Single-phase Thyristor Unit

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

THV-10 Installation Manual

IMR02W01-E2

In order to achieve maximum performance and ensure proper operation of the instrument, carefully read all the instructions in this manual. This manual describes the mounting and wiring of the THV-10 (20 A to 100 A).

For detailed handling procedures, operations, and accessory dimensions, refer to separate **20 A/30 A/45 A/60 A/80 A/ 100 A types THV-10 Instruction Manual (IMR02W05-E□)**.

The manual can be downloaded from the official RKC website:
https://www.rkcinst.co.jp/english/download-center/

Product Check

THV-10 Installation Manual (IMR02W01-E2)..... 1 THV-10 Quick Operation Manual (IMR02W04-E□)..... 1	Connector (only supplied if ordered) • Plug connector for input/output (Code: THV1P-C01) ..... 1 • Plug connector for retransmission output (Code: THV1P-C02)..... 1 • Plug connector for communication (Code: THV1P-C03)..... 1

Safety Precautions

⚠ WARNING

- To prevent injury to persons, damage to the instrument and the equipment, a suitable external protection device shall be required.
- All wiring must be completed before power is turned on to prevent electric shock, fire or damage to the instrument and the equipment.
- This instrument must be used in accordance with the specifications to prevent fire or damage to the instrument and the equipment.
- This instrument is not intended for use in locations subject to flammable or explosive gases.
- Do not touch high-voltage connections such as power supply terminals, etc. to avoid electric shock.
- When the withstand voltage test or each test is performed, please contact RKC sales office or the agent. If you make a mistake in the test method, the instrument failure may result.
- RKC is not responsible if this instrument is repaired, modified or disassembled by other than factory-approved personnel. Malfunction may occur and warranty is void under these conditions.
- Prevent metal fragments or lead wire scraps from falling inside instrument case to avoid electric shock, fire or malfunction.
- Tighten each terminal screw to the specified torque found in the manual to avoid electric shock, fire or malfunction.

High temperature caution:
Do not touch the heat radiation fin while the power is turned on or just after the power is turned off as it may be at high temperatures. If touched, burning may result.

⚠ CAUTION

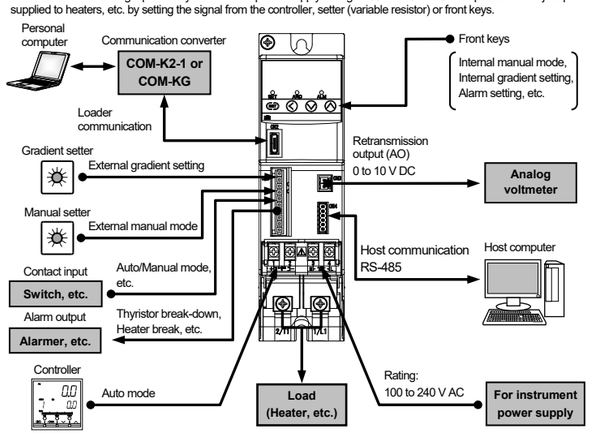
- This product is intended for use with industrial machines, test and measuring equipment. (It is not designed for use with medical equipment and nuclear energy plant.)
- This is an Environment A instrument. In a domestic environment, this instrument may cause radio interference, in which case the user may be required to take additional measures.
- Be sure to provide an appropriate surge control circuit respectively for the following:
  − If input/output or signal lines within the building are longer than 30 meters.
  − If input/output or signal lines leave the building, regardless the length.
- This product is manufactured on the assumption that it is mounted within a control panel. All high-voltage connections such as power supply terminals must be enclosed in the control panel to avoid electric shock to operating personnel.
- All precautions described in this manual should be taken to avoid damage to the instrument or equipment.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- All wiring must be in accordance with local codes and regulations.
- Always use this product at the rated power supply voltage, load current and power frequency.
- All wiring must be completed before power is turned on to prevent electric shock, instrument failure, or incorrect action.
- To prevent instrument damage or failure, protect the power line and the input/output lines with a protection device such as fuse, etc.
- If this product is used for phase control, higher harmonic noise may be generated. Therefore in this case, take such measures as separating the power line from the high-voltage line for load drive.
- For proper operation of this instrument, provide adequate ventilation for heat dissipation.
- Do not connect wires to unused terminals as this will interfere with proper operation of the instrument.
- Turn off the power supply before cleaning the instrument.
- Do not use a volatile solvent such as paint thinner to clean the instrument. Deformation or discoloration may occur. Use a soft, dry cloth to remove stains from the instrument.
- To avoid damage to the instrument display, do not rub with an abrasive material or push the front panel with a hard object.

