Robostar Robot Controller

N2 Series
Alarm and Maintenance Manual

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Robostar

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I. Prior to Startup

Purpose & Usage

This manual describes information on the problems that can occur in the robot system based on N2 controller and measures to solve the problems with procedures. It also describes the measures for the cases that Teach Pendant (hereafter called T/P) doesn't display error messages.

This manual is for the persons such as;

- Service persons for the mechanics or robot who are qualified to solve basic problems
- Programmers who are qualified to write or alter RRL (Robostar robot language) program
- Specialized service persons who are able to systematically analyze and solve the problems

Prerequisites

In case of conducting repair & maintenance services based on this manual, it is recommended the service person to fulfil the following conditions.

- Experience on problems of industrial electrical & mechanical devices
- Knowledge on the functions of robot system
- Experience on installation of actual robot system and its peripherals

Chapter 1 Alarm Level & Hazard

1. Overview

This chapter states alarm Levels that appeared in this manual and all hazards that can occur when performing the relevant works described.

2. Alarm Levels

Controller creates 4 different alarm levels and each level acts differently as below.

Alarm Level	Description	Robot motion	Threads	Motor power
Level 0 (Warning)	Minor error. This is the stage that there is No influence on robot operation at the moment but a long-term neglect may cause problems.	Normal	Normal	ON
Level 1	This is the stage that a recovery via measures for alarms including alarm reset can be possible.	Pause	Normal /Stop	OFF
Level 2	This is the stage that the controller must restart.	Stop	Stop	OFF
Level 3	This is the critical stage that may require a replacement of components.	Stop	Stop	OFF

2.1 Level 0 (Warning)

Level 0 Alarm (Warning) indicates a minor error. It has no influence on robot operation but may cause problems if ignored for long time. All works are valid without recovery of this alarm.

Description	Minor Error (Warning)
Robot motion	Normal
Background thread	Normal
Threads	Normal
Motor power	Normal
Small T/P display	Pop-up of error message window, Blinking of Alarm LED
Error log	Logged
Etc.	This can be set as Level 1 Alarm in the parameter setting.

2.2 Level 1

Level 1 Alarm indicates errors that can be recovered via simple measures without alarm reset of T/P or power cut-off. When background thread was activated, this alarm level doesn't influence on the background thread. If this alarm level continues, it may require the following measures.

Description	Abnormal situation occurs. This can be recovered via simple measures such as alarm reset.
Robot motion	Pause
Background thread	Normal
Threads	Stop
Motor power	Stop
Small T/P display	Pop-up window for error messages, Alarm LED ON
Error log	Logged
Etc.	-

2.3 Level 2

Level 2 Alarm indicates errors on abnormal situations that require power restart. Robot doesn't move and all threads stop. Robot or JOB program cannot be started until error recovery is completed. If the alarm continues, it may require the following measures.

Description	Alarms that require a restart of controller.
Robot motion	Stop
Background thread	Stop
Threads	Stop
Motor power	Stop
Small T/P display	Pop-up window for error messages, Alarm LED ON
Error log	Logged
Etc.	-

2.4 Level 3

Level 3 Alarm indicates errors that require a replacement of certain parts or components used in the robot system. This alarm level may cause a destruction of the robot system. Robotor JOB program cannot be started until error recovery is completed.

Description	This indicates the critical alarms that require a replacement of certain parts or components.
Robot motion	Stop
Background thread	Stop
Threads	Stop
Motor power	Stop
Small T/P display	Pop-up window for error messages, Alarm LED ON
Error log	Logged
Etc.	-

3. Hazard Stages & Signs

The table below defines signs that indicate hazard stages used throughout this manual.

Sign	Designation	Meaning
	DANGER	This warns that deadly and serious injuries or serious product damages can be caused from the accidents unless complying the guidelines.
	WARNING	This warns that accidents may occur unless complying the guidelines and it leads to deadly and serious injuries or serious product damages can be caused from the accidents.
	CAUTION	This warns that accidents may occur unless complying the guidelines and it leads to serious product damages can be caused from the accidents.
	ELECTRICAL SHOCK	This sign indicates a hazard on electric shock which may lead to serious or deadly injuries.
	NOTE	This sign notices important facts and conditions.
	PROHIBITION	This sign notices the prohibitions for normal operation.

Chapter 2 Failure Symptoms & Malfunctions

1. Failure Symptoms

Failure of the robot system includes following symptoms.

- Event Alarm Message
- Mechanical errors or the system that doesn't properly operate
- Unable to start the system or showing abnormal status
- Displaying via hardware such as LEDs
- Other symptoms

Failures without Alarm Message

If the symptoms are not met the criteria including symptoms, causes and measures described in this section, make sure to contact the representatives or Robostar.

Startup Failure

Status	System doesn't start or doesn't properly operate.
Symptoms & Causes	• No LED is on. • Error in Power source or power connection • T/P failure • T/P is operated but no response to the input • Unable to load the system software • Disk failure of the system software
Measures recommended	
1) Check if the main power supply for the robot system exists and is within the allowed limitation. 2) Check if the main power supply cable is properly connected to the controller power supply. If there are damages on the cable, immediately replace the cable. 3) Check if the main switch is on state. 4) Check the LED of power supply module. If all LEDs are off state, refer to Chapter 2, Section 0 All LEDs Off State. 5) If it is determined that the system is completely dead, refer to Chapter 2, Section 0 Controller Unusable. 6) If it is determined that the T/P failed, refer to Chapter 2, Section 0 T/P Unusable. 7) If it is determined that the system software has troubles, refer to Chapter 2, Section 0 Failure in System Software Loading.	
Reference Literature	Installation & Handling Manual, Operation manual

Controller Unusable

Status	Controller is completely or intermittently dead. NO LED is on and no action is available. T/P cannot be used.
Symptoms & Causes	• Errors in applying the controller power • Power module failure • Disconnection between control module and power module
Measures recommended	
1) Check if the main power supply for the robot system exists and voltage level is in line with the requirements of the controller. 2) Check if the main power supply cable is properly connected to the controller power supply. If there are damages on the cable, immediately replace the cable. 3) Check the LED of power supply module. If all LEDs are off state, replace the power module.	
Reference Literature	Installation & Handling Manual

T/P Unusable

Status	Controller T/P was completely or intermittently dead. No input is available and nothing can be used. If nothing appears on the screen although T/P was started, move to Chapter 2, Section 0 T/P Communication Error.
Symptoms & Causes	• Errors in applying the controller power • T/P was not connected to the controller. • Damages in T/P cable or connector • T/P failure • Interface board failure
Measures recommended	
1) Check if the system is on and T/P is connected to the controller. 2) Check visually if T/P cable was damaged and check if connector was damaged. If possible, directly test T/P in another controller. 3) If any defect in T/P is discovered, replace the T/P. 4) Check the status of the interface board that communicates with the main board after applying the power to T/P. If there is any defect on the interface board, replace it.	
Reference Literature	Installation & Handling Manual

All LEDs Off State

Status	LEDs in all boards including power module are off. System may not work or may not even start.
Symptoms & Causes	• Errors in applying the controller power • Circuit cut-off function • Defect in power module
Measures recommended	
1) Check if main switch was on.  2) Measure the main voltage using a voltage meter if power is supplied to the system. 3) Check if the circuit cut-off function was used. 4) If LEDs are still off even though the voltage stays at 220VAC, replace the power module.	
Reference Literature	Installation & Handling Manual

T/P Communication Error

Status	T/P starts but nothing is displayed. No input is available and nothing can be used. T/P was not completely unusable yet. If T/P becomes completely unusable, refer to Chapter 2, Section 0 T/P Unusable.
Symptoms & Causes	• In case that the controller was not restarted after changing from small T/P to graphic T/P, or vice versa • In case that a problem occurs in loading the system software
Measures recommended	
1) Restart the controller after changing from small T/P to graphic T/P, or vice versa. 2) Verify the failed T/P by connecting the normally working T/P in another controller to this controller and applying a power. 3) If any defect in T/P is discovered, replace the T/P. 4) If the normally working T/P in another controller shows same problem, check the status of a main board 5) If a power is not applied to the main board, replace it. 6) If it is determined that system software caused problems because power is normally supplied to the main board, refer to Chapter 2, Section 0 Failure in System Software Loading.	
Reference Literature	Installation & Handling Manual

Irregular Alarm Message

Status	It is thought that alarm messages to T/P are irregular and do not match actual malfunction of the robot. Various types of messages are likely to be displayed wrongly. The most significant reason for this type is that an operator disassembles or reassembles without authorization.
Symptoms & Causes	• In case that cable was not properly connected. • Defect in connector • Damages in cable insulating materials
Measures recommended	
1) Check the all internal operation cables, especially the cables recently reconnected during repair works. Re-connect all cables as stated in the robot manual. 2) Check if all cable connectors were tightened. 3) Check if any damage occurred in all cables. Replace all damaged cables by referring to the instructions in the robot manual.	
Reference Literature	Installation & Handling Manual

T/P Key Inoperable

Status	After starting the system, T/P screen is displayed but key is not input.
Symptoms & Causes	• T/P is wrongly connected or cable was damaged. • T/P internal cable was not connected or connector was damaged. • Defect in T/P components
Measures recommended	
1) Check if there are problems in T/P status changing switch or emergency key function. In case of any problem, replace the T/P. 2) Check if Buzzer sound is out when input the T/P key. If a key with no Buzzer sound exists or all keys have a problem, replace the T/P. 3) Check if T/P was properly connected to the controller. 4) Check if T/P cable was damaged. 5) Check if controller power supply and interface board work properly. 6) Check if T/P is usable or not. 7) Replace the T/P if no other ways.	
Reference Literature	Installation & Handling Manual

Failure in System Software Loading

Status	Unable to operate the controller due to failure in booting the controller system. The most significant reason for this type is that an operator altered the system software or disk was damaged due to main power failure or forced stop by an operator.
Symptoms & Causes	• The screen is stopped at T/P logo display and is not moved to the next screen although no problem in the controller. • System software delete and errors
Measures recommended	

1) Check if the main switch was on and the system can be operated using LEDs on the controller. 2) Inspect any damage on the T/P cables visually and check damages in the connector. Directly test T/P at another controller if possible. 3) In case that no fault was discovered in T/P, there is highly likely to be failed in loading the controller system software. 4) After turning the main power off and inserting the USB memory for installation & recovery that was separately provided by the manufacturer, restart the controller. 5) Check if the booting is possible using the USB memory for installation & recovery. If booting is not possible, replace the controller main board. 6) In case of successful booting with the USB memory for installation & recovery, restore the system as a guidance. 7) After restoring the system, remove the USB memory and check if the controller can be normally used.

Reference Literature	Installation & Handling Manual, Operation Manual

Robot Collapse in Power Cut-off

Status	When a motor on state, the robot can normally move, but the motor can collapse due to its own weight in off state. A fixed brake imbedded in each motor needs to be checked. This failure may cause serious damages or even death to works near the system and may seriously damage to a console or surrounding devices. 
Symptoms & Causes	• Failed Brake system • Defect in Brake Power supply
Measures recommended	
1) Select a motor that is suspected as a root cause of robot collapse. 2) Check the brake power that is supplied to the selected motor under the motor off state. 3) Check if there is oil leakage in the motor. If yes, replace the motor immediately. 4) Separate the motor from a transmission and check the motor from driving side. If any problem is found, replace the motor immediately.	
Reference Literature	Installation & Handling Manual

Unable to release Brake

Status	When a robot starts to operate or is jogging, an internal brake needs to be released. If a brake is not released, the robot cannot move and many alarm messages are created.
Symptoms & Causes	• Brake interface doesn't operate correctly. • The system is not switched to the motor on state properly. • Defected brake in robot side • Failure in brake power (24V)
Measures recommended	
1) Check the brake cable connection. 2) Check the brake signal and cable. 3) Only one brake failed, check other brakes nearby. Any one of brakes doesn't operate, no usable brake power of 24V may not exist. 4) Inspect the power supply of driver module in order to check if the 24V brake voltage is within normal range. 5) The brake may work continuously due to various failures in other components of the system. Check the Alarm message log by referring to the Operation Manual.	
Reference Literature	Installation & Handling Manual, Operation Manual

Failures with Alarm Message

Each failure or error is detected as a symptom in advance with or without displaying an alarm log message. Then, the system provides an operator with a message for the problem that causes the specified symptom and explains about the causes.

