Megger

VF-T5

Non-Contact Voltage Detector with Laser Infrared Thermometer

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Megger Limited, Archcliffe Road, Dover, Kent CT17 9EN. ENGLAND
T +44 (0)1304 502101 F +44 (0)1304 207342 www.megger.com

For Patent information about this instrument refer to the following web site:
megger.com/patents

This manual supersedes all previous issues of this manual. Please ensure that you are using the most recent issue of this document. Destroy any copies that are of an older issue.

Declaration of Conformity

Hereby, Megger Instruments Limited declares that radio equipment manufactured by Megger Instruments Limited described in this user guide is in compliance with Directive 2014/53/EU. Other equipment manufactured by Megger Instruments Limited described in this user guide is in compliance with Directives 2014/30/EU and 2014/35/EU where they apply.

The full text of Megger Instruments EU declarations of conformity are available at the following internet address:

megger.com/company/about-us/eu-dofc

Contents

1. Introduction

The Non-Contact Voltage (NCV) Detector with Laser Infrared Thermometer is a tester that lights up when it detects a voltage without needing to make direct contact. The built-in sensor at the tip of the tester detects a voltage when touching a conductor, outlet, or supply cord. The laser infrared thermometer measures the temperature of that power supply allowing the operator to judge if the temperature is normal or there is an overheating fault.

Read the following safety warnings attentively before using this device.

1.1 Company web site

Occasionally an information bulletin may be issued via the Megger web site. This may concern new accessories, new usage instructions or a software update. Please occasionally check on the Megger web site for anything applicable to your Megger instruments.

www.megger.com

2. Safety warnings and standards

These safety warnings must be read and understood before the instrument is used. Retain for future reference.

2.1 Warnings, cautions and notes

This user guide follows the internationally recognised definition. These instructions must be adhered to at all times.

Description
WARNING : Indicates a potentially dangerous situation which, if ignored, could lead to death, serious injury or health problems.
CAUTION : Indicates a situation which could lead to damage of the equipment or environment
NOTE : Indicates important instructions to be followed to perform the relevant process safely and efficiently.

2.2 Safety warnings

- National Health and Safety Legislation requires users of this equipment or their employer to carry out valid risk assessment of all work so as to identify potential sources of danger and to mitigate risk.
- The tester's safety features may not protect the user if not used in accordance with the manufacturer's instructions.
- Inspect the tester before use. Do not use if the tester appears damaged or if it is not operating properly. If in doubt, replace the tester.
- Hold the tester near the control buttons without obscuring the display. Keep hands behind the tactile barrier when in use.
- Check on a known live source within the rated AC voltage range of the tester before and after use to ensure the detector is in working order.
- The VF-T5 does not detect DC voltage. A DC circuit could be live when the VF-T5 signals that there is no voltage present.
- Insulation type and thickness, distance from the voltage source, shielded wires, and other factors may effect reliable operation. Use other methods to verify live voltage if there is any uncertainty.
- Do not use on voltages that are higher than marked on the tester.
- Use caution with voltages above 30 V AC as a shock hazard may exist.
- Comply with all applicable safety codes. Use approved personal protective equipment when working near live electrical circuits-particularly with regard to arc-flash potential.
- Do not operate tester if 'Low Battery' warning occurs. Replace batteries.
- Do not direct laser beam into eyes, as this can cause permanent eye damage.
- The laser comes on for a short time when putting the battery cap on. Make sure the VF-T5 is pointed away from the face when changing the battery.

- Be cautious of readings of reflective materials as the tester may indicate that the surfaces are cooler than the actual temperature.
- Avoid using the meter in strong electromagnetic fields.
- Do not expose tester to extremes in temperature or high humidity.
- Keep the tester clean using a damp cloth. Make sure the tester is dry before use.
- Replace battery only with alkaline cells. Other battery technologies many cause a fire in the event of a fault.
- Do not dispose of the batteries or the instrument to landfill. Dispose of waste electrical equipment for recycling according to local legislation.

2.2.1 Installation category definitions:

CAT IV - Measurement category IV: Equipment connected between the origin of the low-voltage mains supply and distribution panel.

CAT III - Measurement category III: Equipment connected between the distribution panel and electrical outlets.

