

TACHOMETER INSTALLATION INSTRUCTIONS

GENERAL INFORMATION

Please read this instruction manual and review the installation procedures carefully before attempting the installation of your tachometer.

NOTE

If additional wire is needed, use # 18 or # 20 AWG stranded automotive primary wire. For exposed underhood wiring, teflon insulated wire with its associated high temperature capability is recommended. Additional connectors, and hardware, that is not included with this unit may also be needed. As the mounting configuration will vary significantly from vehicle to vehicle, hardware to mount the tachometer to the vehicle is not included. Whether you use self tapping or a machine screw and nut configuration, # 8 hardware including flat and lockwashers is recommended.

CAUTION

This unit is designed for use on twelve (12) volt negative (-) ground four (4) cycle automotive type engines. It is not designed for use on positive (+) ground electrical systems, two (2) cycle engines, aircraft or marine applications. It is compatible with most distributor equipped and distributorless ignition systems.

SUGGESTED TOOLS

Wire and terminal crimping, stripping and cutting tool(s)

Screwdrivers and Nut drivers as required by hardware used

Small open end wrench set: 1/4" to 3/8" sizes may be required

Electric drill

Drill bits (*Sport Tach only*): #29 or 9/64", #18 or 11/64", 1/4", 3/8"

Drill bits (*All except Sport Tach*): #29 or 9/64", #18 or 11/64", 5/16", 3/8"

PACKAGE CONTENTS

Tachometer

Tachometer Mounting Base Pad

Sport Tach only:

Tachometer Perimeter Clamp

Tachometer Mounting Base

All except Sport Tach:

Tachometer Housing to Column Bracket

Tachometer Dashboard Bracket

Installation hardware kit consisting of:

Wire splices

Ring Terminals

1/4" Quick Connect Receptacle

Grommet

8-32 Nut, Black 1 ea

Sport Tach only:

8-32 X 2" Machine Screw, Black 1 ea

8 External Tooth Washer, Black .. 2 ea

All except Sport Tach:

8-32 X 5/8" Machine Screw, Black .. 1 ea

8 Split Washer 1 ea

Knurled Thumb Nut 1 ea

CYLINDER SELECTION

This tachometer should be checked for cylinder setting before installation (see figures 1 through 4). Position the **CYL** selector switch on the rear of the tachometer so that the switch actuator is opposite the number which matches the number of cylinders in the engine, or the slot lines up with the number which matches the number of cylinders in the engine depending on the model of your tachometer. As noted in the **DISTRIBUTORLESS IGNITION SYSTEM CONNECTIONS** section of this manual under Chrysler Corporation, connection to Pin 43 of the Single Board Engine Controller on Distributorless Ignition equipped Chrysler vehicles requires that the **CYL** selector switch be set to the four (4) cylinder position, regardless of the number of cylinders in the engine.

FIGURE 1

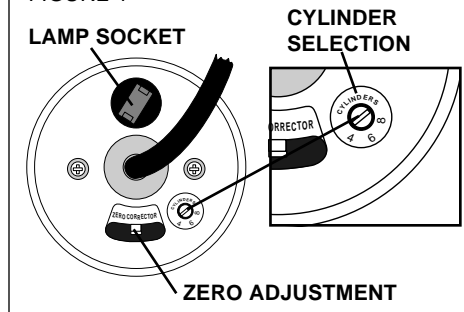


FIGURE 2

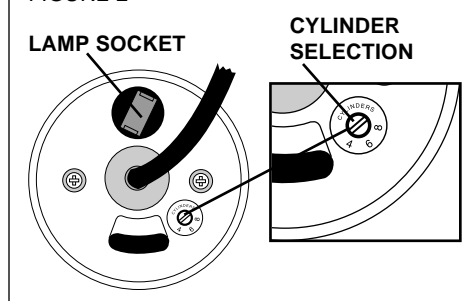


FIGURE 3

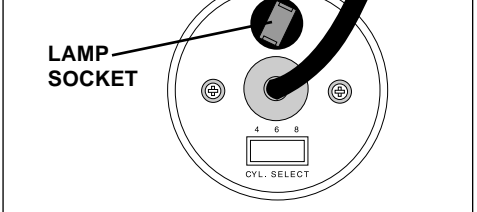
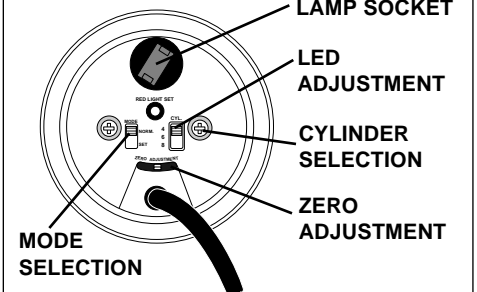


