POINT OF CARE
TESTING

Roche *OMNI C*

Service Manual

Roche

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– Important information! – Always follow! –

This **Service Manual** contains vital **warning and safety information.**

This instrument is intended to be used only for the specialized purpose described in the instructions. The most important prerequisites for use, operation, and safety are explained to ensure smooth operation. No warranty or liability claims will be covered if the instrument is used in ways other than those described or if the necessary prerequisites and safety measures are not observed.

The instrument may be operated only by persons whose qualifications enable them to comply with the safety measures that are necessary during operation of the machine.

Adjustments and maintenance performed with removed covers and connected power may be attempted only by a qualified technician who is aware of the associated dangers.

Instrument repairs are only to be performed by the manufacturer or qualified service personnel.

Only accessories and supplies either delivered by or approved by Roche are to be used with the instrument. These items are manufactured especially for use with this instrument and meet the highest quality requirements.

Operation of the instrument with solutions whose composition is not consistent with that of the original solutions can negatively affect, above all, the long-term measurement accuracy. Deviations in the composition of the solutions can also decrease the service life of the electrodes.

The quality control requirements must be completed at least once daily for safety reasons. Because accurate measurement results depend not only on the proper functioning of the instrument, but also on a number of other factors (such as preanalytics), the results produced by the instrument should be examined by a trained expert before subsequent decisions are reached that are based on the measurement values.

Explanation:

Meaning: "Caution, refer to accompanying documents“.

– Important information! – Always follow! –

– Operating safety information –

- The instrument has been constructed and tested according to the protective measures stipulated by EN 61010-1: 1993 / IEC 1010-1 for electrical measurement, control, IVD, and laboratory instruments and was delivered from the factory in flawless condition with regards to safety features. In order to preserve this condition and ensure safe operation, the user must respect the notices and warnings that are contained in these Instructions for Use.

- This instrument is classified under the protection class I according to EN 61010-1 / IEC 1010-1.

- The instrument meets the conditions for overvoltage category II.

- The instrument meets the conditions for contamination level 2.

- Do not operate the instrument in an explosive environment or in the vicinity of explosive anesthetic mixtures containing oxygen or nitrous oxide.

- If an object or liquid enters the internal areas of the instrument, remove the instrument from its power supply and allow an expert to check it thoroughly before using it again.

- The instrument is suitable for long-term operation indoors.

CAUTION:

- The power cord may be plugged into a grounded socket only. When using an extension cord, make sure it is properly grounded.

- Any rupture of the ground lead inside or outside the instrument or a loose ground connection may result in hazardous operating conditions. Intentional disconnection of the grounding is not permitted.

- The instrument is not suitable for operation with a direct current power supply.
  Use only the original mains plug delivered with the Roche OMNI C.

– Operating safety information –

1 Introduction 1-1

1 Introduction

1.1 General notes

This manual contains all of the information required for the maintenance and repair of the OMNI C.

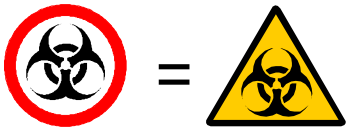
You must be familiar with the function and operation of the instrument to fully understand the processes described here. Please refer to the OMNI C Instructions for Use or OMNI C Reference Manual for this information.

Observe the service and repair procedures described in this manual and use only genuine Roche replacement parts and Roche-approved materials to guarantee the full functionality of your OMNI C.

For the order numbers of replacement parts, please refer to the OMNI C spare part list.

Chapter 2 of this manual contains an overview of possible revisions and available software versions.

1.2 Symbols



All sections or text passages marked with this symbol describe procedures that may involve risk of infection.

Sections marked with this symbol contain information that must be observed for the prevention of personal injury to patients, users or third parties.

All sections or text passages that are marked with this symbol describe procedures and/or indicate conditions or dangers that could damage or lead to malfunctions in the Roche OMNI C.

All sections or text passages marked with this symbol refer to situations and/or potential dangers affecting personnel performing the servicing or repair work.

All sections or text passages marked with this symbol refer to components that require special precautions related to electrostatic discharge. Packaging marked with this symbol may only be opened by trained personnel (also see page 1-6, section 1, ESD protection measures)

1.3 Important notes and warnings

- *Never use the analyzer near highly inflammable or explosive gasses (anaesthetic gasses, etc.).*
- *Use only 2-pin, grounded AC power sockets for the instrument.*
- *Ensure that the AC power cable and plug are in good condition. Damaged AC cables or plugs must be replaced immediately.*
- *Switch the instrument off and unplug the AC power cable before opening its rear panel.*
- *Be sure to replace blown fuses with new fuses of the same type.*

- *Always follow the instructions in this manual when servicing or repairing the instrument.*
- *Always use suitable tools and testing equipment for servicing or repairs.*
- *To avoid damage to the instrument's electronic components, prevent liquids from entering it.*
- *To clean the instrument, use lightly moistened tissue or cotton swabs.*

1.4 Disinfectants

Use only liquid disinfectant such as Roche Deproteinizer or an alcohol-based (about 70%) surface disinfectant.

Do not use sprays, as they may enter the instrument and cause its electronic components to malfunction.

Do not attempt to decontaminate any part of the instrument before shutting it down and unplugging it from the AC power socket.

Before plugging the instrument back in and turning it on, always wait 15 minutes to allow the disinfectant to evaporate.
There is the risk of fire or explosion especially in the vicinity of the power supply!

1.4.1 Roche Deproteinizer

Composition

Aqueous NaOCl solution with active chlorine (≤ 2%)

Potential dangers

Due to the alkaline and oxidizing character of this preparation, we cannot rule out local irritation to the skin, eyes, and mucous membranes.

First aid measures

After inhalation:	Fresh air, drink large amounts of water
After skin contact:	Wash with large amounts of water, remove contaminated clothing
After eye contact:	Rinse with large amounts of water, consult an eye specialist
After swallowing:	Drink large amounts of water, do not induce vomiting, consult a physician

1.4.2 Commercial disinfectants

Use a commercial alcohol-based (70%) disinfectant as a surface decontaminant. Please observe the relevant product information!

Do not use commercial disinfectants to decontaminate the tubing under any circumstances!

1.5 Decontamination

Use the following decontamination procedures to minimize the risk of infection (including hepatitis and HIV) when replacing parts that have come in contact with blood or other biological liquids.

Always wear gloves!

Observe section 1.4, Disinfectants, on page 1-3.

1.5.1 Surfaces

Decontaminate all outside surfaces, including all covers (e.g. the measuring chamber cover, bottle compartment cover, instrument cover) as well as the outside surfaces of the AutoQC module if present, with a cloth moistened with disinfectant.

1.5.2 Touch screen

1. Select
   "**More functions – System – Wash and clean – Clean screen**".
   The touch screen will be disabled for 30 seconds.
   The remaining number of seconds will be displayed on the screen.
2. You may now clean the screen with a cloth moistened with disinfectant.
3. After 30 seconds have elapsed, the menu will reappear.

1.5.3 Barcode scanner

Decontaminate the outer surfaces of the barcode scanner with a cloth moistened with disinfectant.

1.5.4 Sample port module

1. Select
   "**More functions – System – Wash and clean – Clean sample port module**".
2. Open the flap completely (capillary position).
3. Remove the sample drip tray and decontaminate it using a cotton swab dipped in disinfectant.
   If the sample drip tray is heavily contaminated, replace it with a new one.
   Before replacing it, decontaminate the sample drip tray with a cotton swab dipped in disinfectant.
4. Open the bottle compartment cover.
5. Remove the red tube connector from the wash plate.
6. Push the wash plate down to unlock and pull it out.
   (The wash plate is locked and cannot be removed when the plug is inserted.)
7. Decontaminate the wash plate with a cotton swab dipped in disinfectant.
8. Push the wash plate back in completely and attach the tube plug.
9. Push the drip tray in.
10. Decontaminate the fill port and the visible part of the needle with a cotton swab dipped in disinfectant.
11. Close the flap to the syringe position (half-opened position).
12. Clean the tip of the needle.
13. Close the flap.
14. Close the bottle compartment cover.

1.5.5 Measuring chamber

1. Remove the instrument cover and open the measuring chamber cover.
2. Open the electrode locking lever and remove the electrodes.
3. Clean the measuring chamber with a towel soaked in disinfectant (e.g. Roche Deproteinizer).
4. Reinsert the electrodes.
5. Close the measuring chamber cover and replace the instrument cover.

1.5.6 Tubing paths

To decontaminate the tubing system, use Roche Deproteinizer only!

Press
"**More functions – System – Wash and clean – Automatic routines – Decontaminate all tubes**" and follow the on-screen instructions.

For a detailed description of this procedure, please refer to section 6.1, Decontamination, in the Roche OMNI C Instructions for Use.

1.6 ESD protection measures

ESD protection measures are designed to prevent electronic components from being damaged or destroyed by uncontrolled electrostatic discharges.

1.6.1 Causes of electrostatic charges

The most frequent causes of electrostatic charges are friction or the separation of various materials such as plastics, synthetic fibres, hard rubber or paper, or electron beams in CRT units.

They can also be caused within an object by flexure or pressure – such as the friction of individual fibres within a piece of fabric.

The resulting electrical voltages may become a hazard when "charged" bodies or components do not have a conductive connection permitting a discharge (potential equalization).

The resulting charges generally do not have high energy, but nevertheless may have differences in potential of several thousand volts, resulting in perceptible electric shocks or visible sparks.

Example:

- Shoes with rubber soles:
  The friction of walking charges the person wearing the shoes in relation to the floor. A discharge occurs when the person touches an object.
- Clothing made of synthetic fabrics:
  Audible discharge; sparks visible in the dark.

- *The formation of electrostatic charges through friction is promoted by dry air.*
- *This tendency is reduced in high humidity, especially in saturated air.*
- *The occurrence of electrostatic phenomena is thus especially pronounced in the winter (northern hemisphere) in centrally heated rooms with low humidity.*

1.6.2 Effects of ESD on electronic components

When an electrostatically charged person touches an electronic device, the discharge may take place via the pins of an IC or a semiconductor component. If a discharge to ground is possible, the resulting voltage may damage the component.

This would be the case, for example, if the unit has a connection to a protective ground – this therefore also applies to units that are switched off, but have their AC cables plugged in.

Critical situations may also occur when repairing or testing electronic assemblies if they are placed on a more or less conductive surface (e.g. table top) and are touched by an electrostatically charged person. In this case, the discharge may also take place via a critical component connection.

1.6.3 Why is ESD protection so important today?

In the past, current-control semiconductors (TTL, normal transistors, etc.) were most commonly used.

Today, the principle of voltage control is used almost exclusively in MOS and CMOS components that are thus highly sensitive to the effects of externally applied voltages.

The voltages occurring in electrostatic discharges (up to several kV!) damage or destroy the sensitive component inputs.

An additional factor is the shrinking internal dimensions of ICs.

With the decreasing size of the internal conductors, the permissible maximum input voltages are also becoming lower and the effects of electrostatic discharges thus becoming ever more critical.

1.6.4 How can ESD protection be guaranteed?

A continuous discharge must be ensured when handling electronic assemblies.
This can be accomplished as follows:

- When transporting electronic assemblies, be sure to use ESD protection packaging[1] or other suitable storage/shipping packaging (i.e. the original packaging material).
- Test and repair electronic assemblies only on tables with ESD mats[1].
- Wear a grounded ESD wrist strap.
- Handle electronic components/assemblies by the edges only. Avoid touching printed circuits or component pins.
- Do not wear shoes with rubber soles or items of clothing containing synthetic fibres in facilities in which electronic equipment is serviced.
- If necessary, use a humidifier to ensure optimal humidity (>20% rel.) in the room.
- Take care not to touch assemblies or individual components directly with your hand after testing.
- When sending electronic components or assemblies in for repairs, always use ESD protection packaging[1] to prevent further damage that may result in an incorrect interpretation of the cause of the fault.

1.6.5 Conclusion

Naturally, not all printed circuit boards and electronic assemblies require such careful treatment. An assembly that features simple plug connectors, for example, is insensitive to electrostatic discharge and therefore does not need ESD protection packaging.

When in doubt, however, always take ESD precautions!

[1] These are materials with a very low, defined conductivity (10^{12} ohms), which do not accumulate charges with friction and thus cannot damage components.

2 Revisions..... 2-1

2 Revisions

2.1 Software

Version Nr.	Date of Release	Remark	Installed from OMNI C Serial Nr.
1.01	15.10.2001	First Release	≥1000
1.22	15.02.2002		≥1251
1.33	06.12.2002		≥1558

2.2 Service Manual

2.2.1 Revision 1.0

Revision Nr.	Date of Release	Modified Chapters	Applicable from Software Version
1.0	October 2001	First Release	1.01

2.2.2 Revision 2.0

Revision Nr.	Date of Release	Modified Chapters	Applicable from Software Version
2.0	January 2002	2, 3, 6, 8, 9	1.22

Chapter-Page	Modification / Addition
Cover Page	Revision No. and Date
2-I	Table of contents
2-1	Revision List
3-II	Table of contents
3-34	Changing the MBX board battery
6-I	Table of contents
6-1	Password
6-3	Delete databases
6-3 – 6-4	Reset settings
6-12	Consequence action delay
6-13 – 6-14	Log unit
6-15	Boot parameters
6-16	Database
8-I – 8-II	Table of contents
8-1 – 8-9	System Stops
8-10 – 8-18	Error Messages
8-21	Leaks in the Sample port / Needle / Barex tube area
8-22	Electrode limit values
8-22 – 8-23	Contact path limit values
9-1 – 9-6	Index

2.2.3 Revision 3.0

Revision Nr.	Date of Release	Modified Chapters	Applicable from Software Version
3.0	September 2002	2, 5, 6, 8, 9	1.33

Chapter-Page	Modification / Addition
Cover Page	Revision No. and Date
2-I	Table of contents
2-3	Revision List
5-I	Table of contents
5-13	Calibrating the Sample Sensors
5-15	Calibration Flow Chart
5-19	Measurement procedure
5-21	System calibration procedure
6-I	Table of contents
6-2	Roche Service 1 – new Screenshot
6-5	AQC XY adjustment
6-7	Calibration of tHb temperature sensor
6-15	Start button for measurement
6-20	O2 zero interval
8-II	Table of contents
8-10	Error Messages
8-10	List of error messages (sorted by Info No.)
8-23	Electrode calibration limit values
8-23	Conductivity calibration limit values
8-24	Conductivity calibration limit values
8-25	Power-up component test
9-1 – 9-6	Index
Additional page	Start button for measurement

3 Components 3-1

3 Components

3.1 Important Instructions

Components of the OMNI C (sample port, tubing, Waste container, etc.) contain remnants of biological fluids after use, resulting in possible risk for infections.

Handle these components with care and avoid skin contact.
Wear rubber gloves while working on the analyzer!

The tubes may drip a little after being disconnected.
Remove excess fluids with a clean, absorbent cloth.

After changing components, calibration parameters could have changed or some values have to be entered again.

After finishing modifications, a system calibration must be performed to adapt the calibration parameters to the new conditions.

3.2 Shutdown

Switch off the OMNI C before you begin with the modifications!

Determined by the time the analyzer was switched off, one of the following procedures has to be performed:

3.2.1 The OMNI C stays switched off shorter than 24 hours

- Perform the decontamination procedure according to sections **1.5.1** to **1.5.6** on page 1-4.
- Press „**More - System – Tools– Software communication – Shut down software**“ and switch off the analyzer

If the Docking mechanisms C1, C2 or C3 have been opened while the analyzer was switched off, the respective solutions have to be prepared again under „More - System – Tools– Fluid actions – Auto preparation routines“ to avoid improper operation!

3.2.2 The OMNI C stays switched off longer than 24 hours

- Perform the decontamination procedure according to sections **1.5.1** to **1.5.5** on page 1-4.
- Press „**More - System – Tools- Shutdown**“ and follow the instructions on the screen.

Only Roche Deproteinizer may be used for the decontamination of the tubing.

3.3 Dismounting the rear panel

1. Switch off the OMNI C (please pay attention to section 3.2 Shutdown on page 3-2!).
2. Pull off the power cord from the power supply unit.
3. Remove the three mounting screws from the rear panel (see Fig. 3-1) and pull off the rear panel from the analyzer (if needed, remove the power supply unit from the rear panel; a certain amount of force is needed because of the mounting with Velcro tape).

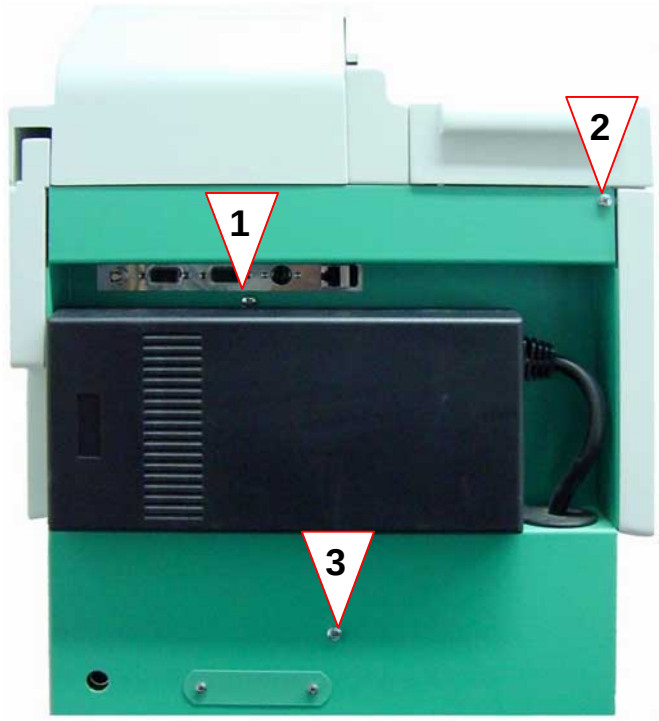


Fig. 3-1 OMNI C rear panel mounting screws

4. Pull off the plug of the power supply cable from the PC tower (see Fig. 3-2).

Fig. 3-2 Plug of the power supply cable

Assembly is done in reverse order.

When installing the rear panel, please pay attention to the correct routing of the power supply cable inside the OMNI C (see Fig. 3-3)!

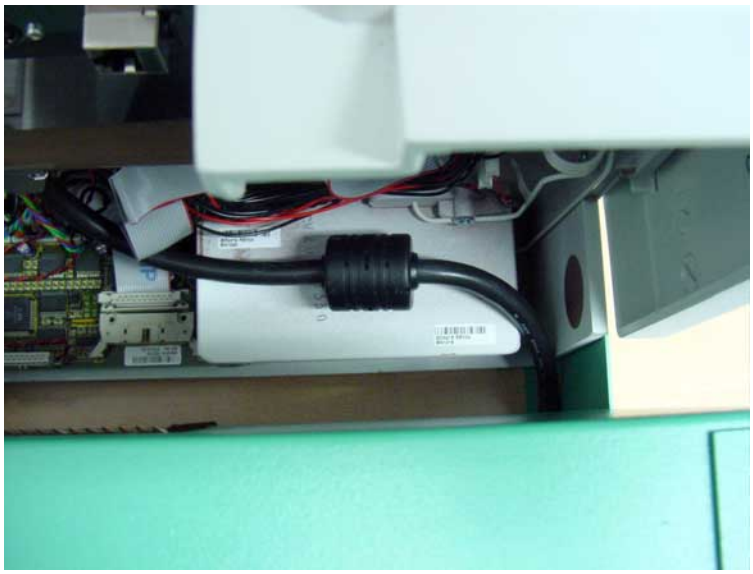


Fig. 3-3 Routing of the power supply cable

3.4 FMS (Fluid Mixing System)

3.4.1 General Information

The OMNI C uses a method which allows the simultaneous calibration of the PCO_2, pH, Na^+, K^+, Ca^{++} and Cl^- sensors by using only two solutions (C1and C2).

Principle:

The Mix is produced by the mixing valve V1 (two inputs, one output) in conjunction with the peristaltic pump. For an optimal mixing process, the synchronous function of pump and the mixing valve is essential.

The Mix consists of alternating fluid packages from solution C1 and solution C2. Homogenization is accomplished by small packages of either solution in relation to the distance.

3.4.2 Changing the FMS unit

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Pull off the cable connections from the Actuator board (see Fig. 3-4).

Fig. 3-4 FMS connecting cables at the Actuator board

3. Remove the bottle compartment cover.
4. Take out the bottles W, C1 and C2.
5. Pull off the tubing connections from the FMS.

6. Open the four mounting screws of the FMS (see Fig. 3-5, 1 to 4).
   (Do not remove the screws completely!)

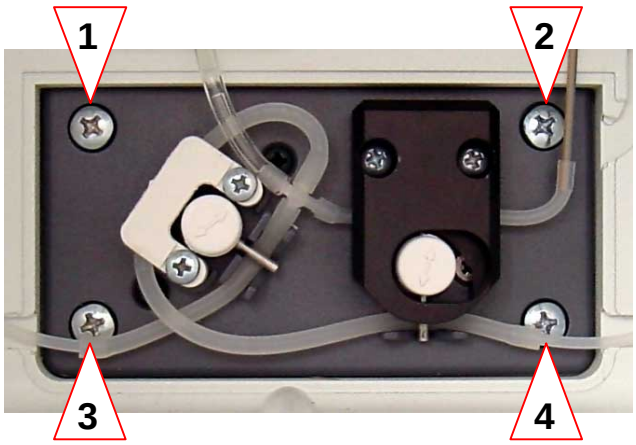


Fig. 3-5 FMS unit

Assembly is done in reverse order.

Test the FMS-valves (V1 and V2) under
„**More - System – Test – valves and Aggregates - valves**“.
(see also section 3.14.5 Testing the valves on page 3-43)

3.5 Measuring chamber

3.5.1 General Information

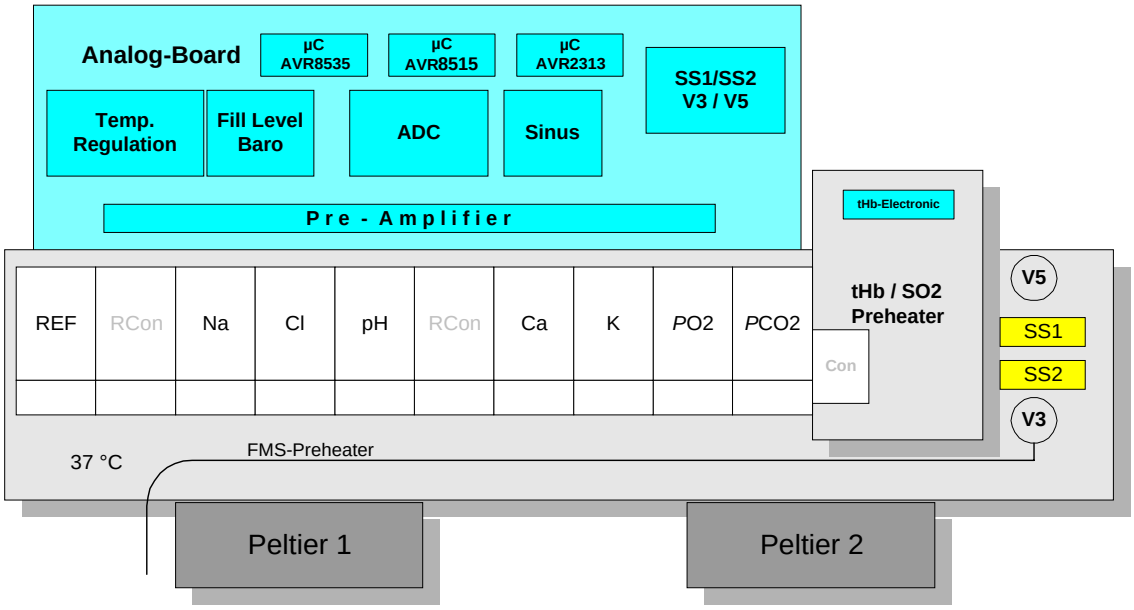


Fig. 3-6 Block diagram measuring chamber

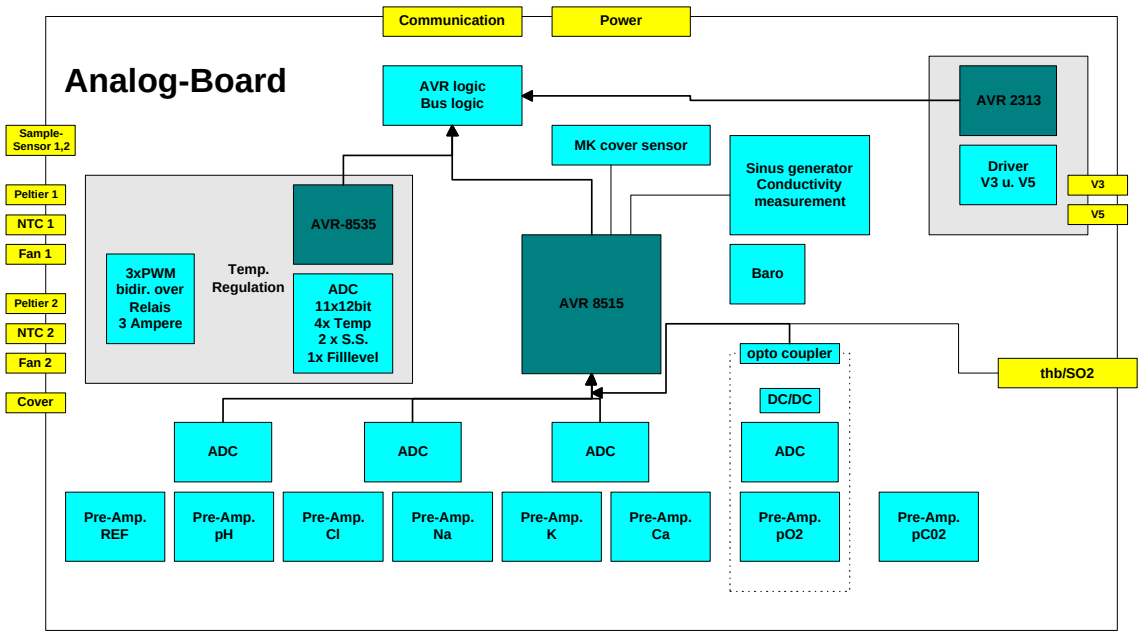


Fig. 3-7 Block diagram analog board

Analog board - functions:

- Controlling and measuring of all functions integrated in the measuring chamber
- Producing polarisation voltage O_2
- Read-in and controlling tHb/SO_2 module
- Conductivity measurement
- Controlling the measuring chamber and the measuring chamber cover temperature
- Controlling and read-in the two sample sensors
- Read-in baro sensor value to determine air-pressure
- Read-in baro sensor value to determine the Waste container fill level
- Controlling of two valves (V3 and V5)
- Read-in measuring chamber cover switch

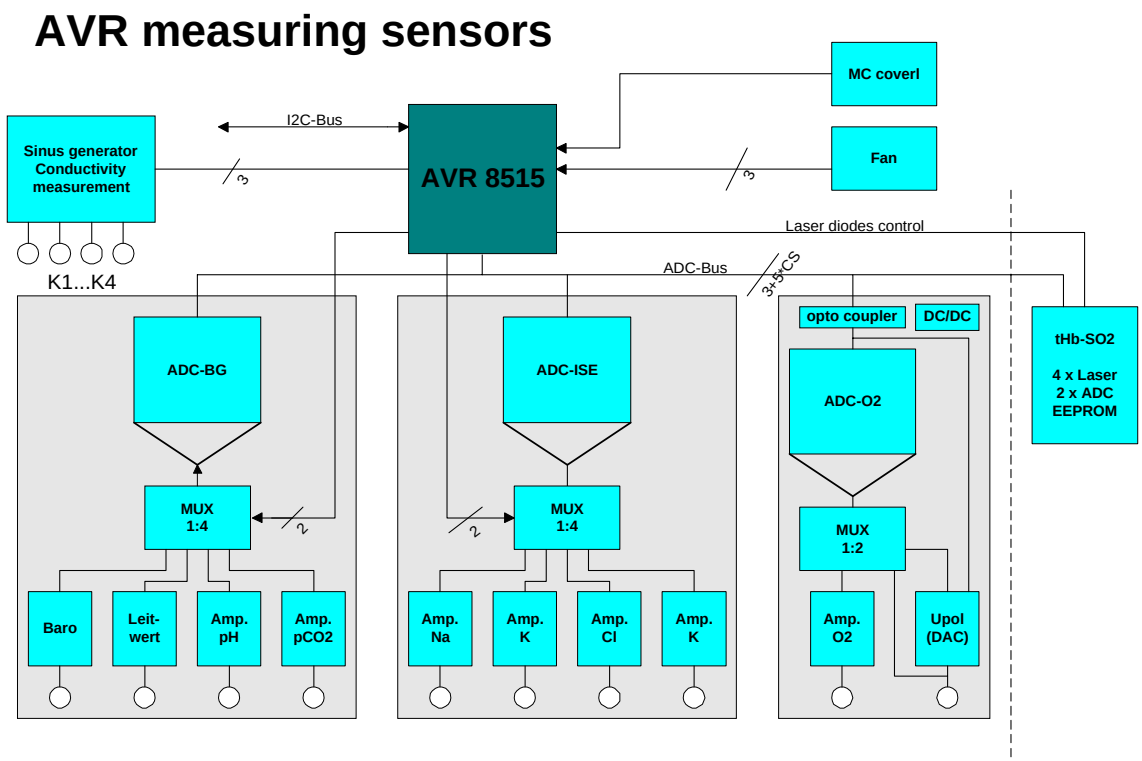


Fig. 3-8 Block diagram AVR measuring sensors

3.5.2 Changing the measuring chamber

1. Switch off the OMNI C (please pay attention to section 3.2 Shutdown on page 3-2!).
2. Pull off the power cord from the power supply unit.
3. Remove the analyzer cover.
4. Dismount the sample port module (see section 3.6.1, Changing the sample port module on page 3-20).
5. Dismount the screen cover (see section 3.8.4, Changing the screen on page 3-30)
6. Open the measuring chamber cover.
7. Remove all electrodes from the measuring chamber.
8. Dismount the cover of the MC cover cable and pull the cable out (see Fig. 3-9)

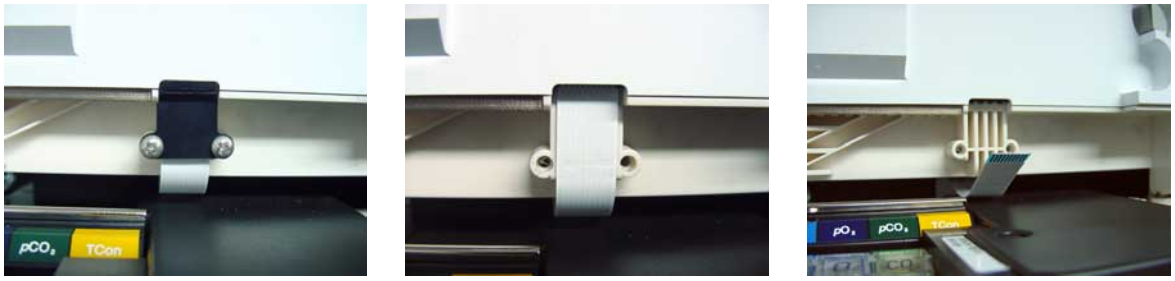


Fig. 3-9 Dismounting the measuring chamber cover cable

9. Dismount the measuring chamber cover by pressing it to the left and then upwards (see Fig. 3-10).

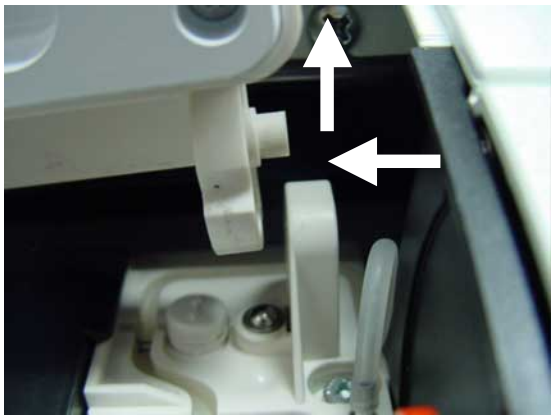


Fig. 3-10 Dismounting the measuring chamber cover

10. Pull the measuring chamber cover to the front, by doing this also the connection to the gas spring to the housing is disconnected (see Fig. 3-11, 1).

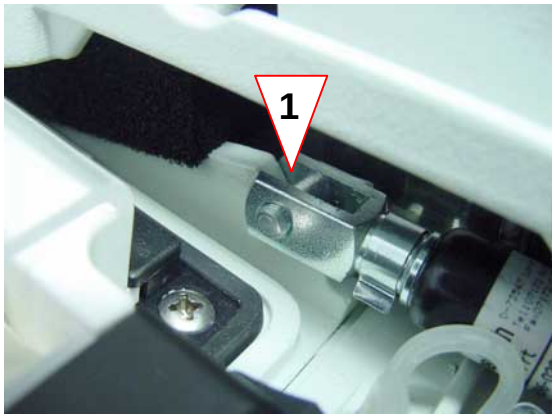


Fig. 3-11 Gas spring connection

11. Remove the 4 allen screws of the measuring chamber.
12. Open the tube connections and the Barex tube connection (see Fig. 3-12, 1 to 4)

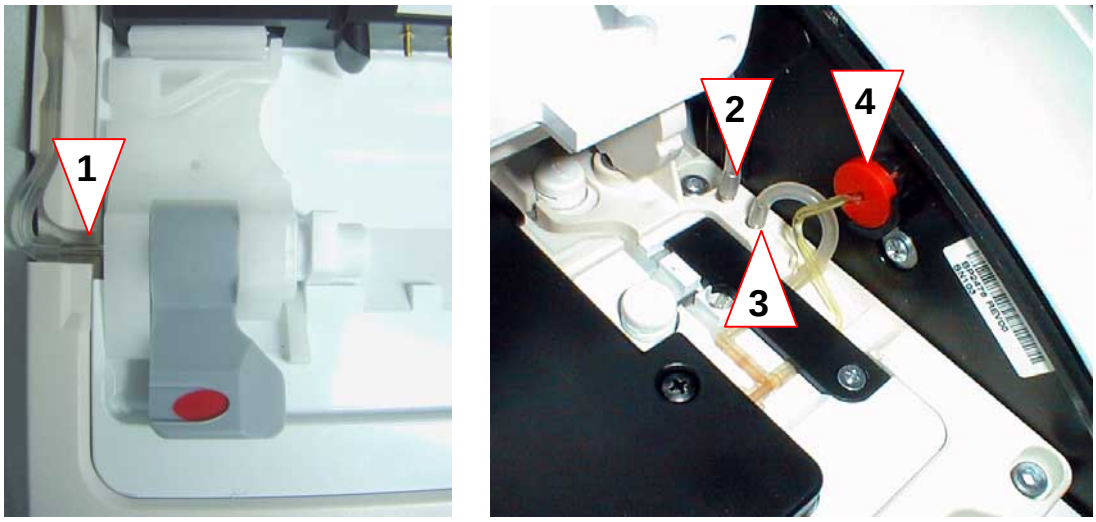


Fig. 3-12 Measuring chamber tube connections

13. Lift the measuring chamber carefully and pull off the two cables and the pressure sensor tube from the analog board.

Assembly is done in reverse order. Please note the following instructions!

When installing the measuring chamber, the FMS pipe must slide exactly into the holder of FMS connector sealing 1 (see Fig. 3-13, 1) and the two pipes at the right side must slide through the two holes at the right side of the measuring chamber (see Fig. 3-13, 2 and 3).

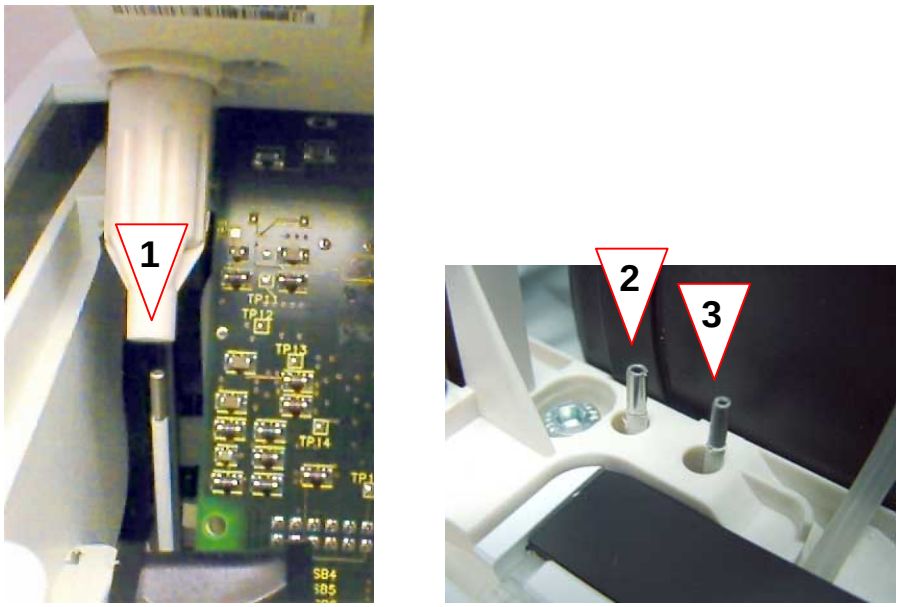


Fig. 3-13 Measuring chamber pipe connections

After installing the measuring chamber a Waste container fill check must be performed:

1. *Insert a full Waste container W into the analyzer and close the docking mechanism W.*
2. *Press „**More - System – Test – Waste Container sensor**“ and measure the Waste container level by pressing the button „**W**“ on the screen.*
3. *The measured fill level must be equivalent to the actual fill level in the Waste container W.*
4. *If the fill levels are not equivalent, check whether the tube at the pressure sensor (on the analog board) is connected properly.*

After installing a new measuring chamber a FMS volume determination must be performed (see chapter 6).

3.5.3 Changing the measuring chamber cover

Follow steps 1 to 10 of section 3.5.2 on page 3-9.

3.5.4 Changing the analog board

1. Dismount the measuring chamber (Follow section 3.5.2 on page 3-9).
2. Follow steps 2 to 5 of section 3.5.13 on page 3-19.
3. Open the screws at the measuring chamber contact part (see Fig. 3-14, 1 and 2).

