INSTRUCTION MANUAL

POWER LINE SUPER MULTI-METER

SQLC-110L

[3φ4W COMMUNICATION OUTPUT (Modbus RTU mode)]

HARDWARE MODEL G

DAIICHI ELECTRONICS CO., LTD.

Thank you for purchase DAIICHI ELECTRONICS product.
Please this instruction manual carefully before use.

Safety precautions

■ Usage environment and product conditions

Please be sure to use this product in a place that meets the following conditions.
In places that do not meet this condition, it may cause malfunction or failure and product life decline.

- Within the range of ambient temperature -10 to +55 ℃, humidity 85% RH or less.
- Place free of dust, corrosive gas, salt and oily smoke. (Corrosive gas : SO_2 / H_2S, etc.)
- Location that is not affected by vibration and shock.
- Location that is not affected by external noise.
- Altitude 1000m or less.
- If this unit directly measures an inverter output of cycle control, SCR phase angle control or PWM control, an error may increase due to its operation principle.

■ Outdoor use conditions

- These products are not a dustproof, waterproof, and splash proof construction.
  Please avoid the place with much dust. Moreover, please install in the place not exposed rain nor water drop.
- Please do not install in the place where sunlight hits directly.
  Discoloration and degradation of a name plate, and deformation of the case by the surface temperature rise may cause.

■ Mounting and wiring

Please refer to this instruction manual for mounting and the wiring.

⚠CAUTION	● Please refer to connection diagram for the wiring. ● Please avoid a hot line work. ● Please use an electrical wire size suitable with the rated current. ● Please check the tightening of the screw.

■ Preparation

This product must be set before use. Please set correctly after reading this instruction manual.

■ About dew condensation

If the temperature and humidity of an installation change rapidly when a product is a non-energization, the waterdrop by dew condensation may adhere to a display inner side. (The display filter and the LCD surface stick and the pattern of the shape of a circle or an ellipse occur.)
This phenomenon does not cause any trouble. Disappears when control power is applied for 2 hours.

■ Maintenance and inspection

- Inspection in energized state is dangerous.
- No replacement in periodic inspection.
- After wiring change and maintenance, attach the terminal cover.
- Please wipe off lightly with the dry soft cloth. Please do not use the organic solvent, chemicals, cleaners, etc., such as an alcohol, for cleaning.
  The LCD may light up during cleaning on the LCD screen. This is a phenomenon that static electricity occurs in the filter. There is no problem with the product. Leave the unit as it is for a while, and the display goes out due to natural discharge.
  Do not press the LCD screen strongly. Pressing the LCD screen may cause the filter and the liquid crystal surface to remain in contact (such as a round pattern).

■ Storage

Please storage in a place that meets the following conditions.

- The ambient temperature is within -20 to +70 ℃ (storage temperature).
- Daily average temperature 40 ℃ or less.
- Location corresponding to the usage environment and use conditions.
- Aluminum electrolytic capacitors are used for products. Please energize the power supply within one year after purchase.

■ Countermeasures against troubles.

If this product breaks down within the warranty period, it will be repairs by DAIICHI ELECTRONICS.

■ Disposal

Please dispose this product as industrial waste (non-combustible).
Mercury parts and a nickel-cadmium battery are not used for this product.

■ Warranty period.

The warranty period of the product is one year after the date of delivery.

■ Operation

Be careful with the following cautions during use.

- Use the input within the rated range. Be careful since negligence of this caution may cause troubles of the unit.
- There is a function to hold the maximum value and the minimum value in this product.
  The blackout this value will not be cleared by a power supply reset. However, the minimum value may be updated in case input is not applied to a power up. For this reason, in order to recover previous minimum value, please apply input within 1 second after switching on a power supply.
- The maximum value, a minimum value measurement element

Measurement elements	Maximum value measurement	Minimum value measurement
Voltage, Current, Demand current, Active power, Demand active power, Reactive power, Apparent power, Power factor, Frequency	○	○
Harmonic (Distortion factor, Effective value, Content)	○	×

⚠CAUTION	● Be careful not to touch any terminal when power is applied to the unit. ● Don't disassemble or modify this unit without any previous permission of our company, otherwise the warranty does not apply to the unit any more. Also, modifications may cause troubles, a fire, or other accidents. For specifications change, etc., please contact us.

■ Setting

This unit requires setting and confirmation of the measuring range, etc. before use.
Wrong setting, if any, causes malfunction of the unit. If setting should be wrong, neither measurement nor output becomes correct. Carefully read the instruction manual before setting the unit.

■ Default setting.

The default settings are as specified below at the delivery time. Please set according to a use condition.
The unit will be delivered with your specified setting values, if specified.

① Voltage, current input (1/2)

No.	Setting item			3φ4W		
				110/√3V input	220/√3V input	440/√3V input
1	Display combination	Pattern		Pattern 1		
		Main monitor		A(L2)		
		Sub-monitor (Left)		V(L1L2)		
		Sub-monitor (Center)		W		
		Sub-monitor (Right)		Wh		
		Bar graph		A(L2)		
2	Alarm output (1)	Alarm 1	Element	DA		
			Reset form	AUTO		
			Contact delay time	0 second		
			Test	—		
		Alarm 2	Element	DA		
			Reset form	AUTO		
			Contact delay time	0 second		
			Test	—		
3	Demand detection	Demand current	Upper limit value	1200A		
			Interval	0 second		
		Demand active power	Upper limit value	OFF		
			Interval	0 second		
			Operation form	Operating system according with bimetallic type.		
			Power factor operation form	Instant measurement		

① Voltage, current input (2/2)

No.	Setting item				3φ4W		
					110/√3V input	220/√3V input	440/√3V input
4	Harmonic detection	Current	Distortion factor upper limit		OFF		
			5th conversion content rate upper limit		OFF		
			n-th content rate	Element	5th		
				Upper limit	OFF		
		Voltage	Distortion factor upper limit		OFF		
			5th conversion content rate upper limit		OFF		
			n-th content rate	Element	5th		
				Upper limit	OFF		
		5th conversion detection characteristics			Inverse-time-delay mode		
		Average value time limit			0 minute		
5	Instant measurement detection	Voltage upper limit value			OFF		
		Voltage lower limit value			OFF		
6	Backlight	Action			AUTO		
		Brightness			3 (Middle)		
7	Measurement range	Voltage range			440V	220V	440V
		Current range			1500A		
		Current display peculiar sensitivity			1500A		
		Active power polarity			One-side swing		
		Active power (apparent power) range			1200kW (1200kVA)	600kW (600kVA)	1200kW (1200kVA)
		Reactive power range			600kvar	300.0kvar	600kvar
		Power factor range			LEAD 0.500 - 1.000 - LAG 0.500		
		Frequency range			45.0 - 65.0Hz		
8	Communication output (1)	Address			1		
		Transmission rate			9600bps		
		Parity			Even number		
		Stop bit			1 bit		
		Protocol version			ver.B		
9	Pulse output (1)	Output 1	Element		Wh		
			Pulse unit		10kWh/p	1kWh/p	10kWh/p
		Output 2	Element		Wh		
			Pulse unit		10kWh/p	1kWh/p	10kWh/p
10	External operation input (1)	Input 1 function			Alarm reset		
		Input 2 function			Max./Min. reset		
11	Measurement display ON/OFF	Voltage			ON		
		Current			ON		
		Active power			ON		
		Reactive power			ON		
		Power factor			ON		
		Frequency			ON		
		Watt-hour of power receiving			ON		
		Watt-hour of power transmission			ON		
		var-hour of power receiving			ON		
		var-hour of power transmission			ON		
		Harmonic current			ON		
		Harmonic voltage			ON		
		Apparent power			ON		
12	Input circuit	Input circuit change			3φ4W (3VT,3CT)		
		Input voltage (2)			110V	220V	—
13	Measurement	Dead band			0.0%		
		Tidal current measurement			General measurement		

Note(1) A setting item is not displayed in case there is no corresponding option.
The external operation input constitutes initial value with an alarm-output option.
It becomes the next function in case there is no alarm-output option.
Input 1 function : Max. / Min. reset, Input 2 function : Measurement element change.

Note(2) If an input-voltage setting is changed, a voltage range will return to initial value.
(110/√3V setting : 440V, 220/√3V setting : 220V)
Rated voltage is the setting item of the product of 110/√3V, 220/√3V sharing.
A setting item is not displayed as 440/√3V product.

② Current input

No.	Setting item				3φ4W
1	Display combination	Pattern			Pattern 15
		Main monitor			A(L2)
		Sub-monitor (Left)			A(L1)
		Sub-monitor (Center)			A(L3)
		Sub-monitor (Right)			A(N)
		Bar graph			A(L2)
2	Alarm output (3)	Alarm 1	Element		DA
			Reset form		AUTO
			Contact delay time		0 second
			Test		－
		Alarm 2	Element		DA
			Reset form		AUTO
			Contact delay time		0 second
			Test		－
3	Demand detection	Demand current	Upper limit value		1200A
			Interval		0 second
4	Harmonic detection	Current	Distortion factor upper limit		OFF
			5th conversion content rate upper limit		OFF
			n-th content rate	Element	5th
				Upper limit	OFF
		5th conversion detection characteristics			Inverse-time-delay mode
		Average value time limit			0 minute
5	Backlight	Action			AUTO
		Brightness			3 (Middle)
6	Measurement range	Current range			1500A
		Current display peculiar sensitivity			1500A
7	Communication output (3)	Address			1
		Transmission rate			9600bps
		Parity			Even number
		Stop bit			1 bit
		Protocol version			ver.B
8	External operation input (3)	Input 1 function			Alarm reset
		Input 2 function			Max./Min. reset
9	Measurement display ON/OFF	Current			ON
		Harmonic current			ON
10	Input circuit	Dead band			0.0%

Note(3) A setting item is not displayed in case there is no corresponding option.
The external operation input constitutes initial value with an alarm-output option.
It becomes the next function in case there is no alarm-output option.
Input 1 function : Max. / Min. reset, Input 2 function : Measurement element change.

③ Voltage input

No.	Setting item				3φ4W		
					110/√3V input	220/√3V input	440/√3V input
1	Display combination	Pattern			Pattern 16		
		Main monitor			V(L1L2)		
		Sub-monitor (Left)			V(L2L3)		
		Sub-monitor (Center)			V(L3L1)		
		Sub-monitor (Right)			Hz		
		Bar graph			V(L1L2)		
2	Alarm output (4)	Alarm 1	Element		V		
			Reset form		AUTO		
			Contact delay time		0 second		
			Test		—		
		Alarm 2	Element		V		
			Reset form		AUTO		
			Contact delay time		0 second		
			Test		—		
3	Harmonic detection	Voltage	Distortion factor upper limit		OFF		
			5th conversion content rate upper limit		OFF		
			n-th content rate	Element	5th		
				Upper limit	OFF		
		5th conversion detection characteristics			Inverse-time-delay mode		
		Average value time limit			0 minute		
4	Instant measurement detection	Voltage upper limit value			OFF		
		Voltage lower limit value			OFF		
5	Backlight	Action			AUTO		
		Brightness			3 (Middle)		
6	Measurement range	Voltage range			440V	220V	440V
		Frequency range			45.0 - 65.0Hz		
7	Communication output (4)	Address			1		
		Transmission rate			9600bps		
		Parity			Even number		
		Stop bit			1 bit		
		Protocol version			ver.B		
8	External operation input (4)	Input 1 function			Alarm reset		
		Input 2 function			Max./Min. reset		
9	Measurement display ON/OFF	Voltage			ON		
		Frequency			ON		
		Harmonic voltage			ON		
10	Input circuit	Input circuit change			3φ4W (3VT)		
		Input voltage (5)			110V	220V	—
11	Measurement	Dead band			0.0%		

Note(4) A setting item is not displayed in case there is no corresponding option.
The external operation input constitutes initial value with an alarm-output option.
It becomes the next function in case there is no alarm-output option.
Input 1 function : Max. / Min. reset, Input 2 function : Measurement element change.

Note(5) If an input-voltage setting is changed, a voltage range will return to initial value.
(110/√3V setting : 440V, 220/√3V setting : 220V)
Rated voltage is the setting item of the product of 110/√3V, 220/√3V sharing.
A setting item is not displayed as 440/√3V product.

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Appendix table 1

1. Product outline

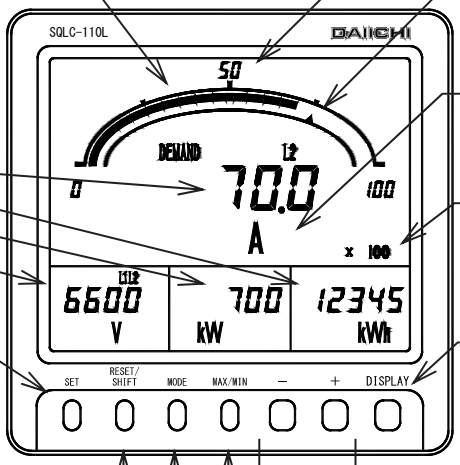
1.1 Usage of product

This single unit can measure and monitor maximum demand-current ×4, demand-current ×4, voltage ×6, current ×4, maximum demand active power, demand active power, active-power, reactive-power, apparent power, power factor, frequency, watt-hour, var-hour, harmonic (voltage, current).
From a low tension circuit to a high tension circuit, it is adapted for various usages, such as a measurement monitor of a power-receiving circuit, an energy conservation power monitor, a demand current measurement monitor, and a harmonic monitor, a leakage monitor.
With the extension of communication output and pulse output, this unit can also act as centralized monitor according to preferred system.

1.2 Features of product

- An input circuit can be selected by setting from 2VT,3CT and 3VT,3CT.
- Bar graph 1 measurement and digital 4 measurement are displayed simultaneously.
- Modbus communication output and contact-output 2 circuit can be taken out. (Option)
  A contact output can be selected from a pulse output, an alarm output, and a CPU error output. (Please designate it at an order.) And, output element can be selected by setting.
- Two external operation inputs are possible. (Option) And, selection of reset input and a display change input is possible at setting.
- Power supply is AC85－264V, DC80－143V (for both AC and DC uses).
- The mounting method of this unit is compatible with the mounting method of conventional 110 square mechanical meter. This unit is mounted at 2 diagonal points.
- Integrated value of Wh and varh can indicate expansion to 3rd digit below the decimal point.
- A tidal current measurement (output 2 quadrant) change is possible for var and $\cos\phi$.
- A backlight function is equipped. Selection of backlight-on, backlight-off, and auto backlight-off and setting of brightness are possible. Automatic turning off the lights at the time of non-operation can be established.
  LED：White

2. The name and function of each part



Bar graph display
The measurement value of the main monitor is indicated by the analog.
(Setting which does bar graph display of the measurement value of sub-monitor is also possible.)

Digital display
Measurement monitor can watch 4 elements at the same time.

- ·Main monitor
- ·Sub-monitor (Right)
- ·Sub-monitor (Center)
- ·Sub-monitor (Left)

Scale markings
Scale markings is automatically set in a measurement range.

Upper limit (or lower limit) setting index
An upper limit (or lower limit) set point is displayed.

Unit display
Unit display is automatically set in a measurement range.

Multiplying factor display
When monitor displays electrical energy, it is at the bottom right of the main monitor.

SET
The switch from which integrated value of the amount of electric power is switched to normal display (5 digits of integer) and expansion indication (integer 2 digits + below decimal point, 3 digits) variously.
If it is not operated for 10 minutes after a display change, it will usually return to a display. It is used also as a switch which changes to setting mode. If it continues pushing 3 seconds or more, it will change to setting mode.
In setting mode, it is used as a switch that determines a set point.

DISPLAY
This is a switch which changes the phase (line) display of current (voltage).
If it is not operated for 10 minutes after a display change, it returns to the original phase (line) display. In setting mode, it is used as a switch that terminates setting mode.

– +
The switch to which measurement displays element of main monitor is changed.
If it is not operated for 10 minutes after a display change, it returns to the original measurement display factor. In set mode, it is used as a switch that changes a setting value.

RESET/
SHIFT
This switch resets various alarms.
And, in the maximum and the minimum measurement display, it is used as a switch that resets the maximum and the minimum value.
In setting mode, it is used as a switch to which a setting item is shifted.

MAX/MIN
The switch to which general measurement display (usually) and the maximum minimum measurement display are changed.

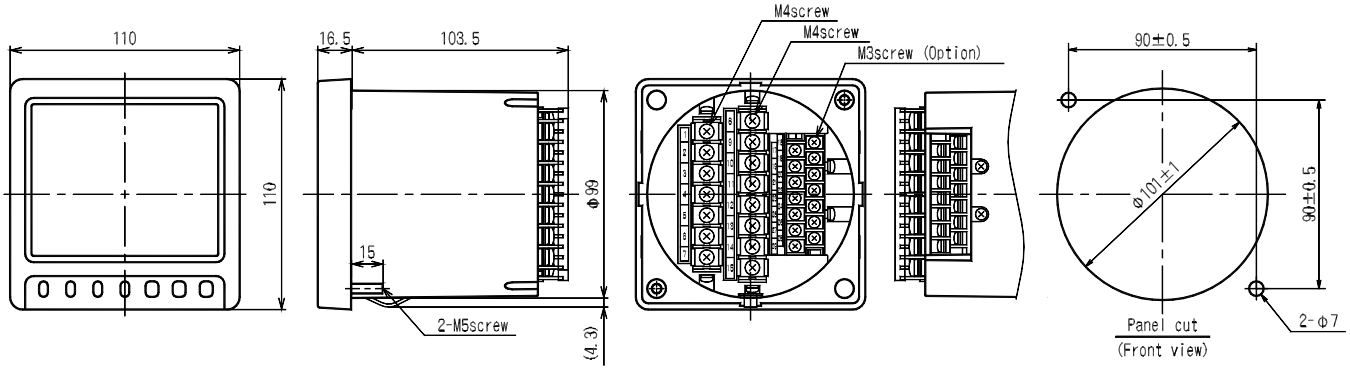
MODE
The switch to which general measurement display (usually) and the harmonic measurement (voltage and current) display are changed.
In set mode, it is used as a switch that changes a setting item.

3. Preparation

3.1 Installation

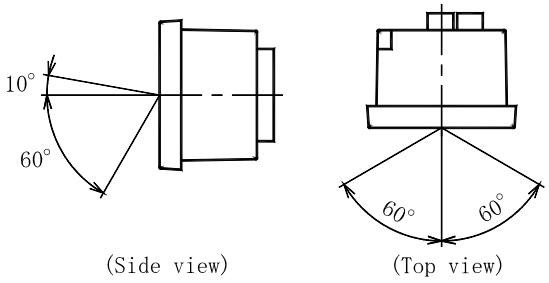
Mount the unit by the attached M5 nuts to a panel of thinner than 10mm, referring to the following external dimensions drawing and panel cutout. Fasten these nuts with tightening torque 2.0 to 2.5N･m.

● Dimension diagram



● Caution on handling

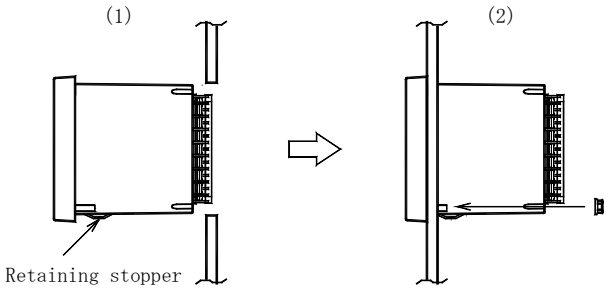
Mount the LCD to obtain an optimum angle, since the contrast changes according to the monitoring angle.



● Installation

(1) A product is put in a cut hole of a panel from a front. A body is inserted until it exceeds retaining stopper of the lower base.

(2) Please fix a product certainly with attached M5 flange nut for installation. Please give a tightening torque as 2.0 to 2.5N･m.

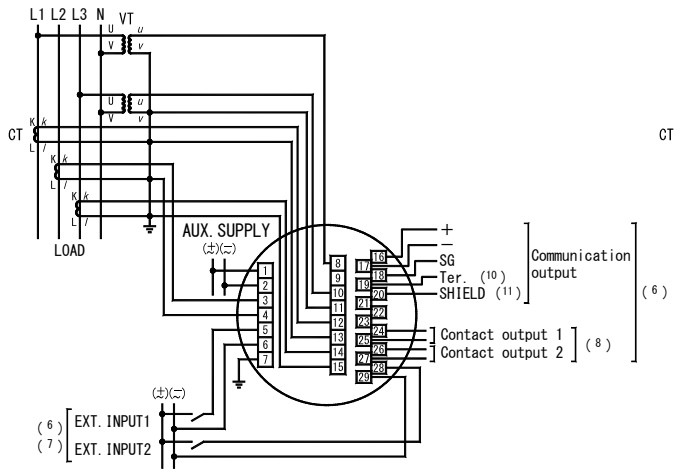


3.2 Connections

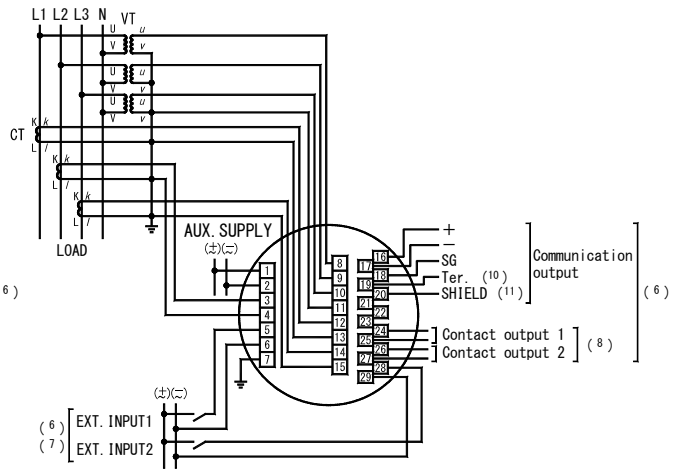
Please perform connection after referring to the following wiring diagram.

● Connection drawing ([9])

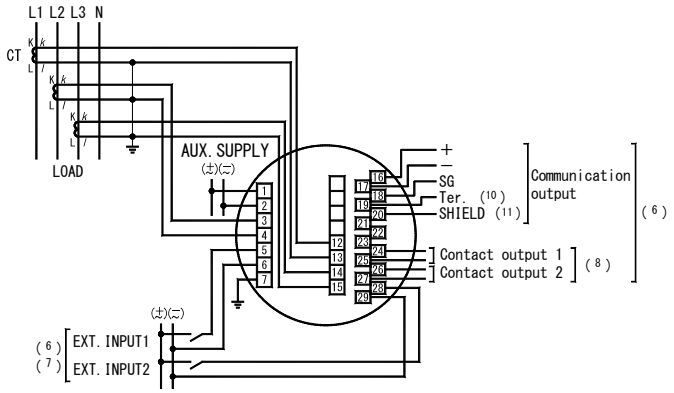
(1) Voltage, Current input (2VT, 3CT)



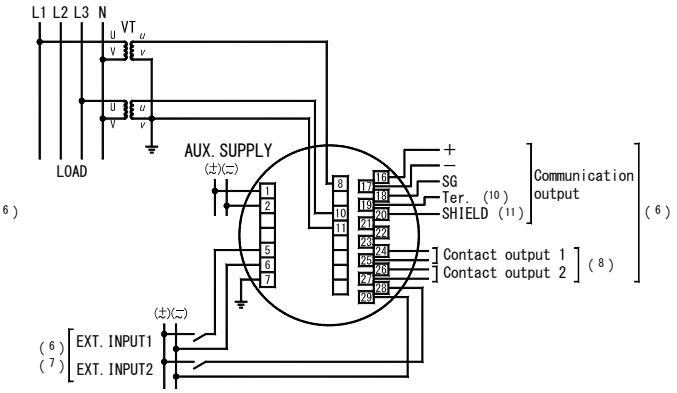
(2) Voltage, Current input (3VT, 3CT)



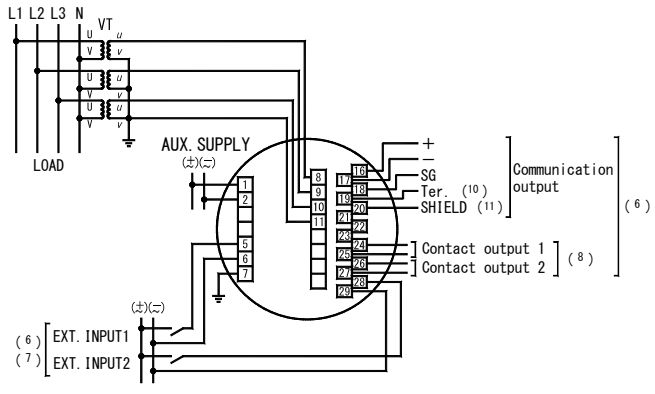
(3) Current input



(4) Voltage input (2VT)



(5) Voltage input (3VT)



Note([6]) Communication output, contact output, external operation input is an option.

Note([7]) An external operation input can be changed to an external-reset function or an external display change function by setting.

Note([8]) The contact output can be selected from pulse output, alarm output, or CPU error output. (Designation)

・Combination of contact output

	Contact output 1	Contact output 2
Pulse＋Alarm	Pulse output	Alarm output
Alarm×2	Alarm output 1	Alarm output 2
Pulse×2	Pulse output 1	Pulse output 2
Pulse＋CPU error	Pulse output	CPU error output
Alarm＋CPU error	Alarm output	CPU error output

Note([9]) In case of low-voltage circuit, secondary side grounding of VT and CT is unnecessary. And, VT is unnecessary in case it used direct 110V, 220V or 440V.

Note([10]) A terminating resistor is connected to inside in short-circuiting No.17 (-) and No.19 (Ter.). (Please use only the product used as a termination on a topology.)

Note([11]) It is the relay terminal (for passage wiring) of the shielding wire of a telecommunication cable. It does not connect to earth and an inside common.

● Caution on connection

(1) Mount the terminal cover without fail for safety after the end of connections.

(2) Separate the input wiring and output wiring from each other without fail, and take a preventive measure against malfunction due to external noises.

(3) Connect the grounding terminal E (No. 7 terminal) to the ground without fail for enhancing the shield effect. Keep the grounding resistance between the grounding terminal and the ground to be lower than 100Ω.

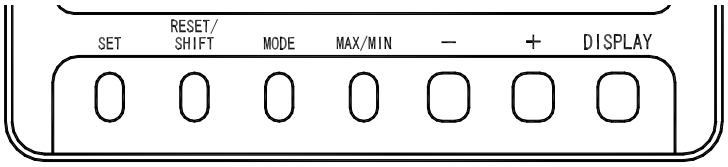
(4) Keep a distance of more than 30cm between this unit and the circuit breaker as well as between this unit and the relay contact signal line.

(5) Please use a transmission line into a twisted-pair cable with a shield. And, please use as the same thing including the inside of a board. And, in case there are many induction noises, please earth in the most effective place (one point).

(6) It is recommended to mount a surge killer outside when connecting an inductive load to the pulse output and alarm output. If no surge killer is mounted, the contact life may shorten.

4. Operation

● The function of switch



Switch	Function
SET	The integrated value of electric energy is changed to the usual display and an enlarged display. If it continues pushing 3 seconds or more, it will change to setting mode. In setting mode, it is used for the determination of a set point.
RESET/SHIFT	Various kinds of alarms are reset. The maximum value and the minimum value are reset in the maximum minimum measurement display. In setting mode, it is used for movement of a setting item.
MODE	The usual general measurement display and harmonic measurement (voltage, current) display are changed. In setting mode, it is used for the change of a setting item.
MAX/MIN	The usual measurement display and maximum value or minimum value display are changed.
＋, －	The measurement display element of the main monitor is changed. In setting mode, it is used for change of a set point.
DISPLAY	A phase (between lines) display of current (voltage) is changed. It is used in case it terminates setting mode. And, it is used in case it returns the display combination of a measurement element.

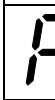
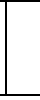
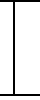
● Convenient functions

(1) In case a measurement change or a phase change is performed and the original screen composition is not clear anymore, DISPLAY is pushed for more than 3 seconds or it's no-operation for 10 minutes and returns to original screen structure.

(2) Even if it stops operation with setting mode, it returns to the display mode in 10 minutes.

