*INSTRUCTION MANUAL*

# MULTI POWER MONITORING MODULE
**(clamp-on current sensor CLSE, CC-Link)**

MODEL **R7CWTU**

## BEFORE USE ....

Thank you for choosing us. Before use, please check contents of the package you received as outlined below.
If you have any problems or questions with the product, please contact our sales office or representatives.

### ■ PACKAGE INCLUDES:

Multi power monitoring module.....(1)
Terminating resistor (110 Ω, 0.5 W).....(1)

### ■ MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

### ■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.
The R7CWTU is programmable by using the PC Configurator Software. For detailed information on the PC configuration, refer to the PMCFG users manual. The PMCFG PC Configurator Software is downloadable at our web site.

## POINTS OF CAUTION

### ■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:
  100 – 240V AC rating: 85 – 264V, 50/60 Hz, < 8VA
  110 – 240V DC rating: 99 – 264V, < 3W

### ■ GENERAL PRECAUTIONS

- Before you remove or mount the unit, turn off the power supply and input signal for safety.
- DO NOT set the switches on the module while the power is supplied. The switches are used only for maintenance without the power.

### ■ ENVIRONMENT

- Indoor use.
- When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within -10 to +55°C (14 to 131°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

### ■ WIRING

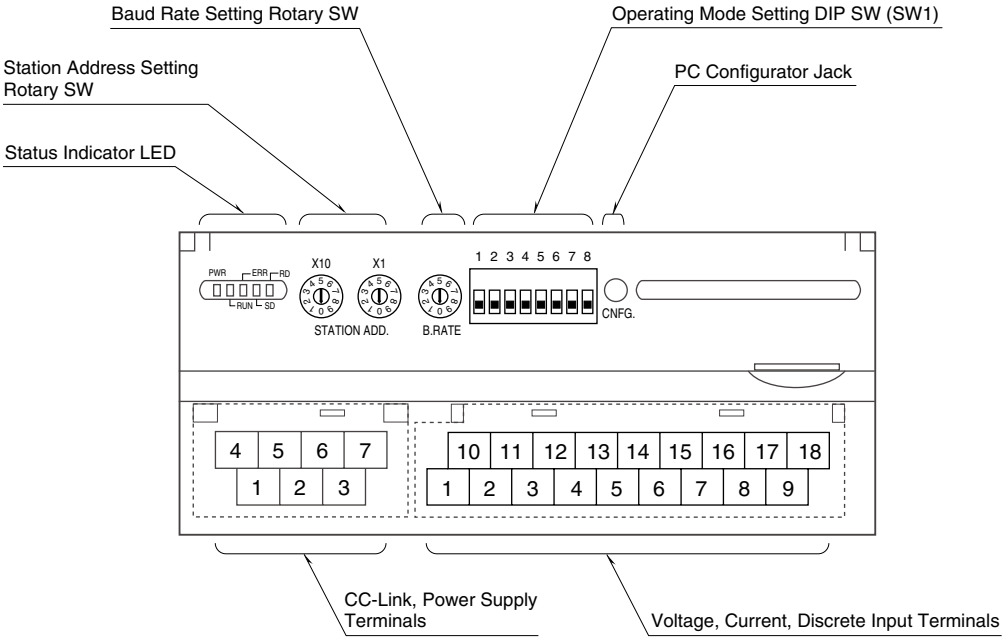
- Wiring to the unit must be conducted by qualified service personnel.
- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

### ■ AND ....

- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.


MG CO., LTD. www.mgco.jp
5-2-55 Minamitsumori, Nishinari-ku, Osaka 557-0063 JAPAN

# COMPONENT IDENTIFICATION

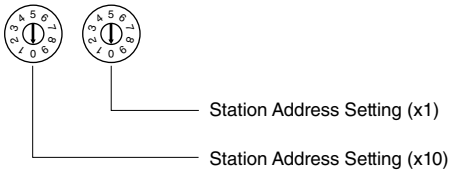



## ■ STATUS INDICATOR LED

| ID | COLOR | STATUS | FUNCTION |
|---|---|---|---|
| PWR | Red | ON | Normal |
| | | Blinking approx. 0.5 Hz | Input overload or no input |
| | | Blinking approx. 2 Hz | Setting error or device error |
| | | OFF | Error in the internal 5V |
| RUN | Red | ON | Refresh data received normally |
| ERR | Red | ON | Received data error |
| SD | Red | ON | Data transmitting |
| RD | Red | ON | Data receiving |

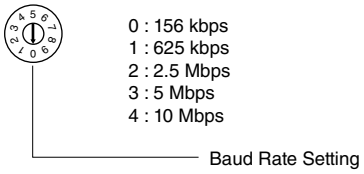
## ■ STATION ADDRESS

Station Address is selected between 1 and 64 in decimal. The left switch determines the tenth place digit, while the right switch does the ones place digit of the address.
(Factory setting: 00)




## ■ BAUD RATE

Baud Rate is selected with the rotary switch.
(Factory setting: 0: 156 kbps)




## ■ OPERATING MODE SETTING

(*) Factory setting

**• System Configuration (SW1-1, 1-2)**

| SW1-1 | SW1-2 | SYSTEM CONFIGURATION |
|---|---|---|
| OFF | OFF | Three-phase / 3-wire (*) |
| ON | OFF | Single-phase / 2-wire |
| OFF | ON | Single-phase / 3-wire |
| ON | ON | Three-phase / 4-wire |

**• Balanced or Unbalanced Load (SW1-3)**

| SW1-3 | BALANCED / UNBALANCED |
|---|---|
| OFF | Unbalanced (*) |
| ON | Balanced |

**• Clamp Sensor Type (SW1-4, 1-5, 1-6)**

Clamp sensor type setting is common to all circuits.
The sensor type and other settings for individual circuit is available with the PC Configurator.

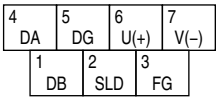
| SW1-4 | SW1-5 | SW1-6 | CLAMP SENSOR TYPE |
|---|---|---|---|
| OFF | OFF | OFF | CLSE-R5 (5A) (*) |
| ON | OFF | OFF | CLSE-05 (50A) |
| OFF | ON | OFF | CLSE-10 (100A) |
| OFF | OFF | ON | CLSE-20 (200A) |
| ON | ON | OFF | CLSE-40 (400A) |
| OFF | ON | ON | CLSE-60 (600A) |

**• Configuration Mode (SW1-8)**

| SW1-8 | CONFIGURATION MODE |
|---|---|
| OFF | DIP switch setting (*)<br>(PC Configurator setting is invalid.) |
| ON | PC Configurator and communication<br>(DIP switch setting is invalid.) |

Note 1: Turn on the power supply to the unit after setting station address, baud rate and operating mode.
Note 2: Be sure to set unused SW1-7 to OFF.

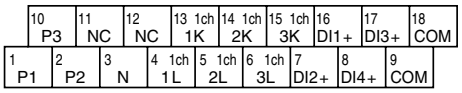
### ■ POWER SUPPLY, CC-Link TERMINAL ASSIGNMENT




1. DB White
2. SLD Shield
3. FG FG
4. DA Blue
5. DG Yellow
6. U(+) Power input (+)
7. V(–) Power input (–)

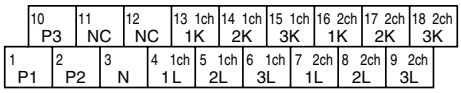
### ■ INPUT TERMINAL ASSIGNMENT

**• 1 Circuit, 4 point discrete**




| PIN No. | ID | FUNCTION | PIN No. | ID | FUNCTION |
|---|---|---|---|---|---|
| 1 | P1 | Voltage Input P1 | 10 | P3 | Voltage Input P3 |
| 2 | P2 | Voltage Input P2 | 11 | NC | Unused |
| 3 | N | Voltage Input N | 12 | NC | Unused |
| 4 | 1ch 1L | 1ch current input 1L | 13 | 1ch 1K | 1ch current input 1K |
| 5 | 1ch 2L | 1ch current input 2L | 14 | 1ch 2K | 1ch current input 2K |
| 6 | 1ch 3L | 1ch current input 3L | 15 | 1ch 3K | 1ch current input 3K |
| 7 | DI2 + | Discrete input 2 | 16 | DI1 + | Discrete input 1 |
| 8 | DI4 + | Discrete input 4 | 17 | DI3 + | Discrete input 3 |
| 9 | COM | Discrete input common | 18 | COM | Discrete input common |

