

400A AC/DC CLAMP METER AUTO RANGING

PART NO:
TTICM600V
(..151478)



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

**OPERATING
INSTRUCTIONS**

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INTRODUCTION

TTICM600V is a true RMS (4000 count) auto ranging digital clamp meter. This meter measures AC/DC Current, AC/DC Voltage, Resistance, Capacitance, Diode Test, Continuity and Non Contact Voltage detection.

The instruction manual includes relevant safety information and warning indication, please read them carefully and strictly observes all warnings and notes.

INTENDED USE

The clamp meter 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



CAUTION

The supplied test leads are used for MAINS measurements CATII 1000V, CATIII 600V according to IEC 61010-031

Unpack and take out the clamp meter, please check carefully if the following attachments are complete or intact.

1. Operating instruction manual
2. Pair Test Leads
3. TTTICM600V Clamp Meter

GENERAL SAFETY

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



CAUTION

Upon first use of the machine, ensure the test leads aren't damaged and in good working order.



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

Please note the "warning signs and words". Warning means the condition or action that may cause threat to user or damage to the instrument or equipment to be measured.

The clamp meter is designed according to EN61010-1, 61010-2 and electromagnetic radiation protection EN61326-1 safety standards, CATII 600V, CATIII 300V and pollution grade II.

If the meter is not used properly as per the instructions, the protection provided may be weakened or lost.

Anyone using this instrument should be knowledgeable and trained about the risks involved with measuring voltage, especially in an industrial setting, and the importance of taking safety precautions and of testing the instrument before and after using it to ensure that it is in good working condition.

This product has been tested to the requirements of IEC 61010












CAT II: Applicable to test and measuring circuits connected directly to utilization points (socket outlets and similar points) of the low-voltage MAINS installation.

CAT III: Applicable to test and measuring circuits connected to the distribution part of the building's low-voltage MAINS installation.

- Check the clamp meter and test leads before using, guard against any damage. If any abnormalities or damage are found, do not use the clamp meter.
- Examine the test leads for damaged insulation or exposed metal. Check test lead continuity. Replace damaged test leads before using the Meter.
- Do not use the clamp meter without having rear cap and battery cover in place, otherwise electric shock may occur.
- To avoid false readings that can lead to electrical shock and injury, replace the batteries as soon as the low battery indicator appears.
- When using the test leads, keep fingers behind the finger guards on the probes. Do not contact the bare wire and connector, unused input terminal or the circuit being measured when clamp meter is in operation.
- Connect the common test lead before connecting the live test lead. When disconnecting test leads, disconnect the live test lead first.
- Function selector shall be set at the correct position prior to measurement. Do not change selector settings while measuring to guard against damage to the meter.

- Refrain from applying voltage over DC1000V/AC750V between the clamp meter terminals and ground to guard against electric shock and clamp meter damage.
- Be careful in measuring RMS voltage higher than DC or AC 30V, such voltage poses a shock hazard.
- Do not measure current in circuits carrying more than 600A with the meter jaw.
- Do not measure voltage or current higher than the allowable input value.
- Disconnect circuit power and discharge all high-voltage capacitors before you measure resistance, continuity, or capacitance.
- Do not modify the internal wiring in the meter to guard against damage to the meter and danger.
- Do not store or use clamp meter in an explosive or flammable environment, high temperature, high humidity or strong electromagnetic field.
- Comply with local and national safety regulations and requirements. Use personal protective equipment such as approved rubber gloves, face protection, and flame-resistant clothing to prevent shock and arc blast injury where hazardous live conductors are exposed.
- Clean the clamp meter case with soft cloth and neutral detergent. To prevent causing corrosion to the case, or damage to the instrument do not use abrasives or solvents. Make sure all water is removed before use.

