Owner's Manual & Safety Instructions

Save This Manual Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual and the receipt in a safe and dry place for future reference. 21a

ZURICH™

DIGITAL TIMING LIGHT

Visit our website at: http://www.harborfreight.com
Email our technical support at: productsupport@harborfreight.com **57678**

When unpacking, make sure that the product is intact and undamaged. If any parts are missing or broken, please call 1-888-866-5797 as soon as possible.

⚠WARNING

Read this material before using this product. Failure to do so can result in serious injury. SAVE THIS MANUAL.

Specifications

Power Input	10 - 16 VDC
Lead Length	6 ft
Timing Advance	2-cycle and 4-cycle (switchable) 0° to 90°
Dwell	0° to 180° / 2-12 cylinders
Tachometer	249 to 9,990 RPM
Bulb	Xenon

IMPORTANT SAFETY INFORMATION

⚠WARNING **Read all safety warnings and instructions.**
Failure to follow the warnings and instructions may result in serious injury.

1. **Work area safety**
   a. Keep work area clean and well lit. *Cluttered or dark areas invite accidents.*
   b. Keep children and bystanders away while operating a diagnostic tool. *Distractions can cause you to lose control.*
2. **Electrical safety**
   a. Do not expose diagnostic tools to rain or wet conditions. *Water entering a diagnostic tool will increase the risk of electric shock.*
   b. Do not abuse the cords. Never use the cords for carrying, pulling or unplugging the diagnostic tool. Keep cords away from heat, oil, sharp edges or moving parts. *Damaged or entangled cords increase the risk of electric shock.*
3. **Personal safety**
   a. Stay alert, watch what you are doing and use common sense when operating a diagnostic tool. Do not use a diagnostic tool while you are tired or under the influence of drugs, alcohol or medication. *A moment of inattention while operating diagnostic tools may result in serious personal injury.*
   b. Use safety equipment. Always wear eye protection. *Safety equipment such as dust mask, non-skid safety shoes, hard hat, or hearing protection used for appropriate conditions will reduce personal injuries.*
   c. Avoid accidental starting. Ensure the switch is in the off-position before plugging in. *Carrying diagnostic tools with the finger on the switch or plugging in diagnostic tools that have the switch on invites accidents.*
   d. Do not overreach. Keep proper footing and balance at all times. *This enables better control of the diagnostic tool in unexpected situations.*
   e. Dress properly. Do not wear loose clothing or jewelry. Keep hair, clothing and gloves away from moving parts. *Loose clothes, jewelry or long hair can be caught in moving parts.*

4. **Diagnostic tool use and care**
   a. Do not force the diagnostic tool. Use the correct diagnostic tool for the application. *The correct diagnostic tool will do the job better and safer at the rate for which it was designed.*
   b. Do not use the diagnostic tool if the trigger does not turn it on and off. *Any diagnostic tool that cannot be controlled with the trigger is dangerous and must be repaired.*
   c. Store idle diagnostic tools out of the reach of children and do not allow persons unfamiliar with the diagnostic tool or these instructions to operate the diagnostic tool. *Diagnostic tools are dangerous in the hands of untrained users.*
   d. Maintain diagnostic tools. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the diagnostic tool's operation. If damaged, have the diagnostic tool repaired before use. *Many accidents are caused by poorly maintained diagnostic tools.*
   e. Use the diagnostic tool and accessories, in accordance with these instructions and in the manner intended for the particular type of diagnostic tool, taking into account the working conditions and the work to be performed. *Use of the diagnostic tool for operations different from those intended could result in a hazardous situation.*
5. **Service**
   a. Have the diagnostic tool serviced by a qualified repair person using only identical replacement parts. *This will ensure that the safety of the diagnostic tool is maintained*.

Specific Safety Rules

1. Maintain labels and nameplates on the tool. These carry important safety information. If unreadable or missing, contact Harbor Freight Tools for a replacement.
2. Avoid unintentional starting. Prepare to begin work before connecting the tool.
3. This product is not a toy. Keep it out of reach of children.
4. People with pacemakers should consult their physician(s) before use. Electromagnetic fields in close proximity to heart pacemaker could cause pacemaker interference or pacemaker failure.
   Caution is necessary when near coil, spark plug cables, or distributor of running engine. Engine should be off during distributor adjustment.

