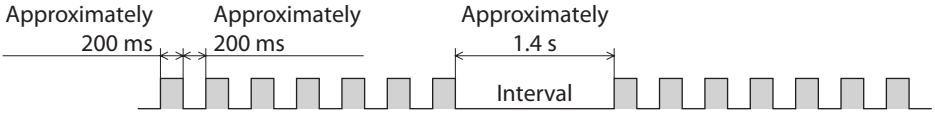
5 Alarms and warnings

The driver provides alarms that are designed to protect the driver from overheating, poor connection, error in operation, etc. (protective functions), as well as warnings that are output before the corresponding alarms generate (warning functions).

5-1 Alarms

When an alarm generates, the ALM output will turn OFF and the motor will stop. At the same time, the ALM LED (or ALARM LED) will start blinking.
The present alarm can be checked by counting the number of times the LED blinks, or using the **MEXE02**, **OPX-2A** or via RS-485 communication.

Example: Hardware overtravel alarm (number of blinks: 7)



■ Alarm reset

Perform one of the reset operations specified below. Before resetting an alarm, always remove the cause of the alarm and ensure safety. Refer to p.313 for the timing chart.

- Turn the ALM-RST input from ON to OFF. (The alarm will be reset at the OFF edge of the input.)
- Perform an alarm reset via RS-485 communication.
- Perform an alarm reset using the **MEXE02** or **OPX-2A**.
- Cycle the power.

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The absolute position error alarm can be reset by turning the P-CLR input from ON to OFF, or executing the reset of the absolute position error alarm using the **MEXE02**, **OPX-2A** or via RS-485 communication. This alarm cannot be reset by any other methods.

■ Alarm records

Up to 10 generated alarms are saved in the non-volatile memory in order of the latest to oldest.
Alarm records saved in the non-volatile memory can be read and cleared when performing any of the following.

- Read the alarm records by the monitor command via RS-485 communication.
- Clear the alarm records by the maintenance command via RS-485 communication.
- Read and clear the alarm records using the **MEXE02** or **OPX-2A**.

■ Alarm list

Code	No. of LED blinks	Alarm type	Cause
10h	4	Excessive position deviation	• When the motor was in a state of current on, the deviation between the command position and actual position exceeded the "excessive position deviation alarm at current ON" parameter. • The load is large, or the acceleration/deceleration is too short.
12h		Excessive position deviation during current OFF	The C-ON input was turned ON while an excessive position deviation warning during current OFF was present.
20h	5	Overcurrent *2	The motor, cable and driver output circuit were short-circuited.
21h	2	Main circuit overheat	The internal temperature of the driver exceeded 85 °C (185 °F).
22h	3	Overvoltage	• A voltage exceeding the specification value was applied. • A large inertial load was stopped abruptly or vertical operation was performed.
23h		Main power off *2	The motor was started when the main power supply had been cut off.
25h		Undervoltage	The main power was cut off momentarily or the voltage became low.
27h	7	Backup battery undervoltage	The battery voltage became below the rated value.
28h	8	Sensor error	A sensor error occurred while the motor was operating.
29h	9	CPU peripheral circuit error	An error occurred in the CPU.
2Dh	5	Main circuit output error *2	The motor cable was disconnected.
30h	2	Overload	A load exceeding the peak torque was applied for the time exceeded the "overload alarm" parameter.
31h		Overspeed	The rotation speed of the motor output shaft exceeded 4500 r/min.
33h	7	Absolute position error	While the "absolute back-up system" parameter was "enable," one of the following conditions is satisfied. • The power was turned on while the position origin was not set. • The power was turned on while the battery was not connected. • The power was turned on while operation range of multi-rotation was exceeded the specification.
			Sudden load fluctuations occurred when the position was managed with the battery.

