# Maintenance and inspection

### (1) Overcurrent

[Display]




[Description of detected alarm]

The output current of the servo motor drive exceeds the rated value.

OC1: Direct detection by internal transistor of servo motor drive.

OC2: Indirect detection with software of servo motor drive.

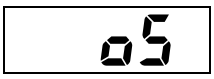
OC3: Direct detection by internal transistor of servo motor drive.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| Wrong servo motor output wiring | Correct the wiring of power cables (U, V and W).<br>Check cables visually or through continuity check and replace the defective cable. |
| Short circuit or grounding fault in Servo motor output wiring | |
| Servo motor insulation fault | Measure the insulation resistance. (Several MΩ or over to ground) |
| Failure of servomotor | Measure the resistance across cables. (Several Ω between cables) |
| Incorrect resistance of regenerative resistor | Replace with the regenerative resistor within the rating. |
| Current imbalance caused by an encoder fault | Replace the servo motor |
| Unconnected grounding cable | Connect the grounding cable |

### (2) Overspeed

[Display]

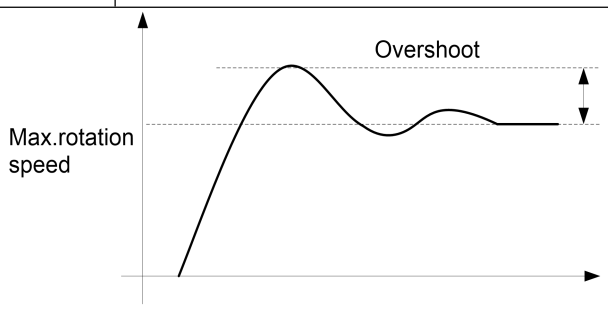



[Description of detected alarm]

The rotation speed of the servomotor exceeds 1.1 times the maximum speed.

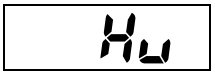
[Causes and Solutions]

| Causes | Solutions |
|---|---|
| Wrong servomotor output wiring | Correct the wiring of power cables (U, V and W). |
| The rotation speed of the Servo motor overshoots. | Check the speed waveform during acceleration (see the figure below) and take the following countermeasures.<br>• Increase P1.37 (acceleration time).<br>• Increase P1.52 (S-curve time constant).<br>• Increase P1.15 (auto tuning gain 1). |



### (3) Overvoltage

[Display] [Description of detected alarm]




The DC voltage inside the servo motor drive exceeds the upper limit.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| The source voltage is too high (immediately after power-on). | • Check if the source voltage is within the specification limits.<br>• Insert a reactor if there is a power factor improvement capacitor. |
| Unconnected external regenerative resistor or wrong wiring | • Connect the external regenerative resistor.<br>• Correct the wiring of the external regenerative resistor. |
| Broken regenerative transistor | Replace the servo motor drive |

The internal DC voltage can be checked in the monitor mode of the keypad.

[dP-15]: Internal DC link voltage (max. value), if approximately over 420 V, overvoltage is detected.

### (4) Encoder Trouble

[Display] [Description of detected alarm]



There is a fault in the encoder built in the servo motor.

1. Et1: Single revolution position detection fault of encoder.
2. Et2: Encoder memory data reading fault.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| Fault in data sent from encoder | Use shielded cables to eliminate noise effects. |
| Failure of encoder | Replace the servo motor. |

### (5) Circuit Trouble

[Display] [Description of detected alarm]


There is a fault in the source control power voltage inside the servo motor drive. There may be a failure in the internal circuit.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| Failure of servo motor drive | Turn the power off then on again. If restoration is not obtained, replace the servo motor drive. |

### (6) Memory Error

[Display] [Description of detected alarm]

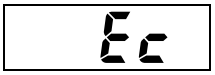

The parameter data stored in the servo motor drive is damaged.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| Failure of stored data | • Initialize parameters and postioning data.<br>• If restoration is not obtained with the actions above, replace the servo motor drive. |
| The parameter overwriting frequency has exceeded 100,000 cycles. | Replace the servo amplifier.<br>(Store the parameters which are overwritten frequently to P2.80 to 85, parameter in RAM 1 to 6.) |

### (7) Encoder communication error

[Display] [Description of detected alarm]




Communications with the internal encoder of the servo motor fails.

[Causes and Solutions]

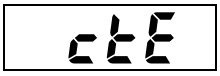
| Causes | Solutions |
|---|---|
| Error in encoder serial communications | • Check cables visually and through continuity check and correct faults.<br>• Check for the broken wire in the encoder cable and correct if broken.<br>• Insert ferrite cores. |
| Broken wire or poor contact | |

The servo motor drive and encoder communicate through high speed serial communications.

