Protective Functions (Details of Alarm Codes)

Protection	Alarm Code No.	Cause	Countermeasures
Control power	11~	The P-N voltage of the control power converter is	Measure the P-N voltage to check whether the
undervoltage~	~	lower than the specified value. Or the control	voltage is correct or not. Modify the control voltage
~	~	voltage is too low due to an instantaneous outage	to an acceptable value, and/or increase the power
~	~	or shortage of power capacity.~	capacity. ~
Overvoltage~	12~	The line voltage is larger than the specified	Measure the terminal-to-terminal voltages
~	~	acceptable range, so that the P-N voltage of the	(between L1, L2 and L3). Remove the causes,
~	~	converter is larger than the specified value, or the	and input the correct voltage.~
~	~ ~	line voltage was raised by a condensive load or	~
~	~	UPS (Uninterruptible Power Supply)."	
		The internal regenerative discharge resistor is	1) Measure the P-B1 resistance of the driver using
_		disconnected.~	a circuit tester. If it read ∞, the connec-tion is
_			broken. Replace the driver. Insert an external
_	~	~	regenerative discharge resistor between the P
~		() T	and B2 terminals."
~	~	2) The external regenerative discharge resistor is	2) Use a resistor having the specified resistance
_		not suitable so that regenerative energy cannot	for specified Watt."
~	_	be absorbed."	O) Dealers with a group driver (that is weaking)
~	_	3) The driver (circuit) failed.~	3) Replace with a new driver (that is working
	40~	TI DAI II CII	correctly for another axis).~
Main power	13~	The P-N voltage of the main power converter is	Measure the terminal-to-terminal voltages
undervoltage~	~	lower than the specified value during Servo-ON.	(between L1, L2 and L3)."
_		1) The main power line voltage is too low, an	1) Increase the capacity supply voltage. Change
_	~	instantaneous outage occurred, the power	power source. Remove the source that caused
_	_	source is too small, the main power is turned	the electromagnetic contractor to drop, and turn
_		off, or the main power is not fed.	the power on again.
_	_	2) Shortage of power source: the line voltage	2) Increase the capacity of the main power. For the
~	~	dropped due to the inrush current at power on.	required capacity, see page 30 "List of drivers
_	_	3) Lack of phase	and Combatible Peripheral Equipment".
_	_	Power source has been operated at single	3) Correct the phase (L1, L2 and L3) connections
_	_	phase.~	of the main power. If the main power is signle-
_	_		phase 100V. use L1 and L3."
_	_	4) Servo-on at main power source off.	4) Check the timing of power-on (for both the main
_	_	~	power and control power). ~
_	_	~	After the servo ready signal is output, activates
~		~	servo-on."
~		E) driver demons (einevit demons)	See page 40 the "T iming Chart". ~
~	~	5) driver damage (circuit damage)~	5) Replace to a new driver (which is operated at
~	~	6) With the short line (short har) between the	another axis)"
~	~	6) With the short line (short bar) between the	6) Ensure that the short line (short bar) between
~	~	connector X2 or DL1 – DL2 (B1-B2)	the connector CN X2 or DL-DL2 is not
* Oversurrent	14	disconnected, a user turned the servo ON.	disconnected.~
* Overcurrent	14	The current flowing in the converter is larger than the specified value.	~
and ground fault		· •	1) Disconnect the motor wires, and enter Conve
		1) The driver failed (due to defective circuits or	1) Disconnect the motor wires, and enter Servo-
		IGBT parts).~	ON. If this trouble happens immediately,
		~	replace the driver with a new one (that is
		2) Motor wires (II)/ and \/\/) are shorted ~	working correctly)."
		2) Motor wires (U, V and W) are shorted.	2) Check if the U. V and W wires are shorted at
		3) Motor wires (U, V and W) are grounded.~	the connections. Reconnect them, if necessary.
		5) Motor wires (0, v and vv) are grounded.	3) Measure the insulation resistance between
		~	U/V/W and earth wire. If the resistance is not
		4) Motor burned	correct, replace the motor with a new one.
		4) Motor burned~	4) Measure the resistance between U,V and W. If
		~	they are unbalanced, replace the motor with a
		E) Deer connection of Motor wires ~	new one."
		5) Poor connection of Motor wires ~	5) Check if the U/V/W connector pins are firmly
		~	secured with screws. Loosened pins should be
		~	fixed firmly. ~
		6) The relay for the dynamic broke is malted and	6) Replace the driver with a new one. Do not start
		6) The relay for the dynamic brake is melted and stuck due to the frequent Servo-ON/OFF.	or stop the motor by entering Servo-ON or OFF.
