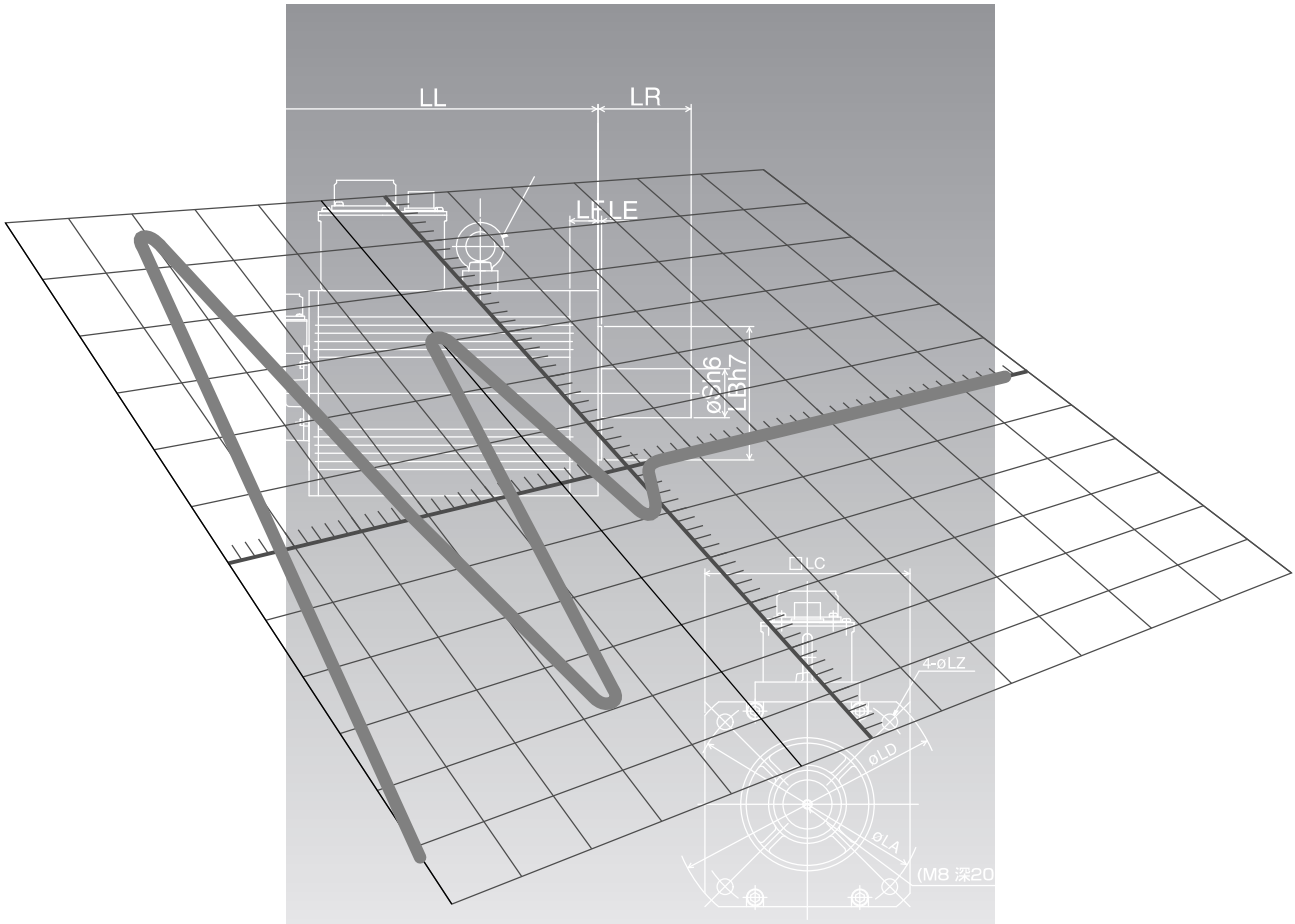


[When in Trouble]

