DIGITAL XENON TIMING LIGHT WITH TACH/ DWELL/ADVANCE/VOLT, IGNITION TIMING

MODEL NO: **TL93.V2**

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 instruction manual


Wear protective gloves


Wear eye protection


Wear protective clothing

1. SAFETY

▲ **DANGER! -** Be aware, lead-acid batteries generate explosive gases during normal battery operation. For this reason it is very important to read and follow these instructions carefully, each time you use the timing light. Follow these instructions and those published by the battery manufacturer and the maker of any equipment you intend to use in the vicinity of the battery. Remember to review warning marks on all products and on engines.

1.1. **PERSONAL PRECAUTIONS**

✓ Ensure there is another person within hearing range of your voice and close enough to come to your aid should a problem arise when working near a lead-acid battery.

✓ Wear safety eye protection and protective clothing. Avoid touching eyes while working near battery.

✓ Have fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.

✓ Wash immediately with soap and water if battery acid contacts skin or clothing. If acid enters eye, flush eye immediately with cool, clean running water for at least 15 minutes and seek immediate medical attention.

✓ Remove personal metallic items such as rings, bracelets, necklaces and watches. A lead-acid battery can produce a short-circuit current high enough to weld a ring or the like to metal and may cause severe burns.

✓ Ensure hands, clothing (especially belts) are clear of fan blades and other moving or hot parts of engine, remove ties and contain long hair.

× **DO NOT** smoke or allow a spark, or flame, in the vicinity of battery or engine.

✓ Remember that a flashing timing light 'freezes' rotating components. **DO NOT** be tempted to touch an apparently stationary component which is, in fact, rotating.

❑ **WARNING!** When ignition is on **DO NOT** touch any ignition components - very high voltages are present.

1.2. **GENERAL SAFETY**

❑ **WARNING!** When running an engine in an enclosed space ensure adequate ventilation or ducted exhaust. Exhaust gases kill.

✓ Keep children and unauthorised persons away from the working area.

✓ Ensure vehicle transmission is in 'Neutral' (manual) or 'Park' (automatic) and the parking brake is applied.

✓ Ensure the ignition is switched off before attaching the power clamps to the battery.

✓ Keep tools and other items away from the engine and ensure that you can see the battery and working parts of engine clearly.

✓ If the battery terminals are corroded or dirty, clean them before attaching the timing light clamps.

× **DO NOT** dis-assemble the timing light for any reason. The timing light must only be checked by qualified service personnel.

❑ **WARNING! DO NOT** allow metal tools or equipment to accidentally touch battery terminals since this may produce sparks or a short circuit resulting in an explosion.

× **DO NOT** cross-connect leads from the timing light to the battery. Ensure positive (+) (RED) is to positive and negative (-) BLACK is to negative.

✓ If symbols cannot be distinguished, negative terminal is normally the one directly connected to the vehicle bodywork (check vehicle handbook).

× **DO NOT** allow inductive pick-up, or leads, to contact exhaust or other engine parts as the heat will cause damage.

× **DO NOT** pull the cables or clamps from the battery terminals.

× **DO NOT** use the timing light outdoors, or in damp, or wet locations, and **DO NOT** operate within the vicinity of flammable liquids or gases.

× **DO NOT** use the timing light for a task for which it is not designed. When not in use, store the timing light in a safe, dry, childproof location.

2. INTRODUCTION

Composite cased Xenon timing light with inductive impulse pick-up. Large LED digital display and 4-digit LED read-out. Reads dwell, advance, voltage, rpm and retard ignition timing. Includes mode for 2-stroke and distributorless 'lost spark', 4-stroke engines. Supplied with 1.5m coiled 12V power lead, inductive coupler and operating instructions. Detachable clamp-on inductive pick-up for safe and easy hook-up. Pistol grip and push-button control for easy operation.

3. SPECIFICATION

Model No: TL93
Measures .....Range
Advance:.....0-60^0 BTDC
Tach: 200-9990rpm
Dwell Accuracy:.....0-99.9%
Voltage:..... 0-16V DC

4. WHAT IS TIMING?

IMPORTANT: Always switch off the ignition before doing the following:
- connecting motor testing instruments
- replacing ignition systems components

In order for an automobile engine to function, three things are necessary: air, fuel and a spark to ignite the air/fuel mixture and create an explosion. The precise instant of the explosion must be timed so that maximum force is delivered to the engine's piston. This is "timing". Each engine manufacturer tells its factory the exact timing necessary for various engines so that every possible amount of power is obtained from each litre of fuel. As normal engine and ignition systems wear, the timing can change, thereby reducing both power and mileage. With the Timing Light, you can reset the timing to the manufacturer's standard, regain lost power and increase mileage.

