john.zuo@hcfa.cn

Control Drive Sensor M&E Info.

HCFA

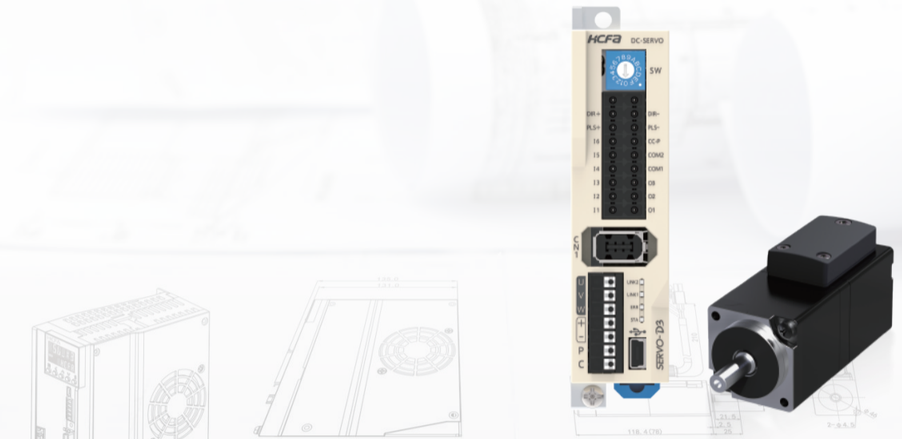
BETTER WORK, BETTER LIFE

HCFA

Initiative Integrity Innovation

D3E SERIES Low-voltage Servo System

IX6MN SERIES Minisize Servo Motor



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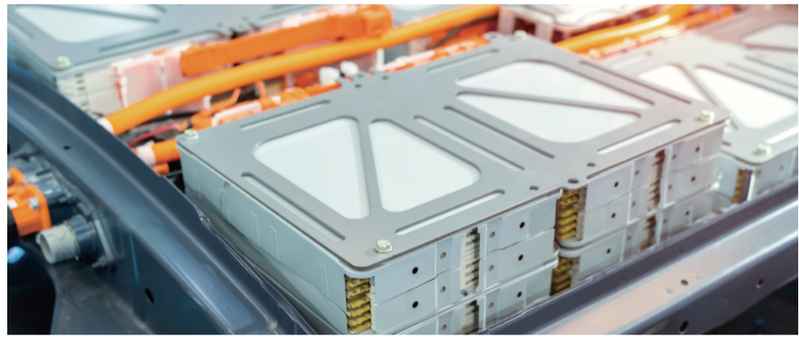
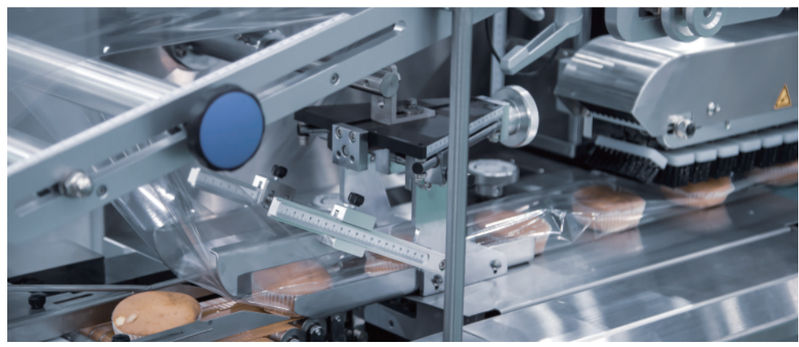
Due to the delay in updating the paper version, please refer to the official website for the latest product information

