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20 Years' Innovation
for a Century of Automation

2003 - 2023

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INOVANCE

20 Years' Innovation for a Century of Automation
2003 - 2023

SV680 Series Flagship Servo Drive (Global Version)

Born for high-end markets

Industrial Automation · Intelligent Elevator · New energy vehicle · Industrial Robot · Rail Transit

FORWARD,ALWAYS PROGRESSING

20

20 Years' Innovation for a Centry of Automation

2003 / 2023

67 offices in China

400 authorized distributors

1020 service centers

6 inventory centers

2500+ sales and service staff

About us

Shenzhen Inovance Technology Co., Ltd. (stock code: SZ.300124) was founded in 2003 and has a current stock market value of about RMB 160 billion. Inovance is the key force in developing industrial automation and drive technologies in China and a provider of optical-mechatronics-hydraulic-pneumatic integrated solutions covering drive, control, motor, and precision machineries.

Inovance achieved an annual revenue of RMB 17.943 billion and an operating profit of RMB 3.573 billon in 2021, which grew by 56% and 70% respectively on a YoY basis. Headquartered in Shenzhen, Inovance has established multiple production bases in Suzhou, Changzhou, Yueyang, and Nanjing, as well as subsidiaries, resident offices, and service centers in over 20 countries and regions worldwide. As of 2021, Inovance has obtained 2,186 patents and software copyrights. Through continuous investment in R&D, Inovance has enhanced its technical strength in such fields as motor and drive control, industrial control software, electric drive assembly for new energy vehicles, digitalization, and industrial robots.

Inovance is dedicated to the development of core technologies in motor drive and control, power electronics, and industrial Internet communication, with business covering industrial automation, elevator electrical accessories, new energy vehicles, industrial robots, and rail transit. Inovance aims to provide integrated solutions and industry-tailored products based on various industry needs, creating continuous values for customers.

The core technologies of Inovance not only covers the information layer, control layer, drive layer, execution layer, and perception layer, but also covers such fields as industrial automation, elevator, new energy vehicle, and trail transit, including:

① high performance vector control technology, servo control technology, and high-power IGCT drive technology in the drive layer;

② small- to large-scale PLC technology, CNC control technology, robot control technology, and high-speed bus technology in the control layer;

③ high-performance servo motor technology, high-efficiency motor technology, high-speed motor and magnetic levitation bearing technology, high-precision encoder design and process technology, precision transmission machine design and process technology, and image recognition technology in the execution layer;

④ industrial Internet, edge computing, industrial AI technology in the information layer; and

⑤ process technologies in industries including new energy vehicle, elevator, air conditioner, air compressor, 3C manufacturing, lithium battery, silicon, crane, injection molding machine, textile, metal product, printing, and packaging.

Inovance has been listed into "CCTV Top 10 Socially Responsible Corporate in Top 50 Listed Companies in China" in 2017, "National Enterprise Technology Center" in 2021, "First Batch of Postdoctoral Workstation in Shenzhen", "Top 100 Innovative Enterprises in Jiangsu", "First Batch of Key R&D Projects in Intelligent Robot in China", and "New Energy Vehicle Power Assembly Engineering Center in Jiangsu".

(The preceding data are as of 2023.)

SV680 Series Flagship Servo Drive (Global Version)

Born for high-end markets

Contents

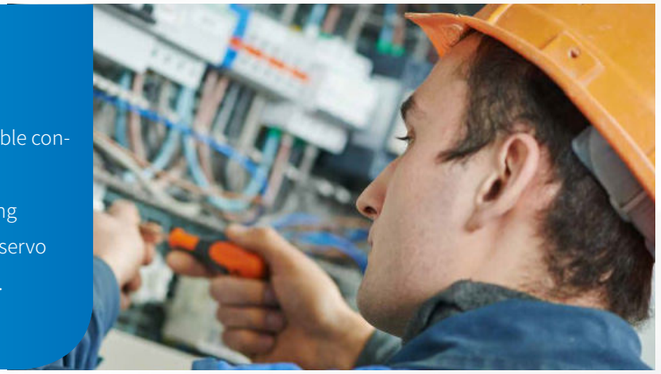
Market Pain Points in Servo Control

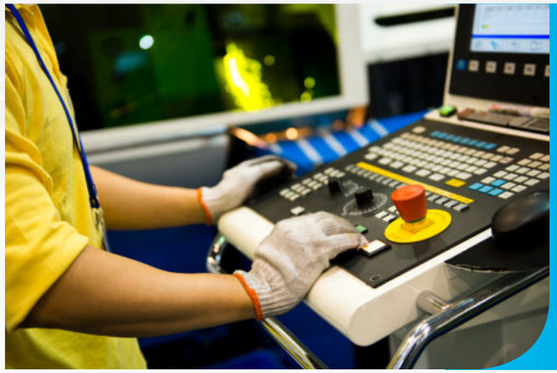
Challenges in high speed and high precision control

High-end manufacturing requires high production efficiency and machining precision. The servo system therefore must be optimized continuously towards high speed, high precision, and high stability.

Challenges in device safety

Safety accidents caused by device faults or unstable control occur occasionally due to insufficient safety functions and safety levels. Meanwhile, the surging needs for reduction in maintenance cost require servo manufacturers to enhance the product reliability.





Challenges in commissioning

Commissioning a servo drive is no easy task and usually consumes a large amount of hours. This is especially true when it comes to commissioning multiple servo drives.

SV680-based Axis-to-Network Ecology

Industry Solutions

Intelligent elevator | Intelligent air compressor | Intelligent energy | Intelligent textile | Intelligent packaging | ...

RESTful API

Inovance Industrial IoT platform

Industrial IoT | Intelligent data | Application development | Management & Maintenance | Operation service

OPC UA | MQTT | WebService | TCP/IP | ODBC

Edge layer

Edge integrated machine

Edge controller

Edge gateway

IoT display

Intelligent video

Control layer

H3U-2416MR-XA

H3U/S-2416MR-XP

H5U

AM400

AM600

AC801

AC802

AC810

AC812

Motion control board card

IT7000

Commissioning device

Drive layer

EtherCAT | CANopen | CANlink | Modbus | PROFINET

SV680 standard model

SV680 functional safety model

SV670

SV660

SV660ND

STD60N

Execution/Perception layer

MS1 general low-power servo motors

LMC linear modules

ISMT1&MP1 precision direct drive torque motors

MHS stepper servo motors

8 safety guarantees

Comprehensive function upgrade

Easy connection & Easy commissioning

Excellent quality

Digitalized intelligent control

7 Highlights

Outstanding performance

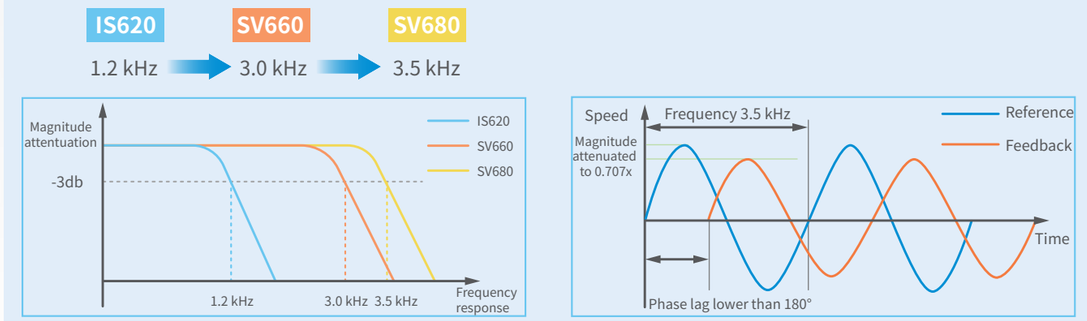
New V6 battery-less absolute encoder

7 Highlights

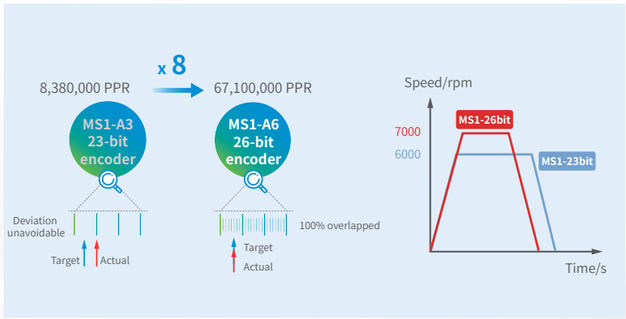
1 Outstanding performance

Industry-leading algorithm

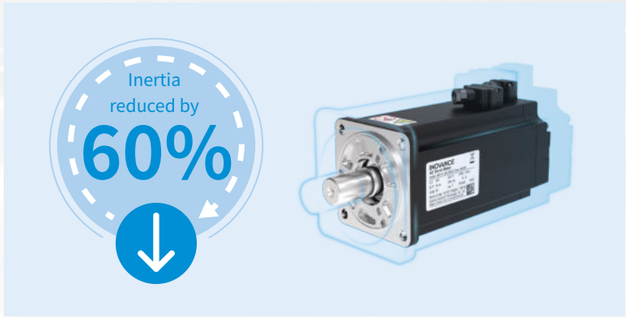
- 625 kHz current loop control algorithm to deliver smooth and accurate command planning
- Speed loop bandwidth frequency improved to 3.5 kHz to ensure high responsiveness



High-speed and high-precision motor

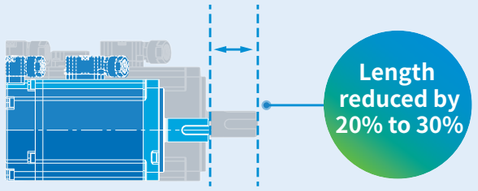


- **Targeting at applications requiring high speed and high precision**
  Encoder resolution improved from 23-bit to 26-bit and max. speed increased from 6000 rpm to 7000 rpm



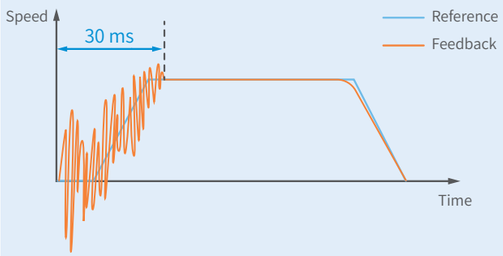
- **Ultra-low inertia motor**
  Over 60% reduction in inertia to fit motion control applications featuring high cycle, low temperature rise, and light load, such as high-cycle bonding arms

Energy-efficient and space-saving



- Motors equipped with 26-bit encoder to comply with GB30253 (Minimum allowable values of energy efficiency and energy efficiency grades for permanent magnet synchronous motors)-Grade 1
- 20% to 30% reduction in motor length to save footprint; dimensions of SV680 kept the same as SV660

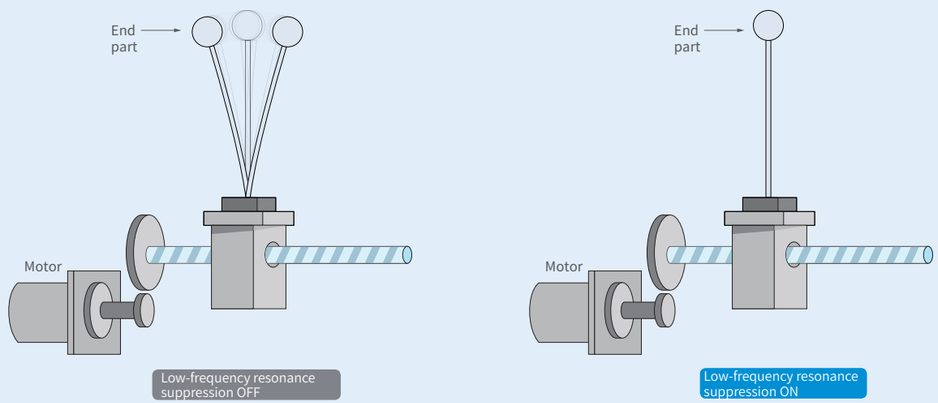
Resonance suppression in 30 ms



- Resonance suppression achieved within 30 ms to better protect the equipment

Stable operation of flexible load

- Shorter setting time needed for vibration lower than 100 Hz, allowing stable operation of flexible equipment



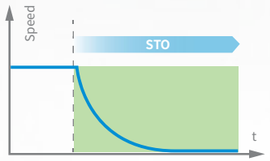
2 Excellent quality

Complete certifications

CE · cULus LISTED E467465 IND.CONT.EQ. · TÜVRheinland CERTIFIED · UKCA · KC · EAC

3 8 safety guarantees

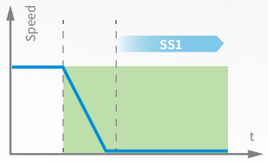
8 safety functions according to IEC61508 SIL3



STO

STO (Safe Torque Off)

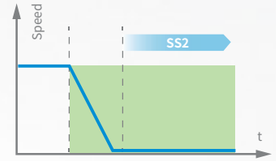
Disconnects the motor power supply to stop the motor.



SS1

Safe Stop 1

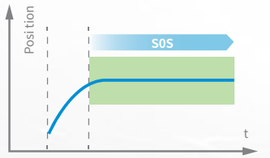
Allows the motor to enter STO state after the motor decelerates to stop.



SS2

Safe Stop 2

Allows the motor to enter SOS state after the motor decelerates to stop.



SOS

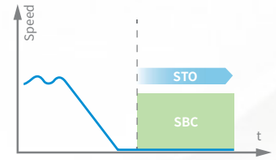
Safe Operating Stop

Provides power supply continuously after the motor stops to make the motor stay at current position.

SSM

Safe Speed Monitor

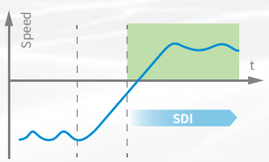
Outputs a safety signal to indicate whether the motor speed is lower than specific limit value.



SBC

Safe Brake Control

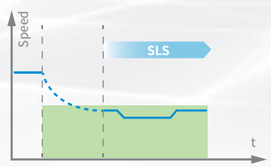
Controls the brake safely. SBC is activated together with STO.



SDI

Safe Direction

Prevents the motor from rotating in undesignated direction.



SLS

Safely-limited Speed

Keeps the motor speed lower than the designated speed.

FSoE to enhance safety of industrial network

FSoE (FailSafe Over EtherCAT), a safe bus protocol developed based on EtherCAT communication protocol, supports SIL3-based (highest level of safety in industrial control products) applications.

Features of FSoE

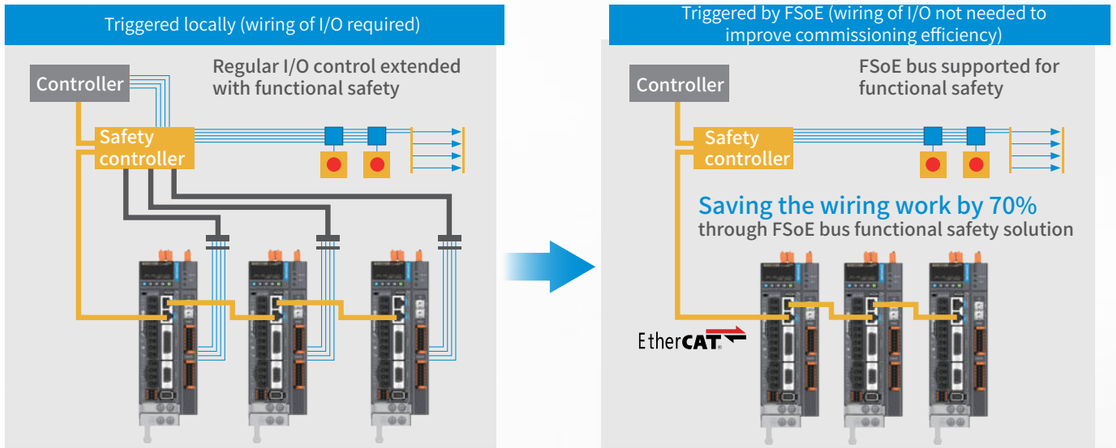
Monitoring on safety data

1. Monitors and checks safety data in EtherCAT process data to reduce safety data error rate.
2.Detects and alarms safety data frame errors before triggering safety state (such as STO).

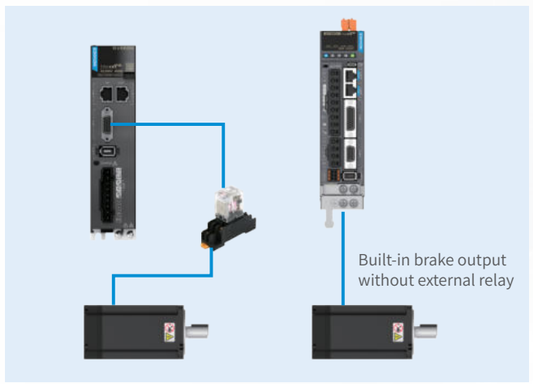
Safety over EtherCAT®

Simplified wiring process

The drive triggers safety functions such as STO/SLS in the following ways:



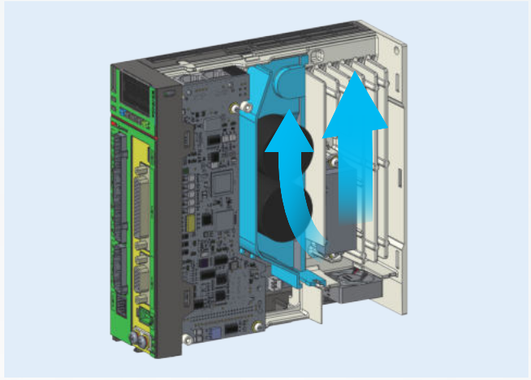
Safe and efficient built-in brake output



Features of built-in brake output

- Improving the safety of the motor with brake
- Reducing the wiring hours to improve commissioning efficiency
- Reducing brake output delay to improve the accuracy of the position where the load stops

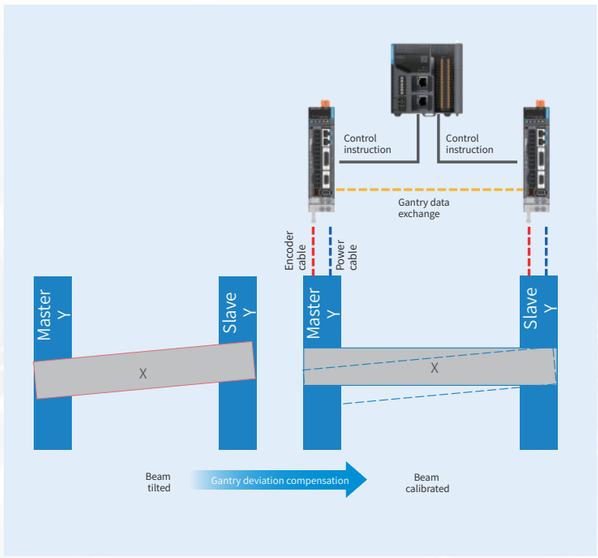
Independent air duct



- Adding a new plastic air duct for heating elements such as capacitors
- Adopting maze design to allow independent air duct, preventing dust and unwanted objects from falling into the control circuit.

4 Comprehensive function upgrade

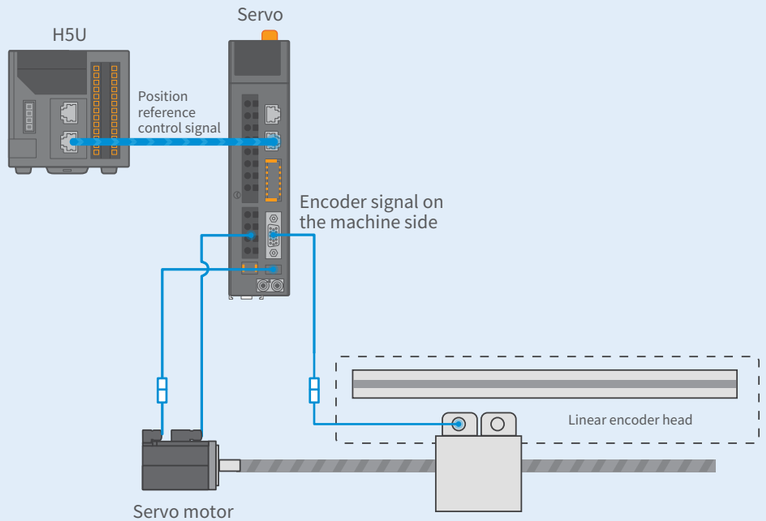
Gantry synchronization



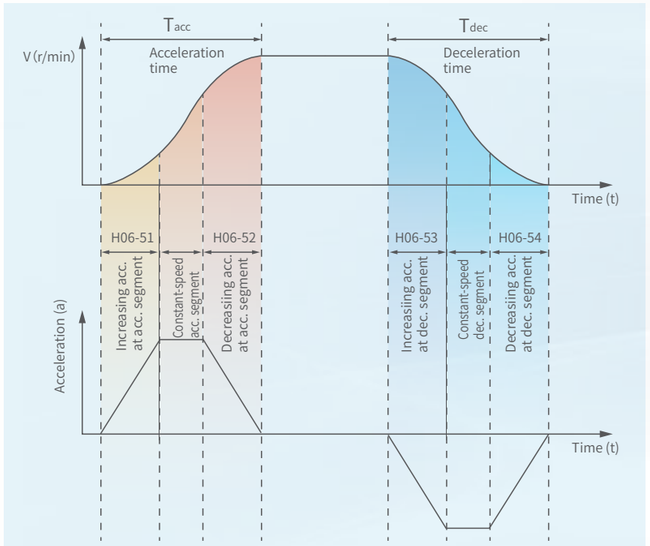
- Gantry synchronization is supported both by the pulse-type and bus-type drives. (Rotary motor and linear motor gantry functions supported simultaneously)
- The position error between two axes can be reduced to 1/5000 revolution for a span of 1.2 m.
- Multiple gantry alignment modes are available, including: Enable alignment, active homing alignment, and DI alignment

Bus-type encoders supported

Five types of 2nd encoders are supported, including ABZ incremental encoders, Inovance bus-type encoders, BiSS-C encoders, SSI encoders, and EnDat 2.2 encoders. Data retention upon power-off can be achieved with an absolute linear encoder.



