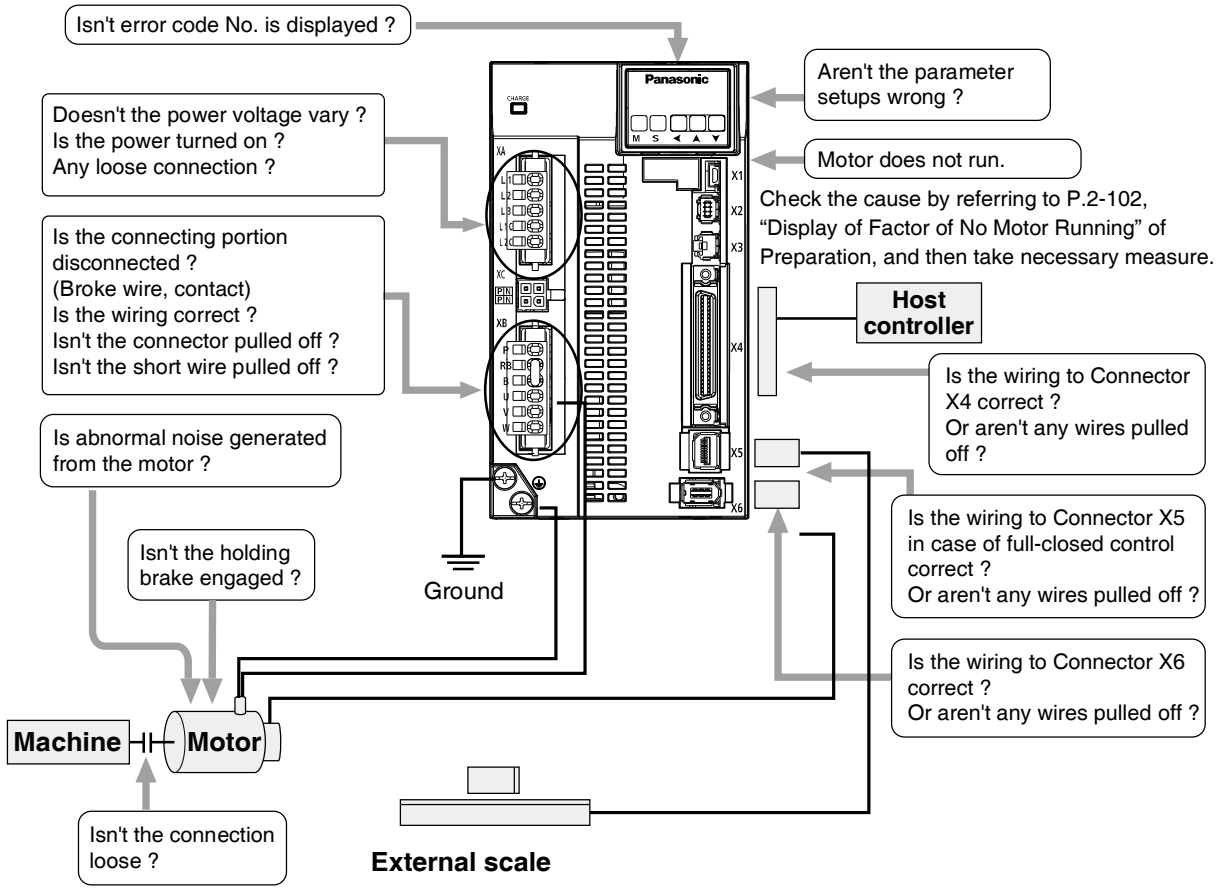
6. When in Trouble

1. When in Trouble

What to Check ?



6 When in Trouble

1. When in Trouble

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, the driver will turn the Servo-Alarm output (ALM) to off (open).
- Error status and 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 Alarm clear input(A-CLR) in 120 ms or longer.
  - When overload protection is triggered, you can clear it by Alarm clear input (A-CLR) in 10sec or longer after the error occurs. *1 Table below) You can clear the Overload protection time characteristics (refer to P.6-17) by turning off the control power supply between L1C and L2C (100 V, 200 V) of the driver.
  - You can clear the above error by operating the front panel keys and setup support softwear "PANATERM". Refer to P.2-111 "Alarm Clear Screen" of Preparation.
  - Be sure to clear the alarm during stop after removing the cause of the error and securing safety.

