

Clarke®



HIGH BEAM TIMING LIGHT

MODEL NO: CHBTL1

PART NO: 4003402

USER INSTRUCTIONS



ORIGINAL INSTRUCTIONS

GC1219 - ISS 1

INTRODUCTION

Thank you for purchasing this CLARKE Timing Light.

Before use, read the following information we are sure that you will enjoy many years of service from your timing light and maintain the efficiency of your car engine.

The Xenon bulb used in this light will provide the bright flash needed to see engine timing marks under bright lighting conditions including daylight. The bulb can be replaced by the user when necessary, reducing the need to return the light to your CLARKE dealer for repair.

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BASICS OF ENGINE TIMING

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 that explosion must be such that the maximum power is delivered to the engine piston. This is "timing". Each engine manufacturer determines the exact timing necessary for various engines so that optimum power is obtained from the fuel used. Due to normal engine and ignition system wear, the accuracy of the timing can be lost, reducing both power and fuel mileage. With the timing light, the timing can be reset to new car standards and regain lost power and fuel mileage.

Timing is given in degrees Before Top Dead Center (BTDC) or After Top Dead Center (ATDC) in the manufacturer's specifications.

In order to completely burn the air/fuel mixture in the engine cylinders, most timing is such that the spark occurs at a point several degrees before top dead center (for example, 4° BTDC) to ensure the full power of the explosion is obtained. See Figure 1 on page 4.

Two additional terms the engine manufacturers use when describing timing are "Advanced" and "Retarded". As shown in Figure 1 on page 4, when the timing is advanced, the spark will occur before the piston reaches the top of the engine cylinder (BTDC). On some late model cars equipped with various emission control devices, the timing is retarded so that the spark occurs after the piston has started to move down in the cylinder (ATDC). Engine timing is changed by adjustment of the ignition distributor.

In order to allow setting and adjustment of the engine timing, special timing marks are provided on the engine during assembly. In most cases, these marks appear on the engine vibration damper or fan pulley at the lower front of the engine. See Figure 1 on page 4. On some early engines, this mark was shown at the rear of the engine on the flywheel.

WHEN TO CHECK TIMING

The instant of spark plug firing is determined by the opening of the distributor ignition breaker points and will change any time the point gap or dwell angle is changed. In addition, normal wear on the contact breaker points will change the dwell and affect the timing. While cars equipped with the modern contact breakerless electronic ignition systems will not normally change timing since there are no contact breaker points, the timing light can still be used to note changes in timing caused by faults in the ignition system as well as for resetting timing when components are replaced.

