Model 53U / 54U / 54UL / 54UC Multi Power Monitor

Model R7LWTU / R7CWTU / R7MWTU / R7EWTU Multi Power Module

Model R9LWTU / R9CWTU / R9MWTU / R9EWTU Multi Power Unit

Model L53U Multi Power Transducer

Model M5XWTU / M5XWT / M50XWTU / M50EXWTU Multi Power Transducer

PC CONFIGURATOR SOFTWARE
Model: PMCFG Ver. 1.21

Users Manual

CONTENTS

1. INTRODUCTION

1.1 GENERAL DESCRIPTION

The PMCFG is used to program parameters for the models 53U, 54U, 54UL or 54UC Multi Power Monitor, R7CWTU, R7MWTU, or R7EWTU Multi Power Modules, R9MWTU, R9CWTU or R9EWTU Multi Power Units, L53U Multi Power Transducer, and M5XWTU, M5XWT, M50XWTU, or M50EXWTU Multi Power Transducer (referred hereunder as 'device'). The following major functions are available:

- Edit parameters
- Download parameters to the device, upload parameters from the device
- Save parameters as files, read parameters from files
- Compare parameters edited on the screen with the ones stored in the device
- Monitoring measured values
- Loop test (only for R7xWTU, R9xWTU M5XWTU, M5XWT, M50XWTU and M50EXWTU)

Note: For R7LWTU and R9LWTU, only "monitoring measured values" and "loop test" functions are selectable.

1.2 PC REQUIREMENTS

The following PC performance is required for adequate operation of the software program.

PC	IBM PC compatible
OS	Windows 10 (32-bit/64-bit) Windows 11 (64-bit) The software may not function adequately in certain conditions.
CPU	Must meet the relevant Windows OS' requirements.
Memory	Must meet the relevant Windows OS' requirements.
Communication port	At least one COM port (COM1 through COM16) or LAN port is required.

For connecting the devices to a PC, the our products detailed in the table below are required.

DEVICES	NETWORK	REQUIRED PRODUCTS
53U R7LWTU R7CWTU R7MWTU R7EWTU R9LWTU R9CWTU R9MWTU R9EWTU L53U M5XWTU M5XWT M50XWTU M50EXWTU	RS-232-C	PC configurator cable (model: MCN-CON or COP-US)
53U (with Modbus) 54U (with Modbus) R7MWTU R9MWTU L53U (with Modbus) M5XWTU (with Modbus) M5XWT (with Modbus) M50XWTU M50EXWTU	RS-485	RS-232-C/RS-485 converter (model: R2K-1) or Transmission level converter (model: LK-1)

53U (with Modbus) 54U (with Modbus) R7MWTU R7EWTU R9MWTU R9EWTU L53U (with Modbus) M5XWTU (with Modbus) M5XWT (with Modbus) M50XWTU M50EXWTU	Ethernet	Ethernet communication adaptor (model: GR8-EM, 72EM-M4 or 72EM2-M4) (R7EWTU, R9EWTU do not require Communication Adaptor)
54U 54UL 54UC	Infrared	Infrared communication adaptor (model: COP-IRU)

CONNECTING THE DEVICE TO THE PC

The RS-232-C/RS-485 Converter (model: R2K-1 or LK1) or the Communication Adaptor (model: 72EM-M4 or 72EM2-M4) is used to interface the device on the Modbus network to the PC.

In order to locally program the device, the non-isolated PC Configurator Cable (model: MCN-CON or COP-US) is required to connect it to the PC. The RS-485 cable must be removed when the device is connected with the PC Configurator Cable.

The 54U, 54UC and 54UL can be connected to the PC via the infrared port using the Infrared Communication Adaptor (model: COP-IRU).

■ **LOCAL CONNECTION**

PC Configurator Cable
(model: MCN-CON or COP-US)

Multi Power Monitor
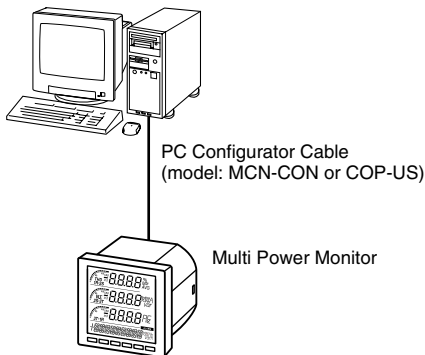
Remove RS-485 cable (Modbus) from 53U and/or L53U
when connected to PC Configurator Cable.
The RS-485 and PC Configurator Cable cannot operate
at once.
When communicating with 53U with analog output
by using configurator cable, it is required to press and
hold the 'IU->' button to switch to the communication mode.
After communication is completed, pressing and holding
the 'IU->' button ebable to return to the measurement view.
For L53U without option code '/A', it is required to turn on
the mode selector.
Analog output level is fixed while in the communication mode.

■ **NETWORK CONNECTION (RS-485)**
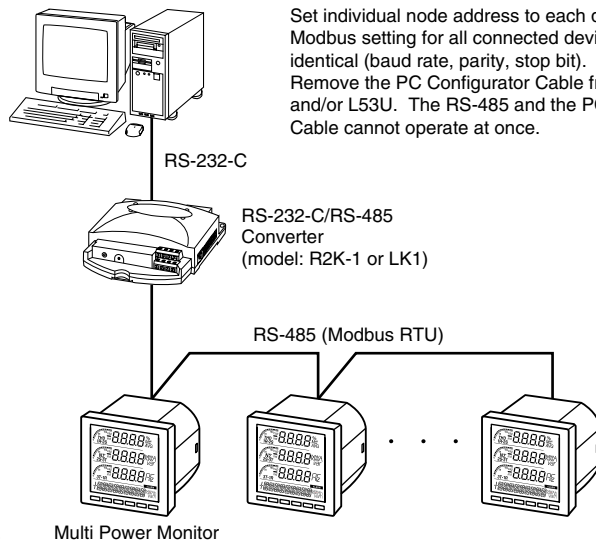
Set individual node address to each device.
Modbus setting for all connected devices must be
identical (baud rate, parity, stop bit).
Remove the PC Configurator Cable from 53U
and/or L53U. The RS-485 and the PC Configurator
Cable cannot operate at once.

RS-232-C

RS-232-C/RS-485
Converter
(model: R2K-1 or LK1)

RS-485 (Modbus RTU)

· · ·

Multi Power Monitor

■ NETWORK CONNECTION (Ethernet)

Ethernet

Communication Adaptor
(model: 72EM-M4 or 72EM2-M4)

RS-485 (Modbus RTU)

Multi Power Monitor
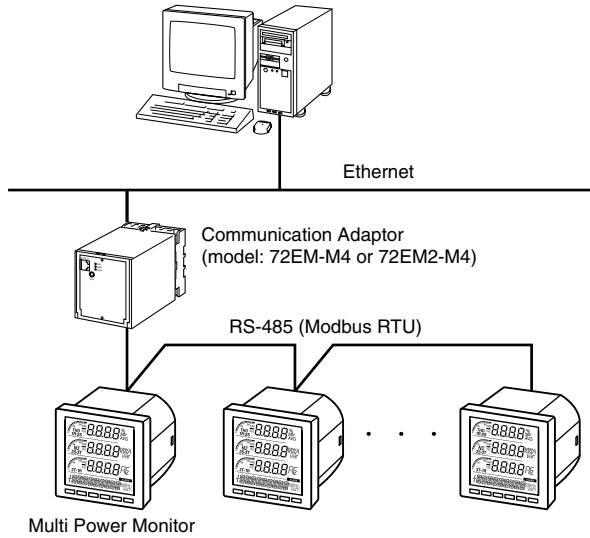
Setting multiple master stations (PCs) is possible with
Ethernet (Modbus/TCP) configuration, however,
only one (1) PC is allowed to communicate to the devices
when programming with the PMCFG.
Accessing the devices from multiple stations may cause
unexpected effects.

Set Modbus parameters for the devices as follows:
   Node address: Individual number
   Baud rate: 19200 bps or 38400 bps
      identical to the 72EM-M4 or 72EM2-M4 settting
   Parity: Odd
   Stop bit: 1 bit

Set the 72EM-M4 or 72EM2-M4 as follows:
   RS-485 baud rate: See above
   Read timeout: 500
   Write timeout: 2000

■ LOCAL CONNECTION (infrared)

Multi Power Monitor

PC

COP-IRU

Infrared
Communication
(max. 1 meter)
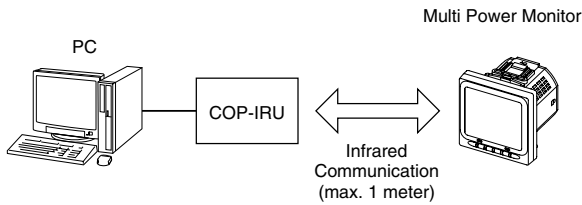
When using infrared communication, press and hold the 'IU->'
button of 54U, 54UL or 54UC to switch to infrared communication
mode. After communication is completed, pressing and holding
the 'IU->' button ebable to return to the measurement view.

DO NOT set multiple devices to the infrared communication mode
at once.
Interference may cause unexpected results.

1.3   INSTALLING & DELETING THE PROGRAM

INSTALL

The program is provided as compressed archive. Decompress the archive and execute 'setup.msi' to start up the PMCFG installer program. Follow instructions on the Windows.

Log on as administrator but you still need to clarify your administrative right before proceeding. When User Account Control window appears, choose 'Continue' or 'Yes'.

User Account Control ✕

Do you want to allow this app to make changes to your device?

PMCFG

Verified publisher: MG CO.,LTD.
File origin: Removable media on this computer

Show more details

| Yes | No |
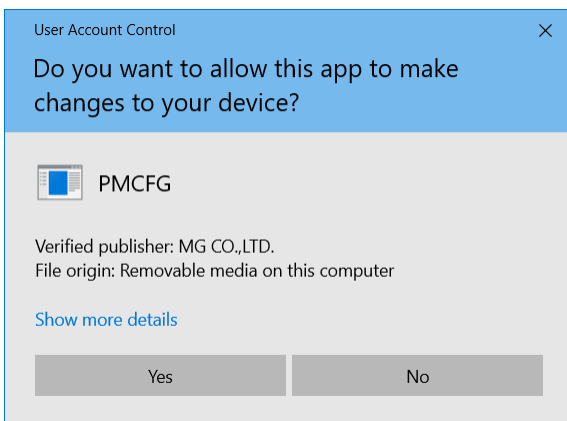
'PMCFG' is shown instead of 'Program name'.

DELETE

Uninstall a program, or Uninstall or change a program. Select the PMCFG X.X (X.X refers version number) from the program list and click Uninstall button.

2. BASIC OPERATIONS

2.1 STARTING THE PMCFG

Open Program > MG > PMCFG to start up it on a Windows PC. The following window appears on the screen.

2.2 MODIFYING PARAMETERS

In order to modify parameters stored in the device, first (1) upload the device parameters, (2) modifying a part of or all of them on the screen, and then (3) download the new parameters to the device.

2.2.1 READING PARAMETERS FROM DEVICE (UPLOAD)

Reading parameters from device. Click Upload button to open the following dialog box.

In order to connect to the device via the configuration cable, check CONFIG and select COM port to use, then click Connect button.

53U	The Modbus settings also apply to CONFIG communications, so you must select Modbus-RTU and adjust the transfer rate, parity bit, stop vit, and device address (node address) to the Modbus setting, then click Conect button.
53U (with analog output)	hold down [IU ▶] button to switch the device to the communication mode before starting uploading. Note: The analog output is fixed during 53U is in communication mode, regardless of variation of input.
L53U without option code '/A'	Set Mode Selector of the L53U to ON and click 'Connect' button. Note: The analog output is fixed during 53U is in communication mode, regardless of variation of input.

In order to connect to the 54U, 54UC or 54UL via the Infrared Communication Adaptor, hold down [IU ▶] button to switch the device to the infrared communication mode, check Infrared and select Infrared Communication Adaptor before starting uploading.

Note: The analog output is fixed during 54Ux is in communication mode, regardless of variation of input.

In order to connect to the device via the RS-485, check Modbus-RTU (RS-485) and enter COM port to use, baud rate, parity bit, stopbit, and device address (node address), the click Connect button.

In order to connect to the device via the Modbus/TCP, check Modbus/TCP (TCP/IP), enter IP address of the Modbus/TCP device to Station address, port number to Port (standard port number of the Modbus/TCP is 502) and Device address (node address), then click Connect button.
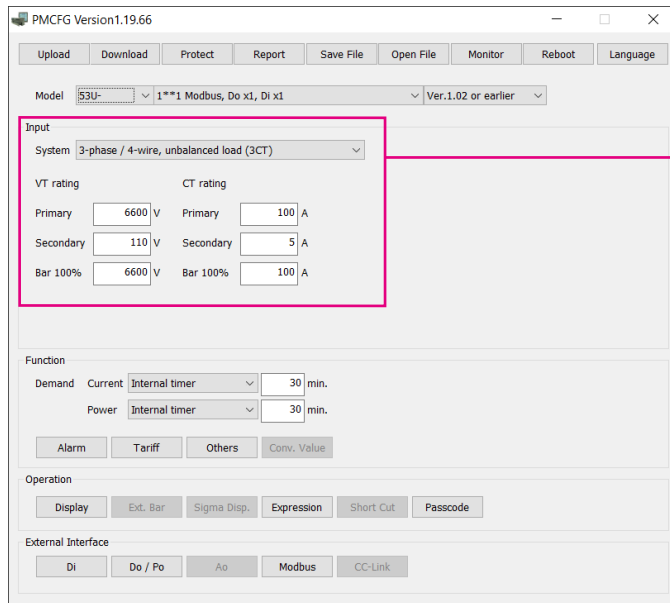
Once all parameters confirmed, click [Connect] to start reading parameters stored in the connected device to show them on the screen.

If an error message appears, confirm the hardware connection and network configuration and its parameters to retry.
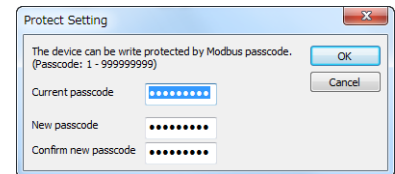
2.2.2 MODIFYING PARAMETERS ON THE SCREEN

The initial window shows only basic parameters on the screen. Buttons such as [Alarm], [Energy] and [Advanced] are used to go into more detailed settings for respective categories.

In the example shown below, the device input has been changed to: 3-phase/4-wire, unbalanced load, VT ratio 6600/110V, CT ratio 100/5A.

Choose from the menu options or enter appropriate values.

Detailed description on each parameter and control button are given in the later pages of this manual.
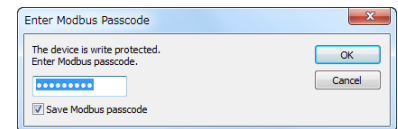
2.2.3 WRITING PARAMETERS TO DEVICE (DOWNLOAD)

Clicking [Download] opens the Connect dialog box just as [Upload] button did. Specify the relevant device address.

Specify also the COM port and Modbus communication parameters depending upon the network configuration and the device's communication parameters.

Click [Connect] to start downloading new parameters.

When the Modbus register writing protection is activated, a dialog box requesting Modbus passcode entry will appear on the screen.

Once downloading begins, a bargraph appears on the screen to indicate progress. When it disappears without any error messages, the new setting becomes valid.

Caution !
Modbus parameters are not enabled by downloading. The device must be restarted (power supply turned off and on).

2.3 PROTECTING PARAMETERS

This function is usable with Firmware Version 1.01 or later of the 53U, all available versions of the 54U, 54UL, 54UC, R7xWTU, R9xWTU and L53U.

In order to protect parameter changes by the front keys of the 54U, 53U, 54UC and 54UL, Passcode (4-digit number) is used. It is also possible to lock local key operations to go to Setting mode.

