Cat. No. I149E-EN-01

SCARA Robots
YRC Series

PROFIBUS

COMMAND REFERENCE MANUAL

OMRON

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Introduction

Thank you for purchasing the PROFIBUS compatible module. This PROFIBUS compatible module is an option module that allows the OMRON robot controller YRC series to be connected as a PROFIBUS system slave module. The robot controller explained in this manual refers to the YRC series.

This manual describes the remote commands used with the PROFIBUS compatible module.
For details on wiring and setting the PROFIBUS compatible module, refer to the PROFIBUS user's manual for the YRC series. For information on other devices such as connecting the master module and sequence programming, refer to the manual for the respective product.
Refer to the controller user's manual and programming manual supplied with the OMRON robot controller for details on operating the robot controller and on the robot program.

Disclaimers

CHANGE IN SPECIFICATIONS
Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS
Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA
Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS
The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

Safety Precautions (Always read before starting use)

Before using this product, be sure to read this manual carefully as well as the PROFIBUS user's manual, robot controller user's manual and programming manual. Take sufficient precautions to ensure safety and handle the product correctly.
The cautions given in this manual are related to this product. Refer to the robot controller user's manual for details on the cautions to be taken with the robot controller system using this product.
* The safety precautions are ranked as "WARNING" and "CAUTION" in this manual.

WARNING
FAILURE TO FOLLOW WARNING INSTRUCTIONS COULD RESULT IN SERIOUS INJURY OR DEATH TO THE OPERATOR OR PERSON SERVICING THE PRODUCT. ADDITIONALLY, THERE MAY BE SEVERE PROPERTY DAMAGE.

CAUTION
FAILURE TO FOLLOW CAUTION INSTRUCTIONS MAY RESULT IN INJURY TO THE OPERATOR OR PERSON SERVICING PRODUCT, OR DAMAGE TO THE PRODUCT OR PERIPHERAL EQUIPMENT.

NOTE
Explains the key point in the operation in a simple and clear manner.

Note that some items described as "CAUTION" may lead to serious results depending on the situation. In any case, important information that must be observed is explained.
Store this manual where it can be easily referred to, and make sure that it is delivered to the end user.

[Precautions for design]

WARNING

• REFER TO THE PROFIBUS SYSTEM MASTER MODULE USER'S MANUAL AND THIS MANUAL FOR DETAILS ON THE STATE OF THE PROFIBUS SYSTEM AND ROBOT CONTROLLER WHEN A COMMUNICATION ERROR OCCURS WITH THE PROFIBUS SYSTEM, ETC. CONFIGURE AN INTERLOCK CIRCUIT IN THE SEQUENCE PROGRAM SO THAT THE SYSTEM, INCLUDING THE ROBOT CONTROLLER WILL WORK SAFELY USING THE COMMUNICATION STATUS INFORMATION.
• THE SAFETY CONNECTOR OF THE ROBOT CONTROLLER HAS AN EMERGENCY STOP TERMINAL TO TRIGGER EMERGENCY STOP. USING THIS TERMINAL, PREPARE A PHYSICAL INTERLOCK CIRCUIT SO THAT THE SYSTEM INCLUDING THE ROBOT CONTROLLER WILL WORK SAFETY.

CAUTION

• THE CONTROL LINE AND COMMUNICATION CABLE MUST NOT BE BOUND WITH OR PLACED NEAR THE MAIN CIRCUIT OR POWER LINE. SEPARATE THESE BY AT LEAST 100MM. FAILURE TO OBSERVE THIS COULD LEAD TO MALFUNCTIONS CAUSED BY NOISE.
• THE DEDICATED INPUT OF STD.DIO CONNECTOR PROVIDED ON THE YRC CONTROLLERS WILL BE DISABLED EXCEPT FOR AN INTERLOCK SIGNAL (DI 11). WHEN THE EXTERNAL 24V MONITOR CONTROL SETTING OF SYSTEM PARAMETERS IS SET INVALID, THE INTERLOCK SIGNAL (DI 11) WILL ALSO BE DISABLED.

[Precautions for installation]

WARNING

• ALWAYS CRIMP, PRESS-FIT OR SOLDER THE CONNECTOR WIRE CONNECTIONS WITH THE MAKER-DESIGNATED TOOL, AND SECURELY CONNECT THE CONNECTOR TO THE MODULE.
• ALWAYS SHUT OFF ALL PHASES OF THE POWER SUPPLY EXTERNALLY BEFORE STARTING INSTALLATION OR WIRING WORK.FAILURE TO SHUT OFF ALL PHASES COULD LEAD TO ELECTRIC SHOCKS OR PRODUCT DAMAGE.

CAUTION

• USE THE ROBOT CONTROLLER WITHIN THE ENVIRONMENT SPECIFICATIONS GIVEN IN THE MANUAL. USE IN AN ENVIRONMENT OUTSIDE THE ENVIRONMENT SPECIFICATION RANGE COULD LEAD TO ELECTRIC SHOCKS, FIRES, MALFUNCTIONING, PRODUCT DAMAGE OR DETERIORATION.
• INSTALL THE PROFIBUS COMPATIBLE MODULE INTO THE ROBOT CONTROLLER, AND SECURELY FIX WITH SCREWS.
• NEVER DIRECTLY TOUCH THE CONDUCTIVE SECTIONS OR ELECTRONIC PARTS OTHER THAN THE ROTARY SWITCH ON THE PROFIBUS COMPATIBLE MODULE.
• NEVER DIRECTLY TOUCH THE CONDUCTIVE SECTIONS OR ELECTRIC PARTS INSIDE THE CONTROLLER.
• ACCURATELY CONNECT EACH CONNECTION CABLE CONNECTOR TO THE MOUNTING SECTION.
FAILURE TO OBSERVE THIS COULD LEAD TO MALFUNCTIONS CAUSED BY A CONNECTION FAULT.

[Precautions for wiring]

WARNING

- ALWAYS SHUT OFF ALL PHASES OF THE POWER SUPPLY EXTERNALLY BEFORE STARTING INSTALLATION OR WIRING WORK. FAILURE TO SHUT OFF ALL PHASES COULD LEAD TO ELECTRIC SHOCKS OR PRODUCT DAMAGE.
- ALWAYS INSTALL THE TERMINAL COVERS ENCLOSED WITH THE PRODUCT BEFORE TURNING ON THE POWER OR OPERATING THE PRODUCT AFTER INSTALLATION OR WIRING WORK. FAILURE TO INSTALL THE TERMINAL COVER COULD LEAD TO MALFUNCTIONS.

CAUTION

- TIGHTEN THE TERMINAL SCREWS WITHIN THE SPECIFIED TORQUE RANGE. A LOOSE TERMINAL SCREW COULD LEAD TO SHORT-CIRCUITING OR MALFUNCTIONING. IF THE TERMINAL SCREW IS TOO TIGHT, SHORT-CIRCUITING OR MALFUNCTIONING COULD OCCUR DUE TO SCREW DAMAGE.
- MAKE SURE THAT FOREIGN MATTER, SUCH AS CUTTING CHIPS OR WIRE SCRAPS, DO NOT ENTER THE ROBOT CONTROLLER.
- THE COMMUNICATION CABLES CONNECTED TO THE PROFIBUS COMPATIBLE MODULE MUST BE PLACED IN A CONDUIT OR FIXED WITH A CLAMP. IF THE CABLE IS NOT PLACED IN A CONDUIT OR FIXED WITH A CLAMP, THE MODULE OR CABLE COULD BE DAMAGED BY THE CABLE SHIFTING, MOVEMENT OR UNINTENTIONAL PULLING LEADING TO MALFUNCTIONING CAUSED BY AN IMPROPER CABLE CONNECTION.
- DO NOT DISCONNECT THE COMMUNICATION CABLE CONNECTED TO THE PROFIBUS COMPATIBLE MODULE BY PULLING ON THE CABLE SECTION. LOOSEN THE SCREWS ON THE CONNECTOR, AND THEN DISCONNECT THE CABLE. PULLING ON THE CABLE FIXED WITH SCREWS COULD LEAD TO MODULE OR CABLE DAMAGE, OR MALFUNCTIONING CAUSED BY AN IMPROPER CABLE CONNECTION.

[Precautions for starting and maintenance]

WARNING

- DO NOT TOUCH THE TERMINALS WHILE THE POWER IS ON. FAILURE TO OBSERVE THIS COULD LEAD TO MALFUNCTIONING.
- ALWAYS SHUT OFF ALL PHASES OF THE POWER SUPPLY EXTERNALLY BEFORE CLEANING OR TIGHTENING THE TERMINAL SCREWS. FAILURE TO SHUT OFF ALL PHASES COULD LEAD TO ELECTRIC SHOCKS, PRODUCT DAMAGE OR MALFUNCTIONING. A LOOSE SCREW COULD LEAD TO DROPPING, SHORT-CIRCUITING OR MALFUNCTIONING. IF THE SCREW IS TOO TIGHT, SHORT-CIRCUITING OR MALFUNCTIONING COULD OCCUR DUE TO SCREW DAMAGE.
- NEVER DISASSEMBLE OR MODIFY ANY OF THE ROBOT CONTROLLER MODULES. FAILURE TO OBSERVE THIS COULD LEAD TO TROUBLE, MALFUNCTIONING, INJURIES OR FIRES.
- ALWAYS SHUT OFF ALL PHASES OF THE POWER SUPPLY EXTERNALLY BEFORE INSTALLING OR REMOVING THE PROFIBUS COMPATIBLE MODULE.
  FAILURE TO SHUT OFF ALL PHASES COULD LEAD TO ROBOT CONTROLLER TROUBLE OR MALFUNCTIONING.
- WHEN USING THE ROBOT CONTROLLER WITH THE PROFIBUS COMPATIBLE MODULE MOUNTED, ALWAYS MOUNT THE ENCLOSED FERRITE CORE FOR NOISE MEASURES ON THE POWER CABLE AS CLOSE TO THE ROBOT CONTROLLER AS POSSIBLE.
  FAILURE TO MOUNT THIS FERRITE CORE COULD LEAD TO MALFUNCTIONING CAUSED BY NOISE.

CAUTION

THE PROFIBUS SYSTEM MAY NOT FUNCTION PROPERLY IF THE MASTER MODULE AND ROBOT CONTROLLER POWER ARE TURNED ON SIMULTANEOUSLY. ALWAYS TURN THE ROBOT CONTROLLER POWER ON AFTER TURNING ON THE POWER FOR THE MASTER MODULE ON.

[Precautions for disposal]

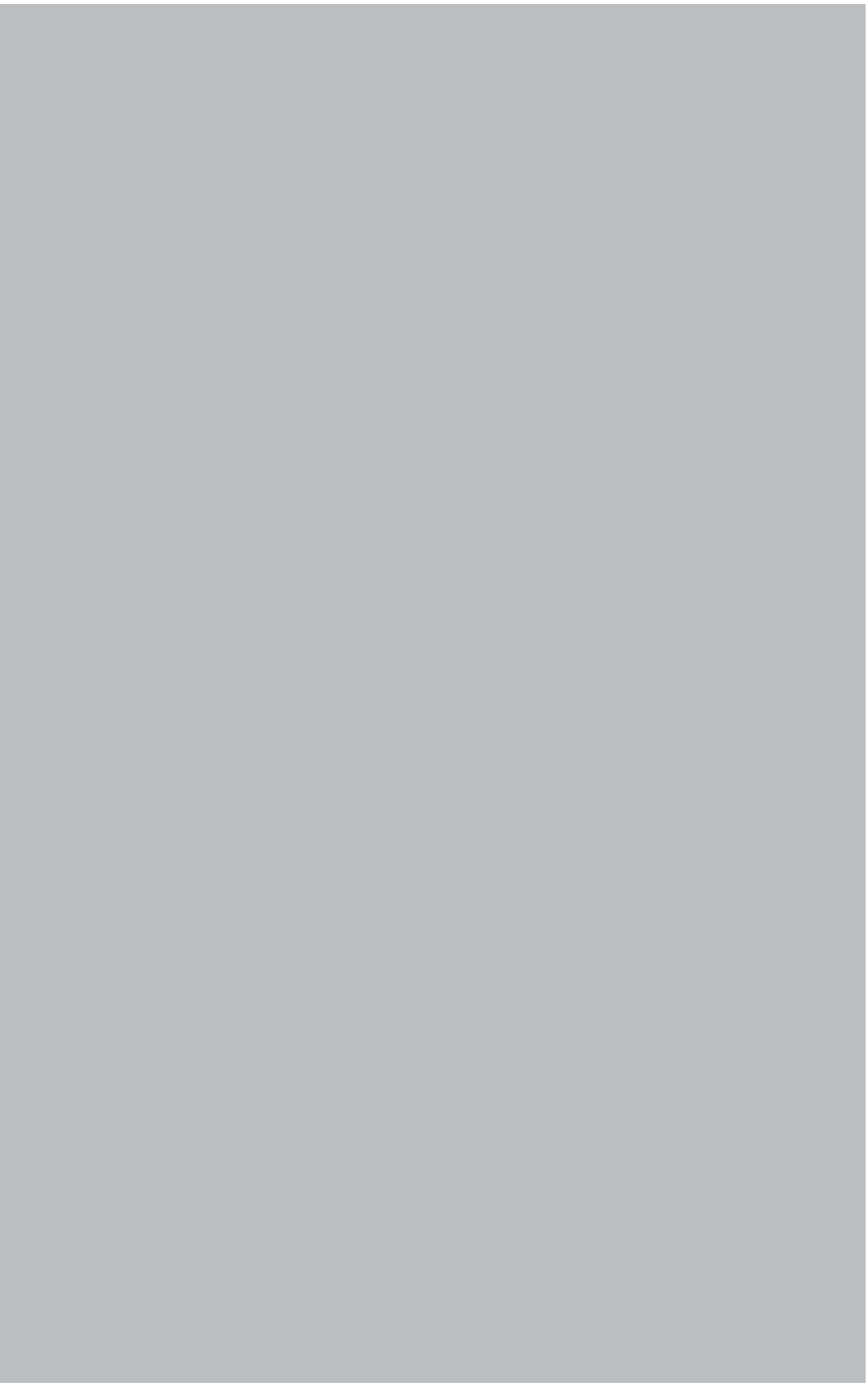
CAUTION

DISPOSE OF THIS PRODUCT AS INDUSTRIAL WASTE.

General Contents

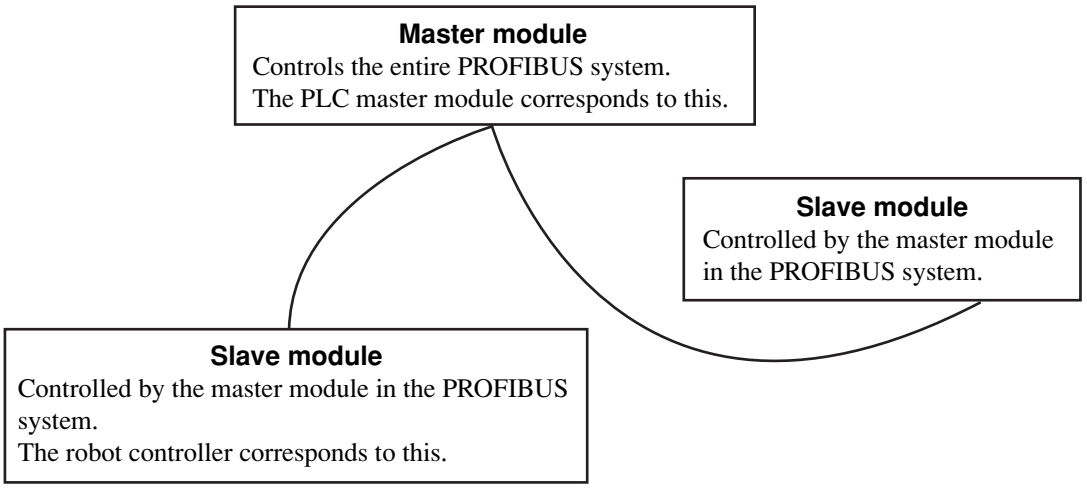
Chapter 1 OUTLINE

Contents



1. Features

The PROFIBUS system is a system used to connect the robot controller or scattered input/output modules, etc., with dedicated cables, and to control these modules from the master module.
The PROFIBUS system allows wiring to be reduced.



NOTE

The dedicated input of STD.DIO connector provided on the YRC controllers will be disabled except for an interlock signal (DI 11). When the external 24V monitor control setting of system parameters is set invalid, the interlock signal (DI 11) will also be disabled.

[Wiring saving]

One dedicated cable (5-wire) is used to connect the robot controller and PLC. This allows the entire system wiring to be reduced.

[Emulated serialization on parallel DIO]

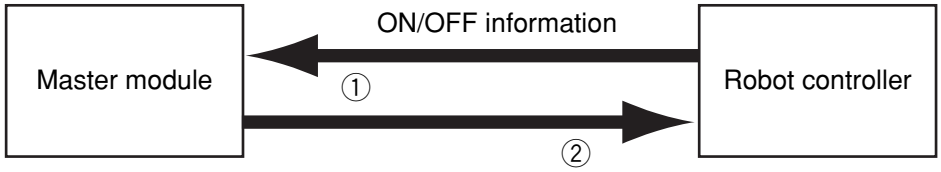
By making the robot controller's internal settings without using a robot program, the various I/O devices, such as the sensors and relays mounted on the robot controller's parallel I/O can be controlled from the PLC as if they were PROFIBUS system I/O devices.

CAUTION

AN EMERGENCY STOP TERMINAL FOR HARDWIRE IS PROVIDED IN SAFETY CONNECTOR ON THE ROBOT CONTROLLER.
WHEN THE PROFIBUS SYSTEM IS USED WHILE STD. DIO IS NOT USED (EXTERNAL DC 24V POWER SUPPLY IS NOT USED), THE EXTERNAL DC 24V MONITOR CONTROL SETTING OF SYSTEM PARAMETERS MUST BE SET INVALID. IF IT IS LEFT VALID, THE STD. DIO INTERLOCK SIGNAL IS ENABLED CAUSING AN ERROR IN THE ROBOT OPERATION COMMANDS.

2. Mechanism

The mechanism of communication is explained in this section to provide an understanding of how the robot controller and master module operate via the PROFIBUS system.



1- The robot controller's ON/OFF information is sent to the master module via the network (PROFIBUS system cable).

2- The master module's ON/OFF information is sent to the robot controller via the network (PROFIBUS system cable).

* **The robot controller monitors the ON/OFF information at a 10ms cycle.**

* **The ON/OFF information consists of two words each of dedicated I/O words, 14 words each of general-purpose I/O words as word information, and 16 points each of dedicated I/O points, 96 points each of general-purpose I/O points as bit information.**

If the following is executed with the robot program in the robot controller, the bit information will be sent to the master module via the PROFIBUS system by 1.

SO (20)=1

Conversely, if the following is executed with the robot program, the bit information received from the master module via the PROFIBUS system will be monitored by 2, and the robot controller will wait for the ON information.

WAIT SI (20)=1

If the following is executed with the robot program in the robot controller, the word information will be sent to the master module via the PROFIBUS system by 1.

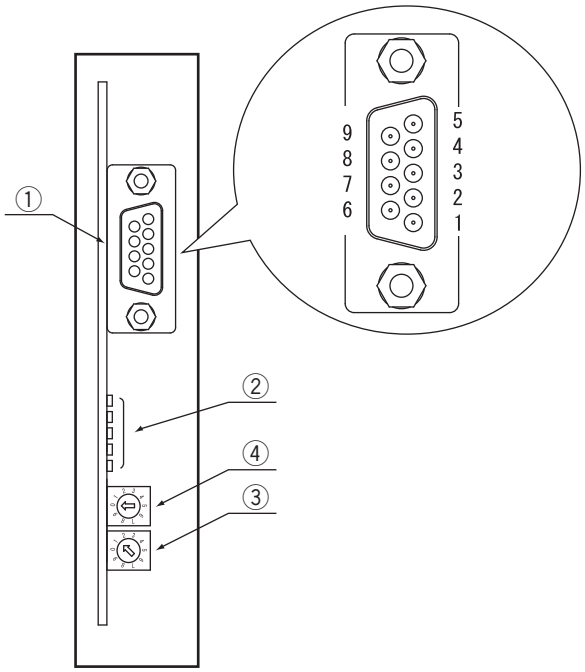
SOW (2)= 256

Conversely, if the following is executed with the robot program, the word information received from the master module via the PROFIBUS system will be substituted in integer variable A% by 2.

A% = SIW (3)

3. Names of each part on the PROFIBUS compatible module

The part names of the PROFIBUS compatible module installed in the robot controller are described in this section. The PROFIBUS compatible module is installed into an optional slot in the robot controller.



Front of the unit

1- PROFIBUS-DP connector

This is used to connect the PROFIBUS system cable. Follow the pin assignment below to avoid miswiring.

Pin No.	Description
1	No connection
2	No connection
3	Signal
4	RTS
5	GND
6	+5V
7	No connection
8	Signal
9	No connection
Metal part, screw part	For protective ground

2- Transmission monitor LED

The status in the PROFIBUS system is indicated with ON, OFF and flickering status of five LEDs. These terminals are "DATA-EX", "SD" "RD" "ERR" and "RUN" from the top.

3- Station address setting switch (LSB: 1st digit)

This is the rotary switch for setting the robot controller station address in the PROFIBUS system. The 1st digit of the station address is set with this switch.

4- Station address setting switch (MSB: 2nd digit)

This is the rotary switch for setting the robot controller station address in the PROFIBUS system. The 2nd digit of the station address is set with this switch.

4. Assignment of PROFIBUS compatible I/O

The I/O expressions in the robot controller's program language and the I/O expressions in the slave module differ. The correspondence is shown below.

Output from robot controller			Input to robot controller		
Program language		Master module	Program language		Master module
	SOW(0)*3	Im		SIW(0)*3	Qn
	SOW(1)*3	Im+2		SIW(1)*3	Qn+2
SOD(2)	SOW(2)	Im+4	SID(2)	SIW(2)	Qn+4
	SOW(3)	Im+6		SIW(3)	Qn+6
SOD(4)	SOW(4)	Im+8	SID(4)	SIW(4)	Qn+8
	SOW(5)	Im+10		SIW(5)	Qn+10
SOD(6)	SOW(6)	Im+12	SID(6)	SIW(6)	Qn+12
	SOW(7)	Im+14		SIW(7)	Qn+14
SOD(8)	SOW(8)	Im+16	SID(8)	SIW(8)	Qn+16
	SOW(9)	Im+18		SIW(9)	Qn+18
SOD(10)	SOW(10)	Im+20	SID(10)	SIW(10)	Qn+20
	SOW(11)	Im+22		SIW(11)	Qn+22
SOD(12)	SOW(12)	Im+24	SID(12)	SIW(12)	Qn+24
	SOW(13)	Im+26		SIW(13)	Qn+26
SOD(14)	SOW(14)	Im+28	SID(14)	SIW(14)	Qn+28
	SOW(15)	Im+30		SIW(15)	Qn+30
SO0(7 to 0)*1		Im+32.7 to Im+32.0	SI0(7 to 0)*1		Qn+32.7 to Qn+32.0
SO1(7 to 0)*1		Im+33.7 to Im+33.0	SI1(7 to 0)*1		Qn+33.7 to Qn+33.0
SO2(7 to 0)		Im+34.7 to Im+34.0	SI2(7 to 0)		Qn+34.7 to Qn+34.0
SO3(7 to 0)		Im+35.7 to Im+35.0	SI3(7 to 0)		Qn+35.7 to Qn+35.0
SO4(7 to 0)		Im+36.7 to Im+36.0	SI4(7 to 0)		Qn+36.7 to Qn+36.0
SO5(7 to 0)		Im+37.7 to Im+37.0	SI5(7 to 0)		Qn+37.7 to Qn+37.0
SO6(7 to 0)		Im+38.7 to Im+38.0	SI6(7 to 0)		Qn+38.7 to Qn+38.0
SO7(7 to 0)		Im+39.7 to Im+39.0	SI7(7 to 0)		Qn+39.7 to Qn+39.0
SO10(7 to 0)		Im+40.7 to Im+40.0	SI10(7 to 0)		Qn+40.7 to Qn+40.0
SO11(7 to 0)		Im+41.7 to Im+41.0	SI11(7 to 0)		Qn+41.7 to Qn+41.0
SO12(7 to 0)		Im+42.7 to Im+42.0	SI12(7 to 0)		Qn+42.7 to Qn+42.0
SO13(7 to 0)		Im+43.7 to Im+43.0	SI13(7 to 0)		Qn+43.7 to Qn+43.0
SO14(7 to 0)		Im+44.7 to Im+44.0	SI14(7 to 0)		Qn+44.7 to Qn+44.0
SO15(7 to 0)		Im+45.7 to Im+45.0	SI15(7 to 0)		Qn+45.7 to Qn+45.0
----------		Im+47.7 to Im+46.0 *2	----------		Qn+47.7 to Qn+46.0 *2

I, Q : Input/output address
m, n : Start address assigned by hardware configuration

Caution)

*1: Has a meaning in the robot controller's internal process as a dedicated input/output. This cannot be used as a general-purpose input/output in the robot program.

