EiUK

Rasi 900
Emission Analyser

9 gases with NDIR infrared technology

Conform to EN50379
Comply to USEPA-method CTM-30 and CTM-034

Analyser system

The Rasi 900 is without any doubt the most complete series of portable combustion/ emission analyser available in the marketplace now days. It combines NDIR non dispersive infrared technology with electrochemical measurement cells to ensure high level of accuracy, extreme flexibility, and the highest standard of performance.

Integrated Superior Gas Cooler with automatic water removal system

The system uses an high efficiency Peltier chiller to continuously condense and remove the water form the gas stream. The moisture laden gas enters the chiller and comes into contact with the chiller wall at its bottom. This way, the dry gases exit the top of the cooler without coming into contact with water. This allows for a sample that is most representative of the emissions being released as none of the gases are diluted into water phase. The internal surface of the cooler is highly polished to ensure that the water drops our rapidly. The internal peristaltic pump automatically removes the water at programmable interval depending on the water contest and allow for the analyser to be use for long term emission monitoring. The cooler, not only provides conditions for better accuracy, but also highly protect the measurement cells, as no condensate is able to enter the internal gas path. The Internal cooler is able to cool down to 5 °C an it is temperature is shown and monitored on the unit.

Rasi 900 and Rasi 901 features

	Rasi 900	Rasi 901
Maximum number of gases simultaneously	9	9
O2, CO, NO, NO2, SO2, CO High, H2	•	•
Single of Triple NDIR Bench	•	•
Superior gas preparation system, including built-in thermoelectric cooler and automatic water condensate removal		•
Heated Sampling Line and Heated Probe		•
Built-in rechargeable battery	•	•
Differential pressure measurement	•	•
Data Logging, RS 232/RS485	•	•
Fresh Rinse and internal Flow Rate measurements		•
CO Sensor Purge for CO protection and fast CO activity	•	•

Cutting Edge technology, outstanding design, rugged and versatile

The extreme flexible design, the choice of high accuracy selected sensor combined with the NDIR infrared technology, the superior integrated gas preparation system and the widest choice of gas sampling probes make with no doubt the RASI 900 the ideal tool for field emission monitoring.

- Advanced NDIR Technology
- Superior integrated gas preparation system for TRUE NOx measurement vital for ultimate accuracy
- Temperature Controlled heated sample line
- Backlight display, with zoom function , icon based
- Easy data logging with on-board automatic and user defined testing routines
- Powerful software package for uploading or downloading with online real time measurement view

Integrated superior thermoelectric gas cooler, with automatic controlled water removal and easy field replaceable. The Cooler is able to drop temperature down to 5 C for moisture drop-out.

Peristaltic pump, for automatic water condensation removal, allow for long term measurement.

Integrated High-Speed thermal printer with easy to replace paper roll

Special designed solenoid valve for auto zeroing / fresh air rinse to preserve sensor life and optimizes performances

Display and on-line view software

User friendly, highly intuitive and ICON based menu driven, it could not be easier to operate

Rasi900 utilises a large customized back light graphical display which facilitates the reading of the measurements even in the poorest light conditions.

The internal software utilises a highly intuitive Icon based menu, which helps the engineers to quickly identify the desired function by simply touching the Function keys.

The display is equipped with ZOOM function and it is user configurable. It shows all the combustion parameters in one page.

Some on-board user-defined features include

Unlikely other analyser avowable in the market the RASI900 comprehensive onboard software feature allows the user to set up task and parameters directly from the keyboard with the use of any additional software. This include:

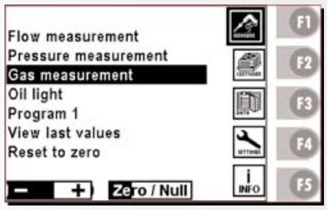
- Fully programmable data logging for automatic measurement
- Editing/programming of customer location including site, address, and additional information
- User-defined fuel selection
- User-defined oxygen (O2) reference values
- calculation and display of Max, Min, AVG values
- Fully comprehensive stored data review for field analysis

Powerful ONLINE VIEW software package

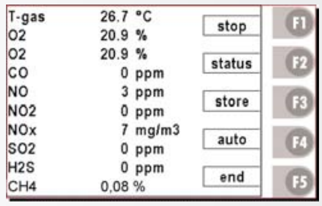
The online view software package allow the user to control the Rasi900 from a PC. The software provide excellent data management capability and the possibility to import/export data from the Rasi900 as well as real time data transfer

