

SampleJet

- Installation Guide

Version 5



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P/N: Z31750

DWG-Nr.: Z4D9718E

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Summary

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1 About

1.1 This Manual

This manual is intended to be a reference guide for operators and service technicians. It provides detailed information about the user level maintenance and service and overall use of the Bruker device.

The figures shown in this manual are designed to be general and informative and may not represent the specific Bruker model, component or software/firmware version you are working with. Options and accessories may or may not be illustrated in each figure.

This manual describes parts and procedures relevant to the device version it is delivered with. For older hardware, please refer to the manual supplied at the time.

1.2 Policy Statement

It is the policy of Bruker to improve products as new techniques and components become available. Bruker reserves the right to change specifications at any time.

Every effort has been made to avoid errors in text and figure presentation in this publication. In order to produce useful and appropriate documentation, we welcome your comments on this publication. Support engineers are advised to regularly check with Bruker for updated information.

Bruker is committed to providing customers with inventive, high quality products and services that are environmentally sound.

1.3 Disclaimer of Liability

All specifications and instructions in this manual have been compiled taking account of applicable standards and regulations, the current state of technology and the experience and insights we have gained over the years.

NOTICE

Disclaimer of liability

Bruker is not responsible or liable for any injury or damages that occurs as a consequence of non-approved manipulations on the SampleJet.

- ▶ Read the manual carefully before working on the SampleJet.

Disrespecting the following rules is at the users own risk and invalidates any and all manufacturers warranties:

- The unit should only be used for its intended purpose as described in this manual.
- Service or maintenance work on the unit must be carried out by qualified Bruker service personnel.
- Only those persons trained in the operation of the SampleJet Products should operate them.
- Read the users manual before operating the unit. Pay particular attention to any safety related information.
- Technical modifications and the use of unauthorized spare parts are not allowed.

1.4 Symbols and Conventions

Safety instructions in this manual are marked with symbols. The safety instructions are introduced using indicative words which express the extent of the hazard.

In order to avoid accidents, personal injury or damage to property, always observe safety instructions and proceed with care.



DANGER

This combination of symbol and signal word indicates an immediately hazardous situation which could result in death or serious injury unless avoided.



WARNING

This combination of symbol and signal word indicates a potentially hazardous situation which could result in death or serious injury unless avoided.



CAUTION

This combination of symbol and signal word indicates a possibly hazardous situation which could result in minor or slight injury unless avoided.

SAFETY INSTRUCTIONS

This combination of color and signal words are used for control flow and shutdowns in the event of an error or emergency.

NOTICE

This combination of symbol and signal word indicates a possibly hazardous situation which could result in damage to property or the environment unless avoided.



This symbol highlights useful tips and recommendations as well as information designed to ensure efficient and smooth operation.

2 Installation Notes

2.1 Installation Procedure

This manual describes the hardware installation of the SampleJet only. All the topics depending on the firmware version are described in the „Users Manual“. Therefore the 8 steps of the complete installation procedure is divided into chapters in both manuals.

Installation depends on ...	Is described in manual ...
Hardware	„Installation Guide“ Z31750 (this manual)
Firmware	„Users Manual“ Z31749 (included in the firmware) see "How to Get the Users Manual" on page 14

Table 2.1 Where Information can be Found

Start the installation with this „Installation Guide“ Z31750

1. Installation notes (this chapter)
Important information to read before starting to work.
2. Mounting instructions (chapter [2](#))
Describes how to screw a SampleJet on a Magnet.
3. Cooling installation (option, chapter [4](#))
Guide to install a cooling on a SampleJet.
4. Remote control installation (option, chapter [5](#))
Connecting the remote control.

Proceed with the „Users Manual“ Z31749

5. Calibration
The SampleJet has to be calibrated before the first use.
6. User settings
Configuration of the settings.
7. Initial configuration
Setup of software like Topspin or IconNMR

Go back to the „Installation Guide“ Z31750

8. Acceptance test (chapter [6](#))
How to ensure the system is correctly installed

2.2 How to Get the Users Manual

The „Users Manual“ is included in the SampleJet's firmware as a „pdf“ file and can be downloaded from the SampleJet. For this the SampleJet must be switched on and connected to the spectrometer computer via the ethernet cable.

On the spectrometer computer you can connect to the SampleJet home page with a internet browser. To access the SampleJet just enter <http://149.236.99.55> in a web browser. Once the web interface is accessible, the manual is available in the menu „Documentation“ in „Download Manual“.

2.3 General Safety

WARNING



Use suitable ladders or platform.

For bigger magnets one or more ladders or platforms are needed. Working at an elevated level above ground always bears the risk of falling.

- ▶ Do only use approved climbing aids.
- ▶ Wear non-slip shoes.



Ensure SampleJet is mounted properly on the magnet.

Due to the position on the magnet and the weight of the SampleJet bad fixation is serious.

- ▶ Strictly follow the mounting instructions in this manual.
- ▶ Use only the original screws and hardware delivered with the system.
- ▶ Double-check if the mounting hardware holds firmly on the magnet before lifting the main unit on it.



SampleJet filled with hazardous tubes.

If the SampleJet was already in use (e.g. upgrading the cooling option) it may be loaded with tubes containing hazardous substances.

- ▶ Let the customer remove all hazardous tubes by itself.
- ▶ The same applies for glass coming from broken tubes.
- ▶ Ask the customer for the "[Safety and Repair Declaration](#)" on page 68.



Risk of suffocation when operating the SampleJet with nitrogen gas.

In case of an error the SampleJet can exhaust a lot of nitrogen gas and reduce the oxygen concentration in the lab.

- ▶ Connect the SampleJet to compressed air whenever possible.
- ▶ Connecting the SampleJet to nitrogen gas is only allowed if the lab has a sufficient ventilation supplying fresh air and installed oxygen monitors.

2.4 Cooling Option Safety

WARNING



Risk of suffocation when operating the cooling with nitrogen gas.

The cooling option consumes a lot of gas and can therefore reduce the oxygen concentration in the lab when connected to nitrogen gas.

- ▶ Connect the chiller of the cooling to compressed air whenever possible.
- ▶ Connecting the chiller of the cooling to nitrogen gas is only allowed if the lab has a sufficient ventilation supplying fresh air and installed oxygen monitors.

CAUTION



Do not stack the BCU I on top of one another.

Often an NMR System with a SampleJet cooling option will have two BCU I cooling units. If stacking them, the upper one is instable and may fall down. In addition the vibration damping inside the BCU I may not work.

- ▶ Place several BCU I units next to each other on the floor instead of stacking them.

2.5 Magnet Stability

Before mounting the SampleJet, it is important to make sure that the magnet is firmly anchored to its base in order to prevent the magnet from tipping over. Switch off the dampers of the magnet if they exist.

Small magnet needs to be equipped with the right stand to hold a SampleJet. Some stands result in a footprint that is too small to ensure stability in extreme situations. For some magnet stands a special sample changer foot is available to enlarge the footprint.

⚠ WARNING

The magnet might get unstable together with a SampleJet.

The stability of the magnet (according to DIN EN 61010-1 (2011) Chapter 7.4) is only guaranteed if the correct magnet stand will be used. With the wrong magnet stand the magnet might tilt in a worst case scenario.



- ▶ If you are not sure, if your magnet stands stable enough contact the SampleJet hotline to reach clarification before the installation ("[Contact for Additional Technical Assistance](#)" on page 79).
- ▶ Be special cautious with small magnets and magnet stands producing a small footprint.
- ▶ Change the magnet stand or add a sample changer foot if necessary and possible
- ▶ The „H80 easy“ magnet stand is not allowed with the SampleJet.

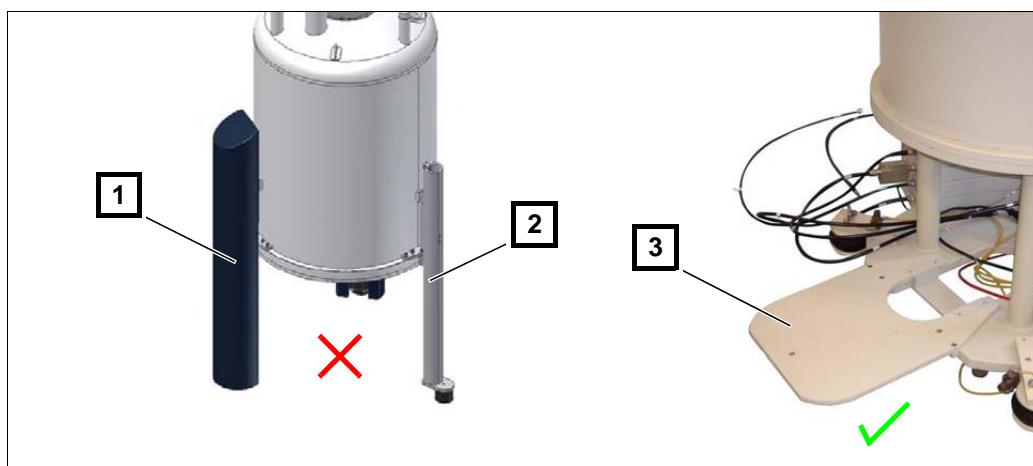


Figure 2.1 Small Magnet Stand Footprints

- [1] H80 easy magnet stand covered
[2] H80 easy magnet stand uncovered

- [3] Footprint enlarged with a sample changer foot

2.6 Drop-Off Plate

When arranging supply and communication lines towards the magnet and the Sample-Jet they need to be fixed properly.

WARNING



Do never cover the drop-off plate.

The drop-off plate is a safety valve and must always be in perfect working condition. Covering this plate can block the valve and disable its overpressure safety function.

- ▶ Use Velcro fasteners and/or cable ties to arrange the cables, hoses or transfer lines around the drop-off plate.
- ▶ Pay attention to the minimum clearance above the drop-off plate indicated on its safety sticker.

