TENMA®

200A True RMS Fork Meter

Models: 72-3545

CONTENTS

WHAT'S INCLUDED

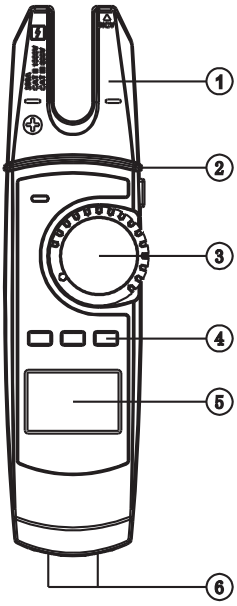
- Fork Meter
- One pair of probes
- One zip bag
- One user manual

Please read these instructions carefully before use and retain for future reference.

IMPORTANT SAFETY INFORMATION

- When using electrical appliances basic safety precautions should always be followed.
- Before each use, check the Meter and probes for any damage. If you notice any damage to the probe or the instrument, do not use the Meter.
- Do not use the Meter without the rear cover or battery cover, otherwise there is a severe risk of shock.
- When carrying out measurements, keep your fingers behind the line, ensuring you do not touch any bare wires and connectors, an unused input terminal or circuits under measurement, in order to prevent electric shock.
- Before any measurement, ensure that the dial switch is in the correct position. Do not rotate the dial during measurement, in order to prevent damage to the Meter.
- Do not apply 1000V DC/ 750V AC or above voltage between the meter terminal and grounding, in order to prevent electric shock or damage to the Meter.
- Use extra care when measuring DC voltage of higher than 42V or 30V AC RMS as there may be danger of an electric shock.
- Do not measure voltage or current higher than the allowable input. When the range of the value to be measured is unknown, set the function range switch to the maximum range position.
- Before measuring resistance, diode or circuit on-off, cut off all the power supplies in the circuit and discharge all capacitors, otherwise it may lead to incorrect measurement results.
- When the low battery symbol appears on the LCD, replace the batteries as soon as possible, in order to ensure precise measurements.
- There are no user-serviceable parts in the meter. Do not attempt to change the internal wiring of the Meter, to prevent causing any damage.
- Do not use or store the Meter in an environment of high temperature, high humidity, inflammable nature and where an explosive or strong electro-magnetic field exists.
- When cleaning, use a dry cloth for the outer shell of the Meter.
- Do not use any chemicals, abrasives or solvents that could damage the Meter.

PRODUCT OVERVIEW



1. Clamp head - the sensing device for AC/DC measurement. Fix the wire into the designated position to measure the current through the wire.
As the head may touch the live wire at the time of the measurement, keep your hand below the clamp head.

2. Clamp body - hold the middle of the clamp body and do not exceed the protective baffle at the joining section between the upper part of the clamp body and the clamp head.

3. Function dial - used for the start-up and selection of basic measurement functions. The salient point on the function dial indicates the present gear position.

4. Function buttons - used for the selection of key functions, including SELECT, REL/ZERO, HOLD/☼ and TORCH 🔦.

5. Display screen - used to display measurement data and function symbols. The screen also has the backlight function, which enables you to measure in low-light environments.

6. Measurement at input terminal - it is at the insertion port of the probe that the voltage, resistance, capacitance and other parameters are measured.

SELECT BUTTON

SELECT: function selection button, which works at AC/DC, ACV/DCV and RES/CNT/DIO/CAP functions.

- When the function dial is switched to AC/DC, it defaults to AC function. Press the **SELECT** button to switch between AC and DC functions.
- When the function dial is switched to ACV/DCV it defaults to ACV function. Press the **SELECT** button to switch between ACV and DCV functions.
- When the function dial is switched to the RES/CNT/DIO/CAP function it defaults to the RES function. Press the **SELECT** button to switch to the CNT function, press again to access the DIO function and then again to switch to the CAP function.

REL BUTTON

REL: measurement button of relative value, which works at other functions except from CNT, DIO, NCV and DC functions.

