MECHATROLINK-II Communications Reference SERVOPACKs

SGDV-□□□E11

(For Rotary Servomotors)

Model Designations

S G D V - 2R9 E 11 A 002 00 0

Σ-V Series SGDV SERVOPACKs with DC Power Input	1st+2nd+3rd digits	4th digit	5th+6th digits	7th digit	8th+9th+10th digits	11th+12th digits	13th digit

1st+2nd+3rd digits Current

Voltage	Code	Applicable Servomotor Max. Capacity kW
24 VDC/ 48 VDC	1R7	0.011
	2R9	0.030

4th digit Power Supply Voltage

Code	Specifications
E	48 VDC*

5th+6th digits Interface

Code	Specifications
11	MECHATROLINK-II communications Reference (for rotary servomotors)

7th digit Design Revision Order

A, B…

8th+9th+10th digits Options (hardware)

Code	Specifications
002	Base-mounted, varnish(standard)

11th+12th digits Options (software)

Code	Specifications
00	Standard

13th digit Options (parameter)

Code	Specifications
0	Standard

*: Either a 24-VDC or a 48-VDC power supply can be used for the main circuit. The control power supply must be 24 VDC.
Note: If the option codes digits 8 to 13 are all zeros, they are omitted.

Features

●Real-time communications

MECHATROLINK-II communications enable high-speed control for 30 stations at a maximum transmission speed of 10 Mbps in a transmission cycle from 250 μs to 4 ms (set by the host controller). Such a high transmission speed allows real-time transmission of various data required for control.

●Cost savings

Thirty stations can be connected to a single MECHATROLINK-II transmission line, so wiring costs and time are greatly reduced. Also, only one signal connector is required on the host controller. And, the all-digital network eliminates the need for conversion from digital to analog for speed/torque references and for a pulse generator to generate position references.

●High-precision motion control

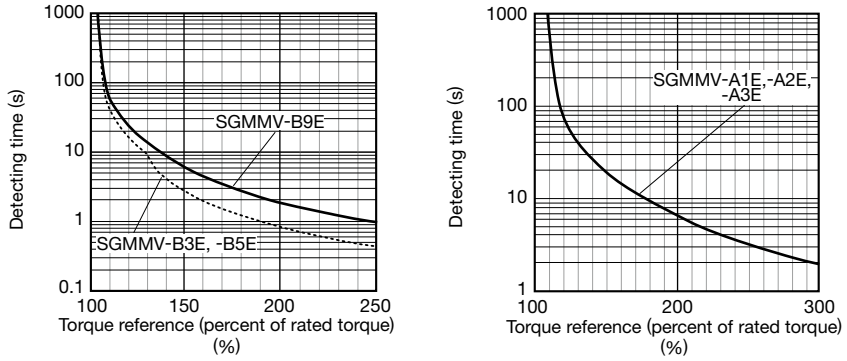
The SGDV SERVOPACK when connected to the host controller in the MECHATROLINK-II network provides not only torque, position, and speed control but also synchronized phase control that requires advanced control technology. The control mode can be changed online so that the machine can move smoothly in complex motions with great efficiency.

Ratings

SERVOPACK Model SGDV-□□□□		1R7E		2R9E	
Applicable Servomotor Max. Capacity	kW	0.011		0.030	
Continuous Output Current	Arms	1.7		2.9	
Max. Output Current	Arms	4.1		8.6	
Regenerative Resistors		None			
Main Circuit*		24 VDC±15%	48 VDC±15%	24 VDC±15%	48 VDC±15%
Control Circuit		24 VDC±15%			

*: Either a 24-VDC or a 48-VDC power supply can be used for the main circuit. When a 24-VDC power supply is used, the torque-motor speed characteristics for a 48 VDC cannot be achieved. For details, refer to Torque-Motor Speed Characteristics on page 6.

●SERVOPACK Overload Characteristics



Note: Overload characteristics shown above do not guarantee continuous duty of 100% or more output. Use a servomotor with effective torque within the continuous duty zone of Torque-Motor Speed Characteristics.

