



Wiring Main Circuit and Peripheral Devices

Wiring Main Circuit

● Typical Main Circuit Wiring Examples

This section shows an example of the typical wiring for the main circuit.



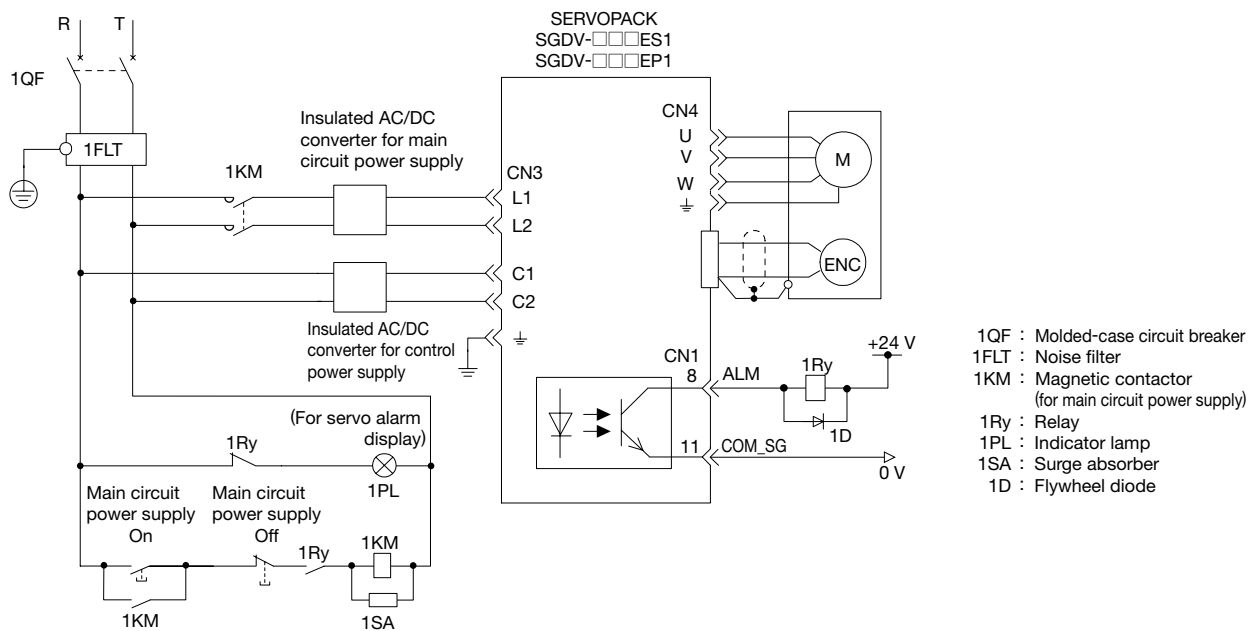
WARNING

High voltage may still remain in the SERVOPACK after the power has been turned OFF. To avoid electric shocks, do not touch the power supply terminals. Be sure that the remaining voltage has been discharged before wiring and inspecting.