**• 2 Circuits**

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| 5 | 1ch 2L | 1ch current input 2L | 14 | 1ch 2K | 1ch current input 2K |
| 6 | 1ch 3L | 1ch current input 3L | 15 | 1ch 3K | 1ch current input 3K |
| 7 | 2ch 1L | 2ch current input 1L | 16 | 2ch 1K | 2ch current input 1K |
| 8 | 2ch 2L | 2ch current input 2L | 17 | 2ch 2K | 2ch current input 2K |
| 9 | 2ch 3L | 2ch current input 3L | 18 | 2ch 3K | 2ch current input 3K |

## STATUS INDICATOR LED

| PWR | RUN | ERR | SD *1 | RD | STATUS *2 |
|---|---|---|---|---|---|
| ON | ON | BL | BL | ON | Communicates normally with occasional CRC errors due to noise interference. |
| ON | ON | BL | BL | ON | Communicates normally but the Baud Rate and/or Station Address switches failed. ERR LED blinks approximately in 0.5 seconds intervals. |
| ON | ON | BL | BL | OFF | ---- |
| ON | ON | BL | OFF | ON | CRC error found in the received data. Unable to respond. |
| ON | ON | BL | OFF | OFF | ---- |
| ON | ON | OFF | BL | ON | Normal communication |
| ON | ON | OFF | BL | OFF | ---- |
| ON | ON | OFF | OFF | ON | Unable to receive data addressed to the station. |
| ON | ON | OFF | OFF | OFF | ---- |
| ON | OFF | BL | BL | ON | Performs the interval-timed responses but CRC error found in receiving the refresh data. |
| ON | OFF | BL | BL | OFF | ---- |
| ON | OFF | BL | OFF | ON | CRC error found in the data addressed to the station. |
| ON | OFF | BL | OFF | OFF | ---- |
| ON | OFF | OFF | BL | ON | Link is not started. |
| ON | OFF | OFF | BL | OFF | ---- |
| ON | OFF | OFF | OFF | ON | No data addressed to the station. Or unable to receive data addressed to the station due to noise interference. (Missing parts of the data sent from the master) |
| ON | OFF | OFF | OFF | OFF | Unable to receive data due to wire breakdown |
| ON | OFF | ON | OFF | ON/OFF | Faulty Baud Rate and/or Station Address setting |
| BL | OFF | OFF | OFF | OFF | Blinking in approx. 0.5 Hz intervals: Input overload or no input<br>Blinking in approx. 2 Hz intervals: Setting error or device error |
| OFF | OFF | OFF | OFF | OFF | Power input removed. Or power supply failure. |

OFF = OFF, ON = ON, BL = Blinking

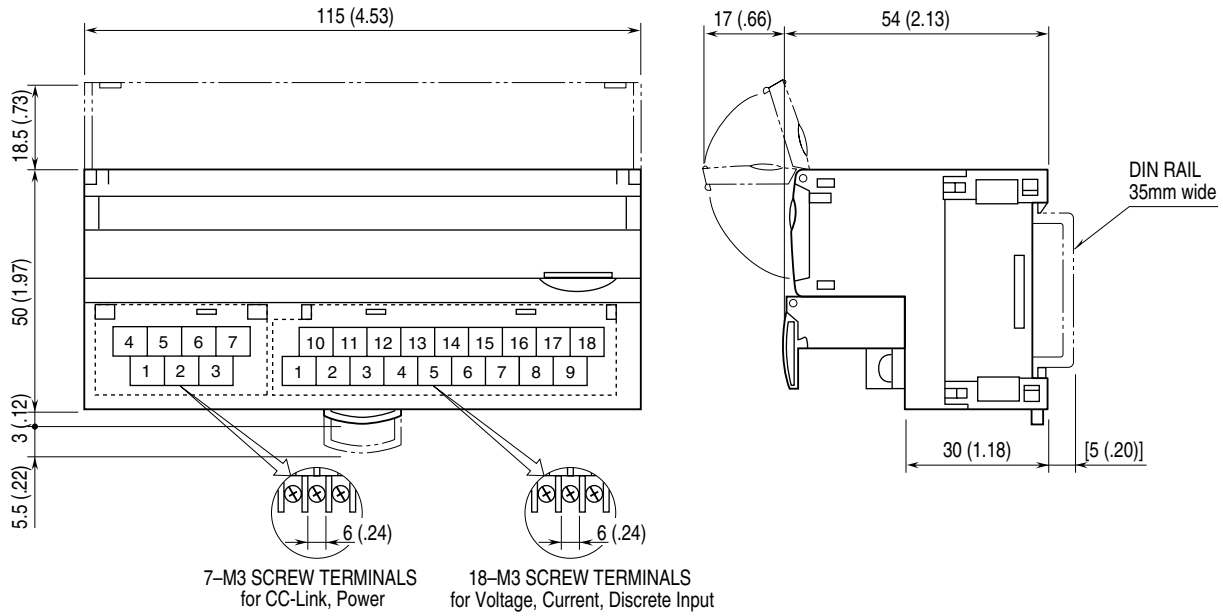
*1. SD LED may look not blinking but ON with high baud rate and fewer connected modules.

*2. LEDs indicated with "----" in STATUS rarely occurs in normal operation (LED failure or the like as possible cause).

# TERMINAL CONNECTIONS

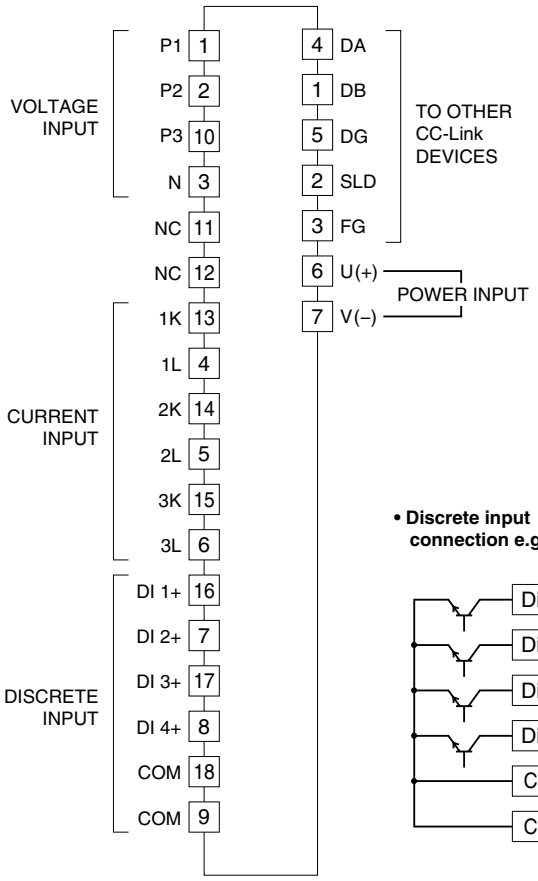
Connect the unit as in the diagram below.

### ■ EXTERNAL DIMENSIONS unit: mm (inch)




### ■ CONNECTION DIAGRAM

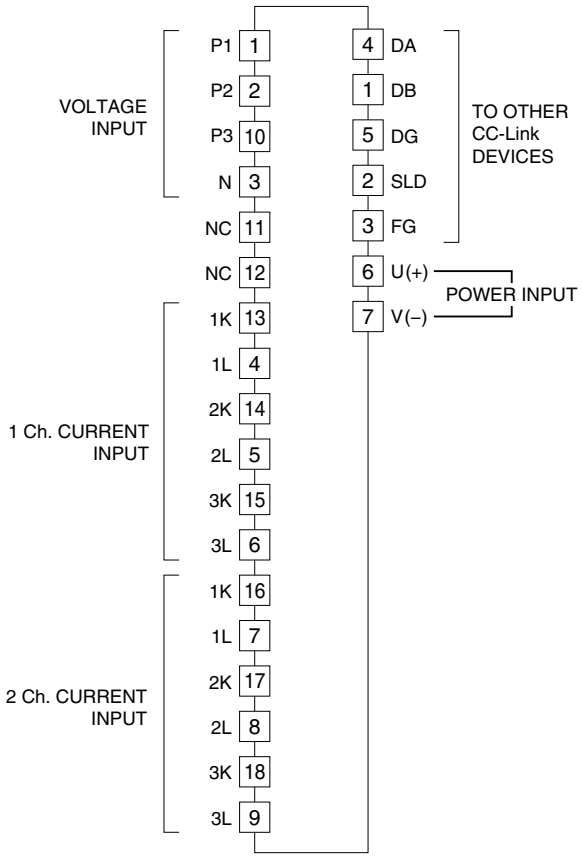
**• 1 Circuit, 4-point Discrete Inputs**



