

8 DEVICE ACCESS

This chapter explains the commands to read and write devices.

8.1 Data to be Specified in Commands

This section explains the contents and specification methods for data items which are set in each command related to device access.

Devices

Specify the device to be accessed by a device code and a device number.

- The data order differs between ASCII code or binary code.
- The data size to be set differs between MELSEC-Q/L series subcommands (subcommand: 0000, 0001) and MELSEC iQ-R series subcommands (subcommand: 0002, 0003).

| Subcommand type | ASCII code | Binary code |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| For MELSEC-Q/L series | <div>Device code Device number</div> <div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div> <div>(2 digits) (6 digits)</div> | <div>Device number Device code</div> <div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div></div></div> <div>(3 bytes) (1 byte)</div> |
| For MELSEC iQ-R series | <div>Device code Device number</div> <div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div> <div>(4 digits) (8 digits)</div> | <div>Device number Device code</div> <div><div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div></div></div> <div>(4 bytes) (2 bytes)</div> |

Point

When accessing any of the following devices, use the device extension specification (subcommand: 008□).

- Link direct device
- Module access device
- CPU buffer memory access device

For the message format for device extension specification, refer to the following section.

📖 Page 438 Read/Write by Device Extension Specification

Device codes

Specify the device name to be accessed.

Specify the device within the range of the access target module.

For the values of each device code, refer to the following section.

 Page 68 Device code list

■Data communication in ASCII code

Convert the numerical value to 2-digit or 4-digit ASCII code (hexadecimal), and send it from the upper digits.

- For MELSEC-Q/L series: 2-digit ASCII code
- For MELSEC iQ-R series: 4-digit ASCII code

The "*" in a device code can also be specified with a space (code: 20H).

■Data communication in binary code

Send the 1-byte or 2-byte numerical value from the lower byte (L: bits 0 to 7).

- For MELSEC-Q/L series: 1 byte
- For MELSEC iQ-R series: 2 bytes

Ex.

For input (X)

| Subcommand type | ASCII code | Binary code |
|------------------------|-----------------------------------------------------------|----------------------------------|
| For MELSEC-Q/L series | <div>X *</div> <div>58H , 2AH</div> | <div></div> <div>9CH</div> |
| For MELSEC iQ-R series | <div>X * * *</div> <div>58H , 2AH , 2AH , 2AH</div> | <div></div> <div>9CH , 00H</div> |

Device number

Specify the number of device to be accessed.

Specify the device number within the range of the access target module.

■Data communication in ASCII code

Convert the numerical value to 6-digit or 8-digit ASCII code, and sent it from the upper digits.

Specify the device number in decimal or hexadecimal, depending on the device type. ( Page 68 Device code list)

- For MELSEC-Q/L series: 6-digit ASCII code
- For MELSEC iQ-R series: 8-digit ASCII code (10 digits at device extension specification)


The '0' in the upper digits can also be specified with a space (code: 20H).

■Data communication in binary code

Send the 3-byte or 4-byte numerical value in order from the lower byte (L: bit 0 to 7).

For a device of which device number is in decimal, convert it to hexadecimal and specify.

- For MELSEC-Q/L series: 3 bytes^{*1}
- For MELSEC iQ-R series: 4 bytes^{*1}

^{*1} For C24, the additional code may be added. ( Page 35 Additional code (10H))

Ex.

For input (X) 1234 (a device of which device number is in hexadecimal)


| Subcommand type | ASCII code | Binary code |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| For MELSEC-Q/L series | <div> <div>0 0 1 2 3 4</div> <div>30_H 30_H 31_H 32_H 33_H 34_H</div> </div> | <div> <div>34_H 12_H 00_H</div> </div> |
| For MELSEC iQ-R series | <div> <div>0 0 0 0 1 2 3 4</div> <div>30_H 30_H 30_H 30_H 31_H 32_H 33_H 34_H</div> </div> | <div> <div>34_H 12_H 00_H 00_H</div> </div> |

For internal relay (M) 1234 (a device of which device number is in decimal)

For binary code, convert the device number to hexadecimal. '1234' (decimal) → '4D2' (hexadecimal)

| Subcommand type | ASCII code | Binary code |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| For MELSEC-Q/L series | <div> <div>0 0 1 2 3 4</div> <div>30_H 30_H 31_H 32_H 33_H 34_H</div> </div> | <div> <div>D2_H 04_H 00_H</div> </div> |
| For MELSEC iQ-R series | <div> <div>0 0 0 0 1 2 3 4</div> <div>30_H 30_H 30_H 30_H 31_H 32_H 33_H 34_H</div> </div> | <div> <div>D2_H 04_H 00_H 00_H</div> </div> |

