



**CAUTION: CAREFULLY READ INSTRUCTIONS BEFORE PROCEEDING**

## OVERVIEW

The WEGO units can be used with an easily fabricated exhaust sniffer that allows temporary installation on vehicles for tuning and diagnostic purposes. The exhaust sniffer is compatible with late model vehicles with catalytic converter.

## EXHAUST SNIFFER FABRICATION

The exhaust sniffer is shown in Figure 1. It is constructed from a 6" length of 1" ID steel pipe. A 3/4" hole is drilled approximately 2" from the end and an 18 x 1.5 mm weld nut (our P/N EGO-WELD-NUT) is welded onto the pipe. After welding, an 18 x 1.5 mm tap must be used to clean the threads.

Figure 1 – Automotive Exhaust Sniffer



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A mounting bracket and reversion deflector is fabricated from a 7" length of 1" wide x 1/8" thick aluminum. The bends can be done in a vise and are not critical. The bracket is held in place by a hose clamp. The end that is bent up helps to eliminate reversion and suction effects. Optimum spacing is about 1/8" from the end of the pipe.

Copper pipe can be used as alternative to steel. If a copper pipe material is used, the mild steel weld nut can be soldered to the pipe using acid core flux and a propane torch.

All the materials, except the exhaust wrap described in the following section, can be readily

obtained in the plumbing department of any hardware store.

## **VEHICLE INSTALLATION**

The exhaust sniffer is attached to the tailpipe with a large diameter hose clamp as shown in Figures 2 and 3. Woven glass high temperature exhaust wrap (available from most automotive parts stores) is used to protect the tailpipe from scratches. A small section of foam pipe insulation is used to cover the Bosch sensor connector in order to protect the car finish. If the WEGO is dash mounted, an extension cable (our P/N WEGO-CBL-12) will be required to reach the sensor.

Figure 2 – Exhaust Sniffer Vehicle Installation



## **WEGO HOOKUP**

A cigarette lighter plug (available from Radio-Shack or other electronic parts stores) can be used to power the WEGO.

Temporary tach and analog signal (MAP or TPS) connections can be made with insulation piercing test clips. Once you use these, you will wonder how you ever got along without them. The best type is the

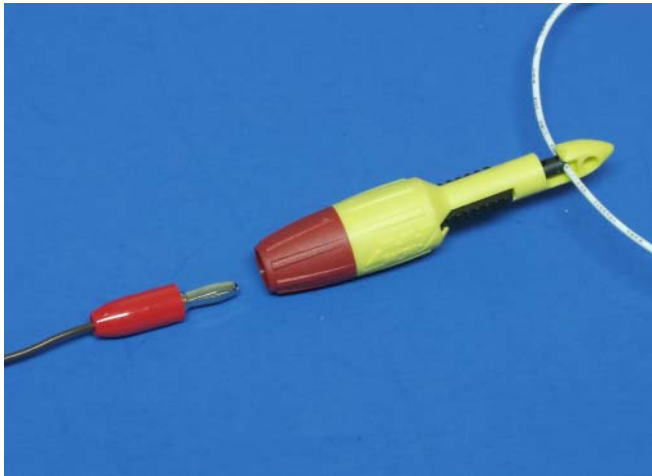
Pomona 6405. These lock onto the wire. A set of the Pomona test clips is available from Newark as their P/N 23C2020. They also sell extended reach versions (refer to the data sheet available on the Diagnostic Tools and Suppliers Tech FAQ on our website at [www.daytona-sensors.com](http://www.daytona-sensors.com)). You will need banana plugs to connect the insulation piercing test clips to the WEGO. These are available from Newark as P/N 39F1531 (red) and 39F1532 (black). The insulation

piercing test clips are also very handy for probing signals with a DVM or scopemeter. To use them with a DVM or scopemeter, you will need a set of test leads with banana plugs. These are also available from Newark as P/N 34F850 (36" red) and 34F851 (36" black). The test clips, banana plugs, and test leads together will cost about \$50.00. Newark can be reached at 800-463-9275 or [www.newark.com](http://www.newark.com).

Figure 3 – Exhaust Sniffer Vehicle Installation



Figure 4 – Insulation Piercing Test Clip



## VEHICLES WITH CATALYTIC CONVERTER

The WEGO can be used on vehicles with a catalytic converter. Sniffing the exhaust gas after the catalytic converter has some limitations. The catalytic converter has an oxygen storage capacity (OSC). At idle and part throttle cruise, the engine control module (ECM) will attempt to maintain a stoichiometric 14.7 AFR. The catalytic converter will have some stored oxygen and will further buffer the exhaust. Under these conditions the WEGO should read near 14.7 AFR.

Under decel conditions, the ECM will reduce or entirely cut off fuel delivery and the engine will run very lean. The catalytic converter will absorb the excess oxygen for 1-2 seconds until reaching its OSC limit. After this delay, the WEGO will indicate a very lean AFR, possibly as high as 19.5.

Under wide open throttle (WOT), the ECM will increase fuel delivery and the engine will run rich. The catalytic converter will use up its stored oxygen. Depending on the OSC, this can take about one second. After this delay, the WEGO will indicate the actual engine AFR. Typical readings should be in the range of 12.5-13.5 AFR.

The delay between decel and a lean AFR reading (or accel and a rich AFR reading) for an oxygen sensor located in the exhaust stream past the catalytic converter is an indication of the OSC. The delay in AFR readings is directly proportional to OSC. As the catalytic converter ages, or if it is damaged by overheating or contaminants, the OSC drops to zero. 1996 and newer vehicles with OBD II diagnostics use this principle to detect catalytic converter failure.

Figure 5 shows data logged on our 2006 Nissan 350Z test vehicle using the exhaust sniffer installation shown in Figure 3. The graph shows data for throttle position (TPS) and sniffer AFR. The data represents steady state part throttle cruise followed by 9 seconds of WOT acceleration, and then decel. You can clearly see the 1 second delay between WOT and rich AFR readings. When the throttle is closed, AFR fluctuates for about 2 seconds before going lean.

Figure 5 – Automotive Exhaust Sniffer AFR Data