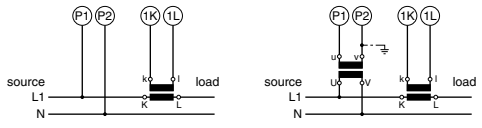
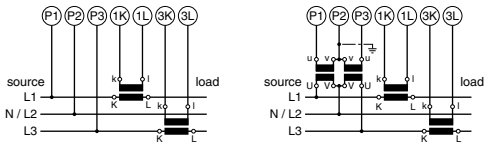
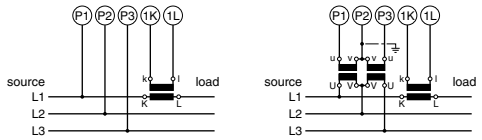
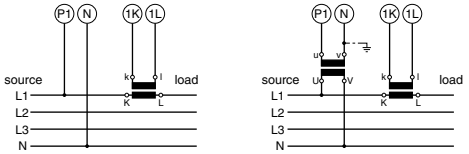
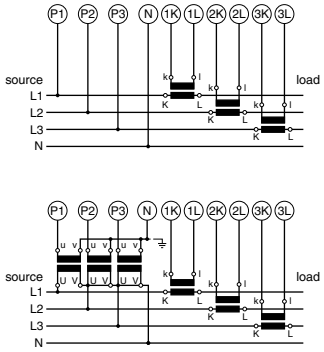

**• Discrete input connection e.g.**




**• 2 Circuits**



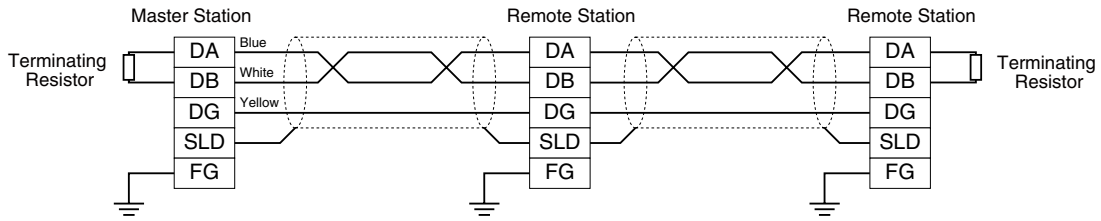
### ■ INPUT WIRING

| System / Application | Terminal | System / Application | Terminal |
|---|---|---|---|
| Single phase / 2-wire |  | Single phase / 3-wire<br>Three phase / 3-wire unbalanced load (2CT) |  |
| Three phase / 3-wire, balanced load |  | Three phase / 4-wire, balanced load |  |
| Three phase / 4-wire, unbalanced load |  | | |

Note: Use CLSE for CT.
Grounding is unnecessary for low-voltage circuit.

## COMMUNICATION CABLE CONNECTIONS

### ■ MASTER CONNECTION




Note: Be sure to turn ON the terminating resistor located at both ends of the modules.
Crosswire between terminals DA – DB.
Master unit is connectable at both ends and at other points.

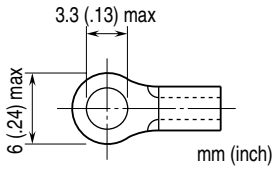
# WIRING INSTRUCTIONS

### ■ SCREW TERMINAL

Torque: 0.5 N·m

### ■ SOLDERLESS TERMINAL

Refer to the drawing below for recommended ring tongue terminal size. Spade tongue type is also applicable.
Applicable wire size: 0.25 to 1.65 mm$^2$ (AWG 22 to 16)
Recommended manufacturer: Japan Solderless Terminal MFG. Co., Ltd, Nichifu Co., Ltd




# CC-Link - COMMUNICATION

### ■ CC-Link COMMUNICATION

| | |
|---|---|
| Version | Version 1.10 |
| Station address | 1 through 64 |
| Baud rate | 156 kbps, 625 kbps, 2.5 Mbps, 5 Mbps, 10 Mbps |
| Station type | Remote Device |
| Data allocation | One (1) |

### ■ READING/WRITING VIA CC-Link

In order to read measured data from or write new settings to the R7CWTU, access registers in the unit via CC-Link according to the tables below. All registers are composed of two words in signed integer. Negative values are in two's complements. Refer to "CC-Link - OPERATIONS" in this manual for register numbers and their contents.

**• Master to Slave (R7CWTU)**

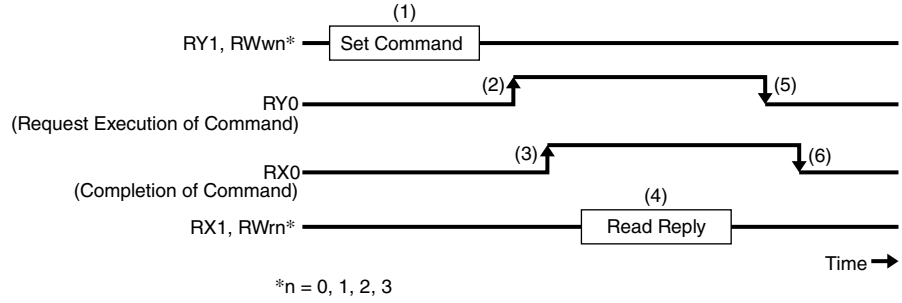
| | | |
|---|---|---|
| Bit data | RY0 | Set ON in order to execute the command. (Set OFF after RX0 turns ON.) |
| | RY1 | Command<br>0: Reading<br>1: Writing |
| Word data | RWw0 | Register number |
| | RWw1 | - |
| | RWw2 | Data to write (LSW) |
| | RWw3 | Date to write (MSW) |

**• Slave (R7CWTU) to Master**

| | | |
|---|---|---|
| Bit data | RX0 | Turns ON when the command executed (Turns OFF after RY0 set OFF) |
| | RX1 | Same as RY1 |
| | RX1A | R7CWTU system error |
| | RX1B | Ready |
| Word data | RWr0 | Same as RWw0 |
| | RWr1 | Error code |
| | RWr2 | Data to read (LSW) |
| | RWr3 | Data to read (MSW) |

### ■ READING/WRITING PROCEDURE

The sequence (1) through (6) shown in below is the procedure to read/write a set of data. When you need to read/write continuously, repeat the sequence.



## ■ DETAIL OF READING/WRITING SEQUENCE

### Sequence (1)

**• Reading command**

Set register number in RWw0.
Set RY1 OFF.

**• Writing command**

Set register number in RWw0.
Set the data to write in RWw2 and RWw3.
Set RY1 ON.

**• Master to Slave (R7CWTU)**

| COMMAND | READING | WRITING |
|---|---|---|
| RY1 | OFF | ON |
| RWw0 | Register number | Register number |
| RWw2 | ---- | Data to write (LSW) |
| RWw3 | ---- | Data to write (MSW) |

### Sequence (2)

Set RY0 ON.
Receiving a command, the unit copies RY1, RWw0, RWw2, RWw3 to RX1, RWr0, RWr2, RWr3.

**• Master to Slave (R7CWTU)**

| REQUIRE | READING | WRITING |
|---|---|---|
| RY0 | ON | ON |

**• Slave (R7CWTU) to Master**

| ACKNOWLEDGE | READING | WRITING |
|---|---|---|
| RX1 | OFF | ON |
| RWr0 | Register number | Register number |
| RWr2 | ---- | Data to write (LSW) |
| RWr3 | ---- | Data to write (MSW) |

### Sequence (3)

Following the completion of a command, the unit sets reply data in RWr2 and RWr3, and sets RX0 ON.

**• Slave (R7CWTU) to Master**

| REPLY | READING | WRITING |
|---|---|---|
| RX0 | ON | ON |
| RWr1 | Error code | Error code |
| RWr2 | Data to read (LSW) | ---- |
| RWr3 | Data to read (MSW) | ---- |

**• Error Codes**

| ERROR CODE | COMMAND | CONTENTS |
|---|---|---|
| 100H | Reading | No error |
| 111H | | Command error |
| 112H | | Device error (Time out) |
| 113H | | Device error (Communication) |
| 200H | Writing | No error |
| 211H | | Command error |
| 212H | | Device error (Time out) |
| 213H | | Device error (Communication) |

Note: Check the R7CWTU's fault, if device error repeats.

