

High Performance Single-phase Thyristor Unit

20 A/30 A/45 A
60 A/80 A/100 A

THV-A1 Quick Operation Manual

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IMR02D02-E3

Thank you for purchasing this RKC product. In order to achieve maximum performance and ensure proper operation of your new instrument, carefully read all the instructions in this manual. Please place the manual in a convenient location for easy reference.

This manual explains the basic procedures for operating the THV-A1. For detailed handling procedures and various function settings, please refer to separate THV-A1 Instruction Manual [Detailed version] (IMR02D04-E3).

The above manuals can be downloaded from the official RKC website:
http://www.rkcinst.com/english/manual_load.htm.

1. PARTS DESCRIPTION

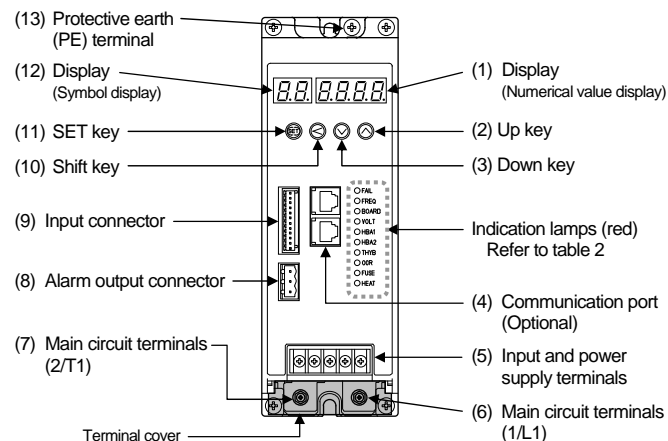


Table 1 Parts description [The name is the same as for each type (20 to 100 A).]

No.	Name	Description
(1)	Display (Numerical value display)	Display the input signal values and parameters.
(2)	Up key	• Used to select the monitor item and function block (F□). • Increase numerals.
(3)	Down key	• Used to select the monitor item and function block (F□). • Decrease numerals.
(4)	Communication port (COM.PORT1, COM.PORT2)	Communication port for connecting a host computer or the THV-A1 in a multi-drop connection. (Optional)
(5)	Input and power supply terminals	Used to connect input signal (controller) and power supply (instrument power supply voltage) wires.
(6)	Main circuit terminals (1/L1)	Used to connect main circuit wires.
(7)	Main circuit terminals (2/T1)	
(8)	Alarm output connector	Used to alarm output. (Number of output points: 2 points) The type of alarm to be output must be set.
(9)	Input connector	Used to connect with a setter (potentiometer), external contact or controller. A function must be assigned to the contact input (DI).
(10)	Shift key	• Used to select the mode. • Shift digits when settings are changed.
(11)	SET key	Used for parameter calling up and set value registration.
(12)	Display (Symbol display)	Display the parameter symbols.
(13)	Protective earth (PE) terminal	Used to connect the grounding terminal.

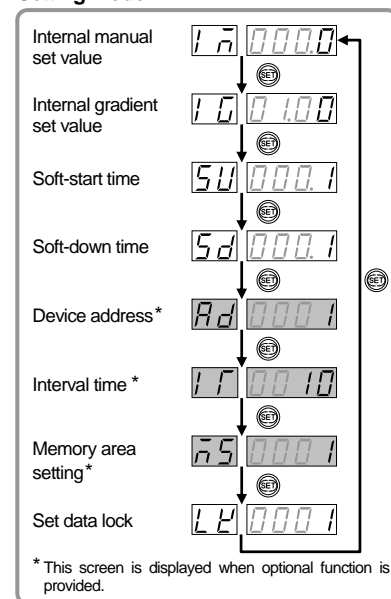
Table 2 Indication lamps [The name is the same as for each type (20 to 100 A).]

