

INSTRUCTION MANUAL

POWER LINE MULTI-METER

SFLC-110L

[1 ϕ 2W / 1 ϕ 3W / 3 ϕ 3W
COMMUNICATION OUTPUT (Modbus RTU mode)]

HARDWARE MODEL E

Thank you for your purchase of our product.

Read this instruction manual carefully before installation, wiring, and using this product.

Safety concerns

■ Environment and conditions of usage

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 °C, humidity 85% RH or more.
- Place free of dust, corrosive gas, salt and oily smoke. (Corrosive gas : SO₂ / H₂S, etc.)
- Location that is not affected by vibration and shock.
- Location that is not affected by external noise.
- Altitude 2000m 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.

■ The precautions at the case of using by outdoor panel.

- These products are not a dustproof construction, waterproof construction, and splash proof construction. Please avoid the place with much dust. Moreover, please install in the place which requires neither rain nor waterdrop.
- Please do not install in the place where sunlight hits directly. Discoloration and degradation of a name plate, and cover is deformed by the surface temperature rise.

■ Installation and wiring

Installation and wiring, refer to the instruction manual, please be conducted by engineers.

And, please observe the following notes.

 CAUTION	● Please wire after the connection diagram is checked. ● Please forbid a hot line work. ● Please use the size of the electric wire that is suitable for conducting current. ● Please securely tighten the terminal screws. Please make sure that forgotten tightening of the terminal screw is not.
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■ Preparation before use

At the case of connect this product to the main power supply directly, please put the suitable fuse to the outside. This product must be set before use. Reading this instruction manual, please set correctly.

■ 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 is not trouble. It will disappear, if a control power supply is applied and about 2 hour passes.

■ Maintenance

- Inspection of energized is dangerous.
- There is no parts to be replaced on a regular inspection.
- Please wipe off lightly with the dry soft cloth. When it wipes with the damp cloth or the dry cloth strongly, a surface is damaged. And, the character of a name plate may disappear. Please do not use the organic solvent, chemicals, cleaners, etc., such as an alcohol, for cleaning. The liquid crystal display (LCD) may light during cleaning on the LCD face. However, this phenomenon is caused by the static electricity that may be produced in the filter, and it does not show any trouble. Leave the unit as it is for a while, and the display goes out due to natural discharge. Do not press the LCD face strongly, otherwise it may be broken. When the filter has been pressed, it may touch the LCD face to stain the LCD face. However, this phenomenon does not show any trouble, but it is caused by a change of the ambient environment or the like. The LCD face may be restored to its original condition after a while during the use as it is.

■ Storage

Please be storage in a place that meets the following conditions.

- Within the range of ambient temperature -20 to +70 °C.
- The average temperature (day) 40 °C or less.
- Place free of dust, corrosive gas, salt and oily smoke.
- Location that is not affected by vibration and shock.
- The aluminum electrolytic capacitor is used for a product. Please do the energization of the power supply within one year after shipment.

■ Countermeasures against troubles

If the product has failed, we can repair pick up the product.

■ Proper disposal

Please dispose of this product as industrial waste (noncombustible).

Mercury parts and a nickel-cadmium battery are not used for this product.

■ Warranty period

The warranty period of this product is for one year after supplying the appointed place.

■ 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 with a measurement factor in this product. A blackout is guaranteed and this value isn't also 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 make the past minimum value hold by powering on, please apply input within 1 second after switching on a power supply.
- The maximum value, a minimum value measurement factor

Measurement factor	Maximum value measurement	Minimum value measurement
Voltage, Current , Demand current , Active power , Demand power , Reactive power , Power factor , Frequency	○	○

 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. Please forbid a hot line work.
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■ 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. Set them according to the working conditions. The input circuit of this product is the common use of 3-phase 3-wire (3 ϕ 3W), single-phase 2-wire (1 ϕ 2W), and single-phase 3-wire (1 ϕ 3W). In case an input circuit is designated at the case of an order, it is shipped by the default value of the designated input circuit. And, in case it does not do designation of the input circuit (with no designation), it is shipped by the default value of 3-phase 3-wire (110V).

The unit will be delivered with your specified setting values, if so specified.

No.	Setting item		3-phase 3-wire		Single-phase 3-wire	Single-phase	
			110V input	220V input	(R-W-B)	110V input	220V input
1	Display combination	Pattern	Pattern 1		Pattern 1	Pattern 1	
		Main monitor	A(Y)		A(R)	A	
		Sub monitor (Left)	V(RY)		V(RW)	V	
		Sub monitor (Center)	W		W	W	
		Sub monitor (Right)	Wh		Wh	Wh	
		Bar graph	A(Y)		A(R)	A	
2	Alarm output (¹)	Factor	DA		DA	DA	
		Reset form	AUTO		AUTO	AUTO	
		Contact delay time	0 second		0 second	0 second	
3	Demand detection	Demand current	Upper limit <H>		80.0A	400.0A	
			Interval		0 second	0 second	
		Demand power	Upper limit <H>		OFF	OFF	
			Interval		0 second	0 second	
			Operation form		Operating system according with bimetallic type.	Operating system according with bimetallic type.	
4	Instant measurement detection	Voltage upper limit	OFF		OFF	OFF	
		Voltage lower limit	OFF		OFF	OFF	
5	Backlight	Action	AUTO		AUTO	AUTO	
		Brightness	3 (Middle)		3 (Middle)	3 (Middle)	
6	Measurement range	Voltage range	6600V	220.0V	110.0V	3300V	220.0V
		Digit number of voltage range	4 digits	4 digits	4 digits	4 digits	4 digits
		Current range	100.0A		500.0A	50.00A	
		Current display intrinsic sensitivity	100.0A		500.0A	50.00A	
		Digit number of current range	4 digits		4 digits	4 digits	
		Active power polarity	One-way deflection		One-way deflection	One-way deflection	
		Active power range	1200kW (/1kW)	40.00kW (/2kW)	100.0kW (/1kW)	150.0kW (/500W)	10.00kW (/1kW)
		Digit number of active power range	4 digits	4 digits	4 digits	4 digits	4 digits
		Reactive power range	600.0kvar (/500var)	20.00kvar (/1kvar)	50.00kvar (/500var)	75.00kvar (/250var)	5000var (/500var)
		Digit number of reactive power range	4 digits	4 digits	4 digits	4 digits	4 digits
		Power-factor range	LEAD 0.500 - 1.000 - LAG 0.500		LEAD 0.500 - 1.000 - LAG 0.500	LEAD 0.500 - 1.000 - LAG 0.500	
		Frequency range	45.0 - 65.0Hz		45.0 - 65.0Hz	45.0 - 65.0Hz	
		Digit number of frequency range	3 digits		3 digits	3 digits	
7	Communication output (¹)	Address	1		1	1	
		Transmission rate	9600bps		9600bps	9600bps	
		Parity	Even number		Even number	Even number	
		Stop bit	1 bit		1 bit	1 bit	
8	Pulse output (¹)	Factor	Wh		Wh	Wh	
		Pulse unit	10kWh/pulse	0.1kWh/pulse	1kWh/pulse	1kWh/pulse	0.1kWh/pulse
9	External operation input (¹)		Alarm reset		Alarm reset	Alarm reset	

No.	Setting item		3-phase 3-wire		Single-phase 3-wire	Single-phase	
			110V input	220V input	(R-B-W)	110V input	220V input
10	Measurement display ON/OFF	Voltage	ON		ON	ON	
		Current	ON		ON	ON	
		Demand current	ON		ON	ON	
		Active power	ON		ON	ON	
		Demand power	ON		ON	ON	
		Reactive power	ON		ON	ON	
		Power-factor	ON		ON	ON	
		Frequency	ON		ON	ON	
		Watt-hour of power receiving	ON		ON	ON	
		Watt-hour of power transmission	ON		ON	ON	
		var-hour of power receiving	ON		ON	ON	
		var-hour of power transmission	ON		ON	ON	
11	Input circuit	Phase line change ⁽²⁾	3 ϕ 3W		1 ϕ 3W (R-W-B)	1 ϕ 2W	
		Input voltage ⁽³⁾	110V	220V	150V	110V	220V
12	Measurement	Tidal current measurement	General measurement		General measurement	General measurement	

Note⁽¹⁾ A setting item is not displayed in case there is no corresponding option.

Note⁽²⁾ When the input circuit phase line switching setting is changed, the setting values of setting 1 and setting 2 (No. 1 to 10 in the table) return to the default setting values of the switched phase line. However, the value of setting 3 (No. 11 and 12 in the table) does not return to the initial setting.

Note⁽³⁾ When phase line change setting of an input circuit is set as 3 ϕ 3W (or 1 ϕ 2W) and the input voltage setting is changed, the voltage range returns to the default value of the phase line.
(For example : In case of 3 ϕ 3W, 6600V at the case of 110V setting, 220.0V at the case of 220V setting.)

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1. Product outline

1.1 Usage of product

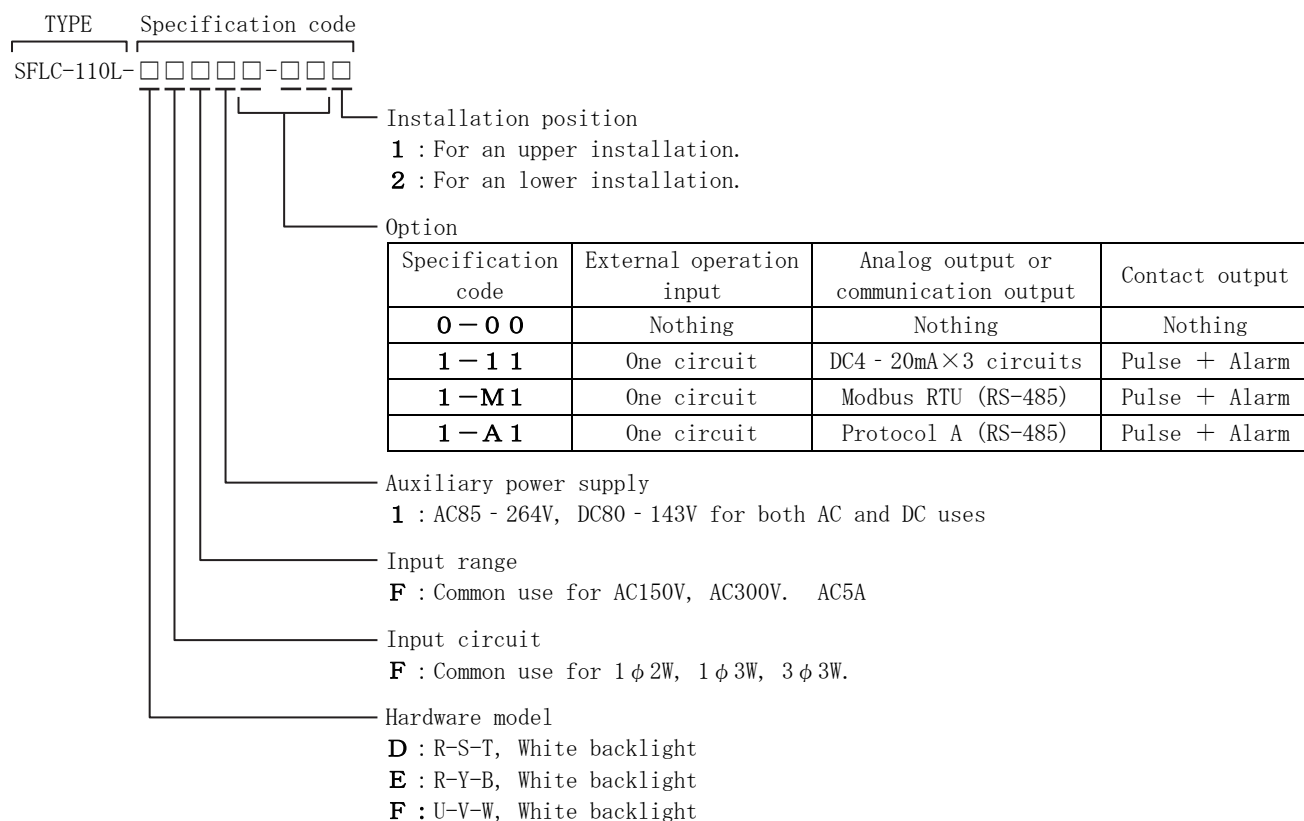
This single unit can measure and monitor voltage $\times 3$, current $\times 3$, demand-current $\times 3$, active-power, demand active power, reactive-power, power-factor, frequency, watt-hour, var-hour.

The measurement monitor of an initial power receiving circuit, an energy conservation power monitor, a demand current measurement monitor, etc. are adapted for various usages from a low tension circuit to a high tension circuit. The intensive monitor doubled with the system by option (analog output, alarm output, pulse output, external operation input) addendum is possible.

1.2 Features of product

- High-performance products which collected the function of the power line multi-meter (QLC-110L, DLC-110L) of our company.
- This product is 3-phase 3-wire, single-phase 2-wire, single-phase 3-wire common type.
Product inventory can be standardized.
- Bar graph 1 measurement and digital 4 measurement are displayed simultaneously.
- Modbus (RTU mode) output and a pulse output and a contact-output can be taken out. (Option)
And, about an output factor, it can select by setting.
- External operation inputs are possible of reset. (Option) Choice of an alarm output, the maximum/minimum value, and an alarm output, and the maximum/minimum value is possible at setting.
- Power supply is AC85 - 264V, DC80 - 143V (for both AC and DC uses).
- The mounting method of this unit is compatible with the mounting method of conventional 110 square mechanical meter. This unit is mounted at 2 diagonal points.
- Integrated value of Wh and varh can indicate expansion to 3rd digit below the decimal point.
- A tidal current measurement (output 2 quadrant) change is possible for var and $\cos\phi$.
- With backlight (white LED backlight) function.
In addition, the selection of the on / off / auto off and, you can set the brightness.
- 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.)

1.3 Composition of type



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)

SET

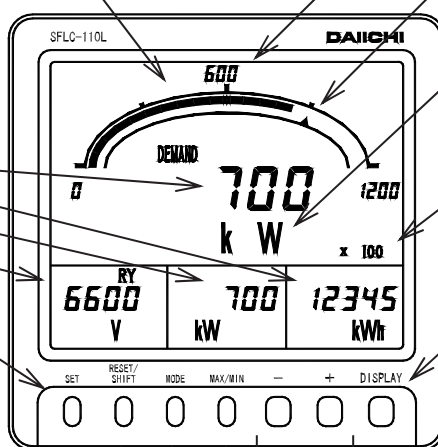


The switch from which integrated value of the amount of electric power is switched to normal display (5 digits of integer) and expansion indication (integer 2 digits + below decimal point, 3 digits) variously.
If it is not operated for 10 minutes after a display change, it will usually return to a display. 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.

RESET/
SHIFT



If this switch is pushed 1 second or more continuously, it will reset an alarm, the maximum value, and the minimum value (factor which it is displaying on the main monitor).
In setting mode, it uses it as a switch to which it moves a setting item (move up).



Scale markings

It sets automatically by measurement-range setting.

Upper limit (or lower limit) setting index

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

Unit display

It sets automatically by measurement-range setting.

Multiplying factor display

It displays on the lower right of the main monitor at the time of watt-hour and var-hour display.

DISPLAY



It is the switch that changes a 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.

MAX/MIN



The switch to which general measurement display (usually) and the maximum minimum measurement display are changed.
In setting mode, it uses it as a switch to which it moves a setting item (move down).

MODE



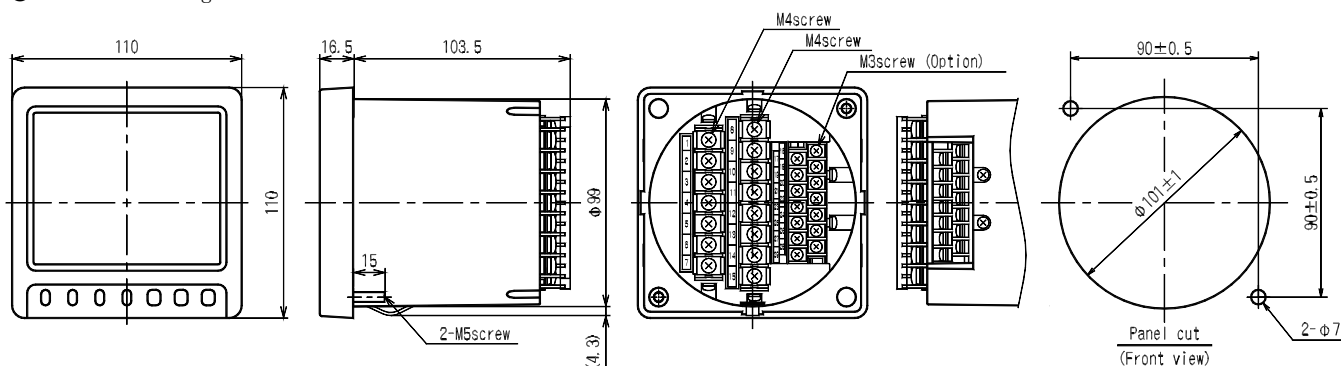
In setting mode, it is used as a switch that changes a setting item.

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.

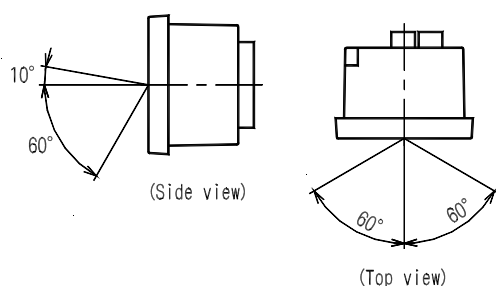
● Dimension diagram



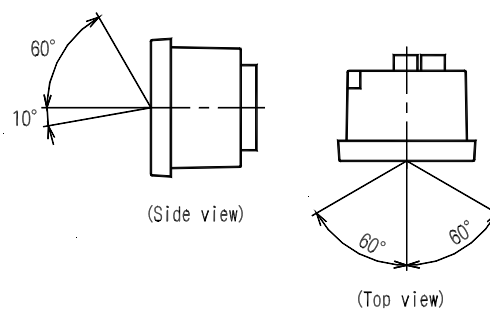
● Caution on handling

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

(1) For upper case installation

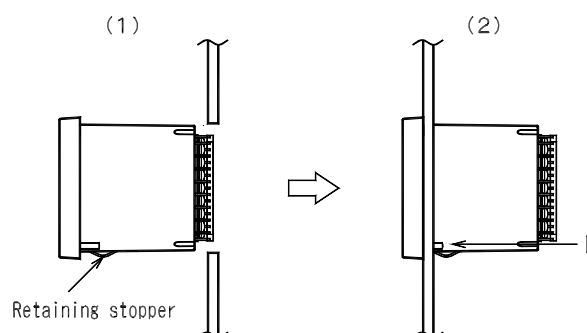


(2) For lower case installation



● 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.

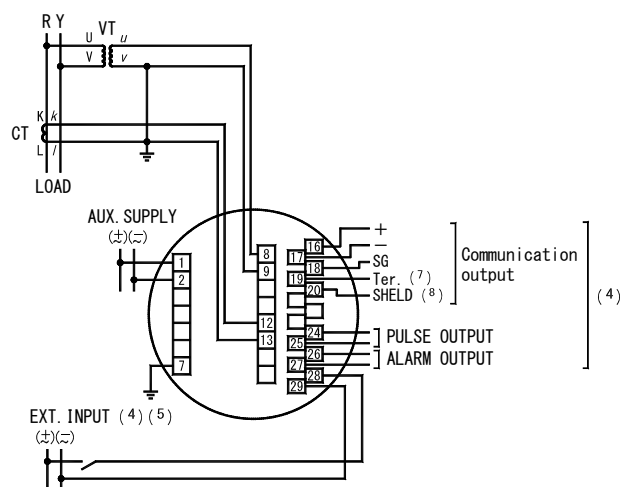


3.2 Connections

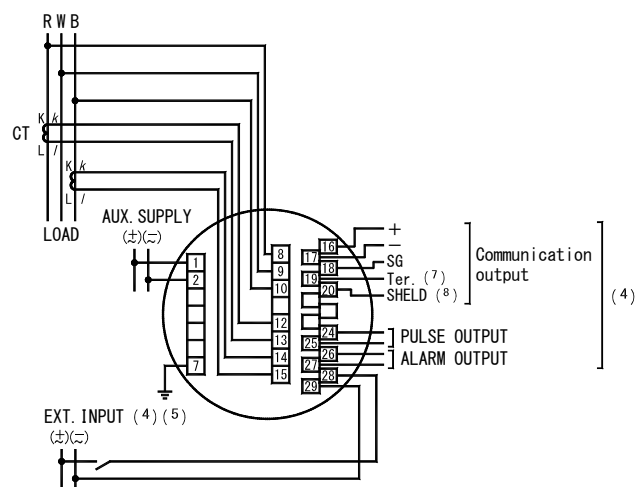
Please perform connection after referring to the following wiring diagram.

● Connection drawing (6)

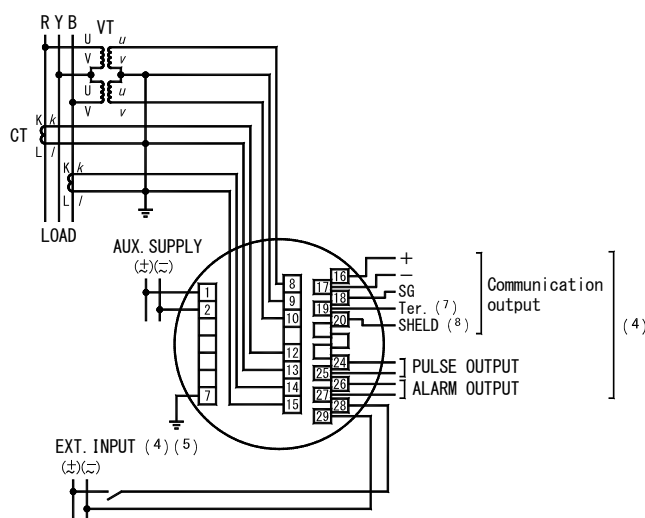
(1) 1 ϕ 2W, Communication output.



(2) 1 ϕ 3W, Communication output.



(3) 3 ϕ 3W, Communication output



Note⁽⁴⁾ Communication output, pulse output, alarm output, external operation input is an option.

Note⁽⁵⁾ By setting, it can switch an external operation input.

Alarm reset. Maximum, minimum value reset.
Alarm and maximum, minimum value all reset.

Note⁽⁶⁾ In case of low-voltage circuit, secondary side earthing of VT and CT is unnecessary.
And, VT is unnecessary in case it used 110V or direct 220V.

Note⁽⁷⁾ A terminating resistor is connected to inside in short-circuiting No. 17 (-) and No. 19 (Ter.). (Please use only the product used as a termination on a topology.)

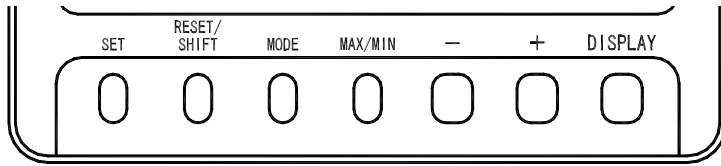
Note⁽⁸⁾ It is the terminal for relay (for transition wiring) of the shielded line of a telecommunication cable.

● 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 100 Ω .
- (4) Keep a distance of more than 30cm between this unit and the circuit breaker as well as between this unit and the relay contact signal line.
- (5) Please use a transmission line into a twisted-pair cable with a shield. And, please use as the same thing including the inside of a board. And, in case there are many induction noises, please earth in the most effective place (one point).
- (6) It is recommended to mount a surge killer outside when connecting an inductive load to the pulse output and alarm output. If no surge killer is mounted, the contact life may shorten.

4. Operation

● The function of switch



Switch	Function
SET	The integrated value of electric energy is changed to the usual display and an enlarged display. If it continues pushing 3 seconds or more, it will change to setting mode. In setting mode, it is used for the determination of a set point.
RESET/SHIFT	Various kinds of alarms are reset. The maximum value and the minimum value are reset in the maximum minimum measurement display. In setting mode, it uses it as a switch to which it moves (move up) a setting item.
MODE	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. In setting mode, it uses it as a switch to which it moves (move down) a setting item.
+ , -	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) If a measurement change is performed and the original main monitor display is not clear anymore. It continues pushing a **+** or **-** more than 3 seconds, or returns to the original measurement display factor by no operation for 10 minutes.
- (3) Even if it stops operation with setting mode, it returns to the display mode in 10 minutes.

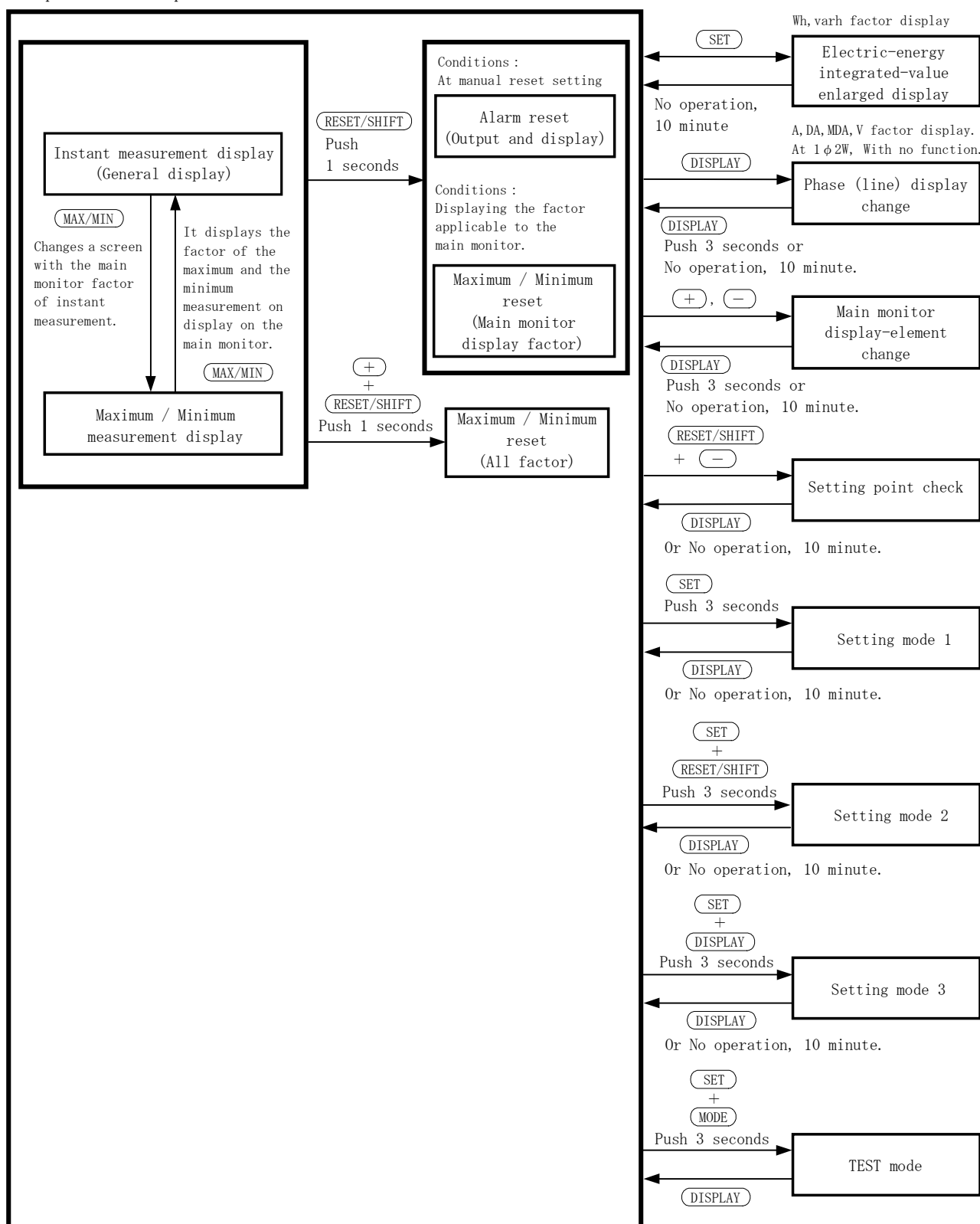
● 7 segment displays

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-dis play	Non-dis play	L	M
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-dis play	y	z
0	1	2	3	4	5	6	7	8	9			
0	1	2	3	4	5	6	7	8	9			

4.1 The screen change and function by switch operation.

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



4.2 The kind of display

4.2.1 Measurement display

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.