In order to protect parameter changes via Modbus (CONFIG port or RS-485), Modbus Register Writing Protection Passcode is used. The code consists of 9-digit number.

Clicking [Protection] opens the Connect dialog box just as [Upload] button did. Specify the relevant device address.

Specify also the COM port and Modbus communication parameters depending upon the network configuration and the device's communication parameters.

Click [Connect] to open Protect Setting dialog box.

Modbus passcode is selectable between 1 and 999 999 999. In order to change, enter the current passcode and new passcode (twice). If there is no passcode setting or if you do not want to activate the protection, leave relevant field blank. Click [OK].

Caution !

Once a passcode is set, no parameter changes via Modbus are available unless the correct passcode is entered. BE SURE NOT TO FORGET the passcode.

2.4 SAVING FILES

Parameter set on the screen can be saved as a file on the hard disk. A file can be called up on the screen. You can store backup setting data by utilizing these functions in combination with [Upload] [Download] functions.

2.4.1 READING PARAMETERS SAVED AS FILE

Clicking [Open File] calls up the Windows-standard Open dialog box. Select a parameter file to show a stored parameter setting.
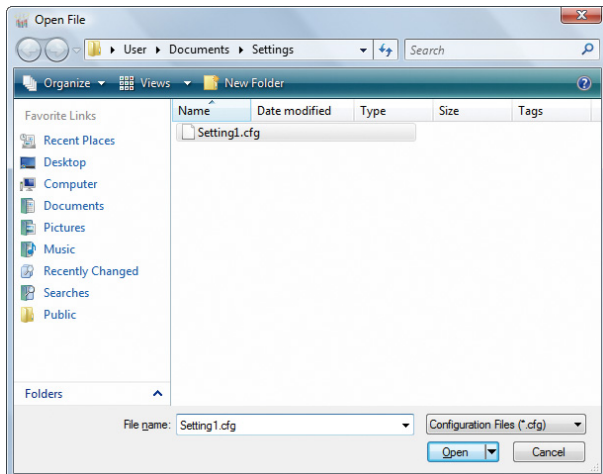
2.4.2 SAVING PARAMETERS IN A FILE

Clicking [Save File] calls up the Windows-standard Save As dialog box. Enter a desired file name to File Name field and click [Save] to store a parameter setting.
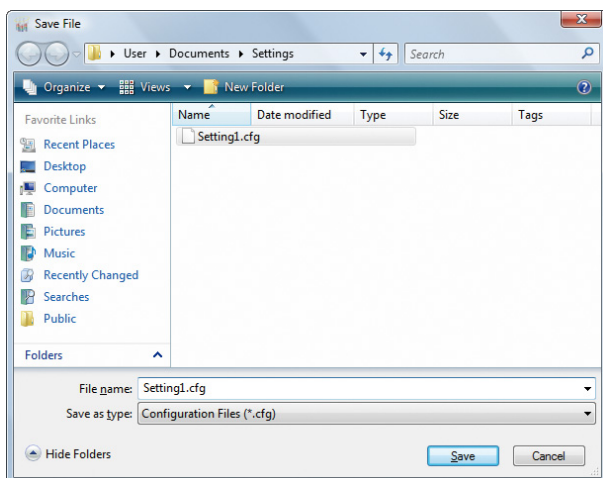
2.5 REPORT

2.5.1 DISPLAYING PARAMETERS

Clicking [Report] opens Parameter Report window showing all parameters presently edited on the screen.
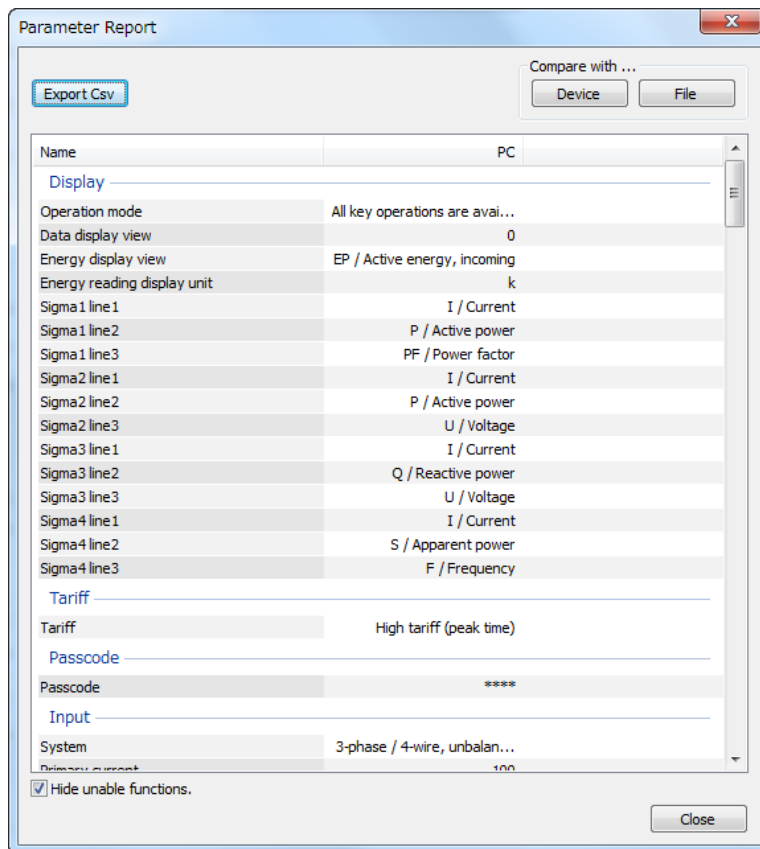
2.5.2 COMPARING PARAMETERS

Parameters presently edited on the screen and those stored in the connected device or in a file can be compared side by side.

Click [Device] in order to upload the parameters in the device, or [File] to upload those in a file. Parameters are compared and listed on the screen side by side.

The rows showing differences between two sets of parameters are highlighted in red background. Cells for matching parameters are filled in white, or light gray. Gray characters shows parameters not supported by the other one.

The total number of non-matching cases is mentioned in the bottom of the window frame.

2.5.3 CSV FILE

The parameter list can be exported as a CSV text format file for use in another application software such as Microsoft Excel.

Click [Export Csv] button at the top left of the screen and go through standard Windows Save As procedure.

Input the file name and click [Save] button then the CSV file with the name is created. The CSV file format is in the following:

- Each row for one parameter

- Each row (parameter) consists of 3 or 4 separated data

- Data is arranged in order of 'Parameter group,' 'Parameter identification,' 'Parameter edited' and 'Parameter to compare.'

If you have not uploaded a parameter set for comparing, 'Parameter to compare' is not exported.

[Example]

```
"Display" , "Operation mode" , "All key operations are available"
"Display" , "Data display view" , "0"
"Display" , "Energy display view" , "EP / Active energy, incoming"
```

2.6   MONITORING MEASURED VALUES

All the measured values of a particular device can be displayed on the PC screen.

Clicking [Monitor] opens the Connect dialog box (See Figure in Section 2.2.3). Specify the relevant device address, COM port and Modbus communication parameters and click [Connect].

2.6.1   For 53U, L53U, 54U, 54UC, 54UL, R7MWTU, R7CWTU, R7LWTU, R7EWTU, M5XWTU, M5XWT, M50XWTU, and M50EXWTU
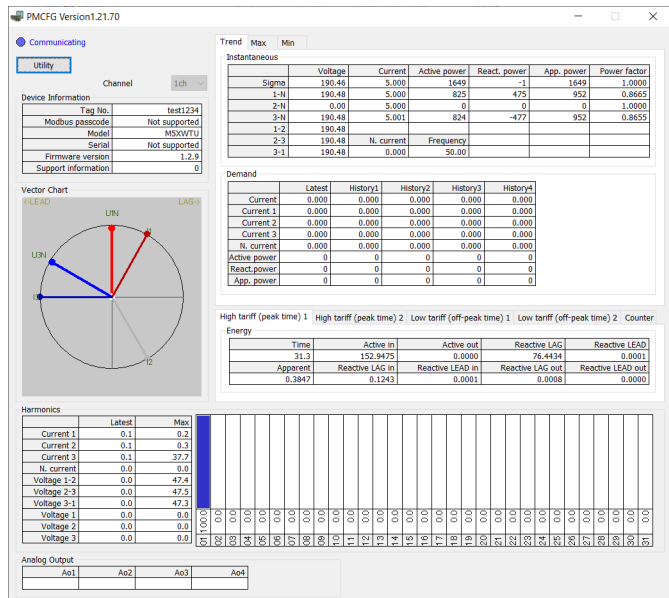
Once the PC has started communicating with the connected device, display values are updated in approx. 0.5 seconds intervals.

DEVICE INFORMATION

Tag No.	Tag number
Modbus passcode	Modbus register writing protection status Protection enabled : Modbus registers are write-protected. Protection disabled : Modbus registers are not protected. Not supported : This function is not supported.
Model	Model number
Serial	Serial number
Firmware version	Firmware version number
Support information	our support information

INSTANTANEOUS & DEMAND VALUES

[Real time], [Max] and [Min] tabs are selectable to switch the view between the instantaneous values, the maximum values and the minimum values respectively.

Unit: Voltage (V), current (A), active power (W), reactive power (var), apparent power (VA), power factor (cosφ), frequency (Hz)

ENERGY AND COUNTER VALUES

Display the counter values. Clicking on TAB, the energy's high tariff (peak time) and low tariff (off-peak time) and the pulse counter value are sequentially displayed.

Unit: Hour (hour), active energy (kWh), Reactive energy (kvarh), apparent energy (kVAh)

HARMONIC DISTORTION VALUES

The left-bottom table shows the total harmonic distortion (THD) for each measurand. Clicking on a row in this table switches the measurand displayed in the right-bottom table, where the detailed harmonic distortion values from 1st to 31st are shown.

Unit: %

Harmonic distortion is not displayed when the M5XWT is connected.

VECTOR CHART

The chart shows the vector chart for input voltage and current.

U1N, U2N, and U3N show the vector of phase 1, phase 2, and phase 3 (R phase, S phase, T phase) voltages.

I1, I2, and I3 show the vector of line 1, line 2, and line 3 (R line, S line, T line) currents.

In three-phase/3-wire, each phase voltage vector is displayed with the virtual midpoint as the neutral point (origin).

In M5XWTU and M5XWT (as shown in the previous page), in three-phase/3-wire, U1N shows the voltage between line 1-2, and U3N shows the voltage between line 3-1.

For M50XWTU and M50EXWTU, trend value, maximum value, minimum value and energy for each circuit are switchable with tab.

In addition, clicking vector chart, circuit to display the vector chart can be switched.

UTILITY

By clicking [Utility] button at left top, the following window appears. The buttons in the window reset counters, edit Tag Number or execute a Network loop test. For detail, refer to the following.

Energy	Reset all the energy counts to zero.
Max/Min	Reset all the maximum and minimum values to the present values
Demand	Reset all the demand values to zero.
Counter	Resets all counters to 0. Only for R7LWTU, R7CWTU, R7EWTU and R7MWTU.
Tag No.	Open Tag Number Setting dialog box. Max. 16 characters.

Loop test	Executes a network (LONWORKS, CC-Link, Modbus) loop test with arbitrarily changed measurand. Only for R7LWTU, R7CWTU, R7MWTU, R7EWTU, M5XWTU, M5XWT, M50XWTU, and M50EXWTU.
Clear alarm	Clears the latched alarm

ANALOG OUTPUT LOOP TEST

Performs loop test for analog output. Details are described below.

Unit: Voltage output (V), current output (mA)

2.6.2 For R9MWTU, R9CWTU, R9LWTU and R9EWTU

ENERGY

Energy per hour for maximum past 24 hours is displayed. When resetting, data for 24 hours and latest value are set to '0'. [Basic Module] and [Extension Module] tabs are selectable to switch the view. When extension unit is R9WTU-ED16, both red-boxed area show counter value.

Unit: Energy (kWh)

MOMENTARY VALUE

Power, current and power factor are shown. Also, active energy and reactive energy are shown, when resetting these energies are set to '0'.

Unit: Active power (W), current (A), power factor (cosφ), active energy (kWh), reactive energy (kvarh)

By clicking [Device Info] button at top, the following window appears. In this window, the device information is shown and TAG No. can be changed.

By clicking […] button at right top, the following window appears. In this window, date/time can be set.

Set Date and Time

If you re-set the time during operation, note the following.

If a past time before HH o'clock 00 minute is set,
- Two records for each hour will be stored into the SD memory card in that period.
- The energy count per hour for the previous 24 hours in the device will be cleared.

If a future time later than HH o'clock 00 minute is set,
- The data scheduled to be stored in that period will be canceled.

| PC's Time | 2015/07/07 11:34:17 | Sync PC |
| Device's Time | 2015/07/07 11:33:56 (Processing now...) | |

2015 / 07 / 07   11 : 33 : 50   Set   Close

By clicking [Detail] button at bottom, the following window appears. In this window, momentary value, maximum/ minimum value, average value and harmonic distortion are displayed. Clicking button enables resetting of maximum/ minimum value.

Channel Detail (1ch)

⬤ Communicating

Trend | Max | Min

Instantaneous

	Voltage	Current	Active power	React. power	App. power	Power factor	Reset max / min
Sigma	0.00	0.000	0	0	0	1.0000	Voltage
1-N	0.00	0.000	0	0	0	1.0000	Current
2-N	0.00	0.000	0	0	0	1.0000	Power
3-N	0.00	0.000	0	0	0	1.0000	Power Factor
1-2	0.00						Frequency
2-3	0.00	N. current	Frequency				
3-1	0.00	0.000	0.00				

Demand

	Latest	Reset demand
Current	0.000	Current
Current 1	0.000	Power
Current 2	0.000	
Current 3	0.000	Reset max / min
N. current	0.000	Current
Active power	0	Power
React.power	0	
App. power	0	

Harmonics

	Latest	Max	Reset max
Current 1	0.0	182.9	THD Current
Current 2	0.0	182.9	THD Voltage
Current 3	0.0	183.1	
N. current	0.0	0.0	
Voltage 1-2	0.0	327.8	
Voltage 2-3	0.0	353.5	
Voltage 3-1	0.0	314.6	
Voltage 1	0.0	179.2	
Voltage 2	0.0	181.9	
Voltage 3	0.0	192.1	

Note: Notice that resetting of maximum/minimum value affects display of other channels because voltage and voltage THD are common measurement items among each channel.

2.7 NETWORK LOOP TEST

For R9xWTU in the monitor view, for others in the utility view, clicking Loop Test button enables to execute network loop test. With network loop test it is available to set some measured value by device to any given value. Also, it is available to confirm the communication of open network by checking to read set value at communication destination of open network such as LONWORKS, CC-Link and Modbus.

R7xWTU, M5XWTU, and M5XWT

R9xWTU

M50XWTU, M50EXWTU

Above figure shows loop test views. By clicking Loop Test button, the current channel become loop test mode, click ∨ ing measured value enables to change to any given value. Clicking Normal enables to exit loop test mode and show measured value corresponding to the input of the device of current channel. This function is available only for all R7xWTU, M5XWTU, M5XWT, M50XWTU, M50EXWTU, and Ver. 1.40 or later of R9xWTU.

2.8 PRESET

For R9xWTU in the monitor view, for R7xWTU in the utility view, clicking preset button enables to preset accumulated value (energy and counter value) to any given value.

R7xWTU, M5XWTU and M5XWT

R9xWTU

M50XWTU, M50EXWTU

Above figure shows preset views. Clicking accumulated value enables to change to any given value. This function is available only for all 53U, 54U, 54UC, 54UL, L53U, R7xWTU, M5XWTU, M5XWT, M50XWTU, M50EXWTU, and Ver.1.30 or later of R9xWTU.