The encoder signal has a voltage amplitude of about 5 V. Do not route the encoder cable in a strong magnetic or electric field. Route the encoder cable separately from the main body of the servo motor drive, inverter, electromagnetic contactor or similar (reserve at least 100 mm).

### (8) EI Error

[Display] [Description of detected alarm]



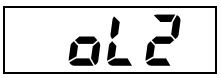

There is duplication in allocation of EI input terminals of the servo motor drive.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| The same input signal is allocated to two or more terminals. | Do not specify the same number among EI signal settings. |

### (9) Overload

[Display]


[Description of detected alarm]

- OL1: Alarm that detects failures such as a locked shaft instantaneously. (3s/300%)
- OL2: The effective torque exceeds the allowable limit of the servo motor. (Detection at electronic thermal relay built in servo motor drive)(about 200s/200%)

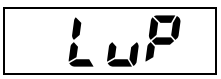
[Causes and Solutions]

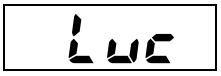
| Causes | Solutions |
|---|---|
| The servo motor fails to rotate mechanically. | • Check the wiring of power cables (U, V and W) and correct faults.<br>• Check if the brake is active. |
| The mechanical system is too heavy against the servo motor capacity. | • Examine the servo motor capacity, based on the load factor.<br>• If the rotation speed can be reduced, add a reduction gear.<br>• Apply the brake to retain a stopped elevator. |
| The acceleration/deceleration frequency and operation frequency are too high. | Increase the cycle time and decrease the operation frequency. |
| Servo motor drive is damaged. | Replace the servo motor drive |

If an OL2 alarm is caused but no damaged servo motor drive or incorrect wiring is found, the Servo motor capacity must be examined.

### (10) Main Power Undervoltage

[Display]




[Description of detected alarm]

The power supplied to the servo motor drive falls below the minimum specification voltage limit.

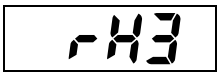
[Causes and Solutions]

| Causes | Solutions |
|---|---|
| The source voltage drops due to momentary power failure or similar. | • Check the power supply environment whether momentary power failure is generated or not, and improve the power supply environment.<br>• Check and improve the power supply capacity and transformer capacity. |

If the power supply environment is adverse, P2.67 (alarm detection at undervoltage) can be applied to ignore undervoltage detection. In this case, operation can be continued with the setting of P2.66 (flying start at speed control) in the event of momentary power failure. Undervoltage detection is set at about 200V by the DC voltage in the servo motor drive.

### (11) Regenerative Transistor Error

[Display] [Description of detected alarm]




The regeneration handling transistor built in the servo motor drive is damaged.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| The regenerative transistor is short circuited or damaged. | Turn the power off then on again. If the alarm persists, replace the servo motor drive. |

Note: If the regenerative transistor is short circuited or damaged, fire may be caused. If the regenerative transistor fault alarm signal is output, turn the power off immediately.

### (12) Deviation Overflow

[Display] [Description of detected alarm]


A position deviation amount equivalent to servo motor revolutions specified in P2.69 (deviation detection overflow value) is accumulated inside the servo motor drive.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| Wrong connection of power cables (The alarm is alerted immediately when servo-on is turned on.) | Check and correct the wiring of power cables (U, V and W). |
| The servo motor fails to rotate mechanically. | Check if the brake is applied. |
| Low output torque | Increase P1.27, 28 (torque limit). |
| The deviation detection width is small. | Increase P2.69 (deviation detection overflow value). |
| The servo motor drive is in the P control mode. | Turn off the P motion signal. |
| Low gain | Perform gain adjustment. |
| Acceleration/deceleration of pulse frequency is too acute. | Increase the acceleration/deceleration time. |

### (13) Servo motor drive overheat

[Display] [Description of detected alarm]

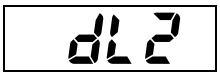

The temperature of the servo motor drive has exceeded the allowable limit.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| The ambient temperature exceeds 55°C. | Reduce the ambient temperature to 55°C or lower. (40°C or lower temperatures are recommended for regular operation.) |
| | Move heat generating bodies near the servo motor drive as far away as possible. |

### (14) ABS Data loss

[Display] [Description of detected alarm]



- Encoder absolute value data loss
- dL1=The battery is low and the encoder cable is broken.
- dL2 = multi-turn data error inside the encoder
- dL3=Re-energization check when an ET alarm occurs