### Sequence (4)

Confirm RX0 is ON, and then read in reply data.

### Sequence (5)

Set RY0 OFF.

**• Master to Slave (R7CWTU)**

| COMPLETION | READING | WRITING |
|---|---|---|
| RY0 | OFF | OFF |

### Sequence (6)

Confirming RY0 set OFF, the unit sets RX0 and RX1 OFF and clears RWr0 through RWr3 (sets OFF).

| ACKNOWLEDGING COMPLETION | READING | WRITING |
|---|---|---|
| RX1 | OFF | OFF |
| RWr0 | 0 | 0 |
| RWr1 | 0 | 0 |
| RWr2 | 0 | 0 |
| RWr3 | 0 | 0 |

# CC-Link - OPERATIONS

## ■ CC-Link REGISTER ACCESS SETTING

| RGTR. | PARAMETER |
|---|---|
| 4943 | Deactivate CC-Link register writing protection<br>Writing a preset passcode in this register deactivates the writing protection via CC-Link.<br>When the CC-Link passcode set in this register matches the preset one, setting '1' or '2' in the register address 4945 becomes available to enable writing in CC-Link registers.<br>Reading out the register value is not possible. It reads always '-1' regardless of the code setting.<br>After writing is complete, be sure to set a value other than the passcode ('0' is recommended) to activate the writing protection again. |
| 4945 | CC-Link register access setting<br>0 : Write disable (*)<br>1 : Write enable<br>2 : Write enable count values<br>Other : Write disable<br>This setting is erased when the power supply to the unit is removed. It always starts with '0' (Write disable) when the power supply is turned on. Set '1' or '2' before starting writing at other registers.<br>When the CC-Link register writing protection is enabled, this register setting cannot be changed from '0' to '1' or '2' unless a correct security code is set in the register address 4943. |

(*) Factory setting

## ■ SYSTEM OPERATIONS

System operations include switching high tariff/low tariff, resetting accumulated values and rebooting.

| RGTR. | PARAMETER |
|---|---|
| 5329 | Switch tariff (Circuit 1)<br>0 : High tariff (peak time) (*)<br>1 : Low tariff (off-peak time) |
| 5330 | Reset energy count (Circuit 1)<br>1 : Reset all values<br>2 : Reset all MAX / MIN values and set the present values.<br>3 : Reset all average (demand) values<br>Specify the extent of count resetting. The register is automatically set to '0' when the resetting procedure is complete after one of these values is written at this address. If another value is written before '0' has been set, the former resetting procedure ends indefinitely.<br>Specific values can be preset to each register by writing at this address from the host. |
| 5331 | Reboot system<br>Write '10001' to reboot the system. (Any other values can be written but invalid.) |
| 5332 | Backup / restore setting<br>20002 : Backup the present setting<br>30003 : Restore the device with the backup setting data<br>The register is automatically set to '0' when the procedure is complete after one of these values is written at this register. If another value is written before '0' has been set, the former procedure ends indefinitely. |
| 5334 | CC-Link register writing protection passcode<br>Setting a passcode to control writing registers via CC-Link.<br>0 : Cancel writing protection (*)<br>1 to 999 999 999: The set value is used for the passcode<br>The passcode must be set to the register address 4943 before setting '1' or '2' in the address 4945 to deactivate the writing protection.<br>The value in this register is encrypted when it is read out. Only '0' (Cancel protection) is read out as it is.<br>When a new code is set in this register, the register address 4945 is immediately reset to '0' so that a next command will be already limited in access. |
| 5336 | Loop test (Circuit 1)<br>Measuring is stopped when '1' is set in this address. Then any value can be written in measurement value registers (1 through 87) for loop test purposes.<br>CC-Link register access setting (4945) must be separately set to Write Enable mode.<br>Measuring is restarted when '0' is set in this address. |
| 5337 | Switch tariff (Circuit 2)<br>Switching tariff for Circuit 2. Same as with the register 5329. |
| 5338 | Reset energy count (Circuit 2)<br>Resetting energy count for Circuit 2. Same as with the register 5330. |
| 5339 | Loop test (Circuit 2)<br>Turning Circuit 2 to the loop test mode. Same as the register 5336. |

(*) Factory setting

# CC-Link - SETTING

## ■ SYSTEM SETTING

| RGTR. | PARAMETER | UNIT |
|---|---|---|
| 5601 | System configuration<br>0 : Single-phase / 2-wire (1CT)<br>1 : Single-phase / 3-wire (2CT)<br>2 : Three-phase / 3-wire, balanced load (1CT)<br>3 : Three-phase / 3-wire, unbalanced load (2CT) (*)<br>4 : Three-phase / 4-wire, balanced load (1CT)<br>5 : Three-phase / 4-wire, unbalanced load (3CT) | --- |
| 5602 | CT rating, Primary (Circuit 1)<br>1 to 20 000 : Current (A)<br>Factory setting : 5<br>Valid only for the sensor type CLSE-R5. Selected sensor's rating is automatically set for other types of sensors. | A |
| 5603 | CT sensor type (Circuit 1)<br>0 : CLSE-R5 (*)<br>1 : CLSE-05<br>2 : CLSE-10<br>3 : CLSE-20<br>4 : CLSE-40<br>5 : CLSE-60<br>6 : Reserved<br>7 : Reserved | --- |
| 5604 | VT rating, Primary<br>0 to 400 000 : Voltage (V)<br>Factory setting : 110 | V |
| 5606 | VT rating, Secondary<br>50 to 500 : Voltage (V)<br>Factory setting : 110<br>The secondary can be set up to 500V. However, this does not mean the unit accepts 500V for input. Do not use with the condition exceeding input rating written in the specification sheet of the unit. | V |
| 5607 | Frequency input<br>0 : Voltage (*)<br>1 : Current | --- |
| 5608 | Low-end cutout, Current (Circuit 1)<br>0 to 999 : Rated current × 0.001 × Specified value<br>Factory setting : 10 | %/10 |
| 5609 | Low-end cutout, Voltage<br>0 to 999 : Rated voltage × 0.001 × Specified value<br>Factory setting : 10 | %/10 |
| 5610 | CT rating, Primary (Circuit 2)<br>Same as with the register 5602. | A |
| 5611 | CT sensor type (Circuit 2)<br>Same as with the register 5603. | --- |
| 5612 | Low-end cutout, Current (Circuit 2)<br>Same as with the register 5608. | %/10 |

(*) Factory setting

## ■ DEMAND SETTING

| RGTR. | PARAMETER | UNIT |
|---|---|---|
| 5857 | Average (demand) current update interval<br>0 : External trigger signal<br>1 to 60 : Minutes<br>Factory setting : 30 | Minutes |
| 5858 | Average (demand) power update interval<br>0 : External trigger signal<br>1 to 60 : Minutes<br>Factory setting : 30 | Minutes |

## ■ STYLE SETTING

| RGTR. | PARAMETER |
|---|---|
| 5987 | Power factor (PF1 through PF3, PF) sign<br>0 : Standard (IEC), Identical to the active energy (*)<br>1 : Special type 1 (IEEE), Positive in LAG, Negative in LEAD |
| 5988 | Reactive power (Q1 through Q3, Q) sign<br>0 : Standard (IEC), Positive from PF = 1.0 to 180° in LAG direction; Negative for the other direction (*)<br>1 : Special type 1, Positive in LAG, Negative in LEAD |
| 5989 | Reactive power (Q1 through Q3) calculation (Q = Q1 + Q2 + Q3)<br>0 : Standard (*) $Qn = \sqrt{Sn^2 - Pn^2}$<br>1 : Reactive power meter method $Qn = \frac{1}{Nsmp} \sum_{i=1}^{Nsmp} (Uni - Nui)\, I_{i + (Nsmp / 4)}$ |
| 5990 | Apparent power (S) calculation<br>0 : Standard (*) $S = \sqrt{P^2 + Q^2}$<br>1 : Sum $S = S1 + S2 + S3$ |

(*) Factory setting
Note: '1,' '2,' '3' in expressions like Q1, Q2, Q3 indicate 'R,' 'S,' 'T' respectively.

