

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

PC CONFIGURATOR SOFTWARE
Model: PMCFG Ver. 1.11

Users Manual

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1. INTRODUCTION

1.1 GENERAL DESCRIPTION

M-System 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 and L53U 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 R7LWTU, R7EWTU, R7CWTU and R7MWTU)

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

For R9LWTU, only "monitoring measured values" function selectable.

1.2 PC REQUIREMENTS

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

PC	IBM PC compatible
OS	Windows 7 (32-bit/64-bit) Windows 10 (32-bit/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 M-system's products detailed in the table below are required.

DEVICES	NETWORK	REQUIRED PRODUCTS
53U R7LWTU R7CWTU R7MWTU R7EWTU R9LWTU R9CWTU R9MWTU R9EWTU L53U	RS-232-C	PC configurator cable (model: MCN-CON or COP-US)
53U (with Modbus) 54U (with Modbus) R7MWTU R9MWTU L53U (with Modbus)	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)	Ethernet	Ethernet communication adaptor (model: 72EM-M4 or 72EM2-M4) (R7EWTU, R9EWTU do not require Communication Adaptor)
54U 54UL 54UC	Infrared	Infrared communication adaptor (model: COP-IRU)

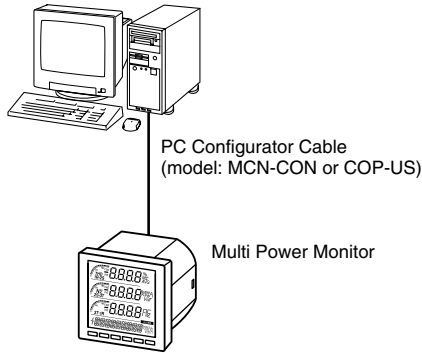
CONNECTING THE DEVICE TO THE PC

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).

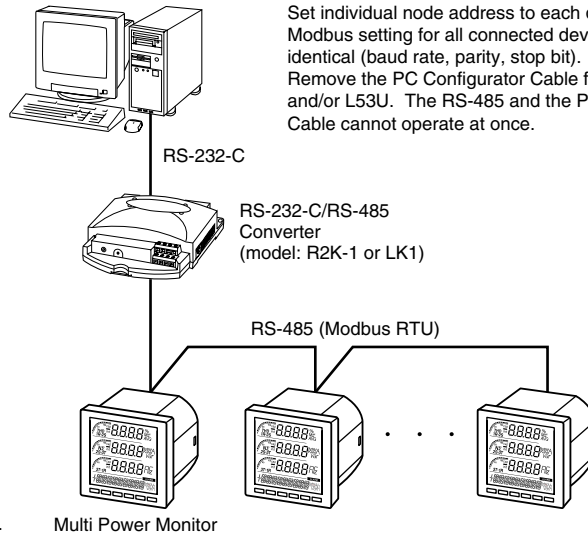
■ LOCAL CONNECTION



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.

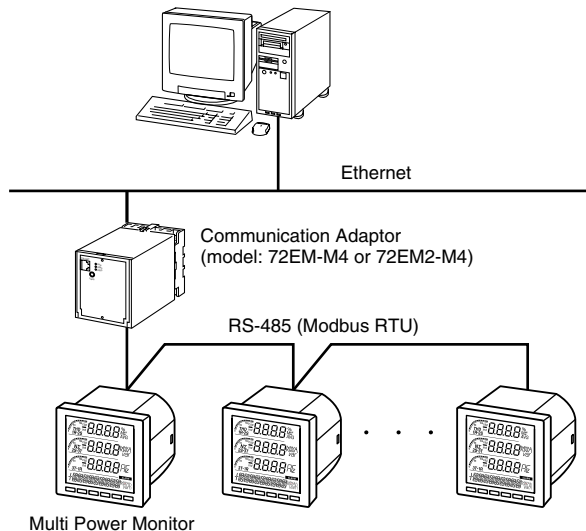
When communicating with 53U with analog output by using configurator cable, it is required to press and hold the 'IU→' button to switch to the communication mode. After communication is completed, pressing and holding the 'IU→' button enable to return to the measurement view. For L53U without option 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.

■ NETWORK CONNECTION (Ethernet)

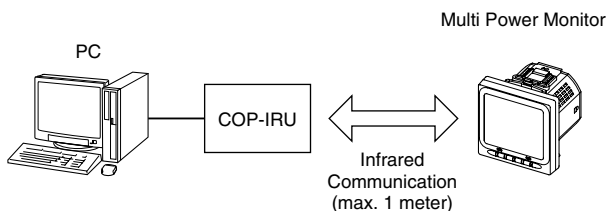


Setting multiple master stations (PCs) is possible with Ethernet (Modbus/TCP) configuration, however, only one (1) PC is allowed to communicate to the devices when programming with the PMCFG. Accessing the devices from multiple stations may cause unexpected effects.

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 setting
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)



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 enable to return to the measurement view.

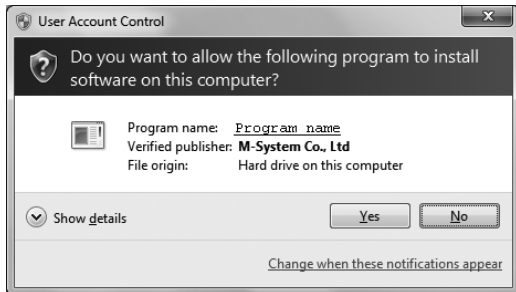
DO NOT set multiple devices to the infrared communication mode at once. Interference may cause unexpected results.

1.3 INSTALLING & DELETING THE PROGRAM

INSTALL

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

For Windows 7, 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'.



'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 > M-System > Configurator > PMCFG to start up it on a Windows PC. The following window appears on the screen.

PMCFG Version 1.9.37

Upload Download Protect Report Save File Open File Monitor Language

Model 53U- 1**1 Modbus, Do x1, Di x1 Ver. 2.40 or later

Input

System 3-phase / 4-wire, unbalanced load (3CT)

VT rating CT rating

Primary 110 V Primary 5 A

Secondary 110 V Secondary 5 A

Bar 100% 300 V Bar 100% 5 A

Function

Demand Current Internal timer 30 min.

Power Internal timer 30 min.

Alarm Tariff Others

Operation

Display Ext. Bar Sigma Disp. Expression Short Cut Passcode

External Interface

Di Do / Po Ao Modbus CC-Link

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)

Clicking [Upload] opens the Connect dialog box.

