

X-SEL (Cartesian/IX SCARA)

Serial Communication Protocol Specification (Format B)

X-SEL (Cartesian) Main Application V0.52
X-SEL (IX SCARA) Main Application V0.23

IAI America, Inc.

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1. Overview

This specification covers the communication protocol between the host and the X-SEL controller (Cartesian/IX SCARA).

The X-SEL controller can communicate with the host based on this protocol, in the AUTO mode and using the host connector, if “I/O parameter No. 90: Usage of user-open channel 1” is set to 2 (IAI protocol B (slave)).

The communication conditions are summarized in the table below. (For details on RS232C interface, refer to the operation manual for the controller.)

Item	Communication condition	Setting parameter (*1)
Communication interface	RS232C	
Communication speed	9.6 kbps, 19.2 kbps, 38.4 kbps	“I/O parameter No. 92”
Data length	7 bits, 8 bits	“I/O parameter No. 93”
Stop bit length	1 bit, 2 bits	“I/O parameter No. 94”
Parity	None, odd, even	“I/O parameter No. 95”

*1 A desired communication condition for each item can be selected by parameter setting.

2. Transmission Control Procedure

Controller Setting

Change the following settings if you wish to enable communication between the host (master station) and the controller (slave station) using this protocol:

- (1) Parameter settings
 - Set "I/O parameter No. 90" to 2 (IAI protocol)
 - Set "I/O parameter Nos. 91 through 95" to the applicable communication conditions with the host (communication speed, data length, stop bit length and parity).
- (2) Set the mode switch on the controller to AUTO (automatic mode).
- (3) Connect the host to the host connector on the controller.

Note

- 1 Communication via the host connector is enabled only in the AUTO (automatic) mode (the settings in (1) are required before this protocol can be used). Since the host connector cannot be used simultaneously with the teaching-pendant connector, communication via the teaching-pendant connector will be selected in the MANU (manual) mode and communication cannot be established using the host connector. Exercise caution.
- 2 Refer to the operation manual supplied with the controller for connection between the host and the host connector.

Message Transmission Timing

Under the basic transmission control procedure, one unit of transmission consists of command transmission from the master station (host) and response transmission from the receiving slave station (controller). The switching timing of transmission between the master station and slave station conforms to the following rules:

- (1) Minimum delay time after completion of command reception by the slave station (controller) before start of response transmission = α msec

α is the setting of "I/O parameter No. 97: User-open SIO channel 1, IAI-protocol response minimum delay time" (this parameter is available in X-SEL (Cartesian) main application V0.26 or later and X-SEL (IX SCARA)). The slave station (controller) will start sending a response message when this time has elapsed after completing the reception of a command message. The master station (host) must become reception-ready within this time after completing the transmission of a command message.

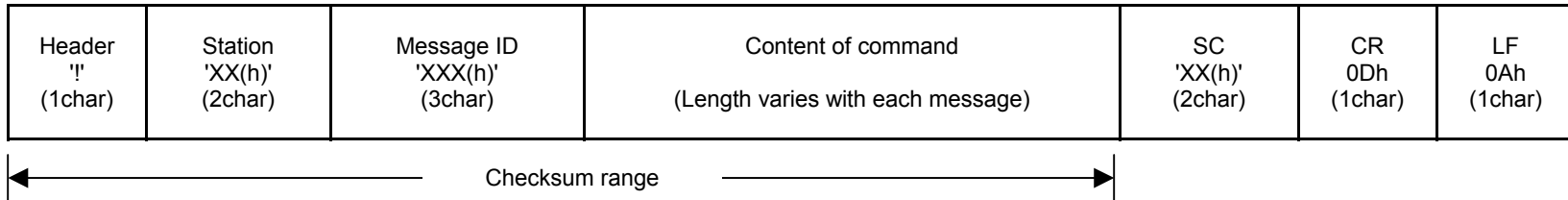
- (2) Minimum delay time after completion of response reception by the master station (host) before start of command transmission = 1 msec

The slave station (controller) will become reception-ready within this time after completing the transmission of a response message. The master station (host) must start sending the next command message only when this time has elapsed after completing the reception of a response message.

3. Outline of Message

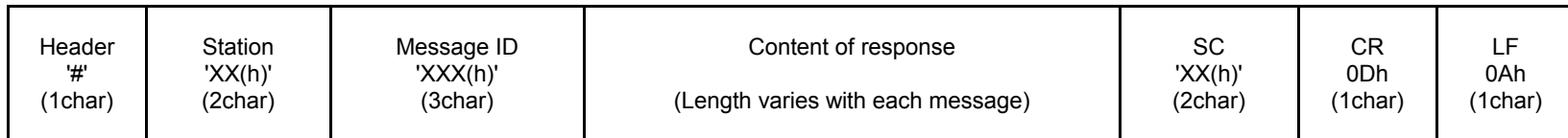
Both commands and responses conform to the respective variable-length formats shown below.

(1) Command Format

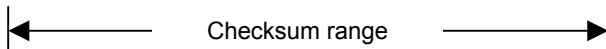
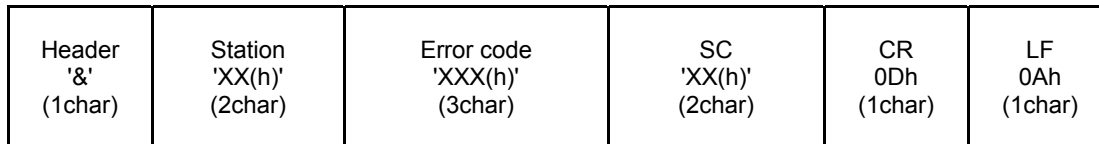


(2) Response Format

(Normal response)



(Error response)



- Header:** Indicate the start of a command/response message. The header specifies one of the following message categories:
- '!' (21H) - - - Command
 - '#' (23H) - - - Normal response
 - '&' (26H) - - - Error response
- Station:** Indicate the station number of the controller (value of "I/O parameter No. 91: User-open SIO channel 1, station code").
- Message ID:** A three-digit hexadecimal code indicates the message type. (Refer to 4-1, "Message List.")
- Message content:** Set data varies with each message. (Refer to 4-3, "Message Details," for details on each message.)
- SC:** Checksum
- CR (0DH):** Indicate the end of a command/response.
- LF (0AH):** Indicate the end of a command/response.

Calculation of Checksum (SC)

A checksum is used to verify if the communication has been successful. The communication is deemed successful if the checksum calculated from the received data is the same as the checksum in the message. Each checksum is an ASCII code representing the lower byte of the total sum calculated by adding the message values represented in one byte length from the beginning of the message to immediately before the checksum. You can disable the controller's checksum function by entering '@@' as the checksum.

Example: Effective Point Data Query

'!'	'99'		'209'			'001'			'005'			SC		CR	LF
21H	39H	39H	32H	30H	39H	30H	30H	31H	30H	30H	35H	▲	▲	0DH	0AH

$$\begin{aligned}
 \text{Total sum} &= 21\text{H} + 39\text{H} + 39\text{H} + 32\text{H} + 30\text{H} + 39\text{H} \\
 &+ 30\text{H} + 30\text{H} + 31\text{H} + 30\text{H} + 30\text{H} + 35\text{H} \\
 &= \underline{254\text{H}}
 \end{aligned}$$

35H ('5') 34H ('4')

The checksum is calculated as '54.'

4. Message Details

4-1. Message List

Message ID	Message name	Type	Applicable type		Page
			Cartesian	IX SCARA	
	Error response	Common	○	○	14
200H	Test call	Query	○	○	15
201H	Version code query	Query	○	○	16
208H	Number of effective point data query	Query	○	○	17
209H	Effective point data query	Query	○	○	18
20BH	Input port query	Query	○	○	19
20CH	Output port query	Query	○	○	20
20DH	Flag query	Query	○	○	21
20EH	Integer variable query	Query	○	○	22
20FH	Real variable query	Query	○	○	23
210H	String variable query	Query	○	○	25
212H	Axis status query	Query	○		26
213H	Program status query	Query	○	○	28
215H	System status query	Query	○	○	29
216H	Error detail information query	Query	○	○	31
232H	Servo ON/OFF	Execute	○	○	33
233H	Origin return	Execute	○	*1	34
234H	Absolute-coordinate specification movement	Execute	○		35
235H	Relative-coordinate specification movement	Execute	○		36
236H	Jogging/inching	Execute	○	○	37

Message ID	Message name	Type	Applicable type		Page
			Cartesian	IX SCARA	
237H	Point-number specification movement	Execute	○		38
238H	Operation stop & cancel	Execute	○	○	39
244H	Point data range-specification continuous write	Execute	○	○	40
245H	Change point data continuous write	Execute	○	○	41
246H	Point data clear	Execute	○	○	42
24AH	Output port status change	Execute	○	○	43
24BH	Flag status change	Execute	○	○	44
24CH	Integer variable change	Execute	○	○	45
24DH	Real variable change	Execute	○	○	46
24EH	String variable change	Execute	○	○	47
252H	Alarm reset	Execute	○	○	48
253H	Program run	Execute	○	○	49
254H	Program end	Execute	○	○	49
255H	Program pause	Execute	○	○	49
256H	Program one-step run	Execute	○	○	49
257H	Program resume	Execute	○	○	49
25BH	Software reset	Execute	○	○	50
25CH	Drive-source recovery request	Execute	○	○	51
25EH	Operation pause cancellation request	Execute	○	○	52
262H	Speed change	Execute	○		53
2A0H	Coordinate system definition data range-specification continuous query	Query		○	54
2A1H	SCARA axis status query	Query		○	55

Message ID	Message name	Type	Applicable type		Page
			Cartesian	IX SCARA	
2A2H	Simple-interference-check-zone definition data range-specification continuous query	Query		○	57
2D4H	SCARA absolute-coordinate specification movement	Execute		○	59
2D5H	SCARA relative-coordinate specification movement	Execute		○	60
2D6H	SCARA point-number specification movement	Execute		○	61

*1 This can be used only by IAI as a “Z-axis ABS reset position movement” command.

