

13. Before making a service call

- Trip information and remedies

13.1 Trip causes/warnings and remedies

When a problem arises, diagnose it in accordance with the following table.

If it is found that replacement of parts is required or the problem cannot be solved by any remedy described in the table, contact your Toshiba dealer.

[Trip information]				
Error code	Failure code	Problem	Possible causes	Remedies
<i>OL1</i>	0001	Overcurrent during acceleration	<ul style="list-style-type: none"> The acceleration time <i>RLC</i> is too short. The V/F setting is improper. A restart signal is input to the rotating motor after a momentary stop, etc. A special motor (e.g. motor with a small impedance) is used. 	<ul style="list-style-type: none"> Increase the acceleration time <i>RLC</i>. Check the V/F parameter. Use <i>F30</i> (auto-restart) and <i>F302</i> (ride-through control). Adjust the carrier frequency <i>F300</i>. Set the carrier frequency control mode selection parameter <i>F315</i> to 1 (carrier frequency decreased automatically).
<i>OL2</i>	0002	Overcurrent during deceleration	<ul style="list-style-type: none"> The deceleration time <i>dEL</i> is too short. 	<ul style="list-style-type: none"> Increase the deceleration time <i>dEL</i>. Set the carrier frequency control mode selection parameter <i>F315</i> to 1 (carrier frequency decreased automatically).
<i>OL3</i>	0003	Overcurrent during constant speed operation	<ul style="list-style-type: none"> The load fluctuates abruptly. The load is in an abnormal condition. 	<ul style="list-style-type: none"> Reduce the load fluctuation. Check the load (operated machine). Set the carrier frequency control mode selection parameter <i>F315</i> to 1 (carrier frequency decreased automatically).
<i>OLL</i>	0004	Overcurrent (An overcurrent on the load side at start-up)	<ul style="list-style-type: none"> The insulation of the output main circuit or motor is defective. The motor has too small impedance. 	<ul style="list-style-type: none"> Check the cables and wires for defective insulation.
<i>OLR</i>	0005	Arm overcurrent at start-up	<ul style="list-style-type: none"> A main circuit elements is defective. 	<ul style="list-style-type: none"> Make a service call.
* <i>EPH1</i>	0008	Input phase failure	<ul style="list-style-type: none"> A phase failure occurred in the input line of the main circuit. The capacitor in the main circuit lacks capacitance. 	<ul style="list-style-type: none"> Check the main circuit input line for phase failure. Enable <i>F508</i> (input phase failure detection). Check the capacitor in the main circuit for exhaustion.
* <i>EPH0</i>	0009	Output phase failure	<ul style="list-style-type: none"> A phase failure occurred in the output line of the main circuit. 	<ul style="list-style-type: none"> Check the main circuit output line, motor, etc. for phase failure. Enable <i>F505</i> (Output phase failure detection).

