YASKAWA

AC SERVO DRIVES
JUNMA SERIES
PULSE REFERENCE TYPE – MECHATROLINK-II NETWORK TYPE

EN
DE
ES
FR
IT

JUNMA JUNMA JUNMA JUNMA JUNMA JUNMA JUNMA

New Servo Concept JUNMA

Contents

JUNMA similarly uses the world's top-level servo technology to provide a quick and efficient setup. JUNMA is a modern concept of digital servo drive technology that requires no parameter settings and gain adjustments to achieve high-precision positioning.

JUNMA's simple Plug'n Play design, easy set-up procedures and high precision characteristics offer optimum drive performance and efficiency for any kind of application and industry.

The JUNMA Mechatrolink-II network type servo drive can maintain steady operation at high speed by automatically adjusting the speed to compensate load change in real time. JUNMA ML-II easily connects every servo drive with the other (up to 16 axes) and enables start-up and control using one cable.

JUNMA occupies 30% less space than comparable drives in the market and remarkably reduces start-up and installation time.

JUNMA's ready-to-use features for high-speed, high-torque, and high-precision operation are ready to work for you.

YASKAWA JUNMA Features

Features of JUNMA Pulse Reference Type Drives

- Attain optimum servo performance without setting parameters or adjusting gains
- Resolution: 10,000 pulses/rev
- High torque output at high speeds of 4,500 min^{-1}, easily suppress mechanical vibrations with the turn of the rotary switch
- Conforms to international standards

Features of Mechatrolink-II Communications Type

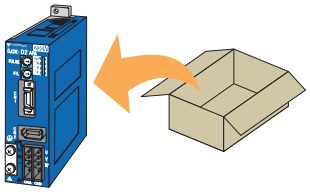
- Automatic speed adjustment when load changes
  – constant automatic adjustment function quickly reacts to load changes,
  – steady operation for applications with high frequency speed and torque changes
- Quick and efficient setup
  – connect and go! Same concept as other JUNMA products, hence no troublesome parameter settings and gain adjustments needed
- Enhanced control functions
  – high-precision and high-performance positioning. The position reference, speed reference, and acceleration/deceleration time can be changed in real time during positioning.
  – external positioning function using position latch signal: Detects the accurate position when a latch signal is received and adjusts the amount of movement. This is useful for transfer, wrapping, and printing equipment
  – zero point return: A zero point can be individually set for each of customer's machines
  – other functions: Interpolation, JOG operation, alarm reset, and other helpful functions
- Conforms to international standards

JUNMA SERVOPACK – FAST & EASY SETUP

- Settings are easy to make, so setup time is reduced.

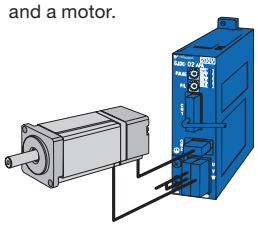
1 Unpacking

Remove the SERVOPACK from the box.



2 Installation and wiring

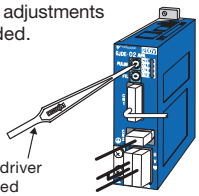
Connect the cables for the power supply, signal lines, and a motor.



PULSE CONTROL TYPE

3 Reference pulse setting

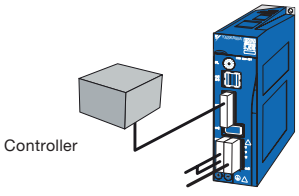
Select the reference pulse switch for your controller. No parameter settings and gain adjustments are needed.



MECHATROLINK-II NETWORK TYPE

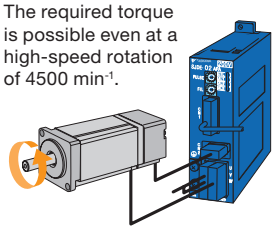
3 Communication settings

Only required for communication settings. No gain adjustments are needed.



4 Setup completion

The motor is ready to run with the reference from the controller. The required torque is possible even at a high-speed rotation of 4500 min^{-1}.



Ratings and Specifications

Voltage		200 VAC			
Servomotor Model SJME-□□A		01	02	04	08
Applicable SERVOPACK	SJDE-□□A	01	02	04	08
Rated output *1	W	100	200	400	750
Rated torque *1, *2	Nm	0.318	0.637	1.27	2.39
Instantaneous peak torque *1	Nm	0.955	1.91	3.82	7.16
Rated current *1	A_{rms}	0.84	1.1	2.0	3.7
Instantaneous max. current *1	A_{rms}	2.5	3.3	6.0	11.1
Rated speed *1	min^{-1}	3000			
Max. speed *1	min^{-1}	4500			
Torque constant	Nm/A_{rms}	0.413	0.645	0.682	0.699
Rotor moment of inertia	$kg \times m^2 \times 10^{-4}$	0.0634	0.330	0.603	1.50
Rated power rate *1	kW*/s	16.0	12.3	26.7	38.1
Rated angular acceleration *1	rad/s^2	50200	19300	21100	15900
Time rating		Continuous			
Thermal class		B			
Vibration class		15 µm or below			
Withstand voltage		1500 VAC for one minute			
Insulation resistance		500 VDC, 10 MΩ min.			
Enclosure		Totally enclosed, self-cooled, IP55 (excluding shaft opening and connectors)			
Impact resistance		Impact acceleration: 490 m/s^2 in three directions – vertical, side to side, and front to back. Impact occurrencies: 2			
Vibration resistance		Vibration acceleration: 49 m/s^2 in three directions – vertical, side to side, and front to back.			

*1 These items and speed/torque characteristics quoted in combination with a SJDE SERVOPACK are at an armature winding temperature of 100 °C. Other values are at 20 °C.

*2 The rated torques listed here are the values for the continuous allowable torque at 40 °C with an aluminium heatsink (250 mm × 250 mm × 6 mm) attached.

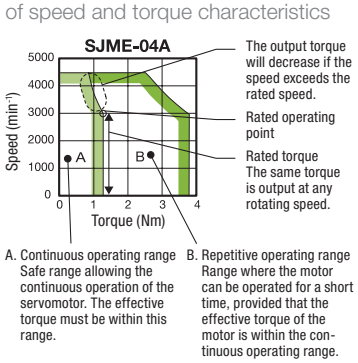
Holding Brake Specifications

Servomotor Model SJME-□□A		01	02	04	08
Rated voltage		24 VDC ±10%			
Holding brake moment of inertia *	$kg \times m^2 \times 10^{-4}$	0.0075	0.064		0.171
Capacity	W	6	6.9		7.7
Minimum holding torque (Static friction torque)	Nm	0.318	1.27		2.39
Coil resistance	Ω (at 20 °C)	96	83		75
Rated current	A (at 20 °C)	0.25	0.29		0.32
Brake release time	ms	80 max.			
Rise time for holding torque	ms	100 max.			