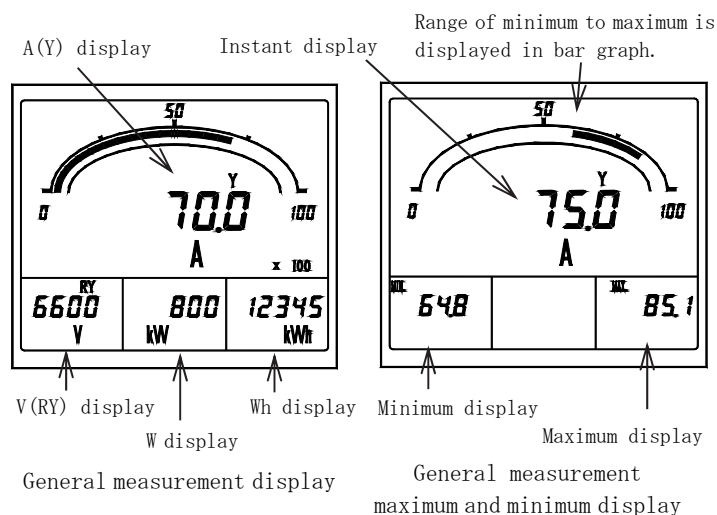
Measurement factors, such as current, voltage, and active power, are displayed.

The measurement value of four factors is displayed.

Setting which always displays a measurement factor is possible. And, it is possible to change to a display of the maximum value and the minimum value, about the measurement factor which performs holding of the maximum value and the minimum value by switch operation.

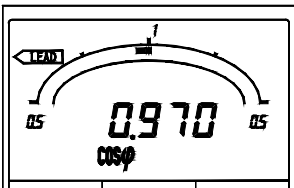
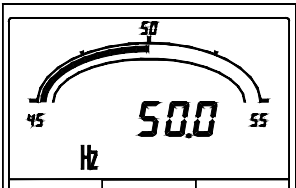
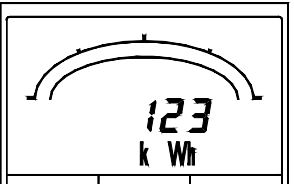
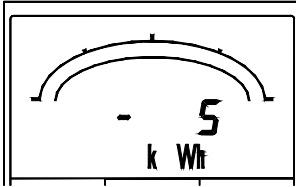
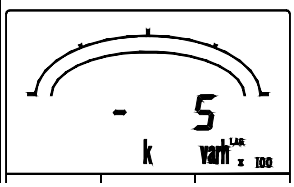
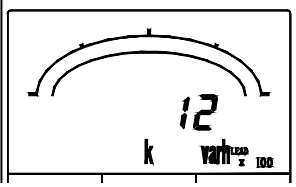
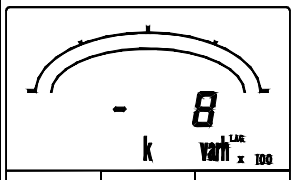
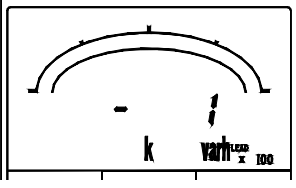
These maximum values and the minimum value are reset by switch operation (it updates to the instantaneous value at the time).

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.



• The example of a measurement display of each measurement factor (Main monitor)

Measurement factor	Example of display	Note	Measurement factor	Example of display	Note
Voltage V			Current A		
Demand current DA		"DEMAND" display	Maximum demand current MDA		"MAX DEMAND" display
Active power W			Demand power DW		"DEMAND" display
Maximum demand power MDW		"MAX DEMAND" display	Reactive power var		LAG or LEAD display

Measurement factor	Example of display	Note	Measurement factor	Example of display	Note
Power factor $\cos \phi$		LAG or LEAD display	Frequency Hz		
Watt-hour (Power receiving) Wh			Watt-hour (Power transmission) -Wh		“— (minus)” display
var-hour (Power receiving, LAG) varh (LAG)		“LAG” display	var-hour (Power receiving, LEAD) varh (LEAD)		“LEAD” display
var-hour (Power transmission, LAG) -varh (LAG)		“LAG” and “— (minus)” display	var-hour (Power transmission, LEAD) -varh (LEAD)		“LEAD” and “— (minus)” display

4.2.2 Alarm detection display

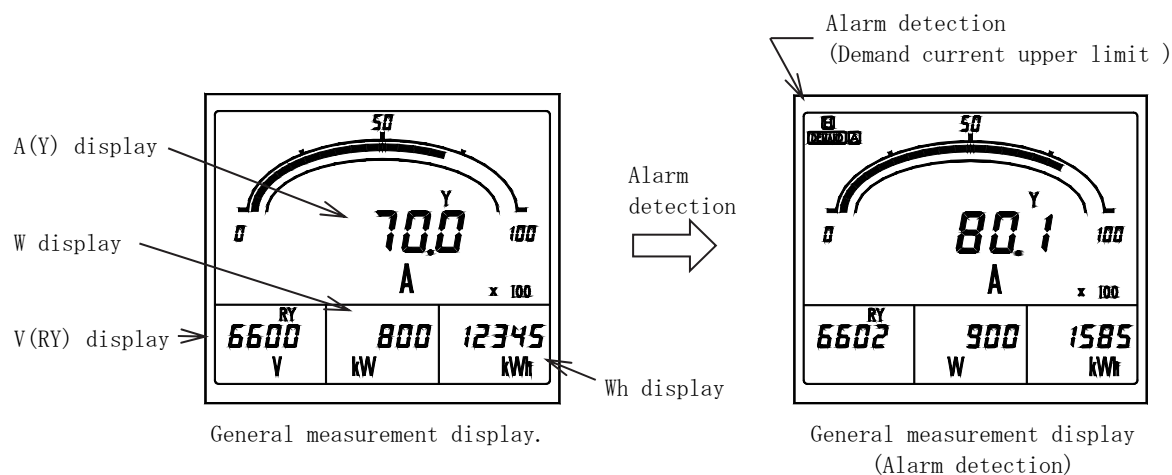
The alarm value setting is a possible measurement factor (demand current and demand power, etc.), it displays in case an input exceeds a set point.

Besides the usual measurement display, the detected factor is displayed on a screen upper case.

In addition, in case setting OFF (not use) as measurement factor, 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 factor) Demand current, Demand power, Voltage



- The example of a display at the case of the detection in each alarm factor.

In case the alarm factor 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.

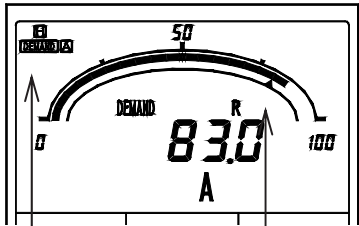
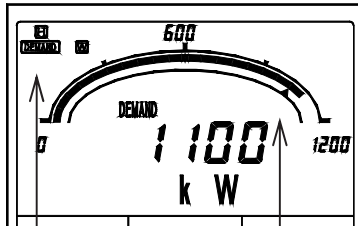
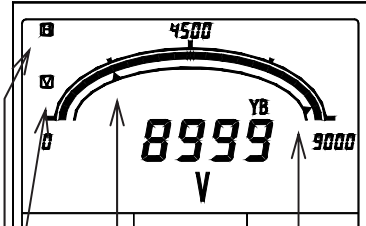
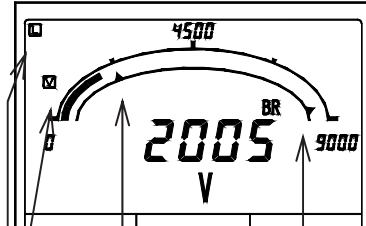
In case a return method is automatic reset setting.

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 factor).

The return in this case needs alarm reset operation. Please refer to "4.3.7 Reset" about alarm reset.

Alarm factor		Example of a display	Alarm factor		Example of a display
Demand current	Upper limit (H)	 A semi-circular gauge with a needle pointing to 83.0. The gauge has markings at 0, 50, and 100. Above the needle is the word "DEMAND". Below the needle is "A". To the right of the needle is "R".	Demand power	Upper limit (H)	 A semi-circular gauge with a needle pointing to 1100. The gauge has markings at 0, 600, and 1200. Above the needle is the word "DEMAND". Below the needle is "k W". To the right of the needle is "R".
		Alarm setting value Detection display (At alarm factor setting)			Alarm setting value Detection display (At alarm factor setting)
Voltage	Upper limit (H)	 A semi-circular gauge with a needle pointing to 8999. The gauge has markings at 0, 4500, and 9000. Above the needle is the word "DEMAND". Below the needle is "V". To the right of the needle is "YB".	Voltage	Lower limit (L)	 A semi-circular gauge with a needle pointing to 2005. The gauge has markings at 0, 4500, and 9000. Above the needle is the word "DEMAND". Below the needle is "V". To the right of the needle is "BR".
		Low-alarm setting value High-alarm setting value Detection display (At alarm factor setting)			Low-alarm setting value High-alarm setting value Detection display (At alarm factor setting)

4.2.3 Setting display

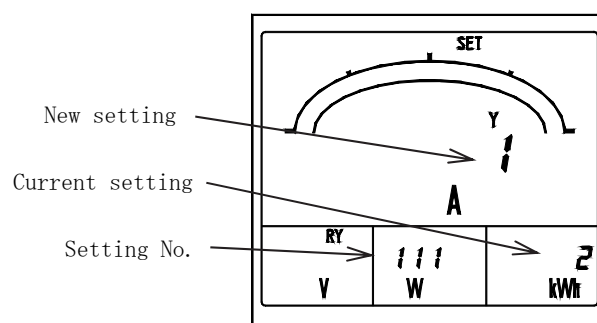
It is the display at the case of various setting. There are three types of setting modes according to the contents of a setting.

Operation and the contents of setting (detail) in setting mode, please refer to "5 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.

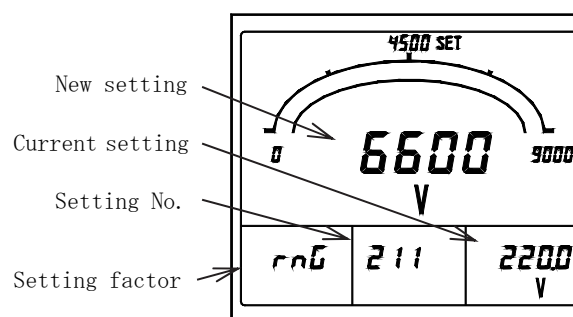


Setting mode 1
(No.111 Display pattern)

② Setting mode 2

Setting of measurement range, communication output, pulse output, and measurement display ON/OFF is mainly performed.

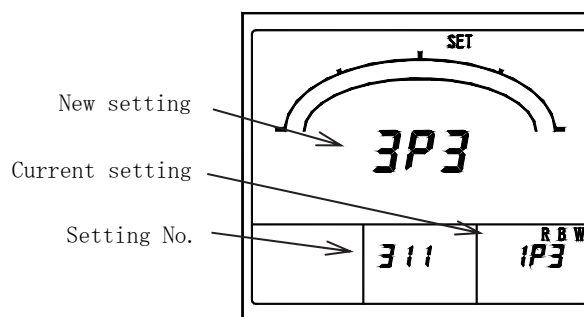
And, initialization of a setting value and reset of watt-hour integrated value can be performed in this setting mode.



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 phase line change)

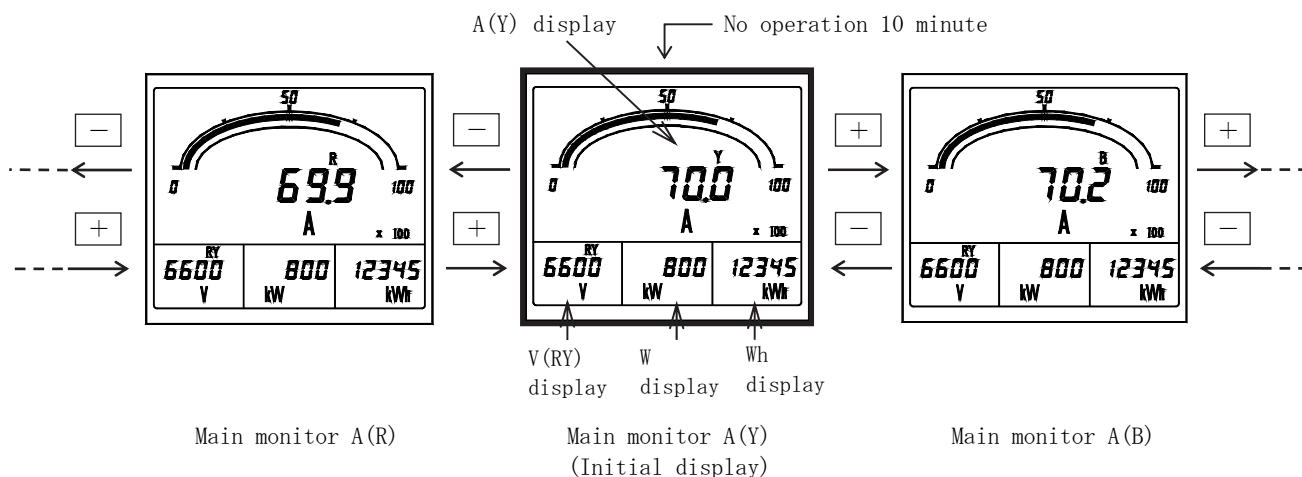
4.3 Operation

4.3.1 The main monitor display-element change

The measurement display element of the main monitor is changed. A change is performed by $\boxed{+}$ $\boxed{-}$.
A measurement display and maximum display, minimum display can also perform this operation.

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 maximum display and minimum display, even if a switch is not operated for 10 minutes, it does not return to the original display.



4.3.2 Phase (line) display change (Three-phase three-wire, Single-phase three-wire)

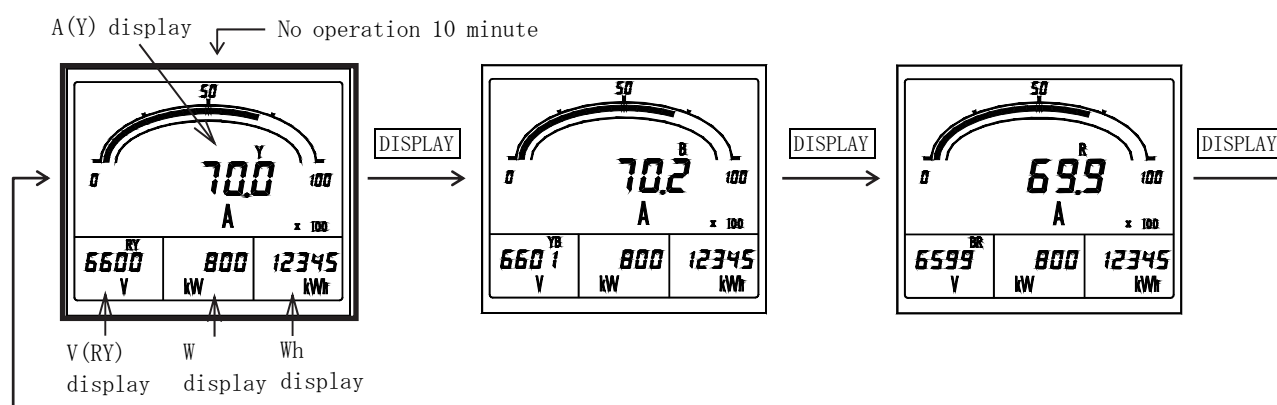
A phase (line) display of current or voltage is changed. (Everything which is being indicated.)

A change is performed by $\boxed{\text{DISPLAY}}$.

A measurement display and maximum display, minimum display can also perform this operation.

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.

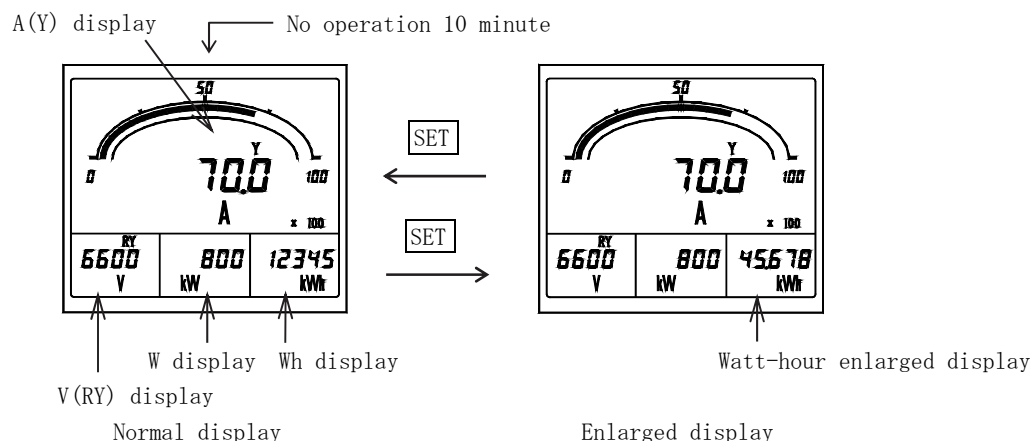
In a maximum display and minimum display, even if a switch is not operated for 10 minutes, it does not return to the original display.



4.3.3 Enlarged display of integral power consumption.

In case electric energy is being displayed by the general measurement display, an electric-energy display is changed to a normal 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.

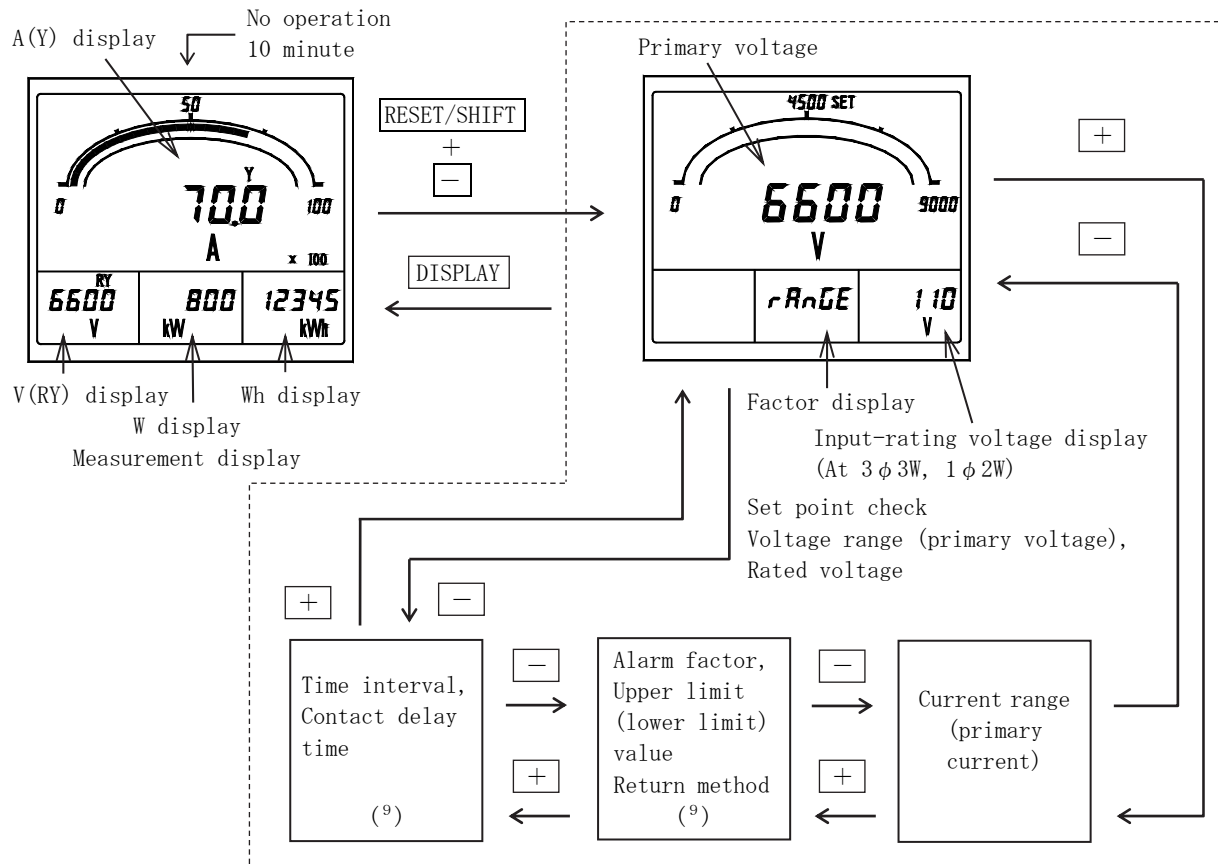
<Caution> If it continues pushing **SET** 3 seconds or more, it will become the setting mode 1.



4.3.4 Setting value check

A voltage range (primary voltage), a current range (primary current), 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 **-**. **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.



Note⁽⁹⁾ It is not displayed if there is no option.

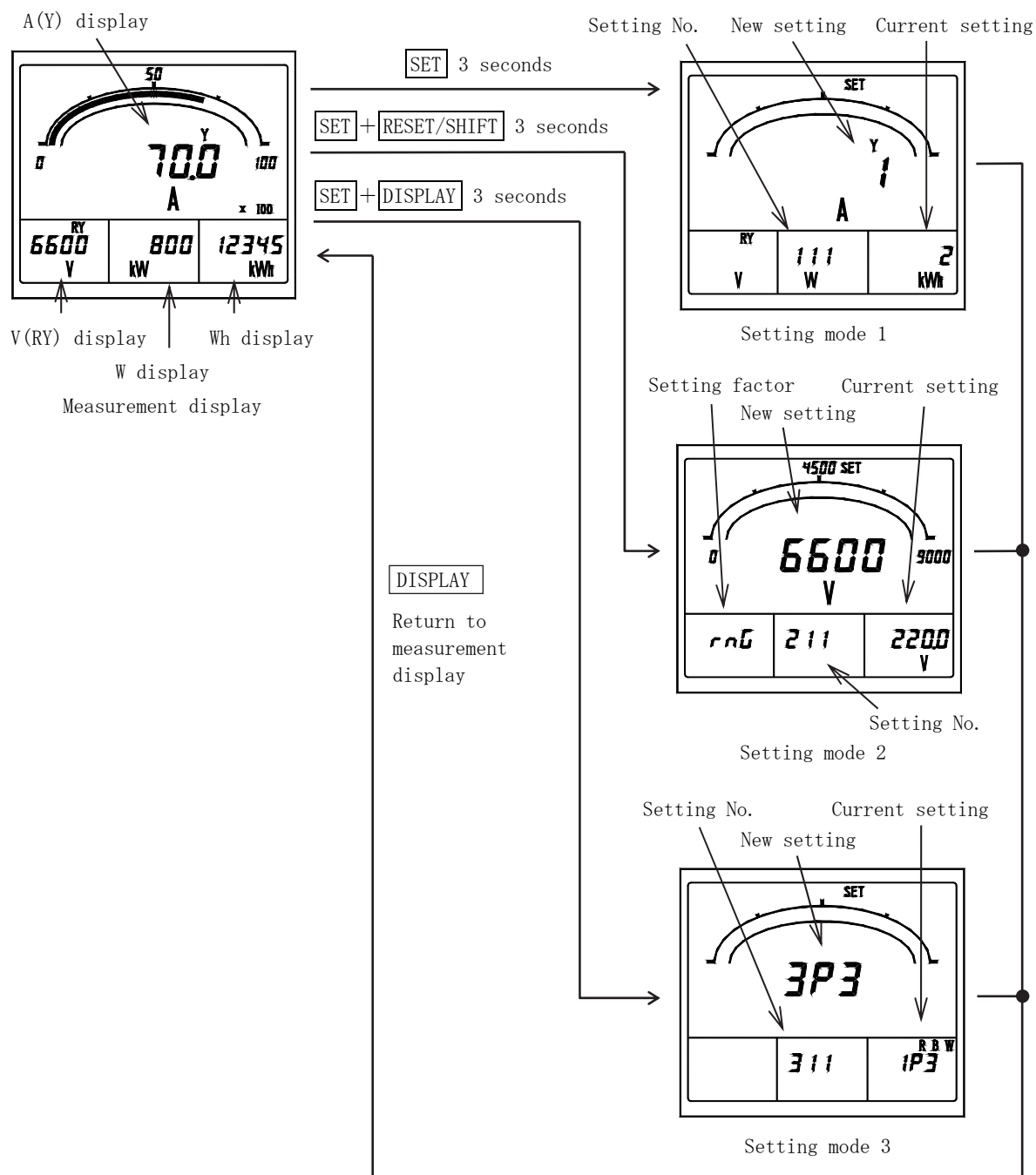
4.3.5 Setting mode

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> A measurement display and maximum display, minimum display can also perform this operation.



4.3.6 Reset

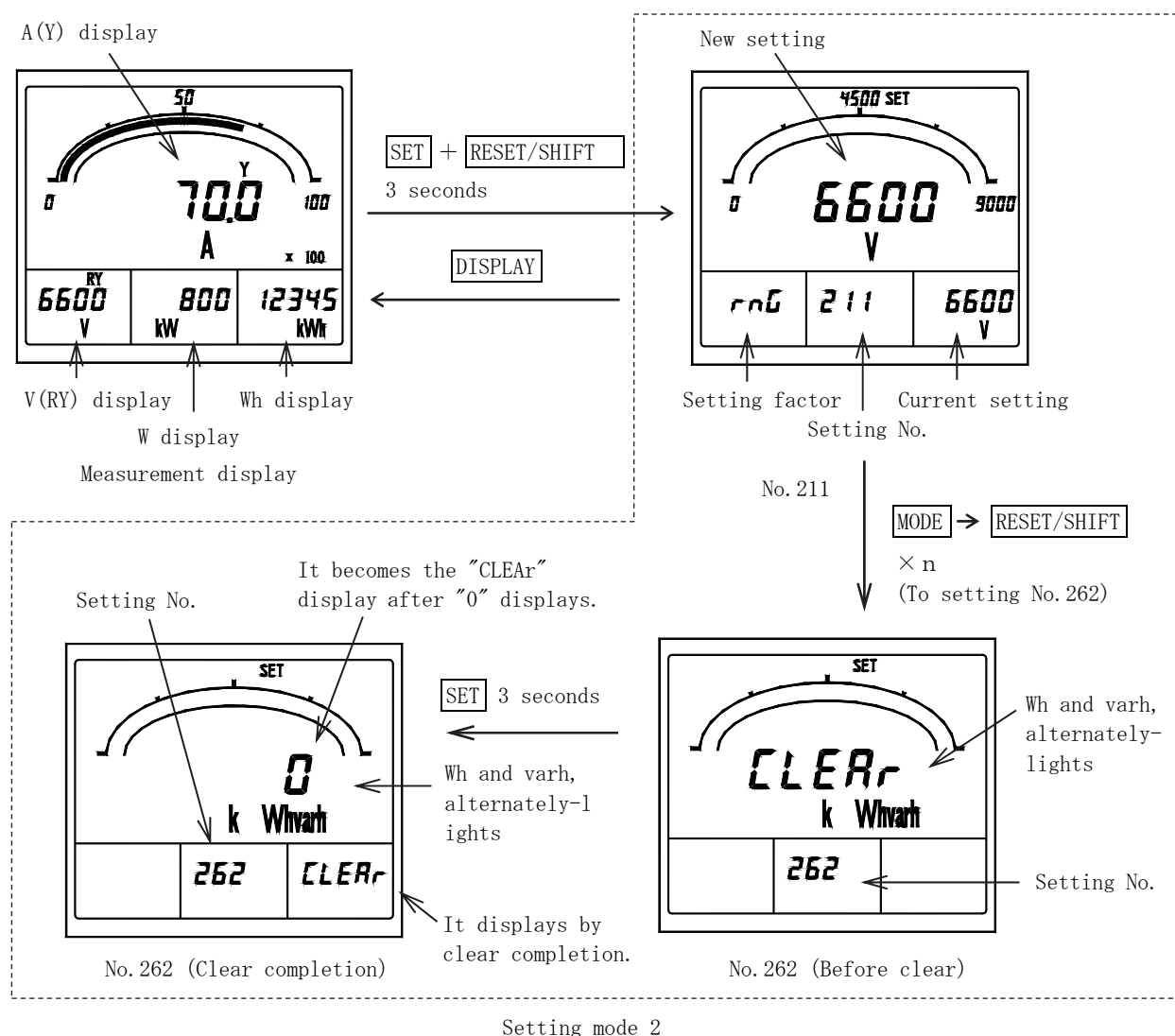
Various kinds of reset are performed. The kind of reset is as follows and operations are different, respectively. Reset of integral power consumption (zero clear), Reset of maximum value and minimum value (it updates to the instantaneous value at the time), Alarm-output reset (OFF of an alarm output (at the case of manual reset setting)).

And, the operation from each measurement display constitutes conditions at each reset.

(1) Integral power consumption reset

It resets by package about the integrated value of various watt-hour. 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. It goes into the setting mode 2.
- ② **MODE** is pushed until setting is set to No.261. Further **RESET/SHIFT** is pushed once and it is made a watt-hour-reset display by No.262.
- ③ Press **SET** for longer than 3 seconds.
- ④ **DISPLAY** is pushed and it returns to a measurement display.



(2) 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 if an alarm return method is set as "AUTO (automatic return)". (An output is also OFF to an alarm return.)