ELECTRICAL SYMBOLS

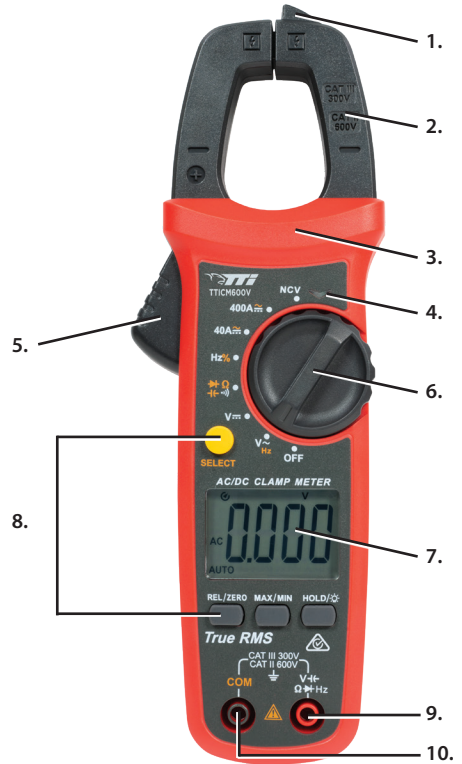
	Double insulation		Diode measurement
	Grounding		AC or DC (alternating current or direct current)
	Warning		High voltage hazard
	AC (alternating current)		Continuity measurement
	DC (direct current)		This symbol signifies product complies with Australian requirements
	Capacitance		

GENERAL SPECIFICATIONS

- Display count: 4000
- Polarity display: Auto
- Maximum jaw opening: 28 mm
- Power supply: 2 x AAA 1.5V batteries
- Dimension: 215mm x 63mm x3mm

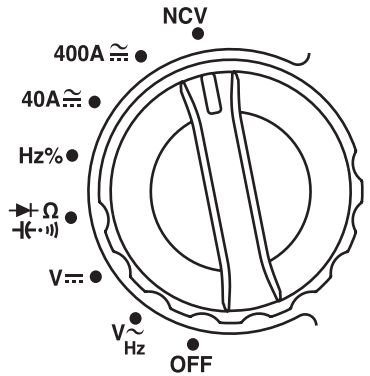
EXTERNAL OVERVIEW

1. NCV sensor
2. Clamp jaws
3. Hand guard
4. LED indicator
5. Jaw opening trigger
6. Function selector
7. LCD display
8. Function buttons
9. Terminal input jack (red and positive +)
10. COM input jack (black and negative -)












FUNCTION SELECTOR 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
NCV	Non-contact voltage measurement
Hz%	Frequency/ duty ratio measurement
$\rightarrow +$	Diode measurement
$\cdot)$	Continuity measurement
Ω	Resistance measurement
$\text{--} $	Capacitance measurement
OFF	Shut-down







LCD SCREEN OVERVIEW

SYMBOL	DESCRIPTION
	Caution AC/DC voltage is higher than 30V
	Data hold
	Negative reading
AC/DC	AC/DC measurement
	Low battery indicator
	Diode measurement
	Continuity measurement
	Relative value measurement
Ω, kΩ, MΩ	Resistance unit
mV, V	Voltage unit
μA, mA, A	Current unit
nF, μF, mF	Capacitance unit
Hz%	Frequency unit, duty ratio
β	Transistor amplification factor
NCV	Non-contact voltage measurement
LED	LED measurement
	Auto power off



BUTTONS OVERVIEW

BUTTON	DESCRIPTION
 SELECT	In composite scale, press this button to switch between the corresponding functions or ranges.
 REL/ZERO	Press this button to store the current reading as a reference for future readings. When the LCD display value is reset to zero, the stores reading will be subtracted from the future readings. Press this button again to exit the relative value mode.
 MAX/MIN	Short press of this button will enter the maximum/minimum measurement mode and long press will exit the function. *Valid for ACV/DCV, ACA/DCA, °C/°F, resistance and capacitance scales*
 HOLD/☼	A short press of this button will enter or exit the data hold mode; a long press (about 2s) will turn the LCD backlight on or off

