

9. TROUBLESHOOTING

9.1 Alarms and warning list

When a fault occurs during operation, the corresponding alarm or warning is displayed. If any alarm or warning has occurred, refer to section 9.2 or 9.3 and take the appropriate action.

After its cause has been removed, the alarm can be deactivated in any of the methods marked ○ in the alarm deactivation column.

	Display	Name	Alarm deactivation		
			Power OFF→ON	Error reset	CPU reset
Alarms	10	Undervoltage	○	○	○
	12	Memory error 1	○		
	13	Clock error	○		
	15	Memory error 2	○		
	16	Encoder error 1	○		
	17	Board error	○		
	19	Memory error 3	○		
	1A	Motor combination error	○		
	20	Encoder error 2	○		
	24	Main circuit error	○	○	○
	25	Absolute position erase	○ (Note 2)		
	30	Regenerative error	○ (Note 1)	○ (Note 1)	○ (Note 1)
	31	Overspeed	○	○	○
	32	Overcurrent	○	○	○
	33	Overvoltage	○	○	○
	34	CRC error	○	○	○
	35	Command frequency error	○	○	○
	36	Transfer error	○	○	○
	37	Parameter error	○		○
	45	Main circuit device overheat	○ (Note 1)	○ (Note 1)	○ (Note 1)
46	Servo motor overheat	○ (Note 1)	○ (Note 1)	○ (Note 1)	
50	Overload 1	○ (Note 1)	○ (Note 1)	○ (Note 1)	
51	Overload 2	○ (Note 1)	○ (Note 1)	○ (Note 1)	
52	Error excessive	○	○	○	
8E	Serial communication error	○	○	○	
88	Watchdog	○			
Warnings	92	Open battery cable warning	Removing the cause of occurrence deactivates the alarm automatically.		
	96	Home position setting warning			
	9F	Battery warning			
	E0	Excessive regenerative warning			
	E1	Overload warning			
	E3	Absolute position counter warning			
	E4	Parameter warning			
	E6	Servo forced stop warning			
	E7	Controller forced stop warning			
	E9	Main circuit off warning			
EE	SSCNET error warning				

Note 1. Deactivate the alarm about 30 minutes of cooling time after removing the cause of occurrence.

2. For confirming the connection to the servo system controller, the alarm may not be reset unless turning the power on twice or more times.

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9.2 Remedies for alarms



CAUTION

- When any alarm has occurred, eliminate its cause, ensure safety, then reset the alarm, and restart operation. Otherwise, injury may occur.
- If an absolute position erase alarm (25) occurred, always make home position setting again. Otherwise, misoperation may occur.
- As soon as an alarm occurs, mark Servo-off and power off the main circuit and control circuit.

POINT

- When any of the following alarms has occurred, always remove its cause and allow about 30 minutes for cooling before resuming operation. If operation is resumed by switching control circuit power off, then on to reset the alarm, the servo amplifier and servo motor may become faulty. To protect the main circuit elements, any of these servo alarms cannot be deactivated from the servo system controller until the specified time elapses after its occurrence. Judging the load changing condition until the alarm occurs, the servo amplifier calculates this specified time automatically.
 - Regenerative error (30)
 - Overload 1 (50)
 - Overload 2 (51)
- The alarm can be deactivated by switching power off, then on or by the error reset command • CPU reset from the servo system controller. For details, refer to section 9.1.

When an alarm occurs, the dynamic brake is operated to stop the servo motor. At this time, the display indicates the alarm No.

The servo motor comes to a stop. Remove the cause of the alarm in accordance with this section. The MR Configurator (servo configuration software) may be used to refer to the cause.

