

# Maintenance and inspection

## (1) Overcurrent

### 【Display】

oc1

oc2

### 【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.

### 【Causes and Solutions】

Causes	Solutions
Wrong servo motor output wiring	Correct the wiring of power cables (U, V and W).
Short circuit or grounding fault in servo motor output wiring	Check cables visually or through continuity check and replace the defective cable.
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】

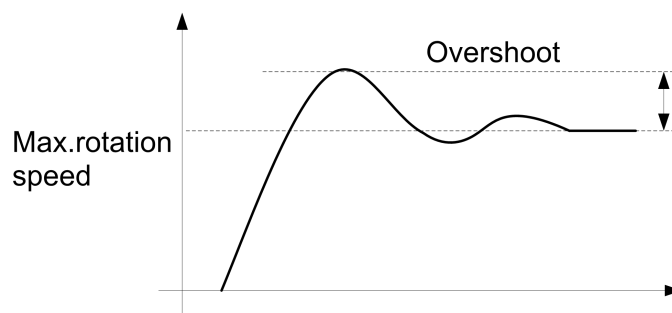
os

### 【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. <ul style="list-style-type: none"> <li>• Increase P1.37 (acceleration time).</li> <li>• Increase P1.52 (S-curve time constant).</li> <li>• Increase P1.15 (auto tuning gain 1).</li> </ul>



### (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).	<ul style="list-style-type: none"><li>• Check if the source voltage is within the specification limits.</li><li>• Insert a reactor if there is a power factor improvement capacitor.</li></ul>
Unconnected external regenerative resistor or wrong wiring	<ul style="list-style-type: none"><li>• Connect the external regenerative resistor.</li><li>• Correct the wiring of the external regenerative resistor.</li></ul>
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.

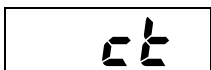
1. Et1: Single revolution position detection fault of encoder.
2. Et2: Encoder memory data reading fault.

#### 【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】

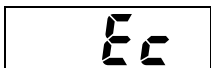
The parameter data stored in the servo motor drive is damaged.

【Causes and Solutions】

Causes	Solutions
Failure of stored data	<ul style="list-style-type: none"><li>• Initialize parameters and positioning data.</li><li>• If restoration is not obtained with the actions above, replace the servo motor drive.</li></ul>
The parameter overwriting frequency has exceeded 100,000 cycles.	Replace the servo amplifier. (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】

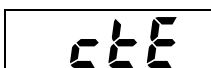
Causes	Solutions
Error in encoder serial communications	<ul style="list-style-type: none"><li>• Check cables visually and through continuity check and correct faults.</li><li>• Check for the broken wire in the encoder cable and correct if broken.</li></ul>
Broken wire or poor contact	<ul style="list-style-type: none"><li>• Insert ferrite cores.</li></ul>

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%)

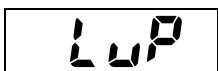
### 【Causes and Solutions】

Causes	Solutions
The servo motor fails to rotate mechanically.	<ul style="list-style-type: none"> <li>• Check the wiring of power cables (U, V and W) and correct faults.</li> <li>• Check if the brake is active.</li> </ul>
The mechanical system is too heavy against the servo motor capacity.	<ul style="list-style-type: none"> <li>• Examine the servo motor capacity, based on the load factor.</li> <li>• If the rotation speed can be reduced, add a reduction gear.</li> <li>• Apply the brake to retain a stopped elevator.</li> </ul>
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.	<ul style="list-style-type: none"> <li>• Check the power supply environment whether momentary power failure is generated or not, and improve the power supply environment.</li> <li>• Check and improve the power supply capacity and transformer capacity.</li> </ul>

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. 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. If the ET alarm cannot be cancelled, replace the servo motor.

## (15) Multi-circle overflow

### 【Display】



### 【Description of detected alarm】

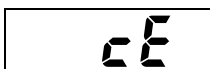
The output shaft of the servo motor has rotated -32767~+32766.

### 【Causes and Solutions】

Causes	Solutions
Large amount of servo motor rotation	Confirm the amount of rotation of the servo motor 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.

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 [v] 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.