S-shaped speed curve for smooth acceleration/deceleration



The SV680 series servo drive is supports S-shaped speed curves, allowing users to smoothen the acceleration/deceleration process through controlling the change rate of acceleration/deceleration, without the need for prolonging the motion time. (This function is available in speed control mode only.)

New process segment for flexible motion control

The process segment (PR) mode is a multi-function position mode integrated with homing, constant speed control, and positioning control.
Pulse-type SV680 series drives support 16 process segments, in which the segment 0 is the homing mode and segments 1 to 15 are defined by users. The interval time and linkage mode among process segments can also be selected as needed.

5 Easy connection & easy commissioning

Easy commissioning

STune:

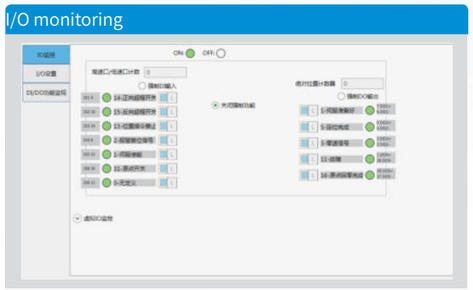
In STune (single tune) mode, automatic inertia tuning, gain tuning, and resonance suppression can be achieved at a time through H09-01 (Stiffness level).

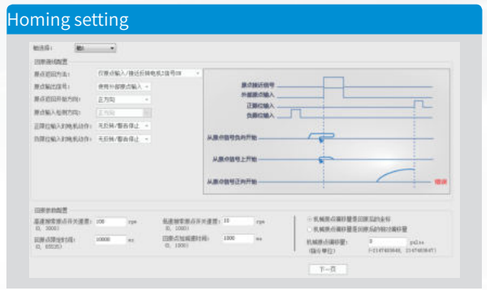
ETune:

ETune is a wizard-style function that guides users to set curve trajectories and response parameters. After the curve trajectories and response parameters are set, the drive performs auto-tuning automatically to generate the optimal gain parameters. The auto-tuned parameters can be saved and exported as a recipe for use in other devices of the same model.

Wizard-style software tool

- New InoDriverShop to simplify commissioning
- New software tools to improve usability through wizard-style instructions and graphic parameter configurations, allowing the commissioning work to be done even by starters

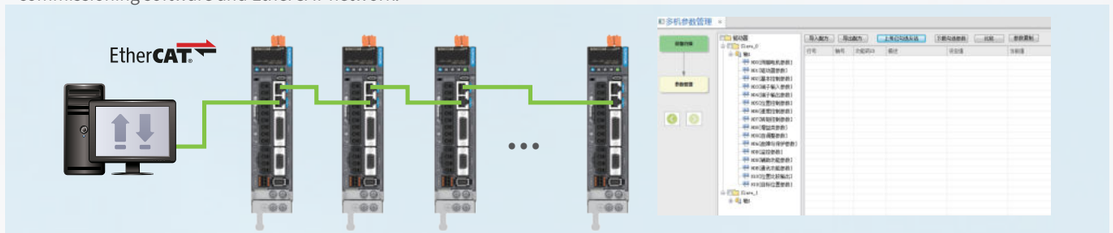




6 Digitalized intelligent control

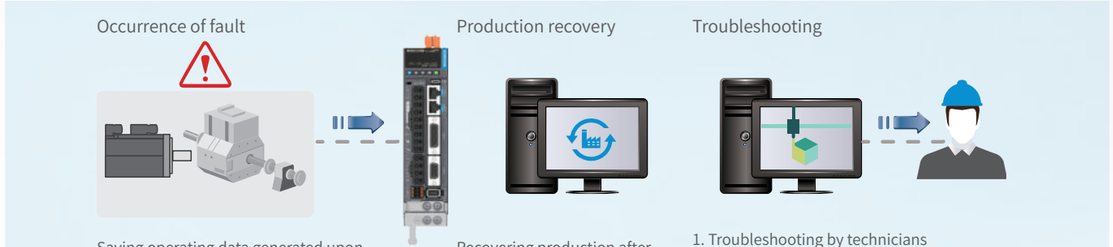
Multi-drive parameter management - Efficient read-write

- For drives (EtherCAT bus-type) connected to the same equipment, all the parameters can be uploaded/downloaded at once through the commissioning software and EtherCAT network.



Black box - Fault monitoring

- Information of all the channels can be read through a click, delivering comprehensive fault records.



7 New V6 Battery-less absolute encoder

Easy maintenance, easy wiring, and high transportability

- Reducing the maintenance cost through removing the need for battery replacement and battery inventory management
- Simplifying the wiring work through removing the need for wiring battery wires
- Easy air transport and maritime transport owing to elimination of lithium metal batteries

Naming Rules and Dimensions

Naming Rules of the Servo Drive

SV680 P S 2R8 I - GINT
① ② ③ ④ ⑤ ⑥

① Product series
SV680: SV680 series

② Product type
N: EtherCAT communication type
P: Pulse type + CANopen communication type

③ Voltage class
S: 200 V to 240 V
T: 380 V to 480 V

④ Rated output current

200 V to 240 V	T: 380 V to 480 V
1R6: 1.6 A	3R5: 3.5 A
2R8: 2.8 A	5R4: 5.4 A
5R5: 5.5 A	8R4: 8.4 A
7R6: 7.6 A	012: 12.0 A
012: 12.0 A	017: 17.0 A
018: 18.0 A	021: 21.0 A
022: 22.0 A	026: 26.0 A
027: 27.0 A	

⑤ Model configuration
I: Standard type
S: Functional safety type [1]

⑥ Model configuration
GINT: General-purpose global version
PINT: Backup power supply type (global version)

[1] SV680XXXXXS-GINT supports backup power supply function by default.

Naming Rules of the Motor

MS1 H1- 75B 30C B - A6 3 2 R - INT
① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

① MS1 series servo motor

② Inertia, capacity
H1: low inertia, small capacity
H2: low inertia, medium capacity
H3: medium inertia, medium capacity
H4: medium inertia, small capacity

③ Rated power (W)
One letter and two digits
B: x 10
C: x 100
Example: 75B: 750 W

④ Rated speed (rpm)
One letter and two digits
B: x 10
C: x 100
Example: 30C: 3,000 rpm

⑤ Voltage class (V)
B: 220
D: 380

⑥ Encoder type
One letter and one digit
A6: 26-bit multi-turn absolute encoder
S6: Functional safety type 26-bit multi-turn absolute encoder
V6: Battery-less 26-bit multi-turn absolute encoder

⑦ Shaft connection mode
3: Solid and keyed shaft, with tapped hole in the center

⑧ Brake, reducer and oil seal [1]
0: Without oil seal or brake
1: With oil seal but no brake
2: With brake but no oil seal
4: With oil seal and brake

⑨ Sub-series No.
R: R series
Z: Z series

⑩ Model type
INT: Global version

[1] The oil seal is included in the standard configuration of all motor models, except 40-flange H1 models.
[2] 40-flange motors do not support battery-less V6 encoder.

Specifications of SV680

Single-phase 220 V drives

Item	Size A		Size C		Size D
Servo drive model	S1R6	S2R8	S5R5	S7R6	S012
Continuous output current (Arms)	1.6	2.8	5.5	7.6	12.0
Maximum output current (Arms)	5.8	10.1	16.9	23.0	32.0
Main circuit power supply	Single-phase 200 VAC to 240 VAC, -10% to +10%, 50Hz/60Hz				
Control circuit power supply	Single-phase 200 VAC to 240 VAC, -10% to +10%, 50Hz/60Hz				
Power input range of backup power supply circuit (for control circuit)	24 VDC, -15% to +15% (This power supply is only applicable to -PINT models with backup power supply.)				
Braking resistor	All models support built-in and external braking resistors. Only drives in size A do not come with a built-in braking resistor as standard.				

Three-phase 220 V drives

Item	Size A		Size C		Size D	Size E		
Servo drive model	S1R6	S2R8	S5R5	S7R6	S012	S018	S022	S027
Continuous output current (Arms)	1.6	2.8	5.5	7.6	12.0	18.0	22.0	27.0
Maximum output current (Arms)	5.8	10.1	16.9	23.0	32.0	45.0	55.0	67.5
Main circuit power supply	Three-phase 200 VAC to 240 VAC, -10% to +10%, 50 Hz/60 Hz							
Control circuit power supply	Single-phase 200 VAC to 240 VAC, -10% to +10%, 50 Hz/60 Hz							
Power input range of backup power supply circuit (for control circuit)	24 VDC, -15% to +15% (This power supply is only applicable to -PINT models with backup power supply.)							
Braking resistor	All models support built-in and external braking resistors. Only drives in size A do not come with a built-in braking resistor as standard.							

Three-phase 400 V drives

Item	Size C		Size D		Size E		
Servo drive model	T3R5	T5R4	T8R4	T012	T017	T021	T026
Continuous output current (Arms)	3.5	5.4	8.4	12.0	17.0	21.0	26.0
Maximum output current (Arms)	11.0	14.0	20.0	30.0	42.5	52.5	65.0
Main circuit power supply	Three-phase 380 VAC to 480 VAC, -10% to +10%, 50 Hz/60 Hz						
Control circuit power supply	Single-phase 380 VAC to 480 VAC, -10% to +10%, 50 Hz/60 Hz						
Power input range of backup power supply circuit (for control circuit)	24 VDC, -15% to +15% (This power supply is only applicable to -PINT models with backup power supply.)						
Braking resistor	All the models support built-in and external braking resistors.						

Specifications of SV680P

General specifications of the servo drive

Item				Description
Basic specifications	Control mode			IGBT SVPWM control, sine wave current drive mode 220 V, 380 V: Single-phase/Three-phase full bridge rectification
	Encoder feedback			Supports Inovance 23-bit/26-bit multi-turn absolute encoders and functional safety encoders (the drive must be of the functional safety type). For other encoder types supported, see the related section in the commissioning guide. Inovance multi-turn absolute encoders can be used as incremental encoders once the battery is removed. The third-party encoders supported include ABZ incremental encoders, BiSS-C encoder, SSI encoders, EnDat2.2 encoders, Nikon encoders, and TAMAGAWA encoders.
	Operating Condition	Ambient/Storage temperature [1]		-5°C to +55° C (Keep the average load rate below 80% for ambient temperatures between 45°C and 55°C .) (non-frozen)/-40°C to +70°C
		Ambient/Storage humidity		Below 90% RH (without condensation)
		Vibration resistance		Operation: ● 5 Hz to 8.4 Hz: 3.5 mm displacement ● 8.4 Hz to 200 Hz: 1 g Product package: ● 5 Hz to 100 Hz: 0.01 g^2/Hz ● 200 Hz: 0.001 g^2/Hz ● Grms=1.14 g
		Impact resistance		19.6 m/s^2
		IP rating		IP20 (Terminals excluded, which comply with IP00)
		Pollution degree		PD2
		Altitude		The maximum altitude is 2000 m. ● For altitudes not higher than 1000 m, derating is not required. ● For altitudes above 1000 m, derate 1% for every additional 100 m. ● For altitudes above 2000 m, contact Inovance.
Speed/ Torque control mode	Perfor-mance	Speed change rate [2]	Load change rate	Below 0.5% at 0% to 100% load (under rated speed)
			Voltage change rate	0.5% at rated voltage ± 10% (under rated speed)
			Temperature change rate	Below 0.5% at 25 ± 25°C (under rated speed)
		Speed control range		1:000 (Under the rated torque load, the servo drive keeps operating as long as the lower limit of the speed control range is not exceeded.)
		Torque control accuracy		±1%
		Soft start time setting		0s to 65s (Acceleration and deceleration can be set separately.)
	Input signal	Speed reference input		Analog input signal; digital input signal; 16 speeds (speed 0 to speed 15) supported in multi-speed operation mode
		CANopen communication mode		PV mode
		Torque reference input		Analog input signal; digital input signal
		CANopen communication mode		PT mode
Position control mode	Perfor-mance	Feedforward compensation		0.0% to 100.0% (resolution: 0.1%)
		Timing window		1 to 65535 in encoder unit
	Input signal	Pulse reference	Input pulse form	Direction+Pulse, Phase A + Phase B quadrature pulse, and CW/CCW pulse supported
			Input form	Differential input and open collector supported
			Input pulse frequency	Differential input: 4 Mpps for single channel and 8 Mpps for quadrature pulse, with pulse width ⩾ 0.125 us Open collector: 200 kpps as the maximum single-channel pulse frequency, with pulse width ⩾ 2.5 us
		Power supply for built-in open collector [3]		+24 V (built-in 2.4 kΩ resistor)
		Multi-position reference selection		Position 0 to position 15 selectable through DI signal combination (Other terminals can be assigned with this function.)
		CANopen communication mode		PP mode/HM mode/IP mode
	Position output	Output form		Phase A, phase B: differential output
				Phase Z: differential output or open collector output
		Frequency division ratio		Any frequency division

Specifications of SV680P

General specifications of the servo drive

Item				Description
Input/ Output signal	DI signal	DI signal function assignment		8 DIs
				DI1 to DI6: Max. digital signal input frequency up to 1 kHz (or lower when current limiting resistance exceeding 2.4 kΩ); DI7 and DI8: DI hardware delay shorter than 1 ms (when current limiting resistance being 2.4 kΩ)
				DI functions: servo enable, alarm reset, gain switching, reference switching, mode switching, zero clamp enable, position reference inhibit, pulse reference inhibit, forward overtravel, reverse overtravel, speed limit, torque limit, forward and reverse jog, step enable, hand wheel switching, electronic gear selection, reference direction setting, home switch, homing enable, current position as home, emergency stop, multi-position, interrupt positioning, position deviation clearing, positioning and command completion signal clearing
	DO signal	DO signal function assignment		5 DOs With-load capacity: 50 mA Voltage range: 5 V to 30 V
				DO functions: servo ready, motor rotation signal, zero speed signal, speed consistent, speed attained, torque attained, positioning completed, positioning proximity, torque limit, speed limit, braking, warning output, fault output, warning or fault output, interrupt positioning completed, homing completed, electrical homing completed, enable completed, comparison output, communication forced output, and EDM output
	AI signal			AI1 voltage input: 16-bit, -10 V to +10 V; max. allowable voltage: ±12 V
				AI2 voltage input: 12-bit, -10 V to +10 V; max. allowable voltage: ±12 V
	AO signal			AO1 voltage output range: -10 V to +10 V
Built-in functions	Overtravel prevention			The servo drive stops immediately when P-OT or N-OT signal is active.
	Electronic gear ratio			0.001 ⩽ B/A ⩽ 26843545.6
	Protective functions			Including protections against overcurrent, overvoltage, undervoltage, overload, main circuit detection error, heatsink overtemperature, power phase loss, overspeed, encoder errors, CPU errors, and parameter errors
	Safety function	Safety function categories		STO (standard)/SS1/SBC/SOS/SS2/SLS/SDI/SSM [4], 24 V backup power supply supported
		Applicable standard		IEC 61800-5-2:2016
	LED display			Main circuit CHARGE indicator, 5-digit LED display
	Vibration suppression			5 notches (including two adaptive notches) available, 50 Hz to 8000 Hz
	Usability functions			One-key parameter tuning, adaptive parameter tuning, intelligent parameter tuning, speed observer, and model tracking
	Commu-nication function	Software tool		Type_C
		Multi-slave communication protocol		ModBus (RS485 interface), CANopen
		Number of axes in multi-slave communication		Up to 32 for RS485 or 127 for CANopen
		Axis address setting		Set through the software (without physical knob)
		Functions		Including status display, user parameter setting, monitored value display, alarm tracking, JOG and auto-tuning, speed/torque reference signal observation, and communication and motion control command setting
	Others			Gain tuning, alarm log, jog

[1] The environment where the drive is installed must be within the specified temperature range. When it is installed inside a control cabinet, the temperature inside the cabinet must also be within this range.

[2] The speed change ratio is defined by the following formula:
Speed change ratio = (No-load speed - Full-load speed)/Rated speed x 100%

The voltage change and temperature change may result in amplifier deviation, which causes the calculated resistance value to change. Such changes is reflected by changes in the speed.

Speed changes caused by the voltage change and the temperature change are indicated respectively by a percentage to the rated speed.

[3] The internal open collector power supply is not electrically insulated from the control circuit in the servo drive.

[4] SSM is supported by S models only. For details, see the safety guide.

Specifications of SV680N

General specifications of the servo drive

Item				Description
Basic specifications	Control mode			IGBT SVPWM control, sine wave current drive mode 220 V, 380 V: Single-phase/Three-phase full bridge rectification
	Encoder feedback			The drive supports Inovance 23-bit/26-bit multi-turn absolute encoders and functional safety encoders (the drive must also be the functional safety type). For other encoder types supported, see section "Commissioning Objects" in the commissioning guide. Inovance multi-turn absolute encoders can be used as incremental encoders once the battery is removed. The third-party encoders supported include ABZ incremental encoders, BiSS-C encoders, SSI encoders, EnDat2.2 encoders, Nikon encoders, and TAMAGAWA encoders.
	Operating Condition	Ambient/Storage temperature [1]		-5°C to +55° C (non-frozen) (Keep the average load rate below 80% for ambient temperatures between 45°C and 55°C .) /-40°C to +70°C
		Ambient/Storage humidity		Below 90% RH (without condensation)
		Vibration resistance		Operation: ● 5 Hz to 8.4 Hz: 3.5 mm displacement ● 8.4 Hz to 200 Hz: 1 g Product package: ● 5 Hz to 100 Hz: 0.01 g^2/Hz ● 200 Hz: 0.001 g^2/Hz ● Grms=1.14 g
		Impact resistance		19.6 m/s^2
		IP rating		IP20 (Terminals excluded, which comply with IP00)
		Pollution degree		PD2
		Altitude		The maximum altitude is 2000 m. ● For altitudes not higher than 1000 m, derating is not required. ● For altitudes above 1000 m, derate 1% for every additional 100 m. ● For altitudes above 2000 m, contact Inovance.
Speed/ Torque Control mode	Performance	Speed change rate [2]	Load change rate	Below 0.5% at 0% to 100% load (under rated speed)
			Voltage change rate	0.5% at rated voltage±10% (under rated speed)
			Temperature change rate	Below 0.5% at 25±25°C (under rated speed)
		Speed control range		1:10000 (Under the rated torque load, the servo drive keeps operating as long as the lower limit of the speed control range is not exceeded.)
		Torque control accuracy		±2%
	Input signal	Speed reference input	EtherCAT communication mode	CSV/PV mode
			Analog setting; digital setting	-
		Torque reference input	EtherCAT communication mode	CST/PT mode
			Analog setting; digital setting	-
Position control mode	Performance	Feedforward compensation		0.0% to 100.0% (resolution: 0.1%)
		Timing window		1 to 65535 in encoder unit
	Input signal	EtherCAT communication mode		CSP mode/PP mode/HM mode
		Output forms		Phase A, phase B: differential output
				Phase Z: differential output or open collector output
	Position output	Frequency division ratio		Any

Specifications of SV680N

General specifications of the servo drive

Item			Description
Input/ Output signal	DI signal	DI signal function assignment	5 DIs DI1 to DI3: regular DIs (rising edge (24 V input from low to high) input delay: 100 us, falling edge (24 V input from high to low) input delay: 50 us, voltage range: 20 V–30 V) DI4 and DI5: fast DI (rising edge (24 V input from low to high) input delay: 30 us, falling edge (24 V input from high to low) input delay: 5 us, voltage range: 20 V–30 V)
			The DI functions are as follows: servo enable, alarm reset, forward overtravel, reverse overtravel, electronic gear selection, home switch, emergency stop, probe
	DO signal	DO signal function assignment	2 DOs With-load capacity: 50 mA Voltage range: 5 V to 30 V
			DO functions: servo ready, motor rotation output, comparison output, brake output, forced communication output, EDM output, fault, and alarm
	AI signal		AI1 voltage-type input: 16-bit, -10 V to +10 V; max. allowable voltage: ±12 V
			AI2 voltage-type input: 12-bit, -10 V to +10 V; max. allowable voltage: ±12 V
	AO signal		AO1 voltage output range: -10 V to +10 V
Built-in functions	Overtravel prevention		The servo drive stops immediately when P-OT or N-OT signal is active.
	Electronic gear ratio		0.001 ⩽ B/A ⩽ 26843545.6
	Protective functions		Including protections against overcurrent, overvoltage, undervoltage, overload, main circuit detection error, heatsink overheat, power phase loss, overspeed, encoder error, CPU error, and parameter error
	Safety functions	Categories	STO (standard)/SS1/SBC/SOS/SS2/SLS/SDI/SSM [3], 24 V backup power supply supported
		Standard compliance	IEC 61800-5-2:2016
	LED display		Main circuit CHARGE indicator, 5-digit LED display
	Vibration suppression		5 notches (including two adaptive notches) available, 50 Hz to 8000 Hz
	Usability functions		One-key parameter tuning, adaptive parameter tuning, intelligent parameter tuning, speed observer, and model tracking
	Communication function	Software tool	Type_C
		Multi-slave communication	EtherCAT, FSoE[3]
		Number of axes in multi-slave communication	Maximum number of slaves: 65535
		Axis address setting	0 to 65535 (set through the software, without physical knob)
		Functions	Including status display, user parameter setting, monitored value display, fault tracing display, JOG and auto-tuning, speed/torque reference signal observation, and communication and motion control command setting
	Others		Gain tuning, alarm log, jog

[1] The environment where the drive is installed must be within the specified temperature range. When it is installed inside a control cabinet, the temperature inside the cabinet must also be within this range.

