Dansensor®
MAP Check 3 Vacuum
User Guide EN

AMETEK® | mocon®

P/N 320598-G
11/2019

This blank page has been inserted to enable double sided printing of the document!

Dansensor®
MAP Check 3 Vacuum
User Guide

EN

Published by:

MOCON Europe A/S
Rønnedevej 18
4100 Ringsted, Denmark
Tel +45 57 66 00 88
info.dk.mocon@ametek.com
www.dansensor.com

P/N 320598-G
11/2019

P/N 320598-G
11/2019

Table of Contents

P/N 320598-G
11/2019

P/N 320598-G
11/2019

1. General Information

About this Manual

Intended Use of this Manual

- This manual describes the common use and maintenance procedures of the **Dansensor® MAP Check 3 Vacuum** device.
  It is intended for the daily users and should be kept with the equipment for reference at all times.

Reservations

- This manual was written and illustrated using the best possible information available at the time of publication.
- Any differences between this manual and the equipment reflect improvements introduced after the publication of the manual.
- Changes, technical inaccuracies and typographic errors will be corrected in subsequent editions.
- As a part of our policy of continuous improvement, we reserve the right to alter design and specifications without further notice.

Important!

Safety and Use

- Prior to using the equipment it is assumed that it has been properly installed and configured as described in this manual.
- The manufacturer cannot be held responsible for any damage caused by incorrect use of this equipment.

Notes, cautions, warnings and tips!

Throughout the manual notes, cautions, and warnings are indicated with various icons and written in bold like the example below:

CAUTION! Never use hard tools or abrasive materials when cleaning any part of the device.

Explanation

NOTE! The operator should observe and/or act according to the information in order to obtain the best possible function of the equipment.

CAUTION! The operator must observe and/or act according to the information in order to avoid any mechanical or electrical damage to the equipment.

WARNING! The operator must observe and/or act according to the information in order to avoid any personnel injury.

Tips and recommendations

Tips, recommendations and "best practise" advises are indicated as shown in the example below:

TIP! If grille does not come off easily, you can use a screwdriver or the like to release it.

Safety Instructions

Personnel operating and maintaining the device must be familiar with all aspects of its operation and be proficient in maintenance.
Such personnel should review the following precautions to promote safety awareness.

General

- Always refer to the manual before operating or maintaining the equipment.
- Observe all WARNINGS, CAUTIONS and NOTES.
- Do not open the device. In case of technical problems please contact your service provider.
- Do not cover the machine with a cloth or piece of plastic to protect it from dust, as this prevents free air circulation around the machine and might lead to overheating and errors in the sensor read-out.
- Do not expose the equipment to heavy moisture or heat and keep it away from direct sunlight.
- Never short circuit or remove safety devices.

Installation

- To ensure the best installation with the least technical problems, please install equipment as described in this manual.
- Never install the equipment in explosive environments.
- Always use correct fittings when connecting gas from the gas bottle.
- Provide adequate space around the equipment for proper ventilation.
- The units are Class 1 appliances and must be connected to an earthed mains connection.
- It is the responsibility of the owner and operator(s) of the equipment, that the installation is made in accordance with local rules and regulations.
- When installing the equipment it is necessary to ensure proper ventilation in the room of the installation in accordance with requirements from manufacturer.
- The manufacturer cannot be held responsible for any damage caused by incorrect installation of this equipment.

Operation and Maintenance

- Be sure to disconnect electrical power and unplug the unit before performing any cleaning or maintenance.
- All panels and protective guards must be in place before operating the equipment.
- When operating or maintaining the equipment always obey the relevant rules and regulations for workers safety.
- Repair or replace damaged power cords immediately.
- Never block gas outlets.

P/N 320598-G
11/2019

2. Introduction

Dansensor® MAP Check 3 Vacuum

The **Dansensor® MAP Check 3 Vacuum Vacuum** is a gas analyser designed for measurement of O_2 or O_2 /CO_2 concentrations on packaging machines that flushes gas in cycles controlled by the packaging machine. This can either be a tray sealer or thermo former that uses vacuum or a packaging machine that flushes gas over the product in a cycle, where the device is connected to an external vacuum to enable measuring.
The device has no built-in pump and depends on external vacuum.
Depending on the version, the analyser measures oxygen (O_2) and carbon dioxide (CO_2) simultaneously or only oxygen (O_2).

For additional system quality control, all versions are available with built-in buffer tank measurement capability to ensure proper mixture and pressure in the tank before start of packaging. These models connect directly with a sample hose to the buffer tank and are independent of tank pressure within the specified working range.

The device measures the O_2 or O_2 /CO_2 concentrations of gas in the die of the packaging machine, immediately before it is sealed. This measuring method is, therefore, non-destructive. The concentration of gas is measured for each packaging machine cycle.

The device will ensure the user a quality control of oxygen and carbon dioxide in the packaging process, by observing critical points in the machine; gas concentration at die and if used also quality of the buffer tank contents before start.

The device has a **Diagnostics** view that will facilitate running-in of the packaging machine for new production. It gives a view to critical parameters of importance to the measuring cycle. This reduces the number of laboratory tests required to make machine ready for production.

The device takes out the measuring gas from the product vacuum directly on the machine vacuum die (or from the gas flushed in to a chamber if there is no vacuum in the packaging machine). The results of this type of measurements are typically different from what is actually measured in spot tests on packaged products. This is due to the fact that sample is taken directly in the stream of gas in vacuum outlet of die.

Results from the device should be used as a process status indicator rather than exact measurement of package contents. Combined with the buffer tank measuring capability this increases the level of certainty that packages will be packed with correct gas concentrations.

Observation of changes in packaging machine can be made using the product warning and alarm settings to alert user or machine that something is out of range.

The device is prepared to communicate with the packaging machine and is, therefore typically a fully integrated part of the machine. Communication can be either RS232 or LAN (Ethernet) using PSIP and Modbus TCP protocols.

"Stand-Alone" or "Black-Box"

The "Stand-Alone" devices features a 5" colour touch screen from which device settings are made and measuring results are continuously displayed.
The "Black-Box" version without user interface is especially designed for cost effective automated machine control. The "Black-Box" version can only be controlled from the packaging machine or a connected PC.

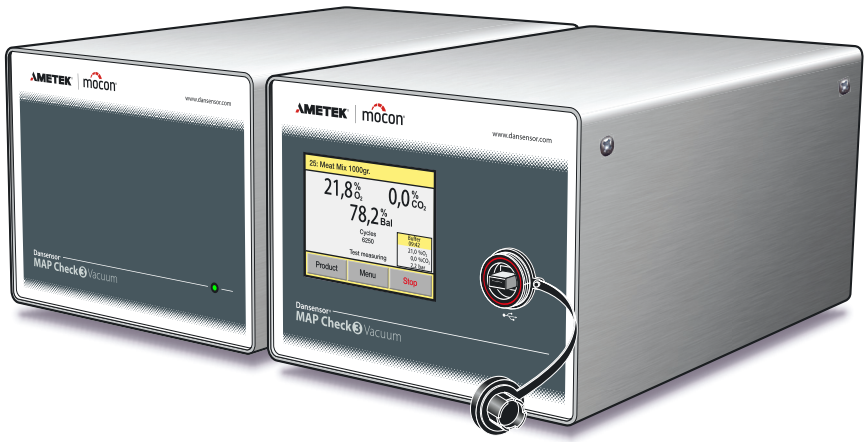


Fig. 1. Dansensor® MAP Check 3 Vacuum "Black-Box" and "Stand-Alone" devices

Sensors

The devices can be fitted with both an O_2 sensor and a CO_2 sensor or an O_2 sensor only.

Mixer control

In combination with the **Dansensor® MAP Mix Provectus** gas mixer the device can fill a buffer tank by letting **Dansensor® MAP Check 3 Vacuum** control the mixer. See *"Mixer Control" on page 30* for details.

Flow System

The figures below show the internal flow system of the various device versions.
Fig. 2 shows a standard version with O_2 sensor
Fig. 3 shows a standard version with both O_2 and CO_2 sensors.
Fig. 4 shows a buffer version with O_2 sensor.
Fig. 5 shows a buffer version with both O_2 and CO_2 sensors.

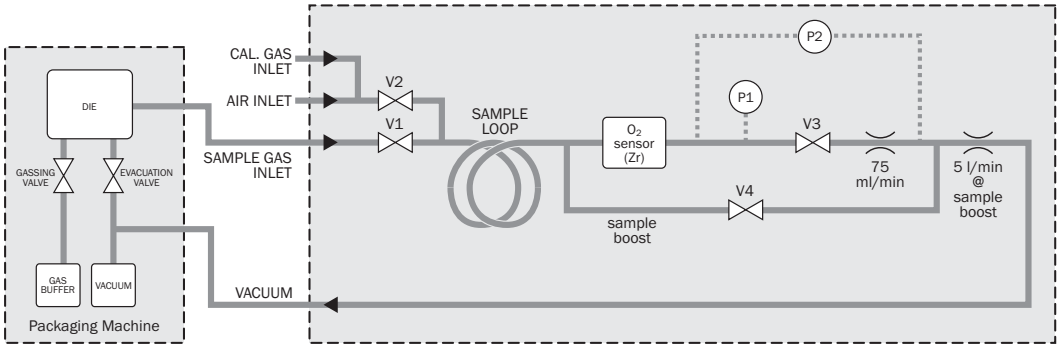


Fig. 2.

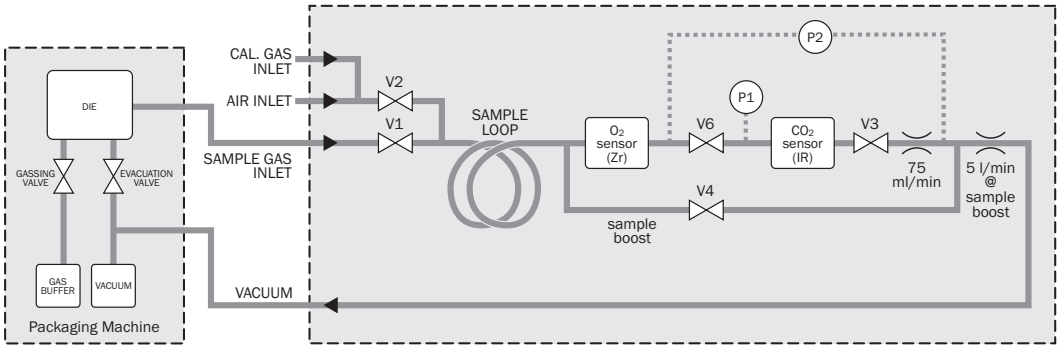


Fig. 3.

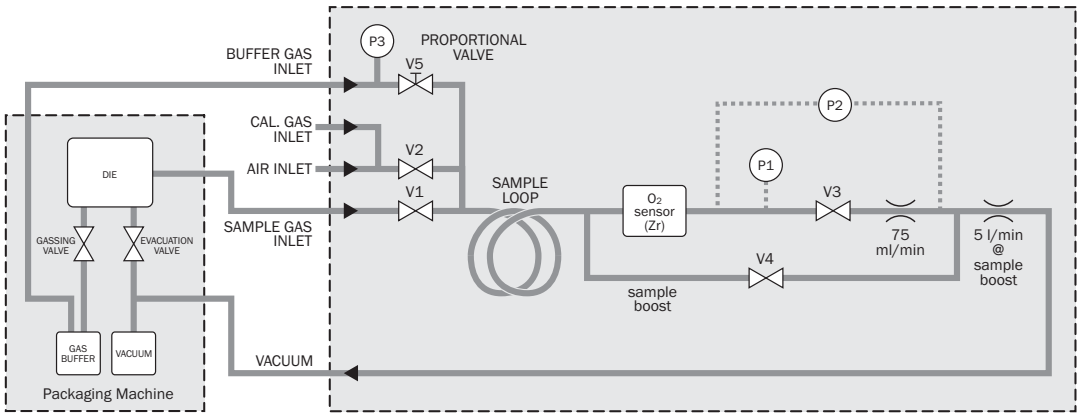


Fig. 4.

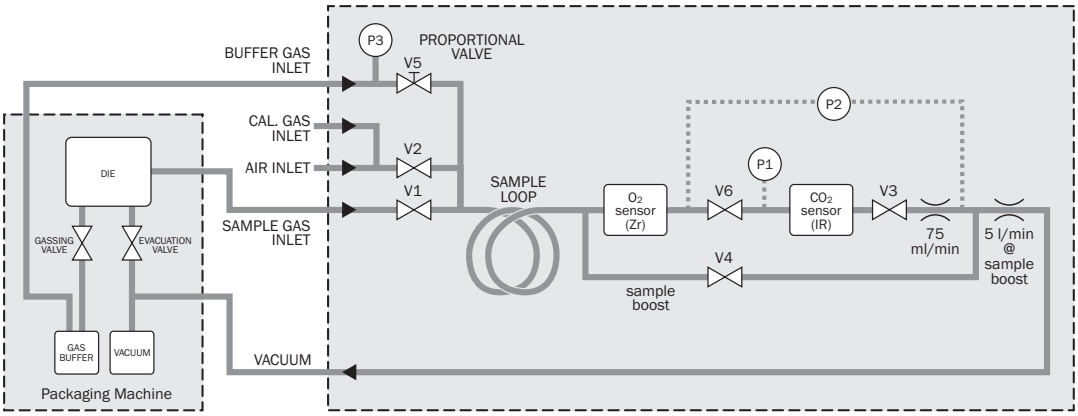


Fig. 5.

"Buffer" version

The "Buffer "versions can measure the O_2 and CO_2 levels in the packaging machines buffer tank. Doing this before start up ensures that the gas is OK before you start to pack the product.

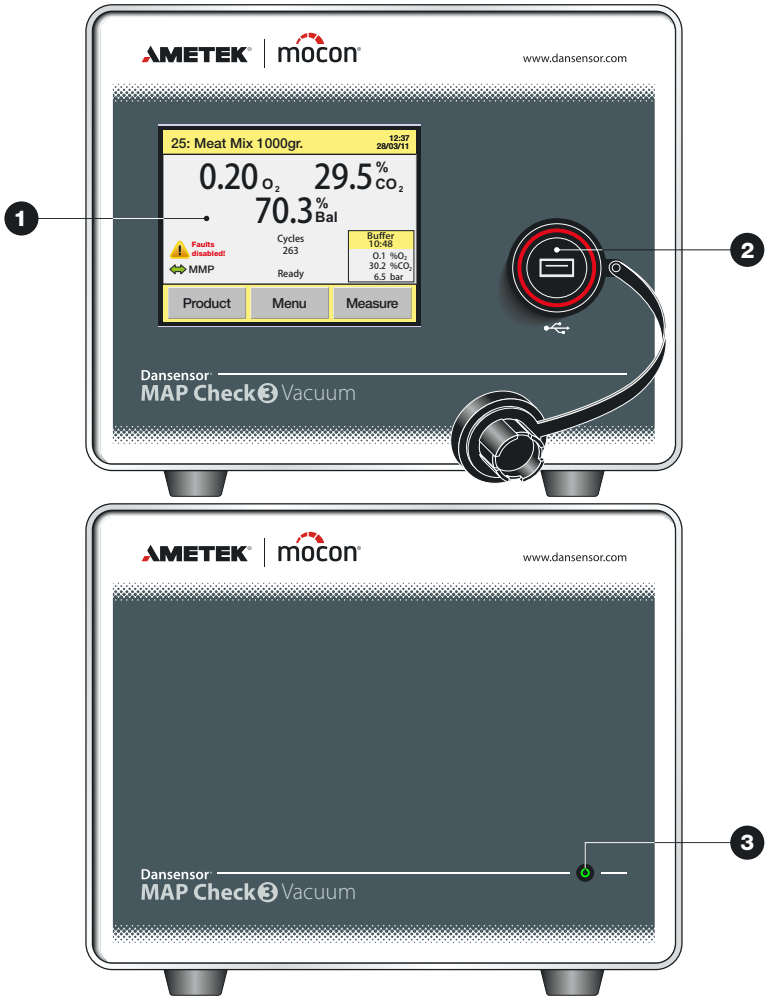
A hose is connected from the buffer tank to the "Buffer Gas Inlet" on the device. Please note that the device will not be able to perform a proper measurement unless the pressure in the buffer tank is within a certain range - see *"7. Technical Information" on page 83* for further details.

During a buffer measurement the device uses a normal sensor flow (75 ml/min).
The longer hose that is used and the higher pressure the longer it will take to get the correct gas to the sensors. Therefore make the hose as short as possible. Do a test measurement to find out how long time it takes for the gas to reach the sensor. Then ensure that the buffer measure time is long enough.

No vacuum in the packaging machine

The **Dansensor® MAP Check 3 Vacuum** can be used even if there is no vacuum connected inside the die of the packaging machine. To use the device in this way connect the evacuation and gas signals so that the device gets the signals at the same time.

