INSTRUCTION MANUAL

POWER LINE SUPER MULTI-METER

SQLC-110L

3-PHASE 4-WIRE

ANALOG OUTPUT

HARDWARE MODEL D

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				3-phase 4-wire		
					110/√3V input	220/√3V input	440/√3V input
1	Display combination	Pattern			Pattern 1		
		Main monitor			A(S)		
		Sub-monitor (Left)			V(RS)		
		Sub-monitor (Center)			W		
		Sub-monitor (Right)			Wh		
		Bar graph			A(S)		
2	Alarm output (1)	Alarm 1	Element		DA		
			Reset form		AUTO〈自動復帰〉		
			Contact delay time		0 second〈秒〉		
			Test〈テスト〉		－		
		Alarm 2	Element		DA		
			Reset form		AUTO〈自動復帰〉		
			Contact delay time		0 second〈秒〉		
			Test〈テスト〉		－		
3	Demand detection〈需要〉	Demand current	Upper limit value〈上限〉		1200A		
			Interval〈時限〉		0 second〈秒〉		
		Demand active power	Upper limit value〈上限〉		OFF		
			Interval〈時限〉		0 second〈秒〉		
			Operation form		Operating system according with bimetallic type.		
			Power factor operation form		Instant measurement		
4	Harmonic detection〈高調波〉	Current	Distortion factor upper limit〈歪率 上限〉		OFF		
			5th conversion content rate upper limit〈5次換算 上限〉		OFF		
			n-th content rate〈n次〉	Element	5th〈5次〉		
				Upper limit〈上限〉	OFF		
		Voltage	Distortion-factor upper limit〈歪率 上限〉		OFF		
			5th conversion content rate upper limit〈5次換算 上限〉		OFF		
			n-th content rate〈n次〉	Element	5th〈5次〉		
				Upper limit〈上限〉	OFF		
		5th conversion detection characteristics			Inverse-time-delay mode		
		Average value time limit			0 minute〈分〉		

① Voltage, current input (2/2)

No.	Setting item			3-phase 4-wire		
				110/√3V input	220/√3V input	440/√3V input
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 to 1.000 to LAG 0.500		
		Frequency range		45.0 to 65.0Hz		
8	Analog output (1)	Output factor 1		A(S)		
		Output factor 2		V(RS)		
		Output factor 3		W		
		Output factor 4		cosϕ		
		Output peculiar sensitivity	Current	100.0%		
			Active power (Apparent power)	100.0%		
			Reactive power	50.0%		
		Low input cut		OFF		
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		3P4W (3VT,3CT)		
		Input voltage (3)		110V	220V	—
13	Measurement	Dead band		0.0%		
		Tidal current measurement		General measurement		
14	Analog output specification (1)(2)			1 to 5V		
15	Analog output adjustment (1)	Output 1	Bias adjustment	0.0%		
			Span adjustment	100.0%		
		Output 2	Bias adjustment	0.0%		
			Span adjustment	100.0%		
		Output 3	Bias adjustment	0.0%		
			Span adjustment	100.0%		
		Output 4	Bias adjustment	0.0%		
			Span adjustment	100.0%		

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.
The functions without the alarm output option are as follows.
Input 1 function : Max. / Min. reset, Input 2 function : Measurement element change.

Note(2) A setting item is not displayed if analog output is except DC0 to 5V (or DC1 to 5V) specification,
And analog output insulation product does not display a setting item.

Note(3) 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				3-phase 4-wire
1	Display combination	Pattern			Pattern 15
		Main monitor			A(S)
		Sub-monitor (Left)			A(R)
		Sub-monitor (Center)			A(T)
		Sub-monitor (Right)			A(N)
		Bar graph			A(S)
2	Alarm output (4)	Alarm 1	Element		DA
			Reset form		AUTO〈自動復帰〉
			Contact delay time		0 second〈秒〉
			Test〈テスト〉		－
		Alarm 2	Element		DA
			Reset form		AUTO〈自動復帰〉
			Contact delay time		0 second〈秒〉
			Test〈テスト〉		－
3	Demand detection〈需要〉	Demand current	Upper limit value〈上限〉		1200A
			Interval〈時限〉		0 second〈秒〉
4	Harmonic detection〈高調波〉	Current	Distortion-factor upper limit〈歪率 上限〉		OFF
			5th conversion content rate upper limit 〈5 次換算 上限〉		OFF
			n-th content rate〈n次〉	Element	5th〈5 次〉
				Upper limit〈上限〉	OFF
		5th conversion detection characteristics			Inverse-time-delay mode
		Average value time limit			0 minute〈分〉
5	Backlight	Action			AUTO
		Brightness			3 (Middle)
6	Measurement range	Current range			1500A
		Current display peculiar sensitivity			1500A
7	Analog output (4)	Output factor 1			A(S)
		Output factor 2			A(R)
		Output factor 3			A(T)
		Output factor 4			A(N)
		Output peculiar sensitivity	Current		100.0%
		Low input cut			OFF
8	External operation input (4)	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%
11	Analog output specification (4)(5)				1 to 5V
12	Analog output adjustment (4)	Output 1	Bias adjustment		0.0%
			Span adjustment		100.0%
		Output 2	Bias adjustment		0.0%
			Span adjustment		100.0%
		Output 3	Bias adjustment		0.0%
			Span adjustment		100.0%
		Output 4	Bias adjustment		0.0%
			Span adjustment		100.0%

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.
The functions without the alarm output option are as follows.
Input 1 function：Max. / Min. reset, Input 2 function：Measurement element change.

Note(5) A setting item is not displayed if analog output is except DC0 to 5V (or DC1 to 5V) specification,
And analog output insulation product does not display a setting item.

③ Voltage input

No.	Setting item				3-phase 4-wire		
					110/√3V input	220/√3V input	440/√3V input
1	Display combination	Pattern			Pattern 16		
		Main monitor			V(RS)		
		Sub-monitor (Left)			V(ST)		
		Sub-monitor (Center)			V(TR)		
		Sub-monitor (Right)			Hz		
		Bar graph			V(RS)		
2	Alarm output (6)	Alarm 1	Element		V		
			Reset form		AUTO〈自動復帰〉		
			Contact delay time		0 second〈秒〉		
			Test〈テスト〉		－		
		Alarm 2	Element		V		
			Reset form		AUTO〈自動復帰〉		
			Contact delay time		0 second〈秒〉		
			Test〈テスト〉		－		
3	Harmonic detection〈高調波〉	Voltage	Distortion-factor upper limit〈歪率 上限〉		OFF		
			5th conversion content rate upper limit〈5次換算 上限〉		OFF		
			n-th content rate〈n次〉	Element	5th〈5次〉		
				Upper limit〈上限〉	OFF		
		5th conversion detection characteristics			Inverse-time-delay mode		
		Average value time limit			0 minute〈分〉		
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 to 65.0Hz		
7	Analog output (6)	Output factor 1			V(RS)		
		Output factor 2			V(ST)		
		Output factor 3			V(TR)		
		Output factor 4			Hz		
		Low input cut			OFF		
8	External operation input (6)	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			3P4W (3VT)		
		Input voltage (8)			110V	220V	－
11	Measurement	Dead band			0.0%		
12	Analog output specification (6)(7)				1 to 5V		
13	Analog output adjustment (6)	Output 1	Bias adjustment		0.0%		
			Span adjustment		100.0%		
		Output 2	Bias adjustment		0.0%		
			Span adjustment		100.0%		
		Output 3	Bias adjustment		0.0%		
			Span adjustment		100.0%		
		Output 4	Bias adjustment		0.0%		
			Span adjustment		100.0%		

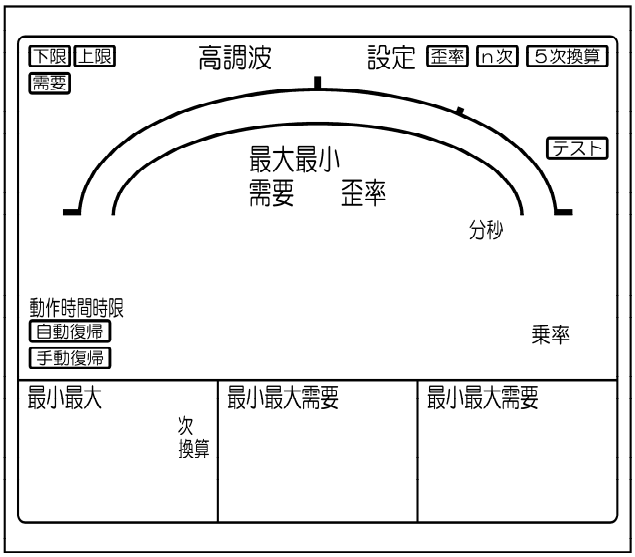
Note(6) A setting item is not displayed in case there is no corresponding option.
The external operation input constitutes initial value with an alarm output option.
The functions without the alarm output option are as follows.
Input 1 function：Max. / Min. reset, Input 2 function：Measurement element change.

Note(7) A setting item is not displayed if analog output is except DC0 to 5V (or DC1 to 5V) specification,
And analog output insulation product does not display a setting item.

Note(8) 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.

■ Explanation of LCD.

This product (hardware model D) has the part displayed in Japanese.
Please refer to explanation of a display.



下限：Lower limit
上限：Upper limit
需要：Demand
高調波：Harmonic
設定：Set
歪率：Distortion factor
ｎ次：n th
5 次換算：5th conversion
テスト：Test
最大：Maximum
最小：Minimum
分：Minute
秒：Second
動作時間：Operating time
時限：Time interval
自動復帰：Automatic reset
手動復帰：Manual reset
乗率：Multiplying factor

Content

1. Product outline

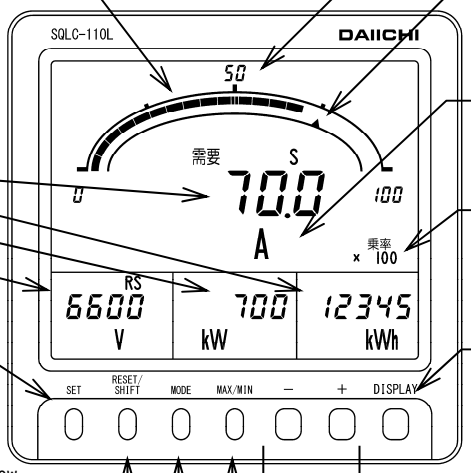
1.1 Usage of product

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 voltage circuit to a high voltage 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.
The intensive monitor united with the system is made in an addendum of analog output and a pulse output.

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.
- Analog output 4 circuit 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 specify when ordering.) And an output factor can be selected by setting.
- Two external operation inputs are possible. (Option)
  And, selection of reset input and display change input is possible at setting.
- Power supply is AC85 to 264V, DC80 to 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.
- Analog output is with a lower limit limiter.
- A tidal current measurement (output 2 quadrant) change is possible for var and cosϕ.
- 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 set.
  LED : White.
- LCD can be chosen from 2 kinds, the type to see from the top and the type to see from the bottom.
  (Please designate it at an order.)
- The product with analog output can be selected from between analog output insulation type and the analog output non-insulation type. (Please specify when ordering.)

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

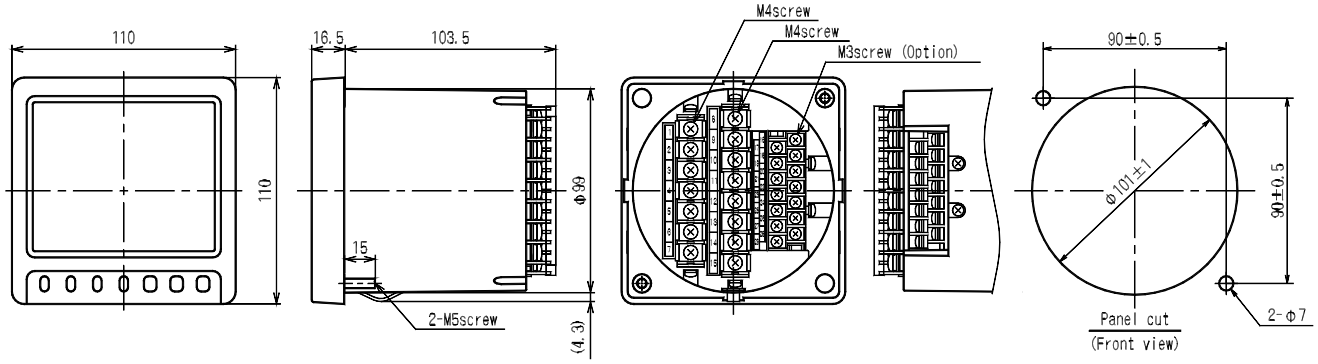
The switch to which general measurement display (usually) and the harmonic measurement (voltage and current) display are changed.
In set mode, it is used as a switch that changes a setting item.

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.

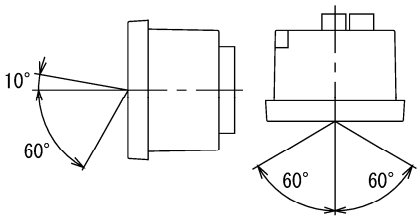
● Dimension diagram



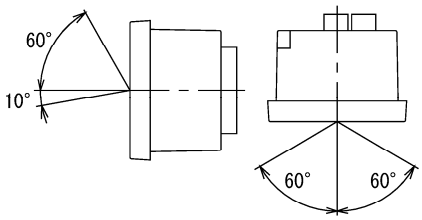
● Caution on handling

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

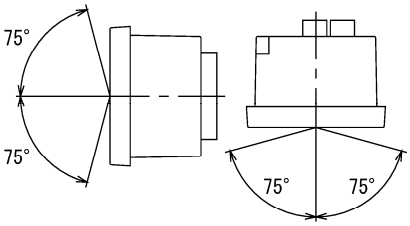
(1) For upper case installation



(2) For lower case installation



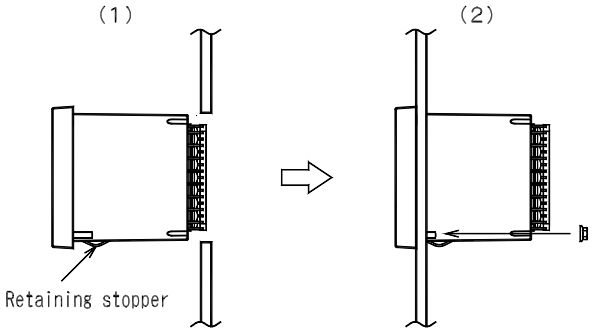
(3) Wide viewing angle model



● 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.

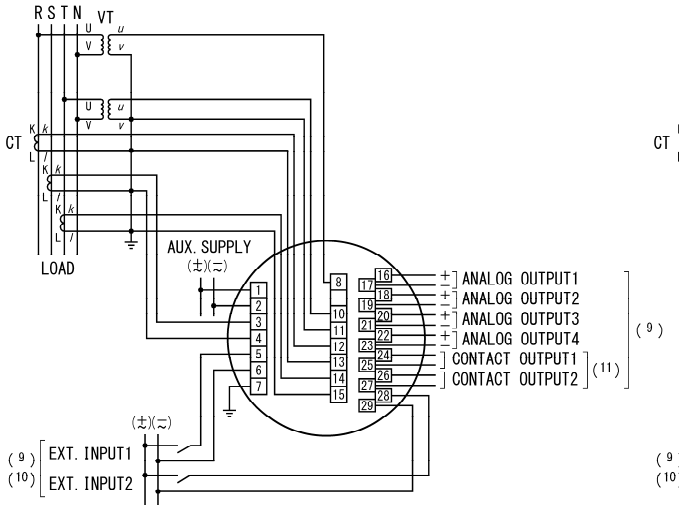


3.2 Connections

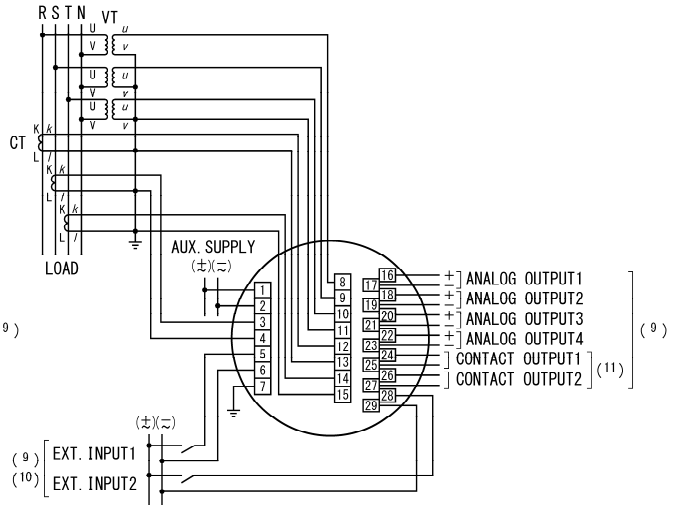
Please perform connection after referring to the following wiring diagram.

● Connection drawing (12)

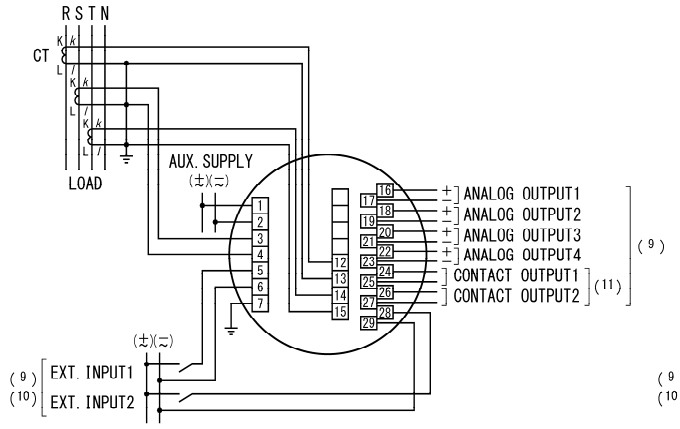
(1) Voltage, Current input (2VT, 3CT)



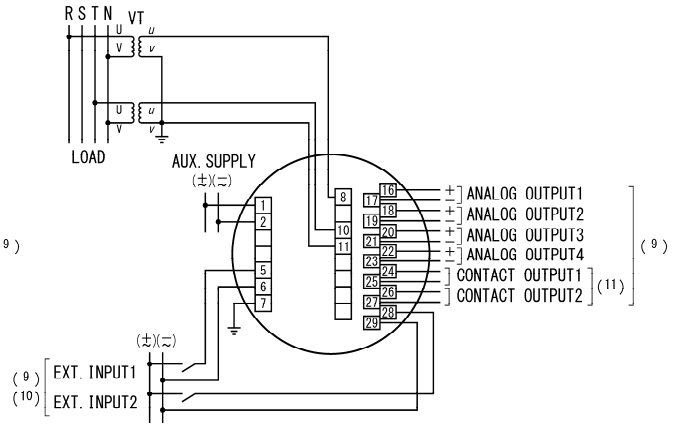
(2) Voltage, Current input (3VT, 3CT)



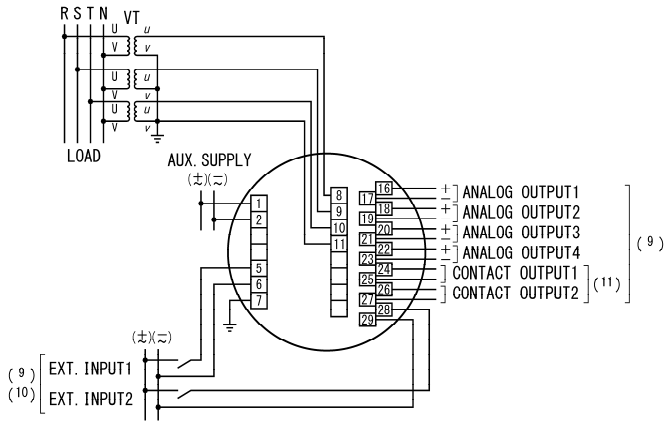
(3) Current input



(4) Voltage input (2VT)



(5) Voltage input (3VT)



Note(9) Analog output, contact output, external operation input is an option.

Note(10) An external operation input can be changed to an external-reset function or an external display change function by setting.

Note(11) 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(12) 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.

● 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.

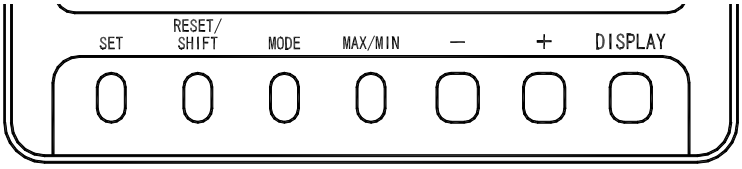
(5) No protection is necessary for this unit even if the transmission line may be affected by an induced lightning surge or the like when transmitting an analog output to the receiver. Mount an about 500V arrester or the like between the line surge protector and the ground as well as between the transmission line and the ground on the receiver side for the purpose of protecting the devices on the receiver side.

(6) When connecting an inductive load to the pulse output or alarm output, it is recommended that a surge killer be installed externally. Without a surge killer, the life of the contacts may be shortened.

(7) This product takes in frequency from voltage input terminals 8-9 and current input terminals 12-13 and performs various measurements.
When using with no input to this terminal (less than 20% of voltage full scale, less than 10% of current full scale), set the frequency range (No. 218) according to the input frequency.
If the settings do not match, the measurement value may fluctuate or the error may become large.
Please refer to page 54 for setting instructions.

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 factor.

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

● Terminology

(1) Range

Measurement range of each measurement.

① Voltage range : Measurement range of voltage measurement (primary voltage value for 0 to 150V/0 to 300V)

② Current range : Measurement range of current measurement (primary current value for 0 to 5A/0 to 1A)

③ Active power range / Reactive power range : Measurement range of active/reactive power measurement (Active power and reactive power values by voltage range and current range [VT ratio × CT ratio])

④ Power factor range : Measurement range of power factor measurement

⑤ Frequency range : Measurement range of frequency measurement

(2) Intrinsic sensitivity

Display intrinsic sensitivity : Maximum scale value that can be changed with range as 100%

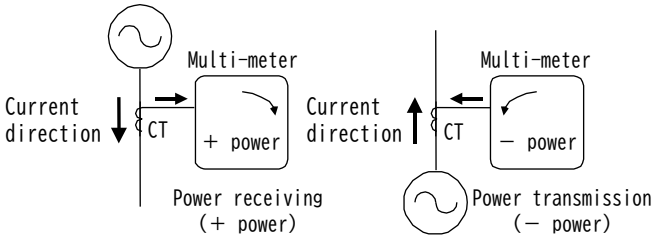
Output intrinsic sensitivity : Maximum output value that can be changed with range as 100%

(3) Full scale

Maximum scale value for bar graph display

(4) Power receiving / Power transmission

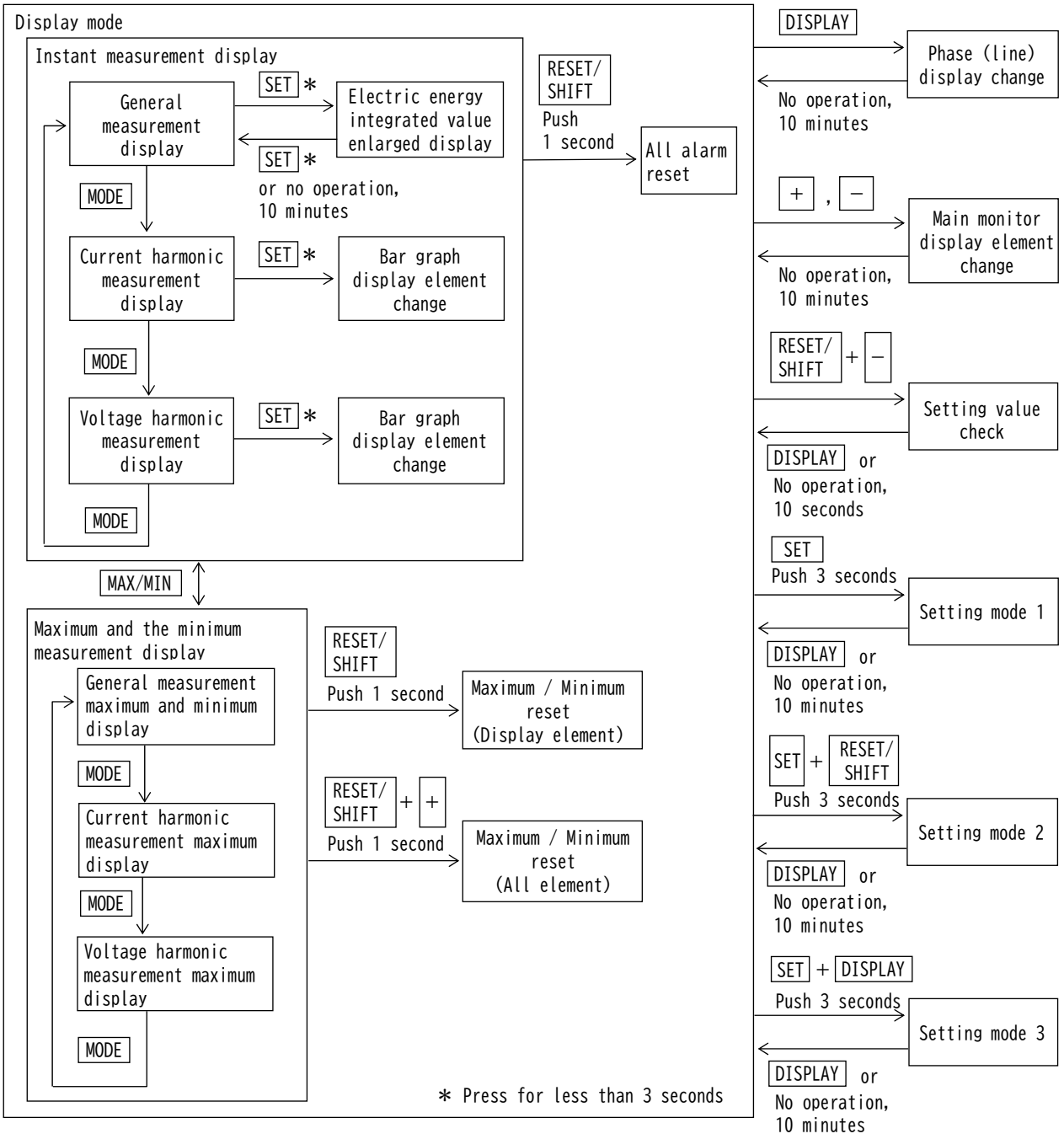
The multi-meter measures power receiving (+ power) and power transmission (- power) depending on the direction of current flowing through the transformer.



