

INSTRUCTIONS FOR:

DIGITAL AUTOMOTIVE ANALYSER 14 FUNCTION WITH IC

MODEL:TA203

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. PLEASE KEEP THESE INSTRUCTIONS SAFE FOR FUTURE USE.

1. SAFETY INSTRUCTIONS

1.1. PERSONAL PRECAUTIONS

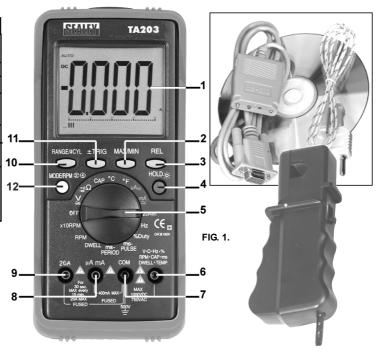
- ✓ When using this meter, please observe all normal safety rules concerning: Protection against the dangers of electronic current.
 - Protection of the meter against misuse.
- ✓ Full compliance with safety standards can only be guaranteed if used with the test leads supplied. If necessary, they must be replaced with genuine Sealey leads with the same electronic ratings. Failure to do so will invalidate the warranty.
- X 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 meter as well as the potential hazards. IF IN ANY DOUBT CONSULT A QUALIFIED ELECTRICIAN.
- ✓ When the meter is linked to a measurement circuit, do not touch unused meter terminals.
- ✓ When the scale of the value to be measured is unknown set the selector to the highest range available.
- ✓ Before rotating the range selector to change functions, disconnect test leads from the circuit under test.
- □ WARNING! Never perform resistance measurements on live circuits.
- ✓ Always be careful when working with voltages above 60Vdc or 30Vac rms. Keep your fingers behind the probe barriers while measuring.
- ✓ When not in use, store the meter carefully in a safe, dry, childproof location. Storage temperature range -10°C to 50°C.
- ✓ Never apply voltage or current to the meter that exceeds the specified maximum.

Input Limits		
Function	Terminal	Maximum Input
AC Volts	V - Ω - RPM	750V AC rms
DC Volts	· · · · · · ·	1000V DC
Frequency	V - Ω - RPM	250V AC/DC
Ohms (Resistance)	050)/40/20	050) / 4 0 / D 0
Diode Test	V - Ω - RPM	250V AC/DC
AC/DCµ AmA	μ A/mA	400mAAC/DC
20A AC/DC (30 secs max every 15 minutes)	20A	20AAC/DC
RPM		
Duty Cycle (%)	V - Ω - RPM	250V AC/DC
Dwell Angle		

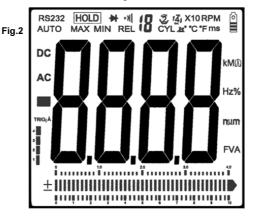
- □ WARNING! Do Not make current measurements on the 20A scale for longer than 30 seconds in every 15 minutes. Exceeding 30 seconds may cause damage to the meter and test leads.
- WARNING! Ohms can not be measured if a voltage is present.
 Only measure in non powered circuits.



2. FEATURES

Extra large, hi-contrast LCD display with 36mm high digital read-out, bar graph and backlight. Durable bi-composite case with probe storage and integral stand, suitable for the toughest workshop conditions. Features millisecond pulse-width function for accurate measurement of fuel injection systems. Includes auto ranging, data hold and auto power off. Supplied with inductive coupler with adjustable sensitivity, for fast reading of engine rpm, test leads (probe and clip) and thermocouple plus interface cable and software for downloading data to PC.

Meter Functions
Voltage(V AC/DC)
Resistance (Ω)
Diode Check (→→)
Audible Continuity(๑))
AC or DC Current(A)
Temperature (Temp °C & °F)
Frequency(Freq)
Dwell
Duty Cycle (%)
Ms - Pulse & ms - Period .(ms)
RPM(C)



Layout: (Refer to fig. 1.)

- Large LCD display
- 2. Max/Min/RS232 Button
- Relative Button
- 4. Data Hold/Back Light Button
- Rotary selector Switch
- Volts, Ω, Hz, %, RPM, CAP, ms, DWELL and TEMP Terminal
- 7. Com Terminal
- 8. **mA** Terminal
- 9. **20A** Terminal
- 10. Range/#CYL Button
- 11. ± TRIG Button
- 12. Mode/RPM, 2, 4 stroke Button

3. SPECIFICATION

DC Voltage (Auto Ranging)

Range	Resolution	Accuracy
400.0mV	0.1mV	± 0.5% of reading ± 2 digits
4.000V	1mV	
40.00V	10mV	±1.5% of reading ± 2 digits
400.0V	100mV	
1000V	1V	± 1.8% of reading ± 2 digits

Input Impedance: 10MΩ.