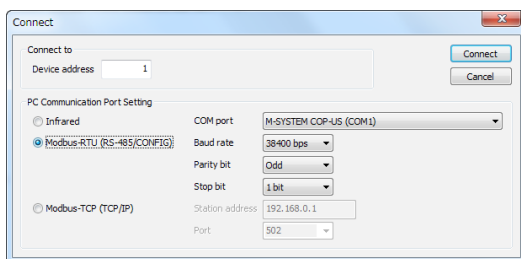
In order to connect to the 53U with analog output type via the PC configuration cable, hold down [IU ►] button to switch the device to the communication mode before starting uploading. The analog output are held, separated from the actual input signals while in this mode.

When L53U without option code '/A' communicates with PC by using PC Configurator Cable, set Mode Selector of the L53U to ON and click 'Connect' button.

Note: The analog output is fixed during L53U 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 before starting uploading.

Modbus-RTU (RS-485 or local)



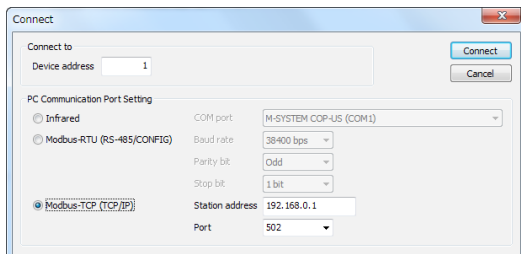
Specify the relevant device address. Specify also the COM port and Modbus communication parameters depending upon the network configuration and the device's communication parameters.

Reference. 53U / 54U factory default setting.

Device address	1
Baud rate	38400
Parity bit	Odd
Stop bit	1 bit

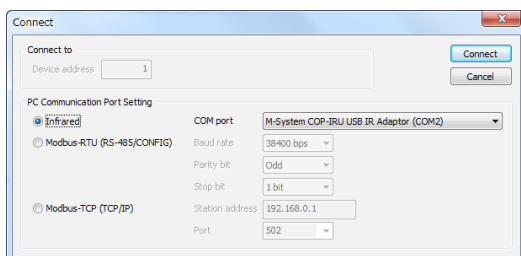
Note: For the R7LWTU, R7CWTU, R7MWTU, R7EWTU, R9M, WTU, R9CWTU, R9LWTU, R9EWTU and L53U, the parameters are fixed as the table above.

Modbus-TCP (Ethernet)



Specify the IP address (Station address) and Service port (Standard Modbus TCP port number is '502').

Infrared



Specify the COM port.

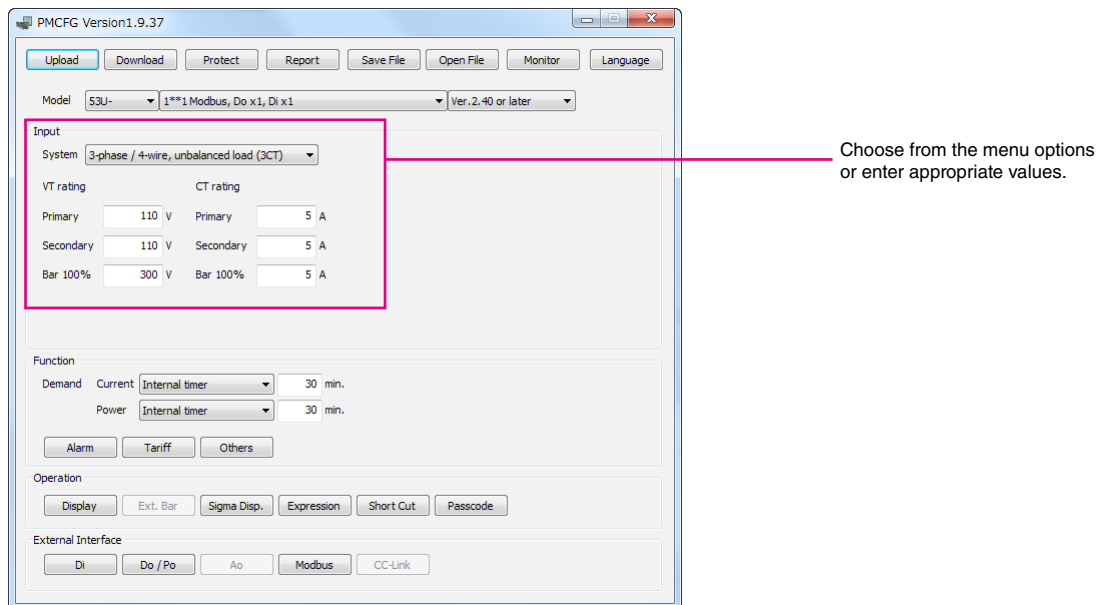
Once all parameters confirmed, click [Connect] to start reading parameters stored in the connected device to show them on the screen.

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.



Detailed description on each parameter and control button are given in the later pages of this manual.

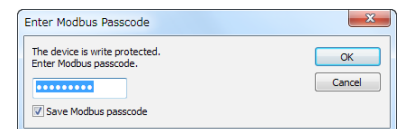
2.2.3 WRITING PARAMETERS TO DEVICE (DOWNLOAD)

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.

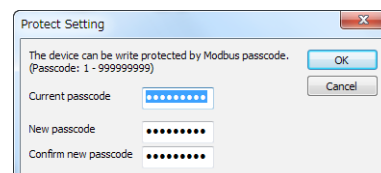
In order to protect parameter changes via Modbus (CONFIG port or RS-485), Modbus Register Writing Protection Passcode is used. The code consists of 9-digit number.

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 !

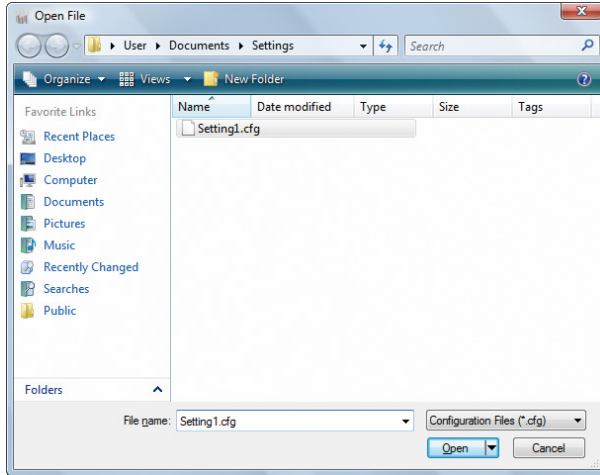
Once a passcode is set, no parameter changes via Modbus are available unless the correct passcode is entered.
BE SURE NOT TO FORGET the passcode.

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.