NOTICE

- This manual assumes that the reader has a fundamental knowledge of the principles of electricity, process control, computer technology and communications.
- The figures, diagrams and numeric values used in this manual are only for explanation purpose.
- RKC is not responsible for any damage or injury that is caused as a result of using this instrument, instrument failure or indirect damage.
- RKC is not responsible for any damage and/or injury resulting from the use of instruments made by imitating this instrument.
- Periodic maintenance is required for safe and proper operation of this instrument. Some components have a limited service life, or characteristics that change over time.
- Every effort has been made to ensure accuracy of all information contained herein. RKC makes no warranty, expressed or implied, with respect to the accuracy of the information. The information in this manual is subject to change without prior notice.
- No portion of this document may be reprinted, modified, copied, transmitted, digitized, stored, processed or retrieved through any mechanical, electronic, optical or other means without prior written approval from RKC.

1. OUTLINE

This instrument is a single-phase thyristor unit for power supply voltage 100 to 240 V AC. It is possible to adjust power supplied to heaters, etc. by setting the signal from the controller, setter (variable resistor) or front keys.



2. MOUNTING

⚠ WARNING

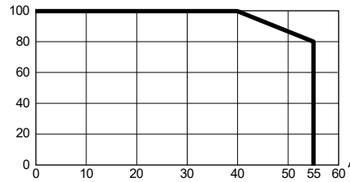
- In order to prevent electric shock or instrument failure, always mount or remove this instrument after power supplied to the entire system is turned off.
- As this instrument generates a large amount of heat, it is cooled by circulating air by convection. Therefore, if mounted in any direction other than specified, accident or failure may result.
- When carrying this instrument, hold the heat radiation fin. In addition, always carry it with the heat radiation fin cooled. If held by the main body, deformation or damage to the main body may result.

2.1 Mounting Environment

(1) This instrument is intended to be used under the following environmental conditions.
- EN60947-4-3, UL508, C22.2 No.14 POLLUTION DEGREE 2

(2) Use this instrument within the following environment conditions:
- Allowable ambient temperature: −15 to +55 °C
  The rated current drops when the ambient temperature exceeds 40 °C.

Rated current (%)



Temperature characteristic (20 to 100 A types)

The temperature characteristic eristic is the same for close mounting.

The temperature characteristic is common to the all types (20 A, 30 A, 45 A, 60 A, 80 A and 100 A).

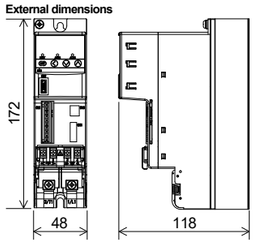
- Allowable ambient humidity: 5 to 95 %RH
  (Absolute humidity: MAX. W. C 29 g/m³ dry air at 101.3 kPa)

(3) Do not use this instrument in the following environment:
- Sudden change in ambient temperature
- Condensation or icing
- Corrosive or inflammable gases
- Such a place where there are inflammable materials near this instrument
- Strong vibration or impact
- Water, oil, chemicals, vapor or steam splashes
- Excessive dust, salt or iron particles
- Excessive induction noise, static electricity, magnetic fields or noise
- Direct air flow from an air conditioner
- Exposure to direct sunlight
- Direct radiant heat

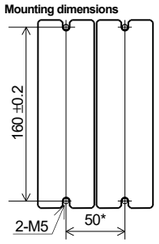
2.2 External Dimensions and Mounting Dimensions

■ 20 A/30 A types

External dimensions (Unit: mm)



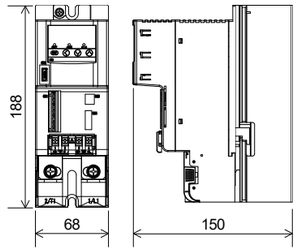
Mounting dimensions (Unit: mm)



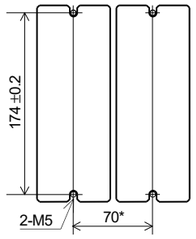
* Minimum space when mounted closely side by side.

