

# ELECTRICIAN'S MULTIMETER

PART NO: TTIDM1000V (..151476)



**TO PREVENT SERIOUS INJURY, READ AND UNDERSTAND ALL WARNINGS AND INSTRUCTIONS BEFORE USE.**

**OPERATING INSTRUCTIONS**

# CONTENTS

- INTRODUCTION .....3
  - Intended Use.....3
  - Product Contents .....3
  - Electrical Symbols.....3
- GENERAL SAFETY .....4
- SAFETY INSTRUCTIONS.....4
  - Safety Standards .....4
  - Safety Instructions.....4
- GENERAL SPECIFICATIONS.....6
- EXTERNAL OVERVIEW .....6
  - Functional Dial Overview .....7
  - LCD Screen Overview .....8
  - Buttons Overview .....8
- OPERATING INSTRUCTIONS .....10
  - DC Voltage Measurement .....10
  - AC Voltage Measurement .....11
  - AC/DC Current Measurement .....12
  - Resistance Measurement .....13
  - Diode Measurement.....14
  - Continuity Measurement .....16
  - Capacitance Measurement .....17
  - Frequency/Duty Ratio Measurement .....18
  - Temperature Measurement .....19
  - Transistor Measurement.....20
  - Non-Contact Voltage Measurement (NCV) .....21
  - Contact Type Live/Neutral Wire Management .....22
- TECHNICAL INDEX.....23
  - DC Voltage Measurement.....23
  - AC Voltage Measurement .....23
  - Resistance Measurement .....24
  - Continuity, Diode Measurement.....24
  - Transistor Measurement.....25
  - Capacitance Measurement .....25
  - DC Current Measurement.....25
  - AC Current Measurement.....26
  - Frequency/Duty Ratio Measurement.....26
  - Temperature Measurement .....27
  - LED Three Colour Indicator .....27
- MAINTENANCE .....29
  - General Maintenance .....29
  - Battery/Fuse Installation and Replacement .....29
- WARRANTY INFORMATION .....32

# INTRODUCTION

TTIDM1000V is a professional digital multimeter with the following features:

- HVAC temperature measurement
- Non-contact voltage detection
- AC/DC current measurement up to 20A
- AC/DC voltage measurement up to 1000V
- hFE function
- Diode test

## INTENDED USE









This multimeter is to be used only for electrical inspection within the specifications the machine is rated for. Failure to use the machine within the specifications may result in serious injury or death.

## PRODUCT CONTENTS

Unpack ensure the following attachments are complete or intact.

- TTIDM1000V Multimeter
- Operating instruction manual
- Pair Test Leads
- 4 x 1.5V AAA Batteries
- K-Type thermocouple lead

## ELECTRICAL SYMBOLS

	AC (alternating current)		High voltage hazard
	DC (direct current)		Grounding
	Warning		Low battery indicator
	Double insulation		This symbol signifies product complies with Australian requirements

# GENERAL SAFETY

Prior to using the multimeter, please read the product manual and ensure you have a solid understanding of the multimeter's functions and features.



## WARNING

The warnings, cautions, and instructions discussed in this instruction manual cannot cover all possible conditions or situations that could occur. It must be understood by the operator that common sense and caution are factors that cannot be built into this product, this must be supplied by the operator.


# SAFETY INSTRUCTIONS

## SAFETY STANDARDS




- CAT III 600V, CAT II 1000V, double insulation and material pollution grade II.
- CAT safety level: Category III is suitable for measuring circuits connected to the power distribution section of a buildings low voltage supply unit.

## SAFETY INSTRUCTIONS

- Before using the meter inspect the case. Do not use the meter if it is damaged or the case (or part of the case) is removed. If you can identify cracks or missing parts stop using the meter immediately.
- Inspect the test leads for damaged insulation or exposed wires. Check test leads continuity. Replace damaged test leads with leads that are suitable to the meter that meet or exceed the safety requirements.
- Comply with local and national safety codes. Use personal protective equipment (approved rubber gloves, face protection, and flame-resistant clothes) to prevent shock and arc blast injury where hazardous live conductors are exposed.
- Do not apply more than the rated voltage, as marked on the meter, between the terminals or between any terminal and grounding.
- Limit operation to the specified measurement category, voltage, or amperage ratings.
- Use Product-approved measurement category (CAT), voltage, and amperage rated accessories (probes, test leads, and adapters) for all measurements.
- Use the correct terminals, function, and range for measurements.
- Before each use, verify meter operation by measuring a known voltage first.
- Do not touch voltages  $>30$  V ac rms, 42 V ac peak, or 60 V dc.
- Do not use the meter around explosive gas, vapor, or in damp or wet environments
- The function selector should be placed in the right position before using the unit, do not change the range/function during measurement to avoid damage to the meter or equipment under test.
- When the meter is working at an effective voltage over 60V in DC or 30V rms in AC, special care should be taken as there is danger of electric shock.
- Do not touch the probes to a voltage source when the test leads are connected to the current terminals.

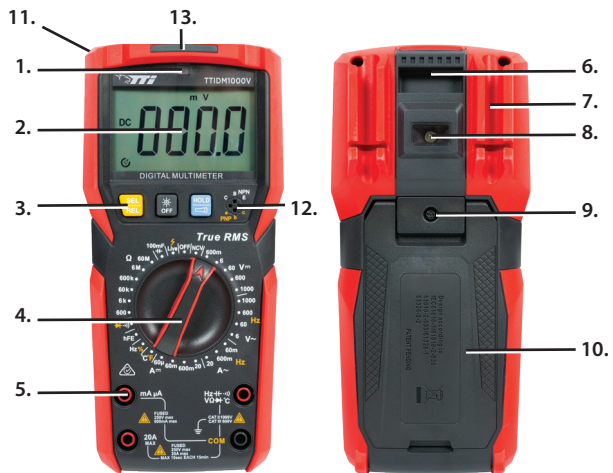
- Connect the common test lead before the live test lead and remove the live test lead before the common test lead.
- Do not use a current measurement as an indication that a circuit is safe to touch. A voltage measurement is necessary to know if a circuit is hazardous.
- Do not use the HOLD function to measure unknown potentials. When HOLD is turned on, the display does not change when a different potential is measured.
- When using the test leads, ensure leads are fully seated and keep your fingers behind the finger guards.
- To avoid electric shock, injury, or damage to the meter, disconnect circuit power and discharge all high-voltage capacitors before testing resistance, continuity, diodes, or capacitance.
- Before measuring current, check the meters fuses' and turn off the current to be tested before connecting the meter to the circuit. After connecting the circuit reliably, turn the current to be tested on.
- Replace the battery as soon as the battery indicator " " appears. With a low battery, the meter may produce false readings that can lead to electric shock and personal injury.
- Do not alter the meter and use only as specified, or the protection supplied by the meter can be compromised.
- Use a soft cloth and mild detergent should to clean the surface of the meter when performing general maintenance. No abrasives or solvents should be used in cleaning; this is to prevent the surface of the meter from corrosion, damage and accident.
- Turn the meter off when it is not in use. Remove the batteries if the meter is not used for an extended period of time. If the batteries are not removed, battery leakage may result.
- Repair the meter before use if the battery leaks. Battery leakage may create a shock hazard or damage the meter.