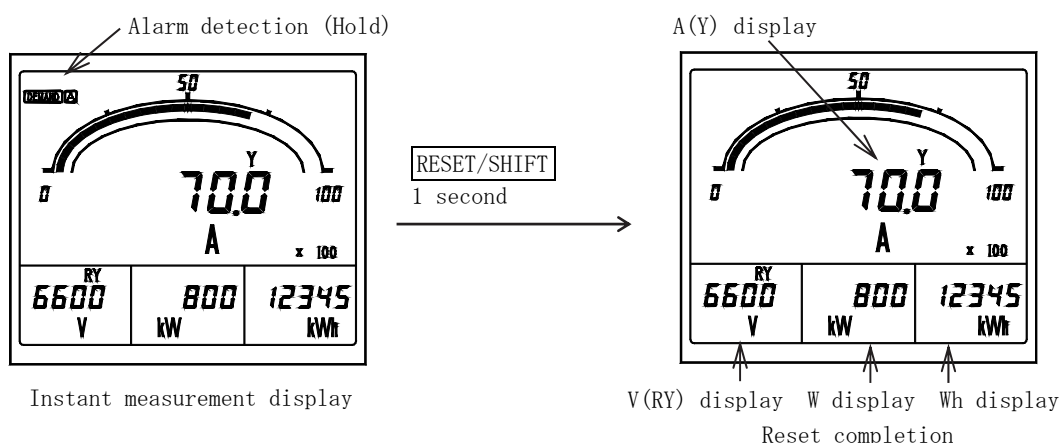
In addition, setting can perform same operation in external operation input.

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 It continues pushing **RESET/SHIFT** 1 second or more by a measurement display, the maximum measurement display, and the minimum measurement display.

<Caution> If a **RESET/SHIFT** switch performs alarm reset, the maximum value of the measurement factor currently displayed on the main monitor and the minimum value are also reset.



(3) Maximum value and minimum value reset.

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 factor individual.

How to reset all maximum values and minimum values by package.)

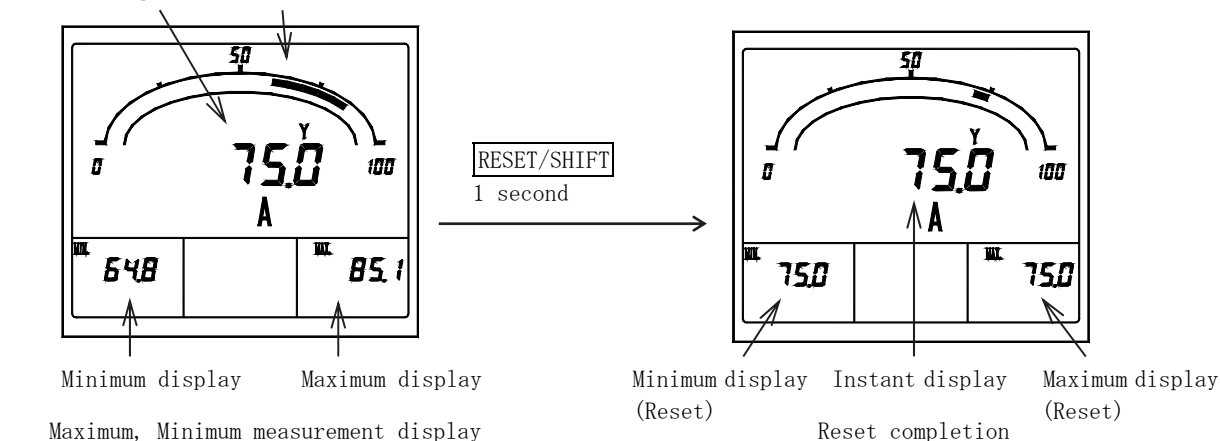
a) Individual reset

It resets the differential maximum value and minimum value. Other maximum values and minimum values are not reset by this operation.

- ① It displays a measurement factor to reset on the main monitor. (By measurement display and the maximum and the minimum measurement display.)
 ② Press **RESET/SHIFT** for longer than 1 seconds.

<Caution> Please be sure to perform this operation after displaying the maximum value and a minimum value measurement factor to reset. And, if the maximum value and minimum value reset are performed, the alarm output of detection will also be reset.

It displays in bar graph, the range of minimum to maximum.



- b) All reset of maximum value and minimum value.

It resets all the maximum values and minimum values.

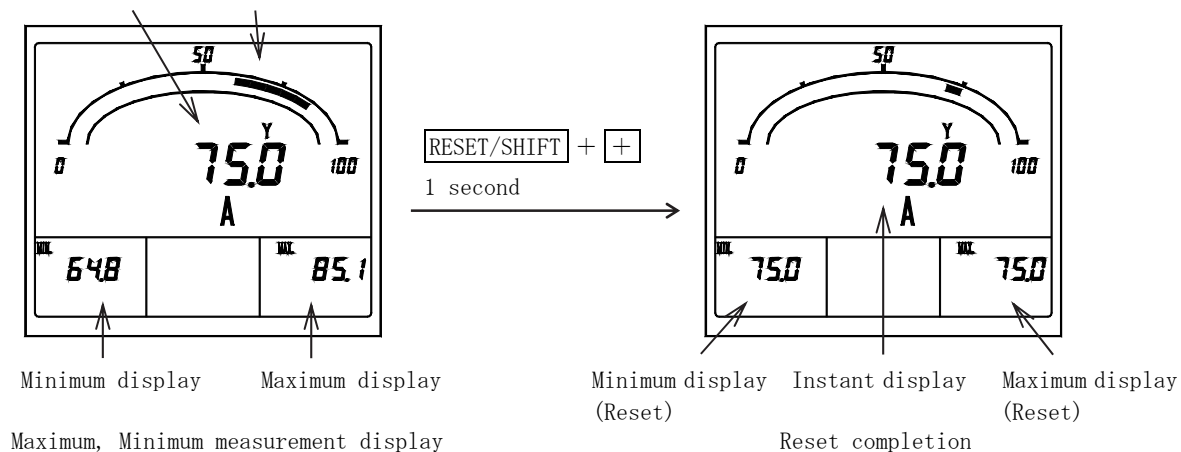
In addition, setting can perform same operation in external operation input.

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 measurement display and the maximum and minimum measurement display, it continues pushing **RESET/SHIFT** and **+** 1 second or more simultaneously.

It displays in bar graph, the
Instant display range of minimum to maximum.



- (4) Alarm reset, and all reset of maximum value and minimum value.

It resets an alarm in an external operation input. And, it resets all the maximum values and minimum values.

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.

5. Setting

< Caution >

When changing the input circuit setting, please be sure to perform a setup from an input circuit setting in the setting mode 3. After changing the other setting, when the input circuit setting is changed the set value returns to default value (default value of a changed input circuit).

5.1 Function table

This product has each function setting with a front switch.

<Caution> In case the input circuit is not designated at the case of an order, it is shipping in the default value of 3-phase 3-wire 110V input.

Setting mode 1. Function table

Setting No.	Function	Functional description	Default setting	Important setting	Page
111	Display pattern	Sets the display combination pattern of the digital 4 displays and bar graph display.	Pattern 1	○	33-37
112	Main monitor	Sets the display factor of digital main monitor.	3 ϕ 3W A (Y)	○	33-37
			1 ϕ 3W A (R)		
			1 ϕ 2W A		
113	sub monitor (left)	Sets the display factor of digital sub monitor (left).	3 ϕ 3W V (RY)	○	33-37
			1 ϕ 3W V (RW)		
			1 ϕ 2W V		
114	sub monitor (center)	Sets the display factor of digital sub monitor (center).	W	○	33-37
115	sub monitor (right)	Sets the display factor of digital sub monitor (right).	Wh	○	33-37
116	Bar graph	Sets the display factor of bar graph.	3 ϕ 3W A (Y)	○	33-37
			1 ϕ 3W A (R)		
			1 ϕ 2W A		
121AL ⁽¹⁰⁾	Alarm factor	Sets the output factor of alarm.	DA	○	37
122AL ⁽¹⁰⁾	Alarm return method	Sets the output action at the case of an alarm return.	Automatic reset		37
123AL ⁽¹⁰⁾	Alarm contact delay time	Sets the contact delay time of alarm.	0 second		37
131H	Demand current upper limit	Sets the high-alarm value of demand current.	80% (Full scale=100%)		38
132	Demand current time interval	Sets time interval of demand current.	0 second	○	38
133H	Demand power upper limit	Sets the high-alarm value of demand power.	OFF (No operation)		38
134	Demand power time interval	Sets the time interval of demand power.	0 second	○	38
135	Demand power operating method	Sets the operating method of demand active power.	Operating method according with bimetal type.	○	38
141H	Instant measurement voltage upper limit	Sets the high-alarm value of instant voltage.	OFF (No operation)		39
142L	Instant measurement voltage lower limit	Sets the low-alarm value of instant voltage.	OFF (No operation)		39
151	Backlight action	Sets the ON/OFF of backlight.	AUTO OFF		39
152	Backlight brightness	Sets the brightness of backlight.	3 (Middle)		39

Note⁽¹⁰⁾ A setting item is not displayed in case there is no corresponding option.

Setting mode 2. Function table (1)

Setting No.	Function	Functional description	Default setting		Important setting	Page
211	Voltage range	Sets the voltage-measurement range (primary voltage).	3 ϕ 3W	6600V ⁽¹²⁾	○	41-44
			1 ϕ 3W	110.0V		
			1 ϕ 2W	3300V ⁽¹²⁾		
212	Digit number of voltage range	Sets the digit number of voltage range.	3 ϕ 3W	4 digits		41-44
			1 ϕ 3W	4 digits		
			1 ϕ 2W	4 digits		
213	Current range	Sets the current-measurement range (primary current).	3 ϕ 3W	100.0A	○	41-44
			1 ϕ 3W	500.0A		
			1 ϕ 2W	50.00A		
214	Current display intrinsic sensitivity	Sets the full scale of current meter.	3 ϕ 3W	100.0A		41-44
			1 ϕ 3W	500.0A		
			1 ϕ 2W	50.0A		
215	Digit number of current range	Sets the digit number of current range.	3 ϕ 3W	4 digits		41-44
			1 ϕ 3W	4 digits		
			1 ϕ 2W	4 digits		
216	Active power polarity	Sets the deflection display of active power meter.	One-way deflection			41-44
217	Active power range	Sets the full scale of active power meter.	3 ϕ 3W	1200kW ⁽¹³⁾		41-44
			1 ϕ 3W	100.0kW		
			1 ϕ 2W	150.0kW ⁽¹⁴⁾		
218	Digit number of active power range	Sets the digit number of active power range.	3 ϕ 3W	4 digits		41-44
			1 ϕ 3W	4 digits		
			1 ϕ 2W	4 digits		
219	Reactive power range	Sets the full scale of reactive power meter.	3 ϕ 3W	600.0kvar ⁽¹³⁾		41-44
			1 ϕ 3W	50.00kvar		
			1 ϕ 2W	75.00kvar ⁽¹⁴⁾		
21A	Digit number of reactive power range	Sets the digit number of reactive power range.	3 ϕ 3W	4 digits		41-44
			1 ϕ 3W	4 digits		
			1 ϕ 2W	4 digits		
21B	Power-factor range	Sets the full scale of power-factor meter.	0.5 to 1 to 0.5			41-44
21C	Frequency range	Sets the full scale of frequency meter.	45.0 to 65.0Hz			41-44
21D	Digit number of frequency range	Sets the digit number of frequency range.	3 digits			41-44
221C ⁽¹¹⁾	Address	Set the address of device in communication output.	1		○	45
222C ⁽¹¹⁾	Transmission rate	Set the transmission rate of communication output.	9600bps		○	45
223C ⁽¹¹⁾	Parity	Set the parity bit added to communication data.	Even number		○	45
224C ⁽¹¹⁾	Stop bit	Set the stop bit added to communication data.	1 bit		○	45
231P ⁽¹¹⁾	Pulse output factor	Sets the factor of pulse output.	Wh		○	46
232P ⁽¹¹⁾ ⁽¹⁵⁾	Pulse unit	Sets the pulse unit of pulse output.	3 ϕ 3W	10kWh/pulse		46
			1 ϕ 3W	1kWh/pulse		
			1 ϕ 2W			

Note⁽¹¹⁾ A setting item is not displayed in case there is no corresponding option.

Note⁽¹²⁾ Set to "220.0V (4-digits)" in 220V input.

Note⁽¹³⁾ Set to "40.00kW (4-digits)" and "20.00kvar (4-digits)" in 220V input.

Note⁽¹⁴⁾ Set to "10.00kW (4-digits)" and "5.000kvar (4-digits)" in 220V input.

Note⁽¹⁵⁾ Set to "0.1kWh/pulse" in 220V input. (3 ϕ 3W, 1 ϕ 2W)

Setting mode 2. Function table (2)

Setting No.	Function	Functional description	Default setting	Important setting	Page
241 (16)	External operation input function	Sets the function of the external operation input.	Alarm reset	○	46
251	Voltage ON/OFF	Sets the ON/OFF of voltage measurement display.	ON		47
252	Current ON/OFF	Sets the ON/OFF of current measurement display.	ON		47
253	Demand current ON/OFF	Sets the ON/OFF of demand current measurement display.	ON		47
254	Active power ON/OFF	Sets the ON/OFF of active power measurement display.	ON		47
255	Demand power ON/OFF	Sets the ON/OFF of demand power measurement display.	ON		47
256	Reactive power ON/OFF	Sets the ON/OFF of reactive power measurement display.	ON		47
257	Power factor ON/OFF	Sets the ON/OFF of power-factor measurement display.	ON		47
258	Frequency ON/OFF	Sets the ON/OFF of frequency measurement display.	ON		47
259	Power receiving watt-hour ON/OFF	Sets the ON/OFF of power-receiving watt-hour measurement display.	ON		47
25A	Power transmission var-hour ON/OFF	Sets the ON/OFF of power transmission var-hour measurement display.	ON		47
25B	Power receiving var-hour (LAG, LEAD) ON/OFF	Sets the ON/OFF of power-receiving var-hour (LAG, LEAD) measurement display.	ON		47
25C	Power transmission var-hour (LAG, LEAD) ON/OFF	Sets the ON/OFF of power transmission var-hour (LAG, LEAD) measurement display.	ON		47
261	set value initialization	Initialize the settings of setting 1 and setting 2 (return to the default settings). (The set value of setting 3 does not return to the default value)	—		47
262	Watt-hour reset	Integrated value is cleared by package about each electric energy.	—		47

Note⁽¹⁶⁾ A setting item is not displayed in case there is no corresponding option.

Setting mode 3. Function table

Setting No.	Function	Functional description	Default setting		Important setting	Page
311	Input circuit phase line change	Sets the input circuit or phase line.	3 ϕ 3W	3 ϕ 3W	○	48
			1 ϕ 3W	1 ϕ 3W (R-W-B)		
			1 ϕ 2W	1 ϕ 2W		
312	Input voltage	Sets the input voltage or phase voltage full scale.	3 ϕ 3W	110V	○	48, 49
			1 ϕ 3W	150V		
			1 ϕ 2W	110V		
321	Tidal current measurement	Sets 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			49

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
Sets the phase wire of input circuit. (311)	Press SET and DISPLAY together for longer than 3 seconds ➡ (311) Select an phase wire by + and - ➡ Press SET for longer than 3 seconds ➡ Selected phase wire is entered ➡ Press DISPLAY ➡ Returns to display mode.	48
Sets the input voltage (phase-voltage full scale). (312)	Press SET and DISPLAY together for longer than 3 seconds ➡ Press RESET/SHIFT ➡ (311) (312) Select an input voltage (In case of 1 ϕ 3W, it is phase-voltage full scale) by + and - ➡ Press SET ➡ Selected input voltage is entered ➡ Press DISPLAY ➡ Returns to display mode.	48, 49
Sets the measurement range of voltmeter (211)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ (211) Select a measurement range by + and - ➡ Press SET ➡ Selected measurement range is entered ➡ Press DISPLAY ➡ Returns to display mode.	41-44
Sets the measurement range of ammeter (213)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ (211) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Select a measuring range by + and - (212) (213) ➡ Press SET ➡ Selected measuring range is entered ➡ Press DISPLAY ➡ Returns to display mode.	41-44
Sets 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.	33-37
Set the address of device in communication output. (221C)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ Press MODE ➡ (211) (221C) Select an address by + and - ➡ Press SET ➡ Selected address is entered ➡ Press DISPLAY ➡ Returns to display mode.	45
Set the transmission rate of communication output. (222C)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ Press MODE ➡ (211) (221C) Press RESET/SHIFT ➡ Select an transmission rate by + and - ➡ Press SET ➡ (222C) Selected transmission rate is entered ➡ Press DISPLAY ➡ Returns to display mode.	45
Set the parity bit added to communication data. (223C)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ Press MODE ➡ (211) (221C) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Select an parity by + and - ➡ (222C) (223C) Press SET ➡ Selected parity is entered ➡ Press DISPLAY ➡ Returns to display mode.	45

Items	Setting and operation procedures	Page
Set the stop bit added to communication data. (224C)	Press SET and RESET/SHIFT together for longer than 3 seconds → Press MODE → (211) (221C) Press RESET/SHIFT → Press RESET/SHIFT → Press RESET/SHIFT → (222C) (223C) (224C) Select an stop bit by + and - → Press SET → Selected stop bit is entered → Press DISPLAY → Returns to display mode.	45
Sets the output factor of pulse output. (231P)	Press SET and RESET/SHIFT together for longer than 3 seconds → Press MODE → (211) (221A) Press MODE → Select an output factor by + and - → Press SET → (231P) Selected output factor is entered → Press DISPLAY → Returns to display mode.	46
Sets the factor of alarm output. (121AL)	Press SET for longer than 3 seconds → Press MODE → (111) (121AL) Select an factor by + and - → Press SET → Selected factor is entered → Press DISPLAY → Returns to display mode.	37
Sets the function of external operation input. (241)	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 → (231P) (241) Selected function is entered → Press DISPLAY → Returns to display mode.	46
Sets 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.	38
Sets the time interval of demand 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.	38
Sets the operation method of demand 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.	38

(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
Sets the display factor of main monitor. (112)	Press SET for longer than 3 seconds → Press RESET/SHIFT → (111) (112) Select an display factor by + and - → Press SET → Selected display factor is entered → Press DISPLAY → Returns to display mode.	33-37
Sets the display factor of sub monitor (left). (113)	Press SET for longer than 3 seconds → Press RESET/SHIFT → Press RESET/SHIFT (111) (112) → Select an display factor by + and - → Press SET → (113) Selected display factor is entered → Press DISPLAY → Returns to display mode.	33-37
Sets the display factor of sub monitor (center). (114)	Press SET for longer than 3 seconds → Press RESET/SHIFT → Press RESET/SHIFT (111) (112) → Press RESET/SHIFT → Select an display factor by + and - → Press SET → (113) (114) Selected display factor is entered → Press DISPLAY → Returns to display mode.	33-37
Sets the display factor of sub monitor (right). (115)	Press SET for longer than 3 seconds → Press RESET/SHIFT → Press RESET/SHIFT (111) (112) → Press RESET/SHIFT → Press RESET/SHIFT → (113) (114) (115) Select an display factor by + and - → Press SET → Selected display factor is entered → Press DISPLAY → Returns to display mode.	33-37
Sets the display factor of bar graph. (116)	Press SET for longer than 3 seconds → Press RESET/SHIFT → Press RESET/SHIFT (111) (112) → Press RESET/SHIFT → Press RESET/SHIFT → Press RESET/SHIFT → (113) (114) (115) (116) Select an display factor by + and - (If a sub monitor is selected, an underbar will be displayed on the bottom of a digital display.) → Press SET → Selected display factor is entered → Press DISPLAY → Returns to display mode.	33-37

(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
Sets the polarity and measurement range of active power. (216) (217)	Press SET and RESET/SHIFT together for longer than 3 seconds → (211) Press RESET/SHIFT → Press RESET/SHIFT → Press RESET/SHIFT → (212) (213) (214) Press RESET/SHIFT → Press RESET/SHIFT → (215) (216) Select an one-way deflection (P) / both deflection (-) by + and - → Press SET → Selected deflection is entered → Press RESET/SHIFT → (217) Select a measuring range by + and - → Press SET → Selected measuring range is entered → Press DISPLAY → Returns to display mode.	41-44

(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
Sets the measurement range of reactive power. (219)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ (211) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (212) (213) (214) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (215) (216) (217) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Select a measuring range by + and - (218) (219) ➡ Press SET ➡ Selected measuring range is entered ➡ Press DISPLAY ➡ Returns to display mode.	41-44

(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
Sets the pulse unit of pulse output. (232P)	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 - ➡ (231P) (232P) Press SET ➡ Selected output pulse unit is entered ➡ Press DISPLAY ➡ Returns to display mode.	46

(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
Sets the measurement range of power-factor. (21B)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ (211) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (212) (213) (214) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (215) (216) (217) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (218) (219) (21A) Press RESET/SHIFT ➡ Select a measuring range by + and - ➡ Press SET ➡ (21B) Selected measuring range is entered ➡ Press DISPLAY ➡ Returns to display mode.	41-44
Sets the measurement range of frequency. (21C)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ (211) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (212) (213) (214) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (215) (216) (217) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (218) (219) (21A) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Select a measuring range by + and - (21B) (21C) ➡ Press SET ➡ Selected measuring range is entered ➡ Press DISPLAY ➡ Returns to display mode.	41-44

(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
Sets the display sensitivity (% of a display to an input) of current. (214)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ (211) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (212) (213) (214) Select a display sensitivity by + and - ➡ Press SET ➡ Selected display sensitivity is entered ➡ Press DISPLAY ➡ Returns to display mode.	41-44

(8) Setting of range digit number.

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

Items	Setting and operation procedures	Page
Sets the digit number of voltage range. (212)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ (211) Press RESET/SHIFT ➡ Select a digit number by + and - ➡ Press SET ➡ (212) Selected digit number is entered ➡ Press DISPLAY ➡ Returns to display mode.	41-44
Sets the digit number of current range. (215)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ (211) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (212) (213) (214) Press RESET/SHIFT ➡ Select a digit number by + and - ➡ Press SET ➡ (215) Selected digit number is entered ➡ Press DISPLAY ➡ Returns to display mode.	41-44
Sets the digit number of active power range. (218)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ (211) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (212) (213) (214) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (215) (216) (217) Press RESET/SHIFT ➡ Select a digit number by + and - ➡ Press SET ➡ (218) Selected digit number is entered ➡ Press DISPLAY ➡ Returns to display mode.	41-44
Sets the digit number of reactive power range. (21A)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ (211) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (212) (213) (214) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (215) (216) (217) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (218) (219) (21A) Select a digit number by + and - ➡ Press SET ➡ Selected digit number is entered ➡ Press DISPLAY ➡ Returns to display mode.	41-44

Items	Setting and operation procedures	Page
Sets the digit number of frequency range. (21D)	Press SET and RESET/SHIFT together for longer than 3 seconds ➡ (211) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (212) (213) (214) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (215) (216) (217) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (218) (219) (21A) Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ Press RESET/SHIFT ➡ (21B) (21C) (21D) Select a digit number by + and - ➡ Press SET ➡ Selected digit number is entered ➡ Press DISPLAY ➡ Returns to display mode.	41-44

(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
Sets the return method of alarm output. (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.	37
Sets the contact delay time of alarm output. (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.	37

(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
Sets 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.	38
Sets the high-alarm value of demand 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 - ➡ Press SET ➡ (132) (133H) Selected high-alarm value is entered ➡ Press DISPLAY ➡ Returns to display mode.	38

(11) Instant measurement setting

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

Items	Setting and operation procedures	Page
Sets the high-alarm value of instant voltage. (141H)	Press SET for longer than 3 seconds → Press MODE → Press MODE → (111) (121AL) (131H) Press MODE → Select a high-alarm value by + and - → Press SET → (141H) Selected high-alarm value is entered → Press DISPLAY → Returns to display mode.	39
Sets the low-alarm value of instant voltage. (142L)	Press SET for longer than 3 seconds → Press MODE → Press MODE → (111) (121AL) (131H) Press MODE → Press RESET/SHIFT → Select a low-alarm value by + and - → (141H) (142L) Press SET → Selected low-alarm value is entered → Press DISPLAY → Returns to display mode.	39

(12) Backlight setting

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

Items	Setting and operation procedures	Page
Sets the action of backlight. (151)	Press SET for longer than 3 seconds → Press MODE → Press MODE → Press MODE → (111) (121AL) (131H) → Press MODE → Select a backlight action by + and - → Press SET → (141H) (151) Selected backlight action is entered → Press DISPLAY → Returns to display mode.	39
Sets the brightness of backlight. (152)	Press SET for longer than 3 seconds → Press MODE → Press MODE → Press MODE → (111) (121AL) (131H) → Press MODE → Press RESET/SHIFT → Select a brightness by + and - → (141H) (151) (152) Press SET → Selected backlight brightness is entered → Press DISPLAY → Returns to display mode.	39

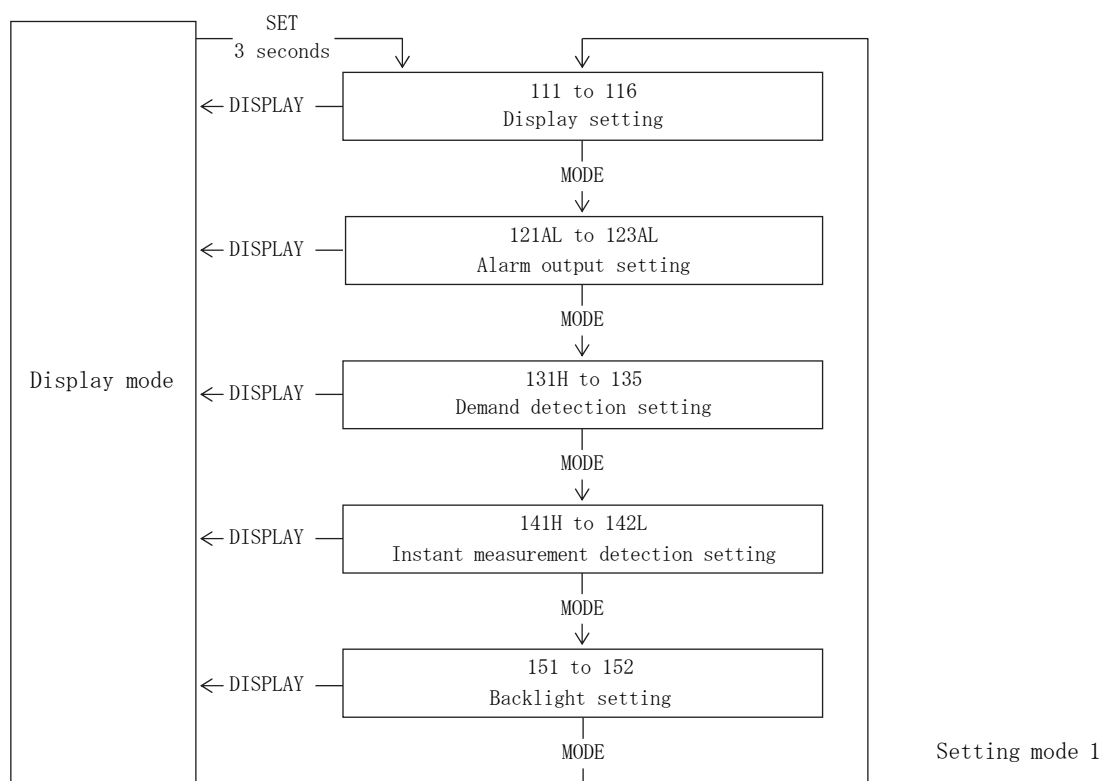
(13) Other, measurement setting

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

Items	Setting and operation procedures	Page
Sets the tidal current measurement of reactive power and power-factor. (321)	Press SET and DISPLAY together for longer than 3 seconds → Press MODE → (311) (321) Press RESET/SHIFT → Select a tidal current measurement ON/OFF by + and - → (322) Press SET → Selected action is entered → Press DISPLAY → Returns to display mode.	49

5.3 Setting in detail explanation

5.3.1 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.