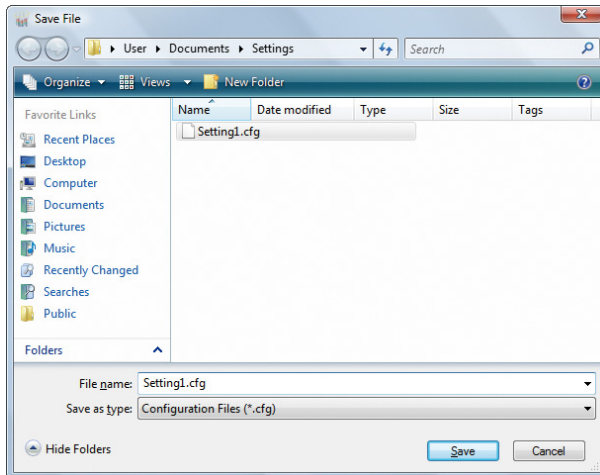
2.4.1 READING PARAMETERS SAVED AS FILE

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

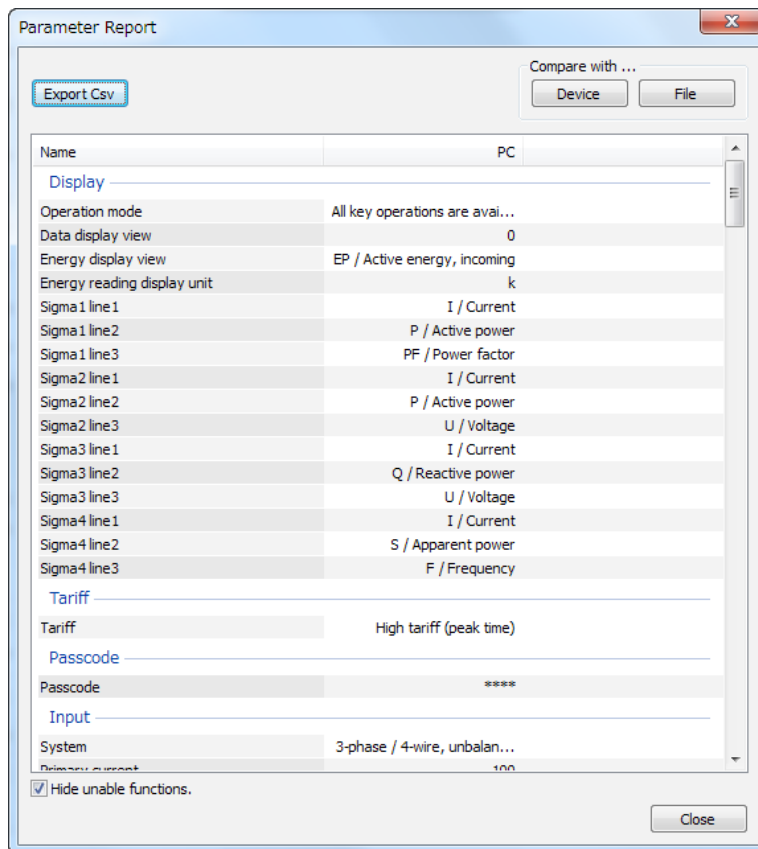
Clicking [Save File] calls up the Windows-standard Save As dialog box. Enter a desired file name to File Name field and click [Save] to store a parameter setting.



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 and R7EWTU

The screenshot shows the PMCFG Version 1.9.37 interface. Key components include:

- Utility Window:** A dropdown menu at the top left.
- Device Information:** A table on the left showing details like Tag No., Modbus passcode, Model (53U), Serial (WB007745), and Firmware version (2.10).
- Vector Chart:** A circular chart on the left showing voltage and current vectors.
- Instantaneous Values Table:** A table with columns for Voltage, Current, Active power, React. power, App. power, and Power factor. It includes rows for Sigma, 1-L, 2-N, 3-N, 1-2, 2-3, and 3-1.
- Demand Table:** A table with columns for Latest, History1, History2, History3, and History4. It includes rows for Current, Current 1, Current 2, Current 3, N. current, Active power, React. power, and App. power.
- Energy and Counter Values Table:** A table with columns for High tariff (peak time) 1, High tariff (peak time) 2, Low tariff (off-peak time) 1, Low tariff (off-peak time) 2, and Counter. It includes rows for Energy, Time, Active in, Active out, Reactive LAG, and Reactive LEAD.
- Harmonics Table:** A table with columns for Latest and Max. It includes rows for Current 1, Current 2, Current 3, N. current, Voltage 1-2, Voltage 2-3, Voltage 3-1, Voltage 1, Voltage 2, and Voltage 3.

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	M-System's 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.

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.

HARMONIC DISTORTION VALUES

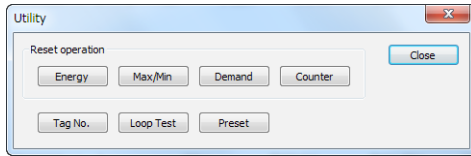
The left-bottom table shows the total harmonic distortion (THD) for each measurand. Clicking on a row in this table switches the measurand displayed in the right-bottom table, where the detailed harmonic distortion values from 1st to 31st are shown.

VECTOR CHART

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

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 and R7EWTU.

2.6.2 For R9MWTU, R9CWTU, R9LWTU and R9EWTU

	1ch	2ch	3ch	4ch	5ch	6ch	7ch	8ch
00:00 to 01:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01:00 to 02:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
02:00 to 03:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
03:00 to 04:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
04:00 to 05:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05:00 to 06:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
06:00 to 07:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
07:00 to 08:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08:00 to 09:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
09:00 to 10:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10:00 to 11:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11:00 to 12:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12:00 to 13:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13:00 to 14:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14:00 to 15:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15:00 to 16:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16:00 to 17:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17:00 to 18:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18:00 to 19:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19:00 to 20:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20:00 to 21:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21:00 to 22:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22:00 to 23:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23:00 to 00:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Latest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Reset	Reset	Reset	Reset	Reset	Reset	Reset	Reset
Active power	0	0	0	0	0	0	0	0
Current 1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Current 2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Current 3	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Power factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Active en	111.1	222.2	333.3	444.4	555.5	666.6	777.7	888.8
Reactive LAG	1111.1	2222.2	3333.3	4444.4	5555.5	6666.6	7777.7	8888.8
	Reset	Reset	Reset	Reset	Reset	Reset	Reset	Reset
	Detail	Detail	Detail	Detail	Detail	Detail	Detail	Detail

Energy

Momentary value

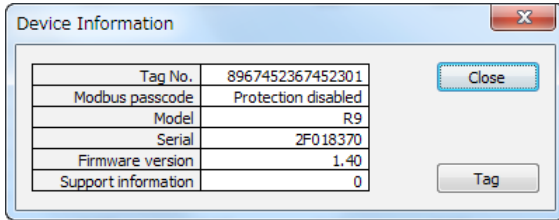
ENERGY

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.

