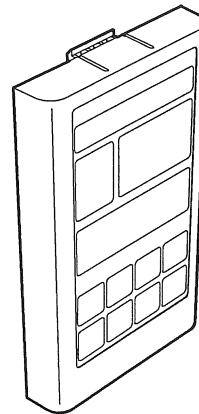




## Display Panel for Thyristor Type Power Adjusting Unit

# UF-DP

## OPERATING MANUAL



- Thank you very much for having purchased the “Display Panel for Thyristor Type Power Adjusting Unit UF-DP”.
- The operators and other persons concerned are all requested to read this OPERATING MANUAL thoroughly and to operate this display panel as instructed therein so that it can fulfill its functions perfectly. Keep this OPERATING MANUAL carefully at any easily accessible place so that it can be referred to at any time when required.

## SAFETY PRECAUTIONS

Before installing, operating, maintaining, and inspecting this display panel, be sure to read the present OPERATING MANUAL and all other documents attached therein carefully in order for you to operate this display panel properly. Before use, you are requested to master the know-how, safety instructions, and all other precautions on the equipment.

In this OPERATING MANUAL, the following safety precautions are ranked as “DANGER” and “CAUTION”.

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### DANGER

A procedure which, if not properly followed, may cause extremely hazardous conditions, resulting in death or serious injury.

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### CAUTION

A procedure which, if not properly followed, may cause hazardous conditions, resulting in medium or slight injury and/or only damage on physical assets.

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Further, note that articles, even if noted in the  CAUTION , may cause a serious result depending on the situation. Strictly observe the articles since they describe important matters.

### DANGER

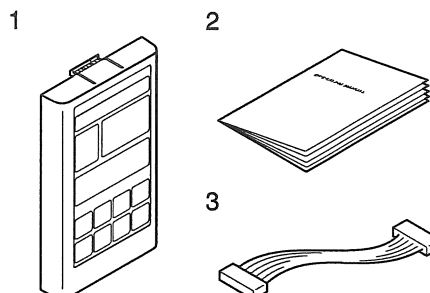
Before attaching the display panel, operators are required to turn off all the input power by a switch on the distribution panel and to check to see that power is off. Otherwise, an electric shock or an injury may be caused.

# PRECAUTIONS BEFORE USE

## ■ Confirmation of the product

Check if the following items are all provided.

No.	Included items	Q'ty
1	Main body of display panel	1 unit
2	Operating Manual (the present document)	1 volume
3	Connection cable	1 pce



## ■ The display panel has convenient functions as shown below

- Can display output current, voltage, and power. However, display items and their precisions are subject to any change, depending on with or without options and the types of options.
- The percentage of the setting of the control signal sent from the temperature control unit, upper limit signal, lower limit signal, and grade signal can be displayed for checking.
- Arbitrary setting of the control signal, upper limit signal, lower limit signal, and grade signal without externally attaching a volume is possible from the display panel. Additionally, the value once set is stored even after power is turned off.
- Arbitrary setting of the soft-start time, current limit, and heater disconnection detection is possible from the display panel. Additionally, the value once set is stored even after power is turned off.
- Controlling of Start/Stop is possible from the display panel.
- The functional feature allows the selection of seven types of input/output characteristics in addition to linear type. One of seven types allows arbitrary setting of input/output characteristics. Additionally, the value once set is stored even after power is turned off.

## ■ Precautions in use

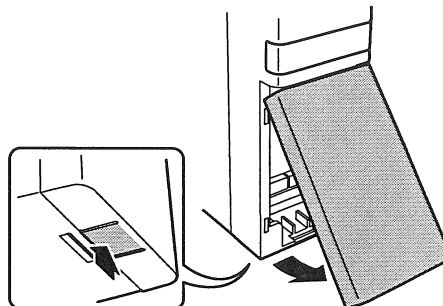
- Do not connect or disconnect the cables from the display panel while power is on.
- When inserting the connector, insert it by aligning the groove.
- Do not push the surface of the display panel with anything sharp-pointed.
- The connection cables shown below are being prepared, but if any other cable is to be used, consult with our salesperson for assistance.

