Dansensor®
MAP Mix ProVectus
User Guide EN

AMETEK® | mocon®

P/N 300862-K
11/2019

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

Dansensor®
MAP Mix ProVectus
User Guide

EN

Published by:

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

P/N 300862-K
11/2019

P/N 300862-K
11/2019

Table of contents

1. General Information 7
   - About this Manual 7
     - Intended Use of this Manual 7
     - Reservations 7
   - Important! 7
     - Safety and Use 7
   - Notes, cautions, warnings and tips! 8
     - Tips and recommendations 8
   - Safety Instructions 9
     - General 9
     - Installation 9
     - Operation and Maintenance 9

2. Introduction 11
   - Dansensor® MAP Mix Provectus 11
   - Flow System 12
     - “Flow” 13
     - “Buffer” 13
   - Overview 14

3. Connections 17
   - Gas Connections 17
     - Correct mounting/dismounting of fittings 17
     - Correct tubing for gas inlets 17
     - “Flow” versions 18
     - “Buffer” versions 19
   - Electrical connections 20
     - Power connector 21
     - I/O Cable 21
     - COM-1/COM-2 Cables 23
     - Relay signalling 24
     - I/O signals for machine control 24
   - Bridging of multiple mixers 25

P/N 300862-K
11/2019

4. Operation and Maintenance 27

General 27
The Main Screen 28
Start up 29
"Black Box" models 29
Display models 29
Selecting a product for mixing 30
Start mixer 30
Analog control 30
Errors/Warnings 31
Error/Warning messages 31
Error/Warning list 32
Using MAP Mix Provectus in MM8000 emulation mode 35
MMP emulating MM8000 using PBI protocol (PSIP) interface on COM1 35
MMP as MM8000 using analogue control 43
MMP emulating MM8000 connected to CMV-2 43
Cables for use with MAP Mix Provectus 44
Cleaning and Maintenance 45
General 45
Spare parts 45
Cleaning 45
Replacing gas inlet filters 45
Replacing air inlet and outlet dust filters 46

5. Menus and Settings 47

General 47
Main menu 47
Product menu 48
Edit product 48
Clear product contents 49
View collected data 49
Delete collected data 49
Delete all collected data 49
Data log 50
Diagnostics menu 50
General setup 51
Mixer configuration 52
Network setup 54
Data log setup 54
Formats/Units/Time 59

Access level **60**
Change Supervisor PIN code 60
Export/Import **62**
Language **62**

6. PuTTY Terminal Server **63**
Preparations **63**
Configuration and Use **63**
Initial configuration 63
Using PuTTY 66

7. Technical Information **71**
Technical specifications **71**
Electrical connections 71
Mechanical data 71
Connectivity 71
Gas connections 72
Basic specifications 72
Specification conditions 73
Conformity 73
Pressure dependend flow capacity tables 74
Spare parts, consumables and accessories **75**
Ordering items 75
Spare parts 75
Consumables 75
Accessories 75
Toxic and Hazardous Substances or Elements **75**

P/N 300862-K
11/2019

1. General Information

About this Manual

Intended Use of this Manual

- This manual describes the common use and maintenance procedures of the **Dansensor® MAP Mix Provectus** gas mixer.
  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.

P/N 300862-K
11/2019

Notes, cautions, warnings and tips!

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

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

Explanation

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

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

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

Tips and recommendations

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

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

Safety Instructions

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

General

- Always refer to the manual before operating or maintaining the equipment.
- Observe all WARNINGS, CAUTIONS and NOTES.
- Do not open the device. In case of technical problems please contact your service provider.
- Do not cover the machine with a cloth or piece of plastic to protect it from dust, as this prevents free air circulation around the machine and might lead to overheating.
- 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 Mix Provectus

Dansensor® MAP Mix Provectus is a proportional gas mixer for gas mixing and monitoring of gas and pressure, especially designed for packaging machines, welding and other industrial applications, where the gases Ar (option), O_2, CO_2, N_2, and Air can be used in either 2-gas or 3-gas combinations.

The mixing principle of **Dansensor® MAP Mix Provectus** is very stable and can be used for all types of packaging machines, both flow packaging machines, vacuum packaging machines and other industrial processes such as welding.

Dansensor® MAP Mix Provectus is user-friendly with very high precision, also under conditions which usually cause problems for most other types of gas mixers.

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

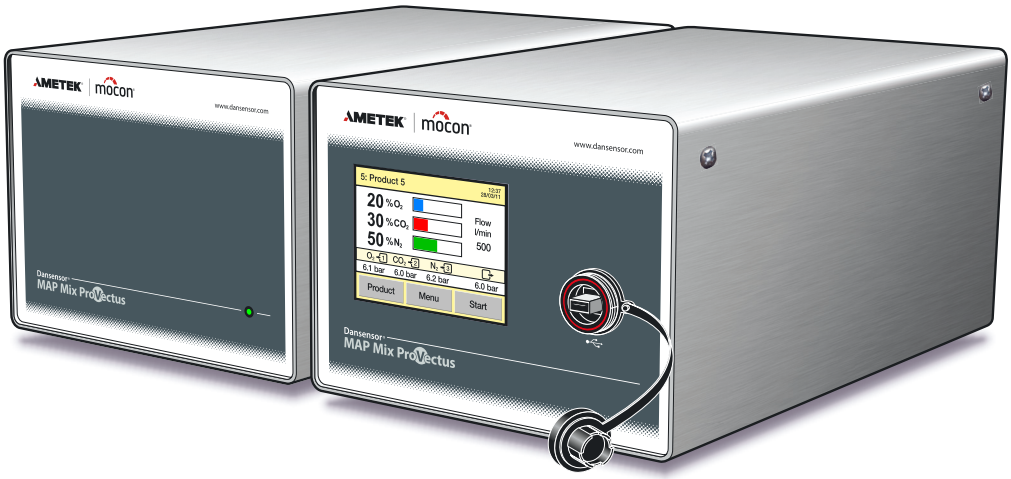
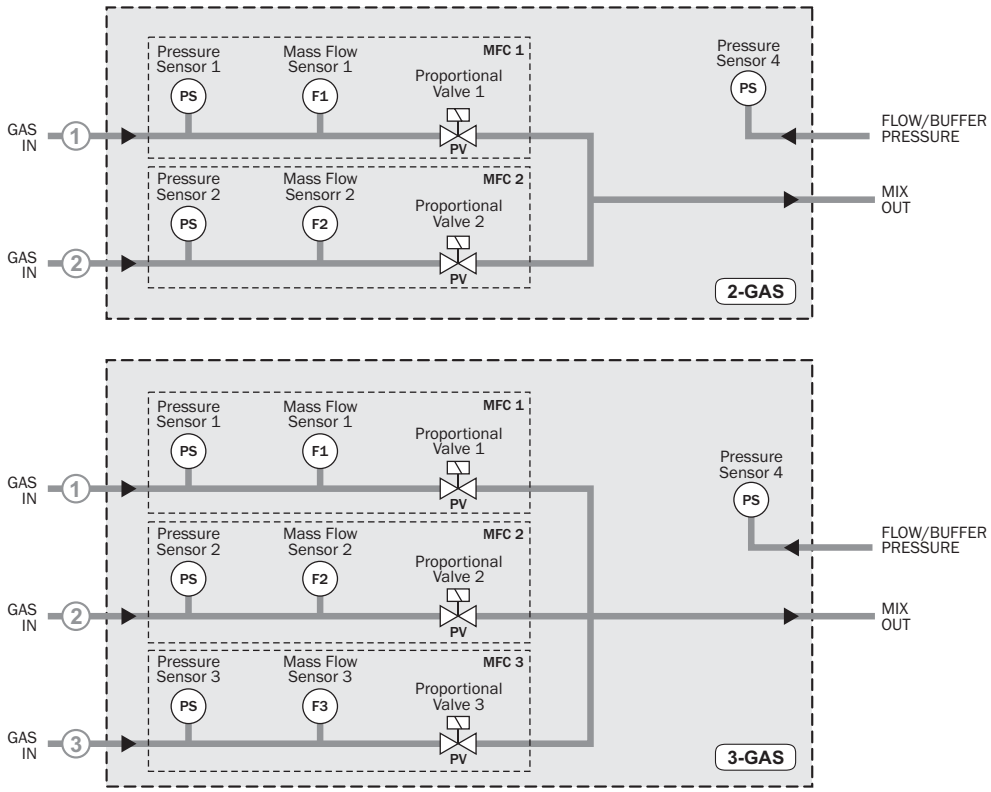


Fig. 1. Dansensor® MAP Mix Provectus "Black-Box" and "Stand-Alone" versions

Dansensor® MAP Mix Provectus is offered either as a "Stand-Alone" version or a "Black-Box" version without user interface. The "Black-Box" version is especially designed for cost effective automated machine control and can only be externally controlled and maintained.

Flow System

The figure below shows the internal flow system of the **Dansensor® MAP Mix Provectus** 2-Gas and 3-Gas versions respectively.



The principle used in the gas mixer is based on the use of "Mass Flow Controllers" (MFC). For each gas line in the mixer there is an MFC controlling the flow of the respective gas. The mixture is programmed by the software and each MFC is then set to a flow proportional to the required mixture of the respective gas.

Example: Total flow required = 500 l/min, 30% CO_2 and 70% N_2; the software calculates the necessary flow of each gas input (150l/min CO_2 and 350l/min N_2) and the MFC´s are set to deliver these flows.

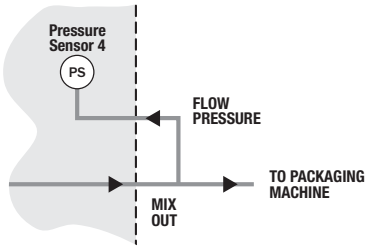
Each MFC has a PID controller which controls the proportional valve based on the measured flow from the Mass Flow Sensor and the set point.
The pressure drop through the gas mixer is much lower than on traditional mechanical mixers and this assures maximum usage of the input gas pressure ranges and also allows running at lower input pressures (depending on the back pressure at the output).

Each gas line is fitted with a pressure sensor (PS) and in case of low gas supply pressure a gas input pressure alarm can be set to give an early "Alarm" signal to alert user of low gas supply pressure.
If input pressure exceeds the minimal or maximal functional levels a "Fault" relay will be activated. This can be used to stop the packaging machine.

The mixer can be installed for either "Flow" or "Buffer" operation. The main difference is in the installation (see explanation below).

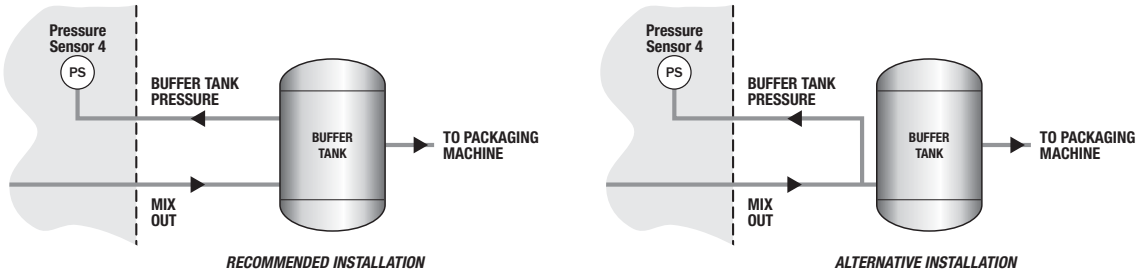
"Flow"

The "Flow" mixer feeds gas directly to a line in the packaging machine. The built-in pressure sensor has no control function but is solely used for monitoring of the output pressure.



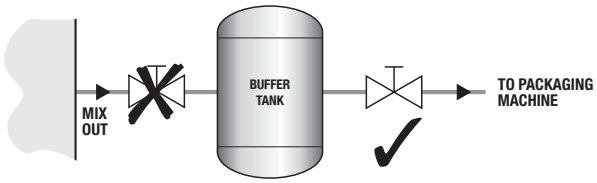
"Buffer"

The "Buffer" version, which is typically used by vacuum packers, feeds gas to a buffer tank from where the packaging machine gets its gas supply. The built-in pressure sensor is used to maintain the set buffer tank pressure.

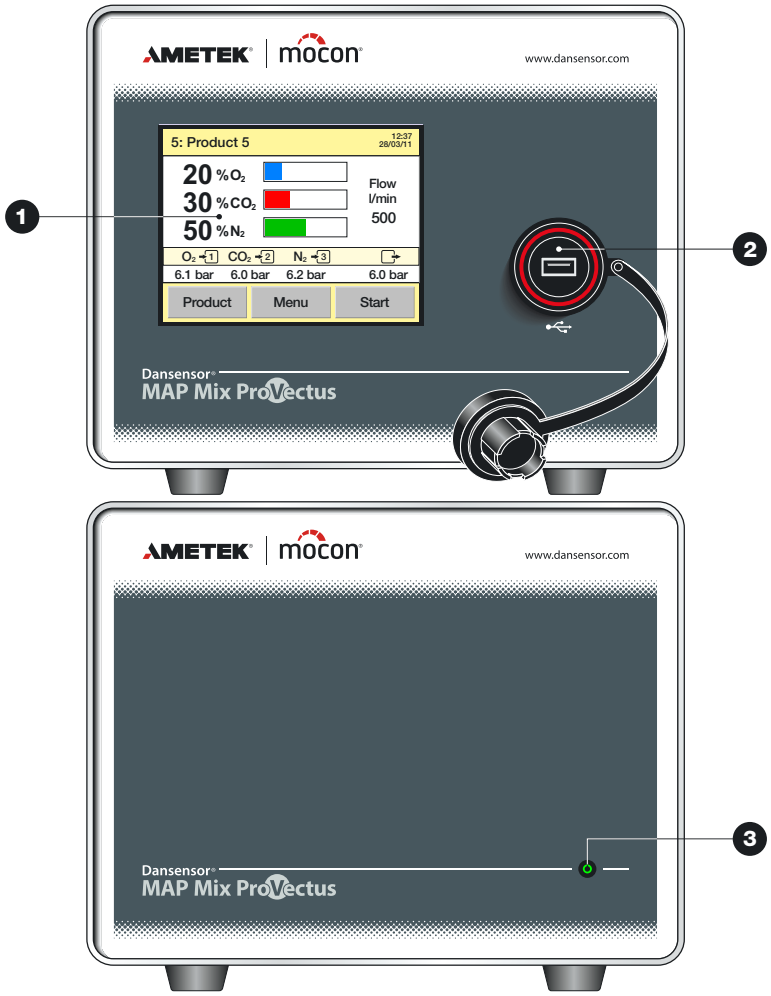


NOTE! We recommend that the buffer tank has a separate connection for the pressure sensor. If this is not the case make sure to establish a connection on the inlet string as close to the buffer tank as possible.