Timing is given in Degrees Before Top Dead Centre (BTDC) or After Top Dead Centre (ATDC). In order to completely burn the air/fuel mixture in the car's cylinders, most timing is such that the spark occurs at a point several degrees BTDC (for example 4° BTDC). This ensures that the full power of the is explosions obtained (see fig 1).Two additional terms used when describing timing are 'Advanced' and 'Retarded'.

As shown in figure 1, when the timing is advanced the spark will occur BTDC. On some late model cars equipped with various emission control devices, the timing is retarded so that the spark occurs ATDC. Timing is changed by adjustment of the ignition distributor.

In order to allow setting and adjustment of the engine timing, timing marks are provided on each engine during assembly. In most cases, these marks appear on the engine vibration damper or fan pulley at the lower front of the engine (figure 1). On some early engines, this mark was shown at the rear of the engine on the flywheel.

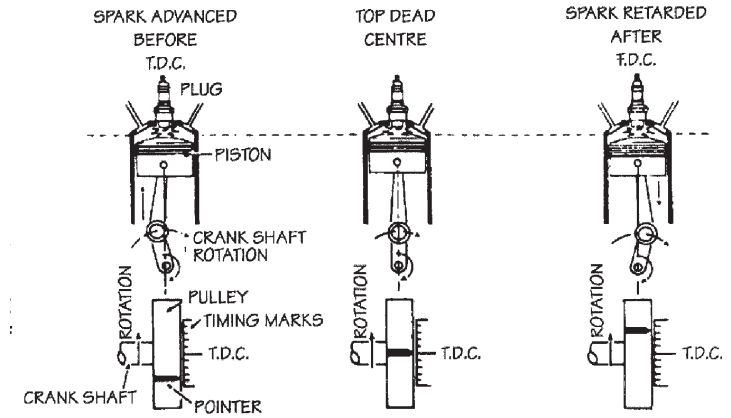
4.1. **WHEN TO CHECK TIMING**

The instant of the spark plug firing is determined by the closing of the distributor ignition breaker points and will change any time the points gap or dwell angle is changed. In addition, normal wear on the breaker point rubbing block will change the dwell and affect the timing. Cars equipped with the new "breakerless electronic ignition system" will not normally change timing since there are no breaker points. For these vehicles, the Timing Light can still be used to note changes in timing caused by troubles in the ignition system as well as for resetting timing when components are changed.

4.2. **TIMING SPECIFICATIONS**

As noted earlier, timing requirements vary from engine to engine. The engine manufacturer's specifications should always be referred to before making any adjustment. These specifications can be found in the cars owner manual, on the under bonnet decal required on all cars manufactured since 1968 and in various automotive publications.

Fig.1



5. OPERATION

5.1. Bring the engine to operating temperature. Make sure that the contact breaker points of the dwell angle are correctly adjusted.
5.2. Use your owner's manual to determine the pertinent technical data of your vehicle (e.g. rpm, dwell angle).
5.3. Locate engine timing mark (see fig.1) and use a rag to clean all grease and dirt from the mark and the pointer. It may help to use chalk or white paint on the marks to make them more visible.
5.4. Two marks are needed for adjusting the timing:
1. A fixed mark on the engine housing, usually a pin, arrow or graduated scale.
2. A rotating mark on the flywheel or on the crankshaft pulley, mostly in the form of a notch, a steel ball or a graduated scale.

IMPORTANT: The above marks are usually in the vicinity of hot and rotating parts. Be careful of the exhaust manifolds, fan blades, V-belts etc.

5.5. **OPERATIONAL MODE SWITCH PROCEDURE** (fig.2)
5.5.1. Set display to Mode 1 for distributor type ignitions.

