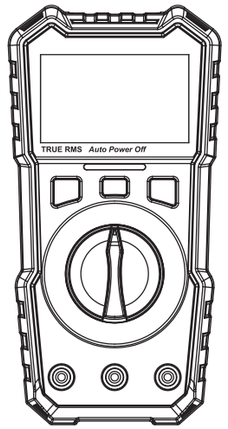
# TIS 201 TRMS Auto-Ranging Digital Multimeter




CE

CAT III 600V

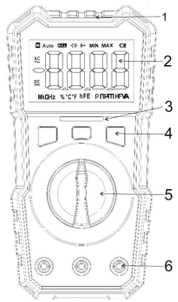
## User Manual

**Units 12 to 15 Luddite Way Business Park**
**Rawfolds way**
**Cleckheaton**
**West Yorkshire**
**United Kingdom**
**BD19 5DQ**

## Introduction

This multimeter has been designed as a highly stable, reliable & robust digital electronic measuring tool, with an inbuilt 31.5mm font height LCD display to show readings clearly. Inbuilt into the circuitry is an accurate Analogue to Digital converter, allowing the instrument to measure AC/DC Voltage, AC/DC current, Resistance, Diodes, Transistors (only available with the optional adapter), Continuity, Temperature, Frequency, Duty Cycle, Capacitance, NCV and Live Wire detection. With an inbuilt backlight and flashlight allowing the user to read values in dark environments. To fully understand the safe usage & features of the instrument, please read this manual carefully & keep in it in a safe for future reference.

## Panel Description




1.NCV induction position
2.LCD display: font height 31.5mm
3.NCV indicator
4.Functional button
SEL - slight press to activate function shift, holding press to activate flash light
☼/H - slight press to activate data hold function, holding press to activate back light display
MIN MAX - Slight press to shift MAX/MIN, holding press to exit MAX/MIN; activate or exit REL measuring mode in same method
5.Function selection rotary switch
6.Input jacks

## Safety Information

This multimeter has been designed according to IEC1010 concerning electronic measuring instruments with 600V CAT III and pollution 2.
⚠ This symbol indicates that the operator must refer to an explanation in the operating instruction to avoid personal injury or damage to the meter.
⏚Grounding ⚠ High Voltage ▣ Double insulation

## Cautions

• Improper use of this meter can cause damage, shock, injury or death. Read and understand this user manual before operating the meter.
• Always remove the test leads before replacing the battery or fuses.
• Inspect the condition of the test leads and the meter itself for any damage before operating the meter.
• Take great care when making measurements if the voltages are greater 30VAC RMS or 60V DC, then these voltages are considered a shock hazard.
• Always discharge capacitors and remove power from the device under test before performing Diode, Resistance or Continuity tests.
• To avoid damages to the meter, do not exceed the maximum limits of the input values shown in the specification.
• In case the device is going to be unused for an extended period of time, remove the batteries to prevent them from draining.

## Maintenance

• To avoid electric shock, disconnect the test leads from any source of voltage before removing the back cover or the battery or fuse covers.
• To avoid electric shock, do not operate the meter until the battery and fuse covers are in place and fastened securely.
• To protect circuit, the replacement fuse must be to the same specification.
• Do not use clean the housing case of meter using chemical solvent

## Technical Specifications

• Accuracy: ± (%readings + digit), warranty period: 12 months
• Environment temperature: 18℃~28℃; humidity: ≤80%
• Maximum between voltage input and grounding: CATIII 600V
• Fuse: F500mA/250V, F10A/250V
• Battery: 1.5V AAA x 2
• Auto power off: automatically powers off approximately 15 minutes after last usage.
• Max display: 6000 count
• Overload display: "OL"
• Polarity display: negative "-"
• Operating temperature: 0℃~40℃
• Storage temperature: -10℃~50℃
• Low battery indication:
• Dimension: 150x75x47mm
• Weight: about 300g (include batteries)

## DC & AC Voltage

| Range | Resolution | DCV Accuracy | ACV Accuracy |
|---|---|---|---|
| 600mV | 0.1mV | ±0.5%±3 | ±1.0%±10 |
| 6V | 1mV | ±0.5%±3 | ±1.0%±10 |
| 60V | 10mV | ±0.8%±3 | ±1.0%±10 |
| 600V | 100mV | ±0.8%±3 | ±1.0%±10 |

Input impedance:10MΩ
Overload protection:600mV range at 250V DC or 250V AC RMS;
other ranges at 600V DC or 600V AC RMS
Frequency range: 40Hz - 1000Hz,
Display: TRUE RMS

