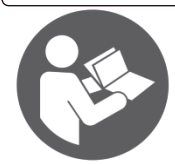
INSTRUCTIONS FOR:

5-IN-1 MULTIMETER

MODEL No: **TM104**

Thank you for purchasing a Sealey product. Manufactured to a high standard, this product will, if used according to these instructions and maintained properly, 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 Instruction Manual

Warning: Electricity

Warning: 600V Maximum

1. SAFETY

✗ **DO NOT** test voltages above 600V AC or DC - the circuitry of the multimeter will be destroyed and a personal hazard created.
✗ **DO NOT** use the meter if it appears damagred in any way.
✗ **DO NOT** use the multimeter in a potentially explosive atmosphere or where flammable material is present.
✗ **DO NOT** use leads if damaged or if the wire is bared in any way. 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 electronic ratings. Failure to do so will invalidate the warranty.
❒ **WARNING! USE EXTREME CAUTION** when working with high voltages.
❒ **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, diode or continuity measurements on live circuits.***
❒ **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.
✓ When using this multimeter, observe all normal safety rules concerning:
Protection against the dangers of electrical current.
Protection of the meter against misuse.
✓ Familiarise yourself with the application and limitations of the multimeter as well as the potential hazards. ***IF IN ANY DOUBT CONSULT A QUALIFIED ELECTRICIAN.***
✓ Before commencing testing, follow instructions below and select the correct input sockets, function and range on the multimeter.
✓ When the meter is connected to a circuit, **DO NOT** touch any unused meter terminals.
✓ When the magnitude of the value to be measured is unknown beforehand, set the range selector to the highest value available.
✓ Before rotating the range selector to change functions, disconnect test probes from the circuit under test.
✓ Always take care when working with voltages above 35V DC or 25V AC rms. These voltages are considered a shock hazard.
✓ Always keep fingers behind the probe barriers whilst measuring and **DO NOT** use when hands are wet..
✓ Components should not be connected to the transistor socket when taking voltage measurements with the test leads.
✓ **ALWAYS** discharge filter capacitors in power supplies and disconnect the power when making resistance or diode tests.
✓ **ONLY** operate the multimeter when the back cover is in place and fastened securely.
✓ If any abnormal readings are observed, the multimeter must be checked out by an authorised technician.
✓ **ALWAYS** turn off the multimeter and disconnect the test leads, before opening the back cover to replace the battery.
✓ When not in use, store the multimeter carefully in a safe, dry, childproof location out of direct sunlight. If storing for a long period of time, remove the battery.
✓ 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.

Note: 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.

2. INTRODUCTION

Five-in-one digital multi-tester has been designed to combine the functions of Sound Level Meter, Light Meter (Lux), Humidity Meter, Temperature Meter and Digital Multimeter. Conforms to IEC-1010 CATIII 600V safety requirements for electrical equipment for measurement, control and laboratory use. Features integral upright stand, auto and manual range selection, data hold, relative measurement, auto power off function, LCD display and back light. Supplied with test probes and thermocouple.

Measures:
» AC and DC Voltage
» AC and DC Current
» Resistance
» Diode Test
» Continuity Buzzer
» Frequency
» Duty Cycle
» Capacitance
» Humidity
» Light (Lux)
» Sound Level
» Temperature (Thermocouple & Sensor)

3. SPECIFICATION

Model No:	**TM104**
AC Voltage (Accuracy):	4V, 400V (±0.8%), 600V (±1.5%)
DC Voltage (Accuracy):	0-400mV, 400V (±0.7%), 600V (±1.0%)
AC Current (Accuracy):	40mA, 400mA (±1.5%), 10A (±3.0%)
DC Current (Accuracy):	40mA, 400mA (±1.2%), 10A (±2.0%)
Resistance (Accuracy):	400Ω, 4MΩ (±1.2%), 40MΩ (±2.0%)
Capacitance (Accuracy):	4nF, 40µF (±3%), 200µF (±8%)
Temperature (Accuracy):	-20°C-0°C (±5%), 0°C-20°C (±3%), 20°C-400°C (±2%)
Frequency (Accuracy):	9.999Hz (±2.0%), 99.99Hz, 9.999kHz(±1.5%), 99.99kHz, 199.99kHz (±2.0%)
Duty Cycle:	0.1%-99.9% (±3.0%)
Continuity Audible:	Yes
Diode Test:	Yes
Digits x Height:	7 x 19mm
Low Battery Indicator:	Yes
Batteries (Supplied):	1 x 9V
Information:	Data-Hold & Auto Power Off
Size (L x W x D):	178 x 85 x 40mm
Weight:	320g
Conformity:	IEC 1010, CATIII 600V
Humidity:	30-90% (±8%)
Sound Level:	35-100dB (±5dB at 94dB)
Light:	0-40,000Lux (±5%) (x10)

4. CONTROLS

4.1. Button Functions

4.1.1. **Rotary Selector** (fig.1.1). Switches the meter on or off and selects the various functions.

