DIGITAL AUTOMOTIVE ANALYSER 12 FUNCTION WITH IC

MODEL NO: **TA302**

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

Warning

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 probes supplied. If necessary, they must be replaced with genuine Sealey leads with the same electronic ratings. Failure to do so will invalidate the warranty.
- × **DO NOT** use leads if damaged or if the wire is 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.***
- ✓ 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.
- ❑ **WARNING! Never perform resistance, transistor, diode or continuity measurements on live circuits.**
- ✓ Always take care when working with voltages above 60V dc or 30V ac rms. These voltages are considered harmful.
- ❑ **WARNING! USE EXTREME CAUTION** when working with high voltages.
- ✓ Always keep fingers behind the probe barriers whilst measuring and **DO NOT** use when hands are wet..
- ✓ Before attempting to insert transistors for testing, ensure that the test probes have been disconnected.
- ✓ Components should not be connected to the transistor socket when taking voltage measurements with the test probes.
- × **DO NOT** test voltages above 600V ac or 1000V dc - the circuitry of the multimeter will 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.
- ✓ **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 or where flammable material is present.
- ✓ **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 probes, before opening the back cover to replace the fuse or 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. Storage temperature range: -20°C to 60°C.

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

New generation, 12-function, auto-ranging automotive diagnostic multimeter. Combination digital/bar-graph display gives accurate indication of component outputs. Large, easy to read high contrast display with bright, white backlight. Workshop-tough, durable bi-composite case with integral stand. Reads standard automotive parameters including duty cycle. Features auto-ranging, and data hold functions with overload protection on all ranges. Supplied with inductive coupler, test probes and thermocouple.

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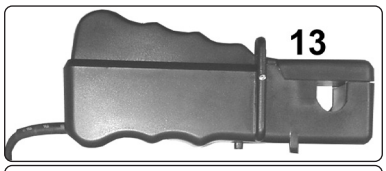
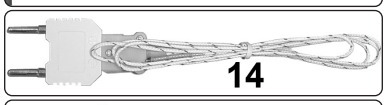
3. FEATURES

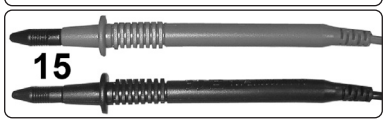
Input Limits		
Function	**Terminal**	**Input Limit**
ac volts	V - Ω - rpm	600V ac rms
dc Volts		1000V dc
Frequency	V - Ω - rpm	500V ac/dc
Ohm (resistance)	V - Ω - rpm	250V ac/dc
Diode		
ac/dc mA	mA	320mA ac/dc
ac/dc 20A	20A	*20A ac/dc
RPM	V - Ω - rpm	500V ac/dc
Duty Cycle (%)		
Dwell Angle		

- **WARNING! DO NOT make current measurements between 1A and 20A for longer than 30 seconds in every 15 minutes. Exceeding 30 seconds may cause damage to the meter and test probes.**
- **WARNING! Ohms cannot be measured if a voltage is present. Only measure in non powered circuits.**

Contents/Layout:
1. LCD display
2. Alternate Function
3. Dwell
4. RPM Mode Button - Stroke (4/2(DIS)
5. Rotary selector Switch
6. **20A** Terminal
7. **mA** Terminal
8. Range Button
9. Backlight
10. Hold Button
11. Volts, Ω, Hz, %, RPM,DWELL and TEMP Terminal
12. COM Terminal
13. Inductive Coupler
14. Thermocouple
15. Test Probes







