SELF POWERED TIMING LIGHT

Item Number W80587

OWNER'S MANUAL

Performance Tool®

⚠**WARNING:** *READ, UNDERSTAND AND FOLLOW ALL INSTRUCTIONS AND WARNINGS BEFORE OPERATING THIS TOOL. FAILURE TO DO SO MAY RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE AND WILL VOID WARRANTY.*

PT® Performance Tool

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. Two additional terms that manufacturers use when describing timing are; "Advanced" and "Retarded." 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 harmonic balancer attached to the crank pulley at the lower front of the engine.

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 have the same affect on the point gap or dwell angle. 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 or the vehicle is tuned.

TIMING SPECIFICATIONS

As noted in earlier paragraphs, timing requirements vary from engine to engine and for this reason the engine manufacturer's specification-should always be referred to before making and adjustment. These specifications are contained in the car owner's manual, and typically on the under hood decal specifications.

SAFETY GUIDELINES / DEFINITIONS

This instruction manual is intended for your benefit. Please read and follow the safety, installation, maintenance and troubleshooting steps described within to ensure your safety and satisfaction. The contents of this instruction manual are based upon the latest product information available at the time of publication. The manufacturer reserves the right to make product changes at any time without notice.

⚠**WARNING:** Read and understand this entire instruction manual before attempting to assemble, install, operate or maintain this product. Failure to comply with the instructions may result in serious personal injury and/or property damage!

The following signal words are used to emphasize safety warnings that must be followed when using this product:

⚠**DANGER:** Indicates an imminently hazardous situation that, if not avoided, WILL result in death or serious injury.

⚠**WARNING:** Indicates a potentially hazardous situation that, if not avoided, COULD result in death or serious injury.

⚠**CAUTION:** Indicates a potentially hazardous situation that, if not avoided, MAY result in minor or moderate injury.

⚠**NOTE:** Indicates important information, which if not followed, MAY cause damage to equipment.

GENERAL WARNINGS

1. Keep work area clean and well lit.
2. Keep children away. Children must never be allowed in the work area.
3. Dress properly. Do not wear loose clothing or jewelry as they can be caught in moving engine parts. Protective clothes and nonskid footwear are recommended when working. Wear restrictive hair covering to contain long hair.
4. Wear ANSI-approved impact safety goggles and heavy-duty work gloves at all times during setup and use.
5. Do not overreach. Keep proper footing and balance at all times.
6. Maintain timing light with care. Keep the timing light clean for better and safer performance. Inspect cables periodically, and if damaged, have them repaired by a qualified technician.
7. Stay alert. Watch what you are doing, use common sense. Do not operate timing light when you are tired.
8. Do not operate timing light if under the influence of alcohol or drugs. Read warning labels if taking prescription medicine to determine if your judgment or reflexes are impaired while taking drugs. If there is any doubt, do not operate the tool.
9. The warnings, cautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors, which cannot be built into this product, but must be supplied by the operator.
10. Do not start an engine in an enclosed area (like a garage). A running gasoline engine generates carbon monoxide; carbon monoxide is a colorless, odorless gas that can cause serious injury and death, if inhaled.
11. Keep hands away from the moving parts and hot parts of vehicle's engine.

GENERAL OPERATING PROCEDURES

1. Locate engine-timing mark, see figure 1. Us 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 manufacturer's 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 at the timing mark, be cautious of moving parts.
7. Trigger the timing light and observe the reading from timing mark.

⚠**CAUTION:** Use care when working around moving engine. The stroboscopic action will make moving parts appear to be in slow motion. 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
9. Stop engine.

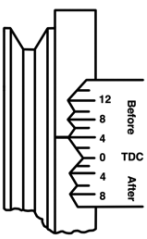
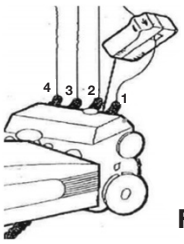


Fig. 1



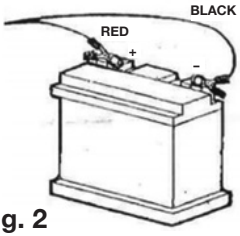


Fig. 2

OPERATION

ADJUSTING TIMING TO SPECIFICATION

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 warm engine to normal operating temperature
3. Direct timing light flash at timing marks and slowly rotate distributor right and left until timing marks re aligned with pointer to factory spec., see figure 1 above.
4. Stop engine.
5. Tighten distributor hold down bolt-using care not to over tighten.
6. Start engine and recheck timing.

