

VEICHI

SD700 Series High Performance Servo System



VEICHI

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VEICHI Electric Co., Ltd. is a high-tech enterprise that is professionally engaged in the development, manufacturing and marketing of industrial automatic control products, and we are committed to becoming a global leading provider of industrial automatic control products and system solutions.

VEICHI is a competitive company and adopts the dual-base operating mode, which contains the Shenzhen VEICHI and Suzhou VEICHI. Suzhou VEICHI Electric Co., LTD is located in Suzhou Wuzhong Economic and Technological Development Zone, which covers 50 acres. The total construction area is approximately 80 thousand square meters and all properties are privately run. Additionally, VEICHI is always at the forefront of the domestic industrial automation field.

VEICHI has become the flagship company of industrial automation, which owns an innovative R&D team and establishes a good corporation relationship with famous universities and research institutions. Currently, VEICHI owns more than 110 patents of invention, and many of them are in the leading position both at home and abroad, which completely has independent intellectual property rights. VEICHI produces a variety of core products, including Variable Frequency Drive (VFD), Servo Drive System, Photovoltaic Inverter, PLC, HMI, and automation equipment, which are widely used in industries such as oil & gas, chemical, ceramic, crane & construction hoist, lathe, Auto making, metallurgy, electrical cable and wire, plastic, print and package, textile, chemical fiber, metal work and , coalmining and municipal engineering. Suitable solutions and products are always ready to meet the demands and improve comprehensive competitiveness of customers.

"Innovation is the lifeblood of VEICHI", therefore we're committed to becoming one of the leading providers of electric drives, industrial control and green energy products. VEICHI has set up more than 40 brand offices in China and dozens of partners in Asia, Europe and Africa. VEICHI has been named Chinese Electrical Industry's Top Ten National Brands, Chinese Electrical Industry Top Ten Satisfying Brands and Top Ten National Brands of Inverter Industry. VEICHI products have become the first choice of many enterprises.



SD700 Series High Performance Servo System

Latest
software
algorithm
design

Latest
hardware
platform
design

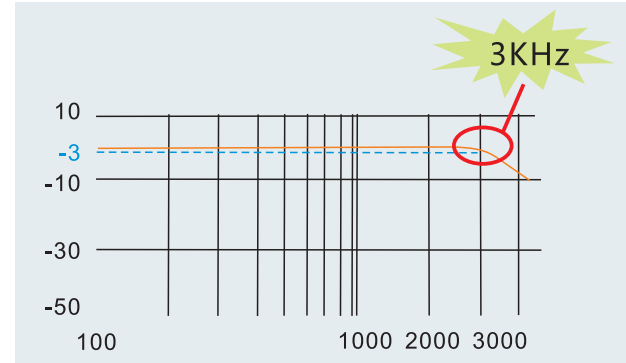
Latest
structure
appearance
design



Product features

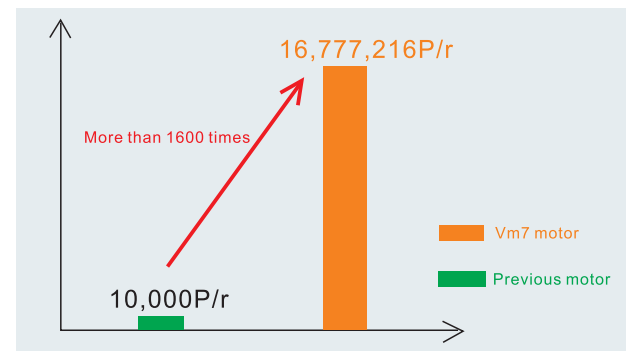
3KHz speed loop response bandwidth

The unique current algorithm can effectively improve the speed loop bandwidth which can greatly reduce the adjusting time and improve production efficiency. The fastest adjusting time can reach 1ms.



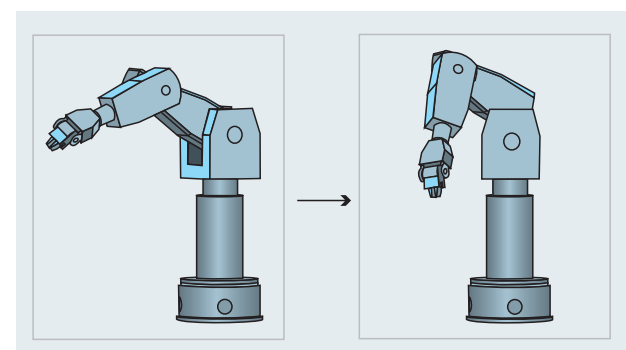
24-bit absolute encoder

Use the industrial top level 24-bit absolute encoder which single loop is up to 16,777,216 pulses and communication speed is up to 4Mbps. It can achieve more accurate positioning, more stability at low speed and no loss under power failure.



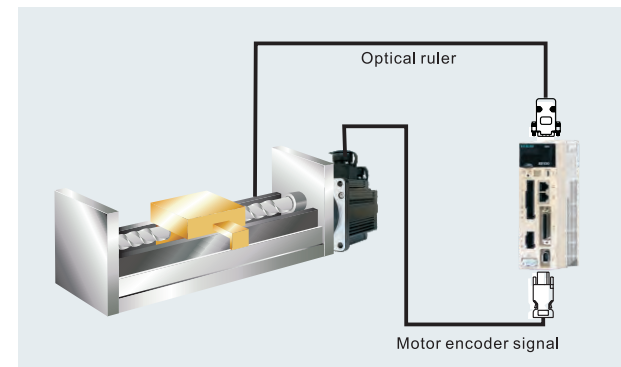
Robust control

Adopt latest control theory algorithm to achieve load rotating inertia within 30 times (even load changes during processing). It can ensure stable operation without parameter adjustment and can be used after installation.



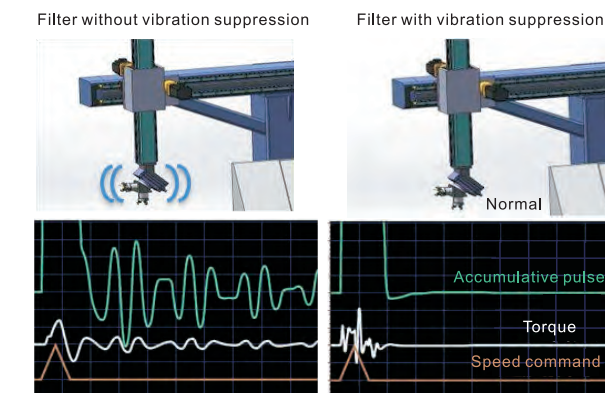
Support full closed loop mode

The full closed loop mode supports external second encoder or grating ruler to reduce mechanical transmission gaps and increase the actual positioning accuracy.



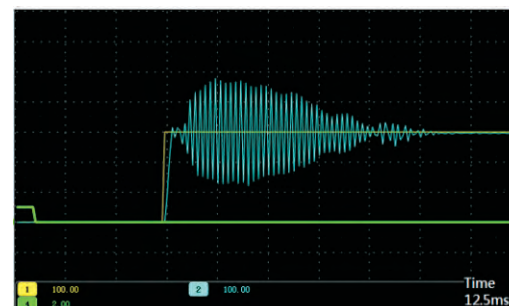
Low frequency vibration suppression function

The vibration filter can be set manually or automatically via the upper machine softwares to effectively eliminate the inherent vibration frequency, greatly reduce the stop axis jitter (sloshing) and effectively suppress vibration in 0~100Hz frequency.



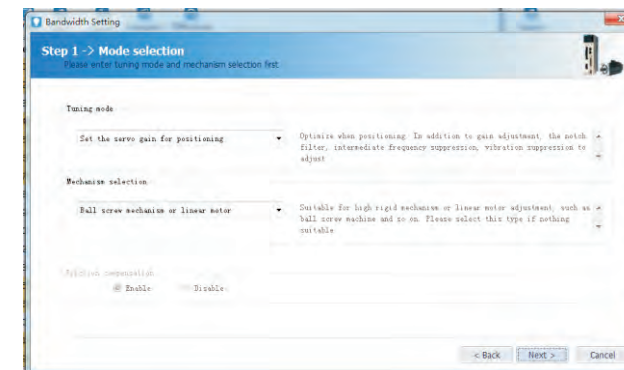
Auto set notch filter

There is no need to do complex vibration frequency measurement and analysis. The notch filter is quickly searched and automatically set through the single parameter adjustment function of the upper machine. It features easy to use, and the shortest time is within 70ms. It can greatly reduce the noise and vibration due to the equipment mechanical resonance so as to achieve more rapid response operation.



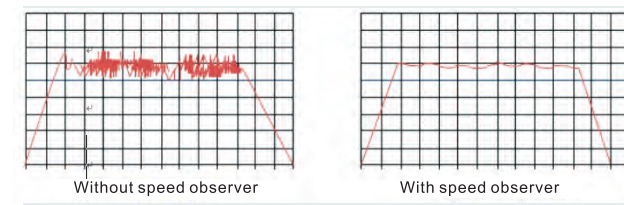
Intelligent setting

Automatic gain adjustment, guided setting mode, and sequential setting can complete servo gain settings, which is easy to use. It also provides more adjustment modes, which can be adjusted according to different mechanical structure and technological characteristics, so that the machine can reach the optimum state.



