



# Dansensor® MAP Check 3

## User Guide EN

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**Dansensor®**  
**MAP Check 3**  
**User Guide**  
EN

Published by:

  
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# 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** 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! When using the AUX-signal we recommend to set the minimum flow as low as possible.**

## 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.



## 2. Introduction

### Dansensor® MAP Check 3

**Dansensor® MAP Check 3** is an online gas analyzer for usage mainly in the MAP industry for food packaging applications. Basically the device measures the O<sub>2</sub> and/or CO<sub>2</sub> contents in a gas-line and based on these measurements it can notify operators if gas contents are close to the set limits or even stop processes if limits are exceeded.

#### “Pump” or “Pressure” version

The **Dansensor® MAP Check 3** is available in either a “Pump” version or a “Pressure” version. The “Pump” version has a built-in pump which sucks the sample gas from the gas-line. The “Pressure” version has been developed mainly to measure the gas concentrations in a buffer tank or on a gas mixer outlet and so the sample gas is led through the device simply by the pressure in the gas-line.

See *“Flow System” on page 13* for further details about the “Pump” and “Pressure” versions.

Each of the **Dansensor® MAP Check 3** versions can be configured in various combinations to suit different needs.

#### “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.

Please note that the “Pressure” version is only available as “Stand-Alone”.

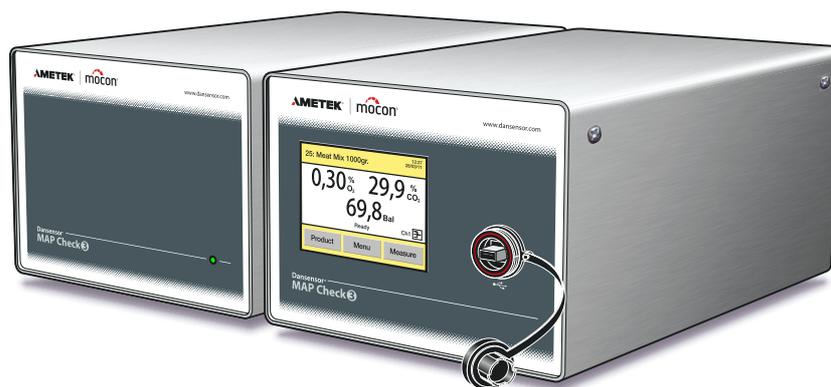


Fig. 1. Dansensor® MAP Check 3 “Black-Box” and “Stand-Alone” devices

### Sensors

The devices can be fitted with either an O<sub>2</sub> sensor, a CO<sub>2</sub> sensor or both. Please note that "Pump" versions with a CO<sub>2</sub> sensor only is not available as "Black-Box".

### Measuring channels

Standard devices has only 1 measuring channel. "Pump" versions can optionally be fitted with a "Multiplexer" (MUX) which enables up to three measuring inputs.

### GasSave

("Pump" versions only)

All variants can be supplied with a "GasSave" system which is a purging system that can control the gas consumption by monitoring and regulating the gas levels - see "[GasSave](#)" on [page 16](#) for further details.

### "Flush-Back"

("Pump" versions only)

The "**Flush-back**" functionality is standard on all "Pump" version devices. The "Flush-Back" function ensures measuring accuracy by continuously monitoring the sample system and periodically performing automatic cleaning of measuring gas hoses.

### Mixer control

In combination with the **Dansensor® MAP Mix Provectus** gas mixer the device can replace the older purging system TGC-2 and offer similar functionality by letting **Dansensor® MAP Check 3** control the mixer.

## Flow System

### “Pump” version

The figures below show the internal flow system of the “Pump” version.

Fig. 2 shows a standard device with one measure channel and a flush-back connection, Fig. 3 shows a device equipped with the 3 channel multiplexer (MUX) unit for 3 measure channels.

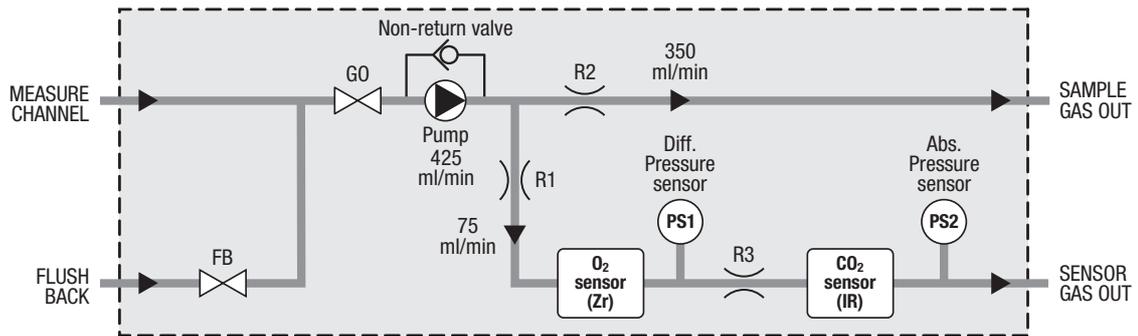


Fig. 2.

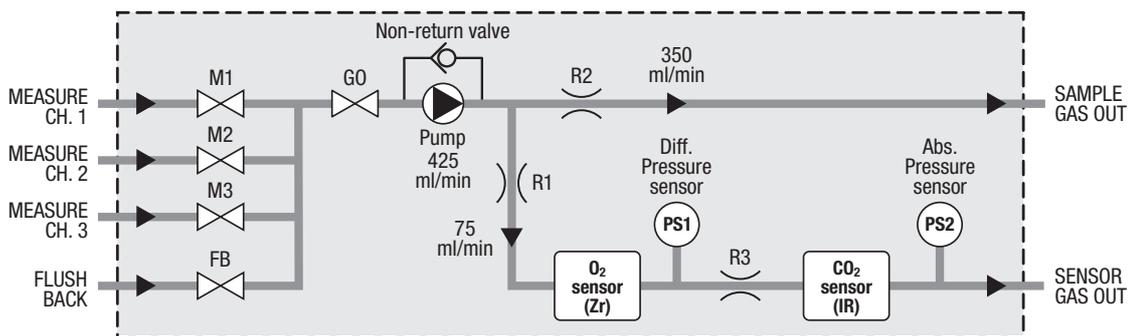


Fig. 3.

For normal on-line measuring the internal pump sucks the measuring gas from the probe to an overflow. The total flow through the unit is approximately 425 ml/min. The restriction ensures that approx.

75 ml/min. passes through the CO<sub>2</sub> and O<sub>2</sub> sensor system.

The excess flow as well as the measuring flow is discharged on the rear of the device. The pressure sensors PS1 and PS2 are used to detect clogged sample hoses to initiate automatic flush-back cleaning (if enabled) and are also used for pressure compensation of the O<sub>2</sub> and CO<sub>2</sub> sensors.



**“Pressure” version**

Fig. 5 shows the internal flow system of the “Pressure” version. The proportional valve ensures that approx. 75 ml/min. passes through the CO<sub>2</sub> and O<sub>2</sub> sensor system.

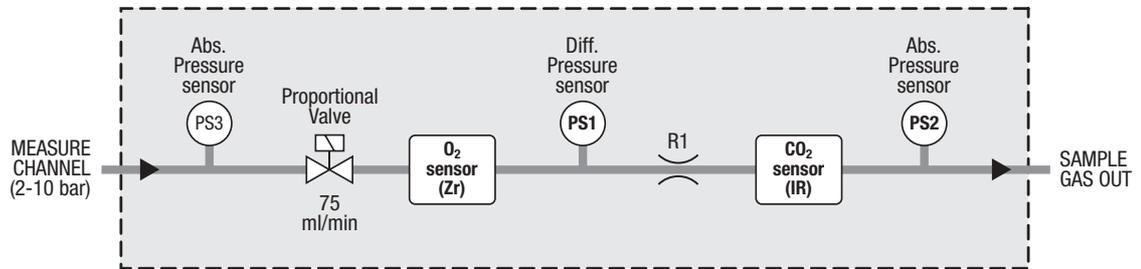


Fig. 5.

## GasSave

(“Pump” versions only)

When **GasSave regulation mode** is set to **GasSave** (see *“Product menu” on page 60* for details) the **GasSave** function now regulates the flow so that the gas concentration is maintained using as little gas as possible.

In the following the GasSave function and the influence of the various GasSave parameters are explained.

<b>GasSave regulation gas</b>	This is the gas that the GasSave regulates on. Only a gas that is displayed in the product can be used for regulation. You can choose from either O <sub>2</sub> or CO <sub>2</sub> assuming that the device have both sensors installed. If the CO <sub>2</sub> measurement is not used for the product then O <sub>2</sub> will automatically be chosen for the gas regulation.
<b>Regulation maximum</b>	Upper and lower gas concentration limits for the <b>GasSave regulation gas</b> .
<b>Regulation minimum</b>	If the device measures a higher concentration than set in the <b>Regulation maximum</b> parameter, it will increase the gas flow to lower the concentration. Observe that this value must be smaller than 100 or the regulation will never start to increase the flow. Opposite if the device measures a lower concentration than set in the <b>Regulation minimum</b> parameter, it will decrease the gas flow to raise the concentration. This value must be larger than 0 or the regulation will never start to decrease the flow. The minimum regulation value must of course be smaller than the maximum regulation.
<b>Minimum flow</b>	Upper and lower limits for the GasSave flow.
<b>Maximum flow</b>	When the packaging machine stops, the flow is slowly regulated down to the minimum flow because no gas is used. The lowest possible setting is 6 l/min. When an AUX-signal is enabled, the flow will quickly get back to “normal” when products start to arrive again.
	 <b>TIP! When using the AUX-signal we recommend to set the minimum flow as low as possible.</b> When AUX-signal is disabled, the minimum flow prevents the flow from being lowered to an unrealistic level, e.g. due to a brief production interruption. Even though it will result in a higher gas consumption, we still recommend that the minimum flow is set a bit higher compared to when AUX-signal is enabled because when products start, the regulation can not keep up and it takes a few seconds before the gas has been flushed down to the correct concentration.

### Maximum flush-in time Flush-in flow

The **Maximum flow** parameter prevents the flow from increasing to maximum (e.g. 500 l/min) due to an error, if the normal consumption rate is much lower.



**TIP!** We recommend that you set it to a value between the max. expected gas consumption and the "Flush-in flow".

Time and flow rate for the Flush-in function.

When the packaging machine starts again after it has been stopped either manually or by the packaging machine logic or after expiration of **Flow hold timeout** (if AUX-signal is enabled) the GasSave does a flush-in to quickly reestablish the correct gas concentration.

The "Maximum flush-in time" should be set to the period of time it takes to flush down to an acceptable gas concentration plus 10 seconds.

Setting the time to 0 will disable the flush-in function.



**TIP!** To achieve a quick start-up, the "Flush-in flow" should be set to the highest possible value that will not damage the packaging or product.

Often it is enough to set the "Flush-in flow" 25% higher than the normal production flow.

### Flow control timeout

Enables use of an AUX-signal when set to a value higher than 0. If the use of AUX-signal is enabled, the device expects to receive both a measuring signal and a pulse signal from the packaging machine for the GasSave to regulate.

The pulses from the packaging machine can be given e.g. for each stroke or every time a new product is fed. The pulses are solely used as "heartbeat" signals to indicate that the packaging machine is running. Every time a pulse is received the "Flow control timeout" period is reset and the gas regulation continues. If the "Flow control timeout" period expires before a pulse is received, the device assumes that packaging machine has stopped and the "Flow hold timeout" (see below) period will start.



**TIP!** The "Flow control timeout" should approximately be set to the time between two pulses multiplied by 2.

When the "Flow hold timeout" period (see below) expires, the regulation is set free again. If no AUX-signal is received, the gas is regulated down to the minimum flow.

If an AUX-signal is received again within the "Flow control timeout" period, the flow is raised to "normal" again.

If an AUX-signal is received after the "Flow control timeout" period has expired, the device starts a "Flush-in flow" to quickly reach the correct gas concentration again.

### Flow hold timeout

When the "Flow control timeout" period expires (because no AUX-pulses are received - see above) the gas flow "freezes" at the current level to avoid that flow decreases too much, if it is only a brief stop. At the same time the "Flow hold timeout" period will start. If a pulse is received during the "Flow hold timeout" period, the "Flow control timeout" will be reset and the normal flow control resumes.

If the "Flow hold timeout" period expires before a pulse is received the regulation is released and the "Minimum flow" setting will be ignored, enabling the lowest possible gas flow to save gas.



**TIP!** The "Flow hold timeout" should approximately be set to the time set in "Flow control timeout" multiplied by 5 to 10.

### Positive/Negative gain

Negative and positive control factor.

These two factors determine how quick the gas flow should be increased and decreased.

When the flow rate changes based on the O<sub>2</sub> or CO<sub>2</sub> value measured, this takes place twice per second.

The following example assumes a low Regulation min./max. and N<sub>2</sub> as GasSave gas:

When the measured O<sub>2</sub> value is higher than "Regulation maximum", the gas flow [l/min] is increased by a value depending on the difference between the measured O<sub>2</sub> value and "Regulation maximum" multiplied by the "Positive gain" factor. If the "Positive gain" factor is set too high, the gas flow will reach "Maximum flow" before the measured O<sub>2</sub> value drops below "Regulation maximum".

When using a correctly set "Positive gain" factor the flow will slowly increase until the measured O<sub>2</sub> value is just below the "Maximum flow".

This also applies to the "Negative gain" factor. If factor is set too high, the gas flow will decrease to "Minimum flow", before the measured O<sub>2</sub> value exceeds "Regulation minimum".



**TIP!** High values mean faster control, but excessive values can cause unstable control.

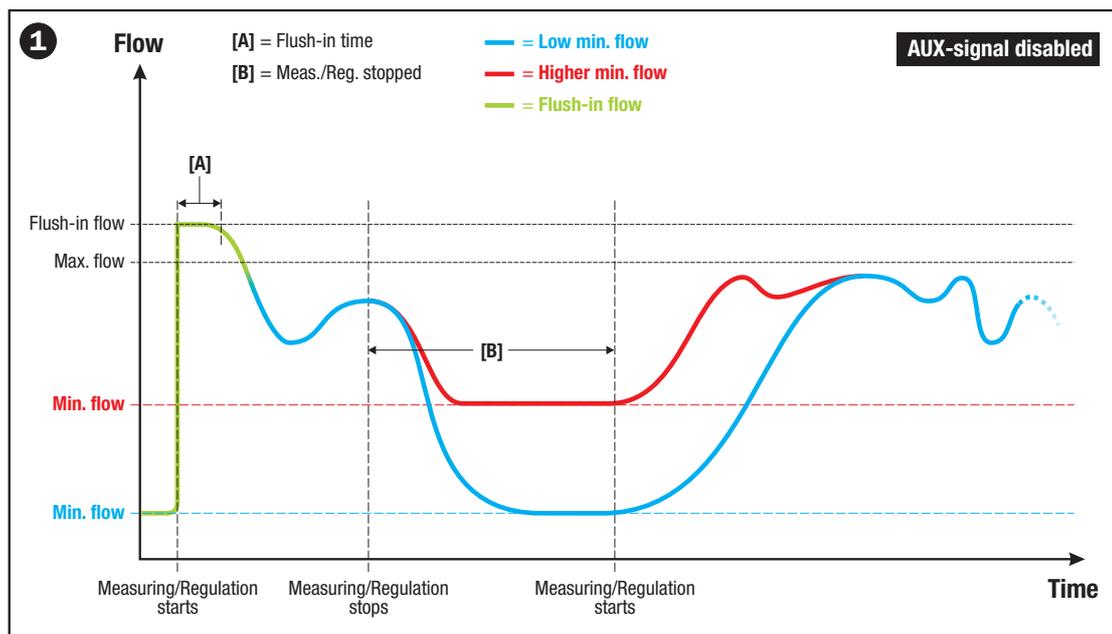
### GasSave diagrams

The diagrams below shows the GasSave functionality with the AUX-signals disabled or enabled respectively.

**Diagram 1 - Gas regulation with AUX-signal disabled**

**Diagrams 2, 3 and 4 - Gas regulation with AUX-signal enabled**

#### Diagram 1



The device controls the gas concentration and flow according to the settings in the **GasSave regulation gas, Regulation maximum, Regulation minimum, Minimum flow, and Maximum flow** parameters.

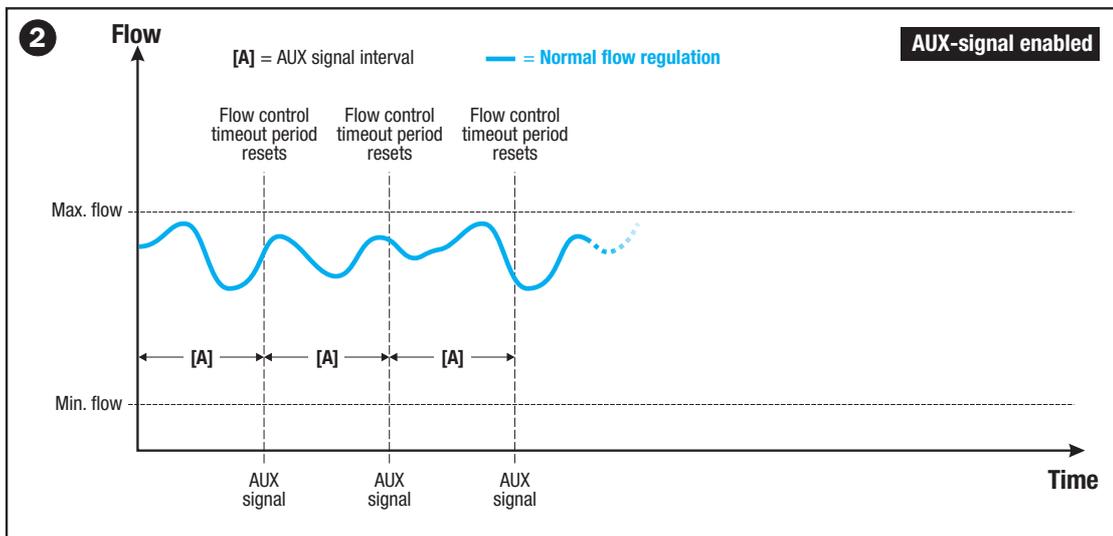
When measuring is stopped, gas flow drops to the set minimum flow which is retained until measuring starts again. The minimum flow prevents the flow from being lowered to an unrealistic level, e.g. due to a brief production interruption.

