

## 10. TROUBLESHOOTING

### 10.2.2 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 (AL.25) occurred, always make home position setting again. Otherwise, misoperation may occur.

#### 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.
  - Regenerative error (AL.30)
  - Overload 1 (AL.50)
  - Overload 2 (AL.51)
- The alarm can be deactivated by switching power off, then on press the "SET" button on the current alarm screen or by turning on the reset signal (RES). For details, refer to Section 10.2.1.

When an alarm occurs, the trouble signal (ALM) switches off and the dynamic brake is operated to stop the servomotor. 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 optional servo configuration software may be used to refer to the cause.

Display	Name	Definition	Cause	Action	
AL.10	Undervoltage	Power supply voltage dropped. MR-J2S-□A:160V or less MR-J2S-□A1:83V or less	1. Power supply voltage is low.	Review the power supply.	
			2. There was an instantaneous control power failure of 60ms or longer.		
			3. Shortage of power supply capacity caused the power supply voltage to drop at start, etc.		
			4. Power was restored after the bus voltage had dropped to 200VDC. (Main circuit power switched on within 5s after it had switched off.)		
			5. Faulty parts in the servo amplifier	Change the servo amplifier.	
			— Checking method — Alarm (AL.10) occurs if power is switched on after CN1A, CN1B and CN3 connectors are disconnected.		
AL.12	Memory error 1	RAM, memory fault	Faulty parts in the servo amplifier	Change the servo amplifier.	
AL.13	Clock error	Printed board fault	— Checking method — Alarm (any of AL.12,13 and 15) occurs if power is switched on after CN1A, CN1B and CN3 all connectors are disconnected.		
AL.15	Memory error 2	EEP-ROM fault			
AL.16	Encoder error 1	Communication error occurred between encoder and servo amplifier.	1. CN2 connector disconnected.	Connect correctly.	
			2. Encoder fault	Change the servo motor.	
			3. Encoder cable faulty (Wire breakage or shorted)	Repair or change cable.	

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Display	Name	Definition	Cause	Action
AL.17	Board error 2	CPU/parts fault	Faulty parts in the servo amplifier	Change the servo amplifier.
AL.19	Memory error 3	ROM memory fault	<p>Checking method</p> <p>Alarm (AL.17 or AL.19) occurs if power is switched on after CN1A, CN1B and CN3 connectors are disconnected.</p>	
AL.1A	Motor combination error	Wrong combination of servo amplifier and servo motor.	Wrong combination of servo amplifier and servo motor connected.	Use correct combination.
AL.20	Encoder error 2	Communication error occurred between encoder and servo amplifier.	1. Encoder connector (CN2) disconnected.	Connect correctly.
			2. Encoder cable faulty (Wire breakage or shorted)	Repair or change the cable.
AL.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.	Change the servo amplifier.
			<p>Checking method</p> <p>AL.24 occurs if the servo is switched on after disconnecting the U, V, W power cables from the servo amplifier.</p>	
AL.25	Absolute position erase	Absolute position data in error	1. Reduced voltage of super capacitor in encoder	After leaving the alarm occurring for a few minutes, switch power off, then on again. Always make home position setting again.
			2. Battery voltage low	Change battery.
			3. Battery cable or battery is faulty.	Always make home position setting again.
		4. 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.	
		Power was switched on for the first time in the absolute position detection system.		
AL.30	Regenerative alarm	Permissible regenerative power of the built-in regenerative brake resistor or regenerative brake option is exceeded.	1. Wrong setting of parameter No. 0	Set correctly.
			2. Built-in regenerative brake resistor or regenerative brake option is not connected.	Connect correctly
			3. High-duty operation or continuous regenerative operation caused the permissible regenerative power of the regenerative brake option to be exceeded.	1. Reduce the frequency of positioning. 2. Use the regenerative brake option of larger capacity. 3. Reduce the load.
			<p>Checking method</p> <p>Call the status display and check the regenerative load ratio.</p>	
			4. Power supply voltage is abnormal. MR-J2S-□A:260V or more MR-J2S-□A1:135V or more	Review power supply
		5. Built-in regenerative brake resistor or regenerative brake option faulty.	Change servo amplifier or regenerative brake option.	
		Regenerative transistor fault	6. Regenerative transistor faulty.	Change the servo amplifier.
			<p>Checking method</p> <p>1) The regenerative brake option has overheated abnormally. 2) The alarm occurs even after removal of the built-in regenerative brake resistor or regenerative brake option.</p>	

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Display	Name	Definition	Cause	Action
AL.31	Overspeed	Speed has exceeded the instantaneous permissible speed.	1. Input command pulse frequency exceeded the permissible instantaneous speed frequency.	Set command pulses correctly.
			2. Small acceleration/deceleration time constant caused overshoot to be large.	Increase acceleration/deceleration time constant.
			3. Servo system is instable to cause overshoot.	1. Re-set 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.
			4. Electronic gear ratio is large (parameters No. 3, 4)	Set correctly.
			5. Encoder faulty.	Change the servo motor.
AL.32	Overcurrent	Current that flew is higher than the permissible current of the servo amplifier.	1. Short occurred in servo amplifier output phases U, V and W.	Correct the wiring.
			2. Transistor (IPM) of the servo amplifier faulty. <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Checking method Alarm (AL.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.
AL.33	Overvoltage	Converter bus voltage exceeded 400V.	1. Lead of built-in regenerative brake resistor or regenerative brake option is open or disconnected.	1. Change lead. 2. Connect correctly.
			2. Regenerative transistor faulty.	Change servo amplifier
			3. Wire breakage of built-in regenerative brake resistor or regenerative brake option	1. For wire breakage of built-in regenerative brake resistor, change servo amplifier. 2. For wire breakage of regenerative brake option, change regenerative brake option.
			4. Capacity of built-in regenerative brake resistor or regenerative brake option is insufficient.	Add regenerative brake option or increase capacity.
			5. Power supply voltage high.	Review the power supply.