Speed observer

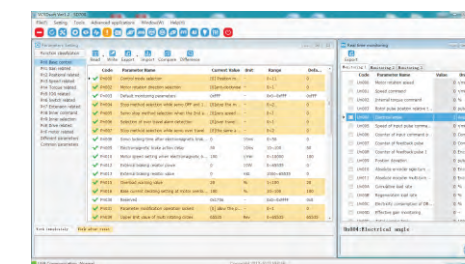
It can effectively eliminate noise feedback from low resolution encoder and improve speed loop response bandwidth.



Powerful PC software

Debugging software free of installation.

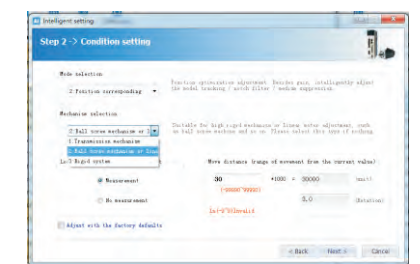
The USB communication between the drive and computer is simple and easy to use.



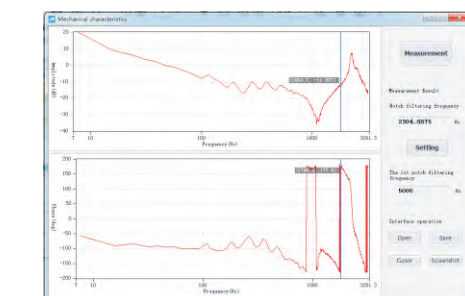
Batch parameter reading and writing



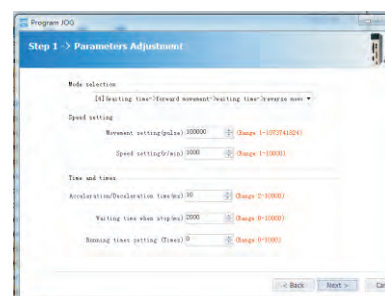
Inertia identification



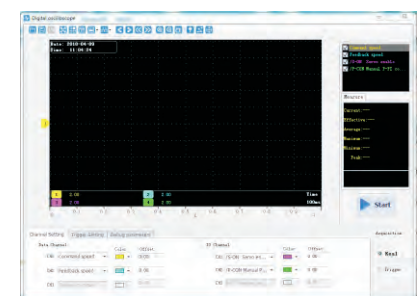
Guide PID parameters according to different mechanical structures



Mechanical characteristics analysis, automatic resonance suppression



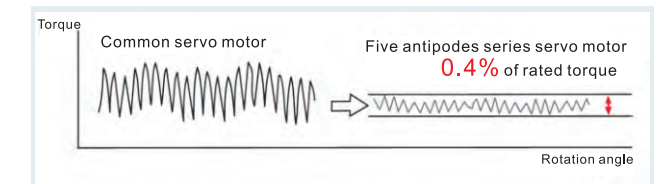
Internal position loop program JOB facilitates easy debugging



The online oscilloscope can monitor in real-time (125us) with multi-channels

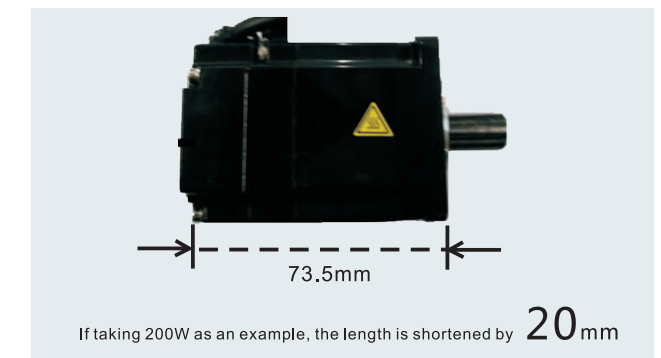
Greatly reduce motor ripple torque and stably operate at low speed

10 stages rotor and 12 slots stator are adopted. The unique magnetic circuit design can effectively suppress slot effect and greatly reduce ripple torque to ensure constant motor speed and stable operation at low speed.

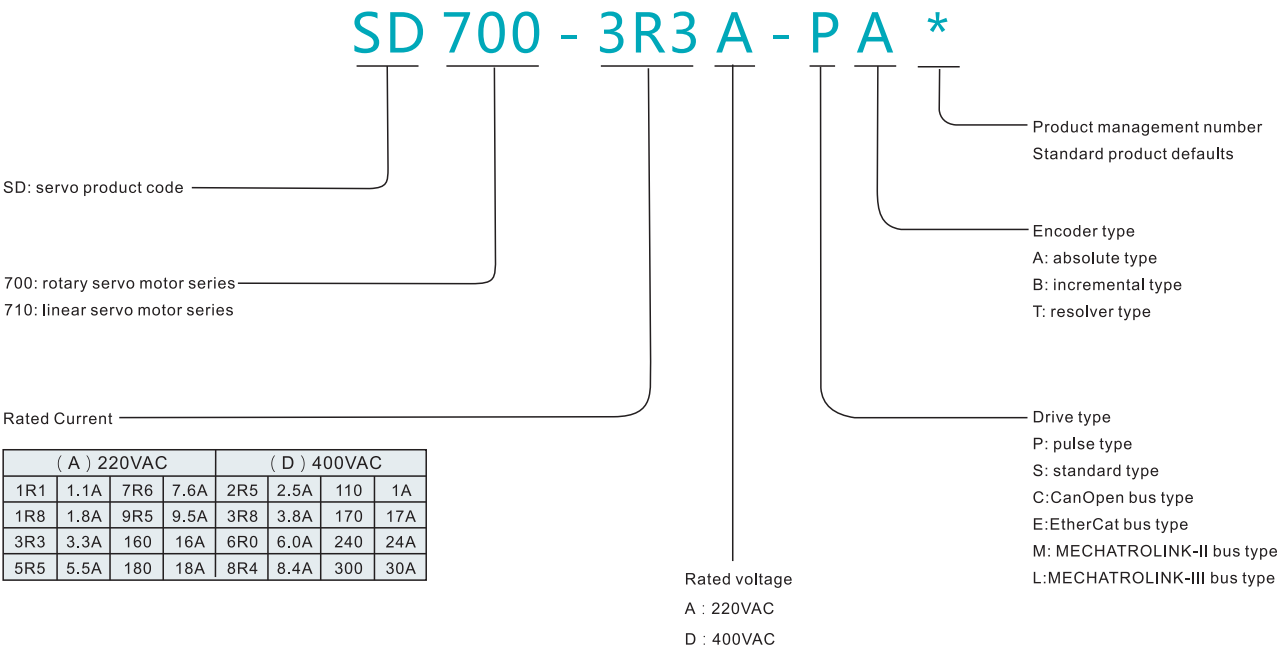


Motor miniaturization and high dynamic performance

Adopt the latest manufacturing techniques to optimize magnetic circuit design and reduce magnetic loss, achieving motor high dynamic response performances; Besides, the motor volume is reduced by 20%.