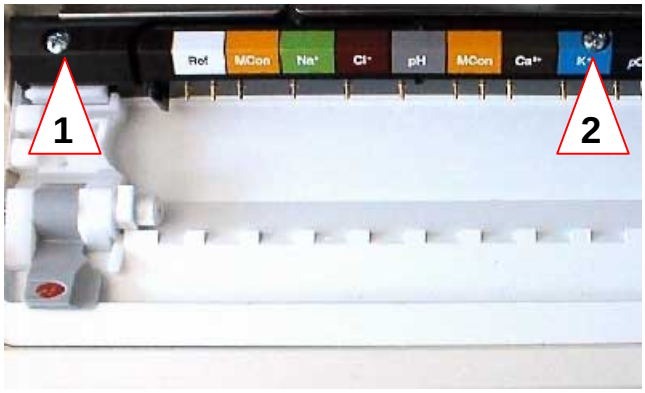


Fig. 3-14 Measuring chamber contact part

4. Pull off all cable connections from the analog board (see Fig. 3-15)

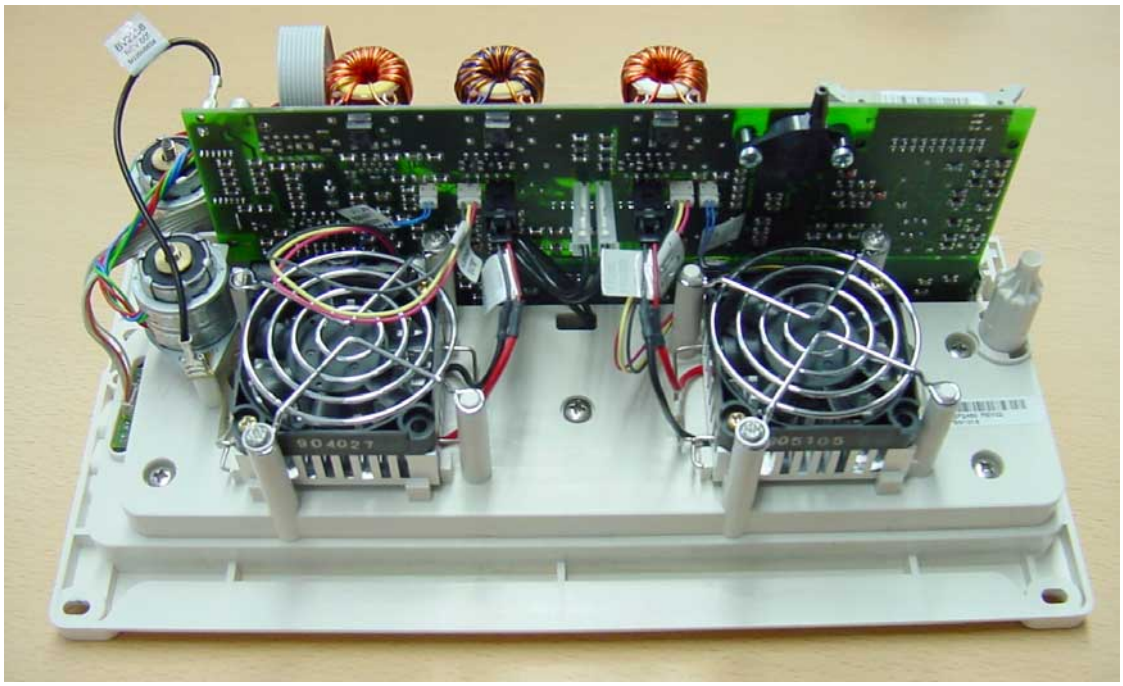


Fig. 3-15 Analog board

5. Take out the analog board (by doing this also the electrode locking lever disengages).

Assembly is done in reverse order.

3.5.5 Changing the measuring chamber actuators

1. Dismount the measuring chamber (Follow section 3.5.2 on page 3-9).
2. The holders of the valve heads can be dismounted only in one direction.
   Turn the holders into the positions according to Fig. 3-16.
3. To disengage the holders, press into the direction of the arrows at Fig. 3-16.
   If necessary, move the valve head by turning the brass disk at the backside of the valve (see Fig. 3-17).
4. Open the mounting screws at the rear of the measuring chamber actuators (see Fig. 3-17) and take out the actuator.
5. Pull off the cable connection from the analog board (see Fig. 3-17).

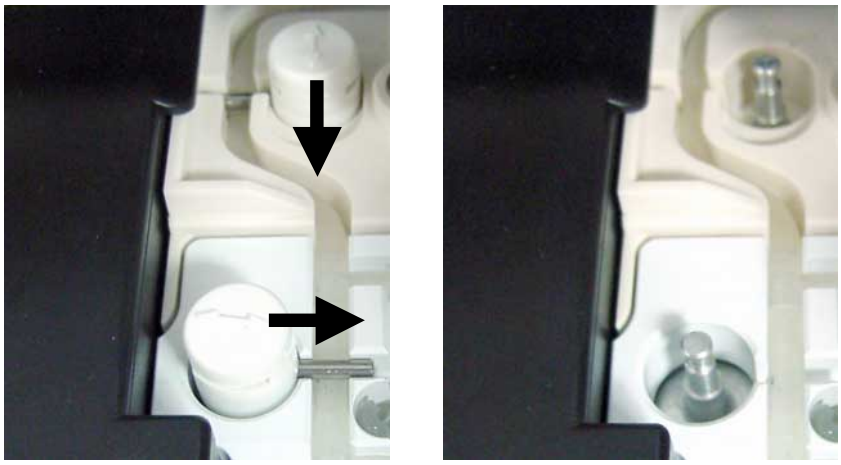


Fig. 3-16 Measuring chamber actuators

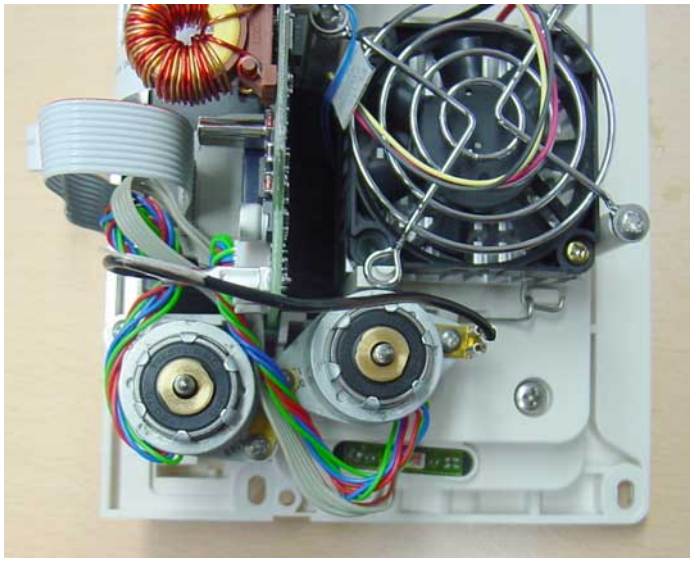


Fig. 3-17 Measuring chamber actuators (rear view)

Assembly is done in reverse order.

3.5.6 Changing the sample sensor board

1. Switch off the OMNI C (please pay attention to section 3.2 Shutdown on page 3-2!).
2. Pull off the power cord from the power supply unit.
3. Remove the analyzer cover.
4. Open the measuring chamber cover.
5. Open the screw of the sample sensor cover (see Fig. 3-18, 1) and remove the cover.

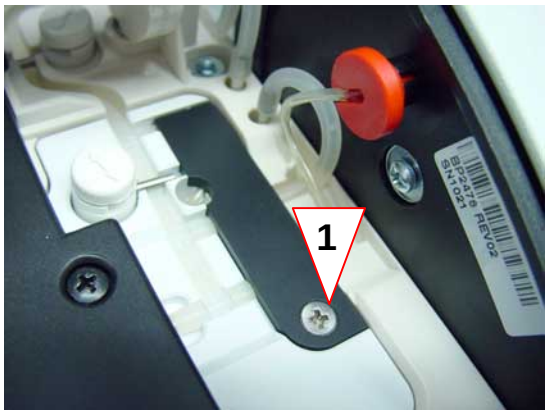


Fig. 3-18 Sample sensor cover

6. Pull the tube out of the FMS connector sealing 2 (see Fig. 3-19, 1).

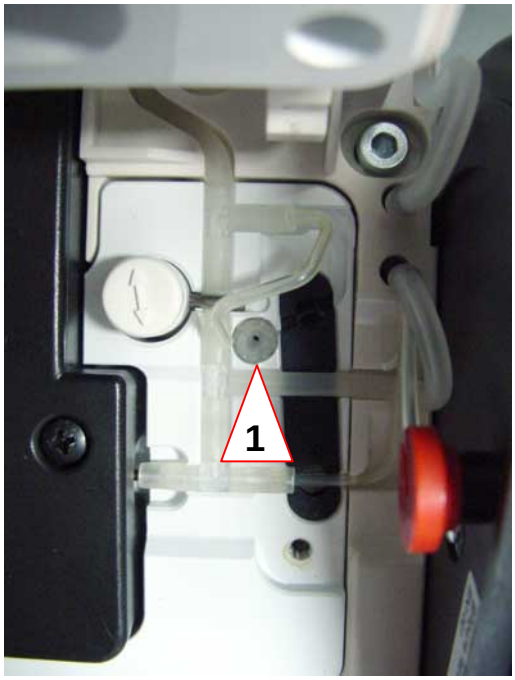


Fig. 3-19 Tube connection at FMS connector sealing 2

7. Open the tube connection and the Barex tube connection (see Fig. 3-20, 1 and 2).

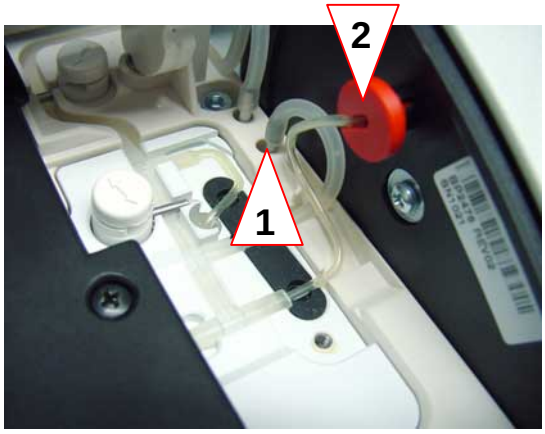


Fig. 3-20 Tube connection and Barex tube connection

8. Push the tube connections to the side and take out the sample sensor board (see Fig. 3-21).
9. Pull off the cable from the sample sensor board (see Fig. 3-21, 1).

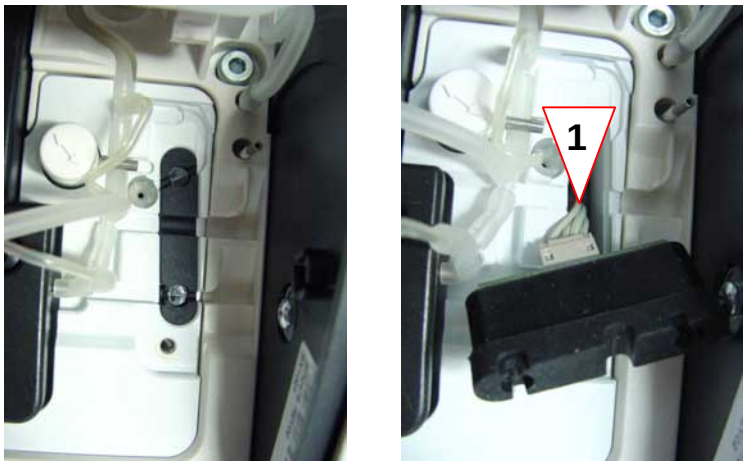


Fig. 3-21 Sample sensor board

Assembly is done in reverse order.

3.5.7 Changing the TCon

1. Remove the analyzer cover.
2. Open the measuring chamber cover.
3. Open the electrode locking lever.
4. Push the electrodes to the left.
5. Take out the TCon, by pushing to the rear and upwards.

Assembly is done in reverse order.

3.5.8 Changing the electrode locking lever

1. Remove the analyzer cover.
2. Open the measuring chamber cover.
3. Open the electrode locking lever.
4. Disengage the electrode locking lever at the upper side (see Fig. 3-22, 1).
5. Pull off the tube from the electrode locking lever (see Fig. 3-22, 2).

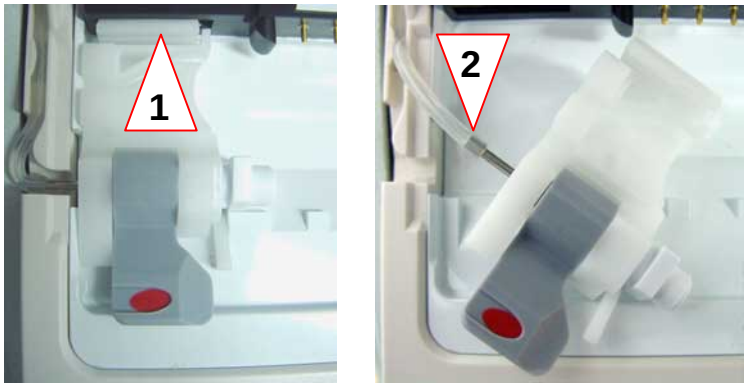


Fig. 3-22 Electrode locking lever

Assembly is done in reverse order.

3.5.9 Changing the measuring chamber tubing

1. Press „**More - System – Test – valves and Aggregates - valves**“ (see also section 3.14.5 Testing the valves on page 3-43)
2. Remove the analyzer cover.
3. Open the measuring chamber cover
4. Switch the valves V3 and V5 into the opened position in order to lift them from the tubes.
5. Open the screw of the sample sensor board cover (see Fig. 3-23, 1) and remove the cover.
6. Pull off the Barex tube from the sample port module (see Fig. 3-23, 2).
7. Pull off the two tubes from the pipes (see Fig. 3-23, 3 and 4).

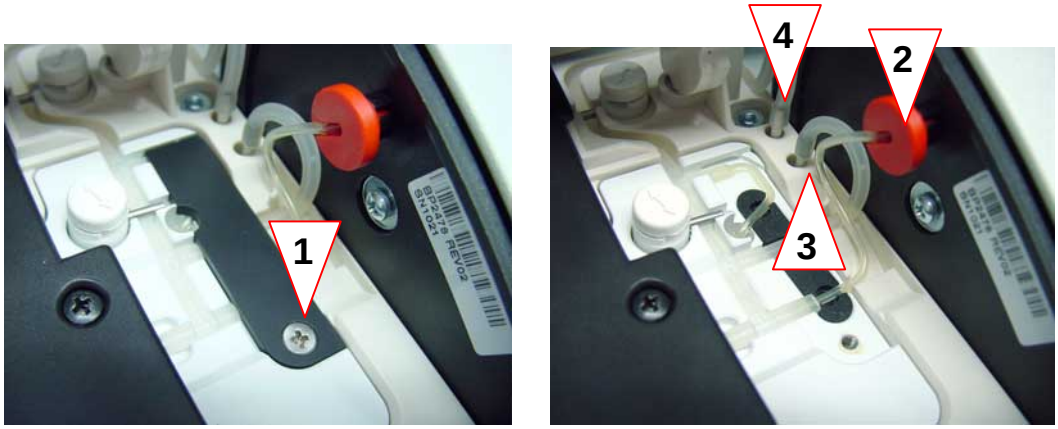


Fig. 3-23 Sample sensor cover / Barex tube

8. Take out the measuring chamber tubing.

Assembly is done in reverse order.

Do not bend the Barex tube! Damaged areas appear white-coloured.
If this happens, replace the Barex tube!

3.5.10 Changing the Barex tube

1. Remove the analyzer cover.
2. Open the measuring chamber cover.
3. Open the screw of the sample sensor board cover (see Fig. 3-23, 1) and remove the cover.
4. Pull off the Barex tube from the sample port module (see Fig. 3-23, 2).
5. Pull out the Barex tube from the tube connection (see Fig. 3-24, 1).

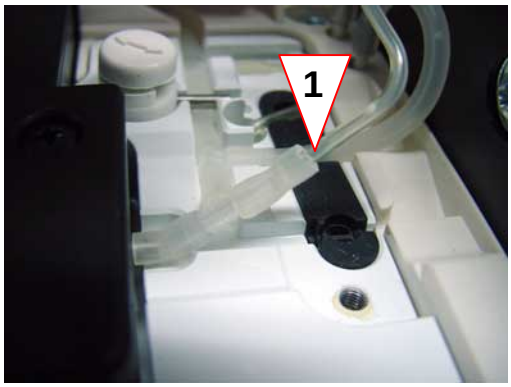


Fig. 3-24 Barex tube connection

Assembly is done in reverse order.

Do not bend the Barex tube! Damaged areas appear white-coloured.
If this happens, replace the Barex tube!

3.5.11 Changing the FMS connector sealing 1

1. Dismount the measuring chamber (Follow section 3.5.2 on page 3-9).
2. Remove the holder of the FMS connector sealing 1 by turning left (see Fig. 3-25, 1)
3. Take out the FMS connector sealing 1 (see Fig. 3-25, 2).

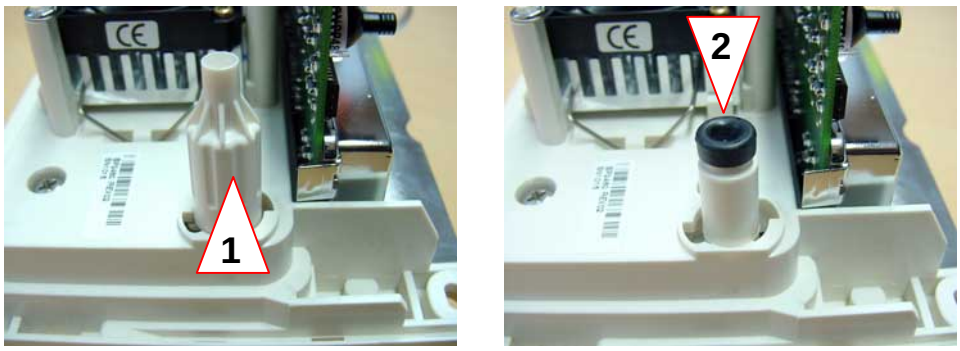


Fig. 3-25 FMS connector sealing 1

Assembly is done in reverse order.

3.5.12 Changing the FMS connector sealing 2

1. Follow steps 1 to 6 of section 3.5.6 Changing the sample sensor board on page 3-14.
2. Pull off the FMS connector sealing 2 from the pipe (see Fig. 3-26, 1).

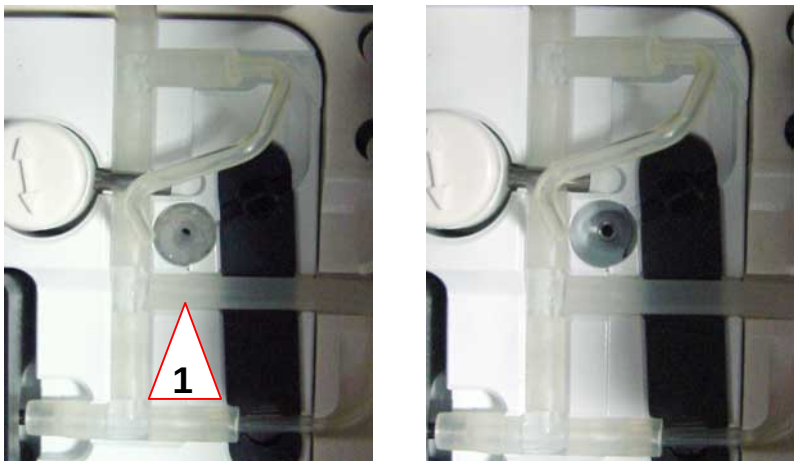


Fig. 3-26 FMS connector sealing 2

Assembly is done in reverse order

3.5.13 Changing the tHb/SO_2 module

The tHb/SO_2 module is calibrated and sealed at the factory („Factory calibration“) and can only be replaced as a unit.

Never try to open or disassemble the tHb/SO_2 module – the module would not be calibrated any longer in this case!

1. Dismount the measuring chamber cover (Follow steps 1 to 10 of section 3.5.2 on page 3-9.)
2. Take out the TCon.
3. Open the two mounting screws at the tHb/SO2 – Module.
   (Do not remove the screws completely!)
4. Take out the tHb/SO_2 module (pay attention to the tube connection at the right measuring chamber side (see Fig. 3-27, 1).
5. Disconnect the cable connection to the analog board (see Fig. 3-27, 2).

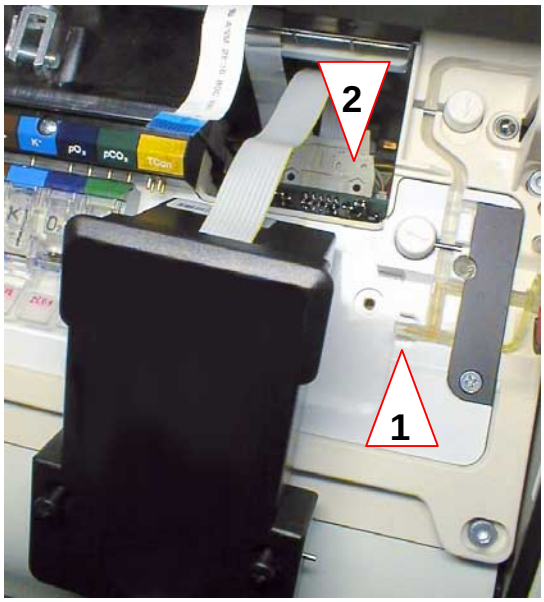


Fig. 3-27 tHb/SO_2 module

Assembly is done in reverse order.

3.6 Sample port module

3.6.1 Changing the sample port module

1. Switch off the OMNI C (please pay attention to section 3.2 Shutdown on page 3-2!).
2. Pull off the power cord from the power supply unit.
3. Open the flap completely.
4. Push the sample port upwards until it disengages from the axis (see Fig. 3-28).

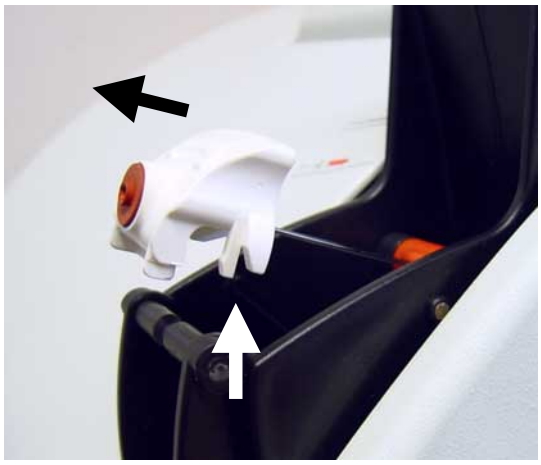


Fig. 3-28 sample port

5. Push the needle to the left, then upwards and take it out (see Fig. 3-29).

Fig. 3-29 Needle

6. Remove the sample drip tray by pulling to the front.
7. Pull off the connector from the wash plate.
8. Take out the wash plate by pushing downwards at the front and then pulling out.
9. Position the flap horizontally.
10. Open (do not remove) the two mounting screws (see Fig. 3-30, 1 and 2).

11. Remove the analyzer cover.
12. Open the measuring chamber cover.
13. Pull off the Barex tube from the sample port module (see Fig. 3-30, 3).
14. Take out the sample port module by pushing it upwards and to the front.
15. Pull off the cable from the flap detection board (Fig. 3-30, 4).

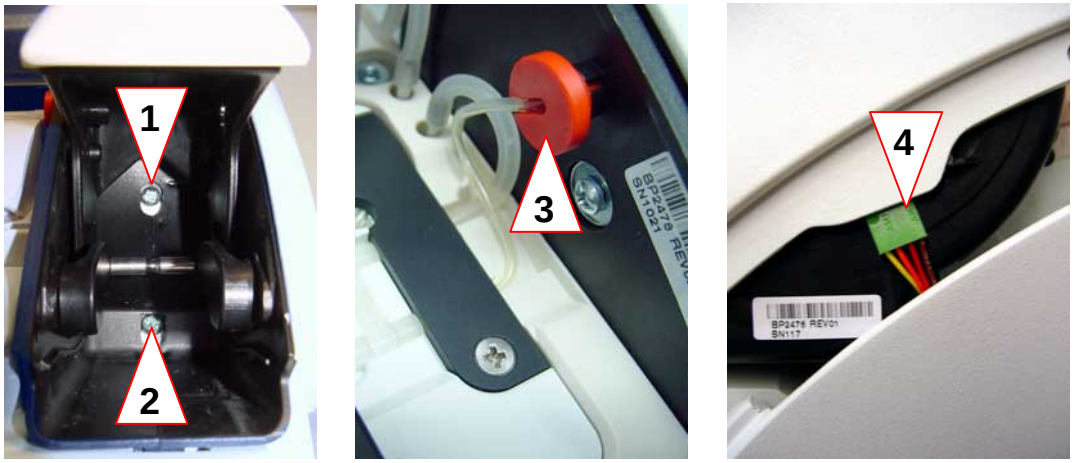


Fig. 3-30 sample port module

Assembly is done in reverse order.

Pay attention to correct connection of the cable!

3.6.2 Changing the sample port

1. Press **„More – System – Wash & clean – Clean sample port module“**.
2. Open the flap completely.
3. Push the sample port upwards until it disengages from the axis (see Fig. 3-28).
4. Pull off the sample port from the needle (see Fig. 3-28).

Assembly is done in reverse order.

3.6.3 Changing the needle

1. Take out the sample port (see section 3.6.2).
2. Push the needle to the left, then upwards and take it out (see Fig. 3-29).

Assembly is done in reverse order.

3.6.4 Changing the needle sealing

1. Dismount the needle according to section 3.6.3 Changing the needle on page 3-22.
2. Pull off the Barex tube from the sample port module.
3. The needle sealing falls out when re-connecting the Barex tube (see Fig. 3-31).

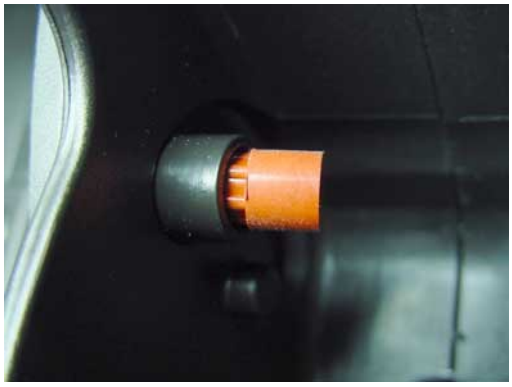


Fig. 3-31 Needle sealing

Assembly is done in reverse order.

Pay attention to correct orientation of the needle sealing (see Fig. 3-31)!

3.6.5 Changing the flap detection board

1. Dismount the sample port module according to section 3.6.1 Changing the sample port module on page 3-20.
2. Open the two screws of the side cover (see Fig. 3-32).

Fig. 3-32 Side cover of the sample port module

3. Dismount the flap detection board by carefully disengaging the clips (see Fig. 3-33, 1 and 2).

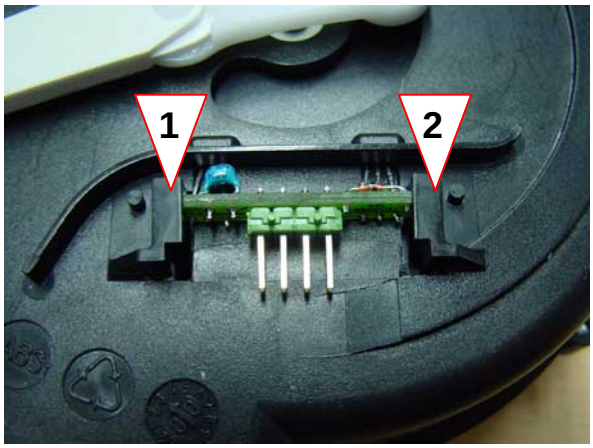


Fig. 3-33 Flap detection board

Assembly is done in reverse order.

3.7 Peristaltic pump

3.7.1 Changing the peristaltic pump

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Remove the analyzer cover.
3. Pull off the two cables from the pump (see Fig. 3-34, 1 and 2).

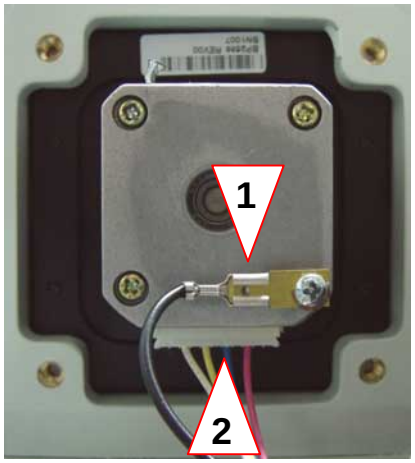


Fig. 3-34 Peristaltic pump (rear view)

4. Open the tension lever (translucent cover) of the peristaltic pump and push the linear clamp (white plastic part) upwards (see Fig. 3-35).
5. Take out the pump tube.

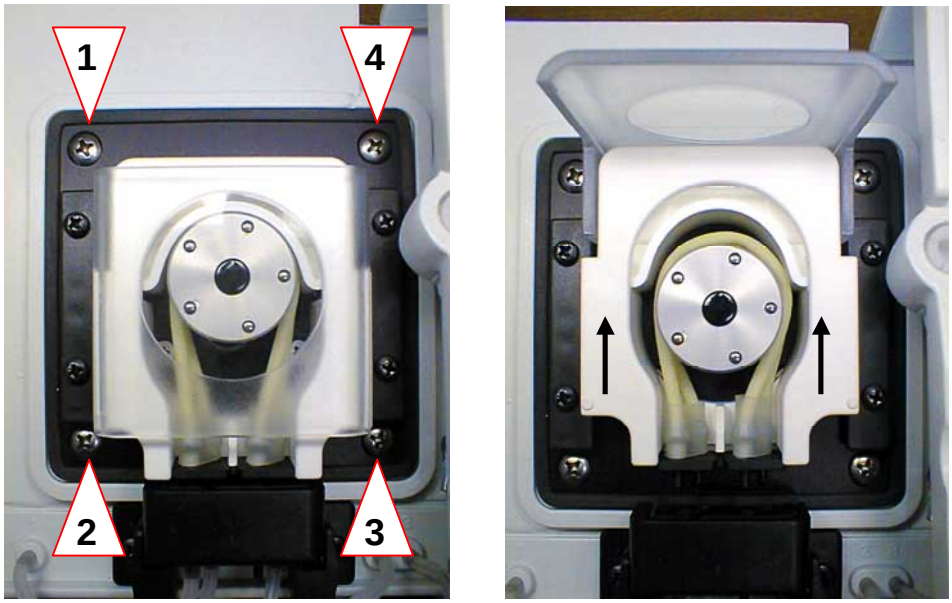


Fig. 3-35 Peristaltic pump

6. Open the mounting screws of the peristaltic pump (see Fig. 3-35, 1 to 4) and take out the pump.

Assembly is done in reverse order.

Test the proper operation of the peristaltic pump under
„**More - System – Test – valves and Aggregates - Peristaltic pump**“
(see also section 3.7.6 Testing the peristaltic pump on page 3-27).

3.7.2 Changing the pump head

1. Press **„More – System“**.
2. Remove the analyzer cover.
3. Open the tension lever (translucent cover) of the peristaltic pump and push the linear clamp (white plastic part) upwards (see Fig. 3-35 on page 3-24).
4. Take out the pump tube.
5. Open the threaded bolt (1,5 mm allen wrench) at the pump head.
6. Pull off the pump head.
7. Slide the new pump head over the axis and tighten the threaded bolt.
   The threaded bolt must be located at the flat side of the axis.

The pump head must have some clearance below!

8. Place the pump tube around the pump head (the tubes must not be crossed!).
9. Close the tension lever (translucent cover).
10. Put the analyzer cover back onto the analyzer.

3.7.3 Changing the pump tube

1. Press **„More – System“**.
2. Remove the analyzer cover.
3. Open the tension lever (translucent cover) of the peristaltic pump and push the linear clamp (white plastic part) upwards (see Fig. 3-35 on page 3-24).
4. Take out the pump tube.
5. Place the pump tube around the pump head (the tubes must not be crossed!).
6. Close the tension lever (translucent cover).
7. Put the analyzer cover back onto the analyzer.

3.7.4 Changing the tension lever

1. Press **„More – System“**.
2. Remove the analyzer cover.
3. Open the tension lever (translucent cover).
4. Open the mounting screws of the left linear clamp guide (see Fig. 3-36, 1 and 2).
5. Take out the linear clamp guide.
6. Push the linear clamp to the left (see Fig. 3-36) and take out the tension lever.

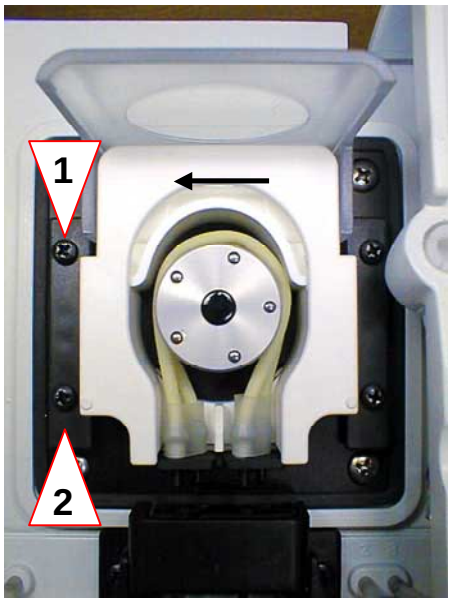


Fig. 3-36 mounting screws the left linear clamp guide

Assembly is done in reverse order.

3.7.5 Changing the pump plate sealing

1. Follow the instructions in section 3.7.1 Changing the peristaltic pump on page 3-24.
2. Pull off the pump plate sealing from the plate.

Assembly is done in reverse order.

3.7.6 Testing the peristaltic pump

Press **„More – System – Test – Valves and aggregates – Peristaltic pump“**.

The peristaltic pump can be tested at four speeds via this function.
The pump can be activated only counter-clockwise because a clockwise rotation would draw fluid out of the Waste container.

Following 4 speeds are selectable:

- 5 µl/s
- 12 µl/s
- 40 µl/s
- 80 µl/s

Additionally displayed values are:

- The pump volume in µl/Revolution
- The FMS volume in µl

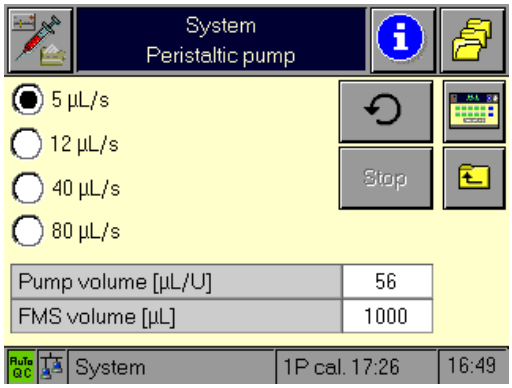


Fig. 3-37 Testing the Peristaltic pump

3.8 PC tower

3.8.1 General Information

The PC tower contains following components:

PC unit	• MBX board (with PCMCIA slot) • Connectors: 2x RS232, 1x Ethernet, 1x PS/2 (Barcode) • Connector for the power supply unit • Connectors to the modules • 20 pin communication cable
Colour screen	• see section 3.8.3
2” Thermo printer	• see section 3.8.6

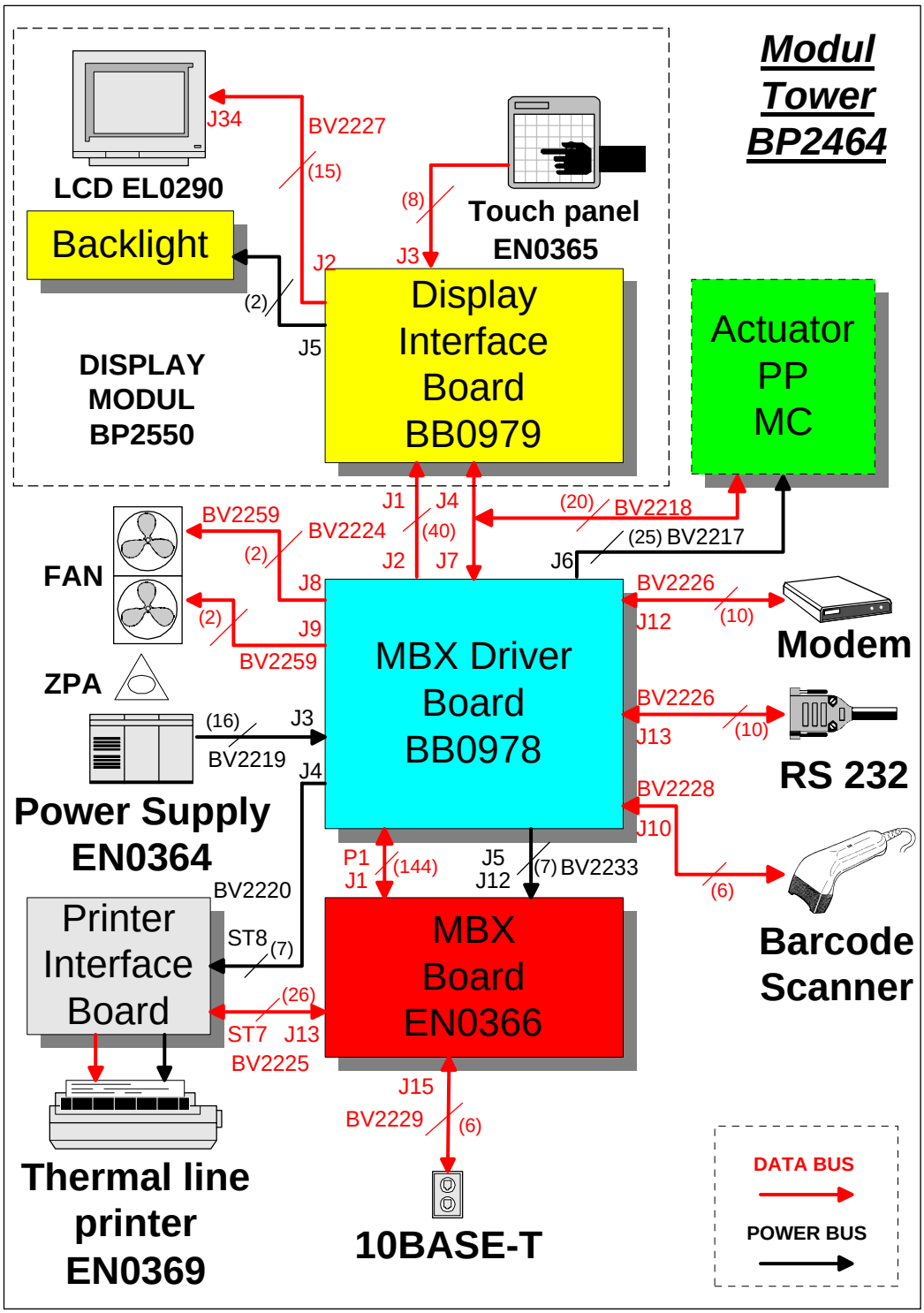


Fig. 3-38 Block diagram PC tower

3.8.2 Changing the PC tower

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Remove the analyzer cover and the printer cover.
3. Pull off all cables from the PC tower.
4. Remove the mounting screws of the PC tower (see Fig. 3-39, 1 to 3).

