

Equipment	AutoGas Emissions Analyzer
Description	5 gas emissions analyzer measures the amount of HC, CO CO2, O2 and NOx in the exhaust of a vehicle
Team	Student Design Center
Location	E5-1106A
SOP created	2016-01-08
SOP revised	
Manual location	Top shelf to the right of the entrance door
Authorized trainers	Peter Teertstra Yulian Bagnol Stefanie Bruinsma
Support technicians	Yulian Bagnol Stefanie Bruinsma



Significant hazards	<ul style="list-style-type: none"> • Electrocution • Gas poisoning • Hot surfaces
Administrative Controls	<ul style="list-style-type: none"> • The equipment is only to be operated in presence of authorized trainer
Engineering Controls	None
PPE Required	None
Relevant MSDS	None
Accident procedures	None
Emergency shutdown procedures	None

Equipment Diagram

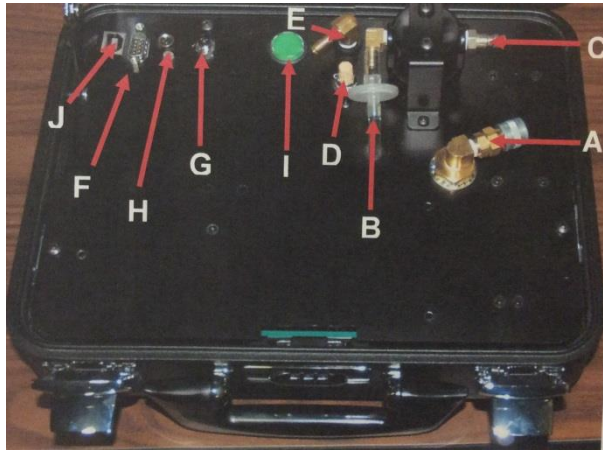


Figure 1: Gas analyzer connections

- A- Water/exhaust outlet
- B- Vacuum seal quick disconnect
- C- Sample probe connector
- D- Zero air port
- E- Calibration port
- F- PC or Pocket PC RS232 (serial) connector
- G- 12V power input connector
- H- Pocket PC power connector
- I- Power button
- J- USB connector

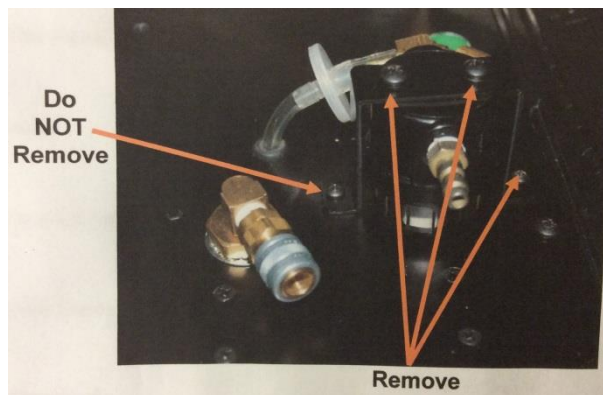


Figure 2: Access to water trap filter

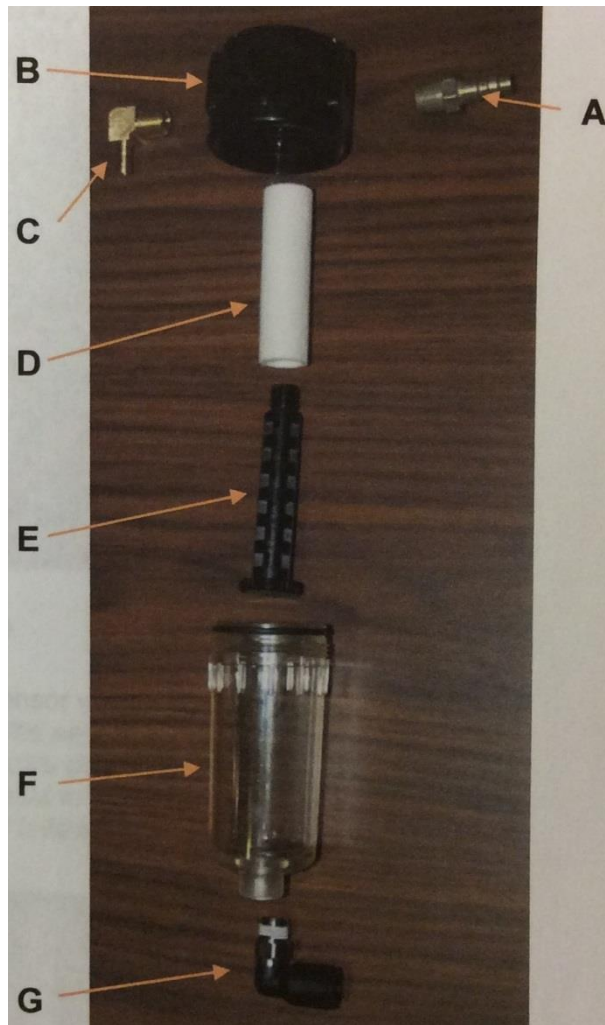


Figure 3: Water trap

- A- Gas sample hose connector
- B- Filter head
- C- Elbow
- D- Filter element
- E- Filter element retainer
- F- Filter bowl
- G- Water drain hose connector