*2: This is a reserved area.

*3: Has a meaning in the robot controller internal process as a dedicated command region. This cannot be used as a general-purpose input/output in the robot program.

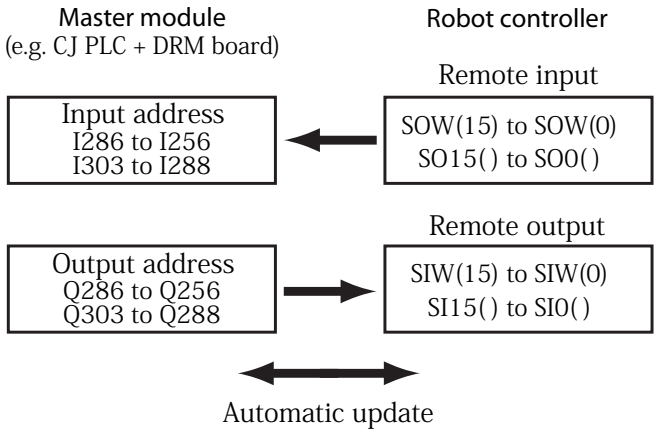
NOTE

• SIW(n) and SOW(n) are handled as numerical data of word with no sign.
SID(n) and SOD(n) are handled as numerical data of double words with a sign.

• The dedicated input of STD. DIO connector provided on the controller will be disabled except for an interlock signal (DI 11). When the Board condition (external 24V monitor control) of system parameters is set invalid, the interlock signal (DI 11) will also be disabled.

An example of the I/O information flow in the robot controller (slave module) is shown below. The buffer memory of the master module into which the I/O information is stored differs depending on the PLC type, assignment method, etc. Refer to the PLC manual for details.

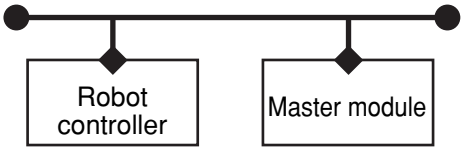
Example :



5. Shift of PROFIBUS system connection status and robot controller status

Always start the PROFIBUS system specification robot controller in the servo OFF state after the power is turned ON.

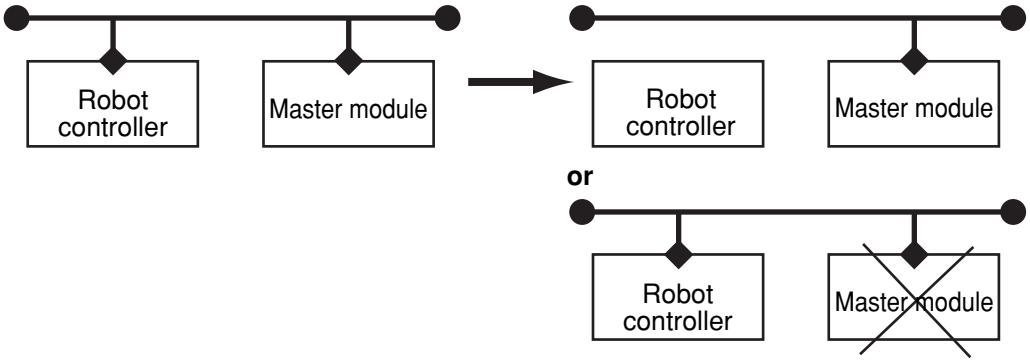
1- Normal state of PROFIBUS system connection when robot controller power is turned ON



- Emergency stop/interlock signals in PROFIBUS system are valid.
- When SAFE mode is enabled, service mode input signal is made valid with SI (02) in the PROFIBUS system.
- Emergency stop terminal in SAFETY connector is valid.
- Interlock signal in STD. DIO connector is valid unless the external 24V monitor control setting of system parameters is set invalid.
- When the external 24V monitor control setting of system parameters is left valid while SAFE mode is enabled, service mode input signal is made valid with DI (02) in SAFETY connector.

* The signals in the PROFIBUS system are sent and received.

2- Shift from PROFIBUS system normal connection state to PROFIBUS system erroneous connection state

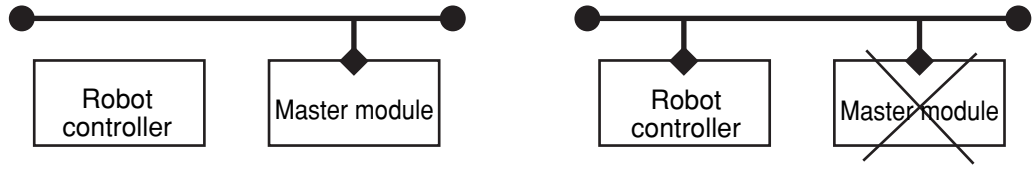


- Emergency stop input turns off with SI (00) in the robot controller.
- Service mode input turns off with SI (02) in the robot controller.
- Emergency stop terminal in SAFETY connector is valid.
- Interlock signal in STD. DIO connector is valid when the external 24V monitor control setting of system parameters is left valid.
- When the external 24V monitor control setting of system parameters is left valid while SAFE mode is enabled, service mode input signal is made valid with DI (02) in SAFETY connector.

* The signals in the PROFIBUS system are not sent or received.
* The "PROFIBUS Link Error" is added to the error history in the robot controller.
* If the connection to the PROFIBUS system shifts from the normal state to the erroneous state, the PROFIBUS system connection must be returned to the normal state.
* The PROFIBUS system will return when the PROFIBUS system connection is recovered to the normal state.

3- PROFIBUS system erroneous connection state due to following factors when robot controller power is turned ON

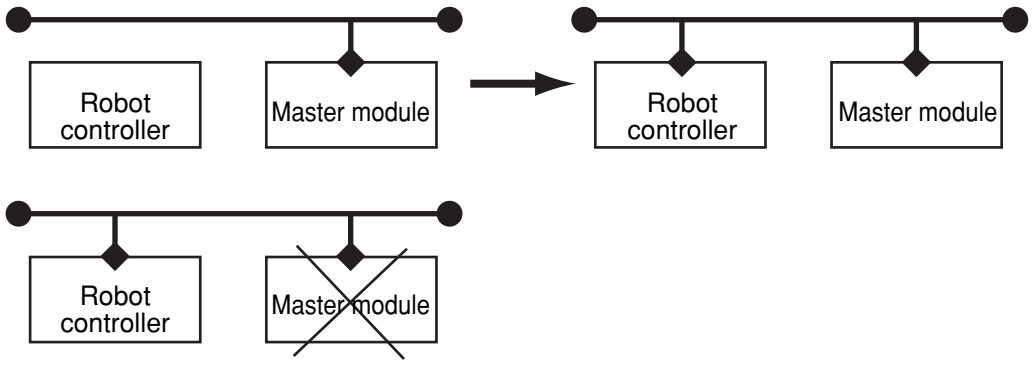
- Connection to PROFIBUS system not possible
- Error in master module



- Emergency stop/interlock signals in PROFIBUS system are invalid.
- When SAFE mode is enabled, service mode input signal is made valid with SI (02) in the PROFIBUS system.
- Emergency stop terminal in SAFETY connector is valid.
- Interlock signal in STD. DIO connector is valid when the external 24V monitor control setting of system parameters is left valid.
- When the external 24V monitor control setting of system parameters is left valid while SAFE mode is enabled, service mode input signal is made valid with DI (02) in SAFETY connector.

* The signals on the PROFIBUS system cannot be exchanged.
* The "PROFIBUS Link Error" has been added to the error history in the robot controller. (A standby state for up to 5 seconds will occur to check the communication.)
* As opposed to the state given in 2, in this state, the emergency stop state by SI (00) is not attained in the controller, so the robot can be operated from the programming box. (The robot controller can be started independently when setting up the system, etc.)
* Service mode input signal cannot be invalidated with SI (02) when SAFE mode is enabled, so change the service mode parameter setting in SYSTEM > PARAM mode. In this case, take full precautions to prevent improper settings that might lead to a hazardous situation.
* When the connection to the PROFIBUS system is correctly recovered, the system will automatically return to the PROFIBUS system.

4- Transmission from PROFIBUS system erroneous connection state to PROFIBUS correct connection state when robot controller power is turned ON

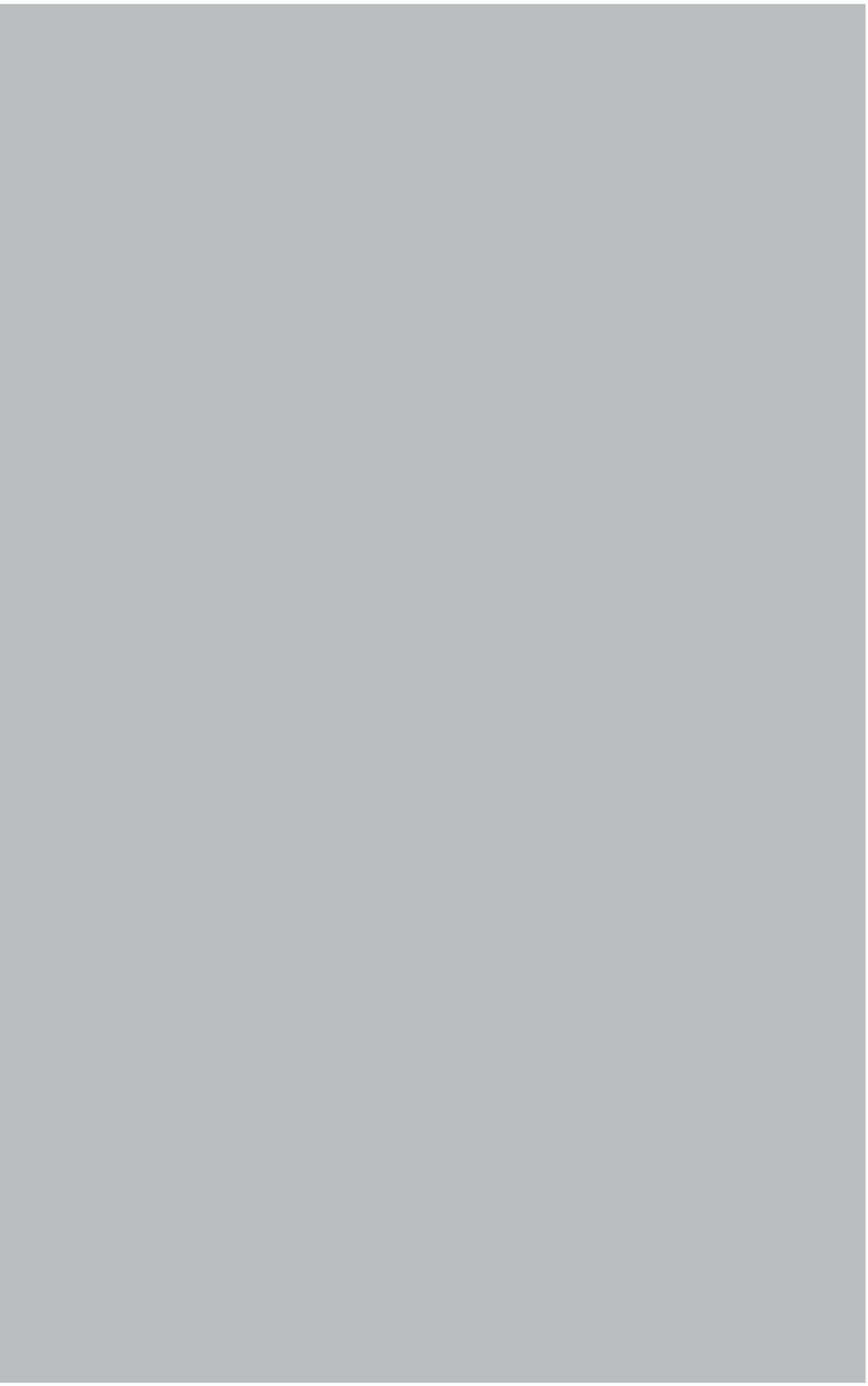


- PROFIBUS system emergency stop/interlock signals change to valid state.
- Emergency stop terminal in SAFETY connector is valid.
- Interlock signal in STD. DIO connector is valid when the external 24V monitor control setting of system parameters is left valid.
- When the external 24V monitor control setting of system parameters is left valid while SAFE mode is enabled, service mode input signal is made valid with DI (02) in SAFETY connector.

* The signals in the PROFIBUS system can be sent and received.
* When service mode parameter setting in SYSTEM > PARAM mode has been changed while SAFE mode is enabled, make the service mode parameter setting again. In this case, take full precautions to prevent improper settings that might lead to a hazardous situation.
* The PROFIBUS system will return when the PROFIBUS system connection is recovered to the normal state.

Chapter 2 REMOTE COMMANDS

Contents



1. Remote command format

Using the PROFIBUS compatible module allows issuing commands directly from the PLC (programmable logic controller). Commands such as MOVE commands can now be run that were impossible to execute up until now without using the robot program or RS-232C port.

CAUTION

• TO USE REMOTE COMMANDS, THE "REMOTE CMD / IO CMD (SI05)" PARAMETER IN SYSTEM > PARAM > OP.BRD MODE MUST BE SET TO "VALID" IN ADVANCE. REFER TO THE PROFIBUS USER'S MANUAL AND CONTROLLER USER'S MANUAL FOR MORE DETAILS.

1.1 Remote command specifications

Functions such as shown below are assigned to each remote register.

Output (remote → master)			Input (remote ← master)	
Address	**Contents**		**Address**	**Contents**
Im	Status		Qn	Execute command code
	Normal end	Abnormal end		
Im+2	Response	Error code	Qn+2	Command data
Im+4		Additional information	Qn+4	
Im+6			Qn+6	
to			to	
Im+30			Qn+30	

I, Q : Input/output address
m, n : Start address assigned by hardware configuration

NOTE

Remote commands must be held until the status changes to a normal end (0x0200) or an abnormal end (0x4000). If a remote command is changed before the status changes to an end, the status of the remote command executed will not be reflected.

- Remote commands are run by assigning the command codes to the Qn, and command data to the Qn+2 to Qn+30. When the controller receives the remote command, it starts the processing and sends the status (results) and its other information to the PLC by way of the Im and Im+2 to Im+30. When the remote command ends, assign the status reset command (0x0000 (hexadecimal)) to the Qn to clear the status. The remote command can be run when in command ready status (0x0000 (hexadecimal)).
- Command data to be added to remote commands differs according to the particular remote command. See the detailed information available on the remote commands. Command data must always be entered before trying to set the remote command.
- Contents of the remote command response sent as the remote command results differ according to the particular remote command. See the detailed information available on the remote commands.

- Data is set in binary code. When setting two pieces of 8-bit data such as character code data, set the upper bit data into the higher address. If the data size is greater than 16 bits, set the upper bit data into the higher address. (little endian)
  For example, to set "12" in Qn+8, enter 0x3231 (hexadecimal)
  (character code: "1" = 0x31, "2" = 0x32)
  For example, to set 0x01234567 (hexadecimal) (=19,088,743) in the Qn+8 and Qn+10 registers, set 0x0123 (hexadecimal) in Qn+10 and set 0x4567 (hexadecimal) in Qn+8.
- The status code is sent to Im when the remote command ends correctly.
- When the remote command ends incorrectly, an error code is sent to Im+2 and additional information is sent to Im+4 as a response. The error group number is displayed in the upper 8 bits of the error code and the error category number is displayed in the lower 8 bits. The additional information section appears in the upper 8 bits of additional information and a detail value for the additional information appears in the lower 8 bits. See the troubleshooting section of the robot controller user's manual for description of the error group number and error category number.
  For example, when 0x0201 (hexadecimal) was set in Im+2, this shows that a "soft limit over" error has occurred. When 0x0001 (hexadecimal) is set in Im+4, it indicates that Axis 1 of the controller is selected.

1.2 Remote status

The controller starts processing when the remote command is received and sends the status (results) to the PLC by way of Im.

- **Remote status list**

Status contents				Meaning
Im	Im+2	Im+4	From Im+6	
0x0000	0x0000			Command ready status
0x0100	0x0000			Command run status
0x0200	Response data			Normal end status
0x4000	Error code	Additional information	0x0000	Abnormal end status

I : Input address
m : Start address assigned by hardware configuration

NOTE

Remote commands must be held until the status changes to a normal end (0x0200) or an abnormal end (0x4000). If a remote command is changed before the status changes to an end, the status of the remote command executed will not be reflected.

- **Code 0x0000** .....Command ready status
  Indicates a state where remote command is not being run and a new remote command can be received. Remote status must always be set to command ready status (0x0000) in order to execute a remote command. To change the remote status to command ready status (0x0000), run the status reset command (0x0000).

- **Code 0x0100** .....Command run status
  Indicates a state where the controller has received a remote command and is in command run status.
  In some cases the command run status (0x0100) might not be sent to the PLC due to problems caused by a short remote command execution time versus the controller scan time (10 ms).

- **Code 0x0200** .....Normal end status
  Indicates a state where the remote command was run correctly.
  Category 5 (key operation command) indicates command was received as a key operation command. The actual key operation sometimes might be in progress.

- **Code 0x4000** .....Abnormal end status
  Indicates remote command ended abnormally.
  Error number and error additional information on the error that occurred are sent to Im+2 and Im+4.
  - **Error code Im+2**
    Shows the error code for error causing command to end abnormally.
    Upper 8 bits show the group number and lower 8 bits show the category number.
  - **Additional information Im+4**
    Shows additional information if present in error code, such as axis number causing error.
    Upper 8 bits show the section number of additional information and lower 8 bits show a detail value.

Section No.	Contents
00	Actual axis d
01	Axis-d of main robot
02	Axis-d of sub robot*
04	Main robot
05	Sub robot*
09	d task

* Sub robot not used in OMRON version.

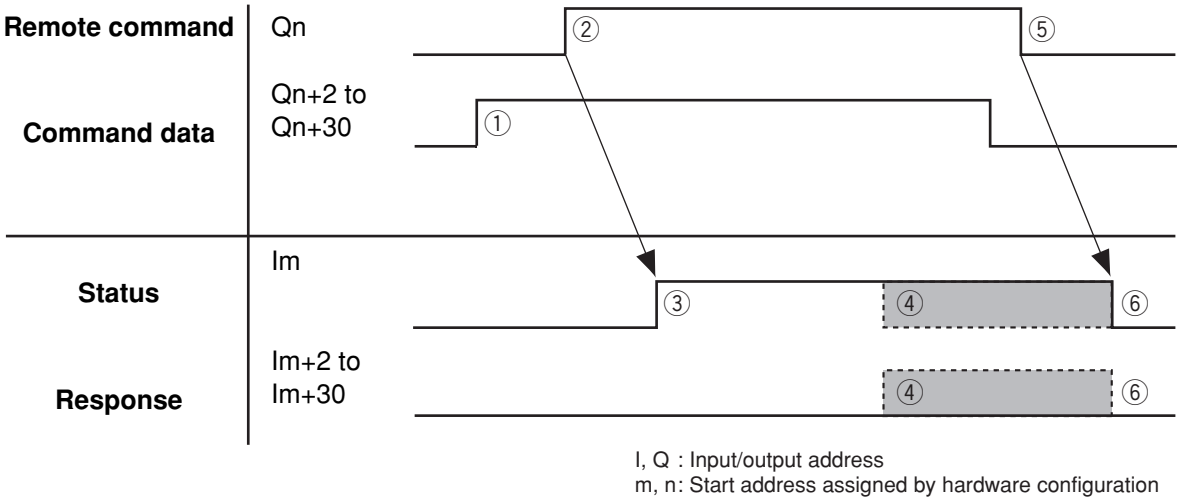
Here, d shows a detail value for the additional information.

* For example, 0x0C02 is set in Im+2 as the error code when the remote command was interrupted by an interlock signal.

* For information on the error code, refer to the error message section of the robot controller user's manual.

2. Sending and receiving remote commands

Remote register transmit and receive is performed as follows.



NOTE

Remote commands must be held until the status changes to a normal end (0x0200) or an abnormal end (0x4000). If a remote command is changed before the status changes to an end, the status of the remote command executed will not be reflected.

1- Command data setting
2- Remote command setting
3- Status shifts to command run status (0x0100).
(If the command is quickly executed, status may sometimes shift to normal end status (0x0200) without changing to command run status (0x0100).)
4- Shifts to response change and normal end status (0x0200) or to abnormal end status (0x4000).
5- Status reset command (0x0000) setting
6- Status and response shifts to command ready status.

Example: Typical transmit/receive when running a PTP movement command (all axes, program speed 50%) to point 19 is shown below.

1- To run the PTP movement command for the designated point, enter the value in the registers shown below.

Qn+2 : command flag (0x0004 = speed setting)
Qn+6 : speed setting (0x0032=50%)
Qn+8 : point setting (0x0013= point 19)

2- Enter the PTP movement command (0x0001) for the designated point into the Qn.

3- The robot controller receives the remote command and starts running it if the command code and command data can be executed. Status now shifts to command run status (0x0100). The robot moves to the position designated as point 19 at the program speed (50% of normal speed). If the command cannot be executed, status shifts to abnormal end status (0x4000) and Im+2 changes to an error code.

4- When finished executing the remote command, status changes to normal end status (0x0200). Response information is changed at the same time if present.

5- The current remote command has now finished, so set the status reset command (0x0000) in Qn in order to issue the next command.

6- The status and response shift to command ready status (0x0000).

3. Remote command & remote status tables

Remote commands and remote status codes are shown in hexadecimal notation.

- **Remote Command**

Command contents		Meaning
Category	Qn	
Special	0x0000	Status reset command
	0x8000	Main robot current position reference command
	0x4000	*Sub robot current position reference command
1	0x00nn	Movement command and associated command (including commands supported with IO command)
2	0x01nn	Definition and reference command
3	0x02nn	Arithmetic command
4	0x03nn	I/O port command
5	0x04nn	Key operation command
6	0x05nn	Data handling command

Q : Output address
n : Start address assigned by hardware configuration

* Sub robot not used in OMRON version.

* nn is determined by the particular remote command.

- **Remote Status**

Status contents				Meaning
Im	Im+2	Im+4	From Im+6	
0x0000	0x0000			Command ready status
0x0100	0x0000 or response data			Command run status
0x0200	Response data			Normal end status
0x4000	Error code	Additional information	0x0000	Abnormal end status

I : Input address
m : Start address assigned by hardware configuration

- **Category 1**

No.	Command contents			Command code (Qn)	
				Main robot	Sub robot*
1-1	MOVE command	PTP point designation		0x0001	0x0081
		Arch designation		0x0002	0x0082
		Linear interpolation		0x0003	0x0083
		Circular interpolation		0x0004	0x0084
		Direct PTP designation	Millimeter units	0x0006	0x0086
			Pulse units	0x0007	0x0087
1-2	MOVEI command	PTP point designation		0x0009	0x0089
		Direct PTP designation	Millimeter units	0x000E	0x008E
			Pulse units	0x000F	0x008F
1-3	DRIVE command	Point designation		0x0010	0x0090
		Direct designation	Millimeter units	0x0012	0x0092
			Pulse units	0x0013	0x0093
1-4	DRIVEI command	Point designation		0x0014	0x0094
		Direct designation	Millimeter units	0x0016	0x0096
			Pulse units	0x0017	0x0097
1-5	Pallet command	PTP designation		0x0018	0x0098
		Arch designation		0x0019	0x0099
1-6	Jog movement command			0x0020	0x00A0
1-7	Inching movement command			0x0024	0x00A4
1-8	Point teaching command			0x0028	0x00A8
1-9	Absolute reset movement command			0x0030	0x00B0
1-10	Absolute reset command			0x0031	0x00B1
1-11	Return-to-origin command			0x0032	0x00B2
1-12	Servo command	On designation		0x0034	0x00B4
		Off designation		0x0035	0x00B5
		Free designation		0x0036	0x00B6
		Power-on designation		0x0037	
1-13	Manual speed change command			0x0038	0x00B8
1-14	Automatic speed change command			0x0039	0x00B9
1-15	Program speed change command			0x003A	0x00BA
1-16	Shift designation change command			0x003B	0x00BB
1-17	Hand designation change command			0x003C	0x00BC
1-18	Arm designation change command			0x003D	0x00BD
1-19	Point display unit designation command			0x003E	

* Sub robot not used in OMRON version.