WARNING! Make sure that the gas outlet is NEVER blocked or restricted in front of the buffer tank.



Overview

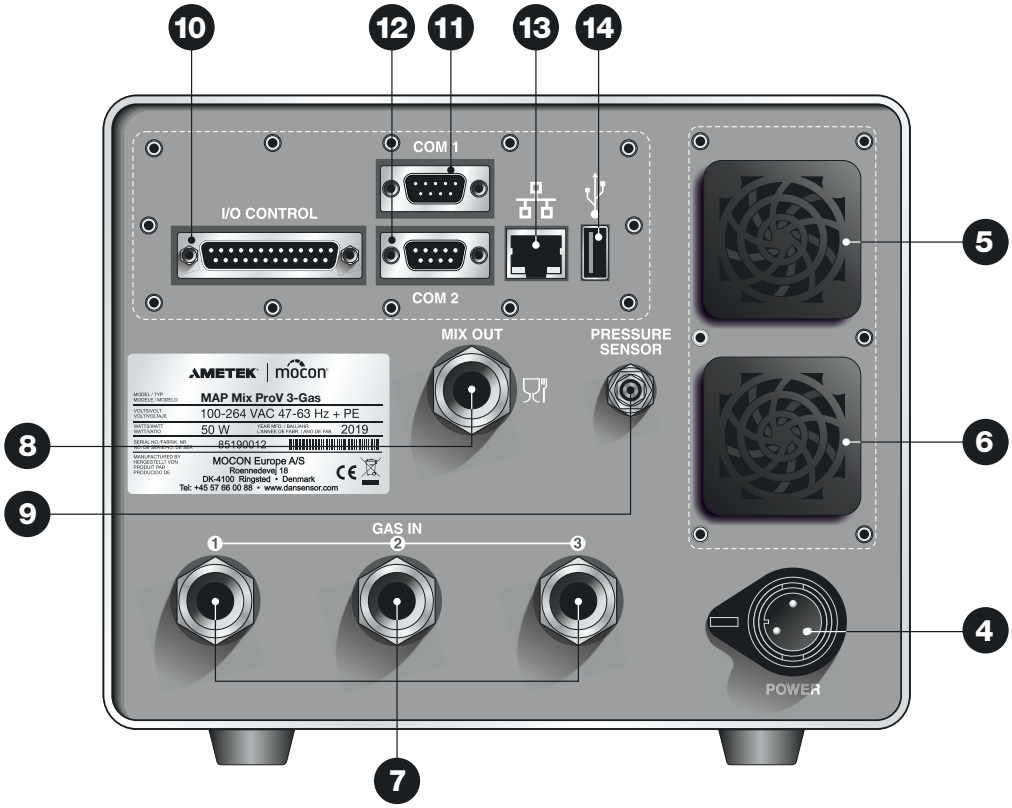


1 **5" touch panel color display** ("Stand-Alone" versions only)
For intuitive operation of the device by use of explanatory icons and easy understandable text messages and buttons.

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** Mixing
- **Red - steady** 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 **"GAS IN (1-2-3)"**
Connectors for inlet gasses (3-Gas mixer illustrated)

8 **"MIX OUT"**
Connector for mixed gas outlet

9 **"PRESSURE SENSOR"**
Inlet connector for flow gas/buffer pressure measurement

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

11 **"COM1"**
RS232 port (D-SUB 9) for connection to packaging machine, MAP Check 3 or master mixer or external data collection and control via PC software (SDK-PSIP)

12 **"COM2"**
RS232 port (D-SUB 9) for control signals when controlling a slave mixer

13 **LAN/Ethernet port**
Connection to local computer network for
- external data collection
- Modbus TCP communication with packaging machine
The port has 2 built-in status indicator LED's

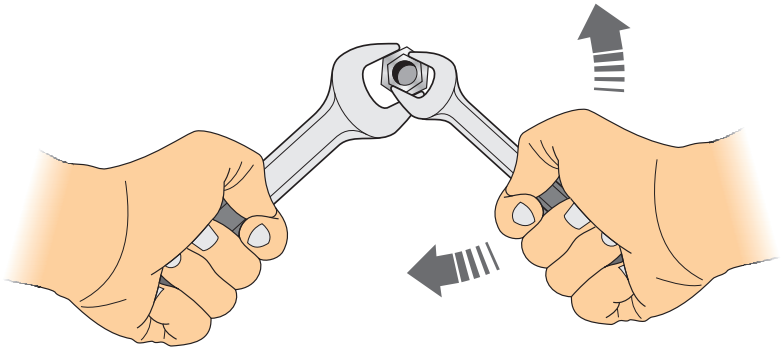
14 **USB host**
For connection of a memory stick
"Stand-Alone" versions have a USB connector on the device front as well.

3. Connections

Gas Connections

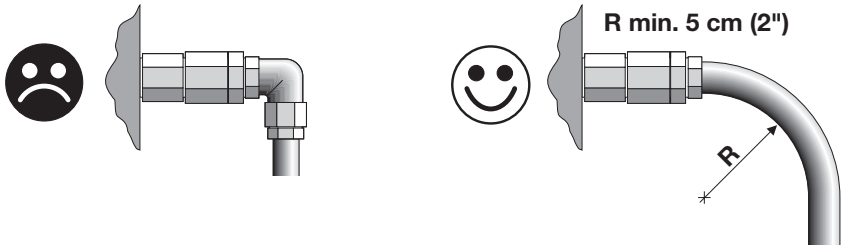
Correct mounting/dismounting of fittings

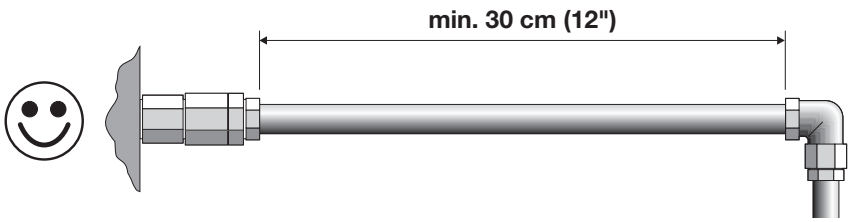
CAUTION! When mounting/dismounting fittings in order to change filters or connect gasses, it is very important that you hold against on the already mounted fittings to avoid damaging the existing assemblies.



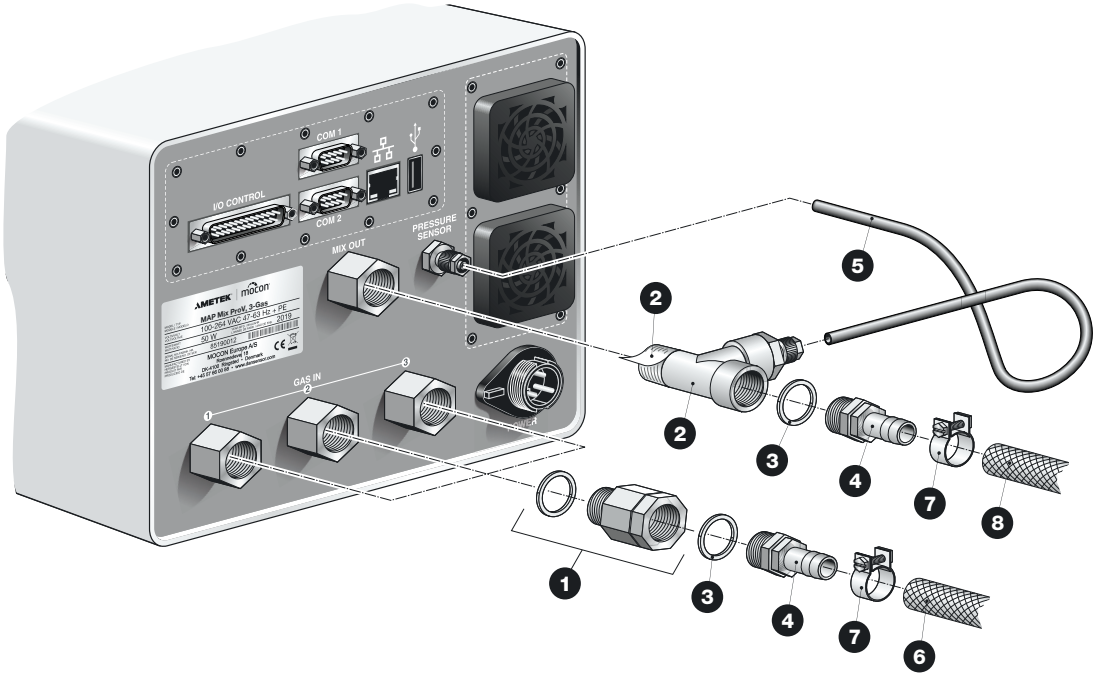
Correct tubing for gas inlets

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”).





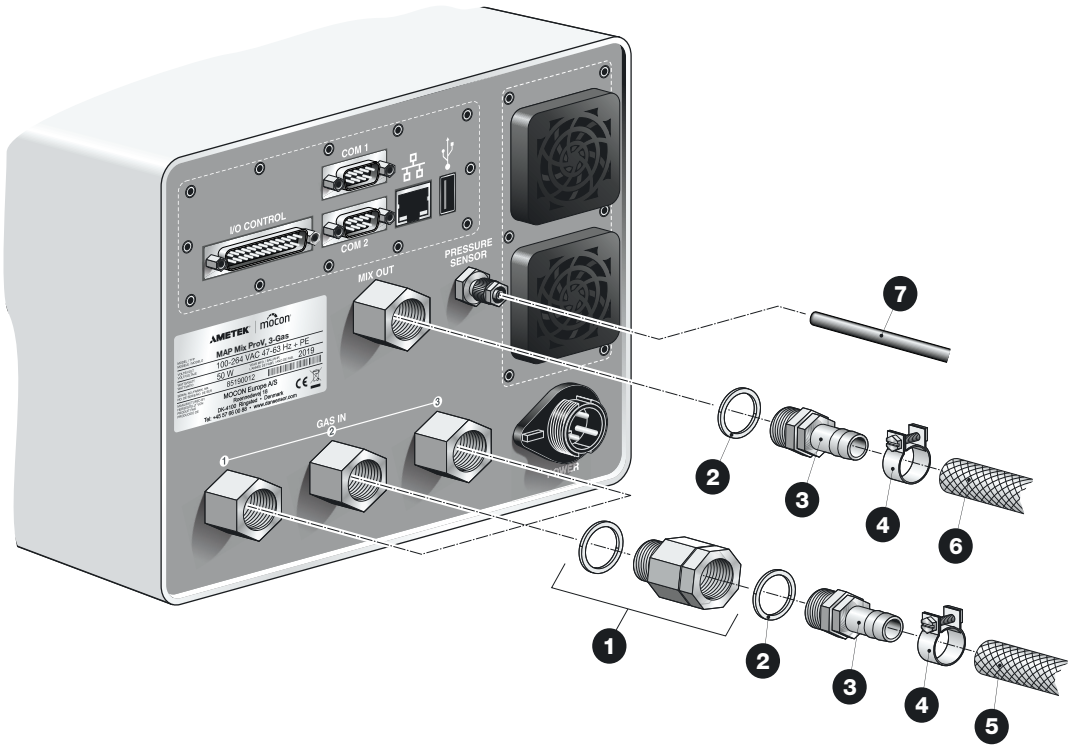
"Flow" versions



- The input gas filters ❶ have been fitted to the "GAS IN" inlet connectors from the factory.
- Connect the T-fitting ❷ to the "MIX OUT" outlet connector, then connect the hose fittings ❹ using the gaskets ❸ to the T-fitting ❷ and to the gas filters ❶ on the "GAS IN" inlet connectors.
- Connect pressure measurement hose ❺ from the T-fitting ❷ to the "PRESSURE SENSOR" inlet connector.
- Connect the gas in- and outlet hoses ❻ and ❽ to the hose fittings ❹ on "GAS IN" and "MIX OUT" using the hose clamps ❼.

CAUTION! Never operate the mixer without installing the input filters ❶.

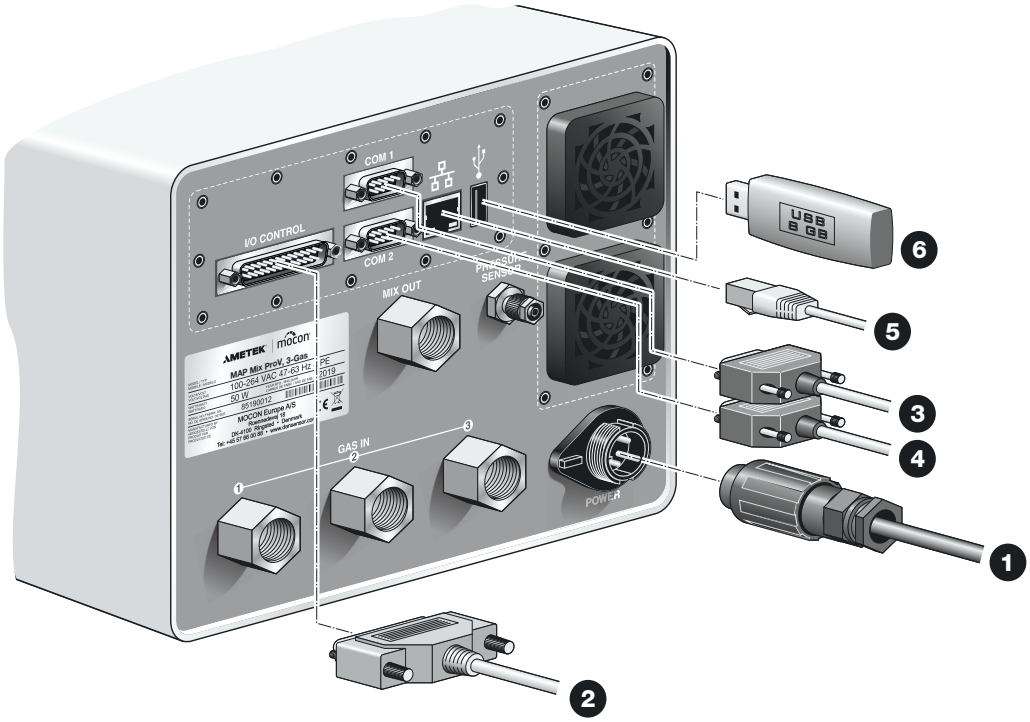
"Buffer" versions



- The input gas filters ❶ have been fitted to the "GAS IN" inlet connectors from the factory.
- Connect the hose fittings ❸ using the gaskets ❷ to the gas filters ❶ on the "GAS IN" inlet connectors and to the "MIX OUT" outlet connector.
- Connect pressure measurement hose ❼ between the pressure measurement outlet on the buffer tank and the "PRESSURE SENSOR" inlet connector.
- Connect the gas in- and outlet hoses ❺ and ❻ to the hose fittings ❸ on "GAS IN" and "MIX OUT" using the hose clamps ❹.