* To obtain the motor moment of inertia with a brake, add the holding brake moment of inertia to the rotor moment of inertia. The rated power rate and angular acceleration of the motor will change according to the motor moment of inertia.

Notes:
1 The holding brake is only used to hold the load and cannot be used to stop the servomotor.
2 Do not use the holding brake when the servo is on. Failure to observe this caution may result in an overload of the SERVOPACK or a decrease of brake life.

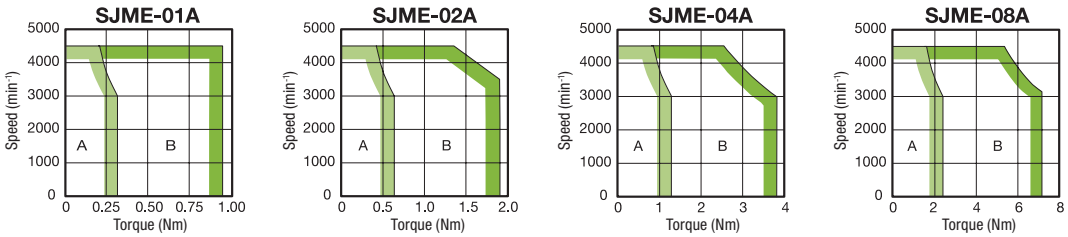
How to read a graph of speed and torque characteristics



A. Continuous operating range
Safe range allowing the continuous operation of the servomotor. The effective torque must be within this range.

B. Repetitive operating range
Range where the motor can be operated for a short time, provided that the effective torque of the motor is within the continuous operating range.

Speed/Torque Characteristics

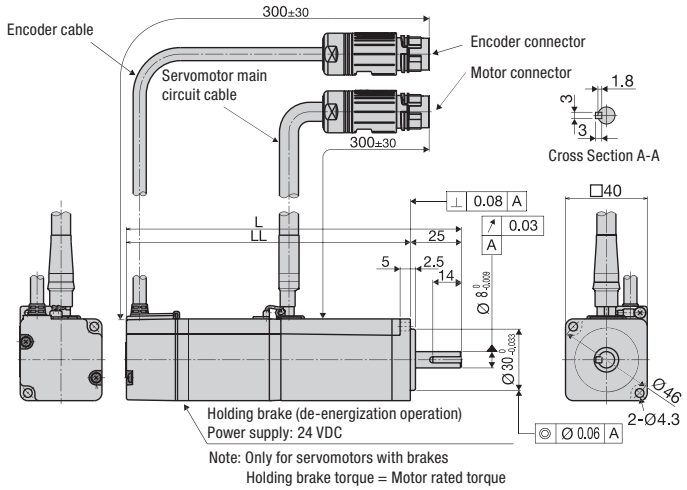


Note: Solid lines show the torque/speed characteristics of the servomotor at 200 VAC, and the broken lines show them at 230 VAC.

Dimensions

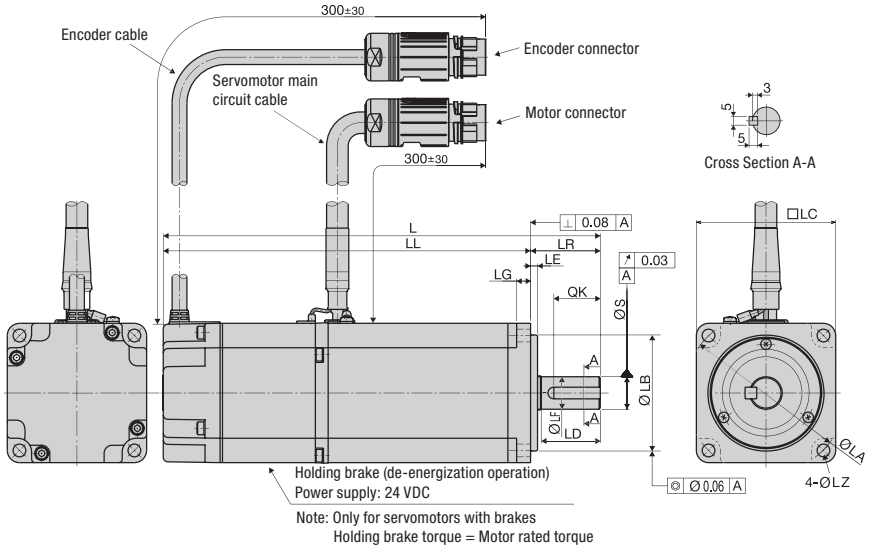
Units: mm

100 W



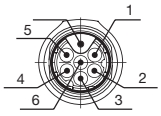
Type SJME-	L	LL	Approx. mass (kg)
01AMC41	119	94	0.5
01AMC4C	164	139	0.8

200 W to 750 W



Type SJME-	L	LL	LR	LG	LE	S	LB	LC	LD	LF	LA	LZ	QK	Approx. mass (kg)
02AMC41	125.5	95.5	30	6	3	$14^{0}_{-0.011}$	$50^{0}_{-0.039}$	60	–	–	70	5.5	20	0.9
02AMC4C	165.5	135.5												1.5
04AMC41	148.5	118.5							–	–				1.3
04AMC4C	188.5	158.5												1.9
08AMC41	173	133	40	8	3	$16^{0}_{-0.011}$	$70^{0}_{-0.046}$	80	35	20	90	7	30	2.6
08AMC4C	216	176												3.5

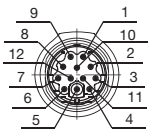
Motor Connector Specifications



	No brake		With brake	
Pin	Description	Colour	Description	Colour
1	Phase U	Red	Phase U	Red
2	Phase V	White	Phase V	White
3	Phase W	Blue	Phase W	Blue
4	FG	Green/ Yellow	FG	Green/ Yellow
5	–	–	Brake	Red
6	–	–	Brake	Black

Extension: BKUA854NN0085155A000
Male contact (Crimp): 61.006.11 (INTERCONTEC)
Plug: BSTA852NN0085201A000
Female Contact: (Crimp): 60.001.11
(Solder): 60.004.11

Encoder Connector Specifications



Pin	Description	Colour
1	PG5 V	Red
2	PG0 V (GND)	Black
3	Phase A+	Blue
4	Phase A–	Blue/White
5	–	–
6	Phase B+	Yellow
7	Phase B–	Yellow/ White
8	Phase /Z	Purple
9	Phase U	Gray
10	Phase V	Green
11	Phase W	Orange
12	–	–
Case	Frame ground	Shield wire