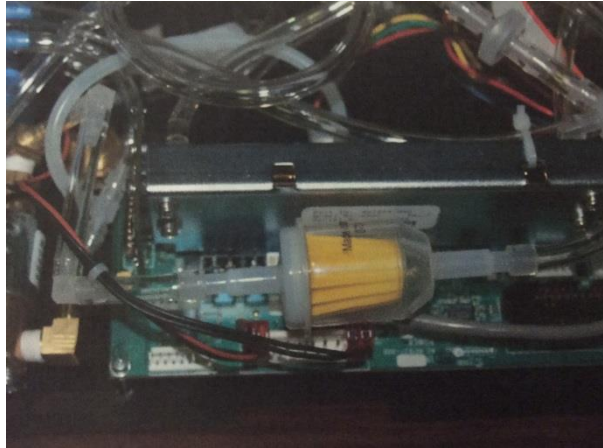


Figure 4: Internal inline filter

Operation information

Pre-start Checklist

- Make sure there is proper ventilation
- Make sure the engine of the vehicle is warm and in good operating condition before running the gas analyzer tests

Start-up Procedures

1. Thread emission sample probe into the emission sample hose
2. Connect the emission sample hose to its mating spring lock coupling on the gas analyzer
3. Connect the water/exhaust hose to its mating spring lock coupling on the gas analyzer. When the gas analyzer is located in a vehicle for testing, make sure the open exhaust hose end is routed to the outside of the window and does not obstruct the operations of the driver. (NOTE: The water/exhaust to be connected before powering-up the gas analyzer or a *Low Flow* condition will result in the PC or Pocket PC software)
4. Connect the PC USB cable as appropriate for the configuration being used
5. Connect the Pocket PC serial cables power connector to the gas analyzer
6. Thread one of the analyzer power cables into the gas analyzer and connect the other end to the end of the power supply cord.
7. At this point, everything is connected and ready. If using the Pocket PC, power on the device, click on Start menu using the stylus pen, usually found in the upper right corner of the Pocket PC, then select Pocket Gas™ to load the software. If there is no Pocket Gas™ menu shortcut on the Start menu, select Programs, and locate and select AutoGas Emissions Analyzer menu item. Additional information on the PC and Pocket PC software can be found in their respective manuals.

Operating Procedure

- If significant amount of data is stored, periodically delete the data from the Pocket PC software
- Certain gases are produced only when driving vehicles under certain conditions. NOx is typically generated only when a car is under load
- The analyzer must be oriented on a flat surface with the top case open for proper operation. Low flow may occur when operating the analyzer upside down or when the analyzer is sitting on a severe incline.
- If the analyzer is used where very high level of hydrocarbons and water exist, hydrocarbon (HC) hangup may result. Hydrocarbon hangup is shown when there is a value for HC when sampling air. Running the pump for extended periods of time after usage in these environments will cause the condition to clear.

Shutdown Procedure

- The analyzer uses a filter to filter the water and particulates from the sample gas coming into the analyzer. In normal use, this filter will retain moisture. The analyzer should be run with the pump on after using the analyzer on a vehicle to remove this moisture. A good rule of thumb is to run the pump of any analyzer for 15 minutes after operation before shutting down.

Maintenance and Repair

- Water trap filter replacement (monthly)
 1. Remove only the 3 screws as shown above (Figure 2), do not remove the fourth screw on the panel holding the bracket
 2. Rotate the bracket clockwise until there is adequate room for the filter bowl to be removed
 3. Remove water drain hose from the bottom of the filter bowl (Figure 3)
 4. Push the gray sleeve inward and pull hose straight out of the connector
 5. Unscrew filter bowl
 6. Remove filter, filter seal and O-ring
 7. Wash bowl with soap and water. **Do not use solvents.**
 8. Inspect attached O-ring on top of the filter bowl. Make sure it is not split.
 9. Install the O-ring and seal back into the bottom of the filter bowl. Make sure the O-ring is seated in the groove on the seal and it rests in the filter bowl.
 10. Insert new filter in filter bowl on top of the seal
 11. Line up bowl with tip and tighten the bowl 4.5 turns. **Do not over tighten filter.**
 12. Reconnect the water drain hose, insert the filter bowl, and attach the screws.
 13. Perform a leak check after filter service is complete
- NOx sensor (yearly)
- O2 sensor (yearly)
- Internal inline filter (Figure 4)

If there are repeated low flows after the filter in the filter bowl has been replaced or if there is still significant amounts of HC readings after replacing the filter in the filter bowl, the inline filter should be replaced.

To replace the internal inline filter, disconnect the hoses and connectors to the analyzer and remove the four screws as shown above to remove the main panel. The filter is located between the sample hose where it enters the analyzer. After locating the filter, replace it and then replace the panel and four screws. Re-zero the analyzer.

- Calibration (monthly)
- Leak check (weekly)

Lockout

Make sure the sample probe is not hot before handling.

APPENDIX. Authorized Users

Name	Trained on	Trained by	Signature (trainer)
Yulian Bagnol			
Stefanie Bruinsma			
Peter Teerstra			