Program Type Controller

Serial communication (format B)

Protocol Specification **Fifteenth Edition**

Please Read Before Use

Thank you for purchasing our product.

This instruction manual explains the handling methods, structure and maintenance of this product, providing the information you need in order to use the product safely.

Before using the product, be sure to read this manual and fully understand the contents explained herein to ensure safe use of the product.

The DVD enclosed with the product contains instruction manuals for IAI products.
When using the product, refer to the necessary sections of the applicable instruction manual by printing them out or displaying them on a PC.

After reading the instruction manual, keep it in a convenient place so that whoever is handling the product can refer to it quickly when necessary.

[Important]

- This instruction manual is an original document dedicated for this product.
- This product cannot be used in ways not shown in this instruction manual. IAI shall not be liable for any result whatsoever arising from the use of the product in any other way than what is noted in the manual.
- The information contained in this instruction manual is subject to change without notice for the purpose of product improvement.
- If any issues arise regarding the information contained in this instruction manual, contact our customer center or the nearest sales office.
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Safety Guide

“Safety Guide” has been written to use the machine safely and so prevent personal injury or property damage beforehand.
Make sure to read it before the operation of this product.

Safety Precautions for Our Products

The common safety precautions for the use of any of our robots in each operation.

No.	Operation Description	Description
1	Model Selection	● This product has not been planned and designed for the application where high level of safety is required, so the guarantee of the protection of human life is impossible. Accordingly, do not use it in any of the following applications. 1) Medical equipment used to maintain, control or otherwise affect human life or physical health. 2) Mechanisms and machinery designed for the purpose of moving or transporting people (For vehicle, railway facility or air navigation facility) 3) Important safety parts of machinery (Safety device, etc.) ● Do not use the product outside the specifications. Failure to do so may considerably shorten the life of the product. ● Do not use it in any of the following environments. 1) Location where there is any inflammable gas, inflammable object or explosive 2) Place with potential exposure to radiation 3) Location with the ambient temperature or relative humidity exceeding the specification range 4) Location where radiant heat is added from direct sunlight or other large heat source 5) Location where condensation occurs due to abrupt temperature changes 6) Location where there is any corrosive gas (sulfuric acid or hydrochloric acid) 7) Location exposed to significant amount of dust, salt or iron powder 8) Location subject to direct vibration or impact ● For an actuator used in vertical orientation, select a model which is equipped with a brake. If selecting a model with no brake, the moving part may drop when the power is turned OFF and may cause an accident such as an injury or damage on the work piece.

No.	Operation Description	Description
2	Transportation	● When carrying a heavy object, do the work with two or more persons or utilize equipment such as crane. ● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● When in transportation, consider well about the positions to hold, weight and weight balance and pay special attention to the carried object so it would not get hit or dropped. ● Transport it using an appropriate transportation measure. The actuators available for transportation with a crane have eyebolts attached or there are tapped holes to attach bolts. Follow the instructions in the instruction manual for each model. ● Do not step or sit on the package. ● Do not put any heavy thing that can deform the package, on it. ● When using a crane capable of 1t or more of weight, have an operator who has qualifications for crane operation and sling work. ● When using a crane or equivalent equipments, make sure not to hang a load that weighs more than the equipment’s capability limit. ● Use a hook that is suitable for the load. Consider the safety factor of the hook in such factors as shear strength. ● Do not get on the load that is hung on a crane. ● Do not leave a load hung up with a crane. ● Do not stand under the load that is hung up with a crane.
3	Storage and Preservation	● The storage and preservation environment conforms to the installation environment. However, especially give consideration to the prevention of condensation. ● Store the products with a consideration not to fall them over or drop due to an act of God such as earthquake.

No.	Operation Description	Description
4	Installation and Start	(1) Installation of Robot Main Body and Controller, etc. ● Make sure to securely hold and fix the product (including the work part). A fall, drop or abnormal motion of the product may cause a damage or injury. Also, be equipped for a fall-over or drop due to an act of God such as earthquake. ● Do not get on or put anything on the product. Failure to do so may cause an accidental fall, injury or damage to the product due to a drop of anything, malfunction of the product, performance degradation, or shortening of its life. ● When using the product in any of the places specified below, provide a sufficient shield. 1) Location where electric noise is generated 2) Location where high electrical or magnetic field is present 3) Location with the mains or power lines passing nearby 4) Location where the product may come in contact with water, oil or chemical droplets
		(2) Cable Wiring ● Use our company's genuine cables for connecting between the actuator and controller, and for the teaching tool. ● Do not scratch on the cable. Do not bend it forcibly. Do not pull it. Do not coil it around. Do not insert it. Do not put any heavy thing on it. Failure to do so may cause a fire, electric shock or malfunction due to leakage or continuity error. ● Perform the wiring for the product, after turning OFF the power to the unit, so that there is no wiring error. ● When the direct current power (+24V) is connected, take the great care of the directions of positive and negative poles. If the connection direction is not correct, it might cause a fire, product breakdown or malfunction. ● Connect the cable connector securely so that there is no disconnection or looseness. Failure to do so may cause a fire, electric shock or malfunction of the product. ● Never cut and/or reconnect the cables supplied with the product for the purpose of extending or shortening the cable length. Failure to do so may cause the product to malfunction or cause fire.
		(3) Grounding ● The grounding operation should be performed to prevent an electric shock or electrostatic charge, enhance the noise-resistance ability and control the unnecessary electromagnetic radiation. ● For the ground terminal on the AC power cable of the controller and the grounding plate in the control panel, make sure to use a twisted pair cable with wire thickness 0.5mm^2 (AWG20 or equivalent) or more for grounding work. For security grounding, it is necessary to select an appropriate wire thickness suitable for the load. Perform wiring that satisfies the specifications (electrical equipment technical standards). ● Perform Class D Grounding (former Class 3 Grounding with ground resistance 100Ω or below).

No.	Operation Description	Description
4	Installation and Start	(4) Safety Measures ● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● When the product is under operation or in the ready mode, take the safety measures (such as the installation of safety and protection fence) so that nobody can enter the area within the robot’s movable range. When the robot under operation is touched, it may result in death or serious injury. ● Make sure to install the emergency stop circuit so that the unit can be stopped immediately in an emergency during the unit operation. ● Take the safety measure not to start up the unit only with the power turning ON. Failure to do so may start up the machine suddenly and cause an injury or damage to the product. ● Take the safety measure not to start up the machine only with the emergency stop cancellation or recovery after the power failure. Failure to do so may result in an electric shock or injury due to unexpected power input. ● When the installation or adjustment operation is to be performed, give clear warnings such as “Under Operation; Do not turn ON the power!” etc. Sudden power input may cause an electric shock or injury. ● Take the measure so that the work part is not dropped in power failure or emergency stop. ● Wear protection gloves, goggle or safety shoes, as necessary, to secure safety. ● Do not insert a finger or object in the openings in the product. Failure to do so may cause an injury, electric shock, damage to the product or fire. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity.

No.	Operation Description	Description
5	Teaching	● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● Perform the teaching operation from outside the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. ● When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. ● When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. ● Place a sign “Under Operation” at the position easy to see. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. * Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.
6	Trial Operation	● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● After the teaching or programming operation, perform the check operation one step by one step and then shift to the automatic operation. ● When the check operation is to be performed inside the safety protection fence, perform the check operation using the previously specified work procedure like the teaching operation. ● Make sure to perform the programmed operation check at the safety speed. Failure to do so may result in an accident due to unexpected motion caused by a program error, etc. ● Do not touch the terminal block or any of the various setting switches in the power ON mode. Failure to do so may result in an electric shock or malfunction.

No.	Operation Description	Description
7	Automatic Operation	● Check before starting the automatic operation or rebooting after operation stop that there is nobody in the safety protection fence. ● Before starting automatic operation, make sure that all peripheral equipment is in an automatic-operation-ready state and there is no alarm indication. ● Make sure to operate automatic operation start from outside of the safety protection fence. ● In the case that there is any abnormal heating, smoke, offensive smell, or abnormal noise in the product, immediately stop the machine and turn OFF the power switch. Failure to do so may result in a fire or damage to the product. ● When a power failure occurs, turn OFF the power switch. Failure to do so may cause an injury or damage to the product, due to a sudden motion of the product in the recovery operation from the power failure.
8	Maintenance and Inspection	● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● Perform the work out of the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. ● When the work is to be performed inside the safety protection fence, basically turn OFF the power switch. ● When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. ● When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. ● Place a sign “Under Operation” at the position easy to see. ● For the grease for the guide or ball screw, use appropriate grease according to the instruction manual for each model. ● Do not perform the dielectric strength test. Failure to do so may result in a damage to the product. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. ● The slider or rod may get misaligned OFF the stop position if the servo is turned OFF. Be careful not to get injured or damaged due to an unnecessary operation. ● Pay attention not to lose the removed cover or screws, and make sure to put the product back to the original condition after maintenance and inspection works. Use in incomplete condition may cause damage to the product or an injury. * Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.

No.	Operation Description	Description
9	Modification and Dismantle	● Do not modify, disassemble, assemble or use of maintenance parts not specified based at your own discretion.
10	Disposal	● When the product becomes no longer usable or necessary, dispose of it properly as an industrial waste. ● When removing the actuator for disposal, pay attention to drop of components when detaching screws. ● Do not put the product in a fire when disposing of it. The product may burst or generate toxic gases.
11	Other	● Do not come close to the product or the harnesses if you are a person who requires a support of medical devices such as a pacemaker. Doing so may affect the performance of your medical device. ● See Overseas Specifications Compliance Manual to check whether complies if necessary. ● For the handling of actuators and controllers, follow the dedicated instruction manual of each unit to ensure the safety.

Table of Contents

1. Overview

This document is a communication protocol specification between the host device and the SEL controller.
The applicable models are as follows:

- XSEL-J/K/KE/KT/KET
- XSEL-JX/KX/KTX
- XSEL-P/Q/PCT/QCT
- XSEL-PX/QX
- XSEL-R/S
- XSEL-RX/SX
- XSEL-RXD/SXD
- XSEL-RA/SA
- XSEL-RAX/SAX
- XSEL-RAXD/SAXD
- SSEL
- ASEL/PSEL
- TT
- TTA
- MSEL-PC/PG/PCF/PGF
- MSEL-PCX/PGX
- RSEL

2. Communication Interface

2-1. Serial Communication (PC Connector / Teaching Connector)

The SEL controller can communicate with the host in the AUTO mode via a PC connector or teaching connector using this protocol by setting I/O parameter No. 90 "Usage of user-open SIO channel xx" (xx: see *) to 2 (IAI protocol B (slave)). (To which connector, a PC connector or teaching connector, to be connected varies with the controller. Refer to [3. Transmission Control Procedure] for details.)

* xx in I/O parameter No. 90 "Usage of user-open SIO channel xx" above denotes a channel number as follows.

Controller	Channel No.
XSEL (P/Q/PCT/QCT/PX/QX/R/S/RX/SX/RXD/SXD/ RA/SA/RAX/SAX/RAXD/SAXD), SSEL/ASEL/PSEL, RSEL	Channel 0
XSEL (J/K/KE/KT/KET/JX/KX/KTX), TT, TTA, MSEL (PC/PG/PCF/PGF/PCX/PGX)	Channel 1

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

Item	Communication condition	Setting parameter (*1)
Communication Interface	RS-232C	
Baud Rate	9.6kbps, 19.2kbps, 38.4kbps, 57.6kbps, 115.2kbps (*2), 230.4kbps (*3)	"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　57.6kbps and 115.2kbps can only be set on XSEL (P/Q/PCT/QCT/PX/QX/R/S/RX/SX/RXD/SXD/RA/SA/RAX/SAX/RAXD/SAXD), SSEL/ASEL/PSEL and TTA, MSEL (PC/PG/PCF/PGF/PCX/PGX) and RSEL.

*3　230.4kbps can only be set on XSEL (RA/SA/RAX/SAX/RAXD/SAXD).

2-2. Serial Communication (Connector in Extension SIO Board)

The applicable controller described below is capable of communication with a host device by this protocol using a connector in an extension SIO board by setting bit 0 to 3 "IAI Protocol Multiple Channel Communication Permission Select" = 1 (Permit) in I/O Parameter No. 116 "IAI Protocol Communication Attribute" and bit 0 to 3 "Channel Use System" = 2 (IAI Protocol B (Slave)) in I/O Parameter No. 100 "User-open SIO channel 2 attribute 2". The controllers and main CPU applicable for the IAI protocol communication by the extension SIO are as shown in the table below, and the channel number should be Channel 2.

Controller	IAI Protocol Communication by Extension SIO	Main CPU application Applicable version	Channel No.
TTA, MSEL (PC/PG/PCF/PGF/PCX/PGX)	Applicable	V2.00 or later	Channel 2
Other than Above	Not Applicable	—	—

The communication conditions and setting parameter are summarized in the table below.

Item	Communication condition	Setting parameter
Communication Interface	RS-232C, RS-485 (Determined by Type of Extension SIO Board)	
Baud Rate	9.6kbps,19.2kbps, 38.4kbps, 57.6kbps,115.2kbps, 230.4kbps	I/O parameter No. 100 "User Release SIO Channel 2 Attribute 1" bit 28 to 31
Data Length	7 bits, 8 bits	I/O parameter No. 100 "User Release SIO Channel 2 Attribute 1" bit 24 to 27
Stop Bit Length	1 bit, 2 bits	I/O parameter No. 100 "User Release SIO Channel 2 Attribute 1" bit 20 to 23
Parity	None, odd, even	I/O parameter No. 100 "User Release SIO Channel 2 Attribute 1" bit 16 to 19

2-3. Ethernet

SEL system controllers are capable of communication with a host device by this protocol using Ethernet / EtherNet/IP Options or a standard Ethernet connector (*1). For details of the Ethernet interface, refer to [Ethernet Instruction Manual].

Item	Contents
Communication Interface	Ethernet
Communication System	TCP/IP
Baud Rate	10Mbps/100Mbps/1000Mbps (*2)
Connector	RJ45
Max. Number of Connections	1

*1　A standard Ethernet connector is available only for XSEL (RA/SA/RAX/SAX/RAXD/SAXD) and RSEL.

*2　1000Mbps can only be set on XSEL (RA/SA/RAX/SAX/RAXD/SAXD).

3. Transmission Control Procedure

3-1. Controller Setting

(1) In Serial Communication (connecting to PC Connector / Teaching Connector)

Make a change to the following settings when the serial communication is to be conducted between a host (master) and a controller (slave) connecting to a PC connector or a teaching connector using this protocol.

1) Parameter settings
   - Set "I/O parameter No. 90" = 2 (IAI protocol B (slave))
   - Set "I/O parameter Nos. 91 through 95" to the applicable communication conditions with the host (baud rate, 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 device on the controller. The host devices to be connected should be as shown below.

Controller	Where to connect
XSEL (K/KE/KT/KET/KX/KTX)	PC connector
XSEL (J/JX/P/Q/PCT/QCT/PX/QX/R/S/RX/SX/RXD/SXD) XSEL (RA/SA/RAX/SAX/RAXD/SAXD), RSEL	Teaching connector
TT, TTA, SSEL/ASEL/PSEL, MSEL (PC/PG/PCF/PGF/PCX/PGX)	Teaching connector or USB connector

Note

- With the XSEL (K/KE/KT/KET/KX/KTX) controller, the PC connector and teaching connector cannot be used at the same time.
- When using a teaching connector, it is necessary that you aware that the enable input terminal assigned to the teaching connector may get disabled in AUTO Mode for some controller types. (Refer to the [instruction manual of each model] for details)
- When the TT, TTA, SSEL/ASEL/PSEL and MSEL (PC/PG/PCF/PGF/PCX/PGX) connector is used and the teaching connector and USB connector are both connected, connection to the USB connector will be given priority.
- Use the cable specified by IAI for connection. If a different cable is used, the cable may be burned due to improper wiring.
- Refer to the [instruction manual supplied] with the controller for connection between the host device and the controller.

(2) In Serial Communication (connecting to Connector in Extension SIO Board) (Main CPU Application Part V2.00 or later in TTA and MSEL (PC/PG/PCF/PGF/PCX/PGX))

Make a change to the following settings communication is to be conducted between a host (master) and a controller (slave) connecting to a connector in the extension SIO board.

1) parameter setting

- Set "I/O parameter No.116" bit 0 to 3 = 1 (IAI Protocol Multiple Channel Communication Permission Select = Permit)
- Set "I/O parameter No.101" bit 0 to 3 = 2 (User Release SIO Channel 2 Use System = (IAI protocol B (slave))
- Set " I/O parameter No.100" to the applicable communication conditions with the host (baud rate, data length, stop bit length and parity).