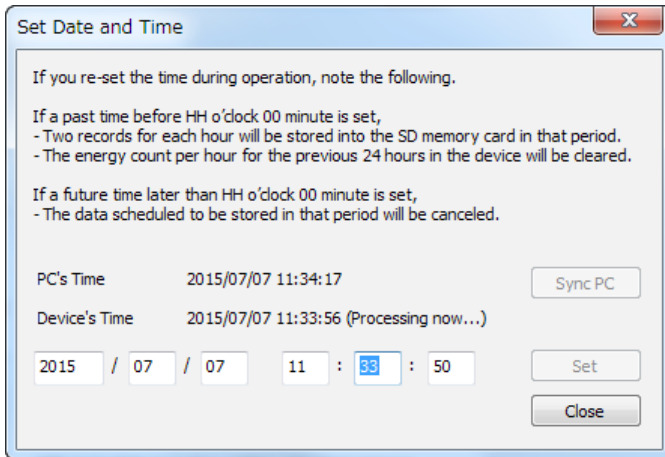
MOMENTARY VALUE

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

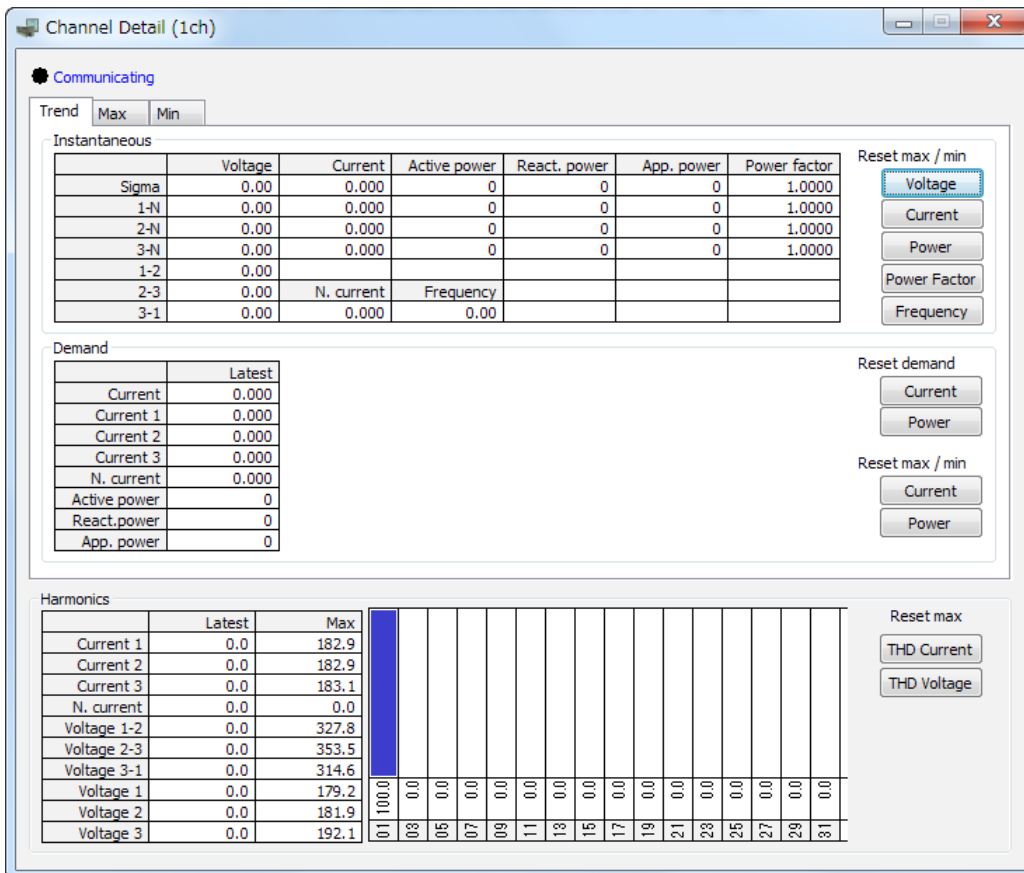
By clicking [Device Info] button at top, the following window appears. In this window, the device information is shown and TAG No. can be changed.



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



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.



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 R7xWTU 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.

	Voltage	Current	Active power	React. power	App. power	Power factor
Sigma	0.34	0.015	0	0	0	1.0000
1-N	0.21	0.007	0	0	0	1.0000
2-N	0.36	0.022	0	0	0	1.0000
3-N	0.47	0.016	0	0	0	1.0000
1-2	0.25					
2-3	0.38	N. current	Frequency			
3-1	0.43	0.000	0.00			

R7xWTU

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

R9xWTU

Above figure shows loop test views. By clicking Loop Test button, the current channel become loop test mode, clicking 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 R7xMWTU 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.

Time	Active in	Active out	Reactive LAG	Reactive LEAD
72.0	1.0000	2.0000	0.0000	0.0000
Apparent	Reactive LAG in	Reactive LEAD in	Reactive LAG out	Reactive LEAD out
0.0000	0.0000	0.0000	0.0000	0.0000

R7xWTU

	1ch	2ch	3ch	4ch	5ch	6ch	7ch	8ch
Active in	111.1	222.2	333.3	444.4	555.5	666.6	777.7	888.8
Reactive LAG	1111.1	2222.2	3333.3	4444.4	5555.5	6666.6	7777.7	8888.8

R9xWTU

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 and R7xWTU and Ver.1.30 or later of R9xWTU.

2.9 ANALOG OUTPUT LOOP TEST

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

Time	Active in	Active out	Reactive LAG	Reactive LEAD
2.0	100.0000	200.0000	300.0000	400.0000
Apparent	Reactive LAG in	Reactive LEAD in	Reactive LAG out	Reactive LEAD out
500.0000	600.0000	700.0000	800.0000	900.0000

Ao1	Ao2	Ao3	Ao4
4.00	4.00	4.00	4.00

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 Ver.2.00 or later of L53U.

2.10 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.

