OPERATING MANUAL

MULTI POWER MONITOR
(4 digital displays, CC-Link)

MODEL **54UC**

CONTENTS

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BEFORE USE ....

Thank you for choosing M-System. Before use, please check contents of the package you received as outlined below.
If you have any problems or questions with the product, please contact M-System's Sales Office or representatives.

■ PACKAGE INCLUDES:

Multi power monitor
(body + mounting bracket × 2 + gasket) .....(1)
Terminating resistor (110 Ω, 0.5 W).....(1)

■ MODEL NO.

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

■ OPERATING MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection, basic maintenance procedures, and detailed operations.
The 54UC is programmable either by using the front control buttons or the PC Configurator Software. For detailed information on the PC configuration, refer to the PMCFG users manual. The PMCFG PC Configurator Software is downloadable at M-System's web site.
http://www.m-system.co.jp
Availability of certain functions explained in this manual depends upon hardware options and firmware versions. Those limited ones are identified with the following markings.

MARKING	LIMITATION
DI	Discrete input option
3P4W	3-phase / 4-wire system option
3.00	Ver.3.00 or later versions

POINTS OF CAUTION

■ AUXILIARY POWER SUPPLY RATING & OPERATIONAL RANGE

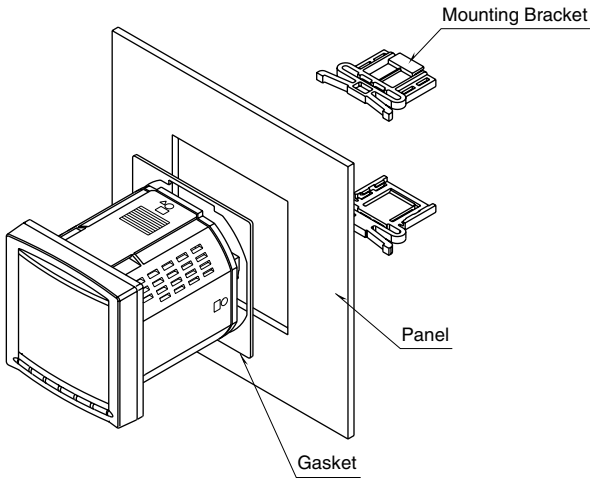
- Locate the auxiliary power supply rating marked on the product and confirm its operational range as indicated below:
  100 – 240V AC rating: 85 – 264V AC, 47 – 66 Hz, < 8VA
  110 – 240V DC rating: 99 – 264V DC, < 4W

■ GENERAL PRECAUTION

- Before you remove or mount the unit, turn off the power supply and input signal for safety.

■ ENVIRONMENT

- Indoor use.
- Do not install the unit where it is directly exposed to rain, water droplets or sunlight.
- When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within -10 to +55°C (14 to 131°F) with relative humidity within 90% RH in order to ensure adequate life span and operation.
- Contrast of the LCD screen depends upon viewing angles. Choose the height and angle where it is the most legible.
- Do not apply physical impact to the front face.
- To ensure the designated ingress protection, insert the gasket before attaching the mounting brackets.
- When using the mounting brackets, remove the mounting screws and turn back the gasket as shown below.



■ WIRING

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

■ AND ....

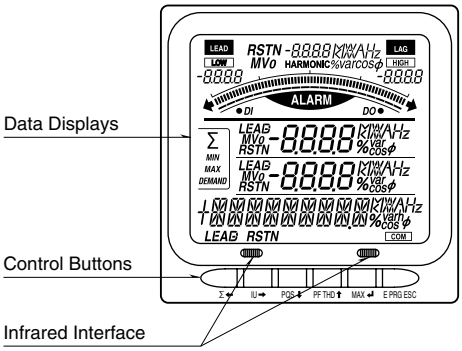
- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.
- Altitude up to 2000 meters.
- The equipment must be mounted inside a panel.

LIGHTNING SURGE PROTECTION

M-System offers a series of lightning surge protector for protection against induced lightning surges. Please contact M-System to choose appropriate models.

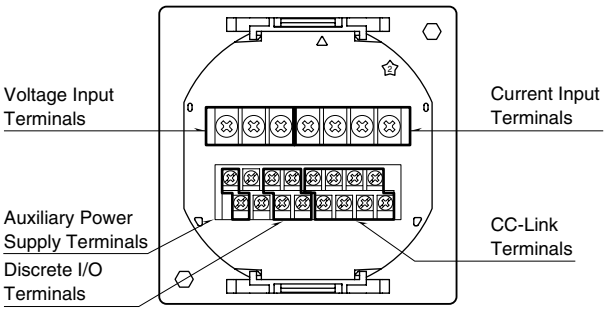
COMPONENT IDENTIFICATION

■ FRONT VIEW

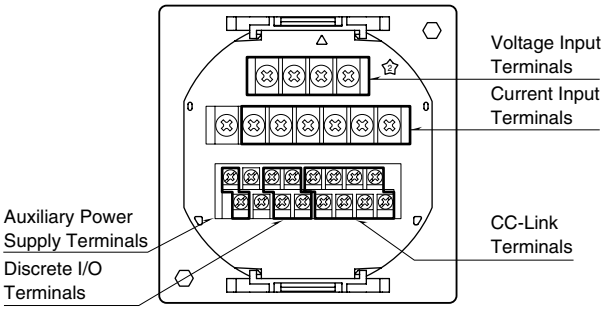


■ REAR VIEW

• CONFIGURATION CODE: 1



• CONFIGURATION CODE: 2

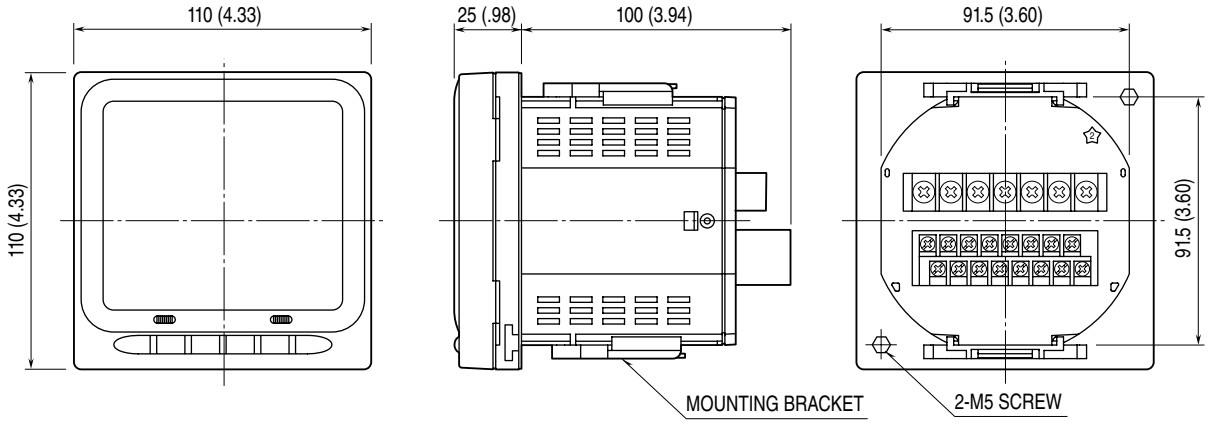


■ CONTROL BUTTON OPERATIONS

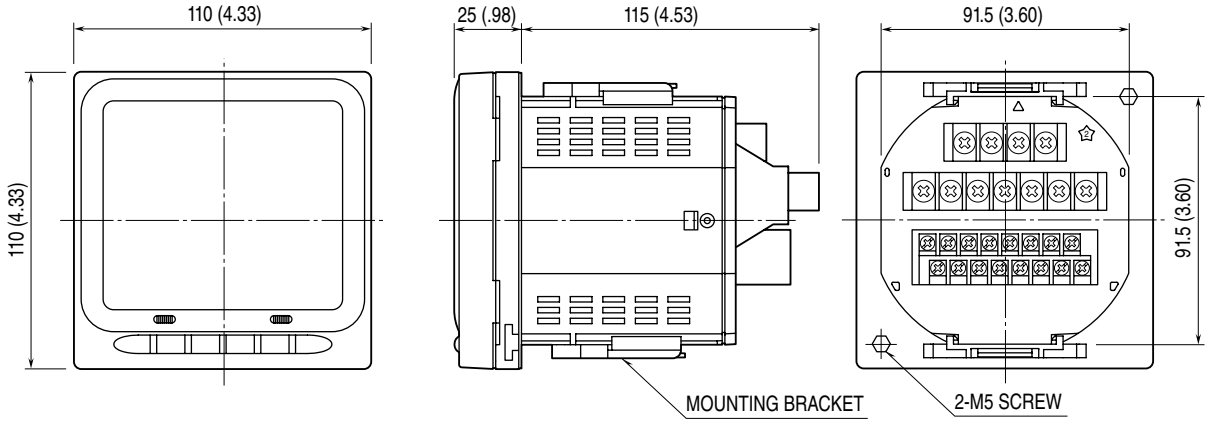
BUTTON OPERATION	FUNCTIONS	
	NORMAL MODE	SETTING MODE
Σ ◀	Indicates Σ values	Go Left
IU ▶	Indicates Voltage or Current	Go Right
PQS ▼	Indicates Power	Go Down
PF THD ▲	Indicates Power Factor or THD	Go Up
MAX ENTER	Indicates totalized values (max., min., average/demand)	Selects menu; Enables setting changes
E PRG ESCAPE	Switches Energy readings	Cancels setting changes
Σ ◀ Hold down	Switches to My Default mode	----
IU ▶ Hold down	Switches to PC Configuration mode	----
E PRG ESCAPE Hold down	Switches to Setting mode	----
IU ▶ + PF THD ▲ Hold down	Indicates Harmonics by degrees	----
Σ ◀ + E PRG ESCAPE Hold down	Switches Energy reading units	----
PQS ▼ Hold down	Indicates the shortcut menu	----

EXTERNAL DIMENSIONS unit: mm (inch)

■ **CONFIGURATION CODE: 1**

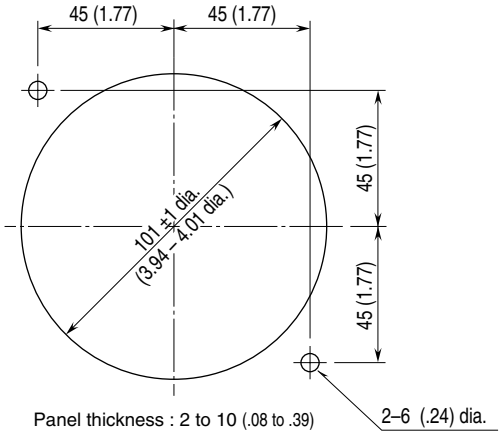


■ **CONFIGURATION CODE: 2**



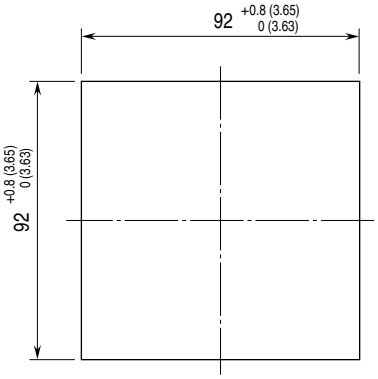
■ **PANEL CUTOUT unit: mm (inch)**

• USING MOUNTING SCREWS
Remove the mounting brackets.



Panel thickness : 2 to 10 (.08 to .39)

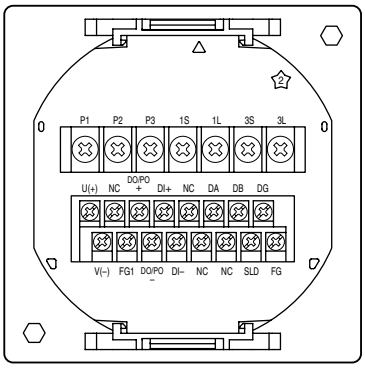
• USING MOUNTING BRACKETS
Remove the mounting screws.

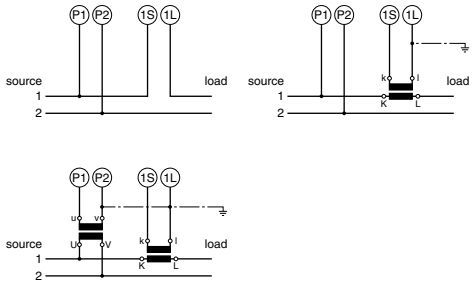
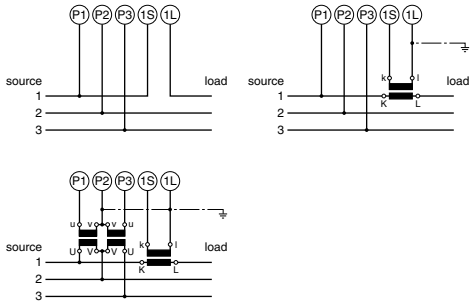


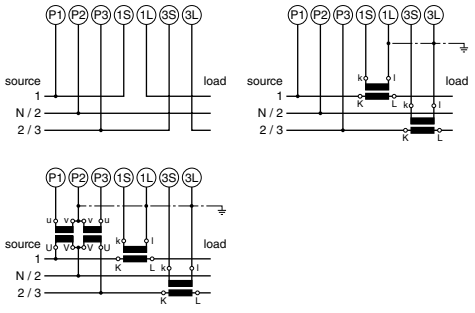
Panel thickness : 2 to 15 (.08 to .59)

TERMINAL CONNECTIONS

■ **CONFIGURATION CODE: 1**

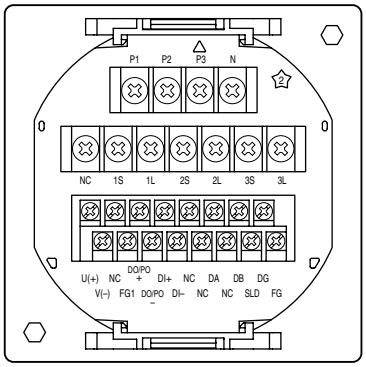


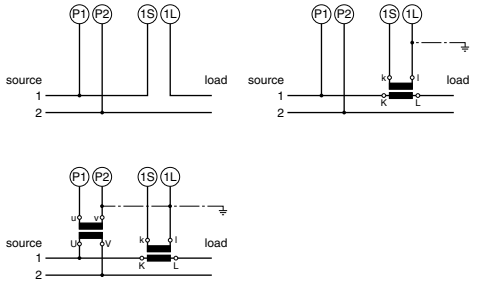
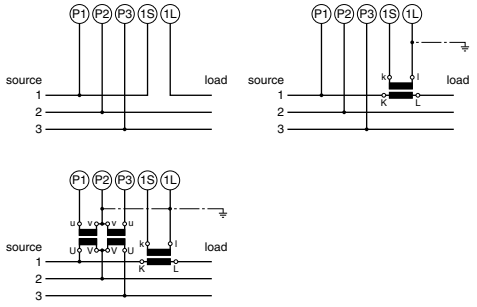
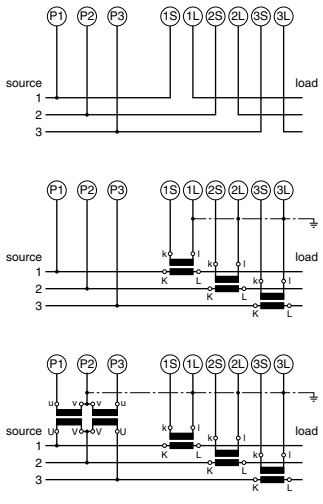
System / Application	Terminal
Single-phase / 2-wire	
Three-phase / 3-wire, balanced load	

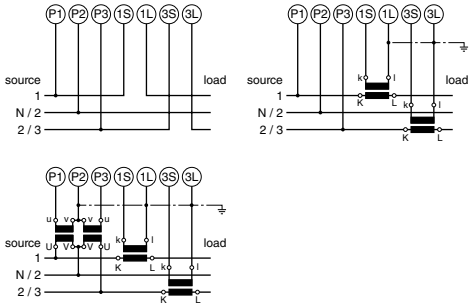
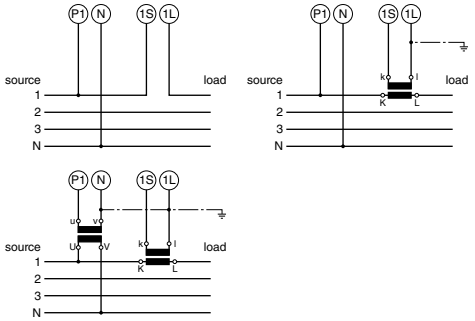
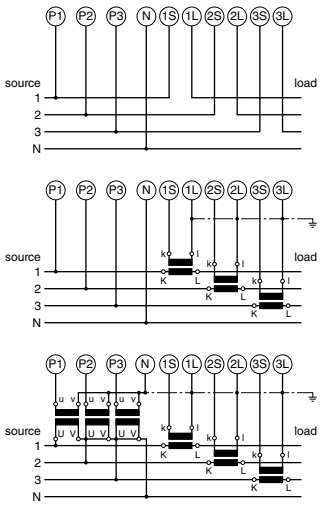
System / Application	Terminal
Single-phase / 3-wire Three-phase / 3-wire, unbalanced load (2CT)	

Note: For low voltage circuit, grounding is not required.

