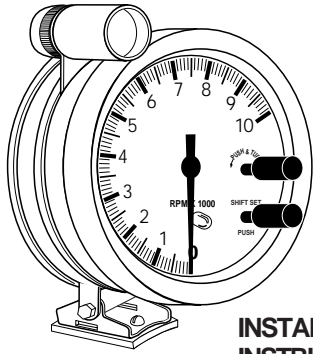


5" TACHOMETER



INSTALLATION INSTRUCTIONS

APPLICATIONS

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

PACKAGE CONTENTS

include Installation Hardware Kit consisting of:

- Tachometer Mounting Base Pad 1 ea
- Wire Splices 3 ea
- Ring Terminals 2 ea
- 1/4" Quick Connect Receptacle 1 ea
- Grommet 1 ea
- #10 X 5/8" Self-tapping Screw 2 ea
- External Shift Light Cap 1 ea

CYLINDER SELECTION

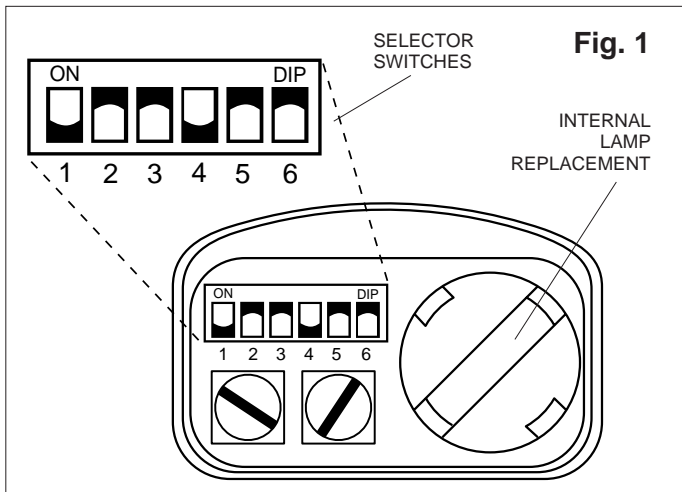
Check the cylinder setting before installation. See Figure 1 and Selector Switch Setting Chart below. Position the Cylinder selector switch located on the back of the Tachometer (behind the rubber door), so that the switch positions match the positions for the number of cylinders in the engine.

No. of cylinders	NUMBER OF CYLINDERS SELECTOR SWITCH SETTING					
	1	2	3	4	5	6
2 Cyl.	Off	On	Off	Off	Off	Off
3 Cyl.	Off	Off	On	Off	Off	Off
4 Cyl.	On	On	Off	Off	Off	Off
5 Cyl.	Off	Off	Off	Off	On	Off
6 Cyl.	On	Off	On	Off	Off	Off
8 Cyl.*	On	Off	Off	On	Off	Off
10 Cyl.	On	Off	Off	Off	On	Off

* Factory Setting

EXCEPTIONS:

- The tachometer-ignition connection for some GM 2.2L 4 Cylinder DIS engines requires that you use the 2 Cylinder setting. Depending on which type of system you have, set the switches in either the 4 or 2 Cylinder position. If your ignition system has a tachometer output, connect the tachometer following the connection instructions in the **Electrical Connections** Section and set the switches to the 4 Cylinder position. If there is no tach output, connect the tachometer lead wire to either of the driver wires from the vehicle computer to the ignition module, and set the switches to the 2 Cylinder position.
- Follow a similar procedure for Chrysler 3.3L 6 Cylinder tachometer-ignition connection. For systems with tach output, use normal 6 Cylinder switch position. For systems without the tach output, use a computer driver wire connection and set the switches in the 2 Cylinder position.
- Connection to Pin 43 of the Single Board Engine Controller on some Distributorless Ignition equipped Chrysler vehicles requires that the Cylinder selector switches be set to the 4 Cylinder position, regardless of the number of cylinders in the engine.



FUNCTIONAL QUICK CHECK

It is suggested (especially if you have an engine that has non-OEM, or aftermarket ignition system components) 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. 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. In the case of an automatic transmission equipped vehicle, place the gear selector in **DRIVE** for several seconds, with the engine at curb idle and the **brake firmly applied**. Tachometer operation should remain smooth.

If the tachometer does not operate properly, verify the electrical connections. If problem persists, 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.