# GENERAL SPECIFICATIONS

Max voltage between input terminal and ground: please refer to the technical index for more details.
 20A terminal: 20A 250V fast-acting fuse ( $\Phi$ 5x 20mm)
 mA/ $\mu$ A terminal: 600mA 250V fast-acting fuse ( $\Phi$ 5x20mm)
Display count: 6000
Max capacitance: 100mF
Range: Manual
Polarity: Auto
Refreshes 2-3 times/s; "OL" appears when over-range
Operating temperature: 0°C~40°C (32°F~ 104°F)
Storage temperature: -20°C~60°C (-4°F- 140°F)
Relative humidity: 0°C ~ below 30°C <75%, 30°C~40°C <50%
Operating altitude: 0-2000m
Battery: AAA 1.5V x 4
Low battery indication: LCD displays "  " symbol
EMC: a. RF field {1V/m}: overall accuracy= specified accuracy+ 5% of range b. RF field (>3V/m): no specified calculation

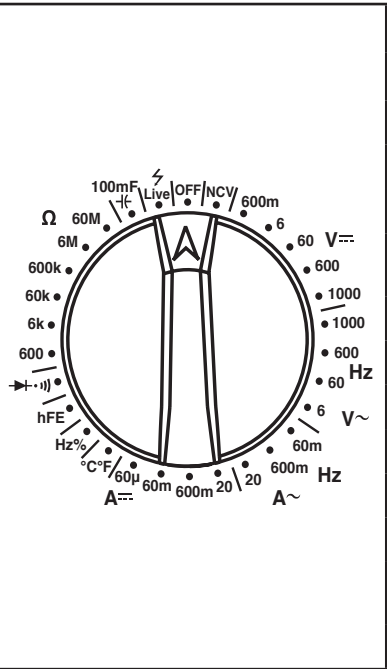
# EXTERNAL OVERVIEW

1. Auto backlight sensing window
2. LCD screen
3. Functional buttons
4. Function selector
5. Input terminals
6. Hook
7. Multifunctional test lead slot
8. Flashlight
9. Battery cover screw
10. Case holder
11. NCV sensing part
12. Transistor test ports
13. Audio/visual alarm indicator











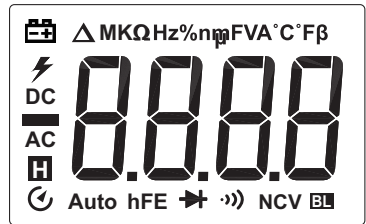
# FUNCTIONAL DIAL OVERVIEW

POSITION	DESCRIPTION
V $\overline{\text{---}}$	DC voltage measurement
V $\sim$	AC voltage measurement
A $\sim$	AC current measurement
A $\overline{\text{---}}$	DC current measurement
Live	Contact-type live/neutral wire measurement
OFF	Shut-down
Hz%	Frequency/ duty ratio measurement
NCV	Non-contact voltage measurement
hFE	Transistor measurement
$\Omega$	Resistance measurement
100mF $\overline{\text{---}}$	Capacitance measurement
$\rightarrow$ $\vdash$ $\cdot$ $\parallel$ )	Diode PN junction voltage/ continuity measurement
$^{\circ}\text{C}/^{\circ}\text{F}$	Temperature measurement






## LCD SCREEN OVERVIEW

SYMBOL	DESCRIPTION
	Caution AC/DC voltage is higher than 30V
	Data hold
	Negative reading
<b>AC/DC</b>	AC/DC measurement
	Low battery indicator
	Diode measurement
	Continuity measurement
	Relative value measurement
<b>Ω, kΩ, MΩ</b>	Resistance unit
<b>mV, V</b>	Voltage unit
<b>μA, mA, A</b>	Current unit
<b>nF, μF, mF</b>	Capacitance unit
<b>Hz%</b>	Frequency unit, duty ratio
<b>°C/°F</b>	Temperature unit, Celsius/Fahrenheit
<b>β</b>	Transistor amplification factor
<b>NCV</b>	Non-contact voltage measurement
<b>Live</b>	Contact-type live/neutral wire measurement
	Auto power off
<b>BL</b>	Auto backlight







## BUTTONS OVERVIEW


BUTTON	DESCRIPTION
	<ul style="list-style-type: none"> <li>• Continuity/diode: short press (&lt;2s) to cycle through continuity and diode measurement.</li> <li>• Hz%: short press (&lt;2s) to cycle through frequency and duty ratio measurement.</li> <li>• ACV: short press (&lt;2s) to cycle through frequency and AC voltage measurement.</li> <li>• ACA: short press (&lt;2s) to cycle through frequency and AC current measurement.</li> <li>• °C °F: short press (&lt;2s) to cycle through Celsius and Fahrenheit degree measurement.</li> <li>• NCV: short press (&lt;2s) to cycle through the sensing range of EFHI and EFLo.</li> <li>• In the off state, press and hold the SEL/REL key, then rotate the function dial to turn on the device. The product enters the non-sleep mode, and the buzzer produces 5 beeps every 15 minutes, reminding the user to turn off the product.</li> <li>• Long press (&gt;2s) REL key to enter/exit REL measurement mode, LCD will display the REL symbol (applied to V, mV, uA , mA , A, CAP, Ω measurement).</li> </ul>
	<ul style="list-style-type: none"> <li>• Press to tum on/off the auto backlight</li> </ul>
	<ul style="list-style-type: none"> <li>• Short press (&lt;2s) and the displayed value will be locked, and the LCD will display the "Cl" symbol ; short press again and the value will be unlocked. Long press (&gt;2s) this button to turn on/off the flashlight</li> </ul>

# OPERATING INSTRUCTIONS

If the battery voltage is low when the device is turned on, “” symbol will appear on the screen. User needs to replace batteries in time before use.