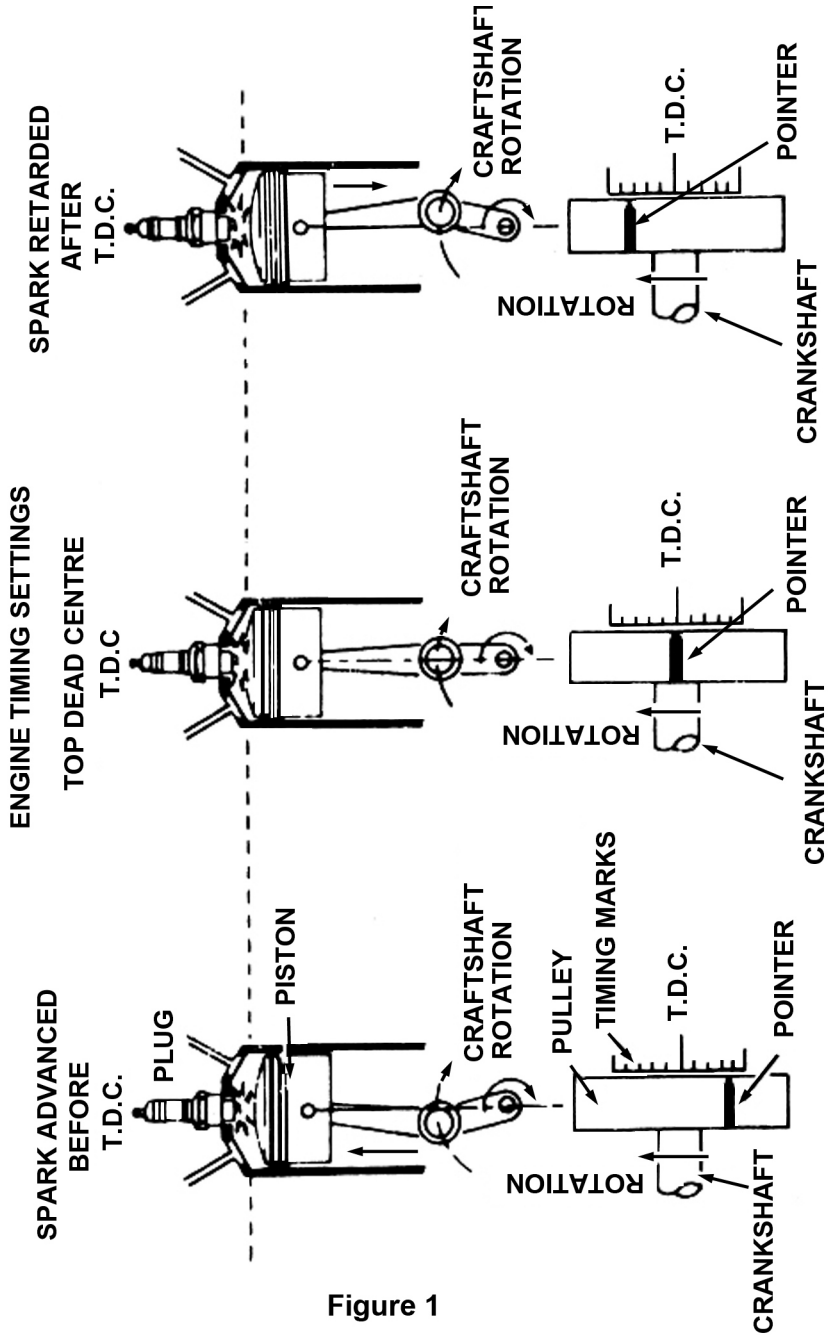


Figure 1

TIMING SPECIFICATIONS

Timing requirements vary from engine to engine and therefore the engine manufacturers specifications should always be referred to before making any adjustments.

These specifications are contained in the car owners manual, on the engine bay label (required on all cars manufactured since 1968) and in various publications. Many spark plug manufacturers such as Champion, Autolite and others also provide specifications.