Power Receiving / Power transmission diagram

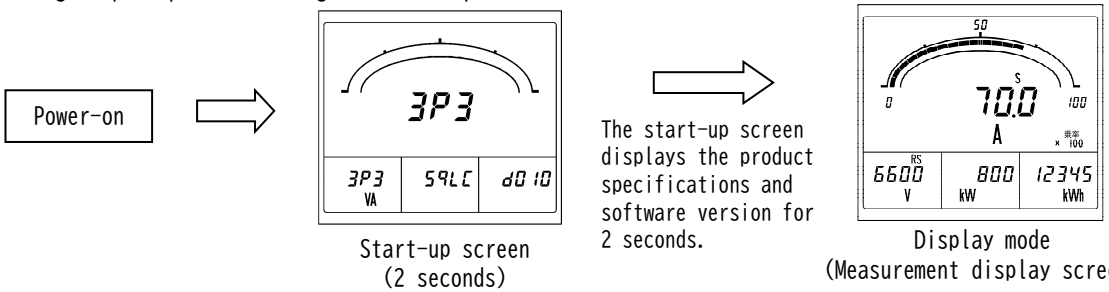
4.1 The screen change and function by switch operation

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



● Operation at power-on

The start-up screen (display of product specifications and software version) is displayed for 2 seconds after the power on. After that, the display mode (measurement display screen) is automatically entered.
The maximum and minimum values for each measurement are not updated on the start-up screen.
The analog output operates during the start-up screen.



Start-up screen (2 seconds)

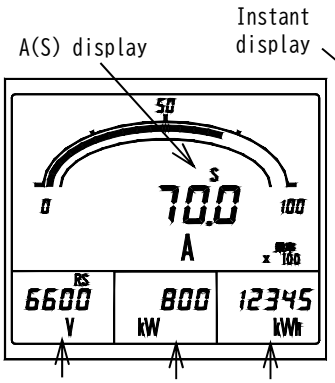
Display mode (Measurement display screen)

4.2 The kind of display

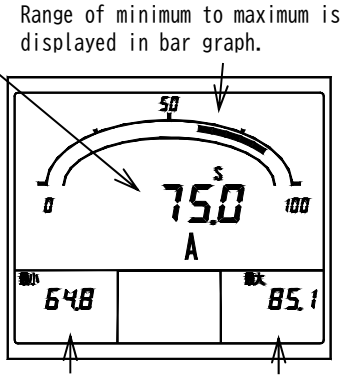
4.2.1 Measurement display

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.

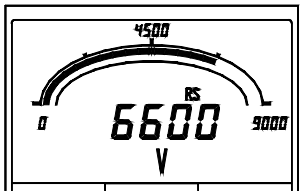
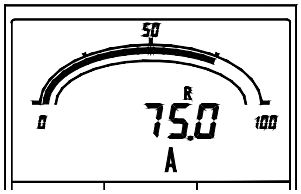
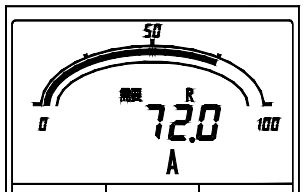
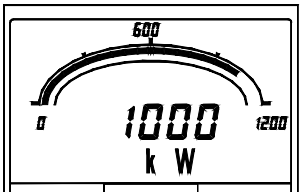
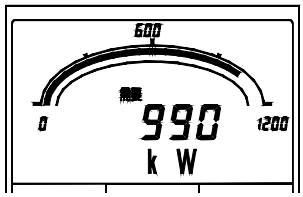
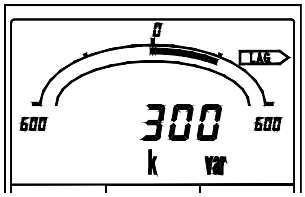
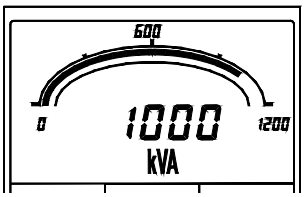
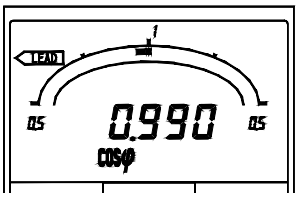


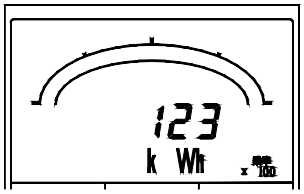
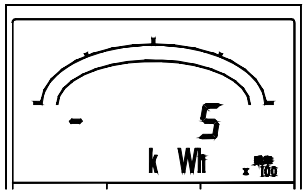
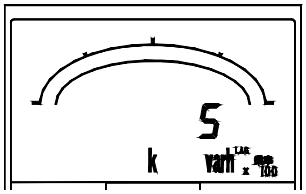
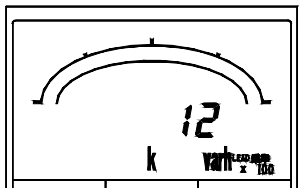
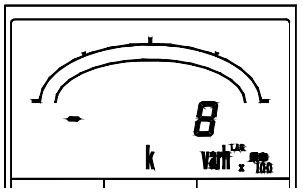
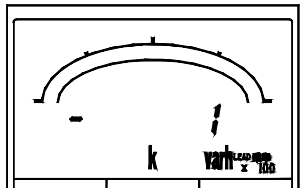
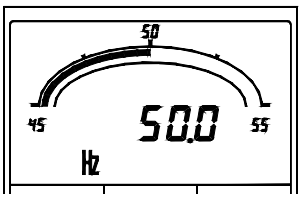
General measurement display



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 <需要>" is display	Active power		
Demand active power		"DEMAND <需要>" 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

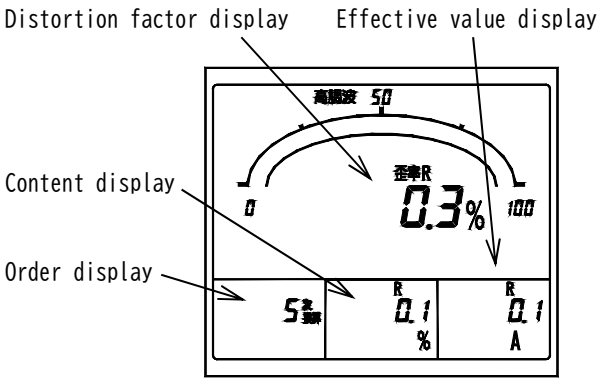
Display is measurement elements such as current distortion factor, harmonic content, and harmonic effective value. And it is possible to change to a display of the maximum value by switch operation. These maximum values can be reset by switch operation (it updates to the instantaneous value at the time). 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)

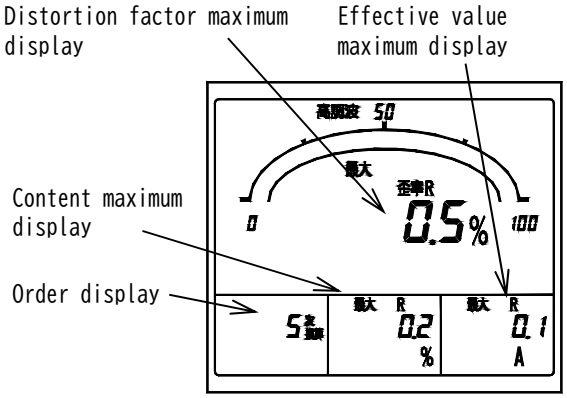
Main monitor : Distortion factor <歪率>
Sub monitor (Left) : 5th conversion <5 次換算> or harmonic order (n) <高調波 n 次>
Sub monitor (Center) : Harmonic 5th conversion content <高調波 5 次換算> or
Harmonic nth content (n=3, 4, 5, 7, 9, 11, 13, 15) <高調波 n 次>
Sub monitor (Right) : Fundamental-wave effective value,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

③ Voltage harmonic measurement display

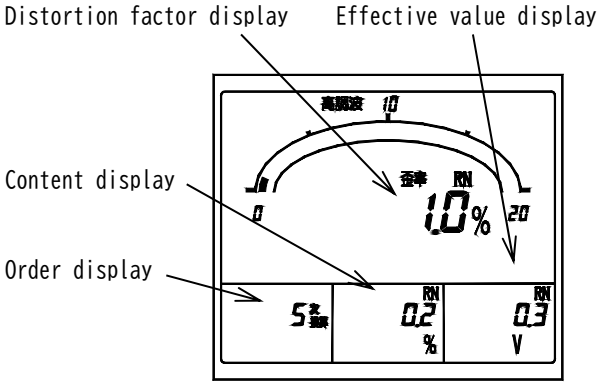
Measurement element display of the distortion factor of voltage, relative harmonic content, harmonic effective value, etc.. About a function, it is the same as a current harmonic measurement display.



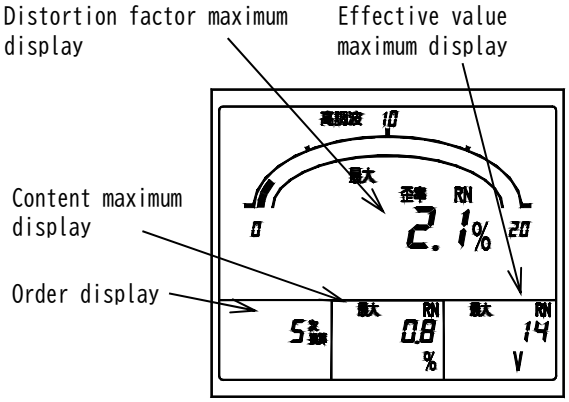
Current harmonic measurement display.



Current harmonic measurement maximum display.



Voltage harmonic measurement display.

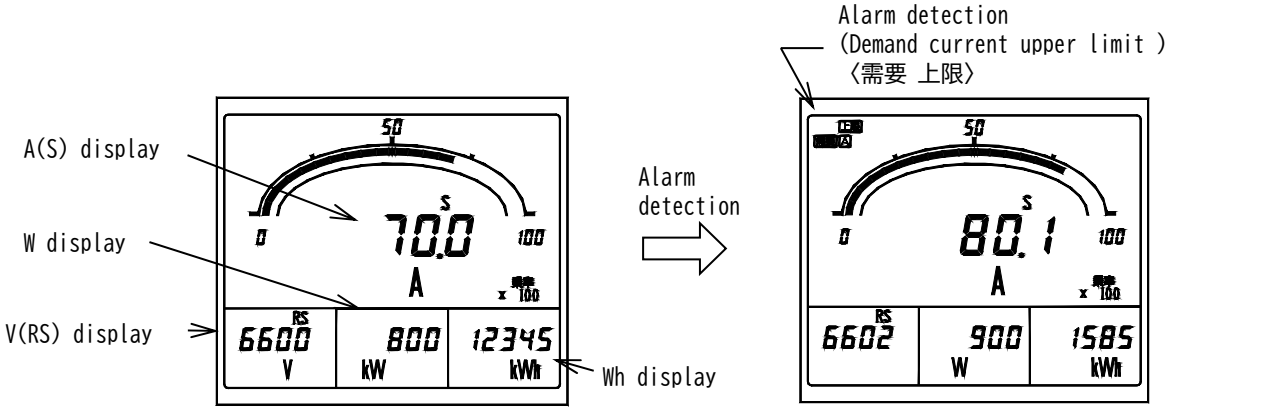


Voltage harmonic measurement maximum display.

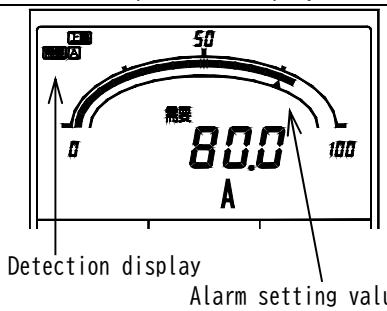
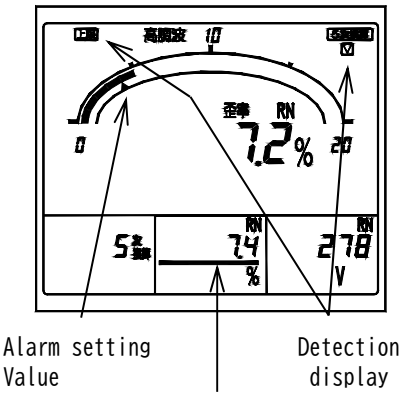
4.2.2 Alarm detection display

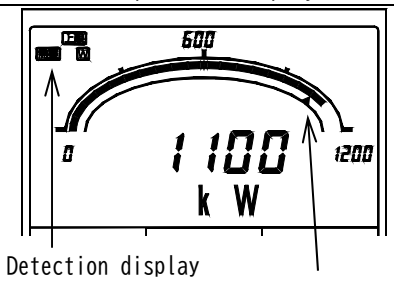
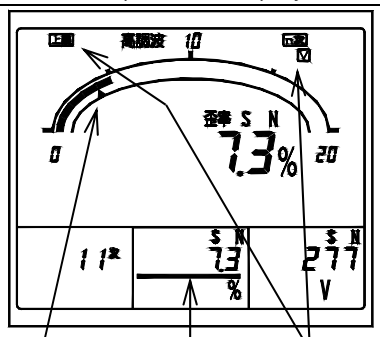
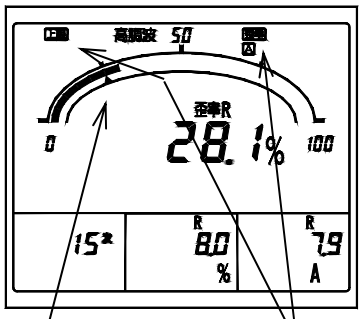
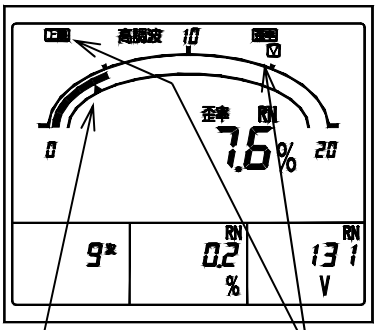
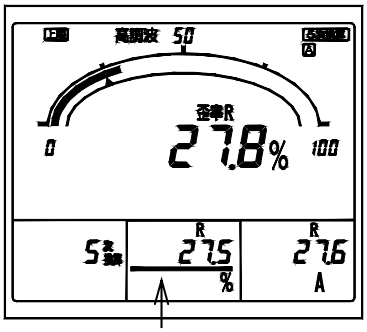
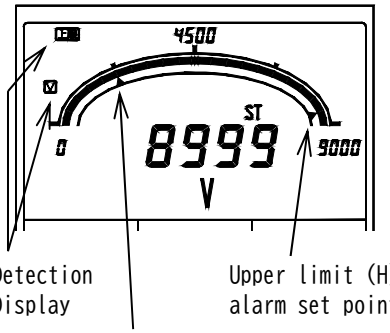
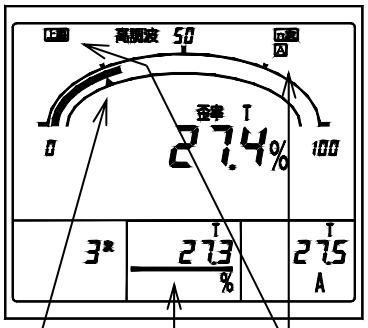
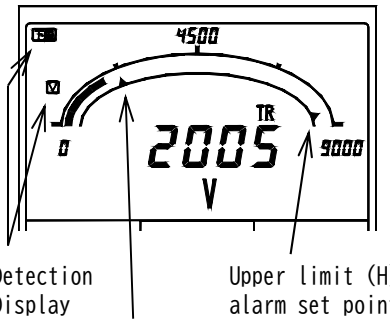
The alarm value setting is a possible measurement element (demand current and harmonic, etc.), it displays in case an input exceeds a set point.
Besides the usual measurement display, the detected element is displayed on a screen upper case.
In addition, in case setting OFF (not use) as measurement element, 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〈需要〉, Demand active power〈需要〉,
Harmonic distortion factor (current, voltage)〈高調波 歪率〉,
Harmonic 5th conversion content (current, voltage)〈高調波 5 次換算〉,
Harmonic nth content (current, voltage n=3, 4, 5, 7, 9, 11, 13, 15)〈高調波 n 次〉,
Voltage



・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.

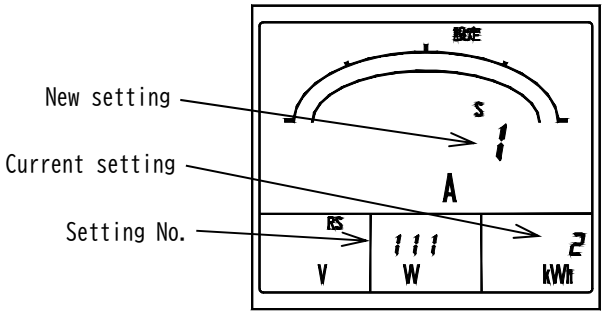
Alarm element		Example of a display	Alarm element		Example of a display
Demand <需要> current	Upper limit (H) <上限>		Voltage harmonic <高調波> 5th conversion content <5 次換算>	Upper limit (H) <上限>	

Alarm element		Example of a display	Alarm element		Example of a display
Demand active power <需要>	Upper limit (H) <上限>	 Detection display Alarm setting value	Voltage harmonic <高調波> nth content <n 次>	Upper limit (H) <上限>	 Alarm setting Value Detection display Setting as 11th content of bar graph (Distinguishes in underbar)
Current distortion factor <歪率>	Upper limit (H) <上限>	 Alarm setting value Detection display	Voltage distortion factor <歪率>	Upper limit (H) <上限>	 Alarm setting Value Detection display
Current harmonic <高調波> 5th conversion content <5 次換算>	Upper limit (H) <上限>	 Setting as 5th conversion content of bar graph (It distinguishes in an underbar)	Voltage	Upper limit (H) <上限>	 Detection Display Upper limit (H) alarm set point Lower limit (L) alarm set point
Current harmonic <高調波> nth content <n 次>	Upper limit (H) <上限>	 Alarm setting value Detection display Setting as 3th content of bar graph (Distinguishes in underbar)	Voltage	Lower limit (L) <下限>	 Detection Display Upper limit (H) alarm set point Lower limit (L) alarm set point

4.2.3 Setting display

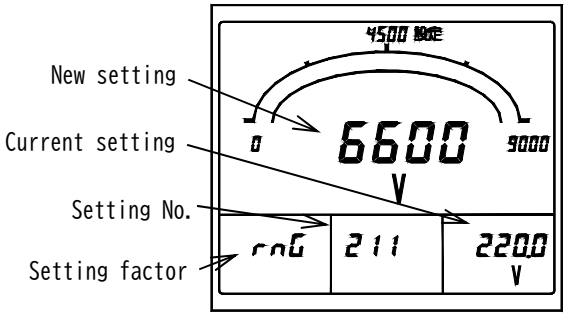
The display of various setting. There are three types of setting modes according to the contents of a setting. Refer to "5. Setting" for the operation in setting mode, and the detailed contents of a setting.

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.



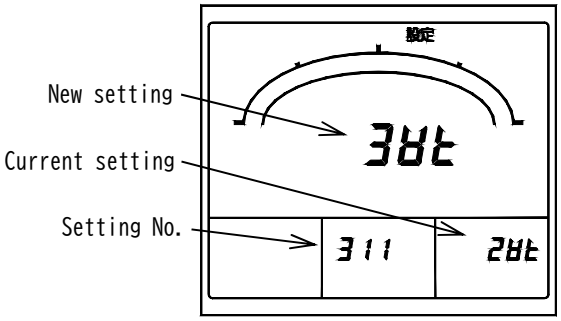
Setting mode 1 (No.111 Display pattern)

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.

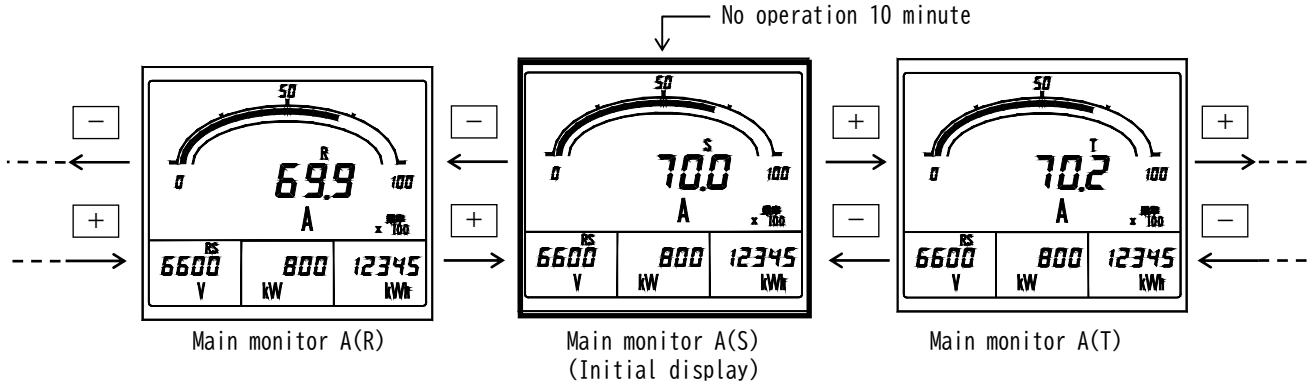


Setting mode 3
(No.311 Input circuit change)

4.3 Operation

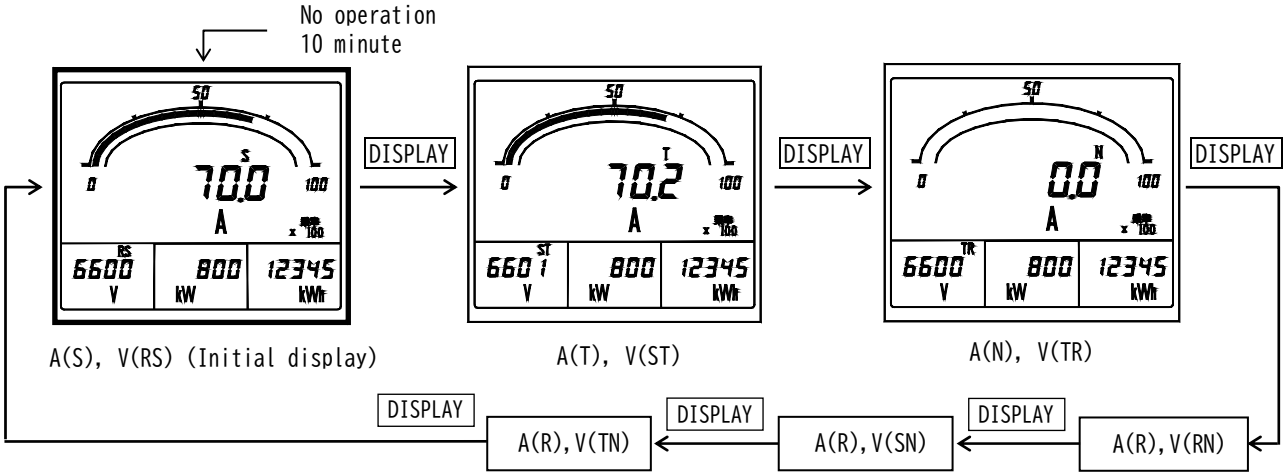
4.3.1 The main monitor display element change

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.