IMPORTANT

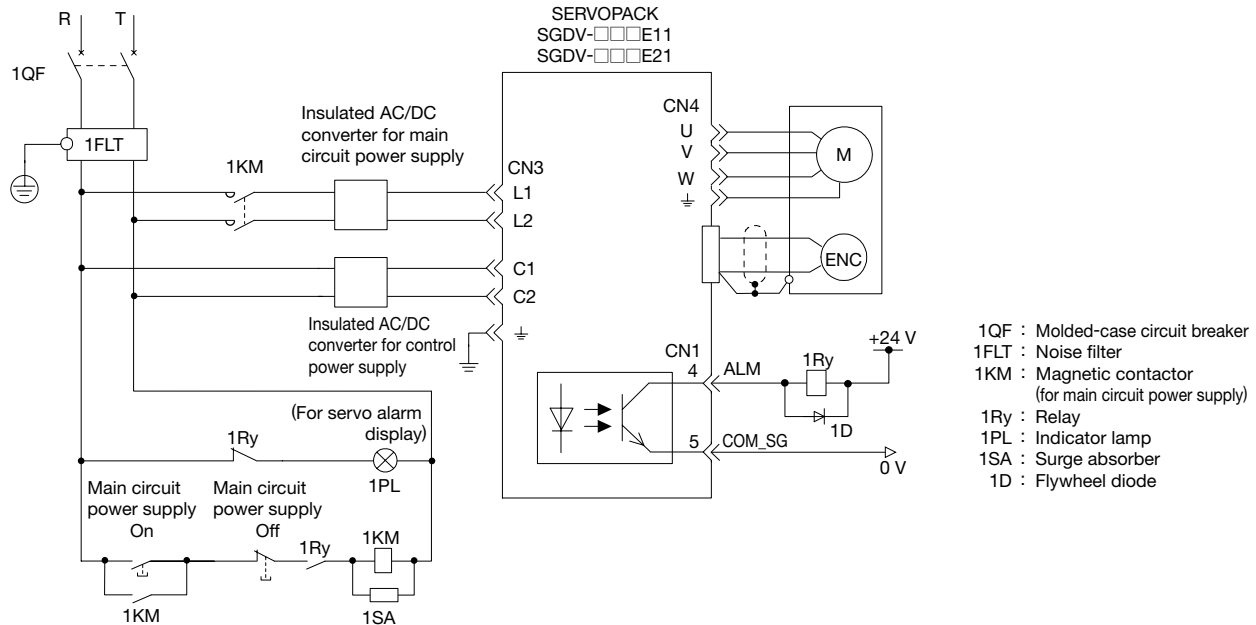
- Turn ON the power supplies for the control and for the main circuit at the same time, or first turn ON the control power and then the power for the main circuit power. When turning OFF the power, first turn OFF the power for the main circuit and then control power.
- Use separate power supplies for the main circuit AC/DC power supply and control AC/DC power supply. Use power supplies with double or reinforced insulation and that have also been certified for safety standards.
- Do not connect the following devices to the control power line: motors, solenoids, or other devices with large load fluctuations, and contactors or other devices that generate surge voltage. If connected, internal elements may deteriorate or a fuse may melt.

● SERVOPACKs with Analog Voltage Reference/Pulse Train Reference



Wiring Main Circuit

● SERVOPACKs with MECHATROLINK-II or -III Communications Reference



● General Precautions for Wiring

IMPORTANT

- Use a molded-case circuit breaker (1QF) or a fuse to protect the servo system.
 Always use a molded-case circuit breaker or a fuse to protect the servo system from accidents involving different power voltages or other accidents.
- Install a ground fault detector.
 The SERVOPACK does not have a built-in protective circuit for grounding. For a safer system, install a ground fault detector to protect against overloads and short circuits, or install a ground fault detector that is combined with a molded-case circuit breaker.
- Do not turn the power OFF and ON more than necessary.
- Do not use the SERVOPACK for applications that require the power to be frequently turned OFF and ON. Such applications will cause elements in the SERVOPACK to deteriorate.
- As a guideline, wait at least one hour before restarting the power after turning OFF the power during operation.

To ensure safe, stable application of the servo system, observe the following precautions when wiring.

Observe the following precautions when wiring the main circuit.

- Use shielded twisted-pair wires or shielded, multi-core, twisted-pair wires for I/O signal cables and the encoder cables.
- The maximum wiring length is 3 m for I/O signal cables, 50 m for encoder cables or servomotor main circuit cables, and 10 m for control power and main circuit power cables.

Observe the following precautions when grounding.

- Use a cable that is as thick as possible.
- Ground the SERVOPACK to a resistance of 100 Ω or less.
- Be sure to ground at only one point.
- Ground the servomotor directly if the servomotor is insulated from the machine.

The signal cable conductors are as thin as 0.2 mm² or 0.3 mm². Do not impose excessive bending force or tension.