For devices with AUX-signal and “Flush-in” function disabled we recommend that the minimum flow is set a bit higher, otherwise when measuring starts, the regulation can not keep up and it takes a few seconds before the gas has been flushed down to the correct concentration.

When measuring starts again, the “Flush-in” function (as set in the **Maximum flush-in** and **Flush-in flow** parameters) will ensure that the device reaches the normal operating flow as quick as possible.

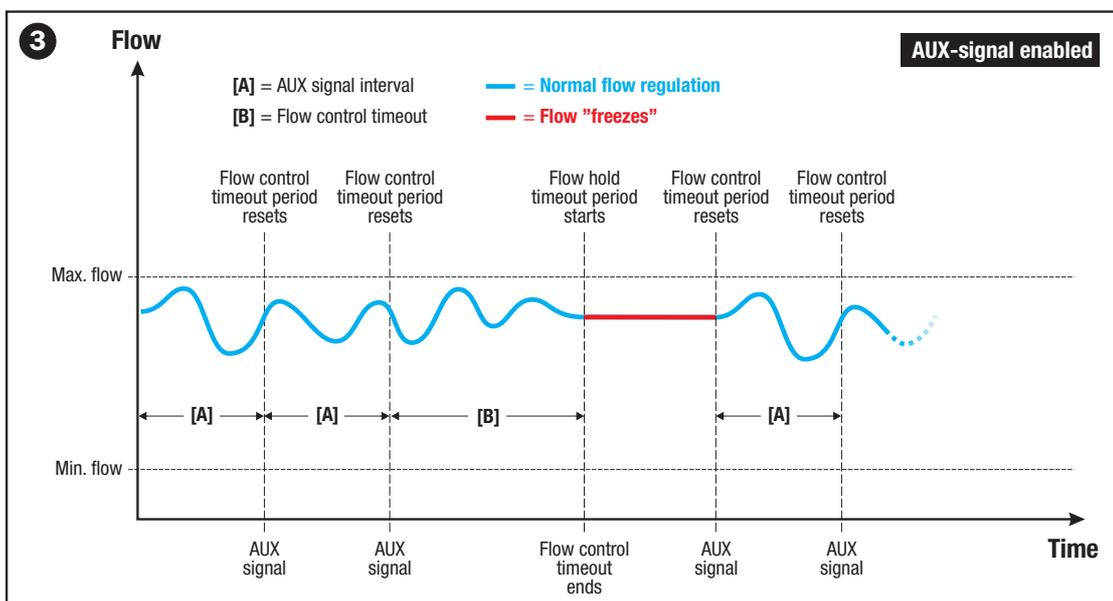
If “Flush-in” is disabled, the Positive/Negative gain factors will control the flow increase/decrease rates.

Diagram 2



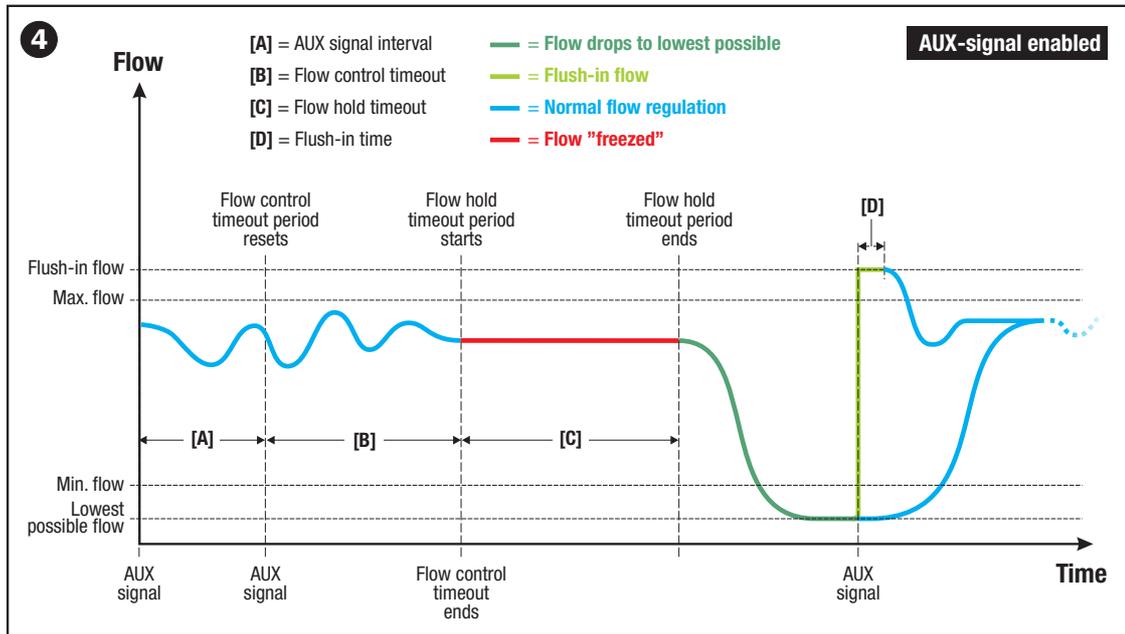
When AUX-signal is enabled, the normal flow regulation continues as long as the device receives pulses from the packaging machine. Each time a pulse is received, the “Flow control timeout” period is reset.

Diagram 3



If the “Flow control timeout” period **[B]** expires without a pulse is received, the device assumes that the packaging machine has stopped and the “Flow hold timeout” period will start. At the same time the flow “freezes” at the current level. If a pulse is received before expiration of the “Flow hold timeout” period, the “Flow control timeout” period is reset and the normal gas regulation resumes.

Diagram 4

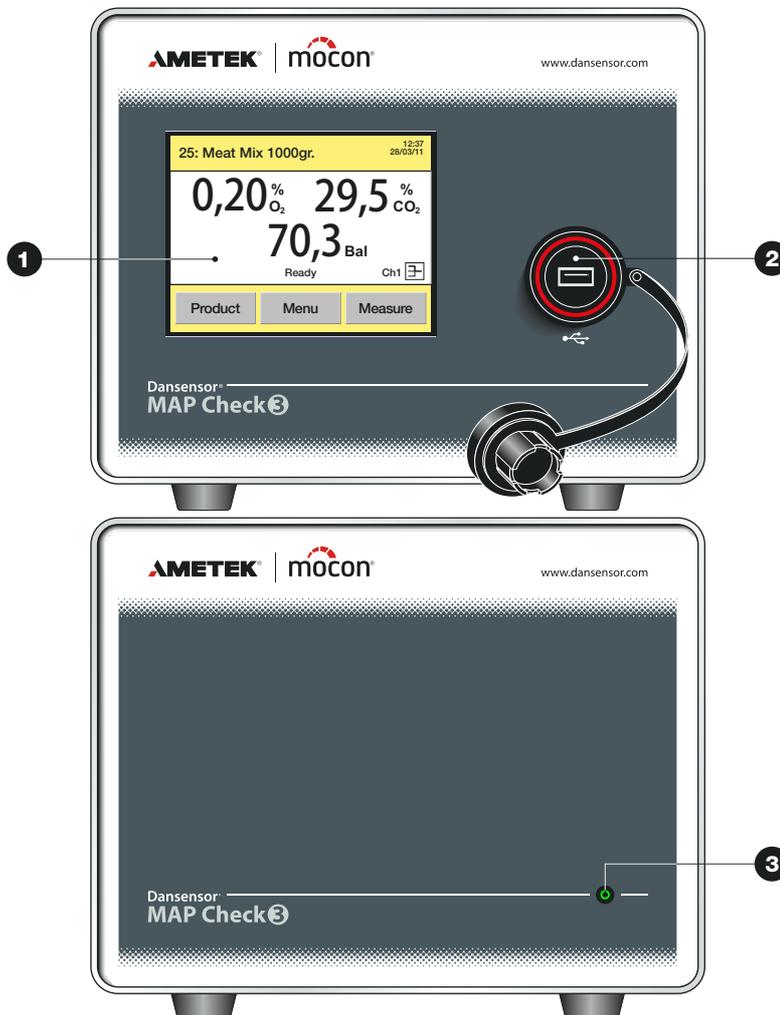


If the "Flow hold timeout" period [C] expires without a pulse is received, the regulation is released and the "Minimum flow" setting will be ignored, enabling the lowest possible gas flow to save gas.

When measuring starts again, the "Flush-in" function (as set in the **Maximum flush-in time** and **Flush-in flow** parameters) will ensure that the device reaches the normal operating flow as quick as possible.

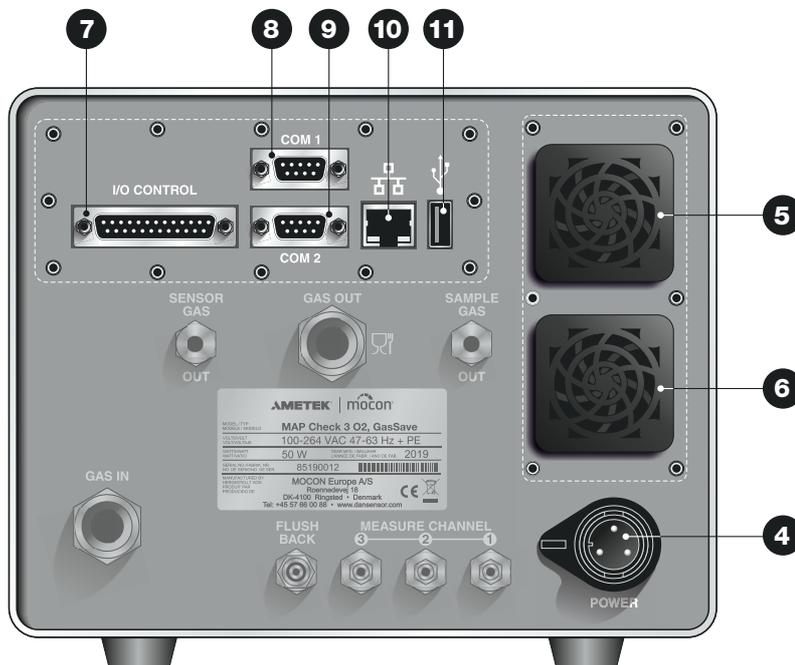
If "Flush-in" is disabled, the Positive/Negative gain factors will control the flow increase/ decrease rates.

## Overview



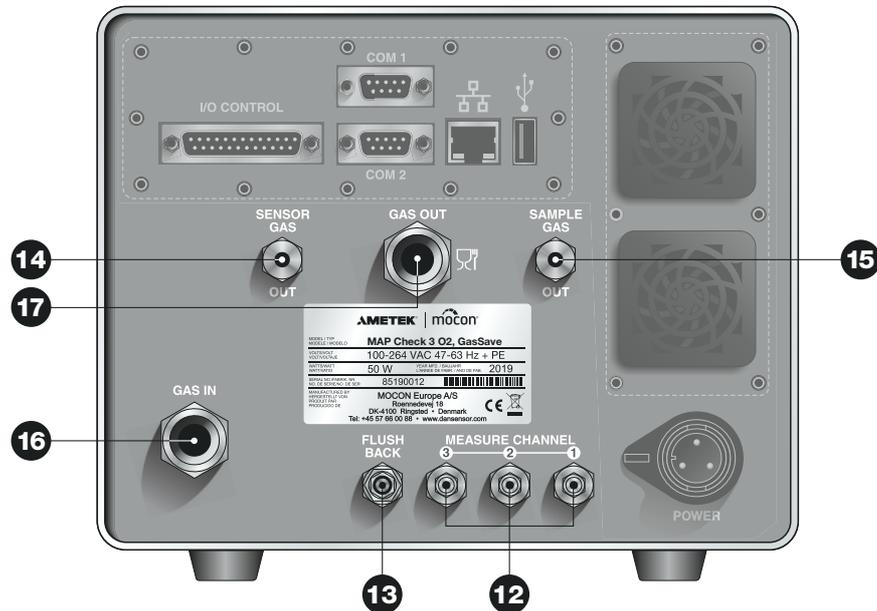
- 1 5" touch panel color display** ("Stand-Alone" versions only)  
For intuitive operation of the device by use of explanatory icons and easy understandable text messages and buttons.
- 2 USB host**   
For connection of a memory stick ("Stand-Alone" versions only)  
The connector is fitted with a water-proof 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** Ready
  - **Green - flashing** Measuring
  - **Red - steady** Heating/Error (Fault)
  - **Red - flashing** Warning



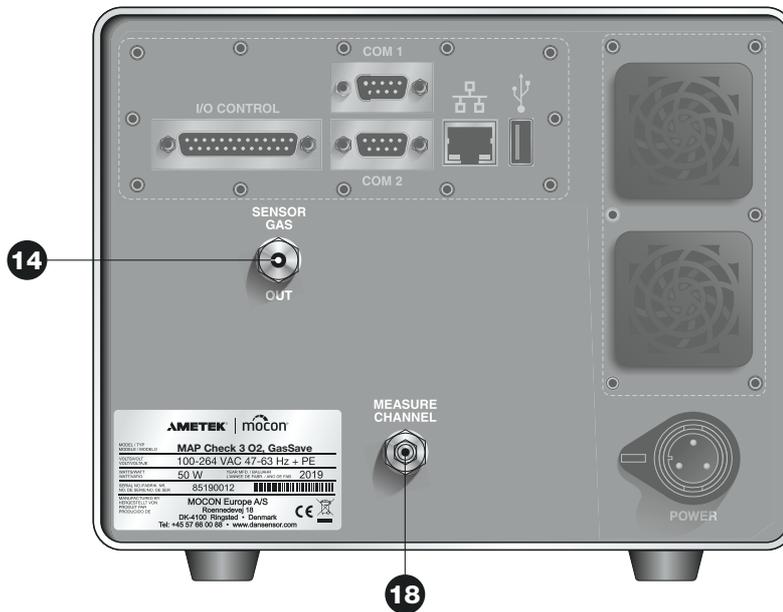
- 4 "POWER"**  
Power supply connector
- 5 Cooling air inlet grille**  
With dust filter and a fan inside the device
- 6 Cooling air outlet grille**  
With dust filter
- 7 "I/O CONTROL"**  
Communication port (D-SUB 25) for packaging machine control signals
- 8 "COM1"**  
RS232 port (D-SUB 9) for connection 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 - "Pump" version



- 12** "MEASURE CHANNEL (1-3)"  
Connectors for sample gas probes (Multiplexer option)  
Standard models have only one measuring gas inlet
- 13** "FLUSH BACK"  
Connector for flush-back gas inlet
- 14** "SENSOR GAS OUT"  
Connector for sensor gas outlet
- 15** "SAMPLE GAS OUT"  
Connector for excess sample gas outlet
- 16** "GAS IN"  
Gas inlet connector for "GasSave" system (option)
- 17** "GAS OUT"  
Gas outlet connector for "GasSave" system (option)

## Gas connections - "Pressure" version



- 14 "SENSOR GAS OUT"  
Connector for sensor gas outlet
- 18 "MEASURE CHANNEL"  
Connector for sample gas hose (2-10 bar)



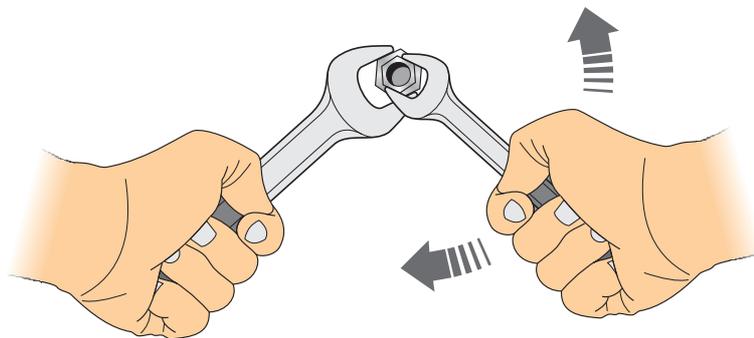
### 3. Connections

#### Gas Connections

##### Correct mounting/dismounting of fittings



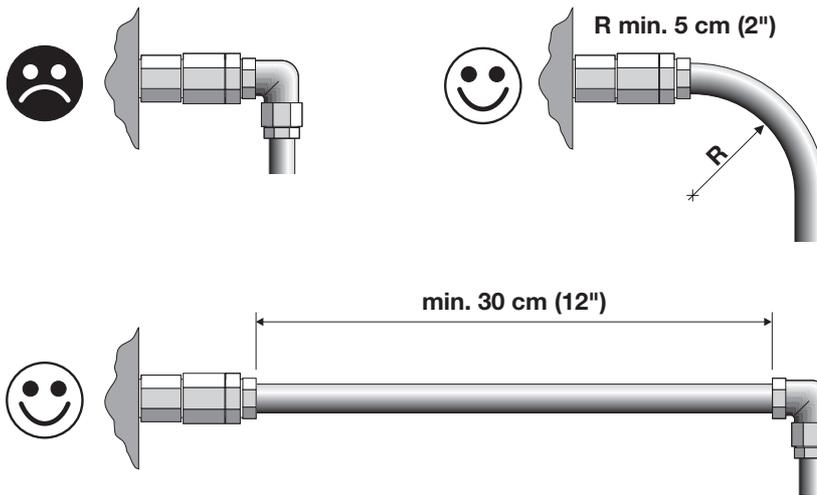
**CAUTION!** When mounting/dismounting fittings in order to change filters or connect gasses, it is very important that you hold against on the already mounted fittings to avoid damaging the existing assemblies.



##### Correct tubing for gas inlets



**NOTE!** To ensure a uniform gas flow into the device, there must be a straight hose with a length of min. 30 cm (12") between the gas inlet and the closest 90° elbow. Alternatively the connection hose must have a bending radius of min. 5 cm (2").



## "Pump" version - Standard devices



- Connect the sample gas probe **1** to the "MEASURE CHANNEL" inlet connector. See ["Pump" versions - Sample gas probe](#) on page 32 for details.
- Connect flush-back gas hose **2** to the "FLUSH BACK" inlet connector. The hose type should be an appropriate type 6/4 mm plastic hose. Gas pressure must be 4-7 bar.