2.9 ANALOG OUTPUT LOOP TEST

For L53U and M5XWTU in the monitor view, clicking Loop Test enables to change analog output value to any given value.

By clicking Loop Test button in the loop test views, the device status become analog fixed output mode, clicking analog output value enables to change to any given value. Clicking Normal enables to exit analog fixed output mode. This function is available only for M5XWTU and Ver.2.00 or later of L53U.

2.10 RESTARTING DEVICE

Clicking [Reboot] opens the dialog box for connecting with the device.

Click [Connect] with appropriate setting to restart the connected device.

This function is used to enable the settings that cannot be enabled unless the device is restarted, such as Modbus setting or CC-Link setting.

This function can be used for all devices except for 54UL, R7LWTU, and R9LWTU.

2.11 SWITCHING LANGUAGE

Click [Language] to switch the display language between English and Japanese.

The program starts up in English mode as initial state when the OS is other than Japanese version. You can switch to Japanese only when the OS supports Japanese language.

3. PARAMETER LIST

Supported parameters depend upon model types. Supported ones are marked with 'X' in the following tables.

Category	Parameter	53U-1xx1 (Ver.1.02 or earlier)	53U-1xx1 (Ver.2.00 to 2.31) / 53U-1xx1 (Ver.2.40 or later)	53U-1xx2 (Ver.2.31 or earlier) / 53U-1xx2 (Ver.2.40 or later)	53U-1xx3 (Ver.2.31 or earlier) / 53U-1xx3 (Ver.2.40 or later)	53U-1xx4 (Ver.2.31 or earlier) / 53U-1xx4 (Ver.2.40 or later)	53U-1xx5 (Ver.2.31 or earlier) / 53U-1xx5 (Ver.2.40 or later)	53U-1xx6 (Ver.2.31 or earlier) / 53U-1xx6 (Ver.2.40 or later)	53U-1xx7 (Ver.2.31 or earlier) / 53U-1xx7 (Ver.2.40 or later)	53U-1xx8 (Ver.2.31 or earlier) / 53U-1xx8 (Ver.2.40 or later)	53U-1xx9 (Ver.2.31 or earlier) / 53U-1xx9 (Ver.2.40 or later)
Basic Parameters	System	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VT ratio primary / secondary	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VT bar 100%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	CT ratio primary / secondary	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	CT bar 100%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Demand update interval, current	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Demand update interval, power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alarm	Power ON delay time	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Latching	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Current alarm I1...I3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Neutral current alarm IN	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Delta voltage alarm U12...U31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase voltage alarm U1N...U3N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Active power alarm P	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Reactive power alarm Q	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Apparent power alarm S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Power factor alarm PF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Frequency alarm F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average current alarm I1...I3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average neutral current alarm IN AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average active power alarm P AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average reactive power alarm Q AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average apparent power alarm S AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Current THD alarm THDI1...THD13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Neutral current THD alarm THDIN	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Delta voltage THD alarm THDU12...THDU31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase voltage THD alarm THDU1N...THDU3N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase angle between voltages alarm UT12...UT31		✓	✓	✓	✓	✓	✓	✓	✓	✓
Tariff	Tariff	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Conversion value	Conversion value coefficient										
	Conversion value display unit										

*1. -1 setting (cyclic) not selectable.
*2. Frequency can be set to 50Hz or 60Hz fixed with the firmware version 2.40 or later.
*3. Limit patterns are available.
*4. Clear alarm and Tariff switching are not available.

Category	Setting	53U-1xx1 (Ver.102 or earlier)	53U-1xx1 (Ver.2.00 to 2.31)	53U-1xx1 (Ver.2.40 or later)	53U-1xx2 (Ver.2.31 or earlier)	53U-1xx2 (Ver.2.40 or later)	53U-1xx3 (Ver.2.31 or earlier)	53U-1xx3 (Ver.2.40 or later)	53U-1xx4 (Ver.2.31 or earlier)	53U-1xx4 (Ver.2.40 or later)	53U-1xx5 (Ver.2.31 or earlier)	53U-1xx5 (Ver.2.40 or later)	53U-1xx6 (Ver.2.31 or earlier)	53U-1xx6 (Ver.2.40 or later)	53U-1xx7 (Ver.2.31 or earlier)	53U-1xx7 (Ver.2.40 or later)	53U-1xx8 (Ver.2.31 or earlier)	53U-1xx8 (Ver.2.40 or later)	53U-1xx9 (Ver.2.31 or earlier)	53U-1xx9 (Ver.2.40 or later)
Display	Backlight operating mode	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display	Backlight OFF timer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display	Backlight brightness	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display	Update rate		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display	Data display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display	Energy display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display	Key operation lock	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display	My default data display view	*1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display	My default energy display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display	My default, use preset timer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display	Auto off setting																			
Display	Display brightness																			
Display	Energy volume display range																			
Display	Energy display range																			
Display	Current display range																			
Display	Voltage display range																			
Display	Power factor display range																			
Display	Frequency display range																			
Display	Active display																			
Other	Low-end cutout voltage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other	Low-end cutout current	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other	Frequency input	✓	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2	*2
Other	Energy tariff function	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other	Power factor PF sign	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other	Reactive power Q sign	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other	Phase reactive power Qn	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other	Apparent power S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other	Measurement mode, Power factor at simplified measurement																			
Extension Bar	Current bar																			
Extension Bar	Voltage bar																			
Extension Bar	Active power bar																			
Extension Bar	Reactive power bar																			
Extension Bar	Apparent power bar																			
Extension Bar	Power factor bar																			
Extension Bar	Frequency bar																			
Extension Bar	Total harmonic distortion bar																			
Extension Bar	Phase angle between voltages bar																			
Σ View	Σ1, Line 1...3		*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3
Σ View	Σ1, Line 4																			
Σ View	Σ2, Line 1...3		*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3
Σ View	Σ2, Line 4																			
Σ View	Σ3, Line 1...3		*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3
Σ View	Σ3, Line 4																			
Σ View	Σ4, Line 1...3		*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3	*3
Σ View	Σ4, Line 4																			
Σ View	Σ5, Line 1...4																			
Σ View	Σ6, Line 1...4																			

*1. -1 setting (cyclic) not selectable.
*2. Frequency can be set to 50Hz or 60Hz fixed with the firmware version 2.40 or later.
*3. Limit patterns are available.
*4. Clear alarm and Tariff switching are not available.

		53U-1xx1 (Ver.1.02 or earlier)	53U-1xx1 (Ver.2.00 to 2.31) / (Ver.2.40 or later)	53U-1xx2 (Ver.2.31 or earlier) / (Ver.2.40 or later)	53U-1xx3 (Ver.2.31 or earlier) / (Ver.2.40 or later)	53U-1xx4 (Ver.2.31 or earlier) / (Ver.2.40 or later)	53U-1xx5 (Ver.2.31 or earlier) / (Ver.2.40 or later)	53U-1xx6 (Ver.2.31 or earlier) / (Ver.2.40 or later)	53U-1xx7 (Ver.2.31 or earlier) / (Ver.2.40 or later)	53U-1xx8 (Ver.2.31 or earlier) / (Ver.2.40 or later)	53U-1xx9 (Ver.2.31 or earlier) / (Ver.2.40 or later)
Expression	Input line indication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase direction indication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Power format		✓	✓	✓	✓	✓	✓	✓	✓	✓
Di	Di function	*4	✓			✓	✓				
	Di contact type	✓	✓			✓	✓				
Do	Do 1 function, contact type, energy detail	✓	✓			✓	✓	✓	✓	✓	✓
	Do 2 function, contact type, energy detail							✓	✓	✓	✓
	Do 3 function, contact type, energy detail									✓	✓
	Do 4 function, contact type, energy detail										✓
Ao	Ao 1 function, zero/span, linearization, I/O 0%/100%, table			✓	✓	✓	✓	✓	✓		
	Ao 2 function, zero/span, linearization, I/O 0%/100%, table			✓	✓	✓	✓	✓	✓		
	Ao 3 function, zero/span, linearization, I/O 0%/100%, table			✓	✓						
	Ao 4 function, zero/span, linearization, I/O 0%/100%, table			✓	✓						
Modbus	Device address	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Baud rate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Parity bit	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Stop bit	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Mode										
	RUN LED Time out										
	Long register	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Protocol operation timer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CC-Link	Node address										
	Transfer rate										
Shortcut	Clear alarm		✓	✓	✓	✓	✓	✓	✓	✓	✓

*1. -1 setting (cyclic) not selectable.
*2. Frequency can be set to 50Hz or 60Hz fixed with the firmware version 2.40 or later.
*3. Limit patterns are available.
*4. Clear alarm and Tariff switching are not available.

	54U-1xx1 (Ver.1.03 or earlier)	54U-1xx2 (Ver.1.03 or earlier)	54U-1xx3 (Ver.1.03 or earlier)	54U-1xx1 (Ver.2.00 to 2.20)	54U-1xx2/7 (Ver.2.00 to 2.20)	54U-1xx3/8 (Ver.2.00 to 2.20)	54U-1xx1 (Ver.3.00 or later)	54U-1xx2/7 (Ver.3.00 or later)	54U-1xx3/8 (Ver.3.00 or later)	54U-1xx4 (Ver.2.00 to 2.20)	54U-1xx5/9 (Ver.2.00 to 2.20)	54U-1xx6/A (Ver.2.00 to 2.20)
Basic Parameters												
System	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4	*4
VT ratio primary / secondary	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
VT bar 100%												
CT ratio primary / secondary	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CT bar 100%												
Demand update interval, current	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Demand update interval, power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alarm												
Power ON delay time	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Latching	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Current alarm I1...I3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Neutral current alarm IN							✓	✓	✓			
Delta voltage alarm U12...U31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phase voltage alarm U1N...U3N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Active power alarm P	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Reactive power alarm Q	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Apparent power alarm S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Power factor alarm PF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Frequency alarm F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Average current alarm I1...I3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Average neutral current alarm IN AVG							✓	✓	✓			
Average active power alarm P AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Average reactive power alarm Q AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Average apparent power alarm S AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Current THD alarm THDI1...THD13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Neutral current THD alarm THDIN							✓	✓	✓			
Delta voltage THD alarm THDU12...THDU31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phase voltage THD alarm THDU1N...THDU3N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Phase angle between voltages alarm UT12...UT31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tariff — Tariff	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display												
Backlight operating mode	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Backlight OFF timer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Backlight brightness	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Update rate				✓	✓	✓	✓	✓	✓	✓	✓	✓
Data display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Energy display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Key operation lock	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
My default data display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
My default energy display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
My default, use preset timer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Auto off setting												
Display brightness												
Energy volume display range												
Energy display range												
Current display range												
Voltage display range												
Power factor display range												
Frequency display range												
Active display												

*3. Clear alarm and Tariff switching are not available.

*4. 3-phase / 4-wire not selectable.

		54U-1xx1 (Ver.1.03 or earlier)	54U-1xx2 (Ver.1.103 or earlier)	54U-1xx3 (Ver.1.103 or earlier)	54U-1xx1 (Ver.2.00 to 2.20)	54U-1xx2/7 (Ver.2.00 to 2.20)	54U-1xx3/8 (Ver.2.00 to 2.20)	54U-1xx1 (Ver.3.00 or later)	54U-1xx2/7 (Ver.3.00 or later)	54U-1xx3/8 (Ver.3.00 or later)	54U-1xx4 (Ver.2.00 to 2.20)	54U-1xx5/9 (Ver.2.00 to 2.20)	54U-1xx6/A (Ver.2.00 to 2.20)
Other	Low-end cutout voltage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Low-end cutout current	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Frequency input	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Energy tariff function	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Power factor PF sign	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Reactive power Q sign	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase reactive power Qn	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Apparent power S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Measurement mode, Power factor at simplified measurement												
Conversion value	Conversion value coefficient												
	Conversion value display unit												
Extension Bar	Current bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Voltage bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Active power bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Reactive power bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Apparent power bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Power factor bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Frequency bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Total harmonic distortion bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase angle between voltages bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Σ View	Σ1, Line 1...3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ1, Line 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ2, Line 1...3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ2, Line 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ3, Line 1...3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ3, Line 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ4, Line 1...3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ4, Line 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ5, Line 1...4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ6, Line 1...4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Expression	Input line indication												
	Phase direction indication												
	Power format				✓	✓	✓	✓	✓	✓	✓	✓	✓
Di	Di function	*3	*3	*3	✓	✓	✓	✓	✓	✓			
	Di contact type	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Do	Do 1 function, contact type, energy detail	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Do 2 function, contact type, energy detail										✓	✓	✓
	Do 3 function, contact type, energy detail												
	Do 4 function, contact type, energy detail												
Ao	Ao 1 function, zero/span, linearization, I/O 0%/100%, table		✓	✓		✓	✓		✓	✓		✓	✓
	Ao 2 function, zero/span, linearization, I/O 0%/100%, table		✓	✓		✓	✓		✓	✓		✓	✓
	Ao 3 function, zero/span, linearization, I/O 0%/100%, table		✓	✓		✓	✓		✓	✓		✓	✓
	Ao 4 function, zero/span, linearization, I/O 0%/100%, table		✓	✓		✓	✓		✓	✓		✓	✓

*3. Clear alarm and Tariff switching are not available.
*4. 3-phase / 4-wire not selectable.

		54U-1xx1 (Ver.1.03 or earlier)	54U-1xx2 (Ver.1.03 or earlier)	54U-1xx3 (Ver.1.03 or earlier)	54U-1xx1 (Ver.2.00 to 2.20)	54U-1xx2/7 (Ver.2.00 to 2.20)	54U-1xx3/8 (Ver.2.00 to 2.20)	54U-1xx1 (Ver.3.00 or later)	54U-1xx2/7 (Ver.3.00 or later)	54U-1xx3/8 (Ver.3.00 or later)	54U-1xx4 (Ver.2.00 to 2.20)	54U-1xx5/9 (Ver.2.00 to 2.20)	54U-1xx6/A (Ver.2.00 to 2.20)
Modbus	Device address	✓			✓			✓			✓		
	Baud rate	✓			✓			✓			✓		
	Parity bit	✓			✓			✓			✓		
	Stop bit	✓			✓			✓			✓		
	Mode												
	RUN LED Time out												
	Long register	✓			✓			✓			✓		
	Protocol operation timer	✓			✓			✓			✓		
CC-Link	Node address												
	Transfer rate												
Shortcut	Clear alarm				✓	✓	✓	✓	✓	✓	✓	✓	✓

*3. Clear alarm and Tariff switching are not available.
*4. 3-phase / 4-wire not selectable.

		54U-1xx4 (Ver.3.00 or later)	54U-1xx5/9 (Ver.3.00 or later)	54U-1xx6/A (Ver.3.00 or later)	54U-2xx1	54U-2xx2/7	54U-2xx3/8	54U-2xx4	54U-2xx5/9	54U-2xx6/A
Basic Parameters	System	*4	*4	*4	✓	✓	✓	✓	✓	✓
	VT ratio primary / secondary	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VT bar 100%									
	CT ratio primary / secondary	✓	✓	✓	✓	✓	✓	✓	✓	✓
	CT bar 100%									
	Demand update interval, current	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Demand update interval, power	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alarm	Power ON delay time	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Latching	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Current alarm I1...I3	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Neutral current alarm IN	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Delta voltage alarm U12...U31	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase voltage alarm U1N...U3N	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Active power alarm P	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Reactive power alarm Q	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Apparent power alarm S	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Power factor alarm PF	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Frequency alarm F	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average current alarm I1...I3	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average neutral current alarm IN AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average active power alarm P AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average reactive power alarm Q AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average apparent power alarm S AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Current THD alarm THDI1...THD13	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Neutral current THD alarm THDIN	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Delta voltage THD alarm THDU12...THDU31	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase voltage THD alarm THDU1N...THDU3N	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase angle between voltages alarm UT12...UT31	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tariff	Tariff	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display	Backlight operating mode	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Backlight OFF timer	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Backlight brightness	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Update rate	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Data display view	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Energy display view	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Key operation lock	✓	✓	✓	✓	✓	✓	✓	✓	✓
	My default data display view	✓	✓	✓	✓	✓	✓	✓	✓	✓
	My default energy display view	✓	✓	✓	✓	✓	✓	✓	✓	✓
	My default, use preset timer	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Auto off setting									
	Display brightness									
	Energy volume display range									
	Energy display range									
	Current display range									
	Voltage display range									
	Power factor display range									
	Frequency display range									
	Active display									

*4. 3-phase / 4-wire not selectable.