Note

- The figure above shows connections on velocity, position, torque and full-closed mode driver.

Related page

- P. 2-88 . . . "How to Use the Front Panel"
- P. 3-32 "I nputs and outputs on connector X4"
- P. 7-26 "Outline of Setup support software "PANATERM"

<List of error code No.>

Error code Main	Sub	Protective function	Attribute History	Can be cleared	Immediate stop*3	Detail page
11	0	Under voltage protection of control power supply		○		6-4
12	0	Over-voltage protection	○	○		
13	0	Main power supply under-voltage protection (between P and N)		○		
	1	Main power supply under-voltage protection (AC interception detection)		○	○	
14	0	Over-current protection	○			6-5
	1	IPM error protection	○			
15	0	Over-heat protection	○		○	
	1	Encoders abnormal overheat protection	○		○	
16	0	Over-load protection	○	○*1	Switchable*2	6-6
	1	Torque saturation error protection	○	○		
18	0	Over-regeneration load protection	○		○	
	1	Regeneration Tr error protection	○			6-7
21	0	Encoder communication disconnect error protection	○			
	1	Encoder communication error protection	○			
23	0	Encoder communication data error protection	○			
24	0	Position deviation excess protection	○	○	○	
	1	Speed deviation excess protection	○	○	○	
25	0	Hybrid deviation excess error protection	○		○	6-8
26	0	Over-speed protection	○	○	○	
	1	2nd over-speed protection	○	○		
27	0	Command pulse input frequency error protection	○	○	○	
	1	Absolute clear abnormal protection	○			
	2	Command pulse multiplier error protection	○	○	○	
28	0	Limit of pulse replay error protection	○	○	○	
29	0	Deviation counter overflow protection	○	○		6-9
	1	counter overflow protection 1	○			
	2	Counter overflow error protection 2	○			
31	0	Safety function error protection 1	○			
	2	Safety function error protection 2	○			
33	0	IF overlaps allocation error 1 protection	○			
	1	IF overlaps allocation error 2 protection	○			
	2	IF input function number error 1 protection	○			
	3	IF input function number error 2 protection	○			
	4	IF output function number error 1 protection	○			6-10
	5	IF output function number error 2 protection	○			
	6	Counter clear allocation error	○			
	7	Command pulse inhibition input allocation error	○			
34	0	Motor working range setup error protection	○	○		
36	0 to 1	EEPROM parameter error protection				
37	0 to 2	EEPROM check code error protection				
38	0	Drive prohibition input protection		○		

Error code Main	Sub	Protective function	Attribute History	Can be cleared	Immediate stop*3	Detail page
39	0	Analog input1 excess protection	○	○	○	6-11
	1	Analog input2 excess protection	○	○	○	
	2	Analog input3 excess protection	○	○	○	
40	0	Absolute system down error protection	○	○*4		
41	0	Absolute counter over error protection	○			
42	0	Absolute over-speed error protection	○	○*4		
43	0	Incremental encoder initialization error protection	○			
44	0	Absolute single turn counter error protection	○			
45	0	Absolute multi-turn counter error protection	○			6-12
47	0	Absolute status error protection	○			
48	0	Increment encoder Z-phase error protection	○			
49	0	Increment encoder CS-phase error protection	○			
50	0	External scale connection error protection	○			
	1	External scale communication error protection	○			
51	0	External scale status 0 error protection	○			
	1	External scale status 1 error protection	○			
	2	External scale status 2 error protection	○			
	3	External scale status 3 error protection	○			
	4	External scale status 4 error protection	○			
	5	External scale status 5 error protection	○			6-13
55	0	A-phase connection error protection	○			
	1	B-phase connection error protection	○			
	2	Z-phase connection error protection	○			
70	0	U-phase current detector error protection	○			
	1	W-phase current detector error protection	○			
72	0	Thermal protector error	○			
80	0	Modbus communication timeout protection	○			
87	0	Compulsory alarm input protection		○	○	
92	0	Encoder data recovery abnormal protection	○			
	1	External scale data recovery error protection	○			
	3	Multi-turn data upper-limit value disagreement error protection	○			
93	0	Parameter setup error protection 1	○			6-14
	1	Block data setting error protection	○	○		
	2	Parameter setup error protection 2	○			
	3	External scale connection error protection				
	8	Parameter setup error protection 6				
94	0	Block operation error protection	○	○		
	2	Return to origin error protection	○	○		
95	0 to 4	Motor automatic recognition error protection				
97	0	Other error				
Other number			○			

