MITSUBISHI ELECTRIC

# MDU Breaker

# Programming Manual

MODBUS Communication Version

## Applicable models

| | |
|---|---|
| 250A frame | NF250-SEV with MDU,NF250-HEV with MDU |
| 400A frame | NF400-SEW with MDU,NF400-HEW with MDU |
| 800A frame | NF800-SEW with MDU,NF800-HEW with MDU |

● Indications and what they mean are listed below.

| | |
|---|---|
| ⚠Caution | Wrong handling may cause dangerous situation in which possibility of significant or minor injuries, or material damages assumed. |

● The meaning of the symbol is as follows.

| | |
|---|---|
|  | Be sure to follow the instructions. |

Before using the product, please read the instruction manual for the MDU breaker in order to use it properly and safely.
- MDU Breaker Instruction Manual: Main unit
- MDU Breaker Instruction Manual: MDU

# Index

# 1. Introduction

Thank you very much for purchasing our MDU breaker.
Please read this manual before use and fully understand the functions and performance of the MDU breaker for safe and proper operation.

The MDU breaker supports RS-485 (MODBUS-RTU) communication. When monitoring each measurement value and circuit breaker information, or when setting each setting value of the MDU breaker, it is necessary to create a program according to the purpose.

This manual describes the communication procedures, commands, and responses to commands that are necessary when producing a program according to the purpose. In addition to this manual, please be sure to read the manual for the device used on the same network. The terms used in this manual refer to the following models unless otherwise noted.

| | 250A frame | 400A frame | 800A frame |
|---|---|---|---|
| No fuse breaker | NF250-SEV with MDU<br>NF250-HEV with MDU | NF400-SEW with MDU<br>NF400-HEW with MDU | NF800-SEW with MDU<br>NF800-HEW with MDU |

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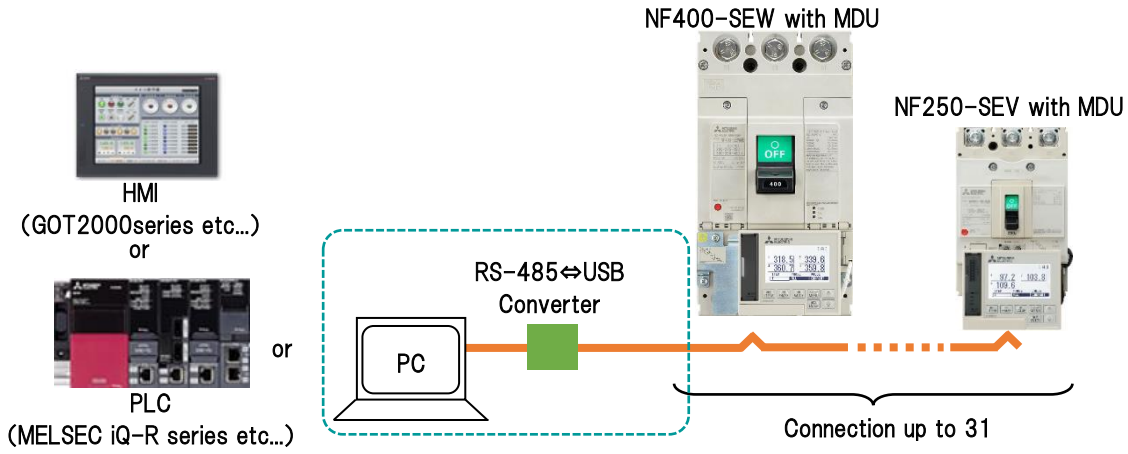
# 2. System configuration example

The following shows an example of configuring a system with only MDU breakers. For details on specific connection methods and connection precautions, please read the instruction manual “MDU Breaker : MDU” that is included in the package.




# 3. Communication specification

## 3.1 MDU specification

| Item | Specification |
|---|---|
| Physical interface | RS-485/Two-wire type/Half-duplex communication |
| Protocol | MODBUS-RTU |
| Synchronization type | Start/Stop synchronization |
| Topology | Multi-drop |
| Baud rate | 2400,4800,9600,19200,38400 bps (selectable) |
| Data bit | 8 bit |
| Stop bit | 1 bit, 2 bit (selectable) |
| Parity | ODD,EVEN,NONE (selectable) |
| Bus Address | 1 to 127 |
| Response time | 1s or less |
| Distance | Max 1200m |
| Connectable number of devices | Max 31 |
| Terminate | 120Ω1/2W |
| Recommended cable | SPEV(SB)-MPC-0.2×1P(MITSUBISHI CABLE INDUSTRIES, LTD.)<br>permissible substitute |

## 3.2 Message structure

For details on the MODBUS I / F specification, download the
"MODBUS over Serial Line Specification and Implementation Guide V1.02" from the following URL and refer to it.
→ http://www.modbus.org/docs/Modbus_over_serial_line_V1_02.pdf

The communication format of query and response is shown below.

| Slave address | Function | Data | ··· | CRC Lo | CRC Hi |
|---|---|---|---|---|---|

| | |
|---|---|
| Slave address | 00h to 7Fh<br>The address that can be set by each slave is in the range of 01h to 7Fh (1 to 127).<br>00h is a broadcast address. During broadcast, all slaves execute the function but do not send a response. |
| Function | 03h ····· Read Holding Register (monitor)<br>08h ····· Diagnostics<br>10h ····· Preset Multiple Registers (batch setting) |
| Data | 8 bit HEX data |
| CRC | 16-bit CRC from address to data·····$X^{16}+X^{15}+X^{2}+1$<br>**CRC calculation method**<br>① Put FFFFh in the CRC register.<br>② Performs an exclusive OR operation of the first character of the message and the low byte of the CRC register. Store the result in the CRC register.<br>③ Shift the CRC register one bit to the right.<br>④ If the LSB of the CRC register is 0, repeat ③ until it changes to 1.<br>⑤ If the LSB of the CRC register is 1, calculate the exclusive OR of the CRC register and the generator polynomial A001h. Then, store the result in the CRC register.<br>⑥ Repeat steps ③-⑤ until the CRC register shifts 8 bits.<br>⑦ Repeat steps ② to ⑥ in the same way for the second and subsequent characters. And apply to all the bytes of the message.<br>⑧ The last value remaining in the CRC register is the CRC. |

## 3.3 Bit configuration of serial communication 1 byte

1 byte data is sent in the following order (from left to right).

With parity bit and stop bit 1

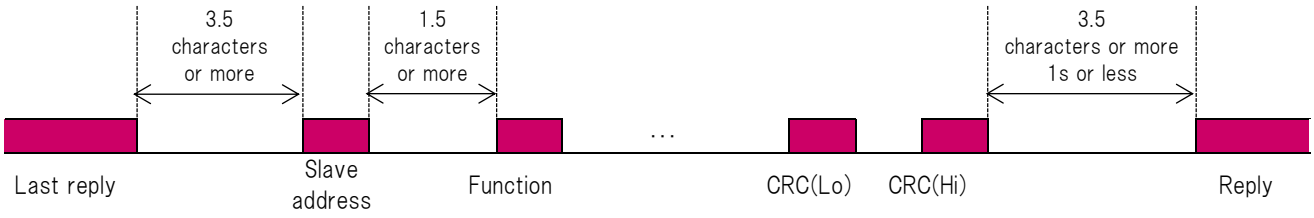
| Strat bit | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Parity bit | Stop bit |
|---|---|---|---|---|---|---|---|---|---|---|
| | LSB | | | | | | | MSB | | |

Without parity bit and stop bit 1

| Strat bit | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Stop bit | Stop bit |
|---|---|---|---|---|---|---|---|---|---|---|
| | LSB | | | | | | | MSB | | |

## 3.4 Communication timing

The communication timing is as follows.




| | |
|---|---|
| Keep communication timing | ● Set idling of 3.5 characters or more before and after each communication text.<br>● Also, it sends a response in less than 1s after receiving a query (request). (See the table below)<br>● Transmit at intervals of 1.5 characters or less between each data.<br>● If the data interval is 3.5 characters or more, communication ends, and data received so far is discarded. And it is treated as a new query start address. |

The data interval time and transmission time are shown in the table below. Each data is a reference value and does not guarantee each time.