Model explanation

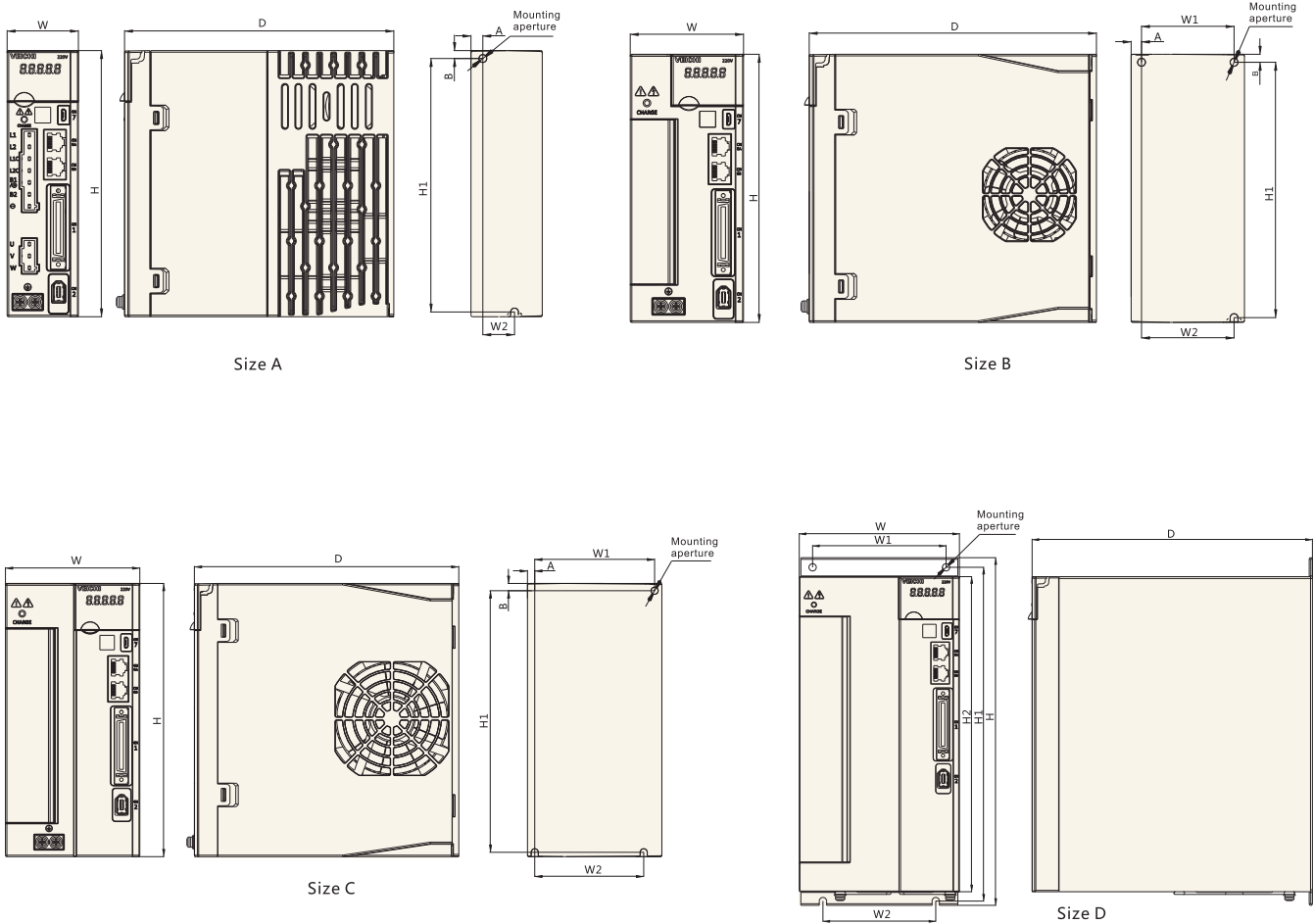


Code	Model	Pulse Input	16-bit analog	full closed loop	RS485	CANopen	PROFIBUS-DP	EtherCAT	MECHATRO LINK II	MECHATRO LINK III
P	Pulse type	√	×	×	√	×	×	×	×	×
S	Standard type	√	√	√	√	√	×	×	×	×
C	CANopen type	√	×	×	×	√	×	×	×	×
E	EtherCAT type	×	×	√	×	×	×	√	×	×
M	MECHATROLINK II type	×	×	√	×	×	×	×	√	×
L	MECHATROLINK III type	×	×	√	×	×	×	×	×	√

Drive power and chassis Division

Model	Input	Output			Chassis size
		Rated current (A)	Instant current (A)	Power (W)	
SD700-1R1A	Single Phase 220	1.1	3.9	100	A
SD700-1R8A	Single Phase 220	1.8	6.3	200	
SD700-3R3A	Single Phase 220	3.3	11.6	400	
SD700-5R5A	Single /Three Phase 220	5.5	16.5	750	B
SD700-7R6A	Single /Three Phase 220	7.6	22.8	1000	
SD700-9R5A	Three Phase 220	9.5	23.8	1500	
SD700-160A	Three Phase 220	16.0	40.0	2000	C
SD700-2R5D	Three Phase 400	2.5	7.5	750	B
SD700-3R8D	Three Phase 400	3.8	11.4	1000	
SD700-6R0D	Three Phase 400	6.0	18.0	1500	
SD700-8R4D	Three Phase 400	8.4	25.2	2000	C
SD700-110D	Three Phase 400	11.0	27.5	3000	
SD700-170D	Three Phase 400	17.0	42.5	4400	
SD700-240D	Three Phase 400	24.0	60.0	5500	D
SD700-300D	Three Phase 400	30.0	70.0	7500	

Drive appearance and installation size



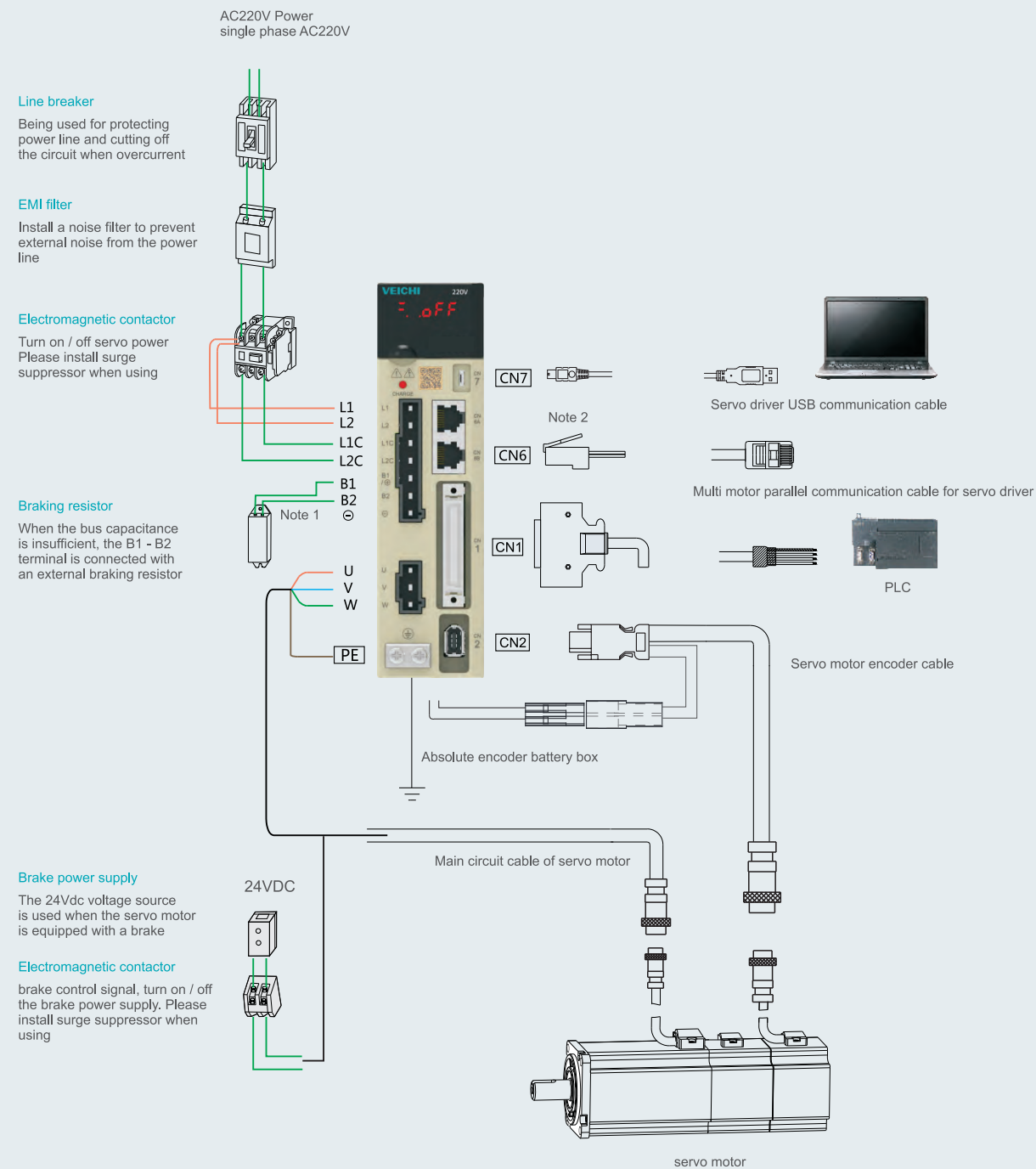
Chassis size	Model	Overall size (mm)			Installation size(mm)						Mounting aperture
		W	H	D	W1	W2	H1	H2	A	B	
A	SD700-1R1A-**	45	168	170	\	20	160	\	7.5	5	2-M4
	SD700-1R8A-**										
	SD700-3R3A-**										
B	SD700-5R5A-**	71	168	180	58	58	160	\	6.5	5	3-M4
	SD700-7R6A-**										
	SD700-9R5A-**										
	SD700-2R5D-**										
C	SD700-3R8D-**	92.5	188	182	82.5	75	180	\	5	5	3-M4
	SD700-160A-**										
	SD700-6R0D-**										
	SD700-8R4D-**										
D	SD700-110D-**	120	260	210	100	84.5	250	236	\	\	4-M5
	SD700-170D-**										
	SD700-240D-**										
	SD700-300D-**										

Drive specifications (50W~7.5kW)