■ CONFIGURATION CODE: 2

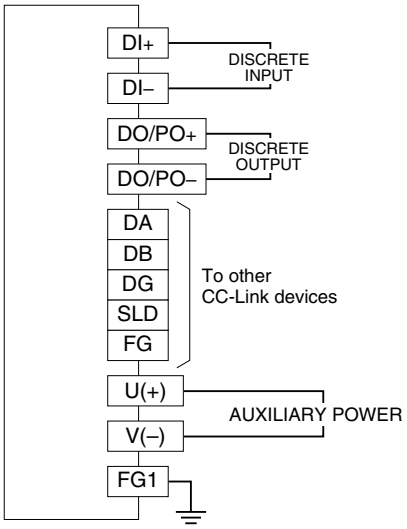


System / Application	Terminal
Single-phase / 2-wire	
Three-phase / 3-wire, balanced load	
Three-phase / 3-wire, unbalanced load (3CT)	

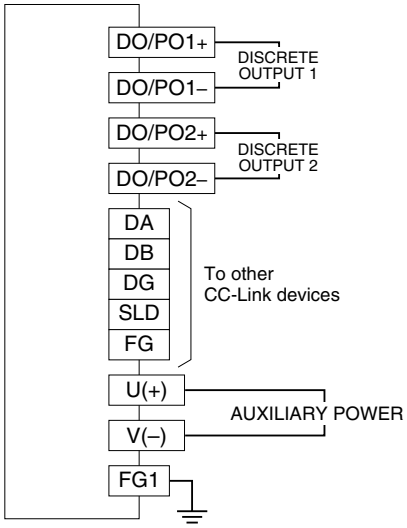
System / Application	Terminal
Single-phase / 3-wire Three-phase / 3-wire, unbalanced load (2CT)	
Three-phase / 4-wire, balanced load	
Three-phase / 4-wire, unbalanced load	

Note: For low voltage circuit, grounding is not required.

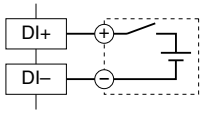
■ **EXTERNAL INTERFACE CODE: 1**



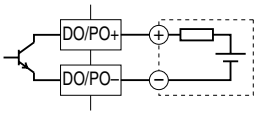
■ **EXTERNAL INTERFACE CODE: 2**



• Discrete Input Connection E.g.



• Discrete Output Connection E.g.



WIRING INSTRUCTIONS

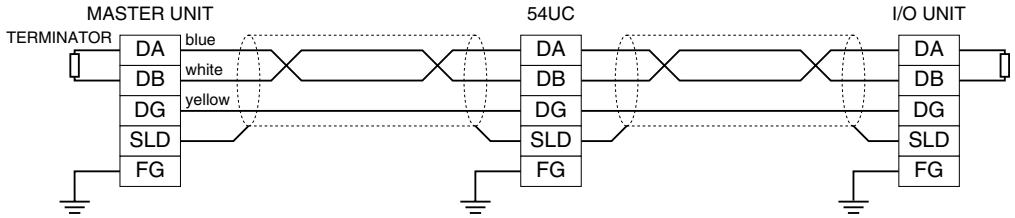
■ **M3 Screw (discrete input, discrete output, CC-Link, auxiliary power)**

Torque: 0.6 N·m

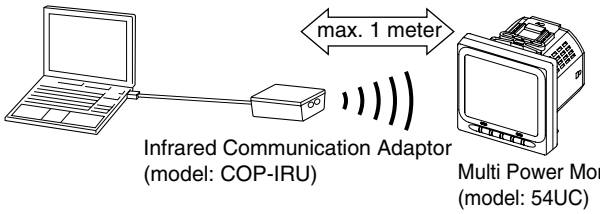
■ **M4 Screw (voltage input, current input)**

Torque: 1.4 N·m

COMMUNICATION CABLE CONNECTION



CONFIGURATION VIA INFRARED COMMUNICATION



Note 1: Hold down IU button to enter to Infrared Communication mode (IR-READY on the display).
Hold down IU button to exit Infrared Communication mode.
During Infrared Communication mode, CC-Link master communication are not available.

Note 2: COP-IRU communicates with one 54UC. DO NOT set more than one 54UC to Infrared Communication mode simultaneously.

CC-Link - COMMUNICATION

■ CC-Link COMMUNICATION

Version	Version 1.10
Node Address	1 through 64
Transfer Rate	156 kbps, 625 kbps, 2.5 Mbps, 5 Mbps, 10 Mbps
Station Type	Remote Device
Occupied Nodes	One (1)

For setting Node address and/or Transfer rate, use PC configurator software (model: PMCFG) or control buttons on the front panel. In order to make the settings effective, turn on the power again, or reboot the device or reset CC-Link by using buttons on the front panel.
For detail, refer to the PMCFG users manual and OPERATION FLOWCHART in this manual.

■ DISPLAY COMMUNICATION STATUS

Communication segment of LCD shows CC-Link communication status.

COM. SEGMENT	STATUS
Turn on	Normal communications
Blinking (ON & OFF: 1 sec.)	CC-Link settings changed
Turn off	No communication

■ Reading from/Writing to 54UC via CC-Link

In order to read measured data from or write new settings to 54UC, access registers in the 54UC via CC-Link according to the tables below. Each data in resister is 2's complementary 32-bit integer. Refer to CC-Link - OPERATIONS in this manual for register numbers and their contents.

• Master to Slave (54UC)

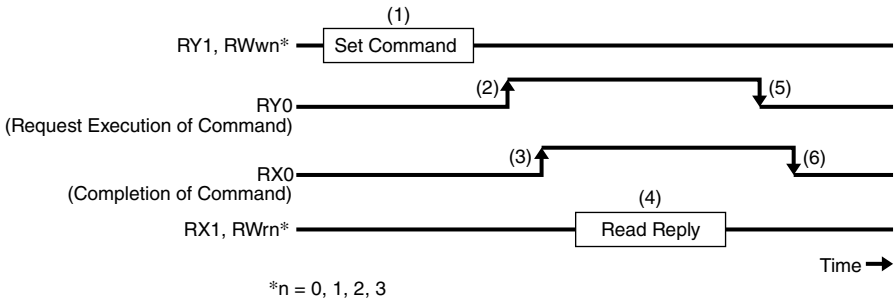
1-bit data	RY0	Set ON in order to execute the command. (Set OFF after RX0 turns ON.)
	RY1	Command 0: Reading 1: Writing
1-Word data (16-bit data)	RWw0	Register number
	RWw1	----
	RWw2	Data to write (LSW)
	RWw3	Date to write (MSW)

• Slave (54UC) to Master

1-bit data	RX0	Turns ON when the command executed (Turns OFF after RY0 set OFF)
	RX1	Same as RY1
	RX1A	54UC system error
	RX1B	Ready
1-Word data (16-bit data)	RWr0	Same as RWw0
	RWr1	Error code
	RWr2	Data to read (LSW)
	RWr3	Data to read (MSW)

■ Reading/Writing procedure

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



■ Detail of Reading/Writing sequence

[Sequence (1)]

• Reading command

Set register number in RWw0.
Set RY1 OFF.

• Writing command

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

• Master to Slave (54UC)

Command	Reading	Writing
RY1	OFF	ON
RWw0	Register number	Register number
RWw2	----	Data to write (LSW)
RWw3	----	Data to write (MSW)

[Sequence (2)]

Set RY0 ON.
Following receiving a command, the 54UC copies RY1, RWw0, RWw2, RWw3 to RX1, RWr0, RWr2, RWr3.

• Master to Slave (54UC)

Require	Reading	Writing
RY0	ON	ON

• Slave (54UC) to Master

Acknowledge	Reading	Writing
RX1	OFF	ON
RWr0	Register number	Register number
RWr2	----	Data to write (LSW)
RWr3	----	Data to write (MSW)

[Sequence (3)]

Following completion of a command, the 54UC sets reply data in RWr2 and RWr3, and sets RX0 ON.

• Slave (54UC) to Master

Reply	Reading	Writing
RX0	ON	ON
RWr1	Error code	Error code
RWr2	Data to read (LSW)	----
RWr3	Data to read (MSW)	----

• Error Codes

Error code	Command	Contents
100H	Reading	No error
111H		Command error
112H		Device error (Time out)
113H		Device error (Communication)
200H	Writing	No error
211H		Command error
212H		Device error (Time out)
213H		Device error (Communication)

Note: Check the 54UC's fault, if device error repeats.

[Sequence (4)]

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

[Sequence (5)]

Set RY0 OFF.

• Master to Slave (54UC)

Completion	Reading	Writing
RY0	OFF	OFF

[Sequence (6)]

Following setting RY0 OFF, the 54UC sets RX0 and RX1 OFF and clears RWr0 through RWr3 (sets OFF).

Acknowledge of Completion	Reading	Writing
RX1	OFF	OFF
RWr0	0	0
RWr1	0	0
RWr2	0	0
RWr3	0	0

CC-Link - OPERATIONS

CC-Link registers are assigned to program and operate the unit via CC-Link network. It can also disable the view switching control via the front buttons to fix the display view to a specific parameter combination.

■ CC-Link REGISTER ACCESS SETTING

RGTR.	PARAMETER
4943	Deactivate CC-Link register writing protection Writing a preset passcode in this register deactivates the writing protection via CC-Link. When the CC-Link passcode set in this register matches the preset one, setting '1' or '2' in the register address 4945 becomes available to enable writing in CC-Link registers. Reading out the register value is not possible. It reads always '-1' regardless of the code setting. After writing is complete, be sure to set a value other than the passcode ('0' is recommended) to activate the writing protection again.
4945	CC-Link register access setting 0 : Write disable (*) 1 : Write enable 2 : Write enable the count values Other : Write disable This setting is erased when the power supply to the unit is removed. It always starts with '0' (Write disable) when the power supply is turned on. Set '1' or '2' before starting writing at other registers. In order to write a count value (e.g. active energy), set '2' at this register. When it is set, the unit stops counting so that a new count value can be written in the register. Be careful to use '2' setting because no counting will be performed if the unit remains with this setting. When the CC-Link register writing protection is enabled, this register setting cannot be changed from '0' to '1' or '2' unless a correct security code is set in the register 4943.

(*) Factory setting

■ USER OPERATIONS

User operations include switching the display views and resetting alarm trips.

RGTR.	PARAMETER
5201	Button operation lock 0 : All key operations available (*) 1 : All key operations locked 2 : Lock the key operation to go to Setting mode only
5202	Data reading display Shows the parameter set displayed on the three data displays. The display can be switched by writing at this address from the host.
5203	Energy reading display Shows the parameter type displayed on the bottom data display. The display can be switched by writing at this address from the host.
5204	Energy reading display unit 0 : 0.1 kWh, 0.1 kvarh, 0.1 kVAh (*) 1 : 0.1 Wh, 0.1 varh, 0.1 VAh Shows the unit (factor) of the parameter on the energy display (k = kilo). The display unit can be switched by writing at this address from the host. Exception: Count time (unit: h) is displayed always 'without kilo'.
5205	Reset alarm trip 1 : Reset 0 : No resetting
5206	Automatic Σ view switching 0 : Disable automatic switching (*) 1 : Enable automatic switching: Σ1 through Σ6 switched in 10 second intervals. Automatic switching is cancelled when one of the front control buttons are touched.

(*) Factory setting

■ SYSTEM OPERATIONS

System operations include switching the tariff or resetting energy counts, and rebooting.

RGTR.	PARAMETER
5329	Switch tariff 0 : High tariff (peak time) (*) 1 : Low tariff (off-peak time)
5330	Reset energy count 1 : Reset all values 2 : Reset all MAX / MIN values and set the present values. 3 : Reset all average (demand) values 0 : No resetting Specify the extent of count resetting. The register is automatically set to '0' when the resetting procedure is complete after one of these values is written at this address. If another value is written before '0' has been set, the former resetting procedure ends indefinitely. Specific values can be preset to each register by writing at this address from the host.
5331	Reboot system Write '10001' to reboot the system. (Any other values can be written but invalid.)
5332	Backup / restore setting 20002 : Backup the present setting 30003 : Restore the device with the backup setting data The register is automatically set to '0' when the procedure is complete after one of these values is written at this register. If another value is written before '0' has been set, the former procedure ends indefinitely.
5333	Passcode 0000 to 9999 0000 : Factory setting Set and read out a passcode used to go into the Setting Mode using the front control buttons.
5334	CC-Link register writing protection passcode Setting a passcode to control writing registers via CC-Link. 1 to 999 999 999 0 : Cancel writing protection (*) The CC-Link passcode must be set to the register 4943 before setting '1' or '2' in the register 4945 to deactivate the writing protection. The value in this register is encrypted when it is read out. Only '0' (Cancel protection) is read out as it is. When a new code is set in this register, the register 4945 is immediately reset to '0' so that a next command will be already limited in access.

(*) Factory setting

CC-Link - SETTING

■ SYSTEM OPERATIONS

RGTR.	PARAMETER	UNIT
5601	System configuration 0 : Single-phase / 2-wire (1CT) 1 : Single-phase / 3-wire (2CT) 2 : 3-phase / 3-wire, balanced load (1CT) 3 : 3-phase / 3-wire, unbalanced load (2CT) (*) 4 : 3-phase / 4-wire, balanced load (1CT) **3P4W** 5 : 3-phase / 4-wire, unbalanced load (3CT) **3P4W** 6 : 3-phase / 3-wire, unbalanced load (3CT) **3P4W**	
5602	CT rating, Primary 1 to 20 000 : Current (A) Factory setting : 1 or 5	A
5603	CT rating, Secondary 1 to 5 Factory setting : 1 or 5	A
5604	VT rating, Primary 50 to 400 000 : Voltage (V) Factory setting : 110	V
5606	VT rating, Secondary 50 to 500 : Voltage (V) Factory setting : 110	V
5607	Frequency input 0 : Voltage (*) 1 : Current	----
5608	Low-end cutout, Current 0 to 999 : Rated current × 0.001 × Specified value Factory setting : 10	%/10
5609	Low-end cutout, Voltage 0 to 999 : Rated voltage × 0.001 × Specified value Factory setting : 10	%/10

(*) Factory setting

■ DEMAND SETTING

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

■ STYLE SETTING

RGTR.	PARAMETER
5987	Power factor (PF1 through PF3, PF) sign 0 : Standard (IEC) (*) Identical to the active energy 1 : Special type 1 (IEEE) Positive in LAG, Negative in LEAD
5988	Reactive power (Q1 through Q3, Q) sign 0 : Standard (IEC) (*) Positive from [PF = 1.0] to 180° in LAG direction; Negative for the other direction 1 : Special type 1 Positive in LAG, Negative in LEAD
5989	Reactive power (Q1 through Q3) calculation (Q = Q1 + Q2 + Q3) 0 : Standard (*) $Qn = \sqrt{Sn^2 - Pn^2}$ 1 : Reactive power meter method $Qn = \frac{1}{Nsmp} \sum_{i=1}^{Nsmp} (Uni - Nui)\, I_{i + (Nsmp / 4)}$
5990	Apparent power (S) calculation 0 : Standard (*) $S = \sqrt{P^2 + Q^2}$ 1 : Sum S = S1 + S2 + S3
5991	Unit used to indicate power up to 9999 0 : With 'k' (0.000 k) 1 : Without 'k' (0000) (*)

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

■ DISCRETE I/O SETTING

RGTR.	PARAMETER
6113	Discrete output 1 function 0 : Undefined (*) 1 : Energy count 2 : Alarm
6114	Discrete output 1 0 : Normally open (*) 1 : Normally closed Open at the power OFF regardless of this setting.
6115	Discrete input function **DI** 0 : Undefined (*) 1 : Update demand 2 : Reset energy count 3 : Reset alarm 4 : Tariff [On: high (peak), Off: low (off-peak)]
6116	Type of discrete input **DI** 0 : Normally open (*) 1 : Normally closed
6117	Discrete output 2 function 0 : Undefined (*) 1 : Energy count 2 : Alarm
6118	Type of discrete output 2 0 : Normally open (*) 1 : Normally closed Open at the power OFF regardless of this setting

