



The AQR/P is a special rack with 6 slots on the front side and 2 slots on the backside. All boards except the User-Bus are extended Eurocard-Boards. A complete equipped AQR/P holds from the front side 6 boards (4 \* 7TE, 1 \* 4TE, 1 \* 5TE). The backside houses the power supply which includes 2 power supply boards (2 \* 12TE) and the transformer. Between the front side and the backside is a User-Bus.

Figure 1: Front View of a complete equipped AQR/P

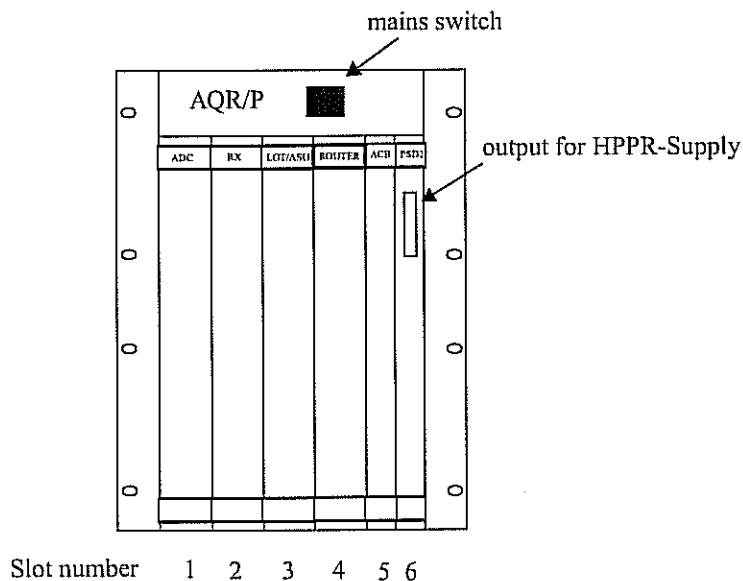
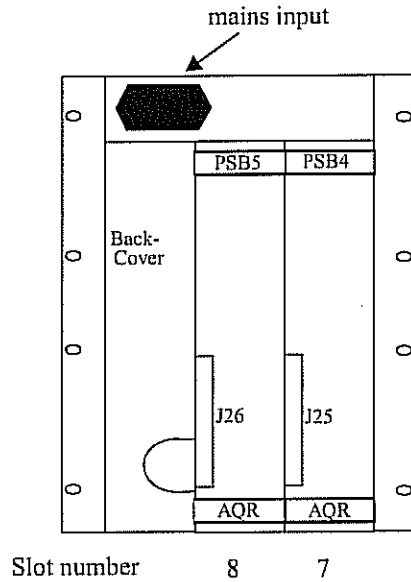


Figure 2: Back view of the AQR/P

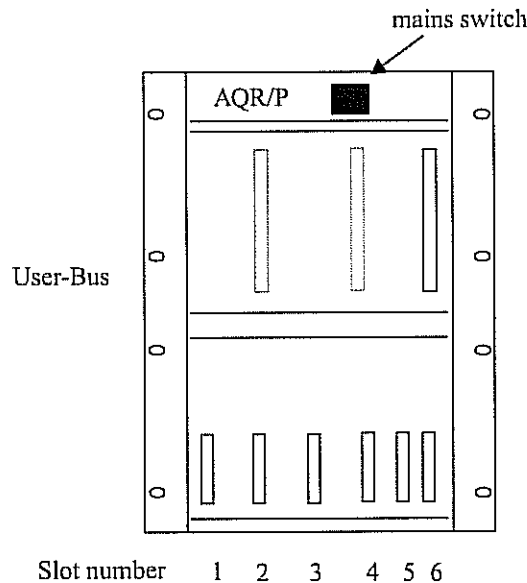


The back view shows the power supply unit, housing of the power supply boards PSB4 and PSB5. Behind the back-cover is the transformer located. For more information about the power supply see Chapter 3.

User-Bus

2.2

Figure 3: User-Bus in the AQR/P (Front view)



The User-Bus is designed to route all specific signals and power supplies to the specific boards. It contains the frame ground point of the AQR/P. About the ground concept see page 13.