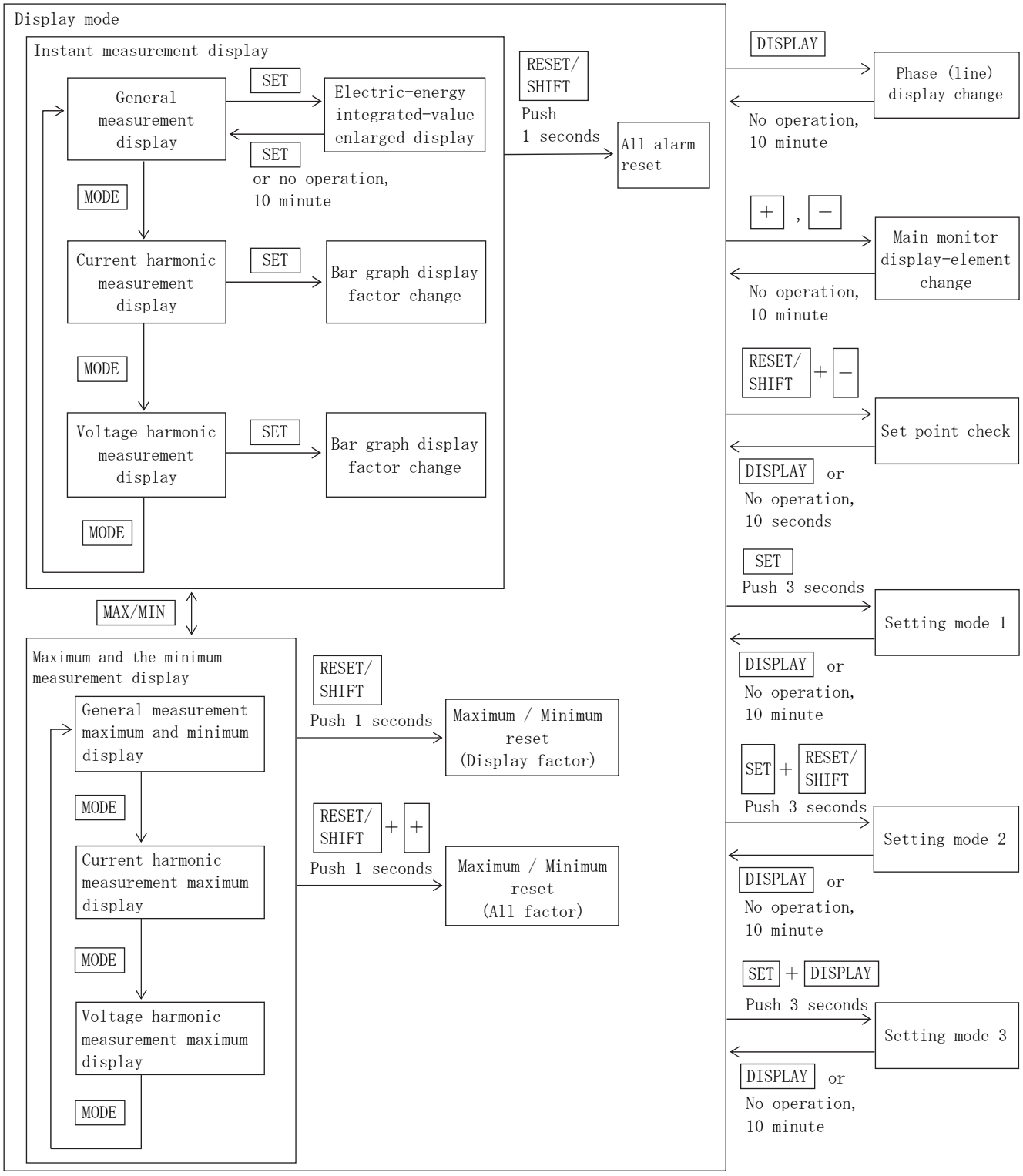
● 7 segment displays

This product shows the guidance in various setting using 7 segment displays besides a display of a measurement value. A digital readout and 7 segment displays corresponding to each alphabet are shown in the following.

A	*B(b)*	*C*	*D(d)*	*E*	*F*	*G*	*H*	*I*	*J*	*K*	*L*	*M*
									Non-display	Non-display		
N(n)	*O(o)*	*P*	*Q(q)*	*R(r)*	*S*	*T(t)*	*U(u)*	*V*	*W*	*X*	*Y(y)*	*Z*
										Non-display		Non-display
0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*			
												

4.1 The screen change and function by switch operation

This product changes various screens by switch operation. Here, the change step of the screen by switch operation is explained.



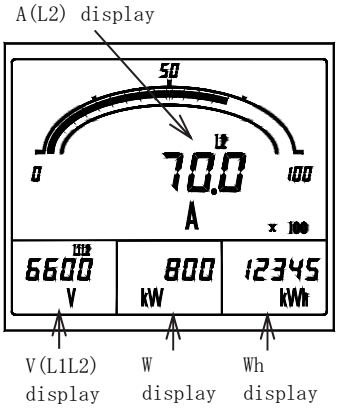
4.2 The kind of display

4.2.1 Measurement display

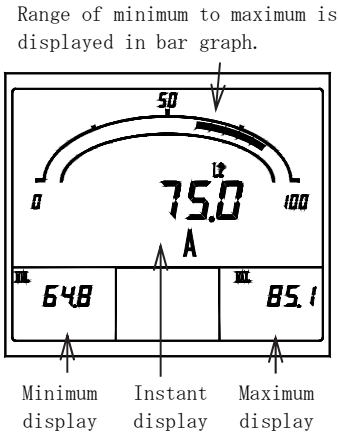
A measurement value display has the three following types of displays.
The change of the measurement display element of the main monitor by switch operation and the change of the phase / line display of current / voltage is possible (temporarily).
In a general measurement display, if switch operation is not performed for 10 minutes after changing a display element, it returns to the original measurement display element automatically.

① General measurement display

Measurement elements, such as current, voltage, and active power, are displayed.
The maximum numbers of measuring elements that can be displayed simultaneously is four.
You can always set or change any measurement elements to be displayed.
And, you can also perform measurement which needs you to maintain the maximum and minimum value, by switch operation to change to maximum and minimum value display.
These maximum values and the minimum value are reset by switch operation (it updates to the instantaneous value at the time).
In addition, as for the maximum value and the minimum value, power-supply reset is not cleared either. And, this display is held by even after 10 minutes of switch non-operation.

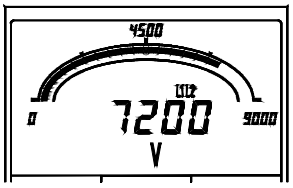
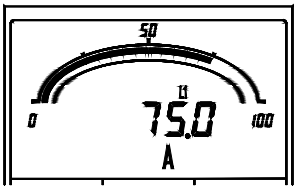
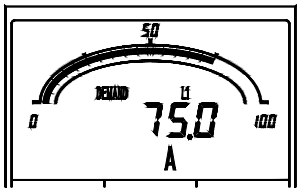
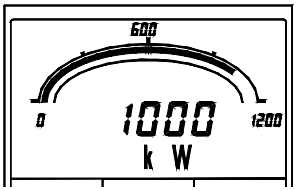
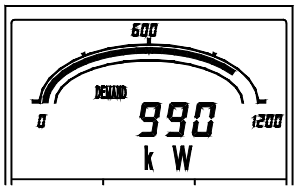
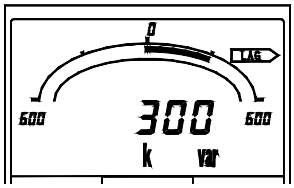
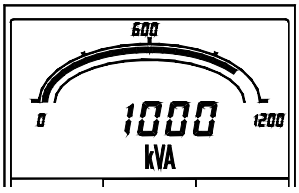
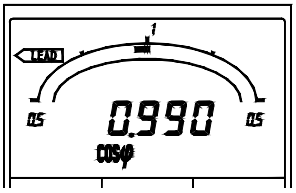


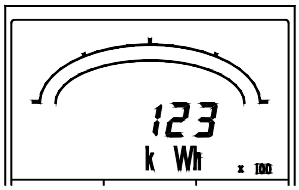
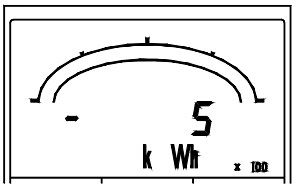
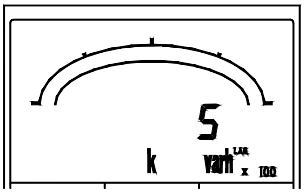
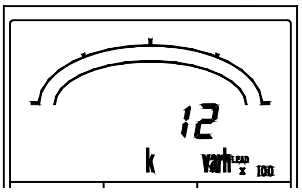
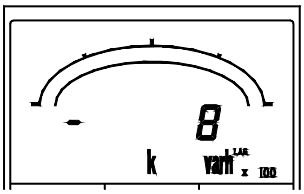
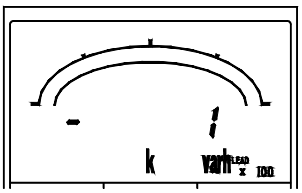
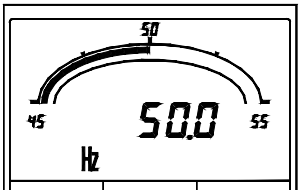
General measurement display



General measurement maximum and minimum display

・The example of a measurement display of each measurement element (Main monitor) ・・・ Harmonic measurement is excluded.

Measurement element	Example of display	Note	Measurement element	Example of display	Note
Voltage			Current		
Demand current		"DEMAND" is display	Active power		
Demand active power		"DEMAND" is display	Reactive power		LAG or LEAD display
Apparent power			Power factor		LAG or LEAD display

Measurement element	Example of display	Note	Measurement element	Example of display	Note
Watt-hour (Power receiving)			Watt-hour (Power transmission)		"−" is display
var-hour (Power receiving, LAG)		"LAG" display	var-hour (Power receiving, LEAD)		"LEAD" display
var-hour (Power transmission, LAG)		"LAG" and "−" display	var-hour (Power transmission, LEAD)		"LEAD" and "−" display
Frequency					

② Current harmonic measurement display

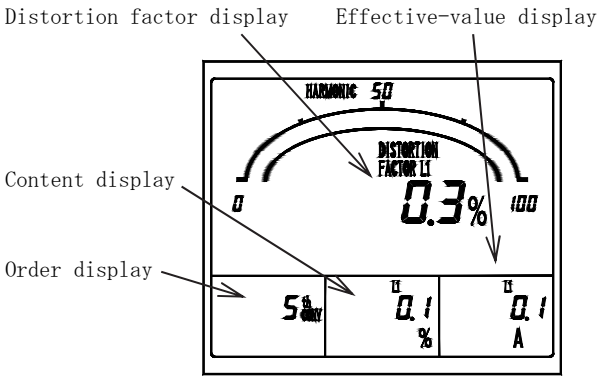
This is a measurement element display of the distortion factor of current, relative harmonic content, harmonic effective value, etc. And it is possible to change to a display of the maximum value by switch operation. These maximum values can be reset by switch operation (it updates to the instantaneous value at the time). In addition, as for the maximum value, even power-supply reset is not cleared. And, a display is held, even after elapsing for 10 minutes without operating a switch.

Measurement display element)

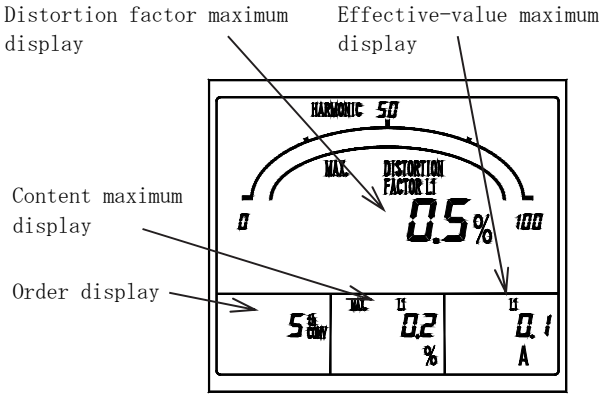
Main monitor : Distortion factor
Sub-monitor (Left) : 5th conversion or harmonic order (n)
Sub-monitor (Center) : Harmonic 5th conversion content or harmonic nth content (n=3,4,5,7,9,11,13,15)
Sub-monitor (Right) : Fundamental-wave effective value , 5th harmonic conversion effective value or harmonic nth effective value (n=3,4,5,7,9,11,13,15)

③ Voltage harmonic measurement display

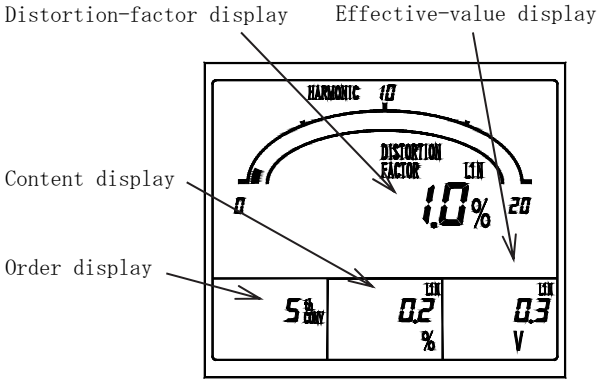
It is a measurement element display of the distortion factor of voltage, relative harmonic content, harmonic effective value, etc. About a function, it is the same as a current harmonic measurement display.



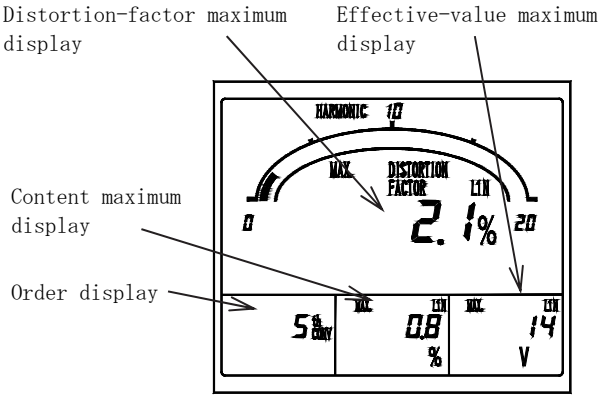
Current harmonic measurement display.



Current harmonic measurement maximum display.



Voltage harmonic measurement display.

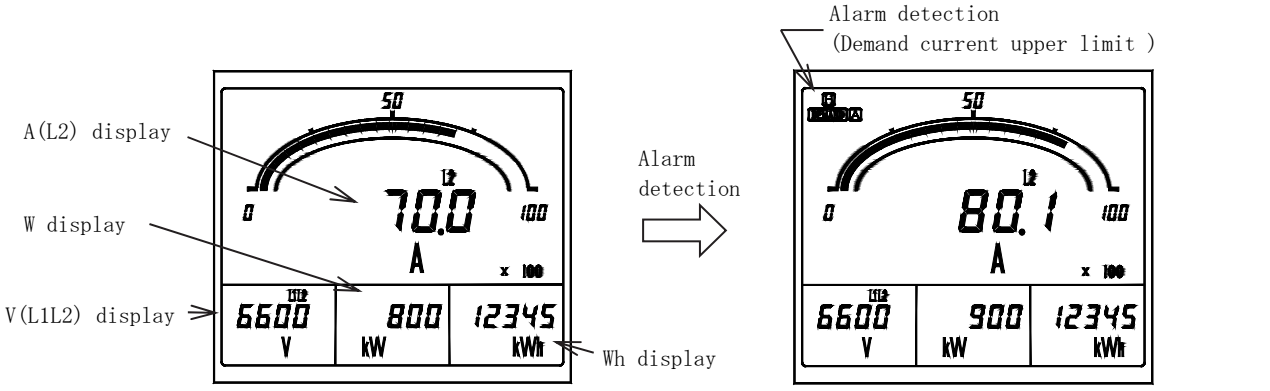


Voltage harmonic measurement maximum display.

4.2.2 Alarm detection display

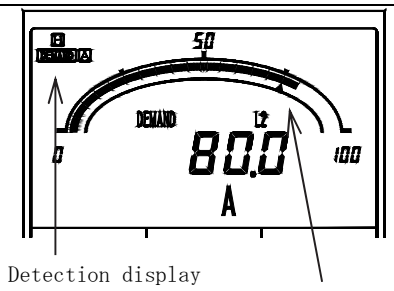
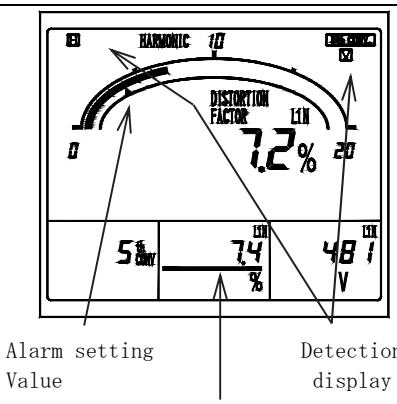
The alarm value setting is a possible measurement element (demand current and harmonic, etc.), it displays in case an input exceeds a set point.
Besides the usual measurement display, the detected element is displayed on a screen upper case.
In addition, in case setting OFF (not use) as measurement element, it does not detect.
And in the case of with an alarm-output option, it is possible to do an alarm output (relay make contact) to the outside simultaneously with a screen display.

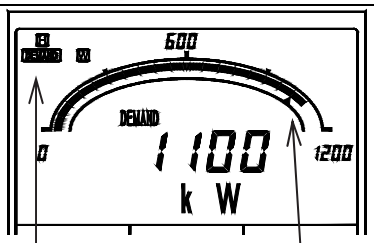
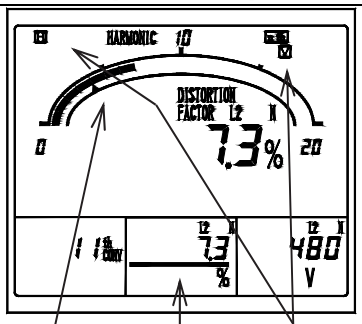
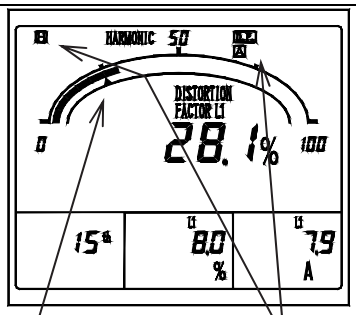
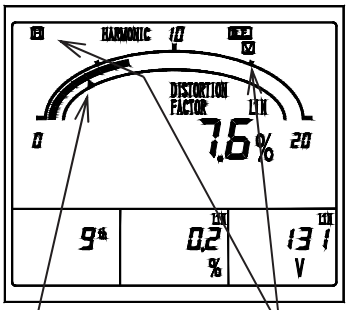
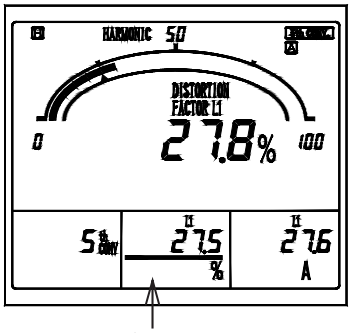
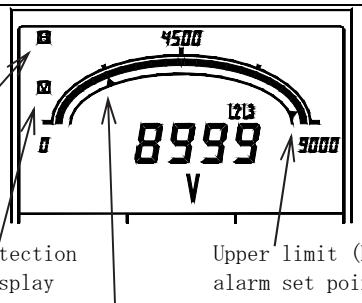
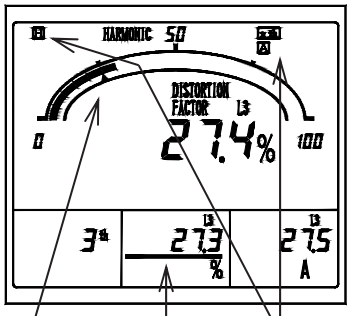
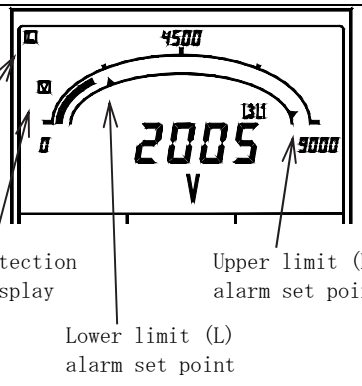
Alarm display possible element) Demand current, Demand active power,
Harmonic distortion factor (current, voltage),
Harmonic 5th conversion content (current, voltage),
Harmonic nth content (current, voltage n=3, 4, 5, 7, 9, 11, 13, 15),
Voltage



General measurement display. General measurement display (Alarm detection)

・The example of a display at the case of the detection in each alarm element.
In case the alarm element is indicating by measurement at the main monitor or the sub-monitor, a measurement value constitutes a blinking display.
The displays after an alarm return.
In case a return method is automatic reset setting : It returns to the usual measurement display.
In case a return method is manual reset setting
: A detection display and an alarm output hold (in case setting as an alarm output of applicable element).
The return in this case needs alarm reset operation. Please refer to "4.3.7 Reset" about alarm reset.

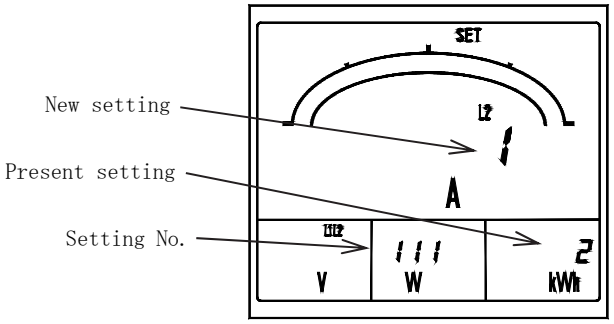
Alarm element		Example of a display	Alarm element		Example of a display
Demand current	Upper limit (H)		Voltage harmonic 5th conversion content	Upper limit (H)	

Alarm element		Example of a display	Alarm element		Example of a display
Demand active power	Upper limit (H)	 Detection display Alarm setting value	Voltage harmonic nth content	Upper limit (H)	 Alarm setting Value Detection display Setting as 11th content of bar graph (It distinguishes in an underbar)
Current distortion factor	Upper limit (H)	 Alarm setting value Detection display	Voltage distortion factor	Upper limit (H)	 Alarm setting Value Detection display
Current harmonic 5th conversion content	Upper limit (H)	 Setting as 5th conversion content of bar graph (It distinguishes in an underbar)	Voltage	Upper limit (H)	 Detection Display Upper limit (H) alarm set point Lower limit (L) alarm set point
Current harmonic nth content	Upper limit (H)	 Alarm setting value Detection display Setting as 3th content of bar graph (It distinguishes in an underbar)	Voltage	Lower limit (L)	 Detection Display Upper limit (H) alarm set point Lower limit (L) alarm set point

4.2.3 Setting display

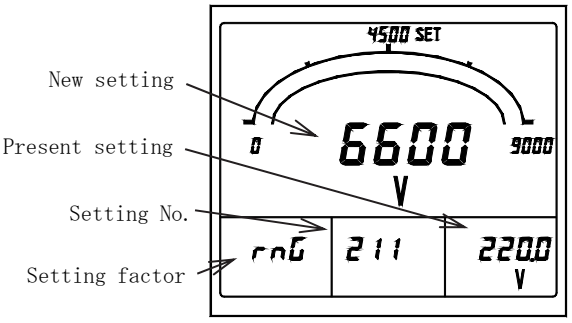
It is the display at the case of various setting. There are three types of setting modes according to the contents of a setting.
Refer to "5. Setting" for the operation in setting mode, and the detailed contents of a setting.

① Setting mode 1
Setting of a measurement display element, an alarm output, and an alarm value is mainly performed.
And, an alarm output can be tested in this setting mode.



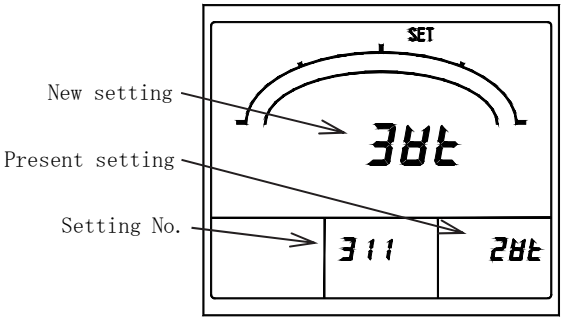
Setting mode 1 (No.111 Display pattern)

② Setting mode 2
Setting of measurement range, communication output, pulse output, and measurement display ON/OFF is mainly performed.
And, initialization of a setting value and reset of watt-hour integrated value can be performed in this setting mode.



Setting mode 2 (No.211 Voltage range)

③ Setting mode 3
Setting of an input circuit and tidal current measurement is mainly performed.

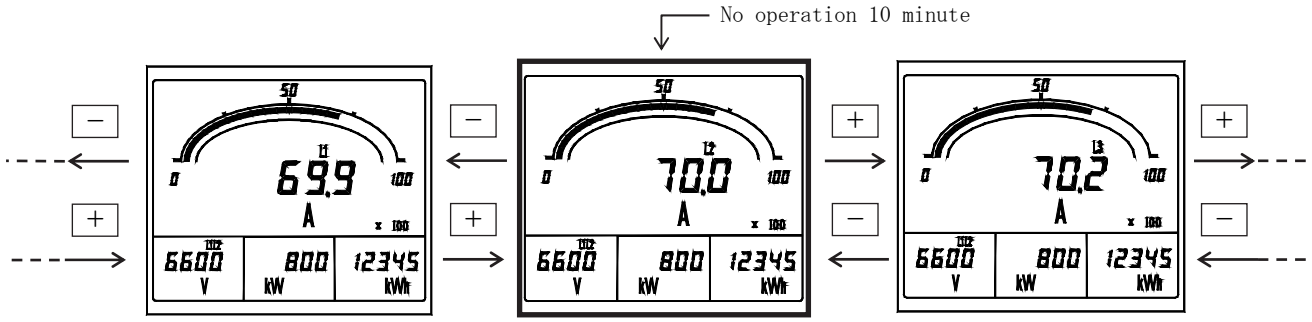


Setting mode 3
(No.311 Input circuit change)

4.3 Operation

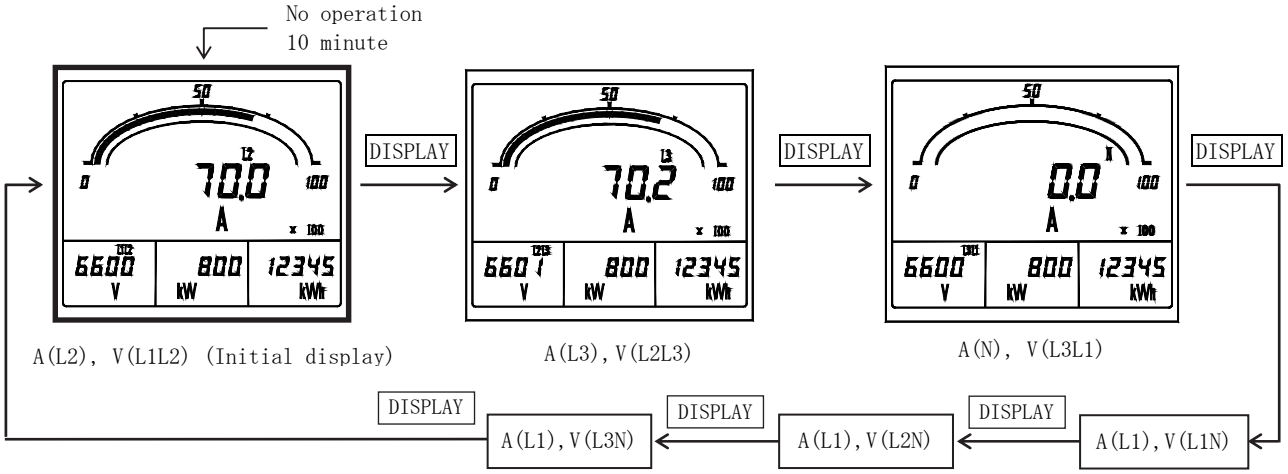
4.3.1 The main monitor display-element change

The measurement display element of the main monitor is changed. A change is performed by [+] [−].
This operation can be performed also except a general measurement display (harmonic measurement display, maximum display and minimum display). However, in a harmonic measurement display, a sub-monitor changes with a harmonic order. (The main monitor is distortion factor fixation.)
After changing a measurement display element, if a switch is not operated for 10 minutes, it will return to the original measurement display element automatically.
In a harmonic measurement display and maximum display and minimum display, even if a switch is not operated for 10 minutes, it does not return to the original display.
Setting can perform same operation in external operation input. Please refer to "5.3.2 Setting mode 2, (4) external operation input setting" about the setting method. Please refer to "6.3 Option specification" about external operation input.



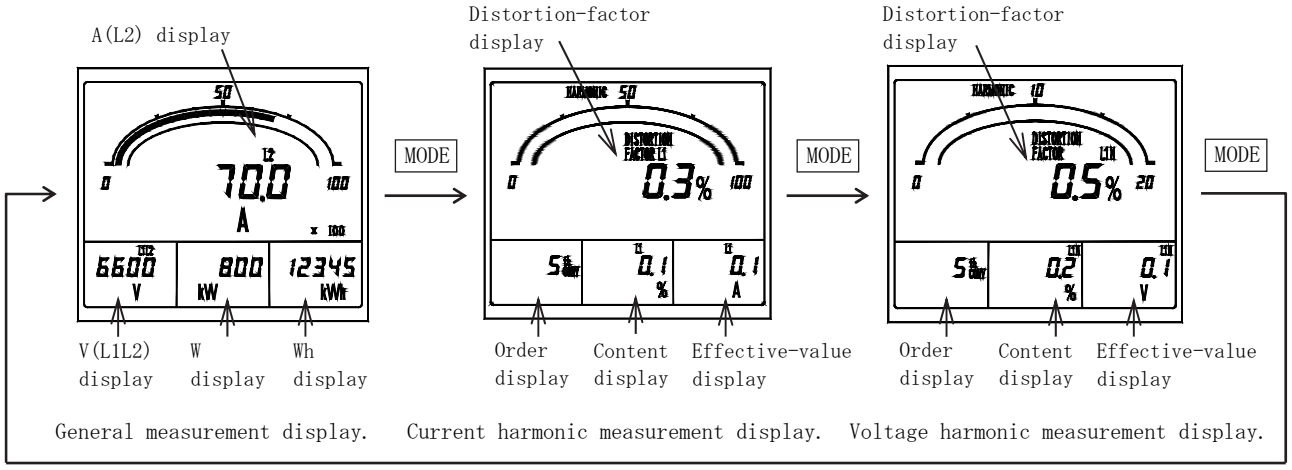
4.3.2 Phase (line) display change

A phase (line) display of current or voltage is changed. (Everything which is being indicated)
A change is performed by [DISPLAY]. This operation can be performed also except a general measurement display (harmonic measurement display, maximum display and minimum display).
In addition, after changing a phase (line) display, if a switch is not operated for 10 minutes, it will return to the original phase (line) display automatically.
In a harmonic measurement display and maximum display and minimum display, even if a switch is not operated for 10 minutes, it does not return to the original display.
Setting can perform same operation in external operation input. Please refer to "5.3.2 Setting mode 2, (4) external operation input setting" about the setting method. Please refer to "6.3 Option specification" about external operation input.