* You can select a trip ON/OFF by parameters.
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Error code	Failure code	Problem	Possible causes	Remedies
<i>OP1</i>	000A	Overvoltage during acceleration	<ul style="list-style-type: none"> The input voltage fluctuates abnormally. (1) The power supply has a capacity of 200kVA or more. (2) A power factor improvement capacitor is opened or closed. (3) A system using a thyristor is connected to the same power distribution line. A restart signal is input to the rotating motor after a momentary stop, etc. 	<ul style="list-style-type: none"> Insert a suitable input reactor. Use <i>F301</i> (auto-restart) and <i>F302</i> (ride-through control).
<i>OP2</i>	000B	Overvoltage during deceleration	<ul style="list-style-type: none"> The deceleration time <i>dEC</i> is too short. (Regenerative energy is too large.) The input voltage fluctuates abnormally. (1) The power supply has a capacity of 200kVA or more. (2) A power factor improvement capacitor is opened and closed. (3) A system using a thyristor is connected to the same power distribution line. 	<ul style="list-style-type: none"> Increase the deceleration time <i>dEC</i>. Enable <i>F305</i> (overvoltage limit operation). Insert a suitable input reactor.
<i>OP3</i>	000C	Overvoltage during constant-speed operation	<ul style="list-style-type: none"> The input voltage fluctuates abnormally. (1) The power supply has a capacity of 200kVA or more. (2) A power factor improvement capacitor is opened or closed. (3) A system using a thyristor is connected to the same power distribution line. The motor is in a regenerative state because the load causes the motor to run at a frequency higher than the inverter output frequency. 	<ul style="list-style-type: none"> Insert a suitable input reactor. Install an optional brake module.
<i>OL1</i>	000D	Inverter overload	<ul style="list-style-type: none"> The acceleration time ACC is too short. The DC braking amount is too large. The V/F setting is improper. A restart signal is input to the rotating motor after a momentary stop, etc. The load is too large. 	<ul style="list-style-type: none"> Increase the acceleration time <i>ACC</i>. Reduce the DC braking amount <i>F251</i> and the DC braking time <i>F252</i>. Check the V/F parameter setting. Use <i>F301</i> (auto-restart) and <i>F302</i> (ride-through control). Use an inverter with a larger rating.
<i>OL2</i>	000E	Motor overload	<ul style="list-style-type: none"> The V/F setting is improper. The motor is locked up. Low-speed operation is performed continuously. An excessive load is applied to the motor during operation. 	<ul style="list-style-type: none"> Check the V/F parameter setting. Check the load (operated machine). Adjust <i>OL1</i> to the overload that the motor can withstand during operation in a low speed range.
<i>OL3</i>	003E	Main module overload	<ul style="list-style-type: none"> The carrier frequency is high and load current has increased at low speeds (mainly at 15Hz or less). 	<ul style="list-style-type: none"> Raise the operation frequency. Reduce the load. Reduce the carrier frequency. When an operating motor is started up at 0Hz, use the auto-restart function.
* <i>Ot</i>	0020	Over-torque trip	<ul style="list-style-type: none"> Over-torque reaches to a detection level during operation. 	<ul style="list-style-type: none"> Enable <i>F615</i> (over-torque trip selection). Check system error.
<i>OH</i>	0010	Overheat	<ul style="list-style-type: none"> The cooling fan does not rotate. The ambient temperature is too high. The vent is blocked up. A heat generating device is installed close to the inverter. The thermistor in the unit is broken. 	<ul style="list-style-type: none"> Restart the operation by resetting the inverter after it has cooled down enough. The fan requires replacement if it does not rotate during operation. Secure sufficient space around the inverter. Do not place any heat generating device near the inverter. Make a service call.

* You can select a trip ON/OFF by parameters.