2) Connect the host device to the controller (Connector in Extension SIO Board) on the controller.

Note

- For the extension SIO, the channel available for the IAI protocol communication should be Channel 2.
- As it is communication with the IAI protocol multiple channel, follow the caution instruction described in (4).

(3) In Ethernet

Refer to the [instruction manual of Ethernet].

(4) When Using IAI Protocol Communication in Multiple Channel Simultaneously (Main CPU Application Part V2.00 or later in TTA and MSEL (PC/PG/PCF/PGF/PCX/PGX))

When using the IAI protocol, one channel only should be available exclusively as a default, but it IAI protocol communication will become available in multiple channels in parallel by the parameter setting.
The types of the IAI protocol communication command should be classified as shown below. (For the types of each command, refer to [5.1 Message List].)

- Inquiry Command：Commands to inquire data in the controller
- Execution Command：Commands to execute data modification for axis operation and program operation

The inquiry command should always be enabled in the multiple channel in two types of commands, but an execution command may become disabled in some channels. As an invalid execution command would not respond (communication disconnected on teaching tool and PC software), construct the user system to have the execution command transfer set to one channel.
The system to determine a channel to enable an execution command should differ in MANU Mode and AUTO Mode.

・In MANU Mode

When an execution command is received in multiple channels at the same time, a channel in high priority should become enabled.

The priority is given as (Teaching port) > (Ethernet) > (Extension SIO).

For example, if an execution command is received at a teaching port and an extension SIO at the same time, the execution command received at the teaching port should become enabled while the command received at the extension SIO becomes disabled and no response.

・In AUTO Mode

I Only the channel set in bit 4 to 11 in I/O Parameter No. 116 "IAI Protocol Communication Attribute" should become enabled and execution commands in channels not set should always become disabled.

Below shows an example of setting when an extension SIO is selected for an execution command activation in AUTO Mode.

1)　Parameter setting

・Set "I/O parameter No.116" bit 0 to 3 = 1 (IAI protocol multiple channel communication permission select = Permit)

・Set "I/O parameter No.116" bit 4 to12 = 02H (IAI protocol execution command communication enabled channel select in AUTO Mode = Extension SIO)

2)　Establish connection between the host device and a controller (connector for each used channel).

Note

- It is necessary to use a software with the versions shown in Extension SIO Applicable Tool Version List below when connecting a teaching tool or PC software to a channel not selected in IAI Protocol Execution Command Communication Enable Channel (I/O Parameter No. 116) in AUTO Mode.
  As only the monitoring operation using the inquiry commands (data inquiry) is available, it is required to set to the execution command communication enable channel in this parameter when active operations such as editing or startup using an execution command. Pay special attention as the communication would be disconnected if an active operation is conducted without setting to a valid channel.

- Extension SIO Features　Applicable Tool Version List

Tool name	Version
PC software	V12.03.00.00 or later
TB-01	V1.50 or later

3-2. Message Transmission Timing (in Serial Communication)

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 ms
α is a value set in "User Release SIO Channel n IAI Protocol Response Min. Latency" (n: channel number) (XSEL-I/K should be enabled with the main application part V0.26 or later). (I/O Parameter No. 97 when PC connector or teaching connector. Bit 4 to 11 in I/O Parameter No. 101 when extension SIO)
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 ms
(It should be 3ms in RS-485 communication with the Extension SIO Board.)
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.

Notes

・If the slave station (controller) cannot recognize command messages (reception error, header / station number / line feed (LF) error, sum check error, etc.) from the master station (host), response transmission is not performed. Referring to [6. Timeout and Retry], perform communication recovery or take other applicable measures on the master station (host).

・n in "User Release SIO Channel n IAI Protocol Response Min. Latency" above denotes a channel number. For details, refer to [2. Communication Interface].

4. Outline of Message

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

(1) Command Format

Header '!' (1char)	Station 'XX(h)' (2char)	Message ID 'XXX(h)' (3char)	Content of command (Length varies with each message)	SC 'XX(h)' (2char)	CR 0Dh (1char)	LF 0Ah (1char)

Checksum range

(2) Response Format

(Normal response)

Header '#' (1char)	Station 'XX(h)' (2char)	Message ID 'XXX(h)' (3char)	Content of response (Length varies with each message)	SC 'XX(h)' (2char)	CR 0Dh (1char)	LF 0Ah (1char)

(Error response)

Header '&' (1char)	Station 'XX(h)' (2char)	Error code 'XXX(h)' (3char)	SC 'XX(h)' (2char)	CR 0Dh (1char)	LF 0Ah (1char)

Checksum range

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 Release SIO Channel xx, station code"). (xx in "I/O parameter No. 91: User Release SIO Channel xx, station code" above denotes a channel number. For details, refer to [2. Communication Interface].)

Message ID : A three-digit hexadecimal code indicates the message type. (Refer to [5-1. Message List].)

Message content : Set data varies with each message. (Refer to [5-3. 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 Position Data Query

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

35H ('5')　34H ('4')

Total sum = 21H + 39H + 39H + 32H + 30H + 39H
+ 30H + 30H + 31H + 30H + 30H + 35H
= 254H

The checksum is calculated as '54'.

5. Message Details

5-1. Message List

Message ID	Message name	Type	XSEL-J/K/KE/KT/KET	XSEL-JX/KX/KTX	XSEL-P/Q/PCT/QCT	XSEL-PX/QX	XSEL-R/S	XSEL-RX/SX/RXD/SXD	XSEL-RA/SA	XSEL-RAX/SAX/RAXD/SAXD	TT	TTA	SSEL	ASEL PSEL	MSEL-PC/PG/PCF/PGF	MSEL-PCX/PGX	RSEL	Page
	Error response	Common	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	29
200H	Test call	Query	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	30
201H	Version code query	Query	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	31
208H	Number of effective position data query	Query	○	○	○ *3	○ *3	○ *3	○ *3	○ *3	○ *3	○	○ *3	○ *3	○	○ *3	○ *3	○ *7	33
209H	Effective position data query	Query	○	○	○ *3	○ *3	○ *3,4	○ *3,4	○ *3,4	○ *3,4	○	○ *3	○ *3	○	○ *3	○ *3	○ *7	34
20BH	Input port query	Query	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	36
20CH	Output port query	Query	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	38
20DH	Flag query	Query	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	40
20EH	Integer variable query	Query	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	42
20FH	Real variable query	Query	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	44
210H	String variable query	Query	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	47
212H	Axis status query	Query	○	×	○	×	○	×	○	×	○	○	○	○	○	×	○ *7	49
213H	Program status query	Query	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	53
215H	System status query	Query	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	54
216H	Error detail information query	Query	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *7 *8	57

Message ID	Message name	Type	XSEL-J/K/KE/KT/KET	XSEL-JX/KX/KTX	XSEL-P/Q/PCT/QCT	XSEL-PX/QX	XSEL-R/S	XSEL-RX/SX/RXD/SXD	XSEL-RA/SA	XSEL-RAX/SAX/RAXD/SAXD	TT	TTA	SSEL	ASEL PSEL	MSEL-PC/PG/PCF/PGF	MSEL-PCX/PGX	RSEL	Page
21EH	Number of effective position data query 2	Query	×	×	○ *1	○ *1	○	○	○	○	×	○	○ *1	×	○	○	○ *7	60
21FH	Effective position data query 2	Query	×	×	○ *1	○ *1	○ *4	○ *4	○ *4	○ *4	×	○	○ *1	×	○	○	○ *7	61
22DH	Number of effective position data query 3	Query	×	×	×	×	○ *4	○ *4	○ *4	○ *4	×	○ *6	×	×	○ *6	○	○ *7	63
232H	Servo ON/OFF	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *7	66
233H	Home return *2	Execute	○	×	○	○	○	○	○	○	○	○	○	○	○	○	○ *7	67
234H	Absolute-coordinate specification movement	Execute	○	×	○	×	○	×	○	×	○	○	○	○	○	×	○ *7	68
235H	Relative-coordinate specification movement	Execute	○	×	○	×	○	×	○	×	○	○	○	○	○	×	○ *7	70
236H	Jogging/inching	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *7	72
237H	Position-number specification movement	Execute	○	×	○ *3	×	○ *3	×	○ *3	×	○	○ *3	○ *3	○	○ *3	×	○ *7	75
238H	Operation stop & cancel	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *7	77
244H	Position data range-specification continuous write	Execute	○	○	○ *3	○ *3	○ *3,4	○ *3,4	○ *3,4	○ *3,4	○	○ *3	○ *3	○	○ *3	○ *3	○ *7	78
245H	Change position data continuous write	Execute	○	○	○ *3	○ *3	○ *3,4	○ *3,4	○ *3,4	○ *3,4	○	○ *3	○ *3	○	○ *3	○ *3	○ *7	80
246H	Position data clear	Execute	○	○	○ *3	○ *3	○ *3,4	○ *3,4	○ *3,4	○ *3,4	○	○ *3	○ *3	○	○ *3	○ *3	○ *7	82
24AH	Output port status change	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	83
24BH	Flag status change	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	84
24CH	Integer variable change	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	85
24DH	Real variable change	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	87
24EH	String variable change	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	89
252H	Alarm reset	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	90

Message ID	Message name	Type	XSEL-J/K/KE/KT/KET	XSEL-JX/KX/KTX	XSEL-P/Q/PCT/QCT	XSEL-PX/QX	XSEL-R/S	XSEL-RX/SX/RXD/SXD	XSEL-RA/SA	XSEL-RAX/SAX/RAXD/SAXD	TT	TTA	SSEL	ASEL PSEL	MSEL-PC/PG/PCF/PGF	MSEL-PCX/PGX	RSEL	Page
253H	Program run	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	91
254H	Program end	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	91
255H	Program pause	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	91
256H	Program one-step run	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	91
257H	Program resume	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○ *8	91
25BH	Software reset	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	92
25CH	Drive-source recovery request	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	93
25EH	Operation pause cancellation request	Execute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	94
262H	Speed change	Execute	○	×	○	○	○	○	○	○	○	○	○	○	○	○	○ *7	95
26BH	Position-number specification movement 2	Execute	×	×	○ *1	×	○	×	○	×	×	○	○ *1	×	○	×	○ *7	98
26CH	Position data range-specification continuous write 2	Execute	×	×	○ *1	○ *1	○ *4	○ *4	○ *4	○ *4	×	○	○ *1	×	○	○	○ *7	100
26DH	Change position data continuous write 2	Execute	×	×	○ *1	○ *1	○ *4	○ *4	○ *4	○ *4	×	○	○ *1	×	○	○	○ *7	102
26EH	Position data clear 2	Execute	×	×	○ *1	○ *1	○ *4	○ *4	○ *4	○ *4	×	○	○ *1	×	○	○	○ *7	104
271H	Controller function specification 2	Execute	×	×	○ *1	○ *1	○	○	○	○	×	×	○ *1	×	×	×	○	105
290H	Position data range-specification continuous write 3	Execute	×	×	×	×	○ *4	○ *4	○ *4	○ *4	×	○ *6	×	×	○ *6	○	○ *7	107
291H	Change position data continuous write 3	Execute	×	×	×	×	○ *4	○ *4	○ *4	○ *4	×	○ *6	×	×	○ *6	○	○ *7	110
2A0H	Coordinate system definition data range-specification continuous query	Query	×	○	×	○	×	○	×	○	×	○ *6	×	×	○ *6	○	×	113
2A1H	Unit axis status query	Query	×	○	×	○	×	○	×	○	×	○ *6	×	×	○ *6	○	×	115
2A2H	Simple-interference-check-zone definition data range-specification continuous query	Query	×	○	×	○	×	○	×	○	×	×	×	×	×	○	×	120

Message ID	Message name	Type	XSEL-J/K/KE/KT/KET	XSEL-JX/KX/KTX	XSEL-P/Q/PCT/QCT	XSEL-PX/QX	XSEL-R/S	XSEL-RX/SX/RXD/SXD	XSEL-RA/SA	XSEL-RAX/SAX/RAXD/SAXD	TT	TTA	SSEL	ASEL PSEL	MSEL-PC/PG/PCF/PGF	MSEL-PCX/PGX	RSEL	Page
2A3H	Unit axis status query 2	Query	×	×	×	×	×	○	×	○	×	○ *6	×	×	○ *6	○	×	123
2A4H	Coordinate system definition data range-specification continuous query 2	Execute	×	×	×	×	×	○	×	○	×	○ *6	×	×	○ *6	○	×	128
2D4H	Unit absolute-coordinate specification movement	Execute	×	○	×	○	×	○	×	○	×	○ *6	×	×	○ *6	○	×	130
2D5H	Unit relative-coordinate specification movement	Execute	×	○	×	○	×	○	×	○	×	○ *6	×	×	○ *6	○	×	133
2D6H	Unit position-number specification movement	Execute	×	○	×	○ *3	×	○ *3	×	○ *3	×	○ *6	×	×	○ *6	○ *3	×	136
2D9H	Unit position-number specification movement 2	Execute	×	×	×	○ *1	×	○	×	○	×	○ *6	×	×	○ *6	○	×	139

*1　XSEL-P/Q main application V0.56 or later, PX/QX main application V0.26 or later, SSEL main application V0.15 or later
*2　The home-return operation except for adjustment is not recommended on an ABS encoder axis. The home-return operation on axes in the ABS encoder type SCARA Robot is prohibited.
*3　There is a limit on the number of positions that can be used. For details, refer to [7-1.　Regarding Model Dependency of Position / Program Data Counts].
*4　Position comment query, write and clear are not allowed.
*5　Query of some SCARA axis data of the 5th to 8th axes is not allowed. For data not subject to query, refer to [5-3-48. Unit Axis Status Query (2A1H)].
*6　In the main application part V2.00 and later in TTA and MSEL-PC/PG/PCF/PGF, the coordinate system definition related protocols are available only when the coordinate system definition feature is enabled.
(Refer to [7-3-2.] for details.)
*7　It is only axes in Axes Group No. 1 and position data that are available for operation and inquiry. Operation or inquiry is not available on axes in Axes Group No. 2 and later or position data.
*8　Operations such as program control, local variable related operations or status inquiry are not available in Program No. 256 or later. (However, all the programs launched including Program No. 256 and later should be subject when "00" is set in the program number in Message ID 254H/255H/257H.)

5-2. 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 [5-3-1. Error Response], for details on the error response format.

5-3. 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.

* The maximum receivable size and maximum transmittable size of the controller are as follows:

・In Serial Communication (connecting to PC Connector / Teaching Connector)

Controller	Receivable size	Transmittable size
XSEL (J/K/KE/KT/KET/JX/KX/KTX), TT	1023 bytes	1024 bytes
TTA, XSEL (P/Q/PCT/QCT/PX/QX/R/S/RX/SX/RXD/SXD/ RA/SA/RAX/SAX/RAXD/SAXD), RSEL, SSEL/ASEL/PSEL, MSEL (PC/PG/PCF/PGF/PCX/PGX)	2051 bytes	2048 bytes

・In Serial Communication (connecting to Connector in Extension SIO Board)

Controller	Receivable size	Transmittable size
TTA, MSEL (PC/PG/PCF/PGF/PCX/PGX)	2048 bytes	2048 bytes

・In Ethernet

Controller	Receivable size	Transmittable size
XSEL (J/K/KE/KT/KET/JX/KX/KTX), TT	1023 bytes	1024 bytes
XSEL (P/Q/PCT/QCT/PX/QX)	2051 bytes	2048 bytes
TTA, XSEL (R/S/RX/SX/RXD/SXD/RA/SA/RAX/SAX/ RAXD/SAXD), MSEL (PC/PG/PCF/PGF/PCX/PGX), RSEL	1472 bytes	1472 bytes

5-3-1. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Error code	'XXX(h)'	3	6	○			○		Indicate the error type.	
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	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.

5-3-2. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'200(h)'	3	6	○			○			
	String	'XXXXXXXXXX'	10	16	○			○		Arbitrary string (10 bytes)	
	SC	'XX(h)'	2	18	○			○			
	CR	0Dh	1	19	○			○			
	LF	0Ah	1	20	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'200(h)'	3	6	○			○			
	String	'XXXXXXXXXX'	10	16	○			○		Same string as in the command (10 bytes)	
	SC	'XX(h)'	2	18	○			○			
	CR	0Dh	1	19	○			○			
	LF	0Ah	1	20	○			○			
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.