4.3.3 Harmonic measurement display change

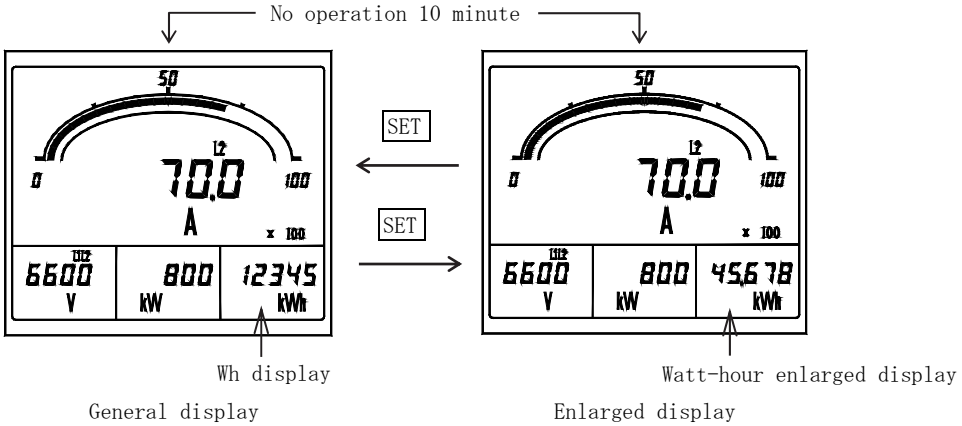
A general measurement display and a harmonic measurement display are changed. A change is performed by MODE.
Whenever it pushes a switch, it changes as follows. General measurement display → Current harmonic measurement display → Voltage harmonic measurement display → General measurement display ・・・
This operation can also perform the maximum display and minimum display.
In that case, it changes in order of a next. General measurement maximum and the minimum display → Current harmonic measurement maximum display → Voltage harmonic measurement maximum display → General measurement maximum and the minimum display ・・・
In addition, about this operation, even if it does not do switch operation for 10 minutes, it does not return to the original display.



4.3.4 Watt-hour enlarged display

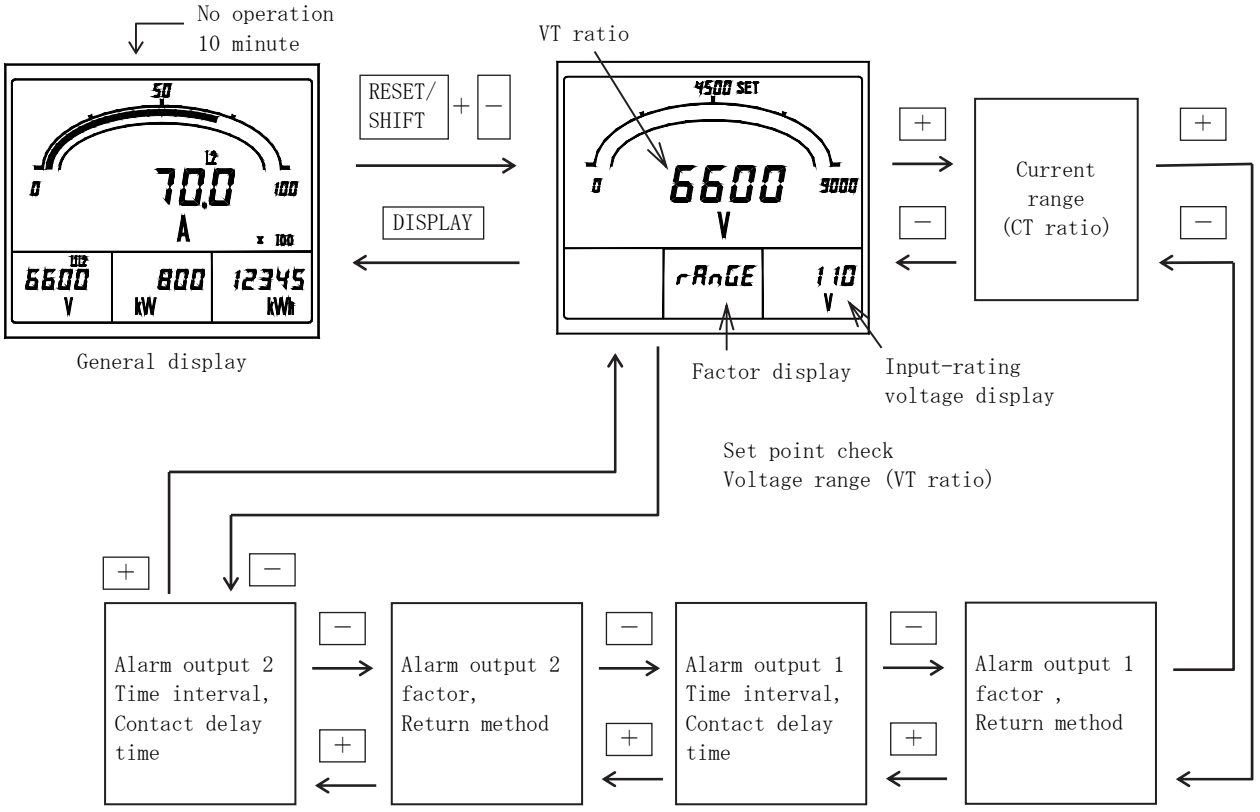
In case electric energy is being displayed by the general measurement display, an electric-energy display is usually changed to a display (5 digits of integers), and an enlarged display (2 digits integer + below decimal point, 3 digits).
A change is performed by SET.
After an enlarged display, if a switch is not operated for 10 minutes, it returns to the usual display automatically.

<Caution > If it continues pushing SET 3 seconds or more, it will become the setting mode 1. (An electric-energy display does not change)



4.3.5 Setting value check

A voltage range (VT ratio), a current range (CT ratio), and an alarm-output set point are checked.
Check is RESET/SHIFT and − are pushed simultaneously and performed.
The change of a set point is carries out by ＋ and −.
This operation can be performed also except a general measurement display (harmonic measurement display, maximum display and minimum display). DISPLAY is pushed in case it returns to the original measurement display.
And, if a switch is not operated for 10 seconds after a set point check, it will return to the original measurement display automatically.

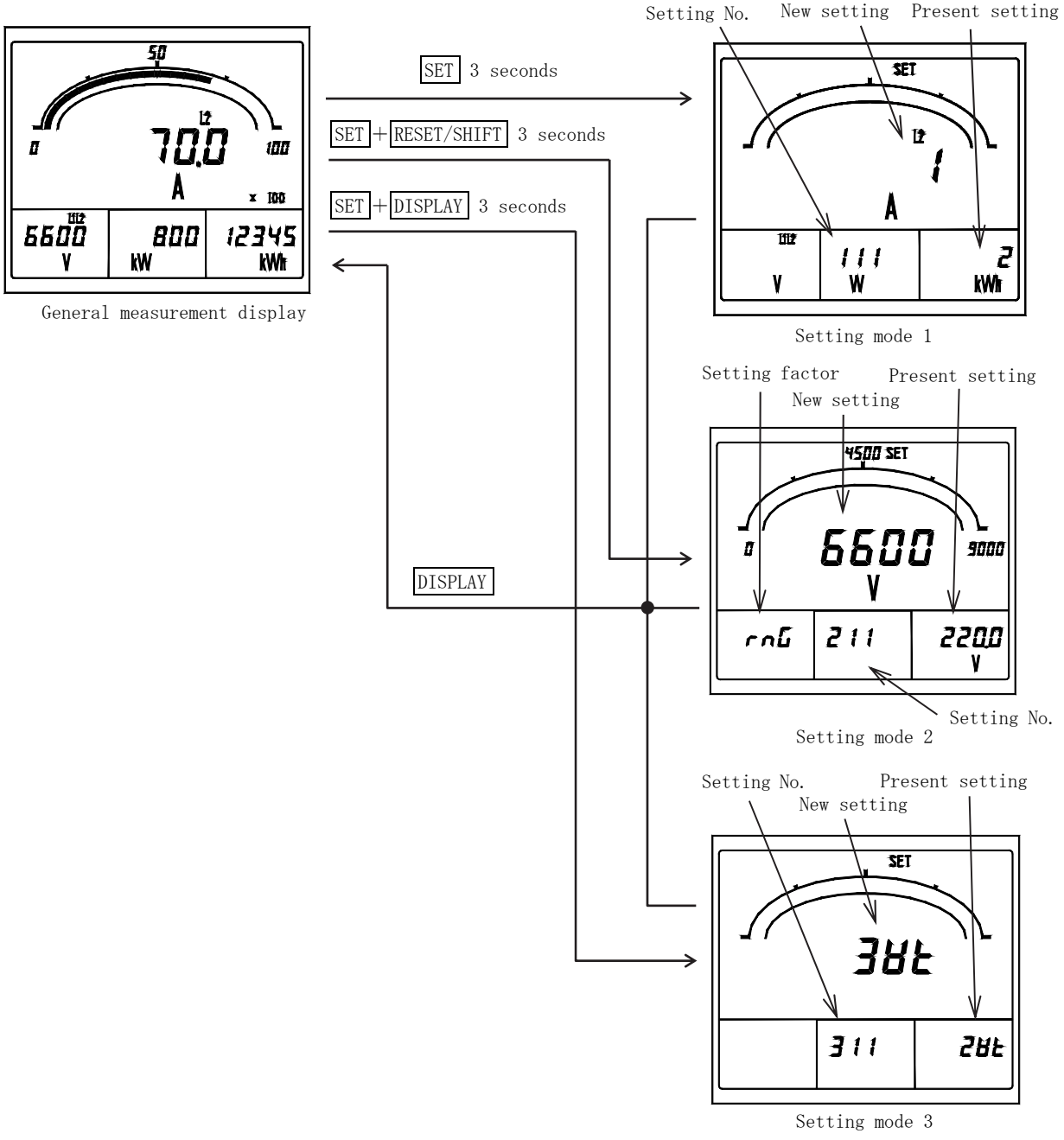


4.3.6 Setting mode

Various kinds of setting are performed. Setting mode is three types, and operations are different.
DISPLAY is pushed in case it returns to the original measurement display. And, if a switch is not operated for 10 minute after a set point check, it will return to the original measurement display automatically.
Operation and the contents of setting (detail) in setting mode, please refer to "5 Setting".

- Setting mode 1 : Press SET for longer than 3 seconds.
- Setting mode 2 : Press SET and RESET/SHIFT together for longer than 3 seconds.
- Setting mode 3 : Press SET and DISPLAY together for longer than 3 seconds.

<Reference> This operation can be performed also except a general measurement display (harmonic measurement display, maximum display and minimum display).



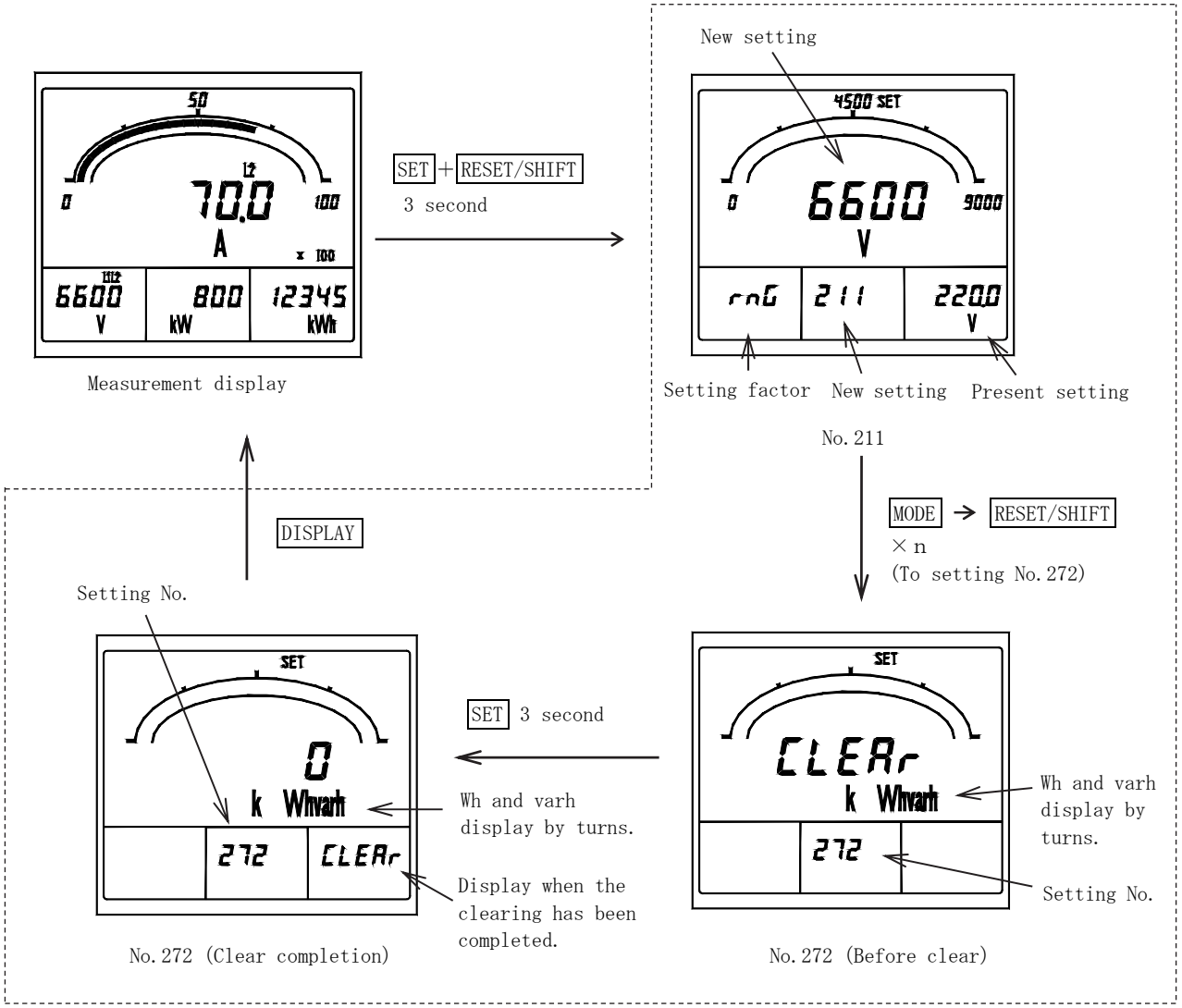
4.3.7 Reset

Various kinds of reset are performed. The kind of reset is as follows and operations are different, respectively.
Reset of watt-hour integrated value (zero clear),
Reset of maximum value and minimum value (it updates to the instantaneous value at the time),
Alarm-output reset (OFF of an alarm output (at the case of manual reset setting)).
And, the operation from each measurement display constitutes conditions at each reset.

(1) Watt-hour integrated-value reset

The integrated value of various watt-hour resets simultaneously. Watt-hour reset is performed in the setting mode 2. In detail explanation in the setting mode 2, please refer to "5.3.2 Setting mode 2".

① Press [SET] and [RESET/SHIFT] together for longer than 3 seconds. Migrate to the setting mode 2.
② [MODE] is pushed until setting is set to No.271. Further [RESET/SHIFT] is pushed once and it is made a watt-hour-reset display.
③ Press [SET] for longer than 3 seconds.
④ [DISPLAY] is pushed and it returns to a measurement display.



Setting mode 2

(2) Reset of maximum value and minimum value

Reset of the various measurement values of maximum value and minimum value is performed.
This reset has two types of methods. (How to perform according to a measurement element individual. How to reset all maximum values and minimum values simultaneously.)

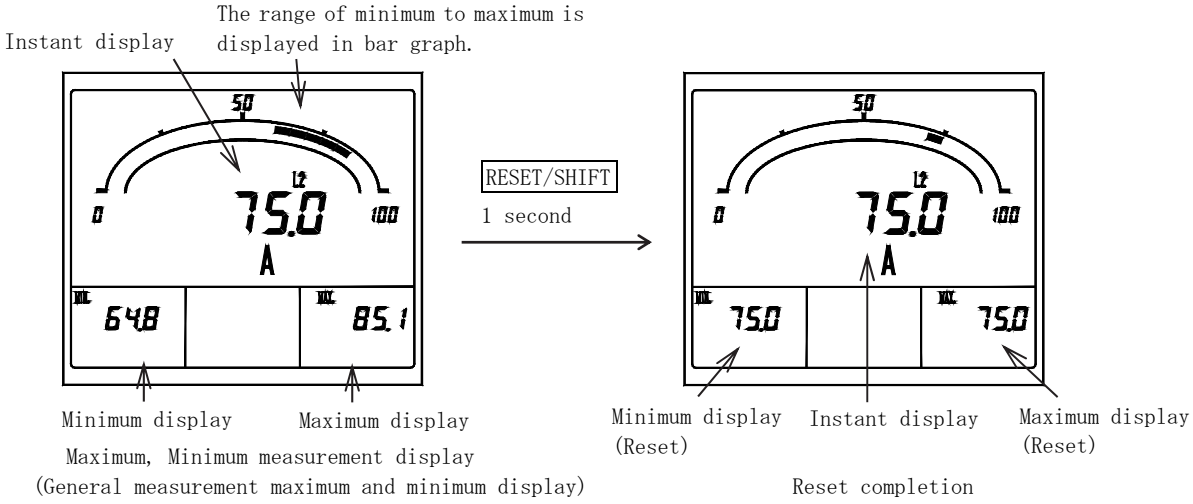
a) Individual reset

Reset of only a certain differential maximum value or the minimum value is performed. Other maximum values and minimum values are not reset by this operation.

① A measurement element to reset is displayed. (General measurement maximum value, minimum value, or Current, voltage harmonic measurement maximum display)

② Press RESET/SHIFT for longer than 1 seconds.

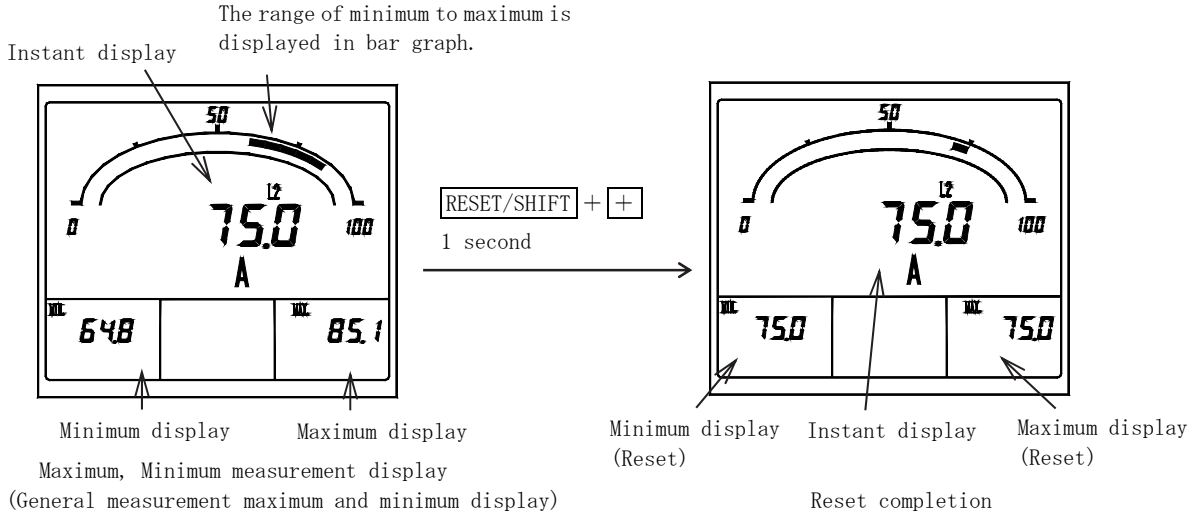
<Caution> An alarm output will be reset if this operation is performed by instant measurement display. Please be sure to perform this operation after displaying the maximum value and a minimum value measurement element to make it reset.



b) Simultaneously reset

Reset of all the maximum values and minimum value is performed.
In addition, setting can perform same operation in external operation input.
Please refer to "5.3.2 Setting mode 2 (4) external operation input setting" for the setting method,
Please refer to "6.3 Option" for the external operation input,

① Press RESET/SHIFT and ＋ together for longer than 1 seconds. By the maximum and the minimum measurement display (The general measurement maximum and minimum display or current, voltage harmonic measurement maximum display).



<Caution> In the general measurement maximum and minimum value reset, all the elements of general measurement are reset simultaneously. (The harmonic measurement maximum value is not reset.)
By harmonic measurement maximum value reset, a current element and a voltage element are reset simultaneously. (The general measurement maximum value and the minimum value are not reset.)

(3) Alarm reset

In case an alarm return method is set to “HOLD (manual return)”, an alarm output is reset (output OFF). (With an alarm-output option)

However, an output is not turned off by this operation, in case an alarm continues and it has caused.

And, this operation is unnecessary in case setting as "AUTO (automatic return)” in alarm return method. (By which an output is also OFF according to an alarm return.)

In case the number of alarm outputs is two, both outputs are reset (output OFF) by this operation. (Return operation that comes out individually cannot be performed.)

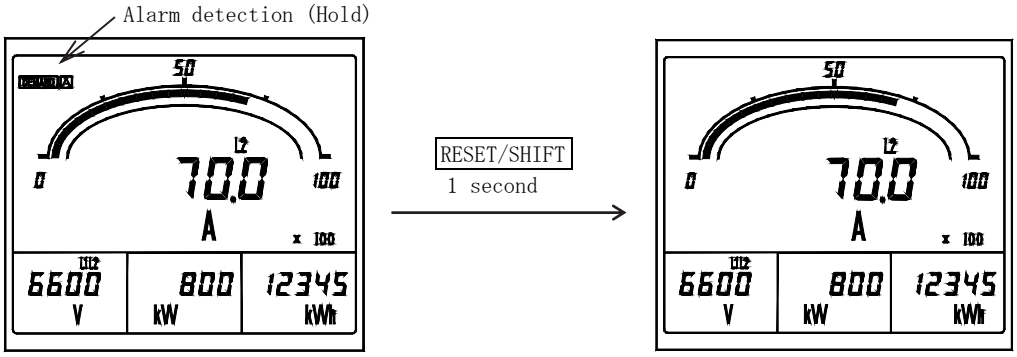
In addition, setting can perform same operation in external operation input.

Please refer to "5.3.2 Setting mode 2 (4) external operation input setting" for the setting method,

Please refer to "6.3 Option" for the external operation input,

① By instant measurement display (a general measurement display or current, voltage harmonic measurement display), RESET/SHIFT is pushed 1 second or more.

<Caution> If this operation is performed by the maximum and the minimum measurement display, the maximum value and minimum value of the measurement element currently displayed will be reset.
Please be sure to perform this operation in the state of an instant measurement display.



Instant measurement display
(General measurement display)

Reset completion

5. Setting

5.1 Function table

This product has each function setting with a front switch.

Setting mode 1. Function table (1)

Set No.	Function	Functional description	Current input	Voltage input	Initial set value (Voltage, current input)	Important setting	Page
111	Display pattern	Set the display combination pattern of the digital 4 displays and bar graph display.	○	○	Pattern 1	○	38-40
112	Main monitor	Set the display element of digital main monitor.	○	○	A(L2)	○	38-40
113	sub-monitor (left)	Set the display element of digital sub-monitor (left).	○	○	V(L1L2)	○	38-40
114	sub-monitor (center)	Set the display element of digital sub-monitor (center).	○	○	W	○	38-40
115	sub-monitor (right)	Set the display element of digital sub-monitor (right).	○	○	Wh	○	38-40
116	Bar graph	Set the display element of bar graph.	○	○	A(L2)	○	38-40
121AL (12)	Alarm 1 element	Set the output element of alarm 1.	○	○	DA	○	41
122AL (12)	Alarm 1 return method	Set the output action at the case of reset of alarm 1.	○	○	Automatic reset		41
123AL (12)	Alarm 1 mask time (Contact delay time)	Set the contact delay time of alarm 1.	○	○	0 second		41
124AL (12)	Alarm 1 test	Output test of alarm 1 is performed.	○	○	－		41
125AL (12)	Alarm 2 element	Set the output element of alarm 2.	○	○	DA	○	41
126AL (12)	Alarm 2 return method	Set the output action at the case of reset of alarm 2.	○	○	Automatic reset		41
127AL (12)	Alarm 2 mask time (Contact delay time)	Set the contact delay time of alarm 2.	○	○	0 second		41
128AL (12)	Alarm 2 test	Output test of alarm 2 is performed.	○	○	－		41
131H	Demand current upper limit	Set the high-alarm value of demand current.	○		80% (Full scale＝100%)		42
132	Demand current time interval	Set time interval of demand current.	○		0 second	○	42
133H	Demand active power upper limit	Set the high-alarm value of demand active power.			OFF (No operation)		42
134	Demand active power time interval	Set the time interval of demand active power.			0 second	○	42
135	Demand active power operating method	Set the operating method of demand active power.			Operating system according with bimetallic type.	○	42
136	Power factor operating method	Set the operating method of power factor measurement.			Instant measurement		42,43

Note(12) A setting item is not displayed in case there is no corresponding option.

Setting mode 1. Function table (2)

Set No.	Function	Functional description	Current input	Voltage input	Initial set value (Voltage, current input)	Important setting	Page
141H	Current distortion factor upper limit	Set the high-alarm value of current distortion factor.	○		OFF (No operation)		43,44
142H	Current 5th conversion content upper limit	Set the high-alarm value of current 5th conversion content.	○		OFF (No operation)		43,44
143	Current n-th content factor	Set the order of n-th current content.	○		5th		43,44
144H	Current n-th content upper limit	Set the high-alarm value of current n-th content.	○		OFF (No operation)		43,44
145H	Voltage distortion factor upper limit	Set this high-alarm value of voltage distortion factor.		○	OFF (No operation)		43,44
146H	Voltage 5th conversion content upper limit	Set the high-alarm value of voltage 5th conversion content.		○	OFF (No operation)		43,44
147	Voltage n-th content factor	Set the order of n-th voltage content.		○	5th		43,44
148H	Voltage n-th content upper limit	Set the high-alarm value of voltage n-th content.		○	OFF (No operation)		43,44
149	5th conversion detection characteristics	Set the detection characteristic of 5th conversion content.	○	○	Inverse-time-delay mode		43,44
14A	Average value time interval	Set the average value detection time interval of harmonic.	○	○	0 minute		43,44
151H	Instant measurement voltage upper limit	Set the high-alarm value of instant voltage.		○	OFF (No operation)		44
152L	Instant measurement voltage lower limit	Set the low-alarm value of instant voltage.		○	OFF (No operation)		44
171	Backlight action	Set the ON/OFF of backlight.	○	○	AUTO OFF		45
172	Backlight brightness	Set the brightness of backlight.	○	○	3 (Middle)		45

Setting mode 2. Function table (1)

Set No.	Function	Functional description	Current input	Voltage input	Initial set value (Voltage, current input)	Important setting	Page
211	Voltage range	Set the voltage-measurement range (VT ratio).		○	440V (14)	○	46-48
212	Current range	Set the current-measurement range (CT ratio).	○		1500A	○	46-48
213	Current display peculiar sensitivity	Set the full scale of current meter.	○		1500A		46-48
214	Active power polarity	Set the swing display of active power meter.			One-side swing		46-48
215	Active power (apparent power) range	Set the full scale of active power meter (apparent power meter).			1200kW (1200kVA) (15)		46-48
216	Reactive power range	Set the full scale of reactive power meter.			600kvar (15)		46-48
217	Power factor range	Set the full scale of power factor meter.			0.500 - 1.000 - 0.500		46-48
218	Frequency range	Set the full scale of frequency meter.		○	45.0 - 65.0Hz		46-48
231C (13)	Address	Set the address of device in communication output.	○	○	1	○	49
232C (13)	Transmission rate	Set the transmission rate of communication output.	○	○	9600bps	○	49
233C (13)	Parity	Set the parity bit added to communication data.	○	○	Even number	○	49
234C (13)	Stop bit	Set the stop bit added to communication data.	○	○	1 bit	○	49
235C (13)	Protocol version	Set the protocol version.	○	○	ver.B	○	49
241P (13)	P01 element	Set the output element of P01 (pulse output 1).			Wh	○	50
242P (13) (16)	P01 pulse unit	Set the output pulse unit of P01 (pulse output 1).			10kWh/p		50
243P (13)	P02 element	Set the output element of P02 (pulse output 2).			Wh	○	50
244P (13) (16)	P02 pulse unit	Set the output pulse unit of P02 (pulse output 2).			10kWh/p		50
251 (13)	External operation input 1 function	Set the function of the external operation input 1.	○	○	Alarm reset	○	51
252 (13)	External operation input 2 function	Set the function of the external operation input 2.	○	○	Maximum / Minimum reset	○	51

Note(13) A setting item is not displayed in case there is no corresponding option.
Note(14) In 220/√3V input, it becomes "220V".
Note(15) In 220/√3V input, it becomes "600kW" and "600VA" and "300kvar".
Note(16) In 220V input, it becomes "1kWh/p".