DLX, DMX

AQX

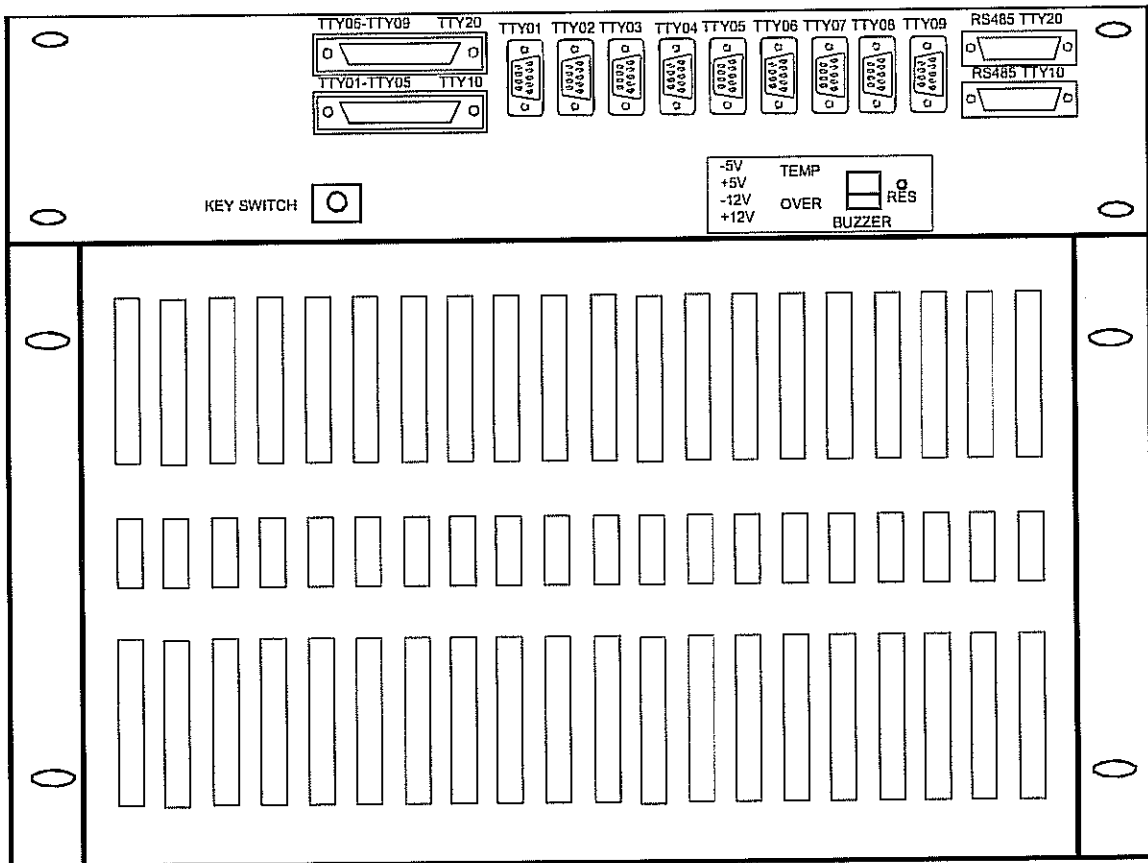
# Chassis Wired

# 1

Front View

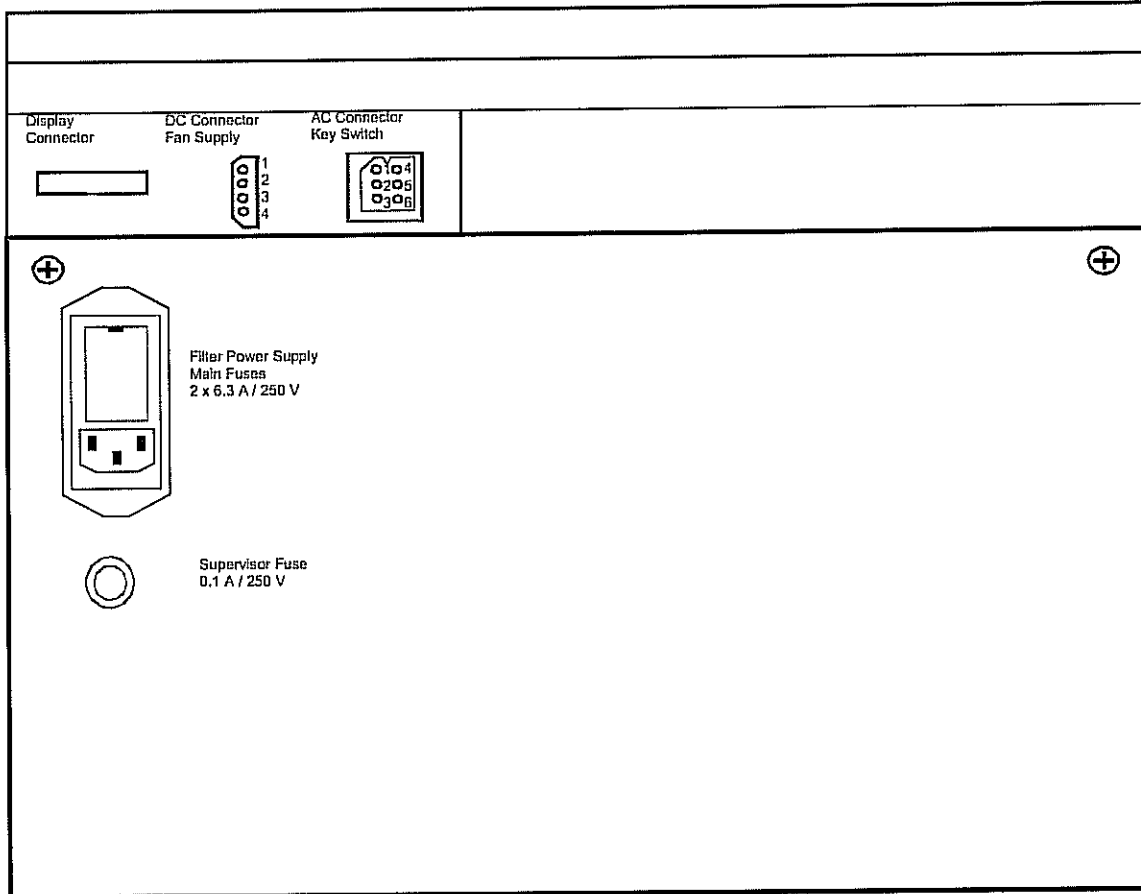
1.1

Figure 1.1. Chassi Wired Front View



KST 15.03.95 ADXCHAS1.MIF

Figure 1.2. Chassis Wired Rear Panel



KST 15.03.95 AQXCHAS2.MIF

DMX, Dmx

## Introduction

2.1

The AQR is a special rack with 13 slots on the front side and 4 slots on the backside. All boards except the User-Bus are extended Eurocard-Boards. A complete equipped AQR holds from the front side 12 boards (10 \* 7TE, 1 \* 4TE, 1 \* 6TE). The backside houses the power supply which includes 3 power supply boards (3 \* 12TE) and the transformer. The power supply distribution (1 \* 4TE) is also on the backside located. Between the front side and the backside is a User-Bus.