Symbol	Name	Description
FAIL	FAIL	This lamp lights to indicate an error detected by the watchdog timer of the self-diagnosis function or the CPU power monitor.
FREQ	Power frequency error	This lamp lights if power frequency is out of the allowable range (detecting range) when power is turned on or during operation. (Detection range: 45.0 to 64.9 Hz)
BOARD	Board error	This lamp lights if a board error of this instrument is detected by the self-diagnosis function.
VOLT	Power supply voltage error	This lamp lights if the power voltage exceeds 264 V when the power is turned on or during operation.
HBA1	Heater break alarm 1	Lights when HBA1 output is turned on. This alarm function is available on the instrument with a constant current control or constant power control.
HBA2	Heater break alarm 2	Lights when HBA2 output is turned on. This alarm function is available on the instrument with a constant current control or constant power control.
THY.B	Thyristor break-down alarm	Lights when thyristor break-down alarm output is turned on. This alarm function is available on the instrument with a constant current control or constant power control.
OCR	Over current	This lamp lights if the current of more than 1.2 times the rating of this instrument flows. This alarm function is available on the instrument with a constant current control or constant power control.
FUSE	Fuse break	This lamp lights if the fast-blow fuse inside the instrument blows. This alarm function is available on the instrument with a built-in fast-blow fuse.
HEAT	Heat sink temperature abnormality	This lamp lights if the temperature of the semiconductor controlled rectifier (SCR) rises above 120 °C. This alarm function is available on the instrument with a heat sink temperature detection function.