Alarm Message Description

When an alarm occurs at the controller, the system displays an alarm message window on the T/P screen.

1) Small T/P

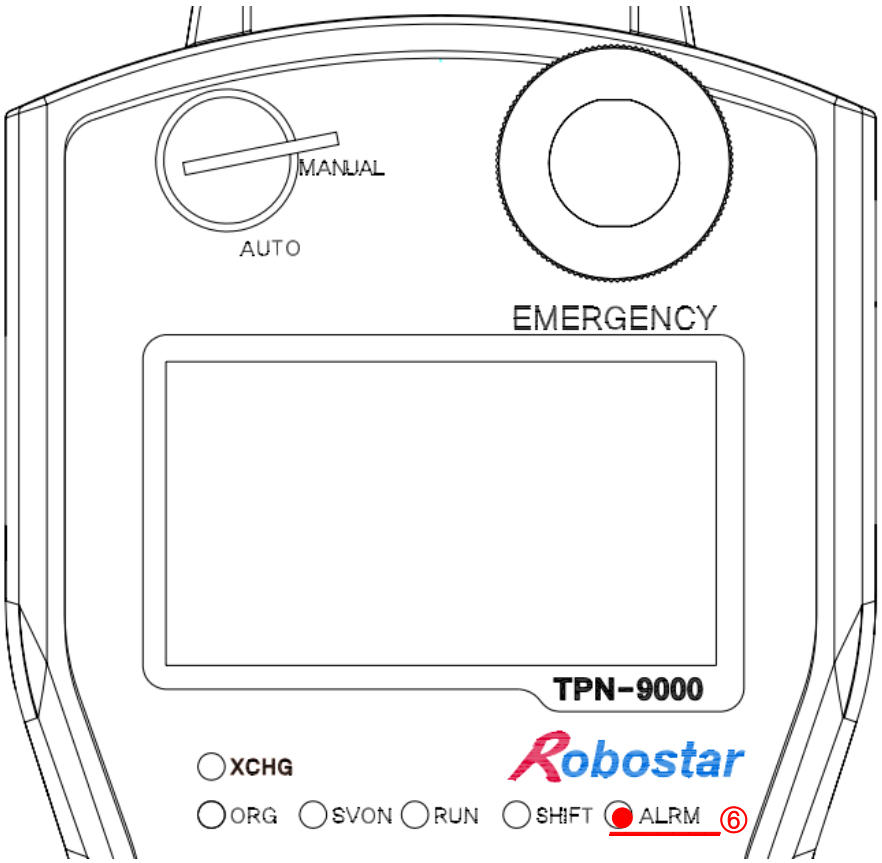


Figure 2-1 Screen of Small T/P

No.	Classification	Description
①	Alarm Code	This indicates the specified number for the alarm currently occurred.
②	Alarm Page	[Current Alarm Page No / Total Number of Alarm Pages] When changing the page, current alarm page no is changed as well. The Page up or down buttons as below can change the page. Pg Up Pg Dn

③	Alarm Message	This indicates the detail of currently occurred alarm. Additional message as below can be displayed depending on the alarm status. [Format] ROBOT: ⓐ AXIS:ⓑ [Detail] Alarm occurred at ⓑ axis of ⓐ robot The message window can be closed by pressing F4 or ESC key. Alarm List key below allows to check the alarm message again. 
④	Alarm Details	This displays the information of currently occurred alarm. This sometimes displays a part of information on brief causes and measures.
⑤	Alarm Measures	This briefly displays solutions for the alarm currently occurred. This may not contain relevant solutions.
⑥	Alarm LED	The corresponding LED becomes on once an alarm occurs. In case of warning situation, the LED blinks.
⑦	Others	Pressing the Up or Down key as below allow to check all messages. 

Classification & Summary of Alarm List

The below classifies alarm codes that occur in the controller. For more detail alarm list, refer to Chapter 3 Alarm List.

1) File System (1001~1050)

- This specifies the alarms that occur largely in the file system such as memory errors or JOB program file errors. For more detail, refer to Chapter 3 Section 1. File System (1001~1050).

2) Device (1051~1100)

- This specifies the alarms on other devices except for a driver. For more detail, refer to Chapter 3 Section 2. Device (1051~1100).

3) Protection (1101~1200)

- This specifies the alarms on the damage prevention or motion limitation of controller or robot. For more detail, refer to Chapter 3 Section 3. Protection (1101~1200).

4) Runtime (1201~1300)

- This specifies the alarms that can occur during JOB program execution. For more detail, refer to Chapter 3 Section 4. Runtime (1201~1300).

5) Compile (1301~1400)

- This specifies the alarms on errors of JOB program. For more detail, refer to Chapter 3 Section 5. Compile (1301~1400).

6) Trajectory (1401~1500)

- This specifies the alarms that can occur during motion creation or motion execution. For more detail, refer to Chapter 3 Section 6. Trajectory (1401~1500).

7) Emergency (2101~2200)

- This specifies the alarms on errors that can occur during emergency situation. For more detail, refer to Chapter 3 Section 7. Emergency (2101~2200).

8) EtherCAT Servo Driver (4001~5000)

- This specifies the alarms on errors that were detected by EtherCAT Servo Driver. For more detail, refer to Chapter 3 Section 8. EtherCAT Servo Driver (4001~5000).

9) Graphic T/P (5001~5100)

- This specifies the alarms that can occur in communication with the Graphic T/P. For more detail, refer to Chapter 3 Section 9. Graphic T/P (5001~5100).

Alarm Release Method & Solution Strategy

This briefly mentions the methods to release alarms occurred and to find the causes of alarms through a systematic approach. For more detail alarm list and measures, refer to Chapter 3. Alarm List.

1) Release Method of Alarms & Warnings

When the alarms are released by simple actions without stopping the controller, the alarms are released by following procedure.

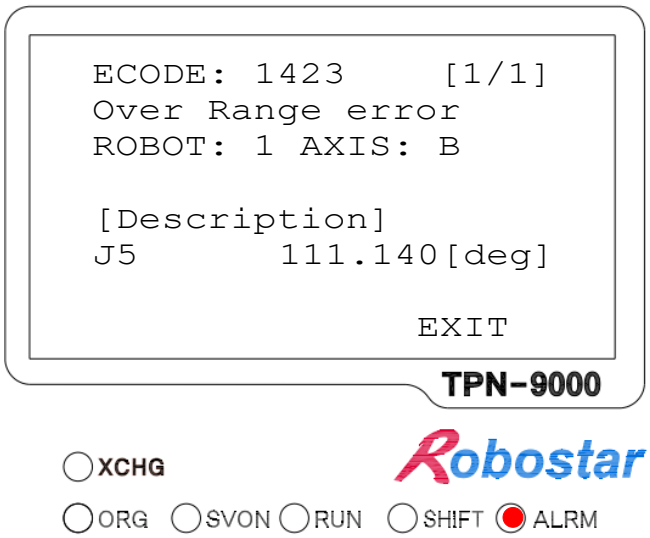


Figure 2-2 Example of Over Range Alarm

① When Alarm LED is on or blinking, check the entire messages for alarms or errors by using Up or Down key.
② Take necessary measures after finding out the causes of the alarm by referring to the Chapter 3 Alarm List.
③ Pop up the Alarm Message window by pressing Alarm List Key. This key has a priority action in most of screens.

④ After re-checking the details of alarm or error, press the reset button to release the alarm or warning.

⑤ The alarms unreleased show again in alarm format.
⑥ If the alarm was completely released, the alarm message window disappear and the alarm LED goes off, then the robot connected to the controller can be resumed to normal operation.

2) Strategy to resolve Alarms

The causes of alarms are analyzed to solve by referring to procedures and methods below.

① Check Alarm Message or Alarm Log.
A big effort has been invested to create alarm log messages as much as other technical literature. This can provide an important clue to solve the problem even if it is incomplete. In addition, the alarm log message is consistently upgraded.

② Identify the basic structure of the system by reading a product description.
A product description was specified in A. Literature Reference. This contains useful and essential information to solve the problems.

③ Read the Log Information.
Other than alarm log messages, there may be lots of information on malfunctions detected by the system such as the controller system log, JOB program log.

④ Check the LEDs of each electronic device.
If the alarm was caused by the electronic components, LEDs either on the front or the board can lead to the causes of the alarm.

⑤ Eliminate the elements that cause defect.
All failures can create various symptoms such as displaying an alarm log message window. In order to effectively solve the failure, it is important to separate the cause symptom from the subsequent symptom.

⑥ Identify the causes of failure by dividing them into two parts.
It is recommended to separate the causes of failure into two areas. Once identifying the overall causes, then determine the specific area of the failure. Afterwards, the same concept is applied by dividing the area into two parts. Eventually this can identify single component that has a defect.

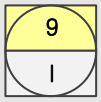
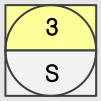
⑦ Check the communication parameters and cables.
The causes for majority of errors in the serial communication are confirmed to be cable defects, transmission speed, wrongly set data bandwidth.

⑧ Check the software version.
Check if the system software and other software are correct versions.
A certain version may not be compatible with a specific hardware. Record the software version because it can be useful information when asking to the agent or manufacturer.

1. Do not replace components without authorization. It is important to determine the unit by identifying the cause of failure to replace before replacing all.
2. Replace one at a time.
3. Confirm if the problem was solved by testing the system after replacing the components.

Alarm Log Verification Method

When verifying the information on the controller alarms that occurred before, it is possible to confirm the alarms through the alarm log menu. Most recent 100 alarm logs can be verified. For more detail, refer to the Operation Manual.
In case of aiming to verify entire alarm logs, those can be downloaded by the Uni-host program or by inserting an USB memory into the controller. When trying to download the log file, refer to the Uni-host Manual and the Operation Manual.

Step	Measures	Information or Figure
1.	Press the 9 key in main screen of manual mode to move to 9. INFO. 	<MANUAL MODE> 1.JOB 2.RUN 3.HOST 4.PARA 5.ORIGIN 6.I/O 7.GVAL 8.GPNT **9.INFO** ITEM #■
2.	Press the 3 key at INFO screen to move to 3. LOG screen. 	<INFO> 1.ROBOT 2.CONT **3.LOG** 4.USB 5.IF ITEM #■
3.	Press the 3 key at LOG screen to move to 2. ALARM screen.	<INFO:LOG> 1.SYSTEM **2.ALARM** 3.USER 4.COMM ITEM #■
4	Alarm Log can be verified. Pressing the left or right arrow key enables to check the entire messages.  Pressing the Page Up/Down keys or Up/Down arrow keys enables to check the entire logs. 	ALARM LOG 93:[180827 18:58:16] 94:[180827 18:58:39] 95:[180827 18:58:48] 96:[180827 19:02:31] 97:[180828 14:02:14] 98:[180828 14:02:32] EXIT

Chapter 3 Alarm List

This chapter describes various alarms that can occur when using the controller.
In addition, the root cause for the alarm is presented and the measures are briefly explained.

When the situations below occur, contact to the agent or the manufacturer.

- In case that the alarm not described in this manual occurs
- In case that the presented cause and measures are not satisfied

1) Alarm List Item
Alarm is presented as a table form shown below.
In the table, the code number appears first to easily find out the error messages. It is able to get additional information on the error and measures by referring to this number.
Corresponding information is divided into code, message, description, monitoring, influence, alarm level, cause and measures. The implication for each information is described in the table presented.

