



INSTRUCTIONS FOR

# PROFESSIONAL DIGITAL MULTIMETER NCVD 7 FUNCTION

MODEL NO: **TM101**

Thank you for purchasing a Sealey product. Manufactured to a high standard, this product will, if used according to these instructions, and properly maintained, give you years of trouble free performance.

**IMPORTANT:** PLEASE READ THESE INSTRUCTIONS CAREFULLY. NOTE THE SAFE OPERATIONAL REQUIREMENTS, WARNINGS & CAUTIONS. USE THE PRODUCT CORRECTLY AND WITH CARE FOR THE PURPOSE FOR WHICH IT IS INTENDED. FAILURE TO DO SO MAY CAUSE DAMAGE AND/OR PERSONAL INJURY AND WILL INVALIDATE THE WARRANTY. KEEP THESE INSTRUCTIONS SAFE FOR FUTURE USE.



Refer to  
instructions



Electrical  
shock  
hazard

## 1. SAFETY

### 1.1. PERSONAL PRECAUTIONS

- ✓ When using this multimeter, please observe all normal safety rules concerning:  
Protection against the dangers of electrical current.  
Protection of the meter against misuse.
- ✓ Full compliance with safety standards can only be guaranteed if used with the test leads supplied. If necessary, they must be replaced with genuine Sealey leads with the same electrical ratings. Failure to do so will invalidate the warranty.  
**DO NOT** use leads if damaged or if the wires are bared in any way.

### 1.2. GENERAL SAFETY INSTRUCTIONS

- ✓ Familiarise yourself with the application and limitations of the multimeter as well as the potential hazards.  
**IF IN ANY DOUBT CONSULT A QUALIFIED ELECTRICIAN.**
- ✓ **USE EXTREME CAUTION** when working with high voltages.
- ✓ When the meter is connected to a circuit, do not touch unused meter terminals.
- ✓ When the magnitude of the value to be measured is unknown, set the range selector to the highest value available.
- ✓ Before commencing testing, follow instructions below and select the correct input sockets, function and range on the multimeter.
- ✓ Before rotating the rotary switch to change functions, disconnect the test leads from the circuit under test.
- ✓ Take care when working with voltages above 35V DC or 25V AC rms. These voltages are considered a shock hazard.  
Keep fingers behind the probe barriers whilst measuring.
- ✗ **DO NOT** test voltages above 600V - the circuitry of the multimeter may be destroyed.
- **WARNING!** NEVER connect the multimeter to a voltage source / live circuit when the rotary switch is set to any other function apart from Voltage testing.
- **WARNING!** NEVER perform resistance, transistor, diode or continuity measurements on live circuits.  
ALWAYS discharge filter capacitors in power supplies and disconnect the power when making resistance or diode tests.
- **WARNING!** Voltage checks on electrical outlets can be difficult and misleading because of the uncertainty of connection to the recessed electrical contacts. Other means should be used to ensure that the terminals are not "live".
- ✗ **DO NOT** use the multimeter in a potentially explosive atmosphere.
- ✗ **DO NOT** operate the meter unless the back cover and the battery and fuse doors are in place and fastened securely.
- ✓ If any abnormal readings are observed, the multimeter must be checked by an authorised technician.
- ✓ When not in use, store the multimeter carefully in a safe, dry, childproof location out of direct sunlight. Storage temperature range: -20°C to 60°C.
- ✓ ALWAYS turn off the power and disconnect the test leads before opening the covers to replace the fuse or battery.
- ✓ Keep product surfaces clean and dry.
- ✓ The user shall ensure that test probes are correctly selected in order to prevent danger. Probes shall be selected to ensure that adequate barriers guard against inadvertent hand contact with live conductors under test and that probes have minimal exposed probe tips. Where there is a risk of the probe tip short circuiting with other live conductors under test, it is recommended that the exposed tip length shall not exceed 4mm.  
The warnings, cautions and instructions referred to in this manual cannot cover all possible conditions and situations that may occur. It must be understood that common sense and caution are factors which cannot be built into this product, but must be applied by the operator.

### 1.3. SAFETY SYMBOLS



This symbol adjacent to another symbol, terminal or operating device indicates that the operator must refer to an explanation in the Operating Instructions to avoid personal injury or damage to the meter.

**WARNING** This WARNING symbol indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.

**CAUTION** This CAUTION symbol indicates a potentially hazardous situation, which if not avoided, may result in damage to the product.



This symbol, adjacent to one or more terminals identifies them as being associated with ranges that may, in normal use, be subjected to particularly hazardous voltages. For maximum safety, the meter and its test leads should not be handled when these terminals are energized.



This symbol indicates that a device is protected throughout by double insulation or reinforced insulation.