4-2. Error Response

If, for some reason, the slave station (controller) cannot execute the command from the master station (host) that has been received as a normal command by the slave station (controller), an error response will be sent to the master station (host). Each error response stores an error number, so identify the cause of failed command execution based on the error number and take an appropriate action. Refer to 4-3-1, “Error Response,” for details on the error response format.

4-3. Message Details

The maximum cumulative data size in the message map only indicates the maximum data size allowable by the format structure. The actual size of transmittable messages will be limited by the sizes of the controller's receive buffer and send buffer.

* As of June 26, 2001, the maximum receivable size of the controller is 1023 bytes, while the maximum transmittable size is 1024 bytes.

4-3-1. Error Response

Function: Notify the content of an error that occurred with respect to a command.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Error response	Header	'&'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Error code	'XXX(h)'	3	6	<input type="radio"/>			<input type="radio"/>		Indicate the error type.	
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
(Note 1)	Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.										
(Note 2)	Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.										

4-3-2. Test Call (200H)

Function: Perform communication test. The same data as in the command will be returned.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'200(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	String	'XXXXXXXXXX'	10	16	<input type="radio"/>			<input type="radio"/>		Arbitrary string (10 bytes)	
	SC	'XX(h)'	2	18	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	19	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	20	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'200(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	String	'XXXXXXXXXX'	10	16	<input type="radio"/>			<input type="radio"/>		Same string as in the command (10 bytes)	
	SC	'XX(h)'	2	18	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	19	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	20	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
(Note 1)	Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.										
(Note 2)	Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.										

4-3-3. Version Code Query (201H)

Function: Query the version code of the software.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'201(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Unit type	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		0 = Main CPU application / 1 = Main CPU core / 2 = Driver CPU	
	Device number	'X(h)'	1	9	<input type="radio"/>			<input type="radio"/>		Number that specifies the device (0 ~)	
	SC	'XX(h)'	2	11	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	12	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	13	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'201(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Unit type	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		0 = Main CPU application / 1 = Main CPU core / 2 = Driver CPU	
	Device number	'X(h)'	1	9	<input type="radio"/>			<input type="radio"/>		Number that specifies the device (0 ~)	
	Model code	'XX(h)'	2	11	<input type="radio"/>			<input type="radio"/>			
	Unit code	'XX(h)'	2	13	<input type="radio"/>			<input type="radio"/>			
	Version number	'XXXX(h)'	4	17	<input type="radio"/>			<input type="radio"/>			
	Time	'XXXX(h)'	4	21	<input type="radio"/>			<input type="radio"/>		Year (4 digits, hexadecimal ASCII code)	
	Time	'XX(h)'	2	23	<input type="radio"/>			<input type="radio"/>		Month (1 to 12, hexadecimal ASCII code)	
	Time	'XX(h)'	2	25	<input type="radio"/>			<input type="radio"/>		Day (1 to 31, hexadecimal ASCII code)	
	Time	'XX(h)'	2	27	<input type="radio"/>			<input type="radio"/>		Hours (0 to 23, hexadecimal ASCII code)	
	Time	'XX(h)'	2	29	<input type="radio"/>			<input type="radio"/>		Minutes (0 to 59, hexadecimal ASCII code)	
	Time	'XX(h)'	2	31	<input type="radio"/>			<input type="radio"/>		Seconds (0 to 59, hexadecimal ASCII code)	
	SC	'XX(h)'	2	33	<input type="radio"/>			<input type="radio"/>			
CR	0Dh	1	34	<input type="radio"/>			<input type="radio"/>				
LF	0Ah	1	35	<input type="radio"/>			<input type="radio"/>				
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.
 (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-4. Number of Effective Point Data Query (208H)

Function: Query the number of effective point data.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'208(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'208(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Number of effective point data	'XXX(h)'	3	9	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	11	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	12	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	13	<input type="radio"/>			<input type="radio"/>				
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>											

4-3-5. Effective Point Data Query (209H)

Function: Query data for the number of query points from the query head point number, and return the number of effective point data and the data.												
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks	
					Big	Little	Yes	No				
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>				
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>				
	Message ID	'209(h)'	3	6	<input type="radio"/>			<input type="radio"/>				
	Query head point number	'XXX(h)'	3	9	<input type="radio"/>			<input type="radio"/>				
	Number of query records	'XXX(h)'	3	12	<input type="radio"/>			<input type="radio"/>		The number of records will be limited based on the send/receive buffers.		
	SC	'XX(h)'	2	14	<input type="radio"/>			<input type="radio"/>				
	CR	0Dh	1	15	<input type="radio"/>			<input type="radio"/>				
	LF	0Ah	1	16	<input type="radio"/>			<input type="radio"/>				
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>				
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>				
	Message ID	'209(h)'	3	6	<input type="radio"/>			<input type="radio"/>				
	Number of effective records	'XXX(h)'	3	9	<input type="radio"/>			<input type="radio"/>		The number of records will be limited based on the send/receive buffers.		
	Point data (*1)	Point number	'XXX(h)'	12	12	<input type="radio"/>			<input type="radio"/>			
		Axis pattern	'XX(h)'	14	14	<input type="radio"/>			<input type="radio"/>			
		Acceleration	'XXXX(h)'	18	18	<input type="radio"/>			<input type="radio"/>	0.01 G		
		Deceleration	'XXXX(h)'	22	22	<input type="radio"/>			<input type="radio"/>	0.01 G		
		Speed	'XXXX(h)'	26	26	<input type="radio"/>			<input type="radio"/>	mm/sec		
		Position data (*2)	'XXXXXXXX(h)'	34	34	<input type="radio"/>		<input type="radio"/>		0.001 mm		
		Position data repetition for remaining effective axes	Data indicated by *2 for the number of remaining effective axes	MAX 90	MAX 90	<input type="radio"/>		<input type="radio"/>		0.001 mm	Data indicated by *2 x Number of remaining effective axes = 8 bytes x (Max 8 - 1) axes = Max 56 bytes	
	Point data repetition for remaining records	Data indicated by *1 for the number of remaining records	MAX 242919	MAX 243009	Refer to the data indicated by *1.					Data indicated by *1 x Number of remaining records = Max 81 bytes x (Max 3000 records - 1) = Max 242919 bytes		
	SC	'XX(h)'	2	MAX 243011	<input type="radio"/>			<input type="radio"/>				
CR	0Dh	1	MAX 243012	<input type="radio"/>			<input type="radio"/>					
LF	0Ah	1	MAX 243013	<input type="radio"/>			<input type="radio"/>					
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>				

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.
 (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-6. Input Port Query (20BH)

Function: Query input ports.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Message ID	'20B(h)'	3	6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Query start port number	'XXXX(h)'	4	10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		Be sure to specify "Category head port number + Multiple of 8."	
	Number of query ports	'XXXX(h)'	4	14	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		The number of ports will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	16	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	CR	0Dh	1	17	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	LF	0Ah	1	18	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Message ID	'20B(h)'	3	6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Response start port number	'XXXX(h)'	4	10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Number of response ports	'XXXX(h)'	4	14	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		The number of ports will be limited based on the send/receive buffers.	
	Input port data (*1)	'XX(h)'	2	16	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		8 bits from the head input port	
	Remaining input port data	Data indicated by *1 for the number of remaining data	MAX 16382	MAX 16398	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		Remaining input port data = 2 bytes x (Max 8192 – 1) = 16382 bytes	
	SC	'XX(h)'	2	MAX 16400	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	CR	0Dh	1	MAX 16401	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	LF	0Ah	1	MAX 16402	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal. (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.											

4-3-7. Output Port Query (20CH)

Function: Query output ports.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Message ID	'20C(h)'	3	6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Query start port number	'XXXX(h)'	4	10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		Be sure to specify "Category head port number + Multiple of 8."	
	Number of query ports	'XXXX(h)'	4	14	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		The number of ports will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	16	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	CR	0Dh	1	17	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	LF	0Ah	1	18	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Message ID	'20C(h)'	3	6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Response start port number	'XXXX(h)'	4	10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	Number of response ports	'XXXX(h)'	4	14	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		The number of ports will be limited based on the send/receive buffers.	
	Output port data (*1)	'XX(h)'	2	16	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		8 bits from the head output port	
	Remaining output port data	Data indicated by *1 for the number of remaining data	MAX 16382	MAX 16398	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		Remaining output port data = 2 bytes x (Max 8192 - 1) = 16382 bytes	
	SC	'XX(h)'	2	MAX 16400	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	CR	0Dh	1	MAX 16401	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
	LF	0Ah	1	MAX 16402	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			
(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal. (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.											

4-3-8. Flag Query (20DH)

Function: Query flags.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'20D(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		'00(h)' in the case of global flag specification	
	Query start flag number	'XXXX(h)'	4	12	<input type="radio"/>			<input type="radio"/>		Be sure to specify "Category head flag number + Multiple of 8."	
	Number of query flags	'XXXX(h)'	4	16	<input type="radio"/>			<input type="radio"/>		The number of flags will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	18	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	19	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	20	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'20D(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		'00(h)' in the case of global flag specification	
	Response start flag number	'XXXX(h)'	4	12	<input type="radio"/>			<input type="radio"/>			
	Number of response flags	'XXXX(h)'	4	16	<input type="radio"/>			<input type="radio"/>		The number of flags will be limited based on the send/receive buffers.	
	Flag data (*1)	'XX(h)'	2	18	<input type="radio"/>			<input type="radio"/>		8 bits from the head flag.	
	Remaining flag data	Data indicated by *1 for the number of remaining data	MAX 16382	MAX 16400	<input type="radio"/>			<input type="radio"/>		Remaining flag data = 2 bytes x (Max 8192 - 1) = 16382 bytes	
	SC	'XX(h)'	2	MAX 16402	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	MAX 16403	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	MAX 16404	<input type="radio"/>			<input type="radio"/>				
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.