Figure 1: Front view of a complete equipped AQR

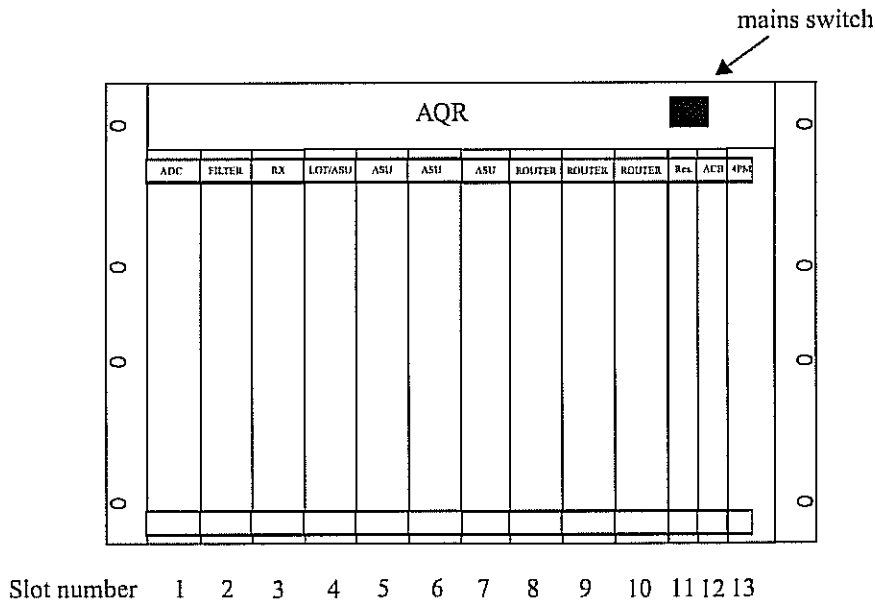
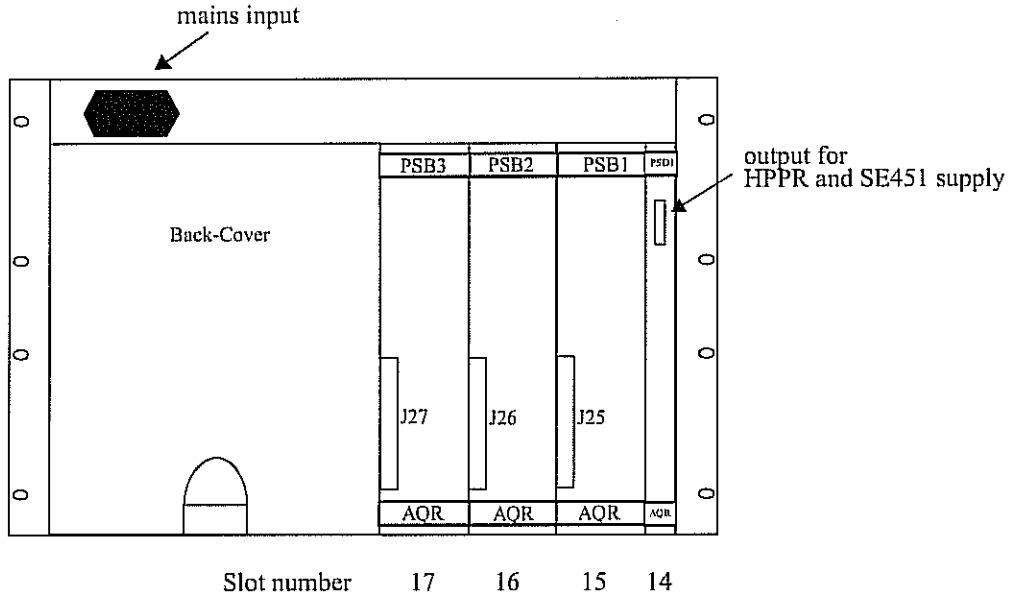


Figure 2: Back view of the AQR

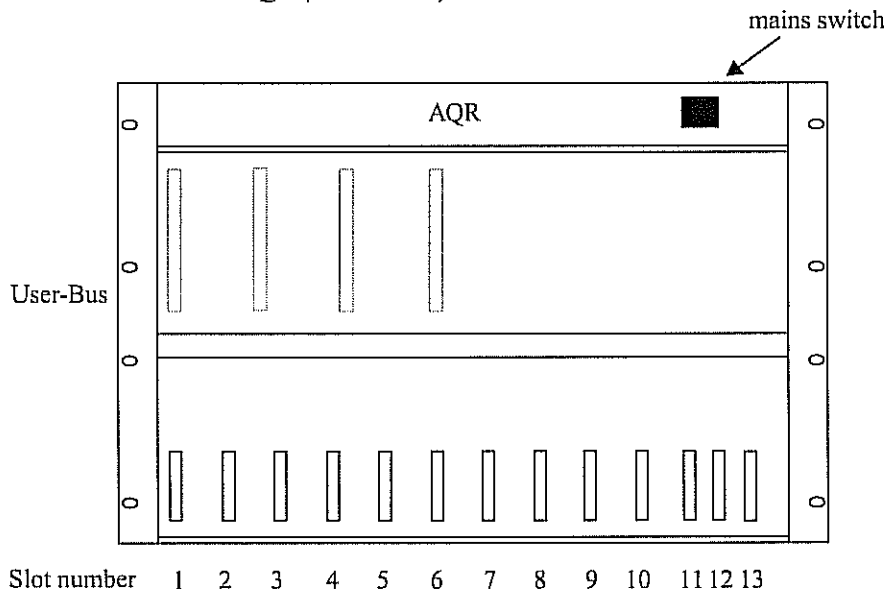


The back view shows the power supply unit, housing of the power supply boards PSB1, PSB2, PSB3 and PSD1. Behind the back-cover is the transformer located. For more information about the power supply see Chapter 3.

User-Bus

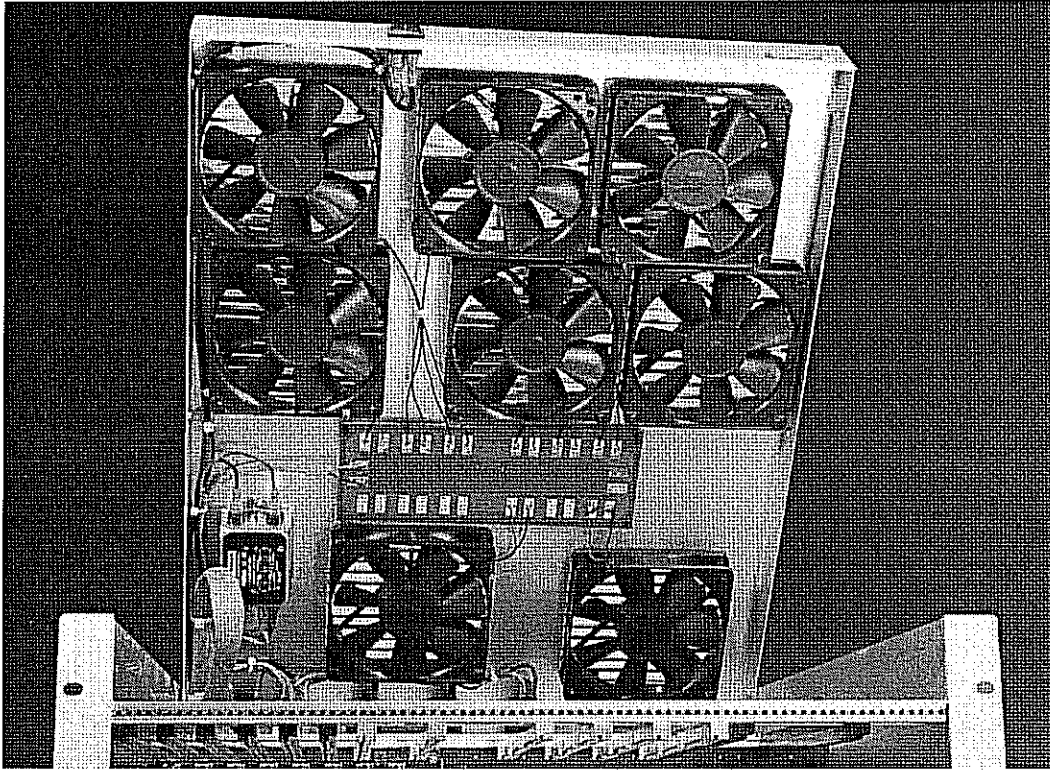
2.2

Figure 3: User-Bus in the AQR (Front view)



The User-Bus is designed to route all specific signals and power supplies to the specific boards. It contains the frame ground point of the AQR. About the ground concept see page 13.