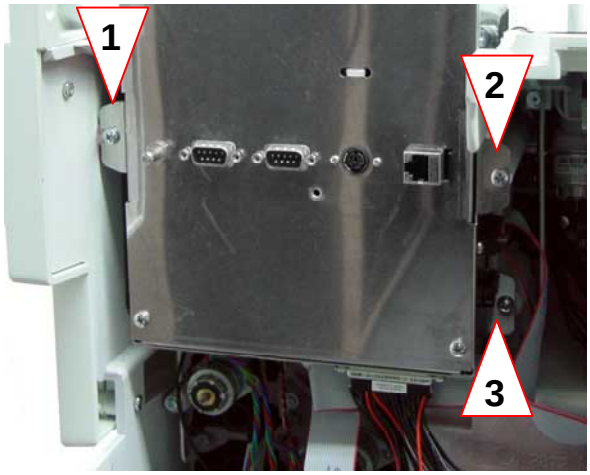


Fig. 3-39 PC tower (rear view)

5. Pull out the PC tower to the rear .
6. Remove the screen cover by opening the screws (see Fig. 3-40, 1 to 3).

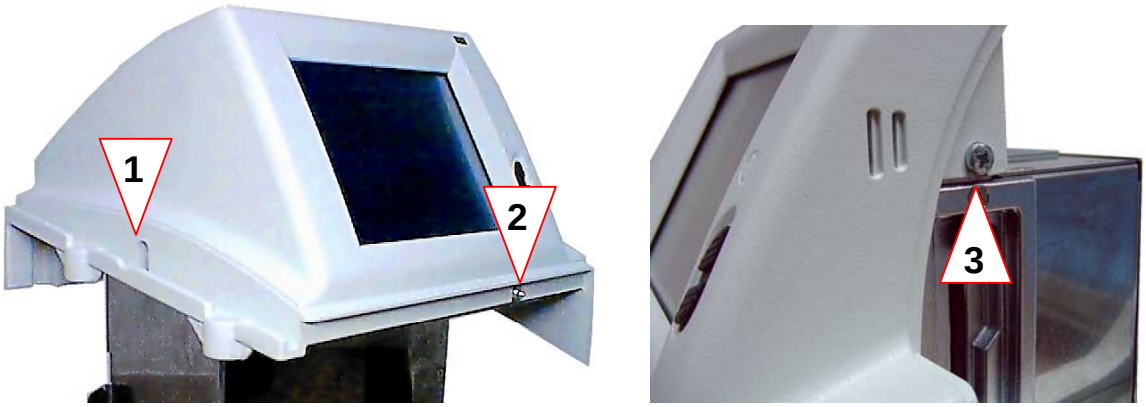


Fig. 3-40 screen cover mounting screws

Assembly is done in reverse order.

3.8.3 Screen

Type:	KYOCERA KCS057QV1AA-A47 with touch screen Display Interface Board (including touch screen electronics)
Resolution:	¼ VGA Display 5,7”
Dimensions:	154,6 x 114,8 x 8,5 mm
Contrast:	min. 10, typ. 25
Reaction time:	typ. 220 ms
Screen format:	320 x 3 (B) x 240 (H)
Pixel dimensions:	0,1 x 0,34
Line format:	0,12 x 0,36
Operating temperature:	0°C to 50°C
Power consumption:	200 to 300mW (without backlight)
Backlight:	CFL, changeable, lifetime approx. 40.000h

3.8.4 Changing the screen

1. Switch off the OMNI C (please pay attention to section 3.2 Shutdown on page 3-2!).
2. Pull off the power cord from the power supply unit.
3. Remove the analyzer cover and the printer cover.
4. Dismount the sample port module according to section 3.6.1. Changing the sample port module on page 3-20).
5. Dismount the screen cover by opening the mounting screws (see Fig. 3-41, 1 to 3).

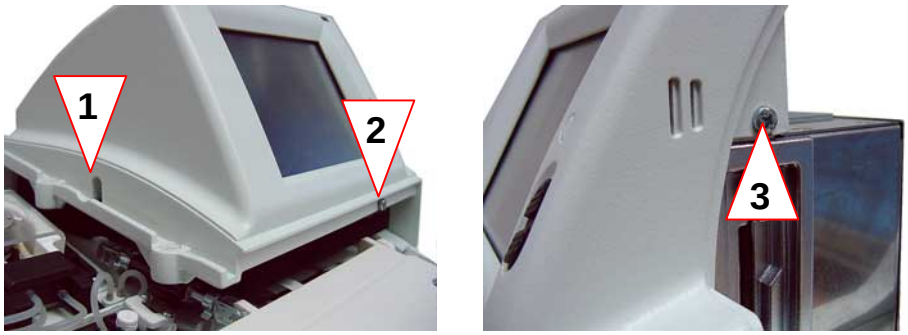


Fig. 3-41 Screen cover mounting screws

6. Remove the two screws of the screen (see Fig. 3-42, 1 and 2).

Fig. 3-42 Screen

7. Unplug the two connectors, pull off the cable and take out the screen.

Assembly is done in reverse order.

Reinstall the two contact strips at the housing sides according to Fig. 3-43, 1 and 2.

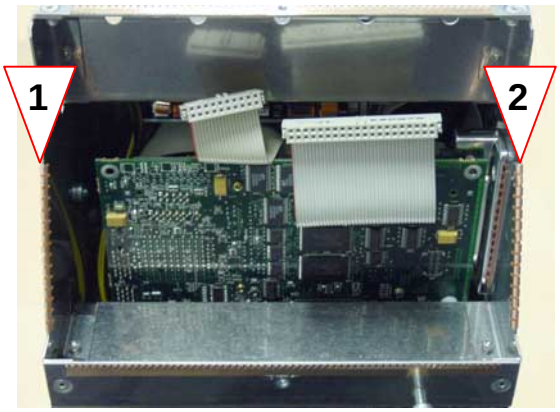


Fig. 3-43 Contact strips

3.8.5 Changing the backlight

1. Follow section 3.8.4 Changing the screen on page 3-30.
2. Pull off the connector from the fluorescent tube (see Fig. 3-44, 1).
3. Open the mounting screw (see Fig. 3-44, **2**) and take out the fluorescent tube.

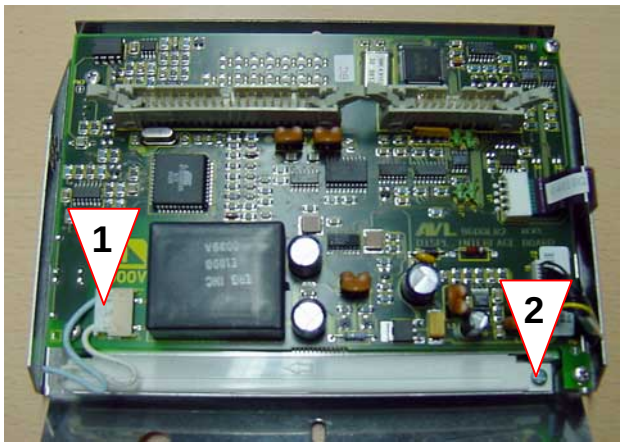


Fig. 3-44 Screen (rear view)

Assembly is done in reverse order.

Reinstall the two contact strips at the housing sides according to Fig. 3-43, 1 and 2.

3.8.6 Changing the printer

1. Switch off the OMNI C (please pay attention to section 3.2 Shutdown on page 3-2!).
2. Pull off the power cord from the power supply unit.
3. Remove the printer cover.
4. Remove the printer mounting screws (see Fig. 3-45, 1 and 2).

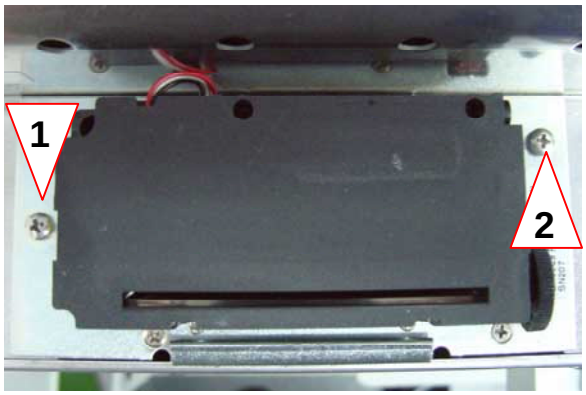


Fig. 3-45 Printer mounting screws

5. Lift the printer carefully and unplug the two cables.

Assembly is done in reverse order.

Test the printer under „**More - System – Test – PC components- printer**“.

3.8.7 Changing the MBX board

1. Follow section 3.8.2 Changing the PC tower on page 3-29.
2. Open the mounting screws of the PC tower rear panel (see Fig. 3-46, **1** to **4**).

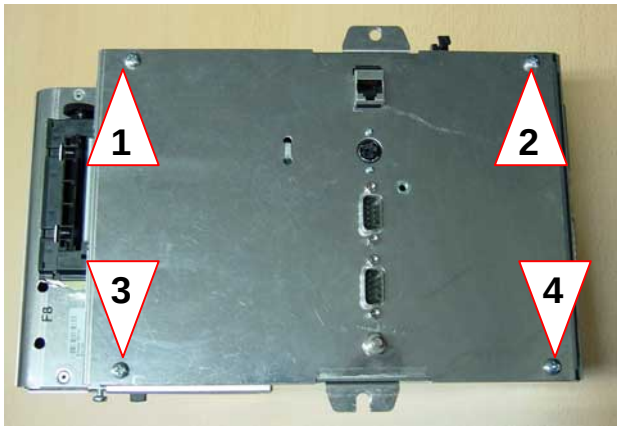


Fig. 3-46 PC tower (rear view)

3. Lift the rear panel and unplug the cable connections (see Fig. 3-47, **1**).

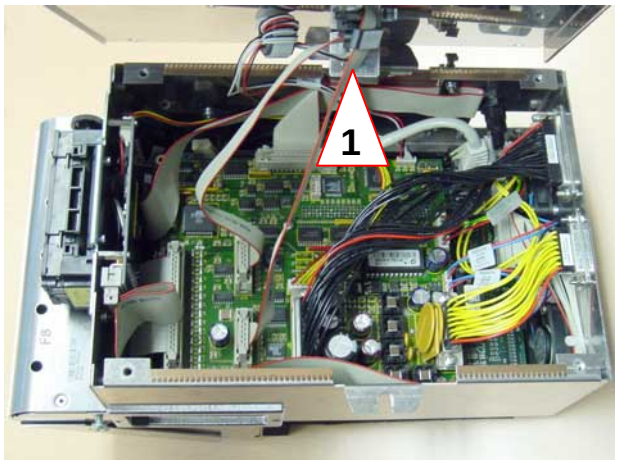


Fig. 3-47 PC tower (opened)

4. Pull off all cable connections from the MBX board.
5. Dismount the PCMCIA slot.
6. Open the mounting screws and take out the MBX board.

Assembly is done in reverse order.

Pay attention to proper cable connections and correct orientation of the PCMCIA slots to the MBX board!

3.8.8 Changing the MBX board battery

Type:	Sanyo CR14250SE (Primary Lithium Battery)
Voltage:	3V
Capacity:	850mAh
Dimensions:	14,5 x 25mm

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Remove the printer cover.
3. Open the mounting screws of the PC tower rear panel (see Fig. 3-46, 1 to 4 on page 3-33).
4. Take the MBX board battery out of the holder (see Fig. 3-48, **1**)

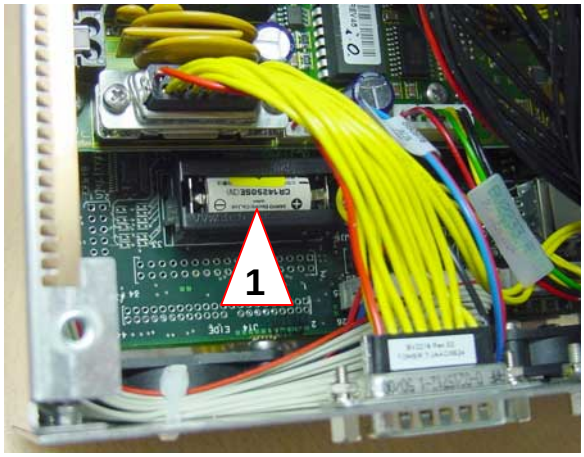


Fig. 3-48 MBX board battery

Assembly is done in reverse order.

3.9 Cables

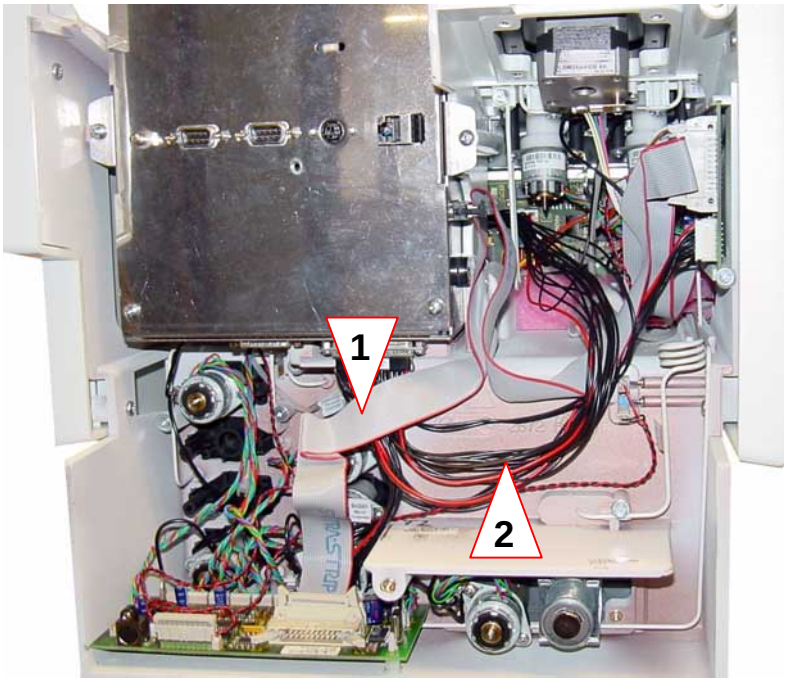


Fig. 3-49 Cables

3.9.1 Changing the data bus cable

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Pull off the data bus cable (gray flat cable) from all components (see Fig. 3-49, **1**). (Dismount the measuring chamber if necessary).

Assembly is done in reverse order.

3.9.2 Changing the DC power cable

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Pull off the DC power cable from all components (see Fig. 3-49, **2**). (Dismount the measuring chamber if necessary).

Assembly is done in reverse order.

3.10 Fan

3.10.1 Changing the fan

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Dismount the left side cover by removing the three mounting screws in the rear compartment and in the bottle compartment (see Fig. 3-50, 1 to 3).

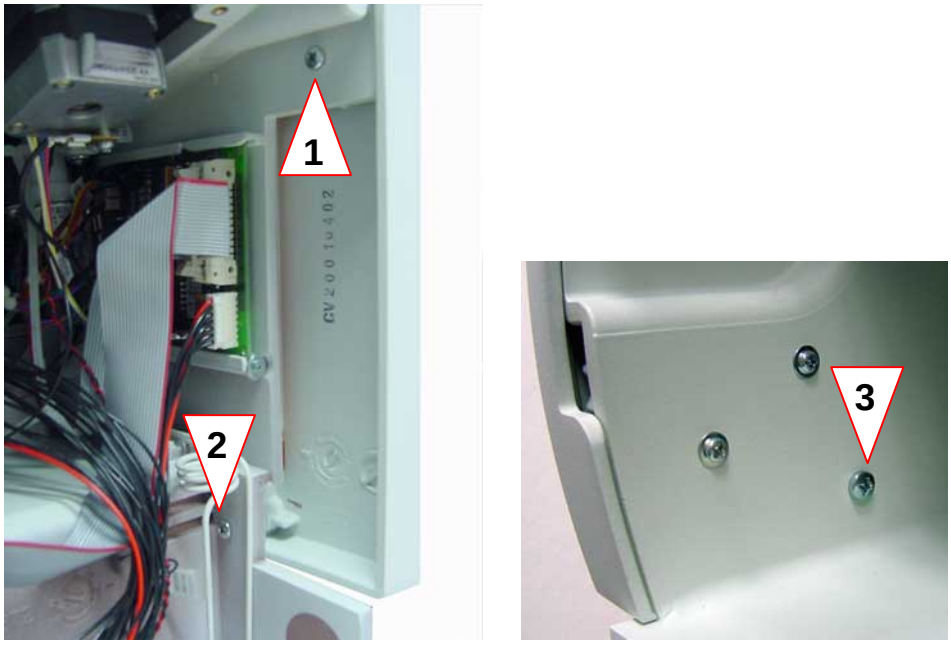


Fig. 3-50 Mounting screws of the left side cover

3. Dismount the measuring chamber according to section 3.5.2 on page 3-9.
4. Open the mounting screws of the fan and take it out (see Fig. 3-51).

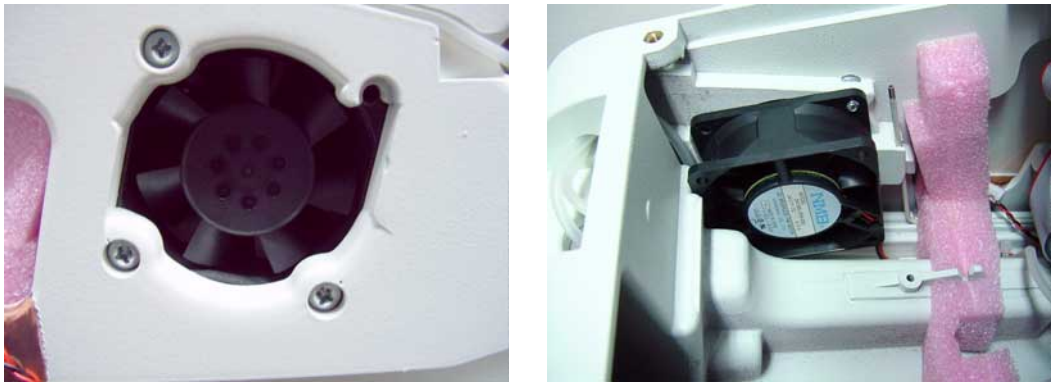


Fig. 3-51 Fan

5. Pull off the fan cable from the Pump board (see Fig. 3-52, 1).

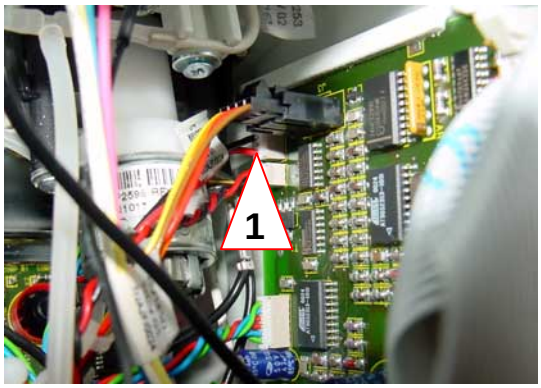


Fig. 3-52 Fan cable connection at the Pump board

Assembly is done in reverse order.

3.11 Micro switch unit (Bottle compartment cover switch)

3.11.1 General Information

The micro switch unit detects the position of the bottle compartment cover.

The white plastic part of the micro switch unit can be locked in the closed position by pushing back and upwards to simulate a closed bottle compartment cover (see Fig. 3-53).

Fig. 3-53 Micro switch in unlocked / locked position

Test the micro switch unit by moving the bottle compartment cover!

3.11.2 Changing the micro switch unit

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Dismount the left side cover by removing the three mounting screws in the rear compartment and in the bottle compartment (see Fig. 3-50, 1 to 3).
3. Pull off the micro switch unit cable from the Pump board (see Fig. 3-54).

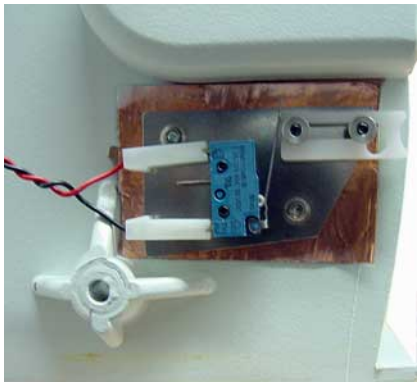


Fig. 3-54 Micro switch unit

4. Open the mounting screws of the micro switch unit in the bottle compartment (see Fig. 3-1) and take out the micro switch unit.

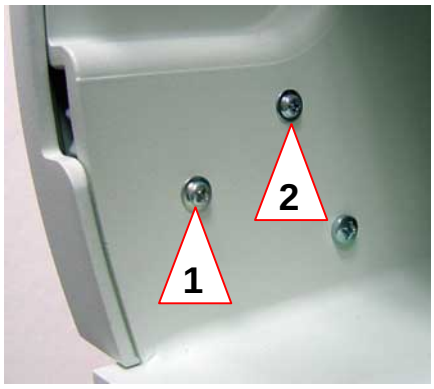


Fig. 3-55 Micro switch unit mounting screws

Assembly is done in reverse order.

3.12 Micro switches

3.12.1 Changing the Waste container micro switch

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Dismount the left side cover by removing the three mounting screws in the rear compartment and in the bottle compartment (see Fig. 3-50, 1 to 3).
3. Pull off the connectors from the micro switch (see Fig. 3-56).
4. Open the mounting screws (see Fig. 3-56) and take out the micro switch.

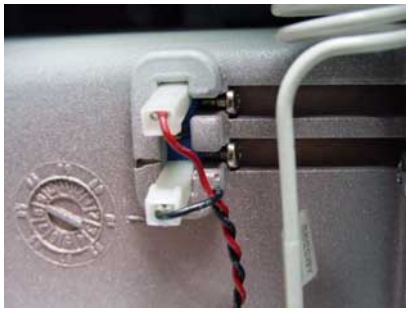


Fig. 3-56 Waste container micro switch (rear view)

Assembly is done in reverse order.

3.12.2 Changing the C3 docking mechanism micro switch

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Dismount the measuring chamber according to section 3.5.2 on page 3-9.
3. Pull off the connectors from the micro switch (see Fig. 3-57).
4. Open the mounting screws (see Fig. 3-57) and take out the micro switch.

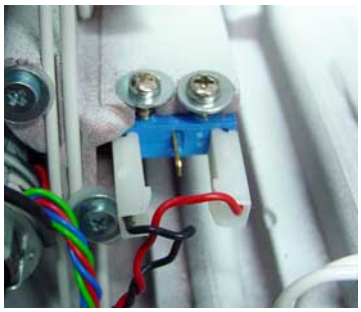


Fig. 3-57 C3 docking mechanism micro switch

Assembly is done in reverse order.

3.12.3 Testing the micro switches

Press „**More – System – Test – Control sensors – Monitoring sensors**“.

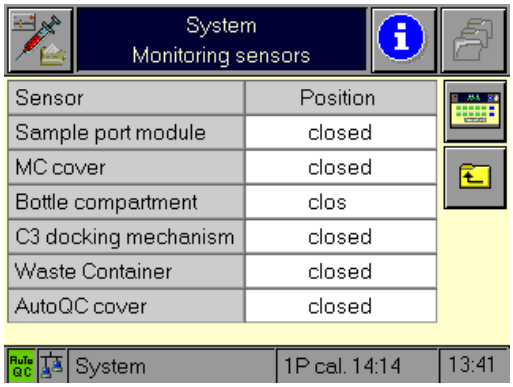


Fig. 3-58 Testing the micro switches

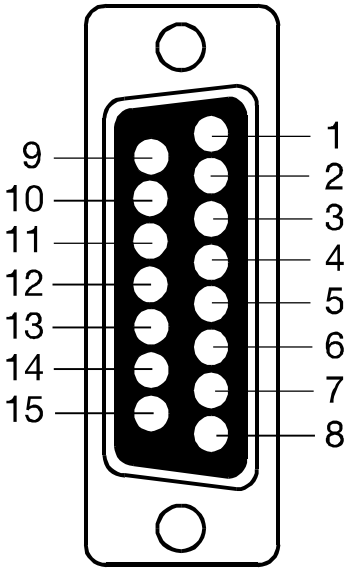
3.13 Power supply unit

3.13.1 Technical data

Pin assignment:

15 Pin Sub-D, female

Pin No.	Assignment
1	+12V
2	GND (±12V)
3	5V (5-Dig)
4	5V (5-Dig)
5	5V (PWR)
6	5V (PWR)
7	5V (PWR)
8	24V
9	-12V
10	GND (5-Dig)
11	GND (PWR)
12	GND (PWR)
13	GND (PWR)
14	GND (24V)
15	24V



3.13.2 Changing the power supply unit

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Remove the power supply unit from the rear panel; a certain amount of force is needed because of the mounting with Velcro tape

Assembly is done in reverse order.

3.14 Valves

3.14.1 General Information

The 3 valve types used in the analyzer have different cable lengths (S, L, XL):

Valve No.	Name	Description
V4	MC bypass valve	VALVE XL OMNI C
V6	MC out	VALVE S OMNI C
V7	Conditioner	VALVE S OMNI C
V8	Reference Solution	VALVE S OMNI C
V9	Ventilation	VALVE S OMNI C
V10	Cleaning Solution	VALVE S OMNI C
V11	Zero point solution	VALVE L OMNI C
V12	AQC valve	VALVE S OMNI C
V13	AQC wash valve	VALVE S OMNI C
V14	Bypass	VALVE L OMNI C

The needed valve head configuration has to be installed before mounting the valve in the analyzer (see section 3.14.2 Single valve head and 3.14.3 Double valve head).

3.14.2 Single valve head

1. Install the single valve head.
2. Press on the holder onto the axis from the side. If necessary, move the valve head by turning the brass disk at the backside of the valve.

Fig. 3-59 Single Valve head

3.14.3 Double valve head

1. Install the double valve head.
2. Press on the holder onto the axis from the side. If necessary, move the valve head by turning the brass disk at the backside of the valve.
3. Attach the bar and place the screws in the openings.
4. Push the screws through the plate and tighten them.

Fig. 3-60 Double Valve head

3.14.4 Changing the valves

Never connect or disconnect the valves while the analyzer is running!
Pay attention to proper connection of the valves at the respective boards!

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Disconnect the valve cable from the respective board.
3. Take out the tube(s) - dismount the valve head and/or the bar if necessary.
4. Press out the valve from the backside.

Assembly is done in reverse order.

3.14.5 Testing the valves

Press „**More - System – Test – valves**“.

The valves can be switched once or for consecutive 10 times.
The state of the selected valve is displayed graphically.

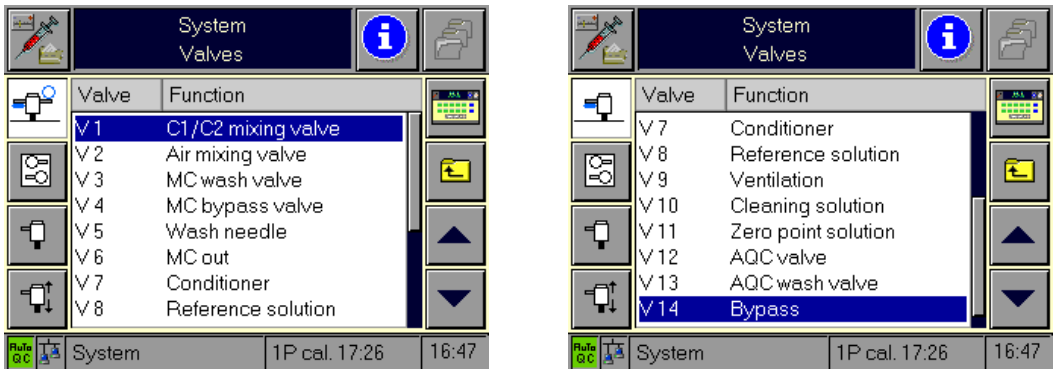


Fig. 3-61 Testing the valves

Schematic drawings of the measuring chamber and the bottle compartment help to locate the selected valve.

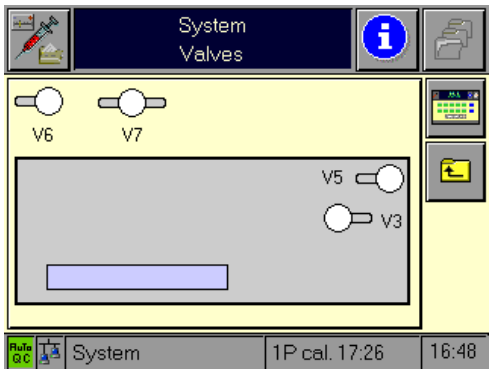


Fig. 3-62 Schematic drawing of the measuring chamber

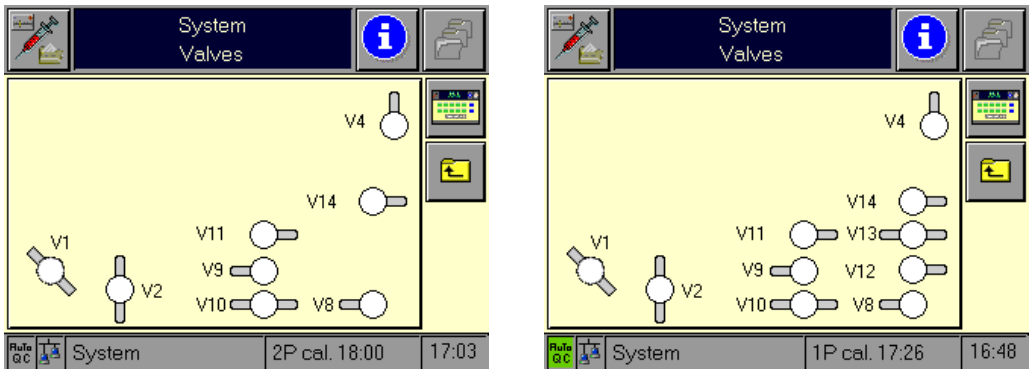


Fig. 3-63 Schematic drawing of the bottle compartment without AutoQC (left) and with AutoQC (right)

3.15 Actuator board

3.15.1 Changing the Actuator board

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Pull off all cable connections from the Actuator board.
3. Disengage the Actuator board from the clips by pressing them together at the top (see Fig. 3-64, 1 and 2).
4. Take out the Actuator board.

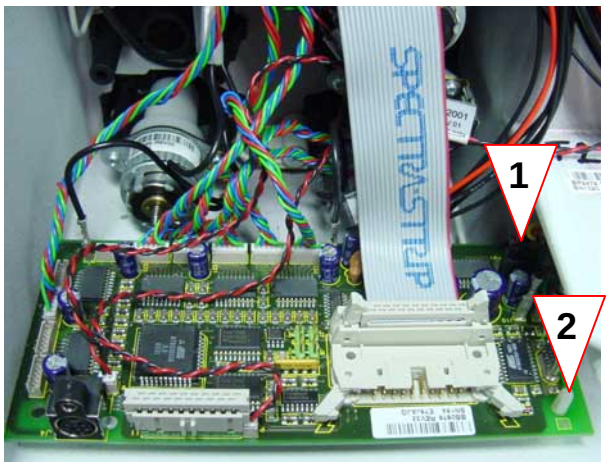


Fig. 3-64 Actuator board

Assembly is done in reverse order.

Pay attention to proper cable connections!

3.16 Pump board

3.16.1 Changing the Pump board

1. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
2. Pull off all cable connections from the Pump board.
3. Remove the mounting screw of the Pump board (see Fig. 3-65, 1).
4. Take out the Pump board.

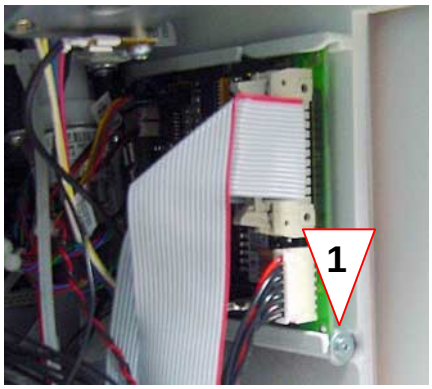


Fig. 3-65 Pump board

Assembly is done in reverse order.

Pay attention to proper cable connections!

3.17 Docking mechanisms

3.17.1 Changing the docking mechanism Waste W

1. Open the bottle compartment cover.
2. Open the docking mechanism Waste W.
3. Take out the Waste container.

4. Open the mounting screw of the docking mechanism Waste W (see Fig. 3-66).

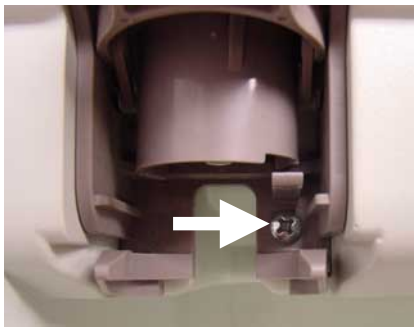


Fig. 3-66 docking mechanism-mounting screw

5. Pull off the tube from the top of the docking mechanism Waste W and close the flap in order to protect the translucent plastic from being damaged when pulling out the docking mechanism (see Fig. 3-67).

Fig. 3-67 Tube connections at the top of docking mechanism W

6. Pull out the docking mechanism Waste W to the front.
7. Pull off the tube from the backside of the docking mechanism (see Fig. 3-68).

Fig. 3-68 docking mechanism W (rear view)

Assembly is done in reverse order.

3.17.2 Changing the docking mechanisms Calibration solution C1 and C2

1. Open the bottle compartment cover.
2. Open the docking mechanism calibration solution C1 (or C2).
3. Take out the C1 (or C2) bottle.
4. Open the mounting screw of docking mechanism C1 (or C2) (see Fig. 3-69).

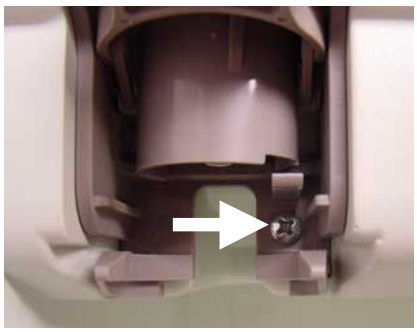


Fig. 3-69 Docking mechanism mounting screw

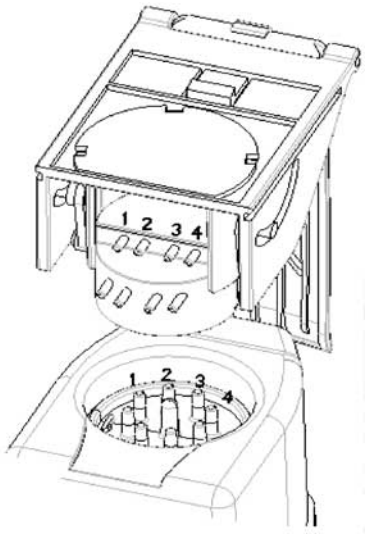
5. Pull out the respective docking mechanism C1 (or C2) to the front.
6. Pull off the tube from the backside of the docking mechanism (see Fig. 3-70).

Fig. 3-70 Docking mechanism C1 and C2 (rear view)

Assembly is done in reverse order.

3.17.3 Changing the docking mechanism Pack C3

1. Open the bottle compartment cover.
2. Open the docking mechanism Pack C3.
3. Take out the Pack C3.
4. Pull out the docking mechanism Pack C3 to the front (a certain amount of force is needed)
5. Pull off the tubes from the docking mechanism (see Fig. 3-71).



1...Reference Solution
2...Conditioning Sol.
3...Zero point Solution
4...Cleaning Solution

Fig. 3-71 Docking mechanism C3

Assembly is done in reverse order.

Pay attention to correct connection of the tubes to the upper row of connectors at the docking mechanism (see Fig. 3-71)!

3.18 Analyzer tubing

3.18.1 Preparation

1. Open the bottle compartment cover.
2. Take out all bottles.
3. Dismount the rear panel according to section 3.3 Dismounting the rear panel on page 3-3.
4. Dismount the left side cover by opening the three mounting screws in the rear compartment and in the bottle compartment (see Fig. 3-50, 1 to 3 on page 3-36).
5. Dismount the docking mechanisms (see section 3.17 on page 3-45).
6. Pull out the tubing cover plate behind the docking mechanism Pack C3 to the front (see Fig. 3-72).
7. Change the tubing in the respective areas according to the following instructions and pictures. Dismount the valve heads and/or the bars if necessary (see section 3.14 Valves on page 3-41).

Pay attention to the correct routing of the tubes according to the respective pictures, especially at the valve heads.

Use the tubing diagrams in chapter 5 for checking.

3.18.2 Tubing in the area of docking mechanism Pack C3

Fig. 3-72 Tubing in the area of docking mechanism Pack C3

3.18.3 Tubing in the right bottle compartment area without AutoQC

Fig. 3-73 Tubing in the right bottle compartment area without AutoQC

3.18.4 Tubing in the right bottle compartment area with AutoQC

Fig. 3-74 Tubing in the right bottle compartment area with AutoQC

3.18.5 Tubing in the FMS area (Fluid Mixing System)

Fig. 3-75 Tubing in the FMS area (Fluid Mixing System)

3.18.6 Tubing in the pump area

Fig. 3-76 Tubing in the pump area

3.18.7 Tubing of the reference electrode connector

1. Remove the analyzer cover.
2. Pull off the reference electrode connector (see Fig. 3-77, 1).
3. Remove the connector piece by turning left (see Fig. 3-77, 2).
4. Pull out the tube (see Fig. 3-77, 3).

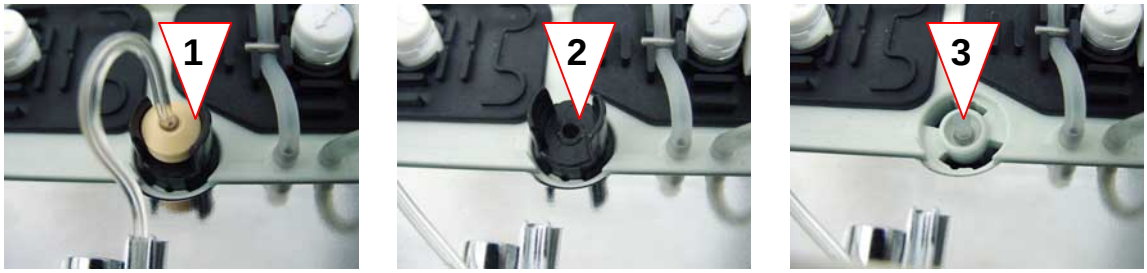


Fig. 3-77 Tubing of the reference electrode connector

Assembly is done in reverse order.

