

**XENON TIMING LIGHT**

***OPERATING  
INSTRUCTIONS***

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**NOTE:** Do not place the instrument on the hot engine surface and avoid engine fan, fan belt, and battery to prevent damage.

## **IN TRODUCTION**

Congratulations, you are now the owner of one of the finest Timing Lights on the market today. if you will take a few moments to read through the following information we are sure that you will enjoy many years of service from your Timing Light and through its use increase the efficiency of your car's engine.

The special "Xenon" bulb used in these lights will provide the ultra bright flash needed to see engine timing marks under most bright lighting conditions, even during normal daylight. In several models the bulb can be replaced by the user when needed reducing the need to return the light to the factory for service.

## **WHAT IS 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 at the factory the exact timing necessary for various engines so that each ounce of power is obtained from every gallon of fuel. Due to normal engine and ignition system wear, the timing can change and will reduce both power and mileage. With the Xenon timing light, the car owner can reset the timing to the new car standards and regain lost power and increase 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 car's engine cylinders, most timing is such that the spark occurs at a point several degrees before top dead center (for example, 4° BTDC) to assure that full power of the explosion is obtained. See Figure 1.

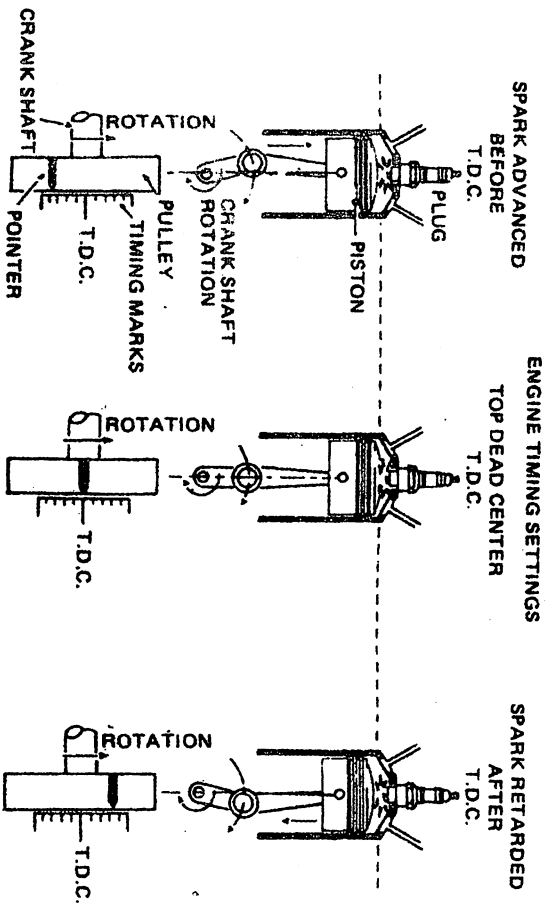


Figure 1

Two additional terms the engine manufacturers use when describing timing are "Advanced" and "Retarded". As shown in Figure 1, 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 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 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. See Figure 1. 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 breaker point-rubbing block will change the dwell and affect the timing. While cars equipped with the new "breaker less Electronic Ignition Systems" will not normally change timing since there are no breaker points, 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.

### **TIMING SPECIFICATIONS**

As noted in earlier paragraphs, timing requirements are vary from engine to engine and for this reason the engine manufacturers specification- s should always be referred to before making any adjustments. These specificatio are contained in the car owners manual,

on the under hood decal required on all cars printed by such companies as "Motor", "Chilton", "Petersen" and others. Many spark plug manufacturers such as "hampion" "Autolite" and others also provide specifications.

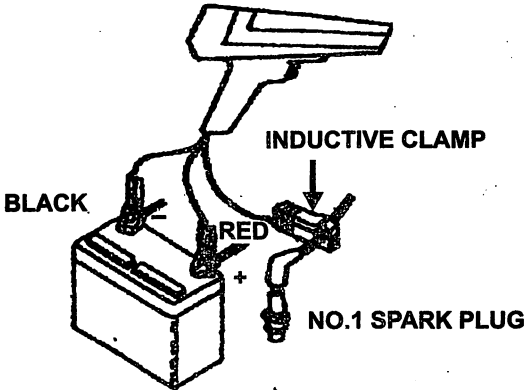
### **OPERATING PROCEDURES IN GENERAL**

1. Locate engine-timing mark (see figure 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 easily seen.
2. Check manufacturers specifications for correct timing for engine being serviced.
3. Start and run engine until normal operating temperature is reached. Approximately 15 minutes. Stop engine.
4. If specifications require, locate the vacuum line going to the ignition distributor vacuum advance and disconnect and plug the line. A golf tee or small pencil may be used to seal the line.
5. Connect the timing light as shown in figure 2.
6. Start engine and operate at normal idle speed. Aim the timing light to timing mark as figure 4.
7. Trigger the timing light and observe the reading from timing mark.