UF-DP	Display panel body only
UF-DP01	Display panel with a cable for attaching UF unit body
UF-DP10	Display panel with a cable of 1m long
UF-DP30	Display panel with a cable of 3m long
UF-DP50	Display panel with a cable of 5m long

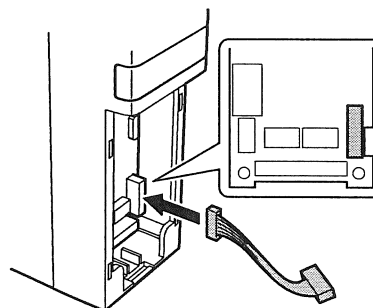
# HOW TO INSTALL DISPLAY PANEL

\* If the display panel is to be installed in a place other than the unit, reshape the panel by referring the outer dimensions and the drawing for reshaping.

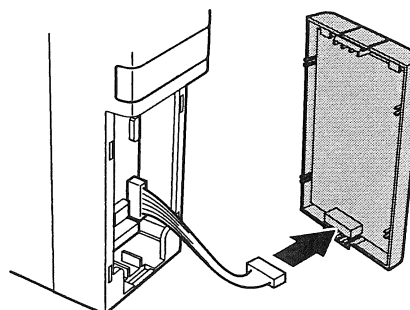
- 1 Remove the cover which is located on the front of the unit.



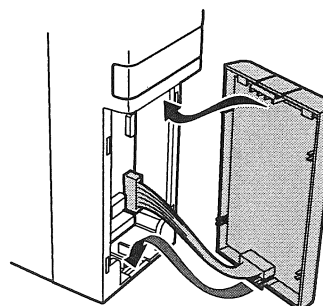
- 2 Insert one end of the attached cable into a connector "CN1" which is located at the lower right of the printed circuit board inside the unit. The connector has a polarity. When inserting the cable, align a projecting part on the cable and a groove onto the connector.



- 3 Insert another end of the cable into a connector "CN1" which is located on the display panel. The connector has a polarity. When inserting the cable, align a projecting part on the cable and a groove onto the connector.

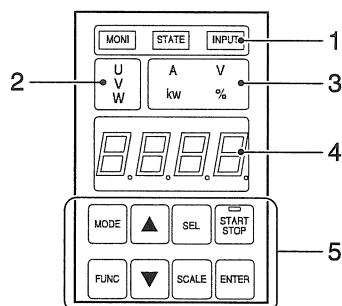


- 4 In place of the cover which was removed in the procedure "1" above, install the display panel on the front of the unit.



# IN REGARD TO NAME AND KEY OF EACH PORTION

## ■ Name of each portion



No.	Item	Description
1	Display of mode	It indicates which mode the content being displayed with numerical value is in. There are three modes, namely, MONITOR, STATE, and INPUT.
2	Display of phase (Available for 3 phase type only)	It indicates which phase (U, V, or W) of current, voltage, or power is being displayed. It is not displayed in the UF1 unit because the UF1 unit is single-phased.
3	Display of unit	It indicates the unit of data being displayed with numerical value.
4	Display of numerical value (Display of error)	It indicates the content of each mode and function with numerical value. Additionally, in the event any abnormality is detected, it indicates the content of such abnormality.
5	Operation key	It changes the modes and functions, and starts or stops operation.




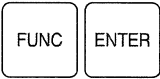




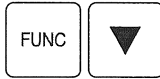



## ■ Explanation of each portion

Display of mode	Function
MONI (Monitor)	It lights up when output current, output voltage, and output power are being displayed with numerical value.
STATE (State)	It lights up when the set values of control signal, upper limit signal, lower limit signal, and grade signal, as well as soft start time, current limit, and heater disconnection detection amount are being displayed with numerical value.
INPUT (Input)	It lights up when you make the setting of control signal, upper limit signal, lower limit signal and grade signal, of soft start time, current limit and heater disconnection detection amount, and of rated current and voltage, and the changeover between function characteristics.