page

When in Trouble 252

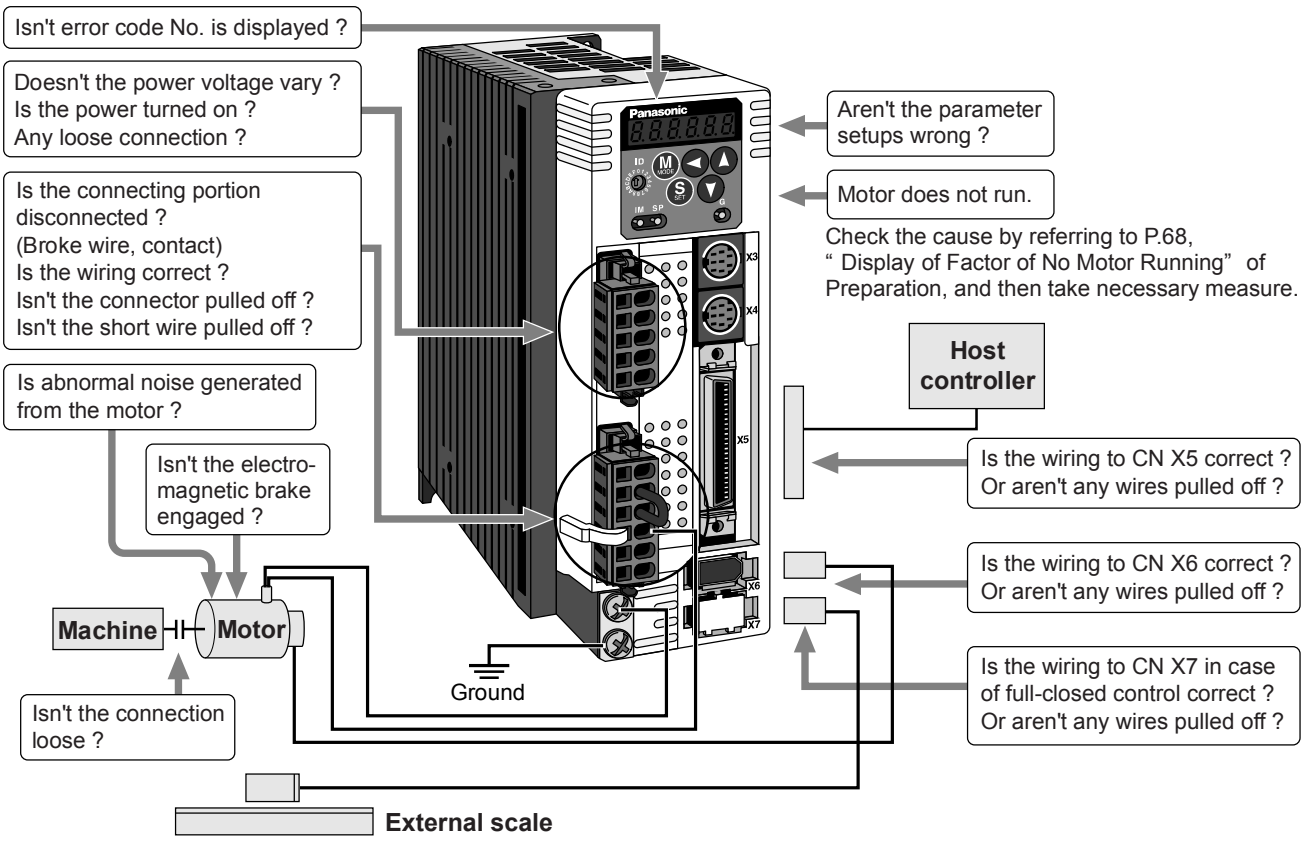
What to Check ? 252
Protective Function (What is Error Code ?) 252
Protective Function (Details of Error Code) 253

Troubleshooting 260

Motor Does Not Run 260
Unstable Rotation (Not Smooth)/Motor Runs Slowly Even with Speed Zero at Velocity Control Mode 261
Positioning Accuracy Is Poor 262
Origin Point Slips 263
Abnormal Noise or Vibration 263
Overshoot/Undershoot, Overheating of the Motor (Motor Burn-Out) 264
Motor Speed Does Not Reach to the Setup/Motor Revolution (Travel) Is Too Large or Small 264
Parameter Returns to Previous Setup 264
Display of "Communication port or driver cannot be detected" Appears on the Screen While using the PANATERM® 264

When in Trouble

What to Check ?