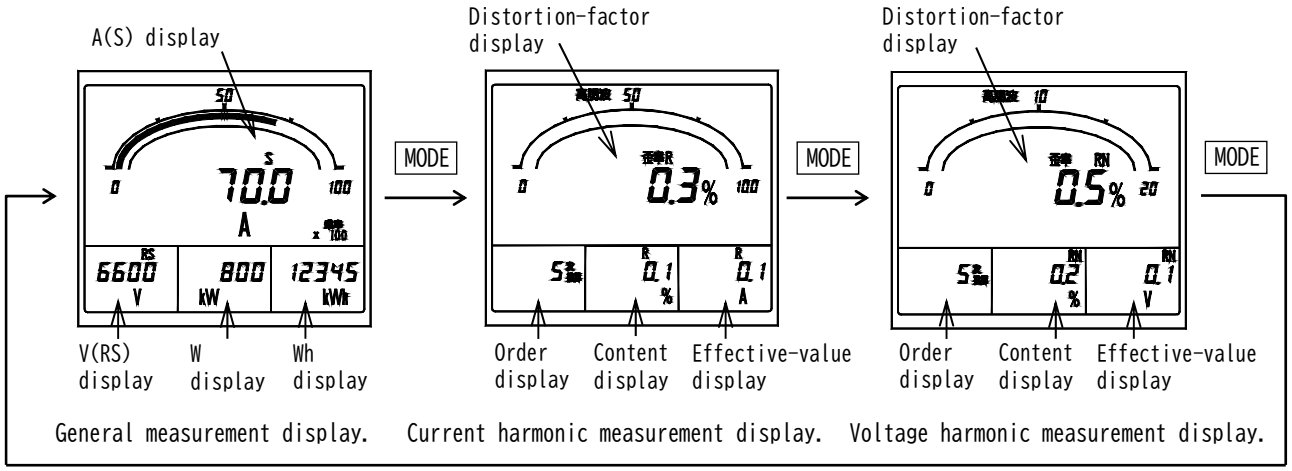
4.3.2 Phase (line) display change

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

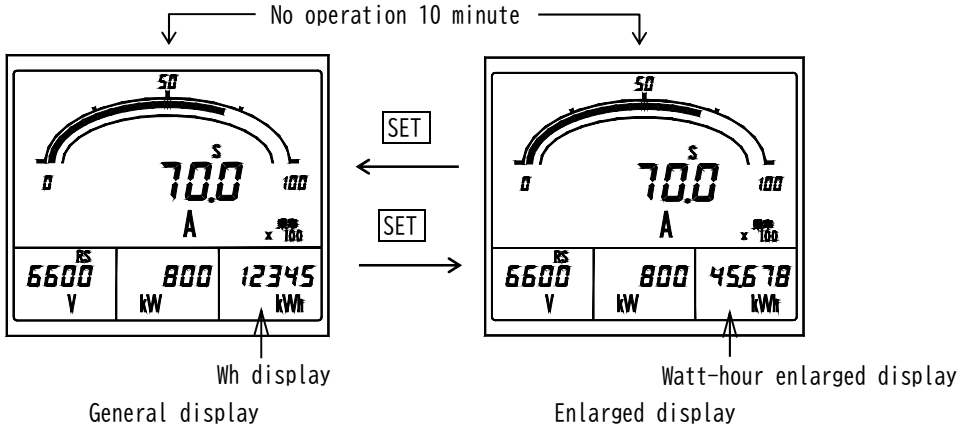
A general measurement display and a harmonic measurement display are changed. A change is performed by MODE.
Whenever it pushes a switch, it changes as follows. General measurement display → Current harmonic measurement display → Voltage harmonic measurement display → General measurement display ···
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

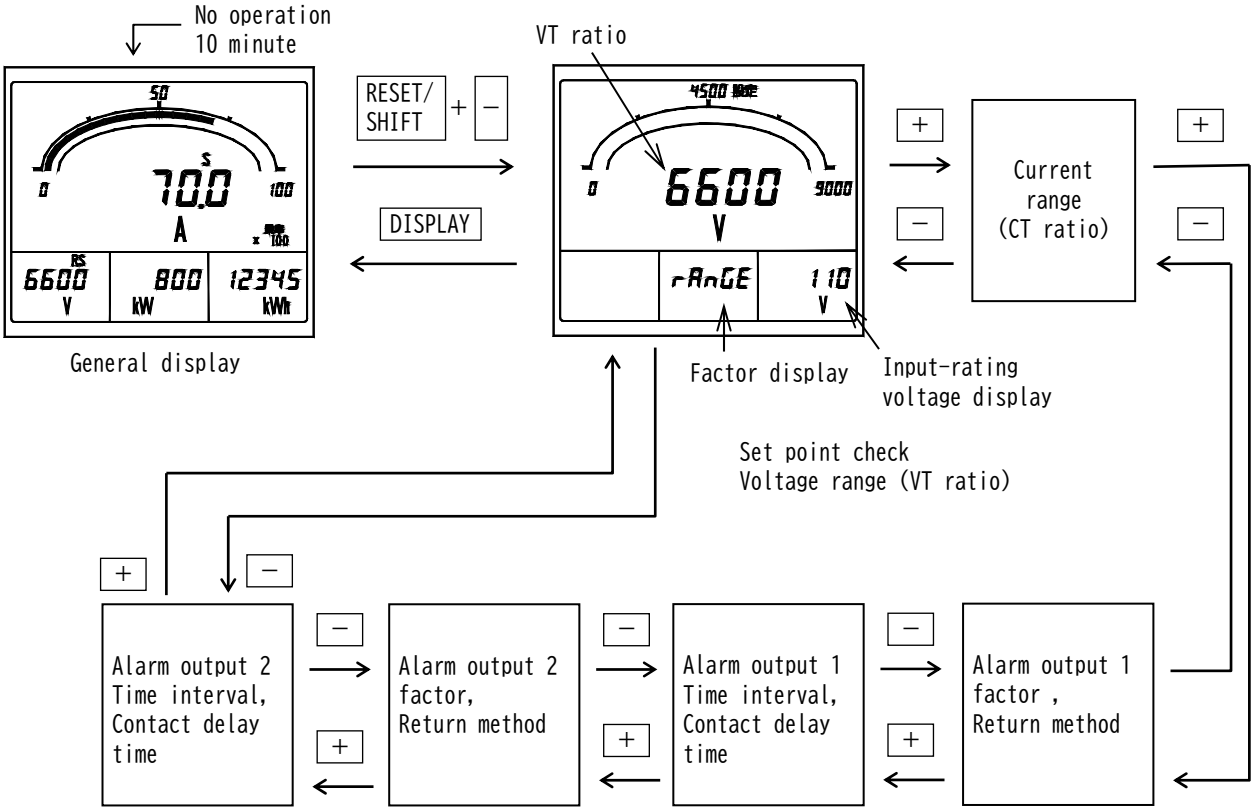
In case electric energy is being displayed by the general measurement display, an electric-energy display is usually changed to a display (5 digits of integers), and an enlarged display (2 digits integer + below decimal point, 3 digits).
A change is performed by SET.
After an enlarged display, if a switch 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.

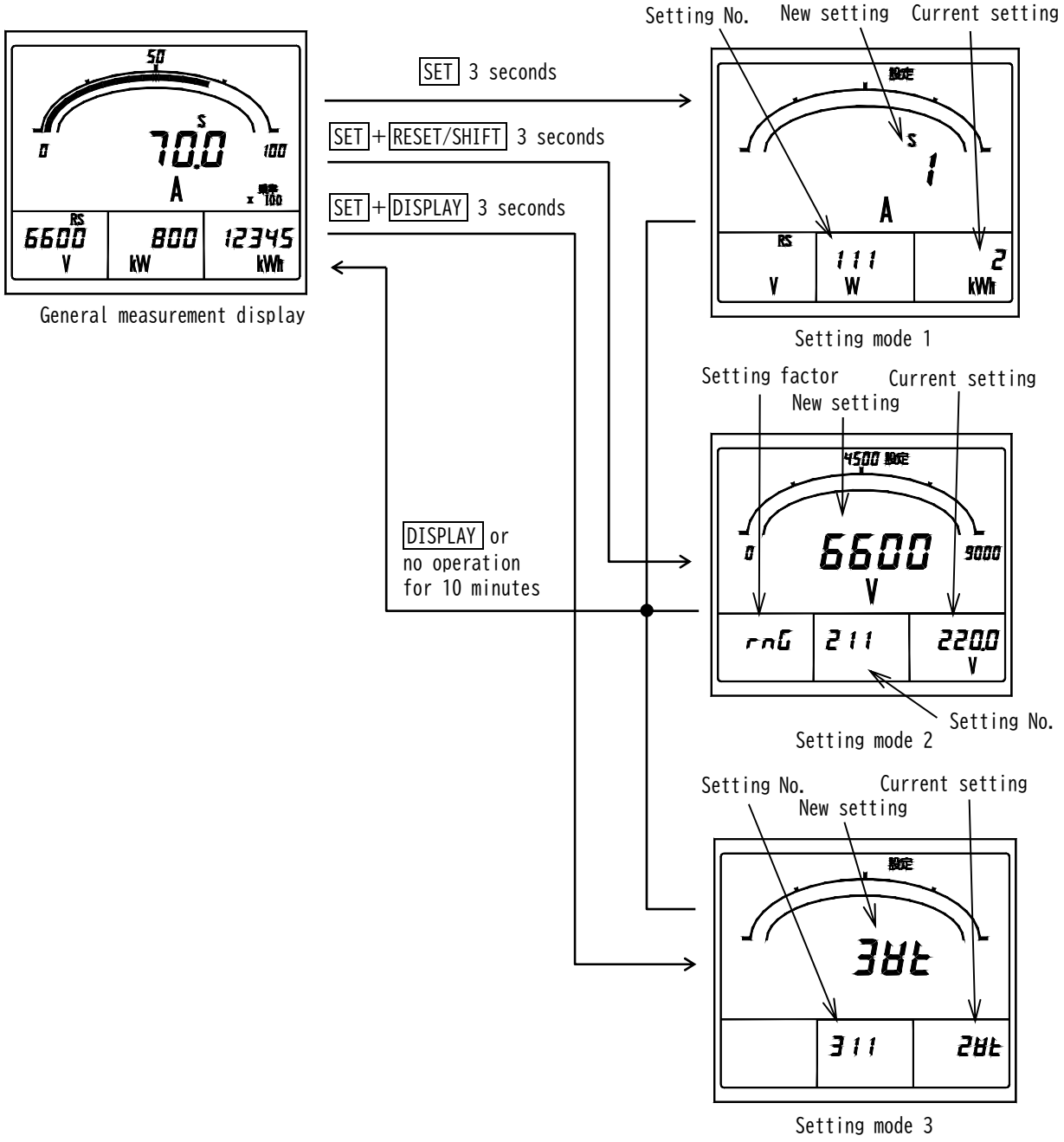


4.3.6 Setting mode

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).



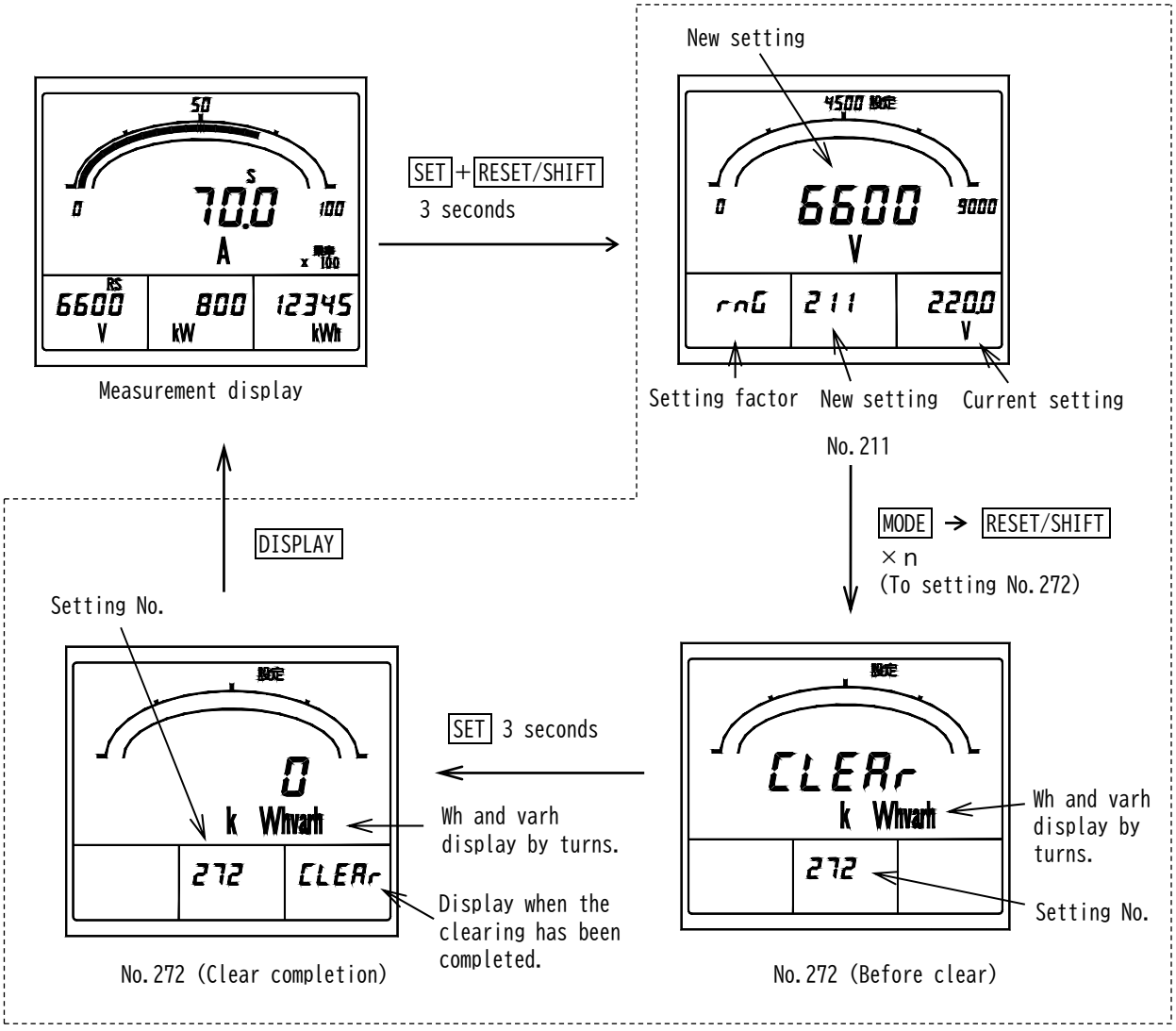
4.3.7 Reset

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.)

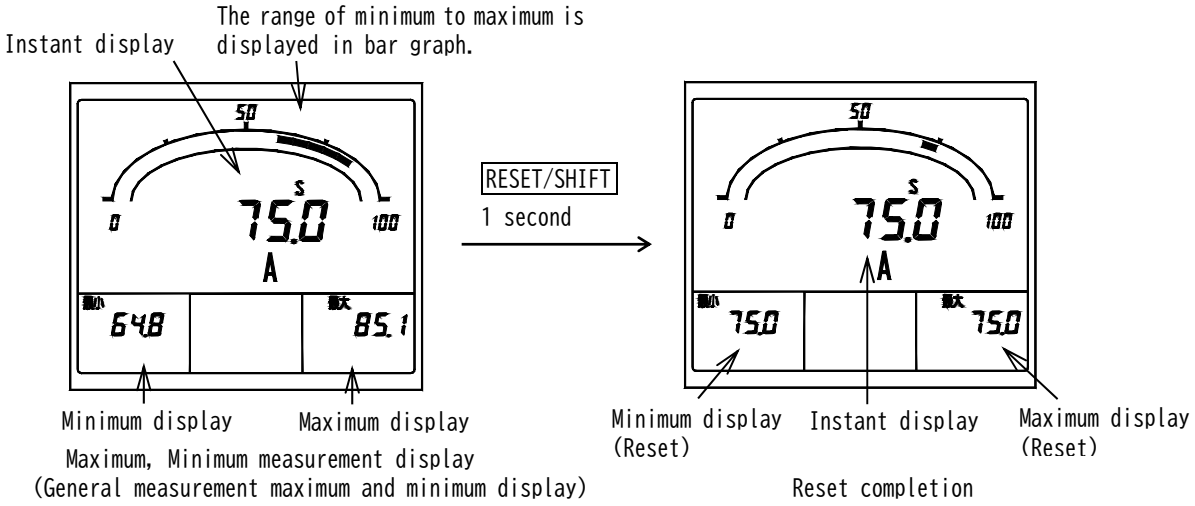
a) Individual reset

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.

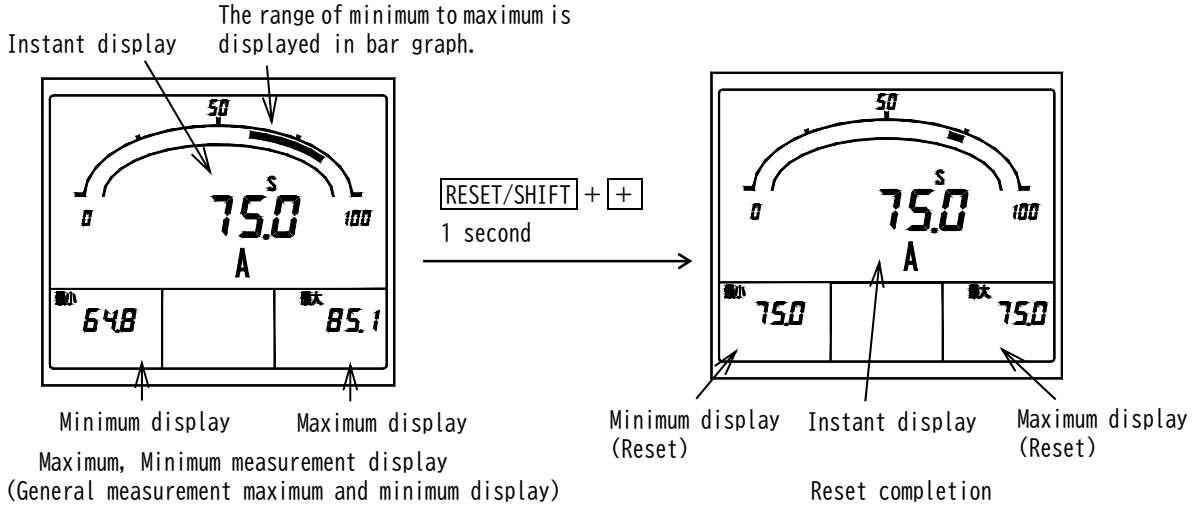
<Caution> An alarm output will be reset if this operation is performed by instant measurement display. Please be sure to perform this operation after displaying the maximum value and a minimum value measurement element to make it reset.



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).



