

Single-phase Thyristor Unit (High voltage type)

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

THV-40

Installation Manual

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IMR02S01-E4

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 describes the mounting, wiring and specifications only.

For detailed handling procedures and key operations, refer to separate **THV-40 Instruction Manual (IMR02S03-ED)**. (On CD-ROM)
The manual can be downloaded from the official RKC website:
http://www.rkcinst.com/english/manual_load.htm.

Product Check

THV-40 Installation Manual (IMR02S01-E4).....1
CD-ROM1

Accessories (Order separately)

- Setter for open loop control [potentiometer, knob and scale plate] (Code: THVP-S01) Ordered quantity
 - Input/Output connector [plug] (Code: THV4P-C01).....1
 - Stepdown transformer [for instrument power supply] (Code: CH1-4H381-006).....1
- For other accessories not described above, refer to the **THV-40 Instruction Manual (IMR02S03-ED)**.

Safety Precautions

WARNING

- An external protection device must be installed if failure of this instrument could result in damage to the instrument, equipment or injury to personnel.
- All wiring must be completed before power is turned on to prevent electric shock, fire or damage to instrument and equipment.
- This instrument must be used in accordance with the specifications to prevent fire or damage to instrument and 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 can occur and warranty is void under these conditions.

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

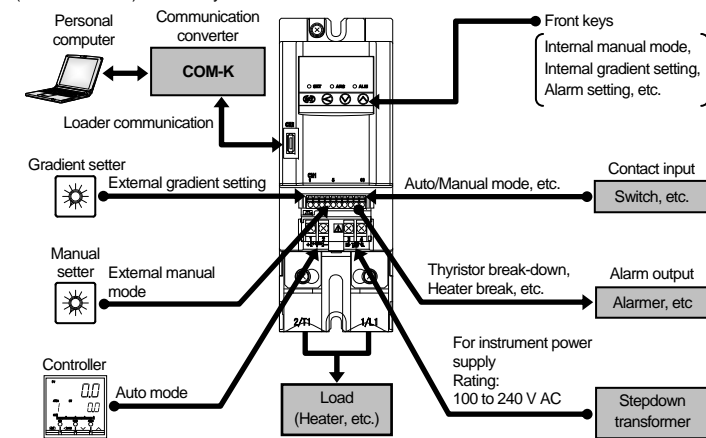
- This product is intended for use with industrial machines, test and measuring equipment. It is not designed for use with medical equipment and nuclear energy.
- This is a Class A instrument. In a domestic environment, this instrument may cause radio interference, in which case the user may be required 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 by operating personnel.
- All precautions described in this manual should be taken to avoid damage to the instrument or equipment.
- 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.
- 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.
- 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 will occur. Use a soft, dry cloth to remove stains from the instrument.
- To avoid damage to instrument display, do not rub with an abrasive material or push 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 purpose of illustration.
- 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 380 to 480 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

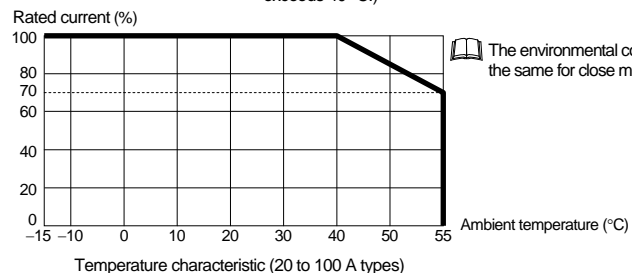
- In order to prevent electric shock or instrument failure, always mount or remove this instrument after power supplied to the entire system is turned off.
- As the temperature of this instrument becomes high, mount the instrument on a non-inflammable material (metal plate, etc.).
- As this instrument 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.)



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

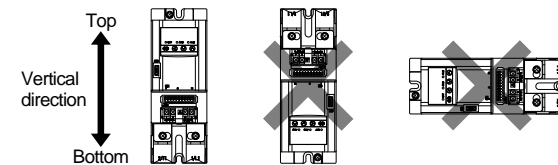
- (3) Do not use this instrument in the following environment:
 - Sudden change in ambient temperature
 - Condensation or icing
 - Corrosive or inflammable gases.
 - Such a place where there are inflammable materials near this instrument.
 - Strong vibration or impact
 - Water, oil, chemicals, vapor 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

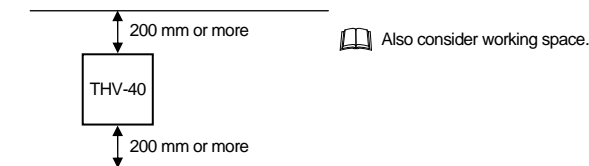
2.2 Mounting Cautions

Take the following points into consideration when mounting this instrument.

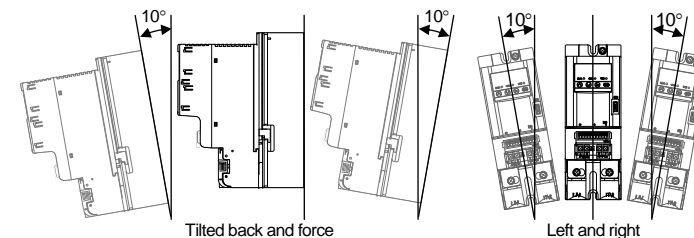
- The instrument must be mounted in a proper direction. When installing the instrument, observe mounting directions.