## DC & AC Current

| Range | Resolution | DCV Accuracy | ACV Accuracy |
|---|---|---|---|
| 600μA | 0.1μA | ±1.0%±5 | ±1.8%±5 |
| 6000μA | 1μA | ±1.0%±5 | ±1.8%±5 |
| 60mA | 0.01mA | ±1.0%±5 | ±1.8%±5 |
| 600mA | 0.1mA | ±2.0%±5 | ±2.5%±5 |
| 6A | 0.001A | ±3.0%±5 | ±3.0%±5 |
| 10A | 0.01A | ±3.0%±5 | ±3.0%±5 |

Overload protection:fuse F500mA/250V for mA range
fuse F10A/250V for 10A range
Frequency range: 40Hz - 1000Hz,
Display: TRUE RMS

## Resistance

| Range | Resolution | Accuracy |
|---|---|---|
| 600Ω | 0.1Ω | ±1.0%±5 |
| 6kΩ | 0.001kΩ | ±1.0%±5 |
| 60kΩ | 0.01kΩ | ±1.0%±5 |
| 600kΩ | 0.1kΩ | ±1.0%±5 |
| 6MΩ | 0.001MΩ | ±1.0%±5 |
| 60MΩ | 0.01MΩ | ±1.2%±5 |

Overload protection:250V DC or 250V AC RMS

## Frequency

| Range | Resolution | Accuracy |
|---|---|---|
| 10Hz | 0.001Hz | ±0.5%±4 |
| 100Hz | 0.01Hz | |
| 1kHz | 0.1Hz | |
| 10kHz | 0.001kHz | |
| 100kHz | 0.01kHz | |
| 1MHz | 0.1kHz | |
| 10MHz | 0.001MHz | |

Overload protection: 250V DC or 250V AC RMS

## Capacitance

| Range | Resolution | Accuracy |
|---|---|---|
| 60nF | 0.01nF | ±4.0%±25 |
| 600nF | 0.1nF | ±4.0%±15 |
| 6μF | 0.001μF | |
| 60μF | 0.01μF | |
| 600μF | 0.1μF | |
| 6mF | 0.001mF | ±5.0%±25 |
| 60mF | 0.01mF | |
| 100mF | 0.1mF | |

Overload protection: 250V DC or 250V AC RMS

## Diode and Continuity

| Range | Description |
|---|---|
| Buzzer | Built-in buzzer will be sounded if resistance is less than 50Ω±30Ω |
| Diode | Display approximate forward voltage of diode |

Overload protection: 250V DC or 250V AC RMS

## Temperature

| Unit | Range | Resolution | Accuracy |
|---|---|---|---|
| ℃ | -20 ℃ ~ 0 ℃ | 1 ℃ | ±4 ℃ |
| | 0 ℃ ~400 ℃ | | ±(2.0%+3d) |
| | 400 ℃ ~1000 ℃ | | ±(3.0%+3d) |
| ℉ | -4 ℉ ~50 ℉ | 1 ℉ | ±5 ℉ |
| | 50 ℉ ~750 ℉ | | ±(2.0%+5d) |
| | 750 ℉ ~1832 ℉ | | ±(3.0%+5d) |

Overload protection: 250V DC or 250V AC RMS

## Transistor (hFE) Test (only available with the optional adapter)

| Range | Description | Test Condition |
|---|---|---|
| hFE | Measure NPN type or PNP type transistor, to display approx. hFE value 0~1000 | Based current 10uA Vce is about 2.8V |

## Duty Cycle Test

| Range | Description | Accuracy |
|---|---|---|
| Duty Cycle % | 0.1%-99.9% Typical value Vrms=1V,f=1 | ±1.2%±3 |
| | 0.1%-99.9% （≥1kHz） | ±2.5%±3 |

Overload protection: 250V DC or 250V AC RMS

## Non-Contact Voltage Detection

AC Voltage range > 30V - 1000V (50Hz-60Hz)

## Live Wire Recognition

AC Voltage range > 100V - 250V (50Hz-60Hz)

## Operation Instruction

Tips before operation:
• Turn the meter on and check the battery status, if displays in LCD, please change the batteries.
• To avoid damage to the meter, do not attempt to take any voltage or current measurements exceeding the rating values.
• Before the measurement, turn the rotary switch to the correct range.

### Voltage Measurement

1. Insert the red test lead into “**VΩmA”** jack and insert black test lead into “**COM**” jack.
2. Set the rotary switch to voltage range and select DCV or ACV mode, connect the test lead probe tips to the circuit under test, and the voltage value will be displayed in LCD.
3. Under AC voltage mode, press “**SEL**” button to move frequency measurement.