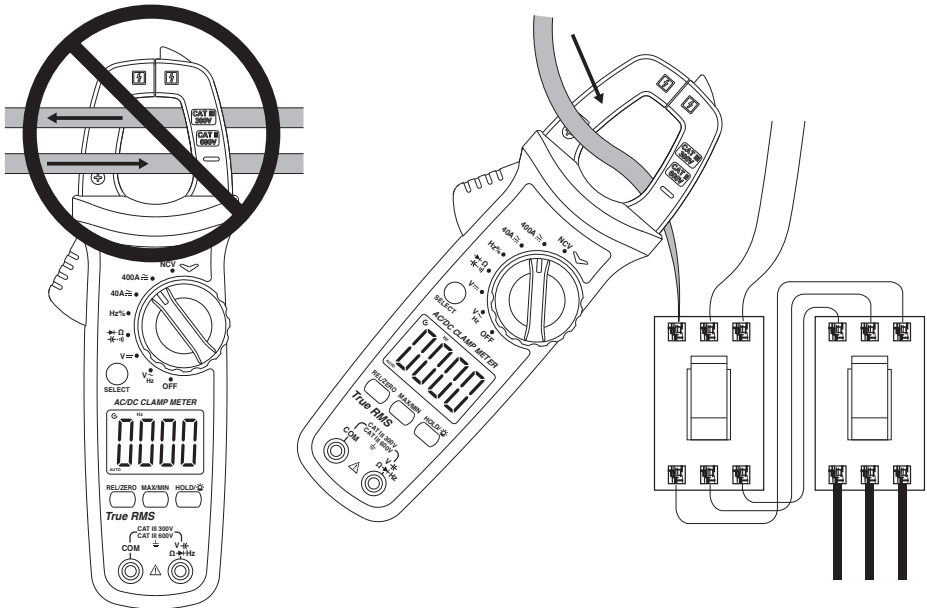
OPERATING INSTRUCTIONS

AC/DC CURRENT MEASUREMENT

1. Select the corresponding current range.
2. Press the trigger to open the clamp jaws, and fully enclose one conductor.
3. Only one conductor can be measured at a time, or the measurement reading will be wrong.

NOTE:

- Do not insert the testing leads during current measurement to avoid electric shock.
- The current measurement must be taken with safeguard protection.
- Press the **REL** button to return to zero before the DC current measurement, and meanwhile the centre hole of the jaw should be perpendicular to the current direction to ensure accuracy.
- The open circuit zeroing reading may be relatively large after (high) DC current measurement. Please perform the AC current detection again to counteract the remanence signal by alternating electric field.

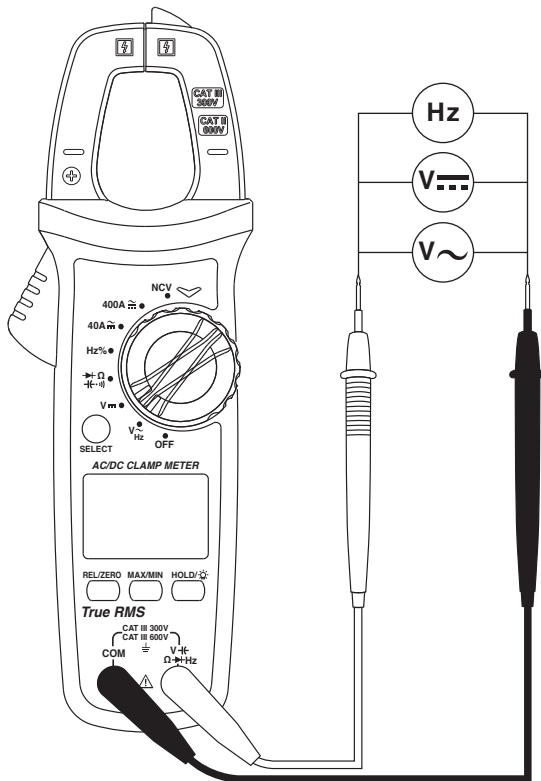


AC/DC VOLTAGE AND VOLTAGE FREQUENCY (% DUTY CYCLE) MEASUREMENT

1. Select the corresponding function $V\sim$ (AC) or $V\text{---}$ (DC)
2. Insert the red test lead into the positive (+) jack, and the black into the **COM** jack.
3. Connect test leads to the measured circuit.

