# INSTALLATION INSTRUCTIONS

FUEL PRESSURE
VACUUM GAUGE
TEMPERATURE GAUGE
OIL PRESSURE GAUGE
VOLTMETER GAUGE
AMMETER GAUGE
FUEL LEVEL

## GENERAL MOUNTING INSTRUCTIONS

These gauge kits are supplied with hardware for two different methods of mounting.

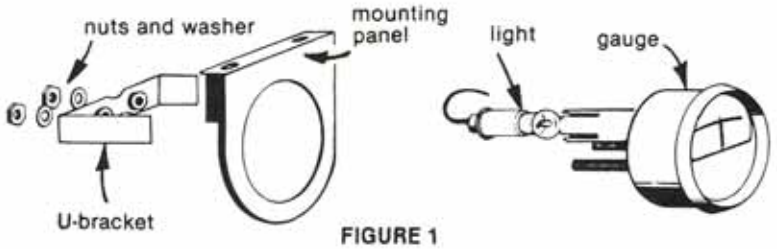


FIGURE 1

NOTE: **Single, Dual and Triple Mounting Panels are available for replacement Gauges.**
**Single Panel** SUN MODEL CP 7552
**Dual Panel SUN MODEL CP 7551**
**Triple panel SUN MODEL CP 7550**

### CONVENTIONAL MOUNT FOR PANEL OR IN-DASH MOUNTING

Attach the gauge to the mounting panel or dashboard using the U-bracket and the two lock-washers and nuts (Figure 1).

### GAUGE PANEL MOUNTING INSTRUCTIONS

1. Select the location of the mounting panel for the best possible visibility from the normal driving position.
2. Connect the mounting panel to the dashboard using the two sheetmetal screws (drilling might be required).
3. Assemble the gauge as described above.

### LIGHT CONNECTIONS

1. Connect one wire of the light assembly to the dash light circuit. This enables you use your dash dimmer control for your gauge(s).
2. Connect the other wire to engine/chassis ground.

NOTE: **Not all dashboards are properly grounded. Avoid painted or insulated surfaces.**

# VACUUM GAUGE

The vacuum gauge measures the engine's intake manifold vacuum. Knowing the vacuum, you can adjust your driving speed to maximize your fuel mileage. The vacuum gauge can also be used to diagnose mechanical, ignition, or fuel problems in the engine.

**PRO TIP:** In general, maximum fuel economy during cruising speeds can be achieved by maintaining a high and steady vacuum reading at the desired speed.

**NOTE: Replacement Gauges may require Vacuum Tubing Kit MODEL CP 7575.**

## ASSEMBLY INSTRUCTIONS

1. Connect the vacuum hose to the intake manifold using one of the following procedures:
   a. Connect the vacuum hose to an accessory vacuum hose connected to the intake manifold (below the carburetor) by using the supplied "T" adapter as shown in Figure 2.

**NOTE: Do not connect the gauge to the vacuum advance hose (hose leading to the vacuum advance unit on the distributor).**

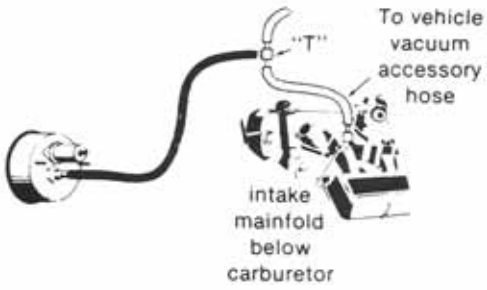


**FIGURE 2**

   b. If no true vacuum hoses are present, locate and remove the pipe plug from the manifold and screw in the manifold adapter (supplied with gauge). Attach the vacuum hose to the manifold adapter as shown in Figure 3.