(*) Factory setting

■ ENERGY SETTING **DO**

RGTR.	PARAMETER	UNIT
6241	Energy count 1 assigned to the discrete output 1 Refer to the table in the following page.	----
6242	Pulse weight for Energy count 1 0 : No pulse output (disabled) 1 to 100 000 : Specified value × 0.1 (kWh/10, kvarh/10, kVAh/10) Factory setting : 10	kWh/10 kvarh/10 kVAh/10
6244	Pulse duration (width) for Energy count 1 1 to 20 : Specified value × 100 msec. Factory setting : 1	sec/10
6245	Tariff setting for Energy count 1 0 : Disable (*) 1 : Enable	----
6246	Energy count 2 assigned to the discrete output 2 Refer to the table in the following page.	----

RGTR.	PARAMETER	UNIT
6247	Pulse weight for Energy count 2 0 : No pulse output (disabled) 1 to 100 000 : Specified value × 0.1 (kWh/10, kvarh/10, kVAh/10) Factory setting : 10	kWh/10 kvarh/10 kVAh/10
6249	Pulse duration (width) for Energy count 2 1 to 20 : Specified value × 100 msec. Factory setting : 1	sec/10

(*) Factory setting

■ ENERGY COUNT TYPE

SET VALUE	ID	PARAMETER
0	T-EP	Active energy, incoming (*)
1	T-EQ	Reactive energy, LAG
2	T-ES	Apparent energy
3	T-EP–	Active energy, outgoing
4	T-EQ–	Reactive energy, LEAD
5	T-EQ+LAG	Reactive energy, incoming, LAG
6	T-EQ+LEAD	Reactive energy, incoming, LEAD
7	T-EQ–LAG	Reactive energy, outgoing, LAG
8	T-EQ–LEAD	Reactive energy, outgoing, LEAD
9	----	Reserved. DO NOT USE.
10	T-EQ+P	Reactive energy, incoming
11	T-EQ–P	Reactive energy, outgoing
12	----	Reserved. DO NOT USE.
13	T-EQA	Active energy, (incoming + outgoing)
200	EP	Active energy, high tariff, incoming
201	EQ	Reactive energy, high tariff, LAG
202	ES	Apparent energy, high tariff
203	EP–	Active energy, high tariff, outgoing
204	EQ–	Reactive energy, high tariff, LEAD
205	EQ+LAG	Reactive energy, high tariff, incoming, LAG
206	EQ+LEAD	Reactive energy, high tariff, incoming, LEAD
207	EQ–LAG	Reactive energy, high tariff, outgoing, LAG
208	EQ–LEAD	Reactive energy, high tariff, outgoing, LEAD
209	----	Reserved. DO NOT USE.
210	EQ+P	Reactive energy, high tariff, incoming
211	EQ–P	Reactive energy, high tariff, outgoing
212	----	Reserved. DO NOT USE.
213	EQA	Reactive energy, high tariff, (incoming + outgoing)
300	L-EP	Active energy, low tariff, incoming
301	L-EQ	Reactive energy, low tariff, LAG
302	L-ES	Apparent energy, low tariff
303	L-EP–	Active energy, low tariff, outgoing
304	L-EQ–	Reactive energy, low tariff, LEAD
305	L-EQ+LAG	Reactive energy, low tariff, incoming, LAG
306	L-EQ+LEAD	Reactive energy, low tariff, incoming, LEAD
307	L-EQ–LAG	Reactive energy, low tariff, outgoing, LAG
308	L-EQ–LEAD	Reactive energy, low tariff, outgoing, LEAD
309	----	Reserved. DO NOT USE.
310	L-EQ+P	Reactive energy, low tariff, incoming
311	L-EQ–P	Reactive energy, low tariff, outgoing
312	----	Reserved. DO NOT USE.
313	L-EQA	Reactive energy, low tariff, (incoming + outgoing)

(*) Factory setting

■ ALARM SETTING

RGTR.	PARAMETER	UNIT
6369	Power ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6370	Latching 0 : No latching (*) 1 : Latching (Alarm trip is held until a reset command is received or power OFF)	----
6371	I1 thr. I3 - Current : High setpoint Factory setting : 0	mA
6373	I1 thr. I3 - Current : Low setpoint Factory setting : 0	mA
6375	I1 thr. I3 - Current : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6376	I1 thr. I3 - Current : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6377	I1 thr. I3 - Current : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6379	IN - Neutral current : High setpoint **3P4W 3.00** Factory setting : 0	mA
6381	IN - Neutral current : Low setpoint **3P4W 3.00** Factory setting : 0	mA
6383	IN - Neutral current : Alarm output **3P4W 3.00** 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6384	IN - Neutral current : Hysteresis (deadband) **3P4W 3.00** 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6385	IN - Neutral current : ON delay time **3P4W 3.00** 0 to 999 : Seconds Factory setting : 0	Seconds
6387	U12 thr. U31 - Delta voltage : High setpoint Factory setting : 0	V/100
6389	U12 thr. U31 - Delta voltage : Low setpoint Factory setting : 0	V/100
6391	U12 thr. U31 - Delta voltage : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6392	U12 thr. U31 - Delta voltage : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6393	U12 thr. U31 - Delta voltage : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6395	U1N thr. U3N - Phase voltage : High setpoint Factory setting : 0	V/100
6397	U1N thr. U3N - Phase voltage : Low setpoint Factory setting : 0	V/100
6399	U1N thr. U3N - Phase voltage : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6400	U1N thr. U3N - Phase voltage : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6401	U1N thr. U3N - Phase voltage : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds

RGTR.	PARAMETER	UNIT
6403	P - Active power : High setpoint Factory setting : 0	W
6405	P - Active power : Low setpoint Factory setting : 0	W
6407	P - Active power : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6408	P - Active power : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6409	P - Active power : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6411	Q - Reactive power : High setpoint Factory setting : 0	var
6413	Q - Reactive power : Low setpoint Factory setting : 0	var
6415	Q - Reactive power : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6416	Q - Reactive power : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6417	Q - Reactive power : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6419	S - Apparent power : High setpoint Factory setting : 0	VA
6421	S - Apparent power : Low setpoint Factory setting : 0	VA
6423	S - Apparent power : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6424	S - Apparent power : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6425	S - Apparent power : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6427	PF - Power factor : High setpoint Factory setting : 0	1/10 000
6429	PF - Power factor : Low setpoint Factory setting : 0	1/10 000
6431	PF - Power factor : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6432	PF - Power factor : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6433	PF - Power factor : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6435	F - Frequency : High setpoint Factory setting : 6500	Hz/100
6437	F - Frequency : Low setpoint Factory setting : 4500	Hz/100

RGTR.	PARAMETER	UNIT
6439	F - Frequency : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6440	F - Frequency : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6441	F - Frequency : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6443	I1 AVG thr. I3 AVG - Average (demand) current : High setpoint Factory setting : 0	mA
6445	I1 AVG thr. I3 AVG - Average (demand) current : Low setpoint Factory setting : 0	mA
6447	I1 AVG thr. I3 AVG - Average (demand) current : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6448	I1 AVG thr. I3 AVG - Average (demand) current : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6449	I1 AVG thr. I3 AVG - Average (demand) current : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6451	IN AVG - Average (demand) neutral current : High setpoint **3P4W** **3.00** Factory setting : 0	mA
6453	IN AVG - Average (demand) neutral current : Low setpoint **3P4W** **3.00** Factory setting : 0	mA
6455	IN AVG - Average (demand) neutral current : Alarm output **3P4W** **3.00** 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6456	IN AVG - Average (demand) neutral current : Hysteresis (deadband) **3P4W** **3.00** 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6457	IN AVG - Average (demand) neutral current : ON delay time **3P4W** **3.00** 0 to 999 : Seconds Factory setting : 0	Seconds
6459	P AVG - Average (demand) active power : High setpoint Factory setting : 0	W
6461	P AVG - Average (demand) active power : Low setpoint Factory setting : 0	W
6463	P AVG - Average (demand) active power : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6464	P AVG - Average (demand) active power : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6465	P AVG - Average (demand) active power : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6467	Q AVG - Average (demand) reactive power : High setpoint Factory setting : 0	var
6469	Q AVG - Average (demand) reactive power : Low setpoint Factory setting : 0	var
6471	Q AVG - Average (demand) reactive power : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6472	Q AVG - Average (demand) reactive power : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10

RGTR.	PARAMETER	UNIT
6473	Q AVG - Average (demand) reactive power : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6475	S AVG - Average (demand) apparent power : High setpoint Factory setting : 0	VA
6477	S AVG - Average (demand) apparent power : Low setpoint Factory setting : 0	VA
6479	S AVG - Average (demand) apparent power : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6480	S AVG - Average (demand) apparent power : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6481	S AVG - Average (demand) apparent power : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6483	THD I1 thr. THD I3 - Current total harmonic distortion : High setpoint Factory setting : 0	%/10
6485	THD I1 thr. THD I3 - Current total harmonic distortion : Low setpoint Factory setting : 0	%/10
6487	THD I1 thr. THD I3 - Current total harmonic distortion : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6488	THD I1 thr. THD I3 - Current total harmonic distortion : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6489	THD I1 thr. THD I3 - Current total harmonic distortion : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6491	THD IN - Neutral current total harmonic distortion : High setpoint **3P4W** **3.00** Factory setting : 0	%/10
6493	THD IN - Neutral current total harmonic distortion : Low setpoint **3P4W** **3.00** Factory setting : 0	%/10
6495	THD IN - Neutral current total harmonic distortion : Alarm output **3P4W** **3.00** 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6496	THD IN - Neutral current total harmonic distortion : Hysteresis (deadband) **3P4W** **3.00** 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6497	THD IN - Neutral current total harmonic distortion : ON delay time **3P4W** **3.00** 0 to 999 : Seconds Factory setting : 0	Seconds
6499	THD U12 thr. THD U31 - Delta voltage total harmonic distortion : High setpoint Factory setting : 0	%/10
6501	THD U12 thr. THD U31 - Delta voltage total harmonic distortion : Low setpoint Factory setting : 0	%/10
6503	THD U12 thr. THD U31 - Delta voltage total harmonic distortion : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6504	THD U12 thr. THD U31 - Delta voltage total harmonic distortion : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6505	THD U12 thr. THD U31 - Delta voltage total harmonic distortion : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6507	THD U1N thr. THD U3N - Phase voltage total harmonic distortion : High setpoint Factory setting : 0	%/10
6509	THD U1N thr. THD U3N - Phase voltage total harmonic distortion : Low setpoint Factory setting : 0	%/10

RGTR.	PARAMETER	UNIT
6511	THD U1N thr. THD U3N - Phase voltage total harmonic distortion : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6512	THD U1N thr. THD U3N - Phase voltage total harmonic distortion : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6513	THD U1N thr. THD U3N - Phase voltage total harmonic distortion : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds
6515	UT12 thr. UT31 - Phase angle between phase voltages : High setpoint Factory setting : 0	°
6517	UT12 thr. UT31 - Phase angle between phase voltages : Low setpoint Factory setting : 0	°
6519	UT12 thr. UT31 - Phase angle between phase voltages : Alarm output 0 : Disable (*) 1 : Display only 2 : Display + discrete output 1 3 : Display + discrete output 2	----
6520	UT12 thr. UT31 - Phase angle between phase voltages : Hysteresis (deadband) 0 to 999 : Specified value × 0.1 (%) Factory setting : 0	%/10
6521	UT12 thr. UT31 - Phase angle between phase voltages : ON delay time 0 to 999 : Seconds Factory setting : 0	Seconds

(*) Factory setting

■ LCD SETTING

RGTR.	PARAMETER
6625	LCD backlight operating mode (The backlight turns on regardless of this setting in case of alarms/errors.) 0 : AUTO (*) ON at alarm and operating; OFF after the OFF TIMER time has been elapsed after the last operating. 1 : ON Continuously ON 2 : OFF Continuously OFF
6626	LCD backlight OFF timer 1 to 999 : Seconds Time to be elapsed after the last operating before the backlight is turned off. Factory setting : 600
6627	LCD backlight brightness 1 to 3 (dark) 1 << brightness >> 3 (bright) Factory setting : 2
6628	LCD update rate 0 to 60 : Seconds Display data updating rate. Set '0' for the maximum possible rate. Factory setting : 0

(*) Factory setting

■ LCD BARGRAPH SETTING

The bargraph is indicated proportionally to the specified rating (100%). For the energy values, it indicates [Current × Voltage] as 100%.

RGTR.	PARAMETER	UNIT
6769	Current 100% 0 to 20 000 000: Current (mA) Factory setting : 5 000	mA
6771	Current 0% 0 to 20 000 000: Current (mA) Factory setting : 0	mA
6773	Voltage 100% 0 to 40 000 000: Voltage (V/100) Factory setting : 30 000	V/100
6775	Voltage 0% 0 to 40 000 000: Voltage (V/100) Factory setting : 0	V/100
6777	Active power 100% 0 to +2 000 000 000: Power (W) Factory setting : 1 500	W
6779	Active power 0% -2 000 000 000 to +2 000 000 000: Power (W) Factory setting : 0	W
6781	Reactive power 100% 0 to +2 000 000 000: Power (var) Factory setting : 1 500	var
6783	Reactive power 0% -2 000 000 000 to +2 000 000 000: Power (var) Factory setting : 0	var
6785	Apparent power 100% 0 to 2 000 000 000: Power (VA) Factory setting : 1 500	VA
6787	Apparent power 0% 0 to 2 000 000 000: Power (VA) Factory setting : 0	VA
6789	Power factor 100% 0 to +10 000: Power factor (1/10 000) Factory setting : 10 000	1/10 000
6791	Power factor 0% -10 000 to +10 000: Power factor (1/10 000) Factory setting : 0	1/10 000
6793	Frequency 100% 4 500 to 6 500: Frequency (Hz/100) Factory setting : 6 500	Hz/100
6795	Frequency 0% 4 500 to 6 500: Frequency (Hz/100) Factory setting : 4 500	Hz/100
6797	Harmonic Distortion 100% 0 to 9 999: Harmonic distortion (%/10) Factory setting : 1 000	%/10
6799	Harmonic Distortion 0% 0 to 9 999: Harmonic distortion (%/10) Factory setting : 0	%/10
6801	Phase angle between phase voltages 100% 0 to +180: Phase angle (°) Factory setting : 180	°
6803	Phase angle between phase voltages 0% -180 to +180: Phase angle (°) Factory setting : -180	°

■ 'MY DEFAULT' SETTING

Custom default view setting.

RGTR.	PARAMETER	UNIT
6881	'My default' time 0 : Disable (*) 1 to 999 : Seconds The display returns to the preset view if the control keys are untouched for the preset time.	Seconds
6882	'My default' data display view Shows the parameter set displayed on 'My default' view. -1 : Automatic cyclic switching of Σ1 through Σ6 as 'My default' view.	----
6883	'My default' energy display view Shows the parameter type displayed on the bottom data display.	----
6884	'My default' energy reading display unit 0 : 0.1 kWh, 0.1 kvarh, 0.1 kVA (*) 1 : 0.1 Wh, 0.1 varh, 0.1 VA Shows the unit (factor) of the parameter on the energy display (k = kilo).	----

(*) Factory setting

■ Σ VIEW DISPLAY PARAMETER SETTING

RGTR.	PARAMETER
7393	Σ1, Line 1 - Measurand to be assigned - Refer to the table below.
7394	Σ1, Line 2 - Measurand to be assigned - Refer to the table below.
7395	Σ1, Line 3 - Measurand to be assigned - Refer to the table below.
7396	Σ1, Line 4 - Measurand to be assigned - Refer to the table below.
7397	Σ2, Line 1 - Measurand to be assigned - Refer to the table below.
7398	Σ2, Line 2 - Measurand to be assigned - Refer to the table below.
7399	Σ2, Line 3 - Measurand to be assigned - Refer to the table below.
7400	Σ2, Line 4 - Measurand to be assigned - Refer to the table below.
7401	Σ3, Line 1 - Measurand to be assigned - Refer to the table below.
7402	Σ3, Line 2 - Measurand to be assigned - Refer to the table below.
7403	Σ3, Line 3 - Measurand to be assigned - Refer to the table below.
7404	Σ3, Line 4 - Measurand to be assigned - Refer to the table below.
7405	Σ4, Line 1 - Measurand to be assigned - Refer to the table below.
7406	Σ4, Line 2 - Measurand to be assigned - Refer to the table below.
7407	Σ4, Line 3 - Measurand to be assigned - Refer to the table below.
7408	Σ4, Line 4 - Measurand to be assigned - Refer to the table below.
7409	Σ5, Line 1 - Measurand to be assigned - Refer to the table below.
7410	Σ5, Line 2 - Measurand to be assigned - Refer to the table below.
7411	Σ5, Line 3 - Measurand to be assigned - Refer to the table below.
7412	Σ5, Line 4 - Measurand to be assigned - Refer to the table below.
7413	Σ6, Line 1 - Measurand to be assigned - Refer to the table below.
7414	Σ6, Line 2 - Measurand to be assigned - Refer to the table below.
7415	Σ6, Line 3 - Measurand to be assigned - Refer to the table below.
7416	Σ6, Line 4 - Measurand to be assigned - Refer to the table below.