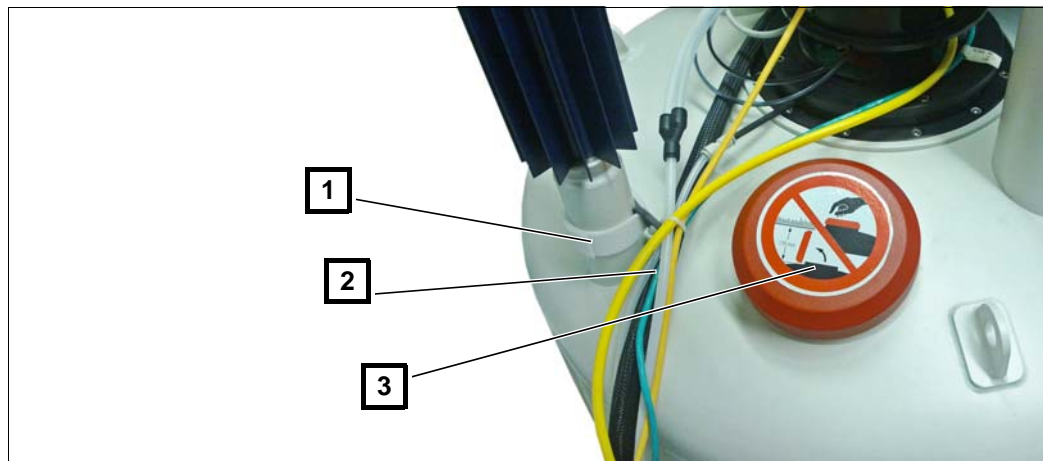


Figure 2.2 Magnet Top View Showing Drop-Off Plate and Cables

- | | |
|---|--|
| [1] Velcro fastener attached on the magnet | [3] Drop-off plate with safety sticker |
| [2] Cables going to magnet and sample changer | |

2.7 Unpacking and Handling Instructions

⚠ WARNING



Do not carry the SampleJet alone.

The SampleJet main unit is too heavy to be carried by one person. The main body has a size and shape that needs to be hold from two sides.

- ▶ At least two persons are needed to move the main unit (approx. 40kg).
- ▶ When moving the main unit make sure that the destination is ready and accessible.

⚠ CAUTION



Do not lift the SampleJet out of the cardboard boxes.

The side walls of the cardboard boxes are too high to lift the heavy main body over the box.

- ▶ First open the box on top to unload the smaller boxes inside.
- ▶ The outer and the inner box do not have a bottom and can be lifted up over the main unit sitting on the pallet itself.



Figure 2.3 The Cardboard Cox Containing the Main Unit

[1] The outer box that has no bottom

[2] The pallet supporting the main unit

2.8 De-Energize the System

⚠ CAUTION



De-energize the system for installation and service.

For the whole hardware installation the SampleJet should be off and not supplied with compressed gas.

- ▶ Shut down the SampleJet if it is on as described below in the shutdown procedure.
- ▶ Disconnect the SampleJet from the compressed gas supply.



Do not move the SampleJet in magnetic fields when switched on.

The electronic inside the controller is sensitive to magnetic fields and is optimized for its end position when mounted. The magnetic field in other positions relative to the magnet does have the wrong orientation or is too high.

- ▶ Switch off the SampleJet before moving it next to non-shielded magnets.

SAFETY SHUTDOWN PROCEDURE

Always follow this procedure to shutdown the SampleJet:

The SampleJet has a built-in computer which needs to save data before powered off.

1. Set the operating mode to manual (if possible)
2. Shut down the SampleJet from the display or the web interface (if possible)
3. Switch off the power supply

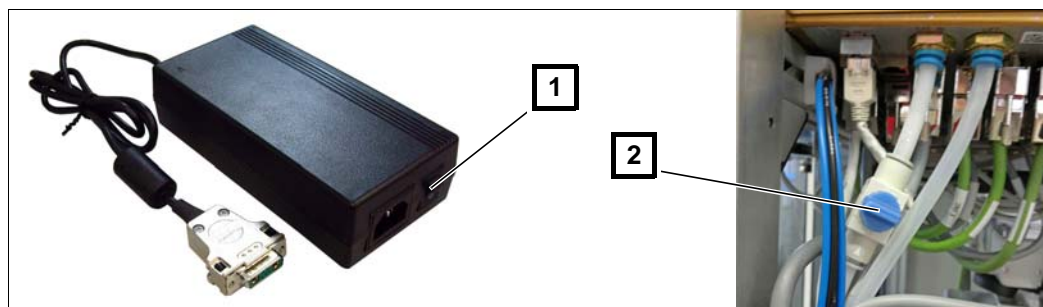


Figure 2.4 Gas and Power Supply of the SampleJet

[1] Power switch on the 24V DC power supply

[2] Gas main switch („off“ position) underneath the control unit

2.9 Electrostatic Discharge

CAUTION



Risk of electrostatic discharge (ESD)

Electrostatic discharge can damage sensitive parts. Everything inside the control unit should be regarded as sensitive to electrostatic discharge.

- ▶ Use ESD protection wrist strap from the console.
- ▶ Avoid touching components in the control unit if not necessary.

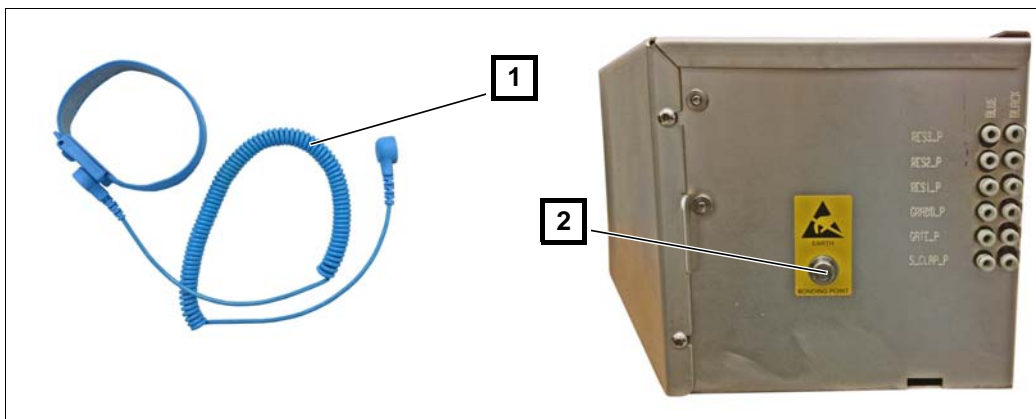


Figure 2.5 ESD Protection

[1] ESD strap from the console

[2] Grounding point at the back of the control unit

2.10 Required Tools

Tool	Size(s)
Slot screwdriver	2 and 4
Crosstip screwdriver ^a	0 and 2
Allen key	2.5 ^b , 3, 4 and 5
Flat spanner	7 ^c , 13, 16 and 17
Water level	medium
Cutter	medium
Side cutter	medium
Metric scale	30cm
2 ladders / platform	Depending on the magnet
Cable ties	Various

Table 2.2 Required Tools

a. For „Phillips“ screws

b. Ball-head, comes with the SampleJet in the tool kit

c. Comes with the tool kit

CAUTION



Tools will be attracted by the field of the magnet.

All tools may contain iron and may be attracted by the magnetic field. This applies also for the tools that are coming with the SampleJet in the tool kit.

- ▶ Work cautious on un-shielded magnets.
- ▶ Approach the magnet with not more the one tool in the hand.
- ▶ Refer to the hints in curly brackets for the proper tool. E.g. {Tool: abc}
- ▶ Store unused tools in distance to the magnet.

2.11 Modifications for Special High Field Magnets

For some high field magnets the clearance between the helium towers (and a KF flange) is not sufficient for the standard SampleJet width. Regarding this the covers and the frame may have to be modified non-reversible to reduce the width of the SampleJet.

These modifications are all described in chapter "[Mounting Instructions](#)".



Figure 2.6 High Field Magnet with Limited Clearance Between the HE Towers

[1] Clearance between the helium towers

[2] KF flange

CAUTION

Avoid access through cut-outs in the side covers.

The moving parts inside the SampleJet should not be accessible through openings in the side covers. The cut-outs in the side covers should be only then removed, when the magnet is requiring this and will cover these cut-outs with its HE towers.

- ▶ Only modify the covers if required.
- ▶ Contact the SampleJet service for hardware replacement if the modification has been done by mistake or is no longer needed (e.g. SampleJet on a different magnet)

Sharp edges on the covers

When breaking away parts from the side covers the remains of the bridges will be sharp.

- ▶ Always bend the parts to remove as much as possible to the inside (the side without print) of the covers to avoid sharp edges on the outside.



3 Mounting Instructions

3.1 Installing the Mounting Hardware

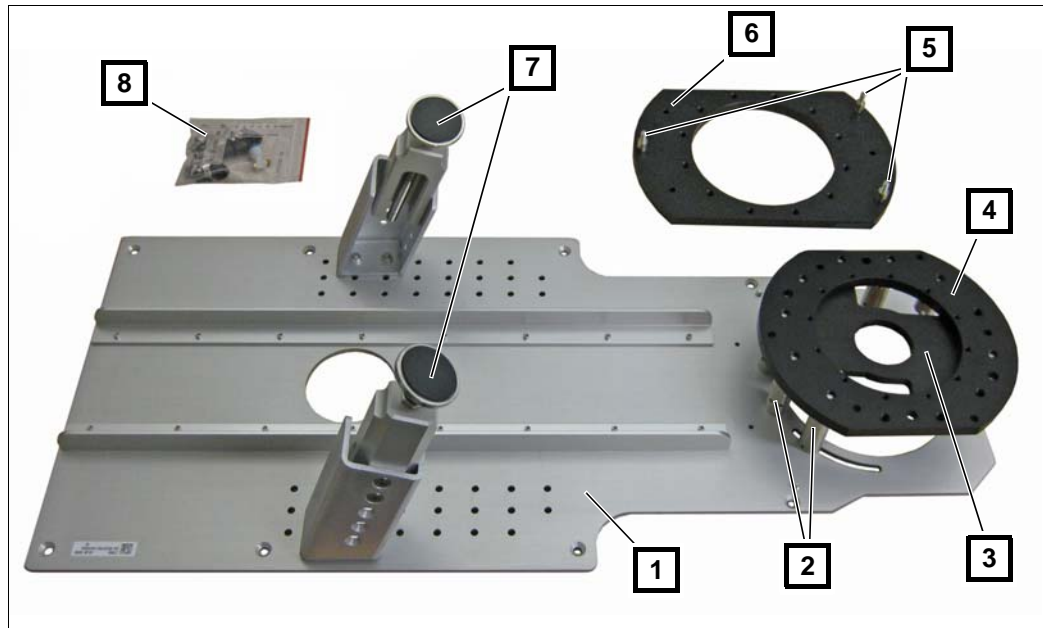
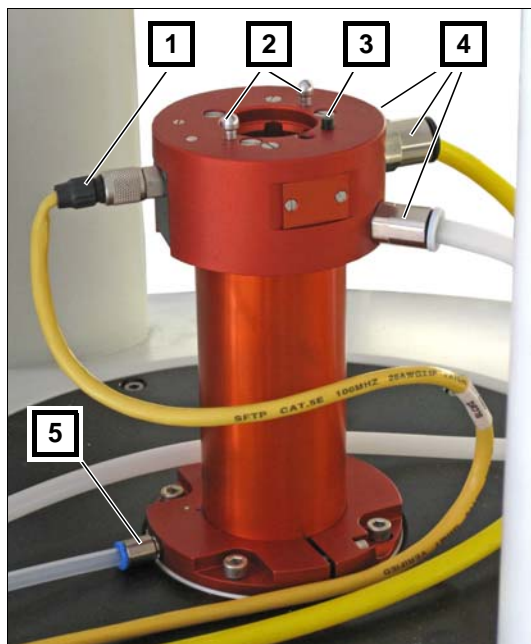