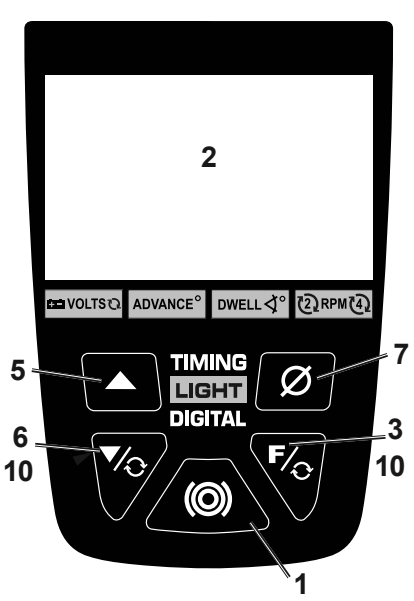
SAVE THESE INSTRUCTIONS.

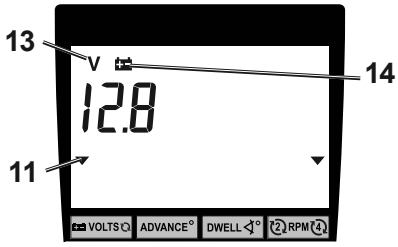
Setup - Before Use:

Read the ENTIRE IMPORTANT SAFETY INFORMATION section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

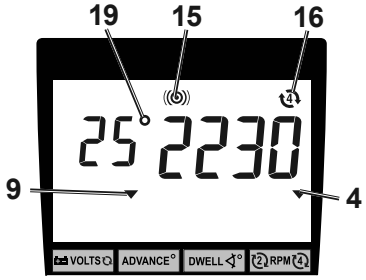
Functions

Control Panel

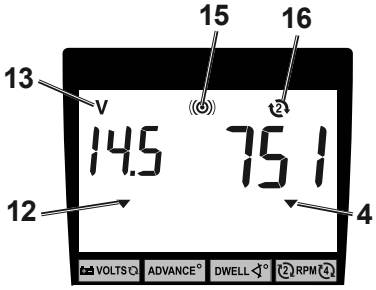




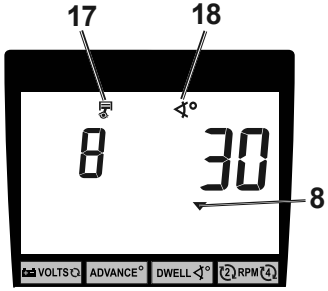
BATTERY VOLTAGE MODE



ADVANCE MODE



VOLTAGE/RPM MODE



DWELL MODE

Item	Description	Function
1	Flash Switch	Push to turn strobe light on and push again to turn light off.
2	Display	Backlit digital display showing engine operating parameters including engine speed (RPM), advance (degrees), dwell angle (degrees), and battery and charging system voltage. Displayed information depends on selected operating mode.
3	Function (F) Switch	Selects operating mode (voltage/RPM, advance or dwell).
4	RPM Indicator	Displays when 2-cycle (DIS) or 4-cycle RPM mode is selected.
5	Cylinder/Advance Increment Switch	• Dwell Mode - when dwell mode selected, increases cylinder setting for dwell check. • Advance Mode - when advance mode selected, increases degree of advance.
6	Cylinder/Advance Decrement Switch	• Dwell Mode - when dwell mode selected, reduces cylinder setting for dwell check. • Advance Mode - when advance mode selected, reduces degree of advance.
7	Zeroing Switch	When advance mode selected, returns advance degrees to zero.
8	Dwell Indicator	When dwell mode selected, displays dwell angle and number of cylinders.
9	Advance Indicator	When advance mode selected, displays degrees advance and engine RPM.
10	Ignition System Selection	Selects timing light operating mode: 2-cycle (DIS) or 4-cycle by pressing both the Function (F) and Cylinder/Advance Decrement switches at the same time.
11	Battery Volts indicator	When battery mode selected, displays battery voltage.
12	Charging System Battery Volts Indicator	When Voltage/RMP mode selected, displays charging system battery voltage and engine RMP.
13	Volt Symbol	Displays when voltage mode selected.
14	Battery Symbol	Displays when battery voltage mode selected.
15	Flash Symbol	Blinks when strobe light operating.
16	Ignition Mode Symbol	Displays when ignition system selected.
17	Cylinder Symbol	Displays when dwell mode selected.
18	Dwell Angle Symbol	Displays when dwell mode selected.
19	Advance Degree Symbol	Displays when advance mode selected.