Figure 5.4. AQS Fans





**AC Power Line Fuses**

4.7

The AQS/2 is protected by two fuses as specified on the power supply nameplate. The fuses are located in a removable fuse holder next to the AC power connector. Always use time-lag T fuse types with high breaking capacity H.

**Mains Circuit Breaker**

4.8

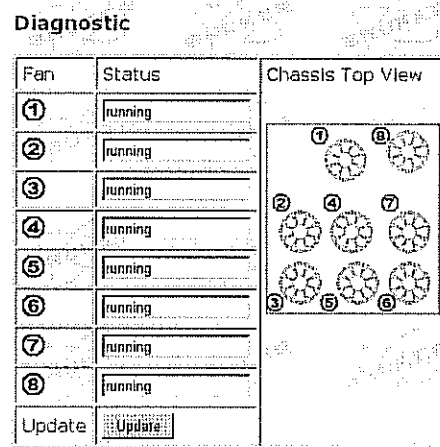
The mains circuit breaker on the front can only be turned on when a life AC power line is connected to the mainframe. In the event of an AC power loss in the spectrometer cabinet, the mains circuit breaker resets automatically into the off position.

**Fan Control and Over Temperature Protection (ECL ≥ 01 only)**

4.9

The operation of all fans is individually controlled by the AQS controller and the control circuit on the AQS/2 user bus. If a fan fails to operate, a corresponding error message will occur after reading the fan status by UniTool or by the DRU.

Figure 4.4. DRU Service Web: AQS Chassis Diagnostic

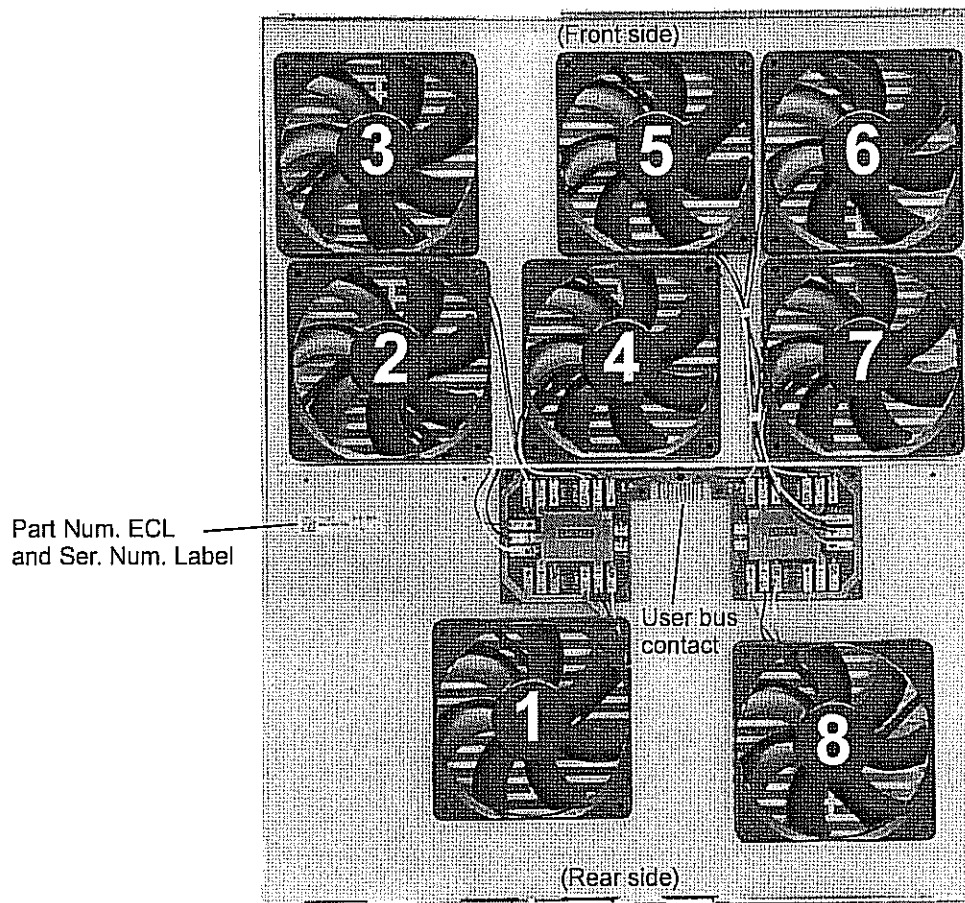


If the temperature inside the mainframe exceeds the absolute maximum limit of safe operation, the mains circuit switch is turned off automatically to prevent permanent damage to the AQS units.

The fans are located in the fan tray on top of the mainframe. They are supplied and controlled via the AQS/2 user bus.

The fan tray is serviceable without removing the mainframe from the spectrometer cabinet. (see "Fan Tray Service Instructions" on page 71)

Figure 4.7. AQS/2 Fan Tray (Bottom view)



**Fan Tray Service Instructions**

4.12

**!** Only qualified Bruker personnel are allowed to service the AQS/2 mainframe.

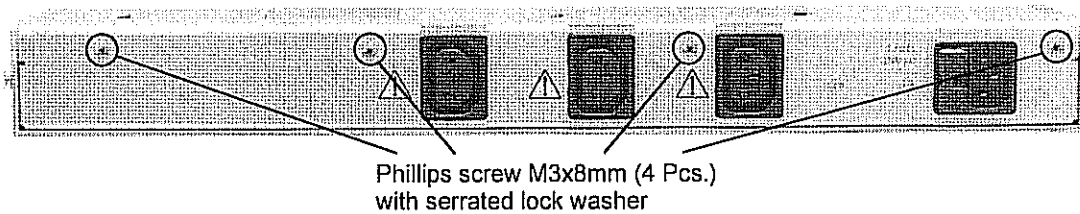
**Fan Tray removal**

4.12.1

To remove the Fan Tray from the AQS/2 mainframe please follow the steps exactly as described below:

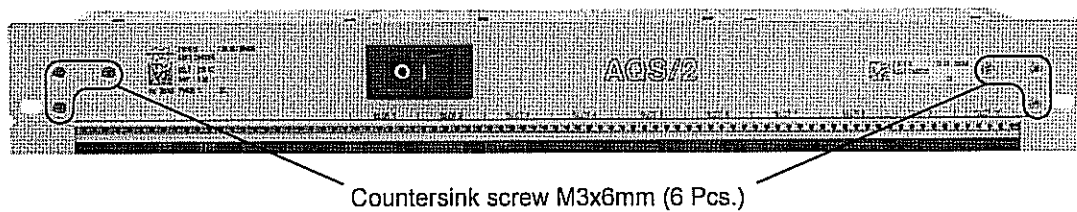
1. Turn of chassis with mains circuit breaker
2. Remove AC power line (rear side)
3. Remove 4 screws on the rear side

Figure 4.8. Fan Tray screws rear side



4. Remove 6 screws on the front side

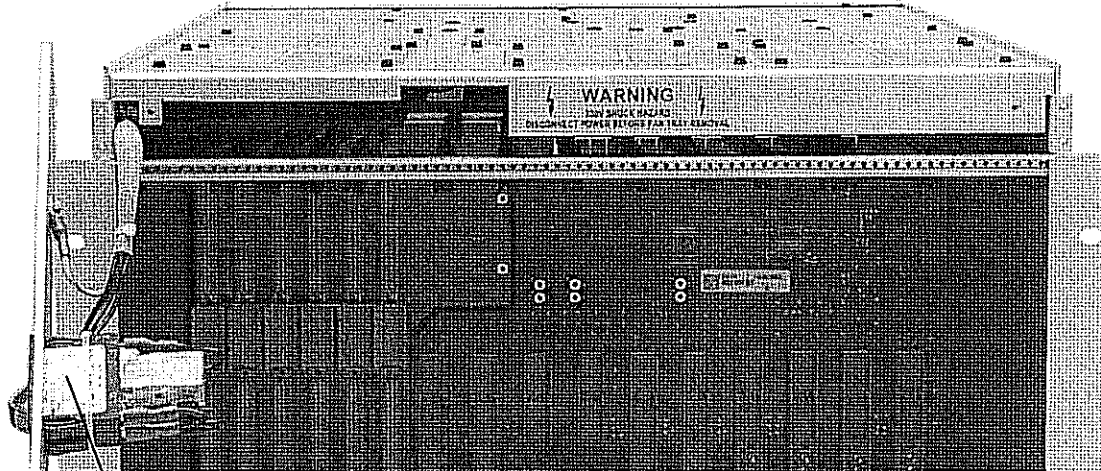
Figure 4.9. Fan Tray screws front side



## AQS/2 Mainframe

5. Carefully pull the front panel away from the mainframe and place it towards the left side (dangling from the cable)

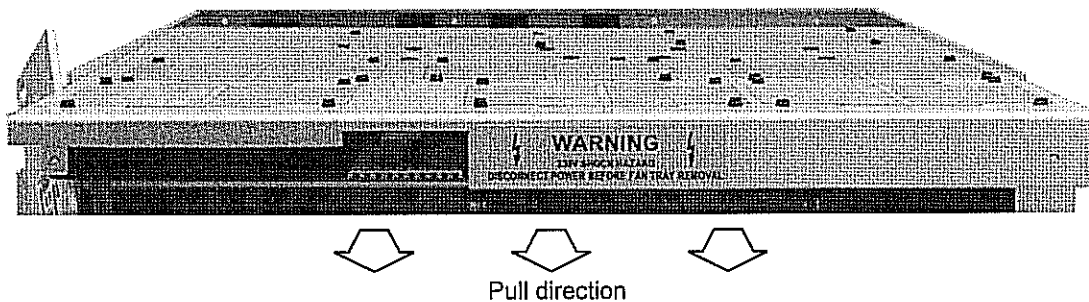
Figure 4.10. Front panel removal



Front Panel with mains circuit breaker and cable

6. Remove the fan tray by pulling it gently towards the front

Figure 4.11. Fan Tray removal



Pull direction

### Fan Tray reassembly

4.12.2

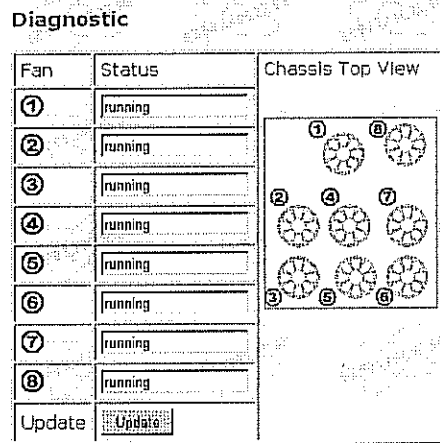
To replace the fan tray in the AQS/2 mainframe follow the steps as described above in **reverse order**.

Make sure that:

- the fan tray sits flat on the guide rails on either side of the mainframe before final insertion
- no wires are squeezed in between the front panel and the fan tray
- all screws are secured and fastened properly (rear side screws with serrated lock washers)
- all fans turn freely after power up

The operation of all fans is individually controlled by the AQS controller and the control circuit on the AQS/3 user bus. The fan status can be checked via the AQS chassis page in the DRU service web.

*Figure 4.4. DRU Service Web: AQS Chassis Diagnostic*



If the temperature inside the mainframe exceeds the absolute maximum limit of safe operation, the mains supply to the chassis is switched off automatically (and without warning) to prevent permanent damage to the AQS units. This „Safety Stop“ condition is indicated with a red lamp on the front panel as long as the mains supply is present at the power connector.