[2] The speed change ratio is defined by the following formula:
Speed change ratio = (No-load speed - Full-load speed)/Rated speed x 100%

The voltage change and temperature change may result in amplifier deviation, which causes the calculated resistance value to change. Such changes is reflected by the changes in the speed.

Speed changes caused by the voltage change and the temperature change are indicated respectively by a percentage to the rated speed.

[3] SSM is supported by S models only. For details, see the safety guide.

Configuration of Standard Models

Item	Model	Appearance	Servo Drive Model	Applicable motor power	Applicable motor model	
Single-phase 200 V models	Size		SV680*S1R6I-GINT	 50 W 100 W 200 W	MS1H1-05B30CB-A63*R-INT MS1H1-10B30CB-A63*R-INT MS1H1-20B30CB-A63*R-INT MS1H4-05B30CB-A63*R-INT MS1H4-10B30CB-A63*R-INT MS1H4-20B30CB-A63*R–INT	MS1H1-20B30CB-V63*R-INT MS1H4-20B30CB-V63*R -INT
			SV680*S2R8I-GINT	 400 W	MS1H1-40B30CB-A63*R-INT MS1H4-40B30CB-A63*R-INT	MS1H1-40B30CB-V63*R-INT MS1H4-40B30CB-V63*R-INT
	Size C		SV680*S5R5I-GINT	 550 W 750 W	MS1H1-55B30CB-A63*R-INT MS1H1-75B30CB-A63*R-INT MS1H4-55B30CB-A63*R-INT MS1H4-75B30CB-A63*R-INT	MS1H1-55B30CB-V63*R-INT MS1H1-75B30CB-V63*R-INT MS1H4-55B30CB-V63*R-INT MS1H4-75B30CB-V63*R-INT
			SV680*S7R6I-GINT	 850 W 1 kW	MS1H1-10C30CB-A63*R-INT MS1H2-10C30CB-A63*R-INT MS1H3-85B15CB-A63*R-INT MS1H4-10C30CB-A63*R-INT	MS1H1-10C30CB-V63*R-INT MS1H2-10C30CB-V63*R-INT MS1H3-85B15CB-V63*R-INT MS1H4-10C30CB-V63*R-INT
	Size D		SV680*S012I-GINT	 1.3 kW 1.5 kW	MS1H2-15C30CB-A63*R-INT MS1H3-13C15CB-A63*R-INT	MS1H2-15C30CB-V63*R-INT MS1H3-13C15CB-V63*R-INT

Item	Model	Appearance	Servo drive model	Applicable motor power	Applicable motor model	
Three-phase 200 V models	Size		SV680*S1R6I-GINT	 50 W 100 W 200 W	MS1H1-05B30CB-A63*R-INT MS1H1-10B30CB-A63*R-INT MS1H1-20B30CB-A63*R-INT MS1H4-05B30CB-A63*R-INT MS1H4-10B30CB-A63*R-INT MS1H4-20B30CB-A63*R–INT	MS1H1-20B30CB-V63*R-INT MS1H4-20B30CB-V63*R -INT
			SV680*S2R8I-GINT	 400 W	MS1H1-40B30CB-A63*R-INT MS1H4-40B30CB-A63*R-INT	MS1H1-40B30CB-V63*R-INT MS1H4-40B30CB-V63*R-INT
	Size C		SV680*S5R5I-GINT	 550 W 750 W	MS1H1-55B30CB-A63*R-INT MS1H1-75B30CB-A63*R-INT MS1H4-55B30CB-A63*R-INT MS1H4-75B30CB-A63*R-INT	MS1H1-55B30CB-V63*R-INT MS1H1-75B30CB-V63*R-INT MS1H4-55B30CB-V63*R-INT MS1H4-75B30CB-V63*R-INT
			SV680*S7R6I-GINT	 850 W 1 kW	MS1H1-10C30CB-A63*R-INT MS1H2-10C30CB-A63*R-INT MS1H3-85B15CB-A63*R-INT MS1H4-10C30CB-A63*R-INT	MS1H1-10C30CB-V63*R-INT MS1H2-10C30CB-V63*R-INT MS1H3-85B15CB-V63*R-INT MS1H4-10C30CB-V63*R-INT
	Size D		SV680*S012I-GINT	 1.3 kW 1.5 kW	MS1H2-15C30CB-A63*R-INT MS1H3-13C15CB-A63*R-INT	MS1H2-15C30CB-V63*R-INT MS1H3-13C15CB-V63*R-INT
	Size E		SV680*S018I-GINT	 1.8 kW 2 kW	MS1H2-20C30CB-A63*R-INT MS1H3-18C15CB-A63*R-INT	MS1H2-20C30CB-V63*R-INT MS1H3-18C15CB-V63*R-INT
			SV680*S022I-GINT	 2.5 kW 2.9 kW 3 kW	MS1H2-25C30CB-A63*R-INT MS1H2-30C30CB-A63*R-INT MS1H3-29C15CB-A63*R-INT	MS1H2-25C30CB-V63*R-INT MS1H2-30C30CB-V63*R-INT MS1H3-29C15CB-V63*R-INT
			SV680*S027I-GINT	 4 kW 4.4 kW 5 kW	MS1H2-40C30CB-A63*R-INT MS1H2-50C30CB-A63*R-INT MS1H3-44C15CB-A63*R-INT	MS1H2-40C30CB-V63*R-INT MS1H2-50C30CB-V63*R-INT MS1H3-44C15CB-V63*R-INT

Item	Model	Appearance	Servo Drive Model	Applicable motor power	Applicable Motor Model	
Three-phase 400V models	Size C		SV680 x T3R5I-GINT	 850 W 1 kW	MS1H2-10C30CD-A63*R-INT MS1H3-85B15CD-A63*R-INT	MS1H2-10C30CD-V63*R-INT MS1H3-85B15CD-V63*R-INT
			SV680*T5R4I-GINT	 1.3 kW 1.5 kW	MS1H2-15C30CD-A63*R-INT MS1H3-13C15CD-A63*R-INT	MS1H2-15C30CD-V63*R-INT MS1H3-13C15CD-V63*R-INT
	Size D		SV680*S012I-GINT	 1.8 kW 2 kW 2.5 kW	MS1H2-20C30CD-A63*R-INT MS1H2-25C30CD-A63*R-INT MS1H3-18C15CD-A63*R-INT	MS1H2-20C30CD-V63*R-INT MS1H2-25C30CD-V63*R-INT MS1H3-18C15CD-V63*R-INT
			SV680*T012I-GINT	 2.9 kW 3 kW	MS1H2-30C30CD-A63*R-INT MS1H3-29C15CD-A63*R-INT	MS1H2-30C30CD-V63*R-INT MS1H3-29C15CD-V63*R-INT
	Size E		SV680*T017I-GINT	 4 kW 4.4 kW	MS1H2-40C30CD-A63*R -INT MS1H3-44C15CD-A63*R-INT	MS1H2-40C30CD-V63*R -INT MS1H3-44C15CD-V63*R-INT
			SV680*T021I-GINT	 5 kW 5.5 kW	MS1H2-50C30CD-A63*R-INT MS1H3-55C15CD-A63*R-INT	MS1H2-50C30CD-V63*R-INT MS1H3-55C15CD-V63*R-INT
			SV680*T026I-GINT	 7.5 kW	MS1H3-75C15CD-A63*R -INT	MS1H3-75C15CD-V63*R -INT

[1] The expansion functional safety module is not included in standard models.

Configuration of Functional Safety Models

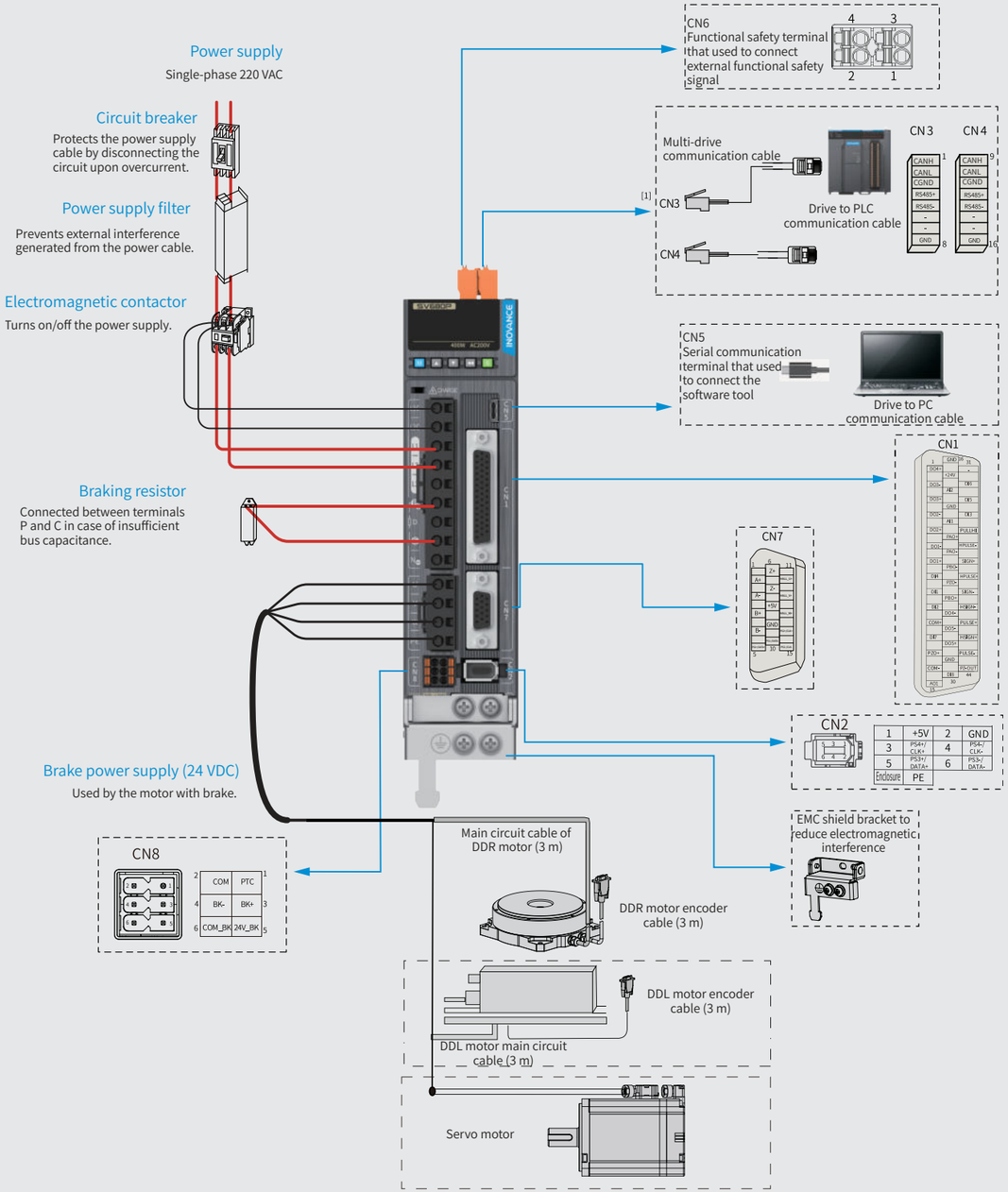
Item	Model	Appearance	Servo drive model	Applicable motor power	Applicable motor model
Single-phase 200 V models	Size A		SV680*S1R6S-PINT	 50 W 100 W 200 W	MS1H1-05B30CB-S63*R-INT MS1H1-10B30CB-S63*R-INT MS1H4-05B30CB-S63*R-INT MS1H4-10B30CB-S63*R-INT MS1H4-20B30CB-S63*R–INT
			SV680*S2R8S-PINT	 400 W	MS1H1-40B30CB-S63*R-INT MS1H4-40B30CB-S63*R-INT
	Size C		SV680*S5R5I-PINT	 550 W 750 W	MS1H1-55B30CB-S63*R-INT MS1H1-75B30CB-S63*R-INT MS1H4-55B30CB-S63*R-INT MS1H4-75B30CB-S63*R-INT
			SV680*S7R6I-PINT	 850 W 1 kW	MS1H1-10C30CB-S63*R-INT MS1H2-10C30CB-S63*R-INT MS1H3-85B15CB-S63*R-INT MS1H4-10C30CB-S63*R-INT
	Size D		SV680*S012I-PINT	 1.3 kW 1.5 kW	MS1H2-15C30CB-S63*R-INT MS1H3-13C15CB-S63*R-INT

Item	Model	Appearance	Servo drive model	Applicable motor power	Applicable motor model
Three-phase 200 V models	Size A		SV680*S1R6S-PINT	 50 W 100 W 200 W	MS1H1-05B30CB-S63*Z-INT MS1H1-10B30CB-S63*Z-INT MS1H1-20B30CB-S63*R-INT MS1H4-10B30CB-S63*Z-INT MS1H4-20B30CB-S63*R -INT
			SV680*S2R8S-PINT	 400 W	MS1H1-40B30CB- S63*R-INT MS1H4-40B30CB-S63*R-INT
	Size C		SV680*S5R5S-PINT	 550 W 750 W	MS1H1-55B30CB- S63*R-INT MS1H1-75B30CB- S63*R-INT MS1H4-55B30CB-S63*R-INT MS1H4-75B30CB-S63*R-INT
			SV680*S7R6S-PINT	 850 W 1 kW	MS1H1-10C30CB- S63*R-INT MS1H2-10C30CB-S63*R-INT MS1H3-85B15CB-S63*R-INT MS1H4-10C30CB-S63*R-INT
	Size D		SV680*S012S-PINT	 1.3 kW 1.5 kW	MS1H2-15C30CB-S63*R-INT MS1H3-13C15CB-S63*R-INT
	Size E		SV680*S018S-PINT	 1.8 kW 2 kW	MS1H2-20C30CB-S63*R-INT MS1H3-18C15CB-S63*R-INT
			SV680*S022S-PINT	 2.5 kW 2.9 kW 3KW	MS1H2-25C30CB-S63*R-INT MS1H2-30C30CB-S63*R-INT MS1H3-29C15CB-S63*R-INT
			SV680*S027S-PINT	 4 kW 4.4 kW 5 kW	MS1H2-40C30CB-S63*R-INT MS1H2-50C30CB-S63*R-INT MS1H3-44C15CB-S63*R-INT

Item	Model	Appearance	Servo drive model	Applicable motor power	Applicable motor model
Three-phase 400 V models	Size C		SV680*T3R5S-PINT	 850 W 1 kW	MS1H2-10C30CD-S63*R-INT MS1H3-85B15CD-S63*R-INT
			SV680*T5R4S-PINT	 1.3 kW 1.5 kW	MS1H2-15C30CD-S63*R-INT MS1H3-13C15CD-S63*R-INT
	Size D		SV680*T8R4S-PINT	 1.8 kW 2 kW 2.5 kW	MS1H2-20C30CD-S63*R-INT MS1H2-25C30CD-S63*R-INT MS1H3-18C15CD-S63*R-INT
			SV680*T012S-PINT	 2.9 kW 3 kW	MS1H2-30C30CD-S63*R-INT MS1H3-29C15CD-S63*R-INT
	Size E		SV680*T017S-PINT	 4 kW 4.4 kW	MS1H2-40C30CD-S63*R -INT MS1H3-44C15CD-S63*R-INT
			SV680*T021S-PINT	 5 kW 5.5 kW	MS1H2-50C30CD-S63*R-INT MS1H3-55C15CD-S63*R-INT
			SV680*T026S-PINT	 7.5 kW	MS1H3-75C15CD-S63*R -INT

Wiring and Terminal Assignment of SV680P

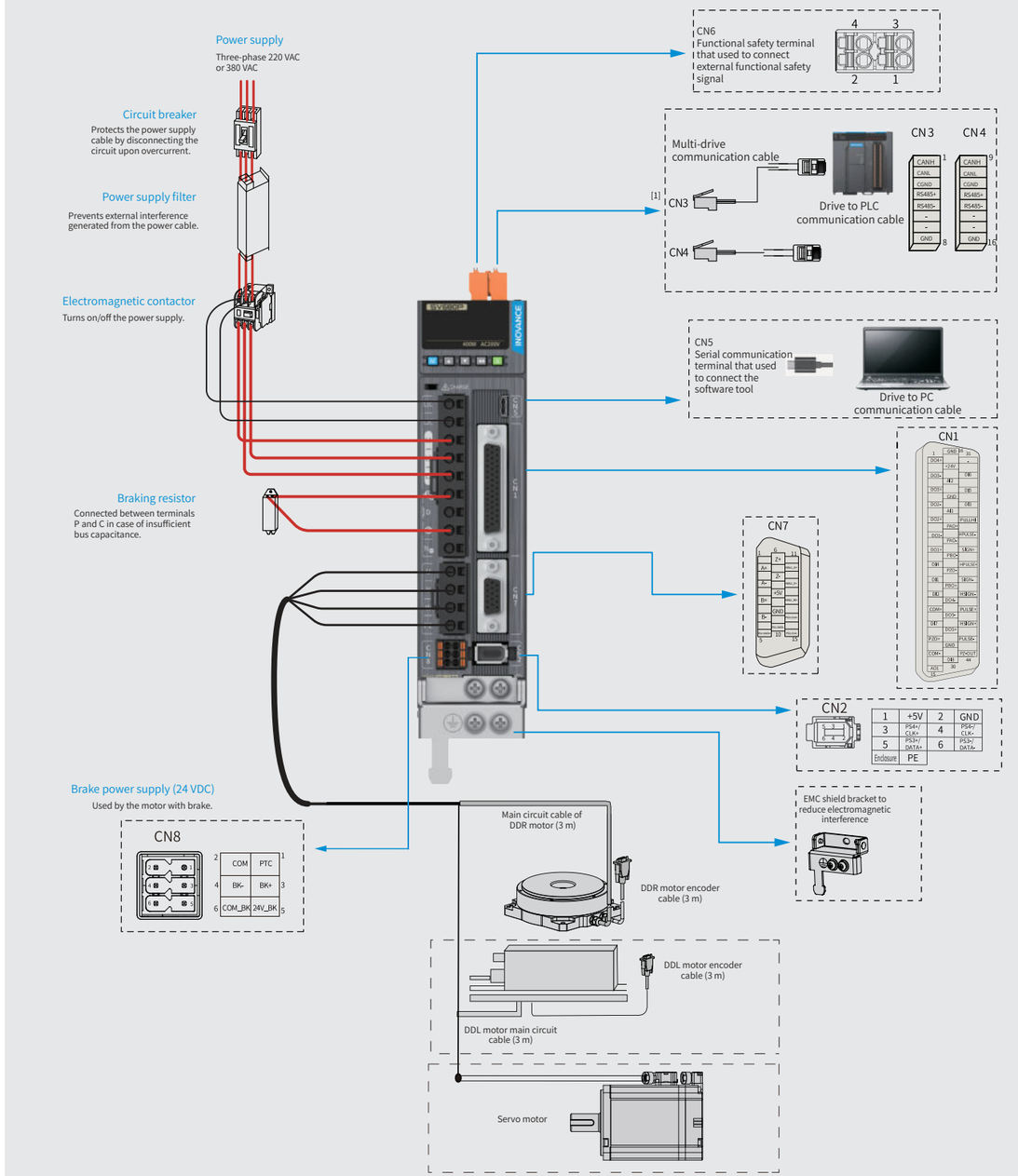
Connection between SV680P and peripherals (single-phase 220 V)



Note: For more information about direct drive motors, see brochure *Direct Drive Motor Stages and Drives*.