■ 45 A/60 A types

External dimensions



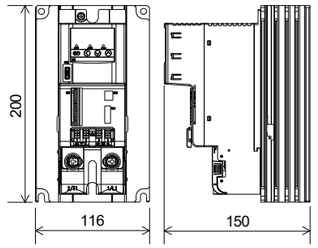
Mounting dimensions (Unit: mm)



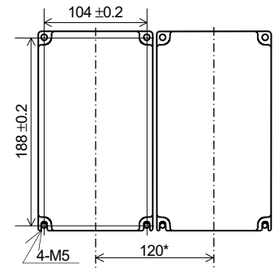
* Minimum space when mounted closely side by side.

■ 80 A/100 A types

External dimensions



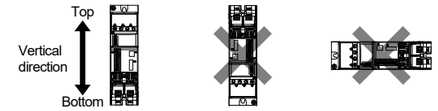
Mounting dimensions (Unit: mm)



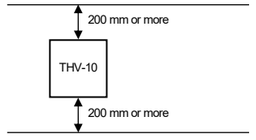
* Minimum space when mounted closely side by side.

2.3 Mounting Cautions

- The instrument must be mounted in a proper direction. When installing the instrument, observe mounting directions.

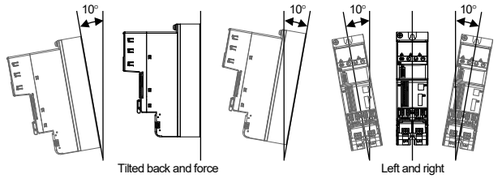


- The instrument requires radiation space above and below it. Allow minimum 200 mm clearance.



Also consider working space.

- Mount the instrument tilted within 10 degrees from vertical (back and force and left and right).



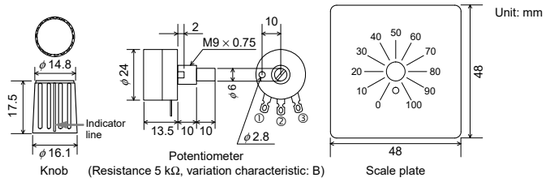
Tilted back and force Left and right

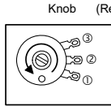
- The temperature inside the control panel increases due to heat generation of this instrument itself. Therefore, take into account full ventilation by mounting forced ventilation fans on the panel.

Table of calorific values

Rating current	Calorific values	Rating current	Calorific values
20 A	Approx. 30 W	60 A	Approx. 84 W
30 A	Approx. 43 W	80 A	Approx. 112 W
45 A	Approx. 63 W	100 A	Approx. 140 W

Setter (Potentiometer, Knob and Scale plate)

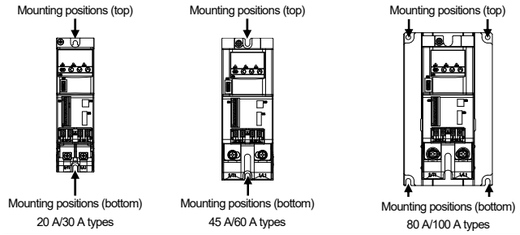




Turn the potentiometer counterclockwise fully before combining it with the scale plate.
When attaching a knob, align the Indicator line on the knob with 0 on the scale plate and then combine it.

2.4 Mounting Procedures

1. Prepare the holes as specified in **2.2 External Dimensions and Mounting Dimensions**.
2. Place the instrument in mounting position.
3. Insert the mounting screws into the holes, then tighten them with a screwdriver.
   - Mounting screw
     Customer must provide the set of screws.
     Screw type: Pan-head screws
     Size: M5, Length: 10 mm or more , Screw head diameter, max. ϕ10.3
     Recommended tighten torque: 3.6 N·m [36 kgf·cm]



3. WIRING

⚠ WARNING

To prevent electric shock or instrument failure, do not turn on the power until all wiring is completed. Make sure that the wiring is correct before applying power to the instrument.

3.1 Wiring Cautions

- Always conduct wiring so that the phase of the main circuit (2/T1) coincides with that of terminal No. 3 and the phase of the main circuit (1/L1) with that of terminal No. 4. Otherwise the instrument may not function properly or the load may be damaged.
- To avoid noise induction, keep input signal wire of controller away from instrument power line, load lines and power lines of other electric equipment. If wiring near high-voltage power is unavoidable, use shielded wires.
- There are neither fuses nor power switches in the power circuit of this instrument. Therefore install the fuses and switches near the instrument, if necessary.
- Choose solderless terminals from the following table.