Display of unit	Function
A	It lights up when the current value is being displayed.
V	It lights up when the voltage value is being displayed.
kW	It lights up when the power value is being displayed.
%	It lights up when the control signal, upper limit signal, lower limit signal, grade signal, current limit, heater disconnection detecting amount, and function characteristics are being displayed.
	None light up when the soft start time is being displayed.

## ■ Explanation of keys

\* If there are two operation keys, press the key on the right while pressing the key on the left.

Operation key	Description	Function	Operational mode		
			MONI	STATE	INPUT
	Start/Stop	It starts/stops output. However, external terminals (ST-PT) have the priority over this key.	○	○	○
	Function mode	Switching is performed in the display mode. From "MONI" to "STATE" and "INPUT".	○	○	○
	Select	The indications in each mode are displayed one by one.	○	○	○
	Function enter	Switching is performed in the "INPUT" mode. From "SETTING" to "SPECIAL MONITOR".			○
	Scale	The scales for displayed data are switched. Voltage: from 99.0 to 990.0, 9.9, and 99.0 Current: from 160 to 1600, 16, and 160			○
	Up	The value in the first digit is added one by one, and when this key is held in the pushed state, the value is added automatically.			○
	Down	The value in the first digit is subtracted one by one, and when this key is held in the pushed state, the value is subtracted automatically.			○
	Function up	The value in the second digit is added one by one, and when this key is held in the pushed state, the value is added automatically.			○
	Function down	The value in the second digit is subtracted one by one, and when this key is held in the pushed state, the value is subtracted automatically.			○
	Mode up	The value in the third digit is added one by one, and when this key is held in the pushed state, the value is added automatically.			○
	Mode down	The value in the third digit is subtracted one by one, and when this key is held in the pushed state, the value is subtracted automatically.			○
	Enter	The data modified using the UP and DOWN keys is stored.			○

# PRECAUTIONS BEFORE STARTING OPERATION

In order to display output current, voltage, and power in the monitor mode, set the current and voltage values at rated outputs. This setting is not possible during full power operation, so perform the setting when power is off. The set values of current and voltage at rated outputs differ from one type of conversion boards to another.

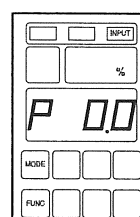
	Type of conversion board	Rated current value of unit body	Primary current value of external CT	Input voltage value of the control power voltage	Primary voltage value of external PT
	Without conversion board	Available		Available	
UF1 unit	UF-TB1A		Available	Available	
	UF-TB1V	Available			Available
	UF-TB3		Available		Available
	UF-TB3U		Available		Available
	UF-TB3H		Available		Available
	UF-TB3HU		Available		Available
	UF-TB4		Available		Available
	UF-TB4H		Available		Available
UF3 unit	UF-TB21A		Available	Available	
	UF-TB32U		Available		Available
	UF-TB33		Available		Available
	UF-TB33U		Available		Available

## ■ Setting procedure of rated output current

In order to display output current in the monitor mode, set the current value at rated output. However, perform this setting while power is off. Setting is not possible during full power operation. Set the value of the rated current of the unit, or the value of the primary current of an external CT.

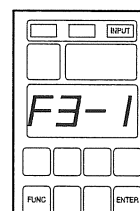
### 1 Changing the display mode

If the [MODE] key is pressed while the [FUNC] key is being pressed down, the display mode is switched. Press the [MODE] key several times to light the "INPUT".



### 2 Changeover by input mode

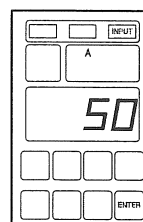
If the [ENTER] key is pressed while the [FUNC] key is being pressed down, the sub-mode is switched. If the [ENTER] key is pressed once, the sub-mode is switched to the special monitor display "F3-1".



### 3 Checking the display item

If the [ENTER] key is pressed, the display is switched to the rating set display.

Check to see that the "INPUT" and "A" light. If they are not indicated, return to the procedure "1 Changing the display mode" and try again.



### 4 Setting the rated current

Initially, it is set to 50A. This value is set to the value of the rated current of the unit or the value of the primary current of the external CT. Changing the numerical value is performed by operations shown in the table on the right, and press the [ENTER] key at the end of changing the value. The flickering value changes to being lit, and the setting is completed.