Items			Specifications		
Control mode			IGBT PWM control; sine wave current drive mode		
Feedback	Rotating motor combination		Serial communication encoder: 17-bit, 20-bit, 24-bit (absolute encoder)		
			Pulse type encoder: wireless type 2500 wires		
			Resolver type encoder		
Environment condition	Ambient temperature	-5℃ ~ 55℃(derating use at 55℃ ~ 60℃)			
	Storage temperature	-20℃ ~ 85℃			
	Ambient humidity	Below 95%RH (no freezing, no condensation)			
	Storage humidity	Below 95%RH (no freezing, no condensation)			
	Vibration resistance	4.9m/s²			
	Impact resistance	19.6m/s²			
	Protection class	IP20			
		No corrosive gases or flammable gases			
	Cleanliness	No water, oil or chemicals			
		Environment with less dust, ash, salt, and metal powders			
	Altitude	Below 1000m (derating use at 1000m to 2000m)			
Others	No static interference, strong electric field, strong magnetic sound, radiation and so on				
Applicable standard			EN 61800-5-1:2007 EN 61800-3:2004/A1:2012		
Installation type			Base mounting type: all models		
			Shelf mounting type: all models		
Performance	Speed control range		1:5000 (the lower limit of speed control range is the value under the rated torque load condition but not stop)		
	Speed fluctuation rate	Load fluctuation	Below rated speed ±0.01% (load fluctuation:0%~100%)		
		Voltage fluctuation	Rated speed 0% (rated voltage±10%)		
		Temperature fluctuation	Below rated speed ±0.1% (temperature fluctuation:25±25℃)		
	Torque control accuracy		±1%		
Soft start time setting			0 ~ 10s (Can set ACC and DEC separately)		
Communication function	RS-485	1:N communication	For RS-485 port,Nmax== 127		
		Axis address setting	Parameters setting		
	USB communication	Equipment connection	Computer		
		Communication specifications	According to USB1.1 specifications(12M)		
Display function			CHARGE indicator		
Keypad operator function			Button switch ×4		
Input/output signal	Encoder pulse division output		A phase, B phase, C phase: number of pulse division output for linear drive can be arbitrarily set		
		Fixed input	Working voltage range:DC5V±5%		
			Input points: 1		
			Input (SEN) signal of absolute encoder data requirements		
		Assignable input signal	Working voltage range : DC24V±20%		
			Input points:9		
			Input mode: common collector input, common emitter input		
			Input signal		
			Servo ON (/S-ON)		
			P operation (/P-ON)		
			Origin reset deceleration switch signal (/DEC)		
			Forward drive banned (P-OT), reverse drive banned (N-OT)		
			Alarm reset (/ALM-RST)		
			FWD side external torque limit (/P-CL) REV side external torque limit (/N-CL)		
			Signal of speed rotation direction selection (/SPD-D)		
			Control mode switch (/C-SEL)		
			Zero position fixed (/ZCLAMP)		
			Command pulse inhibited (/INHIBIT)		
			Magnetic poles detection input (/P-DET) signal		
			Gain switch (/G-SEL)		
			Command pulse input rate switch (/PSEL)		
			SEN input (/SEN) signal		
			Assignable signals and variable positive / negative logic		

Items				Specifications		
Input/ output signal	Sequential control output signal	Fixed output		Working voltage range : DC5V~DC30V		
				Output points:1		
				Output signal:servo alarm (ALM)		
		Assignable output signals		Working voltage range : DC5V~DC30V		
				Output points:3		
				Input method: optocoupler output (isolated)		
				Output signal		
				Position finished(/COIN)		
				Rotational detection (/TGON)		
				Servo ready(S-RDY)		
				Torque limited detection (/CLT)		
				Speed limit detection (/VLT)		
				Brake (/BK)		
				Warning (/WARN)		
				Location nearby (/NEAR)		
				Assignable output signals and change positive / negative logic		
Dynamic brake				Operate when the main loop power OFF, servo alarm, servo OFF, Over travel(OT)		
Regeneration treatment				Built-in function		
Over travel (OT) prevention				the dynamic brake (DB) stops, DEC stops, or free stops when P-OT, N-OT inputs operate		
Protection function				Over current, over voltage, under voltage, overload, regeneration fault, etc		
Auxiliary function				Gain adjustment, alarm record, JOG operation, origin search, etc		
Security function		Input		STO, base block signal for the power module		
Control	Position control	Feedforward compensation		0%~100%		
		Position arrived range		0~1073741824 Command unit		
		Input signal	Command pulse	Command pulse morphology	Choose either of the following	
				Input morphology	Symbol + pulse sequence, CW+CCW pulse sequence,two-phase pulse of 90°difference	
					Linear drive, open collector	
				Maximum input frequency	Line drive	
					Symbol + pulse sequence, CW+CCW pulse sequence: 4Mpps	
					Two-phase pulse of 90°difference: 1Mpps	
					Open collector	
					Symbol + pulse sequence, CW+CCW pulse sequence: 200Kpps	
					Two-phase pulse of 90°difference: 200Kpps	
				Input rate switching	1~100 times	
		signal clearance			Clearance of position deviation	
		speed control	Soft start time setting		0~10s(setting acceleration and deceleration respectively)	
			Input signal	Command voltage		Maximum input voltage: ±10V (motor runs forwardly under positive voltage command)
	Rated speed at DC6V [factory setting]					
	Variable input gain setting					
	Input impedance		About 14KΩ			
	Internal set speed control		Loop time parameter		30μs	
			Rotation direction selection		Use the P action signal	
			Speed selection		Use forward / reverse side external torque limit signal input	
					Stop or change to other control modes when both sides are OFF	
	Torque control		Input signal	Command voltage		Maximum input voltage: ±10V (motor runs forwardly under positive voltage command)
		Rated speed at DC6V [factory setting]				
		Variable input gain setting				
		Input impedance		About 14KΩ		
		Loop time setting		16μs		

Series configuration drawing



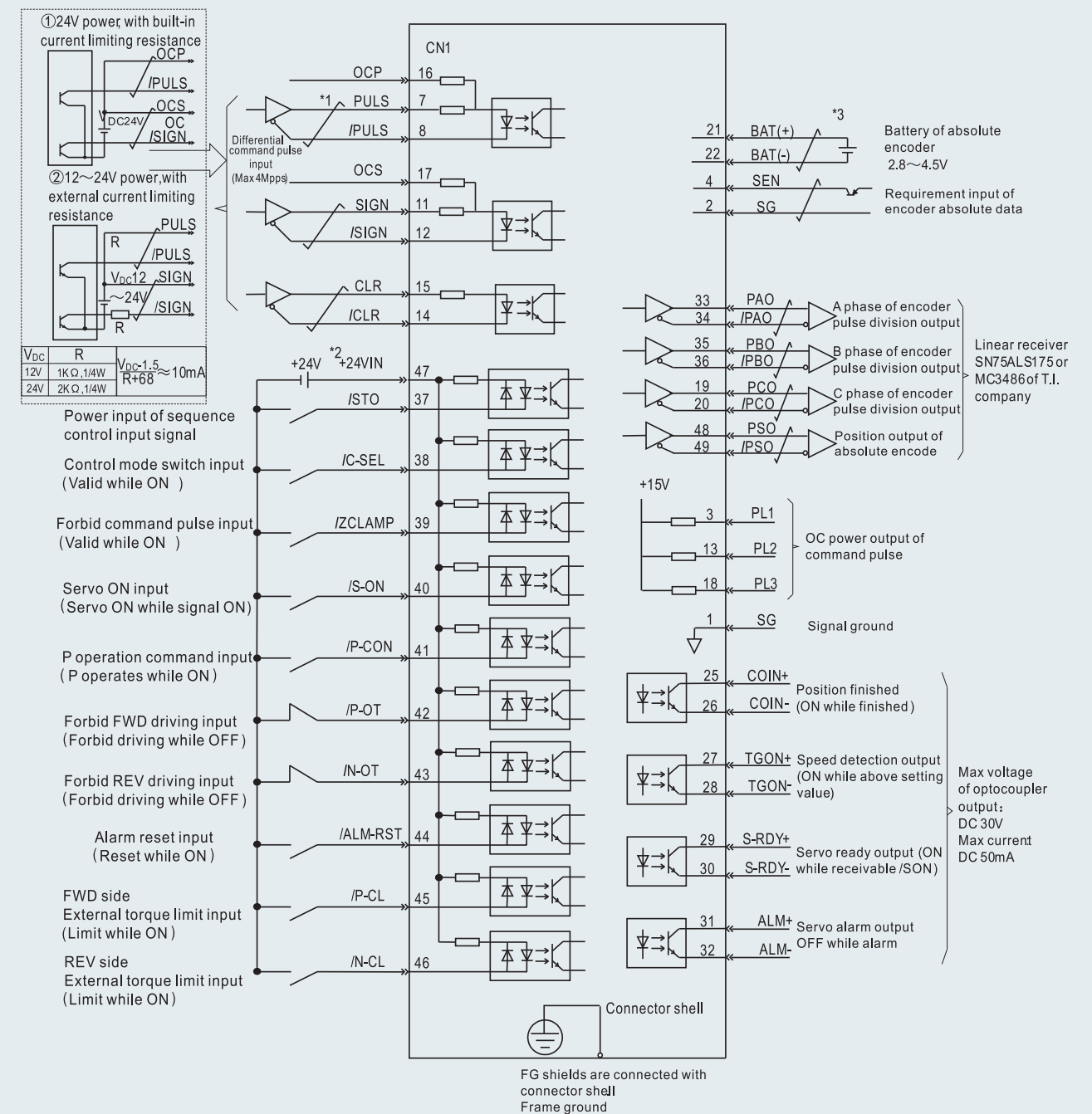
Note 1: when the external braking resistor is removed, disconnect the servo drive B2-B3 terminal before shorting the connection.