- Provide adequate heat radiation space so that heat does not build up.
- The instrument requires radiation space above and below it. Allow minimum 200 mm clearance.



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



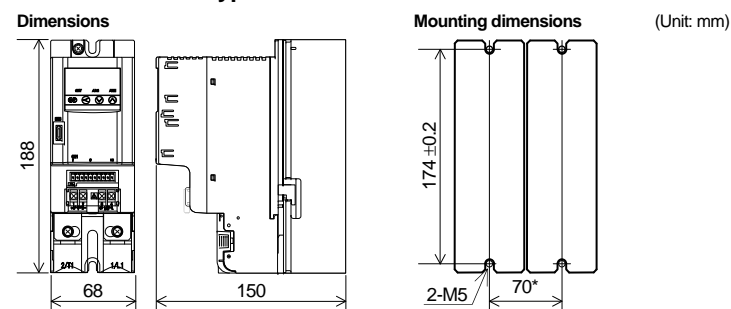
- The temperature inside the control panel increases due to heat generation of this instrument itself. Therefore, take into account full ventilation by mounting forced ventilation fans on the panel.

Table of calorific values (380 to 480 V AC)

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

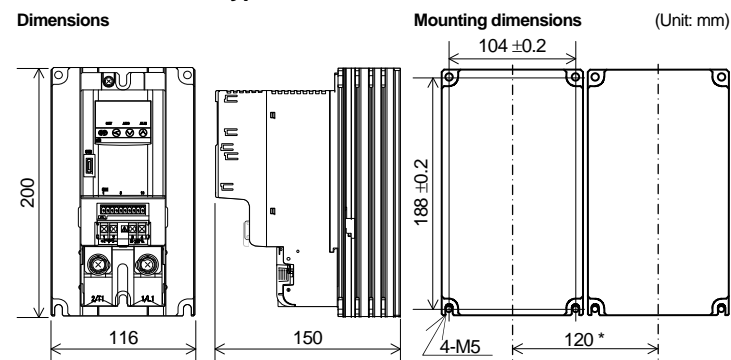
2.3 Dimensions

20 A/30 A/45 A types



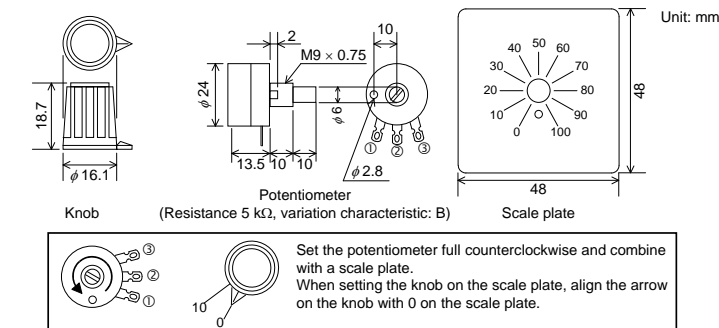
* Minimum space when mounted closely side by side.

60 A/80 A/100 A types



* Minimum space when mounted closely side by side.

Setter (Potentiometer, Knob and Scale plate)

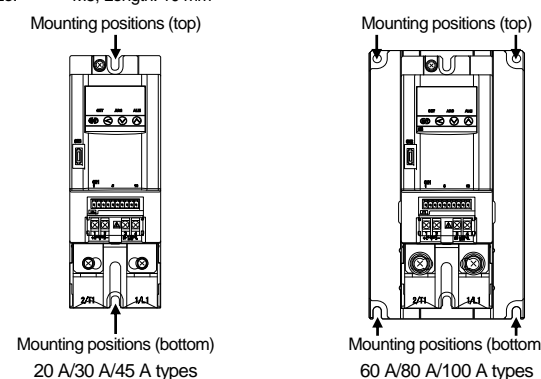


For dimensional details of a fuse holder, an output voltmeter and a stepdown transformer, refer to the **THV-40 Instruction Manual (IMR02S03-ED)**.

2.4 Mounting Procedures

1. Prepare the holes as specified in 2.3 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 Recommended tighten torque: 3.6 N·m [36 kgf·cm]
Size: M5, Length: 10 mm



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 of Main Circuit

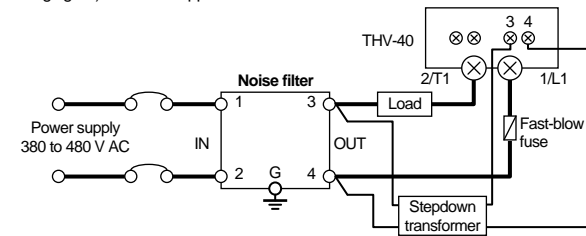
CAUTION

- Match the phase between the supply voltage for the instrument and the supply voltage for the load. Without proper matching, the instrument may not work properly.

- 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.

For setting procedure of each function, refer to **THV-40 Instruction Manual (IMR02S03-ED)**.

- If the secondary side of the transformer goes open due to a break in the heater, connect resistor in parallel on the primary side of the transformer to allow current flow larger than the minimum load current (0.5 A or more). (Adjust the resistance value considering the exciting current of the transformer.)
- 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: NF3020C-SVB
- 45 A: NF3050C-SVB
- 80 A: HF3080C-SZC
- 30 A: NF3030C-SVB
- 60 A: NF3060C-SVB
- 100 A: HF3100C-SZC

- 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.