- Press **REL** under normal measurement mode to switch to relative value measuring mode.
- Under relative value measuring mode, it will show Dn-Df on the display screen and Df on the sub-display screen, of which Df is the last measured value (relative value) and Dn is the current measured value.
- It will display “REL Δ” at the top left of the display screen, which indicates it has

entered relative value measuring mode.

- You can return to normal operation mode by pressing the **REL** button again, or pressing **SELECT** for a function switch.
- Press the **HOLD** button under relative value measuring mode and it will enter data-hold mode as well and the Meter will not update the measurement data. When you exit relative value measuring mode, “hold” state will be cancelled also.

ZERO BUTTON

ZERO: base reset button. This function is used with REL and works at the DC function.

- Since the clamp head of the meter generates the induced voltage due to earth magnetic field induction when it does not measure any signal, the base number exists at DC gear generally and varies from the placement position and direction of the Meter.
- It is necessary to deduct the base number at the time of DC measurement.

- Press the **ZERO** button under DC function to enter reset mode and deduct the base number during DC measurement.
- Under reset mode, it will display Dn-Df on the main display screen, of which Df is the DC base number and Dn is the current measured value.
- Meanwhile, it will display the “ZERO” symbol at the top left of the display screen, which indicates it has entered reset mode.

- By pressing the **ZERO** button again under reset mode, it will update Df again and display the updated Dn-Df.
- To exit the reset function either press and hold the **ZERO** button, turn the function dial, or press **SELECT**.
- Press the **HOLD** button under reset mode, it will enter data-hold mode and the Meter will not update the measurement data. When you exit reset mode, “hold” state will be cancelled also.

HOLD BUTTON

HOLD: the data hold button works with all functions.

- To enter data-hold mode, press the **HOLD** button under normal measurement mode.
- The Meter will not update the measurement data and the displayed value will be locked and remain unchanged.
- It will display the “H” symbol at the top left of the display screen, which indicates it has entered data-hold mode.
- If you wish to exit data-hold mode either press **HOLD**, turn the function dial or press **SELECT**.

BACKLIGHT BUTTON

- Press and hold the ☼ button to turn on the backlight and enter low-light mode, which means the backlight is bright enough for basic reading.
- Press and hold the ☼ button again to enter the high-light mode, under which the backlight is brighter and the contrast is clearer.
- Press and hold the ☼ button again to turn off the backlight.

TORCH BUTTON

- To switch on the LED light ensure the Meter is on and simply press the torch button on the side of the Meter.
- Press the same button to turn off the light.

GENERAL SPECIFICATION

LCD	Max. display 5999
Polarity display	Automatic positive and negative
Overload display	“OL” or “-OL”
Battery voltage	<2.4V means the low battery symbol will display
Sampling rate	Approx. 3 times per second
Sensor types	Hall effect sensor for DC/AC measurement
Measured position error	When measuring current, ±1% additional error may occur because it fails to put the source to be measured into the centre position of the probe.
Impact resistant strength	1m high impact can be borne
Max. opening dimension of clamp head	Diameter of 14.7mm
Max. dimension of current wire	Diameter of 14.7mm
Electromagnetic field effect	When an electromagnetic field interference exists, it may display unstable or incorrect readings
Power requirements	2 x AA 1.5V batteries (not included)
Auto-off function	15 minutes
Dimensions	210mm x 53mm x 35mm
Weight (approx.)	163.7g

ENVIRONMENTAL LIMIT

Working environment	Indoor
Altitude	<2000m
Safety requirements	IEC61010-1, IEC61010-2-032, CAT II 1000V, CAT III 600V
Pollution degree	2
Operating temperature and humidity	0°C-30°C (<80%RH), 30C-40°C (<75%RH), 40°C-50C (<45%RH)
Storage temperature and humidity	-20C-+60°C (<80%RH)

ELECTRICAL SPECIFICATION

Accuracy	± (% reading + word count), calibration period is one year
Ambient temperature	23°C ± 5°C
Ambient humidity	≤80%RH
Temperature coefficient	0.1 x (accuracy)/°C

AC CURRENT SPECIFICATION

Measurement range	Resolution ratio	Accuracy	Overload protection
200.0A	0.1A	±(2.5% + 5)	200A

- Main display: true virtual value current.
- Frequency response: 50Hz - 60Hz.