- Import/Export customer details
- Downloading of data measurements from RASI900 to the PC
- Direct reading of data stored on the SD card
- Real time data transfer with customised view
- View in numerical format, barograph, or graphical trend
- Display of Max, Min, AVG values
- Quick and east data transfer into Excel files

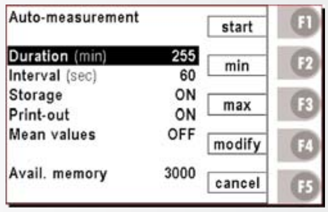
Display Example



Back light, high contrast graphic display , Icon based menu with direct function kit. Easy to remember.

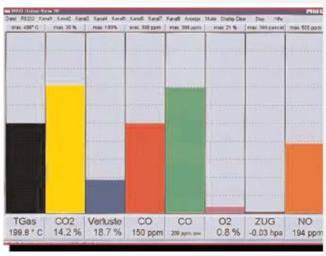


Simultaneous display of 10 parameters with user configurable menu. The large Display show the type of gas measured, the value and the unit of measured. Direct function key are displayed at the same time for additional operations.

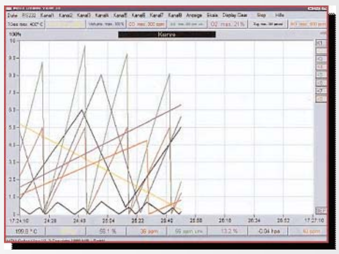


Automatic semi continuos measurement. User can define the start, the duration and the sampling time. Data can be store either on the internal memory or on the SD card.
Data can also be printed automatically by setting the print-out function ON.

Data transfer



Real time bar view



Graphical view

NDIR non dispersive infrared technology

CO2% Importance

The CO_2 level is of major important in many different process. Often the CO_2 level is used for optimising adjustment and combustion evaluation in many processes. Below is a quick guide, why the CO_2 NDIR sensor should be selected:

Steel Furnaces
Measuring is a must due to high concentration of CO2% and changing or unknow mixed fuel

Cold Fired Power Plant
Measuring is a must due to high concentration of CO2% and changing or unknow mixed fuel. CO2% is also an important parameter

Motors
CO2% is also a very important parameter and need to be measured for adjustment and evaluation report

Emission Official Reporting
Official Reporting prefer direct measurement than calculated value

Lime and Cement Production
CO2% is released not only trough the combustion process but also from process material. Measuring with NDIR is the only solution to obtain reliable and accurate results

Miniature Infrared Bench Specification and Ranges

3 Gases Infrared Benches				
Part Number	Measure	Min Range	Max Range	Accuracy
58118	CO	0- 3 %	10 %	±0.03% or ± 5 % rdg
	CO2 %	0-3 %	50 %	±0.6 % or ± 5 % rdg
	CxHy as CH4	0-1 %	5 %	±60ppm or ± 5 % rdg
58986	CO %	0-3 %	10 %	±0.03% or ± 5 % rdg
	CO2%	0-3 %	30 %	±0.6 % or ± 5 % rdg
	CxHy as C3H8	0-2000 ppm	0-5000 ppm	±30ppm or ± 5 % rdg
61447	CO (ppm)	0-10.000 ppm	30000 ppm	±40ppm or ± 5 % rdg
	CO2 %	0-3 %	30 %	±0.6 % or ± 5 % rdg
	CxHy as CH4	0-10000 ppm	3 %	±60ppm or ± 5 % rdg
Single Gas Infrared Bench				
Part Number	Measure	Min Range	Max Range	Accuracy
61099	CO2 %	0-20 %	0-50%	±0.5 % rdg

Reliable and Accurate measurements

A non-dispersive range of Infrared-sensors (NDIR) can be installed into the Rasi 9000 for direct measurement of **CO_2%**, CO and Total Hydrocarbon. This technology, uses a dual wavelength ratioing to ensure long term stable response and sensitivity. These sensors are **automatically** compensated for temperature and barometric pressure, by using internal temperature and pressure sensors. This maximised reading accuracy. The **NDIR technology** offer at a glance