Note

History. . . The error will be stored in the error history.
Can be cleared...To cancel the error, use the alarm clear input (A-CLR).
If the alarm clear input is not effective, turn off power, remove the cause of the error and then turn on power again.
Immediate stop...Instantaneous controlled stop upon occurrence of an error.
(Setting of “Pr. 5. 10 Sequence at alarm” is also required.)

*1 : When Err16. 0 “Overload Protection 1”is activated, error can be cleared about 10 seconds after the occurrence.

*2 : When Err40. 0 “Absolute System Down Error protection, ” or Err42. 0 “Absolute Overspeed Protection” occurs, the error is unable to be cleared unless Absolute Clear is performed.

*3:I mmediate stop refers to alarms which result in an immediate stop when setting is made to 4 to 7 in Pr5. 10 “Sequence at alarm” are shown. For the detail of an immediate stop, see 6-5-4 “Sequence at alarm. ”

*4 : Err 16. 0 “Overload protection, ”can be switched to responsive/ non-responsive by switching bit 11 of “Function expansion setting 2” of Pr 6.47. Set to non-responsive at time of shipment.

1. When in Trouble

Protective function (Detail of error code)

Protective function	Error code No. Main	Error code No. Sub	Causes	Measures
Under voltage protection of control power supply	**11**	**0**	Voltage between P and N of converting unit of control power supply has fallen down and dropped below specified value. 100 V version: approx. 200 VDC (approx. 140 VAC) 200 V version: approx. 400 VDC (approx. 280 VAC) 1) Low power supply voltage. Occurrence of momentary power failure. 2) Power capacity shortage…Due to rush current at the main power-on, power supply voltage has fallen down. 3) Servo driver failure (circuit failure)	Measure L1C-L2C line voltage of connector and terminal block 1) Increase the capacity of power supply voltage. Change the power supply. 2) Increase the power capacity. 3) Replace with new servo driver.
Over-voltage protection	**12**	**0**	Voltage between P and N of the converter portion of the control power supply has exceeded the specified value 100 V version: approx. 200 VDC (approx. 140 VAC) 200 V version: approx. 400 VDC (approx. 280 VAC) 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 resistor is not appropriate and could not absorb the regenerative energy. 4) External regeneration discharge resistor is not appropriate and could not absorb the regeneration energy. 5) 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 - B of the driver. Replace the external resistor if the value is ∞. 3) Change the specified regeneration resistance value to wattage. 4) Change to the one with specified resistance and wattage. 5) Check that Pr0. 16.
Main power supply under-voltage protection (PN)	**13**	**0**	Instantaneous power failure has occurred between L1 and L3 for longer period than the preset time with Pr5. 09 (Main power off detecting time) while Pr5. 08 (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. 100 V version: approx. 80 VDC (approx. 55 VAC) 200 V version: approx. 110 VDC (approx. 75 VAC) 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 Pr5. 09 (Main power off detecting time). Set up each phase of the power correctly. 3) Increase the power capacity. For the capacity, refer to P. 2-10, "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, 100 V and 200 V driver, use L1 and L3. 5) Replace the driver with a new one.
Main power supply under-voltage protection (AC)		**1**		

Related page ··· • P. 2-12. . . "System Configuration and Wiring" • P. 4-6 to P. 4-85. . . "Details of parameter"