		•	7) Check the capacity of the motor and driver on the nameplate. If the motor is not compatible
		7) The motor is not compatible with the driver. ~	
		8) The timing of the pulse input and servo-on is	with the driver, replace it with a correct one.
		the same, or the pulse is faster.	8) Input the pulse at least 50 ms after servo-on. See page 41 the "T iming Chart".
		the same, of the pulse is laster.	Oce page 41 the Timility Chart.

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Identifying Problem

Protection	Alarm Code No.	Cause	Countermeasures
* Motor and/ or	15~		Check the ambient temperature and cooling
Drive Overtemp.~	~		conditions. Check the load rate. Make the
~ 	~ ~		environment under ~
~			which the driver operates. Reduce the load.
Overload ~	16~		Monitor the torque (current wave) using an
(Discharge)~	~		oscilloscope to check whether the torque is
~	~		surging or not. Check the load factor and overload alarm messages.
~	~	specified overload level. Caused by a long operation with a torque that exceeds the specified ~	alam messages.
~	~	torque limit. (table of characteristics)	-
~	~		1) Increase the capacity of the driver and motor.
~	~	the rating.	Lengthen the ramp time of
~	~	~	acceleration/deceleration. Reduce the motor
~	~	2) Vibration or hunting due to incorrect gains.	load.~
~	~	Cause vibration and/or abnormal sound. 2	2) Readjust the gains.~
~	~	3) Motor wires connected wrong or broken 3	Correct the motor wiring per the wiring
~	~	~	diagrams. Replace cables.~
~	~		4) Free the machine of any tangle. ~
~	~	, , ,	Reduce the motor load.~
~ 	~	machine is entangled.	•
		5) The electromagnetic brake is ON.~	5) Measure the voltage at the brake wiring
~	~	C) In a sustain of multiple different	connections. Turn off the brake.
~	~		6) Correct the motor and encoder wiring to eliminate
~	~	are wired incorrectly to other axis.~	the mismatching between the motors and axis.
~	~	~ Overload Protection: Time(sec)	me Limiting Characteristic
~	~	~ 100	
~	~	~	
~	~	~	MSMA 30W-100W
~	~	-	MAMA 200W-750W
~	~	-	MSMA 200W – 5kW
~	~	~ 	MDMA 750W – 5kW
~	~	~	MHMA 500W – 5kW MFMA 400W – 4.5kW
~	~	10	MGMA 300W – 4.5kW
~	~		THE
~	~		
_			┤┤┞┡┥┥ ╪ <u>┾╏╣┧</u> ┼┼┼┼┼┼┼
~	~		
~	~		*****
~	~	_	
~	~	- 1	
~	~	~ 100 ¹¹⁵ 150 200 250 300	350 400 450 500 550
~	~	~	Torque(%)
* Regenerative	18~	The regenerative energy is larger than the	Check the load rate of the regenerative resistor in
resistor overload	~		the Monitor mode. The driver should not be used
		~ v	with continuous regenerative braking.~
		1) When the load inertia is too large,the converter 1	1) Check the operation pattern (using the velocity
		voltage increases due to the large energy	monitor). Check the load rate of the
		regenerated during deceleration, and increases	regenerative resistor and the over-regeneration
		more due to the shortage of energy	alarm on display. ~
		consumption by the regenerative discharge	Increase the capacity of the driver and motor.
		resistor.~	Increase the deceleration time. Use an external
		~	regenerative resistor. Check the connection
		2) When the speed of the motor is too high, the	wire between DL1 – DL2 (B1 and B2) terminals.
		regenerative energy cannot be consumed	Check the operation pattern (using the speed monitor). Check the load rate of the
		within the specified deceleration time.	regenerative resistor and the over-regeneration
		mann are opcomed deceleration time.	alarm on display.
			Increase the capacity of the driver and motor.
			Increase the deceleration time. Reduce the
			motor speed. Use an external regenerative
			resistor.