Protective Function (What is Error Code ?)

- Various protective functions are equipped in the driver. When these are triggered, the motor will stall due to error, according to P.43, "Timing Chart (When error occurs)"of Preparation, and the driver will turn the Servo-Alarm output (ALM) to off (open).

- Error status ands their measures
  - During the error status, the error code No. will be displayed on the front panel LED, and you cannot turn Servo-ON.
  - You can clear the error status by turning on the alarm clear input (A-CLR) for 120ms or longer.
  - When overload protection is triggered, you can clear it by turning on the alarm clear signal (A-CLR) 10 sec or longer after the error occurs. You can clear the time characteristics by turning off the connection between L1C and L2C or r and t of the control power supply of the driver.
  - You can clear the above error by operating the front panel keys. (Refer to P.73, "Alarm Clear Mode" of Preparation.)
  - You can also clear the above error by operating the "PANATERM®".

<Remarks>

- When the protective function with a prefix of "*" in the protective function table is triggered, you cannot clear with alarm clear input (A-CLR). For resumption, shut off the power to remove the cause of the error and re-enter the power.
- Following errors will not be stored in the error history.

Control power supply under-voltage protection	(Error code No. 11)
Main power supply under-voltage protection	(Error code No. 13)
EEPROM parameter error protection	(Error code No. 36)
EEPROM check code error protection	(Error code No. 37)
Over-travel prohibition input protection	(Error code No. 38)
Motor self-recognition error protection	(Error code No. 95)

Protective Function (Detail of Error Code)