Protective function	Error code No. Main	Sub	Causes	Measures
* **Over-current protection**	14	0	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)	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.
* **IPM error protection** [I PM: Intelligent Power Module]		1	3) Earth fault of the motor wire 4) Burnout of the motor 5) Poor contact of the motor wire. 6) Welding of contact of dynamic braking relay due to frequent servo ON/ OFF operations. 7) Timing of pulse input is same as or earlier than Servo-ON. 8) Blowout of thermal fuse due to overheating dynamic brake circuit. (Only F and G frames) 9) Power Modulef overheat protection	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 servo driver. Do not use Servo-ON/Servo-OFF as a means of staring/stopping the operation. 7) Enter the pulses 100 ms or longer after Servo-ON. 8) Replace the driver. 9)Increase capacity of servo driver and motor. Set up longer acceleration/deceleration time.Reduce the load.
* **Over-heat protection**	15	0	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.
* **Encoders abnormal Over-heat protection**		1	When encoder overheating prtection detection is valid by the setting value of bit 11 Pr6. 10, (I nvaild initial set value) The temperature of encoder has exceeded an encoder overheat abnormal level. 1) The ambient temperature of servomotor is high. 2) Overload	1) Improve the ambient temperature of servomotor and the cooling condition. 2) Increase capacity of servo driver and motor.Set up longer acceleration/ deceleration time.Reduce the load..

Note • When protective function marked with * in the protective function table is activated, it cannot be disabled by the alarm clear input (A-CLR). To return to the normal operation, turn off power, remove the cause, and then turn on power again.

Protective function	Error code No. Main	Error code No. Sub	Causes	Measures
Over-load protection	**16**	**0**	Torque command value has exceeded the over-load level set with Pr5.12 (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. I nertia ratio (Pr0. 04) 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.	Check that the torque (current) does not oscillates nor fluctuate up an down very much on the analog outoput and via communication. Check the over-load alarm display and load factor with the analog outoput and via communication.. 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. 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.
			• The over-load protection time characteristics are described on P. 6-14.	
			Caution ··· Once this error occurs, it cannot be cleared at least for 10 sec.	
Torque saturation anomaly protection		**1**	Torque saturation has continued for the time set in Pr6. 57 Torque saturation error protection detect time.	• Check operation of the driver. • Refer to Measures described for Err16. 0.
*** Over-regeneration load protection**	**18**	**0**	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 from the front panel or via communication. 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 Pr0. 16 to 2.
			Caution ··· Install an external protection such as thermal fuse without fail when you set up Pr0. 16 to 2. Otherwise, regenerative resistor loses the protection and it may be heated up extremely and may burn out.	

Note ··· • When protective function marked with * in the protective function table is activated, it cannot be disabled by the alarm clear input (A-CLR). To return to the normal operation, turn off power, remove the cause, and then turn on power again.

Related page ··· • P. 4-6 to P. 4-85. . . “Details of parameter”

Protective function	Error code No. Main	Error code No. Sub	Causes	Measures
* Regenerative transistor error protection	18	1	Regenerative driver transistor on the servo driver is defective.	Replace the driver.
* Encoder communication disconnection error protection	21	0	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.
* Encoder communication error protection		1	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.	• Secure the power supply for the encoder of DC4. 90 V to 5. 25 V). . . 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.
* Encoder communication data error protection	23	0	Data communication between the encoder is normal, but contents of data are not correct. Mainly data error due to noise. Encoder cables are connected, but communication data has some errors.	
Position deviation excess protection	24	0	Deviation pulses have exceeded the setup of Pr0. 14. 1) The motor movement has not followed the command. 2) Setup value of Pr0. 14 (Position deviation excess setup) 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 Pr0. 13 and Pr5. 22. 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 Pr0. 14.
Speed deviation excess protection		1	The difference between the internal positional command speed and actual speed (speed deviation) exceeds the setup vale of Pr6. 02. Note) If the internal positional command speed is forcibly set to 0 due to instantaneous stop caused by the command pulse inhibit input (I NH) or CW/CCW over-travel inhibit input, the speed deviation rapidly increases at this moment. Pr6. 02 setup value should have sufficient margin because the speed deviation also largely increases on the rising edge of the internal positional command speed.	• I ncrease the setup value of Pr6. 02. • Lengthen the acceleration/ deceleration time of internal positional command speed, or improve the follow-up characteristic by adjusting the gain. • Disable the excess speed deviation detection (Pr6. 02 = 0).