Figure 3.1 The Mounting Hardware

- | | |
|--|--|
| [1] Base plate (shown upside down) | [5] Adapter screws |
| [2] Central bearings (spacer bolts and adjustable bolts) | [6] Adapter plate 2 (116 and 130 mm) |
| [3] Tension ring | [7] Supports (left and right version) |
| [4] Adapter plate 1 (82, 87, 90 and 100 mm) | [8] Screws, angled gas connectors and adjustment gauge |

3.1.1 Prepare the BST Hardware

1. Unplug the yellow cable (see [Figure 3.2](#) detail [1]) coming from the BSMS
1. Remove the special screws (see [Figure 3.2](#) detail [2]) on top of the BST {Tool: Slot screwdriver 2}.
2. Replace the straight gas connectors (see [Figure 3.2](#) detail [4]) on the BST with angled connectors {Tools: Flat spanner 13, 16}.



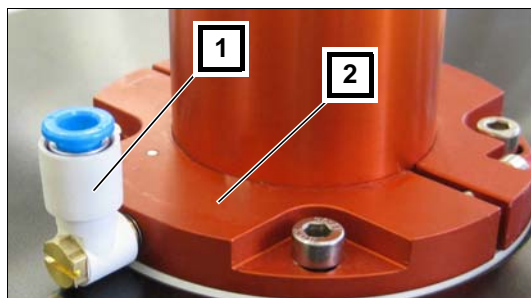
- [1] Cable from the SLCB
- [2] Special screws
- [3] Lid switch
- [4] Straight gas connectors on the BST
- [5] Straight gas connector on the BST flange

Figure 3.2 The BST Hardware in the Original State

3. If installed, replace the straight gas connector for the shim system cooling (see [Figure 3.2](#) detail [5]) on the BST flange with an angled connector {Tool: Allen key 2.5, Slot screwdriver 2}.



The gas connector for the shim system cooling cannot be added later in the installation.



- [1] Angled gas connector
- [2] BST flange for shim system cooling

Figure 3.3 Shim System Cooling Gas Connector

3.1.2 Installing the Adapter Plate

There are three different options (later referred as option A, B or C) to screw the adapter plate to the magnet. Depending on the magnet, different option may be available. Chose the best possible option to have the best conditions for the installation and future service.

Facts	Description
Option A: (best case)	
Solution	The SampleJet will be screwed directly to the magnet flange.
Requirements	This can only be done if the magnet flange has 2 M8 threads at the radius of 82mm or 90mm or has 6 M6 threads at the radius of 100mm.
Effect	With this option you can remove the red BST without removing the SampleJet.
Used parts	Adapter plate 1, screws (2 or 3).
Description	"Option A: Adapter Plate Screwed on the Magnet Flange" on page 27.
Option B: (second best case)	
Solution	The SampleJet will be screwed to the magnet using the threads for the magnet flange and 3 special screws.
Requirements	This can only be done if the magnet flange has its screws at the radius of 87, 100, 116 or 130mm.
Effect	With this option you can remove the red BST without removing the SampleJet.
Used parts	Adapter plate 1 or 2, adapter screws, 3 screws.
Description	"Option B: Adapter Plate Screwed on the Magnet" on page 28.
Option C: (worst case)	
Solution	The SampleJet will be clamped to the red BST tube.
Requirements	This can be done on every system.
Effect	With this option you cannot remove the red BST without removing the SampleJet.
Used parts	Adapter plate 1, tension ring, 6 screws for the tension ring.
Description	"Option C: Adapter Plate Clamped on the BST" on page 29.

Table 3.1 Selecting the Best Installation Option

- Select the best option to install the adapter plate. For this you have to measure the holes or threads in the magnet flange with the adjustment gauge as shown in ["Measuring the Radius of the Holes in the Magnet Flange" on page 26](#) {Tool: Adjustment gauge}.

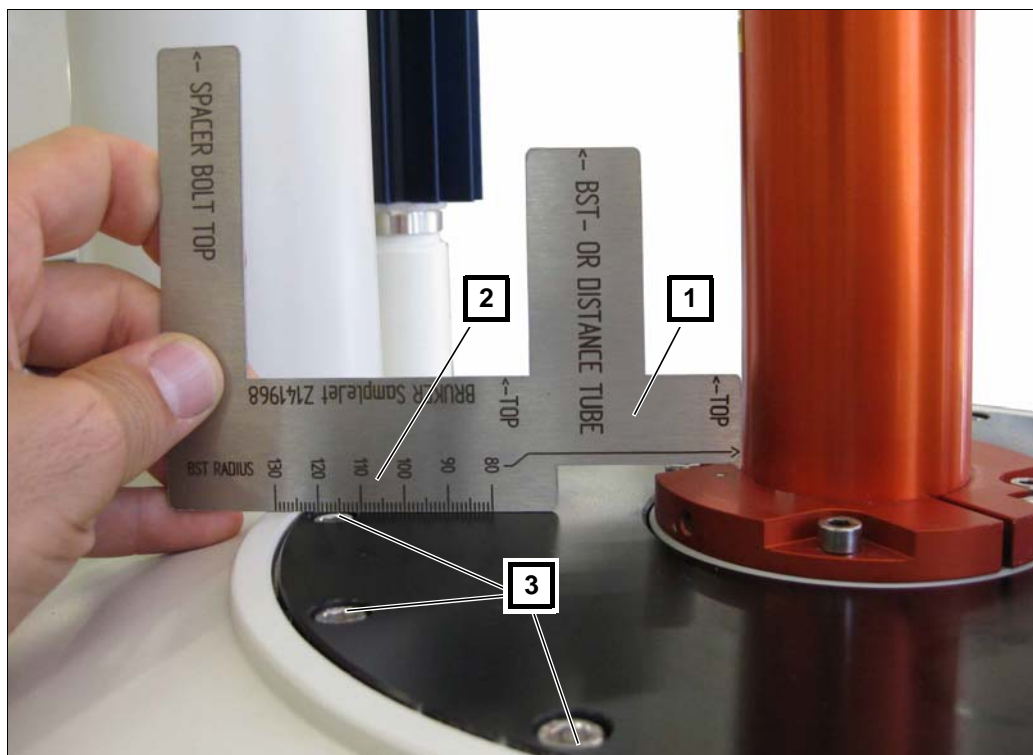


Figure 3.4 Measuring the Radius of the Holes in the Magnet Flange

- [1] Adjustment gauge
- [2] Scale with radius from BST center
- [3] Screws in the magnet flange (here at radius 116mm)



If the adjustment gauge is missing, use the printed one from the appendix "[Adjustment Gauge](#)" on page XV

3.1.2.1 Option A: Adapter Plate Screwed on the Magnet Flange

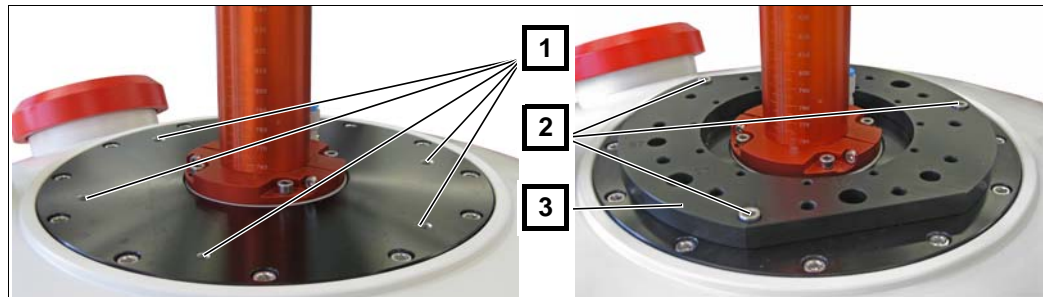


Figure 3.5 Installation Option A with 6 Screws

- [1] The M6 threads in the magnet flange
- [2] Three M6x12mm screws (here at radius 100mm).
- [3] Adapter plate 1

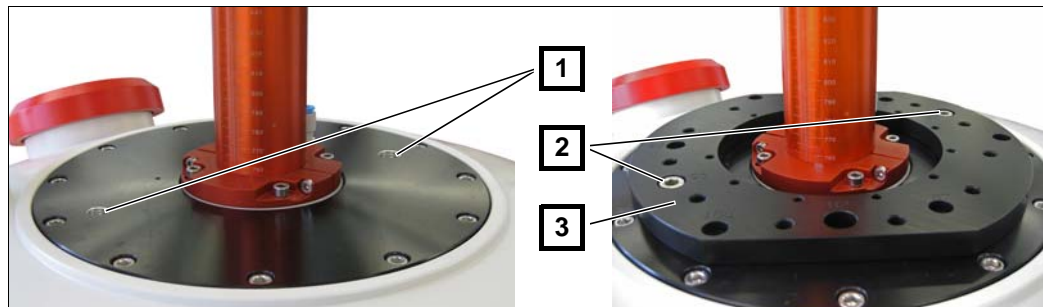


Figure 3.6 Installation Option A with 2 Screws

- [1] The M8 threads in the magnet flange
- [2] Two M8x10 screws (here at radius 90mm)
- [3] Adapter plate 1