Key operation	Action
[▲]	The 1st-digit + 1
[▼]	The 1st-digit - 1
[FUNC] + [▲]	The 2nd-digit + 1
[FUNC] + [▼]	The 2nd-digit - 1
[MODE] + [▲]	The 3rd-digit + 1
[MODE] + [▼]	The 3rd-digit - 1
[SCALE]	x 10

**Ex.** Starting from the display of 50A

To be set to 100A,

Press the [FUNC] and [▲] keys five times to add 10A five times, and it will be 100A.

To be set to 250A,

Press the [MODE] and [▲] keys twice to add 100A twice, and it will be 250A.

### 5 Correction

If there is some error against a value of 0.1A in the secondary current (the current flowing onto a terminal block I1) of the external CT, or if the displayed value of the current is different from its real value, it can be corrected with an optional conversion board.

## ■ Setting procedure of rated output voltage

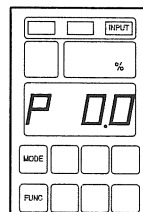
In order to display output voltage in the monitor mode, set the voltage value at rated outputs.

However, perform this setting when power is off. The setting is not possible during power operation.

Set the value of the input voltage of the control power supply or the value of the primary voltage of the external PT.

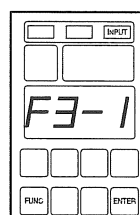
#### 1 Changing the display mode

If the [MODE] key is pressed while the [FUNC] key is being pressed down, the display mode is switched. Press the [MODE] key several times to light the "INPUT".



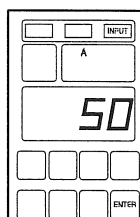
## 2 Changeover by input mode

If the [ENTER] key is pressed while the [FUNC] key is being pressed down, the sub-mode is switched. If the [ENTER] key is pressed once, the sub-mode is switched to the special monitor display "F3-1".



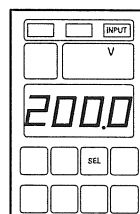
## 3 Checking the display item

If the [ENTER] key is pressed, the display is switched to the rating set display. Check to see that the "INPUT" and "A" light.



## 4 Changeover of the display item

If the [SEL] key is pressed, the display item is switched. If the key is pressed once, the "INPUT" and "V" light. If they are not indicated, return to the procedure "1 Changing the display mode" and try again.



## 5 Setting the rated voltage

Initially, it is set to 200V. This value is set to the value of the input voltage of the control power supply or the value of the primary voltage of the external PT. Changing the numerical value is performed by operations shown in the table on the right, and press the [ENTER] key at the end of changing the value. The flickering value changes to being lit, and the setting is completed.

Key operation	Action
[▲]	The 1st-digit + 1
[▼]	The 1st-digit - 1
[FUNC] + [▲]	The 2nd-digit + 1
[FUNC] + [▼]	The 2nd-digit - 1
[MODE] + [▲]	The 3rd-digit + 1
[MODE] + [▼]	The 3rd-digit - 1
[SCALE]	x 10

**Ex.** Starting from the display of 200V

To be set to 210V,

Press the [MODE] and [▲] keys once to add 10V, and it will be 210V.

To be set to 25.0V,

Press the [SCALE] key three times, and it will be 20.0V. Following this, press the [FUNC] and [▲] keys five times to add 1.0V five times, and it will be 25.0V.



# HOW TO PERFORM OPERATION FROM DISPLAY PANEL

Operation from the display panel is made possible when the GT and PH on the terminal block of the unit are short-circuited. Operation can be performed with the [START/STOP] key on the display panel, and every time the key is pressed, it starts or stops in turn. However, the signal sent from the terminal block (ST terminal) is given priority. In other words, operation cannot be stopped from the display panel when ST and PH are short-circuited. Additionally, even when the unit is operated from the display panel, if the ST and PH are short-circuited and then opened, the unit stops operation. When the unit is in operation ready status, the indicator lamp on the upper side of the [START/STOP] key lights up. In case that the soft start time is long, the indicator lamp will stay lighting until output becomes zero.