5-3-3. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'201(h)'	3	6	○			○			
	Unit type	'XX(h)'	2	8	○			○		0 = Main CPU application / 1 = Main CPU core / 2 = Driver CPU /3 = Mounted SIO	
	Device number	'X(h)'	1	9	○			○		Number that specifies the device (0 ~)	
	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	'201(h)'	3	6	○			○			
	Unit type	'XX(h)'	2	8	○			○		0 = Main CPU application / 1 = Main CPU core / 2 = Driver CPU /3 = Mounted SIO	
	Device number	'X(h)'	1	9	○			○		Number that specifies the device (0 ~)	
	Model code	'XX(h)'	2	11	○			○			
	Unit code	'XX(h)'	2	13	○			○			
	Version number	'XXXX(h)'	4	17	○			○			
	Time	'XXXX(h)'	4	21	○			○		Year (4 digits, hexadecimal ASCII code)	
	Time	'XX(h)'	2	23	○			○		Month (1 to 12, hexadecimal ASCII code)	
	Time	'XX(h)'	2	25	○			○		Day (1 to 31, hexadecimal ASCII code)	
	Time	'XX(h)'	2	27	○			○		Hours (0 to 23, hexadecimal ASCII code)	
	Time	'XX(h)'	2	29	○			○		Minutes (0 to 59, hexadecimal ASCII code)	
	Time	'XX(h)'	2	31	○			○		Seconds (0 to 59, hexadecimal ASCII code)	
	SC	'XX(h)'	2	33	○			○			
	CR	0Dh	1	34	○			○			
	LF	0Ah	1	35	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-4. Number of Effective Position Data Query (208H)

Function: Query the number of effective position 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'208(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	'208(h)'	3	6	○			○			
	Number of effective position data	'XXX(h)'	3	9	○			○			
	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.

5-3-5. Effective Position Data Query (209H)

Function: Query data for the number of query positions from the query head position number, and return the number of effective position 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	○			○			
	Station		'XX(h)'	2	3	○			○			
	Message ID		'209(h)'	3	6	○			○			
	Query head position number		'XXX(h)'	3	9	○			○			
	Number of query records		'XXX(h)'	3	12	○			○		The number of records will be limited based on the send/receive buffers.	
	SC		'XX(h)'	2	14	○			○			
	CR		0Dh	1	15	○			○			
	LF		0Ah	1	16	○			○			
Normal response	Header		'#'	1	1	○			○			
	Station		'XX(h)'	2	3	○			○			
	Message ID		'209(h)'	3	6	○			○			
	Number of effective records		'XXX(h)'	3	9	○			○		The number of records will be limited based on the send/receive buffers.	
	Position data (*1)	Position number	'XXX(h)'	3	12	○			○			
		Axis pattern	'XX(h)'	2	14	○			○			
		Acceleration	'XXXX(h)'	4	18	○			○	0.01G		
		Deceleration	'XXXX(h)'	4	22	○			○	0.01G		
		Speed	'XXXX(h)'	4	26	○			○	mm/s		
		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	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	Position 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	○			○			
	CR	0Dh	1	MAX 243012	○			○			
	LF	0Ah	1	MAX 243013	○			○			
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.

5-3-6. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'20B(h)'	3	6	○			○			
	Query start port number	'XXXX(h)'	4	10	○			○		Be sure to specify "Category head port number + Multiple of 8."	
	Number of query ports	'XXXX(h)'	4	14	○			○		The number of ports will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	16	○			○			
	CR	0Dh	1	17	○			○			
	LF	0Ah	1	18	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'20B(h)'	3	6	○			○			
	Response start port number	'XXXX(h)'	4	10	○			○			
	Number of response ports	'XXXX(h)'	4	14	○			○		The number of ports will be limited based on the send/receive buffers.	
	Input port data (*1)	'XX(h)'	2	16	○			○		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	○			○		Remaining input port data = 2 bytes x (Max 8192 – 1) = 16382 bytes	
	SC	'XX(h)'	2	MAX 16400	○			○			
	CR	0Dh	1	MAX 16401	○			○			
	LF	0Ah	1	MAX 16402	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-7. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'20C(h)'	3	6	○			○			
	Query start port number	'XXXX(h)'	4	10	○			○		Be sure to specify "Category head port number + Multiple of 8."	
	Number of query ports	'XXXX(h)'	4	14	○			○		The number of ports will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	16	○			○			
	CR	0Dh	1	17	○			○			
	LF	0Ah	1	18	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'20C(h)'	3	6	○			○			
	Response start port number	'XXXX(h)'	4	10	○			○			
	Number of response ports	'XXXX(h)'	4	14	○			○		The number of ports will be limited based on the send/receive buffers.	
	Output port data (*1)	'XX(h)'	2	16	○			○		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	○			○		Remaining output port data = 2 bytes x (Max 8192 – 1) = 16382 bytes	
	SC	'XX(h)'	2	MAX 16400	○			○			
	CR	0Dh	1	MAX 16401	○			○			
	LF	0Ah	1	MAX 16402	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-8. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'20D(h)'	3	6	○			○			
	Program number	'XX(h)'	2	8	○			○		'00(h)' in the case of global flag specification	
	Query start flag number	'XXXX(h)'	4	12	○			○		Be sure to specify "Category head flag number + Multiple of 8."	
	Number of query flags	'XXXX(h)'	4	16	○			○		The number of flags will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	18	○			○			
	CR	0Dh	1	19	○			○			
	LF	0Ah	1	20	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'20D(h)'	3	6	○			○			
	Program number	'XX(h)'	2	8	○			○		'00(h)' in the case of global flag specification	
	Response start flag number	'XXXX(h)'	4	12	○			○			
	Number of response flags	'XXXX(h)'	4	16	○			○		The number of flags will be limited based on the send/receive buffers.	
	Flag data (*1)	'XX(h)'	2	18	○			○		8 bits from the head flag.	
	Remaining flag data	Data indicated by *1 for the number of remaining data	MAX 16382	MAX 16400	○			○		Remaining flag data = 2 bytes x (Max 8192 – 1) = 16382 bytes	
	SC	'XX(h)'	2	MAX 16402	○			○			
	CR	0Dh	1	MAX 16403	○			○			
	LF	0Ah	1	MAX 16404	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-9. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'20E(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	'20E(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.	
	Integer variable data (*1)	'XXXXXXXX(h)'	8	21	○		○			(Hexadecimal ASCII code)	
	Remaining integer variable data	Data indicated by *1 for the number of remaining data	MAX 2032	MAX 2053	○		○			Remaining variable data = Data indicated by *1 x Number of remaining data = 8 bytes (Max FFh – 1) = 2032 bytes	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	SC	'XX(h)'	2	MAX 2055	○			○			
	CR	0Dh	1	MAX 2056	○			○			
	LF	0Ah	1	MAX 2057	○			○			
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.

5-3-10. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'20F(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	'20F(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.	

		Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
						Big	Little	Yes	No			
Normal response	Selected in accordance with the condition	[Format supported in XSEL-J/K V0.41 or earlier, or when Bit 0 to 3 of Other parameter No. 46 = 0]										
		Real variable data (*1)	"XXXXXXXXXXXXXXXX(h)'	16	29			○			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' (0x383941424344454630313233334353637 (binary))	
		Format supported in conditions other than the above										
		Real variable data (*1)	"XXXXXXXXXXXXXXXX(h)'	16	29	○		○			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' (0x303132333435363738394142434445 46 (binary))	
	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	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	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	○			○			

(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.

5-3-11. 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	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	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.

5-3-12. 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	○			○		Bit 6, 7 (Reserved for system use) Bit 5 (Push error detection): 0 = Not detected / 1 = Detected Bit 4 (Operation command successful completion): 0: Not yet complete / 1 = Completed successfully *Can be used only for completion check after an operation command. Bit 3 (Servo): 0 = OFF / 1 = ON Bit 1, 2 (Home return): 0 = Not yet performed / 1 = Returning to home / 2 = Completed Bit 0 (Servo axis in use): 0 = Not in use / 1 = In use (moving, etc.)	

	Data name		Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
						Big	Little	Yes	No			
Normal response	Single-axis status (*1)	Axis status	'XX(h)'	2	10	○			○		*"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: •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. 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): 1) [Bit 0 (Servo axis in use) = OFF] AND [Bit 4 (Operation command successful completion) = ON] --- Positioning has completed successfully. 2) [Bit 0 (Servo axis in use) = OFF] AND [Bit 5 (Push error detection) = ON] --- Push error (* Need not be checked if push command is not used.)	

	Data name		Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
						Big	Little	Yes	No			
Normal response	Single-axis status (*1)	Axis status	'XX(h)'	2	10	○			○		3) [Bit 0 (Servo axis in use) = OFF] AND [bit 4 (Operation command successful completion) = OFF] AND [Bit 5 (Push error detection) = OFF] --- Operation cancellation due to error, emergency stop, etc.	
		Axis sensor input status	'X(h)'	1	11	○			○		Bit 3 (Reserved for system use) Bit 2 (Home 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	○		○		0.001mm	(Hexadecimal ASCII code) * Current position in work coordinate system currently selected for coordinate system definition unit axes (Applicable Models: TTA, MSEL-PC/PG/PCF/PGF)	
	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	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-13. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'213(h)'	3	6	○			○			
	Program number	'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	'213(h)'	3	6	○			○			
	Program number	'XX(h)'	2	8	○			○			
	Status	'X(h)'	1	9	○			○		Bit 1 to 3 (Reserved for system use) Bit 0 (Start): 0 = Not started / 1 = Started	
	Executing program step number	'XXXX(h)'	4	13	○			○		Invalid if 0	
	Program-dependent error code	'XXX(h)'	3	16	○			○			
	Error occurrence step number	'XXXX(h)'	4	20	○			○			
	SC	'XX(h)'	2	22	○			○			
	CR	0Dh	1	23	○			○			
	LF	0Ah	1	24	○			○			
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.

5-3-14. 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	*4

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	System status byte 1	'XX(h)'	2	15	○			○		* When XSEL-P/Q/PCT/QCT/PX/QX/R/S/RX/SX/RXD/SXD/RA/SA/RAX/SAX/RAXD/SAXD, SSEL, ASEL/PSEL, TTA, MSEL or RSEL is used, this bit indicates the status of an enable switch (deadman switch/enable switch). Bit 1 (TP enable switch status): 0 = ON / 1 = OFF * When XSEL-J/K/JX/KX or TT is used, this bit is invalid (fixed to 0). 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.

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	System status byte 3	'XX(h)'	2	19	○			○		Bit 5 to 7 (Reserved for system use) Bit 4 (Operation mode): 0 = Program mode / 1 = Positioner mode 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	○			○			

(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.

5-3-15. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'216(h)'	3	6	○			○			
	Type 1	'X(h)'	1	7	○			○		0 = System error / 1 = Axis-specific error / 2 = Program-specific error / 3 = Error in error list record / 4 = Reserved for system use / 5 = Error in error list record (record count extension) (applicable models: XSEL-R/S/RX/SX/RXD/SXD/RA/SA/RAX/SAX/RAXD/SAXD, TTA, MSEL and RSEL)	
	Type 2	'XX(h)'	2	9	○			○		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 in error list record (record count extension): Not used (specified by error number)	
	Record number	'XXX(h)'	3	12	○			○		Error in error list record (record count extension): Record number (1~) Other than error in error list record (record count extension): Fixed to 0	
	SC	'XX(h)'	2	14	○			○			
	CR	0Dh	1	15	○			○			
	LF	0Ah	1	16	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'216(h)'	3	6	○			○			
	Error number	'XXX(h)'	3	9	○			○			
	Detail information 1	'XXXXXXXX(h)'	8	17	○			○		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	○			○		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	○			○		Other than system-down level error: Axis number System-down level error: System down information 1	
	Detail information 4	'XXXXXXXX(h)'	8	41	○		○			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	○			○			
	Detail information 6	'XXXXXXXX(h)'	8	57	○			○			
	Detail information 7	'XXXXXXXX(h)'	8	65	○			○			
	Detail information 8	'XXXXXXXX(h)'	8	73	○			○			
	Reserved for system use	'XX(d)'	2	75	○			○			
	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	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	Message bytes	'XX(h)'	2	90	○			○		* Message byte count fixed at 0 for models after XSEL-R/S/RX/SX/RXD/SXD/RA/SA/RAX/SAX/RAXD/SAXD, TTA and MSEL.	
	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 * Do not attempt to use it as it as a reference data. No message may be responded (the number of message bytes is 0) depending on the error number.	
	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	○			○			

(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.

5-3-16. Number of Effective Position Data Query 2 (21EH)

Function: Query the number of effective position 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'21E(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	'21E(h)'	3	6	○			○			
	Number of effective position data	'XXXX(h)'	4	10	○			○			
	SC	'XX(h)'	2	12	○			○			
	CR	0Dh	1	13	○			○			
	LF	0Ah	1	14	○			○			
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.

5-3-17. Effective Position Data Query 2 (21FH)

Function: Query data for the number of query positions from the query head position number, and return the number of effective position 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	○			○			
	Station		'XX(h)'	2	3	○			○			
	Message ID		'21F(h)'	3	6	○			○			
	Query head position number		'XXXX(h)'	4	10	○			○			
	Number of query records		'XXXX(h)'	4	14	○			○		The number of records will be limited based on the send/receive buffers.	
	SC		'XX(h)'	2	16	○			○			
	CR		0Dh	1	17	○			○			
	LF		0Ah	1	18	○			○			
Normal response	Header		'#'	1	1	○			○			
	Station		'XX(h)'	2	3	○			○			
	Message ID		'21F(h)'	3	6	○			○			
	Number of effective records		'XXXX(h)'	4	10	○			○		The number of records will be limited based on the send/receive buffers.	
	Position data (*1)	Position number	'XXXX(h)'	4	14	○			○			
		Axis pattern	'XX(h)'	2	16	○			○			
		Acceleration	'XXXX(h)'	4	20	○			○	0.01G		
		Deceleration	'XXXX(h)'	4	24	○			○	0.01G		
		Speed	'XXXX(h)'	4	28	○			○	mm/s		
		Position data (*2)	'XXXXXXXX(h)'	8	36	○		○		0.001mm		
		Position data repetition for remaining effective axes	Data indicated by *2 for the number of remaining effective axes	MAX 56	MAX 92	○		○		0.001mm	Data indicated by *2 x Number of remaining effective axes = 8 bytes x (Max 8 – 1) axes = Max 56 bytes	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	Position data repetition for remaining records	Data indicated by *1 for the number of remaining records	MAX 1639918	MAX 1640010	Refer to the [data indicated by *1].					Data indicated by *1 x Number of remaining records = Max 82 bytes x (Max 20000 records – 1) = Max 1639918 bytes	
	SC	'XX(h)'	2	MAX 1640012	○			○			
	CR	0Dh	1	MAX 1640013	○			○			
	LF	0Ah	1	MAX 1640014	○			○			
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.

5-3-18. Effective Position Data Query 3 (22DH)

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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'22D(h)'	3	6	○			○			
	Record Format Extension Indication Type (*1)	'XX (h)'	2	8	○			○		Bit 1 to 7 (Reserved for system use) Fixed to 0 Bit 0 (Record Format Extension Indication Type): 0= Disabled /1= Enabled	(*5) Described outside frame
	Query head position number	'XXXX(h)'	4	12	○			○			
	Number of query records	'XXXX(h)'	4	16	○			○		The number of records will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	18	○			○			
	CR	0Dh	1	19	○			○			
	LF	0Ah	1	20	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'22D(h)'	3	6	○			○			
	Record Format Extension Indication Type (*1)	'XX (h)'	2	8	○			○		Bit 1 to 7 (Reserved for system use) Fixed to 0 Bit 0 (Record Format Extension Indication Type): 0= Disabled /1= Enabled	
	Number of effective records	'XXXX(h)'	4	12	○			○		The number of records will be limited based on the send/receive buffers.	