Display	Name	Definition	Cause	Action
10	Undervoltage	Power supply voltage dropped. MR-J2S-□B: 160VAC or less MR-J2S-□B1: 83VAC or less	1. Power supply voltage is low.	Check the power supply.
			2. There was an instantaneous control circuit power failure of 60ms or longer.	
			3. Shortage of power supply capacity caused the power supply voltage to drop at start, etc.	
			4. Main voltage has dropped to the following voltage or less. MR-J2S-□B: 200VDC MR-J2S-□B1: 158VDC	
			5. Faulty parts in the servo amplifier	Change the servo amplifier.
			— Checking method — Alarm (10) occurs if power is switched on after CN1A, CN1B and CN3 connectors are disconnected.	
12	Memory error 1	RAM, memory fault	Faulty parts in the servo amplifier	Change the servo amplifier.
13	Clock error	Printed board fault	— Checking method — Alarm (any of 12 and 13) occurs if power is switched on after disconnection of all cables but the control circuit power supply cables.	

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Display	Name	Definition	Cause	Action
15	Memory error 2	EEP-ROM fault	1. Faulty parts in the servo amplifier <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> <p style="text-align: center;">— Checking method —</p> <p>Alarm (15) occurs if power is switched on after disconnection of all cables but the control circuit power supply cables.</p> </div>	Change the servo amplifier.
			2. The number of write times to EEPROM exceeded 100,000.	
16	Encoder error 1	Communication error occurred between encoder and servo amplifier.	1. Encoder connector (CN2) disconnected.	Connect correctly.
			2. Encoder fault	Change the servo motor.
			3. Encoder cable faulty (Wire breakage or shorted)	Repair or change the cable.
17	Board error	CPU/parts fault	1. Faulty parts in the servo amplifier <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> <p style="text-align: center;">— Checking method —</p> <p>Alarm (17) occurs if power is switched on after disconnection of all cable but the control circuit power supply cable.</p> </div>	Change the servo amplifier.
		The output terminals U, V, W of the servo amplifier and the input terminals U, V, W of the servo motor are not connected.	2. The wiring of U, V, W is disconnected or not connected.	Correctly connect the output terminals U, V, W of the servo amplifier and the input terminals U, V, W of the servo motor.
19	Memory error 3	ROM memory fault	Faulty parts in the servo amplifier <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> <p style="text-align: center;">— Checking method —</p> <p>Alarm (19) occurs if power is switched on after disconnection of all cable but the control circuit power supply cable.</p> </div>	Change the servo amplifier.
1A	Motor combination error	Wrong combination of servo amplifier and servo motor.	Wrong combination of servo amplifier and servo motor connected.	Use correct combination.
20	Encoder error 2	Communication error occurred between encoder and servo amplifier.	1. Encoder connector (CN2) disconnected.	Connect correctly.
			2. Encoder fault	Change the servo motor.
			3. Encoder cable faulty (Wire breakage or shorted)	Repair or change the cable.
			4. Excessive acceleration is occurred due to oscillation and others.	1. Decrease the speed control gain 2. 2. Decrease the auto tuning response level.
24	Main circuit error	Ground fault occurred at the servo motor outputs (U, V and W phases) of the servo amplifier.	1. Power input wires and servo motor output wires are in contact at main circuit terminal block (TE1).	Connect correctly.
			2. Sheathes of servo motor power cables deteriorated, resulting in ground fault.	Change the cable.
			3. Main circuit of servo amplifier failed. <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;"> <p style="text-align: center;">— Checking method —</p> <p>Alarm (24) occurs if the servo is switched on after disconnecting the U, V, W power cables from the servo amplifier.</p> </div>	Change the servo amplifier.
25	Absolute position erase	Absolute position data in error	1. Battery voltage low 2. Battery cable or battery is faulty.	Change the battery. Always make home position setting again.
		Power was switched on for the first time in the absolute position detection system.	3. Super capacitor of the absolute position encoder is not charged.	After leaving the alarm occurring for a few minutes, switch power off, then on again. Always make home position setting again.