CAUTION! Never operate the mixer without installing the input filters ❶.

Electrical connections



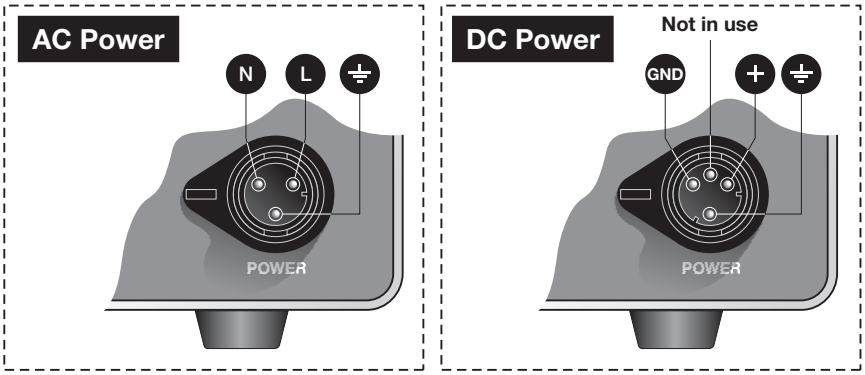
- Connect the power supply cable ❶ between a power outlet and the "POWER" connector. (The power cable is delivered with the device).
- Connect a 25-pole communication cable ❷ from the "I/O CONTROL" connector to the appropriate port on the packaging machine. This cable is delivered with the device. See cable specifications in *"I/O Cable" on page 21*.
- Connect a 9-pole serial cable ❸ from the "COM1" connector to the "COM2" connector on the MAP Check 3 or a master mixer or to the appropriate port on the packaging machine - see *"COM-1/COM-2 Cables" on page 23* for details. This cable is not delivered with the device.
- Connect a 9-pole serial cable ❹ from the "COM2" connector to the "COM1" connector on a slave mixer (option) - see *"COM-1/COM-2 Cables" on page 23* for details. This cable is not delivered with the device.
- Connect a LAN/Ethernet cable ❺ from the LAN connector (labelled 🖧) to a connector on your local area network This cable is not delivered with the device.

NOTE! Use CAT6 cables for optimal noise immunity.

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

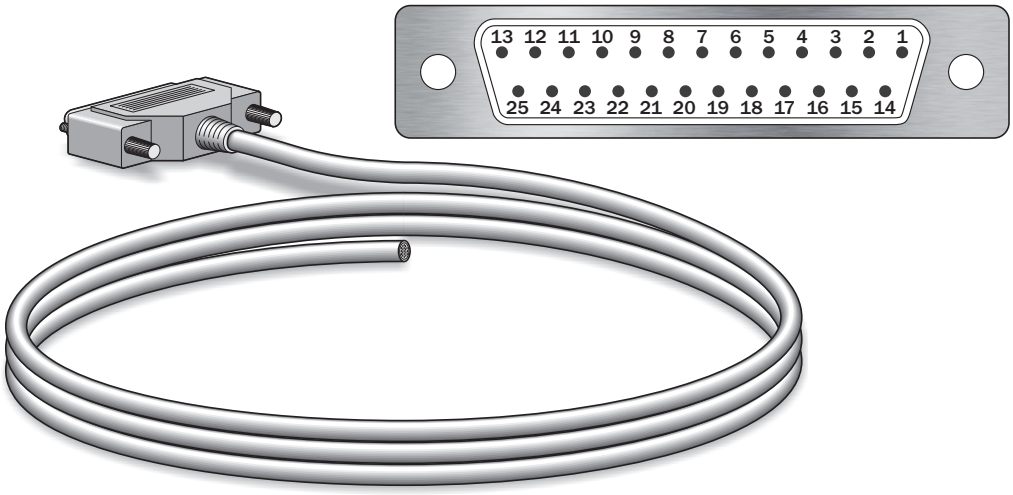
Power connector

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



I/O Cable

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

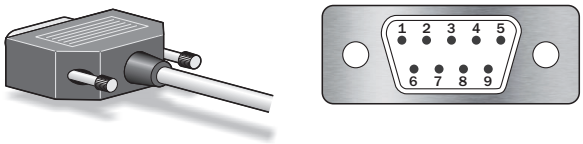


Pins/Colours/ Function	Description
1 - White 2 - Brown "Start/Stop"	Start/Stop signal from packaging machine / PLC. Signal must be stable: 10-32VDC (bipolar), consumption: 10mA max.
5 - Grey 6 - Pink "Alarm", NO	Alarm relay output. Activated if input gas pressure is lower than pressure alarm limit. Relay contacts: Normally Open (NO), max. 48V, max. 1A Contacts closed during power OFF

Pins/Colours/ Function	Description
5 - Grey 7 - Blue "Alarm", NC	Alarm relay output. Activated if input gas pressure is lower than pressure alarm limit. Relay contacts: Normally Closed (NC), max. 48V, max. 1A Contacts open during power OFF
11 - Grey/Pink 12 - Blue/red "Fault/Ready", NO	Fault/ready relay output. Activated if device is NOT ready or has severe error. Relay contacts: Normally Open (NO), max. 48V, max. 1A Contacts closed during power OFF
11 - Grey/Pink 13 - White/Green "Fault/Ready", NC	Fault/ready relay output. Activated if device is NOT ready or has severe error. Relay contacts: Normally Closed (NC), max. 48V, max. 1A Contacts open during power OFF
18 - Grey/Brown 19 - White/Pink "Voltage Control 1"	External control of mix setting #1. Voltage input range: 0/2 to 10V. **Note ! May never exceed 15 volts** Pin 18: positive (+) voltage input, Pin 19: ground reference input (-)
19 - White/Pink 20 - Pink/Brown "Voltage Control 2"	External control of mix setting #2. Voltage input range: 0/2 to 10V. **Note ! May never exceed 15 volts** Pin 20: positive (+) voltage input, Pin 19: ground reference input (-)

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"	Limited current output supply +5V maximum current: 250mA

COM-2 Main (SLAVE) 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

Relay signalling

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

FAULT Relay		State of device
Device OFF	DSUB pin 11 connected to pin 12	"Fault" (Off)
Device ON - OK	DSUB pin 11 connected to pin 13	"OK"
Device ON - Fault	DSUB pin 11 connected to pin 12	"Fault"
DSUB pins/colour	Pin 11 - Grey/Pink (Common) Pin 12 - Blue/Red Pin 13 - White/Green	

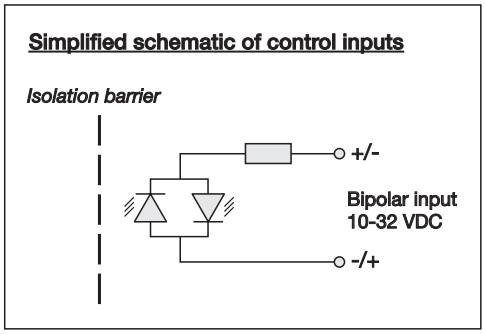
ALARM Relay		State of device
Device OFF	DSUB pin 5 connected to pin 6	"Alarm" (Off)
Device ON - OK	DSUB pin 5 connected to pin 7	"OK"
Device ON - Fault	DSUB pin 5 connected to pin 6	"Alarm"
DSUB pins/colour	Pin 5 - Grey (Common) Pin 6 - Pink Pin 7 - Blue	

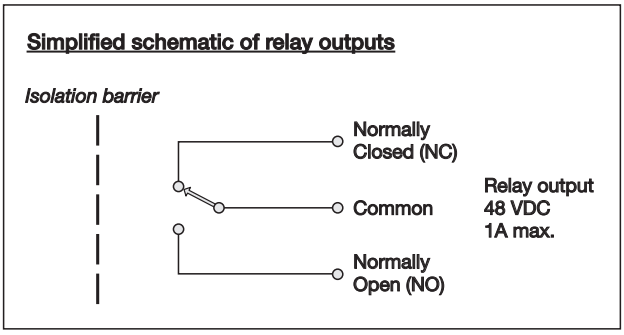
I/O signals for machine control

I/O machine control:

- Start/Stop input

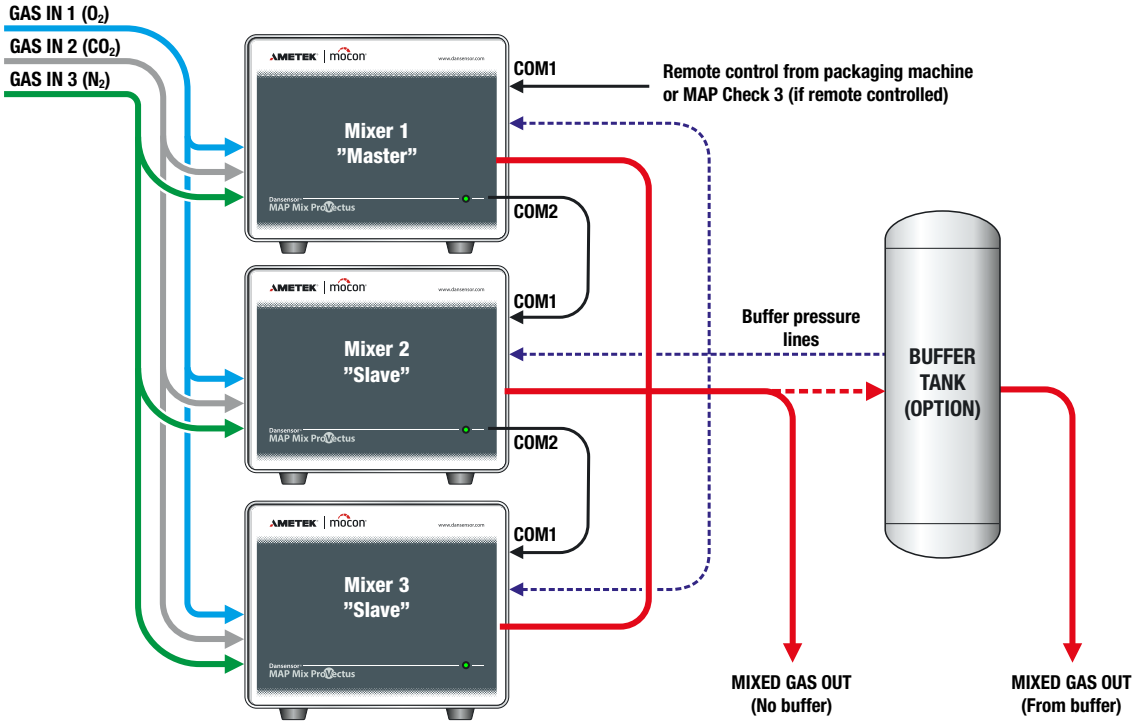
- Fault relay
- Alarm relay





Bridging of multiple mixers

Dansensor® MAP Mix Provectus gas mixers with firmware version V1.10 and above, has a build in facility to bridge up to 3 gas mixers of exact same configuration to achieve very high gas flows making it possible to reach up to 4500 l/min depending on selected mixture.



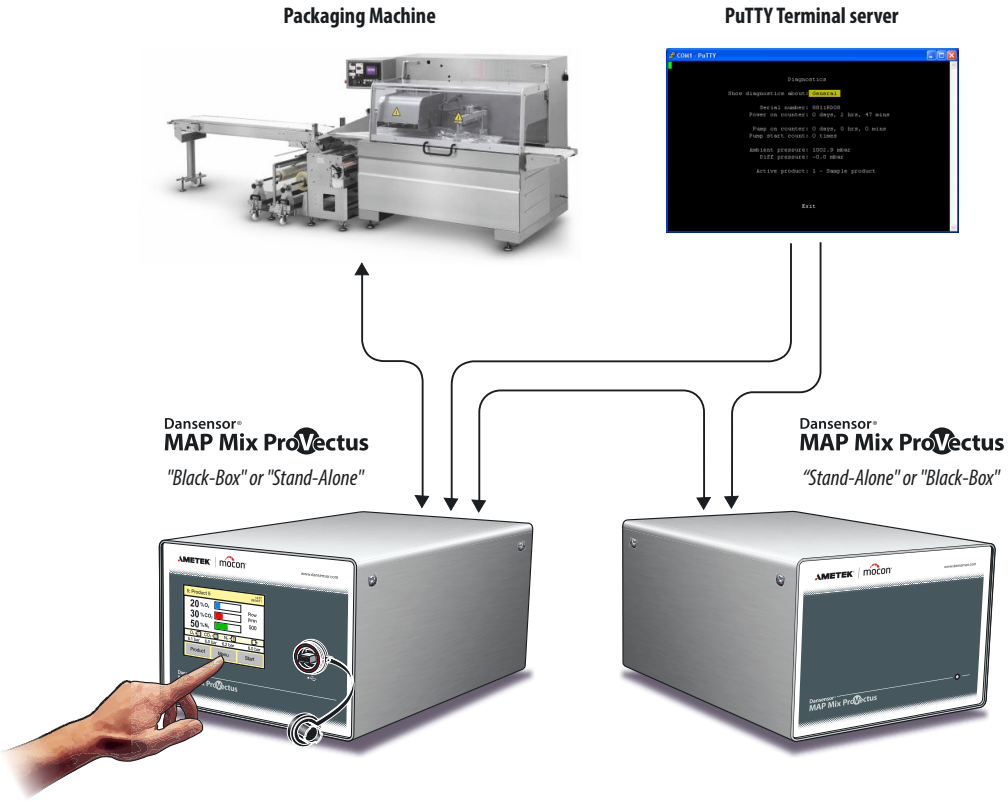
Rules and restrictions for bridged mixers:

- Up to 3 mixers in total can be bridged
- Mixers must be of same type (2-gas or 3-gas) and have the same SW version
- First mixer in bridge is “Master” mixer and will automatically control the “Slave" mixers
- Setting of gas mix, flow and control of start/stop is done on "Master" mixer only
- Bridged mixers DO NOT support GasSave control by MAP Check 3
- Bridged mixers can only be controlled as “Flow” or “Buffer” mixers
- In a “Buffer” configuration all “PRESSURE SENSOR” inputs must be connected to the buffer tank
- Mixers are “daisy chained” using short (0.5 m) NULL modem cables - see *"Accessories" on page 75*
- Gas supply and output must be connected parallel to same ports
- The restrictions of minimum bending radius and length must be fulfilled - see *"Correct tubing for gas inlets" on page 17* for details
- On mixers with display a small icon shows the number of connected “Slave” mixers

4. Operation and Maintenance

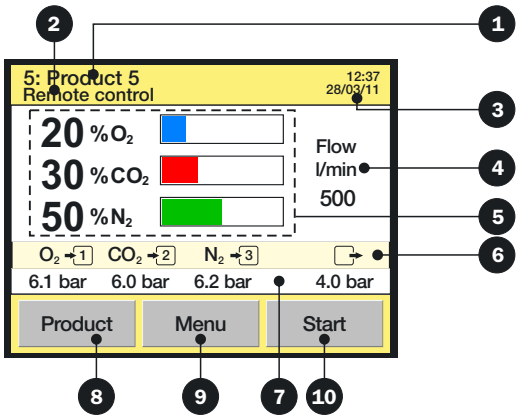
General

The illustration below shows an overview of the various control options for the **Dansensor® MAP Mix Provectus**.
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 63* for details.