	53U-1xx9 (Ver.2.31 or earlier) 53U-1xx9 (Ver.2.40 or later)	53U-1xx8 (Ver.2.31 or earlier) 53U-1xx8 (Ver.2.40 or later)	53U-1xx7 (Ver.2.31 or earlier) 53U-1xx7 (Ver.2.40 or later)	53U-1xx6 (Ver.2.31 or earlier) 53U-1xx6 (Ver.2.40 or later)	53U-1xx5 (Ver.2.31 or earlier) 53U-1xx5 (Ver.2.40 or later)	53U-1xx4 (Ver.2.31 or earlier) 53U-1xx4 (Ver.2.40 or later)	53U-1xx3 (Ver.2.31 or earlier) 53U-1xx3 (Ver.2.40 or later)	53U-1xx2 (Ver.2.31 or earlier) 53U-1xx2 (Ver.2.40 or later)	53U-1xx1 (Ver.2.00 to 2.31) 53U-1xx1 (Ver.2.40 or later)	53U-1xx1 (Ver.1.02 or earlier)
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...THDI3	✓	✓	✓	✓	✓	✓	✓	✓	✓
	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	✓	✓	✓	✓	✓	✓	✓	✓	✓	
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	*1	✓	✓	✓	✓	✓	✓	✓	✓
My default energy display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	
My default, use preset timer	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Other	Low-end cutout voltage	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Low-end cutout current	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Frequency input	✓	*2	*2	*2	*2	*2	*2	*2	*2
	Energy tariff function	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Power factor PF sign	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Reactive power Q sign	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Phase reactive power Qn	✓	✓	✓	✓	✓	✓	✓	✓	✓
Apparent power S	✓	✓	✓	✓	✓	✓	✓	✓	✓	

*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-1xx9 (Ver.2.31 or earlier)									
		53U-1xx9 (Ver.2.40 or later)									
		53U-1xx8 (Ver.2.31 or earlier)									
		53U-1xx8 (Ver.2.40 or later)									
		53U-1xx7 (Ver.2.31 or earlier)									
		53U-1xx7 (Ver.2.40 or later)									
		53U-1xx6 (Ver.2.31 or earlier)									
		53U-1xx6 (Ver.2.40 or later)									
		53U-1xx5 (Ver.2.31 or earlier)									
		53U-1xx5 (Ver.2.40 or later)									
		53U-1xx4 (Ver.2.31 or earlier)									
		53U-1xx4 (Ver.2.40 or later)									
		53U-1xx3 (Ver.2.31 or earlier)									
		53U-1xx3 (Ver.2.40 or later)									
		53U-1xx2 (Ver.2.31 or earlier)									
		53U-1xx2 (Ver.2.40 or later)									
		53U-1xx1 (Ver.2.00 to 2.31)									
		53U-1xx1 (Ver.2.40 or later)									
		53U-1xx1 (Ver.1.02 or earlier)									
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		*3	*3	*3	*3	*3	*3	*3	*3	*3
	Σ1, Line 4										
	Σ2, Line 1...3		*3	*3	*3	*3	*3	*3	*3	*3	*3
	Σ2, Line 4										
	Σ3, Line 1...3		*3	*3	*3	*3	*3	*3	*3	*3	*3
	Σ3, Line 4										
	Σ4, Line 1...3		*3	*3	*3	*3	*3	*3	*3	*3	*3
	Σ4, Line 4										
Σ5, Line 1...4											
Σ6, Line 1...4											
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-1xx6A (Ver.2.00 to 2.20)	54U-1xx5/9 (Ver.2.00 to 2.20)	54U-1xx4 (Ver.2.00 to 2.20)	54U-1xx3/8 (Ver.3.00 or later)	54U-1xx2/7 (Ver.3.00 or later)	54U-1xx1 (Ver.3.00 or later)	54U-1xx3/8 (Ver.2.00 to 2.20)	54U-1xx2/7 (Ver.2.00 to 2.20)	54U-1xx1 (Ver.2.00 to 2.20)	54U-1xx3 (Ver.1.03 or earlier)	54U-1xx2 (Ver.1.03 or earlier)	54U-1xx1 (Ver.1.03 or earlier)
Basic Parameters	System	*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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alarm	Demand update interval, power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	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		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other	My default energy display view	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	My default, use preset timer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

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

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

		54U-1xx6A (Ver.2.00 to 2.20)	54U-1xx5/9 (Ver.2.00 to 2.20)	54U-1xx4 (Ver.2.00 to 2.20)	54U-1xx3/8 (Ver.3.00 or later)	54U-1xx2/7 (Ver.3.00 or later)	54U-1xx1 (Ver.3.00 or later)	54U-1xx3/8 (Ver.2.00 to 2.20)	54U-1xx2/7 (Ver.2.00 to 2.20)	54U-1xx1 (Ver.2.00 to 2.20)	54U-1xx3 (Ver.1.03 or earlier)	54U-1xx2 (Ver.1.03 or earlier)	54U-1xx1 (Ver.1.03 or earlier)
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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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		✓	✓		✓	✓		✓	✓		✓	✓
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-1xxx4 (Ver.3.00 or later)	54U-1xx5/9 (Ver.3.00 or later)	54U-1xx6A (Ver.3.00 or later)	54U-2xx1	54U-2xx2/7	54U-2xx3/8	54U-2xx4	54U-2xx5/9	54U-2xx6A
Basic Parameters	System	*4	*4	*4	✓	✓	✓	✓	✓	✓
	VT ratio primary / secondary	✓	✓	✓	✓	✓	✓	✓	✓	✓
	VT bar 100%									
	CT ratio primary / secondary	✓	✓	✓	✓	✓	✓	✓	✓	✓
	CT bar 100%									
	Demand update interval, current	✓	✓	✓	✓	✓	✓	✓	✓	✓
Alarm	Demand update interval, power	✓	✓	✓	✓	✓	✓	✓	✓	✓
	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	✓	✓	✓	✓	✓	✓	✓	✓	✓	
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	✓	✓	✓	✓	✓	✓	✓	✓	✓	
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	✓	✓	✓	✓	✓	✓	✓	✓	✓	

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

		54U-1xxx4 (Ver.3.00 or later)	54U-1xxx5/9 (Ver.3.00 or later)	54U-1xx6A (Ver.3.00 or later)	54U-2xx1	54U-2xx2/7	54U-2xx3/8	54U-2xx4	54U-2xx5/9	54U-2xx6A
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	✓	✓	✓	✓	✓	✓	✓	✓	✓
Expression	Σ5, Line 1...4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ6, Line 1...4	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Input line indication									
DI	Phase direction indication									
	Power format	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Di function				✓	✓	✓			
Do	Di contact type				✓	✓	✓			
	Do 1 function, contact type, energy detail	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Do 2 function, contact type, energy detail	✓	✓	✓				✓	✓	✓
	Do 3 function, contact type, energy detail									
Ao	Do 4 function, contact type, energy detail									
	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		✓	✓		✓	✓		✓	✓
Modbus	Ao 4 function, zero/span, linearization, I/O 0%/100%, table		✓	✓		✓	✓		✓	✓
	Device address	✓			✓			✓		
	Baud rate	✓			✓			✓		
	Parity bit	✓			✓			✓		
	Stop bit	✓			✓			✓		
	Mode									
	RUN LED time out									
	Long register	✓			✓			✓		
CC-Link	Protocol operation timer	✓			✓			✓		
	Node address									
Shortcut	Transfer rate									
	Clear alarm	✓	✓	✓	✓	✓	✓	✓	✓	✓