**NOTE: Apply a small amount of thread compound or sealing tape to the pipe thread to help prevent leaks.**

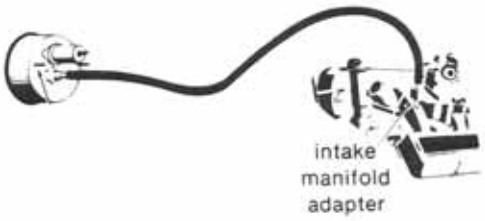


**FIGURE 3**

2. Route the vacuum hose through the firewall making sure it does not come in contact with any hot surfaces or interfere with the carburetor, transmission, or other control linkages. Do not make any sharp bends in the hose. Protect the hose with tape or a rubber grommet where it passes through the firewall.
3. Securely connect the hose to the vacuum gauge.

**PRO TIP:** To make sure that you are connected to manifold vacuum, start the engine and increase the RPM to approximately 2,000 for a second while observing the vacuum gauge. The vacuum should decrease sharply towards zero as you increase RPM from an idle vacuum reading of between 15" and 22". As RPM returns to idle, the vacuum should increase above the original idle vacuum and then return to a normal idle vacuum. If the above is not observed, you are not connected to a direct source of manifold vacuum. Try another vacuum hose.

# WATER/OIL TEMPERATURE GAUGE (MECHANICAL)

The temperature gauge can be installed to measure either water or oil temperature. It can alert you, usually before the dash warning light would, to a problem that may cause a breakdown that would result in costly repairs.

A higher than normal water temperature reading indicates a low coolant level, loose or missing fan and/or water pump belts, a plugged or leaking radiator, a worn water pump, or incorrect ignition timing. A lower than normal water temperature reading indicates a defective thermostat.

A higher than normal oil temperature indicates a low oil level, incorrect oil viscosity (thickness), oil in need of being changed, a plugged filter, clogged oil lines, a blocked oil cooler, higher than normal water temperature, or worn mechanical engine parts.

**PRO TIP:** Other conditions such as high air temperature, use of air conditioning, climbing hills, or towing a trailer, can create additional loads on the engine and cause both water and oil temperatures to increase above their normal operating temperature.

**NOTE: SUN u.s. and metric adapters are available.**

## ASSEMBLY INSTRUCTIONS

1. Locate a hole in the firewall, preferably in-line with the dashboard location of the gauge, and route the bulb (end of tubing) and hose through the firewall. If no hole is available, drill a 3/4" hole in the firewall. The adapters attached to the bulb may be removed for added clearance through the firewall. Do not remove the nut attached to the bulb or cut the tubing.

   **NOTE: Make sure that the tube does not short any electrical terminals and not come in contact with any hot surfaces or interfere with the carburetor, transmission, or any other control linkages. Do not make any sharp bends in the tube. Protect the tube with tape or a rubber grommet where it passes through the firewall.**

2. Attach the bulb and adapter to the engine using one of the following procedures:

   a. Water Temperature—drain the coolant below the existing temperature sender and replace the bulb in place of the sender using an adapter with the threaded fitting on the tubing.

   b. Oil Temperature—replace the bulb in place of the existing oil pressure sender using an adapter with the threaded fitting on the tubing.

   **NOTE: Apply thread compound or sealing tape to the threads of the adapter that is screwed into the engine.**

   **CAUTION: The engine coolant and oil may be very hot.**

3. Start engine and check for leaks.

   **NOTE: 1. Use a "T" adapter if both the gauge and the dashboard warning light are to operate at the same time. "T" adapters are available at your local auto parts store.**

   **2. All pipe threads are standard NPT sizes.**

# OIL PRESSURE GAUGE (MECHANICAL)

The oil pressure gauge measures the engine's oil pressure and it can alert you, usually before the dash warning light would, to a problem that may cause a breakdown that would result in costly repair.

A lower than normal operating oil pressure indicates a low oil level, incorrect oil viscosity (too thin), a plugged oil pick-up screen, excessive mechanical wear of engine parts, oil leaks, or extreme overheating.