Overview

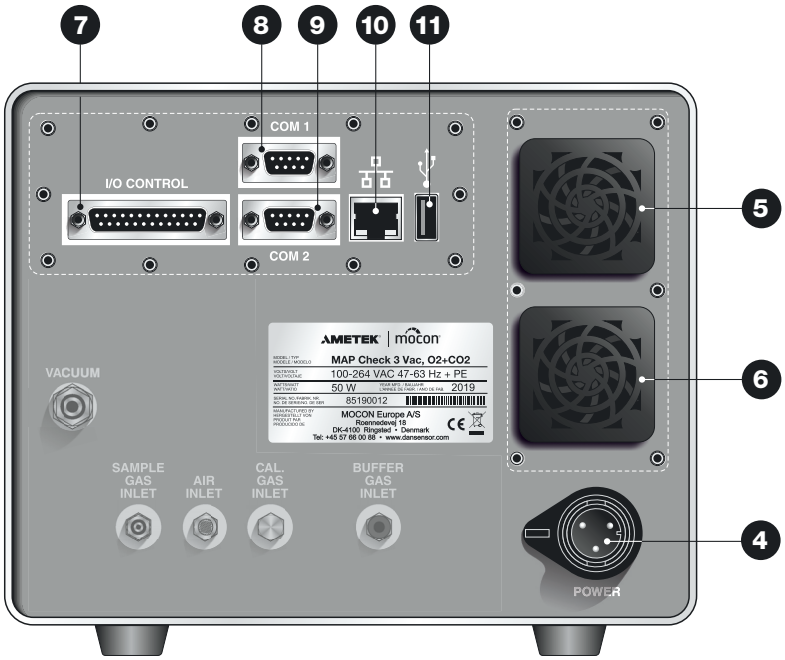


1 **5" touch panel color display** ("Stand-Alone" versions only)
For intuitive operation of the device by use of explanatory icons and easy understandable text messages and buttons.

2 **USB host**
For connection of a memory stick ("Stand-Alone" versions only)
The connector is fitted with a water-proof cover.
All versions have a USB connector on the backside of the device as well.

3 **ON/Status indicator** ("Black-Box" versions only)
When lit power is on.
Colour/light combinations indicate the following:

• **Green - steady**	"Autostart" disabled
• **Green - flashing**	Ready
• **Red - flashing (every 2 sec)**	Heating
• **Red - flashing (twice per sec.)**	Error



4 **"POWER"**
Power supply connector

5 **Cooling air inlet grille**
With dust filter and a fan inside the device

6 **Cooling air outlet grille**
With dust filter

7 **"I/O CONTROL"**
Communication port (D-SUB 25) for packaging machine control signals

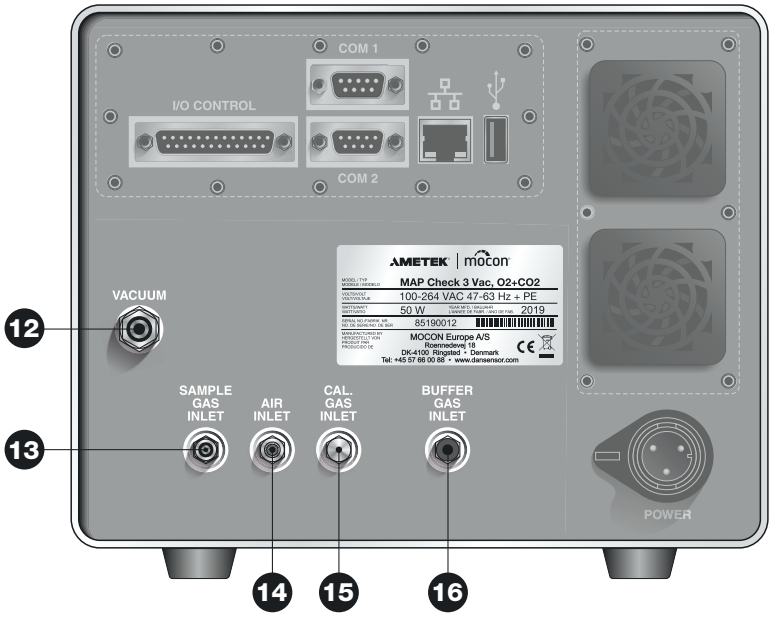
8 **"COM1"**
RS232 port (D-SUB 9) for connection to packaging machine or external data collection via PC software (SDK-PSIP)

9 **"COM2"**
RS232 port (D-SUB 9) for control of MAP Mix Provectus gas mixer and for connection to terminal server for configuration ("Black-Box").

10 **LAN/Ethernet port**
Connection to local computer network for
- external data collection (LAN Data dump)
- communication with PC software (SDK-PSIP)
- Modbus TCP communication with packaging machine
The port has 2 built-in status indicator LED's

11 **USB host**
For connection of a memory stick
"Stand-Alone" versions have a USB connector on the device front as well.

Gas connections



12 **"VACUUM"**
Vacuum connector

13 **"SAMPLE GAS INLET"**
Connector for sample gas from packaging machine die

14 **"AIR INLET"**
For pressure equalisation with atmospheric air or for exhaust of bypass flow when measuring on the buffer tank and when calibrating

15 **"CAL. GAS INLET"**
Only used when calibrating

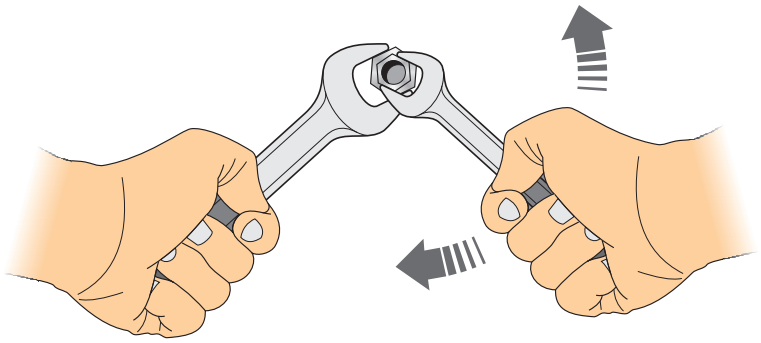
16 **"BUFFER GAS INLET"**
Buffer tank connection ("Buffer" versions only)

3. Connections

Gas Connections

Correct mounting/dismounting of fittings

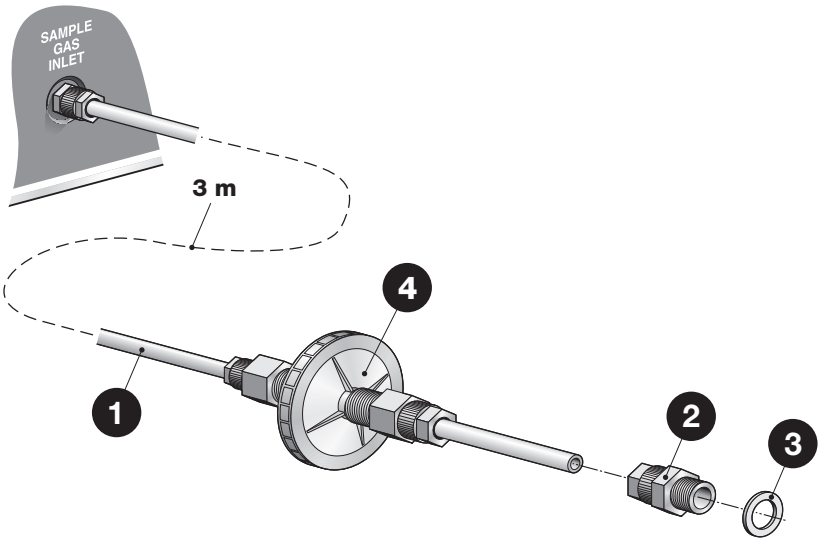
CAUTION! When mounting/dismounting fittings it is very important that you hold against on the already mounted fittings to avoid damaging the existing assemblies.



Device connections

- Connect the long hose of the sample gas probe ❶ to the “SAMPLE GAS INLET” connector. See *"Sample gas probe" on page 21* for further details.
- Connect the vacuum hose ❷ to the “VACUUM” connector. Connect the other end to the packaging machine’s vacuum system using the 1/4” RG hose fitting ❸ and the nylon gasket ❹.
- On “Buffer” versions connect the supplied buffer gas hose ❺ to the “BUFFER GAS INLET” inlet connector simply by pushing the hose into the fitting as far as it goes.
  See *"7. Technical Information" on page 83* for details about the required pressure range.
  See *"Connection to buffer tank" on page 22* for further details about making a proper connection to the buffer tank.

Sample gas probe



The sample gas probe leads the measuring gas from the measuring point of the packaging machine's die to the device. The gas probe consists of a 3 m long hose with a filter. The hose can be shortened if required.

CAUTION! When cutting hoses, ensure a clean and square cut (use a sharp knife instead of cutting pliers).

Connect the long hose ❶ to the device's sample gas inlet.

Connect the other end to the packaging machine's sample gas outlet using the delivered 1/8" RG hose fitting ❷ and the nylon gasket ❸.

CAUTION! The performance of the device depends very much on the gas extraction point on the packaging machine.
Contact MOCON Europe A/S for help to positioning the gas extraction point.

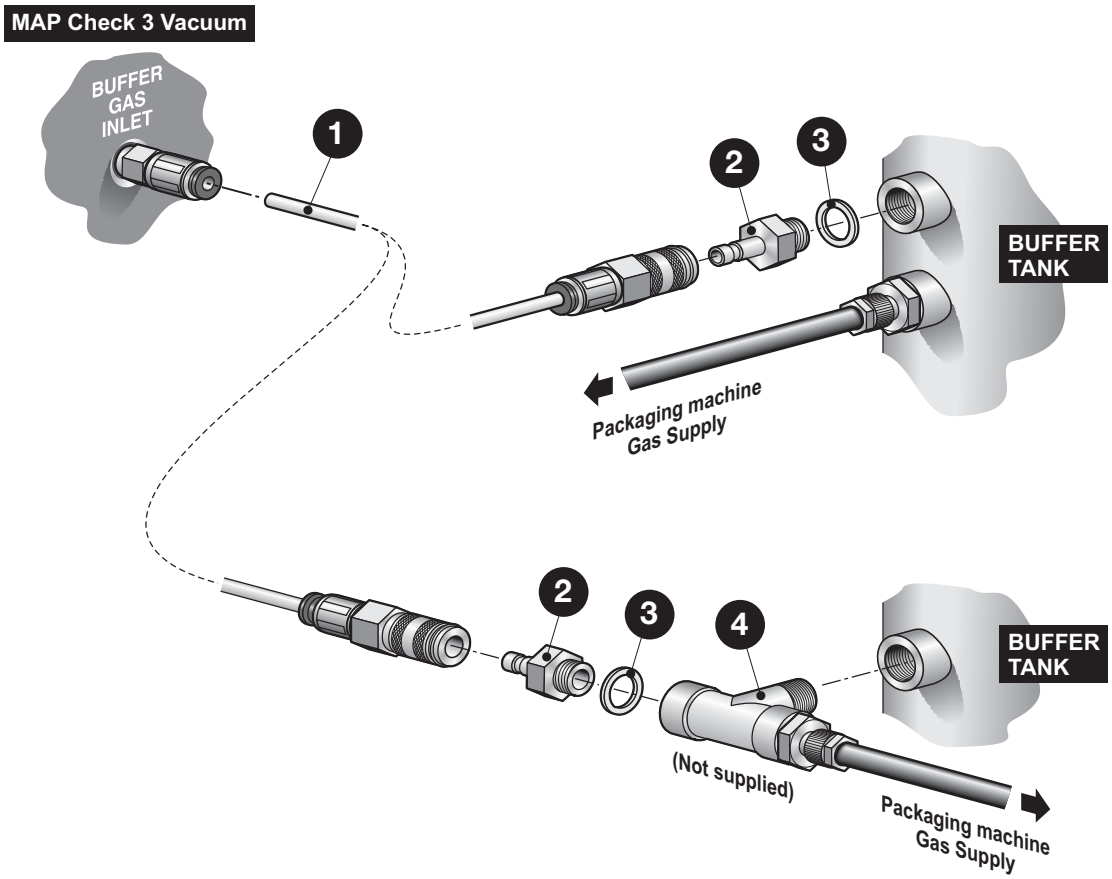
If the filter ❹ or hoses are blocked, the device will indicate an error in the display.

The filter should be replaced regularly - see *"Replacing filter in the sample gas probe" on page 45* for details.

Connection to buffer tank

("Buffer"versions only)

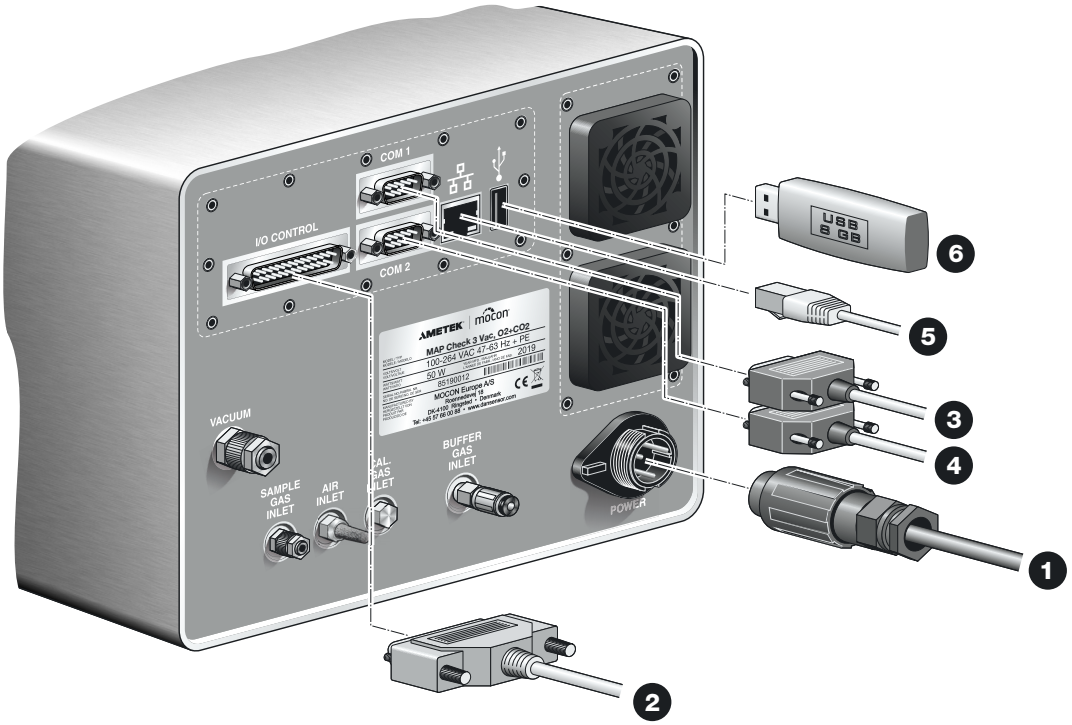
The device is delivered with a hose and fittings for making a proper connection to the buffer tank. There are various ways to make the connection but we recommend any of the methods described below.



1. **Sample hose (3m) with quick-connector**
   The hose can be shortened if required.
2. **Male quick-connector M5**
3. **Nylon gasket**
4. **T-fitting (not supplied)**

CAUTION! When cutting hoses, ensure a clean and square cut (use a sharp knife instead of cutting pliers).

Electrical connections



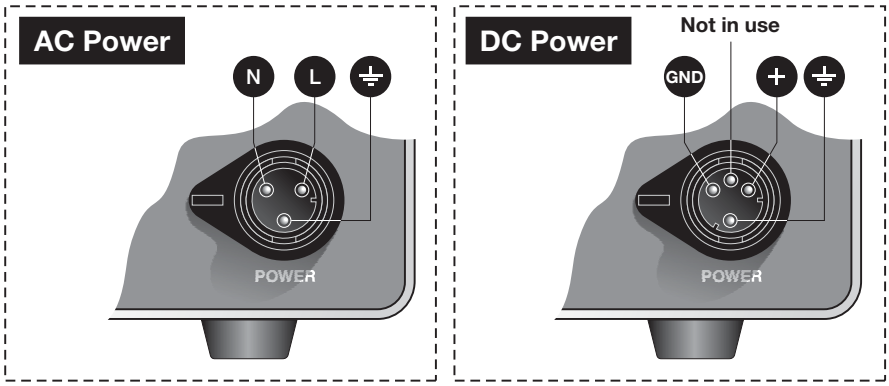
- Connect the power supply cable ❶ between a power outlet and the "POWER" connector. (The power cable is delivered with the device).
  See pin connections for the power connector in *"Power connector" on page 24*.
- Connect a 25-pole communication cable ❷ from the "I/O CONTROL" connector to the appropriate port on the packaging machine. This cable is delivered with the device.
  See cable specifications in *"I/O Cable" on page 24*.
- Connect a 9-pole serial cable ❸ from the "COM1" connector to the appropriate port on the packaging machine - see *"I/O signals for machine control" on page 27* for details.
  This cable is not delivered with the device.
- Connect a 9-pole serial cable ❹ from the "COM2" connector to the "COM1" connector on the MAP Mix Provectus (option) - see *"I/O signals for machine control" on page 27* for details.
  This cable is not delivered with the device.
- Connect a LAN/Ethernet cable ❺ from the LAN connector (labelled) to a connector on your local area network. This cable is not delivered with the device.