**Data interval time**

| Baud rate | 3.5 characters | | 1.5 characters | |
|---|---|---|---|---|
| | Stop bit:1<br>With parity bit | Stop bit:1<br>Without parity bit | Stop bit:1<br>With parity bit | Stop bit:1<br>Without parity bit |
| 2400 bps | 16.04 ms | 14.58 ms | 6.88 ms | 6.25 ms |
| 4800 bps | 8.02 ms | 7.29 ms | 3.44 ms | 3.13 ms |
| 9600 bps | 4.01 ms | 3.65 ms | 1.72 ms | 1.56 ms |
| 19200 bps | 2.00 ms | 1.82 ms | 0.86 ms | 0.78 ms |
| 38400 bps | 1.00 ms | 0.91 ms | 0.43 ms | 0.39 ms |

**Transmission time***

| Baud rate | 3.5 characters | | 1.5 characters | |
|---|---|---|---|---|
| | Stop bit:1<br>With parity bit | Stop bit:1<br>Without parity bit | Stop bit:1<br>With parity bit | Stop bit:1<br>Without parity bit |
| 2400 bps | 36.7 ms | 33.3 ms | 1168.7 ms | 1062.5 ms |
| 4800 bps | 18.3 ms | 16.7 ms | 584.4 ms | 531.2 ms |
| 9600 bps | 9.16 ms | 8.33 ms | 292.2 ms | 265.6 ms |
| 19200 bps | 4.58 ms | 4.17 ms | 146.1 ms | 132.8 ms |
| 38400 bps | 2.29 ms | 2.08 ms | 73.0 ms | 66.4 ms |

* For 250-byte batch monitoring.

## 4. Query (request) / response configuration

Below is a description of each query and its response for each function.

### 4.1 Read holding registers (03h)

**Query structure**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **h | 03h | Hi | Lo | Hi | Lo | Lo | Hi |
| Slave address | Function code | Starting address | | Quantity of registers | | CRC | |

| | |
|---|---|
| Slave address | Slave address 01h to 7Fh |
| Function code | 03h(Read holding registers) |
| Starting address | Register address 2byte |
| Quantity of registers | Quantity of words to read (MAX:125) |
| CRC | Error check code |

**Response structure**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **h | 03h | **h | Hi | Lo | Hi | Lo | Lo | Hi |
| Slave address | Function code | Byte count | Data 1 | | Data 2 | | CRC | |

| | |
|---|---|
| Byte count | Byte count of response data (MAX:250) |

**<Case 1> When monitoring "Instantaneous current in Phase 2"(Address:0301h) (Slave address:01h)**

**Query structure**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 01h | 03h | 03h | 01h | 00h | 01h | Lo | Hi |
| Slave address | Function code | Starting address | | Quantity of registers | | CRC | |

**Response structure**

| | | | | | | |
|---|---|---|---|---|---|---|
| 01h | 03h | 02h | Hi | Lo | Lo | Hi |
| Slave address | Function code | Byte count | Instantaneous current in Phase 2 | | CRC | |

**<Case 2> When monitoring "Instantaneous current in Phase 1" to "Instantaneous current in Phase N" (Address:0300h to 0303h) (Slave address:01h)**

**Query structure**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 01h | 03h | 03h | 00h | 00h | 04h | Lo | Hi |
| Slave address | Function code | Starting address | | Quantity of registers | | CRC | |

**Response structure**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01h | 03h | 08h | Hi | Lo | Hi | Lo | Hi | Lo | Hi | Lo | Lo | Hi |
| Slave address | Function code | Byte count | Instantaneous current in Phase 1 | | Instantaneous current in Phase 2 | | Instantaneous current in Phase 3 | | Instantaneous current in Phase N | | CRC | |

**<Case 3> When monitoring "Electric energy" (Address:0518h) (Slave address:01h)**

**Query structure**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 01h | 03h | 05h | 18h | 00h | 02h | Lo | Hi |
| Slave address | Function code | Starting address | | Quantity of registers | | CRC | |

**Response structure**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01h | 03h | 04h | HH | HL | LH | LL | Lo | Hi |
| Slave address | Function code | Byte count | Electric energy | | | | CRC | |

## 4.2 Preset multiple registers (10h)

Query structure

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **h | 10h | Hi | Lo | Hi | Lo | | Hi | Lo | Hi | Lo | | Lo | Hi |
| Slave address | Function code | Starting address | | Quantity of registers | | Byte count | Data 1 | | Data 2 | | | CRC | |

| | |
|---|---|
| Slave address | Slave address 00h to 7Fh (00h : broadcast) |
| Function code | 10h(Preset Multiple Registers) |
| Starting address | Register address 2byte |
| Quantity of registers | Quantity of words to write (MAX:125) |
| Byte count | Byte count to write (Number of registers × 2) (MAX:246) |
| Data | Data to write |
| CRC | Error check code |

Response structure

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **h | 10h | Hi | Lo | Hi | Lo | Lo | Hi |
| Slave address | Function code | Starting address | | Quantity of registers | | CRC | |

<Case> When setting "Electric energy" (Address:0518h) (Slave address:01h)

Query structure

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01h | 10h | 02h | 04h | 00h | 02h | 04h | HH | HL | LH | LL | Lo | Hi |
| Slave address | Function code | Starting address | | Quantity of registers | | Byte count | Electric energy H | | Electric energy L | | CRC | |

Response structure

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 01h | 10h | 05h | 18h | 00h | 02h | Lo | Hi |
| Slave address | Function code | Starting address | | Quantity of registers | | CRC | |

## 4.3 Diagnostic (08h) (Sub-function code 00h)

Query structure

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **h | 08h | 00h | 00h | Hi | Lo | Lo | Hi |
| Slave address | Function code | Sub-function code | | Data | | CRC | |

| | |
|---|---|
| Slave address | Slave address 01h-7Fh |
| Function code | 08h(Diagnostic) |
| Sub-function code | 00h,00h(fix) |
| Data | Any data |
| CRC | Error check code |

Response structure

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **h | 08h | 00h | 00h | Lo | Hi | Lo | Hi |
| Slave address | Function code | Sub-function code | | Data | | CRC | |

| | |
|---|---|
| Data | Same data as query |

## 5. Error processing, response when an error occurs

The following shows error handling and responses when errors occur.