Remedial action	Alarm reset	Motor excitation *1
• Reduce the load or increase the acceleration/deceleration. • If the driver is in the current control mode, increase the current limit value.	• Turn the ALM-RST input from ON (1) to OFF (0). • Perform alarm reset.	Excitation off
• Do not turn the C-ON input ON while an excessive position deviation warning at current OFF is present. • Set the "automatic return operation" prameter to “disable.”		
Turn off the power supply, and check that the motor, cable and driver output circuit are not short-circuited before turning on the power again.	Cycle the power.	
Review the ventilation condition in the enclosure.	• Turn the ALM-RST input from ON (1) to OFF (0). • Perform alarm reset.	
• Check the input voltage of the power supply. • If this alarm generates during operation, reduce the load or increase the acceleration/deceleration.	• Cycle the power. • Perform alarm reset (DC power input only).	
Check if the main power supply has been input normally.	• Turn the ALM-RST input from ON (1) to OFF (0). • Perform alarm reset.	
Check the input voltage of the main power supply.		
Charge the battery.		Excitation on
Turn off the power supply, and check the connection of the motor cable and driver before turning on the power again.	Cycle the power.	Excitation off
• If a battery is used, disconnect it before turning off the power. After that, connect the battery again, and turn on the power. Check an alarm does not generate, and be sure to perform return-to-home operation. • If a battery is not used, turn on the power again. After that, check an alarm does not generate, and be sure to perform return-to-home operation.		
Turn off the power supply, and check the connection of the motor cable and driver before turning on the power again.		
• Reduce the load or increase the acceleration/deceleration. • If the driver is in the current control mode, increase the current limit value. • Check the connection of the driver and electromagnetic brake.	• Turn the ALM-RST input from ON (1) to OFF (0). • Perform alarm reset.	
• Check the "electronic gear" parameter and set the speed of the motor output shaft to 4500 r/min or less. • If the motor is overshooting at the time of acceleration, increase the acceleration.		
• Execute P-PRESET or return-to-home operation after inputting the P-CLR. • Check the connection of the battery. Or change the battery.	• Turn the P-CLR input from ON (1) to OFF (0). • Perform the reset of the absolute position error alarm.	Excitation on
Do not apply sudden load fluctuations.		

Code	No. of LED blinks	Alarm type	Cause
34h	2	Command pulse error	The command pulse frequency exceeded the specified value.
41h	9	EEPROM error	The stored data was damaged.
42h	8	Initial sensor error	A sensor error occurred when the power was turned on.
43h		Initial rotor rotation error	The motor output shaft did not stand still when the power was turned on.
45h		Motor combination error	A motor not supported by the driver is connected.
4Ah	7	Return-to-home incomplete	The positioning operation was started when the position origin has not been set.
51h	2	Regeneration resistor overheat *2	• The regeneration resistor is not connected correctly. • The regeneration resistor was overheated abnormally.
60h	7	±LS both sides active	Both the +side and −side limit sensors were detected when LS detection was enabled.
61h		Reverse limit sensor connection	The limit sensor opposite to the operating direction has detected during a return-to-home operation in 2-sensor mode or 3-sensor mode.
62h		Home seeking error	Return-to-home operation did not complete normally.
63h		No HOMES	The mechanical home sensor is not detected at a position between +side limit sensor and −side limit sensor during return-to-home operation in 3-sensor mode.
64h		TIM, Z, SLIT signal error	None of the SLIT input or TIM output could be detected during return-to-home operation.
66h		Hardware overtravel	A +LS input or −LS input signal was detected when the "hardware overtravel" parameter was enabled.
67h		Software overtravel	A software limit was reached when the "software overtravel" parameter was enabled.
6Ah		Home seeking offset error	A limit sensor was detected during offset movement as part of return-to-home operation.