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Error code	Failure code	Problem	Possible causes	Remedies
<i>E</i>	0011	Emergency stop	<ul style="list-style-type: none"> During automatic operation or remote operation, a stop command is entered from the operation panel or a remote input device. 	<ul style="list-style-type: none"> Reset the inverter.
<i>EEP1</i>	0012	EEPROM fault 1	<ul style="list-style-type: none"> A data writing error occurs. 	<ul style="list-style-type: none"> Turn off the inverter, then turn it again. If it does not recover from the error, make a service call.
<i>EEP2</i>	0013	EEPROM fault 2	<ul style="list-style-type: none"> Power supply is cut off during <i>LYP</i> operation and data writing is aborted. 	<ul style="list-style-type: none"> Turn the power off temporarily and turn it back on, and then try <i>LYP</i> operation again.
<i>EEP3</i>	0014	EEPROM fault 3	<ul style="list-style-type: none"> A data reading error occurred. 	<ul style="list-style-type: none"> Turn off the inverter, then turn it again. If it does not recover from the error, make a service call.
<i>Err2</i>	0015	Main unit RAM fault	<ul style="list-style-type: none"> The control RAM is defective. 	<ul style="list-style-type: none"> Make a service call.
<i>Err3</i>	0016	Main unit ROM fault	<ul style="list-style-type: none"> The control ROM is defective. 	<ul style="list-style-type: none"> Make a service call.
<i>Err4</i>	0017	CPU fault 1	<ul style="list-style-type: none"> The control CPU is defective. 	<ul style="list-style-type: none"> Make a service call.
<i>Err5</i>	0018	Remote control error	<ul style="list-style-type: none"> An error arises during remote operation. 	<ul style="list-style-type: none"> Check the remote control device, cables, etc.
<i>Err7</i>	001A	Current detector fault	<ul style="list-style-type: none"> The current detector is defective. 	<ul style="list-style-type: none"> Make a service call.
* <i>UC</i>	001D	Low-current operation Trip	<ul style="list-style-type: none"> The output current decreased to a low-current detection level during operation. 	<ul style="list-style-type: none"> Enable <i>F510</i> (low-current detection). Check the suitable detection level for the system (<i>F609</i>, <i>F611</i>, <i>F612</i>). Make a service call if the setting is correct.
* <i>UP1</i>	001E	Undervoltage trip (main circuit)	<ul style="list-style-type: none"> The input voltage (in the main circuit) is too low. 	<ul style="list-style-type: none"> Check the input voltage. Enable <i>F627</i> (undervoltage trip selection). To cope with a momentary stop due to undervoltage, enable <i>F302</i> (ride-through control) and <i>F301</i> (auto-restart).
<i>EF2</i>	0022	Ground fault trip	<ul style="list-style-type: none"> A ground fault occurs in the output cable or the motor. 	<ul style="list-style-type: none"> Check the cable and the motor for ground faults.
<i>Etn1</i>	0054	Auto-tuning error	<ul style="list-style-type: none"> Check the motor parameters <i>F401</i>, <i>F402</i>, <i>F405</i>, <i>F415</i>, <i>F416</i>, <i>F417</i>, and <i>F459</i>. The motor with the capacity of 2 classes or less than the inverter is used. The output cable is too thin. The motor is rotating. The inverter is used for loads other than those of three-phase induction motors. 	<ul style="list-style-type: none"> Make a service call.
<i>EtYP</i>	0029	Inverter type error	<ul style="list-style-type: none"> Circuit board is changed. (Or main circuit/drive circuit board) 	<ul style="list-style-type: none"> Make a service call.
* <i>E-18</i>	0032	Brea in analog signal cable	<ul style="list-style-type: none"> The input signal from VI is equal to or less than the <i>F633</i> setting. 	<ul style="list-style-type: none"> Check the VI signal cable for breaks. Also, check the input signal value or setting of <i>F633</i>.
<i>E-19</i>	0033	CPU communications error	<ul style="list-style-type: none"> A communications error occurs between control CPUs. 	<ul style="list-style-type: none"> Make a service call.
<i>E-20</i>	0034	Excessive torque boosted	<ul style="list-style-type: none"> The automatic torque boost parameter <i>F402</i> setting is too high. The motor has too small impedance. 	<ul style="list-style-type: none"> Set a lower automatic torque boost parameter <i>F402</i> setting.
<i>E-21</i>	0035	CPU fault 2	<ul style="list-style-type: none"> The control CPU is defective. 	<ul style="list-style-type: none"> Make a service call.
<i>E-26</i>	003A	CPU fault 3	<ul style="list-style-type: none"> The control CPU is defective. 	<ul style="list-style-type: none"> Make a service call.

* You can select a trip ON/OFF by parameters.

[Alarm information] Each message in the table is displayed to give a warning but does not cause the inverter to trip.