Wiring and Terminal Assignment of SV680P

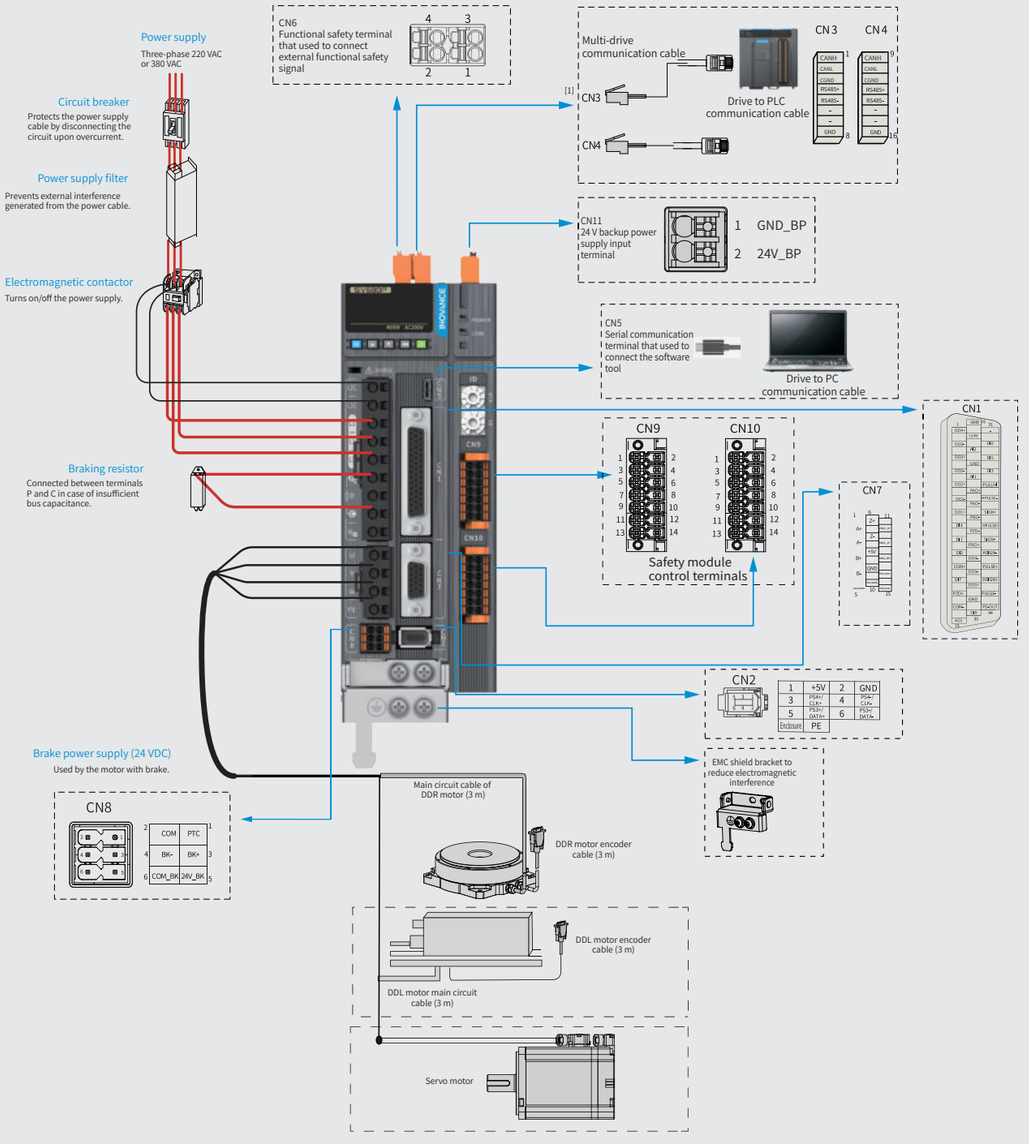
Connection between SV680P and peripherals (three-phase 220 V or 380 V)



Note: For more information about direct drive motors, see brochure *Direct Drive Motor Stages and Drives*.

Wiring and Terminal Assignment of SV680P

Connection between SV680P and peripherals (three-phase 220 V or 380 V)



Note: For more information about direct drive motors, see brochure *Direct Drive Motor Stages and Drives*.

Terminal Assignment of Standard SV680P

STO safety terminal (CN6)

Pin No.	Assignment	Description
1	COM-	STO reference ground
2	24V	Internal 24V power supply
3	STO1	Control input for STO1
4	STO2	Control input for STO2

CN3 & CN4 (comm. terminals)

Pin No.	Assign-ment	Description	Pin No.	Assign-ment	Description
1 and 9	CANH	CAN communication port	6 and 14	-	-
2 and 10	CANL		7 and 15	-	-
3 and 11	CGND	CAN communication GND	8 and 16	GND	Grounding
4 and 12	RS485+	RS485 communica-tion port	Enclosure	PE	Shield
5 and 13	RS485-				

Comm. terminal CN5

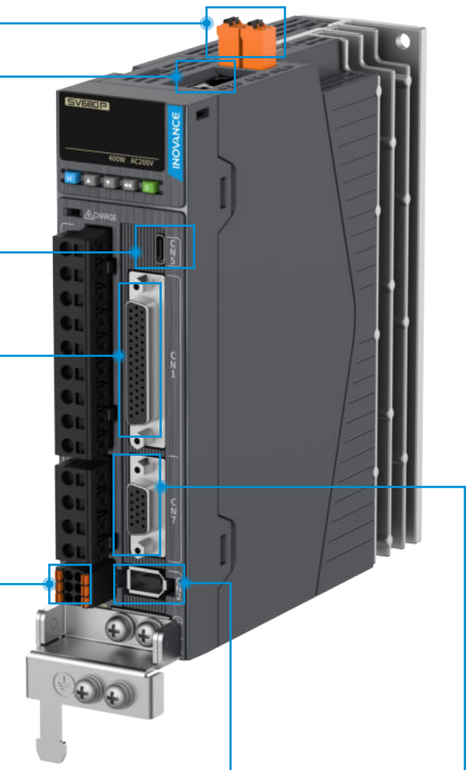
Pin No.	Assign-ment	Description	Pin No.	Assign-ment	Description
A1 B1	GND	Ground	A7 B7	DN	Differential data transmission
A4 B4	VBUS	USB power supply	A8 B8	-	-
A5 B5	-	-	A9 B9	VBUS	USB power supply
A6 B6	DP	Differential data transmission	A12 B12	GND	Ground

Control signal terminal CN1

Signal Name		Default Func-tion	Pin No.	Terminal Function
General	DI1	P-OT	9	Positive limit switch
	DI2	N-OT	10	Negative limit switch
	DI3	INHIBIT	34	Position reference inhibited
	DI4	ALM-RST	8	Alarm reset (edge-triggered)
	DI5	S-ON	33	Servo ON
	DI6	-	32	-
	DI7	XintFree	12	Interrupt positioning selection
	DI8	HomeSwitch	30	Home switch
	+24V		17	Internal 24 V power supply; voltage range: 20 V to 30 V; maximum output current: 150 mA
	COM-		14	
	COM+		11	Common terminal of DI terminals
	DO1+	S-RDY+	7	Ready to switch on
	DO1-	S-RDY-	6	
	DO2+	COIN+	5	Positioning completed
	DO2-	COIN-	4	
	DO3+	-	3	-
	DO3-	-	2	
	DO4+	ALM+	1	Fault output
	DO4-	ALM-	26	
	DO5+	HomeAttain+	28	Homing completed
	DO5-	HomeAttain–	27	

Brake and PTC input terminal CN8

Pin No.	Assignment	Description
1	PTC	Motor temperature feedback input
2	COM-	Onboard 24VCOM
3	BK+	Brake+
4	BK-	Brake–
5	24V_BK	External power supply for the brake
6	COM_BK	Brake 24VCOM



Encoder Terminal CN2

Pin No.	Assignment	Description
1	5V	5 V power supply
2	GND	5 V power supply GND
3	PS4+/CLK+	1. PS± signal of second encoder 2. CLK± signal of bus-type encoder
4	PS4-/CLK-	
5	PS3+/DATA+	1. PS± signal of first encoder 2. DATA± signal of bus-type encoder 3. Gantry synchronization signal
6	PS3-/DATA-	
Enclosure	PE	Shield

Encoder terminal CN7

Pin No.	Assign-ment	Description	Pin No.	Assignment	Description
1	A+	Encoder pulse phase A ±	9	GND	Power supply reference GND
2	A–		10	PS1-/DATA-	1. PS- signal of first encoder 2. DATA- signal of bus-type encoder 3. Gantry synchronization signal
3	B+	Encoder pulse phase B ±	11	HALL_U+	Hall signal U
4	B–		12	HALL_V+	Hall signal V
5	PS1+/DATA+	1. PS+ signal of first encoder 2. DATA+ signal of bus-type encoder 3. Gantry synchronization signal	13	HALL_W+	Hall signal W
6	Z+	Encoder pulse phase Z ±	14	PS2+/CLK	1. PS+ signal of second encoder 2. CLK+ signal of bus-type encoder
7	Z-		15	PS2-/CLK-	
8	+5V	Encoder 5 V power supply (load current lower than 200 mA)	Enclo-sure	PE	Shield

Terminal Assignment of Functional Safety SV680P

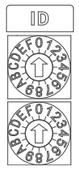
STO safety terminal CN6

Pin No.	Assign-ment	Description
1	COM-	STO reference GND
2	24V	Internal 24 V power supply
3	STO1	Control input of STO1
4	STO2	Control input of STO2

Power indicator of the safety module

Power: When the safety module is connected and the power supply is normal, the indicator is on.
LINK: Indicates the safety communication status.
Note: This indicator does not apply to P models because P models do not support FSoE function.

FSoE ID address setting knob



Sets ID address of the slave drive for FSoE communication.
Address setting method: Digits on the upper knob x 16 + Digits on the lower knob.

Expansion safety function terminal CN9

Pin No.	Assignment	Description	Pin No.	Assign-ment	Description
1	DO3-	Regular DO3 output (-)	8	DI5A_IN	Safety DI5A input
2	DO3+	Common DO3 output (+)	9	DI4A_IN	Safety DI4A input
3	DO2	Safety DO2 output	10	DI3A_IN	Safety DI3A input
4	DO1	Safety DO1 output	11	DI2A_IN	Safety DI2A input
5	DO24VA	24 V power supply of DO1 and DO2	12	DI1A_IN	Safety DI1A input
6	DO0VA	DO1/DO2 reference GND	13	PE	Grounding terminal
7	COM	DIA reference ground	14	-	-

Expansion safety function terminal CN10

Pin No.	Assignment	Description	Pin No.	Assign-ment	Description
1	DO6-	Regular DO6 output (-)	8	DI5A_IN	Safety DI5A input
2	DO6+	Common DO6 output (+)	9	DI4A_IN	Safety DI4A input
3	DO5	Safety DO5 output	10	DI3A_IN	Safety DI3A input
4	DO4	Safety DO4 output	11	DI2A_IN	Safety DI2A input
5	DO24VA	24 V power supply of DO4 and DO5	12	DI1A_IN	Safety DI5A input
6	DO0VA	DO4 and DO5 reference ground	13	PE	Grounding terminal
7	COM	DIB reference ground	14	-	-

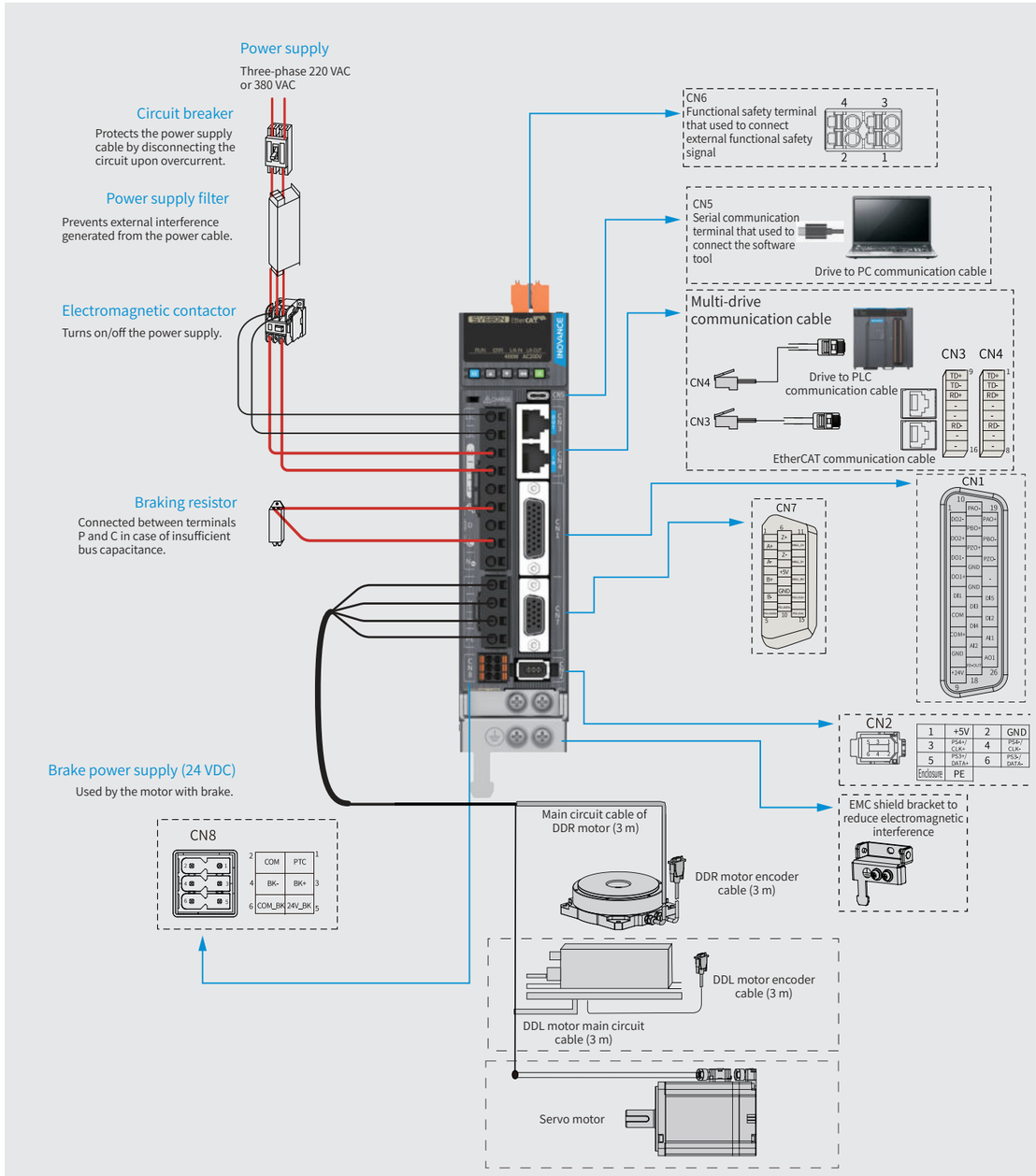
Backup 24 V terminal CN11

When power failure occurs on the main circuit, 24V_BP provides power supply for the control circuit of the drive, keeping the control logic of the drive active.

Pin No.	Assignment	Description
1	GND_BP	0 V input of backup power supply
2	24V_BP	24 V input of backup power supply

Wiring and Terminal Assignment of SV680N

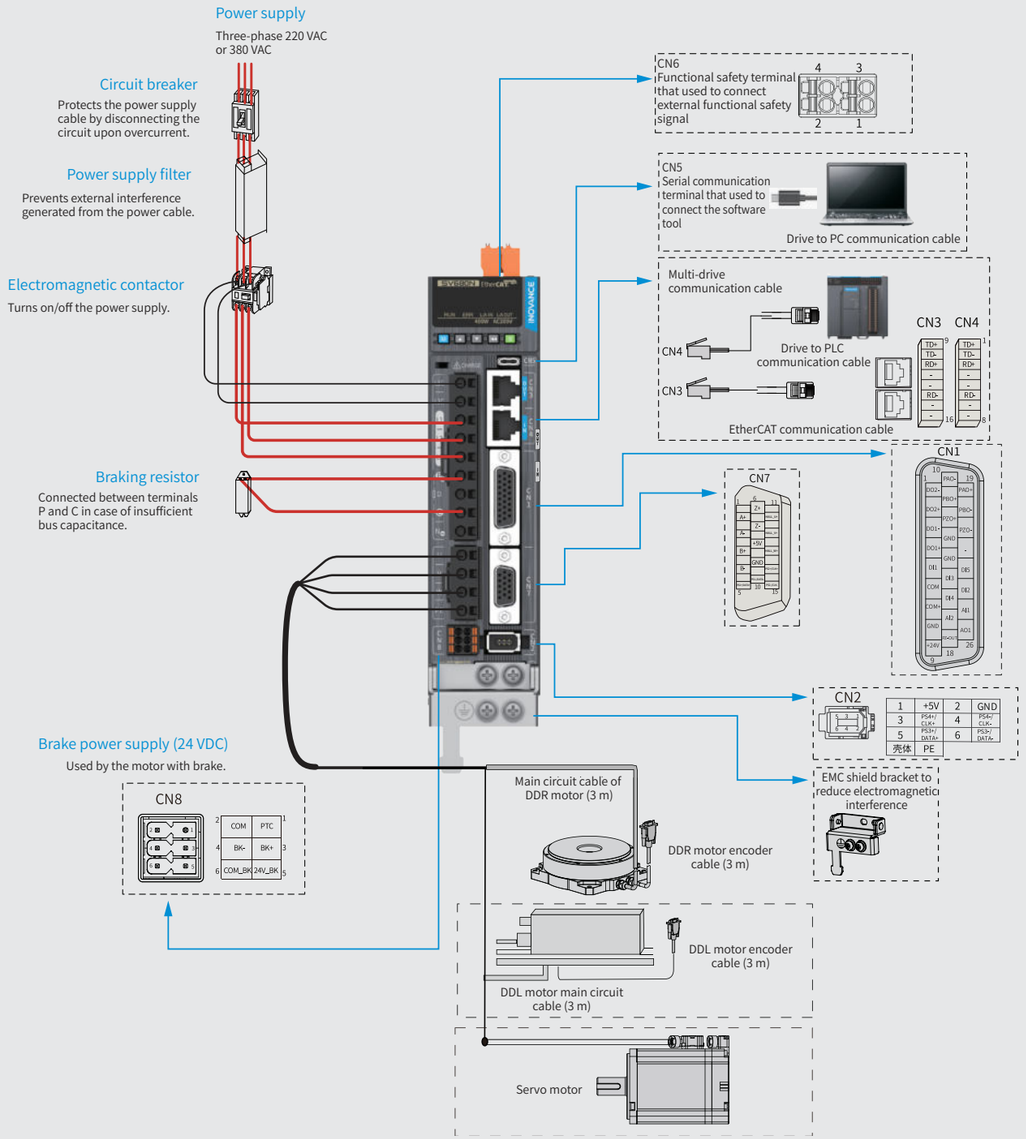
Connection between SV680N and peripherals (single-phase 220 V)



Note: For more information about direct drive motors, see brochure *Direct Drive Motor Stages and Drives*.

Wiring and Terminal Assignment of SV680N

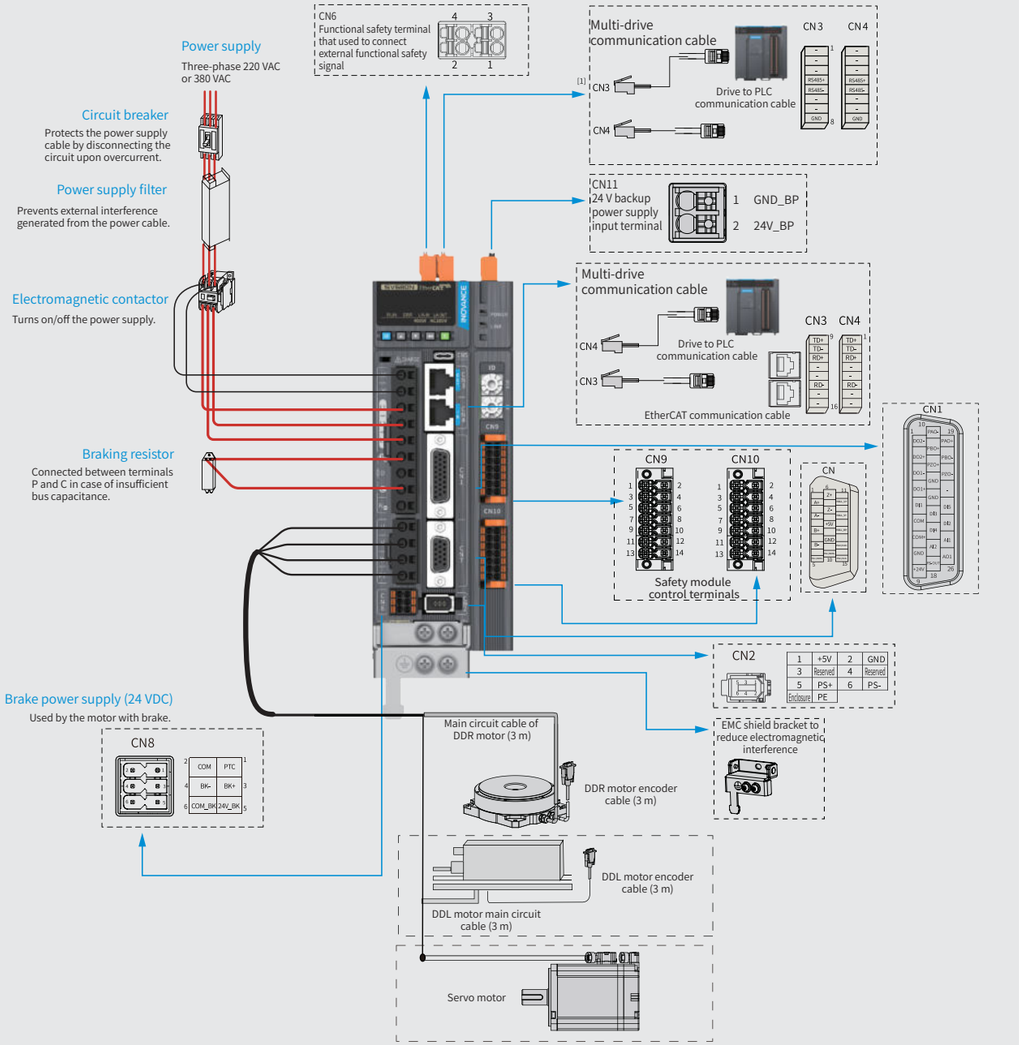
Connection between SV680N and peripherals (three-phase 220 V or 380 V)



Note: For more information about direct drive motors, see brochure *Direct Drive Motor Stages and Drives*.