Input terminals (1, 2) and Power supply terminals (3, 4)

	20 A/30 A/45 A/60 A/80 A/100 A
Maker	J.S.T Mfg. Co., Ltd.
Parts No.	V1.25-MS3

Main circuit terminals (2/T1, 1/L1)

	20 A/30 A	45 A/60 A	80 A/100 A
Maker	J.S.T Mfg. Co., Ltd.		
Parts No.	V5.5-4 (Circular terminal with isolation)	R14-6 (Circular terminal)	R38-8 (Circular terminal)

- Use wires satisfying the rated current capacity.

Input terminals (1, 2) and Power supply terminals (3, 4)

	20 A/30 A/45 A/60 A/80 A/100 A
Applicable wire (twisted wire)	0.25 to 1.65 mm²

Main circuit terminals (2/T1, 1/L1)

	20 A/30 A	45 A/60 A	80 A/100 A
Applicable wire (twisted wire)	2.63 to 5.5 mm²	10.52 to 14 mm²	26.66 to 38 mm²

- Make sure that during field wiring parts of conductors cannot come into contact with adjacent conductive parts.
- Tighten the bolts on the main circuit terminals of the 45 to 100A types with a torque wrench. When tightening the bolts, always place the torque wrench on the hexagonal part of the bolt. Tighten the screws on the main circuit terminals of the 20 A and 30 A types with a torque screwdriver.
- Firmly tighten each terminal hexagon headed bolt with the tightening torque specified below. Otherwise, electric shock, fire or heat generation may result.

Input terminals (1, 2) and Power supply terminals (3, 4)

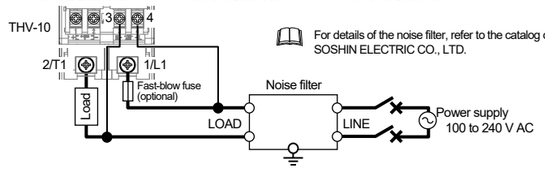
	20 A/30 A/45 A/60 A/80 A/100 A
Recommended tightening torque	0.49 N·m (4.9 kgf·cm)

Main circuit terminals (2/T1, 1/L1)

	20 A/30 A	45 A/60 A	80 A/100 A
Recommended tightening torque	1.6 N·m (16 kgf·cm)	3.8 N·m (38 kgf·cm)	9.0 N·m (90 kgf·cm)

- When a noise filter or a transformer is connected to the load side of this product, a load must be connected when control is executed.
- Caution for conducting control of primary side of a transformer
  – When a protection function for control of primary side of a transformer is provided:
    To conduct control of primary side of a transformer, make sure protection function for control of primary side of a control is set. Appropriately adjust the soft-start time for in case of secondary side breakdown depending on the operating condition.
  – When a protection function for control of primary side of a transformer is not provided:
    If the action of the device is influenced by excessive current (inrush current, current due to flux saturation of transformer), use a transformer 1.25 T (magnetic flux density) or less. Make sure soft-start time is appropriately set.
    When connecting a transformer to the load side of this product, make sure that the current value of the primary side of the transformer is equal to or more than the minimum load current of this product. When the current value of the primary side of the transformer is less than the minimum load current value of this product, connect a bleeder resistor in parallel with the primary side of the transformer, and allow the current more than the minimum load current to flow.
    [Minimum load current: 0.6 A (20 A type) 1 A (30 A type or more)]
- In order to comply with the European EMC- and LV directive the noise filter (shown in the following figure) should be applied.

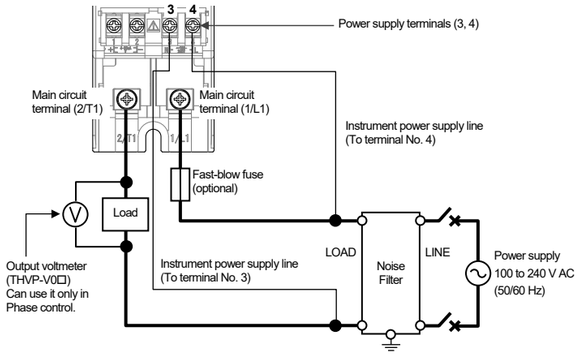
The noise filter specified: SOSHIN ELECTRIC CO., LTD.
20 A: LF2030A-NH 45 A: HF2050A-UP 80 A: HF2080A-UP
30 A: LF2030A-NH 60 A: HF2060A-UP 100 A: HF2100A-UP



For details of the noise filter, refer to the catalog of SOSHIN ELECTRIC CO., LTD.