### Error list

| Error item | Error contents | Processing |
|---|---|---|
| Framing error | The 1-byte data length is incorrect. | Device does not respond error.<br>It will be waiting for the reception. |
| Overrun error | The following data was received before reading the contents of the UART receive buffer. | |
| Parity error | Parity bit is incorrect. | |
| CRC check error | CRC error check code is incorrect. | |
| Illegal function | The device has received a function code other than '03h', '08h' or '10h'. | The device responds with error code 01h. |
| Register address error | There is no request register address. | The device responds with error code 02h. |
| Data value error | Data is out of tolerance.<br>Alternatively,<br>the byte count at the time of setting<br>= the quantity of registers × 2 does not hold. | The device responds with error code 03h. |
| Slave busy | A query was received while changing the device settings. | The device responds with error code 06h. |

### Response structure

| Address | Error function code | Error code | Lo | Hi |
|---|---|---|---|---|
| Slave address | | | CRC | |

| | |
|---|---|
| Error function code | In an exception response, the device sets the MSB of the function code to 1.<br><br>**Error function code list**<br>Function code: 03h → Error function code: 83h<br>Function code: 08h → Error function code: 88h<br>Function code: 10h → Error function code: 90h |
| Error code | 01h:Illegal function<br>02h:Register address error<br>03h:Data value error<br>06h:Slave busy |

# 6. Data specification

The register list and data format are shown below.

## 6.1 Register list

Common items in the register address list are as follows.

**About R/W**

| Item | Information |
|---|---|
| R/W | Read / write register |
| R | Read only register<br>Error code 02h is returned when writing to this register. |

・About data with 4 bytes
Access to 4-byte data is valid only for 4, 8, 12, 16, 20 and 24 bytes from even addresses.
For accesses starting with an odd address such as 0519h, 051Bh, the device responds with Register Address Error 02h.
For access to 1, 3, 5 and 6 byte access from 0518h, 051Ah, etc, the device responds with Register Address Error 02h.

**⚠Caution**

・We are not responsible for any damage, secondary damage, accident compensation, damage to other companies' products, or any other business caused by using commands or data not described in this manual.

・Be careful with the safety design during programming to ensure that the system does not eventually malfunction.

## (1) Setting registers (0X200)

| Register Address | | Number of bytes | R/W | Register Name | Unit | Data Format |
|---|---|---|---|---|---|---|
| DEX | HEX | | | | | |
| 512 | 0200 | 2 | R/W | Line system | — | (4)Setting value 1 |
| 521 | 0209 | 2 | R/W | Demand time for current | 1 minute | |
| 523 | 020B | 2 | R/W | Reset memory | — | (6)16 bit data |
| 524 | 020C | 2 | R | 16 bit monitor | — | |
| 526 | 020E | 2 | R/W | Date and Time (Year and month) ※ | — | (3)Clock data |
| 527 | 020F | 2 | R/W | Date and Time (Day and hour) ※ | | |
| 528 | 0210 | 2 | R/W | Date and Time (Minute and Second) ※ | | |
| 532 | 0214 | 2 | R/W | Alarm reset method | — | (4)Setting value 1 |
| 538 | 021A | 2 | R | Ip (pre-alarm pickup current) | 1% | |
| 541 | 021D | 2 | R | TL (LTD operation time) | 0.1s | |
| 542 | 021E | 2 | R | Is (STD pickup current) | ×0.1 | |
| 543 | 021F | 2 | R | Ts (STD operation time) | — | |
| 544 | 0220 | 2 | R | Ii (INST pickup current) | ×0.1 | |
| 559 | 022F | 2 | R | MDU series code | — | |
| 560 | 0230 | 2 | R | Number of poles | — | |
| 564 | 0234 | 2 | R/W | Phase switch (1- to 3-phase connection) | — | |
| 565 | 0235 | 2 | R | Open / Close frequency | 1 time | (1)Measurement value data(2byte) |
| 566 | 0236 | 2 | R | Trip frequency | 1 time | |
| 568 | 0238 | 2 | R | INST reference value | | (4)Setting value 1 |
| 572 | 023C | 2 | R/W | Alarm ON / OFF setting | — | (6)16 bit data |
| 573 | 023D | 2 | R/W | IDM_AL (Current demand alarm) pickup current | — | (4)Setting value 1 |
| 574 | 023E | 2 | R/W | IDM_AL (Current demand alarm) demand time | — | |
| 592 | 0250 | 2 | R | Rated current | 1A | |
| 700 | 02BC | 2 | R | Current setting Ir | 0.1A | |
| 713 | 02C9 | 2 | R | Phase sequence | — | (1)Measurement value data(2byte) |

* Data at addresses 020Eh to 0210h is valid only for accesses of 3 words or more from the 020Eh address.
A one or two word access from 020Fh, 0210h responds with address error 02h.

## (2) Instantaneous value / maximum value / minimum value monitor register (0X300)

| Register Address | | Number of bytes | R/W | Register Name | Unit | Data Format |
|---|---|---|---|---|---|---|
| DEX | HEX | | | | | |
| 768 | 0300 | 2 | R | Instantaneous current in Phase 1 (I1) | 0.1 A | (1)Measurement value data(2byte) |
| 769 | 0301 | 2 | R | Instantaneous current in Phase 2 (I2) | | |
| 770 | 0302 | 2 | R | Instantaneous current in Phase 3 (I3) | | |
| 771 | 0303 | 2 | R | Instantaneous current in Phase N (IN) | | |
| 772 | 0304 | 2 | R | Instantaneous current (average) | | |
| 773 | 0305 | 2 | R | Demand current in Phase 1 (I1) | | |
| 774 | 0306 | 2 | R | Demand current in Phase 2 (I2) | | |
| 775 | 0307 | 2 | R | Demand current in Phase 3 (I3) | | |
| 776 | 0308 | 2 | R | Demand current in Phase N (IN) | | |
| 778 | 030A | 2 | R | Instantaneous voltage in Line 1-2 (V12) | 0.1 V | |
| 779 | 030B | 2 | R | Instantaneous voltage in Line 2-3 (V23) | | |
| 780 | 030C | 2 | R | Instantaneous voltage in Line 3-1 (V31) | | |
| 781 | 030D | 2 | R | Instantaneous line voltage (average) | | |
| 782 | 030E | 2 | R | Instantaneous voltage in Phase 1-N (V1N) | | |
| 783 | 030F | 2 | R | Instantaneous voltage in Phase 2-N (V2N) | | |
| 784 | 0310 | 2 | R | Instantaneous voltage in Phase 3-N (V3N) | | |
| 789 | 0315 | 2 | R | Instantaneous power factor | 0.1% | |
| 790 | 0316 | 2 | R | Instantaneous frequency | 0.1 Hz | |
| 794 | 031A | 2 | R | Instantaneous electric power | 0.1 kW | |
| 798 | 031E | 2 | R | Demand electric power | | |
| 802 | 0322 | 2 | R | Instantaneous reactive power | 0.1 kvar | |
| 807 | 0327 | 2 | R | Demand reactive power | | |
| 811 | 032B | 2 | R | Fault current | 1 A | |
| 822 | 0336 | 2 | R | Max. demand current in Max. Phase | 0.1 A | |
| 827 | 033B | 2 | R | Max. Instantaneous voltage in Max. Line | 1 V | |
| 836 | 0344 | 2 | R | Max. Instantaneous power factor | 0.1% | |
| 845 | 034D | 2 | R | Max. demand electric power | 0.1 kW | |
| 854 | 0356 | 2 | R | Max. demand reactive power | 0.1 kvar | |
| 899 | 0383 | 2 | R | Instantaneous current in Max. Phase | 0.1 A | |
| 900 | 0384 | 2 | R | Demand current in Max. Phase | | |
| 904 | 0388 | 2 | R | Max. demand current: occurrence Year, Month | — | (3)Clock data |
| 905 | 0389 | 2 | R | Max. demand current: occurrence Day, Hour | | |
| 906 | 038A | 2 | R | Max. demand current: occurrence Minute, Second | | |
| 907 | 038B | 2 | R | Max voltage: occurrence Year, Month | | |
| 908 | 038C | 2 | R | Max voltage: occurrence Day, Hour | | |
| 909 | 038D | 2 | R | Max voltage: occurrence Minute, Second | | |
| 910 | 038E | 2 | R | Max. demand electric power: occurrence Year, Month | | |
| 911 | 038F | 2 | R | Max. demand electric power: occurrence Day, Hour | | |
| 912 | 0390 | 2 | R | Max. demand electric power: occurrence Minute, Second | | |
| 913 | 0391 | 2 | R | Max. demand reactive power: occurrence Year, Month | | |
| 914 | 0392 | 2 | R | Max. demand reactive power: occurrence Day, Hour | | |
| 915 | 0393 | 2 | R | Max. demand reactive power: occurrence Minute, Second | | |