- ❑ **WARNING!** NEVER apply voltage or current to the multimeter that exceeds the specified maximum as shown below:

Input Limits	
Function	Maximum Input
V AC	600V DC/AC
V DC or V AC	600V DC/AC, 200V rms on 200mV range
mA DC	200mA 250V fast acting fuse
A DC	10A 250V fast acting fuse (30 seconds max every 15 min.)
Resistance, Continuity	250V rms for 15sec max

#### 1.4. BATTERY INSTALLATION

- ❑ **WARNING!** To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery cover. Disconnect the test leads from the meter. Open the battery cover by loosening the two screws using a Phillips head screwdriver. Remove old battery (if applicable) and insert the new battery into battery holder, observing the correct polarity. Fit the battery cover back in place. Secure it with the screws.
- ❑ **WARNING!** To avoid electric shock, do not operate the meter until the battery cover is in place and fastened securely. **NOTE!** If your meter does not work properly, check the fuses and battery to make sure that they are still good and that they are properly inserted.

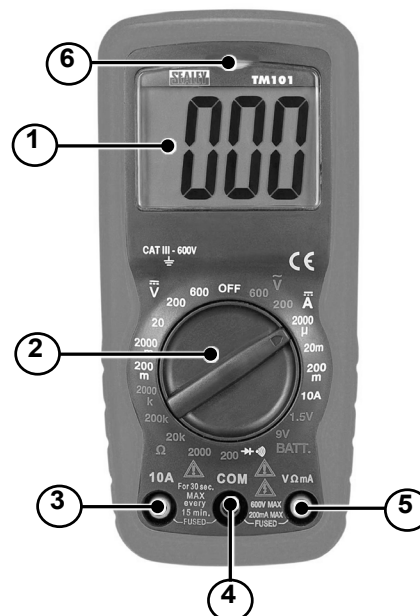


## 2. INTRODUCTION

High precision multimeter. Conforms with EN61010-1 CATIII 600V safety requirements for electrical equipment for measurement, control, and laboratory use. Features Non-Contact AC voltage detection function. Double moulded housing with soft grip case and large display for ease of use. The housing has practical storage for probes and lead and has an integral upright stand for use on the workbench. Measures:

- AC and DC Voltage
- DC Current
- Resistance
- Diode Test
- Continuity Buzzer
- Non Contact Voltage Detection (NCVD)

1. LCD Display
2. Function Switch
3. 10A Jack
4. COM Jack
5. Positive Jack
6. Non Contact Voltage (NCV) Warning Light



#### SYMBOLS AND ANNUNCIATORS

- ))) Continuity Test
- ▶ Diode Test
- μ Micro (Amps)
- m Milli (Volts, Amps)
- k Kilo (Ohms)
- Ω Ohms
- VDC Volts Direct Current
- VAC Volts Alternating Current
- ADC Amps Direct Current
- BAT Battery Test

### 3. SPECIFICATION

Function	Range	Resolution	Accuracy
DC Voltage	200mV	0.1mV	±(0.5% reading + 2 digits)
	2000mV	1mV	
	20V	0.01V	
	200V	0.1V	±(0.8% reading + 2 digits)
	600V	1V	
AC Voltage (V AC)	200V	0.1V	±(1.2% reading + 10 digits) (50/60Hz)
	600V	1V	
DC current (A DC)	2000µA	1µA	±(1.0% reading + 2 digits)
	20mA	10µA	
	200mA	100µA	±(1.2% reading + 2 digits)
	10A	10mA	±(2.0% reading + 2 digits)
Resistance	200Ω	0.1Ω	±(0.8% reading + 2 digits)
	2000Ω	1Ω	
	20KΩ	0.01Ω	
	200KΩ	0.1KΩ	±(1.0% reading + 2 digits)
	2000KΩ	1KΩ	
Battery test	9V	10mV	±(1.0% reading + 2 digits)
	1.5V	10mV	

**NOTE!** Accuracy specifications consist of two elements:  
 (% reading) – This is the accuracy of the measurement circuit.  
 (+ digits) – This is the accuracy of the analog to digital converter.

**NOTE!** Accuracy is stated at 65°F to 83°F (18°C to 28°C) and less than 75% Relative Humidity.

Diode Test:..... Test current of 1mA maximum, open circuit voltage 2.8V DC typical.

Continuity Check:..... Audible signal will sound if the resistance is less than approximately 30Ω.

Battery Test Current:..... 9V (6mA); 1.5V (100mA).

Input Impedance:..... >1MΩ.

ACV Bandwidth:..... 45Hz to 450Hz.

DCA Voltage Drop:..... 200mV.

Display:..... 3 ½ digit, 2000 count LCD, 0.5" digits.

Overrange Indication:..... "1" is displayed.

Polarity:..... Automatic (no indication for positive polarity); Minus (-) sign for negative polarity.

Measurement Rate:..... 2 times per second, nominal.