**TIP!** We recommend that you use either 100% N<sub>2</sub> or any other type of dry gas (oil- and water free).

- The "SENSOR GAS OUT" and "SAMPLE GAS OUT" outlet connectors do not require any connections, but if necessary you can connect a hose **3** with an inner diameter of min. 3 mm and a length of max. 3 m. The hose connector **4** should have 5 mm metric thread and we recommend using an appropriate gasket **5** as well.



**NOTE!** The "SENSOR GAS OUT" and "SAMPLE GAS OUT" outlets must never be blocked or connected to each other.

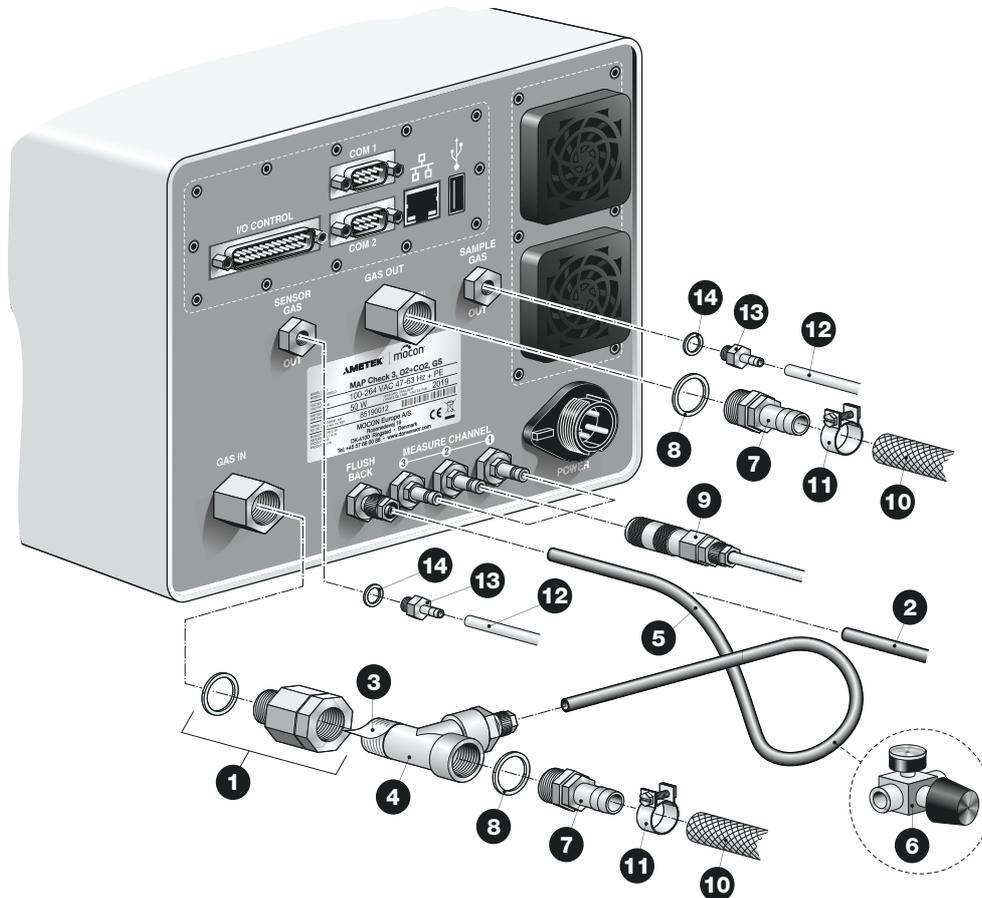


**NOTE!** IF the device is installed in a pour ventilated box, the "SENSOR GAS OUT" and "SAMPLE GAS OUT" outlets must be led outside the box.



**NOTE!** If the device is used for high-oxygen gas, connect a hose to the "SAMPLE GAS OUT" outlet connector and lead it away from the device.

**“Pump” version - Devices with GasSave and Multiplexer (MUX)**



- The input gas filter **1** has been fitted to the “GAS IN” inlet connector from the factory.
- If flush-back is required you have two options:
  - External flush-back gas supply:
 

Connect a flush-back gas hose **2** to the “FLUSH BACK” inlet connector. The hose type should be an appropriate type 6/4 mm plastic hose. Gas pressure must be 4-7 bar.

 **TIP! We recommend that you use either 100% N<sub>2</sub> or any other type of dry gas (oil- and water free).**
  - Flush-back gas supply from “GAS IN” gas string:
 

Apply teflon tape **3** to the thread of the T-fitting **4** then connect it to the input gas filter **1** on the “GAS IN” inlet connector. Connect the flush-back gas hose **5** from the T-fitting **4** to the “FLUSH BACK” inlet connector. If pressure in the “GAS IN” inlet string will exceed 7 bar, you must insert a pressure regulator **6** in the flush-back hose **5** to ensure that flush-back gas pressure is kept within 4-7 bar.
- Connect fittings **7** using the gaskets **8** to the “GAS OUT” outlet connector and to the T-fitting **4** or if external flush-back gas supply hose **2** is connected, to the input gas filter **1** on the “GAS IN” connector.

- Connect the sample gas probes ⑨ to the “MEASURE CHANNEL 1-2-3” inlet connectors. See *“Pump” versions - Sample gas probe* on page 32 for details.
- Connect the gas in- and outlet hoses ⑩ to the hose fittings ⑦ on “GAS IN” and “GAS OUT” using the hose clamps ⑪.
- The “SENSOR GAS OUT” and “SAMPLE GAS OUT” outlet connectors do not require any connections, but if necessary you can connect a hose ⑫ with an inner diameter of min. 3 mm and a length of max. 3 m.



**TIP!** The hose connector ⑬ should have 5 mm metric thread and we recommend using an appropriate gasket ⑭ as well.



**NOTE!** The “SENSOR GAS OUT” and “SAMPLE GAS OUT” outlets must never be blocked or connected to each other.



**NOTE!** IF the device is installed in a pour ventilated box, the “SENSOR GAS OUT” and “SAMPLE GAS OUT” outlets must be led outside the box.



**NOTE!** If the device is used for high-oxygen gas, connect a hose to the “SAMPLE GAS OUT” outlet connector and lead it away from the device.

**"Pressure" version**

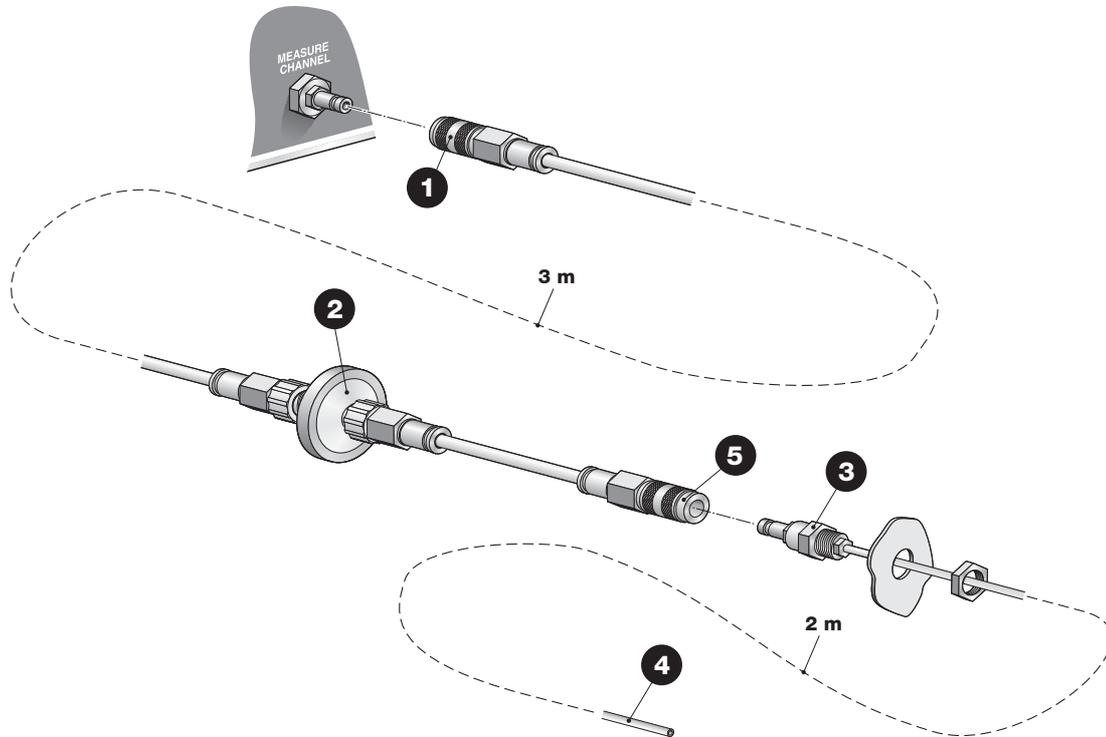
- Connect the supplied sample gas hose **1** to the "MEASURE CHANNEL" inlet connector simply by pushing the hose into the fitting as far as it goes. The inlet pressure must be 2-10 bar.  
See ["Pressure" version - Connection to buffer tank](#) on page 33 for further details about making a proper connection to the buffer tank.
- The "SENSOR GAS OUT" outlet connector does not require any connection, but if necessary you can connect a hose **2** with an inner diameter of min. 3 mm and a length of max. 3 m. The hose connector **3** should have 5 mm metric thread and we recommend using an appropriate gasket **4** as well.

**i** NOTE! If the sample gas inlet pressure is in the range 2-3 bar, the gas temperature and the surrounding temperature must not exceed 40°C.

**i** NOTE! The "SENSOR GAS OUT" outlet must never be blocked.

**i** NOTE! IF the device is installed in a pour ventilated box, the "SENSOR GAS OUT" outlet must be led outside the box.

## "Pump" versions - Sample gas probe



The sample gas probe leads the measuring gas from the measuring point to the device. The gas probe consists of a 3 m long hose with quick-connectors in both ends for easy and quick replacement. 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) to prevent any damage to the O-rings in the push-in fittings.

Connect the quick-connector **1** furthest away from the filter **2** to the MAP Check 3 measuring gas input.

The filter **2** is placed as close to the measuring point as possible. If the filter or hoses are blocked, the device will indicate an error in the display. If flush-back is enabled the device will initially try to flush-back the system 3 times to remove the blocking and if this fails an error will occur in the display.

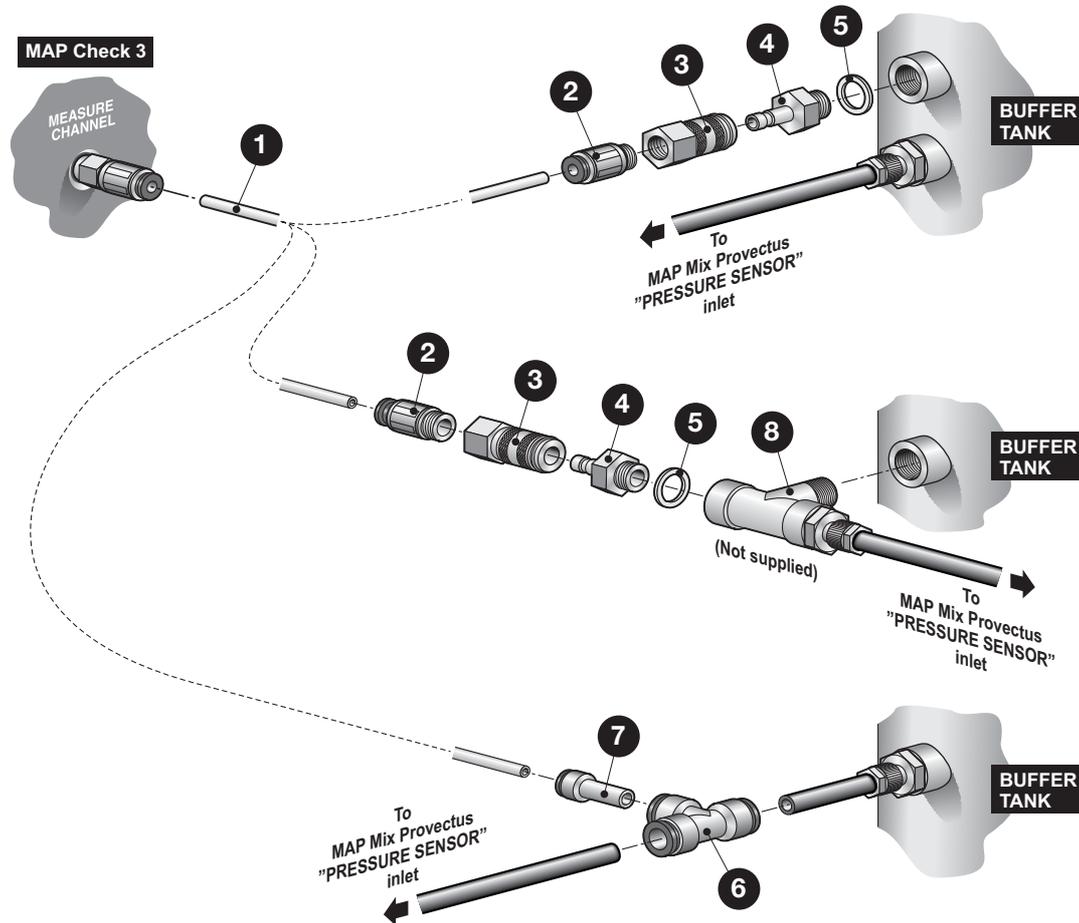
When measuring in a dusty environment, this filter should be replaced regularly - see *"Replacing filter in the sample gas probe ("Pump" versions)" on page 55* for details.

Mount the specially designed soft lance **3** with quick-connector and metric thread on the machine in question, e.g. a packing machine and lead the hose **4** to the measuring point and shorten, if required.

Connect the quick-connector **5** closest to the filter **2** to the soft lance **3**.

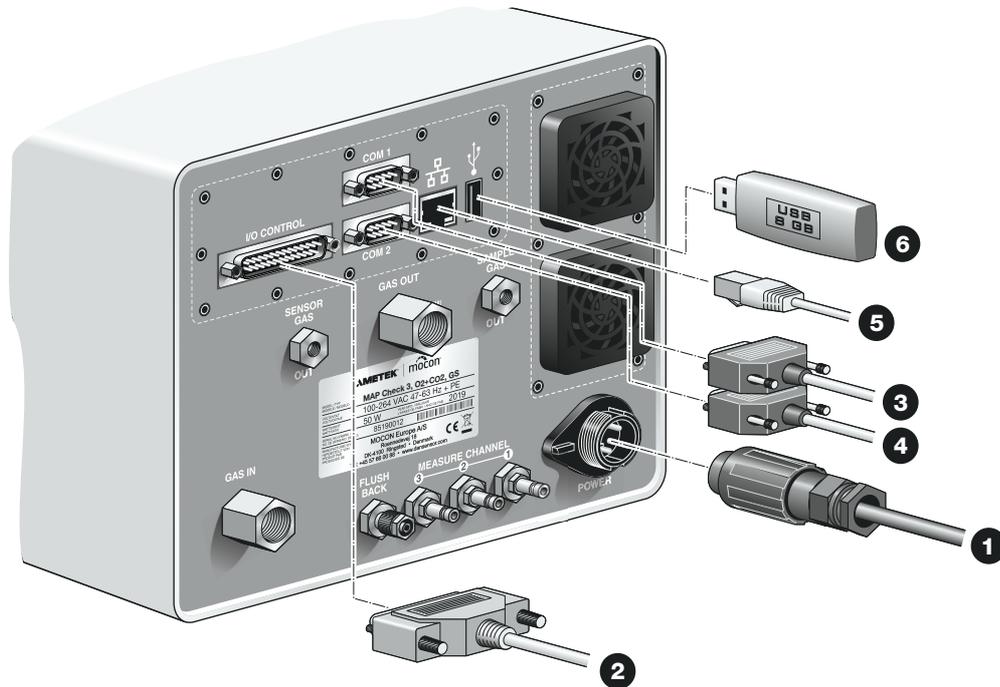
### “Pressure” version - Connection to buffer tank

The device is delivered with a sample hose and a selection of 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)  
The hose can be shortened if required.
- ② Push-in fitting 3mm/M5
- ③ Female quick-connector M5
- ④ Male quick-connector M5
- ⑤ Nylon gasket
- ⑥ Push-in fitting 6mm
- ⑦ Push-in fitting, adapter, 6/3mm
- ⑧ T-fitting (not supplied)

## Electrical connections



- Connect the power supply cable ① between a power outlet and the “POWER” connector. (The power cable is delivered with the device).
- Connect a 25-pole communication cable ② 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 35*.
- Connect a 9-pole serial cable ③ from the “COM1” connector to the appropriate port on the packaging machine - see *“I/O signals for machine control” on page 38* for details. This cable is not delivered with the device.
- Connect a 9-pole serial cable ④ from the “COM2” connector to the “COM1” connector on the MAP Mix Provectus (option) - see *“I/O signals for machine control” on page 38* for details. This cable is not delivered with the device.
- Connect a LAN/Ethernet cable ⑤ from the LAN connector (labelled ) to a connector on your local area network. This cable is not delivered with the device.

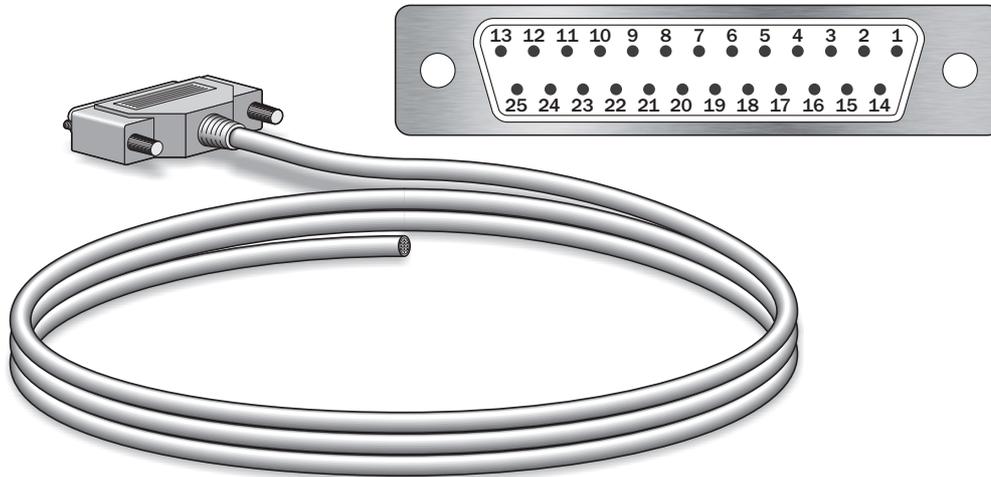


**NOTE! Use CAT6 cables for optimal noise immunity.**

- The USB connector (labelled ) can be used for connecting a USB Memory stick ⑥ for exporting/importing log data, device settings etc. On “Stand-Alone” versions you can use the USB connector on the device front as well.