NOTE! Use CAT6 cables for optimal noise immunity.

- The USB connector (labelled) can be used for connecting a USB Memory stick ❻ for exporting/importing log data, device settings etc.
  On "Stand-Alone" versions you can use the USB connector on the device front as well.

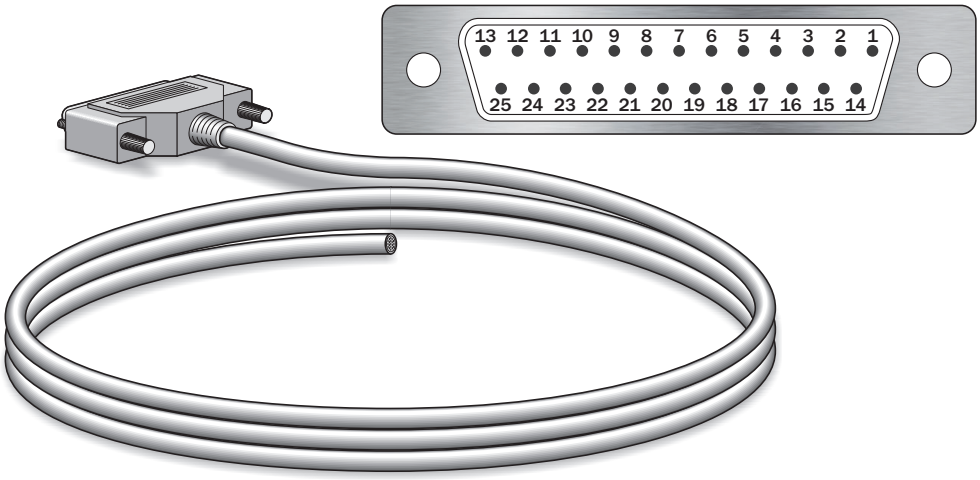
Power connector

The device's power connector should have the following pin connections:



I/O Cable

The 25-pole communication cable between the "I/O CONTROL" connector and the appropriate port on the packaging machine has the following pin connections:



Pins/Colours/ Function	Description
1 - White 2 - Brown "GAS"	Gassing signal from packaging machine. Signal levels: 10 - 32 VDC bipolar. Load: max. 10mA Must be activated during gassing in die.
3 - Green 4 - Yellow "EVAC"	Evacuation signal from packaging machine. Signal levels: 10 - 32 VDC bipolar. Load: max. 10mA Must be activated during evacuation of die.

Pins/Colours/ Function	Description
5 - Grey 6 - Pink "ALARM", NO	Alarm relay output. Activated if product or buffer alarm limit for O_2/CO_2 is exceeded. Relay contacts: max. 48 VDC/VAC. Load: max. 1A Normally Open (NO) - Contacts closed during power OFF.
5 - Grey 7 - Blue "ALARM", NC	Alarm relay output. Activated if product or buffer alarm limit for O_2/CO_2 is exceeded. Relay contacts: max. 48 VDC/VAC. Load: max. 1A Normally Closed (NC) - Contacts open during power OFF.
8 - Red 9 - Black "WARNING", NO	Warning relay output. Activated if product or buffer alarm limit for O_2/CO_2 is exceeded. Relay contacts: max. 48 VDC/VAC. Load: max. 1A Normally Open (NO) - Contacts closed during power OFF.
8 - Red 10 - Purple "WARNING", NC	Warning relay output. Activated if product or buffer alarm limit for O_2/CO_2 is exceeded. Relay contacts: max. 48 VDC/VAC. Load: max. 1A Normally Closed (NC) - Contacts open during power OFF.
11 - Grey/Pink 12 - Blue/red "READY", NO	Ready relay output. Activated when device is READY (heating finished, vacuum OK and device started). Relay contacts: max. 48 VDC/VAC. Load: max. 1A Normally Open (NO). Contacts closed during power OFF.
11 - Grey/Pink 13 - White/Green "READY", NC	Ready relay output. Activated when device is READY (heating finished, vacuum OK and device started). Relay contacts: max. 48 VDC/VAC. Load: max. 1A Normally Closed (NC) - Contacts open during power OFF.

NOTE! If the device is installed on a packaging machine without vacuum, the "EVAC" and "GAS" signals must be connected together to the gassing signal.

NOTE! All "I/O CONTROL" signals are galvanic isolated.

Relay signalling

The following describes how relays act during power OFF, normal and fault states:

READY Relay		State of device
Device OFF	DSUB pin 11 connected to pin 12	"Not ready" (OFF)
Device ON - Ready	DSUB pin 11 connected to pin 13	"Ready"
Device ON - Not ready	DSUB pin 11 connected to pin 12	"Not ready" (error, stopped or heating)
DSUB 25 pins/ colours	Pin 11 - Grey/Pink (Common) Pin 12 - Blue/Red Pin 13 - White/Green	

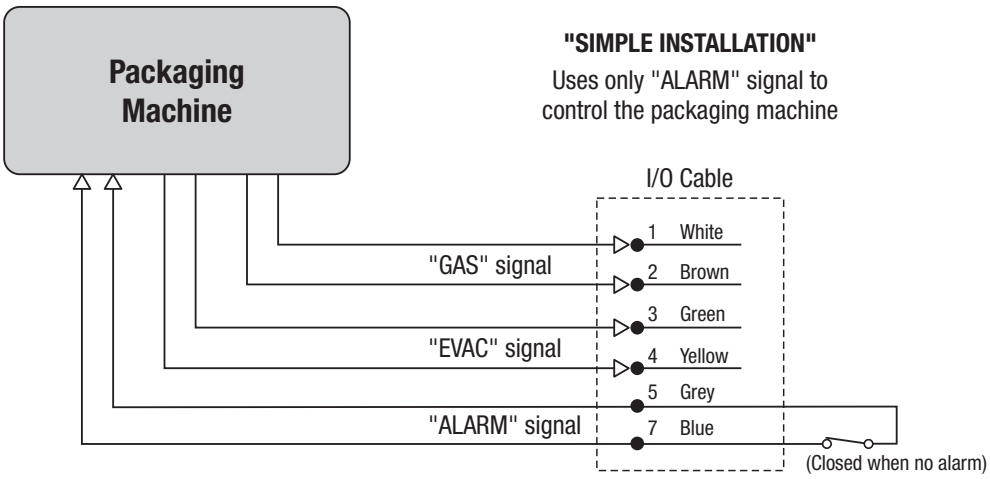
ALARM Relay		State of device
Device OFF	DSUB pin 5 connected to pin 6	"Alarm" (OFF)
Device ON - OK	DSUB pin 5 connected to pin 7	"OK"
Device ON - Alarm	DSUB pin 5 connected to pin 6	"Alarm"
DSUB 25 pins/ colours	Pin 5 - Grey (Common) Pin 6 - Pink Pin 7 - Blue	

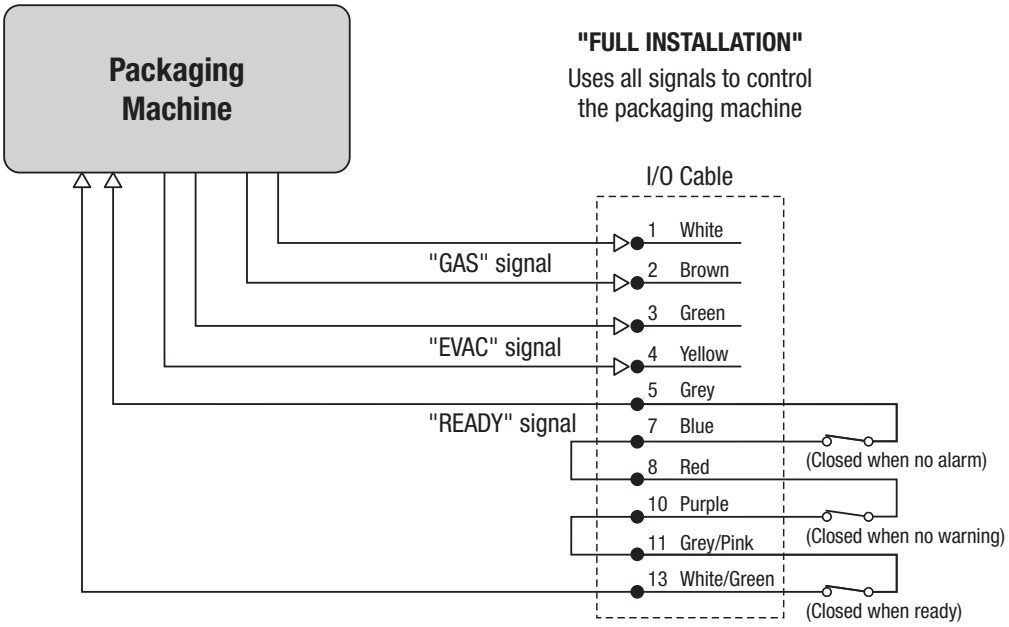
WARNING Relay		State of device
Device OFF	DSUB pin 8 connected to pin 9	"Warning" (OFF)
Device ON - OK	DSUB pin 8 connected to pin 10	"OK"
Device ON - Warning	DSUB pin 8 connected to pin 9	"Warning"
DSUB 25 pins/ colours	Pin 8 - Red (Common) Pin 9 - Black Pin 10 - Purple	

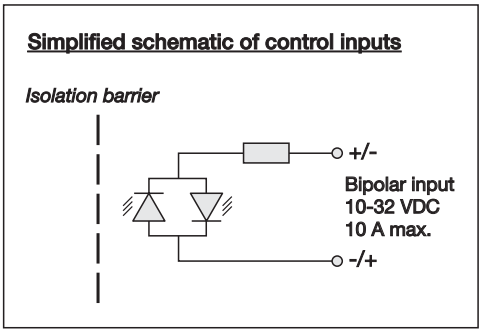
I/O signals for machine control

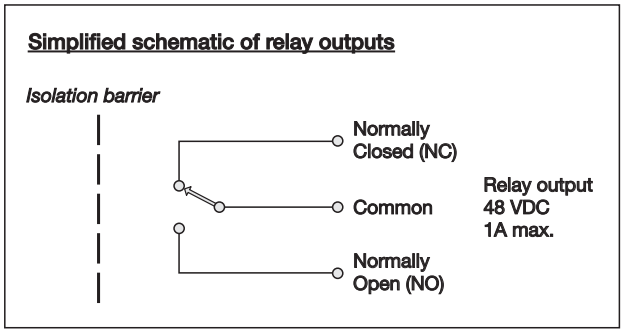
- "EVAC" signal
- "GAS" signal

- "READY" relay
- "ALARM" relay
- "WARNING" relay



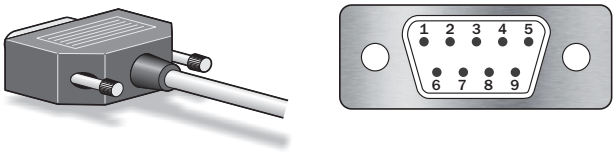



Simplified schematic of control inputs
Isolation barrier
+/-
Bipolar input
10-32 VDC
10 A max.
-/+


Simplified schematic of relay outputs
Isolation barrier
Normally
Closed (NC)
Common
Normally
Open (NO)
Relay output
48 VDC
1A max.

COM-1/COM-2 Cables

The 9-pole communication cables should have the following pin connections (female connectors):



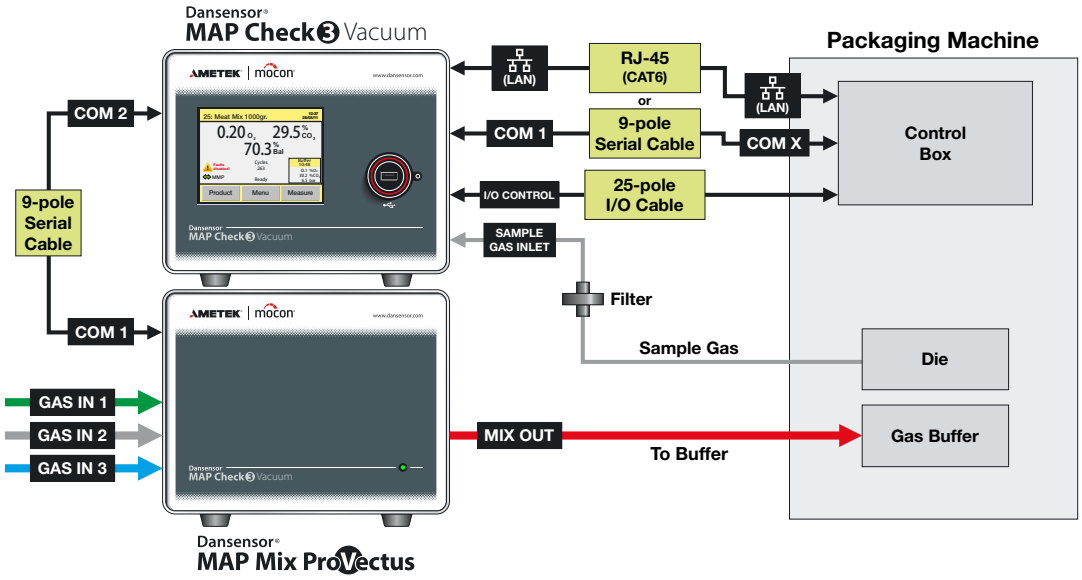
COM-1 Main (MASTER) RS232 communication port (DTE Male)	
Pins/text	**Description**
2 "RxD"	Receive data, serial data input from packaging machine / PLC
3 "TxD"	Transmit data, serial data output to packaging machine / PLC
5 "GND"	Ground, signal ground
7	CURRENTLY NOT USED
8	CURRENTLY NOT USED
9 "+5V"	Voltage supply +5V. Max. 250mA (fused)

COM-2 Main (SLAVE) RS232 communication port (DTE Male)	
Pins/text	**Description**
2 "RxD"	Receive data, serial data input from slave device - e.g. MAP Mix Provectus
3 "TxD"	Transmit data, serial data output to slave device - e.g. MAP Mix Provectus
5 "GND"	Ground, signal ground

NOTE! COM-1 and COM-2 communication ports are not galvanic isolated i.e. "GND" is connected to Mains ground and the chassis. Avoid ground loops during installation.

Mixer Control

The **Dansensor® MAP Check 3 Vacuum** can control a **Dansensor® MAP Mix Provectus** gas mixer. The illustration below shows how to connect the devices.



Make following parameter settings:

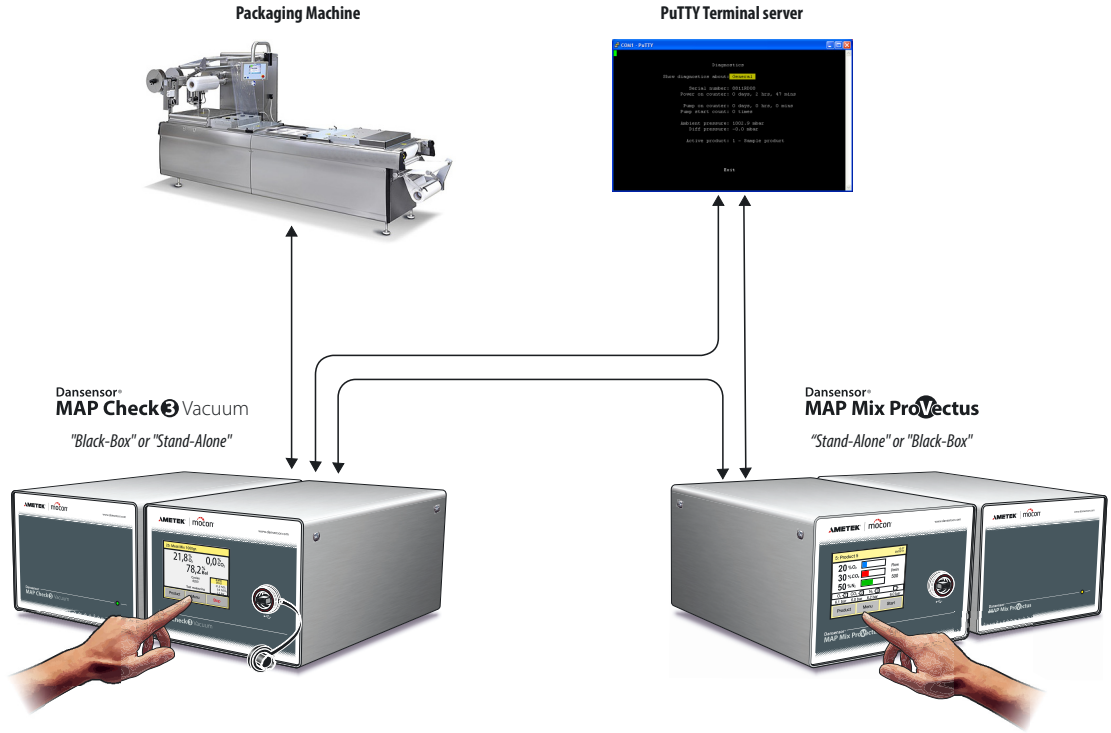
1. In **General setup** select **External mixer settings** and set **External mixer connected** to **Yes**.
   This will fold out the gas configuration parameters. Make appropriate settings.
2. The product(s) must be setup with **External mixer** to **Yes** and then the appropriate settings for
   mix %, buffer pressure, and gas flow must be set.