Setting mode 2. Function table (2)

Set No.	Function	Functional description	Current input	Voltage input	Initial set value (Voltage, current input)	Important setting	Page
261	Voltage ON/OFF	Set the ON/OFF of voltage measurement display.		○	ON		51
262	Current ON/OFF	Set the ON/OFF of current measurement display.	○		ON		51
263	Active power ON/OFF	Set the ON/OFF of active power measurement display.			ON		51
264	Reactive power ON/OFF	Set the ON/OFF of reactive power measurement display.			ON		51
265	Power factor ON/OFF	Set the ON/OFF of power factor measurement display.			ON		51
266	Frequency ON/OFF	Set the ON/OFF of frequency measurement display.		○	ON		51
267	Power-receiving watt-hour ON/OFF	Set the ON/OFF of power-receiving watt-hour measurement display.			ON		51
268	Power transmission var-hour ON/OFF	Set the ON/OFF of power transmission var-hour measurement display.			ON		51
269	Power-receiving var-hour (LAG,LEAD) ON/OFF	Set the ON/OFF of power-receiving var-hour (LAG,LEAD) measurement display.			ON		51
26A	Power transmission var-hour (LAG,LEAD) ON/OFF	Set the ON/OFF of power transmission var-hour (LAG,LEAD) measurement display.			ON		51
26B	Harmonic current ON/OFF	Set the ON/OFF of harmonic current measurement display.	○		ON		51
26C	Harmonic voltage ON/OFF	Set the ON/OFF of harmonic voltage measurement display.		○	ON		51
26D	Apparent power ON/OFF	Set the ON/OFF of apparent power measurement display.			ON		51
271	Set value initialization	All set values are initialized. (Return to initial set value)	○	○	－		52
272	Watt-hour reset	Integrated value is cleared simultaneously about each electric energy.			－		52

Setting mode 3. Function table

Set No.	Function	Functional description	Current input	Voltage input	Initial set value (Voltage, current input)	Important setting	Page
311	Input circuit change	Set the input circuit.		○	3φ4W (3VT,3CT)	○	53
312 ([17])	Input voltage	About of rated voltage 110/√3V or 220/√3V common product, set the input voltage.		○	110V	○	53
321	Measurement dead band	Set the dead band of measurement display.	○	○	0.0%		54
322	Tidal current measurement	Set the general measurement or tidal current measurement which was conscious of power transmission / power receiving, in measurement of reactive power and power factor.			General measurement		54

Note([17]) It is a setting item in 110/√3V or 220/√3V common products. A setting item is not displayed in 440/√3V product.

5.2 Setting table

A setting item changes by the specification of a product, or the existence of an option.

(1) Important setting

Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Set the measurement range of voltmeter (211)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ (211) Select a measurement range by + and − ➡ Press SET ➡ Selected measurement range is entered ➡ Press DISPLAY ➡ Returns to display mode.	46-48
Set the measurement range of ammeter (212)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ Press RESET/SHIFT ➡ (211) (212) Select a measuring range by + and − ➡ Press SET ➡ Selected measuring range is entered ➡ Press DISPLAY ➡ Returns to display mode.	46-48
Set the display combination (111)	Press SET for longer than 3 seconds ➡ Select the display combination by + and − ➡ (111) Press SET ➡ Selected display combination is entered ➡ Press DISPLAY ➡ Returns to display mode.	38-40
Set the address of device in communication output. (231C)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ Press MODE ➡ (211) (231C) Select an address by + and − ➡ Press SET ➡ Selected address is entered ➡ Press DISPLAY ➡ Returns to display mode.	49
Set the transmission rate of communication output. (232C)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ Press MODE ➡ (211) (231C) Press RESET/SHIFT ➡ Select an transmission rate by + and − ➡ Press SET ➡ (232C) Selected transmission rate is entered ➡ Press DISPLAY ➡ Returns to display mode.	49
Set the parity bit added to communication data. (233C)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ Press MODE ➡ (211) (231C) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Select an parity by + and − ➡ (232C) (233C) Press SET ➡ Selected parity is entered ➡ Press DISPLAY ➡ Returns to display mode.	49
Set the stop bit added to communication data. (234C)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ Press MODE ➡ (211) (231C) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (232C) (233C) (234C) Select an stop bit by + and − ➡ Press SET ➡ Selected stop bit is entered ➡ Press DISPLAY ➡ Returns to display mode.	49
Set the protocol version. (235C)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ Press MODE ➡ (211) (231C) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (232C) (233C) (234C) Select an protocol version by + and − ➡ Press SET ➡ (235C) Selected protocol version is entered ➡ Press DISPLAY ➡ Returns to display mode.	49
Set the output element of pulse output 1 (P01). (241P)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ Press MODE ➡ (211) (231C) Press MODE ➡ Select an output element by + and − ➡ Press SET ➡ (241P) Selected output element is entered ➡ Press DISPLAY ➡ Returns to display mode.	50

Items	Setting and operation procedures	Page
Set the output element of pulse output 2 (P02). (243P)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (231C) Press [MODE] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (241P) (242P) (243P) Select an output element by [+] and [−] ➡ Press [SET] ➡ Selected output element is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	50
Set the element of alarm output 1. (121AL)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ (111) (121AL) Select an output element by [+] and [−] ➡ Press [SET] ➡ Selected element is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	41
Set the element of alarm output 2. (125AL)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ (111) (121AL) (122AL) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (123AL) (124AL) (125AL) Select an element by [+] and [−] ➡ Press [SET] ➡ Selected element is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	41
Set the external operation input 1 function. (251)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (231C) Press [MODE] ➡ Press [MODE] ➡ Select an function by [+] and [−] ➡ Press [SET] ➡ (241P) (251) Selected function is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	51
Set the external operation input 2 function. (252)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (231C) Press [MODE] ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ Select an function by [+] and [−] ➡ (241P) (251) (252) Press [SET] ➡ Selected function is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	51
Set the time interval of demand current. (132)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ (111) (121AL) (131H) Select an time interval by [+] and [−] ➡ Press [SET] ➡ (132) Selected time interval is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	42
Set the time interval of demand active power. (134)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ (111) (121AL) (131H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Select an time interval by [+] and [−] ➡ (132) (133H) (134) Press [SET] ➡ Selected time interval is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	42
Set the operation method of demand active power. (135)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ (111) (121AL) (131H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (132) (133H) (134) (135) Select an operation method by [+] and [−] ➡ Press [SET] ➡ Selected operation method is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	42
Set the input circuit. (311)	Press [SET] and [DISPLAY] together for longer than 3 seconds ➡ (311) Select an circuit by [+] and [−] ➡ Press [SET] ➡ Selected circuit is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	53
Set the input voltage. (312)	Press [SET] and [DISPLAY] together for longer than 3 seconds ➡ Press [RESET/SHIFT] ➡ (311) (312) Select an input voltage by [+] and [−] ➡ Press [SET] ➡ Selected input voltage is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	53

(2) A combination except a display pattern.
Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Set the display element of main monitor. (112)	Press [SET] for longer than 3 seconds ➡ Press [RESET/SHIFT] ➡ (111) (112) Select an display element by [+] and [−] ➡ Press [SET] ➡ Selected display element is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	38-40
Set the display element of sub-monitor (left). (113)	Press [SET] for longer than 3 seconds ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (111) (112) (113) Select an display element by [+] and [−] ➡ Press [SET] ➡ Selected display element is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	38-40
Set the display element of sub-monitor (center). (114)	Press [SET] for longer than 3 seconds ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (111) (112) (113) Press [RESET/SHIFT] ➡ Select an display element by [+] and [−] ➡ Press [SET] ➡ (114) Selected display element is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	38-40
Set the display element of sub-monitor (right). (115)	Press [SET] for longer than 3 seconds ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (111) (112) (113) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Select an display element by [+] and [−] ➡ (114) (115) Press [SET] ➡ Selected display element is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	38-40
Set the display element of bar graph. (116)	Press [SET] for longer than 3 seconds ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (111) (112) (113) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (114) (115) (116) Select an display element by [+] and [−](If a sub-monitor is selected, an underbar will be displayed on the bottom of a digital display.) ➡ Press [SET] ➡ Selected display element is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	38-40

(3) Setting of active power polarity and measurement range.
Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Setting of measurement range of active power (apparent power). (214),(215)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [RESET/SHIFT] ➡ (211) (212) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (213) (214) Select an one-side(P)/both-side(-) deflection by [+] and [−] ➡ Press [SET] ➡ Selected deflection is entered ➡ Press [RESET/SHIFT] ➡ (215) Select a measuring range by [+] and [−] ➡ Press [SET] ➡ Selected measuring range is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	46-48

(4) Setting of reactive power measurement range.
Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Setting of measurement range of reactive power. (216)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [RESET/SHIFT] ➡ (211) (212) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (213) (214) (215) (216) Select a measuring range by [+] and [−] ➡ Press [SET] ➡ Selected measuring range is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	46-48

(5) Setting of Wh (varh) output pulse unit.
Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Set the pulse unit of pulse output 1 (Po1). (242P)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (231C) Press [MODE] ➡ Press [RESET/SHIFT] ➡ Select a output pulse unit by [+] and [−] ➡ (241P) (242P) Press [SET] ➡ Selected output pulse unit is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	50
Set the pulse unit of pulse output 2 (Po2). (244P)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (231C) Press [MODE] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (241P) (242P) (243P) (244P) Select a output pulse unit by [+] and [−] ➡ Press [SET] ➡ Selected output pulse unit is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	50

(6) Setting of active power factor and frequency measurement range
Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Set the measurement range of active power factor. (217)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [RESET/SHIFT] ➡ (211) (212) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (213) (214) (215) (216) Press [RESET/SHIFT] ➡ Select a measuring range by [+] and [−] ➡ Press [SET] ➡ (217) Selected measuring range is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	46-48
Set the measurement range of frequency. (218)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [RESET/SHIFT] ➡ (211) (212) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (213) (214) (215) (216) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Select a measuring range by [+] and [−] ➡ (217) (218) Press [SET] ➡ Selected measuring range is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	46-48

(7) Setting of current display intrinsic sensitivity.
Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Set the display sensitivity (% of a display to an input) of current. (213)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [RESET/SHIFT] ➡ (211) (212) Press [RESET/SHIFT] ➡ Select a display sensitivity by [+] and [−] ➡ Press [SET] ➡ (213) Selected display sensitivity is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	46-48

(8) Setting of alarm output.
Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Set the return method of alarm output 1. (122AL)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ (111) (121AL) (122AL) Select a return method by [+] and [−] ➡ Press [SET] ➡ The selected return method is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	41
Set the contact delay time of alarm output 1. (123AL)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ (111) (121AL) (122AL) Press [RESET/SHIFT] ➡ Select an contact delay time by [+] and [−] ➡ Press [SET] ➡ (123AL) The selected contact delay time is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	41
Set the return method of alarm output 2. (126AL)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ (111) (121AL) (122AL) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (123AL) (124AL) (125AL) (126AL) Select a return method by [+] and [−] ➡ Press [SET] ➡ The selected return method is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	41
Set the contact delay time of alarm output 2. (127AL)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ (111) (121AL) (122AL) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (123AL) (124AL) (125AL) (126AL) Press [RESET/SHIFT] ➡ Select an contact delay time by [+] and [−] ➡ Press [SET] ➡ (127AL) The selected contact delay time is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	41

(9) Demand measurement (current, active power) setting.
Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Set the high-alarm value of demand current. (131H)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) Select a high-alarm value by [+] and [−] ➡ Press [SET] ➡ Selected high-alarm value is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	42
Set the high-alarm value of demand active power. (133H)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ (111) (121AL) (131H) Press [RESET/SHIFT] ➡ Select a high-alarm value by [+] and [−] ➡ Press [SET] ➡ (132) (133H) Selected high-alarm value is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	42
Set the operation method of power factor measurement. (136)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ (111) (121AL) (131H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (132) (133H) (134) (135) Select a operation method by [+] and [−] ➡ Press [SET] ➡ (136) Selected operation method is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	42, 43

(10) Harmonic measurement setting

Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Set the high-alarm value of current distortion factor. (141H)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Select a high-alarm value by [+] and [−] ➡ Press [SET] ➡ Selected high-alarm value is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	43, 44
Set the high-alarm value of 5th current conversion content. (142H)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [RESET/SHIFT] ➡ Select a high-alarm value by [+] and [−] ➡ Press [SET] ➡ (142H) Selected high-alarm value is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	43, 44
Set the order of n-th current content. (143)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Select a order by [+] and [−] ➡ Press [SET] (142H) (143) ➡ Selected order is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	43, 44
Set the high-alarm value of n-th current content. (144H)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (142H) (143) (144H) Select a high-alarm value by [+] and [−] ➡ Press [SET] ➡ Selected high-alarm value is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	43, 44
Set the high-alarm value of voltage distortion factor. (145H)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (142H) (143) (144H) (145H) Select a high-alarm value by [+] and [−] ➡ Press [SET] ➡ Selected high-alarm value is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	43, 44
Set the high-alarm value of voltage 5th conversion content. (146H)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (142H) (143) (144H) (145H) Press [RESET/SHIFT] ➡ Select a high-alarm value by [+] and [−] ➡ Press [SET] ➡ (146H) Selected high-alarm value is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	43, 44
Set the order of n-th voltage content. (147)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (142H) (143) (144H) (145H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Select a order by [+] and [−] ➡ Press [SET] (146H) (147) ➡ Selected order is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	43, 44
Set the high-alarm value of n-th voltage content. (148H)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (142H) (143) (144H) (145H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (146H) (147) (148H) Select a element by [+] and [−] ➡ Press [SET] ➡ Selected element is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	43, 44

Items	Setting and operation procedures	Page
Set the detected characteristics of 5th conversion content. (149)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (142H) (143) (144H) (145H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (146H) (147) (148H) (149) Select a detected characteristics by [+] and [−] ➡ Press [SET] ➡ Selected detected characteristics is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	43, 44
Set the average time interval. (14A)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (142H) (143) (144H) (145H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (146H) (147) (148H) (149) Press [RESET/SHIFT] ➡ Select a time interval by [+] and [−] ➡ Press [SET] ➡ (14A) Selected time interval is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	43, 44

(11) Instant measurement setting

Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Set the high-alarm value of instant voltage. (151H)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [MODE] ➡ Select a high-alarm value by [+] and [−] ➡ Press [SET] ➡ (151H) Selected high-alarm value is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	44
Set the low-alarm value of instant voltage. (152L)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [MODE] ➡ Press [RESET/SHIFT] ➡ Select a low-alarm value by [+] and [−] ➡ (151H) (152L) Press [SET] ➡ Selected low-alarm value is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	44

(12) Backlight setting

Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Set the action of backlight. (171)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [MODE] ➡ Press [MODE] ➡ Select backlight action by [+] and [−] ➡ Press [SET] ➡ (151H) (171) Selected backlight action is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	45
Set the brightness of backlight. (172)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [MODE] ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ Select a brightness by [+] and [−] (151H) (171) (172) ➡ Press [SET] ➡ Selected backlight brightness is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	45

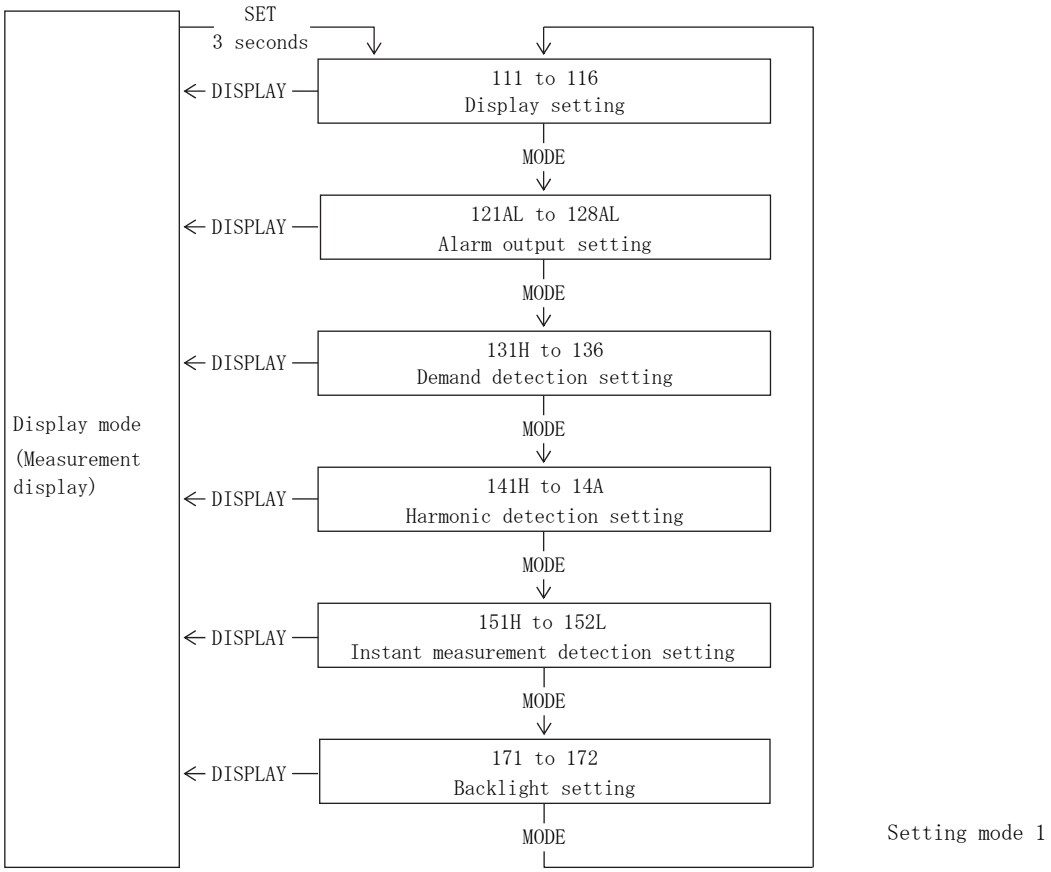
(13) Other, measurement setting

Each parenthesized number shows a setting number and this number is displayed on the setting screen.

Items	Setting and operation procedures	Page
Set the dead band of measurement display. (321)	Press [SET] and [DISPLAY] together for longer than 3 seconds ➡ Press [MODE] ➡ (311) (321) Select of dead band value in measurement display by [+] and [−] ➡ Press [SET] ➡ The value of dead band in display is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	54
Set the tidal current measurement of reactive power and power factor. (322)	Press [SET] and [DISPLAY] together for longer than 3 seconds ➡ Press [MODE] ➡ (311) (321) Press [RESET/SHIFT] ➡ Select a tidal current measurement by [+] and [−] ➡ (322) Press [SET] ➡ Selected action is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	54

5.3 Setting in detail explanation

5.3.1 Setting mode 1



Setting mode 1

Setting mode 1 is selected by pressing [SET] switch for longer than 3 seconds.
Pushing [MODE] switch performs movement of setting item.
The present mode can be returned to the display mode by pressing [DISPLAY] switch.

< Caution >
If setting change should have been mistaken, an alarm output is not obtained correctly.
Therefore, users must not set. The setting item without the corresponding option is not displayed.

(1) 111 to 116 Display combination setting 【All models】

● Voltage, current input (18)(19)

No.	Pattern No.	Main-monitor	Sub-monitor (Left)	Sub-monitor (Center)	Sub-monitor (Right)	Bar graph
1	Pattern 1	A(L2)	V(L1L2)	W	Wh	A(L2)
2	Pattern 2	A(L2)	V(L1L2)	W	cos ϕ	A(L2)
3	Pattern 3	A(L2)	V(L1L2)	W	Hz	A(L2)
4	Pattern 4	DA(L2)	A(L2)	V(L1L2)	W	DA(L2)
5	Pattern 5	DA(L2)	A(L2)	V(L1L2)	Wh	DA(L2)
6	Pattern 6	DA(L2)	V(L1L2)	W	cos ϕ	DA(L2)
7	Pattern 7	W	V(L1L2)	A(L2)	Wh	W
8	Pattern 8	W	V(L1L2)	A(L2)	cos ϕ	W
9	Pattern 9	W	V(L1L2)	A(L2)	Hz	W
10	Pattern 10	DW	V(L1L2)	W	Wh	DW
11	Pattern 11	DW	V(L1L2)	A(L2)	cos ϕ	DW
12	Pattern 12	A(L2)	cos ϕ	W	Wh	A(L2)
13	Pattern 13	A(L2)	var	W	Wh	A(L2)
14	Pattern 14	W	cos ϕ	var	Wh	W
15	Pattern 15	A(L2)	A(L1)	A(L3)	Wh	A(L2)
16	Pattern 16	V(L1L2)	V(L2L3)	V(L3L1)	Hz	V(L1L2)

Note(18) Voltage input is pattern 16 only.

Note(19) Current input is pattern 15 only. (However, sub-monitor (right) is A(N) display.)

● Displays set element

Main monitor	V(L1N), V(L2N), V(L3N), V(L1L2), V(L2L3), V(L3L1), A(L1), A(L2), A(L3), A(N), DA(L1), DA(L2), DA(L3), DA(N), W, DW, var, VA, cos ϕ, Hz, Wh, -Wh, varh(LAG), varh(LEAD), -varh(LAG), -varh(LEAD), Distortion factor(A,V)
Sub-monitor (Left)	V(L1N), V(L2N), V(L3N), V(L1L2), V(L2L3), V(L3L1), A(L1), A(L2), A(L3), A(N), W, var, cos ϕ
Sub-monitor (Center)	V(L1N), V(L2N), V(L3N), V(L1L2), V(L2L3), V(L3L1), A(L1), A(L2), A(L3), A(N), DA(L1), DA(L2), DA(L3), DA(N), W, DW, var, varh(LAG), varh(LEAD), -varh(LAG), -varh(LEAD), Harmonic 5th conversion content(A,V), Harmonic nth content(A,V)
Sub-monitor (Right)	V(L1N), V(L2N), V(L3N), V(L1L2), V(L2L3), V(L3L1), A(L1), A(L2), A(L3), A(N), DA(L1), DA(L2), DA(L3), DA(N), W, DW, cos ϕ, Hz, Wh, -Wh, Fundamental-wave effective value(A,V), Harmonic 5th conversion effective value(A,V), Harmonic nth effective value(A,V)
Bar graph	V(L1N), V(L2N), V(L3N), V(L1L2), V(L2L3), V(L3L1), A(L1), A(L2), A(L3), A(N), DA(L1), DA(L2), DA(L3), DA(N), W, DW, var, cos ϕ, Hz, Distortion factor(A,V), Harmonic 5th conversion content(A,V), Harmonic nth content(A,V), Fundamental-wave effective value(A,V), Harmonic 5th conversion effective value(A,V), Harmonic nth effective value(A,V)

● Phase (line) change (20)

→ V(L1L2) → V(L2L3) → V(L3L1) →
V(L3N) ← V(L2N) ← V(L1N) ←

→ A(L2) → A(L3) → A(N) →
A(L1) ← A(L1) ← A(L1) ←

Note(20) Press DISPLAY, Voltage and current are replaced at the same time.

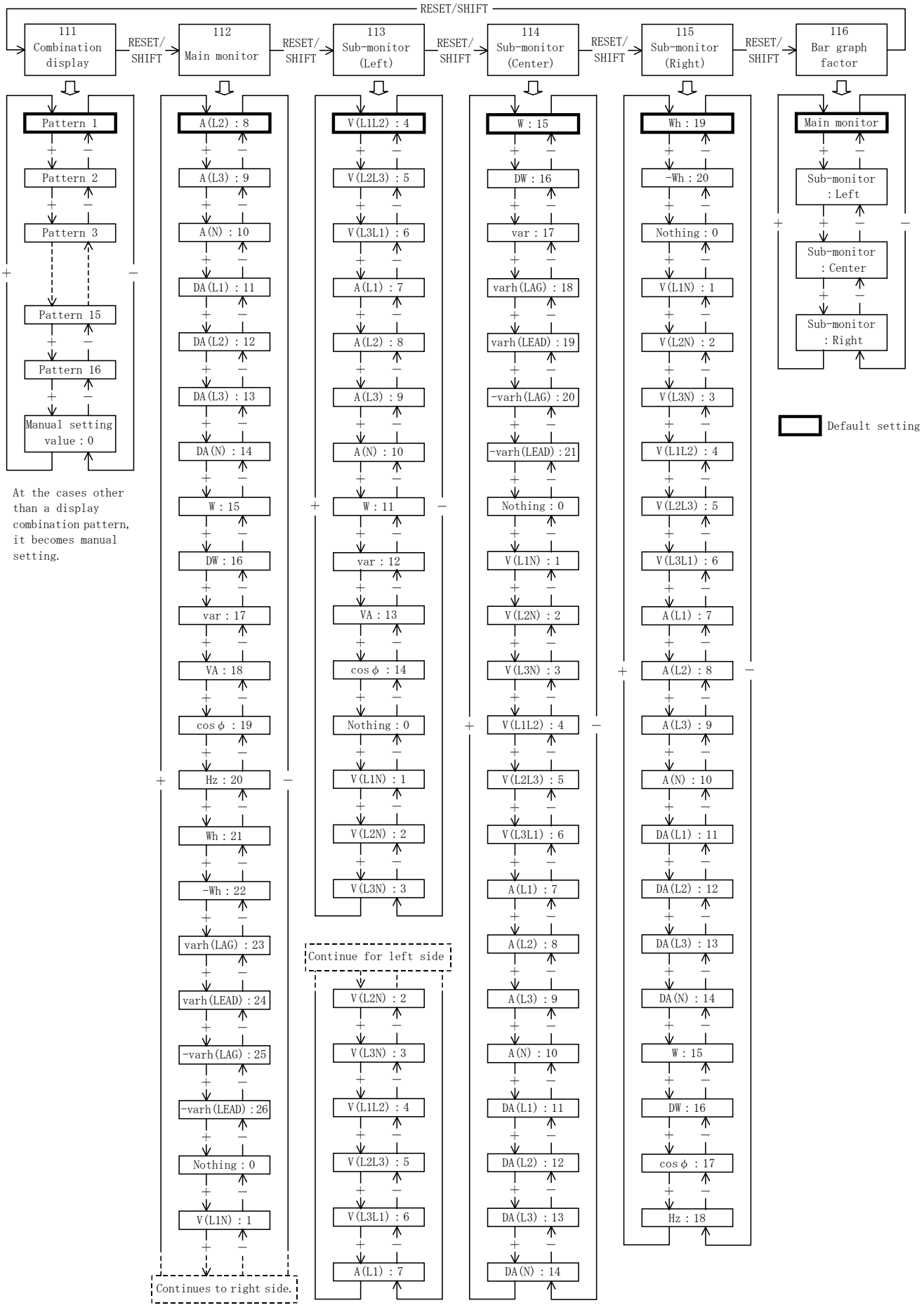
● Measurement element change (Measurement display mode)

→ V(L1L2) → V(L2L3) → V(L3L1) → A(L1) → A(L2) → A(L3) → A(N) →
→ DA(L1) → DA(L2) → DA(L3) → DA(N) → W → DW → var →
→ VA → cos ϕ → Hz → Wh → -Wh → varh(LAG) →
→ varh(LEAD) → -varh(LAG) → -varh(LEAD) → Nothing →
→ V(L1N) → V(L2N) → V(L3N) →

● Measurement element change (Harmonic measurement display mode)

Main monitor : Distortion factor (Fixation)
Sub-monitor (Left) : Harmonic order n → 5th conversion → 1 → 3 → 4 → 5 → 7 → 9 → 11 → 13 → 15 →
Sub-monitor (Center) : Harmonic nth content (Fixation)
Sub-monitor (Right) : Harmonic nth effective value (Fixation)

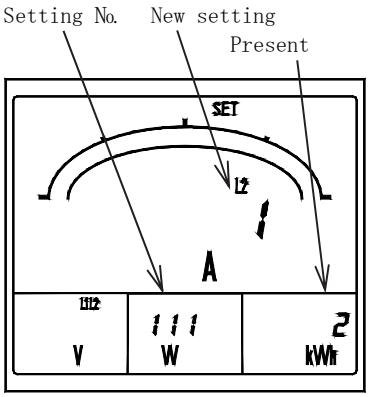
Display combination setting

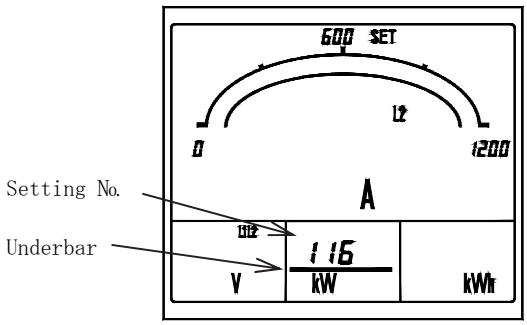


◆ 111 Combination display
Select the elements to be measured and monitored by 4 digital displays out of combination patterns.
Set values are updated by SET.

◆ 112 to 115 Main monitor, Sub-monitor (left), Sub-monitor (center), Sub-monitor (right)
Set these items for a display configuration other than combined patterns. Set values are updated by SET.

◆ 116 Bar graph element
A element being monitored in the main monitor is basically displayed by a bar graph. Set this item for displaying a element being monitored on a sub-monitor by bar graph. An underbar is attached to the digital display of the setting sub-monitor.
Set values are updated by SET.

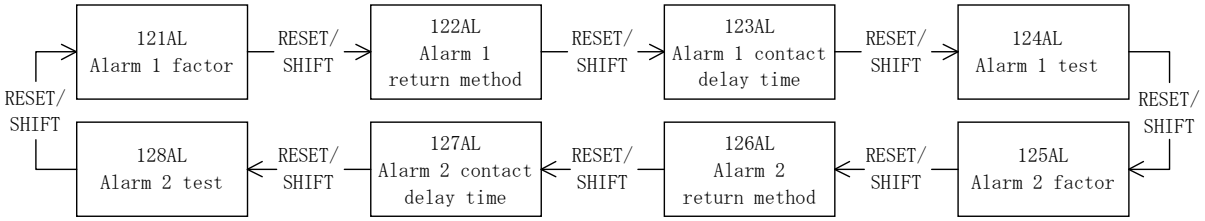




(2) 121AL to 128AL Alarm output setting 【With an alarm output option】

Various setting and an output test are performed about an alarm output.