		54U-1xx4 (Ver.3.00 or later)	54U-1xx5/9 (Ver.3.00 or later)	54U-1xx6/A (Ver.3.00 or later)	54U-2xx1	54U-2xx2/7	54U-2xx3/8	54U-2xx4	54U-2xx5/9	54U-2xx6/A
Other	Low-end cutout voltage	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Low-end cutout current	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Frequency input	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Energy tariff function	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Power factor PF sign	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Reactive power Q sign	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase reactive power Qn	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Apparent power S	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Measurement mode, Power factor at simplified measurement									
Conversion value	Conversion value coefficient									
	Conversion value display unit									
Extension Bar	Current bar	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Voltage bar	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Active power bar	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Reactive power bar	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Apparent power bar	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Power factor bar	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Frequency bar	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Total harmonic distortion bar	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase angle between voltages bar	✓	✓	✓	✓	✓	✓	✓	✓	✓
Σ View	Σ1, Line 1...3	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ1, Line 4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ2, Line 1...3	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ2, Line 4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ3, Line 1...3	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ3, Line 4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ4, Line 1...3	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ4, Line 4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ5, Line 1...4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ6, Line 1...4	✓	✓	✓	✓	✓	✓	✓	✓	✓
Expression	Input line indication									
	Phase direction indication									
	Power format	✓	✓	✓	✓	✓	✓	✓	✓	✓
Di	Di function				✓	✓	✓			
	Di contact type				✓	✓	✓			
Do	Do 1 function, contact type, energy detail	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Do 2 function, contact type, energy detail	✓	✓	✓				✓	✓	✓
	Do 3 function, contact type, energy detail									
	Do 4 function, contact type, energy detail									
Ao	Ao 1 function, zero/span, linearization, I/O 0%/100%, table		✓	✓		✓	✓		✓	✓
	Ao 2 function, zero/span, linearization, I/O 0%/100%, table		✓	✓		✓	✓		✓	✓
	Ao 3 function, zero/span, linearization, I/O 0%/100%, table		✓	✓		✓	✓		✓	✓
	Ao 4 function, zero/span, linearization, I/O 0%/100%, table		✓	✓		✓	✓		✓	✓

*4. 3-phase / 4-wire not selectable.

		54U-1xx4 (Ver.3.00 or later)	54U-1xx5/9 (Ver.3.00 or later)	54U-1xx6/A (Ver.3.00 or later)	54U-2xx1	54U-2xx2/7	54U-2xx3/8	54U-2xx4	54U-2xx5/9	54U-2xx6/A
Modbus	Device address	✓			✓			✓		
	Baud rate	✓			✓			✓		
	Parity bit	✓			✓			✓		
	Stop bit	✓			✓			✓		
	Mode									
	RUN LED time out									
	Long register	✓			✓			✓		
	Protocol operation timer	✓			✓			✓		
CC-Link	Node address									
	Transfer rate									
Shortcut	Clear alarm	✓	✓	✓	✓	✓	✓	✓	✓	✓

*4. 3-phase / 4-wire not selectable.

Category	Parameter	54UL-1xx1 (Ver.1.02 or earlier)	54UL-1xx2 (Ver.1.02 or earlier)	54UL-1xx1 (Ver.3.00 or later)	54UL-1xx2 (Ver.300 or later)	54UL-2xx1	54UL-2xx2	54UC-1xx1 (Ver.1.00 or earlier)	54UC-1xx2 (Ver.1.00 or earlier)	54UC-1xx1 (Ver.3.00 or later)	54UC-1xx2 (Ver.300 or later)	54UC-2xx1	54UC-2xx2
Basic Parameters	System	*4	*4	*4	*4	✓	✓	*4	*4	*4	*4	✓	✓
	VT ratio primary / secondary	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VT bar 100%												
	CT ratio primary / secondary	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	CT bar 100%												
	Demand update interval, current	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Demand update interval, power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alarm	Power ON delay time	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Latching	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Current alarm I1...I3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Neutral current alarm IN			✓	✓	✓	✓			✓	✓	✓	✓
	Delta voltage alarm U12...U31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase voltage alarm U1N...U3N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Active power alarm P	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Reactive power alarm Q	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Apparent power alarm S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Power factor alarm PF	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Frequency alarm F	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average current alarm I1...I3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average neutral current alarm IN AVG			✓	✓	✓	✓			✓	✓	✓	✓
	Average active power alarm P AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average reactive power alarm Q AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Average apparent power alarm S AVG	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Current THD alarm THDI1...THD13	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Neutral current THD alarm THDIN			✓	✓	✓	✓			✓	✓	✓	✓
	Delta voltage THD alarm THDU12...THDU31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase voltage THD alarm THDU1N...THDU3N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase angle between voltages alarm UT12...UT31	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tariff	Tariff	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Display	Backlight operating mode	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Backlight OFF timer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Backlight brightness	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Update rate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Data display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Energy display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Key operation lock	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	My default data display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	My default energy display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	My default, use preset timer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Auto off setting												
	Display brightness												
	Energy volume display range												
	Energy display range												
	Current display range												
	Voltage display range												
	Power factor display range												
	Frequency display range												
	Active display												

*4. 3-phase / 4-wire not selectable.

		54UL-1xx1 (Ver.1.02 or earlier)	54UL-1xx2 (Ver.1.02 or earlier)	54UL-1xx1 (Ver.3.00 or later)	54UL-1xx2 (Ver.300 or later)	54UL-2xx1	54UL-2xx2	54UC-1xx1 (Ver.1.00 or earlier)	54UC-1xx2 (Ver.1.00 or earlier)	54UC-1xx1 (Ver.3.00 or later)	54UC-1xx2 (Ver.300 or later)	54UC-2xx1	54UC-2xx2
Other	Low-end cutout voltage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Low-end cutout current	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Frequency input	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Energy tariff function	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Power factor PF sign	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Reactive power Q sign	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase reactive power Qn	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Apparent power S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Measurement mode, Power factor at simplified measurement												
Conversion value	Conversion value coefficient												
	Conversion value display unit												
Extension Bar	Current bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Voltage bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Active power bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Reactive power bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Apparent power bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Power factor bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Frequency bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Total harmonic distortion bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase angle between voltages bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Σ View	Σ1, Line 1...3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ1, Line 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ2, Line 1...3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ2, Line 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ3, Line 1...3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ3, Line 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ4, Line 1...3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ4, Line 4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ5, Line 1...4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ6, Line 1...4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Expression	Input line indication												
	Phase direction indication												
	Power format	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Di	Di function	✓		✓		✓		✓		✓		✓	
	Di contact type	✓		✓		✓		✓		✓		✓	
Do	Do 1 function, contact type, energy detail	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Do 2 function, contact type, energy detail		✓		✓		✓		✓		✓		✓
	Do 3 function, contact type, energy detail												
	Do 4 function, contact type, energy detail												
Ao	Ao 1 function, zero/span, linearization, I/O 0%/100%, table												
	Ao 2 function, zero/span, linearization, I/O 0%/100%, table												
	Ao 3 function, zero/span, linearization, I/O 0%/100%, table												
	Ao 4 function, zero/span, linearization, I/O 0%/100%, table												

*4. 3-phase / 4-wire not selectable.

		54UL-1xx1 (Ver.1.02 or earlier)	54UL-1xx2 (Ver.1.02 or earlier)	54UL-1xx1 (Ver.3.00 or later)	54UL-1xx2 (Ver.300 or later)	54UL-2xx1	54UL-2xx2	54UC-1xx1 (Ver.1.00 or earlier)	54UC-1xx2 (Ver.1.00 or earlier)	54UC-1xx1 (Ver.3.00 or later)	54UC-1xx2 (Ver.300 or later)	54UC-2xx1	54UC-2xx2
Modbus	Device address												
	Baud rate												
	Parity bit												
	Stop bit												
	Mode												
	RUN LED time out												
	Long register												
	Protocol operation timer												
CC-Link	Node address							✓	✓	✓	✓	✓	✓
	Transfer rate							✓	✓	✓	✓	✓	✓
Shortcut	Clear alarm	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

*4. 3-phase / 4-wire not selectable.

		R7LWTU	R7CWTU	R7MWTU	R7EWTU	R9LWTU	R9CWTU	R9MWTU	R9EWTU
Basic Parameters	System		✓	✓	✓		✓	✓	✓
	VT ratio primary / secondary		✓	✓	✓		✓	✓	✓
	VT bar 100%								
	CT ratio primary / secondary		✓	✓	✓		✓	✓	✓
	CT bar 100%								
	Demand update interval, current		✓	✓	✓		✓	✓	✓
	Demand update interval, power		✓	✓	✓		✓	✓	✓
Alarm	Power ON delay time								
	Latching								
	Current alarm I1...I3								
	Neutral current alarm IN								
	Delta voltage alarm U12...U31								
	Phase voltage alarm U1N...U3N								
	Active power alarm P								
	Reactive power alarm Q								
	Apparent power alarm S								
	Power factor alarm PF								
	Frequency alarm F								
	Average current alarm I1...I3								
	Average neutral current alarm IN AVG								
	Average active power alarm P AVG								
	Average reactive power alarm Q AVG								
	Average apparent power alarm S AVG								
	Current THD alarm THDI1...THD13								
	Neutral current THD alarm THDIN								
	Delta voltage THD alarm THDU12...THDU31								
	Phase voltage THD alarm THDU1N...THDU3N								
	Phase angle between voltages alarm UT12...UT31								
Tariff	Tariff		✓	✓	✓				
Display	Backlight operating mode								
	Backlight OFF timer								
	Backlight brightness								
	Backlight update rate								
	Data display view								
	Energy display view								
	Key operation lock								
	My default data display view								
	My default energy display view								
	My default, use preset timer								
	Auto off setting								
	Display brightness								
	Energy volume display range								
	Energy display range								
	Current display range								
	Voltage display range								
	Power factor display range								
	Frequency display range								
	Active display								

Configure the R7LWTU and R9LWTU with LONWORKS Management Tool (e.g LonMaker)

		R7LWTU	R7CWTU	R7MWTU	R7EWTU	R9LWTU	R9CWTU	R9MWTU	R9EWTU
Other	Low-end cutout voltage		✓	✓	✓		✓	✓	✓
	Low-end cutout current		✓	✓	✓		✓	✓	✓
	Frequency input		✓	✓	✓				
	Energy tariff function								
	Power factor PF sign		✓	✓	✓		✓	✓	✓
	Reactive power Q sign		✓	✓	✓		✓	✓	✓
	Phase reactive power Qn		✓	✓	✓		✓	✓	✓
	Apparent power S		✓	✓	✓		✓	✓	✓
	Measurement mode, Power factor at simplified measurement								
Conversion value	Conversion value coefficient								
	Conversion value display unit								
Extension Bar	Current bar								
	Voltage bar								
	Active power bar								
	Reactive power bar								
	Apparent power bar								
	Power factor bar								
	Frequency bar								
	Total harmonic distortion bar								
	Phase angle between voltages bar								
Σ View	Σ1, Line 1...3								
	Σ1, Line 4								
	Σ2, Line 1...3								
	Σ2, Line 4								
	Σ3, Line 1...3								
	Σ3, Line 4								
	Σ4, Line 1...3								
	Σ4, Line 4								
	Σ5, Line 1...4								
	Σ6, Line 1...4								
Expression	Input line indication								
	Phase direction indication								
	Power format								
Di	Di function								
	Di contact type								
Do	Do 1 function, contact type, energy detail								
	Do 2 function, contact type, energy detail								
	Do 3 function, contact type, energy detail								
	Do 4 function, contact type, energy detail								
Ao	Ao 1 function, zero/span, linearization, I/O 0%/100%, table								
	Ao 2 function, zero/span, linearization, I/O 0%/100%, table								
	Ao 3 function, zero/span, linearization, I/O 0%/100%, table								
	Ao 4 function, zero/span, linearization, I/O 0%/100%, table								

Configure the R7LWTU and R9LWTU with LONWORKS Management Tool (e.g LonMaker)

		R7LWTU	R7CWTU	R7MWTU	R7EWTU	R9LWTU	R9CWTU	R9MWTU	R9EWTU
Modbus	Device address								
	Baud rate								
	Parity bit			✓				✓	
	Stop bit			✓				✓	
	Mode			✓				✓	
	IP address				✓				✓
	Subnet mask				✓				✓
	Default gateway				✓				✓
	Port				✓				✓
	Connection timeout				✓				✓
	RUN LED time out			✓	✓			✓	✓
	Long register								
	Protocol operation timer								
CC-Link	Node address								
	Transfer rate								
Shortcut	Clear alarm								

Configure the R7LWTU and R9LWTU with LONWORKS Management Tool (e.g LonMaker)

		L53U-1xx1	L53U-1xx2	L53U-1xx3	L53U-1xx4	L53U-1xx5	L53U-1xx6	L53U-1xx7	M5XWTU-1x1	M5XWTU-1x2	M5XWTU-1x3	M5XWT-1x3	M50XWTU-2x3	M50EXWTU-2x3
Basic Parameters	System	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VT ratio primary / secondary	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VT bar 100%													
	CT ratio primary / secondary	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	CT bar 100%													
	Demand update interval, current	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Demand update interval, power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Alarm	Power ON delay time	✓	✓	✓	✓	✓	✓	✓		✓				
	Latching	✓	✓	✓	✓	✓	✓	✓		✓				
	Current alarm I1...I3	✓	✓	✓	✓	✓	✓	✓		✓				
	Neutral current alarm IN	✓	✓	✓	✓	✓	✓	✓		✓				
	Delta voltage alarm U12...U31	✓	✓	✓	✓	✓	✓	✓		✓				
	Phase voltage alarm U1N...U3N	✓	✓	✓	✓	✓	✓	✓		✓				
	Active power alarm P	✓	✓	✓	✓	✓	✓	✓		✓				
	Reactive power alarm Q	✓	✓	✓	✓	✓	✓	✓		✓				
	Apparent power alarm S	✓	✓	✓	✓	✓	✓	✓		✓				
	Power factor alarm PF	✓	✓	✓	✓	✓	✓	✓		✓				
	Frequency alarm F	✓	✓	✓	✓	✓	✓	✓		✓				
	Average current alarm I1...I3	✓	✓	✓	✓	✓	✓	✓		✓				
	Average neutral current alarm IN AVG	✓	✓	✓	✓	✓	✓	✓		✓				
	Average active power alarm P AVG	✓	✓	✓	✓	✓	✓	✓		✓				
	Average reactive power alarm Q AVG	✓	✓	✓	✓	✓	✓	✓		✓				
	Average apparent power alarm S AVG	✓	✓	✓	✓	✓	✓	✓		✓				
	Current THD alarm THDI1...THD13	✓	✓	✓	✓	✓	✓	✓		✓				
	Neutral current THD alarm THDIN	✓	✓	✓	✓	✓	✓	✓		✓				
	Delta voltage THD alarm THDU12...THDU31	✓	✓	✓	✓	✓	✓	✓		✓				
	Phase voltage THD alarm THDU1N...THDU3N	✓	✓	✓	✓	✓	✓	✓		✓				
	Phase angle between voltages alarm UT12...UT31	✓	✓	✓	✓	✓	✓	✓						
Tariff	Tariff	✓	✓	✓	✓	✓	✓	✓						
Display	Backlight operating mode													
	Backlight OFF timer													
	Backlight brightness													
	Backlight update rate													
	Data display view													
	Energy display view													
	Key operation lock													
	My default data display view													
	My default energy display view													
	My default, use preset timer													
	Auto off setting													✓
	Display brightness													✓
	Energy volume display range													✓
	Energy display range													✓
	Current display range													✓
	Voltage display range													✓
	Power factor display range													✓
	Frequency display range													✓
	Active display													✓

