INSTALLATION INSTRUCTIONS
MECHANICAL GAUGES/KITS

1 PREPARATION FOR INSTALLATION

This section *must* be read and followed before installation of the gauge is performed.

1. Read instructions completely before installation.
2. Install gauges only when engine is cool and ignition is off.
3. Make sure all necessary tools, materials, and parts are on hand.
4. Always read the vehicle's service manual and follow it's safety precautions before any test or service procedure is performed.
5. Disconnect negative (-) battery cable before installing gauges (**do not forget to reconnect battery after installation is complete**).
6. Locate the vehicle's oil pressure and/or coolant temperature sending units, and verify the vehicle's sending unit port thread size is compatible with the thread size on the gauge's sending unit and/or the supplied adapters. DO NOT DRILL ANY HOLES IN DASH BEFORE ENSURING COMPATIBILITY. See the following notes.

NOTES:

- If the vehicle's original temperature sending unit is used by the computer for engine control functions, DO NOT REPLACE. Consult the dealer (or a professional) to determine if the new sending unit can be installed in an alternate location on the engine. If no suitable location is found, this gauge is not suitable for your application. (See below for oil pressure gauge.)
- For oil pressure gauges, a T-fitting (sold separately) may be used to accommodate the new gauge sending unit, and to keep the vehicle's original sender operational.

7. Determine a mounting location for the gauge. Choose a location that does not impair visibility or interfere with driving. Check behind the mounting location for any wiring or components before drilling. Also take into consideration the routing and length of the lead wires, nylon tubing and/or the capillary tube from gauge to engine sender port.

WARNING: Follow vehicle manufacturer's service recommendations. Check and maintain the vehicle's engine regularly (cooling system level and condition, oil system level and condition, charging system condition, etc.). Never rely on the gauges as the ONLY means of protection.

2 MOUNTING AND INSTALLATION

A. PANEL INSTALLATION

For On-Dash or Under-Dash mounting (panels are optional with some gauge models and must be purchased separately).

1. Determine mounting location (see section 1, step 7).
2. Using gauge panel as a template, mark locations for screws.
3. Drill small holes for the screws.
4. Mount panel in place and secure with screws and flat washers provided.

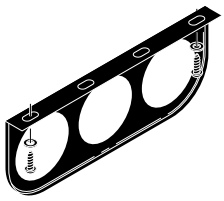


Figure 1. Gauge Panel

B. IN-DASH MOUNTING

1. Using a hole template, cut out a 1-1/2", 2" or 2-5/8" (3.81 cm, 5.08 cm, or 6.67 cm) hole, as necessary, through the dashboard.
2. Using a round file, smooth out the rough edges around the drilled hole.

C. INSTALLING GAUGE INTO GAUGE PANEL OR IN-DASH

1. Insert gauge through front of panel or hole in dashboard, as applicable.
2. Hold gauge case and rotate gauge, as needed, until gauge dial face is properly positioned in front of dashboard/panel. Secure gauge in place.
3. Tighten locking ring on gauge in clockwise direction until gauge is tight against dashboard/panel. Tighten locking ring HAND TIGHT ONLY.

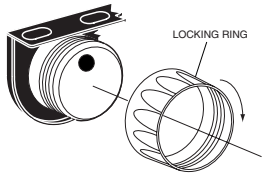


Figure 2. Gauge Equipped with Locking Ring

3 GAUGE LIGHT INSTALLATION AND CONNECTION

NOTE: Depending on the model of gauge, backlighting color may be changed to either red, green or blue by installing the optional color filter over the bulb (not available for all gauge kits).

1. Insert the light bulb and socket assemblies into the light receptacles on the back of the gauge and press firmly to snap/lock into place.

   NOTE: Wire for gauge lights must be purchased separately. Use size 18-20 AWG stranded copper wire.

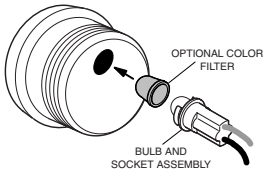


Figure 3. Light Bulb Installation

2. Splice the RED or WHITE wire from the gauge light(s) into the vehicle's lighting circuit, between the dimmer control switch and the dash lights (consult the vehicle's service manual for proper wire).
3. Connect light socket BLACK wire to a good chassis ground.
4. Insulate all connections with shrink tubing to prevent shorting.

   WARNING: For bulb replacement use <u>only</u> part # 161 Instrument/ Indicator wedge type bulbs available at most auto parts stores. DO NOT USE ANY OTHER PART NUMBER SINCE THE HEAT PRODUCED BY A HIGHER WATTAGE BULB WILL MELT THE GAUGE CASE AND CREATE A FIRE HAZARD.

4 GAUGE CONNECTION

A. VOLTMETER

1. Using a multimeter or test light, find a 12-volt positive (+) location that is hot ONLY when the ignition key is in the "ON" position (possible locations: fuse panel accessory, radio and cigarette lighter circuits).

   NOTE: Wire must be purchased separately. Use 18-20 AWG stranded copper wire.