MOUNTING THE TACHOMETER

Mount the tachometer on any flat surface, horizontal, vertical, or virtually any angle.

CAUTION

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

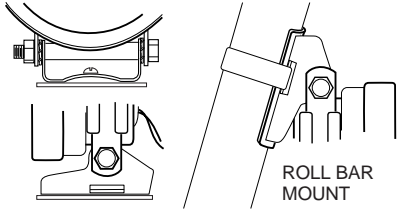
Mark hole locations, and drill holes as required per the following:

#10 Self-tapping screws – #18 or 11/64" drill bit

Clearance hole for wiring harness – 3/8" drill bit

Fig. 3

Note: Mounting foot position is reversed for vertical mounting.



SUGGESTED MOUNTING LOCATIONS

Figures 2 through 5 show examples of mounting locations. If the tachometer is mounted on the steering column, as shown in Figure 2, use a hose clamp (not provided) which is large enough in diameter to encircle the steering column. Once the tachometer and the External Shift Light are adjusted to their final position, securely tighten all hardware.

CAUTION

Care should be taken when tightening the clamp to avoid damage to the column.

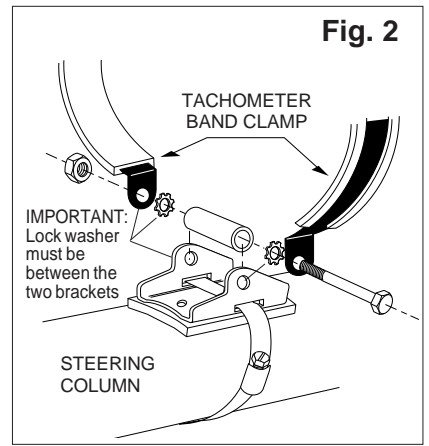
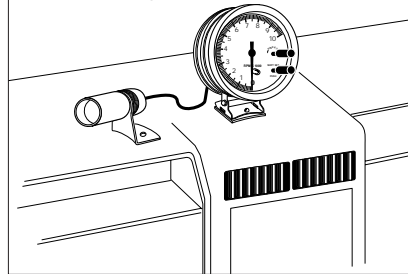


Fig. 2

DASH MOUNT
(With remote
External Shift Light)

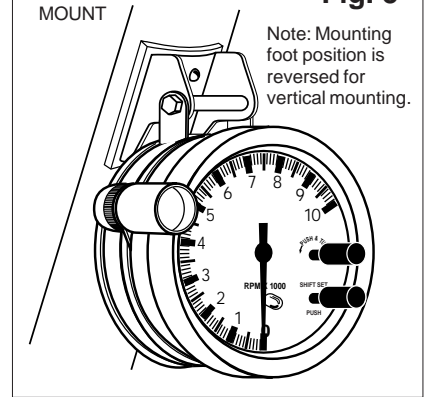
Fig. 4



PILLAR MOUNT

Fig. 5

Note: Mounting foot position is reversed for vertical mounting.



EXTERNAL SHIFT LIGHT MOUNTING

CAUTION

When attaching the External Shift Light wires to their mounting screws, make sure wire ends are not frayed and the strands DO NOT TOUCH each other. A short circuit can damage the tachometer or the vehicle electrical system.

The External Shift Light driver circuit was designed specifically for the Shift Light supplied with the tachometer. Connecting other manufacturer's lights or devices may damage the tachometer and/or the devices, and will void your warranty.

Loosen the rear tachometer mounting band clamp. Adjust the **External Shift Light** position by sliding it around the rear tach mounting band clamp as shown in Figure 6 until you are satisfied with its location and then tighten the mounting bolt and nut at the bottom of the band clamp. Make sure of the final tachometer mounting position and tach face position before tightening the band clamp to secure the External Shift Light and tach housing.

The External Shift Light can also be mounted remotely from the tachometer as shown in Figure 4. Use #10 self-tapping

screws (not included) and mounting bracket to mount the External shift Light in any desired location. **MAKE SURE NOT TO CUT THE EXTERNAL SHIFT LIGHT TWIN-LEAD WIRE UNTIL YOU ARE ABSOLUTELY SURE OF ITS MOUNTING POSITION AND LOCATION.**

To connect the External Shift Light wires to their terminals, thread the wires through the hole in the rubber door as shown in Figure 7. Cut wires to desired length, allowing some slack. Split and strip wire ends and secure each under a terminal screw. Tighten terminal screws.