DC CURRENT SPECIFICATION

Measurement range	Resolution ratio	Accuracy	Overload protection
200.0A	0.1A	±(2.5% + 5)	200A

- The DC base number can be cleaned up by pressing the **ZERO** button.

AC VOLTAGE SPECIFICATION

Measurement range	Resolution ratio	Accuracy	Overload protection
6.000V	0.001V	±(1.2% + 5)	1000V DC / 750V AC
60.00V	0.01V	±(1.2% + 3)	
600.0V	0.1V		
750V	1V	±(1.5% + 5)	

- Main display: true virtual value voltage.
- Input impedance: ≥10MΩ.
- Frequency response: 45 - 400Hz.
- (50 - 100Hz when ≤400mV).

DC VOLTAGE SPECIFICATION

Measurement range	Resolution ratio	Accuracy	Overload protection
6.000V	0.001V	±(0.8% + 3)	1000V DC / 750V AC
60.00V	0.01V		
600.0V	0.1V		
1000V	1V	±(1.0% + 5)	

- Input impedance ≥10MΩ.

RESISTANCE SPECIFICATION

Measurement range	Resolution ratio	Accuracy	Overload protection
600.0Ω	0.1Ω	±(1.2% + 2)	1000V DC / 750V AC
6.000KΩ	0.001kΩ	±(1.0% + 2)	
60.00KΩ	0.01kΩ		
600.0KΩ	0.1kΩ		
6.000MΩ	0.001MΩ	±(1.2% + 2)	
60.00MΩ	0.01MΩ	±(1.5% + 5)	

CONDUCTIVITY TESTING SPECIFICATION

Measurement range	Resolution ratio	Accuracy	Overload protection
600.0Ω	0.1Ω	<10Ω, the buzzer will ring >10Ω, the buzzer will not ring	1000V DC / 750V AC

- Open circuit voltage is about 1.2V.

DIODE MEASUREMENT SPECIFICATION

Measurement range	Resolution ratio	Accuracy	Overload protection
6.000V	0.001V	0.5V - 0.8V	1000V DC / 750V AC

- Open circuit voltage is about 3.3V.

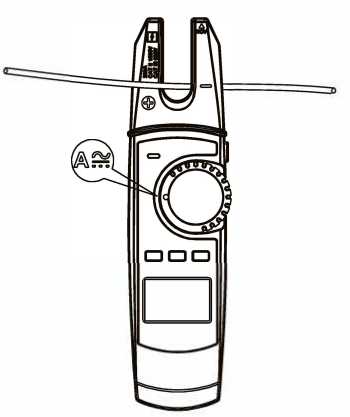
CAPACITANCE SPECIFICATION

Measurement range	Resolution ratio	Accuracy	Overload protection
60.00nF	0.01nF	±(4.0% + 20)	1000V DC / 750V AC
600.0nF	0.1nF		
6.000μF	0.001nF		
60.00μF	0.01μF		
600.0μF	0.1μF		
6.000mF	0.001mF	± 10%	
60.00mF	0.01mF	For reference only	

INDUCED VOLTAGE MEASUREMENT (NCV) SPECIFICATION

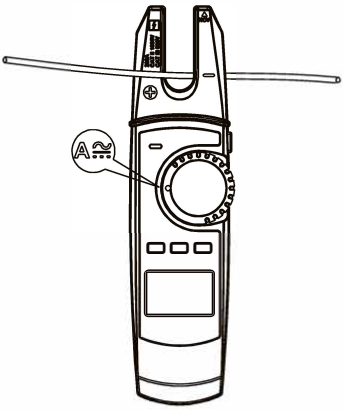
Measurement range	Accuracy
NCV	Induced voltage ≥ 100Vrms, Distance ≤ 10mm (LED flashes and the buzzer sounds).