Timing Light Basics

Automobile engines work by mixing air, fuel and a spark to ignite the fuel/air mixture, creating an explosion, that powers the vehicle. Maximum power from the explosion must be delivered to the engine at a precise instant. Attaining that precise instant is called “Timing”. Timing is essential for fuel economy and power. Automobile engine manufacturers determine the exact timing necessary for every engine they build. Normal engine and ignition system wear causes the timing to change, reducing both fuel efficiency and power.

Engine manufacturers use two terms when describing timing, “advanced” and “retarded”. Timing is advanced when the spark occurs before the piston reaches the top of a cylinder. Timing is retarded when the spark occurs after the piston has started down in the cylinder. Timing is changed by adjusting the ignition distributor.

To set timing, the engine manufacturer provides “timing marks” on the engine’s vibration damper. Read the vehicle’s manual or contact the manufacturer for the location of timing marks on the engine. Also, refer to the vehicle service manual or contact the manufacturer for the timing specifications for the particular engine.

When to Check Timing

The instant that the spark plug fires is determined by the opening of the distributor ignition breaker points and will change any time the point gap or dwell angle is changed. Normal wear on the breaker point rubbing block will change the dwell and effect the timing.

Most late model vehicles are equipped with “breakerless electronic ignition systems” and will not allow a change in timing, because there are no breaker points. The Timing Light can still be used to note changes in the timing caused by problems in the ignition system or for resetting the timing when components are changed (i.e. removed and/or replaced).

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Operating Instructions

Read the ENTIRE IMPORTANT SAFETY INFORMATION section at the beginning of this document including all text under subheadings therein before set up or use of this product.

⚠WARNING

TO AVOID SERIOUS INJURY: Be careful working around a running engine. Moving belts and fans can cause severe serious injury if contacted. Metal engine parts are very hot. Do not contact any part of the engine.

Note: These general instructions will not apply to all engine designs and/or vehicles. Consult your engine manufacturer's service instructions which supersede these instructions.

Timing Light Connection

1. **IMPORTANT! Turn ignition off. Do not connect Timing Light with the ignition on or engine running.**
2. Clamp Inductive Pickup Clip around No. 1 spark plug wire with arrow pointing toward spark plug.
3. Connect Green Dwell Clip to the negative (tach) side of the ignition coil (if applicable).
4. Connect Battery Clips to battery:
   a. Connect RED clip to battery positive (+) terminal.
   b. Connect Black clip to battery negative (–) terminal or chassis ground.
5. Attach Pickup Leads to bottom of the Timing Light's Handle.

Voltmeter Operation

1. Connect the Timing Light as described in *Timing Light Connection* page 7.
2. Always check battery and charging system voltage before performing timing check.
3. With the Timing Light connected and **engine off**, the Timing Light is in **Battery Voltage Mode,** the following information will be displayed:
   - the Battery Volts indicator (11),
   - Volts symbol (13),
   - Battery symbol (14),
   - the battery voltage.
4. When the **engine is started,** the Timing Light changes to **Voltage/RPM Mode**, the following information will be displayed:
   - the Charging System Battery Volts indicator (12),
   - Volts symbol (13),
   - Ignition Mode symbol (16) - either 2-cycle (DIS) or 4-cycle,
   - the charging system voltage and engine RPM.

Checking Dwell Angle

The dwell angle check can be performed for vehicles equipped with conventional or electronic ignition systems.

1. Connect the Timing Light as described in *Timing Light Connection* page 7.
2. Start engine and run it until it reaches normal operating temperature.