Protective function	Error code No. Main	Error code No. Sub	Causes	Measures
* **Hybrid deviation excess error protection**	**25**	**0**	• Position of load by the external scale and position of the motor by the encoder slips larger than the setup pulses with Pr3.28 (Setup of hybrid deviation excess) at full-closed control. • During full closed control, numerator of command division/multiplication is changed or switched over.	• 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 (Pr3.24 and 3.25) and reversal of external scale direction (Pr3.26) are correctly set. • Do not change command division/ multiplication during full closed control.
Over-speed protection	**26**	**0**	The motor rotational speed has exceeded the setup value of Pr5.13.	• 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.
2nd Over-speed protection		**1**	The motor rotational speed has exceeded the setup value of Pr6.15.	
Command pulse input frequency error protection	**27**	**0**	The frequency of command pulse input is more than 1.2 times the setting in Pr5.32.	Check the command pulse input for frequency.
Absolute clear abnormal protection		**1**	Absolute encode multi-rotation clear has been executed when a block operation was enabled (Pr 6. 28 is non 0).	Confirm whether absolute encode multi-rotation clear has when a block operation was enabled.(Note) This is a safety measure and is not an abnormality.
Command pulse multiplier error protection		**2**	Division and multiplication ratio which are set up with the command pulse counts per single turn and the1st and the 4th numerator/denominator of the electronic gear are not appropriate. The command pulses per 0. 167 ms multiplied by the command division and multiplication ratio exceeds 3000 Mpps. The command pulse input fluctuates. Noises mixed with the command pulse input cause counting error.	• Set the command division and multiplication ratio to a value as small as possible e.g. between 1/ 1000 and 1000. • Check the setup value of electronic gear. • I f possible, use the line driver I / F. • Set Pr5. 32 (setting of max. command pulse input) to a value less than 1000 and enable digital filter.
Limit of pulse replay protection	**28**	**0**	The output frequency of pulse regeneration has exceeded the limit.	• Check the setup values of Pr0. 11 and 5. 03. • To disable the detection, set Pr5. 33 to 0.

Protective function	Error code No. Main	Sub	Causes	Measures
Deviation counter overflow protection	**29**	0	Position deviation value of the encoder pulse standard has exceeded 2^{30}-1 (1073741823).	• Check that the motor follows the position command. • Check that the output toque has not saturated on torque monitor. • Make a gain adjustment. • Maximize Pr0. 13 “The 1st torque limit setup” and Pr5. 22 “The 2nd torque limit setup”. • Make a connection of the encoder as described in the wiring diagram.
Counter overflow error protection 1		1	The value of absolute encoder (absolute external scale) position [pulse units] / electronic gear ratio has exceeded $\pm 2^{31}$(2147483648), in position information initialization process after closing control power supply under absolute mode when block operations is valid	• Confirm the operating range of absolute encoder (absolute external scale) position and review the electronic gear ratio.
Counter overflow error protection 2		2	Value of positioning deviation has exceeded$\pm 2^{30}$-1(1073741823) in pulse units. Or the value ofpositioning deviation has exceeded $\pm 2^{30}$ (1073741824) in command units.	• Confirm that motor rotates in accordance with the positioning command. • Confirm that output torque has not saturated by the torque monitor. • Adjust gain. • Set Pr. 0. 13 “1st torque limit setting” and Pr5. 22 “2ndtorque limit setting” to maximum. • Connect encoder connection wiring as per the wiring diagram.
* **Safety function error protection**	**31**	**0**	Safety function has detected an error.	In case of the repeated occurrence, because failure is possible, replace the servo driver. Return to a dealer for investigation (repair).
		2		
* **I/F overlap allocation error 1 protection**	**33**	**0**	Input signals (SI1, SI2, SI3, SI4, SI5) are assigned with two functions.	Allocate correct function to each connector pin.
* **I/F overlap allocation error 2 protection**		**1**	I nput signals (SI 6, SI 7, SI 8, SI 9, SI 10) are assigned with two functions.	
* **I/F input function number error 1**		**2**	Input signals (SI1, SI2, SI3, SI4, SI5) are assigned with undefined number.	