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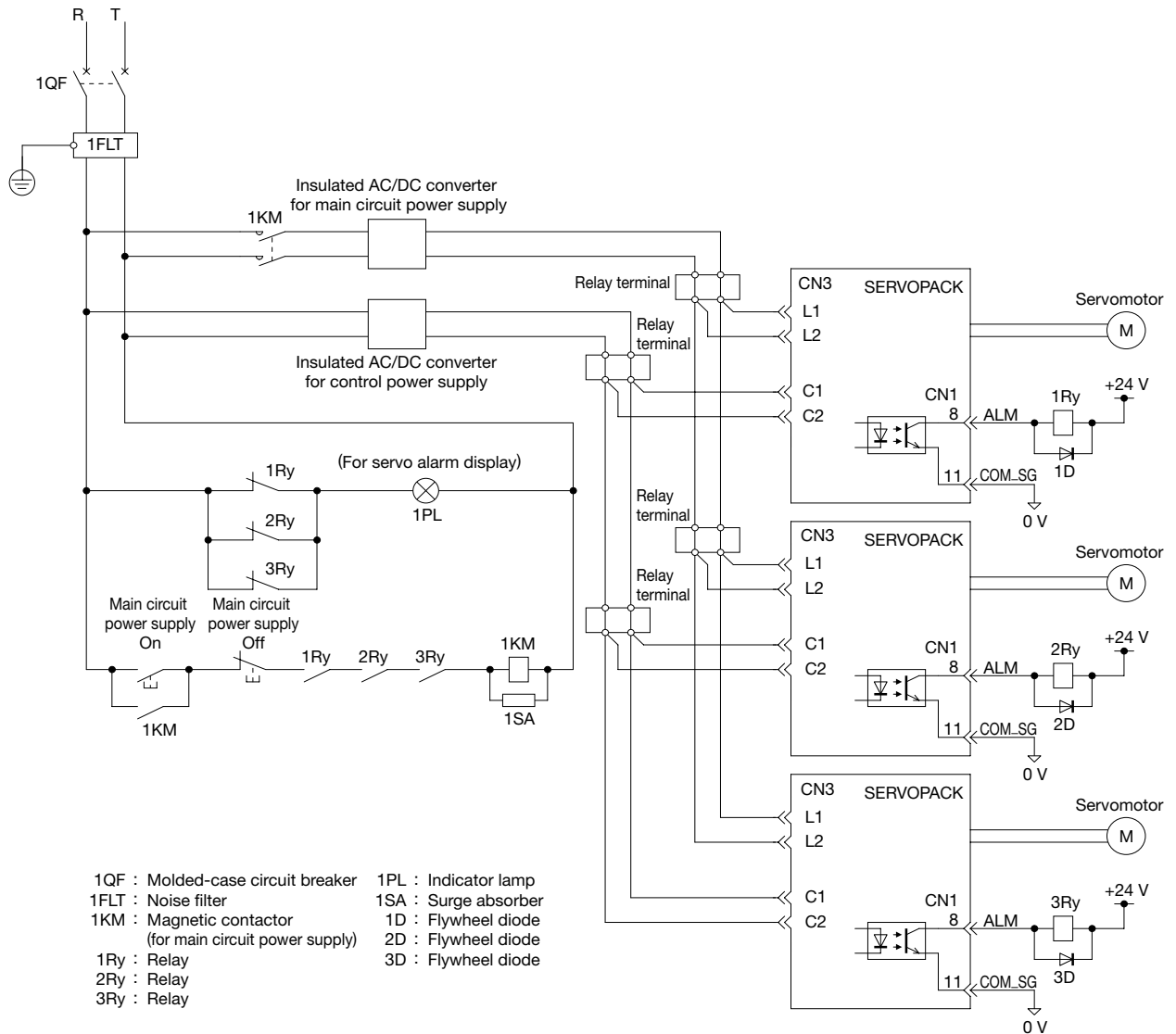
● Precautions When Using More Than One SERVOPACK

This section shows an example of wiring and precautions when more than one SERVOPACK is used.

● Wiring Example

Wire the circuit so that each alarm detection relay (1 Ry, 2 Ry, 3 Ry) can be separately activated to issue an alarm.

After a SERVOPACK alarm is activated, the ALM output signal transistor is turned OFF.



● Precautions

- Multiple SERVOPACKs can share a single molded-case circuit breaker (1QF) and a single noise filter. Always select a molded-case circuit breaker and a noise filter that have a large enough capacity to handle all SERVOPACKs used. When selecting a breaker and a filter, also consider load conditions.
- When using SERVOPACKs with DC power, four signals for the sequencing of one SERVOPACK are connected at only one location (COM_SG) for common signal grounding. If alarm signals for multiple SERVOPACKs are connected in series, an alarm signal may not be received correctly when an alarm is issued.