(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-9. Integer Variable Query (20EH)

Function: Query integer variables for the number of query data from the query start variable number.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!''	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'20E(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		'00(h)' in the case of global variable specification	
	Query start variable number	'XXX(h)'	3	11	<input type="radio"/>			<input type="radio"/>			
	Number of query variable data	'XX(h)'	2	13	<input type="radio"/>			<input type="radio"/>		The number of data will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	15	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	16	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	17	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#''	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'20E(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		'00(h)' in the case of global variable specification	
	Response start variable number	'XXX(h)'	3	11	<input type="radio"/>			<input type="radio"/>			
	Number of response variable data	'XX(h)'	2	13	<input type="radio"/>			<input type="radio"/>		The number of data will be limited based on the send/receive buffers.	
	Integer variable data (*1)	'XXXXXXXX(h)'	8	21	<input type="radio"/>		<input type="radio"/>			Long-type data (hexadecimal ASCII code)	
	Remaining integer variable data	Data indicated by *1 for the number of remaining data	MAX 2032	MAX 2053	<input type="radio"/>		<input type="radio"/>			Remaining variable data = Data indicated by *1 x Number of remaining data = 8 bytes (Max FFh - 1) = 2032 bytes	
	SC	'XX(h)'	2	MAX 2055	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	MAX 2056	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	MAX 2057	<input type="radio"/>			<input type="radio"/>				
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.

(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-10. Real Variable Query (20FH)

Function: Query real variables for the number of query data from the query start variable number.												
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks	
					Big	Little	Yes	No				
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>				
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>				
	Message ID	'20F(h)'	3	6	<input type="radio"/>			<input type="radio"/>				
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		'00(h)' in the case of global variable specification		
	Query start variable number	'XXX(h)'	3	11	<input type="radio"/>			<input type="radio"/>				
	Number of query variable data	'XX(h)'	2	13	<input type="radio"/>			<input type="radio"/>		The number of data will be limited based on the send/receive buffers.		
	SC	'XX(h)'	2	15	<input type="radio"/>			<input type="radio"/>				
	CR	0Dh	1	16	<input type="radio"/>			<input type="radio"/>				
	LF	0Ah	1	17	<input type="radio"/>			<input type="radio"/>				
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>				
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>				
	Message ID	'20F(h)'	3	6	<input type="radio"/>			<input type="radio"/>				
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		'00(h)' in the case of global variable specification		
	Response start variable number	'XXX(h)'	3	11	<input type="radio"/>			<input type="radio"/>				
	Number of response variable data	'XX(h)'	2	13	<input type="radio"/>			<input type="radio"/>		The number of data will be limited based on the send/receive buffers.		
	Selected in accordance with the condition	Format supported in X-SEL (Cartesian) main application V0.41 or earlier, or [in X-SEL (Cartesian) main application V0.42 or later AND other parameter No. 46 (bit 0 to 3) = 0], or [in X-SEL (IX SCARA) AND other parameter No. 46 (bit 0 to 3) = 0]										
		Real variable data (*1)	"XXXXXXXXXXXX XXXXX(h)'	16	29				<input type="radio"/>		Hexadecimal ASCII code representing lower 4 bytes + upper 4 bytes of double-type data (Example) Variable data 0x0123456789ABCDEF (binary) In the message, the following data will be set from the beginning: '8"9"A"B"C"D"E"F"0"1"2"3"4"5"6"7' (0x38394142434445463031323334353637 (binary))	
		Format supported in conditions other than the above										
Real variable data (*1)	"XXXXXXXXXXXX XXXXX(h)'	16	29				<input type="radio"/>	<input type="radio"/>		Hexadecimal ASCII code representing double-type data (Example) Variable data 0x0123456789ABCDEF (binary) In the message, the following data will be set from the beginning: '0"1"2"3"4"5"6"7"8"9"A"B"C"D"E"F' (0x30313233343536373839414243444546 (binary))		

Normal response (Continued from the previous page)	Remaining integer variable data	Data indicated by *1 for the number of remaining data	MAX 4064	MAX 4093						Remaining variable data = Data indicated by *1 x Number of remaining data = 16 bytes (Max FFh – 1) = 4064 bytes
	SC	'XX(h)'	2	MAX 4095	○			○		
	CR	0Dh	1	MAX 4096	○			○		
	LF	0Ah	1	MAX 4097	○			○		
Error response	Error response format	Refer to the error response format.	10	10	○			○		
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>										

4-3-11. String Variable Query (210H)

Function: Query string variables for the number of query data from the query start variable number.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'210(h)'	3	6	○			○			
	Program number	'XX(h)'	2	8	○			○			'00(h)' in the case of global variable specification
	Query start variable number	'XXX(h)'	3	11	○			○			
	Number of query variable data	'XX(h)'	2	13	○			○			The number of data will be limited based on the send/receive buffers.
	SC	'XX(h)'	2	15	○			○			
	CR	0Dh	1	16	○			○			
	LF	0Ah	1	17	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'210(h)'	3	6	○			○			
	Program number	'XX(h)'	2	8	○			○			'00(h)' in the case of global variable specification
	Response start variable number	'XXX(h)'	3	11	○			○			
	Number of response variable data	'XX(h)'	2	13	○			○			The number of data will be limited based on the send/receive buffers.
	String variable data (*1)	'XX(h)'	2	15	○			○			Char-type data (hexadecimal ASCII code)
	Remaining string variable data	Data indicated by *1 for the number of remaining data	MAX 508	MAX 523	○			○			Remaining string variable data = Data indicated by *1 x Number of remaining data = 2 bytes x (Max FFh - 1) = 508 bytes
	SC	'XX(h)'	2	MAX 525	○			○			
	CR	0Dh	1	MAX 526	○			○			
LF	0Ah	1	MAX 527	○			○				
Error response	Error response format	Refer to the error response format.	10	10	○			○			

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.

(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-12. Axis Status Query (212H)

Function: Query the axis status											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'212(h)'	3	6	○			○			
	Query axis pattern	'XX(h)'	2	8	○			○			
	SC	'XX(h)'	2	10	○			○			
	CR	0Dh	1	11	○			○			
	LF	0Ah	1	12	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'212(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○			No axis pattern is the same as "driver not connected."
	Single-axis status (*1)	Axis status	'XX(h)'	2	10	○			○		<p>Bit 6, 7 (Reserved for system use)</p> <p>Bit 5 (Push error detection): 0 = Not detected / 1 = Detected</p> <p>Bit 4 (Operation command successful completion): 0 = Not yet complete / 1 = Completed successfully</p> <p>* Can be used only for completion check after an operation command.</p> <p>Bit 3 (Servo): 0 = OFF / 1 = ON</p> <p>Bit 1, 2 (Origin return): 0 = Not yet performed / 1 = Returning to origin / 2 = Completed</p> <p>Bit 0 (Servo axis in use): 0 = Not in use / 1 = In use (moving, etc.)</p> <p>* "Servo axis in use" indicates that a given task has the right to use the applicable axis. Therefore, this bit will turn ON not only when an operation command involving axis movement is in progress (including when an axis is moving), but also in the following conditions:</p> <ul style="list-style-type: none"> • Servo is starting up from an OFF state • Servo is shutting down from an ON state (excluding emergency stop) • Operation axis is paused <p>* Check method for operation command positioning under IAI protocol</p> <p>After an IAI-protocol operation command is executed, turning OFF (Not in use) of bit 0 (Servo axis in use) will be monitored for the applicable axis.</p> <p>When "Not in use" is detected, the cause will be checked based on the conditions of bit 4 (Operation command successful completion) and bit 5 (Push error detection) (three causes are shown below):</p> <p>(1) [Bit 0 (Servo axis in use) = OFF] AND [Bit 4 (Operation command successful completion) = ON]</p> <p>--- Positioning has completed successfully.</p> <p>(2) [Bit 0 (Servo axis in use) = OFF] AND [Bit 5 (Push error detection) = ON]</p> <p>--- Push error (* Need not be checked if push command is not used.)</p> <p>(3) [Bit 0 (Servo axis in use) = OFF] AND [bit 4 (Operation command successful completion) = OFF] AND [Bit 5 (Push error detection) = OFF]</p> <p>--- Operation cancellation due to error, emergency stop, etc.</p>

Normal response (Continued from the previous page)	Single-axis status (Continued from the previous page) (*1)	Axis sensor input status	'X(h)'	1	11	○		○		Bit 3 (Reserved for system use) Bit 2 (Origin sensor): 0 = OFF / 1 = ON Bit 1 (Overrun sensor): 0 = OFF / 1 = ON Bit 0 (Creep sensor): 0 = OFF / 1 = ON
		Axis error code	'XXX(h)'	3	14	○		○		
		Encoder status (at reset)	'XX(h)'	2	16	○		○		Bit 7 (Battery alarm (BA)) Bit 6 (Battery error (BE)) Bit 5 (Multi-rotation error (ME)) Bit 4 (Reserved for system use) Bit 3 (Counter overflow (OF)) Bit 2 (Count error (CE)) Bit 1 (Full absolute status (FS)) Bit 0 (Overspeed (OS))
		Current position	'XXXXXXXX(h)'	8	24	○		○	0.001 mm	Long-type data (hexadecimal ASCII code)
	Single-axis status repetition for remaining axes	Data indicated by *1 for the number of remaining axes	MAX 112	MAX 136	Refer to the data indicated by *1.				Data indicated by *1 x Number of remaining effective axes = 16 bytes x (Max 8 – 1) = Max 112 bytes	
	SC	'XX(h)'	2	MAX 138	○		○			
	CR	0Dh	1	MAX 139	○		○			
LF	0Ah	1	MAX 140	○		○				
Error response	Error response format	Refer to the error response format.	10	10	○		○			
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>										

4-3-13. Program Status Query (213H)

Function: Query the program status.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'213(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	10	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	11	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	12	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'213(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	Status	'X(h)'	1	9	<input type="radio"/>			<input type="radio"/>		Bit 1 to 3 (Reserved for system use)	
	Executing program step number	'XXXX(h)'	4	13	<input type="radio"/>			<input type="radio"/>		Bit 0 (Start): 0 = Not started / 1 = Started	
	Program-dependent error code	'XXX(h)'	3	16	<input type="radio"/>			<input type="radio"/>			
	Error occurrence step number	'XXXX(h)'	4	20	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	22	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	23	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	24	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>											

4-3-14. System Status Query (215H)

Function: Query the system status.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'215(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'215(h)'	3	6	○			○			
	System mode	'X(h)'	1	7	○			○		0 = Indeterminable / 1 = AUTO mode / 2 = MANUAL mode / 3 = Slave update mode / 4 = Core update mode	*1
	Critical level system error number	'XXX(h)'	3	10	○			○			*2
	Latest system error number	'XXX(h)'	3	13	○			○			*3
	System status byte 1	'XX(h)'	2	15	○			○		Bit 7 (Reserved for system use) Bit 6 (Battery voltage error status): 0 = No error / 1 = Error Bit 5 (Battery voltage low warning status): 0 = Not low / 1 = Low Bit 4 (Power error status): 0 = Normal / 1 = Error Bit 3 (Emergency stop switch status): 0 = No emergency stop / 1 = Emergency stop Bit 2 (Safety gate status): 0 = CLOSE / 1 = OPEN Bit 1 (TP enable switch status): 0 = ON / 1 = OFF Bit 0 (Operation mode switch status): 0 = AUTO / 1 = MANUAL	*4
	System status byte 2	'XX(h)'	2	17	○			○		Bit 7 (Reserved for system use) Bit 6 (Reserved for system use) Bit 5 (Program run status): 0 = Not run / 1 = Running Bit 4 (Restart wait status): 0 = Not waiting / 1 = Waiting Bit 3 (I/O interlock status): 0 = No interlock / 1 = Interlock Bit 2 (Servo interlock status): 0 = No interlock / 1 = Interlock Bit 1 (Slave parameter writing status): 0 = Not writing / 1 = Writing Bit 0 (Application data flash ROM write status): 0 = Not writing/erasing / 1 = Writing/erasing	Only bit 0 has meaning when the core program is operating (application update mode). The data indicated by *1 through *6 will have no meaning.