## (3) Electric energy register (0X500)

[250A frame]

| Register Address | | Number of bytes | R/W | Register Name | Unit | Data Format |
|---|---|---|---|---|---|---|
| DEX | HEX | | | | | |
| 1280 | 0500 | 2 | R | Electric energy (low-order) | 0.1 kWh | (1)Measurement value data(2byte) |
| 1281 | 0501 | 2 | R | Electric energy (high-order) | 0.1 MWh | |
| 1284 | 0504 | 2 | R | Reactive energy (LAG) (low-order) | 0.1 kvarh | |
| 1285 | 0505 | 2 | R | Reactive energy (LAG) (high-order) | 0.1 Mvarh | |
| 1304 | 0518 | 4 | R/W | Electric energy | 0.1 kWh | (2)Measurement value data(3byte) |
| 1308 | 051C | 4 | R/W | Reactive energy (LAG) | 0.1 kvarh | |
| 1328 | 0530 | 2 | R | Electric energy amount of last 1 hour (low-order) | 0.1 kWh | (1)Measurement value data(2byte) |
| 1329 | 0531 | 2 | R | Electric energy amount of last 1 hour (high-order) | 0.1 MWh | |
| 1330 | 0532 | 2 | R | Reactive energy amount of last 1 hour (low-order) | 0.1 kvarh | |
| 1331 | 0533 | 2 | R | Reactive energy amount of last 1 hour (high-order) | 0.1 Mvarh | |
| 1332 | 0534 | 2 | R | Max. electric energy amount of last 1 hour (low-order) | 0.1 kWh | |

| Register Address | | Number of bytes | R/W | Register Name | Unit | Data Format |
|---|---|---|---|---|---|---|
| DEX | HEX | | | | | |
| 1333 | 0535 | 2 | R | Max. electric energy amount of last 1 hour (high-order) | 0.1 MWh | |
| 1334 | 0536 | 2 | R | Max. reactive energy amount of last 1 hour (low-order) | 0.1 kvarh | |
| 1335 | 0537 | 2 | R | Max. reactive energy amount of last 1 hour (high-order) | 0.1 Mvarh | |
| 1336 | 0538 | 4 | R | Electric energy amount of last 1 hour | 0.1 kWh | (2)Measurement value data(3byte) |
| 1338 | 053A | 4 | R | Reactive energy amount of last 1 hour | 0.1 kvarh | |
| 1340 | 053C | 4 | R | Max. electric energy amount of last 1 hour | 0.1 kWh | |
| 1342 | 053E | 4 | R | Max. reactive energy amount of last 1 hour | 0.1 kvarh | |
| 1344 | 0540 | 2 | R | Max. electric energy amount of last 1 hour: occurrence Year, Month | — | (3)Clock data |
| 1345 | 0541 | 2 | R | Max. electric energy amount of last 1 hour: occurrence Day, Hour | | |
| 1346 | 0542 | 2 | R | Max. electric energy amount of last 1 hour: occurrence Minute, Second | | |
| 1347 | 0543 | 2 | R | Max. reactive energy amount of last 1 hour: occurrence Year, Month | | |
| 1348 | 0,544 | 2 | R | Max. reactive energy amount of last 1 hour: occurrence Day, Hour | | |
| 1349 | 0545 | 2 | R | Max. reactive energy amount of last 1 hour: occurrence Minute, Second | | |

[400A/800A frame]

| Register Address | | Number of bytes | R/W | Register Name | Unit | Data Format |
|---|---|---|---|---|---|---|
| DEX | HEX | | | | | |
| 1280 | 0500 | 2 | R | Electric energy (low-order) | 1 kWh | (1)Measurement value data(2byte) |
| 1281 | 0501 | 2 | R | Electric energy (high-order) | 1 MWh | |
| 1284 | 0504 | 2 | R | Reactive energy (LAG) (low-order) | 1 kvarh | |
| 1285 | 0505 | 2 | R | Reactive energy (LAG) (high-order) | 1 Mvarh | |
| 1304 | 0518 | 4 | R/W | Electric energy | 1 kWh | (2)Measurement value data(3byte) |
| 1308 | 051C | 4 | R/W | Reactive energy (LAG) | 1 kvarh | |
| 1328 | 0530 | 2 | R | Electric energy amount of last 1 hour (low-order) | 1 kWh | (1)Measurement value data(2byte) |
| 1329 | 0531 | 2 | R | Electric energy amount of last 1 hour (high-order) | 1 MWh | |
| 1330 | 0532 | 2 | R | Reactive energy amount of last 1 hour (low-order) | 1 kvarh | |
| 1331 | 0533 | 2 | R | Reactive energy amount of last 1 hour (high-order) | 1 Mvarh | |
| 1332 | 0534 | 2 | R | Max. electric energy amount of last 1 hour (low-order) | 1 kWh | |
| 1333 | 0535 | 2 | R | Max. electric energy amount of last 1 hour (high-order) | 1 MWh | |
| 1334 | 0536 | 2 | R | Max. reactive energy amount of last 1 hour (low-order) | 1 kvarh | |
| 1335 | 0537 | 2 | R | Max. reactive energy amount of last 1 hour (high-order) | 1 Mvarh | |
| 1336 | 0538 | 4 | R | Electric energy amount of last 1 hour | 1 kWh | (2)Measurement value data(3byte) |
| 1338 | 053A | 4 | R | Reactive energy amount of last 1 hour | 1 kvarh | |
| 1340 | 053C | 4 | R | Max. electric energy amount of last 1 hour | 1 kWh | |
| 1342 | 053E | 4 | R | Max. reactive energy amount of last 1 hour | 1 kvarh | |
| 1344 | 0540 | 2 | R | Max. electric energy amount of last 1 hour: occurrence Year, Month | — | (3)Clock data |
| 1345 | 0541 | 2 | R | Max. electric energy amount of last 1 hour: occurrence Day, Hour | | |
| 1346 | 0542 | 2 | R | Max. electric energy amount of last 1 hour: occurrence Minute, Second | | |
| 1347 | 0543 | 2 | R | Max. reactive energy amount of last 1 hour: occurrence Year, Month | | |
| 1348 | 0,544 | 2 | R | Max. reactive energy amount of last 1 hour: occurrence Day, Hour | | |
| 1349 | 0545 | 2 | R | Max. reactive energy amount of last 1 hour: occurrence Minute, Second | | |

## (4) Alarm setting register (0X600)

| Register Address | | Number of bytes | R/W | Register Name | Unit | Data Format |
|---|---|---|---|---|---|---|
| DEX | HEX | | | | | |
| 1536 | 0600 | 4 | R/W | Electric current demand upper limit alarm setting value * | 0.1A | (5)Setting value 2 |
| 1556 | 0614 | 4 | R/W | Electric current demand lower limit alarm setting value * | | |

* Set one by one and wait 2 seconds for the next setting. If set at the same time, range check and cross check (comparison with the current setting value) are performed in the order of upper limit value → lower limit value.