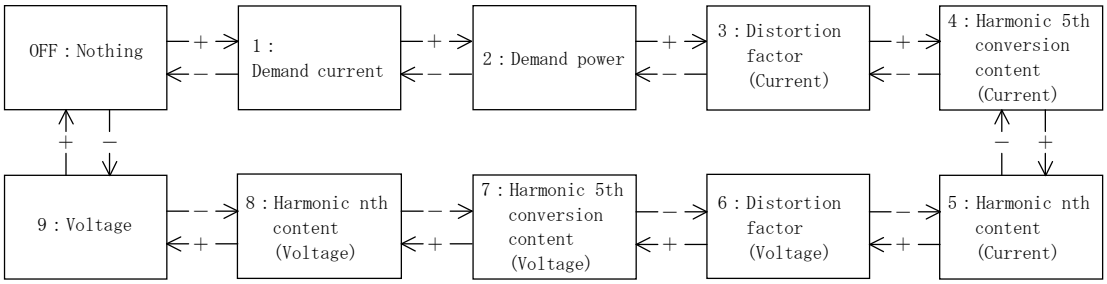
In case contact outputs 1 and 2 are alarm-output specifications, the corresponding alarm output is setting.



◆ 121AL Alarm 1 element setting, 125AL Alarm 2 element setting.

Set the output element of alarms 1 and 2. Selection by [+] and [−], set value is updated by [SET].

Default setting : 1(DA : Demand current)

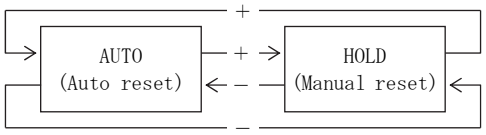


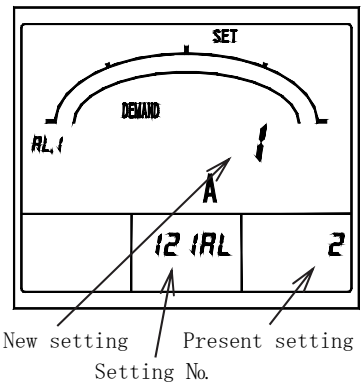
◆ 122AL Alarm 1 reset method setting, 126AL Alarm 2 reset method setting

Output action at the case of a reset of alarms 1 and 2 can be selected from AUTO (automatic reset) and HOLD (manual reset).

In "AUTO (automatic reset)", an alarm output also constitutes OFF according to a reset of an alarm. In "HOLD (manual reset)", even after an alarm reset, an output holds ON. The reset in this case (output OFF) is performed in [RESET/SHIFT]. Selection by [+] and [−], set value is updated by [SET].

Default setting : AUTO (automatic reset)





◆ 123AL Alarm 1 contact delay time, 127AL Alarm 2 contact delay time

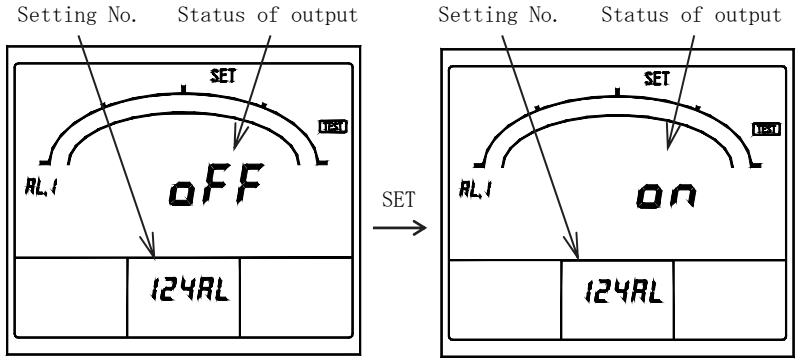
Set the contact delay time of alarms 1 and 2. The setting range is 0 to 300 seconds (1-second step).

Selection by [+] and [−], set value is updated by [SET].

Default setting : 0 second (With no contact delay)

◆ 124AL Alarm 1 test, 128AL Alarm 2 test

The output of alarms 1 and 2 is tested. While pushing [SET], an output is ON, and if it detaches, an output switches OFF.



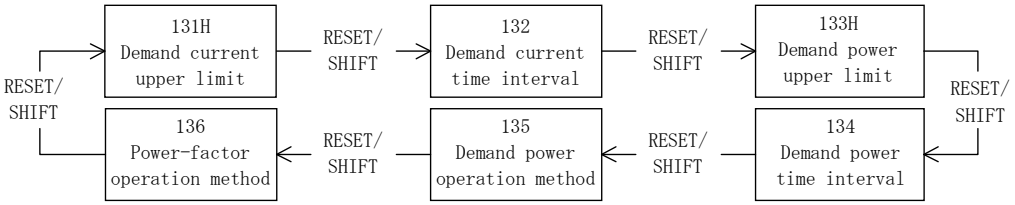
(Output OFF) (Output ON)

Alarm 1 test

(3) 131H to 136 Demand detection setting 【Except voltage input】

The following operation method is setting.

Demand current, action of demand, high-alarm value, time-interval, power factor, demand active power.



◆ 131H Demand current upper limit. 133H Demand active power upper limit.

Set the high-alarm value of demand current(DA) and demand active power(DW).

The setting range is 5 to 100% (1% step) and OFF (To full scale = 100%).

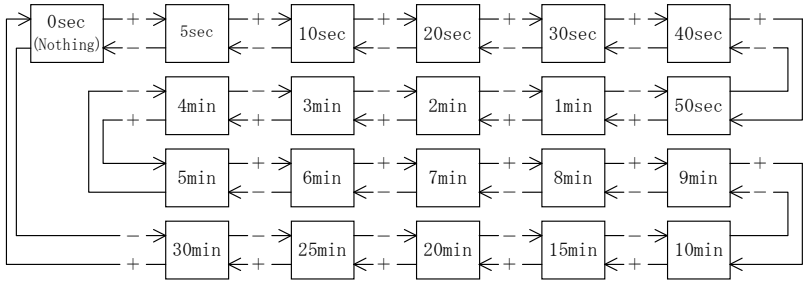
Selection by [+] and [−], set value is updated by [SET].

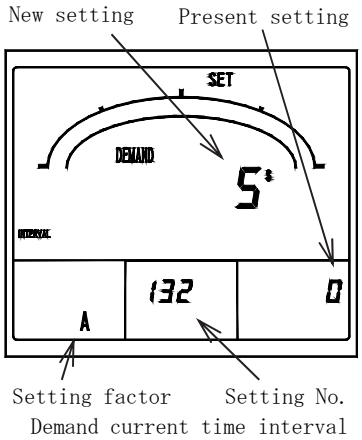
Default setting : 80% (Demand current), OFF (Demand active power)

◆ 132 Demand current time interval. 134 Demand active power time interval.

Set the time interval (95% time interval) of demand current(DA) and demand active power(DW). Selection by [+] and [−], set value is updated by [SET].

Default setting : 0 second (demand current, demand active power)



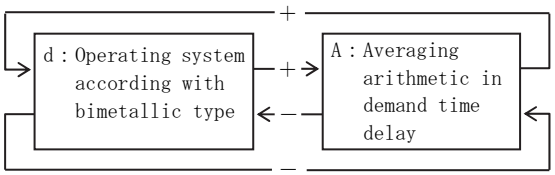


◆ 135 Demand active power operation method

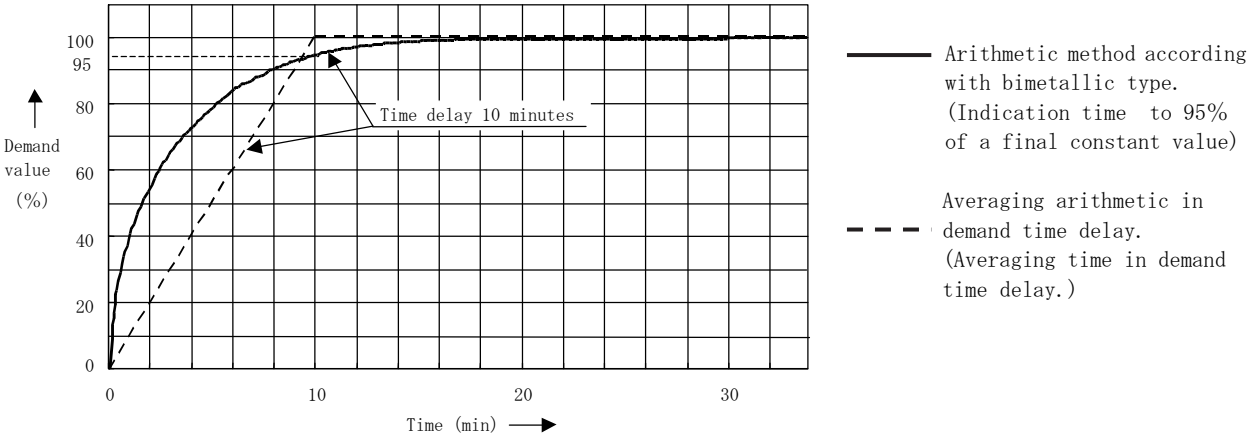
The operating system of demand (DW) can be selected from d (operating system according with bimetallic type : demand) and A (Averaging arithmetic in demand time delay : average).

Selection by [+] and [−], set value is updated by [SET].

Default setting : d(Operating system according with bimetallic type)



● Demand time delay characteristic (Demand current, Demand active power)



Arithmetic method

Demand current measurement : Arithmetic method according with bimetallic type.

Demand active power measurement : Arithmetic method according with bimetallic type (Initial value). Or the averaging arithmetic in a demand time interval. One is selected by setting.

100% indication time is about 3 times the time delay at the case of the arithmetic method according with bimetallic type.(In case of 10 minutes/95% of time-interval, time to reach to 100% is about 30 minutes.)

Demand measurement is measured to the 2 times of the rated current, and the 2 time of a rated active power.

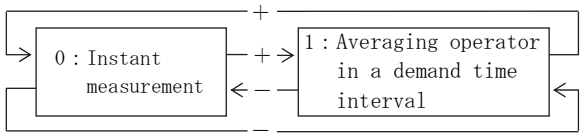
◆ 136 Power factor operation method

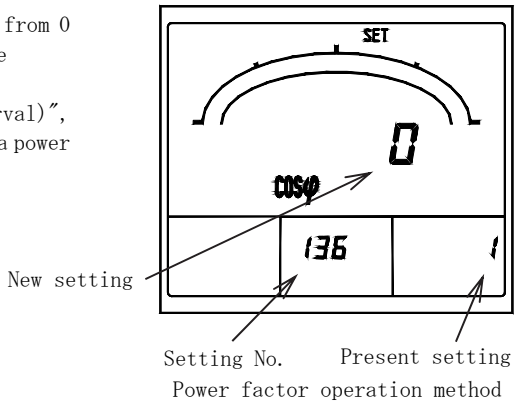
The operation method of power factor measurement can be selected from 0 (instant measurement) and 1 (averaging operator in a demand time interval).

In case it is set as "1 (averaging operator in a demand time interval)", power factor measurement is calculated from the operation method of a power demand time interval and a demand active power meter.

Selection by [+] and [−], set value is updated by [SET].

Default setting : 0 (Instant measurement)

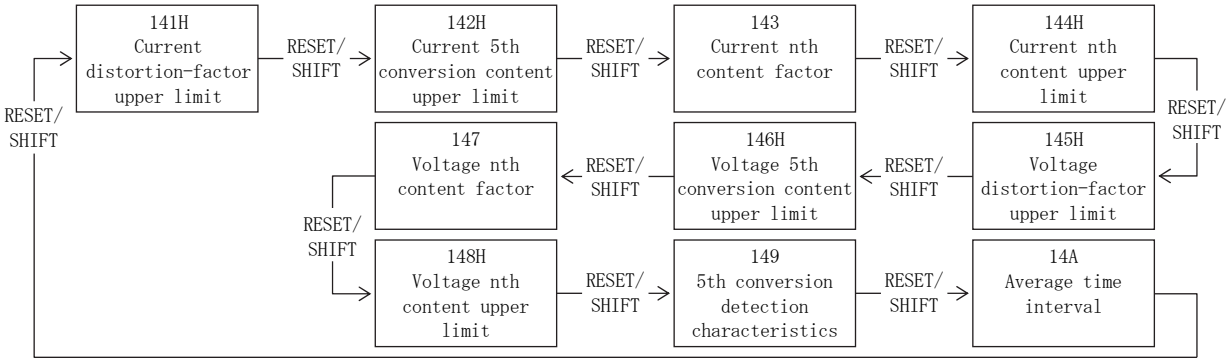




Power factor operation method

(4) 141H to 14A Harmonic detection setting 【All models】

Set the high-alarm value of each harmonic (current, voltage) measurement element, element, 5th conversion detection characteristics, and average time interval is performed.



◆ 141H Current distortion factor upper limit,
145H Voltage distortion factor upper limit

Set the high-alarm value of distortion factor (current, voltage).

Setting range. Current : 5 - 100%(1% step) and OFF.
Voltage : 1.0 - 20.0%(0.1% step) and OFF.

Selection by [+] and [−], set value is updated by [SET].

Default setting : OFF [Non-use] (Current, Voltage)

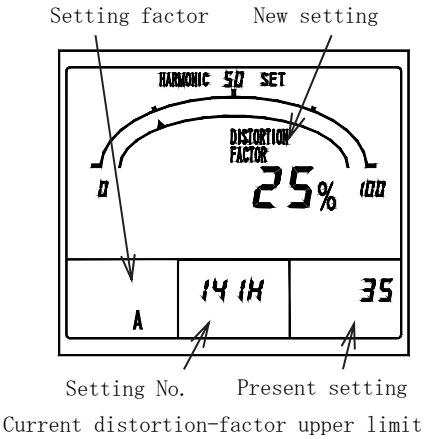
◆ 142H Current 5th conversion content upper limit,
146H Voltage 5th conversion content upper limit.

Set the high-alarm value of 5th conversion content (current, voltage).

Setting range. Current : 5 - 100%(1% step) and OFF.
Voltage : 1.0 - 20.0%(0.1% step) and OFF.

Selection by [+] and [−], set value is updated by [SET].

Default setting : OFF [Non-use] (Current, Voltage)



Current distortion-factor upper limit

◆ 143 Current nth content factor, 147 Voltage nth content factor.

Set the element (order) of nth content (current, voltage).

An order can be selected from n= 3, 4, 5, 7, 9, 11, 13, 15.

Selection by [+] and [−], set value is updated by [SET].

Default setting : 5th(Current, Voltage)

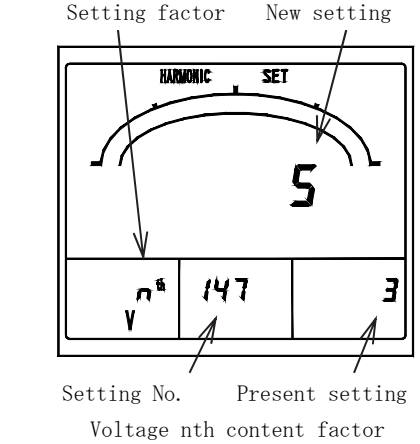
◆ 144H Current nth content upper limit,
148H Voltage nth content upper limit.

Set the high-alarm value of nth content (current, voltage).

Setting range. Current : 5 - 100%(1% step) and OFF.
Voltage : 1.0 - 20.0%(0.1% step) and OFF.

Selection by [+] and [−], set value is updated by [SET].

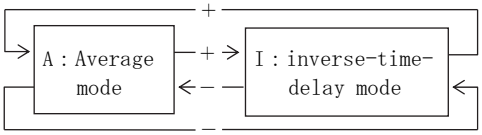
Default setting : OFF [Non-use] (Current, Voltage)

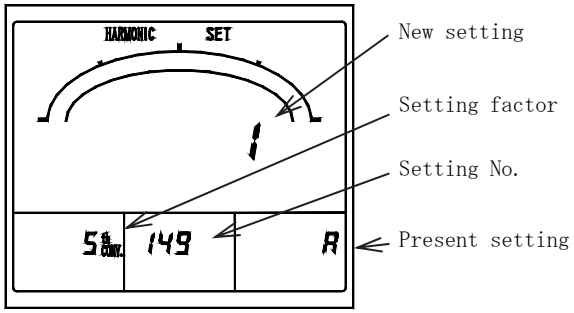


Voltage nth content factor

◆ 149 5th conversion detection characteristics.

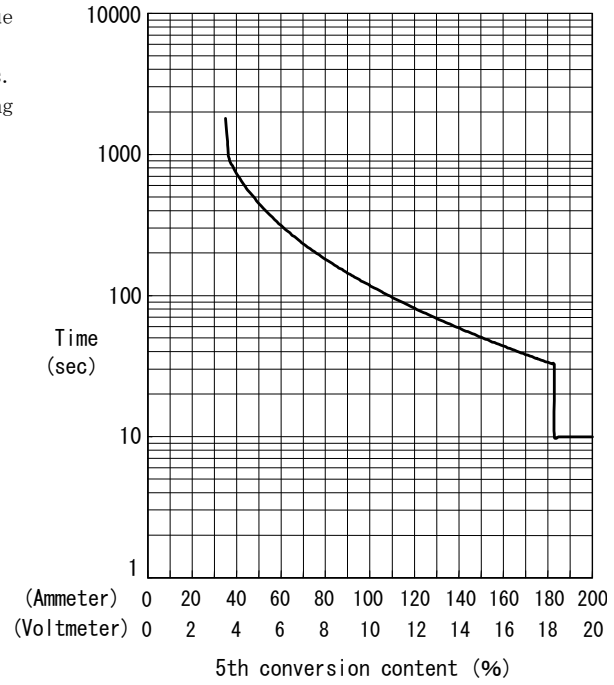
The detection characteristics of 5th conversion content can be selected from A (average mode) and I (inverse-time-delay mode).
In case of "A (average mode)", when average measured value (the average of instantaneous value in average time interval) exceeded the upper limit alarm value, it detects.
And in case of "I (inverse-time-delay mode)", when exceeding the upper limit warning value by anti-time limit characteristic of instantaneous value, it detects.
Selection by [＋] and [－], set value is updated by [SET].
Default setting : I(inverse-time-delay mode)





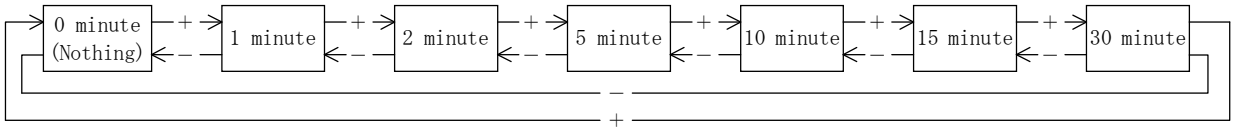
5th conversion detection

Alarm output, Inverse-time-delay characteristics
In case of high-limit-setting value 35%
(voltmeter 3.5%)

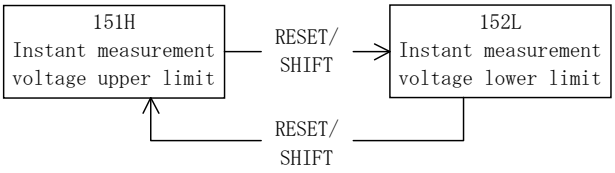


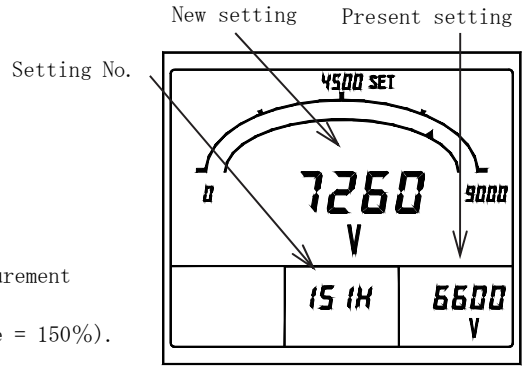
◆ 14A Average time interval

Set the average time interval of each harmonic measurement.
Selection by [＋] and [－], set value is updated by [SET].
In addition, in case the detection characteristics of 5th conversion content are set as inverse-time-delay mode, since 5th conversion content may operate in inverse-time-delay characteristics, this time interval is disregarded.
Default setting : 0 minute (With no average)



(5) 151H to 152L Instant measurement detection setting 【Current input is excluded.】
An upper limit low-alarm value is set by instant measurement (voltage element).





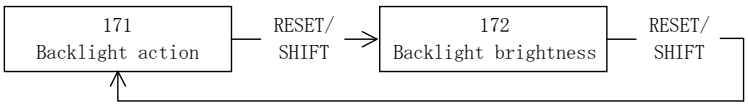
Instant measurement voltage upper limit

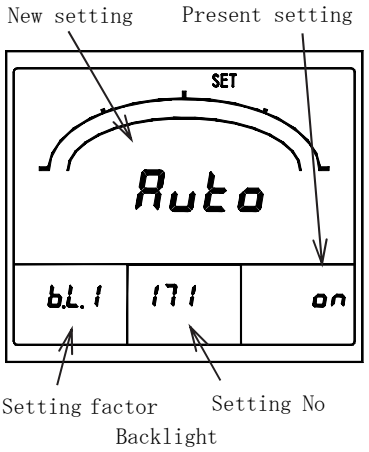
◆ 151H Instant measurement voltage upper limit,
152L Instant measurement voltage lower limit.

Set the high-alarm value and low-alarm value of instant measurement (voltage).
Setting range is 30 to 150%(1% step) and OFF (To full scale = 150%).
Selection by [＋] and [－], set value is updated by [SET].
Default setting : OFF 〔Non-use〕 (Upper limit, lower limit)

(6) 171 to 172 Backlight setting

Sets the action and brightness of backlight.





◆ 171 Backlight action

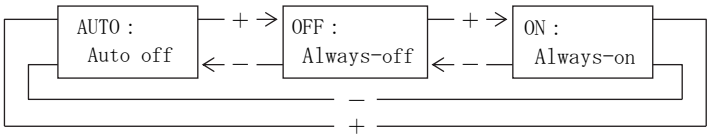
It can select from ON (always-on), AUTO (auto off), and OFF (always-off) about action of backlight.

If 5 minutes elapses without operating a switch in case it is set as "AUTO (auto off)", backlight will go out automatically.

After that, backlight will be turned on if either of switches is operated.

Selection by [+] and [−], set value is updated by [SET].

Default setting : AUTO (Auto off)



◆ 172 Backlight brightness

It can select the brightness of backlight as five steps of 1 to 5.

Backlight becomes the darkest if it is set as "1".

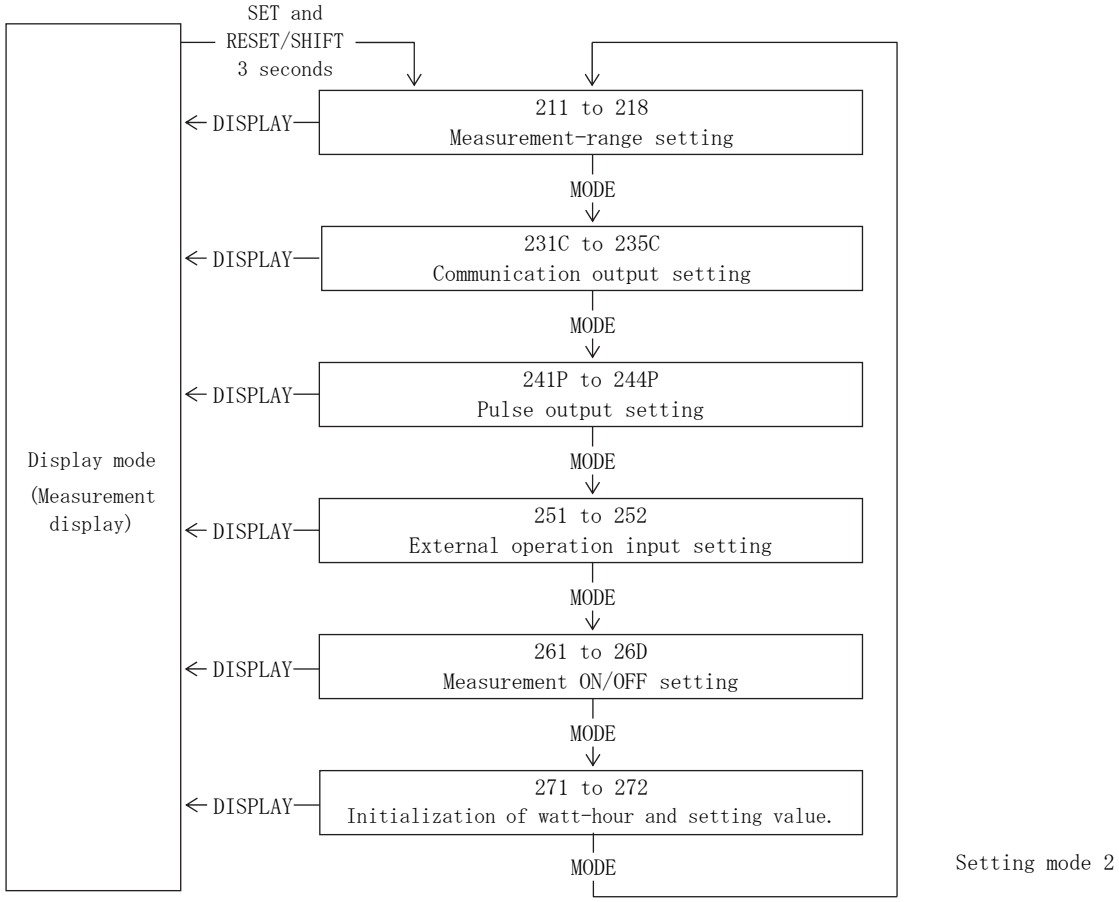
Backlight becomes the brightest if it is set as "5".

Selection by [+] and [−], set value is updated by [SET].

Default setting : 3 (Middle)

Setting	Brightness
5	Bright
4	
3	
2	
1	Dark

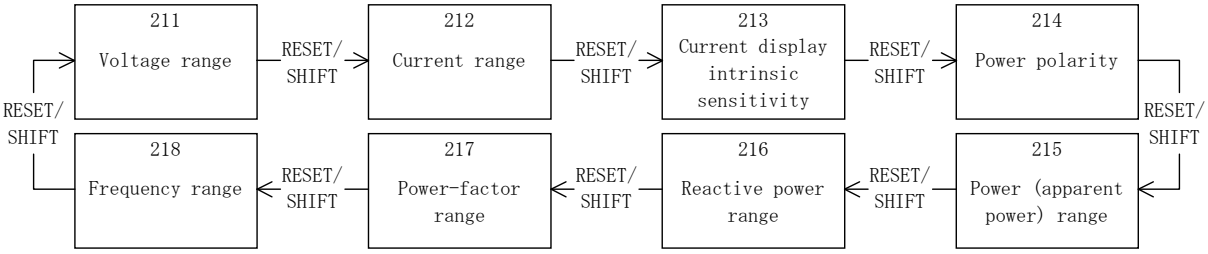
5.3.2 Setting mode 2



Setting mode 2 is selected by pressing SET and RESET/SHIFT switches continuously for longer than 3 seconds.
Pushing MODE switch performs movement of setting item.
The present mode can be returned to the display mode by pressing DISPLAY switch.

< Caution >
If setting change should have been mistaken, a display and output of measurement are not obtained correctly.
Therefore, users must not set. The setting item without the corresponding option is not displayed.

(1) 211 to 218 Measurement-range setting 【All models】
Setting of measurement range in each measurement elements.



◆ 211 Voltage range

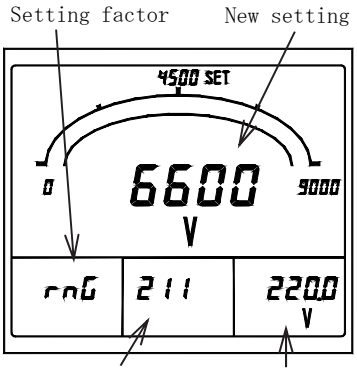
Set the voltage range (VT ratio). Change of this setting also sets the measurement range of active power (apparent power) and reactive power automatically simultaneously.

Selection by [+] and [−], set value is updated by [SET].

Default setting : 440V(110/√3, 440/√3V products), 220V(220/√3V product)

Voltage measurement range (34 range)

150.0V(110V)	4500V (3300V)	150.0kV (110kV)
150V (110V)	4.50kV (3300V)	180.0kV (132kV)
300.0V(220V)	9000V (6600V)	210.0kV (154kV)
300V (220V)	9.00kV (6600V)	270.0kV (187kV)
500V (380V)	15.00kV (11kV)	300.0kV (220kV)
600V (440V)	18.00kV (13.2kV)	400.0kV (275kV)
600V (460V)	18.00kV (13.8kV)	500.0kV (380kV)
600V (480V)	24.00kV (16.5kV)	750.0kV (550kV)
1200V (880V)	25.00kV (18.4kV)	
1500V (1100V)	30.0 kV (22kV)	
2400V (1650V)	45.0 kV (33kV)	
3000V (2200V)	90.0 kV (66kV)	
3.00kV (2200V)	120.0 kV (77kV)	



Voltage range

◆ 212 Current range

Set the current range (CT ratio). Change of this setting also sets the measurement range of active power (apparent power) and reactive power automatically simultaneously.