Protective function	Error code No.	Causes	Measures
Control power supply under-voltage protection	**11**	Voltage between P and N of the converter portion of the control power supply has fallen below the specified value. 1)Power supply voltage is low. Instantaneous power failure has occurred 2)Lack of power capacity...Power supply voltage has fallen down due to inrush current at the main power-on. 3)Failure of servo driver (failure of the circuit)	Measure the voltage between lines of connector (L1C and L2C) and terminal block (r and t). 1)Increase the power capacity. Change the power supply. 2)Increase the power capacity. 3)Replace the driver with a new one.
Over-voltage protection	**12**	Voltage between P and N of the converter portion of the control power supply has exceeded the specified value 1)Power supply voltage has exceeded the permissible input voltage. Voltage surge due to the phase-advancing capacitor or UPS (Uninterruptible Power Supply) have occurred. 2)Disconnection of the regeneration discharge resistor 3)External regeneration discharge resistor is not appropriate and could not absorb the regeneration energy. 4)Failure of servo driver (failure of the circuit)	Measure the voltage between lines of connector (L1, L2 and L3). 1)Enter correct voltage. Remove a phase-advancing capacitor. 2)Measure the resistance of the external resistor connected between terminal P and B of the driver. Replace the external resistor if the value is ∞. 3)Change to the one with specified resistance and wattage. 4)Replace the driver with a new one.
Main power supply under-voltage protection	**13**	Instantaneous power failure has occurred between L1 and L3 for longer period than the preset time with Pr6D (Main power off detecting time) while Pr65 (LV trip selection at the main power-off) is set to 1. Or the voltage between P and N of the converter portion of the main power supply has fallen below the specified value during Servo-ON. 1)Power supply voltage is low. Instantaneous power failure has occurred 2)Instantaneous power failure has occurred. 3)Lack of power capacity...Power supply voltage has fallen down due to inrush current at the main power-on. 4)Phase lack...3-phase input driver has been operated with single phase input. 5)Failure of servo driver (failure of the circuit)	Measure the voltage between lines of connector (L1, L2 and L3). 1)Increase the power capacity. Change the power supply. Remove the causes of the shutdown of the magnetic contactor or the main power supply, then re-enter the power. 2)Set up the longer time to Pr6D (Main power off detecting time). Set up each phase of the power correctly. 3)Increase the power capacity. For the capacity, refer to P.32, "Driver and List of Applicable Peripheral Equipments" of Preparation. 4)Connect each phase of the power supply (L1, L2 and L3) correctly. For single phase, 100V and 200V driver, use L1 and L3. 5)Replace the driver with a new one.
*** Over-current protection**	**14**	Current through the converter portion has exceeded the specified value. 1)Failure of servo driver (failure of the circuit, IGBT or other components) 2)Short of the motor wire (U, V and W) 3)Earth fault of the motor wire 4)Burnout of the motor 5)Poor contact of the motor wire. 6)Melting of the relays for dynamic brake due to frequent Servo-ON/OFF operation 7)The motor is not applicable to the driver. 8)Timing of pulse input is same as or earlier than Servo-ON. 9)Overheating of the dynamic brake circuit (F-frame only)	1)Turn to Servo-ON, while disconnecting the motor. If error occurs immediately, replace with a new driver. 2)Check that the motor wire (U, V and W) is not shorted, and check the branched out wire out of the connector. Make a correct wiring connection. 3)Measure the insulation resistance between motor wires, U, V and W and earth wire. In case of poor insulation, replace the motor. 4)Check the balance of resister between each motor line, and if unbalance is found, replace the motor. 5)Check the loose connectors. If they are, or pulled out, fix them securely. 6)Replace the driver. Prohibit the run/stop operation with Servo-ON/OFF. 7)Check the name plate and capacity of the motor and driver, and replace with motor applicable to the driver. 8)Enter the pulses 100ms or longer after Servo-ON. 9)Discontinue the run/stop operation with Servo ON-OFF. Allow approx. 3 minutes pause when the dynamic brake is activated during high-speed running.
*** Over-heat protection**	**15**	Temperature of the heat sink or power device has been risen over the specified temperature. 1)Ambient temperature has risen over the specified temperature. 2)Over-load	1)Improve the ambient temperature and cooling condition. 2)Increase the capacity of the driver and motor. Set up longer acceleration/deceleration time. Lower the load.