## (5) Harmonic current instantaneous effective value (0X900)

| Register Address | | Number of bytes | R/W | Register Name | Unit | Data Format |
|---|---|---|---|---|---|---|
| DEX | HEX | | | | | |
| 2304 | 0900 | 2 | R | Total harmonics current in Phase 1 (I1) | 0.1 A | (1)Measurement value data(2byte) |
| 2305 | 0901 | 2 | R | Total harmonics current in Phase 2 (I2) | | |
| 2306 | 0902 | 2 | R | Total harmonics current in Phase 3 (I3) | | |
| 2307 | 0903 | 2 | R | Total harmonics current in Phase N (IN) | | |
| 2308 | 0904 | 2 | R | Fundamental current in Phase 1 (I1) | | |
| 2309 | 0905 | 2 | R | Fundamental current in Phase 2 (I2) | | |
| 2310 | 0906 | 2 | R | Fundamental current in Phase 3 (I3) | | |
| 2311 | 0907 | 2 | R | Fundamental current in Phase N (IN) | | |
| 2312 | 0908 | 2 | R | 3rd harmonics current in Phase 1 (I1) | | |
| 2313 | 0909 | 2 | R | 3rd harmonics current in Phase 2 (I2) | | |
| 2314 | 090A | 2 | R | 3rd harmonics current in Phase 3 (I3) | | |
| 2315 | 090B | 2 | R | 3rd harmonics current in Phase N (IN) | | |
| 2316 | 090C | 2 | R | 5th harmonics current in Phase 1 (I1) | | |
| 2317 | 090D | 2 | R | 5th harmonics current in Phase 2 (I2) | | |
| 2318 | 090E | 2 | R | 5th harmonics current in Phase 3 (I3) | | |
| 2319 | 090F | 2 | R | 5th harmonics current in Phase N (IN) | | |
| 2320 | 0910 | 2 | R | 7th harmonics current in Phase 1 (I1) | | |
| 2321 | 0911 | 2 | R | 7th harmonics current in Phase 2 (I2) | | |
| 2322 | 0912 | 2 | R | 7th harmonics current in Phase 3 (I3) | | |
| 2323 | 0913 | 2 | R | 7th harmonics current in Phase N (IN) | | |
| 2324 | 0914 | 2 | R | 9th harmonics current in Phase 1 (I1) | | |
| 2325 | 0915 | 2 | R | 9th harmonics current in Phase 2 (I2) | | |
| 2326 | 0916 | 2 | R | 9th harmonics current in Phase 3 (I3) | | |
| 2327 | 0917 | 2 | R | 9th harmonics current in Phase N (IN) | | |
| 2328 | 0918 | 2 | R | 11th harmonics current in Phase 1 (I1) | | |
| 2329 | 0919 | 2 | R | 11th harmonics current in Phase 2 (I2) | | |
| 2330 | 091A | 2 | R | 11th harmonics current in Phase 3 (I3) | | |
| 2331 | 091B | 2 | R | 11th harmonics current in Phase N (IN) | | |
| 2332 | 091C | 2 | R | 13th harmonics current in Phase 1 (I1) | | |
| 2333 | 091D | 2 | R | 13th harmonics current in Phase 2 (I2) | | |
| 2334 | 091E | 2 | R | 13th harmonics current in Phase 3 (I3) | | |
| 2335 | 091F | 2 | R | 13th harmonics current in Phase N (IN) | | |
| 2336 | 0920 | 2 | R | 15th harmonics current in Phase 1 (I1) | | |
| 2337 | 0921 | 2 | R | 15th harmonics current in Phase 2 (I2) | | |
| 2338 | 0922 | 2 | R | 15th harmonics current in Phase 3 (I3) | | |
| 2339 | 0923 | 2 | R | 15th harmonics current in Phase N (IN) | | |
| 2340 | 0924 | 2 | R | 17th harmonics current in Phase 1 (I1) | | |
| 2341 | 0925 | 2 | R | 17th harmonics current in Phase 2 (I2) | | |
| 2342 | 0926 | 2 | R | 17th harmonics current in Phase 3 (I3) | | |
| 2343 | 0927 | 2 | R | 17th harmonics current in Phase N (IN) | | |
| 2344 | 0928 | 2 | R | 19th harmonics current in Phase 1 (I1) | | |
| 2345 | 0929 | 2 | R | 19th harmonics current in Phase 2 (I2) | | |
| 2346 | 092A | 2 | R | 19th harmonics current in Phase 3 (I3) | | |
| 2347 | 092B | 2 | R | 19th harmonics current in Phase N (IN) | | |