**CAUTION:** Use care when working around moving engine. The action of the "troboscopic" to keep hands, tools and timing light clear of moving fan, belts or other moving parts.

8. Compare reading obtained in step 7 with manufacturers specifications. If timing is not as specified readjust as described in the following procedure.  
Stop engine.

## INDUCTIVE TIMING LIGHT HOOK-UP



## D.C. POWERED TIMING LIGHT HOOK-UP

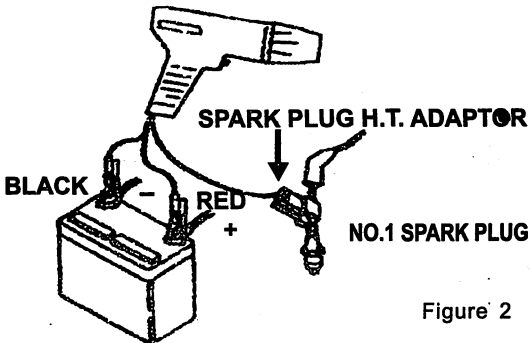


Figure 2

## TO USE AN ADVANCE TIMING LIGHT CHECKING THE "IDLE TIMING"

Get the knob at "timing" position as figure 3.  
Follows the general procedures on page 4.

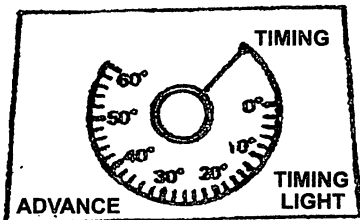


Figure 3

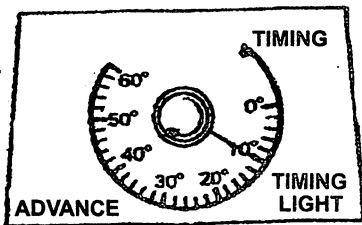


Figure 4

## CHECKING THE "CENTRIFUGAL ADVANCE" AND "VACUUM ADVANCE"

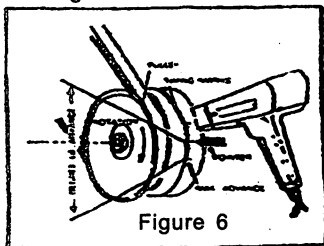
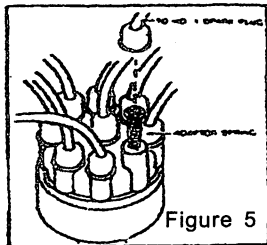
1. Follows the step 1 to 6 of general procedures on page except increase the engine speed to 2000 rpm.
2. Trigger the timing light and rotate the knob clockwise slowly and stop until the timing mark moves to "T.D.C" or "O" position.
3. Observe the reading from advance scale as shown On page 4.



4. Compare the reading with manufacturer's Specifications.

#### ADJUSTING TIMING TO SPECIFICATIONS:

1. Loosen distributor hold down locking bolt located at base of distributor enough so that distributor may be rotated back and forth. Do not over loosen or remove bolt but leave tight enough to prevent distributor from turning by itself.
2. Start and run engine.
3. Direct timing light flash at timing marks and slowly rotate distributor right and left until timing marks are aligned with pointer. See figure 6. Stop engine.
4. Tighten distributor hold down bolt—using care not to change position of distributor.
5. Start engine and recheck timing.



#### NOTE:

In some cases the ignition spark may jump to the engine block or baffle. This may occur on those engines such as late model Ford B-cylinders where the timing light adaptor spring is too close to engine metal parts. In such cases, trace the wire from the spark plug to the distributor or cap. Disconnect the wire at the cap and install the adaptor spring as shown in figure 5.

## TESTING CENTRIFUGAL ADVANCE

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

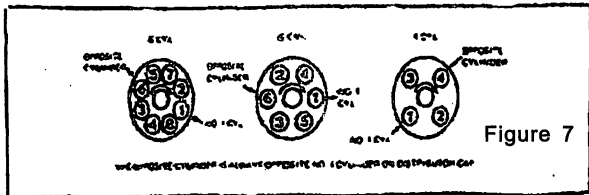
1. Speed the engine up slowly and watch the timing mark.
2. The timing mark should remain stationary until the engine reaches the manufacturer's specified speed.

The timing mark should then move steadily and without jerking. (See figure 6.)

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 manufacturer's specifications and follow manufacturer's procedures.

## TESTING VACUUM ADVANCE

1. The vacuum line to the distributor must be connected to make this test.
2. Set engine speed to 800 R.P.M. or speed necessary to apply vacuum to distributor.
3. Aim the timing light and note position of the timing Mark.
4. Disconnect vacuum line.
5. If the timing mark does not move, the trouble could be a plugged line. A leaky diaphragm or a frozen distributor Plate, and the distributor should be serviced as required.