Protective function	Error code No.	Causes	Measures
Over-load protection	**16**	Torque command value has exceeded the over-load level set with Pr72 (Setup of over-load level) and resulted in overload protection according to the time characteristics (described later) 1)Load was heavy and actual torque has exceeded the rated torque and kept running for a long time. 2)Oscillation and hunching action due to poor adjustment. Motor vibration, abnormal noise. Inertia ratio (Pr20) setup error. 3)Miswiring, disconnection of the motor. 4)Machine has collided or the load has gotten heavy. Machine has been distorted. 5)Electromagnetic brake has been kept engaged. 6)While wiring multiple axes, miswiring has occurred by connecting the motor cable to other axis. 7)Pr72 setup has been low.	Check that the torque (current) does not oscillates nor fluctuate up an down very much on the graphic screen of the PANATERM®. Check the over-load alarm display and load factor with the PANATERM®. 1)Increase the capacity of the driver and motor. Set up longer acceleration/deceleration time. Lower the load. 2)Make a re-adjustment. 3)Make a wiring as per the wiring diagram. Replace the cables. Connect the black (W phase), white (V phase) and red (U phase) cables in sequence from the bottom at the CN X2 connector. 4)Remove the cause of distortion. Lower the load. 5)Measure the voltage between brake terminals. Release the brake 6)Make a correct wiring by matching the correct motor and encoder wires. 7)Set up Pr72 to 0. (Set up to max. value of 115% of the driver)
*** Over-regeneration load protection**	**18**	Regenerative energy has exceeded the capacity of regenerative resistor. 1)Due to the regenerative energy during deceleration caused by a large load inertia, converter voltage has risen, and the voltage is risen further due to the lack of capacity of absorbing this energy of the regeneration discharge resistor. 2)Regenerative energy has not been absorbed in the specified time due to a high motor rotational speed. 3)Active limit of the external regenerative resistor has been limited to 10% duty.	Check the load factor of the regenerative resistor on the monitor screen of the PANATERM®. Do not use in the continuous regenerative brake application. 1)Check the running pattern (velocity monitor). Check the load factor of the regenerative resistor and over-regeneration warning display. Increase the capacity of the driver and the motor, and loosen the deceleration time. Use the external regenerative resistor. 2)Check the running pattern (speed monitor). Check the load factor of the regenerative resistor. Increase the capacity of the driver and the motor, and loosen the deceleration time. Lower the motor rotational speed. Use an external regenerative resistor. 3)Set up Pr6C to 2.
		<Remarks> Install an external protection such as thermal fuse without fail when you set up Pr6C to 2. Otherwise, regenerative resistor loses the protection and it may be heated up extremely and may burn out.	
*** Encoder communi-cation error protection**	**21**	Communication between the encoder and the driver has been interrupted in certain times, and disconnection detecting function has been triggered.	• Make a wiring connection of the encoder as per the wiring diagram. Correct the miswiring of the connector pins. Note that the encoder cable to be connected to CN X6. • Secure the power supply for the encoder of DC5V±5% (4.75-5.25V)...pay an attention especially when the encoder cables are long. • Separate the encoder cable and the motor cable if they are bound together. • Connect the shield to FG...Refer to P.38, "Wiring to the Connector, CN X6" of Preparation.
*** Encoder communi-cation data error protection**	**23**	Communication error has occurred in data from the encoder. Mainly data error due to noise. Encoder cables are connected, but communication data has some errors.	
Position deviation excess protection	**24**	Deviation pulses have exceeded the setup of Pr70 (Setup of position deviation excess). 1)The motor movement has not followed the command. 2)Setup value of Pr70 (Setup of position deviation excess) is small.	1)Check that the motor follows to the position command pulses. Check that the output toque has not saturated in torque monitor. Make a gain adjustment. Set up maximum value to Pr5E (Setup of 1st torque limit) and Pr5F (2nd torque limit setup). Make a encoder wiring as per the wiring diagram. Set up the longer acceleration/deceleration time. Lower the load and speed. 2)Set up a larger value to Pr70, or set up 0 (invalid).