Code	〈Code No.〉	Message	〈Message being output in T/P〉	
Description	〈Description of alarm meaning〉			
Monitoring	〈Situation or cycle that monitors the corresponding alarm occurrence〉		Alarm Level	〈Level Value〉
Influence	〈Influence that the corresponding alarm gives to the controller〉			
Causes		Measures		
〈Causes for alarm occurrence〉		〈Measures for the alarm〉		

1. File System (1001~1050)

Code	1003	Message	Out of Memory		
Description	Memory Allocation Error Prevention				
Monitoring	When loading JOB program file			Alarm Level	2
Influence	Failure in JOB program load and execution				
Causes			Measures		
Failure in memory allocation for controller internal program			1) Check if the alarm is cleared after turning off the controller power and restart the system. 2) When the alarm consistently occurred • Reinstall or replace the RAM in main board		

1. When the alarm above occurs, the stored JOB program data may be lost.

Code	1021	Message	Job step info error		
Description	Mismatch in the number of lines of JOB program				
Monitoring	When loading JOB program file			Alarm Level	1
Influence	Failure in JOB program load and execution				
Causes			Measures		
When loading the JOB program into memory, it occurs if actual line number in the JOB and recorded line number are different.			1) Re-write after deleting the JOB file that an error occurs.		

2. Device (1051~1100)

Code	1091	Message	FAN error		
Description	FAN failure occurred				
Monitoring	Periodical inspection			Alarm Level	0
Influence	None				

Causes	Measures
FAN failure or FAN cable failure	1) Clear the alarm by pressing the reset button. 2) When the alarm stays consistently; A. Inspect FAN B. Verify FAN connector contact status C. Replace FAN

1. If not restoring the warning above, the controller system is internally over-heated, resulting in damages on the entire system.

Code	1092	Message	FBUS Mismatch error		
Description	In case that field bus type is not in line with the parameter value				
Monitoring	Periodical inspection			Alarm Level	0
Influence	None				

Causes	Measures
Received filed type doesn't match to the parameter value of the controller.	1) After altering the filed bus type setting correctly, press the reset button to clear the alarm. 2) When the alarm consistently occurs; A. Inspect the field bus board B. Replace the field bus board

1. If not restoring the warning above, the functions related to the field bus board cannot be used.

3. Protection (1101~1200)

Code	1104	Message	Servo On Error	ROBOT: ⓐ AXIS: ⓑ
Description	Transition failure to servo on state			
Monitoring	In case of servo on		Alarm Level	2
Influence	Unable to operate the robot			

Causes	Measures
Problem in applying power to servo module Defect on cable or connector	1) Inspect the power supply system and electrical modules.
Error status in servo driver	1) Check servo driver status and connection status with a motor. 2) Inspect running status of servo driver.
Error status in controller	1) Check if there is no problem on parameter setting between servo driver and motor. 2) Adjust gain in servo parameter.

Code	1105	Message	Servo Off Error	ROBOT: ⓐ AXIS: ⓑ
Description	Transition failure to servo off state			
Monitoring	In case of servo off		Alarm Level	2
Influence	Unable to operate the robot			

Causes	Measures
Problem in applying power to servo module Defect on cable or connector	1) Inspect the power supply system and electrical modules.
Error status in servo driver	1) Check servo driver status and connection status with a motor. 2) Inspect running status of servo driver.
Error status in controller	1) Check if there is no problem on parameter setting between servo driver and motor. 2) Adjust gain in servo parameter.

Code	1107	Message	ORIGIN FAIL	ROBOT: ⓐ AXIS: ⓑ
Description	Origin Work Failure Alarm			
Monitoring	Origin Work In Progress		Alarm Level	1
Influence	Unable to Verify Origin Position, Position Data Error			

Causes	Measures
It occurs in case that functional execution was failed with the set Origin work method.	1) Check if Origin work method is correct. 2) In case that the alarm consistently occurs A. Check if input of limit sensor is normal range.

Code	1108	Message	Not Completed Org	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when conducting other works during Origin work.			
Monitoring	Origin Work In Progress		Alarm Level	1
Influence	Position Data Error, Unable to execute JOB program			

Causes	Measures
It occurs when executing JOB program before completing Origin work.	1) Perform Origin work. 2) In case of an absolute type motor, perform Zero offset Calibration.

Code	1178	Message	MC OFF error
Description	MC (Magnetic Contact) Alarm		
Monitoring	Periodical inspection	Alarm Level	1
Influence	Position Data Error, Unable to execute JOB program		

Causes	Measures
It occurs when MC is on under emergency stop status. (MC must be off in alarm status)	1) Press a reset button to clear the alarm. 2) When the alarm stays consistently; A. Check MC cable wiring. B. Replace the module if MC module has a problem. C. Replace the module if Safety PLC module has a problem. D. Replace the module if Interface and Safety board have a problem.

Code	1179	Message	Safety relay fault

Description	The relay of Safety module were not in contact.		
Monitoring	Periodical inspection	Alarm Level	1
Influence	Unable to operate the robot		

Causes	Measures
The relay of Safety module were not in contact.	1) The relay of Safety module were not normally in contact when alarm release timing doesn't match. Press the reset key to clear the alarm.
Safety module problem	1) When this alarm stays consistently under no other external alarms, replace the Safety module.

Code	1186	Message	In range error ROBOT: ⓐ AXIS: ⓑ	
Description	Exceed the robot's range			
Monitoring	Periodical inspection		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
It occurs when the axis position exceeds the specified range (In Range).	1) Check if the robot is currently in specified range (In Range) and move it to allowed range. 2) Adjust the teaching point of corresponding axis or specified range(In Range).

Code	1199	Message	DEADMAN error	
Description	Dead Man switch was not in contact when operating the robot in the manual mode			
Monitoring	In case of jogging		Alarm Level	0
Influence	Stopping robot operation			

Causes	Measures
It occurs when Dead Man switch was not in contact during the robot operation.	1) If this alarm occurs when Dead Man switch became not in contact during the manual operation of robot, reattach the contacts after clearing it.
Dead Man switch problem	1) Replace T/P.

4. Runtime (1201~1300)

Code	1204	Message	Not Teaching Point ROBOT: ⓐ	
Description	It occurs when using the point that teaching was not performed.			
Monitoring	When conducting a motion		Alarm Level	1
Influence	Robot operation stopping, No motion available			

Causes	Measures
Use of the point that teaching was not performed in case of using the commands related to robot movement.	1) Check in JOB program if the point that teaching was not performed was used or check if the using point was performed with a teaching. 2) Complete the point teaching by referring to the Operation Manual.

Code	1219	Message	Range Over error ROBOT: ⓐ AXIS: ⓑ	
Description	It occurs when the teaching point exceeded to the maximum movable distance.			
Monitoring	When conducting a motion		Alarm Level	1
Influence	Robot operation stopping, No motion available			

Causes	Measures
Teaching point value exceeded the defined range.	1) Check if the teaching point value is within the range. 2) Adjust the teaching point value to be in the range.
Inappropriate setting in the system parameters (RANGE)	1) Check the system parameters. 2) Alter and store the system parameters.

Code	1236	Message	Interpreter error	
Description	It occurs when having problems in the command interpretation during execution of JOB program.			
Monitoring	When execution of JOB program		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
It occurs when the controller cannot understand an execution command during JOB program operation or when the controller is about to execute a wrong command.	1) Check the line number and message contents displayed in the alarm message. 2) Repeat the work after revising corresponding JOB program or altering the value with referring to the interpreter alarm detail and its causes.

※ Interpreter Alarm Messages & Causes

No.	Alarm Message (Description) Causes of Alarm
1	'(' is needed In case that there is no input for "(" after a command
2	')' is needed In case that there is no input for ")" after a command
3	[<Execution Mode>:<Thread No>] function call depth is over 100. In case that a depth of function call exceeds 100 in <Thread No> of <Execution Mode>.
4	[<Execution Mode>:<Thread No>] binaryExpr ==> not define operand[<Operator No>] In case that undefined operator was used in <Thread No> of <Execution Mode>.
5	[<Execution Mode>:<Thread No>] factor ==> not define command[<Command No>] In case that undefined command was used in <Thread No> of <Execution Mode>
6	[<Input Value>] Tool parameter is not assigned. In case that the tool coordinate system with incomplete setting was selected.
7	[<Input Value>] User parameter is not assigned. In case that the user coordinate system with incomplete setting was selected.
8	~ operation only int In case that the target using the "~" mark as the first character is not an integer type.
9	<JOB Name> JOB Point index = <No> is not teaching point. In case that uninitialized program position variable (P) was attempted to use.
10	<Command> index [<Input Value>] is out of range (<Minimum Value>-<Maximum Value>). In case that Input Value exceeds the input tolerance.
11	<Command> instruction must be used only position variable. In case that the type of input value is not a position type but other types.
12	<Command> must be used only in the servo off state. In case that the commands only for servo off state were used in servo on state.
13	<Command>(<Index>) error or <Command>[<Index>] error In case that Index value inputted exceeds the tolerance range.
14	<Command>[<Input Value>]: value range is (<Minimum Value>-<Maximum Value>). In case that Input Value exceeds the input tolerance.
15	<Motion Command> execute error[<Return Value>] In case that <Motion Command> execution was failed.
16	<Motion Command>: Error to convert to <Type> position In case of a failure in conversion process that converts the input position value into the position value of <Type> that is required for the command of corresponding motion.
17	<Index> subscript is out of range (range:0-<Maximum Value>) In case that input index exceeds the selection range arrangement.
18	<Variable Name> : Uninitialized variable has been used.

No.	Alarm Message (Description) Causes of Alarm
	In case that uninitialized variables were attempted to use.
19	<Logic or Bit Operator> d1, d2 data type is only integer. In case that the type of two terms are not an integer form when using a logic and a bit operators
20	<General digital input and output commands> failed. If index [<No>] is valid, check IO board. In case that use of general digital input and output commands was failed
21	<Input & Output Command>(<Index>) = <Input Value> error In case that Index value exceeds the input tolerance range when using input & output commands
22	<Axis No> AXIS <Motion Command> range over In case that axis of <Axis No> was beyond the allowed distance
23	<Field Bus Input & Output Command> failed. If index [<No>] is valid, check cclink board. In case that use of Field Bus Input & Output Command was failed
24	<Command> parameter p_id /t_id value [<Input Value>] is not correct. In case that <Input Value> exceeded the input tolerance range when using a Command
25	ac ==>[<Current Character String No>] string data memory over In case that total character strings exceeded the input tolerance count (1000)
26	ACC: value[<Input Value >] range is (<Minimum Value>-< Maximum Value>). In case that the input value for acceleration time exceeded the input tolerance range
27	Cannot call main function. In case that a thread was attempted to dually assign to the main thread
28	Cannot assign different type position variable. In case that other type variable was attempted to substitute
29	Cannot find the job file[<File Name>.JOB] In case that the JOB program of inputted file name doesn't exist when using PSEL command
30	Cannot use <Auto Mode Dedicated Command> at foretask. In case that Auto Mode Dedicated Command was used in Manual Mode
31	Create thread error In case that thread creation was failed when using CTHREAD command
32	d2 data is zero. In case that the second term is 0 when using the remainder sign (%) of division
33	d2 data type is wrong. In case that the type of second term is different from the first term when using addition (+), subtraction (-), multiplication (*), division (/) signs
34	Data field only assigns integer or float data. In case that the substitute value is not the integer or the real number when substituting a value for the individual element of a position variable.
35	Data stored in the global integer/float must be integer type or float type.