MEASUREMENT OPERATIONS - MEASURING AC CURRENT



- Set the measuring function range of AC current by rotating the dial to **A**≅. The meter will be within the measuring function range of AC current as default.
- Clamp the instrument to the input current signal to be tested.
- Clamp a single current lead to be tested and keep it at the bottom of the “U” clamp head.
- The clamp meter will automatically select the proper range and display the true virtual value of AC current in the centre of the screen.
- Frequency response range: 50Hz-60Hz.
- **Warning**: the largest measuring current must not be greater than 200A AC during the measurement of AC current.

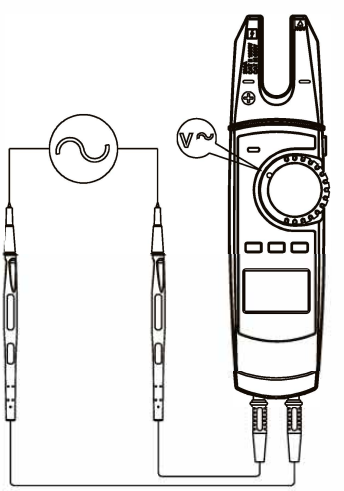
MEASURING DC CURRENT



- Set the measuring function range of DC current by rotating the dial to **A**≅. The Meter will be within the measuring function range of DC current as default.
- Press the **SELECT** button to switch into the measuring function range of DC current.
- Clear the base number of the measuring range of DC current.
- As the clamp head sensor reacts to terrestrial magnetism and surrounding magnetic field, there generally exists a base number even without measuring.
- Therefore, before measuring DC current, the base number should be cleared by pressing the **ZERO** button.
- Measurements must be conducted after the base number is cleared and the measured value returns to zero.

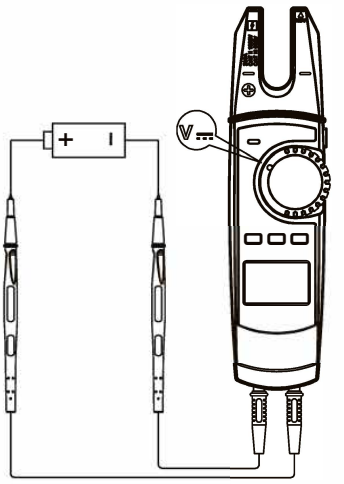
- Clamp the instrument to the input current signal to be tested.
- Clamp the single current lead to be tested and keep it at the bottom of the “U” clamp head.
- The Meter will automatically select the proper range.
- If the current direction is in the same direction as that as that of the clamp head, it will display the positive value of AC current in the centre of the display screen, otherwise it will display the negative current value.
- **Warning**: the largest measuring current must not be greater than 200A DC during measurement of DC current.

MEASURING AC VOLTAGE



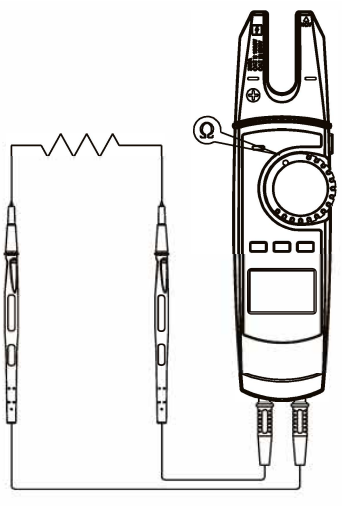
- Insert the black probe into the "**COM**" input and the red probe into the "**V Ω**" input.
- Set the measuring function range of AC voltage by rotating the dial to **V≅**.
- The Meter will be within the measuring function range of AC voltage as default.
- Connect the voltage to be tested and put the red and black probes at two sides of the voltage to be tested. The clamp meter will automatically select the correct range.
- The centre of the screen will display the current true visual value of AC voltage.
- When the voltage value exceeds 30V AC, the screen will display the high-voltage alarm signal to warn against a shock hazard.
  Note: frequency response scope: 45Hz - 400Hz.
- **Warning**: AC voltage measuring range must not be greater than 750V AC.