4. Operation and Maintenance

General

The illustration below shows an overview of the various control options for the **Dansensor® MAP Check 3 Vacuum**.

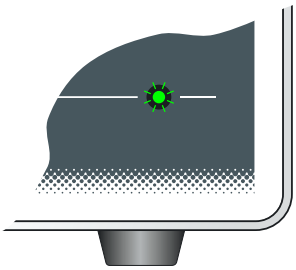
Use the **PuTTY Terminal Server** program for device configuration. It can be used with all models but especially applies to the “Black Box” models - see *“PuTTY Terminal Server” on page 75* for details.



Start up

"Black Box" models

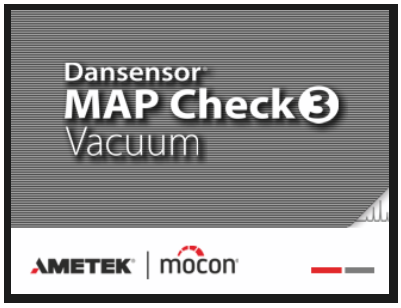
- When power is applied to the unit, the indicator on the front will be lit.



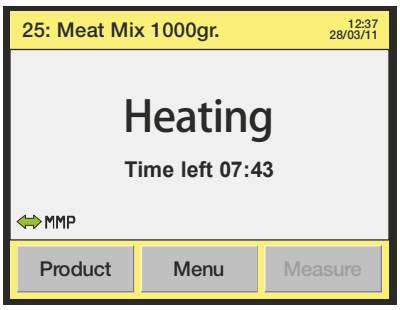
- After a short internal self diagnosis the device will start heating up the sensors. During this period the indicator will turn red (steady).
- When heating period has finished the indicator will change to green (steady) and the device is now ready for use.

Display models

- When first powered ON the display will shortly show the **Dansensor® MAP Check 3 Vacuum** splash screen.

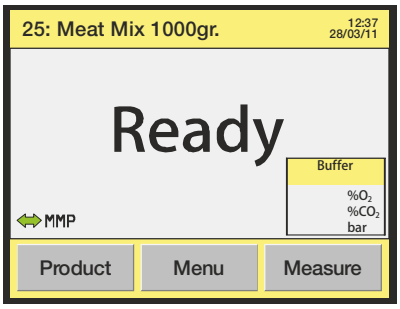


- After a short internal self diagnosis the device will start heating up the sensors.



During this time the "Measure" button will be disabled. If device is set to "Autostart" it will automatically start when heating period finishes.
While heating, you can go to the **Main menu** by pressing the **Menu** key - see *"Main menu" on page 53* for details.

- When heating period has finished the display will say “Ready” and the device is now ready for use.



If device is set up to perform buffer measurements, the “Buffer” window is displayed in the lower right corner of the display.

Measuring

"Black Box" models

The “BlackBox” models are as default set to "Autostart". When heating period has finished the device starts automatically and checks for the “Evacuation” and “Gassing” signals. When receiving a signal the device starts a cycle. A new signal is required to start the next cycle and so on.

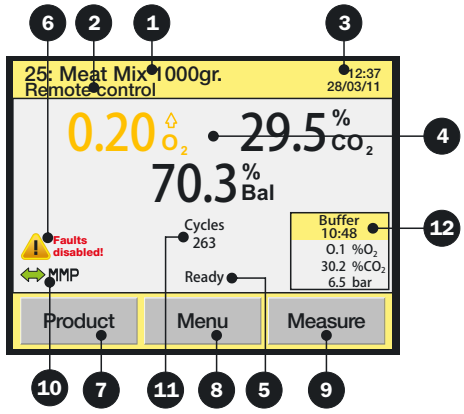
Display models

When set to "Autostart" the “Display” models remember how the device was setup when it was turned off. If the device was measuring then it will automatically start to check for the “Evacuation” and “Gassing” signals when heating period has finished. When receiving a signal the device starts a cycle. A new signal is required to start the next cycle and so on.
If the device was stopped then it will stop when heating period finishes.
It is recommended is to leave the device in measure mode so that it starts automatically.

Alternatively the measuring can be started and stopped manually using the **Measure/Stop** key in the measuring screen - see "The Measuring Screen" below.

The Measuring Screen

CAUTION! The touch screen should only be finger touch operated. Pencils or metal tools will destroy the touch sensitive film.



The measuring screen offers the following information/functions:

❶ **Selected product**	Currently selected product number/product name.
❷ **Remote control**	Displayed when the device is remote controlled from Modbus TCP protocol. In this case the buttons ❼, ❽, and ❾ are disabled.
❸ **Time/Date**	Current time and date
❹ **Measuring result**	Result of the recent measurement. During heating up the remaining heating time is also displayed in this area. Only values selected for display in the product setup are displayed - see *"Edit product" on page 54* for details.

Text colors indicate the following:

Black indicates that the result is within limit or that no limit has been defined for this gas.

Orange indicates that the gas concentration has exceeded the set warning value.
The arrow symbol to the right of the value indicates whether it is an upper or lower warning.

Red indicates that the gas concentration has exceeded the set alarm value.
The arrow symbol to the right of the value indicates whether it is an upper or lower alarm.

5 Status — Shows current status of the device e.g. “Ready” or “Measuring”

6 Faults disabled — This symbol indicates that faults has been disabled in “Measure setup”.
All faults are detected but external signalling is disabled.
This is used as last resort if you want to be able to run packaging machine even though an error exists in the device.

7 Product key — Takes you to the “Products” list for selection of product.
See *"Selecting a product for measuring" on page 36* for details.

8 Menu key — Takes you to the “Main menu”.
See *"Main menu" on page 53* for details.

9 Measure/Stop key — Starts/stops measurement.

10 Mixer connection — (Only appears if External mixer is enabled)
Shows current connection status of the external mixer.
⇔ MMP = Connection OK
⇔ MMP = No connection

Pressing the icon changes the screen to display the mixer flow, mix and pressure readings.

11 Cycle count — Shows the number of completed packaging machine cycles

12 Buffer measurement — (”Buffer” versions only)
Displays the result of the latest buffer measurement. Read-out includes time of measurement, O_2/CO_2 values and buffer pressure.
Text colors indicate the following:

Black indicates that the result is within limit or that no limit has been defined for the gasses and the pressure.

Orange indicates that the result has exceeded the set warning value.

Red indicates that the result has exceeded the set alarm value.

The small display is also a key that you can press to start a buffer measurement manually.

Selecting a product for measuring

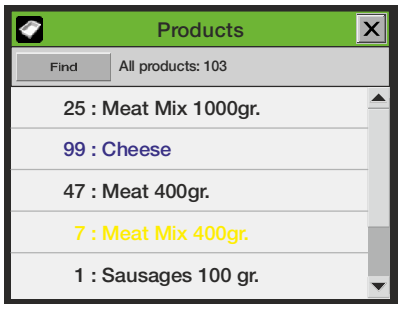
"Black Box" models

Products are selected via the packaging machine's control software.

Display models

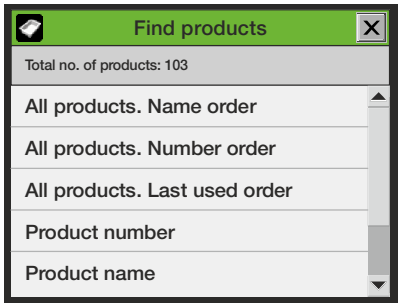
A product is selected from the **Products** list as described below:

1. From the measuring screen press the **Product** key to bring up the **Products** screen.

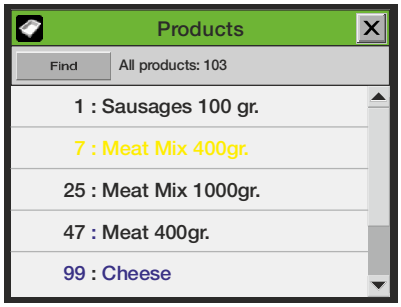


   This screen holds a list of all products with the most recently used product at the top.
   Blue text indicates that measurements have been stored for the product.
   Yellow text indicates that product settings are not compatible with the current device configurations.

2. Use scroll keys ▲ and ▼ to locate the appropriate product then press product to select it and return to the measuring screen.
   If you have a very long list of products you can locate the product by pressing the **Find** key. This will bring up the **Find products** screen.



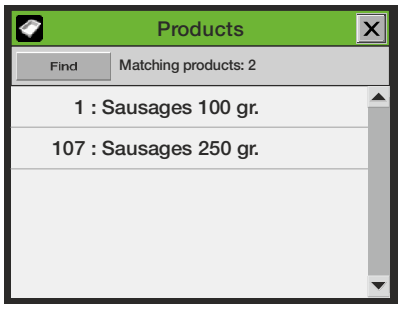
3. Select the appropriate product search method.
4. Selecting one of the **All products....** methods brings up a list of all the products sorted in the order as selected (ex. **Number order**).



5. Use scroll keys ▲ and ▼ to locate the appropriate product then press product to select it and return to the measuring screen.

6. Selecting one of the **Product....** methods (ex. **Product name**) brings up an appropriate touch screen keyboard for keying in the product data.

7. Key in the product name (ex. **Sausages**) and confirm by pressing the **OK** key.
Now a list will appear showing all products with the name starting with **Sausages**.



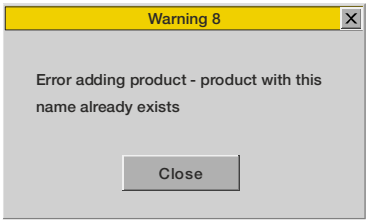
8. Press the appropriate product to select it and return to the measuring screen.

TIP! When selecting the "Product name" search method, keying in only an "S" will bring up a list of all products starting with "S".
When selecting the "Product number" search method keying in "1" will bring up only product no. 1 and not a list of all product numbers starting with "1" (ex. 1, 17, 134).

Errors/Warnings

Error/Warning messages

In case a device error or warning occurs, a pop-up window appears on the display.



The window shows the type (error or warning), the error/warning number and a brief description of the error/warning.
To acknowledge the error/warning and close the window either press the **Close** button or the **X** button in the upper right corner.

The error/warning number may be reported to a Service Technician to correct any errors.

See the complete *"Error/Warning list" on page 39*.

A list of the most recent errors/warnings is available from the **Diagnostics menu** - see *"Diagnostics menu" on page 59* for details.

"Black Box" models

In case of an error/warning the indicator lamp on the device front changes to red (error = steady, warning = flashing) and an error signal is sent to the packaging machine.
A description of the error/warning can only be displayed on the packaging machine's display if the packaging machine has been prepared with the necessary communication software.

Error/Warning list

Please note that messages marked with an asterisk (*) does not pop up on the screen. These messages only appear as entries in the Error log - see *"Diagnostics menu" on page 59* for details.

No.	Type	Message	User action
0	Error	Unknown error has occured	Re-start unit If error persists, contact service
1	Warning	No products were found, a product with default values was created	User information
2	Warning	Too many products were found, some products were deleted	User information
3	Error	Error deleting product	Try again If error persists, contact service
4	Error	Internal error handling the products	Contact service
5	Error	Error changing active product	Contact service
6	Error	Error reading product from database	Contact service
7	Error	Error writing product to database	Contact service
8	Warning	Error adding product - product with this name already exists	User information
9	Warning	Product corrupt - replaced with default parameters	User information
10	Error	No such product found	Contact service
12	Error	Internal user interface error	Contact service
13	Error	Error opening LCD driver	Contact service
14	Error	Changing LCD contrast failed	Contact service
15	Error	Changing LCD brightness failed	Contact service
16	Error	Changing LCD backlight failed	Contact service
17	Error	Setting LCD to standby failed	Contact service
18	Error	Could not detect keyboard layout file. External keyboard or scanner may not work correctly	Contact service
20	Error	Internal data logging interface error	Contact service
21	Error	Data logging IO error	Contact service
22	Error	Data logging module is shut down	Contact service
23	Warning	Internal memory full. Data logging stopped	User information
24	Error	Could not detect USB memory stick. Please check if the memory stick is correctly connected	User information
25	Error	Import/Export: copy failed	User information

No.	Type	Message	User action
26	Error	Import/Export: no data found	User information
27	Error	Import/Export: corrupted data	User information
28	Error	Import/Export failed	User information
29	Warning	CO_2 sensor needs calibration. Measuring values may not be valid.	Contact service for sensor calibration
30	Warning	O_2 sensor needs calibration. Measuring values may not be valid.	Contact service for sensor calibration
31	Error	Cannot set mixer gas ratios. Mixer is not configured for gases found in active product.	User information
32	Error	Unknown error from STM	Contact service
33	Error	Error from STM	Contact service
34	Error	Error from STM	Contact service
35	Error	Internal communication error	Contact service
36	Error	Internal communication error	Contact service
37	Error	External analog-digital converter failed	Contact service
38	Error	External analog-digital converter failed	Contact service
39	Warning	Atmospheric pressure sensor is not calibrated. Pressure values may not be valid.	Contact service
40	Warning	Difference pressure sensor is not calibrated. Pressure values may not be valid.	Contact service
41	Error	Voltage/current analog output failed	Contact service
42	Error	CO_2 sensor communication error	Contact service
43	Error	CO_2 sensor output out of range	Contact service
44	Error	Zr O_2: could not detect cold-junction temperature sensor	Contact service
45	Error	Zr O_2: error with heater regulator	Contact service
46	Error	Zr O_2: cold-junction temperature sensor error	Contact service
47	Error	O_2 sensor temperature out of range	Contact service
48*	Warning	Too high O2 sensor temperature: XX C	Contact service
49*	Warning	Too low O2 sensor temperature: XX C	Contact service
50	Error	O_2 sensor is disabled because of hardware fail. Please call service.	Contact service
51	Error	O_2 sensor is disabled because of hardware fail. Please call service.	Contact service

No.	Type	Message	User action
52	Error	O_2 sensor is disabled because of hardware fail. Please call service.	Contact service
54	Warning	Error in O_2 sensor calibration data. Check if the gas concentration and span is correct.	Contact service for sensor calibration
55	Warning	O_2 sensor needs calibration. Measuring values may not be valid.	Contact service for sensor calibration
58	Error	Fan speed too low, check if fan is functional	Contact service
59	Error	Error in fan parameters, running fan at full speed.	Contact service
60	Error	Temperature sensor not calibrated. Device temperature may not be valid.	Check cooling/ filters If error persists, contact service
69	Error	Sample system clogged. Check hose for blockages	User information
70	Error	Illegal mixer setting: a 2-gas mixer is connected but 3-gas mixer is expected	User information
71	Error	Cannot establish connection to external mixer	User information
72	Error	Data log network dump failed: cannot connect to server	Check LAN connection
73	Error	Data log network dump failed: connection to server was lost	Check LAN connection
74	Error	Data log network dump failed: no ACK received	Check LAN connection
75	Error	Data log network dump failed: wrong ACK received	Check LAN connection
76	Warning	Mixer low pressure alarm on gas input X	User information
77	Error	Error from slave mixer	User information
79	Error	Zr O_2 cold-junction temperature too high. Possible O_2 sensor fan fault.	Contact service
83	Warning	Ambient pressure value out of reasonable range. Possible pressure sensor fault.	Check and clean Air inlet/Sensor gas/sample gas outlets If error persists, contact service

No.	Type	Message	User action
85*	Warning	Device temperature very low	Place unit in temperature above 0 °C Allow unit to heat up
86	Error	Device temperature too low	Place unit in temperature above 0 °C Allow unit to heat up
87*	Warning	Device temperature very high	Check cooling/ filters If error persist, contact service
88	Error	Device temperature too high	Check cooling/ filters If error persist, contact service
89	Error	Zr O2 cold-junction temperature too low, shutting down O2 sensor.	Check ambient temperature - must be within range If problem persists, contact service
90*	Warning	Zr O2 cold-junction temperature high	Check cooling/ filters Check ambient temperature - must be within range If problem persists, contact service
91*	Warning	Ir CO2 sensor temperature low	Check ambient temperature - must be within range If problem persists, contact service

No.	Type	Message	User action
92	Error	Ir CO2 sensor temperature too low, shutting down CO2 sensor.	Check ambient temperature - must be within range If problem persists, contact service
93*	Warning	Ir CO2 sensor temperature high	Check ambient temperature - must be within range Check cooling/ filters If problem persists, contact service
94	Error	Ir CO2 sensor temperature too high, shutting down CO2 sensor.	Check ambient temperature - must be within range Check cooling/ filters If problem persists, contact service
98	Error	Input pressure too high	Reduce pressure at gas input
99	Error	Input pressure too low	Increase pressure at gas input
101	Warning	Product uses external mixer but mixer is disabled	Enable mixer or choose different product
102	Warning	Buffer alarm	Check alarm settings for buffer.
103	Event	TIMING PROBLEMS, VAC signal too soon	Check control signals
104	Event	TIMING PROBLEMS, IR delay too long	Check control signals
105	Error	Critical high pressure on buffer input. More than 10 bar may be destructive	Lower input pressure on buffer input
232	Error	Vacuum is above max. Vacuum=%s, Max=%s	Check vacuum

No.	Type	Message	User action
233	Error	Too high bypass flow (V2,V4 Problem ?)	Check flow system hoses
234	Error	Too low bypass flow (V2,V4 Problem ?)	Check flow system hoses
235	Error	Too high bypass flow (V1,V4 Problem ?)	Check flow system hoses
236	Error	Too low bypass flow (V1,V4 Problem ?)	Check flow system hoses
237	Error	Sensor flow too low	Check flow system hoses
238	Error	O_2% reading is out of range 19.9 .. 21.9 %	Check flow system hoses
239	Error	Cannot reach Leak test pressure	Check leak target setting or vacuum supply
240	Error	Connect calibration gas to both Cal gas inlet and Buffer Inlet	Contact service
241	Error	Connect pressurized gas to Buffer inlet	Check buffer gas
242	Error	Could not obtain target pressure	Check buffer gas
243	Error	Connect vacuum to Vacuum inlet	Check vacuum
244	Error	Sample system clogged. Check hose for blockages.	Check filter in sample gas probe

Cleaning and Maintenance

General

Performing cleaning and maintenance regularly reduces the chances of equipment failure.