Specifications

Items			Specifications	
Control Method			PWM control, sine-wave driven	
Feedback			Serial encoder: 17-bit (incremental/absolute)	
Operating Conditions	Ambient Temperature		0 to +55°C	
	Storage Temperature		−20 to +85°C	
	Ambient Humidity		90%RH or less	With no freezing or condensation
	Storage Humidity		90%RH or less	
	Vibration Resistance		4.9 m/s2	
	Shock Resistance		19.6 m/s2	
	Protection Class		IP10	An environment that satisfies the following conditions. • Free of corrosive or flammable gases • Free of exposure to water, oil, or chemicals • Free of dust, salts, or iron dust
	Pollution Degree		2	
	Altitude		1000 m or less	
	Others		Do not use SERVOPACKs in the following locations: • Locations subject to static electricity noise, strong electromagnetic/magnetic fields, radioactivity	
Applicable Standards			UL508C EN55011/A1, EN61000-6-2,EN61800-3, EN61800-5-1	
Mounting			Base-mounted	
Performance	Speed Control Range		1 : 5000 (The lower limit of the speed control range must be lower than the point at which the rated torque does not cause the servomotor to stop.)	
	Speed Regulation*1	Load Fluctuation	0% to 100% load: ±0.01% max. (at rated speed)	
		Voltage Fluctuation	Rated voltage: ±10% : 0% (at rated speed)	
		Temperature Fluctuation	25±25°C : ±0.1% max. (at rated speed)	
	Torque Control Tolerance (Repeatability)		±1%	
	Soft Start Time Setting*2		0 to 10 s (can be set individually for acceleration and deceleration.)	
I/O Signal	Sequence Input	Input Signals which can be allocated	Number of Channels	3 channels
			Functions	• Homing deceleration switch signal (/DEC) • External latch signals (/EXT 1) • Forward run prohibited (P-OT), reverse run prohibited (N-OT) • Forward external torque limit (/P-CL), reverse external torque limit (/N-CL) Positive and negative logic can be changed.
	Sequence Output	Fixed Output	Servo alarm (ALM)	
		Output Signals which can be allocated	Number of Channels	3 channels
			Functions	• Positioning completion (/COIN) • Speed limit detection (/VLT) • Speed coincidence detection (/V-CMP) • Brake (/BK) • Rotation detection (/TGON) • Warning (/WARN) • Servo ready (/S-RDY) • Near (/NEAR) • Torque limit detection (/CLT) Positive and negative logic can be changed.
Communications	Computer (USB)		Compatible with SigmaWin+. Compliant with the USB1.1 standard (12 Mbps)	
Display			Servo alarm (ALM): red; servo ready (RDY): green; communications(COM): green	
DIP Switches for MECHATROLINK-II Communication Settings			DIP switches: SW1 and SW2	Number of poles: 4/DIP switch (two DIP switches)*3
Analog Monitor			Number of points: 2 Output voltage: ±10 VDC (linearity effective range: ±8 V) Output through the analog monitor unit (model: JUSP-PC001-E)	

*1: Speed regulation is defined as follows:

(Cont'd)

$$\text{Speed regulation} = \frac{\text{No-load motor speed} - \text{Total load motor speed}}{\text{Rated motor speed}} \times 100\%$$

The motor speed may change due to voltage fluctuation or temperature fluctuation.

The ratio of speed changes to the rated speed represent speed regulation due to voltage and temperature fluctuations.