# CC-Link - MEASURED VARIABLES

Each measured variable has different engineering unit (Refer to the table below). For example, when 40000 is read at the register 41 for the 1 – 2 delta voltage, the actual voltage value equals to 400.0V = 40000 × 0.01, as the engineering unit for this item is V/100 (0.01V).
Readable range for each parameter depends upon the parameter type, as shown in the table below. For example, Current unit is applied to Line current or Neutral current, and Voltage unit is applied to the 1 – 2 delta voltage or the minimum value voltage.

| TYPE | UNIT | RANGE |
|---|---|---|
| Current | mA | 0 to 2 000 000 000 mA |
| Voltage | V/100 | 0 to 20 000 000.00 V |
| Active power | W | -2 000 000 000 to 2 000 000 000 W |
| Reactive power | var | -2 000 000 000 to 2 000 000 000 var |
| Apparent power | VA | 0 to 2 000 000 000 VA |
| Power factor | 1/10 000 | -1.0000 to 1.0000 |
| Frequency | Hz/100 | 0 or 40.00 Hz to 70.00 Hz |
| Active energy | kWh/10 | 0 to 99 999 999.9 kWh *1 |
| Reactive energy | kvarh/10 | 0 to 99 999 999.9 kvarh *1 |
| Apparent energy | kVAh/10 | 0 to 99 999 999.9 kVAh *1 |
| Energy count time | h/10 | 0 to 99 999 999.9 hours *1 |
| Harmonic distortion | %/10 | 0 to 999.9 % |
| Phase angle between phase voltages | ° | -180 to +180° |

*1. Reset to 0 at overflow

### ■ MOMENTARY VALUE

| RGTR. | | ID | PARAMETER | UNIT |
|---|---|---|---|---|
| Circuit 1 | Circuit 2 | | | |
| 1 | 4001 | I | Current | mA |
| 3 | 4003 | U | Voltage | V/100 |
| 5 | 4005 | P | Active power | W |
| 7 | 4007 | Q | Reactive power | var |
| 9 | 4009 | S | Apparent power | VA |
| 11 | 4011 | PF | Power factor | 1/10 000 |
| 13 | 4013 | F | Frequency | Hz/100 |
| 15 | 4015 | DIR | Phase difference direction (0 = inductive or lag, 1 = capacitive or lead) | --- |
| 33 | 4033 | I1 | Current, Line 1 | mA |
| 35 | 4035 | I2 | Current, Line 2 | mA |
| 37 | 4037 | I3 | Current, Line 3 | mA |
| 39 | 4039 | IN | Neutral current | mA |
| 41 | 4041 | U12 | Delta voltage, 1 – 2 | V/100 |
| 43 | 4043 | U23 | Delta voltage, 2 – 3 | V/100 |
| 45 | 4045 | U31 | Delta voltage, 3 – 1 | V/100 |
| 47 | 4047 | U1N | Phase voltage, Phase 1 | V/100 |
| 49 | 4049 | U2N | Phase voltage, Phase 2 | V/100 |
| 51 | 4051 | U3N | Phase voltage, Phase 3 | V/100 |
| 53 | 4053 | P1 | Active power, Phase 1 | W |
| 55 | 4055 | P2 | Active power, Phase 2 | W |
| 57 | 4057 | P3 | Active power, Phase 3 | W |
| 59 | 4059 | Q1 | Reactive power, Phase 1 | var |
| 61 | 4061 | Q2 | Reactive power, Phase 2 | var |
| 63 | 4063 | Q3 | Reactive power, Phase 3 | var |
| 65 | 4065 | S1 | Apparent power, Phase 1 | VA |
| 67 | 4067 | S2 | Apparent power, Phase 2 | VA |
| 69 | 4069 | S3 | Apparent power, Phase 3 | VA |
| 71 | 4071 | PF1 | Power factor, Phase 1 | 1/10 000 |
| 73 | 4073 | PF2 | Power factor, Phase 2 | 1/10 000 |
| 75 | 4075 | PF3 | Power factor, Phase 3 | 1/10 000 |
| 77 | 4077 | DIR1 | Phase difference direction, Phase 1 (0 = inductive or lag, 1 = capacitive or lead) | --- |
| 79 | 4079 | DIR2 | Phase difference direction, Phase 2 (0 = inductive or lag, 1 = capacitive or lead) | --- |
| 81 | 4081 | DIR3 | Phase difference direction, Phase 3 (0 = inductive or lag, 1 = capacitive or lead) | --- |
| 83 | 4083 | UT12 | Phase angle between Phase 1 – 2 voltages | ° |
| 85 | 4085 | UT23 | Phase angle between Phase 2 – 3 voltages | ° |
| 87 | 4087 | UT31 | Phase angle between Phase 3 – 1 voltages | ° |

**■ ENERGY**

Writing the following registers enables energy presetting. Set CC-Link Register Access in order to write in the energy and fractions.

