SECTION 7
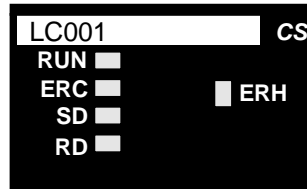# Errors and Alarm Troubleshooting

7-1 Errors and Alarm Troubleshooting

7-1-1 Judging Errors by Indicators

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LC001                  CS
RUN ■
ERC ■        ■ ERH
SD  ■
RD  ■
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Indication	Name	Color	State	Description

RUN	CPU Unit running	Green	Out	• System stopped
				  A probable cause is one of the following:
				  • Initialization of unit in progress
				  • Unit hardware trouble
				  • No power supply from power supply unit
				  • Unit WDT error
				  • Operation of Loop Control Unit stopped
				    (A probable cause is one of the following:)
				    - Regular operation stopped
				    - CPU Unit run stop error
				    - CPU Unit in standby mode
				    - Load rate exceeded at operation cycle of 2 s (Operation Cycle Automatic Switching Generation flag ON)

			Lit	• Loop Control Unit running
ERH	CPU Unit error	Red	Out	• No CPU Unit error
			Lit	• CPU Unit error
ERC	Loop Control Unit error	Red	Out	• No error
			Lit	• Error
			Blinking	• Battery error (Only when DIP switch pin 2 is OFF)
SD	Not used	—	—	—
RD	Not used	—	—	—

Errors that occur during initial processing (at CPU Unit power ON or restart of the Loop Control Unit)

LED			Item	Cause	State	Error code (stored as error log data)	Remedy
RUN	ERH	ERC					
Out	Lit	Out	Unit number setting error	1) The same unit number has been specified twice or more on the same CPU Unit.	All functions stopped	None	1) Set the correct unit number, and turn the power back ON again.
				2) The unit number is not registered to CPU Unit I/O table.		0006 detailed code: 0800	2) Prepare an I/O table.
				3) Failed to recognize the CPU Unit		None	3) Replace the Loop Control Unit if ERH lights even if mounted on a different CPU Unit.
				4) Error occurred during initial processing on CPU Unit.		000F	4) Refer to the *CPU Unit Operation Manual*.
Out	Lit	Lit	Initial recognition error	Failed to recognize the CPU Unit	All functions stopped	None	Replace the Loop Control Unit if ERH/ERC light even if mounted on a different CPU Unit.
Out	Out	Lit	Unit error	Hardware malfunction such as memory malfunction was detected during the self-diagnostic test.	All functions stopped	None	Replace the Loop Control Unit if ERC lights even if mounted on a different CPU Unit.
Out	Out	Out	Power supply failure	1) The correct internal power is not being supplied to the Loop Control Unit.	All functions stopped	None	1) Check the power voltage, and supply the correct power. Or, check the total current consumption of the PC.
				2) The unit is not properly fixed to the Backplane.			2) Firmly fix the Loop Control Unit on the Backplane.
				3) The unit is malfunctioning.			3) Replace the Loop Control Unit if LED goes off even if mounted on a different CPU Unit.
(not related)	(not related)	Lit	Function block database error	1) Drop in internal battery power voltage or battery not mounted (Only when DIP switch pin 2 is OFF)	All functions stopped Running stopped	0331 Detailed code: Block address. FFFF indicates that the entire database is in error.	1) Check the battery connection. If the connection is normal, replace the battery. Then execute initialization using CX-Process Tool.
				2) Data corruption caused by noise	In the case of only a partial error, running is stopped only at the function block in question.		2) Set the data again to the function block in question using CX-Process Tool.

Error that occur during regular running

LED			Item	Cause	State	Error code (stored as error log data)	Remedy
RUN	ERH	ERC					
Lit	Out	Out	Normal	CPU Unit running		None	
Out	Out	Out	Normal or load rate exceeded at operation cycle of two seconds	Running stopped One of the following:		None	
				• Regular running stop			
				• Fatal error on CPU Unit	Running stopped		Cancel the fatal error referring to the CPU Unit Operation Manual.
				• CPU Unit in standby mode			Cancel the standby mode referring to the CPU Unit Operation Manual.
				• Load rate exceeded at operation cycle of 2s (Operation Cycle Automatic Switching Generation flag is ON)	1) Running stopped 2) ITEM068 of System Common block is 1 (ON).		Add on another Loop Control Unit, and distribute processing between Loop Control Units.
(not related)	(not related)	Lit	Function block database error	Data corruption caused by noise	1) Running stopped 2) In the case of only a partial error, operation is stopped only at the function block in question.	0331 Detailed code: Block address. FFFF indicates that the entire database is in error.	Execute initialization using CX-Process Tool. Set the data again to the function block in question using CX-Process Tool.
(not related)	(not related)	Blinking	Battery error	Battery not mounted or drop in internal battery power voltage (Only when DIP switch pin 2 is OFF)	Running continued	0330	Check the battery connection. If the connection is normal, replace the battery.
(not related)	Lit	(not related)	CPU Unit error	One of the following errors occurred on the CPU Unit: 1) WDT error 2) Cyclic monitoring error 3) Bus error	Running stopped	1) 0001 2) 0002 3) 000E	Refer to the *CPU Unit Operation Manual*.