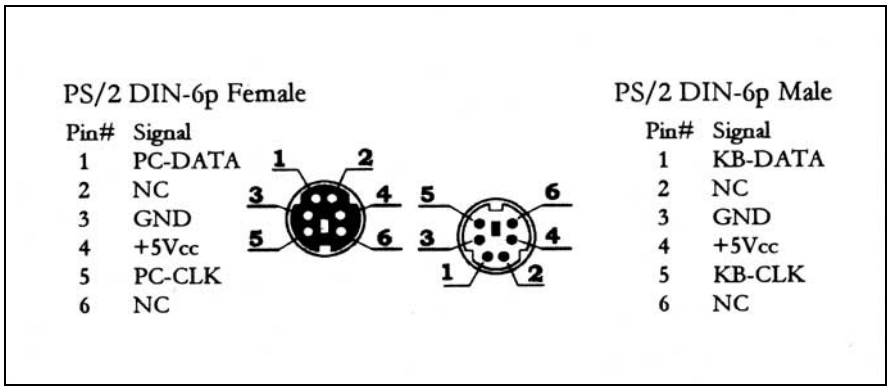
After installing the analyzer tubing set, a FMS volume determination must be performed (see chapter 6).

3.19 Barcode scanner

3.19.1 General Information

Type	Scanner with integrated decoder
Reading rate	Up to 45 scans/second
Resolution	0,1 mm
Reading distance	Up to 5 cm
Reading width	Up to 9 cm

Connector:



The barcode scanner is pre-programmed for the following barcode types:

- Code 39
- Full ASCII Code 39
- UPC/EAN
- Codabar
- UPC-E
- Code 11
- Interleaved 2 of 5
- Code 128
- MSI
- Code 32

3.19.2 Testing the barcode scanner

Press „**More – System – Test – PC components– Barcode**“
and read in a barcode (e.g. from Fig. 3-78).

The displayed number on the screen must be identical with the number under the barcode (see Fig. 3-78).

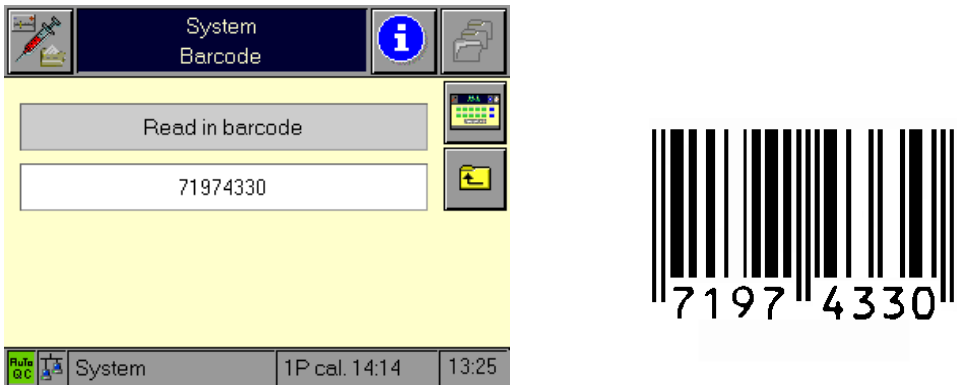


Fig. 3-78 Testing the Barcode-Scanner

4 AutoQC module 4-1

4 AutoQC module

4.1 General Information

When transporting the OMNI C with the AutoQC module installed, do not use the AutoQC module to carry the instrument.

The AutoQC module is a unit which, in conjunction with the OMNI C, performs automatic quality control measurements at times pre-programmed by the user.

The module consists of the ampoule holder for 120 ampoules maximally, and a steel tube which, after being positioned by motors (in Y-, Y-, and Z-direction), breaks the bottom of the ampoule and withdraws QC fluid. The aspirated QC fluid is transported to the measuring chamber and then measured.

The electronics of the AutoQC module are comprised of 3 boards:

- **AQC board:** main board including micro controller
- **YZ-distributor board:** contains all connectors for the Y-drive and is responsible for transferring the signals from the AQC board to the Z-distributor board.
- **Z-distributor board:** contains all components for the Z-drive (light barrier-Z, connector for z-drive) and sample sensor.

3 identical DC motors control the unit in all 3 axes. The distance covered and the rotational speed are measured by an incremental position transducer integrated in the motor.

The absolute position is determined by light barriers. A transmissive photo interrupter is used in all 3 axes. The light barrier for the X-direction is directly on the AQC board.

Sample detection is performed via a light barrier located on the Z-distributor board.

The cover of the AutoQC module is monitored by a hall sensor. When the cover is opened, all mechanical actions are stopped by the software (except actions in the Component Test).

The ampoule ambient temperature is measured by the temperature sensor and used for correction of QC measurement values (PO2 and PCO2 only).

The measured value of the temperature sensor can be read under "**More - System - Test – Control sensors – Temperature control**".

Moving the unit into the service position as described in the following may in some cases only be partly or not at all possible due to defective components. lt should, however, be performed at any rate to facilitate service work.

If the service positions cannot be approached at all, the vertical and the horizontal slide can be moved manually, by removing the toothed belt from the carrier pins of the vertical and/or horizontal slide..

4.2 Dismounting the housing

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Switch off the OMNI C (please pay attention to section 3.2 Shutdown).
3. Open the bottle compartment cover.
4. Remove all bottles.
5. Pull off the two tubes from the AutoQC docking part (see Fig. 4-1).

Fig. 4-1 AutoQC tubing connections

6. Pull off the AutoQC cable from the backside of the OMNI C (see Fig. 4-2).
7. Unlock the AutoQC module by pulling the lever on the backside of the OMNI C (see Fig. 4-2).

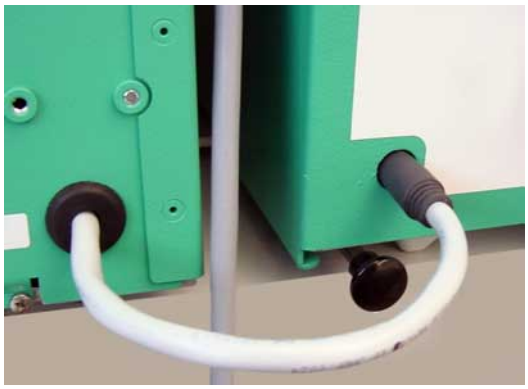


Fig. 4-2 AutoQC cable & locking lever

8. Pull the AutoQC module out of the guide.

9. Open the four cover mounting screws (on the lever) and remove the cover (see Fig. 4-3, 1 and 2).
10. Remove the two screws at the front of the AutoQC top cover (see Fig. 4-3, 3 and 4)

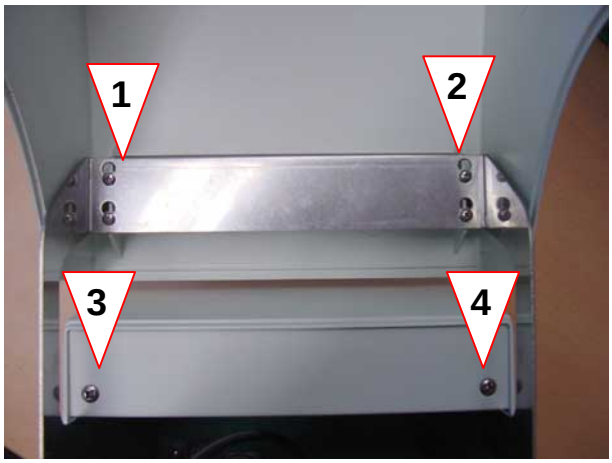


Fig. 4-3 AutoQC cover opened

11. Remove the two screws at the back of the AutoQC top cover (see Fig. 4-4, 1 and 2).
12. Remove the AutoQC top cover.

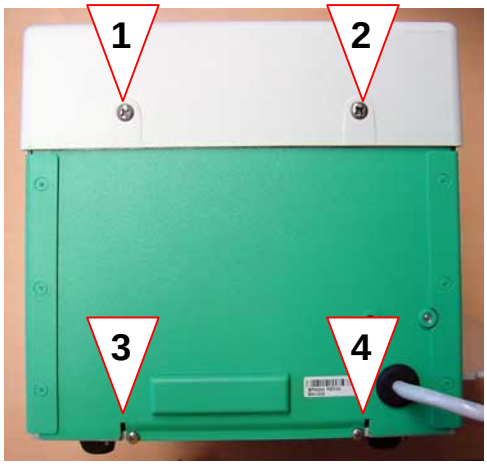


Fig. 4-4 AutoQC module (rear view)

13. Remove the two screws at the back of the housing (see Fig. 4-4, 3 and 4).

14. Remove the screws of the side covers (see Fig. 4-5, 1 and 2).

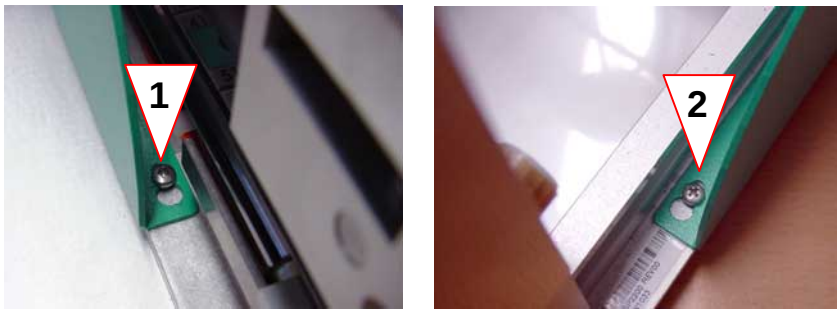


Fig. 4-5 Side cover mounting screws

15. Remove the two screws from the bottom of the AutoQC module (see Fig. 4-6, 1 and 2).

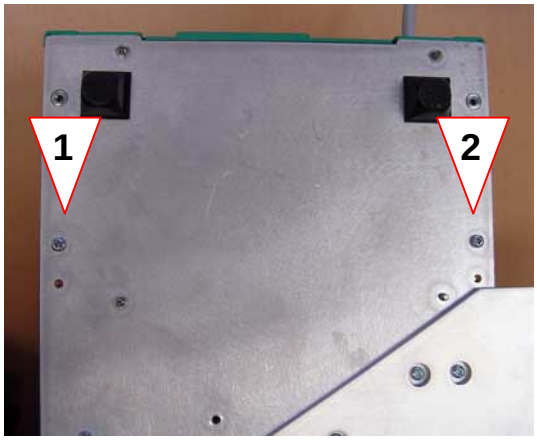


Fig. 4-6 Bottom mounting screws

16. Pull off the AutoQC cable from the AQC board (see Fig. 4-7, 1).

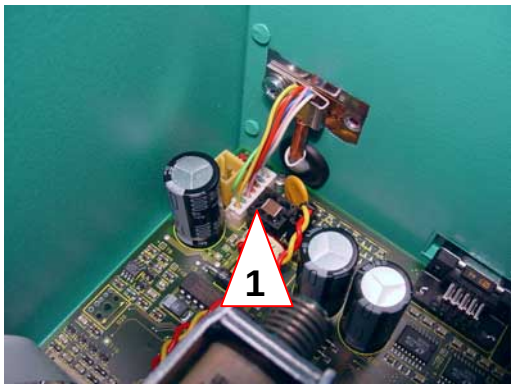


Fig. 4-7 AutoQC cable

17. Remove the Barex tube security clamp from the docking part by pressing it upwards (see Fig. 4-8, 1).

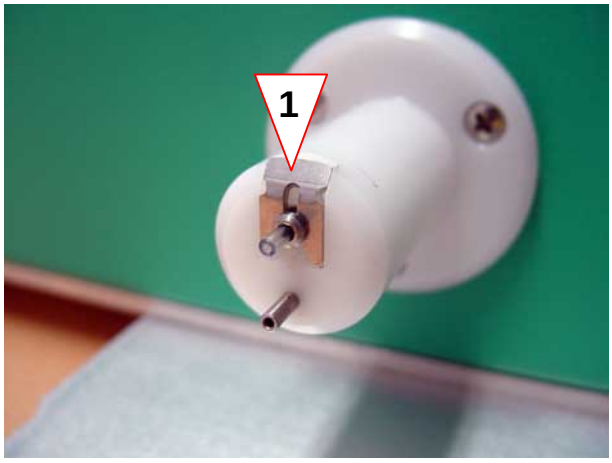


Fig. 4-8 Barex tube security clamp

18. Pull the barex tube out of the docking part.
19. Pull off the AutoQC wash tube from the docking part.
20. Pull off the housing to the back.

4.3 Dismounting the horizontal slide cover

Open the two mounting screws (see Fig. 4-9, 1 and 2).

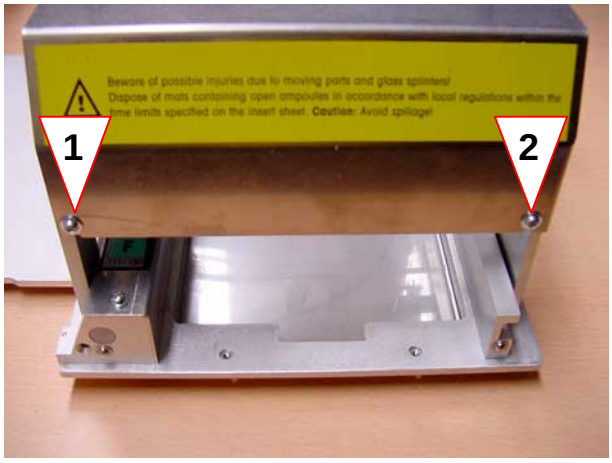


Fig. 4-9 Horizontal slide cover

4.4 Changing the AQC board

1. Follow the instructions in section 4.2 Dismounting the housing on page 4-2.
2. Disconnect all cables from the AQC board and the cable from the AQC temperature sensor.
3. Remove the two screws at the rear and the two spacer bolts at the front of the AQC board.
4. Take out the AQC board.

Assembly is done in reverse order.

4.5 Changing the barex tube

1. Follow the steps 1 to 12 in section 4.2 Dismounting the housing on page 4-2.
2. Follow the steps 17 and 18 in section 4.2 Dismounting the housing on page 4-2.
3. Dismount the horizontal slide cover (see section 4.3).
4. Open the mounting screw of the barex tube and remove the holder (see Fig. 4-10, 1).

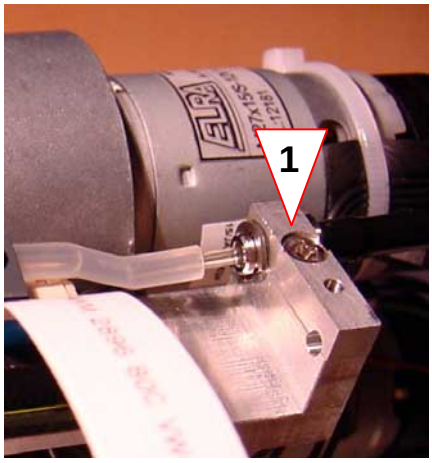


Fig. 4-10 Barex tube mounting screw

Assembly is done in reverse order.

4.6 Changing the AQC magnetic valve

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Switch off the OMNI C (please pay attention to section 3.2 Shutdown).
3. Dismount the AutoQC top cover and the AutoQC cover (Follow the steps 9 to 12 in section 4.2 Dismounting the housing on page 4-2).
4. Remove the holder and the valve head from the AQC magnetic valve (see Fig. 4-11).

5. Remove the two screws from the AQC magnetic valve (see Fig. 4-11).
6. Disconnect the valve cable.

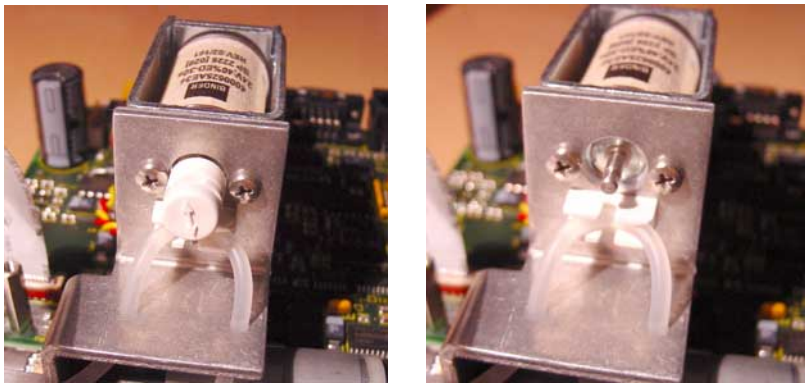


Fig. 4-11 AQC magnetic valve

Assembly is done in reverse order.

4.7 Changing the YZ-distributor board

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Switch off the OMNI C (please pay attention to section 3.2 Shutdown).
3. Open the cover of the AutoQC module.
4. Dismount the horizontal slide cover (see section 4.3).
5. Remove the screw of the cable guide and remove the cable guide backwards (see Fig. 4-12, 1).

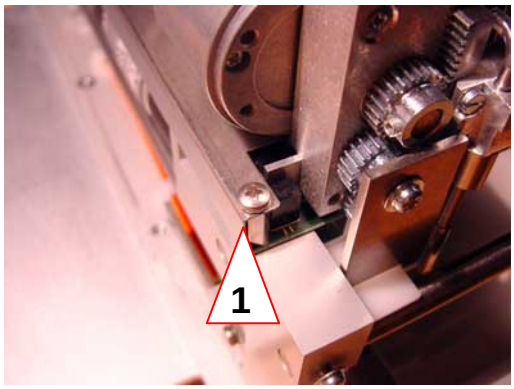


Fig. 4-12 Cable guide mounting screw

6. Disconnect the motor cable
7. Remove the spacer bolt and the screw.
8. Take out the YZ-distributor board.
9. Disconnect the flex cables (short and long) from the YZ-distributor board (Caution - connector lock!).

Assembly is done in reverse order.

4.8 Changing the Z-distributor board

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Switch off the OMNI C (please pay attention to section 3.2 Shutdown).
3. Open the cover of the AutoQC module.
4. Dismount the horizontal slide cover (see section 4.3).
5. Remove the screw (see Fig. 4-13, 1) and disconnect all cables and tubing from the Z-distributor board.
6. Remove the Z-distributor board (If the vertical slide is in the upper end-position, also remove the allen screw and the axis (see Fig. 4-13, 2 and 3).)

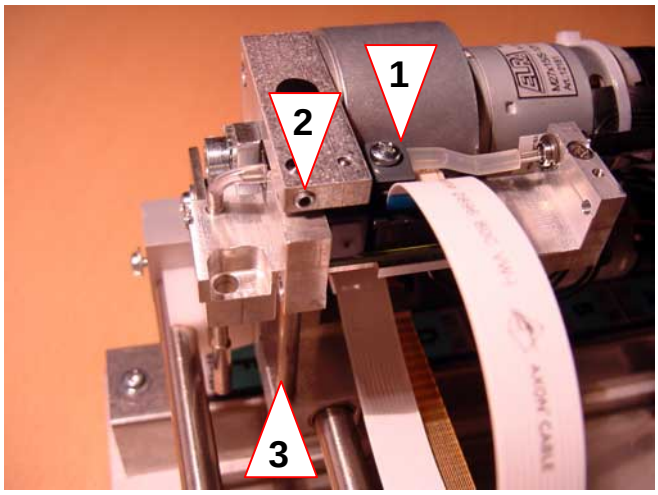


Fig. 4-13 Z-distributor board

Assembly is done in reverse order.

The connectors of the flex cable (short) are not coded, therefore make sure that the contacts are installed pointing toward the OMNI C!

4.9 Changing the flex cable (short)

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Switch off the OMNI C (please pay attention to section 3.2 Shutdown).
3. Open the cover of the AutoQC module.
4. Dismount the horizontal slide cover (see section 4.3).
5. Remove the screw of the cable guide and remove the cable guide backwards (see Fig. 4-12, 1).
6. Open the connector locks and replace the flex cable.

Assembly is done in reverse order.

The connectors of the flex cable (short) are not coded, therefore make sure that the contacts are installed pointing toward the OMNI C!

4.10 Changing the flex cable (long)

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Switch off the OMNI C (please pay attention to section 3.2 Shutdown).
3. Open the cover of the AutoQC module.
4. Dismount the horizontal slide cover (see section 4.3).
5. Remove the screw of the cable guide and remove the cable guide backwards (see Fig. 4-12, 1).
6. Open the connector locks and replace the flex cable.

Assembly is done in reverse order.

The connectors of the flex cable (long) are not coded, therefore make sure that the contacts are installed pointing toward the edge of the board respective the light barrier.

4.11 Changing the X-motor

Follow the instructions in section 4.2 Dismounting the housing on page 4-2.

Remove the two screws from the holder unit (see Fig. 4-14, 1 and 2) and remove the holder unit including the motor.

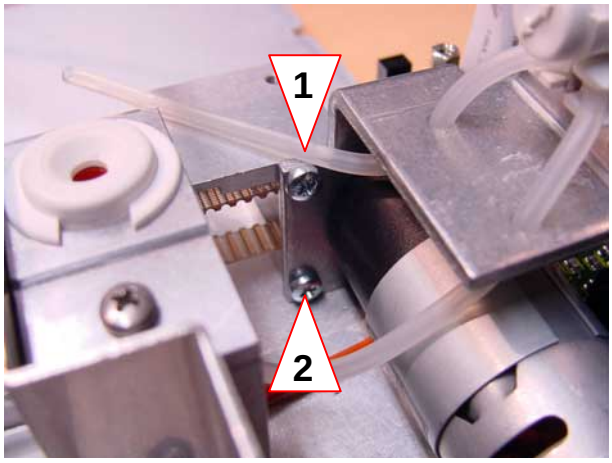


Fig. 4-14 Holder unit mounting screws

Disconnect the motor cable from the AQC board.

Remove the two Phillips screws of the motor at the holder unit and remove the motor.

Remove the toothed disk from the motor and attach it to the new motor.

Assembly is done in reverse order.

4.12 Changing the Y-motor

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Switch off the OMNI C (please pay attention to section 3.2 Shutdown).
3. Open the cover of the AutoQC module.
4. Dismount the horizontal slide cover (see section 4.3).
5. Remove the screw of the cable guide and remove the cable guide backwards (see Fig. 4-12, 1).
6. Disconnect the motor cable from YZ-distributor board.
7. Remove the slide plate by opening the screw (see Fig. 4-15, 1).

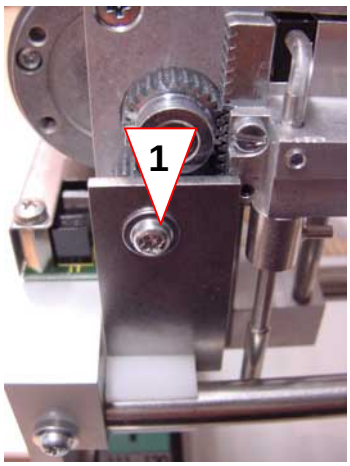


Fig. 4-15 Slide plate mounting screw

8. Remove the fastening screws from the motor and remove the motor.
9. Remove the toothed disk from the motor and attach it to the new motor.

Assembly is done in reverse order.

4.13 Changing the Z-motor

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Switch off the OMNI C (please pay attention to section 3.2 Shutdown).
3. Open the cover of the AutoQC module.
4. Dismount the horizontal slide cover (see section 4.3).
5. Remove the slide plate by opening the screw (see Fig. 4-15, 1).
6. Disconnect the motor cable from the Z-distributor board.
7. Remove the allen screw and the axis (see Fig. 4-13, 2 and 3).)
8. Remove the fastening screws from the motor and remove the motor.

9. Remove the toothed wheel and the guiding sleeve from the motor and connect it to the new motor.

Assembly is done in reverse order.

4.14 Changing the AQC steel tube complete

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Open the cover of the AutoQC module.
3. Dismount the horizontal slide cover (see section 4.3).
4. Disconnect the tubing from the steel tube.
5. Use the 1.5 mm allen wrench to open the allen screw (see Fig. 4-16, 1).

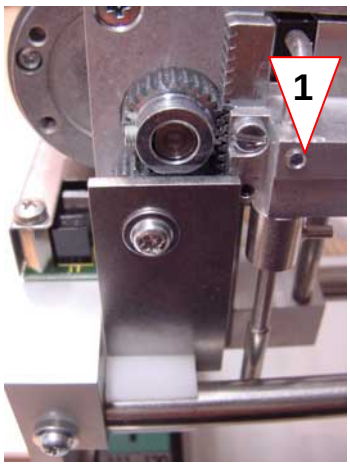


Fig. 4-16 Steel tube - allen screw

6. Pull the steel tube out toward the bottom.

Assembly is done in reverse order.

Make sure that the connecting piece points to the right!

4.15 Changing the AQC temperature sensor

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Switch off the OMNI C (please pay attention to section 3.2 Shutdown).
3. Dismount the AutoQC top cover and the AutoQC cover (Follow the steps 9 to 12 in section 4.2 Dismounting the housing on page 4-2).

Do not install or remove the AQC temperature sensor when the system is connected to power!

4. Disconnect the cable from the back of the AQC temperature sensor.
5. Remove the AQC temperature sensor and clean the vertical slide cover from all glue rests.
6. Paste the new AQC temperature sensor on the vertical slide cover

Assembly is done in reverse order.

4.16 Changing the AQC wash port

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Open the cover of the AutoQC module.
3. Dismount the AutoQC top cover and the AutoQC cover (Follow the steps 9 to 12 in section 4.2 Dismounting the housing on page 4-2).
4. Open the screw (see Fig. 4-17, 1) and remove the wash port angle.

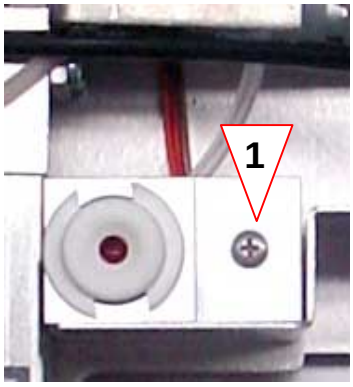


Fig. 4-17 AQC wash port

5. Dismount the wash port holder by pressing the two snap locks together.
6. Insert a new wash port into the wash port holder.

Assembly is done in reverse order.

4.17 Changing the AQC wash tube

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Open the cover of the AutoQC module.
3. Dismount the AutoQC top cover and the AutoQC cover (Follow the steps 9 to 12 in section 4.2 Dismounting the housing on page 4-2).
4. Open the screw (see Fig. 4-17, 1) and remove the wash port angle.
5. Disconnect the wash tube at the wash port and at the docking part.
6. Remove the wash tube from the magnetic valve.

Assembly is done in reverse order.

4.18 Changing the toothed belt (short)

1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Open the cover of the AutoQC module.
3. Dismount the horizontal slide cover (see section 4.3).
4. Remove the screw at the carrying wheel and remove the old toothed belt.
5. Stretch the new toothed belt over the toothed disk at the motor and over the carrying wheel.
6. Fasten the carrying wheel.
7. Insert the toothed belt into the carrier pins of the horizontal slide.

Further assembly is done in reverse order.

4.19 Changing the toothed belt (long)

Follow the instructions in section 4.2 Dismounting the housing on page 4-2.
Remove the two screws of the vertical slide cover (see Fig. 4-18, 1 and 2).

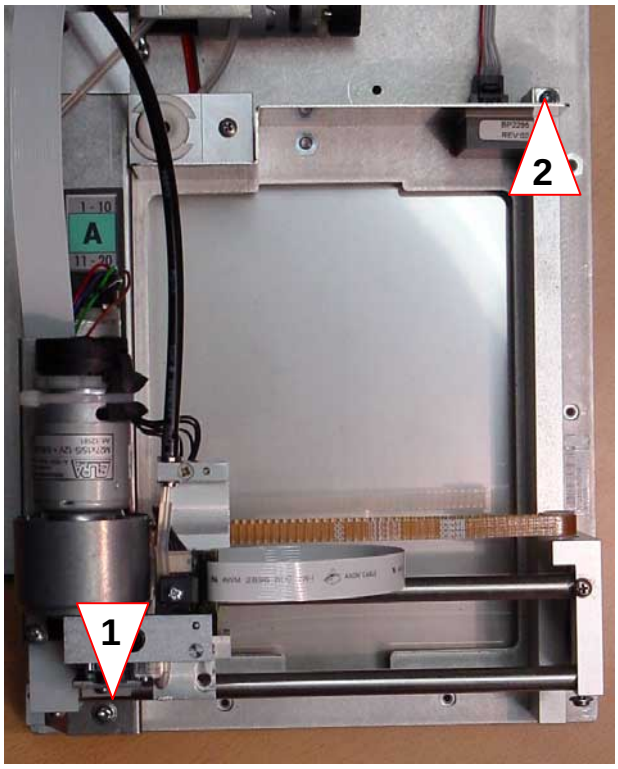


Fig. 4-18 Vertical slide cover mounting screws

Disconnect the cable from the back of the AQC temperature sensor.
Pull out the vertical slide cover to the front.
Remove the screw at the carrying wheel and remove the old toothed belt.
Stretch the new toothed belt over the toothed disk of the motor and over the carrying wheel.
Fasten the carrying wheel.
Insert the toothed belt into the carrier pins of the vertical slide.

Further assembly is done in reverse order.

4.20 Changing the AQC docking part

1. Follow the steps 1 to 8 in section 4.2 Dismounting the housing on page 4-2.
2. Follow step 17 in section 4.2 Dismounting the housing on page 4-2.
3. Dismount the docking part by removing the three mounting screws and pull off the tubing.

Assembly is done in reverse order.

4.21 Changing the AQC cable

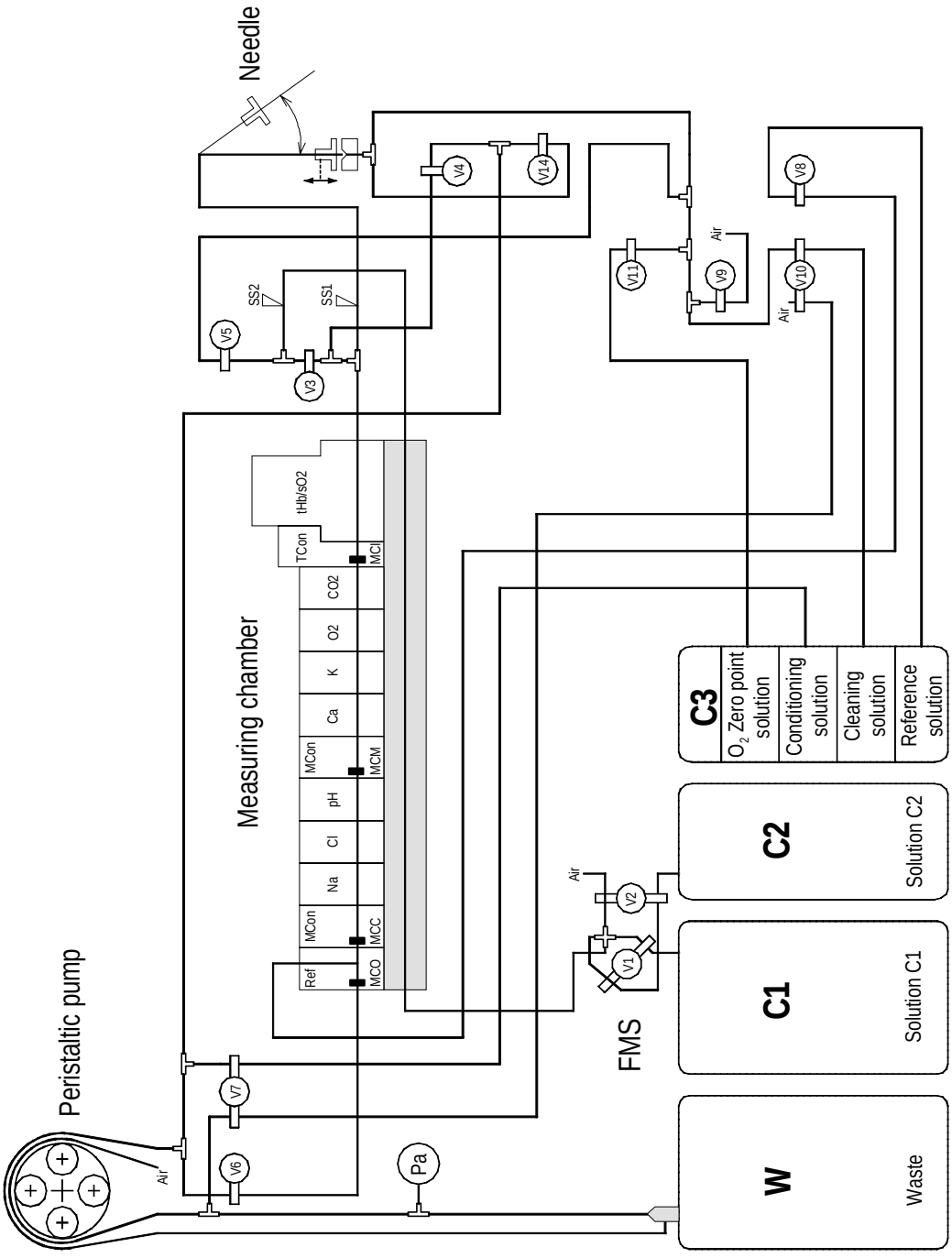
1. Press „**More – System – Test – Valves and aggregates – AutoQC position test – Service position**“ to move the motors into the service position (Remove the ampoule mats, the ampoule holder and the AQC tray).
2. Switch off the OMNI C (please pay attention to section 3.2 Shutdown).
3. Dismount the AutoQC top cover and the AutoQC cover (Follow the steps 9 to 12 in section 4.2 Dismounting the housing on page 4-2).
4. Pull off the AutoQC cable from the backside of the OMNI C (see Fig. 4-2).
5. Pull off the AutoQC cable from the AQC board (see Fig. 4-7, 1).
6. Open the mounting screw and remove the AQC cable.

Assembly is done in reverse order.