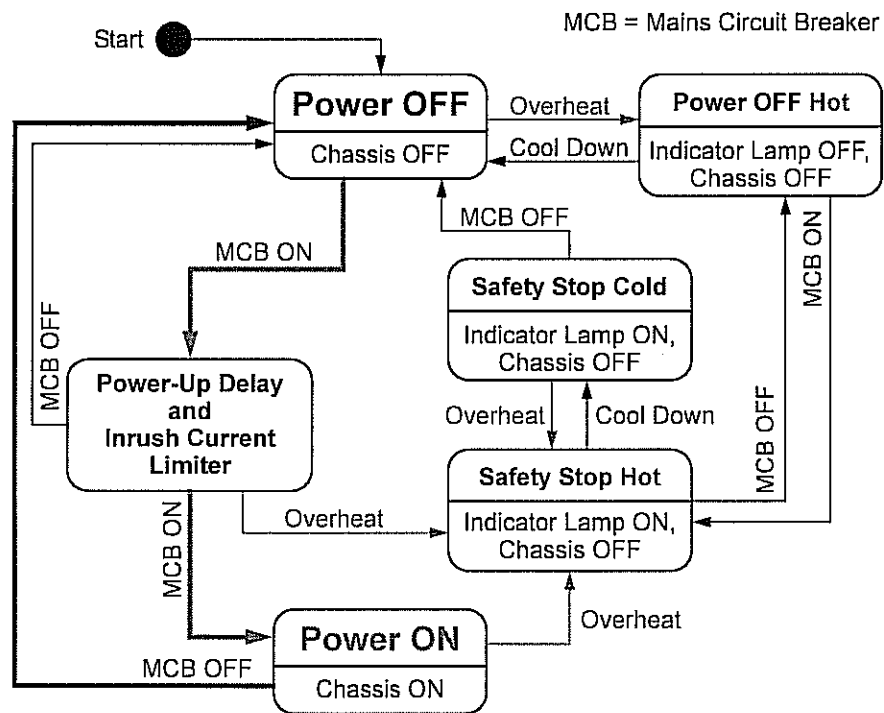
**!** *Make sure to establish and remove the cause of the Safety Stop condition before you use the spectrometer again.*

The Safety Stop can be caused by a fan or power supply failure within the mainframe. Other causes can be inefficient cooling air supply to the mainframe or exceeding ambient air temperatures within or around the spectrometer cabinet.

Please contact Bruker service personnel if you cannot establish the cause of the failure.

The chassis can be returned to its normal working state by switching the mains circuit breaker manually OFF and ON. An AC power loss also resets the chassis to its working state (see “AC Power Loss”).

Figure 4.5. Safety Stop State Diagram



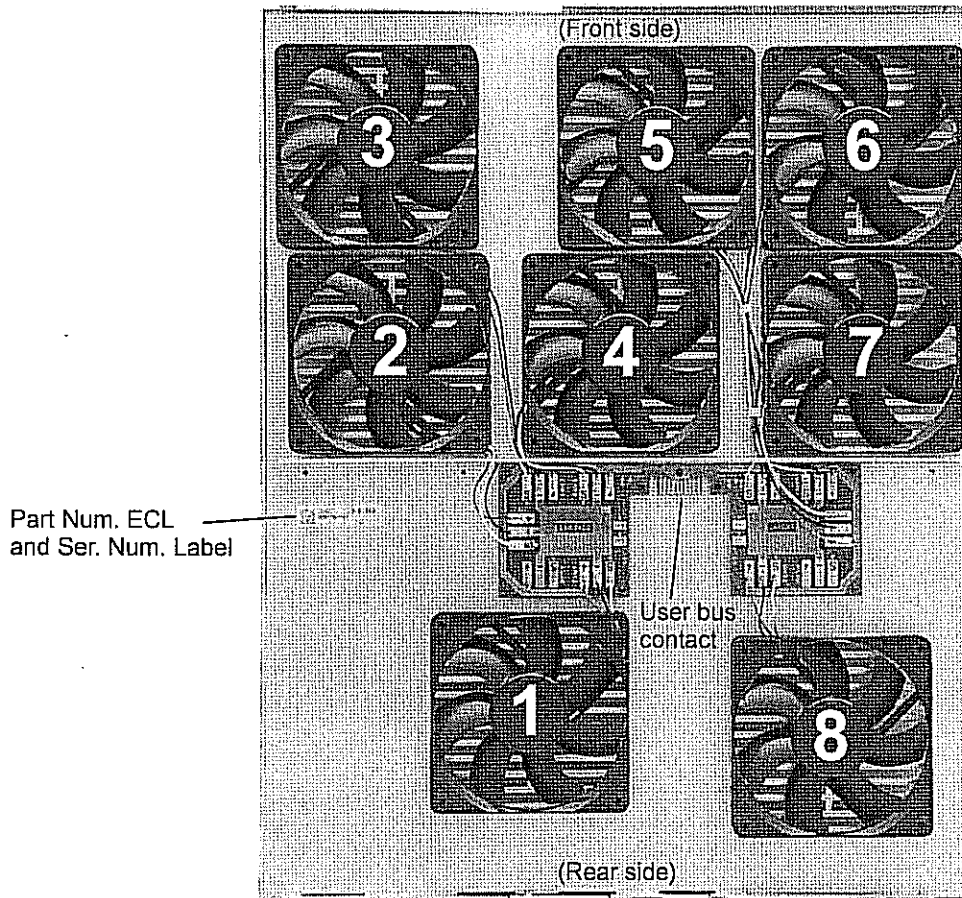
The fans are located in the fan tray on top of the mainframe. They are supplied and controlled via the AQS/3 user bus.

The fan tray is serviceable without removing the mainframe from the spectrometer cabinet. (see *"Fan Tray Service Instructions" on page 69*)

The AQS/3 mainframe uses the same fan tray as the AQS/2 or AQS/2-M mainframe.

**!** Only use AQS/2 FAN TRAY (Z101617) with ECL03 or higher as a replacement.

Figure 4.8. AQS/2 Fan Tray (Bottom view)



**Fan Tray Service Instructions****4.15**

**!** Only qualified Bruker personnel are allowed to service the AQS/3 mainframe.

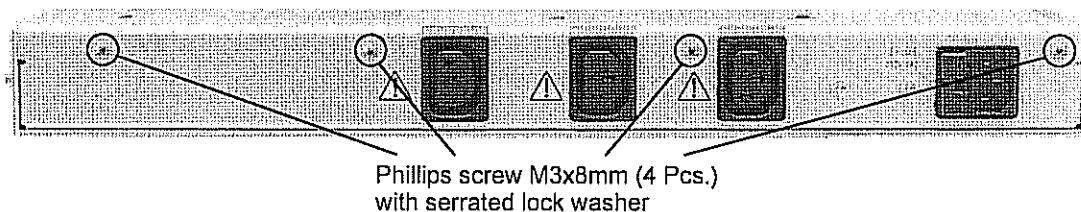
The fan tray removal and reassembly is the same as in the AQS/2 chassis. Please do not be confused if the pictures of the AQS/2 chassis are used in the following instructions.