Wiring and Terminal Assignment of SV680N

Connection between SV680N and peripherals (three-phase 220 V or 380 V)



Note: For more information about direct drive motors, see brochure *Direct Drive Motor Stages and Drives*.

Terminal Assignment of Standard SV680N

STO safety terminal CN6

Pin No.	Assignment	Description
1	COM-	STO reference GND
2	24V	Internal 24 V power supply
3	STO1	Control input of STO1
4	STO2	Control input of STO2

Servo commissioning terminal CN5

Pin No.	Assign-ment	Description	Pin No.	Assign-ment	Description
A1 B1	GND	Ground	A7 B7	DN	Differential data transmission
A4 B4	VBUS	USB power supply	A8 B8	-	-
A5 B5	-	-	A9 B9	VBUS	USB power supply
A6 B6	DP	Differential data transmission	A12 B12	GND	Ground

CN3 & CN4 (comm. terminals)

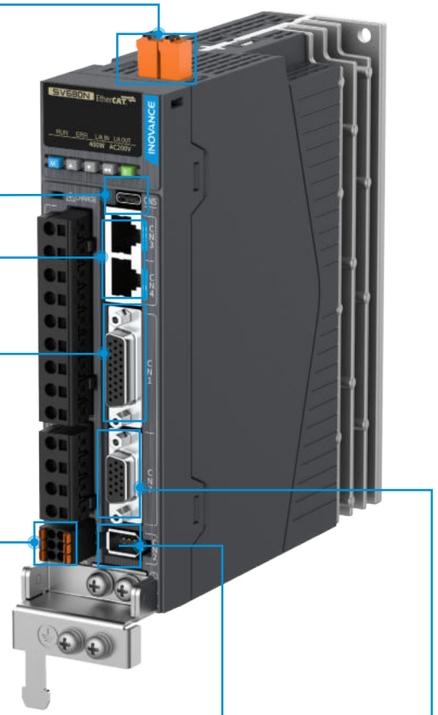
Pin No.	Assign-ment	Description	Pin No.	Assign-ment	Description
1	TD+	Transmit data (+)	9	TD+	Transmit data (+)
2	TD-	Transmit data (-)	10	TD-	Transmit data (-)
3	RD+	Receive data (+)	11	RD+	Receive data (+)
4&5	-	-	12&13	-	-
6	RD-	Receive data (-)	14	RD-	Receive data (-)
7&8	-	-	15&16	-	-

CN1 (control terminal)

Signal Name		Default Function	Pin No.	Terminal Function
General	DI1	P-OT	5	Positive limit switch
	DI2	N-OT	24	Negative limit switch
	DI3	HomeSwitch	15	Home switch
	DI4	Emergence Stop	16	Emergency stop
	DI5	TouchProbe1	23	Touch probe 1
	+24V		9	Internal 24 V power supply; voltage range: 20 V to 28 V; maximum output current: 150 mA.
	COM-		6	
	COM+		7	Common terminal of DI terminals
	DO1+	S-RDY+	4	Ready to switch on
	DO1-	S-RDY-	3	
	DO2+	ALM+	2	Fault
	DO2-	ALM-	1	

Brake terminal CN8

Pin No.	Assign-ment	Description	Pin No.	Assign-ment	Description
1	PTC	Motor temperature feedback input	4	BK-	Brake–
2	COM-	Onboard 24VCOM	5	24V_BK	External power supply for the brake
3	BK+	Brake+	6	COM_BK	Brake 24VCOM



Encoder terminal CN2

Pin No.	Assignment	Description
1	5V	5 V power supply
2	GND	5 V power supply GND
3	PS4+/CLK+	1. PS± signal of second encoder 2. CLK± signal of bus-type encoder
4	PS4-/CLK-	
5	PS3+/DATA+	1. PS± signal of first encoder 2. DATA± signal of bus-type encoder 3. Gantry synchronization signal
6	PS3-/DATA-	
Enclosure	PE	Shield

Encoder terminal CN7

Pin No.	Assign-ment	Description	Pin No.	Assignment	Description
1	A+	Encoder pulse phase A ±	9	GND	Power supply reference ground
2	A–		10	PS1-/DATA-	1. PS- signal of first encoder 2. DATA- signal of bus-type encoder 3. Gantry synchronization signal
3	B+	Encoder pulse phase B ±	11	HALL_U+	Hall signal U
4	B–		12	HALL_V+	Hall signal V
5	PS1+/ DATA+	1. PS+ signal of first encoder 2. DATA+ signal of bus-type encoder 3. Gantry synchronization signal	13	HALL_W+	Hall signal W
6	Z+	Encoder pulse phase Z ±	14	PS2+/CLK	1. PS+ signal of second encoder 2. CLK+ signal of bus-type encoder
7	Z-		15	PS2-/CLK-	
8	+5V	Encoder 5 V power supply (load current lower than 200 mA)	Enclo-sure	PE	Shield

Terminal Assignment of Functional Safety SV680N

STO safety terminal CN6

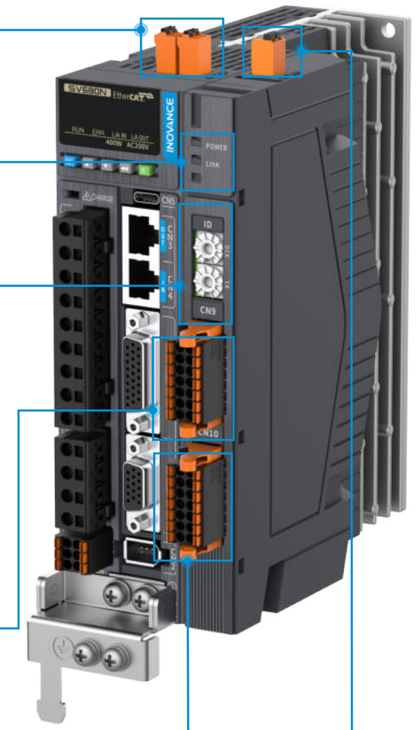
Pin No.	Assign-ment	Description
1	COM-	STO reference GND
2	24V	Internal 24 V power supply
3	STO1	Control input for STO2
4	STO2	Control input for STO2

Power supply indicator of the safety module

Power: When the safety module is connected and the power supply is normal, the indicator is on.
LINK: Indicates safety communication status.
Note:
Solid ON: FSoE ready;
Flashing: communication OK;
OFF: FSoE off

FSoE ID address setting knob

Used to set ID address of the slave drive for FSoE communication.
Address setting method: Digits on the upper knob x 16 + Digits on the lower knob



Expansion safety function terminal CN9

Pin No.	Assignment	Description	Pin No.	Assign-ment	Description
1	DO3-	Common DO3 output (-)	8	DI5A_IN	Safety DI5A input
2	DO3+	Common DO3 output (+)	9	DI4A_IN	Safety DI4A input
3	DO2	Safety DO2 output	10	DI3A_IN	Safety DI3A input
4	DO1	Safety DO1 output	11	DI2A_IN	Safety DI2A input
5	DO24VA	24 V power supply of DO1 and DO2	12	DI1A_IN	Safety DI1A input
6	DO0VA	DO2 reference ground	13	PE	Grounding terminal
7	COM	DIA reference ground	14	-	-

Expansion safety function terminal CN10

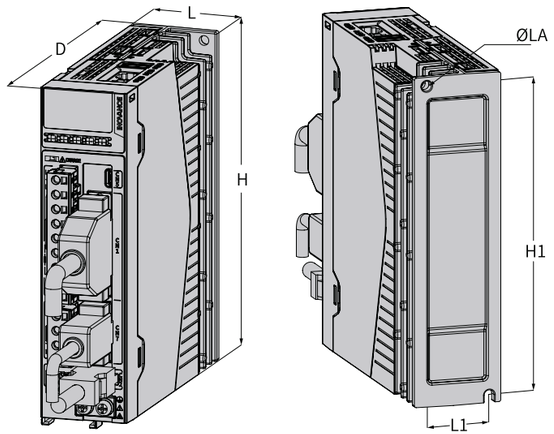
Pin No.	Assignment	Description	Pin No.	Assign-ment	Description
1	DO6-	Common DO6 output (-)	8	DI5A_IN	Safety DI5B input
2	DO6+	Common DO6 output (+)	9	DI4A_IN	Safety DI5A input
3	DO5	Safety DO5 output	10	DI3A_IN	Safety DI5A input
4	DO4	Safety DO4 output	11	DI2A_IN	Safety DI5A input
5	DO24VA	24 V power supply of DO4 and DO5	12	DI1A_IN	Safety DI5A input
6	DO0VA	DO4 and DO5 reference ground	13	PE	Grounding terminal
7	COM	DIB reference ground	14	-	-

Backup 24 V terminal CN11

When power failure occurs on the main circuit, 24V_BP provides power supply for the control circuit of the drive, keeping the control logic of the drive active.

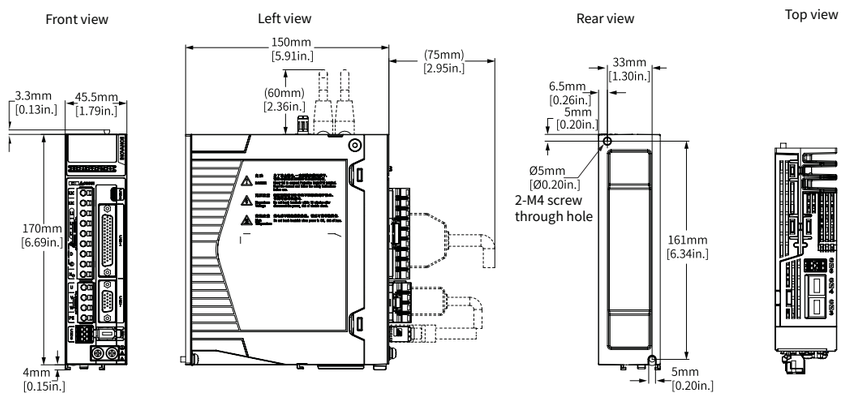
Pin No.	Assignment	Description
1	GND_BP	0 V input of backup power supply
2	24V_BP	24 V input of backup power supply

Dimensions of SV680P Series Servo Drives

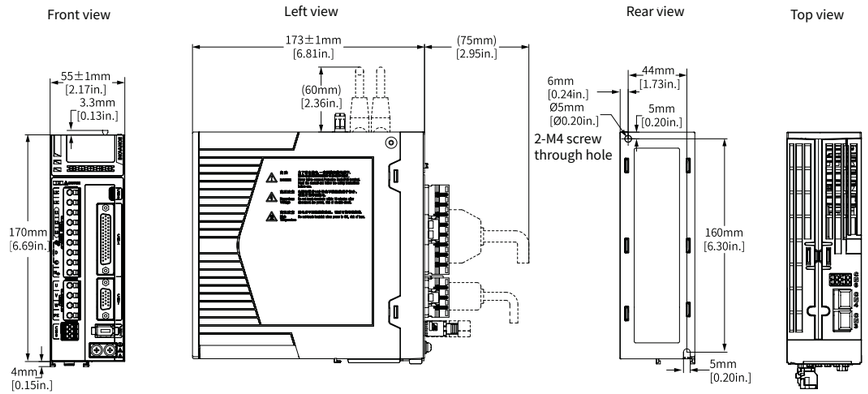


Structure	L mm (in.)	H mm (in.)	D mm (in.)	L1 mm (in.)	H1 mm (in.)	D1 mm (in.)	Screw Hole (ØLA)	Tightening torque (N·m)	Weight (kg)
Size A	45.5 (1.79)	170 (6.69)	150 (5.91)	33 (1.30)	161 (6.34)	75 (2.95)	2-M4	1.2	0.96
SIZE C	55±1 (2.17±0.04)	170 (6.69)	173±1 (6.81±0.04)	44 (1.73)	160 (6.30)	75 (2.95)	2-M4	1.2	1.3
SIZE D	80±1 (3.15±0.04)	170 (6.69)	183 (7.20)	71 (2.80)	160 (6.30)	75 (2.95)	3-M4	1.2	1.8
SIZE E	90 (3.54)	250 (9.84)	230 (9.06)	78 (3.07)	241 (9.47)	75 (2.95)	4-M4	1.2	3.6

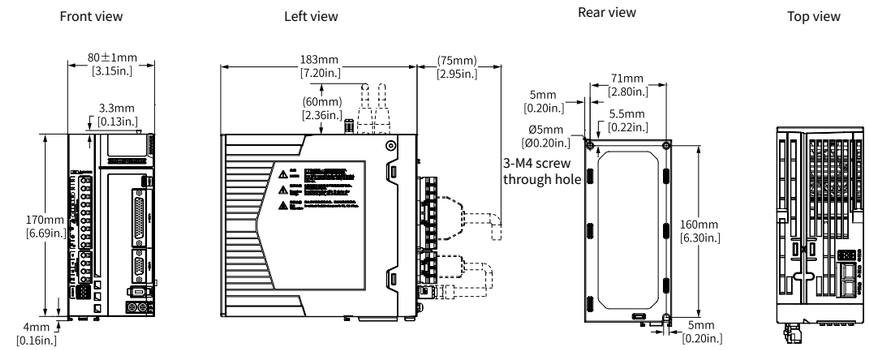
Dimension drawing of servo drives in size A



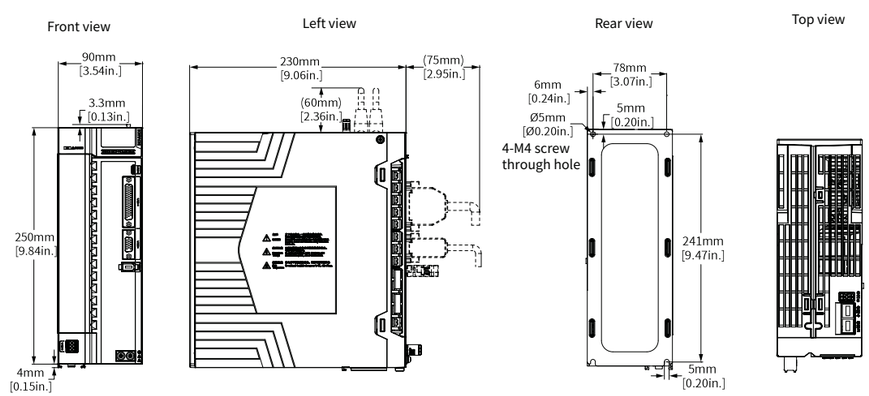
Dimension drawing of servo drives in size C



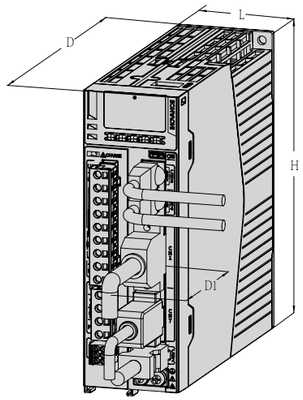
Dimension drawing of servo drives in size D

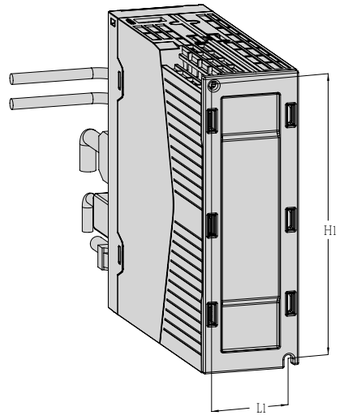


Dimension drawing of servo drives in size E



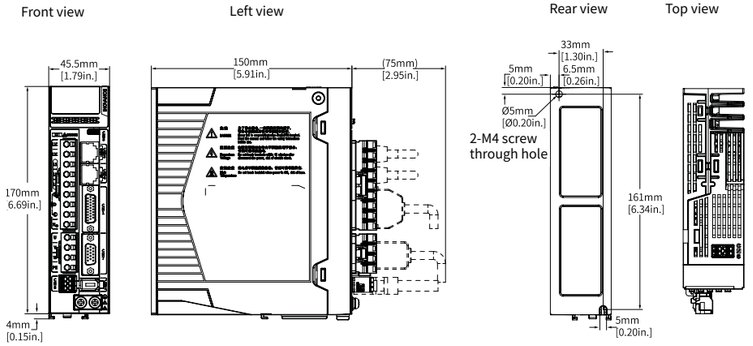
Dimensions of SV680N Series Servo Drives



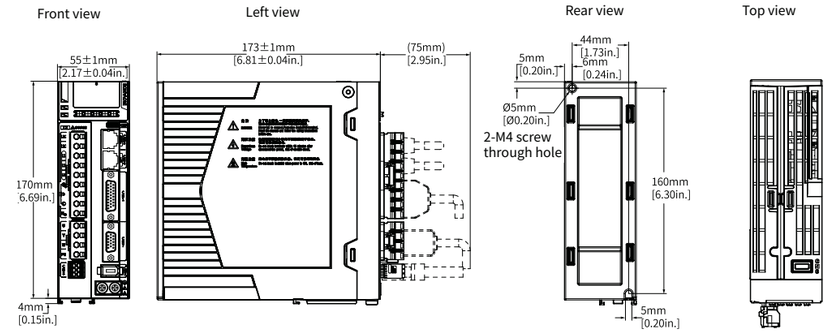


Structure	L mm (in.)	H mm (in.)	D mm (in.)	L1 mm (in.)	H1 mm (in.)	D1 mm (in.)	Screw Hole (ØLA)	Tightening Torque (N·m)	Weight (kg)
SIZE A	45.5 (1.79)	170 (6.69)	150 (5.91)	33 (1.30)	161 (6.34)	75 (2.95)	2-M4	1.2	0.96
SIZE C	55±1 (2.17±0.04)	170 (6.69)	173±1 (6.81±0.04)	44 (1.73)	160 (6.30)	75 (2.95)	2-M4	1.2	1.3
SIZE D	80±1 (3.15±0.04)	170 (6.69)	183 (7.20)	71 (2.80)	160 (6.30)	75 (2.95)	3-M4	1.2	1.8
SIZE E	90 (3.54)	250 (9.84)	230 (9.06)	78 (3.07)	241 (9.47)	75 (2.95)	4-M4	1.2	3.6

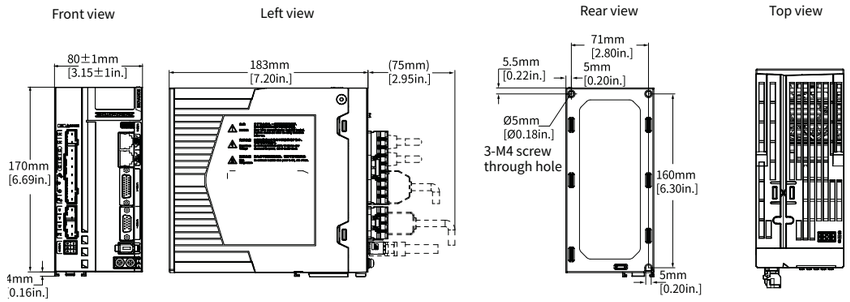
Dimension drawing of servo drives in size A



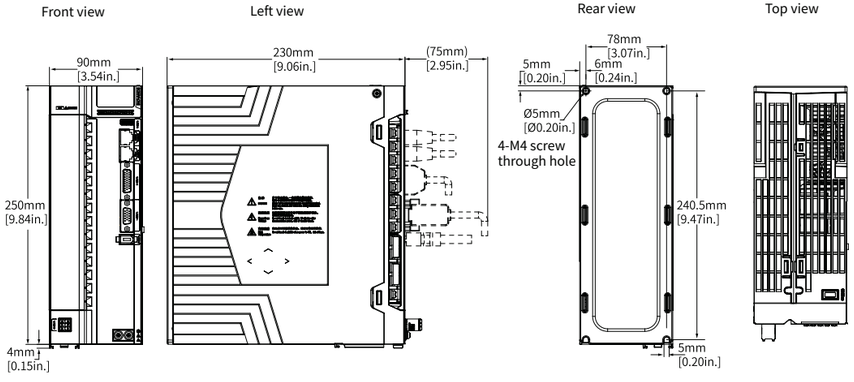
Dimension drawing of servo drives in size C