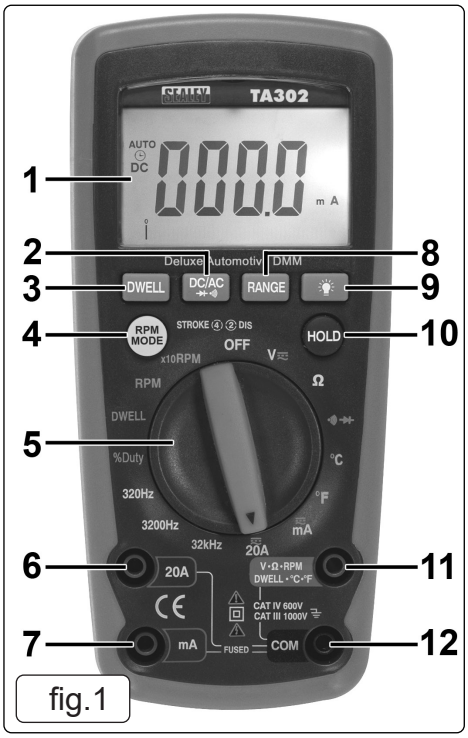


fig.1

4. SPECIFICATION

DC Voltage (Auto Ranging)		
Range	**Resolution**	**Accuracy**
32mV	0.1mV	± 1.2% of rdg +1 dgt
3.2V	1mV	
32V	10mV	
320V	100mV	
1000V	1V	

Input Impedance: 10MΩ.
Maximum Input: 1000Vdc or 750Vac rms

AC Voltage (Auto Ranging)		
Range	**Resolution**	**Accuracy**
3.2V	0.1mV	± 2.0% of rdg +4 dgt
32V	1mV	
320V	10mV	
750V	100mV	

Input Impedance: 10MΩ.
Frequency Range: 50 to 60Hz
Maximum Input: 1000Vdc or 750Vac rms

Current		
Range	**Resolution**	**Accuracy**
32mA	0.1mA	DC ± 2.0% of rdg +1dgt
		AC ± 2.5% of rdg +4dgt
320mA	1mA	DC ± 2.0% of rdg +1dgt
		AC ± 2.5% of rdg +4dgt
10A	10mA	DC ± 3.0% of rdg +3dgt
		AC ± 3.5% of rdg +4dgt

Frequency Response: 50 to 60Hz
Input Protection: Fast acting ceramic fuse on mA and 10A input

Resistance (Auto Ranging)		
Range	**Resolution**	**Accuracy**
320Ω	0.1Ω	± 1.5% of rdg +3 dgt
3.2kΩ	1Ω	
32kΩ	10Ω	
3.2MΩ	1KΩ	± 2.5% of rdg +3 dgt
32MΩ	10KΩ	± 5.0% of rdg +5 dgt

Overload Protection: 250Vdc or RMS ac

Duty Cycle		
Range	**Resolution**	**Accuracy**
1.0%~90.0%	0.1%	± 2.0% of rdg +5 dgt

Pulse Width: >100us, <100ms
Overload Protection: 500Vdc or RMS ac

Dwell Angle			
No. Cyl	**Range**	**Resolution**	**Accuracy**
4	0~90°	0.1°	± 2.0% of rdg +5 dgt
5	0~72°		
6	0~60°		
8	0~45°		

Overload Protection: 500Vdc or RMS ac

Temperature		
Range	**Resolution**	**Accuracy**
-20~750°C	0.1°C	± 3.0% of rdg +2°C
-4~1400°F	0.1°F	± 3.0% of rdg +4°F

Sensor: Type K Thermocouple
Input Protection: 250Vdc or Vac rms

Frequency		
Range	**Resolution**	**Accuracy**
320Hz	0.1Hz	± 1.0% of rdg +4 dgt
3200Hz	1Hz	
32KHz	10Hz	

Sensitivity: 3.5V rms min.
Overload Protection: 500Vdc or rms ac

Diode Test		
Range	**Resolution**	**Accuracy**
0.6mA typical (Vf=0.6V)	1mA	± 10% of rdg +3 dgt

Open Circuit Voltage: 3Vdc Typical
Overload Protection: 250Vdc or rms ac

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RPM (Tach)			
Range		Resolution	Accuracy
rpm 4	600-3200	1rpm	± 2.0% of rdg +4 dgt
	6000~12000	10rpm	
rpm 2/DIS	300~3200	1rpm	
	3000~6000	10rpm	