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Display	Name	Definition	Cause	Action
AL.35	Command pulse frequency error	Input pulse frequency of the command pulse is too high.	1. Pulse frequency of the command pulse is too high.	Change the command pulse frequency to a proper value.
			2. Noise entered command pulses.	Take action against noise.
			3. Command device failure	Change the command device.
AL.37	Parameter error	Parameter setting is wrong.	1. Servo amplifier fault caused the parameter setting to be rewritten.	Change the servo amplifier.
			2. Regenerative brake option not used with servo amplifier was selected in parameter No.0.	Set parameter No.0 correctly.
AL.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. Exchange the cooling fan or the servo amplifier. 2. Reduce ambient temperature.
AL.46	Servo motor overheat	Servo motor temperature rise actuated the thermal protector.	1. Ambient temperature of servo motor is over 40°C.	Review environment so that ambient temperature is 0 to 40°C.
			2. Servo motor is overloaded.	1. Reduce load. 2. Review operation pattern. 3. Use servo motor that provides larger output.
			3. Thermal protector in encoder is faulty.	Change servo motor.
AL.50	Overload 1	Load exceeded overload protection characteristic of servo amplifier. Load ratio 300%: 2.5s or more Load ratio 200%: 100s or more	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 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.	Change the servo motor.
		<p style="text-align: center;">— Checking method —</p> <p>When the servo motor shaft is rotated slowly with the servo off, the cumulative feedback pulses should vary in proportion to the rotary angle. If the indication skips or returns midway, the encoder is faulty.</p>		

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Display	Name	Definition	Cause	Action
AL.51	Overload 2	Machine collision or the like caused max. output current to flow successively for several seconds. Servo motor locked: 1s or more	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 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; margin-top: 5px;">                     Checking method                      When the servo motor shaft is rotated slowly with the servo off, the cumulative feedback pulses should vary in proportion to the rotary angle. If the indication skips or returns midway, the encoder is faulty.                 </div>	Change the servo motor.
AL.52	Error excessive	The droop pulse value of the deviation counter exceeded the encoder resolution $\times 10$ [pulse].	1. Acceleration/deceleration time constant is too small.	Increase the acceleration/deceleration time constant.
			2. Torque limit value (parameter No.28) 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.6) 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.
AL.8A	Serial communication time-out error	RS-232C or RS-422 communication stopped for longer than the time set in parameter No.56.	1. Communication cable breakage.	Repair or change communication cable
			2. Communication cycle longer than parameter No. 56 setting.	Set correct value in parameter.
			3. Wrong protocol.	Correct protocol.
AL.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).

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Display	Name	Definition	Cause	Action
88888	Watchdog	CPU, parts faulty	Fault of parts in servo amplifier  <div style="border: 1px solid black; padding: 5px; width: fit-content;">                     Checking method                      Alarm (88888) occurs if power is switched on after CN1A, CN1B and CN3 connectors are disconnected.                 </div>	Change servo amplifier.

### 10.2.3 Remedies for warnings

If AL.E6 or AL.EA 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. Use the optional servo configuration software to refer to the cause of warning.

Display	Name	Definition	Cause	Action
AL.92	Open battery cable warning	Absolute position detection system battery voltage is low.	1. Battery cable is open. 2. Battery voltage dropped to 2.8V or less.	Repair cable or changed. Change battery.
AL.96	Home position setting warning	Home position setting could not be made.	1. Droop pulses remaining are greater than the in-position range setting. 2. Command pulse entered after clearing of droop pulses. 3. Creep speed high.	Remove the cause of droop pulse occurrence Do not enter command pulse after clearing of droop pulses. Reduce creep speed.
AL.9F	Battery warning	Voltage of battery for absolute position detection system reduced.	Battery voltage fell to 3.2V or less.	Change the battery.
AL.E0	Excessive regenerative warning	There is a possibility that regenerative power may exceed permissible regenerative power of built-in regenerative brake resistor or regenerative brake option.	Regenerative power increased to 85% or more of permissible regenerative power of built-in regenerative brake resistor or regenerative brake option.  <div style="border: 1px solid black; padding: 5px; width: fit-content;">                     Checking method                      Call the status display and check regenerative load ratio.                 </div>	1. Reduce frequency of positioning. 2. Change regenerative brake option for the one with larger capacity. 3. Reduce load.
AL.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;">                     Cause, checking method                      Refer to AL.50,51.                 </div>	Refer to AL.50, AL.51.
AL.E3	Absolute position counter warning	Absolute position encoder pulses faulty.	1. Noise entered the encoder. 2. Encoder faulty.	Take noise suppression measures. Change servo motor.
AL.E5	ABS time-out warning		1. PC ladder program wrong. 2. ST2 • TLC signal mis-wiring	Contact the program. Connect properly.
AL.E6	Servo emergency stop warning	EMG-SG are open.	External emergency stop was made valid. (EMG-SG opened.)	Ensure safety and deactivate emergency stop.
AL.E9	Main circuit off warning	Servo was switched on with main circuit power off.		Switch on main circuit power.
AL.EA	ABS servo-on warning	Servo-on signal (SON) turned on more than 1s after servo amplifier had entered absolute position data transfer mode.	1. PC ladder program wrong. 2. SON signal mis-wiring.	1. Correct the program. 2. Connect properly.