Remedial action	Alarm reset	Motor excitation *1
Check the "electronic gear" parameter and reduce the speed of the motor output shaft to 4500 r/min or less.	• Turn the ALM-RST input from ON (1) to OFF (0). • Perform alarm reset.	Excitation off
Initialize the all parameters.	Cycle the power.	
Turn off the power supply, and check the connection of the motor cable and driver before turning on the power again.		
Make sure the motor output shaft does not turn by an external force when the power is turned on.		
Check the model name of motor and driver, and use the motor and driver in the correct combination.		
Perform the position preset or return-to-home operation.	• Turn the ALM-RST input from ON (1) to OFF (0). • Perform alarm reset.	Excitation on
Turn off the power supply, and check the following items before turning on the power again. • When the regeneration resistor is not used, short-circuit the TH1 and TH2 terminals on the CN1. • Connect the regeneration resistor correctly. • Regenerative power from the motor exceeds the allowable regenerative power of the regeneration resistor. Make sure the load and operating condition.	Cycle the power.	Excitation off
Check the sensor logic and "LS contact configuration" parameter.	• Turn the ALM-RST input from ON (1) to OFF (0). • Perform alarm reset.	Excitation on
Check the limit sensor wiring.		
• An unanticipated load may have been applied during the return-to-home operation. Check the load. • If the installation positions of limit sensor and mechanical home sensor are close to one another, the return-to-home sequence may not end properly, depending on the starting direction of return-to-home operation. Review the sensor installation positions and the starting direction of return-to-home operation. • Return-to-home operation may have been performed in a condition where both +side and −side limit sensors were detected. Check the sensor logic and "LS contact configuration" parameter.		
Set a mechanical home sensor between +side and −side limit sensors.		
• Adjust the connection condition of the motor output shaft and load as well as the mechanical home sensor position so that at least one of the SLIT input or TIM output will turn ON while HOMES input is ON. • Set the "SLIT detection with home-seeking" parameter to "disable" if the SLIT input are not used with HOMES, while set the "TIM signal detection with home-seeking" parameter to "disable" if the TIM output are not used with HOMES.		
Pull out from the limit sensor via continuous operation or return-to-home operation.		
In single-motion operation, check to see if the position exceeds the softlimit. In linked-motion operation, check to see if the result of linked position exceeds the softlimit.		
Check the offset value.		

Code	No. of LED blinks	Alarm type	Cause
70h	7	Abnormal operation data	• Data of different directions may be linked in linked-motion operation. • Five or more data may be linked. • Positioning operation of the operating speed 0 r/min was performed. • The larger value than 500 r/min was set in the operating speed of push-motion operation. *3
71h		Electronic gear setting error	The resolution set by the "electronic gear" parameter was outside of the specification.
72h		Wrap setting error	The resolution and "wrap setting range" parameter was inconsistent.
81h		Network bus error	When the motor operates, the master controller for the network converter shows a disconnected status.
83h		Communication switch setting error	Transmission rate setting switch (SW2) was out-of-specification.
84h		RS-485 communication error	The number of consecutive RS-485 communication errors reached the "communication error alarm" parameter.
85h		RS-485 communication timeout	The time set in the "communication timeout" parameter has elapsed, and yet the communication could not be established with the master controller.
8Eh		Network converter error	The network converter generated an alarm.
F0h	Lit	CPU error	CPU malfunctioned.

*1 When an alarm generates, the motor operates as follows.
Excitation off: When an alarm generates, the motor current will be cut off and the motor will lose its holding torque. The electromagnetic brake will automatically actuate and hold the position when using the electromagnetic brake motor.
Excitation on: Even when an alarm generates, the motor current will not be cut off and the motor position will be held.
*2 AC power input only.
*3 For the driver which is before the specification change, the maximum speed of push-motion operation is 30 r/min. Refer to p.7 for details.

If the alarm is not cleared even when these remedial actions have been performed, the driver may have been damaged. Contact your nearest Oriental Motor sales office.