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

Adjust the advance to 0 (zero) on the timing light with the + an – buttons located on the back of the timing light, see figure 3.

Follow the "General Operating Procedures" from above.

1. Pull the trigger on the timing light, point the light at the timing mark on the vehicle.
2. Use the + or – buttons on the timing light see fig. 3, to move the mark to the 0 (zero) line on the harmonic balancer in fig. 4
3. Look at the figure on the back of the timing light, this is your Idle Timing.

CHECKING THE CENTRIFUGAL ADVANCE AND VACUUM ADVANCE

1. Follow the "Operating Procedures In General" from above, except increase the engine speed to 2000 rpm. Refer to factory owner's manual for the recommended rpm.
2. Trigger the timing light and use the + an – buttons located on the back of the timing light. Stop when the timing mark moves to TDC or O position.
3. Look at the figure on the back of the timing light, add this to your idle timing figure. This is your Total Timing.
4. Compare the reading with manufacturer's specification.

Fig. 3

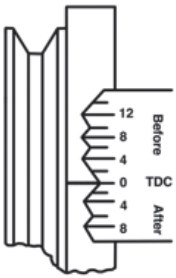


Fig. 4

TESTING CENTRIFUGAL ADVANCE

1. With the timing light still connected and with the vacuum line disconnected:
2. Speed the engine up slowly and watch the timing mark.
3. The timing mark should remain stationary until the engine reaches the manufactures specified speed. The timing mark should then move steadily and without jerking.
4. If the mark does not move, or if it moves erratically, the centrifugal (automatic) advance should be serviced as necessary.
5. To check the maximum advance stop the engine.
6. It's necessary to mark the harmonic balance with the maximum degree per manufacturer's specifications and follow manufacture' procedures.

OPERATION CONTINUED

TESTING VACUUM ADVANCE

The vacuum line to the distributor must be connected to make this test.

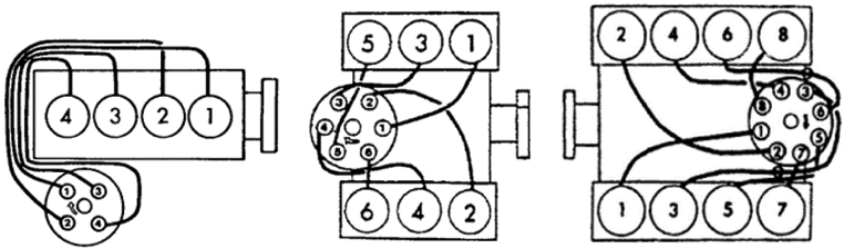
1. Set engine speed to 800 R.P.M or speed necessary to apply vacuum to distributor.
2. Aim the timing light and note position of the timing Mark.
3. Disconnect vacuum line.
4. If the timing mark does not move, the trouble could be a plugged line. A leaky diaphragm or a frozen distributor Plate, and the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

CHECKING DISTRIBUTOR CAM WEAR

This check is done after the timing has been set and the timing mark lines up with the reference pointer for #1 cylinder.

1. Connect the timing light to the wire directly opposite (180) #1 cylinder on the distributor cap, see figure 5.
2. Start engine and aim the timing light towards the timing mark. The reading should be the same as when connected to #1 cylinder.
3. If reading is not the same, probable cause is worm out distributor cam or bent distributor shaft. Repair as required.

4-Cyl move from #1 to #4 **6-Cyl move from #1 to #4** **8-Cyl move from #1 to #6**



SMALL ENGINES

The DC power Timing Light can be used on any combustion engine with impulse ignition, magneto ignition, such as motorcycle, 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 proper spark plug.

TROUBLE SHOOTING

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 below trouble shooting procedure if the timing light fails to perform satisfactorily.

SYMPTOM	PROBABLE CAUSE	SOLUTION
No Flash	Switch in “OFF” position.	Move switch to “ON” position.
	Battery clips connected backwards.	Reverse the battery clip connection.
	Poor connection of clips.	Make sure the clip is connected to a clean battery post.
No Flash but double check indictor is “ON”	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 gap.
	Fault Lamp	Replace it.
Light Flashes Intermittently	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.