SERVOPACK Main Circuit Wire

● For 48 VDC and 24 VDC

Cables	Terminal Symbol	SERVOPACK Model SGD V-		Remarks
		1R7E	2R9E	
Power Supply Cable	L1, L2, C1, C2, \pm	JZSP-CF1G00-□□-E		For details, refer to Selecting Cables for SERVOPACKs with DC Power Input on page 13.
Servomotor Main Circuit Cable	U, V, W, \pm	JZSP-CF1M00-□□-E (For motors without brakes) JZSP-CF1M10-□□-E (For motors with brakes) JZSP-CF1M20-□□-E (Flexible type cable for motors without brakes) JZSP-CF1M30-□□-E (Flexible type cable for motors with brakes)		For details, refer to Selecting Cables on page 415, page 425, and page 435.

If assembling a main circuit cable for the SERVOPACK, observe the following conditions.

IMPORTANT

- The specified wire sizes are for use when the three lead cables are bundled and when the rated electric current is applied with a surrounding air temperature of 40°C
- Use a wire with a minimum withstand voltage of 100 V.
- Use insulated wire with an outer diameter of 1.85 mm or smaller. The wire size is restricted due to the specifications of the contact used.
- If cables are bundled in PVC pipes or metal ducts, remember to consider resulting reduction of the allowable current.
- Use heat-resistant wire for high surrounding air or panel temperatures.
- Use a cable with a maximum length of 10 m for the main circuit's power and one with a maximum length of 50 m for the motor's main circuit.

Cables	SERVOPACK Model SGD V-		Remarks	
	1R7E	2R9E		
CN3 For Main Circuit Power	Connector	43025-0600 (by Molex Japan Co., Ltd.)		6 poles
	Contact	43030-0001 (by Molex Japan Co., Ltd.)		-
	Wire for Main Circuit Power (L1, L2, \pm)	UL1007, AWG20		Rated voltage: 300 V; rated temperature: 80°C
	Wire for Control Power (C1, C2, \pm)	UL1007, AWG20-24		Rated voltage: 300 V; rated temperature: 80°C
CN4 For Motor Main Circuit	Connector (SERVOPACK End)	43025-0400 (by Molex Japan Co., Ltd.)		4 poles
	Contact (SERVOPACK End)	43030-0001 (by Molex Japan Co., Ltd.)		-
	Connector (for a servomotor without brake)	43020-0401 (by Molex Japan Co., Ltd.)		4 poles
	Connector (for a servomotor with brake)	43020-0601 (by Molex Japan Co., Ltd.)		6 poles
	Contact (Servomotor End)	43031-0001 (by Molex Japan Co., Ltd.)		-
	Wire for Servomotor Main Circuit (U, V, W, brake power, \pm)	UL1007, AWG20		Rated voltage: 300 V; rated temperature: 80°C

Molded-case Circuit Breaker and Fuse Capacity

● Input Power Capacity

Main Circuit Power Supply	Applicable Servomotor Max. Capacity W	SERVOPACK Model SGD V-	Main Circuit Power Supply Capacity per SERVOPACK W	Input Current Capacity		
				Main Circuit Continuous Rated Current A	Main Circuit Instantaneous Maximum Current A	Control Circuit A
24 VDC	11	1R7E	108	2.0	5.5	0.3
	30	2R9E	165	3.5	8.5	
48 VDC	11	1R7E	169	1.0	4.5	
	30	2R9E	411	2.0	10.5	

Note: The power supply capacities indicated in the table are values at an instantaneous maximum load. The main circuit's power supply capacity and the input current capacity are indicated in net values.

● Molded-case Circuit Breaker and Fuse Capacity

Power Supply	Output Voltage	SERVOPACK Model SGD V-	Current Capacity of MCCB or Fuse (Main + Control Circuit)	
			Power Supply Voltage at 100 VAC Arms	Power Supply Voltage at 200 VAC Arms
Main Circuit Power Supply	24 VDC	1R7E	5.5	2.9
	48 VDC		9.0	4.8
Control Circuit Power Supply	24 VDC	2R9E	–	–

Note: Select an MCCB or a fuse that satisfies the following braking characteristics.
 •No braking at the inrush current value of the used power supply for 20 ms.