Remedial action	Alarm reset	Motor excitation *1
Check the operation data.	• Turn the ALM-RST input from ON (1) to OFF (0). • Perform alarm reset.	Excitation on
Turn off the power supply, and set the "electronic gear" parameter correctly so that the resolution is in a range of 100 to 10000 P/R before turning on the power again.	Cycle the power.	Excitation off
Turn off the power supply, and set the "wrap setting range" parameter correctly before turning on the power again.		
Check the master controller connector or cable.	• Turn the ALM-RST input from ON (1) to OFF (0). • Perform alarm reset.	Excitation on
Check the transmission rate setting switch (SW2).	Cycle the power.	Excitation off
• Check the connection between the master controller and driver. • Check the setting of RS-485 communication.	• Turn the ALM-RST input from ON (1) to OFF (0). • Perform alarm reset.	Excitation on
Check the connection between the master controller and driver.		
Check the alarm code of the network converter.		
Cycle the power.	Cycle the power.	Excitation off

5-2 Warning

When a warning generates, the WNG output will turn ON. The motor will continue to operate.
Once the cause of the warning is removed, the WNG output will turn OFF automatically.

■ Warning records

Up to 10 generated warnings are saved in the RAM in order of the latest to oldest.
Warning records saved in the RAM can be read and cleared when performing any of the following.

- Read the warning records by the monitor command via RS-485 communication.
- Clear the warning records by the maintenance command via RS-485 communication.
- Read and clear the warning records using the **MEXE02** or **OPX-2A**.

memo You can also clear the warning records by turning off the driver power.

■ Warning list

Code	Warning type	Cause	Remedial action
10h	Excessive position deviation	• When the motor was in a state of current ON, the deviation between the command position and actual position exceeded the "excessive position deviation warning at current ON" parameter. • The load is large or acceleration/deceleration is too short.	• Reduce the load or increase the acceleration/deceleration. • If the driver is in the current control mode, increase the current limit value.
12h	Excessive position deviation during current OFF	When the motor was in a state of current OFF, the deviation between the command position and actual position exceeded the "excessive position deviation alarm at current OFF" parameter. (This warning is output when the "auto return operation" parameter is set to "enable".)	Reduce the amount of rotation at current OFF to the specified setting value or less. Or, change the setting value.
21h	Main circuit overheat	The temperature inside the driver exceeded the "overheat warning" parameter.	Review the ventilation condition in the enclosure.
22h	Overvoltage	• The voltage of the power supply exceeded the "overvoltage warning" parameter. • A large inertial load was stopped abruptly or vertical operation was performed.	• Check the input voltage of the power supply. • If this alarm generates during operation, reduce the load or increase the acceleration/deceleration.
25h	Undervoltage	• The power supply voltage dropped from the "undervoltage warning" parameter. • The main power was cut off momentarily or the voltage became low.	Check the input voltage of the power supply.
30h	Overload	• A load exceeding the peak torque was applied for the time set in the "overload warning" parameter or longer. • The load is large or acceleration/deceleration is too short.	• Reduce the load or increase the acceleration/deceleration. • If the driver is in the current control mode, increase the current limit value. • Check the connection between the driver and electromagnetic brake.
31h	Overspeed	The detected motor speed exceeded the "overspeed warning" parameter.	• Check the "electronic gear" parameter and reduce the speed of the motor output shaft to the value set in the parameter or less. • If the motor is overshooting in acceleration, increase the acceleration/deceleration.
48h	Battery connection error	The battery was unconnected while the "absolute back-up system" parameter was "enable."	Check the battery connection.

Code	Warning type	Cause	Remedial action
71h	Electronic gear setting error	The resolution set in the "electronic gear" parameter is outside the specified range.	Turn off the power supply, and set the "electronic gear" parameter correctly so that the resolution is in a range of 100 to 10000 P/R before turning on the power again.
72h	Wrap setting error	The resolution and "wrap setting range" parameter was inconsistent.	Turn off the power supply, and set the "wrap setting range" parameter correctly before turning on the power again.
84h	RS-485 communication error	A RS-485 communication error was detected.	• Check the connection between the master controller and driver. • Check the setting of RS-485 communication.

5-3 Communication errors

Up to 10 communication errors are saved in the RAM in order of the latest to the oldest and you can check using the **MEXE02** or via RS-485 communication.

■ Communication error records

Up to 10 communication errors are saved in the RAM in order of the latest to oldest.
Communication error records saved in the RAM can be read and cleared when performing any of the following.