* The DRIVE command (1-3) and DRIVEI command (1-4) are only valid for a single axis.
* The movement methods on the jog movement command (1-6) and inching movement command (1-7) will differ according to the point units that were specified.
* Point units for the point teaching command (1-8) will differ according to the point units that were specified.
* If no axis is specified, the absolute reset command (1-10) is executed on all axes (main robot + sub robot) in either case of command code 0x0031 or 0x00B1.
* If no axis is specified, the return-to-origin command (1-11) is executed on all axes (main robot + sub robot) in either case of command code 0x0032 or 0x00B2.
* The point unit designation command (1-19) is for use on the controller.

- **Category 2**

No.	Command contents			Command code (Qn)
2-1	Point-related command	Point data definition		0x0100
		Point data reference		0x0101
2-2	Point comment-related command	Point comment data definition		0x0104
		Point comment data reference		0x0105
2-3	Pallet-related command	Pallet data definition		0x0108
		Pallet data reference		0x0109
2-4	Shift-related command	Shift data definition		0x010C
		Shift data reference		0x010D
2-5	Hand-related command	Hand data definition	Main robot	0x0110
			Sub robot*	0x0190
		Hand data reference		0x0111

* Sub robot not used in OMRON version.

- **Category 3**

No.	Command contents			Command code (Qn)
3-1	Static variable-related commands	Assignment	Value	0x0200
			Variable	0x0201
		Addition	Value	0x0204
			Variable	0x0205
		Subtraction	Value	0x0208
			Variable	0x0209
		Multiplication	Value	0x020C
			Variable	0x020D
		Division	Value	0x0210
			Variable	0x0211
		Reference	Variable	0x0214
3-2	Parameter-related command	Assignment	Main robot	0x0220
			Sub robot*	0x02A0
		Reference	Main robot	0x0224
			Sub robot*	0x02B4
3-3	Point-related command	Point assignment		0x0230
		Addition		0x0234
		Subtraction		0x0235
		Pallet point assignment		0x0238
3-4	Element assignment command	Point element assignmen	"x1" input format	0x0240
			"x100" input format	0x0241
		Shift element assignment	"x100" input format	0x0245

* Sub robot not used in OMRON version.

- **Category 4**

No.	Command contents			Command code (Qn)
4-1	I/O port-related commands	Assignment	Port units	0x0300
			Bit units	0x0301
		Reference	Port units	0x0304

- **Category 5**

No.	Command contents		Command code (Qn)
5-1	Execution program designation		0x0401
5-2	Program execution	Program execution	0x0402
		Program step execution	0x0403
		Program skip execution	0x0404
		Program next execution	0x0405
5-3	Program reset		0x0406
5-4	Program task switching		0x0407
5-5	Program execution information reference		0x0408

- **Category 6**

No.	Command contents			Command code (Qn)
6-1	Version information reference			0x0501
6-2	Controller configuration reference			0x0502
6-3	Servo status reference			0x0503
6-4	Absolute reset status reference			0x0504
6-5	Current position reference	Pulse units	Main robot	0x0505
			Sub robot*	0x0585
		Millimeter units	Main robot	0x0506
			Sub robot*	0x0586
6-6	Task status reference			0x0507
6-7	Task execution reference			0x0508
6-8	Message reference			0x0509
6-9	Speed status reference			0x050A
6-10	Arm designation status reference			0x050B
6-11	Arm status reference			0x050C
6-12	Service mode status reference			0x050D
6-13	Point unit status reference			0x050E
6-14	Return-to-origin status reference			0x050F

* Sub robot not used in OMRON version.

4. Remote command information

4.1 Special commands

Special commands are used in applications different from other remote commands.
A list of those commands is shown below.

No.	Command contents	Command code (Qn)
1	Status reset command	0x0000
2	Main robot current position reference command	0x8000
3	*Sub robot current position reference command	0x4000

* Sub robot not used in OMRON version.

4.1.1 Status reset command

This command is executed to set the status to command ready status (0x0000).
Remote commands cannot be executed unless in command ready status (0x0000). Therefore after executing a remote command, this command must always be executed before running the next command.

- **Command**

Address	Contents	Value
Qn	Command code	0x0000
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Address	Contents	Value
Im	Status code	0x0000
Im+2	Response	
to		
Im+30		

4.1.2 Main robot current position reference command

Execute this command to obtain the main robot current position data.
This command returns normal end status (0x0200) as the status code, but continually executes the main robot current position reference command until the status reset command is run. Units for the current position obtained at this time are the same as the point unit system of the controller.
This command is useful when constantly monitoring the main robot current position.

- **Command**

Address	Contents	Value
Qn	Command code	0x8000
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for the current position data obtained. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the data in 32 bits. (little endian)
Data is shown in integers when units are in pulses.
Data is shown in integers (x100) when units are in millimeters.

Example:
Values are expressed as shown at right when controller display units are in millimeters and with:
Axis 1 = 200.01
Axis 3 = -123.45
Other axes = 0.00

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0001
Im+8	0x4E21
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0xCFC7
Im+18	0xFFFF
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.1.3 *Sub robot current position reference command

Execute this command to obtain the sub robot current position data.
This command returns normal end status (0x0200) as the status code, but continually executes the sub robot current position reference command until the status reset command is run. Units for the current position obtained at this time are the same as the point unit system of the controller.
This command is valid when constantly monitoring the sub robot current position.

* Sub robot not used in OMRON version.

- **Command**

Address	Contents	Value
Qn	Command code	0x4000
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for the current position data obtained. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the data in 32 bits. (little endian)
Data is shown in integers when units are in pulses.
Data is shown in integers (x100) when units are in millimeters.

Example:
Values are expressed as shown at right when controller display units are in pulses and with:

Axis 1 = 123456
Axis 2 = -123
Other axes = 0

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0xE240
Im+10	0x0001
Im+12	0xFF85
Im+14	0xFFFF
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2 Category 1 remote commands

These are remote commands mainly for movement commands. A list of these commands is shown below.

No.	Command contents			Command code (Qn)	
				Main robot	Sub robot*
1	MOVE command	PTP point designation		0x0001	0x0081
		Arch designation		0x0002	0x0082
		Linear interpolation		0x0003	0x0083
		Circular interpolation		0x0004	0x0084
		Direct PTP designation	Millimeter units	0x0006	0x0086
			Pulse units	0x0007	0x0087
2	MOVEI command	PTP point designation		0x0009	0x0089
		Direct PTP designation	Millimeter units	0x000E	0x008E
			Pulse units	0x000F	0x008F
3	DRIVE command	Point designation		0x0010	0x0090
		Direct designation	Millimeter units	0x0012	0x0092
			Pulse units	0x0013	0x0093
4	DRIVEI command	Point designation		0x0014	0x0094
		Direct designation	Millimeter units	0x0016	0x0096
			Pulse units	0x0017	0x0097
5	Pallet command	PTP designation		0x0018	0x0098
		Arch designation		0x0019	0x0099
6	Jog movement command			0x0020	0x00A0
7	Inching movement command			0x0024	0x00A4
8	Point teaching command			0x0028	0x00A8
9	Absolute reset movement command			0x0030	0x00B0
10	Absolute reset command			0x0031	0x00B1
11	Return-to-origin command			0x0032	0x00B2
12	Servo command	On designation		0x0034	0x00B4
		Off designation		0x0035	0x00B5
		Free designation		0x0036	0x00B6
		Power-on designation		0x0037	
13	Manual speed change command			0x0038	0x00B8
14	Automatic speed change command			0x0039	0x00B9
15	Program speed change command			0x003A	0x00BA
16	Shift designation change command			0x003B	0x00BB
17	Hand designation change command			0x003C	0x00BC
18	Arm designation change command			0x003D	0x00BD
19	Point display unit designation command			0x003E	

I, Q : Input/output address
m, n : Start address assigned by hardware configuration

* Sub robot not used in OMRON version.
* The DRIVE command (3) and DRIVEI command (4) are only valid for a single axis.
* The movement methods on the jog movement command (6) and inching movement command (7) will differ according to the point units that were specified.
* Point units for the point teaching command (8) will differ according to the point units that were specified.
* If no axis is specified, the absolute reset command (10) is executed on all axes (main robot + sub robot) in either case of command code 0x0031 or 0x00B1.
* If no axis is specified, the return-to-origin command (11) is executed on all axes (main robot + sub robot) in either case of command code 0x0032 or 0x00B2.
* The point unit designation command (19) is for use on the controller.

4.2.1 MOVE command

Execute this command group to move the robot to an absolute position.

4.2.1.1 PTP designation

This command moves the robot to a target position in PTP motion by specifying the point number.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0001
			For sub robot*	0x0081
Qn+2	Command flag	bit 0	Axis designation flag	a
		bit 2−bit 1	Speed designation flag	bb
		bit 14−bit 3	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Point numbe			0xpppp
Qn+10 to Qn+30	Not used			0x0000

* Sub robot not used in OMRON version.

a : Specify in 1 bit whether all axes are designated.

Value	Meaning
0	All axes are specified.
1	One or more axes are specified.

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits. Valid when axis designation flag is 1.

ssss : Specify the movement speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppp : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the MOVE command with PTP designation as shown at right, when moving all axes of the main robot to point number 100 at 50% speed. The current position output is specified at this time.

Address	Value
Qn	0x0001
Qn+2	0x8004
Qn+4	0x0000
Qn+6	0x0032
Qn+8	0x0064
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when controller display units are in pulses and with:

Axis 1 = 123456
Axis 2 = -123
Other axes = 0

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0xE240
Im+10	0x0001
Im+12	0xFF85
Im+14	0xFFFF
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.1.2 Arch designation

This command moves the robot to a target position in arch motion by specifying the point number, arch axis and arch data.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0002
			For sub robot*	0x0082
Qn+2	Command flag	bit 0	Axis designation flag	a
		bit 2−bit 1	Speed designation flag	bb
		bit 3	(0:Fixed)	0
		bit 4	Arch data unit flag	d
		bit 14−bit 5	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0xuutt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 7−bit 4	(0:Fixed)	
	Arch designation axis	bit 8	Axis 1	
		bit 9	Axis 2	
		bit 10	Axis 3	
		bit 11	Axis 4	
		bit 15−bit 12	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Point number			0xpppp
Qn+10	Not used			0x0000
Qn+12				
Qn+14				
Qn+16	Arch position data			0xqqqqqqqq
Qn+18				
Qn+20	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

a : Specify in 1 bit how to designate axis.

Value	Meaning
0	All axes are specified.
1	One or more axes are specified.

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

d : Specify the arch data units in 1 bit.

Value	Meaning
0	Pulse units
1	Millimeter units

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits.
Valid when axis designation flag is 1.

uu : Specify the arch motion axis in bit pattern using upper 8 bits. Specified arch axis is one axis only.

ssss : Specify the speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppp : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

qqqqqqqq : Specify the arch position in 32 bits. (little endian)
Data should be integers when units are in pulses.
Data should be integers (x100) when units are in millimeters.

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Spmecify the MOVE command with arch designation as shown at right, when moving all axes of the main robot to point number 100 at 50% speed by way of a Z-axis arch position of 10.00mm. The current position output is specified at this time.

Address	Value
Qn	0x0002
Qn+2	0x8014
Qn+4	0x0400
Qn+6	0x0032
Qn+8	0x0064
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x03E8
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when controller display units are in millimeters and with:

Axis 1 = 123.45
Axis 2 = -1.23
Axis 3 = 50.00
Axis 4 = 90.23
Other axes = 0.00

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0001
Im+8	0x3039
Im+10	0x0000
Im+12	0xFF85
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0x233F
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.1.3 Linear interpolation

This command moves the robot to a target position by linear interpolation by specifying the point number.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0003
			For sub robot*	0x0083
Qn+2	Command flag	bit 0	(0:Fixed)	0
		bit 2−bit 1	Speed designation flag	bb
		bit 4−bit 3	(0:Fixed)	0
		bit 5	Acceleration designation flag	d
		bit 6	Deceleration designation flag	e
		bit 14−bit 7	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Not used			0x0000
Qn+6	Specified speed			0xssss
Qn+8	Point number			0xpppp
Qn+10 to Qn+18	Not used			0x0000
Qn+20	Acceleration designation			0xrrrr
Qn+22	Deceleration designation			0xrrrr
Qn+24 to Qn+30	Not used			0x0000

* Sub robot not used in OMRON version

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.
11	Speed is specified in mm/s.

d : Specify in 1 bit whether to set acceleration.

Value	Meaning
0	Acceleration is not specified.
1	Acceleration is specified.

e : Specify in 1 bit whether to set deceleration.

Value	Meaning
0	Deceleration is not specified.
1	Deceleration is specified.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

ssss : Specify the speed in 16 bits.
Specified range: Speed % : 1 (=0x0001) to 100 (=0x0064)
Specified speed in mm/s : 1 (=0x0001) to 1000 (=0x03E8)

pppp : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

rrrr : Specify the acceleration and deceleration in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the MOVE command with linear interpolation as shown at right, when moving all axes of the main robot to point number 100 at a speed of 200 mm/s and at 50% acceleration. The current position output is specified at this time.

Address	Value
Qn	0x0003
Qn+2	0x8026
Qn+4	0x0000
Qn+6	0x00C8
Qn+8	0x0064
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0032
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when controller display units are in millimeters and with:

Axis 1 = 123.45
Axis 2 = -1.23
Axis 3 = 50.00
Axis 4 = 90.23
Other axes = 0.00

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0001
Im+8	0x3039
Im+10	0x0000
Im+12	0xFF85
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0x233F
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.1.4 Circular interpolation

This command moves the robot to a target position by circular interpolation by specifying two point numbers.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0004
			For sub robot*	0x0084
Qn+2	Command flag	bit 0	(0:Fixed)	0
		bit 2−bit 1	Speed designation flag	bb
		bit 4−bit 3	(0:Fixed)	0
		bit 5	Acceleration designation flag	d
		bit 6	Deceleration designation flag	e
		bit 14−bit 7	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Not used			0x0000
Qn+6	Specified speed			0xssss
Qn+8	First point number			0xpppp
Qn+10	Second point number			0xpppp
Qn+12 to Qn+18	Not used			0x0000
Qn+20	Acceleration designation			0xrrrr
Qn+22	Deceleration designation			0xrrrr
Qn+24 to Qn+30	Not used			0x0000

* Sub robot not used in OMRON version

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.
11	Speed is specified in mm/s.

d : Specify in 1 bit whether to set acceleration.

Value	Meaning
0	Acceleration is not specified.
1	Acceleration is specified.

e : Specifies in 1 bit whether to set deceleration.

Value	Meaning
0	Deceleration is not specified.
1	Deceleration is specified.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

ssss : Specify the speed in 16 bits.
Specified range: Speed % : 1 (=0x0001) to 100 (=0x0064)
Specified speed in mm/s : 1 (=0x0001) to 1000 (=0x03E8)

pppp : Specify the first and second point numbers in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

rrrr : Specify the acceleration and deceleration in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the MOVE command with circular interpolation as shown at right, when moving all axes of the main robot to point numbers 100 and 101 at 20% speed and 50% deceleration. The current position output is specified at this time.

Address	Value
Qn	0x0004
Qn+2	0x8044
Qn+4	0x0000
Qn+6	0x0014
Qn+8	0x0064
Qn+10	0x0065
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0032
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when controller display units are in millimeters and with:

Axis 1 = 123.45
Axis 2 = -1.23
Axis 3 = 50.00
Axis 4 = 90.23
Other axes = 0.00

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0001
Im+8	0x3039
Im+10	0x0000
Im+12	0xFF85
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0x233F
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.1.5 Direct PTP designation (millimeter units)

This command moves the robot to a target position in PTP motion by directly specifying the data in millimeters.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0006
			For sub robot*	0x0086
Qn+2	Command flag	bit 0	Axis designation flag	a
		bit 2−bit 1	Speed designation flag	bb
		bit 14−bit 3	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Axis-1 data			0xpppppppp
Qn+10				
Qn+12	Axis-2 data			0xpppppppp
Qn+14				
Qn+16	Axis-3 data			0xpppppppp
Qn+18				
Qn+20	Axis-4 data			0xpppppppp
Qn+22				
Qn+24	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

a : Specify in 1 bit whether all axes are designated.

Value	Meaning
0	All axes are specified.
1	One or more axes are specified.

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits. Valid when axis designation flag is 1.

ssss : Specify the speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppppppp : Specify the target position data for each axis in 32 bits. (little endian)
Data should be integers (x100) in millimeter units.

CAUTION

DO NOT TRY TO SPECIFY ONLY AXIS 4 TO MOVE ON SCARA ROBOTS. ATTEMPTING TO SPECIFY ONLY AXIS 4 WILL CAUSE A "5.38: ILLEGAL OPTION". WHEN SPECIFYING AXIS 4, THEN ALSO SPECIFY AXIS 1 AND AXIS 2 AT THE SAME TIME.

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the MOVE command with direct PTP designation (millimeter units) as shown at right, when moving all axes of the main robot to the following points at 50% speed.

Axis 1 = 100.00
Axis 2 = -200.00
Axis 3 = 50.00
Axis 4 = -180.00
Other axes = 0.00

The current position output is specified at this time.

Address	Value
Qn	0x0006
Qn+2	0x8004
Qn+4	0x0000
Qn+6	0x0032
Qn+8	0x2710
Qn+10	0x0000
Qn+12	0xB1E0
Qn+14	0xFFFF
Qn+16	0x1388
Qn+18	0x0000
Qn+20	0xB9B0
Qn+22	0xFFFF
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right, when controller display units are in millimeters.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0001
Im+8	0x2710
Im+10	0x0000
Im+12	0xB1E0
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0xB9B0
Im+22	0xFFFF
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.1.6 Direct PTP designation (pulse units)

This command moves the robot to a target position in PTP motion by directly specifying the data in pulses.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0007
			For sub robot*	0x0087
Qn+2	Command flag	bit 0	Axis designation flag	a
		bit 2−bit 1	Speed designation flag	bb
		bit 14−bit 3	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Axis-1 data			0xpppppppp
Qn+10				
Qn+12	Axis-2 data			0xpppppppp
Qn+14				
Qn+16	Axis-3 data			0xpppppppp
Qn+18				
Qn+20	Axis-4 data			0xpppppppp
Qn+22				
Qn+24	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

a : Specify in 1 bit whether all axes are designated.

Value	Meaning
0	All axes are specified.
1	One or more axes are specified.

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits. Valid when axis designation flag is 1.

ssss : Specify the speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppppppp : Specify the target position data for each axis in 32 bits.
(little endian)
Data should be integers in pulse units.

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the MOVE command with direct designation PTP (pulse units) as shown at right, when moving all axes of the main robot to the following points at 50% speed.

Axis 1 = 100000
Axis 2 = -200000
Axis 3 = 50000
Axis 4 = -180000
Other axes = 0

The current position output is specified at this time.

Address	Value
Qn	0x0007
Qn+2	0x8004
Qn+4	0x0000
Qn+6	0x0032
Qn+8	0x86A0
Qn+10	0x0001
Qn+12	0xF2C0
Qn+14	0xFFFC
Qn+16	0xC350
Qn+18	0x0000
Qn+20	0x40E0
Qn+22	0xFFFD
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right, when controller display units are in pulses.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x86A0
Im+10	0x0001
Im+12	0xF2C0
Im+14	0xFFFC
Im+16	0xC350
Im+18	0x0000
Im+20	0x40E0
Im+22	0xFFFD
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.2 MOVEI command

Execute this command group to move the robot to a relative position.

4.2.2.1 PTP designation

This command moves the robot a specified distance in PTP motion by specifying the point number.

NOTE

• The other parameters default "MOVEI/DRIVEI start position" setting is Keep (motion to the original target position when MOVEI is interrupted and then re-executed).

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0009
			For sub robot*	0x0089
Qn+2	Command flag	bit 0	Axis designation flag	a
		bit 2−bit 1	Speed designation flag	bb
		bit 14−bit 3	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Point number			0xpppp
Qn+10 to Qn+30	Not used			0x0000

* Sub robot not used in OMRON version

a :Specify in 1 bit whether all axes are designated.

Value	Meaning
0	All axes are specified.
1	One or more axes are specified.

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits. Valid when axis designation flag is 1.

ssss : Specify the movement speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppp : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the MOVEI command with PTP designation as shown at right, when moving all axes of the main robot a distance specified by point number 100 at 50% speed. The current position output is specified at this time.

Address	Value
Qn	0x0009
Qn+2	0x8004
Qn+4	0x0000
Qn+6	0x0032
Qn+8	0x0064
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when controller display units are in pulses and with:

Axis 1 = 123456
Axis 2 = -123
Other axes = 0

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0xE240
Im+10	0x0001
Im+12	0xFF85
Im+14	0xFFFF
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.2.2 Direct PTP designation (millimeter units)

This command moves the robot a specified data distance in PTP motion by directly specifying the data in millimeters.

NOTE

• The other parameters default "MOVEI/DRIVEI start position" setting is Keep (motion to the original target position when MOVEI is interrupted and then re-executed).

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x000E
			For sub robot*	0x008E
Qn+2	Command flag	bit 0	Axis designation flag	a
		bit 2−bit 1	Speed designation flag	bb
		bit 14−bit 3	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Axis-1 data			0xpppppppp
Qn+10				
Qn+12	Axis-2 data			0xpppppppp
Qn+14				
Qn+16	Axis-3 data			0xpppppppp
Qn+18				
Qn+20	Axis-4 data			0xpppppppp
Qn+22				
Qn+24	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

a : Specify in 1 bit whether all axes are designated.

Value	Meaning
0	All axes are specified.
1	One or more axes are specified.

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits. Valid when axis designation flag is 1.

ssss : Specify the speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppppppp : Specify the target movement distance data for each axis in 32 bits. (little endian)
Data should be integers (x100) in millimeter units.

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the MOVEI command with direct PTP designation (millimeter units) as shown at right, when moving all axes of the main robot a distance specified by the following points from "0.00" mm positions at 50% speed.

Axis 1 = 100.00
Axis 2 = -200.00
Axis 3 = 50.00
Axis 4 = -180.00
Other axes = 0.00

The current position output is specified at this time.

Address	Value
Qn	0x000E
Qn+2	0x8004
Qn+4	0x0000
Qn+6	0x0032
Qn+8	0x2710
Qn+10	0x0000
Qn+12	0xB1E0
Qn+14	0xFFFF
Qn+16	0x1388
Qn+18	0x0000
Qn+20	0xB9B0
Qn+22	0xFFFF
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right, when controller display units are in millimeters.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0001
Im+8	0x2710
Im+10	0x0000
Im+12	0xB1E0
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0xB9B0
Im+22	0xFFFF
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.2.3 Direct PTP designation (pulse units)

This command moves the robot a specified data distance in PTP motion by directly specifying the data in pulses.

NOTE

• The other parameters default "MOVEI/DRIVEI start position" setting is Keep (motion to the original target position when MOVEI is interrupted and then re-executed).

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x000F
			For sub robot*	0x008F
Qn+2	Command flag	bit 0	Axis designation flag	a
		bit 2−bit 1	Speed designation flag	bb
		bit 14−bit 3	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Axis-1 data			0xpppppppp
Qn+10				
Qn+12	Axis-2 data			0xpppppppp
Qn+14				
Qn+16	Axis-3 data			0xpppppppp
Qn+18				
Qn+20	Axis-4 data			0xpppppppp
Qn+22				
Qn+24	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

a : Specify in 1 bit whether all axes are designated.

Value	Meaning
0	All axes are specified.
1	One or more axes are specified.

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits. Valid when axis designation flag is 1.

ssss : Specify the speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppppppp : Specify the target movement distance data for each axis in 32 bits. (little endian)
Data should be integers in pulse units.

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the MOVEI command with direct PTP designation (millimeter units) as shown at right, when moving all axes of the main robot a distance specified by the following points from "0" pulse positions at 50% speed.

Axis 1 = 100000
Axis 2 = -200000
Axis 3 = 50000
Axis 4 = -180000
Other axes = 0

The current position output is specified at this time.