Protection	Alarm Code No.	Cause	Countermeasures
* Encoder	21~	Due to communication breakdown between the	Correct the encoder wiring per the wiring diagram.
communication	~	encoder and driver, the detective function for	Correct the connection of the pins."
error	~	broken encoder wires is activated.~	~
~	~	<caution>~</caution>	~
~	~	If the above has occurred before power-on, be	~
~	~	careful as the motor automatic recognition of and	~
~	~	protection against abnormality (alarm code No.95)	~
~	~	will be activated.	~
* Encoder	23~	The encoder sends an erroneous data mainly due	Make sure that the power of the encoder is 5VDC
communication	23	to noises. The encoder is connected correctly,	± 5% (4.75 to 5.25V). Especially when the wire
data error	~	though the data is not correct.	length is long, it is important to meet this
~	~	<pre><caution>~</caution></pre>	requirement. You should not bundle the encoder
~	~	If the above has occurred before power-on, be	wires and motor wires together. Connect the
~	~	careful as the motor automatic recognition of and	shield to FG. See the encoder wiring diagram.
~	~	protection against abnormality (alarm code No.95)	silield to FG. See the encoder willing diagram.
~	~		~
Docition	24~	will be activated."	Charle whather the motor energies per the
Position	24~	The position error pulse is larger than Pr63	Check whether the motor operates per the
deviation error	_	(position error limit). The motor operation does not	position command pulse or not. See the torque
~		respond to the commands.~	monitor to check if the output torque is saturated.
~		_	Readjust the gains. Maximize the value of Pr5E
			(torque limit set-up). Correct the encoder wiring
			per the wiring diagram. Increase the acceleration
~	~		and deceleration time. Reduce the load and
~	_ ~	~	speed.~
* Hybrid	25~	When the driver of the full-closed version is under	Check the connection between the motor and
deviation error~	~	the full-closed and hybrid control with an external	load. Check the connection between the external
~	~	encoder, the load position detected by the external	encoder and driver. Correct the values of the
~	~	encoder and the motor position detected by the	external scale numerator and denominator
~	~	motor encoder are beyond the limit specified by	regarding parameters Pr74, Pr75, Pr 76 and Pr77.
~	~	Pr73 (hybrid error limit).~	Increase the value of Pr73 Increase the value of
~	~	~	Pr71 (hybrid switching time).~
Overspeed ~	26~	The motor speed exceeds the specified limit."	Decrease the target speed (command values).
~	~	~	Decrease the value of Pr50 (speed command
~	~	~	input gain). Adjust the scale ratio so that the
~	~	~	frequency of the command pulse is 500 kpps or
~	~	~	less. If an overshoot occurs, readjust the gains.
~	~	~	Correct the encoder wiring per the wiring diagram.
Command	27~	The command pulse is larger than 500 kpps at the	Reduce the multiplication factor by adjusting the
scaling error~	~	entrance of the position error counter. The scale	values of Pr46 through Pr4B, and then adjust the
~	~	ratios set by Pr46 through Pr4B (numerator of 1st	scale ratios so that the command pulse frequency
~	~	to 4th command scale) are not correct.~	is 500 kpps or less."
* External scale	28~	When Pr76 (scale error invalidation) = 0, and the	Check the reason why the CN X5 Pin 33 is OFF.
communication	~	driver is operated under the full-closed and hybrid	~
data error~	~	control with an external encoder, the scale error	~
~	~	input is OFF.	~
Deviation	29~	The value of the position error counter is over 2 ²⁷	Check that the motor operates per the position
counter overflow	~	(134217728).~	command pulse. See the torque monitor to check
~	~	~	that the output torque does not get saturated.
~	~	~	Readjust the gains. Maximize the value of Pr5E
~	~	~	(torque limit set-up). Correct the encoder wiring
~	~	~	per the wiring diagram.
* External scale	35~	The external scale is disconnected, or the scale	Check the power supply for the external scale.
communication	~	fails."	Properly connect the external scale cable and the
	~	Tall5.	
* EEPROM	36~	The data contained in the parameter storage area	CN X4 cable according to the wiring diagram. Set all the parameters again. If this error occurs
	~	·	frequently, the driver may have been broken.
parameter error	~	of the EEPROM is broken, so erroneous data is	
~	_	retrieved.~	Replace the driver with a new one. Return the old
* EEDDOM	37~	The check ends of the EEDDOM is broken as	driver to the sales agent for repair.
* EEPROM	31	The check code of the EEPROM is broken, so	The driver may have been broken. Replace the
check code error		erroneous data is retrieved.~	driver with a new one. Return the old driver to the
Or combination of the Late of	00~	Dath the OW and OOM area to 11' '	sales agent for repair.