3.2 Wiring Example of Main Circuit

⚠ CAUTION **Always conduct wiring so that the phase of the main circuit (2/T1) coincides with that of terminal No. 3 and the phase of the main circuit (1/L1) with that of terminal No. 4. Otherwise the instrument may not function properly or the load may be damaged.**

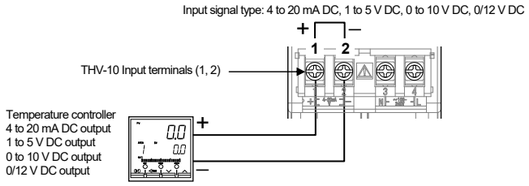


Terminal screws size and Recommended tightening torque

		20 A/30 A	45 A/60 A	80 A/100 A
Power supply terminals (3, 4)	Terminal screws size	M3×7 (With 5.8×5.8 square washer)		
	Recommended tightening torque	0.49 N·m (4.9 kgf·cm)		
Main circuit terminals (2/T1, 1/L1)	Terminal screws size	M4×8	M6×16	M8×20
	Recommended tightening torque	1.6 N·m (16 kgf·cm)	3.8 N·m (38 kgf·cm)	9.0 N·m (90 kgf·cm)

3.3 Wiring of Input Signal

Connect output signals from a temperature controller, etc. to input terminals 1 (+) and 2 (–) of this instrument.



Input impedance of THV-10 input terminals
Current input: Approx. 50 Ω
Voltage input or Voltage pulse input: Approx. 30 kΩ

Terminal screws size and Recommended tightening torque

		20 A/30 A/45 A/60 A/80 A/100 A
Input terminals (1, 2)	Terminal screws size	M3×7 (With 5.8×5.8 square washer)
	Recommended tightening torque	0.49 N·m (4.9 kgf·cm)

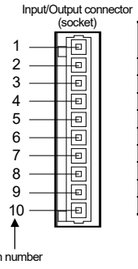
Input signal type
Input signal is factory preset to your specification. If you need to change the input signal type, you can do it in the Engineering mode D at the Input signal selection (XI).

If the input signal type needs to be changed on the user's side, refer to **THV-10 Instruction Manual (IMR02W05-E□)**.

3.4 Wiring for Input/Output Connector

The connector used to connect to an external gradient setter, an external manual setter, external contacts, or an alarm unit.

■ Input/Output connector pin number and details



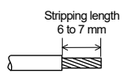
Pin number	Details
1	+5.0 V (Gradient setting)
2	Gradient setting input (0 to 5.0 V input by gradient setter)
3	0 V (Gradient setting, Manual mode)
4	Manual mode input (0 to 5.0 V input by manual setter)
5	+5.0 V (Manual mode)
6	Contact input: DI (+)
7	0 V (Contact input): DI (–)
8	Unused (Do not connect any device to this terminal.)
9	Transistor output (alarm output): DO (+)
10	Transistor output (alarm output): DO (–)

DI: Digital input DO: Digital output

■ Wire size used for Input/Output connector

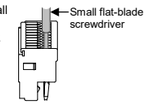
Use the stranded leadwires.

Stranded leadwires: AWG28-14 (cross-section: 0.08 to 1.5 mm^2)
Stripping length: 6 to 7 mm

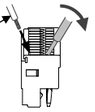


Wiring method (Input/Output connector)

① Insert a small flat-blade screwdriver.



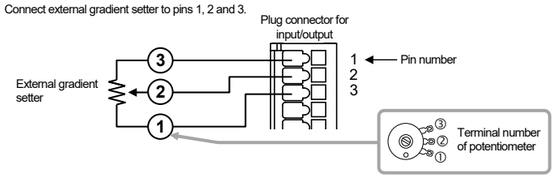
② Tilt the flathead screwdriver to the right and wire the electric wires.



■ Wiring of setting unit

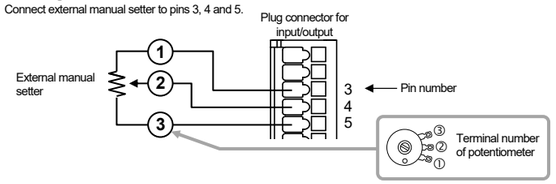
● Wiring of external gradient setter

Connect external gradient setter to pins 1, 2 and 3.



