



INSTRUCTIONS FOR:  
**INFRA-RED LASER THERMOMETER**  
 Model: **VS901**

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 AND 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 INSTRUCTIONS SAFE FOR FUTURE USE.**

**1. SAFETY INSTRUCTIONS**

**1.1. GENERAL SAFETY**

- WARNING!** Ensure that Health & Safety, local authority and general workshop practice regulations are adhered to when using this equipment.
- ✓ Familiarise yourself with the applications, limitations, and potential hazards of the thermometer.
- ✓ Keep the thermometer clean and in good condition.
- ✓ Protect the thermometer from the following:
  - Electro-magnetic fields from engine components closer than 125mm.
  - Static electricity.
  - Thermal shock caused by large and/or rapid ambient temperature change.
  - High temperatures.
- x **DO NOT** get the thermometer wet or use in damp or wet locations or areas where there is condensation.
- x **DO NOT** use the thermometer for any purpose other than for which it is designed.
- x **DO NOT** allow untrained persons (particularly children) to operate the thermometer.

**1.2 LASER SAFETY**

The VS901 utilises Class II lasers that emit low levels of visible radiation (i.e. wavelengths between 400 and 700 nanometres) which are safe for the skin but not inherently safe for the eyes. The Class II emission limit is set at the maximum level for which eye protection is normally afforded by natural aversion responses to bright light. Accidental eye exposure is therefore normally safe, although the natural aversion response can be overridden by deliberately staring into the beam, and can also be influenced by the use of alcohol or drugs.

- WARNING!** Do not look or stare into the laser beams as permanent eye damage could result.
- x **DO NOT** direct the laser beams at any person's (or animal's) eyes as eye damage could result.
- x **DO NOT** operate the thermometer when you are tired or under the influence of alcohol, drugs or intoxicating medication.
- ✓ Be aware that reflections of the laser beam from mirrors or other shiny surfaces can be as hazardous as direct eye exposure.



**2. INTRODUCTION**

New way to tackle diagnosis of engine and vehicle faults. VS901 detects energy emission in the infra-red spectrum and converts it into a temperature reading. Features laser pointers to indicate area being sampled. Temperature is displayed on large LCD panel with backlit display for use in low light areas. Temperature can be shown in either °C or °F. Magnetic base and LED flashlight. Powered by 9V battery (not included).

**Specification**

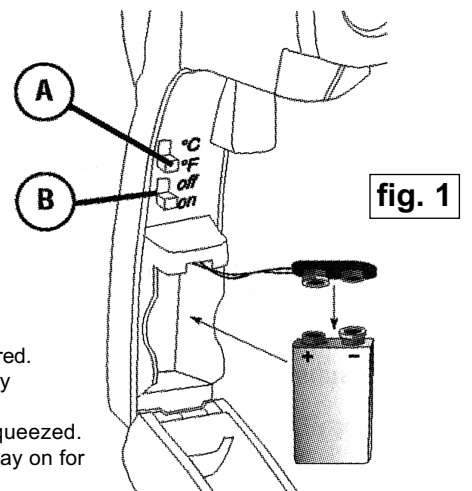
Temperature Range	-32 to 535°C (-25 to 999°F)	
Ambient Operating Range	0 to 50°C (32 to 122°F)	
Accuracy @ 23°C Ambient	Target Temperature	Accuracy
	-32 to -26°C	±3°C
	-27 to -18°C	±2.5°C
	-19 to 23°C	±2°C
	24 to 100°C	±1°C
	101 to 510°C	±1% of reading
	>510°C	±1.5% of reading
Display Resolution	.0.2°C (0.5°F)	
Optimum Target Range	.200mm	
Battery	9V Alkaline or Ni-Cad (not supplied)	
Battery Life	4 hours with laser, backlight and flashlight on	
	20 hours with laser, backlight and flashlight off	
Display Hold Time	7 seconds	
Tripod Mount	0.25" 20 UNC	
Laser	Class II. Turns off if ambient >40°C	