Dimension drawing of servo drives in size D



Dimension drawing of servo drives in size E



Specifications of Standard MS1 Motors

Model	Rated power (kW)	Rated voltage	Rated torque (N·m)	Maximum torque (N·m)	Rated current (Arms)	Max. current (Arms)	Torque coefficient (N·m/Arms)	Rotor moment of inertia (kg·cm^2)	Brake Included
Ratings of MS1H1 series motors (Vn = 3000 rpm, Vmax = 7000 rpm)									
MS1H1-05B30CB-A6/S630R-INT	0.05	220	0.16	0.56	1.37	5.25	0.12	0.018	No
MS1H1-05B30CB-A6/S632R-INT								0.0208	Yes
MS1H1-10B30CB-A6/S630R-INT	0.1	220	0.32	1.12	1.26	5.25	0.25	0.0316	No
MS1H1-05B30CB-A6/S632R-INT								0.0345	Yes
MS1H1-20B30CB-A6/V6/S630R-INT	0.2	220	0.64	2.24	1.5	5.8	0.46	0.094	No
MS1H1-20B30CB-A6/V6/S632R-INT								0.106	Yes
MS1H1-40B30CB-A6/V6/S630R-INT	0.4	220	1.27	4.45	2.5	9.8	0.53	0.145	No
MS1H1-40B30CB-A6/V6/S632R-INT								0.157	Yes
MS1H1-55B30CB-A6/V6/S630R-INT	0.55	220	1.75	6.13	3.9	15	0.49	0.55	No
-								-	Yes
MS1H1-75B30CB-A6/V6/S630R-INT	0.75	220	2.39	8.37	4.4	16.9	0.58	0.68	No
MS1H1-75B30CB-A6/V6/S632R-INT								0.71	Yes
MS1H1-10C30CB-A6/V6/S630R-INT	1.0	220	3.18	11.13	6.2	24	0.46	0.82	No
MS1H1-10C30CB-A6/V6/S632R-INT								0.87	Yes
Ratings of MS1H2 series motors (Vn = 3000 rpm, Vmax = 6000 rpm)									
MS1H2-10C30CB-A6/V6/S631R-INT	1.0	220	3.18	9.54	6.4	23	0.54	1.78	No
MS1H2-10C30CB-A6/V6/S634R-INT								2.6	Yes
MS1H2-10C30CD-A6/V6/S631R-INT	1.0	380	3.18	9.54	3.3	11	1.07	1.78	No
MS1H2-10C30CD-A6/V6/S634R-INT								2.6	Yes
MS1H2-15C30CB-A6/V6/S631R-INT	1.5	220	4.9	14.7	8.6	32	0.62	2.35	No
MS1H2-15C30CB-A6/V6/S634R-INT								3.17	Yes
MS1H2-15C30CD-A6/V6/S631R-INT	1.5	380	4.9	14.7	4.2	14	1.28	2.35	No
MS1H2-15C30CD-A6/V6/S634R-INT								3.17	Yes
MS1H2-20C30CB-A6/V6/S631R-INT	2.0	220	6.36	19.1	11.3	42	0.60	2.92	No
MS1H2-20C30CB-A6/V6/S634R-INT								3.74	Yes
MS1H2-20C30CD-A6/V6/S631R-INT	2.0	380	6.36	19.1	5.6	20	1.19	2.92	No
MS1H2-20C30CD-A6/V6/S634R-INT								3.74	Yes
MS1H2-25C30CB-A6/V6/S631R-INT	2.5	220	7.96	23.9	14.7	53	0.60	3.49	No
MS1H2-25C30CB-A6/V6/S634R-INT								4.3	Yes
MS1H2-25C30CD-A6/V6/S631R-INT	2.5	380	7.96	23.9	7.2	26	1.18	3.49	No
MS1H2-25C30CD-A6/V6/S634R-INT								4.3	Yes
MS1H2-30C30CB-A6/V6/S631R-INT	3.0	220	9.8	24.5	16.6	55	0.67	6.4	No
MS1H2-30C30CB-A6/V6/S634R-INT								9.38	Yes
MS1H2-30C30CD-A6/V6/S631R-INT	3.0	380	9.8	29.4	8.9	29	1.25	6.4	No
MS1H2-30C30CD-A6/V6/S634R-INT								9.38	Yes
MS1H2-40C30CB-A6/V6/S631R-INT	4.0	220	12.6	31.5	22	67.5	0.65	9	No
MS1H2-40C30CB-A6/V6/S634R-INT								11.98	Yes
MS1H2-40C30CD-A6/V6/S631R-INT	4.0	380	12.6	37.8	13.5	42.5	1.06	9	No
MS1H2-40C30CD-A6/V6/S634R-INT								11.98	Yes
MS1H2-50C30CB-A6/V6/S631R-INT	5.0	220	15.8	39.5	22	67.5	0.81	11.6	No
MS1H2-50C30CB-A6/V6/S634R-INT								14.58	Yes
MS1H2-50C30CD-A6/V6/S631R-INT	5.0	380	15.8	47.4	17	52.5	1.04	11.6	No
MS1H2-50C30CD-A6/V6/S634R-INT								14.58	Yes

Model	Rated Power (kW)	Rated Voltage	Rated torque (N·m)	Maximum torque (N·m)	Rated current (Arms)	Maximum current (Arms)	Torque coefficient (N·m/Arms)	Rotor moment of inertia (kg·cm^2)	Brake Included
Ratings of MS1H3 series motors (Vn = 3000 rpm, Vmax = 4500 rpm)									
MS1H3-85B15CB-A6/V6/S631R-INT	0.85	220	5.39	13.5	6.6	17.2	0.93	13.56	No
MS1H3-85B15CB-A6/V6/S634R-INT								15.8	Yes
MS1H3-85B15CD-A6/V6/S631R-INT	0.85	380	5.39	13.5	3.5	8.5	1.84	13.56	No
MS1H3-85B15CD-A6/V6/S634R-INT								15.8	Yes
MS1H3-13C15CB-A6/V6/S631R-INT	1.3	220	8.34	20.85	10.5	27.3	0.89	19.25	No
MS1H3-13C15CB-A6/V6/S634R-INT								21.5	Yes
MS1H3-13C15CD-A6/V6/S631R-INT	1.3	380	8.34	20.85	5.1	12.6	1.85	19.25	No
MS1H3-13C15CD-A6/V6/S634R-INT								21.5	Yes
MS1H3-18C15CB-A6/V6/S631R-INT	1.8	220	11.5	28.75	11.9	32.2	1.05	24.9	No
MS1H3-18C15CB-A6/V6/S634R-INT								27.2	Yes
MS1H3-18C15CD-A6/V6/S631R-INT	1.8	380	11.5	28.75	6.75	17.7	1.87	24.9	No
MS1H3-18C15CD-A6/V6/S634R-INT								27.2	Yes
MS1H3-29C15CB-A6/V6/S631R-INT	2.9	220	18.6	46.5	18	52.5	1.16	44.7	No
MS1H3-29C15CB-A6/V6/S634R-INT								52.35	Yes
MS1H3-29C15CD-A6/V6/S631R-INT	2.9	380	18.6	46.5	10.5	29.75	1.94	44.7	No
MS1H3-29C15CD-A6/V6/S634R-INT								52.35	Yes
MS1H3-44C15CB-A6/V6/S631R-INT	4.4	220	28.4	71.1	25.5	67	1.25	64.9	No
MS1H3-44C15CB-A6/V6/S634R-INT								72.55	Yes
MS1H3-44C15CD-A6/V6/S631R-INT	4.4	380	28.4	71.1	16	42	1.96	64.9	No
MS1H3-44C15CD-A6/V6/S634R-INT								72.55	Yes
MS1H3-55C15CD-A6/V6/S631R-INT	5.5	380	35	87.6	20.7	52	1.92	86.9	No
MS1H3-55C15CD-A6/V6/S634R-INT								94.55	Yes
MS1H3-75C15CD-A6/V6/S631R-INT	7.5	380	48	119	25	65	2.13	127.5	No
MS1H3-75C15CD-A6/V6/S634R-INT								135.15	Yes
Ratings of MS1H4 series motors (Vn = 3000 RPM, Vmax = 6000 RPM)									
MS1H4-05B30CB-A6/S631R-INT	0.05	220	0.16	0.56	1.27	4.78	0.126	0.038	No
MS1H4-05B30CB-A6/S634R-INT								0.04	Yes
MS1H4-10B30CB-A6/S631R-INT	0.1	220	0.32	1.12	1.27	4.78	0.252	0.072	No
MS1H4-10B30CB-A6/S634R-INT								0.074	Yes
MS1H4-20B30CB-A6/V6/S631R-INT	0.2	220	0.64	2.24	1.3	5.3	0.46	0.22	No
MS1H4-20B30CB-A6/V6/S634R-INT								0.23	Yes
MS1H4-40B30CB-A6/V6/S631R-INT	0.4	220	1.27	4.45	2.4	9.2	0.53	0.43	No
MS1H4-40B30CB-A6/V6/S634R-INT								0.44	Yes
MS1H4-55B30CB-A6/V6/S631R-INT	0.55	220	1.75	6.13	3.3	13.2	0.49	1.12	No
-								-	Yes
MS1H4-75B30CB-A6/V6/S631R-INT	0.75	220	2.39	8.37	4.4	16.9	0.58	1.46	No
MS1H4-75B30CB-A6/V6/S634R-INT								1.51	Yes
MS1H4-10C30CB-A6/V6/S631R-INT	1.0	220	3.18	11.13	6.5	24	0.46	1.87	No
MS1H4-10C30CB-A6/V6/S634R-INT								1.97	Yes

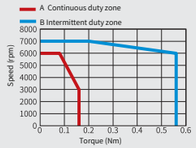
Note:
[1] The oil seal is not included in the standard configuration of 40-flange H1 models. Other motor models are equipped with the oil seal as standard.
[2] 40-flange motors do not support V6 battery-less encoder.

Overview of Servo Motors

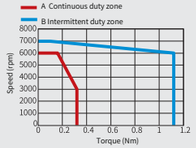
Torque-Speed characteristics

MS1H1 low inertia, small capacity

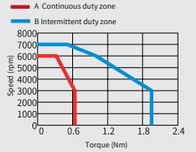
MS1H1-05B30CB



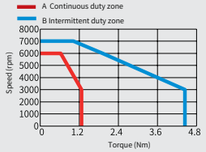
MS1H1-10B30CB



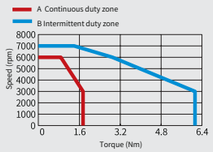
MS1H1-40B30CB



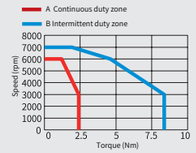
MS1H1-40B30CB



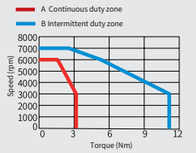
MS1H1-55B30CB



MS1H1-75B30CB

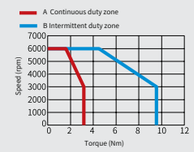


MS1H1-10C30CB

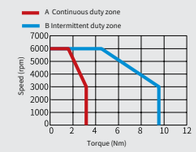


MS1H2 low inertia, medium capacity

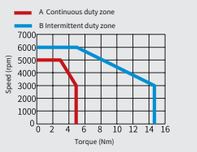
MS1H2-10C30CB-*63*R



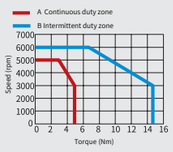
MS1H2-10C30CD-*63*R



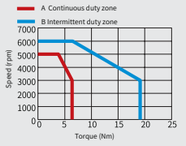
MS1H2-15C30CB-*63*R



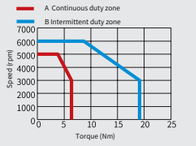
MS1H2-15C30CD-*63*R



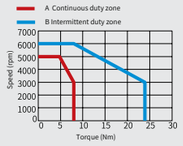
MS1H2-20C30CB-*63*R



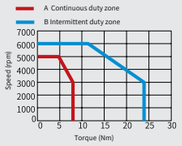
MS1H2-20C30CD-*63*R



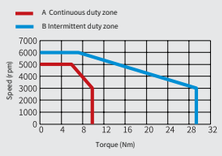
MS1H2-25C30CB-**63*R



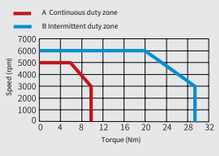
MS1H2-25C30CD-*63*R



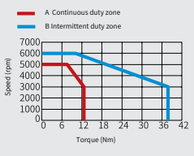
MS1H2-30C30CB-*63*R



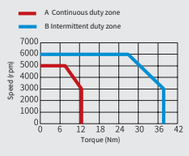
MS1H2-30C30CD-*63*R



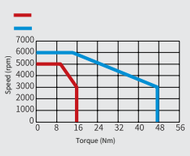
MS1H2-40C30CB*63*R



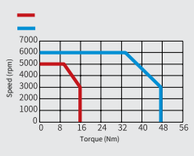
MS1H2-40C30CD-*63*R



MS1H2-50C30CB-*63*R



MS1H2-50C30CD-*63*R



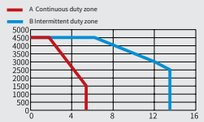
Overview of Servo Motors

Torque-Speed characteristics

MS1H3 medium inertia, medium capacity

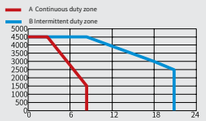
MS1H3-85B15CB-*63*R

MS1H3-85B15CD-*63*R



MS1H3-13C15CB-*63*R

MS1H3-13C15CD-*63*R



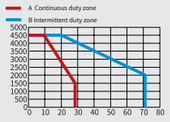
MS1H3-18C15CB-*63*R

MS1H3-18C15CD-*63*R

MS1H3-29C15CB-*63*R

MS1H3-29C15CD-*63*R

MS1H3-44C15CB-*63*R



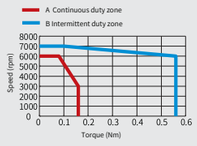
MS1H3-44C15CD-*63*R

MS1H3-55C15CD-*63*R

MS1H3-75C15CD-*63*R

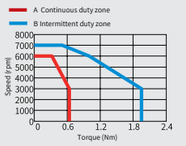
MS1H4 medium inertia, small capacity

MS1H4-05B30CB-*63*R

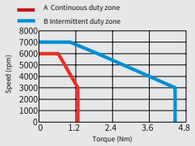


MS1H4-10B30CB-*63*R

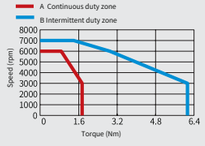
MS1H4-20B30CB-*63*R



MS1H4-40B30CB-*63*R

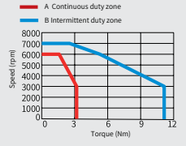


MS1H4-55B30CB-*63*R

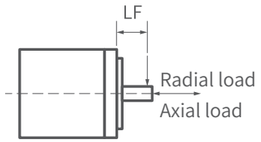


MS1H4-75B30CB-*63*R

MS1H4-10C30CB-*63*R



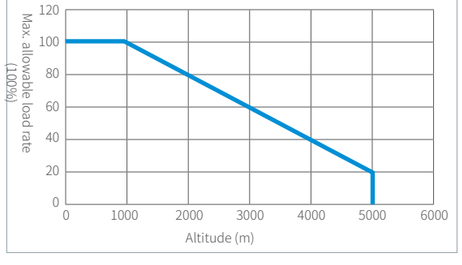
Allowable Axial/Radial Load (N)



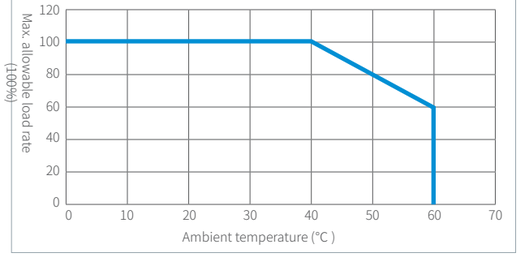
Motor model	Flange size (mm)	LF (mm)	Allowable radial load (N)	Allowable axial load (N)
MS1H1-05B30CB- □□ 3 □ R-INT MS1H1-10B30CB- □□ 3 □ R-INT MS1H4-05B30CB- □□ 3 □ R-INT MS1H4-10B30CB- □□ 3 □ R-INT	40	20	78	54
MS1H1-20B30CB- □□ 3 □ R-INT MS1H1-40B30CB- □□ 3 □ R-INT MS1H4-20B30CB- □□ 3 □ R-INT MS1H4-40B30CB- □□ 3 □ R-INT	60	25	245	74
MS1H1-55B30CB- □□ 3 □ R-INT MS1H1-75B30CB- □□ 3 □ R-INT MS1H1-10C30CB- □□ 3 □ R-INT MS1H4-55B30CB- □□ 3 □ R-INT MS1H4-75B30CB- □□ 3 □ R-INT MS1H4-10C30CB- □□ 3 □ R-INT	80	35	392	147
MS1H2-10C30CB- □□ 3 □ R-INT MS1H2-10C30CD- □□ 3 □ R-INT MS1H2-15C30CB- □□ 3 □ R-INT MS1H2-15C30CD- □□ 3 □ R-INT MS1H2-20C30CB- □□ 3 □ R-INT MS1H2-20C30CD- □□ 3 □ R-INT MS1H2-25C30CB- □□ 3 □ R-INT MS1H2-25C30CD- □□ 3 □ R-INT	100	45	686	196
MS1H2-30C30CB- □□ 3 □ R-INT MS1H2-30C30CD- □□ 3 □ R-INT MS1H2-40C30CB- □□ 3 □ R-INT MS1H2-40C30CD- □□ 3 □ R-INT MS1H2-50C30CB- □□ 3 □ R-INT MS1H2-50C30CD- □□ 3 □ R-INT	130	63	1176	392
MS1H3-85B15CB- □□ 3 □ R-INT MS1H3-85B15CD- □□ 3 □ R-INT MS1H3-13C15CB- □□ 3 □ R-INT MS1H3-13C15CD- □□ 3 □ R-INT MS1H3-18C15CB- □□ 3 □ R-INT MS1H3-18C15CD- □□ 3 □ R-INT	130	55	686	196
MS1H3-29C15CB- □□ 3 □ R-INT MS1H3-29C15CD- □□ 3 □ R-INT MS1H3-44C15CB- □□ 3 □ R-INT MS1H3-44C15CD- □□ 3 □ R-INT	180	79	1470	490
MS1H3-55C15CD- □□ 3 □ R-INT MS1H3-75C15CD- □□ 3 □ R-INT	180	113	1764	588

Derating Characteristics

Altitude-based derating



Temperature-based derating



Specifications of the Brake

Motor model	Holding torque (N·m)	Supply voltage (VDC)±10%	Rated power (W)	Coil resistance (Ω)±7%	Exciting current (A)	Release time (ms)	Apply time (ms)	Backlash (°)
MS1H1-05B/10B MS1H4-05B/10B	0.32	24	6.1	94.4	0.25	⩽ 20	⩽ 40	⩽ 1.5
MS1H1/4-20B/40B	1.5	24	7.6	75.79	0.32	⩽ 20	⩽ 60	⩽ 1.5
MS1H1/4-75B/10C	3.2	24	10	57.6	0.42	⩽ 40	⩽ 60	⩽ 1
MS1H2-10C/15C/20C/25C	8	24	17.6	32.73	0.73	⩽ 40	⩽ 100	⩽ 1
MS1H2-30C/40C/50C	16	24	24	24	1	⩽ 60	⩽ 120	⩽ 1
MS1H3-85B/13C/18C	16	24	24	24	1	⩽ 60	⩽ 120	⩽ 1
MS1H3-29C/44C/55C/75C	50	24	31	18.58	1.29	⩽ 100	⩽ 200	⩽ 1

[1] Do not use a holding brake for braking.
[2] The release time and apply time of the brake vary with the discharge circuit. Be sure to confirm the actual action delay of the equipment before use.
[3] The 24 VDC power supply is provided by users.

Technical Data

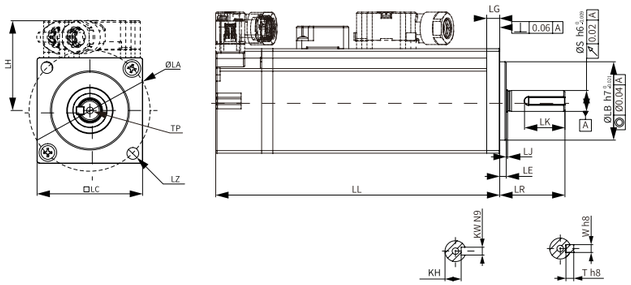
Item	Description
Duty type	S1 (Continuous duty)
Vibration grade	V15[1]
Insulation resistor	500 VDC, above 10 MΩ
Ambient temperature	0°C to 40°C (non-frozen) (See the derating curves for ambient temperatures above 40°C .
Ambient humidity	20% to 80% (without condensation)
Storage environment	Observe the following requirements for storing a de-energized motor: · Storage temperature: -20° C to +60° C (non-frozeon) · Storage humidity: 20% to 80% RH (without condensation)
Excitation mode	Permanent magnet
Mounting mode	Flange
Thermal class	F (155°C)
Insulation voltage	1500 VAC for 1 min (220 V class); 1800 VAC for 1 min (380 V class)
Enclosure IP rating	IP67 (excluding the shaft opening and connectors of flying leads type motors)
Direction of rotation	The motor rotates counterclockwise by default when viewed from the shaft extension end with a forward run command. 
Vibration resistance[2][4]	Vibration acceleration (flange face as standard); 49m/s² in radial direction and24.5m/s² in axial direction
Shock resistance[3][4]	490m/s² (flange face as standard); Number of shocks: Two
Altitude	Derating is not required for altitudes lower than 1000 m. For altitudes above 1000 m, see the altitude-based derating curves.

Note:[1] Vibration grade V15 indicates that the amplitude of vibration is less than 15 μ m when a single servo motor rotates at its rated value.
[2]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.
[3]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.
[4]The intensity of vibration applied on the motor is affected by the transmission structure, alignment accuracy, mounting conditions, and external vibration. These factors may enhance the vibration applied on the motor. When the maximum allowable vibration limit is exceeded, the motor may fail.

