Galio
Industrial Development Co.

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SMART 2000xfl

SMART 2000xfl module provides a mobile and portable instrumentation for raw exhaust gas flow and temperature measurements. That is synchronized with sample gas concentration and sample cell pressure and temperature measurements to provide mobile and portable exhaust gas mass measurements.

During emission testing all measured and calculated momentary values are placed in three dimensional data arrays in computer memory for the duration of the test. Test data is also displayed in CHART RECORDER graph format for visual analysis during testing. It can also be retrieved for historical chart displays or stored in MS EXCELL compatible data file.

SMART 2000xfl

SMART 2000 software provides utilities for saving each test into data files for further analysis and displays. When Mass Measurement switch is ON, following is the example of a sequence of the data columns in data files:

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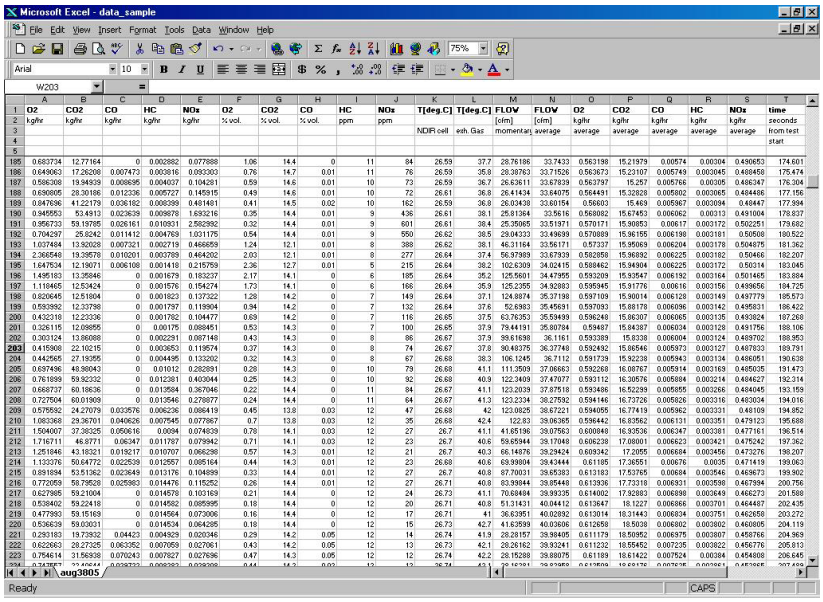
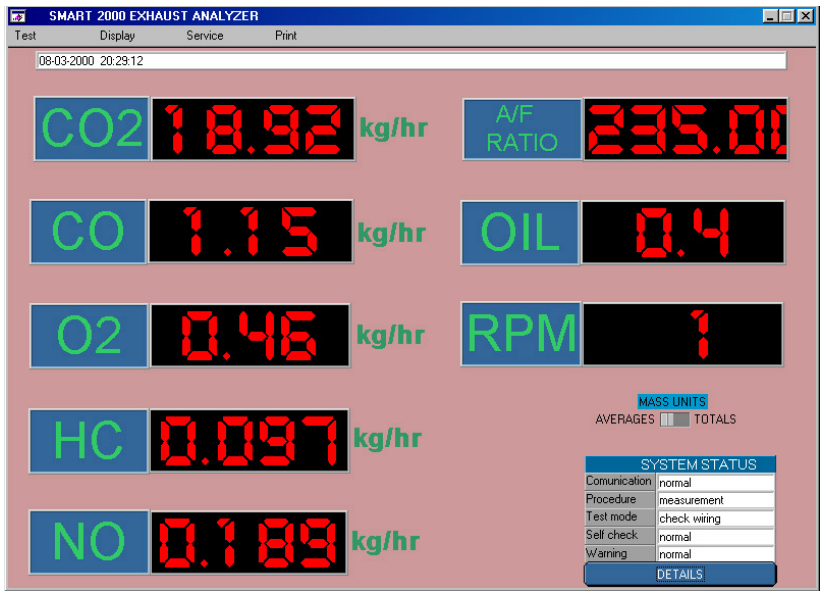
MASS O2 [g/km], MASS CO2 [g/km], MASS CO [g/km], MASS HC [g/km], MASS NOx [g/km], O2 [% vol.], CO2 [% vol.], CO [% vol.], HC [ppm.], NDIR Cell temp. [deg.C], Exh. Gas temp. [deg.C], Exh. gas flow [cfm],], Average Exh. gas flow [cfm], Average MASS O2 [g/km], Average MASS CO2 [g/km], Average MASS CO [g/km], Average MASS HC [g/km], Average MASS NOx [g/km], Average Fuel Consumption[l/100 km], number of seconds from the beginning of the test [sec]. Data files have text format and can be imported to any standard data analysis software like Microsoft EXCEL.