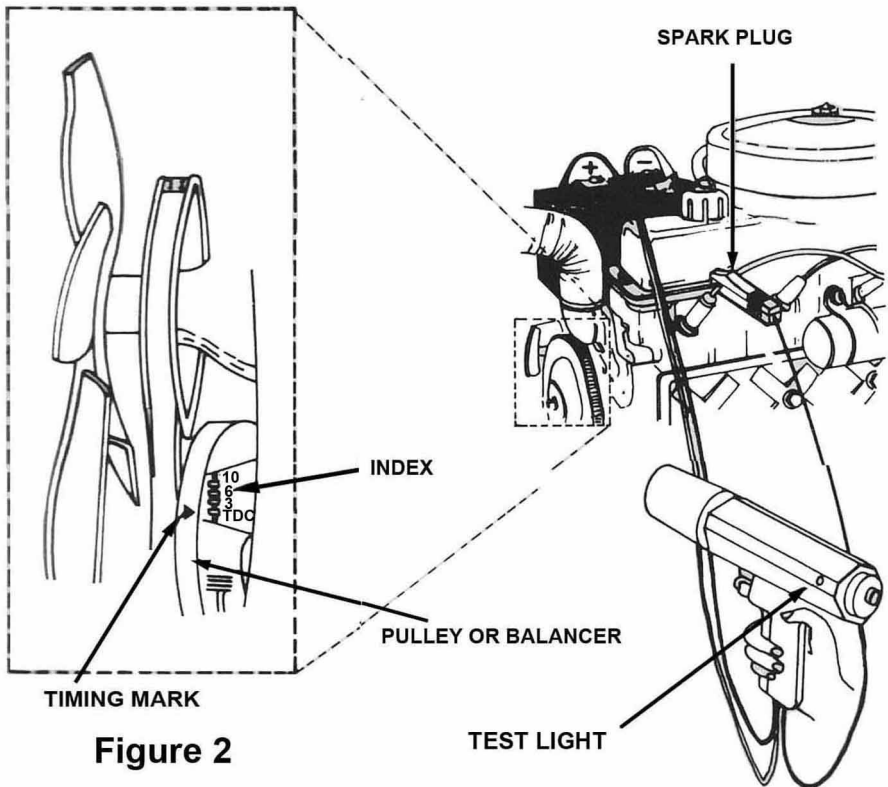


Figure 2

SAFETY PRECAUTIONS

1. DO NOT smoke, strike a match, or cause a spark in vicinity of the engine.
2. Remove all rings, bracelets, necklaces, and watches while working with a vehicle engine.
3. Take care not to drop a metal tool onto the battery or onto the moving parts of the engine.
4. DO NOT place the timing light on the hot engine surface and avoid the engine fan, fan belt or battery to prevent damage.
5. Take care when clipping the clamp to the spark plug lead. Risk of electric shock if the engine is running.
6. Take care of any moving parts such and drive belts etc.
7. DO NOT look directly at the timing light.

GENERAL OPERATING PROCEDURES



CAUTION: TAKE CARE WHEN WORKING AROUND A MOVING ENGINE. KEEP HANDS, TOOLS AND THE TIMING LIGHT CLEAR OF MOVING FAN, BELTS OR OTHER MOVING PARTS.

1. Locate the engine timing mark shown in figure 2 on page 5, and use a rag to clean any 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 easily seen.
2. Check the manufacturers specifications for correct timing for the engine being serviced.
3. Start and run the engine until its normal operating temperature is reached. (approximately 15 minutes) and stop the engine.
4. If specifications require, locate the vacuum tube going to the ignition distributor vacuum advance.
5. Disconnect and block the tube. A golf tee or small pencil may be used to block the tube.
6. Connect the timing light as shown in figure 3 on page 8.
7. Start the engine and operate at normal idle speed. Aim the timing light at the timing mark as figure 5 on page 9.
8. Trigger the timing light and observe the reading from the timing mark.
 - If the connection at any of the terminals or at the inductive clamp are not satisfactory, this will be indicated by the test light on the side of the unit.
9. Compare the reading obtained in step 8 with the manufacturers specification. If the timing is not as specified re-adjust as described in the following procedure (Adjusting the Timing to Specification)
10. Stop the engine.

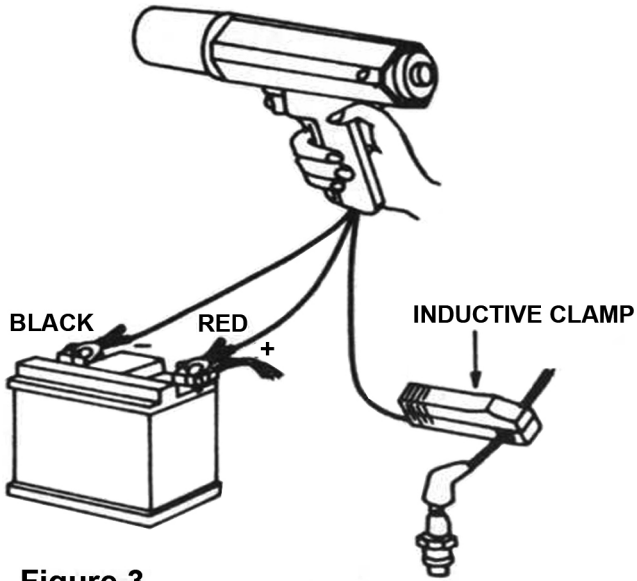


Figure 3

No 1 SPARK PLUG

USING AN ADVANCE TIMING LIGHT

CHECKING THE "IDLE TIMING"