**Note:**
• Set the rotary switch to higher range if the voltage range under test is not known, and then reduce down until the you select the most accurate setting.
• To avoid electrical shock and/or damage to the instrument, do not attempt to take any voltage measurement that might exceed 600VRMS.
• It is normal with no effects on measurement, for the instrument to display readings on the 600mV setting even without bring connected to a circuit.

### Current Measurement

1. Insert black test lead into “COM” jack, and insert the red test lead into “VΩmA” jack for current measurement lower 600mA & insert the red test lead into the 10A jack for current measurement between 600mA to 10A.
2. Set the rotary switch to the current range and press “SEL” key to shift DCA or ACA mode, connect the test lead probe tips onto the circuit under test, and the current value will be displayed in LCD.
3. Press “SEL” button to display frequency value of current under test.

**Note:**
• Set the rotary switch to higher range if the current range under test is not known and then reduce for the best accuracy.
• If display shows “OL” for over range, set the rotary switch to higher range.
• To avoid damage to the meter, check the fuse of the meter before current measurement.
⚠indicates the max current is 600mA or 10A

### Frequency & Duty Cycle (Hz/%) Measurement

1. Insert black test lead into “**COM**” jack, and red test lead into “**VΩmA**” jack.
2. Touch the test lead probe tips to the both sides of the signal source under test, and read the value on the LCD.
3. Press “**SEL**” button to shift frequency / duty cycle (Hz/%) mode

### Diode, Capacitance, Resistance and Continuity Measurement

1. Insert black test lead into “**COM**” jack, and red test lead into “**VΩmA**” jack, the polarity of red test lead is “+”.
2. Set the function selection rotary switch to position, press “**SEL**” to correct testing mode. Place the red test lead on the anode of diode and black test lead on the cathode of diode, the meter will show values in the LCD display.

**Note:**
• If the measured resistance value exceeds the maximum value of the chosen range, the meter displays “OL” for over range, then set the rotary switch to higher. For measuring over 1MΩ of high resistance, the meter may take a few seconds to stabilise the readings.
• If there is an open circuit, the meter display OL on diode, resistance and continuity tests; and will show “0000” on capacitance test.
• To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any resistance measurements.
• Under continuity check, if the resistance between two points is less than 50Ω±30Ω, the inbuilt buzzer will sound.

### Transistor (hFE) Measurement (only available with the optional adapter)

1. Set the function rotary switch to hFE range, and insert the transistor test kit correctly.
2. Make sure the triode type is NPN or PNP, and then, insert E,B,C of triode under testing into E.B.C holes of triode seat on the panel. The meter will display the approximate value of hFE, and the test condition is based on current 10uA, Vce is about 2.8V.

### Temperature Measurement

1. Set the rotary switch to ℃/℉ range, the value of environmental temperature shows in LCD display
2. Insert the red terminal of temperature probe (K Type) into the ℃/℉ jack, the black terminal into **COM** jack, place the temperature probe tip on the measurement point.
3. The temperature value is shown in the LCD display.

**Note:**
Since cold-junction compensating circuitry stalled inside meter, due to the sealing of the instrment, the user needs to leave the instrument within the measuring enviroment for more accurate readyings.

### Non-Contact Voltage(NCV) Detection

1. Set the rotary switch to **NCV/Live** range and press **SEL** to activate NCV mode, the LCD will display “EF”.
2. Move the top part of meter with the circuit under test, the audible alert signal will sound and LED flashes once voltage is detected.

**Note:**
• The detection result is for reference, do not determine the voltage by NCV detection ONLY.
• Detection may be affected by socket design, insulation thickness and other variable conditions.
• External interference sources, such as flashlights, motors, etc, may cause incorrect detection.

### Live Wire Recognition(Live)

1. Set the rotary switch to **NCV/Live** range and press **SEL** to activate Live mode, the LCD display “LIVE”.
2. Insert red test lead into **VΩmA** jack and place the red test lead tip to contact the AC Voltage. Once meter sounds an alarm and LED flashes, the LCD will show “LIVE”, meaning the line under test is the live conductor.

**Note:**
• When the circuit has serious leakage & the red test lead is in contact with the earth conductor, the buzzer of meter willsound.
• Detection may be affected by socket design, insulation thickness and other variable conditions.
• External interference sources, such as flashlights, motors, etc, may cause the incorrect detection.

## Battery and Fuse Replacement

1. To avoid electric shock, disconnect the test leads from any source of voltage before removing the back cover or the battery or fuse covers.
2. To avoid electric shock, do not operate the meter until the battery and fuse covers are in place and fastened securely.
3. Once battery indicator appears, please open the battery cover and replace the same type battery into battery holder, then replace the batttery cover and secure with the screws.
4. If changing the fuse, gently remove the old fuse and install the new fuse into fuse holder, ensuring the fuse specification is the same as original fuse, then replace and secure the rear cover.