	Data name			Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
							Big	Little	Yes	No			
Normal response	Position Data 1 Record (*2)	In Normal Condition	Position number	'XXXX(h)'	4	16	○			○			
			Axis pattern	'XX(h)'	2	18	○			○			
			Acceleration	'XXXX(h)'	4	22	○			○	0.01G		
			Deceleration	'XXXX(h)'	4	26	○			○	0.01G		
			Speed	'XXXX(h)'	4	30	○			○	mm/s		
			Position data (*3)	'XXXXXXXX(h)'	8	38	○		○		0.001mm		
			Position data repetition for remaining effective axes	Data indicated by *3 for the number of remaining effective axes	MAX 56	MAX 94	○		○		0.001mm	Data indicated by *3 x Number of remaining effective axes = 8 bytes x (Max 8 – 1) axes = Max 56 bytes	
			Extended data	'XX(h)'	2	MAX 96	○		○			Bit 0 to 3 (spare) Bit 4 to 5 (SCARA 1 arm system data): 0 = No specification / 1 = Right arm system / 2 = Left arm system Bit 6 to 7 (SCARA 2 arm system data): 0 = No specification / 1 = Right arm system / 2 = Left arm system	
		Only When Output Operation Data Extension Enabled	Output Function Code	'XX(h)'	2	MAX 98	○			○		Output Function Disabled when Set to 0	(*4) Described outside frame
			Reserved for system use	'XX(h)'	2	MAX 100	○			○		Fixed to 0	(*4) Described outside frame

	Data name			Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
							Big	Little	Yes	No			
Normal response	Position Data 1 Record (*2)	Only When Output Operation Data Extension Enabled	Output Port / Flag Number	'XXXX(h)'	4	MAX 104	○						
			Function Parameter 1	'XXXXXX(h)'	6	MAX 110	○						
			Function Parameter 2	'XXXXXX(h)'	6	MAX 116	○						
	Position data repetition for remaining records			Data indicated by *2 for the number of remaining records	MAX 6815536	MAX 6815652	Refer to the [data indicated by *2].					Data indicated by *2 x Number of remaining records = Max 104 bytes x (Max FFFFh records – 1) = Max 6815536 bytes	
	SC			'XX(h)'	2	MAX 6815654	○			○			
	CR			0Dh	1	MAX 6815655	○			○			
	LF			0Ah	1	MAX 6815656	○			○			
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: It should not be recorded when *1 Data Bit 0 (Output Operation Data Extension) is set to 0 (Disable).
*5: Set the value in *1 Data Bit 0 (Output Operation Data Extension) always to 0 (Disable) for models not applicable for the position output operation features. Refer to [7-2. Position Output Operation Features] for the applicable models.

5-3-19. 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) are fixed to 0. 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	○			○			

(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.

5-3-20. Home Return (233H)

Function: Perform home return. *It is not recommended to perform the home-return operation in any case other than adjustment of an ABS encoder axis. The home-return operation on axes for the ABS encoder type SCARA Robot is prohibited.

	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	'233(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○		Meaning indication of single axis / cartesian actuator axes	
	End search speed at home return	'XXX(h)'	3	11	○			○	mm/s	The parameter setting becomes effective if zero. * Indication not available (parameters always enabled) for RSEL	
	Creep speed at home return	'XXX(h)'	3	14	○			○	mm/s	The parameter setting becomes effective if zero. * Indication not available (parameters always enabled) for RSEL	
	SC	'XX(h)'	2	16	○			○			
	CR	0Dh	1	17	○			○			
	LF	0Ah	1	18	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'233(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.

5-3-21. Absolute-Coordinate Specification Movement (234H)

Function: Move the actuator with CP operation 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	'I'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'234(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○			
	Acceleration	'XXXX(h)'	4	12	○			○	0.01G	The parameter setting becomes effective if zero.	
	Deceleration	'XXXX(h)'	4	16	○			○	0.01G	The parameter setting becomes effective if zero.	
	Speed	'XXXX(h)'	4	20	○			○	mm/s	The parameter setting becomes effective if zero. (Safety limit applies depending on the mode.)	
	Absolute coordinate data (*1)	'XXXXXXXX(h)'	8	28	○		○		0.001mm	* Absolute coordinates in work coordinate system currently selected for coordinate system definition unit axes (Applicable models: TTA, MSEL-PC/PG/PCF/PGF)	
	Remaining absolute coordinate data	Data indicated by *1 for the number of remaining axes	MAX 56	MAX 84	○		○		0.001mm	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	○			○			
	CR	0Dh	1	MAX 87	○			○			
	LF	0Ah	1	MAX 88	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'234(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-22. Relative-Coordinate Specification Movement (235H)

Function: To have an actuator make CP operation from the current position to the indicated relative 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'235(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○			
	Acceleration	'XXXX(h)'	4	12	○			○	0.01G	The parameter setting becomes effective if zero.	
	Deceleration	'XXXX(h)'	4	16	○			○	0.01G	The parameter setting becomes effective if zero.	
	Speed	'XXXX(h)'	4	20	○			○	mm/s	The parameter setting becomes effective if zero. (Safety limit applies depending on the mode.)	
	Relative coordinate data (*1)	'XXXXXXXX(h)'	8	28	○		○		0.001mm	* Indicated relative coordinates in work coordinate system currently selected for coordinate system definition unit axes (Applicable models: TTA, MSEL-PC/PG/PCF/PGF)	
	Remaining relative coordinate data	Data indicated by *1 for the number of remaining axes	MAX 56	MAX 84	○		○		0.001mm	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	○			○			
	CR	0Dh	1	MAX 87	○			○			
	LF	0Ah	1	MAX 88	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'235(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-23. Jogging/Inching (236H)

Function: Move by jogging/inching.

Remarks: The type of travel for the linear axis is PTP operation, and the type of travel for the SCARA axes and coordinate system definition unit axes differ depending on the indication made in "Operation Type".

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'I'	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. For the XSEL-PX/QX/RX/SX/RAX/SAX series, SCARA and direct-acting axes cannot be specified simultaneously. For the XSEL-RXD/SXD/RAXD/SAXD series, two SCARA units cannot be specified simultaneously. Coordinate system definition unit axes are available only for indication of single axis (*Excluded when movement coordinate system = axis specific system) Coordinate system definition unit axis is capable of jog/inching commands only in non-operation status of all the unit axes (*Excluded when movement coordinate system = axis specific system)	
	Acceleration	'XXXX(h)'	4	12	○			○	0.01G (For each axis, in %)	The parameter setting becomes effective if zero.	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Deceleration	'XXXX(h)'	4	16	○			○	0.01G (For each axis, in %)	The parameter setting becomes effective if zero.	
	Speed	'XXXX(h)'	4	20	○			○	mm/s (For each axis, in %)	The parameter setting becomes effective if zero. (Safety limit applies depending on the mode.)	
	Inching distance	'XXXXXXXX(h)'	8	28	○			○	0.001mm (For each axis, in 0.001deg)	Specify by an absolute value. Distance is not specified if zero (= jogging). Inching distance is 1,000mm at maximum (1,000deg for each axis). * The distance available to travel should be 1,000mm even with a setting above the maximum setting (1,000deg for each axis). (An error would not occur even with a setting above the maximum setting)	
	Operation type	'X(h)'	1	29	○			○		Bit 3 (Reserved for system use) Bit 1, 2 (Jogging/inching coordinate system (SCARA/ Coordinate system definition unit axis only)): 0 = Base coordinate system / 1 = Selected work coordinate system / 2 = Selected tool coordinate system / 3 = Each axis system * It should be PTP operation when "axis-specific system" is indicated and CP operation when another indicated. Bit 0 (Jogging/inching direction): 0 = Negative direction on coordinate axis / 1 = Positive direction on coordinate axis	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	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.

5-3-24. Position-Number Specification Movement (237H)

Function: To have an actuator make CP operation to a position indicated in the position number

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'I'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'237(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○		Used by an AND condition with the axis pattern of the position number.	
	Acceleration	'XXXX(h)'	4	12	○			○	0.01G	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	○			○	0.01G	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	○			○	mm/s	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.)	
	Position number	'XXX(h)'	3	23	○			○		* Coordinate system definition unit axis operates with the indicated position as the position on the work coordinates (Applicable models: TTA, MSEL-PC/PG/PCF/PGF)	
	SC	'XX(h)'	2	25	○			○			
	CR	0Dh	1	26	○			○			
	LF	0Ah	1	27	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'237(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-25. 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	'I'	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.

5-3-26. Position Data Range-Specification Continuous Write (244H)

Function: Change position data for the number of change positions from the change start 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	○			○			
	Station		'XX(h)'	2	3	○			○			
	Message ID		'244(h)'	3	6	○			○			
	Change start position data number		'XXX(h)'	3	9	○			○			
	Number of change position data		'XXX(h)'	3	12	○			○		The number of data will be limited based on the send/receive buffers.	
	Position data (*1)	Axis pattern	'XX(h)'	2	14	○			○			
		Acceleration	'XXXX(h)'	4	18	○			○	0.01G		
		Deceleration	'XXXX(h)'	4	22	○			○	0.01G		
		Speed	'XXXX(h)'	4	26	○			○	mm/s		
		Position data (*2)	'XXXXXXXX(h)'	8	34	○		○		0.001 mm		
		Position data repetition for remaining effective axes	Data indicated by *2 for the number of remaining effective axes	MAX 56	MAX 90	○		○		0.001 mm	Data indicated by *2 x Number of remaining effective axes = 8 bytes x (Max 8 – 1) axes = Max 56 bytes	
	Position 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	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'244(h)'	3	6	○			○			
	Change start position data number	'XXX(h)'	3	9	○			○			
	Number of changed position 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.

5-3-27. Change Position Data Continuous Write (245H)

Function: Change position data for the number of change positions from the change start 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	○			○			
	Station		'XX(h)'	2	3	○			○			
	Message ID		'245(h)'	3	6	○			○			
	Number of change position data		'XXX(h)'	3	9	○			○		The number of data will be limited based on the send/receive buffers.	
	Position data (*1)	Change position data number	'XXX(h)'	3	12	○			○			
		Axis pattern	'XX(h)'	2	14							
		Acceleration	'XXXX(h)'	4	18	○			○	0.01G		
		Deceleration	'XXXX(h)'	4	22	○			○	0.01G		
		Speed	'XXXX(h)'	4	26	○			○	mm/s		
		Position data (*2)	'XXXXXXXX(h)'	8	34	○		○		0.001 mm		
		Position data repetition for remaining effective axes	Data indicated by *2 for the number of remaining effective axes	MAX 56	MAX 90	○		○		0.001 mm	Data indicated by *2 x Number of remaining effective axes = 8 bytes x (Max 8 – 1) axes = Max 56 bytes	
	Position 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	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'245(h)'	3	6	○			○			
	Number of changed position 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.

5-3-28. Positon Data Clear (246H)

Function: Clear position data for the number of clear positions from the clear start position number. (Position data comments cannot be cleared.)

	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	'246(h)'	3	6	○			○			
	Clear start position data number	'XXX(h)'	3	9	○			○			
	Number of clear position data	'XXX(h)'	3	12	○			○			
	SC	'XX(h)'	2	14	○			○			
	CR	0Dh	1	15	○			○			
	LF	0Ah	1	16	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'246(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.

5-3-29. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'24A(h)'	3	6	○			○			
	Output port number	'XXXX(h)'	4	10	○			○			
	Change type	'X(h)'	1	11	○			○		Bit 1 to 3 (Reserved for system use) are fixed to 0. Bit 0 (Output port ON/OFF): 0 = OFF / 1 = ON	
	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	'24A(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.

5-3-30. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'24B(h)'	3	6	○			○			
	Program number	'XX(h)'	2	8	○			○		'00' in the case of a global flag	
	Flag number	'XXXX(h)'	4	12	○			○			
	Change type	'X(h)'	1	13							
	SC	'XX(h)'	2	15	○			○		Bit 1 to 3 (Reserved for system use) are fixed to 0. Bit 0 (Output port ON/OFF): 0 = OFF / 1 = ON	
	CR	0Dh	1	16	○			○			
	LF	0Ah	1	17	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'24B(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.

5-3-31. 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	'I'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'24C(h)'	3	6	○			○			
	Program number	'XX(h)'	2	8	○			○		'00' in the case of a global variable	
	Change start variable number	'XXX(h)'	3	11	○			○			
	Number of change variable data	'XX(h)'	2	13	○			○		The number of data will be limited based on the send/receive buffers.	
	Integer variable data (*1)	'XXXXXXXX(h)'	8	21	○		○			(Hexadecimal ASCII code)	
	Remaining integer variable data	Data indicated by *1 for the number of remaining data	MAX 2032	MAX 2053	○		○			Data indicated by *1 x Number of remaining data = 8 bytes x Max (FFh – 1) = Max 2032 bytes	
	SC	'XX(h)'	2	MAX 2055	○			○			
	CR	0Dh	1	MAX 2056	○			○			
	LF	0Ah	1	MAX 2057	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'24C(h)'	3	6	○			○			
	Program number	'XX(h)'	2	8	○			○		'00' in the case of a global variable	
	Change start variable number	'XXX(h)'	3	11	○			○			
	Number of changed 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	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-32. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'24D(h)'	3	6	○			○			
	Program number	'XX(h)'	2	8	○			○		'00' in the case of a global variable	
	Change start variable number	'XXX(h)'	3	11	○			○			
	Number of change variable data	'XX(h)'	2	13	○			○		The number of data will be limited based on the send/receive buffers.	
	Real variable data (*1)	'XXXXXXXXXXXXXXXX(h)'	16	29	○		○			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	○		○			Data indicated by *1 x Number of remaining data = 16 bytes x Max (FFh – 1) = Max 4064 bytes	
	SC	'XX(h)'	2	MAX 4095	○			○			
	CR	0Dh	1	MAX 4096	○			○			
	LF	0Ah	1	MAX 4097	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'24D(h)'	3	6	○			○			
	Program number	'XX(h)'	2	8	○			○		'00' in the case of a global variable	
	Change start variable number	'XXX(h)'	3	11	○			○			
	Number of changed 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	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-33. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'24E(h)'	3	6	○			○			
	Program number	'XX(h)'	2	8	○			○		'00' in the case of a global variable	
	Change start variable number	'XXX(h)'	3	11	○			○			
	Number of change 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	○			○			
	Remaining string variable data	Data indicated by *1 for the number of remaining data	MAX 508	MAX 523	○			○		Data indicated by *1 x Number of remaining data = 2 bytes x Max (FFh – 1) = Max 508 bytes	
	SC	'XX(h)'	2	MAX 525	○			○			
	CR	0Dh	1	MAX 526	○			○			
	LF	0Ah	1	MAX 527	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'24E(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.

5-3-34. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'252(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	'252(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.

5-3-35. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'XXX(h)'	3	6	○			○			
	Program number	'XX(h)'	2	8	○			○		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	○			○			
	CR	0Dh	1	11	○			○			
	LF	0Ah	1	12	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'XXX(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.

5-3-36. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'25B(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			
Normal response			0	0						No normal response. * Because the controller transits to initialization processing after transmitting this command, no communication can be established during this period. (The initialization processing time depends on the model, installed options, etc.) Perform communication recovery on the master station (host), such as resuming retry transmission after waiting for a certain period.	
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.

5-3-37. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'25C(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	'25C(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.

5-3-38. 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'25E(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	'25E(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.

5-3-39. 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	'I'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'262(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○		For the XSEL-PX/QX/RX/SX/RAX/SAX and MSEL-PCX/PGX, specification of SCARA axes is prohibited.	
	Speed	'XXXX(h)'	4	12	○			○	mm/s	(Note 1) This does not take effect for the axes that are operated with the CIR, ARC, PSPL, PUSH, ARCH, PACH, CIRS and ARCS instructions of the SEL program. (Note 2) If Speed Change is executed for the operation axis that uses the S motion (SCRV instruction of SEL), "Error No. CC1 Speed change condition error" occurs. (Note 3) This is just a temporary speed change command for the packet (point) operating as the main. The VEL declaration data of the SEL program does not affect. (Note 4) This takes effect only for the packet operating as the main while the command is being executed, in relation to the continuous motion packet point operation axis such as PATH of the SEL program, so it is necessary to be aware of timing deviation and other issues. It is also necessary to be aware of locus deviation because packet handling is held during speed change processing.	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Speed	'XXXX(h)'	4	12	○			○	mm/s	(Note 5) The upper limit of the home return completion specification axis speed is clamped by the minimum value of "Individual Axis Parameter No. 28 Individual Axis Operation MAX Speed" or "Individual Axis Parameter No. 27 Motor MAX Speed" of the home return completion specification axis and the axis in related interpolation operation. To prevent upper limit speed restrictions due to the effects of other axes with slower MAX speeds than the speed change specification speed, execute Speed Change for each group of axes with a different MAX speed. Separate specification is especially recommended for the rotary axes.	
	SC	'XX(h)'	2	14	○			○			
	CR	0Dh	1	15	○			○			
	LF	0Ah	1	16	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'262(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-40. Position-Number Specification Movement 2 (26BH)

Function: Move the actuator with CP operation to the position of the specified position number.