MEASURING DC VOLTAGE



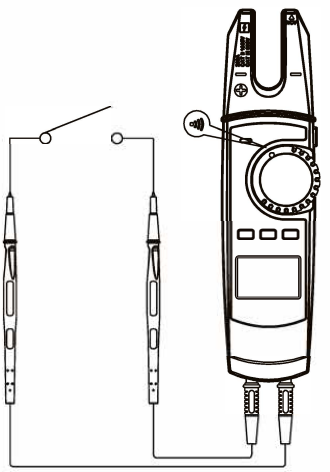
- Insert the black probe into the "**COM**" input and insert the red probe into the "**V Ω**" input, ready for measurement.
- Set the measuring function range by rotating the dial to **V≅**.
- Press the **SELECT** button to switch the Meter into the measuring function range of DC voltage.
- Connect the voltage to be tested and put the red and black probes at the two sides of voltage to be tested and the Meter will automatically select the correct range.
- The screen will then display the current true virtual value of DC voltage.
- If the electric potential at the red probe is higher than that at the black probe, the screen will display the positive voltage value, otherwise the negative voltage will be shown.
- When the voltage exceeds 42V DC the screen will display the high-voltage symbol to warn against shock hazard.
- **Warning**: DC voltage measuring range must not be greater than 1000V DC.

MEASURING RESISTANCE



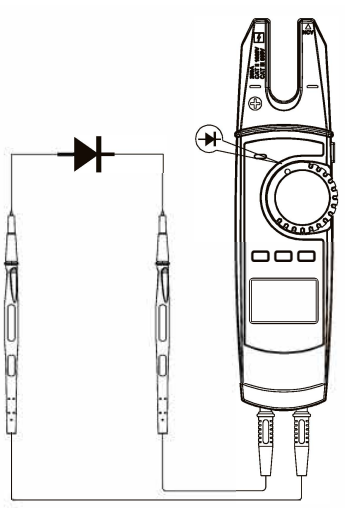
- Insert the black probe into the "**COM**" input and the red probe into the "**V Ω**" input, ready for measurement.
- Set the measuring function range to Resistance by rotating the dial to the "**Ω**" symbol.
- Place the two probes across the circuit elements to be tested.
- The Meter will automatically select the correct range and the screen will display the current resistance value.
- **Warning**: before connecting resistance, the power must be cut off and the residual charge of all capacitors must be fully discharged. More accurate measurements may be available when the elements are separated from the circuit.
- Note: at the function range of 600Ω, it is suggested to short-circuit the meter probe and press the **REL** button to clear the probe short-circuit base number before measurement, to eliminate the impact of probe resistance.

CONDUCTIVITY TESTING



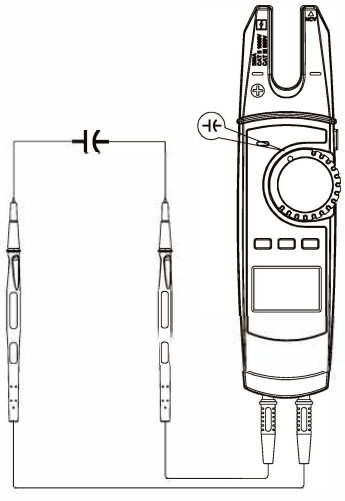
- Insert the black probe into the "**COM**" input and the red probe into the "**V Ω**" input, ready for measurement.
- Set the measuring function range by rotating the dial so it aims at the " " symbol.
- Press **SELECT** to switch to the conductivity testing function range.
- Place the red and black probes at the two sides of the end points to be tested.
- If the measured resistance is less than 10Ω the buzzer will sound. In contrast, if it is larger than 100Ω it will not sound.
- **Warning**: when measuring on-off condition, the power to the circuit must be cut off and the residual electric charge of all electric capacitors must be fully discharged before the end points are connected with the product.