● Wiring of external manual setter

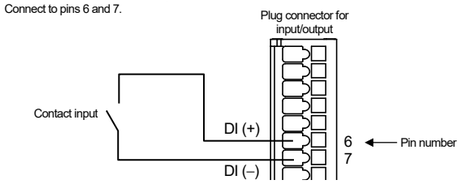
Connect external manual setter to pins 3, 4 and 5.



When both of gradient and manual setters are connected, connect the 0 V wires externally. Just connect a single wire to terminal 3.

■ Wiring of contact input

Connect to pins 6 and 7.

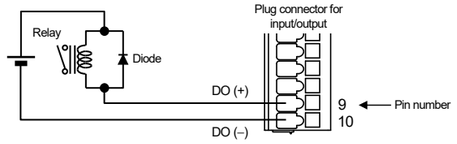


Functional assignment is required for contact input. At the time of shipment, it is preset to "0: No function."

For the setting method of functional assignment, refer to **THV-10 Instruction Manual (IMR02W05-E□)**.

■ Wiring of alarm output

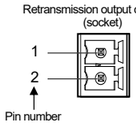
Connect to pins 9 and 10.
A diode should be used and connected as show in the diagram, when using a relay.



3.5 Wiring for Retransmission Output Connector

The connector on the plug side is supplied when the instrument with a retransmission output (AO) is specified at the time of ordering.

■ Retransmission output connector pin number and details

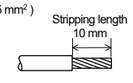


Pin number	Details
1	Retransmission output (+)
2	Retransmission output (–)

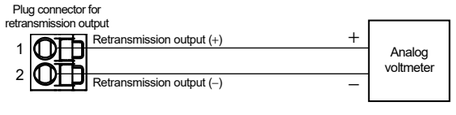
■ Wire size used for retransmission output connector

Use the stranded leadwires.

Stranded leadwires: AWG24-16 (cross-section: 0.25 to 1.5 mm^2)
Stripping length: 10 mm

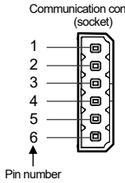


■ Wiring example of retransmission output (AO)



3.6 Wiring for Communication Connector

The communication connector is a connector for communication with a host computer. The connector on the plug side is supplied when an instrument with communication function is ordered.



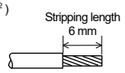
Pin number	Symbol	Signal name
1	SG	Signal ground
2	SG	Signal ground
3	T/R (A)	Send data/Receive data
4	T/R (A)	Send data/Receive data
5	T/R (B)	Send data/Receive data
6	T/R (B)	Send data/Receive data

Pin Nos. 1 and 2, pin Nos. 3 and 4, and pin Nos. 5 and 6 are internally connected respectively.

■ Wire size used for communication connector

Use the stranded leadwires.

Stranded leadwires: AWG24-20 (cross-section: 0.25 to 0.5 mm^2)
Stripping length: 6 mm



■ Wiring of communication connector

For communication connection, refer to the separate **THV-10 Host Communication Instruction Manual (IMR02W06-E□)**.

The manual can be downloaded from the official RKC website: https://www.rkcinst.co.jp/english/download-center/

4. MODEL CODE

Check whether the delivered product is as specified by referring to the following model code list. If the product is not identical to the specifications, please contact RKC sales office or the agent.

THV- 10 PZ □ – □ ∗ □ □ □ – □
(1) (2) (3) (4) (5) (6) (7) (8)

(1) Power supply for load
10: 100 to 240 V AC

(2) Control method
PZ: Phase control/Zero-cross control (configurable) [Factory shipment: Phase control]

(3) Rated current
020: 20 A AC 045: 45 A AC 080: 80 A AC
030: 30 A AC 060: 60 A AC 100: 100 A AC

(4) Input signal
5: Voltage input 0 to 10 V DC 8: Current input 4 to 20 mA DC
6: Voltage input 1 to 5 V DC V: Voltage pulse input 0/12 V DC

(5) Heater break alarm, Current limit function, Constant current control function, Protection function for control of primary side of a transformer and Power proportioning control function
N: No function
H: Heater break alarm, Current limit function, Constant current control function, Protection function for control of primary side of a transformer and Power proportioning control function
B: Non-linear resistance heater break alarm, Current limit function, Constant current control function, Protection function for control of primary side of a transformer and Power proportioning control function

To control the primary side of the transformer, it is recommended to purchase a THV-10 with a protection function for control of primary side of a transformer.