FIGURE 4



LAMP SUBSTITUTION OR REPLACEMENT

Your tachometer is supplied with an automotive type, wedge base (*full size tachometers*) or subminiature wedge base (*mini tachometers*) lamp, for illumination. This lamp should provide satisfactory illumination intensity in most applications, however the following substitute lamps are available at your local auto parts store, and may allow you to custom tailor the illumination characteristics of the tachometer to your application. Note the higher the MSCD (Mean Spherical Candela) of the lamp, the brighter it is. The *Sport Tach* is supplied with a # 194 lamp.

LAMP	#MSCD	COLOR	BASE
73	.3	CLEAR	SUBMINIATURE WEDGE
37	.5	CLEAR	SUBMINIATURE WEDGE
74	.75	CLEAR	SUBMINIATURE WEDGE
161	1	CLEAR	WEDGE
194	2	CLEAR	WEDGE
194A	-	AMBER COATED	WEDGE
168	3	CLEAR	WEDGE

The lamp socket is located at the top rear of the tachometer (see figures 1 through 4). To remove the lamp, gently grasp the black lamp socket (use pliers if necessary) and twist it counter-clockwise approximately 1/8 turn until it stops. Pull the socket with lamp straight out of the tachometer housing. Remove the lamp from its socket by pulling it straight out. Replace the lamp as required following the chart above. Reinstall the socketed lamp by rotating it against the tachometer's PC board until it drops into place, and then rotate it approximately 1/8 turn clockwise until it reaches its mechanical stop.

ZERO ADJUSTMENT AND POINTER POSITION

On some models the tachometer pointer can be positioned precisely on "0" RPM. This sliding tab adjustment is located on the rear of the tachometer housing. **With the engine OFF** slide the adjustment tab from side to side until the pointer rests on "0". This adjustment may have to be reset once the tachometer is installed in the vehicle.

On models using an air core meter movement, it is normal for the pointer to randomly stop at any point on the meter scale when the power is removed (key is turned OFF). This is not indicative of a defect! When the key is turned ON, the pointer will automatically return to zero. No further zero adjustment is required.

LED (LIGHT EMITTING DIODE) INDICATOR - RPM THRESHOLD ADJUSTMENT

SPORT TACH FEATURE ONLY

The RPM at which the RED LED indicator located at the bottom of the tachometer dial turns on, is adjustable from approximately 1500 to 8000 RPM. Some possible uses for this indicator are:

- Engine RED LINE (maximum safe operating speed of the engine)
- Engine maximum torque RPM (for maximum performance shifting)
- Desired shift RPM (manual transmission applications)
- Maximum desired high gear vehicle speed (can act as a warning that a safe vehicle speed has been exceeded)

LED Adjustment (see figure 4) is made after the tachometer is installed in the vehicle as follows:

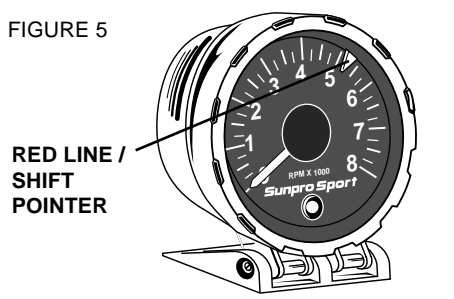
1. Turn the ignition key to the **ON** or **RUN** position. The engine does not have to be running.
2. Slide the **MODE** switch to the **SET** position. The **RED LED** should turn **ON**.
3. Rotate the **RED LIGHT SET** control until the tachometer indicates the RPM at which "LED turn on" is desired.
4. Slide the **MODE** switch to the **NORMAL** position. The **RED LED** should turn **OFF**.

ALL TACHOMETERS

WARNING - SAFETY PRECAUTION!

Neither the driver nor any passenger should compromise the safe operation of the vehicle by attempting to readjust the tachometer in any way while the vehicle is in motion!