## **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 #1 cylinder.
- 2.Connect the timing light to the wire directly opposite( $180^{\circ}$ )#1 cylinder on the distributor cap.(See figure 7.)
- 3.Start engine and aim the timing light towards the timing mark. The reading should be the same as when connected to #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 proper spark plug.

## **ROTARY ENGINE**

The Timing Light can be used on Rotary engines. Follow the manufacturer's specific instructions and

specifications. Below is a typical procedure for the Mazda twin rotor engine.

1. Connect the Red and Black power leads 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 recheck the timing.
6. Repeat the above step for setting the trailing side distributor timing with the timing light connected to the trailing spark plug.

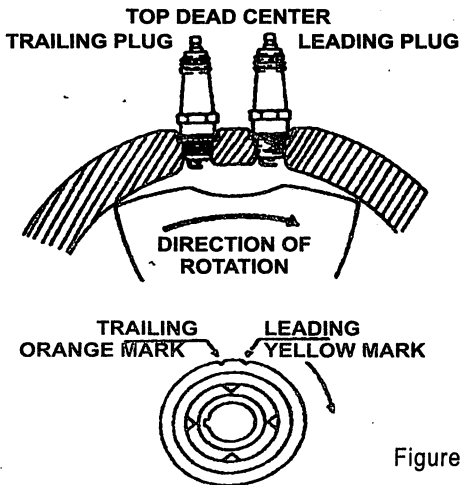


Figure 8

## **TROUBLE SHOOTING PROCEDURE**

All timing lights are tested 100% before they are shipped from the factory and improper operation is usually caused by incorrect hook-up. Please observe the above trouble shooting procedure if the timing light fails to perform satisfactorily.

<b>SYMPTOM</b>	<b>PROBABLE CAUSE</b>	<b>SOLUTION</b>
<b>NO FLASH</b>	Switch in "OFF" position.	Move switch to "ON" position,
	Battery clips connected backward,	Reverse the battery clip connections.
	Poor connection of clips	Make sure the clips is connected to a clean battery post.
<b>NO FLASH but DOUBLE CHECK INDICATOR IS "ON"</b>	Wrong direction of inductive clamp	Toward the arrow on clamp to # 1 plug.
	Weak ignition or spark plug. The gap is too close	Connect to other plugs or spark plug wires, If flashes then repair the plug or gap,
	Fault lamp	Replace it,
<b>LIGHT FLASHES INTERMITTENTLY</b>	Timing light high-tension wire lying on or too close to the other spark plug wires.	Place the high tension wire in good order so it is routed away from the other spark plug wires.

## **XENON LAMP REPLACEMENT**

If procedures outlined in above do not correct the failure, 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. For replacement xenon lamp, please contact the staff in the store. For the consumer non-replaceable model you may send to our service dept or contact your dealer for service.

## **INSTALLING XENON LAMP**

There are several different bulbs have been used in the Timing Lights and each is removed and installed differently. For consumer replaceable xenon lamp, please follow below procedures:

1. When changing Xenon Lamp, be sure timing light is disconnected.
2. Remove Xenon Lamp by turning the lamp retainer cap one quarter turn in either direction, (See Figure 9.)
3. Insert the new lamp straight into the timing light. Make sure the metal pin of the lamp touch the center of the inner disc. (See Figure 10.)
4. Install lamp retainer cap, Line up the index tabs on the lamp retainer cap with the key way in the timing light and push the retainer cap into the timing light case. Turn the retainer cap one quarter turn.

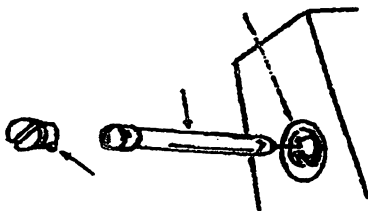


Figure 9

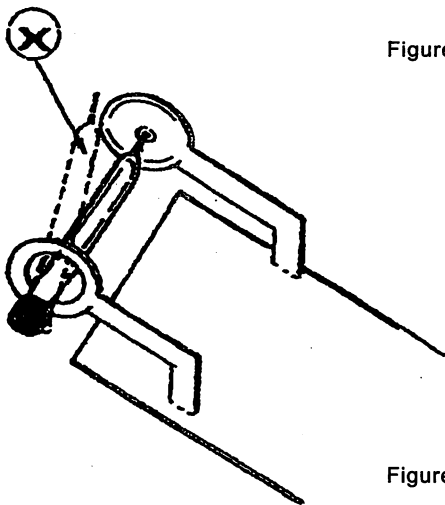


Figure 10

**NOTE: The inductive clamp is fragile  
DO NOT DROP.**