Extension: AKUA047NN0084151A000
Male contact (Crimp): 61.004.11 (INTERCONTEC)
Plug: ASTA046NN0084200A000
Female Contact: (Crimp): 60.001.11
(Solder): 60.004.11

SERVOPACKs – Pulse Reference Type

Ratings and Specifications

SERVOPACK Model SJDE-□				01APA	02APA	04APA	08APA
Max. applicable servomotor capacity			kW	0.1	0.2	0.4	0.75
Continuous output current			A_{rms}	0.84	1.1	2.0	3.7
Instantaneous max. output current			A_{rms}	2.5	3.3	6.0	11.1
Input power supply (for main circuit and control circuit)		Voltage		Single-phase 200 to 230 VAC, +10 to –15%			
		Frequency		50/60 Hz ± 5%			
		Voltage frequency capacity at rated output	kVA	0.40	0.75	1.2	2.2
Power loss at rated output			W	14	16	24	35
Input control method				Capacitor-input type, single-phase full-wave rectification with resistance to prevent inrush currents			
Output control method				PWM control, sine wave power driven system			
Feedback				Incremental encoder			
Allowable load inertia*1			kgm^2	0.6×10^{-4}	3×10^{-4}	5×10^{-4}	10×10^{-4}
I/O signals	Input signal for reference (designated pulse type and pulse resolution with PULSE switch)	Pulse type		Select one of the following settings: 1. CCW + CW pulse train 2. Sign + pulse train 3. CCW + CW pulse train (negative logic) 4. Sign + pulse train (negative logic)			
		Pulse resolution		Select one of the following settings: 1. 1000 pulses/rev (open collector/line driver) 75 kpps max. 2. 2500 pulses/rev (open collector/line driver) 187,5 kpps max. 3. 5000 pulses/rev (line driver) 375 kpps max. 4. 10000 pulses/rev (line driver) 750 kpps max.			
	Clear input signal			Clears the positioning error at the rising edge of the pulse			
	Servo ON input signal			Turns the servomotor on or off			
	Alarm output signal			OFF if an alarm occurs			
	Brake output signal			External signal to control brakes. Turn ON to release the brake.			
	Position completed output signal			ON if the current position is equal to the reference position ± 10 pulses			
	Origin output signal			ON if the motor is at the origin (width: 1/500 rev)			
Built-in functions	Dynamic brake (DB)			Operated at main power OFF, servo alarm, servo OFF (OFF after motor stops; ON if the motor power is off)			
	Regenerative processing			Optional (if the regenerative energy is too large, install a regenerative unit)			
	Protection*2			Speed errors, overload, encoder errors, voltage errors, overcurrents, disablement of the built-in cooling fan, system errors			
	Display			Five LED indicators (PWR, REF, AL1, AL2, AL3)			
	Reference filter			Select one of eight levels with FIL switch			
Cooling method				Forced cooling (built-in fan)			
Operating temperature				0 °C to +55 °C			
Operating humidity				90% RH or less (no condensation)			
Storage temperature				–20 °C to +70 °C			
Storage humidity				90% RH or less (no condensation)			
Installation site				Free of corrosive gases Free of dust and iron powder Clean and dry			
Altitude				1000 m or below			
Vibration resistance				$4.9\ m/s^2$			
Shock resistance				$19.6\ m/s^2$			
Operating conditions				Installation category (overvoltage category): II Pollution degree: 2 Protection class: IP1X (EN50178)			

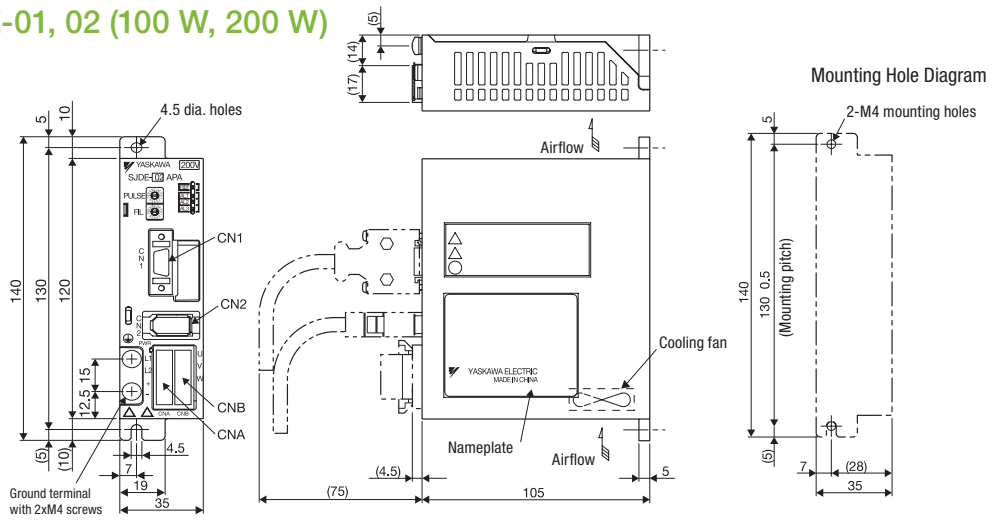
*1 Be sure to use the motor within the allowable load moment of inertia. The motor will become unstable if the load moment of inertia exceeds the allowable value.

*2 The ground protection circuit is designed for ground fault inside the motor windings while the motor is running. Therefore, it may not protect the system under the following cases:
- A low-resistance ground fault occurs in the main circuit cable or in the connector of the cable for the servomotor.
- The power supply is turned on during a ground fault.