5. Screw the adapter plate 1 (with the labeling on top) to the magnet flange {Tool: Allen key 5 or 6}.

3.1.2.2 Option B: Adapter Plate Screwed on the Magnet

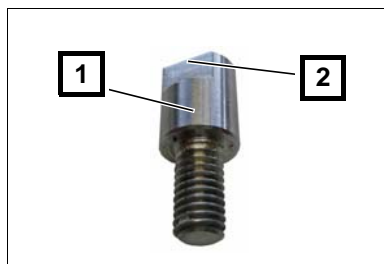


Figure 3.7 The Special Adapter Screw

[1] Adapter Screw M6x12mm

[2] The recess to 7mm

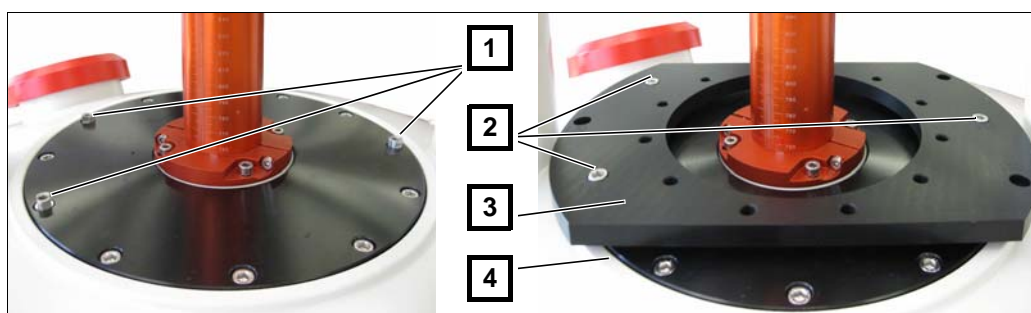


Figure 3.8 Installation Option B

[1] The three special adapter screws

[3] Adapter plate 1 or 2 (here adapter plate 2)

[2] Three M6x12 screws (here at radius 116mm)

[4] Rim on the magnet body

WARNING

Do not remove multiple screws at the same time from the magnet flange.



The magnet flange is a vacuum sealing. Removing too many screws together may break the vacuum and the magnet will quench.

- ▶ Replace the screws in the magnet flange only one by one.
- ▶ Store the removed screws in the SampleJet tool box for future use (e.g. removing the SampleJet).
- ▶ Check that the adapter plate is not touching rim on the magnet body (labeling of the adapter plate must be on topside).

6. Replace the screws in the magnet flange one by one with the adapter screws {Tools: Allen key 5 and flat spanner 7}.
7. Store the removed screws from the magnet in the SampleJet tool box.
8. The screw the adapter plate with the labeling on top {Tool: Allen key 5}.

3.1.2.3 Option C: Adapter Plate Clamped on the BST



Figure 3.9 Installation Option C

[1] Adapter Plate 1

[2] Tension Ring

9. Place the hardware as shown and insert all screws loosely. Choose an orientation of the tension ring that allows access to the shim system cooling gas connector {Tools: Allen key 4}.
10. Tighten first the 2 screws clamping the tension ring {Tools: Allen key 4}.
11. Then tighten the 4 screws connecting the tension ring with the adapter plate 1 {Tool: Allen key 4}.
12. Check if the hardware holds firmly and does not wobble.

3.1.3 Mounting the Base Plate

3.1.3.1 Install the Central Bearing

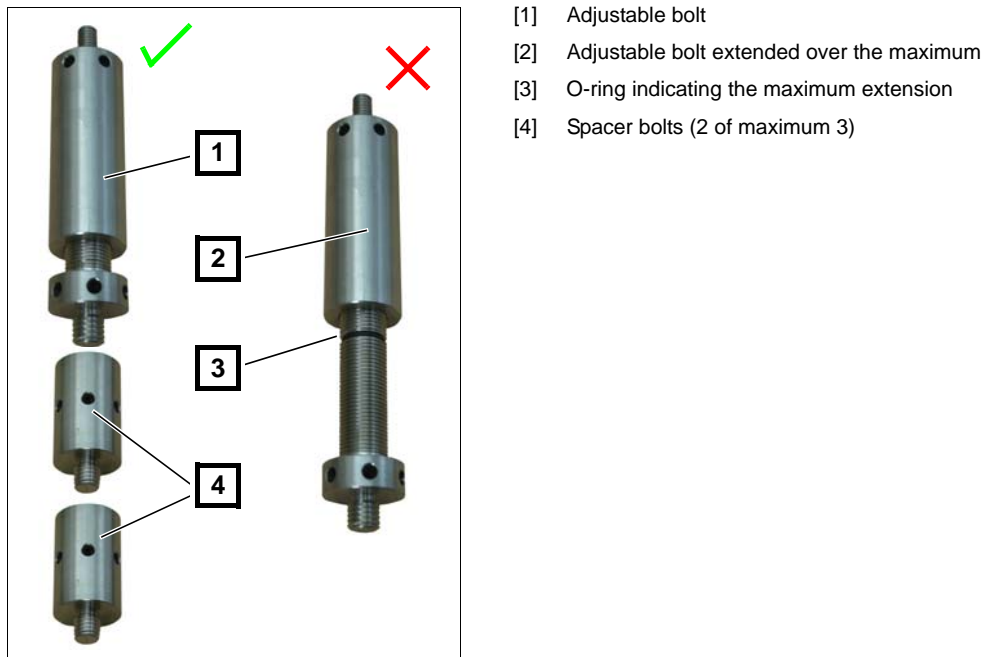


Figure 3.10 How to Use the Bolts of the Central Bearing

⚠ CAUTION



Do not extend the adjustable bolts over the maximum.

The maximum extension of the adjustable bolts is indicated with an O-ring in the tread (see [Figure 3.10 \[3\]](#)). If extended further, upper and lower part of the adjustable bolt may fall apart and the mounting hardware is unsafe.

- ▶ Check that this O-ring is not visible in your mounted hardware.
- ▶ If the adjustable bolt is too short then insert more spacer bolts (see [Figure 3.10 \[4\]](#)).

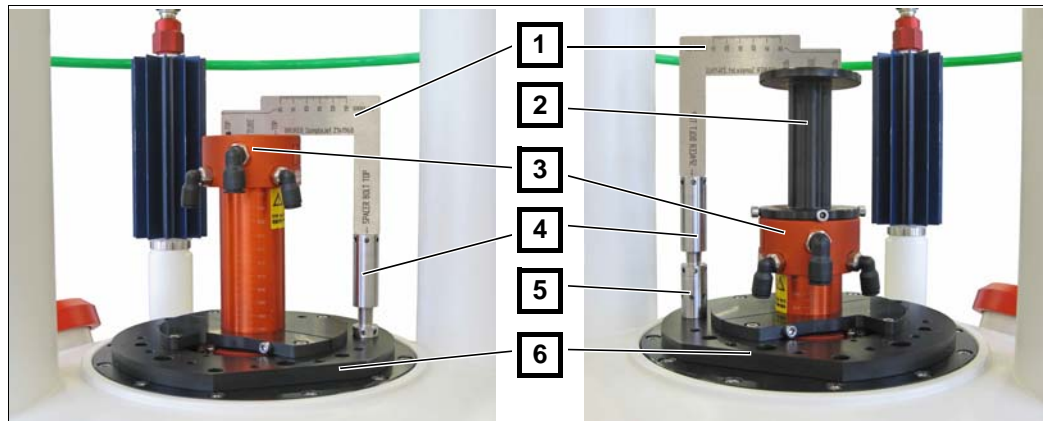


Figure 3.11 Use the Adjustment Gauge to Set the Base Plate Height

- | | |
|----------------------|---|
| [1] Adjustment gauge | [5] Spacer bolt (here only 1 of maximum 3 in use) |
| [2] Distance tube | [6] Adapter (here shown in the installation option „C“ with the tension ring) |
| [3] BST tube | |
| [4] Adjustable bolt | |

- Use the adjustment gauge as shown (see [Figure 3.11\[1\]](#)) to determine the height for the bolts. If the BST tube extends not enough from the magnet, the distance tube (see [Figure 3.16\[3\]](#) on [page 34](#)) is needed for the installation {Tools: Adjustment gauge, 2.5mm allen key}.



If your BST height allows an installation with and without the distance tube, then use the distance tube, what is anyway the most common setup for newer magnets.



WARNING

Bad fixation of the SampleJet is serious.
Therefore: Always use all 3 bolts.

- Insert and adjust all 3 bolts. Choose an even distribution (approx. $3 \times 120^\circ$) of the bolts so that the base plate will fit: Two bolts are on the front side of the magnet and one on the back side. {Tools: Adjustment gauge, 2.5mm allen key}.

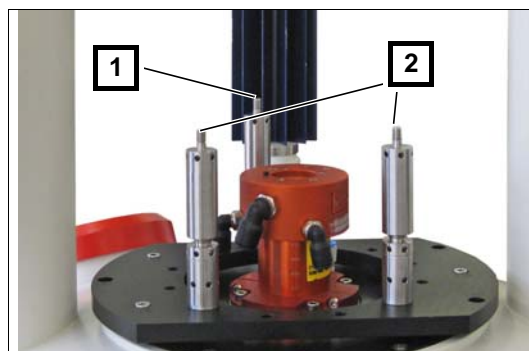


Figure 3.12 All 3 Bolts Installed on the Adapter Plate

- | |
|---------------------------------|
| [1] One bolt on the back side |
| [2] Two bolts on the front side |

3.1.3.2 Adjusting the Supports

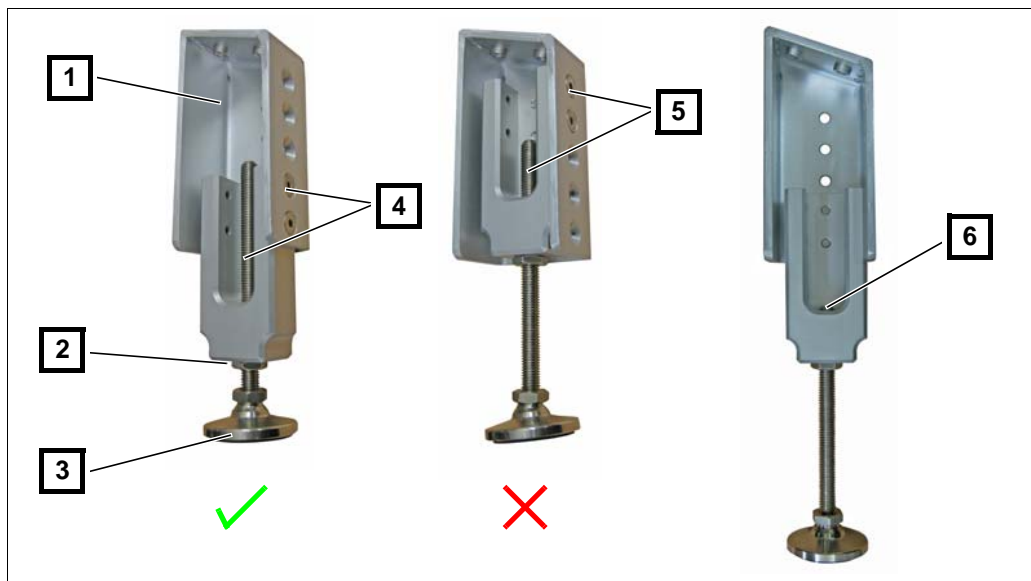


Figure 3.13 How to Adjust the Supports

- | | |
|--|--|
| [1] Support block (left version) | [5] Bad example: Support block minimized but feet extended |
| [2] Locking nut | [6] Support feet extended to the maximum |
| [3] Support feet | |
| [4] Good example: Support block extended and feed screwed in | |

CAUTION

Do not extend the support feet over the maximum.