Maximum Input 700Vac rms or 1000Vdc.

AC Voltage (Auto Ranging except 400mV)

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Range	Resolution	Accuracy
400.0mV	0.1mV	± 1.5% of reading ± 60 dig
4.000V	1mV	± 1.0% of reading ± 3 digits
40.00V	10mV	± 1.5% of reading ± 3 digits
400.0V	100mV	
750V	1V	± 2.0% of reading ± 4 digits

Input Impedance: 10MΩ. Frequency Range: 50 to 400Hz. Maximum Input: 750Vac rms or 100Vdc.

Capacitance (Auto Ranging)

Range	Resolution	Accuracy
40.00nF	10pF	± 5.0% of reading ± 7 digits
400.0nF	0.1nF	
4.000uF	1nF	± 3.0% of reading ± 5 digits
40.00uF	10nF	
100.0uF	0.1uF	± 5.0% of reading ± 5 digits

Input Protection: 250Vac rms or 250Vdc.

Resistance (Auto Ranging)

Range	Resolution	Accuracy
400.0Ω	0.1Ω	± 1.2% of reading ± 4 digits
4.000 k Ω	1Ω	± 1.0% of reading ± 2 digits
40.00 k Ω	10Ω	± 1.2% of reading ± 2 digits
400.0kΩ	100Ω	
$4.000M\Omega$	1kΩ	
$40.00M\Omega$	10kΩ	± 2.0% of reading ± 3 digits

Input Protection: 250Vac rms or 250Vdc.

Diode test

Range	Resolution	Accuracy
0.3mA typical	1mV	± 10% of reading ±5 digits

Open Circuit Voltage: 1.5Vdc typical Overload Protection: 250Vac rms or dc.

Temperature

Range	Resolution	Accuracy
-20°C~+760°C	1°C	± 3.0% of reading ± 5 digits
-4°F~+1400°F	1°F	(Meter only, probe accuracy not included).

Sensor: Type K Thermocouple

RPM (Tach)

Range		Resolution	Accuracy
RPM 4	600~4000RPM	1RPM	
	600~1200RPM	10RPM	
	(X 10PM)		±2% of rdg ± 4 digits
RPM 2	300~4000 RPM	1RPM	
	300~600RPM	10RPM	
	(x 10RPM)		

Effect Reading: >600RPM

Overload Protection: 250Vac rms or dc.

Overvoltage Category: CAT.111. 1000V.

RS232: Optically isolated PC interface cable and Windows® 95/98/200/XP compatible software to collect, display, plot and save data.

Display: 4 3.4 digit (4000 counts) LCD display with function and unit sign annunciator.

Analogue Bar Graph: 40 segments with measurements 15 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.

Auto Power Off: Meter automatically shuts down after approx. 30 minutes of inactivity.

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 (14°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 Vollt battery (PP9). Battery Life: 200 hours typical with alkaline battery.

Fuse: 20A/250V, 10.3 x 38mm fast acting ceramic type.

0.5A/250V, 5 x 20mm fast acting ceramic type.

Dimensions: 197 (H) x 88.4 (W) x 41.2 (D) mm.

Weight Approx: 635g including holster.

Accuracy is given at 18°C to 28°C (65°F to 83°F) less than 70% relative humidity.

Duty Cycle (Auto Ranging)

Range	Resolution	Accuracy
0.1%~99.9%	0.1%	± 1.2% of reading ± 4 digits

Pulse Width: >100us, <100ms

Sensitivity: < 0.5V rms

Overload Protection: 250Vac rms or dc.

Dwell Angle

Cylinder	Range	Resolution	Accuracy	
1CYL	0~360.0°		-	
2CYL	0~180.0°			
3CYL	0~120.0°			
4CYL	0~90.0°			
5CYL	0~72.0°	0.1°	± 2.0% of reading ± 4 digits	
6CYL	0~60.0°			
8CYL	0~45.0°			
10CYL	0~36.0°			
12CYL	0~30.0°			

Overload Protection: 250Vac rms or dc.

Frequency (Auto Ranging)

	· 0 0/	
Range	Resolution	Accuracy
5Hz	0.001Hz	
50Hz	0.01Hz	± 1.5% of reading ± 5 digits
500Hz	0.1Hz	
5kHz	1Hz	
30.00kHz	10Hz	± 1.2% of reading ± 3 digits

Sensitivity: >5V RMS MIN.

Overload Protection: 250Vac rms or dc.