■ SHORTCUT MENU FUNCTION

RGTR.	PARAMETER
7553	Resetting alarm trip 0 : Disable 1 : Enable (*)

(*) Factory setting

CC-Link - MEASURED VARIABLES

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

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

*1. Version 3.27 or earlier: Reset to 0 when exceeding the max. value, count is continued. Counter pulse output is stopped.
Version 3.28 or later: Reset to 0 when exceeding the max. value, count is continued. Counter pulse output is continued.
*2. Stops at either -99 999 999.9 or 99 999 999.9.

■ **MOMENTARY VALUE**

RGTR.	ID	PARAMETER	UNIT
1	I	Current	mA
3	U	Voltage	V/100
5	P	Active power	W
7	Q	Reactive power	var
9	S	Apparent power	VA
11	PF	Power factor	1/10 000
13	F	Frequency	Hz/100
15	DIR	Phase difference direction (0 = inductive or lag, 1 = capacitive or lead)	----
33	I1	Current, Line 1	mA
35	I2	Current, Line 2	mA
37	I3	Current, Line 3	mA
39	IN	Neutral current **3P4W 3.00**	mA
41	U12	Delta voltage, 1 – 2	V/100
43	U23	Delta voltage, 2 – 3	V/100
45	U31	Delta voltage, 3 – 1	V/100
47	U1N	Phase voltage, Phase 1	V/100
49	U2N	Phase voltage, Phase 2	V/100
51	U3N	Phase voltage, Phase 3	V/100
53	P1	Active power, Phase 1	W
55	P2	Active power, Phase 2	W
57	P3	Active power, Phase 3	W
59	Q1	Reactive power, Phase 1	var
61	Q2	Reactive power, Phase 2	var
63	Q3	Reactive power, Phase 3	var
65	S1	Apparent power, Phase 1	VA
67	S2	Apparent power, Phase 2	VA
69	S3	Apparent power, Phase 3	VA
71	PF1	Power factor, Phase 1	1/10 000
73	PF2	Power factor, Phase 2	1/10 000
75	PF3	Power factor, Phase 3	1/10 000
77	DIR1	Phase difference direction, Phase 1 (0 = inductive or lag, 1 = capacitive or lead)	----
79	DIR2	Phase difference direction, Phase 2 (0 = inductive or lag, 1 = capacitive or lead)	----
81	DIR3	Phase difference direction, Phase 3 (0 = inductive or lag, 1 = capacitive or lead)	----
83	UT12	Phase angle between Phase 1 – 2 voltages	°
85	UT23	Phase angle between Phase 2 – 3 voltages	°
87	UT31	Phase angle between Phase 3 – 1 voltages	°

■ ENERGY

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

RGTR.	ID	PARAMETER	UNIT
129	EP	Active energy, high tariff, incoming	kWh/10
131	EQ	Reactive energy, high tariff, LAG	kvarh/10
133	ES	Apparent energy, high tariff	kVAh/10
135	EP–	Active energy, high tariff, outgoing	kWh/10
137	EQ–	Reactive energy, high tariff, LEAD	kvarh/10
139	EQ+LAG	Reactive energy, high tariff, incoming, LAG	kvarh/10
141	EQ+LEAD	Reactive energy, high tariff, incoming, LEAD	kvarh/10
143	EQ–LAG	Reactive energy, high tariff, outgoing, LAG	kvarh/10
145	EQ–LEAD	Reactive energy, high tariff, outgoing, LEAD	kvarh/10
147	TIMER	Energy count time, high tariff	h/10
149	EQ+P	Reactive energy, high tariff, incoming	kvarh/10
151	EQ–P	Reactive energy, high tariff, outgoing	kvarh/10
153	EPA	Active energy, high tariff, (incoming – outgoing)	kWh/10
155	EQA	Reactive energy, high tariff, (incoming + outgoing)	kvarh/10
161	L-EP	Active energy, low tariff, incoming	kWh/10
163	L-EQ	Reactive energy, low tariff, LAG	kvarh/10
165	L-ES	Apparent energy, low tariff	kVAh/10
167	L-EP–	Active energy, low tariff, outgoing	kWh/10
169	L-EQ–	Reactive energy, low tariff, LEAD	kvarh/10
171	L-EQ+LAG	Reactive energy, low tariff, incoming, LAG	kvarh/10
173	L-EQ+LEAD	Reactive energy, low tariff, incoming, LEAD	kvarh/10
175	L-EQ–LAG	Reactive energy, low tariff, outgoing, LAG	kvarh/10
177	L-EQ–LEAD	Reactive energy, low tariff, outgoing, LEAD	kvarh/10
179	L-TIMER	Energy count time, low tariff	h/10
181	L-EQ+P	Reactive energy, low tariff, incoming	kvarh/10
183	L-EQ–P	Reactive energy, low tariff, outgoing	kvarh/10
185	L-EPA	Active energy, low tariff, (incoming – outgoing)	kWh/10
187	L-EQA	Reactive energy, low tariff, (incoming + outgoing)	kvarh/10
193	EP_L	Active energy fraction, high tariff, incoming	kWh/(10×2^{32})
195	EQ_L	Reactive energy fraction, high tariff, LAG	kvarh/(10×2^{32})
197	ES_L	Apparent energy fraction, high tariff	kVAh/(10×2^{32})
199	EP–_L	Active energy fraction, high tariff, outgoing	kWh/(10×2^{32})
201	EQ–_L	Reactive energy fraction, high tariff, LEAD	kvarh/(10×2^{32})
203	EQ+LAG_L	Reactive energy fraction, high tariff, incoming, LAG	kvarh/(10×2^{32})
205	EQ+LEAD_L	Reactive energy fraction, high tariff, incoming, LEAD	kvarh/(10×2^{32})
207	EQ–LAG_L	Reactive energy fraction, high tariff, outgoing, LAG	kvarh/(10×2^{32})
209	EQ–LEAD_L	Reactive energy fraction, high tariff, outgoing, LEAD	kvarh/(10×2^{32})
211	TIMER_L	Energy fraction count time, high tariff	seconds/1 000
213	EQ+P_L	Reactive energy fraction, high tariff, incoming	kvarh/(10×2^{32})
215	EQ–P_L	Reactive energy fraction, high tariff, outgoing	kvarh/(10×2^{32})
217	EPA_L	Active energy fraction, high tariff, (incoming – outgoing)	kWh/(10×2^{32})
219	EQA_L	Reactive energy fraction, high tariff, (incoming + outgoing)	kvarh/(10×2^{32})
225	L-EP_L	Active energy fraction, low tariff, incoming	kWh/(10×2^{32})
227	L-EQ_L	Reactive energy fraction, low tariff, LAG	kvarh/(10×2^{32})
229	L-ES_L	Apparent energy fraction, low tariff	kVAh/(10×2^{32})
231	L-EP–_L	Active energy fraction, low tariff, outgoing	kWh/(10×2^{32})
233	L-EQ–_L	Reactive energy fraction, low tariff, LEAD	kvarh/(10×2^{32})
235	L-EQ+LAG_L	Reactive energy fraction, low tariff, incoming, LAG	kvarh/(10×2^{32})
237	L-EQ+LEAD_L	Reactive energy fraction, low tariff, incoming, LEAD	kvarh/(10×2^{32})
239	L-EQ–LAG_L	Reactive energy fraction, low tariff, outgoing, LAG	kvarh/(10×2^{32})
241	L-EQ–LEAD_L	Reactive energy fraction, low tariff, outgoing, LEAD	kvarh/(10×2^{32})
243	L-TIMER_L	Energy fraction count time, low tariff	seconds/1 000
245	L-EQ+P_L	Reactive energy fraction, low tariff, incoming	kvarh/(10×2^{32})
247	L-EQ–P_L	Reactive energy fraction, low tariff, outgoing	kvarh/(10×2^{32})
249	L-EPA_L	Active energy fraction, low tariff, (incoming – outgoing)	kWh/(10×2^{32})
251	L-EQA_L	Reactive energy fraction, low tariff, (incoming + outgoing)	kvarh/(10×2^{32})

■ **AVERAGE VALUE**

RGTR.	ID	PARAMETER	UNIT
257	I AVG	Current AVG	mA
259	I1 AVG	Current AVG, Line 1	mA
261	I2 AVG	Current AVG, Line 2	mA
263	I3 AVG	Current AVG, Line 3	mA
265	IN AVG	Neutral current AVG **3P4W 3.00**	mA
273	I AVG 1	Current AVG, History 1	mA
275	I1 AVG 1	Current AVG, Line 1, History 1	mA
277	I2 AVG 1	Current AVG, Line 2, History 1	mA
279	I3 AVG 1	Current AVG, Line 3, History 1	mA
281	IN AVG 1	Neutral current AVG, History 1 **3P4W 3.00**	mA
289	I AVG 2	Current AVG, History 2	mA
291	I1 AVG 2	Current AVG, Line 1, History 2	mA
293	I2 AVG 2	Current AVG, Line 2, History 2	mA
295	I3 AVG 2	Current AVG, Line 3, History 2	mA
297	IN AVG 2	Neutral current AVG, History 2 **3P4W 3.00**	mA
305	I AVG 3	Current AVG, History 3	mA
307	I1 AVG 3	Current AVG, Line 1, History 3	mA
309	I2 AVG 3	Current AVG, Line 2, History 3	mA
311	I3 AVG 3	Current AVG, Line 3, History 3	mA
313	IN AVG 3	Neutral current AVG, History 3 **3P4W 3.00**	mA
321	I AVG 4	Current AVG, History 4	mA
323	I1 AVG 4	Current AVG, Line 1, History 4	mA
325	I2 AVG 4	Current AVG, Line 2, History 4	mA
327	I3 AVG 4	Current AVG, Line 3, History 4	mA
329	IN AVG 4	Neutral current AVG, History 4 **3P4W 3.00**	mA
513	P AVG	Active power AVG	W
515	Q AVG	Reactive power AVG	var
517	S AVG	Apparent power AVG	VA
529	P AVG 1	Active power AVG, History 1	W
531	Q AVG 1	Reactive power AVG, History 1	var
533	S AVG 1	Apparent power AVG, History 1	VA
545	P AVG 2	Active power AVG, History 2	W
547	Q AVG 2	Reactive power AVG, History 2	var
549	S AVG 2	Apparent power AVG, History 2	VA
561	P AVG 3	Active power AVG, History 3	W
563	Q AVG 3	Reactive power AVG, History 3	var
565	S AVG 3	Apparent power AVG, History 3	VA
577	P AVG 4	Active power AVG, History 4	W
579	Q AVG 4	Reactive power AVG, History 4	var
581	S AVG 4	Apparent power AVG, History 4	VA

■ **MAXIMUM / MINIMUM VALUE**

RGTR.	ID	PARAMETER	UNIT
769	I MAX	Current MAX	mA
771	U MAX	Voltage MAX	V/100
773	P MAX	Active power MAX	W
775	Q MAX	Reactive power MAX	var
777	S MAX	Apparent power MAX	VA
779	PF MAX	Power factor MAX	1/10 000
781	F MAX	Frequency MAX	Hz/100
801	I1 MAX	Current MAX, Line 1	mA
803	I2 MAX	Current MAX, Line 2	mA
805	I3 MAX	Current MAX, Line 3	mA
807	IN MAX	Neutral current MAX **3P4W 3.00**	mA
809	U12 MAX	Delta voltage MAX, 1 – 2	V/100
811	U23 MAX	Delta voltage MAX, 2 – 3	V/100
813	U31 MAX	Delta voltage MAX, 3 – 1	V/100
815	U1N MAX	Phase voltage MAX, Phase 1	V/100
817	U2N MAX	Phase voltage MAX, Phase 2	V/100
819	U3N MAX	Phase voltage MAX, Phase 3	V/100
821	P1 MAX	Active power MAX, Phase 1	W
823	P2 MAX	Active power MAX, Phase 2	W
825	P3 MAX	Active power MAX, Phase 3	W
827	Q1 MAX	Reactive power MAX, Phase 1	var
829	Q2 MAX	Reactive power MAX, Phase 2	var
831	Q3 MAX	Reactive power MAX, Phase 3	var
833	S1 MAX	Apparent power MAX, Phase 1	VA
835	S2 MAX	Apparent power MAX, Phase 2	VA
837	S3 MAX	Apparent power MAX, Phase 3	VA
839	PF1 MAX	Power factor MAX, Phase 1	1/10 000
841	PF2 MAX	Power factor MAX, Phase 2	1/10 000
843	PF3 MAX	Power factor MAX, Phase 3	1/10 000
865	THD I1 MAX	Current total harmonic distortion MAX, Line 1	%/10
867	THD I2 MAX	Current total harmonic distortion MAX, Line 2	%/10
869	THD I3 MAX	Current total harmonic distortion MAX, Line 3	%/10
871	THD IN MAX	Neutral current total harmonic distortion MAX **3P4W 3.00**	%/10
873	THD U12 MAX	Delta voltage total harmonic distortion MAX, 1 – 2	%/10
875	THD U23 MAX	Delta voltage total harmonic distortion MAX, 2 – 3	%/10
877	THD U31 MAX	Delta voltage total harmonic distortion MAX, 3 – 1	%/10
879	THD U1N MAX	Phase voltage total harmonic distortion MAX, Phase 1	%/10
881	THD U2N MAX	Phase voltage total harmonic distortion MAX, Phase 2	%/10
883	THD U3N MAX	Phase voltage total harmonic distortion MAX, Phase 3	%/10
897	I MAX AVG	Current MAX AVG	mA
899	I1 MAX AVG	Current MAX AVG, Line 1	mA
901	I2 MAX AVG	Current MAX AVG, Line 2	mA
903	I3 MAX AVG	Current MAX AVG, Line 3	mA
905	IN MAX AVG	Neutral current MAX AVG **3P4W 3.00**	mA
907	P MAX AVG+	Active power MAX AVG, incoming	W
909	P MAX AVG–	Active power MAX AVG, outgoing	W
911	Q MAX AVG+	Reactive power MAX AVG, incoming	var
913	Q MAX AVG–	Reactive power MAX AVG, outgoing	var
915	S MAX AVG	Apparent power MAX AVG	VA
929	I MIN	Current MIN	mA
931	U MIN	Voltage MIN	V/100
933	P MIN	Active power MIN	W
935	Q MIN	Reactive power MIN	var
937	S MIN	Apparent power MIN	VA
939	PF MIN	Power factor MIN	1/10 000
941	F MIN	Frequency MIN	Hz/100
961	I1 MIN	Current MIN, Line 1	mA
963	I2 MIN	Current MIN, Line 2	mA
965	I3 MIN	Current MIN, Line 3	mA
967	IN MIN	Neutral current MIN **3P4W 3.00**	mA
969	U12 MIN	Delta voltage MIN, 1 – 2	V/100
971	U23 MIN	Delta voltage MIN, 2 – 3	V/100
973	U31 MIN	Delta voltage MIN, 3 – 1	V/100

RGTR.	ID	PARAMETER	UNIT
975	U1N MIN	Phase voltage MIN, Phase 1	V/100
977	U2N MIN	Phase voltage MIN, Phase 2	V/100
979	U3N MIN	Phase voltage MIN, Phase 3	V/100
981	P1 MIN	Active power MIN, Phase 1	W
983	P2 MIN	Active power MIN, Phase 2	W
985	P3 MIN	Active power MIN, Phase 3	W
987	Q1 MIN	Reactive power MIN, Phase 1	var
989	Q2 MIN	Reactive power MIN, Phase 2	var
991	Q3 MIN	Reactive power MIN, Phase 3	var
993	S1 MIN	Apparent power MIN, Phase 1	VA
995	S2 MIN	Apparent power MIN, Phase 2	VA
997	S3 MIN	Apparent power MIN, Phase 3	VA
999	PF1 MIN	Power factor MIN, Phase 1	1/10 000
1001	PF2 MIN	Power factor MIN, Phase 2	1/10 000
1003	PF3 MIN	Power factor MIN, Phase 3	1/10 000

