

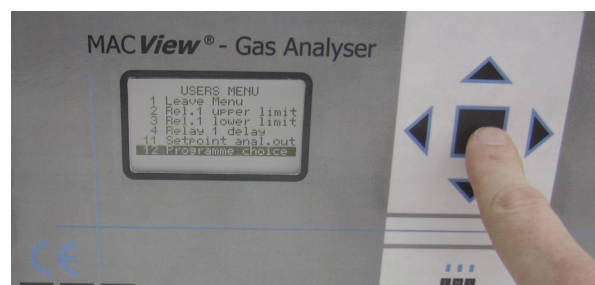
TECHNICAL SPECIFICATIONS

MACView®-Ethylene Postharvest Portable Analyser

Type of instrument	MACView®-Ethylene Postharvest Analyser, based on the solid state electrochemical sensor technology with very high sensitivity and stability
Versions available	0-5000 ppb ethylene resolution 1 ppb max. inaccuracy ±0.5‰ 0-500 ppm resolution 0.01 ppm max. inaccuracy ±0.5 ‰
Versions available	Portable version for handheld monitoring Fixed 19" version for fixed mounting to measure rooms of storages
Option for add a 2nd sensor	Optical O2 sensor measurement range 0 - 25% , 0.001% resolution < 1% O2
Option to add a 3th sensor	Optical CO2 sensor measurement range 0 - 0.2% 0 - 1% / 0 - 10% CO2 inaccuracy ±0.1%
Syringe injection port for MAP	Volume syringe injection for MAP applications, analysis possible by syringe injection
Software	Webportal with standard Web Interface internet connection use with internet browser
LAN / WAN interface	GPRS and UMTS (3G & 4G) or ethernet 10/100Mbit TCP/IP RJ45 or optional WLAN 54Mbps
Sample speed	2 modes Real time: 1 sample/sec. / Automatic: 180-7200 seconds per measurement
Inputs / outputs flow	Combined Input1 / zero input / calibration input (19" also Input 2 available)
Material of housing	Stainless steel IP62 housing, fixed analyser: is 19" rack mount housing
Standards	NEN-EN-IEC 61000-6-1 up to 4, CE
Operation modes	Measurements, dosing, standby, flushing, real-time or syringe injection measurement
Signals / alarms	ppb / ppm hysteresis adjustable on relays (programmable per function), status messages, power, failure
Data collection	Web enabled by webportal / SD-Card internal database, date time for 100.000+ records
Service connection	USB, SD Card, Serial RS 232 interface and RS485 interface
Battery Pack (portable)	Lithium-Ion 11.500 mAh, charged while system is running, approx. 10 hrs runtime @20°C
Charger (portable)	External charger
Supply	110 - 230 VAC 75W
Working temperature	-10 + 50 degrees Celsius, relative humidity 5 - 99%, not condensed
Languages	Give up 2 languages at order: English, Dutch
Control panel	Intuitive menu with graphical display and backlight
Dimensions	Portable: Width 230 x Depth 405 x Height 180 mm 19" fixed version: Width 480 x Depth 350 x Height 301 mm
Weight	Portabe version: 11.3 Kg Fixed 19" version: 12.8 kg
Options	Portable version: External calibration package for manual periodic calibration 19" fixed version: Internal calibration bottle included in the device

Sales and distribution:

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MACView®

ETHYLENE POSTHARVEST PORTABLE ANALYSER

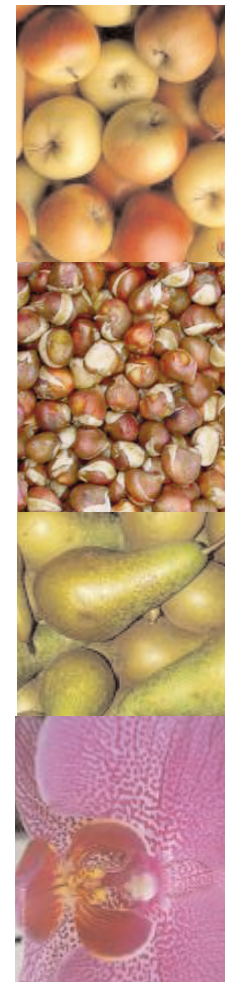
The concept for real ethylene measurement of fruit, vegetables, bulbs, trees en plants