1. Set the knob at "0" position as figure 4.
2. Follow the General Operating Procedures on page 7.

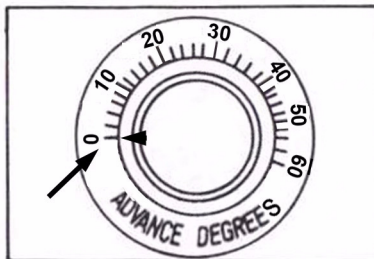


Figure 4

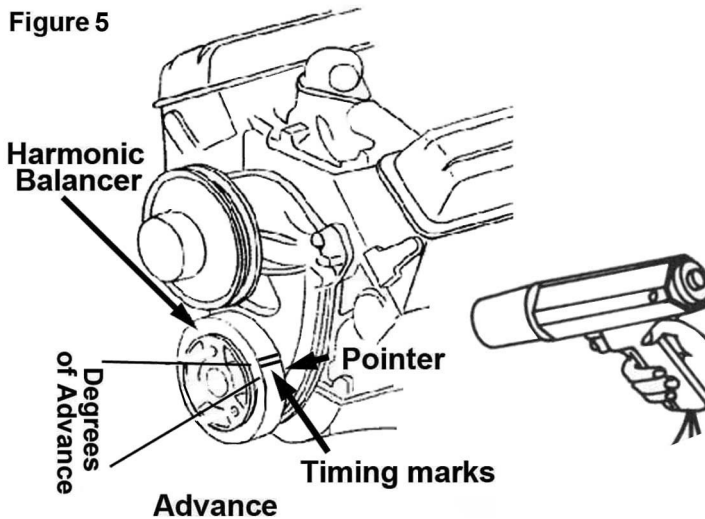
CHECKING THE "CENTRIFUGAL ADVANCE" & "VACUUM ADVANCE"

1. Follows the steps 1 to 6 of General Operating Procedures on page 7 except for increasing the engine speed to 2000 rpm.
2. Trigger the timing light and rotate the knob clockwise slowly and stop when the timing mark moves to "T.D.C." position.
3. Observe the reading from advance scale as shown on figure 4.
4. Compare the reading with the manufacturer's specifications.

ADJUSTING THE TIMING TO SPECIFICATION

1. Loosen the distributor hold-down locking bolts located at base of the distributor so that the distributor may be rotated back and forth. Do not overloosen or remove the bolts but leave them tight enough to prevent the distributor from turning by itself.
2. Start and run the engine.

Figure 5



3. Direct the timing light flash at the timing marks and slowly rotate the distributor right or left until the timing marks are aligned with the pointer. Stop the engine.
4. Tighten the distributor hold-down bolt taking care not to change the position of the distributor.
5. Start the engine and recheck the timing.

TESTING CENTRIFUGAL ADVANCE

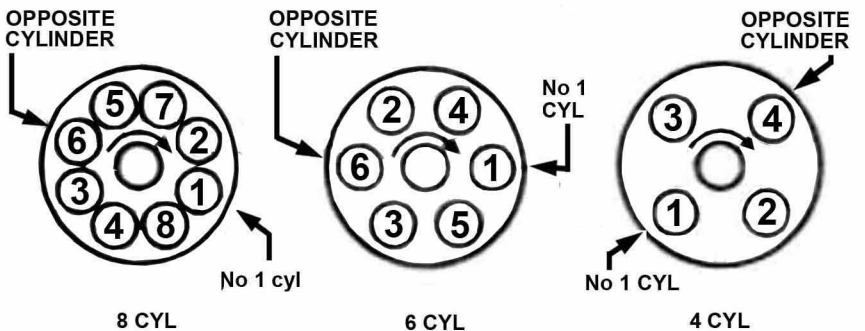
With the timing light still connected and with the vacuum line disconnected:

1. Speed the engine up slowly to the manufacturers recommended speed and watch the timing mark.
2. The timing mark should remain stationary until the engine reaches the manufacturer's specified speed. The timing mark should then move steadily. (See figure 5 on page 9)
3. If the mark does not move or if it moves erratically, the centrifugal (automatic) advance should be serviced as necessary.
4. To check the maximum advance it is necessary to mark the harmonic balancer with the maximum degree per the manufacturer's specifications and follow the manufacturer's procedures.