No.	Alarm Message (Description) Causes of Alarm
	In case that the Input Value is not the integer nor the real number when substituting a value for global integer variable (I) or global real number variable (F)
36	Data type is not specified nor void. In case that the variable to be stored is VOID type or doesn't exist
37	DEC: value[<Input Value>] range is (<Minimum Value>-< Maximum Value>). In case that the Input Value for deceleration time exceeded the input tolerance range
38	divide by 0 In case that the second term is 0 when using the division (/) and remainder sign (%)
39	ELSEIF or ELSE should execute after IF instruction. In case that ELSEIF or ELSE statement was executed without IF statement
40	EXIT Instruction In case that EXIT command was used
41	Fail to clear serial data. In case that use of FLUSH command was failed
42	FOS: value[<Input Value>] range is (<Minimum Value>-< Maximum Value>). In case that FOS Input Value exceeded the input tolerance range
43	Function id[<No>] is invalid. In case of trying to assign the function with a transfer factor to a thread when using CTHREAD command
44	Global Point field only assign integer or float data. In case that the substituting value for individual element of global position variable (GP) is not an integer nor real number
45	Global Point index = <No> is not teaching point. In case that uninitialized global position variable (GP) was attempted to use
46	Global Point only assign position data. In case that the input value substituting for global position variable (GP) is not the joint position type
47	HERE/HERE_REF index range(1 - < Minimum Value >) input = < Input Value > In case that the input value exceeded the input tolerance range when using HERE/HERE_REF function
48	Incorrect loop condition in IF/ELSEIF/WHILE loop - not integer type or float type. In case that the result of conditional expression of IF/ELSEIF/WHILE statement is not an integer nor a real number
49	Limit : Minimum and maximum values have been reversed.[index : <No>, min: <Minimum Value>, max: <Maximum Value>] In case that Minimum Value is larger than Maximum Value when using LIMT command
50	Load job err In case that JOB program loading was failed due to a program error

No.	Alarm Message (Description) Causes of Alarm
51	Minus operation only int, float In case that the target using the "-" mark as the first character is not an integer type or a real number
52	needed variable name: <Variable Name> In case that a variable of undefined type was attempted to call
53	No need any factor. In case that unnecessary element is followed to a command
54	not integer type or float type In case that the input data are not integers nor real numbers
55	Not operation only int, float In case that the target using the "!" mark as the first character is not an integer type or a real number
56	Plus/Minus d1, d2 data type mismatch. In case that the type of input value is not allowed to conduct addition (+) or subtraction (-) operation
57	robot id mismatch[<Execution Mode>:<Thread No>] 1) In case that the robot number stored in JOB program file was wrong 2) In case that the robot number inputted by a user was wrong
58	servo is off!!! In case that a command for servo on was used in servo off state
59	SMID : The start position of characters to be extracted is too big. In case that the start position for character string extraction is larger than the target character string when using SMID function
60	SMID : The number of characters to be extracted is too big. In case that the end position for character string extraction is larger than the target character string when using SMID function
61	Subscript must be unsigned integer. 1) In case that an integer value was not input when selecting the Index of program position variable (P) or global position variable (GP) 2) In case that an integer value was not input when selecting the Index of global integer variable (I) 3) In case that an integer value was not input when selecting the Index of global real variable (F) 4) In case that an integer value was not input when selecting the Index of array variable
62	Take robot first. In case that robot was not selected
63	The <Function Name> function argument type is invalid. In case that a transfer factor type of a function is not correct
64	The field value[<Axis No>] of point is out of range(1 - <Axis Max No>). Global point field[<Axis No>] is out of range(1 - <Axis Max No>). In case that the Input Axis No exceeded Axis Max No when reading the individual element value of a position variable
65	The first index value[<Input Value>] of <Command> function is out of range(0 - <Maximum Value>). In case that the first Input Value of a command exceeded the input tolerance range

No.	Alarm Message (Description) Causes of Alarm
66	The first parameter should be used only integer type. In case that the first Input Value of a command is not an integer type
67	The first parameter type of <Command> function must be <Type> position type. In case that the first Input Value of a command is not a position type of <Type>
68	The first parameter type of <Command> function must be <Data Type>. In case that the first Input Value of a command is not a <Data Type>.
69	The first parameter value [<Input Value>] of <Command> function/instruction is out of range (<Minimum Value> - <Maximum Value>) In case that the first Input Value of a command exceeded the input tolerance range
70	The first parameter value [<Input Value>] of <Command> function must be <Value>. In case that the first Input Value of a command is not <Value>
71	The index of global point must be integer. In case that a different value other than an integer was inputted when selecting the Index of global position variable (GP)
72	The index of job point must be integer. In case that a different value other than an integer was inputted when selecting the Index of program position variable (P)
73	The index value [<Index>] of <Arrangement Variable> is out of range (0 - < Maximum Value >). In case that the Input Index value exceeded the selectable range
74	The parameter value [<Input Value>] of <Command> function is out of range (0 - <Maximum Value>) In case that the Input value exceeded the selectable range of input tolerance range
75	The input value [<Input Value >] of <Command> is out of range (0 - <Maximum Value>). In case that the Input value exceeded the selectable range of input tolerance range
76	The left side is not position variable. In case of trying to substitute a position value for not position variable
77	The left side is position constant. In case of trying to substitute a value for an integer
78	The maximum length plus two strings must be <Character String Max Length> characters or less. In case that the length of a combined string is longer than <Character String Max Length>
79	The number [<No>] of <Function Name> function arguments are invalid. In case that the number of transfer factor in a function doesn't match the definition of the function
80	The parameter count of SETERR instruction is 2. In case that the number of input factors exceeded 2 when using SETERR command
81	The parameter type of <Command> function must be <Data Type>. In case that Input value of a command is not <Data Type>
82	The parameter value of SVAL function must include numeric character. In case that no number is included in the input character string when using SVAL command

No.	Alarm Message (Description) Causes of Alarm
83	The parameter value [<Input Value>] of <Command> instruction is out of range (<Minimum Value> - <Maximum Value>). In case that Input Value range of a command exceeded the input tolerance range
84	The pulse width[<Input Value 1>] should be less than the pulse period[<Input Value 2>]. In case that a pulse width of <Input Value 1> is larger than that of < Input Value 2>
85	The right side is not position variable. In case of trying to substitute a non-position value for a position variable
86	The right side is string type. In case of trying to substitute a character string for a non-character string variable
87	The robot [<No>] is disabled, or its type is not defined. In case of the robot not being used or no robot type was set
88	The second index value [<Input Value>] of <Command> function is out of range (0-<Maximum Value>) In case that the second input value of a command exceeded the input tolerance range
89	The second parameter should be used only integer type. In case that the second input value of a command is not the integer type
90	The second parameter type of <Command> function must be <Type> position type. In case that the second input value of a command is not the position type of <Type>
91	The second parameter type of <Command> function must be <Data Type>. In case that the second input value of a command is not the <Data Type>
92	The second parameter value [<Input Value>] of <Command> function is less than <Minimum Value>. In case that the second input value of a command is smaller than the Minimum Value
93	The second parameter value [<Input Value>] of <Command> function/instruction is out of range (<Minimum Value> - <Maximum Value>). In case that the second input value of a command exceeded the input tolerance range
94	The second parameter value [<Input Value>] of <Command> function must be bigger than <Minimum Value>. In case that the second input value of a command is smaller than the Minimum Value
95	The third parameter should be used only integer type. In case that the third input value of a command is not the integer type
96	The third parameter type of <Command> function must be <Data Type>. In case that the third input value of a command is not <Data Type>
97	The third parameter type of <Command> function must be only position type. In case that the third input value of a command is not a joint position type
98	The third parameter value[<Input Value>] of <Command> function is less than <Minimum Value>. In case that the third input value of a command is smaller than the Minimum Value
99	The third parameter value[<Input Value>] of <Command> function is less than <Minimum Value>. In case that the third input value of a command is smaller than the Minimum Value

No.	Alarm Message (Description) Causes of Alarm
100	The third parameter value[<Input Value>] of <Command> function/instruction is out of range(<Minimum Value> - <Maximum Value>). In case that the third input value of a command exceeded the input tolerance range
101	The tool number[<Input Value >] of position variable is out of range(0 - < Maximum Value >). In case that, among the individual elements of position variable, the value inputted into the Tool No exceeded the input tolerance range
102	The used value[<Input Value>] of position variable is out of range(0 - 1). In case that, among the individual elements of position variable, the value inputted into the Variable Initialization exceeded the input tolerance range
103	The user number[<Input Value>] of position variable is out of range(0 - <Maximum Value>). In case that, among the individual elements of position variable, the value inputted into the User No exceeded the input tolerance range
104	The variable type is not integer or float. In case that STEP input value is not an integer nor a real number when executing FOR statement
105	Thread function cannot have arguments. In case of trying to assign the function with a transfer factor to thread
106	Thread id[<No>] is invalid. In case that the selected thread number exceeded the input tolerance range when using a multi-tasking command
107	Thread id[<No>] is used. In case that the selected thread has already been used when using CTHREAD command
108	Undefined ARM form[<Value>] In case that, among the individual elements of position variable, the value not defined in the robot posture was entered
109	Undefined variable In case of calling the undeclared variable
110	User_number: value[<Input Value>] range is (<Minimum Value>-<Maximum Value>). In case that the input value exceeded the input tolerance range when selecting a user coordinate system
111	Using uninitialized POS variable In case of using the position variable that was not initialized
112	VEL: value[<Input Value >] range is (<Minimum Value >-< Maximum Value >). In case that the speed input value exceeded the input tolerance range
113	Wrong argument number[<Factor No>] In case that the input transfer factors were input more than the input tolerance number
114	Wrong description: < Command or Sign>) In case of entering wrong command or using not defined command

No.	Alarm Message (Description) Causes of Alarm
115	Wrong file input [BGTD/BGTF.JOB] In case of trying to use the unusable JOB program when using PSEL command
116	Wrong local robot[<Robot No>].. Robot ID error!!! 1) In case of problem in the Robot No stored in JOB program file 2) In case that a wrong Robot No was entered by a user
117	Wrong parameter value In case that the value not in allowed range was entered

Code	1237	Message	Invalid ThreadID		
Description	It occurs in case of Thread ID allocation error in JOB program				
Monitoring	When executing JOB program			Alarm Level	1
Influence	Unable to execute the program				

Causes	Measures
It occurs when Threads with same ID are used.	1) Check if Threads having same ID are simultaneously used in JOB program. 2) Execute again after altering JOB.

5. Compile (1301~1400)

Code	1315	Message	Compile error		
Description	JOB Program Syntax Error				
Monitoring	When loading a JOB program before execution			Alarm Level	1
Influence	Unable to execute the program				

Causes	Measures
It occurs when the controller cannot understand the commands in the robot program that was written by a user or the commands were poorly written.	1) Check the line number and detail messages displayed in the alarm message. 2) Execute the program again by altering corresponding JOB after checking the message.

6. Trajectory (1401~1500)

Code	1414	Message	ik isnan error ROBOT: ⓐ AXIS: ⓑ	
Description	In case that the calculated result is not the number, when interpreting the inverse kinematics of robot.			
Monitoring	Prior to motion execution		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
Errors in teaching point or trajectory when using CP motion	1) Check the information of axis that has problems by referring to the alarm message. 2) Check the teaching point of the line that the program execution was stopped or the trajectory according to the operation condition. 3) Execute again after completing the point modification.
Errors in the value of used variable when using CP motion	1) Check the value of point variable in the line that program execution was stopped. 2) Execute again after point modification.

Code	1415	Message	ik position error ROBOT: ⓐ AXIS: ⓑ	
Description	Coordinate conversion error occurs when interpreting the inverse kinematics of robot.			
Monitoring	During the motion execution		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
Error occurs when the data conversion from Base coordinate system to Joint coordinate system.	1) Check the teaching point of the line that program execution was stopped. 2) Execute again after point modification.

Code	1422	Message	Time Sched. error	ROBOT: ⓐ AXIS: ⓑ
Description	Failure in time plan for motion command			
Monitoring	Prior to motion execution		Alarm Level	1
Influence	Program execution stopping, Unable to execute the motion			

Causes	Measures
In case that time plan was failed during creating a motion path.	1) Check and adjust the motion parameters. 2) Check the setting values if speed or acceleration and deceleration were used. 3) Check the teaching point and adjust it if necessary. 4) Check and adjust the setting value after using FOS commands.