DC Current (Auto Ranging for uA and mA)

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Range	Resolution	Accuracy
400.0uA	0.1uA	± 1.0% of reading ± 3 digits
4000uA	1uA	
40.00mA	10uA	± 1.5% of reading ± 3 digits
400.0mA	100uA	
4A	1mA	± 2.5% of reading ± 5 digits
20A	10mA	

Overload Protection: 0.5A/250V and 20A/250V Fuse.

Maximum Input:400mAac rms or 400mAdc on uA/mA ranges
20A ac rms or dc on 10A range.

Pulse Width

Range	Resolution	Accuracy
2.0~10.0ms	0.1ms	± 3% of reading ± 10 digits
Overload Protection: 250Vac rms or dc.		

Audible Continuity			
Audible threshold:	Less than 150 Ω		
Test Current:	<0.3mA		

Overload Protection: 250Vac rms or dc.

AC Current (Auto Ranging for uA and mA

Range	Resolution	Accuracy		
400.0uA	0.1uA	± 1.5% of reading ± 5 digits		
4000uA	1uA			
40.00mA	10uA			
400.0mA	100uA			
4A	1mA	± 3.0% of reading ± 7 digits		
20A	10mA	± 2.5% of reading ± 7 digits		

Overload Protection: 0.5A/250V and 20A/250V Fuse.

Frequency Range:50 to 400Hz

Maximum Input: 40mA ac rms or 400mA dc on uA/mA ranges,

20A ac rms or dc on 20A range.

OPERATION

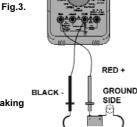
- WARNING! Ensure that you read, understand and apply the safety and operational instructions before connecting the meter. Only when you are sure that you understand the procedures is it safe to proceed with testing.
- П WARNING! Risk of electrocution. High voltage circuits, both AC and DC are very dangerous 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 leads 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.
- 4.1. Mode Button (fig.1.12)
- 4.1.1. Press the Mode button to toggle between the AC and DC in the voltage & current measurements.
- 4.2. Range/#CYL Button (fig.1.10)
- The range is automatically selected by the meter. 4.2.1.
- 4.2.2. 4.2.3. To manually select a range or DWELL (#CYL) range within a function, press the range button.
- To exit the range mode and return to autoranging, press and hold the range button for two seconds.
- If the range is to high, the meter will be less accurate. Note: If the range is to low, the meter displays 'OL' (Over Limit)
- 4.3. Data hold, Backlight button (fig.1.4.).
- 4.3.1. The data hold function allows the meter to freeze a measurement reading for later reference.
- Press the data hold button once to freeze the reading in the display. The indicator "hold" will appear in the display. 4.3.2
- Press the data hold button again to return to normal operation. 4.3.3.
- 4.3.4. Press and hold the data button for two seconds to to switch on the display back light.
- 4.3.5. Press and hold the data button again for two seconds to turn off the back light.
- 4.4. Relative Button (fig.1.3.)
- 4.4.1. The relative measurement feature allows you to make measurements relative to a stored reference value. A reference voltage, current etc can be stored and measurements made in comparison to that value. The displayed value is the difference between the reference value and the measured value.
- 442 Perform any measurement as described in the operating instructions.
- Press the relative button to store the reading in the display and the "REL" indicator will appear in the display. 443
- The display will now indicate the difference between the stored value and the measured value. 4.4.4.
- 4.4.5. Press the relative button to return to normal operation.
- 4.5. ± Trig Button (fig.1.11.)
- 451 To toggle between the Negative (-) and Positive (+) Trigger slope when the meter is in the ms-pulse, %duty cycle mode.
- Press and hold for two seconds to toggle between Negative (-) and Positive (+) Trigger slope. 4.5.2.
- 4.5.3. Press the button repeatedly to adjust the trigger level if the meter reading is to high or unstable.
- The Trigger level has five steps and is different for each function combination. Note:
- 4.6. MAX/MIN/RS232 (fig.1.2.).
- 4.6.1. Press the MAX/MIN to enter MAX, MIN mode
- Note: MAX/MIN function is only available in the manual range.
- 4.6.2. Select the proper test range before activating the MIN/MAX button to ensure that the MIN/MAX reading will not exceed the testing range.
- 4.6.3. Press once to select MAX, press again to select MIN.
- Press again to release MAX/MIN recording function. 4.6.4
- Press and hold down for two seconds to activate the RS232 PC interface mode. 4.6.5.
- 4.7. AC or DC Voltage Measurements
- 471 Insert the black test lead into the negative "COM" jack and the red test lead into the positive "V" jack.
- 4.7.2 Turn the rotary switch to the 'V' position.
- 4.7.3 Press the "MODE" button to select ac or dc voltage
- 4.7.4. Touch the test probes to the circuit under test and read the voltage display.
- 4.8. **AC or DC Current Measurements**
- \Box 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 leads.
- 4.8.1. Insert the black test lead into the into the negative "COM" jack and the red test lead into the:
 - a) Positive uA/mA jack for currents to 400mA (fig.1.8.).

b) Positive 20A jack for currents to 20A (fig.1.9.)