Note • When protective function marked with * in the protective function table is activated, it cannot be disabled by the alarm clear input (A-CLR). To return to the normal operation, turn off power, remove the cause, and then turn on power again.

Protective function	Error code No. Main	Error code No. Sub	Causes	Measures
* I/F input function number error 2	33	3	I nput signals (SI 6, SI 7, SI 8, SI 9, SI 10) are assigned with undefined number.	Allocate correct function to each connector pin.
* I/F output function number error 1		4	Output signals (SO1, SO2, SO3) are assigned with undefined number.	
* I/F output function number error 2		5	Output signals (SO4, SO5, SO6) are assigned with undefined number.	
* Counter clear allocation error		6	Counter clear function is assigned to a signal number other than SI7.	
* Command pulse inhibition input allocation error		7	Command pulse inhibit input function is assigned to a signal number other than SI 10.	
Motor working range setup error protection	34	0	The motor has exceeded the motor working range set to Pr5.14 “Allowable motor operating range setting” against the position command input range. 1) Gain is not appropriate. 2) Pr5.14 setup value is low.	1) Check the gain (balance between position loop gain and speed loop gain) and inertia ratio. 2) Increase the setup value of Pr5.14. Or, Set Pr5. 14 to 0 to disable the protective function.
* EEPROM parameter error protection	36	0 1	Data in parameter storage area has been damaged when reading the data from EEPROM at power-on.	• Set up all parameters again. • I f 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	0 1 2	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.
* Drive prohibition input protection	38	0	Both positive and negative direction drive prohibition inputs (POT and NOT) have been turned ON at Pr5. 04 “Over-travel inhibition input setting” =0. Either positive direction drive prohibition input or negative direction drive prohibition input has been turned ON at Pr5. 04=2.	• Check that there is no error in the switches, wires and power supply connected to the positive direction/negative direction drive prohibition input. Check particularly that start-up of the power supply for the control signal (DC12 to 24 V) is not slow.

Protective function	Error code No. Main	Sub	Causes	Measures
Analog input 1 (AI1) excess protection	**39**	**0**	The voltage more than the value set in Pr4.24 “Analog input 1 (AI1) excess setup” has been applied to analog input 1.	• Correctly set Pr4. 24 “Analog input 1 (AI 1) excess setup.” Check the connection of I/F connector. • Set Pr4. 24 to 0 and disable the protective function.
Analog input 2 (AI2) excess protection		**1**	The voltage more than the value set in Pr4.27 “Analog input 2 (AI2) excess setup” has been applied to analog input 2.	• Correctly set Pr4. 24 “Analog input 1 (AI 1) excess setup.” Check the connection of I/F connector. • Set Pr4. 24 to 0 and disable the protective function.
Analog input 3 (AI3) excess protection		**2**	The voltage more than the value set in Pr4. 30 “Analog input 3 (AI 3) excess setup” has been applied to analog input 3.	• Correctly set Pr4. 24 “Analog input 1 (AI 1) excess setup.”Clear the absolute encoder first to excute the alarm clear. Check the connection of I/F connector. • Set Pr4. 24 to 0 and disable the protective function.
Absolute system down error protection	**40**	**0**	The power supplies and battery powers to absolute encoder were shut down, and the built-in capacitor voltage dropped below specified value.	After connecting the power supply for the battery, clear the absolute encoder. • I f you use the incremental system Pr 0. 15 "sets the absolute encoder " is set to 1.
			Caution Once this error occurs, the alarm cannot be cleared until the absolute encoder is reset.	
* **Absolute counter over error protection**	**41**	**0**	Multi-turn counter of the absolute encoder has exceeded the specified value.	• Set Pr0. 15 to 2 to ignore the multi-turn counter over. • Limit the travel from the machine origin within 32767 revolutions.
Absolute over-speed error protection	**42**	**0**	When using absolute encoder 1) During a power failure, when only battery power is supplied, the motor rotational speed has exceeded the specified value. 2) During normal operation, for some reason, the power of encoder has been shut down, and the rotational speed has exceeded the specified value.	1) Check the driving from outside in a power outage and the rotational speed at the time, and operate to make it below specified value. 2) Because the mode was switched to a power failure mode during normal activity • Check the encoder-side power supply voltage (5 V±5 %). • Check the connection of connector CN2. The alarm cannot be cleared until the absolute encoder is reset. • I f you use the incremental system Pr 0. 15 "sets the absolute encoder " is set to 1.
			Caution Once this error occurs, the alarm cannot be cleared until the absolute encoder is reset.	