The maximum extension of the support feet is indicated with the inner cut-out (see [Figure 3.13 \[6\]](#)). If extended further, upper and lower part of the support feet are poorly connected and the mounting hardware is unsafe.

- ▶ Check that the thread is still visible inside the support block in your mounted hardware.
- ▶ If the support feet is too short extend the support block.
- ▶ Always first extend the support block rather than the support feet.

WARNING

Bad fixation of the SampleJet is serious.
Therefore: Always use both supports.

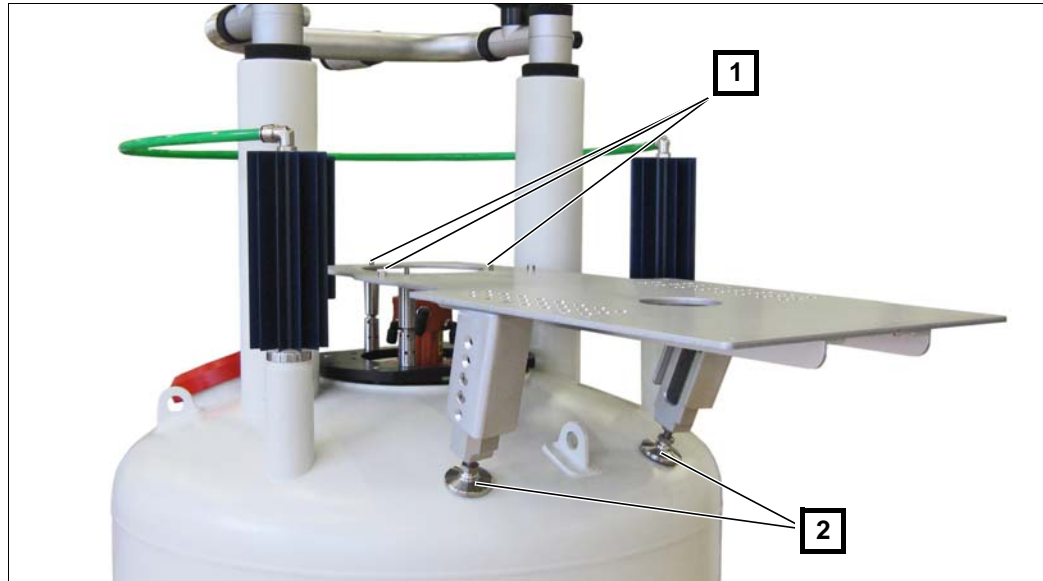


Figure 3.14 Positioning of the Supports

[1] Base plate is not screwed yet

[2] Supports at the best position on the magnet

15. Screw the support blocks as far as possible to the outside of the magnet with the feet still on the flat magnet top and not on the round border {Tool: Allen key 4}.



Figure 3.15 Bottom up View of Properly Adjusted Bolts and Supports

[1] No gap between the adjustable bolts and the base plate

16. Adjust the height of the supports until there is no gap between all of the three bolts and the base plate when the base plate is not screwed on the bolts {Tool: Allen key 4}.
17. Screw the base plate on the bolts with the nuts and use a washer for each {Tool: Flat spanner 13}.

3.2 Installing the BST Adapter

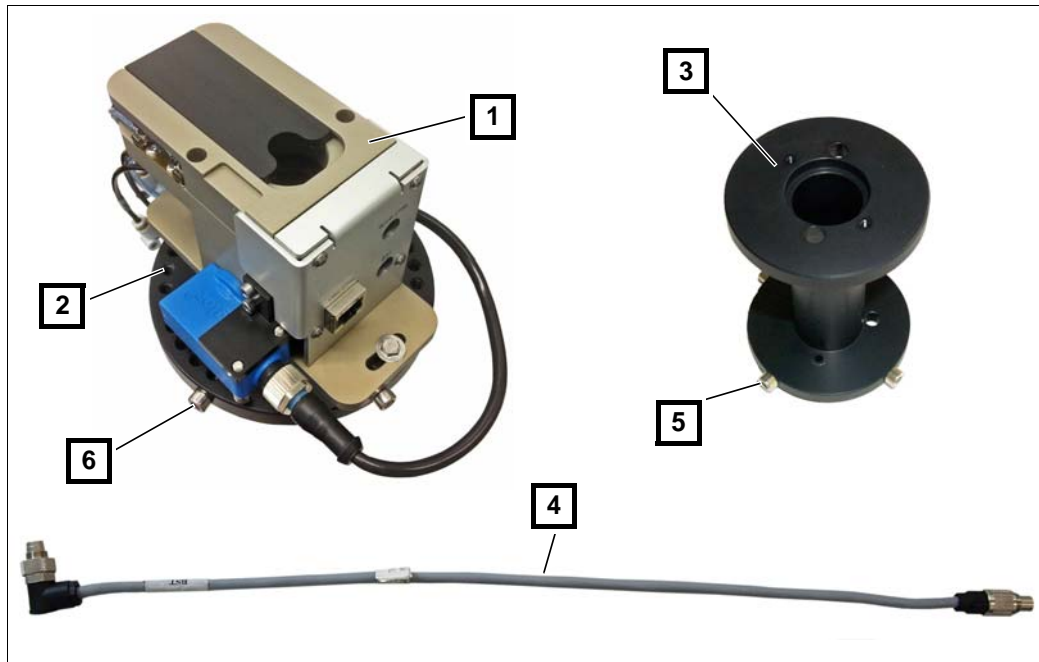
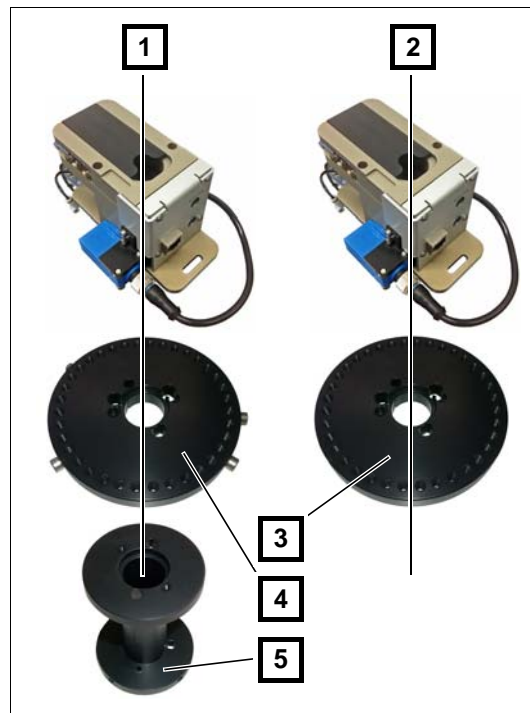


Figure 3.16 The Complete BST Adapter Hardware

- [1] The BST adapter
- [2] The BST adapter flange
- [3] The distance tube
- [4] The BST-BST cable
- [5] Lift bypass screws at the BST adapter flange (1 of 4)
- [6] Lift bypass screws at the distance tube (1 of 4)

3.2.1 Presetting the Lift Bypass Screws



- [1] The setup with the distance tube
- [2] The setup without the distance tube
- [3] Flange without bypass screws
- [4] Flange with bypass screws
- [5] Distance tube without bypass screws

Figure 3.17 Set the Lift Bypass Screws Correctly

18. The lift bypass screws (see [Figure 3.16 \[5\]\[6\]](#)) have to be set correctly depending on the hardware setup {Tool: allen key 4}.
19. Store the unused bypass screws in the tool box for future use.

Setup	Bypass Screws in the Flange	Bypass Screws in the Distance Tube
Setup with distance tube	4 (always)	0 (initially)
Setup without distance tube	0 (initially)	-

Table 3.2 Set the Lift Bypass Screws Correctly



The lift bypass screws are the presetting for the software lift calibration. The screws will be set accordingly to this description during the installation and may have to be changed later when proceeding the lift calibration.

3.2.2 Screwing the BST Adapter



Make sure that the lid switch in the BST (see [Figure 3.2 \[3\]](#) on [page 24](#)) fits in a hole and is not pushed down by the hardware.

