

# 8. TROUBLESHOOTING

## 8-2 Alarms and warnings

### 8-2-1 Alarm 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 8-2-2 or 8-2-3 and take the appropriate action. Set □□□1 in parameter No. 49 to output the alarm code in ON/OFF status across the corresponding pin and SG. Warnings (A. 92 to A. EA) have no codes. Any alarm code is output at occurrence of the corresponding alarm. In the normal status, the signals available before alarm code setting (CN1B-19: ZSP, CN1A-18: INP or SA, CN1A-19: RD) are output.

	Display	(Note) Alarm Code			Name
		CN1B-19 pin	CN1A-18 pin	CN1A-19 pin	
Alarms	A. 10	0	1	0	Undervoltage
	A. 11	0	0	0	Board error1
	A. 12	0	0	0	Memory error1
	A. 13	0	0	0	Clock error
	A. 15	0	0	0	Memory error2
	A. 16	1	1	0	Encoder error1
	A. 17	0	0	0	Board error2
	A. 18	0	0	0	Board error3
	A. 20	1	1	0	Encoder error2
	A. 24	1	0	0	Ground fault
	A. 25	1	1	0	Absolute position erase
	A. 30	0	0	1	Regenerative error
	A. 31	1	0	1	Overspeed
	A. 32	1	0	0	Overcurrent
	A. 33	0	0	1	Overvoltage
	A. 35	1	0	1	Command pulse frequency alarm
	A. 37	0	0	0	Parameter error
	A. 46	0	1	1	Servo motor overheat
	A. 50	0	1	1	Overload1
	A. 51	0	1	1	Overload2
A. 52	1	0	1	Error excessive	
A. 8E	0	0	0	RS-232C error	
8888	0	0	0	Watchdog	
Warnings	A. 92	/			Open battery cable warning
	A. 96				Zero setting error
	A. 9F				Battery warning
	A. E0				Excessive regenerative load warning
	A. E1				Overload warning
	A. E3				Absolute position counter warning
	A. E5				ABS time-out warning
	A. E6				Servo emergency stop
	A. E9				Main circuit off warning
	A. EA				ABS servo on warning

NOTE, 0:OFF 1:ON

## 8. TROUBLESHOOTING

### 8-2-2 Alarms

#### WARNING

1. When any alarm has occurred, eliminate its cause, ensure safety, then reset the alarm, and restart operation. Otherwise, injury may occur.
2. If an absolute position erase alarm (A. 25) occurred, always make home position setting again. Otherwise, misoperation may occur.

#### NOTICE

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 repeated by switching control circuit power off, then on to reset the alarm, the servo amplifier, servo motor and regenerative brake option may become faulty.

- Regenerative error (A. 30)
- Overload 1 (A. 50)
- Overload 2 (A. 51)

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.

Display	Alarm Code			Name	Definition	Cause	Action
	CN1B-19 pin	CN1A-18 pin	CN1A-19 pin				
A. 10	0	1	0	Undervoltage	Power supply voltage dropped. MR-J2-□A:160V or less MR-J2-□A1: 83V or less	<ol style="list-style-type: none"> <li>1. Power supply voltage is low.</li> <li>2. Power failed instantaneously for 15ms or longer.</li> <li>3. Shortage of power supply capacity caused the power supply voltage to drop at start, etc.</li> <li>4. Power switched on within 5 seconds after it had switched off.</li> <li>5. Faulty parts in the servo amplifier</li> </ol>	Review the power supply.
						<p>Checking method</p> <p>Alarm (A. 10) occurs if power is switched on after CN1A, CN1B, and CN3 connectors are disconnected.</p>	Change the servo amplifier.
A. 11	0	0	0	Board error 1	Printed board faulty	Faulty parts in the servo amplifier	Change the servo amplifier.
A. 12	0	0	0	Memory error 1	RAM, ROM memory fault	<p>Checking method</p> <p>Alarm (any of A. 11 to 15) occurs if power is switched on after CN1A, CN1B, and CN3 connectors are disconnected.</p>	
A. 13	0	0	0	Clock error	Printed board fault		
A. 15	0	0	0	Memory error 2	EEPROM fault		
A. 16	1	1	0	Encoder error 1	Communication error occurred between encoder and servo amplifier.	<ol style="list-style-type: none"> <li>1. Encode connector disconnected.</li> <li>2. Encoder fault</li> <li>3. Encoder cable faulty (Wire breakage or short)</li> <li>4. Combination of servo amplifier and servo motor is not proper.</li> </ol>	<p>Connect correctly.</p> <p>Change the servo motor.</p> <p>Repair or change cable.</p> <p>Use correct combination</p>

