

6. When in Trouble

1. When in Trouble

What to Check ?	6-2
Protective Function (What is Error Code ?)	6-2
Protective function (Detail of error code)	6-4

2. Setup of gain pre-adjustment protection6-18

3. Troubleshooting

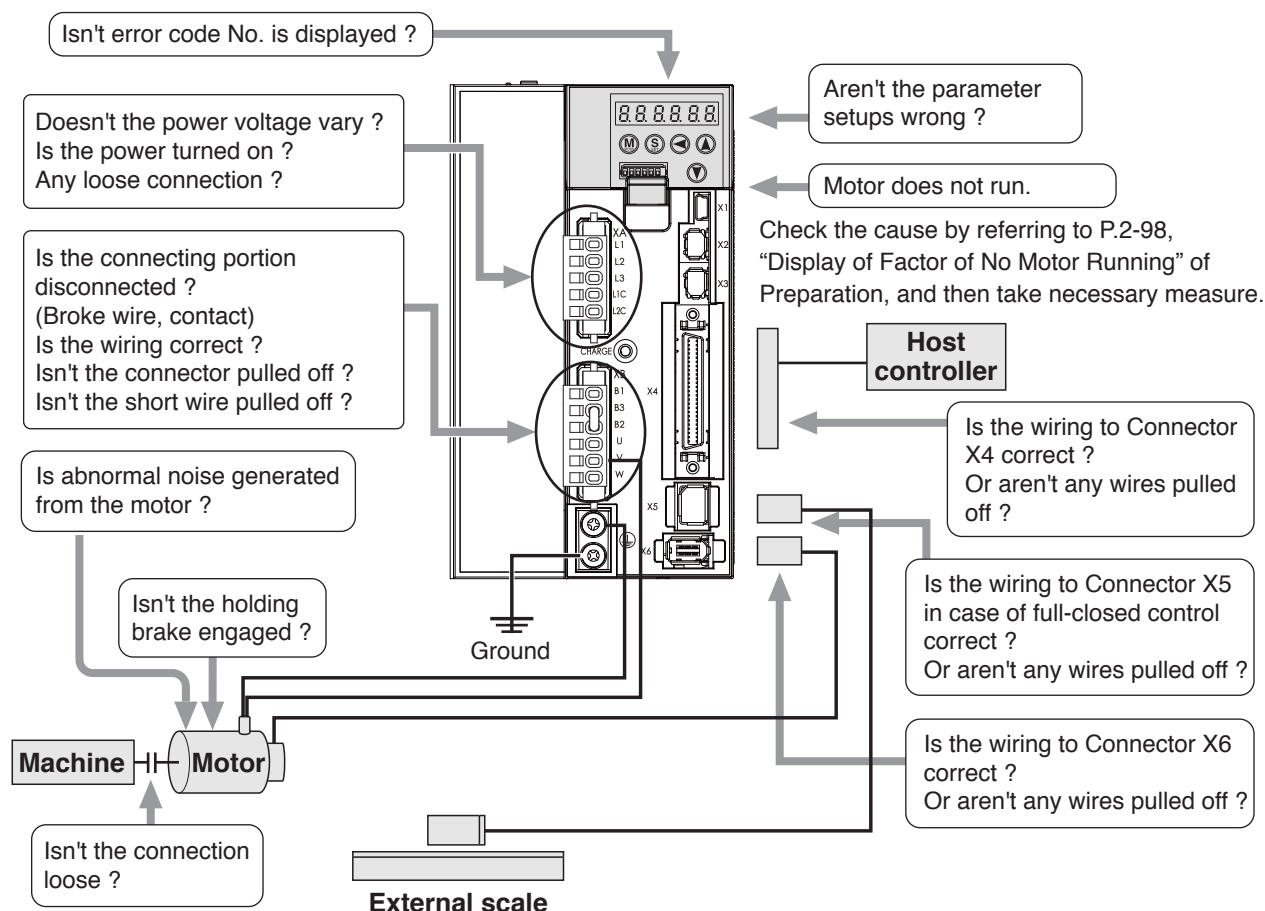
Motor Does Not Run	6-21
Unstable Rotation (Not Smooth) ,	
Motor Runs Slowly Even with Speed Zero at Velocity Control Mode	6-23
Positioning Accuracy Is Poor	6-24
Origin Point Slips	6-25
Abnormal Motor Noise or Vibration	6-25
Overshoot/Undershoot,	
Overheating of the Motor (Motor Burn-Out)	6-26
Motor Speed Does Not Reach to the Setup,	
Motor Revolutions (Travel) Is Too Large or Small	6-26
Parameter Returns to Previous Setup	6-27

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 120ms 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.6-14) by turning off the control power supply between L1C and L2C (100V, 200V) , 24V and 0V (400V) of the driver.
 - You can clear the above error by operating the front panel keys and setup support software "PANATERM". Refer to P.2-109 "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.
- Only for position control type is not provided with X2 X3 and X5.

Related page

- P.2-86 ... "How to Use the Front Panel" • P.3-30 "Inputs and outputs on connector X4"
- P.7-26 "Outline of Setup support software "PANATERM"

1. When in Trouble

Protective Function (What is Error Code ?)