The cumulative and averaged mass values are calculated automatically and displayed in NUMERIC screen.

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SPECIFICATIONS

Measuring Ranges	Accuracy/Performance
Exhaust Gas flow range 0 - 120 cfm - Engines up tp 3000 cc 0 - 450 cfm - Engines up tp 12000 cc	+/- 0.5 % Absolute
Exhaust Gas. Temp. 0-700 Deg. C. J Type Thermomcouple	+/- .5% Absolute
Exhaust Gas Pressure Diff. Sensor 0 - 12 " H2O, +/- 1000 mV	14 bits
CO: g/min, g/km, g/bhp-h, g/kWh CO_2: g/min, g/km, g/bhp-h, g/kWh HC: g/min, g/km, g/bhp-h, g/kWh O_2: g/min, g/km, g/bhp-h, g/kWh NOx: g/min, g/km, g/bhp-h, g/kWh	+/- 3.5% of Reading +/- 3.5% of Reading +/- 3.5% of Reading +/- 3.5% of Reading +/- 5% of Reading

Environment	
Temperature	10 - 50 Deg. C.
Gas Pressure	0- 12 in. H2O
Humidity	95%

General	
Response Time	Less than 100 msec
Warm Up Time	1 min.
Power	12 VDC , Max. 1 Watt

Dimensions/Weight	
Flow Sensor	18" x 4" dia – heavy duty / 7.4 lb 12" x 2" dia – passenger / 3.0 lb

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SPECIFICATIONS:

DRS1000 VEHICLE GROUND SPEED SENSOR

Measuring Ranges	Accuracy/Performance
Vehicle speed range 0 - 300 mph Max. target distance 1000 ft	+/- 0.36 % Absolute +/- .25% Absolute
Output: 0 5 square wave, 211.6 Hz/mph	

Environment	
Temperature	-17 - 60 Deg. C.
Humidity	98%

General	
Response Time	Less than 50 msec
Warm Up Time	.5 min.
Power	12 VDC , Max. 4 Watt

Dimensions/Weight	
Speed sensor Mounting bracket	4.175" x 2.0"dia, 0.5 Lb 8" x 2 " x 1.5", 1.7 lb.

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SMART 2000dil module

Portable dilution system eliminates sample water condensation related problems and measuring errors during exhaust gas analysis.
SMART 2000dil module is incorporated into SMART 2000xfl mass emission module where sample gas and dilution gas are being mixed at high temperature of the exhaust gas stream. Dilution gas (typically air) is drawn into unique channels inside the SMART 2000xfl module body, heated up and then mixed with the exhaust gas sample in user selected ratio. Dilution ratio coefficient can be entered into SMART 2000 software for real time recalculation of the actual exhaust gas concentrations.

SMART 2000dil module sets up a new standard of reliability and accuracy in portable tail pipe mass emission measurements. When combined with SMART 2000 series analyzers and modules it delivers laboratory grade capabilities in real life driving test cycles.

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SPECIFICATIONS

Measuring Ranges	Accuracy/Performance
Exhaust Gas Sample Flow range: 0 - 1 lpm	+/- .5%
Air flow range: 0 - 5 lpm	+/- .25%
ResponseTime (flow, temperature)	Less than 30 msec.
Dilution Ratio : 5:1 to 1:1	
Warm Up Time: 1 min.	
Exhaust Gas Temperature 0-700 Deg. C. (J Type Thermomcouple)	+/- .5%
Sampling hose 3/8" up to 35' length	
Exhaust Gas Pressure Sensor 0 -18" H20, 1000mV	14 bits
Control Computer : Pentium Based Notebook for SMART 2000	
Power: 12 VDC 50 mA	
Dilution Ratio Regulation 3/8" Flow Valve	

Environment	
Temperature	10 - 50 Deg. C.
Gas Pressure	0- 20 in. H2O
Humidity	98%