



RISHABH

**RISHABH INSTRUMENTS LTD**

# Instruction Manual

## High Voltage Tester

### Rish HVT 5kV DC



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Thank you for purchasing **High Voltage Tester RISH HVT 5KV DC**. We would highly appreciate any feedback offered from field engineers, technicians, and readers at [marketing@rishabh.co.in](mailto:marketing@rishabh.co.in). The procedure, instructions and depictions mentioned in this manual will be for reference only and the released real product is the sole standard.

The provided test equipment should be operated by professionals, safety regulations must be followed, and thorough reading of this manual is required before operation of the test equipment.

Reading this instruction manual will intimate the reader with topics such as:

- 1) Safety instructions to operate RISH HVT 5KV DC. **Focus on safety at all steps is important.**
- 2) Specifications of the RISH HVT 5KV DC.
- 3) How to adjust settings of RISH HVT 5KV DC (if any present).
- 4) List of indicators on RISH HVT 5KV DC and what they signify.
- 5) List of buttons and their functions.
- 6) List of protections offered by the RISH HVT 5KV DC.
- 7) Faults that may arise due to the provided protections and steps to rectify the fault.
- 8) Operating the RISH HVT 5KV DC.
- 9) How and where to store the RISH HVT 5KV DC.
- 10) The additional accessories provided with the RISH HVT 5KV DC (if any present).

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Rish HVT 5kV DC carries a warranty of 12 months from the date of purchase.

# 1. Safety Instructions

**THIS INSTRUMENT CAN PRODUCE FATALLY HIGH VOLTAGES.  
SAFETY IS THE RESPONSIBILITY OF THE USER.**



- 1. Any voltage above 30V is considered as potentially harmful and dangerous so appropriate care must be taken.**
2. Power supply must be disconnected from any equipment that is to undergo testing using RISH HVT 5KV DC.
3. The test kit must NOT be operated with its case open under any circumstances.
4. Avoid using equipment in harsh weather conditions such as rain, storm, snow and thunder. The equipment is intended for indoor usage. Never let water or any liquid be spilled on the test kit. Further note that the usage of RISH HVT 5KV DC is prohibited in places having explosive gases or excessive water vapor are present.
5. Ensure proper and safe connections of input and output before applying the voltage.
6. Safety connecting leads must be used for connections.
- 7. The test kit may produce fatally high voltage up to 5kV.**
8. Use the test kit on a safe isolated surface, so that it insulates the equipment under test from ground and any nearby conductors. Also ensure that there are no onlookers/bystanders or that they are properly shielded.
9. Handle all the clips and wires only through their insulators/insulation, and never touch directly. Even after a test has been completed, do not touch the clips or wires until the dimmer has returned to the zero position (indicated by zero interlock lamp).
10. Always ensure that the built-up charge during the test is discharged using the discharge rod before touching the equipment under test and RISH HVT 5KV DC's diode/capacitor/HV Transformer.
11. Ensure that any item/circuit to undergo testing using RISH HVT 5KV DC is only connected or disconnected when RISH HVT 5KV DC's high voltage is off.
12. There are no parts requiring maintenance in RISH HVT 5KV DC, hence customer should not open the equipment for maintenance. The equipment must never be opened when it is in operation.
13. Place the item under test at safe distance from the operator and any other onlookers/bystanders/equipment.

14. The warranty will become invalid if RISH HVT 5KV DC is opened by the customer.



## Safety Advice



Hazardous voltages occur in **RISH HVT 5KV DC** during operation. Violation or disregard of safety instructions may result in damage to property, severe physical harm or even death. Only trained and qualified personnel should work on or around RISH HVT 5KV DC . **Anyone operating the instrument must only do so after being fully acquainted with safety instructions, warnings, and operating instructions.**

Successful and safe operation of RISH HVT 5KV DC is subject to proper handling and operation.



## 2. Specifications

### 2.1 Input specifications

Input Voltage	230 VAC $\pm$ 10%
Frequency	50Hz
Protection	Fuse

### 2.2 Output specifications

DC Voltage Range	0 to 5000 VDC, 50 Hz
Protection	Over current and over voltage protection relay provided.

