



## Application note

Version Rev1.3

Short user manual MACView® Postharvest Gas Analyser

### Portability

We have 2 versions. (Portable and 19" fixed version). The portable version has a handle which you can carry the device with 1 hand. The device is very robust for harsh environment, stainless steel (food grade housing) and has a weight of 11.3 kilogram. The system has an internal battery with a capacity of 10 hours of working at a temperature of 20°C. Keep in mind that in a cold store of 0°C the battery life is much shorter (around 6-7 hours). The reason is due to 2 aspects:

1. Batteries have the property that the capacity decreases sharp with the temperature.
2. The sensors internal are heated. This heating cost energy. The lower the temperature is, the higher the battery consumption.

As mentioned the sensors are heated to provide a stable system. In the latest system released the sensors are individual heated instead of the complete device, so we reduced energy consumption. Temperature heating is necessary to reach 1 ppb stability.

The dimension of the portable device is Width 230 x Depth 405 x Height 180 mm.

The portable interpretation and use must be explained. With portable we (EMS) defined a device which you can place for 2 - 4 hours close beside or inside the room / space with the target gasses of interest to be analyzed. Then make some measurements to see the trend and confirm measurement / concentration behavior. Some people tried to use the device to take 1 sample from 1 storage / space and then move as fast as they can go to another storage or space. With this method or way of working faults are introduced. The storages / spaces have mostly different environmental factors like small differences in temperature, humidity, oxygen, carbon dioxide etc. All these parameters must be sure to be stable in the analyser, otherwise miss-measurements are made. So our advice to get a good impression what happens inside storage is to use the device with approximately 2 - 4 hours (at least) next to or into the storage. We have customers that move the analyser every 12 or 24 hours to another place or storage. EMS believes that this is an excellent way of working. It gives you a good trend. Every 15 minutes a measurement is automatically taken.

With a gas-chromatograph it will take you more work, due to handling and analysis. The analyser has an external charger. This charger can be connected always. The charger will charge the battery until it is full and meanwhile will supply the analyser. The charger is also a supply for the analyser, and can thus run continuously.

### Ability to perform measurements as low as 1 ppb of ethylene with 0.1 ppb resolution

EMS is the best in ethylene accuracy related to price in the world. All our devices are designed to meet 1 ppb or lower. The internal resolution is 0.1 ppb. Some big exporters / importers and producers choose by this reason our equipment. Keep in mind that the system must be maintained every year with some new filters and calibration. This can be done by our maintenance-kits or maintenance contracts the EMS offers. Maintenance can be done by an average educated technician. The equipment is build for world wide maintenance guaranteed.

Raiffeisenstraat 24  
4697 CG Sint-Annaland  
The Netherlands

t +31 (0) 166 65 72 00  
f +31 (0) 166 65 72 10

e [info@macview.info](mailto:info@macview.info)  
l [www.macview.info](http://www.macview.info)





## Ability to make measurements from the ambient inside cold chambers and inside fruit / flowers or vegetables

We advise mostly to use the analyser in an ambient environment, by making a connection with a hose / pipe to the space, storage or a CA-room and then take the samples out of the room. But there are also customers who place the analyser inside the cold store. The temperature range we guarantee the product running is between -10 and 50 degrees. A note is that above 35°C accuracy issues can occur with the absolute accuracy. If we know that the analyser is used at higher temperatures then 35° - 40° and that accuracy is still important, we can change settings of the internal heaters. But in most cases this is no issue.

### Battery life

The system will be powered up with the main switch on the backside. Battery life is approximately 10 hours @ 20°C. An external charger which is delivered inside the package can be connected to supply the analyser as well charge the battery inside the analyser.

As already mentioned above, there are limitations. It is a pure (common) technical issue. We use already high quality Lithium-Ion batteries, but having more capacity makes the instrument bigger and also more heavy. There is a good alternative: We advise / deliver UPS device with batteries. These UPS (Uninterruptable Power Supplies) are mounted on small tables with wheels (small table top coffee-cars). You can push the cars through the company. Everything is mounted on it: UPS, analyser, sometimes a computer. Then you can extend the battery life. Batteries and low temperature is technical not so easy, but we tried what we can. I cannot fulfill more hours then mentioned above. We have customers that use the UPS devices also in transport, reefer containers or cooling cars for several days. An external 24VDC supply with a 220VAC converter connected to the charger of the analyser is then recommended when continuous sampling is required.

### 3 Sensors in one device

The MACView® Postharvest Gas Analyser is prepared to have 3 sensors in 1 device. The user can choose all combinations of sensors, based on CO<sub>2</sub> (Carbon Dioxide) sensor and / or oxygen sensor. Carbon dioxide is available at different ranges of 0-0.1%, 0-1% and 0-10%. Oxygen is available only in 0-25% with a 10 ppm resolution. (Especially oxygen is very selective and high accuracy below 1%. Ethylene is available in 2 measurement ranges 0-5000 ppb and 0-500 ppm. All measurement ranges must be chosen at purchase.

### Environmental Conditions and accuracy

The system must be conditioned before use. When the system is powered-up, it is advised to use 30 minutes of conditioning. The electronics inside are heated, and all temperatures will be controlled and maintained. 30 minutes after power up, the values are reliable. For the versions with the ppb-range measurement the values are most reliable after conditioning.