For internal relay (M) 16 (with additional code)

For C24 binary code, specify '10H' as '10H + 10H'. ( Page 35 Additional code (10H))

| Subcommand type | Binary code (For C24) | Binary code (For E71) |
|------------------------|-------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| For MELSEC-Q/L series | <div> <div>DLE</div> <div>10_H 10_H 00_H 00_H</div> </div> | <div> <div>10_H 00_H 00_H</div> </div> |
| For MELSEC iQ-R series | <div> <div>DLE</div> <div>10_H 10_H 00_H 00_H 00_H</div> </div> | <div> <div>10_H 00_H 00_H 00_H</div> </div> |



Device code list


The following shows the device code of each device and the notation of device number (decimal/hexadecimal).


The data to be set differs between MELSEC-Q/L series commands (subcommand: 0000, 0001) and MELSEC iQ-R series subcommand (0002, 0003).


—: Inaccessible


| Device | | | | For MELSEC-Q/L series | | For MELSEC iQ-R series | | |
|------------------------------|-----------------------------|--------|------------------------------------------|-----------------------|-------|------------------------|-------|--------|
| Device name | | Symbol | Type | Notation | ASCII | Binary | ASCII | Binary |
| Special relay | | SM | Bit | Decimal | SM | 91H | SM** | 0091H |
| Special register | | SD | Word | Decimal | SD | A9H | SD** | 00A9H |
| Input | | X | Bit | Hexadecimal | X* | 9CH | X*** | 009CH |
| Output | | Y | | Hexadecimal | Y* | 9DH | Y*** | 009DH |
| Internal relay | | M | | Decimal | M* | 90H | M*** | 0090H |
| Latch relay | | L | | Decimal | L* | 92H | L*** | 0092H |
| Annunciator | | F | | Decimal | F* | 93H | F*** | 0093H |
| Edge relay | | V | | Decimal | V* | 94H | V*** | 0094H |
| Link relay | | B | | Hexadecimal | B* | A0H | B*** | 00A0H |
| Data register | | D | Word | Decimal | D* | A8H | D*** | 00A8H |
| Link register | | W | | Hexadecimal | W* | B4H | W*** | 00B4H |
| Timer | Contact | TS | Bit | Decimal | TS | C1H | TS** | 00C1H |
| | Coil | TC | | | TC | C0H | TC** | 00C0H |
| | Current value | TN | Word | | TN | C2H | TN** | 00C2H |
| Long timer*1 | Contact | LTS | Bit | Decimal | — | — | LTS* | 0051H |
| | Coil | LTC | | | — | — | LTC* | 0050H |
| | Current value | LTN | Double word | | — | — | LTN* | 0052H |
| Retentive timer | Contact | STS | Bit | Decimal | SS | C7H | STS* | 00C7H |
| | Coil | STC | | | SC | C6H | STC* | 00C6H |
| | Current value | STN | Word | | SN | C8H | STN* | 00C8H |
| Long retentive timer*1 | Contact | LSTS | Bit | Decimal | — | — | LSTS | 0059H |
| | Coil | LSTC | | | — | — | LSTC | 0058H |
| | Current value | LSTN | Double word | | — | — | LSTN | 005AH |
| Counter | Contact | CS | Bit | Decimal | CS | C4H | CS** | 00C4H |
| | Coil | CC | | | CC | C3H | CC** | 00C3H |
| | Current value | CN | Word | | CN | C5H | CN** | 00C5H |
| Long counter*1 | Contact | LCS | Bit | Decimal | — | — | LCS* | 0055H |
| | Coil | LCC | | | — | — | LCC* | 0054H |
| | Current value | LCN | Double word | | — | — | LCN* | 0056H |
| Link special relay | | SB | Bit | Hexadecimal | SB | A1H | SB** | 00A1H |
| Link special register | | SW | Word | Hexadecimal | SW | B5H | SW** | 00B5H |
| Step relay | | S | Bit | Decimal | S* | 98H | S*** | 0098H |
| Direct access input | | DX | Bit | Hexadecimal | DX | A2H | DX** | 00A2H |
| Direct access output | | DY | | Hexadecimal | DY | A3H | DY** | 00A3H |
| Index register | Index register | Z | Word | Decimal | Z* | CCH | Z*** | 00CCH |
| | Long index register*2 | LZ | Double word | | — | — | LZ** | 0062H |
| File register*3 | Block switching method | R | Word | Decimal | R* | AFH | R*** | 00AFH |
| | Serial number access method | ZR | | Hexadecimal | ZR | B0H | ZR** | 00B0H |
| Extended data register*4 | | D | Word | Decimal | D* | A8H | — | — |
| Extended link register*4 | | W | Word | Hexadecimal | W* | B4H | — | — |
| Refresh data register | | RD | Word | Decimal | — | — | RD** | 002CH |
| Network No. specified device | | J□□ | 📄 Page 440 Accessing link direct devices | | | | | |
| Link direct device | | | | | | | | |