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

	54UC-2xx2	54UC-2xx1	54UC-1xx2 (Ver.300 or later)	54UC-1xx1 (Ver.3.00 or later)	54UC-1xx2 (Ver.1.00 or earlier)	54UC-1xx1 (Ver.1.00 or earlier)	54UL-2xx2	54UL-2xx1	54UL-1xx2 (Ver.300 or later)	54UL-1xx1 (Ver.3.00 or later)	54UL-1xx2 (Ver.1.02 or earlier)	54UL-1xx1 (Ver.1.02 or earlier)	
Basic Parameters	System	✓	✓	*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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Alarm	Demand update interval, power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

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

		54UC-2xx2	54UC-2xx1	54UC-1xx2 (Ver.300 or later)	54UC-1xx1 (Ver.3.00 or later)	54UC-1xx2 (Ver.1.00 or earlier)	54UC-1xx1 (Ver.1.00 or earlier)	54UL-2xx2	54UL-2xx1	54UL-1xx2 (Ver.300 or later)	54UL-1xx1 (Ver.3.00 or later)	54UL-1xx2 (Ver.1.02 or earlier)	54UL-1xx1 (Ver.1.02 or earlier)
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	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Expression	Σ5, Line 1...4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Σ6, Line 1...4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Input line indication												
DI	Phase direction indication												
	Power format	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Do	Di function	✓		✓		✓		✓		✓		✓	
	Di contact type	✓		✓		✓		✓		✓		✓	
	Do 1 function, contact type, energy detail	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Do 2 function, contact type, energy detail		✓		✓		✓		✓		✓		✓
Ao	Do 3 function, contact type, energy detail												
	Do 4 function, contact type, energy detail												
	Ao 1 function, zero/span, linearization, I/O 0%/100%, table												
	Ao 2 function, zero/span, linearization, I/O 0%/100%, table												
Modbus	Ao 3 function, zero/span, linearization, I/O 0%/100%, table												
	Ao 4 function, zero/span, linearization, I/O 0%/100%, table												
	Device address												
	Baud rate												
	Parity bit												
	Stop bit												
	Mode												
	RUN LED time out												
CC-Link	Long register												
	Protocol operation timer												
Shortcut	Node address					✓	✓	✓	✓	✓	✓	✓	✓
	Transfer rate					✓	✓	✓	✓	✓	✓	✓	✓
	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								
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		✓	✓	✓		✓	✓	✓	

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

		R7LWTU	R7CWTU	R7MWTU	R7EWTU	R9LWTU	R9CWTU	R9MWTU	R9EWTU
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	Σ 1, Line 1...3							
Σ 1, Line 4									
Σ 2, Line 1...3									
Σ 2, Line 4									
Σ 3, Line 1...3									
Σ 3, Line 4									
Σ 4, Line 1...3									
Σ 4, Line 4									
Σ 5, Line 1...4									
Σ 6, 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								
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								
	OC-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
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							
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	✓	✓	✓	✓	✓	✓	✓	

		L53U-1xx1	L53U-1xx2	L53U-1xx3	L53U-1xx4	L53U-1xx5	L53U-1xx6	L53U-1xx7
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	$\Sigma 1$, Line 1...3							
	$\Sigma 1$, Line 4							
	$\Sigma 2$, Line 1...3							
	$\Sigma 2$, Line 4							
	$\Sigma 3$, Line 1...3							
	$\Sigma 3$, Line 4							
	$\Sigma 4$, Line 1...3							
	$\Sigma 4$, Line 4							
Expression	$\Sigma 5$, Line 1...4							
	$\Sigma 6$, Line 1...4							
	Input line indication							
DI	Phase direction indication							
	Power format							
	Di function	✓			✓	✓		
Do	Di contact type	✓			✓	✓		
	Do 1 function, contact type, energy detail	✓			✓	✓	✓	✓
	Do 2 function, contact type, energy detail						✓	✓
	Do 3 function, contact type, energy detail							
Ao	Do 4 function, contact type, energy detail							
	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		✓	✓				
Modbus	Ao 4 function, zero/span, linearization, I/O 0%/100%, table		✓	✓				
	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)	

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-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, R7CW TU, R7MWTU and R7EWTU.

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

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.

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

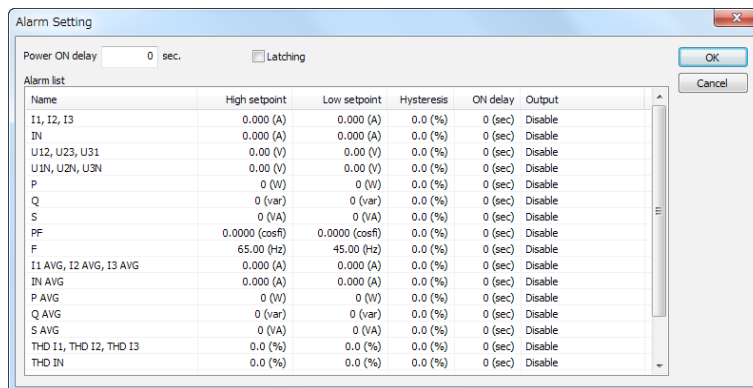
Internal timer	Demand values are calculated automatically by the internal timer (clock). Specify in minutes.
Discrete input	Demand values are calculated when a contact input is supplied to the device's discrete input terminals.

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
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 φ *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
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
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]

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.

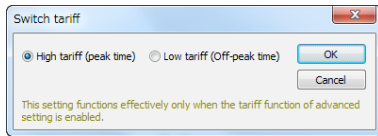
Communication + Do 1...Do 2 ALARM is activated via communication plus a discrete signal output is provided.

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.