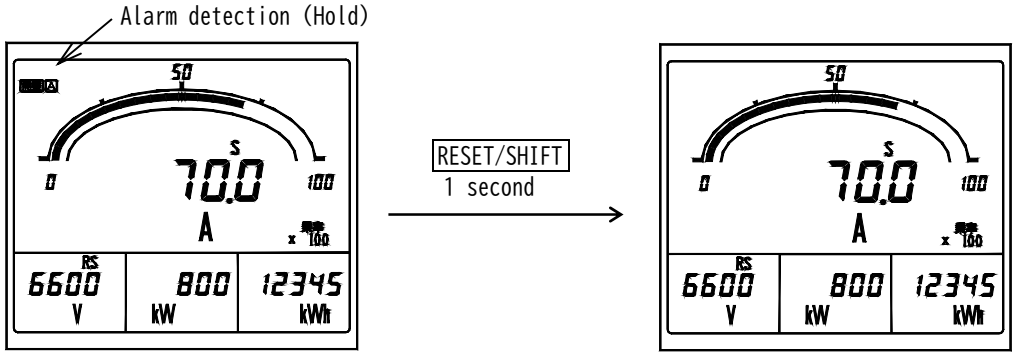
<Caution> In the general measurement maximum and minimum value reset, all the elements of general measurement are reset simultaneously. (The harmonic measurement maximum value is not reset.)
By harmonic measurement maximum value reset, a current element and a voltage element are reset simultaneously. (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	○	42 to 44
112	Main monitor	Set the display element of digital main monitor.	○	○	A(S)	○	42 to 44
113	sub-monitor (left)	Set the display element of digital sub-monitor (left).	○	○	V(RS)	○	42 to 44
114	Sub-monitor (center)	Set the display element of digital sub-monitor (center).	○	○	W	○	42 to 44
115	Sub-monitor (right)	Set the display element of digital sub-monitor (right).	○	○	Wh	○	42 to 44
116	Bar graph	Set the display element of bar graph.	○	○	A(S)	○	42 to 44
121AL (13)	Alarm 1 element	Set the output element of alarm 1.	○	○	DA	○	45
122AL (13)	Alarm 1 return method	Set the output action at the case of reset of alarm 1.	○	○	Automatic reset		45
123AL (13)	Alarm 1 mask time (Contact delay time)	Set the contact delay time of alarm 1.	○	○	0 second		45
124AL (13)	Alarm 1 test	Output test of alarm 1 is performed.	○	○	—		45
125AL (13)	Alarm 2 element	Set the output element of alarm 2.	○	○	DA	○	45
126AL (13)	Alarm 2 return method	Set the output action at the case of reset of alarm 2.	○	○	Automatic reset		45
127AL (13)	Alarm 2 mask time (Contact delay time)	Set the contact delay time of alarm 2.	○	○	0 second		45
128AL (13)	Alarm 2 test	Output test of alarm 2 is performed.	○	○	—		45
131H	Demand current upper limit	Set the high alarm value of demand current.	○		80% (Full scale=100%)		46
132	Demand current time interval	Set the time interval of demand current.	○		0 second	○	46
133H	Demand active power upper limit	Set the high alarm value of demand active power.			OFF (No operation)		46
134	Demand active power time interval	Set the time interval of demand active power.			0 second	○	46
135	Demand active power operating method	Set the operating method of demand active power.			Operating system according with bimetallic type.	○	46
136	Power factor operating method	Set the operating method of power factor measurement.			Instant measurement		46, 47

Note(13) 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)		47, 48
142H	Current 5th conversion content upper limit	Set the high alarm value of current 5th conversion content.	○		OFF (No operation)		47, 48
143	Current n-th content factor	Set the order of n-th current content.	○		5th		47, 48
144H	Current n-th content upper limit	Set the high alarm value of current n-th content.	○		OFF (No operation)		47, 48
145H	Voltage distortion factor upper limit	Set this high alarm value of voltage distortion factor.		○	OFF (No operation)		47, 48
146H	Voltage 5th conversion content upper limit	Set the high alarm value of voltage 5th conversion content.		○	OFF (No operation)		47, 48
147	Voltage n-th content factor	Set the order of n-th voltage content.		○	5th		47, 48
148H	Voltage n-th content upper limit	Set the high alarm value of voltage n-th content.		○	OFF (No operation)		47, 48
149	5th conversion detection characteristics	Set the detection characteristic of 5th conversion content.	○	○	Inverse-time-delay mode		47, 48
14A	Average value time interval	Set the average value detection time interval of harmonic.	○	○	0 minute		47, 48
151H	Instant measurement voltage upper limit	Set the high alarm value of instant voltage.		○	OFF (No operation)		48
152L	Instant measurement voltage lower limit	Set the low alarm value of instant voltage.		○	OFF (No operation)		48
171	Backlight action	Set the ON/OFF of backlight.	○	○	AUTO OFF		49
172	Backlight brightness	Set the brightness of backlight.	○	○	3 (Middle)		49

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 (15)	○	51 to 54
212	Current range	Set the current measurement range (CT ratio).	○		1500A	○	51 to 54
213	Current display peculiar sensitivity	Set the full scale of current meter.	○		1500A		51 to 54
214	Active power polarity	Set the swing display of active power meter.			One-side swing		51 to 54
215	Active power range (apparent power range)	Set the full scale of active power meter (apparent power meter).			1200kW (1200kVA) (16)		51 to 54
216	Reactive power range	Set the full scale of reactive power meter.			600kvar (16)		51 to 54
217	Power factor range	Set the full scale of power factor meter.			0.500 to 1.000 to 0.500		51 to 54
218	Frequency range	Set the full scale of frequency meter.		○	45.0 to 65.0Hz		51 to 54
221A (14)	AO1 output factor	Set the output factor of AO1 (analog output 1).	○	○	A(S)	○	55 to 57
222A (14)	AO2 output factor	Set the output factor of AO2 (analog output 2).	○	○	V(RS)	○	55 to 57
223A (14)	AO3 output factor	Set the output factor of AO3 (analog output 3).	○	○	W	○	55 to 57
224A (14)	AO4 output factor	Set the output factor of AO4 (analog output 4).	○	○	cosϕ	○	55 to 57
225A (14)	Current output peculiar sensitivity	Set the analog output sensitivity (% of output for input) of current.	○		100.0%		55 to 57
226A (14)	Active power-output peculiar sensitivity	Set the analog output sensitivity (% of output for input) of active power (apparent power).			100.0%		55 to 57
227A (14)	Reactive power output peculiar sensitivity	Set the analog output sensitivity (% of output for input) of reactive power.			50.0%		55 to 57
228A (14)	Low input cut	Set the function which makes a lower limit the output at the case of a minute input (adequate to 0.5% or less) in analog output.	○	○	OFF (No operation)		55 to 57
241P (14)	PO1 element	Set the output element of PO1 (pulse output 1).			Wh	○	57
242P (14)(17)	PO1 pulse unit	Set the output pulse unit of PO1 (pulse output 1).			10kWh/p		57
243P (14)	PO2 element	Set the output element of PO2 (pulse output 2).			Wh	○	57
244P (14)(17)	PO2 pulse unit	Set the output pulse unit of PO2 (pulse output 2).			10kWh/p		57
251 (14)	External operation input 1 function	Set the function of the external operation input 1.	○	○	Alarm reset	○	58
252 (14)	External operation input 2 function	Set the function of the external operation input 2.	○	○	Maximum / Minimum reset	○	58

Note(14) A setting item is not displayed in case there is no corresponding option.
Note(15) In 220/√3V input, it becomes "220V".
Note(16) In 220/√3V input, it becomes "600kW" and "600VA" and "300kvar".
Note(17) 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		58
262	Current ON/OFF	Set the ON/OFF of current measurement display.	○		ON		58
263	Active power ON/OFF	Set the ON/OFF of active power measurement display.			ON		58
264	Reactive power ON/OFF	Set the ON/OFF of reactive power measurement display.			ON		58
265	Power factor ON/OFF	Set the ON/OFF of power factor measurement display.			ON		58
266	Frequency ON/OFF	Set the ON/OFF of frequency measurement display.		○	ON		58
267	Power receiving watt-hour ON/OFF	Set the ON/OFF of power receiving watt-hour measurement display.			ON		58
268	Power transmission var-hour ON/OFF	Set the ON/OFF of power transmission var-hour measurement display.			ON		58
269	Power receiving var-hour (LAG, LEAD) ON/OFF	Set the ON/OFF of power receiving var-hour (LAG, LEAD) measurement display.			ON		58
26A	Power transmission var-hour (LAG, LEAD) ON/OFF	Set the ON/OFF of power transmission var-hour (LAG, LEAD) measurement display.			ON		58
26B	Harmonic current ON/OFF	Set the ON/OFF of harmonic current measurement display.	○		ON		58
26C	Harmonic voltage ON/OFF	Set the ON/OFF of harmonic voltage measurement display.		○	ON		58
26D	Apparent power ON/OFF	Set the ON/OFF of apparent power measurement display.			ON		58
271	Set value initialization	All set values are initialized. (Return to initial set value)	○	○	—		59
272	Watt-hour reset	Integrated value is cleared simultaneously about each electric energy.			—		59

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.		○	3P4W (3VT, 3CT)	○	60, 61
312 (18)	Input voltage	About of rated voltage 110/√3V or 220/√3V common product, set the input voltage.		○	110V	○	60, 61
321	Measurement dead band	Set the dead band of measurement display.	○	○	0.0%		61, 62
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		61, 62
331 (19)(20)	Analog output specification	Set the analog output specification.	○	○	DC1 to 5V or DC0 to 5V (Designation)		63
341 (19)	AO1 BIAS adjustment	Set the BIAS value of AO1 (Analog output 1).	○	○	0.0%		63
342 (19)	AO1 SPAN adjustment	Set the SPAN value of AO1 (Analog output 1).	○	○	100.0%		63
343 (19)	AO2 BIAS adjustment	Set the BIAS value of AO2 (Analog output 2).	○	○	0.0%		63
344 (19)	AO2 SPAN adjustment	Set the SPAN value of AO2 (Analog output 2).	○	○	100.0%		63
345 (19)	AO3 BIAS adjustment	Set the BIAS value of AO3 (Analog output 3).	○	○	0.0%		63
346 (19)	AO3 SPAN adjustment	Set the SPAN value of AO3 (Analog output 3).	○	○	100.0%		63
347 (19)	AO4 BIAS adjustment	Set the BIAS value of AO4 (Analog output 4).	○	○	0.0%		63
348 (19)	AO4 SPAN adjustment	Set the SPAN value of AO4 (Analog output 4).	○	○	100.0%		63

Note(18) This is a setting item for 110/√3V and 220/√3V common products.
A setting item is not displayed in 440/√3V product.
Note(19) A setting item is not displayed in case there is no corresponding option.
Note(20) A setting item is not displayed if analog output is except DC0 to 5V (or DC1 to 5V) specification,
And analog output insulation product does not display a setting item.

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 voltmer (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.	51 to 54
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.	51 to 54
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.	42 to 44
Set the output factor of analog output 1 (AO1). (221A)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) Select an output factor by [+] and [−] ➡ Press [SET] ➡ Selected output factor is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	55 to 57
Set the output factor of analog output 2 (AO2). (222A)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) Press [RESET/SHIFT] ➡ Select an output factor by [+] and [−] ➡ Press [SET] ➡ (222A) Selected output factor is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	55 to 57
Set the output factor of analog output 3 (AO3). (223A)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Select an output factor by [+] and [−] ➡ (222A) (223A) Press [SET] ➡ Selected output factor is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	55 to 57
Set the output factor of analog output 4 (AO4). (224A)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (222A) (223A) (224A) Select an output factor by [+] and [−] ➡ Press [SET] ➡ Selected output factor is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	55 to 57
Set the output element of pulse output 1 (PO1). (241P)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) Press [MODE] ➡ Select an output element by [+] and [−] ➡ Press [SET] ➡ (241P) Selected output element is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	57
Set the output element of pulse output 2 (PO2). (243P)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) 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.	57

Items	Setting and operation procedures	Page
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.	45
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.	45
Set the external operation input 1 function. (251)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) Press [MODE] ➡ Press [MODE] ➡ Select an function by [+] and [−] ➡ Press [SET] ➡ (241P) (251) Selected function is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	58
Set the external operation input 2 function. (252)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) Press [MODE] ➡ Press [MODE] ➡ Press [RESET/SHIFT] ➡ Select an function by [+] and [−] ➡ Press [SET] ➡ (241P) (251) (252) Selected function is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	58
Set the time interval of demand current. (132)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) Press [RESET/SHIFT] ➡ Select an time interval by [+] and [−] ➡ Press [SET] ➡ (132) Selected time interval is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	46
Set the time interval of demand active power. (134)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (132) (133H) (134) Select an time interval by [+] and [−] ➡ Press [SET] ➡ Selected time interval is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	46
Set the operation method of demand active power. (135)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (132) (133H) (134) Press [RESET/SHIFT] ➡ Select an operation method by [+] and [−] ➡ Press [SET] ➡ (135) Selected operation method is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	46
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.	60, 61
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.	60, 61

(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.	42 to 44
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.	42 to 44
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.	42 to 44
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.	42 to 44
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.	42 to 44

(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.	51 to 54

(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.	51 to 54

(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) (221A) 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.	57
Set the pulse unit of pulse output 2 (Po2). (244P)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) 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.	57

(6) Setting of 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 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.	51 to 54
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.	51 to 54

(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.	51 to 54

(8) Setting of analog 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 analog output sensitivity (% of an output to an input) of current. (225A)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (222A) (223A) (224A) Press [RESET/SHIFT] ➡ Select a output sensitivity by [+] and [−] ➡ Press [SET] ➡ (225A) Selected output sensitivity is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	55 to 57
Set the analog output sensitivity (% of an output to an input) of active power (apparent power). (226A)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (222A) (223A) (224A) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (225A) (226A) Select a output sensitivity by [+] and [−] ➡ Press [SET] ➡ Selected output sensitivity is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	55 to 57
Set the analog output sensitivity (% of an output to an input) of reactive power. (227A)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (222A) (223A) (224A) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (225A) (226A) (227A) Select a output sensitivity by [+] and [−] ➡ Press [SET] ➡ Selected output sensitivity is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	55 to 57
Set the output cut function at the case in minute input (0.5% or less). (At the case of analog output) (228A)	Press [SET] and [RESET/SHIFT] together for longer than 3 seconds ➡ Press [MODE] ➡ (211) (221A) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (222A) (223A) (224A) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (225A) (226A) (227A) Press [RESET/SHIFT] ➡ Select a low input cut ON/OFF by [+] and [−] ➡ Press [SET] ➡ (228A) Selected action is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	55 to 57

(9) 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.	45
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.	45
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.	45
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.	45

(10) 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.	46
Set the high alarm value of demand active power. (133H)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Select a high alarm value by [+] and [−] ➡ (132) (133H) Press [SET] ➡ Selected high alarm value is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	46
Set the operation method of power factor measurement. (136)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ Press [RESET/SHIFT] ➡ (132) (133H) (134) (135) Press [RESET/SHIFT] ➡ Select a operation method by [+] and [−] ➡ Press [SET] ➡ (136) Selected operation method is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	46, 47

(11) 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.	47, 48
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.	47, 48
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.	47, 48
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.	47, 48
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.	47, 48
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.	47, 48
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.	47, 48
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.	47, 48

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.	47, 48
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.	47, 48

(12) 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.	48
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.	48

(13) Backlight setting
Each parenthesized number shows a setting number and this number is displayed on the setting screen.

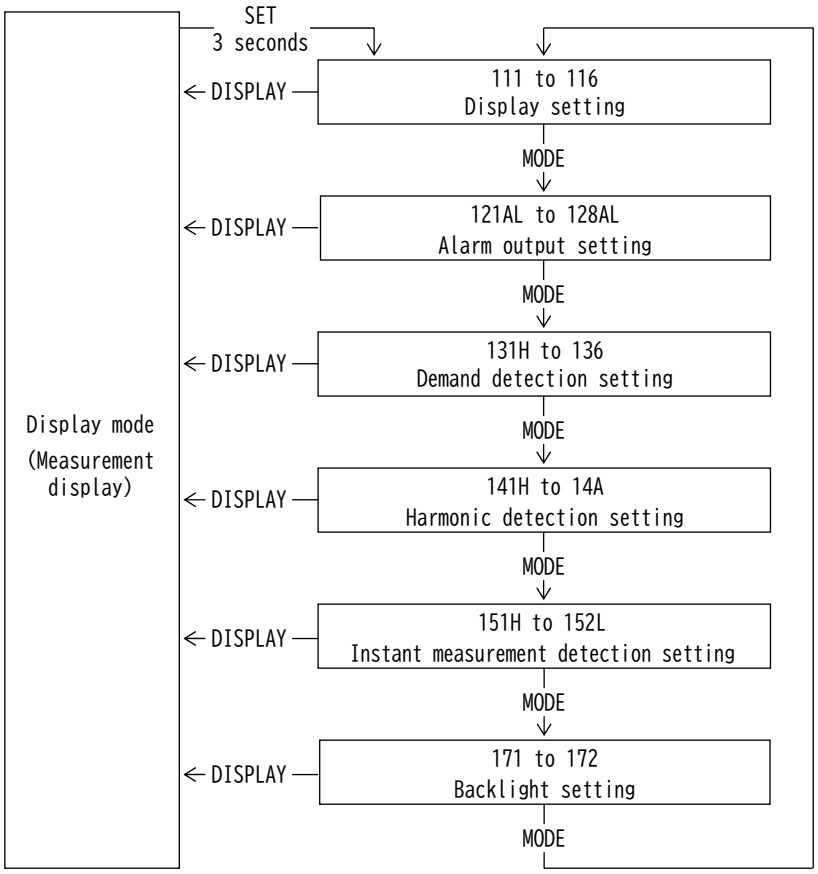
Items	Setting and operation procedures	Page
Set the action of backlight. (171)	Press [SET] for longer than 3 seconds ➡ Press [MODE] ➡ Press [MODE] ➡ Press [MODE] ➡ (111) (121AL) (131H) (141H) Press [MODE] ➡ Press [MODE] ➡ Select backlight action by [+] and [−] ➡ Press [SET] ➡ (151H) (171) Selected backlight action is entered ➡ Press [DISPLAY] ➡ Returns to display mode.	49
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.	49

(14) 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.	61, 62
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.	61, 62

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

● Voltage, current input ([21])([22])

No.	Pattern No.	Main-monitor	Sub-monitor (Left)	Sub-monitor (Center)	Sub-monitor (Right)	Bar graph
1	Pattern 1	A(S)	V(RS)	W	Wh	A(S)
2	Pattern 2	A(S)	V(RS)	W	cosφ	A(S)
3	Pattern 3	A(S)	V(RS)	W	Hz	A(S)
4	Pattern 4	DA(S) <需要>	A(S)	V(RS)	W	DA(S) <需要>
5	Pattern 5	DA(S) <需要>	A(S)	V(RS)	Wh	DA(S) <需要>
6	Pattern 6	DA(S) <需要>	V(RS)	W	cosφ	DA(S) <需要>
7	Pattern 7	W	V(RS)	A(S)	Wh	W
8	Pattern 8	W	V(RS)	A(S)	cosφ	W
9	Pattern 9	W	V(RS)	A(S)	Hz	W
10	Pattern 10	DW <需要>	V(RS)	W	Wh	DW <需要>
11	Pattern 11	DW <需要>	V(RS)	A(S)	cosφ	DW <需要>
12	Pattern 12	A(S)	cosφ	W	Wh	A(S)
13	Pattern 13	A(S)	var	W	Wh	A(S)
14	Pattern 14	W	cosφ	var	Wh	W
15	Pattern 15	A(S)	A(R)	A(T)	Wh	A(S)
16	Pattern 16	V(RS)	V(ST)	V(TR)	Hz	V(RS)

Note([21]) Voltage input is pattern 16 only.
Note([22]) Current input is pattern 15 only. (However, sub-monitor (right) is A(N) display.)

● Displays set element

Main monitor	V(RN), V(SN), V(TN), V(RS), V(ST), V(TR), A(R), A(S), A(T), A(N), DA(R) <需要>, DA(S) <需要>, DA(T) <需要>, DA(N) <需要>, W, DW <需要>, var, VA, cosφ, Hz, Wh, -Wh, varh(LAG), varh(LEAD), -varh(LAG), -varh(LEAD), Distortion factor(A,V) <歪率>
Sub-monitor (Left)	V(RN), V(SN), V(TN), V(RS), V(ST), V(TR), A(R), A(S), A(T), A(N), W, var, cosφ
Sub-monitor (Center)	V(RN), V(SN), V(TN), V(RS), V(ST), V(TR), A(R), A(S), A(T), A(N), DA(R) <需要>, DA(S) <需要>, DA(T) <需要>, DA(N) <需要>, W, DW <需要>, var, varh(LAG), varh(LEAD), -varh(LAG), -varh(LEAD), Harmonic 5th conversion content (A,V), Harmonic nth content (A,V)
Sub-monitor (Right)	V(RN), V(SN), V(TN), V(RS), V(ST), V(TR), A(R), A(S), A(T), A(N), DA(R) <需要>, DA(S) <需要>, DA(T) <需要>, DA(N) <需要>, W, DW <需要>, cosφ, Hz, Wh, -Wh, Fundamental-wave effective value(A,V), Harmonic 5th conversion effective value (A,V) <高調波 5 次換算>, Harmonic nth effective value(A,V) <高調波 n次>
Bar graph	V(RN), V(SN), V(TN), V(RS), V(ST), V(TR), A(R), A(S), A(T), A(N), DA(R) <需要>, DA(S) <需要>, DA(T) <需要>, DA(N) <需要>, W, DW <需要>, var, cosφ, Hz, Distortion factor (A,V) <歪率>, Harmonic 5th conversion content (A,V) <高調波 5 次換算>, Harmonic nth content (A,V) <高調波 n次>, Fundamental-wave effective value(A,V), Harmonic 5th conversion effective value (A,V) <高調波 5 次換算>, Harmonic nth effective value (A,V) <高調波 n次>

● Phase (line) change ([23])

V(RS) → V(ST) → V(TR) →
V(TN) ← V(SN) ← V(RN) ←

A(S) → A(T) → A(N) →
A(R) ← A(R) ← A(R) ←

Note([23]) Press DISPLAY, Voltage and current are replaced at the same time.

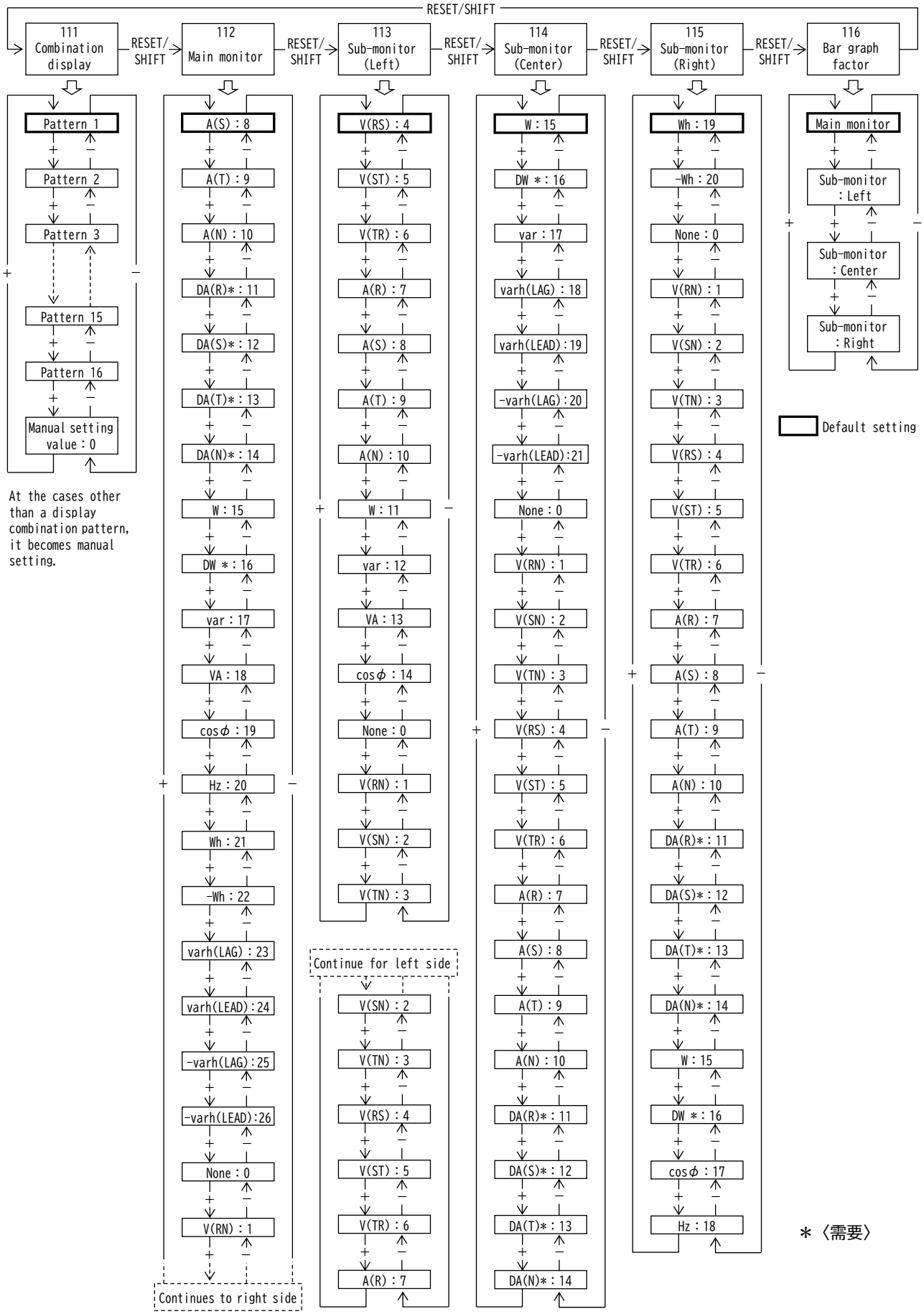
● Measurement element change (Measurement display mode)

V(RS) → V(ST) → V(TR) → A(R) → A(S) → A(T) → A(N) →
DA(R) <需要> → DA(S) <需要> → DA(T) <需要> → DA(N) <需要> → W → DW <需要> → var →
VA → cosφ → Hz → Wh → -Wh → varh(LAG) →
varh(LEAD) → -varh(LAG) → -varh(LEAD) → None →
V(RN) → V(SN) → V(TN) →

● Measurement element change (Harmonic measurement display mode)

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

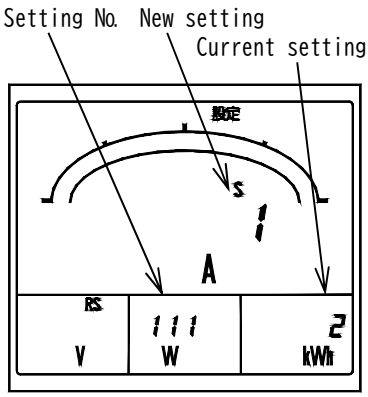
Display combination setting

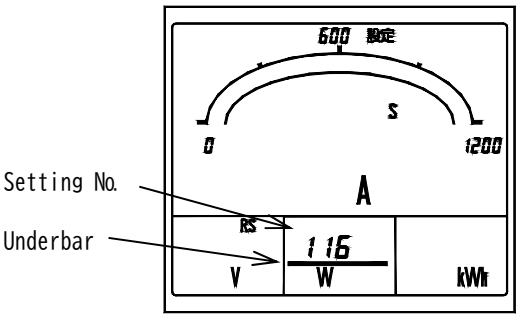


◆ 111 Combination display
Select the elements to be measured and monitored by 4 digital displays out of combination patterns.
Set values are updated by SET.