Be dedicated to creating values in automation industry





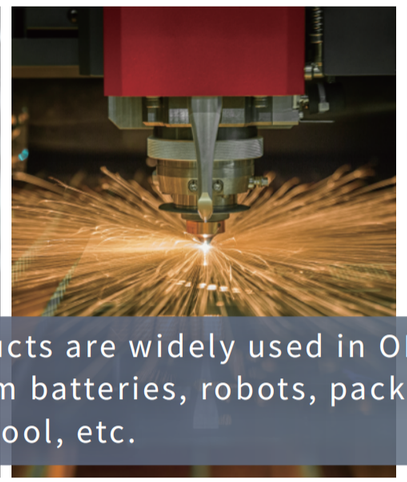
HCFA

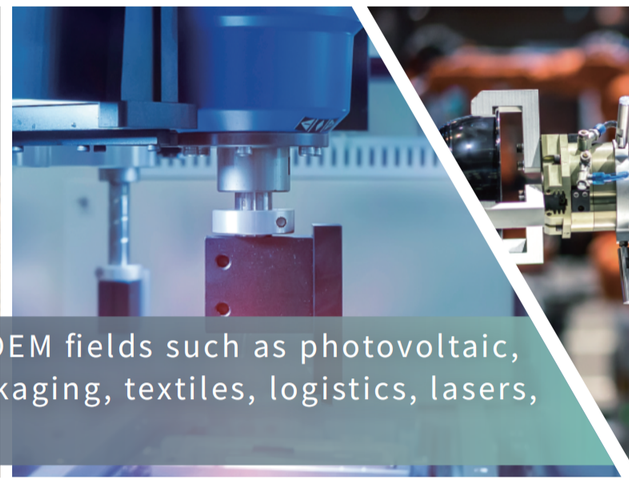
Stock code: 688320.SH

R&D Centers
5
Set up nationally

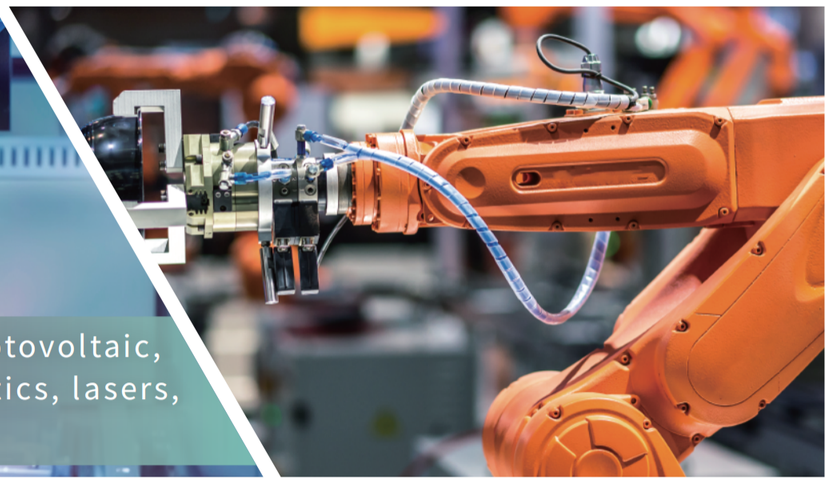
Sales Office
40+
Sales elites gathering

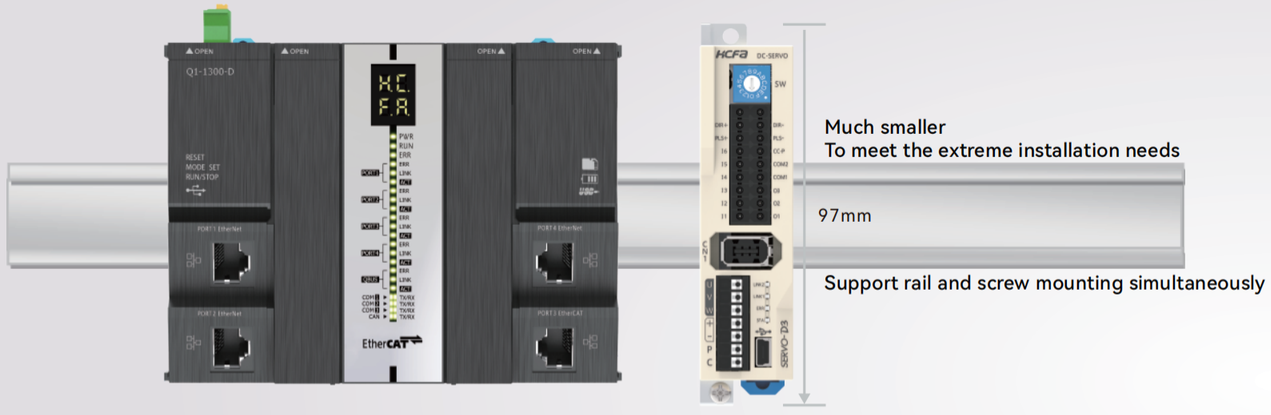
Global Distributor
400+
Products sold worldwide





The products are widely used in OEM fields such as photovoltaic, 3C, lithium batteries, robots, packaging, textiles, logistics, lasers, machine tool, etc.

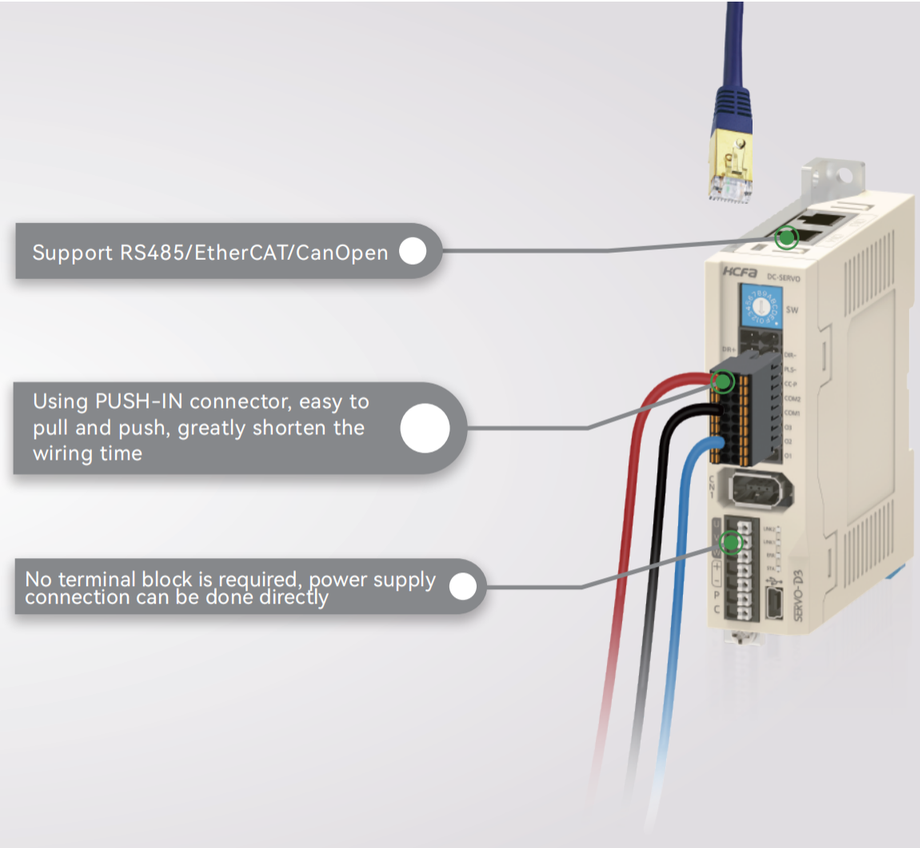




D3E DRIVES

Compact design
Quick response
Rich interfaces

Compact & high ease of use



SV-D3E B 010 L - E

1	2	3	4

1 Types	
A	Pulse type
B	EtherCAT type
N	CANopen type
G	Analog type

2 Output power	
010	100W
020	200W
040	400W
075	750W

3 Main power voltage	
L	DC48V
M*1	DC24V

4 Control power	
E	Internal control power

NOTE *1: 24VDC models:
SV-D3EA010M-E SV-D3EA020M-E
SV-D3EN010M-E SV-D3EN020M-E
SV-D3EB010M-E SV-D3EB020M-E

Excellent user experience

From equipment design to installation and commissioning and maintenance, HCFA fully considers user experience and chooses standard general solutions to improve efficiency.

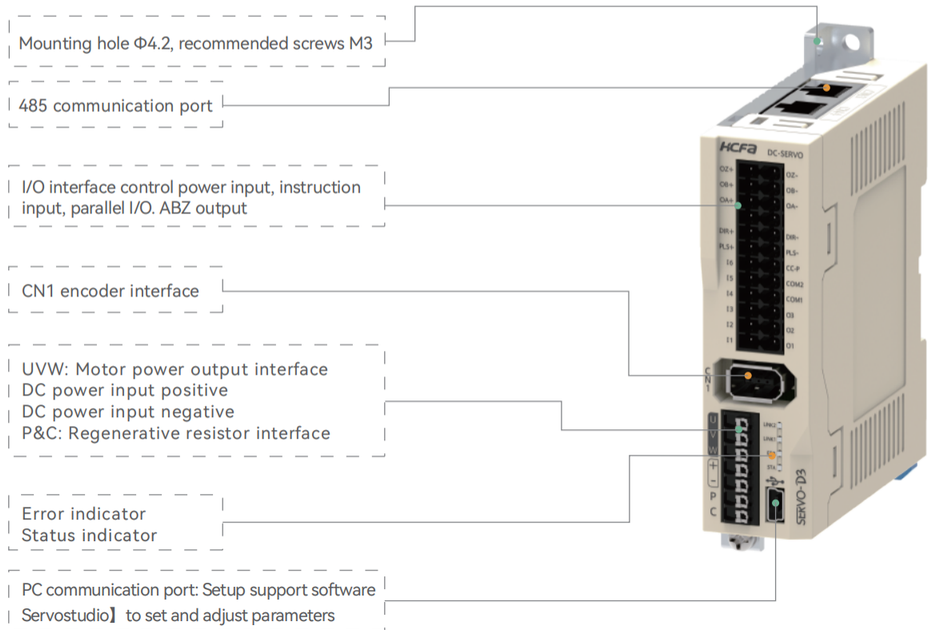
Programming software HCS-Studio

Compatible with all HCFA servo systems. Set the parameters of servo drive through serial port or miniUSB connection. The software can be automatically upgraded, with simple interface and easy maintenance.