The Main Screen

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



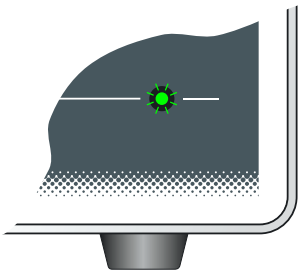
The main screen offers the following information/functions:

❶ **Selected product**	Currently selected product number/product name.
❷ **Remote control**	Displayed when the device is remote controlled from Modbus TCP protocol. In this case the buttons ❽, ❾, and ❿ are disabled.
❸ **Time/Date**	Current time and date
❹ **Flow**	Display of the gas flow setting of the currently selected product. (Only displayed when mixer is set to “Flow” mode mixing)
❺ **Mix settings**	Display of the gas mix settings of the currently selected product.
❻ **Connected gasses**	Display of the gasses connected to the gas inputs and as selected in the “Mixer configuration”.
❼ **Gas pressures**	Display of the gas pressures currently measured by the pressure sensors on the gas in- and outlets. When pressure on either of the gas inlets (1-3) gets below a preset lower value the pressure is indicated in red and the mixer generates an early "Alarm" signal to alert user of low gas supply pressure.
❽ **Product key**	Takes you to the Products list for selection of product. See *"Selecting a product for mixing" on page 30* for details.
❾ **Menu key**	Takes you to the Main menu. See *"Main menu" on page 47* for details.
❿ **Start/Stop key**	Starts/stops the mixer. If the device has been setup for external start/stop control, the external control signal from the packaging machine determines when the mixer starts and stops and the Start/Stop key is disabled.

Start up

"Black Box" models

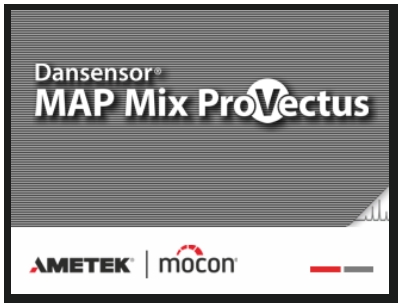
When power is applied to the unit, the indicator on the front will be lit.



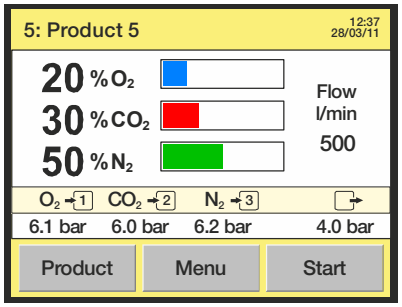
After a short internal self diagnosis the device will be ready for use.

Display models

When first powered ON the display will shortly show the **Dansensor® MAP Mix Provectus** splash screen.



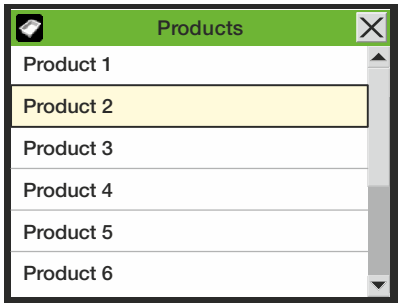
After a short internal self diagnosis the device will switch to show the main screen and be ready for use.



Selecting a product for mixing

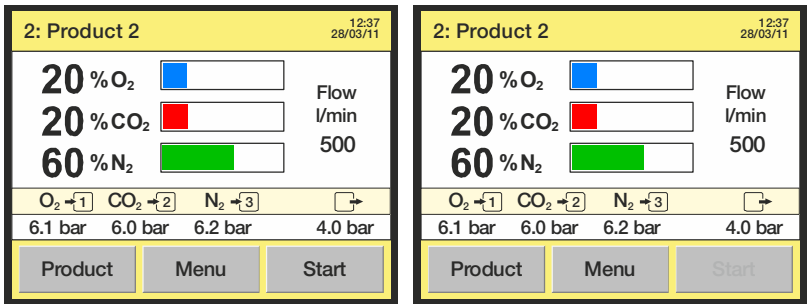
Select a product for measuring by selecting it from the **Products** list as described below:

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



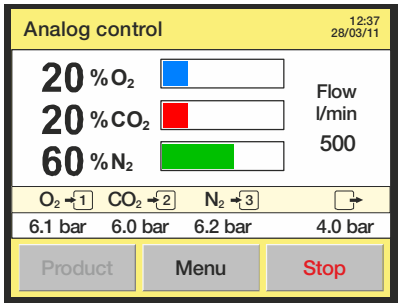
   The **Products** list holds a fixed amount of products (10) and you cannot delete a product or add new products.
   Blue text indicates that the product has logged data.
2. Use scroll keys ▲ and ▼ to locate the appropriate product then press product to select it and return to the measuring screen.

Start mixer



The mixer can be started and stopped manually using the **Start/Stop** key in the main screen. If the device has been setup for external start/stop control, the external control signal from the packaging machine determines when the mixer starts and stops and the **Start/Stop** key will be disabled in the main screen.

Analog control

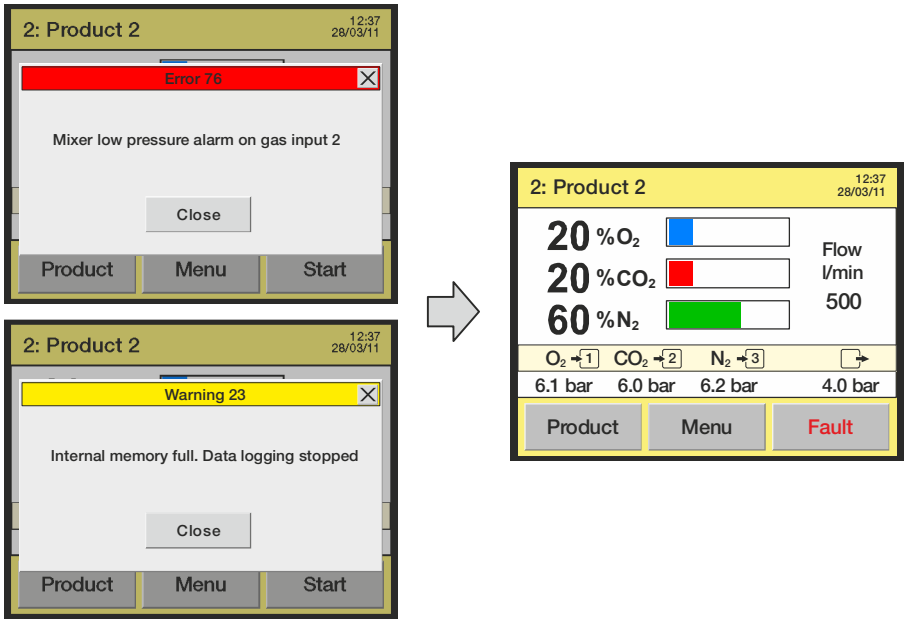


If mixer has been set-up for analog control (see *"Mixer configuration" on page 52* for details) the mix is controlled by the packaging machine and thus the **Product** key for selection of products is disabled.

Errors/Warnings

Error/Warning messages

In case a device error or warning occurs, a pop-up window appears on the display. An error will stop the mixer as well (a warning will not).



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 pop-up window either press the **Close** button or the **X** button in the upper right corner.
Before you can start mixer again you must clear the error by pressing the **Fault** button.

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

See the complete *"Error/Warning list" on page 32*.

A list of the most recent errors/warnings is available from the **Diagnostics menu** - see *"Diagnostics menu" on page 50* 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 50* for details.

No.	Type	Message	User action
0	Error	Unknown error has occured	Re-start unit If error persists, contact service
1	Warning	No products were found, a product with default values was created	User information
2	Warning	Too many products were found, some of the products are 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 open 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
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
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
61	Error	Cannot start mixer: invalid mixer parameters.	User information
62	Warning	Mixer is not calibrated	Contact service for calibration
63	Error	Mixer could not reach requested flow	Check that the inlet pressure is OK (2-10 bar)
71	Error	Cannot establish connection to external mixer	User information
72	Error	Data log network dump failed: cannot connect to server	Check LAN connection
73	Error	Data log network dump failed: connection to server was lost	Check LAN connection
74	Error	Data log network dump failed: no ACK received	Check LAN connection
75	Error	Data log network dump failed: wrong ACK received	Check LAN connection
76	Error	Mixer low pressure alarm on gas input X	User information
77	Error	Error from slave mixer	User information
78	Error	Configured flow over maximum possible	User information
80	Error	Cannot start mixer: flow under minimum	User information
81	Error	Pressure alarm on gas input X	User information

No.	Type	Message	User action
85*	Warning	Device temperature very low	Place unit in temperature above 0 °C Allow unit to heat up
86	Error	Device temperature too low	Place unit in temperature above 0 °C Allow unit to heat up
87*	Warning	Device temperature very high	Check cooling/ filters If error persist, contact service
88	Error	Device temperature too high	Check cooling/ filters If error persist, contact service
95	Warning	A X-gas mixer is connected, must be X-gas	Check settings Slave mixer must have same number of gasses and types as Master mixer.
96	Error	Mixer high pressure alarm on gas input X	Input pressure over 10.5 bar Adjust input pressure to less than 10 bar
97	Warning	Pressure alarm on mixer X gas input X	Check gas supply
100	Warning	Cannot bridge to a mixer with older software version	Use mixer with compatible SW version

Using MAP Mix Provectus in MM8000 emulation mode

The **MAP Mix Provectus** (MMP) can be used as replacement for the old **MAP Mix 8000 EL** (MM8000) when certain limitations are taken into account. It is however recommended to use the native operation mode of the MMP if at all possible.

The MMP is a completely different design and there are huge differences in the way it operates compared to MM8000. The capacity of the new MMP is much greater than that of the MM8000, this has the effect that the GAS supply must be able to cope with the higher flows that MMP typically uses. The final flow out of MMP depends of the mixture setting, i.e. if using 50% / 50% mix on a 2-gas MMP you will get 1000L/min out. Due to the high output flow, the filling will be much faster than with MM8000.

In MAP Mix Provectus devices with firmware V1.1.0 and below this cannot be limited. Firmware V2.0.0 has build in menu to reduce the maximum flow out (regardless of what is possible for the mix shown), use this setting to avoid overshoot in pressure while filling tank.

To enable that mixer runs flawless, installation must ensure that capacity for each gas is high enough and that restrictions in the gas lines do not influence on the pressure and flow. Refer to *"Gas Connections" on page 17* for installation requirements and observe the figures in the tables on *page 74* for minimum pressure drop vs. flow.

In general terms there are three ways to use MMP in MM8000 mode:

- MMP emulating MM8000 using PBI protocol interface on COM1 (controlled from packaging machine, PLC or PC)
- MMP emulating MM8000 using analogue control voltages to select mixtures. Typically supplied from PLC DAC.
- MMP emulating MM8000 attached to CMV-2

The MixSet program used with MM8000 can also be used with the MMP mixer to configure buffer tank pressure and select between analogue control modes. It can also be used for debugging during setup, to stop/start the system and select mixtures.

MMP emulating MM8000 using PBI protocol (PSIP) interface on COM1

To setup the MMP for MM8000 mode, first use the PuTTY terminal program connected to the mixers COM2 port. If you have a mixer with user interface you can set the parameters from the General setup menu.

- Login as **Supervisor (0000)** and select **General setup -> Mixer configuration**.
- In **Mixer mode** select the MM8000 emulation mode you want to use:
  - 2-gas mixers can be set to **CO2/N2**, **N2/O2** or **CO2/O2**
  - 3-gas mixers can only be set to **3 gas mode (N2/CO2/O2)**
  - You can NOT assign GAS type in MM8000 mode as inputs are preconfigured
  - Select alarm levels for input gas pressures (per GAS)
- In **External start/stop** select whether the mixer shall be controlled by an external start/stop signal (24V) or not. The mixer will also start when mixture is changed like the MM8000.

Now the mixer is ready to accept data on COM1 using PBI protocol. You can now attach the mixer to the packaging machine PLC/PC. The MixSet program of MM8000 can also be connected to test and configure the mixer.

Notice that pressure alarms will trigger the Alarm relay and will NOT stop the mixer, however if flow cannot be maintained the Fault relay will be triggered and mixer must be restarted either by sending stop/start sequence on external control or changing mixture.

Allocation Table

Read only commands (G "Read configuration")

Location	Register read	Encoding
0x0000	Device ID	4 bytes Unique device identifier MAP Mix Provectus returns 0x0100005A (hex) or 16777306 (decimal). Request this ID at startup to make sure that it is a MAP Mix Provectus emulating MM8000 you are communicating with.
0x0008	Program version	3 bytes unsigned Byte 0: Major program version (0..255) Byte 1: Minor program version (0..255) Byte 2: Build (0..255). Only set for validating versions. For released versions this will byte will be zero.

Read only commands (R "Read memory (Operational commands")

Location	Register read	Encoding
0xA065	Status register (Read only)	2 bytes unsigned integer Each bit represent a status condition 0x0001: Always 0 as MMP is already initialized. 0x0002: A system FAULT has occurred LED on mixer is blinking red at 2Hz (fast blink) Possible error causes are: • Flow cannot be maintained (to low input capacity flow/pressure or backpressure to high) • Any ERROR listed in User Guide After FAULT situation, the mixer must be restarted by either changing the mixture, sending stop/start sequence using command 0x0066 or external signal 0x0004: Not used in MMP 0x0008: One or more gas input pressure is below limit. LED on mixer is blinking red at 2Hz (slow blink) 0x0010: Gas inlet pressure is OK. For mixer type CO_2/N_2 this bit is set when Gas 2 (N_2) inlet pressure is OK. For all other mixer types this bit is set when Gas 1inlet pressure is OK. 0x0020: Gas inlet pressure is OK. For mixer type CO_2/N_2 this bit is set when Gas 1 (CO_2) inlet pressure is OK. For all other mixer types this bit is set when Gas 2 inlet pressure is OK. 0x0040: Gas 3 inlet pressure is OK. If the mixer is configured as a 2-gas mixer this bit is 1 (pressure OK) 0x0080: This bit is 1 when mixer is running and GAS is flowing through the mixer. 0x0100: Not used in MMP 0x0200: Not used in MMP 0x0400: Not used in MMP
0xA067	Error register (Read only)	2 bytes unsigned integer Not used in MMP, this register is always 0x0000 in MMP.