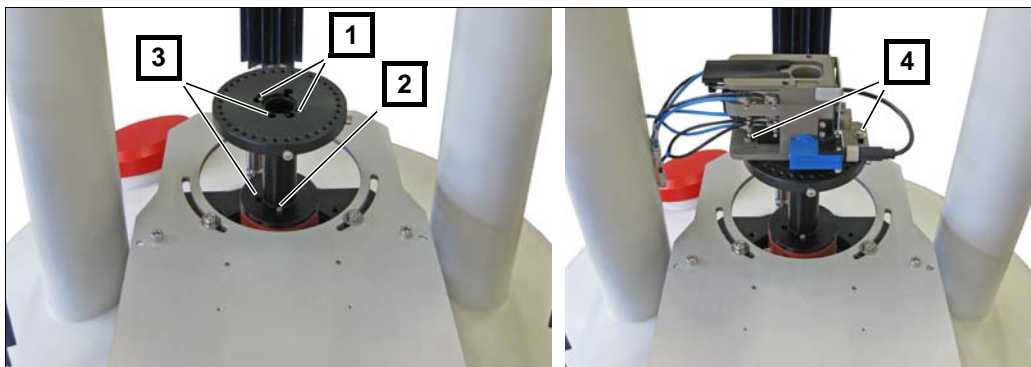


Figure 3.18 Installing the BST Adapter

- | | |
|---|--|
| [1] The flange is screwed with two M3 x 12 screws | [3] Holes for the lid switch of the BST in both hardware parts |
| [2] The distance tube (if needed) installed with two M3 x 12 screws | [4] BST adapter screwed with its two M5 x 12 screws |

20. If required, screw the distance tube on the BST {Tool: Allen key 2.5}. Do not press in the lid switch.
21. Screw the BST adapter flange to the distance tube or the BST {Tool: Allen key 2.5}. Do not press in the lid switch.
22. Then install the BST adapter on the BST adapter flange.{Tool: Flat spanner 7}. Make sure the alignment is correct (see [Figure 3.19](#))

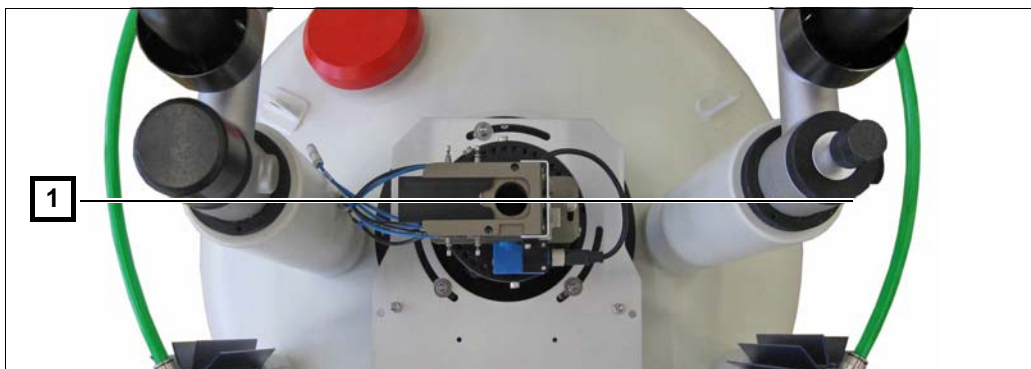


Figure 3.19 Aligning the BST Adapter

- [1] BST adapter aligned to the HE towers

3.3 Installing the SampleJet

3.3.1 Removing the Fan Transportation Lock

The control unit is equipped with a spring-loaded fan to prevent potentially vibrations on the NMR System. This is indicated with a yellow sticker on the side of the control unit as shown below.

For transportation the fan inside the control unit is secured with a cable tie that has to be removed at the installation.



Electrostatic discharge.
Therefore: Do not touch the parts in the controller.

23. Open the control unit by un-tightening 8 screws (see [Figure 3.20 \[1\]\[2\]](#)) on both sides.
24. Cut the cable tie (see [Figure 3.20 \[3\]](#)) that secures the fan and remove it {Tool: Side cutter}.
25. Check if the fan can freely swing.
26. Close the control unit.
27. Mark the sticker on the side of the control unit (see [Figure 3.20 \[4\]](#))

Remove the fan transportation lock inside the control unit and indicate on the yellow sticker that the lock has been removed.



The fan is properly working even when the lock is not removed. The customer may then see vibrations in the spectra when running very sensitive experiments.

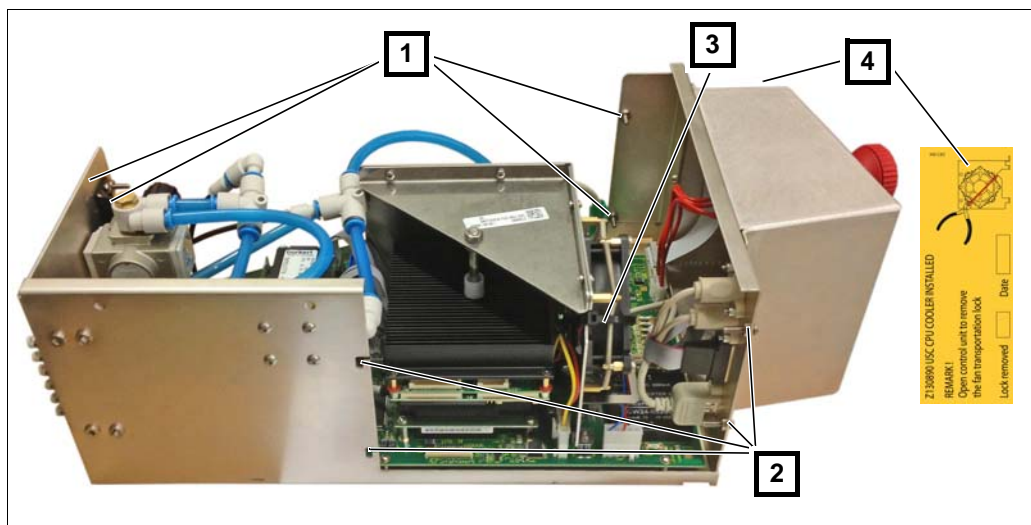


Figure 3.20 The Open Control Unit with the Transportation Lock

- | | |
|---------------------------------------|---|
| [1] 4 Screws for the right side cover | [3] The transportation lock cable tie |
| [2] 4 Screws for the left side cover | [4] The sticker on the side of the control unit |

3.3.2 Modifying the Frame for Special High Field Magnets



On some special high field magnets the frame needs to be modified for the installation.

28. If you are sure that the SampleJet needs to be modified (try first without), break away the cover mounting point.

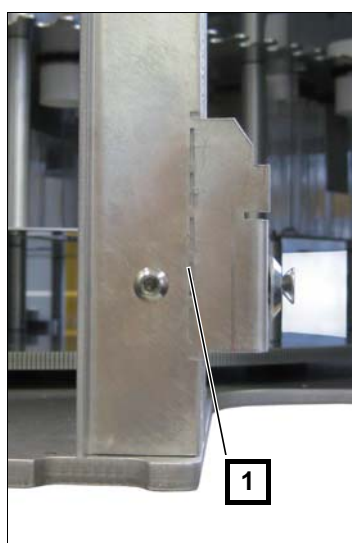


Figure 3.21 Modifying the Frame

- [1] Predetermined braking point on the sheet on the back post (left side)

3.3.3 Lifting up the SampleJet Frame

⚠ WARNING

The SampleJet main unit is heavy.
Therefore: Do not carry the SampleJet alone.

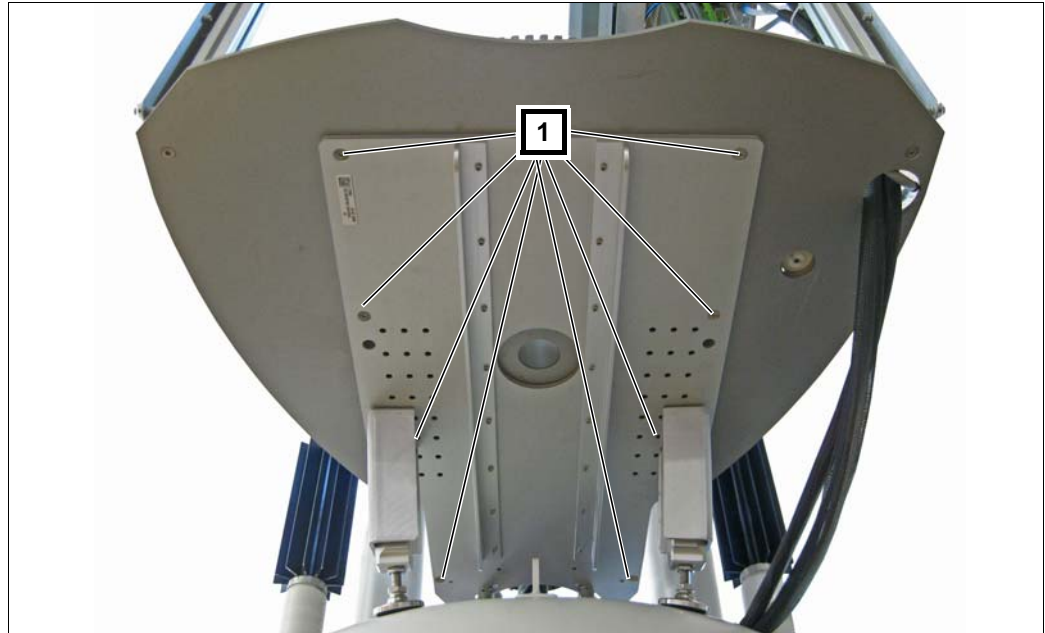


Figure 3.22 Screwing the Frame to the Base Plate

[1] Eight M6 x16 screws holding the SampleJet

29. Screw the SampleJet on the mounting hardware with the 8 M6 x 16 screws. All screws are necessary to brace the SampleJet base plate {Tool: Allen key 4}.

3.3.4 Removing the Transportation Lock Cable Ties

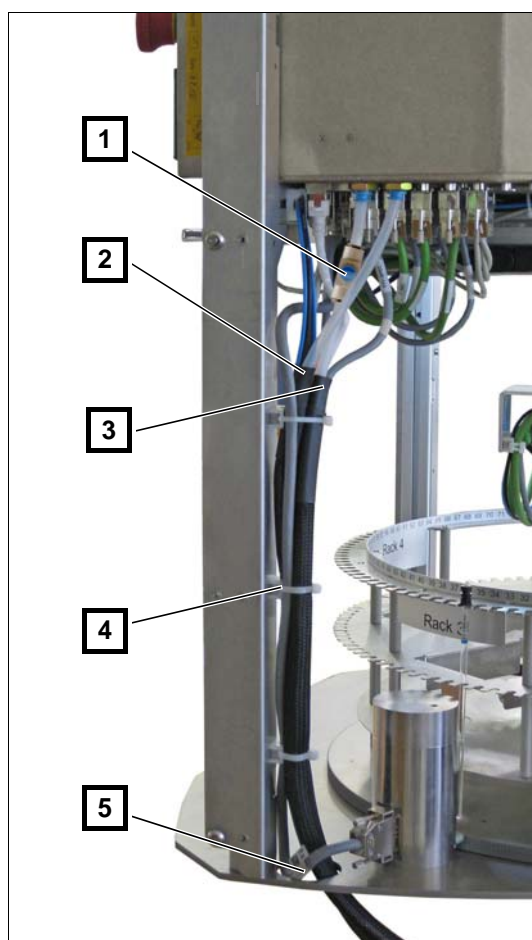
30. Remove the cable ties that holds the carousel in place {Tool: Side cutter}.
31. Remove the cable ties that secures the gripper arm {Tool: Side cutter}.