### 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 "Measure"	Measuring signal from packaging machine. Signal must be stable. Measuring signal: 10 - 32VDC bipolar. Consumption: max. 10mA
3 - Green 4 - Yellow "AUX"	Pulse signal from the packing machine: 10 -32VDC bipolar. Consumption: 10mA. The pulse signal tells the device if the packing machine is running or not. If it is not running (and a 'measuring signal' is still being received) the device enters a mode that allows gassing to be reduced to minimum.
5 - Grey 6 - Pink "Alarm" Normally Open (NO)	Alarm relay output. Activated if product alarm limit for O <sub>2</sub> /CO <sub>2</sub> is exceeded. Relay contacts: max. 48 VDC/VAC. Load: max. 1A Normally Open (NO): Contacts open during power OFF.
5 - Grey 7 - Blue "Alarm" Normally Closed (NC)	Alarm relay output. Activated if product alarm limit for O <sub>2</sub> /CO <sub>2</sub> is exceeded. Relay contacts: max. 48 VDC/VAC. Load: max. 1A Normally Closed (NC): Contacts closed during power OFF.
8 - Red 9 - Black "Warning" Normally Open (NO)	Warning relay output. Activated if product warning limit for O <sub>2</sub> /CO <sub>2</sub> is exceeded. Relay contacts: max. 48 VDC/VAC. Load: max. 1A Normally Open (NO): Contacts open during power OFF.

Pins/Colours/Function	Description
8 - Red 10 - Purple "Warning" Normally Closed (NC)	Warning relay output. Activated if product warning limit for O <sub>2</sub> /CO <sub>2</sub> is exceeded. Relay contacts: max. 48 VDC/VAC. Load: max. 1A Normally Closed (NC): Contacts closed during power OFF.
11 - Grey/Pink 12 - Blue/red "Fault/Ready" Normally Open (NO)	Fault/ready relay output. Activated if the device is NOT ready (heating) or has severe error. Relay contacts: max. 48 VDC/VAC. Load: max. 1A Normally Open (NO): Contacts open during power OFF.
11 - Grey/Pink 13 - White/Green "Fault/Ready", NC	Fault/ready relay output. Activated if the device is NOT ready (heating) or has severe error. Relay contacts: max. 48 VDC/VAC. Load: max. 1A Normally Closed (NC) - Contacts closed during power OFF.
14 - Brown/Green 15 - White/Yellow "Current output"	If selected in "General setup" the analog current output signal comes out here. Pin 14: + (positive output signal), Pin 15: - (negative output signal) Can be configured as 0-20 mA or 4-20 mA, load resistance ≤ 500 Ohm
24 - Brown/Red 25 - White/Black "Voltage Output"	If selected in "General setup" the analog voltage output signal comes out here. Pin 24: + (positive output signal), Pin 25: - (negative output signal) Can be configured as 0-10 V DC or 2-10 V DC



**NOTE! Only one analog output can be active at any time (either current or voltage).**



**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	

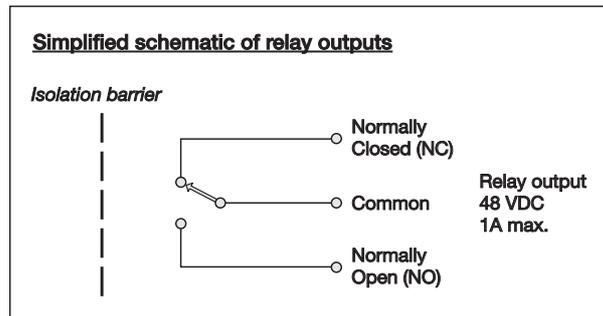
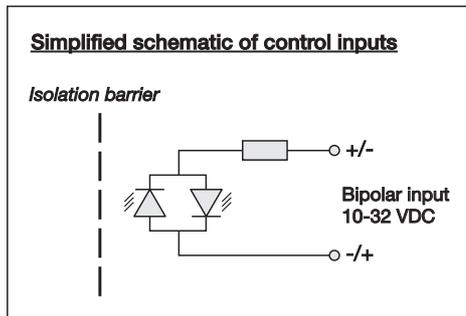
ALARM Relay		State of device
Device OFF	DSUB pin 5 connected to pin 6	"Alarm" (OFF)
Device ON - OK	DSUB pin 5 connected to pin 7	"OK"
Device ON - Alarm	DSUB pin 5 connected to pin 6	"Alarm"
DSUB 25 pins/ colours	Pin 5 - Grey (Common) Pin 6 - Pink Pin 7 - Blue	

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

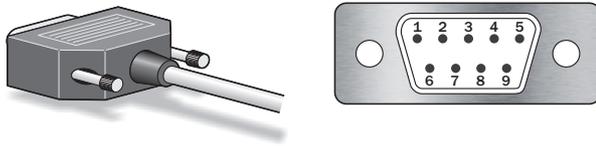
### I/O machine control:

- Start/Stop input
- AUX input
  
- Fault relay
- Alarm relay
- Warning relay



### 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 "RTS"	Request To Send, signal output to packaging machine / PLC (CURRENTLY NOT USED)
8 "CTS"	Clear To Send, signal input from packaging machine / PLC (CURRENTLY NOT USED)
9 "+5V"	Voltage supply +5V. Max. 250mA (fused)

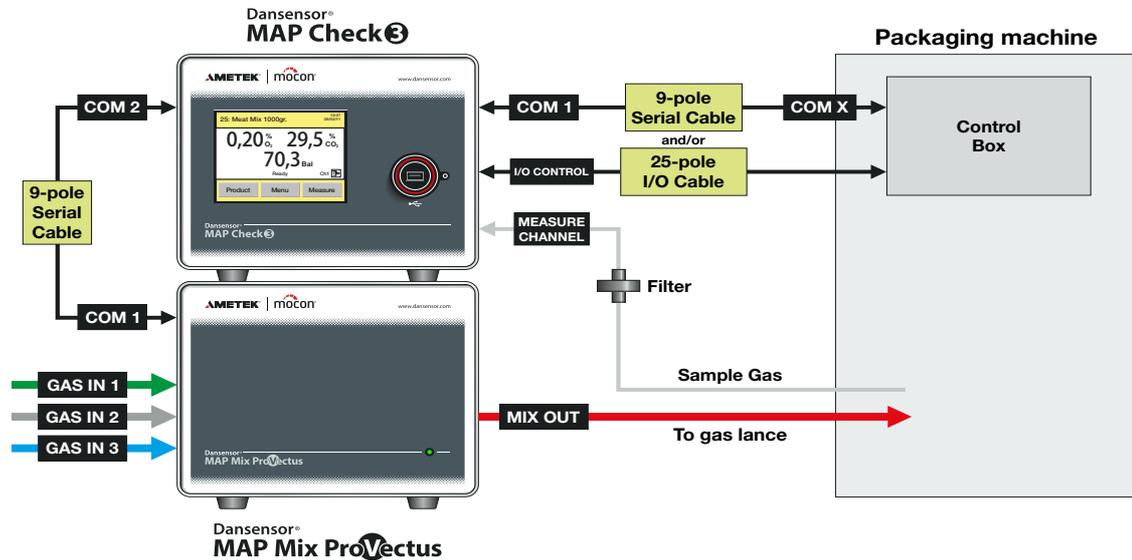
COM-2 Main (SLAVE) RS232 communication port (DTE Male)	
Pins/text	Description
2 "RxD"	Receive data, serial data input from slave device - e.g. MAP Mix Provectus
3 "TxD"	Transmit data, serial data output to slave device - e.g. MAP Mix Provectus
5 "GND"	Ground, signal ground



**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 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** set **COM2** protocol to **PBI**.
2. 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.
3. The product(s) must be configured with the appropriate setting for **External mixer mode**, either **Flow**, **Buffer** or **GasSave**.  
Having selected the required mixer mode, the appropriate settings for mix %, buffer pressure, gas flow or GasSave settings must be set.

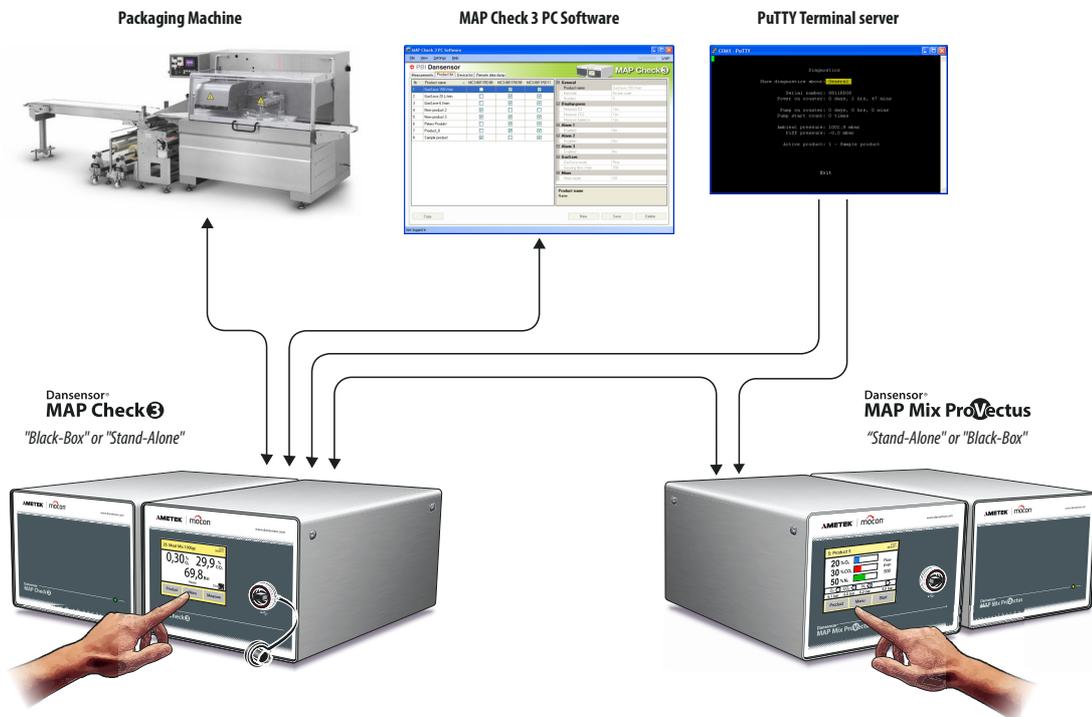
# 4. Operation and Maintenance

## General

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

With the **Dansensor® MAP Check 3 PC Software** you can collect measurement data and maintain your product database - see the "MAP Check 3 PC SW" manual for details.

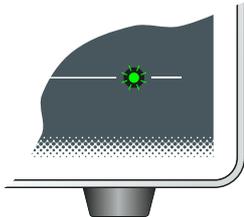
Use the **PuTTY Terminal Server** program for device configuration. It can be used with all models but especially applies to the "Black Box" models - see "PuTTY Terminal Server" on page 87 for details.



## Start up

### "Black Box" models

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

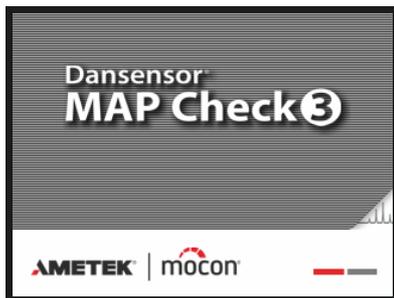


After a short internal self diagnosis the device will start heating up the sensors. During this period the indicator will turn red (steady).

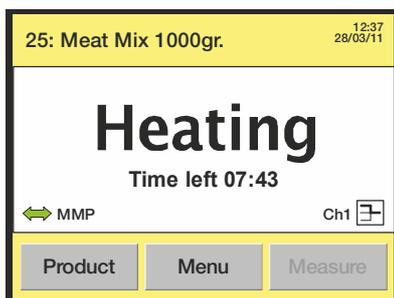
When heating period has finished the indicator will change to green (steady) and the device is now ready for use.

### Display models

When first powered ON the display will shortly show the **Dansensor® MAP Check 3** 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 external control it will hold back any machine logic to avoid premature starting.

While heating, the user can go to the **Main menu** by pressing the **Menu** key - see "[Main menu](#)" [on page 59](#) for details.

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



## Measuring

### "Black Box" models

The external control signal from the packaging machine determines when measuring starts and stops.

If sensor heating is in progress, the measuring automatically starts upon completion of heating.

### Display models

If the device has been setup for external measuring control, the external control signal from the packaging machine determines when measuring starts and stops.

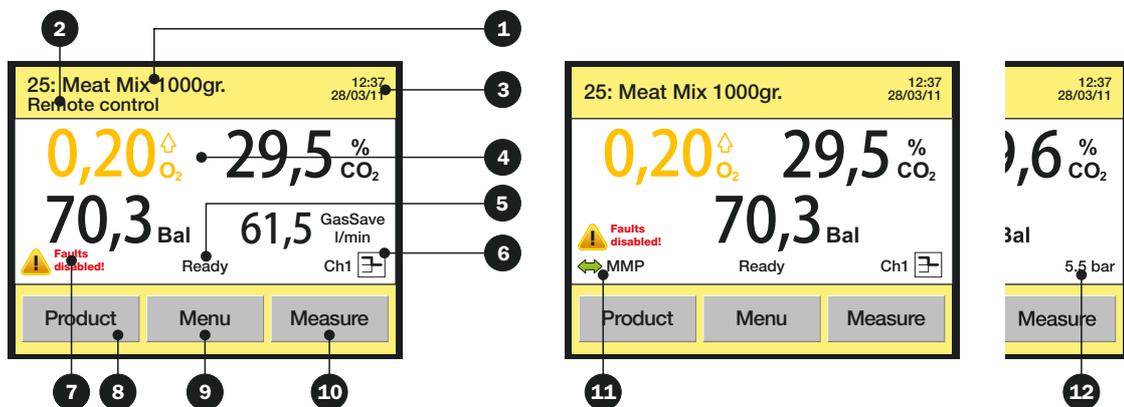
If sensor heating is in progress, the measuring automatically starts upon completion of heating.

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:

- ① **Selected product** Currently selected product number/product name.
- ② **Remote control** Displayed when the device is remote controlled from Modbus TCP protocol.  
In this case the buttons ⑧, ⑨, and ⑩ are disabled.
- ③ **Time/Date** Current time and date
- ④ **Measuring result** Result of the recent measurement.  
During heating up the remaining heating time is also displayed in this area.  
On devices with GasSave and with External mixer disabled the GasSave flow is displayed in this area as well.  
Only values selected for display in the product setup are displayed - see *"Edit product"* on page 60 for details.

Text colors indicate the following:

**Black** indicates that the result is within limit or that no limit is 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 Measuring channel** (Multiplexer versions only)  
The measurement continuously switches between the 3 measuring channels. The symbol shows which measuring input is currently active:  
Ch1  , Ch2  OR Ch3 
- 7 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.
- 8 Product key** Takes you to the "Products" list for selection of product.  
See *"Selecting a product for measuring" on page 46* for details.
- 9 Menu key** Takes you to the "Main menu".  
See *"Main menu" on page 59* for details.
- 10 Measure/Stop key** Starts/stops measurement.  
If device is set to external control, this button will be disabled.
- 11 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.
- 12 Inlet pressure** ("Pressure" versions only)  
Read-out of the gas inlet pressure.

## Selecting a product for measuring

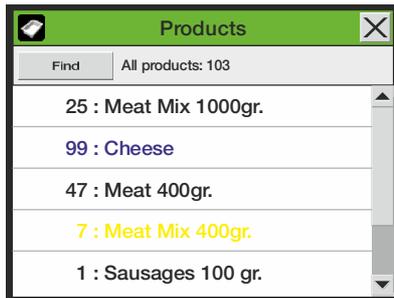
### "Black Box" models

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

### Display models

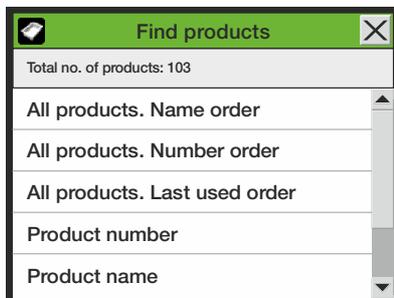
A product is selected from the **Products** list as described below:

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

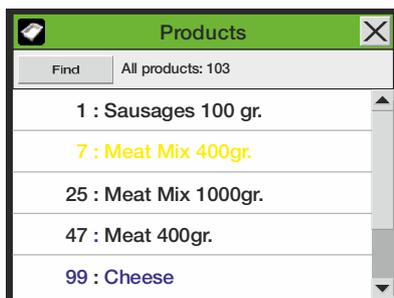


This screen holds a list of all products with the most recently used product at the top. Blue text indicates that measurements have been stored for the product. Yellow text indicates that product settings are not compatible with the current device configurations.

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.



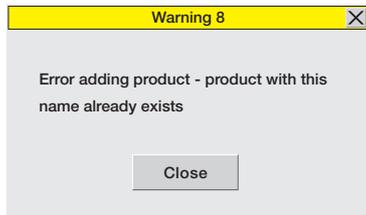
**TIP!** When selecting the "Product name" search method, keying in only an "S" will bring up a list of all products starting with "S".

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 49*.

A list of the most recent errors/warnings is available from the **Diagnostics menu** - see *"Diagnostics menu" on page 66* 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 66 for details.