Location	Register read	Encoding
0xA07A	M1 position ADC10 value (Read only)	2 bytes unsigned integer Range 0 to 1023 This is the external voltage input signal controlling the setting of the CO_2 mixing for a 3-gas mixer. For a CO_2/O_2 mixer it controls CO_2 (gas 1). For N_2/O_2 and CO_2/O_2 mixers it controls O_2 (gas 2). Input range is 0 to 11.75V ~ 0 to 1023 ADC counts For input range 2 to 10V for 0 to 100% mix, the ADC read-out range will be approx. 174 to 871 counts For input range 0 to 10V for 0 to 100% mix, the ADC read-out range will be approx. 0 to 871 counts **Input must change more than 50mV from current setting before new mix settings is recalculated.**
0xA07C	M2 position ADC10 value (Read only)	2 bytes unsigned integer Range 0 to 1023 Only present in a 3-gas mixer. This is the external voltage input signal controlling the setting of the O_2 mixing for a 3-gas mixer. Input range is 0 to 11.75V ~ 0 to 1023 ADC counts For input range 2 to 10V for 0 to 100% mix, the ADC read-out range will be approx. 174 to 871 counts. For input range 0 to 10V for 0 to 100% mix, the ADC read-out range will be approx. 0 to 871 counts. **Input must change more than 50mV from current setting before new mix settings is recalculated.**
0xA005	Voltage input range: 2 - 10V or 0 - 10V (Read only)	1 byte unsigned. Readout of the range used for the two voltage input signals controlling the mixer setting. 0 = range is 0-10V 1 = range is 2-10V (default)
0xA004	Mixer type installed (Read only)	1 byte unsigned 0 = No gas mixer 1 = CO_2/N_2 (Gas 1/Gas 2) 2 = N_2/O_2 (Gas 1/Gas 2) 3 = CO_2/O_2 (Gas 1/Gas 2) 4 = $N_2/CO_2/O_2$ (Gas 1/Gas 2/Gas 3)

Location	Register read	Encoding
0xA07E	Mix 1 actual setting (Read only)	1 unsigned byte Range 0 to 100% For a 3-gas mixer this is the mixer setting of $\%CO_2$ For a CO_2/N_2 mixer this is the mixer setting of $\%N_2$ For a N_2/O_2 mixer this is the mixer setting of $\%N_2$ For a CO_2/O_2 mixer this is the mixer setting of $\%CO_2$
0xA07F	Mix 2 actual setting (Read only)	1 unsigned byte Range 0 to 100% For a 3-gas mixer this is the mixer setting of $\%N_2$ For a CO_2/N_2 mixer this is the mixer setting of $\%CO_2$ For a N_2/O_2 mixer this is the mixer setting of $\%O_2$ For a CO_2/O_2 mixer this is the mixer setting of $\%O_2$
0xA080	Mix 3 actual setting (Read only)	1 unsigned byte Range 0 to 100% Only present in a 3-gas mixer. This is the mixer setting of $\%O_2$. For a 2-gas mixer this register returns zero.
0xA084	Actual Vacuum buffer pressure	4 byte float Actual pressure in the vacuum buffer [bar]
0xA06E	Vacuum buffer set pressure (read only)	4 byte float Actual set point for the pressure in the vacuum buffer. Typical 3.0 or 5.0 bars
0xA072	Vacuum buffer hysteresis (read only)	4 byte float Typical 0.3 bar. When buffer pressure reach "Vacuum buffer set pressure" - "Vacuum buffer hysteresis" the valve is turned on. When the pressure reaches "Vacuum buffer set pressure" it is turned off.
0xA076	Vacuum buffer min on time (times 100ms) (read only)	1 byte unsigned Not used, will always return 0
0xA077	Vacuum buffer min off time (times 100ms) (read only)	1 byte unsigned Not used, will always return 0
0xA0D6	Output valve mode	1 byte unsigned See also write 0x0066 0 = OFF, mixer is stopped 1 = Running (Auto). Normal operation mode.

Location	Register read	Encoding
0xA035	"Mixer table 1" offset (read only)	Not used in MMP
0xA04B	"Mixer table 2" offset (read only)	Not used in MMP
0xA009	Mixer table 1 (read only)	Not used in MMP
0xA01F	Mixer table 2 (read only)	Not used in MMP

Write commands (W (Operational commands))

Location	Register write	Encoding
0x0000		
0x0010	Mix 1 setting	1 unsigned byte Range 0 to 100% For a 3-gas mixer this controls the setting of "GAS 2 INPUT" i.e. $\%CO_2$ Mixer type GAS 1/2/3: CO_2/N_2 → "Mix 1 setting" controls: $\%N_2$ Mixer type GAS 1/2/3: N_2/O_2 → "Mix 1 setting" controls: $\%N_2$ Mixer type GAS 1/2/3: CO_2/O_2 → "Mix 1 setting" controls: $\%CO_2$ Mixer type GAS 1/2/3: $N_2/CO_2/O_2$ → "Mix 1 setting" controls: $\%CO_2$ For a 3-gas mixer: When writing new "Mix 1 setting" MAP mix 8000 will not change "Mix 2 setting", and vice versa, if possible. i.e. $\%O_2$ is increased/decreased to compensate for the change in the new "Mix 1 setting" or "Mix 2 setting" setting. If/when $\%O_2$ reach minimum % or 100%, when adjusting to a new "Mix 1 setting", "Mix 2 setting"($\%N_2$) is changed and vice versa. The sum of $\%N_2$, $\%CO_2$ and $\%O_2$ is always 100

Location	Register write	Encoding
0x0011	Mix 2 setting (3-gas mixer only)	1 unsigned byte Range 0 to 100% Only used when a 3-gas mixer is connected. In case send to a 2-gas mixer, the mixer will return a ACK, but the received setting is ignored For a 3-gas mixer this parameter controls the setting of "GAS 1 INPUT" i.e. $\%N_2$ **Mixer type GAS 1/2/3** / **"Mix 2 setting" controls** $N_2/CO_2/O_2$ / $\%N_2$ See "Mix 1 setting" encoding column, how setting of "Mix 2 setting" will change the setting of "Mix 1 setting"
0x0020	"Mixer table 1" offset values (write only)	Not used in MMP
0x0030	"Mixer table 2" offset values (write only)	Not used in MMP
0x0040	Vacuum buffer set pressure (Write only)	4 byte float. Saved in non volatile memory. Actual set point for the pressure in the vacuum buffer. Typical 3.0 or 5.0 bars.
0x0041	Vacuum buffer hysteresis (Write only)	4 byte float. Saved in non volatile memory. Typical 0.3 bar. When buffer pressure reach "Vacuum buffer set pressure" - "Vacuum buffer hysteresis" the valve is turned on. When the pressure reaches "Vacuum buffer set pressure" it is turned off.
0x0042	Vacuum buffer min on time (times 100ms) (Write only)	Not used in MMP, setting is ignored.
0x0043	Vacuum buffer min off time (times 100ms) (Write only)	Not used in MMP, setting is ignored.

Location	Register write	Encoding
0x0050	Set mixer type (Write only)	1 byte unsigned. Saved in non volatile memory. 0 = Not used in MMP (Ignored) 1 = CO_2/N_2 2 = N_2/O_2 3 = CO_2/O_2 4 = $N_2/CO_2/O_2$ **NOTE! It is NOT allowed to send 2-gas modes to a 3-gas mixer or vice versa**
0x0051	Set input range for voltage input. 0-10/2-10V	1 byte unsigned. Saved in non volatile memory 0 = 0 to 10V 1 = 2 to 10V (default) **NOTE! If V-in (voltage input) is not used, always select the range 2 to 10 V and short circuit the input.**
0x0066	Output valve mode (write)	1 byte unsigned. See also read 0xAD06 0 = Stop mixer 1 = Start mixer

MMP as MM8000 using analogue control

To setup the MMP for MM8000 mode, first use the PuTTY terminal program connected to the mixers COM2 port. If you have a mixer with user interface you can set the parameters from the **General setup** menu.

- Login as **Supervisor (0000)** and select **General setup -> Mixer configuration**.
- In **Mixer mode** select the MM8000 emulation mode you want to use:
  - 2-gas mixers can be set to **CO_2/N_2, N_2/O_2** or **CO_2/O_2**
  - 3-gas mixers can only be set to **3 gas mode ($N_2/CO_2/O_2$)**
  - You can NOT assign GAS type in MM8000 mode as inputs are preconfigured
  - Select alarm levels for input gas pressures (per GAS)

In **External start/stop**, select whether the mixer shall be controlled by an external start/stop signal (24V) or not. The mixer will also start when mixture is changed like the MM8000.

In **Analog control**, select whether the mixer is to be controlled from 0-10V or 2-10V DC.

MAP Mix Provectus with firmware V1.1.0 or less:
Use "MixSet" program from MM8000, connect to the mixers COM1 port to adjust the buffer tank pressure as needed.

MAP Mix Provectus with firmware V2.0.0 and above:
You can set buffer pressure and hysteresis from **General setup** on display models or by using Terminal Server. It is also possible to limit the maximum output flow to avoid overshoot in pressure settings.

After the above steps, the mixer will accept the use as MM8000 mixer with analogue control of mixtures. Notice that pressure alarms will trigger the Alarm relay and will NOT stop the mixer, however if flow cannot be maintained the Fault relay will be triggered and mixer must be restarted either by sending stop/start sequence on external control input or changing mixture on the analogue inputs.

MMP emulating MM8000 connected to CMV-2

To setup the MMP for MM8000 mode, first use the PuTTY terminal program connected to the mixers COM2 port. If you have a mixer with user interface you can set the parameters from the **General setup** menu.

- Login as **Supervisor (0000)** and select **General setup -> Mixer configuration**.
- In **Mixer mode** select the MM8000 emulation mode you want to use:
  - 2-gas mixers can be set to **CO_2/N_2, N_2/O_2** or **CO_2/O_2**
  - 3-gas mixers can only be set to **3 gas mode ($N_2/CO_2/O_2$)**
  - You can NOT assign GAS type in MM8000 mode as inputs are preconfigured
  - Select alarm levels for input gas pressures (per GAS)

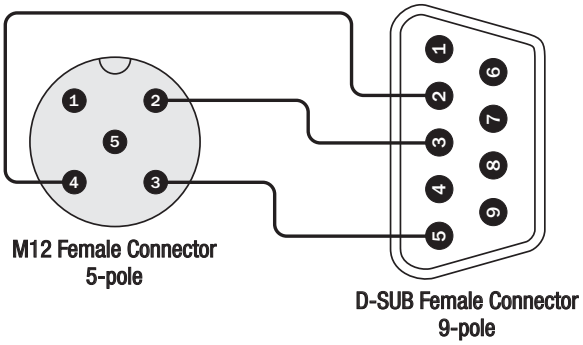
NOTE! The CMV-2 must have updated software version V2.11 or higher to operate with MMP in MM8000 emulation mode!

Cables for use with MAP Mix Provectus

The device uses a D-SUB 9-pin male connector as COM1 plug, hence the cables used must be D-SUB 9 pin female.
The port of the device is standard DTE configuration:
Pin #2 = RxD, pin #3 = TxD and pin #5 = GND.

For connection to a PC/PLC you would normally require a NULL-MODEM cable (also known as cross over cable) that has a D-SUB 9-pin female connector in both ends.
Please refer to *"Spare parts, consumables and accessories" on page 75* for details about available cables.

For older installations where you do not wish to replace the RS232 cable from the MM8000 installation you can make a conversion cable as illustrated below.



This method is not recommended due to addition of another connector assembly. The preferred method is to replace the RS232 cable in the packaging machine.

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 17*.

Spare parts

For a list of spare parts see *"Spare parts, consumables and accessories" on page 75*.

Cleaning

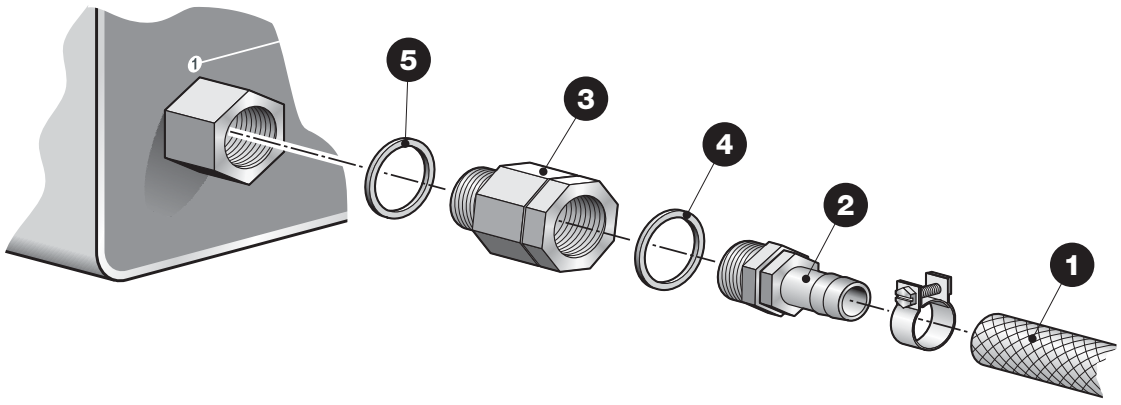
All of the device's surfaces should only be cleaned using a mild soap solution and a wrung cloth.

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 gas inlet filters

Replace the gas inlet filters as described below:

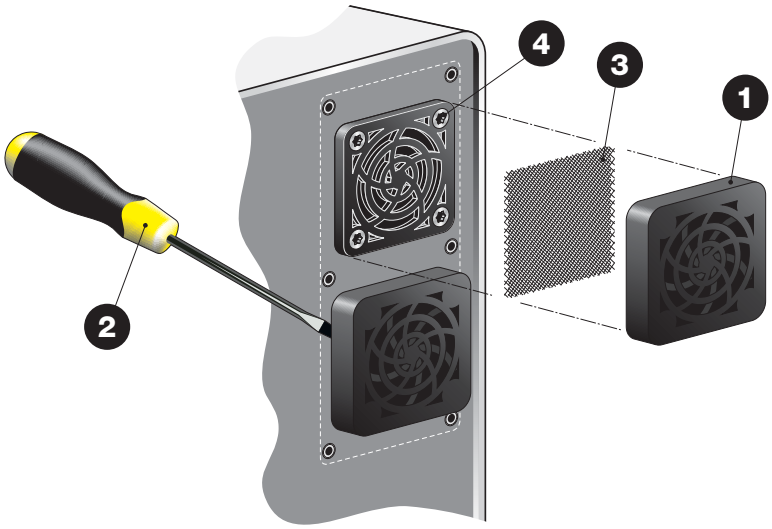


- Disconnect the gas inlet hose ❶ and the hose fitting ❷ from the gas inlet filter unit ❸.
- Remove the filter unit ❸ from the device.
- Mount the new filter unit ❸ on the device using the gasket ❺.
- Connect the hose fitting ❷ using the gasket ❹ and then connect gas inlet hose ❶.