Please also pay special attention to the warning sign “” beside the test lead terminals, which indicates that the tested voltage or current must not exceed the values listed on the device.

## SLEEP MODE AND AUTO POWER OFF




If there is no operation for 15 minutes, the meter will automatically shut down to save power. Before the auto shut-down, the buzzer will make five consecutive beeps and one long beep and then enter the sleep state. Pressing any button to exit sleep mode, and the buzzer will beep once. To disable auto shut-down, switch the function dial to OFF position, long press SEL/REL button and turn on the meter, the  symbol disappears on the LCD with three beeps. Restart the meter to restore the Auto-off function.

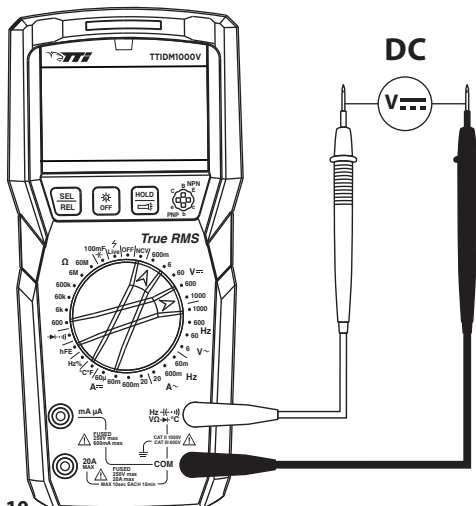
## BUZZER WARNING

Input AC/DC voltage >1000V: buzzer warning and red indicator is on, high voltage symbol appears, indicating that the range is at its limit.

- Current >10A: buzzer warning and the red indicator is on, indicating that the measured current is relatively large, and the measurement time should be controlled.
- Low battery detection: when the battery is lower than about  $4.5V \pm 0.1V$ , the low battery symbol “” appears.

## DC VOLTAGE MEASUREMENT

1. Switch the function selector to  position (range: 600mV/6V/60V/600V/1000V).
2. Connect the common test lead to COM terminal, then insert the red test lead into the to  terminal.  

3. Connect the leads to the correct test points in the circuit to measure voltage.



# AC VOLTAGE MEASUREMENT



## WARNING

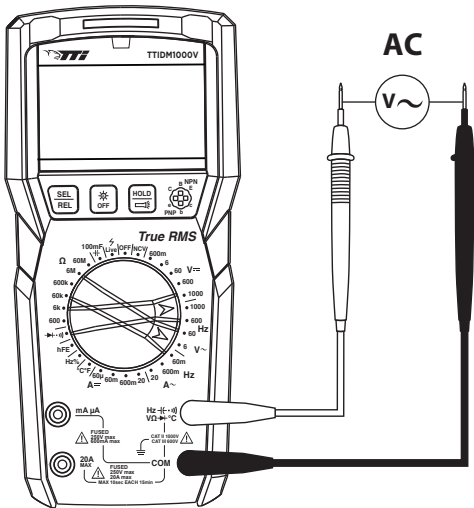
Do not input voltage over 1000Vrms. It is possible to measure higher voltage. However, it may cause damage to the meter. Be cautious to avoid electric shock when measuring high voltage.

1. Switch the function dial to **V~** position (range: 6V/60V/600V/1000V).
2. Connect the common test lead to COM terminal, then insert the red test lead into the to **H $\zeta$**  **( $\cdot$ )** terminal.  
**V $\Omega$**  **→** **+** **°C**
3. Connect the leads to the correct test points in the circuit to measure voltage.



## NOTE:

- Before using the device, it is suggested to measure a known voltage for verification.
- The meter input impedance is about 10M $\Omega$ . This load may cause measurement error when measuring the high impedance circuit. In most cases, if the circuit impedance is under 10k $\Omega$ , the error can be ignored (<0.1%).
- The input impedance of DC mV scale is infinite (> 1000M $\Omega$ ), and it does not attenuate when measuring weak signals, so the measurement accuracy is high. However, when the test leads are disconnected, there may be a value on the screen, which is normal and will not affect the measurement result.
- Readings of AC measurement are true RMS.
- At AC voltage position, short press {<2s} SEL/REL button to enter frequency measurement. Frequency measurement range: 45Hz-1kHz (for reference). Min measurement amplitude: 10% of voltage range.



## AC/DC CURRENT MEASUREMENT

### WARNING

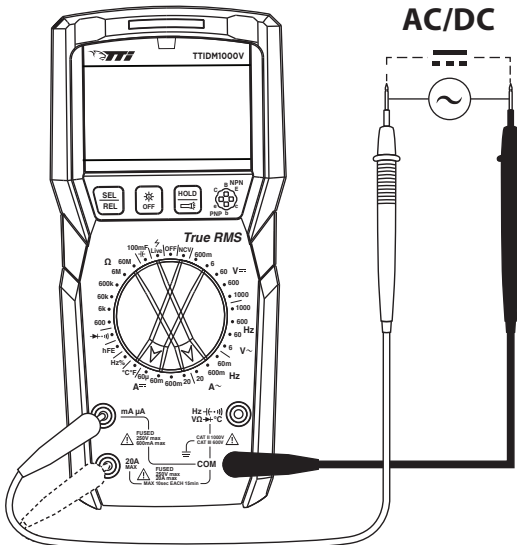
- To prevent possible electric shock, fire or personal injury, switch off the power supply of the circuit before measuring the current, and then connect the meter with the circuit in series.
- Use the proper terminals, switch position, and range for your measurement. If the range of the measured current is unknown, select the maximum range and then accordingly reduce.
- There are fuses built in to the 20A and mA/μA terminals. Never place the probes in parallel with a circuit or component when the leads are plugged into these A (Amps) terminals.

Switch the function selector to **A~** position the green indicator should be on.

1. According to the current being measured, connect the common test lead to COM terminal, then insert the red test lead to mAμA or 20A terminal
2. Connect the test leads with the circuit in series.