5.5.2. Set display to Mode 4 for 2 stroke and direct ignition systems.

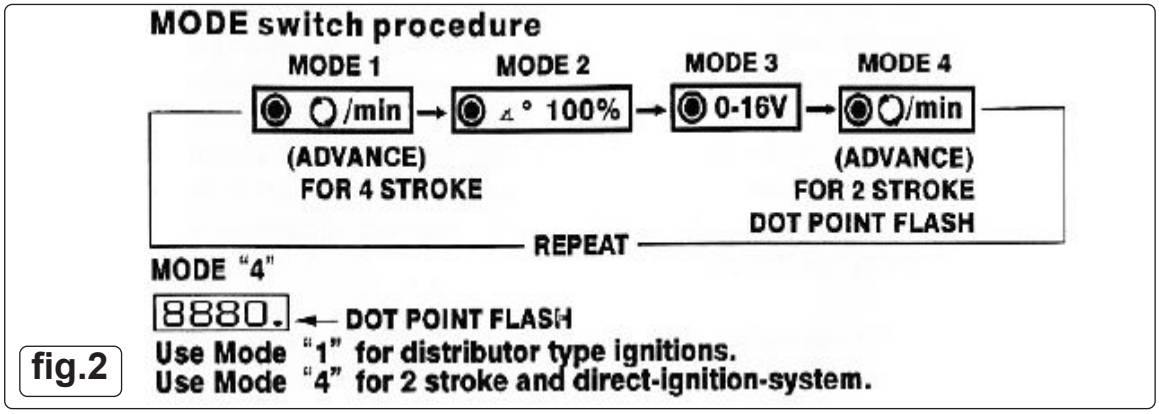


fig.2

5.6. TESTING PROCEDURE

5.6.1. The timing light works directly with the car battery. Connect the red clip to the positive (+) terminal and the black end to the negative terminal (-) (see fig.3).

5.6.2. The light pulse is usually triggered by the ignition pulse of the first cylinder. This may differ in some vehicles, therefore consult your owner's manual.

5.6.3. Attach the inductive clamp to the clean ignition cable so that the arrow shown on the clip points in the direction of the spark plug.

5.6.4. Start the engine, which should be at operating temperature and bring it up to adjustment speed (rpm) recommended by the manufacturer. Press the switch on the handle of the timing light. The Advance indicator will be lighted. Point the timing light at the timing marks. The two marks should normally be opposite each other. If this is not so, proceed as in point 5.6.5 below.

5.6.5. Loosen the clamping of the fastening screws on the distributor until the distributor can be turned by hand. **DO NOT** loosen it too far otherwise the distributor will turn by itself.

5.6.6. Turn the distributor clockwise or anticlockwise until the rotating mark is in the position recommended by the vehicle manufacturer.

5.6.7. Retighten the screws you have loosened so that the distributor setting is maintained.

5.6.8. Recheck the timing.

5.7. VEHICLES WITH POSITIVE EARTH

5.7.1. If the vehicle has a positive earth electrical system it is possible that the Xenon lamp does not light up. In this case reverse the inductive clamp so that the arrow points in the direction of the distributor.

5.8. CHECKING THE CENTRIFUGAL ADVANCE AND VACUUM ADVANCE

5.8.1. Follow the steps 5.6.1 To 5.6.4 of the general procedures except increase the engine speed to 2000rpm.

5.8.2. Trigger the timing light and rotate the knob (on the side) clockwise slowly and stop until the timing mark moves to "TDC" or "0" position.

5.8.3. Read off the advance angle from the LED display.

5.8.4. Compare the reading with the manufacturer's specifications.

fig.3 TACH & ADVANCE

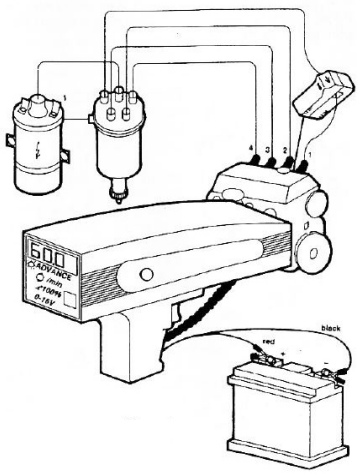
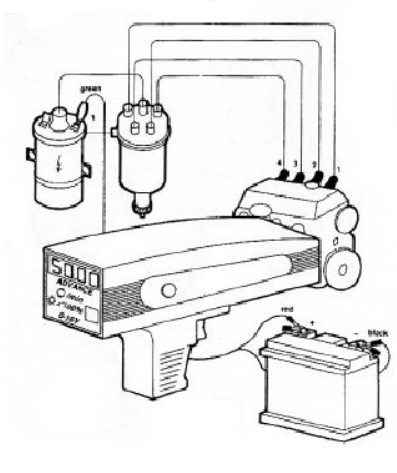


fig.4 DWELL



5.9. DWELL ANGLE MEASUREMENT

5.9.1. Dwell angle measurement is indispensable for exact distributor adjustment. For only when the dwell angle is correctly adjusted can a powerful magnetic field build up within the coil, thus providing a high energy ignition spark at all engine speeds.