*2 : For information on soft start, refer to 4.2.10 Velocity Control (VELCTRL: 3CH) in the AC Servo Drives Σ-V Series USER'S MANUAL MECHATROLINK-II Commands

*3 : For details, refer to 4.1.1 Setting Switches SW1 and SW2 in the AC Servo Drives DC Power Input Σ-V Series USER'S MANUAL Design and Maintenance

Specifications

Items		Specifications
Dynamic Brake (DB)		Not available
Regenerative Processing		Not available
Overtravelling (OT) Prevention		Decelerate to a stop or coast to a stop when overtraveling is detected and an overtravel signal (P-OT or N-OT) is input.
Protective Functions		Overcurrent, Overvoltage, low voltage, overload, etc.
Utility Functions		Gain adjustment, alarm history, JOG operation, origin search, etc.
MECHATROLINK-II Communications	Communications Protocol	MECHATROLINK-II
	Station Address	41H to 5FH (max. number of slaves: 30) Set station addresses with combinations of SW1 and SW2 settings.
	Transmission Speed	10 Mbps, 4 Mbps Set by using the SW2 DIP switch.
	Transmission Cycle	250 μs or 0.5 ms to 4.0 ms (increments of 0.5 ms)
	Number of Transmission Bytes	Can be switched between 17 bytes /station and 32 bytes / station. Set by using the SW2 DIP switch.
Command Method	Performance	Position control, speed control, and torque control through MECHATROLINK-II communications
	Command Input	MECHATROLINK-II commands (for sequence, motion, data setting/reference, monitoring, adjustment, and other commands.)

Power Supply Capacities and Power Losses

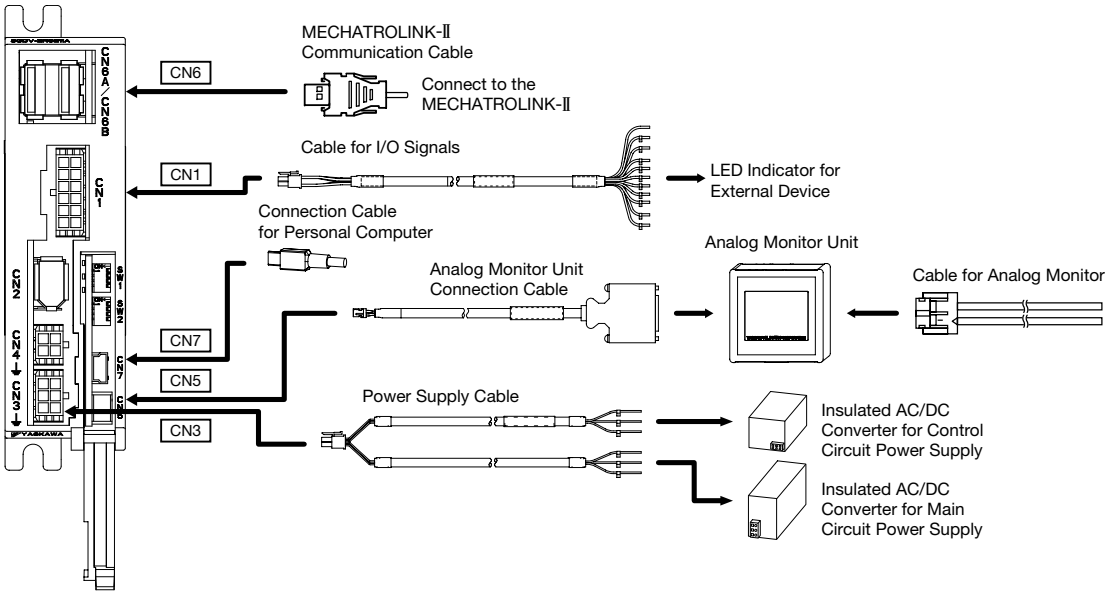
The following table shows SERVOPACK's power supply capacities and power losses at the rated output.

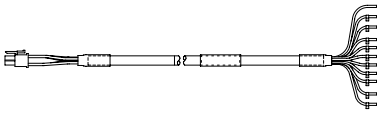
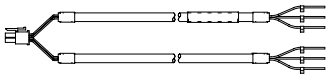
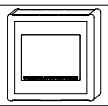
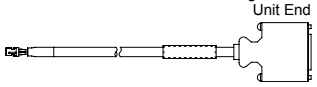
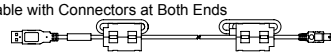
Main Circuit Power Supply	Applicable Servomotor Max. Capacity W	SERVOPACK Model SGDV-	Main Circuit Power Supply Capacity per SERVOPACK W	Output Current Arms	Main Circuit Power Loss W	Regenerative Resistor Power Loss W	Control Circuit Power Loss W	Total Power Loss W
24 VDC	11	1R7E	108	1.7	3.4	–	7.2	10.6
	30	2R9E	165	2.9	6.9			14.1
48 VDC	11	1R7E	169	1.7	3.4	–	7.2	10.6
	30	2R9E	411	2.9	6.9			14.1

Note: These power supply capacities are net values at instantaneous maximum loads.