Selection by [+] and [−], set value is updated by [SET].

Default setting : 1500A

Current-measurement range (76 range)

5.00A	20.00A	80.0A	250A	1.00kA	2.00kA	6.00kA	15.00kA
6.00A	20.0A	100.0A	300.0A	1200A	2500A	7500A	15.0kA
7.50A	25.00A	100A	300A	1.20kA	2.50kA	7.50kA	20.00kA
8.00A	25.0A	120.0A	400A	1500A	3000A	8000A	20.0kA
10.00A	30.00A	120A	500A	1.50kA	3.00kA	8.00kA	30.00kA
10.0A	30.0A	150.0A	600A	1600A	4000A	9.00kA	30.0kA
12.00A	40.0A	150A	750A	1.60kA	4.00kA	10.00kA	
12.0A	50.0A	200.0A	800A	1800A	5000A	10.0kA	
15.00A	60.0A	200A	900A	1.80kA	5.00kA	12.00kA	
15.0A	75.0A	250.0A	1000A	2000A	6000A	12.0kA	

◆ 213 Current display intrinsic sensitivity

Set the full scale of current meter.

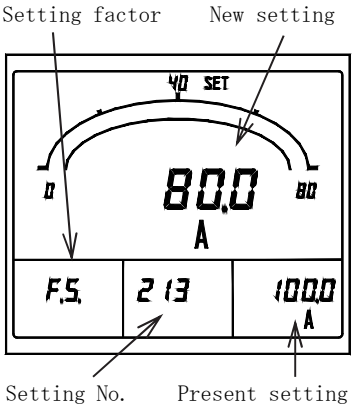
The setting range is 40 to 120% of CT ratio. And, it can select from the following values.

Selection by [+] and [−], set value is updated by [SET].

Default setting : 100.0%

The measurement range (current, active power (apparent power), reactive power) which can be set. ($\times 10^n$)	
1.□	1.0／1.2／1.4／1.5／1.6／1.8
2.□	2.0／2.4／2.5／2.8
3.□	3.0／3.2／3.6
4.□	4.0／4.2／4.5／4.8
5.□	5.0／5.6
6.□	6.0／6.4
7.□	7.2／7.5
8.□	8.0／8.4
9.□	9.0／9.6

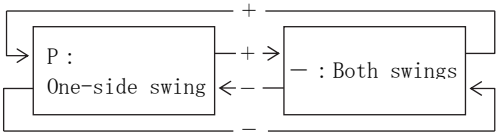
Example)
In case of CT ratio＝100.0A.
・40% of 100A is 40A.
・120% of 100A is 120A.
A measurement range can be selected within the limits of 40 to 120A.
Therefore, a left table A measurement range can be selected from 40/42/45/48/50/56/60/64/72/75/80/84/90/96/100/120A.

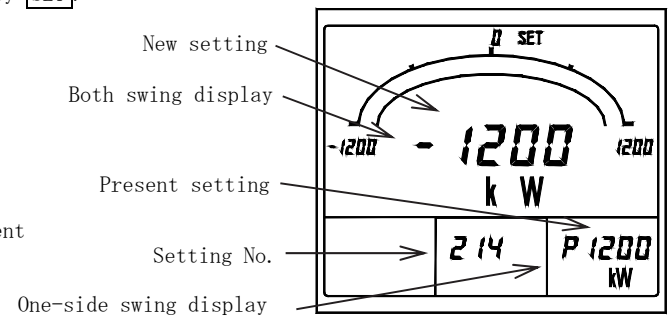


Current display intrinsic sensitivity

◆ 214 Active power polarity

A swing display of active power meter can be selected from P (one side swing) and － (both swings).
Selection by ＋ and －, set value is updated by SET.
Default setting : P (One-side swing)



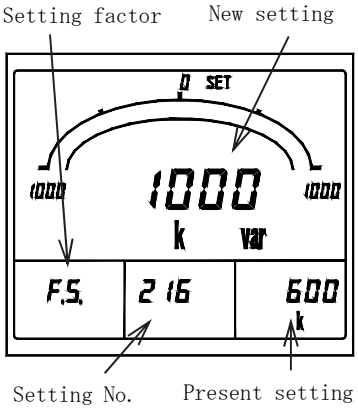


Power polarity

<Caution> Even if it set as both swings, apparent power is one-side swing.

◆ 215 Active power (apparent power) range

Set the full scale of active power (apparent power) meter. The setting range is 40 to 115% of range of a VT ratio × CT ratio. And it can select from "213 current display intrinsic sensitivity" tables.
Selection by ＋ and －, set value is updated by SET.



Reactive power range

<Caution> VT ratio : In case of 220/√3V direct input.
Calculates by VT ratio ＝ 2.
In case of 440/√3V direct input.
Calculates by VT ratio ＝ 4.
CT ratio : In case of 1A input. Calculates by CT ratio÷5.
In addition, active power and apparent power cannot be set individually.
Default setting : 1200kW(1200kVA) : 110/√3V product
600kW(600kVA) : 220/√3V product
1200kW(1200kVA) : 440/√3V product

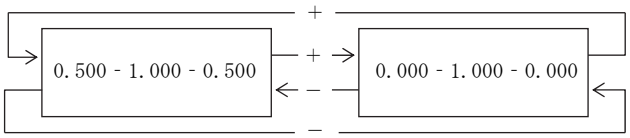
◆ 216 Reactive power range

Set the full scale of reactive power meter.
The setting range is 30 to 115% of range of a VT ratio × CT ratio.
And it can select from "213 current display intrinsic sensitivity" tables.
Selection by ＋ and －, set value is updated by SET.

<Caution> VT ratio : In case of 220/√3V direct input. Calculates by VT ratio ＝ 2.
In case of 440/√3V direct input. Calculates by VT ratio ＝ 4.
CT ratio : In case of 1A input. Calculates by CT ratio÷5.
Default setting : 600kvar (110/√3V product) , 300kvar (220/√3 product) , 600kvar (440/√3 product)

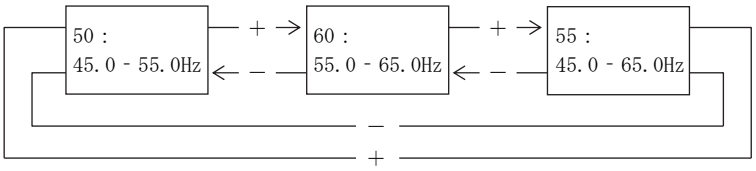
◆ 217 Power factor range

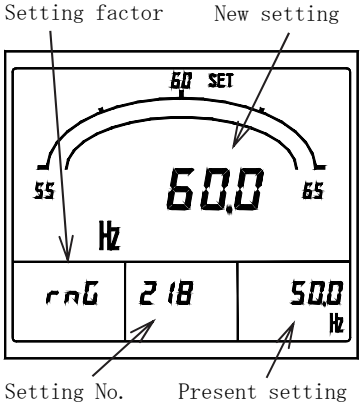
A power factor measurement range can be selected from 0.500 - 1.000 - 0.500 or 0.000 - 1.000 - 0.000.
Selection by ＋ and －, set value is updated by SET.
Default setting : 0.500 - 1.000 - 0.500



◆ 218 Frequency range

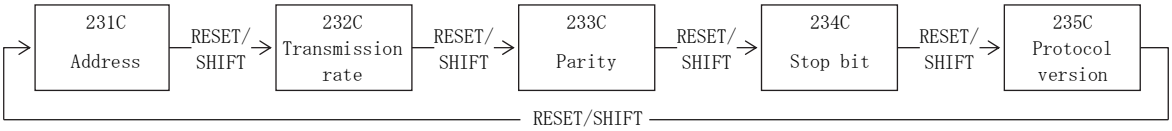
A frequency measurement range can be selected from 45.0 - 55.0Hz or 55.0 - 65.0Hz or 45.0 - 65.0Hz.
Selection by ＋ and －, set value is updated by SET.
Default setting : 45.0 - 65.0Hz





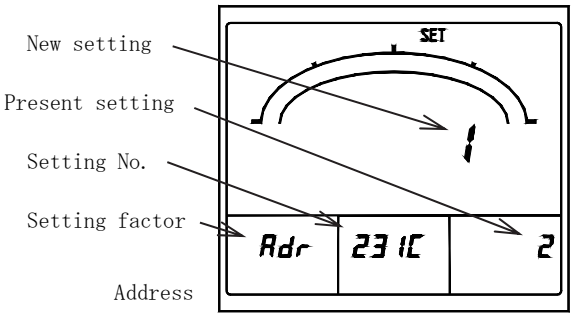
Frequency range

(2) 231C to 235C Communication output setting 【With an communication output option】



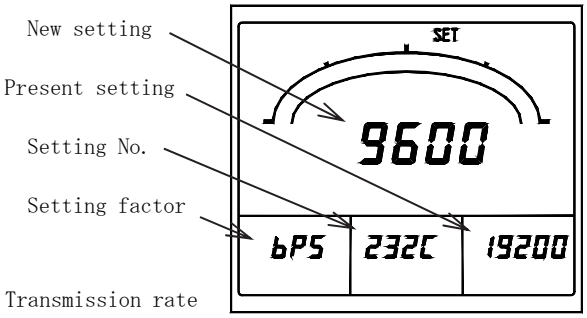
◆ 231C Address

Sets the address of device in communication output.
The address can be selected from 1 to 247.
Selection by [+] and [−], set value is updated by [SET].
Default setting : 1



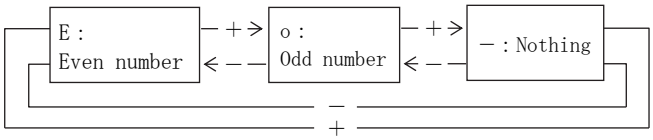
◆ 232C Transmission rate

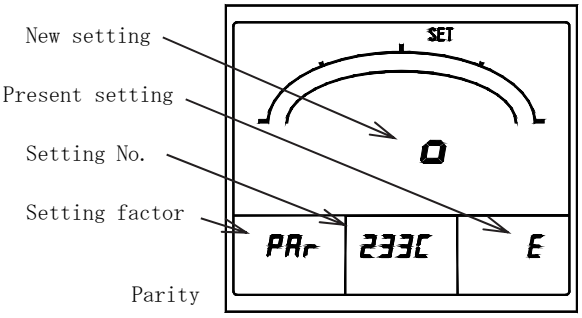
Sets the transmission rate of communication output.
The transmission rate can be selected from 4800bps, 9600bps, 19200bps, 38400bps.
Selection by [+] and [−], set value is updated by [SET].
Default setting : 9600bps



◆ 233C Parity

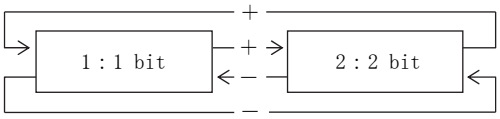
Sets the parity bit added to communication data.
Parity can be selected from nothing (−), even number (EVEN), odd number (oDD).
In case parity is set as “nothing (−)”, parity is not added to communication data.
Selection by [+] and [−], set value is updated by [SET]. Default setting : Even number (EVEN)

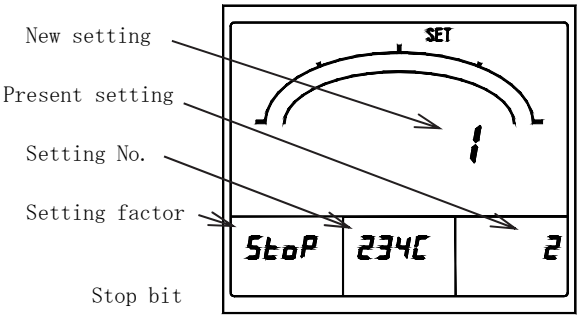




◆ 234C Stop bit

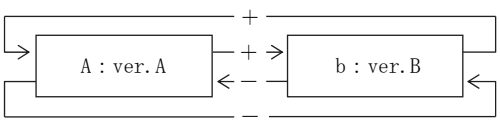
Sets the stop bit added to communication data.
The stop bit can be selected from 1 bit or 2 bit.
Selection by [+] and [−], set value is updated by [SET]. Default setting : 1 bit

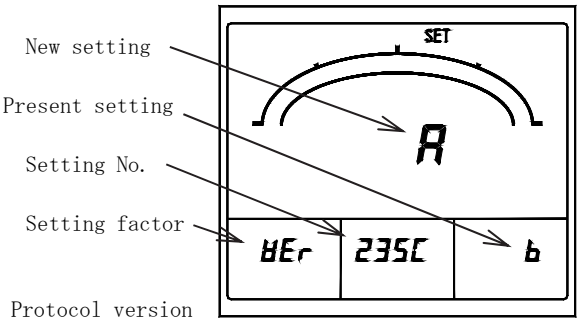




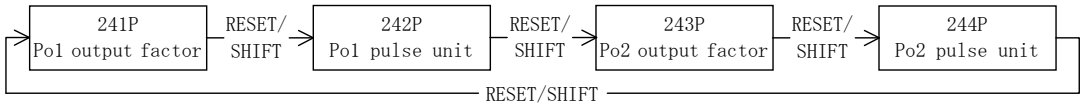
◆ 235C Protocol version

The version of a protocol can be chosen from ver.A / ver.B.
Selection by [+] and [−], set value is updated by [SET].
In the case of a Modbus-IDA standard compliance protocol, please use “ver.B”. “ver.A” has a different part (function codes 02H and 04H) from a Modbus-IDA standard.
Default setting : ver.B



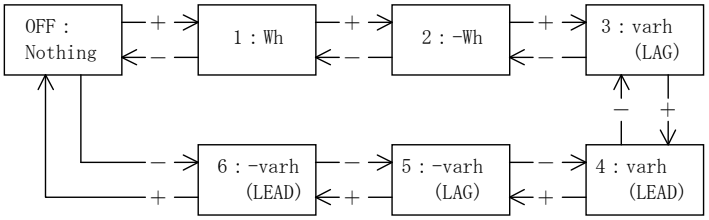


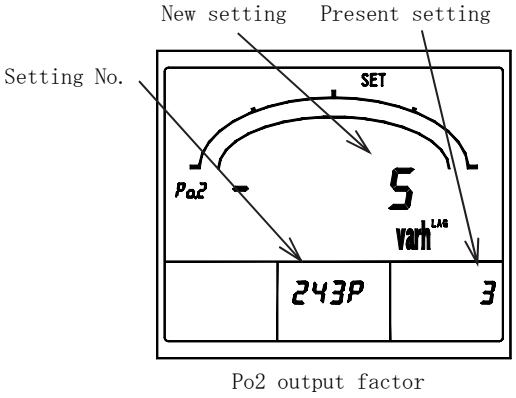
(3) 241P to 244P Pulse output setting 【With a pulse output option】
Various setting of a pulse output is performed.



◆ 241P PO(pulse output) 1 output element,
243P PO(pulse output) 2 output element

Set the output element of each pulse output.
Selection by [＋] and [－], set value is updated by [SET].
Default setting : Wh (PO1, PO2)

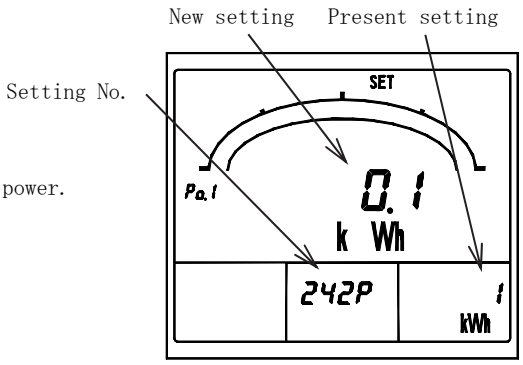




Po2 output factor

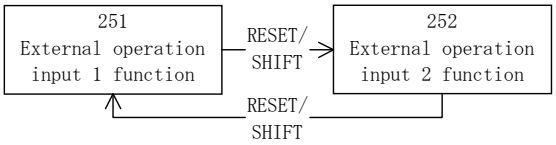
◆ 242P PO(pulse output) 1 pulse unit,
244P PO(pulse output) 2 pulse unit

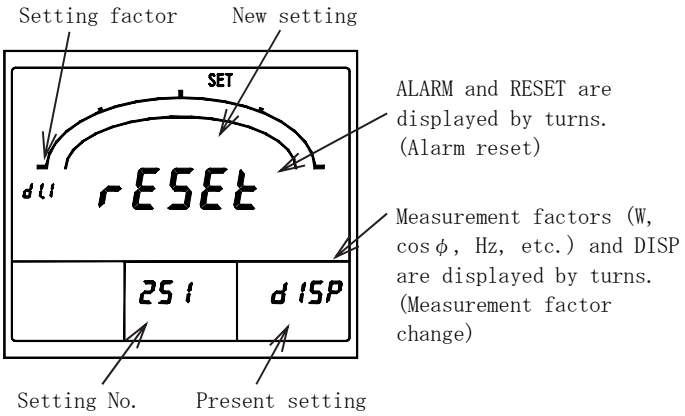
Set the pulse unit of each pulse output.
A pulse unit can be selected from four types.
The pulse unit that can be selected is decided with full-load power.
Default setting : 10kWh/p (110/√3V、440/√3V product),
1kWh/p (220/√3V product)



Po1 pulse unit

(4) 251 to 252 External operation input setting 【With an external operation input option】
Various setting of external operation input is performed.



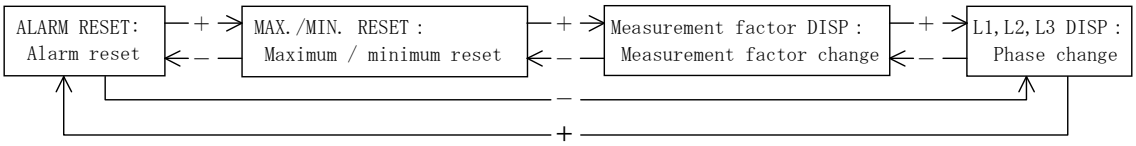


◆ 251 External operation input 1 function,
252 External operation input 2 function

The function of each external operation input (alarm reset, maximum / minimum reset, measurement element change, phase change) can be selected.
Selection by [+] and [−], set value is updated by [SET].

Default setting (With an alarm-output option)
Alarm reset (External operation input 1)
Maximum / minimum reset (External operation input 2)

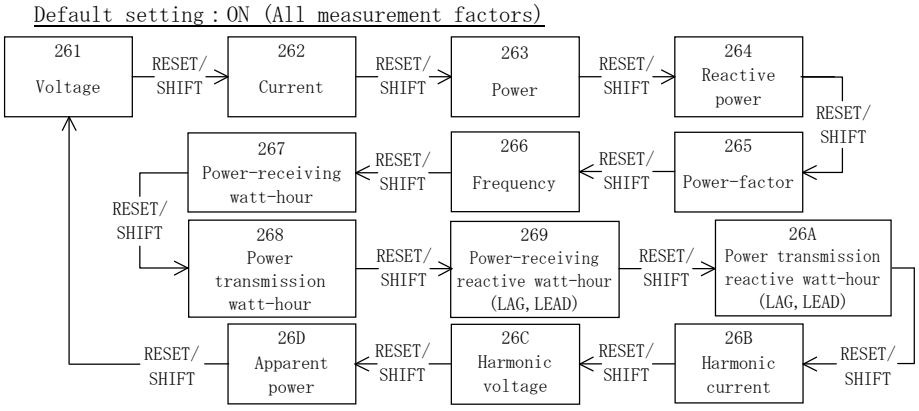
Default setting (With no alarm-output option)
Maximum / minimum reset (External operation input 1)
Measurement element change (External operation input 2)

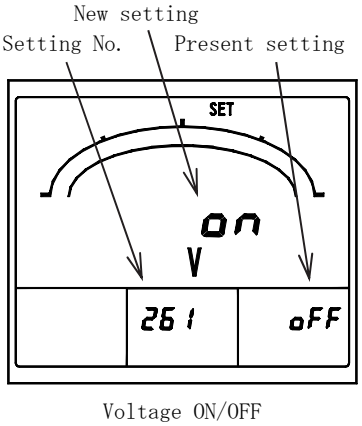


・About the setting display in an external operation input function

Function	The contents of a display at the case of function setting	"Present setting" display point	"New setting" display point
Alarm reset	"ALARM" and "RESET" are displayed by turns by 7 segment displays of the main monitor.	Sub-monitor (right)	Main monitor
Maximum / minimum reset	"RESET" is displayed by 7 segment displays of the main monitor. And, "MAX" and "MIN" display by turns.		
Measurement element change	"DISP" is displayed by 7 segment displays of the main monitor. And, each measurement element (units of A, V, W, etc.) displays by turns.		
Phase change	"DISP" is displayed by 7 segment displays of the main monitor. And, each phase (L1-L2-L3, N) displays by turns.		

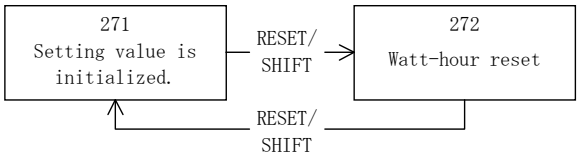
(5) 261 to 26D Measurement ON/OFF setting 【All models】
Measurement display ON/OFF setting of each measurement element is performed.
Selection by [+] and [−], set value is updated by [SET].
Default setting : ON (All measurement factors)



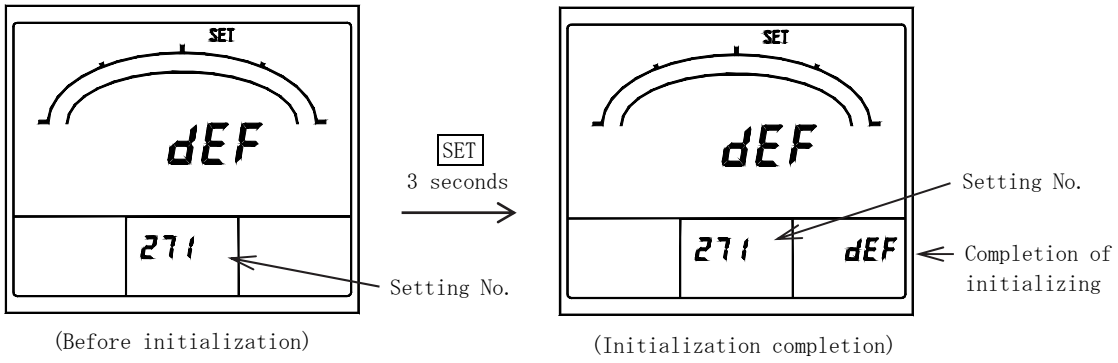


Voltage ON/OFF

(6) 271 to 272 Initialization of watt-hour and setting value. 【All models 】
Simultaneous reset of watt-hour is performed. And, each set value is initialized (returns to default setting).

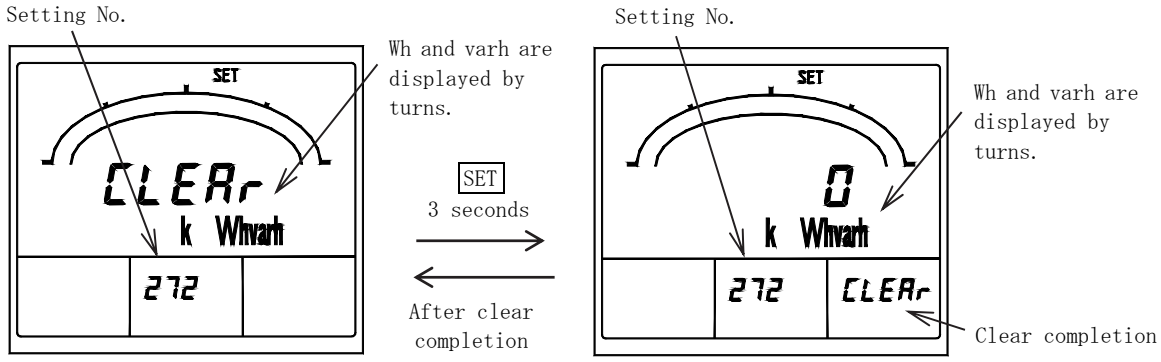


◆ 271 Initialization of setting value
Each set value is initialized (returns to default setting).
Pushing SET for 3 seconds initializes all set values.



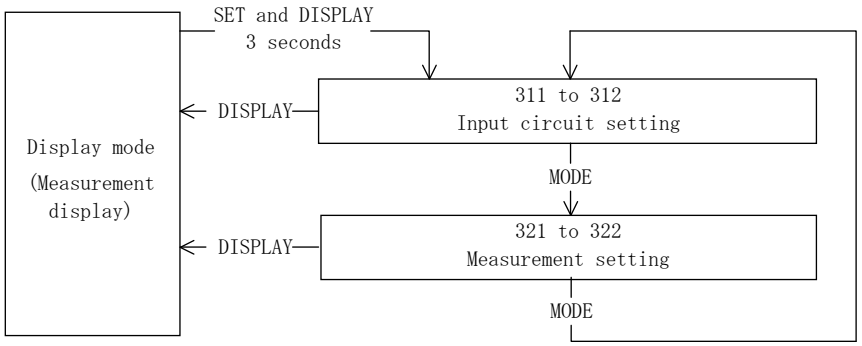
Initialization of setting value

◆ 272 Watt-hour reset
Integrated value of each electric-energy display is cleared (=0). By pushing SET for 3 seconds, all integrated value (Wh, -Wh, var(LAG), -var(LAG), var(LEAD), var(LEAD)) is cleared simultaneously.



Watt-hour reset

5.3.3 Setting mode 3

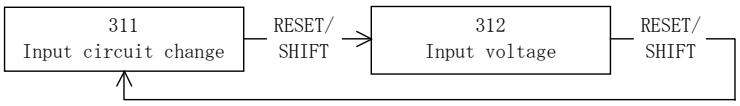


Setting mode 3 is selected by pressing [SET] and [DISPLAY] switches continuously for longer than 3 seconds.
Pushing [MODE] switch performs movement of setting item.
The present mode can be returned to the display mode by pressing [DISPLAY] switch.

< Caution >
If setting change should have been mistaken, a display and output of measurement are not obtained correctly.
Therefore, users must not set. The setting item without the corresponding option is not displayed.

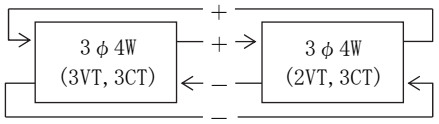
(1) 311 to 312 Input circuit setting 【Current input product is excluded. (However, an input-voltage setting is 110/√3V, 220/√3V common use products only.)】

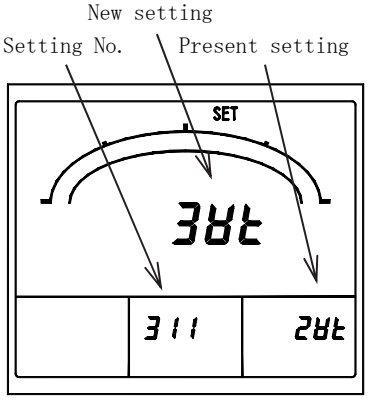
Set the input circuit and input voltage.



◆ 311 Input circuit change
Set the input circuit.
Selection by [+] and [−], set value is updated by pushing [SET] for 3 seconds.
Default setting : 3φ4W (3VT,3CT)

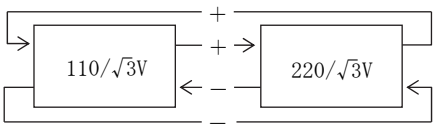
<Caution>
・When this setting is changed, it will become the default setting of the input circuit after all set values changing.
・The right measurement cannot be performed if setting of actual connection and phase wire are different.

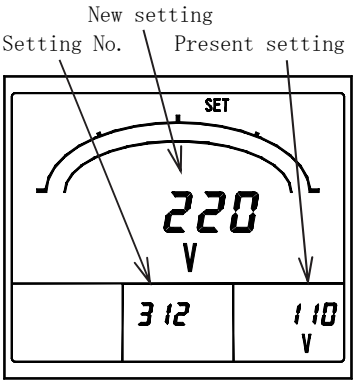




Input circuit change

◆ 312 Input voltage
Set the input voltage with rated voltage 110/√3V, 220/√3V common use product. Selection by [+] and [−], set value is updated by [SET].
Default setting : 110/√3V (110/√3V product, no designation),
220/√3V (220/√3V product)

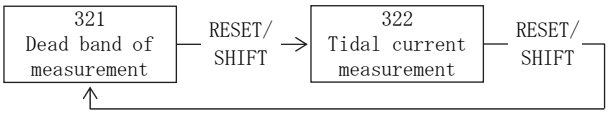




Input-voltage

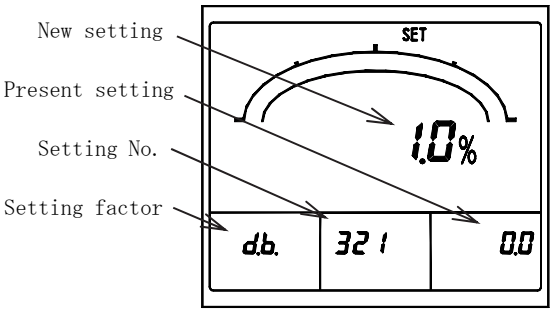
(2) 321 to 322 Measurement setting 【All models】

Set the dead band of measurement display, and with or without of tidal current measurement.