DIODE MEASUREMENT



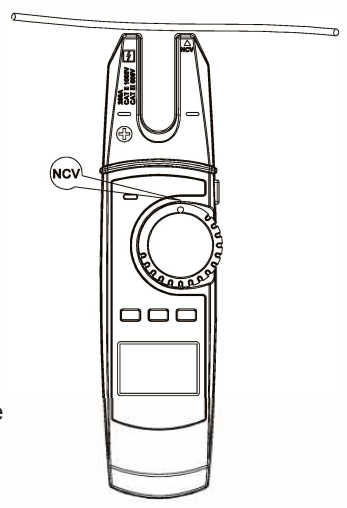
- Insert the black probe into the "**COM**" input and the red probe into the "**V Ω**" input, ready for measurement.
- Set the measuring function range by rotating the dial so it aims at the "⊣◀⊢" symbol.
- Press **SELECT** to switch to the diode measurement function.
- Place the red and black probes at the positive and negative poles of the diode to be tested.
- The positive conductivity value will be displayed in the middle of the screen.
- If the probes are inserted into the wrong terminals the screen will display "OL".
- **Warning**: when measuring diode, the power to the circuit must be cut off and the residual electric charge of all electric capacitors must be fully discharged before the diode is connected with the product. More accurate measurements may be available when the elements are separated from the circuit.

CAPACITANCE MEASUREMENT



- Insert the black probe into the "**COM**" input and the red probe into the "**V Ω**" input, ready for measurement.
- Set the measuring function range by rotating the dial so it aims at the capacitance "⊣⊢" symbol.
- Press **SELECT** to switch to the capacitance measurement function.
- Put the red and black probes at the two sides of capacitance to be tested and the Meter will automatically select the correct range. The screen will display the current capacitance measurement value.
- **Warning:** during the measurement of capacitance, the power to the circuit must be cut off and residual electric charge of all electric capacitors must be fully discharged before connecting. More accurate measurements may be available when the elements are separated from the circuit.
- Before measuring capacitance, press the **REL** button in advance to clean the open-circuit base number to eliminate the effect of probe parasitic capacitance.
- Note: At the range of 60nF, it is suggested to press the **REL** button also, to clear the short-circuit base number before measurement to eliminate the impact of probe resistance.

MEASURING INDUCED VOLTAGE (NCV)



- Set the measuring function range by rotating the dial so it aims at "**NCV**".
- The top right end of the clamp head is equipped with an electromagnetic induction sensor, which is able to detect whether the alternating current magnetic field exists or not.
- During measurement, the right end of the clamp head must be close to the tested conductor to detect induction.
- The screen will display "EF" if the induced voltage is not detected. When the test distance is less than 10mm and the tested voltage is larger than 100Vrms, the Meter will sound and the NCV LED will flicker.
- According to the magnitude of induced voltage, the central screen will display such four grades as "-", "- -", "- - -" and "- - - -".
- The greater the induced voltage, the higher the grade displayed.

MAINTENANCE

- **Warning**: Remove the test probes before uncapping the lid in order to avoid electric shock.
- Maintenance should only be undertaken by a qualified technician, professional maintenance staff or a designated maintenance department.
- Clean the shell using a dry cloth.
- Do not use any chemicals, abrasives or solvents that could damage the Meter.

REPLACING THE BATTERIES

- Turn off the meter and pull out the test probe at the input terminal.
- Place the meter face down and unscrew the battery holder and remove the battery cover.
- Remove the old batteries and install two new batteries of the same specification (1.5V AAA), observing the correct polarities.
- Once installed, fit the battery cover back in place and secure it by screwing in the screw.

INFORMATION ON WASTE DISPOSAL FOR CONSUMERS OF ELECTRICAL & ELECTRONIC EQUIPMENT.

When this product has reached the end of its life it must be treated as Waste Electrical & Electronic Equipment (WEEE). Any WEEE marked products must not be mixed with general household waste, but kept separate for the treatment, recovery and recycling of the materials used. Contact your local authority for details of recycling schemes in your area.