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Display	Name	Definition	Cause	Action
30	Regenerative error	Permissible regenerative power of the built-in regenerative resistor or regenerative option is exceeded.	1. Mismatch between used regenerative option and parameter No. 2 setting	Set correctly.
			2. Built-in regenerative resistor or regenerative option is not connected.	Connect correctly.
			3. High-duty operation or continuous regenerative operation caused the permissible regenerative power of the regenerative option to be exceeded. <div style="border: 1px solid black; padding: 5px; width: fit-content;"> Checking method Call the status display and check the regenerative load ratio. </div>	1. Reduce the frequency of positioning. 2. Use the regenerative option of larger capacity. 3. Reduce the load.
			4. Power supply voltage is abnormal. MR-J2S-□B:260VAC or more MR-J2S-□B1:135VAC or more	Review power supply
			5. Built-in regenerative resistor or regenerative option faulty.	Change the servo amplifier or regenerative option.
		Regenerative transistor fault	6. Regenerative transistor faulty. <div style="border: 1px solid black; padding: 5px; width: fit-content;"> Checking method 1) The regenerative option has overheated abnormally. 2) The alarm occurs even after removal of the built-in regenerative resistor or regenerative option. </div>	Change the servo amplifier.
31	Overspeed	Speed has exceeded the instantaneous permissible speed.	1. Small acceleration/deceleration time constant caused overshoot to be large.	Increase acceleration/deceleration time constant.
			2. Servo system is instable to cause overshoot.	1. Reset servo gain to proper value. 2. If servo gain cannot be set to proper value. 1) Reduce load inertia moment ratio; or 2) Reexamine acceleration/ deceleration time constant.
			3. Encoder faulty.	Change the servo motor.
32	Overcurrent	Current that flew is higher than the permissible current of the servo amplifier. (When the alarm (32) occurs, switch the power OFF and then ON to reset the alarm. Then, turn on the servo-on. When the alarm (32) still occurs at the time, the transistor (IPM · IGBT) of the servo amplifier may be at fault. Do not switch the power OFF/ON repeatedly; check the transistor according to the cause 2 checking method.)	1. Short occurred in servo amplifier output phases U, V and W.	Correct the wiring.
			2. Transistor of the servo amplifier faulty. <div style="border: 1px solid black; padding: 5px; width: fit-content;"> Checking method Alarm (32) occurs if power is switched on after U,V and W are disconnected. </div>	Change the servo amplifier.
			3. Ground fault occurred in servo amplifier output phases U, V and W.	Correct the wiring.
			4. External noise caused the overcurrent detection circuit to misoperate.	Take noise suppression measures.
		Current higher than the permissible current flew in the regenerative transistor. (MR-J2S-500B only)	5. Improper wiring of the regenerative option.	Wire the regenerative option correctly.

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Display	Name	Definition	Cause	Action
33	Overvoltage	Converter bus voltage exceeded 400VDC.	1. Regenerative option is not used.	Use the regenerative option.
			2. Though the regenerative option is used, the parameter No. 2 setting is "□□00 (not used)".	Make correct setting.
			3. Lead of built-in regenerative resistor or regenerative option is open or disconnected.	1. Change the lead. 2. Connect correctly.
			4. Regenerative transistor faulty.	Change the servo amplifier.
			5. Wire breakage of built-in regenerative resistor or regenerative option	1. For wire breakage of built-in regenerative resistor, change the servo amplifier. 2. For wire breakage of regenerative option, change the regenerative option.
			6. Capacity of built-in regenerative resistor or regenerative option is insufficient.	Add regenerative option or increase capacity.
			7. Power supply voltage high.	Review the power supply.
			8. Ground fault occurred in servo amplifier output phases U, V and W.	Correct the wiring.
			9. The jumper across BUE-SD of the FR-BU2 brake unit is removed.	Fit the jumper across BUE-SD.
34	CRC error	Bus cable is faulty	1. Bus cable disconnected.	Connect correctly.
			2. Bus cable fault	Change the cable.
			3. Noise entered bus cable.	Take measures against noise.
			4. Termination connector disconnected.	Connect termination connector.
			5. The same No. exists in the servo amplifier side axis setting.	Set correctly.
35	Command frequency error	Input frequency of command pulse is too high.	1. Command given is greater than the maximum speed of the servo motor.	Review operation program.
			2. Noise entered bus cable.	Take action against noise.
			3. Servo system controller failure	Change the servo system controller.
36	Transfer error	Bus cable or printed board is faulty	1. Bus cable is disconnected.	Connect the connector of the bus cable.
			2. Bus cable fault.	Change the cable.
			3. Printed board is faulty.	Change the servo amplifier.
			4. Termination connector disconnected	Connect termination connector.
37	Parameter error	Parameter setting is wrong.	1. Servo amplifier fault caused the parameter setting to be rewritten.	Change the servo amplifier.
			2. There is a parameter whose value was set to outside the setting range by the controller.	Change the parameter value to within the setting range.
			3. The number of write times to EEPROM exceeded 100,000 due to parameter write, etc.	Change the servo amplifier.
45	Main circuit device overheat	Main circuit device overheat	1. Servo amplifier faulty.	Change the servo amplifier.
			2. The power supply was turned on and off continuously by overloaded status.	The drive method is reviewed.
			3. Air cooling fan of servo amplifier stops.	1. Change the servo amplifier or cooling fan. 2. Reduce ambient temperature.