**Fan Tray removal****4.15.1**

To remove the fan tray from the mainframe please follow the steps exactly as described below:

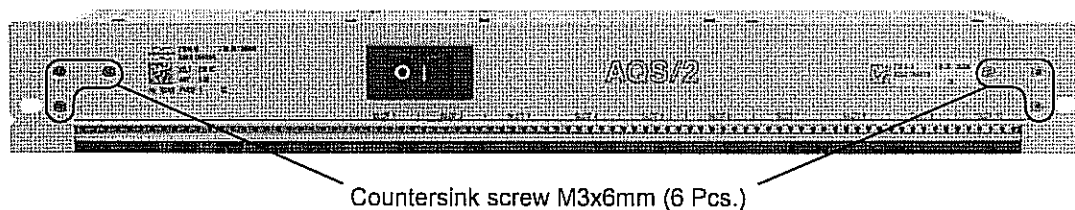
1. Turn off chassis with mains circuit breaker
2. Remove AC power line (rear side)
3. Remove 4 screws on the rear side

Figure 4.9. Fan Tray screws rear side



4. Remove 6 screws on the front side

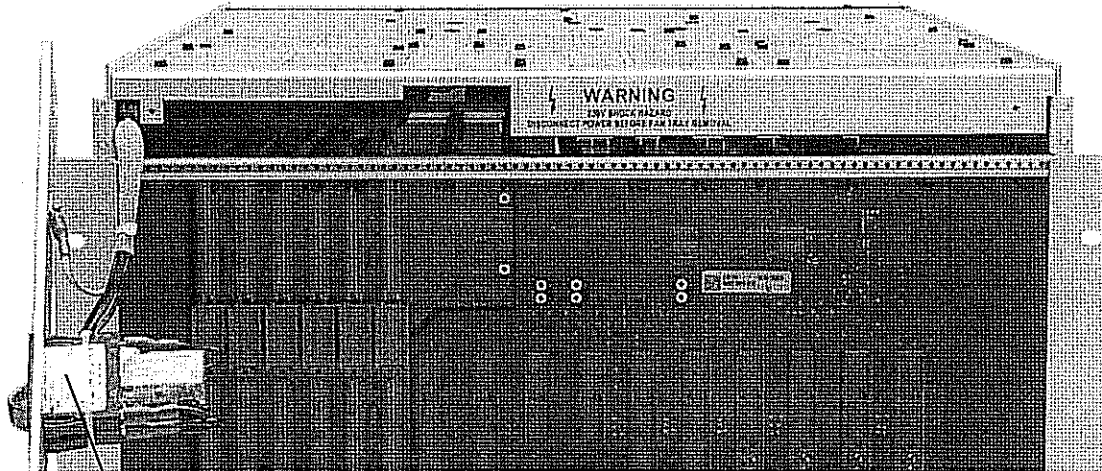
Figure 4.10. Fan Tray screws front side





5. Carefully pull the front panel away from the mainframe and place it towards the left side (dangling from the cable)

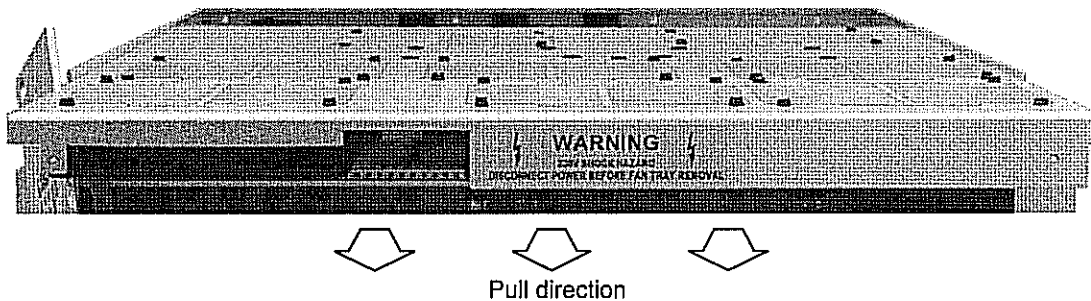
Figure 4.11. Front panel removal



Front Panel with mains circuit breaker and cable

6. Remove the fan tray by pulling it gently towards the front

Figure 4.12. Fan Tray removal



Pull direction

### Fan Tray reassembly

4.15.2

To replace the fan tray in the mainframe follow the steps as described above in **reverse order**.

Make sure that:

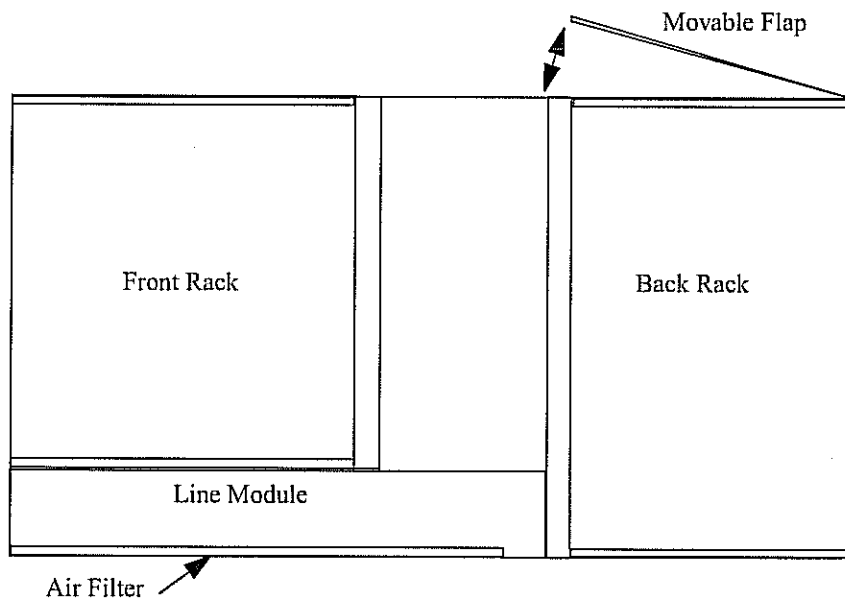
- the fan tray sits flat on the guide rails on either side of the mainframe before final insertion
- no wires are squeezed in between the front panel and the fan tray
- all screws are secured and fastened properly (rear side screws with serrated lock washers)
- all fans turn freely after power up

The BSMS (Bruker Smart Magnet control System) chassis has two 19"-racks: the front and the back rack. These are shown in Figure 1. The front rack has 15 slots (shown in Figure 2) for boards the size of extended Eurocards. These boards are interfaced to the mother board, which contains two bus systems: a VMEBus and a specific USERBus (shown in Figure 3). The front rack can hold 12 boards with VMEBus interfaces (9×4TE, 2×12TE, 1×6TE) and 3 boards with only USERBus connections (1×4TE, 2×7TE). The back rack houses the power supply and pneumatic module.