The product

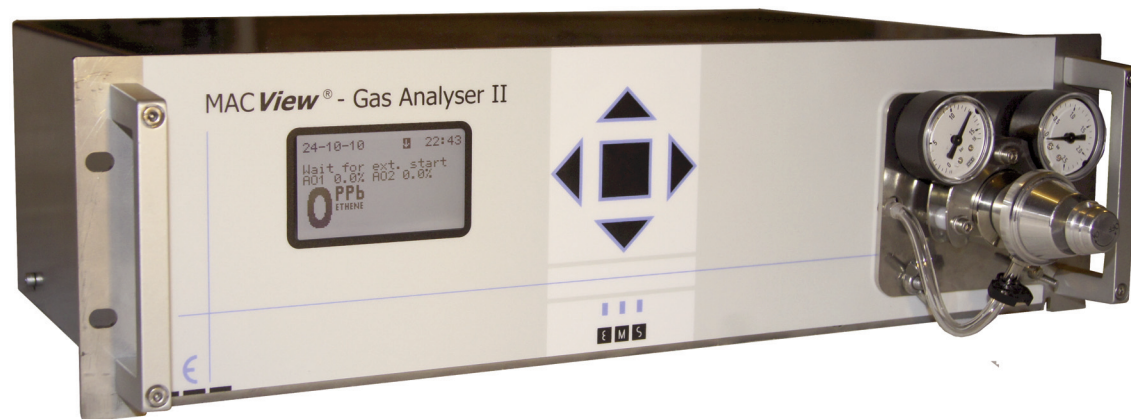
The MACView®-Ethylene Postharvest Analyser is an extreme sensitive ethylene measurement device suitable for measurement in fruit, postharvest vegetables, bulbs, trees, storage rooms, and scrubbers. Levels around 1 ppb resolution can be measured. The system is improved by the extension of the O2 and CO2 sensors, the possibility of syringe injection, and the Web Based Monitoring software that transferred data fully automatically. No difficult software anymore. A GPRS, UMTS or Ethernet modem is standard included. An external and simple system for easy calibration is option available for the system.

Postharvest monitoring

Ethylene (ISO-name ethene), is a plant hormone that is produced by trees, plants, vegetables, fruit, flowers and tulip bulbs. Several cultivars of these vegetations are extremely sensitive for the presence of ethylene in air.



MACView®-Ethylene Postharvest Fixed 19" version



Ethylene cause a trigger of ripening and is thus a stress-hormone that can cause irreversible damage to the stored product. Monitoring of ethylene gives information about ethylene production. This information can prevent unexpected rising of ethylene levels that are higher then the harmful level that a product can handle. The MACView®-Ethylene Postharvest Analyser is a helpful instrument that helps interpreting what has happened during the storage of your valuable product.

Applications

The markets that have direct advantage of the MACView®-Ethylene Postharvest Analyser are fruit producers (growers), storage facilities, distributors, flower growers, greenhouse owners and research laboratories.

How to use

Most customers that use the MACView®-Ethylene Postharvest Analyser says that the value of the instrument is that you can see what happens with the product and that you got the feeling with the process. You will see things that you have never seen before and can relate the change in quality with situations that occur. The portable analyser can be used in any place or circumstances you like. It has a probe that can be inserted in a CA or ULO cell. After the measurement is started up, the measurement will be done in 5 minutes. With a simple press on a button a measurement is started. If necessary the analyser can run in continuous mode. So every 10 minutes, samples are taken and stored in the internal memory. This portable ethylene measurement let you know where ethylene is possible threaten your quality process. For example in storage cells for fruit, the ethylene can be reduced by scrubbing out the ethylene by filters. It gives on long term a improved quality of fruit. An other application is ethylene dosing for potato storage. Dosing ethylene improves the quality of potatoes. In several flower types very low

levels of around 50 ppb will damage the flowers. For example, roses or phalaenopsis are very sensitive, and any increase of ethylene must be avoided.