■ TOTAL HARMONIC DISTORTION (THD)

RGTR.	ID	PARAMETER	UNIT
1281	THD I1	Current total harmonic distortion, Line 1	%/10
1283	THD I2	Current total harmonic distortion, Line 2	%/10
1285	THD I3	Current total harmonic distortion, Line 3	%/10
1287	THD IN	Neutral current total harmonic distortion **3P4W 3.00**	%/10
1289	THD U12	Delta voltage total harmonic distortion, 1 – 2	%/10
1291	THD U23	Delta voltage total harmonic distortion, 2 – 3	%/10
1293	THD U31	Delta voltage total harmonic distortion, 3 – 1	%/10
1295	THD U1N	Phase voltage total harmonic distortion, Phase 1	%/10
1297	THD U2N	Phase voltage total harmonic distortion, Phase 2	%/10
1299	THD U3N	Phase voltage total harmonic distortion, Phase 3	%/10

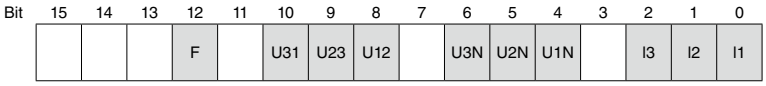
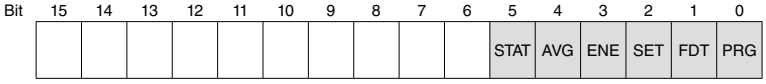
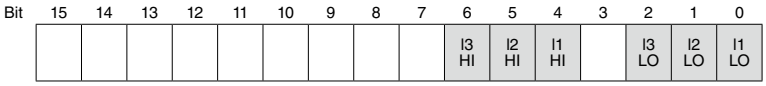
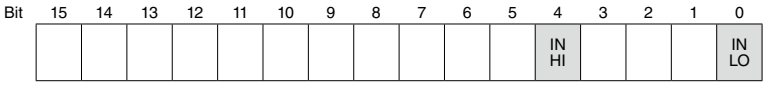
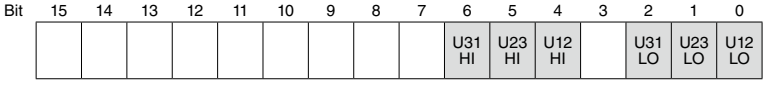
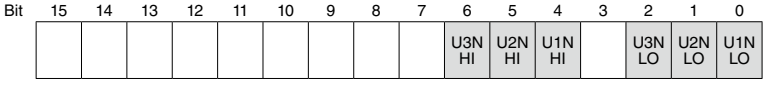
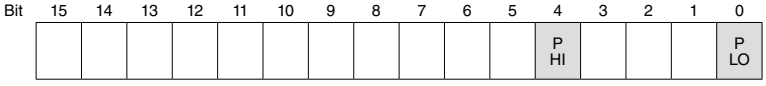
■ **HARMONIC**

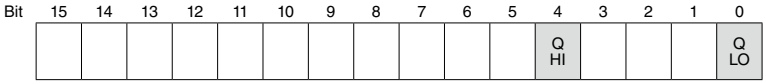
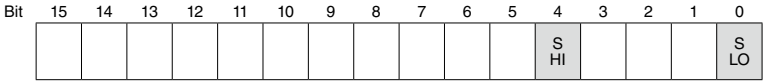
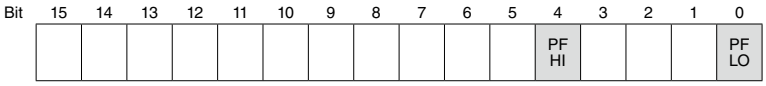
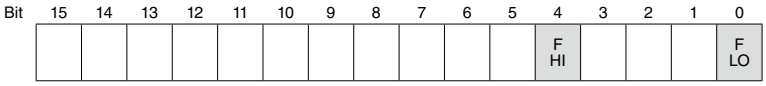
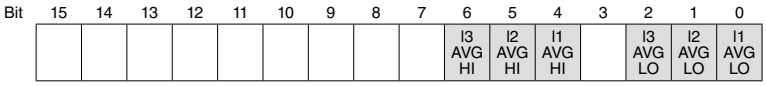
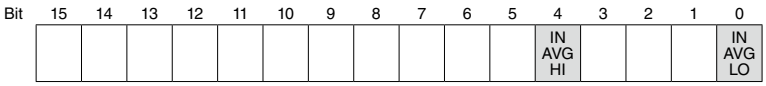
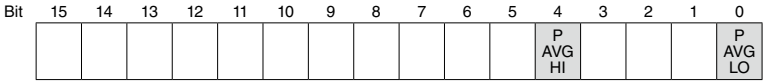
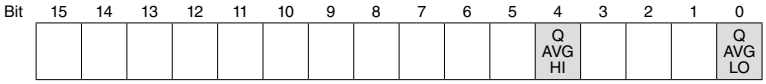
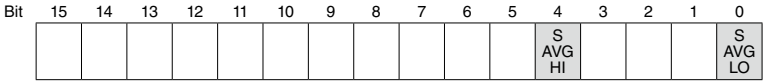
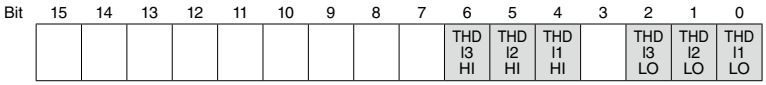
RGTR.	WORD	ID	PARAMETER		UNIT
1537	1	HD I1 2	Current harmonic, Line 1,	2nd	%/10
1538	1	HD I1 3	(id)	3rd	%/10
1539	1	HD I1 4	(id)	4th	%/10
1540	1	HD I1 5	(id)	5th	%/10
1541	1	HD I1 6	(id)	6th	%/10
1542	1	HD I1 7	(id)	7th	%/10
1543	1	HD I1 8	(id)	8th	%/10
1544	1	HD I1 9	(id)	9th	%/10
1545	1	HD I1 10	(id)	10th	%/10
1546	1	HD I1 11	(id)	11th	%/10
1547	1	HD I1 12	(id)	12th	%/10
1548	1	HD I1 13	(id)	13th	%/10
1549	1	HD I1 14	(id)	14th	%/10
1550	1	HD I1 15	(id)	15th	%/10
1551	1	HD I1 16	(id)	16th	%/10
1552	1	HD I1 17	(id)	17th	%/10
1553	1	HD I1 18	(id)	18th	%/10
1554	1	HD I1 19	(id)	19th	%/10
1555	1	HD I1 20	(id)	20th	%/10
1556	1	HD I1 21	(id)	21st	%/10
1557	1	HD I1 22	(id)	22nd	%/10
1558	1	HD I1 23	(id)	23rd	%/10
1559	1	HD I1 24	(id)	24th	%/10
1560	1	HD I1 25	(id)	25th	%/10
1561	1	HD I1 26	(id)	26th	%/10
1562	1	HD I1 27	(id)	27th	%/10
1563	1	HD I1 28	(id)	28th	%/10
1564	1	HD I1 29	(id)	29th	%/10
1565	1	HD I1 30	(id)	30th	%/10
1566	1	HD I1 31	(id)	31st	%/10
1601 : 1630	1	HD I2 2 : HD I2 31	Current harmonic, Line 2,	2nd : 31st	%/10
1665 : 1694	1	HD I3 2 : HD I3 31	Current harmonic, Line 3,	2nd : 31st	%/10
1729 : 1758	1	HD IN 2 : HD IN 31	Neutral current harmonic,	2nd **3P4W 3.00** : 31st	%/10
1793 : 1822	1	HD U12 2 : HD U12 31	Delta voltage harmonic, 1 – 2,	2nd : 31st	%/10
1857 : 1886	1	HD U23 2 : HD U23 31	Delta voltage harmonic, 2 – 3,	2nd : 31st	%/10
1921 : 1950	1	HD U31 2 : HD U31 31	Delta voltage harmonic, 3 – 1,	2nd : 31st	%/10
1985 : 2014	1	HD U1N 2 : HD U1N 31	Phase voltage harmonic, Phase 1,	2nd : 31st	%/10
2049 : 2078	1	HD U2N 2 : HD U2N 31	Phase voltage harmonic, Phase 2,	2nd : 31st	%/10
2113 : 2142	1	HD U3N 2 : HD U3N 31	Phase voltage harmonic, Phase 3,	2nd : 31st	%/10

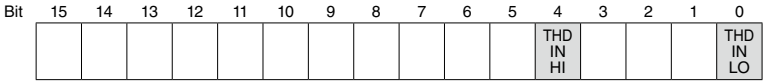
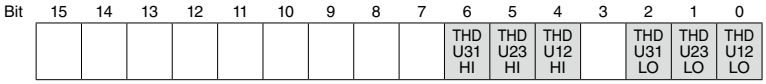
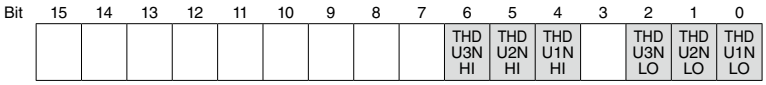
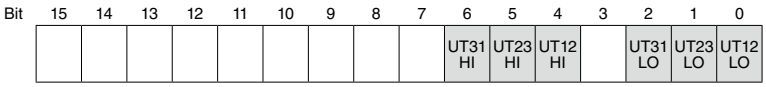
■ DISCRETE I/O D0 DI

RGTR.	WORD	PARAMETER
3073	1	Discrete input status
3105	1	Discrete output 1 The discrete output status can be changed by writing at this address from the host if no function is assigned.
3106	1	Discrete output 2 The discrete output status can be changed by writing at this address from the host if no function is assigned.

■ ERROR, ALARM

RGTR.	PARAMETER
8001	Overload input Bit assignment as shown below.  '1' is placed when the respective inputs are overload.
8002	Number of alarm trips Shows number of alarms presently triggered.
8003	System error Bit assignment as shown below.  PGR : Control software error FDT : Factory calibration data error SET : User setting data error ENE : Energy data error AVG : Average data error STAT : Maximum / minimum data error '1' is placed when the respective errors are detected. All measuring operations stop while one or more system errors are detected.
8004	Reserved
8005	I1 thr. I3 - Current : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.
8006	IN - Neutral current : Alarm **3P4W 3.00** Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8007	U12 thr. U31 - Delta voltage : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.
8008	U1N thr. U3N - Phase voltage : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.
8009	P - Active power : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.

RGTR.	PARAMETER
8010	Q - Reactive power : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8011	S - Apparent power : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8012	PF - Power factor : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8013	F - Frequency : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8014	I1 AVG thr. I3 AVG - Average (demand) current : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.
8015	IN AVG - Average (demand) neutral current : Alarm **3P4W 3.00** Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8016	P AVG - Average (demand) active power : Alarm Bit assignment as shown below  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8017	Q AVG - Average (demand) reactive power : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8018	S AVG - Average (demand) apparent power : Alarm Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8019	THD I1 thr. THD I3 - Current total harmonic distortion : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.

RGTR.	PARAMETER
8020	THD IN - Neutral current total harmonic distortion : Alarm **3P4W 3.00** Bit assignment as shown below.  '1' is placed when the value is out of the predetermined range. '0' in all bits means that no alarm is tripped.
8021	THD U12 thr. THD U31 - Delta voltage total harmonic distortion : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.
8022	THD U1N thr. THD U3N - Phase voltage total harmonic distortion : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.
8023	UT12 thr. UT31 - Phase angle between phase voltages : Alarm Bit assignment as shown below.  '1' is placed when the respective values are out of the predetermined ranges. '0' in all bits means that no alarm is tripped.

■ ALARM HISTORY

Latest alarm data is updated whenever a new alarm is tripped, and the second latest one is shifted to 'History 1,' the third one to 'History 2,' and so forth.

RGTR.	PARAMETER
8129	Latest alarm trip, parameter number 0 : I1 thr. I3 - Current 1 : IN - Neutral current **3P4W** **3.00** 2 : U12 thr. U31 - Delta voltage 3 : U1N thr. U3N - Phase voltage 4 : P - Active power 5 : Q - Reactive power 6 : S - Apparent power 7 : PF - Power factor 8 : F - Frequency 9 : I1 AVG thr. I3 AVG - Average (demand) current 10 : IN AVG - Average (demand) neutral current **3P4W** **3.00** 11 : P AVG - Average (demand) active power 12 : Q AVG - Average (demand) reactive power 13 : S AVG - Average (demand) apparent power 14 : THD I1 thr. THD I3 - Current total harmonic distortion 15 : THD IN - Neutral current total harmonic distortion **3P4W** **3.00** 16 : THD U12 thr. THD U31 - Delta voltage total harmonic distortion 17 : THD U1N thr. THD U3N - Phase voltage total harmonic distortion 18 : UT12 thr. UT31 - Phase angle between phase voltages total harmonic distortion
8130	Latest alarm trip, parameter point Shows which point triggered the latest alarm. Bit assignments are identical to those for 'Alarm,' register address starting from 8005. For example, '0' at 'parameter number' and '1' at Bit 0 of this register address means that I1 value is lower than the low setpoint, triggering the alarm. If another point within the same parameter number goes into alarm after one (e.g. if I2 value goes above the high setpoint while I1 thr. I3 alarm is triggered), the second trip is not recorded in the history.
8131	Latest alarm trip, value Shows the data value at the moment of alarm.
8133	Alarm trip, parameter number, History 1
8134	Alarm trip, parameter point, History 1
8135	Alarm trip, value, History 1
8137	Alarm trip, parameter number, History 2
8138	Alarm trip, parameter point, History 2
8139	Alarm trip, value, History 2
8141	Alarm trip, parameter number, History 3
8142	Alarm trip, parameter point, History 3
8143	Alarm trip, value, History 3
8145	Alarm trip, parameter number, History 4
8146	Alarm trip, parameter point, History 4
8147	Alarm trip, value, History 4
8149	Alarm trip, parameter number, History 5
8150	Alarm trip, parameter point, History 5
8151	Alarm trip, value, History 5
8153	Alarm trip, parameter number, History 6
8154	Alarm trip, parameter point, History 6
8155	Alarm trip, value, History 6
8157	Alarm trip, parameter number, History 7
8158	Alarm trip, parameter point, History 7
8159	Alarm trip, value, History 7
8161	Alarm trip, parameter number, History 8
8162	Alarm trip, parameter point, History 8
8163	Alarm trip, value, History 8
8165	Alarm trip, parameter number, History 9
8166	Alarm trip, parameter point, History 9
8167	Alarm trip, value, History 9

■ DIAGNOSTICS

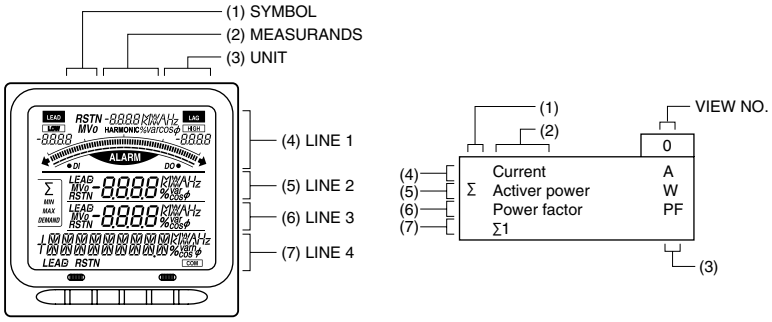
RGTR.	PARAMETER	UNIT
9217	Processing delays	times
9219	Processing delay sequence number	No.