3.4 Cabling



Read the labels on the cables and hoses carefully. Some plugs fits into several sockets.

3.4.1 Connecting the SampleJet to the Console



- [1] Main gas switch
- [2] Short, pre-installed cable harness to the BST adapter (RJ45, 4x3.2mm hose black and blue)
- [3] Long cable harness to the console (RJ45, D-SUB 15, D-SUB 25, 8mm hose)
- [4] Cable holder
- [5] Hole in the base for the cables

Figure 3.23 Connecting the Control Unit

32. Feed the short harness (already connected) through the cut-out in the base plate.
33. Feed the long cable harness (the side with the gas switch) coming from the back side of the magnet through the cut-out in the base plate and connect all the plugs and the hose {Tool: Slot screwdriver 2}.
34. Attache all cables to the cable holders.

WARNING

The drop-off plate is a safety valve.
Therefore: Do not block the drop-off plate.

35. Arrange the long cable harness toward the console.



When installing a SampleJet on an old console without an Ethernet switch, the Ethernet switch that comes with the SampleJet has to be installed.

36. Connect the Ethernet cable to the switch in the console (or to the back panel of the console if a socket is available).

37. Connect the TTY cable on a free TTY socket on the IPSO (or to the back panel of the console if a socket is available) {Tool: Slot screwdriver 2}.

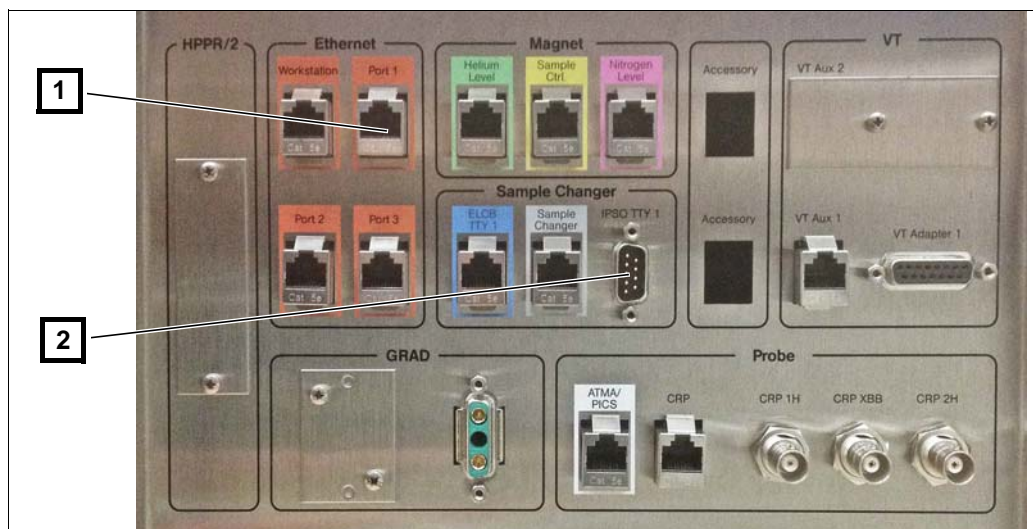


Figure 3.24 Connecting a SampleJet on a Nanobay V3

[1] Socket for the Ethernet cable

[2] Socket for the TTY connector

38. If possible place the power supply inside the console and connect the grounding wire to the chassis of the console. If the console is small or full, place the power supply behind or on top of the console and connect the grounding wire to the grounding point on the outside of the console {Tools: Crosstip screwdriver 2 or flat spanner 7}.

3.4.2 Connecting the Gas Supply



Risk of suffocation with nitrogen gas.

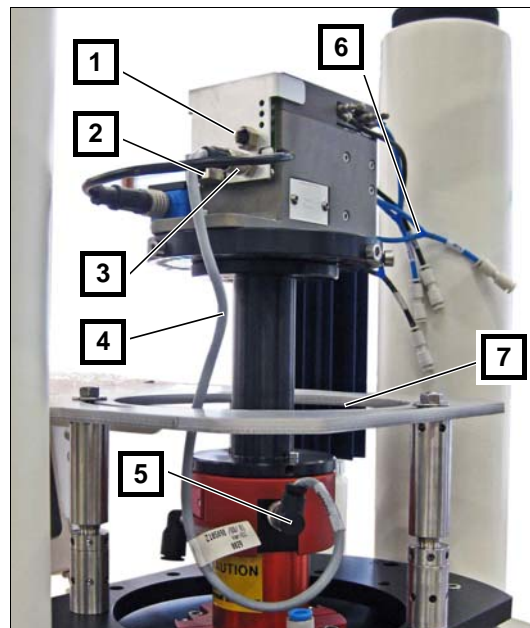
Therefore: Connect the SampleJet to compressed air.

39. Connet the gas supply for the SampleJet to compressed air with the delivered „Y“ connector.



If there is no compressed air supply in the lab available or the nitrogen gas supply has stronger gas flow, read the warning "[Risk of suffocation when operating the SampleJet with nitrogen gas.](#)" on page 14 to see if the SampleJet can be connected to nitrogen gas.

3.4.3 Connecting the BST Adapter



- [1] The SLCB CTRL socket
- [2] The USC CTRL socket
- [3] The BST socket
- [4] The BST - BST cable
- [5] The socket on the BST
- [6] The gas connectors for the sliders (gate and clamp)
- [7] Big hole in the base plate

Figure 3.25 Side View on the BST Adapter



Feed all cables towards the BST adapter through the big hole in the base plate. The back cover will close the free space around the base plate.

40. Connect the short, gray BST-BST cable from the BST to the BST adapter socket „BST“ (see [Figure 3.25 \[3\]\[4\]\[5\]](#)).
41. Connect the yellow BST cable coming from the console to the „SLCB CTRL“ connector on the BST Adapter (see [Figure 3.25 \[1\]](#)).
42. Connect the RJ45 connector coming from the control box to the BST Adapter socket „USC CTRL“ (see [Figure 3.25 \[2\]](#)).
43. Connect the 4 hoses to the gas connectors according to the labeling on the hoses(see [Figure 3.25 \[6\]](#)).

3.5 Installing the Covers

3.5.1 Modifying the Side Covers for Special High Field Magnets



On some special magnets the side cover need to be modified for the installation.

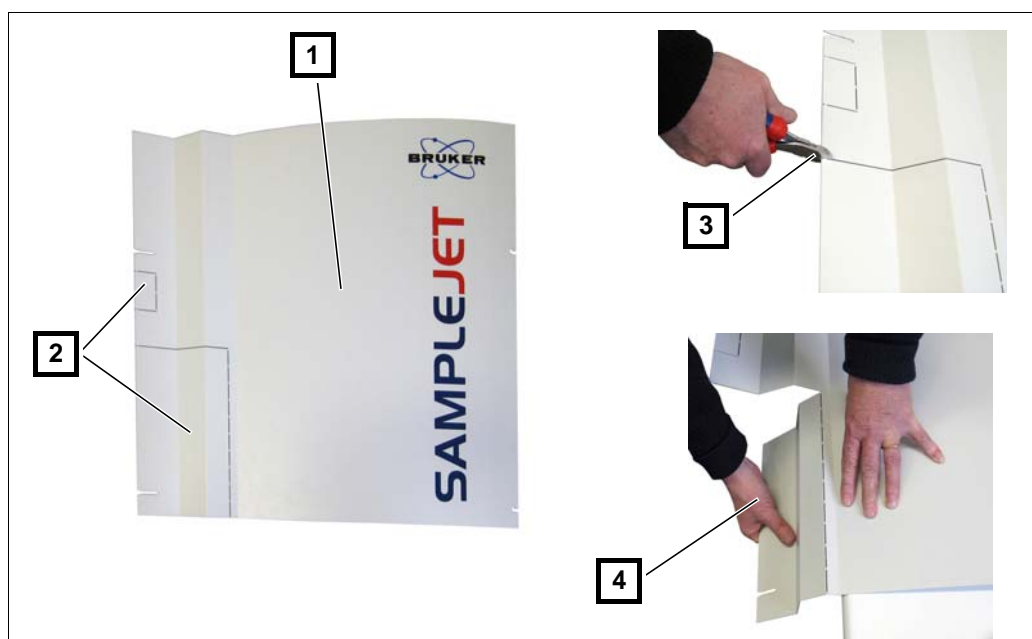


Figure 3.26 Modifying the Side Covers for High Field Magnets

- [1] The left side cover
- [2] The two parts to cut away (only one part on the right side)
- [3] Cutting the bridge with a side cutter
- [4] Breaking the piece at the predetermined breaking point



Sharp edges.
Therefore: Bend the cut-outs inwards.

- 44. Cut the bridge on the sides of both covers {Tool: Side cutter}
- 45. Break away the cut-outs by hand by bending them as much as possible inwards.

3.5.2 Attaching the Covers



The screws and the washers for the covers will always remain at the frame and do not have to be removed to attach or remove the covers.

The front door opening side can be changed if the lab layout requires this.

46. Attach both side covers by sliding the back end first over the screws and then hang in the front end. Then tighten all the screws {Tool: Allen key 2.5mm}.
47. Chose the side of the door opening. If the side has to be changed from standard right to left, the holder for the switch has to be mirrored and mounted in the left side on the frame {Tools: Allen key 2.5mm and crosstip screwdriver}.
48. Hang in the front cover and acoustically check the function of the front door switch. Adjust the position of the door switch until the switch is triggered reliably. Then tighten all the screws {Tool: Allen key 2.5mm}.



Figure 3.27 Changing the Door Opening Side

- | | |
|--|---|
| [1] Holder for the door switch for door opening on left side | [3] Front cover with door opening on right side |
| [2] Front cover with door opening on left side | [4] Holder for the door switch for door opening on right side |

Mounting Instructions

49. Insert the top cover at the front side while holding it in a flat angle. Ensure that the top cover is on the bar of the front cover with its two brackets on the side underneath of it.
50. Then release the rear part onto its holder sheets.