(1) 111 to 116 Display combination setting

● 3-phase 3-wire

No.	Pattern No.	Main monitor	Sub monitor (Left)	Sub monitor (Center)	Sub monitor (Right)	Bar graph
1	Pattern 1	A (Y)	V (RY)	W	Wh	A (Y)
2	Pattern 2	A (Y)	V (RY)	W	$\cos \phi$	A (Y)
3	Pattern 3	A (Y)	V (RY)	W	Hz	A (Y)
4	Pattern 4	DA (Y)	V (RY)	MDA (Y)	Wh	MDA + DA (Y)
5	Pattern 5	MDA (Y)	A (Y)	V (RY)	Wh	MDA + DA (Y)
6	Pattern 6	W	V (RY)	A (Y)	Wh	W
7	Pattern 7	W	V (RY)	A (Y)	$\cos \phi$	W
8	Pattern 8	W	V (RY)	A (Y)	Hz	W
9	Pattern 9	DW	V (RY)	MDW	Wh	MDW + DW
10	Pattern 10	MDW	W	V (RY)	Wh	MDW + DW
11	Pattern 11	A (Y)	$\cos \phi$	W	Wh	A (Y)
12	Pattern 12	A (Y)	var	W	Wh	A (Y)
13	Pattern 13	W	$\cos \phi$	var	Wh	W
14	Pattern 14	A (Y)	A (R)	A (B)	Wh	A (Y)
15	Pattern 15	V (RY)	V (YB)	V (BR)	Hz	V (RY)

● Displays set factor (3-phase 3-wire)

Main monitor	V (RY), V (YB), V (BR), A (R), A (Y), A (B), DA (R), DA (Y), DA (B), MDA (R), MDA (Y), MDA (B), W, DW, MDW, var, $\cos \phi$, Hz, Wh, -Wh, varh (LAG), varh (LEAD), -varh (LAG), -varh (LEAD)
Sub monitor (Left)	V (RY), V (YB), V (BR), A (R), A (Y), A (B), W, var, $\cos \phi$
Sub monitor (Center)	V (RY), V (YB), V (BR), A (R), A (Y), A (B), DA (R), DA (Y), DA (B), MDA (R), MDA (Y), MDA (B), W, DW, MDW, var, varh (LAG), varh (LEAD), -varh (LAG), -varh (LEAD)
Sub monitor (Right)	V (RY), V (YB), V (BR), A (R), A (Y), A (B), DA (R), DA (Y), DA (B), MDA (R), MDA (Y), MDA (B), W, DW, MDW, $\cos \phi$, Hz, Wh, -Wh
Bar graph	V (RY), V (YB), V (BR), A (R), A (Y), A (B), DA (R), DA (Y), DA (B), MDA (R), MDA (Y), MDA (B), W, DW, MDW, var, $\cos \phi$, Hz

● Phase (line) change (3-phase 3-wire) ⁽¹⁷⁾

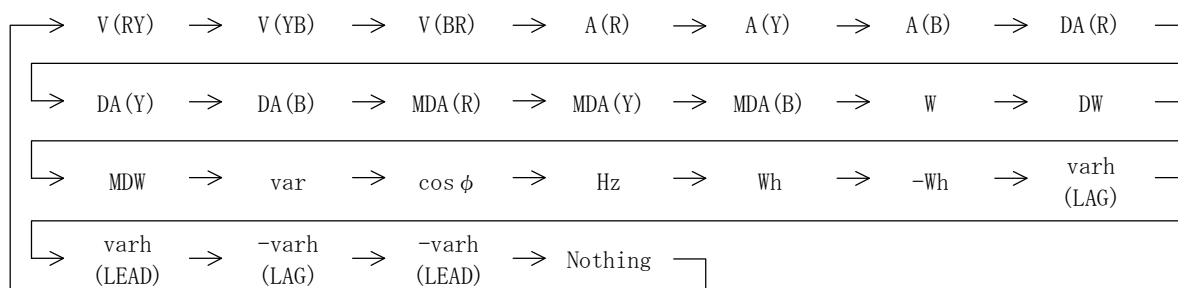
→ V (RY) → V (YB) → V (BR) →

Note⁽¹⁷⁾ Press DISPLAY, Voltage and current are replaced at the same time.

→ A (Y) → A (B) → A (R) → ⁽¹⁸⁾

Note⁽¹⁸⁾ DA and MDA also change.

● Measurement factor change (3-phase 3-wire, Measurement display mode)



● Single-phase 3-wire ⁽²¹⁾

No.	Pattern No.	Main monitor	Sub monitor (Left)	Sub monitor (Center)	Sub monitor (Right)	Bar graph
1	Pattern 1	A (R)	V (RW)	W	Wh	A (R)
2	Pattern 2	A (R)	V (RW)	W	$\cos \phi$	A (R)
3	Pattern 3	A (R)	V (RW)	W	Hz	A (R)
4	Pattern 4	DA (R)	V (RW)	MDA (R)	Wh	MDA + DA (R)
5	Pattern 5	MDA (R)	A (R)	V (RW)	Wh	MDA + DA (R)
6	Pattern 6	W	V (RW)	A (R)	Wh	W
7	Pattern 7	W	V (RW)	A (R)	$\cos \phi$	W
8	Pattern 8	W	V (RW)	A (R)	Hz	W
9	Pattern 9	DW	V (RW)	MDW	Wh	MDW + DW
10	Pattern 10	MDW	W	V (RW)	Wh	MDW + DW
11	Pattern 11	A (R)	$\cos \phi$	W	Wh	A (R)
12	Pattern 12	A (R)	var	W	Wh	A (R)
13	Pattern 13	W	$\cos \phi$	var	Wh	W
14	Pattern 14	A (R)	A (B)	A (W)	Wh	A (R)
15	Pattern 15	V (RW)	V (BW)	V (RB)	Hz	V (RW)

● Displays set factor (Single-phase 3-wire) ⁽²¹⁾

Main monitor	V (RW), V (BW), V (RB), A (R), A (B), A (W), DA (R), DA (B), DA (W), MDA (R), MDA (B), MDA (W), W, DW, MDW, var, $\cos \phi$, Hz, Wh, -Wh, varh (LAG), varh (LEAD), -varh (LAG), -varh (LEAD)
Sub monitor (Left)	V (RW), V (BW), V (RB), A (R), A (B), A (W), W, var, $\cos \phi$
Sub monitor (Center)	V (RW), V (BW), V (RB), A (R), A (B), A (W), DA (R), DA (B), DA (W), MDA (R), MDA (B), MDA (W), W, DW, MDW, var, varh (LAG), varh (LEAD), -varh (LAG), -varh (LEAD)
Sub monitor (Right)	V (RW), V (BW), V (RB), A (R), A (B), A (W), DA (R), DA (B), DA (W), MDA (R), MDA (B), MDA (W), W, DW, MDW, $\cos \phi$, Hz, Wh, -Wh
Bar graph	V (RW), V (BW), V (RB), A (R), A (B), A (W), DA (R), DA (B), DA (W), MDA (R), MDA (B), MDA (W), W, DW, MDW, var, $\cos \phi$, Hz

● Phase (line) change (Single-phase 3-wire) ⁽¹⁹⁾

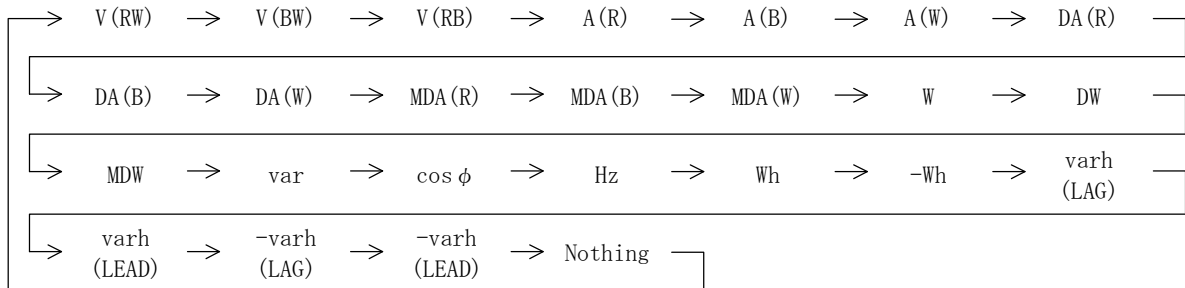
→ V (RW) → V (BW) → V (RB) →

Note⁽¹⁹⁾ Press DISPLAY. Voltage and current are replaced at the same time.

→ A (R) → A (B) → A (W) → ⁽²⁰⁾

Note⁽²⁰⁾ DA and MDA also change.

● Measurement factor change (Measurement display mode) ⁽²¹⁾



Note⁽²¹⁾ The case of single phase 3-wire (R-W-B).

The case of single phase 3-wire (R-W-Y), voltage (RW-YW-RY) and current (R-W-Y).

The case of single phase 3-wire (Y-W-B), voltage (YW-BW-YB) and current (Y-W-B).

● Single-phase 2-wire

No.	Pattern No.	Main monitor	Sub monitor (Left)	Sub monitor (Center)	Sub monitor (Right)	Bar graph
1	Pattern 1	A	V	W	Wh	A
2	Pattern 2	A	V	W	$\cos \phi$	A
3	Pattern 3	A	V	W	Hz	A
4	Pattern 4	DA	V	MDA	Wh	MDA + DA
5	Pattern 5	MDA	A	V	Wh	MDA + DA
6	Pattern 6	W	V	A	Wh	W
7	Pattern 7	W	V	A	$\cos \phi$	W
8	Pattern 8	W	V	A	Hz	W
9	Pattern 9	DW	V	MDW	Wh	MDW + DW
10	Pattern 10	MDW	W	V	Wh	MDW + DW
11	Pattern 11	A	$\cos \phi$	W	Wh	A
12	Pattern 12	A	var	W	Wh	A
13	Pattern 13	W	$\cos \phi$	var	Wh	W
14	Pattern 14	A	—	—	Wh	A
15	Pattern 15	V	—	—	Hz	V

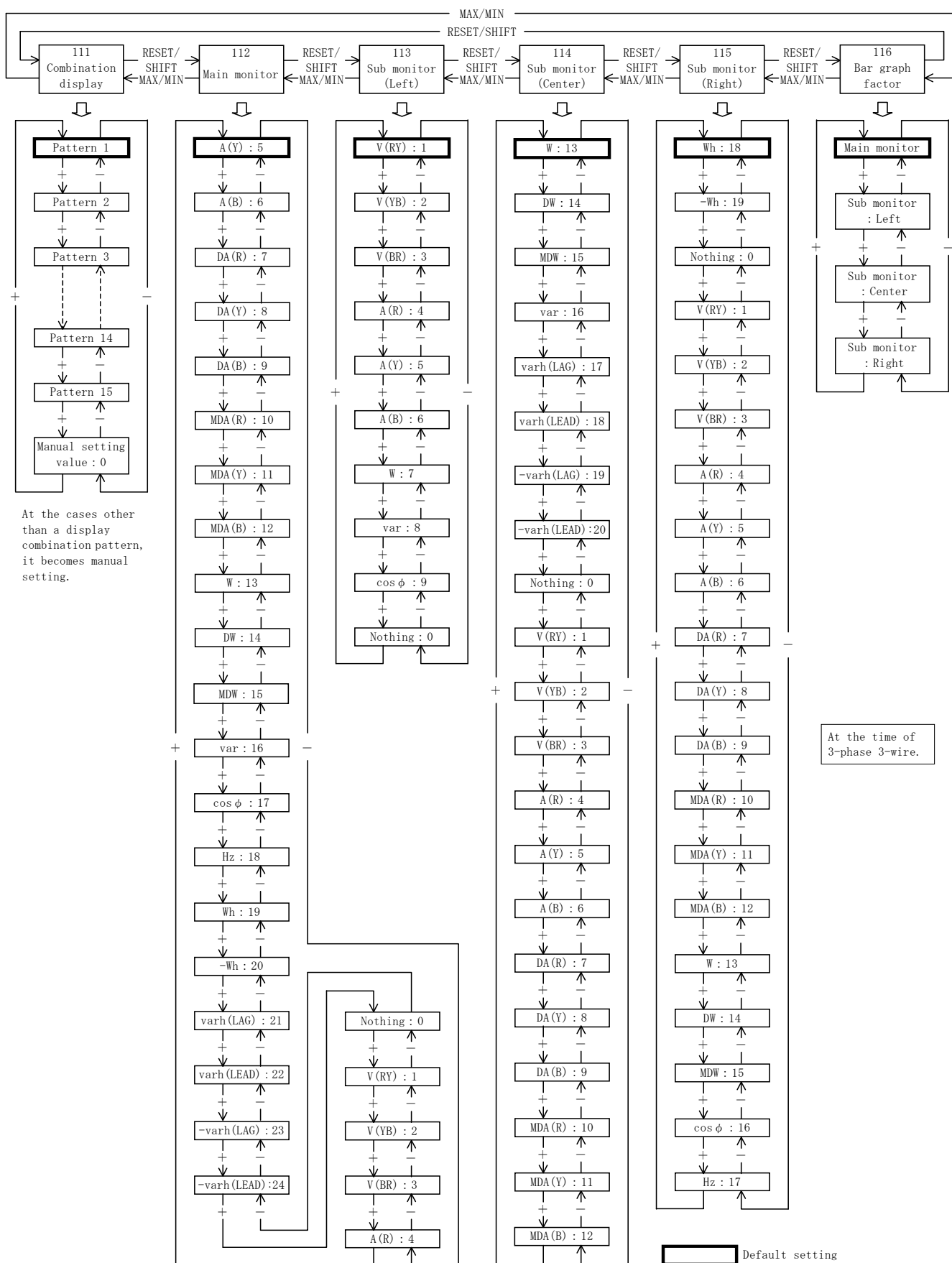
● Displays set factor (Single-phase 2-wire)

Main monitor	V, A, DA, MDA, W, DW, MDW, var, $\cos \phi$, Hz, Wh, -Wh, varh(LAG), varh(LEAD), -varh(LAG), -varh(LEAD)
Sub monitor (Left)	V, A, W, var, $\cos \phi$
Sub monitor (Center)	V, A, DA, MDA, W, DW, MDW, var, varh(LAG), varh(LEAD), -varh(LAG), -varh(LEAD)
Sub monitor (Right)	V, A, DA, MDA, W, DW, MDW, $\cos \phi$, Hz, Wh, -Wh
Bar graph	V, A, DA, MDA, W, DW, MDW, var, $\cos \phi$, Hz

● Measurement factor change (Measurement display mode)



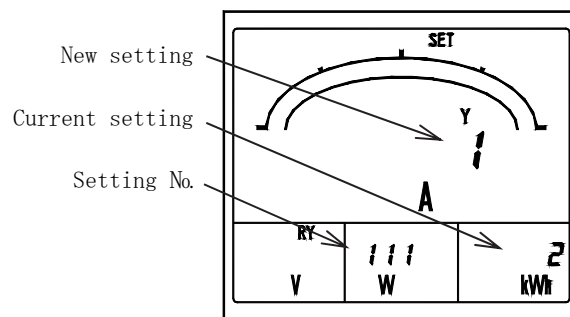
Display combination setting



◆ 111 Combination display

Select the factors to be measured and monitored by 4 digital displays out of combination patterns.

Set values are updated by **SET**.



Combination display

◆ 112 to 115 Main monitor, Sub monitor (left), Sub monitor (center), Sub monitor (right)

Sets these items for a display configuration other than combination patterns.

Set values are updated by **SET**.

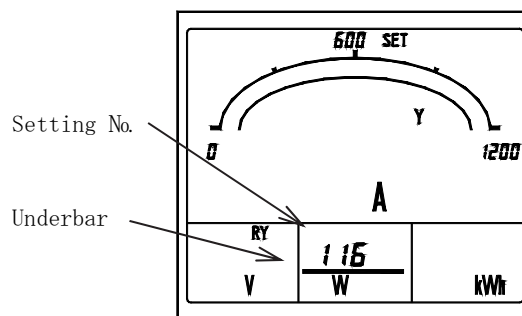
◆ 116 Bar graph factor

A factor being monitored in the main monitor is basically displayed by a bar graph.

Set this item for displaying a factor being monitored on a sub monitor by bar graph.

An underbar is attached to the digital display of the setting sub monitor.

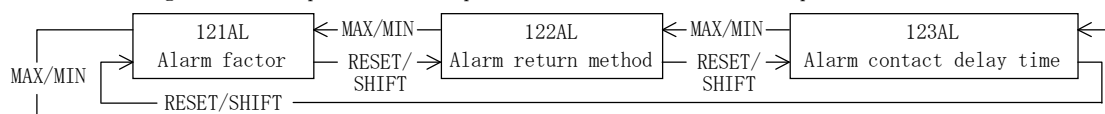
Set values are updated by **SET**.



Bar graph factor

(2) 121AL to 123AL Alarm output setting 【With option】

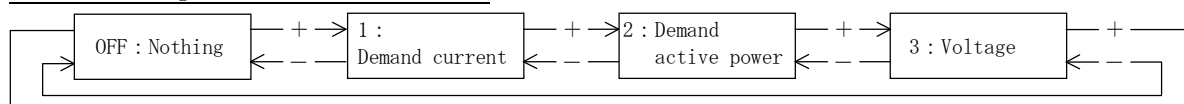
Various setting and an output test are performed about an alarm output.



◆ 121AL Alarm output factor setting

Sets the factor of alarms outputs. Selection by **+** and **-**, set value is updated by **SET**.

Default setting: 1 (DA: Demand current)



◆ 122AL Alarm reset method setting.

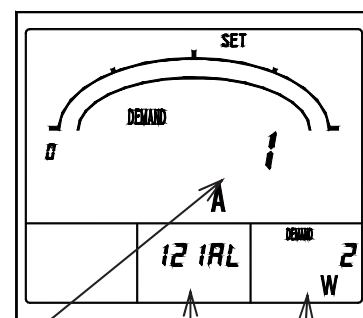
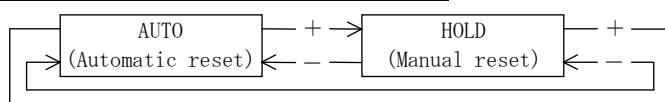
Action at the case of a reset of alarm output can be selected from AUTO (automatic reset) and HOLD (manual reset).

In "AUTO (automatic reset)", an alarm output is OFF according to a reset of an alarm. In "HOLD (manual reset)", even after an alarm reset, an output holds ON.

It performs a return (output OFF) in **RESET/SHIFT**.

Selection by **+** and **-**, set value is updated by **SET**.

Default setting: AUTO (automatic reset)



New setting Setting No. Current setting Alarm factor

◆ 123AL Alarm contact delay time

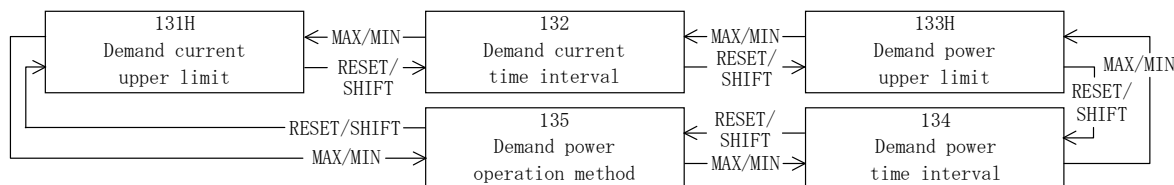
Sets the contact delay time of alarm. The setting range is 0 to 300 seconds (1-second step).

Selection by **+** and **-**, set value is updated by **SET**.

Default setting: 0 second (With no contact delay)

(3) 131H to 135 Demand detection setting

The next operation method is setting. Demand current, Demand power, High-alarm value, Time-interval, Power-factor, Demand power operation method.



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

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

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

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

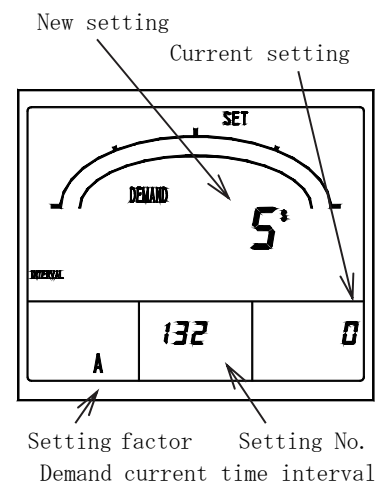
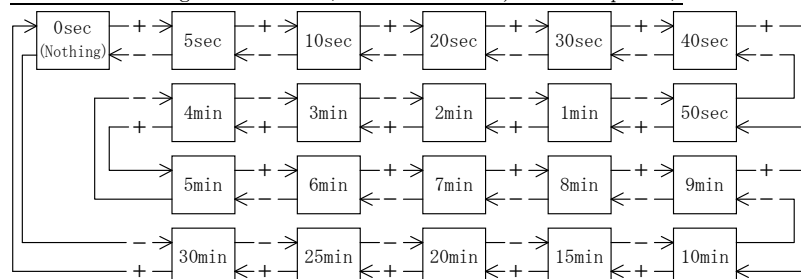
Default setting: 80% (demand current), OFF (demand power)

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

Sets the time interval (95% time interval) of demand current (DA) and demand power (DW).

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: 0 second (Demand current, Demand power)

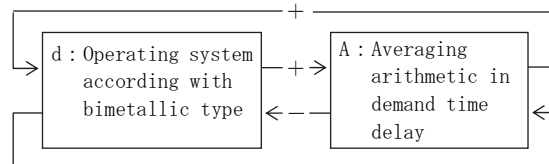


◆ 135 Demand operation method

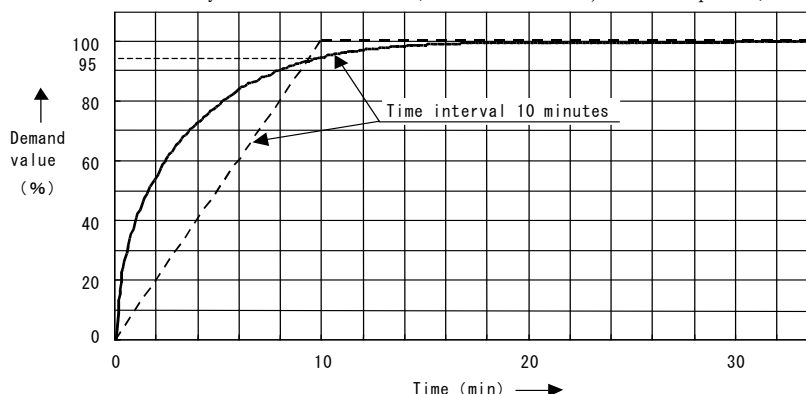
The operating system of demand (DW) can be selected from d (operating system according with bimetallic type: demand) and A (averaging arithmetic in demand time delay: average).

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: d (operation method according with bimetallic type)



● Demand time delay characteristic (Demand current, Demand 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 power measurement: Arithmetic method according with bimetallic type (Default value).

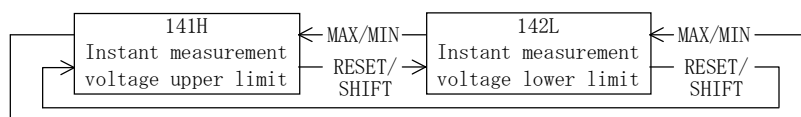
Or the averaging arithmetic in a demand time interval.

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.

(4) 141H to 142L Instant measurement detection setting

An upper limit low-alarm value is set by instant measurement (voltage factor).



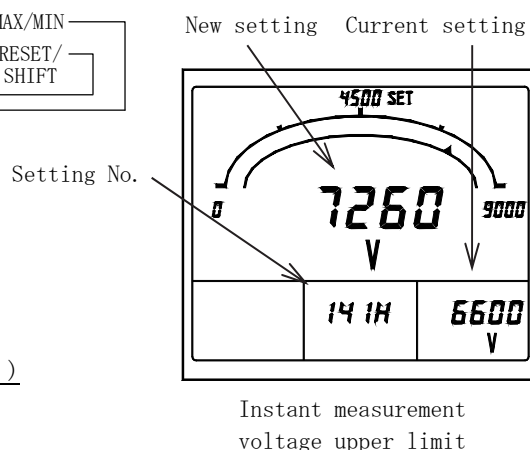
- ◆ 141H Instant measurement voltage upper limit,
142L Instant measurement voltage lower limit.

Sets the high-alarm value and low-alarm value of instant measurement (voltage full scale =150%).

Setting range is 30 to 150% (1% step).

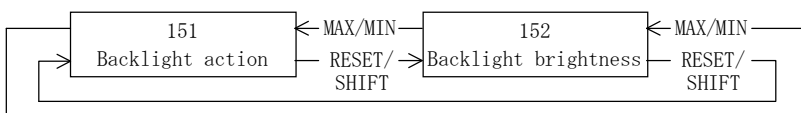
Selection by **+** and **-**, set value is updated by **SET**.

Default setting: OFF [Non-use] (Upper limit, lower limit)



(5) 151 to 152 Backlight setting

Sets the action and brightness of backlight.



- ◆ 151 Backlight action

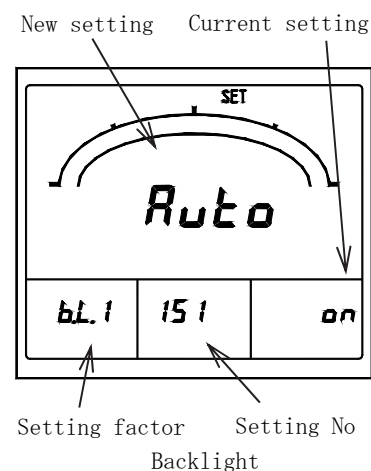
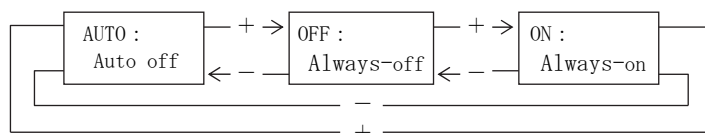
It can select from ON (always-on), AUTO (auto off), and OFF (always-off) about action of backlight.

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

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

Selection by **+** and **-**, set value is updated by **SET**.

Default setting: AUTO (Auto off)



- ◆ 152 Backlight brightness

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

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

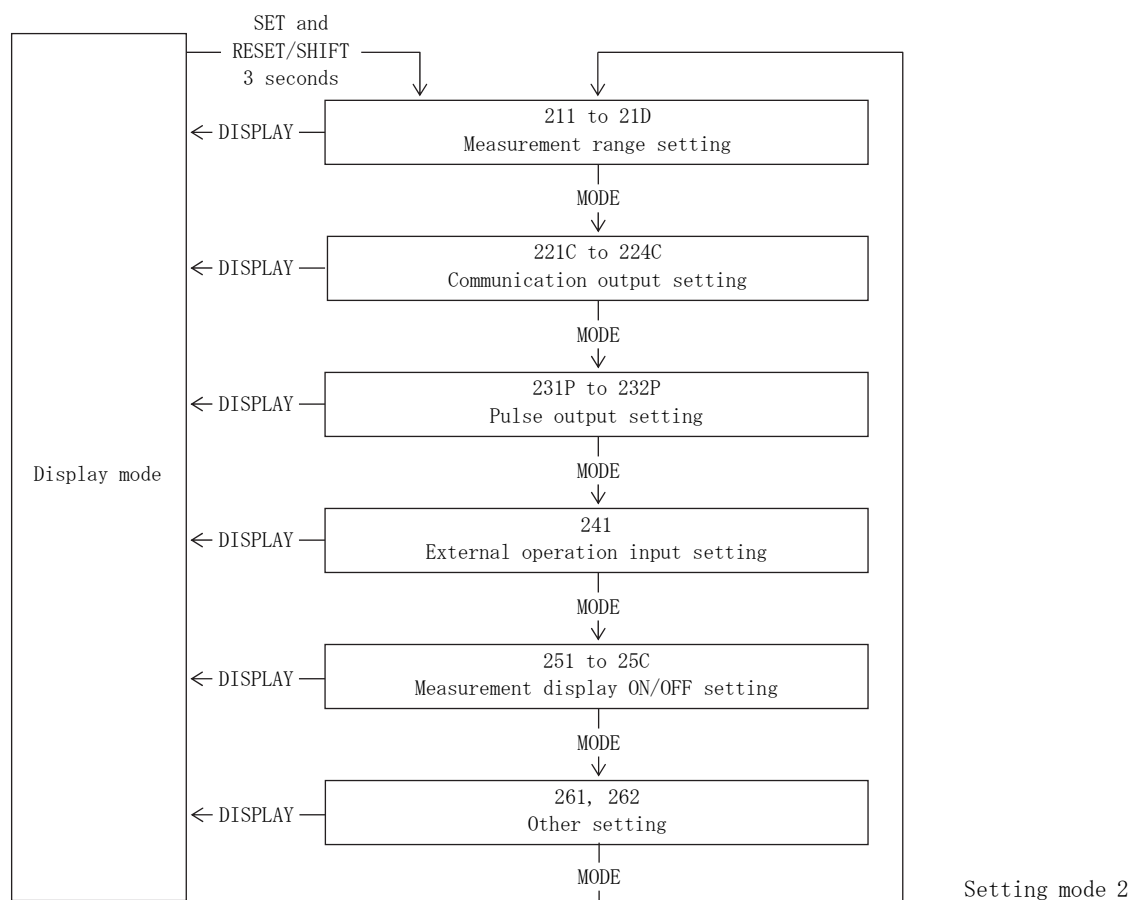
Backlight becomes the brightest if it is set as "5".

Selection by **+** and **-**, set value is updated by **SET**.

Default setting: 3 (Middle)

Setting	Brightness
5	Bright ↑ ↓ Dark
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.