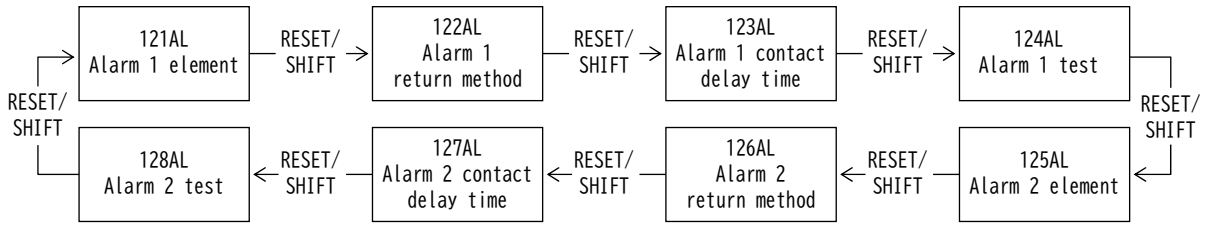
◆ 112 to 115 Main monitor, Sub-monitor (left), Sub-monitor (center), Sub-monitor (right)
Set these items for a display configuration other than combined patterns. Set values are updated by SET.

◆ 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.

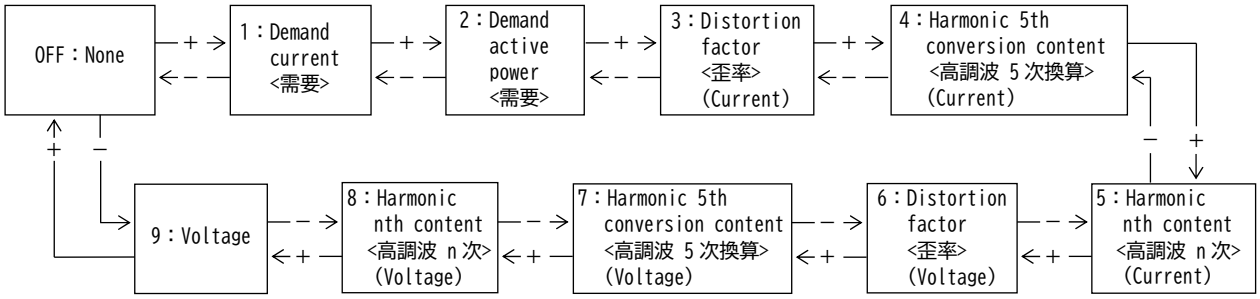




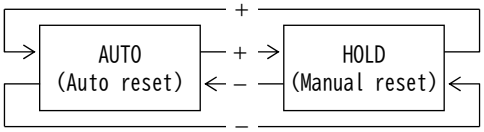
(2) 121AL to 128AL Alarm output setting 【With an alarm output option】
Various settings and an output test are performed about alarm output.
In case contact outputs 1 and 2 are alarm output specifications, the corresponding alarm output is setting.

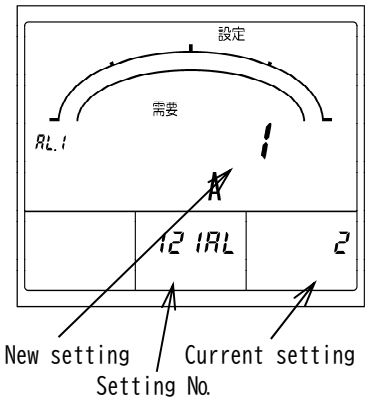


◆ 121AL Alarm 1 element setting, 125AL Alarm 2 element setting.
Set the output element of alarms 1 and 2. Selection by [+] and [−], set value is updated by [SET].
Default setting : 1 (DA : Demand current <需要>)



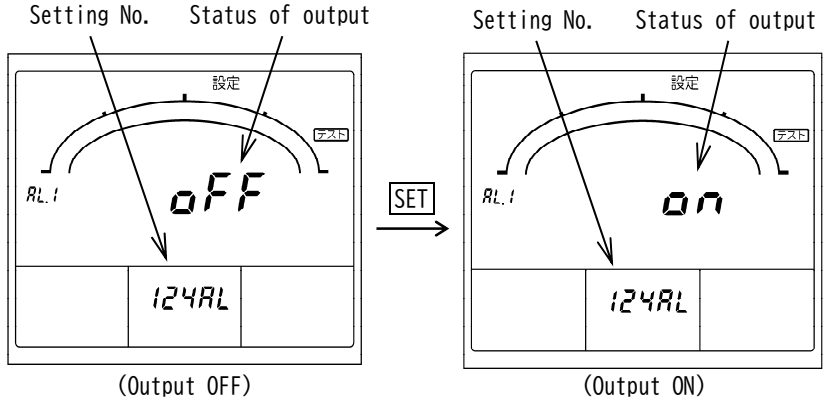
◆ 122AL Alarm 1 reset method setting, 126AL Alarm 2 reset method setting
Output action at the case of a reset of alarms 1 and 2 can be selected from AUTO (automatic reset 〈自動復帰〉) and HOLD (manual reset 〈手動復帰〉).
In "AUTO (automatic reset 〈自動復帰〉)", an alarm output also constitutes OFF according to a reset of an alarm. In "HOLD (manual reset 〈手動復帰〉)", 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 〈自動復帰〉)





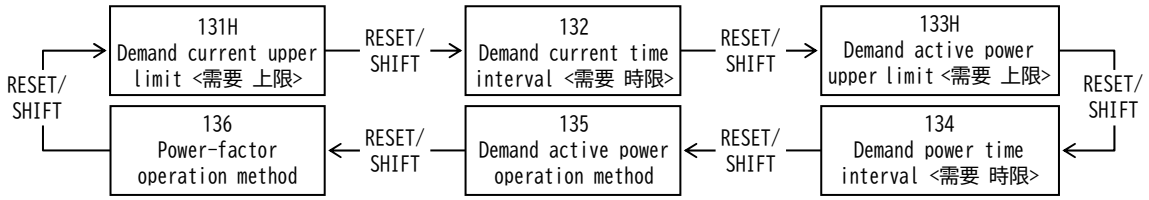
◆ 123AL Alarm 1 contact delay time, 127AL Alarm 2 contact delay time
Set the contact delay time of alarms 1 and 2. The setting range is 0 to 300 seconds (1-second step).
Selection by [+] and [−], set value is updated by [SET].
Default setting : 0 second 〈秒〉 (With no contact delay)

◆ 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.



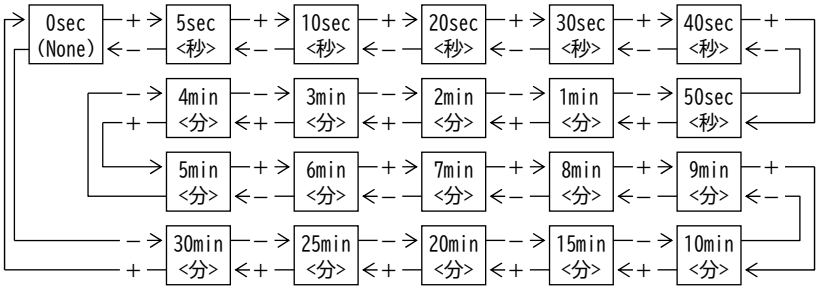
Alarm 1 test

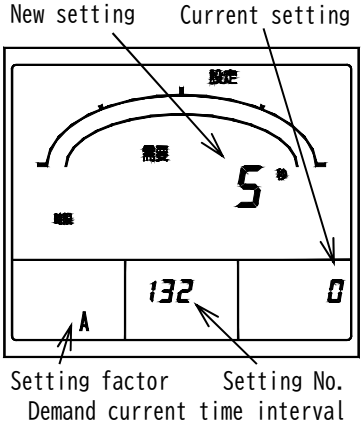
(3) 131H to 136 Demand〈需要〉detection setting 【Except voltage input】
The following operation method is setting.
Demand current, action of demand, high alarm value, time interval, power factor, demand active power.



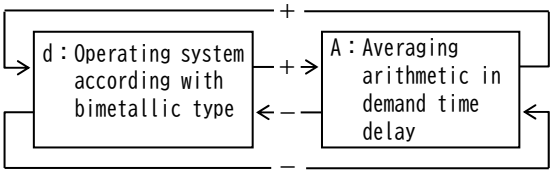
◆ 131H Demand current upper limit. 133H Demand active power upper limit.
Set the high alarm value of demand current(DA) and demand active power(DW).
The setting range is 5 to 100% (1% step) and OFF (To full scale = 100%).
Selection by [+] and [−], set value is updated by [SET].
Default setting : 80% (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〈秒〉(demand current, demand active power)

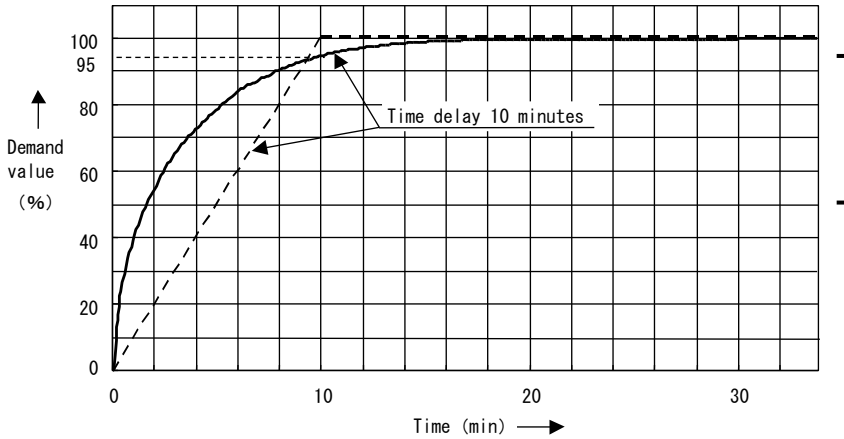




◆ 135 Demand active power operation method
The operating system of demand (DW) can be selected from d (operating system according with bimetallic type : demand) and A (Averaging arithmetic in demand time delay : average).
Selection by [+] and [−], set value is updated by [SET].
Default setting : d(Operating system according with bimetallic type)



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



——— Arithmetic method according with bimetallic type. (Indication time to 95% of a final constant value)

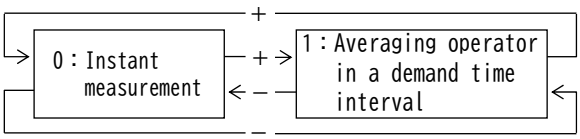
– – – Averaging arithmetic in demand time delay. (Averaging time in demand time delay.)

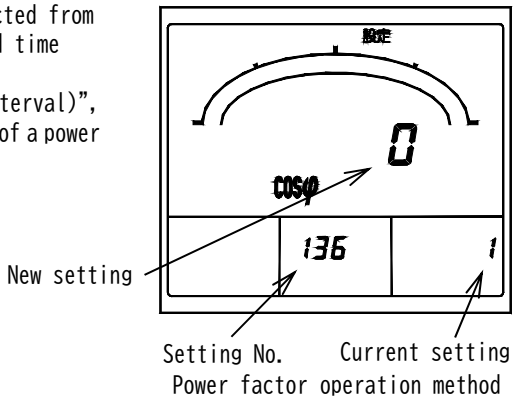
Arithmetic method
Demand current measurement : Arithmetic method according with bimetallic type.
Demand active power measurement : Arithmetic method according with bimetallic type (Initial value). Or the averaging arithmetic in a demand time interval. One is selected by setting.

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

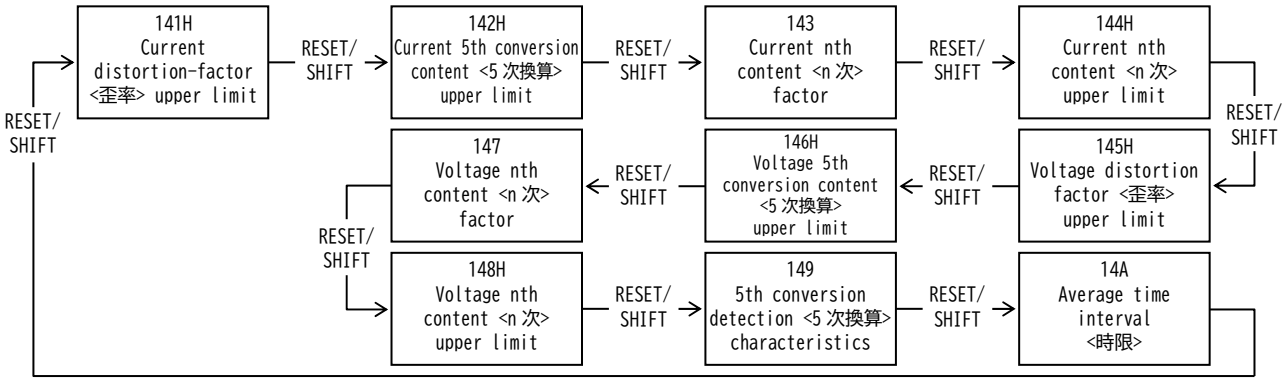
The operation method of power factor measurement can be selected from 0 (instant measurement) and 1 (averaging operator in a demand time interval).
In case it is set as "1 (averaging operator in a demand time interval)", power factor measurement is calculated from the operation method of a power demand time interval and a demand active power meter.
Selection by [+] and [−], set value is updated by [SET].
Default setting : 0 (Instant measurement)





(4) 141H to 14A Harmonic〈高調波〉detection setting

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

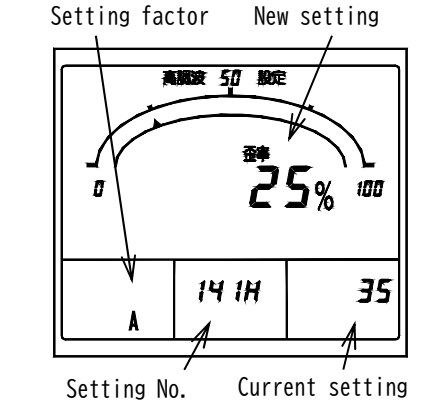


◆ 141H Current distortion factor〈歪率〉upper limit,
145H Voltage distortion factor〈歪率〉upper limit

Set the high alarm value of distortion factor (current, voltage).
Setting range. Current : 5 to 100% (1% step) and OFF.
Voltage : 1.0 to 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〈5 次換算〉upper limit,
146H Voltage 5th conversion content〈5 次換算〉upper limit.

Set the high alarm value of 5th conversion content (current, voltage).
Setting range. Current : 5 to 100% (1% step) and OFF.
Voltage : 1.0 to 20.0% (0.1% step) and OFF.
Selection by [+] and [−], set value is updated by [SET].
Default setting : OFF [Non-use] (Current, Voltage)

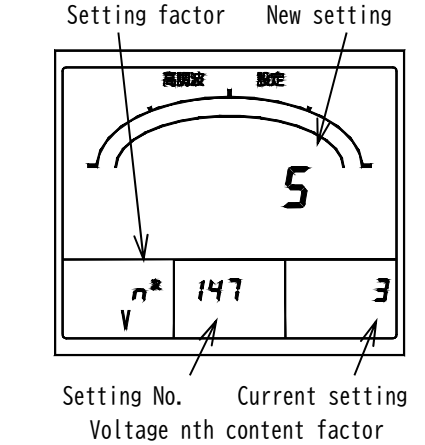


◆ 143 Current nth content〈n 次〉factor,
147 Voltage nth content〈n 次〉factor.

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)

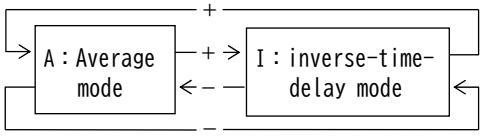
◆ 144H Current nth content〈n 次〉upper limit,
148H Voltage nth content〈n 次〉upper limit.

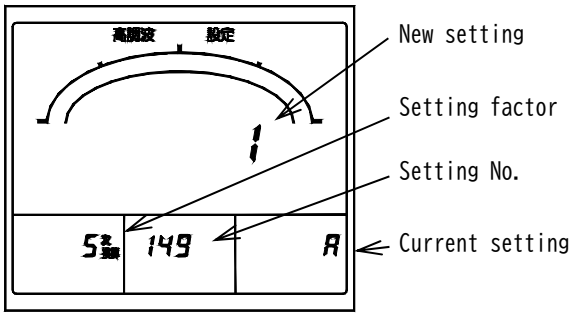
Set the high alarm value of nth content (current, voltage).
Setting range. Current : 5 to 100% (1% step) and OFF.
Voltage : 1.0 to 20.0% (0.1% step) and OFF.
Selection by [+] and [−], set value is updated by [SET].
Default setting : OFF [Non-use] (Current, Voltage)



◆ 149 5th conversion〈5 次換算〉detection characteristics.

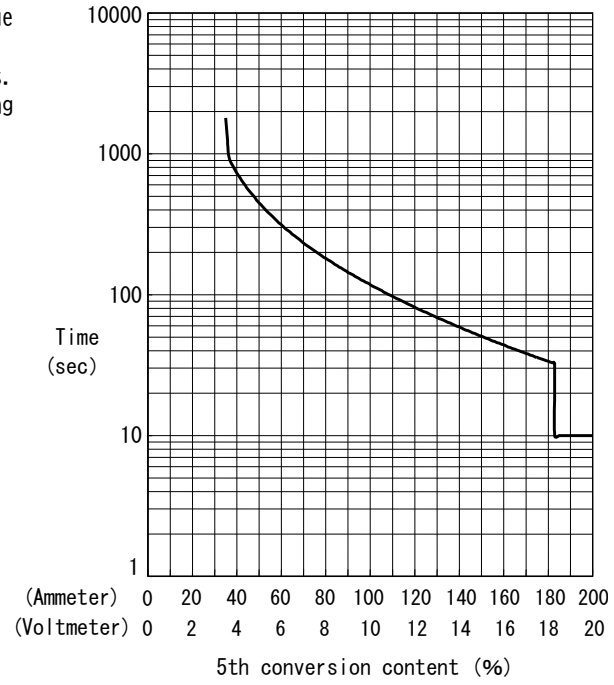
The detection characteristics of 5th conversion content can be selected from A (average mode) and I (inverse-time-delay mode).
In case of "A (average mode)", when average measured value (the average of instantaneous value in average time interval) exceeded the upper limit alarm value, it detects.
And 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

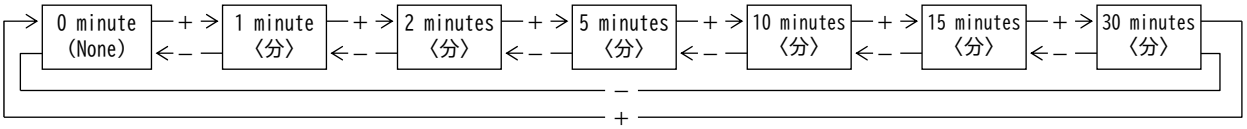
Alarm output, Inverse-time-delay characteristics
In case of high-limit-setting value 35%
(voltmeter 3.5%)



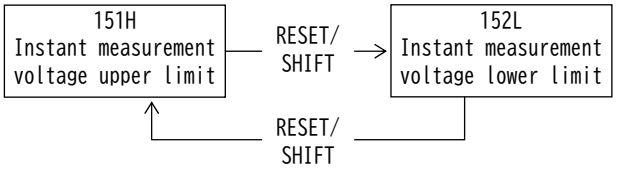
◆ 14A Average time interval

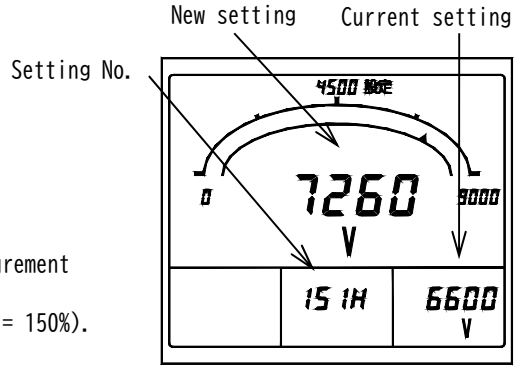
Set the average time interval of each harmonic measurement.
Selection by [+] and [−], set value is updated by [SET].
In addition, in case the detection characteristics of 5th conversion content are set as inverse-time-delay mode, since 5th conversion content may operate in inverse-time-delay characteristics, 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).



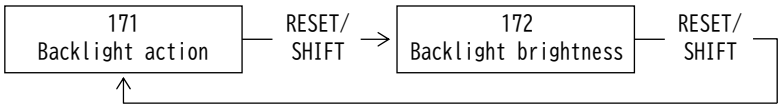


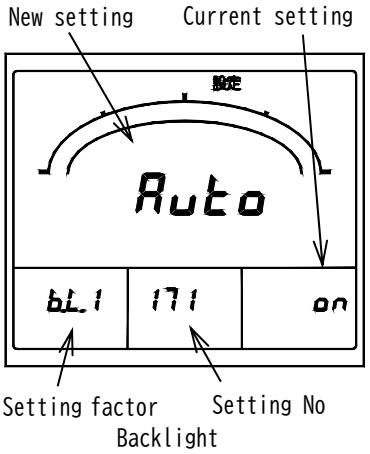
Instant measurement voltage upper limit

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

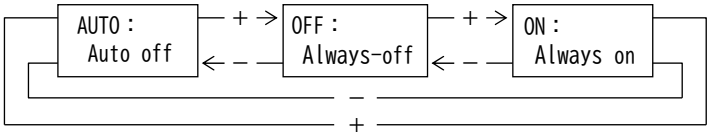
Set the high alarm value and low alarm value of instant measurement (voltage).
Setting range is 30 to 150% (1% step) and OFF (To full scale = 150%).
Selection by [+] and [−], set value is updated by [SET].
Default setting : OFF [Non-use] (Upper limit, lower limit)

(6) 171 to 172 Backlight setting
Set the action and brightness of backlight.