### NOTE:

- Readings of AC measurement are true RMS.
- If the tested current is 6A~10A, the Max measurement time should not exceed 60 seconds, and the next test should be after 1 minute.
- If the tested current is >10A, the Max measurement time should not exceed 10 seconds, and the next test should be after 15 minutes.
- When measuring AC current, short press (<2S) SEL/REL button to display AC frequency.



# RESISTANCE MEASUREMENT

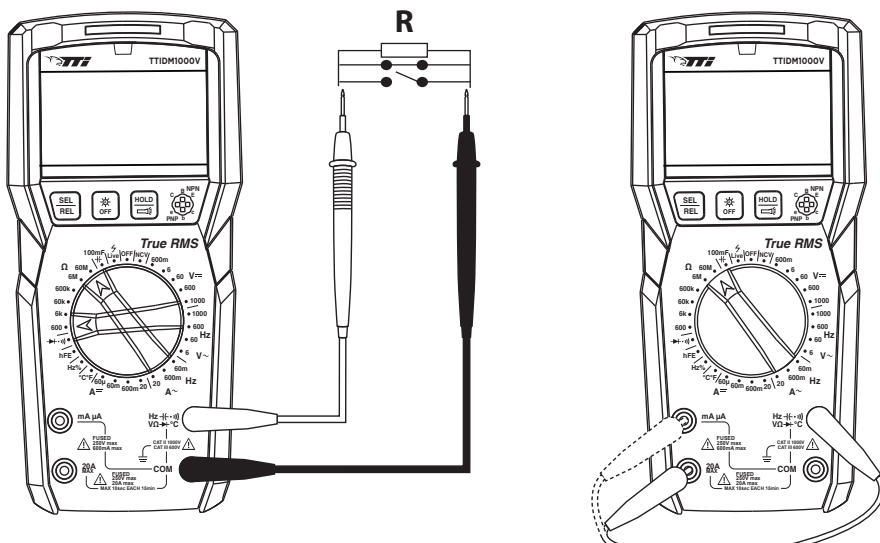
## WARNING

- To avoid damaging the meter or to the device under test, disconnect circuit power and discharge all the high-voltage capacitors before measuring resistance.
- To avoid electric shock, do not input higher than DC 60V or AC 30V voltages.

1. Switch the function selector to  $\Omega$  position (range: 600 $\Omega$ /6k $\Omega$ /60k $\Omega$ /600M $\Omega$ /60M $\Omega$ ), make sure the circuit power is turned off.
2. Connect the common test lead to COM terminal then insert the red test lead to  $\text{Hz} \left( \cdot \cdot \cdot \right) \text{V} \Omega \rightarrow \text{V} \text{ } ^\circ \text{C}$  terminal.
3. Connect the leads to the correct test points in the circuit to measure voltage.

## NOTE:

- If the measured resistor is open or the resistance exceeds the maximum range, the “OL” symbol will be displayed on the screen.
- When measuring low resistance, the test leads will produce 0.1 $\Omega$ -0.3 $\Omega$  measurement error. To obtain accurate measurement, short-circuit the test leads and use the REL function.
- If the resistance is greater than 0.5 $\Omega$  when the test leads are shorted, please check if the test leads are loose or damaged.
- When measuring high resistance at 60M $\Omega$  range, it takes a few seconds to stabilise the readings.
- The internal 600mA and 20A fuses can be checked by the 6M $\Omega$  measurement function. Please refer to Picture 5b for more details: Insert the red probe to the 630mA or 20A input terminal to measure the resistance. If both fuses are blown, the “OL” symbol will appear on the screen.






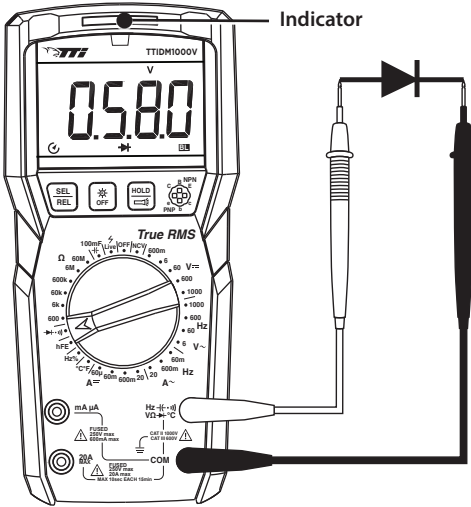
## DIODE MEASUREMENT



### WARNING

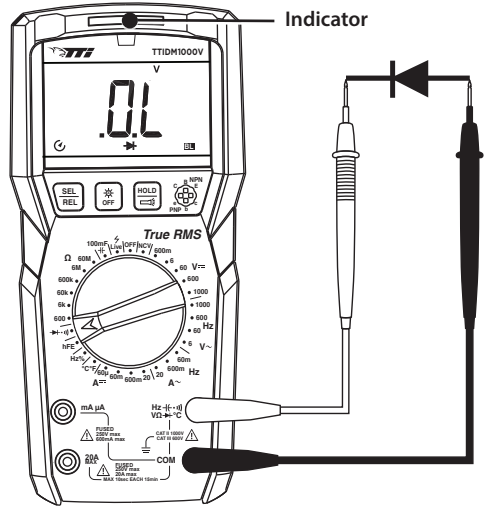
- To avoid possible damage to the meter and to the device under test, disconnect circuit power and discharge all high-voltage capacitors before testing diodes.
- To avoid electric shock, do not input higher than DC 60V or AC 30V

1. Switch the function selector to  position.
2. Short press (<2s) SEL/REL button to activate the diode measurement.
3. Connect the common test lead to COM terminal, then insert red test lead to  terminal.  

4. Connect the red probe to diode anode, black to diode cathode.
5. Reading <0.12V: red indicator will be on with continuous beeps, indicating the diode may break down; Reading within 0.12V-2V: green indicator will be on with one beep, indicating the diode is in good condition (for reference).
6. If the diode is open or its polarity is reversed, the "OL" symbol will appear on the screen.
7. Silicon PN junction: about 500-800mV (normal value).