2. SETTING

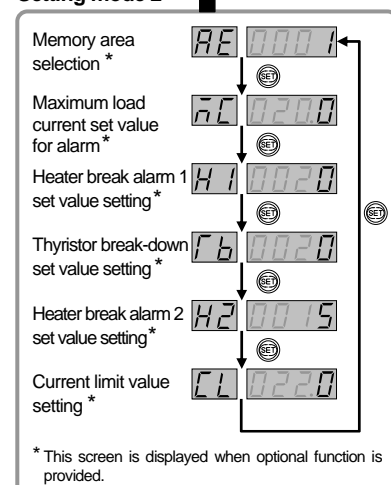
2.1 Transfer to Each Mode and Parameter

Setting mode 1



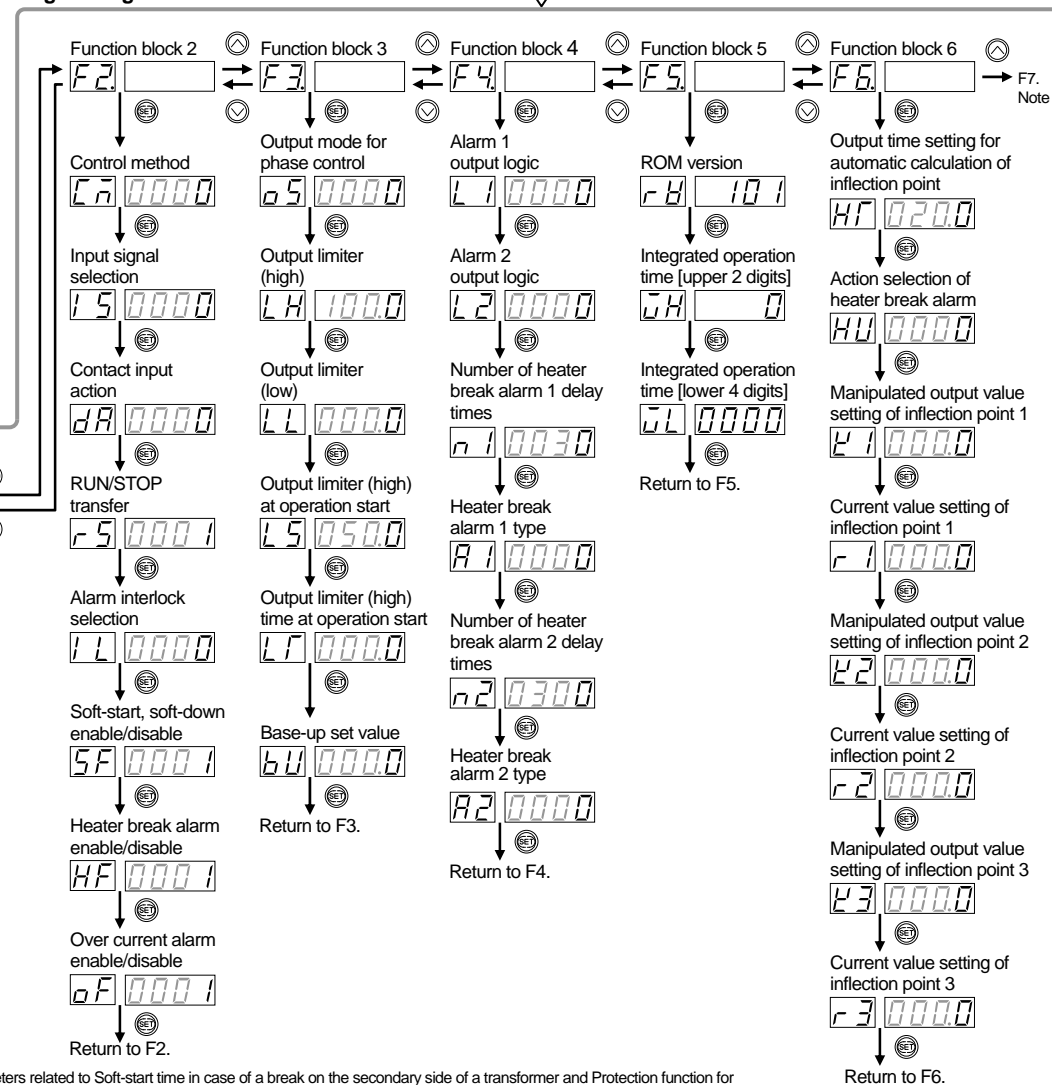
* This screen is displayed when optional function is provided.

Setting mode 2



* This screen is displayed when optional function is provided.

Engineering mode



Note 1: Function block 7 (F7) is made up with the parameters related to Soft-start time in case of a break on the secondary side of a transformer and Protection function for the control of primary side of a transformer. For the parameters to Function block 7 (F7), refer to THV-A1 Instruction Manual [Detailed version] (IMR02D04-E3).

2.2 Parameter List

Monitor mode 1

Symbol	Name	Display range
i1 (M1)	Input signal monitor 1	0 to 100 % Select whether this shows the auto mode set value, the external manual set value, or the internal manual set value.
PA (PA)	Phase angle ratio monitor	0 to 100 % (0 to 180°: When the phase angle is 180°, display the 100 %.)
CT (CT)	CT input monitor ¹	0.0 to 27.0 A (20 A type) 0.0 to 81.0 A (60 A type) 0.0 to 40.5 A (30 A type) 0.0 to 108.0 A (80 A type) 0.0 to 60.8 A (45 A type) 0.0 to 135.0 A (100 A type)
Va (Vo)	PT input monitor	0 to 280 V (90 to 264 V AC [Including power supply voltage variation]) Rated value 100 to 240 V AC Display the output voltage of THV-A1.
Pa (Po)	Power value monitor ²	0.00 to 7.56 kW (20 A type) 0.00 to 22.68 kW (60 A type) 0.00 to 11.34 kW (30 A type) 0.00 to 30.24 kW (80 A type) 0.00 to 17.01 kW (45 A type) 0.00 to 37.80 kW (100 A type)

¹ This screen is displayed on the instrument with a constant current control or constant power control.
² This screen is displayed on the instrument with a constant power control.