7-1-2 Error Log Data

The configuration of error log data including error codes is as follows. Error log data is stored in RAM (battery-backed up) on the Loop Control Unit. The configuration of each error log is as follows and is regarded as a single record.

Error log data is not stored in flash memory.

RAM can hold up to 256 of the latest records:

1 record	Error code
	Detailed information
	Date (year/month) and time (hour/minute/second) of occurrence

Error log data can be read using the FINS (READ ERROR LOG, [command code 2102 Hex]) command.

7-1-3 System Information

When operation of the Loop Control Unit is started, the unit address and run status of the Loop Control Unit, and other system information is reflected in the first 24 words (eight words per Loop Control Unit) of the Data Memory for the Node Terminals. The leading addresses are allocated by ITEM043 (start address of Data Memory (D) for Node Terminals) in the System Common block (Block Model 000).

The following information is stored to the leading 24 words of Data Memory for the Node Terminals.

	Offset address	Data description	Data location		Default address in I/O memory for block address 000
			Block address	ITEM	
LCU number: 0	+0	Unit address	000	041	D16020
	+1	Loop Control Unit run status			D16021
	+2	CPU Unit run status		007 to 013	D16022
	∫				∫
	+7	Data update check code			D16027
LCU number: 1	+0	Unit address	000	041	D16028
	+1	Loop Control Unit run status			D16029
	+2	CPU Unit run status		007 to 013	D16030
	∫				∫
	+7	Data update check code			D16035
LCU number: 2	+0	Unit address	000	041	D16036
	+1	Loop Control Unit run status			D16037
	+2	CPU Unit run status		007 to 013	D16038
	∫				∫
	+7	Data update check code			D16043

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7-1-4   Execution Error Code List

- The execution error codes shown in the list below are stored in ITEM003 of each function block.

- When there are function blocks containing an error other than 0 (normal), the smallest block number in these function block numbers is stored to ITEM093 of the System Common block (Block Model 000).

- The following information can be checked in the Monitor Run Status screen on CX-Process Tool ([Execute]-[Run]-[Validate Action]):

  - Smallest block address where execution error occurred (ITEM093 of System Common block)

  - Execution error codes that occurred at each function block address (smallest code No. when multiple execution errors occur at a single function block) in the Detailed display screen

Code	Description	Explanation	Operation at error	Remedy
0	Normal			
1	Connection terminal/output terminal connection not defined	Either the function block is not registered to the block address of the source designation or the destination, or the ITEM number does not exist.	Running of the function block in question is stopped, and the functions in question do not operate normally.	Check the block address and ITEM number of the source designation or destination designation.
2	Default error	When run/stop command S1 turned ON in the ramp program or segment program, the reference input was outside the rise ramp range.	The program is not started.	Check the connection of the reference input and program settings.
3	Variable value error	A constant between A1 and A8 or an intermediate buffer between B1 and B4 that is used in the conditional statement for Arithmetic Operation (Block Model 126) is not defined.	Execution of the Arithmetic Operation block will be stopped.	Set definitions for all constants A1 to A8 and an intermediate buffers B1 to B4 that are used.
10	Operation process: Division by "0"	An attempt was made to execute division by a "0" denominator in the operation process.	In the case of Multiplication, DI/AI Terminal from CPU Unit, DI/AI Terminal from Expanded CPU Unit or Field Terminal blocks, the maximum value is output. In the case of the Segment Linearizer or Temperature and Pressure Correction blocks, the previous data is retained.	In the case of DI/AI Terminal from CPU Unit, DI/AI Terminal from Expanded CPU Unit or Field Terminal blocks, check the scaling value, and in the case of the Segment Linearizer block, check the setting value of the input coordinate side. In the case of temperature and pressure correction, check the gain bias value.
11	Operation process: Operation out of restricted value	The output value of the operation result exceeded the data length of two bytes. Note: An error does not occur even if the output range (±320.00, e.g) is exceeded if the data length of two bytes is not exceeded.	Output becomes the maximum value or minimum value of the output range. (For example, when the output range is ±320.00, the output becomes +320.00 or 320.00.)	If there is a problem, review the settings of related ITEMs.
12	Arugument beyond definition	An argument used in Arithmetic Operation (Block Model 126) is beyond the definition.	Execution of the Arithmetic Operation block will be stopped.	Check the range of the arguments and correct the conditional statement or calculation expressions.
15	AT error	A limit cycle cannot be generated for Basic PID (Block Model 011) or Advanced PID (Block Model 012) or suitable PID constants cannot be	Execution of the relevant block will be stopped.	Check the following AT parameters: ITEM 036 to ITEM 040. Also, set ITEM 051 to 2 s or less.