Replacing air inlet and outlet dust filters

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

To replace the air filters do the following:



- Release the ventilation grille ❶.

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

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

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

5. Menus and Settings

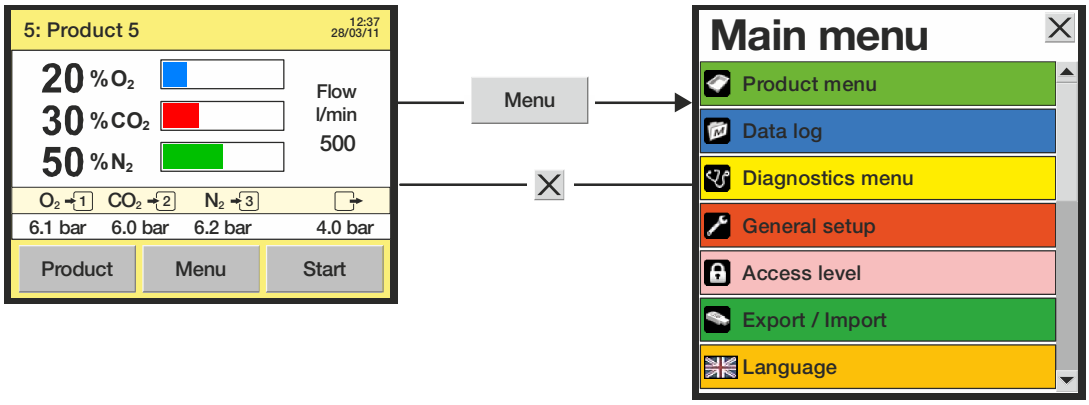
General

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 60* for details.

Main menu

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



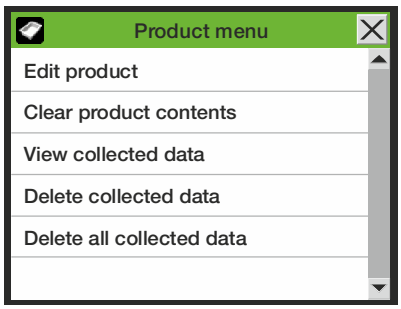
From the **Main menu** you can select the following submenus:

Product menu [1]	Edit and clear product contents. Display and delete logged product data. See *"Product menu" on page 48* for details.
Data log	View logged data for currently selected product. See *"Data log" on page 50* for details.
Diagnostics menu	Display device's internal parameters and error diagnostics. See *"Diagnostics menu" on page 50* for details.
General setup [1]	Setting of various device parameters. See *"General setup" on page 51* for details.
Access level	Selection of access level for User, Supervisor and Service. See*"Access level" on page 60* for details.
Export / Import [1]	Export of product log data, errors and events. Export/import of device settings. Requires connection of a USB memory key. See *"Export/Import" on page 62* for details.
Language	Change language of screens and menus. See *"Language" on page 62* for details.

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

Product menu

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



Edit product

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

Product name A unique product name of up to 40 characters

Gas settings

O_2 ratio Set the O_2 % of the gas mix
Range is 0% or 2-100%

CO_2 ratio Set the CO_2 % of the gas mix
Range is 0% or 2-100%

N_2 ratio Set the N_2 % of the gas mix
Range is 0% or 2-100%

Ar ratio Set the Ar % of the gas mix
Range is 0% or 2-100%
Only applies to devices calibrated for Argon.

NOTE! If Air is connected to the device it will appear in the "0_2 ratio" and "N_2 ratio" settings respectively in the ratio 20.9/ 79.1%.
Ex. on a 2-gas mixer with medias CO_2 and Air, if "CO_2 ratio" is set to 50%, the remaining 50% Air will be split into 10.5% O_2 and 39.5% N_2.

Total flow Set the total gas flow (l/min)
The available flow range depends on the above mix settings.
For "Buffer" mode mixers the flow can be calculated using the following formula:

$$F = \frac{\text{Delta P} * V * 60}{T} * 1.1$$

where

F	=	Flow (l/min)
Delta P	=	Pressure drop in buffer tank to fill one index (bar)
V	=	Buffer tank volume (liter)
T	=	Time to fill the buffer tank (sec.)

Buffer minimum pressure	Set the min. pressure for the buffer tank Only applies to "Buffer" mode mixers
Buffer maximum pressure	Set the max. pressure for the buffer tank Only applies to "Buffer" mode mixers

Clear product contents

Resets product to default values.

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.

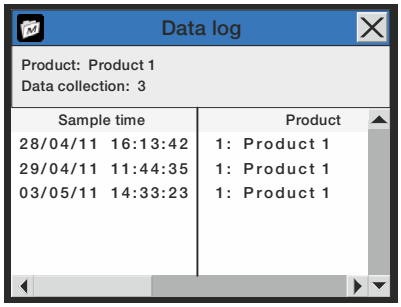
Delete all collected data

NOTE! Be sure to export data to USB stick before executing this command as it cannot be undone - see *"Export/Import" on page 62*.

Use function to delete the logged data for all products.
The action must be confirmed before the data is deleted.

Data log

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



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

Logged data can be exported (see *"Export/Import" on page 62* for details) or deleted (see *"Product menu" on page 48* for details).

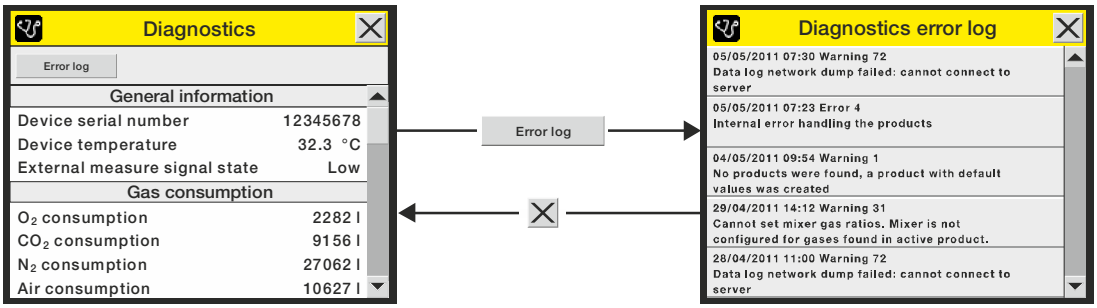
Data logging parameters are set in “General setup” - see *page 51* for details.

Data log memory full

If data log memory is full an error will occur (Warning 23 - see *"Error/Warning list" on page 32* for details).
In this case you must empty data log by using the functions for deleting of data collections - see *"Product menu" on page 48* 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.

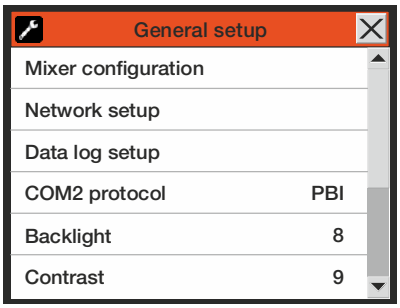


These are values such as device’s internal temperature, gas flow and pressures, day/hour counters, and software versions, etc. The parameters can only be read and not changed.

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

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:

Mixer configuration — Opens the **Mixer configuration** screen
See *"Mixer configuration" on page 52* for details.

Network setup — Opens the **Network setup** screen
See *"Network setup" on page 54* for details.

Data log setup — Opens the **Data log setup** screen
See *"Data log setup" on page 54* for details.

COM2 protocol

- **PBI** — For control of a slave mixer
  Defalt setting at start-up. When Termial Server has been selected, device will return to PBI protocol when switched Off and On.
- **Terminal Server** — For configuration via terminal server.

Backlight — Adjust display background light (1-10)

Contrast — Adjust display contrast (1-10)

Brightness — Adjust display brightness (1-10)

The "Backlight", "Contrast" and "Brightness" items are all related to the display readability. Selecting each setting brings up a new window where value can be set from 1 to 10. Setting impact is seen while adjusting.

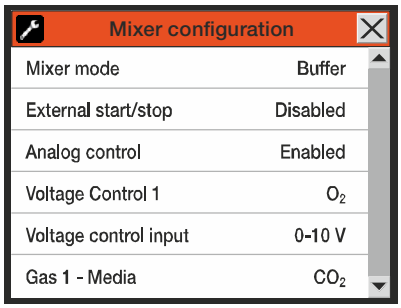
Formats/Units/Time — Opens the **Formats/Units/Time** screen
See *"Formats/Units/Time" on page 59* for details.

Reset gas consumption — Resets the gas consumption counters in the "Gas consumption since...." section in "Diagnostics".

Supervisor PIN code setup — Setting up the four-digit PIN code required for changing from **User** access level to **Supervisor** access level.
(See *"Access level" on page 60* for details).

Mixer configuration

Selecting **Mixer configuration** from the **General setup** menu will display a screen where you can configure the mixer.



Mixer mode

Flow Flow mode

Buffer Buffer mode

MM8000 MAP Mix 8000 compatibility (2- and 3-gas mode)
In MM8000 mode all gas configurations have been preset and therefore the GAS 1, 2, and 3 - Media parameters are disabled.

Available gas configurations:

MM8000 mode	Gas 1	Gas 2	Gas 3
MM8000 (CO_2/N_2)	CO_2	N_2	
MM8000 (N_2/O_2)	N_2	O_2	
MM8000 (CO_2/O_2)	CO_2	O_2	
MM8000 (3 gas mode)	N_2	CO_2	O_2

NOTE! Installation must match setting.

External start/stop Select whether or not mixer should be started/stopped via an external signal.
When enabled the “Start” button in the main screen is disabled.

Analog control

Disabled Analog control disabled.

Enabled Mix is controlled from the packaging machine via analogue voltage signals (see below).
See also *"I/O Cable" on page 21* for details.
For mixers in “MM8000” mode please refer to the “MAP Mix 8000” User Guide for details.

Voltage Control 1 Select which gas is to be controlled by the Voltage Control 1 input signal.

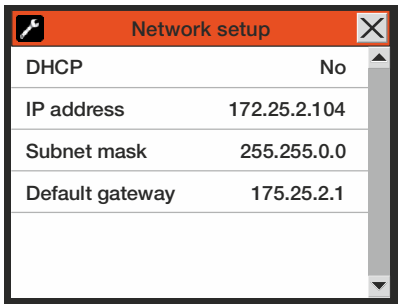
Voltage Control 2 Select which gas is to be controlled by the Voltage Control 2 input signal.
Only applies to 3-gas mixers.

	Voltage control input	Select the voltage signal input range (0-10V or 2-10V). The voltage input is linear and controls the mix percentage of the respective gas, where 0V (or 2V) represents 0% and 10V represents 100%.
Buffer pressure	Set the required buffer pressure. Only applies to mixers in "MM8000" mode.	
Buffer pressure hysteresis	Set the required pressure by which the buffer pressure must drop until mixer starts refilling the buffer tank. Only applies to mixers in "MM8000" mode	
Upper flow limit	Even though the mixer is capable of delivering a high output, we recommend to set the output flow a low as possible but still high enough to maintain buffer pressure. The lower the flow the better mixing accuracy is obtained. Only applies to mixers in "MM8000" mode.	
Gas 1 - Media	Media connected to "GAS IN 1" Select between O_2, CO_2, N_2, Air or "No gas". On devices calibrated for Argon (Ar), this gas can be selected as well	
Gas 1 - P Low alarm	Lower pressure alarm for Gas 1	
Gas 2 - Media	Media connected to "GAS IN 2" (See Gas 1 - Media)	
Gas 2 - P Low alarm	Lower pressure alarm for Gas 2	
Gas 3 - Media	Media connected to "GAS IN 3" (See Gas 1 - Media)	
Gas 3 - P Low alarm	Lower pressure alarm for Gas 3	

NOTE! When certain gases (including Argon) are selected, air (or other gases) remaining in the system will appear to have a flow even when no real flow is present. When requesting a small flow in this situation, it will not result in any flow. Because the gas is never replaced the situation is never resolved. To resolve this situation, the system should be flushed briefly with a flow of at least 50 l/min with 100% of the gas in question.

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

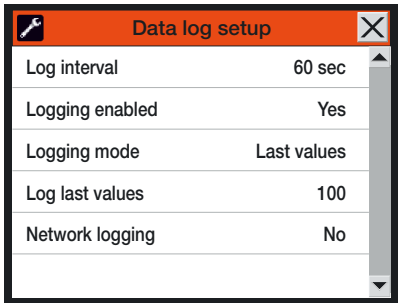
- IP address
- Subnet mask
- Default gateway

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

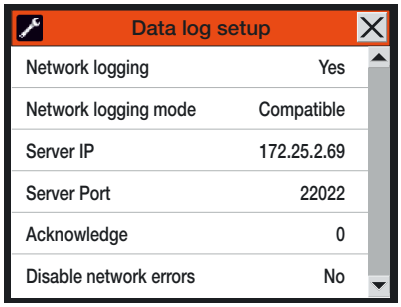
Data log setup

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

(Network logging = No)



(Network logging = Yes)



Log interval Number of seconds between each data log entry.

Logging enabled

No No logging of data

Yes Logging of data enabled

Logging mode

Last values Ring buffer of specified number of log entries. Normally this is best setting for On-Line equipment due to the continuous operation.

Until memory full Logs data until memory is full, then stops logging until data has been exported and/or deleted.

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

Network logging Select whether or not network logging is required.

No	No network logging
Yes	Network logging enabled

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

Network logging mode	Select required data logging output format:	
	Compatible	(Default) Data format as used on devices with firmware versions < 4.2.0. See table on *page 56*.
	Advanced	New data format with more information and many new values. See table on *page 57*.
Server IP	Set up an IP-address to be used for collecting log data for each measurement via LAN. This requires for setting up of a Server Port number as well.	
Server Port	See above.	
Acknowledge	Acknowledge byte can be used if a "handshake" is required for each measurement between device and server, each to be set up to same value.	
Disable network errors	Select whether or not network errors should be disabled. Allows for continued operation while LAN is not connected.	