4.1.2. **HOLD** Button (fig.1.2.). Pressing the hold button at any point will hold the instant display until the button is pressed again to release it.

4.1.3. **FUNCTION** Button. (fig.1.3). When measuring current and voltage, the function button will change between DC and AC. When measuring resistance, capacitance, diode and continuity; the function button can be used to cycle between settings.

4.1.4. **RANGE** Button. (fig.1.4). The default setting for measuring current, voltage and resistance is auto-ranging. If it is desired to select manual ranging, press the RANGE button. Each subsequent press will advance the measurement range. Pressing range for 2 seconds will revert to auto-range.
Note: When 'OL' is displayed, the reading is above the range selected manually.

4.1.5. **Hz/DUTY** Button (fig.1.5). By pressing the 'Hz/DUTY' button whilst in the frequency setting, the duty cycle function will be selected. When measuring voltage or current, one press of the HZ/DUTY button will display the frequency and a second press the duty cycle of the circuit being tested.

4.1.6. **REL** Button (fig.1.6). The Relative button allows comparison between circuits. Pressing the button will zero the display: a subsequent reading will show the difference between the two readings.

4.1.7. **LIGHT** Button (fig.1.7). Switches on the backlight. Owing to the power demands of the backlight, it will fade and extinguish after 5 seconds. Frequent use of the backlight will shorten the life of the battery significantly.

4.2. Battery

4.2.1. Low battery voltage is indicated by the appearance of the icon on the left of the display screen. When the battery icon is showing, readings may become unreliable; the battery should, therefore, be changed as soon as possible.

❒ **WARNING!** Remove the test leads before opening battery compartment.

4.2.2. To insert, replace or remove the battery; remove the two screws and open the battery compartment as in fig.2.

4.2.3. Replace the battery, then refit and secure the cover

4.3. Auto Power Off

4.3.1. If the meter has been left with power on for 15 minutes, it will give an audible warning and then switch off.

4.3.2. To restore power from this condition; switch the rotary selector to off and then back on again or press FUNC, RANGE, Hz/DUTY or REL switch.

4.3.3. To disable the auto power off facility, press FUNC whilst the power is on.

5. OPERATION

❒ **WARNING!** Ensure that the safety and operational instructions are read, understood and applied before connecting the multimeter. Only when the procedures are understood is it safe to proceed with testing.

5.1. MEASURING VOLTAGE (AC and DC)

5.1.1. Connect the black test lead to the COM input socket (fig.1.10)and the red test lead to the V input socket (fig.1.11)

5.1.2. Set the rotary switch to V⎓. The meter default setting is auto-ranging (denoted by AUTO in the display). To deselect auto-ranging, see section 4.1.4.

5.1.3. Connect the test probes across the source or load being measured.

5.1.4. Turn on the power, the voltage will be displayed and the polarity of the red test lead connection will be indicated when measuring DC voltages.

5.1.5. Press FUNC to scroll between AC and DC measurements.

5.1.6. The measured value will be displayed.

5.1.7. If measuring an unknown voltage with the manual range setting, select the highest voltage scale first and work down to the voltage measured.

5.2. MEASURING CURRENT (AC and DC)

5.2.1. Connect the black test lead to the COM input socket (fig.1.10) and the red test lead to the mA input socket (fig.1.9) for measuring up to 400mA .
5.2.2. For values up to 5A, plug the red lead into the 5A socket (fig1.8).
5.2.3. Press FUNC to scroll between AC and DC measurements
5.2.4. Set the rotary switch to the required either the 400mA ⎓ or A ⎓ range and connect the test probes in series with the load being measured.
5.2.5. Press FUNC to scroll between AC and DC measurements.
5.2.6. The measured value will be displayed (the polarity of the red lead will also be displayed; ' - ' denoting negative).

5.3. MEASURING RESISTANCE

5.3.1. Connect the black lead to the COM input socket (fig1.10) and the red (+) test lead to the the Ω input socket (fig.1.11).
❒ **WARNING!** When checking in-circuit resistance, ensure that the circuit under test has all power removed and all capacitors have been discharged fully before testing.
5.3.2. Set the rotary selector to the Ω position and use the FUNC key to scroll to Ω. Connect the test probes across the resistance being measured.
5.3.3. The measured value will be displayed. OL indicates that a higher measurement scale should be selected.
5.3.4. When measuring resistance over 1MΩ, the meter may take a few seconds to get a stable reading. This is normal for high resistance measurements.