Address	Value
Qn	0x000F
Qn+2	0x8004
Qn+4	0x0000
Qn+6	0x0032
Qn+8	0x86A0
Qn+10	0x0001
Qn+12	0xF2C0
Qn+14	0xFFFC
Qn+16	0xC350
Qn+18	0x0000
Qn+20	0x40E0
Qn+22	0xFFFD
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right, when controller display units are in millimeters.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x86A0
Im+10	0x0001
Im+12	0xF2C0
Im+14	0xFFFC
Im+16	0xC350
Im+18	0x0000
Im+20	0x40E0
Im+22	0xFFFD
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.3 DRIVE command

Execute this command group to move the specified axis of the robot to an absolute position. Valid only for a single axis.

4.2.3.1 Point designation

This command moves the specified axis of the robot to a target position in PTP motion by specifying the point number.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0010
			For sub robot*	0x0090
Qn+2	Command flag	bit 0	(1:Fixed)	1
		bit 2−bit 1	Speed designation flag	bb
		bit 6−bit 3	(0:Fixed)	0
		bit 7	Torque limit designation flag	h
		bit 14−bit 8	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Point number			0xpppp
Qn+10 to Qn+14	Not used			0x0000
Qn+16	Specified torque			0xqqqq
Qn+18 to Qn+30	Not used			0x0000

* Sub robot not used in OMRON version

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

h : Specify in 1 bit whether to use torque limit.

Value	Meaning
0	Torque limit is not specified.
1	Torque limit is specified.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits. Only one axis can be specified.

ssss : Specify the movement speed in 16 bits.
Specified range: 1 (= 0x0001) to 100 (=0x0064)

pppp : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

qqqq : Specify the percentage of rated torque in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

CAUTION

- THE AXIS HAS REACHED THE TARGET POSITION WHEN THE TIME REQUIRED TO MOVE TO THE TARGET POSITION HAS ELAPSED.
- THE AXIS TORQUE HAS ALREADY REACHED THE SPECIFIED TORQUE VALUE FOR MORE THAN 1 SECOND WHEN THE TIME REQUIRED TO MOVE TO THE TARGET POSITION HAS ELAPSED.
- THE TORQUE HAS REACHED THE SPECIFIED TORQUE VALUE WHEN THE TIME REQUIRED TO MOVE TO THE TARGET POSITION HAS ELAPSED, AND THIS CONDITION HAS CONTINUED FOR 1 SECOND.
- THIS COMMAND CANNOT USE A TORQUE OFFSET VALUE.

NOTE

Refer to the programming manual for detailed information on the TRQTIME statement of the robot language.

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the DRIVE command with point designation as shown at right, to move axis 3 of the main robot to point number 100 at 50% speed. The current position output is specified at this time.

Address	Value
Qn	0x0010
Qn+2	0x8005
Qn+4	0x0004
Qn+6	0x0032
Qn+8	0x0064
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right, when controller display units are in pulses and with:

Axis 1 = 123456
Axis 2 = -123
Other axes = 0

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0xE240
Im+10	0x0001
Im+12	0xFF85
Im+14	0xFFFF
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.3.2 Direct designation (millimeter units)

This command moves the specified axis of the robot to a target position in PTP motion by directly specifying the data in millimeters.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0012
			For sub robot*	0x0092
Qn+2	Command flag	bit 0	(1:Fixed)	1
		bit 2−bit 1	Speed designation flag	bb
		bit 6−bit 3	(0:Fixed)	0
		bit 7	Torque limit designation flag	h
		bit 14−bit 8	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Movement data			0xpppppppp
Qn+10				
Qn+12	Not used			0x0000
Qn+14				
Qn+16	Not used			0xqqqq
Qn+18	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

h : Specify in 1 bit whether to use torque limit.

Value	Meaning
0	Torque limit is not specified.
1	Torque limit is specified.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits. Only one axis can be specified.

ssss : Specify the movement speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppppppp : Specify target position data for specified axis in 32 bits.
(little endian)
Data should be integers (x 100) in millimeter units.

qqqq : Specify the percentage of rated torque in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

CAUTION

- THE AXIS HAS REACHED THE TARGET POSITION WHEN THE TIME REQUIRED TO MOVE TO THE TARGET POSITION HAS ELAPSED.
- THE AXIS TORQUE HAS ALREADY REACHED THE SPECIFIED TORQUE VALUE FOR MORE THAN 1 SECOND WHEN THE TIME REQUIRED TO MOVE TO THE TARGET POSITION HAS ELAPSED.
- THE TORQUE HAS REACHED THE SPECIFIED TORQUE VALUE WHEN THE TIME REQUIRED TO MOVE TO THE TARGET POSITION HAS ELAPSED, AND THIS CONDITION HAS CONTINUED FOR 1 SECOND.
- THIS COMMAND CANNOT USE A TORQUE OFFSET VALUE.

NOTE

Refer to the programming manual for detailed information on the TRQTIME statement of the robot language.

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the DRIVE command with direct designation (millimeter units) as shown at right, to move axis 3 of the main robot to a position of "50.00" at 50% speed. The current position output is specified at this time.

Address	Value
Qn	0x0012
Qn+2	0x8005
Qn+4	0x0004
Qn+6	0x0032
Qn+8	0x1388
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when controller display units are in millimeters and with:

Axis 1 = 100.00
Axis 2 = -200.00
Axis 3 = 50.00
Axis 4 = -180.00
Other axes = 0.00

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0001
Im+8	0x2710
Im+10	0x0000
Im+12	0xB1E0
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0xB9B0
Im+22	0xFFFF
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.3.3 Direct designation (pulse units)

This command moves the specified axis of the robot to a target position in PTP motion by directly specifying the data in pulses.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0013
			For sub robot*	0x0093
Qn+2	Command flag	bit 0	(1:Fixed)	1
		bit 2−bit 1	Speed designation flag	bb
		bit 6−bit 3	(0:Fixed)	0
		bit 7	Torque limit designation flag	h
		bit 14−bit 8	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Movement data			0xpppppppp
Qn+10				
Qn+12	Not used			0x0000
Qn+14				
Qn+16	Specified torque			0xqqqq
Qn+18	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

h : Specify in 1 bit whether to use torque limit.

Value	Meaning
0	Torque limit is not specified.
1	Torque limit is specified.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits. Only one axis can be specified.

ssss : Specify the movement speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppppppp : Specify the target position data for specified axis in 32 bits. (little endian)
Data should be integers in pulse units.

qqqq : Specify the percentage of rated torque in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

CAUTION

- THE AXIS HAS REACHED THE TARGET POSITION WHEN THE TIME REQUIRED TO MOVE TO THE TARGET POSITION HAS ELAPSED.
- THE AXIS TORQUE HAS ALREADY REACHED THE SPECIFIED TORQUE VALUE FOR MORE THAN 1 SECOND WHEN THE TIME REQUIRED TO MOVE TO THE TARGET POSITION HAS ELAPSED.
- THE TORQUE HAS REACHED THE SPECIFIED TORQUE VALUE WHEN THE TIME REQUIRED TO MOVE TO THE TARGET POSITION HAS ELAPSED, AND THIS CONDITION HAS CONTINUED FOR 1 SECOND.
- THIS COMMAND CANNOT USE A TORQUE OFFSET VALUE.

NOTE

Refer to the programming manual for detailed information on the TRQTIME statement of the robot language.

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the DRIVE command with direct designation (pulse units) as shown at right, to move axis 3 of the main robot to a position of "5000" pulses at 50% speed. The current position output is specified at this time.

Address	Value
Qn	0x0013
Qn+2	0x8005
Qn+4	0x0004
Qn+6	0x0032
Qn+8	0x1388
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when controller display units are in pulses and with:

Axis 1 = 10000
Axis 2 = -20000
Axis 3 = 5000
Axis 4 = -18000
Other axes = 0

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x2710
Im+10	0x0000
Im+12	0xB1E0
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0xB9B0
Im+22	0xFFFF
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.4 DRIVEI command

Execute this command group to move the specified axis of the robot to a relative position. Valid only for a single axis.

4.2.4.1 Point designation

This command moves the specified axis of the robot in PTP motion a distance by specifying the point number.

NOTE

• The other parameters default "MOVEI/DRIVEI start position" setting is Keep (motion to the original target position when DRIVEI is interrupted and then re-executed).

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0014
			For sub robot*	0x0094
Qn+2	Command flag	bit 0	(1:Fixed)	1
		bit 2−bit 1	Speed designation flag	bb
		bit 14−bit 3	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Point number			0xpppp
Qn+10 to Qn+30	Not used			0x0000

* Sub robot not used in OMRON version

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits. Only one axis can be specified.

ssss : Specify the movement speed in 16 bits.
Specified range: 1 (= 0x0001) to 100 (=0x0064)

pppp : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the DRIVEI command with point designation as shown at right, to move axis 3 of the main robot a distance specified by point number 100 at 50% speed. The current position output is specified at this time.

Address	Value
Qn	0x0014
Qn+2	0x8005
Qn+4	0x0004
Qn+6	0x0032
Qn+8	0x0064
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when controller display units are in pulses and with:

Axis 1 = 123456
Axis 2 = -123
Other axes = 0

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0xE240
Im+10	0x0001
Im+12	0xFF85
Im+14	0xFFFF
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.4.2 Direct designation (millimeter units)

This command moves the specified axis of the robot in PTP motion a distance by directly specifying the data in millimeters.

NOTE
• The other parameters default "MOVEI/DRIVEI start position" setting is Keep (motion to the original target position when DRIVEI is interrupted and then re-executed).

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0016
			For sub robot*	0x0096
Qn+2	Command flag	bit 0	(1:Fixed)	1
		bit 2−bit 1	Speed designation flag	bb
		bit 14−bit 3	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Movement data			0xpppppppp
Qn+10				
Qn+12	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits. Only one axis can be specified.

ssss : Specify the speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppppppp : Specify the target movement distance data for specified axis in 32 bits. (little endian)
Data should be integers (x100) in millimeter units.

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the DRIVEI command with direct designation (millimeter units) as shown at right, to move axis 3 a distance equal to "50.00" from "0.00" position at 50% speed. The current position output is specified at this time.

Address	Value
Qn	0x0016
Qn+2	0x8005
Qn+4	0x0004
Qn+6	0x0032
Qn+8	0x1388
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when controller display units are in millimeters and with:

Axis 1 = 100.00
Axis 2 = -200.00
Axis 3 = 50.00
Axis 4 = -180.00
Other axes = 0.00

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0001
Im+8	0x2710
Im+10	0x0000
Im+12	0xB1E0
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0xB9B0
Im+22	0xFFFF
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.4.3 Direct designation (pulse units)

This command moves the specified axis of the robot in PTP motion a distance by directly specifying the data in pulses.

NOTE
• The other parameters default "MOVEI/DRIVEI start position" setting is Keep (motion to the original target position when DRIVEI is interrupted and then re-executed).

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0017
			For sub robot*	0x0097
Qn+2	Command flag	bit 0	(1:Fixed)	1
		bit 2−bit 1	Speed designation flag	bb
		bit 14−bit 3	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Specified axis to move	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Movement data			0xpppppppp
Qn+10				
Qn+12	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in bit pattern using lower 8 bits. Only one axis can be specified.

ssss : Specify the movement speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppppppp : Specify the target movement distance data for specified axis in 32 bits. (little endian)
Data should be integers in pulse units.

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the DRIVEI command with direct designation (pulse units) as shown at right, to move axis 3 a distance equal to "5000" pulses from "0" pulse position at 50% speed. The current position output is specified at this time.

Address	Value
Qn	0x0017
Qn+2	0x8005
Qn+4	0x0004
Qn+6	0x0032
Qn+8	0x1388
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when controller display units are in pulses and with:

Axis 1 = 10000
Axis 2 = -20000
Axis 3 = 5000
Axis 4 = -18000
Other axes = 0

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x2710
Im+10	0x0000
Im+12	0xB1E0
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0xB9B0
Im+22	0xFFFF
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.5 Pallet movement command

Execute this command group to move the robot to work positions on a pallet.

4.2.5.1 PTP designation

This command moves the robot to a target position in PTP motion by specifying the pallet number and work position number.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0018
			For sub robot*	0x0098
Qn+2	Command flag	bit 0	(0:Fixed)	0
		bit 2−bit 1	Speed designation flag	bb
		bit 14−bit 3	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Not used			0x0000
Qn+6	Specified speed			0xssss
Qn+8	Pallet number			0xpppp
Qn+10	Work position number			0xwwww
Qn+12	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

ssss : Specify the movement speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppp : Specify the pallet number in 16 bits.
Specified range: 0 (=0x0000) to 19 (=0x0013)

wwww : Specify the work position number in 16 bits.
Specified range: 1 (=0x0001) to 32767 (=0x7FFF)

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the PMOVE command with PTP designation as shown at right, when moving the main robot to work position number 21 on pallet number 1 at 70% speed. The current position output is specified at this time.

Address	Value
Qn	0x0018
Qn+2	0x8004
Qn+4	0x0000
Qn+6	0x0046
Qn+8	0x0001
Qn+10	0x0015
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when controller display units are in millimeters and with:

Axis 1 = 123.45
Axis 2 = -1.23
Axis 3 = 20.00
Other axes = 0.00

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0001
Im+8	0x3039
Im+10	0x0000
Im+12	0xFF85
Im+14	0xFFFF
Im+16	0x07D0
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.5.2 Arch designation

This command moves the robot to a target position in arch motion by specifying the pallet number, work position number, arch axis and arch data.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0019
			For sub robot*	0x0099
Qn+2	Command flag	bit 0	(0:Fixed)	0
		bit 2−bit 1	Speed designation flag	bb
		bit 3	(0:Fixed)	0
		bit 4	Arch data unit flag	d
		bit 14−bit 5	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Arch designation axis	bit 7−bit 0	(0:Fixed)	0xuu00
		bit 8	Axis 1	
		bit 9	Axis 2	
		bit 10	Axis 3	
		bit 11	Axis 4	
		bit 15−bit 12	(0:Fixed)	
Qn+6	Specified speed			0xssss
Qn+8	Pallet number			0xpppp
Qn+10	Work position number			0xwwww
Qn+12	Not used			0x0000
Qn+14				
Qn+16	Arch position data			0xqqqqqqqq
Qn+18				
Qn+20	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

bb : Specify the speed setting method in 2 bits.

Value	Meaning
00	Speed is not specified.
10	Speed is set in %.

d : Specify the arch data units in 1 bit.

Value	Meaning
0	Pulse units
1	Millimeter units

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

uu : Specify the arch motion axis in bit pattern using upper 8 bits. Specified arch axis is one axis only.

ssss : Specify the speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

pppp : Specify the pallet number in 16 bits.
Specified range: 0 (=0x0000) to 19 (=0x0013)

wwww : Specify the work position number in 16 bits.
Specified range: 1 (=0x0001) to 32767 (=0x7FFF)

qqqqqqqq : Specify the arch position data in 32 bits. (little endian)
Data should be integers when units are in pulses.
Data should be integers (x100) when units are in millimeters.

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the PMOVE command with arch designation as shown at right, when moving the Z-axis to work position number 32 on pallet number 10 at 70% speed by way of a Z-axis arch position of 10.00mm. The current position output is specified at this time.

Address	Value
Qn	0x0019
Qn+2	0x8014
Qn+4	0x0400
Qn+6	0x0046
Qn+8	0x000A
Qn+10	0x0020
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x03E8
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when controller display units are in millimeters and with:

Axis 1 = 123.45
Axis 2 = -1.23
Axis 3 = 50.00
Axis 4 = 90.23
Other axes = 0.00

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0001
Im+8	0x3039
Im+10	0x0000
Im+12	0xFF85
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0x233F
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.6 Jog movement command

Execute this command in MANUAL mode to move the robot in jog mode. This command can only be executed in MANUAL mode. This command is linked with the controller's point display unit. So the axis moves in PTP motion when the display units are in pulses, and moves by linear interpolation on the Cartesian coordinates when the units are in millimeters. Jog speed is determined by the manual movement speed.

To stop the jog command, set the dedicated input of the interlock signal (SI11) to OFF. Abnormal end status (0x4000) appears as the status code and the error code indicates that the robot has stopped by the interlock (0x0C02). After confirming that movement has stopped, set the dedicated input of the interlock signal to ON.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0020
			For sub robot*	0x00A0
Qn+2	Command flag	bit 14−bit 0	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Axis to move and direction	bit 0	Axis 1	tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 6−bit 4	(0:Fixed)	0
		bit 7	Direction	d
		bit 15−bit 8	(0:Fixed)	0
Qn+6	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in 0 to 3 bits. Only one axis can be specified.

d : Specify the movement direction in 1 bit.

Value	Meaning
0	+ direction
1	− direction

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data.
Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end (When jog movement was stopped by interlock)

Address	Contents			Value
Im	Status code			0x4000
Im+2	Error code			0x0C02
Im+4	Not used			
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data.
Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end (other cases)

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6 to Im+30	Not used	

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the jog command as shown at right, to move axis 1 of the main robot in the minus (-) direction. The current position output is specified at this time.

Address	Value
Qn	0x0020
Qn+2	0x8000
Qn+4	0x0081
Qn+6	0x0000
Qn+8	0x0000
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right, after robot movement with the jog command is stopped by the interlock signal, when controller display units are in millimeters and with:

Axis 1 = 123.45
Axis 2 = -1.23
Axis 3 = 20.00
Other axes = 0.00

Address	Value
Im	0x4000
Im+2	0x0C02
Im+4	0x0000
Im+6	0x0001
Im+8	0x3039
Im+10	0x0000
Im+12	0xFF85
Im+14	0xFFFF
Im+16	0x07D0
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.7 Inching movement command

Execute this command to move the robot by inching in MANUAL mode. Inching movement distance is linked to the manual movement speed. The inching command can only be executed in MANUAL mode.
This command is linked with the controller's point display unit. So when display units are in pulses, the axis moves a certain number of pulses at the manual speed setting. When display units are in millimeters, the axis moves on Cartesian coordinates by linear interpolation at the manual speed setting divided by 100.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0024
			For sub robot*	0x00A4
Qn+2	Command flag	bit 14−bit 0	(0:Fixed)	0
		bit 15	Current position output designation flag	n
Qn+4	Axis to move and direction	bit 0	Axis 1	tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 6−bit 4	(0:Fixed)	0
		bit 7	Direction	d
		bit 15−bit 8	(0:Fixed)	0
Qn+6	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

n : Specify in 1 bit whether to output current position.

Value	Meaning
0	No output.
1	Output.

tt : Specify the axis to move in 0 to 3 bits. Only one axis can be specified.

d : Specify the movement direction in 1 bit.

Value	Meaning
0	+ direction
1	- direction

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	a
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Not used			
to				
Im+30				

a : Shows in 1 bit the units for current position output point data. Linked with point display unit of controller.

Value	Meaning
0	Pulse units
1	Millimeter units

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers when point display units are in pulses.
Data is shown in integers (x100) when point display units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Specify the inching command as shown at right, to move axis 2 of the main robot in the plus direction. When controller's point display units are in millimeters, movement is in 0.5 mm steps at 50% manual speed. The current position output is specified at this time.

Address	Value
Qn	0x0024
Qn+2	0x8000
Qn+4	0x0002
Qn+6	0x0000
Qn+8	0x0000
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right, after executing the inching command and then stopping point movement, when controller display units are in millimeters and with;

Axis 1 = 123.45
Axis 2 = -1.23
Axis 3 = 20.00
Other axes = 0.00

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0001
Im+8	0x3039
Im+10	0x0000
Im+12	0xFF85
Im+14	0xFFFF
Im+16	0x07D0
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.2.8 Point teaching command

Execute this command to teach the current robot position to the specified point number.
Point data units of this command are linked to the controller's point display unit.

- **Command**

Address	Contents		Value
Qn	Command code	For main robot	0x0028
		For sub robot*	0x00A8
Qn+2	Not used		0x0000
Qn+4	Point number		0xpppp
Qn+6 to Qn+30	Not used		0x0000

* Sub robot not used in OMRON version

pppp : Specify the point number in 16 bits.
Specified range: 0 (= 0x0000) to 9999 (=0x270F)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2 to Im+30	Not used	

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6 to Im+30	Not used	

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the point teaching command as shown at right, to teach the main robot current position to point 4000.

Address	Value
Qn	0x0028
Qn+2	0x0000
Qn+4	0x0FA0
Qn+6 to Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2 to Im+30	0x0000

4.2.9 Absolute reset movement command

When absolute reset of the specified axis uses the mark method, this command moves the axis to the nearest position where absolute reset can be executed. Positions capable of absolute reset are located at every 1/4 rotation of the motor.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0030
			For sub robot*	0x00B0
Qn+2	Not used			0x0000
Qn+4	Axis to move and direction	bit 0	Axis 1	tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 6−bit 4	(0:Fixed)	0
		bit 7	Direction	d
		bit 15−bit 8	(0:Fixed)	0
Qn+6	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

tt : Specify the axis to move in 0 to 3 bits. Only one axis can be specified.

d : Specify the movement direction in 1 bit.

Value	Meaning
0	+ direction
1	- direction

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the absolute reset movement command as shown at right, to move axis 2 of the main robot in the minus (-) direction to a position capable of absolute reset.

Address	Value
Qn	0x0030
Qn+2	0x0000
Qn+4	0x0082
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
to	
Im+30	

4.2.10 Absolute reset command

Execute this command to perform absolute reset on the specified axis. When absolute reset of the specified axis uses the mark method, a position capable of absolute reset is required. If no particular axis is specified (Qn+4 is 0), then absolute reset is performed on all axes (main robot + sub robot) in either case of command code 0x0031 or 0x00B1. This command cannot be executed if return-to-origin on a mark-specified axis is incomplete. Perform absolute reset on each axis.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0031
			For sub robot*	0x00B1
Qn+2	Not used			0x0000
Qn+4	Specified axis	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

tt : Specify the axis to perform absolute reset in 0 to 3 bits.
Only one axis can be specified.
If no particular axis is specified then absolute reset is performed on all axes (main robot + sub robot).

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to perform absolute reset on axis 2 of the main robot.

Address	Value
Qn	0x0031
Qn+2	0x0000
Qn+4	0x0002
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
to	
Im+30	

4.2.11 Return-to-origin command

This command executes return-to-origin on the specified axis.
When this command is executed on an incremental mode axis, that axis returns to its origin.
When executed on a semi-absolute mode axis, an absolute search is performed on that axis. If no particular axis is specified (Qn+4 is 0), this command is executed on all axes (main robot + sub robot) in either case of command code 0x0032 or 0x00B2.

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0032
			For sub robot*	0x00B2
Qn+2	Not used			0x0000
Qn+4	Specified axis	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15-bit 4	(0:Fixed)	
Qn+6	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

tt : Specify the axis to perform return-to-origin in 0 to 3 bits.
Only one axis can be specified.
If no particular axis is specified then return-to-origin is performed on all axes (main robot + sub robot).

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to perform return-to-origin on axis 2 of the main robot.

Address	Value
Qn	0x0032
Qn+2	0x0000
Qn+4	0x0002
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
to	
Im+30	

4.2.12 Servo command

Execute this command group to operate the robot servos.

Servo ON :

Execute this command to turn on the servo of a specified axis. The motor power must be turned on when specifying the axis. All controller servos are turned on if no axis is specified.

Servo OFF :

Execute this command to turn off the servo of a specified axis. All controller servos are turned off if no axis is specified.

Servo Free :

Execute this command to turn off the mechanical brake and dynamic brake after turning off the servo of a specified axis. Servo OFF and Free are repeated when this command is consecutively executed.

Power ON:

Execute this command to turn on the motor power. No axis can be specified.

- **Command**

Address	Contents			Value
Qn	Command code	Servo ON	For main robot	0x0034
			For sub robot*	0x00B4
		Servo OFF	For main robot	0x0035
			For sub robot*	0x00B5
		Servo Free	For main robot	0x0036
			For sub robot*	0x00B6
		Power ON	All controller servos	0x0037
Qn+2	Not used			0x0000
Qn+4	Specified axis	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+6	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

tt: Specify the axis to move in 0 to 3 bits. All controller servos are processed if no axis is specified. No axis can be specified when executing Power ON.

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the servo command as shown at right, to free the servo of axis 4 of the main robot.

Address	Value
Qn	0x0036
Qn+2	0x0000
Qn+4	0x0008
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
to	
Im+30	

4.2.13 Manual speed change command

Execute this command to change the manual movement speed in MANUAL mode. This command can only be executed in MANUAL mode.

- **Command**

Address	Contents		Value
Qn	Command code	For main robot	0x0038
		For sub robot*	0x00B8
Qn+2	Not used		0x0000
Qn+4	Specified speed		0xssss
Qn+6	Not used		0x0000
to			
Qn+30			

* Sub robot not used in OMRON version

ssss : Specify the manual movement speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the manual speed change command as shown at right, to set the manual movement speed of the main robot to 20%.