CAT II - Measurement category II: Equipment connected between the electrical outlets and user's equipment.

Measurement equipment may be safely connected to circuits at the marked rating or lower. The connection rating is that of the lowest rated component in the measurement circuit.

2.3 Safety, hazard and warning symbols on the instrument

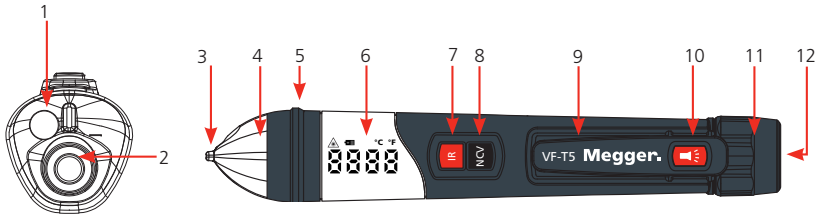
This paragraph details the various safety and hazard icons on the instrument's outer case.

Icon	Description
	Indicates hazardous voltages may be present.
	Indicates the user must refer to the manual for important safety information.
	Targeting lasers active (Class 1 laser product).
UK CA	UK conformity. This equipment complies with current UK legislation.
CE	EU conformity. Equipment complies with current EU directives.
	Conforms to relevant Australian Safety and EMC standards.

	Equipment is protected by double or reinforced insulation.
	Do not dispose of in the normal waste stream.
CAT IV	Measurement category IV corresponds to measurements taken at the source of low-voltage.

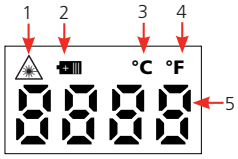
3. Instrument overview

3.1 Instrument layout



Item	Description	Item	Description
1	Visible targeting laser	7	IR button
2	Infrared (IR) sensor	8	NCV button
3	NCV detector tip	9	Pocket clip
4	NCV LED indicators	10	Battery cap
5	Tactile barrier Keep hand and fingers behind this line while using tester	11	Flashlight button
6	LCD display	12	Flashlight

3.2 LCD display



Item	Description	Item	Description
1	Laser warning symbol	4	Temperature unit °F
2	Low battery symbol	5	Temperature value
3	Temperature unit °C		

4. Operation

4.1 Non-Contact Voltage (NCV) Function

NOTE : The tester cannot determine the actual voltage. The voltage level where the tester switches from the low to high voltage mode is effected by insulation type and thickness, distance from the voltage source, and other factors.

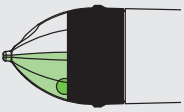
4.1.1 Turning the NCV function on

When turned on the tester will carry out a self-test. The self-function makes it easy to tell that the tester is working or not.

To turn the NCV function on the tester on, press the NCV button.

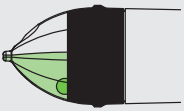
- Self-Test Pass:
  - Self-test occurs once when the NCV function is turned on.

  - The buzzer will beep once, the NCV LED indicator lights will illuminate indicating the tester is switched on and ready for use.

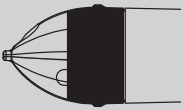


- Self-Test Fail:
  - Self-test occurs once when the NCV function is turned on.

  - The buzzer will beep and all NCV LED indicator lights will flash five times



  - The tester will turn off to indicate that there is a fault and tester will not work.



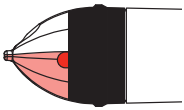
4.1.2 Turning off the VF-T5

To turn off the unit press and hold the NCV button until the unit double beeps and the NCV LED indicator lights turn off. The unit is now turned off.

4.2 Verify operation

Before and after using the tester:

- Make sure the range LED is glowing,
- Verify the NCV LED indicator is green when not in range of a live circuit.
- Verify that the NCV LED indicator shows red when the tester is brought within range of a known live AC circuit.



4.2.1 Turning the buzzer off

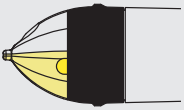
For safety the VF-T5 will default with the buzzer enabled. To operate without buzzer follow the below process.

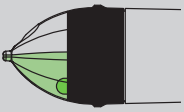
1. Turn off the NCV function by turning off the VF-T5 or by pressing the IR button
2. Press and hold the NCV button until the range LED is illuminated.
3. The tester will now operate without the beeper until the tester is switched off.
   The beeper will be switched back on when the tester is turned back on.