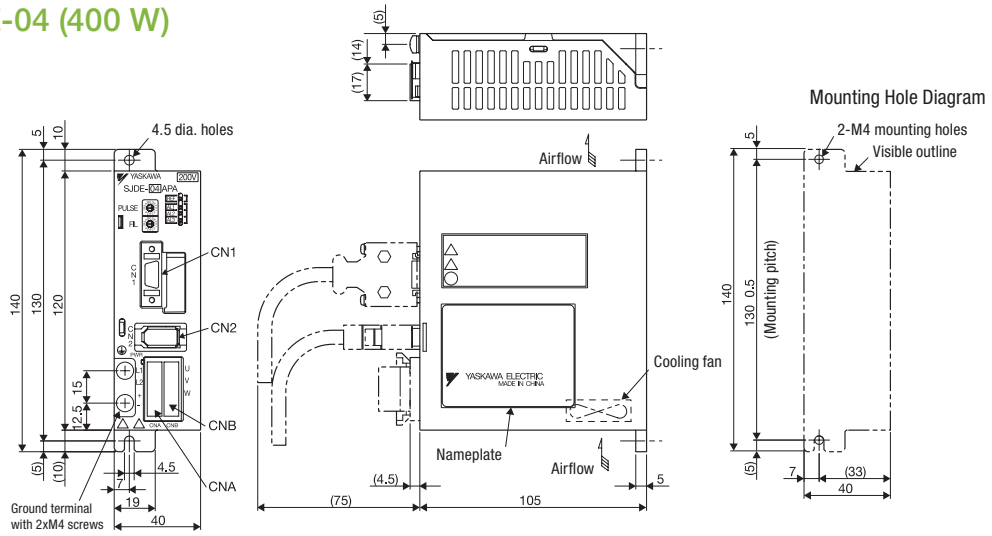
Dimensions

Units: mm

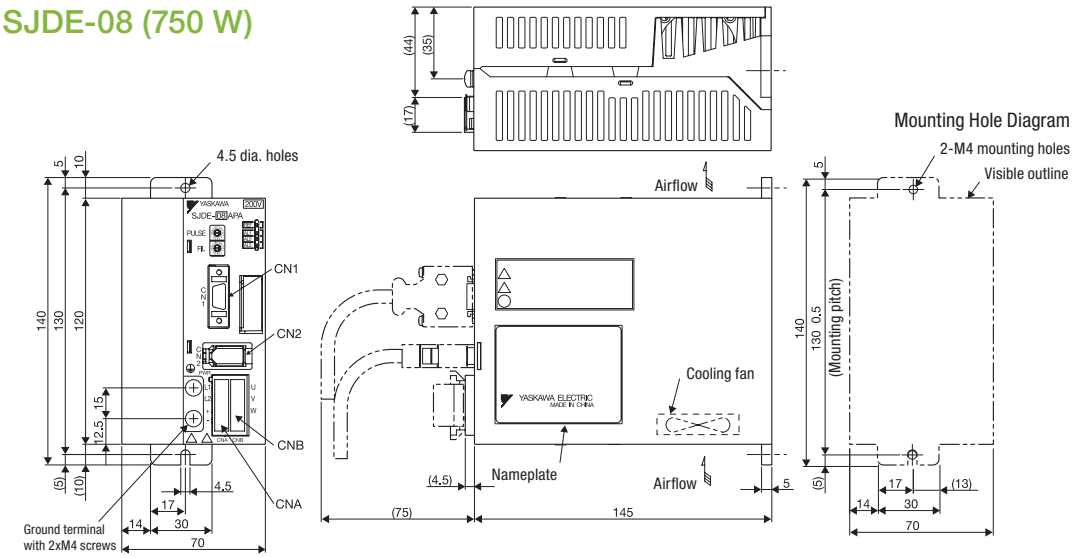
SJDE-01, 02 (100 W, 200 W)



SJDE-04 (400 W)



SJDE-08 (750 W)



Ratings and Specifications

SERVOPACK Model SJDE-□				01ANA	02ANA	04ANA	08ANA
Basic specifications	Applicable servomotor capacity		kW	0.1	0.2	0.4	0.75
	Continuous output current		A_{rms}	0.84	1.1	2	3.7
	Instantaneous max. output current		A_{rms}	2.5	3.3	6	11.1
	Input power supply (for main circuit and control circuit)	Voltage		Single-phase 200 to 230 VAC, +10 to –15%			
		Frequency		50/60 Hz ± 5%			
		Voltage frequency capacity at rated output	kVA	0.40	0.75	1.2	2.2
	Power loss at rated output		W	14	16	24	35
	Input control method			Capacitor-input type, single-phase full-wave rectification with resistance to prevent inrush currents			
	Output control method			PWM control, sine wave power driven system			
	Allowable load moment of inertia*1		kgm^2	0.5×10^{-4}	3×10^{-4}	5×10^{-4}	10×10^{-4}
	Leakage current			3.5 mA max.			
Built-in functions	Dynamic brake (DB)			Activated when the power is OFF, a servo is OFF, or an alarm occurs (Released after the motor stops, applied if the power supply is turned off)			
	Communications for maintenance			JunmaWin (Modification/initialization of parameters, JOG operation, etc)			
	Regenerative processing			If the regenerative energy is too large, mount a regenerative unit			
	Emergency stop			Emergency Stop (E-STP)			
	Overtravel (OT) prevention			Forward run prohibited (P-OT), reverse run prohibited (N-OT)			
	Display			Four LED indicators (PWR, RDY, COM, ALM)			
	Monitor			Power supply status monitor, servo ON/OFF monitor, MECHATROLINK monitor			
	Feedback			Incremental encoder (8192 pulses/rev)			
	Reference resolution setting (electronic gear)			0.01 ≤ B/A ≤ 100			
	Protection			Speed error, overload, encoder error, voltage error, overcurrent, built-in cooling fan stop, system error, ground fault*2			
MECHATROLINK communications		Communications protocol		MECHATROLINK-II			
		Station address		41H to 5FH			
		Transmission speed		10 Mbps			
		Transmission cycle		1 ms, 1.5 ms, 2 ms, 3 ms, 4 ms			
		Data length		17 bytes or 32 bytes			
Command method		Performance		MECHATROLINK-II communications			
				MECHATROLINK-II commands (for motion, data setting/reference, monitor, adjustment, and other commands)			
Sequence input signals		Fixed inputs		5 inputs (external latch signal, homing deceleration signal, forward run prohibited signal, reverse run prohibited signal, and emergency stop signal)			
Sequence output signals		Fixed outputs		2 outputs (servo alarm and holding brake)			
Operating temperature / operating humidity				0°C to +55°C / 90% RH or less (no condensation)			
Storage temperature / storage humidity				-20°C to +70°C / 90% RH or less (no condensation)			
Ambient conditions				Free from corrosive gases, free from dust and iron particles, free from water droplets or machine oil			
Altitude				1000 m or below			
Vibration resistance / shock resistance				4.9 m/s^2 / 19.6 m/s^2			
Operating conditions				Installation category (overvoltage category): II, pollution degree: 2, protection class: IP1X (EN50178)			

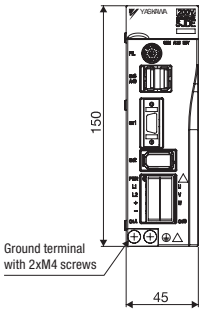
*1 Be sure to use the motor within the allowable load moment of inertia. The motor will become unstable if the load moment of inertia exceeds the allowable value.