<List of error code No.>

Error code		Protective function	Attribute			Detail page
Main	Sub		History	Can be cleared	Immediate stop	
11	0	Control power supply under-voltage protection		○		6-4
12	0	Over-voltage protection	○	○		
13	0	Main power supply under-voltage protection (between P and N)		○		6-4
	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	○		○	6-6
16	0	Over-load protection	○	○ ¹		
18	0	Over-regeneration load protection	○		○	6-7
	1	Over-regeneration Tr error protection	○			
21	0	Encoder communication disconnect error protection	○			6-7
	1	Encoder communication error protection	○			
23	0	Encoder communication data error protection	○			6-7
24	0	Position deviation excess protection	○	○	○	
	1	Velocity deviation excess protection	○	○	○	6-8
25	0	Hybrid deviation excess error protection	○		○	
26	0	Over-speed protection	○	○	○	6-8
	1	2nd over-speed protection	○	○		
27	0	Command pulse input frequency error protection	○	○	○	6-8
	2	Command pulse multiplier error protection	○	○	○	
28	0	Limit of pulse replay error protection	○	○	○	6-9
29	0	Deviation counter overflow protection	○	○		
30	0	Safety detection		○		6-9
33	0	IF overlaps allocation error 1 protection	○			
	1	IF overlaps allocation error 2 protection	○			6-10
	2	IF input function number error 1 protection	○			
	3	IF input function number error 2 protection	○			6-10
	4	IF output function number error 1 protection	○			
	5	IF output function number error 2 protection	○			6-10
	6	CL fitting error protection	○			
	7	INH fitting error protection	○			
34	0	Software limit protection	○	○		6-10
36	0 to 2	EEPROM parameter error protection				
37	0 to 2	EEPROM check code error protection				6-11
38	0	Over-travel inhibit input protection		○		
39	0	Analog input1 excess protection	○	○	○	6-11
	1	Analog input2 excess protection	○	○	○	
	2	Analog input3 excess protection	○	○	○	6-11
40	0	Absolute system down error protection	○	○		
41	0	Absolute counter over error protection	○			6-11
42	0	Absolute over-speed error protection	○	○		
43	0	Initialization failure	○			6-12
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	Encoder Z-phase error protection	○			6-12
49	0	Encoder CS signal error protection	○			
50	0	Feedback scale connection error protection	○			6-12
	1	Feedback scale communication error protection	○			
51	0	Feedback scale status 0 error protection	○			6-12
	1	Feedback scale status 1 error protection	○			
	2	Feedback scale status 2 error protection	○			
	3	Feedback scale status 3 error protection	○			
	4	Feedback scale status 4 error protection	○			
55	0	A-phase connection error protection	○			6-13
	1	B-phase connection error protection	○			
	2	Z-phase connection error protection	○			6-13
87	0	Compulsory alarm input protection		○		
95	0 to 4	Motor automatic recognition error protection				6-13
99	0	Other error	○			
Other number		Other error	○			

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.)

Note • Only for position control type is not provided with X2, X3, X5 and analog input.

1 Before Using the Products

2 Preparation

3 Connection

4 Setup

5 Adjustment

6 When in Trouble

7 Supplement

6

When in Trouble

1. When in Trouble

Protective function (Detail of error code)

Protective function	Error code No.		Causes	Measures
	Main	Sub		
Control power supply under-voltage protection	11	0	<p>Voltage between P and N of the converter portion of the control power supply has fallen below the specified value.</p> <p>100 V version: approx. 70 VDC (approx. 50 VAC)</p> <p>200 V version: approx. 145 VDC (approx. 100 VAC)</p> <p>400 V version: approx. 15 VDC</p> <p>1) Power supply voltage is low. Instantaneous power failure has occurred</p> <p>2) Lack of power capacity...Power supply voltage has fallen down due to inrush current at the main power-on.</p> <p>3) Failure of servo driver (failure of the circuit)</p>	<p>Measure the voltage between lines of connector and terminal block.</p> <p>100V, 200V driver: L1C - L2C</p> <p>400V driver: 24V - 0V</p> <p>1) Increase the power capacity. Change the power supply.</p> <p>2) Increase the power capacity.</p> <p>3) Replace the driver with a new one.</p>
Over-voltage protection	12	0	<p>Voltage between P and N of the converter portion of the control power supply has exceeded the specified value</p> <p>100 V version: approx. 200 VDC (approx. 140 VAC)</p> <p>200 V version: approx. 400 VDC (approx. 280 VAC)</p> <p>400 V version: approx. 800 VDC (approx. 560 VAC)</p> <p>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.</p> <p>2) Disconnection of the regeneration discharge resistor</p> <p>3) External regeneration discharge resistor is not appropriate and could not absorb the regeneration energy.</p> <p>4) Failure of servo driver (failure of the circuit)</p>	<p>Measure the voltage between lines of connector (L1, L2 and L3).</p> <p>1) Enter correct voltage. Remove a phase-advancing capacitor.</p> <p>2) Measure the resistance of the external resistor connected between terminal B1 - B2 of the driver. Replace the external resistor if the value is ∞.</p> <p>3) Change to the one with specified resistance and wattage.</p> <p>4) Replace the driver with a new one.</p>
Main power supply under-voltage protection (PN)	13	0	<p>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.</p> <p>100 V version: approx. 80 VDC (approx. 55 VAC)</p> <p>200 V version: approx. 110 VDC (approx. 75 VAC)</p> <p>400 V version: approx. 180 VDC (approx. 125 VAC)</p> <p>1) Power supply voltage is low. Instantaneous power failure has occurred</p> <p>2) Instantaneous power failure has occurred.</p> <p>3) Lack of power capacity...Power supply voltage has fallen down due to inrush current at the main power-on.</p> <p>4) Phase lack...3-phase input driver has been operated with single phase input.</p> <p>5) Failure of servo driver (failure of the circuit)</p>	<p>Measure the voltage between lines of connector (L1, L2 and L3).</p> <p>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.</p> <p>2) Set up the longer time to Pr5.09 (Main power off detecting time). Set up each phase of the power correctly.</p> <p>3) Increase the power capacity. For the capacity, refer to P.2-10, "Driver and List of Applicable Peripheral Equipments" of Preparation.</p> <p>4) Connect each phase of the power supply (L1, L2 and L3) correctly. For single phase, 100V and 200V driver, use L1 and L3.</p> <p>5) Replace the driver with a new one.</p>
Main power supply under-voltage protection (AC)		1		

1. When in Trouble

Protective function (Detail of error code)

Protective function	Error code No.		Causes	Measures
	Main	Sub		
* 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)	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 resistor 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 starting/stopping the operation. 7) Enter the pulses 100ms or longer after Servo-ON. 8) Replace the driver.
* IPM error protection [IPM: Intelligent Power Module]		1	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) 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)	
* 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.