- Read the communication error records by the monitor command via RS-485 communication.
- Clear the communication error records by the maintenance command via RS-485 communication.
- Read and clear the communication error records by the status monitor of the **MEXE02**.

memo You can also clear the communication records by turning off the driver power.

■ Communication error list

Code	Communication error type	Cause	Remedial action
84h	RS-485 communication error	One of the following errors was detected. · Framing error · BCC error	• Check the connection between the master controller and driver. • Check the setting of RS-485 communication.
88h	Command not yet defined	The command requested by the master controller could not be executed because of being undefined.	• Check the setting value for the command. • Check the flame configuration.
89h	Execution disable due to user I/F communication in progress	The command requested by the master controller could not be executed since the **MEXE02** or **OPX-2A** was communicating with the driver.	Wait until the processing for the **MEXE02** or **OPX-2A** will be completed.
8Ah	Non-volatile memory processing in progress	The command could not be executed because the driver was processing the non-volatile memory. · Internal processing was in progress. (S-BSY is ON.) · An EEPROM error alarm was present.	• Wait until the internal processing will complete. • When the EEPROM error was generated, initialize the parameter using the **MEXE02**, **OPX-2A** or via RS-485 communication.
8Ch	Outside setting range	The setting data requested by the master controller could not be executed due to outside the range.	Check the setting data.
8Dh	Command execute disable	When the command could not be executed, it tried to do it.	Check the driver status.

6 Troubleshooting and remedial actions

During motor operation, the motor or driver may fail to function properly due to an improper speed setting or wiring. When the motor cannot be operated correctly, refer to the contents provided in this section and take appropriate action. If the problem persists, contact your nearest Oriental Motor sales office.

Phenomenon	Possible cause	Remedial action
• The motor is not excited. • The motor output shaft can be moved by hand.	The C-ON input is turned OFF.	Turn the C-ON input ON and confirm that the motor will be excited.
	The FREE input is turned ON.	Turn the FREE input OFF.
There is holding torque even if motor excitation is turned OFF. *	Effect of dynamic brake.	If motor excitation is turned OFF by the C-ON input or STOP input, the motor windings will be in a state of being short-circuited inside the driver, and the holding torque will be generated larger than when the power is shut off (dynamic brake). To release the dynamic brake, shut off the power or turn the FREE input ON.
The motor does not operate.	An electromagnetic brake motor is used and the electromagnetic brake is in the holding state.	Check the connections between electromagnetic brake and driver.
	The STOP input is turned ON.	Turn the STOP input OFF.
	The position (distance) is not set in the operation data while positioning operation.	Check the operation data.
	The FWD input and RVS input are turned ON simultaneously in the continuous operation.	Turn either FWD input or RVS input ON.
The motor rotates in the direction opposite to the specified direction.	The "motor rotation direction" parameter is set wrong.	Check the "motor rotation direction" parameter.
The gear output shaft rotates in the direction opposite to the motor.	A gear that rotates in the direction opposite to the motor shaft is used.	• With **TH** geared type, the gear output shaft rotates in the direction opposite to the motor when the gear ratio is 20 or 30. • With Harmonic geared type, the gear output shaft always rotates in the direction opposite to the motor.
Motor operation is unstable.	Connection error in the motor or power supply.	Check the connections between the driver, motor and power supply.
	The "RUN current" or "STOP current" parameter is too low.	Return the "RUN current" or "STOP current" parameter to its initial setting and check the motor operation. If the operating current is too low, the motor torque will also be too low and operation will be unstable.
Motor vibration is too great.	Load is too small.	Lower the operating current using the "RUN current" parameter. Vibration will increase if the motor's output torque is too large for the load.
The electromagnetic brake does not release.	The power is not supplied to the electromagnetic brake.	Check the connections between electromagnetic brake and driver.

* DC power input only.

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- Check the alarm when the alarm generates.
- I/O signals can be monitored using the **MEXE02**, **OPX-2A** or via RS-485 communication. Use to check the wiring condition of the I/O signals.