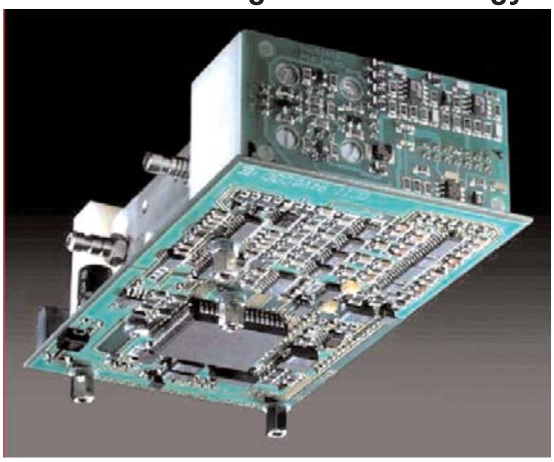
- Direct measurement of CO_2 %
- Extended range to 40 % volume
- Long term stability and accuracy
- Comply with legislation for emission reporting (EN14000)

Why measuring CO2 % Direct

Most of the combustion analyser calculate the actual CO_2 level by using a stachiometic formula which take into consideration the maximum CO_2% that a given fuel can release and the measured O_2 concentration.

Most of combustion processes use **fuel or a combination of different fuels** that have variable amounts of carbon, making the calculation of the CO_2 max extremely difficult. With the **CO_2 max** constantly changing, it is impossible to accurately calculate CO_2 based on the oxygen level in the Flue gases. In such cases the CO_2 direct monitoring is imperative. Additionally, some industry might realise CO_2 not from a combustion process, so that calculating the value would results in reporting **incorrect measurement**.

Miniature Infrared Bench installed in RASI900 utilising NDIR technology



Gas sampling probes

Sampling Probes to suit any application

Our rage of probes and hose cover Every application with an extended temperature range up to 1700 °C and different size. All the probes types have interchangeable shaft and measure temperature by using an integrated thermocouple type K or type S in case of the high temperature model.

Choice of:
- Industrial gas sampling probe
- High temperature sampling probe
- Standard sampling probes with Viton Line
- Glass wool filter for dirty application

Industrial Heated Probe with Heated Line

- For Dusty/Dirty Flue Gases
- Integrated Temperature measurement with Type K Thermocouple
- With heated, easy to replace quartz glass wool filter
- Replaceable tip with different size/lengths

Supplied with (either):
- 3 or 5 mt temperature controlled (120 °C max) teflon heated line
- 3 or 5 mt non-heated Viton gas sampling line

Material of the replaceable Tip	Flue Gas Temperature Deg C (Max)	Lengths (mm)	Probe diameter (mm)
Stainless Steel 1.4571 (SS316T)	650 °C	300, 500, 750, 1000, 1500, 2000	10
Inconel Steel	1100 °C	500, 750, 1000, 2000	10

Material of the replaceable Tip	Flue Gas Temperature Deg C (Max)	Lengths (mm)	Probe diameter Mm
Ceramic	1700 °C	1000	16

Industrial Heated Head

The Modular Heated Head with replaceable heated wool filter provides the best condition to avoid mould formation and condensate while sampling gases. This maintain the integrity of the gas , preventing very soluble gas such us NO2 and SO2 to dissolve into water.

Heated Line

The heated sample line is needed to transport the gas to the analyser while maintaining the integrity of its constituent makeup. The hose temperature is self-regulating and it is insulated and protected with a rugged covering. The special gas tubing is selected to eliminate any gas diffusion trough the hose. The heated line maintain the gas sample above the dew point to prevent the absorption of gases into water phase. This provides conditions for more accurate measurements gases are not lost into the condensate. The temperature set point and it's actual value are shown on the display of unit.