No.	Type	Message	User action
0	Error	Unknown error has occurred	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 <sub>2</sub> sensor needs calibration. Measuring values may not be valid.	Contact service for sensor calibration
30	Warning	O <sub>2</sub> 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 <sub>2</sub> sensor communication error	Contact service
43	Error	CO <sub>2</sub> sensor output out of range	Contact service
44	Error	Zr O <sub>2</sub> : could not detect cold-junction temperature sensor	Contact service
45	Error	Zr O <sub>2</sub> : error with heater regulator	Contact service
46	Error	Zr O <sub>2</sub> : cold-junction temperature sensor error	Contact service
47	Error	O <sub>2</sub> sensor temperature out of range	Contact service
48*	Warning	Too high O <sub>2</sub> sensor temperature: XX C	Contact service
49*	Warning	Too low O <sub>2</sub> sensor temperature: XX C	Contact service
50	Error	O <sub>2</sub> sensor is disabled because of hardware fail. Please call service.	Contact service
51	Error	O <sub>2</sub> sensor is disabled because of hardware fail. Please call service.	Contact service

No.	Type	Message	User action
52	Error	O <sub>2</sub> sensor is disabled because of hardware fail. Please call service.	Contact service
53	Error	Pump regulator parameter error	Contact service
54	Warning	Error in O <sub>2</sub> sensor calibration data. Check if the gas concentration and span is correct.	Contact service for sensor calibration
55	Warning	O <sub>2</sub> sensor needs calibration. Measuring values may not be valid.	Contact service for sensor calibration
56	Error	Pressure regulator parameter error	Contact service
57	Error	Pump speed too low, check if pump is functional	Contact service
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
64	Error	GasSave could not reach requested flow	Check that the gas connections are correct Check that the inlet pressure is OK (2-10 bar) Change gas bottle if needed
65	Error	Internal error. Invalid GasSave parameters.	Contact service
66	Warning	GasSave is not calibrated	Contact service
67	Error	GasSave flow is too high, measuring stopped!	User information
68	Error	GasSave could not reach requested gas concentration	User information
69	Error	Sample system clogged. Check hose for blockages	Check sample hose for blockages
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

No.	Type	Message	User action
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	Error	Mixer low pressure alarm on gas input X	User information
77	Error	Error from slave mixer	User information
79	Error	Zr O <sub>2</sub> cold-junction temperature X too high. Possible O <sub>2</sub> sensor fan fault.	Contact service
82	Error	GasSave high pressure alarm	User information
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
84	Error	Pressure difference too high	Flow system clogged Check samplehose If error persists, contact service
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

No.	Type	Message	User action
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
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

No.	Type	Message	User action
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 to high	Reduce pressure at gas input
99	Error	Input pressure to low	Increase pressure at gas input
101	Warning	Product uses external mixer but mixer is disabled	Enable mixer or choose different product

## 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 27**.

### Spare parts

For a list of spare parts see **"Spare parts, consumables and accessories" on page 101**.

### Cleaning

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

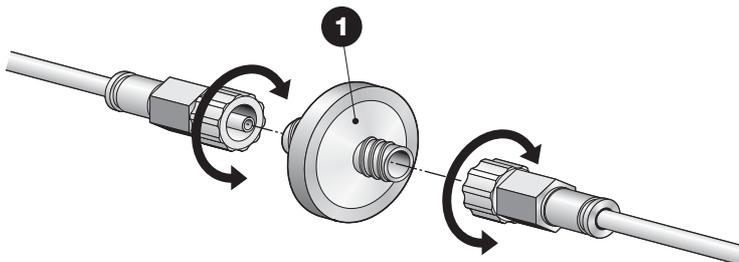


**CAUTION!** Never use hard tools or abrasive materials when cleaning any part of the device.



**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 ("Pump" versions)



The filter **1** is located in the sample gas probe in the end furthest away from the device.

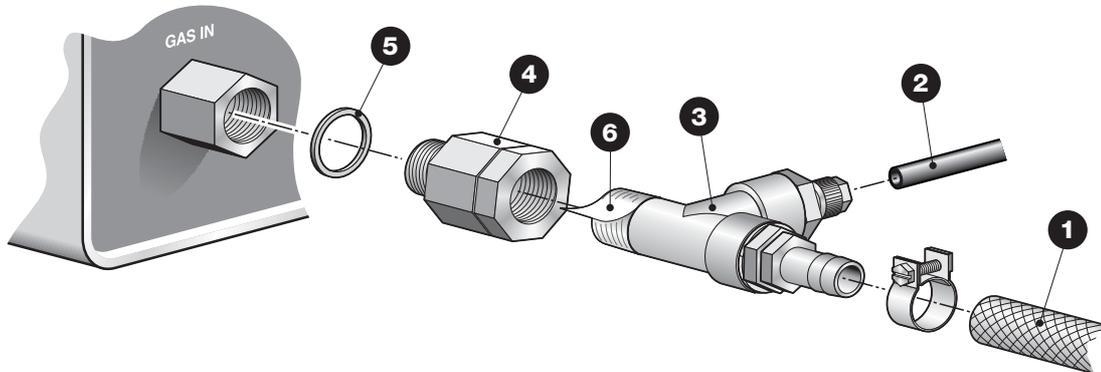
If the filter is blocked, the device will indicate an error in the display.

When measuring in a dusty environment, this filter should be replaced regularly.

To replace the filter simply unscrew the connection fittings.

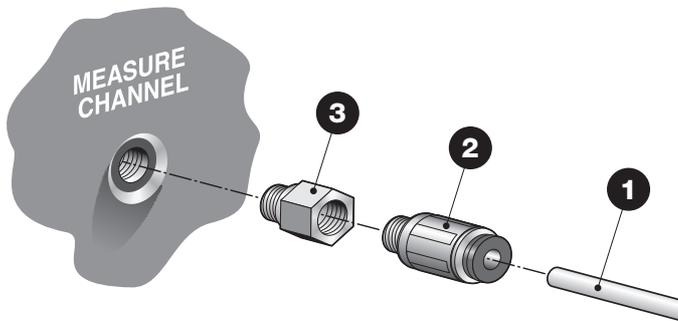
## Replacing gas inlet filters

### "Pump" versions with GasSave



- Disconnect the gas inlet hose ① and the flush-back gas hose ② from the T-fitting ③ and then unscrew the T-fitting ③.
- Unscrew the filter unit ④ from the device.
- Mount the new filter unit ④ on the device again using the gasket ⑤.
- Remove any old teflon tape residuals ⑥ from the thread of the T-fitting ③ and apply new tape before connecting it to the filter unit ④.
- Connect flush-back hose ② and gas inlet hose again ①.

### "Pressure" versions



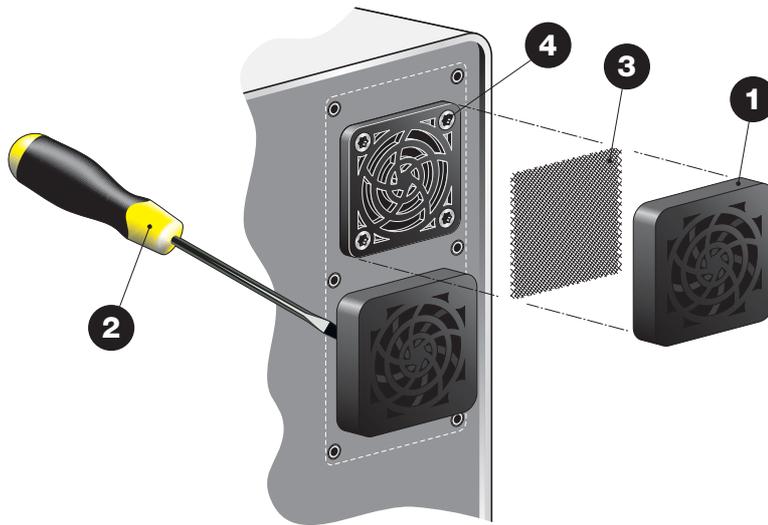
- Disconnect the gas inlet hose ① from the push-in fitting ②.
- Unscrew the push-in fitting ②.
- Replace the filter ③.
- Connect fitting ② and hose ① again.

## 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 ①.



**TIP!** If grille does not come off easily, you can use a screwdriver ② or the like to release it.

- The filter ③ is located inside the grille. You can choose to replace both the grille ② and the filter ③ or only the filter ③.



**CAUTION!** Never remove the screws ④ from the inside grille as they also hold the fan inside the device.



## 5. Menus and Settings

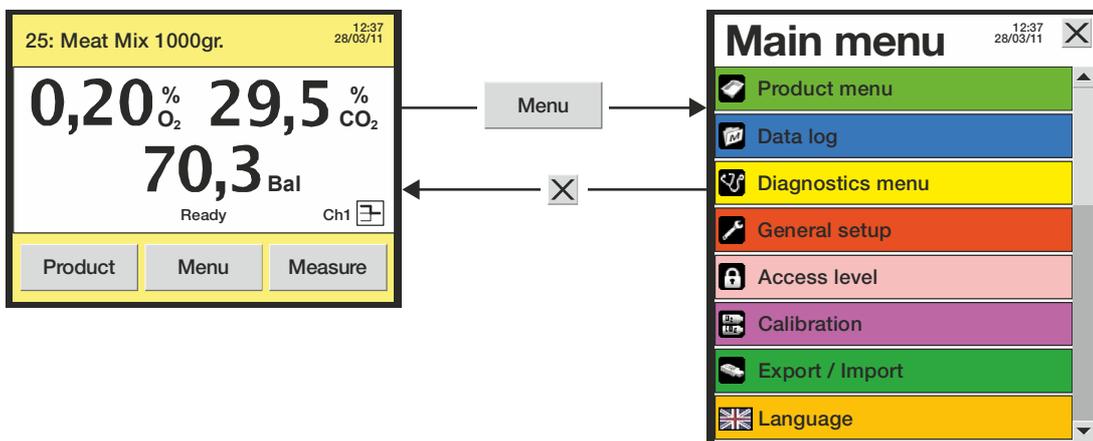
### General

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 83 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**<sup>1</sup> Create, edit and delete products.  
Display and delete logged product data.  
See "[Product menu](#)" on page 60 for details.
-  **Data log** View logged data for currently selected product.  
See "[Data log](#)" on page 65 for details.
-  **Diagnostics menu** Display device's internal parameters and error diagnostics.  
See "[Diagnostics menu](#)" on page 66 for details.
-  **General setup**<sup>1</sup> Setting of various device parameters.  
See "[General setup](#)" on page 67 for details.
-  **Access level** Selection of access level for User, Supervisor and Service.  
See "[Access level](#)" on page 83 for details.
-  **Calibration**<sup>2</sup> Calibration of sensors - for Service Technicians only.

 **Export / Import** <sup>1</sup> 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 85 for details.

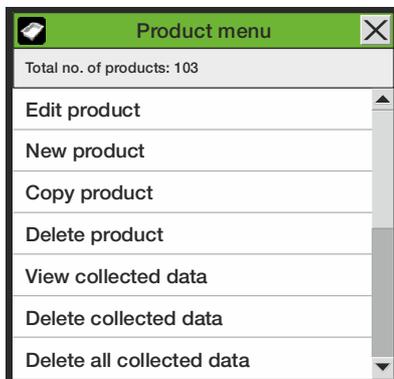
 **Language** Change language of screens and menus.  
See "*Language*" on page 86 for details.

<sup>1</sup> Only available in Supervisor and Service access levels.

<sup>2</sup> 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:

- |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Product name</b>   | A unique product name of up to 40 characters                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Product number</b> | A unique product number (0 to 999999)                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Bar code ID</b>    | A unique product bar code. Can be used to perform a quick product selection using the barcode reader (option)                                                                                                                                                                                                                                                                                                                                                                |
| <b>Display gasses</b> | Select which value(s) to display on the measuring screen. You have the following display combination possibilities: <ul style="list-style-type: none"> <li>• Measure O<sub>2</sub></li> <li>• Measure CO<sub>2</sub></li> <li>• Measure O<sub>2</sub> + Display balance</li> <li>• Measure CO<sub>2</sub> + Display balance</li> <li>• Measure O<sub>2</sub> + Measure CO<sub>2</sub></li> <li>• Measure O<sub>2</sub> + Measure CO<sub>2</sub> + Display balance</li> </ul> |

**Alarm 1..3 settings**

Depending on the device configuration you will have only "Alarm 1 settings" or if Multiplexer is installed there will be "Alarm 2 settings" and "Alarm 3 settings" for the additional inputs.

You have the following options for each alarm:

- **Off** Disables alarm completely
- **On** Enables alarm for the selected input
  - O<sub>2</sub> High alarm and Low alarm (%)
  - O<sub>2</sub> High warning and Low warning (%)
  - CO<sub>2</sub> High alarm and Low alarm (%)
  - CO<sub>2</sub> High warning and Low warning (%)

Any warning or alarm will result in relay activated accordingly and indication in display.

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



**NOTE! From the MAP Check 3 PC Software or directly 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 mode**
  - **Off** Default state and if external mixer is connected but not used
  - **GasSave** Using GasSave as active regulation at specified gas level (see detailed description of the GasSave function on [page 16](#)).
    - **GasSave regulation gas**  
Select O<sub>2</sub> or CO<sub>2</sub>
    - **Regulation maximum**  
Upper limit for regulation value (%)
    - **Regulation minimum**  
Lower limit for regulation value (%)
    - **Use gases from General Setup**  
Yes or No
    - **O<sub>2</sub> ratio**  
O<sub>2</sub> setting for mixer (%)
    - **CO<sub>2</sub> ratio**  
CO<sub>2</sub> setting for mixer (%)
    - **N<sub>2</sub> ratio**  
N<sub>2</sub> setting for mixer (%)
    - **AUX ratio**  
AUX setting for mixer (%)
    - **Maximum flow**  
GasSave max. flow from mixer (l/min)
    - **Minimum flow**  
GasSave min. flow from mixer (l/min)

- **Maximum flush-in time**  
Enter max. flush-in time (sec) (0 = No flush-in)
- **Flush-in flow**  
Enter flush-in flow (l/min)
- **Flow control timeout**  
Enter time (sec) to wait for an external "AUX" signal.  
(0 = AUX disabled)  
If no signal is received GasSave is stopped
- **Flow hold timeout**  
Enter time to freeze regulation at current flow (sec)
- **Positive gain**  
Enter the step response factor for regulation
- **Negative gain**  
Enter the step response factor for regulation
- **Flow** Regulating the mixer for a fixed gas flow
  - **Use gases from General Setup**  
Yes or No
  - **O<sub>2</sub> ratio**  
O<sub>2</sub> setting for mixer (%)
  - **CO<sub>2</sub> ratio**  
CO<sub>2</sub> setting for mixer (%)
  - **N<sub>2</sub> ratio**  
N<sub>2</sub> setting for mixer (%)
  - **AUX ratio**  
AUX setting for mixer (%)
  - **Total flow**  
Set the mixer outlet flow (l/min)
- **Buffer** Regulating the mixer for a fixed buffer tank pressure
  - **Use gases from General Setup**  
Yes or No
  - **Buffer max pressure**  
Set the upper value for buffer pressure (bar)
  - **Buffer min pressure**  
Set the lower value for buffer pressure (bar)
  - **O<sub>2</sub> ratio**  
O<sub>2</sub> setting for mixer (%)
  - **CO<sub>2</sub> ratio**  
CO<sub>2</sub> setting for mixer (%)
  - **N<sub>2</sub> ratio**  
N<sub>2</sub> setting for mixer (%)
  - **AUX ratio**  
AUX setting for mixer (%)
  - **Total flow**  
Set the mixer outlet flow (l/min)

**GasSave settings**

(Only available if "GasSave" is installed and "External mixer" is disabled in "General setup")

- **GasSave regulation mode**

- **Off** Default state and if external mixer is connected as GasSave
- **GasSave** Using GasSave as active regulation at specified gas level (see detailed description of the GasSave function on [page 16](#)).
  - **GasSave regulation gas**  
Select O<sub>2</sub> or CO<sub>2</sub>
  - **Regulation maximum**  
Window higher level % gas
  - **Regulation minimum**  
Window lower level % gas
  - **Minimum flow**  
Enter min. flow setting l/min (range 6 to 500)
  - **Maximum flow**  
Enter max. flow setting l/min (range 6 to 500)
  - **Maximum flush-in time**  
Enter max. flush-in time (sec) (0 = No flush-in)
  - **Flush-in flow**  
Enter flush-in flow (l/min)
  - **Flow control timeout**  
Enter time (sec) to wait for an external "AUX" signal.  
(0 = AUX disabled)  
If no signal is received GasSave is stopped
  - **Flow hold timeout**  
Enter time (sec) to freeze gas flow after expiration of "Flow control timeout".
  - **Positive gain**  
Enter the step response factor for flow regulation
  - **Negative gain**  
Enter the step response factor for flow regulation
- **Flow** Using GasSave as a simple flow regulator
  - **GasSave regulation flow**  
Enter target flow: l/min (range 6 to 500)
- **Measure** Using GasSave as a flow meter without regulation.  
Display will show the actual flow through the GasSave string (range 6 to 500 l/min).  
If flow exceeds 600 l/min. for more than 30 secs. the proportional valve will be closed to protect the flow sensor.

### 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 60*).

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 60*).

### 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



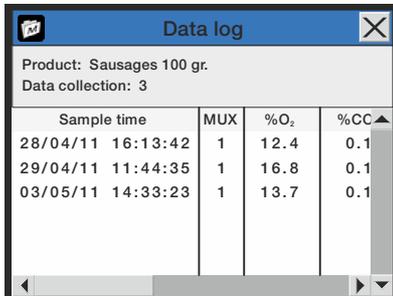
**NOTE!** Be sure to export data to USB stick before executing this command as it cannot be undone - see *"Export/Import" on page 85!*

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.



Sample time	MUX	%O <sub>2</sub>	%CC
28/04/11 16:13:42	1	12.4	0.1
29/04/11 11:44:35	1	16.8	0.1
03/05/11 14:33:23	1	13.7	0.1

Here all logs stored on the device can be examined. Use the two scroll bars to navigate the window.

For best readability we recommend using the **Dansensor® MAP Check 3 PC Software** to collect and display data.

Logged data can be exported (see *"Export/Import" on page 85* for details) or deleted (see *"Product menu" on page 60* for details).

Data logging parameters are set in "General setup" - see *page 67* for details.