| RGTR. | | ID | PARAMETER | UNIT |
|---|---|---|---|---|
| Circuit 1 | Circuit 2 | | | |
| 129 | 4129 | EP | Active energy, high tariff, incoming | kWh/10 |
| 131 | 4131 | EQ | Reactive energy, high tariff, LAG | kvarh/10 |
| 133 | 4133 | ES | Apparent energy, high tariff | kVAh/10 |
| 135 | 4135 | EP– | Active energy, high tariff, outgoing | kWh/10 |
| 137 | 4137 | EQ– | Reactive energy, high tariff, LEAD | kvarh/10 |
| 139 | 4139 | EQ+LAG | Reactive energy, high tariff, incoming, LAG | kvarh/10 |
| 141 | 4141 | EQ+LEAD | Reactive energy, high tariff, incoming, LEAD | kvarh/10 |
| 143 | 4143 | EQ–LAG | Reactive energy, high tariff, outgoing, LAG | kvarh/10 |
| 145 | 4145 | EQ–LEAD | Reactive energy, high tariff, outgoing, LEAD | kvarh/10 |
| 147 | 4147 | TIMER | Energy count time, high tariff | h/10 |
| 149 | 4149 | EQ+P | Reactive energy, high tariff, incoming | kvarh/10 |
| 151 | 4151 | EQ–P | Reactive energy, high tariff, outgoing | kvarh/10 |
| 153 | 4153 | EPA | Active energy, high tariff, (incoming – outgoing) | kWh/10 |
| 155 | 4155 | EQA | Reactive energy, high tariff, (incoming + outgoing) | kvarh/10 |
| 161 | 4161 | L-EP | Active energy, low tariff, incoming | kWh/10 |
| 163 | 4163 | L-EQ | Reactive energy, low tariff, LAG | kvarh/10 |
| 165 | 4165 | L-ES | Apparent energy, low tariff | kVAh/10 |
| 167 | 4167 | L-EP– | Active energy, low tariff, outgoing | kWh/10 |
| 169 | 4169 | L-EQ– | Reactive energy, low tariff, LEAD | kvarh/10 |
| 171 | 4171 | L-EQ+LAG | Reactive energy, low tariff, incoming, LAG | kvarh/10 |
| 173 | 4173 | L-EQ+LEAD | Reactive energy, low tariff, incoming, LEAD | kvarh/10 |
| 175 | 4175 | L-EQ–LAG | Reactive energy, low tariff, outgoing, LAG | kvarh/10 |
| 177 | 4177 | L-EQ–LEAD | Reactive energy, low tariff, outgoing, LEAD | kvarh/10 |
| 179 | 4179 | L-TIMER | Energy count time, low tariff | h/10 |
| 181 | 4181 | L-EQ+P | Reactive energy, low tariff, incoming | kvarh/10 |
| 183 | 4183 | L-EQ–P | Reactive energy, low tariff, outgoing | kvarh/10 |
| 185 | 4185 | L-EPA | Active energy, low tariff, (incoming – outgoing) | kWh/10 |
| 187 | 4187 | L-EQA | Reactive energy, low tariff, (incoming + outgoing) | kvarh/10 |
| 193 | 4193 | EP_L | Active energy fraction, high tariff, incoming | kWh/($10\times2^{32}$) |
| 195 | 4195 | EQ_L | Reactive energy fraction, high tariff, LAG | kvarh/($10\times2^{32}$) |
| 197 | 4197 | ES_L | Apparent energy fraction, high tariff | kVAh/($10\times2^{32}$) |
| 199 | 4199 | EP–_L | Active energy fraction, high tariff, outgoing | kWh/($10\times2^{32}$) |
| 201 | 4201 | EQ–_L | Reactive energy fraction, high tariff, LEAD | kvarh/($10\times2^{32}$) |
| 203 | 4203 | EQ+LAG_L | Reactive energy fraction, high tariff, incoming, LAG | kvarh/($10\times2^{32}$) |
| 205 | 4205 | EQ+LEAD_L | Reactive energy fraction, high tariff, incoming, LEAD | kvarh/($10\times2^{32}$) |
| 207 | 4207 | EQ–LAG_L | Reactive energy fraction, high tariff, outgoing, LAG | kvarh/($10\times2^{32}$) |
| 209 | 4209 | EQ–LEAD_L | Reactive energy fraction, high tariff, outgoing, LEAD | kvarh/($10\times2^{32}$) |
| 211 | 4211 | TIMER_L | Energy fraction count time, high tariff | seconds/1 000 |
| 213 | 4213 | EQ+P_L | Reactive energy fraction, high tariff, incoming | kvarh/($10\times2^{32}$) |
| 215 | 4215 | EQ–P_L | Reactive energy fraction, high tariff, outgoing | kvarh/($10\times2^{32}$) |
| 217 | 4217 | EPA_L | Active energy fraction, high tariff, (incoming – outgoing) | kWh/($10\times2^{32}$) |
| 219 | 4219 | EQA_L | Reactive energy fraction, high tariff, (incoming + outgoing) | kvarh/($10\times2^{32}$) |
| 225 | 4225 | L-EP_L | Active energy fraction, low tariff, incoming | kWh/($10\times2^{32}$) |
| 227 | 4227 | L-EQ_L | Reactive energy fraction, low tariff, LAG | kvarh/($10\times2^{32}$) |
| 229 | 4229 | L-ES_L | Apparent energy fraction, low tariff | kVAh/($10\times2^{32}$) |
| 231 | 4231 | L-EP–_L | Active energy fraction, low tariff, outgoing | kWh/($10\times2^{32}$) |
| 233 | 4233 | L-EQ–_L | Reactive energy fraction, low tariff, LEAD | kvarh/($10\times2^{32}$) |
| 235 | 4235 | L-EQ+LAG_L | Reactive energy fraction, low tariff, incoming, LAG | kvarh/($10\times2^{32}$) |
| 237 | 4237 | L-EQ+LEAD_L | Reactive energy fraction, low tariff, incoming, LEAD | kvarh/($10\times2^{32}$) |
| 239 | 4239 | L-EQ–LAG_L | Reactive energy fraction, low tariff, outgoing, LAG | kvarh/($10\times2^{32}$) |
| 241 | 4241 | L-EQ–LEAD_L | Reactive energy fraction, low tariff, outgoing, LEAD | kvarh/($10\times2^{32}$) |
| 243 | 4243 | L-TIMER_L | Energy fraction count time, low tariff | seconds/1 000 |
| 245 | 4245 | L-EQ+P_L | Reactive energy fraction, low tariff, incoming | kvarh/($10\times2^{32}$) |
| 247 | 4247 | L-EQ–P_L | Reactive energy fraction, low tariff, outgoing | kvarh/($10\times2^{32}$) |
| 249 | 4249 | L-EPA_L | Active energy fraction, low tariff, (incoming – outgoing) | kWh/($10\times2^{32}$) |
| 251 | 4251 | L-EQA_L | Reactive energy fraction, low tariff, (incoming + outgoing) | kvarh/($10\times2^{32}$) |

■ **AVERAGE VALUE**

| RGTR. | | ID | PARAMETER | UNIT |
|---|---|---|---|---|
| Circuit 1 | Circuit 2 | | | |
| 257 | 4257 | I AVG | Current AVG | mA |
| 259 | 4259 | I1 AVG | Current AVG, Line 1 | mA |
| 261 | 4261 | I2 AVG | Current AVG, Line 2 | mA |
| 263 | 4263 | I3 AVG | Current AVG, Line 3 | mA |
| 265 | 4265 | IN AVG | Neutral current AVG | mA |
| 273 | 4273 | I AVG 1 | Current AVG, History 1 | mA |
| 275 | 4275 | I1 AVG 1 | Current AVG, Line 1, History 1 | mA |
| 277 | 4277 | I2 AVG 1 | Current AVG, Line 2, History 1 | mA |
| 279 | 4279 | I3 AVG 1 | Current AVG, Line 3, History 1 | mA |
| 281 | 4281 | IN AVG 1 | Neutral current AVG, History 1 | mA |
| 289 | 4289 | I AVG 2 | Current AVG, History 2 | mA |
| 291 | 4291 | I1 AVG 2 | Current AVG, Line 1, History 2 | mA |
| 293 | 4293 | I2 AVG 2 | Current AVG, Line 2, History 2 | mA |
| 295 | 4295 | I3 AVG 2 | Current AVG, Line 3, History 2 | mA |
| 297 | 4297 | IN AVG 2 | Neutral current AVG, History 2 | mA |
| 305 | 4305 | I AVG 3 | Current AVG, History 3 | mA |
| 307 | 4307 | I1 AVG 3 | Current AVG, Line 1, History 3 | mA |
| 309 | 4309 | I2 AVG 3 | Current AVG, Line 2, History 3 | mA |
| 311 | 4311 | I3 AVG 3 | Current AVG, Line 3, History 3 | mA |
| 313 | 4313 | IN AVG 3 | Neutral current AVG, History 3 | mA |
| 321 | 4321 | I AVG 4 | Current AVG, History 4 | mA |
| 323 | 4323 | I1 AVG 4 | Current AVG, Line 1, History 4 | mA |
| 325 | 4325 | I2 AVG 4 | Current AVG, Line 2, History 4 | mA |
| 327 | 4327 | I3 AVG 4 | Current AVG, Line 3, History 4 | mA |
| 329 | 4329 | IN AVG 4 | Neutral current AVG, History | mA |
| 513 | 4513 | P AVG | Active power AVG | W |
| 515 | 4515 | Q AVG | Reactive power AVG | var |
| 517 | 4517 | S AVG | Apparent power AVG | VA |
| 529 | 4529 | P AVG 1 | Active power AVG, History 1 | W |
| 531 | 4531 | Q AVG 1 | Reactive power AVG, History 1 | var |
| 533 | 4533 | S AVG 1 | Apparent power AVG, History 1 | VA |
| 545 | 4545 | P AVG 2 | Active power AVG, History 2 | W |
| 547 | 4547 | Q AVG 2 | Reactive power AVG, History 2 | var |
| 549 | 4549 | S AVG 2 | Apparent power AVG, History 2 | VA |
| 561 | 4561 | P AVG 3 | Active power AVG, History 3 | W |
| 563 | 4563 | Q AVG 3 | Reactive power AVG, History 3 | var |
| 565 | 4565 | S AVG 3 | Apparent power AVG, History 3 | VA |
| 577 | 4577 | P AVG 4 | Active power AVG, History 4 | W |
| 579 | 4579 | Q AVG 4 | Reactive power AVG, History 4 | var |
| 581 | 4581 | S AVG 4 | Apparent power AVG, History 4 | VA |