Standard Probe

- For use only with clean flue gases (natural gas or light oil)
- Integrated temperature measurement with type thermocouple
- Replaceable tip with different size/lengths
- Stack pressure/draft measurement
- Special Viton inner sampling hose

Material of the replaceable Tip	Flue Gas Temp. Deg C (Max)	Lengths (9mm)	Probe ∅ (mm)
Stainless Steel 1.4571 (SS316T)	650 °C	300, 500, 750, 1000, 1500, 2000	10
Inconel Steel	1100 °C	500, 750, 1000, 2000	10

Gas sampling probes

EiUK

How To Order

Decide Type of probe first
Select Heated or non-heated line
Select at least one replaceable tip

Note

Heated Line is only available on Rasi901

Probe Tips

Industrial Heated Probe is always suggested, as it prevent contamination and forming of mould and condensate thanks to heated wool filter installed in the probe head

If NO2 and SO2 are very important parameters we highly recommend to select the Heated Line which further prevent the dilution of these two gases. (Heated Line works only with Rasi900-1)

If ordering the Rasi900, we then recommend to use at least the non heated line with inner VITON which helps in maintain the integrity of the gas measured.

Ordering Information

Probe Type	Industrial Heated Probe, modular

Each probe is supplied with heated easy replaceable glass wool filter with exchangeable shaft available in different size and lengths. To order please select at least one line (heated or non heated) and the replaceable tip

Part Number	non-heated line
60043	Gas sampling probe handle complete with 2700 mm non-heated sample Line(inner Viton)
60044	Gas sampling probe handle complete with 5000 mm non-heated sample Line(inner Viton)
62224	Gas sampling probe handle complete with 2700 mm non-heated sample Line, inner Viton
62225	Gas sampling probe handle complete with 5000 mm non-heated sample Line, inner Viton
Part Number	**Heated line, 120 °C max, temperature controlled (Only Rasi 901)**
62498	Gas sampling probe handle with 3000 mm heated sampling line
62499	Gas sampling probe handle with 5000 mm heated sampling line
Part Number	**Replaceable Shaft (tip)**
11620	300 x 12 mm probe tip, max temperature 650 °C
11621	750 x 12 mm probe tip, max temperature 650 °C
11622	1000 x 12 mm probe tip, max temperature 650 °C
59552	1000 x 12 mm probe tip, INCONEL , max temperature 1200 C short term
11623	1500 x 12 mm probe tip, max temperature 650 °C
59904	1500 x 12 mm probe tip, INCONEL, max temperature 1100 °C, 1200 C short term
11624	2000 x 12 mm probe tip, max temperature 650 °C
50622	2000 x 12 mm probe tip, INCONEL, max temperature 1100 °C, 1200 C short term

Probe Type	Industrial Heated probe, modular, High Temperature

Each probe is supplied with heated, easy replaceable glass wool filter with exchangeable shaft, measuring thermocouple type S. To order please select at least one line (heated or non heated) and the replaceable tip)

60048	Gas Sampling probe handle complete with 2700 mm non-heated sample Line
61076	Gas sampling probe handle with 3000 mm heated sampling line, 120 °C max, temperature controlled
61077	Gas sampling probe handle with 5000 mm heated sampling line, 120 °C max, temperature controlled
Part Number	**Replaceable Shaft (tip)**
50869	1000 x 10 mm probe tip, CERAMIC, max temperature 1700 °C

Probe Type	Standard Probes

With exchangeable shaft, measuring thermocouple type K, continuos stack draft measurement, no filter element. To order please select at least one handle and one or more replaceable tip

61709	Gas sampling probe handle complete with 2700 mm non-heated sample Line,
61710	Gas sampling probe handle complete with 5000 mm non-heated sample Line
62222	Gas Sampling probe handle complete with 2700 mm non-heated sample Line, Viton
62223	Gas sampling probe handle complete with 5000 mm non-heated sample Line, Viton
Part Number	**Replaceable Tip/Shaft**
55671	300 x 10 mm probe tip, max temperature 650 °C
55672	750 x 10 mm probe tip, max temperature 650 °C
60183	750 x 10 mm mm probe tip, max temperature 500 °C with sintered metal filter 56748
55673	1000 x 10 mm probe tip, max temperature 650 °C
60814	1000 x 10 mm probe tip, max temperature 500 °C with sintered metal
56737	1000 x 10 mm probe tip, INCONEL, max temperature 1100 °C
55674	1500 x 10 mm probe tip, max temperature 650 °C
56738	1500 x 10 mm probe tip, INCONEL, max temperature 1100 °C
60815	1500 x 10 mm probe tip, max temperature up 500 °C with sintered metal filter 65748
60815	2000 x 10 mm probe tip, max temperature 1100 °C