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Header	'I'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'26B(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○		Used by an AND condition with the axis pattern of the position number.	
	Acceleration	'XXXX(h)'	4	12	○			○	0.01G	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	○			○	0.01G	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	○			○	mm/s	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.)	
	Position number	'XXX(h)'	4	24	○			○		* Coordinate system definition unit axis operates with the indicated position as the position on the work coordinates (Applicable models: TTA, MSEL-PC/PG/PCF/PGF)	
	SC	'XX(h)'	2	26	○			○			
	CR	0Dh	1	27	○			○			
	LF	0Ah	1	28	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'26B(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-41. Position Data Range-Specification Continuous Write 2 (26CH)

Function: Change position data for the number of change positions from the change start position 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		'26C(h)'	3	6	○			○			
	Change start position data number		'XXXX(h)'	4	10	○			○			
	Number of change position data		'XXXX(h)'	4	14	○			○		The number of data will be limited based on the send/receive buffers.	
	Position data (*1)	Axis pattern	'XX(h)'	2	16	○			○			
		Acceleration	'XXXX(h)'	4	20	○			○	0.01G		
		Deceleration	'XXXX(h)'	4	24	○			○	0.01G		
		Speed	'XXXX(h)'	4	28	○			○	mm/s		
		Position data (*2)	'XXXXXXXX(h)'	8	36	○		○		0.001mm		
		Position data repetition for remaining effective axes	Data indicated by *2 for the number of remaining effective axes	MAX 56	MAX 92	○		○		0.001mm	Data indicated by *2 x Number of remaining effective axes = 8 bytes x (Max 8 – 1) axes = Max 56 bytes	
	Position data repetition for remaining data		Data indicated by *1 for the number of remaining data	MAX 1559922	MAX 1560014	Refer to the [data indicated by *1].					Data indicated by *1 x Number of remaining data = Max 78 bytes x (Max 20000 data – 1) = Max 1559922 bytes	
	SC		'XX(h)'	2	MAX 1560016	○			○			
	CR		0Dh	1	MAX 1560017	○			○			
	LF		0Ah	1	MAX 1560018	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'26C(h)'	3	6	○			○			
	Change start position data number	'XXXX(h)'	4	10	○			○			
	Number of changed position data	'XXXX(h)'	4	14	○			○		The number of data will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	16	○			○			
	CR	0Dh	1	17	○			○			
	LF	0Ah	1	18	○			○			
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.

5-3-42. Change Position Data Continuous Write 2 (26DH)

Function: Change position data for the number of change positions from the change start position 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		'26D(h)'	3	6	○			○			
	Number of change position data		'XXXX(h)'	4	10	○			○		The number of data will be limited based on the send/receive buffers.	
	Position data (*1)	Change position data number	'XXXX(h)'	4	14	○			○			
		Axis pattern	'XX(h)'	2	16							
		Acceleration	'XXXX(h)'	4	20	○			○	0.01G		
		Deceleration	'XXXX(h)'	4	24	○			○	0.01G		
		Speed	'XXXX(h)'	4	28	○			○	mm/s		
		Position data (*2)	'XXXXXXXX(h)'	8	36	○		○		0.001mm		
		Position data repetition for remaining effective axes	Data indicated by *2 for the number of remaining effective axes	MAX 56	MAX 92	○		○		0.001mm	Data indicated by *2 x Number of remaining effective axes = 8 bytes x (Max 8 – 1) axes = Max 56 bytes	
	Position data repetition for remaining data		Data indicated by *1 for the number of remaining data	MAX 1639918	MAX 1640010	Refer to the [data indicated by *1].					Data indicated by *1 x Number of remaining data = Max 82 bytes x (Max 20000 data – 1) = Max 1639918 bytes	
	SC		'XX(h)'	2	MAX 1640012	○			○			
	CR		0Dh	1	MAX 1640013	○			○			
	LF		0Ah	1	MAX 1640014	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'26D(h)'	3	6	○			○			
	Number of changed position data	'XXXX(h)'	4	10	○			○		The number of data will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	12	○			○			
	CR	0Dh	1	13	○			○			
	LF	0Ah	1	14	○			○			
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.

5-3-43. Position Data Clear 2 (Old: Point Data Clear 2) (26EH)

Function: Clear position data for the number of clear positions from the clear start position number. (Position data comments cannot be cleared.)

	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	'26E(h)'	3	6	○			○			
	Clear start position data number	'XXXX(h)'	4	10	○			○			
	Number of clear position data	'XXXX(h)'	4	14	○			○			
	SC	'XX(h)'	2	16	○			○			
	CR	0Dh	1	17	○			○			
	LF	0Ah	1	18	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'26E(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.

5-3-44. Controller Function Specification 2 (271H)

Function: Specify the function of the controller.

	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	'271(h)'	3	6	○			○			
	Controller function specification word 9	'XXXX(h)'	4	10	○			○		‘0001H’ (Extended data (SEL programs, program steps, point data) IAI protocol query, change enable specification) * Because the controller clears all the settings of the controller function specification words 9 to 16 when the power is turned OFF, a software reset is received or IAI protocol (format A (old protocol)) "version query" is received, resetting is required. * XSEL-P/Q/PX/QX FROM16M controller, SSEL SRAM4M controller and XSEL-R/S/RX/SX/RXD/SXD/ RA/SA/RAX/SAX/RAXD/SAXD controller settings are disabled.	
	Controller function specification word 10	'XXXX(h)'	4	14	○			○		Bit 0 to 15 (Reserved for system use) are fixed to 0.	
	Controller function specification word 11	'XXXX(h)'	4	18	○			○		Bit 0 to 15 (Reserved for system use) are fixed to 0.	
	Controller function specification word 12	'XXXX(h)'	4	22	○			○		Bit 0 to 15 (Reserved for system use) are fixed to 0.	
	Controller function specification word 13	'XXXX(h)'	4	26	○			○		Bit 0 to 15 (Reserved for system use) are fixed to 0.	
	Controller function specification word 14	'XXXX(h)'	4	30	○			○		Bit 0 to 15 (Reserved for system use) are fixed to 0.	
	Controller function specification word 15	'XXXX(h)'	4	34	○			○		Bit 0 to 15 (Reserved for system use) are fixed to 0.	
	Controller function specification word 16	'XXXX(h)'	4	38	○			○		Bit 0 to 15 (Reserved for system use) are fixed to 0.	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	SC	'XX(h)'	2	40	○			○			
	CR	0Dh	1	41	○			○			
	LF	0Ah	1	42	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'271(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.

5-3-45. Position Data Range-Specification Continuous Write 3 (290H)

Function: Change position data for the number of change positions from the change start position 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			'290(h)'	3	6	○			○			
	Record Format Extension Indication Type (*1)			'XX (h)'	2	8	○			○		Bit 1 to 7 (Reserved for system use) Fixed to 0 Bit 0 (Output operation data extension):0=Disabled/1=Enabled	(*5) Described outside frame
	Change start position data number			'XXXX(h)'	4	12	○			○			
	Number of change position data			'XXXX(h)'	4	16	○			○		The number of data will be limited based on the send/receive buffers.	
	Position Data 1 Record (*2)	In Normal Condition	Axis pattern	'XX(h)'	2	18	○			○			
			Acceleration	'XXXX(h)'	4	22	○			○	0.01G		
			Deceleration	'XXXX(h)'	4	26	○			○	0.01G		
			Speed	'XXXX(h)'	4	30	○			○	mm/s		
			Position data (*3)	'XXXXXXXX(h)'	8	38	○		○		0.001mm		
			Position data repetition for remaining effective axes	Data indicated by *3 for the number of remaining effective axes	MAX 56	MAX 94	○		○		0.001mm	Data indicated by *3 x Number of remaining effective axes = 8 bytes x (Max 8 – 1) axes = Max 56 bytes	

	Data name			Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
							Big	Little	Yes	No			
Command	Position Data 1 Record (*2)	In Normal Condition	Extended data	'XX(h)'	2	MAX 96	○		○			Bit 0 to 3 (spare) Bit 4 to 5 (SCARA 1 arm system data): 0 = No specification / 1 = Right arm system / 2 = Left arm system Bit 6 to 7 (SCARA 2 arm system data): 0 = No specification / 1 = Right arm system / 2 = Left arm system	
		Only When Output Operation Data Extension Enabled	Output Function Code	'XX(h)'	2	MAX 98	○			○		Output Function Disabled when Set to 0	(*4) Described outside frame
			Reserved for system use	'XX(h)'	2	MAX 100	○			○		Always set 0.	(*4) Described outside frame
			Output Port / Flag Number	'XXXX(h)'	4	MAX 104	○			○			(*4) Described outside frame
			Function Parameter 1	'XXXXXX(h)'	6	MAX 110	○			○	0.001mm 0.001s		(*4) Described outside frame
			Function Parameter 2	'XXXXXX(h)'	6	MAX 116	○			○	0.001mm 0.001s		(*4) Described outside frame
	Position data repetition for remaining data			Data indicated by *2 for the number of remaining data	MAX 6553400	MAX 6553516	Refer to the [data indicated by *2].					Data indicated by *2 x Number of remaining data = Max 100 bytes x (Max FFFFh data – 1) = Max 6553400 bytes	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	SC	'XX(h)'	2	MAX 6553518	○			○			
	CR	0Dh	1	MAX 6553519	○			○			
	LF	0Ah	1	MAX 6553520	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'290(h)'	3	6	○			○			
	Reserved for system use	'XXXX(h)'	2	8	○			○		Bit 1 to 7 (Reserved for system use) Fixed to 0 Bit 0 (Output operation data extension): 0= Disabled / 1= Enabled	
	Change start position data number	'00(h)'	4	12	○			○			
	Number of changed position data	'XXXX(h)'	4	16	○			○		The number of data will be limited based on the send/receive buffers.	
	SC	'XX(h)'	2	18	○			○			
	CR	0Dh	1	19	○			○			
	LF	0Ah	1	20	○			○			
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: It should not be recorded when *1 Data Bit 0 (Output Operation Data Extension) is set to 0 (Disable).
*5: It should not be recorded when *1 Data Bit 0 (Output Operation Data Extension) is set to 0 (Disable). Refer to [7-2. Position Output Operation Features] for the applicable models.

5-3-46. Change Position Data Continuous Write 3 (291H)

Function: Change the specified position data for the number of change position from the change start position 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			'291(h)'	3	6	○			○			
	Record Format Extension Indication Type (*1)			'00(h)'	2	8	○			○		Bit 1 to 7 (Reserved for system use) Fixed to 0 Bit 0 (Record Format Extension Indication Type):0=Disabled /1=Enabled	(*5) Described outside frame
	Number of change position data			'XXXX(h)'	4	12	○			○		The number of data will be limited based on the send/receive buffers.	
	Position Data 1 Record (*2)	In Normal Condition	Number of change position data	'XXXX(h)'	4	16	○			○			
			Axis pattern	'XX(h)'	2	18	○			○			
			Acceleration	'XXXX(h)'	4	22	○			○	0.01G		
			Deceleration	'XXXX(h)'	4	26	○			○	0.01G		
			Speed	'XXXX(h)'	4	30	○			○	mm/s		
			Position data (*3)	'XXXXXXXX(h)'	8	38	○		○		0.001mm		
			Position data repetition for remaining effective axes	Data indicated by *3 for the number of remaining effective axes	MAX 56	MAX 94	○		○		0.001mm	Data indicated by *3 x Number of remaining effective axes = 8 bytes x (Max 8 – 1) axes = Max 56 bytes	

	Data name			Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
							Big	Little	Yes	No			
Command	Position Data 1 Record (*2)	In Normal Condition	Extended data	'XX(h)'	2	MAX 96	○		○			Bit 0 to 3 (spare) Bit 4 to 5 (SCARA 1 arm system data): 0 = No specification / 1 = Right arm system / 2 = Left arm system Bit 6 to 7 (SCARA 2 arm system data): 0 = No specification / 1 = Right arm system / 2 = Left arm system	
		Only When Output Operation Data Extension Enabled	Output Function Code	'XX(h)'	2	MAX 98	○			○		Output Function Disabled when Set to 0	(*4) Described outside frame
			Reserved for system use	'XX(h)'	2	MAX 100	○			○		Always set 0.	Described outside frame
			Output Port / Flag Number	'XXXX(h)'	4	MAX 104	○			○			(*4) Described outside frame
			Function Parameter 1	'XXXXXX(h)'	6	MAX 110	○			○	0.001mm 0.001s		(*4) Described outside frame
			Function Parameter 2	'XXXXXX(h)'	6	MAX 116	○			○	0.001mm 0.001s		(*4) Described outside frame
	Position data repetition for remaining data			Data indicated by *2 for the number of remaining data	MAX 6815536	MAX 6815652	Refer to the [data indicated by *2].					Data indicated by *2 x Number of remaining data = Max 104 bytes x (Max FFFFh data – 1) = Max 6815536 bytes	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	SC	'XX(h)'	2	MAX 6815654	○			○			
	CR	0Dh	1	MAX 6815655	○			○			
	LF	0Ah	1	MAX 6815656	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'291(h)'	3	6	○			○			
	Record Format Extension Indication Type (*1)	'XX (h)'	2	8	○			○		Bit 1 to 7 (Reserved for system use) Fixed to 0 Bit 0 (Output operation data extension):0= Disabled /1= Enabled	
	Number of changed position data	'XXXX(h)'	4	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: It should not be recorded when *1 Data Bit 0 (Output Operation Data Extension) is set to 0 (Disable).
*5: Set the value in *1 Data Bit 0 (Output Operation Data Extension) always to 0 (Disable) for models not applicable for the position output operation features. Refer to [7-2. Position Output Operation Features] for the applicable models.

5-3-47. 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.	

	Data name		Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
						Big	Little	Yes	No			
Normal response	Coordinate system definition data (*1)	Coordinate offset (*2)	"XXXXXXXX(h)'	8	19	○		○		0.001mm	X-axis data	
		Remaining coordinate offset	Date indicated by *2 for the remaining 3 axes	24	43	○		○		0.001mm (R-axis: 0.001deg)	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.

5-3-48. Unit 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	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'2A1(h)'	3	6	○			○			
	Query axis pattern	'XX(h)'	2	8	○			○		For the XSEL-PX/QX/RX/SX/RAX/SAX, MSEL-PCX/PGX series, status of direct-acting axes can be queried (simultaneous specification with SCARA axes is permitted).	
	Type	'X(h)'	1	9	○			○		Bit 2, 3 (Reserved for system use) Bit 0, 1 (SCARA axis / coordinate system definition unit axis 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	○			○			
	CR	0Dh	1	12	○			○			
	LF	0Ah	1	13	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'2A1(h)'	3	6	○			○			
	Work coordinate system selection number	'XX(h)'	2	8	○			○		Work coordinate system selection number (0 ~) For the XSEL-RXD/SXD/RAXD/SAXD series, work coordinate system selection number of 1st to 4th SCARA axes	
	Tool coordinate system selection number	'XX(h)'	2	10	○			○		Tool coordinate system selection number (0 ~) For the XSEL-RXD/SXD/RAXD/SAXD series, work coordinate system selection number of 1st to 4th SCARA axes	

	Data name		Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
						Big	Little	Yes	No			
Normal response	Common axis status		'XX(h)'	2	12	○			○		Bit 4 to 7 (Reserved for system use) Bit 2, 3 (SCARA axis / coordinate system definition unit axis 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 For the XSEL-RXD/SXD/RAXD/SAXD series, axis common status of 1st to 4th SCARA axes	
	Axis pattern		'XX(h)'	2	14	○			○			No axis pattern is the same as "driver not connected."
	Single-axis status (*1)	Axis status	'XX(h)'	2	16	○			○		Bit 6, 7 (Reserved for system use) Bit 5 (Push error detection): 0 = Not detected / 1 = Detected Bit 4 (Operation command successful completion): 0: Not yet complete / 1 = Completed successfully *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.) Bit 3 (Servo): 0 = OFF / 1 = ON Bit 1, 2 (Home return): 0 = Not yet performed / 1 = Returning to home / 2 = Completed	

	Data name		Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
						Big	Little	Yes	No			
Normal response	Single-axis status (*1)	Axis status	'XX(h)'	2	16	○			○		Bit 0 (Servo axis in use): 0 = Not in use / 1 = In use (moving, etc.) *"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: • 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. 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): 1) [Bit 0 (Servo axis in use) = OFF] AND [Bit 4 (Operation command successful completion) = ON] --- Positioning has completed successfully.	