Protective function	Error code No.	Causes	Measures
*** Hybrid deviation excess error protection**	**25**	Position of load by the external scale and position of the motor by the encoder slips larger than the setup pulses with Pr7B (Setup of hybrid deviation excess) at full-closed control.	• Check the connection between the motor and the load. • Check the connection between the external scale and the driver. • Check that the variation of the motor position (encoder feedback value) and the load position (external scale feedback value) is the same sign when you move the load. Check that the numerator and denominator of the external scale division (Pr78, 79 and 7A) and reversal of external scale direction (Pr7C) are correctly set.
Over-speed protection	**26**	The motor rotational speed has exceeded the setup value of Pr73 (Over-speed level setup)	• Do not give an excessive speed command. • Check the command pulse input frequency and division/multiplication ratio. • Make a gain adjustment when an overshoot has occurred due to a poor gain adjustment. • Make a wiring connection of the encoder as per the wiring diagram. • Set up Pr73 to 0 (Set up to motor max. speed x 1.2.)
Electronic gear error protection	**27**	Division and multiplication ratio which are set up with the 1st and the 2nd numerator/denominator of the electronic gear (Pr48 to 4B) are not appropriate.	• Check the setup values of Pr48 to 4B. • Set up the division/multiplication ratio so that the command pulse frequency after division. multiplication may become less than 80Mpps at deviation counter input portion, and 3Mpps at command input portion.
*** External scale communication data error protection**	**28**	Communication error has occurred in data from the encoder. Mainly data error due to noise. Encoder cables are connected, but communication date has some error.	• Secure the power supply for the encoder of DC5±5% (4.75-5.25V)...pay attention especially when the encoder cables are long. • Separate the encoder cable and the motor cable if they are bound together. • Connect the shield to FG...refer to wiring diagram.
Deviation counter overflow protection	**29**	Deviation counter value has exceeded 2^{27} (134217728).	• Check that the motor runs as per the position command pulses. • Check that the output toque has not saturated in torque monitor. • Make a gain adjustment. • Set up maximum value to Pr5E (1st torque limit setup) and Pr5F (2nd torque limit setup). • Make a wiring connection of the encoder as per the wiring diagram.
Software limit protection	**34**	The motor position has exceeded the range set with software limit. 1)Gain has not matched up. 2)Setup value of Pr26 (Software limit setup) is small.	Refer to P.258,"Software Limit Function" before using this. 1)Check the gain (balance of position loop gain and velocity loop gain) and the inertia ratio. 2)Setup a larger value to Pr26.
*** External scale communication error protection**	**35**	Communication between the external scale and the driver has been interrupted in certain times, and disconnection detecting function has been triggered.	• Make a wiring connection of the external scale as per the wiring diagram. • Correct the miswiring of the connector pins.
*** EEPROM parameter error protection**	**36**	Data in parameter storage area has been damaged when reading the data from EEPROM at power-on.	• Set up all parameters again. • If the error persists, replace the driver (it may be a failure.) Return the product to the dealer or manufacturer.
*** EEPROM check code error protection**	**37**	Data for writing confirmation to EEPROM has been damaged when reading the data from EEPROM at power-on.	Replace the driver. (it may be a failure). Return the product to a dealer or manufacturer.
Over-travel inhibit input protection	**38**	Connection of both CW and CCW over-travel inhibit input (CWL, Pin-8/CCW, Pin-9) to COM- have been opened, while Pr04 (Over-travel inhibit input setup) is 0. Or either one of the connection of CW or CCW over-travel inhibit input to COM- has been opened, while Pr04 is set to 2.	• Check that there are not any errors in switches, wires or power supply which are connected to CW/CCW over-travel inhibit input. Check that the rising time of the control power supply (DC12-24V) is not slow.