Address	Value
Qn	0x0038
Qn+2	0x0000
Qn+4	0x0014
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
to	
Im+30	

4.2.14 Auto speed change command

Execute this command to change the auto movement speed in AUTO mode.

- **Command**

Address	Contents		Value
Qn	Command code	For main robot	0x0039
		For sub robot*	0x00B9
Qn+2	Not used		0x0000
Qn+4	Specified speed		0xssss
Qn+6	Not used		0x0000
to			
Qn+30			

* Sub robot not used in OMRON version

ssss : Specify the auto movement speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the auto speed change command as shown at right, to set the auto movement speed of the main robot to 80%.

Address	Value
Qn	0x0039
Qn+2	0x0000
Qn+4	0x0050
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
to	
Im+30	

4.2.15 Program speed change command

Execute this command to change the program speed in AUTO mode. The program speed changed with this command is reset to 100% when the program is reset or changed.

- **Command**

Address	Contents		Value
Qn	Command code	For main robot	0x003A
		For sub robot*	0x00BA
Qn+2	Not used		0x0000
Qn+4	Specified speed		0xssss
Qn+6	Not used		0x0000
to			
Qn+30			

* Sub robot not used in OMRON version

ssss : Specify the program speed in 16 bits.
Specified range: 1 (=0x0001) to 100 (=0x0064)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the program speed change command as shown at right, to set the program speed for the main robot to 80%.

Address	Value
Qn	0x003A
Qn+2	0x0000
Qn+4	0x0050
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
to	
Im+30	

4.2.16 Shift designation change command

Execute this command to change the selected shift to a specified shift number.

- **Command**

Address	Contents		Value
Qn	Command code	For main robot	0x003B
		For sub robot*	0x00BB
Qn+2	Not used		0x0000
Qn+4	Specified shift number		0xssss
Qn+6	Not used		0x0000
to			
Qn+30			

* Sub robot not used in OMRON version

ssss : Specify the shift number in 16 bits.
Specified range: 0 (=0x0000) to 9 (0x0009)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the shift designation change command as shown at right, to set the shift number of the main robot to shift 4.

Address	Value
Qn	0x003B
Qn+2	0x0000
Qn+4	0x0004
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
to	
Im+30	

4.2.17 Hand designation change command

Execute this command to change the selected hand to a specified hand number.

- **Command**

Address	Contents		Value
Qn	Command code	For main robot	0x003C
		For sub robot*	0x00BC
Qn+2	Not used		0x0000
Qn+4	Specified hand number		0xssss
Qn+6	Not used		0x0000
to			
Qn+30			

* Sub robot not used in OMRON version

ssss : Specify the hand number in 16 bits.
Specified range for main robot : 0 (=0x0000) to 3 (0x0003)
Specified range for sub robot : 4 (=0x0004) to 7 (0x0007)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the hand designation change command as shown at right, to set the hand number of the main robot to hand 1.

Address	Value
Qn	0x003C
Qn+2	0x0000
Qn+4	0x0001
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
to	
Im+30	

4.2.18 Arm designation change command

Execute this command to change the arm designation status. This command is valid only when SCARA robot is specified.

- **Command**

Address	Contents		Value
Qn	Command code	For main robot	0x003D
		For sub robot*	0x00BD
Qn+2	Not used		0x0000
Qn+4	Status of specified arm		0xssss
Qn+6	Not used		0x0000
to			
Qn+30			

* Sub robot not used in OMRON version

ssss : Specify the arm designation status in 16 bits.

Value	Meaning
0x0000	Right-handed system
0x0001	Left-handed system

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the arm designation change command as shown at right, to set the arm designation status of the main robot to the right-handed system.

Address	Value
Qn	0x003D
Qn+2	0x0000
Qn+4	0x0000
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
to	
Im+30	

4.2.19 Point display unit designation command

Execute this command to change the point display unit.

- **Command**

Address	Contents	Value
Qn	Command code	0x003E
Qn+2	Not used	0x0000
Qn+4	Display units for specified point	0xssss
Qn+6	Not used	0x0000
to		
Qn+30		

ssss : Specify the point display unit system in 16 bits.

Value	Meaning
0x0000	Pulse units
0x0001	Millimeter units
0x0002	Millimeter units (Tool coordinates)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the point display unit designation command as shown at right, to set the point display units to pulses.

Address	Value
Qn	0x003E
Qn+2	0x0000
Qn+4	0x0000
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
to	
Im+30	

4.3 Category 2 remote commands

Category 2 remote commands are used to define or obtain point data.
A command list is given below.

No.	Command contents			Command code (Qn)
1	Point-related commands	Point data definition		0x0100
		Point data reference		0x0101
2	Point comment-related commands	Point comment data definition		0x0104
		Point comment data reference		0x0105
3	Pallet-related command	Pallet data definition		0x0108
		Pallet data reference		0x0109
4	Shift-related command	Shift data definition		0x010C
		Shift data reference		0x010D
5	Hand-related command	Hand data definition	Main robot	0x0110
			Sub robot*	0x0190
		Hand data reference		0x0111

* Sub robot not used in OMRON version

I, Q : Input/output address
m, n : Start address assigned by hardware configuration

4.3.1 Point-related command

Execute this command to define or obtain point data.

4.3.1.1 Point data definition

This command defines point data by specifying the point number and position data on each axis.

- **Command**

Address	Contents			Value
Qn	Command code			0x0100
Qn+2	Command flag	bit 0	Point unit	u
		bit 2−bit 1	Hand system	tt
		bit 15−bit 3	(0:Fixed)	0
Qn+4	Point number			0xssss
Qn+6	Not used			0x0000
Qn+8	Axis-1 data			0xbbbbbbbb
Qn+10				
Qn+12	Axis-2 data			0xbbbbbbbb
Qn+14				
Qn+16	Axis-3 data			0xbbbbbbbb
Qn+18				
Qn+20	Axis-4 data			0xbbbbbbbb
Qn+22				
Qn+24	Axis-5 data			0xbbbbbbbb
Qn+26				
Qn+28	Axis-6 data			0xbbbbbbbb
Qn+30				

u : Specify the point data unit in 1 bit.

Value	Meaning
0	Pulse units
1	Millimeter units

tt : Specify in 2 bits the hand system to be defined.
Valid only when SCARA robot is specified and units are in millimeters.

Value	Meaning
01	Right-handed system is defined.
10	Left-handed system is defined.
Others	No hand system is defined.

ssss : Specify the point number in 16 bits.
Specified range: 1 (=0x0001) to 9999 (=0x270F)

bbbbbbbb : Specify the point data in 32 bits. (little endian)
Data should be integers when units are in pulses.
Data should be integers (x100) when units are in millimeters.

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the point data definition command as shown at right, to create the following point data in pulse units.

Point number = 100
Axis 1 = 10000
Axis 2 = -20000
Axis 3 = 5000
Axis 4 = -18000
Other axes = 0

Address	Value
Qn	0x0100
Qn+2	0x0000
Qn+4	0x0064
Qn+6	0x0000
Qn+8	0x2710
Qn+10	0x0000
Qn+12	0xB1E0
Qn+14	0xFFFF
Qn+16	0x1388
Qn+18	0x0000
Qn+20	0xB9B0
Qn+22	0xFFFF
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.3.1.2 Point data reference

Use this command to find and obtain point data by specifying the point number.

- **Command**

Address	Contents	Value
Qn	Command code	0x0101
Qn+2	Not used	0x0000
Qn+4	Point number	0xssss
Qn+6	Not used	
to		
Qn+30		

ssss : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4	Point number			0xssss
Im+6	Point flag	bit 0	Point unit	u
		bit 2−bit 1	Hand system	tt
		bit 15−bit 3	(0:Fixed)	0
(m+4CH)	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Axis-5 data			0xbbbbbbbb
Im+26				
Im+28	Axis-6 data			0xbbbbbbbb
Im+30				

ssss : Shows the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

u : Shows the point data unit in 1 bit.

Value	Meaning
0	Pulse units
1	Millimeter units

tt : Shows in 2 bits the hand system to define point data.
Valid only when SCARA robot is specified and units are in millimeters.

Value	Meaning
00	No hand system is defined.
01	Right-handed system is defined.
10	Left-handed system is defined.

bbbbbbbb : Shows the point data in 32 bits. (little endian)
Data is shown in integers when units are in pulses.
Data is shown in integers (x100) when units are in millimeters.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the point data reference command as shown at right, to search and obtain point data at point number 50.

Address	Value
Qn	0x0101
Qn+2	0x0000
Qn+4	0x0032
Qn+6	0x0000
Qn+8	0x0000
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly to obtain the following point data.

Point number = 50
Axis 1 = 100.00
Axis 2 = -200.00
Axis 3 = 50.00
Axis 4 = -180.00
Other axes = 0.00

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0032
Im+6	0x0001
Im+8	0x2710
Im+10	0x0000
Im+12	0xB1E0
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0xB9B0
Im+22	0xFFFF
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.3.2 Point comment-related command

Execute this command to define or obtain point comment data.

4.3.2.1 Point comment data definition

Use this command to define point comment data by specifying the point number and point comment data.

- **Command**

Address	Contents	Value
Qn	Command code	0x0104
Qn+2	Not used	0x0000
Qn+4	Point number	0xssss
Qn+6	Not used	0x0000
Qn+8	Comment data	0xbbbb
Qn+10		0xbbbb
Qn+12		0xbbbb
Qn+14		0xbbbb
Qn+16		0xbbbb
Qn+18		0xbbbb
Qn+20		0xbbbb
Qn+22		0x00bb
Qn+24	Not used	0x0000
to		
Qn+30		

ssss : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

bb : Specify 1 byte comment data in 8 bits. (little endian)
Specified range: " "(=0x20) to "~ "(=0x7E)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the point comment data definition command as shown at right, to create the following point comment data.

Point number = 100
Comment data = "WAIT ORG"
(character code : "W" =0x57
: "A" =0x41
: "I" =0x49
: "T" =0x54
: " " =0x20
: "O" =0x4F
: "R" =0x52
: "G" =0x47)

Values are expressed as shown at right when executed correctly.

Address	Value
Qn	0x0104
Qn+2	0x0000
Qn+4	0x0064
Qn+6	0x0000
Qn+8	0x4157
Qn+10	0x5449
Qn+12	0x4F20
Qn+14	0x4752
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.3.2.2 Point comment data reference

Use this command to search and obtain point comment data by specifying the point number.

- **Command**

Address	Contents	Value
Qn	Command code	0x0105
Qn+2	Not used	0x0000
Qn+4	Point number	0xssss
Qn+6	Not used	0x0000
to		
Qn+30		

ssss : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Point number	0xssss
Im+6	Not used	
Im+8	Comment data	0xbbbb
Im+10		0xbbbb
Im+12		0xbbbb
Im+14		0xbbbb
Im+16		0xbbbb
Im+18		0xbbbb
Im+20		0xbbbb
Im+22		0x00bb
Im+24	Not used	
to		
Im+30		

ssss : Shows the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

bb : Shows the 1 byte comment data in 8 bits. (little endian)

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the point comment data reference command as shown at right, to obtain point comment data at point number 50.

Address	Value
Qn	0x0105
Qn+2	0x0000
Qn+4	0x0032
Qn+6	0x0000
Qn+8	0x0000
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly to obtain the following point data.

Point number = 50
Comment data = "WAIT ORG"

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0032
Im+6	0x0000
Im+8	0x4157
Im+10	0x5449
Im+12	0x4F20
Im+14	0x4752
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.3.3 Pallet-related command

Execute this command to define or obtain pallet data.

4.3.3.1 Pallet data definition

Use this command to define pallet data by specifying the pallet number and the number of pallets (Nx, Ny, Nz).

NOTE

Point data used for pallet movement is determined by the pallet number. Refer to the robot controller user's manual or robot programming manual for detailed information.

- **Command**

Address	Contents	Value
Qn	Command code	0x0108
Qn+2	Not used	0x0000
Qn+4	Pallet number	0xssss
Qn+6	Number of pallets in X direction (Nx)	0xaaaa
Qn+8	Number of pallets in Y direction (Ny)	0xaaaa
Qn+10	Number of pallets in Z direction (Nz)	0xaaaa
Qn+12 to Qn+30	Not used	0x0000

ssss : Specify the pallet number in 16 bits.
Specified range: 0 (=0x0000) to 19 (=0x0013)

aaaa : Specify the number of pallets (positive integer) in 16 bits.
Specified range: 0 (=0x0000) to 32767 (=0x7FFF)
The value of "Nx*Ny*Nz" should be 32767 or less.

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2 to Im+30	Not used	

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6 to Im+30	Not used	

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the pallet data definition command as shown at right, to create the following pallet.

Pallet number = 10
Nx = 10
Ny = 15
Nz = 1

Address	Value
Qn	0x0108
Qn+2	0x0000
Qn+4	0x000A
Qn+6	0x000A
Qn+8	0x000F
Qn+10	0x0001
Qn+12	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
to	
Im+30	

4.3.3.2 Pallet data reference

Use this command to obtain pallet data by specifying the pallet number.

- **Command**

Address	Contents	Value
Qn	Command code	0x0109
Qn+2	Not used	0x0000
Qn+4	Pallet number	0xssss
Qn+6	Not used	0x0000
to		
Qn+30		

ssss : Specify the pallet number in 16 bits.
Specified range: 0 (=0x0000) to 19 (=0x0013)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Pallet number	0xssss
Im+6	Number of pallets in X direction (Nx)	0xaaaa
Im+8	Number of pallets in Y direction (Ny)	0xaaaa
Im+10	Number of pallets in Z direction (Nz)	0xaaaa
Im+12	Not used	
to		
Im+30		

ssss : Shows the pallet number in 16 bits.
aaaa : Shows the number of pallets in 16 bits.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the pallet data reference command as shown at right, to obtain pallet data at pallet number 10.

Address	Value
Qn	0x0109
Qn+2	0x0000
Qn+4	0x000A
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly to obtain the following pallet data.

Pallet number = 10
Nx = 10
Ny = 15
Nz = 1

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x000A
Im+6	0x000A
Im+8	0x000F
Im+10	0x0001
Im+12	0x0000
to	
Im+30	

4.3.4 Shift-related command

Execute this command to define or obtain shift data.

4.3.4.1 Shift data definition

Use this command to define shift data by specifying the shift number and shift data.

- **Command**

Address	Contents	Value
Qn	Command code	0x010C
Qn+2	Not used	0x0000
Qn+4	Shift number	0xssss
Qn+6	Not used	0x0000
Qn+8	Axis-1 data	0xbbbbbbbb
Qn+10		
Qn+12	Axis-2 data	0xbbbbbbbb
Qn+14		
Qn+16	Axis-3 data	0xbbbbbbbb
Qn+18		
Qn+20	Axis-4 data	0xbbbbbbbb
Qn+22		
Qn+24	Not used	0x0000
to		
Qn+30		

ssss : Specify the shift number in 16 bits.
Specified range: 0 (=0x0000) to 9 (=0x0009)

bbbbbbbb : Specify the shift data in 32 bits. (little endian)
Data should by integers (x100).

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the shift data definition command as shown at right, to create the following shift data.

Shift number = 5
Axis 1 = 100.00
Axis 2 = -200.00
Axis 3 = 50.00
Axis 4 = -180.00

Address	Value
Qn	0x010C
Qn+2	0x0000
Qn+4	0x0005
Qn+6	0x0000
Qn+8	0x2710
Qn+10	0x0000
Qn+12	0xB1E0
Qn+14	0xFFFF
Qn+16	0x1388
Qn+18	0x0000
Qn+20	0xB9B0
Qn+22	0xFFFF
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.3.4.2 Shift data reference

Use this command to search and obtain shift data by specifying the shift number.

- **Command**

Address	Contents	Value
Qn	Command code	0x010D
Qn+2	Not used	0x0000
Qn+4	Shift number	0xssss
Qn+6	Not used	0x0000
to		
Qn+30		

ssss : Specify the shift number in 16 bits.
Specified range: 0 (=0x0000) to 9 (=0x0009)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Shift number	0xssss
Im+6	Not used	
Im+8	Data 1	0xbbbbbbbb
Im+10		
Im+12	Data 2	0xbbbbbbbb
Im+14		
Im+16	Data 3	0xbbbbbbbb
Im+18		
Im+20	Data 4	0xbbbbbbbb
Im+22		
Im+24	Not used	
to		
Im+30		

ssss : Shows the shift number in 16 bits.

bbbbbbbb : Shows the shift data in 32 bits. (little endian)
Data is show in integers (x100).

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the shift data reference command as shown at right, to obtain shift data at shift number 5.

Address	Value
Qn	0x010D
Qn+2	0x0000
Qn+4	0x0005
Qn+6	0x0000
Qn+8	0x0000
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly to obtain the following shift data.

Shift number = 5
Axis 1 = 100.00
Axis 2 = -200.00
Axis 3 = 50.00
Axis 4 = -180.00

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0005
Im+6	0x0000
Im+8	0x2710
Im+10	0x0000
Im+12	0xB1E0
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0xB9B0
Im+22	0xFFFF
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.3.5 Hand-related command

Execute this command to define or obtain hand data.

4.3.5.1 Hand data definition

Use this command to define hand data by specifying the hand number and each data.

- **Command**

Address	Contents		Value
Qn	Command code	For main robot	0x0110
		For sub robot*	0x0190
Qn+2	Not used		0x0000
Qn+4	Hand number		0xssss
Qn+6	Not used		0x0000
Qn+8	Data 1		0xbbbbbbbb
Qn+10			
Qn+12	Data 2		0xbbbbbbbb
Qn+14			
Qn+16	Data 3		0xbbbbbbbb
Qn+18			
Qn+20	Data 4		0xbbbbbbbb
Qn+22			
Qn+24	Not used		0x0000
to			
Qn+30			

* Sub robot not used in OMRON version

ssss : Specify the hand number in 16 bits.
Specified range for main robot : 0 (0x0000) to 3 (=0x0003)
Specified range for sub robot : 4 (=0x0004) to 7 (=0x0007)

bbbbbbbb : When SCARA robot is specified and data 4 is 0:
Data 1 : Specify the integer in 32 bits. (little endian)
Data 2 and 3 : Specify the integer (x100) in 32 bits. (little endian)
Data 4 : When hand is installed to R-axis =1, other cases =0
In other cases
Data 1 to 3 : Specify the integer (x100) in 32 bits. (little endian)
Data 4 : When hand is installed to R-axis =1, other cases =0

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the hand data definition command as shown at right, to create hand data.

Hand number= 1
Data 1 = 100.00
Data 2 = -20.00
Data 3 = 50.00
Data 4 = 0

Address	Value
Qn	0x0110
Qn+2	0x0000
Qn+4	0x0001
Qn+6	0x0000
Qn+8	0x2710
Qn+10	0x0000
Qn+12	0xF830
Qn+14	0xFFFF
Qn+16	0x1388
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.3.5.2 Hand data reference

Use this command to obtain hand data by specifying the hand number.

- **Commands**

Address	Contents	Value
Qn	Command code	0x0111
Qn+2	Not used	0x0000
Qn+4	Hand number	0xssss
Qn+6	Not used	0x0000
to		
Qn+30		

ssss : Specify the hand number in 16 bits.
Specified range: 0 (0x0000) to 7 (=0x0007)
(Numbers 0 to 3 are hand data for main robot, and numbers 4 to 7 are hand data for sub robot.)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Hand number	0xssss
Im+6	Not used	
Im+8	Data 1	0xbbbbbbbb
Im+10		
Im+12	Data 2	0xbbbbbbbb
Im+14		
Im+16	Data 3	0xbbbbbbbb
Im+18		
Im+20	Data 4	0xbbbbbbbb
Im+22		
Im+24	Not used	
to		
Im+30		

ssss : Shows the hand number in 16 bits.

bbbbbbbb : When SCARA robot is specified and data 4 is 0:
- Data 1 : Shows the integer in 32 bits. (little endian)
- Data 2 and 3 : Shows the integer (x100) in 32 bits. (little endian)
- Data 4 : When hand is installed to R-axis =1, other cases =0

In other cases
- Data 1 to 3 : Shows the integer (x100) in 32 bits. (little endian)
- Data 4 : When hand is installed to R-axis =1, other cases =0

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the hand data reference command as shown at right, to obtain hand data.

Address	Value
Qn	0x0111
Qn+2	0x0000
Qn+4	0x0001
Qn+6	0x0000
Qn+8	0x0000
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly to obtain the following hand data.

Hand number= 1
Data 1 = 10000
Data 2 = -20.00
Data 3 = 50.00
Data 4 = 0

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0001
Im+6	0x0000
Im+8	0x2710
Im+10	0x0000
Im+12	0xF830
Im+14	0xFFFF
Im+16	0x1388
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.4 Category 3 remote commands

Category 3 remote commands are arithmetic commands. A command list is given below.

No.	Command contents			Command code (Qn)
1	Static variable-related commands	Assignment	Value	0x0200
			Variable	0x0201
		Addition	Value	0x0204
			Variable	0x0205
		Subtraction	Value	0x0208
			Variable	0x0209
		Multiplication	Value	0x020C
			Variable	0x020D
		Division	Value	0x0210
			Variable	0x0211
		Reference	Variable	0x0214
2	Parameter-related command	Assignment	Main robot	0x0220
			Sub robot*	0x02A0
		Reference	Main robot	0x0224
			Sub robot*	0x02B4
3	Point-related command	Point assignment		0x0230
		Addition		0x0234
		Subtraction		0x0235
		Pallet point assignment		0x0238
4	Element assignment command	Point element assignment	"x1" input format	0x0240
			"x100" input format	0x0241
		Shift element assignment	"x100" input format	0x0245

* Sub robot not used in OMRON version

I, Q : Input/output address
m, n : Start address assigned by hardware configuration

4.4.1 Static variable-related command

Execute this command to assign a numerical value to a static variable for four arithmetic operations or reference.

4.4.1.1 Assigning a numerical value to a static variable

This command assigns a numerical value to a static variable (SGIn or SGRn) by specifying the destination variable number and the numerical value.

Variable number 1 = numerical value

⚠ CAUTION

- A REAL NUMBER IS ASSIGNED WHEN A REAL VARIABLE WAS USED.
- DUE TO CANCELLATION OF SIGNIFICANT DIGITS WHEN USING REAL NUMBER DATA FOR ASSIGNMENT REFERENCE, THE ASSIGNED DATA MIGHT SOMETIMES DIFFER FROM THE REFERENCE DATA.

- **Command**

Address	Contents	Value
Qn	Command code	0x0200
Qn+2	Not used	0x0000
Qn+4	Variable number 1 (Variable number at assignment destination)	0xssss
Qn+6	Not used	0x0000
Qn+8	Numerical data	0xbbbbbbbb
Qn+10		
Qn+12	Not used	0x0000
to		
Qn+30		

ssss : Specify variable number 1 in 16 bits.
Specified range for integer variable : 0 (0x0000) to 7 (=0x0007)
Specified range for real variable : 256 (=0x0100) to 263 (=0x0107)

Integer variable	Variable number	Real variable	Variable number
SGI0	0(=0x0000)	SGR0	256(=0x0100)
SGI1	1(=0x0001)	SGR1	257(=0x0101)
:	:	:	:
SGI7	7(=0x0007)	SGR7	263(=0x0107)

bbbbbbbb : Specify the integer in 32 bits. (little endian)
Specify a signed integer value when assigning to an integer variable
Specify a single-precision real number when assigning to a real variable.

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6 to Im+30	Not used	

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to assign numerical data to variable number 1.

Variable number 1 = 1
Numerical data = 10000

Address	Value
Qn	0x0200
Qn+2	0x0000
Qn+4	0x0001
Qn+6	0x0000
Qn+8	0x2710
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.4.1.2 Assigning a variable to a static variable

This command assigns a numerical value to a static variable (SGIn or SGRn) by designating the source variable number and destination variable number.

Variable number 1 = Variable number 2

- **Command**

Address	Contents	Value
Qn	Command code	0x0201
Qn+2	Not used	0x0000
Qn+4	Variable number 1 (Variable number at assignment destination)	0xssss
Qn+6	Not used	0x0000
Qn+8	Variable number 2 (Variable number at assignment source)	0xssss
Qn+10	Not used	0x0000
to		
Qn+30		

ssss : Specify variable numbers 1 and 2 in 16 bits.
Specified range for integer variable : 0 (0x0000) to 7 (=0x0007)
Specified range for real variable : 256 (=0x0100) to 263 (=0x0107)

Integer variable	Variable number	Real variable	Variable number
SGI0	0(=0x0000)	SGR0	256(=0x0100)
SGI1	1(=0x0001)	SGR1	257(=0x0101)
:	:	:	:
SGI7	7(=0x0007)	SGR7	263(=0x0107)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to assign numerical data of variable number 2 to variable number 1.