	Data name		Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
						Big	Little	Yes	No			
Normal response	Single-axis status (*1)	Axis status	'XX(h)'	2	16	○			○		2) [Bit 0 (Servo axis in use) = OFF] AND [Bit 5 (Push error detection) = ON] ---Push error (* Need not be checked if push command is not used.) 3) [Bit 0 (Servo axis in use) = OFF] AND [bit 4 (Operation command successful completion) = OFF] AND [Bit 5 (Push error detection) = OFF] ---Operation cancellation due to error, emergency stop, etc.	
		Axis sensor input status	'X(h)'	1	17	○			○		Bit 3 (Reserved for system use) Bit 2 (Home 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	20	○			○			
		Encoder status (at reset)	'XX(h)'	2	22	○			○		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	30	○		○		0.001mm or 0.001deg	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	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-49. 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 (*1) Simple-interference-check-zone definition coordinate effective axis pattern	'XX(h)'	2	12	○			○			
	Simple-interference-check-zone definition data (*1) Simple-interference-check-zone definition coordinate 1 (*2)	'XXXXXXXX(h)'	8	20	○		○		0.001mm (R-axis: 0.001deg)	Define a rectangular solid with coordinates 1 and 2. * Coordinates on the base coordinate system	

	Data name		Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
						Big	Little	Yes	No			
Normal response	Simple-interference-check-zone definition data (*1)	Definition coordinate 1 remaining coordinate data	Date indicated by *2 for the number of remaining effective axes	MAX 24	MAX 44	○		○		0.001mm (R-axis: 0.001deg)	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	○		○		0.001mm (R-axis: 0.001deg)	Define a rectangular solid with coordinates 1 and 2. * Coordinates on the base coordinate system	
		Definition coordinate 2 remaining coordinate data	Date indicated by *3 for the number of remaining effective axes	MAX 24	MAX 76	○		○		0.001mm (R-axis: 0.001deg)	Data indicated by *3 x Number of remaining effective axes = 8 bytes x Max (4 – 1) axes = Max 24 bytes	
		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	○			○			
	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	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal response	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	○			○			

(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.

5-3-50. Unit Axis Status Query 2 (2A3H)

Function: Query the axis status (Unit). (In SCARA Unit: UNit 1 = 1st to 4th Axes　UNit 2 = 5th to 8th Axes)										
	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	'2A1(h)'	3	6	○			○			
	Query axis pattern	'XX(h)'	2	8	○			○		For the XSEL-RX/SX/RAX/SAX, MSEL-PCX/PGX series, status of direct-acting axes can be queried (simultaneous specification with SCARA axes is permitted).	
	Type	'X(h)'	2	10	○			○		Bit 0 to 1 (Unit 1 current position type): 0 = Base coordinate system / 1 = Selected work coordinate system / 2 = Reserved/3 = Each axis system Bit 2 to 3 (Reserved) Bit 4 to 5 (Unit 2 current position type): 0 = Base coordinate system / 1 = Selected work coordinate system / 2 = Reserved/3 = Each axis system Bit 6 to 7 (Reserved)	
	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	'2A3(h)'	3	6	○			○			
	Unit axis pattern	'XX(h)'	2	8	○			○		Unit axis pattern in query response axis	
	Work coordinate system selection number (Unit 1)	'XX(h)'	2	10	○			○		Work coordinate system selection number (0 ~)	
	Tool coordinate system selection number (Unit 1)	'XX(h)'	2	12	○			○		Tool coordinate system selection number (0 ~)	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Normal respons	Unit 1 common status	'XX(h)'	2	14	○			○		Bit 0 to 1 (Unit axis current arm system): 0 = Indeterminable / 1 = Right arm system / 2 = Left arm system / 3 = Reserved for system use * System reservation for coordinate system definition unit axis Bit 2 to 3 (Unit axis current position coordinate system type): 0 = Base coordinate system / 1 = Selected work coordinate system / 2 = Reserved for system use / 3 = Each axis system Bit 4 to 7 (Reserved for system use)	
	Work coordinate system selection number (Unit 2)	'XX(h)'	2	16	○			○		Work coordinate system selection number (0 ~)	
	Tool coordinate system selection number (Unit 2)	'XX(h)'	2	18	○			○		Tool coordinate system selection number (0 ~)	
	Unit 2 common status	'XX(h)'	2	20	○			○		Bit 0 to 1 (SCARA axis current arm system): 0 = Indeterminable / 1 = Right arm system / 2 = Left arm system / 3 = Reserved for system use Bit 2 to 3 (SCARA axis current position coordinate system type): 0 = Base coordinate system / 1 = Selected work coordinate system / 2 = Reserved for system use / 3 = Each axis system Bit 4 to 7 (Reserved for system use)	

	Data name		Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
						Big	Little	Yes	No			
Normal respons	Axis pattern		'XX(h)'	2	22	○			○		Query response all axes pattern	No axis pattern is the same as "driver not connected."
	Single-axis status (*1)	Axis status	'XX(h)'	2	24	○			○		Bit 0 (Servo axis in use): 0 = Not in use / 1 = In use (moving, etc.) * "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: ・ Servo is starting up from an OFF state ・ Servo is shutting down from an ON state (excluding emergency stop) ・ Operation axis is paused Bit 1, 2 (Home return): 0 = Not yet performed / 1 = Returning to home / 2 = Completed Bit 3 (Servo): 0 = OFF / 1 = ON Bit 4 (Operation command successful completion): 0 = Not yet complete / 1 = Completed successfully * 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.) Bit 5 (Push error detection): 0 = Not detected / 1 = Detected Bits 6, 7 (Reserved for system use)	

	Data name		Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
						Big	Little	Yes	No			
Normal response	Single-axis status (*1)	Axis status	'XX(h)'	2	24	○			○		* 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. 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): 1) [Bit 0 (Servo axis in use) = OFF] AND [Bit 4 (Operation command successful completion) = ON] --- Positioning has completed successfully. 2) [Bit 0 (Servo axis in use) = OFF] AND [Bit 5 (Push error detection) = ON] --- Push error (* Need not be checked if push command is not used.) 3) [Bit 0 (Servo axis in use) = OFF] AND [bit 4 (Operation command successful completion) = OFF] AND [Bit 5 (Push error detection) = OFF] --- Operation cancellation due to error, emergency stop, etc.	
		Axis sensor input status	'X(h)'	1	25	○			○		Bit 0 (Creep sensor): 0 = OFF / 1 = ON Bit 1 (Overrun sensor): 0 = OFF / 1 = ON Bit 2 (Home sensor): 0 = OFF / 1 = ON Bit 3: (Reserved for system use)	
		Axis error code	'XXX(h)'	3	28	○			○			

	Data name		Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
						Big	Little	Yes	No			
Normal response	Single-axis status (*1)	Encoder status (at reset)	'XX(h)'	2	30	○			○		Bit 0 (Overspeed (OS)) Bit 1 (Full absolute status (FS)) Bit 2 (Count error (CE)) Bit 3 (Counter overflow (OF)) Bit 4 (Reserved for system use) Bit 5 (Multi-rotation error (ME)) Bit 6 (Battery error (BE)) Bit 7 (Battery alarm (BA))	
		Current position	'XXXXXXXX(h)'	8	38	○		○		0.001mm or 0.001deg	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 150	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 152	○			○			
	CR		0Dh	1	MAX 153	○			○			
	LF		0Ah	1	MAX 154	○			○			
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.

5-3-51. Coordinate System Definition Data Range-Specification Continuous Query 2 (2A4H)

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	'2A4(h)'	3	6	○			○			
	Query axis pattern	'XX(h)'	2	8	○			○		Specify with 0Fh, F0h or FFh.	
	Type	'X(h)'	1	9	○			○		0 = Work coordinate system definition data / 1 = Tool coordinate system definition data	
	Query-target head coordination system definition data number	'XX(h)'	2	11	○			○		Work/tool coordinate system definition data number (0 ~)	
	Number of query records	'XX(h)'	2	13	○			○		The number of records 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	'2A4(h)'	3	6	○			○			
	Response axis pattern	'XX(h)'	2	8	○			○			
	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.	

	Data name		Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
						Big	Little	Yes	No			
Normal response	Coordinate system definition data (*1)	Coordinate offset (*2)	"XXXXXXXX(h)'	8	19	○		○		0.001mm	X-axis data	
		Remaining coordinate offset	Date indicated by *2 for the remaining 3 axes	MAX 56	MAX 75	○		○		0.001mm (R-axis: 0.001deg)	Data indicated by *2 x Number of remaining response axes = 8 bytes × (Max 8 - 1) axes = 56 bytes	
	Remaining coordinate system definition data		Data indicated by *1 for the number of remaining records	MAX 16256	MAX 16331	Refer to the [data indicated by *1].					Data indicated by *1 x Number of remaining records = 64 bytes x (Max 255 records – 1) = Max 16256 bytes	
	SC		'XX(h)'	2	MAX 16333	○			○			
	CR		0Dh	1	MAX 16334	○			○			
	LF		0Ah	1	MAX 16335	○			○			
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.

5-3-52. Unit Absolute-Coordinate Specification Movement (2D4H)

Function: Move to the specified absolute coordinates (SCARA / Coordinate Definition Unit Axes).											
	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	'2D4(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○		For the XSEL-PX/QX/RX/SX/RAX/SAX, MSEL-PCX/PGX series, simultaneous specification of SCARA and direct-acting axes is prohibited (direct-acting axes can be specified).	
	Acceleration	'XXXX(h)'	4	12	○			○	% or 0.01G	The parameter setting becomes effective if 0. * Unit: Movement control = PTP: [%] / Movement control = CP: [0.01 G]	
	Deceleration	'XXXX(h)'	4	16	○			○	% or 0.01G	The parameter setting becomes effective if 0. * Unit: Movement control = PTP: [%] / Movement control = CP: [0.01 G]	
	Speed	'XXXX(h)'	4	20	○			○	% or mm/s	The parameter setting becomes effective if 0. (Safety limit applies depending on the mode.) * Unit: Movement control = PTP: [%] / Movement control = CP: [mm/s]	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	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) * Only SCARA axes are enabled 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 * Only SCARA axes are enabled (Linear axis always in CP operation)	
	Absolute coordinate data (*1)	'XXXXXXXX(h)'	8	30	○		○		0.001mm		
	Remaining absolute coordinate data	Data indicated by *1 for the number of remaining axes	MAX 56	MAX 86	○		○		0.001mm (R-axis: 0.001deg)	Data indicated by *1 x Number of remaining effective axes = 8 bytes x (Max 8 – 1) axes = Max 56 bytes	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	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	'2D4(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.

5-3-53. Unit Relative-Coordinate Specification Movement (2D5H)

Function: Move to the relative coordinates specified with respect to the current position (SCARA / Coordinate Definition Unit Axes).											
	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	○			○		For the XSEL-PX/QX/RX/SX/RAX/SAX, MSEL-PCX/PGX series, simultaneous specification of SCARA and direct-acting axes is prohibited (direct-acting axes can be specified).	
	Acceleration	'XXXX(h)'	4	12	○			○	% or 0.01G	The parameter setting becomes effective if 0. * Unit: Movement control = PTP: [%] / Movement control = CP: [0.01 G]	
	Deceleration	'XXXX(h)'	4	16	○			○	% or 0.01G	The parameter setting becomes effective if 0. * Unit: Movement control = PTP: [%] / Movement control = CP: [0.01 G]	
	Speed	'XXXX(h)'	4	20	○			○	% or mm/s	The parameter setting becomes effective if 0. (Safety limit applies depending on the mode.) * Unit: Movement control = PTP: [%] / Movement control = CP: [mm/s]	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	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) * Only SCARA axes are enabled 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 * Only SCARA axes are enabled (Linear axis always in CP operation)	
	Relative coordinate data (*1)	'XXXXXXXX(h)'	8	30	○		○		0.001mm		
	Remaining relative coordinate data	Data indicated by *1 for the number of remaining axes	MAX 56	MAX 86	○		○		0.001mm (R-axis: 0.001deg)	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	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-54. Unit Position-Number Specification Movement (2D6H)

Function: Move to the specified position number (SCARA, coordinate system definition unit axes).

	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	'2D6(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○		Used by an AND condition with the axis pattern of the position number. * For the XSEL-PX/QX/RX/SX/RAX/SAX, MSEL-PCX/PGX series, simultaneous specification of SCARA and direct-acting axes is prohibited (direct-acting axes can be specified).	
	Acceleration	'XXXX(h)'	4	12	○			○	% or 0.01G	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	○			○	% or 0.01G	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	○			○	% or mm/s	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/s	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Positioning operation type	'XX(h)'	2	22	○			○		Bit 5 to 7 (Reserved for system use) are fixed to 0. 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) * Only SCARA axes are enabled 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 * Only SCARA axes are enabled (Linear axis always in CP operation)	
	Position number	'XXX(h)'	3	25	○			○			
	SC	'XX(h)'	2	27	○			○			
	CR	0Dh	1	28	○			○			
	LF	0Ah	1	29	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'2D6(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

5-3-55. Unit Position-Number Specification Movement 2 (2D9H)

Function: Move to the specified position number (SCARA, coordinate system definition unit axes).

	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	'2D9(h)'	3	6	○			○			
	Axis pattern	'XX(h)'	2	8	○			○		Used by an AND condition with the axis pattern of the position number. * For the XSEL-PX/QX/RX/SX/RAX/SAX and MSEL-PCX/PGX series, simultaneous specification of SCARA and direct-acting axes is prohibited (direct-acting axes can be specified).	
	Acceleration	'XXXX(h)'	4	12	○			○	% or 0.01G	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	○			○	% or 0.01G	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	○			○	% or mm/s	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/s	

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
Command	Positioning operation type	'XX(h)'	2	22	○			○		Bit 5 to 7 (Reserved for system use) are fixed to 0. 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) * Only SCARA axes are enabled 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 * Only SCARA axes are enabled (Linear axis always in CP operation)	
	Position number	'XXXX(h)'	4	26	○			○			
	SC	'XX(h)'	2	28	○			○			
	CR	0Dh	1	29	○			○			
	LF	0Ah	1	30	○			○			
Normal response	Header	'#'	1	1	○			○			
	Station	'XX(h)'	2	3	○			○			
	Message ID	'2D9(h)'	3	6	○			○			
	SC	'XX(h)'	2	8	○			○			
	CR	0Dh	1	9	○			○			
	LF	0Ah	1	10	○			○			

	Data name	Data range (value)	Data size [bytes]	Cumulative bytes [bytes]	Endian		Sign extension		Unit	Description	Remarks
					Big	Little	Yes	No			
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.

6. 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.

7. Precautions

7-1. Regarding Model Dependency of Position / Program Data Counts

The number of positions and the number of programs than can be handled by each controller differ (refer to [Table 7-1]). When handling position data and programs, please follow the three items below. However, [1] is not required if the models to be supported can be identified.

1) Determine the number of positions and the number of programs that can be handled by the controller from the controller's model code and unit code (for details, refer to [7-1-1]).
2) Use position data query and change messages distinguishably between the controller with extended data and the controller without extended data (for details, refer to [7-1-2]).
3) If the controller with extended data will handle all data, send the controller function specification 2 (271h) command at the start of communication (for details, refer to [7-1-3]).