Fig. 6

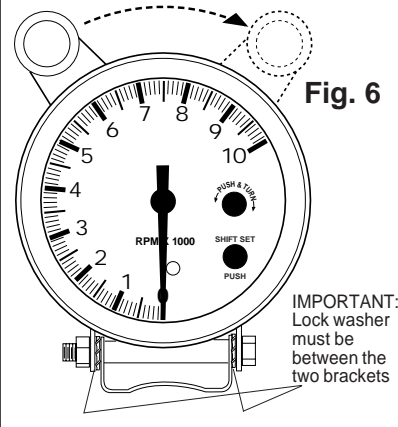
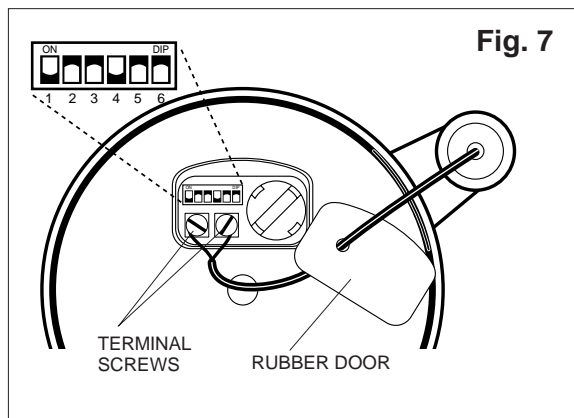


Fig. 7



ELECTRICAL CONNECTIONS

CAUTION

For your 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

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 8.

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 9.)

Make the following connections with wire splices, or by an alternative method if desired. (See Figure 10.)

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 Figure 9.)

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 9.)

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 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.

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.

DISTRIBUTORLESS IGNITION SYSTEM EQUIPPED ENGINES

Connection of the **GREEN** (tach signal) wire to the ignition is specific to the engine and ignition system. See wiring diagrams in your vehicle service manual.

For some GM 2.2L and Chrysler 3.3L engines you must determine if you have a tachometer output on the ignition module. See Cylinder Selection Section.

MSD IGNITION SYSTEM EQUIPPED ENGINES

For **MSD** (Multiple Spark Discharge) ignition systems, connect only to the tachometer output terminal on the ignition module. Do NOT connect to the ignition coil.

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, limited hardware to mount the tachometer to the vehicle is included. If additional hardware is required, regardless of whether you use self-tapping or machine screws and nuts, #10 hardware including flat and lockwashers is recommended.