"Compatible" network logging data format

Parameter	Type	Value
Log version	Int	2
Device serial number	Text	
Device software version	Text	
Product name	Text	
Timestamp	Time	<yyyy-MM-dd HH:mm:ss>
Gas input1 media	Text	"OFF", "O2", "N2", "CO2", "Air",<AUX gas name>"
Gas input1 realtime pressure	Float	
Gas input1 realtime flow	Float	
Gas input2 media	Text	"OFF", "O2", "N2", "CO2", "Air",<AUX gas name>"
Gas input2 realtime pressure	Float	
Gas input2 realtime flow	Float	
Gas input3 media	Text	"OFF", "O2", "N2", "CO2", "Air",<AUX gas name>"
Gas input3 realtime pressure	Float	
Gas input3 realtime flow	Float	
O2 ratio	Float	
CO2 ratio	Float	
N2 ratio	Float	
AUX ratio	Float	
Current total flow	Int	
O2 consumption	Int	
CO2 consumption	Int	
N2 consumption	Int	
Air consumption	Int	
AUX (Ar) consumption	Int	
Trip O2 consumption	Int	
Trip CO2 consumption	Int	
Trip N2 consumption	Int	
Trip Air consumption	Int	
Trip AUX (Ar) consumption	Int	
Trip reset timestamp	Time	<yyyy-MM-dd HH:mm:ss>

Parameter	Type	Value
Device temperature	Float	

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

"Advanced" network logging data format

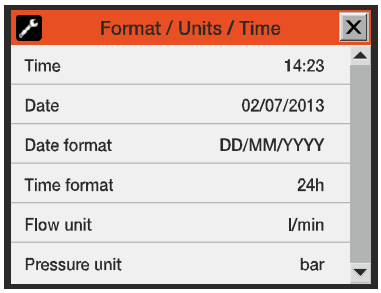
Parameter	Type	Value	Unavailable/ Error value
Log version	Int	3	3
Device serial number	Text		
Device software version	Text		
Date	Time	<yyyy-MM-dd>	<yyyy-MM-dd>
Time	Time	<HH:mm:ss>	<HH:mm:ss>
Product name	Text		"-"
O2 ratio	Float		0.0
CO2 ratio	Float		0.0
N2 ratio	Float		0.0
AUX ratio	Float		0.0
Gas input1 media	Text	"OFF", "O2", "N2", "CO2", "Air","<AUX gas name>	""-"
Gas input1 realtime pressure	Float		0.0
Gas input1 pressure alarm	Text	"Inactive", "Active	""-"
Gas input1 pressure alarm limit	Float		0.0
Gas input1 realtime flow	Float		0.0
Gas input2 media	Text	"OFF", "O2", "N2", "CO2", "Air","<AUX gas name>	""-"
Gas input2 realtime pressure	Float		0.0
Gas input2 pressure alarm	Text	"Inactive", "Active	""-"
Gas input2 pressure alarm limit	Float		0.0
Gas input2 realtime flow	Float		0.0
Gas input3 media	Text	"OFF", "O2", "N2", "CO2", "Air","<AUX gas name>	""-"
Gas input3 realtime pressure	Float		0.0
Gas input3 pressure alarm	Text	"Inactive", "Active	""-"
Gas input3 pressure alarm limit	Float		0.0

Parameter	Type	Value	Unavailable/ Error value
Gas input3 realtime flow	Float		0.0
Output pressure	Float		0.0
O2 consumption	Int		0
CO2 consumption	Int		0
N2 consumption	Int		0
Air consumption	Int		0
AUX (Ar) consumption	Int		0
Mixer mode	Text	"Flow", "Buffer", "MM8000 CO2/N2", "MM8000 N2/O2", "MM8000 CO2/O2", "MM8000 N2/CO2/O2	""-"
Device temperature	Float		0.0
Error state	Int	0	<error code>

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

Formats/Units/Time

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

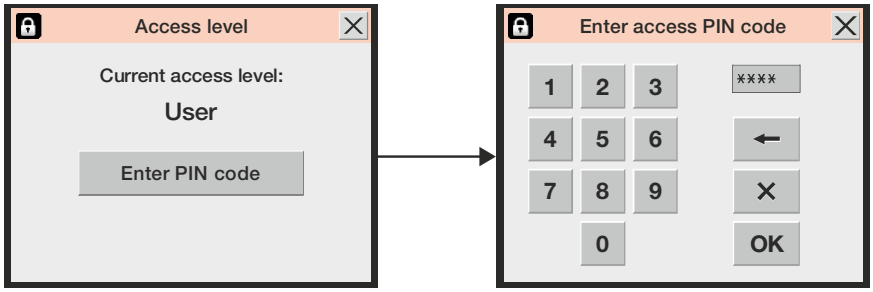


Time	Setting of current time (hh:mm)
Date	Setting of current date (using “Date format”)
Date format	Setting of date format (DD/MM/YY or MM/DD/YY) "Time", "Date" and "Date format" are related to the real time clock setting in the device. The settings will have effect in all displays showing time and date.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

Access level

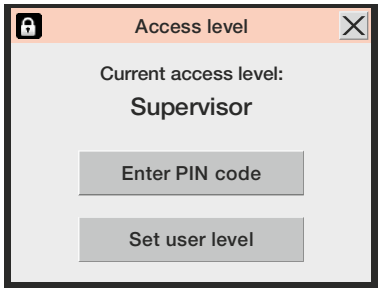
When device is switched on (after power off) it is locked in **User** access level. In **User** access level you have only access to a limited number of functions and is not allowed to perform parameter setup.

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



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

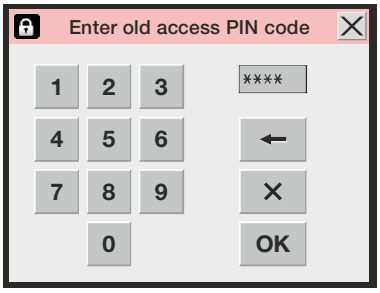
For best safety and correct operation of device, you can easily return the device to **User** level access to restrict access to extended menu items. To do so either press the **Set user level** key in the **Access level** screen (will only be available in **Supervisor** or **Service** access levels)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



Change Supervisor PIN code

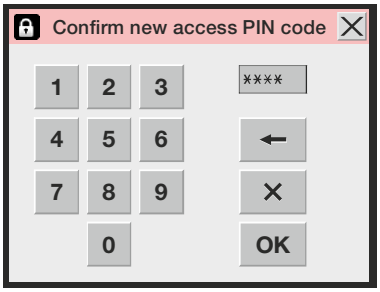
The **Supervisor** PIN code can be changed to one of your own selection:

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

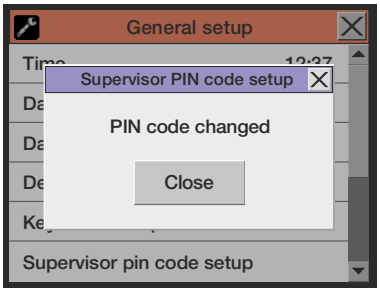


- Enter current PIN code and press **OK**.

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



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



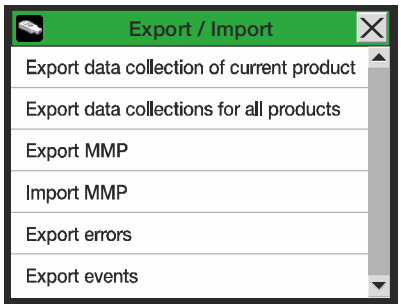
- Press **Close** in the appearing confirmation pop-up screen.
- PIN code has successfully been changed.

NOTE! Make sure to note the new supervisor code in a safe location. If you loose this information please contact your appointed service provider 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 17* for details.

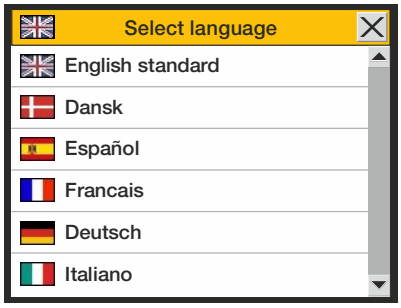


Export data collection of current product	Exports data logs (as text file) stored for the currently selected product.
Export data collections for all products	Exports all data logs (as text files) stored on the device.
Export MMP	Exports device settings to a binary file. Is normally used as backup to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

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

Language

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



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

6. PuTTY Terminal Server

The **PuTTY Terminal Server** program enables you to change the device's configuration parameters.
Even though the program can be used with any **Dansensor® MAP Mix Provectus** 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 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 **Dansensor® MAP Mix Provectus** application to start and then follow the directions.

Preparations

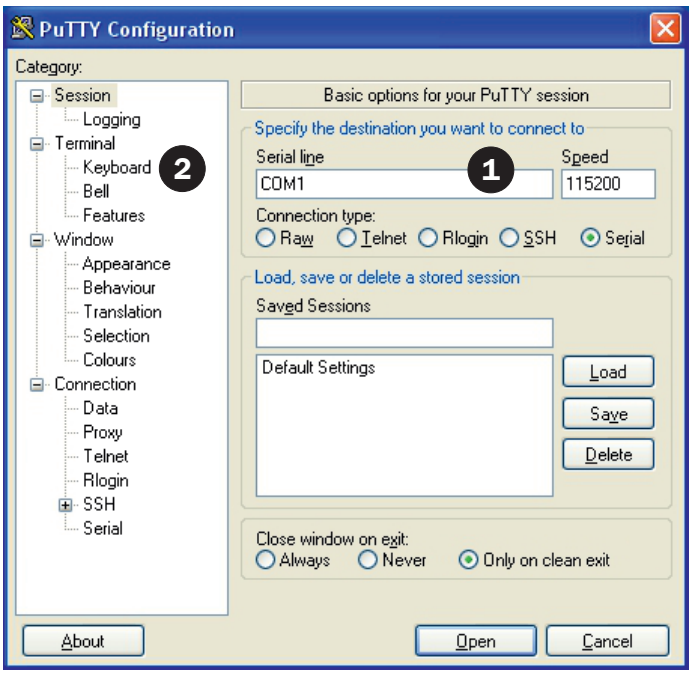
Before starting the program your device must be switched on and connected to your computer by connecting an RS232 (D-SUB 9) cable between a free COM-port on your computer and the "COM 2" connector on the device (see *"Electrical connections" on page 20* for details).

Configuration and Use

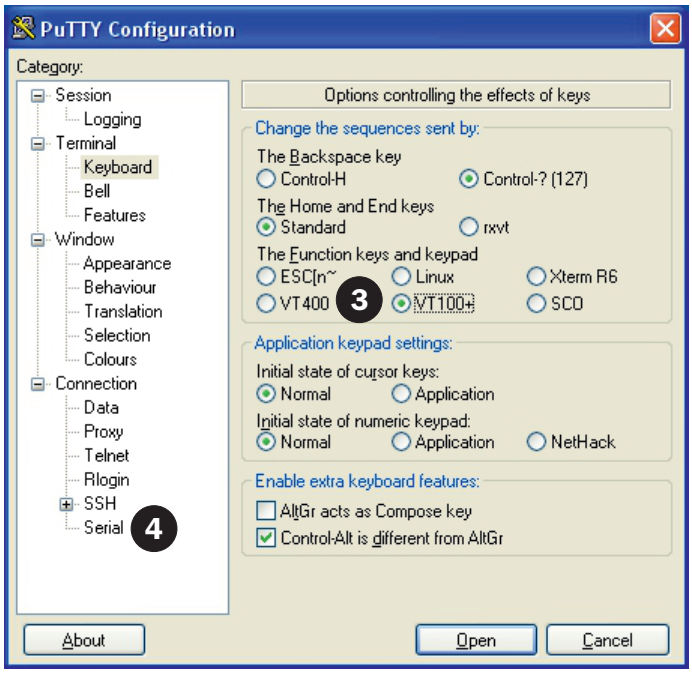
Initial configuration

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

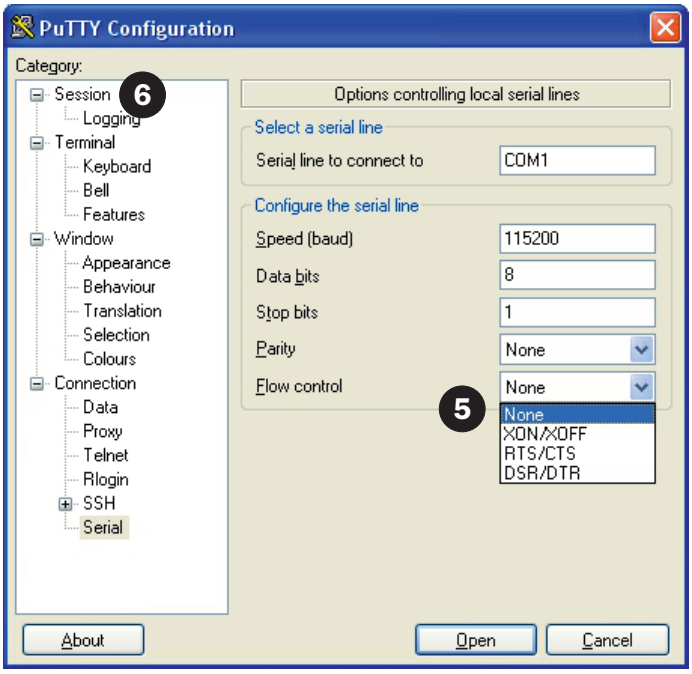
The application starts showing the configuration window.



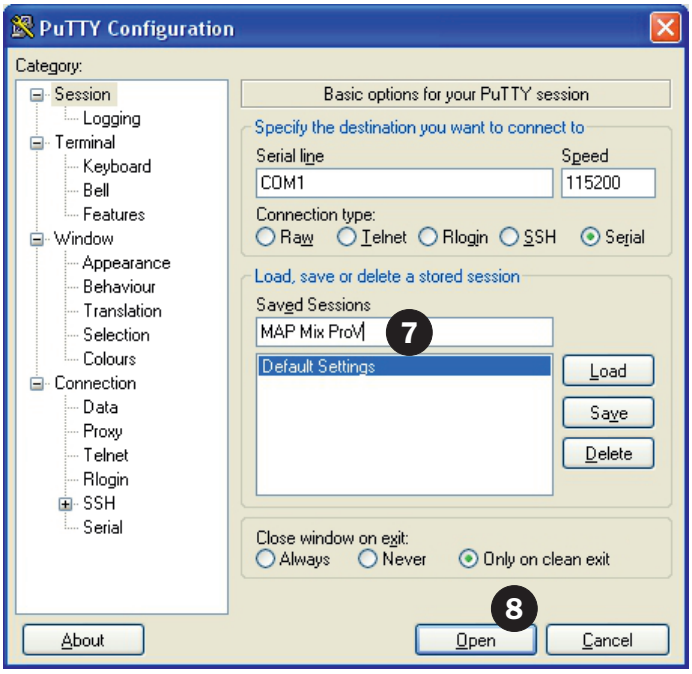
1. Select **Serial** connection type and specify the number of your computer's COM-port to which the device is connected. In the **Speed** field type **115200**.
2. Select the **Keyboard** entry in the **Category** list.



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.