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.2-12 "System Configuration and Wiring" • P.4-45 "Details of parameter"

1. When in Trouble

Protective function (Detail of error code)

Protective function	Error code No.		Causes	Measures
	Main	Sub		
Over-load protection	16	0	<p>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)</p> <ol style="list-style-type: none"> 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 (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. 	<p>Check that the torque (current) does not oscillates nor fluctuate up and down very much on the analog output and via communication. Check the over-load alarm display and load factor with the analog output and via communication..</p> <ol style="list-style-type: none"> 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.
			<p>• The over-load protection time characteristics are described on P.6-14.</p>	
			<p>Caution ⚠ Once this error occurs, it cannot be cleared at least for 10 sec.</p>	
* Over-regeneration load protection	18	0	<p>Regenerative energy has exceeded the capacity of regenerative resistor.</p> <ol style="list-style-type: none"> 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. 	<p>Check the load factor of the regenerative resistor from the front panel or via communication.</p> <p>Do not use in the continuous regenerative brake application.</p> <ol style="list-style-type: none"> 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.
			<p>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.</p>	

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... "Details of parameter"

1. When in Trouble

Protective function (Detail of error code)

Protective function	Error code No.		Causes	Measures
	Main	Sub		
* 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.	<ul style="list-style-type: none"> Secure the power supply for the encoder of DC4.90V to 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.
* 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 torque 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.
Velocity 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 (INH) 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.	<ul style="list-style-type: none"> Increase 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).

1. When in Trouble

Protective function (Detail of error code)

Protective function	Error code No.		Causes	Measures
	Main	Sub		
* Hybrid deviation excess error protection	25	0	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> 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.
Electronic gear error protection		2	Division and multiplication ratio which are set up with the command pulse counts per single turn and the 1st 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.	<ul style="list-style-type: none"> 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. If 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.
Pulse regeneration limit protection	28	0	The output frequency of pulse regeneration has exceeded the limit.	<ul style="list-style-type: none"> Check the setup values of Pr0.11 and 5.03. To disable the detection, set Pr5.33 to 0.

1. When in Trouble

Protective function (Detail of error code)

Protective function	Error code No.		Causes	Measures
	Main	Sub		
Deviation counter overflow protection	29	0	Positional deviation of encoder pulse reference has exceeded 2 ²⁹ (536870912).	<ul style="list-style-type: none"> Check that the motor runs as per the position command pulses. Check that the output torque has not saturated in torque monitor. Make a gain adjustment. Set up maximum value to Pr0.13 and Pr5.22. Make a wiring connection of the encoder as per the wiring diagram.
Safety input protection	30	0	Input photocoupler of both or one of safety input 1 and 2 is OFF.	Check wiring of safety input 1 and 2.
* I/F input duplicated 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 input duplicated allocation error 2 protection		1	Input signals (SI6, SI7, SI8, SI9, SI10) are assigned with two functions.	
* I/F input function number error 1 protection		2	Input signals (SI1, SI2, SI3, SI4, SI5) are assigned with undefined number.	
* I/F input function number error 2 protection		3	Input signals (SI6, SI7, SI8, SI9, SI10) are assigned with undefined number.	
* I/F output function number error 1 protection		4	Output signals (SO1, SO2, SO3) are assigned with undefined number.	
* I/F output function number error 2 protection		5	Output signals (SO4, SO5, SO6) 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.
- Only for position control type is not provided with X3 and analog input.

1. When in Trouble

Protective function (Detail of error code)

Protective function	Error code No.		Causes	Measures
	Main	Sub		
* CL assignment error	33	6	Counter clear function is assigned to a signal number other than SI7.	Allocate correct function to each connector pin.
* INH assignment error		7	Command pulse inhibit input function is assigned to a signal number other than SI10.	
Software limit protection	34	0	When a position command within the specified input range is given, the motor operates outside its working range specified in Pr5.14. 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	Data in parameter storage area has been damaged when reading the data from EEPROM at power-on.	<ul style="list-style-type: none"> 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.
		1		
		2		
* EEPROM check code error protection	37	0	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.
		1		
		2		
* Over-travel inhibit input protection	38	0	With Pr5.04, over-travel inhibit input setup = 0, both positive and negative over-travel inhibit inputs (POT/NOT) have been ON. With Pr5.04 = 2, positive or negative over-travel inhibit input has turned ON.	Check that there are not any errors in switches, wires or power supply which are connected to positive direction/ negative direction over-travel inhibit input. Check that the rising time of the control power supply (DC12 to 24V) is not slow.
Analog input 1 (AI1) excess protection	39	0	Higher voltage has been applied to the analog input 1 than the value that has been set by Pr4.24.	<ul style="list-style-type: none"> Set up Pr4.24 correctly. Check the connecting condition of the connector X4. Set up Pr4.24 to 0 and invalidate the protective function.
Analog input 2 (AI2) excess protection		1	Higher voltage has been applied to the analog input 2 than the value that has been set by Pr4.27.	<ul style="list-style-type: none"> Set up Pr4.27 correctly. Check the connecting condition of the connector X4. Set up Pr4.27 to 0 and invalidate the protective function.
Analog input 3 (AI3) excess protection		2	Higher voltage has been applied to the analog input 3 than the value that has been set by Pr4.30.	<ul style="list-style-type: none"> Set up Pr4.30 correctly. Check the connecting condition of the connector X4. Set up Pr4.30 to 0 and invalidate the protective function.

Note

- Only for position control type is not provided with analog input.

1. When in Trouble

Protective function (Detail of error code)

Protective function	Error code No.		Causes	Measures
	Main	Sub		
Absolute system down error protection	40	0	Voltage of the built-in capacitor has fallen below the specified value because the power supply or battery for the absolute encoder has been down. Caution ⚠ Once this error occurs, the alarm cannot be cleared until the absolute encoder is reset.	After connecting the power supply for the battery, clear the absolute encoder.
* Absolute counter over error protection	41	0	Multi-turn counter of the absolute encoder has exceeded the specified value.	<ul style="list-style-type: none"> 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	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. Caution ⚠ Once this error occurs, the alarm cannot be cleared until the absolute encoder is reset.	<ul style="list-style-type: none"> Check the supply voltage at the encoder side (5V±5%) Check the connecting condition of the connector X2.
* Encoder initialization error protection *1	43	0	Encoder initialization error was detected.	Replace the motor.
* Absolute single turn counter error protection *1	44	0	Absolut: single turn counter error protection incremental: single turn counter error protection	Replace the motor.
* Absolute multi-turn counter error protection *1	45	0	Absolut: multi-turn counter error protection incremental: single turn counter error protection	Replace the motor.
* Absolute status error protection *1	47	0	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*1	48	0	Missing pulse of Z-phase of serial incremental encoder has been detected. The encoder might be a failure.	Replace the motor.

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.