Protective function	Error code No.	Causes	Measures
Analog input excess protection	**39**	Higher voltage has been applied to the analog command input (SPR : CN X5, Pin-14) than the value that has been set by Pr71 (Analog input excess setup) This protective function is validated when SPR/TRQR/SPL is valid such cases as, 1)Velocity control when Pr02 (Control mode setup) is set to 1, 3 or 5 and Pr05 (Velocity setup internal/external switching) is set to 0 or 2, and when analog velocity command is selected and speed zero clamp is invalidated. (velocity command is not zero). 2)Torque control when Pr02 (Control mode setup) is set to 2 or 4 and Pr5B (Torque command selection) is set to 0. 3)Torque control when Pr02 (Control mode setup) is set to 2, 4 or 5 and Pr5B (Torque command selection) is set to 1, and speed zero clamp is invalidated (Velocity command is not zero.)	• Set up Pr71 (Setup of analog input excess) correctly. Check the connecting condition of the connector, CN X5. • Set up a larger value to Pr57 (Filter setup of Velocity command). • Set up Pr71 to 0 and invalidate the protective function.
Absolute system down error protection	**40**	Voltage of the built-in capacitor has fallen below the specified value because the power supply or battery for the 17-bit absolute encoder has been down.	After connecting the power supply for the battery, clear the absolute encoder. (Refer to P.271, "Setup (Initialization) of Absolute Encoder" of Supplement.) You cannot clear the alarm unless you clear the absolute encoder.
*** Absolute counter over error protection**	**41**	Multi-turn counter of the 17-bit absolute encoder has exceeded the specified value.	• Set up an appropriate value to Pr0B (Absolute encoder setup) . • Limit the travel from the machine origin within 32767 revolutions.
Absolute over-speed error protection	**42**	The motor speed has exceeded the specified value when only the supply from the battery has been supplied to 17-bit encoder during the power failure.	• Check the supply voltage at the encoder side (5V±5%) • Check the connecting condition of the connector, CN X6. • You cannot clear the alarm unless you clear the absolute encoder.
*** Absolute single turn counter error protection**	**44**	Single turn counter error of 17-bit absolute encoder has been detected. Single turn counter error of 2500[P/r] , 5-wire serial encoder has been detected.	Replace the motor.
*** Absolute multi-turn counter error protection**	**45**	Multi turn counter error of 17-bit absolute encoder has been detected. Multi turn counter error of 2500[P/r] , 5-wire serial encoder has been detected.	Replace the motor.
Absolute status error protection	**47**	17-bit absolute encoder has been running at faster speed than the specified value at power-on.	Arrange so as the motor does not run at power-on.
*** Encoder Z-phase error protection**	**48**	Missing pulse of Z-phase of 2500[P/r] , 5-wire serial encoder has been detected	The encoder might be a failure. Replace the motor.
*** Encoder CS signal error protection**	**49**	CS signal logic error of 2500[P/r] , 5-wire serial encoder has been detected	The encoder might be a failure. Replace the motor.

Protective function	Error code No.	Causes	Measures
*** External scale status 0 error protection**	**50**	Bit 0 of the external scale error code (ALMC) has been turned to 1. Check the specifications of the external scale.	Remove the causes of the error, then clear the external scale error from the front panel. And then, shut off the power to reset.
*** External scale status 1 error protection**	**51**	Bit 1 of the external scale error code (ALMC) has been turned to 1. Check the specifications of the external scale.	
*** External scale status 2 error protection**	**52**	Bit 2 of the external scale error code (ALMC) has been turned to 1. Check the specifications of the external scale.	
*** External scale status 3 error protection**	**53**	Bit 3 of the external scale error code (ALMC) has been turned to 1. Check the specifications of the external scale.	
*** External scale status 4 error protection**	**54**	Bit 4 of the external scale error code (ALMC) has been turned to 1. Check the specifications of the external scale.	
*** External scale status 5 error protection**	**55**	Bit 5 of the external scale error code (ALMC) has been turned to 1. Check the specifications of the external scale.	
CCWTL input excess protection	**65**	Higher voltage than ±10V has been applied to the analog command input (CCWTL : CN X5, Pin-16) This protective function is validated when CCWTL is valid such cases as, 1) Torque control when Pr02 (Control mode setup) is 5, or Pr02 is2 or 4 and when Pr5B (Torque command selection) is 1. 2) Position control, Velocity control and Full-closed control when Pr03 (Torque limit selection) is 0.	• Check the connecting condition of connector, CN X5. • Set the CCWTL voltage within ±10V.
CWTL input excess protection	**66**	Higher voltage than ±10V has been applied to the analog command input (CCWTL : CN X5, Pin-18) This protective function is validated when CCWTL is valid such case as, 1) Position control, Velocity control and Full-closed control when Pr03 (Torque limit selection) is 0.	• Check the connecting condition of connector, CN X5. • Set the CWTL voltage within ±10V.
*** Motor automatic recognition error protection**	**95**	The motor and the driver has not been matched.	Replace the motor which matches to the driver.
*** Other error**	**Other No.**	Control circuit has malfunctioned due to excess noise or other causes. Some error has occurred inside of the driver while triggering self-diagnosis function of the driver.	• Turn off the power once, then re-enter. • If error repeats, this might be a failure. Stop using the products, and replace the motor and the driver. Return the products to the dealer or manufacturer.