■ DEVICE INFORMATION

RGTR.	PARAMETER		
9601	Device ID 5401 : 54UC		
9602	Device Version No. Version No. = (No. × 100). e.g. Version 1.00 = 100		
9603	Serial No.	Upper digit: 2nd character	Lower digit: 1st character
9604		Upper digit: 4th character	Lower digit: 3rd character
9605		Upper digit: 6th character	Lower digit: 5th character
9606		Upper digit: 8th character	Lower digit: 7th character
9607	Tag No.	Upper digit: 2nd character	Lower digit: 1st character
9608		Upper digit: 4th character	Lower digit: 3rd character
9609		Upper digit: 6th character	Lower digit: 5th character
9610		Upper digit: 8th character	Lower digit: 7th character
9611		Upper digit: 10th character	Lower digit: 9th character
9612		Upper digit: 12th character	Lower digit: 11th character
9613		Upper digit: 14th character	Lower digit: 13th character
9614		Upper digit: 16th character	Lower digit: 15th character
	This register can be written in.		
9623	Extension function An addition of the following numbers are read out to identify the external interface type. 0008 : Discrete output 110 V DC 0010 : 3-phase / 4-wire 0100 : CC-Link		
9624	Numbers of Di 0 : None 1 : 1 point		
9625	Numbers of Do 0 : None 1 to 2 : 1 to 2 points		

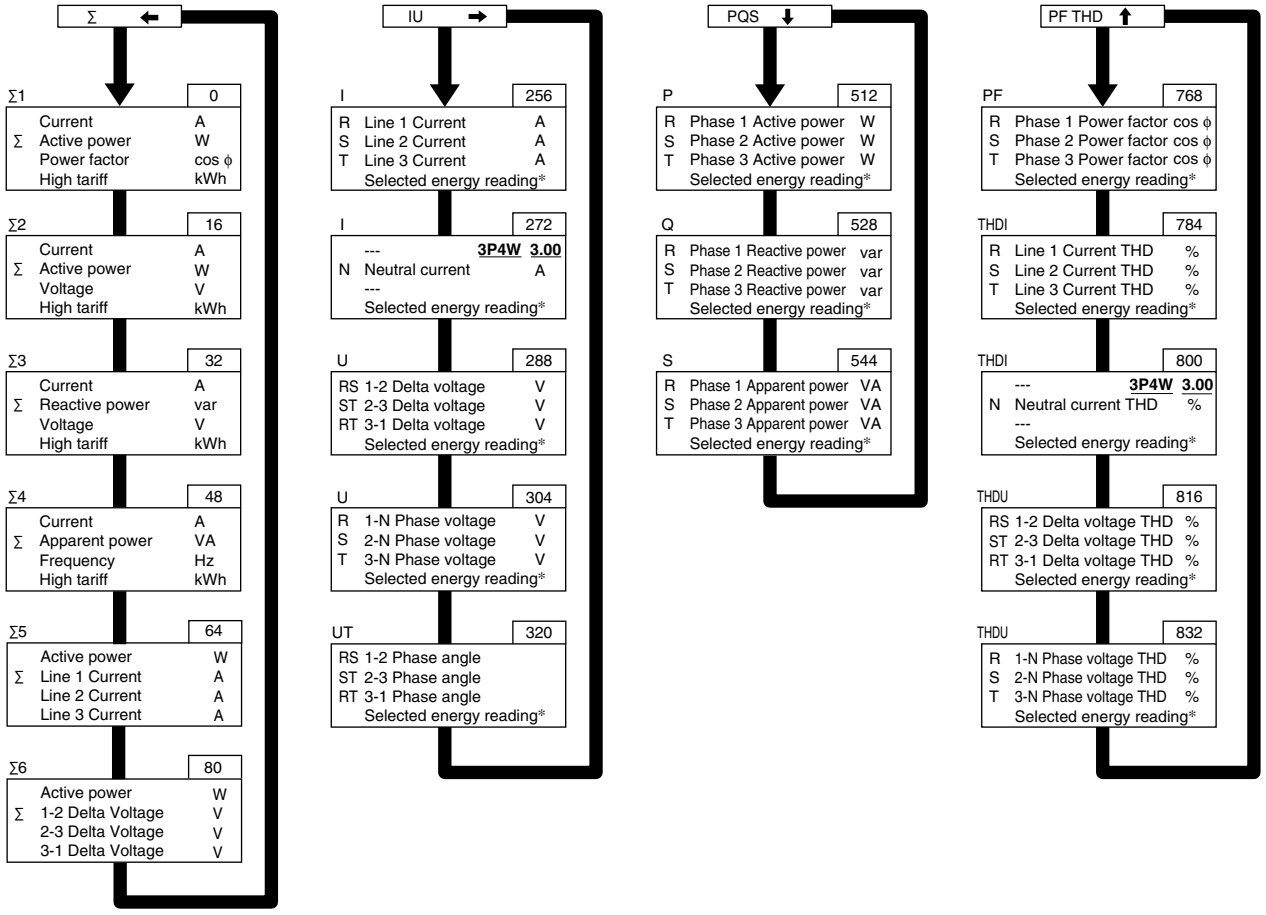
OPERATION FLOWCHART

■ **DISPLAY**



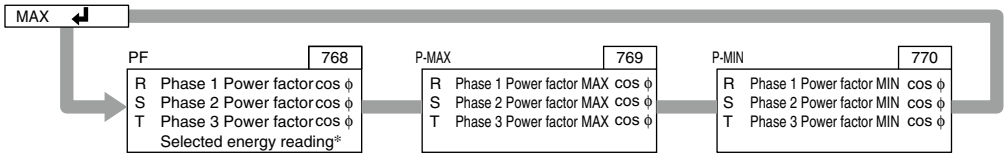
■ **HOW TO SWITCH THE DISPLAY VIEWS**

Pressing one of [Σ ←] [IU →] [PQS ↓] [PF THD ↑] buttons switches the view to the one of top among those assigned to the respective button. Pressing the same button continuously switches it to more selections in turn.



∑1 thr. ∑6 views in the above figure shows the factory setting. These combinations can be changed.
[MAX ↵] button switches the presently displayed view to its extension views if any.
Pressing the same button continuously switches it to more selections in turn.
Basic and extension views are all listed in the table in the following page.

[Example] Pressing [MAX ↵] button on the view No. 768 (power factor) switches it to extension views as below.



*Selected with [E PRG ESC] button.

■ BASIC AND EXTENSION VIEW PARAMETERS

Σ view PRMTR	BASIC PARAMETER.	EXTENSION								
		MAX	MIN	AVE	AVE HIST1	AVE HIST2	AVE HIST3	AVE HIST4	MAX AVE	MAX AVE (out)
0	Not assigned									
1	Current	✓	✓	✓	✓	✓	✓	✓	✓	
2	Voltage	✓	✓	✓						
3	Active power	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	Reactive power	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	Apparent power	✓	✓	✓	✓	✓	✓	✓	✓	
6	Power factor	✓	✓							
7	Frequency	✓	✓							
8	Current, Line 1	✓	✓	✓	✓	✓	✓	✓	✓	
9	Current, Line 2	✓	✓	✓	✓	✓	✓	✓	✓	
10	Current, Line 3	✓	✓	✓	✓	✓	✓	✓	✓	
11	Neutral current **3P4W 3.00**	✓	✓	✓	✓	✓	✓	✓	✓	
12	Delta voltage, 1 – 2	✓	✓							
13	Delta voltage, 2 – 3	✓	✓							
14	Delta voltage, 3 – 1	✓	✓							
15	Phase voltage, Phase 1	✓	✓							
16	Phase voltage, Phase 2	✓	✓							
17	Phase voltage, Phase 3	✓	✓							
18	Active power, Phase 1	✓	✓							
19	Active power, Phase 2	✓	✓							
20	Active power, Phase 3	✓	✓							
21	Reactive power, Phase 1	✓	✓							
22	Reactive power, Phase 2	✓	✓							
23	Reactive power, Phase 3	✓	✓							
24	Apparent power, Phase 1	✓	✓							
25	Apparent power, Phase 2	✓	✓							
26	Apparent power, Phase 3	✓	✓							
27	Power factor, Phase 1	✓	✓							
28	Power factor, Phase 2	✓	✓							
29	Power factor, Phase 3	✓	✓							
30	THD, Current, Line 1	✓								
31	THD, Current, Line 2	✓								
32	THD, Current, Line 3	✓								
33	THD, Neutral current **3P4W 3.00**	✓								
34	THD, Delta voltage, 1 – 2	✓								
35	THD, Delta voltage, 2 – 3	✓								
36	THD, Delta voltage, 3 – 1	✓								
37	THD, Phase voltage, Phase 1	✓								
38	THD, Phase voltage, Phase 2	✓								
39	THD, Phase voltage, Phase 3	✓								
40	Phase angle between phase voltages, 1 – 2									
41	Phase angle between phase voltages, 2 – 3									
42	Phase angle between phase voltages, 3 – 1									
100	Active energy, high tariff, incoming									
101	Reactive energy, high tariff, LAG									
102	Apparent energy, high tariff									
103	Active energy, high tariff, outgoing									
104	Reactive energy, high tariff, LEAD									
105	Reactive energy, high tariff, incoming/LAG									
106	Reactive energy, high tariff, incoming/LEAD									
107	Reactive energy, high tariff, outgoing/LAG									
108	Reactive energy, high tariff, outgoing/LEAD									
109	Energy count time, high tariff									
110	Active energy, low tariff, incoming									
111	Reactive energy, low tariff, LAG									
112	Apparent energy, low tariff									
113	Active energy, low tariff, outgoing									
114	Reactive energy, low tariff, LEAD									

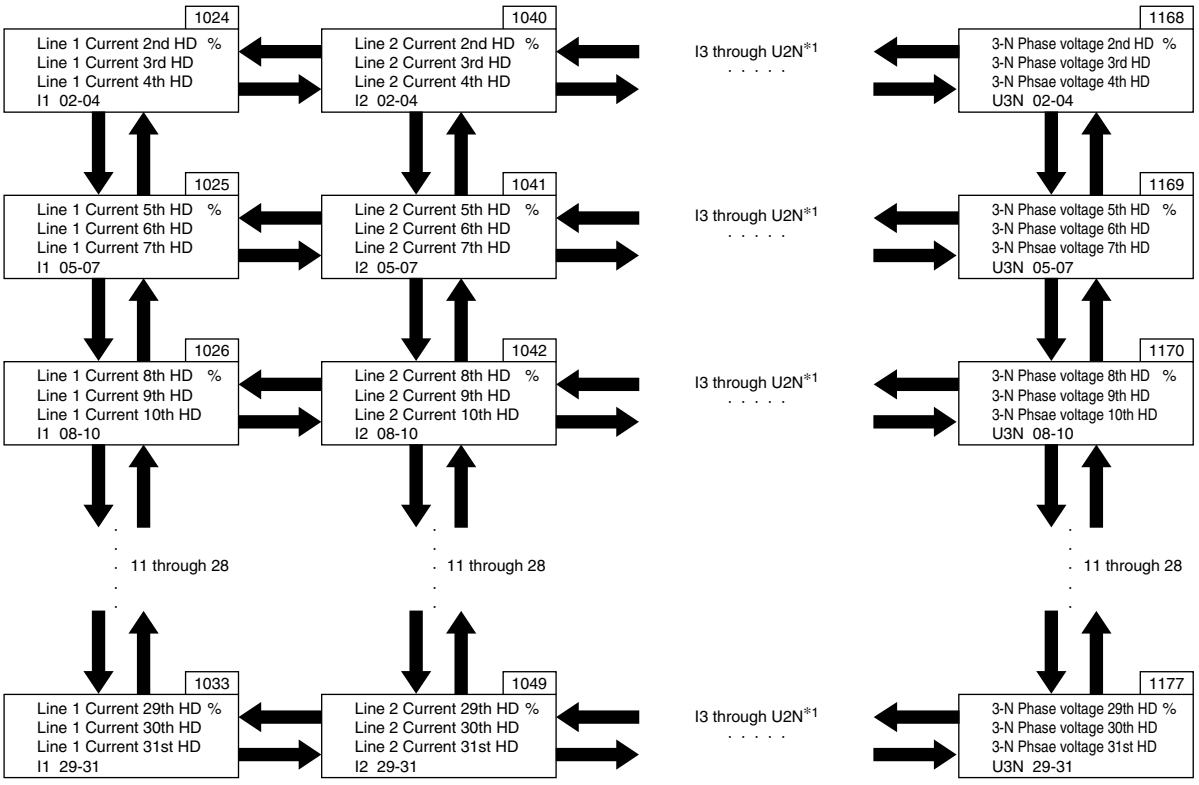
Σ view PRMTR	BASIC PARAMETER.	EXTENSION								
		MAX	MIN	AVE	AVE HIST1	AVE HIST2	AVE HIST3	AVE HIST4	MAX AVE	MAX AVE (out)
115	Reactive energy, low tariff, incoming/LAG									
116	Reactive energy, low tariff, incoming/LEAD									
117	Reactive energy, low tariff, outgoing/LAG									
118	Reactive energy, low tariff, outgoing/LEAD									
119	Energy count time, low tariff									
210	Reactive energy, high tariff, incoming									
211	Reactive energy, high tariff, outgoing									
212	Active energy, high tariff, incoming - outgoing									
213	Reactive energy, high tariff, incoming + outgoing									
310	Reactive energy, low tariff, incoming									
311	Reactive energy, low tariff, outgoing									
312	Active energy, low tariff, incoming - outgoing									
313	Reactive energy, low tariff, incoming + outgoing									

Note: The parameters 100 through 313 are available only on the line 4. These parameters have no extension.

■ HARMONIC

IU → + PF THD ↑ Hold down both buttons for 1 second or more to switch from various setting mode to the harmonics.

Σ ← | IU → | PQS ↓ | PF THD ↑ Press triangle buttons to switch the views.



*1. I3 : Line 3 Current HD
IN : Neutral current HD **3P4W 3.00**
U12 : 1-2 Delta voltage HD
U23 : 2-3 Delta voltage HD
U31 : 3-1 Delta voltage HD
U1N : 1-N Phase voltage HD
U2N : 2-N Phase voltage HD

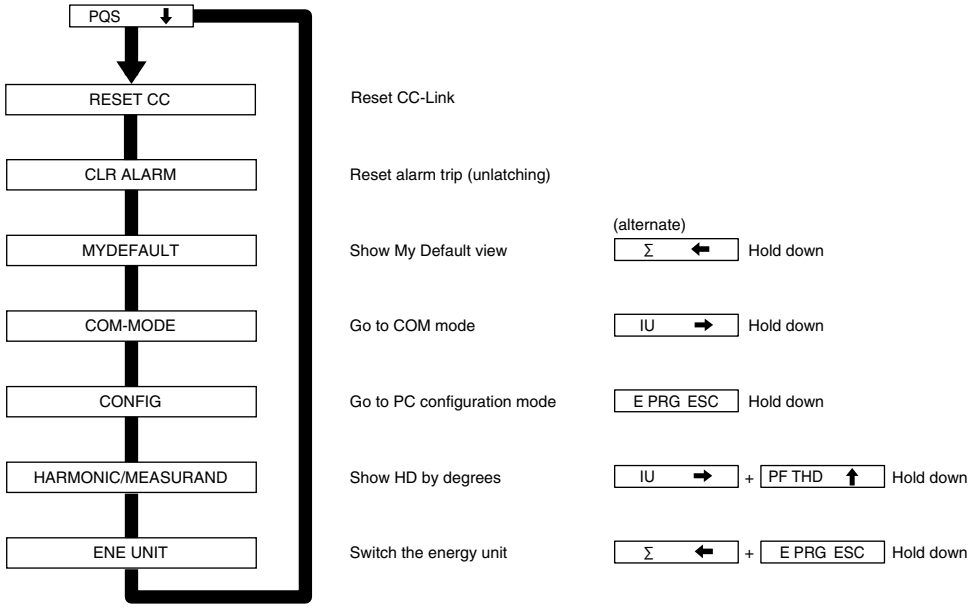
■ SHORTCUT MENU

Hold down PQS ↓ button until the 4th line is switched to the shortcut menu.
Resetting alarm trip and other operations are swiftly executed using this menu.

Press PQS ↓ button one or more times to scroll the menu.