■ **MAXIMUM / MINIMUM VALUE**

| RGTR. | | ID | PARAMETER | UNIT |
|---|---|---|---|---|
| Circuit 1 | Circuit 2 | | | |
| 769 | 2769 | I MAX | Current MAX | mA |
| 771 | 2771 | U MAX | Voltage MAX | V/100 |
| 773 | 2773 | P MAX | Active power MAX | W |
| 775 | 2775 | Q MAX | Reactive power MAX | var |
| 777 | 2777 | S MAX | Apparent power MAX | VA |
| 779 | 2779 | PF MAX | Power factor MAX | 1/10 000 |
| 781 | 2781 | F MAX | Frequency MAX | Hz/100 |
| 801 | 2801 | I1 MAX | Current MAX, Line 1 | mA |
| 803 | 2803 | I2 MAX | Current MAX, Line 2 | mA |
| 805 | 2805 | I3 MAX | Current MAX, Line 3 | mA |
| 807 | 2807 | IN MAX | Neutral current MAX | mA |
| 809 | 2809 | U12 MAX | Delta voltage MAX, 1 – 2 | V/100 |
| 811 | 2811 | U23 MAX | Delta voltage MAX, 2 – 3 | V/100 |
| 813 | 2813 | U31 MAX | Delta voltage MAX, 3 – 1 | V/100 |
| 815 | 2815 | U1N MAX | Phase voltage MAX, Phase 1 | V/100 |
| 817 | 2817 | U2N MAX | Phase voltage MAX, Phase 2 | V/100 |
| 819 | 2819 | U3N MAX | Phase voltage MAX, Phase 3 | V/100 |
| 821 | 2821 | P1 MAX | Active power MAX, Phase 1 | W |
| 823 | 2823 | P2 MAX | Active power MAX, Phase 2 | W |
| 825 | 2825 | P3 MAX | Active power MAX, Phase 3 | W |
| 827 | 2827 | Q1 MAX | Reactive power MAX, Phase 1 | var |
| 829 | 2829 | Q2 MAX | Reactive power MAX, Phase 2 | var |
| 831 | 2831 | Q3 MAX | Reactive power MAX, Phase 3 | var |
| 833 | 2833 | S1 MAX | Apparent power MAX, Phase 1 | VA |
| 835 | 2835 | S2 MAX | Apparent power MAX, Phase 2 | VA |
| 837 | 2837 | S3 MAX | Apparent power MAX, Phase 3 | VA |
| 839 | 2839 | PF1 MAX | Power factor MAX, Phase 1 | 1/10 000 |
| 841 | 2841 | PF2 MAX | Power factor MAX, Phase 2 | 1/10 000 |
| 843 | 2843 | PF3 MAX | Power factor MAX, Phase 3 | 1/10 000 |
| 865 | 2865 | THD I1 MAX | Current total harmonic distortion MAX, Line 1 | %/10 |
| 867 | 2867 | THD I2 MAX | Current total harmonic distortion MAX, Line 2 | %/10 |
| 869 | 2869 | THD I3 MAX | Current total harmonic distortion MAX, Line 3 | %/10 |
| 871 | 2871 | THD IN MAX | Neutral current total harmonic distortion MAX | %/10 |
| 873 | 2873 | THD U12 MAX | Delta voltage total harmonic distortion MAX, 1 – 2 | %/10 |
| 875 | 2875 | THD U23 MAX | Delta voltage total harmonic distortion MAX, 2 – 3 | %/10 |
| 877 | 2877 | THD U31 MAX | Delta voltage total harmonic distortion MAX, 3 – 1 | %/10 |
| 879 | 2879 | THD U1N MAX | Phase voltage total harmonic distortion MAX, Phase 1 | %/10 |
| 881 | 2881 | THD U2N MAX | Phase voltage total harmonic distortion MAX, Phase 2 | %/10 |
| 883 | 2883 | THD U3N MAX | Phase voltage total harmonic distortion MAX, Phase 3 | %/10 |
| 897 | 2897 | I MAX AVG | Current MAX AVG | mA |
| 899 | 2899 | I1 MAX AVG | Current MAX AVG, Line 1 | mA |
| 901 | 2901 | I2 MAX AVG | Current MAX AVG, Line 2 | mA |
| 903 | 2903 | I3 MAX AVG | Current MAX AVG, Line 3 | mA |
| 905 | 2905 | IN MAX AVG | Neutral current MAX AVG | mA |
| 907 | 2907 | P MAX AVG+ | Active power MAX AVG, incoming | W |
| 909 | 2909 | P MAX AVG– | Active power MAX AVG, outgoing | W |
| 911 | 2911 | Q MAX AVG+ | Reactive power MAX AVG, incoming | var |
| 913 | 2913 | Q MAX AVG– | Reactive power MAX AVG, outgoing | var |
| 915 | 2915 | S MAX AVG | Apparent power MAX AVG | VA |
| 929 | 2929 | I MIN | Current MIN | mA |
| 931 | 2931 | U MIN | Voltage MIN | V/100 |
| 933 | 2933 | P MIN | Active power MIN | W |
| 935 | 2935 | Q MIN | Reactive power MIN | var |
| 937 | 2937 | S MIN | Apparent power MIN | VA |
| 939 | 2939 | PF MIN | Power factor MIN | 1/10 000 |
| 941 | 2941 | F MIN | Frequency MIN | Hz/100 |
| 961 | 2961 | I1 MIN | Current MIN, Line 1 | mA |
| 963 | 2963 | I2 MIN | Current MIN, Line 2 | mA |
| 965 | 2965 | I3 MIN | Current MIN, Line 3 | mA |
| 967 | 2967 | IN MIN | Neutral current MIN | mA |

| RGTR. | | ID | PARAMETER | UNIT |
|---|---|---|---|---|
| Circuit 1 | Circuit 2 | | | |
| 969 | 2969 | U12 MIN | Delta voltage MIN, 1 – 2 | V/100 |
| 971 | 2971 | U23 MIN | Delta voltage MIN, 2 – 3 | V/100 |
| 973 | 2973 | U31 MIN | Delta voltage MIN, 3 – 1 | V/100 |
| 975 | 2975 | U1N MIN | Phase voltage MIN, Phase 1 | V/100 |
| 977 | 2977 | U2N MIN | Phase voltage MIN, Phase 2 | V/100 |
| 979 | 2979 | U3N MIN | Phase voltage MIN, Phase 3 | V/100 |
| 981 | 2981 | P1 MIN | Active power MIN, Phase 1 | W |
| 983 | 2983 | P2 MIN | Active power MIN, Phase 2 | W |
| 985 | 2985 | P3 MIN | Active power MIN, Phase 3 | W |
| 987 | 2987 | Q1 MIN | Reactive power MIN, Phase 1 | var |
| 989 | 2989 | Q2 MIN | Reactive power MIN, Phase 2 | var |
| 991 | 2991 | Q3 MIN | Reactive power MIN, Phase 3 | var |
| 993 | 2993 | S1 MIN | Apparent power MIN, Phase 1 | VA |
| 995 | 2995 | S2 MIN | Apparent power MIN, Phase 2 | VA |
| 997 | 2997 | S3 MIN | Apparent power MIN, Phase 3 | VA |
| 999 | 2999 | PF1 MIN | Power factor MIN, Phase 1 | 1/10 000 |
| 1001 | 3001 | PF2 MIN | Power factor MIN, Phase 2 | 1/10 000 |
| 1003 | 3003 | PF3 MIN | Power factor MIN, Phase 3 | 1/10 000 |

**■ TOTAL HARMONIC DISTORTION (THD)**

| RGTR. | | ID | PARAMETER | UNIT |
|---|---|---|---|---|
| Circuit 1 | Circuit 2 | | | |
| 1281 | 8281 | THD I1 | Current total harmonic distortion, Line 1 | %/10 |
| 1283 | 8283 | THD I2 | Current total harmonic distortion, Line 2 | %/10 |
| 1285 | 8285 | THD I3 | Current total harmonic distortion, Line 3 | %/10 |
| 1287 | 8287 | THD IN | Neutral current total harmonic distortion | %/10 |
| 1289 | 8289 | THD U12 | Delta voltage total harmonic distortion, 1 – 2 | %/10 |
| 1291 | 8291 | THD U23 | Delta voltage total harmonic distortion, 2 – 3 | %/10 |
| 1293 | 8293 | THD U31 | Delta voltage total harmonic distortion, 3 – 1 | %/10 |
| 1295 | 8295 | THD U1N | Phase voltage total harmonic distortion, Phase 1 | %/10 |
| 1297 | 8297 | THD U2N | Phase voltage total harmonic distortion, Phase 2 | %/10 |
| 1299 | 8299 | THD U3N | Phase voltage total harmonic distortion, Phase 3 | %/10 |