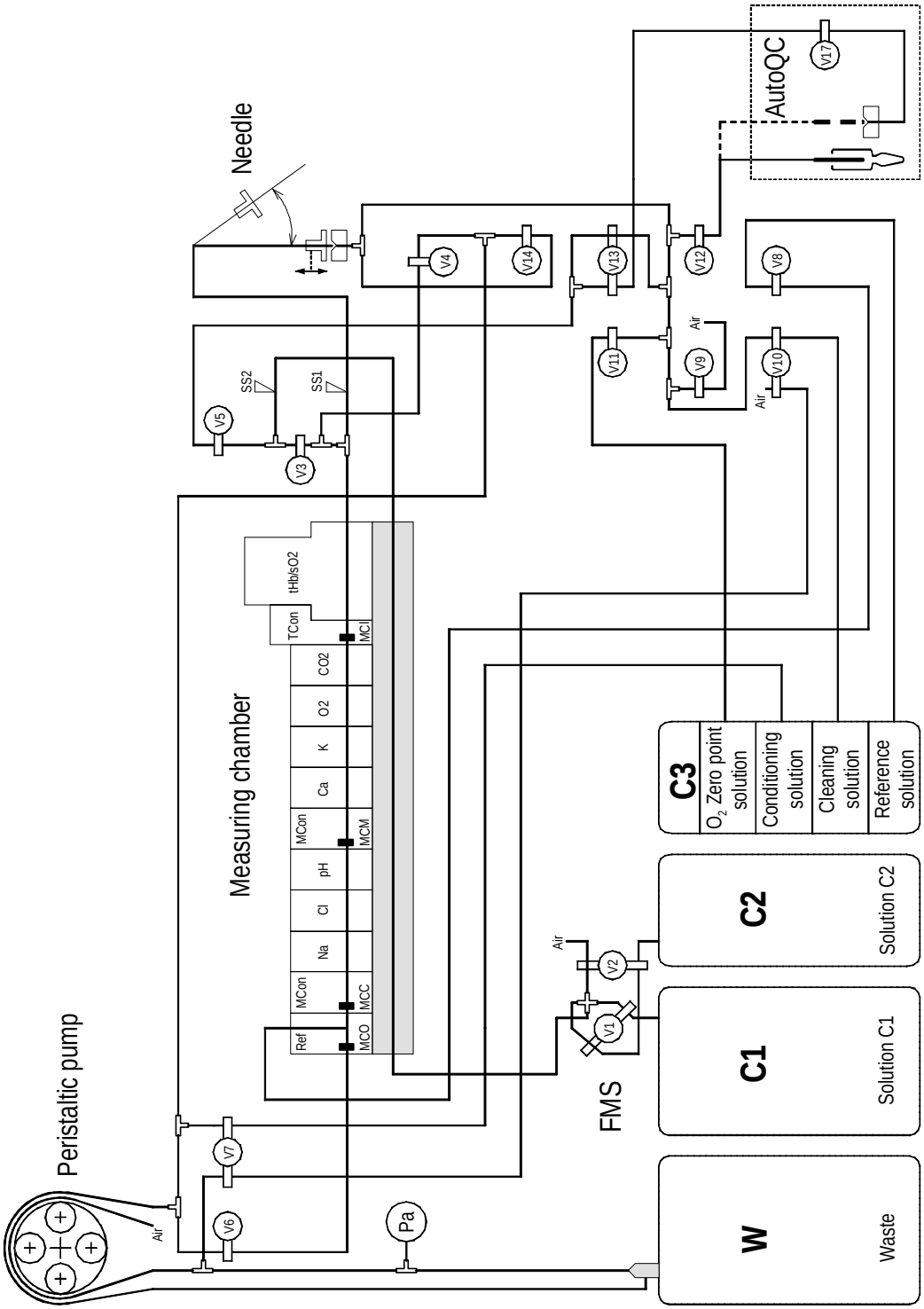
5 Fluidic procedures 5-1

5 Fluidic procedures

5.1 Tubing diagram OMNI C BG/ISE



5.2 Tubing diagram OMNI C BG/ISE/AQC



5.3 Valves and sensors

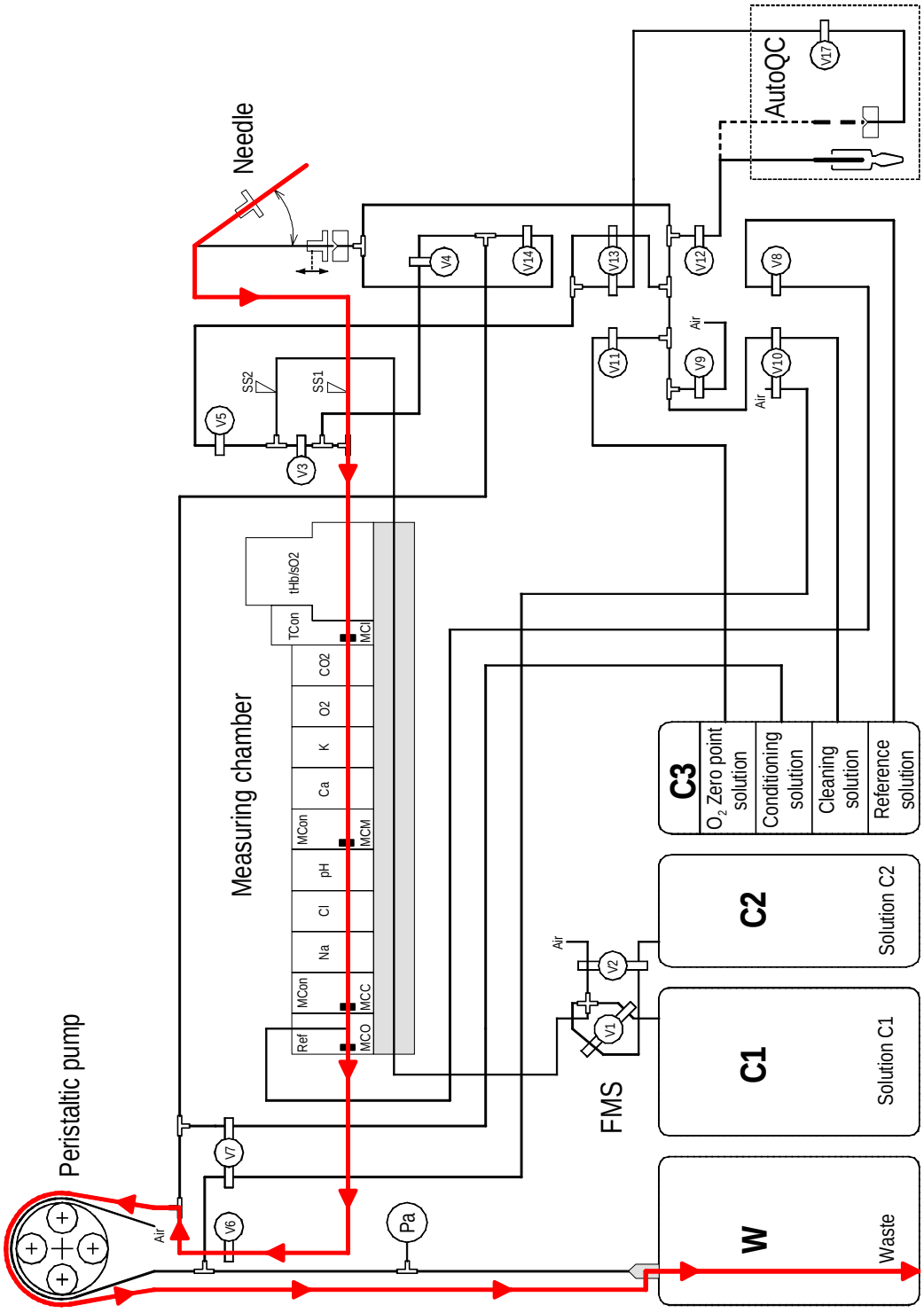
V1 C1/C2 mixing valve
V2 Air mixing valve
V3 MC wash valve
V4 MC bypass valve
V5 Wash needle
V6 MC out
V7 Conditioner
V8 Reference solution
V9 Ventilation
V10 Cleaning solution
V11 Zero point solution
V14 bypass

If the AutoQC module has been installed:
V12 AQC valve
V13 AQC wash valve
V17 AQC wash valve II

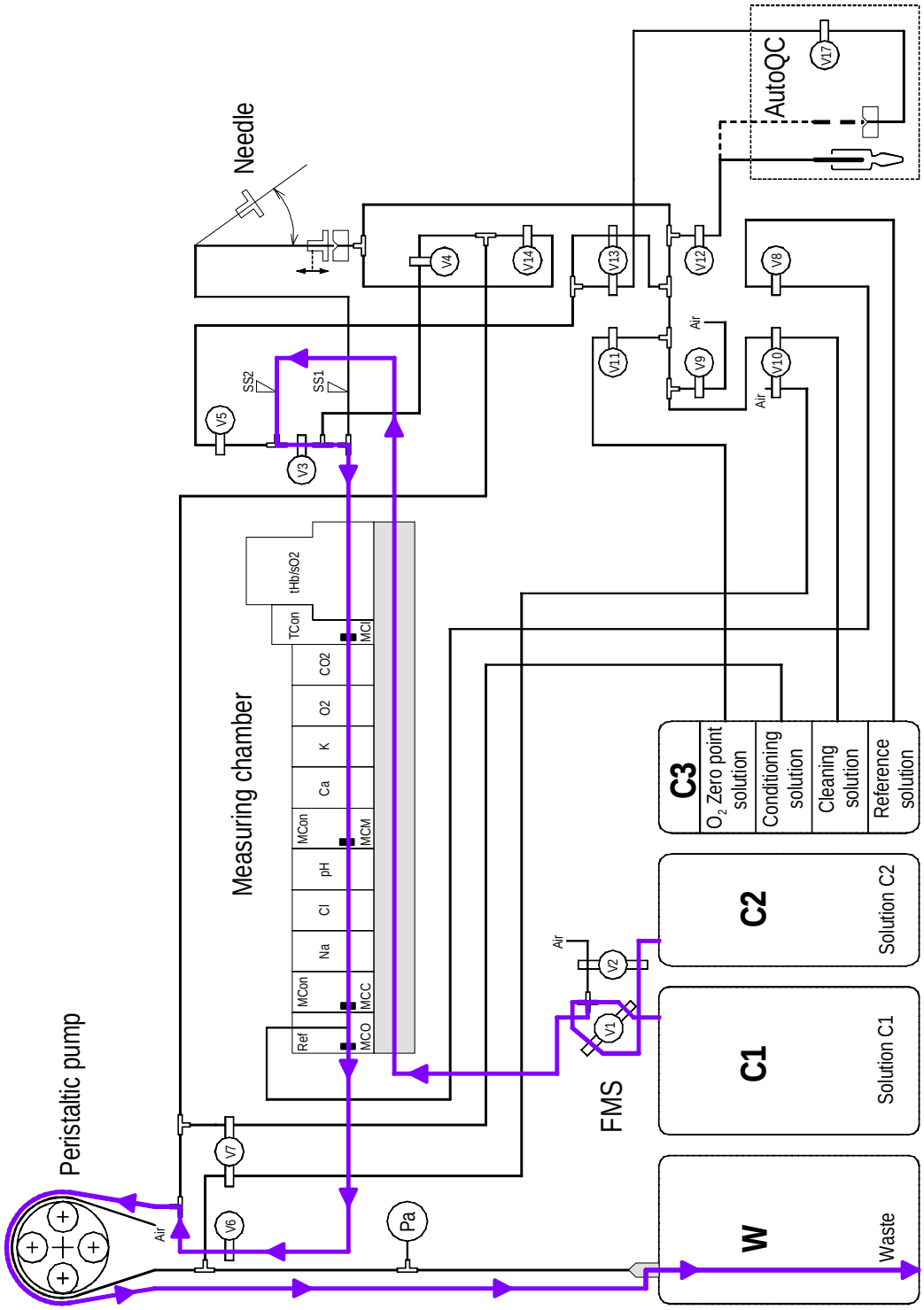
SS1, SS2 Sample sensors

Pa Pressure Sensor

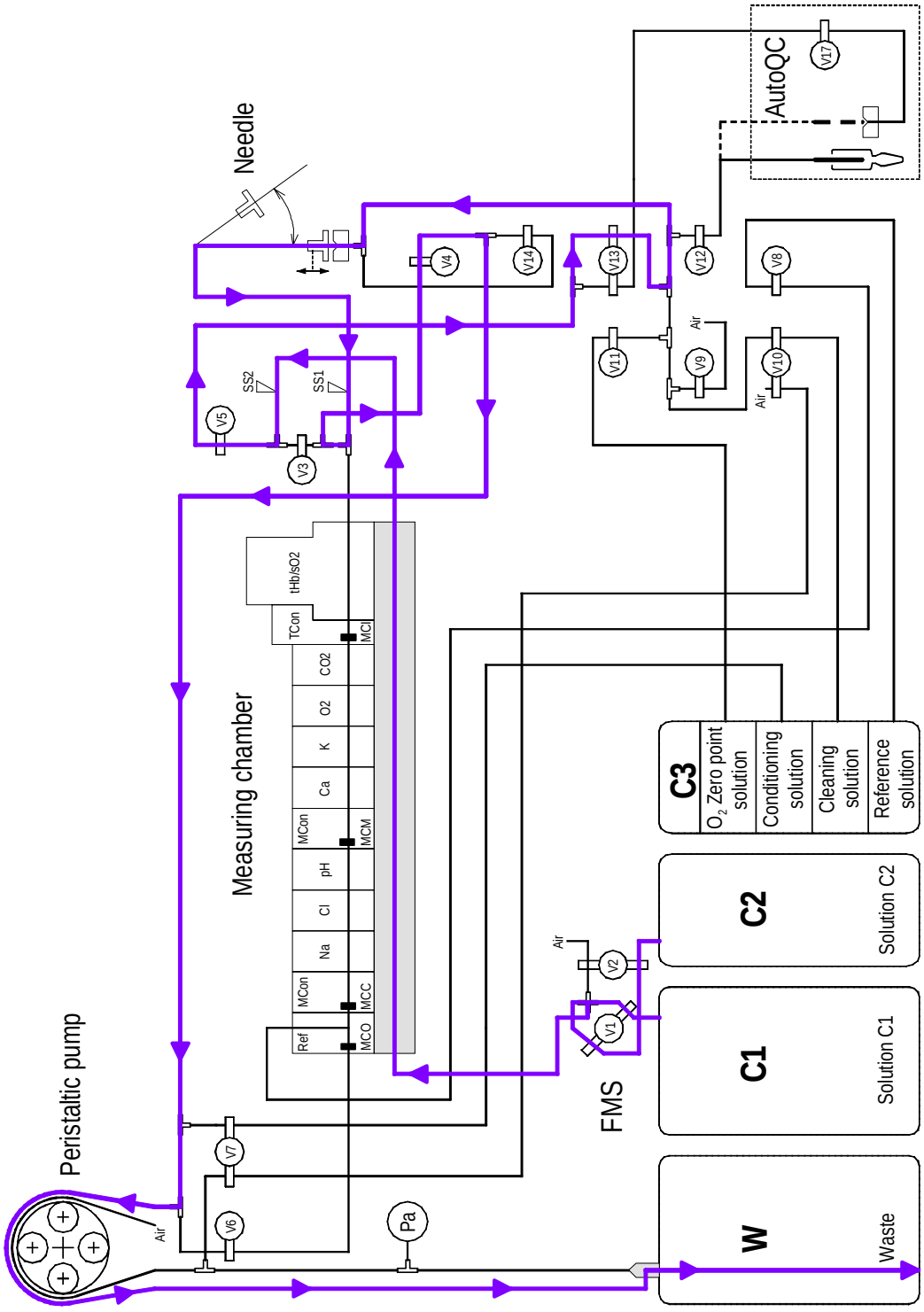
5.4 Aspiration of sample / QC material



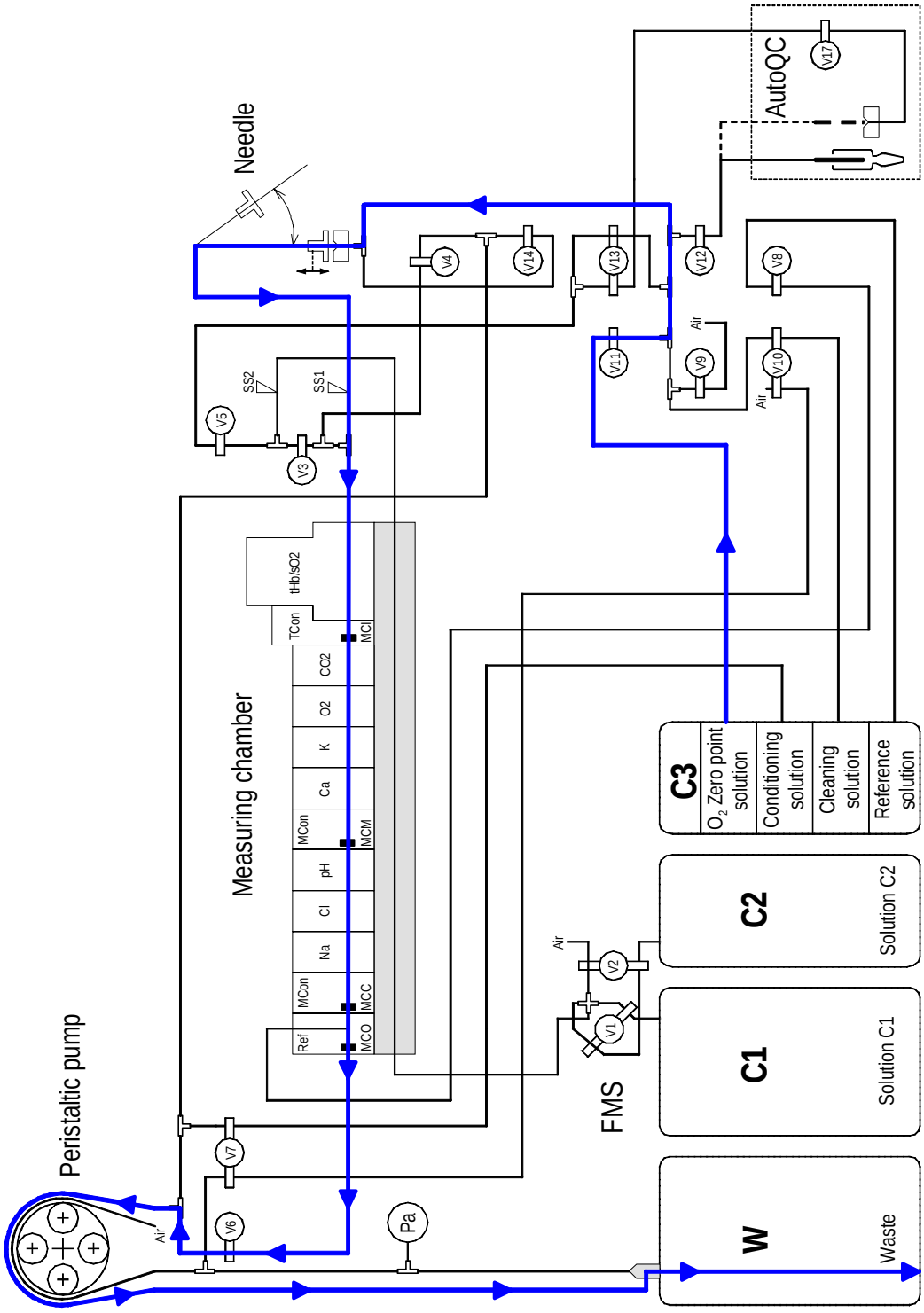
5.5 Aspiration of C1, C2 or Mix / washing the measuring chamber



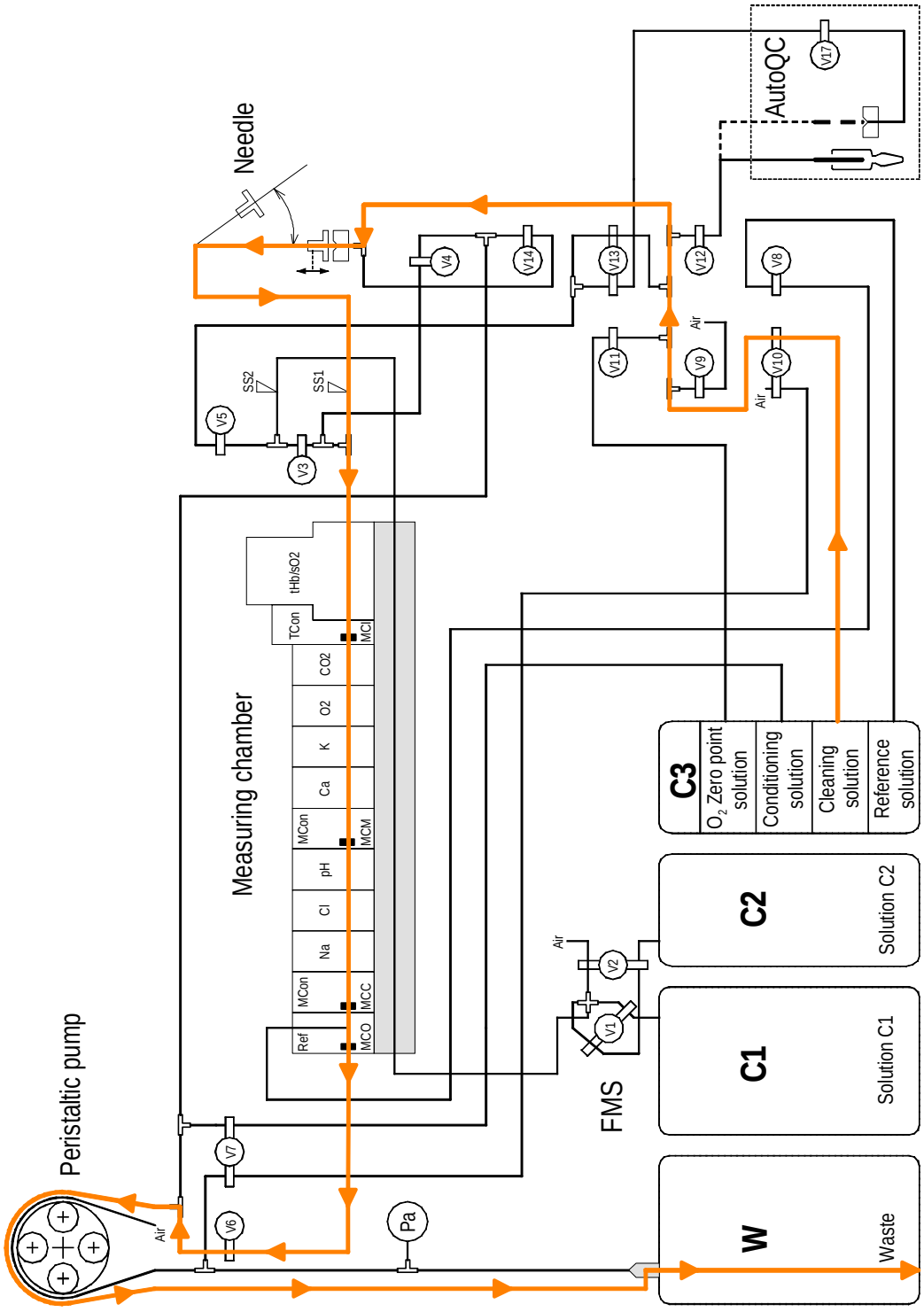
5.6 Washing the needle (over the bypass)



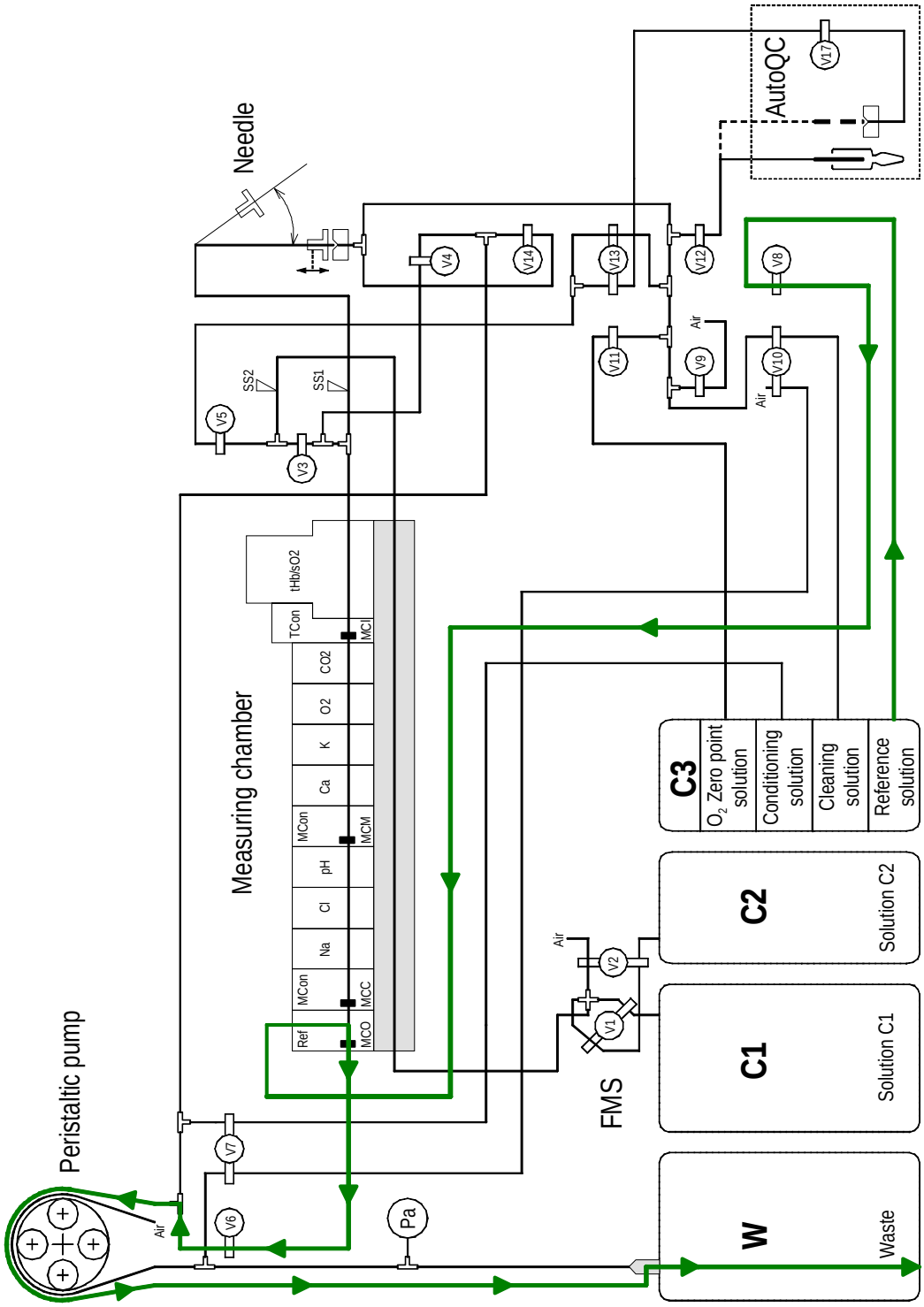
5.7 Aspiration of the O_2 zero point solution



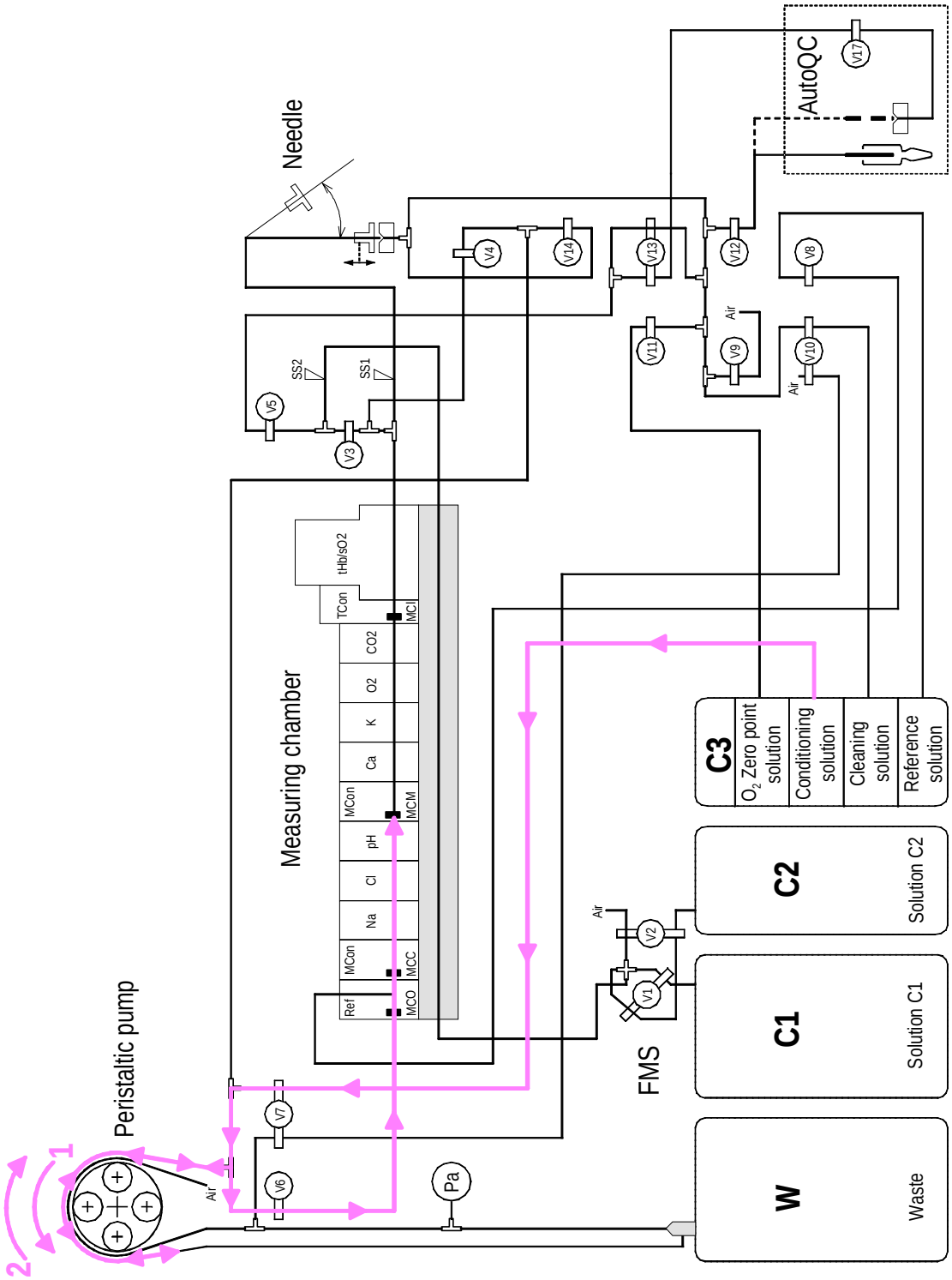
5.8 Aspiration of the cleaning solution



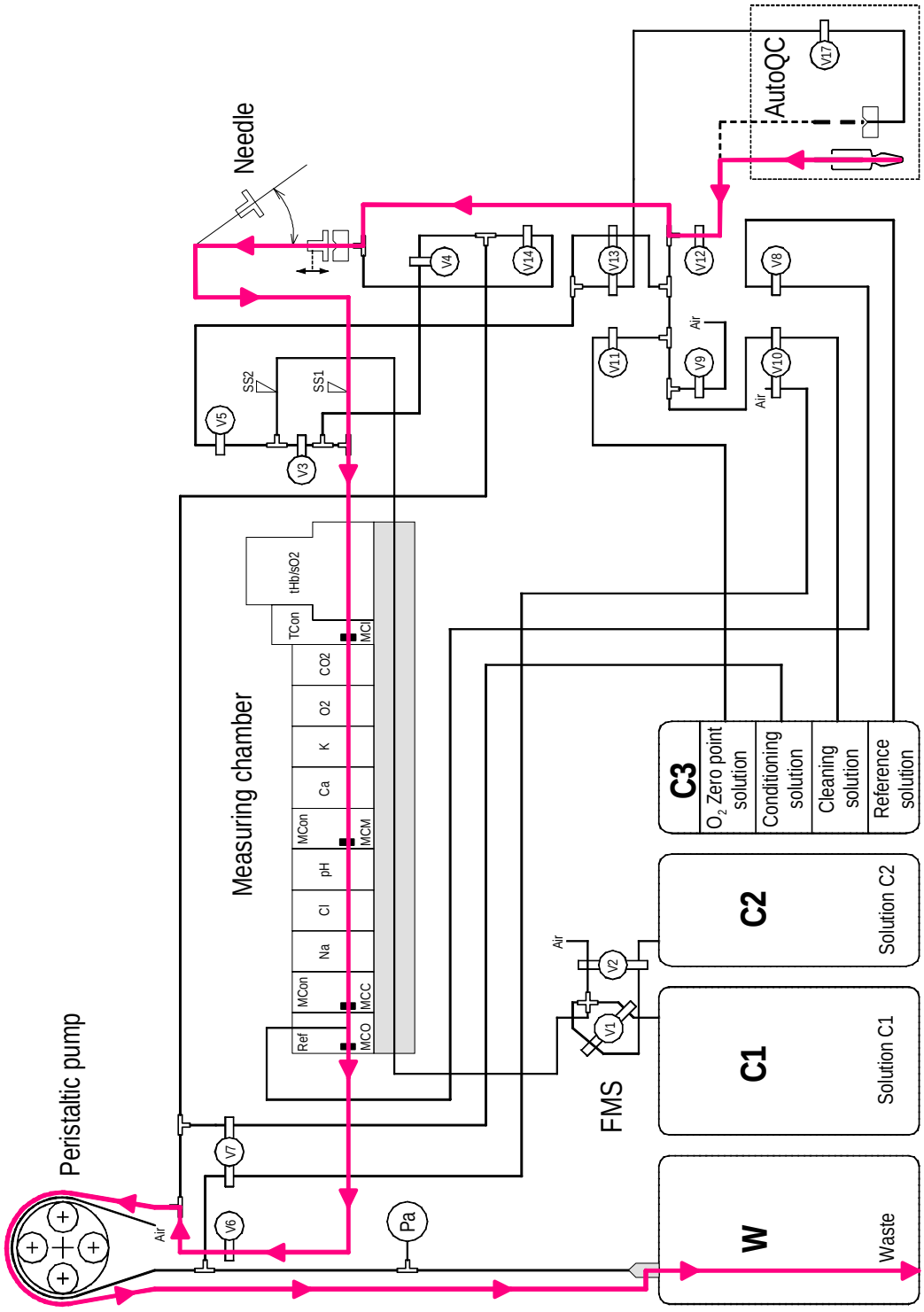
5.9 Filling of the reference electrode



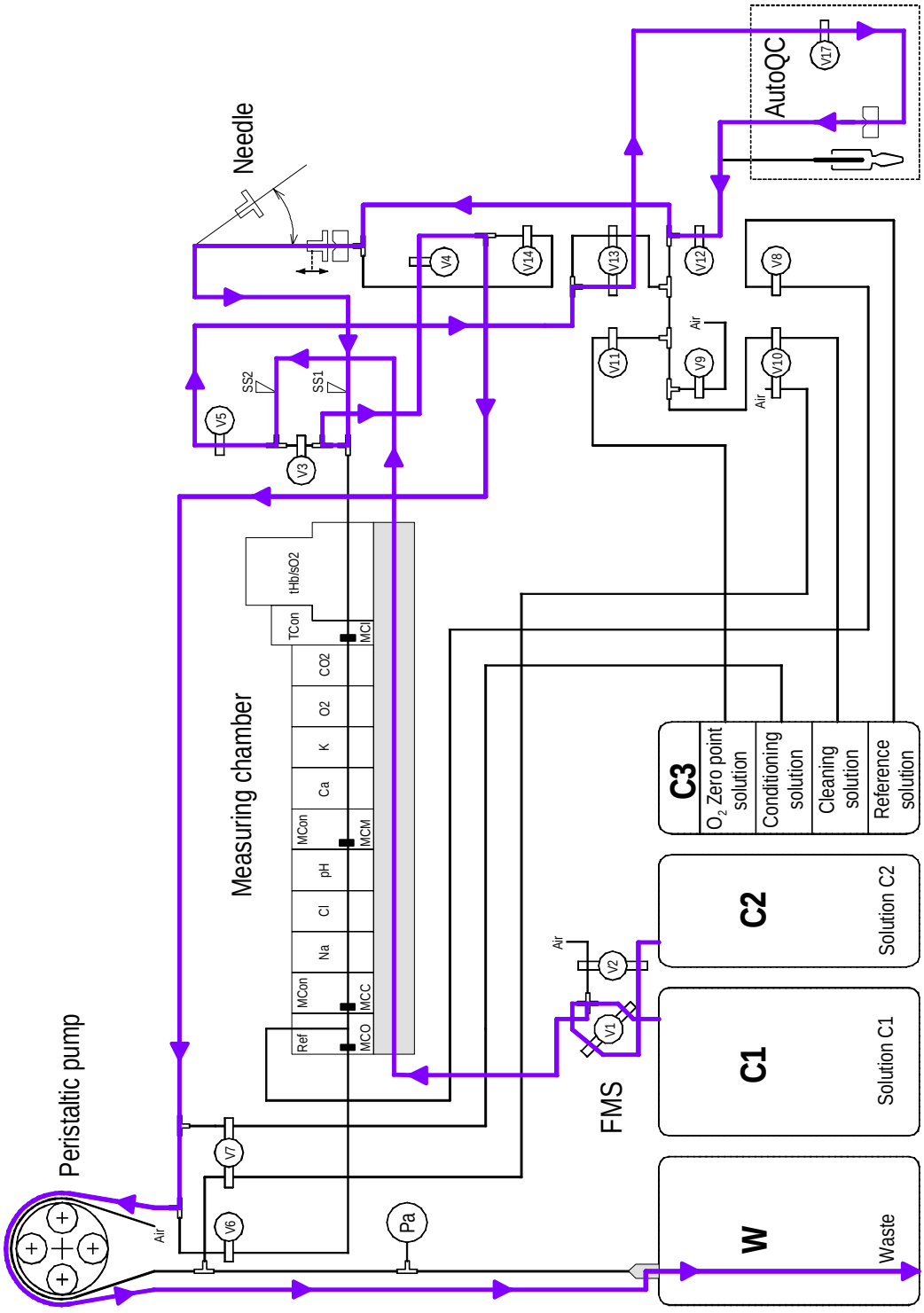
5.10 Conditioning cycle



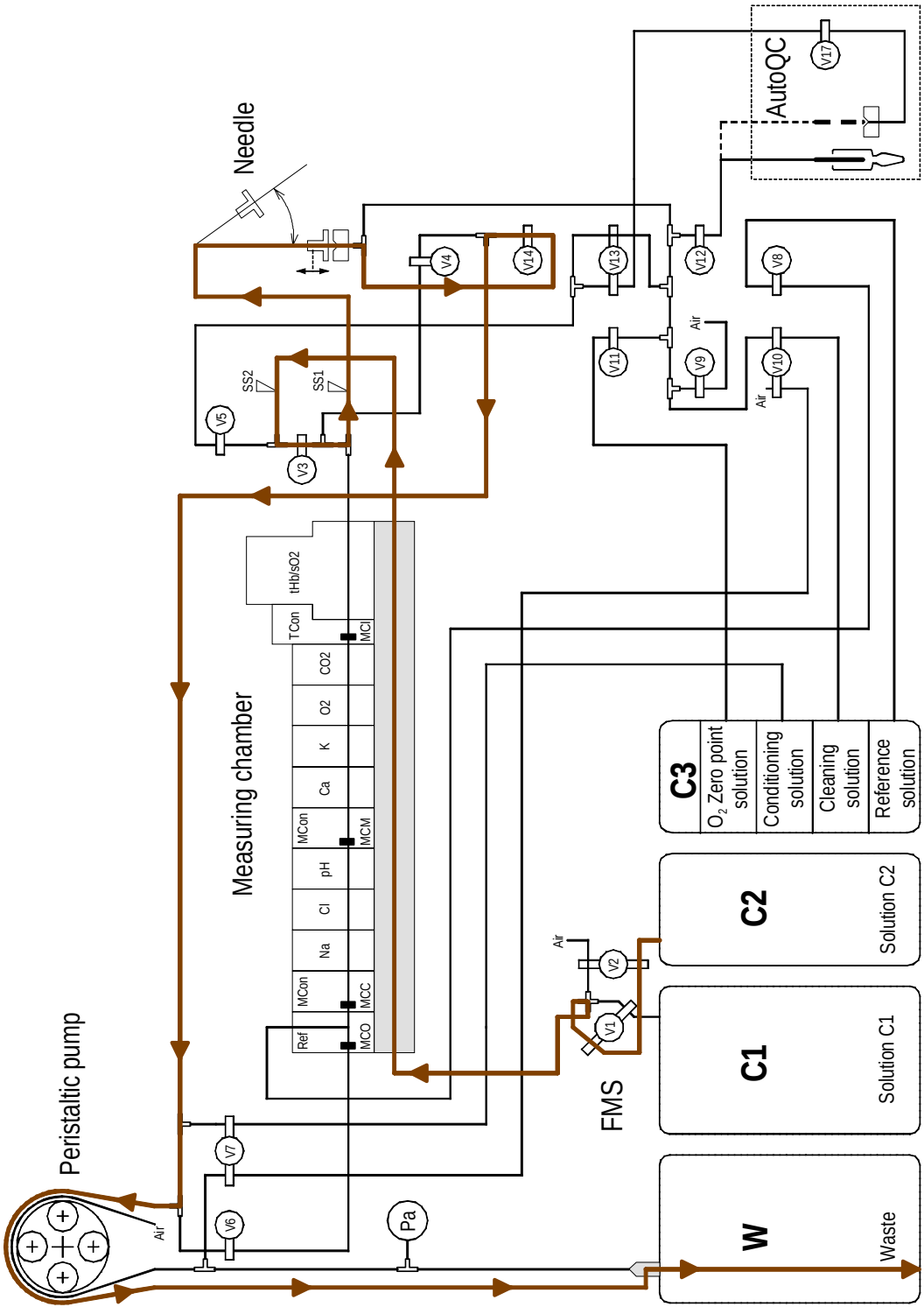
5.11 Aspiration of the AutoQC material



5.12 Washing the AutoQC



5.13 Calibrating the Sample Sensors



5.14 The FMS principle

The OMNI C uses a method that allows the simultaneous calibration of the PCO2, pH, Na+, K+, Ca++ and Cl- sensors by using only two calibration solutions (C1 and C2).

To achieve specific PCO_2, pH and Electrolyte values in the calibration solution, the two solutions (and C2) are mixed by a special Fluid Mixing System (FMS) in a certain mixing ratio. The actual ratio in which the solutions C1 and C2 are aspirated is exactly determined by a conductivity measurement in the measuring chamber.

The conductivity measurement is calibrated by measuring the conductivity of the pure solutions C1 and C2.

When the actual mixing ratio is known, the PCO_2, pH and Electrolyte values can be calculated by known chemical and mathematic formulas.

C1	:	C2		
2	:	1	=	Mix1
1	:	2	=	Mix2

5.15 Calibrations

Calibration for ready

Automatic selection of calibration type!