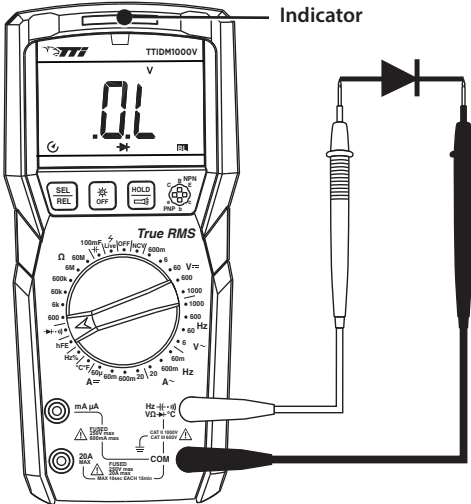
Indicator

Good diode (forward bias)



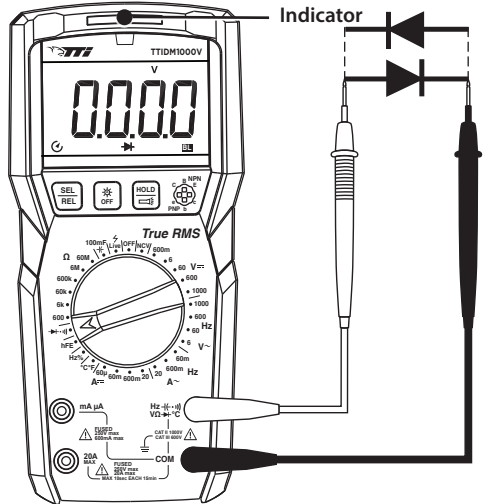
Indicator

Good diode (reverse bias)



Indicator

Bad diode (open)



Indicator



Bad diode (shorted)

# CONTINUITY MEASUREMENT



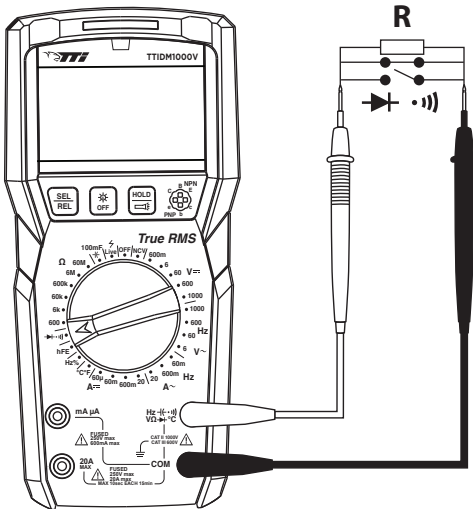
## WARNING

- To avoid damaging the meter or to the device when testing, disconnect circuit power and discharge all the high-voltage capacitors before testing for continuity.
- To avoid electric shock, do not input higher than DC 60V or AC 30V

1. Switch the function dial to the  position, and make sure the circuit power is turned off.
2. Connect common test lead to COM terminal, then insert the red test lead to  terminal.
3. Connect the probes to the circuit test points.
4. Measured resistance  $>30\Omega$  : The circuit is broken; buzzer makes no sound; red indicator is on.

Measured resistance,  $<30\Omega$ : The circuit is in good conduction status; buzzer beeps continuously; green indicator is on.

If "OL " appears on the screen, the circuit is in open status.





# CAPACITANCE MEASUREMENT



## WARNING

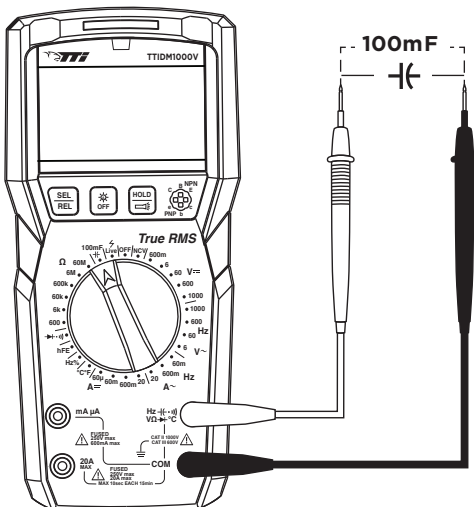
Please fully discharge all capacitors before measuring (especially for capacitors with high voltage) to avoid damage to the meter and personal injury.

1. Switch the function dial to **100mF** position, the green indicator should be on.
2. Connect the common test lead to COM terminal, then insert red test lead to **Hz** terminal.  
**V Ω → °C**
3. Connect the probes to the pins of capacitor.
4. When measuring large volume capacitor, if the yellow indicator is on, it indicates that the capacitor is being charged, and the green indicator will be on when the capacitor is fully charged, then wait for the steady reading.



## NOTE:

- If the measured capacitor is short-circuited or the capacitance exceeds the maximum range, the "OL" symbol will appear on the screen.
- When measuring large volume capacitors, it may take a few seconds to obtain steady readings.
- When there is no input, the meter displays a fixed value (intrinsic capacitance).
- For small capacitance measurement, this fixed value must be subtracted from the measured value to ensure measurement accuracy. Or users can choose the relative measurement function (REL) to automatically subtract the intrinsic capacitance.



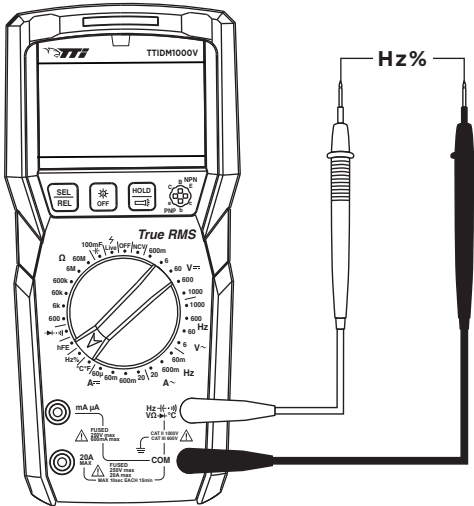
# FREQUENCY/DUTY RATIO MEASUREMENT



## WARNING

Do not input voltage higher than DC 60V or AC 30V to avoid personal injury!

1. Switch the function selector to **Hz%** position the green indicator should be on.
2. Connect the common test lead to COM terminal, then insert red test lead to **Hz** terminal.  
**Hz**  $\left( \left( \cdot \right) \right)$   
**V**  $\Omega$   $\rightarrow$   $\left( \left( \cdot \right) \right)$   $^{\circ}\text{C}$
3. The frequency value is displayed on the screen.
4. Short press (<2s) SEL/REL button to perform duty ratio measurement.
5. When measuring AC voltage or AC current, you can short press (<2s) the SEL/REL button to switch to frequency measurement.