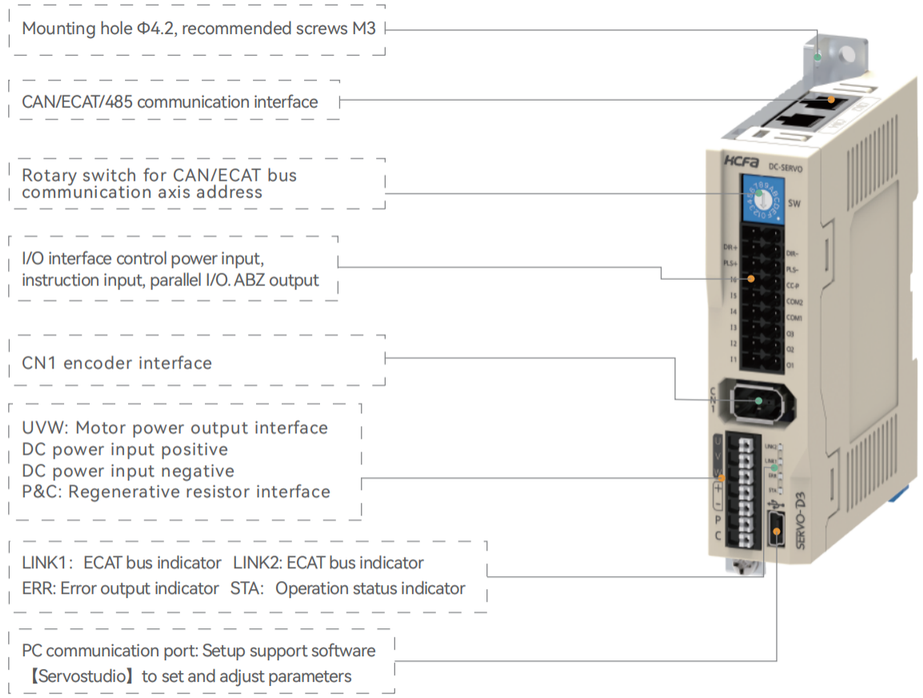
Vibration suppressed to make the movement smoother

Supports Notch Filter, low-frequency resonance suppression, and adaptive filter to quickly suppress vibration.

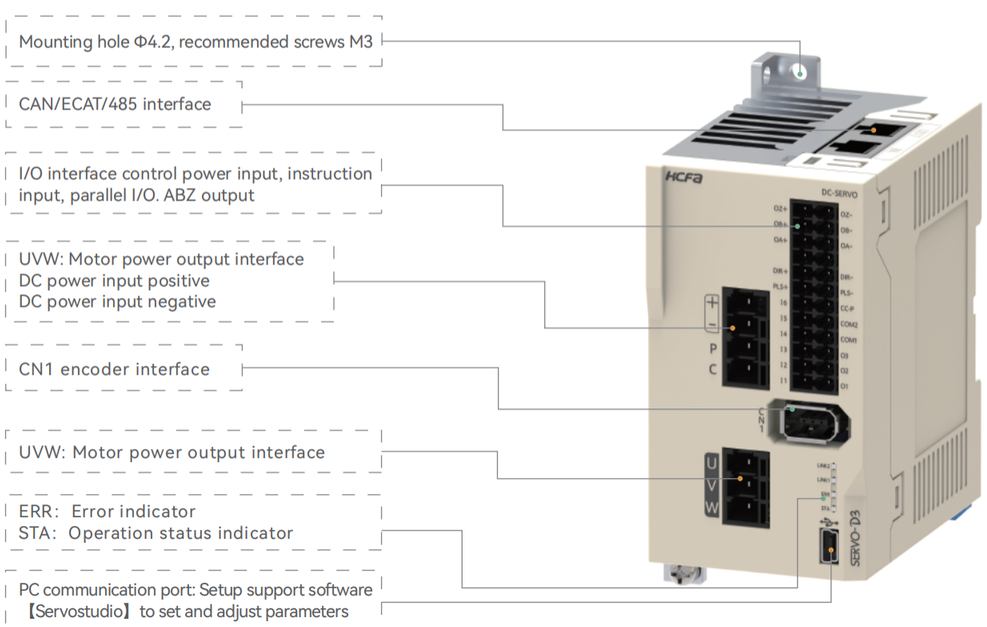
Pulse-type (100W)



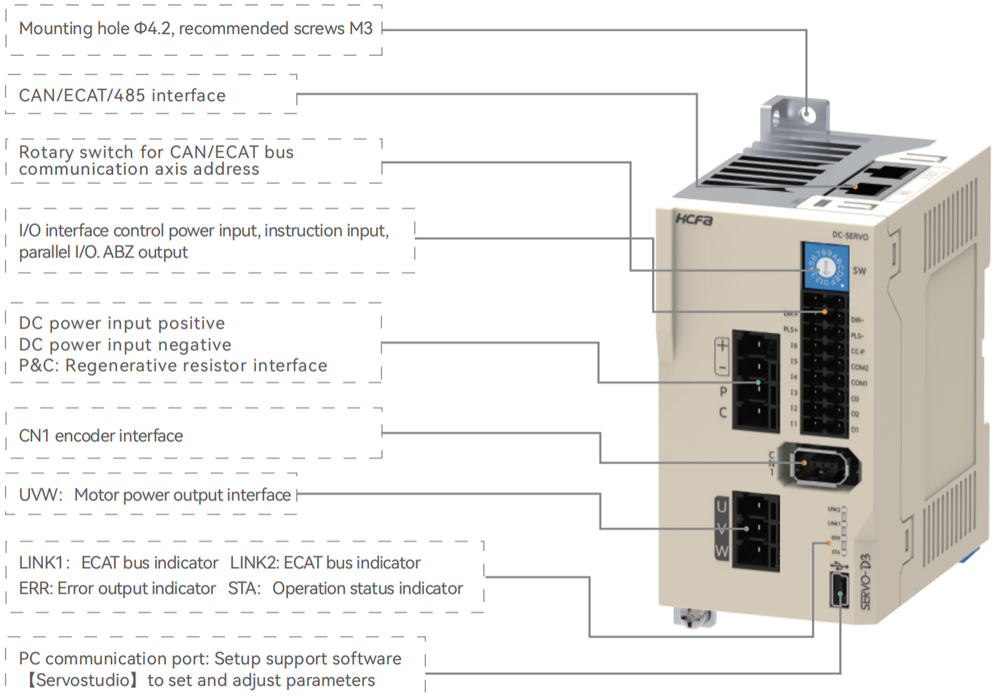
Bus-type (100W)



Pulse-type (400W/750W)



Bus-type (400W/750W)



Environment Specifications

Items			Spefications								
			Pulse input type					EtherCAT/CANOpen bus-type			
Models											
Applicable motor power			10w	20w	30w	40w	50w	100w	200w	400w	750w
Encoder feedback			17bit encoder								
Input power	Main circuit power		DC 48V								
	IO control power		DC 24V								
Environmental specifications	Temperature	Ambient temperature for use	0～55°C								
		Ambient temperature for storage	-20～65°C								
	Humidity	Ambient humidity for use	20～85%RH or less (no condensation)								
		Ambient humidity for storage	20～85%RH or less (no condensation)								
	Atmosphere for use & storage		Indoors (Not subject to direct sunlight); free from corrosive gas, flammable gas, oil mist, or dust								
	Altitude		1000m or less above sea level								
	Vibration		5.8m/s^2 (0.6G) or less, 10~60Hz (No continuous operation allowed at frequency of resonance)								
绝缘耐压			1 minute at 1500 VAC across the primary and FG								