CAUTION! Personnel performing any maintenance or cleaning must familiarize themselves with the *"Safety Instructions" on page 9* before attempting any of these procedures.

NOTE! For correct mounting/dismounting of fittings please see *"Correct mounting/dismounting of fittings" on page 19*.

Spare parts

For a list of spare parts see *"Spare parts, consumables and accessories" on page 87*.

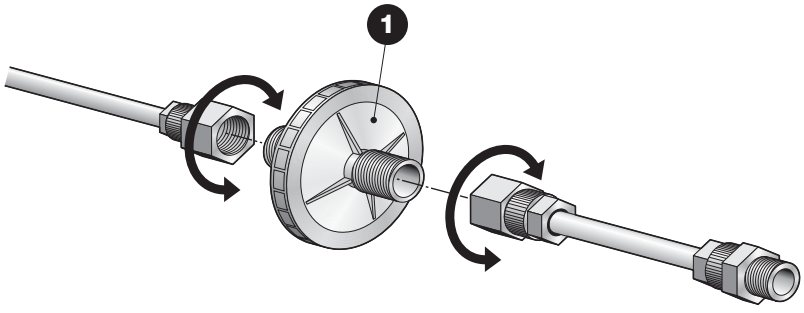
Cleaning

All of the device's surfaces should only be cleaned using a mild soap solution and a wrung cloth.

CAUTION! Never use hard tools or abrasive materials when cleaning any part of the device.

WARNING! Never use cleaning agents containing chlorinated solvents or acetic or phosphoric acid. These constitute a health hazard and could damage the instrument.

Replacing filter in the sample gas probe

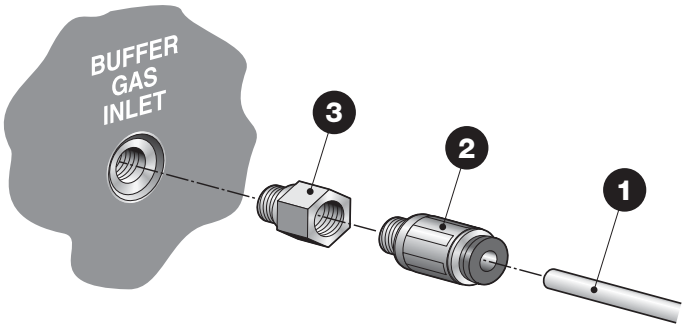


We recommend that you inspect the filter ❶ regularly and replace it when necessary.

If the filter is blocked the device will indicate an error in the display.
To replace the filter simply unscrew the connection fittings.

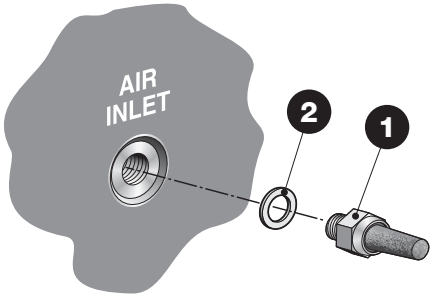
Replacing buffer gas filter

("Buffer"versions only)



- Disconnect the gas inlet hose ❶ from the push-in fitting ❷.
- Unscrew the push-in fitting ❷.
- Replace the filter ❸.
- Connect fitting ❷ and hose ❶ again.

Replacing air inlet filter

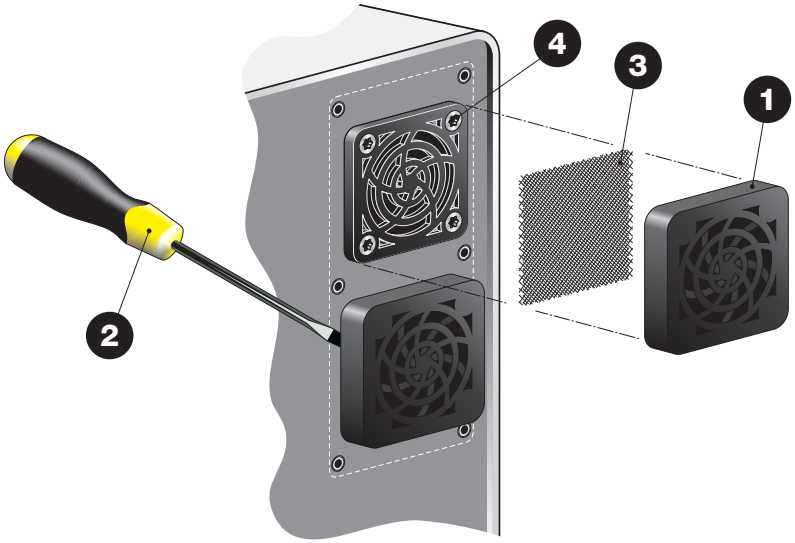


- Unscrew the filter ❶ and replace it with a new.
- Remember to fit the gasket ❷.

Replacing air inlet and outlet dust filters

CAUTION! Clogged air inlet and outlet filters can lead to overheating of the device. Therefore they should be replaced or cleaned regularly, especially when device is used in a dusty environment.

To replace the air filters do the following:



- Release the ventilation grille ❶.

  TIP! If grille does not come off easily, you can use a screwdriver ❷ or the like to release it.

- The filter ❸ is located inside the grille. You can choose to replace both the grille ❷ and the filter ❸ or only the filter ❸.

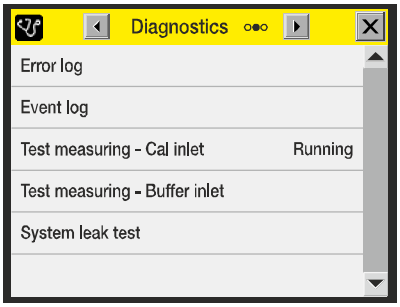
CAUTION! Never remove the screws ❹ from the inside grille as they also hold the fan inside the device.

Test modes in Diagnostics

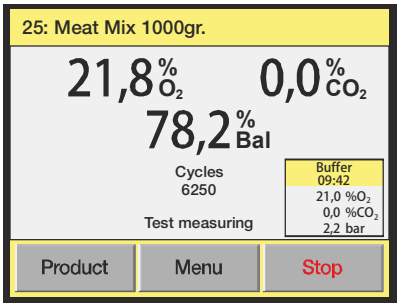
Test measuring - Cal inlet

This test is used for calibration of the sensors in the system. It is normally used for servicing purposes.

- Remove the blind plug from the input labelled “CAL. GAS IN” and connect a suitable M5 fitting.
- Connect a calibration gas to the input.
  The gas must be regulated using a needle valve for a flow of 0.5 L/min ± 0.1 L/min.
- Apply vacuum to the device and stop the packaging machine.
- Enter **Diagnostics** and go to page 2 and select **Test measuring - Cal inlet** in the menu.



- The device starts a continuous measurement of the connected calibration gas.
- It is now possible to close the **Diagnostics** window and to go to the measuring screen to watch the gas values.
  The measuring screen will say “Test measuring”.



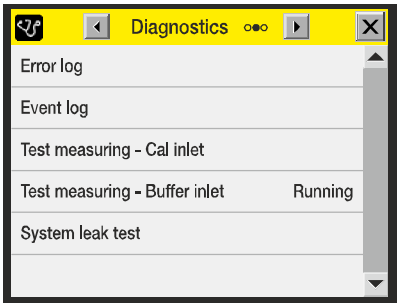
- The test will run until you press **Stop** or until **Test measuring - Cal inlet** is pressed again on page 2 in **Diagnostics**.

NOTE! Always install the blind plug in the “CAL. GAS IN” input when not in use.

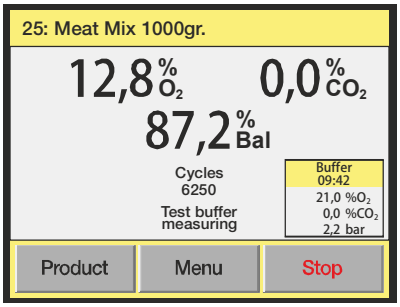
Test measuring - Buffer inlet

This test is used for a manual continuous measurement of the buffer tank contents. It is normally used for servicing purposes or to check the tank after installation.

- Apply vacuum to the device and stop the packaging machine.
- Enter **Diagnostics** and go to page 2 and select **Test measuring - Buffer inlet** in the menu.



- The device starts a continuous measurement of the buffer tank gas.
- It is now possible to close the **Diagnostics** window and to go to the measuring screen to watch the gas values.
  The measuring screen will say “Test buffer measuring”.

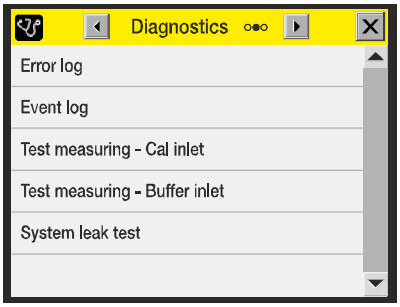


- The test will run until you press **Stop** or until **Test measuring - Buffer inlet** is pressed again on page 2 in **Diagnostics**.

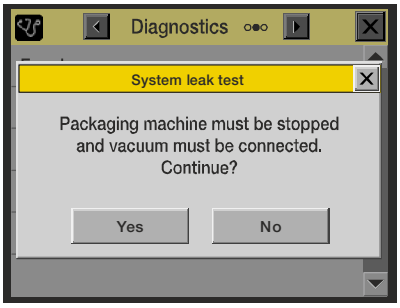
System leak test

This test is used to verify system tightness in sensor and flow parts. A leak is fatal for measurements and the test should therefore be done periodically or in case of strange readings.

- Apply vacuum to the device and stop the packaging machine.
- Enter **Diagnostics** and go to page 2 and select **System leak test** in the menu.

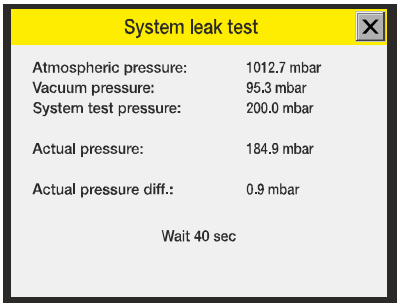


- A popup window will remind you to stop machine and to ensure that vacuum is applied.

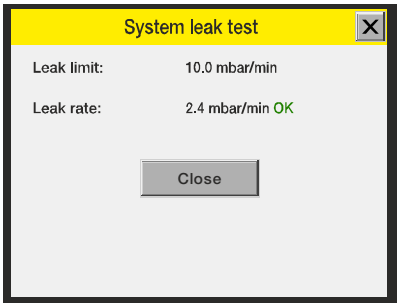


Press **Yes** to continue or **No** to cancel.

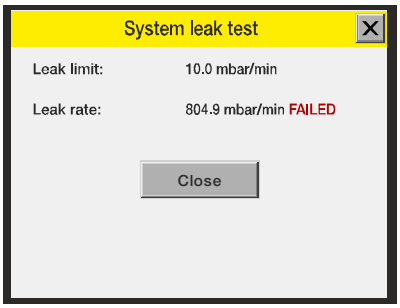
- The test will start with a short stabilizing period then a 1 minute measurement is performed.



- In case of good result the following screen is shown.



- In case of a failed result the following screen is shown.



NOTE! Devices with CO_2 sensor installed will have separate results for this sensor, named "Leak limit IR" and "Leak rate IR".

5. Menus and Settings

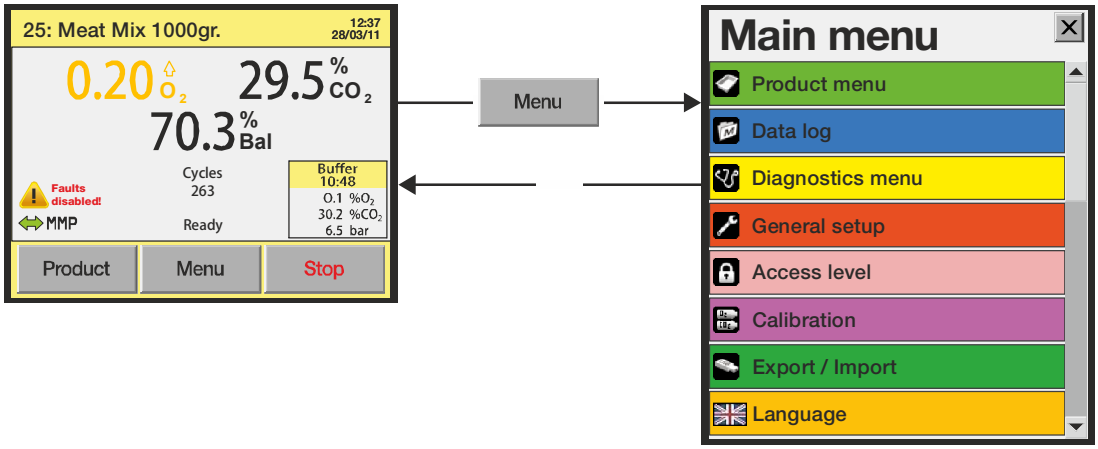
General

When device is switched on (after power off) it is locked in **User** access level. In **User** access level the operator has access to a limited number of functions only and is not allowed to perform parameter setup.

To obtain full access you have to change the device to **Supervisor** access level.
See *"Access level" on page 70* for details.

Main menu

Pressing the **Menu** key from the measuring screen brings up the **Main menu**



From the **Main menu** you can select the following submenus:

Product menu [1]	Create, edit and delete products. Display and delete logged product data. See *"Product menu" on page 54* for details.
Data log	View logged data for currently selected product. See *"Data log" on page 58* for details.
Diagnostics menu	Display device's internal parameters and error diagnostics. See *"Diagnostics menu" on page 59* for details.
General setup [1]	Setting of various device parameters. See *"General setup" on page 60* for details.
Access level	Selection of access level for User, Supervisor and Service. See *"Access level" on page 70* for details.
Calibration [2]	Calibration of sensors - for Service Technicians only.

Export / Import [1] — Export of product log data, export/import of products, users and device settings.
Requires connection of a USB memory key.
See *"Export/Import" on page 72* for details.

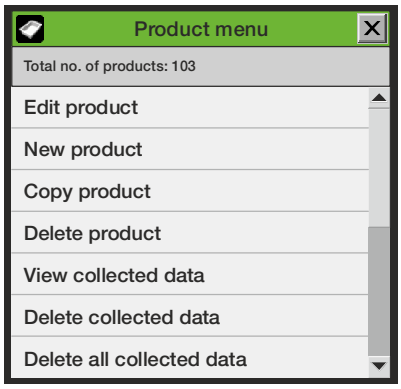
Language — Change language of screens and menus.
See *"Language" on page 73* for details.

[1] Only available in Supervisor and Service access levels.

[2] Only available in Service access level.

Product menu

Selecting **Product menu** from the **Main menu** will display a menu with available product options.



Edit product

This function allows you to edit the setup of a product. The following parameters can be set for each product:

Product name — A unique product name of up to 40 characters

Product number — A unique product number (0 to 999999)

Bar code ID — A unique product bar code. Can be used to perform a quick product selection using the barcode reader (option)

Display gasses — Select which value(s) to display on the measuring screen. You have the following display combination possibilities:

- Measure O_2
- Measure CO_2
- Measure O_2 + Display balance
- Measure CO_2 + Display balance
- Measure O_2 + Measure CO_2
- Measure O_2 + Measure CO_2 + Display balance

Alarm settings

Setting of the sample gas measurement warning and alarm values.

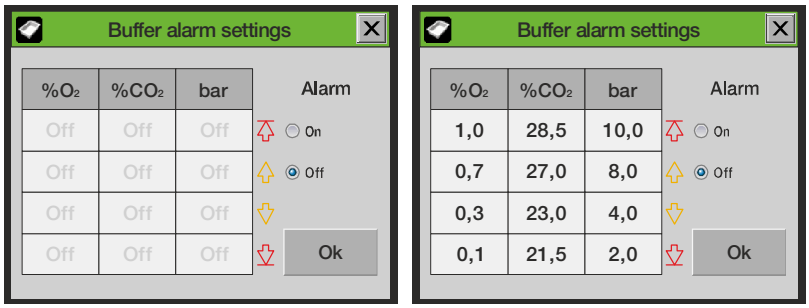
You have the following options for each alarm:

- **Off** Disables all alarms
- **On** Enables alarm for the selected input
  - O_2 High alarm and Low alarm (%)
  - O_2 High warning and Low warning (%)
  - CO_2 High alarm and Low alarm (%)
  - CO_2 High warning and Low warning (%)

If alarm settings are as shown above, O_2 measurements between 0,3 and 0,7% are OK, measurements between 0,7 and 1,0% will result in a high warning, an measurements above 1,0% will result in a high alarm.
Any warning or alarm will result in a relay activated accordingly and an indication in the display.