Normal response (Continued from the previous page)	System status byte 3	'XX(h)'	2	19	○			○	Bit 4 to 7 (Reserved for system use) Bit 3 (Reserved for system use)Bit 2 (System ready status): 0 = Not ready / 1 = Ready Bit 1 (System operation status): 0 = Not operating in AUTO mode / 1 = Operating in AUTO mode Bit 0 (Drive-source cutoff status): 0 = Not cut off / 1 = Cut off	*5
	System status byte 4	'XX(h)'	2	21	○			○	Reserved for system use	*6
	SC	'XX(h)'	2	23	○			○		
	CR	0Dh	1	24	○			○		
	LF	0Ah	1	25	○			○		
Error response	Error response format	Refer to the error response format.	10	10	○			○		
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>										

4-3-15. Error Detail Information Query (216H)

Function: Query the error detail information.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'216(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Type 1	'X(h)'	1	7	<input type="radio"/>			<input type="radio"/>		0 = System error / 1 = Axis-specific error / 2 = Program-specific error / 3 = Error in error list record / 4 = Reserved for system use	
	Type 2	'XX(h)'	2	9	<input type="radio"/>			<input type="radio"/>		System error: 0 = Critical level error / 1 = Latest error Axis-specific error: Axis number Program-specific error: Program number Error in error list record: Record number (1 ~)	
	Error number	'XXX(h)'	3	12	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	14	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	15	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	16	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'216(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Error number	'XXX(h)'	3	9	<input type="radio"/>			<input type="radio"/>			
	Detail information 1	'XXXXXXXX(h)'	8	17	<input type="radio"/>			<input type="radio"/>		Other than system-down level error: Program number (Error source will be indicated if the step number is not 0.) System-down level error: System down type	
	Detail information 2	'XXXXXXXX(h)'	8	25	<input type="radio"/>			<input type="radio"/>		Other than system-down level error: Step number (Error source) System-down level error: System down error code	
	Detail information 3	'XXXXXXXX(h)'	8	33	<input type="radio"/>			<input type="radio"/>		Other than system-down level error: Axis number System-down level error: System down information 1	
	Detail information 4	'XXXXXXXX(h)'	8	41	<input type="radio"/>			<input type="radio"/>		Other than system-down level error: Point number (Negative value at interpolation point) System-down level error: System down information 2	
	Detail information 5	'XXXXXXXX(h)'	8	49	<input type="radio"/>			<input type="radio"/>			
	Detail information 6	'XXXXXXXX(h)'	8	57	<input type="radio"/>			<input type="radio"/>			
	Detail information 7	'XXXXXXXX(h)'	8	65	<input type="radio"/>			<input type="radio"/>			
	Detail information 8	'XXXXXXXX(h)'	8	73	<input type="radio"/>			<input type="radio"/>			
Reserved for system use	'XX(d)'	2	75	<input type="radio"/>			<input type="radio"/>				

Normal response (Continued from the previous page)	Reserved for system use	'XX(d)'	2	77	○			○		
	Reserved for system use	'XX(d)'	2	79	○			○		
	Reserved for system use	'X(d)'	1	80	○			○		
	Reserved for system use	'XX(d)'	2	82	○			○		
	Reserved for system use	'XX(d)'	2	84	○			○		
	Reserved for system use	'XXXX(d)'	4	88	○			○		
	Message bytes	'XX(h)'	2	90	○			○		
	Message string	String for the number of message bytes	MAX 255	MAX 345	○			○		String data x Number of message bytes = 1 byte x (Max FFh) = Max 255 bytes
	SC	'XX(h)'	2	MAX 347	○			○		
	CR	0Dh	1	MAX 348	○			○		
LF	0Ah	1	MAX 349	○			○			
Error response	Error response format	Refer to the error response format.	10	10	○			○		
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>										

4-3-16. Servo ON/OFF (232H)

Function: Turn on/off the servo.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'232(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○			
	Operation type	'X(h)'	1	9	○			○		Bit 1 to 3 (Reserved for system use) Bit 0 (Servo ON/OFF): 0 = OFF / 1 = ON	
	SC	'XX(h)'	2	11	○			○			
	CR	0Dh	1	12	○			○			
	LF	0Ah	1	13	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'232(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			
Error response	Error response format	Refer to the error response format.	10	10	○			○			
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>											

4-3-17. Origin Return (233H)

Function: Perform origin return.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'233(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Axis pattern	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	End search speed at origin return	'XXX(h)'	3	11	<input type="radio"/>			<input type="radio"/>	mm/sec	The parameter setting becomes effective if zero.	
	Creep speed at origin return	'XXX(h)'	3	14	<input type="radio"/>			<input type="radio"/>	mm/sec	The parameter setting becomes effective if zero.	
	SC	'XX(h)'	2	16	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	17	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	18	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'233(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
(Note 1)	Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.										
(Note 2)	Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.										

4-3-18. Absolute-Coordinate Specification Movement (234H)

Function: Move the actuator to the specified absolute coordinates.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'234(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Axis pattern	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	Acceleration	'XXXX(h)'	4	12	<input type="radio"/>			<input type="radio"/>	0.01 G	The parameter setting becomes effective if zero.	
	Deceleration	'XXXX(h)'	4	16	<input type="radio"/>			<input type="radio"/>	0.01 G	The parameter setting becomes effective if zero.	
	Speed	'XXXX(h)'	4	20	<input type="radio"/>			<input type="radio"/>	mm/sec	The parameter setting becomes effective if zero. (Safety limit applies depending on the mode.)	
	Absolute coordinate data (*1)	'XXXXXXXX(h)'	8	28	<input type="radio"/>			<input type="radio"/>	0.001 mm		
	Remaining absolute coordinate data	Data indicated by *1 for the number of remaining axes	MAX 56	MAX 84	<input type="radio"/>			<input type="radio"/>	0.001 mm	Data indicated by * x Number of remaining effective axes = 8 bytes x (Max 8 - 1) axes = Max 56 bytes	
	SC	'XX(h)'	2	MAX 86	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	MAX 87	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	MAX 88	<input type="radio"/>			<input type="radio"/>				
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'234(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.

(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-19. Relative-Coordinate Specification Movement (235H)

Function: Move the actuator to the relative coordinates specified with respect to the current position.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'235(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Axis pattern	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	Acceleration	'XXXX(h)'	4	12	<input type="radio"/>			<input type="radio"/>	0.01 G	The parameter setting becomes effective if zero.	
	Deceleration	'XXXX(h)'	4	16	<input type="radio"/>			<input type="radio"/>	0.01 G	The parameter setting becomes effective if zero.	
	Speed	'XXXX(h)'	4	20	<input type="radio"/>			<input type="radio"/>	mm/sec	The parameter setting becomes effective if zero. (Safety limit applies depending on the mode.)	
	Relative coordinate data (*1)	'XXXXXXXX(h)'	8	28	<input type="radio"/>		<input type="radio"/>		0.001 mm		
	Remaining relative coordinate data	Data indicated by *1 for the number of remaining axes	MAX 56	MAX 84	<input type="radio"/>		<input type="radio"/>		0.001 mm	Data indicated by * x Number of remaining effective axes = 8 bytes x (Max 8 – 1) axes = Max 56 bytes	
	SC	'XX(h)'	2	MAX 86	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	MAX 87	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	MAX 88	<input type="radio"/>			<input type="radio"/>				
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'235(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>											

4-3-20. Jogging/Inching (236H)

Function: Move by jogging/inching.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'236(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○		* Only one axis can be specified for the SCARA type (multiple axes cannot be specified). * With the SCARA type, a jogging/inching command can be issued only when none of the servo axes are operating.	
	Acceleration	'XXXX(h)'	4	12	○			○	0.01 G (For each axis, in %)	The parameter setting becomes effective if zero.	
	Deceleration	'XXXX(h)'	4	16	○			○	0.01 G (For each axis, in %)	The parameter setting becomes effective if zero.	
	Speed	'XXXX(h)'	4	20	○			○	mm/sec (For each axis, in %)	The parameter setting becomes effective if zero. (Safety limit applies depending on the mode.)	
	Inching distance	'XXXXXXXX(h)'	8	28	○			○	0.001 mm (For each axis, in 0.001 deg)	Specify by an absolute value. Distance is not specified if zero (= jogging).	
	Operation type	'X(h)'	1	29	○			○		Bit 3 (Reserved for system use) Bit 1, 2 (Jogging/inching coordinate system (SCARA only)): 0 = Base coordinate system / 1 = Selected work coordinate system / 2 = Selected tool coordinate system / 3 = Each axis system Bit 0 (Jogging/inching direction): 0 = Negative direction on coordinate axis / 1 = Positive direction on coordinate axis	
	SC	'XX(h)'	2	31	○			○			
	CR	0Dh	1	32	○			○			
LF	0Ah	1	33	○			○				
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'236(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			
Error response	Error response format	Refer to the error response format.	10	10	○			○			

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.
 (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-21. Point-Number Specification Movement (237H)

Function: Move the actuator to the position of the specified point number.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'237(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Axis pattern	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		Used by an AND condition with the axis pattern of the point number.	
	Acceleration	'XXXX(h)'	4	12	<input type="radio"/>			<input type="radio"/>	0.01 G	The applicable setting in the position data becomes effective if zero. If both are zero, the parameter setting is followed.	
	Deceleration	'XXXX(h)'	4	16	<input type="radio"/>			<input type="radio"/>	0.01 G	The applicable setting in the position data becomes effective if zero. If both are zero, the parameter setting is followed.	
	Speed	'XXXX(h)'	4	20	<input type="radio"/>			<input type="radio"/>	mm/sec	The applicable setting in the position data becomes effective if zero. If both are zero, the parameter setting is followed. (Safety limit applies depending on the mode.)	
	Point number	'XXX(h)'	3	23	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	25	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	26	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	27	<input type="radio"/>			<input type="radio"/>				
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'237(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal. (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.											