3. Press Function (F) switch (3) as needed to select **Dwell Mode**, the following information will be displayed:
   - the Dwell Indicator (8),
   - Cylinder Symbol (17),
   - Dwell Angle Symbol (18),
4. Press Cylinder/Advance Increment (5) and Decrement (6) buttons as needed to select the appropriate number of cylinders in the vehicle under test. The Display will show the number of cylinders selected and the Dwell Angle.
5. Compare Dwell Angle to the vehicle manufacturer's specifications. If its needs adjustment, refer to the vehicle's service manual for adjustment procedure.
6. When finished, turn off ignition and disconnect the Timing Light from the engine.

Initial Timing Check (using No. 1 Cylinder)

Refer to the vehicle manufacturer's test procedure and specifications when performing timing check. Timing procedures vary from vehicle to vehicle. Refer to the Vehicle Emission Control Label or vehicle's service manual.

1. Connect the Timing Light as described in *Timing Light Connection* page 7.
2. Make sure the proper operating mode is selected: 2-cycle (DIS) or 4-cycle.
3. If the vehicle is equipped with distributor points, check dwell as described in *Checking Dwell Angle* on page 7. Make any adjustments to the dwell angle before performing timing check.
4. Start engine and run it until it reaches normal operating temperature.
   a. The Flash Symbol (15) will blink indicating the strobe light is operating.
   b. Press both Ignition System Selection buttons (3, 10 and 6, 10) at the same time and select either 2-cycle (DIS) or 4-cycle mode. The Ignition Mode Symbol (16) will display the selected mode.
   c. Press Function (F) switch (3) as needed to select **Voltage/RPM Mode**, the following information will be displayed:
      - the RPM Indicator (4),
      - engine RPM.
   d. Adjust the RPM as needed.
5. Adjust the Timing Light Head as needed to ensure proper illumination of timing marks.
6. Refer to the vehicle's service manual to check and adjust timing. Observe all safety precautions.
7. Press Flash Switch (1) to stop strobe light flashing.
8. Turn ignition of and disconnect timing light from engine. If disconnected, reconnect vacuum line to distributor.

Advance/Retard Timing Control Checks

Advance/Retard timing controls ensure that ignition occurs at the proper time during the compression stroke. These controls include mechanical advance, vacuum advance, vacuum retard, electronic advance, electronic retard, and electronic advance/retard. A vehicle may be equipped with a single timing control device, or two or more devices may be used in combination.

Advance/Retard timing test procedures vary widely from vehicle to vehicle. General test procedures are provided for checking mechanical advance, mechanical/vacuum advance, and vacuum retard. Always make sure initial timing and dwell are correct before checking advance/retard timing. Refer to vehicle's service manual for proper timing procedures and specifications. Observe all safety precautions.

Centrifugal/Mechanical Advance

1. Connect Timing Light as described in *Timing Light Connection* page 7.
2. Make sure initial timing is correct and prepare engine for advance timing check as directed by the vehicle manufacturer's instructions.
3. Direct Timing Light at timing marks and note position of rotating timing mark in relation to reference pointer. The reading should indicate initial timing in accordance with the manufacturer's specifications.
4. Adjust engine speed to the specified RPM for advance test.
5. Press Function (F) switch (3) as needed to select **Advance Mode**, the following information will be displayed:
   - advance indicator (9),
   - advance degree symbol (19),
   - the Display will show "0" degrees advance and engine RPM.
6. Point Timing Light at timing marks and press Cylinder/Advance Increment switch (5) as needed to realign timing marks to the initial timing, or as instructed by manufacturer's specifications. Note degrees advance on the Display and compare with manufacturer's specifications.
7. Turn off ignition and disconnect Timing Light from engine.

Vacuum Advance

1. Connect Timing Light as described in *Timing Light Connection* page 7.
2. Make sure initial timing is correct and prepare engine for advance timing check as directed by the vehicle's manufacturer instructions.

Note: A vacuum pump equipped with a vacuum gauge is needed to check vacuum advance.