Control panel

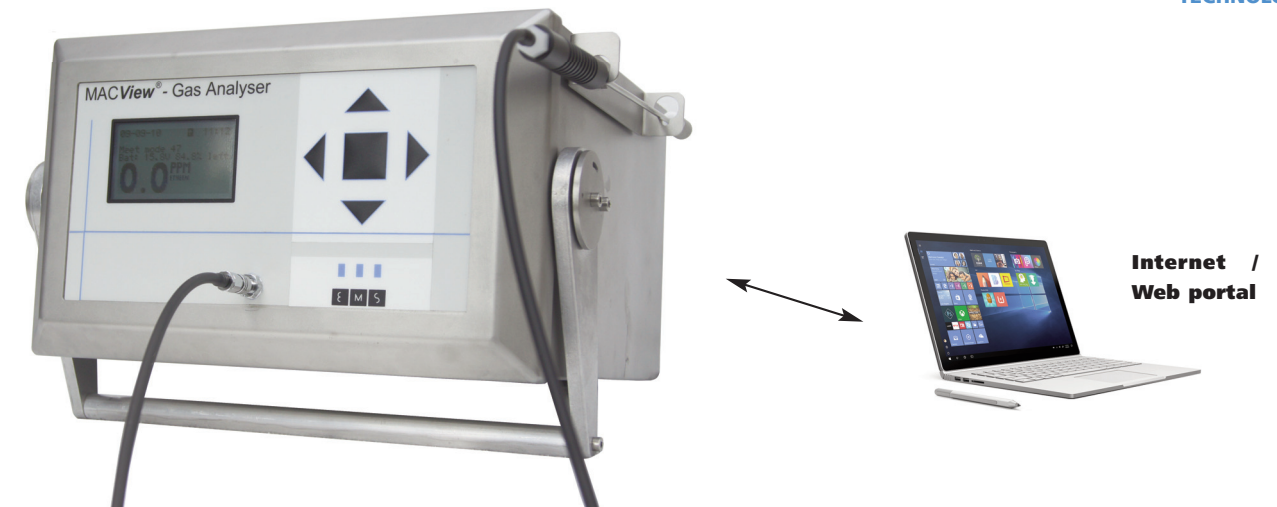
The MACView®-Ethylene Postharvest Portable Analyser is available in 2 measurement ranges: 0-5000 ppb and 0-500 ppm. In the 0-5000 ppb version it gives the measured values in number of ppb's (parts per billion) on the display. In the 0-500 ppm version it gives a minimum value of 0.1 ppm resolution. In every analyser 2 additional sensors can be placed for O₂ or CO₂. Data is logged in the analyser, where also date and time is stored. The complete menu has a intuitive control panel.

Connection to external control systems (CA / ULO)

This fixed version analyser is suitable for a connection with external control systems. For this purpose we have a separate analyser which could be integrated for 24 hours continuous work. In most storage facilities there are control systems for Ultra Low Oxygen (ULO), Controlled Atmosphere (CA), ventilation or circulation systems. These control systems already measure oxygen (O₂), and carbon dioxide (CO₂). The MACView®-Ethylene Postharvest Analyser has an extended range of possibilities for interconnection with these systems. In short can the control system send some pulses for: Start ethylene measurement, start zero measurement and start calibration. The analyser is then functioning as a slave machine and send back the measured values by the analog outputs.



The MACView®-Ethylene Postharvest Portable Analyser is easy to use, easy to read-out, reliable and the best alternative for ethylene measurement in Controlled Atmosphere (CA) / Ultra Low Oxygen (ULO).



Data / software

With the MACView®-Ethylene Postharvest Portable Analyser data can be logged with date and time stamp. Approximately 6700 records can be logged and the internal rechargeable Lithium-Ion battery pack will work for 16 hours continuously. Data is logged in the analyser, where also date and time is stored. The complete menu has a intuitive control panel. The analyser and software are available in the languages: English, Dutch, German, Italian, Spanish and French. This gives a state of the art control to the system ready for immediate start!

Calibration

The MACView®-Ethylene Postharvest Portable Analyser has an external option for an external low pressure gas bottle that contains calibration gas. The calibration interval can be determined by the user. With a calibration interval of 2 weeks, the calibration bottle can be used approximately 1 year.

Tests carried out by the WUR

The MACView®-Ethylene Postharvest Portable Analyser is tested at important institutes in the Netherlands: The device is tested at the WUR in the Netherlands. (WUR = Wageningen University and Research). The WUR department PPO flowerbulbs and WUR department Agrotechnology Food Sciences Group (Postharvest Quality) tested the device. They tested our device against their GC and they concluded that the accuracy was better then the lowest accuracy they achieve with their existing GC. (Better then 10 ppb) The WUR also was looking for a good device to do research in practice at farmers locations for the measurement of very low ppb levels. It shows excellent results. The cross sensitivity is none to all common gases in normal air. For example apples emit very much aromates. None of these aromates does have any effect on the measurement. Also variations like temperature, humidity, CO₂ and O₂ variations are tested and show all very good results.

With many thanks for all the tests and co-operation with the Wageningen University and Research (WUR) Netherlands.