NOTE:

- Do not input voltage above 600V to prevent electric shock or damage. The input impedance of each range scale is $10M\Omega$, this load effect in high resistance measurement may cause error. If the input impedance is lower than $10k\Omega$, the error can be ignored ($<0.1\%$).
- Be cautious to avoid electric shock when measuring high voltage.
- Please check the functions by applying a known voltage before use.

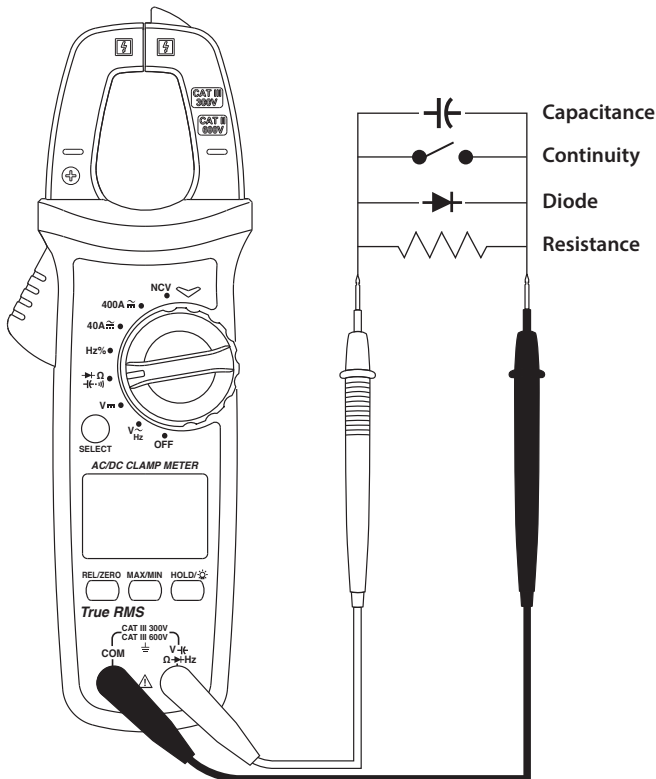


CONTINUITY TEST / RESISTANCE / DIODE / CAPACITANCE MEASUREMENT

1. Select the corresponding function scale $\rightarrow \Omega$
2. Insert the red test lead into the positive (+) jack, and the black into the **COM** jack.
3. Connect test leads to the measured circuit.

NOTE:

- Don't input voltage above DC 60V or AC 30V to avoid personal injury.
- Disconnect all the other parts of the circuit to avoid inaccuracy.
- Before measuring resistance, disconnect all power and fully discharge all capacitors to avoid injury or device damage.
- If the resistance is over 0.5 Ω when the test leads are short-circuited check the test leads for looseness or other abnormalities.
- If the measured resistor is open or the resistance exceeds the maximum range, the LCD will display "OL".
- It is recommended to use "REL" measurement mode for capacitance less than 100nF.



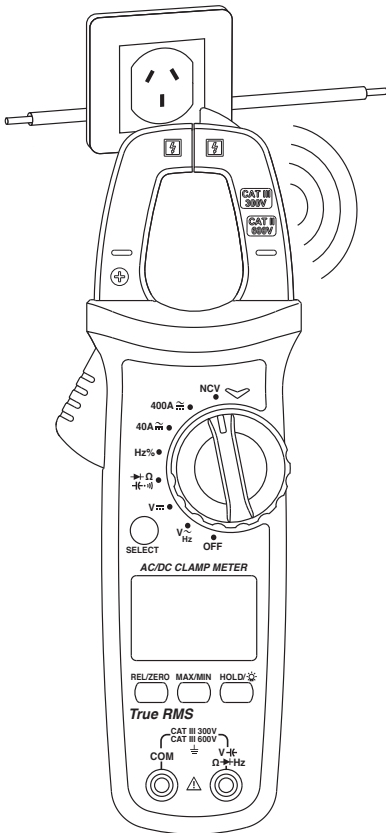
NON-CONTACT (NCV) AC ELECTRIC FIELD SENSING

The electric field sensing sensitivity is divided into two levels (“EFHI” and “EFLo”). The meter defaults to “EFHI”/ Users can select different sensitivity levels according to the intensity of the measured electric field.