A higher than normal operating oil pressure indicates blocked oil passage(s), dirty oil, a plugged oil cooler or filter, incorrect oil viscosity (too thick), or failure of the oil pressure relief valve.

## ASSEMBLY INSTRUCTIONS

**NOTE: Replacement Gauges require Pressure Tubing Kit Kit CP7554.**

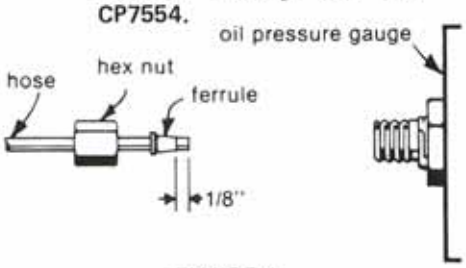


FIGURE 4

**NOTE: Apply a small amount of thread compound or sealing tape to all tapered pipe threads to help prevent oil leaks. No sealer or tape is needed on the threads that retain the tube and the ferrule.**

1. Slide the hex nut and ferrule onto the hose, leaving 1/8" between the ferrule and the end of the hose. Hold the hose against the gauge and tighten the hex nut snugly. (Figure 4)
2. Route the hose through the firewall making sure that it does not come in contact with any hot surfaces or interfere with the carburetor, transmission, or other control linkages. Do not make any sharp bends in the hose. Protect the hose with tape or a rubber grommet where it passes through the firewall.
3. Remove the existing oil pressure sender.

**CAUTION: The engine oil may be very hot.**

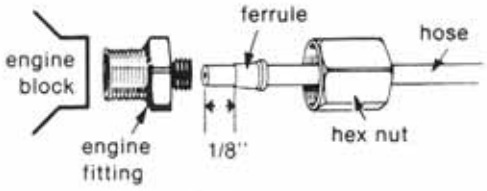


FIGURE 5

4. Connect the engine fitting to the engine using one of the following procedures:
   a. If only the gauge is to be used, connect the hose and the fittings directly to the engine as shown in Figure 5.
   b. If both the gauge and the dash warning light are to work at the same time, a "T" adapter is needed and can be purchased from your local auto parts store. All pipe threads are standard NPT sizes. Connect the hose and the fittings as shown in Figure 6.

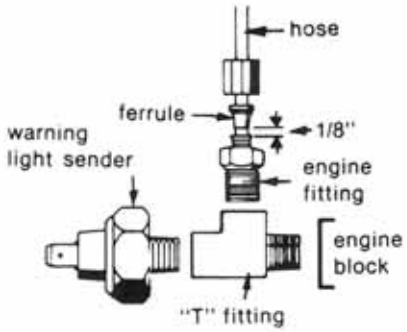


FIGURE 6

## OIL PRESSURE GAUGE (cont.)

**NOTE: Sun U.S. or Metric adapters are available from your local auto parts store and can be placed between the "T" adapter and engine block if necessary.**

5. Start engine and check for oil leaks at all connections.

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## VOLTMETER GAUGE

The voltmeter gauge indicates electrical pressure or voltage. It provides easy to understand information on the condition and operation of your vehicle's electrical system.

Under normal conditions, the voltmeter will indicate between 13 to 15 volts while the car is being operated at usual road speeds. If the gauge reads higher than 15 volts, it indicates that the charging system's voltage regulator is not operating properly and it can result in damage to the battery and accessories. A continuous reading of less than 13 volts indicates that the charging system is not operating properly and will eventually result in a discharged battery.

If the voltmeter reads too high or too low at normal operating conditions, the battery, the starting system, and the charging system should be throughly tested and serviced as necessary.

### ASSEMBLY INSTRUCTIONS

1. Add a flatwasher and a nut to each post at the back of the gauge as shown in Figure 7.
2. Connect insulated wires (18 gauge or larger recommended) between the washer and the last nut on each post (Figure 7).