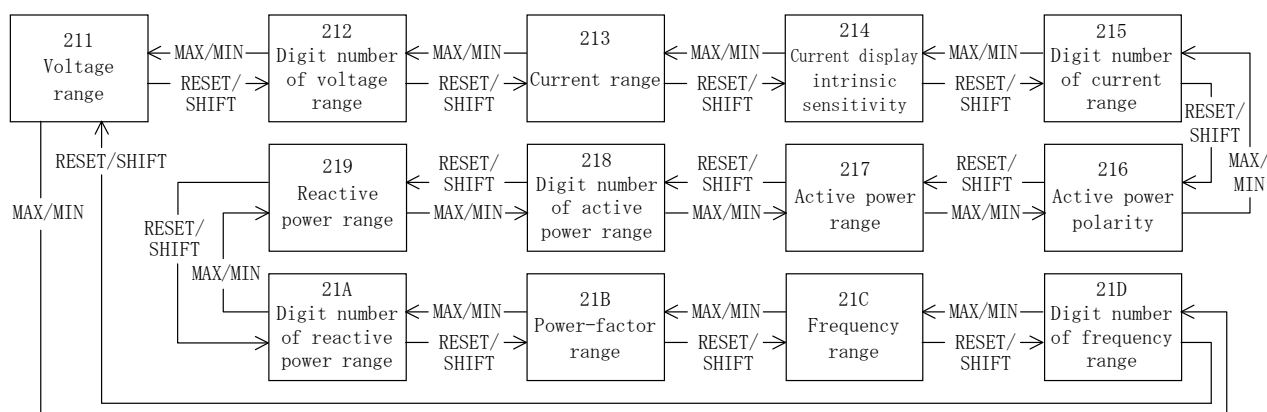
The present mode can be returned to the display mode by pressing **DISPLAY** switch.

< 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 21D Measurement range setting

Sets the measurement range of each measurement factor.

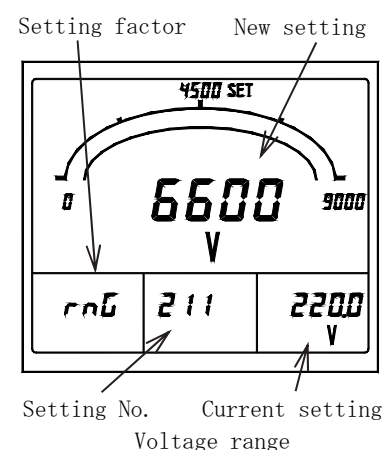
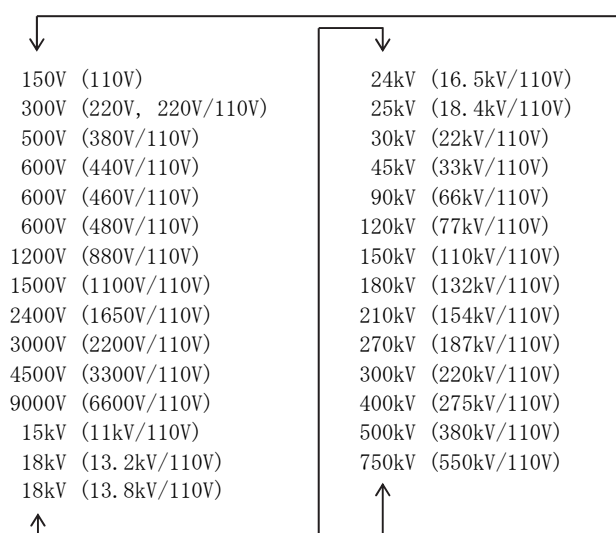


◆ 211 Voltage range

Sets the voltage range (primary voltage). Change of this setting also sets the measurement range of active power and reactive power automatically simultaneously.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: 6600V (3 ϕ 3W, 110V input), 110.0V (1 ϕ 3W), 3300V (1 ϕ 2W, 110V input),
220.0V (3 ϕ 3W/1 ϕ 2W, 220V input)



◆ 212 Digit number of voltage range

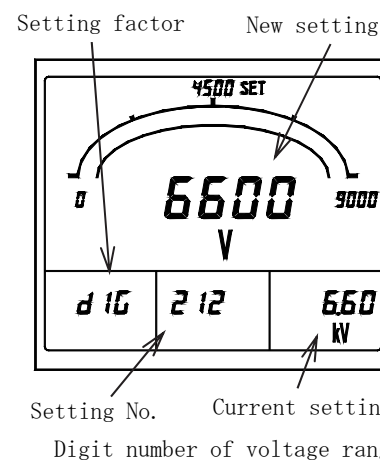
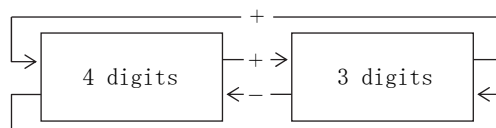
Sets the digit number of voltage range.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: 4 digits

The unit may be changed if the number of digits is changed.

Example) 6600V $\leftrightarrow$ 6.60kV



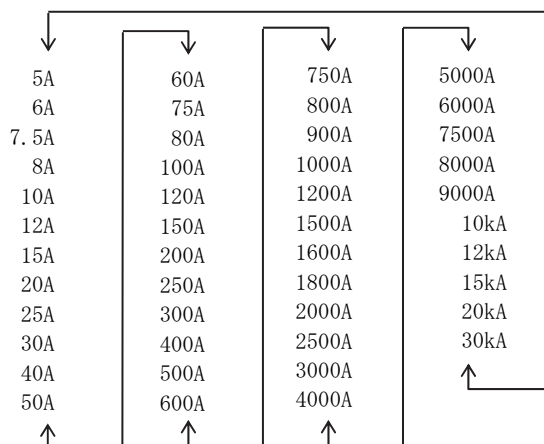
◆ 213 Current range

Sets the current range (primary current). Change of this setting also sets the measurement range of active power and reactive power automatically simultaneously.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: 100.0A (3 ϕ 3W), 500.0A (1 ϕ 3W), 50.00A (1 ϕ 2W)

Current-measurement range



◆ 214 Current display intrinsic sensitivity

Sets the full scale of current meter.

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

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: 100.0A (3 ϕ 3W), 500A (1 ϕ 3W), 50.0A (1 ϕ 2W)

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

Example)

In case of CT ratio=100.0A.

•40% of 100A is 40A.

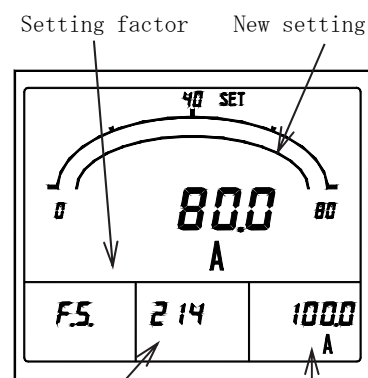
•120% of 100A is 120A.

A measurement range can be selected within the limits of 40 to 120A.

Therefore, a left table

A measurement range can be selected from

40/42/45/48/50/56/60/64/72/75/80/84/90/96/100/120A.



Setting No. Current setting
Current display intrinsic sensitivity

◆ 215 Digit number of current range

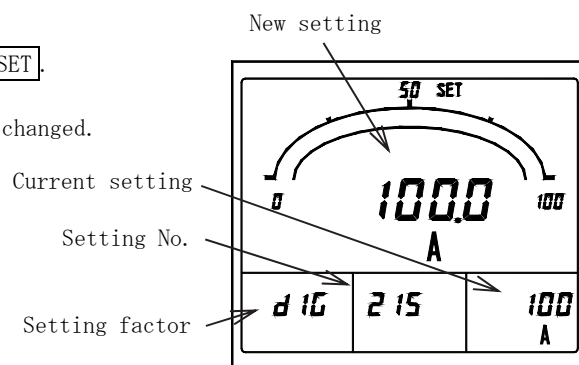
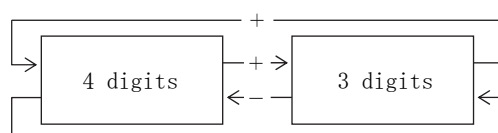
Sets the digit number of current range.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: 4 digits

The unit may be changed if the number of digits is changed.

Example) 1000A $\leftrightarrow$ 1.00kA

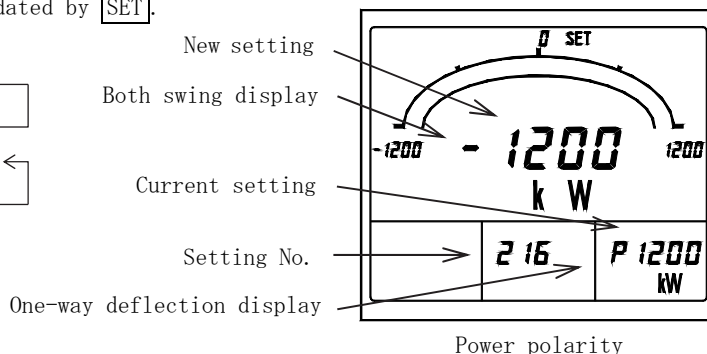
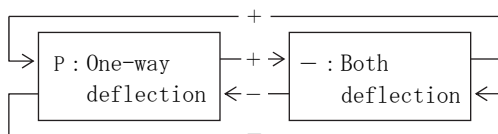


Digit number of current range

◆ 216 Active power polarity

A swing display of active power meter can be selected from P (one-way deflection) and - (both deflection). Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: P (one-way deflection)



◆ 217 Active power range

Set the full scale of active power meter. The setting range is 30 to 120% of rated power.

And it can select from "214 current display intrinsic sensitivity" tables.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

(1000MW or more becomes 4 digits display fixation.)

<Caution> In case of 220V direct input. Calculates by VT ratio=2.

Default setting: 3 ϕ 3W, 110V input : 1200kW , 3 ϕ 3W, 220V input : 40.00kW , 1 ϕ 3W : 100.0kW

1 ϕ 2W, 110V input : 150.0kW , 1 ϕ 2W, 220V input : 10.00kW

◆ 218 Digit number of active power range

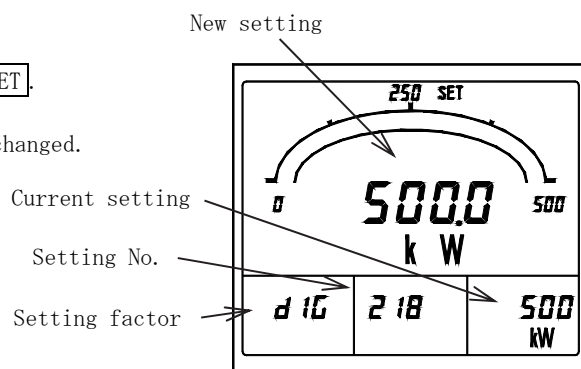
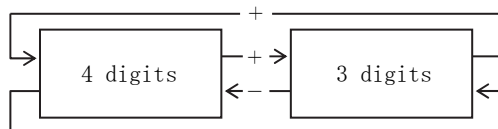
Sets the digit number of active power range.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: 4 digits

The unit may be changed if the number of digits is changed.

Example) 1200kW $\leftrightarrow$ 1.20MW



◆ 219 Reactive power range

Sets the full scale of reactive power meter.

The setting range is 30 to 120% of rated reactive power.

And it can select from "214 current display intrinsic sensitivity" tables. Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

(1000Mvar or more becomes 4 digits display fixation.)

<Caution> In case of 220V direct input. Calculates by VT ratio=2.

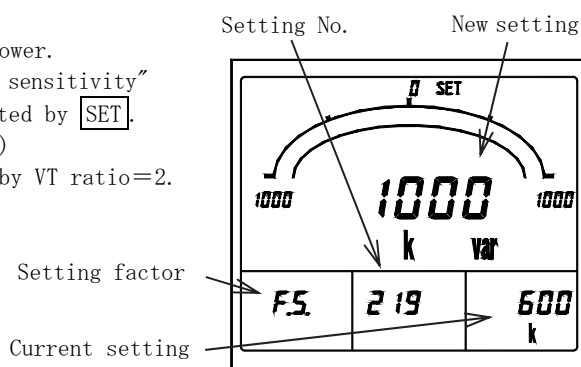
Default setting: 3 ϕ 3W, 110V input : 600.0kvar

3 ϕ 3W, 220V input : 20.00kvar

1 ϕ 3W : 50.00kvar

1 ϕ 2W, 110V input : 75.00kvar

1 ϕ 2W, 220V input : 5000var



◆ 21A Digit number of reactive power range

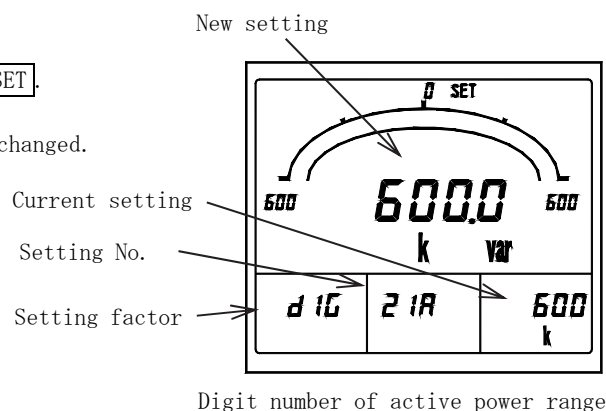
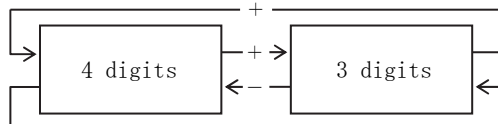
Sets the digit number of reactive power range.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: 4 digits

The unit may be changed if the number of digits is changed.

Example) 1000kvar $\leftrightarrow$ 1.00Mvar

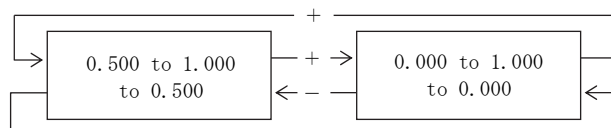


◆ 21B Power-factor range

A power-factor measurement range can be selected from 0.500 to 1.000 to 0.500 / 0.000 to 1.000 to 0.000.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: 0.500 to 1.000 to 0.500

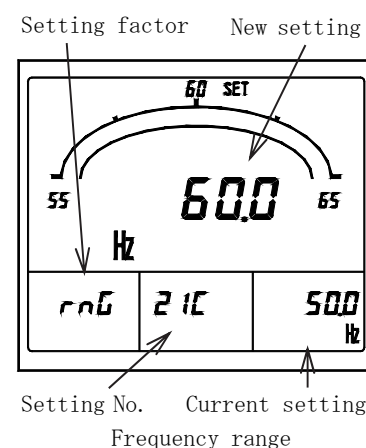
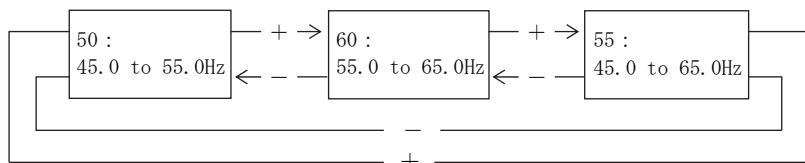


◆ 21C Frequency range

A frequency measurement range can be selected from 45.0 to 55.0Hz / 55.0 to 65.0Hz / 45.0 to 65.0Hz.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: 45.0 to 65.0Hz

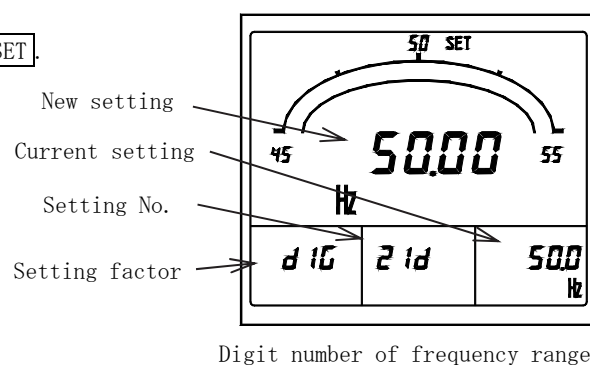
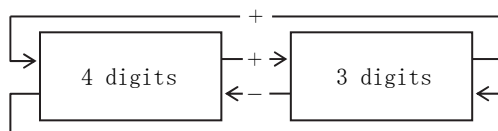


◆ 21D Digit number of frequency range

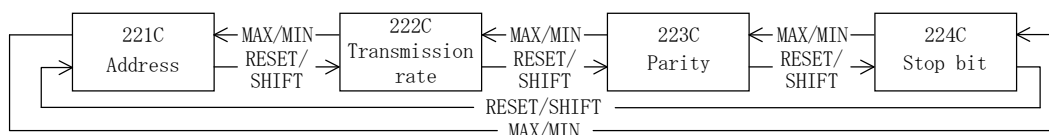
Sets the digit number of frequency range.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: 3 digits



(2) 221C to 224C Communication output setting 【With an communication output option】

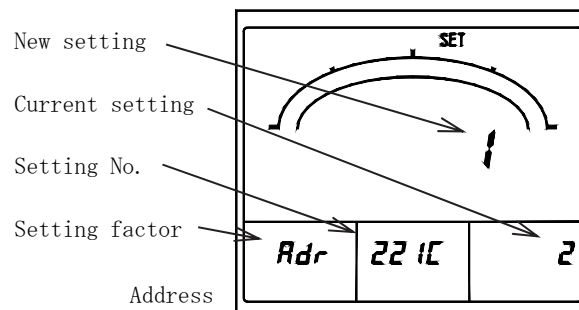


◆ 221C Address

Sets the address of device in communication output.
The address can be selected from 1 to 247.

Selection by **+** and **-**, set value is updated by **SET**.

Default setting: 1

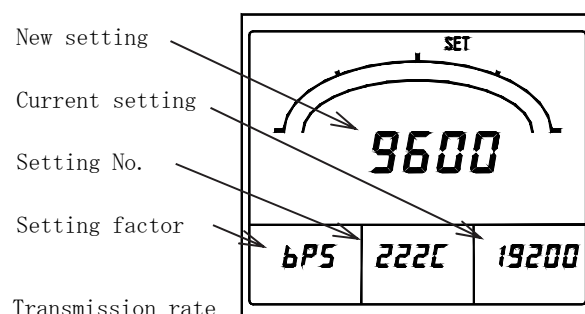


◆ 222C Transmission rate

Sets the transmission rate of communication output.
The transmission rate can be selected from 4800bps, 9600bps, 19200bps, 38400bps.

Selection by **+** and **-**, set value is updated by **SET**.

Default setting: 9600bps

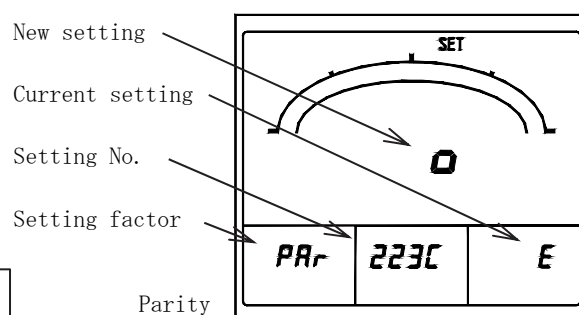
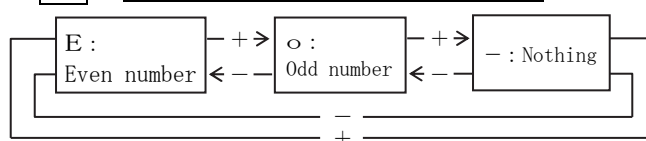


◆ 223C Parity

Sets the parity bit added to communication data.
Parity can be selected from nothing (-), even number (EVEN), odd number (ODD).

In case parity is set as "nothing (-)", parity is not added to communication data.

Selection by **+** and **-**, set value is updated by **SET**. Default setting: Even number (EVEN)

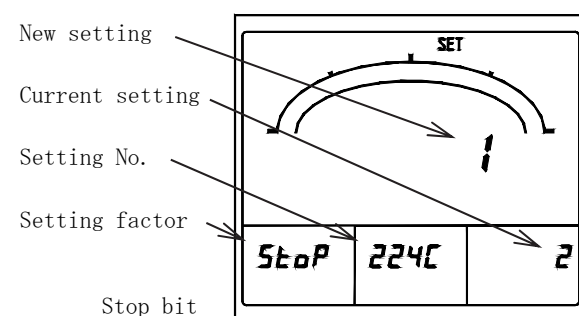
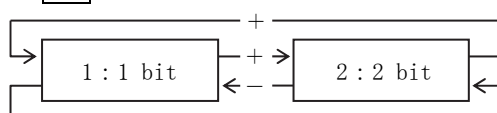


◆ 224C Stop bit

Sets the stop bit added to communication data.

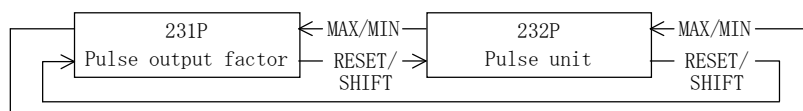
The stop bit can be selected from 1 bit or 2 bit.

Selection by **+** and **-**, set value is updated by **SET**. Default setting: 1 bit



(3) 231P to 232P Pulse output setting 【With option】

Various setting of a pulse output is performed.

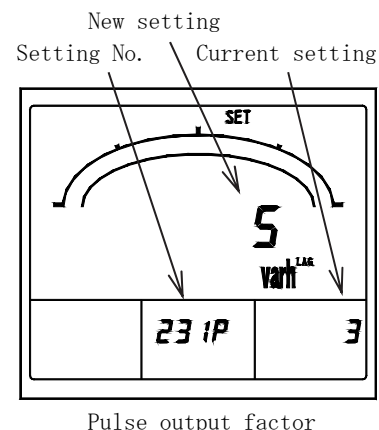
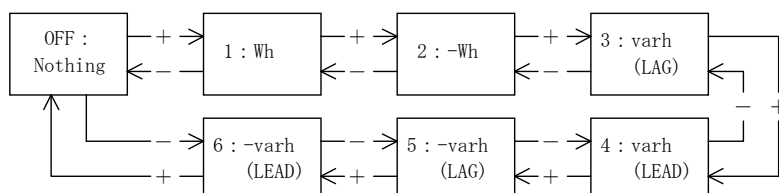


◆ 231P Pulse output factor,

Sets the output factor of pulse output.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{SET}$.

Default setting: Wh



◆ 232P Unit of pulse output

Sets the pulse unit of pulse output.

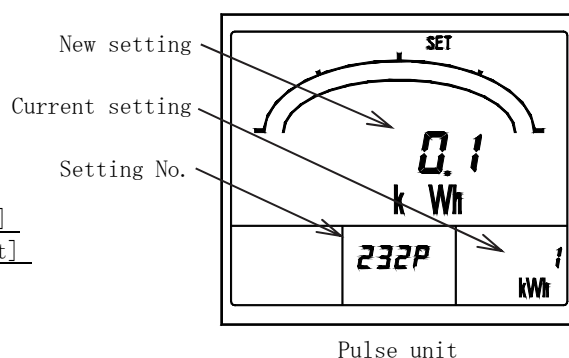
A pulse unit can be selected from four types.

The pulse unit that can be selected is decided with full-load power.

Default setting: 10kWh/pulse [3 ϕ 3W, 110V input]

1kWh/pulse [1 ϕ 3W/1 ϕ 2W, 110V input]

0.1kWh/pulse [3 ϕ 3W/1 ϕ 2W, 220V input]



(4) 241 External operation input setting 【With option】

Various setting of external operation input is performed.

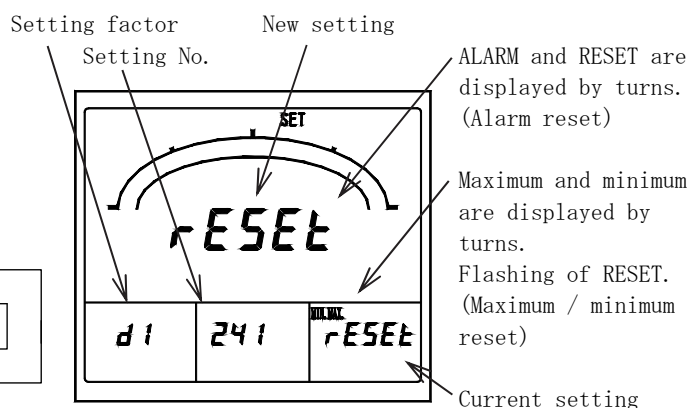
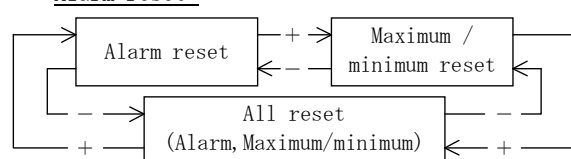
◆ 241 External operation input function

The function of each external operation input (alarm reset, maximum / minimum reset, all reset) can be selected.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{SET}$.

Default setting (With alarm-output option)

Alarm reset



• About the setting display in an external operation input function

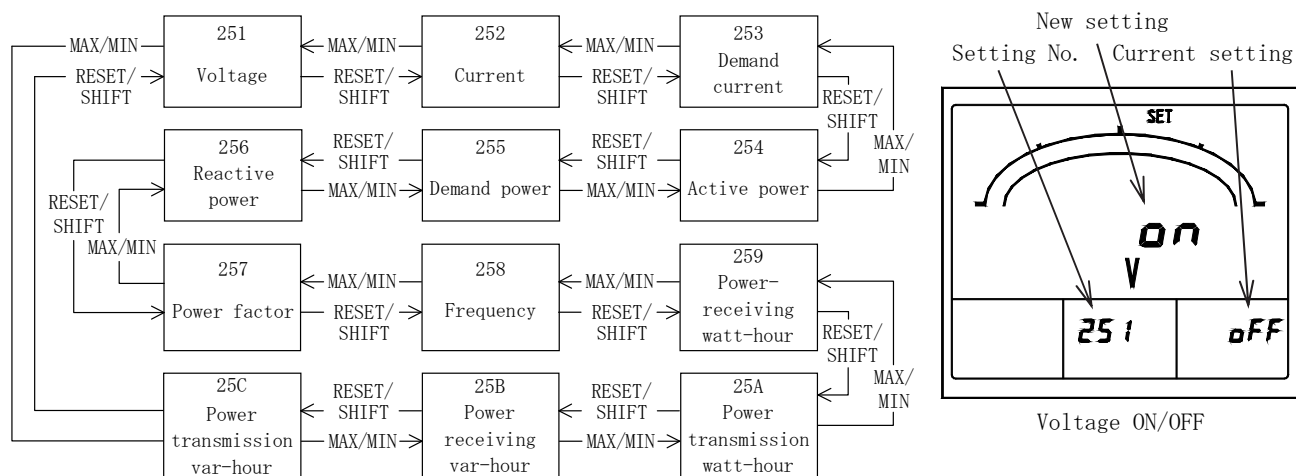
Function	The contents of a display at the function setting	"Current setting" display point	"New setting" display point
Alarm reset	"ALARM" and "RESET" are displayed by turns by 7 segment display.	Sub monitor (right)	Main monitor
Maximum / minimum reset	Flashing of RESET, by 7 segment display. And, maximum and minimum of guidance displayed by turns.		
All reset	"ALL" and "RESET" are displayed by turns by 7 segment display.		

(5) 251 to 25C Measurement ON/OFF setting

Measurement display ON/OFF setting of each measurement factor is performed.

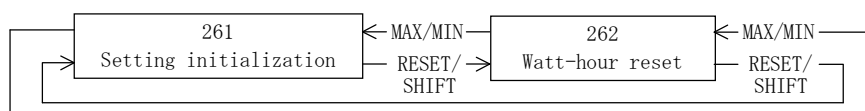
Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: ON (All measurement factors)



(6) 261 to 262 Initialization of watt-hour and setting value.

All reset of watt-hour, and initializes the each settings (it returns to a default setting).

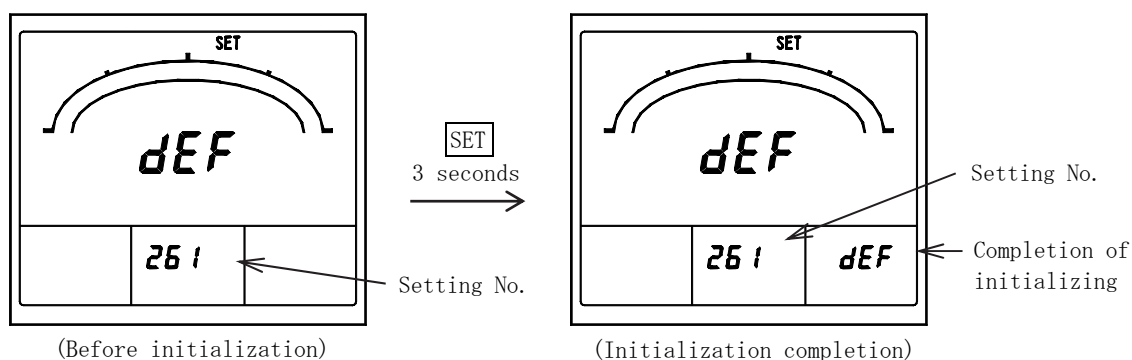


◆ 261 Initialization of setting value

Initialize the settings of setting 1 and setting 2 (return to the default settings).

Pushing $\boxed{\text{SET}}$ for 3 seconds or longer to initialize the settings of setting 1 and setting 2.