5.4. MEASURING CAPACITANCE

❒ **WARNING!** Ensure that capacitors have been discharged fully before testing to minimise the risk of electric shock.
5.4.1. Connect the black test lead the COM input socket (fig.1.10) and the red (+) lead to the ⊣⊢ socket (fig.1.11).
5.4.2. Set the rotary selector to the ⊣⊢ position and use the FUNC button to scroll through to the mF setting.
5.4.3. The measured value will be displayed.
5.4.4. When measuring high capacitance devices, the meter will take a certain time (e.g: 30 seconds for 200µF) to settle.
5.4.5. If a false reading appears when the circuit is open, press REL to zero the display.

5.5. DIODE TESTING

5.5.1. Connect the black lead to the COM input socket (fig.1.10) and the red (+) lead to the ⇻ input socket (fig.1.11).
5.5.2. Set the rotary switch to the ⇻ position and scroll through until ⇻ is displayed.
5.5.3. Connect the red lead to the anode and the black lead to the cathode of the diode under test. If the leads are cross connected, OL will display.
5.5.3. The meter will show the approximate forward voltage drop of the diode in V.

5.6. AUDIBLE CONTINUITY TEST

❒ **WARNING!** Ensure that the circuit to be tested is powered down and that any capacitors have been discharged
5.6.1. Connect the black lead to the COM input socket (fig.1.10) and the red (+) lead to the Ω input socket (fig1.11).
5.6.2. Set the rotary switch to the •)) position and connect the test leads across the two points of the circuit under test.
5.6.3. If continuity exists (i.e. resistance is less than about 40Ω), the built-in buzzer will sound.

5.7. FREQUENCY MEASUREMENT

5.7.1. Connect the black lead with the COM input socket (fig.1.10) and the red (+) lead with the Hz socket (fig.1.11)
5.7.2. Turn the rotary selector to the Hz position, or press the 'Hz/DUTY' button when measuring V AC or V DC.
5.7.3. Connect he test leads across the power source.
5.7.4. The frequency will be displayed in Hz.

5.8. DUTY CYCLE MEASUREMENT

5.8.1. Connect the black lead with the COM input socket (fig.1.10) and the red (+) lead with the Hz socket (fig.1.11).
5.8.2. Turn the rotary selector to the Hz position
5.8.3. Press the Hz/DUTY button to select DUTY, or press the Hz/DUTY button when measuring V AC or V DC.
5.8.4. The duty cycle will be displayed as a % figure, representing % of time 'on'.

5.9. MEASURING TEMPERATURE

5.9.1. Ambient temperature may be measured by setting the rotary selector to the ° C position.
5.9.2. The ambient temperature will be displayed in °C.
5.9.3. To measure surface temperature: insert the red lead of the thermocouple into the °C input socket (fig.1.9) and the black lead into the COM input socket (fig.1.10)
5.9.4. Set the rotary selector to the °C position.
5.9.5. Touch the object to be measured with the thermocouple probe and the ambient temperature will be displayed.
❒ **WARNING!** To avoid electric shock, do not place thermocouple in contact with live components.

5.10 MEASURING RELATIVE HUMIDITY

❒ **WARNING** Remove test leads before using this function.
5.10.1. Move the rotary selector to the %RH position.
5.10.2. Ambient relative humidity will be displayed as %RH.
NOTE: it will take some time for the %RH display to settle in conditions of humidity which are charging rapidly.

5.11. MEASURING SOUND LEVEL (dB)

❒ **WARNING** Remove test leads before using this function.
5.11.1. Turn the rotary selector to the dB position.
5.11.2. Point the sensor (located in the end of the unit) towards the sound source to be measured.
5.11.3. The value will be displayed in dB.
NOTE: Using the sound meter in strong winds will affect the readings. A screen should be used to shield the sensor from buffeting.

5.12. LUMINANCE MEASUREMENT

❒ **WARNING** Remove test leads before using this function.
5.12.1. Turn the rotary selector to the Lux or x10Lux setting, depending on the brightness of the light source.
5.12.2. The luminance will be displayed in Lux or x10Lux.
5.12.3. If 'OL' appears, change the setting to the x10Lux scale.

6. MAINTENANCE

6.1. Clean the casing of the multimeter occasionally by wiping with a slightly damp cloth. Do not use abrasive or solvent cleaners.
6.2. When the symbol appears in the display, the battery should be changed as in section 4.2.

Battery Removal

For battery removal details, see section 4.2.
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.

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, dispose of it 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.

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.

CE

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