**3. OPERATION**

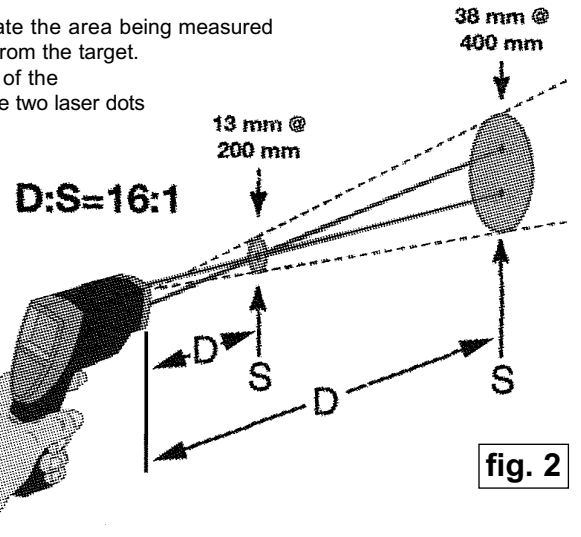
**3.1. Set-up**

- 3.1.1. Remove the magnet from the end of the grip by undoing the retaining screw.
  - 3.1.2. Press and hold the small button positioned just in front of the trigger and pull the front section of the handle forward and down to reveal the control switches and battery compartment, see fig. 1.
  - 3.1.3. Switch A allows the display to be selected in °C or °F. Select as required.
  - 3.1.4. Switch B allows the lasers, backlight and flashlight to be turned on or off. Select as required.
  - 3.1.5. Attach the battery connector to the battery terminals and place the battery in the battery compartment positive side first, as shown in fig. 1.
- Note: If being used, the lasers, flashlight and backlight will come on when the trigger is squeezed. When the trigger is released the lasers and flashlight will go out but the backlight will stay on for a further seven seconds.



3.2. **Lasers.** The lasers play no part in the temperature measurement but indicate the area being measured and also enable the thermometer to be positioned at the optimum 200mm from the target. The two beams are angled towards each other and cross 200mm in front of the thermometer. Thus if the thermometer-to-target distance is adjusted until the two laser dots merge into one the optimum target distance will have been achieved.

3.3. **Target Area.** The smallest target area (Ø13mm) occurs at the optimum thermometer-to-target distance of 200mm. As this distance is increased so the target area gets larger, see fig. 2. The ratio of target distance to target diameter is 16:1.



3.4. **Emissivity.** Different materials and surfaces have different energy emitting characteristics (emissivity) but most organic materials and painted or oxidised surfaces are similar in this respect and the thermometer is designed to give correct readings for these materials and surfaces (Emissivity 0.95). To maintain accurate measurement, shiny or polished metal surfaces should be covered in masking tape or matt black paint before using the thermometer. Allow time for the tape/paint to attain the same temperature as the material beneath.

3.5. **Magnetic Base.** The magnetic base allows the thermometer to be attached to ferrous surfaces when appropriate. The magnet is recessed into the base of the handle so that it will not cause scratches. However it is important to check that the magnet has not attracted ferrous particles, small screws etc., before using it on finished surfaces.

3.6. **Obstructions.** The thermometer cannot read the temperature of a target through glass or plastic sheet. It will only show the surface temperature of the sheet. Similarly, steam, dust or smoke will result in erroneous readings.

3.7. **Display - fig. 3**

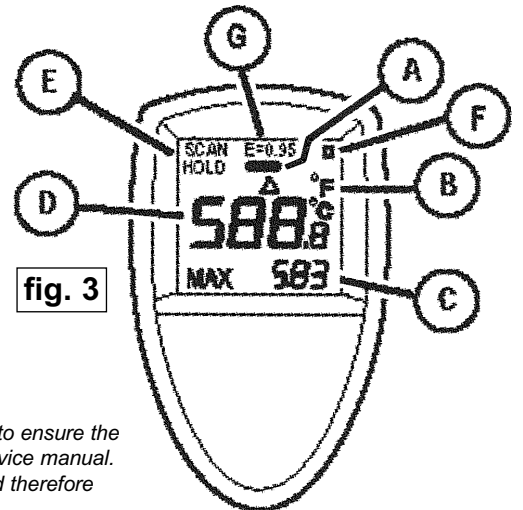
- A - Low battery indicator.
- B - Temperature scale.
- C - Maximum temperature, continuously updated while unit is on.
- D - Temperature reading.
- E - Scan/Hold indicator.
- F - Laser, backlight, flashlight 'On' indicator.
- G - Emissivity number (pre-set, not adjustable).

**Warning displays**

--- (instead of temp.) . . . Target temperature is outside thermometer range.

ERR . . . . . Possible EMF damage.

. . . . . Low battery.



**4. APPLICATIONS**

□ **WARNING!** When working on vehicle systems, take all the precautions necessary to ensure the safety of yourself and others - always refer to vehicle manufacturer's handbook/service manual. The purpose of this tool dictates that it will be used close to very hot equipment and therefore extreme care should be exercised.

4.1. **Air Conditioning**

With the air conditioning set to maximum cooling, the temperature of the output air should be at least 15°C colder than the outside ambient once the system has stabilized.

Do not place the thermometer directly in the cold air stream (thermal shock) but rather hold it to one side and take the temperature of the air duct.

If the air temperature differential is less than 15°C have the A/C system checked.