Low Battery Indication:..... "BAT" is displayed if battery voltage drops below operating voltage.

Battery:..... 9 volt (PP9 type).

Fuses:..... mA, µA ranges; 0.2A/250V fast blow. A Range: 10A/250V fast blow.

Operating Temperature:..... 32°F to 122°F (0°C to 50°C).

Storage Temperature:..... -4°F to 140°F (-20°C to 60°C).

Relative Humidity:..... <70% operating, <80% storage.

Operating Altitude:..... 7000ft. (2000m) maximum.

Weight:..... 260g.

Size:..... 121.5mm x 60.6mm x 40mm.

Safety: For indoor use and in accordance with Overvoltage Category II, Pollution Degree 2. Category II includes local level, appliance, portable equipment, etc., with transient overvoltages less than Overvoltage Category III.

### 4. OPERATION

- ❑ **WARNING!** Risk of electrocution. High-voltage circuits, both AC and DC, are very dangerous and should be measured with great care. ALWAYS turn the function switch to the "OFF" position when the meter is not in use.

If "OL" appears in the display during a measurement, the value exceeds the range you have selected. Change to a higher range.

NOTE! On some low AC and DC voltage ranges, with the test leads not connected to a device, the display may show a random reaing. This is normal and is caused by the high-input sensitivity. The reading will stabilise and give a proper measurement when connected to a circuit.

#### 4.1. DC VOLTAGE MEASUREMENTS

CAUTION: Do not measure DC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

4.1.1. Set the function switch to the highest V DC position.

4.1.2. Insert the black test lead banana plug into the negative (COM) jack. Insert the red test lead banana plug into the positive (V) jack.

4.1.3. Touch the black test probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit.

4.1.4. Read the voltage in the display. Reset the function switch to successively lower V DC positions to obtain a higher resolution reading.

The display will indicate the proper decimal point and value. If the polarity is reversed, the display will show (-) minus before the value.

4.2. AC VOLTAGE MEASUREMENTS

- ❑ **WARNING!** Risk of Electrocution. The probe tips may not be long enough to contact the live parts inside some 240V outlets for appliances because the contacts are recessed deep in the outlets. As a result, the reading may show 0 volts when the outlet actually has voltage on it. Make sure the probe tips are touching the metal contacts inside the outlet before assuming that no voltage is present. **CAUTION:** Do not measure AC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.
- 4.2.1. Set the function switch to the highest V AC position.
- 4.2.2. Insert the black test lead banana plug into the negative (COM) jack. Insert red test lead banana plug into the positive (V) jack.
- 4.2.3. Touch the black test probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit.
- 4.2.4. Read the voltage in the display. Reset the function switch to successively lower V AC positions to obtain a higher resolution reading. The display will indicate the proper decimal point and value

4.3. DC CURRENT MEASUREMENTS

- CAUTION:** Do not make current measurements on the 10A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.
- 4.3.1. Insert the black test lead banana plug into the negative (COM) jack.
- 4.3.2. For current measurements up to 200mA DC, set the function switch to the highest DC mA position and insert the red test lead banana plug into the (mA) jack.
- 4.3.3. For current measurements up to 10A DC, set the function switch to the 10A range and insert the red test lead banana plug into the (10A) jack.
- 4.3.4. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
- 4.3.5. Connect test leads in series with the circuit under measurement.
- 4.3.6. Apply power to the circuit.
- 4.3.7. Read the current in the display. For mA DC measurements, reset the function switch to successively lower mA DC positions to obtain a higher resolution reading. The display will indicate the proper decimal point and value.

4.4. RESISTANCE MEASUREMENTS

- WARNING!** To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any resistance measurements. Remove the batteries and unplug the line cords.
- 4.4.1. Set the function switch to the highest  $\Omega$  position.
- 4.4.2. Insert the black test lead banana plug into the negative (COM) jack. Insert the red test lead banana plug into the positive  $\Omega$  jack.
- 4.4.3. Touch the test probe tips across the circuit or component under test. It is best to disconnect one side of the component under test so the rest of the circuit will not interfere with the resistance reading.
- 4.4.4. Read the resistance in the display and then set the function switch to the lowest  $\Omega$  position that is greater than the actual or any anticipated resistance. The display will indicate the proper decimal point and value.

4.5. CONTINUITY CHECK

- ❑ **WARNING!** To avoid electric shock, never measure continuity on circuits or wires that have voltage on them.
- 4.5.1. Set the function switch to the  $\rightarrow / \bullet$  position.
- 4.5.2. Insert the black lead banana plug into the negative (COM) jack. Insert the red test lead banana plug into the positive ( $\Omega$ ) jack.
- 4.5.3. Touch the test probe tips to the circuit or wire you wish to check.
- 4.5.4. If the resistance is less than approximately 30 $\Omega$ , the audible signal will sound. If the circuit is open, the display will indicate "1".