## 8. TROUBLESHOOTING

Display	Alarm Code			Name	Definition	Cause	Action
	CN1B-19 pin	CN1A-18 pin	CN1A-19 pin				
A. 17	0	0	0	Board error 2	CPU/parts fault	Faulty parts in the servo amplifier	Change the servo amplifier.
A. 18	0	0	0	Board error 3		<p>————— Checking method —————</p> <p>Alarm (A. 17 or A. 18) occurs if power is switched on after CN1A, CN1B, and CN3 connectors have been disconnected.</p>	
A. 20	1	1	0	Encoder error 2	Communication error occurred between encoder and servo amplifier.	1. Encoder connector disconnected. 2. Encoder cable faulty (wire breakage or short)	Connect correctly. Repair or change the cable.
A. 24	1	0	0	Motor output ground fault	Ground fault occurred at servo motor outputs (U, V, W phases) of servo amplifier.	1. Power input wires and servo motor output wires are in contact at main circuit terminal block (TE1). 2. The servo motor power line cover is deteriorated, and causes earthing. 3. The main circuit of the servo amplifier is broken. ————— Investigating method ————— Disconnect the U, V, and W power lines from the servo amplifier, and turn on the servo motor. A. 24 still occurs.	Connect correctly. Replace the line. Replace the servo amplifier.
A. 25	1	1	0	Absolute position erase	Absolute position data in error	1. Reduced voltage of super capacitor in encoder 2. Battery voltage low 3. Battery cable or battery is faulty.	After leaving the alarm occurring for a few minutes, switch power off, then on again. Ensure to make home position return again. Change battery. Ensure to make home position return again.
					Power was switched on for the first time in the absolute position detection system.	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. Home position setting must be made again.
A. 30	0	0	1	Regenerative error	The permissible regenerative power of the built-in regenerative brake resistor or regenerative brake option is exceeded.	1. Wrong setting of parameter No. 0 2. Built-in regenerative brake resistor or regenerative brake option is not connected. 3. High-duty operation or continuous regenerative operation caused the permissible regenerative power of the regenerative brake option to be exceeded. ————— Checking method ————— Call the status display and check the regenerative load ratio.	Set correctly. Connect correctly. 1. Reduce the frequency of positioning. 2. Use the regenerative brake option of larger capacity. 3. Reduce the load.
					Regenerative transistor fault	4. Power supply voltage increased to 260V or more. 5. Regenerative transistor faulty. ————— Checking method ————— 1) The regenerative brake option has overheated abnormally. 2) The alarm occurs after removal of the built-in regenerative brake resistor or regenerative brake option.	Review power supply. Change the servo amplifier.
						6. Built-in regenerative brake resistor or regenerative brake option faulty.	Change servo amplifier or regenerative brake option.

## 8. TROUBLESHOOTING

Display	Alarm Code			Name	Definition	Cause	Action
	CN1B-19 pin	CN1A-18 pin	CN1A-19 pin				
A. 31	1	0	1	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 the 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.
A. 32	1	0	0	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.	Change the servo amplifier.
						<div style="border: 1px solid black; padding: 5px; width: fit-content;">                     — Checking method —                      Alarm (A. 32) occurs if power is switched on after U,V and W connectors are disconnected.                 </div>	
						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.
A. 33	0	0	1	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.