		L53U-1xx1	L53U-1xx2	L53U-1xx3	L53U-1xx4	L53U-1xx5	L53U-1xx6	L53U-1xx7	M5XWTU-1x1	M5XWTU-1x2	M5XWTU-1x3	M5XWT-1x3	M50XWTU-2x3	M50EXWTU-2x3
Other	Low-end cutout voltage	✓	✓	✓	✓	✓	✓	✓					✓	
	Low-end cutout current	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Frequency input	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Energy tariff function	✓	✓	✓	✓	✓	✓	✓						
	Power factor PF sign	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Reactive power Q sign	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase reactive power Qn	✓	✓	✓	✓	✓	✓	✓					✓	✓
	Apparent power S	✓	✓	✓	✓	✓	✓	✓					✓	✓
	Measurement mode, Power factor at simplified measurement								✓	✓	✓	✓	✓	✓
Conversion value	Conversion value coefficient												✓	✓
	Conversion value display unit													✓
Extension Bar	Current bar													
	Voltage bar													
	Active power bar													
	Reactive power bar													
	Apparent power bar													
	Power factor bar													
	Frequency bar													
	Total harmonic distortion bar													
	Phase angle between voltages bar													
Σ View	Σ1, Line 1...3													
	Σ1, Line 4													
	Σ2, Line 1...3													
	Σ2, Line 4													
	Σ3, Line 1...3													
	Σ3, Line 4													
	Σ4, Line 1...3													
	Σ4, Line 4													
	Σ5, Line 1...4													
	Σ6, Line 1...4													
Expression	Input line indication													
	Phase direction indication													
	Power format													
Di	Di function	✓			✓	✓								
	Di contact type	✓			✓	✓								
Do	Do 1 function, contact type, energy detail	✓			✓	✓	✓	✓		✓			✓	✓
	Do 2 function, contact type, energy detail						✓	✓					✓	✓
	Do 3 function, contact type, energy detail													
	Do 4 function, contact type, energy detail													
Ao	Ao 1 function, zero/span, linearization, I/O 0%/100%, table		✓	✓	✓	✓	✓	✓	✓					
	Ao 2 function, zero/span, linearization, I/O 0%/100%, table		✓	✓	✓	✓	✓	✓						
	Ao 3 function, zero/span, linearization, I/O 0%/100%, table		✓	✓										
	Ao 4 function, zero/span, linearization, I/O 0%/100%, table		✓	✓										

		L53U-1xx1	L53U-1xx2	L53U-1xx3	L53U-1xx4	L53U-1xx5	L53U-1xx6	L53U-1xx7	M5XWTU-1x1	M5XWTU-1x2	M5XWTU-1x3	M5XWT-1x3	M50XWTU-2x3	M50EXWTU-2x3
Modbus	Device address	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
	Baud rate	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
	Parity bit	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
	Stop bit	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
	Mode													
	RUN LED time out													
	Long register	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
	Protocol operation timer	✓	✓	✓	✓	✓	✓	✓						
CC-Link	Node address													
	Transfer rate													
Shortcut	Clear alarm													

4. BASIC PARAMETERS

The initial window when you start up the PMCFG contains basic parameters as described below.

4.1 MODEL

Choose an appropriate device type to be configured on the PMCFG.

Selection

53U-	1xx1	Modbus, Do x1, Di x1	Ver.1.02 or earlier
			Ver.2.00 to 2.31
			Ver.2.40 or later
	1xx2	Ao 4-20mA x4	Ver.2.31 or earlier
			Ver.2.40 or later
	1xx3	Ao 1-5V x4	Ver.2.31 or earlier
			Ver.2.40 or later
	1xx4	Ao 4-20mA x2, Do x1, Di x1	Ver.2.31 or earlier
			Ver.2.40 or later
	1xx5	Ao 1-5V x2, Do x1, Di x1	Ver.2.31 or earlier
			Ver.2.40 or later
	1xx6	Ao 4-20mA x2, Do x2	Ver.2.31 or earlier
			Ver.2.40 or later
	1xx7	Do 1-5V x2, Do x2	Ver.2.31 or earlier
			Ver.2.40 or later
	1xx8	Modbus, Do x3	Ver.2.31 or earlier
			Ver.2.40 or later
	1xx9	Do x4	Ver.2.31 or earlier
			Ver.2.40 or later
54U-	1xx1	Modbus, Do x1, Di x1	Ver.1.03 or earlier
			Ver.2.00 to 2.20
			Ver.3.00 or later
	1xx2/7	Ao 4-20mA x4, Do1 x1, Di x1	Ver.1.03 or earlier
			Ver.2.00 to 2.20
			Ver.3.00 or later
	1xx3/8	Ao 1-5V x4, Do x1, Di x1	Ver.1.03 or earlier
			Ver.2.00 to 2.20
			Ver.3.00 or later
	1xx4	Modbus, Do x2	Ver.2.00 to 2.20
			Ver.3.00 or later
	1xx5/9	Ao 4-20mA x4, Do x2	Ver.2.00 to 2.20
			Ver.3.00 or later
	1xx6/A	Ao 1-5V x4, Do x2	Ver.2.00 to 2.20
			Ver.3.00 or later
	2xx1	3P4W, Modbus, Do x1, Di x1	
	2xx2/7	3P4W, Ao 4-20mA x4, Do x1, Di x1	
	2xx3/8	3P4W, Ao 1-5V x4, Do x1, Di x1	
	2xx4	3P4W, Modbus, Do x2	
	2xx5/9	3P4W, Ao 4-20mA x4, Do x2	
	2xx6/A	3P4W, Ao 1-5V x4, Do x2	

54UL-	1xx1	LONWORKS, Do x1, Di x1	Ver.1.02 or earlier
			Ver.3.00 or later
	1xx2	LONWORKS, Do x2	Ver.1.02 or earlier
			Ver.3.00 or later
	2xx1	3P4W, LONWORKS, Do x1, Di x1	
	2xx2	3P4W, LONWORKS, Do x2	
54UC-	1xx1	CC-Link, Do x1, Di x1	Ver.1.00 or earlier
			Ver.3.00 or later
	1xx2	CC-Link, Do x2	Ver.1.00 or earlier
			Ver.3.00 or later
	2xx1	3P4W, CC-Link, Do x1, Di x1	
	2xx2	3P4W, CC-Link, Do x2	
R7CWTU-	21x	3P4W, CC-Link, Counter x4	
	22x	3P4W, CC-Link, Input x2	
R7MWTU-	21x	3P4W, Modbus, Counter x4	
	22x	3P4W, Modbus, Input x2	
R7EWTU-	21x	3P4W, Modbus-TCP, Counter x4	
	22x	3P4W, Modbus-TCP, Input x2	
L53U-	1xx1	Modbus, Do x1, Di x1	
	1xx2	Ao 4 – 20mA x4	
	1xx3	Ao 1 – 5V x4	
	1xx4	Ao 4 – 20mA x2, Do x1, Di x1	
	1xx5	Ao 1 – 5V x2, Do x1, Di x1	
	1xx6	Ao 4 – 20mA x2, Do x2	
	1xx7	Ao 1 – 5V x2, Do x2	
R9CWTU-	2xxx	CC-Link, Input x8	
	2xxx	CC-Link, Input x8 + R9WTU-EP8 (Input x8)	
R9MWTU-	2xxx	Modbus, Input x8	
	2xxx	Modbus, Input x8 + R9WTU-EP8 (Input x8)	
R9EWTU-	2xxx	Modbus-TCP, Input x8	
	2xxx	Modbus-TCP, Input x8 + R9WTU-EP8 (Input x8)	
M5XWTU-	1x1	Ao x1	
	1x2	Do x1	
	1x3	Modbus	
M5XWT-	1x3	Modbus	
M50XWTU-	2x3	Modbus Do x2	
M50EXWTU-	2x3	Modbus Do x2	

Note: For models with 'External interface' code 2 or 7, select the same device type. Do the same for models with code 3 or 8, 5 or 9, and 6 or A.

4.2 INPUT

SYSTEM

Choose an input wiring configuration from the following:

Selection / Range	
System	Single-phase / 2-wire (1CT)
	Single-phase / 3-wire (2CT)
	3-phase / 3-wire, balanced load (1CT) *3
	3-phase / 3-wire, unbalanced load (2CT)
	3-phase / 4-wire, balanced load (1CT) *1
	3-phase / 4-wire, unbalanced load (3CT) *1
	3-phase / 3-wire, unbalanced load (3CT) *2

*1. Selectable for the 53U, L53U, 54U-2, 54UL-2, 54UC-2, R7CWTU, R7MWTU and R7EWTU.

*2. Selectable for the 54U-2, 54UL-2 and 54UC-2

*3. The M5XWTU and M5XWT are not selectable.

For M50XWTU and M50EXWTU, choose an input wiring configuration from the following:

SELECTION	CIRCUIT A	CIRCUIT B	CIRCUIT C	CIRCUIT D
Single-phase/2-wire (1CT)	Single-phase/2-wire	Single-phase/2-wire	Single-phase/2-wire	Single-phase/2-wire
Single-phase/3-wire (2CT)	Single-phase/3-wire	–	Single-phase/3-wire	–
3-phase / 3-wire, unbalanced load (2CT)	Three-phase/3-wire	–	Three-phase/3-wire	–
3-phase / 4-wire, unbalanced load (3CT)	Three-phase/4-wire	–	–	–
Single-phase/2-wire branched from single-phase/3-wire	Single-phase/2-wire	Single-phase/2-wire	Single-phase/2-wire	Single-phase/2-wire
Single-phase/3-wire + Single-phase/2-wire	Single-phase/3-wire	–	Single-phase/2-wire	Single-phase/2-wire

The M50XWTU and M50EXWTU share the same voltage, but it can measure up to four circuits, and this setting allows individual load measurement by circuits A through D as shown in the table above.

VOLTAGE

Enter VT's primary and secondary and secondary ratings when an external voltage transformer (VT) is used. The maximum selectable ratio is 400kV/50V, but both CT and VT ratios must be considered to satisfy the maximum measurable power value of 2GVA.

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.

'Bar 100%' value is applied as the full-scale bargraph range indicated on the left end of the LCD display and the full-scale vector chart range indicated on the monitor view. The 54U, 54UL and 54UC do not support this function. Use 'Bar Setting.'

Selection / Range	
Primary voltage	50 to 400000V
Secondary voltage	50 to 500V
Bar 100% voltage	50 to 400000V

CURRENT

Enter CT's primary and secondary and secondary ratings when an external current transformer (CT) is used. The maximum selectable ratio is 20kA/1A, but both CT and VT ratios must be considered to satisfy the maximum measurable power value of 2GVA.

'Bar 100%' value is applied as the full-scale bargraph range indicated on the left end of the LCD display and the full-scale vector chart range indicated on the monitor view. The 54U, 54UL and 54UC do not support this function. Use 'Bar Setting.'

Selection / Range	
Primary current	1 to 20000A
Secondary current	1 to 5A
Bar 100% current	1 to 20000A

The sensors used for CT current input are the followings:
CLSE-R5
CLSE-05
CLSE-10
CLSE-20
CLSE-40
CLSE-60

Primary current setting is necessary when choosing CLSE-R5. Set the CLSE-R5 to "5" at connection on the available measurements line, for other items, set primary current of the CT connected to CLSE-R5.

Select same current sensor for circuit A and B, and circuit C and D for the M50XWTU and M50EXWTU.

MEASUREMENT POSITION

For the M50XWTU and M50EXWTU, when selecting single-phase/2-wire branched from single-phase/3-wire, or single-phase/3-wire + single-phase/2-wire, the position of the load to be measured on the single-phase/2-wire can be selected from the following table.

1-N
3-N
1-3

5. FUNCTION PARAMETERS

When you click various control buttons under 'Function' on the initial window of the PMCFG, you can go to detailed setting.

5.1 DEMAND UPDATE INTERVAL

CURRENT & POWER

Choose how you want to update demand (average) values for the current and the power signals.

Selection / Range	
Internal timer	Demand values are calculated automatically by the internal timer (clock). Specify in minutes.
Discrete input	Demand values are calculated when a contact input is supplied to the device's discrete input terminals.

Caution !

With 'Discrete input' setting, demand values are automatically updated if there is no contact input for 100 minutes. Be sure to set also 'Update demand value' for 'Discrete input function' as explained in Section 3.3.

5.2 ALARM

19 groups of measurands are available for alarm. Each alarm can have High and Low setpoints, enabled or disabled respectively.
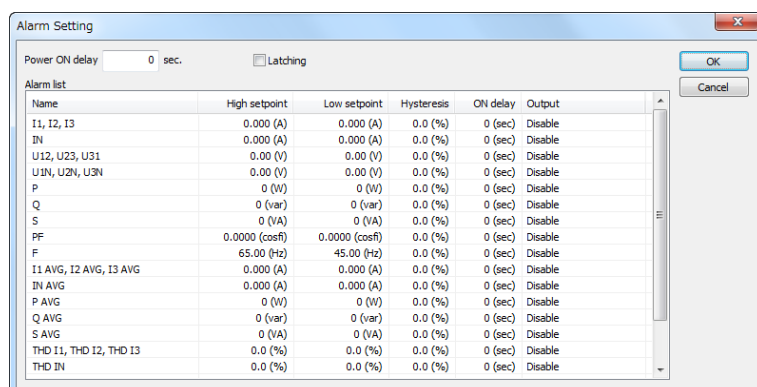
■ **ALARM OUTPUT SETTING**

ID	DEFINITION	LOW SETPOINT	HIGH SETPOINT	UNIT	DEVICE*1
I1-3	Current, Line 1 thr. Line 3	0.000	20 000.000	A	
IN	Neutral current	0.000	20 000.000	A	53U, L53U, 54U, 54UL, 54UC*5, M5XWTU
U12-31	Delta voltage, Line 1 – 2, 2 – 3, 3 – 1	0.00	400 000.00	V	
U1N-3N	Phase voltage, Phase 1 thr. Phase 3	0.00	400 000.00	V	
P	Active power	-2 000 000 000	2 000 000 000	W	
Q	Reactive power	-2 000 000 000	2 000 000 000	var	
S	Apparent power	0	2 000 000 000	VA	
PF	Power factor	-1.0000	1.0000	cos ø *2	
F	Frequency	45.00	65.00	Hz	
I1-3 AVG	Average current, Line 1 thr. Line 3 (demand)	0.000	20 000.000	A	
IN AVG	Average neutral current (demand)	0.000	20 000.000	A	53U, L53U, 54U, 54UL, 54UC*5, M5XWTU
P AVG	Average active power (demand)	-2 000 000 000	2 000 000 000	W	
Q AVG	Average reactive power (demand)	-2 000 000 000	2 000 000 000	var	
S AVG	Average apparent power (demand)	0	2 000 000 000	VA	
THDI1-3	THD, Current, Line 1 thr. Line 3	0.0	999.9	%	
THDIN	THD, Neutral current	0.0	999.9	%	53U, L53U, 54U, 54UL, 54UC*5, M5XWTU
THDU12-31	THD, Delta voltage, Line 1 – 2, 2 – 3, 3 – 1	0.0	999.9	%	
THDU1N-3N	THD, Phase voltage, Phase 1 thr. Phase 3	0.0	999.9	%	
UT12-31	Phase angle between voltages, Phase 1 – 2, 2 – 3, 3 – 1	-180	180	°*4	53U*3, L53U, 54U, 54UL, 54UC

*1. Function available for specific models.