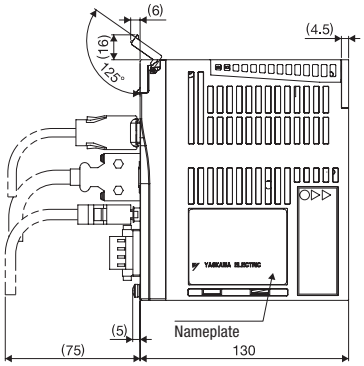
*2 The ground protection circuit is designed for ground fault inside the motor windings while the motor is running. Therefore, it may not protect the system under the following cases:
- A low-resistance ground fault occurs in the main circuit cable or in the connector of the cable for the servomotor.
- The power supply is turned on during a ground fault.

Dimensions

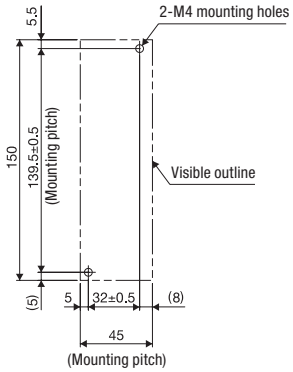
Units: mm

SJDE-01, 02 (100 W, 200 W)

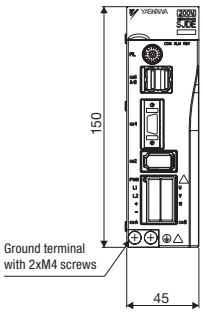


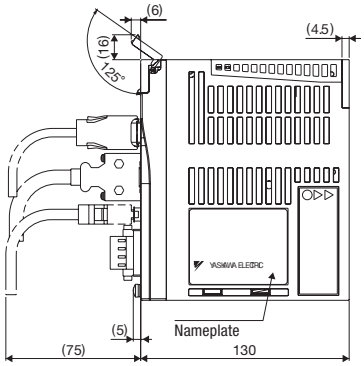


Mounting Hole Diagram

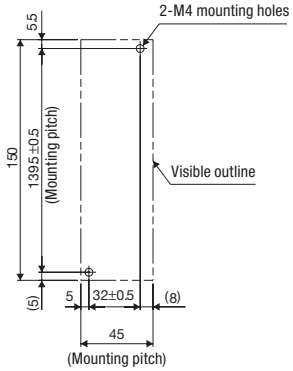


SJDE-04 (400 W)

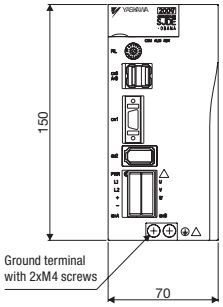


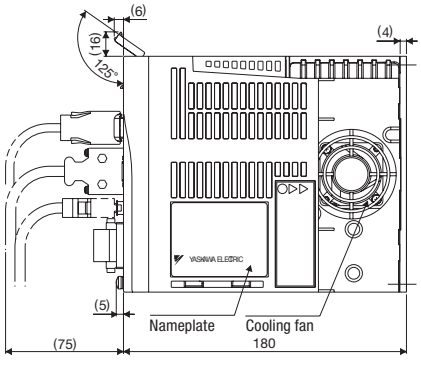


Mounting Hole Diagram

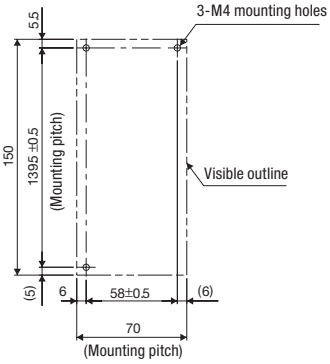


SJDE-08 (750 W)



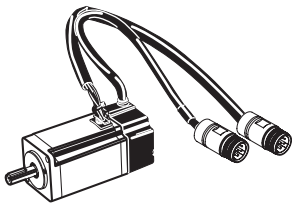


Mounting Hole Diagram



Ordering Instructions

Servo Motor Model Designation



Junma Servo Motor
3,000 rpm
(100 – 750 W)

SJME - 02 A M C 4 1 - OY

Junma Servomotor

Capacity	
Output (W)	**Code**
100	01
200	02
400	04
750	08

Voltage	
Specification	**Code**
200 VAC	A

Brake Specifications	
Specification	**Code**
No Brake	1
24 VDC Brake	C

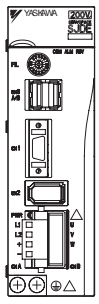
Shaft end Specifications	
Specification	**Code**
Straight with key	4

Design procedure	
Specification	**Code**
Standard	C

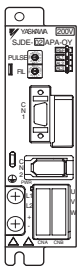
Feedback specification	
Specification	**Code**
Analogue output encoder	M

SERVOPACK Model Designation

Junma MECHATROLINK-II Servo Drive



Junma Pulse Servo Drive



SJDE - 02 A P A - OY

JUNMA Series
SJDE SERVOPACK

Applicable Servomotor Capacity	
Output (W)	**Code**
100	01
200	02
400	04
750	08

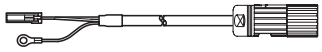
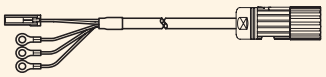
Design Revision Order
A, B…

Interface Specification	
Specification	**Code**
Pulse Reference Control	P
Mechatrolink-II	N

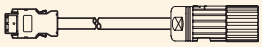
Power Supply Voltage	
Specification	**Code**
200 VAC	A

Ordering Instructions

Power Cables

Specifications			Model	Appearance
Power cable for Junma servomotors without brake	Flexible cables (Standard) Shielded Cable Bending radius (Dynamic) > 10 x Diameter Bending cycles > 5 Million	1.5 m	JZSP-CHM000-01-5-E-G4	
		3 m	JZSP-CHM000-03-E-G4	
		5 m	JZSP-CHM000-05-E-G4	
		10 m	JZSP-CHM000-10-E-G4	
		15 m	JZSP-CHM000-15-E-G4	
		20 m	JZSP-CHM000-20-E-G4	
Power cable for Junma servomotors with brake	Flexible cables (Standard) Shielded Cable Bending radius (Dynamic) > 10 x Diameter Bending cycles > 5 Million	1.5 m	JZSP-CHM030-01-5-E-G4	
		3 m	JZSP-CHM030-03-E-G4	
		5 m	JZSP-CHM030-05-E-G4	
		10 m	JZSP-CHM030-10-E-G4	
		15 m	JZSP-CHM030-15-E-G4	
		20 m	JZSP-CHM030-20-E-G4	