## (6) Harmonic current Maximum phase effective value(0XF00)

| Register Address | | Number of bytes | R/W | Register Name | Unit | Data Format |
|---|---|---|---|---|---|---|
| DEX | HEX | | | | | |
| 3841 | 0F01 | 2 | R | Max. total harmonics current in Max. Phase | 0.1 A | (1)Measurement value data(2byte) |
| 3842 | 0F02 | 2 | R | Max. 3rd harmonics current in Max. Phase | | |
| 3843 | 0F03 | 2 | R | Max. 5th harmonics current in Max. Phase | | |
| 3844 | 0F04 | 2 | R | Max. 7th harmonics current in Max. Phase | | |
| 3845 | 0F05 | 2 | R | Max. 9th harmonics current in Max. Phase | | |
| 3846 | 0F06 | 2 | R | Max. 11th harmonics current in Max. Phase | | |
| 3847 | 0F07 | 2 | R | Max. 13th harmonics current in Max. Phase | | |
| 3848 | 0F08 | 2 | R | Max. 15th harmonics current in Max. Phase | | |
| 3849 | 0F09 | 2 | R | Max. 17th harmonics current in Max. Phase | | |
| 3850 | 0F0A | 2 | R | Max. 19th harmonics current in Max. Phase | | |
| 3884 | 0F2C | 2 | R | Max. total harmonics demand current | | |
| 3888 | 0F30 | 2 | R | Max. 3rd harmonics current: occurrence Year, Month | — | (3)Clock data |
| 3889 | 0F31 | 2 | R | Max. 3rd harmonics current: occurrence Day, Hour | | |
| 3890 | 0F32 | 2 | R | Max. 3rd harmonics current: occurrence Minute, Second | | |
| 3891 | 0F33 | 2 | R | Max. 5th harmonics current: occurrence Year, Month | | |
| 3892 | 0F34 | 2 | R | Max. 5th harmonics current: occurrence Day, Hour | | |
| 3893 | 0F35 | 2 | R | Max. 5th harmonics current: occurrence Minute, Second | | |
| 3894 | 0F36 | 2 | R | Max. 7th harmonics current: occurrence Year, Month | | |
| 3895 | 0F37 | 2 | R | Max. 7th harmonics current: occurrence Day, Hour | | |
| 3896 | 0F38 | 2 | R | Max. 7th harmonics current: occurrence Minute, Second | | |
| 3897 | 0F39 | 2 | R | Max. 9th harmonics current: occurrence Year, Month | | |
| 3898 | 0F3A | 2 | R | Max. 9th harmonics current: occurrence Day, Hour | | |
| 3899 | 0F3B | 2 | R | Max. 9th harmonics current: occurrence Minute, Second | | |
| 3900 | 0F3C | 2 | R | Max. 11th harmonics current: occurrence Year, Month | | |
| 3901 | 0F3D | 2 | R | Max. 11th harmonics current: occurrence Day, Hour | | |
| 3902 | 0F3E | 2 | R | Max. 11th harmonics current: occurrence Minute, Second | | |
| 3903 | 0F3F | 2 | R | Max. 13th harmonics current: occurrence Year, Month | | |
| 3904 | 0F40 | 2 | R | Max. 13th harmonics current: occurrence Day, Hour | | |
| 3905 | 0F41 | 2 | R | Max. 13th harmonics current: occurrence Minute, Second | | |
| 3906 | 0F42 | 2 | R | Max. 15th harmonics current: occurrence Year, Month | | |
| 3907 | 0F43 | 2 | R | Max. 15th harmonics current: occurrence Day, Hour | | |
| 3908 | 0F44 | 2 | R | Max. 15th harmonics current: occurrence Minute, Second | | |
| 3909 | 0F45 | 2 | R | Max. 17th harmonics current: occurrence Year, Month | | |
| 3910 | 0F46 | 2 | R | Max. 17th harmonics current: occurrence Day, Hour | | |
| 3911 | 0F47 | 2 | R | Max. 17th harmonics current: occurrence Minute, Second | | |
| 3912 | 0F48 | 2 | R | Max. 19th harmonics current: occurrence Year, Month | | |
| 3913 | 0F49 | 2 | R | Max. 19th harmonics current: occurrence Day, Hour | | |
| 3914 | 0F4A | 2 | R | Max. 19th harmonics current: occurrence Minute, Second | | |
| 3915 | 0F4B | 2 | R | Max. total harmonics demand current: occurrence Year, Month | | |
| 3916 | 0F4C | 2 | R | Max. total harmonics demand current: occurrence Day, Hour | | |
| 3917 | 0F4D | 2 | R | Max. total harmonics demand current: occurrence Minute, Second | | |

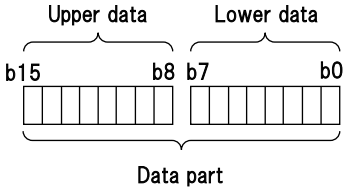
## (7) Harmonic current demand value(0X1300)

| Register Address | | Number of bytes | R/W | Register Name | Unit | Data Format |
|---|---|---|---|---|---|---|
| DEX | HEX | | | | | |
| 4864 | 1300 | 2 | R | Total harmonics demand current in Phase 1 (I1) | 0.1A | (1)Measurement value data(2byte) |
| 4865 | 1301 | 2 | R | Total harmonics demand current in Phase 2 (I2) | | |
| 4866 | 1302 | 2 | R | Total harmonics demand current in Phase 3 (I3) | | |
| 4867 | 1303 | 2 | R | Total harmonics demand current in Phase N (IN) | | |

## 6.2 Data format

Data format are shown below.

### (1) Measurement value data (2byte)

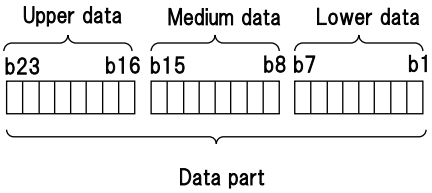



∗1 Negative values are represented by 2's complement.
∗2 For the measurement rating, measurement range, and accuracy of the MDU breaker, read the instruction manual "MDU Breaker: MDU".

| Item | Compatible circuit breaker | Current setting | Measurement range | Data range | Conversion unit | Cutoff |
|---|---|---|---|---|---|---|
| Load current | 250 A frame | 50, 60, 75, 100, 125 A | 0.0 to 250.0 A | 0 to 2500d | 0.1A | 1.2A |
| | | 125 to 250 A | 0.0 to 500.0 A | 0 to 5000d | | 2.5A |
| | 400 A frame | 200 to 400 A | 0.0 to 800.0 A | 0 to 8000d | | 4.0A |
| | 800 A frame (630 A rated value) | 300 to 630 A | 0.0 to 999.9 A<br>1000 to 1260 A | 0 to 12600d | | 6.3 A |
| | 800 A frame (800 A rated value) | 400 to 800 A | 0.0 to 999.9 A<br>1000 to 1600 A | 0 to 16000d | | 8.0A |
| Line voltage | common | common | 0.0 to 99.9 V<br>100 to 759 V | 0 to 7590d | 0.1A | 22V |
| Harmonic current | 250 A frame | 50, 60, 75, 100, 125 A | 0.0 to 125.0 A | 0 to 1250d | 0.1A | 1.2A |
| | | 125 to 250 A | 0.0 to 250.0 A | 0 to 2500d | | 2.5A |
| | 400 A frame | 200 to 400 A | 0.0 to 400.0 A | 0 to 4000d | | 8.0A |
| | 800 A frame (630 A rated value) | 300 to 630 A | 0.0 to 630.0 A | 0 to 6300d | | 12.6 A |
| | 800 A frame (800 A rated value) | 400 to 800 A | 0.0 to 800.0 A | 0 to 8000 | | 16.0A |
| Electric power | 250 A frame | 50, 60, 75, 100, 125 A | −328.6 to 328.6 kW | −3286d to 3286d | 0.1kW | — |
| | | 125 to 250 A | −657.3 to 657.3 kW | −6573d to 6573d | | |
| | 400 A frame | 200 to 400 A | −1052 to −1000 kW<br>−999.9 to 999.9 kW<br>1000 to 1052 kW | −10520d to 10520d | | |
| | 800 A frame (630 A rated value) | 300 to 630 A | −1656 to −1000 kW<br>−999.9 to 999.9 kW<br>1000 to 1656 kW | −16560d to 16560d | | |
| | 800 A frame (800 A rated value) | 400 to 800 A | −2103 to −1000 kW<br>−999.9 to 999.9 kW<br>1000 to 2103 kW | −21030d to 21030d | | |
| Reactive power | 250 A frame | 50, 60, 75, 100, 125 A | −328.6 to 328.6 kvar | −3286d to 3286d | 0.1kvar | — |
| | | 125 to 250 A | −657.3 to 657.3 kvar | −6573d to 6573d | | |
| | 400 A frame | 200 to 400 A | −1052 to −1000 kvar<br>−999.9 to 999.9 kvar<br>1000 to 1052 kvar | −10520d to 10520d | | |
| | 800 A frame (630 A rated value) | 300 to 630 A | −1656 to −1000 kvar<br>−999.9 to 999.9 kvar<br>1000 to 1656 kvar | −16560d to 16560d | | |
| | 800 A frame (800 A rated value) | 400 to 800 A | −2103 to −1000 kvar<br>−999.9 to 999.9 kvar<br>1000 to 2103 kvar | −21030d to 21030d | | |
| Power factor Note 1 | common | common | Lead 0% to 100% to Lag 0% | Lead 0d to 1000d to Lag 0d | 0.1% | — |
| Frequency | common | common | 0.0 Hz, 45.0 to 65.0 Hz | 0d, 450d to 650d | 0.1Hz | — |
| Fault current LTD/STD/INST | 250 A frame | 50, 60, 75, 100, 125 A | 0 to 2000 A | 0 to 2000d | 1A | — |
| | | 125 to 250 A | 0 to 4000 A | 0 to 4000d | | |
| | 400 A frame | 200 to 400 A | 0 to 6400 A | 0 to 6400d | | |
| | 800 A frame (630 A rated value) | 300 to 630 A | 0 to 10080 A | 0 to 10080d | | |
| | 800 A frame (800 A rated value) | 400 to 800 A | 0 to 12800 A | 0 to 12800d | | |
| Phase sequence | 400 A frame<br>800 A frame | common | Normal phase | 0d | — | — |
| | | | Reverse phase | 1d | | |
| Trip frequency Open/close frequency | common | common | 0 to 9999 | 0 to 9999d | 1 time | — |