### Data log memory full

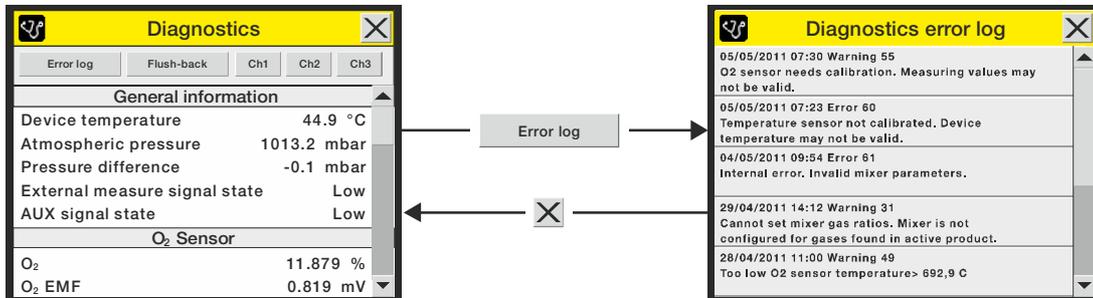
If data log memory is full an error will occur (Warning 23 - see *"Error/Warning list" on page 49* for details).

In this case you must empty data log by using the functions for deleting of data collections - see *"Product menu" on page 60* 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 display a screen showing the internal parameters of the device.



These are values such as 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.

Pressing the **Error log** key brings up an **Diagnostics error log** screen with a list of all errors.

Pressing the **Flush-back** key starts a manual flush-back. On devices with multiplexer installed, this will happen on all active channels.

Depending on device type the display offers one or more keys for testing of the measuring functions as well.

Devices with only one channel has one button named **Measure** and devices with Multiplexer has three buttons named **Ch1**, **Ch2** and **Ch3** respectively.

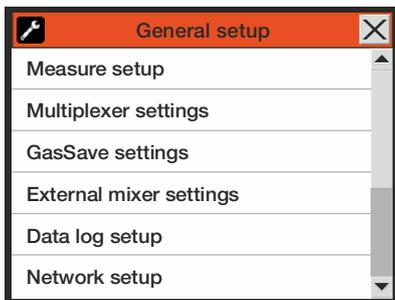
Pressing either of these will start measuring on the respective channel without data logging and if GasSave is installed this will also be running.

The measure function is normally used for initial testing after installation on machine.

## 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.



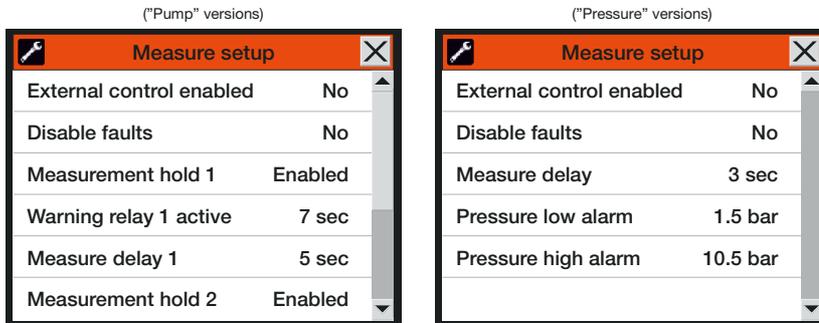
The **General setup** menu holds the following items:

- Measure setup**                      Opens the **Measure setup** screen  
See *"Measure setup" on page 69* for details.
- Multiplexer settings**            (Only appears on devices with Multiplexer installed)  
Opens the **Multiplexer settings** screen  
See *"Multiplexer settings" on page 73* for details.
- GasSave settings**                (Only appears if external mixer is disabled)  
Opens the **GasSave settings** screen  
See *"GasSave settings" on page 74* for details.
- External mixer settings**        Opens the **External mixer settings** screen  
See *"External mixer settings" on page 74* for details.
- Data log setup**                    Opens the **Data log setup** screen  
See *"Data log setup" on page 75* for details.
- Network setup**                    Opens the **Network setup** screen  
See *"Network setup" on page 80* for details.
- Analog output setup**            Opens the **Analog output setup** screen  
See *"Analog output setup" on page 80* for details.
- COM1 protocol**                    **PBI**                                      For remote control using PBI protocol  
**MAP Check Combi**                  Compatibility mode for old MAP Check Combi devices (product selection on RS232).
- COM2 protocol**                    **PBI**                                      For control of MAP Mix Provectus  
**Terminal Server**                    For configuration via terminal server.
- 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.
- Auto flush-back**                  Select whether "Flush-Back" is initiated automatically or not.  
Interval is fixed in device and set to 30 minutes.  
Note that the device will also monitor if sample system is clogged and initiate "Flush-Back".

<b>Request ID when changing product</b>	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.
<b>Backlight</b>	Adjust display background light (1-10)
<b>Contrast</b>	Adjust display contrast (1-10)
<b>Brightness</b>	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.
<b>Formats/Units/Time</b>	Opens the <b>Formats/Units/Time</b> screen See " <i>Formats/Units/Time</i> " on page 82 for details.
<b>Reset gas consumption</b>	(Only appears on devices with GasSave installed) Resets the "Trip gas consumption" counter in the "GasSave" section in "Diagnostics".
<b>Supervisor PIN code setup</b>	Setting up the four-digit PIN code required for changing from <b>User</b> access level to <b>Supervisor</b> access level. (See " <i>Access level</i> " on page 83 for details).

## Measure setup

Selecting **Measure setup** from the **General setup** menu will display a screen where you can configure the measuring function.



- External control enabled**

  - No** External measure input disabled
  - Yes** External measure input is enabled and controlled by packaging machine. "Measure/Stop" button in the measuring screen is disabled.
  
- Disable faults**

  - No** All faults are detected and FAULT 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 measure screen by a warning symbol and a red text saying "Faults disabled".
  
- Measurement hold**

(Only available on "Pump" devices)

  - Disabled** Function disabled.
  - Enabled** Holds packaging machine logic until gas values are within limits.
    - **Warning relay active** Set time

**i** **NOTE! If a Multiplexer is installed, a "Measurement hold" function is available for each of the 3 channels for individual settings.**
  
- Measure delay**

Enter number of seconds to delay measuring after start of the measurement (min. setting = 3 sec.)  
 If "Measurement hold" is disabled, alarms and warnings are ignored in this period.  
 If "Measurement hold" is enabled, the alarm relay is forced active in this period.  
 This time-out also applies after a "Flush-Back" period.

**Pressure low alarm** (Only available on "Pressure" devices)  
**Pressure high alarm** Low and high alarms for the input pressure.  
Setting to 0 will disable an alarm.

See description of the "Measurement hold" function on [page 72](#).

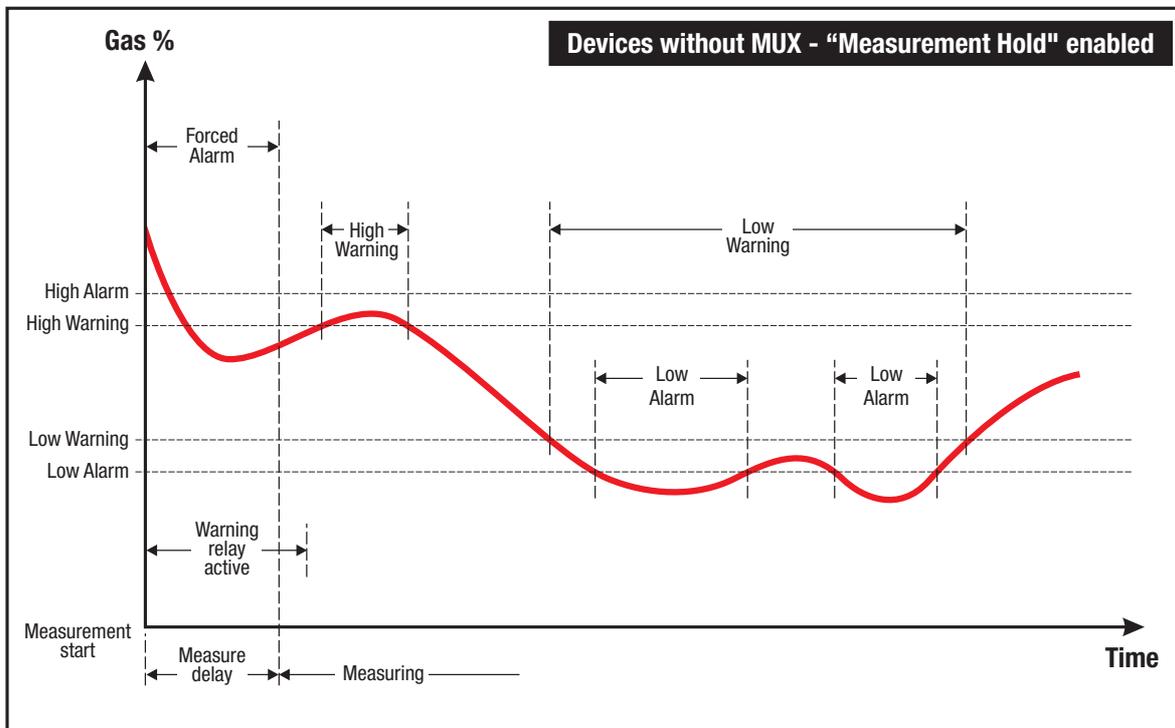
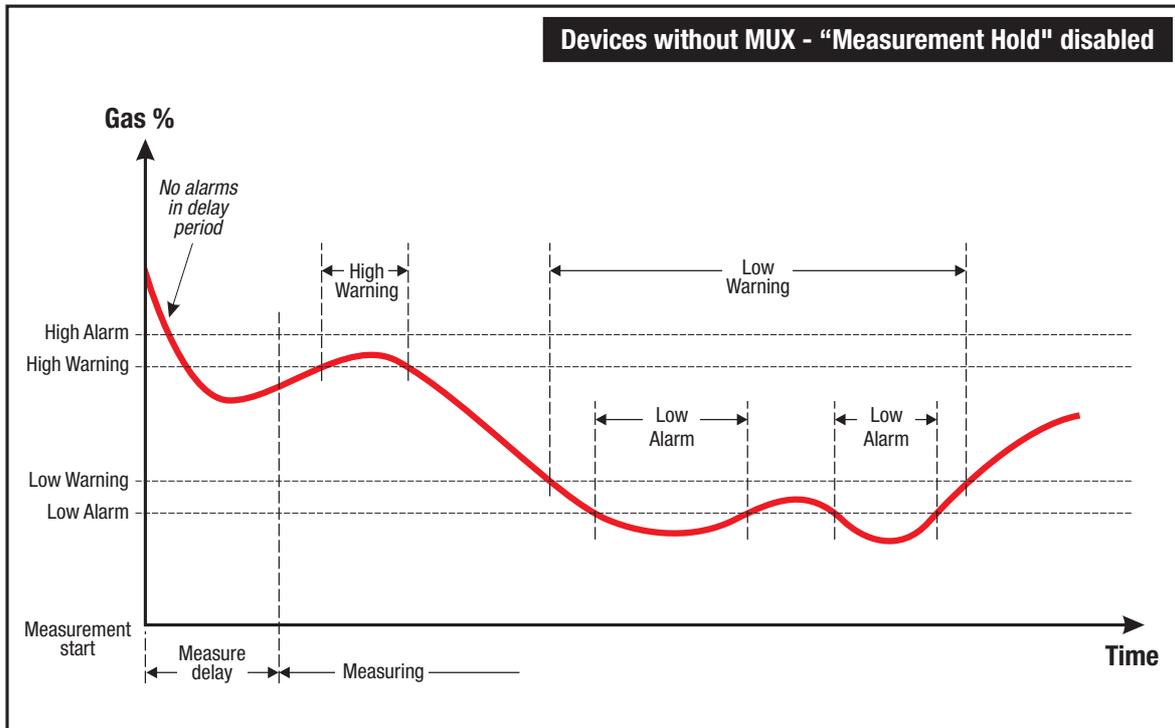


Fig. 6.

### “Measurement hold” disabled

(See upper diagram on *Fig. 6.*).

Measurement starts with a “Measure delay” period. During this period measuring is retained and warnings and alarms are ignored and the sample gas hose and the device’s hoses are flushed to ensure a representative gas sample when measuring starts.

When measuring starts, the device now uses the gas concentration warning and alarm settings to activate the respective relays for use in the packaging machine control if required.

Devices with multiplexer (MUX) use the same practice as described above for each channel respectively, and each channel can be setup with different delay and measuring times as well as different warning and alarm limits. Measuring times are not affected by occurring gas alarms.

### “Measurement hold” enabled

(See lower diagram on *Fig. 6.*).

Measurement starts with a “Measure delay” period. During this period measuring is retained and the alarm relay is forced active to hold back the packing machine (assuming that alarm relay is used for this function) while sample gas hose and the device’s hoses are flushed to ensure a representative gas sample when measuring starts. If function is required, the warning relay can be activated from the start of the “Measure delay” period but with a duration independent of the duration of the “Measure delay” period.

When measuring starts the packaging machine also starts, and the device now uses the gas concentration warning and alarm settings to activate the respective relays for use in the packaging machine control if required.

Devices with multiplexer (MUX) use the same practice as described above for each channel respectively, and each channel can be setup with different delay and measuring times as well as different warning and alarm limits.

Further the “Measurement hold” function adds the below functionality:

- When an alarm occurs during a measuring period the measuring period restarts when alarm disappears.
- The alarm relays are only forced active in the “Measure delay” periods during the very first measuring cycle. From the second cycle and on, the measuring works as if “Measurement hold” was disabled (see above).
- If activation of the warning relays at the start of the “Measure delay” period(s) has been selected, this only happens during the very first measuring cycle.

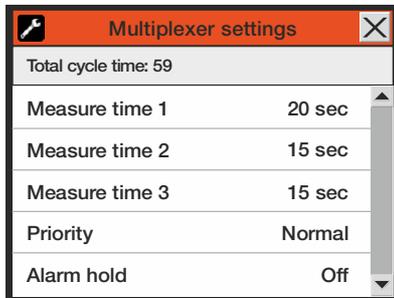
On devices with GasSave and multiplexer (MUX) the GasSave only regulates on Measure channel 1.

When measuring on the other channels the GasSave flow is “frozen”.

## Multiplexer settings

(Only appears on devices with Multiplexer installed)

Selecting **Multiplexer settings** from the **General setup** menu will display a screen showing the Multiplexer parameters.



- Measure time 1** Set measuring time for channel 1 before switching to next channel. Min. setting = 10 sec. Setting to 0 sec. will disable/skip this channel.
- Measure time 2** Set measuring time for channel 2 before switching to next channel. Min. setting = 10 sec. Setting to 0 sec. will disable/skip this channel.
- Measure time 3** Set measuring time for channel 3 before switching to next channel. Min. setting = 10 sec. Setting to 0 sec. will disable/skip this channel.



**NOTE! At least one channel must be enabled.**

- Priority**
  - Normal** Multiplexer switches 1-2-3-1-2-3...
  - Channel 1** Multiplexer switches 1-2-1-3-1-2-1-3...(Priority on channel 1)
- Alarm hold**
  - On/Off**

Under normal circumstances alarms are active for approx. 3-4 seconds after the alarm condition has disappeared. The setting determines what must happen when a switch is made to a new channel and an alarm is active on the current channel. If the alarm hold function is active (On), the alarm in question is kept active until the next time the device measures on the channel which generated the alarm and the alarm condition has disappeared. If the alarm hold function is not active (Off) and there is an alarm when a switch is made to a new channel, the alarm will disappear after 3-4 seconds, provided that there is no alarm on the new channel.

The **Total cycle time** is the calculated duration of 1 whole multiplexer cycle.

## GasSave settings

(Only on devices with GasSave and if external mixer is disabled)

Selecting **GasSave settings** from the **General setup** menu will display a screen showing the setup parameters for the GasSave gas string.

GasSave settings	
Mix of gases is 100%	
Input gas O <sub>2</sub>	20.0 %
Input gas CO <sub>2</sub>	30.0 %
Input gas N <sub>2</sub>	50.0 %
Input gas Air	0 %

<b>Input gas O<sub>2</sub></b>	Set the O <sub>2</sub> gas % of the inlet gas
<b>Input gas CO<sub>2</sub></b>	Set the CO <sub>2</sub> gas % of the inlet gas
<b>Input gas N<sub>2</sub></b>	Set the N <sub>2</sub> gas % of the inlet gas
<b>Input gas Air</b>	Select between 0% or 100%. When set to 100% the other gases are automatically set to 0%.

## External mixer settings

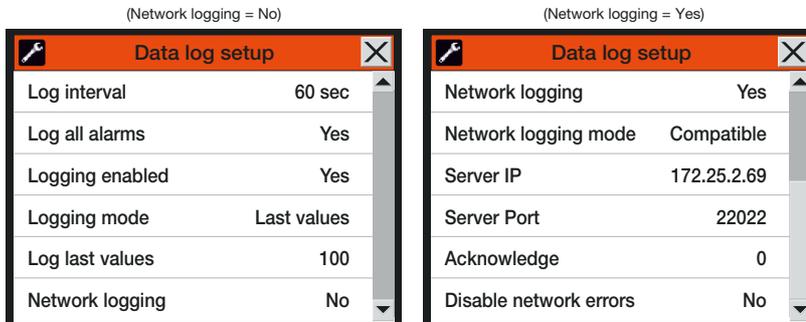
Selecting **External mixer settings** from the **General setup** menu will display a screen showing the setup parameters for an external **MAP Mix Provectus** mixer connected to the COM2-port of the device.

External mixer settings	
External mixer connected	Yes
Gas 1 - Media	O <sub>2</sub>
Gas 1 - P Low alarm	5.0 bar
Gas 2 - Media	N <sub>2</sub>
Gas 2 - P Low alarm	5.0 bar
Gas 3 - Media	CO <sub>2</sub>

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

## Data log setup

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



<b>Log interval</b>		Number of seconds between each data log entry.
<b>Log all alarms</b>	<b>No</b>	Alarms occurring in the period between logs as set in "Log interval" are not logged.
	<b>Yes</b>	All alarms are logged.
<b>Logging enabled</b>	<b>No</b>	No logging of data
	<b>Yes</b>	Logging of data enabled
<b>Logging mode</b>	<b>Last values</b>	Ring buffer of specified number of log entries. Normally this is best setting for On-Line equipment due to the continuous operation.
	<b>Until memory full</b>	Logs data until memory is full, then stops logging until data has been exported and/or deleted.
<b>Log last values</b>		Set number of log entries in the data log ring buffer (Only appears when "Logging mode" is set to "Last values")
<b>Network logging</b>		Select whether or not network logging is required.
	<b>No</b>	No network logging
	<b>Yes</b>	Network logging enabled
		(Below parameters only appears when "Network Logging" is set to "Yes").
	<b>Network logging mode</b>	Select required data logging output format: <b>Compatible</b> (Default) Data format as used on devices with firmware versions < 4.2.0. See table on <a href="#">page 77</a> . <b>Advanced</b> New data format with more information and many new values. See table on <a href="#">page 78</a> .
	<b>Server IP</b>	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.
	<b>Server Port</b>	See above.