Error code	Problem	Possible causes	Remedies
OFF	ST terminal OFF	<ul style="list-style-type: none"> The ST-CC circuit is opened. 	<ul style="list-style-type: none"> Close the ST-CC circuit.
ROFF	Undervoltage in main circuit	<ul style="list-style-type: none"> The supply voltage between R, S and T is under voltage. 	<ul style="list-style-type: none"> Measure the main circuit supply voltage. If the voltage is at a normal level, the inverter requires repairing.
rtr4	Retry in process	<ul style="list-style-type: none"> The inverter is in the process of retry. A momentary stop occurred. 	<ul style="list-style-type: none"> The inverter is normal if it restarts after several tens of seconds. The inverter restarts automatically. Be careful of the machine because it may suddenly restart.
Err 1	Frequency point setting error alarm	<ul style="list-style-type: none"> The frequency setting signals at points 1 and 2 are set too close to each other. 	<ul style="list-style-type: none"> Set the frequency setting signals at points 1 and 2 apart from each other.
CLR	Clear command acceptable	<ul style="list-style-type: none"> This message is displayed when pressing the STOP key while an error code is displayed. 	<ul style="list-style-type: none"> Press the STOP key again to clear the trip.
EOFF	Emergency stop command acceptable	<ul style="list-style-type: none"> The operation panel is used to stop the operation in automatic control or remote control mode. 	<ul style="list-style-type: none"> Press the STOP key for an emergency stop. To cancel the emergency stop, press any other key.
H/L L/O	Setting error alarm / An error code and data are displayed alternately twice each.	<ul style="list-style-type: none"> An error is found in a setting when data is reading or writing. 	<ul style="list-style-type: none"> Check whether the setting is made correctly.
HEAD END	Display of first/last data items	<ul style="list-style-type: none"> The first and last data item in the <i>RUH</i> data group is displayed. 	<ul style="list-style-type: none"> Press MODE key to exit the data group.
db	DC braking	<ul style="list-style-type: none"> DC braking in process 	<ul style="list-style-type: none"> The message goes off in several tens of seconds if no problem occurs. Note)
E1 E2 E3	Flowing out of excess number of digits	<ul style="list-style-type: none"> The number of digits such as frequencies is more than 4. (The upper digits have a priority.) 	<ul style="list-style-type: none"> Lower the frequency free unit magnification <i>F7D2</i>.
STOP	Momentary power failure slowdown stop prohibition function activated.	<ul style="list-style-type: none"> The slowdown stop prohibition function set with <i>F3D2</i> (momentary power failure ride-through operation) is activated. 	<ul style="list-style-type: none"> To restart operation, reset the inverter or input an operation signal again.
LSLP	Auto-stop because of continuous operation at the lower-limit frequency	<ul style="list-style-type: none"> The automatic stop function selected with <i>F255</i> was activated. 	<ul style="list-style-type: none"> To deactivate the automatic stop function, increase the frequency command above the lower-limit frequency (LL) + 0.2 Hz or turn off the operation command.
init	Parameters in the process of initialization	<ul style="list-style-type: none"> Parameters are being initialized to default values. 	<ul style="list-style-type: none"> Normal if the message disappears after a while (several seconds to several tens of seconds).
A-05	Output frequency upper limit	<ul style="list-style-type: none"> An attempt was made to operate at a frequency higher than 10 times the base frequency (<i>UL</i> or <i>F17D</i>). 	<ul style="list-style-type: none"> Operate at a frequency within 10 times the base frequency.
A-17	Operation panel key fault	<ul style="list-style-type: none"> The RUN or STOP key is held down for more than 20 seconds. The RUN or STOP key is faulty. 	<ul style="list-style-type: none"> Check the operation panel.
Autn	Auto-tuning	<ul style="list-style-type: none"> Auto-tuning in process 	<ul style="list-style-type: none"> Normal if it the message disappears after a few seconds.
E-50	Source logic switching check alarm	<ul style="list-style-type: none"> The input terminal was switched to source logic. 	<ul style="list-style-type: none"> Check the wiring, and set the appropriate logic.
E-51	Sink logic switching check alarm	<ul style="list-style-type: none"> The input terminal was switched to sink logic. 	<ul style="list-style-type: none"> Check to make sure that the wiring is normal, and reset or turn the power off and then back on again. This switches the logic.

Note) When the ON/OFF function is selected for DC braking (DB), using the input terminal selection parameter, you can judge the inverter to be normal if "db" disappears when opening the circuit between the terminal and CC.