Note 2: CN3 and CN4 define a fully consistent communication interface for the two pin, which can be used arbitrarily between the two.

Note 3: this diagram is of the 220V driver.

Note 4: SD700-3R3A-**, SD700-1R8A-**, SD700-1R1A-**, no built-in brake resistance and B3 terminals.

Standard wiring diagram - position mode



*1. ∇ is twisted shields

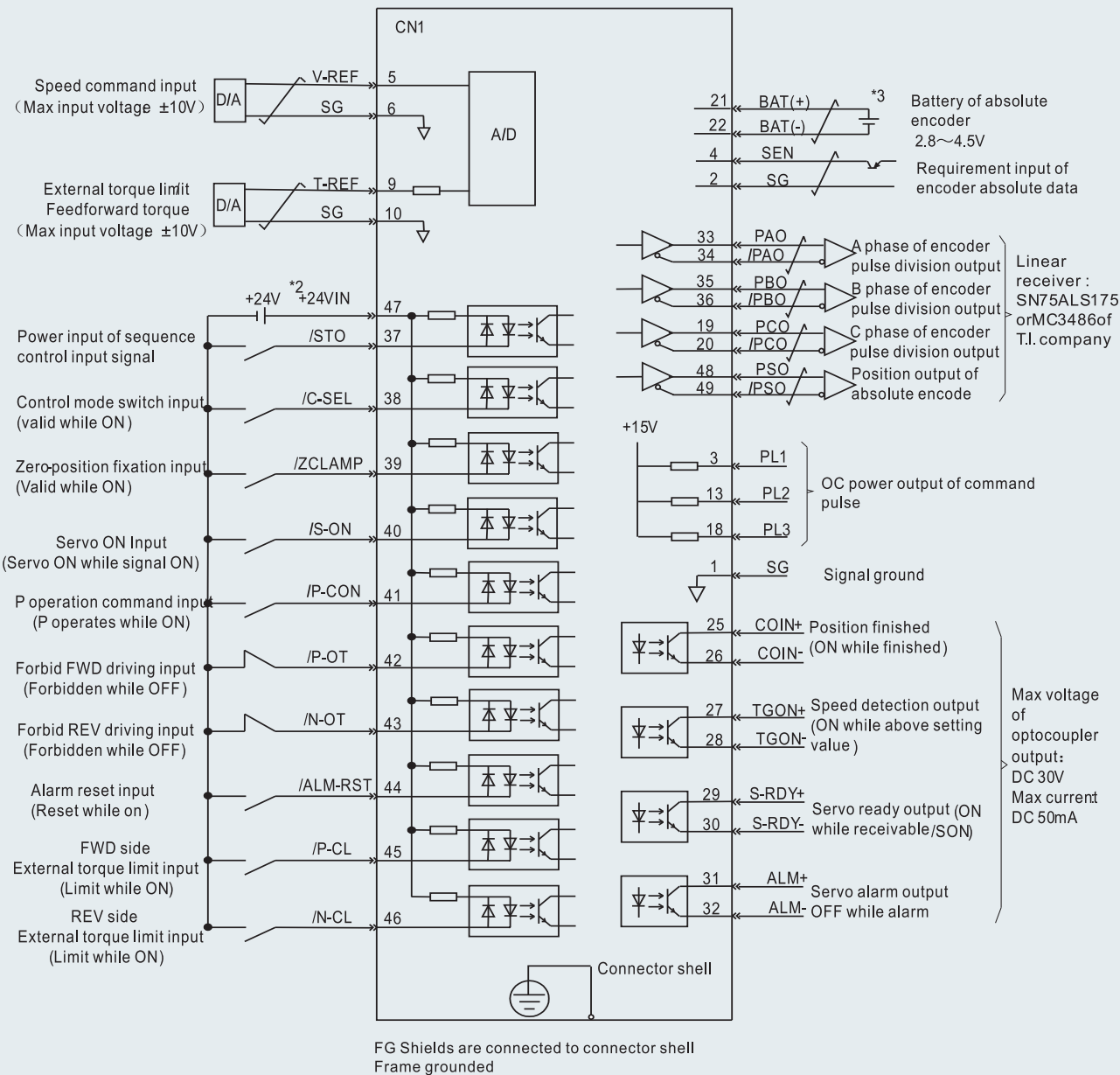
*2. DC24V powerR should be prepared by user . And double insulation or reinforced insulation equipments should be used for DC 24V power .

*3. Connected while using absolute encoder. But never connect backup battery while using encoder cables with battery unit

*4. Output signal should be received by linear receiver.

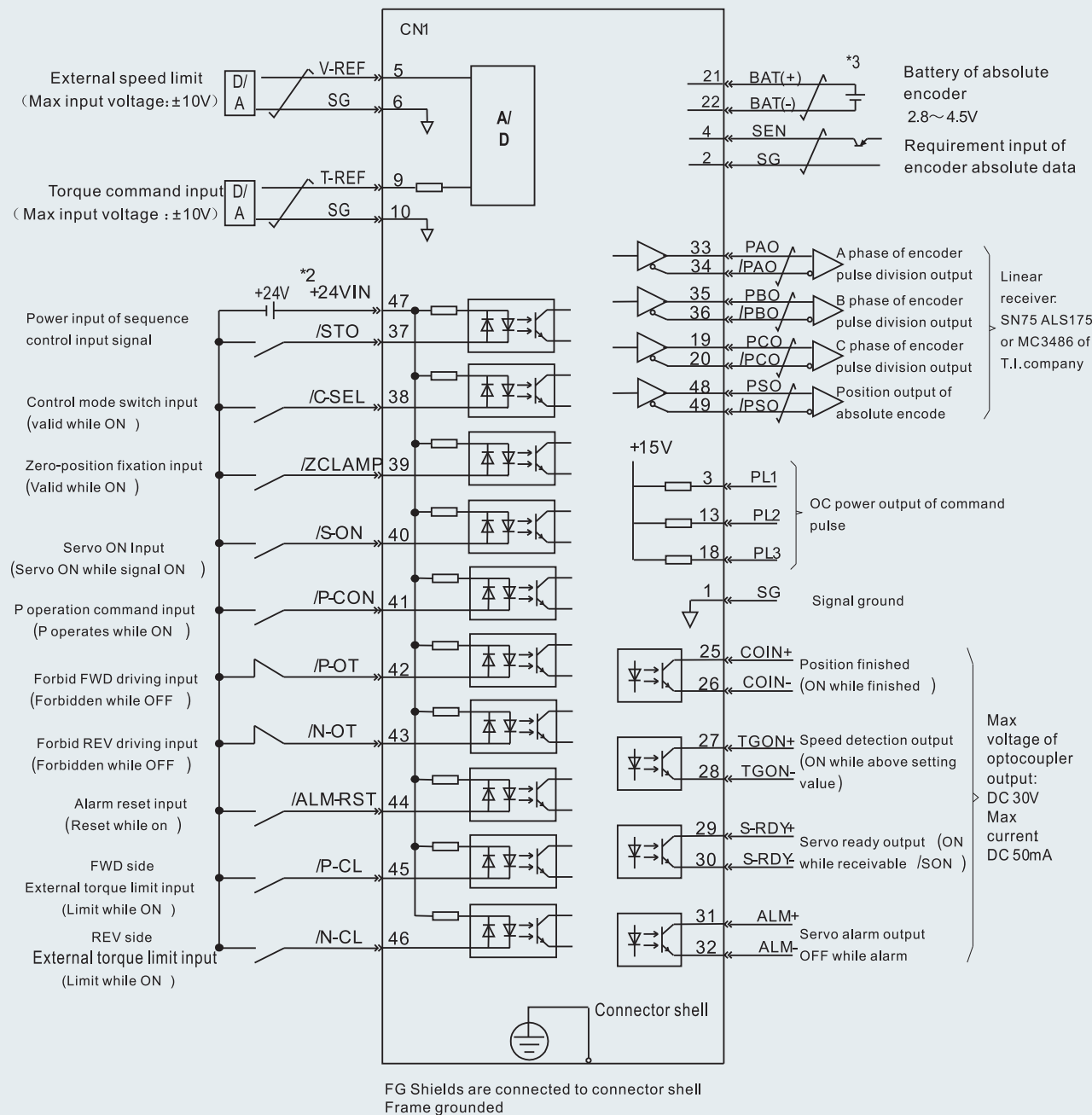
(Note) While using 24V BRaker, DC24V power should be separated Form the power for input and output signal (CN1). Please prepare other power individually, otherwise, there may be misoperation of input and output signal while power on.