Encoder Cables

Specifications			Model	Appearance
Encoder cable for Junma servomotors	Flexible cables (Standard) Shielded Cable Bending radius (Dynamic) > 10 x Diameter Bending cycles > 5 Million	1.5 m	JZSP-CHP800-01-5-E-G4	
		3 m	JZSP-CHP800-03-E-G4	
		5 m	JZSP-CHP800-05-E-G4	
		10 m	JZSP-CHP800-10-E-G4	
		15 m	JZSP-CHP800-15-E-G4	
		20 m	JZSP-CHP800-20-E-G4	

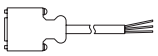
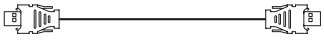
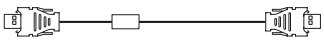
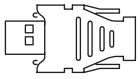
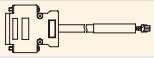
Connectors for power and encoder

Specifications			Model (Yaskawa)	Model (Manufacturer)
Connectors for making power cables	Drive side (CNB)	Manufacturer: JST	JZSP-CHM9-2	04JFAT-SAYGF-N
	Motor side	Manufacturer: Intercontec		BSTA852NN0085201A000 *
Connectors for making encoder cables	Drive side (CN2)	Manufacturer: 3M	JZSP-CHP9-2	Shell kit: 36310-3200-008 **
	Motor side	Manufacturer: Intercontec		ASTA046NN0084200A000 *
Connector Kit for Power Supply / Regenerative Unit	Drive side (CNA)	Manufacturer: JST	JZSP-CHG9-1	04JFAT-SBXGF-N

* Note: Female contacts for Intercontec plugs have to be ordered separately, Crimp Type: 60.001.11 - Solder Type: 60.004.11

** Note: Part No. of receptacle: 36210-0100FD

Signal and communication cables

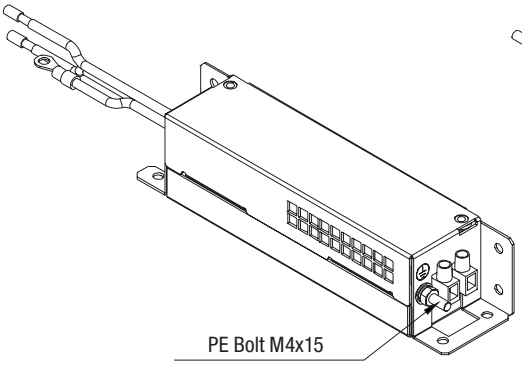
Name	Type		Model	Length	Appearance
I/O Signal Cables			JZSP-CHI003-01	1 m	
			JZSP-CHI003-02	2 m	
			JZSP-CHI003-03	3 m	
I/O Signal Connector Kits	For SERVOPACK CN1	Soldered Type	JZSP-CHI9-1	–	
MECHATROLINK-II Communication Cable	Cable with Connectors at Both Ends *1 (Without Ferrite Core)		JEPMC-W6002-□□*2	–	
			JEPMC-W6002-□□*2-E (Compliant with RoHS Directive)	–	
	Cable with Connectors at Both Ends *1 (With Ferrite Core)		JEPMC-W6003-□□*2	–	
			JEPMC-W6003-□□*2-E (Compliant with RoHS Directive)	–	
	Terminators		JEPMC-W6022-□□*2	–	
			JEPMC-W6022-□□*2-E (Compliant with RoHS Directive)	–	
Cable for Personal Computer	Cables		JZSP-CPS00-02	2 m	
PC Communication Board (for Pulse Reference Type only)			JUSP-JC001	–	

*1: The total cable length must be 50 m max. and the cable length between stations 0.5 m min.

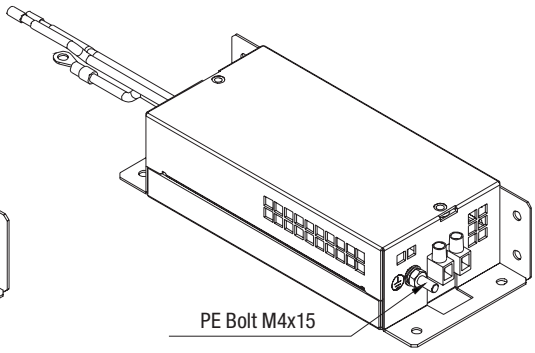
*2: Specify the cable length in □□ when ordering as shown in the table below.

□□	Cable length m	□□	Cable length m	□□	Cable length m	□□	Cable length m	□□	Cable length m
A5	0.5	03	3.0	07	7.0	20	20	40	40
01	1.0	05	5.0	10	10	30	30	50	50

Noise Filters



100 to 400 W SERVOPACKs



750 W SERVOPACKs

Ordering Instructions

Pulse Reference Type

Noise Filter Model	Servopack Model		
FB-SJDE04P	SJDE-01APA	SJDE-02APA	SJDE-04APA
FB-SJDE08P	SJDE-08APA		

Mechatrolink-II Network Type

Noise Filter Model	Servopack Model		
FB-SJDE04N	SJDE-01ANA	SJDE-02ANA	SJDE-04ANA
FB-SJDE08N	SJDE-08ANA		

Ratings and Specifications

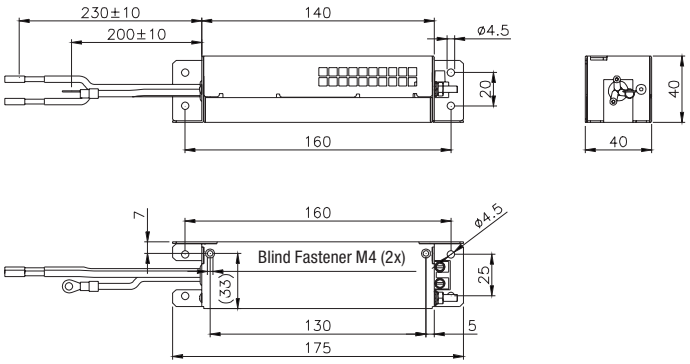
Noise Filter Model FB-□		SJDE04P	SJDE08P	SJDE04N	SJDE08N
No. of phase		1			
Rated voltage	V	250			
Rated frequency	Hz	50-60			
Rated current	A	5	9	5	9
Max. leakage current	mA	1.7			
High voltage test	V	2150 (Line-Line) 2700 (Line-Case)			
Operating conditions					
Protection index		IP 20			
Ambient temperature	°C	+45°C			
Climatic category (according to EN 60068-1)		25/085/21			
Type of cooling		AN (natural-air cooling)			
Air speed	m/s	-			
Operation mode		S1 (continuous operation)			

Note: The noise filters are designed as side-by-side-mounted and footprint filters.

