THV-40
Installation Manual

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.

All wiring must be completed before power is turned on to prevent electric shock, fire damage to the instrument, equipment or injury to personnel.

This instrument must be used in accordance with the specifications to prevent fire or damage to the instrument and equipment.

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.

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.

WARNING

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.
- This product is intended for use with industrial machines, test and measuring equipment. It is not designed for use with media without high energy.
- 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:
- Input/output or signal lines leaving the building, regardless the length.
- This product is manufactured with 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 operation personnel.
- The instrument described in this manual should be turned off to avoid damage to the instrument or equipment.

To prevent instrument damage or failure, protect the power line and the input/output lines with a protection device such as fuse, etc.

Temperature characteristics (20 to 100 A types)
- Allowable ambient temperature: -15 to +50 °C
- The temperature inside the control panel increases due to heat generation of the instrument itself. Therefore, be sure to provide ventilation by mounting forced ventilation fans on the panel.

Table of calorific values (380 to 480 V AC)

<table>
<thead>
<tr>
<th>Voltage (A)</th>
<th>Calorific values</th>
<th>Wattage</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 A</td>
<td>Approx. 15 W</td>
<td></td>
</tr>
<tr>
<td>30 A</td>
<td>Approx. 43 W</td>
<td></td>
</tr>
<tr>
<td>60 A</td>
<td>Approx. 84 W</td>
<td></td>
</tr>
<tr>
<td>80 A</td>
<td>Approx. 112 W</td>
<td></td>
</tr>
<tr>
<td>100 A</td>
<td>Approx. 140 W</td>
<td></td>
</tr>
</tbody>
</table>

2. MOUNTING

2.1 Mounting Environment

2.2 Mounting Cautions

2.3 Dimensions

3. WIRING

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

A diode should be used and connected as shown in the diagram, when using a relay.

When the power is turned on, the Heater break alarm output may be turned on for up to 0.5 ms. When an interlock circuit or any other related circuit is used, take a necessary measure externally for delaying the activation of the circuit more than 0.5 ms.

When connecting a relay, ensure that the load is connected to the relay contact. If the load is connected to the main circuit, this can lead to damage of the relay or the controller.

Power off leakage current:

- **Input signal select switch**: Use this switch to select the input signal for the controller. The switch has two positions: "Input" and "Output".

- **Contact input**: Use this input for connecting devices that produce an electrical signal.

- **Current input**: Connect this input to devices that produce a current signal.

- **Diode connector (plug)**: This is used to connect a diode to the controller.

- **Main circuit terminals (1/L1, 2)**: The main circuit terminals are used for connecting the primary power supply to the controller.

- **Input/Output connector (plug)**: This connector is used for connecting the controller to other devices.

- **Resistance heater break alarm**: This is used to detect a fault in the heater circuit.

- **Current limit**: This function limits the current flowing through the load.

- **Constant current control**: This function allows precise control of the current output.

- **Non-linear resistance heater break alarm**: This function provides a more accurate heater break alarm.

3.3 Input/Output Connector Pin Number and Details

<table>
<thead>
<tr>
<th>Pin number</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>Input terminals (1, 2)</td>
</tr>
<tr>
<td>3, 4</td>
<td>20 A/30 A/45 A/60 A</td>
</tr>
<tr>
<td>5</td>
<td>Temperature controller</td>
</tr>
<tr>
<td>6</td>
<td>10 V DC output</td>
</tr>
<tr>
<td>7</td>
<td>0 V DC output</td>
</tr>
<tr>
<td>8</td>
<td>Power supply for load</td>
</tr>
<tr>
<td>9, 10</td>
<td>0 V DC output</td>
</tr>
<tr>
<td>11</td>
<td>Power supply for load</td>
</tr>
<tr>
<td>12</td>
<td>Power supply for load</td>
</tr>
</tbody>
</table>

Wiring of setting unit

When pins 1 and 2 and manual setters are connected, connect the 0 V wires externally. Just connect a single wire to terminal 5.

Wiring of external gradient setter

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

Wiring of contact input

Connect to pins 1 and 7.

Wiring of output connector (plug)

Make sure that the Input signal select switch is set to the signal specified at the time of ordering. There is an input signal select switch on the controller.

3. Wiring procedure for input signal

Make sure that the input signal select switch is set to the signal specified at the time of ordering. There is an input signal select switch on the controller.

4. Wiring of output connector (plug)

Make sure that the Input signal select switch is set to the signal specified at the time of ordering. There is an input signal select switch on the controller.

Wiring of alarm output

Connect to pins 3 and 4.

Wiring of control board

Connect the control board to pins 3 and 4.

Wiring of transformer

Connect the transformer to pins 3 and 4.

5. SPECIFICATIONS

**Maximum load current**: 20 A, 30 A, 45 A, 60 A, 80 A, 100 A and 120 A

**Minimum load current**: 20 A, 30 A, 45 A, 60 A, 80 A, 100 A and 120 A

**Power supply**: 323 to 528 V AC [Including power supply voltage variation]

**Rated power**: 450 VA

**Recommended transformer**: A 400 VA or 500 VA transformer can be used.

**Input voltage range**: 0 to 98 % of supply voltage for load

**Applicable load**: Phase control: 0.0 to 100.0 % (Set by the controlling unit)