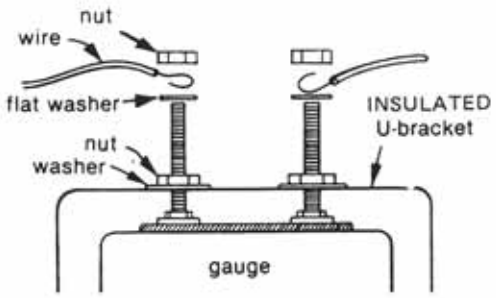


**FIGURE 7**

3. Connect the wire from the negative ( – ) terminal of the voltmeter to engine/chassis ground.

   **NOTE: Not all dashboards are properly grounded. Avoid painted or insulated surfaces.**

4. Turn the ignition switch to the accessory or on position.
5. Route the wire from the positive ( + ) terminal of the voltmeter to the fuseblock and touch the wire to the exposed accessory terminals. When the voltmeter indicates battery voltage (approximately 12 volts) turn the ignition switch to the off position. If the voltmeter now reads 0 volts, this is the terminal that you want to make your permanent connection to. If the voltmeter still reads battery voltage, try another accessory terminal and repeat the above procedure.

## VOLTMETER GAUGE (cont.)

6. Disconnect the battery ground cable to avoid accidental grounding and damage to the vehicle's electrical system while making the permanent connections.

7. Securely connect the wire from the positive (+) terminal of the gauge to the accessory terminal.

**PRO TIP:** 1. If there are no accessory terminals available, alternate hook-up locations can be found on the accessory terminal of the ignition switch or the radio's power leads.

2. These instructions apply to vehicles with negative ground systems. For positive ground systems, reverse the leads at the back of the meter.

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## AMMETER GAUGE

The ammeter gauge indicates the amount and direction of current flow to and from the vehicle's battery. This gives you a good indication of the operation and electrical condition of the battery, alternator and voltage regulator.

A needle positioned on the charge or positive (+) side of the gauge indicates that the charging system is supplying enough electrical current to satisfy all of the requirements of the vehicle's electrical system and still has enough current to charge the battery. A needle positioned on the discharge or negative (−) side of the gauge indicates that the charging system is not supplying enough electrical current to satisfy all of the requirements of the vehicle's electrical system and the battery is being discharged to supply this extra needed current.

Normally, after starting the engine, the ammeter will indicate a slight charge. This occurs due to the fact that the battery has to be recharged for the current used to start the engine. After a few minutes, at fast idle or at cruising speeds, the needle should swing towards zero indicating that the charging system has restored the battery to a charged condition and is satisfying all of the electrical needs of the vehicle.

If the ammeter indicates discharging at all engine speeds, there is a problem with the charging system or the current required is above the capability of the charging system. Check for loose connections, loose drive belts, a faulty alternator, a faulty generator, a faulty voltage regulator, or reason for the excessive current load, that should be eliminated. An ammeter reading continuously and excessively in the charge position indicates a battery or voltage regulator problem, poor ground or a loose connection.

### INSTALLATION INSTRUCTIONS

The wires used to connect the ammeter to the vehicle should be insulated and heavy enough to carry the current required on all of the accessories operating simultaneously.

| MAXIMUM EXPECTED LOAD | WIRE SIZE REQUIRED |
|---|---|
| 30 amperes | 10 gauge |
| 45 amperes | 8 gauge |
| 60 amperes | 6 gauge |

## AMMETER GAUGE (cont.)

**PRO TIP:** The maximum rated output of your alternator or generator is a good guide to use.

1. Disconnect the battery ground cable to avoid the accidental grounding of the electrical system.
2. Securely connect the wires using 2 crimp terminals (not supplied) as illustrated in the Ammeter Application and Figure 8.
3. Route the wires through the firewall making sure that they do not come in contact with any hot surfaces or interfere with the carburetor, transmission or other control linkages. Protect the wire with tape or a rubber grommet where it passes through the firewall.
4. Connect the wires between the washer and the last nut on each post of the ammeter (Figure 7) making sure to observe the polarity of the connections as shown in Figure 8.
5. Reconnect the battery ground cable.