<b>Acknowledge</b>	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.
<b>Disable network errors</b>	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	2
Device serial number	Text	
Device software version	Text	
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"
Active MUX channel	Int	
Ambient pressure	Float	
Mixer mode    GasSave mode	Text	"Off", "GasSave", "Flow", "Buffer" / "Off", "Flow", "GasSave", "Measure"
O2 mixer    GasSave input O2	Float	
CO2 mixer    GasSave input CO2	Float	
N2 mixer    GasSave input N2	Float	
AUX mixer    GasSave input air	Float	
Mixer pressure out    GasSave input pressure	Float	
GasSave flow	Int	
GasSave gas consumption	Int	
Trip gas consumption	Int	
Trip reset timestamp	Time	<yyyy-MM-dd HH:mm:ss>
Device temperature	Float	

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

### “Advanced” network logging data format

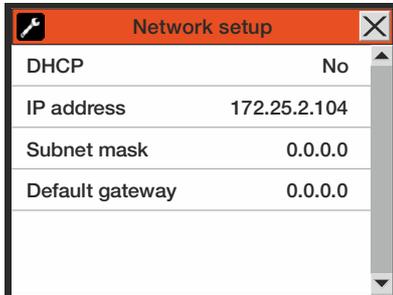
Parameter	Type	Value	Unavailable/ Error value
Log version	Int	3	3
Device serial number	Text		
Device software version	Text		
Date	Time	<yyyy-MM-dd>	<yyyy-MM-dd>
Time	Time	<HH:mm:ss>	<HH:mm:ss>
Product name	Text		"_"
Product number	Int		0
Product barcode	Text		"_"
O2 measurement	Float		0.00
O2 alarm state	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
Active channel / MUX channel	Int		0
Pressure Input	Float		0.0
Mixer mode    GasSave mode	Text	"Off", "GasSave", "Flow", "Buffer" / "Off", "Flow", "GasSave", "Measure	""-
O2 mixer    GasSave input O2	Float		0.0
CO2 mixer    GasSave input CO2	Float		0.0
N2 mixer    GasSave input N2	Float		0.0
AUX mixer    GasSave input air	Float		0.0

Parameter	Type	Value	Unavailable/ Error value
Mixer pressure out    GasSave input pressure	Float		0.0
GasSave flow	Int		0
GasSave gas consumption	Int		0
Trip gas consumption	Int		0
Trip reset timestamp	Time	<yyyy-MM-dd HH:mm:ss>	"_"
Ambient pressure	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.



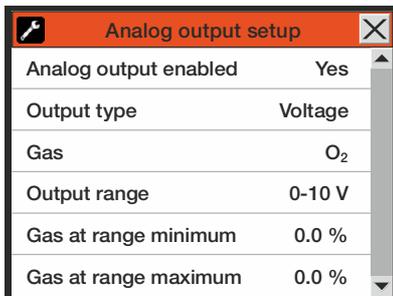
- DHCP**
- Yes** Using DHCP network address automatically received from a DHCP server on the network (default setting).
- No** User must set network address information manually
- **IP address**
  - **Subnet mask**
  - **Default gateway**



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

## Analog output setup

Selecting **Analog output setup** from the **General setup** menu will display a screen showing the parameters for the use of the analog output signal.



- Analog output enabled**
- Off** Not used, i.e. no control on analog output
- On** Analog output enabled (brings up the below parameters)
- Output type**
- Voltage** Voltage output is used
- Current** Current output is used
- Gas**
- O<sub>2</sub>** Select O<sub>2</sub> value for analog output
- CO<sub>2</sub>** Select CO<sub>2</sub> value for analog output

**Output range**

If "Voltage" mode:

**0-10V** Output swing from 0 to 10 volts

**2-10V** Output swing from 2 to 10 volts

If "Current" mode:

**0-20mA** Output swing from 0 to 20 mA

**4-20mA** Output swing from 4 to 20 mA

**Gas at range minimum**

Select % value of selected gas corresponding to the lower output swing value.

**Gas at range maximum**

Select % value of selected gas corresponding to the higher output swing value.

**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.



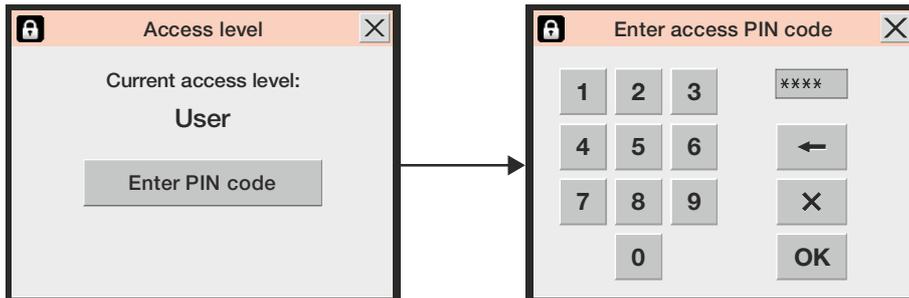
<b>Time</b>	Setting of current time (hh:mm)
<b>Date</b>	Setting of current date (using "Date format")
<b>Date format</b>	Setting of date format (DD/MM/YY or MM/DD/YY) "Time", "Date" and "Date format" are related to the real time clock setting in the device. The settings will have effect in all displays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

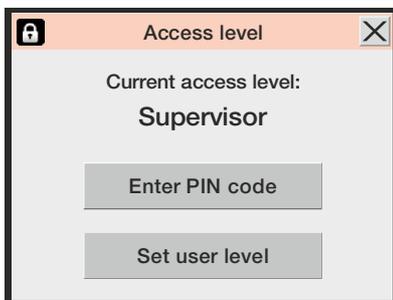
To do so select **Access level** from the **Main menu** menu to display the **Access level** screen.



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:

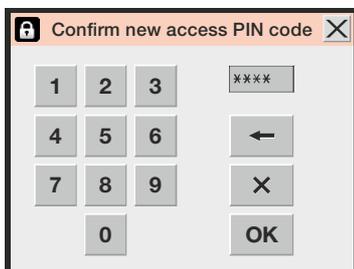
- Select **General setup** from the **Main menu** then scroll to the bottom and select the **Supervisor PIN code setup** item. This brings up a touch screen keyboard.



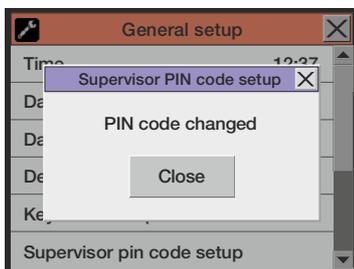
- Enter current PIN code and press **OK**.



- 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.



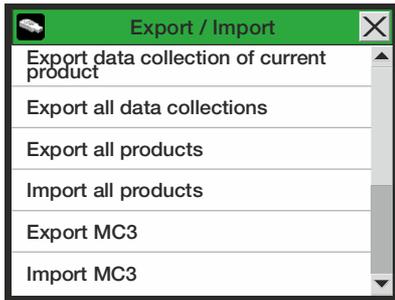
**NOTE!** Make sure to note the new supervisor code in a safe location. If you loose this information please contact your local Dansensor service department for assistance in restoring code.



## 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 27](#) for details.



- |                                                  |                                                                                                                           |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| <b>Export data collection of current product</b> | Exports data logs (as text file) stored for the currently selected product.                                               |
| <b>Export all data collections</b>               | Exports all data logs (as text files) stored on the device.                                                               |
| <b>Export all products</b>                       | Exports the product database (binary file) stored on the device.                                                          |
| <b>Import all products</b>                       | Imports the product database (binary file) from USB stick onto the device.                                                |
| <b>Export MC3</b>                                | Exports device settings to a binary file. Is normally used as backup to be able to clone device settings to a new device. |
| <b>Import MC3</b>                                | Imports device settings (binary file) from USB stick onto the device.                                                     |
| <b>Export errors</b>                             | Exports the error log (as text file) onto the USB stick                                                                   |
| <b>Export events</b>                             | 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** 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 34 for details).

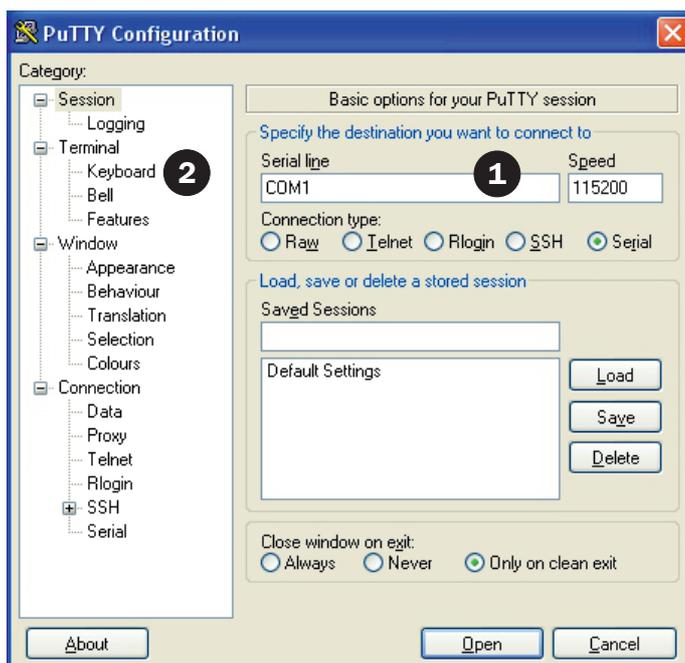
### Configuration and Use

#### Initial configuration

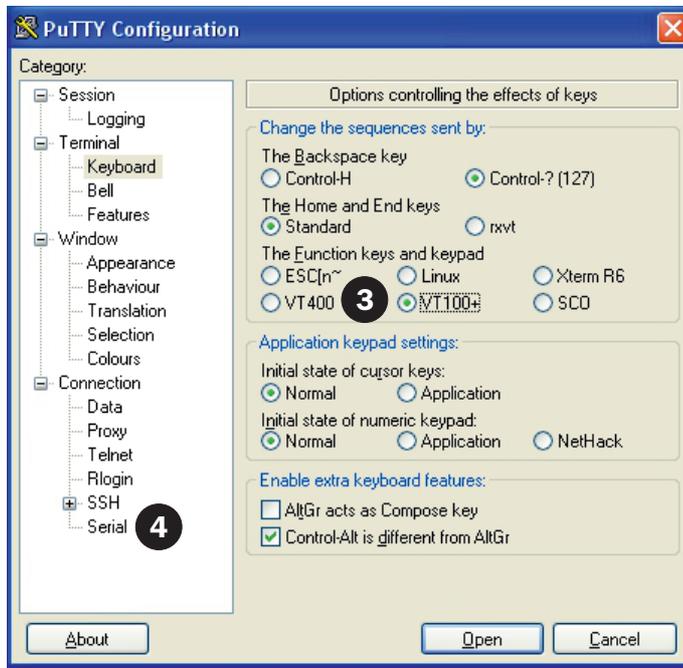


To start the program simply double-click the **PuTTY** shortcut icon on your desktop.

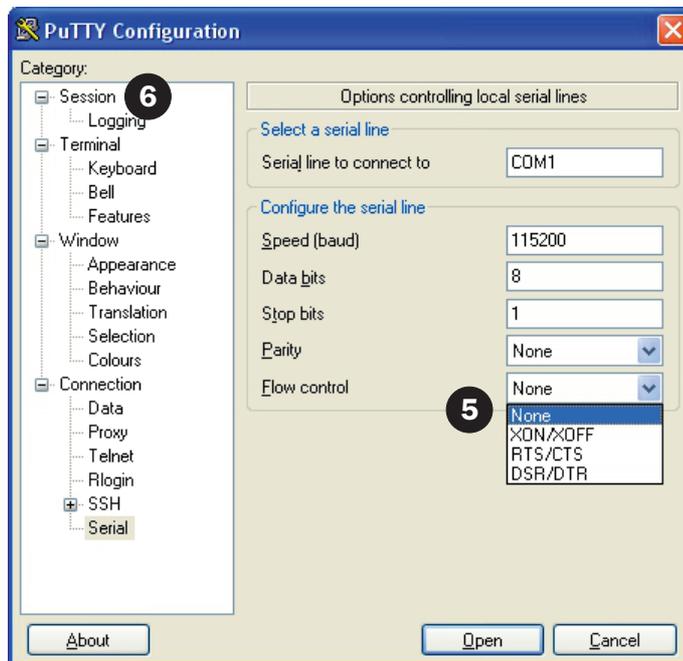
The application starts showing the configuration window.



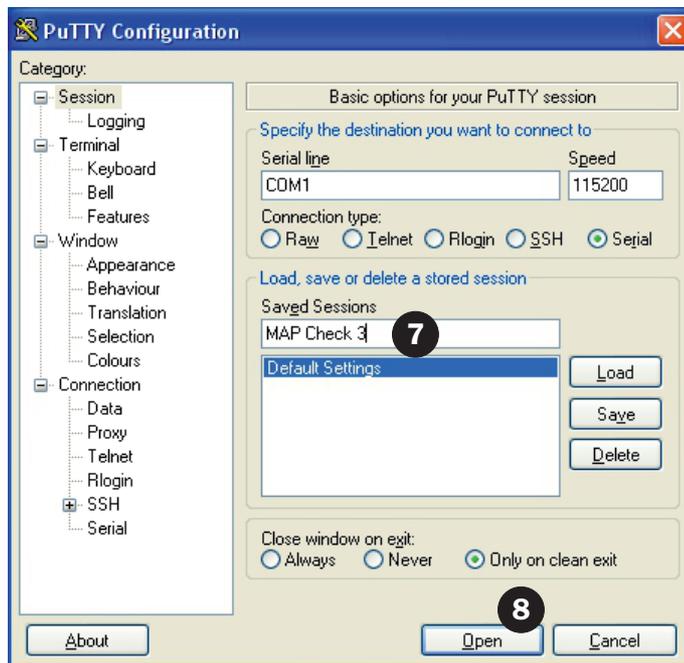
1. Select **Serial** connection type and specify the number of your computer's COM-port to which the device is connected. In the **Speed** field type **115200**.
2. Select the **Keyboard** entry in the **Category** list.



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



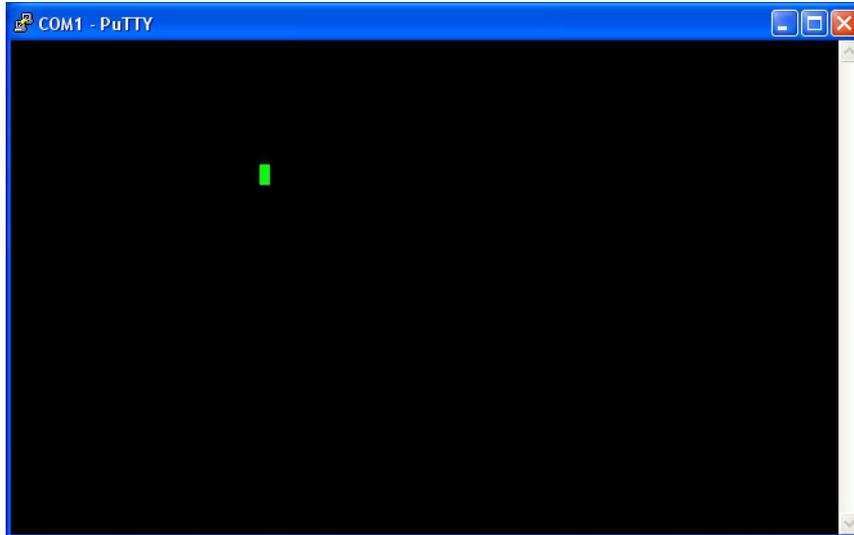
5. In the **Flow control** drop down list select **None**.
6. Select the **Session** entry from the **Category** list.



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

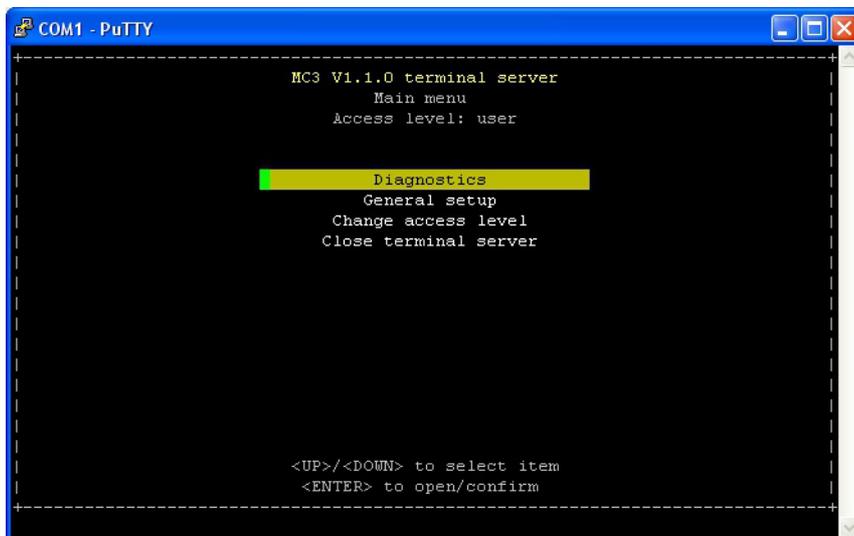
## Using PuTTY

- When the program starts...