[Prealarm display]

\mathcal{L}	Overcurrent alarm	Same as $\mathcal{O}\mathcal{L}$ (overcurrent)
\mathcal{P}	Overvoltage alarm	Same as $\mathcal{O}\mathcal{P}$ (overvoltage)
\mathcal{L}	Overload alarm	Same as $\mathcal{O}\mathcal{L} 1$ and $\mathcal{O}\mathcal{L} 2$ (overload)
\mathcal{H}	Overheat alarm	Same as $\mathcal{O}\mathcal{H}$ (overheat)

If two or more problems arise simultaneously, one of the following alarms appears and blinks.

$\mathcal{L}\mathcal{P}$, $\mathcal{P}\mathcal{L}$, $\mathcal{L}\mathcal{P}\mathcal{L}$

The blinking alarms \mathcal{L} , \mathcal{P} , \mathcal{L} , \mathcal{H} are displayed in this order from left to right.

13.2 Restoring the inverter from a trip

Do not reset the inverter when tripped because of a failure or error before eliminating the cause. Resetting the tripped inverter before eliminating the problem causes it to trip again.

The inverter can be restored from a trip by any of the following operations:

- (1) By turning off the power (Keep the inverter off until the LED turns off.)
Note) See inverter trip hold selection $F 6 \mathcal{O}\mathcal{L}$ for details.
- (2) By means of an external signal (Short circuit across RES and CC on control terminal block → Open): The reset function must be assigned to the input terminal block.
- (3) By panel keypad operation
- (4) By inputting a trip clear signal from communication
(Refer to communication manual for details.)

To reset the inverter by panel keypad operation, follow these steps.

1. Press the STOP key and make sure that $\mathcal{L}\mathcal{L} r$ is displayed.
2. Pressing the STOP key again will reset the inverter if the cause of the trip has already been eliminated.

- ★ When any overload function [$\mathcal{O}\mathcal{L} 1$: inverter overload, $\mathcal{O}\mathcal{L} 2$: motor overload] is active, the inverter cannot be reset by inputting a reset signal from an external device or by operation panel operation before the virtual cooling time has passed.

Virtual cooling time ... $\mathcal{O}\mathcal{L} 1$: about 30 seconds after the occurrence of a trip

$\mathcal{O}\mathcal{L} 2$: about 120 seconds after a occurrence of a trip

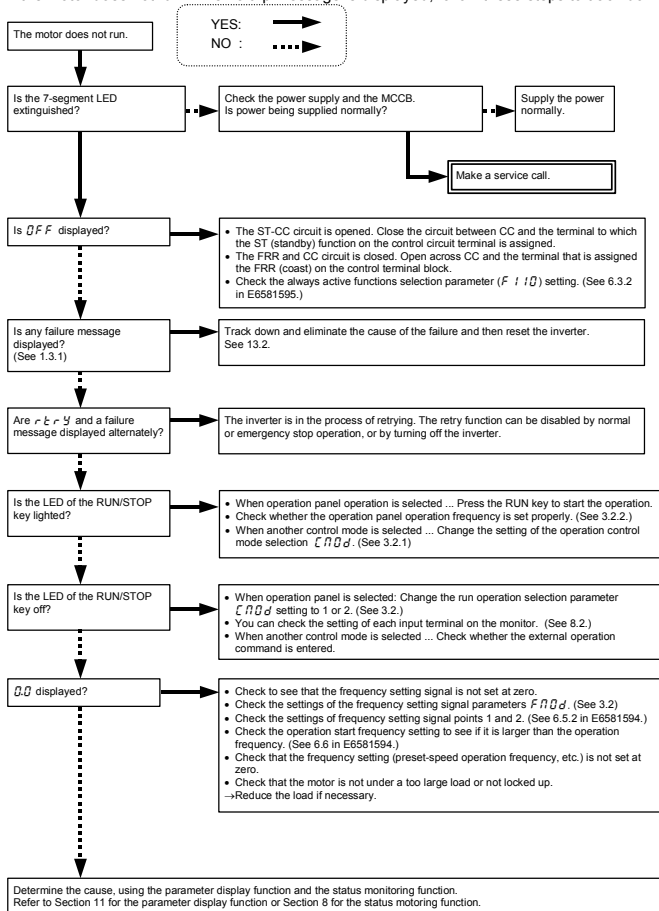
- ★ In case of a trip due to overheat ($\mathcal{O}\mathcal{H}$), the inverter checks the temperature within. Wait until the temperature in the inverter falls sufficiently before resetting the inverter.
- ★ The inverter cannot be reset while the emergency stop signal is being input from the terminal.