1. When in Trouble

Protective function (Detail of error code)

Protective function	Error code No.		Causes	Measures
	Main	Sub		
* Encoder CS signal error protection*1	49	0	CS signal logic error of serial incremental encoder has been detected. The encoder might be a failure.	Replace the motor.
* Feedback 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.	<ul style="list-style-type: none"> • 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 data has some error.	<ul style="list-style-type: none"> • Secure the power supply for the external scale of DC5±5% (4.75 to 5.25V)...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.
* 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.	

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.
- Only for position control type is not provided with X5.

1. When in Trouble

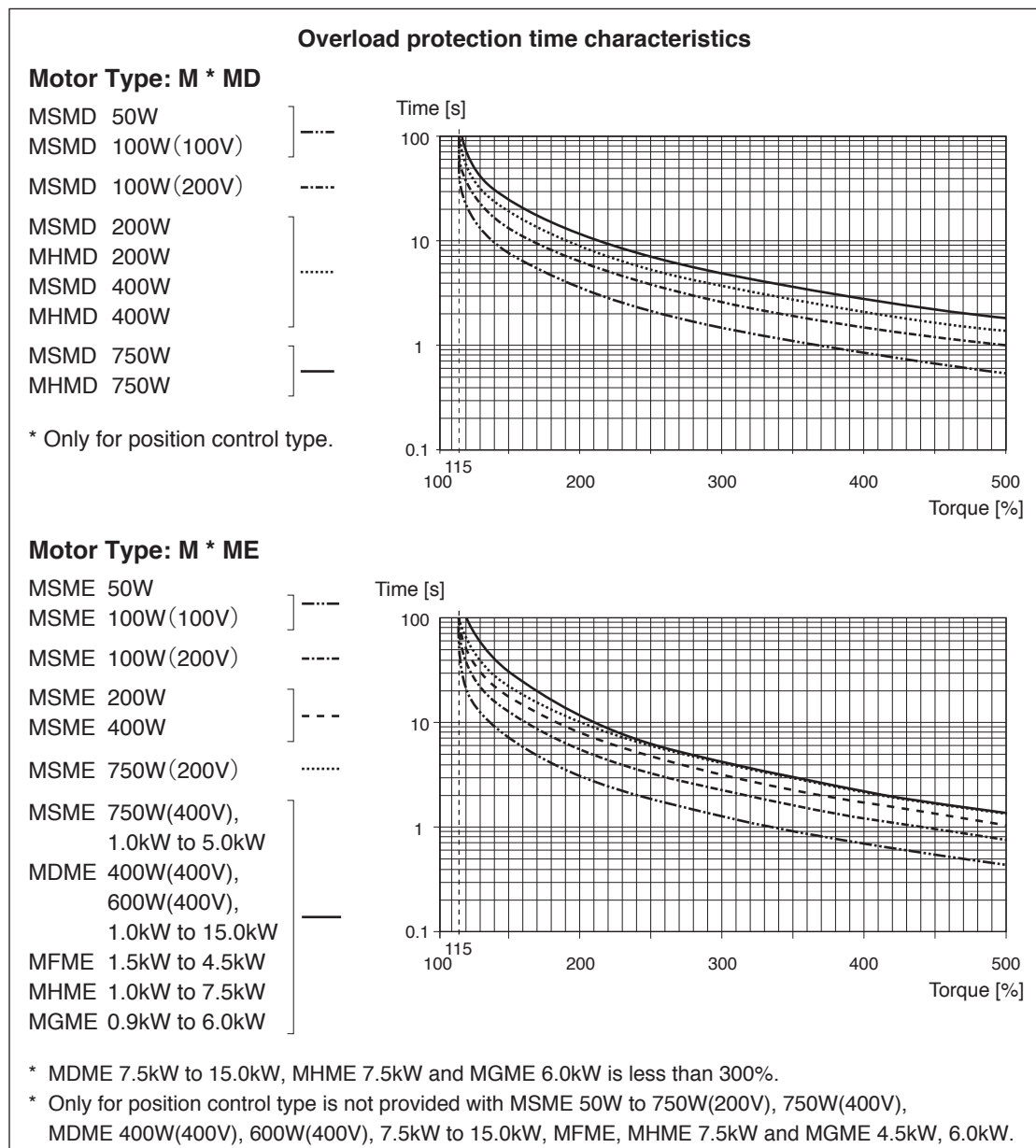
Protective function (Detail of error code)

Protective function	Error code No.		Causes	Measures
	Main	Sub		
* 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.
Forced alarm input protection	87	0	Forced alarm input (E-STOP) is applied.	Check the wiring of forced alarm input (E-STOP).
* 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.
* Other error	99	0	Excessive noise or the like is detected as an abnormal signal. This type of error will occur if the alarm clear is attempted while the safety input 1/safety input 2 is not in normal state (input photocoupler is ON).	<ul style="list-style-type: none"> • 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. • Adjust the condition of the safety input 1/ safety input 2 and then start the alarm clear.
		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.	<ul style="list-style-type: none"> • 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.

1. When in Trouble

Protective function (Detail of error code)

Time characteristics of Err16.0 (Overload protection)



Caution

Use the motor so that actual torque stays in the continuous running range shown in “S-T characteristic” of the motor. For the S-T characteristics, see P.7-55 Motor characteristics (S-T characteristics).

1. When in Trouble

Protective function (Detail of error code)

Software Limit Function (Err34.0)

1) Outline

You can make an alarm stop of the motor with software limit protection (Err34.0) when the motor travels exceeding the movable range which is set up with Pr5.14 (Motor working range setup) against the position command input range.

You can prevent the work from colliding to the machine end caused by motor oscillation.

2) Applicable range

This function works under the following conditions.

	Conditions under which the software limit works
Control mode	• Position control, Full-closed control
Others	• Should be in servo-on condition • Input signals such as the deviation counter clear and command input inhibit, and parameters except for controls such as torque limit setup, are correctly set, assuring that the motor can run smoothly.

3) Cautions

- This function is not a protection against the abnormal position command.
- When this software limit protection is activated, the motor decelerates and stops according to Pr5.10 (sequence at alarm).
The work (load) may collide to the machine end and be damaged depending on the load during this deceleration, hence set up the range of Pr5.14 including the deceleration movement.
- This software limit protection will be invalidated during the trial run and frequency characteristics functioning of the PANATERM.

Note



- Only for position control type is not provided with X5.