5.9.2. Press the tact switch to light the Dwell indicator (fig.4).

5.9.3. Connect the green clip to terminal 1 of the ignition coil (1, D, RUP, -).

5.9.4. Start the engine and let it run at idle speed.

5.9.5. Read off the dwell angle in % from the LED display and compare it with the manufacturer's recommendations. Please refer to the conversion table of Dwell Angle % ∠ (see end of manual).

5.10. TACHOMETER

5.10.1. The tachometer is used to measure engine speed. Engine speed must be known in order to :
- adjust the idling speed
- check the ignition

- adjust the timing
- check the adjustment

5.10.2. Press the tact switch to light the RPM indicator.
5.10.3. Connect the inductive pick-up to the first cylinder plug lead.
5.10.4. Connect the red clip to the positive battery terminal (+) and the black clip to the negative battery terminal (-) (see fig.3).
5.10.5. Start the engine and read off the rpm from the display. Compare the rpm with the figure recommenced by the vehicle manufacturer. Should any deviations be found, make appropriate adjustments.

5.11. VOLTMETER

5.11.1. The voltmeter can be used to check the battery voltage and the supply voltage to the various consumers i.e. lamps etc.
5.11.2. Testing of battery voltage under starting current load:
5.11.2.1. Disconnect the ignition by pulling the plug off the terminal 1 (1, D, RUP, -) on the ignition coil.
5.11.2.2. Press the tact switch to light the VOLT indicator.
5.11.2.3. Connect the black clip to the negative battery terminal (-) and the red/green clip to the positive battery terminal (+) (see fig.5).
5.11.2.4. Have the car started by an assistant.
5.11.2.5. Read off the voltage from the LED display.

IMPORTANT: If a reading less than 9V is indicated have the battery checked professionally.

5.12. Measuring the voltage at the consumers i.e. lamps etc.
5.12.1. Switch on the consumers under investigation.
5.12.2. Connect the black clip to the negative battery terminal (-) and the red clip to the positive battery terminal (+).
5.12.3. Connect the green clip to the positive terminal on the consumer.
5.12.4. Switch on the consumer and read the voltage from the LED display. If the voltage is too low, this indicates leakage through the respective leads or connections. This is frequently indicated by heating of the connecting terminals, switches or parts of the leads.
5.12.5. Should the voltage drop be greater than that specified in your owner's manual, it is advisable to consult a garage.