(6) Alarm output
N: No alarm A: Alarm output 1 point

(7) Option [Retransmission output (AO) or Communication function]
N: None
A: Retransmission output (AO) [Continuous voltage output 0 to 10V DC]
B: Communication (RS-485) [RKC communication]
C: Communication (RS-485) [Modbus]

(8) Accessory to the plug connector for input/output
N: None 1: Plug connector for input/output

For optional accessories (such as fuse and fuse holder), refer to the **THV-10 Instruction Manual (IMR02W05-E□)**.

5. SPECIFICATIONS

Number of phase: Single-phase

Maximum rated current: 20 A AC, 30 A AC, 45 A AC, 60 A AC, 80 A AC, 100 A AC,
For the ambient temperature characteristic, refer to temperature characteristic graph.

Minimum load current: 20 A rating: 0.6 A (When output is 98 %)
Rating 30 A or more: 1 A (When output is 98 %)

Supply voltage for load: 85 to 264 V AC [Including power supply voltage variation] (Rating: 100 to 240 V AC)

Power frequency: 50/60 Hz

Allowable power frequency variations:
50 Hz: 49 to 51 Hz, 60 Hz: 58.8 to 61.2 Hz (Performance guarantee)
50 Hz: 48 to 52 Hz, 60 Hz: 58 to 62 Hz (Operation guarantee)

Input signal: Current input 4 to 20 mA DC (Input impedance: Approx. 50 Ω)
Voltage input 1 to 5 V DC, 0 to 10 V DC (Input impedance: Approx. 30 kΩ)
Voltage pulse input 0/12 V DC (Input impedance: Approx. 30 kΩ)

Output voltage range: 0 to 98 % of supply voltage for load (Except voltage drop by fuse)

Applicable load: Phase control: Resistor load (Corresponding utilization category: AC-51 IEC 60947-4-3)
Control of primary side of a transformer (Magnetic flux density Approx. 1.25 T or less)
Such loads that cause rush current (lamp heaters, transformers, etc) need Soft-start time setting to suppress the current within 1.35 times of the current rating.
Zero-cross control (continuous, input synchronous type):
Resistor load (Corresponding utilization category: AC-51 IEC 60947-4-3)

Overload current profile and duty cycle:
1.1 × I_e– 60s: 50–60

Control method: Phase control, Zero-cross control (continuous) or Zero-cross control (input synchronous type)

Output setting range: Auto mode (control input): 0.0 to 100.0 %
Internal manual set value: 0.0 to 100.0 % (Set by theTHV-10 front keys or communication)
External manual set value: 0.0 to 100.0 % (Set by the setter *)
Internal gradient set value: 0.00 to 2.00 (Set by the THV-10 front keys or communication)
External gradient set value: 0.0 to 100.0 % (Set by the setter *) * Sold separately
Output limiter high/low: 0.0 to 100.0 % (Set by theTHV-10 front keys or communication)
Base-up set value: –9.9 to +100.0 % (Set by theTHV-10 front keys or communication)

Output limiter high at operation start:
High setting: 0.0 to 100.0 % (Set by the THV-10 front keys or communication)
Time setting: 0 to 600 seconds (Set by theTHV-10 front keys or communication)
Ramp (Soft-start/Soft-down) function:
0.0 to 199.9 seconds (Set by the THV-10 front keys or communication)
Current limiter function (optional): Valid at phase control
Setting range: 20 A: 0.0 to 32.0 A 45 A: 0.0 to 55.0 A 80 A: 0 to 90 A
30 A: 0.0 to 32.0 A 60 A: 0 to 70 A 100 A: 0 to 110 A
If a Current limit value is set to its maximum value, the Current limit function is deactivated.
Protection function for control of primary side of a transformer
Output limiter setting in case of a break on the secondary side of the transformer:
15.0 to 50.0 % of phase angle (Set by theTHV-10 front keys or communication)
Soft-start function in case of a break on the secondary side of the transformer:
0.1 to 100.0 seconds (Set by the THV-10 front keys or communication)
Minimum output phase angle adjustment function:
Minimum output phase angle adjustment:
Output phase angle 5.0 to 15.0 %

Output mode for phase control:
Proportional phase angle, Proportional voltage, Proportional square voltage (electric power) or Constant current control (optional) and Power proportioning control (optional)

Power off leakage current: Approx. 27 mA AC rms (load voltage 200 V rms, 60 Hz, Ta = 25 °C)