NOTE : The VF-T5 will automatically re-enable the buzzer if you change modes to IR and back again on single press.

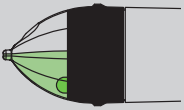
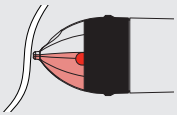
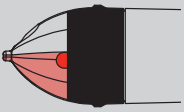
4.3 Voltage modes

4.3.1 Change voltage range mode

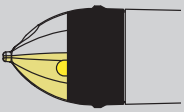
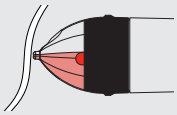
1. Turn on the NCV function on the tester on	
2. To change the voltage range mode between low voltage mode and high voltage mode Press the NCV button, the tester will switch between modes with each press.	
▪ The yellow range LED indicates the tester is set to Low Voltage Mode,	

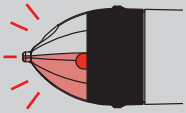
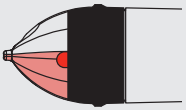
▪ The green range LED indicates the tester is set to High Voltage Mode.	

4.3.2 Testing in High voltage mode (100 V to 1000 V AC)

1. Turn on the NCV function on the tester on To switch between modes Consult chapter 4.3.1 Change voltage range mode on page 12	
2. The green NCV LED indicator will illuminate to indicate the tester is set to High Voltage Mode.	
3. Place the tip of the tester near an AC voltage.	
4. If the tester detects voltage within the detection range, the tester will light a steady red LED and the buzzer will beep rapidly.	

4.3.3 Low voltage mode (12 V to 1000 V AC)

1. Turn on the NCV function on the tester on To switch between modes Consult chapter 4.3.1 Change voltage range mode on page 12	
2. The yellow NCV LED indicator will illuminate to indicate the tester is set to Low Voltage Mode.	
3. Place the tip of the tester near an AC voltage.	

If the tester detects voltage within the detection range, the yellow LED will turn red and flash, the buzzer will beep. The flash and beeping rate will increase as the tester gets closer to the voltage source.	
4. If the tester detects high voltage, the red LED will change to a steady glow and the buzzer will beep rapidly.	

4.4 Low battery indication

To replace the batteries Consult chapter 6.1 Battery replacement on page 17

- Replace the batteries if the range LED does not turn on.
- When the NCV function is on and the batteries are too low for reliable operation, the buzzer will beep three times and the range LED will turn off indicating the tester is not operational, replace the batteries to restore operation.

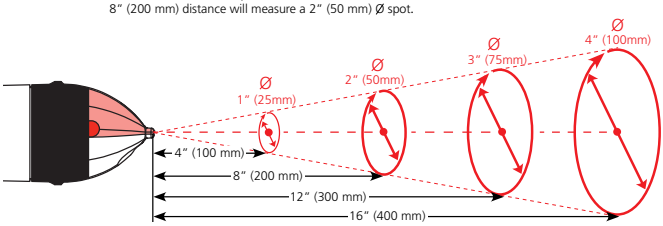
4.4.1 Auto power off

- To conserve battery life, the tester will automatically turn off after approximately 5 minutes of inactivity.
- When powering down, the beeper will beep twice and all LED indicators will turn off.

4.5 Measuring IR temperature

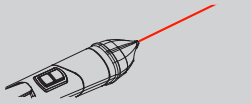
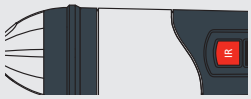
The targeting laser has a Distance-To-Spot ratio of 4:1, which describes the relationship of the distance between the tester and the object, to the target measurement area.

EXAMPLE: Distance to spot ratio is 4:1. The diameter of the measured circle is 1/4 the distance: 8" (200 mm) distance will measure a 2" (50 mm) Ø spot.



Emissivity is the ability of a surface to emit infrared radiation: the wavelength of which indicates the temperature of the surface. Emissivity is in the range 1.0 for a perfectly black surface to 0 for a perfectly mirrored surface. The VF-T5 is calibrated to measure most accurately an emissivity around 0.95 which is suitable for most surfaces but polished metal will not be measured accurately by the VF-T5. If it is safe to do so, a shiny surface to be measured can be painted or marked in matt black pigment or covered with matt black tape. Measuring the blackened surface will give an accurate temperature reading.