**PRO TIP:** With the engine off, turn the headlights on and note the direction of the needle. It should read on the discharge side. If it reads on the charge side of the scale, disconnect the battery and reverse the leads on the back of the meter.

## AMMETER APPLICATION

Figure 8 is an electrical and not a mechanical diagram. Depending on the vehicle point "A" could represent a connection on the starter relay, horn relay, headlight high beam switch, battery cable or other electrical termination point.

## BEFORE INSTALLATION

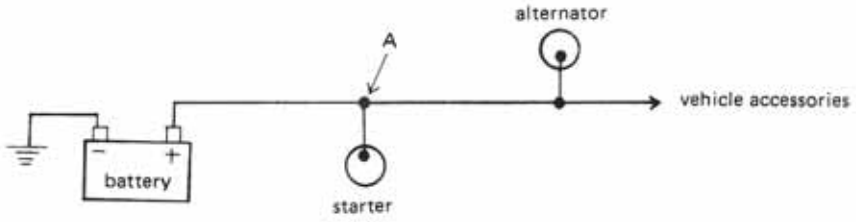


**FIGURE 8**

## AFTER INSTALLATION

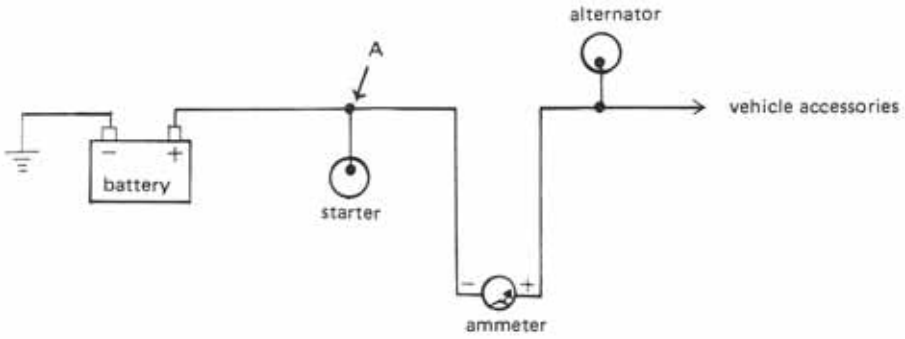


FIGURE 8 (cont.)

### FUEL PRESSURE GAUGE

The fuel pressure gauge measures the engine fuel pressure. It can alert you to a problem that may cause a breakdown.

## ASSEMBLY INSTRUCTION

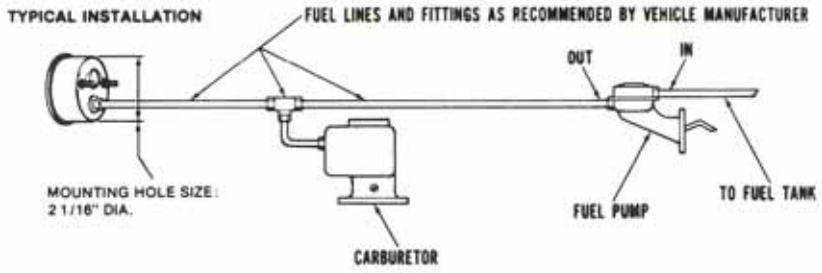


FIGURE 9

USE VEHICLE MANUFACTURER'S RECOMMENDED FUEL LINES, FITTINGS AND SEALS.

DANGER: DO NOT MOUNT FUEL PRESSURE GAUGE IN PASSENGER COMPARTMENT ON ANY VEHICLE.

FUEL PRESSURE GAUGES SHOULD ALWAYS BE MOUNTED IN ENGINE COMPARTMENT OF THE VEHICLE AWAY FROM SHIFT LINKAGES, THROTTLE CONTROLS AND INSURE THAT GAUGE LINES DO NOT CONTACT EXHAUST MANIFOLD.