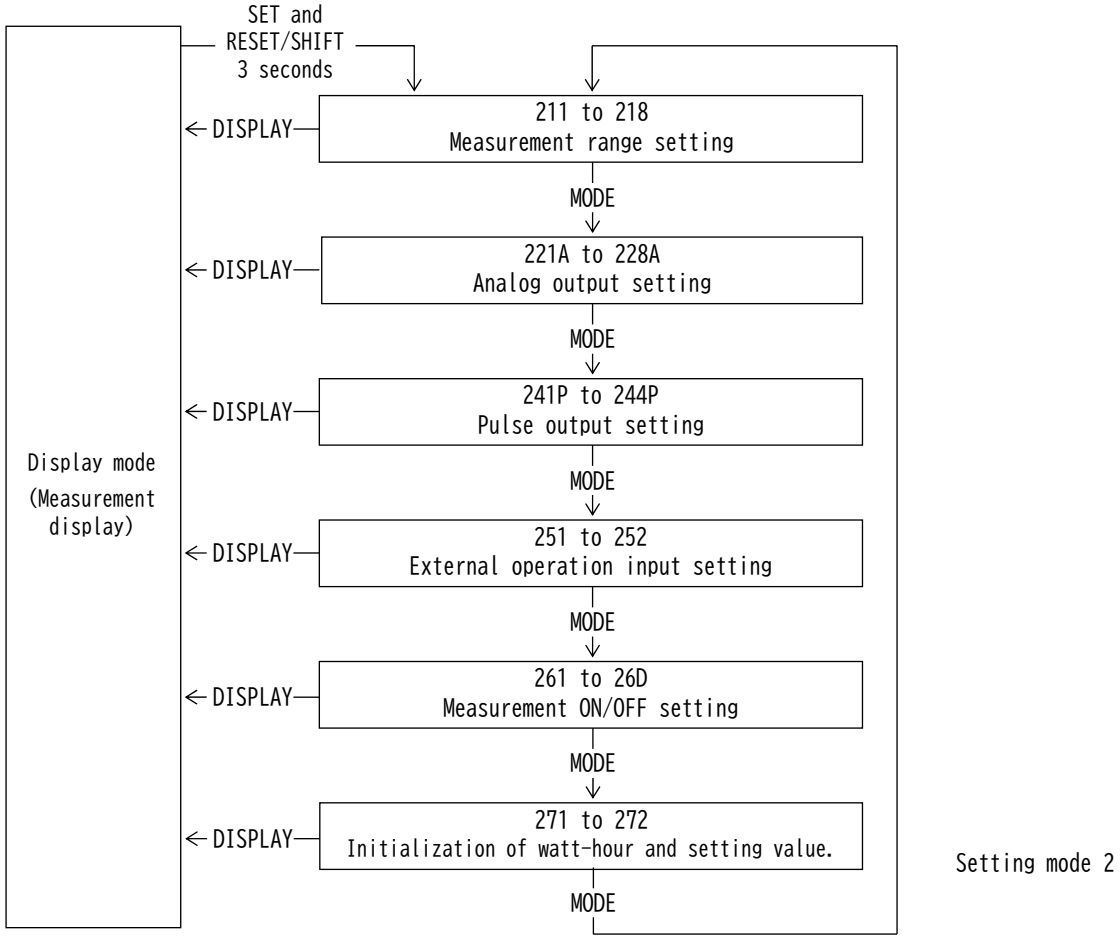
◆ 171 Backlight action
Backlight operation can be selected from ON (always on), AUTO (automatically off), and OFF (always off).
If 5 minutes elapses without operating a switch in case it is set as "AUTO (auto off)", backlight will go out automatically.
After that, backlight will be turned on if either of switches is operated.
Selection by [+] and [−], set value is updated by [SET].
Default setting : AUTO (Auto off)



◆ 172 Backlight brightness
Backlight brightness can be selected from 5 levels from 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

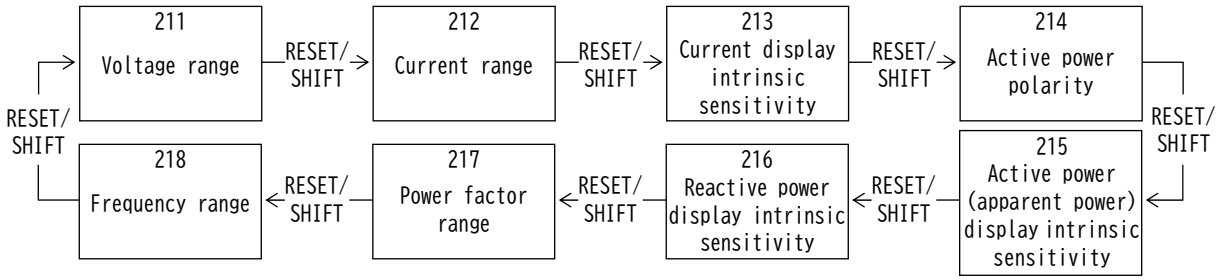


Setting mode 2 is selected by pressing SET and RESET/SHIFT switches continuously for longer than 3 seconds.
Pushing MODE switch performs movement of setting item.
The present mode can be returned to the display mode by pressing DISPLAY switch.

< 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

Setting of measurement range in each measurement elements.



◆ 211 Voltage range

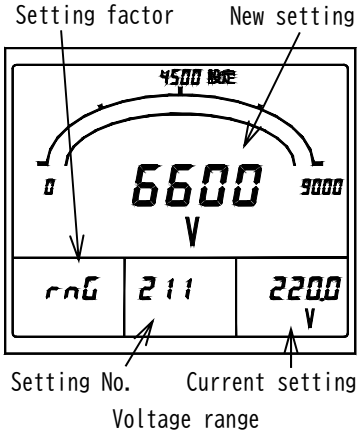
Set the voltage range (VT ratio). Change of this setting also sets the measurement range of active power (apparent power) and reactive power automatically simultaneously.

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)	



◆ 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

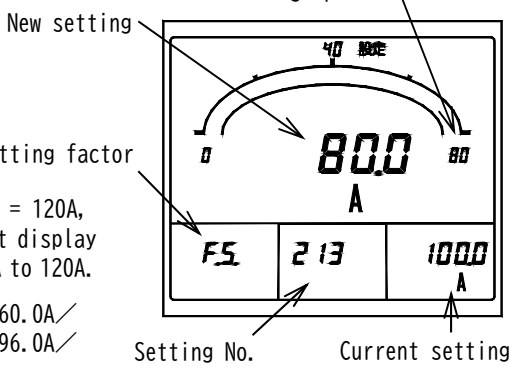
Set the full scale of current meter.
The setting range is from 40 to 120% of the current range and can be selected from the [Current display intrinsic sensitivity (full scale) list].
Selection by [+] and [−], set value is updated by [SET].

Default setting : 100.0A

<Example>
When the current range is 100A.
From 40% of current range = 40A and 120% of current range = 120A, display intrinsic sensitivity can be selected from [Current display intrinsic sensitivity (full scale) list] in the range of 40A to 120A.

Setting range : 40.0A／42.0A／45.0A／48.0A／50.0A／56.0A／60.0A／64.0A／72.0A／75.0A／80.0A／84.0A／90.0A／96.0A／100.0A／100A／120.0A／120A

Full scale
Changing the display specific sensitivity changes the full scale of the bar graph.



<Note> Changing this setting does not change the analog output sensitivity.
When changing the sensitivity of analog output, set "225A current output intrinsic sensitivity.

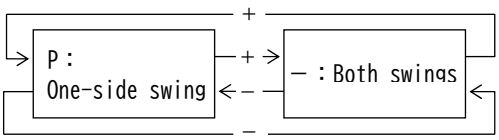
【Current display intrinsic sensitivity (full scale) list】

Full scale		Full scale		Full scale		Full scale	
3 digits	4 digits	3 digits	4 digits	3 digits	4 digits	3 digits	4 digits
		40.0A		400A		4.00kA	4000A
		42.0A		420A		4.20kA	4200A
		45.0A		450A		4.50kA	4500A
		48.0A		480A		4.80kA	4800A
5.00A		50.0A		500A		5.00kA	5000A
5.60A		56.0A		560A		5.60kA	5600A
6.00A		60.0A		600A		6.00kA	6000A
6.40A		64.0A		640A		6.40kA	6400A
7.20A		72.0A		720A		7.20kA	7200A
7.50A		75.0A		750A		7.50kA	7500A
8.00A		80.0A		800A		8.00kA	8000A
8.40A		84.0A		840A		8.40kA	
9.00A		90.0A		900A		9.00kA	
9.60A		96.0A		960A		9.60kA	
10.0A	10.00A	100A	100.0A	1.00kA	1000A	10.0kA	10.00kA
12.0A	12.00A	120A	120.0A	1.20kA	1200A	12.0kA	12.00kA
14.0A	14.00A	140A	140.0A	1.40kA	1400A	14.0kA	14.00kA
15.0A	15.00A	150A	150.0A	1.50kA	1500A	15.0kA	15.00kA
16.0A	16.00A	160A	160.0A	1.60kA	1600A	16.0kA	16.00kA
18.0A	18.00A	180A	180.0A	1.80kA	1800A	18.0kA	18.00kA
20.0A	20.00A	200A	200.0A	2.00kA	2000A	20.0kA	20.00kA
24.0A	24.00A	240A	240.0A	2.40kA	2400A	24.0kA	24.00kA
25.0A	25.00A	250A	250.0A	2.50kA	2500A	25.0kA	25.00kA
28.0A	28.00A	280A	280.0A	2.80kA	2800A	28.0kA	28.00kA
30.0A	30.00A	300A	300.0A	3.00kA	3000A	30.0kA	30.00kA
32.0A	32.00A	320A	320.0A	3.20kA	3200A	32.0kA	32.00kA
36.0A	36.00A	360A	360.0A	3.60kA	3600A	36.0kA	36.00kA

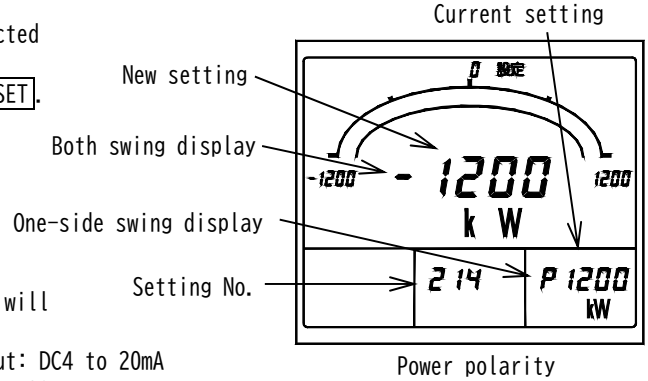
◆ 214 Active power polarity

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)



<Note> Changing the active power polarity setting will change the display and analog output scale.
Example) Primary power value : 1200kW, Analog output: DC4 to 20mA
・Single swing setting : 0 to 1200kW/DC4 to 20mA
・Both swing setting : -1200kW to 0 to 1200kW/DC4 to 12 to 20mA



Power polarity

◆ 215 Active power (apparent power) display intrinsic sensitivity
Set the full scale of active power (apparent power) meter.
The range that can be set is 40 to 115% of the active power (apparent power) range (VT ratio × CT ratio in the attached table), and can be selected from [Active power / Reactive power display intrinsic sensitivity (full scale) list].
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.

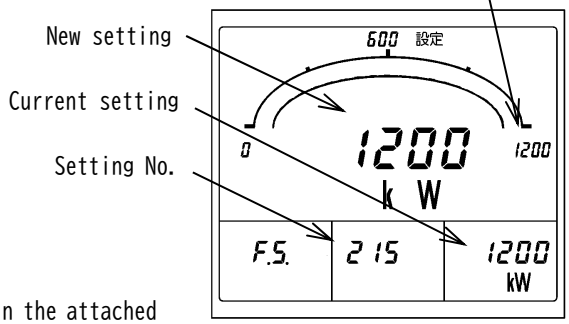
Default setting : 1200kW (1200kVA) : 110/√3V product
600kW (600kVA) : 220/√3V product
1200kW (1200kVA) : 440/√3V product

<Example>
3-phase 4-wire, 440V/110V, 1500/5A
Active power range is 1200kW (from VT ratio × CT ratio in the attached table)
From 40% of the active power range = 480kW and 115% of the active power range = 1380kW, the display intrinsic sensitivity can be selected from the [Active power / Reactive power display intrinsic sensitivity (full scale) list] within the range of 480kW to 1380kW.

Setting range : 480kW／500kW／560kW／600kW／640kW／720kW／750kW／
800kW／840kW／900kW／960kW／1000kW／1200kW

<Note> Changing this setting does not change the analog output sensitivity.
When changing the sensitivity of analog output, set "226A Active power output intrinsic sensitivity.

Full scale
Changing the display specific sensitivity changes the full scale of the bar graph.



Active power display intrinsic sensitivity

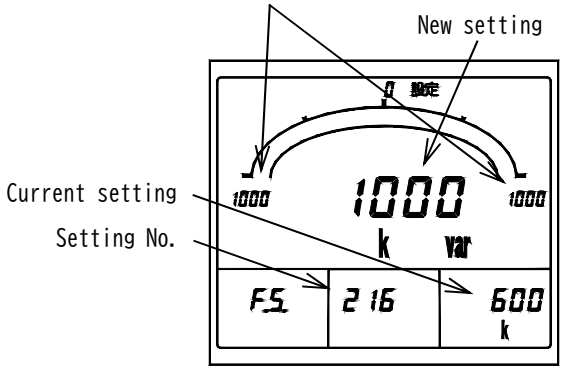
◆ 216 Reactive power display intrinsic sensitivity
Set the full scale of reactive power meter.
The range that can be set is 30 to 115% of the reactive power range (VT ratio × CT ratio in the attached table), and can be selected from [Active power / Reactive power display intrinsic sensitivity (full scale) list].
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)

<Note> The reactive power display is LEAD on the left and LAG on the right.
There is no active power polarity display. (2 quadrant display)
Also, changing this setting does not change the sensitivity of the analog output.
When changing the sensitivity of analog output, set "227A Reactive power output intrinsic sensitivity".

Full scale
Changing the display intrinsic sensitivity changes the full scale of the bar graph.



Reactive power display intrinsic sensitivity

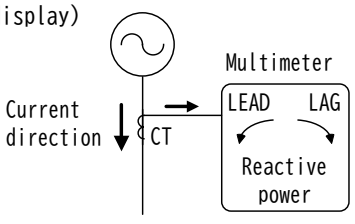


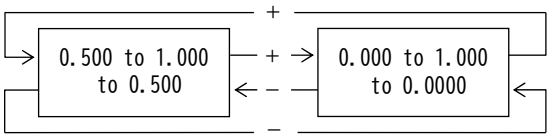
Image of reactive power display

【Active power and Reactive power display intrinsic sensitivity (Full scale) list】 Unit : [W] or [var]

Full scale	Full scale	Full scale	Full scale	Full scale	Full scale	Full scale
400	4.00k	40.0k	400k	4.00M	40.0M	400M
420	4.20k	42.0k	420k	4.20M	42.0M	420M
450	4.50k	45.0k	450k	4.50M	45.0M	450M
480	4.80k	48.0k	480k	4.80M	48.0M	480M
500	5.00k	50.0k	500k	5.00M	50.0M	500M
560	5.60k	56.0k	560k	5.60M	56.0M	560M
600	6.00k	60.0k	600k	6.00M	60.0M	600M
640	6.40k	64.0k	640k	6.40M	64.0M	640M
720	7.20k	72.0k	720k	7.20M	72.0M	720M
750	7.50k	75.0k	750k	7.50M	75.0M	750M
800	8.00k	80.0k	800k	8.00M	80.0M	800M
840	8.40k	84.0k	840k	8.40M	84.0M	840M
900	9.00k	90.0k	900k	9.00M	90.0M	900M
960	9.60k	96.0k	960k	9.60M	96.0M	960M
1000	10.00k	100.0k	1000k	10.00M	100.0M	1000M
1200	12.00k	120.0k	1200k	12.00M	120.0M	
1400	14.00k	140.0k	1400k	14.00M	140.0M	
1500	15.00k	150.0k	1500k	15.00M	150.0M	
1600	16.00k	160.0k	1600k	16.00M	160.0M	
1800	18.00k	180.0k	1800k	18.00M	180.0M	
2000	20.00k	200.0k	2000k	20.00M	200.0M	
2400	24.00k	240.0k	2400k	24.00M	240.0M	
2500	25.00k	250.0k	2500k	25.00M	250.0M	
2800	28.00k	280.0k	2800k	28.00M	280.0M	
3000	30.00k	300.0k	3000k	30.00M	300.0M	
3200	32.00k	320.0k	3200k	32.00M	320.0M	
3600	36.00k	360.0k	3600k	36.00M	360.0M	

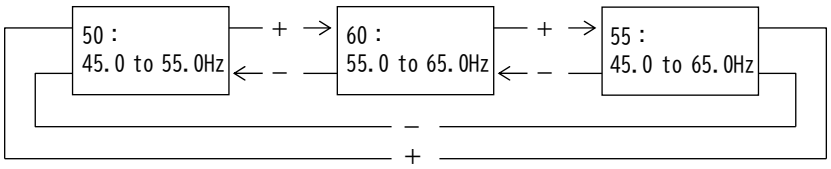
◆ 217 Power factor range

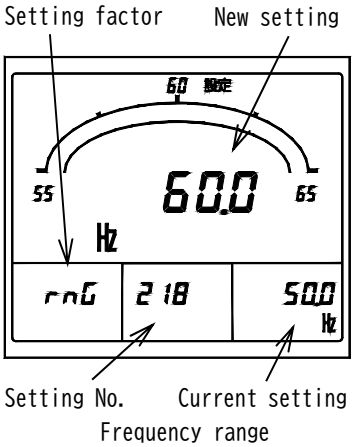
A power factor measurement range can be selected from 0.500 to 1.000 to 0.500 or 0.000 to 1.000 to 0.000.
Selection by [+] and [−], set value is updated by [SET].
Default setting : 0.500 to 1.000 to 0.500



◆ 218 Frequency range

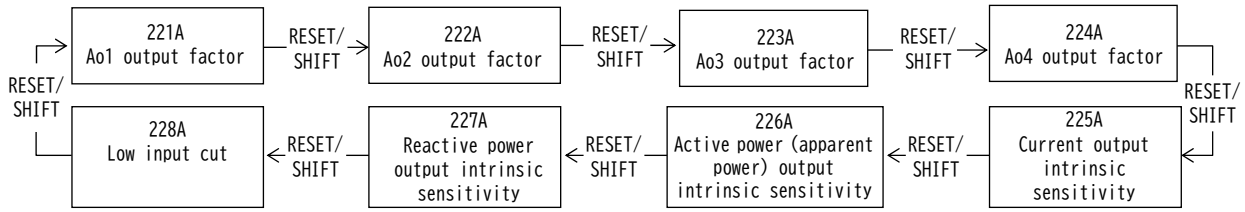
A frequency measurement range can be selected from 45.0 to 55.0Hz or 55.0 to 65.0Hz or 45.0 to 65.0Hz.
Selection by [+] and [−], set value is updated by [SET].
Default setting : 45.0 to 65.0Hz



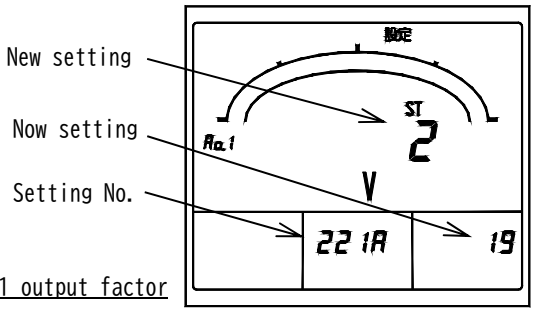


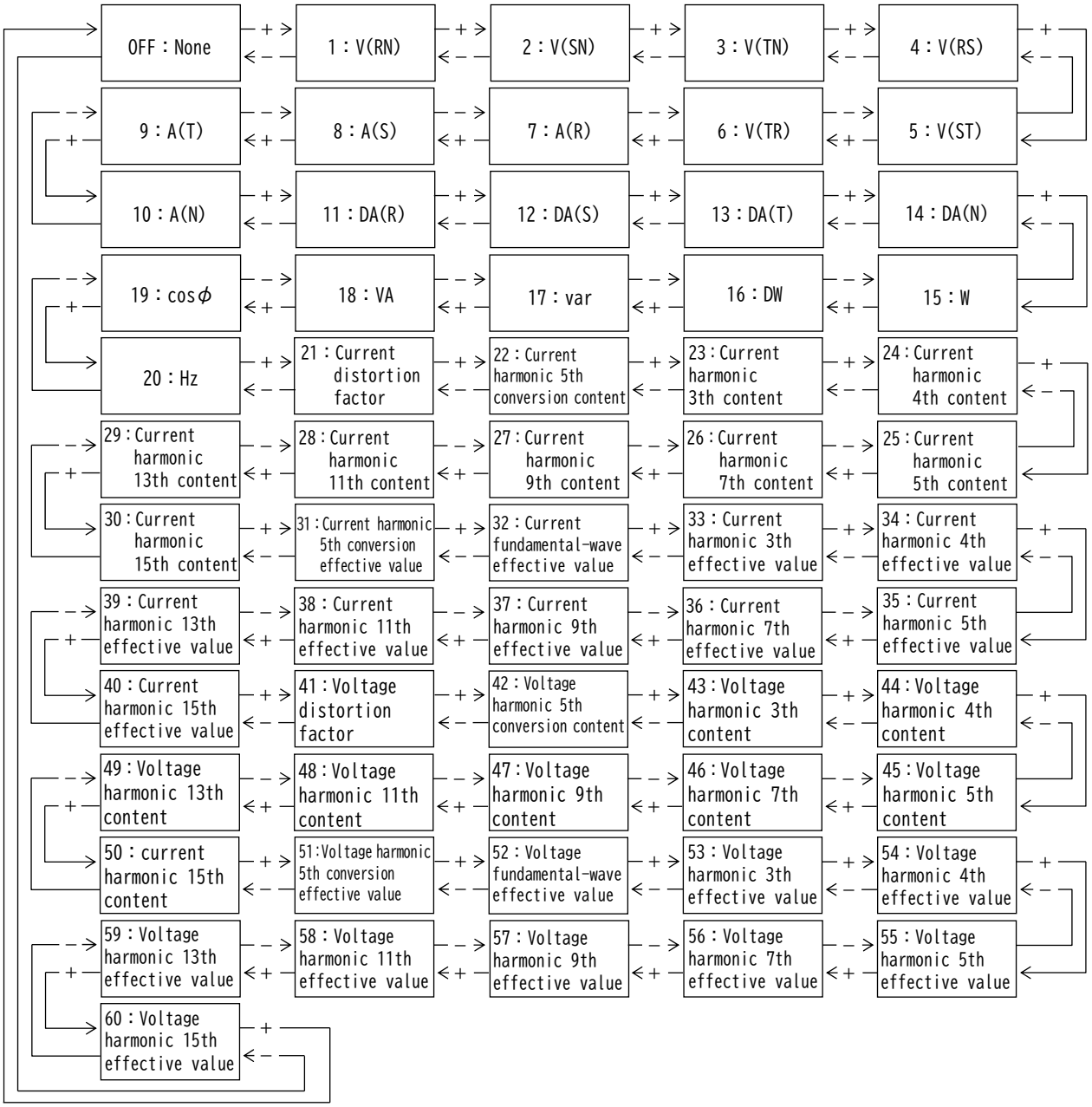
<Note>
This product takes frequency from the voltage input terminals 8-9 and current input terminals 12-13.
When using the product with no input to these terminals (less than 20% of voltage full scale or 10% of current full scale), set the frequency range to match the input frequency.
If the settings do not match, the measured value may fluctuate, or the error may be large.
50Hz input : 45.0 to 55.0Hz or 45.0 to 65.0Hz setting
60Hz input : 55.0 to 65.0Hz setting

(2) 221A to 228A Analog output setting 【With an analog output option】
Various setting of analog output is performed.



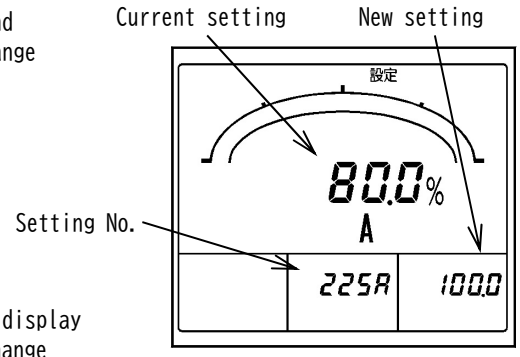
◆ 221A to 224A AO (analog output) 1 to 4 output factor.
Set the output factor of each analog outputs.
Selection by [+] and [−], set value is updated by [SET].
Default setting : A01 A(L2)
A02 V(L1L2)
A03 W
A04 cosφ





◆ 225A Current output intrinsic sensitivity

The current value set in "212 Current Range" is 100.0%, and the analog output intrinsic sensitivity can be set in the range of 40.0% to 120.0% (0.1% steps).
Selection by [+] and [−], set value is updated by [SET].
Default setting : 100.0%



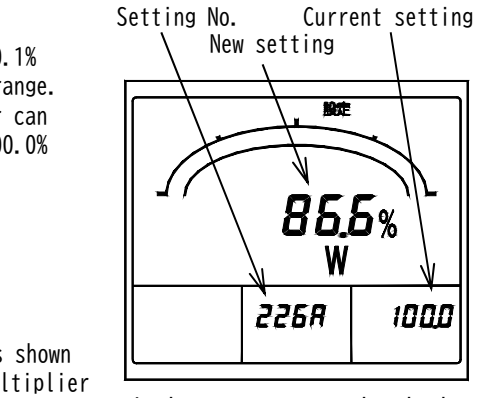
Current output intrinsic sensitivity

Example) Current range 100A, Analog output DC4 to 20mA
・100.0% setting : 0 to 100A / DC4 to 20mA
・80.0% setting : 0 to 80A / DC4 to 20mA

<Note> The sensitivity does not depend on the "213 Current display intrinsic sensitivity" setting, so if you want to change the sensitivity, set the display and output individually.