Protective function	Error code No. Main	Error code No. Sub	Causes	Measures
* **Encoder initialization error protection** *1	**43**	**0**	An error has been detected at initialization time of serial incremental encoder.	Replace the motor.
* **Absolute single turn counter error protection/ incremental single turn counter error protection** *1	**44**	**0**	Absolute encoder has detected a single turn counter error. Serial incremental encoder has detected an error in the incremental counter value of single turn counter. (between z-phase signals)	Replace the motor.
* **Absolute multi-turn counter error protection/ incremental counter error protection** *1	**45**	**0**	Absolute encoder has detected a multi-turn counter error. Serial incremental encoder has detected an error in the incremental counter values between CS signals.	Replace the motor. • I f you use the incremental system Pr 0. 15 "sets the absolute encoder " is set to 1.
* **Absolute status error protection** *1	**47**	**0**	When power is turned on, absolute encoder has been rotated at the specified value or above.	Arrange so as the motor does not run at power-on.
Incremental encoder Z phase error protection	**48**	**0**	Missing pulse of Z-phase of serial incremental encoder has been detected. Failure of encoder.	Replace the motor.
Incremental Encoder CS signal error protection	**49**	**0**	CS signal logic error of serial incremental encoder has been detected. Failure of encoder.	Replace the motor.
* **External scale wiring error protection**	**50**	**0**	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.
* **External communication data error protection**		**1**	Communication error has occurred in data from the external scale. Mainly data error due to noise. External scale cables are connected, but communication date has some error.	• Secure the power supply for the external scale of DC5±5 % (4. 75 V to 5. 25 V). . . pay attention especially when the external scale cables are long. • Separate the external scale cable and the motor cable if they are bound together. • Connect the shield to FG. . . refer to wiring diagram.

Note • When protective function marked with * in the protective function table is activated, it cannot be disabled by the alarm clear input (A-CLR). To return to the normal operation, turn off power, remove the cause, and then turn on power again.

Protective function	Error code No. Main	Sub	Causes	Measures
* External scale status 0 error protection *1	51	0	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 *1		1	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 *1		2	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 *1		3	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 *1		4	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 *1		5	Bit 5 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.
* A-phase wiring error protection	55	0	A-phase wiring in the external scale is defective, e.g. discontinued.	Check the A-phase wiring connection.
* B-phase wiring error protection		1	B-phase wiring in the external scale is defective, e.g. discontinued.	Check the B-phase wiring connection.
* Z-phase wiring error protection		2	Z-phase wiring in the external scale is defective, e.g. discontinued.	Check the Z-phase wiring connection.
U-phase current detector error protection	70	0	U-phase current offset error is detected.	• Turn off the power once, then re-enter. • I f 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.
W-phase current detector error protection		1	W-phase current offset error is detected.	
Thermal protector error	72	0	Thermal protector error is detected.	