Performance Specifications

Control type		Three-phase PWM inverting sine-wave
Encoder feedback		Single-turn absolute 17-bit (multi-turn absolute with battery)
Control signal	Input	6 inputs (24VDC, photo-coupler insulation) Switch by control mode
	Output	3 outputs (24VDC, photo-coupler insulation, open-collector output) Switch by control mode
Pulse signal	Input	2 inputs (photo-coupler insulation, RS-422 differential, open-collector)
	Output	4 outputs (A/B/Z-phase RS-422 differential, Z-phase open collector output)
Analog signal	Input	2 inputs (DC+10V) (For analog-type models)
Communication function	USB	Connection with PC (with “Servostudio” software)
	Bus	Supporting CAN, ECAT and 485 communication
Regeneration function		External regenerative resistor possible
Dynamic brake		Not built-in
Control mode		6 control modes: Position control, speed control, torque control, position/speed control, position/torque control, speed/torque control

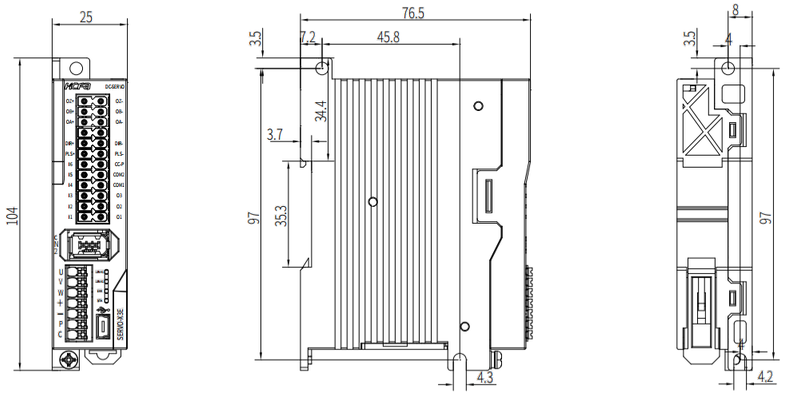
Function Specifications

Items			Spefications
Position control	Control input		Servo ON, alarm reset, deviation counter clear, positive/negative direction over-travel, command input reversal, internal command selection, internal position command input enabled, homing start etc.
	Control output		Alarm state, servo ready, brake off, torque limiting, homing proximity, position reached, homing return completion, motor rotation output, zero-speed output, etc.
	Pulse input	Max input pulse frequency	Differential input: Up to 500KHz, pulse width larger than 1us;Open-collector input: Up to 200KHz, pulse width larger than 2.5us
		Input pulse type	Differential input; open-collector
		Input pulse form	Pulse+ direction, A-Phase + B-Phase, CW+CCW
		Electronic gear	A/B A: 1~1073741824 B: 1~1073741824, Encoder resolution/10000000 < A/B <Encoder resolution/2.5
		Command filter	Smoothing filter, FIR filter
	Pulse output	Output pulse form	A-Phase, B-Phase: Differential output Z-Phase: Differential output
		Division ratio	Arbitrary frequency division
		Output pulse	Encoder pulse or pulse synchronization output
Speed control	Control input		Servo ON, alarm reset, speed instruction negation, zero-speed clamp, internal command selection, external forward/reverse torque limit, emergency stop etc.
	Control output		Alarm state, servo ready, brake off, speed reached, torque limiting, speed limiting, zero-speed output, speed coincidence, motor rotation output etc.
	Internal speed instruction		0~16 segment speed selection by using DI terminal combination
Torque control	Control input		Servo ON, alarm reset, torque instruction negation, zero-speed clamp etc.
	Control output		Alarm state, servo ready, brake off, , torque limiting, speed limit output, emergency stop etc.
	Speed limit		Positive/ negative speed limit P03.27, P03.28
	Speed monitoring		Provided
	Vibration control		Provided
	Adaptive notch filter		Provided
	Auto-tuning		Provided
	Encoder output division and multiplication		Provided
	Internal position control		Provided
	PC setting		Setup support software「Servostudio」to adjust parameters
	Protective functions		Overvoltage, power supply error, overcurrent, overheat, overload, encoder error, over speed, position deviation too large, parameter error

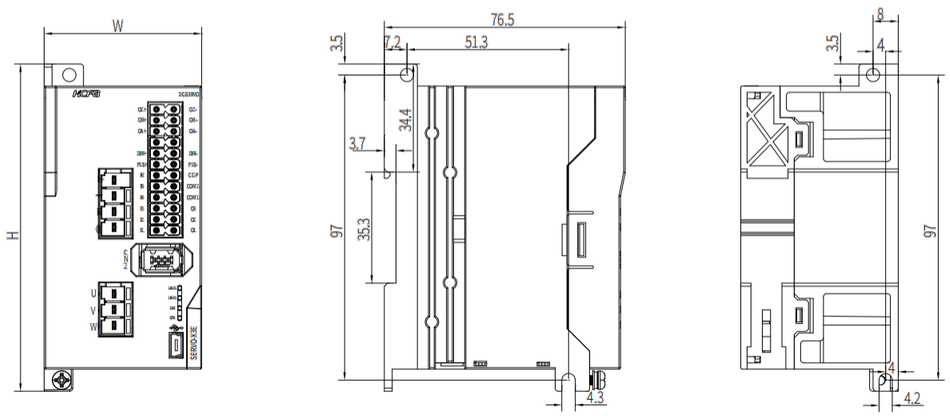
External Dimensions

Models SV-D3E□□□	External dimensions			Weight(kg)
	W (mm)	H (mm)	D (mm)	
010	25	104	76.5	0.17
020	50	104	76.5	0.37
040	50	104	76.5	0.37
075	50	104	76.5	0.37

SV-D3E010



SV-D3E020 SV-D3E040 SV-D3E075

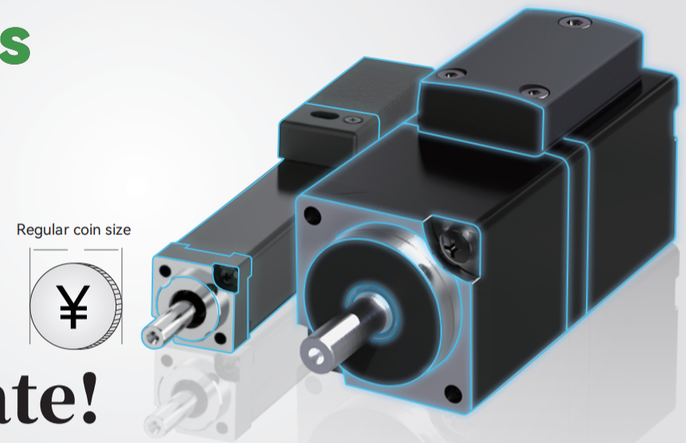


X6MN Series

Much smaller

Much faster

Regular coin size



More accurate!