### 2.3 Operation specifications

Duty Cycle	2 minutes ON, 5 minutes OFF.
Operation	Manual
Cooling	Air Cooled

### 2.4 Environmental Specification

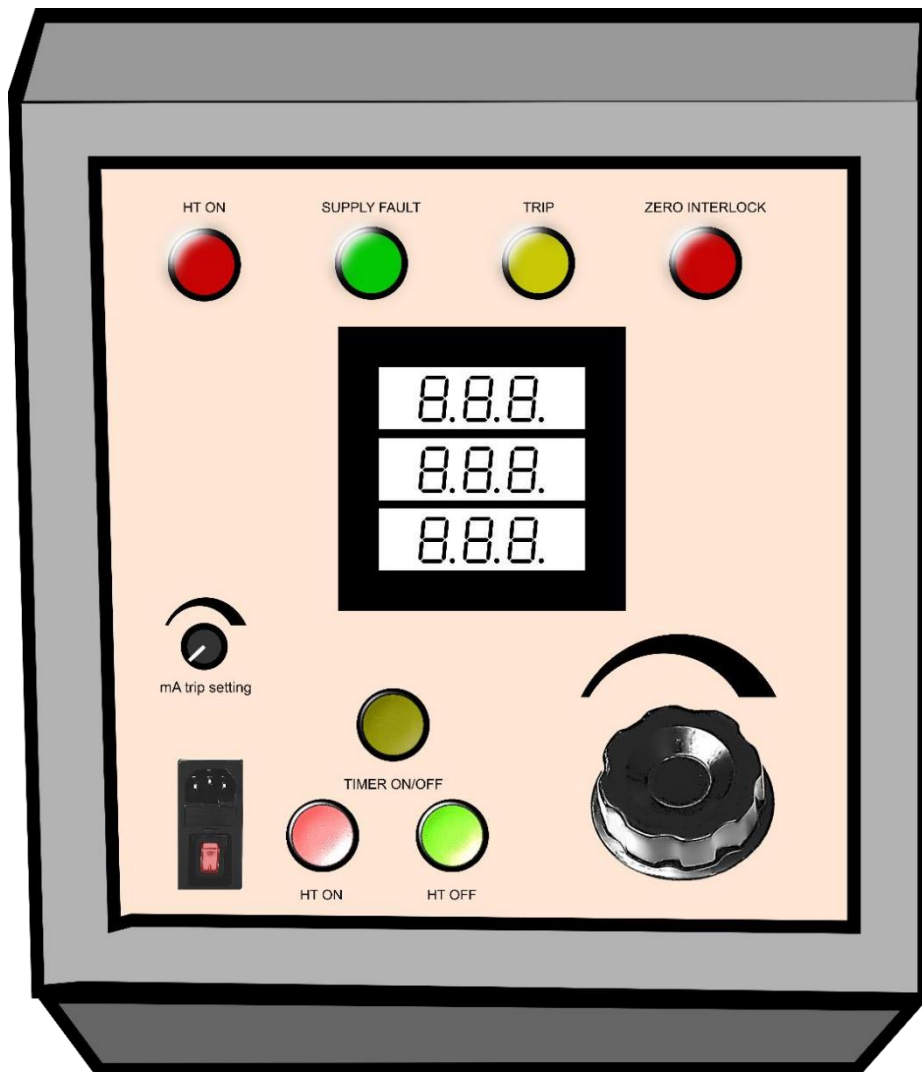
Operating temperature: 0 to +55°C
Storage temperature: 0 to +70°C
Relative humidity: 0... 90% non-condensing

### 2.5 Applicable Standards

- IEC 61010-1
- IS 2071-1 for testing techniques

## 3. Overview

The below diagram depicts the HVT, it has a total of 4 lamps, 3 push buttons, 1 variac, 1 potentiometer, 1 meter & 1 power inlet socket (with inbuilt fuse). One of the lamps (HT ON) also has a buzzer inside it. The push buttons HT ON & HT OFF are of illuminated type (containing lamp within) and indicate whether the test is ON or OFF.



