INSTRUCTIONS FOR: MODEL No. TL93.V2

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.
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What is timing?

1. The timing light is used to check the timing on spark ignition engines. Correct timing has a decisive influence on the performance and service life of the engine.
2. At the firing point the spark plug ignites the fuel-air mixture forced into the cylinder by the piston. The flame spreads from the point of ignition throughout the entire combustion chamber. This is the time when the greatest combustion pressure is exerted on the piston and therefore also the greatest force is acting on the piston. As a certain time elapses between ignition and the flame spreading over the entire combustion chamber, ignition must occur before top dead centre. The correct firing point is specified by the vehicle manufacturer. Incorrect adjustment of ignition timing can damage your vehicle.

   In the owner's manual, in do-it-yourself books and data sheets you will find lots of helpful information on testing and tuning your vehicle.

   Important: **Always switch off the ignition before doing the following:**

   – connecting motor testing instruments
   – replacing ignition system components

   When working on electronic ignition systems be sure not to touch any live parts once the ignition is on and the engine is running. With electronic ignition systems dangerous voltages can occur throughout the system, not only at individual units such as the coil or distributor, but also at the cable harness, on pin-and-socket connectors, on connections to testing instruments, etc. When testing and tuning with the timing light, be sure **not to touch** any leads between the instrument and the vehicle.

Preparations for Adjusting the Timing

Bring the engine to operating temperature. Make sure that the contact breaker points or the dwell angle are correctly adjusted.

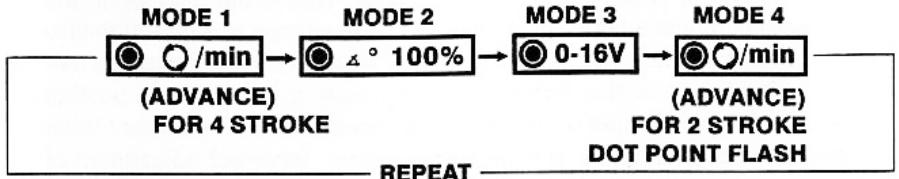
1. Use your owner's manual to determine the pertinent technical data of your vehicle (e.g. rpm, dwell angle).

2. Two marks are needed for adjusting the timing:
   a. a fixed mark on the engine housing, usually a pin, arrow or graduated scale.
   b. 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.

You will find that these marks are easier to see if you clean them and mark them with chalk or white paint.

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.**

MODE switch procedure



MODE "4"

8880. ← **DOT POINT FLASH**

Use Mode "1" for distributor type ignitions.
Use Mode "4" for 2 stroke and direct-ignition-system.

Testing procedure

1. Electrical connection of the timing light
   The timing light works directly with the car battery. Connect the red clip to the positive (+)terminal and the black clip to the negative (-)terminal. (See figure 1)
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.
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.
4. Start the engine, which should be at operating temperature, and bring it up to the adjustment speed 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 2 marks should normally be opposite one another. If this is not so, proceed as in point 5.
5. Loosen the clamping of 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.
6. Turn the distributor clockwise or anti-clockwise until the rotating mark is in the position recommended by the vehicle manufacturer.
7. Retighten the screws you have loosened, so that the distributor setting is maintained.
8. Recheck the timing.
9. Vehicles with positive earth.

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.

CHECKING THE "CENTRIFUGAL ADVANCE" AND "VACUUM ADVANCE"

1. Follows the steps 1 to 4 of general procedures on page 2 except increase the engine speed to 2000 rpm.
2. Trigger the timing light and rotate the knob clockwise slowly and stop until the timing mark moves to "T.D.C." or "0" position.
3. Read off the advance angle from the LED display.
4. Compare the reading with manufacturer's specifications.