- \* When the GT and PH are opened on the terminal block of the unit, "bbb" is displayed on the numerical value indicator lamp of the display panel. This indicates that the gate is being blocked.

At this time, when the ST and PH are short-circuited, the indicator lamp on the upper side of the [START/STOP] key flickers. This indicates that the unit is in stand-by status. When the GT and PH are short-circuited in this status, the unit is brought into operation ready status.

Additionally, when the GT and PH are opened subsequently, the indicator lamp flickers again and the unit is returned to the stand-by status. When you intend to start operation from the [START/STOP] key with the gate being blocked, the indicator lamp on the upper side of the [START/STOP] key does not flicker. This indicates that the unit cannot be in stand-by status.

## HOW TO DISPLAY OUTPUT

Use the monitor mode to check the output current, voltage, and power. Refer to the "Movement of display items". The display items differ from one type of conversion boards to another.

### • In case of UF1 unit

Type of conversion board	Display item		
	Current	Voltage	Power
Without conversion board	○	○	—
UF-TB 1A	◎	○	—
UF-TB 1V	○	◎	—
UF-TB 3	◎	◎	◎

Type of conversion board	Display item		
	Current	Voltage	Power
UF-TB 3U	◎	◎	◎
UF-TB 3H	◎	◎	◎
UF-TB 3HU	◎	◎	◎
UF-TB 4	—	—	◎
UF-TB 4H	—	—	◎

### • In case of UF3 unit

Type of conversion board	Display item						Total power
	Current			Voltage			
	U	V	W	U	V	W	
Without conversion board	○	○	○	—	○	—	—
UF-TB 21A	◎	—	◎	—	○	—	—
UF-TB 32U	◎	◎	◎	◎	◎	◎	—
UF-TB 33	◎	◎	◎	◎	◎	◎	◎
UF-TB 33U	◎	◎	◎	◎	◎	◎	◎

○ ... It is the display with a formal detection circuit not being attached.

◎ ... It is the display with a formal detection circuit being attached.

— ... It does not display.

- \* The character "U" at the end of the model name indicates that the model is equipped with heater disconnection detection function, and the character "H" indicates that the accuracy of the power display is high.

## HOW TO CONFIRM THE SET VALUES

In the STATE mode, you can confirm the set values of control signal, upper limit signal, lower limit signal, and grade signal, as well as soft start time, current limit amount, and heater disconnection detecting amount. Refer to the "Movement of display items".

## HOW TO SET THE RESPECTIVE VALUES FROM THE DISPLAY PANEL

Without wiring connection between + and - and / or to VH2, VL2, and VF2 terminals, setting of control signal, upper limit signal, lower limit signal, and grade signal is possible in the INPUT mode. Additionally, you can make a setting of soft start time, current limit amount, heater disconnection detecting amount, and of rated current and voltage, and the changeover between function characteristics. Refer to the "Movement of display items".

## HOW TO SET FUNCTION CHARACTERISTICS

Setting of function characteristics is possible in the INPUT mode.

The standard unit has the linear characteristic between control signals and output level. It can be changed to have the following characteristics.

## OTHERS

### ■ Error display

In the event that the abnormal condition detection circuit works in the unit or that its self-diagnostic function is in compulsory release, the following errors are displayed.

Error display	Description	Remedy
ocr	Overcurrent abnormality	Check the load side.
tEnP	Temperature rise abnormality	Check fan, and improve the cooling effect. (*1)
FUSE	Fuse disconnection	Replace fuse with a new one. Check the load side. (*2)
tHy	Thyristor abnormality	Replace thyristor with a new one. Check the detection line.
LOAd	Load abnormality	Check the load side. Check the detection line.
HEAt	Heater disconnection	Replace heater with a new one. (*3)
LLL	Power supply undervoltage	Check the control voltage.
FFF	Abnormal frequency	Check frequency.
bbb	Gate block	Check the GT terminal.
nSLF	Self-diagnostic function is in compulsory release.	No remedial action is needed because it indicates no abnormal condition.