Related page



- P.4-55, 4-56 "Details of parameter"

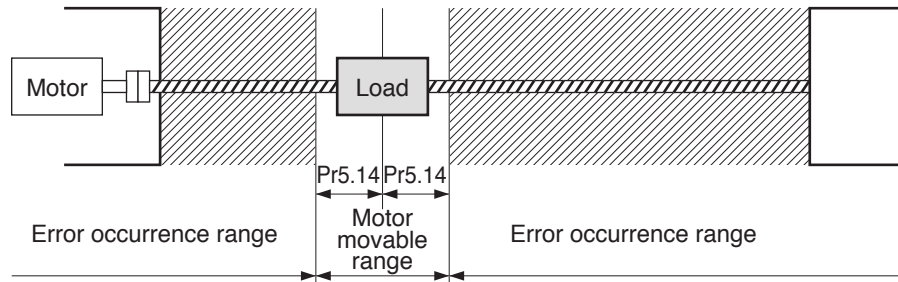
1. When in Trouble

Protective function (Detail of error code)

4) Example of movement

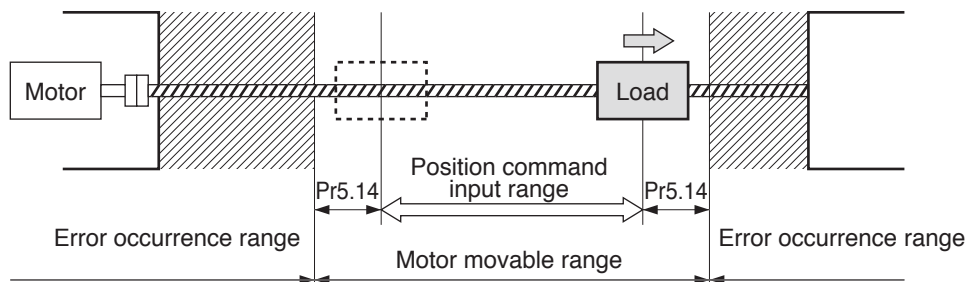
(1) When no position command is entered (Servo-ON status),

The motor movable range will be the travel range which is set at both sides of the motor with Pr5.14 since no position command is entered. When the load enters to the Err34.0 occurrence range (oblique line range), software limit protection will be activated.



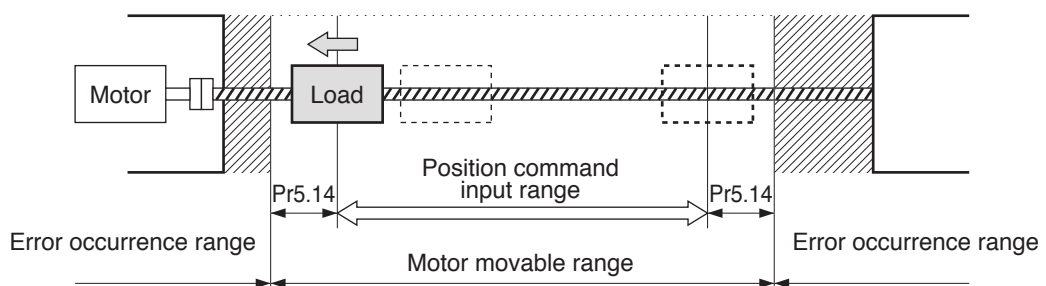
(2) When the load moves to the right (at Servo-ON),

When the position command to the right direction is entered, the motor movable range will be expanded by entered position command, and the movable range will be the position command input range + Pr5.14 setups in both sides.



(3) When the load moves to the left (at Servo-ON),

When the position command to the left direction, the motor movable range will be expanded further.



5) Condition under which the position command input range is cleared

The position command input range will be 0-cleared under the following conditions.

- when the power is turned on.
- while the position deviation is being cleared (Deviation counter clear is valid, Pr5.05 (Sequence at over-travel inhibition) is 2 and over-travel inhibition input is valid.)
- At the beginning and ending of trial run via communication.

1. When in Trouble

Protective function (Detail of error code)

Warning Function

When an error condition e.g. overloading occurs, the alarm code is issued to indicate that the corresponding protective function will be triggered if suitable corrective action is not taken. The alarm will be cleared as the cause of the error is removed. However, certain alarm will remain latched for predetermined period as shown in the table below. To forcibly clear the alarm, take the normal alarm clear procedure.

Alarm	Alarm No.	Pr6.27 *1	Content
Overload protection	A0	○	Load factor is 85% or more the protection level.
Over-regeneration alarm	A1	○	Regenerative load factor is 85% or more the protection level.
Battery alarm	A2	Fixed at no time limit.	Battery voltage is 3.2 V or lower.
Fan alarm	A3	○	Fan has stopped for 1 sec. *2
Encoder communication alarm	A4	○	The number of successive encoder communication errors exceeds the specified value.
Encoder overheat alarm	A5	○	The encoder detects overheat alarm.
Oscillation detection alarm	A6	○	Oscillation or vibration is detected.
Lifetime detection alarm	A7	Fixed at no time limit.	The life expectancy of capacity or fan becomes shorter than the specified time.
External scale error alarm	A8	○	The feedback scale detects the alarm.
External scale communication alarm	A9	○	The number of successive feedback scale communication errors exceeds the specified value.

- *1 The “circle” means that a time in the range 1 to 10s or no time limit can be selected through Pr6.27 “Warning latching time”. Note that the battery warning and the end of life warning have no time limit.
- *2 The upper fan on the H-frame driver stops during servo OFF to save energy. This is normal and no fan alarm is displayed.

Before starting gain adjustment, set the following parameters based on the conditions of use, to assure safe operation.

1) Setup of over-travel inhibit input

By inputting the limit sensor signal to the driver, the bumping against mechanical end can be prevented. Refer to interface specification, positive/negative direction over-travel inhibit input (POT/NOT). Set the following parameters which are related to over-travel inhibit input.

Pr5.04 Setup of over-travel inhibit input

Pr5.05 Sequence at over-travel inhibit

Related page P.3-38 (POT/NOT), P.4-43 (Pr5.04, Pr5.05)

2) Setup of torque limit

By limiting motor maximum torque, damage caused by failure or disturbance such as bite of the machine and collision will be minimized. To apply standardized limit through parameters, set Pr0.13 The 1st torque limit.

If the torque limit setup is lower than the value required during the actual application, the following two protective features will be triggered: over-speed protection when overshoot occurs, and excess positional deviation protection when response to the command delays.