Raiffeisenstraat 24  
4697 CG Sint-Annaland  
The Netherlands

t +31 (0) 166 65 72 00  
f +31 (0) 166 65 72 10

e [info@macview.info](mailto:info@macview.info)  
l [www.macview.info](http://www.macview.info)





## Sampling

As well on the front as well on the backside are inputs. The mobile analyser is ready to work with the front inlet. The front inlet is the "PROBE" text mentioned on the front.

Use the probe with open connector on the front to measure your samples. Gas is sampled by this inlet continuous with a flow of 100 ml.min (0.1 liter/minute). Put the probe or a small hose somewhere in a room or space where you want to sample. (Took a box with an apple or banana inside and you will measure them without any problem. If you use a box, make them not completely closed, because otherwise it will become vacuum.) The analyser detects flow and pressure problems on the inlet. If a flow or pressure problem occurs then the pump will temporary switch off and restore the flow if the problem is solved. A problem could be vacuum or blocking of the inlet. Simply put your finger on the inlet and the system stops pumping. After release it goes on. Take care to use the right tubing. PTFE or PFA tubing is recommended. Do not make tubing longer the 3 meters.

## Data transfer

In the past we had a wire connection between analyser and PC. Read-out of data was done by a PC. That's over. Now we have an internet based system. There are 3 options to transfer the data:

1. Wireless by WLAN / wifi 54Mbps to any TCP/IP router in the company that has access to internet. Also a wired Ethernet TCP/IP 10/100 Mbit RJ45 network connection is available in this option.
2. Only a wired Ethernet TCP/IP 10/100 Mbit RJ45 network connection. (No additional cost and standard)
3. A GPRS/UMTS 3G/4G modem with SIM card that communicates with internet. Be sure that there is a good connection with your cell-phone in your storage before choosing this. (Simple test is to call with your cell-phone from the place where you want to place an analyser. Does it work, then no problem is expected.) Cost are very low. € 10,- a month worldwide data transfer. The SIM card must be an EMS SIM card we deliver to you. This is done due to security of data and servers.

The data is stored inside the analyser (Not on USB or SD-card at this moment). Plenty of memory is inside available. (over 16.000 measurements). On the backside is a connection for TCP/IP Ethernet or an antenna for GPRS/UMTS. When you connect this Ethernet connector the analyser will make a internet connection with the MACView portal server. All data is then purged to the server. With the login details which are provided by EMS you can access the data by internet. You can recognize that the analyser is connected in the right way to internet if you see in the display on the highest row 3 signs / characters. (A signal strength, an antenna, and or a "C") When the "C" character appears in the upper row, the analyser has connection with the portal (C=Client Connection). Data that has been measured in the past is then transferred automatically. When the system is continuously connected (I advice to connect it continuous), the data is real time transferred when the verification measurement has ended. Some seconds later the data is available in the portal. From the portal the data can easily been downloaded in different formats like pdf, excel, text, csv etc.

If there is no connection, data is stored inside the analyser. After a new re-connection the data is transmitted automatically from the analyser to the server without interaction of a person. All is done automatic. On internet you have a portal where you can login and view data.

The system is build for the future and the portability is maximized with this wireless options.

Raiffeisenstraat 24  
4697 CG Sint-Annaland  
The Netherlands

t +31 (0) 166 65 72 00  
f +31 (0) 166 65 72 10

e info@macview.info  
l www.macview.info





The portal is quite intuitive. I suggest if you have questions to send an e-mail for support to [info@macview.nl](mailto:info@macview.nl).

## Measurement process

First start up the system by putting it on. It takes some minutes let's say 10 minutes to zero flow and pressure sensors, warm up, and then it starts with cycles. There is nothing you need to set in the menu. The machine cycles repetitious through basic 2 cycles.

1. 450 seconds verification mode
2. 450 seconds measurement mode

The verification cycle is necessary to determine the exact zero point of the sensors. The measurement cycle determines the measurement. In the last seconds (5, 4, 3, 2, 1, 0) of the measurement, the real ethylene, O<sub>2</sub> and CO<sub>2</sub> concentration are determined. Then after this measurement the verification cycle is done. At the end of this verification cycle, the measurement is shown on the display and data is transferred immediate if the analyser is connected to internet.

## Injection with syringe

Currently for the measurement range of 0-5000 ppb version there is an option for an injection by a syringe. It is possible to change the open inlet connector with a septum connector on the front which is inside the package. This option is available from firmware version 4.03c. Keep in mind that the standard deviation is in the range of 0-5000 ppb, 5% of the whole range when using the syringe option. This is deviation is much higher then sampling with a tube.

## SD Card and USB card

It is recommended not to insert any connectors in the USB connection and also not to insert SD-Cards. This slots are future options to provide firmware updates.



[WWW.MACVIEW.INFO](http://WWW.MACVIEW.INFO)

Raiffeisenstraat 24  
4697 CG Sint-Annaland  
The Netherlands

t +31 (0) 166 65 72 00  
f +31 (0) 166 65 72 10

e [info@macview.info](mailto:info@macview.info)  
l [www.macview.info](http://www.macview.info)