Table 7-1

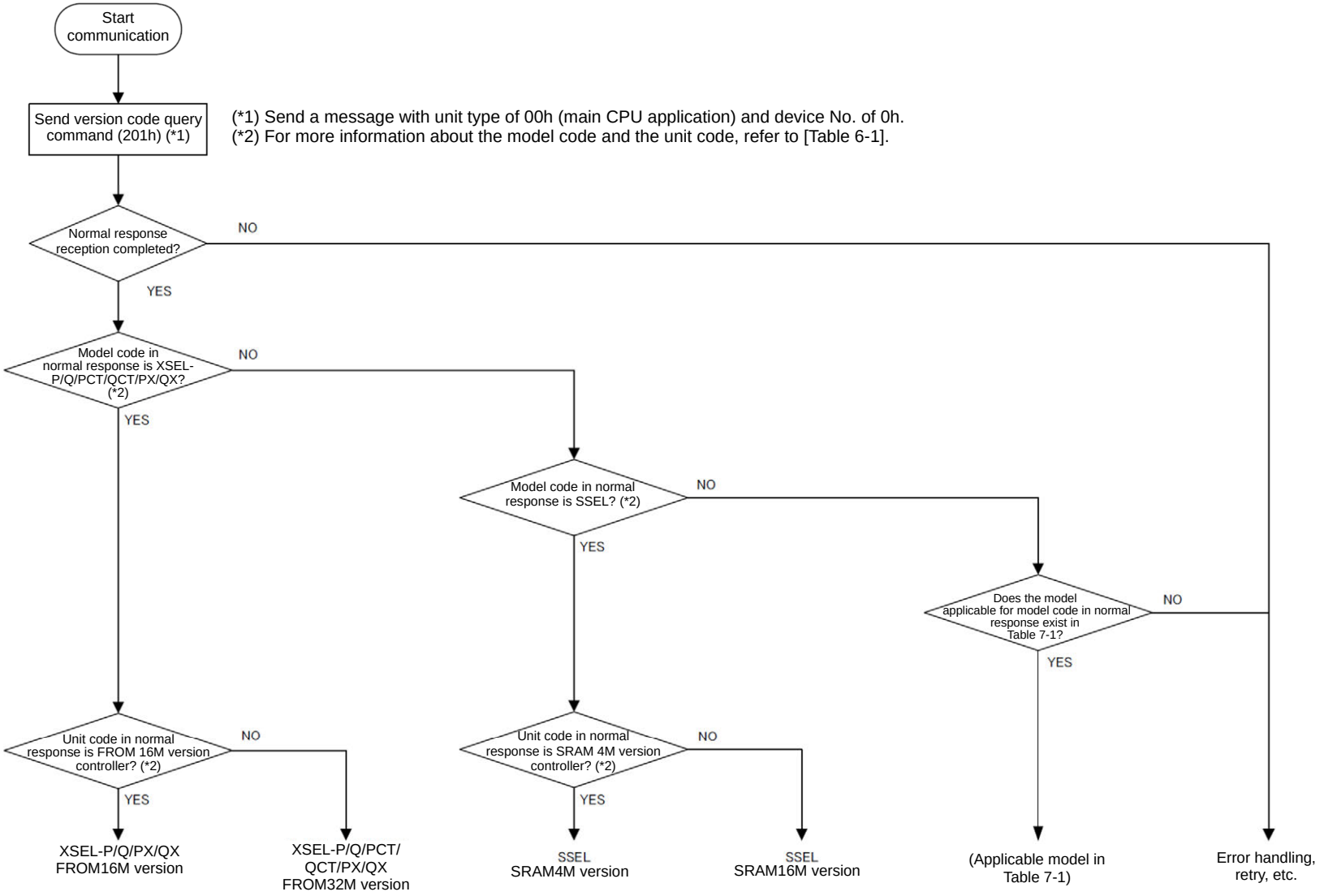
Controller		Model Code	Unit Code	No. of Positions	No. of Programs	Extended Data
XSEL-J/K		B8	—	3000	64	No
XSEL-JX/KX		C0	—	3000	64	No
TT		BC	—	3000	64	No
XSEL-P/Q/PCT/QCT	FROM 16M version	BA	71	4000	64	No
	FROM 32M version		72	20000 (4000)	128 (64)	Yes
XSEL-PX/QX	FROM 16M version	C2	71	4000	64	No
	FROM 32M version		72	20000 (4000)	128 (64)	Yes
SSEL	SRAM 4M version	D6	72	1500	64	No
	SRAM 16M version		73	20000 (1500)	128 (64)	Yes
ASEL		D0	—	1500	64	No
PSEL		D3	—	1500	64	No
XSEL-R/S/RX/SX/RXD/SXD	1-axis specification	BB (R/S) C3 (RX/SX) C5 (RXD/SXD)	—	53332	128	No
	2-axis specification			40000		
	3-axis specification			32000		
	4-axis specification			26666		
	5-axis specification			22856		
	6-axis specification			20000		
	7-axis specification			17776		
	8-axis specification			16000		

Controller		Model Code	Unit Code	No. of Positions	No. of Programs	Extended Data
TTA		B9 BD BF	—	30000	255	No
MSEL-PC/PG/PCF/PGF		D4	—	30000	255	No
MSEL-PCX/PGX		C6	—	30000	255	No
XSEL-RA/SA RAX/SAX RAXD/SAXD	1-axis specification	BE (RA/SA) C7 (RAX/SAX) C9 (RAXD/SAXD)	—	55000	255	No
	2-axis specification			47142		
	3-axis specification			41250		
	4-axis specification			36666		
	5-axis specification			33000		
	6-axis specification			30000		
	7-axis specification			27500		
	8-axis specification			25384		
RSEL	Use group Number 1	DC	—	36000	512	No
	Use group Number 2			18000		

* Description in brackets () in the position counts expresses the data counts capable of dealing before sending Controller Feature Indication 2 (271H).

7-1-1. Model Determination Method

Determine the model as follows, using the model code and unit code obtained by the version code query (201h) command.
*　It is not necessary to determine the model if the model to be supported can be identified



7-1-2. Position Data Query and Change Messages

Table 7-2 shows position data query and change messages.
The position number that can be used and whether or not SCARA axis arm system data query and change can be performed differ in each message. Use messages distinguishably for usage. Query and change of the position data comments cannot be performed with the messages in Table 7-2.

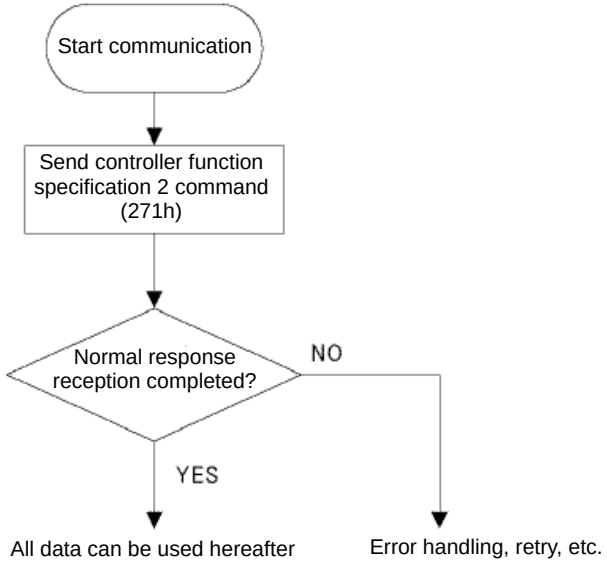
Table 7-2

Message name	Message ID	Max. position numbers allowing query and change	Permission of SCARA axis arm system data query and change	XSEL-J/K/KE/KT/KET	XSEL-JX/KX/KTX	XSEL-P/Q/PCT/QCT	XSEL-PX/QX	XSEL R/S	XSEL-RX/SX/RXD/SXD	XSEL-RA/SA	XSEL-RAX/SAX/RAXD/SAXD	TT	TTA	SSEL	ASEL PSEL	MSEL-PC/PG/PCF/PGF	MSEL-PCX/PGX	RSEL
Number of effective position data query	208H	4095	×	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Number of effective position data query 2	21EH	65535	×	×	×	○	○	○	○	○	○	×	○	○	×	○	○	○
Effective position data query	209H	4095	×	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Effective position data query 2	21FH	65535	×	×	×	○	○	○	○	○	○	×	○	○	×	○	○	○
Effective position data query 3	22DH	65535	○	×	×	×	×	×	○	○	○	×	○	×	×	○	○	○
Position data range-specification continuous write	244H	4095	×	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Position data range-specification continuous write 2	26CH	65535	×	×	×	○	○	○	○	○	○	×	○	○	×	○	○	○
Position data range-specification continuous write 3	290H	65535	○	×	×	×	×	×	○	○	○	×	○	×	×	○	○	○
Change position data continuous write	245H	4095	×	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Change position data continuous write 2	26DH	65535	×	×	×	○	○	○	○	○	○	×	○	○	×	○	○	○

Message name	Message ID	Max. position numbers allowing query and change	Permission of SCARA axis arm system data query and change	XSEL-J/K/KE/KT/KET	XSEL-JX/KX/KTX	XSEL-P/Q/PCT/QCT	XSEL-PX/QX	XSEL R/S	XSEL-RX/SX/RXD/SXD	XSEL-RA/SA	XSEL-RAX/SAX/RAXD/SAXD	TT	TTA	SSEL	ASEL PSEL	MSEL-PC/PG/PCF/PGF	MSEL-PCX/PGX	RSEL
Change position data continuous write 3	291H	65535	○	×	×	×	×	×	○	○	○	×	○	×	×	○	○	○
Position data clear	246H	4095	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Position data clear 2	26EH	65535	○	×	×	○	○	○	○	○	○	×	○	○	×	○	○	○
Position-number specification movement	237H	4095	×	○	×	○	×	○	×	○	×	○	○	○	○	○	×	○
Position-number specification movement 2	26BH	65535	×	×	×	○	×	○	×	○	×	×	○	○	×	○	×	○
Unit position data number specification movement	2D6H	4095	×	×	○	×	○	×	○	×	○	×	○	×	×	○	○	×
Unit position data number specification movement 2	2D9H	65535	×	×	×	×	○	×	○	×	○	×	○	×	×	○	○	×

7-1-3. Handling All Data by the Controller with Extended Data

When the controller with extended data (refer to [Table 7-1], Applicable Models) handles all data, send a message with controller function specification word 9 of "271h: Controller function specification 2" set to 0001h (extended data (SEL programs, programs steps, position data) IAI protocol query and change enable specification).
In case "271h: Controller function specification 2" will not be sent, the data enclosed by ( ) in Table 7-1 can still be queried and changed. However, if the controller handles data outside of the range, a "684: Extended data access error (at IAI protocol reception)" is generated. Additionally, because "271h: Controller function specification 2" will be disabled if the controller is powered OFF, a software reset is received or an IAI protocol (format A (old protocol)) "Version query" is received, it is necessary to resend it.
"271h: Controller function specification 2" is not supported for all of the applicable models listed on the cover page. Be sure to send it after confirming the supported models and the support start version. For more details about the supported models and the support start version, refer to [5-1. Message List].
The following shows the "Controller function specification 2" transmission sequence.



7-2. Regarding Position Output Operation Features

The models applicable for this feature are as follows.

Controller	Applicable Version at Main CPU Application Part
TTA	V2.00 or later
MSEL-PC/PG/PCF/PGF/PCX/PGX	V2.00 or later
XSEL-RA/SA/RAX/SAX/RAXD/SAXD	Applicable from initial version of these products
RSEL	Applicable from initial version of these products

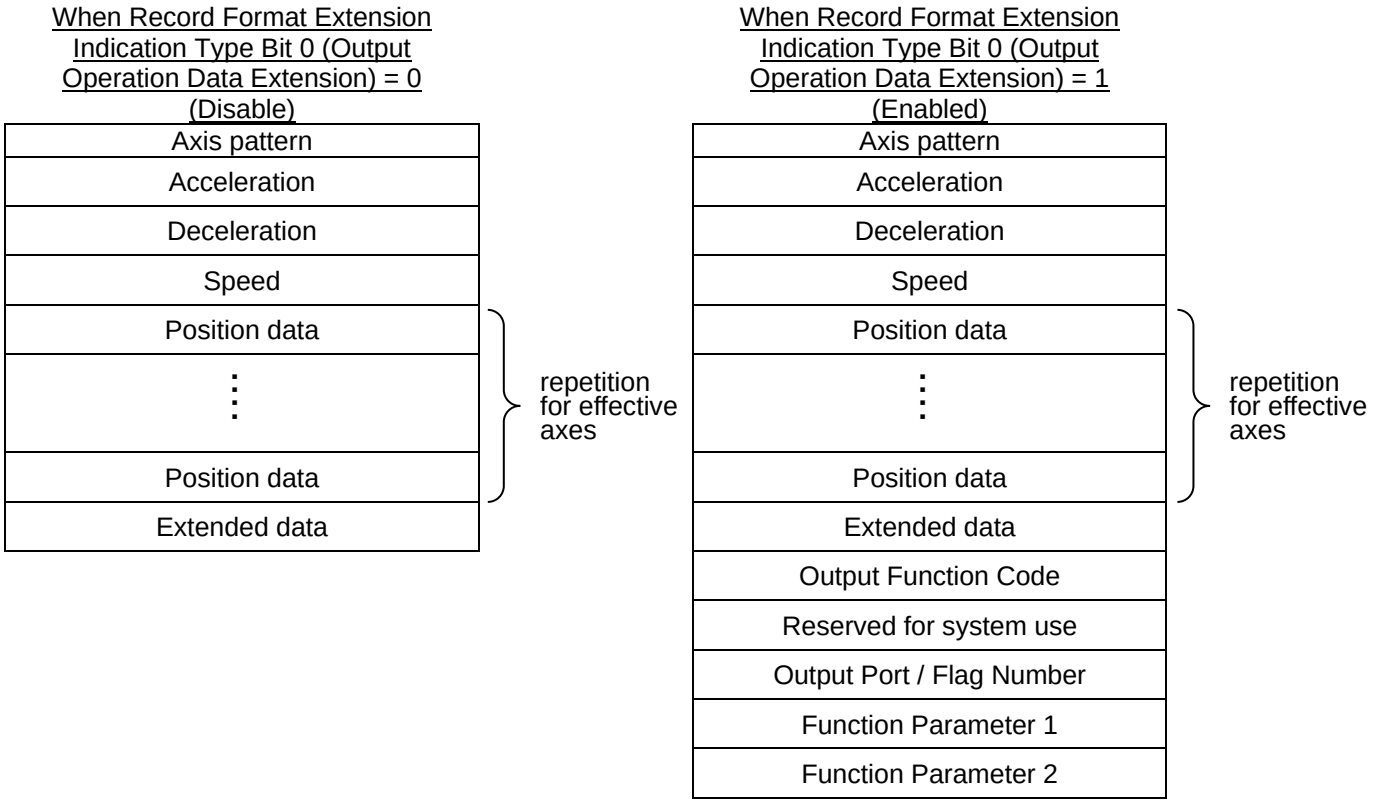
TTA and MSEL-PC/PG/PCF/PGF/PCX/PGX are capable of change for enable / disable of this feature in parameters. Refer to [SEL Language Programing Manual] for details. Also, the setting of enable / disable should be able to check in the [Controller Setting Inquiry] protocol. Refer to [7-3-1. Position Output Operation Data Setting] for details.
This feature should always be activated for XSEL-RA/SA/RAX/SAX/RAXD/SAXD and RSEL. Explanation below is under assumption that the position output operation feature setting is enabled.

Inquiry and change of the position output operation data should become available by setting "Record Format Extension Type Bit 0 (Output Operation Data Extension)" in the following protocol to 1 (Enable).

Message ID	Message name	Page
22DH	Number of effective position data query 3	63
290H	Position data range-specification continuous write 3	107
291H	Change position data continuous write 3	110

Example: "Position Data Range Indication Continuous Writing 3" Protocol

[Position Data 1 Record]



"Output Function Code" is a value at 0 or more defined for each output operation (* output operation disabled when set to 0). Refer to [SEL Language Programing Manual] for details.

Units available for input in the function parameters are as shown in the table below.

Function parameter	Minimum	Maximum
Time (Delay Timer, 1-shot Timer, etc.) (Input unit 0.001s)	0	999999
Distance (Input unit 0.001mm)	0	9999999
Ratio (Input unit 0.001%)	0	100000

*** Caution in Position Data Inquiry / Change**

Pay attention to the combination of the conditions below when sending a protocol to inquire/change the position data to a controller.

1) Position Output Operation Data Feature Setting in Applicable Controller (enable / disable)

2) Position Output Operation Data Extension Select of Sent Protocol *1 *2 (with / without extension)

(*1 A protocol with no "position output operation data extension select" existed should be treated as "Without Extension".)

(*2 Models not applicable for the position output operation features should always be set as "Without Extension".)

In the table below, describes the details of the data operation process in a controller in the combination of each conditions (1) and 2)).

		1) Position Output Operation Data Feature Setting on Applicable Controller	
		Disabled	Enabled
2) With/Without Position Output Operation Data Extension of Sent Inquiry/Change Protocol	Without Extension	(Nothing special to be described)	・When Inquired : Position output operation data not to be acquired ・When Changed : Position output operation data cleared
	With Extension	・When Inquired : Position output operation data acquired as 0 ・When Changed : "Error No. 236 Position Data Record Format Type Error" occurs	(Nothing special to be described)

・An error should occur when a "change protocol with position output operation data extension" is sent to a "controller with position data output operation data disabled" and a change to the data would not be made.