◆ 226A Active power (Apparent power) output intrinsic sensitivity
227A Reactive power output intrinsic sensitivity

The intrinsic sensitivity of the analog output to active power (apparent power) can be set in the range of 40.0 to 115.0% (in 0.1% steps) relative to 100.0% of the active power (apparent power) range.
The intrinsic sensitivity of the analog output to reactive power can be set in the range of 30.0 to 115.0% (0.1% step) relative to 100.0% of the reactive power range.



Active power output intrinsic sensitivity

Selection by [+] and [−], set value is updated by [SET].
Default setting : 100.0% (Active power, Apparent power)
50.0% (Reactive power)

The active power (apparent power) range (VT ratio x CT ratio) is shown in Appendix Tables 1-1 to 1-3 " Active power range, watt-hour multiplier rate table.
Note that the output scale of the active power (apparent power) varies depending on the "214 Active power (Apparent power) polarity".

Example) 3-phase 4-wire, Voltage range : 440V, Current range : 1500A, Analog output : DC4 to 20mA
From Appendix Table 1-3, the active power (apparent power) and reactive power ranges are 1200kW (1200kVA) and 1200kvar.

■ Setting of active power (apparent power) output specific sensitivity.
『214 Active power polarity : At one-side swing setting』
・100.0% setting : 0 to 1200kW / DC4 to 20mA
・ 80.0% setting : 0 to 960kW / DC4 to 20mA
『214 Active power polarity : At both-side swing setting』
・100.0% setting : -1200kW to 0 to 1200kW / DC4mA to 12mA to 20mA
・ 80.0% setting : -960kW to 0 to 960kW / DC4mA to 12mA to 20mA.

■ Setting of reactive power output specific sensitivity.
・100.0% setting : LEAD 1200kvar to 0 to LAG 1200kvar / DC4mA to 12mA to 20mA.
・ 50.0% setting : LEAD 600kvar to 0 to LAG 600kvar / DC4mA to 12mA to 20mA.

<Note>
The sensitivity does not depend on the "215 Active power (apparent power) display intrinsic sensitivity", "216 Reactive power display intrinsic sensitivity", and "225A Current output intrinsic sensitivity" does not depend on the intrinsic sensitivity setting.
To change the sensitivity, set the display and output individually.

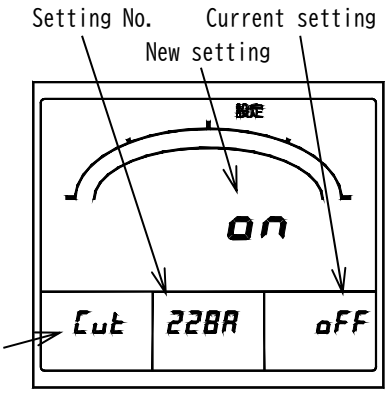
<Note>
Active power and apparent power are set collectively and cannot be set individually.
Example) 600V, 1500A, 1200kW range, analog output DC4 to 20mA
・100.0% setting : Primary input is 1200kW and analog output is DC20mA.
・ 80.0% setting : Primary input is 1200kW×0.8＝960kW and analog output is DC20mA.

◆ 228A Low input cut

This function sets the output to the lower limit vulue for analog outputs of voltage, current, active power (apparent power), and reactive power when the input is minute, equivalent to 0.5% or less of the measurement range as 100%.
A function can be selected from ON (Use) and OFF (Non-use).
Selection by [+] and [−], set value is updated by [SET].
Default setting : OFF (Non-use)

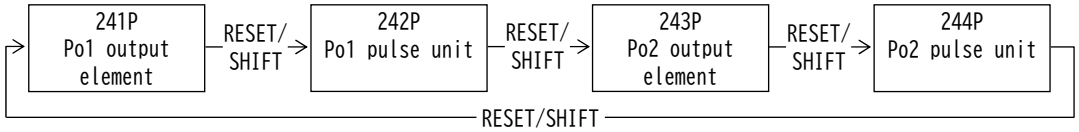
Example) For a current range of 100 A, an analog output of less than 0.5 A is set as the lower limit value.

<Note>
The following settings are not dependent.
"225A Current output intrinsic sensitivity"
"226A Active power (Apparent power) output intrinsic sensitivity"
"227A Reactive power output intrinsic sensitivity"



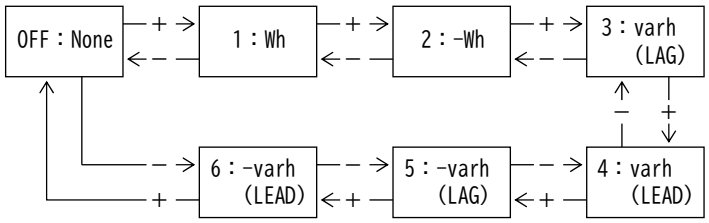
Low input cut

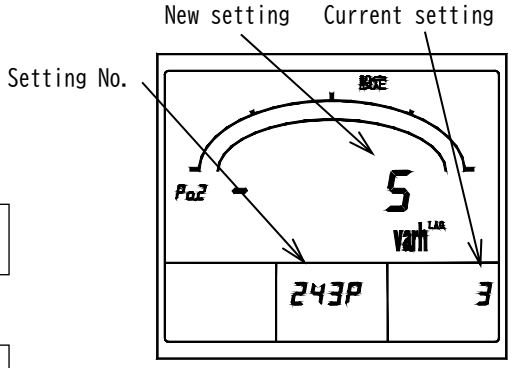
(3) 241P to 244P Pulse output setting 【With a pulse output option】
Various setting of a pulse output is performed.



◆ 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)

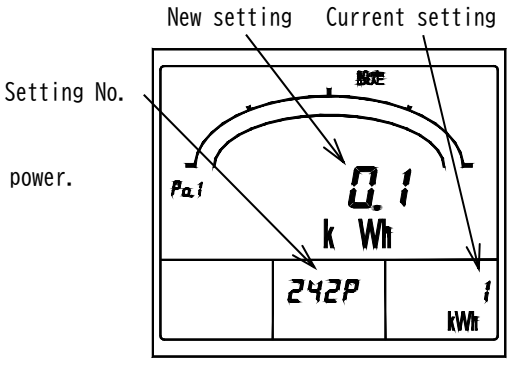




Po2 output factor

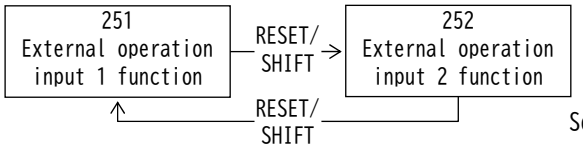
◆ 242P PO (pulse output) 1 pulse unit,
244P PO (pulse output) 2 pulse unit

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)



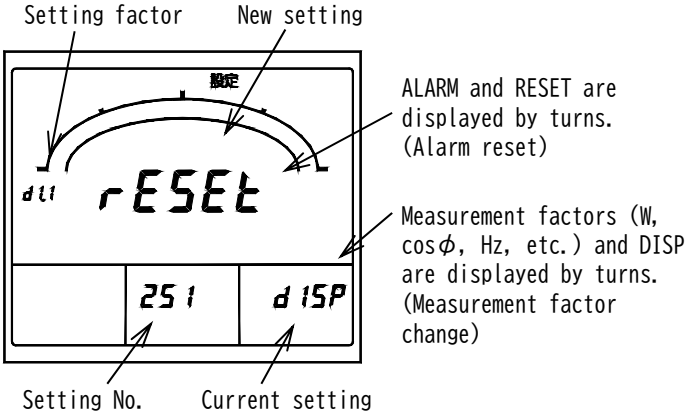
Po1 pulse unit

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



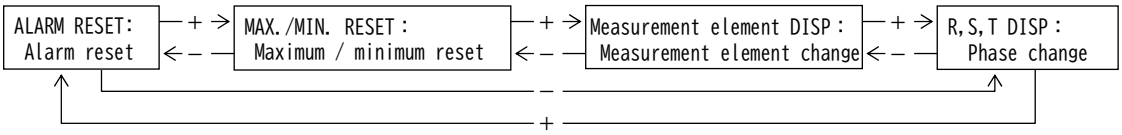
◆ 251 External operation input 1 function,
252 External operation input 2 function

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)

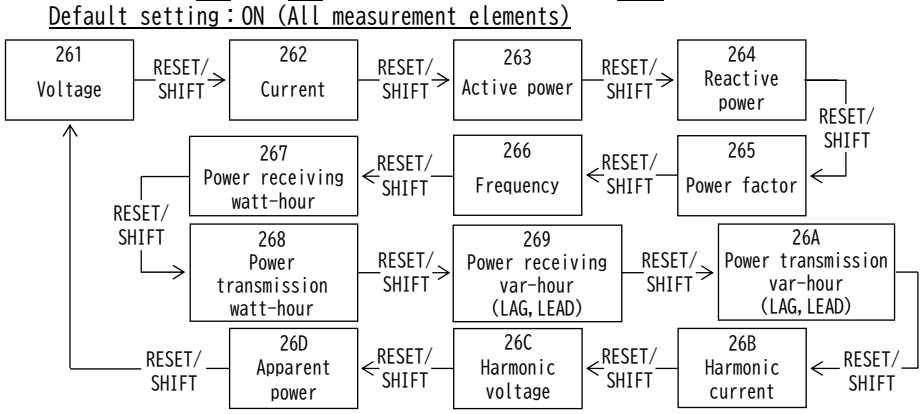
Default setting (With no alarm output option)
Maximum / minimum reset (External operation input 1)
Measurement element change (External operation input 2)

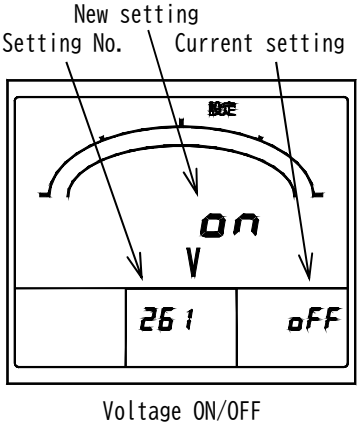


・About the setting display in an external operation input function

Function	The contents of a display at the case of function setting	"Current 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 (R, S, T, N) displays by turns.		

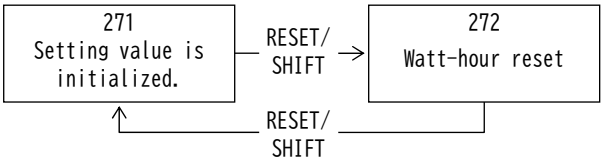
(5) 261 to 26D Measurement ON/OFF setting
Measurement display ON/OFF setting of each measurement element is performed.
Selection by [+] and [−], set value is updated by [SET].
Default setting : ON (All measurement elements)



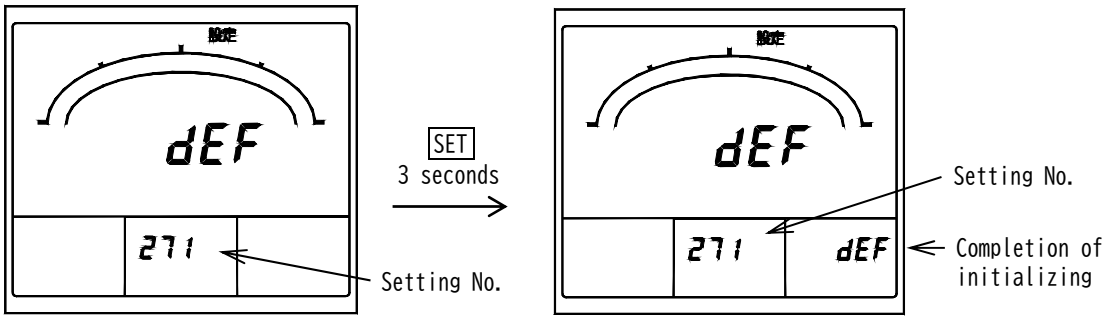


Voltage ON/OFF

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

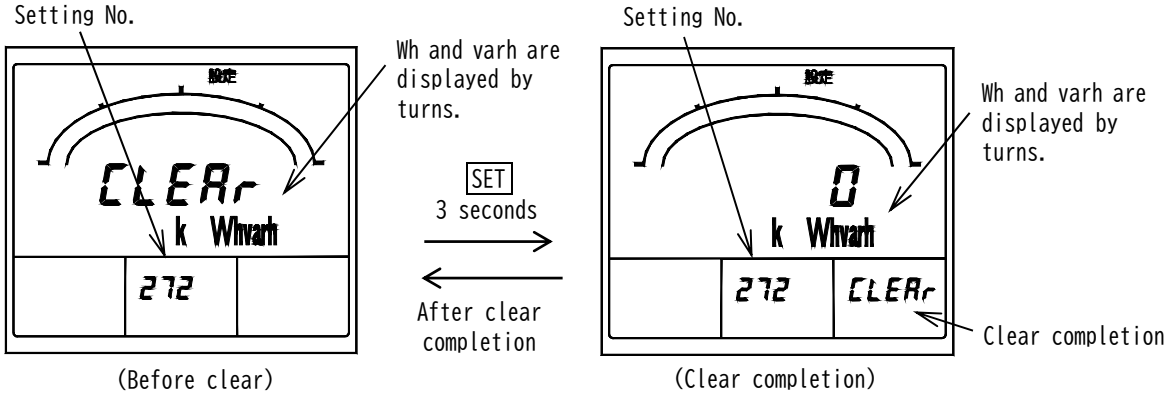


◆ 271 Initialization of setting value
Each set value is initialized (returns to default setting).
Pushing [SET] for 3 seconds initializes all set values.



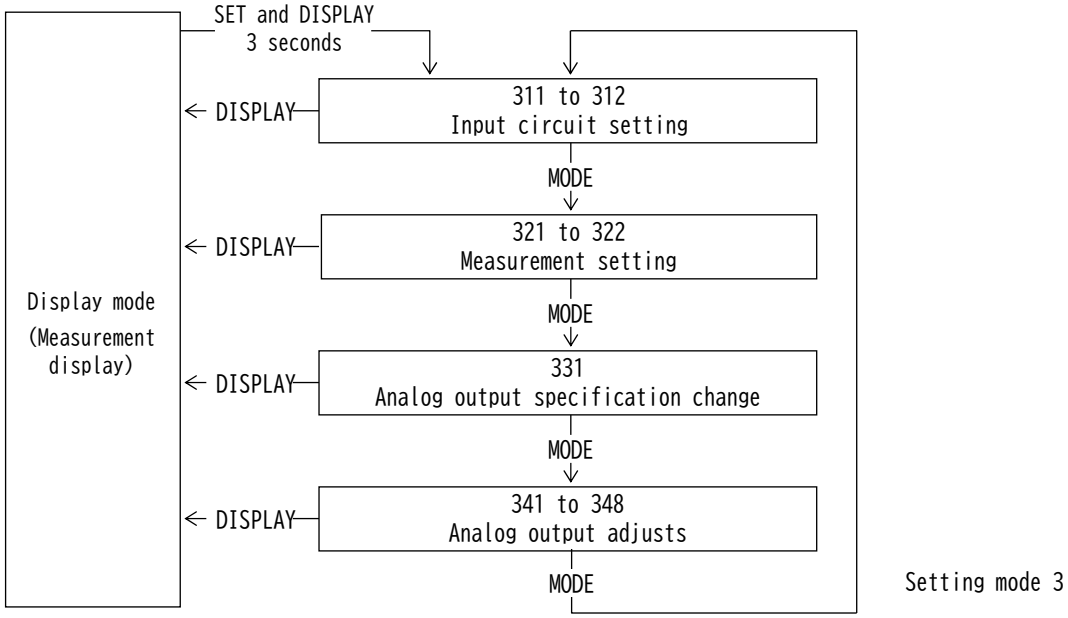
Initialization of setting value

◆ 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, varh(LAG), -varh(LAG), varh(LEAD), -varh(LEAD)) is cleared simultaneously.



Watt-hour reset

5.3.3 Setting mode 3

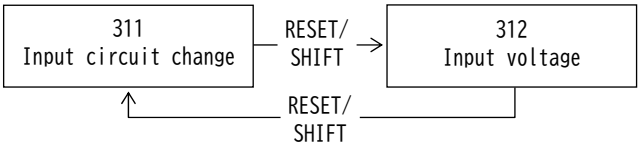


Setting mode 3 is selected by pressing SET and DISPLAY switches continuously for longer than 3 seconds.
Pushing MODE switch performs movement of setting item.
The present mode can be returned to the display mode by pressing DISPLAY switch.

< 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.

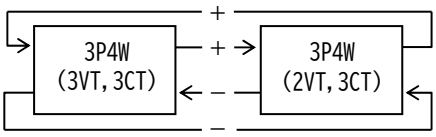
(1) 311 to 312 Input circuit setting 【Current input product is excluded. (However, an input-voltage setting is 110/√3V, 220/√3V common use products only.)】

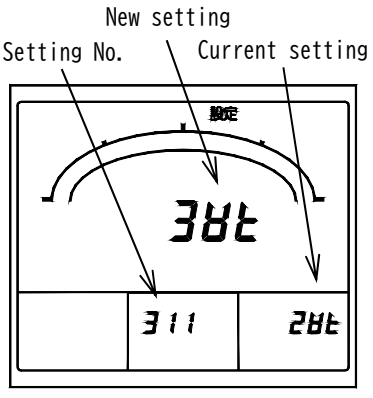
Set the input circuit and input voltage.
The input voltage setting is only for 110/√3V and 220/√3V common-use products.



◆ 311 Input circuit change
Set the input circuit.
Selection by + and −, set value will be updated if SET is pushed for 3 seconds.
Default setting : 3P4W (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.





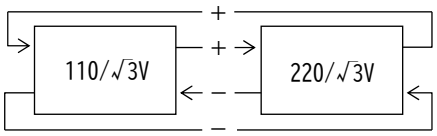
Input circuit and
phase wire change

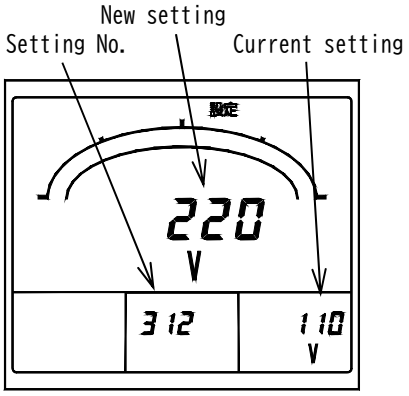
◆ 312 Input voltage

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)

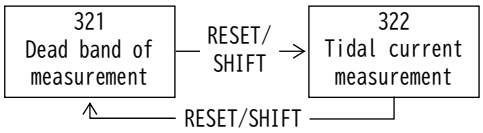




Input voltage

(2) 321 to 322 Measurement setting

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



◆ 321 Measurement dead band

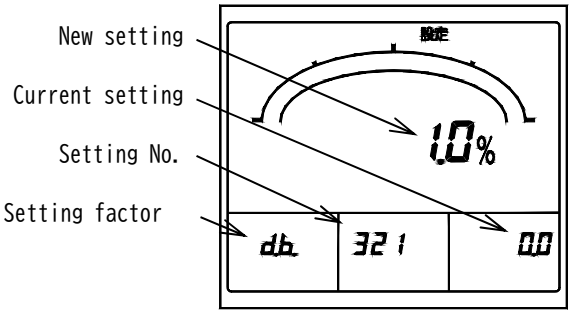
Set the dead band of measurement display.

By this setting, variation of value 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% (None)



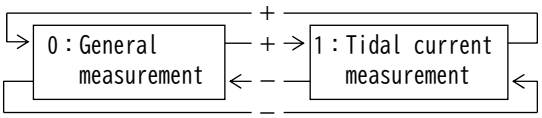
Dead band of measurement

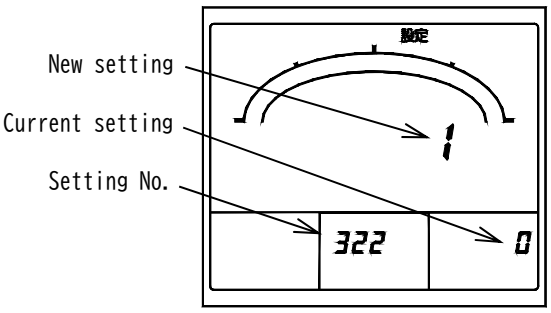
◆ 322 Tidal current measurement

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)



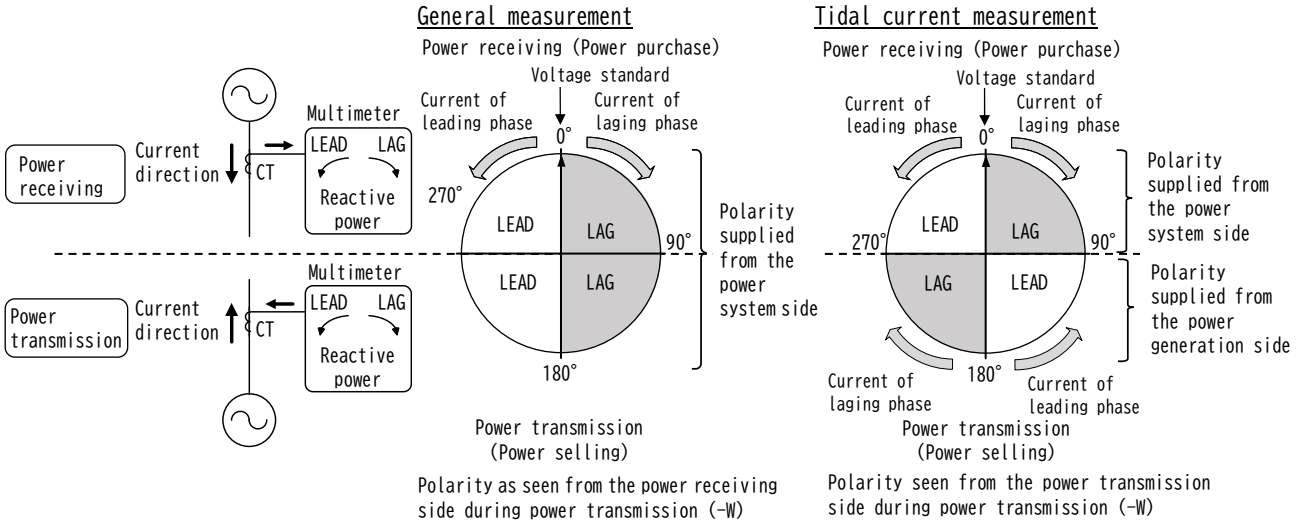


Tidal current measurement

General measurement : Displays the polarity (LAG / LEAD) supplied from the power system side.
(Both power receiving and power transmission)

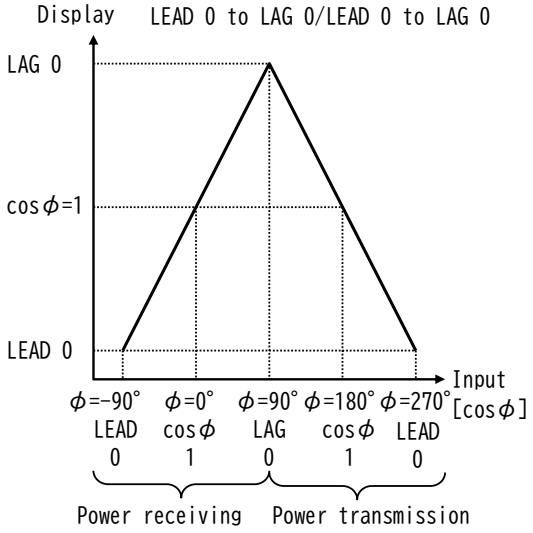
Tidal current measurement : Displays the polarity (LAG / LEAD) supplied from the power system side.
(At power receiving)
Displays the polarity (LAG / LEAD) supplied from the power generation side.
(At power transmission)

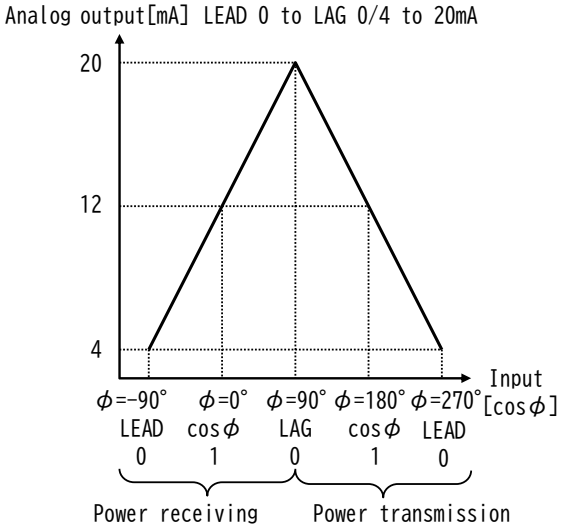
Image of reactive power and power factor display



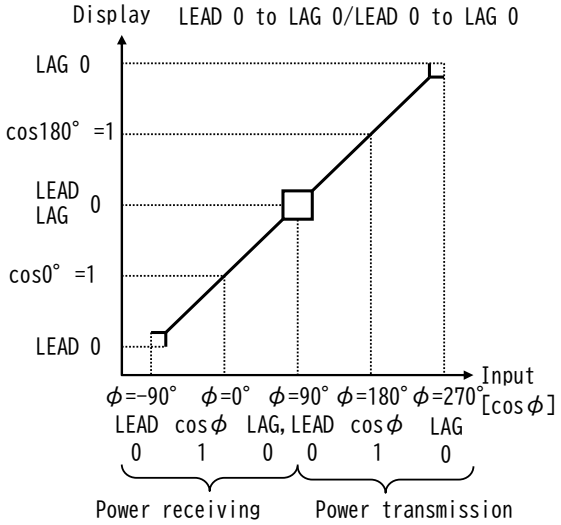
<Note> When used in a place where power transmission operation is performed (supply from the power generation side to the power system side), the polarity (LEAD / LAG) of reactive power and power factor measurement during power transmission changes depending on the power flow measurement setting.
However, the meter display is LEAD on the left and LAG on the right.