[Caution]

Turning the inverter off then turning it on again resets the inverter immediately. You can use this mode of resetting if there is a need to reset the inverter immediately. Note, however, that this operation may damage the system or the motor if it is repeated frequently.

13.3 If the motor does not run while no trip message is displayed ...

If the motor does not run while no trip message is displayed, follow these steps to track down the cause.



13.4 How to determine the causes of other problems

The following table provides a listing of other problems, their possible causes and remedies.

Problems	Causes and remedies
The motor runs in the wrong direction.	<ul style="list-style-type: none"> • Invert the phases of the output terminals U, V and W. • Invert the forward/reverse run-signal terminals of the external input device. (See 7.2.1 "Assignment of functions to control terminals".) • Change the setting of the parameter F_{r} in the case of panel operation.
The motor runs but its speed does not change normally.	<ul style="list-style-type: none"> • The load is too heavy. Reduce the load. • The soft stall function is activated. Disable the soft stall function. (See 5.13.) • The maximum frequency F_H and the upper limit frequency U_L are set too low. Increase the maximum frequency F_H and the upper limit frequency U_L. • The frequency setting signal is too low. Check the signal set value, circuit, cables, etc. • Check the setting characteristics (point 1 and point 2 settings) of the frequency setting signal parameters. (See 6.5.1 in E6581595.) • If the motor runs at a low speed, check to see that the stall prevention function is activated because the torque boost amount is too large. Adjust the torque boost amount (u_b) and the acceleration time (R_L). (See 5.12 and 5.3.)
The motor does not accelerate or decelerate smoothly.	<ul style="list-style-type: none"> • The acceleration time (R_L) or the deceleration time (dE_L) is set too short. Increase the acceleration time (R_L) or the deceleration time (dE_L).
A too large current flows into the motor.	<ul style="list-style-type: none"> • The load is too heavy. Reduce the load. • If the motor runs at a low speed, check whether the torque boost amount is too large. (See 5.12.)
The motor runs at a higher or lower speed than the specified one.	<ul style="list-style-type: none"> • The motor has an improper voltage rating. Use a motor with a proper voltage rating. • The motor terminal voltage is too low. Check the setting of the base frequency voltage parameter (u_L). (See 5.10.) Replace the cable with a cable larger in diameter. • The reduction gear ratio, etc., are not set properly. Adjust the reduction gear ratio, etc. • The output frequency is not set correctly. Check the output frequency range. • Adjust the base frequency. (See 5.10.)
The motor speed fluctuates during operation.	<ul style="list-style-type: none"> • The load is too heavy or too light. Reduce the load fluctuation. • The inverter or motor used does not have a rating large enough to drive the load. Use an inverter or motor with a rating large enough. • Check whether the frequency setting signal changes. • If the V/F control selection parameter P_L is set at 3, check the vector control setting, operation conditions, etc. (See 5.11.)
Parameter settings cannot be changed.	<p>Change the setting of the parameter setting selection prohibited parameter F_{PQ} to $\bar{0}$ (enabled) if it is set to i or $\bar{2}$ (prohibited).</p> <p>* For reasons of safety, some parameters cannot be reprogrammed while the inverter is running. (See 6.18.1 in E6581595.)</p>

How to cope with parameter setting-related problems

If you forget parameters which have been reset	<ul style="list-style-type: none"> • You can search for all reset parameters and change their settings. * Refer to 4.3.1 for details.
If you want to return all reset parameters to their respective default settings	<ul style="list-style-type: none"> • You can return all parameters which have been reset to their default settings. * Refer to 4.3.2 for details.