To measure the temperature:

1. Press and continually hold the IR Button, the laser warning symbol will display.	
2. Aim the laser at the object to be measured.	
3. The temperature will display on the LCD display.	
4. Release the IR Button to hold the last measurement taken, laser symbol will turn off.	
5. The thermometer will power-off after approx. 10 seconds of inactivity and the held reading will be cleared.	

NOTE : The temperature is measured only while the IR button is pressed.
If the measurement temperature is outside the range, the LCD display will display "OL".

4.6 IR temperature settings

To change the temperature unit between Celsius (°C) and Fahrenheit (°F),

1. Press and continually hold the IR button first,	
2. While pressing the IR, press and hold NCV button until the temperature unit changes.	
3. Repeat to change the unit of measure back.	

NOTE : When the low battery symbol is flashing, it indicates that the battery voltage is too low, replace the battery. CONSULT CHAPTER 6.1 BATTERY REPLACEMENT ON PAGE 17

WARNING : Do not look directly into the laser beam.

5. Maintenance.

NOTE : There are no user replaceable parts within this product, other than the battery cells.

5.1 General maintenance

Ensure the unit is kept clean and dry.

5.2 Cleaning

Switch off and remove battery cells.

Wipe the instrument with a clean cloth dampened with either water or isopropyl alcohol (IPA).

Dry off any moisture before replacing the batteries.

6. Battery

CAUTION : Old batteries must be disposed of in accordance with local regulations.

CAUTION : Use only approved batteries as defined below.

To help maintain the health, reliability and longevity of the installed batteries:

Remove battery cells if the instrument is not going to be used for a long period.

Store batteries in a cool, dry place. Batteries can be damaged when exposed to heat and direct sunlight.

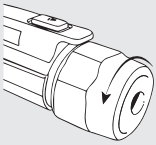
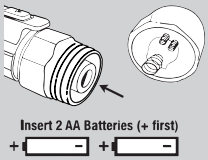
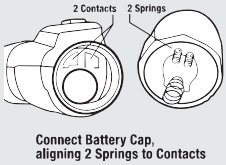
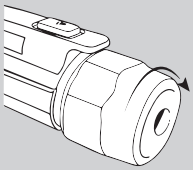
6.2.1 Battery status

WARNING : Do not recharge Alkaline batteries.

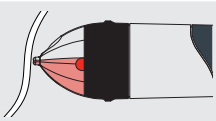
Battery condition icon is positioned at the top of display. This icon is displayed at all times when the instrument is switched on. When runnin

g the icon will indicate state of charge, the icon will be filled in proportion to the state of charge.

6.1 Battery replacement

1. Carefully unscrew battery cap at the rear (flashlight end) of the tester.	
2. Replace batteries with two AAA 1.5 V batteries. Observe polarity.	
3. Carefully align cover with tester as shown below.	
4. Screw cover onto tester until it feels tight. Do not use excessive force. The beeper will beep once if the batteries are loaded correctly.	

5. Verify operation by using the tester on a known live AC voltage within the defined detection range of the tester.



NOTE : When batteries are loaded for the first time, please remove the white, rectangular security strip before installing batteries.

NOTE : When replacing the batteries, be sure to secure the cap firmly to maintain IP54 water and dust protection. A loose or overtightened battery cap may compromise water and dust protection.

7. Specifications

Specification	Detail
Detection voltage range	12 V to 1000 V AC, 100 to 1000 V AC
Frequency range	50/60 Hz
Detection temperature range	-30 to +280 °C (-22 to +536 °F)
Temperature resolution	0.1 °C/ °F
Laser type	Class 1 (Peak wavelength 650 nm)
Laser distance-to-spot ratio	4:1
Temperature accuracy	±3 °C (±5.4 °F) at -30 to +20 °C (-22 to +68 °F) ±2.0% or ±2 °C (±3.6 °F) at +21 to +280 °C (+69 to +536 °F)
Batteries	2x AA, IEC LR6 (1.5 V alkaline cell)
Environment	Indoor or outdoor
Operating temperature	0 to +50 °C (+32 to +122 °F)
Storage temperature	-10 to +60 °C (+14 to +140 °F)
Humidity	≤ 80% RH
Altitude	≤ 2000 m
Pollution degree	2
Measurement rating	CAT IV 1000 V
IP Rating	IP54

8. Calibration, Repair and Warranty

Megger operates fully traceable calibration and repair facilities to make sure your instrument continues to provide the high standard of performance and workmanship that is expected. These facilities are complemented by a worldwide network of approved repair and calibration companies, which offer excellent in-service care for your Megger products.