*2. Indicated PF on the 53U

*3. Firmware Ver.2.00 or later

*4. No unit indication on the module

*5. Only for the models to which 3-phase/4-wire is applicable, or 54U, 54UL and 54UC whose firmware version is 3.00 or later.

POWER ON DELAY TIME

Specify a time delay for the alarm to start functioning after the power is turned on. The time is counted up from the moment when the device starts measuring in approx. 2 seconds after all display segments are turned on at the startup.

Selection / Range	
Power ON delay time	0 to 999 seconds

LATCHING

Check 'Latching' if you do not want to automatically reset an alarm once the measured value is out of the alarm range. In order to reset, (1) reset through network by Modbus command, (2) Remove the 'Check' mark of this setting, or (3) turn off the power supply to the device.

HIGH SETPOINT / LOW SETPOINT

Refer to the above table for the selectable ranges for respective measurand. High alarm is triggered when the measured value goes above the High setpoint, while Low alarm is triggered when it goes below the Low setpoint.

HYSTERESIS (DEADBAND)

Hysteresis is selectable for each alarm from 0.0 to 99.9%. Relationships between the set value in % and actual process value are indicated in the table below. 0% hysteresis equals to 0 in engineering unit unless otherwise mentioned.

ID	DEFINITION	HYSTERESIS AT 100%	UNIT
I1-3	Current, Line 1 thr. Line 3	CT primary rating	A
IN	Neutral current	CT primary rating	A
U12-31	Delta voltage, Line 1 − 2, 2 − 3, 3 − 1	VT primary rating	V
U1N-3N	Phase voltage, Phase 1 thr. Phase 3	VT primary rating	V
P	Active power	CT primary rating x VT primary rating	W
Q	Reactive power	CT primary rating x VT primary rating	var
S	Apparent power	CT primary rating x VT primary rating	VA
PF	Power factor	1.0000	cos φ
F	Frequency	65.00 (45.00 at 0%)	Hz
I1-3 AVG	Average current, Line 1 thr. Line 3 (demand)	CT primary rating	A
IN AVG	Average neutral current (demand)	CT primary rating	A
P AVG	Average active power (demand)	CT primary rating x VT primary rating	W
Q AVG	Average reactive power (demand)	CT primary rating x VT primary rating	var
S AVG	Average apparent power (demand)	CT primary rating x VT primary rating	VA
THDI1-3	THD, Current, Line 1 thr. Line 3	100.0	%
THDIN	THD, Neutral current	100.0	%
THDU12-31	THD, Delta voltage, Line 1 − 2, 2 − 3, 3 − 1	100.0	%
THDU1N-3N	THD, Phase voltage, Phase 1 thr. Phase 3	100.0	%
UT12-31	Phase angle between voltages, Phase 1 − 2, 2 − 3, 3 − 1	360	°

ON DELAY

Specify a time delay for the alarm to be triggered after the measured value is out of the normal range.

Selection / Range	
ON delay time	0 to 999 seconds

OUTPUT

Specify where you want to output each alarm.

[Except L53U and M5XWTU]

Selection	
Disable	No alarm output is provided.
Display	ALARM indicator is activated but no discrete signal output is provided.
Display + Do 1...Do 4	ALARM indicator is activated plus a discrete signal output is provided.

[L53U]

Selection	
Disable	No alarm output is provided.
Communication	ALARM is activated only via communication but no discrete signal output is provided.
Communication + Do 1...Do 2	ALARM is activated via communication plus a discrete signal output is provided.

[M5XWTU]

Selection	
Disable	No alarm output is provided.
Do1	Alarm output is provided to Do1.

Caution !

With 'Display + Do x' 'Communication + Do x' setting, be sure to set also 'Alarm status' for 'Discrete output function' as explained in Section 3.4. Otherwise no contact output is actually provided.

5.3 TARIFF

Choose one of the two energy counters. This setting is valid only when 'Tariff function' under 'Other' setting (See Section 5.5) is set to 'Enable.' When that is set to 'Disable,' this setting is invalid, and then the High tariff (peak time) counter is always used.
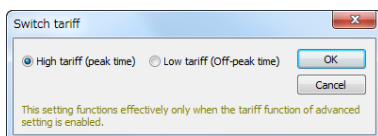
Selection	
Tariff	High tariff (peak time)
	Low tariff (off-peak time)

5.4 PASSCODE

4-digit passcode is needed to enter the programming mode when you use the front keys. Type in 4-digit number once and twice for confirmation and click OK.
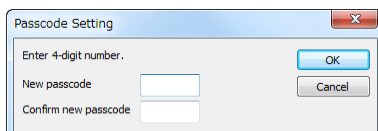
Selection / Range	
Passcode	0000 to 9999

5.5 OTHER SETTINGS

5.5.1 INPUT

LOW-END CUTOUT (VOLTAGE & CURRENT)

Specify voltage/current low-end cutout values in %. Actual cutout voltage/current are calculated from the CT/VT's primary rating by the following equations:

Low-end cutout current = Setting in % x CT's primary rating
Low-end cutout voltage = Setting in % x VT's primary rating

When the input signal goes below the calculated values, '0' is supplied as the input, discarding the actual input signal. For the voltage, the setting is applied to Phase voltage (line-to-neutral) except for 3-phase/3-wire system, to Delta voltage (line-to-line).

FREQUENCY INPUT

Specify either voltage or current to monitor AC frequency.
As 50Hz fixed and 60Hz fixed are used for special purpose, do not use under normal conditions.

Selection	
I1	I1 current[*2]
U1N	U1 voltage
50Hz fixed	AC frequency is fixed to 50Hz.[*1]
60Hz fixed	AC frequency is fixed to 60Hz.[*1]

*1. Selectable with M5XWTU, M5XWT, M50XWTU, M50EXWTU, and firmware version 2.40 or later of 53U.
*2. M5XWTU, M5XWT, M50XWTU, and M50EXWTU are not selectable.

5.5.2 ENERGY

ENABLE / DISABLE TARIFF FUNCTION

Specify to enable or disable the tariff switching function. When enabled, two energy counters are switcheable at any specific timing.

This setting is not available for R7CWTU, R7MWTU and R7EWTU. Tariff function is enabled.

Selection	
Tariff function	Disable
	Enable

5.5.3 CALCULATION METHOD

POWER FACTOR PF SIGN

Selection	
Standard (IEC)	Positive in incoming active power, Negative in outgoing active power.
IEEE	Positive in LAG (inductive), Negative in LEAD (capacitive)

REACTIVE POWER Q SIGN

Selection	
Standard (IEC)	Positive from [PF = 1.0] to 180° in LAG direction; Negative for the other direction.
Inverted when outgoing (Special)	Identical to IEC method in incoming power; Positive-negative inverted in outgoing power.

PHASE REACTIVE POWER Qn

Selection	
Standard (Vector S-P)	Calculate using vector method. $$Qn = \sqrt{Sn^2 - Pn^2}$$ $$Sn = In \cdot Un \,^{*1}$$
Reactive power method (Sigma UI)	Calculate using reactive power method. $$Qn = \frac{1}{Nsmp} \sum_{i=1}^{Nsmp} (Un_i - UN_i)\, In_{i + (Nsmp / 4)}$$ $$Sn = \sqrt{Pn^2 + Qn^2} \,^{*1}$$

*1. Accordingly in M50XWTU and M50EXWTU, the calculation method of each phase apparent power switches.

APPARENT POWER S

Selection	
Standard (Vector P+Q)	$S = \sqrt{P^2 + Q^2}$
Sum (S1+S2+S3)	$S = S1 + S2 + S3$

MEASUREMENT MODE, POWER FACTOR AT SIMPLIFIED MEASUREMENT

Selection	
Standard measurement	Performs standard measurement
Simplified measurement	$S = S1 + S2 + S3$

Selection	
Standard measurement	Performs standard measurement
Simplified measurement	Only DC current sensor measuring, calculates active power and active energy

When simplified measurement mode is selected, power factor at simplified measurement is selectable from 0.0000 to 1.0000.

When simplified measurement mode is selected, calculates active power based on power factor at simplified measurement.

When simplified measurement mode is selected, voltage is not measured but is calculated assuming the value set by the VT's primary rating.

5.6   CONVERSION VALUE

	Conv Value Coef
Circuit A	0.555
Circuit B	
Circuit C	0.555
Circuit D	

Conversion Value Settings

OK   Cancel

M50XWTU

	Conv value coef	Conv value unit
Circuit A	0.555	kG
Circuit B	0.555	kG
Circuit C	0.555	kG
Circuit D	0.555	kG

Conversion Value Settings

OK   Cancel

M50EXWTU

5.6.1   CONVERSION VALUE COEFFICIENT

This function calculates the conversion value by multiplying the active energy by the conversion value coefficient.
The conversion value coefficient can be set in the range of 0.000 - 99.999 for each circuit.
This function is enabled for M50XWTU only .

5.6.2   CONVERSION VALUE DISPLAY UNIT

The display unit of conversion value can be set.
Usable letter is (space), k(kilogram/small letter), number 0 to 9, capital letter A to Z, /(slash), -(minus), +(plus),
° (superscript circle), ₒ (subscript circle). 4 letters can be set at maximum.
Space or k(kilogram/small letter) needs to be set to either 1st, 2nd, or 3rd letter except for the last letter.
k(kilogram/small letter) can be set only for 1 letter.
Empty string cannot be set.
k(kilogram/small letter) cannot be set either for all letters or for the last letter.

6. OPTION PARAMETERS

When you click various control buttons under 'Option' on the initial window of the PMCFG, you can go to detailed setting.

6.1 DISPLAY
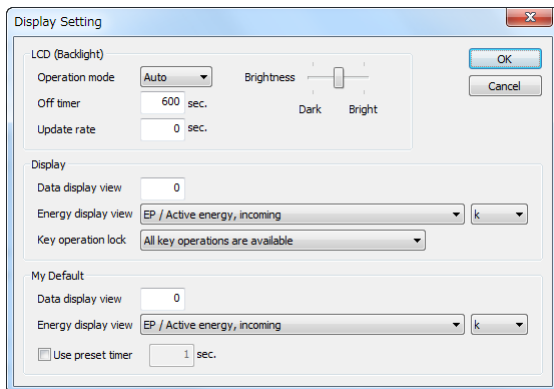
53U, 54U, 54UC, 54UL
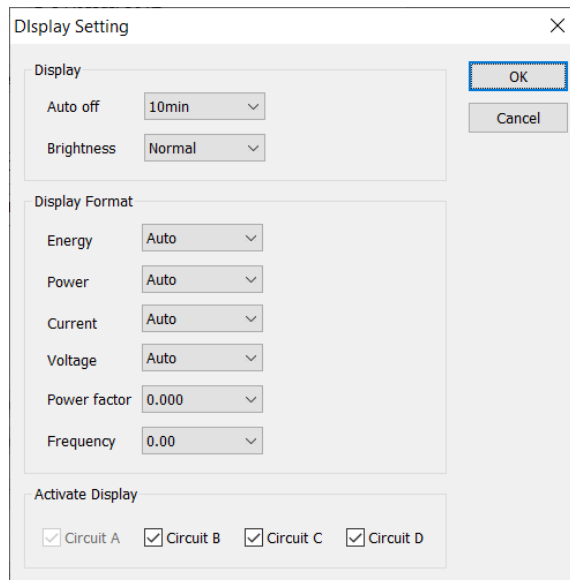
M50EXWTU

6.1.1 LCD BACKLIGHT

OPERATION MODE

Specify when you want to maintain the backlight continuously on or not.

Selection	
Auto	Backlight turns on when keys are touched, when an alarm is triggered, or in a system error status. After the device is operated, it automatically turns off after 'Off timer' time has been elapsed.
On	Continuously on.
Off	Continuously off except when an alarm is triggered or in a system error status.

OFF TIMER

Specify the time duration to maintain the backlight turned on after the device is operated.

Selection / Range	
Off timer	1 to 999 seconds

UPDATE RATE

Specify the time rate in which measurands are updated on the display. With '0,' the display is updated in the maximum possible rate.

This setting is irrelevant for the display's flashing in case of alarms.

Selection / Range	
Update rate	0 to 60 seconds

BRIGHTNESS

Three levels of brightness can be selected using the sliding bar on the screen.

Selection	
Left	Dark
Center	Normal
Right	Bright

6.1.2 DISPLAY

DATA DISPLAY VIEW

Specify which measuring variable you want to show on the 1st to 3rd line data displays. Enter the view number described in the flowchart in the 53U instruction manual (EM-6485-B).

ENERGY DISPLAY VIEW

Specify which energy variable you want to show on the 4th line energy display.

Selection	
Energy display view	EP / Active energy, incoming
	EQ / Reactive energy, lag
	ES / Apparent energy
	EP– / Active energy, outgoing
	EQ– / Reactive energy, lead
	EQ+LAG / Reactive energy, lag, incoming
	EQ+ LEAD / Reactive energy, lead, incoming
	EQ–LAG / Reactive energy, lag, outgoing
	EQ–LEAD / Reactive energy, lead, outgoing
	EQ+P / Reactive energy, incoming [1]
	EQ–P / Reactive energy, outgoing [1]
	EPA / Active energy, (incoming – outgoing) [1]
	EQA / Reactive energy, (incoming + outgoing) [1]
	TIMER / Energy count time
	L-EP / Active energy, incoming, off-peak (low tariff)
	L-EQ / Reactive energy, lag, off-peak (low tariff)
	L-ES / Apparent energy, off-peak (low tariff)
	L-EP– / Active energy, outgoing, off-peak (low tariff)
	L-EQ– / Reactive energy, lead, off-peak (low tariff)
	L-EQ+LAG / Reactive energy, lag, incoming, off-peak (low tariff)
	L-EQ+LEAD / Reactive energy, lead, incoming, off-peak (low tariff)
	L-EQ–LAG / Reactive energy, lag, outgoing, off-peak (low tariff)
	L-EQ–LEAD / Reactive energy, lead, outgoing, off-peak (low tariff)
	L-EQ+P / Reactive energy, incoming (low tariff) [1]
	L-EQ–P / Reactive energy, outgoing (low tariff) [1]
	L-EPA / Active energy, (incoming – outgoing) (low tariff) [1]
	L-EQA / Reactive energy, (incoming + outgoing) (low tariff) [1]
	L-TIMER / Energy count time, off-peak (low tariff)

[1]. Available for the 53U and 54U Firmware Ver.2.00 or later, and all versions of the 54UL and 54UC

Choose 'k' if you want to add 'k' to the engineering unit indication. When the energy count time is specified, the unit is fixed at 'h.'

KEY OPERATION LOCK

You can prohibit the device from unwanted operating and/or unauthorized programming changes.

Selection	
All key operations are available.	
All key operations are locked.	All keys locked except the operation to go to the infrared communication mode with the 54U, 54UL and 54UC.
Lock the key operation to go to Setting mode only	Key function to enter the programming mode (keep pressing E PRG key) is disabled. All other key operations to switch display views are available.

6.1.3 MY DEFAULT

You can choose a specific view to which the display always returns after a specified time while keys are untouched, or with single button control (hold down ∑ button).

The ∑ display automatically switches every 10 seconds from ∑1 through ∑4 (53U) or through ∑6 (54U, 54UL, and 54UC) when this is set to '-1.' (Available for the 53U Firmware Ver.2.00 or later, all versions of the 54U, 54UL and 54UC)

DATA DISPLAY VIEW & ENERGY DISPLAY VIEW

Specify the display view No. and the energy display type you want to return to.