FIGURE 5



RED LINE / SHIFT POINTER

Adjust the **RED LINE SHIFT POINTER** by sliding it around the meter bezel (see figure 5). This pointer may be set at any point on the meter scale, such as engine red line, or transmission shift point. Note - *Sport Tach only* - The setting of the shift pointer does not affect the setting of the "LED turn on" point.

NOTE - FUNCTIONAL QUICK CHECK

Although every attempt has been made to make this tachometer electronically compatible with as many different ignition systems as possible, new ignition systems are being developed continually. It is suggested (especially if you have an engine that has a non OEM, or aftermarket ignition system) that the tachometer be electrically connected to the vehicle, (using alligator clip leads or other suitable means) following the steps below, and an electrical functional check of the tachometer be made, prior to making a permanent installation.

1. Clip the **BLACK** lead from the tachometer to the negative (-) battery terminal.
2. Clip the **RED** lead from the tachometer to the positive (+) battery terminal.
3. Clip the **GREEN** lead from the tachometer to the negative (-) side of the ignition coil or tach signal connection point as indicated in the **ELECTRICAL CONNECTIONS** section of this manual. **Do not allow this connection to touch ground!**
4. The **WHITE** lead is for instrument panel lighting, and need not be connected for this check.
5. When all connections are secure, start the vehicle's engine. Confirm the operation of the tachometer throughout the operating temperature range of the engine, and at both curb idle, and higher engine speeds. The tachometer should follow the speed of the engine smoothly, and show no signs of erratic operation.

Should you encounter unsatisfactory tachometer operation (erratic, no reading, etc.) on engines equipped with high performance and/or aftermarket ignition systems or ignition coils, you may have selected the incorrect tach connection point for the tachometer's **GREEN** lead, or a tachometer filter assembly may be required.

Contact the manufacturer of the ignition system or ignition coil for information regarding tachometer connection to his product and/or the availability of an electrical filter assembly if required.

When you are satisfied with tachometer performance, proceed to the permanent installation instructions which follow.

MOUNTING THE TACHOMETER

SPORT TACH ONLY

Your tachometer is designed to be mounted on any flat surface, horizontal, vertical, or virtually any angle in between. Swivel adjustment has been provided in all axes of rotation, allowing for precise positioning of the tachometer for optimal viewing by the driver (see figures 6 and 7).

FIGURE 6

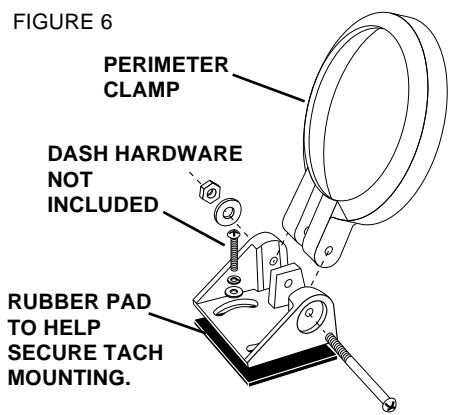
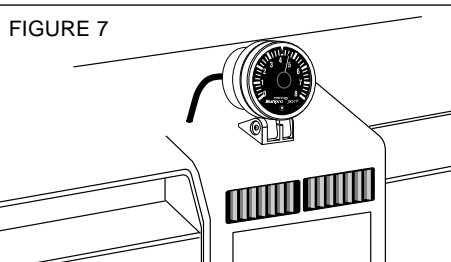


FIGURE 7

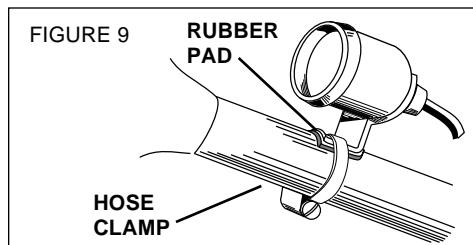
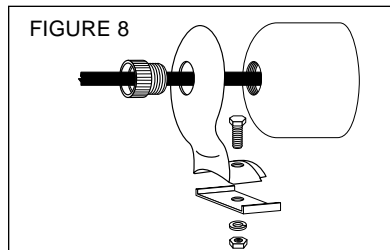


NOTE - SPORT TACH ONLY

If you will be readjusting the **LED (LIGHT EMITTING DIODE) INDICATOR RPM THRESHOLD** regularly, as described above, be sure to mount the tachometer in a location which allows easy access to the switch and control on the rear of the tachometer.