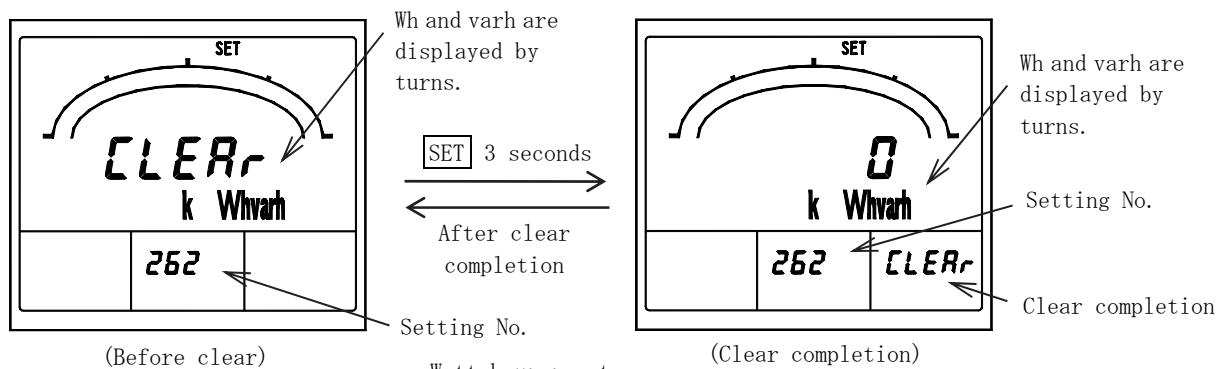
(The set value of setting 3 does not return to the default value)



Initialization of setting value

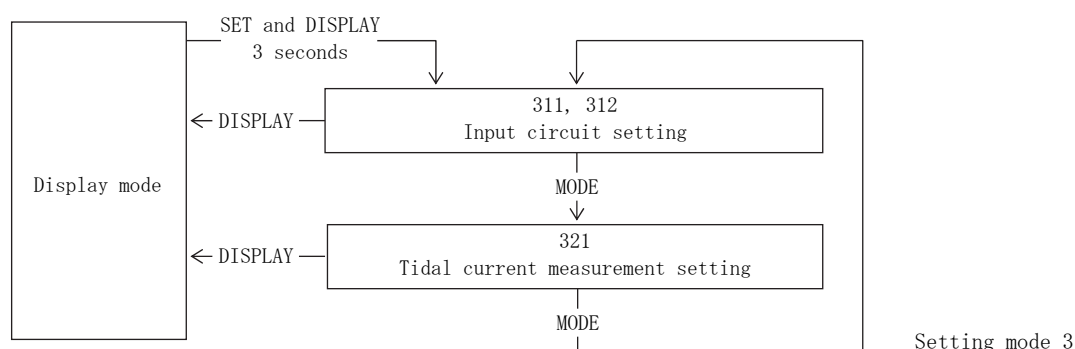
◆ 262 Watt-hour reset

Integrated value of each electric-energy display is cleared (=0). By pushing $\boxed{\text{SET}}$ for 3 seconds, all integrated value (Wh, -Wh, var (LAG), -var (LAG), var (LEAD), -var (LEAD)) is all cleared.



Watt-hour reset

5.3.3 Setting mode 3



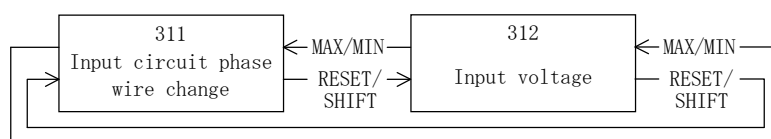
Setting mode 3 is selected by pressing **SET** and **DISPLAY** switches continuously for longer than 3 seconds. Pushing **MODE** switch performs movement of setting item. The present mode can be returned to the display mode by pressing **DISPLAY** switch.

< 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

Sets the input circuit and phase wire and input voltage / phase-voltage full scale.



◆ 311 Input circuit phase wire change

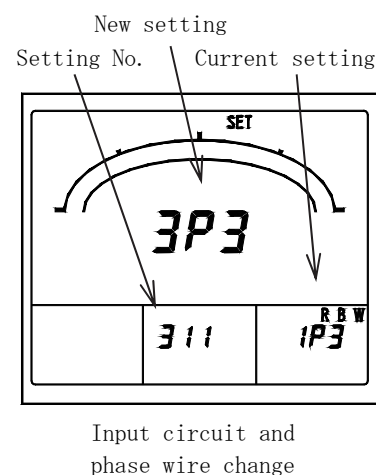
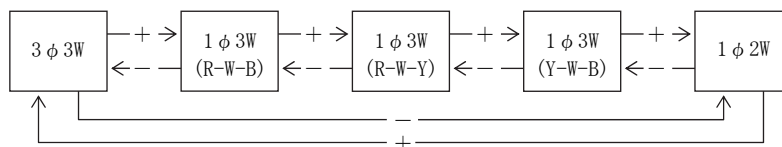
Sets the input circuit and phase wire (1 ϕ 3W).

Selection by **+** and **-**, set value is updated by pushing **SET** 3 seconds or more.

Default setting: 3 ϕ 3W (No designation)

<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.



◆ 312 Input voltage

Set the input voltage (3 ϕ 3W, 1 ϕ 2W) or phase-voltage full scale (1 ϕ 3W).

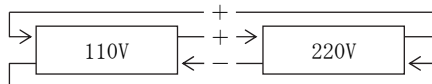
In 3 ϕ 3W/1 ϕ 2W and 1 ϕ 3W, the contents of a setting are different.

Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

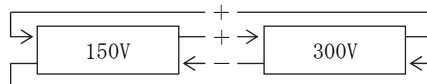
Default setting: 150V (1 ϕ 3W)

Default setting: 110V (3 ϕ 3W, 1 ϕ 2W or no designation)

• 3 ϕ 3W, 1 ϕ 2W

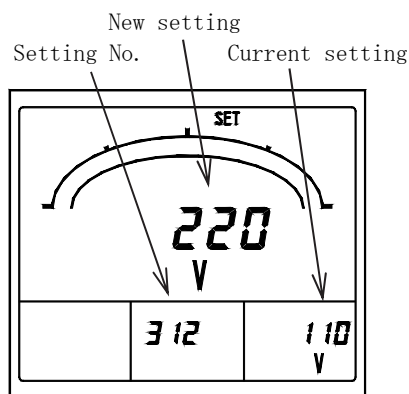


• 1 ϕ 3W

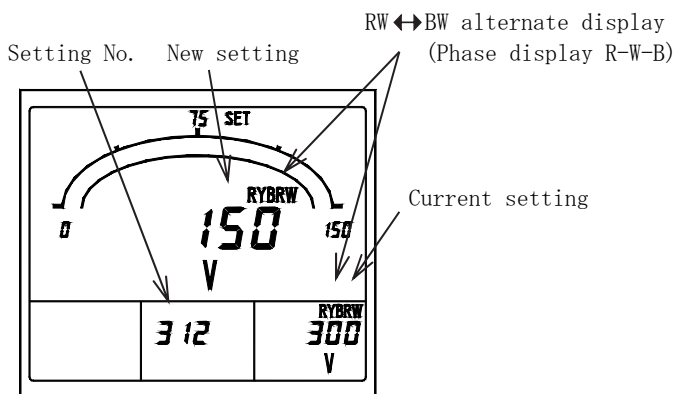


Setting of 300V, Output is AC0 to 150V/0 to 5000.

Setting of 150V, Output is AC0 to 150V/0 to 10000.



Input-voltage rating (3 ϕ 3W)



Phase-voltage full scale (1 ϕ 3W)

(2) 321 Tidal current measurement setting

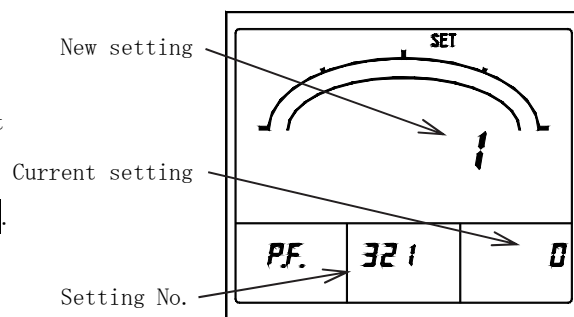
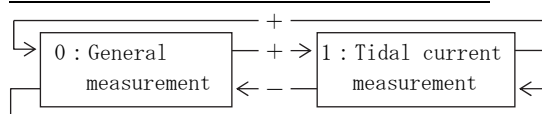
Sets the with or without of tidal current measurement.

◆ 321 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.

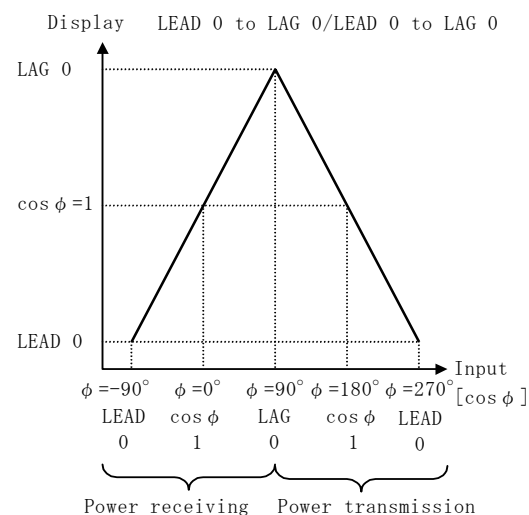
Selection by $\boxed{+}$ and $\boxed{-}$, set value is updated by $\boxed{\text{SET}}$.

Default setting: 0 (General measurement)

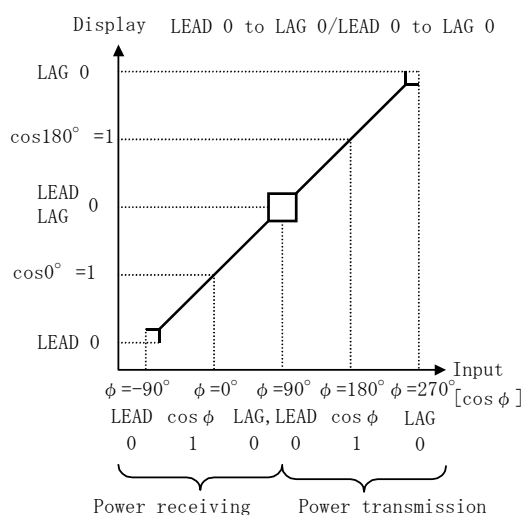


Tidal current measurement

(General measurement)



(Tidal current measurement)



6. Specification

6.1 Specification and intrinsic error.

Input circuit	Input
3-phase 3-wire Single-phase 2-wire	AC110V, 220V common use. AC5A 50/60Hz
Single-phase 3-wire	AC100-200V ⁽²²⁾ , AC5A 50/60Hz

Note ⁽²²⁾ The rated voltage of each phase and W phase is 100V. However, the full scale of a bar graph is 300V.

Measurement item	Measurement range / Display specification	Intrinsic error ⁽²³⁾		Maximum measurement ⁽²⁷⁾	Minimum measurement ⁽²⁷⁾	Notes
		Digital display	Communication output ⁽²⁴⁾			
Voltage	AC150V to 750kV	±0.5%	±0.5%	○	○	RY-YB-BR line change ⁽²⁵⁾
Current	Maximum demand, Demand, Instant AC5A to 30kA	±0.5%	±0.5%	○	○	R-Y-B phase change ⁽²⁶⁾ Apart from a measurement range, range setting of a display and an output is possible.
Active power	Maximum demand, Demand, Instant 150.0W to 1200MW (Range select) In voltage and current range. One-way deflection or both deflection can be setting.	±0.5%	±0.5%	○	○	
Reactive power	LEAD, LAG 150.0var to 1200Mvar (Range select) In voltage and current range.	±0.5%	±0.5%	○	○	
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 : $\cos \phi = 1$. (Output is $\cos \phi = 1$ 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)

Measurement item	Measurement range / Display specification	Intrinsic error ⁽²³⁾		Maximum measurement ⁽²⁷⁾	Minimum measurement ⁽²⁷⁾	Notes
		Digital display	Pulse output ⁽²⁴⁾			
Watt-hour	Display : Integer, 5 digit. Multiplier: Integral number time of 10. Expansion display is possible to the 3rd place below a decimal point. 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 time of 10. Expansion display is possible to the 3rd place below a decimal point. 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 ⁽²³⁾ 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.

Note ⁽²⁴⁾ Communication output, pulse output, alarm output and external operation input are options.

Note ⁽²⁵⁾ Single-phase 3-wire (R-W-B) : RW-BW-RB, Single-phase 3-wire (R-W-Y) : RW-YW-RY, Single-phase 3-wire (Y-W-B) : YW-BW-YB, Single-phase 2-wire : With no phase display.

Note ⁽²⁶⁾ Single-phase 3-wire (R-W-B) : R-W-B, Single-phase 3-wire (R-W-Y) : R-W-Y, Single-phase 3-wire (Y-W-B) : Y-W-B, Single-phase 2-wire : With no phase display.

Note ⁽²⁷⁾ It can usually check the maximum value and the minimum value by MAX/MIN switch operation from a display.

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 sub monitor factor can also be set.	
Operating method	Current, Voltage : Effective value computing type. Demand ammeter : Arithmetic method according with bimetallic type. Demand 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. Power factor : Calculates for active power and reactive power. Frequency : Zero cross cycle computing type.	
Interval setting	Demand current	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)
	Demand power	
The factor in which display setting is possible	Main monitor	Voltage (Each phase and line), Current (Each phase), Demand current (Each phase), Maximum demand current (Each phase), Active power, Demand power, Maximum demand power, Reactive power, Power factor, Frequency, Watt-hour (Power receiving, Power transmission), var-hour (Power receiving LAG/LEAD, Power transmission LAG/LEAD)
	Sub monitor (Left)	Voltage (Each phase and line), Current (Each phase), Active power, Reactive power, Power factor
	Sub monitor (Center)	Voltage (Each phase and line), Current (Each phase), Demand current (Each phase), Maximum demand current (Each phase), Active power, Demand power, Maximum demand power, Reactive power, var-hour (Power receiving LAG/LEAD, Power transmission LAG/LEAD)
	Sub monitor (Right)	Voltage (Each phase and line), Current (Each phase), Demand current (Each phase), Maximum demand current (Each phase), Active power, Demand power, Maximum demand power, Power factor, Frequency, Watt-hour (Power receiving, Power transmission)
	Bar graph	Voltage (Each phase and line), Current (Each phase), Demand current (Each phase), Maximum demand current (Each phase), Active power, Demand power, Maximum demand power, Reactive power, Power factor, Frequency
Option	Communication output (Modbus RTU mode). Pulse output. Alarm output. External operation change input.	

● About power and reactive power full-scale range selection.

The power range and reactive power range is automatically decided in a current range and voltage range.
The full scale range of a bar graph can be selected out of the following range within a 30 to 120%, assuming that the rated power (VT ratio × CT ratio)⁽²⁸⁾ 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 × 10ⁿ

Example) (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⁽²⁸⁾ Assume VT ratio is “2” for calculation in case of 220V input specifications.

● Measurement is possible range.

Measurement factor	Input ⁽²⁹⁾	Measurement is possible range	
		Display	Communication output
Voltage	AC0 to 150V [AC0 to 300V]	101% of meter full scale	101% of output span
Current	AC0 to 5A	120% of meter full scale ⁽³⁰⁾	120% of output span
Demand current		200% of meter full scale ⁽³⁰⁾	120% of output span
Active power	±1kW [±2kW]	120% of meter full scale ⁽³⁰⁾	-1% and 120% of output span
Demand power		200% of meter full scale ⁽³⁰⁾	-1% and 120% of output span
Reactive power	LEAD 1 to 0 to LAG 1kvar [LEAD 2 to 0 to LAG 2kvar]	120% of meter full scale ⁽³⁰⁾	-1% and 120% of output span
Power factor	LEAD 0 to 1 to LAG 0	LEAD 0.000 to 1 to LAG 0.000	0% and 100% of output span
	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	-1% and 101% of output span
	55 to 65Hz	54.9 to 65.1Hz	
	45 to 65Hz	44.8 to 65.2Hz	

Note⁽²⁹⁾ [] is the 300V input case.

Note⁽³⁰⁾ If the number of display digits is exceeded in spite of the measurable range, it becomes to 9999 (four-digit display) or 999 (triple digit display).

* Please reference to the communication specification (separately, Modbus RTU mode version) for the details of communication output data.

6.2 Performance

Item	Specification		
Intrinsic error	Reference to measure specification and accuracy		
Intrinsic error of bar graph	±10% (% for span)		
Influence by temperature	23±10℃ within intrinsic error.		
Compliance standard	JIS C 1102-1 : 2007 , JIS C 1102-2, -3, -4, -5, -7 : 1997 , JIS C 1111 : 2006 , JIS C 1216-1 : 2009 , JIS C 1263-1 : 2009 , TIA-485-A (2003)		
Safety	JIS C 1010-1 : 2005 CATⅢ (The category to the measurement performed with fabric equipment) Maximum circuit voltage 300V Pollution degree 2 (Usually, environment which only contamination of non-conductivity generates. However, temporary conductivity which originates in dew condensation depending on the case occurs.)		
Display updating time	About 1 second (Bar graph : 0.25 seconds)		
Display device Display composition	LCD 〔 Number, Character, Segment color : Black 〕	Main monitor Sub monitor (Left) Sub monitor (Center), (Right) Bar graph	5 digit, character height 11mm 4 digit, character height 6mm 5 digit, character height 6mm 20 dots
LCD view angle	Standard	For upper installation (For lower view)	Upper view angle 10° , Lower view angle 60° , Right and left view angle 60°
	Special	For lower installation (For upper view)	Upper view angle 60° , Lower view angle 10° , Right and left view angle 60°
Backlight	White (LED backlight) ⁽³¹⁾ Always-on, Auto off (after 5 minutes without operating), Always-off. Setting is possible. Select brightness from 5 steps of 1 to 5.		
Auxiliary supply	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		
Rush current (Time constant)	Rated voltage AC110V 2.2A or less (About 2.5ms)		
	Rated voltage AC220V 4.4A or less (About 2.5ms)		
	Rated voltage DC110V 1.6A or less (About 2.5ms)		
Input consumption VA	Voltage circuit	0.25VA or less (110V) , 0.5VA or less (220V)	
	Current circuit	0.1VA or less (5A)	
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	Between electric circuits and case (Earth).		Above 50MΩ at DC500V
	Between input and output and auxiliary supply.		
	Between communication output and pulse output and alarm output.		
Voltage test (Commercial frequency withstand voltage) JIS C 1102-1 JIS C 1111 JIS C 1216-1 JIS C 1263-1	Between electric circuits and case (Earth).		AC2210V (50/60Hz) 5 seconds
	Between input and output and auxiliary supply.		
	Between electric circuits and case (Earth).		AC2000V (50/60Hz) 1 minute
	Between input and output and auxiliary supply.		
	Between communication output and pulse output and alarm output.		
Impulse voltage test (Lightning impulse withstand voltage) JIS C 1111 JIS C 1216-1 JIS C 1263-1	Between electric circuits and case (Earth). (Communication output is excluded)		6kV 1.2/50μs Both positive and negative polarities, for each 3 time.
	Between input and auxiliary supply. (Grounds an output.)		5kV 1.2/50μs Both positive and negative polarities, for each 3 time.

Note⁽³¹⁾ About white backlight.

The white backlight of this product is using white LED which combined the special phosphor and blue LED. In the characteristics of this LED, color tone may be different for each product.

Item	Specification
Noise-capacity JEA B-402	(1) Oscillatory surge voltage When a damping vibration waveform (peak voltage 2.5kV, frequency 1MHz$\pm$10%) is repeatedly applied, the measurement error should be within 10% and no malfunction should occur. And, do not be a communication error and stop. Voltage input circuit (Normal / Common), Current input circuit (Common), Auxiliary supply circuit (Normal / Common) (2) Square wave impulse noise If a noise (1μs, 100ns width) is repeated and added, a measurement error should be within 10%. And, there needs to be no malfunction. And, do not be a communication error and stop. Auxiliary supply circuit (Normal / Common) Over 1500V Voltage input circuit (Normal / Common) Over 1500V Current input circuit (Common) Over 1500V Pulse output (Common) Over 1000V Alarm output (Common) Over 1000V Operation input (Common) Over 1000V Communication output circuit (Induction) Over 1000V (3) Electric wave noise If intermittence irradiation of the electric wave of a 150MHz, 400MHz band is done by (5W, 1m), a measurement error should be within 10%. And, there needs to be no malfunction. And, do not be a communication error and stop. (4) Electrostatic noise Measurement error should be within 10% at contact discharge 8kV and air discharge 15kV, and malfunction shall not occur. And, do not be a communication error and stop. * Communication error Even if it does a retry three consecutive times, it says the time of transmission and reception not being performed correctly.
Vibration JIS C 1102-1	Sweep vibration frequency range : 10 to 55 to 10Hz, Displacement amplitude : 0.15mm, Number of sweep : 5, Sweep velocity : 1 octave /minute
Shock JIS C 1102-1	Peak acceleration : 490m/s ² , Waveform of pulse : Sine half wave, duration of pulse : 11ms Number of shock : It is each 3 times about a forward reverse to 3 shaft orientations (right-angled to mutual). (Total 18 times)
Construction	Dimension : 110mm(Width) $\times$ 110mm(Height) $\times$ 103.5mm(Depth) Body diameter : 99mm ϕ With terminal cover
Material	Case, Cover : ABS(V-0), Terminal block : PBT, Terminal cover : Polycarbonate
Color	Black (Munsell N1.5)
Mass	Approx. 600g
Protection code	IP40
Blackout guarantee	Maximum value, Minimum value, Integrates value, Each setting value. Data hold by nonvolatile memory.
Operating temperature and humidity limits	-10 to +55°C, 30 to 85% RH, Non condensing.
Storage temperature limits	-25 to +70°C
Installation altitude	The altitude of 2000m or less.

6.3 Option

Item	Specification					
Communication output	Standard	TIA-485-A (2003)				
	Protocol	Modbus protocol RTU mode			RTU : Remote Terminal Unit (Monitor operating unit)	
		Use function code	03H, 04H, 06H, 08H		PI-MBUS-300 Rev. J Modbus Application Protocol specification V1.1b	
	Transmission system	Half duplex two-wire system				
	Synchronous system	asynchronous communication method				
	Transmission rate	4800bps / 9600bps / 19200bps / 38400bps				
	Line code	NRZ				
	Start bit	1 bit				
	Data length	8 bit				
	Parity bit	NONE (Nothing) / ODD (Odd number) / EVEN (Even number)				
	Stop bit	1 bit / 2 bit				
	Transmission code	Binary				
	Cable length	1000m				
	Address	1 to 247				The number of connection Max. 31 sets
	Error detection	CRC-16				$X^{16}+X^{15}+X^2+1$
	Topology	Multidrop				
Please reference to the communication specification (separately, Modbus RTU mode version) for the details of communication output data.						
Pulse output	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 3-wire : Full load power (kW, kvar)= $\sqrt{3}\times$ Rated voltage(V) $\times$ Rated current(A) $\times 10^{-3}$					
	■ Single-phase 3-wire : Full load power (kW, kvar)= $2\times$ Rated voltage(V) $\times$ Rated current(A) $\times 10^{-3}$					
	■ Single-phase 2-wire : Full load power (kW, kvar)=Rated voltage(V) $\times$ Rated current(A) $\times 10^{-3}$					
	Full load power (kW, kvar)		Output pulse unit. kWh(kvarh)/pulse			Multiplying factor
	Below 1		0.1	0.01	0.001	0.0001
	Over 1	Below 10	1	0.1	0.01	0.001
	Over 10	Below 100	10	1	0.1	0.01
	Over 100	Below 1,000	100	10	1	0.1
Over 1,000	Below 10,000	1,000	100	10	1	
Over 10,000	Below 100,000	10,000	1,000	100	10	
Over 100,000	Below 1,000,000	100,000	10,000	1,000	100	

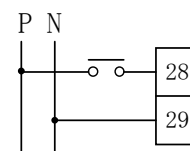
Note⁽³²⁾ Although multiplying factor is 0.01, a multiplying factor display will be 0.1.

(The place by the integer is 4 digits display. An enlarged display is 4 digits below decimal point.)

Item	Specification		
Alarm output	Alarm factor : Demand current, Demand power, Voltage, Alarm OFF. Possible to setting one of them. Reset method : Automatic reset or Manual reset (Setting) Output contact : No-voltage a contact (OR of each phase detection) Contact capacity : AC250V 5A, DC125V 0.3A (Resistance load) AC250V 2A, DC125V 0.1A (Inductive load)		
	Alarm factor	Item	Specification
	Demand current, Demand power	Function	Demand measurement value $\geq$ Upper limit setting value, Alarm display, Alarm output.
		Setting accuracy	$\pm 0.5\%$ (% for full scale)
		Setting range	5 to 100% to the maximum scale. (1% step)
	Voltage	Function	Measurement value $\geq$ Upper limit setting value, Alarm display, Alarm output. Measurement value $\leq$ Lower limit setting value, Alarm display, Alarm output.
		Setting accuracy	$\pm 0.5\%$ (% for full scale)
		Setting range	Using a full scale as 150%. 30 to 150% (1% step)
External operation input	Function		About three types of following functions (it changes by setting), it can carry out by applying a voltage signal from the outside.
	Alarm reset		Alarm output is reset (output OFF). Please refer to "4.3.6 Reset" about operation by the switch.
	Maximum / Minimum value reset		The maximum/minimum value is reset (it updates to the instantaneous value at the time). Please refer to "4.3.6 Reset" about operation by the switch.
	All reset		Resets all of the alarm output and maximum/minimum value. Please refer to "4.3.6 Reset" about operation by the switch.
	Minimum operation pulse width		300ms , Continuation applying is possible.
	Rated input		Input rating becomes the same as that of auxiliary supply. 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)

● Caution on the use of external display selection input (option)

External power consumption is 0.4VA at AC110V or 1.4VA at AC220V or 0.4W at DC110V.
In case a relay or a switch is used for power-supply supply, please use the thing of about 1mA of the minimum application loads.

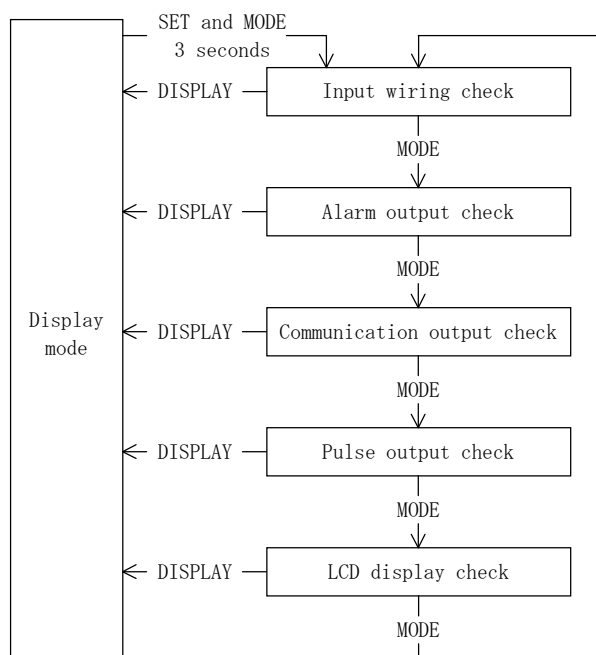


7. Maintenance and check

7.1 Trouble shooting

Symptoms	Possible causes	Remedial measures
Indicator 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.	Check the setting.
	Trouble of device.	Replace the device.
Backlight does not lights.	The setting is set to auto off or always off.	Check the setting.
Have a margin of measurement error.	Setting of a range is not right.	Please set again.
	Setting of a input voltage is not right.	Check the setting.
	Wiring is not right.	Check the wiring.
	Outside the rated frequency (45 to 65Hz).	Cannot be used.
	Cycle control, SCR phase angle control, PWM control, or other inverter output is measured.	Cannot be used.
Communication error occurs.	Communication cable is disconnection. Or communication cable isn't connected justly. (Polarity, etc.)	Check the communication cable.
	Setting of communication isn't good. (Address, Transmission rate, Parity, Stop bit)	Check the setting.
Pulse output is not outputted.	Pulse output is set to OFF or measurement factor is set to OFF.	Check the setting.
Alarm output does not return.	The return method is a "manual reset".	Check the setting.
Settings changed.	Changed an input circuit or input voltage setting.	Please set again.

7.3 Test

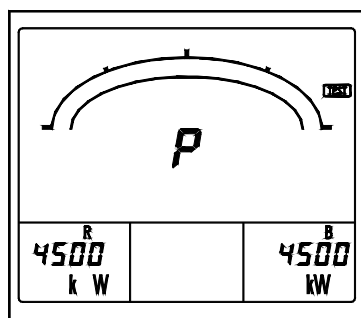


Test mode is selected by pressing **SET** and **MODE** switches continuously for longer than 3 seconds. Pushing **MODE** switch performs movement of setting item.

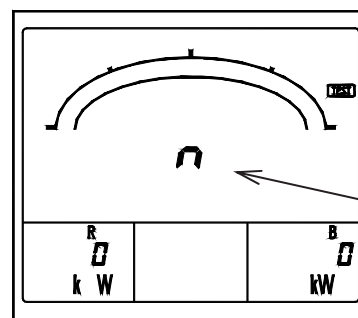
The present mode can be returned to the display mode by pressing **DISPLAY** switch.

(1) Input wiring check

It becomes a wiring check screen and can check the connection status of a voltage input and a current input.



Positive phase sequence display.



