

# MEGA-5

Multi-component Exhaust Gas Analyser



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MEGA-5 is an FTIR-based (Fourier Transform Infra Red spectrometer) exhaust gas analyser designed for R&D use in engine and catalyst testing industries, especially for the heavy duty diesels.

The system uses a MultiGas™ 2030HS analyser with a capacity to simultaneously measure a wide variety of traditional and non-traditional exhaust gas components. MEGA-5 is capable of measuring all components currently regulated by requirements, as well as components not yet regulated.

The MEGA-5 system is fully automated and comes complete with easy-to-use software, system diagnostics and calibrations. The MEGA-5 can be operated manually from the integrated keyboard and 17" LCD-screen. The system can also be operated remotely using "Remote Desktop" or by AK-commands via TCP/IP.

## Areas of application

To meet regulations such as EURO VI and EPA 1065 exhaust gas after-treatment systems have become increasingly complex. The introduction of SCR catalysts for diesel engines and the growing interest in alternative fuels, have contributed to make them even more complex. The MEGA-5 system is capable of fast and accurate measurements of all exhaust gas components in compliance with EURO VI and EPA 1065 regulations. Typical applications of the system:

- R&D of heavy duty engines with SCR
- Measurements of ammonia (NH<sub>3</sub>) for certification purposes
- R&D of catalysts such as SCR, DOC and LNT
- Alternative fuels (Bio-Diesel, Ethanol, Methanol, etc.)
- On-vehicle measurements and data acquisition.

## MultiGas™ 2030HS

The MultiGas™ 2030HS is a high speed, high resolution FTIR-based gas analyser designed to monitor combustion exhaust emissions, especially for heavy duty diesel. The MultiGas™ 2030HS measuring capacity is up to 30 different gas components at 5 measurements per second (5 Hz). The design of the The MultiGas™ 2030HS is highly durable making the system suitable for on-vehicle exhaust measuring and data acquisition.



The MultiGas™ 2030HS gas analyser is composed of a high-speed 0.5 cm<sup>-1</sup> process-hardened FTIR spectrometer. This spectrometer incorporates a patented 5.11 m high-optical-throughput 200 ml gas-sampling cell capable of 100 SLPM flow rate without backpressure or noise that would degrade the quantitative measurement. The analyser also incorporates a high sensitivity liquid nitrogen cooled MCT-detector.

## High speed sampling system

The MEGA-5 is a mobile self-contained high flow sampling system consisting of an analyser rack with integrated MultiGas™ 2030HS FTIR analyser and a filter box.

The MEGA-5 sampling system provides direct hot/wet measurements by maintaining the gas sample at a constant 191°C (selectable) without cold spots that might result in the loss of regulated species from the sample flow. The MEGA-5 sampling system will deliver a particulate free, pulse free and thermally stable sample flow to the FTIR analyser. The high flow rates enables true 5 Hz sampling and data acquisition as well as measurement of transient species.

Acquiring and retaining a precise pressure and temperature control of the sample flow to the analyser is crucial for reliable measurements. Our heated diaphragm pump is fitted with a specially designed damper (zero dead volume) that will deliver pulse free sample flow to ensure the accuracy of measurements.

The positioning of the temperature sensors in the sampling system, as well as in the integrated FTIR-analyser, has been carefully chosen to give a fast and accurate temperature reading of the sample flow. This also improves the accuracy of the system when measuring transient processes in the exhaust flow. The filter box has a heated stainless steel particulate filter (1µ) to protect and ensure the optical efficiency of the FTIR analyser. The filter box is available with 2 or 4 channels, which allows sampling from different points of the exhaust gas after-treatment system.

## Features & Benefits:

- Single analyser measures a variety of traditional and non-traditional emissions
- True 5 Hz measurement and data acquisition
- Measurement of transient species in combustion exhaust, T90 < 300 ms
- EURO VI and EPA 1065 ready
- Wet sample monitoring, no need for moisture removal
- Fully automated and prepared for remote control
- Incorporated system diagnostics
- Pulse free sample flow to ensure accuracy of measurements
- Heated particulate filter to ensure optical efficiency
- Purge and span gas panel to enable method controls
- Filter box with 2 or 4 channels to allow sampling from multiple points
- Robust design to enable on-vehicle measurements
- Low cost of operation

## Options

- FID analyser
- NDIR analyser
- Oxygen analyser
- 2 or 4 channels filter box
- 5l Dewar for LN2 (with level indicator) for 3-5 days unattended use
- Analogue out module for on-vehicle data acquisition.

## Customers, shortlist:

|                       |  |
|-----------------------|--|
| SCANIA                | EURO VI, heavy duty SCR development, on-vehicle measurements |
| Johnson Matthey (SWE) | Heavy duty catalyst development                              |
| Volvo Cars            | Alternative fuels engine development                         |
| Cummins (UK)          | EURO VI, heavy duty SCR development.                         |

## Installation Requirements Analyser-rack

|                      |                               |   |
|----------------------|-------------------------------|---|
| Power                | 3x400 VAC, 16 A, 50 Hz, N, PE | 5 m cable 5 x 2.5 with CEE-connector                      |
| Nitrogen             | 2.0±0.5 Bar, 4.8 or better    | Keyed Quick Connector                                     |
| Span Gas 1           | 2.0±0.5 Bar                   | Keyed Quick Connector                                     |
| Span Gas 2           | 2.0±0.5 Bar                   | Quick Connector   |
| LN2                  | 5 l for 72 h use              | For cooling of the detector                               |
| Compressed Air       | 6-7 Bar, dry and oil free     | Quick Connector   |
| Sample Inlet         | Bulkhead                      | 12 mm Swagelok, 7-pin Amphenol C-16 connector for heating |
| Sample Outlet        | Bulkhead                      | 12 mm Swagelok, to ventilation or reflux                  |
| Dimensions<br>Weight | L x W x H                     | 900 x 600 x 1850 mm<br>225 kg                             |

## Installation Requirements Filterbox

|                                 |                             |   |
|---------------------------------|-----------------------------|---|
| Power                           | 240 VAC, 10 A, 50 Hz, N, PE | 10 m heavy duty power/control cable to connect the filter box to the main cabinet, cable included |
| Nitrogen                        | 2.0±0.5 Bar, 4.8 or better  | Quick Connector   |
| Compressed Air                  | 6-7 Bar, dry and oil free   | Quick Connector   |
| Sample Inlet, 2 or 4 channels   | Bulkhead                    | 12 mm Swagelok, 7-pin Amphenol C-16 connector for heating   |
| Sample Outlet                   | Bulkhead                    | 12 mm Swagelok  |
| Dimensions, 2 cannels<br>Weight | L x W x H                   | 500 x 320 x 540<br>45 kg  |
| Dimensions, 4 cannels<br>Weight | L x W x H                   | 500 x 440 x 540<br>60 kg  |

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