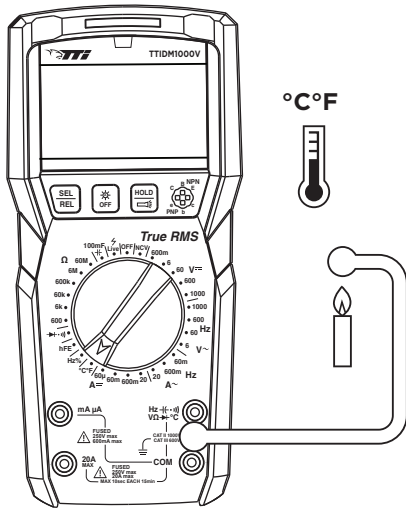


# TEMPERATURE MEASUREMENT

1. Switch the function dial to °C/°F position.
2. Plug the K-type thermocouple “+” end to  $\text{Hz } \left( \begin{smallmatrix} \cdot \\ \cdot \\ \cdot \end{smallmatrix} \right)$  terminal and the other end to COM terminal.
3. Short press (<2s) SEL/REL button to switch between °C/°F.

**NOTE:**

- “OL” symbol appears when the meter is turned on.
- °F=1.8x°C+32



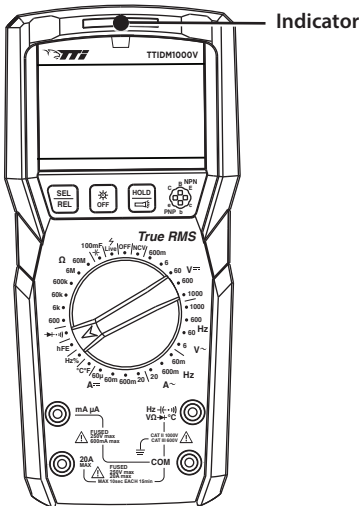
# TRANSISTOR MEASUREMENT



## WARNING

Do not input any voltage at any test lead terminals during the transistor measurement to avoid personal injury!

1. Switch the function selector to hFE position, make sure that the test leads aren't connected to any circuit
2. Insert the three pins of the transistor to the socket according to the polarity
3. The reading on the screen is the amplification factor of the measuring transistor.
  - Amplification factor >50: green indicator is on, indicates the amplification is good.
  - Amplification factor <50: yellow indicator is on, indicates the amplification is poor.



## NON-CONTACT VOLTAGE MEASUREMENT (NCV)

1. Switch the function dial to **NCV** position.
2. In NCV sensing level 2 (default, LCD displays "EFHI"), the voltage range is 48V–220V. Place the upper left corner of the multimeter near the live AC power cord. If the voltage of the measured power cord is in the range of sensing level 2, the yellow indicator will start flashing and the buzzer will beep intermittently.

According to the intensity of the induced voltage, the yellow indicator flashes with varied frequencies (flashes fast when the intensity is strong), and the buzzer beeps with different intermittent time (the intermittent time is short when the intensity is strong).

The LCD displays the induction intensity from weak to strong by "-", "- -", "- - -", "- - - -", "- - - - -".

If the measured power cord is >220V, the red LED will be on.

3. If the measured power cord voltage is <48V, users need to short press (<2s) the SEL/REL button to switch to sensing level 1 (LCD displays "EFLo"). If the voltage of the measured power cord is in the range of sensing level 1, the green indicator will start flashing and the buzzer will beep intermittently.

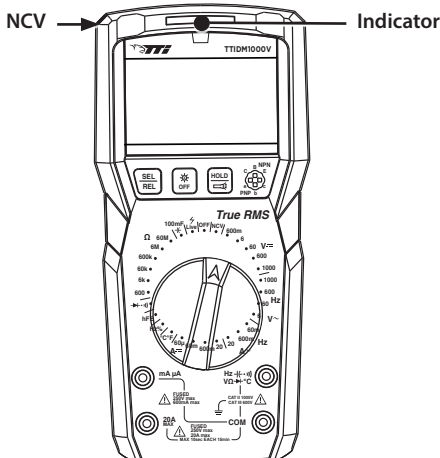
According to the intensity of the induced voltage, the green indicator flashes with varied frequencies (flashes fast when the intensity is strong), and the buzzer beeps with different intermittent time (the intermittent time is short when the intensity is strong).

The LCD displays the induction intensity from weak to strong by "-", "- -", "- - -", "- - - -", "- - - - -".

4. Short press (<2s) SEL/REL button again to switch to sensing level 2 (LCD displays "EFHI") measurement.

### **NOTE:**

- The sensing level varies with the distance between the sensing part and the measured AC power cord.
- The sensing voltage level is for reference only and no specific measurement is made. The frequency of the induced voltage is applicable to 50Hz/60Hz.
- If there is no indication, voltage could still be present. Do not rely on the detector with shielded wire.






# CONTACT TYPE LIVE/NEUTRAL WIRE MANAGEMENT



## WARNING

- Do not input voltage over 1000Vrms. It is possible to measure higher voltage. However, it may cause damage to the meter.
- Be cautious to avoid electric shock when measuring high voltage.

1. Switch the function selector to Live position.
2. Connect the red test lead to **Hz**  terminal.  
**V**  **Ω**  **°C**

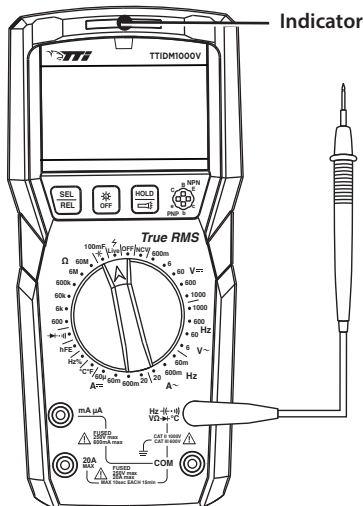
NOTE: Do not connect any test leads or conductors to the other three terminals.

3. Insert the red probe to the AC power socket.
4. The live or neutral wire in the socket can be identified by the audio/visual alarm. If the live wire is contacted, the red indicator flashes and the buzzer beeps. If the neutral wire is contacted, the red indicator is off, and the buzzer makes no sound.