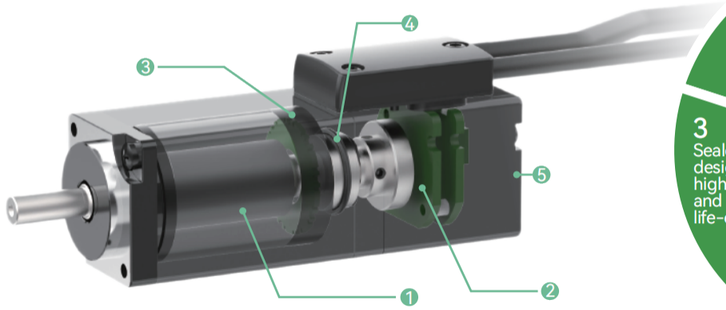
Necessary parts for miniature and high- precision equipment

For some small and high-precision intelligent equipment which needs of small frame size and high-precision, HCFA continue to increase research and development strength and investment, successfully developed the industry's smallest servo motors of SV-X6M series(14mm) . Through excellent electromagnetic analysis technology, optimal structural design, first-class manufacturing technology and advanced equipment, SV·X6M series servo motors have features such as high precision, small size, high torque, low temperature rise, small inertia, and high speed, etc. , to meet the needs of more compact equipment lines. HCFA has applied for a number of national patent for these servo motors.

SVX6M introduction

X6MN series servo motors are equipped with self-developed high-resolution 17-bit absolute encoders, which can meet the industry's high-precision and high-response requirements, are widely used in semiconductor manufacturing equipment (SMT mounting head, semiconductor sorting and picking Etc.), small X-Y platform devices, portable high-precision testing instruments, miniaturized medical instruments, electron microscopes, screw-locking power tools, electronic testing devices and other high-performance fields.

Product Features



SV-X6 MN 001 A - N 6 P A **

1 2 3 4 5 6 7 8

1	Inertia spec.
MN	Micro inertia

2	Power spec.
0024	2.4W
001	10W
002	20W
003	30W
004	40W
005	50W

3	Flange serial No.
A	N/A

4	Brake spec.
N	No brake

5	Voltage spec.
6	DC48V

6	Shaft-end spec.
P	Optical shaft without oil seal
S	Special

7	Encoder spec.
N	Incremental 17bit
A	Absolute 17bit

8	Customization
**	N/A

General Specifications

Items	Specifications	Items	Specifications
Working system	S1	Thermal endurance class	F(155°C)
Vibration class	V15	Dielectric strength	AC1800V 1s(AC200V) AC600V 1s(DC48V)
Insulation resistance	DC500V、10MΩ以上	Protection level	IP 54
Ambient temperature	0~40°C	Ambient humidity	20~80%(no condensation)
Excitation method	Permanent magnetism	Connection	Shaft output
Permanent magnetism	Flange	Rotation direction	CCW viewed from the load side by forward rotation command

X6MN Performance specifications

Items	Specifications					
Voltage	DC24 V/DC48 V*3					
Rated power W	2.4	10	20	30	40	50
Motor models SV-X6MN00□A-N6P□	24A-N6PA 24A-N6PN	1A-N6PA 1A-N6PN	2A-N6PA 2A-N6PN	3A-N6PA 3A-N6PN	4A-N6PA 4A-N6PN	5A-N6PA 5A-N6PN
Flange size mm	14	25				
Weight kg	0.11	0.114	0.143	0.161	0.202	0.225
Ratted torque N · m	0.023	0.032	0.064	0.095	0.127	0.159
Instantaneous max. torque N · m	0.06	0.096	0.192	0.287	0.381	0.477
Rated current Arms	0.6	2.04	1.82	2.7	3.64	3.02
Instantaneous max. current Arms	1.59	6.53	5.83	8.64	11.65	9.67
Rated speed min^{-1}	1000	3000				
Max. speed min^{-1}	1500	6000				5000
Torque constant N · m/Arms	0.043	0.016	0.037	0.038	0.038	0.056
Rotator inertia $\times 10^{-4}$ kg · m^2	0.0023	0.0044	0.0063	0.0079	0.011	0.013
Rated power change rate kW/s	2.28	2.33	6.5	11.55	14.66	19.45

▲ Note: *1 The torque-rotation speed characteristic and the combined servo drive operation are the Typ. value for the motor winding temperature at 100°C. Others are Typ. values at 20°C.

*2 The rated torque indicates the continuous allowable torque value at an ambient temperature of 40°C when mounted on an aluminum heat sink of the following size

SV-X6MN0024A-N6PA SV-X6MN001A-N6PA SV-X6MN002A-N6PA
SV-X6MN0024A-N6PN SV-X6MN001A-N6PN SV-X6MN002A-N6PN
Size for aluminum heat sink: 150×150×3mm

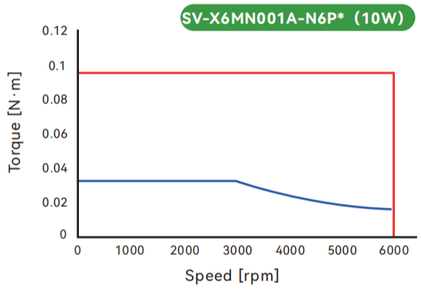
SV-X6MN003A-N6PA SV-X6MN004A-N6PA SV-X6MN005A-N6PA
SV-X6MN003A-N6PN SV-X6MN004A-N6PN SV-X6MN005A-N6PN
Size for aluminum heat sink: 250×250×6mm

*3 The torque-rotation speed characteristics can be changed according to the allowable voltage range of the servo drive main circuit.

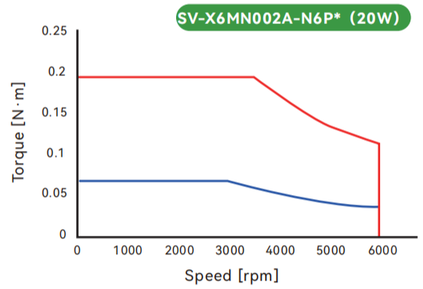
Continuous working range

Instantaneous working range

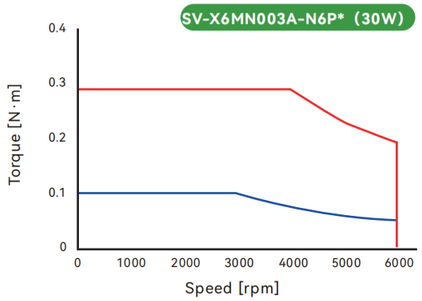
SV-X6MN001A-N6P* (10W)



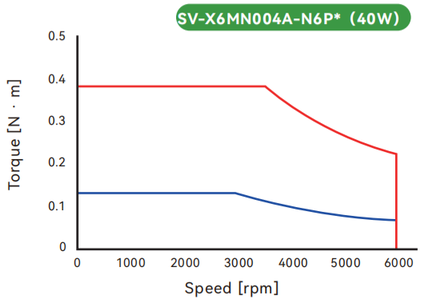
SV-X6MN002A-N6P* (20W)



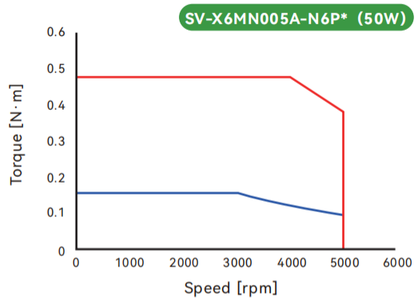
SV-X6MN003A-N6P* (30W)