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| dL1 Alarm occurs | Confirm and repair the disconnection status of the encoder cable.<br>Replacement battery |
| dL2 Alarm occurs | If the position preset cannot be released, replace the servo motor. |
| dL3 Alarm occurs | Can release dL3 with position preset, but residual ET alarm.<br>If the ET alarm cannot be cancelled, replace the servo motor. |

### (15) Multi-circle overflow

[Display] [Description of detected alarm]

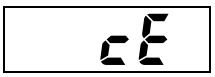

The output shaft of the servo motor has rotated -32767~+32766

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| Large amount of servo motor rotation | Confirm the amount of rotation of the servo motor<br>Confirm target location |

## (16) Abnormal motor combination

[Display]




[Description of detected alarm]

The encoder of the servo motor does not match the selected servo operating mode.

Motor ID setting error.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| When the value of parameter P1.02 is not 0, the value of parameter P2.99 (encoder selection) is not 5 | When using the absolute value mode, select the encoder as the encoder with battery (P2.99=5) |
| Parameter P3.90 sets values other than those described in the manual. | Please follow the instructions to correctly set the value of parameter P3.90. |

## (17) Encoder matching exception

[Display]


[Description of detected alarm]

The currently connected encoder does not match the encoder set by the drive.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| The set value of the parameter P2.99 does not match the connected encoder. | Set the correct parameter value according to the bits of encoders. |

## (18) External terminal alarm

[Display]


[Description of detected alarm]

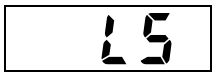
The EI terminal of the external terminal alarm function is set to ON.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| The EI terminal of the external terminal alarm function is set to ON. | If you do not need this alarm function, set the parameter corresponding to the EI terminal to 0 |

## (19) Speed out of control

[Display]




[Description of detected alarm]

The deviation between the command speed and the feedback speed is too large.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| Wrong connection of power cables | Check and correct the wiring of power cables (U, V and W) |
| The servo motor fails to rotate mechanically | Check if the brake is applied |
| Low output torque | Increase P1.27, 28 (torque limit) |
| The value of speed out of control level is to small | Confirm parameter value of P4.21 |
| Low gain | Perform gain adjustment, or increase the value of speed out of control timeout (parameter p4.22) |
| Acceleration/deceleration is too acute | Increase the acceleration/deceleration time, or increase the value of speed out of control timeout (parameter p4.22) |
| The electronic gear ratio is set incorrectly | Confirm the set value for the relevant parameters of the electronic gears |

## (20) Homing timeout

[Display]


[Description of detected alarm]

The homing is not completed within the set time.

[Causes and Solutions]

| Causes | Solutions |
|---|---|
| The homing signal is lost, resulting in the unable to complete the origin return | Repair homing signal sensor |
| Homing timeout (parameter P4.25) set value too small | Increase the setting value of the parameter P4.25, or set it to 0 to turn off the timeout check |

After troubleshooting, the alarm can be reset，To reset the alarm, perform one of the following methods.

• Turn the alarm reset (RST: EI input signal) on temporarily and then turn it off.

• From the keypad, select the additional function mode [AF-05] and execute the alarm reset.

• On the alarm screen, press and hold the [∧] and [∨] keys of the keypad simultaneously for at least one second.

• After the alarm reset, the data specified with parameter " P2.77 (initial display of the keypad)" is displayed.

Some alarms cannot be cleared through alarm resetting. To remove the alarm that is not cleared through alarm resetting, remove the cause of the alarm following the method described in “Maintenance and inspection" after (or before) the power is turned off, and then reset the status by turning the power again.

Alarms cleared through alarm resetting

| Display | Name |
|---|---|
| oc1 | Overcurrent 1 |
| oc2 | Overcurrent 2 |
| oS | Overspeed |
| Hu | Overvoltage |
| Ec | Encoder communication error |
| oL1 | Overload 1 |
| oL2 | Overload 2 |
| LuP | Main Power Undervoltage |
| oF | Deviation overflow |
| AH | Servo motor drive overheat |

Alarms not cleared through alarm resetting

| Display | Name |
|---|---|
| Et1 | Encoder trouble 1 |
| Et2 | Encoder trouble 2 |
| ct | Circuit trouble |
| dE | Memory error |
| ctE | EI Error |
| rH3 | Regenerative Transistor Error |
| dL1 | Absolute Data Lost 1 |
| dL2 | Absolute Data Lost 2 |
| dL3 | Absolute Data Lost 3 |
| AF | Multi-turn Data Over Flow |

※dL1~dL3, AF can be released by position preset

The steps of alarm reset through the additional function mode from the keypad is shown below.