## WATER/OIL TEMPERATURE GAUGE (ELECTRICAL)

The temperature gauge can be installed to measure either water or oil temperature. It can alert you, usually before the dash warning light would, to a problem that may cause a breakdown that would result in costly repairs.

A higher than normal water temperature reading indicates a low coolant level, loose or missing fan and/or water pump belts, a plugged or leaking radiator, a worn water pump, or incorrect ignition timing. A lower than normal water temperature reading indicates a defective thermostat.

A higher than normal oil temperature indicates a low oil level, incorrect oil viscosity (thickness), oil in need of being changed, a plugged filter, clogged oil lines, a blocked oil cooler, higher than normal water temperature, or worn mechanical engine parts.

**PRO TIP:** Other conditions such as high air temperature, use of air conditioning, climbing hills, or towing a trailer, can create additional loads on the engine and cause both water and oil temperatures to increase above their normal operating temperature.

## OIL PRESSURE GAUGE (ELECTRICAL)

The oil pressure gauge measures the engine's oil pressure and it can alert you, usually before the dash warning light would, to a problem that may cause a breakdown that would result in costly repair.

A lower than normal operating oil pressure indicates a low oil level, incorrect oil viscosity (too thin), a plugged oil pick-up screen, excessive mechanical wear of engine parts, oil leaks, or extreme overheating.

A higher than normal operating oil pressure indicates blocked oil passage(s), dirty oil, a plugged oil cooler filter, incorrect oil viscosity (too thick), or failure of the oil pressure relief valve.

WIRING DIAGRAM (Negative ground ignitions only)

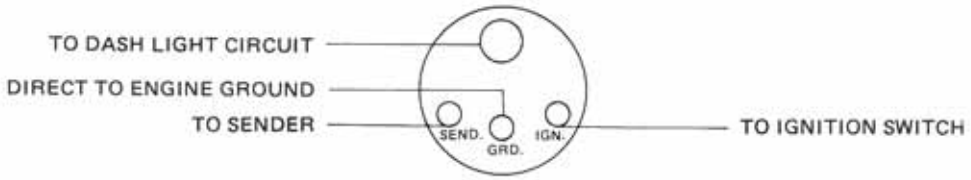


**FIGURE 10**

**NOTE: Replacement Gauges require SUN Senders.**
**OIL PRESSURE CP 7577.**
**WATER TEMPERATURE CP 7576.**

## WATER/OIL TEMP-OIL PRESSURE — ELEC (CONT.)

ASSEMBLY PROCEDURE:
For gauges CP-7920 and CP-7921 proceed as follows:

1. A 2-1/16" hole is required for in-dash mounting.
2. Use 18-gauge wire to connect ground, sender and ignition wires as shown on circuit diagram above. CAUTION: DISCONNECT BATTERY GROUND CABLE TO AVOID ACCIDENTAL GROUNDING OF ELECTRICAL SYSTEM WHILE MAKING ELECTRICAL CONNECTIONS TO THE GAUGE.
3. Remove original oil pressure/water temperature senders and replace with appropriate Sun units. Connect sender wire only to terminal on sender.

   NOTE: CP 7553 adapter kit, contained in CP-7920 package, adapts water temperature sender to proper thread size of engine block sender hole, if other than 1/8-27 N.P. thread (Metric adapters also available).
4. The sending unit is usually installed in the same hole from which the warning light sender is removed.
5. Connect all wiring as noted in FIG. 10.