Protective function	Error code No. Main	Error code No. Sub	Causes	Measures
Modbus communication timeout protection	**80**	**0**	While ensuring Modbus execution right, Modbus communication against own axis has not been received for more than the set time.	• Set Pr5. 40 "Modbus communication timeout period" to 0 to be disabled or to appropriate time. • Check the connection of Modbus communication.
Forced alarm input protection	**87**	**0**	Forced alarm input (E-STOP) is applied.	Check the wiring of forced alarm input (E-STOP).
Encoder data recovery abnormal protection	**92**	**0**	Initialization process of internal position information has not conducted normally under absolute and semi-closed control mode.	• Secure encoder power supply voltage at DC5V±5% (4. 75 to 5. 25V). Care must be taken when the encoder lines are lengthy. • I f motor wires and encoder wires are bundled together, separate them. • Connect shield to FG.
External scale data recovery error protection		**1**	Internal position information initialization error under full-closed control and absolute mode with block operation enabled.	• Secure external scale power supply voltage of 5 VDC±5% (4. 75 to 5. 25 V). Please take extra care in case the cable connecting the external scale is long. • I n case the motor line and the external scale connecting cable are bundled together, separate them. • Connect shield to FG. Refer to external scale connecting diagram
Multi-rotation upper limit value inconsistency error protection		**3**	At continuous rotating absolute encoder function, there was a disagreement between the upper-limit value of encoder multi-turn data and the upper-limit value of driver parameter multi-turn data.	• Please confirm the set values of parameters. • Reclose the control power supply when this occurs immediately after closing the control power supply. (This is not an abnormality.)
Parameter setup error 1	**93**	**0**	1) Electronic gear ratio exceeds the allowable range. 2) When a block operation was enabled(Pr 6. 28 is non 0), Modbus connection was disabled (Pr 5. 37 is 0).	• Check the setting value of the parameter. 1) When a block operation was enabled (Pr 6. 28 is non 0), Electronic gear ratio must be in the range 1/ 1000 to 8000. 2) When a block operation was enabled (Pr 6. 28 is non 0), Modbus connection was disabled (Pr 5. 37 is 0).

Note • When protective function marked with * in the protective function table is activated, it cannot be disabled by the alarm clear input (A-CLR). To return to the normal operation, turn off power, remove the cause, and then turn on power again.

Protective function	Error code No. Main	Sub	Causes	Measures
Block data setting error protection	**93**	**1**	1)Velocity, acceleration and deceleration were set to 0, and a block operation was started. 2)A conditional branch command has not been supported for comparison purpose. 3)A designated block data command has been undefined. 4)Also, block data setup has some error.	1)Set a value other than zero for velocity, acceleration and deceleration. 2)Check whether the conditional branch command or the comparison purpose does not have any problems. 3)Check whether the block data does not have any problems.Check whether the block number designated does not have any problems. 4)Check whether the block data setup does not have any problems.
Parameter setting error protection 2		**2**	External scale ratio has exceeded the allowable range (1/ 160000 to 160000 times)	• Please confirm the set values of parameters. • Use external scale ratio in the range of 1/ 40 to 1280 times
External scale connection error protection		**3**	Set value for Pr3.23 “External scale type selection” and the connected serial communication type external scale type to not match.	• Set Pr3. 23 to match the type of the connected external scale
Parameter setting error protection 6		**8**	Block operation origin offset (Pr60. 49) has been set outside the range in absolute mode origin offset valid setting (Pr60. 48 bit 1 =1) under infinite rotation absolute mode when block operation is valid (Pr6. 28 ≠ 0).	• Please confirm the set values of parameters.
Block operation error protection	**94**	**0**	1)During the execution of movement system command (During the execution of position command creation process), a new movement system command has been executed. 2)During block operation, a new block number was designated to start. 3)Although it was servo-off, a block operation was started.	1)Check whether the block operation sequence does not have any problems. 2)Check whether the host sequence does not have any problems. 3)Check whether the host sequence does not have any problems.
Return to origin error protection		**2**	Abnormal condition has occurred during block operation return to origin.	Check for abnormalities in various sensor installation status.
*** Motor automatic recognition error protection**	**95**	**0 to 4**	The motor and the driver has not been matched.	Replace the motor which matches to the driver.
*** Control mode setting error prtection**	**97**	**0**	Block operation is set to enabled, when other than Position control (Pr0. 01 = 0) or full-closed control (Pr0. 01 = 6)	Check the setting of Pr 0. 01”control mode setting” and Pr 6.28 “Special function selection”

Protective function	Error code No.		Causes	Measures
	Main	Sub		
* 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 power once, and turn on again. • Even so, if an error indication appears and an error occurs, failure is possible. Discontinue the use and replace the motor and servo driver. Return to a dealer for investigation (repair).