1. Select **NCV** on the function selector. Display will show “EFHI”.
2. Hold sensing end close to a charged electric field (socket, insulated wire, etc.). The LCD will display “_” with beeps and a red LED flashing.
3. As the intensity of the measured electric field increases, more segments (----) display, the buzzer beeps quicker and LED flashes faster.
4. If the electric field is around 110 V AC 50Hz/60Hz, press the Select button to enter “EFLo” mode.

NOTE:



- When using this function, in order to avoid the **COM** input interference, which will affect the electric field and the accuracy, please pull the black test lead out of the **COM** input.
- Keep your hand away from the meter jaw as it can interfere with the reading.



OTHER FUNCTIONS

- **Auto power off:** The meter will automatically power off to save batteries if there is no operation within 15 minutes. You can wake it up by pressing any button or restart it after turning the switch off.

Disabling Auto power off: Press and hold the **SELECT** button in the off state and turn on the meter again to disable the auto power off function. Restart the meter after shutting it down to resume the function.

- **Low battery detection:** The battery voltage will be automatically detected as long as the meter is on. If it is lower than 2.6V, the LCD will display the “” symbol.
- **Low battery shut down function:** When the battery voltage is lower than 2.5V, the LCD displays the “” symbol, the “Lo.bt” interface appears and last for about 10 seconds, the buzzer will sound 3 consecutive beeps, the meter will now enter an automatic shutdown.

TECHNICAL INDEX

ACCURACY SPECIFICATIONS

- Accuracy: \pm (% reading + counts) – the calibration period is 1 year.
- Ambient temperature and humidity: $23^{\circ}\text{C}\pm 5^{\circ}\text{C}$; $<80\%\text{RH}$.
- Temperature coefficient: the accuracy assured temperature condition is 18°C - 28°C , the range of ambient temperature fluctuation is stable within $\pm 1^{\circ}\text{C}$.
When the temperature is less than 18°C or over 28°C , the additional temperature coefficient error is $0.1 \times$ (specified accuracy)/ $^{\circ}\text{C}$.

DC CURRENT MEASUREMENT

RANGE	RESOLUTION	ACCURACY
40A	0.01 A	$\pm(2\%+5)$
400A	0.1A	

AC CURRENT MEASUREMENT

RANGE	RESOLUTION	ACCURACY
40A	0.01 A	$\pm(2\%+5)$
400A	0.1A	

CAUTION

- When the measured current reaches the warning value, there will be an alarm sound.
- With DC current DCA mode, the LCD may display non-zero value in open circuit state, users can press “REL” button to clear display to zero before each measurement.

DC VOLTAGE MEASUREMENT

RANGE	RESOLUTION	ACCURACY
400mV	0.1mV	$\pm (0.7\%+3)$
4V	0.001V	$\pm (0.5\%+2)$
40V	0.01V	
400V	0.1V	
600V	1V	

AC VOLTAGE/VOLTAGE FREQUENCY

RANGE	RESOLUTION	ACCURACY
4V	0.001V	$\pm (1.0\%+5)$
40V	0.01V	$\pm (0.8\%+5)$
400V	0.1V	
600V	1V	
VOLTAGE FREQUENCY	0.01Hz-0.01kHz	$\pm (0.5+2)$

CAUTION

- Short press **SELECT** in AC voltage/Hz scale to enter the Hz function.
- The input impedance is about 10M Ω .
- Current/voltage frequency response: 45Hz~400Hz, displays true RMS value.
- AC crest factor of non-sinusoidal wave can reach 3.0 at 4000 counts while it can only reach 1.8 at 6000 counts. The additional error should be added for the corresponding crest factor as follows:
 - a. Add 3% when the peak factor is 1~2
 - b. Add 5% when the peak factor is 2~2.5
 - c. Add 7% when the peak factor is 2.5~3