TESTING VACUUM ADVANCE

1. The vacuum line to the distributor must be connected to make this test.
2. Set the engine speed to 800 RPM or a speed necessary to apply vacuum to the distributor.
3. Aim the timing light and note the position of the timing mark.
4. Disconnect the vacuum tube.
5. If the timing mark does not move, the fault could be a blocked vacuum tube, a leaky diaphragm or a seized distributor plate and the distributor should be serviced as required.

Figure 6



THE OPPOSITE CYLINDER IS ALWAYS OPPOSITE NO 1 CYLINDER ON THE DISTRIBUTOR CAP

CHECKING DISTRIBUTOR CAM WEAR

1. This check is done after the timing has been set and the timing mark lines up with the reference pointer for No 1 cylinder.
2. Connect the timing light to the wire directly opposite (180°) No 1 cylinder on the distributor cap. (See figure 6 on page 10)
3. Start engine and aim the timing light towards the timing mark. The reading should be the same as when connected to No 1 cylinder.
4. If reading is not the same, probable cause is worn out distributor cam or bent distributor shaft. Repair as required.

SMALL ENGINES

The DC power timing light can be used on any combustion engine with impulse ignition, magneto ignition, such as motorcycles, lawn mowers, outboard motors, or any time there is a high voltage spark used for ignition.

When 12 Volt DC voltage is not available from the engine being tested, an external battery of 12V must be used. Connect a ground from the negative post of the external battery to the engine. Connect the red clip to the (+) positive terminal and the black clip to the (-) negative terminal of the battery. Connect the adaptor lead of the timing light to the correct spark plug.

ROTARY ENGINES

The timing light can be used on rotary engines.

Follow the manufacturer's specific instructions and specifications. Figure 7 on page 12 shows a typical procedure for the Mazda twin rotor engine.

1. Connect the red (+) and black (-) power lead clamps to the battery. Connect wire with the spark plug adaptor to the leading spark plug on the front rotor housing.
2. Start the engine and run at idle speed.
3. Aim the timing light at the timing indicator pin on the front cover.
4. Loosen the distributor locking nuts and rotate the leading side distributor body until the timing mark on the eccentric shaft pulley are in line with the timing indicator pin.
5. Tighten the locking nuts and re-check the timing.

6. Repeat the above step for setting the trailing side distributor timing with the timing light connected to the trailing spark plug.