For service requirements for Megger instruments contact:

Megger Limited Archcliffe Road Dover Kent CT17 9EN **U.K.** Tel: +44 (0) 1304 502 243 Fax: +44 (0) 1304 207 342	OR	**Megger Valley Forge** 400 Opportunity Way Phoenixville PA 19460 **U.S.A.** Tel: +1 610 676 8579 Fax: +1 610 676 8625

If the protection of an instrument has been impaired it should not be used, but sent for repair by suitably trained and qualified personnel. The protection is likely to be impaired if, for example, the instrument shows visible damage, fails to perform the intended measurements, has been subjected to prolonged storage under unfavourable conditions, or has been exposed to severe transport stresses.

New instruments are covered by a two year warranty from the date of purchase by the User, the second year being conditional on the free registration of the product on www.megger.com. You will need to log in, or first register and then login to register your product. The second year warranty covers faults, but not recalibration of the instrument which is warranted for one year. Any unauthorised prior repair or adjustment will automatically invalidate the warranty.

These products contain no User repairable parts and if defective should be returned to your supplier in original packaging or packed so that it is protected from damage during transit. Damage in transit is not covered by this warranty and replacement / repair is chargeable.

Megger warrants this instrument to be free from defects in materials and workmanship, where the equipment is used for its proper purpose. The warranty is limited to making good this instrument (which shall be returned intact, carriage paid, and on examination shall disclose to Megger's satisfaction to have been defective as claimed).
Any unauthorised repair or adjustment will invalidate the warranty. Misuse of the instrument, from connection to excessive voltages, fitting incorrect fuses, or by other misuse is excluded from the warranty. The instrument calibration is warranted for one year.

This Warranty does not affect your statutory rights under any applicable law in force, or your contractual rights arising from a sale and purchase contract for the product. You may assert your rights at your sole

discretion.

8.1 Calibration, Service and Spare Parts

Megger operates fully traceable calibration and repair facilities, to make sure your instrument continues to provide the high standard of performance and workmanship you expect. These facilities are complemented by a worldwide network of approved repair and calibration companies to offer excellent in-service care for your Megger products.

See the **last page** of this User Guide for Megger contact details.

To find your local Authorised Service Centre email Megger on **ukrepairs@megger.com** and give details of your location.

8.2 Approved Repair Companies

A number of independent instrument repair companies have been approved to do repair most Megger instruments, complete with genuine Megger spare parts.

Consult the Appointed Distributor / Agent about spare parts, repair facilities and advice.

8.3 Return procedure

WARNING : Remove the battery cells before shipping this instrument.

UK and USA Service Centres

1. When an instrument requires recalibration, or in the event of a repair being necessary, a Returns Authorisation (RA) number must first be obtained from one of the addresses shown above. The following information is to be provided to enable the Service Department to prepare in advance for receipt of your instrument and to provide the best possible service to you:
   - Model (for example, MFT-X1).
   - Serial number (found on the display under settings, device information, or on the rear cover and by the batteries or on the calibration certificate).
   - Reason for return (for example, calibration required, or repair).
   - Details of the fault if the instrument is to be repaired.
2. Make a note of the RA number. A returns label can be emailed or faxed to you if required.
3. Pack the instrument carefully to prevent damage in transit.
4. Before the instrument is sent to Megger, freight paid, make sure that the returns label is attached or that the RA number is clearly marked on the outside of the package and on any correspondence. Copies of the original purchase invoice and packing note should be sent simultaneously by airmail to expedite clearance through customs. In the case of instruments which require repair outside the warranty period, an immediate quotation can be provided when obtaining the RA number.
5. Track the progress online at **www.megger.com**.