## NOTES:

- When the live wire is >60V, the red indicator will flash, and the buzzer will beep. According to the voltage value of the live wire, the indicator flashes with varied frequencies, and the buzzer beeps with different intermittent time.
- The measured voltage is for reference only and no specific measurement is made. The frequency of the induced voltage is applicable to 50Hz/60Hz.
- During the Live measurement, users need to hold the centre part of the multimeter case by hand. When the Live function is applied to the intensive high-voltage electric field measurement, the accuracy for the device to judge the “live wire” may be unstable. In this case, it should be judged by the LCD display in combination with the sound frequency.



# TECHNICAL INDEX

- Accuracy:  $\pm(a\%$  of reading + b digits)
- Ambient temperature:  $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$  ( $73.4^{\circ}\text{F} \pm 9^{\circ}\text{F}$ )
- Relative humidity:  $<75\%$

## DC VOLTAGE MEASUREMENT

RANGE	RESOLUTION	ACCURACY
600mV	0.1mV	$\pm (0.5\%+4)$
6V	1mV	$\pm (0.7\%+3)$
60V	10mV	$\pm (0.7\%+3)$
600V	100mV	
1000V	1V	$\pm (0.7\%+10)$



Input impedance: \*mV range  $>1000\text{M}\Omega$ , \*other ranges: about  $10\text{M}\Omega$ .  
 (The reading might be unstable at mV range when no load is connected, and it becomes stable once the load is connected,  $<\pm 5$  digits)

- Max input voltage:  $\pm 1000\text{V}$
- Input voltage  $>1000\text{V}$ : audio/visual alarm
- Input voltage  $>1010\text{V}$ : "OL" appears on LCD

## AC VOLTAGE MEASUREMENT

RANGE	RESOLUTION	ACCURACY	RANGE	RESOLUTION	ACCURACY
6V (45~400Hz)	1mV	$\pm (0.8\%+5)$	6V (400~1000Hz)	1mV	$\pm (1.0\%+8)$
60V (45~400Hz)	10mV		60V (400~1000Hz)	10mV	$\pm (1.5\%+8)$
600V (45~400Hz)	100mV		600V (400~1000Hz)	100mV	
1000V (45~400Hz)	1V	$\pm (1.0\%+10)$	1000V (400~1000Hz)	1V	$\pm (1.8\%+12)$



Input impedance: about  $10\text{M}\Omega$

- True RMS display.
- Frequency response: 45-1KHz
- Non-sine wave frequency response: 45Hz-400Hz
- AC crest factor at 3000 counts: allows  $<3.0$
- AC crest factor at 6000 counts (full range):  $<1.5$

- According to the crest factor, the additional error is calculated as follows:
  - a. Add 4% when crest factor is 1-2
  - b. Add 6% when crest factor is 2-2.5
  - c. Add 8% when crest factor is 2.5-3
- AC voltage frequency measurement: 45Hz-1kHz. Min measurement amplitude: 10% of voltage range.
- Accuracy guarantee range: 1-100% of range, shorted circuit allows least significant digit <10
- Max input voltage: 1000V rms
- Input voltage >1000V: audio/visual alarm
- Input voltage >1010V: "OL" appears on LCD

## RESISTANCE MEASUREMENT

RANGE	RESOLUTION	ACCURACY
600Ω	0.1Ω	± ( 0.8%+5)
6kΩ	0.001kΩ	± (0.8%+3)
60kΩ	0.01kΩ	
600kΩ	0.1kΩ	
6MΩ	0.001MΩ	± (1.5%+5)
60MΩ	0.01MΩ	±(1.5%+ 25)



Measurement result = reading of resistance – reading of shorted test leads

- Open circuit voltage: \*about 1V (test current is about 0.4mA)
- Overload protection 600V-PTC10.4

## CONTINUITY, DIODE MEASUREMENT

RANGE	RESOLUTION	REMARK
	0.1Ω	Set value: Open circuit: resistance >30Ω, no beep; Well-connected circuit: resistance ≤30Ω, audio/visual alarm
	0.001V	Open circuit voltage: about 3V (test current is about 1.2mA) Silicon PN junction normal voltage: about 0.5~0.8V, with audio/visual alarm



Overload protection: 600V-PTC

- Reading <0.12V: red indicator will be on with continuous beeps, indicating the diode may break down;
- Reading within 0.12V-2V: green indicator will be on with one beep, indicating the diode works well.



## TRANSISTOR MEASUREMENT

RANGE	RESOLUTION	REMARK
1000 $\beta$	1 $\beta$	(NPNP/ NP)Vce1.8Z , Ib0 5 $\mu$ A

## CAPACITANCE MEASUREMENT

RANGE	RESOLUTION	ACCURACY
6nF	1pF	$\pm$ (5%+35)
60nF	10pF	$\pm$ (2.5%+20)
600nF	100pF	
6 $\mu$ F	1nF	
60 $\mu$ F	10nF	
600 $\mu$ F	100nF	
6mF	1 $\mu$ F	$\pm$ (6.0%+10)
60mF	10 $\mu$ F	$\pm$ (10%+0D)
100.0mF	100 $\mu$ F	$\pm$ (10%+0D)



Overload protection: 600V-PTC

- Measured capacitance <600nF: It is recommended to select REL mode for ensuring accuracy (open circuit allows least significant digit <20).

## DC CURRENT MEASUREMENT

RANGE	RESOLUTION	ACCURACY	
$\mu$ A	60 $\mu$ A	0.01 $\mu$ A	
mA	6 mA({5(UT89XD)	1 $\mu$ A	$\pm$ ( 0.8%+8)
	60mA	10 $\mu$ A	
	600mA	0.1rnA	
A	20A	10mA	$\pm$ (2%+5)



Overload protections:

- $\mu$ A mA range: F1 fuse ( $\Phi$ 5x20)mm 630mA 250V
- 20A range: F2 fuse ( $\Phi$ 5x20)mm 20A250V
- Input >10A: audio/visual alarm
- Input >20.1A: "OL" appears on LCD

## AC CURRENT MEASUREMENT

RANGE		RESOLUTION	ACCURACY	RANGE		RESOLUTION	ACCURACY
mA	60mA (45~400Hz)	10μA	±(1.0%+12)	mA	60mA (400 - 1000Hz)	10μA	±(1.5%+12)
	600mA (45~400Hz)	0.1mA	±(2.0%+3)		600mA (400 - 1000Hz)	0.1mA	±(2.5%+5)
A	20A (45~400Hz)	10mA	±(3.0%+5)	A	20A (400 ~ 1000Hz)	10mA	±(3.5%+8)

- True RMS display. Frequency response: 45~1KHz
- Non-sine wave frequency response: 45Hz-400Hz
- AC crest factor at 3000 counts: allows <3.0
- AC crest factor at 6000 counts (full range): <1.5
- According to the crest factor, the additional error is calculated as follows:
  - a. Add 4% when crest factor is 1-2
  - b. Add 6% when crest factor is 2-2.5
  - c. Add 8% when crest factor is 2.5-3
- AC current frequency measurement: 45Hz-1KHz.
- Min measurement range: mA gear position>35mA, 20A gear position>5.5A.  
Accuracy guarantee range: 1~100% of range, open circuit allows least significant digit <2.
- Input >10A: audio/visual alarm
- Input >20.1A: "OL" appears on LCD.