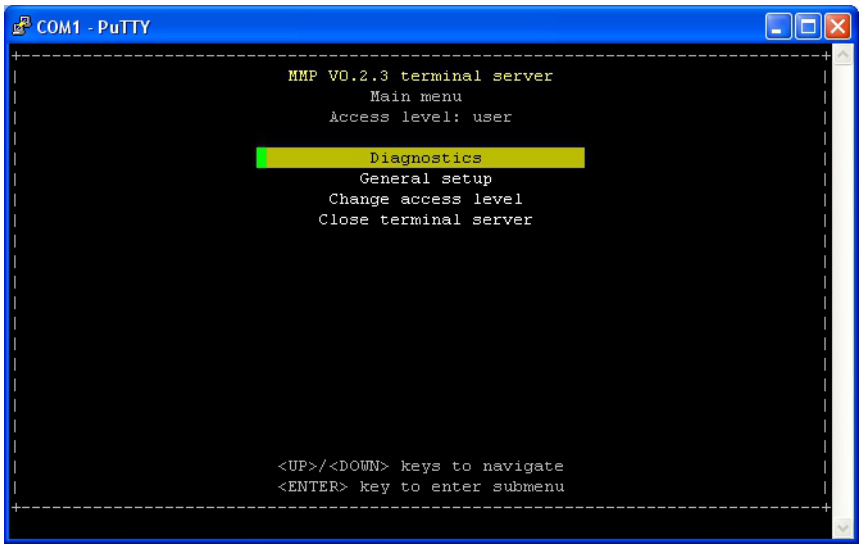
7. To save the current setting we recommend that you give the session a name ex. **MAP Mix ProV** and click **Save**.
   The next time you start the program you can easily retrieve the settings by loading the saved session.
8. Click **Open**.

Using PuTTY

- When the program starts...

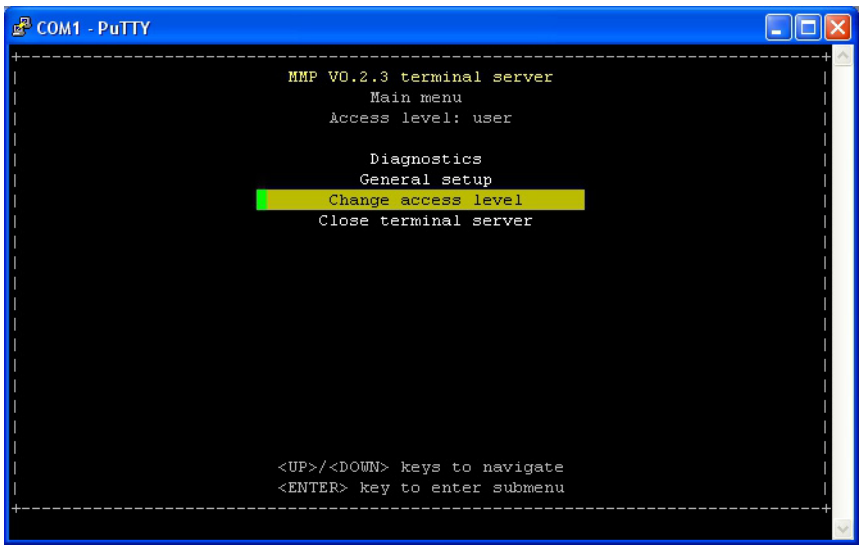
...press **F1** several times to establish a connection to the device by changing it's COM2-port protocol to **Terminal Server**.

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



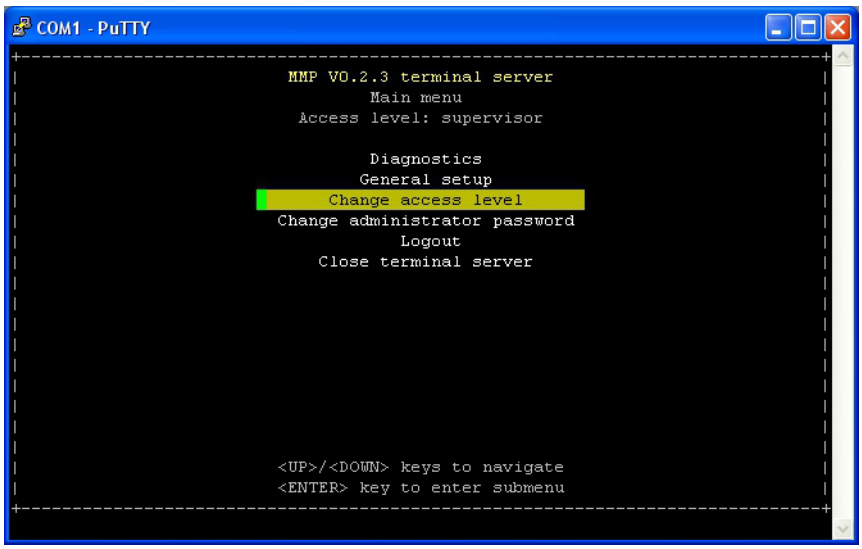
- Generally you use the **arrow** keys to navigate through the various menus and the **Enter** key to enter submenus, change settings and/or confirm a selection.
  When entering figures, either for access codes or numerical values, make sure to use the number keys above the letter keys on the keyboard.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

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

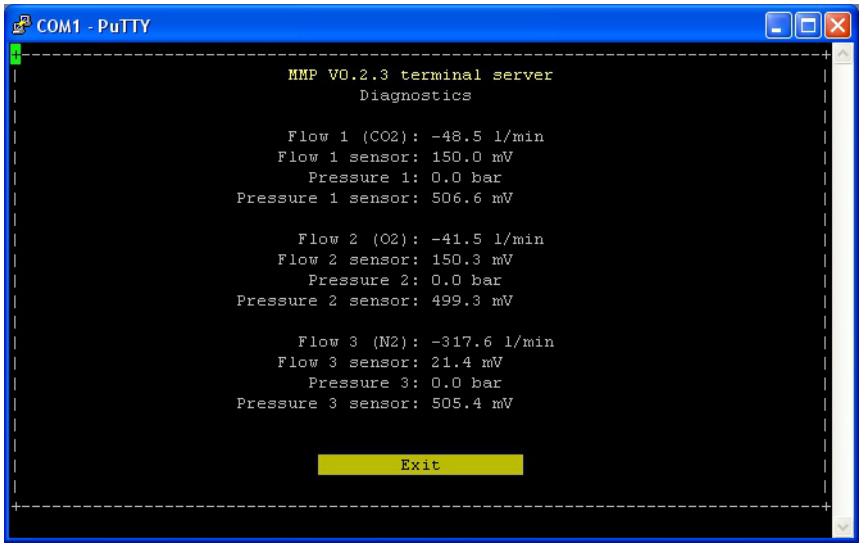


... and press **Enter**.

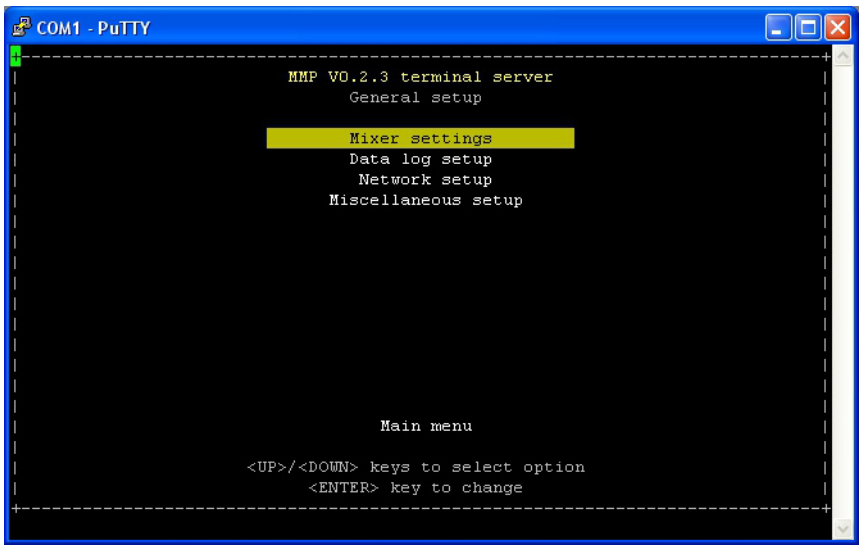
- From the factory the access code has been set to "**0000**". Type in code and press **Enter**.



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

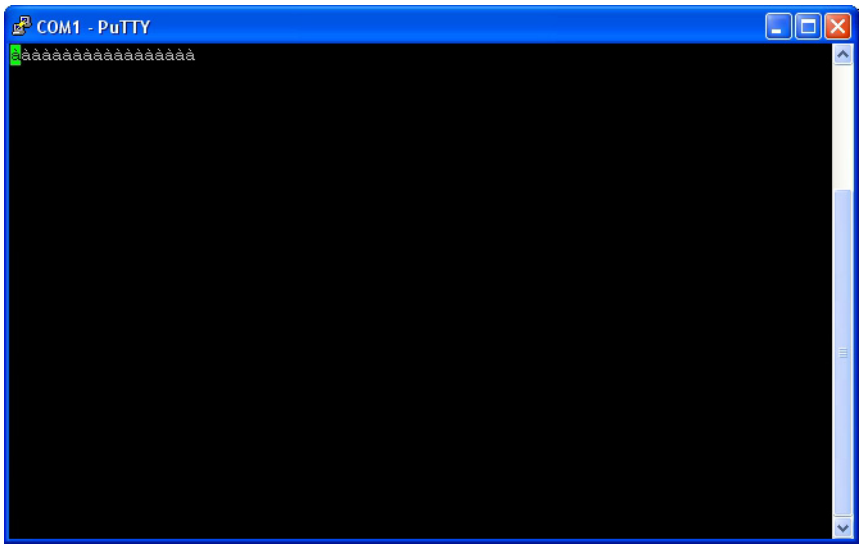


- In the **General setup** section you have access to the various settings in the device.



For information about the various settings and their influence please see *"General setup" on page 51*.

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



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

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

7. Technical Information

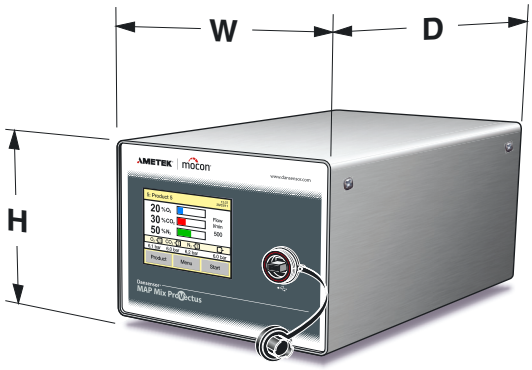
Technical specifications

Electrical connections

Mains	100-264 VAC, 47-63 Hz
DC models	24V DC available, range 19-36V DC input
Power consumption	70W (2-gas) to 100W (3-gas) Depends on flow and configuration

Mechanical data

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



Mixer weight	12.0 - 14.0 kg
Box of one mixer	379 x 357 x 523 mm (H x W x D)
Boxed weight	13.5 - 15.5 kg (depending on model)

Connectivity

Network/LAN	Ethernet 10/100 mbit/s Base-T with DHCP client or fixed IP
RS232	2 x D-SUB 9 DTE interface (male connector)
USB	1(2) x Host, USB 2.0 Connector type A, max. current 100 mA
Machine I/O	D-SUB 25 male, cable supplied
Analogue input	0-10V or 2-10V, 12bit res. (for MM8000 compatible mix setting)

Gas connections

Gas inlet	3/8" BSW
Gas outlet	3/8" BSW
Pressure sensor	6/4 mm hose connector, for buffer tank pressure measurement

Basic specifications

Ambient temperature	Operational: 0 to +45°C, < 95% RH, non condensing Storage: -10 to +60°C, < 95% RH, non condensing
Ambient pressure	Operational: 900 hPa to 1050 hPa
Gasses	Standard version:Dry inert gasses O_2, CO_2, N_2, and Air Argon version:Standard version gases + Argon (Ar)
Gas temperature	0 to +50 °C
Gas inlet pressure	2 - 10 bar (relative to ambient)
Flow capacity	2-gas: 12-1000 l/min (50/50 % mix) 3-gas: 18-1500 l/min (34/33/33 % mix) Typical 2-gas: 60/40% mix, flow range: 15-833 l/min Typical 3-gas: 70/20/10% mix, flow range: 60-714 l/min On 3-gas mixers two channels can be combined to increase flow as 2-gas: 70/30% mix, flow range 20 - 1428 l/min
Gas flow per gas string	6 - 500 l/min [1]
Flow measuring	Total and daily consumption of gasses used
Mixer settings	Range 0%, 2-100%
Mix accuracy	Typ. +/- 2% absolute in flow ranges above 50 l/min total output flow
Mixer configurations	Selectable as buffer or flow mixer by installation

[1] Gas flow depends on inlet- and back pressure - see *"Pressure dependend flow capacity tables" on page 74*

Specification conditions

Ambient temperature	+23 °C.
Ambient pressure	1013 hPa.
Gas temperature	+23 °C

NOTE! All gas concentrations are specified in volume percent.

Conformity

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

Pressure dependend flow capacity 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_2 and N_2 is similar to the flow for air.

The table values are for 1 gas string. When using a 3-gas mixer as a 2-gas mixer two gas strings can be combined for one gas. In these cases flow values can be mulitplied by 2.

CO_2	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

$N_2/O_2/Air$	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

Ar	Back pressure [Bar]								
Inlet pressure [Bar]	1	2	3	4	5	6	7	8	9
2	208								
3	342	252							
4	437	386	270						
5	500	492	430	336					
6	500	500	500	464	316				
7	500	500	500	500	500	355			
8	500	500	500	500	500	500	380		
9	500	500	500	500	500	500	500	416	
10	500	500	500	500	500	500	500	500	450

Spare parts, consumables and accessories

Ordering items

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

Spare parts

- Cable, mains AC, ser. cpl. ..... P/N 301096
- Cable, mains DC, ser. cpl. ..... P/N 301097
- Cable, I/O (5m), ser. cpl.. ..... P/N 301098
- Cable, external RS-232, CMV-2/MAP Mix (3 m), ser. cpl. ..... P/N 301174
- Cable, external RS-232, ser. cpl. ..... P/N 301175

Consumables

- Kit, multiplum filter, Gas in (3 pcs.) ser. cpl. ..... P/N 301092
- Kit, multiplum filter, fan (10 pcs.) ser. cpl. ..... P/N 301093
- Filter, dust 40x40mm (30 pcs.) ser. cpl ..... P/N 330663

Accessories

- Kit, IP45 tightening. ..... P/N 300813
- Cable, RS232C for PC connection (5m), ser. cpl. ..... P/N 301177
- 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 Mix ProVectus

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
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
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

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

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

P/N 300862-K
11/2019

AMETEK | mocon

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

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