● AC/DC Power Supply

Use an AC/DC power supply that is appropriate for the voltage of the main circuit and the model of the SERVOPACK and servomotor. The recommended AC/DC power supplies are shown in the following table.

Main Circuit Power Supply	SERVOPACK Model	Servomotor Model	Recommended AC/DC Power Supply*	
			Model	Manufacturer
24 VDC	SGDV-1R7E□1A	SGMMV-B3E2A□□	HWS150-24	TDK-Lambda Corp.
		SGMMV-B5E2A□□		
		SGMMV-B9E2A□□		
	SGDV-2R9E□1A	SGMMV-A1E2A□□	HWS300-24	
		SGMMV-A2E2A□□		
		SGMMV-A3E2A□□		
48 VDC	SGDV-1R7E□1A	SGMMV-B3E2A□□	HWS300-48	
		SGMMV-B5E2A□□		
		SGMMV-B9E2A□□		
	SGDV-2R9E□1A	SGMMV-A1E2A□□	HWS300P-48	
		SGMMV-A2E2A□□		
		SGMMV-A3E2A□□		

*: Use double-insulated power supplies certified for the following international safety standards: UL60950 or EN60950.

Noise Filters

● Noise Filter Selection

Use of the following noise filter is recommended for the AC side.

Power Supply AC Side Voltage	SERVOPACK Model SGDV-	Recommended Noise Filter		
		Model	Specifications	Leakage Current
100 VAC/ 200 VAC	1R7E, 2R9E	FN2070-6/07	Single-phase 250V 6A	0.734 mA 230 VAC/50 Hz

Note: RoHS-compliant models are not available. Contact the manufactures when in need of an RoHS-compliant model.

IMPORTANT

Some noise filters have large amounts of leakage current. The grounding measures taken also affect the extent of the leakage current. If necessary, select an appropriate leakage current detector or leakage current breaker taking into account the grounding measures that are used and leakage current from the noise filter. Contact the manufacturer of the noise filter for details.

● External Dimensions (Units: mm)

FN Type (by Schaffner EMC, Inc.)

Model	FN2070-6/07
Dimensional Drawings	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Top View</p> </div> <div style="text-align: center;"> <p>Side View</p> </div> </div>
	<p>Connection Lead P/N/E</p>

Magnetic Contactors

● Magnetic Contactor Selection

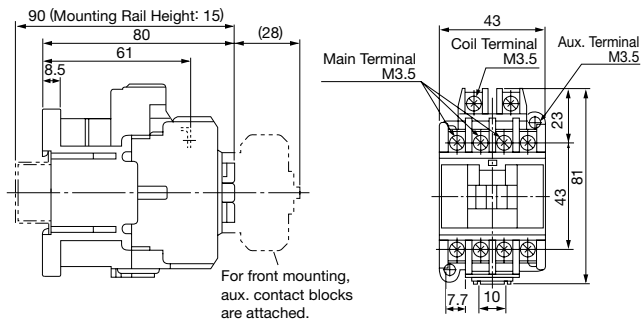
A magnetic contactor is required when external sequence circuit is used to turn the power of a SERVOPACK OFF and ON. The magnetic contactor shown in the following table is recommended on the AC side of the main circuit's power supply. Be sure to attach a surge absorber (surge absorber unit etc.) to the excitation coil of the magnetic contactor.

Power Supply AC Side Voltage	SERVOPACK Model SGDV-	Magnetic Contactor	
		Model	Specifications
100 VAC/ 200 VAC	1R7E, 2R9E	SC-03	(RoHS)

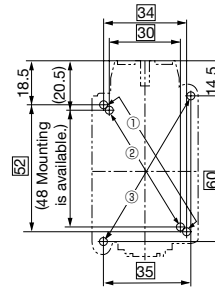
Note: Contact Fuji Electric FA Components & Systems Co., Ltd.

● External Dimensions (Units: mm)

• SC-03



Mounting Hole Dimensions



Aux. Contact	Structure
1a	
1b	

● Mounting methods: The following methods 1, 2, 3 are available.

- 1...34 × 48 to 52
- 2...30 × 48
- 3...35 × 60

● Mounting screw: 2-M4

Use the two mounting holes on the diagonal line to mount a contactor.

Approx. Mass : 0.32 kg