ALL EXCEPT SPORT TACH

Your tachometer is designed to be mounted on top of or underneath the dashboard, or on the steering column (see figures 8 and 9). If you choose the steering column mounting configuration, it will be necessary to obtain a hose clamp which is large enough in diameter to encircle the steering column. Cut off any excess strap from the hose clamp, when clamp mounting is complete.



CAUTION

Some steering columns are made to be collapsible upon impact. Care should be taken when tightening the clamp to avoid damage to the column.

Be sure not to interfere with the movement or mechanism of adjustable/tilt steering columns.

ALL TACHOMETERS

Select a mounting location that allows a clear view of the tachometer, but does not obstruct access or view of controls, or view of other dashboard instruments, or the road.

CAUTION

Position the tachometer in its specific location and determine wire routing and connection locations before drilling any holes! Be sure to check behind areas of intended drilling for obstructions before drilling!

Mark hole locations, and drill holes as required per the following chart.

8 Self-tapping screws - # 29 or 9/64" drill bit
 # 8 Machine screw hardware - # 18 or 11/64" drill bit
 Clearance hole for wiring harness- 1/4" drill bit Sport Tach only
 Clearance hole for wiring harness- 5/16" drill bit All except SportTach

The hardware configurations which mount the tachometer to the vehicle, and the tachometer perimeter clamp to the tachometer base on the Sport Tach only, are shown in figure 6. Once the tachometer is adjusted to its final position, securely tighten all hardware.

ELECTRICAL CONNECTIONS

Refer to figures 10 through 20 while carefully following the wiring instructions.

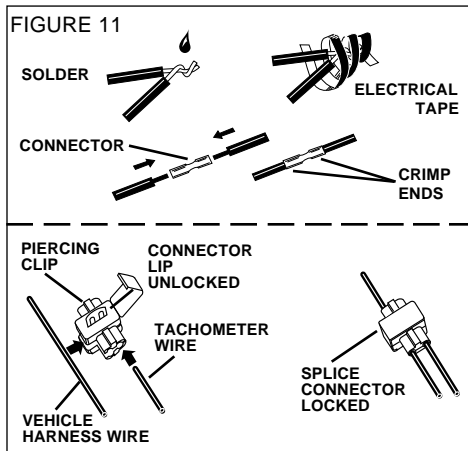
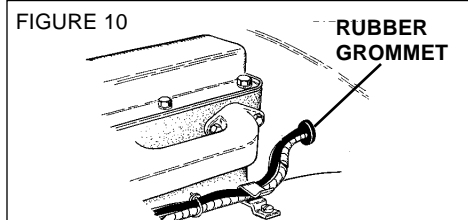
CAUTION

For your own personal safety, and to prevent possible damage to the electrical system of your vehicle during the installation, disconnect the negative (-) battery cable. Reconnect this cable after installation is complete.

BLACK, RED, AND WHITE WIRE CONNECTIONS - ALL SYSTEMS

Route all wires carefully. Securing them with nylon tie wraps (not included) is suggested. Do not route wires along or against sharp edges which could cut the insulation. Also, do not route them along hot engine surfaces, such as exhaust manifolds, where high temperature could melt the insulation, or near spark plug wires.

Route wires through an existing hole in the firewall, or drill a 3/8" hole where desired, making sure there are no hidden wires, hoses, etc. that could be damaged. Insert the supplied rubber grommet in this hole for added protection against wire damage or shorting (see figure 10).



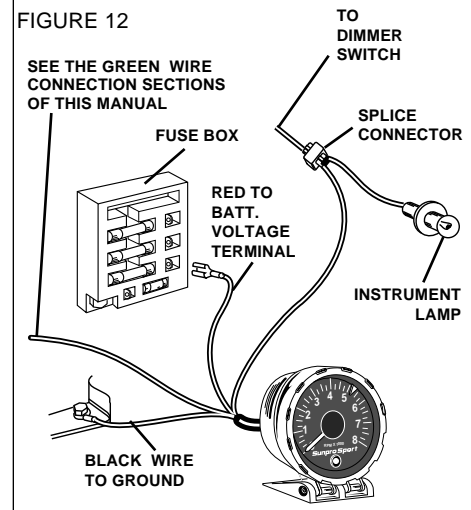
1. Connect the **BLACK** wire to the negative (-) battery terminal, or a clean unpainted chassis ground using a ring terminal or other suitable means (see figure 12).