Code	1423	Message	Over Range error	ROBOT: ⓐ AXIS: ⓑ
Description	In case that a position command exceeds RANG(SW-Limit) setting range			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
In case that moving position of the axis exceeds the allowed range	1) Check if the robot is within the allowed range and move the robot to the allowed range. 2) Adjust the teaching point of corresponding axis.
In case that the parameter setting (RANG) is inappropriate	1) Check the parameter settings. 2) Execute again after adjusting the parameter settings.
In case that the moving path is beyond the allowed range even if the teaching point is within the allowed range	1) Check the teaching point. 2) Check and adjust the RANG (SW Limit) parameter value, or adjust the teaching point. 3) Adjust FOS setting to be small if it occurred in the situation of using FOS command. 4) Check the settings of TOOL or USER coordinate systems.

Code	1424	Message	Over Speed error ROBOT: ⓐ AXIS: ⓑ	
Description	In case that the speed command exceeds the allowed range			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
In case that moving speed of the axis exceeds the allowed range	1) Check the parameter settings (JONT, LINR). 2) Execute again after adjusting the parameter settings.
In case that the parameter setting (OVS) is inappropriate	1) Check the over-speed conditions (OVS). 2) Execute again after adjusting the parameter settings.
Robot Command Error	1) Check the command and motion conditions (VEL, ACC, DEC, FOS) if using the combined JOB command when executing a motion. 2) Check the relevancy of teaching point.
In case of passing through the singularity	1) Check if the robot passes through the singularity. 2) Execute again after adjusting the teaching point.

Code	1425	Message	Over Accel. error	ROBOT: ⓐ AXIS: ⓑ
Description	In case that the acceleration command exceeds the allowed range			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
In case that moving acceleration of the axis exceeds the allowed range	1) Check the parameter settings (JONT, LINR). 2) Execute again after adjusting the parameter settings.
In case that the parameter setting (OVA) is inappropriate	1) Check the over-acceleration conditions (OVA). 2) Execute again after adjusting the parameter settings.
Robot Command Error	1) Check the command and motion conditions (VEL, ACC, DEC, FOS) if using the combined JOB command when executing a motion. 2) Check the relevancy of teaching point.
In case of passing through the singularity	1) Check if the robot passes through the singularity. 2) Execute again after adjusting the teaching point.

Code	1426	Message	Inposition error	ROBOT: ⓐ AXIS: ⓑ
Description	In case of exceeding the position error tolerance range			
Monitoring	When Motion ends		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
In case that a motor doesn't satisfy the allowed range (IPA) within the allowed time (IPE) after completing a motion command	1) Check the parameter related to In-position. 2) Execute again after increasing both IPE and IPA values. 3) Check and adjust the robot status and motor gain if consistently occurred after adjustment.

Code	1427	Message	TG TimeOut error	
Description	In case that the calculation time of a position command exceeds the execution cycle time.			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			
Causes		Measures		
In case that the calculation time of a position command exceeds the defined time		1) Check if there is any overload situation in the system.		

Code	1428	Message	TG Mode error	
Description	It occurs in case of violation in trajectory status transition			
Monitoring	the calculation time of a position command exceeds		Alarm Level	1
Influence	Servo forcedly off			
Causes		Measures		
In case trying to change to the parameter editing screen with staying at servo on state		1) Move to parameter editing screen after servo off.		

Code	1429	Message	ENC Count error ROBOT: ⓐ AXIS: ⓑ	
Description	It occurs when the variation of a feedback pulse exceeds the allowed range.			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			
Causes		Measures		
In case that the variation of encoder data that was periodically entered from servo exceeds the allowed range		1) Check if it consistently occurs. 2) Check the encoder cables, harness and servo board. Replace the relevant component showing a problem.		
In case of performing multi-turn clear		1) Check if it consistently occurs.		

Code	1430	Message	REF Count error	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when the variation of a command pulse exceeds the allowed range.			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
In case that the variation of position command data that was periodically output to servo exceeds the allowed range	1) Check if it consistently occurs. 2) Check if there is a problem on inputting encoder pulse value.
In case that the power was not initialized after altering the axis information in parameters	1) Check if the alarm occurs after applying power again.

Code	1431	Message	Servo ON/OFF TimeOut	ROBOT: ⓐ
Description	It occurs when the status of servo doesn't match.			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
In case that the number of axis being used doesn't match with that of completing the servo on/off	1) Check if the alarm consistently occurs. 2) Check motor, driver and cable.

Code	1434	Message	Over Trq error	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when the defined torque limit value was exceeded.			
Monitoring	In case that a TRQ command was used when executing JOB program under servo on state		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
In case that the torque value in real time exceeded the defined torque limit value	1) Check if the alarm consistently occurs. 2) Adjust the teaching point of corresponding axis. 3) Alter the torque limit value within the range that do not give a damage to a robot or surrounding devices.

7. Emergency (2101~2200)

Code	2101	Message	T/P emergency		
Description	It occurs when the T/P stops by an emergency stop switch.				
Monitoring	Periodically checking			Alarm Level	1
Influence	Robot operation stopping, Unable to both handle JOG and execute program				

Causes	Measures
In case that T/P emergency stop switch was pressed	1) Check if T/P emergency stop switch was pressed. 2) Clear the alarm after releasing the emergency stop switch.
In case that the systems in T/P emergency stop switch have a problem	1) Check if T/P emergency stop switch was pressed. 2) Check if T/P switch was connected to the controller. 3) Repair or replace the T/P when there is a problem.

Code	2102	Message	Front emergency		
Description	It occurs when the system is in emergency stop state by an emergency stop switch on the front panel.				
Monitoring	Periodically checking			Alarm Level	1
Influence	Robot operation stopping, Unable to both handle JOG and execute program				

Causes	Measures
In case that an emergency stop switch on the front panel was pressed	1) Check if an emergency stop switch on the front panel was pressed. 2) Clear the alarm after releasing the emergency stop switch.
In case that the systems in an emergency stop switch on the front panel have a problem	1) Replace the emergency stop switch.

Code	2103	Message	System emergency		
Description	It occurs when the system was in emergency stop due to system I/O operation.				
Monitoring	Periodically checking			Alarm Level	1
Influence	Robot operation stopping, Unable to both handle JOG and execute program				

Causes	Measures
System emergency stop by a user	1) Clear the controller alarm after releasing the emergency stop situation.
Problem in the system emergency stop lines	1) Check if 24V power is normally being applied to two contacts of the system I/O. 2) Check if Safety Input cable was cut and replace it if there is a problem.

Code	2104	Message	Auto emergency		
Description	It occurs when any one of contacts in Interlock A was disconnected in Auto Mode.				
Monitoring	Periodically checking			Alarm Level	1
Influence	Robot operation stopping, Unable to both handle JOG and execute program				

Causes	Measures
In case that an contact of Interlock A was disconnected in Auto Mode because of a user or any other reasons	1) Check if 24V power is normally being applied to the contacts of Interlock A. 2) Check the causes of disconnection. 3) Check if Safety Input cable was cut and replace it if there is a problem.

Code	2105	Message	Manual emergency		
Description	It occurs when any of contacts in Interlock M was disconnected in Manual Mode.				
Monitoring	Periodically checking			Alarm Level	1
Influence	Robot operation stopping, Unable to both handle JOG and execute program				

Causes	Measures
In case that an contact of Interlock M was disconnected in Manual Mode because of a user or any other reasons	1) Check if 24V power is normally being applied to the contacts of Interlock M. 2) Check the causes of disconnection. 3) Check if Safety Input cable was cut and replace it if there is a problem.

Code	2108	Message	Mode mismatch error		
Description	It occurs when the Safety Input Signals in pair were being entered differently.				
Monitoring	Periodically checking			Alarm Level	1
Influence	Robot operation stopping, Unable to both handle JOG and execute program				

Causes	Measures
In case that the Input states of Safety Inputs in pair are not same; • System Emergency • Interlock A • Interlock M • T/P Emergency • T/P Open • T/P Mode	1) Check the causes of disconnection. 2) Check if Safety Input cable was cut and replace it if there is a problem. 3) Check the status of Interface & Safety boards.

Code	2115	Message	Main Board Tmp error		
Description	It occurs when the temperature of main board was higher than the set temperature.				
Monitoring	Periodically checking			Alarm Level	1
Influence	Robot operation stopping, Unable to both handle JOG and execute program				

Causes	Measures
In case that the temperature of main board became higher than the set temperature	1) Stop to use the controller if possible and lower the temperature. 2) Check the cause of over-heating in the main board. 3) Check the fan and replace it if there is a problem. 4) Check the fixed status of the heat sink.

1. Caution is required for burning accident by over-heating in case of the alarm above.

8. EtherCAT Servo Driver (4001~5000)

1. This information is limited to the driver Alarm.
2. When checking the alarms described in this section at the driver, these are marked at the last two digits.

Code	4210	Message	IPM fault	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when an over-current (HW) flows in IPM.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Defect in a motor or an encoder cable	1) Check the wiring status or short status of cables. 2) Replace cables of motor or encoder.
Wrong parameter setting related to a motor or an encoder	1) Check the defined values by moving to the parameters related to motor. 2) Execute again after modification if the parameters do not match the Controller information.
Problems in motor phase resistance	1) Check the resistance between phases of motor. (the resistance of U-V, V-W, W-U is less than several Ω) 2) Replace the motor when identifying the problems such an unbalance in resistance between phases.
Abnormal status in mechanical parts	1) Check if there exists a collision or a constraint of devices. 2) Restore the system into normal state by checking the mechanical part.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, it is possible for driver to have a problem. Thus, replace the driver.
Problems caused by noises	1) Check the FG wiring status. 2) Alter the size of FG wirings to the wiring size of main circuit of the driver.

Code	4211	Message	IPM temperature	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when IPM is over-heated.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Under the status that the ambient temperature is high.	1) Check if the ambient temperature exceeds 50℃. 2) Improve the ambient temperature of the driver and cooling conditions.
Over-heating alarm occurs continuously.	1) Check if the accumulated operation overload rate [0x2603] among driver parameters is less than 100%. 2) Check if the load is less than 100% by verifying the motor temperature [0x261D] among driver parameters. 3) Adjust the gain of motor. 4) Alter the capacity of driver and motor.
Problem in driver	1) Check if the alarm continuously occurs by applying a power again. 2) When the alarm continuously occurs, it is possible for driver to have a problem. Thus, replace the driver.

1. Caution is required for burning accident by over-heating in case of the alarm above.

Code	4214	Message	Over current	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when an over-current flows.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Defect in cables of motor or encoder	1) Check the wiring status or short status of cables. 2) Replace cables of motor or encoder.
Error in parameter setting related to motor or encoder	1) Check the defined values by moving to the parameters related to motor. 2) Execute again after modification if the parameters do not match the controller information.
Problems in motor phase resistance	1) Check the resistance between phases of motor. (the resistance of U-V, V-W, W-U is less than several Ω) 2) Replace the motor when identifying the problems such an unbalance in resistance between phases.
Abnormal status in mechanical parts	1) Check if there exists a collision or a constraint of devices. 2) Restore the system into normal state by checking the mechanical part.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, it is possible for driver to have a problem. Thus, replace the driver.
Problems caused by noises	1) Check the FG wiring status. 2) Alter the size of FG wirings to the wiring size of main circuit of the driver.

Code	4215	Message	Current offset	ROBOT: ⓐ AXIS: ⓑ
Description	Current Offset error occurs			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
The offset margin for phase current of U, V, W in motor was excessively set.	1) Check if the offset margin for phase current of U/V/W [0x2015]~[0x2017] among driver parameters is more than 5% of the rated current.
Problem occurred in driver.	1) When the alarm consistently occurs after adjusting the offset for phase current, it is possible for driver to have a problem. Thus, replace the driver.

