12-3-2 Serial Gateway (Serial Gateway or Protocol Macro Mode)

Responses Returned to the FINS Transmission Source

Conversion Failure/Conversion Successful but Transmission Failed

Error conditions					Cause	Remedy
Board/Unit status	**Serial communications mode**	**Indicator display**	**FINS end code sent to FINS transmission source**	**Words allocated in CIO Area**		
The Board/Unit cannot convert the received (via CPU bus) FINS command into either of the protocols.	The serial communications mode is set to a mode other than Serial Gateway mode or protocol macro mode.	---		Bits 12 to 15 of the words allocated in the CIO Area n+5/n+15 (serial communications mode) are set to a value other than 9 hex or 6 hex.	Serial communications mode is not set correctly.	Set DM Area word m/ m+10 bits 08 to 11 (serial communications mode) either to 9 hex (Serial Gateway mode) or 6 hex (protocol macro mode).
	NT Link, loopback test, or no-protocol mode		0401 hex (undefined command)	2 hex, F hex, or 3 hex	FINS command was sent using Serial Gateway to a Board/Unit with Unit Ver. 1.2 or later.	
	Host Link	---	0205 hex (response timeout), etc.	0 hex or 5 hex		
	Protocol macro, NT Link, or loopback test mode	---	0401 hex (undefined command)	6 hex, 2 hex, F hex, or 3 hex	FINS command was sent using Serial Gateway to a pre-Ver. 1.2 Board/Unit that does not support Serial Gateway communications.	Replace the Board/Unit with one that supports Serial Gateway mode (Unit Ver. 1.2 or later), and set the serial communications mode to Serial Gateway or protocol macro mode.
	Host Link	---	0205 hex (response timeout), etc.	0 hex or 5 hex		

Error conditions					Cause	Remedy
Board/Unit status	**Serial communications mode**	**Indicator display**	**FINS end code sent to FINS transmission source**	**Words allocated in CIO Area**		
The Board/Unit cannot convert the received (via CPU bus) FINS command into either of the protocols.	The serial communications mode is set to Serial Gateway or protocol macro mode.	The SD☐/RD☐ and COM☐ indicators do not flash at all. (Communications have not been electrically established.)	0205 hex (response timeout), etc.	---	A hardware error has occurred.	Conduct a loopback test in serial communications mode to check the transmission lines. If an error occurs during the test, replace the Board or Unit.
		The SD☐ and COM☐ indicators do not flash.	0202 hex (no Unit) or 0401 hex (undefined command)	---	The FINS destination address is not specified correctly.	Correct the FINS destination address specification, and then resend the FINS message. (Refer particularly to *6-7 Conditions Requiring Routing Tables*.)
	The serial communications mode is set to Serial Gateway or protocol macro mode	The SD☐ and COM☐ indicators do not flash at all.	2605 hex (service executing)	---	The serial port received a sixth FINS command when five FINS commands are already waiting.	Include retry processing at the FINS command transmission source for when the FINS response code 2605 hex is received.

Error conditions					Cause	Remedy
Board/Unit status	**Serial communications mode**	**Indicator display**	**FINS end code sent to FINS transmission source**	**Words allocated in CIO Area**		
The Board/Unit converted the received (via CPU bus) FINS command, but could not send the command to the remote device after conversion.	Serial communications mode is set to protocol macro mode	The SD□ and COM□ indicators do not flash at all.	0204 hex (remote node busy)	Bit 05 of CIO word n+9/ n+19 (Serial Gateway Send Start Timeout/ Response Timeout Flag) is ON.	A Serial Gateway send start timeout has occurred. (The converted command will be discarded without being sent). The FINS command was received by the Board/ Unit, but the step transition in the communications sequence of the protocol macro is suspended for either of the following reasons. 1) The next step is a RECEIVE command. 2) The WAIT command is being executed.	Correct the communications sequence. Alternatively, include retry processing at the FINS command transmission source for when the FINS response code 0204 hex is received. Adjust the time set for the serial gateway Send Start Timeout Monitoring Time in DM Area word m+7/m+17, as required.
			2607 hex (transmission command error (no right to execute service))	Bit 08 of CIO word n+9/ n+19 (Serial Gateway Prohibited Flag) is ON (prohibited status)	The Serial Gateway is prohibited.	Turn OFF bits 04/12 of CIO word n (Port 1/2 Serial Gateway Prohibit Switch).
			0205 hex (response timeout), etc.	Bit 15 of CIO word m+3/ m+13 (CTS control) is ON but bit 4 of CIO word n+7/n+17 is OFF.	CTS control is set to ON but the RS signal from the remote device has not been input to the CS signal of the local node.	Perform either of the following: Loop the RS-CS signals of the local node. Disable CTS control. Input the RS signal from the remote node to the CS signal of the local node and use CTS control.