- If you are unsure of the current draw select the 20A jack. Note:
- 4.8.2. Turn the rotary switch to the uA, mA or A position.
- Press the mode button to select AC or DC current.
- 4.8.4 Touch the test probes in series (fig.3.) with the circuit under test and read the current on the display.
- 4.9. Resistance, Diode, Continuity Measurements
- О WARNING! To avoid electric shock, disconnect power to unit under test and discharge all capacitors before taking any resistance or capacitance measurements.
- 491 Insert the black test lead into the negative "COM" jack and the red test lead into the positive "V" jack.
- 492 Turn the rotary switch to the Ω position.
- 4.9.3. Press the Mode button (fig. 1.12.) to select Ω , Diode or continuity.
- Connect the test probes to the two ends of the Resistance, Diode, Continuity circuit to be measured. 4.9.4.
- Read the measured value from the display. 4.9.5.
- When measuring the forward voltage across a good Diode, it will indicate 0.4V or 0.7V will be indicated and the reverse voltage will indicate "OL" (same 496 as on open condition). For a short circuit diode, a value of 0mV will be displayed.
- In continuity mode a complete circuit will beep continuously, if open circuit, there will be no beep. 4.9.7.
- 4.9.8. In resistance measurements, if greater accuracy is required press the Range button.
- 4.10. Capacitance
- WARNING! When checking in-circuit capacitance, be sure to disconnect the power supply from the circuit and that the capacitors are fully discharged. The range control mode in capacitance measurement is auto-ranging.
- Insert the black test lead into the negative "COM" jack and the red test lead into the positive "V" jack. 4.10.1.
- Turn the rotary switch to the CAP position.
- 4.10.3. Touch the test probes to the ends of the capacitor and read the capacitor value on the display.



4.11. Frequency(Hz)

- Insert the black test lead into the negative "COM" jack and the red test lead into the positive "V" jack. 4.11.1.
- 4.11.2. Turn the rotary switch to the "Hz" position.
- Connect the negative "COM" test probe to ground 4.11.3.
- Connect the positive "V" test lead to the "signal out" wire of the sensor to be tested. 4.11.4.

4.12. Duty Cycle (%)

- Select the %DUTY range with the rotary switch. 4.12.1
- Insert the black test lead into the negative "COM" jack and the red test lead into the positive "V" jack. 4.12.2.
- 4.12.3. Connect the negative test probe to ground.
- 4.12.4. Connect the positive test probe to the signal wire circuit.

4 13 Temperature Measurements

- 4.13.1. Insert the type K thermocouple plug into the negative "COM" jack and the positive jack ensuring the + symbol on the plug is inserted into the positive + jack and the negative symbol on the plug is inserted into the negative "COM" jack. Turn the rotary switch to the select "C or "F.
- 4.13.2.
- 4.13.3. Read the temperature on the display.

4.14. **Pulse Width Measurements**

- 4.14.1. Insert the black test lead into the negative "COM" jack and the red test lead into the positive "V" jack.
- 4.14.2. Turn the rotary switch to the ms-PULSE position.
- 4.14.3. Press the ± TRIG button for two seconds until the negative (-) trigger slope is displayed on the lower left of the display.

Note: The applied time for most fuel injectors is displayed on the negative slope.

- 4.14.4. Jumper wires between the fuel injector and the harness connector (fig.4.).
- 4.14.5. Connect negative test probe to a good ground at the fuel injector or the negative (-) vehicle battery post.
- 4.14.6. Connect the red test probe to the fuel injector solenoid driver input on the jumper cable.
- Start the engine. A pulse width in milliseconds should be read. 4.14.7.

Note: If the reading is to high or unstable, adjust the trigger level by pressing the ± TRIG button repeatedly.

4.15. **RPM (TACH) Measurements**

- Select the RPM range with the rotary switch. 4.15.1.
- 4.15.2. Select the X10 RPM range with the rotary switch. Multiply the displayed reading times by 10 to get the actual RPM.
- Press STROKE button (fig.1.12.) to select through RPM 4 for 4-stroke or RPM 2 for 2-stroke DIS. 4.15.3.

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.