TACH & ADVANCE

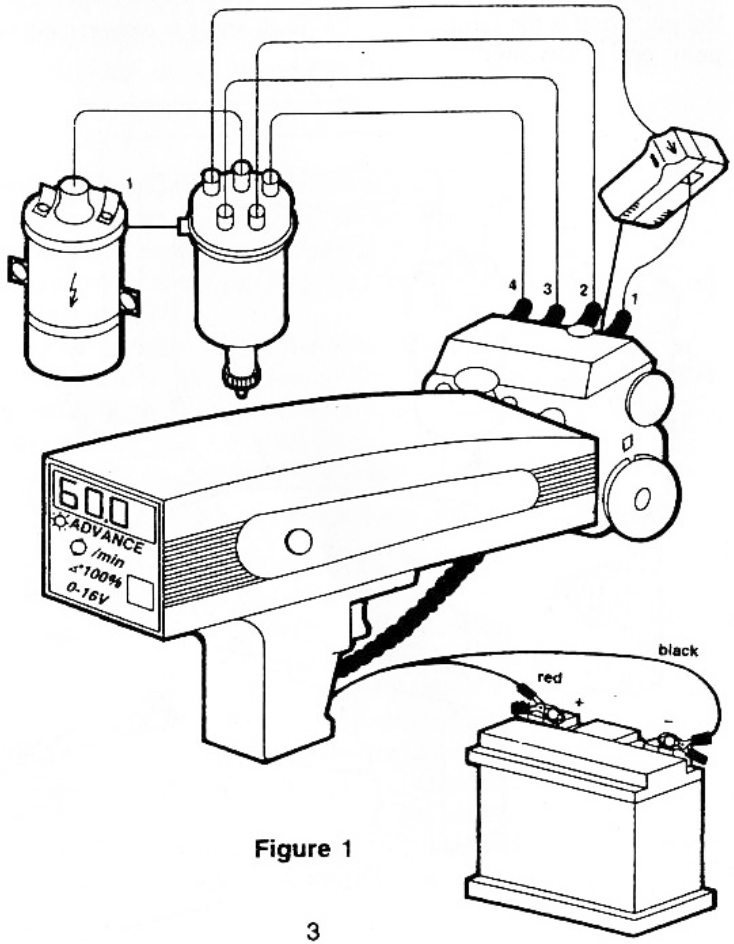


Figure 1

Dwell Angle Measurement

Dwell Angle Measurement is indispensible 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.

1. Press the tact switch to light the Dwell indictor. (See figure 2)
2. **Connect the black clip to the negative battery terminal (–) and the red clip to the positive battery terminal (+).**
3. Connect the green clip to terminal 1 of the ignition coil (1, D, RUP, –).
4. Start the engine and let it run at idling speed.
5. Read off the dwell angle in % from the LED display and compare it with the vehicle manufacturer's recommendations. Please refer to the conversion table of Dwell Angle %: ∠° on page 7. Should you find any deviations, make the appropriate adjustment. If the dwell angle is too small the point gap is too large, and if the dwell angle is excessively large the point gap is too small.

DWELL

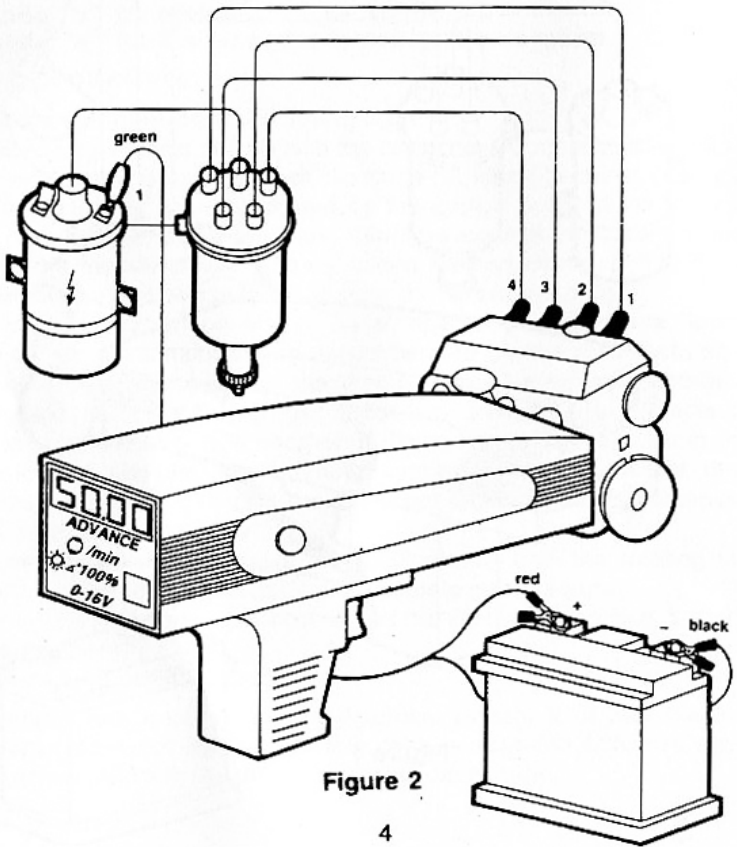


Figure 2

Tachometer

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

1. Press the tact switch to light the RPM indicator.
2. Connect the inductive pick-up to the First cylinder.
3. Connect the red clip to the positive battery terminal (+) and the black clip to the negative battery terminal (–). (See figure 1).
4. Start the engine and read off the rpm from the display. Compare the rpm with the figure recommended by the vehicle manufacturer. Should any deviations be found, make appropriate adjustments.

Voltmeter

The voltmeter can be used to check the battery voltage and the supply voltage to the various consumers, e.g. lamps, etc.

1. Testing of battery voltage under starting current load.
   a. Disconnect the ignition by pulling the plug off terminal 1 (1,D,RUP, –) on the ignition coil.
   b. Press the tact switch to light the VOLT indicator.
   c. Connect the black clip to the negative battery terminal (–) and the red, green clip to the positive battery terminal (+). (See figure 3)
   d. Have the car started by an assistant.
   e. Read off the voltage from the LED display.

If less than 9V is indicated have the battery checked professionally.