・**The output operation data in the changed position should be cleared** when a "change protocol without position output operation data extension" is sent to a "controller with position data output operation data enabled". **Pay attention when using a protocol described in the list below.**

Message ID	Message name	Position Output Operation Data Extension	Page
244H	Position data range-specification continuous write	Without extension	78
245H	Change position data continuous write	Without extension	80
26CH	Position data range-specification continuous write 2	Without extension	100
26DH	Change position data continuous write 2	Without extension	102
290H	Position data range-specification continuous write 3	Chooseable (without extension /with extension)	107
291H	Change position data continuous write 3	Chooseable (without extension /with extension)	110

7-3. How to Check Controller Setting

There may be a restriction in the condition of the protocol use depending on the setting status of the applicable controllers. Here describes the way to judge such conditions. The setting data explained in this chapter should be inquired using the "Controller Setting Inquiry" protocol shown below.

Controller Setting Inquiry

[Command]

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
'!'	**'9'**	**'9'**	**'2'**	**'0'**	**'2'**	**'0'**	**'9'**	**'0'**	***1**			**'0'**	**'0'**	**'1'**	**SC**		**CR**	**LF**

*1 Inquiry Data Number: Set a setting data number you would like to inquire in a hexadecimal number.
(Example) Inquire No. 200 (= "C8h") → Set '0' 'C' '8' to *1 in command message

[Normal response]

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
'#'	**'9'**	**'9'**	**'2'**	**'0'**	**'2'**	**'0'**	**'9'**	**'0'**	***2**								**SC**		**CR**	**LF**

*2 Inquiry Result: The result of inquiry for the set data should be stored in the hexadecimal system.
(Example) *2 in response message is '8' '7' '6' '5' '4' '3' '2' '1' → Setting data should be "87654321h"

* RSEL should not support the "controller setting inquiry" protocol. (It should cause an error response.)

7-3-1　Position Output Operation Data Feature Enable/Disable Setting

Applicable Models	TTA and MSEL-PC/PG/PCF/PGF/PCX/PGX
Explanation	It is necessary that the position output operation data feature setting of the controller is enabled in order to indicate the extension of the position output operation data when having a change/inquiry of the position data in the applicable models.
Way to Check Setting	1. Use the "Inquire Controller Setting" protocol to inquire Setting Data No. 185 (= 0B9h). 2. By the value of bit 3 in the acquired setting data, it is available to judge enable/disable of the feature. (Do not refer to any bit other than bit 3.) ・Bit 3 = "1": Enable (Example)　"0000000**E**h"　Eh = **1**110b ・Bit 3 = "0": Disable (Example)　"0000000**6**h"　6h = **0**110b
Remarks	*The status of enable/disable in this setting should not change until the controller reboots.

7-3-2　Linear Axis Work/Tool Coordinate System Feature Enable/Disable Setting

Applicable Models	TTA and MSEL-PC/PG/PCF/PGF
Explanation	Protocols to change/inquire the coordinate system definition data in the applicable models (eg. "240H Coordinate System Definition Data Range Indication Continuous Inquiry", etc.) are available only when the coordinate system feature setting is enabled. Sending the above protocols to a controller with the feature setting disabled should generate an error such as "Error No. 23C Coordinate System Definition Disabled Error".
Way to Check Setting	1. Use the "Inquire Controller Setting" protocol to inquire Setting Data No. 189 (= 0BDh). 2. By the value of bit 0 in the acquired setting data, it is available to judge enable/disable of the feature. (Do not refer to any bit other than bit 0.) ・Bit 0 = "1": Enable (Example) "0000000**3**h" 1h = 001**1**b ・Bit 0 = "0": Disable (Example) "0000000**0**h" 0h = 000**0**b
Remarks	*The status of enable/disable in this setting should not change until the controller reboots.

8. Change History

Edition	Date	Content of change
First edition	Nov. 19, '02	-
Second edition	Dec. 02, '02	Added note on bit 0 status (Servo axis in use) under "Axis Status Query" and "SCARA Axis Status Query."
Third edition	Jan. 09, '03	Added check method for operation command positioning under IAI protocol for the axis status under "Axis Status Query" and "SCARA Axis Status Query."
Fourth edition	Aug. 24, '06	• Added note under "System Status Query." Added note on use of the XSEL (P/Q series) (Cartesian/SCARA)/SSEL/ASEL/PSEL controller.
〃	Aug. 24, '06	• Changed specification under "Version Code Query." Added "Mounted SIO" for "Unit type."
〃	Aug. 24, '06	• Changed description. Changed all references to "ong-type data (hexadecimal ASCII code)" to "hexadecimal ASCII code." (Changed under "Integer Variable Query, " "Axis Status Query" and "Integer Variable Change.")
〃	Aug. 24, '06	• Added description under "Home Return." • Added "For the XSEL-PX/QX series, specify only direct-acting axes" for "Axis pattern."
〃	Aug. 24, '06	• Changed/added note for "Axis pattern" under "Jogging/Inching." • Changed to "Only one SCARA axis can be specified for the SCARA type (multiple axes cannot be specified)." • Changed to "With the SCARA type, a jogging/inching command can be issued only when none of the SCARA servo axes are operating." • Added "For the XSEL-PX/QX series, SCARA and direct-acting axes cannot be specified simultaneously.
〃	Aug. 24, '06	• Changed note under "SCARA Absolute-Coordinate Specification Movement, " "SCARA Relative-Coordinate Specification Movement" and "SCARA Point-Number Specification Movement." • Added "For the XSEL-PX/QX series, simultaneous specification of SCARA and direct-acting axes is prohibited (direct-acting axes can be specified)" for "Axis pattern." • Added " (Invalid for non-SCARA axes)" for "Positioning operation type."

Edition	Date	Content of change
Fourth edition	Aug. 24, '06	• Changed note under "SCARA Axis Status Query." • Added "For the XSEL-PX/QX series, status of direct-acting axes can be queried (simultaneous specification with SCARA axes is permitted)" for "Axis pattern." • Changed bit name for "Type" (name only). • Bit 0, 1 "(Current position type)" → "(SCARA-axis current position type)" • Changed bit name for "Common axis status" (name only). • Bit 0, 1 "(Current arm system)" → "(SCARA-axis current arm system)" • Bit 2, 3 "(Current position coordinate system type)"→ "(SCARA-axis current position coordinate system type)"
〃	Aug. 24, '06	• Added Bit4 to system status byte 3 under "System Status Query." Bit 4 (Operation mode): 0 = Program mode / 1 = Positioner mode
〃	Aug. 24, '06	• Changed note under "Real Variable Query." • Changed "Format supported in XSEL (Cartesian) main application V0.41 or earlier…" as follows: → "Format supported in XSEL-J/K V0.41 or earlier, or when Bit0 to 3 of Other parameter No. 46 = 0"
〃	Aug. 24, '06	• Added note under "Speed Change." • Added "For the XSEL-PX/QX series, specification of SCARA axes is prohibited" for "Axis pattern."
〃	Aug. 24, '06	• Changed the description of *1 at the end of 4-1, "Message List."
〃	Aug. 24, '06	• Changed "XSEL (Cartesian/IX SCARA) Serial Communication Protocol Specification (Format B)" to "XSEL Serial Communication Protocol Specification (Format B)" on the cover. • Added "XSEL-P/Q, XSEL-PX/QX, TT, SSEL, ASEL and PSEL" as applicable models on the cover.
〃	Sep. 12, '06	• Changed "As of June 26, 2001, the maximum receivable size of the controller is 1023 bytes, while the maximum transmittable size is 1024 bytes" to "As of September 12, 2006, the maximum receivable size and maximum transmittable size of the controller are as follows: XSEL (J/K/JX/KX), TT: The maximum receivable size is 1023 bytes, while the maximum transmittable size is 1024 bytes. XSEL (P/Q/PX/QX), SSEL/ASEL/PSEL: The maximum receivable size is 2051 bytes, while the maximum transmittable size is 2048 bytes" in 4-3, "Message Details."

Edition	Date	Content of change
Fourth edition	Sep. 12, '06	• In 1, "Overview": • Changed "XSEL controller (Cartesian/IX SCARA)" and "XSEL controller" to "XSEL controller, TT or SSEL/ASEL/PSEL controller." • Changed "Usage of user-open channel 1" to "Usage of user-open channel 1 (XSEL (P/Q/PX/QX); Usage of user-open channel 0 for SSEL/ASEL/PSEL." • Changed "host device" to "PC connector or teaching connector." In line with this change, also added note regarding connectors ("Whether to use the PC connector…refer to [2. Transmission Control Procedure].
〃	Sep. 12, '06	• Under "Controller Setting": • Change the content of note [1]. Moved [2] to [5], and added [2] through [4]. • Changed "host device" to "controller" in [5].
〃	Sep. 12, '06	• Under "Message Transmission Timing," changed "User-open SIO channel 1, IAI-protocol response minimum delay time" to "User-open SIO channel 1, IAI-protocol response minimum delay time (XSEL (P/Q/PX/QX); User-open SIO channel 0, IAI-protocol response minimum delay time for SSEL/ASEL/PSEL)."
〃	Sep. 12, '06	• Under 3, "Outline of Message," changed "User-open SIO channel 1, station code" to "User-open SIO channel 1, station code (XSEL (P/Q/PX/QX); User-open SIO channel 0, station code for SSEL/ASEL/PSEL)."
Fifth edition	Aug. 31, '07	• Added the following commands to "4-1, Message List" <Commands Added> Number of effective point data query 2, Effective point data query 2, Point-number specification movement 2, Point data range-specification continuous write 2, Change point data continuous write 2, Point data clear 2, Controller function specification 2, SCARA point-number specification movement 2
〃	Aug. 31, '07	• Added the following commands to "Message Details" <Commands Added> Number of effective point data query 2, Effective point data query 2, Point-number specification movement 2, Point data range-specification continuous write 2, Change point data continuous write 2, Point data clear 2, Controller function specification 2, SCARA point-number specification movement 2
〃	Aug. 31, '07	• Added "6, Precautions" and "6-1, Data Handling of XSEL-P/Q, PX/QX FROM 32M Bit Main CPU Board Products and SSEL SRAM 16M Bit Main CPU Board Products"
Sixth edition	Sep. 26, '07	• Changed "6-1, Data Handling of XSEL-P/Q, PX/QX FROM 32M Bit Main CPU Board Products and SSEL SRAM 16M Bit Main CPU Board Products" to "6-1, Handling Position Data and Programs" • Changed descriptions of "6-1, Handling Position Data and Programs"
Seventh edition	Nov. 12, '07	• Deleted the description "There are restrictions on effective operation, so please contact us before using it." regarding "4-3-38, Speed Change (262H)," and added precaution.

Edition	Date	Content of change
Eighth edition	Mar. 19, '09	• Added the description "* XSEL-KE/KT/KET is included in XSEL-J/K, and XSEL-KTX in XSEL-JX/KX."
〃	Mar. 19, '09	• Added the description "* For the starting version to support each command, refer to notes in [4-1. Message List].
Ninth edition	Jun. 4, '10	• Added the description "However, if the slave station (controller) cannot recognize command messages (reception error, header/station number/line feed (LF) error, sum check error, etc.) from the main station (host), response transmission is not performed. Referring to [5. Timeout and Retry], perform communication recovery or take other applicable measures on the master station (host)."
〃	Jun. 4, '10	• Changed the applicable type in" 4-1, Message List 26BH Point No. Moving Specification 2" to "orthogonal only." (26BH Point No. Moving Specification 2 does not support the IX SCARA.)
Tenth edition	Nov. 26, '13	• Supported XSEL-R/S/RX/SX/RXD/SXD and TTA. • Changed 6, "Notes."
〃	Dec. 6, '13	• Rearranged the applicable type column in the message list by controller. • Changed "point" to "position."
Eleventh edition	Aug. 1, '14	• MSEL-PC/PG/PCX/PGX supported • Correction made to descriptions • Correction made to content of normal response in "5-3-15 Error Detail Data Inquiry (216H)"
Twelfth edition	Nov. 13, '15	• Model codes "B9" and "BF" added in TTA • Change made to only symbol descriptions for encoder status of Axis Status Inquiry (212H), SCARA Axis Status Inquiry (2A1H) and SCARA Axis Status Inquiry 2 (2A3H)
〃	Dec. 17, '15	• Change made to position output application for TTA/MSEL Applicable models updated in "5-1. Message List" Change made in "5-3-18. Effective Position Data Inquiry 3 (Old: Effective Point Data Inquiry 3) (22DH)" Change made in "5-3-45. Position Data Range Indication Continuous Writing 3 (Old: Point Data Range Indication Continuous Writing 3) (290H)" Change made in "5-3-46. Change Position Data Continuous Writing 3 (Old: Change Point Data Continuous Writing 3) (291H)" Newly added "7-2. Regarding Position OutputOperation Features"

Edition	Date	Content of change
Twelfth edition	Dec. 17, '15	• Linear axis work/tool coordinate system application added for TTA/MSEL Update made in protocol applicable model column and supplementary note added outside frame in "5-1. Message List" Remarks added in "5-3-12. Axis Status Inquiry (212h)" Remarks added in "5-3-21. Absolute-coordinate specification movement (234h)" Remarks added in "5-3-22. Relative-coordinate specification movement (235h)" Remarks added in "5-3-23. Jogging/inching (236h)" Remarks added in "5-3-24. Position-number specification movement (237h)" Remarks added in "5-3-40. Position-number specification movement 2 (Old: Point-number specification movement 2) (26BH)" Change made to names and remarks in "5-3-48. Unit Axis Status Inquiry (2A1h)" Change made to names and remarks in "5-3-50. Unit axis status query 2 (2A3h)" Change made to names and remarks in "5-3-52. Unit absolute-coordinate specification movement (2A4h)" Change made to names and remarks in "5-3-53. Unit relative-coordinate specification movement (2A5h)" Change made to names and remarks in "5-3-54. Unit position-number specification movement (2D6h)" Change made to names and remarks in "5-3-55. Unit position-number specification movement 2 (2D9h)" • Item names changed and updated in "7-1. Regarding Model Dependency of Position / Program Data Counts" (Old name: "7-1, Handling Position Data and Programs") • Protocol names changed in "7-1-2. Regarding Position Data Inquiry / Change Message" • Newly added "7-3. How to Check Controller Setting"
〃	Feb. 2, '16	• Change made in application of extension SIO and IAI protocol multiple channel Change made in "2. Communication Interface" Change made in "3. Transmission Control Procedure" Change made in "5-3. Message Details"
Thirteenth edition	Dec. 21, '16	• Change made to Position Output Application Change made in "5-3-18. Effective Position Data Inquiry 3 (Old: Effective Point Data Inquiry 3) (22DH)" Change made in "5-3-45. Position data range-specification continuous write 3 (Old: Point data range-specification continuous write 3) (290H)" Change made in "5-3-46. Change position data continuous write 3(Old: Change point data continuous write 3) (291H)" Change made in "7-2. Regarding Position Output Operation Features" Change made in "7-3-1. Position Output Operation Data Feature Enable/Disable Setting"

Edition	Date	Content of change
Thirteenth edition	Jan. 6, '17	• MSEL-PCF/PGF added
〃	Jan. 11, '17	• Supported XSEL-RA/SA/RAX/SAX/RAXD/SAXD
Fourteenth edition	Mar 10, '17	• Change made in caution for 233H "Home-Return" in Message List • Change made in caution for 233H "Home-Return" in Message Details ("Available to use only for linear axis in XSEL-PX/QX/RX/SX/RAX/SAX and MSEL-PCX/PGX" →"* The home-return operation except for adjustment is not recommended on an ABS encoder axis. The home-return operation on axes in the ABS encoder type SCARA Robot is prohibited.")
〃	Apr. 19, '19	• Change made to feature columns, etc. in following messages in message detail (Description added to clarify movement type is whether PTP or CP) 234H "Absolute-coordinate specification movement", 235H "Relative-coordinate specification movement", 236H "Jogging/inching", 237H "Position-number specification movement", 26BH "Position-number specification movement 2"
〃	Apr. 19, '19	• Change made to feature columns in following messages in message detail ("Coordinate System Definition Unit Axis" added) 2D4H "Unit absolute-coordinate specification movement", 2D5H "Unit relative-coordinate specification movement", 2D6H "Unit position-number specification movement", 2D9H "Unit position-number specification movement 2"
Fifteenth edition	May 8, '20	• Supported RSEL
〃	May 8, '20	• Change made in contents related to 3-1 (1) Caution: Teaching Connector Enable Terminal in AUTO Mode • XSEL-RA/SA Series deleted from 3-1 (1) Caution: USB and Models that USB Prioritized in Simultaneous Connection to Teaching Ports
〃	Jul 1, '21	• Correction made in contents for command "Inching Distance" in 5-3-23. Jog/Inching Movement (236H) • Terms integrated

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