Buffer alarm settings

Setting of buffer measurement warning and alarm values.



Buffer pressure is measured at every "EVAC" signal.
Any warning or alarm will result in a relay activated accordingly and an indication in the display.

Extra sampling time

Prolongs the sampling period. If the gassing time is very short the gas can spread through the system during the prolonged sampling period.
Recommended setting is 1 sec.

External mixer (Only available if "External mixer" is enabled in "General setup")

NOTE! On the device it is possible to create products with mixer settings that do not match the connected mixer. These products can only be used if mixer settings are changed. Otherwise the products are displayed in yellow in the products list and cannot be used.

- **External mixer**
  - **No** Default state and if external mixer is connected but not used
  - **Yes** Regulating the mixer for a fixed buffer tank pressure
    - **Buffer max pressure**
      Set the upper value for buffer pressure (bar)
    - **Buffer min pressure**
      Set the lower value for buffer pressure (bar)
    - **Use gases from General Setup**
      Yes or No
    - **O_2 ratio**
      O_2 setting for mixer (%)
    - **CO_2 ratio**
      CO_2 setting for mixer (%)
    - **N_2 ratio**
      N_2 setting for mixer (%)
    - **AUX ratio**
      AUX setting for mixer (%)
    - **Total flow**
      Set the mixer outlet flow (l/min)

New product

This function creates a new product with default setup. The parameters can then be adjusted to the new product (see *"Edit product" on page 54*).

If new product is very similar to an already existing product, you might want to use the "Copy product" function instead (see below).

Copy product

This function creates a copy of an existing product with exact same setup but a new name. The parameters can then be adjusted to the new product (see *"Edit product" on page 54*).

Delete product

Unused products can be deleted. When deleting a product both the product and the product's log data are deleted.
The action must be confirmed before deletion is performed.

View collected data

This function enables the operator to display logged data for any of the existing products.

(Selecting **Data log** from the main menu displays logged data for the currently selected product only.)

Delete collected data

Use function to delete the logged data for an existing product.
The action must be confirmed before the data is deleted.

Delete all collected data

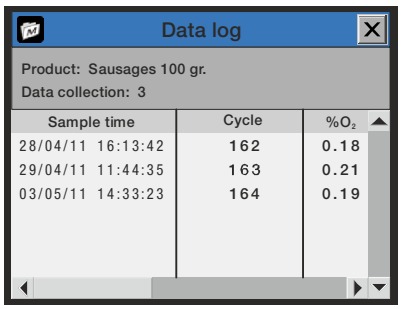
NOTE! Be sure to export data to USB stick before executing this command as it cannot be undone - see *"Export/Import" on page 72*!

Use function to delete the logged data for all products.

The action must be confirmed before the data is deleted.

Data log

Selecting **Data log** from the **Main menu** will display a screen with a list of all the logged data for the currently selected product.



Here all logs stored on the device can be examined. Use the two scroll bars to navigate the window.
Logged data can be exported (see *"Export/Import" on page 72* for details) or deleted (see *"Product menu" on page 54* for details).

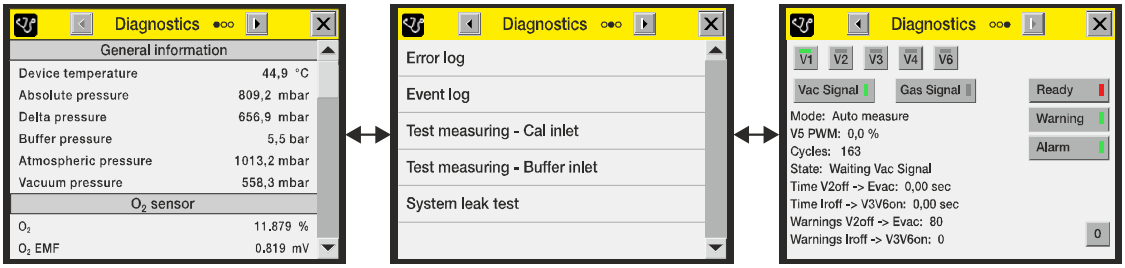
Data logging parameters are set in “General setup” - see *page 60* for details.

Data log memory full

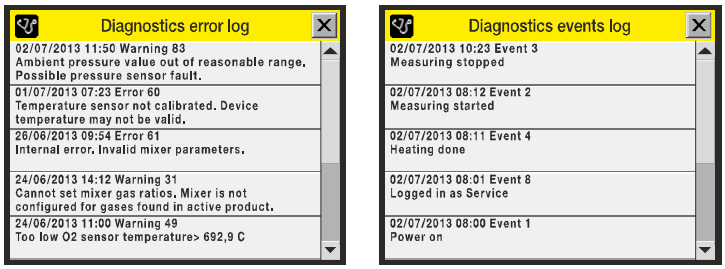
If data log memory is full an error will occur (Warning 23 - see *"Error/Warning list" on page 39* for details).
In this case you must empty data log by using the functions for deleting of data collections - see *"Product menu" on page 54* for details.
Please note that new measurements will not be logged until current data logs have been deleted.

Diagnostics menu

Selecting **Diagnostics menu** from the **Main menu** will take you to the device's **Diagnostics** pages.
The **Diagnostics** section consists of 3 pages. Use the arrow keys in the headline area to go to next or previous page:



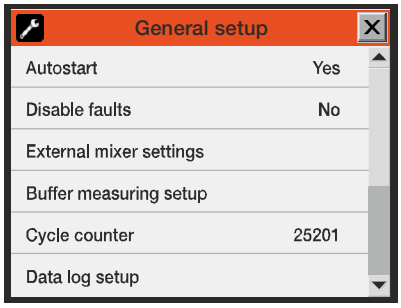
- The first page shows the internal parameters of the device. These are values such as the device's internal temperature, the pressure in the sensors, the sensor's conditions, serial numbers for main components, day/hour counters, time to calibration, and software versions, etc. The parameters can only be read and not changed.
- The second page holds a menu from where you can
  - open the **Diagnostics error log** and **Diagnostics events log** pages.



  - start a test measuring on the **Cal. Gas** or **Buffer Gas** inlets.
    The measure functions are normally used for initial testing after installation on machine.
  - start a **System leak test**.
- The third page shows the state of the valves, the **Vac** and **Gas** signals, and the **Ready**, **Warning** and **Alarm** relays.

General setup

Selecting **General setup** from the **Main menu** will display a menu with available setup parameters.
"Supervisor" access level is required for this menu, as the parameters in this menu control the basic functionality of the device.



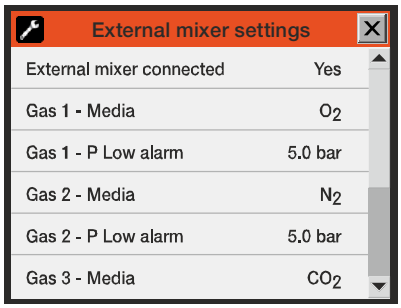
The **General setup** menu holds the following items:

Autostart	**No**	Device must be started manually using the "Measure" button on the display
	Yes	The device starts automatically when heating period ends.
Disable faults	**No**	All faults are detected and READY relay contacts will be activated to stop packaging machine logic.
	Yes	All faults are detected but external signalling is disabled. This is used as last resort if you want to be able to run packaging machine even though an error exists in the device. This setting will be indicated in the measure screen by a warning symbol and a red text saying "Faults disabled".
External mixer settings	Opens the **External mixer settings** screen See *"External mixer settings" on page 61* for details.	
Buffer measuring setup	Opens the **Buffer measure setup** screen See *"Buffer measure setup" on page 62* for details.	
Cycle counter	Can be set to any number. Counter is set to 0 from the factory. Can be set to match the packaging machine cycle counter.	
Data log setup	Opens the **Data log setup** screen See *"Data log setup" on page 63* for details.	
Network setup	Opens the **Network setup** screen See *"Network setup" on page 68* for details.	
User label:	This item is a user configurable text that will be combined with data logging information. Examples of use could be manufacturing line identification or other similar data. See *"User label:" on page 68* for details.	

Request ID when changing product	When set to "Yes" the operator will be prompted to enter some kind of information ex. product batch no. when selecting a new product. The text will be part of the logged data for each measurement.
Backlight	Adjust display background light (1-10)
Contrast	Adjust display contrast (1-10)
Brightness	Adjust display brightness (1-10)
	The "Backlight", "Contrast" and "Brightness" items are all related to the display readability. Selecting each setting brings up a new window where value can be set from 1 to 10. Setting impact is seen while adjusting.
Formats/Units/Time	Opens the **Formats/Units/Time** screen See *"Formats/Units/Time" on page 69* for details.
Supervisor PIN code setup	Setting up the four-digit PIN code required for changing from **User** access level to **Supervisor** access level. (See *"Access level" on page 70* for details).

External mixer settings

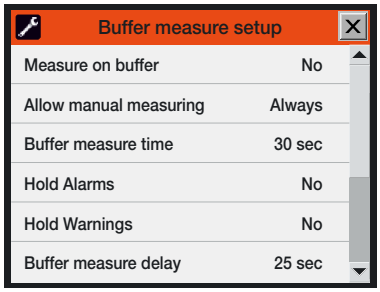
Selecting **External mixer settings** from the **General setup** menu will display a screen showing the setup parameters for an external **MAP Mix Provectus** mixer connected to the COM2-port of the
MAP Check 3 Vacuum.



External mixer connected	**No**	No mixer connected
	Yes	Mixer connected
	- **Gas 1 - Media**	Media connected to "GAS IN 1" on mixer
	- **Gas 1 - P Low alarm**	Lower pressure alarm for Gas 1 (Setting to 0 will disable alarm)
	- **Gas 2 - Media**	Media connected to "GAS IN 2" on mixer
	- **Gas 2 - P Low alarm**	Lower pressure alarm for Gas 2 (Setting to 0 will disable alarm)
	- **Gas 3 - Media**	Media connected to "GAS IN 3" on mixer
	- **Gas 3 - P Low alarm**	Lower pressure alarm for Gas 3 (Setting to 0 will disable alarm)

Buffer measure setup

Selecting **Buffer measuring setup** from the **General setup** menu will display a screen showing the setup parameters for the buffer measuring.

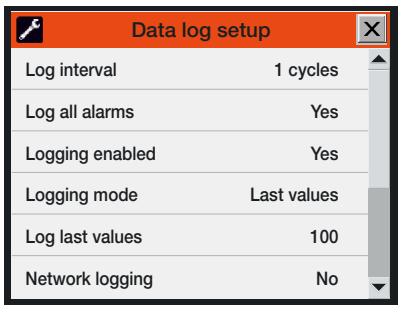


Measure on buffer	**No**	No automatic buffer measurement is performed.
	Start up	An automatic buffer measurement is performed when device is switched into measuring mode.
	Always	An automatic buffer measurement is performed when device is switched into measuring mode and also when a new product is selected while in measuring mode.
Allow manual measuring	**No**	No manual measurement is allowed
	When ready	A manual buffer measurement can only be started when the device is in Ready mode.
	Always	A manual buffer measurement can always be started. Online measuring will be disabled while buffer measurement runs.
Buffer measure time	The time that the device measures on the buffer tank. Ensure that the set time allows the gas to reach the sensor. A higher pressure and longer hose requires for a longer measuring time.	
Hold Alarms	**Yes**	If a buffer measurement is above or below the set O_2%/CO_2% limits, the alarm relay is activated and remains activated until a new measurement has been performed where the result is within the limits.
	No	The alarm relay is activated for 4 secs.
Hold Warnings	**Yes**	If a buffer measurement is above or below the set O_2%/CO_2% limits, the warning relay is activated and remains activated until a new measurement has been performed where the result is within the limits.
	No	The warning relay is activated for 4 secs.
Buffer measure delay	(Parameter only appears when "External mixer connected" is set to "Yes" in the "external mixer settings" menu.) Enter number of seconds to delay measuring after start of the buffer pressure measurement. The delay should ensure that the mixer has sufficient time to fill the buffer tank before measurement starts.	

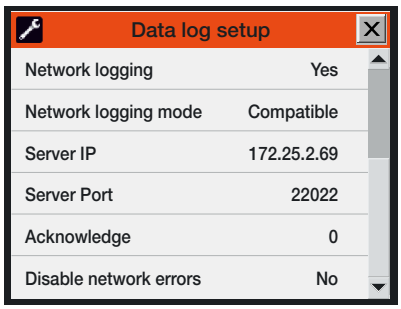
Data log setup

Selecting **Data log setup** from the **General setup** menu will display a screen showing the parameters for the data logging function.

(Network logging = No)



(Network logging = Yes)



Log interval — Set the number of cycles for which the device should log data. If set to 1, data is logged for all cycles.

Log all alarms
- **No** — Alarms occurring in the period between logs as set in "Log interval" are not logged.
- **Yes** — All alarms are logged.

Logging enabled
- **No** — No logging of data
- **Yes** — Logging of data enabled

Logging mode
- **Last values** — Ring buffer of specified number of log entries. Normally this is best setting for On-Line equipment due to the continuous operation.
- **Until memory full** — Logs data until memory is full, then stops logging until data has been exported and/or deleted.

Log last values — Set number of log entries in the data log ring buffer (Only appears when “Logging mode” is set to “Last values”)

Network logging — Select whether or not network logging is required.
- **No** — No network logging
- **Yes** — Network logging enabled

(Below parameters only appears when “Network Logging” is set to “Yes”).

Network logging mode — Select required data logging output format:
- **Compatible** (Default) Data format as used on devices with firmware versions < 4.2.0. See table on *page 65*.
- **Advanced** New data format with more information and many new values. See table on *page 66*.

Server IP — Set up an IP-address to be used for collecting log data for each measurement via LAN. This requires for setting up of a Server Port number as well.

Server Port	See above.
Acknowledge	Acknowledge byte can be used if a “handshake” is required for each measurement between device and server, each to be set up to same value.
Disable network errors	Select whether or not network errors should be disabled. Allows for continued operation while LAN is not connected.

"Compatible" network logging data format

Parameter	Type	Value
Log version	Int	1
Device serial number	Text	
Device software version	Text	
Cycle counter	Int	
Product name	Text	
Product number	Int	
Product barcode	Text	
Timestamp	Time	<yyyy-MM-dd HH:mm:ss>
O2 measurement	Float	
O2 alarm state	Text	"", "High", "Low"
O2 warning state	Text	"", "High", "Low"
CO2 measurement	Float	
CO2 alarm state	Text	"", "High", "Low"
CO2 warning state	Text	"", "High", "Low"
Ambient pressure	Float	
Buffer pressure	Float	
Mixer mode	Text	"Off", "On"
O2 mixer	Float	
CO2 mixer	Float	
N2 mixer	Float	
AUX mixer	Float	
Mixer pressure out	Float	
Device temperature	Float	

Each parameter separated by ';'.
A new line is inserted for each measurement.

"Advanced" network logging data format

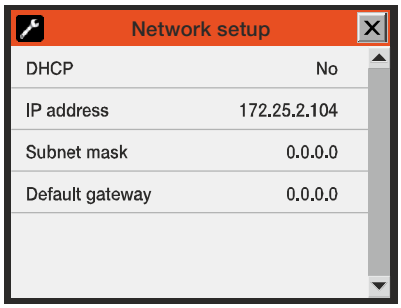
Parameter	Type	Value	Unavailable/ Error value
Log version	Int	3	3
Device serial number	Text		
Device software version	Text		
Date	Time	<yyyy-MM-dd>	<yyyy-MM-dd>
Time	Time	<HH:mm:ss>	<HH:mm:ss>
Product name	Text		"-"
Product number	Int		0
Product barcode	Text		"-"
O2 measurement	Float		0.00
O2 alarm state	Text	"Inactive", "High", "Low	""-"
O2 warning state	Text	"Inactive", "High", "Low	""-"
O2 alarm limit low	Float		0.00
O2 alarm limit high	Float		0.00
O2 warning limit low	Float		0.00
O2 warning limit high	Float		0.00
CO2 measurement	Float		0.00
CO2 alarm state	Text	"Inactive", "High", "Low	""-"
CO2 warning state	Text	"Inactive", "High", "Low	""-"
CO2 alarm limit low	Float		0.00
CO2 alarm limit high	Float		0.00
CO2 warning limit low	Float		0.00
CO2 warning limit high	Float		0.00
BAL measurement	Float		0.0
Cycle counter	Int		0
Buffer O2	Float		0.00
Buffer O2 alarm state	Text	"Inactive", "High", "Low	""-"
Buffer O2 warning state	Text	"Inactive", "High", "Low	""-"
Buffer O2 alarm limit low	Float		0.00
Buffer O2 alarm limit high	Float		0.00
Buffer O2 warning limit low	Float		0.00
Buffer O2 warning limit high	Float		0.00

Parameter	Type	Value	Unavailable/ Error value
Buffer CO2	Float		0.00
Buffer CO2 alarm state	Text	"Inactive", "High", "Low	""-"
Buffer CO2 warning state	Text	"Inactive", "High", "Low	""-"
Buffer CO2 alarm limit low	Float		0.00
Buffer CO2 alarm limit high	Float		0.00
Buffer CO2 warning limit low	Float		0.00
Buffer CO2 warning limit high	Float		0.00
Buffer pressure	Float		0.00
Buffer pressure alarm state	Text	"Inactive", "High", "Low	""-"
Buffer pressure warning state	Text	"Inactive", "High", "Low	""-"
Buffer pressure alarm limit low	Float		0.00
Buffer pressure alarm limit high	Float		0.00
Buffer pressure warning limit low	Float		0.00
Buffer pressure warning limit high	Float		0.00
Mixer mode	Text	"Off", "On	""-"
O2 mixer	Float		0.0
CO2 mixer	Float		0.0
N2 mixer	Float		0.0
AUX mixer	Float		0.0
Mixer pressure out	Float		0.0
Ambient pressure measurement	Float		0.0
Device temperature	Float		0.0
Error state	Int	0	<error code>

Each parameter separated by ';'.
A new line is inserted for each measurement.