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Display	Name	Definition	Cause	Action
46	Servo motor overheat	Servo motor temperature rise actuated the thermal sensor.	1. Ambient temperature of servo motor is over 40°C (104°F).	Review environment so that ambient temperature is 0 to 40°C (32 to 104°F).
			2. Servo motor is overloaded.	1. Reduce load. 2. Review operation pattern. 3. Use servo motor that provides larger output.
			3. Thermal sensor in encoder is faulty.	Change the servo motor.
50	Overload 1	Load exceeded overload protection characteristic of servo amplifier.	1. Servo amplifier is used in excess of its continuous output current.	1. Reduce load. 2. Review operation pattern. 3. Use servo motor that provides larger output.
			2. Servo system is instable and hunting.	1. Repeat acceleration/ deceleration to execute auto tuning. 2. Change the auto tuning response setting. 3. Set auto tuning to OFF and make gain adjustment manually.
			3. Machine struck something.	1. Review operation pattern. 2. Install limit switches.
			4. Wrong connection of servo motor. Servo amplifier's output terminals U, V, W do not match servo motor's input terminals U, V, W.	Connect correctly.
			5. Encoder faulty. <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p style="text-align: center;">Checking method</p> <p>When the servo motor shaft is rotated with the servo off, the cumulative feedback pulses do not vary in proportion to the rotary angle of the shaft but the indication skips or returns midway.</p> </div>	Change the servo motor.
51	Overload 2	Machine collision or the like caused max. For the time of the alarm occurrence, refer to the section 11.1.	1. Machine struck something.	1. Review operation pattern. 2. Install limit switches.
			2. Wrong connection of servo motor. Servo amplifier's output terminals U, V, W do not match servo motor's input terminals U, V, W.	Connect correctly.
			3. Servo system is instable and hunting.	1. Repeat acceleration/deceleration to execute auto tuning. 2. Change the auto tuning response setting. 3. Set auto tuning to OFF and make gain adjustment manually.
			4. Encoder faulty. <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <p style="text-align: center;">Checking method</p> <p>When the servo motor shaft is rotated with the servo off, the cumulative feedback pulses do not vary in proportion to the rotary angle of the shaft but the indication skips or returns midway.</p> </div>	Change the servo motor.

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Display	Name	Definition	Cause	Action
52	(Note) Error excessive	The deviation between the model position and the actual servo motor position exceeds the parameter No.31 setting value (initial value: 2 revolutions).	1. Acceleration/deceleration time constant is too small.	Increase the acceleration/deceleration time constant.
			2. Torque limit value is too small.	Increase the torque limit value.
			3. Motor cannot be started due to torque shortage caused by power supply voltage drop.	1. Review the power supply capacity. 2. Use servo motor which provides larger output.
			4. Position control gain 1 (parameter No.13) value is small.	Increase set value and adjust to ensure proper operation.
			5. Servo motor shaft was rotated by external force.	1. When torque is limited, increase the limit value. 2. Reduce load. 3. Use servo motor that provides larger output.
			6. Machine struck something.	1. Review operation pattern. 2. Install limit switches.
			7. Encoder faulty	Change the servo motor.
			8. Wrong connection of servo motor. Servo amplifier's output terminals U, V, W do not match servo motor's input terminals U, V, W.	Connect correctly.
8E	Serial communication error	Serial communication error occurred between servo amplifier and communication device (e.g. personal computer).	1. Communication cable fault (Open cable or short circuit)	Repair or change the cable.
			2. Communication device (e.g. personal computer) faulty	Change the communication device (e.g. personal computer).
88	Watchdog	CPU, parts faulty	Fault of parts in servo amplifier <div style="border: 1px solid black; padding: 5px; width: fit-content;"> Checking method Alarm (88) occurs if power is switched on after disconnection of all cable but the control circuit power supply cable. </div>	Change the servo amplifier.