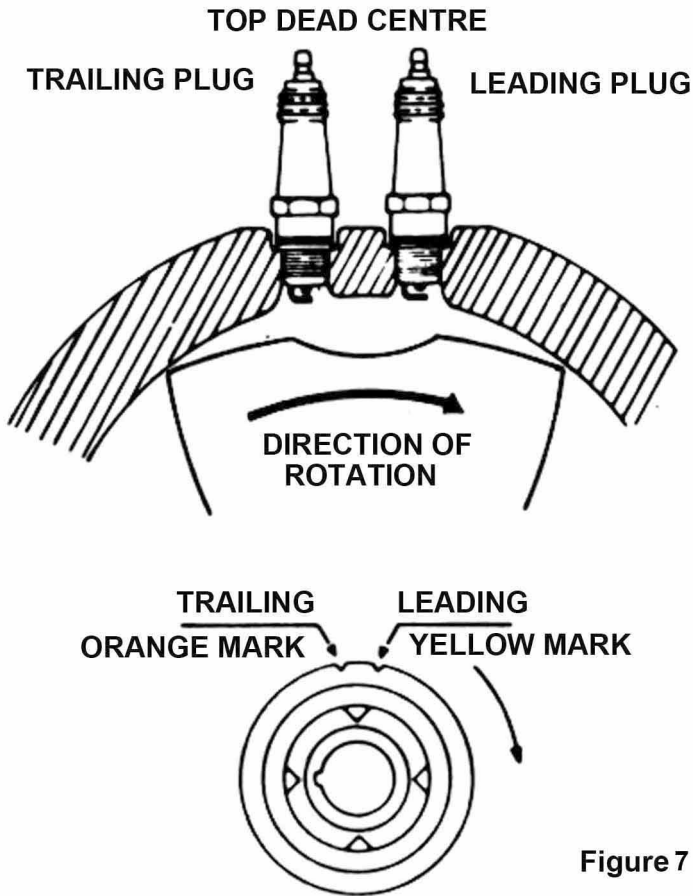


Figure 7

FAULTFINDING

Symptom	Probable Cause	Solution
No flash	Trigger in OFF position	Set trigger to ON position
	Battery clips connected in reverse	Reverse the battery clip connections
	Poor connection of clips	Make sure the clips are connected to a clean battery terminal
No flash but double check indicator is ON	Wrong direction of inductive clamp	Point the arrow on the clamp towards the plug
	Weak ignition or spark plug. Plug gap is too small	Connect to other plugs or spark plug leads. If light flashes, then repair the bad plug or correct the gap.
	Faulty lamp	Replace it
Light flashes intermittently	Timing light high tension lead lying on or too close to the other spark plug leads.	Place the high tension lead so that it is routed away from the other plug leads.

All timing lights are tested before they are shipped from the factory and improper operation is usually caused by incorrect connection. Please observe the above troubleshooting procedure if the timing light fails to perform satisfactorily.

CARE AND MAINTENANCE

Always keep the unit clean including the lamp lens.

Keep the clamps clean and the cables tidy.

Always check for splits or cuts in the cables.

XENON LAMP REPLACEMENT

If the fault finding procedures do not correct the fault the most probable cause is a defective xenon lamp.

The lamp may have a black spot around the anode, this is perfectly normal. However, if the lamp is completely black it has reached its end of life and should be replaced.

Draw the rubber sleeve off the end of the timing light body to expose the lamp access cover. This can be lifted away and the bulb replaced. (See Figure 8)

- Take care when handling new lamps and avoid touching them with bare hands.

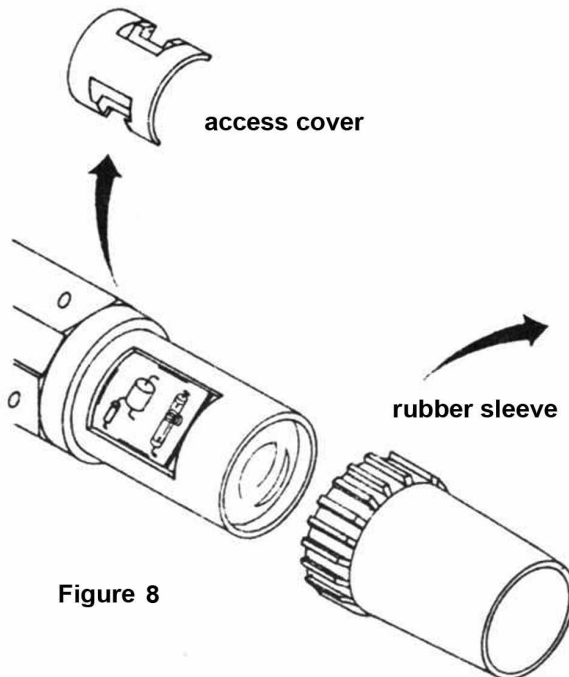


Figure 8

ENVIRONMENTAL RECYCLING POLICY



Through purchase of this product, the customer is taking on the obligation to deal with the WEEE in accordance with the WEEE regulations in relation to the treatment, recycling & recovery and environmentally sound disposal of the WEEE.

In effect, this means that this product must not be disposed of with general household waste. It must be disposed of according to the laws governing Waste Electrical and Electronic Equipment (WEEE) at a recognised disposal facility.

GUARANTEE

This CLARKE product is guaranteed against faulty manufacture for a period of 12 months from the date of purchase. Please keep your receipt as proof of purchase.

This guarantee is invalid if the product is found to have been abused or tampered with in any way, or not used for the purpose for which it was intended.

Faulty goods should be returned to their place of purchase, no product can be returned to us without prior permission.

This guarantee does not effect your statutory rights.

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