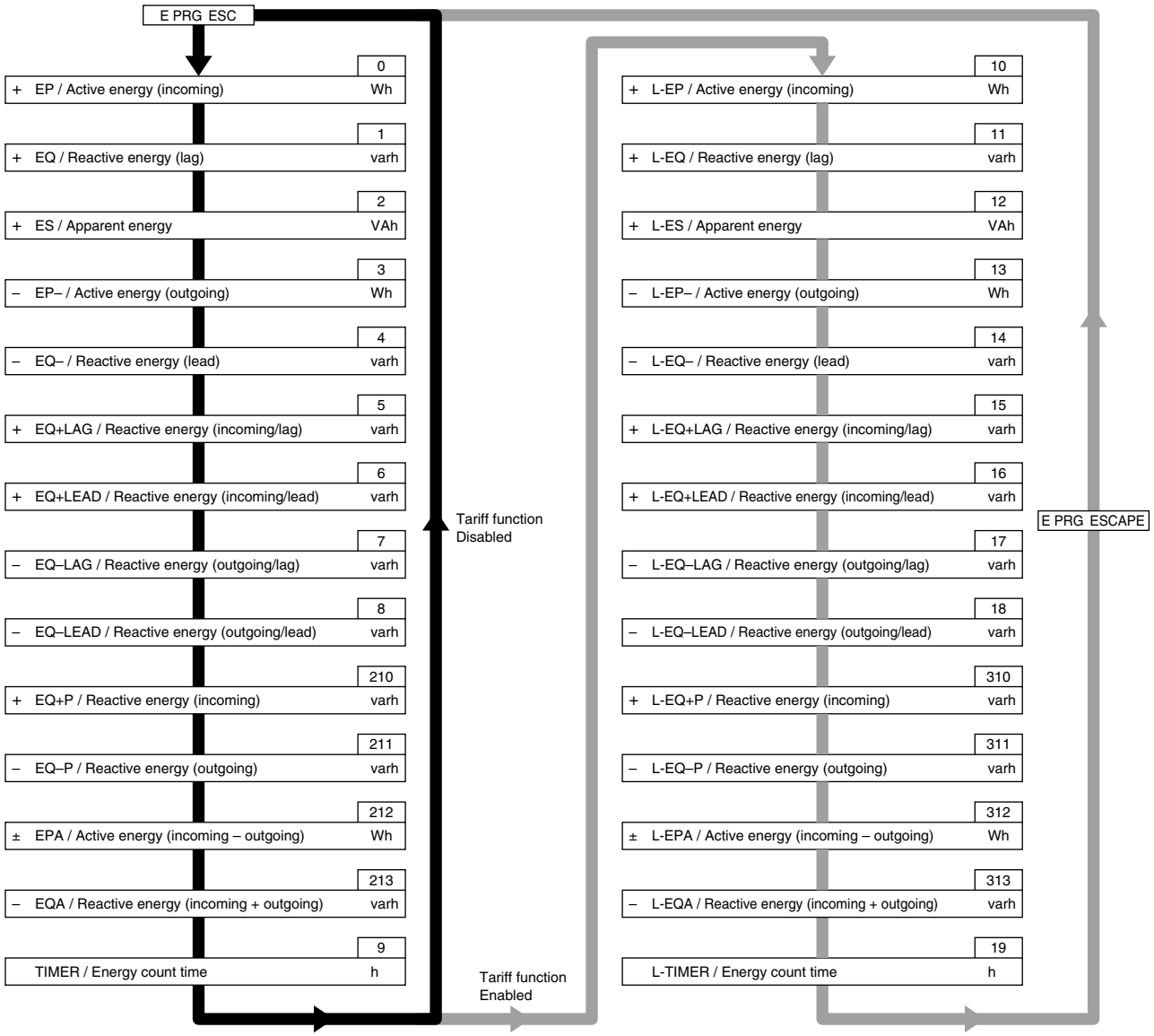
Press MAX ↵ button to execute a menu command.

Press any other button to exit the shortcut menu.



■ **HOW TO SWITCH THE DISPLAY FOR LINE 4**

Σ ← + E PRG ESC Hold down both buttons for 1 second or more to switch the watt-hour unit with or without 'k.'



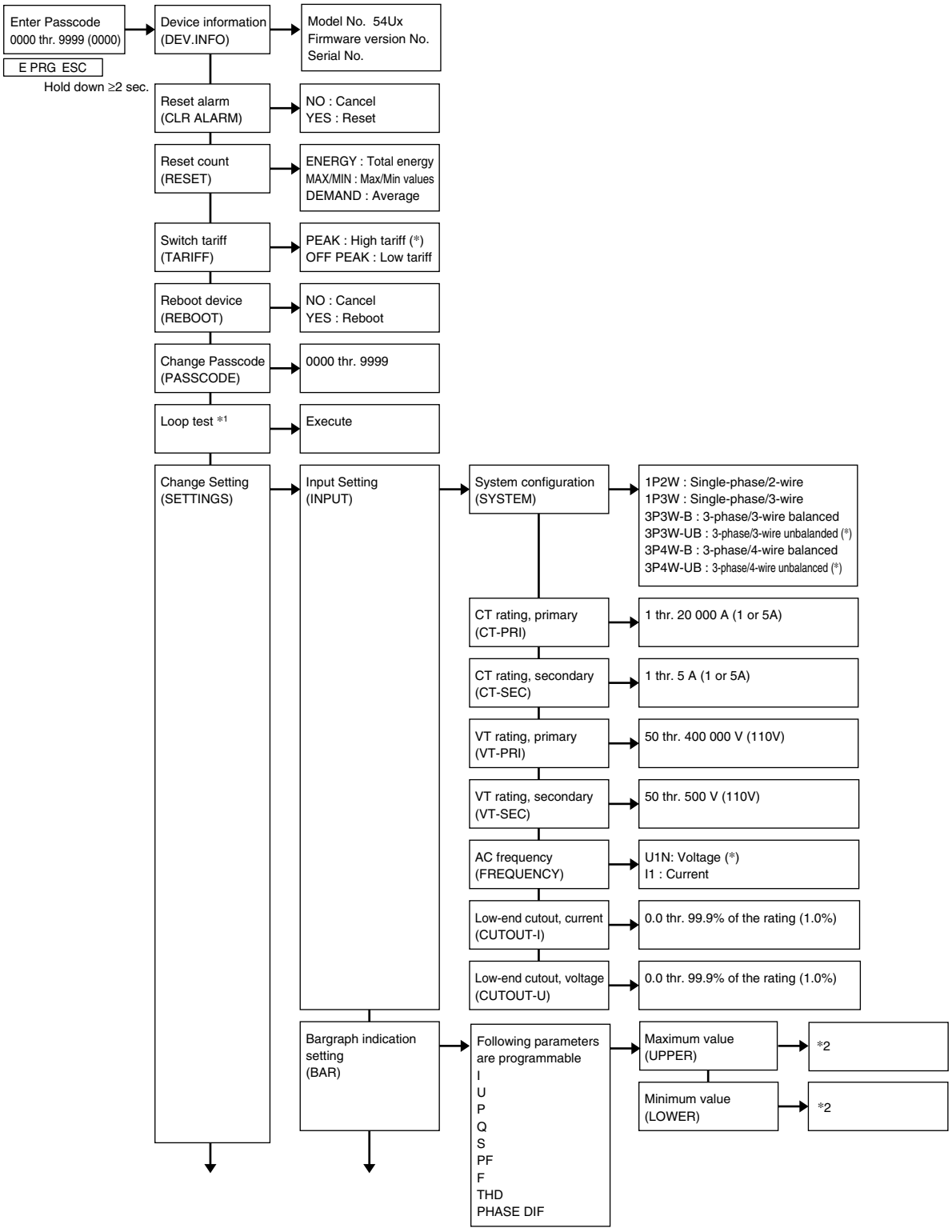
OL or ERR reading flashes in case of errors. Refer to "ERROR MESSAGES" section for detailed information.

■ PROGRAMMING FLOWCHART

PF THD ↑ | PQS ↓ : Move between menu items

MAX ↵ : Select

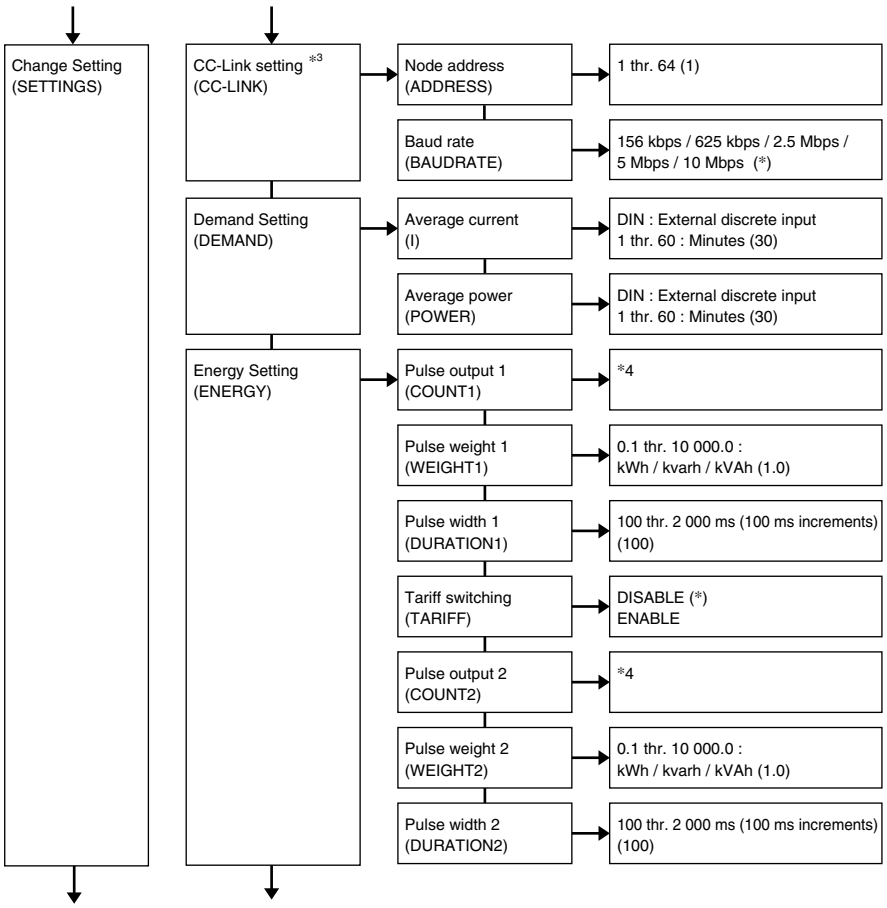
E PRG ESC : Go up one level in the chart



(*) or ( ) : Factory setting

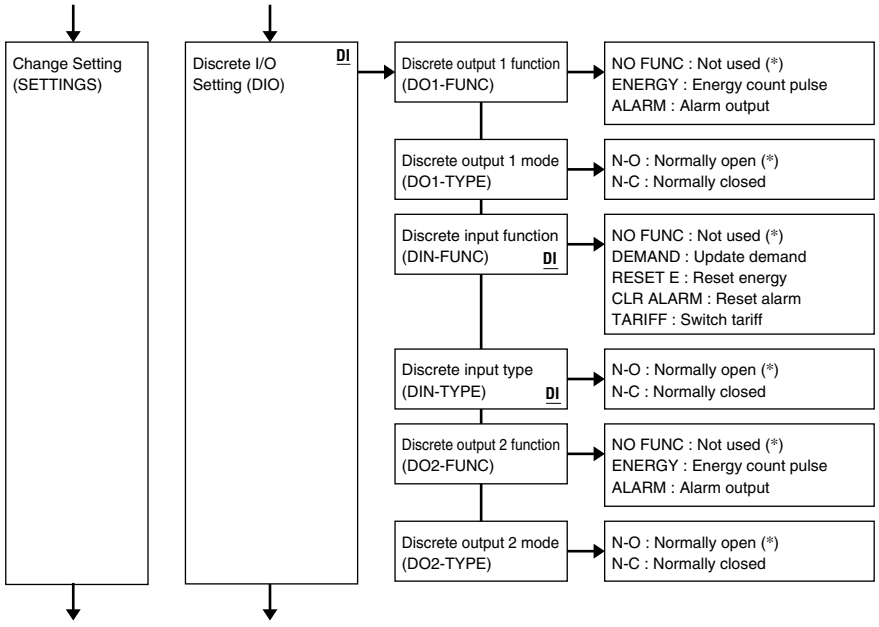
System configuration factory setting
54UC-1: 3P3W-UB
54UC-2: 3P4W-UB

*1. Simulated output without applying actual input signals.
*2. Refer to “SETTING BARGRAPH INDICATION” in “SETTING EXAMPLE” section.

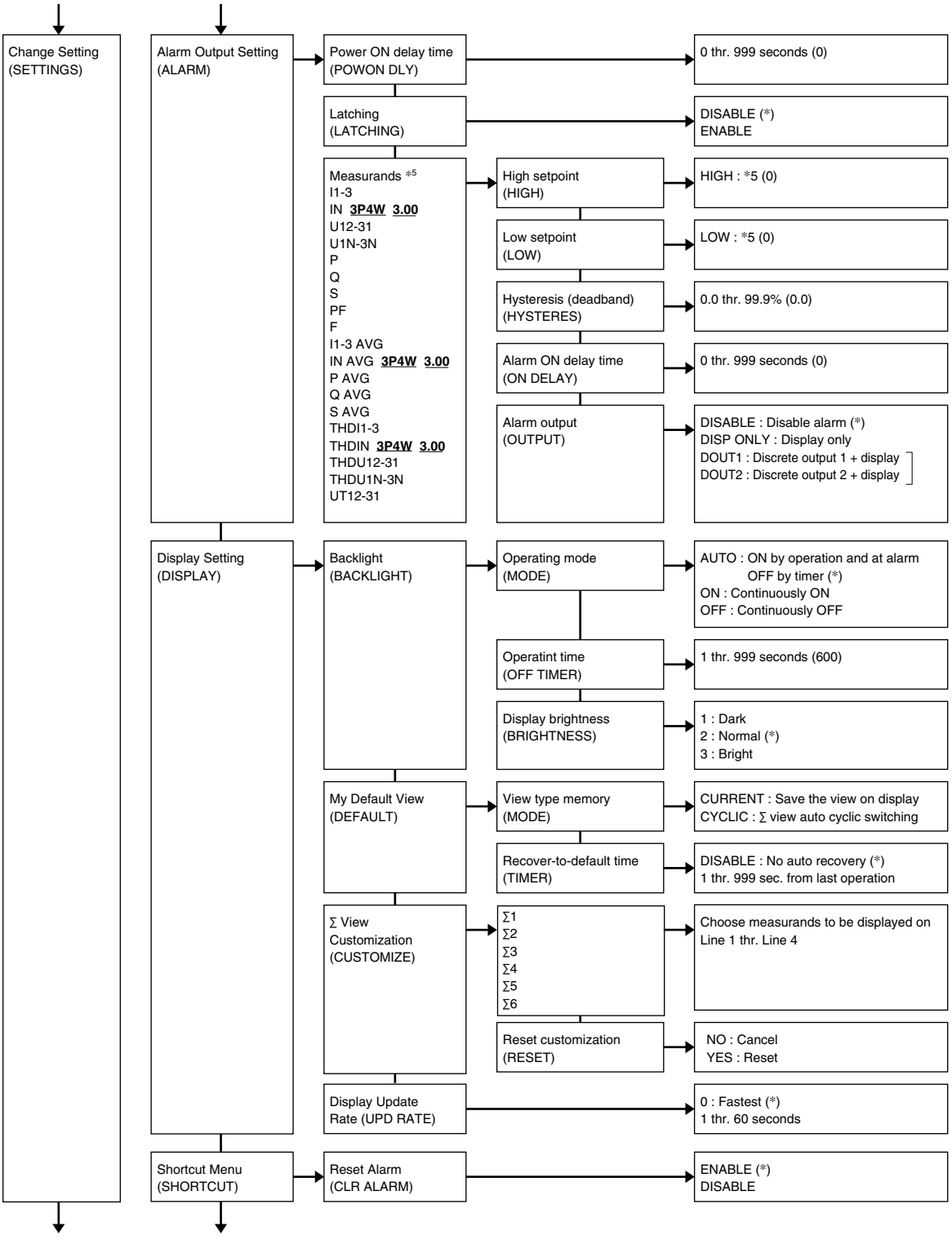


(*) or ( ) : Factory setting

*3. In order to make the settings effective, turn on the power again, or reboot the device or reset CC-Link by using buttons on the front panel.
*4. Refer to "Energy count type" in "CC-Link - SETTING" section.