4-3-22. Operation Stop & Cancel (238H)

Function: Stop/cancel the operation (including servo command/output cancellation while interlock is on hold)											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'238(h)'	3	6	○			○			
	Stop axis pattern	'XX(h)'	2	8	○			○			* Including servo command cancellation while interlock is on hold
	Appended command byte	'XX(h)'	2	10	○			○			Bit 1 to 7 (Reserved for system use) Bit 0 (Specification of output cancellation during interlock on-hold (OUT port) (when all operations are paused)): 0 = Not canceled / 1 = Canceled tentatively
	SC	'XX(h)'	2	12	○			○			
	CR	0Dh	1	13	○			○			
	LF	0Ah	1	14	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'238(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			
Error response	Error response format	Refer to the error response format.	10	10	○			○			
(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal. (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.											

4-3-23. Point Data Range-Specification Continuous Write (244H)

Function: Change point data for the number of change points from the change start point number.												
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks	
					Big	Little	Yes	No				
Command	Header	'!	1	1	○			○				
	Station	'XX(h)'	2	3	○			○				
	Message ID	'244(h)'	3	6	○			○				
	Change start point data number	'XXX(h)'	3	9	○			○				
	Number of change point data	'XXX(h)'	3	12	○			○		The number of data will be limited based on the send/receive buffers.		
	Point data (*1)	Axis pattern	'XX(h)'	2	14	○			○			
		Acceleration	'XXXX(h)'	4	18	○			○	0.01 G		
		Deceleration	'XXXX(h)'	4	22	○			○	0.01 G		
		Speed	'XXXX(h)'	4	26	○			○	mm/sec		
		Position data (*2)	'XXXXXXXX(h)'	8	34	○			○	0.001mm		
	Position data repetition for remaining effective axes	Data indicated by *2 for the number of remaining effective axes	MAX 56	MAX 90	○			○	0.001mm	Data indicated by *2 x Number of remaining effective axes = 8 bytes x (Max 8 - 1) axes = Max 56 bytes		
	Point data repetition for remaining data	Data indicated by *1 for the number of remaining data	MAX 233922	MAX 234012	Refer to the data indicated by *1.					Data indicated by *1 x Number of remaining data = Max 78 bytes x (Max 3000 data - 1) = Max 233922 bytes		
SC	'XX(h)'	2	MAX 234014	○			○					
CR	0Dh	1	MAX 234015	○			○					
LF	0Ah	1	MAX 234016	○			○					
Command Normal response	Header	'#'	1	1	○			○				
	Station	'XX(h)'	2	3	○			○				
	Message ID	'244(h)'	3	6	○			○				
	Change start point data number	'XXX(h)'	3	9	○			○				
	Number of changed point data	'XXX(h)'	3	12	○			○		The number of data will be limited based on the send/receive buffers.		
	SC	'XX(h)'	2	14	○			○				
	CR	0Dh	1	15	○			○				
	LF	0Ah	1	16	○			○				
Error response	Error response format	Refer to the error response format.	10	10	○			○				

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.
 (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-24. Change Point Data Continuous Write (245H)

Function: Change the specified point data for the number of change points from the change start point number.												
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks	
					Big	Little	Yes	No				
Command	Header	'!	1	1	○			○				
	Station	'XX(h)'	2	3	○			○				
	Message ID	'245(h)'	3	6	○			○				
	Number of change point data	'XXX(h)'	3	9	○			○		The number of data will be limited based on the send/receive buffers.		
	Point data (*1)	Change point data number	'XXX(h)'	3	12	○			○			
		Axis pattern	'XX(h)'	2	14							
		Acceleration	'XXXX(h)'	4	18	○			○	0.01 G		
		Deceleration	'XXXX(h)'	4	22	○			○	0.01 G		
		Speed	'XXXX(h)'	4	26	○			○	mm/sec		
		Position data (*2)	'XXXXXXXX(h)'	8	34	○			○	0.001mm		
		Position data repetition for remaining effective axes	Data indicated by *2 for the number of remaining effective axes	MAX 56	MAX 90	○			○	0.001mm	Data indicated by *2 x Number of remaining effective axes = 8 bytes x (Max 8 - 1) axes = Max 56 bytes	
	Point data repetition for remaining data	Data indicated by *1 for the number of remaining data	MAX 242919	MAX 243009	Refer to the data indicated by *1.					Data indicated by *1 x Number of remaining data = Max 81 bytes x (Max 3000 data - 1) = Max 242919 bytes		
	SC	'XX(h)'	2	MAX 243011	○			○				
CR	0Dh	1	MAX 243012	○			○					
LF	0Ah	1	MAX 243013	○			○					
Command Normal response	Header	'#'	1	1	○			○				
	Station	'XX(h)'	2	3	○			○				
	Message ID	'245(h)'	3	6	○			○				
	Number of changed point data	'XXX(h)'	3	9	○			○		The number of data will be limited based on the send/receive buffers.		
	SC	'XX(h)'	2	11	○			○				
	CR	0Dh	1	12	○			○				
	LF	0Ah	1	13	○			○				
Error response	Error response format	Refer to the error response format.	10	10	○			○				

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.

(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-25. Point Data Clear (246H)

Function: Clear point data for the number of clear points from the clear start point number.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'246(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Clear start point data number	'XXX(h)'	3	9	<input type="radio"/>			<input type="radio"/>			
	Number of clear point data	'XXX(h)'	3	12	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	14	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	15	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	16	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'246(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
		LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>		
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal. (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.											

4-3-26. Output Port Status Change (24AH)

Function: Change the status of the output port specified by the output port number.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'24A(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Output port number	'XXXX(h)'	4	10	<input type="radio"/>			<input type="radio"/>			
	Change type	'X(h)'	1	11	<input type="radio"/>			<input type="radio"/>		Bit 1 to 3 (Reserved for system use) Bit 0 (Output port ON/OFF): 0 = OFF / 1 = ON	
	SC	'XX(h)'	2	13	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	14	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	15	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'24A(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>											

4-3-27. Flag Status Change (24BH)

Function: Change the status of the flag specified by the flag number.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'24B(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		'00' in the case of a global flag	
	Flag number	'XXXX(h)'	4	12	<input type="radio"/>			<input type="radio"/>			
	Change type	'X(h)'	1	13							
	SC	'XX(h)'	2	15	<input type="radio"/>			<input type="radio"/>		Bit 1 to 3 (Reserved for system use) Bit 0 (Output port ON/OFF): 0 = OFF / 1 = ON	
	CR	0Dh	1	16	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	17	<input type="radio"/>			<input type="radio"/>				
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'24B(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal. (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.											

4-3-28. Integer Variable Change (24CH)

Function: Change integer variables for the number of change data from the change start variable number.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'24C(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		'00' in the case of a global variable	
	Change start variable number	'XXX(h)'	3	11	<input type="radio"/>			<input type="radio"/>			
	Number of change variable data	'XX(h)'	2	13	<input type="radio"/>			<input type="radio"/>		The number of data will be limited based on the send/receive buffers.	
	Integer variable data (*1)	'XXXXXXXX(h)'	8	21	<input type="radio"/>		<input type="radio"/>			Hexadecimal ASCII code of long-type data	
	Remaining integer variable data	Data indicated by *1 for the number of remaining data	MAX 2032	MAX 2053	<input type="radio"/>		<input type="radio"/>			Data indicated by *1 x Number of remaining data = 8 bytes x Max (FFh - 1) = Max 2032 bytes	
	SC	'XX(h)'	2	MAX 2055	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	MAX 2056	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	MAX 2057	<input type="radio"/>			<input type="radio"/>				
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'24C(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		'00' in the case of a global variable	
	Change start variable number	'XXX(h)'	3	11	<input type="radio"/>			<input type="radio"/>			
	Number of changed data	'XX(h)'	2	13	<input type="radio"/>			<input type="radio"/>		The number of data will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	15	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	16	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	17	<input type="radio"/>			<input type="radio"/>				
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.
 (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-29. Real Variable Change (24DH)

Function: Change real variables for the number of change data from the change start variable number.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'24D(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		'00' in the case of a global variable	
	Change start variable number	'XXX(h)'	3	11	<input type="radio"/>			<input type="radio"/>			
	Number of change variable data	'XX(h)'	2	13	<input type="radio"/>			<input type="radio"/>		The number of data will be limited based on the send/receive buffers.	
	Real variable data (*1)	'XXXXXXXXXXXXXXX(h)'	16	29	<input type="radio"/>		<input type="radio"/>			Hexadecimal ASCII code of double-type data	
	Remaining real variable data	Data indicated by *1 for the number of remaining data	MAX 4064	MAX 4093	<input type="radio"/>		<input type="radio"/>			Data indicated by *1 x Number of remaining data = 16 bytes x Max (FFh - 1) = Max 4064 bytes	
	SC	'XX(h)'	2	MAX 4095	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	MAX 4096	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	MAX 4097	<input type="radio"/>			<input type="radio"/>				
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'24D(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		'00' in the case of a global variable	
	Change start variable number	'XXX(h)'	3	11	<input type="radio"/>			<input type="radio"/>			
	Number of changed data	'XX(h)'	2	13	<input type="radio"/>			<input type="radio"/>		The number of data will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	15	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	16	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	17	<input type="radio"/>			<input type="radio"/>				
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.
 (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-30. String Variable Change (24EH)

Function: Change string variable values for the number of change strings from the change start string variable number.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'24E(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		'00' in the case of a global variable	
	Change start variable number	'XXX(h)'	3	11	<input type="radio"/>			<input type="radio"/>			
	Number of change variable data	'XX(h)'	2	13	<input type="radio"/>			<input type="radio"/>		The number of data will be limited based on the send/receive buffers.	
	String variable data (*1)	'XX(h)'	2	15	<input type="radio"/>			<input type="radio"/>			
	Remaining string variable data	Data indicated by *1 for the number of remaining data	MAX 508	MAX 523	<input type="radio"/>			<input type="radio"/>		Data indicated by *1 x Number of remaining data = 2 bytes x Max (FFh - 1) = Max 508 bytes	
	SC	'XX(h)'	2	MAX 525	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	MAX 526	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	MAX 527	<input type="radio"/>			<input type="radio"/>				
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'24E(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>				
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>											

4-3-31. Alarm Reset (252H)

Function: Reset the alarm.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'252(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'252(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
(Note 1)	Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.										
(Note 2)	Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.										