Network setup

Selecting **Network setup** from the **General setup** menu will display a screen showing the parameters for the Ethernet/LAN connection.



DHCP

Yes Using DHCP network address automatically received from a DHCP server on the network (default setting).

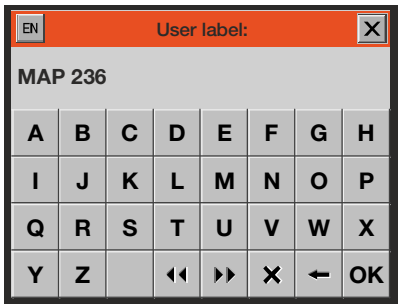
No User must set network address information manually

- **IP address**
- **Subnet mask**
- **Default gateway**

NOTE! Always consult your network administrator before making network settings, as incorrect settings can result in reduced or no network activity.

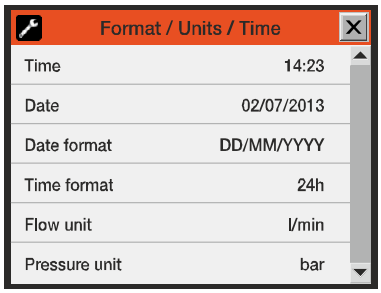
User label:

Selecting the **User label:** from the **General setup** will open a touch screen keyboard, where user can enter a free configurable text that will be combined with data logging information. Examples of use could be manufacturing line identification or other similar data.



Formats/Units/Time

Selecting **Format/Units/Time** from the **General setup** menu will display a screen showing the various setup parameters for output formats and units.

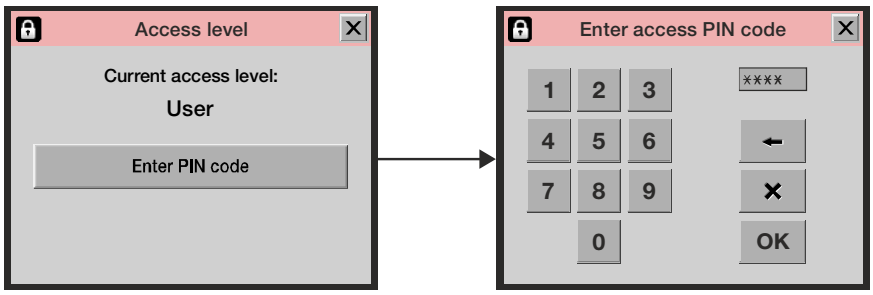


Time	Setting of current time (hh:mm)
Date	Setting of current date (using “Date format”)
Date format	Setting of date format (DD/MM/YY or MM/DD/YY) "Time", "Date" and "Date format" are related to the real time clock setting in the device. The settings will have effect in all displays showing time and date.
Time format	Setting of time format (12h or 24h)
Flow unit	Setting of gas flow read-out unit (l/min or SCFH)
Pressure unit	Setting of gas pressure read-out unit (bar or psi)
Temperature unit	Setting of temperature read-out unit (°C or °F)
Decimal separator	Selects whether decimal values are entered using “.” or “,” as decimal point.
Keyboard layout	Select the available country specific keys for a connected keyboard.

Access level

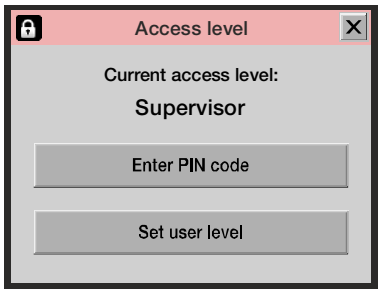
When device is switched on (after power off) it is locked in **User** access level. In **User** access level you have only access to a limited number of functions and is not allowed to perform parameter setup.

To obtain full access (except "Calibration" which is for Service Technicians only) you will have to change the device to **Supervisor** access level.
To do so select **Access level** from the **Main menu** menu to display the **Access level** screen.



Press **Enter PIN code** key to open a touch screen keyboard and enter the PIN code for **Supervisor** access level. From the factory the PIN code is set to **"0000"**.
After pressing **OK** you will be returned to the **Main menu** now displaying the additional menus for the **Supervisor** access level.

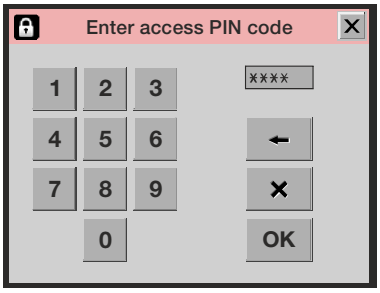
For best safety and correct operation of device, you can easily return the device to **User** level access to restrict access to extended menu items. To do so either press the **Set user level** key in the **Access level** screen (will only be available in **Supervisor** or **Service** access levels) or power the device off and on.



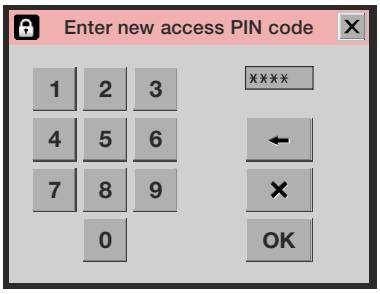
Change Supervisor PIN code

The **Supervisor** PIN code can be changed to one of your own selection:

- Select **General setup** from the **Main menu** then scroll to the bottom and select the **Supervisor PIN code setup item**. This brings up a touch screen keyboard.

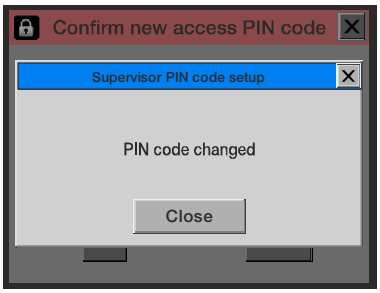


- Enter current PIN code and press **OK**.



- Enter new PIN code and press **OK**.

- Confirm new PIN code and press **OK**.



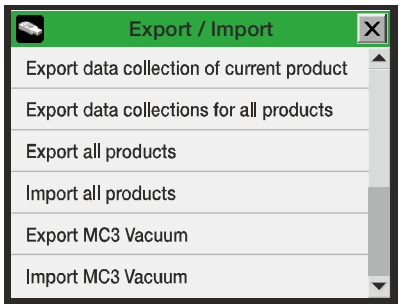
- Press **Close** in the appearing confirmation pop-up screen.
- PIN code has successfully been changed.

NOTE! Make sure to note the new supervisor code in a safe location. If you loose this information please contact your local Dansensor service department for assistance in restoring code.

Export/Import

Selecting **Export/Import** from the **Main menu** will display a screen listing the various functions for exporting and importing of data.

The export and import functions requires for a USB memory key to be connected to either of the USB connectors (labelled ⇠⇢) at the front or back of the device - see *"Connections" on page 19* for details.



Export data collection of current product	Exports data logs (as text file) stored for the currently selected product.
Export all data collections	Exports all data logs (as text files) stored on the device.
Export all products	Exports the product database (binary file) stored on the device.
Import all products	Imports the product database (binary file) from USB stick onto the device.
Export MC3 Vacuum	Exports device settings to a binary file. Is normally used as backup to be able to clone device settings to a new device.
Import MC3 Vacuum	Imports device settings (binary file) from USB stick onto the device.
Export errors	Exports the error log (as text file) onto the USB stick
Export events	Exports the event log (as text file) onto the USB stick

NOTE! It is only possible to have one export file on a USB key. If a file is already on the USB key it will be overwritten.

Language

Selecting **Language** from the **Main menu** will display a screen listing the available languages.

When selecting a language all text throughout the menus will be displayed in this language.

6. PuTTY Terminal Server

The **PuTTY Terminal Server** program enables you to change the device's configuration parameters.
Even though the program can be used with any **Dansensor® MAP Check 3 Vacuum** model, it especially applies to the "Black Box" models, as this is the only way to connect to these devices.

The program file is on the Software CD that comes with the devices, and before using it you should install it from here to the computer from where you wish to connect to the device. To do so insert the CD in your computer, wait for the application to start and then follow the directions.

Preparations

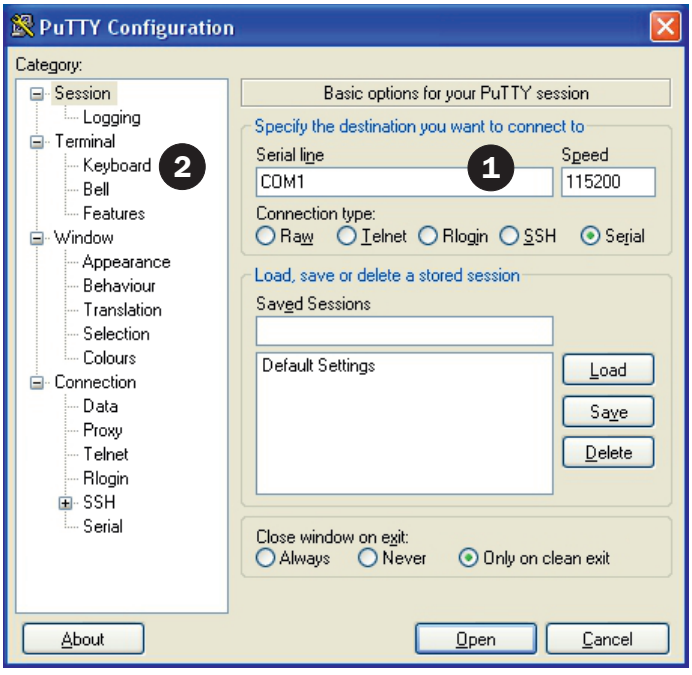
Before starting the program your device must be switched on and connected to your computer by connecting an RS232 (D-SUB 9) "Null modem" cable between a free COM-port on your computer and the "COM 2" connector on the device (see *"Electrical connections" on page 23* for details).

Configuration and Use

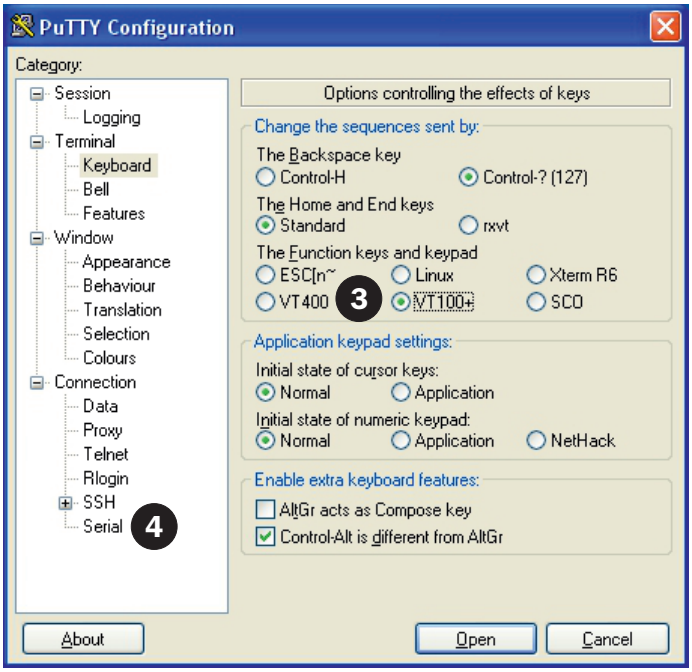
Initial configuration

To start the program simply double-click the **PuTTY** shortcut icon on your desktop.

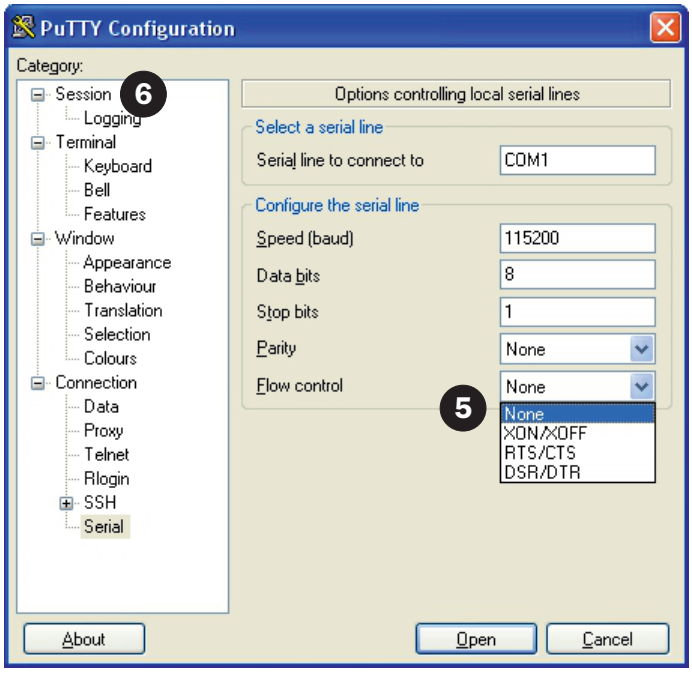
The application starts showing the configuration window.



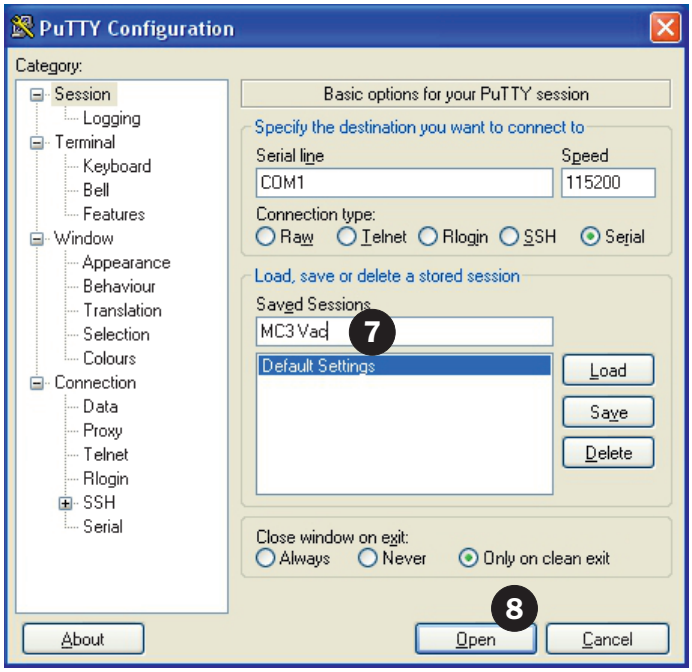
1. Select **Serial** connection type and specify the number of your computer's COM-port to which the device is connected. In the **Speed** field type **115200**.
2. Select the **Keyboard** entry in the **Category** list.



3. Select **VT100+** item.
4. Select **Serial** entry from the **Category** list.



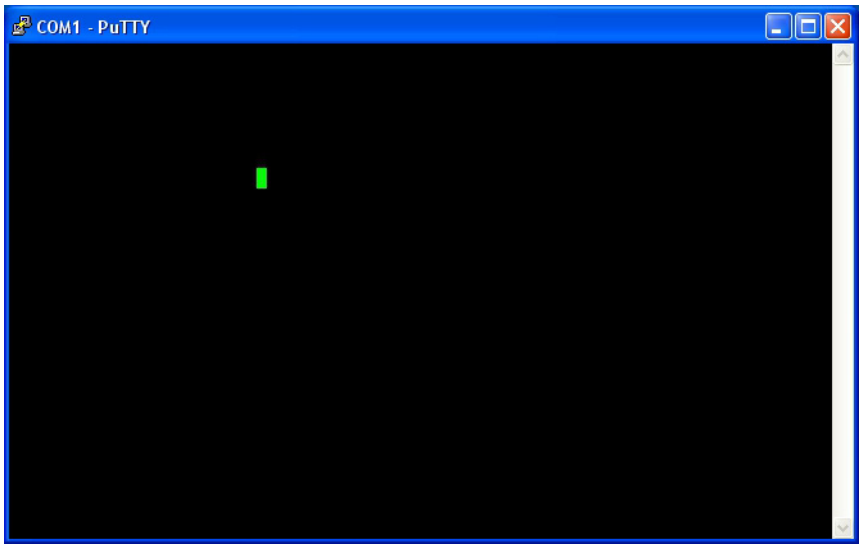
5. In the **Flow control** drop down list select **None**.
6. Select the **Session** entry from the **Category** list.