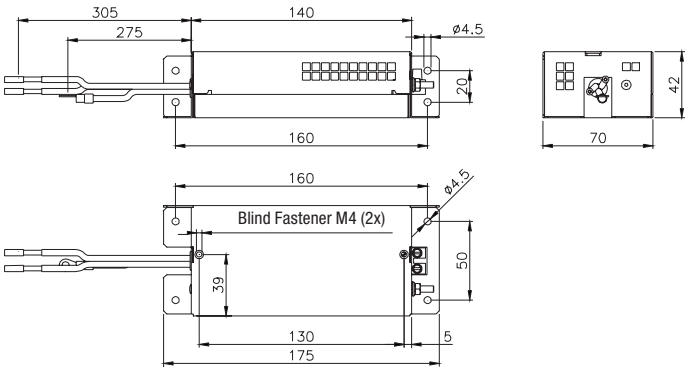
Dimensions

Units: mm

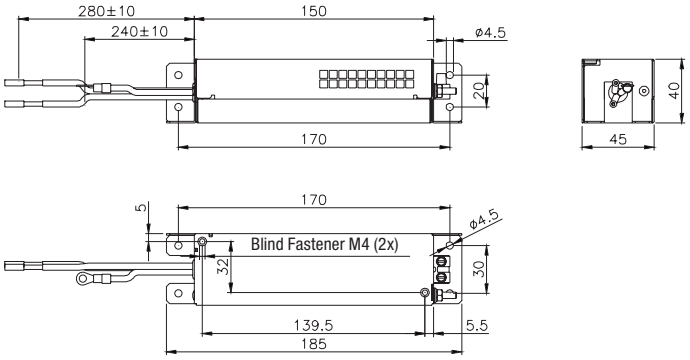
FB-SJDE 04P (SJDE-APA 100 to 400 W)



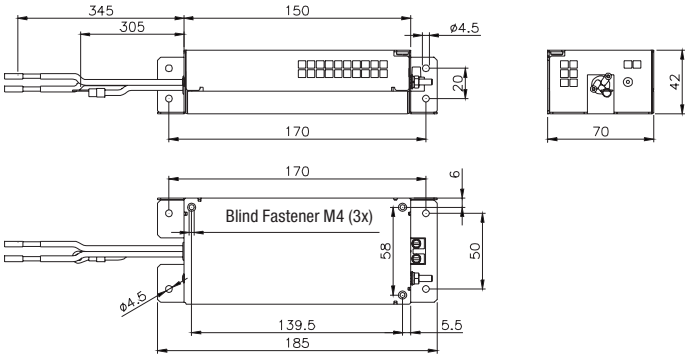
FB-SJDE08P (SJDE-APA 750 W)



FB-SJDE04N (SJDE-ANA 100 to 400 W)

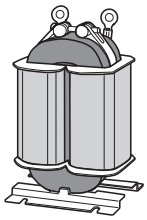


FB-SJDE08N (SJDE-ANA 750 W)



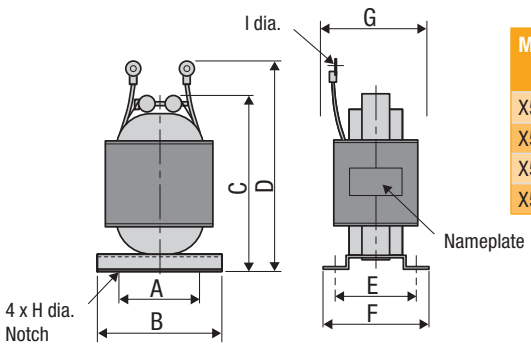
AC Reactor

Ratings and Specifications



Model	Inductance (mH)	Rated Current (A)	Contact
X5052	45.0	1.0	Yaskawa Local Office
X5053	20.0	2.0	
X5054	5.0	3.0	
X5056	2.0	5.0	