Negative phase sequence display.

The example of a display (3 ϕ 3W)

Main monitor ⁽³³⁾: Positive phase sequence, “**P**” (Positive),
 Negative phase sequence, “**n**” (Negative),
 With no input, “———”

Sub monitor (Left) ⁽³⁴⁾: Power of R phase.

Sub monitor (Right) ⁽³⁴⁾: Power of B phase.

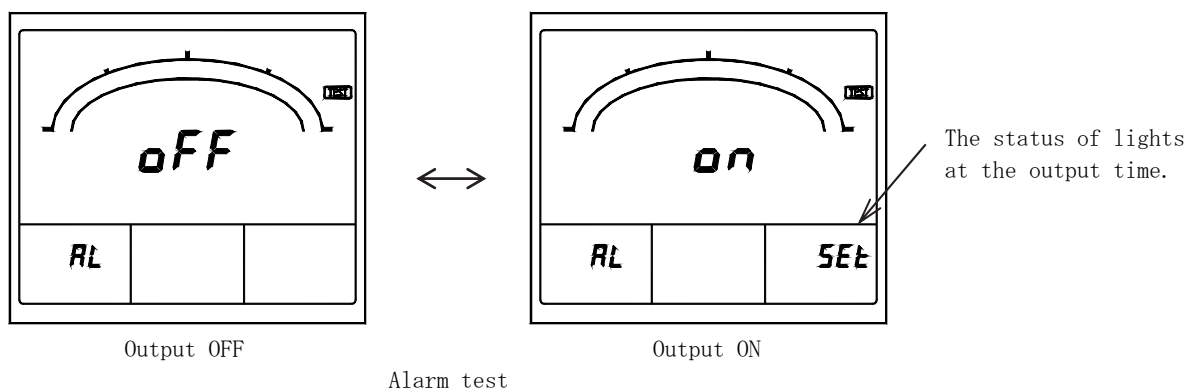
Note⁽³³⁾ It is set to “———” if it is used in 1 ϕ 3W and 1 ϕ 2W circuit.

Note⁽³⁴⁾ The phases displayed by setting of an input circuit phase wire change are different at 1 ϕ 3W.
 There is no phase display at 1 ϕ 2W.

(2) Alarm output check 【With an option】

Even if this product does not have input, it can perform ON/OFF test of an alarm output (relay-contact output). Whenever it pushes **SET**, ON and OFF change.

Default : OFF



(3) Communication output check 【With an option】

It can check the measurement data of a communication output, without applying an input.

It selects 0% (measurement data 0), 50% (measurement data 5000), and 100% (measurement data 10000) with **+** or **-** switch.

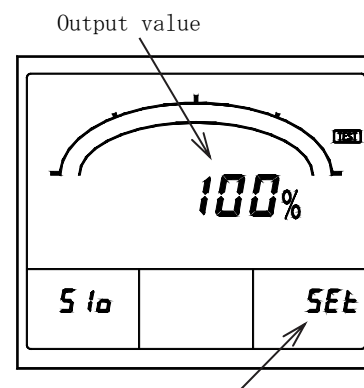
A push on **SET** changes the measurement data of all measurement factors (except for each electric energy factor).

If a request is performed from a high order in this condition, it will return selected measurement data.

Default : 0% (Measurement data 0)

However, in the following cases, measurement data is different from the above.

- The measurement data of frequency is based on frequency range setting.
At the case of 45 to 55Hz, 0% (4500), 50% (5000), 100% (5500)
At the case of 55 to 65Hz, 0% (5500), 50% (6000), 100% (6500)
At the case of 45 to 65Hz, 0% (4500), 50% (5500), 100% (6500)
- Phase voltage data of single phase 3 wire, if a phase voltage full scale is 300V setting, it becomes 0% (0), 50% (2500), and 100% (5000).
- The power and reactive power data at the case of single phase become 0% (0), 50% (2500), and 100% (5000).

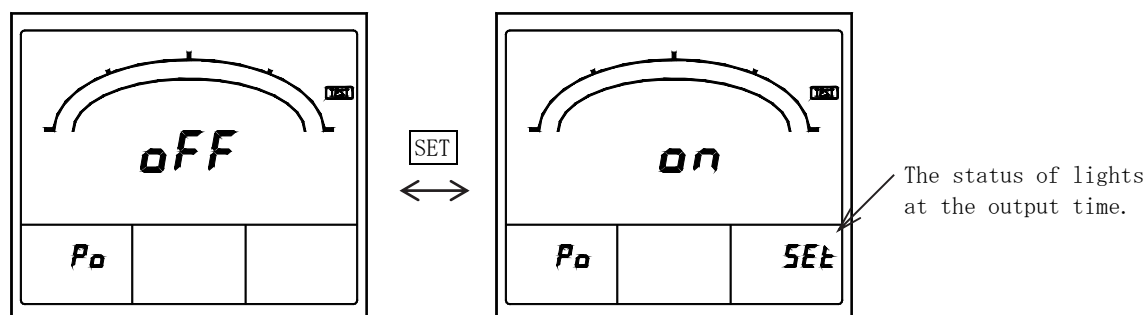


(4) Pulse output check 【With an option】

Even if this product does not have input, it can test pulse output.

A push on **SET** outputs the pulse of a rated power. Pulse unit are the settings of "232P Pulse unit".

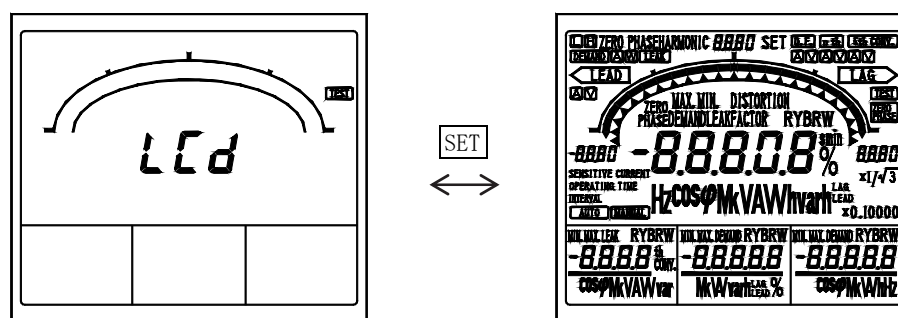
Default : OFF



(5) LCD display check

It can check a liquid crystal display. Whenever it pushes `SET`, a display changes.

Default : Main monitor “LCD” display



Appendix table 1-1

Active power range, watt-hour multiplier rate table (Three-phase three-wire)

Multiplying factor	V range A range	750kV (VT550kV/110V) [W]	500kV (VT380kV/110V) [W]	375kV (VT275kV/110V) [W]	300kV (VT220kV/110V) [W]	255kV (VT187kV/110V) [W]	210kV (VT154kV/110V) [W]	180kV (VT132kV/110V) [W]	150kV (VT110kV/110V) [W]	105kV (VT77kV/110V) [W]	90kV (VT66kV/110V) [W]	45kV (VT33kV/110V) [W]	30kV (VT22kV/110V) [W]	Multiplying factor
× 100	5A	5000 k	3600 k (3455)	2500 k	2000 k	1800 k (1700)	1400 k	1200 k	1000 k	720.0 k (700.0)	600.0 k	300.0 k	200.0 k	× 10
	6A	6000 k	4200 k (4145)	3000 k	2400 k	2400 k (2040)	1800 k (1680)	1500 k (1440)	1200 k	840 k	720.0 k	360.0 k	240.0 k	
	7.5A	7500 k	5600 M (5182)	4000 k (3750)	3000 k	2800 k (2550)	2400 k (2100)	1800 k	1500 k	1200 k (1050)	900.0 k	450.0 k	300.0 k	
	8A	8000 k	5600 k (5527)	4000 k	3200 k	2800 k (2720)	2400 k (2240)	2000 k (1920)	1600 k	1200 k (1120)	960.0 k	480.0 k	320.0 k	
	10A	10.00 M	7200 k (6909)	5000 k	4000 k	3600 k (3400)	2800 k	2400 k	2000 k	1400 k	1200 k	600.0 k	400.0 k	
	12A	12.00 M	8400 k (8291)	6000 k	4800 k	4200 k (4080)	3600 k (3360)	3000 k (2880)	2400 k	1800 k (1680)	1500 k (1440)	720.0 k	480.0 k	
	15A	15.00 M	12.00 M (10.36)	7500 k	6000 k	5600 k (5100)	4200 k	3600 k	3000 k	2400 k (2100)	1800 k	900.0 k	600.0 k	
	20A	20.00 M	14.00 M (13.82)	10.00 M	8000 k	7200 k (6800)	5600 k	4800 k	4000 k	2800 k	2400 k	1200 k	800.0 k	
	25A	25.00 M	18.00 M (17.27)	14.00 M (12.50)	10.00 M	9000 k (8500)	7200 k (7000)	6000 k	5000 k	3600 k (3500)	3000 k	1500 k	1000 k	
	30A	30.00 M	24.00 M (20.73)	15.00 M	12.00 M	12.00 M (10.20)	8400 k	7200 k	6000 k	4200 k	3600 k	1800 k	1200 k	
× 1000	40A	40.00 M	28.00 M (27.64)	20.00 M	16.00 M	14.00 M (13.60)	12.00 M (11.20)	9600 k	8000 k	5600 k	4800 M	2400 k	1600 k	× 100
	50A	50.00 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	7200 k (7000)	6000 M	3000 k	2000 k	
	60A	60.00 M	42.00 M (41.45)	30.00 M	24.00 M	24.00 M (20.40)	18.00 M (16.80)	15.00 M (14.40)	12.00 M	8400 k	7200 k	3600 k	2400 k	
	75A	75.00 M	56.00 M (51.82)	40.00 M (37.50)	30.00 M	28.00 M (25.50)	24.00 M (21.00)	18.00 M	15.00 M	12.00 M (10.50)	9000 k	4500 k	3000 k	
	80A	80.00 M	56.00 M (55.27)	40.00 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)	9600 k	4800 k	3200 k	
	100A	100.0 M	72.00 M (69.09)	50.00 M	40.00 M	36.00 M (34.00)	28.00 M	24.00 M	20.00 M	14.00 M	12.00 M	6000 k	4000 k	
	120A	120.0 M	84.00 M (82.91)	60.00 M	48.00 M	42.00 M (40.80)	36.00 M (33.60)	30.00 M (28.80)	24.00 M	18.00 M (16.80)	15.00 M (14.40)	7200 k	4800 k	
	150A	150.0 M	120.0 M (103.6)	75.00 M	60.00 M	56.00 M (51.00)	42.00 M	36.00 M	30.00 M	24.00 M (21.00)	18.00 M	9000 k	6000 k	
	200A	200.0 M	140.0 M (138.2)	100.0 M	80.00 M	72.00 M (68.00)	56.00 M	48.00 M	40.00 M	28.00 M	24.00 M	12.00 M	8000 k	
	250A	250.0 M	180.0 M (172.7)	140.0 M (125.0)	100.0 M	90.00 M (85.0)	72.00 M (70.00)	60.00 M	50.00 M	36.00 M (35.00)	30.00 M	15.00 M	10.00 M	
× 10000	300A	300.0 M	240.0 M (207.3)	150.0 M	120.0 M	12.00 M (102.0)	84.00 M	72.00 M	60.00 M	42.00 M	36.00 M	18.00 M	12.00 M	× 1000
	400A	400.0 M	280.0 M (276.4)	200.0 M	160.0 M	140.0 M (136.0)	120.0 M (112.0)	96.00 M	80.00 M	56.00 M	48.00 M	24.00 M	16.00 M	
	500A	500.0 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	72.00 M (70.00)	60.00 M	30.00 M	20.00 M	
	600A	600.0 M	420.0 M (414.5)	300.0 M	240.0 M	240.0 M (204.0)	180.0 M (168.0)	150.0 M (144.0)	120.0 M	84.00 M	72.00 M	36.00 M	24.00 M	
	750A	750.0 M	560.0 M (518.2)	400.0 M (375.0)	300.0 M	280.0 M (255.0)	240.0 M (210.0)	180.0 M	150.0 M	120.0 M (105.0)	90.00 M	45.00 M	30.00 M	
	800A	800.0 M	560.0 M (552.7)	400.0 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)	96.00 M	48.00 M	32.00 M	
	900A	900.0 M	640.0 M (621.8)	450.0 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)	56.00 M (54.00)	36.00 M	
	1000A	1000 M	720.0 M (690.9)	500.0 M	400.0 M	360.0 M (340.0)	280.0 M	240.0 M	200.0 M	140.0 M	120.0 M	60.00 M	40.00 M	
	1200A		840.0 M (829.1)	600.0 M	480.0 M	420.0 M (408.0)	360.0 M (336.0)	300.0 M (288.0)	240.0 M	180.0 M (168.0)	150.0 M (144.0)	72.00 M	48.00 M	
	1500A			750.0 M	600.0 M	560.0 M (510.0)	420.0 M	360.0 M	300.0 M	240.0 M (210.0)	180.0 M	90.00 M	60.00 M	
× 10000	1600A			800.0 M	640.0 M	560.0 M (544.0)	450.0 M (448.0)	400.0 M (384.0)	320.0 M	240.0 M (224.0)	200.0 M (192.0)	96.00 M	64.00 M	× 10000
	1800A			900.0 M	720.0 M	640.0 M (612.0)	560.0 M (504.0)	450.0 M (432.0)	360.0 M	280.0 M (252.0)	240.0 M (216.0)	120.0 M (108.0)	72.00 M	
	2000A			1000 M	800.0 M	720.0 M (680.0)	560.0 M	480.0 M	400.0 M	280.0 M	240.0 M	120.0 M	80.00 M	
	2500A				1000 M	900.0 M (850.0)	720.0 M (700.0)	600.0 M	500.0 M	360.0 M (350.0)	300.0 M	150.0 M	100.0 M	
	3000A						840.0 M	720.0 M	600.0 M	420.0 M	360.0 M	180.0 M	120.0 M	
	4000A							960.0 M	800.0 M	560.0 M	480.0 M	240.0 M	160.0 M	
	5000A								1000 M	720.0 M (700.0)	600.0 M	300.0 M	200.0 M	
	6000A									840.0 M	720.0 M	360.0 M	240.0 M	
	7500A										900.0 M	450.0 M	300.0 M	
	8000A										960.0 M	480.0 M	320.0 M	
× 10000	9000A											560.0 M (540.0)	360.0 M	× 10000
	10kA											600.0 M	400.0 M	
	12kA											720.0 M	480.0 M	
	15kA											900.0 M	600.0 M	
	20kA												800.0 M	
	30kA													

<Note 1>

Parenthesis is primary active power (reactive power) value in /1kW(1kvar).
In the blank, setting is impossible. A display of an default is 4 digits.
The unit may be changed if the number of digits is changed.

An example) 4 digits 3 digits
4800W → 4.80kW
4000kvar → 4.00Mvar
2000kW → 2.00MW

<Note 2>

In case the voltage range and the current range were set as [] of an upper table and an output pulse unit (a 4-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 (Three-phase three-wire)

Multiplying factor	V range A range	25kV (VT18.4kV/110V) [W]	24kV (VT16.5kV/110V) [W]	18kV (VT13.8kV/110V) [W]	18kV (VT13.2kV/110V) [W]	15kV (VT11kV/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]	Multiplying factor
× 10	5A	180.0 k (167.3)	150.0 k	140.0 k (125.5)	120.0 k	100.0 k	60.00 k	30.00 k	20.00 k	15.00 k	10.00 k	8000	4500 (4364)	× 0.1
	6A	240.0 k (200.7)	180.0 k	160.0 k (150.5)	150.0 k (144.0)	120.0 k	72.00 k	36.00 k	24.00 k	18.00 k	12.00 k	9600	5600 (5236)	
	7.5A	280.0 k (250.9)	240.0 k (225.0)	200.0 k (188.2)	180.0 k	150.0 k	90.00 k	45.00 k	30.00 k	24.00 k (22.50)	15.00 k	12.00 k	7200 (6545)	
	8A	280.0 k (267.6)	240.0 k	240.0 k (200.7)	200.0 k (192.0)	160.0 k	96.00 k	48.00 k	32.00 k	24.00 k	16.00 k (12.80)	14.00 k (12.80)	7200 (6982)	
	10A	360.0 k (334.5)	300.0 k	280.0 k (250.9)	240.0 k	200.0 k	120.0 k	60.00 k	40.00 k	30.00 k	20.00 k	16.00 k	9000 (8727)	
	12A	420.0 k (401.5)	360.0 k	320.0 k (301.1)	300.0 k (288.0)	240.0 k	150.0 k (144.0)	72.00 k	48.00 k	36.00 k	24.00 k	20.00 k (19.20)	12.00 k (10.47)	
	15A	560.0 k (501.8)	450.0 k	400.0 k (376.4)	360.0 k	300.0 k	180.0 k	90.00 k	60.00 k	45.00 k	30.00 k	24.00 k	14.00 k (13.09)	
	20A	720.0 k (669.1)	600.0 k	560.0 k (501.8)	480.0 k	400.0 k	240.0 k	120.0 k	80.00 k	60.00 k	40.00 k	32.00 k	18.00 k (17.45)	
	25A	840.0 k (836.4)	750.0 k	640.0 k (627.3)	600.0 k	500.0 k	300.0 k	150.0 k	100.0 k	75.00 k	50.00 k	40.00 k	24.00 k (21.82)	
	30A	1200 k (1004)	900.0 k	800.0 k (752.7)	720.0 k	600.0 k	360.0 k	180.0 k	120.0 k	90.00 k	60.00 k	48.00 k	28.00 k (26.18)	
× 100	40A	1400 k (1338)	1200 k	1200 k (1004)	960.0 k	800.0 k	480.0 k	240.0 k	160.0 k	120.0 k	80.00 k	64.00 k	36.00 k (34.91)	× 1
	50A	1800 k (1673)	1500 k	1400 k (1255)	1200 k	1000 k	600.0 k	300.0 k	200.0 k	150.0 k	100.0 k	80.00 k	45.00 k (43.64)	
	60A	2400 k (2007)	1800 k	1600 k (1505)	1500 k (1440)	1200 k	720.0 k	360.0 k	240.0 k	180.0 k	120.0 k	96.00 k	56.00 k (52.36)	
	75A	2800 k (2509)	2400 k (2250)	2000 k (1882)	1800 k	1500 k	900.0 k	450.0 k	300.0 k	240.0 k (225.0)	150.0 k	120.0 k	72.00 k (65.45)	
	80A	2800 k (2676)	2400 k	2400 k (2007)	2000 k (1920)	1600 k	960.0 k	480.0 k	320.0 k	240.0 k	160.0 k	140.0 k (128.0)	72.00 k (69.82)	
	100A	3600 k (3345)	3000 k	2800 k (2509)	2400 k	2000 k	1200 k	600.0 k	400.0 k	300.0 k	200.0 k	160.0 k	90.00 k (87.27)	
	120A	4200 k (4015)	3600 k	3200 k (3011)	3000 k (2880)	2400 k	1500 k (1440)	720.0 k	480.0 k	360.0 k	240.0 k	200.0 k (192.0)	120.0 k (104.7)	
	150A	5600 k (5018)	4500 k	4000 k (3764)	3600 k	3000 k	1800 k	900.0 k	600.0 k	450.0 k	300.0 k	240.0 k	140.0 k (130.9)	
	200A	7200 k (6691)	6000 k	5600 k (5018)	4800 k	4000 k	2400 k	1200 k	800.0 k	600.0 k	400.0 k	320.0 k	180.0 k (174.5)	
	250A	8400 k (8364)	7500 k	6400 k (6273)	6000 k	5000 k	3000 k	1500 k	1000 k	750.0 k	500.0 k	400.0 k	240.0 k (218.2)	
× 1000	300A	12.00 M (10.04)	9000 k	8000 k (7527)	7200 k	6000 k	3600 k	1800 k	1200 k	900.0 k	600.0 k	480.0 k	280.0 k (261.8)	× 10
	400A	14.00 M (13.38)	12.00 M	12.00 M (10.04)	9600 k	8000 k	4800 k	2400 k	1600 k	1200 k	800.0 k	640.0 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	6000 k	3000 k	2000 k	1500 k	1000 k	800.0 k	450.0 k (436.4)	
	600A	24.00 M (20.07)	18.00 M	16.00 M (15.05)	15.00 M (14.40)	12.00 M	7200 k	3600 k	2400 k	1800 k	1200 k	960.0 k	560.0 k (523.6)	
	750A	28.00 M (25.09)	24.00 M (22.50)	20.00 M (18.82)	18.00 M	15.00 M	9000 k	4500 k	3000 k	2400 k (2250)	1500 k	1200 k	720.0 k (654.5)	
	800A	28.00 M (26.76)	24.00 M	24.00 M (20.07)	20.00 M (19.20)	16.00 M	9600 k	4800 k	3200 k	2400 k	1600 k	1400 k (1280)	720.0 k (698.2)	
	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)	5600 k (5400)	3600 k	2800 k (2700)	1800 k	1500 k (1440)	800.0 k (785.5)	
	1000A	36.00 M (33.45)	30.00 M	28.00 M (25.09)	24.00 M	20.00 M	12.00 M	6000 k	4000 k	3000 k	2000 k	1600 k	900.0 k (872.7)	
	1200A	42.00 M (40.15)	36.00 M	32.00 M (30.11)	30.00 M (28.80)	24.00 M	15.00 M (14.40)	7200 k	4800 k	3600 k	2400 k	2000 k (1920)	1200 k (1047)	
	1500A	56.00 M (50.18)	45.00 M	40.00 M (37.64)	36.00 M	30.00 M	18.00 M	9000 k	6000 k	4500 k	3000 k	2400 k	1400 k (1309)	
× 10000	1600A	56.00 M (53.53)	48.00 M	42.00 M (40.15)	40.00 M (38.40)	32.00 M	20.00 M (19.20)	9600 k	6400 k	4800 k	3200 k	2800 k (2560)	1400 k (1396)	× 100
	1800A	64.00 M (60.22)	56.00 M (54.00)	48.00 M (45.16)	45.00 M (43.20)	36.00 M	24.00 M (21.60)	12.00 M (10.80)	7200 k	5600 k (5400)	3600 k	3000 k (2880)	1600 k (1571)	
	2000A	72.00 M (66.91)	60.00 M	56.00 M (50.18)	48.00 M	40.00 M	24.00 M	12.00 M	8000 k	6000 k	4000 k	3200 k	1800 k (1745)	
	2500A	84.00 M (83.64)	75.00 M	64.00 M (62.73)	60.00 M	50.00 M	30.00 M	15.00 M	10.00 M	7500 k	5000 k	4000 k	2400 k (2182)	
	3000A	120.0 M (100.4)	90.00 M	80.00 M (75.27)	72.00 M	60.00 M	36.00 M	18.00 M	12.00 M	9000 k	6000 k	4800 k	2800 k (2618)	
	4000A	140.0 M (133.8)	120.0 M	120.0 M (100.4)	96.00 M	80.00 M	48.00 M	24.00 M	16.00 M	12.00 M	8000 k	6400 k	3600 k (3491)	
	5000A	180.0 M (167.3)	150.0 M	140.0 M (125.5)	120.0 M	100.0 M	60.00 M	30.00 M	20.00 M	15.00 M	10.00 M	8000 k	4500 k (4364)	
	6000A	240.0 M (200.7)	180.0 M	160.0 M (150.5)	150.0 M (144.0)	120.0 M	72.00 M	36.00 M	24.00 M	18.00 M	12.00 M	9600 k	5600 k (5236)	
	7500A	280.0 M (250.9)	240.0 M (225.0)	200.0 M (188.2)	180.0 M	150.0 M	90.00 M	45.00 M	30.00 M	24.00 M (22.50)	15.00 M	12.00 M	7200 k (6545)	
	8000A	280.0 M (267.6)	240.0 M	240.0 M (200.7)	200.0 M (192.0)	160.0 M	96.00 M	48.00 M	32.00 M	24.00 M	16.00 M	14.00 M (12.80)	7200 k (6982)	
× 100000	9000A	320.0 M (301.1)	280.0 M (270.0)	240.0 M (225.8)	240.0 M (216.0)	180.0 M	120.0 M (108.0)	56.00 M (54.00)	36.00 M	28.00 M (27.00)	18.00 M	15.00 M (14.40)	8000 k (7855)	× 1000
	10kA	360.0 M (334.5)	300.0 M	280.0 M (250.9)	240.0 M	200.0 M	120.0 M	60.00 M	40.00 M	30.00 M	20.00 M	16.00 M	9000 k (8727)	
	12kA	420.0 M (401.5)	360.0 M	320.0 M (301.1)	300.0 M (288.0)	240.0 M	150.0 M (144.0)	72.00 M	48.00 M	36.00 M	24.00 M	20.00 M (19.20)	12.00 M (10.47)	
	15kA	560.0 M (501.8)	450.0 M	400.0 M (376.4)	360.0 M	300.0 M	180.0 M	90.00 M	60.00 M	45.00 M	30.00 M	24.00 M	14.00 M (13.09)	
	20kA	720.0 M (669.1)	600.0 M	560.0 M (501.8)	480.0 M	400.0 M	240.0 M	120.0 M	80.00 M	60.00 M	40.00 M	32.00 M	18.00 M (17.45)	
	30kA		900.0 M	800.0 M (752.7)	720.0 M	600.0 M	360.0 M	180.0 M	120.0 M	90.00 M	60.00 M	48.00 M	28.00 M (26.18)	

<Note 1>

Parenthesis is primary active power (reactive power) value in /1kW(1kvar).
In the blank, setting is impossible. A display of an default is 4 digits.
The unit may be changed if the number of digits is changed.

An example) 4 digits 3 digits
4800W → 4.80kW
4000kvar → 4.00Mvar
2000kW → 2.00MW

<Note 2>

In case the voltage range and the current range were set as of an upper table and an output pulse unit (a 4-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 (Three-phase three-wire)

Multiplying factor	V range A range	600V (VT460/110V) [W]	600V (VT440/110V) [W]	500V (VT380/110V) [W]	300V (VT220/110V) [W]	150V (110V) [W]	Multiplying factor
×0.01	5A	4200 (4182)	4000	3600 (3455)	2000	1000	×0.01
	6A	5600 (5018)	4800	4200 (4145)	2400	1200	
	7.5A	6400 (6273)	6000	5600 (5182)	3000	1500	
	8A	7200 (6691)	6400	5600 (5527)	3200	1600	
	10A	8400 (8364)	8000	7200 (6909)	4000	2000	
	12A	12.00 k (10.04)	9600	8400 (8291)	4800	2400	
×0.1	15A	14.00 k (12.55)	12.00 k	12.00 k (10.36)	6000	3000	×0.1
	20A	18.00 k (16.73)	16.00 k	14.00 k (13.82)	8000	4000	
	25A	24.00 k (20.91)	20.00 k	18.00 k (17.27)	10.00 k	5000	
	30A	28.00 k (25.09)	24.00 k	24.00 k (20.73)	12.00 k	6000	
	40A	36.00 k (33.45)	32.00 k	28.00 k (27.64)	16.00 k	8000	
	50A	42.00 k (41.82)	40.00 k	36.00 k (34.55)	20.00 k	10.00 k	
	60A	56.00 k (50.18)	48.00 k	42.00 k (41.45)	24.00 k	12.00 k	
	75A	64.00 k (62.73)	60.00 k	56.00 k (51.82)	30.00 k	15.00 k	
	80A	72.00 k (66.91)	64.00 k	56.00 k (55.27)	32.00 k	16.00 k	
	100A	84.00 k (83.64)	80.00 k	72.00 k (69.09)	40.00 k	20.00 k	
×1	120A	120.0 k (100.4)	96.00 k	84.00 k (82.91)	48.00 k	24.00 k	×1
	150A	140.0 k (125.5)	120.0 k	120.0 k (103.6)	60.00 k	30.00 k	
	200A	180.0 k (167.3)	160.0 k	140.0 k (138.2)	80.00 k	40.00 k	
	250A	240.0 k (209.1)	200.0 k	180.0 k (172.7)	100.0 k	50.00 k	
	300A	280.0 k (250.9)	240.0 k	240.0 k (207.3)	120.0 k	60.00 k	
	400A	360.0 k (334.5)	320.0 k	280.0 k (276.4)	160.0 k	80.00 k	
	500A	420.0 k (418.2)	400.0 k	360.0 k (345.5)	200.0 k	100.0 k	
	600A	560.0 k (501.8)	480.0 k	420.0 k (414.5)	240.0 k	120.0 k	
	750A	640.0 k (627.3)	600.0 k	560.0 k (518.2)	300.0 k	150.0 k	
	800A	720.0 k (669.1)	640.0 k	560.0 k (552.7)	320.0 k	160.0 k	
×10	900A	800.0 k (752.7)	720.0 k	640.0 k (621.8)	360.0 k	180.0 k	×10
	1000A	840.0 k (836.4)	800.0 k	720.0 k (690.9)	400.0 k	200.0 k	
	1200A	1200 k (1004)	960.0 k	840.0 k (829.1)	480.0 k	240.0 k	
	1500A	1400 k (1255)	1200 k	1200 k (1036)	600.0 k	300.0 k	
	1600A	1400 k (1338)	1400 k	1200 k (1105)	640.0 k	320.0 k	
	1800A	1600 k (1505)	1500 k	1400 k (1244)	720.0 k	360.0 k	
	2000A	1800 k (1673)	1600 k	1400 k (1382)	800.0 k	400.0 k	
	2500A	2400 k (2091)	2000 k	1800 k (1727)	1000 k	500.0 k	
	3000A	2800 k (2509)	2400 k	2400 k (2073)	1200 k	600.0 k	
	4000A	3600 k (3345)	3200 k	2800 k (2764)	1600 k	800.0 k	
×100	5000A	4200 k (4182)	4000 k	3600 k (3455)	2000 k	1000 k	×100
	6000A	5600 k (5018)	4800 k	4200 k (4145)	2400 k	1200 k	
	7500A	6400 k (6273)	6000 k	5600 k (5182)	3000 k	1500 k	
	8000A	7200 k (6691)	6400 k	5600 k (5527)	3200 k	1600 k	
	9000A	8000 k (7527)	7200 k	6400 k (6218)	3600 k	1800 k	
	10kA	8400 k (8364)	8000 k	7200 k (6909)	4000 k	2000 k	
	12kA	12.00 M (10.04)	9600 k	8400 k (8291)	4800 k	2400 k	
	15kA	14.00 M (12.55)	12.00 M	12.00 M (10.36)	6000 k	3000 k	
	20kA	18.00 M (16.73)	16.00 M	14.00 M (13.82)	8000 k	4000 k	
	30kA	28.00 M (25.09)	24.00 M	24.00 M (20.73)	12.00 M	6000 k	

<Note 1>

Parenthesis is primary active power (reactive power) value in /1kW(1kvar).
In the blank, setting is impossible. A display of an default is 4 digits.
The unit may be changed if the number of digits is changed.