By allocating the torque in-limit output (TLC) of interface specification to the output signal, torque limit condition can be detected externally.

Related page P.3-46 (TLC), P.4-11 (Pr0.13), P.4-48 (Pr5.21)

3) Setup of over-speed protection

Generates Err26.0 Over-speed protection when the motor speed is excessively high.

Default setting is the applicable motor maximum speed [r/min] × 1.2.

If your application operates below the motor maximum speed, set Pr5.13 Setup of over-speed level by using the formula below.

Pr5.13 Setup of over-speed level = $V_{max} \times (1.2 \text{ to } 1.5)$

V_{max} : motor maximum speed [r/min] in operating condition

Factor in () is margin to prevent frequent activation of over-speed protection.

When running the motor at a low speed during initial adjustment stage, setup the over-speed protection by multiplying the adjusting speed by a certain margin to protect the motor against possible oscillation.

Related page P.4-46 (Pr5.13)

(Continued ...)

4) Setup of the excess positional deviation protection

During the position control or full-closed control, this function detects potential excessive difference between the positional command and motor position and issues Err24.0 Excess positional deviation protection.

Excess positional deviation level can be set to Pr0.14 Setup of positional deviation excess. The deviation can be detected through command positional deviation [pulse (command unit)] and encoder positional deviation [pulse (encoder unit)], and one of which can be selected by Pr5.20 Position setup unit select. (See the control block diagram.)

Default setting is 100000[pulse (command unit)].

Because the positional deviation during normal operation depends on the operating speed and gain setting, fill the equation below based on your operating condition and input the resulting value to Pr0.14.

• When Pr5.20 = 0 (detection through command positional deviation)

Pr0.14 Setup of positional deviation excess = $V_c/k_p \times (1.2 \text{ to } 2.0)$

V_c : maximum frequency of positional command pulse [pulse (command unit)/s]

K_p : position loop gain [1/s]

Factor in () is margin to prevent frequent activation of excess positional deviation protection.

Note 1) When switching position loop gain K_p , select the smallest value for calculation.

Note 2) When using the positional command filter and damping control, add the following values.

Positional command smoothing filter: $V_c \times \text{filter time constant [s]}$

Positional command FIR filter: $V_c \times \text{filter time constant [s]}/2$

Damping control: $V_c/(\pi \times \text{damping frequency [Hz]})$

• When Pr5.20 = 1 (detection through encoder positional deviation, full-closed positional deviation)

Pr0.14 Setup of positional deviation excess = $V_e/K_p \times (1.2 \text{ to } 2.0)$

V_e : maximum operation frequency [pulse/s] in encoder unit or full-closed unit

K_p : position loop gain [1/s]

Note 3) When switching position loop gain K_p , select the smallest value for calculation.

Note 4) When Pr5.20 = 1, setups of positional command filter and damping control have no effect.

Related page ❖❖❖

P.4-11 (Pr0.14), P.4-48 (Pr5.20)

5) Setup of motor working range

During the position control or full-closed control, this function detects the motor position which exceeds the revolutions set to Pr5.14 Motor working range setup, and issues Err34.0 Software limit protection.

Related page ❖❖❖

P.4-46 (Pr5.14)

6) Setup of hybrid deviation excess error protection

At the initial operation with full-closed control, operation failure may occur due to reverse connection of external scale or wrong external scale division ratio.

To indicate this type of defect, Err25.0 Hybrid deviation excess error protection is issued when the deviation of motor position (encoder unit) and load position (external scale unit) exceed Pr3.28 Setup of hybrid deviation excess.

Default setting is 16000 pulse (command unit). Because the deviation in normal operation varies with the operation speed and gain setup. Add a margin to this setting according to your operating condition.

Related page  P.4-32 (Pr3.28)

When the motor does not run, refer to P.2-100, "Display of Factor of No-Motor Running" of Preparation as well.

Classification	Causes		Measures
Parameter	Setup of the control mode is not correct	Check that the present control mode is correct with monitor mode of the front panel.	1) Set up Pr0.01 again. 2) Check that the input to control mode switching (C-MODE) of the Connector X4 is correct, when Pr0.01 is set to 3 to 5.
	Selection of torque limit is not correct	Check that the external analog input (N-ATL/ P-ATL) is not used for the torque limit.	1) Set up Pr05.21 to 0 and apply -9 [V] to N-ATL and +9 [V] to P-ATL when you use the external input. 2) Set up Pr05.21 to 1 and set up the max. value to Pr0.13 when you use the parameter value.
	Setup of electronic gear is not correct. (Position/Full-closed)	Check that the motor moves by expected revolution against the command pulses.	1) Check the setups of Pr0.09, Pr0.10 and Pr5.00 to Pr5.02 again. 2) Connect the electronic gear switching input (DIV) of Connector X4 to COM-, or invalidate the division/multiplication switching by setting up the same value to Pr0.09 and Pr5.00.
Wiring	Servo-ON input of Connector X4 (SRV-ON) is open.	In the front panel monitor mode, is the Pin No. corresponding to SRV-ON in " - " state?	Check and make a wiring so as to connect the SRV-ON input to COM-.
	Positive/negative direction over-travel inhibit input of Connector X4 (NOT/POT) is open.	In the front panel monitor mode, is the Pin No. corresponding to NOT/ POT in " A " state?	1) Check and make a wiring so as to connect both NOT/POT inputs to COM-. 2) Set up Pr5.04 to 1 (invalid) and reset the power.
	Command pulse input setup is incorrect. (Position/Full-closed)	Check that the input pulse counts and variation of command pulse sum does not slips, with monitor mode of the front panel.	1) Check that the command pulses are entered correctly to the direction selected with Pr0.05. 2) Check that the command pulses are entered correctly in the format selected with Pr0.07.
	Command pulse input inhibition (INH) of Connector X4 is open. (Position/ Full-closed)	In the front panel monitor mode, is the Pin No. corresponding to INH in " A " state?	1) Check and make a wiring so as to connect the INH input to COM-. 2) Set up Pr5.18 to 1 (invalid).
	Counter clear input (CL) of Connector X4 is connected to COM-. (Position/ Full-closed)	In the front panel monitor mode, is the Pin No. corresponding to CL in " A " state?	1) Check and make wiring so as to open the CL input 2) Set up Pr5.17 to 0 (invalid).