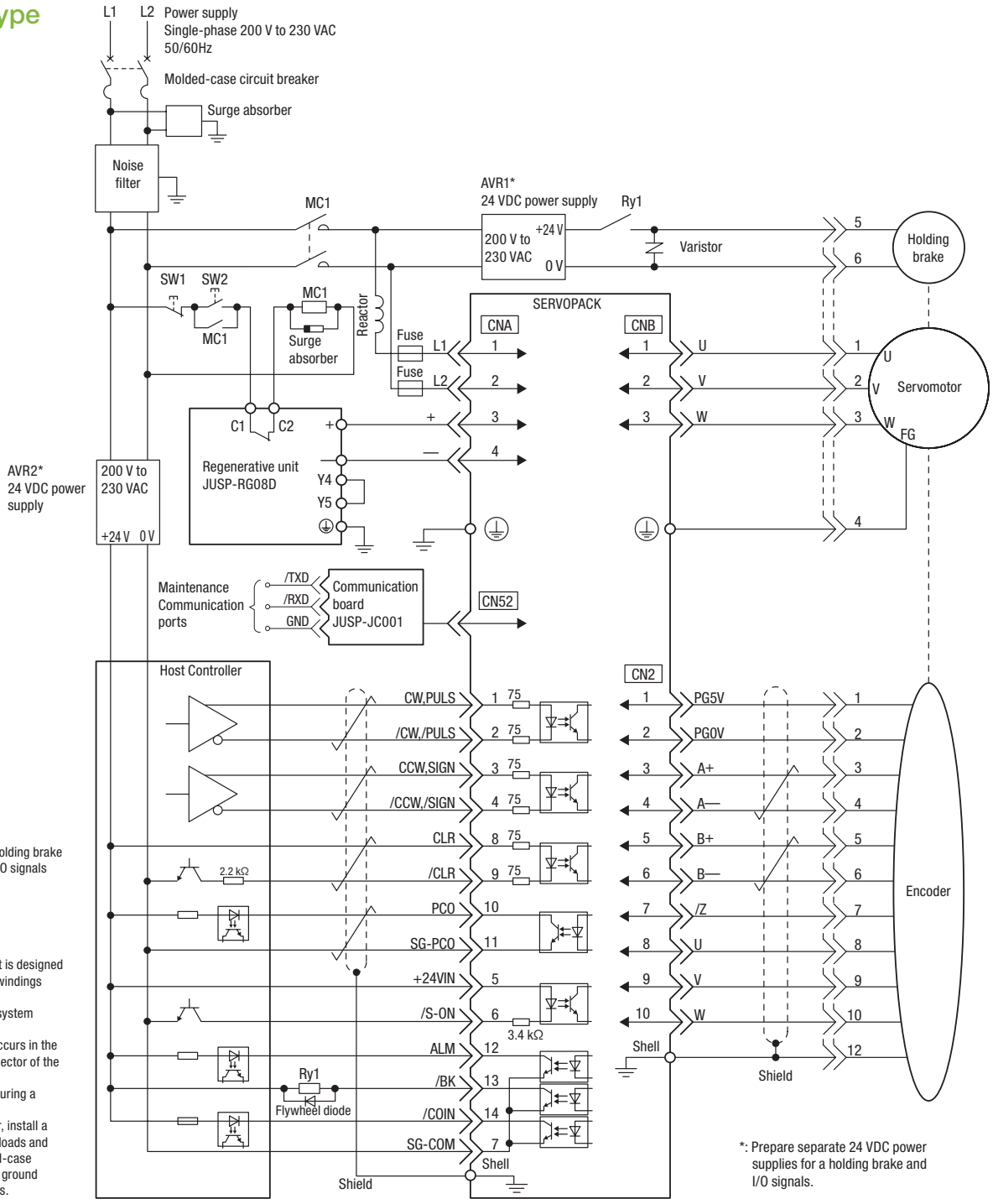
Dimensions



Model	Dimensions (mm)									Approx. Mass (kg)
	A	B	C	D	E	F	G	H	I	
X5052	35	52	80	95	30	40	45	4	4.3	0.4
X5053	35	52	90	105	35	45	50	4	4.3	0.6
X5054	35	52	80	95	30	40	45	4	4.5	0.4
X5056	35	52	80	95	30	40	45	4	4.3	0.4

Connection Diagram

Pulse Reference Type



*: Prepare separate 24 VDC power supplies for a holding brake and I/O signals.

Notes: 1 AVR1 : 24 VDC power supply for holding brake
AVR2: 24 VDC power supply for I/O signals
SW1 : Power off switch
SW2 : Power on switch
MC1 : Magnetic contactor
Ry1 : Relay for holding brake

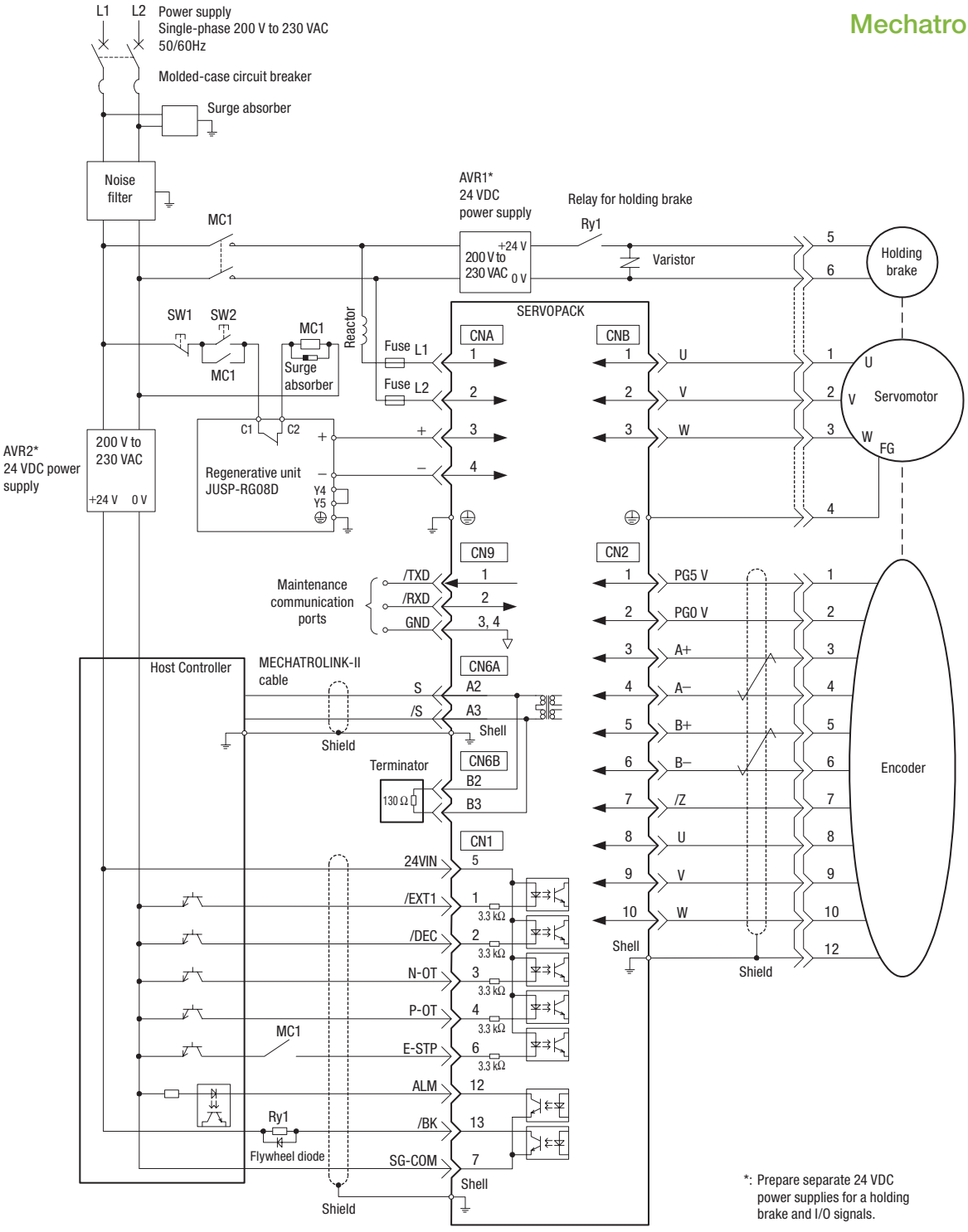
2 The ground fault protection circuit is designed for ground fault inside the motor windings while the motor is running.
Therefore, it may not protect the system under the following cases.
- A low-resistance ground fault occurs in the main circuit cable or in the connector of the cable for the servomotor.
- The power supply is turned on during a ground fault.
To make your system even safer, install a ground fault interrupter for overloads and shortcircuits, or install a molded-case circuit breaker combined with a ground fault interrupter for ground faults.

Manufacturers of Components

Component	Manufacturer	Model
Surge absorber	Okaya Electric Industries Co., Ltd. (Spark killer)	CRE-50500
Flywheel diode	Toshiba Corp.	1NH42
Relay for holding brake	Omron Corp.	MY series
Varistor	Nippon Chemi-Con Corp.	TNR7V121K

Connection Diagram

Mechatrolink-II Network Type



*: Prepare separate 24 VDC power supplies for a holding brake and I/O signals.

AVR1	24 VDC power supply for a holding brake	**SW1**	Emergency Stop Switch
		SW2	Power on switch
AVR2	24 VDC power supply for I/O signals	**MC1**	Magnetic contactor
		Ry1	Relay for holding brake

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