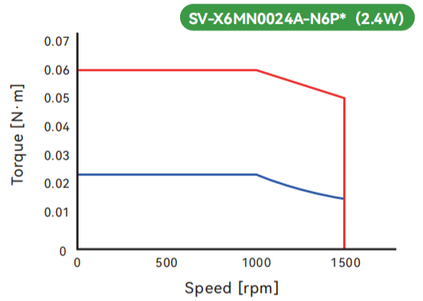
SV-X6MN004A-N6P* (40W)



SV-X6MN005A-N6P* (50W)



SV-X6MN0024A-N6P* (2.4W)

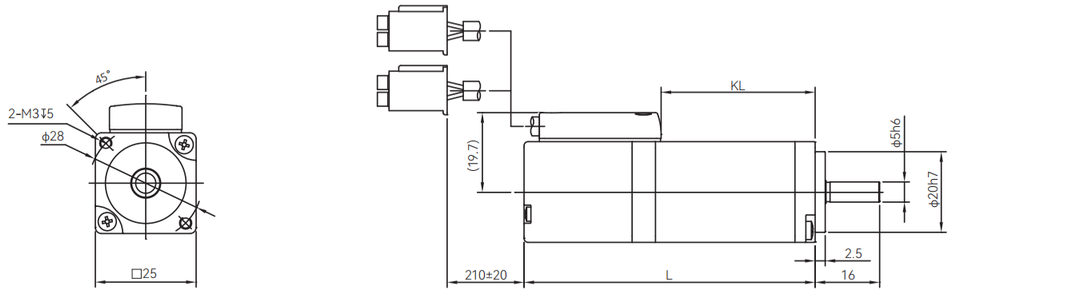


▲ Note: The characteristics may differ when applying DC48V or DC24V to the main circuit of the servo drive .

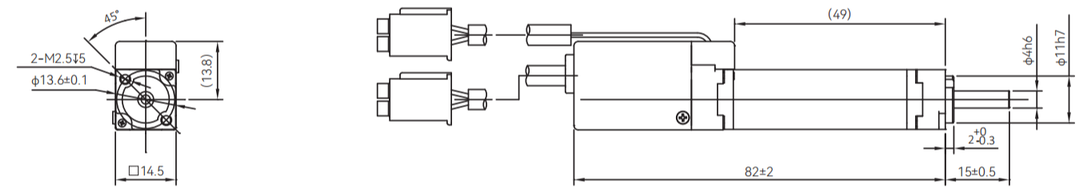
Dimensions

Models	Rated power	Variable size	
		L	KL
SV-X6MN001A-N□P□	10W	60	26
SV-X6MN002A-N□P□	20W	69	35
SV-X6MN003A-N□P□	30W	74	40
SV-X6MN004A-N□P□	40W	86	52
SV-X6MN005A-N□P□	50W	95	61

Diagram

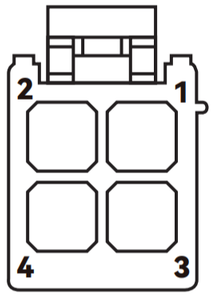


SV-X6MN0024A-N6P*(2.4W)



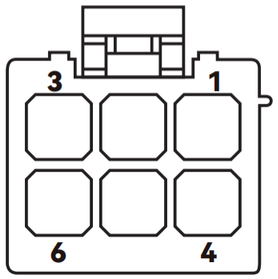
X6MN Power connector

Power side of servo motor		
Pins	Functions	Color
1	U	Red
2	V	White
3	W	Black
4	C.G	Olivine



X6MN Encoder connector

Power side of servo motor		
Pins	Functions	Color
1	BATT	Green
2	+D	Yellow
3	-D	Blue
4	VCC	Red
5	GND	Grey
6	SHIELD	Black



X6MN Combinations for servo drive and motor

Motor models	Voltage class	Power	Rated current	Rated torque	Recommended servo drive
SV-X6MN0024A-N6PA(N)	DC 48V	2.4W	0.6A	0.023N·M	SV-D3E*010L-E
SV-X6MN001A-N6PA(N)		10W	2.04A	0.032N·M	SV-D3E*010L-E
SV-X6MN002A-N6PA(N)		20W	1.82A	0.064N·M	SV-D3E*010L-E
SV-X6MN003A-N6PA(N)		30W	2.7A	0.095N·M	SV-D3E*010L-E
SV-X6MN004A-N6PA(N)		40W	3.64A	0.127N·M	SV-D3E*010L-E
SV-X6MN005A-N6PA(N)		50W	3.02A	0.159N·M	SV-D3E*010L-E

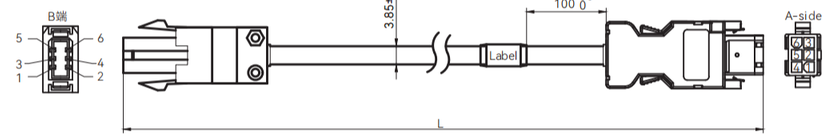
▲Note: * is A: Pulse-type; B: EtherCAT type; N: CANOpen type; G: Analog type

X6MN Encoder cable

SVCAB-ENC005A-*m

A-B:

A-side		Color	Signal name	B-side
1	AWG#28	Green	BATT	4
2		Yellow	+DO	5
3		Blue	-DO	6
4		Red	VCC	1
5		Grey	GND	2
6		Black (ground-wire)	PE	Iron-shell

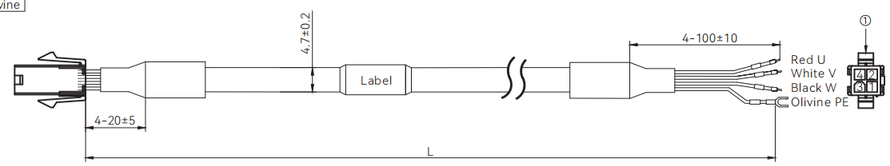


X6MN Power cable

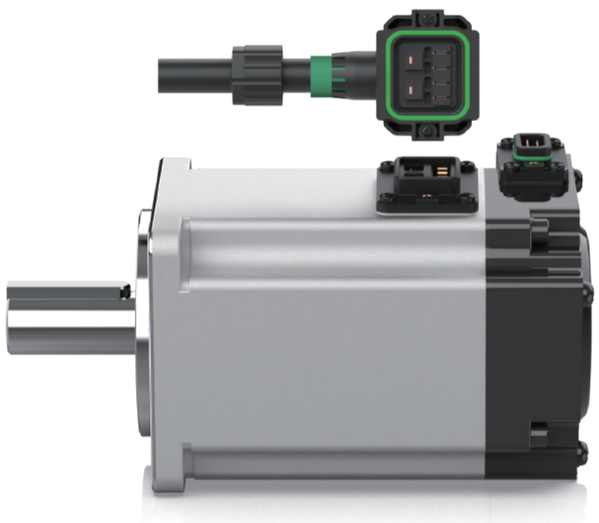
CAB-PWR005A-*m

Sequence at ①:

No.	Wire gauge	Color
1	AWG#24	Red
2		White
3		Black
4		Olivine



Cables	Name	Cables
Encoder cable	SVCAB-ENC005A-1.5m SVCAB-ENC005A-3m SVCAB-ENC005A-5m	28AWG
Power cable	CAB-PWR005A-1.5m CAB-PWR005A-3m CAB-PWR005A-5m	24AWG



Flange for standard servo motor:
40mm 60mm 80mm

Built-in 17bit encoder, the max. speed can reach 4500rpm

SV-X2 MA 075A N 6 L N **

1 2 3 4 5 6 7

1	Inertia spec.
MA	Low inertia
MM	Middle inertia
MH	High inertia

2	Power spec.
010A	100W
020A	200W
040A	400W
075A	750W

3	Brake spec.
N	No brake
B	24V brake

4	Voltage spec.
6	DC48V
8	DC24V

5	Shaft-end spec.
K	Lead-wire /no oil seal
L	Lead-wire/with oil seal

6	Encoder spec.
N	Single-turn absolute 17bit
A	Multi-turn absolute 17bit

7	Customization
**	N/A

X2M Performance specifications (48V)

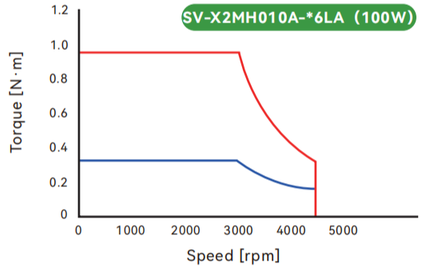
Items	Specifications			
Voltage	DC48 V			
Rated power W	100	200	400	750
Motor models SV-X2M□0□□A-□6LA	H-10A-N6LA H-10A-B6LA	A-20A-N6LA A-20A-B6LA	A-40A-N6LA A-40A-B6LA	A-75A-N6LA A-75A-B6LA
Flange size mm	40	60	60	80
Weight(no/with brake) kg	0.48/0.69	1.08/1.58	1.51/2.01	2.92/3.72
Ratted torque N · m	0.32	0.64	1.27	2.39
Instantaneous max. torque N · m	0.7	1.28	3.82	7.32
Rated current Arms	3.5	8	11	21
Instantaneous max. current Arms	9	20	33	-
Rated speed min^{-1}	3000	3000	3000	3000
Max. speed min^{-1}	4500	4000	3500	4000
Torque constant N · m/Arms	0.09	0.101	0.132	0.119
Torque constant×$10kg^{4}\cdot m^{2}$(no brake)	0.092	0.17	0.35	0.988
Rotator inertia×$10kg^{4}\cdot m^{2}$(with brake)	0.095	0.21	0.38	1.2
Rated power change rate kW/s	12.1/-	24.6/19.8	41.4/38.4	53.6/51.2

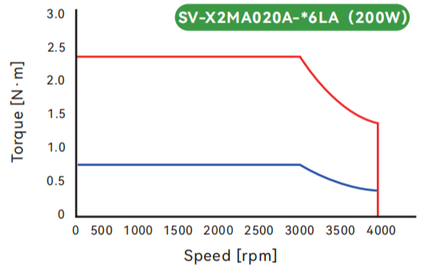
X2M Performance specifications (24V)

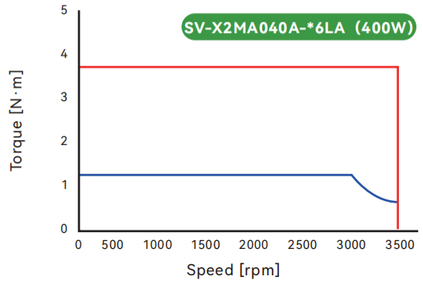
Items	Specifications		
Voltage	DC24 V		
Rated power W	100	200	320
Motor models SV-X2M□0□□A-□6LA	H-10A-N8LA H-10A-B8LA	A-20A-N8LA	H-32A-N8LA
Flange size mm	40	60	60
Weight(no/with brake) kg	0.48/0.69	1.08/-	1.51/-
Ratted torque N · m	0.32	0.64	1
Instantaneous max. torque N · m	0.64	1.28	2
Rated current Arms	6.6	14.5	21
Instantaneous max. current Arms	13.2	30	42
Rated speed min^{-1}	3000	3000	3000
Max. speed min^{-1}	4000	4500	3200
Torque constant N · m/Arms	0.05	0.046	0.06
Torque constant×$10kg^{4}\cdot m^{2}$(no brake)	0.092	0.17	0.73
Rotator inertia×$10kg^{4}\cdot m^{2}$(with brake)	0.095	-	-
Rated power change rate kW/s	12.1/-	-	22.8

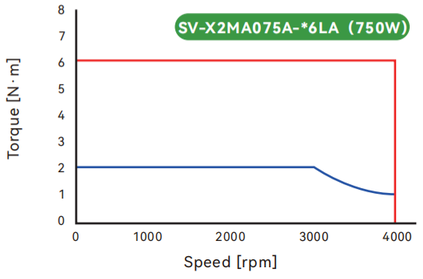
Continuous working range

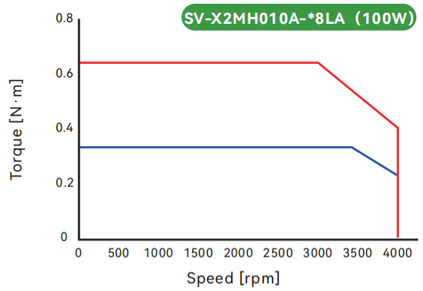
Instantaneous working range

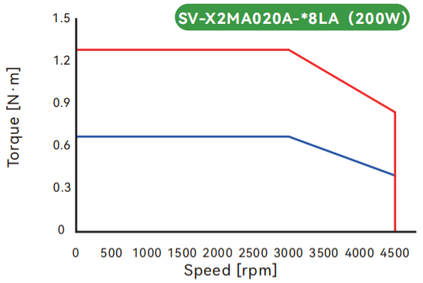


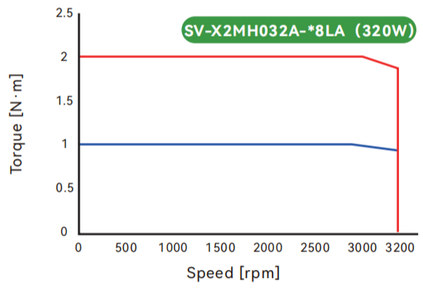












X2M Dimensions (48V)

Unit(mm)

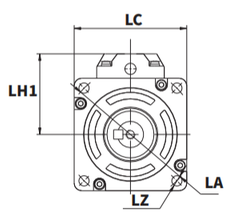
Models	SV-X2MH010A-N6LA SV-X2MH010A-B6LA	SV-X2MA020A-N6LA SV-X2MA020A-B6LA	SV-X2MA040A-N6LA SV-X2MA040A-B6LA	SV-X2MA075A-N6LA SV-X2MA075A-B6LA
LC	40	60	60	80
LA	ϕ46	ϕ70	ϕ70	ϕ90
LB	ϕ30	ϕ50	ϕ50	ϕ70
LZ	2-ϕ4.3	4-ϕ5.5	4-ϕ5.5	4-ϕ6.6
LR	25±0.5	30±0.5	30±0.5	35±0.5
S	ϕ8 h6	ϕ14 h6	ϕ14 h6	ϕ19 h6
LL no brake [with brake]	76.7 [110.7]±1	80 [116.5]±1	119[155.5]±1	128 [165]±1
LG	5	6.5	6.5	8
LE	3	3	3	3
LH1	34.5±0.5	43±0.5	48±0.5	58±0.5
H-typecable length for lead-wire type	210±20	210±20	250±20	250±20