Note 1: Lead values display "−(negative)".

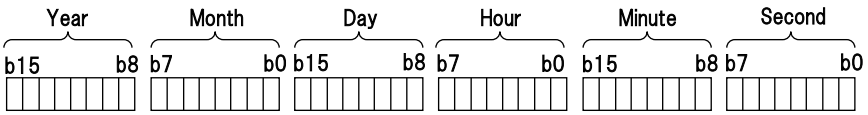
## (2) Measurement value data (3byte)




| Item | Compatible circuit breaker * | Measurement range | Data range | Conversion unit |
|---|---|---|---|---|
| Electric energy | 250 A frame | 0.0 to 99999.9 kWh | 0 to 999999d | 0.1 kWh |
| | 400 A frame<br>800 A frame | 0 to 999999 kWh | | 1 kWh |
| Reactive energy | 250 A frame | 0.0 to 99999.9 kvarh | | 0.1 kvarh |
| | 400 A frame<br>800 A frame | 0 to 999999 kvarh | | 1 kvarh |

* Compatible circuit breaker can be identified by the rated current setting (02BCh).

## (3) Clock data




* These data are BCD code.

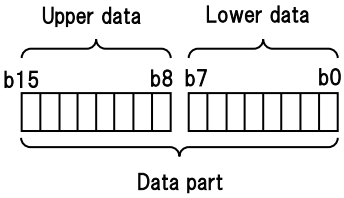
### Maximum value occurrence time

| Item | Data range | Unit |
|---|---|---|
| Year | 00h to 99h | year |
| Month | 01h to 12h | month |
| Day | 01h to 31h | day |
| Hour | 01h to 23h | hour |
| Minute | 01h to 59h | minute |
| Second | 00h (fix) | second |

### Current time

| Item | Data range | Unit |
|---|---|---|
| Year | 00h to 99h | year |
| Month | 01h to 12h | month |
| Day | 01h to 31h | day |
| Hour | 00h to 23h | hour |
| Minute | 00h to 59h | minute |
| Second | 00h to 59h | second |

## (4) Setting value 1 (1/2)



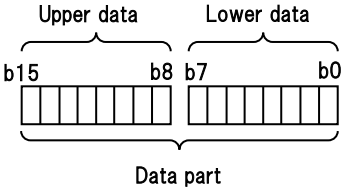

※1 The actual value is the value of "Data Division" multiplied by "conversion unit".
※2 For details on setting contents, read the instruction manual "MDU Breaker: MDU"

| Item | Compatible circuit breaker | Setting range | Conversion unit | Setting step | Setting contents |
|---|---|---|---|---|---|
| Line system | common | 0001h | — | — | Single-phase 2-wire |
| | | 0002h | | | Single-phase 3-wire |
| | | 0003h | | | 3-phase 3-wire |
| | | 0004h | | | 3-phase 4-wire |
| Demand time | common | 0000h to 000Fh | 1 minute | 0001h | 0 to 15 |
| Alarm reset method | common | 0000h | — | — | Automatic reset |
| | | 0001h | | | Self-retention |
| PAL pickup current (Ip) | common | 0046h to 0064h | 1% | 0005h | 70 to 100% |
| INST pickup ratio (Ii) | 250 A frame | 0014h to 008Ch | 0.1% | 0010h | ×2 to ×14 |
| | 400 A frame | 0028h to 00A0h | | | ×4 to ×16 |
| | 800 A frame (630 A rated value) | 0028h to 0096h | | | ×4 to ×15 |
| | 800 A frame (800 A rated value) | 0028h to 0078h | | | ×4 to ×12 |
| STD pickup current (Is) | 250 A frame | 0014h | ×0.1 | — | × 2 |
| | | 0019h | | | × 2.5 |
| | | 001Eh | | | × 3 |
| | | 0023h | | | × 3.5 |
| | | 0028h | | | × 4 |
| | | 0032h | | | × 5 |
| | | 003Ch | | | × 6 |
| | | 0046h | | | × 7 |
| | | 0050h | | | × 8 |
| | | 005Ah | | | × 9 |
| | | 0064h | | | × 10 |
| | 400 A frame 800 A frame | 0014h | | | × 2 |
| | | 0019h | | | × 2.5 |
| | | 001Eh | | | × 3 |
| | | 0023h | | | × 3.5 |
| | | 0028h | | | × 4 |
| | | 0032h | | | × 5 |
| | | 003Ch | | | × 6 |
| | | 0046h | | | × 7 |
| | | 0050h | | | × 8 |
| | | 0064h | | | × 10 |

## (4) Setting value1 (2/2)

| Item | Compatible circuit breaker | Setting range | Conversion unit | Setting step | Setting contents |
|---|---|---|---|---|---|
| STD operating time (Ts) | 250 A frame | 0001h | — | — | 100 ms |
| | | 0002h | | | 200 ms |
| | | 0003h | | | 300 ms |
| | 400 A frame<br>800 A frame | 0000h | | | 60 ms |
| | | 0001h | | | 100 ms |
| | | 0002h | | | 200 ms |
| | | 0003h | | | 300 ms |
| LTD operating time (TL) | 250 A frame | 0078h | 0.1 s | — | 12 s |
| | | 0258h | | | 60 s |
| | | 0320h | | | 80 s |
| | | 03E8h | | | 100 s |
| | 400 A frame<br>800 A frame | 0078h | | | 12 s |
| | | 0258h | | | 60 s |
| | | 03E8h | | | 100 s |
| | | 05DCh | | | 150 s |
| MDU series code | common | 0001h | — | — | MCCB |
| Number of pole | common | 0003h | — | — | 3-pole |
| | | 0004h | | | 4-pole |
| Phase switch<br>(1- to 3- phase connection) | common | 0000h | — | — | Phase not switched<br>(1- to 3-phase connection) |
| | | 0001h | | | Phase switched<br>(3- to 1-phase connection) |
| INST reference value | 250 A frame | 0028h to 0064h | 1% | 0001h | 40 to 100% |
| | 400 A frame<br>800 A frame | 0064h | | | 100%<br>(fix) |
| IDM_AL (current demand alarm) pickup current | common | 0032h to 0064h | 1% | 0001h | 50 to 100% |
| IDM_AL (current demand alarm) demand time | common | 0001h to 000Ah | 1 minute | 0001h | 1 to 10 minute |
| | | 000Fh to 001Eh | | 0005h | 15 to 30 minute |
| Current setting (Ir) | 250 A frame | 04E2h to 09C4h | 0.1 A | 04E2h | 125 to 250 A |
| | 400 A frame | 07D0h to 0FA0h | | 0010h | 200 to 400 A |
| | 800 A frame<br>(630 A rated value) | 0BB8h to 189Ch | | | 300 to 630 A |
| | 800 A frame<br>(800 A rated value) | 0FA0h to 1F40h | | | 400 to 800 A |
| Rated current | 250 A frame | 007Dh | 1 A | — | 125 A |
| | | 00FAh | | | 250 A |
| | 400 A frame | 0190h | | | 400 A |
| | 800 A frame<br>(630 A rated value) | 0276h | | | 630 A |
| | 800 A frame<br>(800 A rated value) | 0320h | | | 800 A |