\* 1 This abnormality is available only for an 100A unit or larger.

\* 2 This abnormality is available only for an unit with fuse.

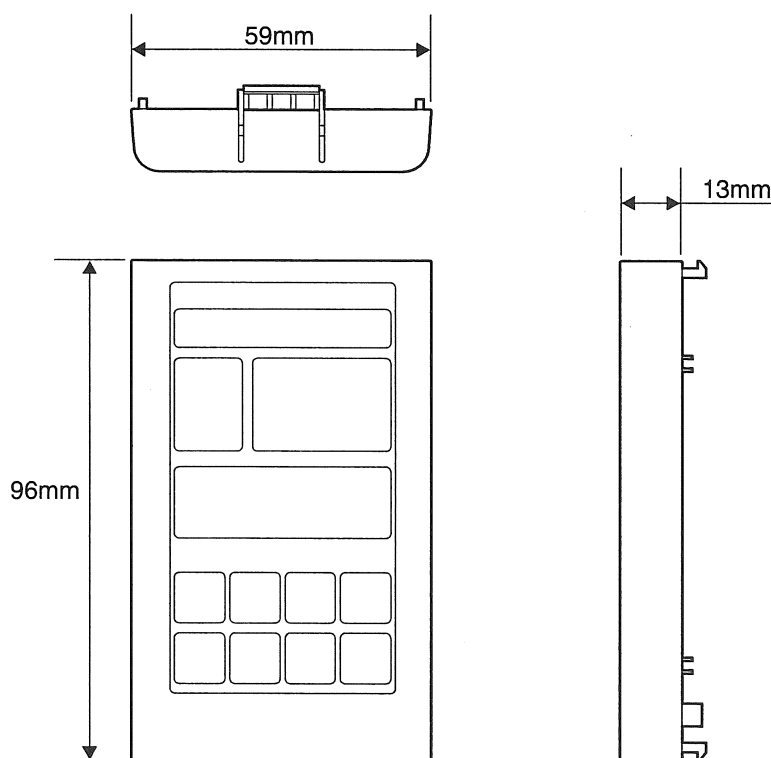
\* 3 This abnormality is available only for an unit equipped with a conversion board for detection of heater disconnection.

## ■ Troubleshooting

If occurrence of a trouble is suspected, read this Operating Manual carefully to inspect the following items. To eliminate possible causes, strictly turn off the power supply for main and control circuits. If the trouble is not solved yet, be sure to turn off the power supply for the unit, and contact our distributors nearest you or our business offices.

Situation	Possible causes/Remedy
None are lit.	Is not any wire and/or cable disconnected?
LLL is displayed.	Is not the voltage of control power AC 160V or less?
bbb is displayed.	Are not GT and PH terminals short-circuited?
FFF is displayed.	Is not frequency 50Hz or 60Hz?
The Start key on the panel does not function.	Are not GT and PH terminals short-circuited?
The Stop key on the panel does not function.	Are not ST and PH terminals short-circuited? Is not thyristor short-circuited?
Output values are not right.	Has setting of rated output current and voltage been made? Has correction for a conversion board been made properly?

## ■ Dimensions



## ■ Specifications

### ○ Monitor mode

Display item	Function	Range of display value	Minimum resolution of displayed value
Current	○ Display of load current by means of internal CT	0A to 9999A	1A or 1% of rated set value, whichever is greater
	◎ Display of load current by means of external CT		1A or 0.5% of rated set value, whichever is greater
Voltage	○ Display of output voltage by means of supply voltage and gate output	0.0V to 999.9V	0.1V or 1% of rated set value, whichever is greater
	◎ Display of load voltage by means of external PT		0.1V or 0.5% of rated set value, whichever is greater
Power	◎ Display of load power by means of external CT and PT	0.0kW or more	0.1kW or 0.5% of rated set value, whichever is greater

### [Display of output current, voltage, and power]

#### • In case of UF1 unit

Type of conversion board	Display item		
	Current	Voltage	Power
Without conversion board	○	○	—
UF-TB 1A	◎	○	—
UF-TB 1V	○	◎	—
UF-TB 3	◎	◎	◎