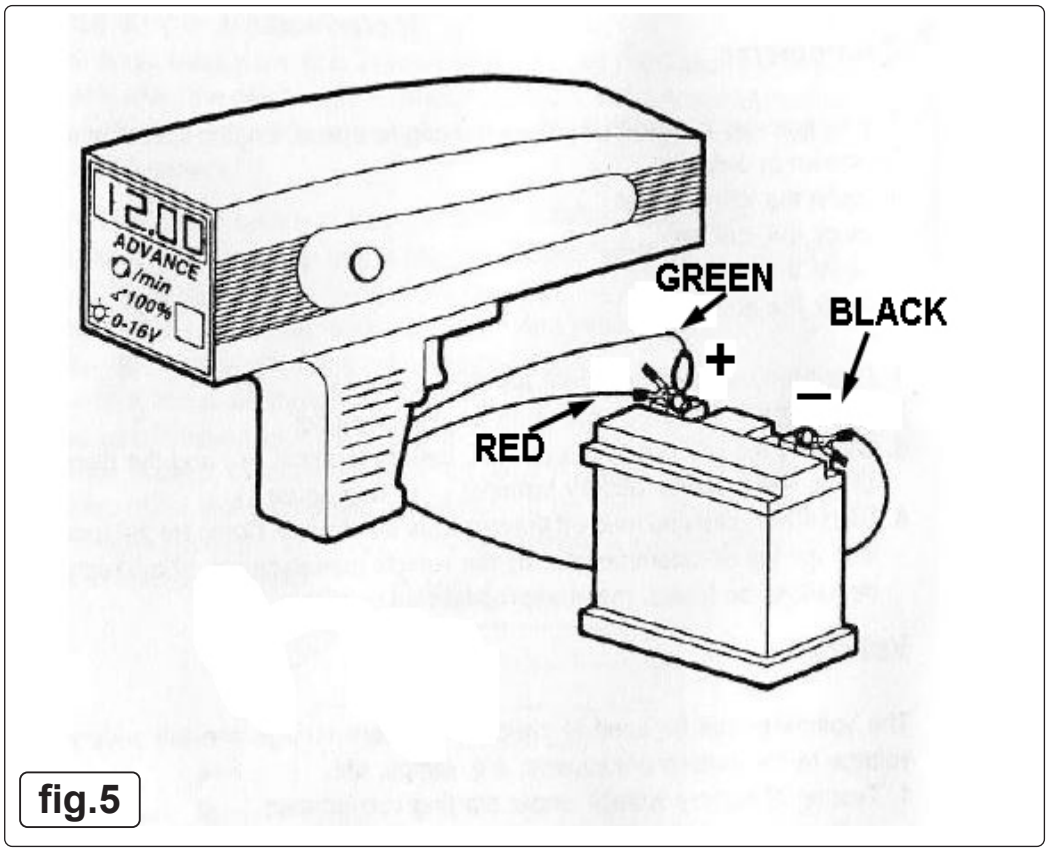
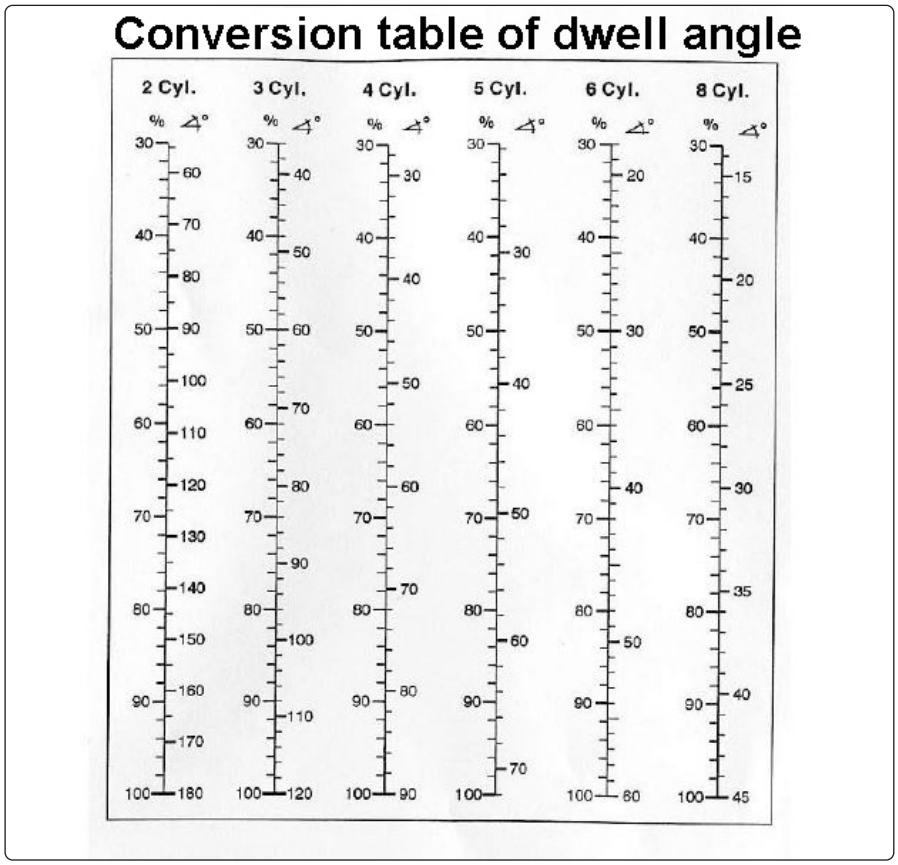


fig.5

6. ADMISSIBLE VOLTAGE DROP

Type of lead	Admissible voltage in insulated CU lead	Admissible voltage drop in the entire circuit
Lamp leads from the light switch terminal 30 to lights <15W or to the trailer sockets and from there to the lights.	0.1V	0.6V
From light switch terminal 30 to lights < 15W or to trailer socket.	0.5V	0.9V
From light switch terminal 30 to headlights.	0.3V	0.6V
From control leads from switch to relay, horn, wipers etc.	0.5V to 12V 1.0V to 24V	1.5V to 12V 2.0V to 24V



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.

REGISTER YOUR PURCHASE HERE

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. Please note that other versions of this product are available. If you require documentation for alternative versions, please email or call our technical team on technical@sealey.co.uk or 01284 757505.

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.

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