Overview of Servo Motors

Dimensions of servo motors

Dimension drawing of MS1H1 series servo motors in mm (Vn = 3000 rpm, Vmax = 7000 rpm)



Dimensions of the shaft end

Dimensions of the shaft end with key

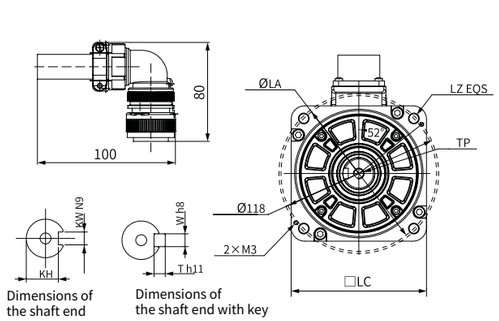
Motor model	LL (mm)	LC (mm)	LR (mm)	LA (mm)	LZ (mm)	LH (mm)	LG (mm)	LE (mm)	LJ (mm)
MS1H1-05B30CB-*63*R-INT	55 (82.3)	40	25±0.5	46	2-Ø4.5	34.5	5	2.5±0.5	0.5±0.35
MS1H1-10B30CB-*63*R-INT	67.5 (94.8)	40	25±0.5	46	2-Ø4.5	34.5	5	2.5±0.5	0.5±0.35
MS1H1-20B30CB-*63*R-INT	75.5 (103)	60	30±0.5	70	4-Ø5.5	44	8.0	3±0.5	0.5±0.35
MS1H1-40B30CB-*63*R-INT	93 (121)	60	30±0.5	70	4-Ø5.5	44	8.0	3±0.5	0.5±0.35
MS1H1-55B30CB-**63*R-INT	96.7	80	35±0.5	90	4-Ø7	54	7.5	3±0.5	0.5±0.35
MS1H1-75B30CB-*63*R-INT	107.3 (141.5)	80	35±0.5	90	4-Ø7	54	7.5	3±0.5	0.5±0.35
MS1H1-10C30CB-*63*R-INT	119.2 (153.4)	80	35±0.5	90	4-Ø7	54	7.5	3±0.5	0.5±0.35

Motor model	S (mm)	LB (mm)	TP (mm)	LK (mm)	KH (mm)	KW (mm)	W (mm)	T (mm)	Weight (kg)
MS1H1-05B30CB-*63*R-INT	8	Ø30h7 $^{0}_{-0.021}$	M3x6	15.5	6.2 $^{0}_{-0.1}$	3	3	3	0.26 (0.43)
MS1H1-10B30CB-*63*R-INT	8	Ø30h7 $^{0}_{-0.021}$	M3x6	15.5	6.2 $^{0}_{-0.1}$	3	3	3	0.35 (0.52)
MS1H1-20B30CB-*63*R-INT	14	Ø50h7 $^{0}_{-0.025}$	M5x8	16.5	11 $^{0}_{-0.1}$	5	5	5	0.80 (1.17)
MS1H1-40B30CB-*63*R-INT	14	Ø50h7 $^{0}_{-0.025}$	M5x8	16.5	11 $^{0}_{-0.1}$	5	5	5	1.11 (1.48)
MS1H1-55B30CB-**63*R-INT	19	Ø70h7 $^{0}_{-0.03}$	M6x20	25	15.5 $^{0}_{-0.1}$	6	6	6	1.88
MS1H1-75B30CB-*63*R-INT	19	Ø70h7 $^{0}_{-0.03}$	M6x20	25	15.5 $^{0}_{-0.1}$	6	6	6	2.22 (2.88)
MS1H1-10C30CB-*63*R-INT	19	Ø70h7 $^{0}_{-0.03}$	M6x20	25	15.5 $^{0}_{-0.1}$	6	6	6	2.61 (3.27)

Overview of Servo Motors

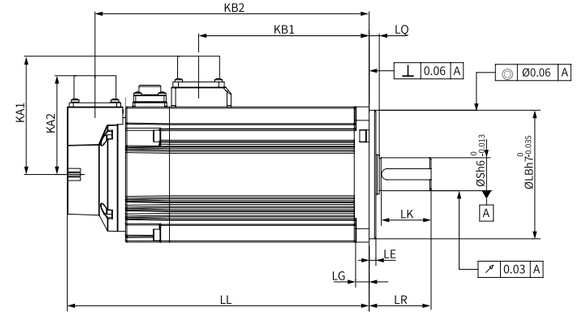
Dimensions of servo motors

Dimensions of MS1H2 series servo motors in mm (Vn = 3000 rpm, Vmax = 6000 rpm)



Dimensions of the shaft end

Dimensions of the shaft end with key



Motor model	LL (mm)	LC (mm)	LR (mm)	LA (mm)	LZ (mm)	KA1 (mm)	KB1 (mm)	KA2 (mm)	KB2 (mm)	LG (mm)	LE (mm)
MS1H2-10C30CB-*63*R-INT	144 (172)	100	45±1	115	4-Ø7	88	75	73	123.5 (151.5)	10	5±0.3
MS1H2-10C30CD-*63*R-INT											
MS1H2-15C30CB-*63*R-INT	161 (189)	100	45±1	115	4-Ø7	88	92	73	140.5 (168.5)	10	5±0.3
MS1H2-15C30CD-*63*R-INT											
MS1H2-20C30CB-*63*R-INT	177 (205)	100	45±1	115	4-Ø7	88	108	73	156.5 (184.5)	10	5±0.3
MS1H2-20C30CD-*63*R-INT											
MS1H2-25C30CB-**63*R-INT	195 (223)	100	45±1	115	4-Ø7	88	126	73	174.5 (202.5)	10	5±0.3
MS1H2-25C30CD-*63*R-INT											
MS1H2-30C30CB-*63*R-INT	198 (223)	130	63±1	145	4-Ø9	102.4	127.5	73	177.5 (202.5)	12	6±0.3
MS1H2-40C30CB*63*R-INT	236 (261)	130	63±1	145	4-Ø9	102.4	165.5	73	215.5 (240.5)	12	6±0.3
MS1H2-40C30CD-*63*R-INT											
MS1H2-50C30CB-*63*R-INT	274 (299)	130	63±1	145	4-Ø9	102.4	203.5	73	253.5 (278.5)	12	6±0.3
MS1H2-50C30CD-*63*R-INT											

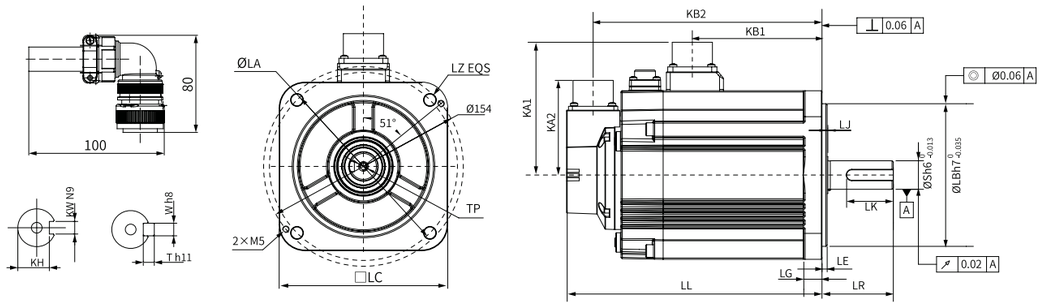
Motor model	LQ (mm)	LB (mm)	S (mm)	TP (mm)	LK (mm)	KH (mm)	KW (mm)	W (mm)	T (mm)	Weight (kg)
MS1H2-10C30CB-*63*R-INT	7.5±0.75	Ø95h7 $^{0}_{-0.035}$	24	M8x16	36	20	8	8	7	5.11 (6.41)
MS1H2-10C30CD-*63*R-INT										
MS1H2-15C30CB-*63*R-INT	7.5±0.75	Ø95h7 $^{0}_{-0.035}$	24	M8x16	36	20	8	8	7	6.22 (7.52)
MS1H2-15C30CD-*63*R-INT										
MS1H2-20C30CB-*63*R-INT	7.5±0.75	Ø95h7 $^{0}_{-0.035}$	24	M8x16	36	20	8	8	7	7.39 (8.7)
MS1H2-20C30CD-*63*R-INT										
MS1H2-25C30CB-**63*R-INT	7.5±0.75	Ø95h7 $^{0}_{-0.035}$	24	M8x16	36	20	8	8	7	8.55 (9.8)
MS1H2-25C30CD-*63*R-INT										
MS1H2-30C30CB-*63*R-INT	0.5±0.75	Ø110h7 $^{0}_{-0.035}$	28	M8x20	54	24	8	8	7	10.73 (13.2)
MS1H2-40C30CB*63*R-INT	0.5±0.75	Ø110h7 $^{0}_{-0.035}$	28	M8x20	54	24	8	8	7	15.43 (17.9)
MS1H2-40C30CD-*63*R-INT										
MS1H2-50C30CB-*63*R-INT	0.5±0.75	Ø110h7 $^{0}_{-0.035}$	28	M8x20	54	24	8	8	7	16.2 (18.4)
MS1H2-50C30CD-*63*R-INT										

Note: In the preceding table, values inside the parentheses are for the motor with brake.

Overview of Servo Motors

Dimensions of servo motors

Dimension drawing of MS1H3 Series Servo Motors in mm (Vn = 1500 rpm, ax = 4500 rpm)



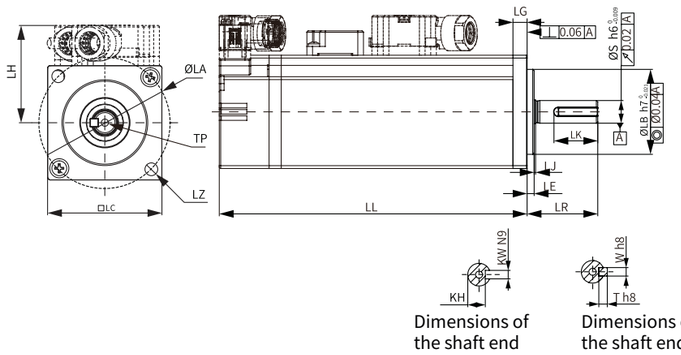
Motor model	LL (mm)	LC (mm)	LR (mm)	LA (mm)	LZ (mm)	KA1 (mm)	KB1 (mm)	KA2 (mm)	KB2 (mm)	LG (mm)	LE (mm)
MS1H3-85B15CB-*63*R-INT	142 (167)	130	55±1	145	4-Ø9	103	70	73	121.5 (146.5)	14	4
MS1H3-85B15CD-*63*R-INT											
MS1H3-13C15CB-*63*R-INT	157 (182)	130	55±1	145	4-Ø9	103	85	73	136.5 (161.5)	14	4
MS1H3-13C15CD-*63*R-INT											
MS1H3-18C15CB-*63*R-INT	172 (197)	130	55±1	145	4-Ø9	103	100	73	151.5 (176.5)	14	4
MS1H3-18C15CD-*63*R-INT											
MS1H3-29C15CB-*63*R-INT	161 (194.8)	180	79±1	200	4-Ø13.5	127.4	93.5	73	140.5 (174.3)	22	3.2±0.3
MS1H3-29C15CD-*63*R-INT											
MS1H3-44C15CB-*63*R-INT	184.5 (218.3)	180	79±1	200	4-Ø13.5	127.4	117	73	164 (197.8)	22	3.2±0.3
MS1H3-44C15CD-*63*R-INT	184.5 (218.3)	180	79±1	200	4-Ø13.5	127.4	117	73	164 (197.8)	22	3.2±0.3
MS1H3-55C15CD-*63*R-INT	208 (241.8)	180	113±1	200	4-Ø13.5	127.4	140.5	73	187.5 (221.3)	22	3.2±0.3
MS1H3-75C15CD-*63*R-INT	255 (288.8)	180	113±1	200	4-Ø13.5	127.4	187.5	73	234.5 (234.5)	22	3.2±0.3

Motor Model	LJ (mm)	LB (mm)	S (mm)	TP (mm)	LK (mm)	KH (mm)	KW (mm)	W (mm)	T (mm)	Weight (kg)
MS1H3-85B15CB-*63*R-INT	0.5 to 0.75	Ø110h7 $^{0}_{-0.035}$	22	M6x20	36	18 $^{0}_{-0.2}$	8	8	7	5.8 (7.7)
MS1H3-85B15CD-*63*R-INT										
MS1H3-13C15CB-*63*R-INT	0.5±0.75	Ø110h7 $^{0}_{-0.035}$	22	M6x20	36	18 $^{0}_{-0.2}$	8	8	7	7.1 (8.9)
MS1H3-13C15CD-*63*R-INT										
MS1H3-18C15CB-*63*R-INT	0.5±0.75	Ø110h7 $^{0}_{-0.035}$	22	M6x20	36	18 $^{0}_{-0.2}$	8	8	7	8.5 (10.3)
MS1H3-18C15CD-*63*R-INT										
MS1H3-29C15CB-*63*R-INT	0.5±0.75	Ø114.3h7 $^{0}_{-0.035}$	35	M12x25	65	30 $^{0}_{-0.2}$	10	10	8	13.8 (17.9)
MS1H3-29C15CD-*63*R-INT										
MS1H3-44C15CB-*63*R-INT	0.5±0.75	Ø114.3h7 $^{0}_{-0.035}$	35	M12x25	65	30 $^{0}_{-0.2}$	10	10	8	17.4 (21.9)
MS1H3-44C15CD-*63*R-INT	0.5±0.75	Ø114.3h7 $^{0}_{-0.035}$	35	M12x25	65	30 $^{0}_{-0.2}$	10	10	8	17.4 (21.6)
MS1H3-55C15CD-*63*R-INT	0.5±0.75	Ø114.3h7 $^{0}_{-0.035}$	42	M16x32	97	30 $^{0}_{-0.2}$	12	12	8	21.7 (25.9)
MS1H3-75C15CD-*63*R-INT	0.5±0.75	Ø114.3h7 $^{0}_{-0.035}$	42	M16x32	97	37 $^{0}_{-0.2}$	12	12	8	29 (33.2)

Overview of Servo Motors

Dimensions of servo motors

Dimension drawing of MS1H4 series servo motors in mm (Vn = 3000 rpm, Vmax = 7000 rpm)



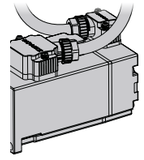
Dimensions of the shaft end

Dimensions of the shaft end with key

Motor Model	LL (mm)	LC (mm)	LR (mm)	LA (mm)	LZ (mm)	LH (mm)	LG (mm)	LE (mm)	LJ (mm)
MS1H4-05B30CB-*63*R-INT	51.5 (78.8)	40	25±0.5	46	2-Ø4.5	34.5	5	2.5±0.5	0.5±0.35
MS1H4-10B30CB-*63*R-INT	62.5 (89.8)	40	25±0.5	46	2-Ø4.5	34.5	5	2.5±0.5	0.5±0.35
MS1H4-20B30CB-*63*R-INT	75.5 (103)	60	30±0.5	70	4- Ø5.5	44	8.0	3±0.5	0.5±0.35
MS1H4-55B30CB-*63*R-INT	96.7	80	35±0.5	90	4- Ø7	54	7.5	3±0.5	0.5±0.35
MS1H4-75B30CB-*63*R-INT	107.3 (141.5)	80	35±0.5	90	4- Ø7	54	7.5	3±0.5	0.5±0.35
MS1H4-10C30CB-*63*R-INT	119.2 (153.4)	80	35±0.5	90	4- Ø7	54	7.5	3±0.5	0.5±0.35

Motor Model	S (mm)	LB (mm)	TP (mm)	LK (mm)	KH (mm)	KW (mm)	W (mm)	T (mm)	Weight (kg)
MS1H4-05B30CB-*63*R-INT	8	Ø30h7 $^{0}_{-0.021}$	M3x6	15.5	6.2 $^{0}_{-0.1}$	3	3	3	0.24 (0.4)
MS1H4-10B30CB-*63*R-INT	8	Ø30h7 $^{0}_{-0.021}$	M3x6	15.5	6.2 $^{0}_{-0.1}$	3	3	3	0.32 (0.48)
MS1H4-40B30CB-*63*R-INT	14	Ø50h7 $^{0}_{-0.025}$	M5x8	16.5	11 $^{0}_{-0.1}$	5	5	5	0.78(1.16)
MS1H4-55B30CB-*63*R-INT	19	Ø70h7 $^{0}_{-0.03}$	M6x20	25	15.5 $^{0}_{-0.1}$	6	6	6	1.85
MS1H4-75B30CB-*63*R-INT	19	Ø70h7 $^{0}_{-0.03}$	M6x20	25	15.5 $^{0}_{-0.1}$	6	6	6	2.18(2.82)
MS1H4-10C30CB-*63*R-INT	19	Ø70h7 $^{0}_{-0.03}$	M6x20	25	15.5 $^{0}_{-0.1}$	6	6	6	2.55(2.9)

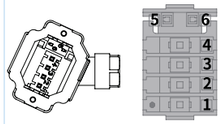
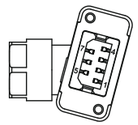
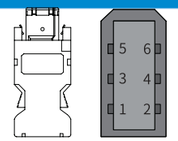
Note:
[1] In the preceding table, values inside the parentheses are for the motor with brake.
[2] The radial runout on the shaft extension end of the 180-flange motors is: 0.03 A
[3] 50 W power cables for motors must use rear outlet mode as shown on the right. This is to prevent the mounting flange face from be disturbed by the power cable. For detailed cable model selection, see section Cables.



Cables and Connector Kits

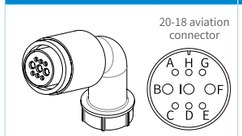
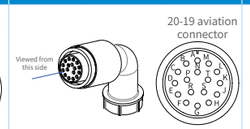
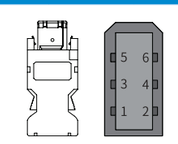
Connection between SV680 and peripherals

Assignment of terminals on the terminal-type motor side (flange size 40/60/80)

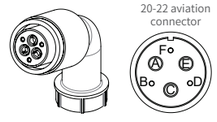
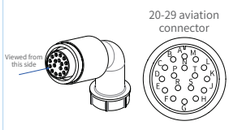
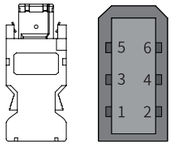
6-pin connector of the power cable		7-pin connector of the encoder on the motor side		6-pin male on the drive side	
 Black 6-pin connector		 6-pin connector		 6-pin male (right side as the joint side)	
Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name
1	PE	1	PS+	1	+5V
2	W	2	PS-	2	GND
3	V	3	DC+	5	PS+
4	U	4	DC-	6	PS-
5	Brake (polarity insensitive)	5	+5V	Enclosure	PE
6		6	GND		
		7	PE		

Connection between SV680 and peripherals

Assignment of terminals on the motor side (flange size 100/130)

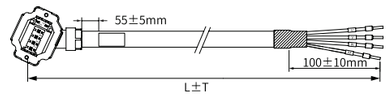
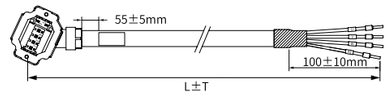
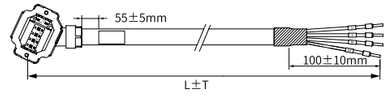
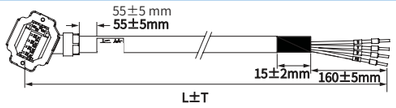
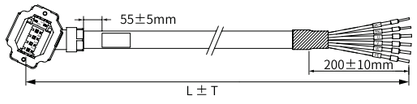
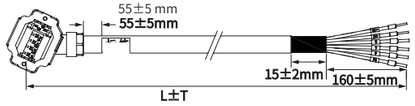
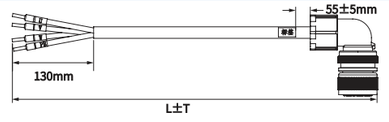
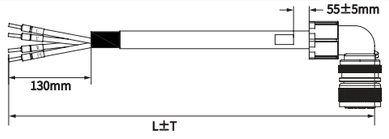
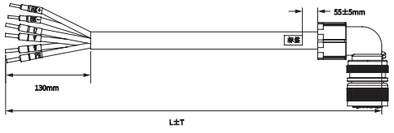
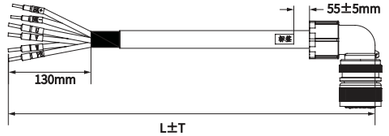
Power cable connector			Encoder cable connector			6-pin male on the drive side		
 MIL-DTL-5015 Series 3108E20-18S aviation connector			 MIL-DTL-5015 series 3108E20-29S aviation connector			 6-pin male (right side as the joint side)		
Pin No.	Pin No.	Color	Pin No.	Signal name	Color	Pin No.	Signal name	Color
B	U	Blue	A	PS+	Blue	1	+5V	Red
I	V	Black	B	PS-	Purple	2	GND	Orange
F	W	Red	E	Battery (+)	Brown	5	PS+	Blue
G	PE	Yellow/ Green	F	Battery (-)	Black	6	PS-	Purple
C	Brake (polarity insensitive)	Red	G	+5V	Red	Enclosure	PE	-
E		Black	H	GND	Orange			
			J	Shield	-			

Assignment of terminals on the motor side (flange size 180)

Power cable connector			Encoder cable connector			6-pin male on the drive side		
 MIL-DTL-5015 Series 3108E20-22S aviation connector			 MIL-DTL-5015 series 3108E20-29S aviation connector			 6-pin male (right side as the joint side)		
Pin No.	Pin No.	Color	Pin No.	Signal name	Color	Pin No.	Signal name	Color
A	U	Blue	A	PS+	Blue	1	+5V	Red
C	V	Black	B	PS-	Purple	2	GND	Orange
E	W	Red	E	Battery (+)	Brown	5	PS+	Blue
F	PE	Yellow/ Green	F	Battery (-)	Black	6	PS-	Purple
B	Brake (polarity insensitive)	Red	G	+5V	Red	Enclosure	PE	-
D		Black	H	GND	Orange			
			J	Shield	-			