Variable number 1 = 1
Variable number 2 = 2

Address	Value
Qn	0x0201
Qn+2	0x0000
Qn+4	0x0001
Qn+6	0x0000
Qn+8	0x0002
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.4.1.3 Arithmetic operation using numerical data on static variable

This command performs four arithmetic operations by specifying variable number 1 and a numerical value. Results are stored in a static variable (SGIn or SGRn) specified by variable number 1.

Variable number 1 = Variable number 1 (operator) numerical value

- **Command**

Address	Contents		Value
Qn	Command code	Addition	0x0204
		Subtraction	0x0208
		Multiplication	0x020C
		Division	0x0210
Qn+2	Not used		0x0000
Qn+4	Variable number 1 (Variable number at arithmetic operation destination)		0xssss
Qn+6	Not used		0x0000
Qn+8	Numerical data		0xbbbbbbbb
Qn+10			
Qn+12	Not used		0x0000
to			
Qn+30			

ssss : Specify variable number 1 in 16 bits.
Specified range for integer variable : 0 (0x0000) to 7 (=0x0007)
Specified range for real variable : 256 (=0x0100) to 263 (=0x0107)

Integer variable	Variable number	Real variable	Variable number
SGI0	0(=0x0000)	SGR0	256(=0x0100)
SGI1	1(=0x0001)	SGR1	257(=0x0101)
:	:	:	:
SGI7	7(=0x0007)	SGR7	263(=0x0107)

bbbbbbbb : Specify the integer in 32 bits. (little endian)
Specify a signed integer value when assigning to an integer variable
Specify a single-precision real number when assigning to a real variable.

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command to assign numerical data to a static variable as shown at right.

Variable number 1 = 1
Numerical data = 10000

Address	Value
Qn	0x0204
Qn+2	0x0000
Qn+4	0x0001
Qn+6	0x0000
Qn+8	0x2710
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.4.1.4 Arithmetic operation using variable on static variable

This command performs four arithmetic operations by specifying variable numbers 1 and 2. Results are stored in a static variable (SGIn or SGRn) specified by variable number 1.

Variable number 1 = Variable number 1 (operator) variable number 2

- **Command**

Address	Contents		Value
Qn	Command code	Addition	0x0205
		Subtraction	0x0209
		Multiplication	0x020D
		Division	0x0211
Qn+2	Not used		0x0000
Qn+4	Variable number 1 (Variable number at arithmetic operation destination)		0xssss
Qn+6	Not used		0x0000
Qn+8	Variable number 2 (Variable number at arithmetic operation source)		0xssss
Qn+10 to Qn+30	Not used		0x0000

ssss : Specify variable numbers 1 and 2 in 16 bits.
Specified range for integer variable : 0 (0x0000) to 7 (=0x0007)
Specified range for real variable : 256 (=0x0100) to 263 (=0x0107)

Integer variable	Variable number	Real variable	Variable number
SGI0	0(=0x0000)	SGR0	256(=0x0100)
SGI1	1(=0x0001)	SGR1	257(=0x0101)
:	:	:	:
SGI7	7(=0x0007)	SGR7	263(=0x0107)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2 to Im+30	Not used	

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6 to Im+30	Not used	

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this arithmetic operation command to multiply static variables as shown at right.

Variable number 1 = 1
Variable number 2 = 2

Address	Value
Qn	0x020D
Qn+2	0x0000
Qn+4	0x0001
Qn+6	0x0000
Qn+8	0x0002
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.4.1.5 Static variable value reference

Use this command to search and obtain the value stored in a static variable (SGIn or SGRn) by specifying the variable number.

- **Command**

Address	Contents	Value
Qn	Command code	0x0214
Qn+2	Not used	0x0000
Qn+4	Variable number	0xssss
Qn+6	Not used	0x0000
to		
Qn+30		

ssss : Specify variable number in 16 bits.
Specified range for integer variable : 0 (0x0000) to 7 (=0x0007)
Specified range for real variable : 256 (=0x0100) to 263 (=0x0107)

Integer variable	Variable number	Real variable	Variable number
SGI0	0(=0x0000)	SGR0	256(=0x0100)
SGI1	1(=0x0001)	SGR1	257(=0x0101)
:	:	:	:
SGI7	7(=0x0007)	SGR7	263(=0x0107)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Variable number	0xssss
Im+6	Not used	
Im+8	Value of variable	0xbbbbbbbb
Im+10		
Im+12	Not used	
to		
Im+30		

ssss : Specify variable number in 16 bits.
Specified range for integer variable : 0 (0x0000) to 7 (=0x0007)
Specified range for real variable : 256 (=0x0100) to 263 (=0x0107)

bbbbbbbb : Shows the numerical value in 32 bits. (little endian)
Specify a signed integer value when assigning to an integer variable
Specify a single-precision real number when assigning to a real variable.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to obtain the numerical value of variable number 5.

Address	Value
Qn	0x0214
Qn+2	0x0000
Qn+4	0x0005
Qn+6	0x0000
Qn+8	0x0000
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly to obtain the following variable.

Variable number = 5
Value = 50

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0005
Im+6	0x0000
Im+8	0x0032
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.4.2 Parameter-related command

Execute this command to assign a value to a parameter or obtain a parameter.

4.4.2.1 Assigning a value to a parameter

This command assigns a numerical value to a specified parameter by specifying the parameter number, axis and numerical value.

Robot parameter		Parameter number	Assignment range
WEIGHT	Robot payload (kg)	1(=0x0001)	0 to maximum payload

Axis parameter		Parameter number	Assignment range
ACCEL	Acceleration coefficient	257(=0x0101)	1 to 100
DECEL	Deceleration ratio	258(=0x0102)	1 to 100
TOLE	Tolerance (pulses)	259(=0x0103)	1 to 2048
OUTPOS	OUT effective position (pulses)	260(=0x0104)	1 to 614400
ARCH	Arch position (pulses)	261(=0x0105)	1 to 614400
AXWGHT	Axis payload (kg)	262(=0x0106)	0 to maximum payload
TORQUE	Torque (%)	263(=0x0107)	1 to 100

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0220
			For sub robot*	0x02A0
Qn+2	Not used			0x0000
Qn+4	Parameter number			0xssss
Qn+6	Specified axis	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+8	Numerical data			0xbbbbbbbb
Qn+10				
Qn+12	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

ssss : Specify the parameter number in 16 bits.

tt : Specify the axis number in bit pattern using lower 8 bits. Only one axis can be specified. Specify "0" for robot parameters.

bbbbbbbb : Specify the integer in 32 bits. (little endian)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6 to Im+30	Not used	

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to assign a numerical value to the tolerance for axis 3 of the main robot.

Parameter number = 259
Specified axis = 3
Numerical data = 1000

Address	Value
Qn	0x0220
Qn+2	0x0000
Qn+4	0x0103
Qn+6	0x0004
Qn+8	0x03E8
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.4.2.2 Parameter value reference

Use this command to search and obtain parameter setting data by specifying the parameter number.

Robot parameter		Parameter number	Reference range
WEIGHT	Robot payload (kg)	1(=0x0001)	0 to maximum payload

Axis parameter		Parameter number	Reference range
ACCEL	Acceleration coefficient	257(=0x0101)	1 to 100
DECEL	Deceleration ratio	258(=0x0102)	1 to 100
TOLE	Tolerance (pulses)	259(=0x0103)	1 to 2048
OUTPOS	OUT effective position (pulses)	260(=0x0104)	1 to 614400
ARCH	Arch position (pulses)	261(=0x0105)	1 to 614400
AXWGHT	Axis payload (kg)	262(=0x0106)	0 to maximum payload

- **Command**

Address	Contents			Value
Qn	Command code		For main robot	0x0224
			For sub robot*	0x02B4
Qn+2	Not used			0x0000
Qn+4	Parameter number			0xssss
Qn+6	Specified axis	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	(0:Fixed)	
Qn+8	Not used			0x0000
to				
Qn+30				

* Sub robot not used in OMRON version

ssss : Specify the parameter number in 16 bits.

tt : Specify the axis number in bit pattern using lower 8 bits. Only one axis can be specified. Specify "0" for robot parameters.

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4	Parameter number			0xssss
Im+6	Specified axis	bit 0	Axis 1	0x00tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 15−bit 4	Not used	
Im+8	Numerical data			0xbbbbbbbb
Im+10				
Im+12	Not used			
to				
Im+30				

ssss : Specify the parameter number in 16 bits.

tt : Specify the axis number in bit pattern using lower 8 bits. Only one axis can be specified. Specify "0" for robot parameters.

bbbbbbbb : Specify the integer in 32 bits. (little endian)

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6 to Im+30	Not used	

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to obtain the OUT effective position of axis 1 of the main robot.

Parameter number = 260
Specified axis = 1

Address	Value
Qn	0x0224
Qn+2	0x0000
Qn+4	0x0104
Qn+6	0x0001
Qn+8	0x0000
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly to obtain the following parameter.

Parameter number = 260
Specified axis = 1
Numerical data = 131071

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0104
Im+6	0x0001
Im+8	0xFFFF
Im+10	0x0001
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.4.3 Point-related command

Execute this command to assign a point to a parameter or obtain a parameter.

4.4.3.1 Assigning a point to a parameter

This command assigns a numerical value to a specified parameter by specifying the parameter number, axis and numerical value.

Point number 1 = Point number 2

- **Command**

Address	Contents	Value
Qn	Command code	0x0230
Qn+2	Not used	0x0000
Qn+4	Point number 1 (Point number at assignment destination)	0xssss
Qn+6	Point number 2 (Point number at assignment source)	0xssss
Qn+8	Not used	0x0000
to		
Qn+30		

ssss : Specify the point number in 16 bits.
Specified range: 0 (= 0x0000) to 9999 (=0x270F)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to assign a point to the specified point.

Point number 1 = 1
Point number 2 = 100

Address	Value
Qn	0x0230
Qn+2	0x0000
Qn+4	0x0001
Qn+6	0x0064
Qn+8	0x0000
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.4.3.2 Point addition/subtraction

This command adds and subtracts points by specifying point number 1 and point number 2.
Point number 1 = Point number 1 (operator) point number 2

- **Command**

Address	Contents		Value
Qn	Command code	Addition	0x0234
		Subtraction	0x0235
Qn+2	Not used		0x0000
Qn+4	Point number 1 (Point number at operation destination)		0xssss
Qn+6	Point number 2 (Point number at operation source)		0xssss
Qn+8 to Qn+30	Not used		0x0000

ssss : Specify the point number in 16 bits.
Specified range: 0 (= 0x0000) to 9999 (=0x270F)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2 to Im+30	Not used	

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6 to Im+30	Not used	

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the point addition command as shown at right, to add point number 2 to point number 1.

Point number 1 = 1
Point number 2 = 100

Address	Value
Qn	0x0234
Qn+2	0x0000
Qn+4	0x0001
Qn+6	0x0064
Qn+8	0x0000
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.4.3.3 Assigning a pallet point

This command assigns a pallet point to the destination point number by specifying a pallet number and work position number.

Pallet point number = Pallet point (pallet number, work position number)

NOTE
- The target pallet must be defined.
- The maximum value of work position number is determined by the target pallet definition.

- **Command**

Address	Contents	Value
Qn	Command code	0x0238
Qn+2	Not used	0x0000
Qn+4	Point number (Point number at assignment destination)	0xssss
Qn+6	Pallet number	0xaaaa
Qn+8	Work position number	0xbbbb
Qn+10 to Qn+30	Not used	0x0000

ssss : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

aaaa : Specify the pallet number in 16 bits.
Specified range: 0 (=0x0000) to 19 (=0x0013)

bbbb : Specify the work position number in 16 bits.
Specified range: 1 (=0x0000) to 32767 (=0x7FFF)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2 to Im+30	Not used	

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6 to Im+30	Not used	

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to assign a pallet point to the following point.

Point number = 100
Pallet number = 2
Work position number = 133

Address	Value
Qn	0x0238
Qn+2	0x0000
Qn+4	0x0064
Qn+6	0x0002
Qn+8	0x0085
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.4.4 Element assignment command

Execute this command to assign a number to a point or shift element.

4.4.4.1 Assigning to a point element

This command assigns a numerical value to a point element by specifying the point number, data number and numerical value.

LOC [data number] (point number) = numerical value

NOTE

When 1000 is specified in the "x1" input format as a numerical value, 1000 is assigned.
When 1000 is specified in the "x100" input format as a numerical value, 10.00 is assigned.
Use the proper input format according to the point data format of the assignment destination.

- **Command**

Address	Contents			Value
Qn	Command code		"x1" input format	0x0240
			"x100" input format	0x0241
Qn+2	Not used			0x0000
Qn+4	Point number (Point number at assignment destination)			0xssss
Qn+6	Data number designation	bit 0	Data 1	0x00tt
		bit 1	Data 2	
		bit 2	Data 3	
		bit 3	Data 4	
		bit 4	Data 5	
		bit 5	Data 6	
		bit 15−bit 6	(0:Fixed)	
Qn+8	Numerical value			0xbbbbbbbb
Qn+10				
Qn+12	Not used			0x0000
to				
Qn+30				

ssss : Specify the point number in 16 bits.
Specified range: 0 (0x0000) to 9999 (=0x270F)

tt : Specify the data number in bit pattern using lower 6 bits.

bbbbbbbb : Specify the integer in 32 bits. (little endian)
Specify data in integers when using "x1" input format.
Specify data in integers (x100) when using "x100" input format.

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to assign a numerical value to part of the following point.

Point number = 1
Data number designation = 4
Numerical value = 10.00

Address	Value
Qn	0x0241
Qn+2	0x0000
Qn+4	0x0001
Qn+6	0x0008
Qn+8	0x03E8
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.4.4.2 Assigning to a shift element

This command assigns a numerical value to a shift element by specifying the shift number, data number and numerical value.

LOC [data number] (shift number) = numerical value

- **Command**

Address	Contents			Value
Qn	Command code			0x0245
Qn+2	Not used			0x0000
Qn+4	Shift number (Shift number at assignment destination)			0xssss
Qn+6	Data number designation	bit 0	Data 1	0x00tt
		bit 1	Data 2	
		bit 2	Data 3	
		bit 3	Data 4	
		bit 15−bit 4	(0:Fixed)	
Qn+8	Numerical value			0xbbbbbbbb
Qn+10				
Qn+12	Not used			0x0000
to				
Qn+30				

ssss : Specify the shift number in 16 bits.
Specified range: 0 (0x0000) to 9 (=0x0009)

tt : Specify the data number in bit pattern using lower 4 bits.

bbbbbbbb : Specify the integer (x100) in 32 bits. (little endian)

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to assign a real number value to part of the following shift.

Shift number = 1
Data number designation = 2
Numerical value = 10.00

Address	Value
Qn	0x0245
Qn+2	0x0000
Qn+4	0x0001
Qn+6	0x0002
Qn+8	0x03E8
Qn+10	0x0000
Qn+12	0x0000
Qn+14	0x0000
Qn+16	0x0000
Qn+18	0x0000
Qn+20	0x0000
Qn+22	0x0000
Qn+24	0x0000
Qn+26	0x0000
Qn+28	0x0000
Qn+30	0x0000

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.5 Category 4 remote commands

Category 4 remote commands are IO (I/O) port commands. A command list is given below.

No.	Command contents			Command code (Qn)
1	I/O port command	Assignment	port units	0x0300
		Assignment	bit units	0x0301
		Reference	port units	0x0304

I, Q : Input/output address
m, n : Start address assigned by hardware configuration

4.5.1 I/O port commands

Use these commands to assign a value to an I/O port or obtain the contents of a specified I/O port.

4.5.1.1 Assigning a numerical value to an I/O port

This command assigns a bit pattern to a port number by specifying the destination port number and bit pattern.

- **Command**

Address	Contents			Value
Qn	Command code		Port units	0x0300
			Bit units	0x0301
Qn+2	Not used			0x0000
Qn+4	Port number	bit 3−bit 0	Bit number	g
		bit 7−bit 4	Units of port number	r
		bit 11−bit 8	Tens of port number	q
		bit 15−bit 12	Specified port type	p
Qn+6	Assignment bit pattern			0x00bb
Qn+8	Not used			0x0000
to				
Qn+30				

g : Specify the bit number in 4 bits.
Specified range: 0 to 7

r, q : Specify the place of each port number in 4 bits.

: Specify the port type in 4 bits. When in port units, specify 0 in the bit number.

Designated port type	Bit pattern	Specified range of port number
DO	0001	2 to 7,10 to 17,20 to 27
MO	0010	2 to 7,10 to 17,20 to 27
LO	0011	0
TO	0100	0
SO	0110	2 to 7,10 to 17,20 to 27

bb : Specify the bit pattern in 8 bits. When in bit units, use 0 or 1 to specify the bit pattern.

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to output a numerical value to the following output port.

Output port = DO12 ()
Numerical data = 7

Address	Value
Qn	0x0300
Qn+2	0x0000
Qn+4	0x1120
Qn+6	0x0007
Qn+8	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
to	
Im+30	

Example:
Use this command as shown at right, to output a numerical value to the following output port.

Output port = DO (21)
Numerical data = 1

Address	Value
Qn	0x0301
Qn+2	0x0000
Qn+4	0x1021
Qn+6	0x0001
Qn+8	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
to	
Im+30	

4.5.1.2 I/O port reference

Use this command to obtain the contents of a port number by specifying the port number.

- **Command**

Address	Contents			Value
Qn	Command code		Port units	0x0304
Qn+2	Not used			0x0000
Qn+4	Port number	bit 3−bit 0	(0:Fixed)	0
		bit 7−bit 4	Units of port number	r
		bit 11−bit 8	Tens of port number	q
		bit 15−bit 12	Specified port type	p
Qn+6	Not used			0x0000
to				
Qn+30				

r, q : Specify the place of each port number in 4 bits.

p : Specify the port type in 4 bits.

Designated port type	Bit pattern	Specified range of port number
DI	0000	0 to 7,10 to 17,20 to 27
DO	0001	0 to 7,10 to 17,20 to 27
MO	0010	0 to 7,10 to 17,20 to 27
LO	0011	0
TO	0100	0
SI	0101	0 to 7,10 to 17,20 to 27
SO	0110	0 to 7,10 to 17,20 to 27

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4	Port number	bit 3−bit 0	Not used	0
		bit 7−bit 4	Units of port number	r
		bit 11−bit 8	Tens of port number	q
		bit 15−bit 12	Specified port type	p
Im+6	Bit pattern			0x00bb
Im+8	Not used			
to				
Im+30				

r, q : Shows the place of each port number in 4 bits.

p : Shows the port type in 4 bits.

bb : Shows the bit pattern in 8 bits. When in bit units, 0 or 1 is used to show the bit pattern.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to obtain the following port data.
Output port = DO12 ()

Address	Value
Qn	0x0304
Qn+2	0x0000
Qn+4	0x1120
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.
Output port = DO12 ()
Numerical data = 7

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x1120
Im+6	0x0007
Im+8	0x0000
to	
Im+30	

Example:
Use this command as shown at right, to output a numerical value to the following port data.
Input port = DI2 ()

Address	Value
Qn	0x0304
Qn+2	0x0000
Qn+4	0x0020
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.
Input port = DI2 ()
Numerical data = 127

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0020
Im+6	0x007F
Im+8	0x0000
to	
Im+30	

4.6 Category 5 remote commands

Category 5 remote commands are key operation commands. A command list is given below.

NOTE
Category 5 commands can be used in AUTO mode.

No.	Command contents		Command code (Qn)
1	Execution program designation		0x0401
2	Program execution	Program execution	0x0402
		Program step execution	0x0403
		Program skip execution	0x0404
		Program next execution	0x0405
3	Program reset		0x0406
4	Program task switching		0x0407
5	Program execution information reference		0x0408

I, Q : Input/output address
m, n : Start address assigned by hardware configuration

* Key operation commands are the same as key instructions from the programming box. Normal status signifies that key input was received correctly and does not mean the actual operation was executed.
* Upon receiving a normal status after issuing a key command, allow a time interval of at least 100ms before issuing the next command. This interval will prevent errors that may occur when issuing consecutive commands.
* Check the robot program in-progress status output signal (SO13) to verify a program execution command has been run.
* Check the program reset status output signal (SO14) to verify the program reset command has been run.

4.6.1 Execution program designation

Use this command to execute a robot program.

- **Command**

Address	Contents	Value
Qn	Command code	0x0401
Qn+2	Not used	0x0000
Qn+4	Program name	0xbbbb
Qn+6		0xbbbb
Qn+8		0xbbbb
Qn+10		0xbbbb
Qn+12	Not used	0x0000
to		
Qn+30		

bb : Specify the 1-byte program name in 8 bits. (little endian)
Specify a program name with letters (uppercase), numbers and underscores (_). When the program name is shorter than 8 characters, use a space.

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to specify a program name "ABC_DE".

Address	Value
Qn	0x0401
Qn+2	0x0000
Qn+4	0x4241
Qn+6	0x5F43
Qn+8	0x4544
Qn+10	0x2020
Qn+12	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
to	
Im+30	

4.6.2 Program execution

These commands execute robot program operations. These are only valid in AUTO mode.

Command	Meaning
Program execution	Starts automatic operation of a robot program. Performs the same processing as the START key on PB and start input (SI12). Use the program in-progress status output signal (SO13) to verify the program is in progress.
Program step execution	Executes one line in the robot program. Enters the subroutine when a GOSUB statement is used. Performs the same processing as the STEP key (F11) on PB.
Program skip execution	Skips one line in the program. Performs the same processing as the SKIP key (F12) on PB.
Program next execution	Executes one line in the robot program. Executes the entire subroutine when a GOSUB statement is used. Performs the same processing as the NEXT key (F13) on PB.

- **Command**

Address	Contents		Value
Qn	Command code	Program execution	0x0402
		Program step execution	0x0403
		Program skip execution	0x0404
		Program next execution	0x0405
Qn+2	Not used		0x0000
to			
Qn+30			

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use these commands to execute a program as shown at right.

Address	Value
Qn	0x0402
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
to	
Im+30	

4.6.3 Program reset

This command resets the robot program. This is only valid in AUTO mode. Check the program reset status output signal (SO14) to verify the program has been reset.

- **Command**

Address	Contents	Value
Qn	Command code	0x0406
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command to reset a program as shown at right.

Address	Value
Qn	0x0406
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
to	
Im+30	

4.6.4 Program task switching

This command switches tasks to run, when the robot program is stopped. This is only valid in AUTO mode.

- **Command**

Address	Contents	Value
Qn	Command code	0x0407
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
to		
Im+30		

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command to switch tasks as shown at right.

Address	Value
Qn	0x0407
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
to	
Im+30	

4.6.5 Program execution information reference

Execute this command to acquire information on task execution, when the robot program is stopped. This is only valid in AUTO mode.

- **Command**

Address	Contents	Value
Qn	Command code	0x0408
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Program name	0xbbbb
Im+6		0xbbbb
Im+8		0xbbbb
Im+10		0xbbbb
Im+12	Task number	0xtttt
Im+14	Execution line number	0xllll
Im+16	Task priority	0xpppp
Im+18	Not used	
to		
Im+30		

bb : Shows the 1-byte program name in 8 bits. (little endian).
Program names are shown with letters (uppercase), numbers and underscores
(_). A space indicates a portion in the program name not having all 8 characters.

tttt : Shows the urrently selected task number (1 to 8).

llll : Shows the currently executed line of selected task (1 to 9999). A value + 10000 is shown when COMMON program is running.

pppp : Shows the priority of curretly selected task (17 to 47).

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command to switch program tasks as shown at right.

Address	Value
Qn	0x0408
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly to switch to the following program task.

Program name = "ABCDEFGH"
Task number = 2
Execution number = 101
Task priority = 32

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x4241
Im+6	0x4443
Im+8	0x4645
Im+10	0x4847
Im+12	0x0002
Im+14	0x0065
Im+16	0x0020
Im+18	0x0000
to	
Im+30	

4.7 Category 6 remote commands

Category 6 remote commands are data handling commands. A command list is given below.