- 4 15 4 Insert the inductive pickup leads into the meter. Black lead into the negative "COM" jack and the red lead into the positive RPM jack.
- 4.15.5. Connect the inductive pickup to a spark plug HT lead. If no reading is received, unhook the clamp, turn it over and connect again.

Note: Connect the pickup 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 pickup has an adjustable sensitivity switch that may also be used to correct an unstable reading.

4.16. **Dwell Angle Measurement**

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

- 4 16 1 Insert the black test lead into the negative "COM" jack and the red test lead into the positive "V" jack.
- 4 16 2 Turn the rotary switch to the dwell position.
- 4 16 3 Set number of cylinders with the CYL button (fig.1.11.).
- 4.16.4. Connect the black test lead to the Ground terminal (-) on the car battery and the red test lead to the contact breaker points or the negative (-) terminal of the ignition coil
- 4 16 5 When the engine is started the Dwell 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.

Other functions

Your meter is also capable of testing the following automotive sensors.

Oxygen Sensors

Fuel Injectors

Temp Sensors **Position Sensors**

absolute pressure (MAP) and Baro Sensors

Mass Air Flow (MAF) Sensors

For a detailed description and testing procedure for these sensors, please refer to the vehicles hand book. 4 17 2

4.18. Windows® Application Program (fig.4.)

Hardware and software requirements: 486 PC, 4 Megabytes of memory or better, 2 Megabytes of installation space, Windows® 95, 98, 2000, ME or XP. Supplied with RS232 Optically isolated cable and Windows® compatible software allowing the user to collect, display, plot and save data.

- Installation of the Windows® Application program. 4.18.1.
- 4.18.2. Insert the supplied software disc into your computers fig.4
- Click on the Windows® Start menu, and in the Run box type 4.18.3. D:\setup (where D is the letter of your disc drive) and press the Enter key
- When loaded you can access the program through the start 4.18.4. menu or the shortcut placed on your desktop

For detailed usage information click the "Help(H)" menu Note: on the PC interface.

Note: If a USB connection is required, you will need to purchase a USB Serial Adaptor from your computer accessories

USB Serial Adaptor, to convert USB port for use with RS232 serial cable.

USB Serial Adaptor Not Supplied



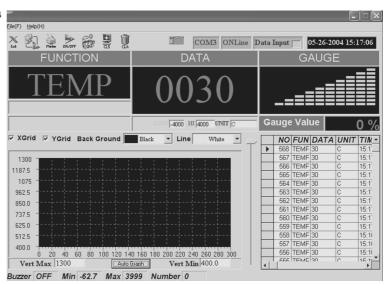




fig.4.

4.19. Replacing The Battery

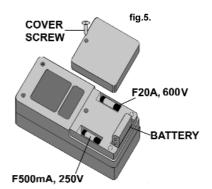
- WARNING! To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery door. \Box
- When the battery becomes exhausted or drops below the operating voltage, 👫 will be appear in the right hand side of the display. Replace the battery. 4.13.1.
- 4.13.2. Disconnect the leads from the meter.
- Open the battery door by loosening the screw using a Philip's head screw driver (fig.5.). 4.13.3.
- 4.13.4. Remove the old battery and insert the new one, observing the correct polarity.
- 4.13.5. 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
- 4.14. Replacing the fuses
- WARNING! To avoid electric shock, disconnect the test leads from any source of voltage before accessing the fuses.
- 4.14.1. Disconnect the test leads from any item under test and disconnect them from the meter.
- 4 14 2 Open the battery door by loosening the screw using a Philip's head screw driver.
- 4.14.3. Remove the old fuse from its holder by gently pulling it out.
- 4.14.4. Install the new fuse into its holder.

Note: Always use a fuse of the correct size and value

0.5A/250V fast blow for the 400mA range

20A/250V fast blow for the 20A range.

- 4.14.5. Replace the battery cover and secure with the screw.
- WARNING! To avoid electric shock, DO NOT use the meter until it has been fully re-assembled.



5. **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.
- 5.1. Periodically wipe the case with a damp cloth and mild detergent. Do not use solvents.
- Turn the meter off when not in use and remove the battery if stored for a long period of time. 5.2.



Declaration of Conformity We, the sole UK importer, declare that the product listed below is in conformity with the following standards and directives.

DIGITAL Automotive Analyser Model: TA203

89/336/EEC EMC Directive

The construction file for this product is held by the Manufacturer and may be inspected, by a national authority, upon request to Jack Sealey Ltd.

Signed by Mark Sweetman

22nd May 2004

For Jack Sealey Ltd. Sole UK importer of Sealey Professional Tools.

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 equipment.

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

INFORMATION: For a copy of our latest catalogue and promotions call us on 01284 757525 and leave your full name and address, including postcode.



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