Code	4216	Message	Current limit exceed	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when the Current limit value was exceeded.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Defect in cables of motor or encoder	1) Check the wiring status or short status of cables. 2) Replace cables of motor or encoder.
Error in parameter setting related to motor or encoder	1) Check the defined values by moving to the parameters related to motor. 2) Execute again after modification if the parameters do not match the Controller information.
Problems in motor phase resistance	1) Check the resistance between phases of motor. (the resistance of U-V, V-W, W-U is less than several Ω) 2) Replace the motor when identifying the problems such an unbalance in resistance between phases.
Abnormal status in mechanical parts	1) Check if there exists a collision or a constraint of devices. 2) Restore the system into normal state by checking the mechanical part.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, it is possible for driver to have a problem. Thus, replace the driver.
Problems caused by noises	1) Check the FG wiring status. 2) Alter the size of FG wirings to the wiring size of main circuit of the driver.

Code	4221	Message	Continuous overload	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs in case of continuous overload.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
In case of continuous operation with overload	1) Check if the accumulated operation overload rate [0x2603] among driver parameters is less than 100%. 2) Adjust the gain of motor. 3) Alter the capacity of driver and motor.
Abnormal status in motor Brake	1) Check if motor Brake was opened in servo on. 2) Check if power is well applied to motor brake.
Error in parameter setting related to motor or encoder	1) Check the setting values by moving to the parameters related to motor. 2) Execute again after modification if the parameters 3) Do not match with the controller information.
In case of errors in basic load rate setting for overload detection among driver parameters	1) Check the basic overload rate setting for overload detection [0x200F] among driver parameters. 2) Execute again after adjusting with an appropriate value.
Defect in cables of motor or encoder	1) Check the wiring status or short status of cables. 2) Replace cables of motor or encoder.
Abnormal status in mechanical parts	1) Check if there exists a collision or a constraint of devices. 2) Check if a normal operation is possible by verifying the mechanical part.

Code	4222	Message	Driver temperature 1	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs in case of driver over-heating1.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Under the status that the ambient temperature is high.	1) Check if the ambient temperature exceeds 50℃. 2) Improve ambient temperature and cooling conditions of the driver.
Problems in driver	1) Check if value of the driver temperature 1 [0x260B] is displayed differently from the ambient temperature under normal state. 2) Replace a driver.

1. Caution is required for burning accident by over-heating in case of the alarm above.

Code	4223	Message	Regeneration overload	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs in case of Regeneration overload.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
In case that high frequency or continuous operations occurred in the regeneration driving.	1) Check the accumulated regeneration overload rate [0x2606] among driver parameters. 2) Check the connection of an external regeneration resistor, alter the capacity of the resistor if it has been already connected and make a connection if not.
Error in parameter setting related to the regeneration resistor among driver parameters	1) Check the parameter setting related to the regeneration resistor [0x2009] ~ [0x200E] among driver parameters. 2) Execute again after adjusting with an appropriate value.
Errors in Input voltage of main power	1) Check if the input voltage of main power is 544VAC. 2) Check the power source again.
Problems in driver	1) Check if there is a heat on the regeneration resistor with no operation. 2) Replace a driver if the alarm occurs with no verification of heat.

1. Caution is required for electric shock when checking the supply voltage due to the alarm above.

Code	4224	Message	Motor cable open	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when motor cable was disconnected.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Error in parameter setting of phase current of U, V, W among driver parameters	1) Check the offset value setting for phase current of U/V/W [0x2015]~[0x2017] among driver parameters.
Defect in motor cable	1) Check the wiring status or short status of cables. 2) Replace cables of motor.
In case of a short circuit among U, V, W phases within a motor	1) Check if a short circuit among U, V, W occurred within a motor. 2) Replace a motor if case of a problem.
Problems in driver	1) Check if the corresponding alarm consistently occurs under servo on. 2) If the alarm is consistent, replace the driver.

Code	4225	Message	Driver temperature 2	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs in case of driver over-heating2.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Under the status that the ambient temperature is high.	1) Check if the ambient temperature exceeds 50℃. 2) Improve the driver ambient temperature and cooling conditions.
Problems in driver	1) Check if the temperature 2 value [0x260C] of driver among driver parameters is displayed differently from the ambient temperature under normal state. 2) Replace a driver.

1. Caution is required for burning accident by over-heating in case of the alarm above.

Code	4226	Message	Encoder temperature	ROBOT: ⓐ AXIS: ⓑ
Description	Encoder over-heat			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
In case of high temperature of encoder inside	1) Check if the internal temperature display of encoder [0x260D] is different from the ambient temperature.
Problems in encoder	1) Replace the encoder.

Code	4227	Message	Motor temperature	ROBOT: ⓐ AXIS: ⓑ
Description	Motor over-heat			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
In case of continuous operation with excessive higher load than the rated	1) Check if the accumulated operation overload rate [0x2603] is less than 100%. 2) Adjust the gain of motor. 3) Alter the capacity of driver and motor.
Abnormal status in motor brake	1) Check if motor brake was released in servo on. 2) Check if power is well supplied to motor brake.
Error in parameter setting related to motor or encoder	1) Check the setting values by moving to the parameters related to motor. 2) Execute again after modification if the parameters do not match with the controller information.
Errors in thermal time constant setting of motor among driver parameters	1) Check the thermal time constant of the 3^{rd} Party motor. 2) Execute again after adjusting with an appropriate value.
Abnormal status in mechanical parts	1) Check if there exists a collision or a constraint of devices. 2) Check if a normal operation is possible by verifying the mechanical part.

1. Caution is required for burning accident by over-heating in case of the alarm above.

Code	4230	Message	Encoder comm err	ROBOT: ⓐ AXIS: ⓑ
Description	Encoder Communication Error			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Defects in encoder cable	1) Check the wiring status or short status of cables. 2) Replace cables of encoder.
Error in parameter setting related to motor or encoder	1) Check the setting values by moving to the parameters related to motor. 2) Execute again after modification if the parameters do not match with the controller information.
Problems in encoder	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the motor.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4231	Message	Encoder cable open	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when encoder cable was cut.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Defect in encoder cable	1) Check the wiring status or short status of cables. 2) Replace cables of encoder.
Error in parameter setting related to motor or encoder	1) Check the setting values by moving to the parameters related to motor. 2) Execute again after modification if the parameters do not match with the Controller information.
Problems in encoder	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the motor.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4232	Message	Encoder data err	ROBOT: ⓐ AXIS: ⓑ
Description	In case of encoder data error			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Defect in encoder cable	1) Check the wiring status or short status of cables. 2) Replace cables of encoder.
Error in parameter setting related to motor or encoder	1) Check the setting values by moving to the parameters related to motor. 2) Execute again after modification if the parameters do not match with the Controller information.
Problems in encoder	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the motor.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4233	Message	Motor ID setting	ROBOT: ⓐ AXIS: ⓑ
Description	In case of wrong setting in Motor ID			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Errors in Motor ID (WATT) setting	1) Check the setting values by moving to the parameters related to Motor ID (WATT). 2) Execute again after modification if the parameters do not match with the Controller information
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4234	Message	Z phase open err	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when the Motor Z phase was opened.			
Monitoring	Periodically checking		Alarm Level	3
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Defect in cables of motor or encoder	1) Check the wiring status or short status of cables. 2) Replace cables of motor or encoder.
Problems in encoder	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the motor.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4235	Message	Low battery err	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when the encoder battery became low voltage state.			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
Errors in encoder parameter setting	1) Check the value by moving to encoder type (ENCTY) parameter. 2) Modify the value if it doesn't match with that of the Controller information. 3) Apply the power again.
Poor connection or miss connection of battery	1) Check the battery connection status. 2) Properly connect the battery once verifying wrong connection. 3) Perform Multi-Turn Clear and Calibration. 4) Apply the power again.
In case of low battery voltage	1) Check if the battery voltage is over 3.3V. 2) Replace the battery if the voltage is lower than the reference. 3) Perform Multi-Turn Clear and Calibration. 4) Apply the power again.

Code	4236	Message	Sin ENC amplitude	ROBOT: ⓐ AXIS: ⓑ
Description	In case of errors in the amplitude of encoder sine waves			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Defect in cables of encoder	1) Check the wiring status or short status of cables. 2) Replace cables of encoder.
Errors in parameter setting for Encoder type among driver parameters	1) Check the setting value of Encoder type parameter [0x2001] among driver parameters. 2) Modify the value if it doesn't match with that of the Controller information.
Problems in encoder	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the motor.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4237	Message	Sin ENC frequency	ROBOT: ⓐ AXIS: ⓑ
Description	In case of errors in the frequency of encoder sine waves			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Defect in cables of encoder	1) Check the wiring status or short status of cables. 2) Replace cables of encoder.
Errors in parameter setting for Encoder type among driver parameters	1) Check the setting value of Encoder type parameter [0x2001] among driver parameters. 2) Modify the value if it doesn't match with that of the controller information.
Problems in encoder	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the motor.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4238	Message	Encoder setting	ROBOT: ⓐ AXIS: ⓑ
Description	In case of errors in encoder setting			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Errors in combining driver and motor	1) Check the brand label and code of driver and motor.
Defect in cables of encoder	1) Check the wiring status or short status of cables. 2) Replace cables of encoder.
Problems in encoder	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the motor.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4239	Message	Encoder Over Current	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when the over-current flows in encoder			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Defect in cables of encoder	1) Check the wiring status or short status of cables. 2) Replace cables of encoder.
Problems in encoder	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the motor.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4240	Message	Under voltage	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs in case of low voltage			
Monitoring	Periodically checking		Alarm Level	3
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Problems in Input voltage of main power source	1) Check if main power voltage is over about 134VAC. 2) Check the power again.
In case that DC link voltage is below the reference	1) Check if DC link voltage [0x2605] of driver parameter is over 165VDC under normal supply status of main power. 2) Replace driver if the problem is verified.
In case of frequent accelerations	1) Adjust acceleration/deceleration time.
In case that the voltage of main power source drops	1) Check the wiring of main power source. 2) Check if there was an instantaneous power failure in factory. 3) Check the supply voltage

Code	4241	Message	Over voltage	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when the over-current flows.			
Monitoring	Periodically checking		Alarm Level	3
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Problems in Input voltage of main power source	1) Check if main power voltage is over about 286VAC. 2) Check the power again.
In case that DC link voltage is over the reference	1) Check if DC link voltage [0x2605] of driver parameter is over 405VDC under normal supply status of main power. 2) Replace driver if the problem is verified.
In case of big external regeneration resistance	1) Check the operation conditions & external regeneration resistance. 2) Review the regeneration resistance value again in considering the operation conditions & load.
In case of frequent accelerations	1) Adjust acceleration/deceleration time.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

1. Caution is required for electric shock when checking the supply voltage due to the alarm above.

Code	4242	Message	Main power fail	ROBOT: ⓐ AXIS: ⓑ
Description	Problem occurs in main power source.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Errors in Input voltage of main power	1) Check the power again.
In case that the input state of main power doesn't match with the input mode setting value of main power among driver parameters	1) Check the input mode setting value [0x2006] of main power among driver parameters.
In case of an instantaneous power failure	1) Check the setting value of phase check time [0x2007] in the main power or the source of power supply.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4243	Message	Control power fail	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs in case of the control power source.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Errors in Input voltage of main power	1) Check the power again.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4244	Message	DC Fan Trip	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs when driver Fan doesn't operate.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Problems in Fan	1) Check the cable connection status of Fan. 2) Replace a Fan if it doesn't operate.
Problems in driver	1) Replace a driver when the alarm consistently occurs after replacing the driver Fan because there is a possibility of problems in driver.