2. Crimp or solder ¼" (6.35 mm) female spade/ring terminals (included) on one end of voltmeter positive (+) and negative (-) wires, and connect wires to voltmeter positive (+) and negative (-) terminal ring/spade posts, as applicable.
3. Connect voltmeter positive (+) wire to an accessory location or line as described in step 1.
4. Connect voltmeter negative (-) wire to a good bare metal chassis ground on the vehicle.

   NOTE: To prevent electrical shorts, route wires away from sharp edges and parts. Insulate all splices with shrink tubing.

5. Reconnect the negative (-) battery cable. With the ignition switch in the "ON" position and engine NOT RUNNING, voltmeter should read between 12.5 and 13.2 volts. A lower reading indicates a low battery, a poor connection or dirty/defective battery cables.

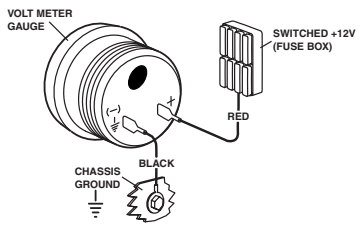


Figure 4. Voltmeter Connections

6. Start and run engine. Voltmeter should read between 13.3 and 15.2 volts (specifications vary, consult your vehicle's service manual for proper specifications). A lower reading can indicate a faulty voltage regulator, slipping belts, faulty alternator/battery, a poor connection or excessive loads. A higher reading can indicate a faulty voltage regulator.

   NOTE: If voltmeter fails to read, make sure positive (+) and negative (-) connections on rear of gauge match. If voltmeter still fails to read, recheck and tighten all connections.

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4 GAUGE CONNECTION (Cont)

B. MECHANICAL OIL PRESSURE

NOTE: Before installation, use shop cloths and drip pans to protect interior from potential vehicle leaks.

1. Determine routing for nylon tubing. Use an existing firewall grommet, or drill a 3/8" (9.53 mm) diameter hole through firewall to accommodate nylon tubing. Install a rubber grommet (purchased separately) in hole, use shrink tubing to protect nylon tubing from chaffing or other damage.

   NOTE: Some gauges require a tubing kit (purchased separately) for installation.
2. Connect nylon tubing to gauge using compression sleeve and compression nut. Tighten compression nut until tubing is secure.
3. Route nylon tubing through grommet in firewall.
4. Locate correct oil pressure port on engine and, if required, install proper adapter from gauge kit.

   NOTE: Some kits may include adapters for most Domestic/Asian vehicles. If adapters are not included, they may be purchased separately.

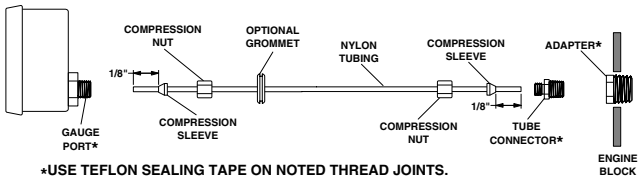


Figure 5. Mechanical Oil Pressure Gauge Connections

5. Connect nylon tubing to pressure port adapter using tube connector, compression sleeve and compression nut. Tighten compression nut until tubing is secure.
6. Secure tubing along its route to prevent damage from sharp edges, moving parts or hot engine components.
7. Reconnect negative (-) battery cable. Start and run engine for approximately 30 seconds. Turn off engine and check gauge installation for leaks. Tighten or reseal joints as needed and retest.

C. MECHANICAL TEMPERATURE

1. Determine routing for temperature sensor. Use an existing firewall grommet, or drill a 7/8" (22.23 mm) hole through firewall to accommodate capillary tube with sensor. Install a rubber grommet (purchased separately), in hole to protect capillary tube from chaffing or other damage.

   CAUTION: The capillary tube is a sealed, pressurized tube that is filled with Ether gas. **NEVER CUT THE TUBE OR ATTEMPT TO REMOVE IT FROM THE GAUGE PORT**.
2. Route capillary tube through grommet in firewall.
3. Remove the vehicle's existing temperature sending unit. Install the proper size adapter (an adapter must be used to properly seat temperature sender; see section 1, item 6) in sender hole and tighten securely. Insert temperature sensor in adapter and tighten sensor nut securely. DO NOT ROTATE SENSOR OR CAPILLARY TUBE WHILE TIGHTENING NUT OR CAPILLARY TUBE MAY BE DAMAGED.

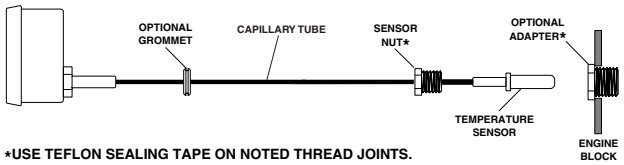


Figure 6. Mechanical Water Temperature Gauge Connections

   NOTE: Some kits may include adapters for most Domestic/Asian vehicles. If adapters are not included, they may be purchased separately.
4. Secure capillary tube along its route to prevent damage from sharp edges, moving parts or hot engine components. DO NOT CRIMP, KINK OR MAKE SHARP BENDS IN THE CAPILLARY TUBE.
5. Reconnect negative (-) battery cable. Start and run engine and check gauge installation for leaks. Tighten or reseal joints as needed and retest.