System calibration

Conductivity C1 calibration + Conductivity C2 calibration + Conditioning cycle + O2 zero point calibration + 2P (Mix2) calibration + O2 air calibration + 1P (Mix1) calibration

Conductivity calibration

Conductivity C1 calibration + Conductivity C2 calibration

1 Point calibration

O2 air calibration + 1P (Mix1) calibration

2 Point calibration incl. O2

O2 zero point calibration + 2P (Mix 2) calibration + O2 air calibration + 1P (Mix1) calibration

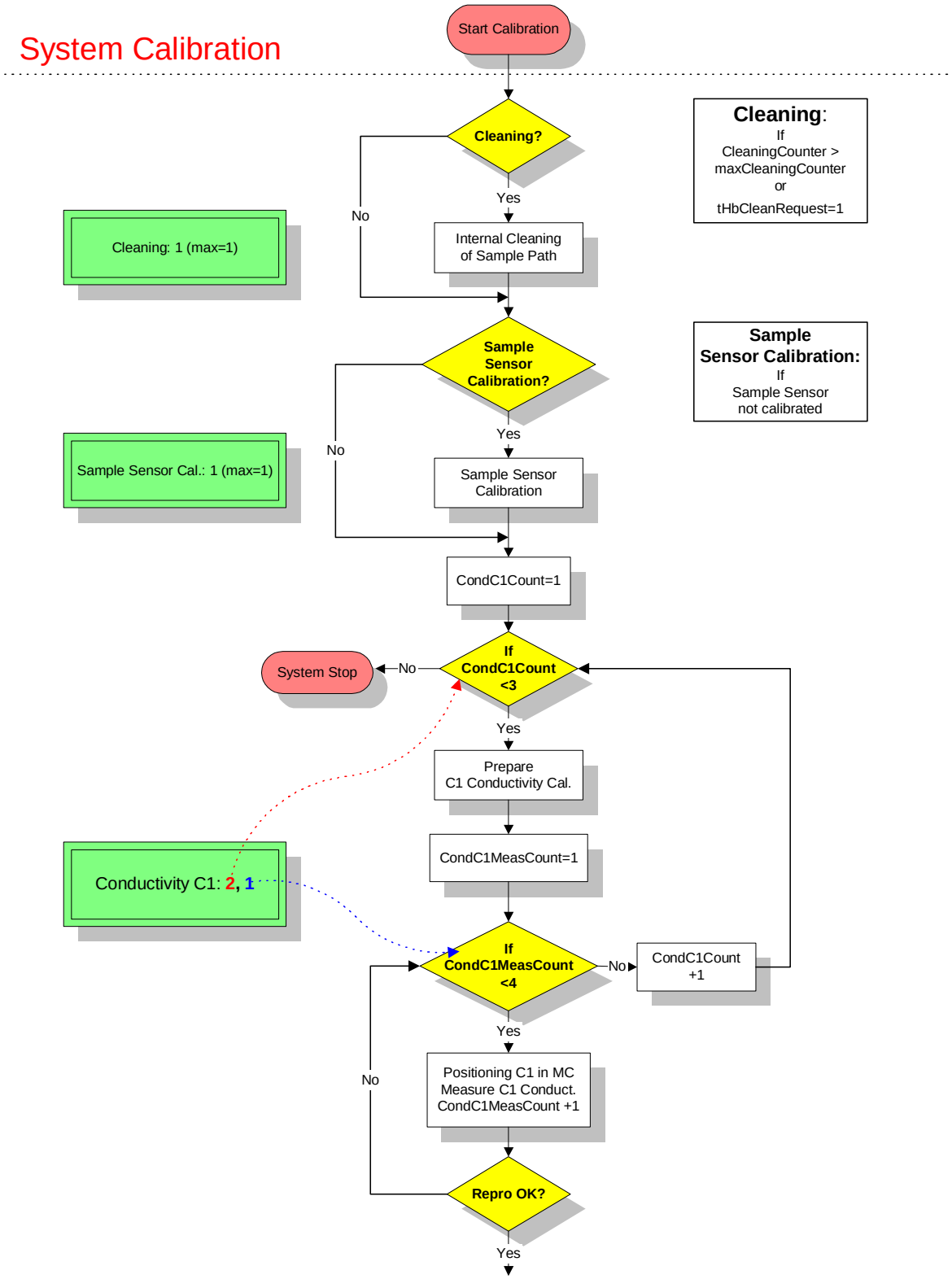
2 Point O2 calibration

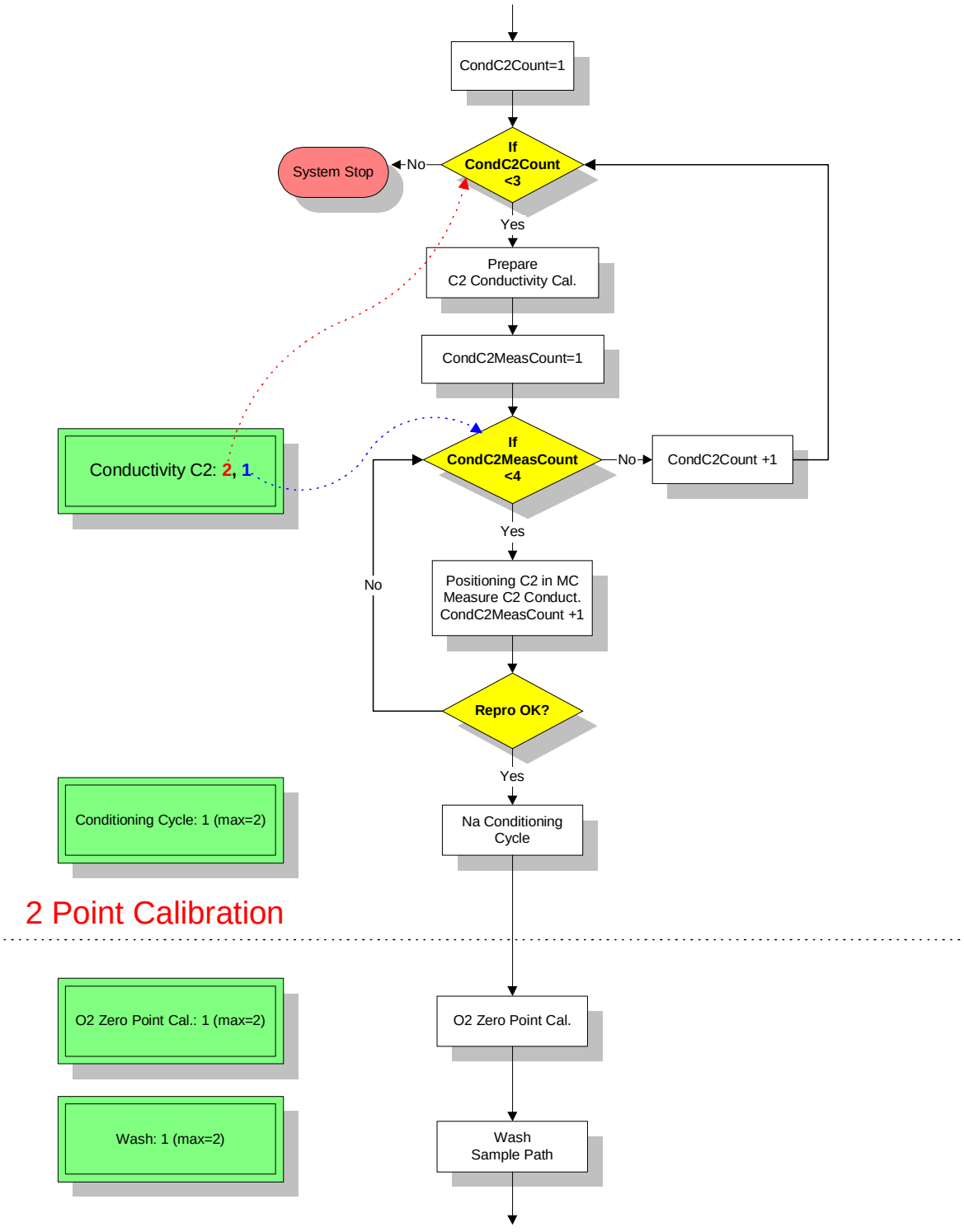
O2 zero point calibration + O2 air calibration + 1P (Mix1) calibration

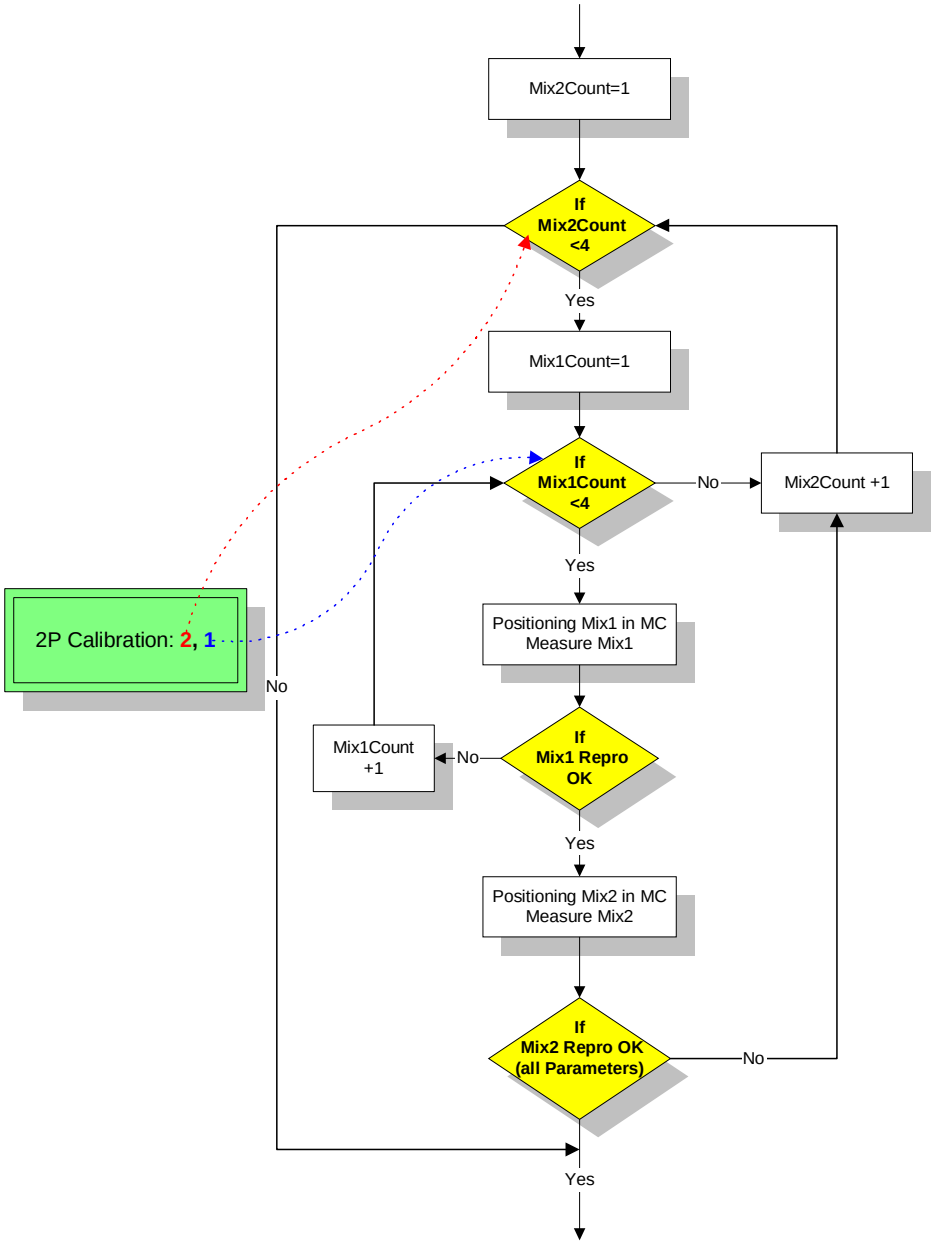
2 Point calibration excl. O2

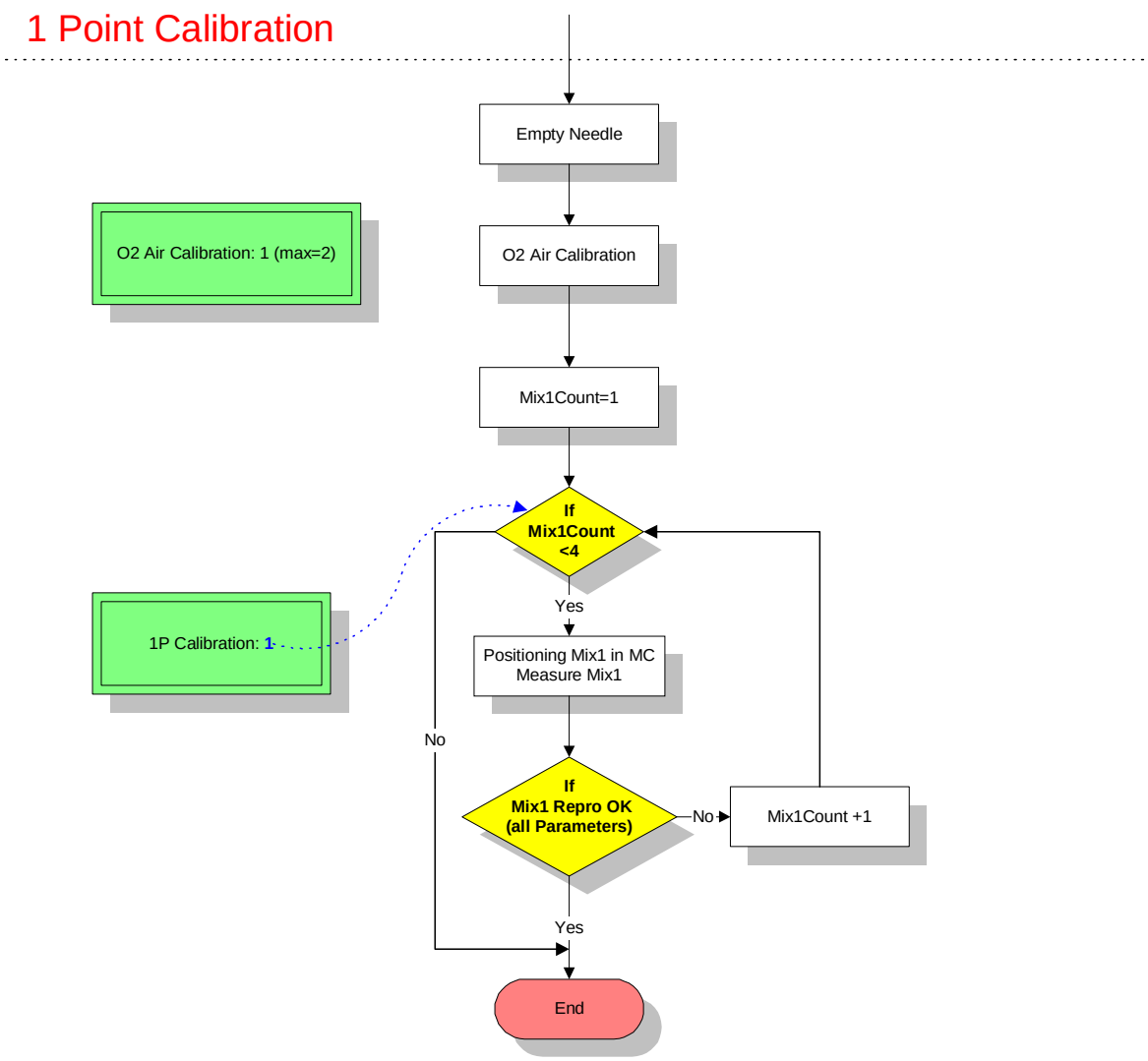
2P (Mix2) calibration + 1P (Mix 1) calibration

5.16 Calibration Flow Chart




CondC2Count=1
If
CondC2Count
<3
No
System Stop
Yes
Prepare
C2 Conductivity Cal.
CondC2MeasCount=1
If
CondC2MeasCount
<4
No
CondC2Count +1
Yes
Conductivity C2: 2, 1
No
Positioning C2 in MC
Measure C2 Conduct.
CondC2MeasCount +1
Repro OK?
Yes
Conditioning Cycle: 1 (max=2)
Na Conditioning
Cycle
2 Point Calibration
O2 Zero Point Cal.: 1 (max=2)
O2 Zero Point Cal.
Wash: 1 (max=2)
Wash
Sample Path


Mix2Count=1
If Mix2Count <4
Yes
Mix1Count=1
If Mix1Count <4
No
Mix2Count +1
Yes
2P Calibration: 2, 1
No
Positioning Mix1 in MC
Measure Mix1
Mix1Count +1
No
If Mix1 Repro OK
Yes
Positioning Mix2 in MC
Measure Mix2
If Mix2 Repro OK (all Parameters)
No
Yes


1 Point Calibration
Empty Needle
O2 Air Calibration: 1 (max=2)
O2 Air Calibration
Mix1Count=1
If
Mix1Count
<4
Yes
1P Calibration: 1
Positioning Mix1 in MC
Measure Mix1
No
If
Mix1 Repro OK
(all Parameters)
No
Mix1Count +1
Yes
End

5.17 Measurement procedure

Starting point	• Needle is empty; air from V9 to the junction in front of the tHb/S02 module • Measuring chamber is filled with Mix1 from the junction in front of the tHb/S02 module until V6 • In the FMS tubing are 6 wash packages consisting of 40µl Mix1 + 25µl air and a conditioning package (CON) consisting of approx. 300µl Mix1 • From V5 to the air channel (from V9 to the needle) are 5 wash packages for the needle (Mix1 + air)
Flap is opened	• V4 is opened – sample path over bypass • Peristaltic pump is started with a speed of von 40µl/sec
Waiting for sample front at SS1	• SS1 (Sample Sensor 1) is not active for approx. 2 sec + 1 sec (Time to sample insertion) → fluid drops in the needle area are ignored • SS1 is activated • Sample is aspirated until SS1 min. 3µl sample must be recognized, otherwise ignore as drop (the drop will be ignored even if the following air bubble is very small)
Sample front detected at SS1	• The aspiration path is switched from bypass to measuring chamber (V4 closes, V6 opens) • Separating air package extends from junction until SS1 (12µl +/- 4µl), minus 3µl for observation of the sample front
Time controlled until sample front is at junction	• Time controlled, after a few mm the sample path is switched shortly to the bypass → filling of the junction to avoid sample fragmentation by air bubbles out of the junction • 2-3µl sample loss are accepted • tHb/SO2 – sample recognition is activated
tHb/SO2 measurement	• tHb/SO2 recognizes separating air package • Peristaltic pump speed is reduced • Further aspiration (approx. 2 sec) – in order to not measure the sample front • tHb/SO2 - scan is started (5 measurements at each of 4 wave lengths)
Filling of the measuring chamber (Parallel to tHb/SO2 measurement)	• Wait until MCI-MCM empty • Wait until MCI-MCM full • Wait until MCM-MCO full
Electrode Scan (Measurement)	• Wait approx. 1,2 sec • Start electrode scan (5 groups, each approx. 4 sec; more if signal quality is poor)

Washing the measuring chamber	• Aspirate out of FMS over bypass until SS2 detects sample; peristaltic pump speed approx. 80µl/sec • Switch sample path to measuring chamber • Aspirate the wash packages (Mix1 + air) through the measuring chamber • Mixing of 6 new wash packages (Mix1 + air) and a CAL (Mix1) package • Wait until SS2 detects the end of the conditioning package (CON (Mix1), observe MCC-MCO at the same time • Measuring chamber is filled with Mix1 from SS2 to V6 (CON)
Water values tHb/SO2	• Check tHb/So2 module for cleanliness (Mix1 is measured optically while stopped)
Aspirate reference solution	• V3 is closed, V8 is opened, vacuum in the system is used • Wait until MCC-MCO detects 100mV hub → reference solution has arrived (max. 3 sec, approx. 10µl reference solution usage)
Wash needle system	• V3 opens, aspirate over bypass until 1st wash package reaches SS2 • V3 closes, V5 opens in order to aspirate the (reservoir) wash packages (Mix1 + air) over the needle into the bypass • Start FMS, produce 5 wash packages (Mix1 + air) • Status after FMS has finished: the existing (reservoir) wash packets have been used to wash the needle, 5 packets are in the needle bypass, 5 new packages have been produced • Peristaltic pump is stopped • V9 is opened • Aspiration until SS1 detects no wash package for a longer period of time
Aspirate calibration package	• Calibration package CAL (Mix1) is in front of or after SS2 • Wait until SS2 detects the CAL (Mix1) package • Time controlled aspiration into the needle-bypass (V5 opens) • Switch to bypass and fill junction (V5 closes, V3 opens), time controlled • Fill junction towards needle: V4 closes, V14 opens • Wait until SS1 detects the CAL (Mix1) package → stop • V14 closes, V6 opens → filling of the measuring chamber • Check for continuous CAL (Mix1) detection at SS1 (otherwise open V14 shortly) • Fill check with MCC-MCO (first empty, then full) • Produce conditioning package CON (Mix1) with FMS at the same time • Wait at SS2 for the end of the calibration package CAL (Mix1) at the same time → Stop → measuring chamber must be filled from V6 to SS2
Calibration	• Start scan
Scan completed	• Empty needle at the end of scan (V9 u. V4 open) • Calibration calculation: if o.k. → Procedure is finished • Status: measuring chamber stays filled (fromV6 to the junction in front of the tHb/S02 module)

5.18 System calibration procedure

Starting point	• Identical to measurement procedure
Conductivity calibration C1	• Air aspiration (time controlled) • Push air back over the FMS crosspiece into the C2 tubing (in order to avoid mixing with C2)
Producing C1 packets	• Production of 5 wash packages consisting of solution C1 + air and a calibration package CAL (C1) (over bypass) • (At the same time the preparation time for the peristaltic pump calibration is determined)
Fill junction	• SS2 waits for an air package (separation of Mix1 from 1st C1-wash package) • With the 1st package, the junction towards V5 and V4 is filled • Switch sample path to measuring chamber
Filling of the measuring chamber	• Detect calibration package CAL (C1) with SS2 • Detect separating air package with MCC-MCO • Detect C1 package with MCC-MCO • Stop peristaltic pump • Fill check • Wait 10 sec for thermostatisation) • Start conductivity scan (MCI-MCC) • If not o.k., further aspiration until the 2nd package is in the measuring chamber (max. 3 measuring fillings of the chamber are possible until the FMS reservoir is empty
Conductivity calibration C2	• Aspirate air (time controlled) (only if the conductivity calibration C1 was o.k. at the first aspiration) • Push air back over the FMS crosspiece into the C1 tubing (in order to avoid mixing with C1)
Producing C2 packets	• Produce 5 wash packages consisting of solution C2 and a calibration package CAL (C2) • → Same procedure as with solution C1
Conditioning cycle	• Starting point: measuring chamber is filled with C2 FMS is filled with C2 and air needle is empty
Positioning of the conditioning solution	• Aspirate air over bypass • Push a separating air package towards V6, in order to separate C2 from the conditioning solution) • Aspiration of the conditioning solution over the T-Piece at the peristaltic pump (time controlled) • Push conditioning solution into the measuring chamber from the rear (C2 package is pushed into the needle area) • Search for separating air package with MCC-MCO • Search for front of the conditioning solution packet with MCC-MCO (Determination by conductivity) • Position with MCM-MCO and stop • Wait (approx. 15sec) O2 and CO2 see air

O2 zero point solution	• Aspirate until needle tip over bypass (time controlled) • V11 closes, V9 opens • Further procedure similar to normal measurement
Mix1 cycle	• Additional – the cycle performed automatically at the end of the measurement does not lead to a valid result with a high possibility
Mix2 cycle	• Identical to Mix1 (but mixing ratio for Mix2-point)
Mix1 cycle	• Can be spared eventually
O_2 air calibration	• Empty measuring chamber with 10µl/sec • MCI-MCM empty → wait 3 sec → start O2 scan • (Peristaltic pump moves all the time)
Mix1 cycle	• In order to reach starting point again

6 Service area 6-1

6 Service area

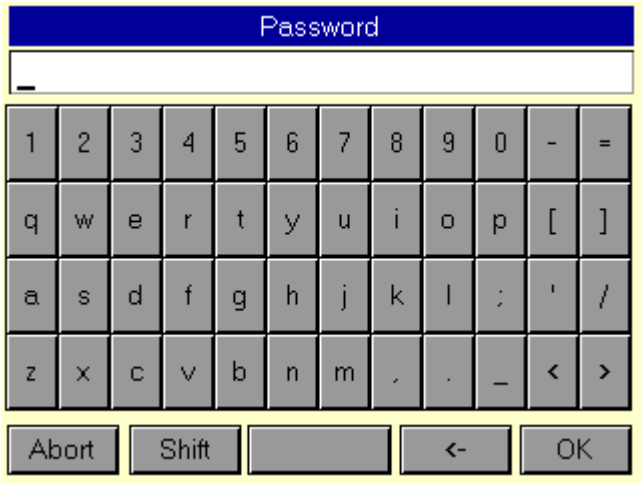
6.1 Password protected software functions

6.1.1 Service Password

Several software functions of the OMNI C are only accessible for the service technician for safety reasons.

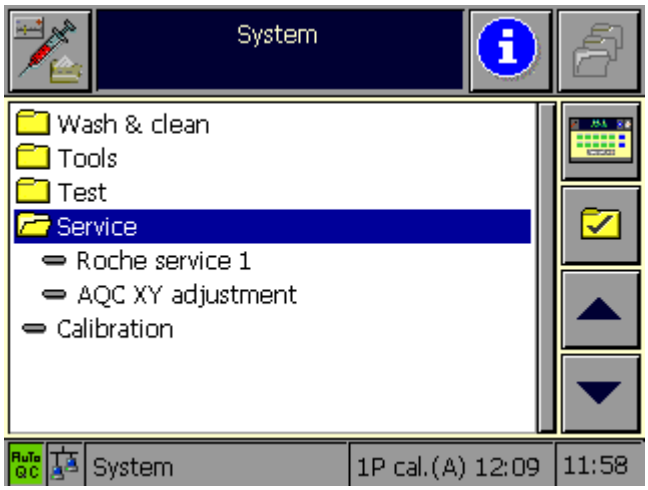
Upon opening these functions, a password will be requested.

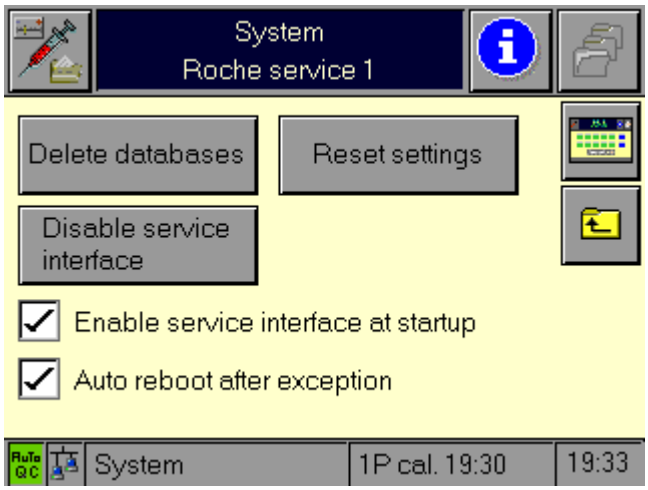
The Service Password can be calculated with **Service_PW_OMNI_C_Rev_1.xls**.



6.1.2 Roche Service 1

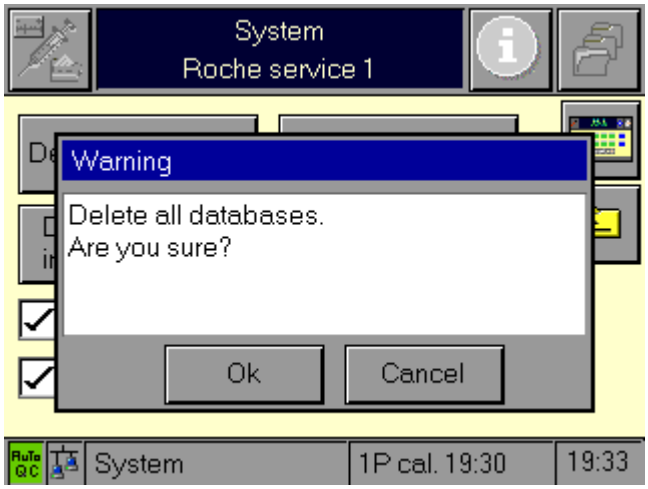
This software function is located under „**More – System – Service**“





Delete databases

This function erases all databases in the internal flash memory.
(Empty database files are created)

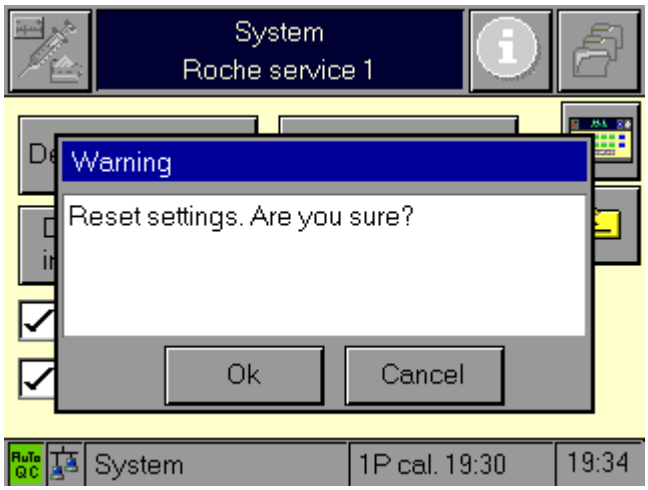


Reset settings

This function restores all settings in the setup area to the default values (a new setup file with the default settings is created).
The QC materials and the QC mat settings are deleted!

After pressing the “Ok” button, the OMNI C must be switched off and on in order to let the reset be executed!

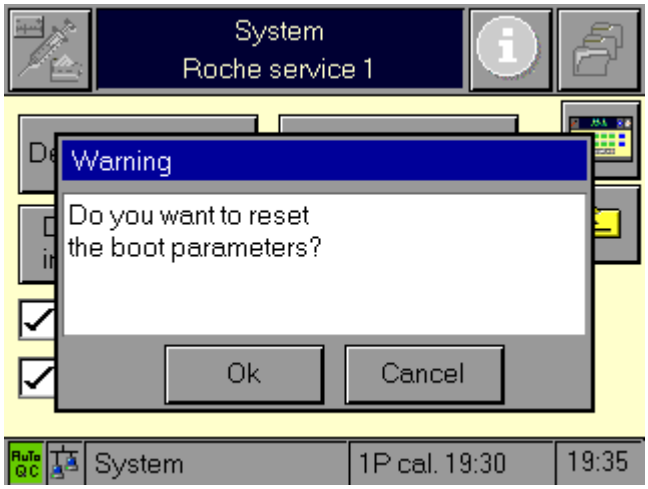
Attention! After switching on again, the OMNI C will be “Out of operation”, requiring to perform the “Installation” procedure!



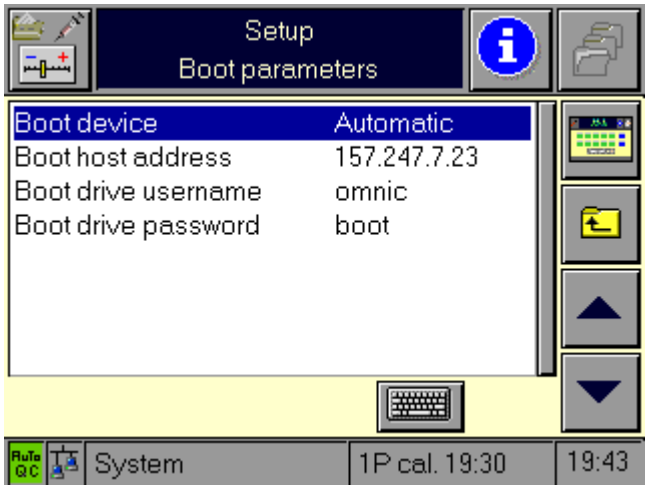
Additionally, the boot parameters can be restored to the default values (By activating this function, also the network IP address is deleted and the automatic network initialization is removed)!

After pressing the “Ok” button, the OMNI C must be switched off and on in order to let the reset be executed!

Attention! After switching on again, the OMNI C will be “Out of operation”, requiring to perform the “Installation” procedure!



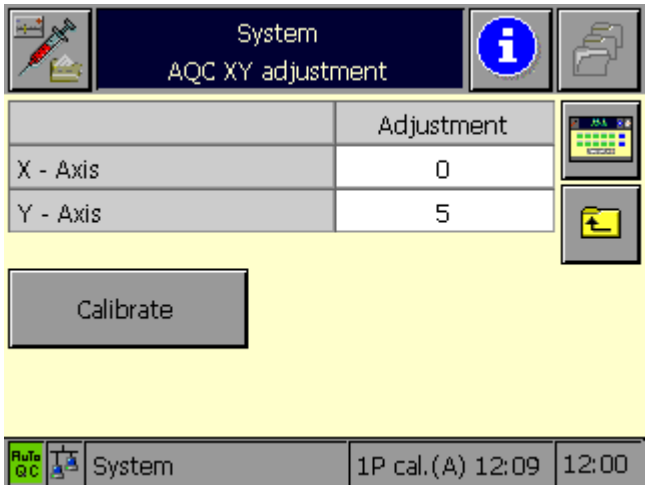
The boot parameters will be restored to the following values:



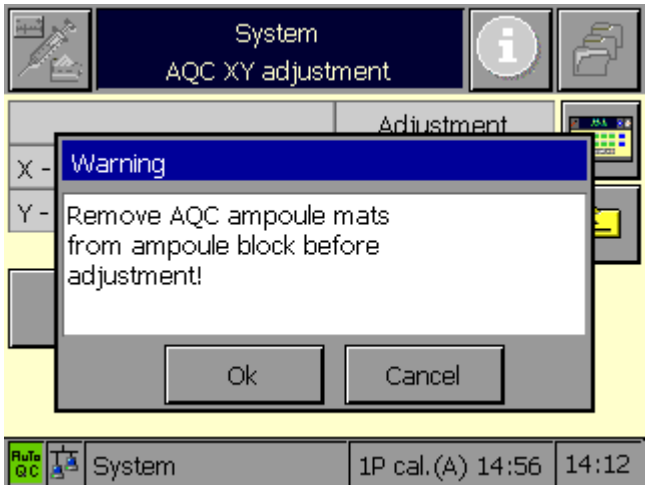
6.1.3 AQC XY adjustment

This software function is located under „**More – System – Service**“

This function is used for position adjustment of the AQC steel tube in X and Y direction, so that after replacement of the AQC board and/or the ampoule block the ampoules are pierced at the right spot.



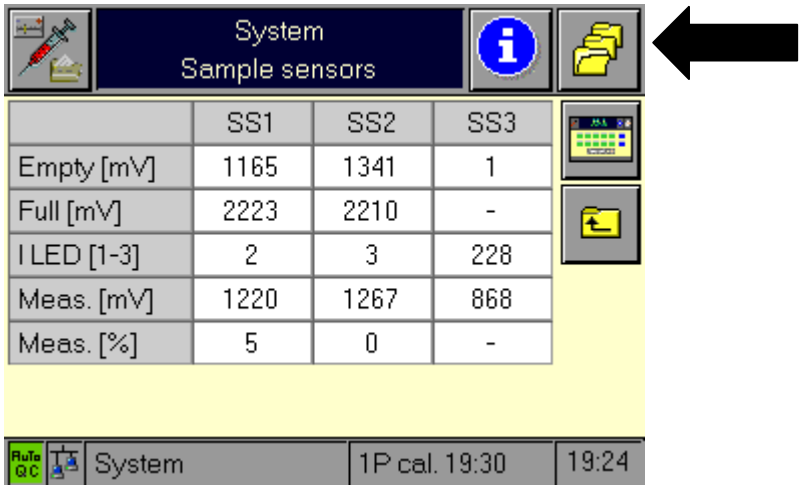
To avoid damage, the AQC ampoule mats must be removed from the AQC ampoule block before starting the adjustment!



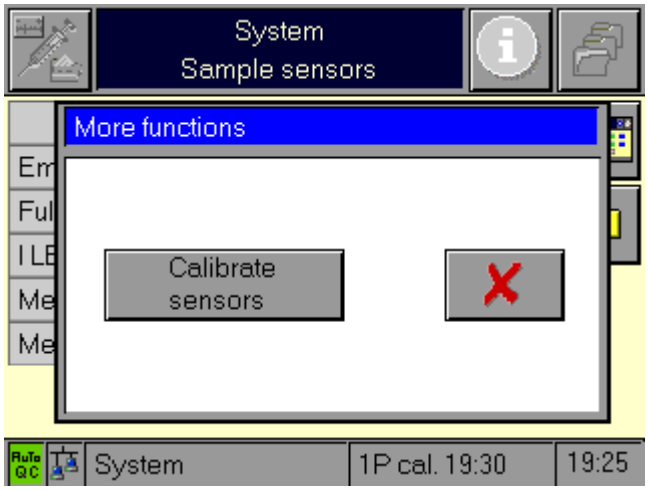
Attention! Be aware of possible injuries due to moving parts!

6.1.4 Sample sensor calibration

This software function can be accessed by pressing the button „**More**“ in the test function „**Sample sensors**“

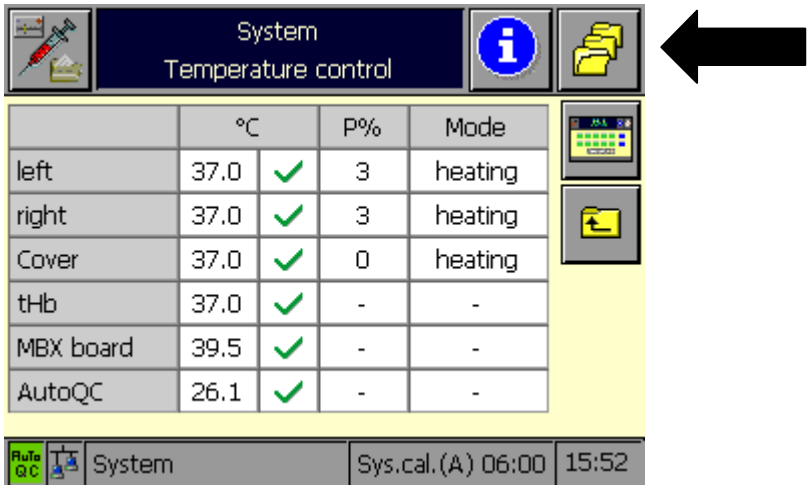


A calibration of SS1 and SS2 with alternating fluid (Solution C2) and air packets can be started here:



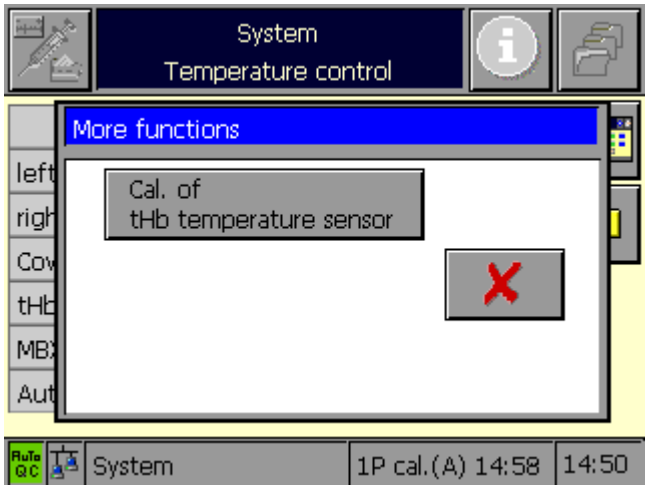
6.1.5 Calibration of tHb temperature sensor

This software function can be accessed by pressing the button „**More**“ in the test function „**Temperature control"**



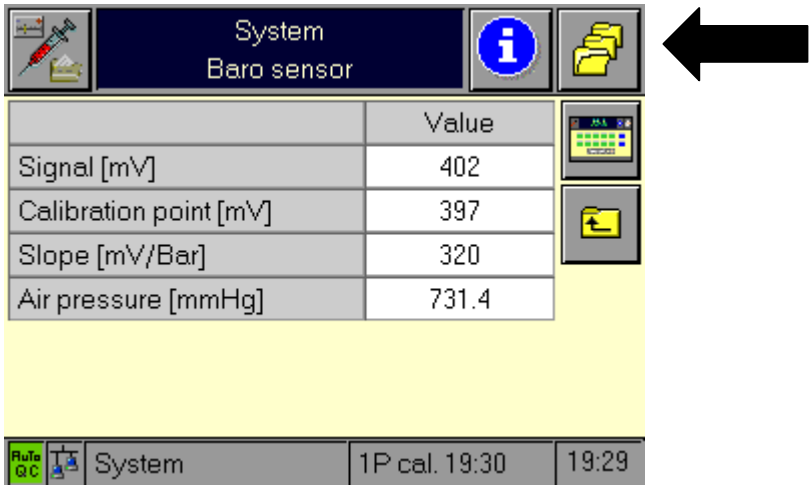
This function starts a calibration of the tHb/SO_2 module temperature sensor.

