Wiring Main Circuit

典型主电路接线示例

此节提供主电路典型接线示例。

警告

在电源关闭后，伺服电机仍可能带有高压。为避免电击，请勿触摸电源供应端子。在进行接线及检查前，请确保电压已完全放电。

重要

- 同时开启控制和主电路电源，或先开启控制电源，随后开启主电路电源。断电时，先断开主电路电源，然后断开控制电路电源。
- 分别使用主电路AC/DC电源和控制AC/DC电源。使用具有双层或加强绝缘且已通过安全标准认证的电源。
- 请勿将电机、电磁阀或其他负载波动大的设备连接到控制电路中。如果连接，内部元件可能恶化，或熔断器可能熔断。

- SERVOPACKS带有模拟电压参考/脉冲列参考

图示显示了主电路接线图。元件标识如下：

- 1QF: 模塑断路器
- 1FLT: 防噪声滤波器
- 1KM: 主电路电源磁接触器
- 1 Ry: 电容
- 1 PL: 指示灯
- 1 SA: 防浪涌吸收器
- 1 D: 飞轮二极管
- ENC: 旋转编码器
- COM_SG: 电机连接端子
- CN 1、CN 2、CN 3、CN 4: 连接端子
- +24 V: 电源
- 0 V: 电源
- M: 电机
- S: 伺服报警信号
Wiring Main Circuit

- SERVOPACKs with MECHATROLINK-II or -III Communications Reference

![Wiring diagram]

- General Precautions for Wiring

  - 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.

- 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.
● 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
1. 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.
2. 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**

<table>
<thead>
<tr>
<th>Cables</th>
<th>Terminal Symbol</th>
<th>SERVOPACK Model SGGV-</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply Cable</td>
<td>L1, L2, C1, C2,</td>
<td>JZSP-CF1G00-□□□-E</td>
<td>For details, refer to Selecting Cables for SERVOPACKs with DC Power Input on page 13.</td>
</tr>
<tr>
<td>Servomotor Main Circuit Cable</td>
<td>U, V, W, □</td>
<td>JZSP-CF1M00-□□□-E (For motors without brakes)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>JZSP-CF1M10-□□□-E (For motors with brakes)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>JZSP-CF1M20-□□□-E (Flexible type cable for motors without brakes)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>JZSP-CF1M30-□□□-E (Flexible type cable for motors with brakes)</td>
<td></td>
</tr>
</tbody>
</table>

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

- 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.

#### CN3 For Main Circuit Power

<table>
<thead>
<tr>
<th>Cables</th>
<th>SERVOPACK Model SGGV-</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector</td>
<td>43025-0600 (by Molex Japan Co., Ltd.)</td>
<td>6 poles</td>
</tr>
<tr>
<td>Contact</td>
<td>43030-0001 (by Molex Japan Co., Ltd.)</td>
<td>-</td>
</tr>
<tr>
<td>Wire for Main Circuit Power (L1, L2, □)</td>
<td>UL1007, AWG20</td>
<td>Rated voltage: 300 V; rated temperature: 80°C</td>
</tr>
<tr>
<td>Wire for Control Power (C1, C2, □)</td>
<td>UL1007, AWG20-24</td>
<td>Rated voltage: 300 V; rated temperature: 80°C</td>
</tr>
</tbody>
</table>

#### CN4 For Motor Main Circuit

<table>
<thead>
<tr>
<th>Cables</th>
<th>SERVOPACK Model SGGV-</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector (SERVOPACK End)</td>
<td>43025-0400 (by Molex Japan Co., Ltd.)</td>
<td>4 poles</td>
</tr>
<tr>
<td>Contact (SERVOPACK End)</td>
<td>43030-0001 (by Molex Japan Co., Ltd.)</td>
<td>-</td>
</tr>
<tr>
<td>Connector (for a servomotor without brake)</td>
<td>43020-0401 (by Molex Japan Co., Ltd.)</td>
<td>4 poles</td>
</tr>
<tr>
<td>Connector (for a servomotor with brake)</td>
<td>43020-0601 (by Molex Japan Co., Ltd.)</td>
<td>6 poles</td>
</tr>
<tr>
<td>Contact (Servomotor End)</td>
<td>43031-0001 (by Molex Japan Co., Ltd.)</td>
<td>-</td>
</tr>
<tr>
<td>Wire for Servomotor Main Circuit (U, V, W, brake power, □)</td>
<td>UL1007, AWG20</td>
<td>Rated voltage: 300 V; rated temperature: 80°C</td>
</tr>
</tbody>
</table>
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.

```
<table>
<thead>
<tr>
<th>Main Circuit Power Supply</th>
<th>SERVOPACK Model</th>
<th>Servomotor Model</th>
<th>Recommended AC/DC Power Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 VDC</td>
<td>SGDV-1R7E1A</td>
<td>SGMMV-B3E2A</td>
<td>HWS150-24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SGMMV-B5E2A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SGMMV-B9E2A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGDV-2R9E1A</td>
<td>SGMMV-A1E2A</td>
<td>HWS300-24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SGMMV-A2E2A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SGMMV-A3E2A</td>
<td></td>
</tr>
<tr>
<td>48 VDC</td>
<td>SGDV-1R7E1A</td>
<td>SGMMV-B3E2A</td>
<td>HWS300-48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SGMMV-B5E2A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SGMMV-B9E2A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SGDV-2R9E1A</td>
<td>SGMMV-A1E2A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SGMMV-A2E2A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SGMMV-A3E2A</td>
<td></td>
</tr>
</tbody>
</table>

*: Use double-insulated power supplies certified for the following international safety standards: UL60950 or EN60960.
```
Noise Filters

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

<table>
<thead>
<tr>
<th>Power Supply AC Side Voltage</th>
<th>SERVOPACK Model SGD-V</th>
<th>Recommended Noise Filter Model</th>
<th>Specifications</th>
<th>Leakage Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 VAC/200 VAC</td>
<td>1R7E, 2R9E</td>
<td>FN2070-6/07</td>
<td>Single-phase 250V 6A</td>
<td>0.734 mA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>230 VAC/50 Hz</td>
<td></td>
</tr>
</tbody>
</table>

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.)

<table>
<thead>
<tr>
<th>Model</th>
<th>FN2070-6/07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top View</td>
<td>Side View</td>
</tr>
<tr>
<td>Dimensional Drawings</td>
<td></td>
</tr>
<tr>
<td>113.5±1</td>
<td>32±0.5</td>
</tr>
<tr>
<td>103±0.3</td>
<td>0.9±0.1</td>
</tr>
<tr>
<td>94±1</td>
<td></td>
</tr>
<tr>
<td>6±0.1</td>
<td>8.4±0.5</td>
</tr>
<tr>
<td>11.5±1</td>
<td>43±0.5</td>
</tr>
<tr>
<td>45±1.2</td>
<td></td>
</tr>
<tr>
<td>8.4±0.5</td>
<td>140.5</td>
</tr>
<tr>
<td>Connection Lead</td>
<td>P/N/E</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Power Supply AC Side Voltage</th>
<th>SERVOPACK Model</th>
<th>Magnetic Contactor Model</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 VAC/200 VAC</td>
<td>1R7E, 2R9E</td>
<td>SC-03</td>
<td>(RoHS)</td>
</tr>
</tbody>
</table>

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