4.2. **Heater**

With the engine running, and at normal operating temperature, A/C 'off' and heater controls 'on' measure the temperatures of the heater inlet and outlet hoses/pipes at the engine compartment bulkhead. The outlet hose/pipe should be approximately 10°C cooler than the inlet. If the differential is significantly more than this the flow through the heater core is restricted and the system should be investigated.

4.3. **Radiator**

When the engine is running at normal operating temperature, there should be an even temperature drop between the radiator inlet and outlet. Check the whole radiator surface for any 'cold' spots which would indicate a blockage.

4.4. **Thermostat**

Under normal operation the thermostat will will open as the engine reaches operating temperature, releasing hot coolant into the hose linking the thermostat housing to the radiator.

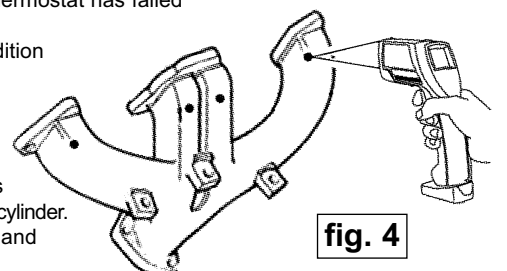
Use the thermometer to monitor the hose temperature, adjacent to the thermostat housing, as the engine warms up to operating temperature (85-105°C).

- 1) If the hose temperature abruptly and quickly increases the thermostat is functioning correctly.
- 2) If the temperature increases gradually and does not reach operating level the thermostat has failed in the open condition (or is missing).
- 3) If the temperature does not rise at all the thermostat as failed in the closed condition or coolant is not flowing for some other reason (air lock, pump failure etc.) and further investigation is required.
- 4) A fluctuating temperature indicates a weak thermostat spring or air in the system.

4.5. **Misfiring Cylinder**

A misfiring cylinder (petrol or diesel) can be located by taking temperature readings of each branch of the exhaust manifold (fig. 4). The cool branch will indicate the misfiring cylinder. The temperature difference will be most marked before the engine has warmed up and heat transfer has warmed the cool branch.

One exhaust branch hotter than the rest (petrol) suggests weak mixture to that cylinder, which should be investigated (faulty injector, inlet manifold gasket leak, etc.).



#### 4.6. Catalytic Converter

With the engine at normal operating temperature and running at 1000rpm the inlet of the catalytic converter should be cooler than the outlet by >55°C (2-way converter) or >20°C (3-way converter).

- 1) If the outlet temperature is lower than the inlet then the converter is 'plugged' and must be replaced.
- 2) If the outlet temperature is the same as the inlet then the converter has reached the end of its service life (say 150,000 miles) or the converter material has broken up due to damage or has become contaminated.

Always determine the cause of failure, and rectify if appropriate, before fitting a replacement.

#### 4.7. Brakes

The thermometer can be used to check comparative brake performance. The brakes should be brought up to operating temperature, by braking the vehicle from 30mph to a halt five times in quick succession, and the brake disc/drum temperatures then measured immediately. Brakes on the same axle should not differ by more than 3°C and front brakes should be hotter than rear brakes by about 30°C.

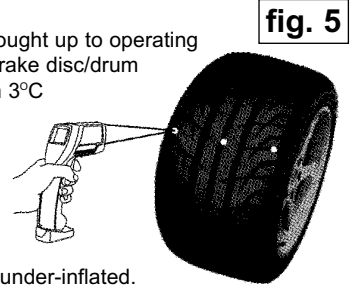
In the case of temperatures not meeting these criteria further investigation will be required - noting that it is normally the cooler brake which is faulty (seized, contaminated, etc.).

#### 4.8. Tyres

A correctly inflated tyre will have the same temperature across the tread, within 10°C. To check, drive the car for a few miles and then measure the tread in three places as shown in fig. 5.

If the readings from the sides of the tread are higher than that from the centre the tyre is probably under-inflated.

conversely over-inflation causes the centre to be hotter than the edges. In either case, adjust the tyre pressure in 2psi steps until even temperatures are achieved. If the resulting pressure is significantly different from that recommended by the vehicle/tyre manufacturer look for another cause of the temperature difference (worn, damaged or misaligned suspension). Note that edge-of-tread temperatures which are significantly different from each other indicate a suspension fault.



## 5. DECLARATION OF CONFORMITY

### INFRA-RED LASER THERMOMETER

Model: VS901

EN 60825-1 Laser safety  
93/68/EEC CE Marking Directive

### Declaration of Conformity

We, the sole importer into the UK, declare that the product listed here is in conformity with the following standards and directives.



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

10th March 2004

For Jack Sealey Ltd. Sole importer into the UK 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 product.

**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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