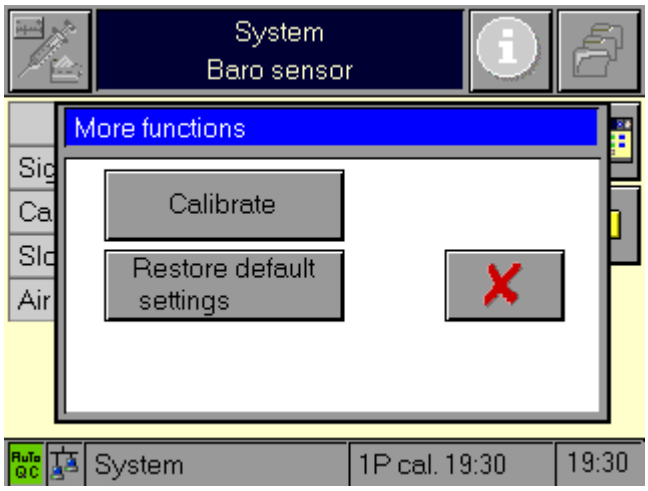
The tHb temperature sensor is calibrated with a precision of +/- 0,1 °C according to the right measuring chamber temperature sensor.



6.1.6 Baro sensor calibration

This software function can be accessed by pressing the button „**More**“ in the test function „**Baro sensor**“



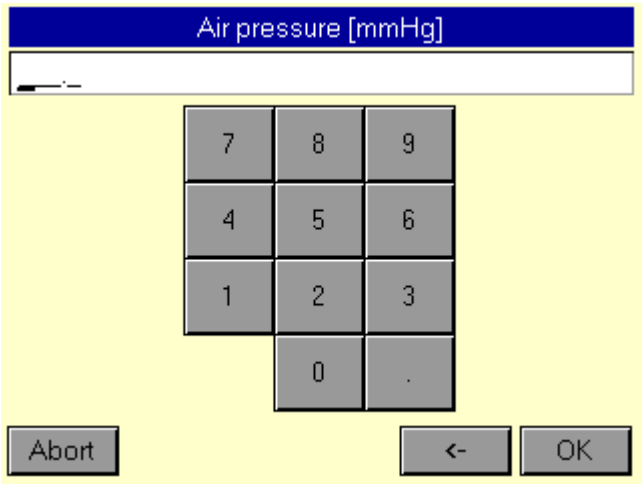


Calibrate

Read off the actual air pressure from a precision barometer and enter the barometric pressure value.

This value will be stored together with the measured mV value of the baro sensor as a calibration point.

(Together with the slope, air pressure can be calculated)

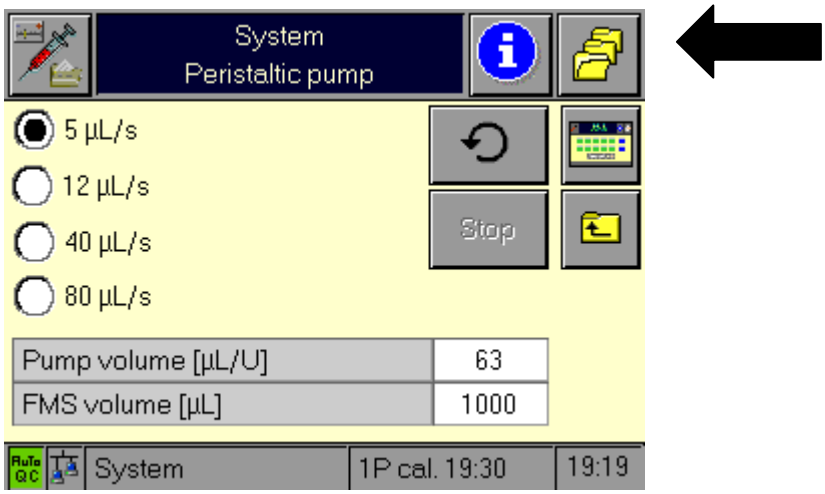


Restore default settings

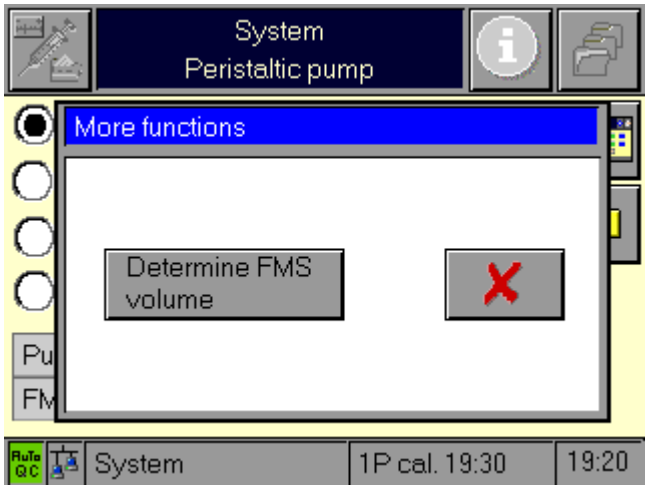
By pressing this Button, the factory settings are restored.

6.1.7 Determination of the FMS volume

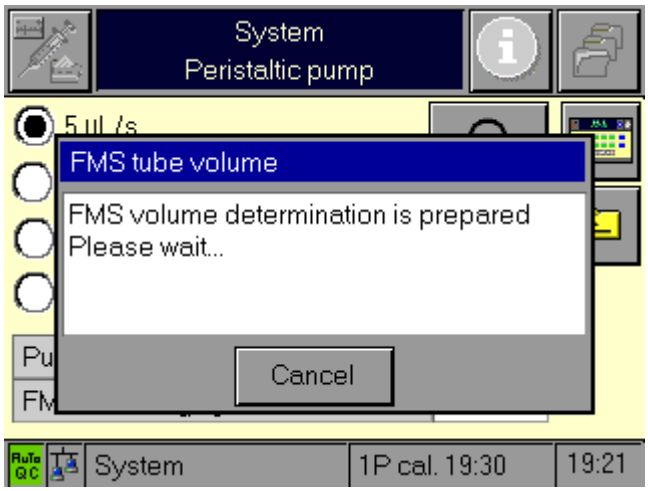
This software function can be accessed by pressing the button „**More**“ in the test function „**Peristaltic pump**“

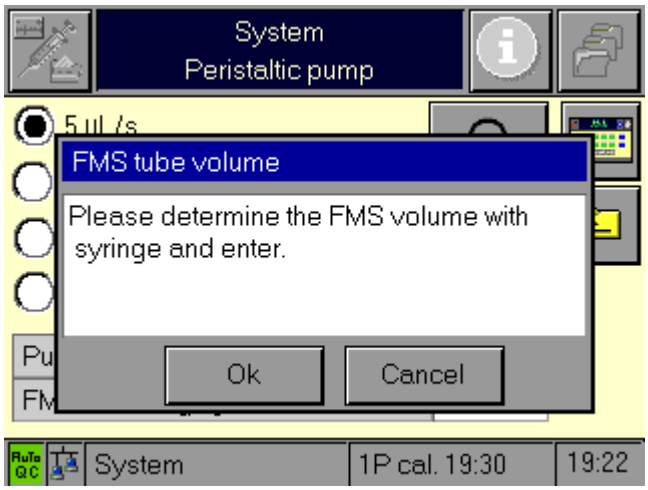


The procedure for determining the FMS volume can be started here:



First, the FMS tubing is emptied:





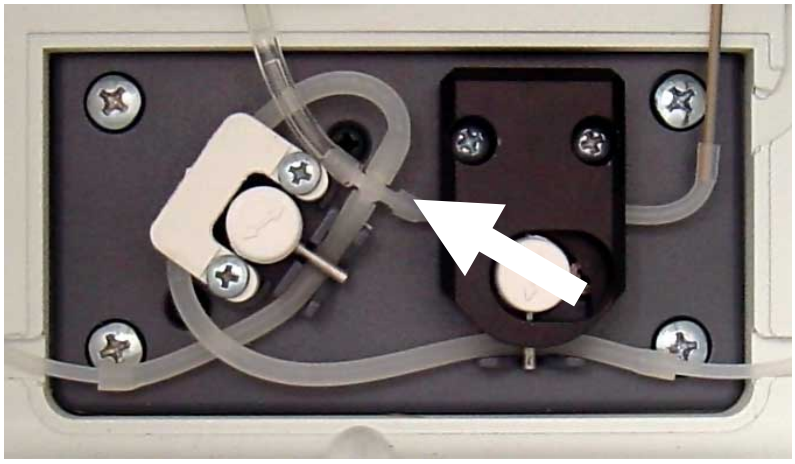
Now the determination of the FMS volume can be started:

Following aids are needed:

- 1ml syringe with divisions: smallest unit 10 µl
- Capillary adapter
- Tube ca. 50 mm

Proceed as follows:

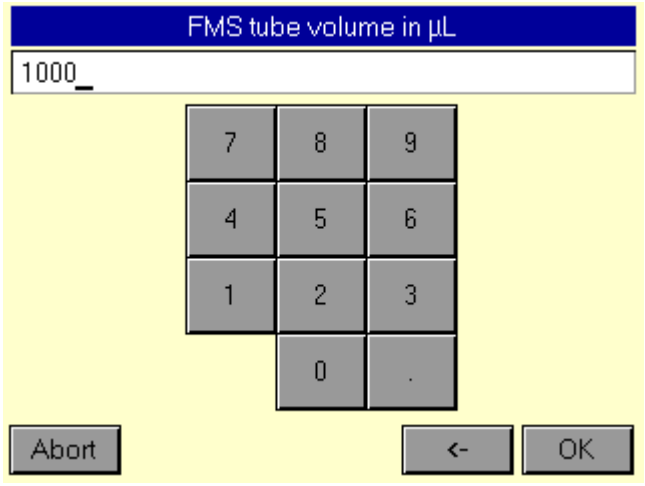
1. Connect the filled syringe (air bubble free!) to the FMS cross piece by using the tube. (It is helpful to use a coloured fluid, e.g. Combitrol).



2. Inject the fluid slowly (avoid air bubbles!).
3. Read off the volume when reaching the FMS cross piece.
4. Read off the volume when the fluid leaves the black sample sensor cover at the measuring chamber where the tube joins the T-piece between V3 and V5.

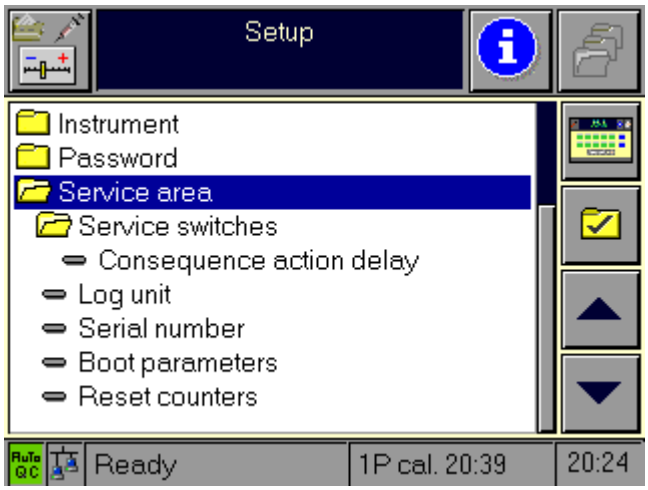
5. To ensure that no drops are in front of the liquid column, inject until the fluid reaches the tube of V5 and pull slowly back until the fluid reaches the edge of the sample sensor cover again.
6. The difference between the two readings is the FMS tubing volume (in µl).

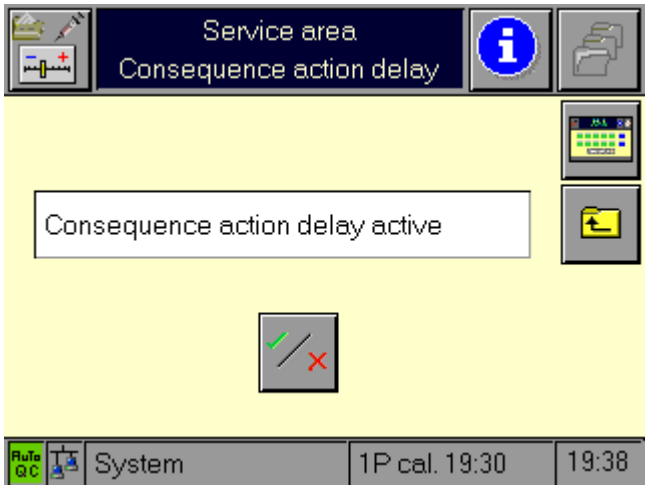
After pressing the “Ok“ Button, the value can be entered.
The value must be in the range of 920µl - 1050µl.



6.1.8 Consequence action delay

This software function is located under „**Setup – Service area – Service switches**“





Designed for well-trained service technicians only, this function offers the opportunity to customize the test routines in the system area for servicing and faultfinding.

The consequence action delay avoids the execution of consequence actions (e.g. switching the valves to home position, stopping the pump) by the analyzer when changing between test functions in the system area.

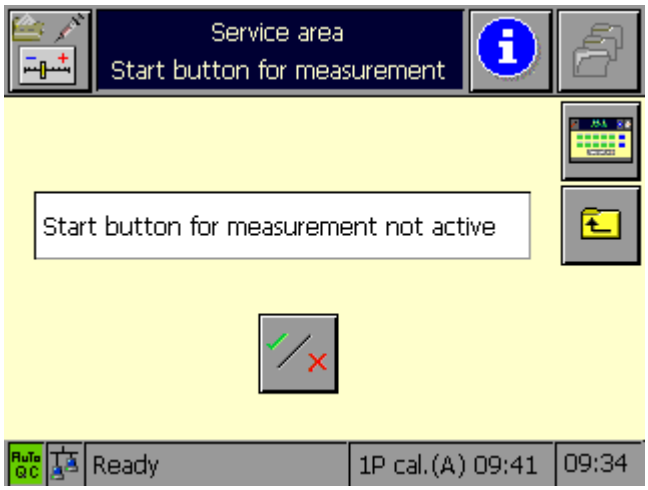
This allows e.g. switching the valves, then changing the test function and performing a manually controlled aspiration by activating the peristaltic pump.

After leaving the system area, all necessary consequence actions are executed.

This function should be activated only by well-trained service technicians because the risk of damaging the analyzer by improper handling is very high in this mode!

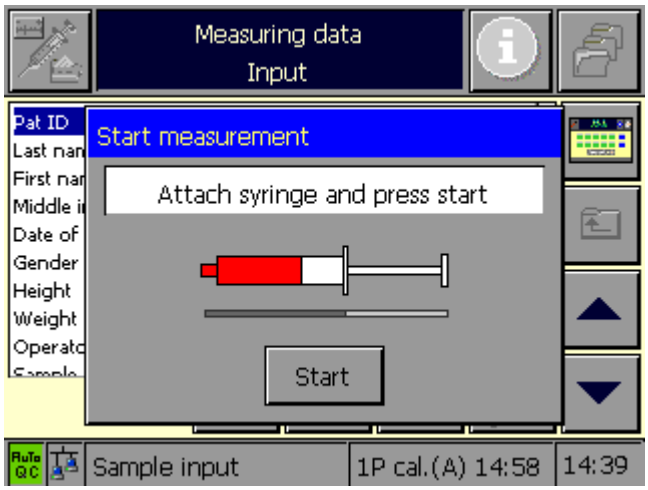
6.1.9 Start button for measurement

This software function is located under „**Setup – Service area – Service switches**“



Use this function to activate the "Start button for measurement".

When this function is activated, the sample aspiration can be started only by pressing the "Start" button.

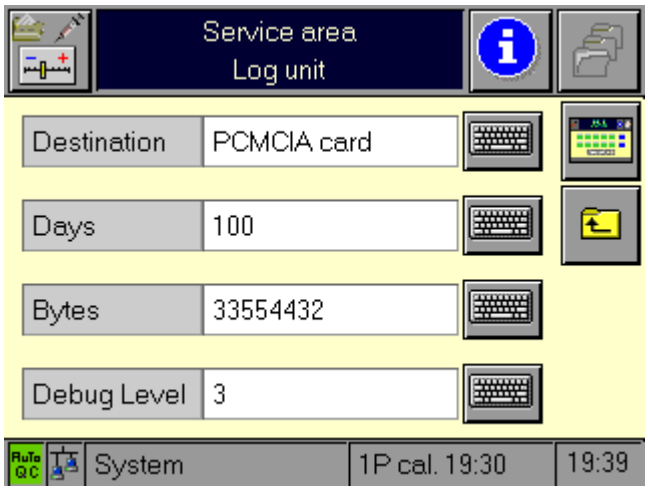


For more detailed information, please refer to the additional page "Start button for measurement" at the end of this service manual.

When the software function "Start button for measurement" has been activated, the additional page "Start button for measurement" must be inserted in the Instructions for use Roche OMNI C, at the end of chapter 4 “Measurement”!

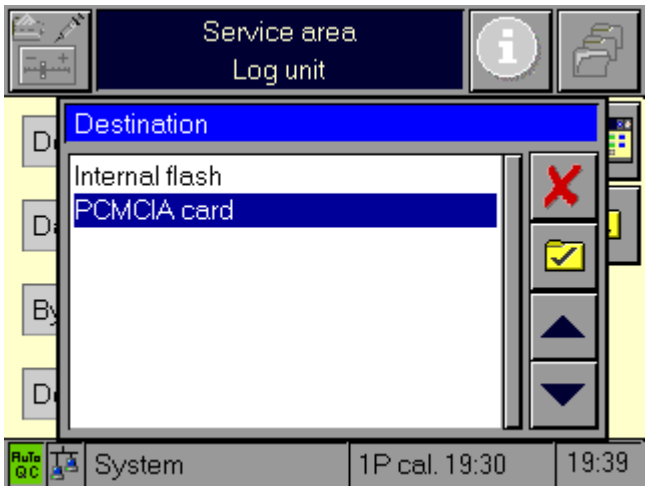
6.1.10 Log unit

This software function is located under „**Setup – Service area**“



Destination

The storage location for the log data (analyzer actions, etc.) can be entered here:
Attention: When set to “Internal flash”, high memory usage might be the consequence!



Days

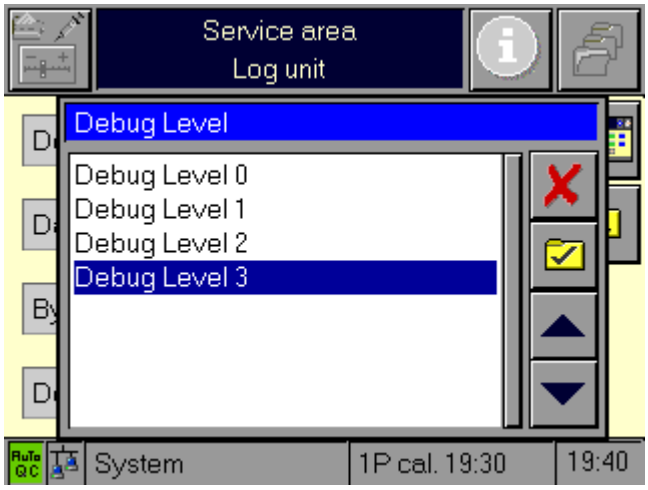
Determines the period of time (in days), for which log data will be stored.

Bytes

Determines the maximum size for the log file (in bytes).

Debug Level

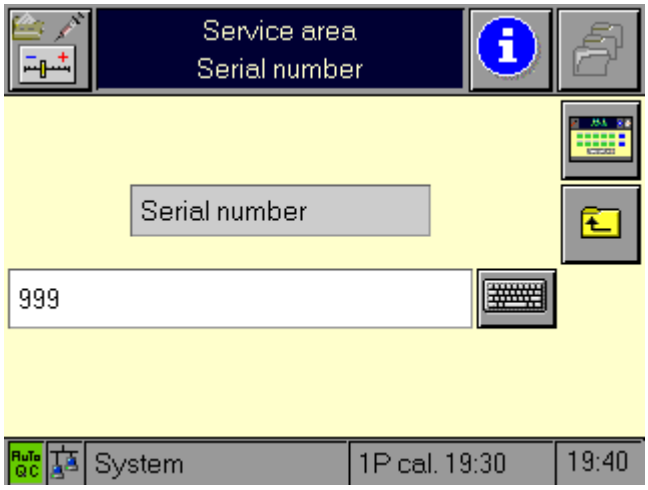
The information depth of data stored can be determined here:
(Debug Level 0 = low amount of data / low memory usage,
Debug Level 3 = high amount of data, high memory usage)



6.1.11 Serial number

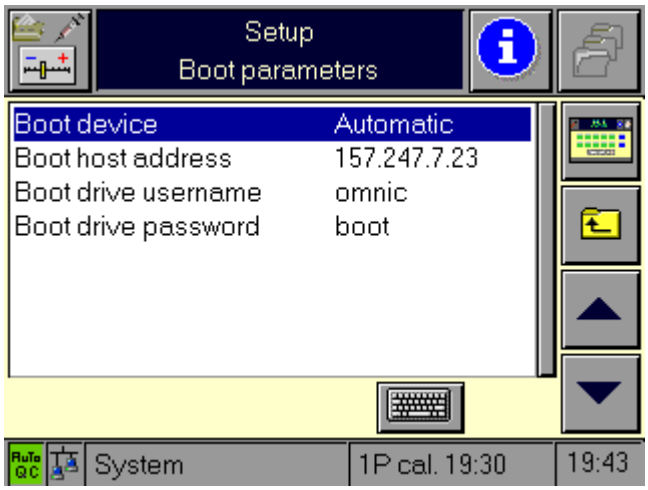
This software function is located under „**Setup – Service area**“

The serial number of the analyzer can be entered here:



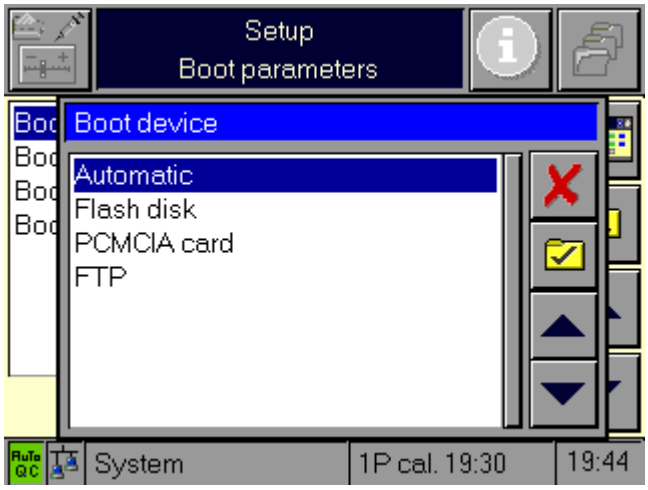
6.1.12 Boot parameters

This software function is located under „**Setup – Service area**“



Boot device

Determines the boot location:



Boot host address

A FTP server address can be entered here.

Boot drive user name

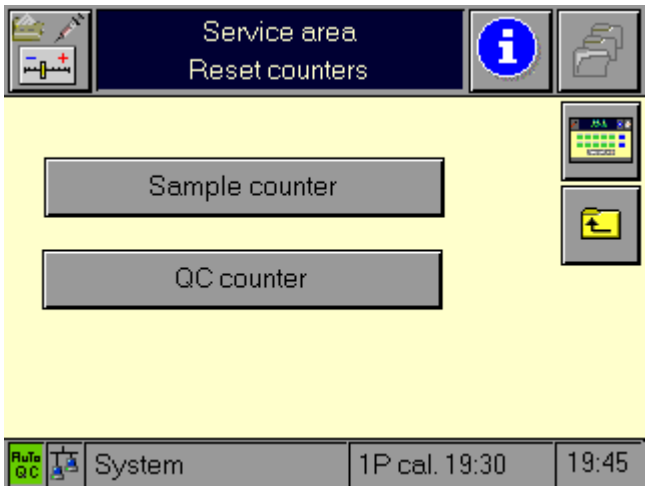
The FTP user account can be entered here.

Boot drive password

The FTP account password can be entered here.

6.1.13 Reset counters

This software function is located under „**Setup – Service area**“



Sample counter

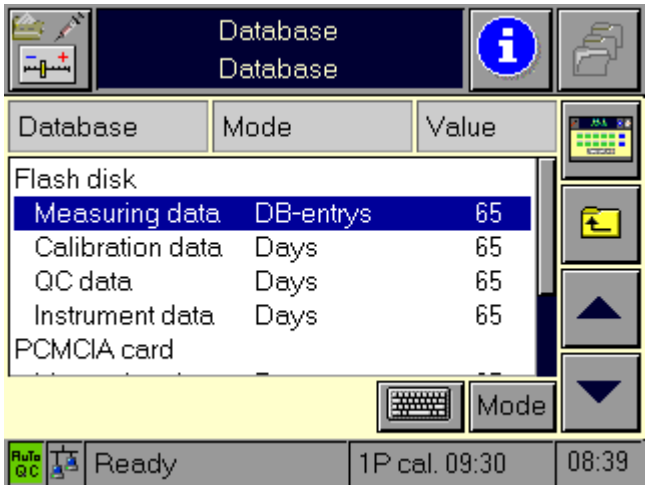
Reset the sample counter by pressing this button.

QC counter

Reset the QC counter by pressing this button.

6.1.14 Database

This software function is located under „**Setup – Service area**“

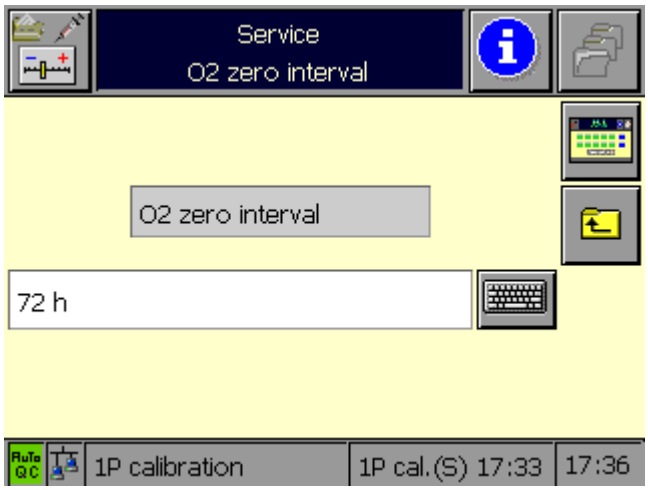


Mode

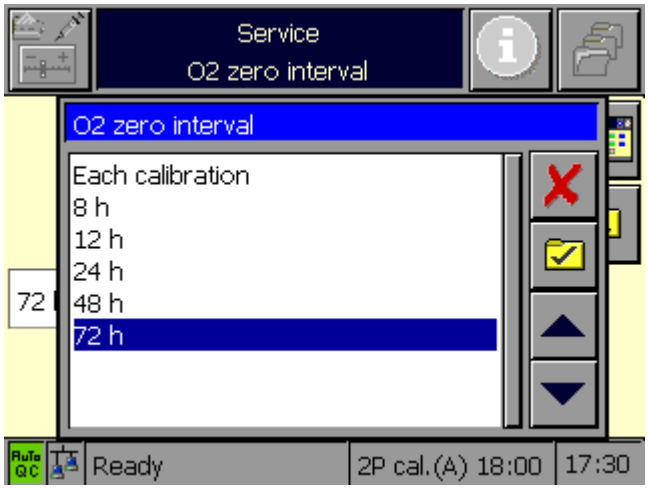
The database size on the internal Flash disk and on the PCMCIA card can be limited by a maximum value for the Days of data storage or a by a maximum value for the number of Database entries.

6.1.15 O2 zero interval

This software function is located under „**Setup – Service area**“



Use this function to enter the calibration interval for the PO_2 zero point calibration.
The default value is 72 hours.



7 Annual maintenance 7-1

7 Annual maintenance

The following procedures have to be conducted when performing an annual maintenance:

7.1 OMNI C

- Decontamination / Cleaning (see chapter 1, Introduction)
- Replace the needle sealing (see chapter 3, Components)
- Replace the fill port (see chapter 3, Components)
- Replace the pump head (see chapter 3, Components)
- Replace the pump tube (see chapter 3, Components)
- Replace the measuring chamber tubing set (see chapter 3, Components)
- Replace the (analyzer) tubing set (see chapter 3, Components)
- Check the barometer value and calibrate if necessary (see chapter 6, Service area)

All necessary components are included in the maintenance kit OMNI C.

7.2 AutoQC module

- Replace the AQC steel tube (see chapter 4, AutoQC module)
- Replace the AQC wash port (see chapter 4, AutoQC module)
- Replace the AQC wash tube (see chapter 4, AutoQC module)

All necessary components are included in the AQC maintenance kit OMNI C.

8 Troubleshooting 8-1

8 Troubleshooting

8.1 System Stops

8.1.1 General Information

During situations when a proper function of the analyzer is not possible, system stops are displayed on the screen. The purpose is to display the errors, to remove the cause of the system stops and to bring the analyzer back to „Ready“.

A stop of all running actions will occur if danger for the user (e.g. by an overflow of the waste while opening the docking mechanism of the Waste container) or for the analyzer exists or a proper operation of the analyzer is not possible because of technical problems.

If a proper operation is not possible, but the complete control of the functions of the analyzer is available (e.g. temperature alarm, measuring chamber cover open, flap open, fill level alarm) all running actions will be finished and Mix 1 will be aspirated into the measuring chamber; the resulting measuring data will be marked resp. discarded.

Unrecoverable system stops remain on the screen and fulfil an emergency program if possible, so that the analyzer stays operating (wetting of the electrodes / keeping the tubing free).

It is possible to access the System menu if no automatic actions are currently performed. When changing to the System menu during a System Stop, the System Stop will not be terminated, but reactivated when the System Menu is closed again. If e.g., there is a change from a Temperature System Stop to the System Menu and the System Menu is closed again, the analyzer will display the Temperature System Stop again. In the case a system calibration has been started in the System Menu, it cannot be conducted immediately because the System Stop has to be removed first.

After all System Stops have been removed, System Stop Consequence actions will be executed. There is a common list of Consequence actions, which impedes double actions. This means that if e.g. „washing“ was activated several times, it is then performed only once.

Possible Consequence actions are:

- Warm-up
- Sample sensor calibration
- Prepare Solution C1
- Prepare Solution C2
- Prepare Pack C3 Solutions
- Fill the AutoQC wash tube
- Fill the FMS reservoir
- Wash
- Wash AutoQC
- Conductivity calibration
- System calibration
- Waste Container fill level measurement
- Aspirate Mix1

8.2 List of System Stops

8.2.1 3001 Measuring chamber cover open

Cause

- The measuring chamber cover is open
- The measuring chamber cover sensor (Hall sensor) is defective
- The measuring chamber cover cable is defective

Removal

- Close measuring chamber cover
- Check the measuring chamber cover sensor („**More - System – Test – Control sensors – Monitoring sensors**“), check cable, change components if necessary

Consequence actions

1. After opening for longer than 5 seconds: Warm-up
2. Wash
3. After changing (an) electrode(s): System calibration

8.2.2 3002 Bottle compartment cover open

Cause

- The Bottle compartment is open
- The Bottle compartment cover micro switch is defective

Removal

- Close bottle compartment cover
- Check to be sure that the bottles are inserted completely
- Check the bottle compartment cover micro switch („**More – System – Test – Control sensors – Monitoring sensors**“), change if necessary

Consequence actions

- C1 changed: Prepare solution C1, Fill FMS reservoir, Conductivity calibration
- C2 changed: Prepare solution C2, Fill FMS reservoir, Conductivity calibration
- C3 changed resp. C3 docking mechanism micro switch operated: Prepare C3 solutions
- Waste container changed resp. micro switch operated: Waste container fill level measurement

8.2.3 3003 Flap open

Cause

- The Flap was opened:
  - during a measurement
  - during a calibration
  - during another System Stop
  - in System menu and System menu is being closed
- The Flap detection is defective

Removal

- Close flap
- Check function of the flap detection board („**More - System – Test – Control sensors – Monitoring sensors**“), change if necessary

Consequence actions

- Wash

8.2.4 3004 Analyzer error

Cause

- The measurement progress was incorrect

Removal

1. Press “OK” button
2. Switch the analyzer off/on

- In case of recurrence: the electronics is defective, change components if necessary

Consequence actions

- Wash

8.2.5 3005 Memory error

Cause

- Fundamental software functions cannot be performed (Memory problems, File system problems), the correct operation of the OMNI C cannot be guaranteed

Removal

- Press the "Reboot" button
- In case of recurrence: the electronics is defective, change components if necessary

8.2.6 3006 Temperature error

Cause

- The module temperatures are outside of the specified range
  Measuring chamber left and right: 37.00 °C ± 0.2 °C
  Measuring chamber cover: 37.00 °C ± 0.2 °C
  tHb-/SO_2 module: 37.00 °C ± 0.2 °C
- A heating device is defective
- The measuring chamber cover cable is defective
- A temperature sensor is defective

Removal

- Reduce / raise the room temperature
- Change measuring chamber cover / measuring chamber or tHb-/SO_2 module

8.2.7 3009 Conductivity cal. error

Cause

- The conductivity calibration has failed

Removal

- Press the “OK” button (Start a System calibration)
- Check the tubing of solutions C1 and C2 (incl. FMS)
- Check the tubing of the reference solution
- Check the tubes to air from V2 and V9 for crystallization
- Check Needle, Fill port and Barex tube area for leaks

Consequence actions

- System calibration

8.2.8 3010 AQC cover open

Cause

- The AutoQC cover is open
- The AutoQC cover sensor (Hall sensor) is defective

Removal

- Close the AutoQC cover
- Check the AutoQC cover sensor („**More – System – Test – Control sensors – Monitoring Sensors**“), change components if necessary.

8.2.9 3012 User system stop

Cause

- The automatic fluidic procedure completion of some System stops can be interrupted by a User system stop (by pressing the “Stop” button), e.g. in order to get immediate access to the “More” button.

Removal

- Press the “OK” button (terminate the User system stop)

Consequence actions

- Aspirate Mix1

8.2.10 3013 Fluid Pack switch

Cause

- The docking mechanism of Fluid Pack C3 has been opened (micro switch activated)
- The Fluid Pack C3 docking mechanism micro switch is defective

Removal

- Close docking mechanism Fluid Pack C3
- Check micro switch („**More - System – Test – Control sensors – Monitoring sensors**“), change if necessary.

Consequence actions

- Auto-preparing of Fluid Pack C3 solutions

8.2.11 3014 Fill level alarm

Cause

- The solutions C1, C2 and/or C3 are empty (below alarm level) or are set to „empty“
- The Waste container W is full (above alarm level)
- The expiry date of the solutions is exceeded
- The On-board lifetime of the solutions is exceeded (C1/C2 = 28 days; C3 = 42 days)

Removal

- Change solutions C1, C2 and Pack C3
- Change or empty the Waste container W according to the instructions

Consequence actions

- C1 changed: Prepare solution C1, Fill FMS reservoir, Conductivity calibration
- C2 changed: Prepare solution C2, Fill FMS reservoir, Conductivity calibration
- C3 changed resp. C3 docking mechanism micro switch operated: Prepare C3 solutions
- Waste container changed resp. micro switch operated: Waste container fill level measurement

8.2.12 3015 Waste Container full

Cause

- Waste container W is full

Removal

- Change or empty the Waste container W according to the instructions

Consequence actions

- Waste container fill level measurement

8.2.13 3016 Waste Container switch

Cause

- The Waste container W was removed
- The Waste container micro switch is defective

Removal

- Reinsert the waste container
- Check Waste Container micro switch („**More - System – Test – Control sensors – Monitoring sensors**“), change if necessary.

Consequence actions

- Waste container fill level measurement

8.2.14 3017 Pump cal. failed

Cause

- The Pump calibration (rotational speed adjustment of the pump) failed

Removal

- Check under „**More - Test – Valves & Aggregates – Peristaltic pump**“ if values inside the following limits are displayed:
  Pump volume: 40 - 70µl
  FMS volume: 920 - 1200µl
  If the displayed values are outside of the limits, perform a FMS volume determination and correct the FMS volume value.