## (5) Setting value 2



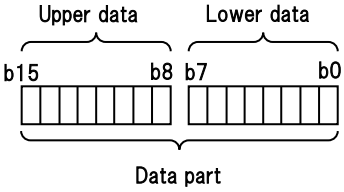

| Item | Compatible circuit breaker | Current setting (Ir) | Setting range | Data range | Conversion unit |
|---|---|---|---|---|---|
| Electric current demand upper limit alarm setting value *1 | 250 A frame | 125 to 250 A | 0.0 to 500.0 A | 0000h to 1388h | 0.1 A |
| | 400 A frame | 200 to 400 A | 0.0 to 800.0 A | 0000h to 1F40h | |
| | 800 A frame (630 A rated value) | 300 to 630 A | 0.0 to 999.9 A<br>1000 to 1260 A | 0000h to 270Fh<br>2710h to 44ECh | |
| | 800 A frame (800 A rated value) | 400 to 800 A | 0.0 to 999.9 A<br>1000 to 1600 A | 0000h to 270Fh<br>2710h to 4640h | |
| Electric current demand lower limit alarm setting value *2 | 250 A frame | 125 to 250 A | 0.0 to 500.0 A | 0000h to 1388h | |
| | 400 A frame | 200 to 400 A | 0.0 to 800.0 A | 0000h to 1F40h | |
| | 800 A frame (630 A rated value) | 300 to 630 A | 0.0 to 999.9 A<br>1000 to 1260 A | 0000h to 270Fh<br>2710h to 44ECh | |
| | 800 A frame (800 A rated value) | 400 to 800 A | 0.0 to 999.9 A<br>1000 to 1600 A | 0000h to 270Fh<br>2710h to 4640h | |

*1 : You can not set a value smaller than the lower limit alarm setting value.

*2 : You can not set a value larger than the upper limit alarm setting value.

*3 : The device monitors the minimum and maximum values within the current demand value of each phase.

## (6) 16 bit data




| Item | Bit | Description | For 1 | Fir 0 | Remark |
|---|---|---|---|---|---|
| 16 bit monitor | b0 | AX(ON/OFF status) | ON | OFF or trip | *1 |
| | b1 | AL(Trip status) | Trip | ON or OFF | *2 |
| | b2 | PAL(Pre-alarm) | Alarm occurred | Alarm not occurred | |
| | b3 | Reserved | - | - | |
| | b4 | Reserved | - | - | |
| | b5 | Reserved | - | - | |
| | b6 | LTD | Occurred | Not occurred | *3 |
| | b7 | STD/INST | Occurred | Not occurred | *3 |
| | b8 | Electric current demand lower limit alarm | - | - | |
| | b9 | Electric current demand upper limit alarm | - | - | |
| | b10 | IDM_AL(Current demand alarm) | Occurred | Not occurred | |
| | b11 | IUB_AL(Current unbalance alarm) | Occurred | Not occurred | |
| | b12 | OVER(Over current alarm) | Alarm occurred | Alarm not occurred | |
| | b13 | ILA_AL(Current open-phase alarm) | Occurred | Not occurred | |
| | b14 | Reserved | - | - | |
| | b15 | Reserved | - | - | |
| 16 bit reset | b0 | Reset all alarm | Reset execution | - | |
| | b1 | All memory clear | All clear execution | - | *4, *5 |
| | b2 | Order-specific harmonic current maximum value clear | Clear execution | - | *4, *6 |
| | b3 | Reserved | "0" fix | | |
| | b4 | Electric power demand maximum value clear | Clear execution | - | *4 |
| | b5 | Reserved | "0" fix | | |
| | b6 | Electric power demand maximum value clear | Clear execution | - | *4 |
| | b7 | Fault information (cause + current) clear | Clear execution | - | |
| | b8 | Reactive power demand maximum value clear | Clear execution | - | *4 |
| | b9 | Reactive energy (Integrated value) clear | Clear execution | - | |
| | b10 | Reactive energy (Maximum value of amount of last 1 hour) clear | Clear execution | - | *4 |
| | b11 | Current demand maximum value clear | Clear execution | - | *4 |
| | b12 | Voltage maximum value clear | Clear execution | - | *4 |
| | b13 | Total harmonic current demand maximum value clear | Clear execution | - | *4 |
| | b14 | Electric energy (Integrated value) clear | Clear execution | - | |
| | b15 | Electric energy (Maximum value of amount of last 1 hour) clear | Clear execution | - | *4 |

*1 : This becomes available when the AX switch for transmission with MDU breaker (optional) is attached to the MDU breaker.

*2 : This becomes available when the AL switch for transmission with MDU breaker (optional) is attached to the MDU breaker.
AL (Trip status) shows the status of the main body mechanism of the MDU breaker.

*3 : Any one of the causes of the fault is regarded as "Occurred".

*4 : This clear includes the clear of the memory of date and time of occurrence of each maximum value.

*5 : All memory clear refers to the clear of all items from items b2 to b15 above (zero clear). (Alarm reset is not included.)

*6 : 3rd-, 5th-, 7th-, 9th-, 11th-, 13th-, 15th-, 17th-, and 19th-order harmonic current maximum values are collectively reset.

| Item | Bit | Description | For 1 | Fir 0 | Remark |
|---|---|---|---|---|---|
| Alarm ON/OFF setting | b0 | IDM_AL(Current demand alarm) | OFF | ON | |
| | b1 | IUB_AL(Current unbalanced alarm) | OFF | ON | |
| | b2 | ILA_AL(Current open-phase alarm) | OFF | ON | |
| | b3 | Reserved | "1" fix | | |
| | b4 | Reserved | "1" fix | | |
| | b5 | Reserved | "1" fix | | |
| | b6 | Reserved | "1" fix | | |
| | b7 | Reserved | "1" fix | | |
| | b8 | Reserved | "1" fix | | |
| | b9 | Reserved | "1" fix | | |
| | b10 | Reserved | "1" fix | | |
| | b11 | Reserved | "1" fix | | |
| | b12 | Reserved | "1" fix | | |
| | b13 | Reserved | "1" fix | | |
| | b14 | Reserved | "1" fix | | |
| | b15 | Reserved | "1" fix | | |

* Be sure to set 1 to the unused bit.

# MDU Breaker Programming Manual

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