Overtravel inhibit	38~	Both the CW and CCW over-travel limits are not	Check if the switch, cable and power supply for
input error	~	active.	the CW/CCW overtravel inhibit input are normal.
			Check that the control power (12 to 24VDC) can
			be established without delay. Check the value of
			Pr04. Correct the wiring, if necessary.

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Identifying Problem

Protection	Alarm Code No.	Cause	Countermeasures
Absolute	40~	Voltage of the battery for the absolute encoder	Check the voltage of the battery. Connect to the
encoder system	~	has dropped below a specified value."	battery, and then clear the encoder using the
down error	~	- ''	absolute encoder clear mode contained in the
~	~	~	auxiliary function (see page 231 "Setup of the
~	~	~	absolute encoder (initialization)" in Appendix).~
* Absolute	41~	The data of the multi-turn counter of the encoder	Limit the movable range to ±32767 revolutions (15
encoder counter	~	exceeds the specified limit."	bits) from the initial position. Adjust the value of
overflow~	~	~	Pr0B.~
Absolute	42~	The encoder rotates faster than the specified rate	Connect the power to the encoder and then make
encoder	~	when it is battery-powered.~	sure that the encoder voltage is 5V±5%. Correct
overspeed~	~	~	CN X4 connections, if necessary.~
* Absolute encoder	44~	The encoder detects an error of the single-turn	Turn off the power and turn it on again. If the error
single-rotation	~	counter.~	cannot be eliminated, the motor and/or driver may
counter error~	~		be broken. Disconnect the power supply of these
* Absolute encoder	45~	2500P/r The encoder has detected abnormality	equipment, and replace them with new ones.
multi-rotation	~	of the single rotation counter.~	Return the old equipment to the sales agent for
counter error~	~	17 bit The encoder has detected abnormality	repair.~
~	~	of the multi-rotation counter.~	~
Absolute	47~	The encoder detects an internal status error. After	Prevent the motor from rotating before output of
encoder status	~	the control power on, the encoder rotates faster	servo ready (S-RDY) since control power supply
error	~	than the specified rate.~	of the driver turned on."
* Encoder ~	48~	Pulse dropouts in phase Z of 2500 [P/r] 5 serial	Turn off the power and turn it on again. If the error
Z-phase error	~	encoders have been detected.~	cannot be eliminated, the motor and/or driver may
~	~	The encoder is defective.	be broken. Disconnect the power supply of these
~	~	~	equipment, and replace them with new ones.
Ĩ	~		Return the old equipment to the sales agent for
~	~		repair.~
* Encoder	49~	Abnormal logic of CS signal of 2500 [P/r] 5 serial	Turn off the power and turn it on again. If the error
commutation	~	encoders have been detected.~	cannot be eliminated, the motor and/or driver may
signal error	~	The encoder is defective.	be broken. Disconnect the power supply of these
_	~	~	equipment, and replace them with new ones.
_	~	~	Return the old equipment to the sales agent for
+ 5.4 (~	(A) The greater is got a great the leaville the second	repair."
* Motor auto	95~	(1) The motor is not compatible with the servo	(1) Replace the motor with one that matches the
recognition error	~	driver. ~	servo driver."
_	~	(2) When power is turned on, the encoder has not	(2) Check connection of the encoder.
~	~	been connected.~ <cautions>~</cautions>	~
~	~		~
~	~	Before power-on, if (1) the encoder line has been	~
~	_	disconnected, or (2) data from the encoder has caused abnormal communications, be careful as	~
~	~	the motor automatic recognition of and protection	~
~	~	against abnormality (alarm code No.95) will be	~
~	~	activated, after power is turned on.	~
~	_	In the case of (1) or (2) above, execute processing	~
~	~	of alarm codes No.21 and 23.	~
* Control mode~	97	The selected control mode cannot be used in	Set up Pr02 (Control mode setup) properly.~
setting error	97	combination with the encoder. The control mode	~
~		does not support use of the encoder.	~
* Other errors ~	888888		Turn off the power and turn it on again. If the error
~	333333	l	cannot be eliminated, the motor and/or driver may
~	FFFFFF	l	be broken. Disconnect the power supply of these
~	3 3 3 3 3 3	~	equipment, and replace them with new ones.
* Other errors	Numbers	The driver's self-diagnosing function is activated,	Return the old equipment to the sales agent for
30.0.0.000	other	because an error happens in the driver.	repair.
	than	2002200 an oner happene in the differ.	
	the~		
	above		
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