Effective Reading: >600rpm
Overload Protection: 500Vdc or RMS ac

Audible Continuity		
Audible Threshold	Resolution	Test Current
<35Ω	100mΩ	<0.7mA

Input Protection: 250Vdc or Vac rms

Display: . . . . . 3.5 digit (3200 counts) LCD display with function and unit sign annunciator.
Analogue Bar Graph: . . . . . 34 segments with measurements 12 times per second.
Polarity: . . . . . Automatic, (-) negative polarity indication.
Over Range Indication: . . . . . "OL" mark indication.
Low Battery Indication: . . . . . The is displayed when the battery voltage drops below the operating level.
Measurement Rate: . . . . . 2 times per second, nominal.
Operating Environment: . . . . 0°C to 50°C (32°F to 122°F) at <70% relative humidity.
Storage Environment: . . . . . -20°C to 60°C (-4°F to 140°F) at <80% relative humidity.
Temperature Coefficient: . . . . 0.2 x (specified accuracy) / °C (<18°C or >28°C).
Power: . . . . . Single standard 9 Volt battery (PP3).
Battery Life:. . . . . 200 hours typical with alkaline battery.
Fuse: . . . . . 20A/250V, 5.5 x 32mm fast acting ceramic type.
. . . . . 0.5A/250V, 5 x 20mm fast acting ceramic type.
Dimensions: . . . . . 167 (H) x 79 (W) x 50 (D) mm.
Weight Approx:. . . . . 366g.
Accuracy is given at 18°C to 28°C (65°F to 83°F) less than 70% relative humidity.

5. OPERATION

- ❑ **WARNING!** Ensure that you read, understand and apply the safety and operational instructions before connecting the meter. Only when you are sure that you understand the procedures is it safe to proceed with testing.
- ❑ **WARNING!** Risk of electrocution. High voltage circuits, both ac and dc are very dangerous and should be measured with great care. Operating temperature range 0°C to 40°C.
  Remember to turn on meter before use and to turn it off when measurement is completed.

NOTE: 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 ranges, with the test probes not connected to a device, the reading may show a random fluctuating reading. 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.

5.1. ALTERNATE FUNCTION BUTTON (FIG.1.2)
5.1.1. Press the Alternate Function button to toggle between ac and dc in the voltage & current measurements. Press the Alternate Function button to toggle between Continuity and Diode Test.

5.2. DWELL BUTTON (FIG.1.3)
5.2.1. To manually scroll through to the correct number of cylinders press the Dwell button.

5.3. **DATA HOLD, (FIG.1.10)**
5.3.1. The data hold function allows the meter to freeze a measurement reading for later reference.
5.3.2. Press the data hold button once to freeze the reading in the display. The indicator "hold" will appear in the display.
5.3.3. Press the data hold button again to return to normal operation.

5.4. RANGE BUTTON (FIG.1.8)
5.4.1. The range is automatically selected by the meter.
5.4.2. To manually select a range within a function, press the range button.
5.4.3. To exit the range mode and return to autoranging, press and hold the range button for two seconds.
NOTE: If the range is too high, the meter will be less accurate.
If the range is too low, the meter displays 'OL' (Over Limit).

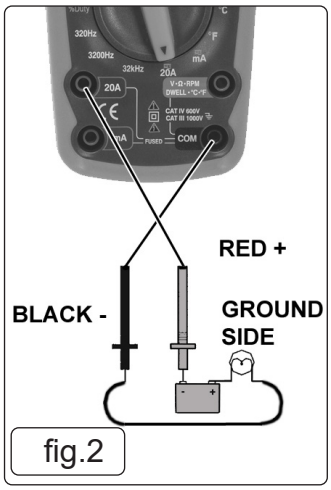

fig.2

5.5. RPM MODE BUTTON (FIG.1.4)
5.5.1. Press rpm mode button to toggle between 4 stroke and 2 stroke / DIS (Distributerless Ignition System).
5.5.2. Press and hold for two seconds to toggle between Negative (-) and Positive (+) Trigger slope.
5.5.3. Press the button repeatedly to adjust the trigger level if the meter reading is to high or unstable.
NOTE: The Trigger level has five steps and is different for each function combination.

5.6. BACKLIGHT BUTTON (FIG.1.9)
5.6.1. To turn the backlight on press the backlight button, to turn off press the backlight button again.