10. Worldwide Sales Offices

Sales Office	Telephone	Email
UK	T. +44 (0)1 304 502101	E. UKsales@megger.com
USA – Dallas	T. +1 214 333 3201	E. USsales@megger.com
USA – Valley Forge	T. +1 214 333 3201	E. USsales@megger.com
USA – Dallas	T. +1 214 333 3201	E. USsales@megger.com
DEUTSCHLAND – Aachen	T. +49 (0) 241 91380 500	E. info@megger.de
SVERIGE	T. +46 08 510 195 00	E. seinfo@megger.com
中国	T. +86 512 6556 7262	E. meggerchina@megger.com
中国 - 香港	T. +852 26189964	E. meggerchina@megger.com
ČESKÁ REPUBLIKA	T. +420 222 520 508	E. info.cz@megger.com
América Latina	T. +1 214 330 3293	E. csasales@megger.com
ESPAÑA	T. +34 916 16 54 96	E. info.es@megger.com
SUOMI	T. +358 08 510 195 00	E. seinfo@megger.com
LA FRANCE	T. +01 30 16 08 90	E. infos@megger.com
ΕΛΛΑΔΑ	T. +49 (0) 9544 68 0	E. sales@sebakmt.com
Magyarország	T. +36 1 214-2512	E. info@megger.hu
ITALIA	T. +49 (0) 9544 68 0	E. sales@sebakmt.com
日本	T. +44 (0)1 304 502101	E. UKsales@megger.com
한국	T. +1-800-723-2861	E. sales@megger.com
العربية الرياض	T. +966 55 111 6836	E. MEsales@megger.com
مملكة البحرين	T. +973 17440620	E. MEsales@megger.com
NEDERLAND	T. +46 08 510 195 00	E. seinfo@megger.com
NORGE	T. +46 08 510 195 00	E. seinfo@megger.com
POLSKA	T. +48 22 2809 808	E. info.pl@megger.com
PORTUGAL	T. +34 916 16 54 96	E. info.es@megger.com
România	T. +40 21 2309138	E. info.ro@megger.com
РОССИЯ	T. +7 495 2 34 91 61	E. sebaso@sebaspectrum.ru
SLOVENSKO	T. +421 2 554 23 958	E. info.sk@megger.com
Türkiye	T. +46 08 510 195 00	E. seinfo@megger.com

9. Decommissioning

9.1 WEEE Directive

The crossed out wheeled bin symbol placed on Megger products is a reminder not to dispose of the product at the end of its life with general waste.

Megger is registered in the UK as a Producer of Electrical and Electronic Equipment. The Registration No is WEE/ HE0146QT.

For further information about disposal of the product consult your local Megger company or distributor or visit your local Megger website.

9.2 Battery disposal

The crossed out wheeled bin symbol placed on a battery is a reminder not to dispose of batteries with general waste when they reach the end of their usable life.

For disposal of batteries in other parts of the EU contact your local Megger branch or distributor.

Megger is registered in the UK as a producer of batteries (registration No.: BPRN00142).

For further information see www.megger.com

Megger

Local Sales office

Megger Limited
Archcliffe Road
Dover
Kent
CT17 9EN
ENGLAND
T. +44 (0)1 304 502101
F. +44 (0)1 304 207342

Manufacturing sites

Megger Limited
Dover, ENGLAND
T. +44 (0)1 304 502101
E. uksales@megger.com

Megger AB
Danderyd, SWEDEN
T. +46 08 510 195 00
E. seinfo@megger.com

Megger Valley Forge
Phoenixville, PA USA
T. +1 610 676 8500
E. USsales@megger.com

Megger USA - Dallas
Dallas, TX USA
T. +1 214 333 3201
E. USsales@megger.com

Megger USA - Fort Collins
Fort Collins, CO USA
T. +1 970 282 1200

Megger GmbH
Aachen, GERMANY
T. +49 (0) 241 91380 500
E. info@megger.de

Megger Germany GmbH
Baunach, GERMANY
T. +49 (0) 9544 68 - 0
E. baunach@megger.com

Megger Germany GmbH
Radeburg, GERMANY
T. +49 (0) 35208 84-0
E. radeburg@megger.com

This instrument is manufactured in China.

The company reserves the right to change the specification or design without prior notice.

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