No.	Command contents			Command code (Qn)
1	Version information reference			0x0501
2	Controller configuration reference			0x0502
3	Servo status reference			0x0503
4	Absolute reset status reference			0x0504
5	Current position reference	Pulse units	For main robot	0x0505
			For sub robot*	0x0585
		Millimeter units	For main robot	0x0506
			For sub robot*	0x0586
6	Task status reference			0x0507
7	Task execution reference			0x0508
8	Message reference			0x0509
9	Speed status reference			0x050A
10	Arm designation status reference			0x050B
11	Arch arm status reference			0x050C
12	Service mode status reference			0x050D
13	Point unit status reference			0x050E
14	Return-to-origin status reference			0x050F

* Sub robot not used in OMRON version

I, Q : Input/output address
m, n : Start address assigned by hardware configuration

4.7.1 Version information reference

Execute this command to acquire information on the sotware version used in the robot controller.

- **Command**

Address	Contents	Value
Qn	Command code	0x0501
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Host software version	0xaabb
Im+6	Host software revision	0xcccc
Im+8	Axis-1 driver software version	0xddee
Im+10	Axis-2 driver software version	0xddee
Im+12	Axis-3 driver software version	0xddee
Im+14	Axis-4 driver software version	0xddee
Im+16	Axis-5 driver software version	0xddee
Im+18	Axis-6 driver software version	0xddee
Im+20	Axis-7 driver software version	0xddee
Im+22	Axis-8 driver software version	0xddee
Im+24	Not used	
to		
Im+30		

aabb : Shows the controller's host software version in upper 8 bits and lower 8 bits.

cccc : Shows the controller's host software revision in 16 bits.

ddee : Shows the controller's driver software version in uper 8 bits and lower 8 bits.
For axes that do not exist actually, the value is 0x0FFF.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bis.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bis.

Example:
Use this command to obtain a software version as shown at right.

Address	Value
Qn	0x0501
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Host software version : V8.08
Host software revision : R1013
Axis-1 driver software version : V1.01
Axis-2 driver software version : V1.01
Axis-3 driver softwre version : V1.01
Axis-4 driver software version : V1.01

No other axis exists.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0808
Im+6	0x03F5
Im+8	0x0101
Im+10	0x0101
Im+12	0x0101
Im+14	0x0101
Im+16	0x0FFF
Im+18	0x0FFF
Im+20	0x0FFF
Im+22	0x0FFF
Im+24	0x0000
to	
Im+30	

4.7.2 Controller configuration reference

Execute this command to acquire information on the settings made for the robot controller.

- **Command**

Address	Contents	Value
Qn	Command code	0x0502
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Main robot number	0xaaaa
Im+6	*Sub robot number	0xaaaa
Im+8	Axis-1 robot number	0xaaaa
Im+10	Axis-2 robot number	0xaaaa
Im+12	Axis-3 robot number	0xaaaa
Im+14	Axis-4 robot number	0xaaaa
Im+16	Axis-5 robot number	0xaaaa
Im+18	Axis-6 robot number	0xaaaa
Im+20	Axis-7 robot number	0xaaaa
Im+22	Axis-8 robot number	0xaaaa
Im+24	Unit number of option slot No. 1	0xpppp
Im+26	Unit number of option slot No. 2	0xpppp
Im+28	Unit number of option slot No. 3	0xpppp
Im+30	Unit number of option slot No. 4	0xpppp

* Sub robot not used in OMRON version

aaaa : Shows the robot number.
The robot number is determined before shipment acording to the user specifications.

pppp : Shows the option slot unit No.

No.	Unit
0	Non
6	DIO unit (NPN specifications)
7	DIO unit (PNP specifications)
16	CC-Link unit
17	DeviceNet unit
18	Profibus unit
19	Ethernet unit
21	YC-Link unit

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command to obtain the robot configuration as shown at right.

Address	Value
Qn	0x0502
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Main robot number : 2000 (R6YXH250)
Sub robot number : 100 (no robot)
Axis-1 robot number : 2000 (R6YXH250)
Axis2 robot number : 200 (R6YXH250)
Axis-3 robot number : 200 (R6YXH250)
Axs-4 robot number : 2000 (R6YXH250)
Axis-5 robot number : 0 (no axis)
Axis-6 robot number : 0 (no axis)
Axis-7 robot number : 0 (no axis)
Axis-8 robot number : 0 (no axis)
Option slot 1 : 18 (Profibus unit)
Option slot 2 : 6 (DIO unit (NPN specifications))
Option slot 3 : 6 (DIO unit (NPN specifications))
Option slot 4 : 0 (no unit)

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x07D0
Im+6	0x0064
Im+8	0x07D0
Im+10	0x07D0
Im+12	0x07D0
Im+14	0x07D0
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
Im+22	0x0000
Im+24	0x0012
Im+26	0x0006
Im+28	0x0006
Im+30	0x0000

4.7.3 Servo status reference

Execute this command to acquire information on servo status.

- **Command**

Address	Contents	Value
Qn	Command code	0x0503
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Axis-1 information	0xaaaa
Im+6	Axis-2 information	0xaaaa
Im+8	Axis-3 information	0xaaaa
Im+10	Axis-4 information	0xaaaa
Im+12	Axis-5 information	0xaaaa
Im+14	Axis-6 information	0xaaaa
Im+16	Axis-7 information	0xaaaa
Im+18	Axis-8 information	0xaaaa
Im+20	Not used	
to		
Im+30		

aaaa : Shows the servo status of each axis.

Value	Contents	
0	Servo OFF + mechanical brake ON	(Brake)
1	Servo ON	(Servo)
2	Servo OFF + mechanical brake OFF	(Free)
9	No axis	

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows te additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command to acquire a servo status as shown at right.

Address	Value
Qn	0x0503
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Axis 1 : 1 (Servo ON)
Axis 2 : 1 (Servo ON)
Axis 3 : 2 (Servo Free)
Axis 4 : 1 (Servo ON)
Axis 5 : 9 (no axis)
Axis 6 : 9 (no axis)
Axis 7 : 9 no axis)
Axis 8 : 9 (no axis)

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0001
Im+6	0x0001
Im+8	0x0002
Im+10	0x0001
Im+12	0x0009
Im+14	0x0009
Im+16	0x0009
Im+18	0x0009
Im+20	0x0000
to	
Im+30	

4.7.4 Absolute reset status reference

Execute this command to acquire information on absolute reset status.

- **Command**

Address	Contents	Value
Qn	Command code	0x0504
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Axis-1 information	0xaaaa
Im+6	Axis-2 information	0xaaaa
Im+8	Axis-3 information	0xaaaa
Im+10	Axis-4 information	0xaaaa
Im+12	Axis-5 information	0xaaaa
Im+14	Axis-6 information	0xaaaa
Im+16	Axis-7 information	0xaaaa
Im+18	Axis-8 information	0xaaaa
Im+20	Not used	
to		
Im+30		

aaaa : Shows the absolute reset status of each axis.

Value	Contents
0	Return-to-origin incomplete
1	Return-to-origin complete
9	No axis

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command to acquire an absolute reset status as shown at right.

Address	Value
Qn	0x0504
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Axis 1 : 1 (Return-to-origin complete)
Axis 2 : 1 (Return-to-origin complete)
Axis 3 : 0 (Return-to-origin incomplete)
Axis 4 : 1 (Return-to-origin complete)
Axis 5 : 9 (no axis)
Axis 6 : 9 (no axis)
Axis 7 : 9 (no axis)
Axis 8 : 9 (no axis)

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0001
Im+6	0x0001
Im+8	0x0000
Im+10	0x0001
Im+12	0x0009
Im+14	0x0009
Im+16	0x0009
Im+18	0x0009
Im+20	0x0000
to	
Im+30	

4.7.5 Current position reference

Execute this command group to obtain the robot current position data.

4.7.5.1 Pulse designation

Use this command to obtain the robot current position data in pulse units.

- **Command**

Address	Contents		Value
Qn	Command code	For main robot	0x0505
		For sub robot*	0x0585
Qn+2	Not used		0x0000
to			
Qn+30			

* Sub robot not used in OMRON version

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	0
		bit 15−bit 1	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Axis-5 data			0xbbbbbbbb
Im+26				
Im+28	Axis-6 data			0xbbbbbbbb
Im+30				

bbbbbbbb : Shows the current position output data in 32 bits. (little endian) Data is shown in integers.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to obtain the main robot current position data in pulse units.

Address	Value
Qn	0x0505
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly to obtain the following positions in pulse units.

Axis 1 = 20001
Axis 3 = -12345
Other axes = 0

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0000
Im+8	0x4E21
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0xCFC7
Im+18	0xFFFF
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.7.5.2 Millimeter designation

Use this command to obtain the robot current position data in millimeter units.

- **Command**

Address	Contents		Value
Qn	Command code	For main robot	0x0506
		For sub robot*	0x0586
Qn+2	Not used		0x0000
to			
Qn+30			

* Sub robot not used in OMRON version

- **Status**

Normal end

Address	Contents			Value
Im	Status code			0x0200
Im+2	Not used			
Im+4				
Im+6	Point flag	bit 0	Point unit	1
		bit 2−bit 1	Hand system	tt
		bit 15−bit 3	Not used	0
Im+8	Axis-1 data			0xbbbbbbbb
Im+10				
Im+12	Axis-2 data			0xbbbbbbbb
Im+14				
Im+16	Axis-3 data			0xbbbbbbbb
Im+18				
Im+20	Axis-4 data			0xbbbbbbbb
Im+22				
Im+24	Axis-5 data			0xbbbbbbbb
Im+26				
Im+28	Axis-6 data			0xbbbbbbbb
Im+30				

tt : Shows in 2 bits the current hand system.
Valid only for a SCARA robot is specified.

Value	Meaning
01	Right-handed is specified.
10	Left-handed is specified.

bbbbbbbb : Shows the current position output data in 32 bits. (little endian)
Data is shown in integers (x100).

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to obtain the main robot current position data in millimeter units.

Address	Value
Qn	0x0506
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly to obtain the following positions in millimeter units.

Axis 1 = 200.01
Axis 3 = -123.45
Other axes = 0.00

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0000
Im+6	0x0001
Im+8	0x4E21
Im+10	0x0000
Im+12	0x0000
Im+14	0x0000
Im+16	0xCFC7
Im+18	0xFFFF
Im+20	0x0000
Im+22	0x0000
Im+24	0x0000
Im+26	0x0000
Im+28	0x0000
Im+30	0x0000

4.7.6 Task status reference

Execute this command to acquire task execution status.

- **Command**

Address	Contents	Value
Qn	Command code	0x0507
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Execution status of task 1	0xaaaa
Im+6	Execution status of task 2	0xaaaa
Im+8	Execution status of task 3	0xaaaa
Im+10	Execution status of task 4	0xaaaa
Im+12	Execution status of task 5	0xaaaa
Im+14	Execution status of task 6	0xaaaa
Im+16	Execution status of task 7	0xaaaa
Im+18	Execution status of task 8	0xaaaa
Im+20	Not used	
to		
Im+30		

aaaa : Shows the execution status of each task.

Value	Contents
0	Stop status
1	Run status (Ready status / Wait status)
2	Suspend status
9	No task

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to acquire the execution status of a task.

Address	Value
Qn	0x0507
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Task 1 : 1 (Run status)
Task 2 : 1 (Run status)
Task 3 : 9 (no task)
Task 4 : 9 (no task)
Task 5 : 2 (Suspend status)
Task 6 : 9 (no task)
Task 7 : 9 (no task)
Task 8 : 9 (no task)

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0001
Im+6	0x0001
Im+8	0x0009
Im+10	0x0009
Im+12	0x0002
Im+14	0x0009
Im+16	0x0009
Im+18	0x0009
Im+20	0x0000
to	
Im+30	

4.7.7 Task execution line reference

Execute this command to acquire information on task execution line.

- **Command**

Address	Contents	Value
Qn	Command code	0x0508
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Execution line of task 1	0xaaaa
Im+6	Execution line of task 2	0xaaaa
Im+8	Execution line of task 3	0xaaaa
Im+10	Execution line of task 4	0xaaaa
Im+12	Execution line of task 5	0xaaaa
Im+14	Execution line of task 6	0xaaaa
Im+16	Execution line of task 7	0xaaaa
Im+18	Execution line of task 8	0xaaaa
Im+20	Not used	
to		
Im+30		

aaaa : Shows the execution line of each task.
When no task exists, the value is 0.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to acquire the execution line of a task.

Address	Value
Qn	0x0508
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Task 1 : Execution on first line
Task 2 : Execution on 19th line
Task 3 : no task
Task 4 : no task
Task 5 : Execution on 99th line
Task 6 : no task
Task 7 : no task
Task 8 : no task

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0001
Im+6	0x0013
Im+8	0x0000
Im+10	0x0000
Im+12	0x0063
Im+14	0x0000
Im+16	0x0000
Im+18	0x0000
Im+20	0x0000
to	
Im+30	

4.7.8 Message reference

Execute this command to acquire information on error message status.

- **Command**

Address	Contents	Value
Qn	Command code	0x0509
Qn+2	Not used	0x0000
Qn+4	Error acquisition number	0xaaaa
Qn+6	Not used	0x0000
to		
Qn+30		

aaaa : Specify the error acquisition number.

No.	Contents
0	Message currently displayed on programming box.
1 to 500	Message number stored in error history.

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to acquire the status of an error message.

Address	Value
Qn	0x0509
Qn+2	0x0000
Qn+4	0x000A
Qn+6	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0C02
Im+4	0x0000
Im+6	0x0000
to	
Im+30	

4.7.9 Speed status reference

Execute this command to acquire information on current speed status.

- **Command**

Address	Contents	Value
Qn	Contents	0x050A
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents		Value
Im	Status code		0x0200
Im+2	Not used		
Im+4	Main robot	AUTO mode speed	0xaaaa
Im+6		MANUAL mode speed	0xaaaa
Im+8	Sub robot*	AUTO mode speed	0xaaaa
Im+10		MANUAL mode speed	0xaaaa
Im+12	Not used		
to			
Im+30			

* Sub robot not used in OMRON version

aaaa : Shows the speed setting (1 to 100).
Shows "0" when no robot axis is specified.

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use the speed status reference command as shown at right, to acquire the status of current speed.

Address	Value
Qn	0x050A
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Main robot speed in AUTO mode : 50%
Main robot speed in MANUAL mode : 50%

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0032
Im+6	0x0032
Im+8	0x0000
Im+10	0x0000
Im+12	0x0000
to	
Im+30	

4.7.10 Arm designation status reference

Execute this command to acquire information on currently designated arm.

- **Command**

Address	Contents	Value
Qn	Command code	0x050B
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Main robot status	0xaaaa
Im+6	*Sub robot status	0xaaaa
Im+8	Not used	
to		
Im+30		

* Sub robot not used in OMRON version

aaaa : Shows the arm designation status.

Value	Contents
0	Right-handed system status
1	Left-handed system status
9	Robots other than SCARA robot

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to acquire the status of currently specified arm.

Address	Value
Qn	0x050B
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Main robot : 1 (Left-handed system status)
Sub robot : 9

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0001
Im+6	0x0009
Im+8	0x0000
to	
Im+30	

4.7.11 Arm status reference

Execute this command to acquire information on arm.

- **Command**

Address	Contents	Value
Qn	Command code	0x050C
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Main robot status	0xaaaa
Im+6	*Sub robot status	0xaaaa
Im+8	Not used	
to		
Im+30		

* Sub robot not used in OMRON version

aaaa : Shows the arm status.

Value	Contents
0	Right-handed system status
1	Left-handed system status
9	Robots other than SCARA robot

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to acquire the status of arm.

Address	Value
Qn	0x050C
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.
Main robot : 1 (Left-handed system status)
Sub robot : 9

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0001
Im+6	0x0009
Im+8	0x0000
to	
Im+30	

4.7.12 Service mode status reference

Execute this command to acquire current information on service mode.
To use this command, DI dedicated input must be enabled by input device exclusive control.

- **Command**

Address	Contents	Value
Qn	Command code	0x050D
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Setting status	0xaaaa
Im+6	Not used	
to		
Im+30		

aaaa : Shows the service mode setting status.

Value	Contents
0	Normal mode
1	Service mode

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to acquire the status of service mode.

Address	Value
Qn	0x050D
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0001
Im+6	0x0000
to	
Im+30	

4.7.13 Point unit status reference

Execute this command to acquire current information on point units.

- **Command**

Address	Contents	Value
Qn	Command code	0x050E
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Setting status	0xaaaa
Im+6	Not used	
to		
Im+30		

aaaa : Shows the point setting status.

Value	Contents
0	Pulse units
1	Millimeter units
2	Tool coordinates

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command as shown at right, to acquire the status of point units.

Address	Value
Qn	0x050E
Qn+2	0x0000
to	
Qn+30	

Values are expressed as shown at right when executed correctly.

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0001
Im+6	0x0000
to	
Im+30	

4.7.14 Return-to-origin status reference

Execute this command to acquire information on the return-to-origin status.

- **Command**

Address	Contents	Value
Qn	Command code	0x050F
Qn+2	Not used	0x0000
to		
Qn+30		

- **Status**

Normal end

Address	Contents	Value
Im	Status code	0x0200
Im+2	Not used	
Im+4	Axis-1 information	0xaaaa
Im+6	Axis-2 information	0xaaaa
Im+8	Axis-3 information	0xaaaa
Im+10	Axis-4 information	0xaaaa
Im+12	Axis-5 information	0xaaaa
Im+14	Axis-6 information	0xaaaa
Im+16	Axis-7 information	0xaaaa
Im+18	Axis-8 information	0xaaaa
Im+20	Not used	
to		
Im+30		

aaaa : Shows the return-to-origin status of each axis.

Value	Contents
0	Return-to-origin incomplete
1	Return-to-origin complete
9	No axis

Abnormal end

Address	Contents	Value
Im	Status code	0x4000
Im+2	Error code	0xaabb
Im+4	Additional information	0xccdd
Im+6	Not used	
to		
Im+30		

aabb : Shows the group number in upper 8 bits, and the category number in lower 8 bits.

ccdd : Shows the additional information section in upper 8 bits, and the detail value in lower 8 bits.

Example:
Use this command to obtain a return-to-origin status as shown at right.

Address	Value
Qn	0x050F
Qn+2	0x0000
to	
Qn+30	

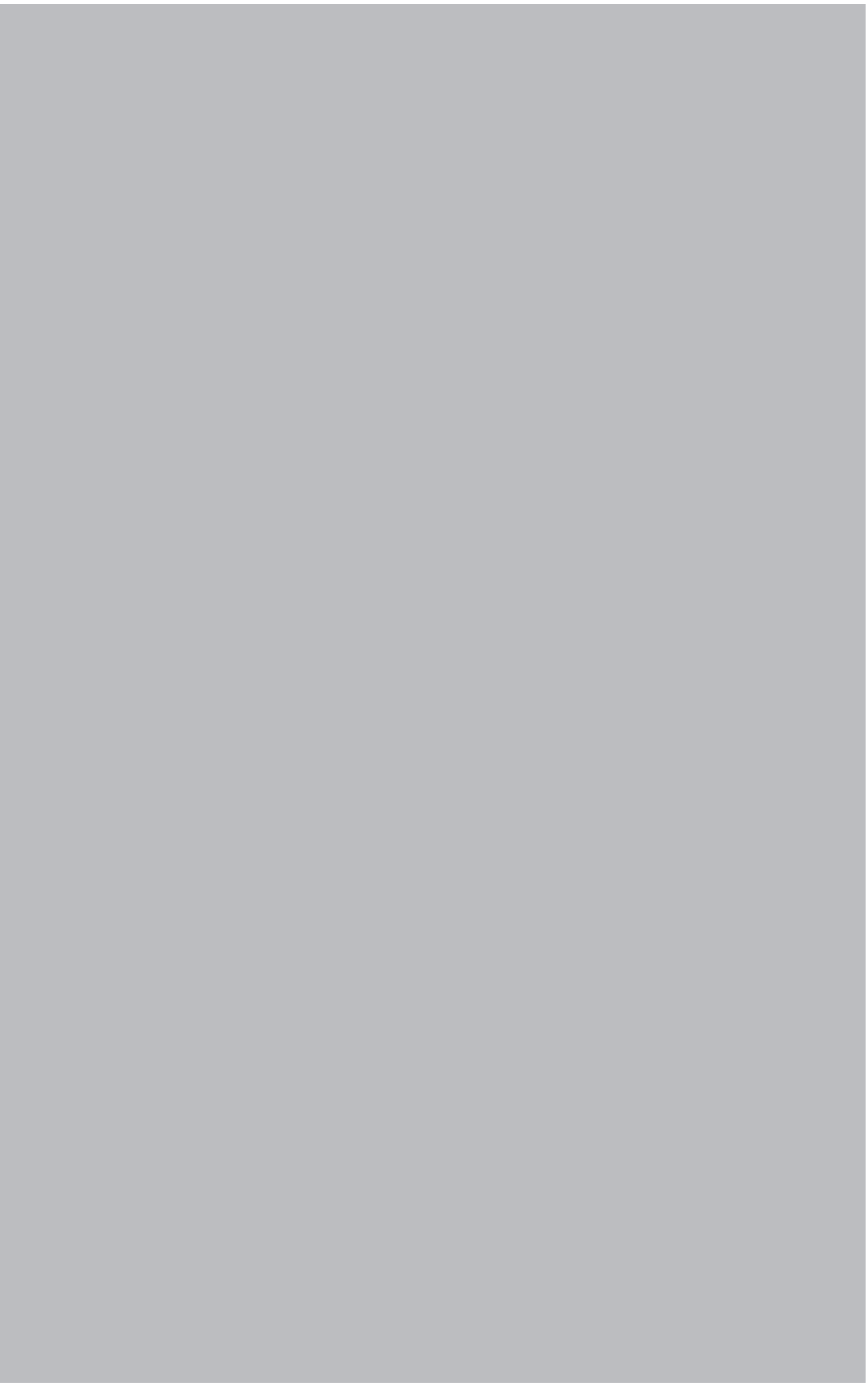
Values are expressed as shown at right when executed correctly.

Axis 1 : 1 (Return-to-origin complete)
Axis 2 : 1 (Return-to-origin complete)
Axis 3 : 0 (Return-to-origin incomplete)
Axis 4 : 1 (Return-to-origin complete)
Axis 5 : 9 (no axis)
Axis 6 : 9 (no axis)
Axis 7 : 9 (no axis)
Axis 8 : 9 (no axis)

Address	Value
Im	0x0200
Im+2	0x0000
Im+4	0x0001
Im+6	0x0001
Im+8	0x0000
Im+10	0x0001
Im+12	0x0009
Im+14	0x0009
Im+16	0x0009
Im+18	0x0009
Im+20	0x0000
to	
Im+30	

Chapter 3 IO COMMANDS

Contents



1. IO command format

Using bit information from the SI/SO port on the PROFIBUS compatible module allows issuing commands directly from the PLC. It is now possible to execute commands such as the MOVE command that were impossible to execute up until now without using the robot program or RS-232C port.

CAUTION

TO USE REMOTE COMMANDS, THE "REMOTE CMD / IO CMD (SI05)" PARAMETER IN SYSTEM > PARAM > OP.BRD MODE MUST BE SET TO "VALID" IN ADVANCE. REFER TO THE PROFIBUS USER'S MANUAL AND CONTROLLER USER'S MANUAL FOR MORE DETAILS.

The following features are assigned to each IO.