Specifications

Measured Compound	Sensor Type	Minimum Range	Maximum Range	Resolution	Accuracy (Which ever is greater)
O2	Electrochemical	0-21 %	0-25 %	0.1 %	± 0.2 % absolute
CO (H2) comp.	Electrochemical	0-2000 ppm	0-10.000 ppm	1 ppm**	<200 ppm= ± 5ppm or ± 5% rdg >200 ppm=± 20ppm or ± 5 % rdg >2000 ppm= ± 10% rdg
CO (high)	Electrochemical	0-4 %	0-10 %	0.1%	<0.4%= ± 0.02 or ± 5 % rdg >0.4%=± 10 % rdg
NO	Electrochemical	0-1.000 ppm	0-5000 ppm	1 ppm**	<1000 ppm= ± 5 ppm or ± 5 % rdg >1000 ppm=10 % rdg
NO2	Electrochemical	0-200 ppm	0-1000 ppm	1 ppm	<200 ppm= ± 5 ppm or ± 5 % rdg >200 ppm=10 % rdg
SO2	Electrochemical	0-2000 ppm	0-5000 ppm	1 ppm	<2000 ppm= ± 10 ppm or ± 5 % rdg >2000 ppm=10 % rdg
H2S*	Electrochemical	0-500 ppm	0-2000 ppm	1 ppm	<50 ppm= ± 5 ppm or ± 5 % rdg >50 ppm=10 % rdg
H2	Electrochemical	0-1 %	0-2 %	0.01%	<1 %= ± 0.02% or ± 5 % rdg >1 %=10 % rdg
CO	NDIR (%)	0-3%	0-10 %	0.01%	± 0.03% or ± 5% rdg
CO	NDIR (ppm)	0-10.000 ppm	0-30000 ppm	1 ppm	± 40 ppm or ± 5% rdg
CO2 % measured	NDIR	0-3 %	0-50 %	0.1%	± 0.6 % or ± 5% rdg
HC (as C3H8)	NDIR	0-2000 ppm	0-5000 ppm	1 ppm	± 30 ppm or ± 5% rdg
HC (as CH4)	NDIR	0-10.000 ppm	0-5 %	1 ppm/0.01%	± 60 ppm or ± 5% rdg
Combustion Air	Type K	-50 to 250 °C	-50 to 250 °C	0.1 °C	± 1°C
Stack Gas Temperature	Type K	0-1200 °C	0-1200 °C	0.1 °C	± 1°C
Stack Gas Temperature	Type S	0-1700 °C	0-1700 °C	1 °C	± 1°C
Differential Pressure	Pizoresistive	±100 mbar	± 100 mbar	0.1 mbar	± 0.03 mbar
Flow Velocity		1 m/s to 100 m/s	1 m/s to 100 m/s	0.1 m/sec	± 1 m/sec or 3 % rdg
Calculated values					
CO2 %		0 to CO2 max	0 to CO2 max	0.1%	± 0.3 % Vol abs
Combustion Efficiency	0 to 120 % (ETA)				
Heat Loss	0 to 99.9 %				
Excess Air	1 to 99.9 %				
Reference to O2, NOx	mg/Nm3, ppm, NOx in mg/m3, NO2, NO + NO2 = NOx				
Fuels:	all common fuels, i.e. Nat Gas, Heavy Oil, Light Oil, Biofuel, Wood Pellet, Coal, etc.. up to 10 plus 4 user definable				

Operating Temperature range: 5 to 45°C, max 95 % RH non condensing
Storage Temperature: -20 to 50 °C
Display: Graphic, custom LCD display, icon based
Sealing: IP 21
Power Supply: Built-in rechargeable battery, main 100 to 250 VAC, 47 to 63 Hz or optional external 12 VDC cable
Pump: 1 litre/min
Size (H x W x D): 530 x 490 x 310
Weight: 7 Kg
Warranty: 1 year including working parts and cells
Housing Material: Aluminium and moulded ABS
Certification: Comply with USEPA method CTM-3 and CTM-034 protocol

Note: * continuos exposure of the H2S sensor to maximum range might decrese the life span of the sensor
** 0,1 ppm resolution available below 500 ppm

Total Mass Emission

To comply with changing regulation in emission reporting, the Rasi 900 provide the results as calculation of the total amount of gases being released during the combustion process. Instead of reporting concentration of gases in ppm, mass emissions indicate the total amount of emissions being released in unit such mg/s. It requires the optional pitot tube.