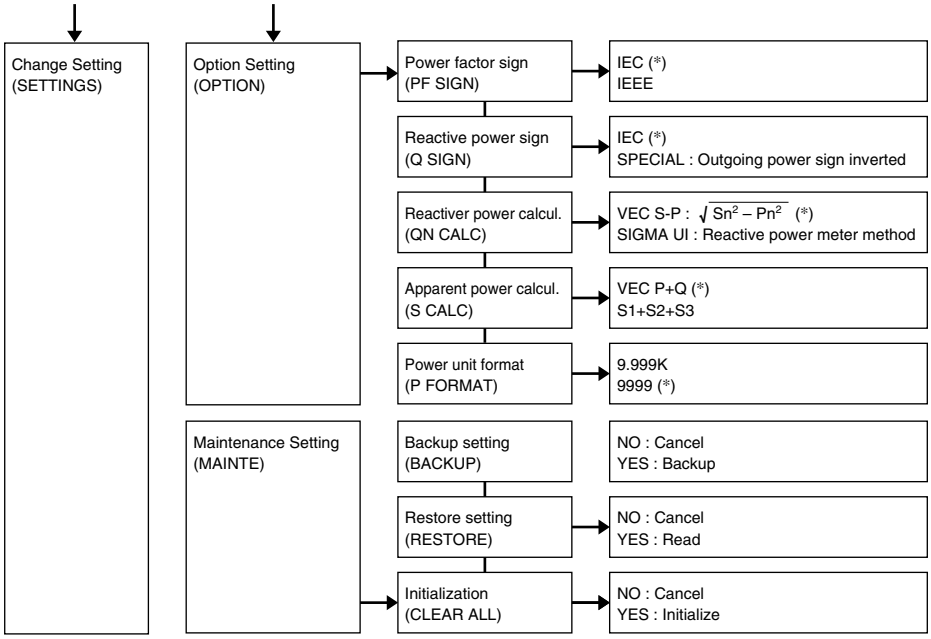


(*) or ( ) : Factory setting



(*) or ( ) : Factory setting

*5. Refer to "ALARM OUTPUT SETTING" in this section.



(*) or ( ) : Factory setting

■ ALARM OUTPUT SETTING

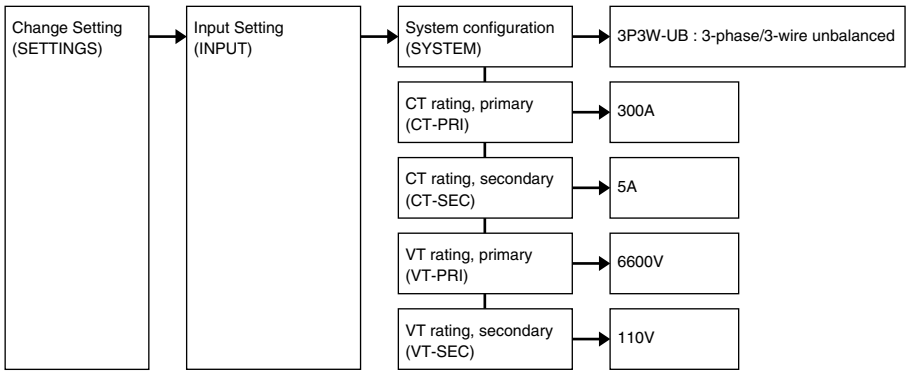
ID*1	DEFINITION	LOW SETPOINT	HIGH SETPOINT	UNIT
I1-3	Current, Line 1 thr. Line 3	0.000	20 000.000	A
IN	Neutral current **3P4W 3.00**	0	20 000	A
U12-31	Delta voltage, Line 1 – 2, 2 – 3, 3 – 1	0.00	400 000.00	V
U1N-3N	Phase voltage, Phase 1 thr. Phase 3	0.00	400 000.00	V
P	Active power	-2 000 000 000	2 000 000 000	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	----
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) **3P4W 3.00**	0	20 000	A
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
THD I1-3	THD, Current, Line 1 thr. Line 3	0.0	999.9	%
THD IN	THD, Neutral current **3P4W 3.00**	0.0	999.9	%
THD U12-31	THD, Delta voltage, Line 1 – 2, 2 – 3, 3 – 1	0.0	999.9	%
THD U1N-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	°

*1. Indicated while in alarm conditions.

SETTING EXAMPLES

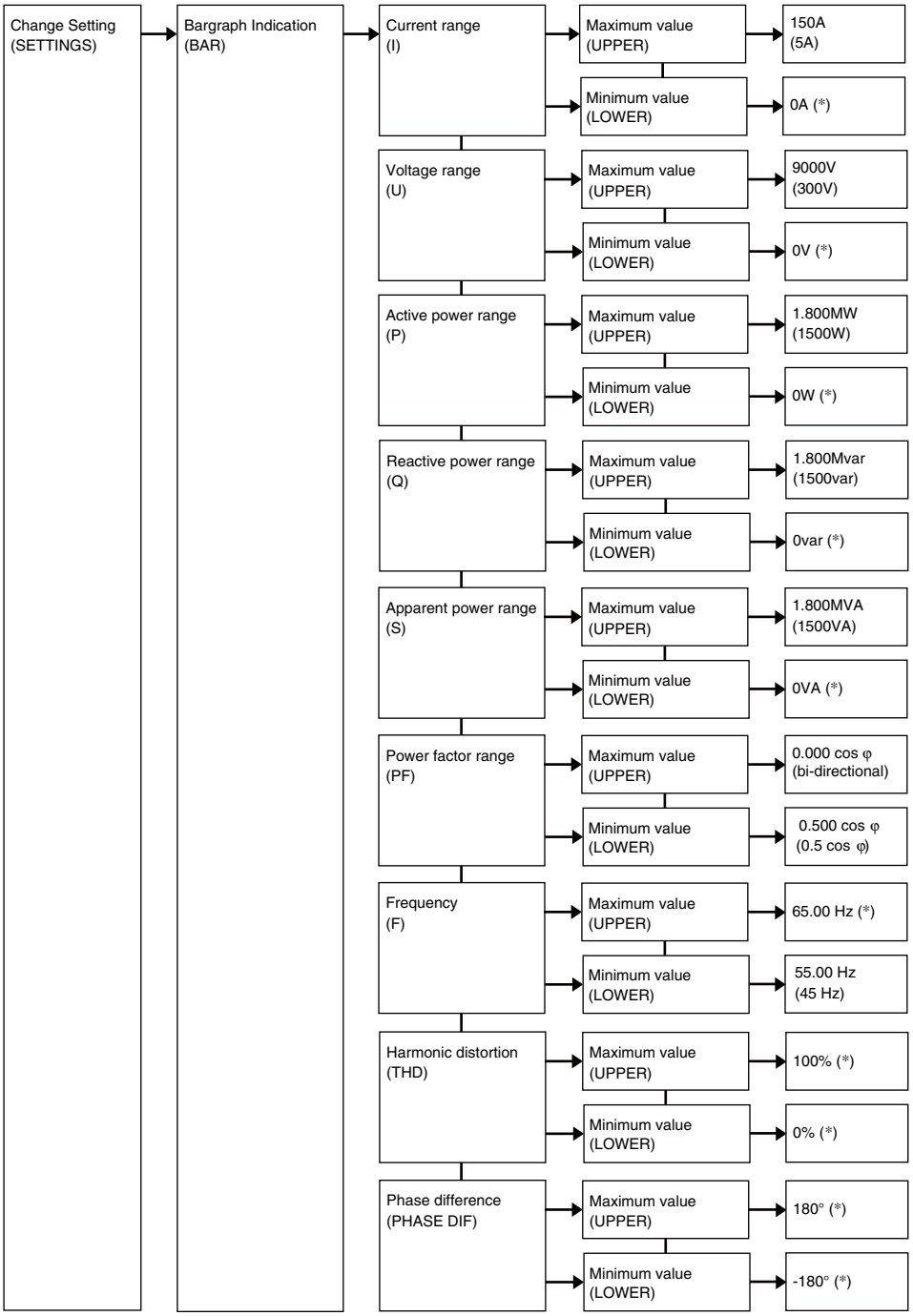
■ SETTING INPUT CONFIGURATION

Input system: Three-phase / 3-wire, unbalanced load
CT ratio: 300 A / 5 A
VT ratio: 6600 V / 110 V



■ SETTING BARGRAPH INDICATION (Refer to "PROGRAMMING FLOWCHART" in "OPERATION FLOWCHART" section.)

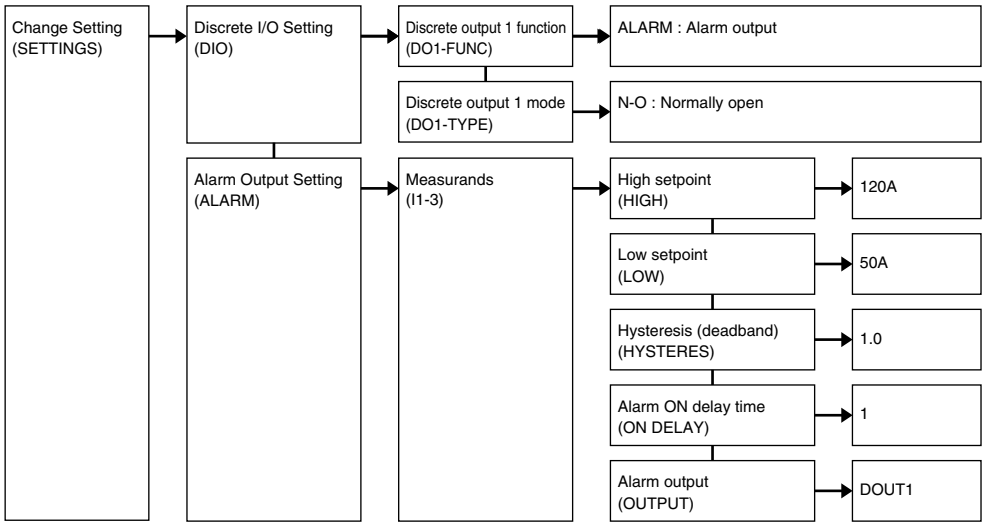
Current range: 0 – 150 A
Voltage range: 0 – 9000 V
Active power range: 0 – 1.800 MW
Reactive power range: 0 – 1.800 Mvar
Apparent power range: 0 – 1.800 MVA
Power factor range: LEAD 0.5 – 1 – LAG 0.5
Frequency: 55 – 65 Hz



(*) or ( ): Factory setting

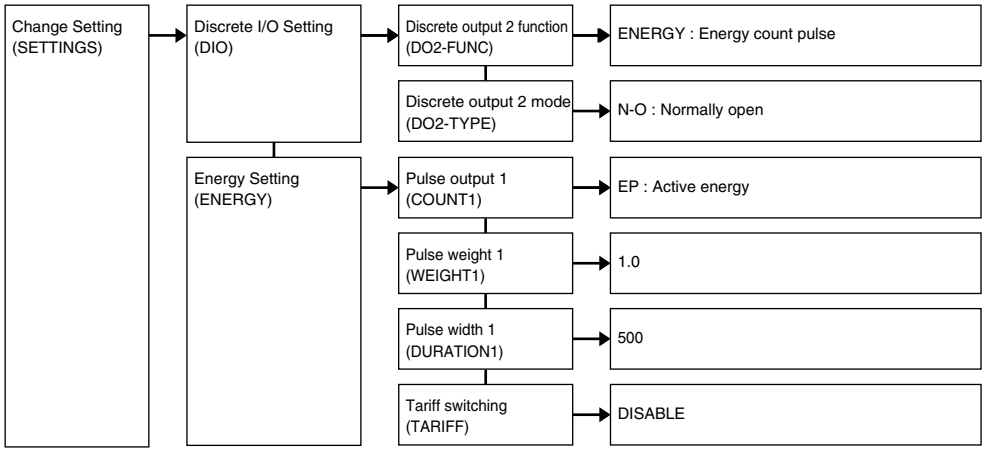
■ SETTING ALARM OUTPUT

Measurand: Current
Low setpoint: 50 A
High setpoint: 120 A
Hysteresis (deadband): 1%
Alarm ON delay time: 1 second
Discrete output: DO1



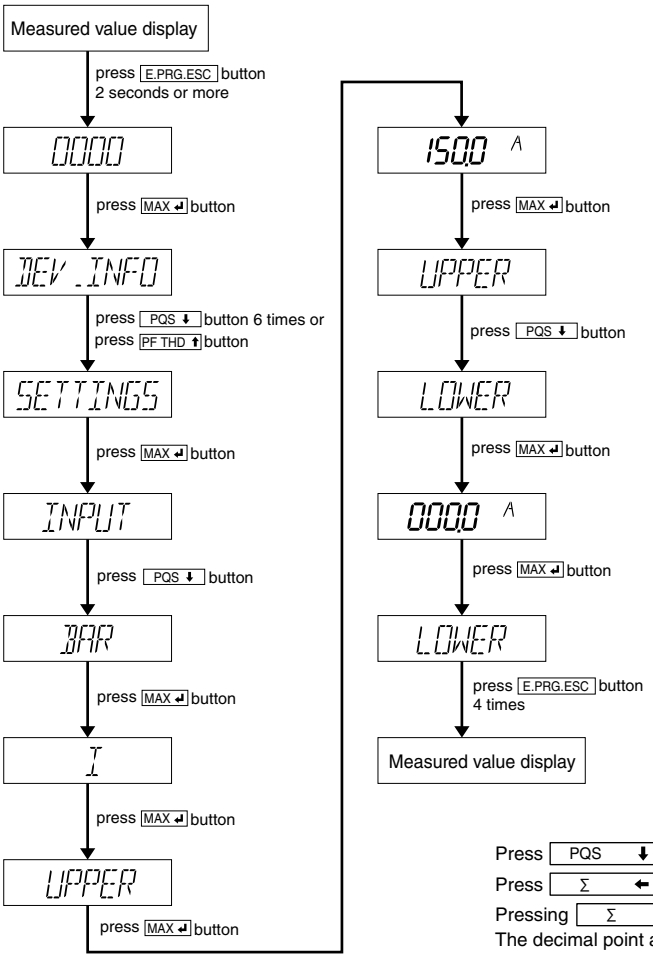
■ SETTING ENERGY COUNT OUTPUT

Measurand: Active energy
Pulse weight: 1 kWh/count
ON pulse width: 500 msec.
Discrete output: DO2

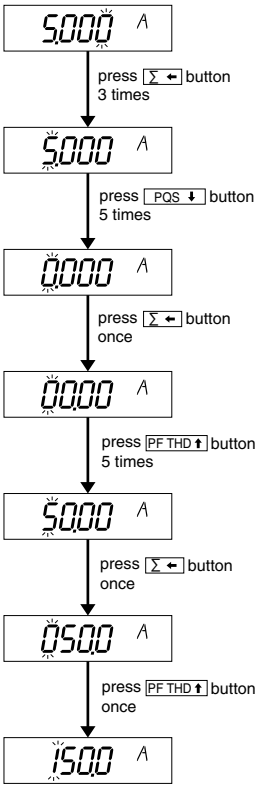


OPERATION EXAMPLES

■ **HOW TO SET BARGRAPH INDICATION**

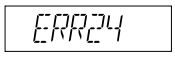


■ **HOW TO CHANGE VALUES (e.g. 5.000A to 150.0A)**



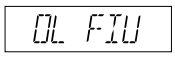
Press PQS ↓ / PF THD ↑ to increase or decrease the value.
Press Σ ← / IU → to move between digits.
Pressing Σ ← at the leftmost digit shifts the value on display to the right by 1 digit.
The decimal point and unit are also switched to appropriate ones.

ERROR MESSAGES



'ERR' followed by numerical figures means a system error. Each figure indicates a particular system error status if there are more than one digit of figures.

FIG	ERROR DIAGNOSTICS	WHAT TO DO
1	Firmware destroyed	Repair at the factory
2	Calibration data destroyed	Repair at the factory
3	System parameters destroyed System parameters stored in the device are destroyed, often due to excessive noise interference.	Initialize the system parameters and set them up again. Go to SETTINGS → MAINTE → ALL CLEAR → YES
4	Energy reading data destroyed Energy reading data stored in the device are destroyed, often due to excessive noise interference.	Reset the energy readings (all energy and time count) to zero. Go to RESET → ENERGY
5	Average (demand) data destroyed Average (demand) data stored in the device are destroyed, often due to excessive noise interference.	Reset the average readings to zero. Go to RESET → DEMAND
6	Statistical data destroyed Statistical data (e.g. MAX/MIN values) stored in the device are destroyed, often due to excessive noise interference.	Reset the statistical data to zero. Go to RESET → MAX/MIN



'OL' followed by a space and alphabets means an input overload error. Each alphabet indicates a particular input error if there are more than one digit of alphabets.

CHR	ERROR DIAGNOSTICS	WHAT TO DO
F	Either U1N or I1 (selectable) input is lost or the input line frequency is out of measurable range (45 – 65 Hz).	Check the input signals/wiring.
I	Either of the current inputs is overload (120% or more of the rating).	Check the input signals.
U	Either of the voltage inputs is overload (120% or more of the rating).	Check the input signals.