3. With engine off, disconnect vacuum hose from distributor's vacuum advance port. Plug the vacuum hose.
4. Connect vacuum pump to distributor's vacuum advance port.
5. Start engine and run it until it reaches normal operating temperature.
6. Press Function (F) Switch (3) as needed to select **Advance Mode**, the following information will be displayed:
   - advance indicator (9),
   - advance degree symbol (19),
   - The DIsplay will show "0" degrees advance and engine RPM.
7. With the Timing Light directed at timing marks, note the position of rotating timing mark in relation to reference pointer. Reading should indicate initial timing in accordance with manufacturer's specifications.
8. Using the vacuum pump, apply the specified amount of vacuum to the distributor's vacuum port.

Note: Refer to manufacturer's specifications for vacuum amount.

9. With the Timing Light directed at the timing marks, press the Cylinder/Advance Increment switch (5) as needed to realign the timing marks to the initial timing. Note degrees advance on the Display and compare with manufacturer's specifications.
10. Turn off ignition and disconnect Timing Light from engine. Unplug and reconnect vacuum hose to the distributor's vacuum port.

Electronic Advance/Retard

Refer to vehicle manufacturer's instructions for procedures to check electronic advance/ retard. It may be necessary to set the Timing Light's advance display to "0" and read timing from the vehicle's timing marks.

Timing Adjustment

Refer to the vehicle's service manual for procedures to adjust timing. Do not attempt to adjust timing without the vehicle manufacturer's specifications.

Record Serial Number Here:_____

Note: If product has no serial number, record month and year of purchase instead.

Note: With the exception of inductive pickup leads, replacement parts are not available for this item. Refer to UPC 193175421081.

Maintenance and Servicing

Procedures not specifically explained in this manual must be performed only by a qualified technician.

⚠WARNING

TO PREVENT SERIOUS INJURY FROM SHOCK OR FIRE:
Disconnect from the vehicle battery before performing any inspection, maintenance, or cleaning procedures.

TO PREVENT SERIOUS INJURY FROM TOOL FAILURE:
Do not use damaged equipment. If abnormal noise or vibration occurs, have the problem corrected before further use.

Cleaning, Maintenance, and Lubrication

1. **BEFORE EACH USE,** inspect general condition of tool. Check for loose hardware, misalignment or cracked or broken parts, damaged electrical wiring, and any other condition that may affect its safe operation.
2. Replace the inductive pickup leads if the test leads or clips become damaged.
3. **AFTER USE,** wipe external surfaces of the tool with clean cloth.
4. **PERIODICALLY** clean the contact surfaces inside the inductive pickup clip by wiping with a soft clean cloth

Troubleshooting

Problem	Possible Causes	Likely Solutions
No flash	1. Flash switched “OFF”. 2. Battery clips connected backward. 3. Poor connection of clips.	1. Press Flash button “ON”. 2. Reverse the battery clip connections. 3. Clean battery post and reconnect.
No flash but double check indicator is “ON”	1. Spark Plug Clamp flipped backwards. 2. Weak ignition or spark plug. 3. Faulty lamp.	1. Make sure arrow on clamp points to #1 plug. 2. Connect to other plugs or spark plug wires. Repair Gap. 3. A new Timing Light is needed.
Light flashes intermittently	Timing Light Spark Plug Clamp wire lying on, or near to, the other spark plug wires.	Route Spark Plug Clamp wire away from the other spark plug wires.
Timing Light’s display locked up	Possible EMI/RFI interference.	Disconnect then reconnect positive terminal to battery to reset the Timing Light.

Follow all safety precautions whenever diagnosing or servicing the tool. Disconnect power supply before service.

Limited 90 Day Warranty

Harbor Freight Tools Co. makes every effort to assure that its products meet high quality and durability standards, and warrants to the original purchaser that this product is free from defects in materials and workmanship for the period of 90 days from the date of purchase. This warranty does not apply to damage due directly or indirectly, to misuse, abuse, negligence or accidents, repairs or alterations outside our facilities, criminal activity, improper installation, normal wear and tear, or to lack of maintenance. We shall in no event be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

To take advantage of this warranty, the product or part must be returned to us with transportation charges prepaid. Proof of purchase date and an explanation of the complaint must accompany the merchandise. If our inspection verifies the defect, we will either repair or replace the product at our election or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if we determine there is no defect, or that the defect resulted from causes not within the scope of our warranty, then you must bear the cost of returning the product.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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