4-3-32. Program Run (253H), Program End (254H), Program Pause (255H), Program One-Step Run (256H), Program Resume (257H)

Function: Run, end, run one step of, pause between steps of, or resume the specified program.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'XXX(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Program number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		When an end, pause or resume command is issued with '00' specified, it will apply to all programs currently running.	
	SC	'XX(h)'	2	10	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	11	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	12	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'XXX(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
(Note 1)	Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.										
(Note 2)	Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.										

4-3-33. Software Reset (25BH)

Function: Reset the software.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'25B(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Normal response			0	0						No normal response. * The controller will become reception-ready upon elapse of approx. 10 seconds after this command is transmitted (as of June 26, 2001).	
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal. (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.											

4-3-34. Drive-Source Recovery Request (25CH)

Function: Request recovery of the drive source.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'25C(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'25C(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
(Note 1)	Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.										
(Note 2)	Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.										

4-3-35. Operation Pause Cancellation Request (25EH)

Function: Request cancellation of operation pause.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'25E(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'25E(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>											

4-3-36. Speed Change (262H)

Function: Chang the operating speed of the servo axis.											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'262(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Axis pattern	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	Speed	'XXXX(h)'	4	12	<input type="radio"/>			<input type="radio"/>	mm/sec	Consult IAI if you wish to use this command, since operations during which the command becomes effective are limited.	
	SC	'XX(h)'	2	14	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	15	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	16	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'262(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>											

4-3-37. Coordinate System Definition Data Range-Specification Continuous Query (2A0H)

Function: Query the definition data for coordinate system.												
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks	
					Big	Little	Yes	No				
Command	Header	'!'	1	1	○			○				
	Station	'XX(h)'	2	3	○			○				
	Message ID	'2A0(h)'	3	6	○			○				
	Type	'X(h)'	1	7	○			○		0 = Work coordinate system definition data / 1 = Tool coordinate system definition data		
	Query-target head coordination system definition data number	'XX(h)'	2	9	○			○		Work/tool coordinate system definition data number (0 ~)		
	Number of query records	'XX(h)'	2	11	○			○		The number of records will be limited based on the send/receive buffers.		
	SC	'XX(h)'	2	13	○			○				
	CR	0Dh	1	14	○			○				
	LF	0Ah	1	15	○			○				
Normal response	Header	'#'	1	1	○			○				
	Station	'XX(h)'	2	3	○			○				
	Message ID	'2A0(h)'	3	6	○			○				
	Type	'X(h)'	1	7	○			○		0 = Work coordinate system definition data / 1 = Tool coordinate system definition data		
	Response start coordinate system definition data number	'XX(h)'	2	9	○			○		Work/tool coordinate system definition data number (0 ~)		
	Number of response records	'XX(h)'	2	11	○			○		The number of records will be limited based on the send/receive buffers.		
	Coordinate system definition data (*1)	Coordinate offset (*2)	"XXXXXXXX(h)'	8	19	○			○	0.001 mm	X-axis data	
		Remaining coordinate offset	Date indicated by *2 for the remaining 3 axes	24	43	○			○	0.001 mm (R-axis: 0.001 deg)	Data indicated by *2 x Remaining 3 axes (Y, Z, R-axes) = 8 bytes x 3 axes = 24 bytes	
	Remaining coordinate system definition data	Data indicated by *1 for the number of remaining records	MAX 4064	MAX 4107	○			○	Refer to the data indicated by *1.	Data indicated by *1 x Number of remaining records = 32 bytes x (Max 128 records - 1) = Max 4064 bytes		
	SC	'XX(h)'	2	MAX 4109	○			○				
CR	0Dh	1	MAX 4110	○			○					
LF	0Ah	1	MAX 4111	○			○					
Error response	Error response format	Refer to the error response format.	10	10	○			○				

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.
 (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-38. SCARA Axis Status Query (2A1H)

Function: Query the axis status (SCARA).											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'2A1(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Query axis pattern	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	Type	'X(h)'	1	9	<input type="radio"/>			<input type="radio"/>		Bit 2, 3 (Reserved for system use) Bit 0, 1 (Current position type): 0 = Base coordinate system / 1 = Selected work coordinate system / 2 = Reserved for system use / 3 = Each axis system	
	SC	'XX(h)'	2	11	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	12	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	13	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'2A1(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Work coordinate system selection number	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>		Work coordinate system selection number (0 ~)	
	Tool coordinate system selection number	'XX(h)'	2	10	<input type="radio"/>			<input type="radio"/>		Tool coordinate system selection number (0 ~)	
	Common axis status	'XX(h)'	2	12	<input type="radio"/>			<input type="radio"/>		Bit 4 to 7 (Reserved for system use) Bit 2, 3 (Current position coordinate system type): 0 = Base coordinate system / 1 = Selected work coordinate system / 2 = Reserved for system use / 3 = Each axis system Bit 0, 1 (Current arm system): 0 = Right arm system / 1 = Left arm system / 2 = Indeterminable / 3 = Reserved for system use	
	Axis pattern	'XX(h)'	2	14	<input type="radio"/>			<input type="radio"/>			No axis pattern is the same as "driver not connected."

Normal response (Continued from the previous page)	Single-axis status (*1)	Axis status	'XX(h)'	2	16	○		○	<p>Bit 6, 7 (Reserved for system use)</p> <p>Bit 5 (Push error detection): 0 = Not detected / 1 = Detected</p> <p>Bit 4 (Operation command successful completion): 0 = Not yet complete / 1 = Completed successfully</p> <p>* Can be used only for completion check after an operation command. (For positioning that includes any of the X, Y and R-axes, be sure to check completion for all of the X, Y and R-axes.)</p> <p>Bit 3 (Servo): 0 = OFF / 1 = ON</p> <p>Bit 1, 2 (Origin return): 0 = Not yet performed / 1 = Returning to origin / 2 = Completed</p> <p>Bit 0 (Servo axis in use): 0 = Not in use / 1 = In use (moving, etc.)</p> <p>* "Servo axis in use" indicates that a given task has the right to use the applicable axis. Therefore, this bit will turn ON not only when an operation command involving axis movement is in progress (including when an axis is moving), but also in the following conditions:</p> <ul style="list-style-type: none"> • Servo is starting up from an OFF state • Servo is shutting down from an ON state (excluding emergency stop) • Operation axis is paused * Check method for operation command positioning under IAI protocol After an IAI-protocol operation command is executed, turning OFF (Not in use) of bit 0 (Servo axis in use) will be monitored for the applicable axis. <p>When "Not in use" is detected, the cause will be checked based on the conditions of bit 4 (Operation command successful completion) and bit 5 (Push error detection) (three causes are shown below):</p> <p>(1) [Bit 0 (Servo axis in use) = OFF] AND [Bit 4 (Operation command successful completion) = ON]</p> <p>--- Positioning has completed successfully.</p> <p>(2) [Bit 0 (Servo axis in use) = OFF] AND [Bit 5 (Push error detection) = ON]</p> <p>--- Push error (* Need not be checked if push command is not used.)</p> <p>(3) [Bit 0 (Servo axis in use) = OFF] AND [bit 4 (Operation command successful completion) = OFF] AND [Bit 5 (Push error detection) = OFF]</p> <p>--- Operation cancellation due to error, emergency stop, etc.</p> <p>--- Operation cancellation due to error, emergency stop, etc.</p>	
		Axis sensor input status	'X(h)'	1	17	○		○	<p>Bit 3 (Reserved for system use)</p> <p>Bit 2 (Origin sensor): 0 = OFF / 1 = ON</p> <p>Bit 1 (Overrun sensor): 0 = OFF / 1 = ON</p> <p>Bit 0 (Creep sensor): 0 = OFF / 1 = ON</p>	
		Axis error code	'XXX(h)'	3	20	○			○	
		Encoder status (at reset)	'XX(h)'	2	22	○			○	<p>Bit 7 (Battery alarm (BA)) Bit 6 (Battery error (BE))</p> <p>Bit 5 (Multi-rotation error (ME)) Bit 4 (Reserved for system use)</p> <p>Bit 3 (Counter overflow (OF)) Bit 2 (Count error (CE))</p> <p>Bit 1 (Full absolute status (FS)) Bit 0 (Overspeed (OS))</p>
		Current position	'XXXXXXXX(h)'	8	30	○		○	0.001 mm or 0.001 deg	Long-type data (hexadecimal ASCII code)
		Single-axis status repetition for remaining axes	Data indicated by *1 for the number of remaining axes	MAX 112	MAX 142	Refer to the data indicated by *1.				Data indicated by *1 x Number of remaining effective axes = 16 bytes x (Max 8 - 1) = Max 112 bytes
		SC	'XX(h)'	2	MAX 144	○			○	
		CR	0Dh	1	MAX 145	○			○	
		LF	0Ah	1	MAX 146	○			○	
		Error response	Error response format	Refer to the error response format.	10	10	○			○

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.