USE PRESET TIMER

When you choose this selection, you can specify the time to return to My Default view if key are untouched.

Selection / Range	
Use preset timer	1 to 999 seconds

6.1.4 AUTO OFF

Select the time from finishing the device operation to turning off the display automatically.

Off
1 minute
5 minutes
10 minutes

Select Off to remain the display on continually.

6.1.5 DISPLAY BRIGHTNESS

Select the display brightness.

Low brightness
Standard brightness

6.1.6 DISPLAY FORMAT

Select the display range of measurement value.

Energy volume

Selection	Description
AUTO	Switch display range automatically according to measurement value.
0.00k	Display the digit of range from 000.00k to 999.99k.
0.0k	Display the digit of range from 0000.0k to 9999.9k.
0k	Display the digit of range from 00000k to 99999k.
0.000M	Display the digit of range from 00.000M to 99.999M.
0.00M	Display the digit of range from 000.00M to 999.99M.
0.0M	Display the digit of range from 0000.0M to 9999.9M.

When measurement value is out of display range, the upper limit value is not displayed. The digit in the display range is displayed.

Energy

Selection	Description
AUTO	Switch display range automatically according to measurement value.
0.0	Display the range from -999.9 to 9999.9 with first decimal digit.
0	Display the range from -9999 to 99999 with no decimal digit.
0.000k	Display the range from -9.999k to 99.999k with three decimal digits.
0.00k	Display the range from -99.99k to 999.99k with two decimal digits.
0.0k	Display the range from -999.9k to 9999.9k with first decimal digit.
0k	Display the range from -9999k to 99999k with no decimal digit.
0.000M	Display the range from -9.999M to 99.999M with three decimal digits.
0.00M	Display the range from -99.99M to 999.99M with two decimal digits.
0.0M	Display the range from -999.9M to 999.9M with first decimal digit.

When energy value is out of display range, upper limit value or lower limit value in display range is displayed.

Current

Selection	Description
AUTO	Switch display range automatically accoding to measurement value.
0.000	Display the range from 0.000 to 99.999 with three decimal digits.
0.00	Display the range from 0.00 to 999.99 with two decimal digits.
0.0	Display the range from 0.0 to 9999.9 with first decimal digit.
0	Display the range from 0 to 99999 with no decimal digit.
0.000K	Display the range from 0.000k to 99.999k with three decimal digits.
0.00K	Display the range from 0.00k to 99.99k with two decimal digits.
0.0K	Display the range from 0.0k to 99.9k with first decimal digit.

When current value is out of display range, upper limit value of display range is displayed.

Voltage

Selection	Description
AUTO	Switch display range automatically accoding to measurement value.
0.00	Display the range from 0.00 to 999.99 with two decimal digits.
0.0	Display the range from 0.0 to 9999.9 with first decimal digit.
0	Display the range from 0 to 99999 with no decimal digit.
0.000k	Display the range from 0.000k to 99.999k with three decimal digits.
0.00k	Display the range from 0.00k to 999.99k with two decimal digits.
0.0k	Display the range from 0.0k to 999.9k with first decimal digit.

When voltage value is out of display range, upper limit value of display range is displayed.

Power factor

Selection	Description
0.000	Display the range from -1.000 to 1.000 with three decimal digits.
0.00	Display the range from -1.00 to 1.00 with two decimal digits.

Frequency

Selection	Description
0.00	Display the range from 0.00 / 40.00 to 70.00 with two decimal digits.
0.0	Display the range from 0.0 / 40.0 to 70.0 with first decimal digit.

6.1.7 ACTIVE DISPLAY

When unused circuit is unchecked, circuits can be switched by the device operation, and display can be skipped.

Circuit A cannot be unchecked, so the display cannot be skipped.

6.2 EXTENSION BAR
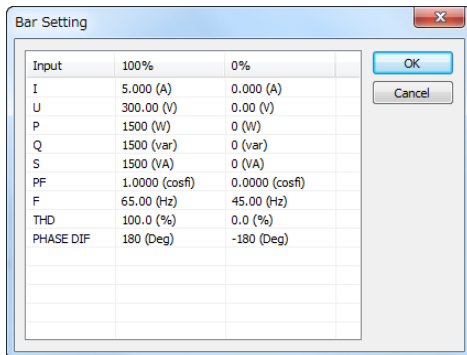
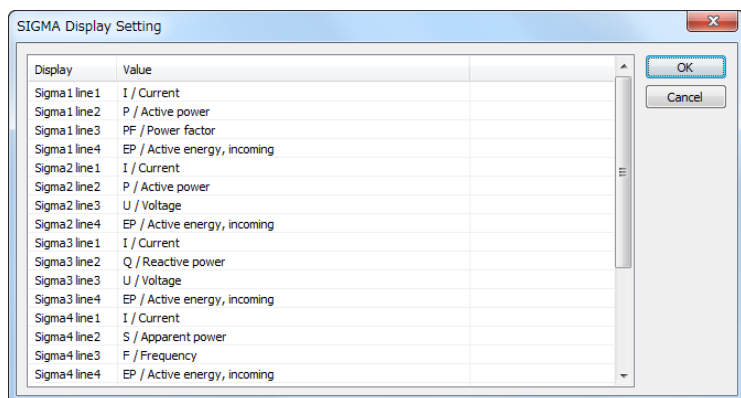This option is available for the 54U, 54UL and 54UC.

The measurand on the first line of the display is also on the bargraph. The following nine (9) parameters are selectable.

■ EXTENSION BAR SETTING

ID	DEFINITION	100% RANGE VALUE		0% RANGE VALUE		UNIT
		MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	
I	Current	0.000	20 000.000	0.000	20 000.000	A
U	Voltage	0.00	400 000.00	0.00	400 000.00	V
P	Active power	0	2 000 000 000	-2 000 000 000	2 000 000 000	W
Q	Reactive power	0	2 000 000 000	-2 000 000 000	2 000 000 000	var
S	Apparent power	0	2 000 000 000	0	2 000 000 000	VA
PF	Power factor	0.0000	1.0000	-1.0000	1.0000	cos ø
F	Frequency	45.00	65.00	45.00	65.00	Hz
THD	Total harmonic distortion	0.0	999.9	0.0	999.9	%
PHASE DIF	Phase angle between voltages	0	180	-180	180	°*

*No unit indication on the module

6.3 ∑ DISPLAY

This option is available for the 53U Firmware Ver.2.00 or later, and all versions of the 54U, 54UL and 54UC.

53U

Four (4) ∑ views are available. The following options are selectable for Line 1 through Line 3 of each view.

■ **53U : ∑ VIEW MEASURANDS & SELECTABLE POSITIONS (lines, X = selectable)**

ID	PARAMETER	UNIT	LINE 1	LINE 2	LINE 3
NULL	Undefined	----	X	X	X
I	Current	A	X		
U	Voltage	V			X
P	Active power	W		X	
Q	Reactive power	var		X	
S	Apparent power	VA		X	
PF	Power factor	PF			X
F	Frequency	Hz			X

54U, 54UL and 54UC

Six (6) ∑ views are available. The following options are freely selectable for Line 1 through Line 3 of each view. Energy and Count Time is selectable for only Line 4.

■ 54U, 54UL and 54UC : Σ VIEW MEASURANDS

ID	PARAMETER
NULL	Undefined
I	Current
U	Voltage
P	Active power
Q	Reactive power
S	Apparent power
PF	Power factor
F	Frequency
I1 I2 I3	Current, Line 1 Current, Line 2 Current, Line 3
IN	Current, Neutral [1]
U12 U23 U31	Delta voltage, 1 – 2 Delta voltage, 2 – 3 Delta voltage, 3 – 1
U1N U2N U3N	Phase voltage, Phase 1 Phase voltage, Phase 2 Phase voltage, Phase 3
P1 P2 P3	Active power, Phase 1 Active power, Phase 2 Active power, Phase 3
Q1 Q2 Q3	Reactive power, Phase 1 Reactive power, Phase 2 Reactive power, Phase 3
S1 S2 S3	Apparent power, Phase 1 Apparent power, Phase 2 Apparent power, Phase 3
PF1 PF2 PF3	Power factor, Phase 1 Power factor, Phase 2 Power factor, Phase 3
THDI1 THDI2 THDI3	Current total harmonic distortion, Line 1 Current total harmonic distortion, Line 2 Current total harmonic distortion, Line 3
THDIN	Total harmonic distortion, Neutral [1]
THDU12 THDU23 THDU31	Delta voltage total harmonic distortion, 1 – 2 Delta voltage total harmonic distortion, 2 – 3 Delta voltage total harmonic distortion, 3 – 1
THDU1N THDU2N THDU3N	Phase voltage total harmonic distortion, Phase 1 Phase voltage total harmonic distortion, Phase 2 Phase voltage total harmonic distortion, Phase 3
UT12 UT23 UT31	Phase angle between Phase 1 – 2 voltages Phase angle between Phase 2 – 3 voltages Phase angle between Phase 3 – 1 voltages
EP	Active energy, high tariff, incoming
EQ	Reactive energy, high tariff, LAG
ES	Apparent energy, high tariff
EP–	Active energy, high tariff, outgoing
EQ–	Reactive energy, high tariff, LEAD
EQ+LAG EQ+LEAD	Reactive energy, high tariff, incoming, LAG Reactive energy, high tariff, incoming, LEAD
EQ–LAG EQ–LEAD	Reactive energy, high tariff, outgoing, LAG Reactive energy, high tariff, outgoing, LEAD
TIMER	Energy count time, high tariff
L-EP	Active energy, low tariff, incoming
L-EQ	Reactive energy, low tariff, LAG
L-ES	Apparent energy, low tariff
L-EP–	Active energy, low tariff, outgoing
L-EQ–	Reactive energy, low tariff, LEAD
L-EQ+LAG L-EQ+LEAD	Reactive energy, low tariff, incoming, LAG Reactive energy, low tariff, incoming, LEAD

ID	PARAMETER
L-EQ–LAG	Reactive energy, low tariff, outgoing, LAG
L-EQ–LEAD	Reactive energy, low tariff, outgoing, LEAD
L-TIMER	Energy count time, low tariff
EQ+P	Reactive energy, high tariff, incoming [2]
EQ–P	Reactive energy, high tariff, ongoing [2]
EPA	Active energy, high tariff, (incoming – outgoing) [2]
EQA	Reactive energy, high tariff, (incoming + outgoing) [2]
L-EQ+P	Reactive energy, low tariff, incoming [2]
L-EQ–P	Reactive energy, low tariff, outgoing [2]
L-EPA	Active energy, low tariff, (incoming – outgoing) [2]
L-EQA	Reactive energy, low tariff, (incoming + outgoing) [2]

*1. Available for the 54U-2, 54UL-2 and 54UC-2
*2. Available for the 54U Firmware Ver.2.00 or later, and all versions of the 54UL and 54UC

6.4 DISPLAY EXPRESSION
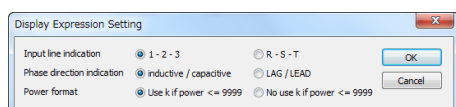
INPUT LINE INDICATION

Selection	
1 - 2 - 3	
R - S - T	

PHASE DIRECTION INDICATION

Selection	
inductive / capacitive	
LAG / LEAD	

POWER FORMAT

Selection	
Use k if power <= 9999	0.0000k ... 9.999k
No use k if power <= 9999	0 ... 9999 (10.00k at 10 000)

6.5 SHORT CUT

Specify either you want to use the shortcut command to reset alarm
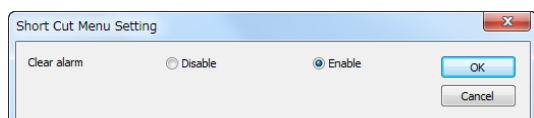
7. EXTERNAL INTERFACE PARAMETERS

External interface parameters specify the settings of the external interface installed on the device.

7.1 DISCRETE INPUT
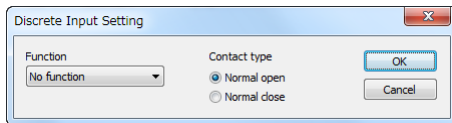
FUNCTION

Specify which function you want to assign for the device's discrete input terminals.

Selection	
No function	Undefined
Update demand value	
Reset energy count	
Reset alarm	
Switch tariff	

CONTACT TYPE

Selection
Normal open
Normal closed

7.2 DISCRETE OUTPUT
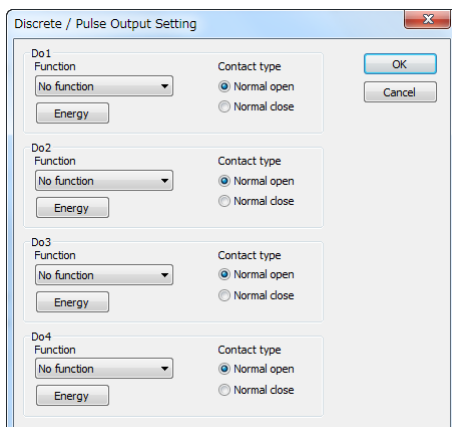
FUNCTION

Specify which function you want to assign for the device's discrete output terminals Do 1 ... Do 4. You cannot assign those which are not provided as hardware.

Selection	
No function	Undefined
Energy count	
Alarm status	

For the M50XWTU and M50EXWTU, function is fixed to the energy count. It is not changeable.

CONTACT TYPE

Selection
Normal open
Normal closed

ENERGY DETAIL

Clicking [Energy] button opens detailed energy setting window. (See Section 7.3)

7.3 ENERGY
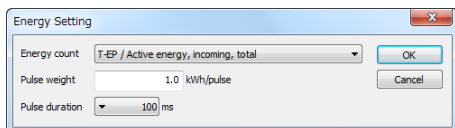
Other than M50XWTU
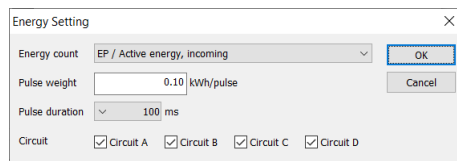
M50XWTU, M50EXWTU

Define energy count parameters for pulse output. In order to have an energy count output, be sure to set 'Discrete output function' to 'Energy count' as explained in Section 7.2.

ENERGY COUNT

Specify which energy parameter you want to supply to the pulse count output.

Choose from the tables below and in the following page.

PULSE WEIGHT

Specify how much energy value corresponds to one pulse.

Selection / Range	
Pulse weight	0.1 to 10000.0 k (Wh/varh/VAh) (0.01 to 1000.00k (Wh/varh/VAh) for M50XWTU and M50EXWTU)

PULSE DURATION

Specify the output pulse width appropriate for a receiving instrument.

Selection / Range	
Pulse duration	100 to 2000 milliseconds (in 100 msec. increments)

PULSE OUTPUT CIRCUIT

Select the circuit that outputs pulse. By selecting multiple circuits, pulses can be output according to the total amount of energy.

Note: Select only necessary circuits.