5.7. AC OR DC VOLTAGE MEASUREMENTS
5.7.1. Insert the black test probe into the negative "COM" terminal and the red test probe into the positive main positive terminal (fig.1.10) terminal.
5.7.2. Turn the rotary switch to the 'V' position.
5.7.3. Press the Alternate Function button to select ac or dc voltage.
5.7.4. Touch the test probes to the circuit under test and read the voltage display.

5.8. AC OR DC CURRENT MEASUREMENTS

❑ **WARNING! DO NOT make current measurements between 1A and 20A for longer than 30 seconds in every 15 minutes. Exceeding 30 seconds may cause damage to the meter and test probes.**

5.8.1. Insert the black test probe into the into the negative “COM” terminal and the red test probe into the:
a) Positive 20A terminal for currents to 20A (fig.1.6).
b) Positive mA terminal for currents to 320mA (fig.1.7).

NOTE: If you are unsure of the current draw select the 20A terminal.

5.8.2. Turn the rotary switch to the 20A or mA position.

5.8.3. Press the Alternate Function button to select ac or dc current.

5.8.4. Touch the test probes in series (fig.2) with the circuit under test and read the current on the display.

5.9. RESISTANCE

❑ **WARNING! To avoid electric shock, disconnect power to unit under test and discharge all capacitors before taking any resistance measurements.**

❑ **WARNING! Ohms cannot be measured if a voltage is present. Only measure in non powered circuits.**

5.9.1. Insert the black test probe into the negative “COM” terminal and the red test probe into the positive main positive terminal (fig.1.10) terminal.

5.9.2. Turn the rotary switch to the Ω position.

5.9.3. Connect the test probes to the two ends of the Resistance circuit to be measured.

5.9.4. Read the measured value from the display.

5.9.5. In resistance measurements, if greater accuracy is required press the Range button.

5.10. DIODE / CONTINUITY MEASUREMENTS

❑ **WARNING! To avoid electric shock, disconnect power to unit under test and discharge all capacitors before taking any resistance measurements.**

5.10.1. Insert the black test probe into the negative “COM” terminal and the red test probe into the positive main positive terminal (fig.1.10) terminal.

5.10.2. Turn the rotary switch to the))) ⊣▶⊢ position.

5.10.3. Press the Alternate Function button (fig.1.2) to select Diode or Continuity.

5.10.4. Connect the test probes to the two ends of the Diode or Continuity circuit to be measured.

5.10.5. Read the measured value from the display.

5.10.6. When measuring the forward voltage across a good Diode, it will indicate 0.4V or 0.7V and the reverse voltage will indicate “OL” (same as on open condition). For a short circuit diode, a value of 0mV will be displayed.

5.10.7. In continuity mode a complete circuit will beep continuously, if open circuit, there will be no beep.

5.11. FREQUENCY (HZ)

5.11.1. Insert the black test probe into the negative “COM” terminal and the red test probe into the positive main positive terminal (fig.1.10) terminal.

5.11.2. Turn the rotary switch to either of the “Hz” positions (320Hz, 3200Hz, 32kHz).

5.11.3. Connect the negative “COM” test probe to ground.

5.11.4. Connect the positive main positive terminal (fig.1.10) test probe to the “signal out” wire of the sensor to be tested.

5.12. DUTY CYCLE (%)

5.12.1. Insert the black test probe into the negative “COM” terminal and the red test probe into the positive main positive terminal (fig.1.10) terminal.

5.12.2. Select the %DUTY range with the rotary switch.

5.12.3. Connect the negative test probe to ground.

5.12.4. Connect the positive test probe to the signal wire circuit.

5.13. TEMPERATURE MEASUREMENTS

5.13.1. Insert the type K thermocouple plug into the negative “COM” terminal and the positive terminal ensuring the + symbol on the plug is inserted into the positive + terminal and the negative symbol on the plug is inserted into the negative “COM” terminal.