Contact input: Contact input can be assigned the function.
Number of input points: 1 point
Input type: Dry contact input
OFF state (open): 50 kΩ or more
ON state (close): 1 kΩ or less
Contact current: 5 mA or less
Voltage at open: Approx. 5 V DC
Capture judgment time: 50 Hz: 100 ms, 60 Hz: 83.33 ms

Current measurement (optional): Number of input points: 1 point
Input range: (Display range of CT input monitor):
20 A: 0.0 to 40.0 A 45 A: 0.0 to 90.0 A 80 A: 0 to 160 A
30 A: 0.0 to 40.0 A 60 A: 0 to 120 A 100 A: 0 to 200 A
Sampling cycle: 50 Hz: 10 ms, 60 Hz: 8.33 ms

Alarm output (optional): Number of output points: 1 point
Output type: Transistor output
Output method: Sink type
Allowable load current: 100 mA DC
Load voltage: 30 V DC or less
Voltage drop at ON: 2 V DC or less (at allowable load current)
Leakage current at OFF: 0.1 mA DC or less

Retransmission output (AO) (optional):
Number of output points: 1 point
Output voltage: 0 to 10 V DC
Output range: 0 to 10.5 V DC
Allowable load resistance: 1 kΩ or more

Allowable ambient temperature: –15 to +55 °C (Operation guarantee range)

Allowable ambient humidity: 5 to 95 %RH (Non-condensing)
Absolute humidity MAX. W. C 29 g/m^3 dry air at 101.3 kPa

Supply voltage for instrument: AC 85 to 264 V AC [Including power supply voltage variation]
(Rating: 100 to 240 V AC) 50/60 Hz
Frequency variation 50 Hz: 48 to 52 Hz, 60 Hz: 58 to 62 Hz

Power consumption: 6 VA MAX. (100 V AC) Rush current 5.6 A or less
8 VA MAX. (240 V AC) Rush current 13.3 A or less

Withstand voltage: 50/60 Hz 1 minute

Time: 1 minute	①	②	③	④	⑤
① Radiator fins					
② Main circuit terminals	2500 V				
③ Power terminals for instrument	2500 V	2500 V			
④ Input terminals [1]	2500 V	2500 V	2300 V		
⑤ Alarm output	2500 V	2500 V	2300 V	2000 V	
⑥ Host com., AO [2]	2500 V	2500 V	2300 V	1000 V	2000 V

[1] Control input, External gradient setting, External manual setting, Contact input
[2] Host com.: Host communication AO: Retransmission output

Insulation resistance:

	①	②	③	④	⑤
① Radiator fins					
② Main circuit terminals	500 V DC 20 MΩ or more				
③ Power terminals for instrument	500 V DC 20 MΩ or more	500 V DC 20 MΩ or more			
④ Input terminals [1]	500 V DC 20 MΩ or more	500 V DC 20 MΩ or more	500 V DC 20 MΩ or more		
⑤ Alarm output	500 V DC 20 MΩ or more	500 V DC 20 MΩ or more	500 V DC 20 MΩ or more	500 V DC 20 MΩ or more	
⑥ Host com., AO [2]	500 V DC 20 MΩ or more	500 V DC 20 MΩ or more	500 V DC 20 MΩ or more	500 V DC 20 MΩ or more	500 V DC 20 MΩ or more

[1] Control input, External gradient setting, External manual setting, Contact input
[2] Host com.: Host communication AO: Retransmission output

Rated conditional short-circuit current: 700 A (20 A, 30 A) 1500 A (80 A, 100 A)
1000 A (45 A, 60 A)

Short-circuit protective device (fuse):
Breaking capacity: 100 kA (fast-blow fuse for 20 A to 100 A), Not UL certified
200 kA (fast-blow fuse for 20 A to 100 A), UL certified

Cooling method: Natural convection

Mounting method: Panel mounting

Dimensions: Refer to Dimensions

Weight: Approx. 0.45 kg (20 A, 30 A) Approx. 1.8 kg (80 A, 100 A)
Approx. 1.2 kg (45 A, 60 A)

Standard: Safety standards: UL: UL508 (file No. E177758)
cUL: C22.2 No.14 (file No. E177758)
CE marking: In order to comply with the European EMC- and LV directive the noise filter (refer to 3.1) should be applied.
LVD: EN60947-4-3 (Form 4), POLLUTION DEGREE 2
Rated insulation voltage: 240 V
EMC: EN60947-4-3 (Form 4)
RoHS: EN IEC 63000

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