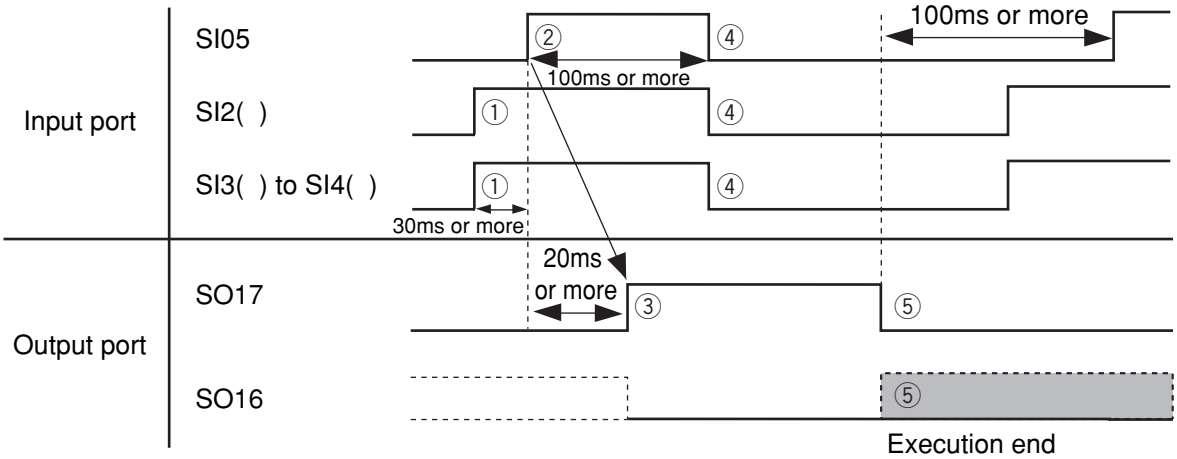
Output (Controller → PLC)		Input (Controller ← PLC)	
Output por	**Contents**	**Input port**	**Contents**
SO16	Execution check output	SI05	IO command execution trigger input
SO17	Execution in-progress output	SI2()	Command code
		SI3()	Command data
		SI4()	

- IO commands cannot be executed simultaneously with remote commands.
- Commands cannot be executed unless the status is ready to accept commands (0x0000).
- IO commands cannot be executed while program execution is in progress (SO13 is ON).
- IO commands cannot be executed simultaneously with on-line commands.
- IO commands assign command codes to be executed to SI2(), and command data to SI3() and SI4(). These are executed when the SI05 is changed from OFF to ON. The controller processes the IO commands when they are received and sends execution check results and execution in-progress information to the PLC via SO16 and SO17.
- Command data added to the IO commands will differ according to the IO command. See detailed information available on the IO commands. Command data settings must always be made before attempting to set the IO commands.
- Data is set in binary code. If the data size is greater than 8 bits, set the upper bit data into the higher address. (little endian)
  For example, to set 0x0F9F [hexadecimal] (=3999) in the SI13 () and SI14 () ports, set 0x0F [hexadecimal] in SI4 () and set 0x9F [hexadecimal] in SI13 ().
- The IO command execution trigger is disabled when the execution in-progress output SO17 is ON.
- The execution in-progress output SO17 is ON in the following cases.
  - When an IO command is running after receiving IO command execution trigger input.
  - When an IO command is terminated after receiving IO command execution trigger input yet a maximum of 100ms state is maintained when IO command trigger input is ON.

- The IO command trigger input pulse must always be maintained for 100ms or more during input. Commands cannot be accepted if this state is not maintained.
- Sometimes 20ms or more is needed for the execution in-progress output SO17 to turn ON after startup (rising edge) of the IO command trigger input pulse. The IO command trigger input might not be accepted during this period.
- After inputting the IO command trigger input pulse and the in-progress output turns OFF, at least a 100ms time period must always elapse before executing the next command. If this elapsed time period is too small, the IO command execution trigger input might not be accepted.
- The execution check output SO16 turns OFF when an IO command is received.
- The execution check output SO16 turns ON when an IO command ended correctly, but stays OFF if an IO command ended abnormally.

2. Sending and receiving IO commands

Sending and receiving is performed in the IO register as shown below.



1- Set command code and command data (Time interval between 1 and 2: 30ms or more)

2- Set IO command execution trigger input (Pulse width: 100ms or more)

3- Transition to execute

4- Clear the IO command trigger input, command code and command data

5- Set termination of IO command and execution check output

Example : Follow these steps when sending and receiving IO commands to execute the PTP movement command to point 19.

1- Set the following values in the register to execute the PTP movement command by designating a point.

SI2 ( ) : Command code (0x01)
SI3 ( ) : Lower point setting (0x13= point 19)
SI4 ( ) : Upper point setting (0x00=point 19)

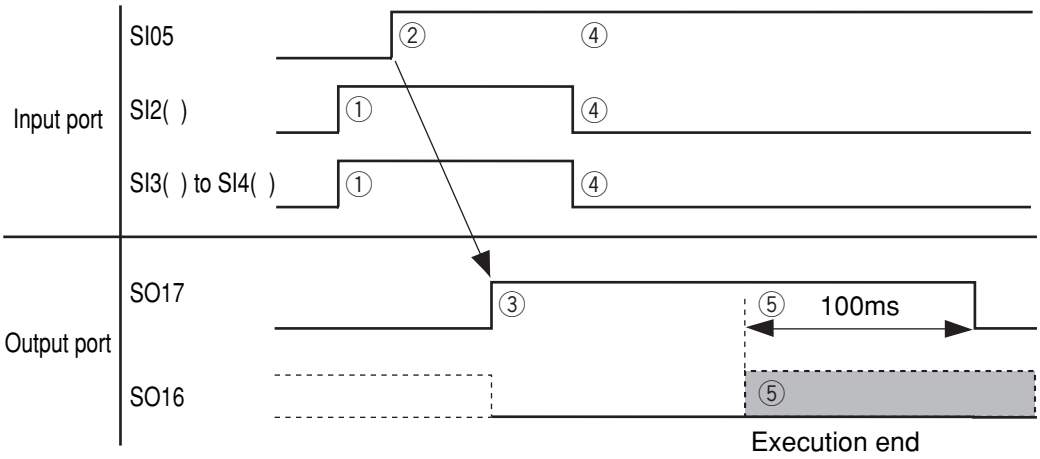
2- Set to ON after SI05 turns OFF.

3- The controller receives the IO command and executes it if the command and command data are acceptable. The in-progress output (SO17) turns ON and the execution check output (SO16) is turned OFF at this time. The robot moves to the position specified by point 19.

4- Clear SI2 ( ) through SI4 ( ) after checking that in-progress output (SO17) is ON.

5- The command has ended so in-progress output (SO17) turns OFF and execution check output (SO16) turns ON if command ended correctly, and turns OFF if the command failed.

* If SI05 was not set to OFF in 4, the in-progress output (SO17) remains ON for a maximum of 100ms from the timing in 5.



3. IO command list

IO commands are expressed with hexadecimal codes.

No.	Command contents		Command code (SI2( ))	
			Main robot	Sub robot*
1	MOVE command	PTP point designation	0x01	0x81
		Linear interpolation	0x03	0x83
2	MOVEI command	PTP designation	0x09	0x89
3	Pallet movement command	PTP designation at pallet 0	0x18	0x98
4	Jog movement command		0x20	0xA0
5	Inching movement command		0x24	0xA4
6	Point teaching command		0x28	0xA8
7	Absolute reset movement command		0x30	0xB0
8	Absolute reset command		0x31	0xB1
9	Return-to-origin command		0x32	0xB2
10	Servo command	On designation	0x34	0xB4
		Off designation	0x35	0xB5
		Free designation	0x36	0xB6
		Power-on designation	0x37	
11	Manual movement speed command		0x38	0xB8
12	Auto movement speed command		0x39	0xB9
13	Program speed change command		0x3A	0xBA
14	Shift designation change command		0x3B	0xBB
15	Hand designation change command		0x3C	0xBC
16	Arm designation change command		0x3D	0xBD
17	Point display unit designation command		0x3E	

* Sub robot not used in OMRON version.

* The pallet movement command (3) is only valid for pallet 0.
* The movement methods on the jog movement command (4) and inching movement command (5) will differ according to the point units that were specified.
* The point teaching command (6) uses different point units according to the point units that were specified.
* If no axis is specified, the absolute reset command (8) is executed on all axes (main robot + sub robot) in either case of command code 0x31 or 0xB1.
* If no axis is specified, the return-to-origin command (9) is executed on all axes (main robot + sub robot) in either case of command code 0x32 or 0xB2.
* The point display unit designation command (17) is for use on the controller.

4. IO command description

4.1 MOVE command

Execute this command group to move the robot to an absolute position.

4.1.1 PTP designation

This command moves the robot to a target position in PTP motion by specifying the point number.

- **Command**

SI port	Contents		Value
SI2()	Command code	For main robot	0x01
		For sub robot*	0x81
SI3()	Point number		0xpppp
SI4()			

* Sub robot not used in OMRON version.

pppp : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

NOTE

When a SCARA robot is used and a hand system flag is set for the point data you specify, that hand system has priority over the current arm type.

4.1.2 Linear interpolation

This command moves the robot to a target position by linear interpolation by specifying the point number.

- **Command**

SI port	Contents		Value
SI2()	Command code	For main robot	0x03
		For sub robot*	0x83
SI3()	Point number		0xpppp
SI4()			

* Sub robot not used in OMRON version.

pppp : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

CAUTION

• WHEN MOVING THE ROBOT BY LINEAR INTERPOLATION TO A POINT WHERE A HAND SYSTEM FLAG IS SPECIFIED, MAKE SURE THAT THE SAME HAND SYSTEM IS USED AT THE CURRENT POSITION AND TARGET POSITION. IF THE SAME HAND SYSTEM IS NOT USED, THEN AN ERROR WILL OCCUR AND ROBOT MOVEMENT WILL NOT BE ALLOWED.

NOTE

When a SCARA robot is used and a hand system flag is set for the point data you specify, that hand system has priority over the current arm type.

4.2 MOVEI command

Execute this command group to move the robot to a relative position.

4.2.1 PTP designation

This command moves the robot a specified distance in PTP motion by specifying the point number.

NOTE
- The other parameters default "MOVEI/DRIVEI start position" setting is Keep (motion to the original target position when MOVEI is interrupted and then re-executed).

- **Command**

SI port	Contents		Value
SI2()	Command code	For main robot	0x09
		For sub robot*	0x89
SI3()	Point number		0xpppp
SI4()			

* Sub robot not used in OMRON version.

pppp : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

NOTE
When a SCARA robot is used and a hand system flag is set for the point data you specify, that hand system has priority over the current arm type.

4.3 Pallet movement command

Execute this command group to move the robot to a position with respect to pallet 0.

4.3.1 PTP designation

This command moves the robot to a target position in PTP motion by specifying the work position number.

- **Command**

SI port	Contents		Value
SI2()	Command code	For main robot	0x18
		For sub robot*	0x98
SI3()	Work position number		0xwwww
SI4()			

* Sub robot not used in OMRON version.

wwww : Specify the work position number in 16 bits.
Specified range: 1 (=0x0001) to 32767 (=0x7FFF)

4.4 Jog movement command

This command moves the robot in jog mode while in MANUAL mode. This command is only valid in MANUAL mode. This command is linked with the controller point display units.
The robot axis moves in PTP motion when display units are in pulses, and moves by linear interpolation on Cartesian coordinates when units are in millimeters. Jog speed is determined by the MANUAL speed.

To stop the jog movement command, set the dedicated input interlock signal (SI11) to OFF. After checking that jog movement has stopped, set the interlock signal back to ON.

- **Command**

SI port	Contents			Value
SI2()	Command code		For main robot	0x20
			For sub robot*	0xA0
SI3()	Axis to move and direction	bit 0	Axis 1	tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 6−bit 4	(0:Fixed)	0
		bit 7	Direction	d
SI4()	Not used			0x00

* Sub robot not used in OMRON version.

tt : Specify the axis to move in 0 to 3 bits. Only one axis can be specified.

d : Specify the movement direction in 1 bit.

Value	Meaning
0	+ direction
1	- direction

4.5 Inching movement command

Execute this command to move the robot by inching in MANUAL mode. Inching movement distance is linked to the manual movement speed. The inching command can only be executed in MANUAL mode.
This command is linked with the controller's point display unit system. So when display units are in pulses, the axis moves a certain number of pulses at the manual speed setting. When display units are in millimeters, the axis moves on Cartesian coordinates by linear interpolation at the manual speed setting divided by 100.

- **Command**

SI port	Contents			Value
SI2()	Command code		For main robot	0x24
			For sub robot*	0xA4
SI3()	Axis to move and direction	bit 0	Axis 1	tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 6−bit 4	(0:Fixed)	0
		bit 7	Direction	d
SI4()	Not used			0x00

* Sub robot not used in OMRON version.

tt : Specify the axis to move in 0 to 3 bits. Only one axis can be specified.

d : Specify the movement direction in 1 bit.

Value	Meaning
0	+ direction
1	- direction

4.6 Point teaching command

Execute this command to teach the current robot position to the specified point number.
Point data units of this command are linked to the controller's point display unit system.

- **Command**

SI port	Contents		Value
SI2()	Command code	For main robot	0x28
		For sub robot*	0xA8
SI3()	Point number		0xpppp
SI4()			

* Sub robot not used in OMRON version.

pppp : Specify the point number in 16 bits.
Specified range: 0 (=0x0000) to 9999 (=0x270F)

4.7 Absolute reset movement command

When absolute reset of the specified axis uses the mark method, this command moves the axis to the nearest position where absolute reset can be executed. Positions capable of absolute reset are located at every 1/4 rotation of the motor.

- **Command**

SI port	Contents			Value
SI2()	Command code		For main robot	0x30
			For sub robot*	0xB0
SI3()	Axis to move and direction	bit 0	Axis 1	tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 6−bit 4	(0:Fixed)	0
		bit 7	Direction	d
SI4()	Not used			0x00

* Sub robot not used in OMRON version.

tt : Specify the axis to move in 0 to 3 bits. Only one axis can be specified.

d : Specify the movement direction in 1 bit.

Value	Meaning
0	+ direction
1	- direction

4.8 Absolute reset command

This command executes absolute reset of the specified axis. When absolute reset of the specified axis uses the mark method, the axis must be at a position where absolute reset can be executed. If no axis is specified (SI3() is 0), then absolute reset is performed on all axes (main robot + sub robot) in either case of command code 0x31 or 0xB1. However, this command cannot be executed if return-to-origin is not yet complete on the axis using the mark method. In this case, perform return-to-origin individually on each axis.

- **Command**

SI port	Contents			Value
SI2()	Command code		For main robot	0x31
			For sub robot*	0xB1
SI3()	Specified axis	bit 0	Axis 1	tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 7−bit 4	(0:Fixed)	0
SI4()	Not used			0x00

* Sub robot not used in OMRON version.

tt : Specify the axis to perform absolute reset in 0 to 3 bits.
Only one axis can be specified.
If no particular axis is specified then absolute reset is performed on all axes (main robot + sub robot).

4.9 Return-to-origin command

This command executes return-to-origin on the specified axis.
When this command is executed on an incremental mode axis, that axis returns to its origin.
When executed on a semi-absolute mode axis, an absolute search is performed on that axis. If no particular axis is specified (SI3() is 0), this command is executed on all axes (main robot + sub robot) in either case of command code 0x32 or 0xB2.

- **Command**

SI port	Contents			Value
SI2()	Command code		For main robot	0x32
			For sub robot*	0xB2
SI3()	Specified axis	bit 0	Axis 1	tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 7−bit 4	(0:Fixed)	0
SI4()	Not used			0x00

* Sub robot not used in OMRON version.

tt : Specify the axis to perform return-to-origin in 0 to 3 bits.
Only one axis can be specified.
If no particular axis is specified then return-to-origin is performed on all axes (main robot + sub robot).

4.10 Servo command

Execute this command group to operate the robot servos.

Servo ON :

Execute this command to turn on the servo of a specified axis. The motor power must be turned on when specifying the axis. All controller servos are turned on if no axis is specified.

Servo OFF :

Execute this command to turn off the servo of a specified axis. All controller servos are turned off if no axis is specified.

Servo Free :

Execute this command to turn off the mechanical brake and dynamic brake after turning off the servo of a specified axis. Servo OFF and Free are repeated when this command is consecutively executed.

Power ON:

Execute this command to turn on the motor power. No axis can be specified.

- **Command**

SI port	Contents			Value
SI2()	Command code	Servo ON	For main robot	0x34
			For sub robot*	0xB4
		Servo OFF	For main robot	0x35
			For sub robot*	0xB5
		Servo Free	For main robot	0x36
			For sub robot*	0xB6
		Power ON	All controller servos	0x37
SI3()	Specified axis	bit 0	Axis 1	tt
		bit 1	Axis 2	
		bit 2	Axis 3	
		bit 3	Axis 4	
		bit 7−bit 4	(0:Fixed)	0
SI4()	Not used			0x00

* Sub robot not used in OMRON version.

tt : Specify the axis to move in 0 to 3 bits. All controller servos are processed if no axis is specified. No axis can be specified when executing Power ON.

4.11 Manual speed change command

Execute this command to change the manual movement speed in MANUAL mode. This command can only be executed in MANUAL mode.

- **Command**

SI port	Contents		Value
SI2()	Command code	For main robot	0x38
		For sub robot*	0xB8
SI3()	Specified speed		0xss
SI4()	Not used		0x00

* Sub robot not used in OMRON version.

ss : Specify the manual movement speed in 8 bits.
Specified range: 1 (=0x01) to 100 (=0x64)

4.12 Auto speed change command

Execute this command to change the auto movement speed in AUTO mode.

- **Command**

SI port	Contents		Value
SI2()	Command code	For main robot	0x39
		For sub robot*	0xB9
SI3()	Specified speed		0xss
SI4()	Not used		0x00

* Sub robot not used in OMRON version.

ss : Specify the auto movement speed in 8 bits.
Specified range: 1 (=0x01) to 100 (=0x64)

4.13 Program speed change command

Execute this command to change the program speed in AUTO mode. The program speed changed with this command is reset to 100% when the program is reset or changed.

- **Command**

SI port	Contents		Value
SI2()	Command code	For main robot	0x3A
		For sub robot*	0xBA
SI3()	Specified speed		0xss
SI4()	Not used		0x00

* Sub robot not used in OMRON version.

ss : Specify the program speed in 8 bits.
Specified range: 1 (=0x01) to 100 (=0x64)

4.14 Shift designation change command

Execute this command to change the selected shift to a specified shift number.

- **Command**

SI port	Contents		Value
SI2()	Command code	For main robot	0x3B
		For sub robot*	0xBB
SI3()	Specified shift number		0xss
SI4()	Not used		0x00

* Sub robot not used in OMRON version.

ss : Specify the shift number in 8 bits.
Specified range: 0 (=0x00) to 9 (0x09)

4.15 Hand designation change command

Execute this command to change the selected hand to a specified hand number.

- **Command**

SI port	Contents		Value
SI2()	Command code	For main robot	0x3C
		For sub robot*	0xBC
SI3()	Specified hand number		0xss
SI4()	Not used		0x00

* Sub robot not used in OMRON version.

ss : Specify the hand number in 8 bits.
Specified range for main robot : 0 (=0x00) to 3 (0x03)
Specified range for sub robot : 4 (=0x04) to 7 (0x07)

4.16 Arm designation change command

Execute this command to change the arm designation status.

- **Command**

SI port	Contents		Value
SI2()	Command code	For main robot	0x3D
		For sub robot*	0xBD
SI3()	Status of specified arm		0xss
SI4()	Not used		0x00

* Sub robot not used in OMRON version.

ss : Specify the arm designation status in 8 bits.

Value	Meaning
0x00	Right-handed system
0x01	Left-handed system

4.17 Point display unit designation command

Execute this command to change the point display unit.

- **Command**

SI port	Contents		Value
SI2()	Command code	For main robot	0x3E
		For sub robot*	
SI3()	Display units for specified point		0xss
SI4()	Not used		0x00

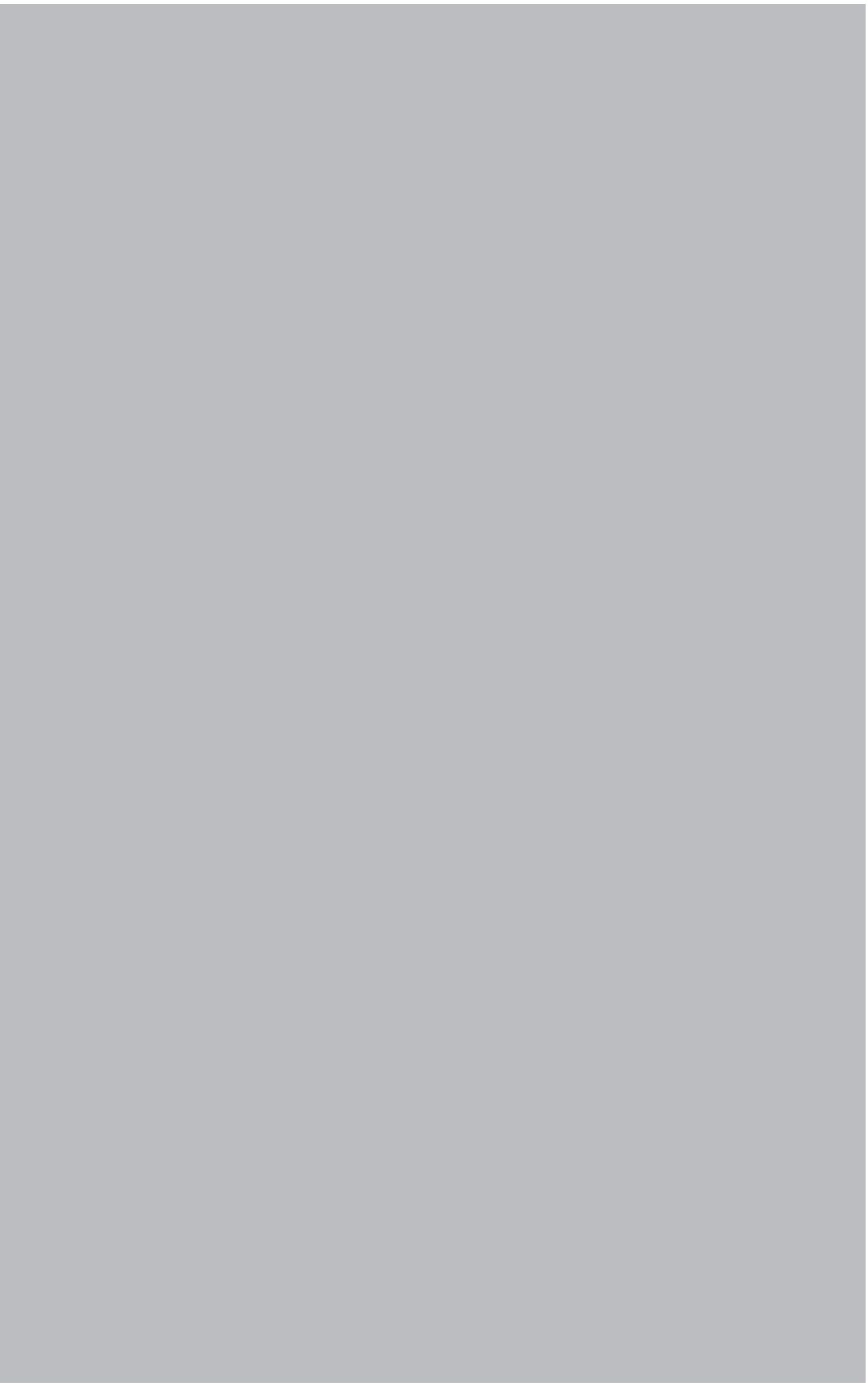
* Sub robot not used in OMRON version.

ss : Specify the point display unit in 8 bits.

Value	Meaning
0x00	Pulse units
0x01	Millimeter units
0x02	Millimeter units (Tool coordinates)

Chapter 4 APPENDIX

Contents



1. Definition of terms

1. PROFIBUS-DP

PROFIBUS-DP (Decentralized Periphery) enables high-speed data transmission between the controller and a field device such as a remote I/O device and drive.

2. SAFE mode setting

When the SAFE mode setting is enabled, service mode input is made valid so that safety functions such as operating speed limits in MANUAL mode can be used.
The SAFE mode setting is determined at the time of shipping.
The SAFE mode setting is always enabled for controllers compatible with CE marking.

3. SERVICE mode

This mode is valid only when the SAFE mode setting is enabled, and can be controlled by service mode input signals.

4. SAFETY connector

This connector is used to connect emergency stop input and service mode input.
Located on the front panel of the robot controller.

5. STD. DIO connector

This connector is used to receive or output dedicated I/O signals and general purpose I/O signals. Located on the front panel of the robot controller.

6. Station address

Identification number assigned to each node in PROFIBUS.

7. Bit information

Bit information that can be handled by PROFIBUS compatible module.

8. Word information

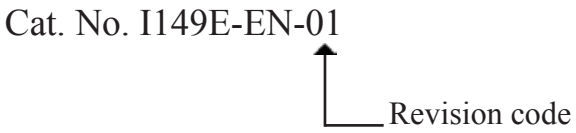
Word information that can be handled by PROFIBUS compatible module.

9. Little endian

Method to substitute LSB in low-order address and refer to LSB when handling word information data as double word data.
For example, when the value 00012345h is substituted in SOD (2), 2345h is substituted in SOW (2) of the first word, and 0001h is substituted in SOW (3) of the second word.

Revision History

A manual revision code appears as a suffix to the catalog number on the front cover of the manual.



The following table outlines the changes made to the manual during each revision. Page numbers refer to the previous revision.

Revision code	Date	Revised content
01	July 2010	Original production