7. To save the current setting we recommend that you give the session a name ex. **MC 3 Vac** and click **Save**.
   The next time you start the program you can easily retrieve the settings by loading the saved session.
8. Click **Open**.

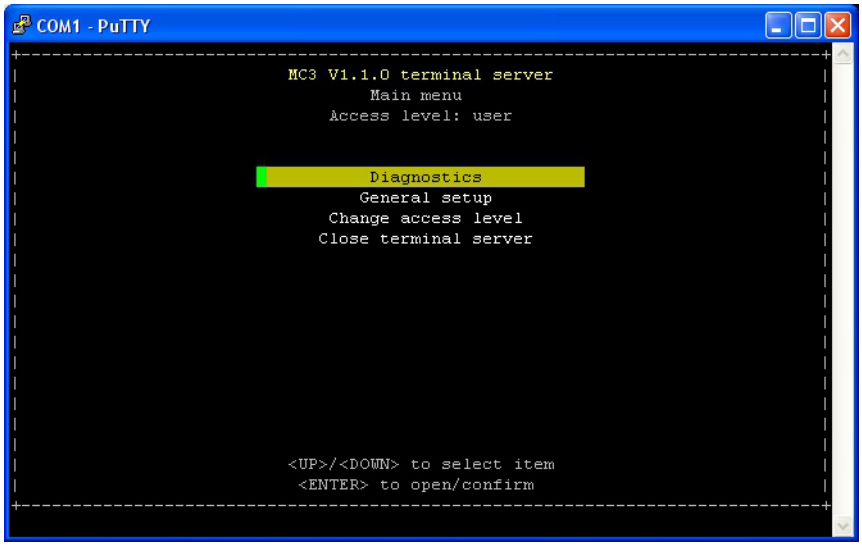
Using PuTTY

- When the program starts...



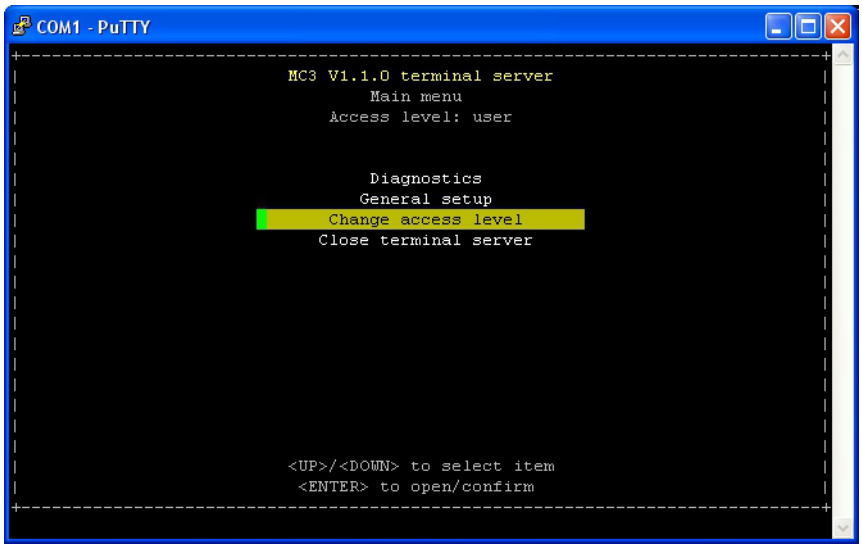
...press **F1** several times to establish a connection to the device by changing it's COM2-port protocol to **Terminal Server**.

- When connection has been established the window will change to show the **Main menu**.



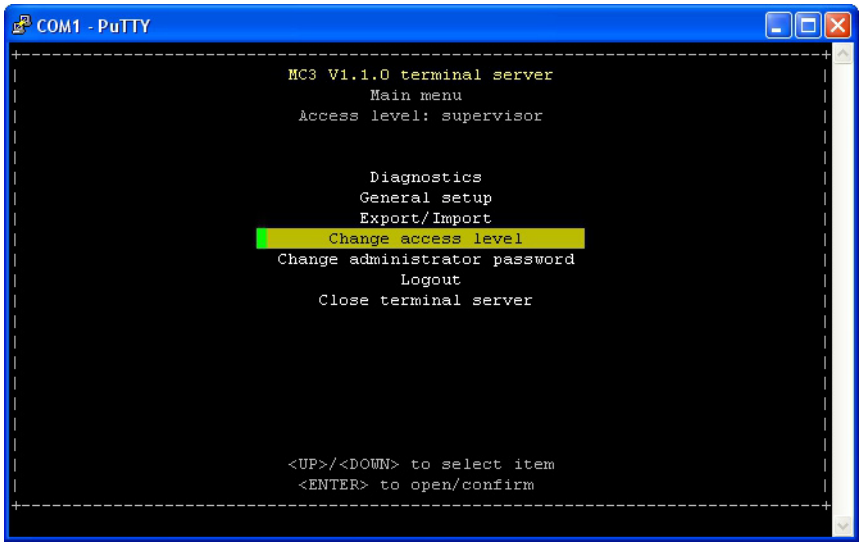
- Generally you use the **arrow** keys to navigate through the various menus and the **Enter** key to enter submenus, change settings and/or confirm a selection.
  When entering figures, either for access codes or numerical values, make sure to use the number keys above the letter keys on the keyboard.
- The program starts up in **user** access level, where you are only allowed to scroll through and check the various settings.
  To be able to change settings you must change access level to **supervisor**.

To do so select **Change access level** item...



... and press **Enter**.

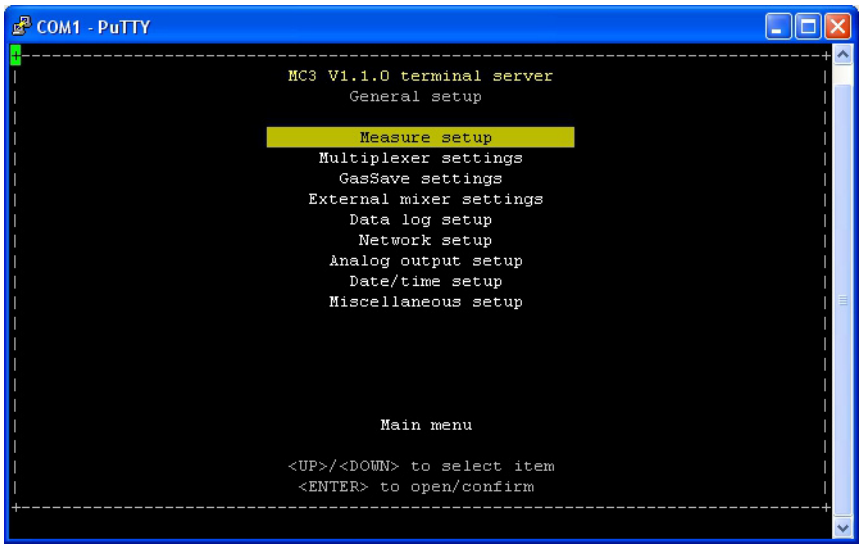
- From the factory the access code has been set to "**0000**". Type in code and press **Enter**.



- Now access level has been changed to **supervisor.**
- The access code can be changed to one of your own selection using the **Change administrator password** function.
  To return the device to **user** level access select **Logout**.
- The **Diagnostics** function shows current temperatures, flows, pressures, and counter statuses etc.

Press **Enter** to scroll through the various diagnostics items.

- In the **General setup** section you have access to the various settings in the device.



For information about the various settings and their influence please see *"General setup" on page 60*.

- To disable the connection to the device select **Close terminal server** from the **Main menu** and then press **Enter** to confirm.
  This will end the session and return the device's COM2-port setting to **PBI** protocol.
  The program window will change to show

To reestablish the connection to the device press **F1** several times.

- To close the program press the **X** button in the window's upper right corner.

7. Technical Information

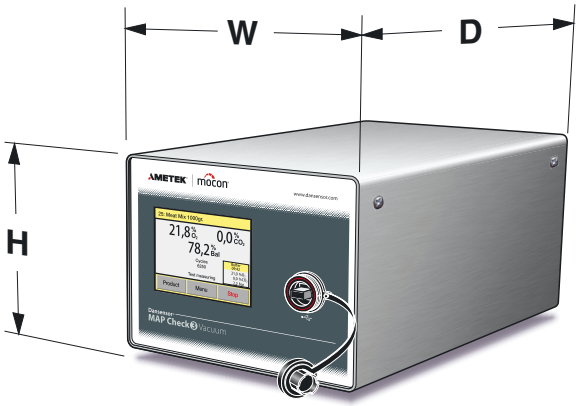
Technical specifications

Electrical connections

Mains	100-264 VAC, 47-63 Hz
DC models	24V DC available, range 19-36V DC input
Power consumption	25 - 50 W (depending on model)

Mechanical data

Analyser size	192 x 230 x 375 mm (H x W x D)



Analyser weight	8.5 - 9.5 kg (depending on model)
Box of one analyser	379 x 357 x 523 mm (H x W x D)
Boxed weight	10.5 to 11.5 kg (depending on model)
IP classification	IP 21 (an IP 45 kit is available as an option)

Connectivity

Network/LAN	Ethernet 10/100 mbit/s Base-T with DHCP client or fixed IP
RS232	2 x D-SUB 9 DTE interface (male connector)
USB	1 or 2 x Host, USB 2.0 Connector type A, max. current 250mA
Machine I/O	D-SUB 25 male, cable supplied

Gas connection

Measurement gas inlet	Hose Ø5/3 mm, sample hose l=3m
Vacuum connection	Hose Ø8/6 mm
Buffer gas inlet	Push-in, OD=3 mm
Calibration gas inlet	M5 female (normally plugged)
Air inlet/Cal. gas overflow	M5 female (normally fitted with filter)

Basic specifications

Warm-up time	Operational after 10 min. (60 minutes to full specifications)	
Measuring ranges	0-100% O_2 and optionally 0-100% CO_2	
Ambient temperature	Operational: Storage:	0 to +45 °C, less than 95% RH, non-condensing -10°C to +60°C, less than 95% RH, non-condensing
Ambient pressure	Operational:900 hPa to 1050 hPa	
Measurement gas	Inert gasses (O_2, CO_2, N_2, Ar, Air), less than 95% RH	
Measurement pressure	Measure input: Buffer versions - gas inlet:	0-1050 mbar [1] 1.5-10 bar
Vacuum	< 100 mbar abs. @ flow of 5 l/min.	

[1] Vacuum >= 400 mbar

O_2 sensor

Sensor type	Zirconia	
Measure gas temperature	+0 to +35 °C	
Measure flow	Measure input: Sensor flow: Buffer measurement:	Typically 5 l/min. ± 0.5 l/min. 75 ml/min. ± 5 ml/min. 75 ml/min. ± 5 ml/min.

CO_2 sensor

Sensor type	Infrared, NDIR, temperature controlled to +60 °C	
Measure gas temperature	+0 to +35 °C	
Measure flow [2]	Measure input: Sensor flow: Buffer measurement:	Typically 5 l/min. ± 0.5 l/min. 75 ml/min. ± 5 ml/min. 75 ml/min. ± 5 ml/min.

[2] At ambient pressure of 1013 mbar and vacuum < 100 mbar abs

Accuracy specification (excl. calibration)

Zirconia sensor resolution	0.1% absolute in range above 10% 0.01% absolute in range above 1% 0.001% absolute in range below 1%
Zirconia sensor accuracy	<0.01% absolute in range below 0.01% [3] ±0.001% absolute in range below 0.1% ±1% relative in range above 0.1%
CO_2 sensor resolution	0.1% absolute
CO_2 sensor accuracy	±0.5% absolute ± 1.5% of reading **NOTE! High concentrations of Argon influences accuracy of CO_2 readings. The CO_2 value will appear to be slightly lower than actual value (app. -2-4%).**

[3] Not calibrated below 1000 ppm

NOTE! Accuracy specifications are valid at the "Specification conditions" (see *page 86*).

Standard calibration specification

Calibration gasses (Zr O_2)	1000 ppm, 1%, 80% (balance N_2) 20.9% (Compressed dried atmosphere air)
Calibration gasses (CO_2)	0%, 25%, 60%, 100% (balance N_2)
Calibration gas accuracy	< 3%
System diffusion	< 25 ppm
Sensor gas flow	75 ml/min. ± 5 ml/min. (at 20.9% O_2 / Bal. N_2)
Ambient temperature	25 °C ± 5 °C
Ambient relative humidity	35 - 65% RH
Ambient pressure	1013 hPa ± 50 hPa
Total calibration accuracy (RMS)	± (25 ppm + 4% of reading) in the range 1000ppm - 100%

Specification conditions

Ambient temperature	+25 °C
Ambient pressure	1013 hPa
Measurement gas temperature	+23 °C
Ambient relative humidity	40% RH
Measurement gas relative humidity	<10% RH
Sensor gas flow	75 ml/min
Vacuum	<25 mbar abs

NOTE! All gas concentrations are specified in volume percent.

Conformity

- CE
- RoHS
- China RoHS Phase 1 compliance
- Food regulation 1935/2004

Spare parts, consumables and accessories

Ordering items

When ordering any of the below listed items please state carefully the item number, the item specification and the number of items wanted and send the order to your spare parts dealer.

Spare parts

- Cable, mains AC, ser. cpl. ..... P/N 301096
- Cable, mains DC, ser. cpl. ..... P/N 301097
- Cable, I/O (5m), ser. cpl.. ..... P/N 301098

Consumables

- Kit, multiplum filter, fan (10 pcs.) ser. cpl. ..... P/N 301093
- Filter, 5µm (2 pcs.) ser. cpl. [1] ..... P/N 310629
- Sampling kit, on-line, pressure, quick connector, ser. cpl. ..... P/N 310630
- Filter, sample gas, 0.2µ (2 pcs.), ser. cpl.. ..... P/N 320722
- Sampling kit, on-line, vacuum, ser. cpl. ..... P/N 320723
- Silencer, M5, sinter bronce (2 pcs.), ser. cpl. ..... P/N 320749
- Filter, dust 40x40mm (30 pcs.) ser. cpl ..... P/N 330663

[1] For "BUFFER GAS INLET" inlet on "Buffer" versions

Accessories

- Kit, IP45 tightening. ..... P/N 300813
- Cable, RS232C for PC connection (0.7m) ser. cpl.. ..... P/N 310351
- Option, assembly brackets MC3/MMP ..... P/N 310631

Toxic and Hazardous Substances or Elements

(For China RoHS compliance)

See table on the next page.

MAP Check 3 Vacuum

Toxic or Hazardous Substances or Elements
有毒有害物质或元素

Component Name（组分名称）	Lead 铅 (Pb)	Mercury 汞 (Hg)	Cadmium 镉 (Cd)	Hexavalent Chromium 六价铬离子 (Cr6+)	Polybrominated Biphenyls 多溴化联苯 (PBB)	Polybrominated Diphenyls Ethers 多溴化二苯醚 (PBDE)
Metal enclosure（**金属外壳**）	0	0	0	0	0	0
Sensor O_2 Zirconia（**氧化锆探头**）	0	0	0	0	0	0
Sensor CO_2 Infrared（红外线二氧化碳探头）	0	0	0	0	0	0
Display panel (LCD)（**LCD显示板**）	0	0	0	0	0	0
Power supply (PSU)（**供电**）	0	0	0	0	0	0
Printed circuit board assembly (Main PCB)（**印刷集成**电路板）	0	0	0	0	0	0
Heater Unit（**加热单元**）	0	0	0	0	0	0
Pump（**抽气泵**）	0	0	0	0	0	0
Fan unit（风扇）	0	0	0	0	0	0
Internal valve blocks（**内部阀块**）	0	0	0	0	0	0
Mounting hardware (screws, studs)（**螺丝**等配件）	0	0	0	0	0	0
Internal cables（**机内**电缆）	0	0	0	0	0	0
Sample hose kit（**采**样气管）	0	0	0	0	0	0

O: Indicates that the toxic substance contained in all the homogenous materials for this component is below the limit requirements in SJ/T11363-2006
代表在所有以同质材料做组分的有毒物质含量低于 **SJ/T11363-2006** 标准所要求的含量。

X: Indicates that the toxic substance contained in at least one of the homogenous materials for this component exceeds the limit requirments in SJ/T11363-2006
代表以至少一种同质材料做组分的有毒物质含量超过 **SJ/T11363-2006** 标准所要求的含量。

P/N 320598-G
11/2019

AMETEK | mocon

This blank page has been inserted to enable double sided printing of the document!

MOCON Europe A/S
Rønnedevej 18
4100 Ringsted, Denmark
Tel +45 57 66 00 88
info.dk.mocon@ametek.com
www.dansensor.com