2. Measuring the voltage at consumers (e.g. lamps).
   For this test switch on the consumers.
   a. Connect the black clip to the negative battery terminal (–) and the red clip to the positive battery terminal (+).
   b. Connect the green clip to the positive terminal on the consumer.
   c. 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 connecting terminals, switches or parts of the leads.
   d. Should the voltage drop be greater than that specified in your owner's manual, it is advisable to consult a garage.

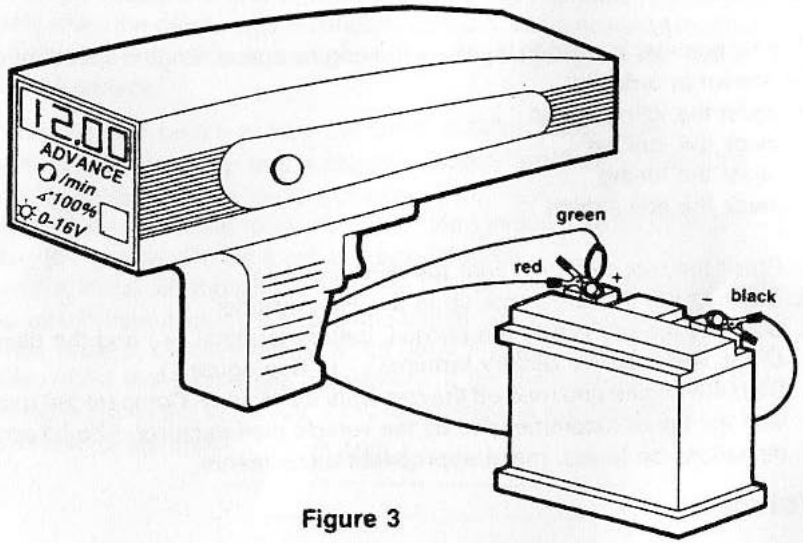
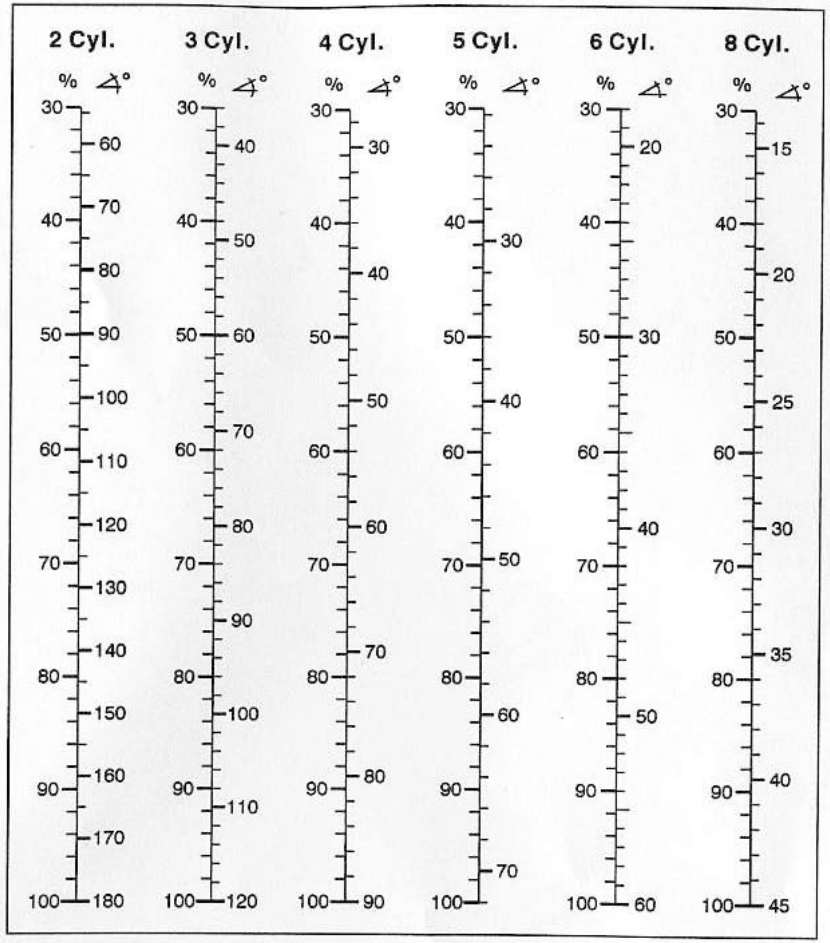


Figure 3

Admissible voltage drop

Type of lead	Admissible voltage in insulated CU lead	Admissible voltage drop in the entire circuit
Lamp leads from light switch terminal 30 to lights < 15W or to the trailer socket 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

(Conversion Table of Dwell Angle)



SPECIFICATION:

Advance: 0~60°	±(0.7% RDG+1%RNG)
TACH: 200-9990 RPM	±(0.7% RDG+1%RNG)
DWELL: 0-99.9%	±(0.7% RDG+1%RNG)
VOLTS: 0~16V	±(0.7% RDG+1%RNG)
Operation temperature:0~40°C	