◆ 321 Measurement dead band

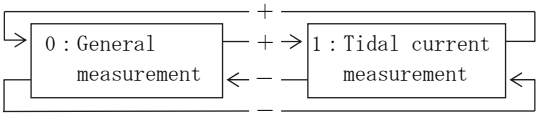
Set the dead band of measurement display.
By this setting, variation of less than this set value is disregarded by voltage, current, active power, and reactive power measurement display.
Setting range : 0.0 to 2.0% (0.1% step)
Selection by [+] and [−], set value is updated by [SET].
Default setting : 0.0% (Nothing)

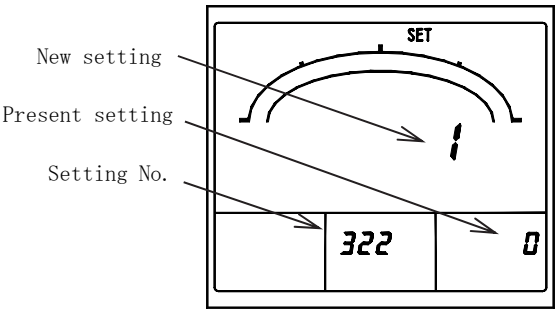


Dead band of measurement

◆ 322 Tidal current measurement

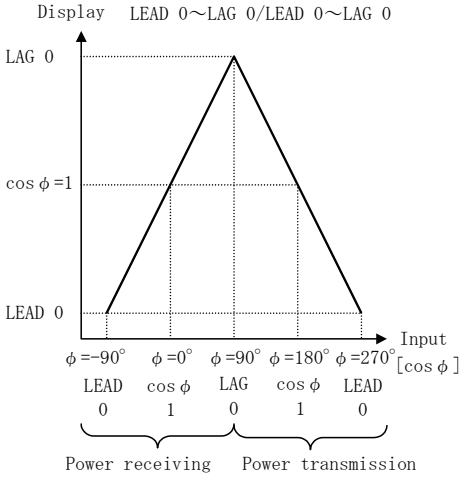
By measurement of reactive power and a power factor, 0 (general measurement) or 1 (tidal current measurement which was conscious of power transmission/power receiving) can be selected.
Selection by [+] and [−], set value is updated by [SET].
Default setting : 0 (General measurement)

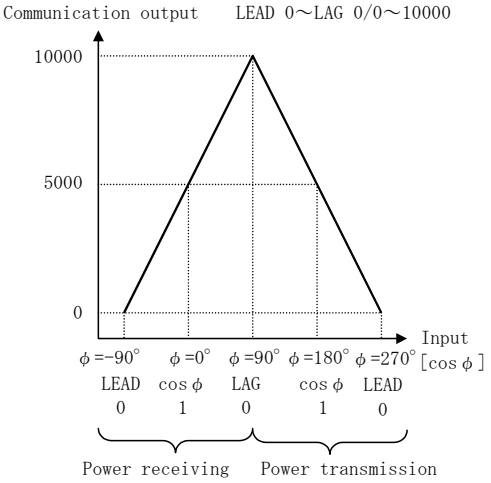




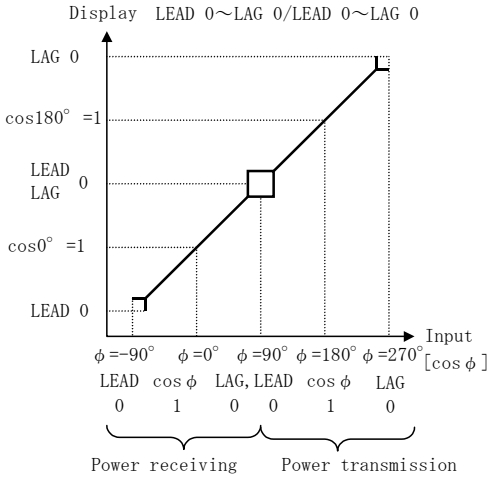
Tidal current measurement

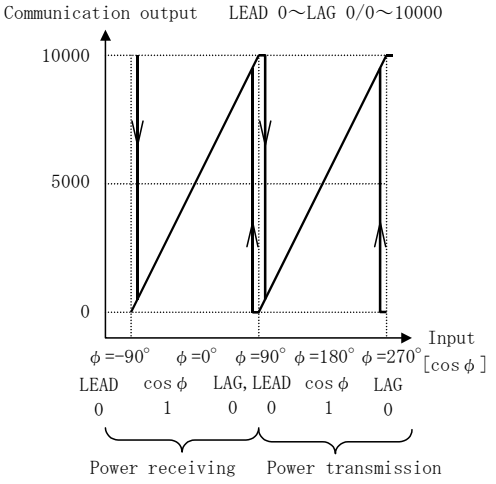
(General measurement)





(Tidal current measurement)





6. Specification

6.1 Specification and intrinsic error.

Input circuit	Input
3-phase 4-wire	AC110/√3V, 220/√3V common use or 440/√3V AC 5A or AC 1A　50/60Hz　Designation

Measurement item	Measurement range / Display specification		Current input	Voltage input	Intrinsic error (21)		Maximum measur-ement	Minimum measur-ement	Note
					Digital display	Communication output Pulse output (22)			
Voltage	AC150V to 750.0kV (34 range)			○	±1.0%	±0.5%	○	○	L1N-L2N-L3N-L1L2-L2 L3-L3L1 line change
Current	Maximum demand (26), Demand, Instant AC5.00A to 30.0kA (76 range)		○		±1.0%	±0.5%	○	○	L1-L2-L3-N phase change Possible to set a range of indication and output apart from the CT ratio.
Active power	Maximum demand (26), Demand, Instant 480W to 1000MW (Range select) In voltage and current range. One-side swing or both side swings can be setting.				±1.0%	±0.5%	○	○	(23) (24)
Apparent power	480VA to 1000MVA In active power range.				±1.0%	±0.5%	○	○	Same scale as the active power range (Display) (24)
Reactive power	LEAD,LAG 360var to 1000Mvar (Range select) In voltage and current range.				±1.0%	±0.5%	○	○	(24)
Power factor	LEAD 0.500 - 1.000 - LAG 0.500 or LEAD 0.000 - 1.000 - LAG 0.000 (Range select)				±2.0%	±2.0%	○	○	In case input is below 20% of voltage range or below 2% of current range : cos φ =1. (Output is cos φ =1 equivalence)
Frequency	45.0 - 55.0Hz or 55.0 - 65.0Hz or 45.0 - 65.0Hz (Range select)			○	±0.5%	±0.5%	○	○	0.0Hz in case input is below 20% of voltage range.
Distortion factor	Voltage	0.0 to 20.0% (Second to 15th harmonic) L1N-L2N-L3N (25)		○	±1.0%	±2.5%	○		Digital display is % to 100% of distortion factors.
	Current	0.0 to 100.0% (Second to 15th harmonic) L1-L2-L3	○		±2.5%	±2.5%	○		
Harmonic nth effective value	Voltage	AC150V to 750.0kV (34 range) n=3,4,5,7,9,11,13,15 L1N-L2N-L3N (25)		○	±1.5%	±1.5%	○		Digital display is % to a voltage range.
Fundamental-wave effective value	Current	AC5.00A to 30.0kA (76 range) n=3,4,5,7,9,11,13,15 L1-L2-L3	○		±1.5%	±1.5%	○		Digital display is % to a current range.
Harmonic nth content	Voltage	0.0 to 20.0% n=3,4,5,7,9,11,13,15 L1N-L2N-L3N (25)		○	±1.0%	±2.5%	○		Digital display is % to 100% of content.
	Current	0.0 to 100.0% n=3,4,5,7,9,11,13,15 L1-L2-L3	○		±2.5%	±2.5%	○		

Measurement item	Measurement range / Display specification		Current input	Voltage input	Intrinsic error (21)		Maximum measur-ement	Minimum measur-ement	Note
					Digital display	Communication output Pulse output (22)			
Harmonic 5th conversion effective value	Voltage	AC150V to 750.0kV (34 range) L1N-L2N-L3N (25)		○	±1.5%	±1.5%	○		Digital display is % to a voltage range.
	Current	AC5.00A to 30.0kA (76 range) L1-L2-L3	○		±1.5%	±1.5%	○		Digital display is % to a current range.
Harmonic 5th conversion content	Voltage	0.0 to 20.0% L1N-L2N-L3N (25)		○	±1.0%	±2.5%	○		Digital display is % to 100% of content.
	Current	0.0 to 100.0% L1-L2-L3	○		±2.5%	±2.5%	○		
Watt-hour	Display : Integer, 5 digit. Multiplier : Integral number times of 10. Possible to indicate it to 3 decimal place. Electric power is integrated. (Power receiving, Power transmission)				Power factor 1 : ±2.0% Power factor 0.5 : ±2.5%	Power factor 1 : ±2.0% Power factor 0.5 : ±2.5%			Conformity with normal watt-hour meter. Setting range of pulse output unit (kWh/pulse) is referred to option-specification.
var-hour	Display : Integer, 5 digit. Multiplier : Integral number times of 10. Possible to indicate it to 3 decimal place. Integrating reactive power of power receiving. (LAG･LEAD) Integrating reactive power of power transmission. (LAG･LEAD)				Power factor 0 : ±2.5% Power factor 0.87 : ±2.5%	Power factor 0 : ±2.5% Power factor 0.87 : ±2.5%			Setting range of pulse output unit (kvarh/pulse) is referred to option-specification.

Note (21) If this unit directly measures an inverter output of cycle control, SCR phase angle control or PWM, an error may increase due to its operation principle.
As for harmonic 5th conversion effective value and nth harmonic effective value, a display will be zero by 0.2% or less of the measurement range. And, communication output constitutes lower limit output.
At this time, a distortion factor, harmonic 5th conversion content rate, and nth harmonic content also become 0% (communication output is lower limit output). Distortion factor, harmonic 5th conversion effective value / content, and nth harmonic effective value / content is zero if fundamental-wave effective measurement value range is 3% or below.

Note (22) Communication output and pulse output are options.
Communication output of harmonic distortion factor and harmonic content : It becomes an upper limit output from a lower limit output, for current 0 to 100% and voltage 0 to 20%.

Note (23) Case of one side swing setting of bar graph. Digital meter measures reverse power to -15% full scale. (Instantaneous power)

Note (24) Active power, reactive power, apparent power display digit.
A full scale display is below 4000 : 4 digits display. A full scale display is 4000 or more : 3 digits display.
Example) 4800kW → 4.80MW
40kvar → 40.0kvar
20kVA → 20.00kVA Please refer to an appendix table for details.

Note (25) 3VT products is L1N-L2N-L3N. 2VT product is L1N-L3N.

Note (26) Maximum value (maximum demand current, others) and minimum value can be checked in the maximum and minimum measurement mode.

Item	Specification	
Bar graph display	Bar graph display of the main-monitor element is done. (Watt-hour and var-hour exclude) A display of a sub-monitor element can also be set.	
Operating method	Current, Voltage : Effective value computing type. Demand ammeter : Arithmetic method according with bimetallic type. Demand active power meter : Arithmetic method according with bimetallic type, or average value within the demand time limit. (One side is selected by setting.) Active power, Reactive power, Watt-hour, var-hour : Time-division multiplication method. Apparent power : Calculates from current and voltage. Power factor : Average value within instant measurement or the demand time limit. (One side is selected by setting.) Calculates for active power and reactive power. Frequency : Zero cross cycle computing type. Harmonic : FFT computing type.	
Interval setting	Demand current Demand active power	0 second / 5 seconds / 10 seconds / 20 seconds / 30 seconds / 40 seconds / 50 seconds / 1 minute / 2 minutes / 3 minutes / 4 minutes / 5 minutes / 6 minutes / 7 minutes / 8 minutes / 9 minutes / 10 minutes / 15 minutes / 20 minutes / 25 minutes / 30 minutes (95% time limit)
	Harmonic measurement	Average time limit : 0 minute / 1 minute / 2 minutes / 5 minutes / 10 minutes / 15 minutes / 30 minutes Average measurement.
The element in which display setting is possible	Main monitor	Voltage(L1N-L2N-L3N-L1L2-L2L3-L3L1), Current(L1-L2-L3-N), Demand current(L1-L2-L3-N), Active power, Demand active power, Reactive power, Apparent power, Power factor, Frequency, Watt-hour(Power receiving, Power transmission), var-hour(Power receiving LAG/LEAD, Power transmission LAG/LEAD), Distortion factor(A, V)
	Sub-monitor (Left)	Voltage(L1N-L2N-L3N-L1L2-L2L3-L3L1), Current(L1-L2-L3-N), Active power, Reactive power, Power factor
	Sub-monitor (Center)	Voltage(L1N-L2N-L3N-L1L2-L2L3-L3L1), Current(L1-L2-L3-N), Demand current(L1-L2-L3-N), Active power, Demand active power, Reactive power, var-hour(Power receiving LAG/LEAD, Power transmission LAG/LEAD), Harmonic 5th conversion content(A, V), Harmonic nth content(A, V)
	Sub-monitor (Right)	Voltage(L1N-L2N-L3N-L1L2-L2L3-L3L1), Current(L1-L2-L3-N), Demand current(L1-L2-L3-N), Active power, Demand active power, Power factor, Frequency, Watt-hour(Power receiving, Power transmission), Fundamental-wave effective value(A, V), Harmonic 5th conversion content(A, V), Harmonic nth effective value(A, V)
	Bar graph	Voltage(L1N-L2N-L3N-L1L2-L2L3-L3L1), Current(L1-L2-L3-N), Demand current(L1-L2-L3-N), Active power, Demand active power, Reactive power, Apparent power, Power factor, Frequency, Distortion factor(A, V), Harmonic 5th conversion content(A, V), Harmonic nth content(A, V), Fundamental-wave effective value(A, V), Harmonic 5th conversion effective value(A, V), Harmonic nth effective value(A, V)
Option	Communication output (Modbus RTU mode) Contact output (2 sets. Select of pulse output or alarm output or CPU error output.) External operation change input (2 sets)	

● About active power and apparent power and reactive power full scale range selection

The active power range (apparent power range) and reactive power range is automatically decided in a current range and voltage range. The full scale range of a bar graph can be selected out of the following values within a 40 to 115% (range of active power and apparent power) and 30 to 115% (range of reactive power), assuming that the rated power (VT ratio × CT ratio)(27) is 100%.

1.0 / 1.2 / 1.4 / 1.5 / 1.6 / 1.8 / 2.0 / 2.4 / 2.5 / 2.8 / 3.0 / 3.2 / 3.6 / 4.0 / 4.2 / 4.5 / 4.8 / 5.0 / 5.6 / 6.0 / 6.4 / 7.2 / 7.5 / 8.0 / 8.4 / 9.0 / 9.6 $\times 10^n$

Example) In case of VT ratio × CT ratio = 1200kW

A full scale range can be selected from the following.

480 / 500 / 560 / 600 / 640 / 720 / 750 / 800 / 840 / 900 / 960 / 1000 / 1200

Note (27) VT ratio should calculate as "2" at the case of 220/$\sqrt{3}$V rating. And VT ratio should calculate as "4" at the case of 440/$\sqrt{3}$V rating. Calculate as CT ratio is CT ratio ÷5 in case of 1A input specifications.

● Measurement is possible range.

Measurement element			Input (28)	Measurement is possible range		Remarks
				Display	Communication output	
Phase voltage			AC0 - 150/√3V [AC0 - 300/√3V] {AC0 - 600/√3V}	101% of meter full scale /√3	101% of output span / √3	
Line voltage			AC0 - 150V [AC0 - 300V] {AC0 - 600V}	101% of meter full scale	101% of output span	
Current			AC0 - 5A (AC0 - 1A)	120% of input rating	120% of output span	Instant, Demand
Active power			0 - 1kW (0 - 200W) [0 - 2kW (0 - 400W)] {0 - 4kW (0 - 800W)}	120% of input rating	120% of output span	Instant, Demand
			±1kW (±200W) [±2kW (±400W)] {±4kW (±800W)}			
Reactive power			LEAD 1 - 0 - LAG 1kvar (LEAD 200 - 0 - LAG 200var) [LEAD 2 - 0 - LAG 2kvar (LEAD 400 - 0 - LAG 400var)] {LEAD 4 - 0 - LAG 4kvar (LEAD 800 - 0 - LAG 800var)}	120% of input rating	120% of output span	
Apparent power			0 - 1kVA (0 - 200VA) [0 - 2kVA (0 - 400VA)] {0 - 4kVA (0 - 800VA)}	120% of input rating	-1% and 120% of output span,	
Power factor			LEAD 0 - 1 - LAG 0	LEAD 0.000 - 1.000 - LAG 0.000	0% and 100% of output span	
			LEAD 0.5 - 1 - LAG 0.5	LEAD 0.490 - 1.000 - LAG 0.490	-1% and 101% of output span	
Frequency			45.0 - 55.0Hz	44.9 - 55.1Hz	-1% and 101% of output span	
			55.0 - 65.0Hz	54.9 - 65.1Hz		
			45.0 - 65.0Hz	44.8 - 65.2Hz		
Harmonic	Effective value	Current	AC0 - 5A (AC0 - 1A)	120% of input rating	120% of output span	
		Voltage	AC0 - 150/√3V [AC0 - 300/√3V] {AC0 - 600/√3V}	101% of meter full scale	101% of output span	
	Rate of content	Current	0 - 100% (% to input rating)	200% of input rating	120% of output span	
		Voltage	0 - 20% (% to meter full scale)	100% of meter full scale	120% of output span	

Note (28) [ ] is the 300V input case. { } is the 600V input case. ( ) is the 1A input case.

＊ For details of communication output data, refer to the communication specification (Modbus RTU mode) separately.

6.2 Specification, Performance.

Item	Specification			
Accuracy	Reference to measure specification and accuracy			
Accuracy of bar graph	±10% (% for span)			
Influence by temperature	23±10℃ within accuracy.			
Conformity technical standard	JIS C 1102-1, -2, -3, -4, -5, -7 : 1997 , JIS C 1111 : 1989 , JIS C 1216 : 1995 , JIS C 1263 : 1995 , EIA/TIA-485-A (2003)			
Display updating time	About 1 second (Bar graph : 0.25 seconds) (Harmonic measurement : Digital and bar graph is 10 seconds or less.)			
Display device Display composition	LCD	Main monitor	5 digit, character height 11mm	
		Sub-monitor (Left)	4 digit, character height 6mm	
		Sub-monitor (Center),(Right)	5 digit, character height 6mm	
		Bar graph	20 dots	
LCD view angle	Standard	For upper installation (For lower view)	Upper view angle 10° , Lower view angle 60° , Right and left view angle 60°	
Backlight	LED backlight : White Always-on, Auto off (after 5 minutes without operating), Always-off. Setting is possible. White backlight can select brightness from five steps of 1 to 5.			
Auxiliary supply	(1) AC85 - 264V 50/60Hz 10VA (Rated voltage, AC100/110V, 200/220V) DC80 - 143V 6W (Rated voltage, DC100/110V) for both AC and DC uses			
	(2) DC20 - 56V 6W (Rated voltage, DC24/48V)			
Rush current (Time constant)	Rated voltage AC110V 2.2A or less (About 3.6ms)			
	Rated voltage AC220V 4.4A or less (About 3.6ms)			
	Rated voltage DC110V 1.6A or less (About 3.6ms)			
	Rated voltage DC24V 5.0A or less (About 2.0ms)			
	Rated voltage DC48V 9.9A or less (About 2.0ms)			
Input consumption VA	Voltage circuit	0.05VA or less (110/√3V) , 0.1VA or less (220/√3V) , 0.2VA or less (440/√3V)		
	Current circuit	0.1VA or less (5A,1A)		
Overload capacity	Voltage circuit	2 times 10 seconds, 1.2 times continuation of rated voltage.		
	Current circuit	40 times 1 second, 20 times 4 seconds, 10 times 16 seconds, 1.2 times continuation of rated current.		
	Auxiliary supply	1.5 times 10 seconds, 1.2 times continuation of rated voltage. In case of DC110V, 1.5 times 10 seconds, 1.3 times continuation of rated voltage.		
Insulation resistance JIS C 1102-1 JIS C 1111	Between electric circuits and case (Earth).			Above 50MΩ at DC500V megger
	Between input and output and auxiliary supply.			
	Between communication output and pulse output and alarm output.			
	Between pulse outputs.			
	Between alarm outputs.			
Withstand voltage JIS C 1102-1 JIS C 1111	Between electric circuits and case (Earth).			AC2000V (50/60Hz) 1 minute
	Between input and output and auxiliary supply.			
	Between communication output and pulse output and alarm output.			AC1500V (50/60Hz) 1 minute
	Between pulse outputs.			
	Between alarm outputs.			
Impulse withstand voltage JIS C 1111	Between electric circuits and case (Earth). (An communication output is excluded)			6kV 1.2/50μs Positive and negative polarities, for each 3 time.
	Between communication output and case (Earth).			5kV 1.2/50μs Positive and negative polarities, for each 3 time.

Item	Specification
Noise-capacity ANSI C37.90a JEA B-402 IEC801-2	(1) Oscillatory surge voltage If a vibration damping waveform (1 - 1.5MHz, Peak voltage : 2.5 - 3kV) is repeated and added, a measurement error should be within 10%. And, there needs to be no malfunction. Voltage input circuit (Normal / Common), Current input circuit (Common) Auxiliary supply circuit (Normal / Common) (2) Square wave impulse noise If a noise (1μs, 100ns width) is repeated and added, a measurement error should be within 10%. And, there needs to be no malfunction. Auxiliary supply circuit (Normal / Common) Over 1500V Voltage input circuit (Normal / Common) Over 1500V Current input circuit (Common) Over 1500V Pulse output (Common) Over 1000V Alarm output (Common) Over 1000V Operation input (Common) Over 1000V Communication output circuit (Induction) Over 1000V (3) Electric wave noise If intermittence irradiation of the electric wave of a 150,400MHz band is done by (5W, 1m), a measurement error should be within 10%. And, there needs to be no malfunction. (4) Electrostatic noise Measurement error should be within 10% at contact discharge 8kV and air discharge 15kV, and malfunction shall not occur.
Vibration, Shock JIS C 1102-1 JIS C 0040, JIS C 0041	Vibration : Single amplitude 0.15mm, 10 - 55Hz, Each minute octave in 5 times sweep Shock : 490m/s^2 It is each 3 times to the X,Y,Z direction.
Construction	Dimension : 110mm (Width)×110mm (Height)×103.5mm (Depth) Body diameter : 99mmφ With terminal cover
Material	Case, Cover : ABS(V-0) , Terminal block : PBT , Terminal cover : Polycarbonate
Color	Black (Munsell N1.5)
Mass	Approx. 600g
Blackout guarantee	Maximum value, Minimum value, Integrates value and each setting value. Data hold by nonvolatile memory.
Operating temperature and humidity limits	-10 to +55℃, 30 to 85% RH, Non condensing.
Storage temperature limits	-25 to +70℃

6.3 Option

Item	Specification					
Communication output	Standard	EIA/TIA-485-A (2003)				
	Protocol	Modbus protocol RTU mode				RTU : Remote Terminal Unit (Monitor operating unit) PI-MBUS-300 Rev.J Modbus Application Protocol specification V1.1b
		Use function code	ver.A [29]	02H, 03H, 04H, 06H, 08H		
			ver.B	03H, 04H, 06H, 08H		
	Transmission system	Half-duplex				
	Synchronous system	asynchronous communication method				
	Transmission rate	4800bps / 9600bps / 19200bps / 38400bps				
	Line code	NRZ				
	Start bit	1 bit				
	Data length	8 bit				
	Parity bit	NONE (Nothing) / ODD (Odd number) / EVEN (Even number)				
	Stop bit	1 bit / 2 bit				
	Transmission code	Binary				
	Cable length	1000m				
	Address	1 to 247				The number of connection. Max. 31 sets
	Error detection	CRC-16				$X^{16}+X^{15}+X^{2}+1$
	Topology	Multidrop				
	Please reference to the communication specification (separately, Modbus RTU mode version) for the details of communication output data.					

Pulse output [31]

Possible output : Watt-hour or var-hour.
Output form : Optical MOS-FET relay. 1a contact
Contact capacity : AC, DC125V, 70mA (Resistance load, inductive load)
Pulse width : 250±10ms (Output pulse width when the output pulse period of rated active power constitutes speed more than 2 pulse/second by setting of an voltage measurement range, a current-measurement range, and an output pulse unit is set to 100 to 130ms.)
Setting of output pulse unit is possible by the next range.
■ 3-phase 4-wire : Full load power (kW,kvar)=$\sqrt{3}$×Rated voltage(V)×Rated current(A)×10^{-3}

Full load power (kW,kvar)		Output pulse unit. kWh(kvarh)/pulse				Multiplying factor
	Below 1	0.1	0.01	0.001	0.0001	0.01 [30]
Over 1	Below 10	1	0.1	0.01	0.001	0.1
Over 10	Below 100	10	1	0.1	0.01	1
Over 100	Below 1,000	100	10	1	0.1	10
Over 1,000	Below 10,000	1,000	100	10	1	100
Over 10,000	Below 100,000	10,000	1,000	100	10	1,000
Over 100,000	Below 1,000,000	100,000	10,000	1,000	100	10,000

Note[29] In the case of a Modbus-IDA standard compliance protocol, please use "ver.B".
"ver.A" has a different part (function codes 02H and 04H) from a Modbus-IDA standard.
Note[30] Although multiplying factor is 0.01, a multiplying factor display will be 0.1.
(The place by the integer is 4 digits display. An enlarged display is 4 digits below decimal point.)
Note[31] 2 outputs combination is possible, for pulse output and alarm output and CPU error output.
(CPU error output is 1 point only)

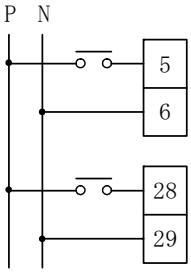
<table>
<tr><th>Item</th><th colspan="4">Specification</th></tr>
<tr><td rowspan="11">Alarm output
(32)</td><td colspan="4">Alarm element : Demand current, Demand active power, harmonic 5th conversion content, Harmonic nth content, Distortion factor, Voltage, Alarm OFF. Possible to setting one of them.
Reset form : Automatic reset or Manual reset (Setting)
Output contact : No-voltage a contact (OR of each phase detection)
Contact capacity : AC250V 8A, DC125V 0.3A (Resistance load) AC250V 2A, DC125V 0.1A (Inductive load)</td></tr>
<tr><td>Alarm element</td><td>Item</td><td colspan="2">Specification</td></tr>
<tr><td rowspan="3">Demand current,
Demand active power</td><td>Function</td><td colspan="2">Demand measurement value ≧ Upper limit setting value,
Alarm display, Alarm output.</td></tr>
<tr><td>Setting accuracy</td><td colspan="2">±1.0% (% for full scale)</td></tr>
<tr><td>Setting range</td><td colspan="2">5 to 100% to the maximum scale. (1% step)</td></tr>
<tr><td rowspan="4">Harmonic 5th conversion content

Harmonic nth content

Distortion factor</td><td>Function</td><td colspan="2">Measurement value ≧ Upper limit setting value,
Alarm display, Alarm output. (Detects by the maximum phase)</td></tr>
<tr><td>Setting accuracy</td><td colspan="2">Current : ±2.5%, Voltage : ±1.0%, % to 100% of content rate.</td></tr>
<tr><td rowspan="2">Setting range</td><td>Current</td><td>Harmonic 5th conversion content,
Harmonic nth content (n=3,4,5,7,9,11,13,15),
Distortion factor
5 to 100% (1% step)</td></tr>
<tr><td>Voltage</td><td>Harmonic 5th conversion content,
Harmonic nth content (n=3,4,5,7,9,11,13,15),
Distortion factor
1.0 to 20.0% (0.1% step)</td></tr>
<tr><td>Detection characteristics</td><td colspan="2">Average value mode : It will detect, if a par measurement value becomes beyond the above setting.
Inverse-time-delay mode : It detects in the inverse-time-delay characteristics of instantaneous value (only a harmonic 5th conversion content is possible).</td></tr>
<tr><td rowspan="3">Voltage</td><td>Function</td><td colspan="2">Measurement value ≧ Upper limit setting value,
Alarm display, Alarm output. (Detects by the maximum phase)
Measurement value ≦ Lower limit setting value,
Alarm display, Alarm output. (Detects by the minimum phase)</td></tr>
<tr><td>Setting accuracy</td><td colspan="2">±1.0% (% for full scale)</td></tr>
<tr><td>Setting range</td><td colspan="2">Using a full scale as 150%. 30 to 150% (1% step)</td></tr>
<tr><td rowspan="2">CPU error output
(32)</td><td colspan="2">Detection item (Self-diagnostics item)</td><td>Contact composition</td><td>Contact capacity</td></tr>
<tr><td colspan="2">(1) Watchdog timer (Inside, outside)
(2) RAM check error
(3) A/D-conversion error
At the case of error detection and not applying for auxiliary supply, an output is ON.
It becomes OR output of a detection item.</td><td>b contact</td><td>AC250V 5A, DC125V 0.2A (Resistance load)
AC250V 1.5A, DC125V 0.1A (Inductive load)</td></tr>
<tr><td rowspan="7">External operation input</td><td colspan="2">Number of circuits</td><td colspan="2">2 circuits, A function (four types) is changed by setting.</td></tr>
<tr><td colspan="2">Function</td><td colspan="2">Four types of following functions can be operated by adding a voltage signal from the outside in addition to switch operation.</td></tr>
<tr><td>Alarm reset</td><td colspan="2">Alarm output is reset (output OFF).</td></tr>
<tr><td>Maximum / Minimum value reset</td><td colspan="2">The maximum/minimum value is reset (it updates to the instantaneous value at the time).</td></tr>
<tr><td>Measurement element change</td><td colspan="2">The measurement display element of the main monitoring is changed.</td></tr>
<tr><td>Phase change</td><td colspan="2">A phase/lines display of all the current/voltage currently displayed is changed.</td></tr>
<tr><td colspan="2">Minimum operation pulse width</td><td colspan="2">300ms , Continuation applying is possible.</td></tr>
<tr><td colspan="2">Rated input</td><td colspan="2">Input rating becomes the same as that of auxiliary supply.
(1) AC100/110V 0.4VA, AC200/220V 1.4VA, DC100/110V 0.4W AC DC two ways.
Contact capacity : About 3mA (AC,DC100/110V) , About 6mA (AC200/220V)
(2) DC24V 0.3W, DC48V 1.2W
Contact capacity : About 10mA (DC24V) , About 20mA (DC48V)</td></tr>
</table>

Note (32) 2 outputs combination is possible, for pulse output and alarm output and CPU error output.
(CPU error output is 1 point only)

● Caution on the use of external display selection input (option)
External power consumption is 0.4VA at AC110V or 1.4VA at AC220V or 0.4W at DC110V.
In case a relay or a switch is used for power-supply supply, please use the thing of about 1mA of the minimum application loads.