4.6. DIODE TEST

- 4.6.1. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the positive diode jack.
- 4.6.2. Turn the rotary switch to the  $\rightarrow / \bullet$  position.
- 4.6.3. Touch the test probes to the diode under test. Forward voltage will indicate 400 to 700mV. Reverse voltage will indicate "1". Shorted devices will indicate near 0mV. Shorted devices will indicate near 0mV and an open device will indicate "1" in both polarities.

4.7. BATTERY TEST

- 4.7.1. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the positive V jack.
- 4.7.2. Select the 1.5V or 9V BAT position using the rotary switch.
- 4.7.3. Connect the red test lead to the positive side of the 1.5V or 9V battery and the black test lead to the negative side of the 1.5V or 9V battery.
- 4.7.4. Read the voltage in the display.

	Good	Weak	Bad
9V Battery	>8.2V	7.2 to 8.2V	<7.2V
1.5V Battery	>1.35V	1.22 to 1.35V	<1.22V

4.8. NON CONTACT VOLTAGE

- 4.8.1. The NCV function works on any function switch position.
- 4.8.2. Test the detector on a known live circuit before use. Direct the top of the multimeter very close to the voltage source.
- 4.8.3. If voltage is present, the red warning light will illuminate and the multimeter will buzz.



## 5. MAINTENANCE

### 5.1. REPLACING THE BATTERY

- ❑ **WARNING!** To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery cover.
- 5.1.1. When the battery becomes exhausted or drop below the operating voltage, "BAT" will appear in the right-hand side of the LCD display. The battery should be replaced.
- 5.1.2. Follow instructions for installing battery. See the Battery Installation section of this manual (1.4.).
- 5.1.3. Dispose of the old battery properly - see recycling statements at the end of this manual.
  - ❑ **WARNING!** To avoid electric shock, do not operate the meter until the battery cover is in place and fastened securely.

### 5.2. REPLACING THE FUSES

- ❑ **WARNING!** To avoid electric shock, disconnect the test leads from any source of voltage before removing the fuse cover.
  - 5.2.1. Disconnect the test leads from the meter and any item under test.
  - 5.2.2. Open the fuse cover by loosening the screw on the cover using a Phillips head screwdriver.
  - 5.2.3. Remove the old fuse from its holder by gently pulling it out.
  - 5.2.4. Install a new fuse into the holder.
  - 5.2.5. Always use a fuse of the proper size and value (0.5A/250V fast blow for the 200mA range, 10A/250V fast blow for the 10A range).
  - 5.2.6. Fit the fuse cover back in place. Insert the screw and tighten it securely.
    - ❑ **WARNING!** To avoid electric shock, do not operate the meter until the fuse cover is in place and fastened securely.
    - ❑ **WARNING!** Before attempting to open the case, ensure that the test leads have been disconnected from the multimeter and that it is switched off to avoid electric shock hazard.
- 5.3. Clean the multimeter's casing using a very slightly dampened cloth and mild detergent - do not use any abrasives or solvents. Clean the inside of each terminal using a swab soaked in isopropyl alcohol, use a new swab to apply a light coat of machine oil to each terminal.
- 5.4. If the multimeter is to be stored for a long period of time, remove the battery first to avoid any damage.

Parts support is available for this product. To obtain a parts listing and/or diagram, please log on to [www.sealey.co.uk](http://www.sealey.co.uk), email [sales@sealey.co.uk](mailto:sales@sealey.co.uk) or telephone 01284 757500.



#### Environmental Protection

Recycle unwanted materials instead of disposing of them as waste. All tools, accessories and packaging should be sorted, taken to a recycling centre and disposed of in a manner which is compatible with the environment. When the product becomes completely unserviceable and requires disposal, drain off any fluids (if applicable) into approved containers and dispose of the product and the fluids according to local regulations.



#### WEEE Regulations

Dispose of this product at the end of its working life in compliance with the EU Directive on Waste Electrical and Electronic Equipment (WEEE). When the product is no longer required, it must be disposed of in an environmentally protective way. Contact your local solid waste authority for recycling information.



#### Battery Removal

See Section 1.4

Under the Waste Batteries and Accumulators Regulations 2009, Jack Sealey Ltd are required to inform potential purchasers of products containing batteries (as defined within these regulations), that they are registered with Valpak's registered compliance scheme. Jack Sealey Ltd's Batteries Producer Registration Number (BPRN) is BPRN00705.

**NOTE:** It is our policy to continually improve products and as such we reserve the right to alter data, specifications and component parts without prior notice.

**IMPORTANT:** No liability is accepted for incorrect use of this product.

**WARRANTY:** Guarantee is 12 months from purchase date, proof of which will be required for any claim.



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