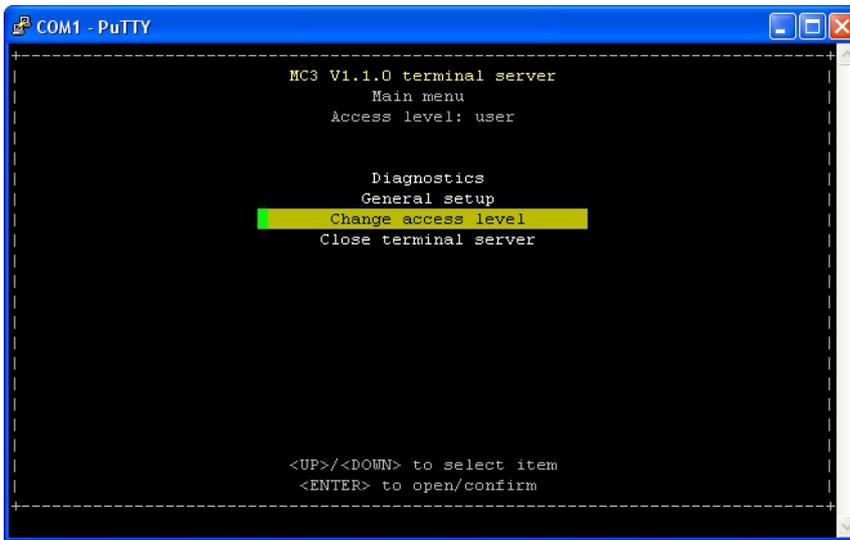
...press **F1** several times to establish a connection to the device by changing it's COM2-port protocol to **Terminal Server**.

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

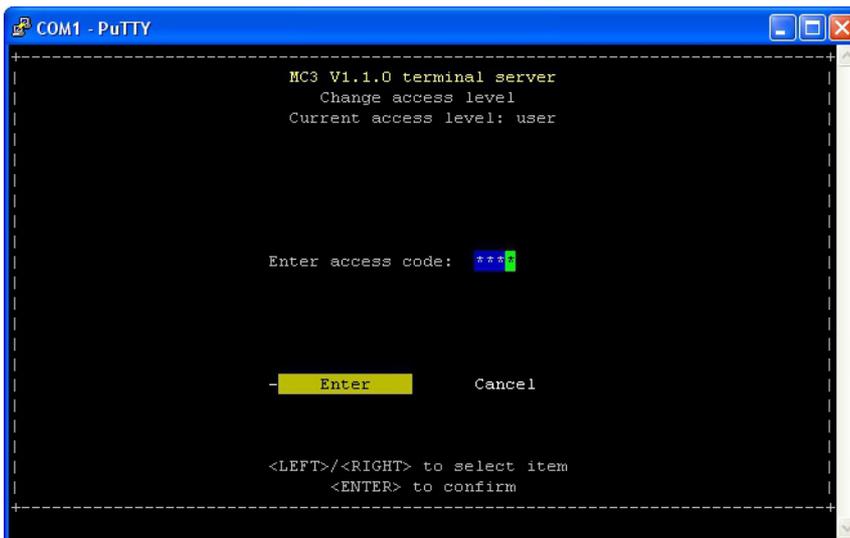


- Generally you use the **arrow** keys to navigate through the various menus and the **Enter** key to enter submenus, change settings and/or confirm a selection. When entering figures, either for access codes or numerical values, make sure to use the number keys above the letter keys on the keyboard.
- 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**.

```

COM1 - PuTTY
-----
MC3 V1.1.0 terminal server
Main menu
Access level: supervisor

Diagnostics
General setup
Export/Import
Change access level
Change administrator password
Logout
Close terminal server

<UP>/<DOWN> to select item
<ENTER> to open/confirm
  
```

- 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.

```

COM1 - PuTTY
-----
MC3 V1.1.0 terminal server
Diagnostics

Show diagnostics about: General

Serial number: 8811RD08
Power on counter: 13 days, 4 hrs, 55 mins
Pump on counter: 0 days, 9 hrs, 58 mins
Pump start count: 405 times
Ambient pressure: 1012.6 mbar
Diff pressure: -0.0 mbar
Device temperature: 34.9 C
Measure state: Ready

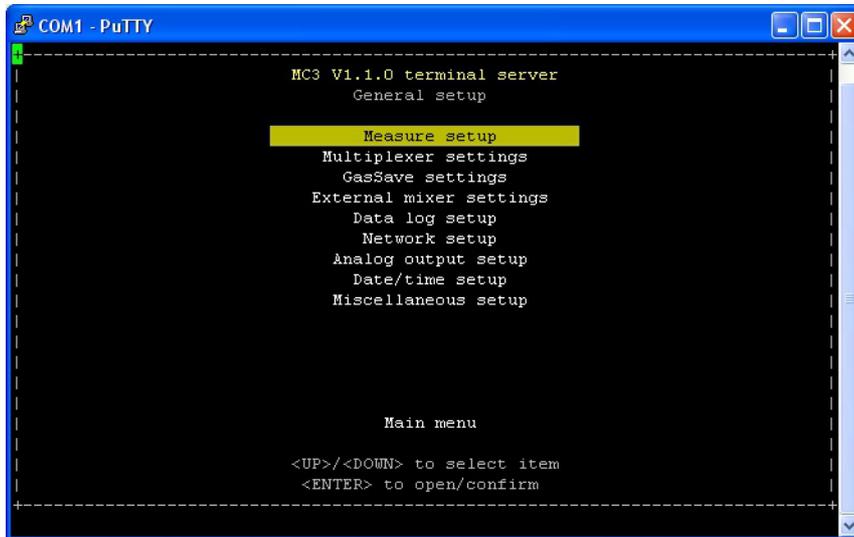
Test measure

Exit

<UP>/<DOWN> to select item
<ENTER> to scroll through items/confirm
  
```

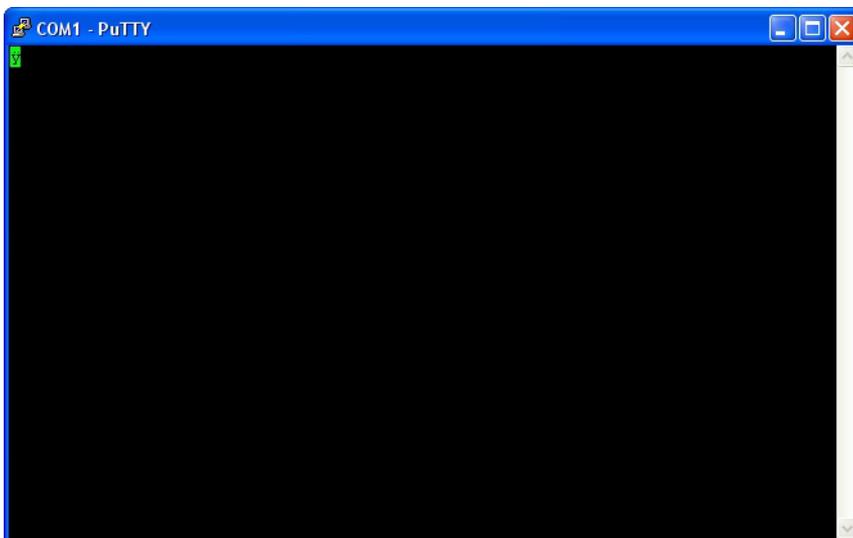
Press **Enter** to scroll through the various diagnostics items.

- 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 67](#).

- 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

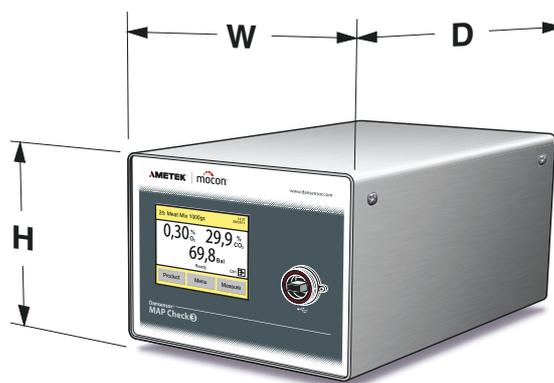
### Technical specifications

#### Electrical connections

<b>Mains</b>	100-264 VAC, 47-63 Hz
<b>Power consumption</b>	25 to 65 W (depends on configuration)

#### Mechanical data

<b>Analyzer size</b>	192 x 230 x 375 mm (H x W x D)
----------------------	--------------------------------



<b>Analyzer weight</b>	8.5 - 11.5 kg (depending on model)
<b>Box of one analyzer</b>	379 x 357 x 523 mm (H x W x D)
<b>Boxed weight</b>	10.5 to 13.5 kg (depending on model)
<b>IP classification</b>	IP 21 (an IP 45 kit is available as an option)

#### Connectivity

<b>Network/LAN</b>	Ethernet 10/100 mbit/s Base-T with DHCP client or fixed IP
<b>RS232</b>	2 x D-SUB 9 DTE interface (male connector)
<b>USB</b>	1 or 2 x Host, USB 2.0 Connector type A, max current 100mA
<b>Machine I/O</b>	D-SUB 25 male, cable supplied
<b>Analogue output</b>	Configurable: 0-20 mA, 4-20 mA, 0-10 V or 2-10 V (galvanic isolated)

### Gas connection

<b>GasSave inlet</b>	3/8" BSW, hose connector supplied
<b>GasSave outlet</b>	3/8" BSW, hose connector supplied
<b>Measure gas inlets</b>	Quick coupling, 5 mm, sample hose kit supplied per channel
<b>Measure gas outlets</b>	M5 female
<b>Measure gas hose</b>	Sample hose L=3.0 m, D=3 mm

### Basic specifications

<b>Warm-up time</b>	Operational after 10 min. (60 minutes to full specifications)
<b>Measuring ranges</b>	0-100 % O <sub>2</sub> and/or 0-100% CO <sub>2</sub>
<b>Ambient temperature</b>	Operational: 0 to +45 °C, less than 95 %RH, non-condensing Storage: -10°C to +60°C, less than 95 %RH, non-condensing
<b>Ambient pressure</b>	Operational: 900 hPa to 1050 hPa
<b>Measurement gas</b>	Inert gasses (O <sub>2</sub> , CO <sub>2</sub> , N <sub>2</sub> , Ar, Air), less than 95 %RH
<b>Measurement pressure</b>	"Pump" versions: Ambient ± 50 mbar <sup>1</sup> "Pressure" versions: 2 - 10 bar
<b>Flush-back inlet pressure</b>	4 to 7 bar, dry air or GasSave
<b>Flush-back flow</b>	Typical 1 to 5 l/min. (depending on inlet pressure)
<b>GasSave gas</b>	Any mix of dry O <sub>2</sub> , CO <sub>2</sub> , N <sub>2</sub> or Air
<b>GasSave temperature</b>	0 to +50 °C
<b>GasSave inlet pressure</b>	2 to 10 bar (relative to ambient) <sup>2</sup>
<b>GasSave flow range</b>	6 to 500 l/min. <sup>2</sup>

<sup>1</sup> The flow will be different from 425 ml/min when pressure is different from atmosphere

<sup>2</sup> GasSave flow depends on inlet- and back pressure - see "[Gas flow tables](#)" on page 100

### O<sub>2</sub> sensor

<b>Sensor type</b>	Zirconia
<b>Measure gas temperature</b>	0 to +35 °C
<b>Measure flow</b>	“Pump” versions: Typically 425 ml/min. ± 50 ml/min. “Pressure” versions: 75 ml/min. ± 20 ml/min.
<b>Measure pressure range</b>	Ambient ± 50 mbar

### CO<sub>2</sub> sensor

<b>Sensor type</b>	Infrared, NDIR, temperature controlled to +60 °C
<b>Measure gas temperature</b>	0 to +35 °C
<b>Measure flow</b>	“Pump” version: Typically 425 ml/min. ± 50 ml/min. “Pressure” version: 75 ml/min. ± 20 ml/min.
<b>Measure pressure range</b>	Ambient ± 50 mbar

### Sensor response times

The response times are highly dependent on the composition of the gas and the direction of transition. The “system flush-out time” is defined as the time it takes for the sample gas to travel from the hose inlet to the sensor. Here it is defined as the time after which the sensor is sensing app. 50% of the concentration change (T<sub>50</sub>).

The “system purge time” is defined as the time it takes further from this point until the sensor senses 99% of the concentration after the sample gas has reached the sensor (T<sub>99-50</sub>).

This is a combination of gas mixing in the hose and internal tubing and equilibration time in the sensor and sensor gas interface.

<b>System flush-out time, T<sub>50</sub></b>	5 sec. (at flow > 370 ml/min.)	
<b>System purge time, T<sub>99-50</sub></b>	Gas transition:	
	N <sub>2</sub> - Air	8 sec.
	0.1% - Air	7 sec.
	80% - Air	10 sec.
	Air - N <sub>2</sub>	8 sec.
	Air - 0.1%	7 sec.
	Air - 80%	15 sec.
	100% CO <sub>2</sub> - Air	24 sec.
	Air - 100% CO <sub>2</sub>	11 sec.

### Accuracy specification (excl. calibration)

<b>Zirconia sensor resolution</b>	0.1 % absolute in range above 10 % 0.01 % absolute in range above 1 % 0.001 % absolute in range below 1 % 1 ppm absolute in range below 0.1 %
<b>Zirconia sensor accuracy</b>	"Pump" version: ±0.01 % abs. in range below 1 % ±1 % relative in range above 1 % "Pressure" version: ±25 ppm abs. in range 0-300 ppm ±100 ppm abs. in range 300 ppm - 1 % ±1 % relative in range above 1 %
<b>CO<sub>2</sub> sensor resolution</b>	0.1 % absolute
<b>CO<sub>2</sub> sensor accuracy</b>	±0.5 % absolute ± 1.5% of reading <b>NOTE! High concentrations of Argon influences accuracy of CO<sub>2</sub> readings. The CO<sub>2</sub> value will appear to be slightly lower than actual value (app. -2-4%).</b>



NOTE! Accuracy specifications are valid at the "Specification conditions" (see [page 99](#)).

### Standard calibration specification

<b>Calibration gasses (Zr O<sub>2</sub>)</b>	25 ppm ("Pressure" versions only), 1000 ppm, 1%, 80% (balance N <sub>2</sub> ) 20.9 % (Compressed dried atmosphere air)
<b>Calibration gasses (CO<sub>2</sub>)</b>	0%, 25%, 60%, 100% (balance N <sub>2</sub> )
<b>Calibration gas accuracy</b>	< 3 %
<b>System diffusion</b>	< 25 ppm
<b>Sensor gas flow</b>	75 ml/min. ± 20 ml/min. (at 20.9% O <sub>2</sub> / Bal. N <sub>2</sub> )
<b>Ambient temperature</b>	23 °C ± 5 °C
<b>Ambient relative humidity</b>	15 - 40% RH
<b>Ambient pressure</b>	1013 hPa ± 50 hPa
<b>Total calibration accuracy (RMS)</b>	± (25 ppm + 4 % of reading) in the range 1000ppm - 100%

### Specification conditions

<b>Ambient temperature</b>	+23 °C
<b>Ambient pressure</b>	1013 hPa
<b>Measurement gas temperature</b>	+23 °C
<b>Ambient relative humidity</b>	30% RH
<b>Measurement gas relative humidity</b>	<10% RH
<b>Sensor gas flow</b>	75 ml/min
<b>By-pass gas flow</b>	350 ml/min



NOTE! All gas concentrations are specified in volume percent.

### Conformity

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

## Gas flow tables

The tables below shows the max. flow (in l/min.) that can be achieved with a specific inlet- and back pressure.

The flow for O<sub>2</sub> and N<sub>2</sub> is similar to the flow for air.

CO <sub>2</sub>		Back pressure [Bar]								
Inlet pressure [Bar]		1	2	3	4	5	6	7	8	9
	2	185								
	3	310	230							
	4	410	375	280						
	5	500	490	430	310					
	6	500	500	500	465	350				
	7	500	500	500	500	500	380			
	8	500	500	500	500	500	500	450		
	9	500	500	500	500	500	500	500	425	
	10	500	500	500	500	500	500	500	500	500

N <sub>2</sub> /O <sub>2</sub> /Air		Back pressure [Bar]								
Inlet pressure [Bar]		1	2	3	4	5	6	7	8	9
	2	250								
	3	380	300							
	4	500	445	335						
	5	500	500	500	405					
	6	500	500	500	500	420				
	7	500	500	500	500	500	435			
	8	500	500	500	500	500	500	485		
	9	500	500	500	500	500	500	500	500	
	10	500	500	500	500	500	500	500	500	500

## 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, I/O (5m), ser. cpl. .... P/N 301098

### Consumables

- Filter, sample gas 1 $\mu$ , Water trap (10 pcs.) ser. cpl. .... P/N 210669
- Filter, sample gas 1 $\mu$ , Water trap (100 pcs.) ser. cpl. .... P/N 280209
- Kit, multiplum filter, Gas in (3 pcs.) ser. cpl. .... P/N 301092
- Kit, multiplum filter, fan (10 pcs.) ser. cpl. .... P/N 301093
- Sampling kit, on-line, 3m  $\varnothing$ 3x0.5, quick connect, ser. cpl. .... P/N 310619
- Filter, 5 $\mu$ m (2 pcs.) ser. cpl.<sup>1</sup> .... P/N 310629
- Sampling kit, on-line, pressure, quick connector, ser. cpl. .... P/N 310630
- Filter, dust 40x40mm (30 pcs.) ser. cpl. .... P/N 330663

<sup>1</sup> To "MEASURE CHANNEL" inlet on "Pressure" versions

### Accessories

- Option, PC Software, MAP Check 3. .... P/N 300774
- 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
- Option, PC Software Data Collection, Ser. Cpl. .... P/N 340370

## Toxic and Hazardous Substances or Elements

(For China RoHS compliance)

See table on the next page.

MAP Check 3 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 <sub>2</sub> Zirconia (氧化锆探头)	0	0	0	0	0	0	
Sensor CO <sub>2</sub> Infrared (红外二氧化碳探头)	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	
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	
<p><b>0:</b> 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。</p> <p><b>X:</b> Indicates that the toxic substance contained in at least one of the homogenous materials for this component exceeds the limit requirements 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>							

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**AMETEK**<sup>®</sup>

The logo for MOCON, featuring a red semi-circular arc above the word "mocon" in a lowercase, sans-serif font. A vertical line is positioned to the left of the logo.

A block of contact information for MOCON Europe A/S, including the company name, address, phone number, email, and website. A red and grey horizontal bar is located above the text.

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