■ **53U Firmware Ver.1.02 or earlier & 54U Firmware Ver.1.03 or earlier : ENERGY COUNT**

ID	PARAMETER
EP	Active energy, incoming
EQ	Reactive energy, LAG
ES	Apparent energy
EP–	Active energy, outgoing
EQ–	Reactive energy, LEAD
EQ+LAG EQ+LEAD	Reactive energy, incoming, LAG Reactive energy, incoming, LEAD
EQ–LAG EQ–LEAD	Reactive energy, outgoing, LAG Reactive energy, outgoing, LEAD

■ **53U Firmware Ver.2.00 or later, 54U Firmware Ver.2.00 or later, and all versions of 54UL, 54UC and L53U : ENERGY COUNT**

ID	PARAMETER
T-EP	Active energy, incoming
T-EQ	Reactive energy, LAG
T-ES	Apparent energy
T-EP–	Active energy, outgoing
T-EQ–	Reactive energy, LEAD
T-EQ+LAG T-EQ+LEAD	Reactive energy, incoming, LAG Reactive energy, incoming, LEAD

ID	PARAMETER
T-EQ–LAG T-EQ–LEAD	Reactive energy, outgoing, LAG Reactive energy, outgoing, LEAD
T-EQ+P T-EQ–P	Reactive energy, incoming Reactive energy, outgoing
T-EQA	Reactive energy, (incoming + outgoing)
EP	Active energy, high tariff, incoming
EQ	Reactive energy, high tariff, LAG
ES	Apparent energy, high tariff
EP–	Active energy, high tariff, outgoing
EQ–	Reactive energy, high tariff, LEAD
EQ+LAG EQ+LEAD	Reactive energy, high tariff, incoming, LAG Reactive energy, high tariff, incoming, LEAD
EQ–LAG EQ–LEAD	Reactive energy, high tariff, outgoing, LAG Reactive energy, high tariff, outgoing, LEAD
EQ+P EQ–P	Reactive energy, high tariff, incoming Reactive energy, high tariff, outgoing
EQA	Reactive energy, high tariff, (incoming + outgoing)
L-EP	Active energy, low tariff, incoming
L-EQ	Reactive energy, low tariff, LAG
L-ES	Apparent energy, low tariff
L-EP–	Active energy, low tariff, outgoing
L-EQ–	Reactive energy, low tariff, LEAD
L-EQ+LAG L-EQ+LEAD	Reactive energy, low tariff, incoming, LAG Reactive energy, low tariff, incoming, LEAD
L-EQ–LAG L-EQ–LEAD	Reactive energy, low tariff, outgoing, LAG Reactive energy, low tariff, outgoing, LEAD
L-EQ+P L-EQ–P	Reactive energy, low tariff, incoming Reactive energy, low tariff, outgoing
L-EQA	Reactive energy, low tariff, (incoming + outgoing)

■ **M5XWTU-1x2, M50XWTU, M50EXWTU : ENERGY COUNT**

ID	PARAMETER
EP	Active energy, incoming
EQ	Reactive energy, LAG
ES	Apparent energy
EP-	Active energy, outgoing
EQ-	Reactive energy, LEAD
EQ+LAG EQ+LEAD	Reactive energy, incoming, LAG Reactive energy, incoming, LEAD
EQ-LAG EQ-LEAD	Reactive energy, outgoing, LAG Reactive energy, outgoing, LEAD
EQ+P EQ–P	Reactive energy, incoming Reactive energy, outgoing
EQA	Reactive energy, (incoming + outgoing)

7.4 ANALOG OUTPUT

Specify which function you want to assign for the device's analog output terminals Ao 1 ... Ao 4.

You cannot assign those which are not provided as hardware.

You can conduct fine adjustments, set scaling and linearization table for each assigned output.

INPUT

Choose measurand from the table below.

■ **PARAMETERS TO BE ASSIGNED TO ANALOG OUTPUTS**

ID	DEFINITION	RANGE (0 to 100%)
NULL	Not assigned [2]	
I	Current	0 to CT primary rating
U	Voltage	0 to VT primary rating
P	Active power	$\pm$ (VT primary rating $\times$ CT primary rating $\times$ n) [1]
Q	Reactive power	$\pm$ (VT primary rating $\times$ CT primary rating $\times$ n) [1]
S	Apparent power	0 to (VT primary rating $\times$ CT primary rating $\times$ n) [1]
PF	Power factor	-1.0000 to + 1.0000
F	Frequency	45.00 to 65.00
I1 I2 I3	Current, Line 1 Current, Line 2 Current, Line 3	0 to CT primary rating 0 to CT primary rating 0 to CT primary rating
IN [3]	Neutral current	0 to CT primary rating
U12 U23 U31	Delta voltage, Line 1 – 2 Delta voltage, Line 2 – 3 Delta voltage, Line 3 – 1	0 to VT primary rating 0 to VT primary rating 0 to VT primary rating
U1N U2N U3N	Phase voltage, Phase 1 Phase voltage, Phase 2 Phase voltage, Phase 3	0 to VT primary rating 0 to VT primary rating 0 to VT primary rating
P1 P2 P3	Active power, Phase 1 Active power, Phase 2 Active power, Phase 3	$\pm$ (VT primary rating $\times$ CT primary rating $\times$ n) [1] $\pm$ (VT primary rating $\times$ CT primary rating $\times$ n) [1] $\pm$ (VT primary rating $\times$ CT primary rating $\times$ n) [1]
Q1 Q2 Q3	Reactive power, Phase 1 Reactive power, Phase 2 Reactive power, Phase 3	$\pm$ (VT primary rating $\times$ CT primary rating $\times$ n) [1] $\pm$ (VT primary rating $\times$ CT primary rating $\times$ n) [1] $\pm$ (VT primary rating $\times$ CT primary rating $\times$ n) [1]
S1 S2 S3	Apparent power, Phase 1 Apparent power, Phase 2 Apparent power, Phase 3	0 to (VT primary rating $\times$ CT primary rating $\times$ n) [1] 0 to (VT primary rating $\times$ CT primary rating $\times$ n) [1] 0 to (VT primary rating $\times$ CT primary rating $\times$ n) [1]
PF1 PF2 PF3	Power factor, Phase 1 Power factor, Phase 2 Power factor, Phase 3	-1.0000 to + 1.0000 -1.0000 to + 1.0000 -1.0000 to + 1.0000
THDI1 THDI2 THDI3	THD, Current, Line 1 THD, Current, Line 2 THD, Current, Line 3	0.0 to 100.0 0.0 to 100.0 0.0 to 100.0
THDIN [3]	THD, Neutral current	0.0 to 100.0

ID	DEFINITION	RANGE (0 to 100%)
THDU12 THDU23 THDU31	THD, Delta voltage, Line 1 – 2 THD, Delta voltage, Line 2 – 3 THD, Delta voltage, Line 3 – 1	0.0 to 100.0 0.0 to 100.0 0.0 to 100.0
THDU1N THDU2N THDU3N	THD, Phase voltage, Phase 1 THD, Phase voltage, Phase 2 THD, Phase voltage, Phase 3	0.0 to 100.0 0.0 to 100.0 0.0 to 100.0
T-Q	Reactive power for bidirectional current	Q_{max} = (CT primary rating) × (VT primary rating) × n[*1][*4]
T-PF	Power factor for bidirectional current	

*1. Single-phase/2-wire: $n = 1$, Single-phase/3-wire: $n = 2$, Three-phase/3-wire: $n = 3 / \sqrt{3}$, Three-phase/4-wire: $n = 3$

*2. When an output is re-assigned to 'Not Assigned' during measuring, the output value is held until the power supply is turned off.

*3. Available for the 53U, L53U and M5XWTU, the 54U, 54UC and 54UL with firmware version 3.00 or later, and all versions of 54U, 54UL and 54UC with 3-phase/4-wire input.

*4. For M5XWTU firmware version 1.2.9 or later 2.10 or later, and for L53U firmware version 2.10 or later.

Input 0%   0.00% - 24.99% (Outgoing, LEAD)

Input 100%   75.01% - 100.00% (Incoming ,LAG)

The above conditions are satisfied, the module operates as follows.

Outgoing   Outputs (input 0%) - (input 100% - 50%) as output 0% - 50%

Incoming   Outputs (50% + input 0%) - (input 100%) as output 50% - 100%.

E.g.) Qmax=1000 var, to set scaling for 400 var for LEAD, and 500 var for LAG,

Input 0% = (1000 - 400) / 1000 x 25 = 15%, input 100% = 100 - (1000 - 500) / 1000 x 25 = 87.5% (100-12.5)%
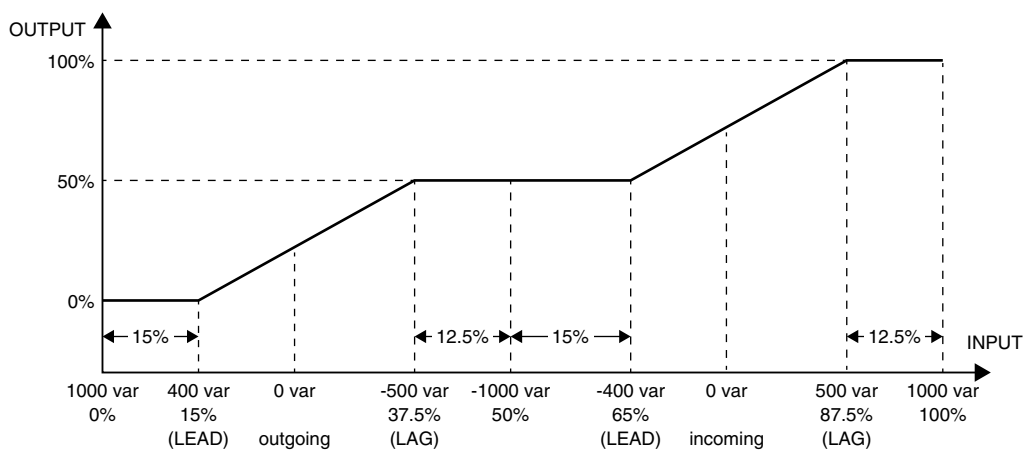
ADJUST ZERO / ADJUST SPAN

Analog output can be finely calibrated using Adjust Zero and Adjust Span by the following equation:

Analog Output
= (Output Value – Analog 0%) x Adjust Fine + Analog 0% + [Adjust Zero x (Analog 100% – Analog 0%)]

Where
Analog 0% = 4mA or 1V, output 0% or lower limit value set by the table for M5XWTU
Analog 100% = 20mA or 5V, output 0% or lower limit value set by the table for M5XWTU

Adjust Zero, Adjust Span 100.00% = 1.0000

Zero is adjustable within ±5%, while Span is adjustable from 95.00 to 105.00%.

LINEARIZER

Specify whether the output is proportional to the input or to be linearized. When 'Table' is selected, the segment data is specified with Table X[0] ... Table X[9] and Table Y[0] ... Table Y[9].

Selection / Range	
Linear	Proportional to the input
Table	Linearized output

INPUT 0% / OUTPUT 0% / INPUT 100% / OUTPUT 100%

When 'Linear' is selected with 'Linearizer,' the output range is scaled using these parameters.

$$\text{Output} = \frac{\text{Input} - \text{Input } 0\%}{\text{Input } 100\% - \text{Input } 0\%} \times (\text{Output } 100\% - \text{Output } 0\%) + \text{Output } 0\%$$

[Note] Input value in engineering unit is first converted into percentage of the full-scale range before provided to the above equation.

Input 0% and Input 100% are selectable from -15.00 to 140.00%.

Output 0% and Output 100% is selectable from 1.60 to 22.40mA (4 to 20 mA range), or from 0.400 to 5.600V (1 to 5V range).

TABLE X[0] ... TABLE X[9] / TABLE Y[0] ... TABLE Y[9]

When 'Table' is selected with 'Linearizer,' the segment data table must be set.

Table consists of ten (10) pairs of X (input) and Y (output) values. When the input is equal to X[n], Y[n] is provided as output.

When the input is between X[n–1] and X[n], the output is provided by the following equation.

$$\text{Output} = \frac{\text{Input} - \text{Table X}[n-1]}{\text{Table X}[n] - \text{Table X}[n-1]} \times (\text{Table Y}[n] - \text{Table Y}[n-1]) + \text{Table Y}[n-1]$$

[Note] Input value in engineering unit is first converted into percentage of the full-scale range before provided to the above equation.
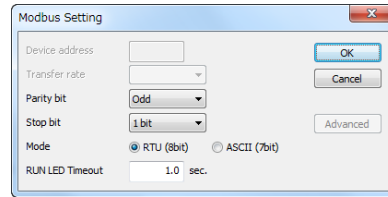
Segment data must be arranged in ascending order, i.e. X[n] must be greater than X[n–1]. For example, if you have set X[7] smaller than X[6], Table X[7] and later values are not used. Linearization is complete with data from X[0] to X[6].

When the input value is lower than X[0], the output equals Y[0]. When the input is higher than X[max], the output equals Y[max].
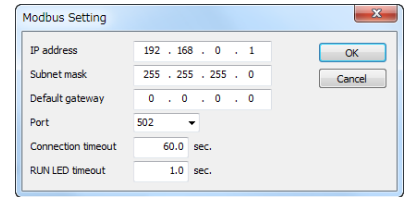
7.5 MODBUS
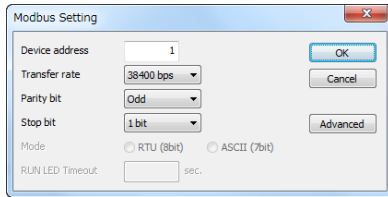
For 53U, 54U, L53U, M5XWTU, M5XWT, M50XWTU, and M50EXWTU	For R7MWTU, R9MWTU	For R7EWTU, R9EWTU

Modbus communication parameters are applied only when the device is restarted (power is turned off and on). Only 'downloading' modified parameters does not affect the device operation.

DEVICE ADDRESS

Selection / Range

Device address	1 to 247

TRANSFER RATE

Selection / Range

Transfer rate	1200 bps
	2400 bps
	4800 bps
	9600 bps
	19200 bps
	38400 bps

PARITY BIT

Selection / Range

Parity bit	None
	Odd
	Even

STOP BIT

Selection / Range

Stop bit	1 bit
	2 bit

MODE

Modbus transmission mode is selectable with the items detailed below.

RTU (7bit)
ASCII (8bit)

IP ADDRESS, SUBNET MASK, DEFAULT GATEWAY
Specify IP address, subnet mask, default gateway for Modbus/TCP.

PORT NO.
Specify the TCP port number for Modbus/TCP. The setting range is 0 to 65535.

CONNECTION TIME OUT
Modbus/TCP connection is severed if no communication is established for the specified time period. The setting range is 0.0 to 3200.0 sec.

RUN LED TIMEOUT
RUN LED turns off to inform an error when there is an interruption of reading query from the master Modbus module and the specified time passes. The setting range is 0.0 to 3200.0 sec.

Click [Advanced] button to go to 'Advanced Modbus Setting' (See 7.6).

7.6 ADVANCED MODBUS SETTING
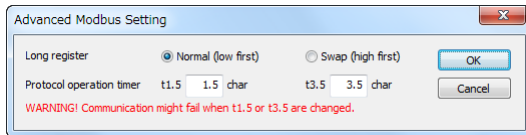
LONG REGISTER (32-bit words assignments)
Specify the order of lower digits and higher digits in sending a 32-bit word data.

Selection	
Normal (low first)	Lower digit word assigned to the lower address
Swap (high first)	Higher digit word assigned to the lower address

PROTOCOL OPERATION TIMER
Specify the character length for t1.5 and t3.5 timers. Modbus defines t1.5 timer as 1.5 character, and t3.5 timer as 3.5 character. These settings should not be changed in normal circumstances. Change these settings only upon our customer support's suggestion.

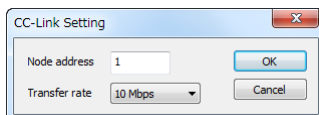| Selection / Range	
t1.5	0.1 to 6.0 characters
t3.5	0.1 to 6.0 characters

Caution !
Modbus communication parameters are applied only when the device is restarted (power is turned off and on).
Only 'downloading' modified parameters does not affect the device operation.
M5XWTU, M5XWT, M50XWTU, and M50EXWTU cannot set.

7.7 CC-Link

CC-Link communication parameters are applied only when the device is restarted (power is turned off and on). Only 'downloading' modified parameters does not affect the device operation.

NODE ADDRESS

Selection / Range	
Node address	1 to 64

TRANSFER RATE

Selection / Range	
Transfer rate	156 kbps
	625 kbps
	2.5 Mbps
	5 Mbps
	10 Mbps