Transmission Successful but Response from Remote Device Not Received

Error conditions					Cause	Remedy
Board/Unit status	Serial communications mode	Indicator display	FINS end code sent to FINS transmission source	Words allocated in CIO Area		
The converted command could be sent to the remote device but a normal response is not received from the remote device.	The serial communications mode is set to Serial Gateway or protocol macro mode.	The SD☐ and COM☐ indicators are flashing but the RD☐ does not flash.	0205 hex (response timeout), etc.	Bit 05 of CIO word n+8/ n+18 (Serial Gateway Send Start Timeout/ Response Timeout) is ON.	A Serial Gateway response timeout has occurred and the response data cannot be received after the timeout. Either of the following causes is possible.	Perform one of the following:
					A remote device that can receive the command after conversion does not exist at the specified FINS destination address.	Check the device at the specified FINS destination address.
					The sent command frame is illegal.	Revise the command frame to be converted.
					The communications conditions and baud rate settings for the serial communications path do not match the settings at the remote device.	Revise the settings in the Setup Area and at the remote device.
					Cable connections are incorrect or faulty. The RS-422A/485 port setting (2-wire or 4-wire) is incorrect. Adapters such as the NT-AL001-E are incorrectly wired or terminating resistance is not set correctly.	Review the wiring or switch settings. Turn ON the terminating resistance switch at two locations (remote device or board) and turn OFF the terminating resistance switch at all other nodes.
					A command was sent in a protocol not understood by the remote device.	Check the command specifications of the remote device and the source of command conversion.
					A hardware error has occurred in the remote device.	Replace the remote device.

Error conditions					Cause	Remedy
Board/Unit status	**Serial communications mode**	**Indicator display**	**FINS end code sent to FINS transmission source**	**Words allocated in CIO Area**		
The converted command could be sent to the remote device but a normal response is not received from the remote device.	The serial communications mode is set to Serial Gateway or protocol macro mode.	Either the SD□/RD□ and COM□ indicators all flash.	0205 hex (response timeout), etc.	Bit 05 of CIO word n+8/ n+18 (Serial Gateway Send Start Timeout/ Response Timeout) is ON.	The response from the remote device is too fast and the data received by the Board/Unit has been discarded.	Delay the response from the remote device.
		The SD□ and COM□ indicators flash, but a response is not always returned.	0205 hex (response timeout), etc.	Bit 02, 03, 04, or 15 of CIO word n+8/ n+18 (transfer error, overrun error, framing error, or parity error) is ON.	A hardware error has occurred in the reception circuit of the Board/ Unit.	Conduct a loopback test in serial communications mode to check the transmission lines. If an error occurs during the test, replace the Board or Unit.
		The RD□/ SD□, and COM□ indicators all flash, but a response is not always returned.			A transmission error has occurred due to noise.	Use shielded twisted-pair cables. Lay power lines separately using ducts. Increase the number of resends at the FINS transmission source. Perform communications retry as required.