An example) 4 digits 3 digits

4800W → 4.80kW

4000kvar → 4.00Mvar

2000kW → 2.00MW

<Note 2>

In case the voltage range and the current range were set as of an upper table and an output pulse unit (a 4-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 2

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

V range A range	150V (110V) [W]	Multiplied factor
5A	1000	
6A	1200	
7.5A	1500	
8A	1600	
10A	2000	
12A	2400	
15A	3000	
20A	4000	
25A	5000	
30A	6000	
40A	8000	× 0.1
50A	10.00 k	
60A	12.00 k	
75A	15.00 k	
80A	16.00 k	
100A	20.00 k	
120A	24.00 k	
150A	30.00 k	
200A	40.00 k	
250A	50.00 k	
300A	60.00 k	
400A	80.00 k	× 1
500A	100.0 k	
600A	120.0 k	
750A	150.0 k	
800A	160.0 k	
900A	180.0 k	
1000A	200.0 k	
1200A	240.0 k	
1500A	300.0 k	
1600A	320.0 k	
1800A	360.0 k	
2000A	400.0 k	
2500A	500.0 k	
3000A	600.0 k	
4000A	800.0 k	× 10
5000A	1000 k	
6000A	1200 k	
7500A	1500 k	
8000A	1600 k	
9000A	1800 k	
10000A	2000 k	
12000A	2400 k	
15000A	3000 k	
20000A	4000 k	
30000A	6000 k	× 100

<Note 1>

Parenthesis is primary active power (reactive power) value in /1kW(1kvar).
In the blank, setting is impossible. A display of an default is 4 digits.
The unit may be changed if the number of digits is changed.

An example) 4 digits 3 digits
 4800W → 4.80kW
 4000kvar → 4.00Mvar
 2000kW → 2.00MW

<Note 2>

In case the voltage range and the current range were set as [] of an upper table and an output pulse unit (a 4-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 3-1

Active power range, watt-hour multiplier rate table (Single-phase two-wire)

Multiplying factor	V range A range	750kV (VT550kV/110V) [W]	500kV (VT380kV/110V) [W]	375kV (VT275kV/110V) [W]	300kV (VT220kV/110V) [W]	255kV (VT187kV/110V) [W]	210kV (VT154kV/110V) [W]	180kV (VT132kV/110V) [W]	150kV (VT110kV/110V) [W]	105kV (VT77kV/110V) [W]	90kV (VT66kV/110V) [W]	45kV (VT33kV/110V) [W]	30kV (VT22kV/110V) [W]	Multiplying factor
× 100	5A	2500 k	1800 k (1727)	1400 k (1250)	1000 k	900.0 k (850.0)	720.0 k (700.0)	600.0 k	500.0 k	360.0 k (350.0)	300.0 k	150.0 k	100.0 k	× 10
	6A	3000 k	2400 k (2073)	1500 k	1200 k	1200 k (1020)	840.0 k	720.0 k	600.0 k	420.0 k	360.0 k	180.0 k	120.0 k	
	7.5A	4000 k (3750)	2800 k (2591)	2000 k (1875)	1500 k	1400 k (1275)	1200 k (1050)	900.0 k	750.0 k	560.0 k (525.0)	450.0 k	240.0 k (225.0)	150.0 k	
	8A	4000 k	2800 k (2764)	2000 k	1600 k	1400 k (1360)	1200 k (1120)	960.0 k	800.0 k	560.0 k	480.0 k	240.0 k	160.0 k	
	10A	5000 k	3600 k (3455)	2500 k	2000 k	1800 k (1700)	1400 k	1200 k	1000 k	720.0 k (700.0)	600.0 k	300.0 k	200.0 k	
	12A	6000 k	4200 k (4145)	3000 k	2400 k	2400 k (2040)	1800 k (1680)	1500 k (1440)	1200 k	840.0 k	720.0 k	360.0 k	240.0 k	
	15A	7500 k	5600 k (5182)	4000 k (3750)	3000 k	2800 k (2550)	2400 k (2100)	1800 k	1500 k	1200 k (1050)	900.0 k	450.0 k	300.0 k	
	20A	10.00 M	7200 k (6909)	5000 k	4000 k	3600 k (3400)	2800 k	2400 k	2000 k	1400 k	1200 k	600.0 k	400.0 k	
	25A	14.00 M (12.50) M	9000 k (8636)	6400 k (6250)	5000 k	4500 k (4250)	3600 k (3500)	3000 k	2500 k	1800 k (1750)	1500 k	750.0 k	500.0 k	
	30A	15.00 M	12.00 M (10.36)	7500 M	6000 k	5600 k (5100)	4200 k	3600 k	3000 k	2400 k (2100)	1800 k	900.0 k	600.0 k	
× 1000	40A	20.00 M	14.00 M (13.82)	10.00 M	8000 k	7200 k (6800)	5600 M	4800 k	4000 k	2800 k	2400 k	1200 k	800.0 k	× 100
	50A	25.00 M	18.00 M (17.27)	14.00 M (12.50)	10.00 M	9000 k (8500)	7200 M (7000)	6000 k	5000 k	3600 k (3500)	3000 k	1500 k	1000 k	
	60A	30.00 M	24.00 M (20.73)	15.00 M	12.00 M	12.00 M (10.20)	8400 M	7200 k	6000 k	4200 k	3600 k	1800 k	1200 k	
	75A	40.00 M (37.50)	28.00 M (25.91)	20.00 M (18.75)	15.00 M	14.00 M (12.75)	12.00 M (10.50)	9000 k	7500 k	5600 k (5250)	4500 k	2400 k (2250)	1500 k	
	80A	40.00 M	28.00 M (27.64)	20.00 M	16.00 M	14.00 M (13.60)	12.00 M (11.20)	9600 k	8000 k	5600 k	4800 k	2400 k	1600 k	
	100A	50.00 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	7200 k (7000)	6000 k	3000 k	2000 k	
	120A	60.00 M	42.00 M (41.45)	30.00 M	24.00 M	24.00 M (20.40)	18.00 M (16.80)	15.00 M (14.40)	12.00 M	8400 k	7200 k	3600 k	2400 k	
	150A	75.00 M	56.00 M (51.82)	40.00 M (37.50)	30.00 M	28.00 M (25.50)	24.00 M (21.00)	18.00 M	15.00 M	12.00 M (10.50)	9000 M	4500 k	3000 k	
	200A	100.0 M	72.00 M (69.09)	50.00 M	40.00 M	36.00 M (34.00)	28.00 M	24.00 M	20.00 M	14.00 M	12.00 M	6000 k	4000 k	
	250A	140.0 M (125.0) M	90.00 M (86.36)	64.00 M (62.50)	50.00 M	45.00 M (42.50)	36.00 M (35.00)	30.00 M	25.00 M	18.00 M (17.50)	15.00 M	7500 k	5000 k	
× 10000	300A	150.0 M	120.0 M (103.6)	75.00 M	60.00 M	56.00 M (51.00)	42.00 M	36.00 M	30.00 M	24.00 M (21.00)	18.00 M	9000 k	6000 k	× 1000
	400A	200.0 M	140.0 M (138.2)	100.0 M	80.00 M	72.00 M (68.00)	56.00 M	48.00 M	40.00 M	28.00 M	24.00 M	12.00 M	8000 k	
	500A	250.0 M	180.0 M (172.7)	140.0 M (125.0)	100.0 M	90.00 M (85.00)	72.00 M (70.00)	60.00 M	50.00 M	36.00 M (35.00)	30.00 M	15.00 M	10.00 M	
	600A	300.0 M	240.0 M (207.3)	150.0 M	120.0 M	120.0 M (102.0)	84.00 M	72.00 M	60.00 M	42.00 M	36.00 M	18.00 M	12.00 M	
	750A	400.0 M (375.0) M	280.0 M (259.1)	200.0 M (187.5)	150.0 M	140.0 M (127.5)	120.0 M (105.0)	90.00 M	75.00 M	56.00 M (52.50)	45.00 M	24.00 M (22.50)	15.00 M	
	800A	400.0 M	280.0 M (276.4)	200.0 M	160.0 M	140.0 M (136.0)	120.0 M (112.0)	96.00 M	80.00 M	56.00 M	48.00 M	24.00 M	16.00 M	
	900A	450.0 M	320.0 M (310.9)	240.0 M (225.0)	180.0 M	160.0 M (153.0)	140.0 M (126.0)	120.0 M (108.0)	90.00 M	64.00 M (63.00)	56.00 M (54.00)	28.00 M (27.00)	18.00 M	
	1000A	500.0 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	72.00 M (70.00)	60.00 M	30.00 M	20.00 M	
	1200A	600.0 M	420.0 M (414.5)	300.0 M	240.0 M	240.0 M (204.0)	180.0 M (168.0)	150.0 M (144.0)	120.0 M	84.00 M	72.00 M	36.00 M	24.00 M	
	1500A	750.0 M	560.0 M (518.2)	400.0 M (375.0)	300.0 M	280.0 M (255.0)	240.0 M (210.0)	180.0 M	150.0 M	120.0 M (105.0)	90.00 M	45.00 M	30.00 M	
× 10000	1600A	800.0 M	560.0 M (552.7)	400.0 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)	96.00 M	48.00 M	32.00 M	× 10000
	1800A	900.0 M	640.0 M (621.8)	450.0 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)	56.00 M (54.00)	36.00 M	
	2000A		720.0 M (690.9)	500.0 M	400.0 M	360.0 M (340.0)	280.0 M	240.0 M	200.0 M	140.0 M	120.0 M	60.00 M	40.00 M	
	2500A		900.0 M (863.6)	640.0 M (625.0)	500.0 M	450.0 M (425.0)	360.0 M (350.0)	300.0 M	250.0 M	180.0 M (175.0)	150.0 M	75.00 M	50.00 M	
	3000A			750.0 M	600.0 M	560.0 M (510.0)	420.0 M	360.0 M	300.0 M	240.0 M (210.0)	180.0 M	90.00 M	60.00 M	
	4000A				800.0 M	720.0 M (680.0)	560.0 M	480.0 M	400.0 M	280.0 M	240.0 M	120.0 M	80.00 M	
	5000A					900.0 M (850.0)	720.0 M (700.0)	600.0 M	500.0 M	360.0 M (350.0)	300.0 M	150.0 M	100.0 M	
	6000A						840.0 M	720.0 M	600.0 M	420.0 M	360.0 M	180.0 M	120.0 M	
	7500A							900.0 M	750.0 M	560.0 M (525.0)	450.0 M	240.0 M (225.0)	150.0 M	
	8000A								800.0 M	560.0 M	480.0 M	240.0 M	160.0 M	
	9000A								900.0 M	640.0 M (630.0)	560.0 M (540.0)	280.0 M (270.0)	180.0 M	
× 10000	10kA									720.0 M (700.0)	600.0 M	300.0 M	200.0 M	× 10000
	12kA									840.0 M	720.0 M	360.0 M	240.0 M	
	15kA										900.0 M	450.0 M	300.0 M	
	20kA											600.0 M	400.0 M	
	30kA											900.0 M	600.0 M	

<Note 1>

Parenthesis is primary active power (reactive power) value in /500W(500var).

In the blank, setting is impossible. A display of an default is 4 digits.

The unit may be changed if the number of digits is changed.

An example) 4 digits 3 digits

4800W → 4.80kW

4000kvar → 4.00Mvar

2000kW → 2.00MW

<Note 2>

In case the voltage range and the current range were set as of an upper table and an output pulse unit (a 4-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 3-2

Active power range, watt-hour multiplier rate table (Single-phase two-wire)

Multiplying factor	V range A range	25kV (VT18.4kV/110V) [W]	24kV (VT16.5kV/110V) [W]	18kV (VT13.8kV/110V) [W]	18kV (VT13.2kV/110V) [W]	15kV (VT11kV/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]	Multiplying factor
× 1	5A	84.00 k (83.64)	75.00 k	64.00 k (62.73)	60.00 k	50.00 k	30.00 k	15.00 k	10.00 k	7500	5000	4000	2400 (2182)	× 0.1
	6A	120.0 k (100.4)	90.00 k	80.00 k (75.27)	72.00 k	60.00 k	36.00 k	18.00 k	12.00 k	9000	6000	4800	2800 (2618)	
	7.5A	140.0 k (125.5)	120.0 k (112.5)	96.00 k (94.09)	90.00 k	75.00 k	45.00 k	24.00 k (22.50)	15.00 k	12.00 k (11.25)	7500	6000	3600 (3273)	
	8A	140.0 k (133.8)	120.0 k	120.0 k (100.4)	96.00 k	80.00 k	48.00 k	24.00 k	16.00 k	12.00 k	8000	6400	3600 (3491)	
	10A	180.0 k (167.3)	150.0 k	140.0 k (125.5)	120.0 k	100.0 k	60.00 k	30.00 k	20.00 k	15.00 k	10.00 k	8000	4500 (4364)	
	12A	240.0 k (200.7)	180.0 k	160.0 k (150.5)	150.0 k (144.0)	120.0 k	72.00 k	36.00 k	24.00 k	18.00 k	12.00 k	9600	5600 (5236)	
	15A	280.0 k (250.9)	240.0 k (225.0)	200.0 k (188.2)	180.0 k	150.0 k	90.00 k	45.00 k	30.00 k	24.00 k (22.50)	15.00 k	12.00 k	7200 (6545)	
	20A	360.0 k (334.5)	300.0 k	280.0 k (250.9)	240.0 k	200.0 k	120.0 k	60.00 k	40.00 k	30.00 k	20.00 k	16.00 k	9000 (8727)	
	25A	420.0 k (418.2)	400.0 k (375.0)	320.0 k (313.6)	300.0 k	250.0 k	150.0 k	75.00 k	50.00 k	40.00 k (37.50)	25.00 k	20.00 k	12.00 k (10.91)	
	30A	560.0 k (501.8)	450.0 k	400.0 k (376.4)	360.0 k	300.0 k	180.0 k	90.00 k	60.00 k	45.00 k	30.00 k	24.00 k	14.00 k (13.09)	
× 10	40A	720.0 k (669.1)	600.0 k	560.0 k (501.8)	480.0 k	400.0 k	240.0 k	120.0 k	80.00 k	60.00 k	40.00 k	32.00 k	18.00 k (17.45)	× 1
	50A	840.0 k (836.4)	750.0 k	640.0 k (627.3)	600.0 k	500.0 k	300.0 k	150.0 k	100.0 k	75.00 k	50.00 k	40.00 k	24.00 k (21.82)	
	60A	1200 k (1004)	900.0 k	800.0 k (752.7)	720.0 k	600.0 k	360.0 k	180.0 k	120.0 k	90.00 k	60.00 k	48.00 k	28.00 k (26.18)	
	75A	1400 k (1255)	1200 k (1125)	960.0 k (940.9)	900.0 k	750.0 k	450.0 k	240.0 k (225.0)	150.0 k	120.0 k (112.5)	75.00 k	60.00 k	36.00 k (32.73)	
	80A	1400 k (1338)	1200 k	1200 k (1004)	960.0 k	800.0 k	480.0 k	240.0 k	160.0 k	120.0 k	80.00 k	64.00 k	36.00 k (34.91)	
	100A	1800 k (1673)	1500 k	1400 k (1255)	1200 k	1000 k	600.0 k	300.0 k	200.0 k	150.0 k	100.0 k	80.00 k	45.00 k (43.64)	
	120A	2400 k (2007)	1800 k	1600 k (1505)	1500 k (1440)	1200 k	720.0 k	360.0 k	240.0 k	180.0 k	120.0 k	96.00 k	56.00 k (52.36)	
	150A	2800 k (2509)	2400 k (2250)	2000 k (1882)	1800 k	1500 k	900.0 k	450.0 k	300.0 k	240.0 k (225.0)	150.0 k	120.0 k	72.00 k (65.45)	
	200A	3600 k (3345)	3000 k	2800 k (2509)	2400 k	2000 k	1200 k	600.0 k	400.0 k	300.0 k	200.0 k	160.0 k	90.00 k (87.27)	
	250A	4200 k (4182)	4000 k (3750)	3200 k (3136)	3000 k	2500 k	1500 k	750.0 k	500.0 k	400.0 k (375.0)	250.0 k	200.0 k	120.0 k (109.1)	
× 100	300A	5600 k (5018)	4500 k	4000 k (3764)	3600 k	3000 k	1800 k	900.0 k	600.0 k	450.0 k	300.0 k	240.0 k	140.0 k (130.9)	× 10
	400A	7200 k (6691)	6000 k	5600 k (5018)	4800 k	4000 k	2400 k	1200 k	800.0 k	600.0 k	400.0 k	320.0 k	180.0 k (174.5)	
	500A	8400 k (8364)	7500 k	6400 k (6273)	6000 k	5000 k	3000 k	1500 k	1000 k	750.0 k	500.0 k	400.0 k	240.0 k (218.2)	
	600A	12.00 M (10.04)	9000 k	8000 k (7527)	7200 k	6000 k	3600 k	1800 k	1200 k	900.0 k	600.0 k	480.0 k	280.0 k (261.8)	
	750A	14.00 M (12.55)	12.00 M (11.25)	9600 k (9409)	9000 k	7500 k	4500 k	2400 k (2250)	1500 k	1200 k (1125)	750.0 k	600.0 k	360.0 k (327.3)	
	800A	14.00 M (13.38)	12.00 M	12.00 M (10.04)	9600 k	8000 k	4800 k	2400 k	1600 k	1200 k	800.0 k	640.0 k	360.0 k (349.1)	
	900A	16.00 M (15.05)	14.00 M (13.50)	12.00 M (11.29)	12.00 M (10.80)	9000 k	5600 k (5400)	2800 k (2700)	1800 k	1400 k (1350)	900.0 k	720.0 k	400.0 k (392.7)	
	1000A	18.00 M (16.73)	15.00 M	14.00 M (12.55)	12.00 M	10.00 M	6000 k	3000 k	2000 k	1500 k	1000 k	800.0 k	450.0 k (436.4)	
	1200A	24.00 M (20.07)	18.00 M	16.00 M (15.05)	15.00 M (14.40)	12.00 M	7200 k	3600 k	2400 k	1800 k	1200 k	960.0 k	560.0 k (523.6)	
	1500A	28.00 M (25.09)	24.00 M (22.50)	20.00 M (18.82)	18.00 M	15.00 M	9000 k	4500 k	3000 k	2400 k (2250)	1500 k	1200 k	720.0 k (654.5)	
× 1000	1600A	28.00 M (26.76)	24.00 M	24.00 M (20.07)	20.00 M (19.20)	16.00 M	9600 k	4800 k	3200 k	2400 k	1600 k	1400 k (1280)	720.0 k (698.2)	× 100
	1800A	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)	5600 k (5400)	3600 k	2800 k (2700)	1800 k	1500 k (1440)	800.0 k (785.5)	
	2000A	36.00 M (33.45)	30.00 M	28.00 M (25.09)	24.00 M	20.00 M	12.00 M	6000 k	4000 k	3000 k	2000 k	1600 k	900.0 k (872.7)	
	2500A	42.00 M (41.82)	40.00 M (37.50)	32.00 M (31.36)	30.00 M	25.00 M	15.00 M	7500 k	5000 k	4000 k (3750)	2500 k	2000 k	1200 k (1091)	
	3000A	56.00 M (50.18)	45.00 M	40.00 M (37.64)	36.00 M	30.00 M	18.00 M	9000 k	6000 k	4500 k	3000 k	2400 k	1400 k (1309)	
	4000A	72.00 M (66.91)	60.00 M	56.00 M (50.18)	48.00 M	40.00 M	24.00 M	12.00 M	8000 k	6000 k	4000 k	3200 k	1800 k (1745)	
	5000A	84.00 M (83.64)	75.00 M	64.00 M (62.73)	60.00 M	50.00 M	30.00 M	15.00 M	10.00 M	7500 k	5000 k	4000 k	2400 k (2182)	
	6000A	120.0 M (100.4)	90.00 M	80.00 M (75.27)	72.00 M	60.00 M	36.00 M	18.00 M	12.00 M	9000 k	6000 k	4800 k	2800 k (2618)	
	7500A	140.0 M (125.5)	120.0 M (112.5)	96.00 M (94.09)	90.00 M	75.00 M	45.00 M	24.00 M (22.50)	15.00 M	12.00 M (11.25)	7500 k	6000 k	3600 k (3273)	
	8000A	140.0 M (133.8)	120.0 M	120.0 M (100.4)	96.00 M	80.00 M	48.00 M	24.00 M	16.00 M	12.00 M	8000 k	6400 k	3600 k (3491)	
× 10000	9000A	160.0 M (150.5)	140.0 M (135.0)	120.0 M (112.9)	120.0 M (108.0)	90.00 M	56.00 M (54.00)	28.00 M (27.00)	18.00 M	14.00 M (13.50)	9000 k	7200 k	4000 k (3927)	× 1000
	10kA	180.0 M (167.3)	150.0 M	140.0 M (125.5)	120.0 M	100.0 M	60.00 M	30.00 M	20.00 M	15.00 M	10.00 M	8000 k	4500 k (4364)	
	12kA	240.0 M (200.7)	180.0 M	160.0 M (150.5)	150.0 M (144.0)	120.0 M	72.00 M	36.00 M	24.00 M	18.00 M	12.00 M	9600 k	5600 k (5236)	
	15kA	280.0 M (250.9)	240.0 M (225.0)	200.0 M (188.2)	180.0 M	150.0 M	90.00 M	45.00 M	30.00 M	24.00 M (22.50)	15.00 M	12.00 M	7200 k (6545)	
	20kA	360.0 M (334.5)	300.0 M	280.0 M (250.9)	240.0 M	200.0 M	120.0 M	60.00 M	40.00 M	30.00 M	20.00 M	16.00 M	9000 k (8727)	
	30kA	560.0 M (501.8)	450.0 M	400.0 M (376.4)	360.0 M	300.0 M	180.0 M	90.00 M	60.00 M	45.00 M	30.00 M	24.00 M	14.00 M (13.09)	

<Note 1>

Parenthesis is primary active power (reactive power) value in /500W(500var).
 In the blank, setting is impossible. A display of an default is 4 digits.
 The unit may be changed if the number of digits is changed.

An example) 4 digits 3 digits
 4800W → 4.80kW
 4000kvar → 4.00Mvar
 2000kW → 2.00MW

<Note 2>

In case the voltage range and the current range were set as of an upper table and an output pulse unit (a 4-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 3-3

Active power range, watt-hour multiplier rate table (Single-phase two-wire)

Multiplying factor	V range A range	600V (VT460/110V) [W]	600V (VT440/110V) [W]	500V (VT380/110V) [W]	300V (VT220/110V) [W]	150V (110V) [W]	Multiplying factor
× 0.1	5A	2400 (2091)	2000	1800 (1727)	1000	500.0	× 0.01
	6A	2800 (2509)	2400	2400 (2073)	1200	600.0	
	7.5A	3200 (3136)	3000	2800 (2591)	1500	750.0	
	8A	3600 (3345)	3200	2800 (2764)	1600	800.0	
	10A	4200 (4182)	4000	3600 (3455)	2000	1000	
	12A	5600 (5018)	4800	4200 (4145)	2400	1200	
	15A	6400 (6273)	6000	5600 (5182)	3000	1500	
	20A	8400 (8364)	8000	7200 (6909)	4000	2000	
× 0.1	25A	12.00 k (10.45)	10.00 k	9000 (8636)	5000	2500	× 0.1
	30A	14.00 k (12.55)	12.00 k	12.00 k (10.36)	6000	3000	
	40A	18.00 k (16.73)	16.00 k	14.00 k (13.82)	8000	4000	
	50A	24.00 k (20.91)	20.00 k	18.00 k (17.27)	10.00 k	5000	
	60A	28.00 k (25.09)	24.00 k	24.00 k (20.73)	12.00 k	6000	
	75A	32.00 k (31.36)	30.00 k	28.00 k (25.91)	15.00 k	7500	
	80A	36.00 k (33.45)	32.00 k	28.00 k (27.64)	16.00 k	8000	
	100A	42.00 k (41.82)	40.00 k	36.00 k (34.55)	20.00 k	10.00 k	
× 1	120A	56.00 k (50.18)	48.00 k	42.00 k (41.45)	24.00 k	12.00 k	× 1
	150A	64.00 k (62.73)	60.00 k	56.00 k (51.82)	30.00 k	15.00 k	
	200A	84.00 k (83.64)	80.00 k	72.00 k (69.09)	40.00 k	20.00 k	
	250A	120.0 k (104.5)	100.0 k	90.00 k (86.36)	50.00 k	25.00 k	
	300A	140.0 k (125.5)	120.0 k	120.0 k (103.6)	60.00 k	30.00 k	
	400A	180.0 k (167.3)	160.0 k	140.0 k (138.2)	80.00 k	40.00 k	
	500A	240.0 k (209.1)	200.0 k	180.0 k (172.7)	100.0 k	50.00 k	
	600A	280.0 k (250.9)	240.0 k	240.0 k (207.3)	120.0 k	60.00 k	
× 10	750A	320.0 k (313.6)	300.0 k	280.0 k (259.1)	150.0 k	75.00 k	× 10
	800A	360.0 k (334.5)	320.0 k	280.0 k (276.4)	160.0 k	80.00 k	
	900A	400.0 k (376.4)	360.0 k	320.0 k (310.9)	180.0 k	90.00 k	
	1000A	420.0 k (418.2)	400.0 k	360.0 k (345.5)	200.0 k	100.0 k	
	1200A	560.0 k (501.8)	480.0 k	420.0 k (414.5)	240.0 k	120.0 k	
	1500A	640.0 k (627.3)	600.0 k	560.0 k (518.2)	300.0 k	150.0 k	
	1600A	720.0 k (669.1)	640.0 k	560.0 k (552.7)	320.0 k	160.0 k	
	1800A	800.0 k (752.7)	720.0 k	640.0 k (621.8)	360.0 k	180.0 k	
× 100	2000A	840.0 k (836.4)	800.0 k	720.0 k (690.9)	400.0 k	200.0 k	× 100
	2500A	1200 k (1045)	1000 k	900.0 k (863.6)	500.0 k	250.0 k	
	3000A	1400 k (1255)	1200 k	1200 k (1036)	600.0 k	300.0 k	
	4000A	1800 k (1673)	1600 k	1400 k (1382)	800.0 k	400.0 k	
	5000A	2400 k (2091)	2000 k	1800 k (1727)	1000 k	500.0 k	
	6000A	2800 k (2509)	2400 k	2400 k (2073)	1200 k	600.0 k	
	7500A	3200 k (3136)	3000 k	2800 k (2591)	1500 k	750.0 k	
	8000A	3600 k (3345)	3200 k	2800 k (2764)	1600 k	800.0 k	
× 1000	9000A	4000 k (3764)	3600 k	3200 k (3109)	1800 k	900.0 k	× 1000
	10kA	4200 k (4182)	4000 k	3600 k (3455)	2000 k	1000 k	
	12kA	5600 k (5018)	4800 k	4200 k (4145)	2400 k	1200 k	
	15kA	6400 k (6273)	6000 k	5600 k (5182)	3000 k	1500 k	
	20kA	8400 k (8364)	8000 k	7200 k (6909)	4000 k	2000 k	
	30kA	14.00 M (12.55)	12.00 M	12.00 M (10.36)	6000 k	3000 k	

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