O2 Reference

The O_2 reference is a standard that has been set to help monitor NOx emissions. This standard calculates NOx emissions based on a set oxygen level to standardise the monitoring and reporting of the total amounts of NOx emitted.

True NOx measurements

The "true" NOx is a method of measuring the value of the NOx emissions without using any factors or presumptions. The concentration of NO and NO_2 are measured separately with high accuracy cells and the value are then added together to find the true "Total" NOx value. In process where the ratio between NO and NO_2 might vary, it is imperative that the true NOx is measured rather then calculated by assumption.

Ordering information and accessories

Ordering Information

Part Number	RASI901 emission analyser
944024	RASI901 emission analyser, equipped with O2, CO(H2), CO swith-off valve, CO purge, built-in gas cooler, peristaltic pump for automatic water removal, gas sampling pump, gas filter, internal rechargeable battery, 12 DVC cable connector, 8500 data memory, fast built-in printer, combustion air temperature probe, RS232 Cable, Software CD, power supply cord, differential pressure measurement, 100 g glass wool filter, nylon protective carrying case with adjustable shoulder strap. Up grade to: Maximum 6 electrochemical cells plus 1 Infrared Bench
Part Number	**RASI900 emission analyser**
944022	RASI900 emission analyser, equipped with O2, CO(H2), CO swith-off valve, CO purge, gas sampling pump, gas filter, internal rechargeable battery, 8500 data memory, fast built-in printer, combustion air temperature probe, RS232 Cable, Software CD, power supply cord, differential pressure measurement, nylon protective carrying case with adjustable shoulder strap. Upgrade to: Maximum 6 electrochemical cells plus 1 Infrared Bench
Part Number	**RASI900 series optional sensors**
59699	Option: NO sensor
59731	Option: NO2 sensor
59732	Option: SO2 sensor
59730	Option: H2S sensor
60270	Option: H2 sensor
59939	Option: CO sensor, high range 4 %
58118	Option: NDIR infrared bench, CO (0 to 10%) CO2% 0 to 50 %, CxHy as CH4 0 to 5%
58986	Option: NDIR infrared bench, CO (0 to 10%), CO2% 0 to 30 %, CxHy as C3H8 0 to5000 ppm
61447	Option: NDIR Infrared bench, CO 0-30000ppm, CO2% 0 to 30%, CxHh as CH4 0 to 10000 ppm
61099	Option: NDIR infrared bench, single, CO2 % Range 0 to 50 %
Part Number	**RASI900 series Pitot Tubes**
60644	Option: Stack gas velocity measurement including mass flow calculation (require pitot tube)
85120	Option: Pitot Tube, 6 mm dia, x 300 mm length
85130	Option: Pitot Tube, 6 mm dia, x 500 mm length
85132	Option: Pitot Tube, 6 mm dia, x 800 mm lengths
85133	Option: Pitot Tube, 8 mm dia, x 1000 mm lengths
Part Number	**RASI900 series options**
59744	Option: Interface for MMC (SD card) with multimedia card 1GB
59795	Option: RS232/RS485 converter for long distance data transfer (2 off are required)
60157	Option: RS232 to USB converter
59739	Option: 8 channel analogue output board (RASI900-1)
59788	Option: Antifreeze device
61683	Option: External NIMH battery (12 V, 9 Ah) for additional 4 hrs free main operation Inclue fast battery charger
61835	Option: External 12 VDC power supply cable, 5 m
59745	Option: Robust aluminum transport case with trolley
59798	Option: Stack draft probe, lengths 250 mm, with 3 m silicone hose
60073	Option: Combustion Air temperature probe, 300 mm lengths
821000	Option: Handle remote control unit, including 10 mt transmission cable
51833	Hand Soot pump, with soot scale

Suggested accessories

Aluminum case
Aluminum Case with Trolly and Weels and side opening for using RASI900 with-out removing it from the case

Remote hand held
Hand held unit for remote control and data transmission up to 20 meters

Pitot tube
Type S pitot tube for gas velocity measurement and total mass emission in Lb/Hr etc. Different size available

Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.

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