Standard wiring diagram - speed mode



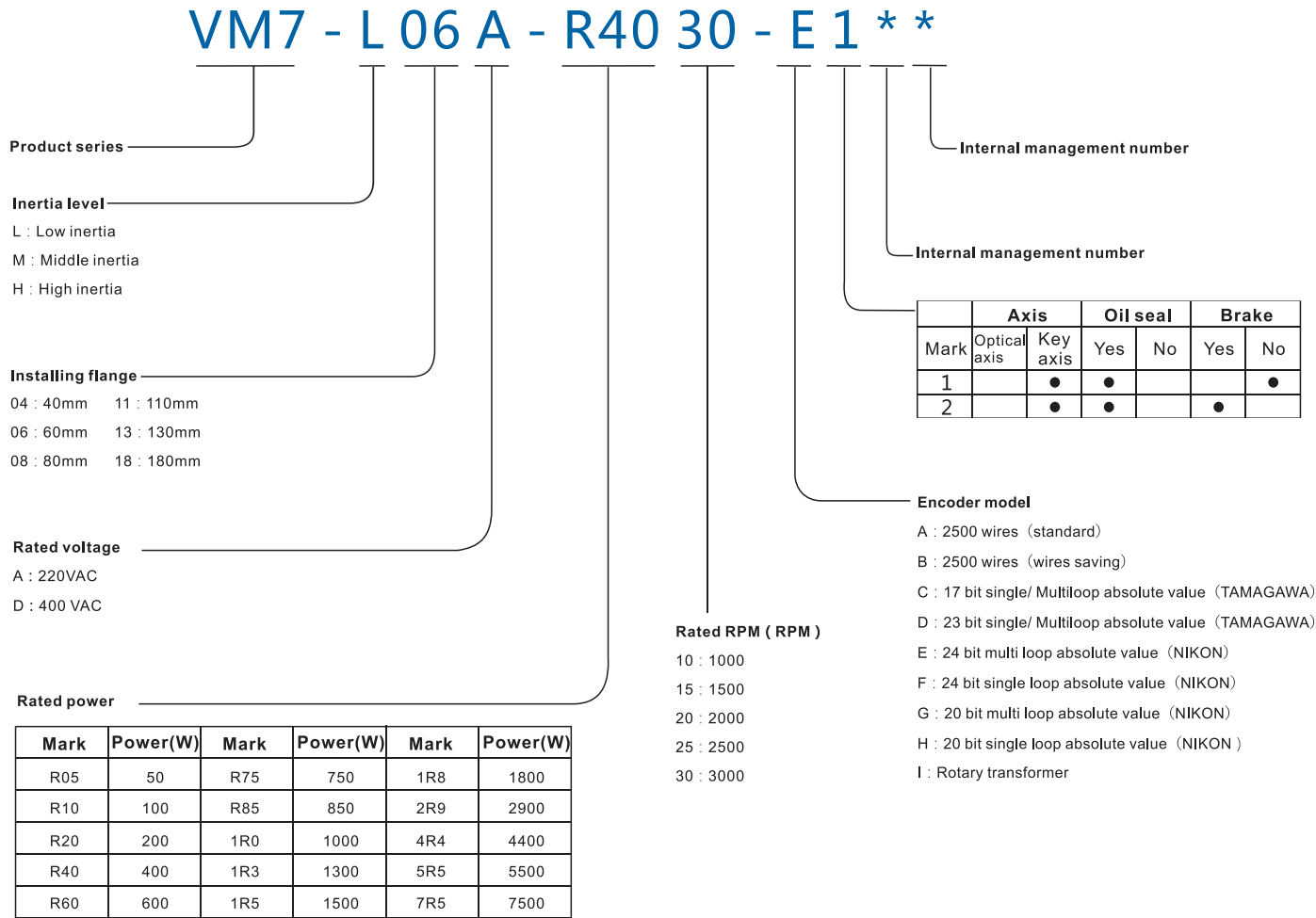
- *1. ∇ is the twisted shields
- *2. DC24V power should be prepared by user. Double insulation or reinforced insulation equipments should be used for DC24V power.
- *3.Connected while using absolute encoder. But never connect backup battery while using encoder cables with battery unit.
- *4. Output signal should be received by linear receiver
- (Note) While using 24V BRaker,DC24V power should be separated Form the power for input and output signal(CN1).Please prepare other power individually,otherwise , there may be misoperation of input and output signal while power on.

Standard wiring diagram - torque mode



- *1. ∇ is the twisted shields
- *2. DC24V power should be prepared by user . And double insulation or reinforced insulation equipments should be used for DC24V power
- *3. Connected while using absolute encoder . But never connect backup battery while using encoder cables with battery unit
- *4. Output signal should be received by linear receiver
- (Note) While using 24V BRaker,DC24 V power should be separated Form the power for input and output signal(CN1).Please prepare other power individually , otherwise , there may be misoperation of input and output signal while power on.

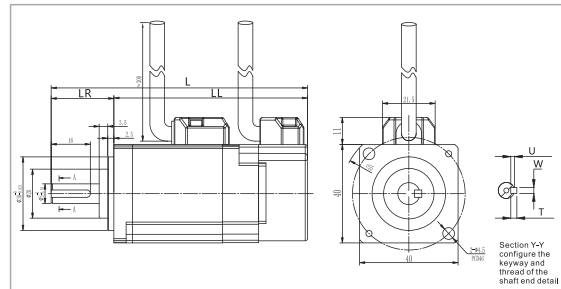
Model explanation



Voltage level(400V)	Motor model						
Motor model VM7-	M13D-R8515- □□□	M13D-1R315- □□□	M13D-1R815- □□□	M18D-2R915- □□□	M18D-4R415- □□□	M18D-5R515- □□□	M18D-7R515- □□□
Rated power(W)	850	1300	1800	2900	4400	5500	7500
Rated RPM(RPM)	1500	1500	1500	1500	1500	1500	1500
Maximum RPM(RPM)	3000	3000	3000	3000	3000	3000	3000
Rated torque(N.m)	5.39	8.34	11.5	18.6	28.4	35	48
Instantaneous maximum torque(Nm)	14.2	23.3	34.5	37.2	56.8	70	96
Rated current(A)	4.1	5.5	7.9	11	17	22.5	30
Instantaneous maximum current(A)	12.3	16.5	23.7	22	34	45	60
Torque factor (Nm/A)	1.31	0.78	1.45	1.69	1.67	1.56	1.6
Rotary inertia(with brake)(Kgcm ²)	13.9 (16)	19.9 (22)	26 (28.1)	44 (59)	66 (80)	102 (110)	146 (156)
Electrical time constant(ms)	11.6	15.6	14	14.3	16.5	18.5	17.6

Servo motor installing dimensions

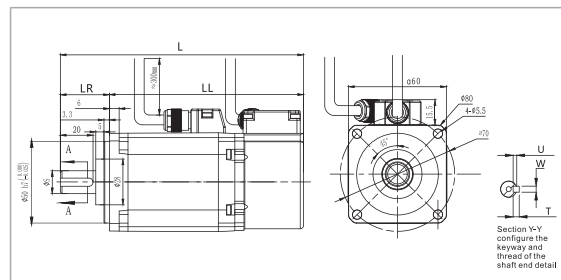
40 flange



Motor model Vm7-	L	LL	LR	S	U	W	T	QK	Thread hole × depth
L04A-R0530-F1□ (L04A-R0530-F2□)	104.1 (134.6)	79.1 (109.6)	25	8	1.2	3	3	16	M3×6
L04A-R1030-F1 (L04A-R1030-F2)	104.1 (134.6)	79.1 (109.6)	25	8	1.2	3	3	16	M3×6

※ When the non-standard encoder is selected, L, LL, LM need to increase 9mm on the basis of the above values;

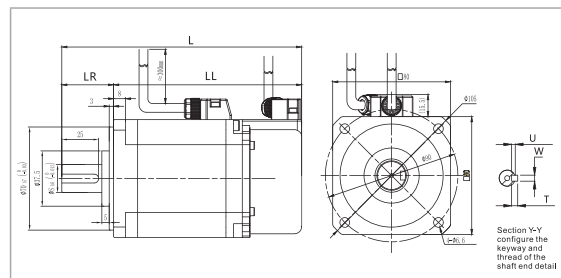
60 flange



Motor model Vm7-	L	LL	LR	S	U	W	T	QK	Thread hole × depth
L06A-R2030-E1□ (L06A-R2030-E2□)	126.8 (161.4)	96.8 (131.4)	30	14	3	5	5	20	M4×12
L06A-R4030-E1□ (L06A-R4030-E2□)	148.8 (183.4)	118.8 (153.4)	30	14	3	5	5	20	M4×12

※ When the non-standard encoder is selected, L, LL, LM need to increase 9mm on the basis of the above values;

80 flange



Motor model Vm7-	L	LL	LR	S	U	W	T	QK	Thread hole × depth
H08A-R7530-E1□ (H08A-R7530-E2□)	172 (207.5)	137 (172.5)	35	19	3.5	6	6	25	M5×15
L08A-R7530-E1□ (L08A-R7530-E2□)	162.7 (199.3)	127.7 (164.3)	35	19	3.5	6	6	25	M5×15
L08A-R7530-E1□L (L08A-R7530-E2□L)	162.7 (199.3)	127.7 (164.3)	35	19	3.5	6	6	25	M5×15

※ When the non-standard encoder is selected, L, LL, LM need to increase 9mm on the basis of the above values;

Technical drawing of the 100L motor showing side and front views with dimensions.