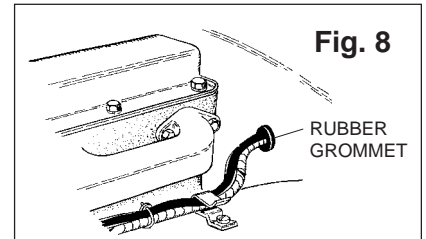


Fig. 8

RUBBER GROMMET

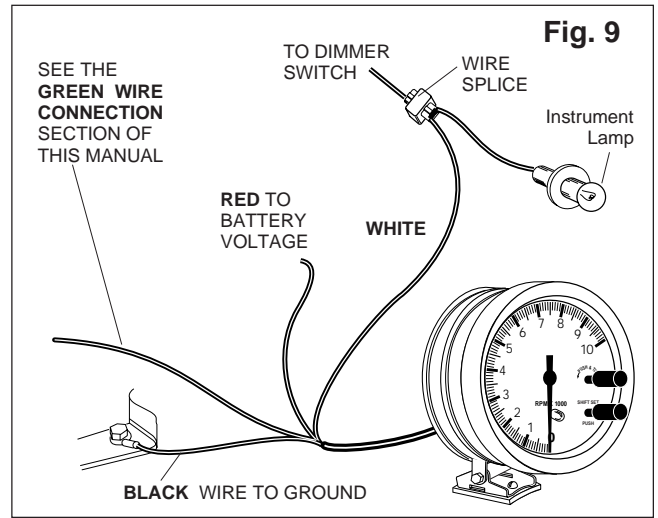


Fig. 9

SEE THE GREEN WIRE CONNECTION SECTION OF THIS MANUAL

TO DIMMER SWITCH

WIRE SPLICE

Instrument Lamp

RED TO BATTERY VOLTAGE

WHITE

BLACK WIRE TO GROUND

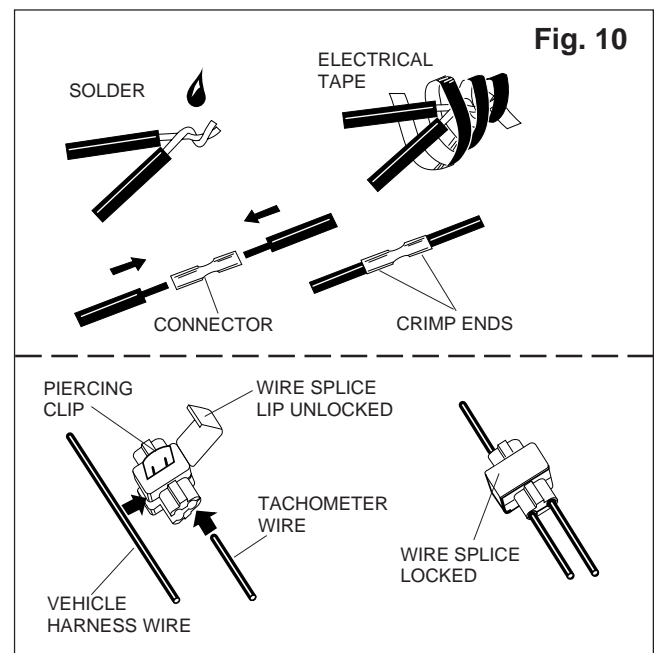


Fig. 10

SOLDER

ELECTRICAL TAPE

CONNECTOR

CRIMP ENDS

PIERCING CLIP

WIRE SPLICE LIP UNLOCKED

VEHICLE HARNESS WIRE

TACHOMETER WIRE

WIRE SPLICE LOCKED

SHIFT LIGHT SET-UP

EXTERNAL SHIFT LIGHT AND LED INDICATOR – RPM THRESHOLD ADJUSTMENT

The RPM at which the External Shift Light turns ON is adjustable from approximately 1500 to 8000 RPM or higher. Setting the External Shift Light for the tachometer also sets the in-dial LED indicator. The LED indicator (located at the lower front of the tachometer) is clear until it turns RED, indicating it is ON. In operation, both lights turn on simultaneously. The tachometer can be operated with the External Shift Light disconnected, with only the in-dial LED as the shift indicator.

Some possible uses for these indicators are:

- Engine RED LINE (maximum safe operating speed of the engine).
- Engine maximum torque RPM (for maximum performance shifting) and

desired shift speed (manual transmission applications).

- Maximum desired high gear vehicle speed (can act as a warning that a safe speed has been exceeded).

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! Press the lower SHIFT SET button marked PUSH to verify the RPM shift setting.

NOTE: You will need both hands free to set the tachometer.

Adjustment is made as follows after the tachometer is installed in the vehicle:

1. Turn the ignition key to the **ON** or **RUN** position. The engine does not have to be running.
2. Push and keep the lower **PUSH** button depressed.
3. Push in and rotate the upper **PUSH & TURN** control knob until the tachometer pointer indicates the RPM threshold at which "Shift Light turn on" is desired.
4. Release both the lower **PUSH** button and the upper **PUSH & TURN** control knob.

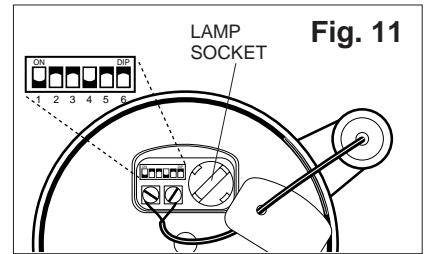
NOTE: If at any time the tach pointer appears to freeze beyond the 10,000 RPM marker, turn on the ignition and press the **PUSH** button to resume normal operation.

BACKLIGHTING LAMP SUBSTITUTION OR REPLACEMENT

Your tachometer is supplied with an automotive type, wedge base #194 lamp for illumination. This is the highest intensity recommended. If the light is too bright, replace with a lamp of less intensity such as a #161.

The lamp socket is located in the rear of the housing of the tachometer (see Figure 11). To remove the lamp, gently grasp the black lamp socket (use pliers if necessary) and twist it counterclockwise

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. Reinstall the socketed lamp by rotating it against the tachometer's internal PC board until it drops into place, and then rotate it approximately 1/8 turn clockwise until it reaches its mechanical stop.