Note. The error excessive detection for 2 revolutions is available only when the servo amplifier of software version B1 or later is used. For the servo amplifier of software version older than B1, an error excessive alarm occurs when the deviation (deviation counter value) between the instructed position and the actual servo motor position exceeds the parameter No. 1 setting value (initial value: 8 revolutions).

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9.3 Remedies for warnings

POINT
<ul style="list-style-type: none"> ▪ When any of the following alarms has occurred, do not resume operation by switching power of the servo amplifier OFF/ON repeatedly. The servo amplifier and servo motor may become faulty. If the power of the servo amplifier is switched OFF/ON during the alarms, allow more than 30 minutes for cooling before resuming operation. ▪ Excessive regenerative warning (E0) ▪ Overload warning 1 (E1)

If servo forced stop warning (E6), controller forced stop warning (E7) or SSCNET error warning (EE) occurs, the servo off status is established. If any other warning occurs, operation can be continued but an alarm may take place or proper operation may not be performed. Eliminate the cause of the warning according to this section. Use the MR Configurator (servo configuration software) to refer to the cause of warning.

Display	Name	Definition	Cause	Action
92	Open battery cable warning	Absolute position detection system battery voltage is low.	1. Battery cable is open.	Repair cable or changed.
			2. Battery voltage supplied from the servo amplifier to the encoder fell to about 3.2V or less. (Detected with the encoder)	Change the battery.
96	Home position setting warning	Home position return could not be made in the precise position.	1. Droop pulses remaining are greater than the in-position range setting.	Remove the cause of droop pulse occurrence.
			2. Home position return was executed during operation command.	Reduce creep speed.
			3. Creep speed high.	
9F	Battery warning	Voltage of battery for absolute position detection system reduced.	Battery voltage fell to 3.2V or less. (Detected with the servo amplifier)	Change the battery.
E0	Excessive regenerative warning	There is a possibility that regenerative power may exceed permissible regenerative power of built-in regenerative resistor or regenerative option.	Regenerative power increased to 85% or more of permissible regenerative power of built-in regenerative resistor or regenerative option. <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Checking method Call the status display and check regenerative load ratio.</div>	1. Reduce frequency of positioning. 2. Change regenerative option for the one with larger capacity. 3. Reduce load.
E1	Overload warning	There is a possibility that overload alarm 1 or 2 may occur.	Load increased to 85% or more of overload alarm 1 or 2 occurrence level. <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Cause, checking method Refer to 50, 51.</div>	Refer to 50, 51.
E3	Absolute position counter warning	Absolute position encoder pulses faulty.	1. Noise entered the encoder.	Take noise suppression measures.
			2. Encoder faulty.	Change the servo motor.
E4	Parameter warning	Parameter outside setting range.	Parameter value set from servo system controller is outside setting range	Set it correctly.
E6	Servo forced stop warning	EM1 is off.	External forced stop was made valid. (EM1 turned off.)	Ensure safety and deactivate forced stop.
E7	Controller forced stop warning		Forced stop signal was entered into the servo system controller.	Ensure safety and deactivate forced stop.
E9	Main circuit off warning	Servo-on command was issued with main circuit power off.		Switch on main circuit power.
EE	SSCNET error warning	The servo system controller connected is not SSCNET-compatible.		