IMPORTANT

Although electrical ground (**BLACK** wire connection) is available under the dashboard, grounding the instrument near or under the dash may cause it to operate erratically, as any ground connection other than the negative (-) battery terminal may be "electrically noisy".

Make the following connections with splice connectors, or by an alternative method if desired (see figure 11).

2. Connect the **RED** wire to any vehicle harness wire which is energized with battery voltage **ONLY** when the ignition key is in the ON (RUN) position, **NOT** OFF or ACCESSORIES (see figures 11 and 12).
3. Connect the **WHITE** wire to the instrument panel lighting circuit or any lead that is controlled by the instrument panel dimmer control (see figure 12).



NOTE

Some vehicles (typically imported) wire the dimmer control into the ground side of the instrument panel lighting circuit, as opposed to the more conventional "hot" or twelve (12) volt side. In vehicles which use this circuit, connect the **WHITE** wire to a circuit which is energized by the headlamp switch.

GREEN WIRE CONNECTION

The **GREEN** wire provides the tachometer with the engine RPM (speed) signal. If your vehicle's engine is equipped with a **DISTRIBUTOR IGNITION SYSTEM** proceed to the **GREEN WIRE CONNECTION - DISTRIBUTOR EQUIPPED ENGINES** section in this manual. If your vehicle's engine is equipped with a **DIS (DISTRIBUTORLESS IGNITION SYSTEM)**

proceed to the **GREEN WIRE CONNECTION - DISTRIBUTORLESS IGNITION SYSTEM EQUIPPED ENGINES** section of this manual. **DIS** equipped engines are characterized by their lack of an ignition distributor. In place of the distributor, will be one or more "ignition coil packs". Unlike the ignition distributor which has a basically round shape, the coil pack is typically a square or rectangular package.

GREEN WIRE CONNECTION – DISTRIBUTOR EQUIPPED ENGINES

Connect the **GREEN** wire to the negative (-) side of the ignition coil. This terminal may also be referred to as the TACH, TACH TEST, DEC, or ECU terminal. Select the figure (13 through 20) which matches your application. **Consult your vehicle service manual for systems not shown.**