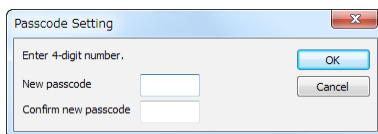


Selection

Tariff	High tariff (peak time) Low tariff (off-peak time)
--------	---

5.4 PASSCODE

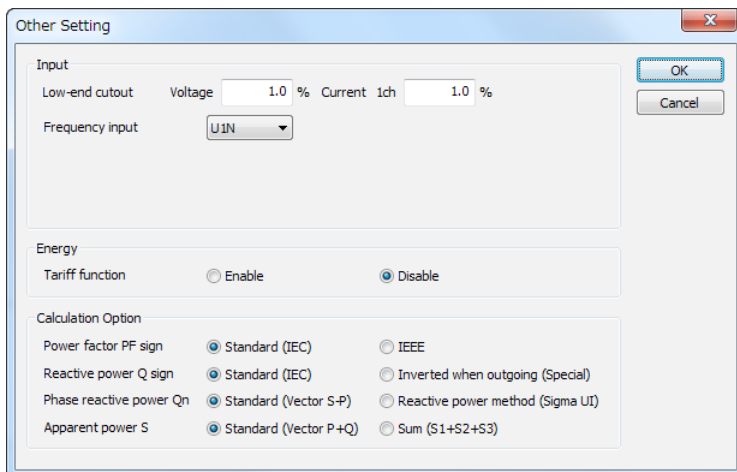
4-digit passcode is needed to enter the programming mode when you use the front keys. Type in 4-digit number once and twice for confirmation and click OK.



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:

$$\begin{aligned} \text{Low-end cutout current} &= \text{Setting in \%} \times \text{CT's primary rating} \\ \text{Low-end cutout voltage} &= \text{Setting in \%} \times \text{VT's primary rating} \end{aligned}$$

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
U1N	U1 voltage
50Hz fixed	AC frequency is fixed to 50Hz.*1
60Hz fixed	AC frequency is fixed to 60Hz.*1

*1. Selectable with firmware version 2.40 or later of 53U.

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)	$Q_n = \sqrt{S_n^2 - P_n^2}$
Reactive power method (Sigma UI)	$Q_n = \frac{1}{N_{smp}} \sum_{i=1}^{N_{smp}} (U_{n_i} - N_{u_i}) I_{i+(N_{smp}/4)}$

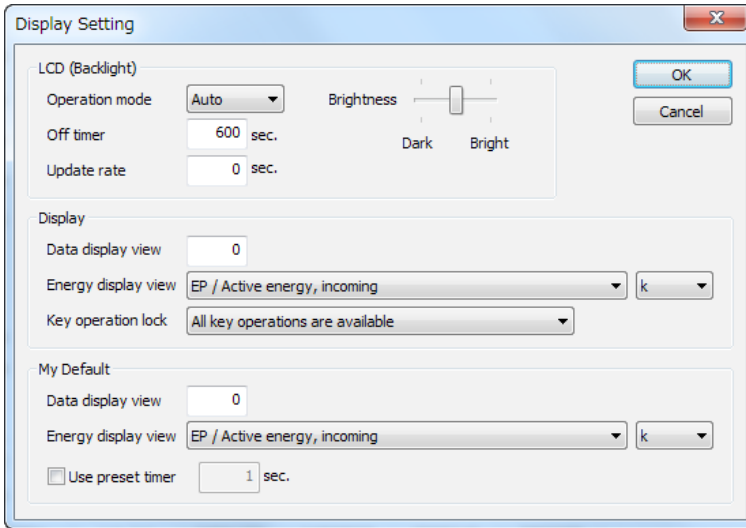
APPARENT POWER S

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

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



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 Σ button).

The Σ display automatically switches every 10 seconds from $\Sigma 1$ through $\Sigma 4$ (53U) or through $\Sigma 6$ (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.

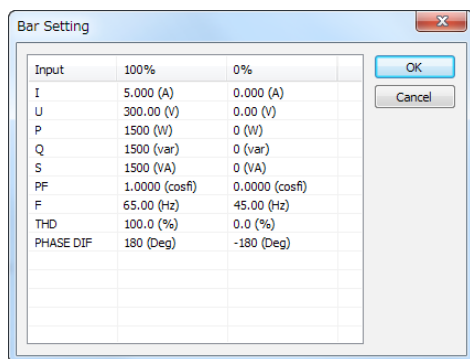
USE PRESET TIMER

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

6.2 EXTENSION BAR



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

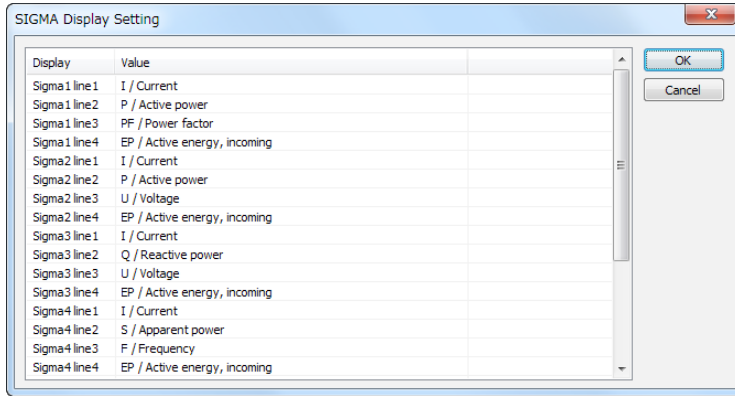
The measurand on the first line of the display is also on the bargraph. The following nine (9) parameters are selectable.

■ 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 ϕ
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 Σ 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) Σ views are available. The following options are selectable for Line 1 through Line 3 of each view.

■ 53U : Σ 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) Σ 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

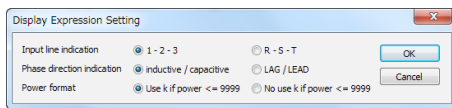
ID	PARAMETER
NULL	Undefined
I	Current
U	Voltage
P	Active power
Q	Reactive power
S	Apparent power
PF	Power factor
F	Frequency
I1	Current, Line 1
I2	Current, Line 2
I3	Current, Line 3
IN	Current, Neutral *1
U12	Delta voltage, 1 – 2
U23	Delta voltage, 2 – 3
U31	Delta voltage, 3 – 1
U1N	Phase voltage, Phase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

1R-2S *1R-2S*
2S-3T *2S-3T*
3T-1R *3T-1R*

R - S - T

1R-2S *1R-2S*
2S-3T *2S-3T*
3T-1R *3T-1R*

PHASE DIRECTION INDICATION

Selection

inductive / capacitive

cap *cap*
ind *ind*
LEAG *LEAG*

LAG / LEAD

cap *cap*
ind *ind*
LEAG *LEAD*

POWER FORMAT

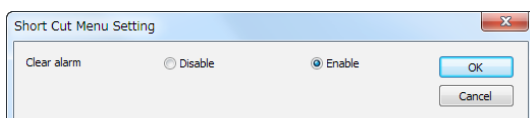
Selection

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

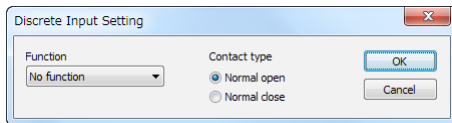
Specify either you want to use the shortcut command to reset alarm