| Device | | | | For MELSEC-Q/L series | | For MELSEC iQ-R series | |
|---------------------------------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------|--------|------------------------|--------|
| Device name | Symbol | Type | Notation | ASCII | Binary | ASCII | Binary |
| I/O No. specified device | U |  Page 442 Accessing module access devices  Page 444 Accessing CPU buffer memory access device | | | | | |
| Module access device | U□\G | Word | Decimal | G | ABH | G*** | 00ABH |
| CPU buffer memory access device | U3E□\G | Word | Decimal | — | — | G** | 00ABH |
| | U3E□\HG | Word | Decimal | — | — | HG** | 002EH |

*1  Page 69 Considerations when accessing long timer, long retentive timer, or long counter


*2  Page 69 Considerations when accessing long index register

*3  Page 69 Consideration when accessing file register

*4  Page 69 Consideration when accessing extended data register or extended link register

Considerations

■Devices that cannot be specified

- Devices which are not listed on the list cannot be specified by the command for device access of MC protocol.
- The available device type and device range are in accordance with the device specifications of access target module. Specify the device that can be used for the access target module.
- Accessing a local device is not available.
- When accessing a device that cannot be specified, create a program etc. to copy a value and store the value temporarily in the device that can be specified and access it.
- When a device can be assigned to a standard global label in GX Works3, even the device, to which a device code cannot be specified, can be accessed by specifying the label name. ( Page 124 LABEL ACCESS)

■Considerations when accessing long timer, long retentive timer, or long counter




Use any of the following commands.

| Device | | | Read | Write |
|------------------------------------|---------------|-----------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Long timer Long retentive timer | Contact | LTS, LSTS | Page 86 Batch read in word units (command: 0401)*1 | Page 108 Random write in bit units (test) (command: 1402) |
| | Coil | LTC, LSTC | | |
| | Current value | LTN, LSTN | Page 86 Batch read in word units (command: 0401) Page 97 Random read in word units (command: 0403) | Page 104 Random write in word units (test) (command: 1402) |
| Long counter | Contact | LCS | Page 86 Batch read in word units (command: 0401) | Page 92 Batch write in word units (command: 1401) |
| | Coil | LCC | Page 90 Batch read in bit units (command: 0401) | Page 95 Batch write in bit units (command: 1401) Page 108 Random write in bit units (test) (command: 1402) |
| | Current value | LCN | Page 86 Batch read in word units (command: 0401) Page 97 Random read in word units (command: 0403) | Page 92 Batch write in word units (command: 1401) Page 104 Random write in word units (test) (command: 1402) |

*1 When reading data with a current value (LTN, LSTN) specified, the values of contacts and coils will be stored in the read data.

■Considerations when accessing long index register

Use a command to which double word access points can be specified.

-  Page 97 Random read in word units (command: 0403)
-  Page 104 Random write in word units (test) (command: 1402)
-  Page 120 Register monitor data (command: 0801)

■Consideration when accessing file register

The file register specified to "Use File Register of Each Program" in "CPU Parameter" or "PLC parameter" of the CPU module cannot be accessed from external devices.

If the file register of the CPU module is consist of multiple blocks, use the device code of the serial number access method.

To specify the file register with the serial number access method, refer to the manual of CPU module.

■Consideration when accessing extended data register or extended link register

If the access target CPU module does not support the access to the extended data register D65536 or later, and the extended link register W10000 or later, replace the extended data register to the file register (ZR) and specify again. For the replacement method, refer to the manual of Q/LCPU module.