Overload protection: similar to DC current overload protection

## FREQUENCY/DUTY RATIO MEASUREMENT

RANGE		RESOLUTION	ACCURACY
Frequency	9.999Hz~10MHz	0.001 Hz~100kHz	± (0.1%+4)
Duty ratio	0.1%~99.9%	0.1%	±(2%+5)

Measurement range: 10Hz-10MHz (auto range)

- <100kHz: 100mVrms <input amplitude <30Vrms
- >100kHz~1mHz:200mVrms <input amplitude <30Vrms

The duty ratio is only applied to square wave measurement

- (<10kHz, 300mVrms <input amplitude <30Vrms)
- Frequency <1kHz: duty ratio is 10.0%-95.0%
- Frequency >1kHz: duty ratio is 30.0%-70.0%



Overload protection: 600V-PTC

## TEMPERATURE MEASUREMENT

RANGE	RESOLUTION	ACCURACY
40°C~0°C	1°C	± (6%+5)
0°C~400°C	1°C	± (2%+4)
400°C~1000°C	1°C	± (2%+5)
-40° F- 32° F	1° F	± (6%+9)
32 °F~752°F	1° F	± (2%+8)
752°F~1832 ° F	1° F	± (2%+9)



Overload protection: 600V-PTC 10.11

## LED THREE COLOUR INDICATOR

FUNCTION	LED COLOUR	DESCRIPTION	
NCV	LED off	>12V	Note: The voltage range is for reference only
	LED on (green)	12V-48V: green LED flickers from slow to fast, buzzer beeps from slow to fast.	
	LED on (yellow)	>48V-220V: yellow LED flickers from slow to fast, buzzer beeps from slow to fast	
	LED on (red)	>220V: red LED is on	
LIVE	LED off	<60V	Note: The voltage range is for reference only
	LED on (red)	>60V: red LED flickers from slow to fast, buzzer beeps from slow to fast to indicate different voltage level	
LED	LED off	OL	
	LED on (green)	<11.1V	
Continuity	LED off	OL	
	LED on (red)	Non-conducting ( $\leq 300$ )	
	LED on (green)	Conducting ( $\leq 30\Omega$ )	
Diode	LED on (green)	Conducting (0.12V-2V)	
	LED on (red)	Breakdown (<0.12V)	
	LED off	>2V	

## LED THREE COLOUR INDICATOR CONTINUED

Transistor	LED on (green)	Amplification factor >50
	LED on (yellow)	Amplification factor 50
	LED off	Amplification factor = 0
Capacitance	LED off	<20pF
	LED on (green)	The capacitor is fully charged
	LED on (yellow)	The capacitor is charging
Voltage	LED off	DCV <1000V, ACV <1000V
	LED on (red)	DCV ≥1000V, ACV ≥1000V
Current	LED off	<10A
	LED on (red)	≥10A

# MAINTENANCE



## WARNING

Do not attempt to repair or service the meter unless you are qualified to do so and have the appropriate calibration, performance test and service tools. If not, consult you Total Tools store for repair/service.

To avoid electrical shock or damage to the meter, do not get expose the meter to water or have it submerged in water.

## GENERAL MAINTENANCE

- Periodically wipe the case with a damp cloth and mild detergent. Do not use abrasives or solvents.
- Turn off the power of the meter when it is not in use.
- Take out the battery when the unit won't be in use for extended periods.
- Do not use or store the meter in an environment of high temperature, humidity, explosive, inflammable and strong magnetic field. The performance of the meter may deteriorate after dampened.


## BATTERY/FUSE INSTALLATION AND REPLACEMENT

Battery specification: 1.5V x4 AAA batteries

Fuse specification: mA input terminal: "F1",  $\Phi 5 \times 20$ mm 630mA 250V

20A input terminal: "F2"  $\Phi 5 \times 20$ mm 20A 250V



Replace the battery immediately when the low battery indicator "" appears on the LCD, otherwise the measurement accuracy might be affected.

Make sure the test leads are disconnected from the circuit being tested before opening the case bottom.

1. Switch the function dial to "OFF" position and remove the test leads;
2. Remove the screw on the battery cover to replace the batteries and fuses
3. Install ONLY replacement fuses with the identical type specified above and make sure the fuses are fixed firmly in the bracket.

Note: blown fuses are not covered under warranty.





1 year  
guarantee 

## WARRANTY INFORMATION

This warranty is provided by Total Tools (Importing) Pty Ltd of 20 Thackray Road, Port Melbourne VIC 3207. Phone: 03 9261 1900 (we, us, our).

### Express Warranty

Subject to the exclusions set out below, we warrant that this product will be free from defects in materials or workmanship for 12 months from the date of purchase.

The benefits conferred by this warranty are in addition to all rights and remedies which you may be entitled to under the Australian Consumer Law, and any other statutory rights you may have under other applicable laws. This warranty does not exclude, restrict or modify any such rights or remedies.

### Warranty exclusions

This express warranty does not apply where a defect or other issue with the product is caused by normal wear and tear, misuse or abuse of the product.

### Consumer guarantees

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage.

You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

### Warranty claims

To make a claim under this warranty, you must bring the product along with the proof of purchase and any other documentary evidence which you think is relevant to the Total Tools' place of purchase where the claim will be handled on our behalf. Any cost incurred by you in bringing the product to the place of purchase will be borne by you.

To make a claim under this warranty, the product and proof of purchase must be returned to the Total Tools place of purchase during the warranty period specified above.

If your warranty claim is accepted, we (or the Total Tools store that handles the claim on our behalf) will, at our discretion, repair or replace the product, or refund money to you and take back the product.