### 3.1 Potentiometer

RISH HVT 5KV DC is equipped with a potentiometer to select the maximum tripping current which linearly goes from 1 mA to 100 mA for 100mA model & 1 mA to 50 mA for 50 mA model.

Pressing the ▲ push button on the meter (also marked as mA trip) will show what value the potentiometer is set at (for example, 36 mA, which would mean the tripping current is set to 36 milliampere).

### 3.2 Protection

RISH HVT 5KV DC is equipped with multiple components that protect the equipment from damage. This section describes the purpose of these protections, and what purpose they serve to ensure correct functioning of the test kit.

Protection	Purpose
Fuse	Protection against any short circuit.
Over voltage protection	Causes tripping above the maximum voltage (5kV, typically overvoltage protection is at 5.15 kV).
Over current protection	Causes tripping if milliampere exceeds the maximum selected current range.
Zero start interlock	Ensures that kit allows start from dimmer zero position.
Line-Neutral reversal	Indicates that the line and neutral have been interchanged and hence wrongly connected (Line-Neutral reversal fault)
Protection against open earth	Indicates that the ground is not connected (Open earth fault)

The follow actions can be taken to remedy the respective faults:

Fault	Required action to correct
Line-Neutral reversal fault	Ensure that line and neutral are connected to their respective input positions properly (wire color red for line, and black for neutral).
Open earth fault	Ensure that earth is connected to the earth wire. (wire color green).

### 3.3 Indicators

The RISH HVT 5KV DC test kit is equipped with 7 indicators – 4 LED lamps, 1 buzzer, 1 illuminated push button & 1 illuminated power inlet switch. The following table describes their purpose.

Indicator	Color	Position	Meaning
Mains ON (power inlet socket)	Red	Switch Lamp ON	Power Supply ON
		Switch Lamp OFF	Power Supply OFF
Supply Fault* (Lamp)	Green	Lamp ON	Supply fault* PRESENT
		Lamp OFF	Supply fault* ABSENT
HT On (Lamp & Buzzer)	Red	Buzzer & Lamp ON	Test is ON
		Buzzer & Lamp OFF	Test is OFF
HT Off (illuminated push button)	Green	Lamp ON	Test is OFF
		Lamp OFF	Test is ON
Trip	Yellow	Lamp ON	Tripping due to over current/voltage. Briefly lights up after time duration is over.
		Lamp OFF	Healthy condition
Zero Interlock	Red	Lamp ON	Dimmer AT Zero Position
		Lamp OFF	Dimmer NOT AT Zero Position

\* Supply Fault refers to Line and Neutral reversal, or open earth.

### 3.4 List of meters

RISH HVT 5KV DC is equipped with one multifunction meter, that has the following functions -

	Purpose	Range	Accuracy
DC kV	Measure DC voltage	0 to 5kV	± 2 % of range ± 2 Digits
DC mA	Measure DC current	1 to 100mA for 100 mA model  1 to 50 mA for 50 mA model	± 2 % of range ± 2 Digits
Timer	Setting test duration	0 to 999 sec	± 0.05 % +1 counts



The timing on the timer can be set using the “RST” tactile switch on the meter. Press & hold the RST switch for 3 seconds, and you will enter timer setting mode. Using the push buttons for increasing the value, you can change the time setting up to a maximum of 999 seconds.

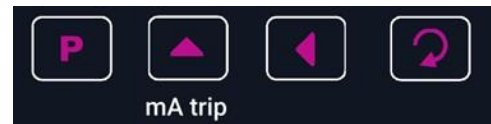
Note that high voltage test should be OFF for safety purpose while interacting with the meter.




### 3.5 Buttons


There are 3 buttons, of which functions are listed below:


1. **Timer On** – Initiates the timer to start which turns off after a specified time (time can be set on the timer meter using pushbuttons on the meter).
2. **HT On** – Turns the HT test ON. Only functions if dimmer is at zero position (zero interlock lamp ON).
3. **HT Off** – Turns the HT test OFF. This button has an LED Lamp inside, which also indicates whether the test is ON or OFF.