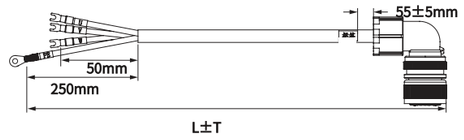
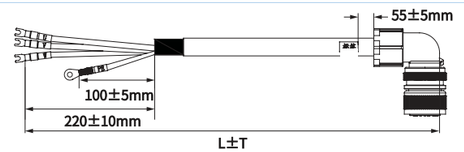
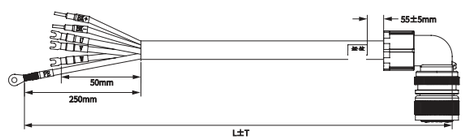
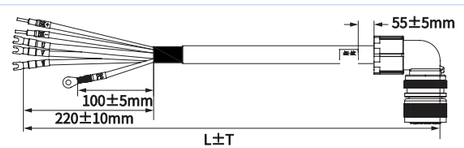
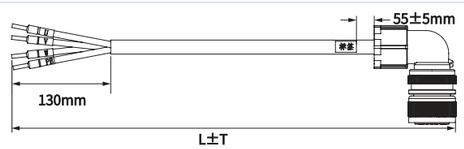
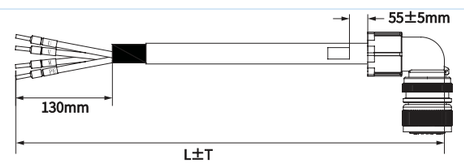
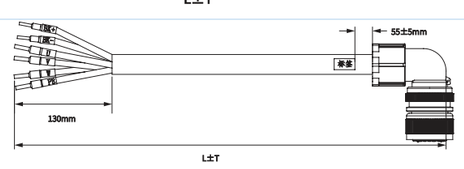
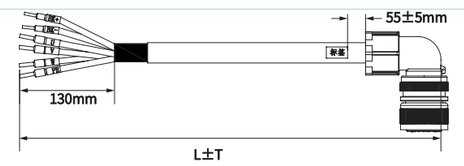
Cables

Power cable

Motor model	Motor Type	Cable model	Cable length (mm)	Toler-ance (T) (mm)	Illustration
MS1H1/ MS1H4 motors	50 W brake-less motor	S6-L-M108-3.0	3000	(-30,30)	
		S6-L-M108-5.0	5000	(-30,30)	
		S6-L-M108-10.0	10000	(-30,30)	
	50 W brake motor	S6-L-B108-3.0	3000	(-30,30)	
		S6-L-B108-5.0	5000	(-30,30)	
		S6-L-B108-10.0	10000	(-30,30)	
	100 W brake-less motor	S6-L-M107-3.0-INT	3000	(-30,30)	
		S6-L-M107-5.0-INT	5000	(-30,30)	
		S6-L-M107-10.0-INT	10000	(-30,30)	
		S6-L-M107-3.0-ZJ-INT	3000	(-20,20)	
		S6-L-M107-5.0-ZJ-INT	5000	(-20,20)	
		S6-L-M107-10.0-ZJ-INT	10000	(-20,20)	
	100 W brake motor	S6-L-B107-3.0-INT	3000	(-30,30)	
		S6-L-B107-5.0-INT	5000	(-30,30)	
		S6-L-B107-10.0-INT	10000	(-30,30)	
		S6-L-B107-3.0-ZJ-INT	3000	(-20,20)	
		S6-L-B107-5.0-ZJ-INT	5000	(-20,20)	
		S6-L-B107-10.0-ZJ-INT	10000	(-20,20)	
MS1H2 motor of 3 kW and below/ MS1H3 motors of 1.8 kW and below	Brake-less motor	S6-L-M111-3.0-INT	3000	(-30,30)	
		S6-L-M111-5.0-INT	5000	(-30,30)	
		S6-L-M111-10.0-INT	10000	(-30,30)	
		S6-L-M111-3.0-ZJ-INT	3000	(-20,20)	
		S6-L-M111-5.0-ZJ-INT	5000	(-20,20)	
		S6-L-M111-10.0-ZJ-INT	10000	(-20,20)	
	Brake motor	S6-L-B111-3.0-INT	3000	(-30,30)	
		S6-L-B111-5.0-INT	5000	(-30,30)	
		S6-L-B111-10.0-INT	10000	(-30,30)	
		S6-L-B111-3.0-ZJ-INT	3000	(-20,20)	
		S6-L-B111-5.0-ZJ-INT	5000	(-20,20)	
		S6-L-B111-10.0-ZJ-INT	10000	(-20,20)	

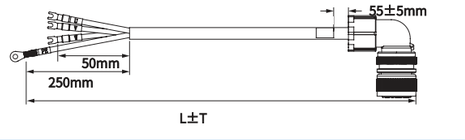
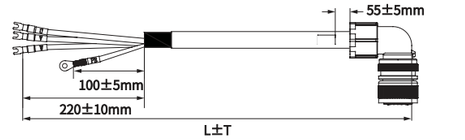
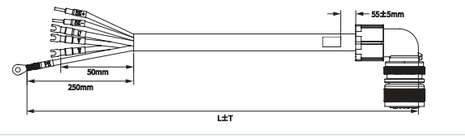
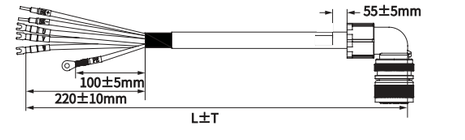
Cables

Power cable

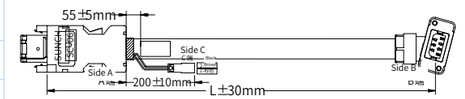
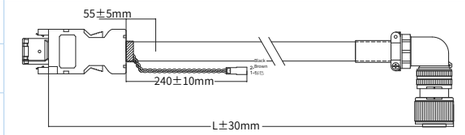
Motor model	Motor type	Cable model	Cable length (mm)	Toler-ance (T) (mm)	Illustration
MS1H2 motors (4 kW/5 kW)	Brake-less motor	S6-L-M011-3.0-INT	3000	(-30,30)	
		S6-L-M011-5.0-INT	5000	(-30,30)	
		S6-L-M011-10.0-INT	10000	(-30,30)	
		S6-L-M011-3.0-ZJ-INT	3000	(-20,20)	
		S6-L-M011-5.0-ZJ-INT	5000	(-20,20)	
		S6-L-M011-10.0-ZJ-INT	10000	(-20,20)	
	Brake motor	S6-L-B011-3.0-INT	3000	(-30,30)	
		S6-L-B011-5.0-INT	5000	(-30,30)	
		S6-L-B011-10.0-INT	10000	(-30,30)	
		S6-L-B011-3.0-ZJ-INT	3000	(-20,20)	
		S6-L-B011-5.0-ZJ-INT	5000	(-20,20)	
		S6-L-B011-10.0-ZJ-INT	10000	(-20,20)	
MS1H3 motors (2.9 kW)	Brake-less motor	S6-L-M112-3.0-INT	3000	(-30,30)	
		S6-L-M112-5.0-INT	5000	(-30,30)	
		S6-L-M112-10.0-INT	10000	(-30,30)	
		S6-L-M112-3.0-ZJ-INT	3000	(-20,20)	
		S6-L-M112-5.0-ZJ-INT	5000	(-20,20)	
		S6-L-M112-10.0-ZJ-INT	10000	(-20,20)	
	Brake motor	S6-L-B112-3.0-INT	3000	(-30,30)	
		S6-L-B112-5.0-INT	5000	(-30,30)	
		S6-L-B112-10.0-INT	10000	(-30,30)	
		S6-L-B112-3.0-ZJ-INT	3000	(-20,20)	
		S6-L-B112-5.0-ZJ-INT	5000	(-20,20)	
		S6-L-B112-10.0-ZJ-INT	10000	(-20,20)	

Cables

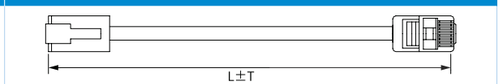
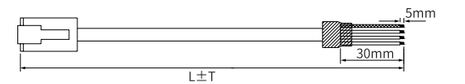
Power cable

Motor model	Cable name	Cable model	Cable length (mm)	Toler-ance (T) (mm)	Illustration
MS1H2 motors (4 kW/ 5 kW)	Brake-less motor	S6-L-M022-3.0-INT	3000	(-30,30)	
		S6-L-M022-5.0-INT	5000	(-30,30)	
		S6-L-M022-10.0-INT	10000	(-30,30)	
		S6-L-M022-3.0-ZJ-INT	3000	(-20,20)	
		S6-L-M022-5.0-ZJ-INT	5000	(-20,20)	
		S6-L-M022-10.0-ZJ-INT	10000	(-20,20)	
	Brake motor	S6-L-B022-3.0-INT	3000	(-30,30)	
		S6-L-B022-5.0-INT	5000	(-30,30)	
		S6-L-B022-10.0-INT	10000	(-30,30)	
		S6-L-B022-3.0-ZJ-INT	3000	(-20,20)	
		S6-L-B022-5.0-ZJ-INT	5000	(-20,20)	
		S6-L-B022-10.0-ZJ-INT	10000	(-20,20)	

Encoder cable

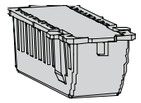
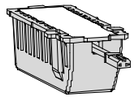
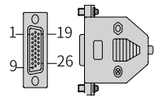
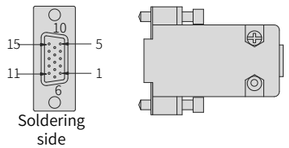
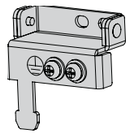
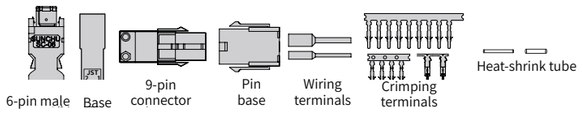
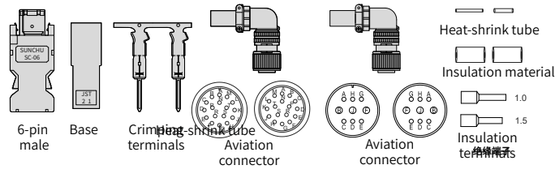
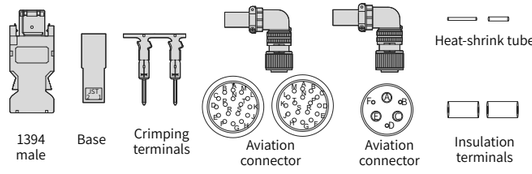
Motor model	Encoder type	Cable model	Cable length (mm)	Toler-ance (T) (mm)	Illustration
MS1H1/ MS1H4 motors	Multi-turn absolute encoder	S6-L-P124-3.0-INT	3000	(-30,30)	
		S6-L-P124-5.0-INT	5000	(-30,50)	
		S6-L-P124-10.0-INT	10000	(-30,80)	
MS1H2/ MS1H3 motors	Multi-turn absolute encoder	S6-L-P121-3.0-INT	3000	(-30,30)	
		S6-L-P121-5.0-INT	5000	(-30,50)	
		S6-L-P121-10.0-INT	10000	(-30,80)	

Communication cable

Cable name	Cable model	Cable length (mm)	Toler-ance (T) (mm)	Illustration
Multi-drive communication cable	S6-L-T04-03	300	(-10,10)	
Drive to host controller communication cable	S6-L-T02-20	2000	(-20,20)	

Connector Kits

Overview of connector kits

Name	Model	Outline Drawing
Battery box kit (battery-less)	S6-C4A-NB	
Battery kit	S6-C4A	
CN1 terminal (DB26)	S6-C74	
CN7 terminal (DB15)	S6-C6	
Shield bracket	S6-C25 S6-C25 (optional for size A to size C) S6-C27 S6-C27 (optional for size D to size E)	
MS1H1/MS1H4 terminal-type motor connector	S6-C26	
MS1H2/MS1H3 motor (1.8 kW and below) connector	S6-C29	
MS1H3 motor (2.9kW and above) connector	S6-C39	

[Note] The battery-less encoder does not need the battery kit. Connecting the battery-less encoder to the battery box can damage the encoder.

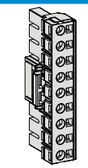
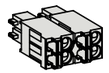
Terminal Accessory Kits

Standard 680P-INT- models

Accessory code

Material code	Name
98050541	Complete accessories (sale)-S6-C70-SV680P size A terminal accessory kit
98050536	Complete accessories (sale)-S6-C58-SV680P Size B/C/D terminal accessory kit
98050537	Complete accessories (sale)-S6-C71-SV680P size E terminal accessory kit

Contents of the accessory kit

Material code	Name	Appearance	Qty
15210577	Pluggable terminal block - Connector - Quick-connect terminal - 9P - Black - With safety lock		1
15210648	Pluggable terminal block - Connector - Quick-connect terminal -2x2P - Orange - Printing on both sides		1
15210695	Pluggable terminal block - Connector - Quick-connect terminal - 4P - Black		1
15211052	Pluggable terminal block - Connector - Quick-connect terminal -/- 3.5 mm - 2x3P - Black - 180° - Screenprint - RoHS		1
15220274	Jumper bar - 16A - Pluggable bridging		1
21020021	Plastic parts - Connector wiring key - For use with servo drive power connector		1

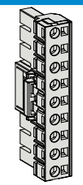
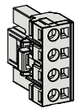
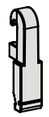
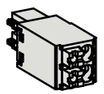
Terminal Accessory Kits

680-INT models with backup power supply

Accessory code

Material code	Name
98050835	Accessories (sale)-S6-C155-SV680P size A terminal accessory kit (backup power supply)
98050840	Accessories (sale)-S6-C156-SV680P size C&D terminal accessory kit (backup power supply)
98050839	Accessories (sale)-S6-C157-SV680P size E terminal accessory kit (backup power supply)

Contents of the accessory kit

Material code	Name	Appearance	Qty
15210577	Pluggable terminal block - Connector - Quick-connect terminal - 9P - Black - With safety lock		1
15210648	Plug-in terminal block - Connector - Quick-connect terminal - 2x2P - Orange - Printing on both sides		1
15210695	Plug-in terminal block - Connector - Quick-connect terminal - 4P - Black		1
15211052	Pluggable terminal block - Connector - Quick-connect terminal -/- 3.5 mm - 2x3P - black - 180° - Screenprint - RoHS		1
15220274	Jumper bar - 16A - Pluggable bridging		1
21020021	Plastic parts - Plug wiring key - For use with servo drive power connector		1
15212326	Pluggable terminal block - Connector - Quick-connect terminal -/- 3.5 mm -1x2P - Orange - 180° - RoHS - Screenprint		1

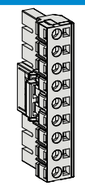
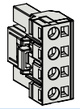
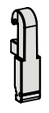
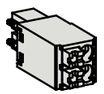
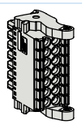
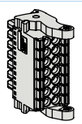
Terminal Accessory Kits

680P-INT-functional safety models

Accessory code

Material Code	Name
98050838	Accessories (sale) - S6-C158- SV680P size A terminal accessory kit (functional safety)
98050836	Accessories (sale)- S6 -C159-SV680P size C&D terminal accessory kit (functional safety)
98050834	Accessories (sale)- S6-C160-SV680P size E terminal accessory kit (functional safety)

Contents of the accessory kit

Material code	Name	Appearance	Qty
15210577	Pluggable terminal block - Connector - Quick-connect terminal - 9P - Black - With safety lock		1
15210648	Pluggable terminal block - Connector - Quick-connect terminal - 2x2P - Orange - Printing on both sides		1
15210695	Pluggable terminal block - Connector - Quick-connect terminal - 4P - Black		1
15211052	Pluggable terminal block - Connector - Quick-connect terminal -/- 3.5 mm - 2x3P - Black - 180° - Screenprint - RoHS		1
15220274	Jumper bar - 16A - Pluggable bridging		1
21020021	Plastic parts - Plug wiring key - For use with servo drive power plug		1
15212326	Pluggable terminal block - Connector - Quick-connect terminal -/-3.5 mm - 1x2P - Black - 180° - RoHS		1
15212114	Pluggable terminal block - Connector - Quick-connect terminal -/- 3.5 mm - 2x7P - Black - 180° - Push rod at both sides - RoHS		1
15212115	Pluggable terminal block - Connector - Quick-connect terminal -NA - 3.5 mm - 2x7P - Black - 180° - Push rod at both sides - RoHS		1

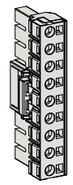
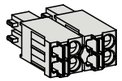
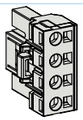
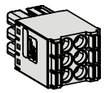
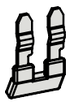
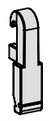
Terminal Accessory Kits

Standard 680N-INT- models

Accessory code

Material code	Name
98050833	Complete accessories (sale) - S6-C70- SV680N size A terminal accessory kit
98050837	Accessories (sale) - S6-C58- SV680N size C&D terminal accessory kit
98050847	Complete accessories (sale) - S6-C71- SV680N size E terminal accessory kit

Contents of the accessory kit

Material code	Name	Appearance	Qty
15210577	Pluggable terminal block - Connector - Quick-connect terminal - 9P - Black - With safety lock		1
15210648	Pluggable terminal block - Connector - Quick-connect terminal - 2x2P - Orange - Printing on both sides		1
15210695	Pluggable terminal block - Connector - Quick-connect terminal - 4P - Black		1
15211052	Pluggable terminal block - Connector - Quick-connect terminal -/- 3.5 mm - 2x3P - Black - 180° - Screenprint - RoHS		1
15220274	Jumper bar - 16A - Pluggable bridging		1
21020021	Plastic parts - Connector wiring key - For use with servo drive power plug		1

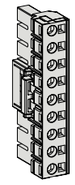
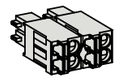
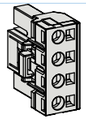
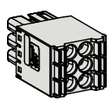
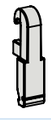
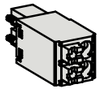
Terminal Accessory Kits

680N-INT models with backup power supply

Accessory code

Material code	Name
98050846	Accessories (sale) - S6-C155- SV680N size A terminal accessory kit (backup power supply)
98050845	Accessories (sale) - S6-C156-SV680N size C&D terminal accessory kit (backup power supply)
98050844	Accessories (sale) - S6-C157-SV680N size E terminal accessory kit (backup power supply)

Contents of the accessory kit

Material Code	Name	Appearance	Qty
15210577	Pluggable terminal block - Connector - Quick-connect terminal - 9P - Black - With safety lock		1
15210648	Pluggable terminal block - Connector - Quick-connect terminal - 2x2P - Orange - Printing on both sides		1
15210695	Pluggable terminal block - Connector - Quick-connect terminal - 4P - Black		1
15211052	Pluggable terminal block - Connector - Quick-connect terminal -/- 3.5 mm - 2x3P - Black - 180° - Screenprint - RoHS		1
15220274	Jumper bar - 16A - Pluggable bridging		1
21020021	Plastic parts - Connector wiring key - For use with servo drive power plug		1
15212326	Pluggable terminal block - Connector - Quick-connect terminal -/-3.5 mm - 1x2P - Orange - 180° - RoHS		1

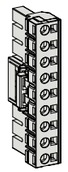
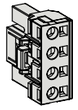
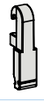
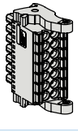
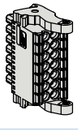
Terminal Accessory Kits

S: Functional safety type

Accessory code

Material code	Name
98050843	Accessories (sale) - S6-C158-SV680N size A terminal accessory kit (functional safety)
98050842	Accessories (sale) - S6-C159-SV680N size A terminal accessory kit (functional safety)
98050841	Accessories (sale) - S6-C160-SV680N size E terminal accessory kit (functional safety)

Contents of the accessory kit

Material code	Name	Appearance	Qty
15210577	Pluggable terminal block - Connector - Quick-connect terminal - 9P - Black - With safety lock		1
15210648	Plug-in terminal block - Connector - Quick-connect terminal - 2x2P - Orange - Printing on both sides		1
15210695	Plug-in terminal block - Connector - Quick-connect terminal - 4P - Black		1
15211052	Pluggable terminal block - Connector - Quick-connect terminal -/- 3.5 mm - 2x3P - Black - 180° - Screenprint - RoHS		1
15220274	Jumper bar - 16A - Pluggable bridging		1
21020021	Plastic parts - Connector wiring key - For use with servo drive power plug		1
15212326	Pluggable terminal block - Connector - Quick-connect terminal -/-3.5 mm - 1x2P - Black - 180° - RoHS		1
15212114	Pluggable terminal block - Connector - Quick-connect terminal -/- 3.5mm - 2x7P- Black - 180° - Push rod at both sides - RoHS		1
15212115	Pluggable terminal block - Connector - Quick-connect terminal - NA - 3.5 mm - 2x7P - Black - 180° - Push rod at both sides - RoHS		1

Document Acquisition

See the following documents for more details on the servo drive and motor.

Name	Data code
98050843 Linear Motor Stages and Drives	19120355
98050842 MS1-R Series Servo Motor	19120307
SV680-INT Series Servo Drive Hardware Guide	PS00015494
SV680-INT Series Servo Drive Quick Installation and Commissioning Guide	PS00015536
SV680-INT Series Servo Drive Communication Guide	PS00015535
SV680-INT Series Servo Drive Parameter Guide	PS00015555
SV680-INT Series Servo Drive Function Guide	PS00015554

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