Code	4250	Message	Over speed limit	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs in case of over speed.			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
Defect in cables of motor or encoder	1) Check the wiring status or short status of cables. 2) Replace cables of motor or encoder.
Problems in parameter setting	1) Check the parameters for Motor ID(WATT), Encoder type (ENCTY), Encoder resolution (ENC). 2) Check the GEAR ratio setting. 3) Modify any item that is inconsistent with the Controller specification for the above parameters if any. 4) Check the motor gain parameter and adjust the gain according to the operation conditions.
Problems in encoder	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the motor.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4251	Message	POS following	ROBOT: ⓐ AXIS: ⓑ
Description	It occurs in case of significant position error			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
Problems in parameter setting	1) Check if the GEAR ratio setting is in line with the specification and modify it if is not. 2) Check the position error range (FOW) setting and adjust it again according to the operation conditions.
In case that motor gain is too low	1) Check the motor gain parameter and adjust it again according to operation condition.
Abnormal status in mechanical parts	1) Check if there exists a collision or a constraint of devices. 2) Restore the system into normal state by checking the mechanical part.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4253	Message	Excessive deviation	ROBOT: ⓐ AXIS: ⓑ
Description	In case that a significant speed error occurred			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
Defect in cables of motor or encoder	1) Check the wiring status or short status of cables. 2) Replace cables of motor or encoder.
Problems in parameter setting	1) Check the parameters for Motor ID (WATT), Encoder type (ENCTY), Encoder resolution (ENC). 2) Check the GEAR ratio setting. 3) Modify any item that is inconsistent with the Controller specification for the above parameters if any.
In case that motor gain is too high or too low	1) Check the motor gain parameter and adjust the gain according to the operation conditions.
Abnormal status in mechanical parts	1) Check if there exists a collision or a constraint of devices. 2) Restore the system into normal state by checking the mechanical part.
Problems in encoder	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the motor.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4263	Message	Parameter checksum ROBOT: ⓐ AXIS: ⓑ	
Description	It occurs when there is a problem in driver parameter data.			
Monitoring	When transmitting driver parameter		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
In case of changing driver OS	1) Check if there is any parameter that was set as the max value in a variable type by verifying the driver parameter setting. 2) Return to the initial driver parameter. 3) After returning to the initial driver parameter, set the parameter according to the Controller specification that was used before the operation.
Problems in driver	1) Check if the alarm consistently occurs by applying the power again. 2) When the alarm consistently occurs, replace the driver.

Code	4271	Message	Factory setting ROBOT: ⓐ AXIS: ⓑ	
Description	Abnormal value in factory setting			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
In case of parameter setting error	1) Set the driver capacity again or download the O/S again. 2) Replace the driver if the alarm consistently occurs after applying the power again.

Code	4501	Message	Ethercat stop	ROBOT: ⓐ AXIS: ⓑ
Description	In case of complete loss in EtherCAT communication			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
XML File Error	1) Check if the XML file according to the Controller specification was used. 2) If it was not properly set, execute the Controller again after modifying the XML file.
LAN Cable Error	1) Check the LAN cable between main board and driver. 2) Insert a LAN cable properly and replace a cable in case of defects.

Code	4502	Message	Ethercat Comm fail	ROBOT: ⓐ AXIS: ⓑ
Description	In case of error during EtherCAT communication			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping, Unable to both handle JOG and execute program			

Causes	Measures
LAN Cable Error	1) Check if the alarm consistently occurs. 2) Check the LAN cable between main board and driver. 3) Insert a LAN cable properly and replace a cable in case of defects.

9. Graphic T/P (5001~5100)

Code	5001	Message	Socket hung up		
Description	It occurs when the communication between graphic T/P and Controller was lost.				
Monitoring	Periodically checking			Alarm Level	1
Influence	Robot operation stopping & unable to operate				

Causes	Measures
In case that an error was received or the connection as terminated by the client	1) Check if the same symptom occurs after connecting a graphic T/P again. 2) Replace the graphic T/P in case that the damages or defects of the graphic T/P cable are verified. 3) Check the status of graphic T/P through key input and replace the graphic T/P in case of problem. 4) If no problem is observed in the graphic T/P, connect it to another Controller. If a problem occurs, replace the graphic T/P. 5) When connecting to another Controller, if the graphic T/P operate normally, check the damages in connector as well as the Interface & Safety boards.

Code	5002	Message	GTP timeout		
Description	In case that the time out occurred during a communication in progress between the graphic T/P and the Controller				
Monitoring	Periodically checking			Alarm Level	1
Influence	Robot operation stopping & unable to operate				

Causes	Measures
In case that Acknowledge signal was not received until termination of timer after data transmission between the graphic T/P and the Controller	1) Check if the same phenomenon occurs after connecting a graphic T/P again. 2) Replace the graphic T/P in case that the damages or defects of the graphic T/P cable are verified.

10. KeDrive Error list (5001~5100)

KeDrive Alarm

Code	5010-0	Message	General overcurrent	
Description	General overcurrent			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5010-1	Message	Hardware overcurrent	
Description	Hardware overcurrent detected			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5010-2	Message	Software overcurrent	
Description	Software overcurrent detected			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5010-3	Message	Inverter error	
Description	Inverter error			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5010-4	Message	DC overcurrent		
Description	DC overcurrent detected				
Monitoring	Periodically checking			Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program				

Causes	Measures
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5010-6	Message	Poser stage overload	
Description	Power stage high overload I2T limit exceeded			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5010-7	Message	Maximum current err	
Description	Actual current exceeds motor maximum current			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5010-8	Message	Motor wirebreak err	
Description	Motor wirebreak detected			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• A motor wire-break was detected. Please check motor connection.
	• Please check parameter CON_MPCHK. Make a scope record with the motor's phase currents.

Caution is required for electric shock when checking the supply voltage due to the alarm above.

Code	5010-9	Message	Sum current too high	
Description	Sum current u+v+w too high, possible short circuit to ground			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Caution is required for electric shock when checking the supply voltage due to the alarm above.

Code	5011-0	Message	I2T limit exceeded	
Description	I2T limit exceeded (device protection)			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• The long-term r.m.s current is too high. Reduce load or consider using a larger device.
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.

Code	5011-1	Message	I2T limit exceeded	
Description	I2T limit exceeded (device protection)			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• The long-term r.m.s current is too high. Reduce load or consider using a larger device.
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.

Code	5012-0	Message	I2T limit exceeded	
Description	I2T limit exceeded (device protection)			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• The long-term r.m.s current is too high. Reduce load or consider using a larger device.
	• Please check motor protection settings
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.

Code	5012-1	Message	I2T limit exceeded		
Description	I2T limit exceeded (device protection)				
Monitoring	Periodically checking			Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program				

Causes	Measures
	• The long-term r.m.s current is too high. Reduce load or consider using a larger device.
	• Please check motor protection settings
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.

Code	5013-0	Message	Motion control error	
Description	General Motion control error			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
	• Quit error and start again
This is probably a software issue.	• Please try to switch to a different version of device firmware. • Save your dataset and reset the axis module to factory setting. See if the error persists, or if it comes with activating a certain feature.

Code	5013-1	Message	To many point cmmand	
Description	Set of set points: Stack overflow, to many set points commanded			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
	• Please re-view master PLC program.

Code	5013-2	Message	Software limit	
Description	Software limit switch would be violated by new profile mode command. Command is discarded.			
Monitoring	Periodically checking		Alarm Level	1
Influence	Robot operation stopping			

Causes	Measures
	• Please check position limitation and reference value

Code	5013-3	Message	Failed to move axis
Description	Failed to move axis to TargetPosition: distance too large		

Monitoring	Periodically checking	Alarm Level	1
Influence	Robot operation stopping		

Causes	Measures
	• Please check auto-commutation settings. Consider using method with minimum movement.
	• Consider raising the position tracking error threshold, or changing EnOpOPC to FORCE.

Code	5014-0	Message	Over voltage detect	
Description	Over voltage detected			
Monitoring	Periodically checking		Alarm Level	3
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
An over-voltage occurred.	• Please check if the actual grid voltage matches the supply setting (parameter PST_VoltageSupply) • Over-voltage may be caused by a decelerating axis, possibly with high inertia. Reduce deceleration ramp. • Consider using a braking resistor with higher power. If the supply unit has an internal braking resistor, please contact your service partner

Caution is required for electric shock when checking the supply voltage due to the alarm above.

Code	5014-1	Message	Over voltage detect	
Description	Device monitoring: Over voltage detected			
Monitoring	Periodically checking		Alarm Level	3
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
An over-voltage occurred.	• Please check if the actual grid voltage matches the supply setting (parameter PST_VoltageSupply) • Over-voltage may be caused by a decelerating axis, possibly with high inertia. Reduce deceleration ramp. • Consider using a braking resistor with higher power. If the supply unit has an internal braking resistor, please contact your service partner

Caution is required for electric shock when checking the supply voltage due to the alarm above.

Code	5014-2	Message	DC link out of range	
Description	DC link center out of range			
Monitoring	Periodically checking		Alarm Level	3
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• This axis module seems to be broken. Switch off power supply and replace it.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5015-0	Message	Under voltage detect	
Description	Under voltage detected			
Monitoring	Periodically checking		Alarm Level	3
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
An under-voltage occurred on the drive while this axis was switched on.	• Power supply was possibly switched off. • Please check if the actual grid voltage matches the supply setting (parameter PST_VoltageSupply) • Verify that the grid is stable under load condition.

Code	5015-1	Message	Under voltage detect	
Description	Device monitoring: Under voltage detected			
Monitoring	Periodically checking		Alarm Level	3
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
An under-voltage occurred on the drive while this axis was switched on.	• Power supply was possibly switched off. • Please check if the actual grid voltage matches the supply setting (parameter PST_VoltageSupply) • Verify that the grid is stable under load condition.

Code	5018-0	Message	Over temperature	
Description	Overtemperature Detected			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please check outside temperature and air flow. • Reduce output power or switching frequency. • This error may also be caused by other axes of this device.
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Caution is required for burning accident by over-heating in case of the alarm above.

Code	5018-1	Message	High in temperature	
Description	Interior temperature too high			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please check outside temperature and air flow. • Reduce output power or switching frequency. • This error may also be caused by other axes of this device.
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Caution is required for burning accident by over-heating in case of the alarm above.

Code	5018-2	Message	High power temp	
Description	Power stage temperature too high			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please check outside temperature and air flow. • Reduce output power or switching frequency. • This error may also be caused by other axes of this device.
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5020-1	Message	Power controller err	
Description	Power stage controller framing error			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please check 24V supply for short-time power loss.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.
This is probably a software issue.	• Please try to switch to a different version of device firmware. • Save your dataset and reset the axis module to factory setting. See if the error persists, or if it comes with activating a certain feature.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5020-2	Message	Power controller err	
Description	Power stage controller checksum error			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please check 24V supply for short-time power loss.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.
This is probably a software issue.	• Please try to switch to a different version of device firmware. • Save your dataset and reset the axis module to factory setting. See if the error persists, or if it comes with activating a certain feature.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5020-3	Message	Power controller err	
Description	Power stage controller I/O error			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please check 24V supply for short-time power loss.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.
This is probably a software issue.	• Please try to switch to a different version of device firmware. • Save your dataset and reset the axis module to factory setting. See if the error persists, or if it comes with activating a certain feature.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5020-4	Message	Power controller err	
Description	Initialization of power stage parameters failed			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
This is probably a software issue.	• Please try to switch to a different version of device firmware. • Save your dataset and reset the axis module to factory setting. See if the error persists, or if it comes with activating a certain feature.

Code	5020-5	Message	Supply para init err	
Description	Initialization of supply parameters failed			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
This is probably a software issue.	• Please try to switch to a different version of device firmware. • Save your dataset and reset the axis module to factory setting. See if the error persists, or if it comes with activating a certain feature.

Code	5021-1	Message	Unspecified brake er	
Description	Motor brake wire break detected			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please check the wiring of the motor brake.

Code	5021-2	Message	Brake not release	
Description	Motor brake not released though release requested			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please increase the motor brake lift time.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5021-3	Message	Brake current limit
Description	Brake check: Current reached limit.		

Monitoring	Periodically checking	Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program		

Causes	Measures
	• If possible, increase the current limit. Consider using lower switching frequency.