Selecting Cables

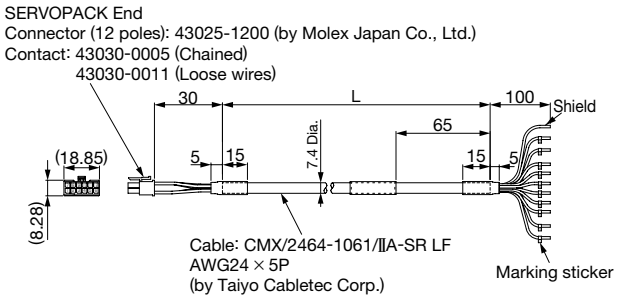
● Cables for CN1 CN3 CN5 CN6 CN7 (MECHATROLINK-II Communications Reference SERVOPACKs)



Name		Length	Order No.	Specifications	Details
CN1 Cables for I/O Signals	Cable with Loose wire at One End	1 m	JZSP-CF1I02-1-E		(1)
		2 m	JZSP-CF1I02-2-E		
		3 m	JZSP-CF1I02-3-E		
CN3 Power Supply Cables	Cable with Loose wire at One End	1 m	JZSP-CF1G00-01-E	SERVOPACK End Power Supply End 	(2)
		2 m	JZSP-CF1G00-02-E		
		3 m	JZSP-CF1G00-03-E		
		4 m	JZSP-CF1G00-04-E		
		5 m	JZSP-CF1G00-05-E		
		6 m	JZSP-CF1G00-06-E		
		7 m	JZSP-CF1G00-07-E		
		8 m	JZSP-CF1G00-08-E		
		9 m	JZSP-CF1G00-09-E		
		10 m	JZSP-CF1G00-10-E		
CN5 Analog Monitor Unit Cable	Analog Monitor Unit		JUSP-PC001-E		(3)
	Analog Monitor Unit Connection Cable	0.3 m	JZSP-CF1S06-A3-E	SERVOPACK End Analog Monitor Unit End 	(4)
	Cables for Analog Monitor	1 m	JZSP-CA01-E	Analog Monitor Unit End 	(5)
CN6A CN6B MECHATROLINK-II Communication Cable	Cables with Connectors at Both Ends	0.5 to 50 m	JEPMC-W6002-□□-E		(6)
	Cables with Connectors at Both Ends (with Ferrite Core)	0.5 to 50 m	JEPMC-W6003-□□-E		(7)
	Terminator		JEPMC-W6022-E		(8)
CN7 Connection Cables for Personal Computer		2.5 m	JZSP-CVS06-02-E	Cable with Connectors at Both Ends 	(9)

(1) Cable with Loose Wires at One End for CN1
(Model: JZSP-CF1I02-□-E)

• External Dimensions (Units: mm)



Model	Cable Length
JZSP-CF1I02-1-E	1 m
JZSP-CF1I02-2-E	2 m
JZSP-CF1I02-3-E	3 m

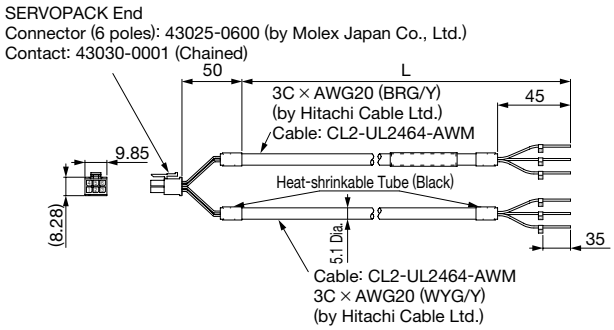
●Cable with Loose Wires at One End for CN1
Connection Diagram of JZSP-CF1I02-□-E Cable