## FUEL LEVEL GAUGE

**The fuel level gauge measures fuel quantity.**

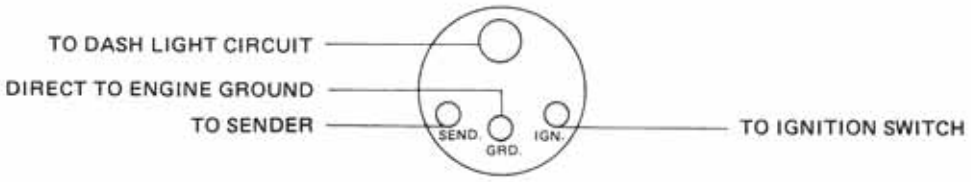


**FIGURE 11**

COMPLETE INSTALLATION OF THE FUEL LEVEL GAUGE REQUIRES THE USE OF A SUN FUEL TRANSMITTER. FIND CORRECT FUEL TANK DEPTH IN THE FOLLOWING TABLES, AND INSTALL CORRESPONDING FUEL TRANSMITTER MODEL.

| FUEL TRANSMITTER | TANK DEPTH | LGTH." C |
|---|---|---|
| MODEL CP7562 | 5 | 3-3/8 |
| | 5-1/2 | 3-7/8 |
| | 6 | 4-3/8 |
| | 6-1/2 | 4-7/8 |
| | 7 | 5-3/8 |
| | 7-1/2 | 5-7/8 |
| | 8 | 6-3/8 |
| | 8-1/2 | 6-7/8 |
| | 9 | 7-3/8 |
| | 9-1/2 | 7-7/8 |
| | 10 | 8-3/8 |
| | 10-1/2 | 8-7/8 |
| | 11 | 9-3/8 |
| | 11-1/2 | 9-7/8 |
| | 12 | 10-3/8 |

| FUEL TRANSMITTER | TANK DEPTH | LENGTH" A | B |
|---|---|---|---|
| MODEL CP7561 | 10 | 6-3/16 | 5-1/8 |
| | 10-1/2 | 6-1/2 | 5-3/8 |
| | 11 | 6-7/8 | 5-5/8 |
| | 11-1/2 | 7-3/16 | 5-7/8 |
| | 12 | 7-9/16 | 6-1/8 |
| | 12-1/2 | 7-7/8 | 6-3/8 |
| | 13 | 8-1/4 | 6-5/8 |
| | 13-1/2 | 8-9/16 | 6-7/8 |
| | 14 | 8-15/16 | 7-1/8 |
| | 14-1/2 | 9-1/4 | 7-3/8 |
| | 15 | 9-5/8 | 7-5/8 |
| | 15-1/2 | 9-15/16 | 7-7/8 |
| | 16 | 10-5/16 | 8-1/8 |
| | 16-1/2 | 10-5/8 | 8-3/8 |

ASSEMBLY PROCEDURE:

1. A 2-1/16" hole is required for in-dash mounting.
2. Use 18-gauge wire to connect ground sender and ignition wires as shown in FIG. 11 above. CAUTION: DISCONNECT BATTERY GROUND CABLE TO AVOID ACCIDENTAL GROUNDING OF ELECTRICAL SYSTEM WHILE MAKING ELECTRICAL CONNECTION S TO THE GAUGE.

## FULL ONE (1) YEAR WARRANTY

SUN ELECTRIC CORPORATION, Instrument Products Division, 1560 Trimble Road, San Jose, California 95131, 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 Sun's option and without charge when returned to the factory. Sun 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, e.g. batteries, fuses, lamp bulbs, flash tubes, are also excluded from the scope of this warranty.

SUN ELECTRIC CORPORATION 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 not apply to you. This warranty gives specific legal rights, and you may also have rights which vary from state to state.

**For repairs in or out of warranty, DO NOT RETURN THE UNIT TO YOUR DEALER. He does not have the specialized equipment required to test or repair your unit. Return it to the address shown below.**

## SERVICE PROCEDURE

Products in need of service should be returned as follows (1) Package carefully to prevent shipping damage, (2) For warranty enclose copy of dated sales receipt, (3) Enclose completed service card, (4) SHIP PREPAID to:


Sun ELECTRIC CORPORATION

INSTRUMENT PRODUCTS DIVISION
Factory Service Center
1560 Trimble Road
San Jose, California 95131
(408) 946-7500 TELEX: 346-415


0692-5049CP