Consequence actions

1. Aspirate Mix1
2. Conductivity calibration

8.2.15 3018 Sample detection failed

Cause

- The Sample detection with sample sensors (SS1 and SS2) failed
- The Sample sensor board is defective

Removal

- Press the “OK” button (start a Sample sensor calibration)
- Check the tubing of solutions C1 and C2 (incl. FMS)
- Check the tube to air from V2 for crystallization
- Check Needle, Fill port and Barex tube area for leaks
- Change sample sensor board

Consequence actions

1. Sample sensor calibration
2. Fill FMS reservoir
3. Wash

8.2.16 3019 Out of operation

Cause

- The instrument has been taken out of operation

Removal

- Perform the installation procedure

8.2.17 3020 Economy mode

Cause

- The Economy mode has been started manually or automatically

Removal

- Manual termination by pressing the “Abort” button
- Automatic termination by pre-set stop time

8.2.18 3023 Waste Container level undefined

Cause

- The actually measured Waste container fill level differs by more than 4 cm from the calculated/set value

Removal

- The Waste container fill level must be set roughly (+/- 4 cm) corresponding to the actual fill level in the Waste container

Consequence actions

1. Wash
2. Waste container fill level measurement

8.2.19 3024 Flash memory full

Cause

- The internal Flash memory has less than 8 KB space left for saving additional data

Removal

- Delete data records (Database entries, Protocols, Log data) in order to free up additional memory

Important! *In order to actually free up additional memory, the functions "**Delete data"** and "**Optimize database**" have to be activated in this order!*

8.2.20 3025 PCMCIA memory full

Cause

- The PCMCIA card has less than 8 KB space left for saving additional data

Removal

- Delete data records (Database entries, Protocols, Log data) in order to free up additional memory

Important! *In order to actually free up additional memory, the functions "**Delete data"** and "**Optimize database**" have to be activated in this order!*

- Insert the PCMCIA card in a PC with a suitable slot, copy or import the data, then delete the data from the card or format the card
- Format the PCMCIA card in the Roche OMNI C („**More - System - Test - PC Components – PCMCIA card – More**")

8.2.21 3026 Data object error

Cause

- The data access onto objects in the analyzer area failed, the correct operation of the OMNI C cannot be guaranteed

Removal

- Press the "Reboot" button
- In case of recurrence: the electronics is defective, change components if necessary

8.2.22 3028 Hardware error

Cause

- Electronic components do not respond properly

Removal

- Wait! These errors are automatically self-repaired!

8.3 Error Messages

8.3.1 General Information

The Error Messages are displayed when pressing a button of a not calibrated parameter, in the databases and on various reports.

They contain a short Info text and the Info No. (Error Number).

8.4 List of error messages (sorted by Info No.)

Info No.	Info text	Description	Removal
500	Unsuitable sample type	tHb, SO2 und Hct can be determined with sample type „blood“ only	
501	Reprod. check. pend.	Reproducibility couldn’t be checked because of lack of calibration cycles.	Perform „Calibration for ready“
502	Pollution warning	tHb water values warning caused by polluted tHb module, water values are used, but an internal cleaning procedure will be performed during the next system calibration.	Perform „Internal cleaning of sample path“
1000	Signal noise	The signal noise of an electrode is outside of the specified limits.	Perform „Internal cleaning of sample path“; Perform „Calibration for ready“; Check environment conditions (vibrations, electrical fields), Check electrode for air bubbles in the electrolyte, Change electrode if necessary
1001	Signal distorted	The sensor signal of an electrode is distorted	Perform „Internal cleaning of sample path“; Perform „Calibration for ready“; Check environment conditions (vibrations, electrical fields), Check electrode for air bubbles in the electrolyte, Change electrode if necessary
1004	Out of range	The calibration result is outside of the specified range	Check electrode for air bubbles in the electrolyte, Change electrode if necessary
1006	Out of range	The measurement result is outside of the indicating range	The sample is not suitable for the selected sample type or the measurement result is outside of the indicating range
1007	Missing data	Initial values not o.k.	At least one measured value needed for calculation was not available (e.g. because the respective electrode was deactivated or not calibrated) or was outside of the indicating range

Info No.	Info text	Description	Removal
1009	Baro out of range	The barometer value is outside of the specified range	Check the barometric pressure value, Enter barometric pressure value
1010	2nd measurement not available	When calculating a result, 2 samples are taken into consideration, but in this case one was missing (e.g. when calculating the Shunt values)	Perform the missing measurement
1012	Interferences (2)	Unsuitable sample, blood sample contains e.g: coloring agents, medicine, infusion or wrong sample type choosen	Use only specified sample types (human blood and specified QC materials)
1013	Sensor signal unstable	The sample was inhomogeneous (contained air, solid particles or had varying density)	Perform proper preanalytics & sampling
1022	Interferences (3)	The tHb/SO2 module/algorithm has detected an interference substance, (e.g. COHb >= 15%, MetHb >= 3%, dye) The SO2 result was outside of the specified range	Use only specified sample types (human blood)
1023	Interferences (4)	The tHb/SO2 module/algorithm has detected an interference substance, (e.g. COHb >= 15%, MetHb >= 3%, dye) The SO2 result was outside of the specified range	Use only specified samples (human blood)
1024	Out of range (+)	The tHb result is higher than 25g/dL.	Use only specified samples (human blood), the measurement result is outside of the specified range
1025	Out of range (-)	The tHb result is lower than 3 g/dL.	Use only specified samples (human blood), the measurement result is outside of the specified range
1026	Out of range (-)	The SO2 result is between 0 and 50%	Use only specified samples (human blood), the measurement result is outside of the specified range
1054	indeterminable	SO2 can not be determined because the tHb result is higher than 25 g/dL	Use only specified samples (human blood), the measurement result is outside of the specified range
1055	indeterminable	SO2 can not be determined because the tHb result is lower than 3 g/dL.	Use only specified samples (human blood), the measurement result is outside of the specified range
1070	Not activated	Electrode is deactivated for measurement. (Electrode status MS_DUMMY)	Activate electrode for measurement
1071	Remote lock	Electrode is deactivated by remote lockout (OMNILINK) (Electrode status MS_RMLOCK)	Remove remote lockout (OMNILINK)
1072	Not activated	Electrode was temporarily deactivated for measurement.	If measurement result is needed, do not temporarily deactivate electrode for measurement.
1073	Calibration pending	2Point calibration is missing.	Perform „Calibration for ready“

Info No.	Info text	Description	Removal
1074	Slope nOK	2Point calibration failed	Perform „Calibration for ready“, Check electrode, Change electrode if necessary
1075	Calibration pending	1Point calibration is missing.	Perform „Calibration for ready“
1076	1P Error	1Point calibration failed, see calibration report for Error No	Perform „Calibration for ready“, Check electrode, Change electrode if necessary
1077	QC lock status	Parameter is locked because a QC measurement failed.	Repeat QC measurement
1078	Conductivity C2 nOk	Conductivity calibration with solution C2 failed.	Check solution C2 fill level, Check tubing for leaks, Check (and clean) C2 docking mechanism, Check sample port and needle
1079	Conductivity C1 nOk	Conductivity calibration with solution C1 failed.	Check solution C2 fill level, Check tubing for leaks, Check (and clean) C1 docking mechanism, Check sample port and needle
1501	fill FMS	FMS not ready.	Switch analyzer off/on
1502	fill FMS	FMS input parameters invalid.	Switch analyzer off/on
1503	fill FMS	Wrong valve position(s).	Switch analyzer off/on
1511	fill check	Fill error, measuring chamber left	While measurement: Avoid air bubbles in the sample, Check for sufficient sample volume, Wet sample path (Perform blood measurement) While calibration: Check C1 and C2 tubing for leaks, Check sample port and needle
1512	fill check	Fill error, measuring chamber right.	While measurement: Avoid air bubbles in the sample, Check for sufficient sample volume, Wet sample path (Perform blood measurement) While calibration: Check C1 and C2 tubing for leaks, Check sample port and needle
1513	fill check	Fill error, location unknown.	While measurement: Avoid air bubbles in the sample, Check for sufficient sample volume, Wet sample path (Perform blood measurement) While calibration: Check C1 and C2 tubing for leaks, Check sample port and needle
1515	Sample too small	Insufficient sample volume.	Check sample volume according to specifications.
1516	Sample fragmented	The sample contains air bubbles.	Proper sampling (avoid air bubbles in the sample)

Info No.	Info text	Description	Removal
1521	fill FMS	FMS not ready.	Switch analyzer off/on
1522	fill FMS	FMS input parameters invalid.	Switch analyzer off/on
1523	fill FMS	Peristaltic pump does not move.	Switch analyzer off/on
1525	fill FMS	Missing 0,6 sec. air before first wash package, timeout=15s (after CON/CAL production)	Check pump tube, Check FMS volume, Determine FMS volume
1526	fill FMS	Missing unfragmented wash package, timeout=10s (only positioning requested)	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms
1527	fill FMS	Missing unfragmented wash package, timeout=15s (after CON/CAL production)	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms
1541	wash MC	FMS not ready.	Switch analyzer off/on
1542	wash MC	Wrong valve position(s).	Switch analyzer off/on
1545	wash MC	Problem in the washing procedure. SS2 has been empty too early. (FMS is still working), CON in front of MC	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms
1546	wash MC	Problem in the washing procedure. CON Package not detected, timeout=10s	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms
1547	wash MC	Problem in the washing procedure. SS2 has been empty too early. (FMS is still working), CON in MC	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms
1548	wash MC	Problem in the washing procedure. End of CON filling couldn't be reached, timeout=10s.	Perform valve test, Check FMS tubing, Check FMS volume, Determine FMS volume
1554	pos Ref.	No reference contact before reference solution aspiration.	Check sample port and needle, Check measuring chamber for clots
1556	pos Ref.	Reference solution aspiration problem (hub is too small after 3 sec. of aspiration).	Check tube and plug of Reference electrode, Check fill level of Reference solution (by auto-preparing), Check (and clean) C3 docking mechanism, Check sample port and needle.
1561	asp. Mix1	FMS not ready.	Switch analyzer off/on
1562	asp. Mix1	Wrong valve position(s).	Switch analyzer off/on
1564	check Ref	Proper filling of reference electrode couldn't be checked because of air bubble in the measuring chamber.	Check sample port and needle
1565	fill Ref	Properly positioning of reference solution not possible, air bubbles in the reference tubing, (soft Ref. / difference >30)	Perform "Fill reference electrode", Check tube and plug of Reference electrode, Check fill level of Reference solution (by auto-preparing), Check (and clean) C3 docking mechanism, Check sample port and needle

Info No.	Info text	Description	Removal
1566	Aspirate Mix1	Improper filling of measuring chamber (SS2 is empty too early. Separating air bubble is in front of MCC-MCO)	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms, Determine FMS volume
1567	Aspirate Mix1	Improper filling of measuring chamber (SS2 is empty too early. Separating air bubble is at MCC-MCO).	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms, Determine FMS volume
1568	Aspirate Mix1	Improper filling of measuring chamber (SS2 is empty too early. Measuring chamber is filled but air separation bubble is in front of V6).	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms, Determine FMS volume
1569	fill MC	Improper filling of measuring chamber (timeout=9s, filling of measuring chamber terminated because of invalid CAL package).	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms, Determine FMS volume
1581	Aspirate Mix2	FMS not ready.	Switch analyzer off/on
1582	Aspirate Mix2	Wrong valve position(s).	Switch analyzer off/on
1585	Aspirate Mix2	Improper filling of measuring chamber (SS2 is empty too early. Separating air bubble is before MCC-MCO)	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms
1586	Aspirate Mix2	Improper filling of measuring chamber (SS2 is empty too early. Separating air bubble is at MCC-MCO)	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms
1587	Aspirate Mix2	Improper filling of measuring chamber (SS2 is empty too early. Measuring chamber is filled but air separation bubble before V6).	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms
1588	fill MC	Improper filling of measuring chamber (timeout=9s, filling of measuring chamber terminated because of invalid Mix2 Package)	Check solution C1/C2 fill level, Check tubing for leaks, Check (and clean) C1/C2 docking mechanisms
1601	Aspirate sample	Improper filling of measuring chamber (timeout=15s, no sample at SS1)	Perform proper sample aspiration within 15 seconds, Check tube to air at V9, Wet sample path (Perform blood measurement)
1602	Aspirate sample	Aspiration procedure incorrect. (SS1 sees fluidic residues before measurement has been started)	Wet sample path (Perform blood measurement)
1603	Aspirate sample	Aspiration procedure incorrect. (timeout=30s, no sample at SS1)	Perform proper sample aspiration within 30 seconds, Check tube to air at V9, Wet sample path (Perform blood measurement)

Info No.	Info text	Description	Removal
1605	SS1 inactive	Sample sensor 1 is not active.	Check sample sensor calibration, Perform sample sensor calibration
1606	SS2 inactive	Sample sensor 2 is not active.	Check sample sensor calibration, Perform sample sensor calibration
1622	pos. sample	Improper filling of tHb-/SO2 module (Timeout=10s, no air separation bubble)	Perform proper sample aspiration
1623	pos. sample	Improper filling of tHb-/SO2 module (Timeout=10s, no sample)	Perform proper sample aspiration
1624	pos. sample	Improper filling of tHb-/SO2 module (Timeout=10s, no reproducibility with sample achieved)	Perform proper sample aspiration (Avoid air bubbles in the sample)
1642	pos. sample	Improper filling of measuring chamber (Timeout=15s, no air separation bubble) at MCI-MCM)	Perform proper sample aspiration, Perform „Internal cleaning of sample path“, Wet sample path (Perform blood measurement)
1643	pos. sample	Improper filling of measuring chamber (Timeout=15s, no sample at MCI-MCM)	Perform proper sample aspiration, Perform „Internal cleaning of sample path“, Wet sample path (Perform blood measurement)
1644	pos. sample	Improper filling of measuring chamber (Timeout=15s, no air separation bubble at MCC-MCO)	Perform proper sample aspiration, Perform „Internal cleaning of sample path“, Wet sample path (Perform blood measurement)
1645	pos. sample	Improper filling of measuring chamber (Timeout=15s, no sample at MCM-MCO)	Perform proper sample aspiration, Perform „Internal cleaning of sample path“, Wet sample path (Perform blood measurement)
1668	asp. AQC	Improper AutoQC sampling (SS3 detects no sample)	Perform „Wash AutoQC“
1669	asp. AQC	Improper AutoQC sampling (SS3 detects no air).	Perform „Wash AutoQC“
1704	asp. C1	Improper aspiration of calibration solution C1 (time out=30s, no air Package at SS2).	Check tube to air at V2, Check sample sensor calibration
1705	asp. C1	Improper aspiration of calibration solution C1 (time out=30s, no calibration solution C1 Package at SS2 detected)	Check solution C2 fill level, Check tubing for leaks, Check (and clean) C1 docking mechanism, Check sample port and needle
1707	asp. C1	Improper aspiration of calibration solution C1 (time out=30s, no calibration solution C1 Package at SS2 detected	Check solution C2 fill level, Check tubing for leaks, Check (and clean) C1 docking mechanism, Check sample port and needle
1722	C1 pos.	Improper filling of measuring chamber (timeout=10s, no calibration solution C1 at MCI-MCC detected).	Check solution C2 fill level, Check tubing for leaks, Check (and clean) C1 docking mechanism, Check sample port and needle

Info No.	Info text	Description	Removal
1744	asp. C2	Improper aspiration of calibration solution C2 (time out=30s, no air Package at SS2 detected).	Check tube to air at V2, Perform sample sensor calibration
1745	asp. C2	Improper aspiration of calibration solution C2 (time out=30s, no calibration solution C2 pre-Package at SS2 detected)	Check solution C2 fill level, Check tubing for leaks, Check (and clean) C2 docking mechanism, Check sample port and needle
1747	asp. C2	Improper aspiration of calibration solution C2 (time out=30s, no calibration solution C2 Package at SS2 detected).	Check solution C2 fill level, Check tubing for leaks, Check (and clean) C2 docking mechanism, Check sample port and needle
1762	C2 pos.	Improper filling of measuring chamber (timeout=10s, no calibration solution C2 at MCI-MCC detected).	Check solution C2 fill level, Check tubing for leaks, Check (and clean) C2 docking mechanism, Check sample port and needle
1782	asp. air	Improper filling of measuring chamber (timeout=15s, measuring chamber is not filled with air)	Check tube to air at V9, perform V6 test
1784	asp. air	O2 electrode scan not completed, Timeout=25s	Switch analyzer off/on
1802	pos. Cond.	Improper filling of measuring chamber (air separation bubble has not been detected by MCC-MCO)	Check tubing for leaks, Check tube to air at V9, perform V9 test
1803	pos. Cond.	Improper filling of measuring chamber (Conditioning solution has not been detected at MCC-MCO)	Check fill level of Conditioning solution (by auto-preparing), Check (and clean) C3 docking mechanism
1804	Cond. pos.	Improper filling of measuring chamber (Conditioning solution has not been detected at MCM-MCO)	Check fill level of Conditioning solution (by auto-preparing), Check (and clean) C3 docking mechanism
1808	Cond. pos.	End of Mix 1 was not detected at SS1 when refilling	Check measuring chamber for leaks, Wet sample path (Perform blood measurement)
1861	fill FMS	FMS not ready	Switch analyzer off/on
1862	fill FMS	Wrong valve position(s).	Switch analyzer off/on
1865	fill Ref	Proper positioning of reference solution not possible, air bubbles in the reference tubing (reference difference >30).	Perform “Fill reference electrode”, Check tube and plug of Reference electrode, Check fill level of Reference solution (by auto-preparing), Check (and clean) C3 docking mechanism, Check AutoQC steel tube
1866	aspirate Mix1	Improper filling of measuring chamber (SS2 is empty too early, air separation bubble before MCC-MCO)	Check solution C1/C2 fill level, Check tubing for leaks (including AutoQC), Check (and clean) C1/C2 docking mechanisms, Determine FMS volume

Info No.	Info text	Description	Removal
1867	aspirate Mix1	Improper filling of measuring chamber (SS2 is empty too early. Separating air bubble is at MCC-MCO).	Check solution C1/C2 fill level, Check tubing for leaks (including AutoQC), Check (and clean) C1/C2 docking mechanisms, Determine FMS volume
1868	aspirate Mix1	Improper filling of measuring chamber (SS2 is empty too early. Measuring chamber is filled but air separation bubble before V6).	Check solution C1/C2 fill level, Check tubing for leaks (including AutoQC), Check (and clean) C1/C2 docking mechanisms, Determine FMS volume
1869	aspirate Mix1	Improper filling of measuring chamber (timeout=9s, filling of measuring chamber terminated because of invalid CAL Package).	Check solution C1/C2 fill level, Check tubing for leaks (including AutoQC), Check (and clean) C1/C2 docking mechanisms, Determine FMS volume
1900	asp. O2zero	Improper aspiration (PO2 zero-point solution has not been detected at SS1)	Check fill level of PO2 zero-point solution (by auto-preparing), Check (and clean) C3 docking mechanism, Check tubing for leaks, Check sample port and needle
1901	asp. clean. sol.	Improper aspiration of Cleaning solution (not detected at SS1)	Check fill level of Cleaning solution (by auto-preparing), Check (and clean) C3 docking mechanism, Check tubing for leaks, Check tubing for leaks, Check sample port and needle
1902	asp. Ref	Improper aspiration of Reference solution (not detected at MCC-MCO)	Check tube and plug of Reference electrode, Check fill level of Reference solution (by auto-preparing), Check tubing for leaks, Check (and clean) C3 docking mechanism
1903	aspirate C1	Improper aspiration of calibration solution C1 (no calibration solution C1 at SS2 detected)	Check solution C2 fill level, Check tubing for leaks, Check (and clean) C1 docking mechanism
1904	aspirate C2	Improper aspiration of calibration solution C2 (no calibration solution C2 at SS2 detected)	Check solution C2 fill level, Check tubing for leaks, Check (and clean) C2 docking mechanism
1998	Undefined	Undefined error	Perform Software update
2002	FMS out of range	The mixing ratio of the solutions C1 and C2 is outside of the specified range.	Check solution C1 and C2 fill levels (also for equal levels), Perform valve test, Check FMS tubing
2004	1P Error	2Point calibration failed, because no valid 1Point calibration was available.	Perform „Calibration for ready“

Info No.	Info text	Description	Removal
2006	Reproducibility nOK	The standard deviation is outside of the specified range for checking the reproducibility (including tHb)	Perform „Calibration for ready“
2007	Signal noise	A scan criteria for tHb water values was violated	Perform „Internal cleaning of sample path“
2009	Pollution error	tHb water values error caused by polluted tHb module. An internal cleaning procedure will be performed during the next system calibration.	Perform „Internal cleaning of sample path“
2011	Invalid EEPROM data	tHb EEPROM values are incorrect.	Change tHb/SO2 module
2012	Invalid factory cal.	tHb factory calibration is improperly stored in the EEPROM.	Change tHb/SO2 module
2014	Cal. time expired	Timeout during calibration (failed to start programmed calibration for > 30 min)	Perform „Calibration for ready“; Do not inhibit programmed calibrations by performing other actions
2015	Ready alarm	The electrode drift is outside of the specified range	Perform „Calibration for ready“
2016	conditioning nOK	Na electrode is in 2Point calibration alarm, because a conditioning is missing	Check fill level of Conditioning solution (by auto-preparing), Check (and clean) C3 docking mechanism, Perform “Conditioning cycle”
3001	Measuring chamber cover open	System Stop	see chapter “8.1 System Stops”
3002	Bottle compartment cover open	System Stop	see chapter “8.1 System Stops”
3003	Flap open	System Stop	see chapter “8.1 System Stops”
3004	Analyzer error	System Stop	see chapter “8.1 System Stops”
3005	Memory error	System Stop	see chapter “8.1 System Stops”
3006	Temperature error	System Stop	see chapter “8.1 System Stops”
3009	Conductivity cal. error	System Stop	see chapter “8.1 System Stops”
3010	AQC cover open	System Stop	see chapter “8.1 System Stops”
3012	User system stop	System Stop	see chapter “8.1 System Stops”
3013	Fluid Pack switch	System Stop	see chapter “8.1 System Stops”
3014	Fill level alarm	System Stop	see chapter “8.1 System Stops”
3015	Waste Container full	System Stop	see chapter “8.1 System Stops”
3016	Waste Container switch	System Stop	see chapter “8.1 System Stops”
3017	Pump cal. failed	System Stop	see chapter “8.1 System Stops”
3018	Sample detection failed	System Stop	see chapter “8.1 System Stops”
3019	Out of operation	System Stop	see chapter “8.1 System Stops”

Info No.	Info text	Description	Removal
3020	Economy mode	System Stop	see “8.1 System Stops”
3023	Waste Container level undefined	System Stop	see “8.1 System Stops”
3024	Flash memory full	System Stop	see “8.1 System Stops”
3025	PCMCIA memory full	System Stop	see “8.1 System Stops”
3026	Data object error	System Stop	see “8.1 System Stops”
3028	Hardware error	System Stop	see “8.1 System Stops”
3030	asp. AQC	Initialisation not o.k.	Switch analyzer off/on
3031	asp. AQC	SS3 calibration not o.k.	Perform „Wash AutoQC“
3032	asp. AQC	The AutoQC steel tube has not reached the ampoule position	Perform „AutoQC position test“
3033	asp. AQC	The AutoQC steel tube has not reached the start position Z.	Perform „AutoQC position test“
3034	asp. AQC	The AutoQC steel tube has not reached the end position Z	Perform „AutoQC position test“
3035	wash AQC	The AutoQC steel tube has not reached the wash position	Perform „AutoQC position test“
3036	wash AQC	The AutoQC steel tube has not reached the ampoule XY	Perform „AutoQC position test“
3037	wash AQC	The AutoQC steel tube has not reached the ampoule position Z (down)	Perform „AutoQC position test“
3038	wash AQC	The AutoQC steel tube has not reached the ampoule Z (up)	Perform „AutoQC position test“
3039	wash AQC	The AutoQC steel tube has not reached the ampoule position Z (up)	Perform „AutoQC position test“
3040	wash AQC	The AutoQC steel tube has not reached the wash position after back-wash procedure	Perform „AutoQC position test“
3051	AQC	AQC timeout (failed to start programmed AQC measurement for > 30 min)	Replace empty AQC Mats; Do not inhibit programmed AQC measurements by performing other actions

8.5 Error sources

8.5.1 Calibration solutions C1 and C2 have flown back

An opening of the docking mechanisms of calibration solutions C1 and C2 cannot be detected by the OMNI C. When opening the docking mechanisms, the calibration solutions flow back into the bottle inlet, therefore at the next aspiration attempt of the resp. solution ,a large air package is aspirated, which leads to an error message.
(After regular change of the calibration solutions an auto-preparation cycle is activated automatically by reading in the barcodes on the bottles.)

While the OMNI C is switched off, also no detection of the C3 docking mechanism is possible!

Prepare the resp. solutions under „***More - System – Tools – Fluid actions – Auto preparation routines***“.

8.5.2 Air tube at V2 is blocked by crystallization

Leads to error messages, because the FMS cannot produce separating air packages.

Check the complete tubing from the open end (see Fig. 8-1, 1) to the beginning of the pipe (see Fig. 8-1, 2).
Crystals (white areas) at the open end of the tube can be removed by pressing the tube end together and rolling it between the fingers (see Fig. 8-1, 1).
A blockage by crystals in the tube or pipe can be removed by disconnecting the pipe at the location according to Fig. 8-1, 2 and flushing with distilled water.

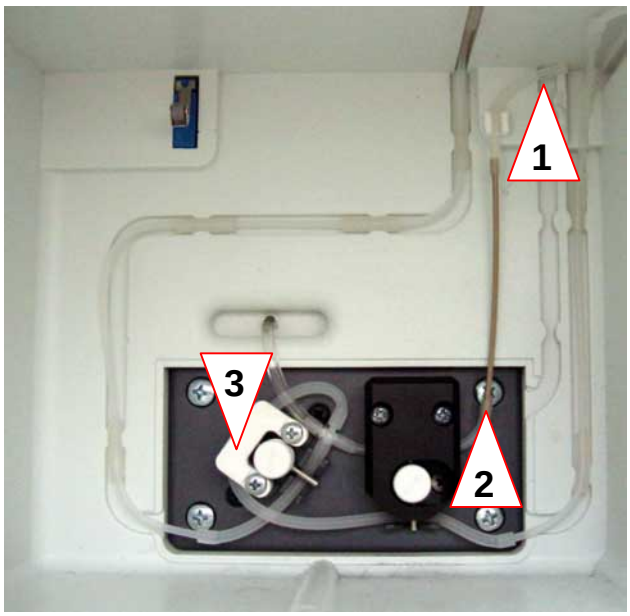


Fig. 8-1 Tubing in the left bottle compartment area

8.5.3 Leak at the tube under the V1 bar

A leak in this area leads to aspiration problems of the solutions C1 and C2 (aspiration is impossible or only possible with air bubbles) and is hardly visible, because the tube is hidden by the valve bar (see Fig. 8-1, 3).

Prepare solutions C1 and C2 „***More - System – Tools – Fluid actions – Auto preparation routines***“ and observe the tubing in the right measuring chamber window and at the peristaltic pump.
The solutions must be visible as homogeneous fluid packages without air bubbles.

8.5.4 Air tube at V9 is blocked by crystallization

Leads to error messages, because no air can be aspirated if the flap is closed resp. no separating air packages can be produced.
Check the complete tubing from V9 (see Fig. 8-2, 1) to the open end (see Fig. 8-2, 2). Crystals (white areas) at the open end of the tube can be removed by pressing the tube end together and rolling it between the fingers. A blockage by crystals in the tube or pipe can be removed by disconnecting the pipe at the location according to Fig. 8-2, 3 and flushing with distilled water.

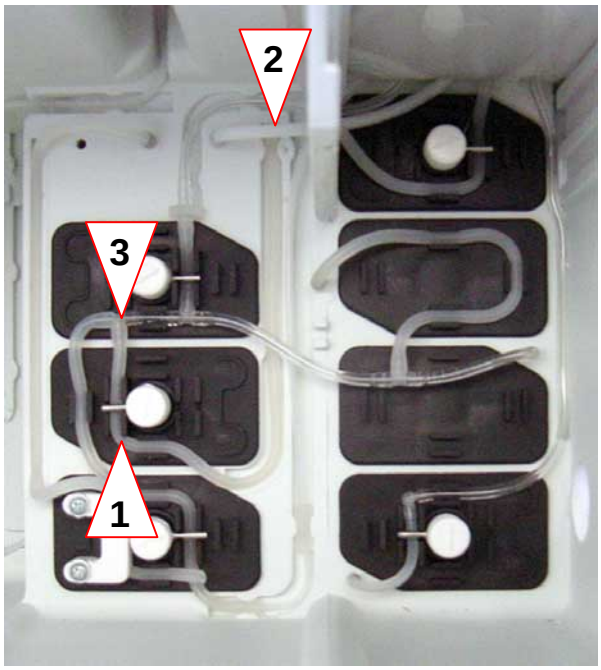


Fig. 8-2 Tubing in the right bottle compartment area

8.5.5 Leaks in the Sample port / Needle / Barex tube area

Leaks in this area lead to aspiration problems of the solutions C1 and C2, the zero point solution and the cleaning solution (aspiration is impossible or only possible with air bubbles). The reference solution cannot be aspirated.

Check:

- the sample port for damage (e.g. by glass splinters) and soiling
- the wash plate for pollution and damage
- the needle for bends, damage and soiling
- the needle sealing for damage and soiling
- the Barex tube for white spots, which are indicators for damage

Prepare solutions C1 and C2 under „***More - System – Tools – Fluid actions – Auto preparation routines***“ and observe the tubing in the right measuring chamber window and at the peristaltic pump.
The solutions must be visible as homogeneous fluid packages without air bubbles.
The reference solution must be visible in the tube of the reference as homogeneous fluid package without air bubbles when filling the reference electrode.

8.5.6 Leaks at the tube or plug of the reference electrode

Leaks in this area lead to aspiration problems of the reference solution (aspiration is impossible or only possible with air bubbles).

Check the reference tube for damage and the plug for tight fit.

Prepare the reference solution under „***More - System – Tools – Fluid actions – Auto preparation routines***“ and observe the tube of the reference electrode. The reference solution must be visible as homogeneous fluid package without air bubbles.

8.5.7 Leaks at the docking mechanisms

Leaks in this area lead to aspiration problems of the respective solution (aspiration is impossible or only possible with air bubbles).

Check the docking mechanisms for crystallization and for tight tubing connection. If necessary, clean the docking mechanisms with distilled water.

8.5.8 Clots in the sample path

For the removal of visible clots in the sample path, proceed as follows:

- Open V6 under „***More - System – Test – Valves and Aggregates – Valves“*** and pull off the V6-tube from the T-piece above V6.
- Take out the tube from V6 and hang it over the analyzer edge to the left.
- Open the flap completely.
- Attach a syringe filled with distilled water to the sample port and flush the measuring chamber.

8.6 Electrode calibration limit values

Parameter	1P		Slope (2P)	
	min	max	min	max
	mV	mV	mV	mV
pCO2	-1300	2000	-160	-110
pO2	250	550	-10	15
pH	-2100	1600	-340	-250
K	-1700	2100	90	140
Ca	-2000	2200	-105	-65
Cl	-2300	1700	-120	-90
Na	-1700	2300	110	140

The electrode values of the system calibration can be used for a rough estimation of the electrode condition.
A high absolute value of Slope for pCO2, pH, K, Ca, Cl, Na and a high absolute value of 1P for PO2 indicate a good electrode performance.

8.7 Conductivity calibration limit values

Contact path	Solution C1		Solution C2	
	min	max	min	max
	mV	mV	mV	mV
MCI-MCM	1300	2300	70	200
MCI-MCC	966	1300	30	120
MCM-MCO	1300	2300	100	200

8.8 Contact path limit values for Mix1

The measuring chamber is filled with Mix1 (Mixing ratio of the Calibration solutions C1/C2 = 2/1) in the “Ready” mode.
The conductivity values of Mix 1 can be used for a rough estimation of the measuring chamber’s contact paths.

An uninterrupted filling of the measuring chamber with Mix1 is definitely necessary.

Under following circumstances, an uninterrupted filling can be impossible:

- Opening the electrode locking lever and/or moving the electrodes
- Aspirated air bubbles in the Mix1 due to a mechanical defect.

To read off the values press:
„**More – System – Test – Control sensors – Contact paths“**

Contact path	Mix1	
	min	max
	mV	mV
MCI-MCM	ca. 1040	ca. 1560
MCI-MCC	ca. 560	ca. 840
MCM-MCO	ca. 1040	ca. 1560
MCC-MCO	ca. 940	ca. 1660

8.9 Power-up component test

After switching on the OMNI C, a component test is performed.

If defective components have been detected, the system will be stopped and two error numbers will be displayed:

1st Number	Description	2nd Number	Description
0x00000000	No error	0x00000000	No error
0x00000001	MBX Driver Board: 3.3V	0x00000001	Tower fan
0x00000002	MBX Driver Board: +12V	0x00000002	Valve 1
0x00000004	MBX Driver Board: -12V	0x00000004	Valve 2
0x00000008	MBX Driver Board: + 5V	0x00000008	Valve 3
0x00000010	MBX Driver Board: +24V Current Valves (short-circuit test)	0x00000010	Valve 4
0x00000020	MBX Driver Board: +24V Current Power (short-circuit test)	0x00000020	Valve 5
0x00000040	MBX Driver Board: +24V Current Valves	0x00000040	Valve 6
0x00000080	MBX Driver Board: +24V Current Power	0x00000080	Valve 7
0x00000100	Display Board: Backlight	0x00000100	Valve 8
0x00000200	Display Board: Contrast	0x00000200	Valve 9
0x00000400	Display Board: Voltage Out	0x00000400	Valve 10
0x00000800	Display Board: Scan	0x00000800	Valve 11
0x00001000	Display Board: LED Green	0x00001000	Valve 12
0x00002000	Display Board: LED Red	0x00002000	Valve 13
0x00004000	Display Board: Speaker	0x00004000	Valve 14
0x00008000	Analog Board: +5V digital	0x00008000	Peristaltic pump
0x00010000	Analog Board: Reference Voltage Status	0x00010000	Fan
0x00020000	Analog Board: +2.5V	0x00020000	Measuring chamber fan
0x00040000	Analog Board: -2.5V		
0x00080000	Analog Board: +5V analog		
0x00100000	Analog Board: -5V analog		
0x00200000	Analog Board: +12V		
0x00400000	Analog Board: -12V		

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Numerics

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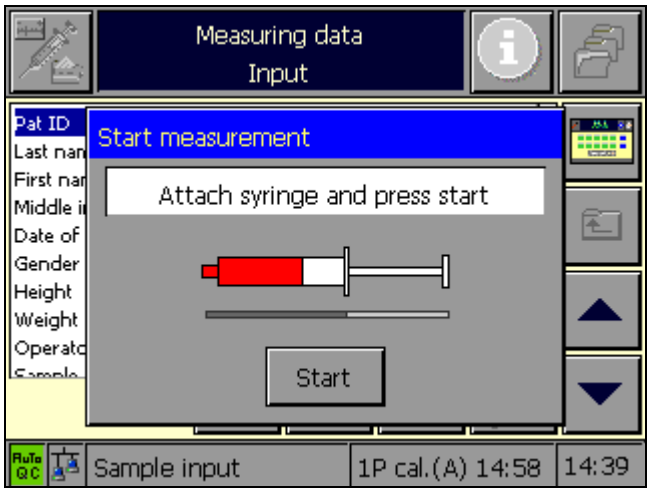
Start button for measurement

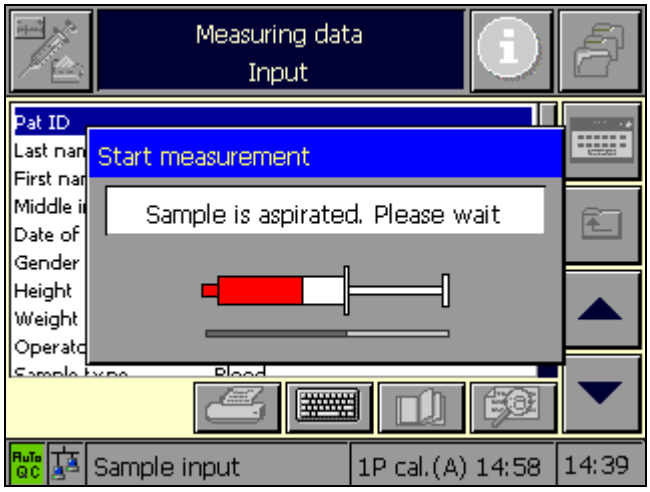
For more detailed information about the **"Measuring procedure"**, please refer to chapter 4 **"Measurement"** of the Instructions for use.

Syringe mode (with activated Start button)

- Open the flap to the designated syringe position (half-opened position).
  The following screen appears:



- Attach the syringe (always remove the cannula first).
  Be sure that the needle sufficiently penetrates the interior of the syringe (or ampoule) in order to aspirate the sample without air bubbles.
  Press the "Start" button. The sample is aspirated into the analyser.

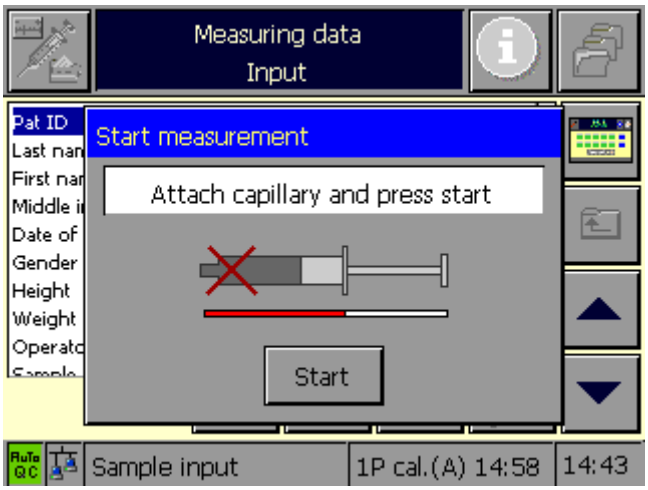


- Upon display of the instruction "Close flap", remove the syringe and close the flap.

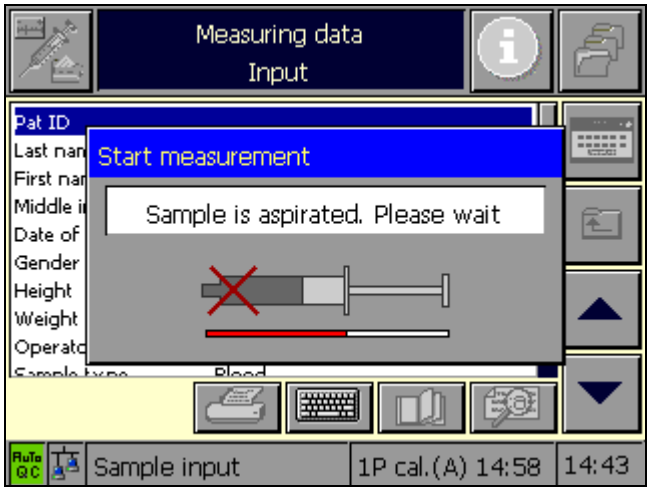
- The measurement starts.

Capillary mode (with activated Start button)

- Open the flap to the designated capillary position (completely open position). The following screen appears:



- Attach the capillary or the microsampler to the fill port.
  Press the "Start" button. The sample is aspirated into the analyzer.



- Upon display of the instruction "Close flap", remove the capillary and close the flap.

- The measurement starts.