Response Received from Remote Device but Error Remains

Error conditions					Cause	Remedy
Board/Unit status	Serial communications mode	Indicator display	FINS end code sent to FINS transmission source	Words allocated in CIO Area		
A normal FINS end code is returned from the remote device, but there is no response data after the end code.	The serial communications mode is set to Serial Gateway or protocol macro mode.	The RD☐/SD☐ and COM☐ indicators all flash.	0000 hex	---	The FINS command requires a response, but the command after conversion does not require a response (e.g., broadcasting)	Check the specifications of the command to be converted.
A response was received from the remote device after a response timeout error was received for a converted command that was sent to the remote device.			0205 hex (response timeout), etc.	Bit 05 of CIO word n+8/n+18 (Serial Gateway send start timeout or Serial Gateway response timeout) is ON.	A Serial Gateway response timeout occurred, but the response data was received normally after the timeout. This is a result of the Serial Gateway response timeout monitoring time setting in DM Area word m+7/m+17 being too short.	Set a longer time for the Serial Gateway response timeout monitoring time in DM Area word m+7/m+17.
A FINS error end code was returned to the FINS transmission source.			0206 hex (transmission error)	CIO word n+8/n+18 bit 07 (FCS check error) or bit 02 (parity error) is ON.	Either of the following errors occurred in the protocol after conversion. Conversion to CompoWay/F command: BCC error or parity error. Conversion to Modbus-RTU command: CRC error or parity error. Conversion to Modbus-ASCII command: CRC error or checksum error. Conversion to Host Link FINS command: FCS error or parity error	Use shielded twisted-pair cables. Lay power lines separately using ducts. Increase the number of resends at the FINS transmission source. Perform communications retry as required.
			Other FINS error end code	---	The Serial Gateway was executed, but the FINS error completion occurred.	Perform error processing based on the following table of FINS end codes.

Troubleshooting Using FINS End Codes

MRC (Main response code)		SRC (Sub-response code)		Check point	Probable cause	Corrective measure
Value (hex)	Contents	Value (hex)	Contents			
00	Normal completion	00	Normal completion	---	---	---
		04	Remote node busy	Bit 05 in CIO word n+8/n+18 (Serial Gateway timeout or Serial Gateway response timeout)	The Serial Gateway cannot be executed as an interrupt between steps in the protocol macro.	Perform FINS send retry processing or change the communications sequence.
02	Remote node error	05	Response timeout at FINS transmission source	Bit 05 in CIO word n+8/n+18 (Serial Gateway timeout or Serial Gateway response timeout)	The message frame was destroyed by noise.	If Bit 05 of CIO word n+8/n+18 is OFF, a response timeout has occurred at the FINS transmission source. Perform the following: Test communications to check the noise conditions. Increase the number of retries at the FINS command transmission source. Perform communications retries, if necessary.
				Instruction control data	The response monitoring time is too short.	Increase the length of the response monitoring time.
				Error history	The send/receive frame was discarded.	Take appropriate measures based on the error history.
			Serial Gateway response timeout	Bit 05 in CIO word n+8/n+18 (Serial Gateway timeout or Serial Gateway response timeout)	A Serial Gateway response timeout has occurred.	If bit 05 of CIO word n+8/n+18 is ON, take appropriate measures for a Serial Gateway response timeout.
		06	Transmission path error	CIO word n+8/n+18 bit 07 (FCS check error) or bit 02 (parity error)	Conversion to CompoWay/F command: BCC error or parity error. Conversion to Modbus-RTU command: CRC error or parity error. Conversion to Modbus-ASCII command: CRC error or checksum error	Use shielded twisted-pair cables. Lay power lines separately using ducts. Increase the number of resends at the FINS transmission source. Perform communications retry as required.
10	Command format error	01	Command too long	Command data	The command is longer than the maximum permissible length.	Check the command format and correct the command data.
		02	Command too short	Command data	The command is shorter than the maximum permissible length.	Check the command format and correct the command data.

MRC (Main response code)		SRC (Sub-response code)		Check point	Probable cause	Corrective measure
Value (hex)	Contents	Value (hex)	Contents			
11	Parameter error	0C	Parameter error	Parameters in command data	The parameter settings are incorrect.	Check the command data and correct the parameter settings.
26	Command error	05	Service already executing	---	The service is being executed. (A sixth FINS command has been received at the serial port when five FINS commands are already waiting to be processed.)	Include retry processing at the FINS command transmission source for when the FINS response code 2605 hex is received.
		07	No execution right	Serial Gateway prohibition status	Serial Gateway is prohibited (bit 08 of CIO word n+9/n+19 is ON)	If the Serial Gateway is prohibited, turn OFF bit 04/12 in CIO word n (Serial Gateway Prohibit Switch port 1/2).