5.13.2. Turn the rotary switch to the select °C or °F.

5.13.3. Read the temperature on the display.

5.14. RPM (TACH) MEASUREMENTS

5.14.1. Select the rpm range with the rotary switch.

5.14.2. Select the x10 rpm range with the rotary switch. Multiply the displayed reading times by 10 to get the actual rpm.

5.14.3. Press the rpm mode button (fig.1.4) to select through rpm 4 for 4-stroke or rpm 2 for 2-stroke DIS.

NOTE: RPM4 for RPM of 4-stroke engines which have 1 ignition on every 4 engine strokes.
RPM2 for RPM of DIS (Distributerless Ignition System) & 2-Stroke engines which have 1 ignition on every 2 engine strokes.

5.14.4. Insert the inductive pick-up leads into the meter. Black lead into the negative “COM” terminal and the red lead into the positive RPM terminal.

5.14.5. Connect the inductive pick-up to a spark plug HT lead. If no reading is received, unhook the clamp, turn it over and connect again.

NOTE: Connect the pick-up as far away from the distributor and exhaust manifold as possible.
Position the pickup to within six inches of the spark plug or move it to another plug HT lead if no reading or an erratic reading is obtained. The inductive pick-up has an adjustable sensitivity switch that may also be used to correct an unstable reading.

5.15. DWELL ANGLE MEASUREMENT

Dwell angle is the number of degrees through which the distributor cam rotates while the breaker points are closed.

5.15.1. Insert the black test probe into the negative “COM” terminal and the red test probe into the positive “V” terminal.

5.15.2. Turn the rotary switch to the DWELL position.

5.15.3. Set number of cylinders with the DWELL button (fig.1.3).

5.15.4. Connect the black test probe to the Ground terminal (-) on the vehicle battery and the red test probe to the contact breaker points or the negative (-) terminal of the ignition coil.

5.15.5. When the engine is started the Dwell angle will be displayed.

NOTE: To reduce the dwell angle reading the points gap must be increased, to increase the dwell angle the points gap must be reduced. Refer to your owners handbook for detailed procedures for dwell settings and adjustments.

6. MAINTENANCE

❑ **WARNING! DO NOT** attempt to repair or service your meter unless you are qualified to do so and have the relevant calibration, performance test, and service information. To avoid electrical shock or damage to the meter **DO NOT** get water inside the case.

6.1. REPLACING THE BATTERY

❑ **WARNING! To avoid electric shock, disconnect the test probes from any source of voltage before removing the battery door.**

6.1.1. When the battery becomes exhausted or drops below the operating voltage, will appear in the right hand side of the display. Replace the battery.

6.1.2. Disconnect the leads from the meter.

6.1.3. Open the battery door by loosening the screws using a Phillip’s screwdriver.

6.1.4. Remove the old battery and insert the new one, observing the correct polarity.

6.1.5. Replace the battery cover and secure with the two screws.

❑ **WARNING! To avoid electric shock, DO NOT operate the meter until the battery cover is secured in place.**

6.2. REPLACING THE FUSES

❑ **WARNING! To avoid electric shock, disconnect the test probes from any source of voltage before accessing the fuses.**

6.2.1. Open the battery door by loosening the screws using a Phillip’s screwdriver. Remove the battery.

6.2.2. Remove the six screws around the back of the meter using a Phillip’s screwdriver.

6.2.3. Gently part the casing then remove the blown fuse. Be careful not to damage the PCB.

6.2.4. Install the new fuse into its holder. Join the casing back together and secure with screws.
Note: Always use a fuse of the correct size and value.
0.5A/250V fast blow for the 320mA range.
20A/250V fast blow for the 20A range.

6.2.5. Replace the battery and cover and secure with the screws.

❑ **WARNING! To avoid electric shock, DO NOT use the meter until it has been fully re-assembled.**

6.3. Periodically wipe the case with a damp cloth and mild detergent. **DO NOT** use solvents.

6.4. Turn the meter off when not in use and remove the battery if stored for a long period of time.

6.5. **DO NOT** store the meter in a place of high humidity or high temperature.

ENVIRONMENT 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 any fluids (if applicable) into approved containers and dispose of the product and 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

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 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 is required for any claim.

REGISTER YOUR PURCHASE HERE

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