Type of conversion board	Display item		
	Current	Voltage	Power
UF-TB 3U	◎	◎	◎
UF-TB 3H	◎	◎	◎
UF-TB 3HU	◎	◎	◎
UF-TB 4	—	—	◎
UF-TB 4H	—	—	◎

#### • In case of UF3 unit

Type of conversion board	Display item						Total power
	Current			Voltage			
	U	V	W	U	V	W	
Without conversion board	○	○	○	—	○	—	—
UF-TB 21A	◎	—	◎	—	○	—	—
UF-TB 32U	◎	◎	◎	◎	◎	◎	—
UF-TB 33	◎	◎	◎	◎	◎	◎	◎
UF-TB 33U	◎	◎	◎	◎	◎	◎	◎

○ ... It is the display with a formal detection circuit not being attached.

◎ ... It is the display with a formal detection circuit being attached.

— ... It does not display.

- \* The character "U" at the end of the model name indicates that the model is equipped with heater disconnection detection function, and the character "H" indicates that the accuracy of the power display is high.

○ State mode

Display item	Function	Range of display value	Minimum resolution of displayed value
Control signal	Display of control signal level	0.0% to 100%	0.1%
Upper limit signal	Display of VH2 signal level	0.0% to 100%	0.1%
Lower limit signal	Display of VL2 signal level	0.0% to 100%	0.1%
Grade signal	Display of VF2 signal level	0.0% to 100%	0.1%
Soft start time	Display of soft start/down time	0.0 sec to 99.9 sec 100 sec to 300 sec	0.1sec 1 sec
Current limit	Display of current limit	50% to 110%	1%
Heater disconnection amount	Display of heater disconnection detecting amount	5% to 50%	1%

○ Input mode

		Function	Set range	Minimum set range
Signal	Control signal	Setting of control signal level	0.0% to 100%	0.1%
	Upper limit signal	Setting of VH2 signal level	0.0% to 100%	0.1%
	Lower limit signal	Setting of VL2 signal level	0.0% to 100%	0.1%
	Grade signal	Setting of VF2 signal level	0.0% to 100%	0.1%
Rated set Value	Rated value of CT	Setting of primary current of CT	1A to 9999A	1A
	Rated value of PT	Setting of primary voltage of PT	0.1V to 999.9V	0.1V
Function characteristic	Input and output characteristic	Setting of output level with reference to control signal	Signal : 0% to 100% Output : 0% to 100%	10% 1%

## ■ Movement of display items

Mode	Display of value	Unit	Function	Range of displayed value
MONI (Monitor)	N/A	A	Output current	0A to 9999A
		V	Output voltage	0.0V to 999.9V
		kW	Output power	0.0kW or more
STATE (State)	P _____	%	Control signal	0.0% to 100%
	H _____	%	Upper limit signal	0.0% to 100%
	L _____	%	Lower limit signal	0.0% to 100%
	F _____	%	Grade signal	0.0% to 100%
	E _____		Soft start time	0.0sec to 300sec
	C _____	%	Current limit	50% to 110%
	U _____	%	Heater disconnecting amount	5% to 50%
	d _____		Delay time	0.0sec to 3.0sec
	— _____		Period time	1.0sec to 3.0sec
	_____			
INPUT (Input)	P _____	%	Control signal	0.0% to 100%
	H _____	%	Upper limit signal	0.0% to 100%
	L _____	%	Lower limit signal	0.0% to 100%
	F _____	%	Grade signal	0.0% to 100%
	E _____		Soft start time	0.0sec to 300sec
	C _____	%	Current limit	50% to 110%
	U _____	%	Heater disconnecting amount	5% to 50%
	d _____		Delay time	0.0sec to 3.0sec
	— _____		Period time	1.0sec to 3.0sec
	_____			
		A	Rated current value	1A to 9999A
		V	Rated voltage value	0.1V to 999.9V





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The specifications of this product described in this OPERATING MANUAL may, incident to any improvement in the product, be subject any change without prior notice.

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