

**PennTex** INDUSTRIES, INC.

# Visual and Audible CHARGING SYSTEM MONITOR

With our advanced Charging System Monitor, you'll know at a glance -- or hear the audible beep -- when your battery is in trouble or your charging system is inoperative. This alerts the driver to problems often ignored with silent volt meters. Helps prevent passengers from becoming stranded due to a charging system failure or a low battery situation.

- 3 LED charging system indicators.
- An audible beeper.
- Load kill relay output.
- 12-Volt CSM Part #: PI-1001
- 24-Volt CSM Part #: PI-1024



## CSM FEATURES



Simple wire connections to CSM:

- Red** - ignition
- Black** - ground
- Orange** - stator
- White** - (optional) - load kill relay

On vehicles with no stator wire connection, hook the Orange wire to the Red wire. Connect the Red wire to a fused ignition-on source.

- Round 2-1/16" automotive instrument mounting hole or surface mount.
- Audible warning indicator with different beep patterns, based on warning emergency. The driver is immediately alerted.
- CSM monitors battery voltage and alternator output.
- Automatic load kill output - disconnects nonessential electrical loads to reduce battery drain if alternator stops charging or the battery voltage drops below 10.8 volts.
- Two second start-up self test for LED's and beeps - lets driver know that the CSM is working properly.
- Muted audio during first minute of operation for driver convenience.
- Works with most alternators and electrical systems - contact PennTex for more information.
- PennTex Industries, Inc. standard warranty is eighteen months (18) months or 75,000 miles- whichever occurs first, when installed on a new OEM vehicle. Aftermarket installations have a warranty of twelve (12) months/unlimited miles.

## PERFORMANCE, ENDURANCE AND SATISFACTION

**PennTex**  
INDUSTRIES, INC.

Manufacturers of  
High Efficiency Alternators and  
Mobile Electronic Devices

**Corporate:**  
202 Plaza Drive  
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Visual and Audible

# CHARGING SYSTEM MONITOR

**12-Volt CSM Model: PI-1001**

**24-Volt CSM Model: PI-1024**

CONNECT TO STATOR WIRE

CONNECT TO FUSED IGNITION-ON POWER

OR

ON VEHICLES WITH NO STATOR WIRE CONNECTION, HOOK THE ORANGE WIRE TO THE RED WIRE. CONNECT THE RED WIRE TO A FUSED IGNITION-ON SOURCE.

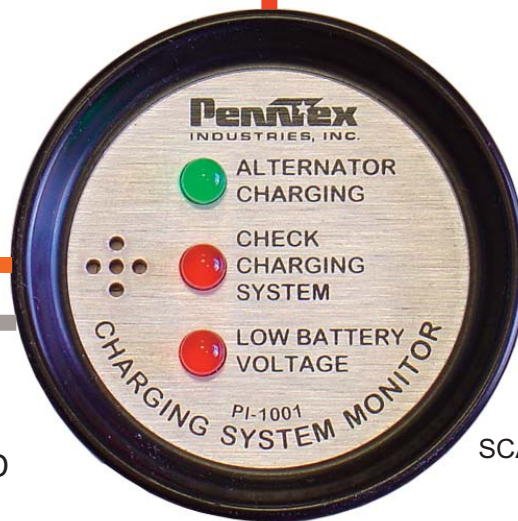
BY MAKING AS FEW AS TWO WIRE CONNECTIONS YOU HAVE A SYSTEM THAT WILL UNMISTAKABLY ALERT A BUSY DRIVER TO AN ELECTRICAL PROBLEM OR ALSO CONFIRM THAT EVERYTHING IS OK.

RED

ORANGE

WHITE

DISABLE NON-ESSENTIAL ACCESSORY LOADS (THIS CONNECTION IS PROVIDED & HOOKUP IS OPTIONAL)



BLACK

SCALE: NONE

GROUND

FITS 2-1/16" HOLE

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**Get The PennTex Advantage!**  
**PERFORMANCE, ENDURANCE AND SATISFACTION**

## FUNCTIONS OF A CHARGING SYSTEM MONITOR (CSM) 12-Volt CSM: PI-1001



### STARTUP:

When the CSM is first powered up it enters a self test mode just as the OEM instrumentation does. During this 2 second test, the CSM beeps once and turns on all the LED indicators. For the first minute of normal operation the beeper is muted to allow the engine to start, battery to recharge and the air intake heater and/or glow plugs to turn off.

### NORMAL OPERATION w/ NO WARNINGS:

If the charging system is working and the battery voltage is above 11.5 volts then only the "ALTERNATOR CHARGING" LED (green) should be on, the beeper should be silent and the accessories should be enabled (*note: with optional load kill relay connection*).

### LOW BATTERY VOLTAGE:

If the battery voltage drops below 11.5 volts then the "LOW BATTERY VOLTAGE" LED (red) will turn on and the beeper will beep once every 60 seconds.

### VERY LOW BATTERY VOLTAGE:

If the battery voltage falls below 10.8 volts then the "LOW BATTERY VOLTAGE" LED will flash and the beeper will beep once every 2 seconds. After 1 minute, if the problem still exists then the accessories will be disabled (*note: with optional load kill relay connection*). The accessories will automatically be re-enabled if the charging system is working and the battery voltage rises above 13 volts for 1 minute.

Above was taken from "PennTex Industries Charging System Monitor (14 Volt) Installation and Testing" written by Rick Wylie.

*NOTE: a 24-Volt Charging System Monitor is also available as part # PI-1024.*

### Charging System Condition / CSM Light Operation

#### DURING VERY LOW BATTERY VOLTAGE:

GREEN "Alternator Charging" Light: On Constantly  
 RED "Check Charging System" Light: Off  
 RED "Low Battery Voltage" Light: Flashes

#### DURING LOW BATTERY VOLTAGE:

GREEN "Alternator Charging" Light: On Constantly  
 RED "Check Charging System" Light: Off  
 RED "Low Battery Voltage" Light: On Constantly

#### DURING NORMAL OPERATION:

GREEN "Alternator Charging" Light: On Constantly  
 RED "Check Charging System" Light: Off  
 RED "Low Battery Voltage" Light: Off

#### DURING A CHARGING SYSTEM FAILURE:

GREEN "Alternator Charging" Light: Off  
 RED "Check Charging System" Light: Flashes Constantly  
 RED "Low Battery Voltage" Light: Off

#### DURING ALTERNATOR OVERCHARGING:

GREEN "Alternator Charging" Light: On Constantly  
 RED "Check Charging System" Light: On Constantly  
 RED "Low Battery Voltage" Light: Off

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