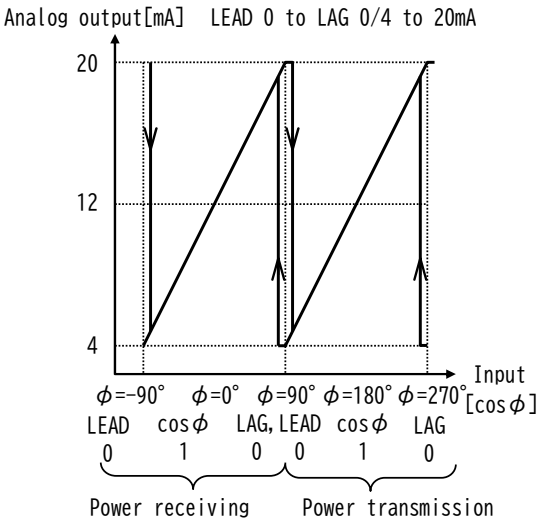
(General measurement)



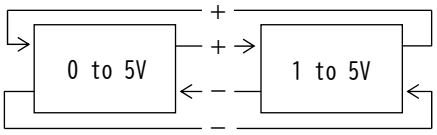


(Tidal current measurement)

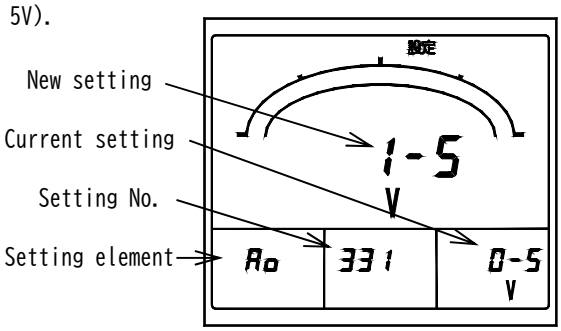




(3) 331 Analog output specification setting 【With analog output (DC0 to 5V or DC1 to 5V)】
Set the specification of analog output (DC0 to 5V／DC1 to 5V).
Selection by [+] and [−], set value is updated by [SET].
Default setting : DC1 to 5V or DC0 to 5V (Designation)

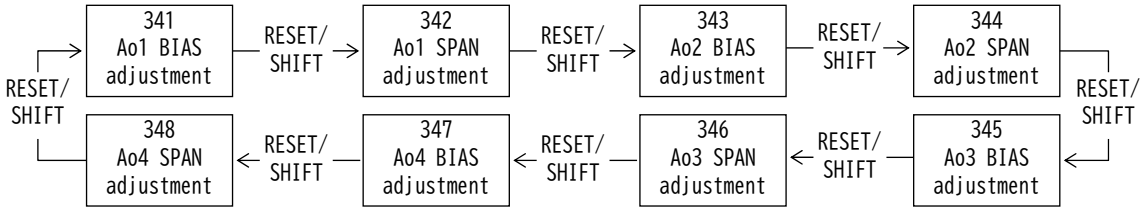


<Note> This setting does not exist at the time of an analog output insulation product.



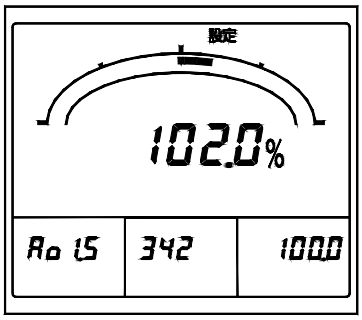
Analog output specification

(4) 341 to 348 Analog output adjustment 【With analog output】
The bias and span of each analog output are adjusted.



◆ 341 AO (Analog output) 1 bias adjustment,
343 AO (Analog output) 2 bias adjustment,
345 AO (Analog output) 3 bias adjustment,
347 AO (Analog output) 4 bias adjustment.

The bias of each analog output is adjusted.
Setting range : ±10.0% (0.1% step)
Selection by [+] and [−], set value is updated by [SET].



Ao1 span adjustment

◆ 342 AO (Analog output) 1 span adjustment,
344 AO (Analog output) 2 span adjustment,
346 AO (Analog output) 3 span adjustment,
348 AO (Analog output) 4 span adjustment.

The span of each analog output is adjusted.
Setting range : ±10.0% (0.1% step)
Selection by [+] and [−], set value is updated by [SET].

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 (24)		Maximum measur-ement	Minimum measur-ement	Note
					Digital display	Analog output Pulse output (25)			
Voltage	AC150V to 750.0kV (34 range)			○	±1.0%	±0.5%	○	○	RN-SN-TN-RS-ST-TR line change
Current	Maximum demand〈最大需要〉(29), Demand〈需要〉, Instant AC5.00A to 30.0kA (76 range)		○		±1.0%	±0.5%	○	○	R-S-T-N phase change Possible to set a range of indication and output apart from the CT ratio.
Active power	Maximum demand <最大需要〉(29), Demand〈需要〉, 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%	○	○	Range of an analog output can be set as an indication independently. (26) (27)
Apparent power	480VA to 1000MVA In active power range.				±1.0%	±0.5%	○	○	Same scale as the active power range (Display, Output) (27)
Reactive power	LEAD, LAG 360var to 1000Mvar (Range select) In voltage and current range.				±1.0%	±0.5%	○	○	Range of an analog output can be set as an indication independently. (27)
Power factor	LEAD 0.500 to 1.000 to LAG 0.500 or LEAD 0.000 to 1.000 to LAG 0.000 (Range select)				±2.0%	±2.0%	○	○	In case input is below 20% of voltage range or below 2% of current range : cosϕ =1. (Output is cosϕ =1 equivalence)
Frequency	45.0 to 55.0Hz or 55.0 to 65.0Hz or 45.0 to 65.0Hz (Range select)			○	±0.5%	±0.5%	○	○	0.0Hz in case input is below 20% of voltage range. Output is a lower limit value. (Lower limit value -1% : % for output span)
Distortion factor	Voltage	0.0 to 20.0% (Second to 15th harmonic) RN-SN-TN (28)		○	±1.0%	±2.5%	○		Digital display is % to 100% of distortion factors.
	Current	0.0 to 100.0% (Second to 15th harmonic) R-S-T	○		±2.5%	±2.5%	○		
Harmonic nth effective value Fundamental -wave effective value	Voltage	AC150V to 750.0kV (34 range) n=3, 4, 5, 7, 9, 11, 13, 15 RN-SN-TN (28)		○	±1.5%	±1.5%	○		Digital display is % to a voltage range.
	Current	AC5.00A to 30.0kA (76 range) n=3, 4, 5, 7, 9, 11, 13, 15 R-S-T	○		±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 RN-SN-TN (28)		○	±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 R-S-T	○		±2.5%	±2.5%	○		

Measurement item	Measurement range / Display specification		Current input	Voltage input	Intrinsic error (24)		Maximum measur-ement	Minimum measur-ement	Note
					Digital display	Analog output Pulse output (25)			
Harmonic 5th conversion effective value	Voltage	AC150V to 750.0kV (34 range) RN-SN-TN (28)		○	±1.5%	±1.5%	○		Digital display is % to a voltage range.
	Current	AC5.00A to 30.0kA (76 range) R-S-T	○		±1.5%	±1.5%	○		Digital display is % to a current range.
Harmonic 5th conversion content	Voltage	0.0 to 20.0% RN-SN-TN (28)		○	±1.0%	±2.5%	○		Digital display is % to 100% of content.
	Current	0.0 to 100.0% R-S-T	○		±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(24) 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, analog output constitutes lower limit output. At this time, a distortion factor, harmonic 5th conversion content rate, and nth harmonic content also become 0% (analog output is lower limit output). As for a distortion factor, harmonic 5th conversion effective value / content, and nth harmonic effective value / content, fundamental-wave effective value constitutes zero by 3% or less of the measurement range.

Note(25) Analog output and pulse output are options.
The analog outputs for harmonic distortion and harmonic content are lower limit outputs to upper limit outputs for current 0 to 100% and voltage 0 to 20%.

Note(26) At the case of one side swing setting of bar graph. Digital meter measures reverse power to -15% full scale. (Instantaneous power)

Note(27) 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(28) 3VT products is RN-SN-TN. 2VT product is RN-TN.

Note(29) The maximum value (maximum demand current, others) and the minimum value can be checked in the maximum and minimum measurement mode.

Item	Specification	
Bar graph display	Bar graph display of the main-monitor factor is done. (Watt-hour and var-hour exclude) A display of a submonitor factor 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 factor in which display setting is possible	Main monitor	Voltage (RN-SN-TN-RS-ST-TR), Current (R-S-T-N), Demand <需要> current (R-S-T-N), Active power, Demand <需要> 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 <歪率> (A, V)
	Sub monitor (Left)	Voltage (RN-SN-TN-RS-ST-TR), Current (R-S-T-N), Active power, Reactive power, Power factor
	Sub monitor (Center)	Voltage (RN-SN-TN-RS-ST-TR), Current (R-S-T-N), Demand <需要> current(R-S-T-N), Active power, Demand <需要> active power, Reactive power, var-hour (Power receiving LAG/LEAD, Power transmission LAG/LEAD), Harmonic 5th conversion <高調波 5 次換算> content (A, V), Harmonic nth content <高調波 n 次> (A, V)
	Sub monitor (Right)	Voltage (RN-SN-TN-RS-ST-TR), Current (R-S-T-N), Demand <需要> current (R-S-T-N), Active power, Demand <需要> active power, Power factor, Frequency, Watt-hour (Power receiving, Power transmission), Fundamental-wave effective value (A, V), Harmonic 5th conversion <高調波 5 次換算> content (A, V), Harmonic nth effective value (A, V)
	Bar graph	Voltage (RN-SN-TN-RS-ST-TR), Current (R-S-T-N), Demand <需要> current (R-S-T-N), Active power, Demand <需要> active power, Reactive power, Apparent power, Power factor, Frequency, Distortion factor <歪率> (A, V), Harmonic 5th conversion <高調波 5 次換算> content (A, V), Harmonic nth content <高調波 n 次> (A, V), Fundamental-wave effective value (A, V), Harmonic 5th conversion <高調波 5 次換算> effective value (A, V), Harmonic nth <高調波 n 次> effective value (A, V)
Option	Analog output (4 sets) 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 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)(30) 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(30) VT ratio should calculate as "2" at the case of 220/√3V rating. And VT ratio should calculate as "4" at the case of 440/√3V rating. Calculate as CT ratio is CT ratio ÷5 in case of 1A input specifications.

● Measurement is possible range.

Measurement factor			Input (31)	Measurement is possible range			
				Display		Analog output	
				Limiter	Low input cut	Limiter	Low input cut
Phase voltage			AC0 to 150/√3V [AC0 to 300/√3V]	101% of full scale /√3	0.5% of full scale	101% of full scale /√3	0.5% of output span
Line voltage			AC0 to 150V [AC0 to 300V]	101% of full scale	0.5% of output span	101% of full scale	0.5% of output span
Current Demand current			AC0 to 5A [AC0 to 1A]	120% of current range	0.5% of current range	120% of current range	0.5% of output span
Active power Demand active power			0 to 1kW (0 to 200W) [0 to 2kW (0 to 400W)] -1kW to 0 to 1kW (-200k to 0 to 200W) [-1kW to 0 to 2kW (-400W to 0 to 400W)]	120% of active power display intrinsic sensitivity	0.5% of active power range	-1% and 120% of output span	0.5% of output span
Reactive power			LEAD 1 to 0 to LAG 1kvar (LEAD 200 to 0 to LAG 200var) [LEAD 2 to 0 to LAG 2kvar (LEAD 400 to 0 to LAG 400var)] {LEAD 4 to 0 to LAG 4kvar (LEAD 800 to 0 to LAG 800var)}	120% of reactive power display intrinsic sensitivity	0.5% of reactive power range	-1% and 120% of output span	0.5% of output span
Apparent power			0 to 1kVA (0 to 200VA) [0 to 2kVA (0 to 400VA)] {0 to 4kVA (0 to 800VA)}	120% of apparent power display intrinsic sensitivity	0.5% of apparent power range	-1% and 120% of output span	0.5% of output span
Power factor			LEAD 0 to 1 to LAG 0	LEAD 0.000 to 1 to LAG 0.000	Less than 20% of voltage range or less than 2% of current range	0% and 100% of output span	Less than 20% of voltage range or less than 2% of current range
			LEAD 0.5 to 1 to LAG 0.5	LEAD 0.490 to 1 to LAG 0.490		-1% and 101% of output span	
Frequency			45 to 55Hz	44.9 to 55.1Hz	Less than 20% of voltage full scale	-1% and 101% of output span	Less than 20% of voltage full scale
			55 to 65Hz	54.9 to 65.1Hz			
			45 to 65Hz	44.8 to 65.2Hz			
Harmonic	Effective value	Current	AC0 to 5A [AC0 to 1A]	—	0.25% of full scale	120% of output span	0.25% of output span
		Voltage	AC0 to 150/√3V [AC0 to 300/√3V] {AC0 to 600/√3V}	—	0.25% of voltage range	101% of output span	0.25% of output span
	Rate of content	Current	0 to 100%	200%	Depends on harmonic effective value current	120% of output span	Depends on harmonic effective value current
		Voltage	0 to 20%	100%	Depends on harmonic effective value voltage	120% of output span	Depends on harmonic effective value voltage

Note(31) [ ] is the 300V input case. { } is the 600V input case. ( ) is the 1A input case.

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				
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	For upper installation (For lower view)	Upper view angle 10° , Lower view angle 60° , Right and left view angle 60°			
	For lower installation (For upper view)	Upper view angle 60° , Lower view angle 10° , Right and left view angle 60°			
	Wide viewing angle	Upper view angle and lower view angle 75° , Right and left view angle 75°			
Backlight	LED backlight : White Always-on, Auto off (after 5 minutes without operating), Always-off. Setting is possible. Backlight can select brightness from five steps of 1 to 5.				
Auxiliary supply	(1) AC85 to 264V 50/60Hz 10VA (Rated voltage, AC100/110V, 200/220V) DC80 to 143V 6W (Rated voltage, DC100/110V) for both AC and DC uses				
	(2) DC20 to 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 (ground).	Above 50MΩ at DC500V megger			
	Between input and output and auxiliary supply.				
	Between outputs (Analog output, Pulse output, Alarm output).				
	Between pulse outputs.				
	Between alarm outputs.				
	Between analog outputs.	Non-insulation (minus common) Above 50MΩ at DC500V megger	Designation		
Withstand voltage JIS C 1102-1 JIS C 1111	Between electric circuits and case (ground).	AC2000V (50/60Hz) 1 minute			
	Between input and output and auxiliary supply.				
	Between outputs (Analog output, Pulse output, Alarm output).	AC1500V (50/60Hz) 1 minute			
	Between pulse outputs.				
	Between alarm outputs.				
	Between analog outputs.	Non-insulation (minus common) AC500V (50/60Hz) 1 minute	Designation		
Impulse withstand voltage JIS C 1111	Between electric circuits and case (ground). (An analog output is excluded)	6kV 1.2/50μs Both positive and negative polarities, for 3 times each.			
	Between analog output and case (ground).	5kV 1.2/50μs Both positive and negative polarities, for 3 times each.			

Item	Specification
Noise-capacity JEA B-402	(1) Oscillatory surge voltage When a damping vibration waveform (peak voltage 2.5kV, frequency 1MHz±10%) is repeatedly applied, the measurement error should be within 10% and no malfunction should occur. Voltage input circuit (Normal / Common) Current input circuit (Common. Current leakage input circuit is excluded) 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 no malfunction should occur. Auxiliary supply circuit (Normal / Common) Over 1500V Voltage input circuit (Normal / Common) Over 1500V Current input circuit (Common) Over 1500V (Current leakage input circuit is excluded) Pulse output (Common) Over 1000V Alarm output (Common) Over 1000V External operation input (Common) Over 1000V Analog output circuit (Induction) Over 1000V (3) Electric wave noise If intermittence irradiation of the electric wave of a 150MHz,400MHz band is done by (5W, 1m), a measurement error should be within 10% and no malfunction should occur. (4) Electrostatic noise Measurement error shall be within 10% at contact discharge 8kV and air discharge 15kV, and no malfunction shall occur.
Vibration, Shock JIS C 1102-1	Vibration : Single amplitude 0.15mm, 10 to 55Hz, Each minute octave in 5 times sweep Shock : 490m/s^2 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

<table>
<tr><th>Item</th><th colspan="7">Specification</th></tr>
<tr><td rowspan="5">Analog output</td><td>Number of output</td><td colspan="6">4 circuits</td></tr>
<tr><td rowspan="2">Output specification</td><td colspan="3">Analog output non-insulation type</td><td colspan="3">Analog output insulation type</td></tr>
<tr><td colspan="3">DC4 to 20mA (Below 550Ω)
DC0 to 1mA (Below 10kΩ)
DC0 to 5V/1 to 5V (Over 600Ω)
DC0 to 10V (Over 2kΩ)
One of them is designated by identical ratings.</td><td colspan="3">DC4 to 20mA (Below 550Ω)
DC1 to 5V (Over 600Ω)
One of them is designated by identical ratings.</td></tr>
<tr><td>Output factor</td><td colspan="6">Voltage (RN-SN-TN-RS-ST-TR), Current (R-S-T-N), Demand current (R-S-T-N),
Active power, Demand active power, Reactive power, Apparent power, Power factor,
Frequency, Distortion factor (A, V),
Fundamental-wave effective value (Maximum value of each A/V phase),
Harmonic 5th conversion content (Maximum value of each A/V phase),
Harmonic 5th conversion effective value (Maximum value of each A/V phase),
Harmonic nth content (Maximum value of each A/V phase),
nth harmonic effective value (Maximum value of each A/V phase)</td></tr>
<tr><td>Response time</td><td colspan="6">1 second or less (Time within ±1% of final constant value.)
Harmonic measurement is 10 seconds or less.</td></tr>
<tr><td>Output ripple</td><td colspan="6">Within the double precision of accuracy (% for output span)</td></tr>
<tr><td>Pulse output ([33])</td><td colspan="7">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}</td></tr>
</table>

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 ([32])
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 ([32]) 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 ([33]) 2 outputs combination is possible, for pulse output and alarm output and CPU error output.
(CPU error output is 1 point only)

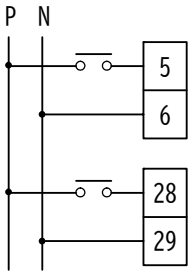
<table>
<tr><th>Item</th><th colspan="5">Specification</th></tr>
<tr><td rowspan="15">Alarm output
(34)</td><td colspan="5">Alarm element : Demand current, Demand active power, harmonic 5th conversion content, Harmonic nth content, Distortion factor, Voltage, Alarm OFF. Possible to setting one of them.
Reset form : Automatic reset or Manual reset (Setting)
Output contact : No-voltage normally open contact (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="3">Specification</td></tr>
<tr><td rowspan="3">Demand current,
Demand active power</td><td>Function</td><td colspan="3">Demand measurement value ≧ Upper limit setting value,
Alarm display, Alarm output.</td></tr>
<tr><td>Setting accuracy</td><td colspan="3">±1.0% (% for full scale)</td></tr>
<tr><td>Setting range</td><td colspan="3">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="3">Measurement value ≧ Upper limit setting value,
Alarm display, Alarm output. (Detects by the maximum phase)</td></tr>
<tr><td>Setting accuracy</td><td colspan="3">Current : ±2.5%, Voltage : ±1.0%, % to 100% of content rate.</td></tr>
<tr><td rowspan="2">Setting range</td><td>Current</td><td colspan="2">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 colspan="2">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="3">Average value mode
: Detect when the average measured value exceeds the set range above.
Inverse time delay mode
: Detects by 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="3">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="3">±1.0% (% for full scale)</td></tr>
<tr><td>Setting range</td><td colspan="3">Using a full scale as 150%. 30 to 150% (1% step)</td></tr>
<tr><td rowspan="2">CPU error output
(34)</td><td colspan="3">Detection item (Self-diagnostics item)</td><td>Contact composition</td><td>Contact capacity</td></tr>
<tr><td colspan="3">(1) Watchdog time
(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>Normally close contact
(b contact)</td><td>AC250V 5A, DC125V 0.2A
(Resistance load)
AC250V 1.5A, DC125V 0.1A
(Inductive load)</td></tr>
<tr><td rowspan="6">External operation input</td><td colspan="2">Number of circuits</td><td colspan="3">2 circuits, A function (four types) is changed by setting.</td></tr>
<tr><td colspan="2">Function</td><td colspan="3">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="3">Alarm output is reset (output OFF).</td></tr>
<tr><td>Maximum / Minimum value reset</td><td colspan="3">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="3">The measurement display element of the main monitoring is changed.</td></tr>
<tr><td>Phase change</td><td colspan="3">The 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="3">300ms, Continuation applying is possible.</td></tr>
<tr><td colspan="2">Rated input</td><td colspan="3">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(34) 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.
When using a relay or switch for power supply, use one with a minimum applicable load of about 1mA.



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 to 65.0Hz).	Cannot be used.
	Cycle control, SCR phase angle control, PWM, or other inverter output is measured.	Cannot be used.
	The frequency range setting is incorrect when there is no input to voltage input terminals 8-9 and current input terminals 12-13 (less than 20% of voltage full scale, less than 10% of current full scale).	Change the frequency range (No. 218) according to the input frequency Please refer to page 54 for setting method.
Analog output is not outputted	Analog output is set to OFF or measurement factor is set to OFF.	Please check setting
Pulse output is not outputted	Pulse output is set to OFF or measurement element is set to OFF.	Please check setting
Alarm output does not return	The return method is a "manual reset".	Please check 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	840 k	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	2800 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	2800 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 (167.3)	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	240.0 k (200.7)	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 (250.9)	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 (267.6)	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 (334.5)	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)	5.40 M	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)	10.80 M	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	7.20 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)	54.0 M	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	9.00 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)	12.00 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)	1280 k	1200 k (1105)	640 k	320.0 k	
	1800A	1600 k (1505)	1440 k	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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An example) 4800kW → 4.80MW
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