Monitor mode 2

Symbol	Name	Display range
IF (IF)	Power frequency monitor	40 to 70 Hz
Va (VI)	Power supply voltage monitor	0 to 280 V (90 to 264 V AC [Including power supply voltage variation]) Rated value 100 to 240 V AC Display the power supply voltage.
i2 (M2)	Input signal monitor 2	0 to 100 % Display the auto mode set value (value of input signal from controller).
EG (EG)	External gradient set value monitor	0 to 100 %
EM (EM)	External manual set value monitor	0 to 100 %
di (di)	Contact input state monitor	di 0000 Contact input 1 (DI1): 0: Contact open 1: Contact closed Contact input 2 (DI2): 0: Contact open 1: Contact closed Contact input 3 (DI3): 0: Contact open 1: Contact closed
MM (MM)	Memory area monitor*	1 to 4 The memory area number now used for alarm monitoring is displayed.

* This screen is displayed on the instrument with a constant current control or constant power control.

Setting mode 1

Symbol	Name	Setting range	Factory set value
1n (IM)	Internal manual set value	0.0 to 100.0 %	0.0
1G (IG)	Internal gradient set value ¹	0.00 to 2.00 (0.00: Internal gradient 0 % 2.00: Internal gradient 200 %)	1.00
5U (SU)	Soft-start time ²	0.0 to 100.0 seconds (0.0: Soft-start function unused)	0.1
5d (SD)	Soft-down time ²	0.0 to 100.0 seconds (0.0: Soft-down function unused)	0.1
Ad (Ad)	Device address ³	0 to 99	1
1T (IT)	Interval time ³	0 to 250 ms	10
rS (MS)	Memory area setting ⁴	1 to 4 Set the memory area used for alarm monitoring.	1
Lk (LK)	Set data lock	0: Lock 1: Unlock Unused Unused	0001

¹ This parameter becomes valid when the control method is the phase control or zero-cross control (continuous).

² This parameter becomes valid when the control method is the phase control.

³ This screen is displayed on the instrument with a communication function (RS-422A or RS-485).

⁴ This screen is displayed on the instrument with a constant current control or constant power control. When the memory area setting (MS) is changed, the memory area selection (AE) changes to the same memory area number. When a contact input (DI) is used, the contact input (DI) setting has priority.

Setting mode 2

Setting mode 2 screen is displayed on the instrument with a constant current control or constant power control.

Symbol	Name	Setting range	Factory set value
rE (AE)	Memory area selection	1 to 4 Select the memory area used to store the set values.	1
rL (MC)	Maximum load current set value for alarm*	0.0 to 22.0 A (20 A type) 0.0 to 33.0 A (30 A type) 0.0 to 50.0 A (45 A type) 0.0 to 66.0 A (60 A type) 0.0 to 88.0 A (80 A type) 0.0 to 110.0 A (100 A type)	20.0 30.0 45.0 60.0 80.0 100.0
H1 (H1)	Heater break alarm 1 set value setting*	0 to 100 % of maximum load current set value* (0: Heater break alarm 1 unused)	20

* Parameters which can be used in multi-memory area function

* Although the following values are recommended, the alarm set value varies depending on the load type and the number of connection. Set the value suited to your system.

When the control method is Phase Control, RKC recommends:
- Set the heater break alarm set value to approximately 20 % of the maximum load current value for heater break alarm Type 1 (constant resistance type, deviation alarm).
- Set the heater break alarm set value to approximately 10 % of the maximum load current value for heater break alarm Type 2 (linearity resistor type, absolute value alarm). Do not set the heater break alarm set value to more than 15 %.
- In the case of a heater break alarm that supports non-linear resistance, there is no recommended value because the load characteristics vary depending on the non-linear load type.

When the control method is Zero-cross Control, RKC recommends:
- Set the heater break alarm set value to approximately 80 % of the reading of current transformer input.
- Set the heater break alarm set value to a slightly smaller value to prevent a false alarm when power supply variation is large.
- Set the heater break alarm set value to a slightly larger value to detect a failure of one heater when more than one heaters are connected in parallel. But the set value should be less than the maximum reading of current transformer input.