■ **HARMONIC**

| RGTR. Circuit 1 | RGTR. Circuit 2 | ID | PARAMETER | UNIT |
|---|---|---|---|---|
| 1537 | 8537 | HD I1 2 | Current harmonic, Line 1, 2nd | %/10 |
| 1538 | 8538 | HD I1 3 | (id.) 3rd | %/10 |
| 1539 | 8539 | HD I1 4 | (id.) 4th | %/10 |
| 1540 | 8540 | HD I1 5 | (id.) 5th | %/10 |
| 1541 | 8541 | HD I1 6 | (id.) 6th | %/10 |
| 1542 | 8542 | HD I1 7 | (id.) 7th | %/10 |
| 1543 | 8543 | HD I1 8 | (id.) 8th | %/10 |
| 1544 | 8544 | HD I1 9 | (id.) 9th | %/10 |
| 1545 | 8545 | HD I1 10 | (id.) 10th | %/10 |
| 1546 | 8546 | HD I1 11 | (id.) 11th | %/10 |
| 1547 | 8547 | HD I1 12 | (id.) 12th | %/10 |
| 1548 | 8548 | HD I1 13 | (id.) 13th | %/10 |
| 1549 | 8549 | HD I1 14 | (id.) 14th | %/10 |
| 1550 | 8550 | HD I1 15 | (id.) 15th | %/10 |
| 1551 | 8551 | HD I1 16 | (id.) 16th | %/10 |
| 1552 | 8552 | HD I1 17 | (id.) 17th | %/10 |
| 1553 | 8553 | HD I1 18 | (id.) 18th | %/10 |
| 1554 | 8554 | HD I1 19 | (id.) 19th | %/10 |
| 1555 | 8555 | HD I1 20 | (id.) 20th | %/10 |
| 1556 | 8556 | HD I1 21 | (id.) 21st | %/10 |
| 1557 | 8557 | HD I1 22 | (id.) 22nd | %/10 |
| 1558 | 8558 | HD I1 23 | (id.) 23rd | %/10 |
| 1559 | 8559 | HD I1 24 | (id.) 24th | %/10 |
| 1560 | 8560 | HD I1 25 | (id.) 25th | %/10 |
| 1561 | 8561 | HD I1 26 | (id.) 26th | %/10 |
| 1562 | 8562 | HD I1 27 | (id.) 27th | %/10 |
| 1563 | 8563 | HD I1 28 | (id.) 28th | %/10 |
| 1564 | 8564 | HD I1 29 | (id.) 29th | %/10 |
| 1565 | 8565 | HD I1 30 | (id.) 30th | %/10 |
| 1566 | 8566 | HD I1 31 | (id.) 31st | %/10 |
| 1601 | 8601 | HD I2 2 | Current harmonic, Line 2, 2nd | |
| : | : | : | : | %/10 |
| 1630 | 8630 | HD I2 31 | 31st | |
| 1665 | 8665 | HD I3 2 | Current harmonic, Line 3, 2nd | |
| : | : | : | : | %/10 |
| 1694 | 8694 | HD I3 31 | 31st | |
| 1729 | 8729 | HD IN 2 | Neutral current harmonic, 2nd | |
| : | : | : | : | %/10 |
| 1758 | 8758 | HD IN 31 | 31st | |
| 1793 | 8793 | HD U12 2 | Delta voltage harmonic, 1 – 2, 2nd | |
| : | : | : | : | %/10 |
| 1822 | 8822 | HD U12 31 | 31st | |
| 1857 | 8857 | HD U23 2 | Delta voltage harmonic, 2 – 3, 2nd | |
| : | : | : | : | %/10 |
| 1886 | 8886 | HD U23 31 | 31st | |
| 1921 | 8921 | HD U31 2 | Delta voltage harmonic, 3 – 1, 2nd | |
| : | : | : | : | %/10 |
| 1950 | 8950 | HD U31 31 | 31st | |
| 1985 | 8985 | HD U1N 2 | Phase voltage harmonic, Phase 1, 2nd | |
| : | : | : | : | %/10 |
| 2014 | 9014 | HD U1N 31 | 31st | |
| 2049 | 9049 | HD U2N 2 | Phase voltage harmonic, Phase 2, 2nd | |
| : | : | : | : | %/10 |
| 2078 | 9078 | HD U2N 31 | 31st | |
| 2113 | 9113 | HD U3N 2 | Phase voltage harmonic, Phase 3, 2nd | |
| : | : | : | : | %/10 |
| 2142 | 9142 | HD U3N 31 | 31st | |

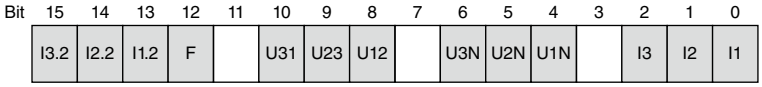
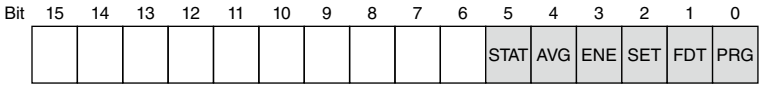
## ■ DISCRETE INPUT

| RGTR. | PARAMETER |
|---|---|
| 3073 | Discrete input 1 status<br>0 : OFF<br>1 : ON |
| 3074 | Discrete input 2 status<br>0 : OFF<br>1 : ON |
| 3075 | Discrete input 3 status<br>0 : OFF<br>1 : ON |
| 3076 | Discrete input 4 status<br>0 : OFF<br>1 : ON |

## ■ DISCRETE INPUT COUNT

| RGTR. | PARAMETER |
|---|---|
| 3137 | Discrete input 1 count<br>Pulse train input at Discrete input 1 is counted.<br>The counter resets to 0 when a pulse is added at 999 999 999 counts. |
| 3138 | Discrete input 2 count<br>Pulse train input at Discrete input 2 is counted.<br>The counter resets to 0 when a pulse is added at 999 999 999 counts. |
| 3141 | Discrete input 3 count<br>Pulse train input at Discrete input 3 is counted.<br>The counter resets to 0 when a pulse is added at 999 999 999 counts. |
| 3143 | Discrete input 4 count<br>Pulse train input at Discrete input 4 is counted.<br>The counter resets to 0 when a pulse is added at 999 999 999 counts. |

## ■ DEVICE STATUS

| RGTR. | PARAMETER |
|---|---|
| 8001 | Input overload<br>Bit assignment as shown below.<br>  <br><br>'1' is placed at the bit where an overload is detected.<br>I3.2, I2.2 and I1.2 are assigned to current values for Circuit 2. |
| 8002 | Reserved |
| 8003 | System error<br>Bit assignment as shown below.<br>  <br><br>PRG : Control software error<br>FDT : Factory calibration data error<br>SET : User setting data error<br>ENE : Energy data error<br>AVG : Average data error<br>STAT : Maximum / minimum data error<br>'1' is placed when the respective errors are detected. All measuring operations stop while one or more system errors are detected. |

## ■ DIAGNOSTICS

| RGTR. | PARAMETER | UNIT |
|---|---|---|
| 9217 | Processing delays | times |
| 9219 | Processing delay sequence number | No. |

■ **DEVICE INFORMATION**

| RGTR. | PARAMETER |
|---|---|
| 9601 | Device ID<br>7701 : R7xWTU |
| 9602 | Device version<br>Version number × 100 (e.g. Version 1.00 = 100) |
| 9603 | Serial No.<br>Each character is stored in the following address:<br>Register / Upper Byte / Lower Byte<br>9603 / 2nd / 1st<br>9604 / 4th / 3rd<br>9605 / 6th / 5th<br>9606 / 8th / 7th |
| 9607 | Tag name<br>This register is writable.<br>Each character is stored in the following address:<br>Register / Upper Byte / Lower Byte<br>9607 / 2nd / 1st<br>9608 / 4th / 3rd<br>9609 / 6th / 5th<br>9610 / 8th / 7th<br>9611 / 10th / 9th<br>9612 / 12th / 11th<br>9613 / 14th / 13th<br>9614 / 16th / 15th |
| 9623 | Extension function flag<br>Reading the following values depending upon the function:<br>0002H : RS-485 (Modbus RTU)<br>0010H : Three-phase / 4-wire system<br>0080H : LonWorks<br>0100H : CC-Link<br>2000H : Modbus/TCP<br>This register is read as follows depending upon model numbers.<br>R7LWTU : 0090H (144)<br>R7CWTU : 0110H (272)<br>R7MWTU : 0012H (18)<br>R7EWTU : 2010H (8208) |
| 9627 | Number of circuits<br>1 : 1 circuit (R7xWTU-211-AD4)<br>2 : 2 circuits (R7xWTU-221-AD4) |
| 9628 | Number of counters<br>0 : None (R7xWTU-221-AD4)<br>4 : 4 points (R7xWTU-211-AD4) |

# LIGHTNING SURGE PROTECTION

We offer a series of lightning surge protector for protection against induced lightning surges. Please contact us to choose appropriate models.