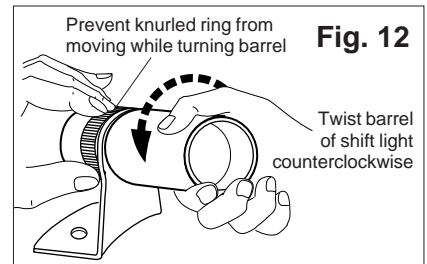
EXTERNAL SHIFT LIGHT LAMP REPLACEMENT

The External Shift Light also uses a wedge base #194 lamp for illumination.

To replace the External Shift Light lamp, hold the knurled lamp holder socket tightly while turning the front barrel counterclockwise, making sure not to twist the twin-lead light wire (See Figure 12). Remove the lamp from its socket by pulling it straight out. Replace the lamp with a #194 automotive lamp. If light is too bright, replace with a lamp of less intensity

such as #161. If you wish to block the shift light entirely, install the shift light cap.

Reinstall by holding the knurled socket holder tightly against the back of the mounting bracket while threading the front barrel clockwise into the lamp holder from the front of the bracket. Finger tighten until both sections are tight and snug against the mounting bracket, again taking care not to twist the twin-lead light wire.



SAFETY GUIDELINES

To prevent accidents that could result in serious injury and/or damage to your vehicle or tachometer, carefully follow these safety rules and test procedures.

• Fire Extinguisher

Never work on your vehicle without having a suitable fire extinguisher handy. A 5-lb or larger CO₂ or dry chemical unit specified for gasoline/chemical/electrical fires is recommended.

• Fireproof Container

Rags and flammable liquids should be stored only in fireproof, closed metal containers. A gasoline-soaked rag should be allowed to dry thoroughly outdoors before being discarded.

• Safety Goggles

We recommend wearing safety goggles when working on your vehicle, to protect your eyes from battery acid, gasoline, and dust and dirt flying off moving engine parts.

NOTE: Never look directly into the carburetor throat while the engine is cranking or running, as sudden backfire can cause burns.

• Be very careful not to get your hands, hair or clothes near any moving parts such as fan blades, belts and pulleys or throttle and transmission linkages. Never wear neckties or loose clothing when working on your vehicle.

• Never wear wrist watches, rings or other jewelry when working on your vehicle. You'll

avoid the possibility of catching on moving parts or causing an electrical short circuit which could shock or burn you.

- The carbon monoxide in exhaust gas is highly toxic. To avoid asphyxiation, always operate vehicle in a well-ventilated area. If vehicle is in an enclosed area, exhaust should be routed directly to the outside via leakproof exhaust hose.

- Make sure that your vehicle is in **Park** or **Neutral**, and that the **parking brake is firmly set**.

NOTE: Some vehicles have an automatic release on the parking brake when the gear shift lever is removed from the **PARK** position. This feature must be disabled when it is necessary (for testing) to have the parking brake engaged when in the **DRIVE** position. Refer to your vehicle service manual for more information.

- Avoid contact with hot surfaces such as exhaust manifolds and pipes, mufflers (catalytic converters), radiator and hoses. Never remove the radiator cap while the engine is hot, as escaping coolant under pressure may seriously burn you.

- Never smoke while working on your vehicle. Gasoline vapor is highly flammable, and the

gas formed in a charging battery is explosive.

- Do not lay tools or equipment on the battery. Accidentally grounding the "HOT" battery terminal can shock or burn you and damage wiring, the battery or your tools and testers. Be careful of contact with battery acid. It can burn holes in your clothing and burn your skin or eyes.

• When operating any test instrument from an auxiliary battery, connect a jumper wire between the negative terminal of the auxiliary battery and ground on the vehicle under test. When working in a garage or other enclosed area, auxiliary battery should be located at least 18 inches above the floor to minimize the possibility of igniting gasoline vapors.

• High voltage — 30,000 to 50,000 volts — is present in the ignition coil, distributor cap, ignition wires and spark plugs. When handling ignition wires while the engine is running, use insulated pliers to avoid a shock. While not lethal, a shock may cause you to jerk involuntarily and hurt yourself.

• The jack supplied with the vehicle should be used only for changing wheels. Never crawl under vehicle or run engine while vehicle is on a jack.