RESISTANCE MEASUREMENT

RANGE	RESOLUTION	ACCURACY	OVERLOAD PROTECTION
400 Ω	0.1 Ω	$\pm (1.0\%+2)$	600Vrms
4k Ω	0.001K Ω	$\pm (0.8\%+2)$	
40k Ω	0.01K Ω		
400k Ω	0.1K Ω		
4M Ω	0.001M Ω	$\pm (2.5\%+5)$	
40M Ω	001M Ω		

CAUTION

- Measured resistance value = displayed value – resistance value of short-circuited test leads
- Open circuit voltage is about 1V

CONTINUITY/DIODE MEASUREMENT

FUNCTION	RANGE	RESOLUTION	ACCURACY
	400Ω/600Ω	0.1Ω	<ul style="list-style-type: none"> • <10Ω : Consecutive beeps • >31Ω: No beep • The median: uncertain
	4V/6V	0.001V	<ul style="list-style-type: none"> • The open circuit voltage is about 4V . • For the silicon PN junction diode, the voltage value is generally about 0.5-0.8V.

CAPACITANCE MEASUREMENT

RANGE	RESOLUTION	ACCURACY	OVERLOAD PROTECTION
40nF	0.01nF	± (4%+5)	600Vrms
400nF	0.1nF		
4uF	0.001μF		
40uF	0.01μF		
400uF	0.1μF		
4mF	0.001mF	± 10%	
40mF	0.01mF		

CAUTION

Measured value = displayed value – open circuit value of the test leads (For capacitance <100nF, “REL” mode is recommended, open circuit has residual reading). The guaranteed accuracy is 1%~100%.

DUTY RATIO MEASUREMENT

RANGE	RESOLUTION	ACCURACY
0.1%~99%	0.1%	± (31'+5)

CAUTION

Measurement sensitivity:

- <100kHz: 200mVrms <input range<30Vrms
- >100kHz~1MHz: 600mVrms < input range<30Vrms
- >1MHz~10MHz: 1Vrms<input range<30Vrms

Duty ratio is only applicable to <10kHz square wave measurement with a range of 1Vp-p:

- If frequency <1kHz, duty cycle will be 10.0% -95.0%
- If frequency >1kHz, duty cycle will be 30.0%-70.0%

FREQUENCY MEASUREMENT

RANGE	RESOLUTION	ACCURACY
10Hz-10MHz	0.01Hz-0.01MHz	$\pm(0.1 + 4)$

NON-CONTACT AC VOLTAGE DETECTING (NCV)

RANGE	ELECTRIC FIELD SENSITIVITY LEVEL	ACCURACY
NCV	EFLo	<p>The electric field sensing sensitivity is divided into two levels (“EFHI” & “EFLo”). The meter defaults to “EFHI”.</p> <ol style="list-style-type: none"> 1. AC Voltage above $24V \pm 6V$ can be sensed. “EFLo” mode is recommended when the power frequency voltage is 110V. 2. “EFHI” can be set in 220V condition. AC voltage above $74V \pm 12V$ can be sensed by placing NCV sensor close to wires. Note: Test results may be affected by different socket designs or wire insulation thickness.
	EFHI	

MAINTENANCE




WARNING

Before opening the rear cover of the meter, remove the test leads to avoid electric shock.

GENERAL MAINTENANCE

- Clean the meter casing with a soft cloth and mild detergent. Do not use abrasives or solvent!
- Do not use tester or test leads if they appear to have any abnormality
- The maintenance and service must be implemented by qualified professionals or designated service departments.

BATTERY REPLACEMENT

When the “” symbol appears on the LCD, please replace the batteries in time to ensure the clamp meter measurements are accurate.

Batteries specifications: 2 standard AAA 1.5V batteries

NOTE: Ensure the meter is off and test leads are disconnected when replacing batteries.

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.