Code	5021-4	Message	Brake torque limit
Description	Brake check: Reached torque limit		
Monitoring	Periodically checking	Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program		

Causes	Measures
	• if possible, increase the torque limit

Code	5021-6	Message	Brake wrong mode
Description	Brake Check: wrong mode		
Monitoring	Periodically checking	Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program		

Causes	Measures
	• Exactly one bit in Parameter MPRO_BRK_CK_Control/ MODE field can be set

Code	5021-7	Message	Brake no direction	
Description	Brake Check: no direction defined			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			
Causes			Measures	
			• Exactly one bit in Parameter MPRO_BRK_CK_Control/ Dir field can be set	

Code	5021-8	Message	Brake grind timeout	
Description	Brake Check: Grind in timeout			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			
Causes			Measures	
			• Increase timeout setting in Parameter GrindTO	

Code	5021-9	Message	Brake power off	
Description	Brake Check: power stage off			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			
Causes			Measures	
			• Enable control	

Code	5024-0	Message	Unspecified error	
Description	Supply unit: Unspecified error			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
An error occurred on the cross-communication line.	• Please check cross communication cabling (X3/X4 or X40A/X40B, whichever applies). • Cross communication must not be connected across different power supplies. • The last axis module's X4 or X40B connector (whichever applies) must remain open. • All axis modules on a cross communication should run the same firmware. • Though this error is displayed by all axis modules, the cause is often a single device or cable. Try to locate the fault by excluding devices from cross-communication.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5024-2	Message	Above chopper limit	
Description	Supply unit: Line voltage above chopper limit			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Nominal voltage in para 602.0 is lower than detected grid voltage. Check nominal voltage and grid connection

Code	5024-7	Message	24V Power supply err	
Description	Supply unit: Error in 24V power supply unit			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Communication to the 24V supply print is missing. Check if the supply unit features a 24V supply. • Check parameter 702-5.
An error occurred on the cross-communication line.	• Please check cross communication cabling (X3/X4 or X40A/X40B, whichever applies). • Cross communication must not be connected across different power supplies. • The last axis module's X4 or X40B connector (whichever applies) must remain open. • All axis modules on a cross communication should run the same firmware. • Though this error is displayed by all axis modules, the cause is often a single device or cable. Try to locate the fault by excluding devices from cross-communication.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.
This is possibly a hardware issue,	• If other measures fail to solve the problem, please replace the axis module

Code	5024-16	Message	DC link overvoltage	
Description	Supply unit: DC link overvoltage			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• DC link voltage higher than defined in parameter 613.2. Check nominal voltage in para 602.0. Check brake resistor
An over-voltage occurred.	• Please check if the actual grid voltage matches the supply setting (parameter PST_VoltageSupply) • Over-voltage may be caused by a decelerating axis, possibly with high inertia. Reduce deceleration ramp. • Consider using a braking resistor with higher power. If the supply unit has an internal braking resistor, please contact your service partner

Caution is required for electric shock when checking the supply voltage due to the alarm above.

Code	5024-24	Message	Brake resistor over	
Description	Supply unit: Brake resistor overcurrent			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please check brake resistor. Use chopper with higher resistance.

Code	5024-27	Message	Undervoltage grid	
Description	Supply unit: Undervoltage grid			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			
Causes			Measures	
			• Grid voltage too low. Check grid connection and nominal voltage in para 602.0. This check is only performed once at the end of the preload phase.	

Code	5024-28	Message	Rectifier overload	
Description	Supply unit: Rectifier Overload			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			
Causes			Measures	
			• The calculated rectifier temperature exceeds the limit. Reduce peak current.	

Caution is required for burning accident by over-heating in case of the alarm above.

Code	5024-29	Message	DC link balance err	
Description	Supply unit: DC link voltage balance out of range			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			
Causes			Measures	
			• The supply unit seems to be broken. Switch off power supply and replace it	
This is possibly a hardware issue.			• If other measures fail to solve the problem, please replace the axis module	

Code	5024-30	Message	Short circuit detect	
Description	Supply unit: Brake transistor or DC link short circuit detected			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			
Causes		Measures		
		• Check DC link load. • Check DC link connection for short circuit.		

Caution is required for electric shock when checking the supply voltage due to the alarm above.

Code	5024-31	Message	Short ground detect	
Description	Supply unit: Short circuit to ground detected.			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			
Causes		Measures		
		• Check DC link connection. • Check motor connection of all axes.		

Caution is required for electric shock when checking the supply voltage due to the alarm above.

Code	5024-32	Message	IGBT short circuit	
Description	Supply unit: Load IGBT short circuit detected			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please check brake resistor. Use lower resistance.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Code	5024-33	Message	Brake resistor error	
Description	Supply unit: Brake resistor not connected			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please check brake resistor. Use lower resistance.

Code	5024-34	Message	Interior temp high	
Description	Supply unit: Interior temperature too high			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please check outside temperature and air flow. • Reduce output power of whole assemblage.
This is possibly a hardware issue.	• If other measures fail to solve the problem, please replace the axis module

Caution is required for burning accident by over-heating in case of the alarm above.

Code	5024-37	Message	Interior temp high	
Description	Supply unit: 24V supply: interior temperature too high			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Please check outside temperature and air flow. • Reduce 24V power consumption. • Reduce output power of whole assemblage.

Caution is required for burning accident by over-heating in case of the alarm above.

Code	5024-41	Message	24V supply overload	
Description	Supply unit: 24V supply: overload			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			
Causes			Measures	
			• Check 24V power consumption for peaks.	

Code	5024-49	Message	DC link overload	
Description	Supply unit: DC link supply overload			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			
Causes			Measures	
The DC line current on whole system was too high.			• If possible, reduce the needed current on the relevant axes, especially those with high power rating. • Try to use sequential movement of the relevant axes.	

Code	5024-53	Message	Chopper current low	
Description	Supply unit: Chopper current too low			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			
Causes			Measures	
			• The system needs a chopper resistor connected to the supply unit. Please check manual for allowable resistance range. • Check cabling of chopper resistor	

Code	5024-54	Message	Chopper error	
Description	Supply unit: Chopper current too low			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• The system needs a chopper resistor connected to the supply unit. Please check manual for allowable resistance range. • Check cabling of chopper resistor

Code	5024-55	Message	Grid choke temp err	
Description	Supply unit: grid choke temperature			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
	• Temperature protection switch for grit choke has triggered. Check cabling of chopper resistor • If protection switch is not needed, please check parameter P717.0
The DC line current on whole system was too high.	• If possible, reduce the needed current on the relevant axes, especially those with high power rating. • Try to use sequential movement of the relevant axes.

Code	5025-0	Message	Motor temp too high	
Description	Motor temperature too high			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
The motor temperature is too high.	• Please let the motor cool down. • Please check motor temperature and motor temperature resistance (PTC sensors do not report the motor temperature). If the values are not plausible, check cables and sensor type. • If you are not using a system motor, please check with the motor manufacturer if the motor can stand a higher temperature
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.

Caution is required for burning accident by over-heating in case of the alarm above.

Code	5025-1	Message	Max motor temp		
Description	Motor temperature reached TMax value				
Monitoring	Periodically checking			Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program				

Causes	Measures
The motor temperature is too high.	• Please let the motor cool down. • Please check motor temperature and motor temperature resistance (PTC sensors do not report the motor temperature). If the values are not plausible, check cables and sensor type. • If you are not using a system motor, please check with the motor manufacturer if the motor can stand a higher temperature
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.

Caution is required for burning accident by over-heating in case of the alarm above.

Code	5025-4	Message	Encoder temp high	
Description	Encoder temperature too high			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
The motor temperature is too high.	• Please let the motor cool down. • Please check motor temperature and motor temperature resistance (PTC sensors do not report the motor temperature). If the values are not plausible, check cables and sensor type. • If you are not using a system motor, please check with the motor manufacturer if the motor can stand a higher temperature
An overcurrent was detected.	• Please check current control settings and step response. • Check the motor's saturation settings (parameter MOT_LSigDiff). If the error occurred in high-current range, lower saturation values manually. • If possible, reduce the needed current, especially in low-frequency range. • If possible, lower the switching frequency or enable automatic frequency selection. • Check if the encoder offset is set properly. • Consider using an axis module with higher current rating.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.

Caution is required for burning accident by over-heating in case of the alarm above.

Code	5032-3	Message	Motor parameter err	
Description	Error in motor parameters			
Monitoring	When transmitting driver parameter		Alarm Level	0
Influence	None			

Causes	Measures
	• Check motor electrical parameters
This issue is probably caused by an unsuit able parameter setting.	• Save your parameter set for a later restore. • See 'history of parameter changes' and undo the latest change. • Please check your parameter set for implausible settings. • Please set device to factory setting, restart, and see if the error occurs again. • When reporting this error to your service partner, please include your device's parameter setting.

Code	5032-4	Message	No motor type	
Description	No motor type was specified			
Monitoring	When transmitting driver parameter		Alarm Level	0
Influence	None			

Causes	Measures
	• Check motor parameters
This issue is probably caused by an unsuit able parameter setting.	• Save your parameter set for a later restore. • See 'history of parameter changes' and undo the latest change. • Please check your parameter set for implausible settings. • Please set device to factory setting, restart, and see if the error occurs again. • When reporting this error to your service partner, please include your device's parameter setting.

Code	5032-7	Message	Motor parameter err
Description	Error in motor parameters/ synchronous motor		

Monitoring	When transmitting driver parameter	Alarm Level	0
Influence	None		

Causes	Measures
	• Check motor electrical parameters
This issue is probably caused by an unsuit able parameter setting.	• Save your parameter set for a later restore. • See 'history of parameter changes' and undo the latest change. • Please check your parameter set for implausible settings. • Please set device to factory setting, restart, and see if the error occurs again. • When reporting this error to your service partner, please include your device's parameter setting.

Code	5036-220	Message	Multiturn pos lost#1
Description	Encoder #1: Battery low, multiturn position is lost (Encoder error while switched off)		
Monitoring	Periodically checking	Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program		

Causes	Measures
	• Check voltage and cabling of encoder backup battery. Replace battery, quit error and repeat homing
The encoder is not connected or not working properly.	• If this is encoder has analogue signals, please check the signal amplitude vs. parameter EncObsMin • Check cabling. If available, please try another encoder and cable. • See detailed error information (>>) for a more detailed description.

Code	5036-230	Message	SmartAbs encoder err	
Description	Encoder #1: SmartAbs encoder error (Encoder error while switched off)			
Monitoring	Periodically checking		Alarm Level	2
Influence	Robot operation stopping, unable to both handle JOG and execute program			

Causes	Measures
The encoder is not connected or not working properly.	• If this is encoder has analogue signals, please check the signal amplitude vs. parameter EncObsMin • Check cabling. If available, please try another encoder and cable. • See detailed error information (>>) for a more detailed description.
This is possibly an EMC issue. This is very likely if the problem occurs when switching on motor control and/ or when connecting DC link power supply.	• Please check the device cabling for proper connection. • Please check device grounding, i. e. the connection to a metal backplane and cabinet connection to earth. • .Check motor grounding and motor cable length.

Chapter 4 Revision

Revision	Date	Revision Detail
1	2019-01-10	Initial Distribution

A. Literature Reference

All the literature, which are required for performing services, repair or installation of all robot system that uses this product, are specified in this chapter.
In the ID of all literature, the very first word indicates the Controller name and the second word means the abbreviation of corresponding literature. The last indicates language and its version.

Language is marked according to the rules below.

- Korean: K
- English: E
- Chinese: C
- Japanese: J
- Vietnam: V

The document IDs listed in the table below always indicate the most recent version.

Document ID	Description
N2-IM-E01	**Installation and handling manual** This explains the Controller structure and installation as well as the methods to interface with external devices.
N2-BM-E01	**Beginner's guide** This provides brief description and method to use for the first time users.
N2-OM-E01	**Operation manual** This explains the method to use the Controller and Teach Pendant, parameter setting, JOB program editing and additional functions.
N2-PM-E03	**Programming manual** This explains the method to create RRL (Robostar robot language) that is the Robostar Robot program and describes the commands.
N2-HM-E01	**Unihost manual** This explains about Unihost that is Robostar on-line PC program.
N2-AM-E01	**Alarm and maintenance manual** This explains the information on problems occurred in the Controller-based Robot system as well as solutions and procedure for the problems.

N2 Series Controller

Alarm and Maintenance Manual

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ROBOSTAR CO., LTD.
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