Beneath the front rack is the line module which is responsible for the following:

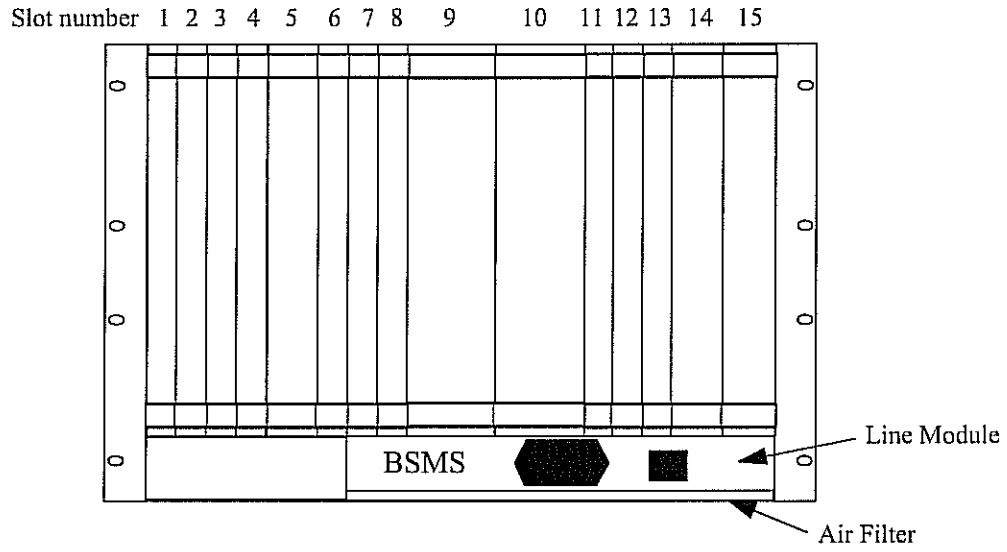
1. The mains filter.
2. The mains switch.
3. The mains fuse.
4. Two fans for actively cooling the BSMS.
5. One air filter. This can be removed for cleaning during operation without switching off the BSMS.
6. The connector providing the primary voltage to the power supply module (see Power Supply Module on page 9).

Figure 1: Front and Back Racks in the BSMS (Side View)



# BSMS Chassis and Buses

Figure 2: Slots in the BSMS (Front View)



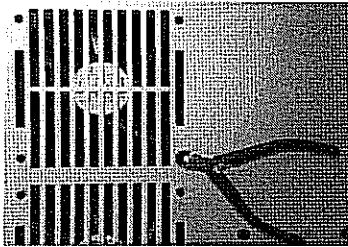
## Installation

2.2

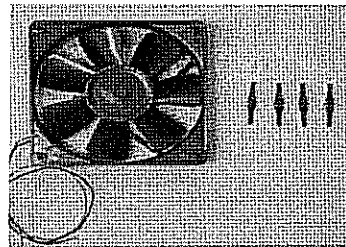
There are no special requirements for installation.

Figure 10: Fan replacement 2

cut fan rubber fittings



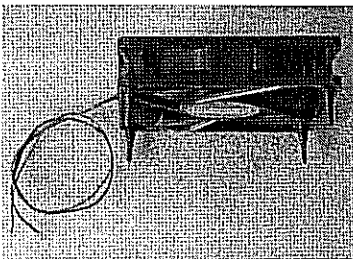
get a fan repair set



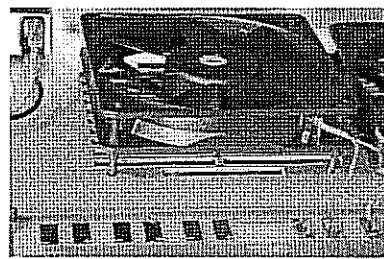
fix the rubber fittings



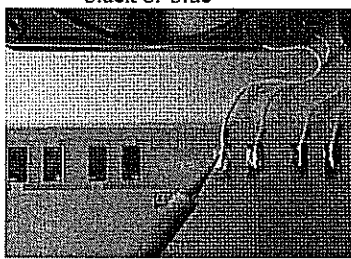
fan with rubber fittings



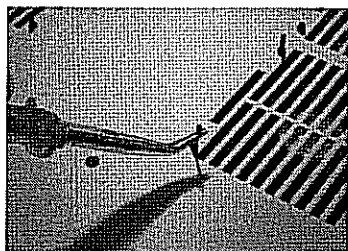
place the fan wire side to the solderpads



solder the wires red => +  
black or blue => -



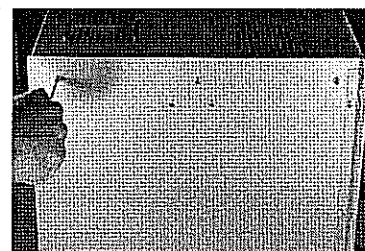
pull rubber fittings till they snap in



cut the rubber fittings



fix the line module screws



## Replacement of a Power Supply Board

3.4

## Power Supply Modules

### Troubleshooting

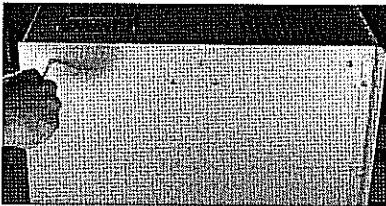
3.3

1. First check if one of the PSB LED's is not lit. If so, look at the two fans above the power supply modules. If one of them doesn't run, that could be the cause for an overheat protection of voltage regulator. In this case the fuse doesn't have to be blown. (For fan replacement see Figure 8)
2. Switch the BSMS/2 off and disconnect the mains power cable.
3. Verify that the primary voltage selection switch on the power supply module is in the correct position (see Installation on page 14).
4. Open the cover plate and replace the fuse corresponding to the LED that doesn't light. (For further information see Fuses 3.4)
5. Now connect the mains power cable, turn on the mains switch and see if the LED lights.
6. If the same fault occurs again plug out all modules in the front and back rack on which the defective supply is used (see Figure 5 and 6). Replace the fuse (Step 1 to 4). Switch on the mains and if still a LED doesn't light the defect is located on this PSB. Otherwise plug in the first module and switch on the mains switch. Check the LED's and continue with the next module until a module causes the DC interruption. The defective part is located and has to be replaced by the BRUKER Troubleshooter.
7. Change a fan.

Figure 9: Fan replacement 1

Disconnect all cables on front side of the BSMS/2 and pull it out of the cabinet.

remove Line Module screws



solder out the two wires