(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-39. Simple-Interference-Check-Zone Definition Data Range-Specification Continuous Query (2A2H)

Function: Query the definition data for simple interference check zone.												
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks	
					Big	Little	Yes	No				
Command	Header	'!'	1	1	○			○				
	Station	'XX(h)'	2	3	○			○				
	Message ID	'2A2(h)'	3	6	○			○				
	Query-target simple-interference-check-zone definition data number	'XX(h)'	2	8	○			○		Simple-interference-check-zone definition data number (1 ~)		
	Number of query records	'XX(h)'	2	10	○			○		The number of records will be limited based on the send/receive buffers.		
	SC	'XX(h)'	2	12	○			○				
	CR	0Dh	1	13	○			○				
	LF	0Ah	1	14	○			○				
Normal response	Header	'#'	1	1	○			○				
	Station	'XX(h)'	2	3	○			○				
	Message ID	'2A2(h)'	3	6	○			○				
	Simple-interference-check-zone definition data number	'XX(h)'	2	8	○			○		Simple-interference-check-zone definition data number (1 ~)		
	Number of response records	'XX(h)'	2	10	○			○		The number of records will be limited based on the send/receive buffers.		
	Simple-interference-check-zone definition data	Simple-interference-check-zone definition coordinate effective axis pattern	'XX(h)'	2	12	○			○			
		Simple-interference-check-zone definition coordinate 1 (*2)	'XXXXXXXX(h)'	8	20	○		○		0.001 mm (R-axis: 0.001 deg)	Define a rectangular solid with coordinates 1 and 2. * Coordinates on the base coordinate system	
		Definition coordinate 1 remaining effective coordinate data	Date indicated by *2 for the number of remaining effective axes	MAX 24	MAX 44	○		○		0.001 mm (R-axis: 0.001 deg)	Data indicated by *2 x Number of remaining effective axes = 8 bytes x Max (4 - 1) axes = Max 24 bytes	
		Simple-interference-check-zone definition coordinate 2 (*3)	'XXXXXXXX(h)'	8	MAX 52	○		○		0.001 mm (R-axis: 0.001 deg)	Define a rectangular solid with coordinates 1 and 2. * Coordinates on the base coordinate system	
		Definition coordinate 2 remaining effective coordinate data	Date indicated by *3 for the number of remaining effective axes	MAX 24	MAX 76	○		○		0.001 mm (R-axis: 0.001 deg)	Data indicated by *3 x Number of remaining effective axes = 8 bytes x Max (4 - 1) axes = Max 24 bytes	

Normal response (Continued from the previous page)	Simple-interference-check-zone definition data (Continued from the previous page) (*1)	Physical output port number or global flag number for output upon entry	'XXXX(h)'	4	MAX 80	○		○		Invalid if 0.
		Entry error type specification	'XX(h)'	2	MAX 82	○		○		0 = No error handling / 1 = Message-level error / 2 = Operation-cancellation level error
		Reserved for system use	'XX(h)'	2	MAX 84	○		○		
		Reserved for system use	'XX(h)'	2	MAX 86	○		○		
		Reserved for system use	'XX(h)'	2	MAX 88	○		○	0.001 mm or 0.001 deg	
	Remaining simple-interference-check-zone definition data	Data indicated by *1 for the number of remaining records	MAX 1170	MAX 1258	Refer to the data indicated by *1.				Data indicated by *1 x Number of remaining records = 78 bytes x (Max 16 records – 1) = Max 1170 bytes	
	SC	'XX(h)'	2	MAX 1260	○		○			
	CR	0Dh	1	MAX 1261	○		○			
	LF	0Ah	1	MAX 1262	○		○			
	Error response	Error response format	Refer to the error response format.	10	10	○		○		
<p>(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.</p> <p>(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.</p>										

4-3-40. SCARA Absolute-Coordinate Specification Movement (2D4H)

Function: Move to the specified absolute coordinates (SCARA).											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'2D4(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Axis pattern	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	Acceleration	'XXXX(h)'	4	12	<input type="radio"/>			<input type="radio"/>	% or 0.01 G	The parameter setting becomes effective if 0. * Unit: Movement control = PTP: [%] / Movement control = CP: [0.01 G]	
	Deceleration	'XXXX(h)'	4	16	<input type="radio"/>			<input type="radio"/>	% or 0.01 G	The parameter setting becomes effective if 0. * Unit: Movement control = PTP: [%] / Movement control = CP: [0.01 G]	
	Speed	'XXXX(h)'	4	20	<input type="radio"/>			<input type="radio"/>	% or mm/sec	The parameter setting becomes effective if 0. (Safety limit applies depending on the mode.) * Unit: Movement control = PTP: [%] / Movement control = CP: [mm/sec]	
	Positioning operation type	'XX(h)'	2	22	<input type="radio"/>			<input type="radio"/>		Bit 5 to 7 (Reserved for system use) Bit 3, 4 (PTP target arm system specification type (Always move current arm system if CP): 0 = Current arm system (Movement of opposite arm system prohibited if unfeasible) / 1 = Current arm system (Movement of opposite arm system permitted if unfeasible) / 2 = Right arm system (Movement of opposite arm system prohibited if unfeasible) / 3 = Left arm system (Movement of opposite arm system permitted if unfeasible) Bit 1, 2 (Movement coordinate system): 0 = Reserved for system use / 1 = Selected work coordinate system / 2, 3 = Reserved for system use Bit 0 (Movement control): 0 = PTP / 1 = CP	
	Absolute coordinate data (*1)	'XXXXXXXX(h)'	8	30	<input type="radio"/>			<input type="radio"/>	0.001 mm		
	Remaining absolute coordinate data	Data indicated by *1 for the number of remaining axes	MAX 56	MAX 86	<input type="radio"/>			<input type="radio"/>	0.001 mm (R-axis: 0.001 deg)	Data indicated by *1 x Number of remaining effective axes = 8 bytes x (Max 8 – 1) axes = Max 56 bytes	
	SC	'XX(h)'	2	MAX 88	<input type="radio"/>			<input type="radio"/>			
CR	0Dh	1	MAX 89	<input type="radio"/>			<input type="radio"/>				
LF	0Ah	1	MAX 90	<input type="radio"/>			<input type="radio"/>				
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'2D4(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>				
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.

(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-41. SCARA Relative-Coordinate Specification Movement (2D5H)

Function: Move to the relative coordinates specified with respect to the current position (SCARA).											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'2D5(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○			
	Acceleration	'XXXX(h)'	4	12	○			○	% or 0.01 G	The parameter setting becomes effective if 0. * Unit: Movement control = PTP: [%] / Movement control = CP: [0.01 G]	
	Deceleration	'XXXX(h)'	4	16	○			○	% or 0.01 G	The parameter setting becomes effective if 0. * Unit: Movement control = PTP: [%] / Movement control = CP: [0.01 G]	
	Speed	'XXXX(h)'	4	20	○			○	% or mm/sec	The parameter setting becomes effective if 0. (Safety limit applies depending on the mode.) * Unit: Movement control = PTP: [%] / Movement control = CP: [mm/sec]	
	Positioning operation type	'XX(h)'	2	22	○			○		Bit 5 to 7 (Reserved for system use) Bit 3, 4 (PTP target arm system specification type (Always move current arm system if CP)); 0 = Current arm system (Movement of opposite arm system prohibited if unfeasible) / 1 = Current arm system (Movement of opposite arm system permitted if unfeasible) / 2 = Right arm system (Movement of opposite arm system prohibited if unfeasible) / 3 = Left arm system (Movement of opposite arm system permitted if unfeasible) Bit 1, 2 (Movement coordinate system): 0 = Reserved for system use / 1 = Selected work coordinate system / 2, 3 = Reserved for system use Bit 0 (Movement control): 0 = PTP / 1 = CP	
	Relative coordinate data (*1)	'XXXXXXXX(h)'	8	30	○			○	0.001 mm		
	Remaining relative coordinate data	Data indicated by *1 for the number of remaining axes	MAX 56	MAX 86	○			○	0.001 mm (R-axis: 0.001 deg)	Data indicated by *1 x Number of remaining effective axes = 8 bytes x (Max 8 - 1) axes = Max 56 bytes	
	SC	'XX(h)'	2	MAX 88	○			○			
	CR	0Dh	1	MAX 89	○			○			
LF	0Ah	1	MAX 90	○			○				
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'2D5(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			
Error response	Error response format	Refer to the error response format.	10	10	○			○			

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.
 (Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

4-3-42. SCARA Point-Number Specification Movement (2D6H)

Function: Move to the specified point number (SCARA).											
	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'!'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'2D6(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	Axis pattern	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			Used by an AND condition with the axis pattern of the point number.
	Acceleration	'XXXX(h)'	4	12	<input type="radio"/>			<input type="radio"/>	% or 0.01 G	The applicable setting in the position data becomes effective if zero. If both are zero, the parameter setting is followed. * Unit: Movement control = PTP: [%] / Movement control = CP: [0.01 G]	
	Deceleration	'XXXX(h)'	4	16	<input type="radio"/>			<input type="radio"/>	% or 0.01 G	The applicable setting in the position data becomes effective if zero. If both are zero, the parameter setting is followed. * Unit: Movement control = PTP: [%] / Movement control = CP: [0.01 G]	
	Speed	'XXXX(h)'	4	20	<input type="radio"/>			<input type="radio"/>	% or mm/sec	The applicable setting in the position data becomes effective if zero. If both are zero, the parameter setting is followed. (Safety limit applies depending on the mode.) * Unit: Movement control = PTP: [%] / Movement control = CP: mm/sec	
	Positioning operation type	'XX(h)'	2	22	<input type="radio"/>			<input type="radio"/>		Bit 5 to 7 (Reserved for system use) Bit 3, 4 (PTP target arm system specification type (Always move current arm system if CP)): 0 = Current arm system (Movement of opposite arm system prohibited if unfeasible) / 1 = Current arm system (Movement of opposite arm system permitted if unfeasible) / 2 = Right arm system (Movement of opposite arm system prohibited if unfeasible) / 3 = Left arm system (Movement of opposite arm system permitted if unfeasible) Bit 1, 2 (Movement coordinate system): 0 = Reserved for system use / 1 = Selected work coordinate system / 2, 3 = Reserved for system use Bit 0 (Movement control): 0 = PTP / 1 = CP	
	Point number	'XXX(h)'	3	25	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	27	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	28	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	29	<input type="radio"/>			<input type="radio"/>			
Normal response	Header	'#'	1	1	<input type="radio"/>			<input type="radio"/>			
	Station	'XX(h)'	2	3	<input type="radio"/>			<input type="radio"/>			
	Message ID	'2D6(h)'	3	6	<input type="radio"/>			<input type="radio"/>			
	SC	'XX(h)'	2	8	<input type="radio"/>			<input type="radio"/>			
	CR	0Dh	1	9	<input type="radio"/>			<input type="radio"/>			
	LF	0Ah	1	10	<input type="radio"/>			<input type="radio"/>			
Error response	Error response format	Refer to the error response format.	10	10	<input type="radio"/>			<input type="radio"/>			

(Note 1) Add H (or h) at the end of each data expressed in hexadecimal notation. If there is no H or h at the end, the data is considered a decimal.