Side View Dimensions:

- Total length: L
- Front flange width: LR
- Motor body length: LL
- Front flange thickness: 5
- Motor body thickness: 65
- Front flange outer diameter: $\varnothing 100 \pm 0.1$
- Front flange inner diameter: $\varnothing 90 \pm 0.1$
- Front flange mounting hole diameter: $\varnothing 15$
- Front flange mounting hole pitch: 40
- Front flange mounting hole offset: 10
- Front flange mounting hole diameter: $\varnothing 15$
- Front flange mounting hole pitch: 40
- Front flange mounting hole offset: 10

Front View Dimensions:

- Motor body diameter: 100 ± 0.1
- Motor body length: 100 ± 0.1
- Motor body mounting hole diameter: $\varnothing 15$
- Motor body mounting hole pitch: 40
- Motor body mounting hole offset: 10
- Motor body mounting hole diameter: $\varnothing 15$
- Motor body mounting hole pitch: 40
- Motor body mounting hole offset: 10

Section V-V Dimensions:

- Section V-V: V
- Section V-V: W
- Section V-V: T

Section V-V: Section V-V configure the keyway and thread of the shaft end detail.

※ The value in () is the model and size of the motor equipped with the holding brake;
※ Hole shaft is customizable

Technical drawing of the 100W motor showing front, side, and shaft end views with dimensions.

Front View Dimensions:

- Total length: L
- Stator length: LR
- Shaft length: LL
- Stator outer diameter: $\varnothing 50 \times 5$
- Shaft diameter: $\varnothing 10$
- Shaft thread: $M10 \times 1$
- Shaft end detail dimensions: U (key width), W (key height), T (thread length)

Side View Dimensions:

- Stator height: 110.5
- Shaft height: 110.5
- Shaft end detail dimensions: U (key width), W (key height), T (thread length)

Shaft End Detail:

- Keyway and thread of the shaft end detail

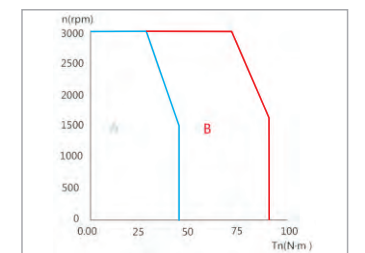
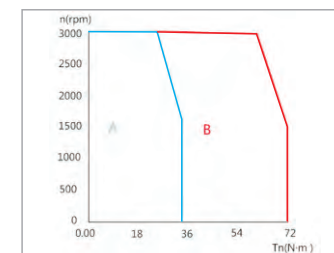
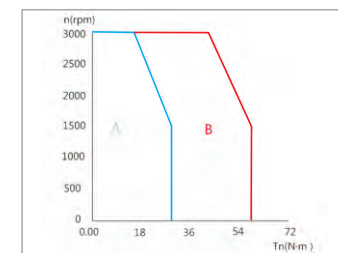
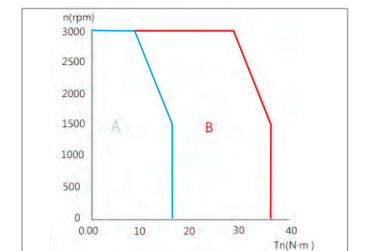
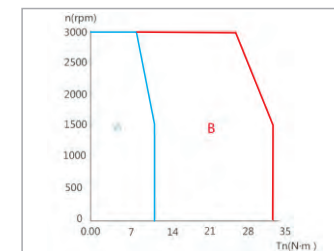
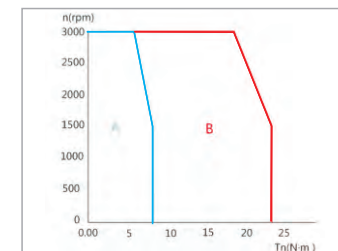
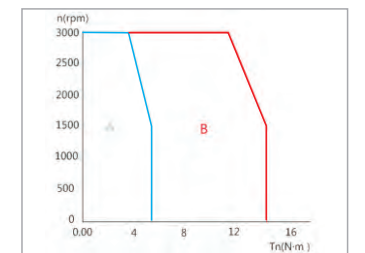
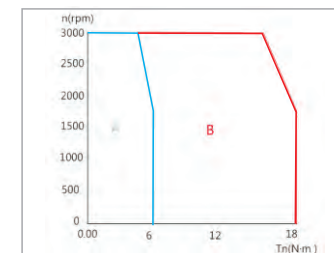
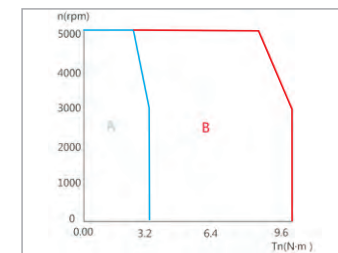
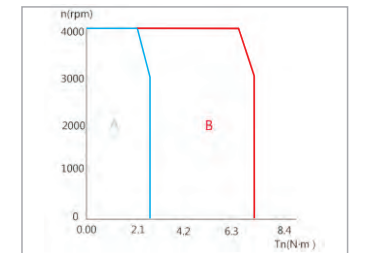
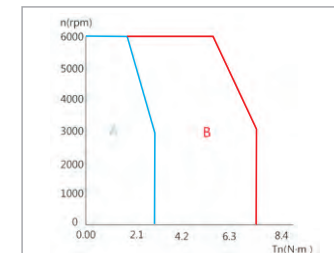
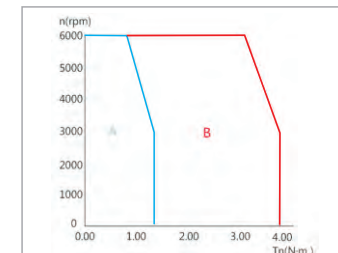
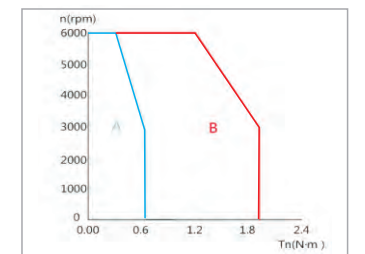
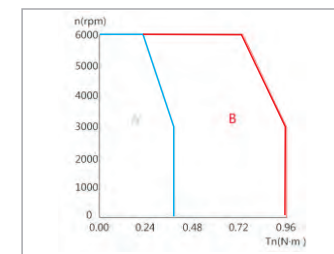
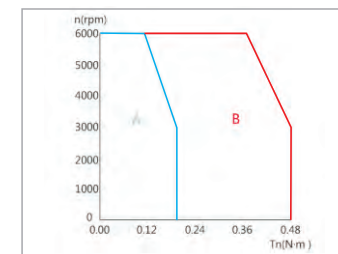
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Section Y-Y configures the keyway and thread of the shaft end detail

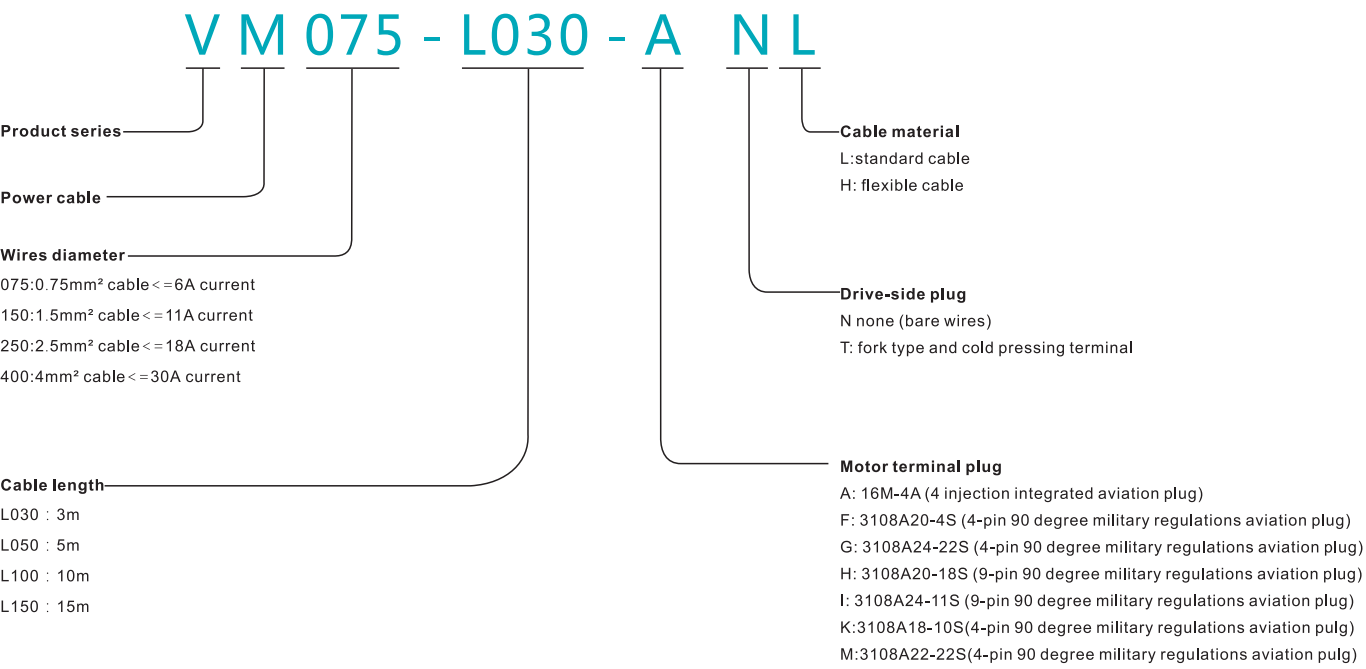
※ The value in () is the model and size of the motor equipped with the holding brake;