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

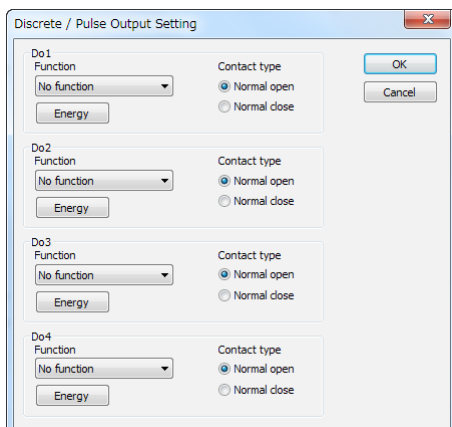
CONTACT TYPE

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

CONTACT TYPE

Selection

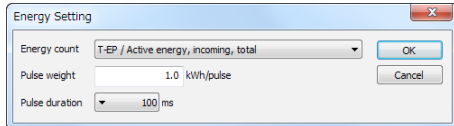
Normal open

Normal closed

ENERGY DETAIL

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

7.3 ENERGY



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)
--------------	--------------------------------

PULSE DURATION

Specify the output pulse width appropriate for a receiving instrument.

Selection / Range

Pulse duration	100 to 2000 milliseconds (in 100 msec. increments)
----------------	--

■ 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	Reactive energy, incoming, LAG
EQ+LEAD	Reactive energy, incoming, LEAD
EQ-LAG	Reactive energy, outgoing, LAG
EQ-LEAD	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	Reactive energy, incoming, LAG
T-EQ+LEAD	Reactive energy, incoming, LEAD
T-EQ-LAG	Reactive energy, outgoing, LAG
T-EQ-LEAD	Reactive energy, outgoing, LEAD
T-EQ+P	Reactive energy, incoming
T-EQ-P	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	Reactive energy, high tariff, incoming, LAG
EQ+LEAD	Reactive energy, high tariff, incoming, LEAD
EQ-LAG	Reactive energy, high tariff, outgoing, LAG
EQ-LEAD	Reactive energy, high tariff, outgoing, LEAD

ID	PARAMETER
EQ+P	Reactive energy, high tariff, incoming
EQ-P	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	Reactive energy, low tariff, incoming, LAG
L-EQ+LEAD	Reactive energy, low tariff, incoming, LEAD
L-EQ-LAG	Reactive energy, low tariff, outgoing, LAG
L-EQ-LEAD	Reactive energy, low tariff, outgoing, LEAD
L-EQ+P	Reactive energy, low tariff, incoming
L-EQ-P	Reactive energy, low tariff, outgoing
L-EQA	Reactive energy, low tariff, (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	Current, Line 1	0 to CT primary rating
I2	Current, Line 2	0 to CT primary rating
I3	Current, Line 3	0 to CT primary rating
IN ^{*3}	Neutral current	0 to CT primary rating
U12	Delta voltage, Line 1 – 2	0 to VT primary rating
U23	Delta voltage, Line 2 – 3	0 to VT primary rating
U31	Delta voltage, Line 3 – 1	0 to VT primary rating
U1N	Phase voltage, Phase 1	0 to VT primary rating
U2N	Phase voltage, Phase 2	0 to VT primary rating
U3N	Phase voltage, Phase 3	0 to VT primary rating
P1	Active power, Phase 1	\pm (VT primary rating \times CT primary rating \times n) ^{*1}
P2	Active power, Phase 2	\pm (VT primary rating \times CT primary rating \times n) ^{*1}
P3	Active power, Phase 3	\pm (VT primary rating \times CT primary rating \times n) ^{*1}
Q1	Reactive power, Phase 1	\pm (VT primary rating \times CT primary rating \times n) ^{*1}
Q2	Reactive power, Phase 2	\pm (VT primary rating \times CT primary rating \times n) ^{*1}
Q3	Reactive power, Phase 3	\pm (VT primary rating \times CT primary rating \times n) ^{*1}
S1	Apparent power, Phase 1	0 to (VT primary rating \times CT primary rating \times n) ^{*1}
S2	Apparent power, Phase 2	0 to (VT primary rating \times CT primary rating \times n) ^{*1}
S3	Apparent power, Phase 3	0 to (VT primary rating \times CT primary rating \times n) ^{*1}
PF1	Power factor, Phase 1	-1.0000 to + 1.0000
PF2	Power factor, Phase 2	-1.0000 to + 1.0000
PF3	Power factor, Phase 3	-1.0000 to + 1.0000
THDI1	THD, Current, Line 1	0.0 to 100.0
THDI2	THD, Current, Line 2	0.0 to 100.0
THDI3	THD, Current, Line 3	0.0 to 100.0
THDIN ^{*3}	THD, Neutral current	0.0 to 100.0

ID	DEFINITION	RANGE (0 to 100%)
THDU12	THD, Delta voltage, Line 1 – 2	0.0 to 100.0
THDU23	THD, Delta voltage, Line 2 – 3	0.0 to 100.0
THDU31	THD, Delta voltage, Line 3 – 1	0.0 to 100.0
THDU1N	THD, Phase voltage, Phase 1	0.0 to 100.0
THDU2N	THD, Phase voltage, Phase 2	0.0 to 100.0
THDU3N	THD, Phase voltage, Phase 3	0.0 to 100.0
T-Q	Reactive power for bidirectional current	$Q_{max} = (CT \text{ primary rating}) \times (VT \text{ primary rating}) \times n^*$
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 and L53U, 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.

ADJUST ZERO / ADJUST SPAN

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

$$\text{Analog Output} = (\text{Output Value} - \text{Analog 0\%}) \times \text{Adjust Fine} + \text{Analog 0\%} + [\text{Adjust Zero} \times (\text{Analog 100\%} - \text{Analog 0\%})]$$

Where

Analog 0% = 4mA or 1V

Analog 100% = 20mA or 5V

Adjust Zero, Adjust Span 100.00% = 1.0000

Zero is adjustable within $\pm 5\%$, 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 and L53U

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

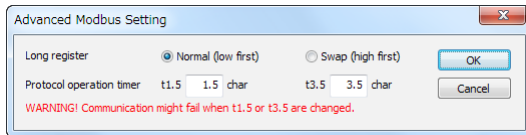
Modbus/TCP connection is severed if no communication is established for the specified time period. The setting range is 0.0 to 3200.0 sec.

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 M-System customer support's suggestion.

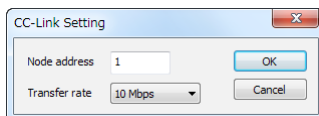
Selection / Range

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.

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