SERVOPACK End					Host Controller End
Pin No.	Signal	Wire Color	Marking		Lead Marker
			Color	Dots	
1	FG	Shield	–	–	–
2	+24VIN	Orange	Black	1	2
3	P-OT	Orange	Red	1	3
4	ALM	Gray	Black	1	4
5	COM_SG	Gray	Red	1	5
6	–	–	–	–	–
7	/DEC	White	Black	1	7
8	N-OT	White	Red	1	8
9	SO3	Yellow	Black	1	9
10	SO2	Yellow	Red	1	10
11	/BK	Pink	Black	1	11
12	–	–	–	–	–

: Represents twisted-pair wires.

(2) Cable with Loose Wires at One End for CN3
(Model: JZSP-CF1G00-□□-E)

• External Dimensions (Units: mm)



Model	Cable Length
JZSP-CF1G00-01-E	1 m
JZSP-CF1G00-02-E	2 m
JZSP-CF1G00-03-E	3 m
JZSP-CF1G00-04-E	4 m
JZSP-CF1G00-05-E	5 m
JZSP-CF1G00-06-E	6 m
JZSP-CF1G00-07-E	7 m
JZSP-CF1G00-08-E	8 m
JZSP-CF1G00-09-E	9 m
JZSP-CF1G00-10-E	10 m

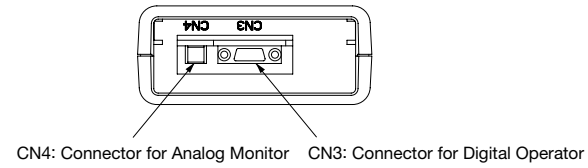
• Specifications

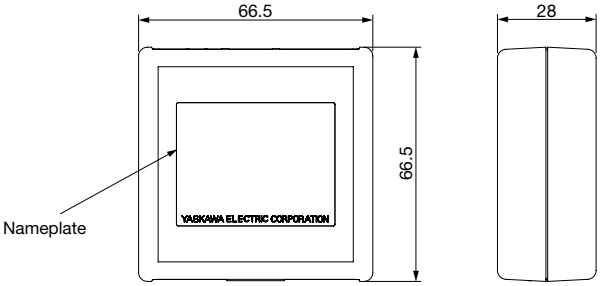
Pin No.	Cable Color	Signal
1	Green/yellow	FG
2	Green/yellow	FG
3	Blue	L2
4	White	C2
5	Yellow	C1
6	Red	L1

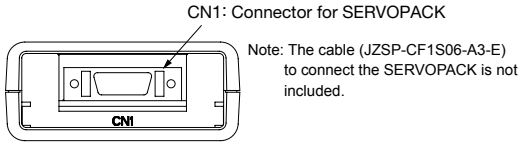
Selecting Cables

(3) Analog Monitor Unit
(Model: JUSP-PC001-E)

• External Dimensions (Units: mm)

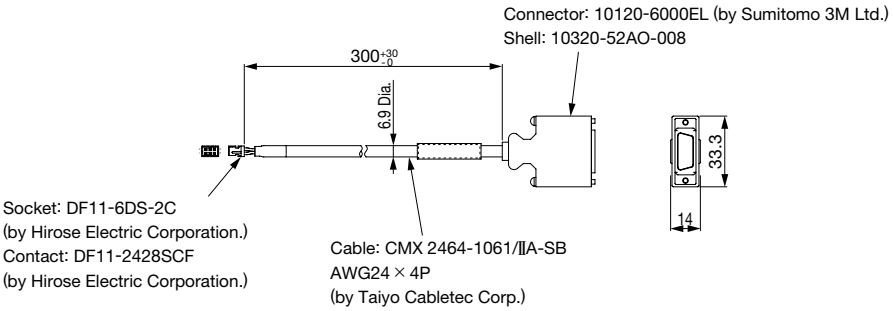






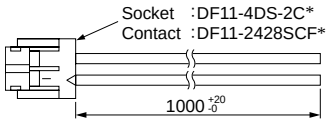
(4) Analog Monitor Unit Connection Cable for CN5
(Model: JZSP-CF1S06-A3-E)

• External Dimensions (Units: mm)

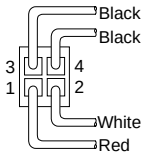


(5) Analog Monitor Unit Cable for CN4
(Model: JZSP-CA01-E)

• External Dimensions (Units: mm)



* : Manufactured by Hirose Electric Corporation.