### 3.6 Tactile push buttons (on meter)



 - After long pressing this button, the meter will enter into a timer programming mode in which the user will be able to change the value of countdown timer using the two buttons below (  &  ).

 - Used to increment the value (digit) by 1. It also has an additional function of “mA trip”. By pressing this button, the meter will show the set tripping current set by potentiometer in **3.1**. Hence, while setting the current setting, the user can use this button to set the desired tripping current.

 - Used to shift 1 digit to left.

## 4.1 Safety

Ensure that all local safety regulations are being followed. Only a qualified operator who has read and understood all the safety warnings, the complete instruction manual and has experience in high voltage testing should operate on the equipment. The following steps must be followed in order.

Please ensure that the both the device under test (DUT) and RISH HVT 5KV DC are powered OFF and earthed while creating the following connections and also while removing the mentioned connections.

## 4.2 Operating conditions that must be met before the test can be turned on:

- 1) There must not be line-neutral reversal. If present, supply fault lamp will turn on with buzzer. Read section 3.2 and 3.3 to see steps to rectify this problem.
- 2) Earth terminal must be connected to the power supply cable earth wire.
- 3) Dimmer is at zero position (indicated by zero interlock lamp).

## 4.3 Operating Instructions:

- 1) Do selection of tripping current using the current selector potentiometer (more in section 3.1). The set value can be from 1mA to 100mA (if 100mA model) and 1mA to 50mA (if 50 mA model).
- 2) Connect the earthing cable to the RISH HVT 5KV DC's earthing connector on control panel.
- 3) Connect the earthing cable to the device under test.
- 4) Connect the power supply cable to RISH HVT 5KV DC.
- 5) Power on the RISH HVT 5KV DC by turning on switch provided on the power inlet socket (**do not turn on RISH HVT 5KV DC before the previous steps have been completed**). If there are no line-neutral reversal or open earth fault, the test kit will turn on without any warnings. If there are such faults, read section 3.2 for actions to rectify.
- 6) Set Dimmer to zero position (if not already at zero). It will be indicated by zero interlock lamp turned ON (more in section 3.3).
- 7) Turn on high voltage by pressing the HT ON button. If HT is not turning ON, ensure zero interlock is not blocking the operation. If HT is ON, it will be indicated by the HT ON lamp along with buzzer (more in section 3.3).

8) Increase/decrease the test voltage slowly by rotating the knob of the dimmer provided on the control panel.

9) Once the desired voltage is reached, turn on the timer by timer start button. After the completion of specified test duration set on timer, the test will turn off. Make the dimmer at zero position again.

10) If there is some fault in the object under test, the kit will trip and the same will be indicated by trip lamp until the user acknowledges/resets it by pressing the HT OFF button. The trip lamp will hence be latched indefinitely until user acknowledgement.

11) Test can be manually stopped at any time using the HT OFF button.

#### **4.4 Post-test instructions (steps after test):**

1) Set dimmer position to zero.

2) Power off the test kit.

3) Discharge the object under test using discharge rod after ensuring that power supply of kit is turned off.

4) After completion of the test and turning the power supply off of the RISH HVT 5KV DC and discharging objects under test, ensure removing of all the accessories like cables, etc.

## 5. Supplied Accessories

- 1) HV Cable (3mtr)
- 2) Power Supply Cable
- 3) Earthing Cable
- 4) Discharge Rod

Furthermore, these accessories are also provided:

- 1) Spare fuse (1 Nos).
- 2) Operation Manual (Soft copy).

## 5. Storage

**Storage:** RISH HVT 5KV DC must **NOT** be stored or used outdoors, or in any place where it may be subject to rain, thunder, excessive water vapor or explosive chemicals. Also ensure that it is not stored in places with temperature less than 0°C or greater than 50°C. Avoid places where any water or other liquid may come in contact with the RISH HVT 5KV DC.

**Cleaning:** Please ensure that the equipment is only cleaned when it is turned off. Under no circumstances should the equipment undergo any kind of cleaning or maintenance while it is turned on.