7. Maintenance and check

7.1 Trouble shooting

Symptoms	Possible causes	Remedial measures
Does not display.	The power supply is not supplied. (Not connected. or voltage is low)	Check the auxiliary supply. Again, a power supply is supplied.
	Measurement display ON/OFF setting is set to OFF.	Setting check.
	Trouble of device.	Replace the device.
Measuring value error is noticeable	Range is not set correctly.	Please set again.
	Out of range in rated frequency (45.0 - 65.0Hz).	It cannot be used.
	Cycle control, SCR phase angle control, PWM, or other inverter output is measured.	It cannot be used.
Communication error occurs.	Communication cable is disconnection. Or communication cable isn't connected justly. (Polarity, etc.)	Confirmation of communication cable.
	Setting of communication isn't good. (Address, Transmission rate, Parity, Stop bit)	Confirmation of setting.
Pulse output is not outputted.	Pulse output is set to OFF or measurement element is set to OFF.	Please check a setting
Alarm output does not return.	The return method is a "manual reset".	Please check a setting

7.2 Test

In case this product is tested, a special setting or operation is not needed fundamentally.
However, the following test should operate it along with each process.

(1) Alarm-output test

Even if this product does not have input, it can perform ON/OFF test of an alarm output (relay-contact output).
Operation is performed by alarm 1 test and alarm 2 test in the setting mode 1.
Please refer to "5.3.1 Setting mode 1 (2) alarm-output setup" about the details of operation.

< Operating process >

・Alarm 1 test (Setting No. 124)

(111) (121) (124)
Press [SET] for 3 seconds → Press [MODE] → Press [RESET/SHIFT] for 3 times → While pushing [SET], the alarm 1 output is ON.

・Alarm 2 test (Setting No. 128)

(111) (121) (128)
Press [SET] for 3 seconds → Press [MODE] → Press [RESET/SHIFT] for 7 times → While pushing [SET], the alarm 2 output is ON.

(2) Harmonic time-interval test

Please test by the following operation about the time interval of a harmonic. An error becomes large, in case it tests without performing the following operation.
Operation is performed with the average time interval in the setting mode 1.
Please refer to "5.3.1 setting mode 1 (4) harmonic detection setting" for operation details.

< Operating process > (Setting No. 14A)

(111) (141) (14A)
Press [SET] for 3 seconds → Press [MODE] for 3 times → Press [RESET/SHIFT] for 9 times

→ Please press [SET] simultaneously with a test start.

Please press [DISPLAY] and return to a measurement screen.

Appendix table 1-1

Active power range, watt-hour multiplier rate table (3-phase 4-wire)

Multiplier rate	V range / A range	750.0kV (VT550000/110V) [W]	500.0kV (VT380000/110V) [W]	375.0kV (VT275000/110V) [W]	300.0kV (VT220000/110V) [W]	255.0kV (VT187000/110V) [W]	210.0kV (VT154000/110V) [W]	180.0kV (VT132000/110V) [W]	150.0kV (VT110000/110V) [W]	105.0kV (VT77000/110V) [W]	90.0kV (VT66000/110V) [W]	45.0kV (VT33000/110V) [W]	30.0kV (VT22000/110V) [W]	Multiplier rate
	5A	5.00 M	3600 k (3455)	2500 k	2000 k	1800 k (1700)	1400 k	1200 k	1000 k	720 k (700)	600 k	300.0 k	200.0 k	
	6A	6.00 M	4.20 M (4.15)	3000 k	2400 k	2000 k (2040)	1800 k (1680)	1500 k (1440)	1200 k	900 k (840)	720 k	360.0 k	240.0 k	
	7.5A	7.50 M	5.60 M (5.18)	4.00 M (3.75)	3000 k	2500 k (2550)	2400 k (2100)	1800 k	1500 k	1200 k (1050)	900 k	450 k	300.0 k	
	8A	8.00 M	5.60 M (5.53)	4.00 M	3200 k	3000 k (2720)	2400 k (2240)	2000 k (1920)	1600 k	1200 k (1120)	960 k	480 k	320.0 k	
×100	10A	10.00 M	7.20 M (6.91)	5.00 M	4.00 M	3600 k (3400)	2800 k	2400 k	2000 k	1400 k	1200 k	600 k	400 k	
	12A	12.00 M	8.40 M (8.29)	6.00 M	4.80 M	4.20 M (4.08)	3600 k (3360)	3000 k (2880)	2400 k	1800 k (1680)	1500 k (1440)	720 k	480 k	
	15A	15.00 M	10.00 M (10.36)	7.50 M	6.00 M	5.60 M (5.10)	4.20 M	3600 k	3000 k	2400 k (2100)	1800 k	900 k	600 k	
	20A	20.00 M	14.00 M (13.82)	10.00 M	8.00 M	7.20 M (6.80)	5.60 M	4.80 M	4.00 M	2800 k	2400 k	1200 k	800 k	
	25A	25.00 M	18.00 M (17.27)	14.00 M (12.50)	10.00 M	9.00 M (8.50)	7.20 M (7.00)	6.00 M	5.00 M	3600 k (3500)	3000 k	1500 k	1000 k	×10
	30A	30.00 M	20.00 M (20.73)	15.00 M	12.00 M	10.00 M (10.20)	8.40 M	7.20 M	6.00 M	4.20 M	3600 k	1800 k	1200 k	
	40A	40.0 M	28.00 M (27.64)	20.00 M	16.00 M	14.00 M (13.60)	12.00 M (11.20)	9.60 M	8.00 M	5.60 M	4.80 M	2400 k	1600 k	
	50A	50.0 M	36.00 M (34.55)	25.00 M	20.00 M	18.00 M (17.00)	14.00 M	12.00 M	10.00 M	7.20 M (7.00)	6.00 M	3000 k	2000 k	
	60A	60.0 M	42.0 M (41.5)	30.00 M	24.00 M	20.00 M (20.40)	18.00 M (16.80)	15.00 M (14.40)	12.00 M	8.40 M	7.20 M	3600 k	2400 k	
	75A	75.0 M	56.0 M (51.8)	40.0 M (37.5)	30.00 M	28.00 M (25.50)	24.00 M (21.00)	18.00 M	15.00 M	12.00 M (10.50)	9.00 M	4.50 M	3000 k	
	80A	80.0 M	56.0 M (55.3)	40.0 M	32.00 M	28.00 M (27.20)	24.00 M (22.40)	20.00 M (19.20)	16.00 M	12.00 M (11.20)	9.60 M	4.80 M	3200 k	
×1000	100A	100.0 M	72.0 M (69.1)	50.0 M	40.0 M	36.00 M (34.00)	28.00 M	24.00 M	20.00 M	14.00 M	12.00 M	6.00 M	4.00 M	
	120A	120.0 M	84.0 M (82.9)	60.0 M	48.0 M	42.0 M (40.8)	36.00 M (33.60)	30.00 M (28.80)	24.00 M	18.00 M (16.80)	15.00 M (14.40)	7.20 M	4.80 M	
	150A	150.0 M	100.0 M (103.6)	75.0 M	60.0 M	56.0 M (51.0)	42.0 M	36.00 M	30.00 M	24.00 M (21.00)	18.00 M	9.00 M	6.00 M	
	200A	200.0 M	140.0 M (138.2)	100.0 M	80.0 M	72.0 M (68.0)	56.0 M	48.0 M	40.0 M	28.00 M	24.00 M	12.00 M	8.00 M	
	250A	250.0 M	180.0 M (172.7)	140.0 M (125.0)	100.0 M	90.0 M (85.0)	72.0 M (70.0)	60.0 M	50.0 M	36.00 M (35.00)	30.00 M	15.00 M	10.00 M	×100
	300A	300.0 M	200.0 M (207.3)	150.0 M	120.0 M	100.0 M (102.0)	84.0 M	72.0 M	60.0 M	42.0 M	36.00 M	18.00 M	12.00 M	
	400A	400 M	280.0 M (276.4)	200.0 M	160.0 M	140.0 M (136.0)	120.0 M (112.0)	96.0 M	80.0 M	56.0 M	48.0 M	24.00 M	16.00 M	
	500A	500 M	360.0 M (345.5)	250.0 M	200.0 M	180.0 M (170.0)	140.0 M	120.0 M	100.0 M	72.0 M (70.0)	60.0 M	30.00 M	20.00 M	
	600A	600 M	420 M (415)	300.0 M	240.0 M	200.0 M (204.0)	180.0 M (168.0)	150.0 M (144.0)	120.0 M	84.0 M	72.0 M	36.00 M	24.00 M	
	750A	750 M	560 M (518)	400 M (375)	300.0 M	280.0 M (255.0)	240.0 M (210.0)	180.0 M	150.0 M	120.0 M (105.0)	90.0 M	45.0 M	30.00 M	
	800A	800 M	560 M (553)	400 M	320.0 M	280.0 M (272.0)	240.0 M (224.0)	200.0 M (192.0)	160.0 M	120.0 M (112.0)	96.0 M	48.0 M	32.00 M	
	900A	900 M	640 M (622)	450 M	360.0 M	320.0 M (306.0)	280.0 M (252.0)	240.0 M (216.0)	180.0 M	140.0 M (126.0)	120.0 M (108.0)	56.0 M (54.0)	36.00 M	
×10000	1000A	1000 M	720 M (691)	500 M	400 M	360.0 M (340.0)	280.0 M	240.0 M	200.0 M	140.0 M	120.0 M	60.0 M	40.0 M	
	1200A		840 M (829)	600 M	480 M	420 M (408)	360.0 M (336.0)	300.0 M (288.0)	240.0 M	180.0 M (168.0)	150.0 M (144.0)	72.0 M	48.0 M	
	1500A			750 M	600 M	560 M (510)	420 M	360.0 M	300.0 M	240.0 M (210.0)	180.0 M	90.0 M	60.0 M	
	1600A			800 M	640 M	560 M (544)	450 M (448)	400 M (384)	320.0 M	240.0 M (224.0)	200.0 M (192.0)	96.0 M	64.0 M	
	1800A			900 M	720 M	640 M (612)	560 M (504)	450 M (432)	360.0 M	280.0 M (252.0)	240.0 M (216.0)	120.0 M (108.0)	72.0 M	
	2000A			1000 M	800 M	720 M (680)	560 M	480 M	400 M	280.0 M	240.0 M	120.0 M	80.0 M	
	2500A				1000 M	900 M (850)	720 M (700)	600 M	500 M	360.0 M (350.0)	300.0 M	150.0 M	100.0 M	×1000
	3000A						840 M	720 M	600 M	420 M	360.0 M	180.0 M	120.0 M	
	4000A							960 M	800 M	560 M	480 M	240.0 M	160.0 M	
	5000A								1000 M	720 M (700)	600 M	300.0 M	200.0 M	
	6000A									840 M	720 M	360.0 M	240.0 M	
	7500A										900 M	450 M	300.0 M	
	8000A										960 M	480 M	320.0 M	
	9000A											560 M (540)	360.0 M	
	10000A											600 M	400 M	
	12000A											720 M	480 M	
	15000A											900 M	600 M	
	20000A												800 M	×10000
	30000A													

<Note 1>

Parenthesis is primary active power (apparent power, reactive power) value in /1kW(1kVA, 1kvar). In the blank, setting is impossible.

About active power and reactive power range.

Full scale display, less than 4000 : 4 digit. More than 4000 : 3 digit.

An example) 4800kW → 4.80MW
40kvar → 40.0kvar
20kVA → 20.00kVA

<Note 2>

In case the voltage range and the current range were set as [ ] of an upper table and an output pulse unit (a four-step setup is possible) is set as the fastest. The output pulse width of a pulse output is set to 100 to 130ms. (Usually 240 to 260ms)

Appendix table 1-2

Active power range, watt-hour multiplier rate table (3-phase 4-wire)

Multiplier rate	V range / A range	25.00kV (VT18400/110V) [W]	24.00kV (VT16500/110V) [W]	18.00kV (VT13800/110V) [W]	18.00kV (VT13200/110V) [W]	15.00kV (VT11000/110V) [W]	9000V (VT6600/110V) [W]	4500V (VT3300/110V) [W]	3000V (VT2200/110V) [W]	2400V (VT1650/110V) [W]	1500V (VT1100/110V) [W]	1200V (VT880/110V) [W]	600V (VT480/110V) [W]	Multiplier rate
	5A	180.0 k (167)	150.0 k	140.0 k (125.5)	120.0 k	100.0 k	60.0 k	30.00 k	20.00 k	15.00 k	10.00 k	8.00 k	4.50 k (4.36)	
	6A	200.0 k (201)	180.0 k	160.0 k (150.5)	150.0 k (144.0)	120.0 k	72.0 k	36.00 k	24.00 k	18.00 k	12.00 k	9.60 k	5.60 k (5.24)	
	7.5A	280.0 k (251)	240.0 k (225.0)	200.0 k (188.2)	180.0 k	150.0 k	90.0 k	45.0 k	30.00 k	24.00 k (22.50)	15.00 k	12.00 k	7.20 k (6.55)	
	8A	280.0 k (268)	240.0 k	200.0 k (200.7)	200.0 k (192.0)	160.0 k	96.0 k	48.0 k	32.00 k	24.00 k	16.00 k	14.00 k (12.80)	7.20 k (6.98)	
	10A	360.0 k (335)	300.0 k	280.0 k (250.9)	240.0 k	200.0 k	120.0 k	60.0 k	40.0 k	30.00 k	20.00 k	16.00 k	9.00 k (8.73)	
	12A	420 k (401)	360.0 k	320.0 k (301.1)	300.0 k (288.0)	240.0 k	150.0 k (144.0)	72.0 k	48.0 k	36.00 k	24.00 k	20.00 k (19.20)	12.00 k (10.47)	×0.1
	15A	560 k (502)	450 k	400 k (376)	360.0 k	300.0 k	180.0 k	90.0 k	60.0 k	45.0 k	30.00 k	24.00 k	14.00 k (13.09)	
	20A	720 k (669)	600 k	560 k (502)	480 k	400 k	240.0 k	120.0 k	80.0 k	60.0 k	40.0 k	32.00 k	18.00 k (17.45)	
×10	25A	840 k (836)	750 k	640 k (627)	600 k	500 k	300.0 k	150.0 k	100.0 k	75.0 k	50.0 k	40.0 k	24.00 k (21.82)	
	30A	1000 k (1004)	900 k	800 k (753)	720 k	600 k	360.0 k	180.0 k	120.0 k	90.0 k	60.0 k	48.0 k	28.00 k (26.18)	
	40A	1400 k (1338)	1200 k	1000 k (1004)	960 k	800 k	480 k	240.0 k	160.0 k	120.0 k	80.0 k	64.0 k	36.00 k (34.91)	
	50A	1800 k (1673)	1500 k	1400 k (1255)	1200 k	1000 k	600 k	300.0 k	200.0 k	150.0 k	100.0 k	80.0 k	45.0 k (43.6)	
	60A	2000 k (2007)	1800 k	1600 k (1505)	1500 k (1440)	1200 k	720 k	360.0 k	240.0 k	180.0 k	120.0 k	96.0 k	56.0 k (52.4)	
	75A	2800 k (2509)	2400 k (2250)	2000 k (1882)	1800 k	1500 k	900 k	450 k	300.0 k	240.0 k (225.0)	150.0 k	120.0 k	72.0 k (65.5)	
	80A	2800 k (2676)	2400 k	2000 k (2007)	2000 k (1920)	1600 k	960 k	480 k	320.0 k	240.0 k	160.0 k	140.0 k (128.0)	72.0 k (69.8)	
	100A	3600 k (3345)	3000 k	2800 k (2509)	2400 k	2000 k	1200 k	600 k	400 k	300.0 k	200.0 k	160.0 k	90.0 k (87.3)	
	120A	4.20 M (4.01)	3600 k	3200 k (3011)	3000 k (2880)	2400 k	1500 k (1440)	720 k	480 k	360.0 k	240.0 k	200.0 k (192.0)	120.0 k (104.7)	×1
	150A	5.60 M (5.02)	4.50 M	4.00 M (3.76)	3600 k	3000 k	1800 k	900 k	600 k	450 k	300.0 k	240.0 k	140.0 k (130.9)	
	200A	7.20 M (6.69)	6.00 M	5.60 M (5.02)	4.80 M	4.00 M	2400 k	1200 k	800 k	600 k	400 k	320.0 k	180.0 k (174.5)	
×100	250A	8.40 M (8.36)	7.50 M	6.40 M (6.27)	6.00 M	5.00 M	3000 k	1500 k	1000 k	750 k	500 k	400 k	240.0 k (218.2)	
	300A	10.00 M (10.04)	9.00 M	8.00 M (7.53)	7.20 M	6.00 M	3600 k	1800 k	1200 k	900 k	600 k	480 k	280.0 k (261.8)	
	400A	14.00 M (13.38)	12.00 M	10.00 M (10.04)	9.60 M	8.00 M	4.80 M	2400 k	1600 k	1200 k	800 k	640 k	360.0 k (349.1)	
	500A	18.00 M (16.73)	15.00 M	14.00 M (12.55)	12.00 M	10.00 M	6.00 M	3000 k	2000 k	1500 k	1000 k	800 k	450 k (436)	
	600A	20.00 M (20.07)	18.00 M	16.00 M (15.05)	15.00 M (14.40)	12.00 M	7.20 M	3600 k	2400 k	1800 k	1200 k	960 k	560 k (524)	
	750A	28.00 M (25.09)	24.00 M (22.50)	20.00 M (18.82)	18.00 M	15.00 M	9.00 M	4.50 M	3000 k	2400 k (2250)	1500 k	1200 k	720 k (655)	
	800A	28.00 M (26.76)	24.00 M	20.00 M (20.07)	20.00 M (19.20)	16.00 M	9.60 M	4.80 M	3200 k	2400 k	1600 k	1400 k (1280)	720 k (698)	
	900A	32.00 M (30.11)	28.00 M (27.00)	24.00 M (22.58)	24.00 M (21.60)	18.00 M	12.00 M (10.80)	5.60 M (5.40)	3600 k	2800 k (2700)	1800 k	1500 k (1440)	800 k (785)	
	1000A	36.00 M (33.45)	30.00 M	28.00 M (25.09)	24.00 M	20.00 M	12.00 M	6.00 M	4.00 M	3000 k	2000 k	1600 k	900 k (873)	
	1200A	42.0 M (40.1)	36.00 M	32.00 M (30.11)	30.00 M (28.80)	24.00 M	15.00 M (14.40)	7.20 M	4.80 M	3600 k	2400 k	2000 k (1920)	1200 k (1047)	×10
	1500A	56.0 M (50.2)	45.0 M	40.0 M (37.6)	36.00 M	30.00 M	18.00 M	9.00 M	6.00 M	4.50 M	3000 k	2400 k	1400 k (1309)	
	1600A	56.0 M (53.5)	48.0 M	42.0 M (40.1)	40.0 M (38.4)	32.00 M	20.00 M (19.20)	9.60 M	6.40 M	4.80 M	3200 k	2800 k (2560)	1400 k (1396)	
	1800A	64.0 M (60.2)	56.0 M (54.0)	48.0 M (45.2)	45.0 M (43.2)	36.00 M	24.00 M (21.60)	12.00 M (10.80)	7.20 M	5.60 M (5.40)	3600 k	3000 k (2880)	1600 k (1571)	
	2000A	72.0 M (66.9)	60.0 M	56.0 M (50.2)	48.0 M	40.0 M	24.00 M	12.00 M	8.00 M	6.00 M	4.00 M	3200 k	1800 k (1745)	
×1000	2500A	84.0 M (83.6)	75.0 M	64.0 M (62.7)	60.0 M	50.0 M	30.00 M	15.00 M	10.00 M	7.50 M	5.00 M	4.00 M	2400 k (2182)	
	3000A	100.0 M (100.4)	90.0 M	80.0 M (75.3)	72.0 M	60.0 M	36.00 M	18.00 M	12.00 M	9.00 M	6.00 M	4.80 M	2800 k (2618)	
	4000A	140.0 M (133.8)	120.0 M	100.0 M (100.4)	96.0 M	80.0 M	48.0 M	24.00 M	16.00 M	12.00 M	8.00 M	6.40 M	3600 k (3491)	
	5000A	180.0 M (167.3)	150.0 M	140.0 M (125.5)	120.0 M	100.0 M	60.0 M	30.00 M	20.00 M	15.00 M	10.00 M	8.00 M	4.50 M (4.36)	
	6000A	200.0 M (200.7)	180.0 M	160.0 M (150.5)	150.0 M (144.0)	120.0 M	72.0 M	36.00 M	24.00 M	18.00 M	12.00 M	9.60 M	5.60 M (5.24)	
	7500A	280.0 M (250.9)	240.0 M (225.0)	200.0 M (188.2)	180.0 M	150.0 M	90.0 M	45.0 M	30.00 M	24.00 M (22.50)	15.00 M	12.00 M	6.40 M (6.55)	
	8000A	280.0 M (267.6)	240.0 M	200.0 M (200.7)	200.0 M (192.0)	160.0 M	96.0 M	48.0 M	32.00 M	24.00 M	16.00 M	14.00 M (12.80)	7.20 M (6.98)	
	9000A	320.0 M (301.1)	280.0 M (270.0)	240.0 M (225.8)	240.0 M (216.0)	180.0 M	120.0 M (108.0)	56.0 M (54.0)	36.00 M	28.00 M (27.00)	18.00 M	15.00 M (14.40)	8.00 M (7.85)	
	10000A	360.0 M (334.5)	300.0 M	280.0 M (250.9)	240.0 M	200.0 M	120.0 M	60.0 M	40.0 M	30.00 M	20.00 M	16.00 M	8.40 M (8.73)	
	12000A	420 M (401)	360.0 M	320.0 M (301.1)	300.0 M (288.0)	240.0 M	150.0 M (144.0)	72.0 M	48.0 M	36.00 M	24.00 M	20.00 M (19.20)	10.00 M (10.47)	×100
	15000A	560 M (502)	450 M	400 M (376)	360.0 M	300.0 M	180.0 M	90.0 M	60.0 M	45.0 M	30.00 M	24.00 M	14.00 M (13.09)	
×10000	20000A	720 M (669)	600 M	560 M (502)	480 M	400 M	240.0 M	120.0 M	80.0 M	60.0 M	40.0 M	32.00 M	18.00 M (17.45)	
	30000A		900 M	800 M (753)	720 M	600 M	360.0 M	180.0 M	120.0 M	90.0 M	60.0 M	48.0 M	28.00 M (26.18)	×1000

<Note 1>

Parenthesis is primary active power (apparent power, reactive power) value in /1kW(1kVA, 1kvar). In the blank, setting is impossible.

About active power and reactive power range.

Full scale display, less than 4000 : 4 digit. More than 4000 : 3 digit.

An example) 4800kW → 4.80MW

40kvar → 40.0kvar

20kVA → 20.00kVA

<Note 2>

In case the voltage range and the current range were set as [ ] of an upper table and an output pulse unit (a four-step setup is possible) is set as the fastest. The output pulse width of a pulse output is set to 100 to 130ms. (Usually 240 to 260ms)

Appendix table 1-3
Active power range, watt-hour multiplier rate table (3-phase 4-wire)

Multiplier rate	V range / A range	600V (VT460/110V) [W]	600V (VT440/110V) [W]	500V (VT380/110V) [W]	300V (VT220/110V) [W]	150V (110V) [W]	Multiplier rate
	5A	4.20 k (4.18)	4.00 k	3600 k (3455)	2000	1000	×0.01
	6A	5.60 k (5.02)	4.80 k	4.20 k (4.15)	2400	1200	
	7.5A	6.40 k (6.27)	6.00 k	5.60 k (5.18)	3000	1500	
	8A	7.20 k (6.69)	6.40 k	5.60 k (5.53)	3200	1600	
	10A	8.40 k (8.36)	8.00 k	7.20 k (6.91)	4.00 k	2000	
×0.1	12A	10.00 k (10.04)	9.60 k	8.40 k (8.29)	4.80 k	2400	
	15A	14.00 k (12.55)	12.00 k	10.00 k (10.36)	6.00 k	3000	
	20A	18.00 k (16.73)	16.00 k	14.00 k (13.82)	8.00 k	4.00 k	
	25A	24.00 k (20.91)	20.00 k	18.00 k (17.27)	10.00 k	5.00 k	
	30A	28.00 k (25.09)	24.00 k	20.00 k (20.73)	12.00 k	6.00 k	
	40A	36.00 k (33.45)	32.00 k	28.00 k (27.64)	16.00 k	8.00 k	
	50A	42.0 k (41.8)	40.0 k	36.00 k (34.55)	20.00 k	10.00 k	×0.1
	60A	56.0 k (50.2)	48.0 k	42.0 k (41.5)	24.00 k	12.00 k	
	75A	64.0 k (62.7)	60.0 k	56.0 k (51.8)	30.00 k	15.00 k	
	80A	72.0 k (66.9)	64.0 k	56.0 k (55.3)	32.00 k	16.00 k	
	100A	84.0 k (83.6)	80.0 k	72.0 k (69.1)	40.0 k	20.00 k	
×1	120A	100.0 k (100.4)	96.0 k	84.0 k (82.9)	48.0 k	24.00 k	
	150A	140.0 k (125.5)	120.0 k	100.0 k (103.6)	60.0 k	30.00 k	
	200A	180.0 k (167.3)	160.0 k	140.0 k (138.2)	80.0 k	40.0 k	
	250A	240.0 k (209.1)	200.0 k	180.0 k (172.7)	100.0 k	50.0 k	
	300A	280.0 k (250.9)	240.0 k	200.0 k (207.3)	120.0 k	60.0 k	
	400A	360.0 k (334.5)	320.0 k	280.0 k (276.4)	160.0 k	80.0 k	
	500A	420 k (418)	400 k	360.0 k (345.5)	200.0 k	100.0 k	×1
	600A	560 k (502)	480 k	420 k (415)	240.0 k	120.0 k	
	750A	640 k (627)	600 k	560 k (518)	300.0 k	150.0 k	
	800A	720 k (669)	640 k	560 k (553)	320.0 k	160.0 k	
	900A	800 k (753)	720 k	640 k (622)	360.0 k	180.0 k	
	1000A	840 k (836)	800 k	720 k (691)	400 k	200.0 k	
×10	1200A	1000 k (1004)	960 k	840 k (829)	480 k	240.0 k	
	1500A	1400 k (1255)	1200 k	1000 k (1036)	600 k	300.0 k	
	1600A	1400 k (1338)	1400 k (1280)	1200 k (1105)	640 k	320.0 k	
	1800A	1600 k (1505)	1500 k (1440)	1400 k (1244)	720 k	360.0 k	
	2000A	1800 k (1673)	1600 k	1400 k (1382)	800 k	400 k	
	2500A	2400 k (2091)	2000 k	1800 k (1727)	1000 k	500 k	
	3000A	2800 k (2509)	2400 k	2000 k (2073)	1200 k	600 k	
	4000A	3600 k (3345)	3200 k	2800 k (2764)	1600 k	800 k	
	5000A	4.20 M (4.18)	4.00 M	3600 k (3455)	2000 k	1000 k	×10
	6000A	5.60 M (5.02)	4.80 M	4.20 M (4.15)	2400 k	1200 k	
	7500A	6.40 M (6.27)	6.00 M	5.60 M (5.18)	3000 k	1500 k	
	8000A	7.20 M (6.69)	6.40 M	5.60 M (5.53)	3200 k	1600 k	
	9000A	8.00 M (7.53)	7.20 M	6.40 M (6.22)	3600 k	1800 k	
	10000A	8.40 M (8.36)	8.00 M	7.20 M (6.91)	4.00 M	2000 k	
×100	12000A	10.00 M (10.04)	9.60 M	8.40 M (8.29)	4.80 M	2400 k	
	15000A	14.00 M (12.55)	12.00 M	10.00 M (10.36)	6.00 M	3000 k	
	20000A	18.00 M (16.73)	16.00 M	14.00 M (13.82)	8.00 M	4.00 M	
×1000	30000A	28.00 M (25.09)	24.00 M	20.00 M (20.73)	12.00 M	6.00 M	×100

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Parenthesis is primary active power (apparent power, reactive power) value in /1kW(1kVA, 1kvar). In the blank, setting is impossible.
About active power and reactive power range.
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An example) 4800kW → 4.80MW
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20kVA → 20.00kVA

<Note 2>
In case the voltage range and the current range were set as [ ] of an upper table and an output pulse unit (a four-step setup is possible) is set as the fastest. The output pulse width of a pulse output is set to 100 to 130ms. (Usually 240 to 260ms)

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