View from Cable End

• Specifications

Pin No.	Cable Color	Signal	Standard Settings
1	Red	Analog Monitor 2	Motor speed : 1V/1000 min-1
2	White	Analog Monitor 1	Torque reference : 1V/100% rated torque
3, 4	Black (2 cables)	GND (0V)	–

Note : The specifications above are factory settings. Monitor specifications can be changed by changing parameters Pn006 and Pn007.

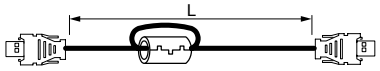
(6) Cable with Connectors at Both Ends for CN6
(Model: JEPMC-W6002-□□-E)

• External Dimensions (Units: mm)

Model	Cable Length (L)
JEPMC-W6002-A5-E	0.5 m
JEPMC-W6002-01-E	1.0 m
JEPMC-W6002-03-E	3.0 m
JEPMC-W6002-05-E	5.0 m
JEPMC-W6002-10-E	10.0 m
JEPMC-W6002-20-E	20.0 m
JEPMC-W6002-30-E	30.0 m
JEPMC-W6002-40-E	40.0 m
JEPMC-W6002-50-E	50.0 m

(7) Cable with Connectors at Both Ends (with Ferrite Core) for CN6
(Model: JEPMC-W6003-□□-E)

• External Dimensions (Units: mm)

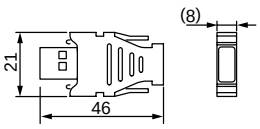


Model	Cable Length (L)
JEPMC-W6003-A5-E	0.5 m
JEPMC-W6003-01-E	1.0 m
JEPMC-W6003-03-E	3.0 m
JEPMC-W6003-05-E	5.0 m
JEPMC-W6003-10-E	10.0 m
JEPMC-W6003-20-E	20.0 m
JEPMC-W6003-30-E	30.0 m
JEPMC-W6003-40-E	40.0 m
JEPMC-W6003-50-E	50.0 m

IMPORTANT Use a MECHATROLINK-II communications cable specified by Yaskawa. When using other cables, noise resistance may be reduced, and operation cannot be guaranteed.

(8) MECHATROLINK-II Terminator for CN6
(Model : JEPMC-W6022-E)

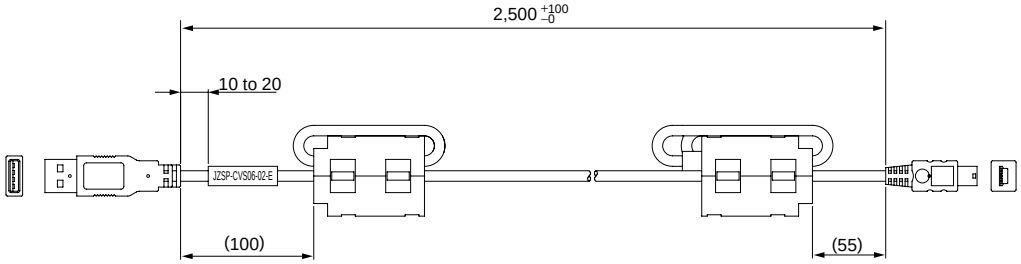
• External Dimensions (Units: mm)



Selecting Cables

(9) Connection Cable for Personal Computer for CN7
(Model: JZSP-CVS06-02-E)

- External Dimensions (Units: mm)



IMPORTANT Use a cable specified by Yaskawa.
When using other cables, operation cannot be guaranteed.