(Note 2) Data enclosed in single quotation marks indicates an ASCII code. Data is a hexadecimal ASCII code if (h) is added before the closing quotation mark, or a decimal ASCII code if (d) is added before the closing quotation mark.

5. Timeout and Retry

The normal responses and error responses received by the master station (host) from the slave station (controller) must satisfy all of the following conditions:

- (1) The normal response or error response format is satisfied.
- (2) The checksum (SC) is correct.
- (3) The station number in the transmitted command is the same as the station number in the reception response.
- (4) The message ID in the transmitted command is the same as the message ID in the reception response (except in the case of error response).

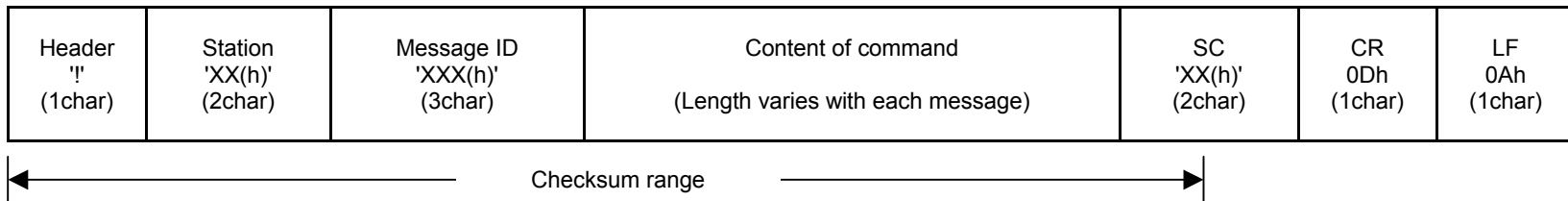
If completion of reception of a normal response or error response that satisfies the above conditions cannot be confirmed within a specified period (3 seconds) after completion of command transmission, the master station (host) will attempt to restore communication via command retransmission (retry transmission). When the number of retry transmissions exceeds the upper limit (2 or 3, selected in accordance with the system), the system shall recognize an irrecoverable communication error.

1. General Rules

1.1 Command/Response Formats

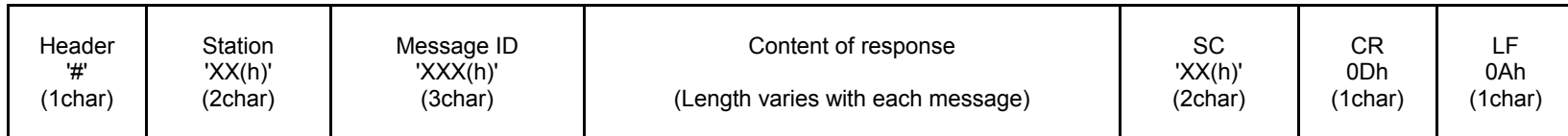
The commands received and responses sent by the controller follow the respective variable-length formats specified below (character codes are in ASCII).

○ Command Format

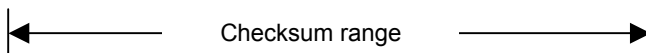
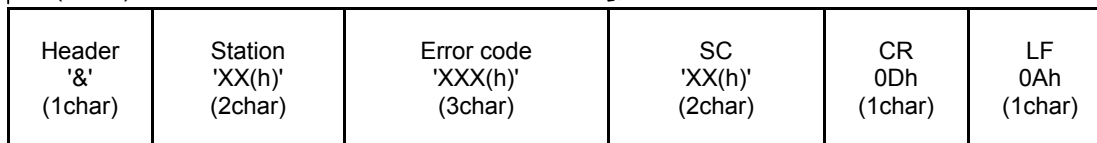


○ Response Format

(Normal)



(Error)



1.2 Content of Command/Response

Header:	Indicate the start of a command/response message. The header specifies one of the following message categories: '!' (21H) --- Command '#' (23H) --- Normal response '%' (25H) --- Error response (format B)
Station:	Indicate the station number of the controller (value of "I/O parameter No. 91: User-open SIO channel 1, station code").
Message ID:	A three-digit hexadecimal code indicates the message type.
Message content:	Set data varies with each message. (Refer to 2, "Message," for details on each message.) The following rules apply commonly to all messages: (1) Set the data in the specified data size. If the digits in the data are less than the specified digits, add 0 in the upper digit(s) left blank. Example: Entering data 12H (hexadecimal notation) when the data size is 4 bytes Set '0012.' (2) If the data unit is specified, set that data in that unit. Example 1: Entering 400 mm in hexadecimal notation when the data size is 8 bytes and unit is 0.001 mm. 400 [mm] = 400000 [in units of 0.001 mm] (decimal notation) = 61A80A [in units of 0.001 mm] (hexadecimal notation) Set '00061A80A.' Example 2: Entering -400 mm in hexadecimal notation (with sign extension) when the data size is 8 bytes and unit is 0.001 mm. -400 [mm] = -400000 [in units of 0.001 mm] (decimal notation) = FFF9E580H [in units of 0.001 mm] (hexadecimal notation, with sign extension) Set 'FFF9E580.' (3) Set the axis pattern, I/O port, flag port, status data, etc. in bit pattern. Example: Entering the axis-pattern data indicating axes 1, 2 and 4 when the data size is 2 bytes Binary 00001011 → Hexadecimal 0BH Set '0B.'
SC:	Checksum
CR (0DH):	Indicate the end of a command/response.
LF (0AH):	Indicate the end of a command/response.

1.3 Checksum

A checksum is used to verify if the communication has been successful. The communication is deemed successful if the checksum calculated from the received data is the same as the checksum in the message. Each checksum is an ASCII code representing the lower byte of the total sum calculated by adding the message values represented in one byte length from the beginning of the message to immediately before the checksum. You can disable the controller's checksum function by entering '@@' as the checksum.

Example: Effective Point Data Query

'!	'99'	'209'			'000'			'032'			SC		CR	LF	
21H	39H	39H	32H	30H	39H	30H	30H	30H	30H	33H	32H	▲	▲	0DH	0AH

$$\begin{aligned}
 \text{Total sum} &= 21\text{H} + 39\text{H} + 39\text{H} + 32\text{H} + 30\text{H} + 39\text{H} \\
 &+ 30\text{H} + 30\text{H} + 30\text{H} + 30\text{H} + 33\text{H} + 32\text{H} \\
 &= \underline{253\text{H}}
 \end{aligned}$$

35H ('5') 35H ('3')

The checksum is calculated as '53.'

1.4 Error Response

If the command from the master station (host equipment) has generated an error in the slave station (controller), an error response will be returned instead of a normal response (refer to 2, "Message," for the format). **When an error response is received, stop the system or take other appropriate action.**

2. Message

2.1 Message ID

Message ID	Message name	Type	Applicable type		Page
			Cartesian	New SCARA	
	Error response	Common	○	○	
200H	Test call	Query	○	○	
201H	Version code query	Query	○	○	
208H	Number of effective point data query	Query	○	○	
209H	Effective point data query	Query	○	○	
20BH	Input port query	Query	○	○	
20CH	Output port query	Query	○	○	
20DH	Flag query	Query	○	○	
20EH	Integer variable query	Query	○	○	
20FH	Real variable query	Query	○	○	
210H	String variable query	Query	○	○	
212H	Axis status query	Query	○	○	
213H	Program status query	Query	○	○	
215H	System status query	Query	○	○	
216H	Error detail information query	Query	○	○	
232H	Servo ON/OFF	Execute	○	○	
233H	Origin return	Execute	○	*1	
234H	Absolute-coordinate specification movement	Execute	○		
235H	Relative-coordinate specification movement	Execute	○		
236H	Jogging/inching	Execute	○	○	
237H	Point-number specification movement	Execute	○		38
238H	Operation stop & cancel	Execute	○	○	39
244H	Point data range-specification continuous write	Execute	○	○	40
245H	Change point data continuous write	Execute	○	○	41
246H	Point data clear	Execute	○	○	42
24AH	Output port status change	Execute	○	○	43
24BH	Flag status change	Execute	○	○	44

2.2 Message Format

Message ID	Message name	Type	Applicable type		Page
			Cartesian	New SCARA	
24CH	Integer variable change	Execute	○	○	
24DH	Real variable change	Execute	○	○	
24EH	String variable change	Execute	○	○	
252H	Alarm reset	Execute	○	○	
253H	Program run	Execute	○	○	
254H	Program end	Execute	○	○	
255H	Program pause	Execute	○	○	
256H	Program one-step run	Execute	○	○	
257H	Program resume	Execute	○	○	
25BH	Software reset	Execute	○	○	
25CH	Drive-source recovery request	Execute	○	○	
25EH	Operation pause cancellation request	Execute	○	○	
262H	Speed change	Execute	○		
2A0H	Coordinate system definition data	Query		○	
2A1H	SCARA axis status query	Query		○	
2A2H	Simple interference check zone	Query		○	
2D4H	SCARA absolute-coordinate specification movement	Execute		○	
2D5H	SCARA relative-coordinate specification movement	Execute		○	
2D6H	SCARA point-number specification movement	Execute		○	