FIGURE 13: FORD ELECTRONIC IGNITION SYSTEM

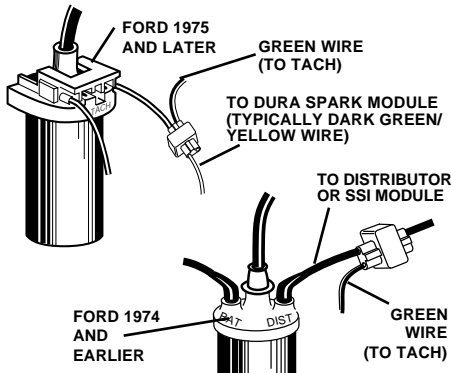


FIGURE 17: FORD TFI SYSTEM 1980 AND LATER

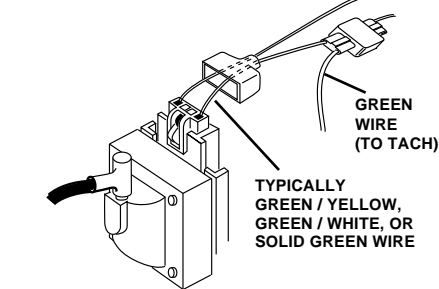


FIGURE 14: GM EXTERNAL COIL HEI 1986 and later

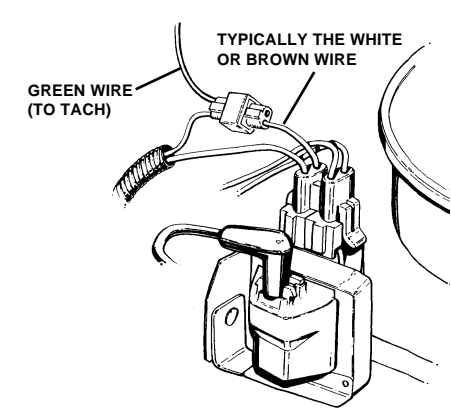


FIGURE 18: CHRYSLER ELECTRONIC IGNITION and BREAKER POINT IGNITION

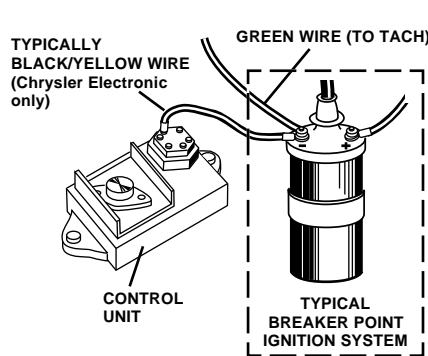


FIGURE 15: GM INTEGRAL COIL HEI

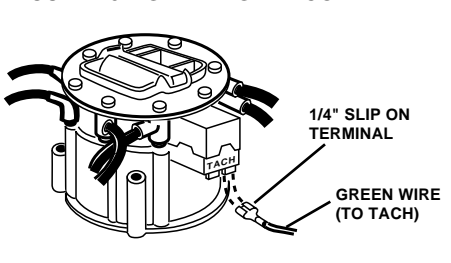


FIGURE 19: TOYOTA IIA (Integrated Ignition Assembly)

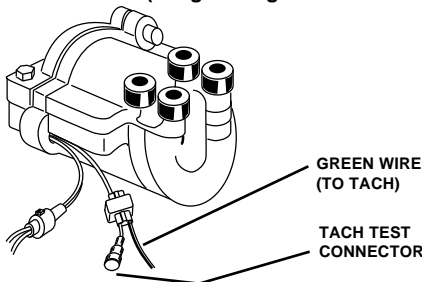


FIGURE 16: GM EXTERNAL COIL HEI 1985 and earlier

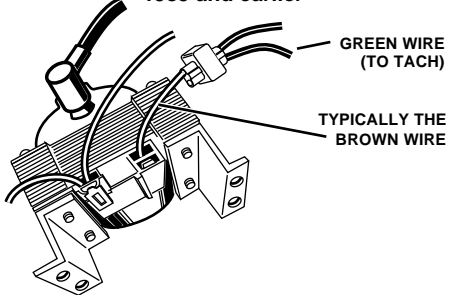
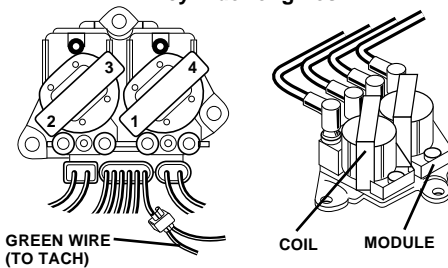


FIGURE 20: GM DIS used on some 4-cylinder engines



GREEN WIRE CONNECTION – DISTRIBUTORLESS IGNITION SYSTEM EQUIPPED ENGINES

Many domestically built vehicles (and some imports) are now using a new type of ignition system which does not use a distributor, but instead, a system of multiple ignition coils, and the necessary sensors and computer controls to fire them in the proper order. This type of system is commonly referred to as a **DISTRIBUTORLESS IGNITION SYSTEM** or **DIS**. Your tachometer is designed to work with these systems, however proper connection to them is important. The **BLACK** (ground), **RED** (12-14 volt supply), and **WHITE** (instrument lamp) connections are the same as for distributor equipped vehicles, however connection of the **GREEN** (tach signal) wire to the ignition is specific to the engine and ignition system.

FULL ONE (1) YEAR WARRANTY

Actron Manufacturing Company, 9999 Walford Avenue, Cleveland, Ohio 44102, warrants to the user that this unit will be free from defects in materials and workmanship for a period of one (1) year from the date of original purchase. Any unit that fails within this period will be repaired or replaced at Actron's option and without charge when returned to the Factory. Actron requests that a copy of the original, dated sales receipt be returned with the unit to determine if the warranty period is still in effect. This warranty does not apply to damages caused by accident, alterations, or improper or unreasonable use. Expendable items, such as batteries, fuses, lamp bulbs, flash tubes are also excluded from this warranty. ACTRON MANUFACTURING COMPANY DISCLAIMS ANY LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY WRITTEN WARRANTY ON THE UNIT. Some states do not allow the disclaimer of liability for incidental or consequential damages, so the above disclaimer may or may not apply to you. This warranty gives specific legal rights, and you may also have rights which vary from state to state.

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