"———" Rated torque "———" MAX instantaneous torque

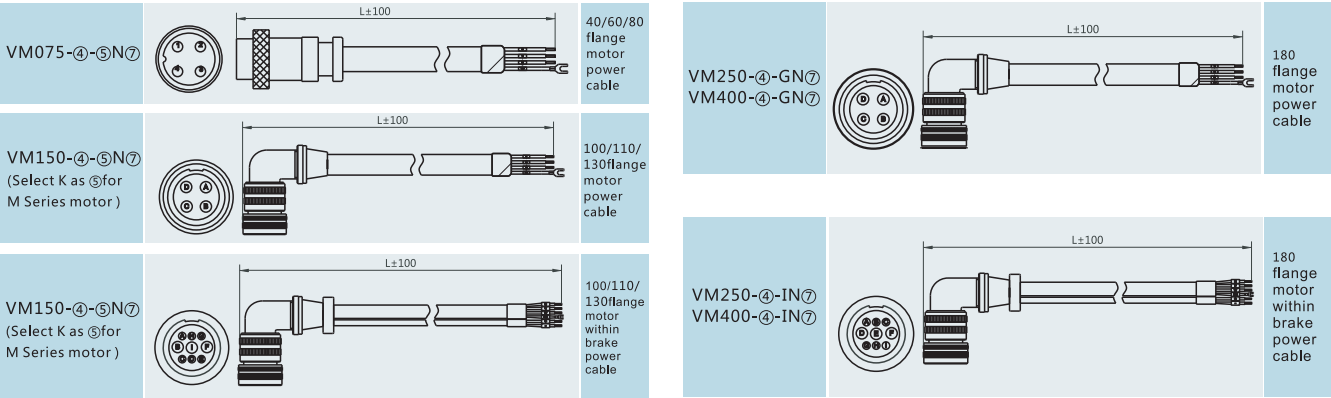


SD700 servo drive wire introduction

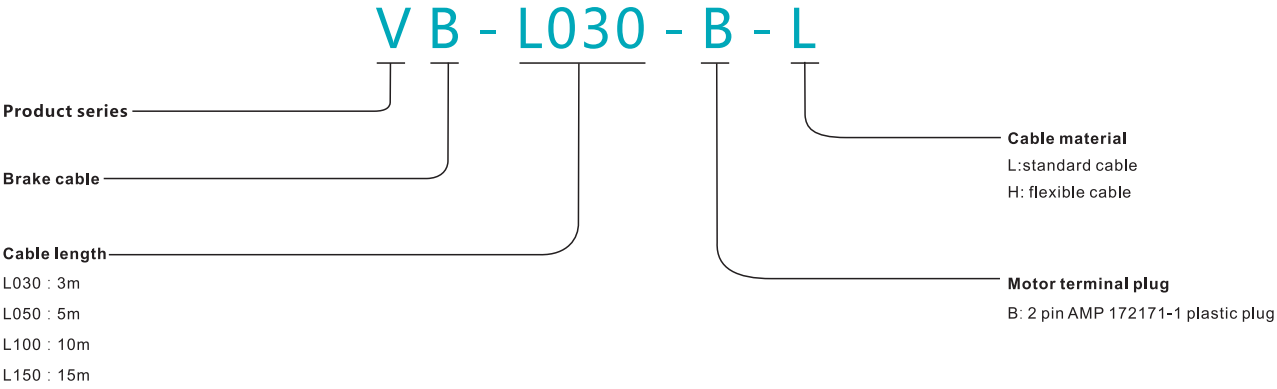
Power cable naming rules



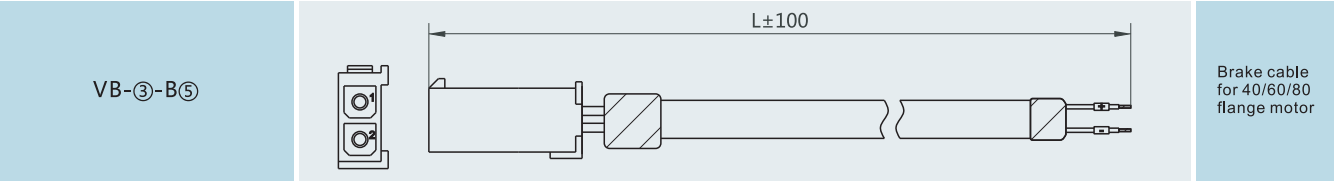
Motor power cable



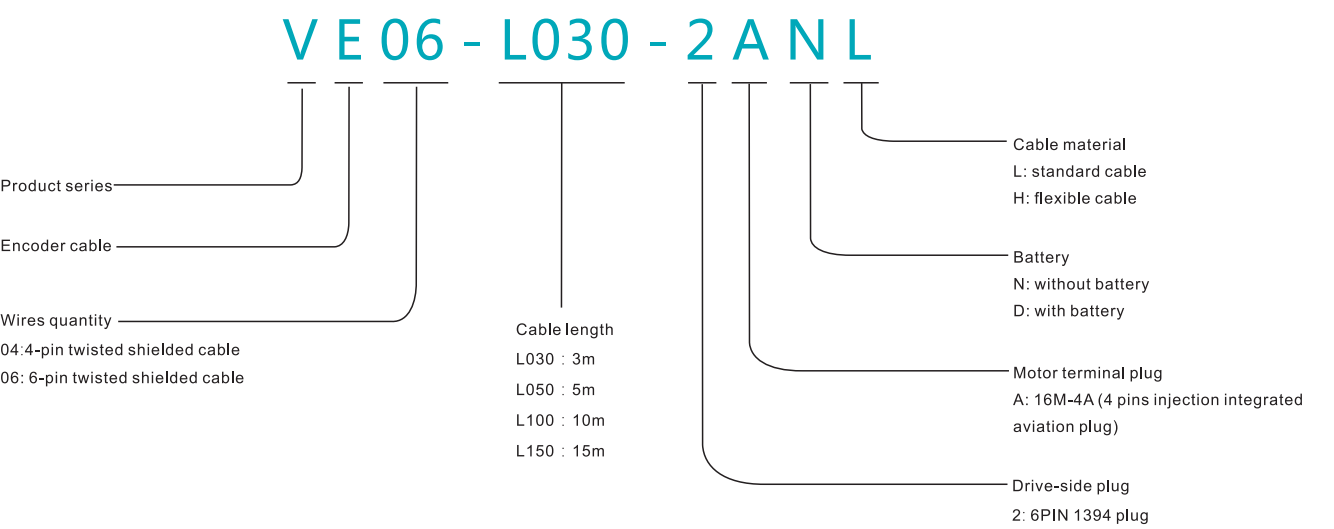
Brake cable naming rules



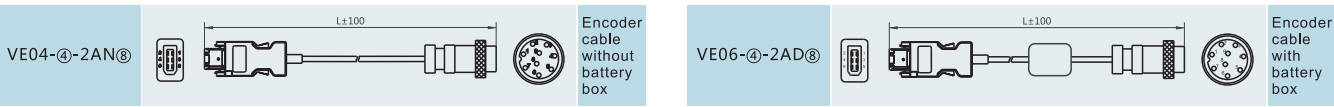
Brake cable



Encoder cable naming rules



Encoder cable



Braking resistor model selection

Model	Braking voltage	Built-in resistor	Minimum external resistor value	Maximum external resistor value
SD700-1R1A	380	No	40	400
SD700-1R8A	380	No	40	200
SD700-3R3A	380	No	40	100
SD700-5R5A	380	40Ω 60W	25	70
SD700-7R6A	380	40Ω 60W	15	50
SD700-9R5A	380	40Ω 60W	15	40
SD700-160A	380	30Ω 200W	10	30
SD700-2R5D	700	80Ω 60W	80	225
SD700-3R8D	700	80Ω 60W	55	180
SD700-6R0D	700	40Ω 60W	35	110
SD700-8R4D	700	40Ω 60W	25	85
SD700-110D	700	40Ω 60W	25	70
SD700-170D	700	30Ω 200W	30	50
SD700-240D	700	30Ω 200W	15	40
SD700-300D	700	30Ω 200W	15	30