Related page

- P.2-91 ... "How to Use the Front Panel" • P.3-30 "Inputs and outputs on connector X4"
- P.4-4... "Details of parameter"

3. Troubleshooting

Motor Does Not Run

When the motor does not run, refer to P.2-100, "Display of Factor of No-Motor Running" of Preparation as well.

Classification	Causes		Measures
Wiring	Speed command is invalid (Velocity)	Check that the velocity command input method (external analog command/internal velocity command) is correct.	1) Check the setups of Pr3.02 to Pr3.03 again by setting up Pr3.00 to 0, when you use the external analog command. 2) Set up Pr3.04 to Pr3.07 and Pr3.08 to Pr3.11 by setting up Pr3.00 to either one of 1, 2 or 3, when you use the internal speed command.
	Speed zero clamp input (ZEROSPD) of Connector X4 is open. (Velocity/Torque)	In the front panel monitor mode, is the Pin No. corresponding to ZEROSPD in "A" state?	1) Check and make wiring so as to connect speed zero clamp input to COM-. 2) Set up Pr3.15.
	Torque command is invalid (Torque)	Check that the torque command input method (SPR/TRQR input, P-ATL/TRQR input) is correct.	1) Check that the input voltage is applied correctly by setting up Pr3.17 to 0, when you use SPR/TRQR input. 2) Check that the input voltage is applied correctly by setting up Pr3.17 to 1, when you use the P-ATL/TRQR input.
	Velocity control is invalid (Torque)	Check that the velocity limit input method (parameter velocity, SPR/TRQR/SPL input) is correct.	1) Set up the desired value to Pr3.21 by setting up Pr3.17 to 0, when you use the parameter speed. 2) Check that the input voltage is applied correctly by setting up Pr3.17 to 1, when you use the SPR/TRQR/SPL input.
Installation	Main power is shut off.	In the front panel monitor mode, is the Pin No. corresponding to S-RDY in "-" state?	Check the wiring/voltage of main power of the driver (L1, L2 and L3).
	The motor shaft drags, the motor does not run.	1) Check that you can turn the motor shaft, after turning off the power and separate it from the machine. 2) Check that you can turn the motor shaft while applying DC24V to the brake in case of the motor with electromagnetic brake.	If you cannot turn the motor shaft, consult with the dealer for repair.

Classification	Causes	Measures
Parameter	Setup of the control mode is not correct.	If you set up Pr0.01 to 1 (Velocity control mode) by mistake at position control mode, the motor runs slowly at servo-ON due to speed command offset. Change the setup of Pr0.01 to 0.
Adjustment	Gain adjustment is not proper.	Increase the setup of Pr1.01, 1st velocity loop gain. Enter torque filter of Pr1.04 and increase the setup of Pr1.01 again.
	Velocity and position command are not stable.	Check the motor movement with connector X7 of the front panel or the waveform graphic function of the PANATERM. Review the wiring, connector contact failure and controller.
Wiring	Each input signal of Connector X4 is chattering. 1) Servo-ON signal	1) Check the wiring and connection between Pin29 and 41 of the Connector X4 using the display function of I/O signal status. Correct the wiring and connection so that the Servo-ON signal can be turned on normally. Review the controller.
	2) Positive/Negative direction torque limit input signal	2) Check the wiring and connection between Pin-18 and 17, 16 and 17 of the Connector X4 using tester or oscilloscope. Correct the wiring and connection so that Positive/Negative direction torque limit input can be entered normally.
	3) Deviation counter input signal	3) Check the wiring and connection between Pin-30 and 41 of the Connector X4 using display function of I/O signal status. Correct the wiring and connection so that the deviation counter input can be turned on normally. Review the controller.
	4) Speed zero clamp signal	4) Check the wiring and connection between Pin-26 and 41 of the Connector X4 using Display function of I/O signal status. Correct the wiring and connection so that the speed zero clamp input can be entered normally. Review the controller.
	5) Command pulse inhibition input	5) Check the wiring and connection between Pin-33 and 41 of the Connector X4 using display function of I/O signal status. Correct the wiring and connection so that the command pulse inhibition input can be entered normally. Review the controller.
	Noise is on the velocity command.	Use a shield cable for connecting cable to the Connector X4. Separate the power line and signal line (30cm or longer) in the separate duct.
	Slip of offset	Check the voltage between Pin-14 and 15 (speed command input) using a tester or an oscilloscope.
	Noise is on the position command.	Use a shield cable for connecting cable to the Connector X4. Separate the power line and signal line (30cm or longer) in the separate duct.

Related page

- P.4-4 "Details of parameter" • P.3-30 "Inputs and outputs on connector X4"
- P.7-26 "Outline of Setup support software "PANATERM"

Classification	Causes	Measures
System	Position command is not correct. (Amount of command pulse)	Count the feedback pulses with a monitor function of the PANATERM or feedback pulse monitor mode of the console while repeating the movement of the same distance. If the value does not return to the same value, review the controller. Make a noise measure to command pulse.
	Captures the positioning complete signal at the edge.	Monitor the deviation at positioning complete signal reception with the Connector X7 or the waveform graphic function of the PANATERM. Make the controller capture the signal not at the edge but with some time allowance.
	Shape or width of the command pulse is not per the specifications.	If the shape of the command pulse is broken or narrowed, review the pulse generating circuit. Make a noise measure.
	Noise is superposed on deviation counter clear input CL (Connector X4, Pin-30).	Make a noise measure to external DC power supply and make no wiring of the unused signal lines.
Adjustment	Position loop gain is small.	Check the position deviation with the monitor function of the PANATERM or at the monitor mode of the console. Increase the setup of Pr1.00 within the range where no oscillation occurs.
Parameter	Setup of the positioning complete range is large.	Lower the setup of Pr4.31 within the range where no chattering of complete signal occurs.
	Command pulse frequency have exceeded 500kpps or 4Mpps.	Lower the command pulse frequency. Change the division/multiplication ratio of 1st and 2nd numerator of command division/multiplication, Pr0.09 and Pr0.10. Use a pulse line interface exclusive to line driver when pulse line interface is used.
	Setup of the division/multiplication is not correct.	Check if the repetition accuracy is same or not. If it does not change, use a larger capacity motor and driver.
	Velocity loop gain is proportion action at motor in stall.	<ul style="list-style-type: none"> Set up Pr1.02 and Pr1.07 of time constant of velocity loop integration to 9999 or smaller. Review the wiring and connection so that the connection between Pin-27 and 41 of the gain switching input connector, Connector X4 becomes off while you set up Pr1.14 of 2nd gain setup, to 1.
Wiring	Each input signal of Connector X4 is chattering. 1) Servo-ON signal 2) Deviation counter clear input signal 3) Positive/Negative direction torque limit input signal 4) Command pulse inhibition input	<ol style="list-style-type: none"> 1) Check the wiring and connection between Pin29 and 41 of the connector, Connector X4 using the display function of I/O signal status. Correct the wiring and connection so that the servo-On signal can be turned on normally. Review the controller. 2) Check the wiring and connection between Pin-30 and 41 of the connector, Connector X4 using display function of I/O signal status. Correct the wiring and connection so that the deviation counter clear input can be turned on normally. Review the controller. 3 Check the wiring and connection between Pin-18 and 17, 16 and 17 of the connector, Connector X4 using tester or oscilloscope. Correct the wiring and connection so that Positive/Negative direction torque limit input can be entered normally. 4) Check the wiring and connection between Pin-33 and 41 of the connector, Connector X4 using display function of I/O signal status. Correct the wiring and connection so that the command pulse inhibition input can be entered normally. Review the controller.
Installation	Load inertia is large.	Check the overshoot at stopping with graphic function of the PANATERM. If no improvement is obtained, increase the driver and motor capacity.