Code	Description	Explanation	Operation at error	Remedy
		calculated.		
19	Inappropriate operation	Two or more S1 to S3 select switches are set to 1 (ON) at the same time in the 3-output Selector block (Block Model 163) or 3-input Selector block (Block Model 164).	The output value that was active before the error occurred is held.	Re-program the Step Ladder Program block so that S1 to S3 select switches are set to 1 (ON) independent of each other.
		There is a syntax error in Arithmetic Operation (Block Model 126), the THEN or ELSE expression is not defined, or the output reverse scaling limits are not set.	Execution of the Arithmetic Operation block will be stopped.	Check the contents of the conditional statement and calculation expressions an check the settings of the output reverse scaling limits.
		There are syntax errors in the membership functions or rules for the Fuzzy Logic block (Block Model 016) making execution impossible. a) A value does not have one sign character and 5 or fewer numeric characters (e.g., when a + sign is included). b) Values are not separated by colons. c) The values that have been set are insufficient. d) There are more than three critical points in a membership functions. e) Critical points in membership functions do not rise to the right. f) Membership functions are not set for labels specified in rules (NL, NS, ZR, PS, PL).	Operation of the Fuzzy Logic block will stop.	Check the membership functions and rules. The ITEM number where the problem occured is given in ITEM 006 (Operation Error Details).
20	Download terminal data exchange error	Data exchange with the CPU Unit is not being executed correctly on the CPU Unit Terminal, Expanded CPU Unit Terminal, Node Terminals and Field Terminal blocks.	The data of the function block in question is not updated.	If a malfunction has occurred on the CPU Unit, follow the remedy for that error. If the CPU Unit is normal, turn ON the power supply again.
21	I/O memory address out-of-range	An address out of the I/O memory address range has been specified on the CPU Unit Terminal, Expanded CPU Unit Terminal, Node Terminals and Field Terminal blocks.	Operation of the function block in question is stopped.	On the CPU Unit Terminal and Expanded CPU Unit Terminal blocks, check the leading address, and on field terminals check the setting of the CIO (channel I/O) Area number setting. In the case of Node Terminals, check the setting of the "leading address of the memory for the node terminals" specified by System Common block ITEM043.
29	Reception error for external device	A communications frame error was generated by the data received from an ES100X Controller for an ES100X Controller Terminal (Block Model 045). (An FCS check error or frame error occured 3 times in a row.	Communications will be stopped with the specified ES100X and tried with another ES100X.	Check the communications path and the communications settings (7 data bits, even parity, and 2 stop bits).
30	Response timeout	A response was not returned after sended data to the Controller for a ES100X Controller Terminal (Block Model 045). (Reponse was not returned for 5 s 3 times.)	Communications will be stopped with the specified ES100X and tried with another ES100X.	Check the communications path, the communications settings (7 data bits, even parity, and 2 stop bits), and other required settings in the ES100X (parameter setting mode, unit number, etc.).

Code	Description	Explanation	Operation at error	Remedy
31	Controller unit number duplicated	The unit number set in ITEM 006 for a ES100X Controller Terminal (Block Model 045) is the same as another ES100X Controller Terminal. (A reponse timeout will occur if the unit number does not exist.)	Communications will be stopped with the ES100X Controllers.	Change the unit number settings (ITEM 006)so that each is used only once.
70	Illegal combination of function blocks	The function block on the primary loop side is not basic PID or advanced PID when bumpless processing between primary/secondary loops was specified in basic PID or advanced PID.	Running of the function block in question is stopped.	Check the function block model number on the primary loop side.
71	Inappropriate parameter	a) When restricted conditions are applied across two ITEMs: (example: when the unit pulse output is equal to or greater than the operation cycle when there is unit pulse output in run time accumulation) b) An attempt has been made to write out-of-range data at the ITEM Setting block.	a) The function block in question is not executed. b) Data cannot be written.	Check the settings of the ITEMs.
80	Step Ladder Program command error	There is an irrelevant command in the Step Ladder Program, or the method of use of commands is wrong, for example, there is an AND command even though there is no input command.	The command in question and onwards are not executed.	Check the program within the Step Ladder Program block.
81	Step Ladder Program source designation not defined	Either the function block is not registered to the block address currently specified by each command in the Step Ladder Program, or the ITEM number does not exist.	The command in question and onwards are not executed.	Check the block address and ITEM number.
89	Overuse of Step Ladder Program differentiated instruction	The number of differentiated instructions to be simultaneously executed has exceeded 256.	Differentiated instructions exceeding 256 instructions are not executed.	Reduce the number of differentiated instructions to be executed simultaneously.