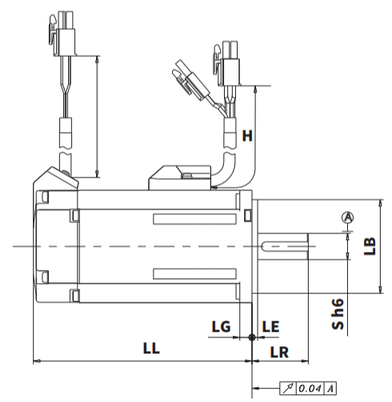
X2M Dimensions (24V)

Unit(mm)

Models	SV-X2MH010A-N8LA SV-X2MH010A-B8LA	SV-X2MA020A-N8LA	SV-X2MH032A-N8LA
LC	40	60	60
LA	ϕ46	ϕ70	ϕ70
LB	ϕ30	ϕ50	ϕ50
LZ	2-ϕ4.3	4-ϕ5.5	4-ϕ5.5
LR	25±0.5	30±0.5	30±0.5
S	ϕ8 h6	ϕ14 h6	ϕ14 h6
LL	76.7 [110.7]±1	80 [116.5]±1	98.6 [-]
LG	5	6.5	6.5
LE	3	3	3
LH1	34.5±0.5	48±0.5	48±0.5
H-typecable length for lead-wire type	210±20	250±20	250±20

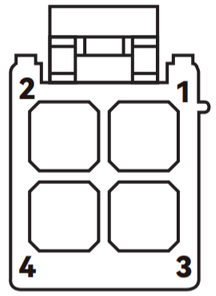
Diagram





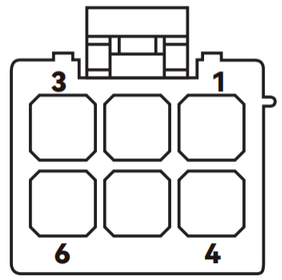
X2M Power connector

Power side of servo motor		
Pins	Functions	Color
1	U	Red
2	V	White
3	W	Black
4	C.G	Green



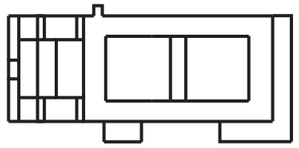
X2M Encoder connector

Power side of servo motor		
Pins	Functions	Color
1	BATT	Yellow(red marked)
2	+DO	White(red marked)
3	-DO	White(black marked)
4	VCC	Orange(red marked)
5	GND	Orange(black marked)
6	SHIELD	Black



X2M Brake connector

Power side of servo motor		
Pins	Functions	Color
1	BRK1	Yellow
2	BRK2	Cyan



X2M Combinations for servo drive and motor

Motor models	Voltage class	Power	Rated current	Rated torque	Recommended servo drive
SV-X2MH010A-N(B)6LA	DC 48V	100W	3.5A	0.32N·M	SV-D3E*010L-E
SV-X2MA020A-N(B)6LA		200W	8A	0.64N·M	SV-D3E*020L-E
SV-X2MA040A-N(B)6LA		400W	11A	1.27N·M	SV-D3E*040L-E
SV-X2MA075A-N(B)6LA		750W	21A	2.39N·M	SV-D3E*075L-E

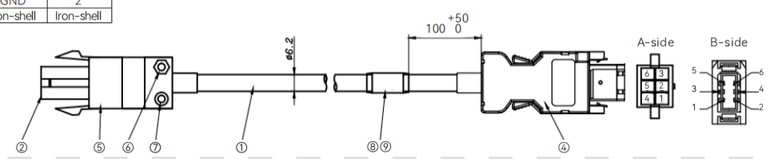
▲Note: * is A: Pulse-type; B: EtherCAT type; N: CANOpen type; G: Analog type

Encoder cable(general-purpose)

Sequence at A-B:

A-side	Wire gauge	Color	Signal name	B-side
1	AWG26	Yellow(red marked)	BATT	4
2		White(red marked)	+DO	5
3		White(black marked)	-DO	6
4		Orange(red marked)	VCC	1
5		Orange(black marked)	GND	2
6		Weave	Iron-shell	Iron-shell

SVCAB-ENC75A-*M

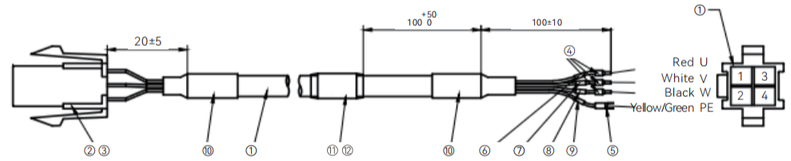


X2M Power cable (100~200W models)

Sequence at ①:

No.	Wire gauge	Color
1	AWG20	Red
2		White
3		Black
4		Yellow/green

CAB-PWR75A-*M

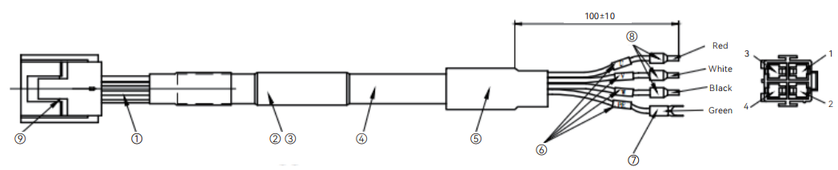


X2M Power cable(for 400 ~750W models)

Sequence at ①:

No.	Wire gauge	Color
1	AWG13	Red
2		White
3		Black
4		green

CAB-PWR75A-*M-48V



X2M Power brake cable(for 100~200W models)

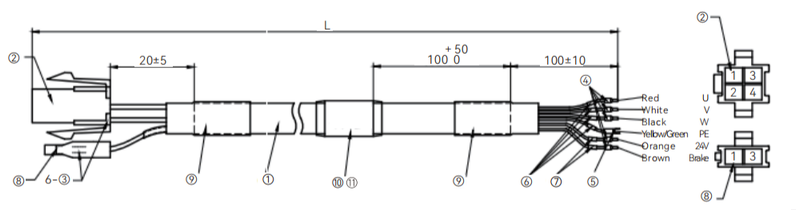
Sequence at ①:

No.	Wire gauge	Color
1	AWG20	Red
2		White
3		Black
4		Yellow/green

Sequence at ④:

No.	Wire gauge	Color
1	AWG22	Orange
2		Brown

CAB-PWB75A-*M



X2M Power brake cable(for 400~750W models)

Sequence at ①:

No.	Wire gauge	Color
1	AWG13	Red
2		White
3		Black
4		Green
5	AWG23	Orange(yellow)
6		Brown(cyan)

CAB-PWB75A-*M-48V