Classification	Causes	Measures
System	Z-phase is not detected.	Check that the Z-phase matches to the center of proximity dog. Execute the homing matching to the controller correctly.
	Homing creep speed is fast.	Lower the homing speed at origin proximity. Or widen the origin sensor.
Wiring	Chattering of proximity sensor (proximity dog sensor) output .	Check the dog sensor input signal of the controller with oscilloscope. Review the wiring near to proximity dog and make a noise measure or reduce noise.
	Noise is on the encoder line.	Reduce noise (installation of noise filter or ferrite core), shield treatment of I/F cables, use of a twisted pair or separation of power and signal lines.
	No Z-phase signal output.	Check the Z-phase signal with oscilloscope. Check that the Pin-13 of the connector, connector X4 is connected to the earth of the controller. Connect the earth of the controller because the open collector interface is not insulated. Replace the motor and driver. Request for repair.
	Miswiring of Z-phase output.	Check the wiring to see only one side of the line driver is connected or not. Use a CZ output (open collector if the controller is not differential input).

Classification	Causes	Measures
Wiring	Noise is on the speed command.	Measure the speed command inputs of Pin-14 and 15 of the connector, Connector X4 with an oscilloscope. Reduce noise (installation of noise filter or ferrite core), shield treatment of I/F cables, use of a twisted pair, separation of power and signal lines.
Adjustment	Gain setup is large.	Lower the gain by setting up lower values to Pr1.01 and 1.06, of velocity loop gain and Pr1.00 and Pr1.05 of position loop gain.
Installation	Resonance of the machine and the motor.	Re-adjust Pr1.04 and 1.09. Check if the machine resonance exists or not with frequency characteristics analyzing function of the PANATERM. Set up the notch frequency to Pr2.01, Pr2.04, Pr2.07 or Pr2.10 if resonance exists.
	Motor bearing	Check the noise and vibration near the bearing of the motor while running the motor with no load. Replace the motor to check. Request for repair.
	Electro-magnetic sound, gear noise, rubbing noise at brake engagement, hub noise or rubbing noise of encoder.	Check the noise of the motor while running the motor with no load. Replace the motor to check. Request for repair.

6

When in Trouble

3. Troubleshooting

Overshoot/Undershoot,
Overheating of the Motor (Motor Burn-Out)

Classification	Causes	Measures
Adjustment	Gain adjustment is not proper.	Check with graphic function of PANATERM or monitor (connector X7). Make a correct gain adjustment. Refer to "Adjustment".
Installation	Load inertia is large.	Check with graphic function of PANATERM or monitor (Connector X7). Make an appropriate adjustment. Increase the motor and driver capacity and lower the inertia ratio. Use a gear reducer.
	Looseness or slip of the machine.	Review the mounting to the machine.
	Ambient temperature, environment.	Lower the temperature with cooling fan if the ambient temperature exceeds the predications.
	Stall of cooling fan, dirt of fan ventilation duct.	Check the cooling fans of the driver and the machine. Replace the driver fan or request for repair. (The upper fan on the H-frame driver stops during servo OFF to save energy. This is normal.)
	Mismatching of the driver and the motor.	Check the name plates of the driver and the motor. Select a correct combination of them referring to the instruction manual or catalogue.
	Failure of motor bearing.	Check that the motor does not generate rumbling noise while turning it by hand after shutting off the power. Replace the motor and request for repair if the noise is heard.
	Electromagnetic brake is kept engaged (left un-released).	Check the voltage at brake terminals. Apply the power (DC24V) to release the brake.
	Motor failure (oil, water or others)	Avoid the installation place where the motor is subject to high temperature, humidity, oil, dust or iron particles.
	Motor has been turned by external force while dynamic brake has been engaged.	Check the running pattern, working condition and operating status, and inhibit the operation under the condition of the left.

6

When in Trouble

3. Troubleshooting

Motor Speed Does Not Reach to the Setup,
Motor Revolutions (Travel) Is Too Large or Small

Classification	Causes	Measures
Parameter	Velocity command input gain is not correct.	Check that the setup of Pr3.02, speed command input gain, is made so as to make the setup of 500 makes 3000 r/min/6V.
Adjustment	Position loop gain is low.	Set up Pr1.00and Pr1.05, position loop gain to approx. 1000.
	Division/Multiplication is not proper.	Set up correct values to Pr0.09, 1st numerator of electronic gear, Pr0.11, numerator multiplier of electronic gear and Pr0.10, denominator of electronic gear. Refer to parameter setup at each mode.

Related page

- P.4-8... "Details of parameter"
- P.7-26 "Outline of Setup support software "PANATERM"

Classification	Causes	Measures
Parameter	No writing to EEPROM has been carried out before turning off the power.	Refer to P.2-107, "EEPROM Writing Mode" of Preparation.

This image shows a full page of white paper with horizontal grey ruling lines. The word "MEMO" is printed at the top center in a bold, black, sans-serif font. Below it, there are approximately 28 evenly spaced horizontal lines extending across the width of the page.