## 8. TROUBLESHOOTING

Display	Alarm Code			Name	Definition	Cause	Action
	CN1B-19 pin	CN1A-18 pin	CN1A-19 pin				
A. 35	1	0	1	Command pulse alarm	Input command pulses are too high.	1. Command pulse frequency is too high.	Reduce the command pulse frequency to proper value.
						2. Noise entered command pulses.	Take measures against noise.
						3. Command unit faulty.	Change the command unit.
A. 37	0	0	0	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.
A. 46	0	1	1	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.
A. 50	0	1	1	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 level setting. 3. Set auto tuning to OFF and make gain adjustment manually.
						3. Machine struck something.	1. Review operation pattern. 2. Install limit switches.

## 8. TROUBLESHOOTING

Display	Alarm Code			Name	Definition	Cause	Action
	CN1B-19 pin	CN1A-18 pin	CN1A-19 pin				
A. 50	0	1	1	Overload 1		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;"> <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> </div>	Change the servo motor.
A. 51	0	1	1	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 level setting. 3. Set auto tuning to OFF and make gain adjustment manually.
						4. Encoder faulty.  <div style="border: 1px solid black; padding: 5px;"> <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> </div>	Change the servo motor.

## 8. TROUBLESHOOTING

Display	Alarm Code			Name	Definition	Cause	Action
	CN1B-19 pin	CN1A-18 pin	CN1A-19 pin				
A. 52	1	0	1	Error excessive	Droop pulse value of the deviation counter exceeded 80k pulses.	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. Start not allowed because of torque shortage due to power supply voltage drop.	1. Review the power supply capacity. 2. Use servo motor that 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.
A. 8E	0	0	0	RS-232C alarm	Communication fault occurred between servo amplifier and personal computer.	1. Communication connector is disconnected.	Connect correctly.
						2. Communication cable faulty. (Wire breakage or short)	Repair or change cable.
						3. Personal computer faulty.	Change personal computer.
8888	0	0	0	Watchdog	CPU, parts faulty	Fault of parts in servo amplifier	Change servo amplifier.
<div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p style="text-align: center;">————— Checking method —————</p> <p>Alarm (8888) occurs if power is switched on after CN1A, CN1B, and CN3 connectors are disconnected.</p> </div>							

## 8. TROUBLESHOOTING

### 8-2-3 Warnings

If a warning occurs, the servo amplifier does not go into a servo off status. However, if operation is continued in the warning status, an alarm may occur or proper operation not performed. Eliminate the cause of the warning according to this section. Use the optional set-up software to refer to the cause of warning.

Display	Name	Definition	Cause	Action
A. 92	Open battery cable warning	Absolute position detection system battery voltage is low.	1. Battery cable is open.	Repair cable or change battery.
			2. Battery voltage dropped to 2.8V or less.	Change battery.
A. 96	Zero setting error	1. For incremental, return to origin point could not be performed. 2. For absolute position detection system, origin point setting could not be performed.	1. Command pulses were input after droop pulses had been cleared.	Make provisions so that command pulses are not input after droop pulses are cleared.
			2. Droop pulses remaining are greater than in-position range setting.	
			3. Creep speed is high.	Reduce creep speed.
A. 9F	Battery warning	Absolute position detection system battery voltage is low.	Battery voltage dropped to 3.2V or less.	Change battery.
A. E0	Excessive regenerative load 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.
A. 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 A. 50, 51.                 </div>	Refer to A. 50, 51.
A. E3	Absolute position counter warning	Absolute position encoder pulses faulty.	1. Noise entered the encoder.	Take noise suppression measures.
			2. Encoder faulty.	Change servo motor.
A. E5	ABS time-out warning	Absolute position data transfer fault	1. Programmable controller's ladder program error	Correct program.
			2. Mis-wiring of CN1B-9 pin, CN1B-6 pin	Connect correctly.
A. E6	Servo emergency stop	EMG-SG are open.	External emergency stop was made valid. (EMG-SG were opened.)	After ensuring safety, reset emergency stop.
A. E9	Main circuit off warning	Servo on signal (SON) was switched on with main circuit power off.	Servo on signal (SON) was switched on with main circuit power off.	Switch on main circuit power.
A. EA	ABS servo on warning	Servo on signal (SON) was not switched on within 1s after servo amplifier went into absolute position data transfer mode.	1. Programmable controller's ladder program error	Correct program
			2. Mis-wiring of SON signal	Connect correctly.