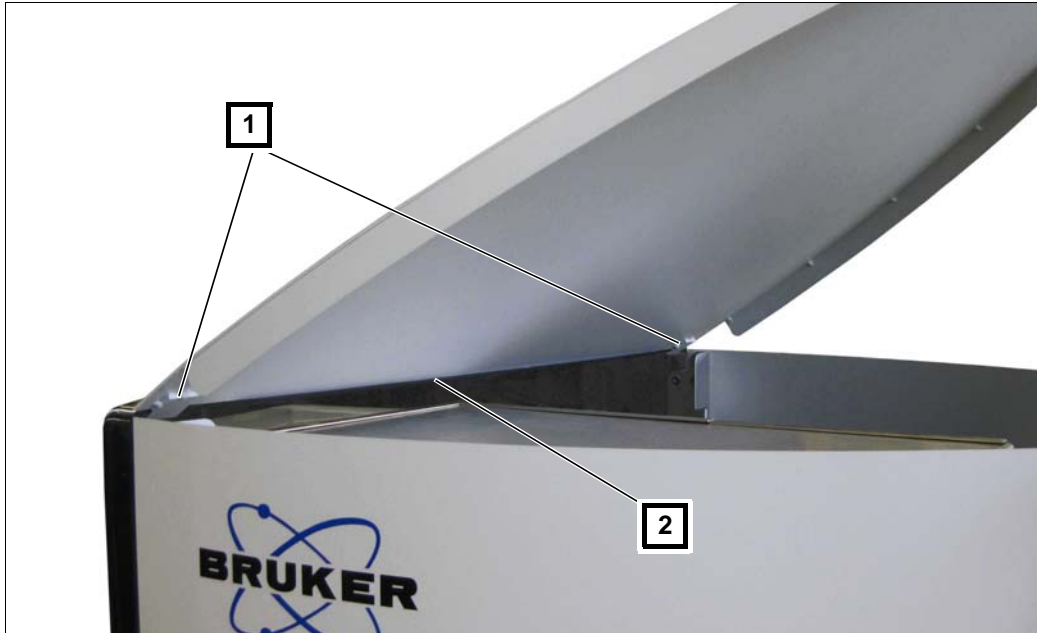


Figure 3.28 Inserting the Top Cover

[1] The 2 brackets on the top cover

[2] The bar of the front cover

51. Hang in the back cover and acoustically check the switching of the back door switch.

4 Cooling Option Installation

4.1 Introduction

SampleJet is delivered with a cooling option are always coming in their standard configuration. This means that the standard carousel 99/5 is installed and needs to be replaced with the cooled carousel. Installing the cooling option is therefore always an upgrade of a current system.

The cooling option consists of an insulated carousel replacing the existing carousel, a kit to connect the cooler and preheating unit. The cooling option requires its own BCU I cooler. For additional information about the cooling and the pre-heating refer to the SampleJet Users Manual (included in the SampleJet firmware).

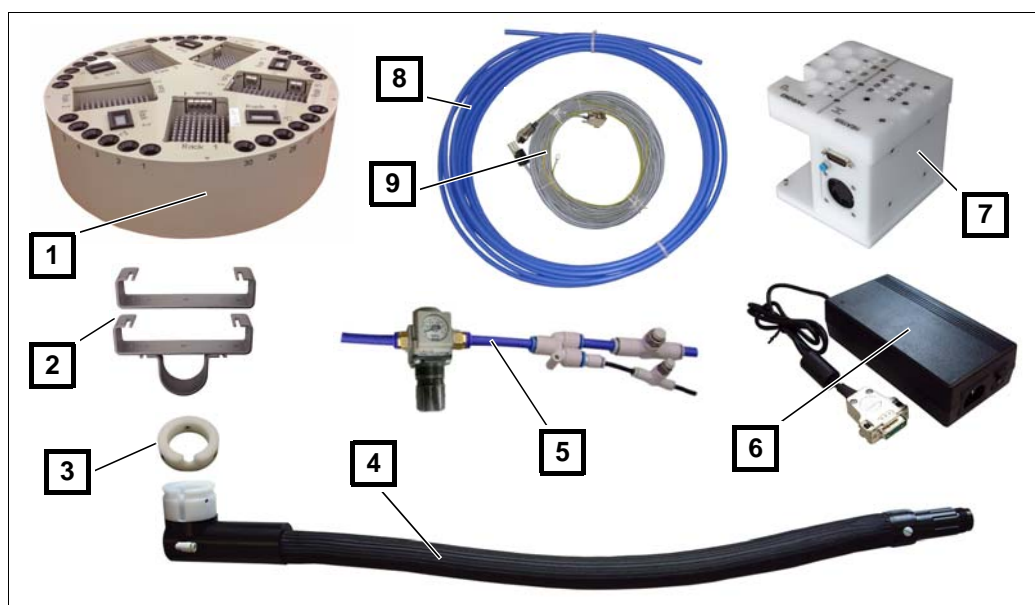


Figure 4.1 Overview of the Cooling Option (Main Parts without Chiller)

- | | |
|-----------------------------|------------------------|
| [1] Carousel cooled 30/5 | [6] Power supply |
| [2] Retaining plates | [7] Pre-heating unit |
| [3] Cable protection ring | [8] 8mm hose |
| [4] BCU I SampleJet adapter | [9] Power supply cable |
| [5] Gas flow reduction | |

4.2 Prepare the Installation

1. De-Energize the SampleJet before installing the cooling option. For details see "[De-Energize the System](#)" on page 19.
2. Remove the front cover {Tool: Allen key 2.5}.
3. Remove the covers on the left and the right side {Tool: Allen key 2.5}.
4. Remove the existing carousel and all supports {Tool: Allen key 2.5}.

4.3 Installing the Pre-Heating

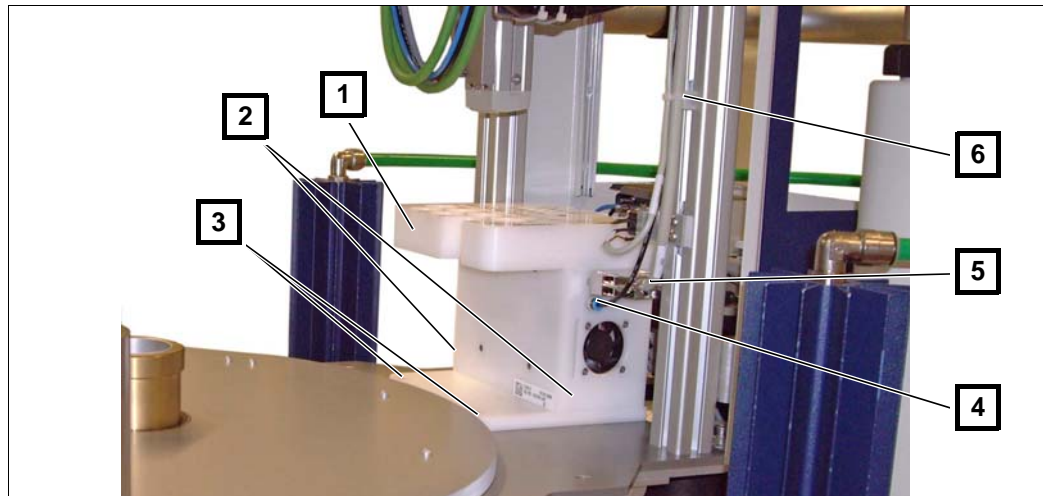


Figure 4.2 The Installed Pre-Heating

- | | |
|-------------------------------------|--------------------------|
| [1] Preheating unit. | [4] Drying gas connector |
| [2] Two screws trapped in the body | [5] Control cable |
| [3] Two screws on the carousel side | [6] Cable holder |



2 of the 4 screws are trapped inside the unit and requires a straight 2.5mm Allen key with ball head.

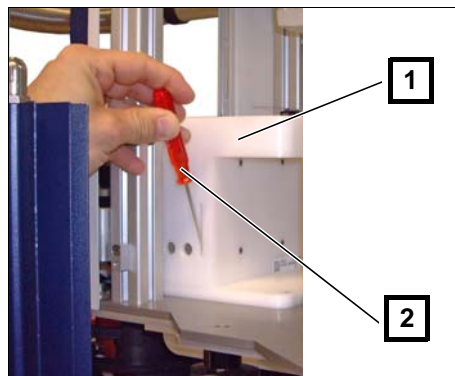


Figure 4.3 Screwing the Trapped Screws

- | |
|--|
| [1] Pre-heating unit |
| [2] Ball-head Allen key 2.5 from the tool box in use |

5. Screw the pre-heating unit to the base plate {Tool: Straight ball-head Allen key 2.5}.
6. Connect the cable and the hose.

Cooling Option Installation

7. Feed the cable and hose toward the control unit and attach them with cable ties on the cable holders.



Make sure that the cable and hose are not touching the moving energy chain when the gripper is moved to the very back (magnet center) side.

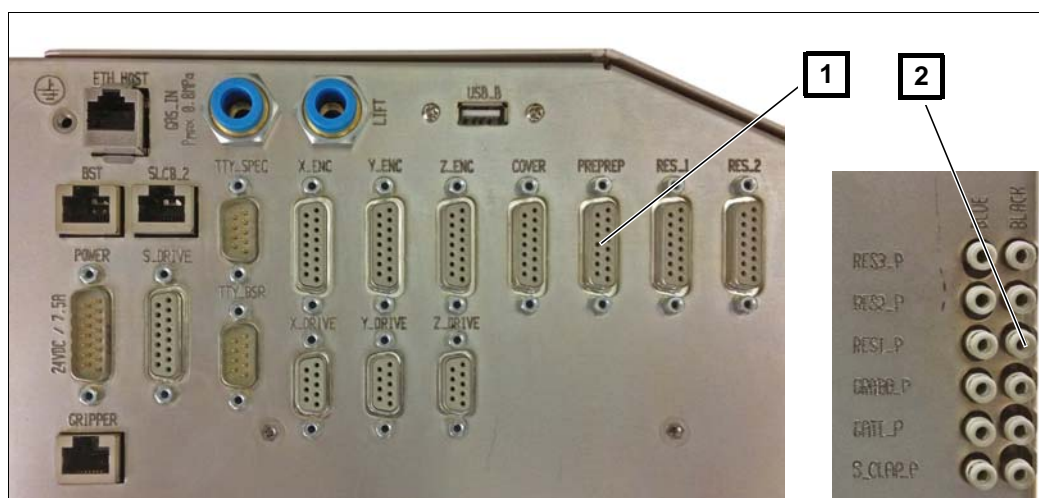


Figure 4.4 Pre-Heating Connections on the Control Unit

- [1] „PREPREP“ connector on the bottom of control unit
 - [2] „RES_1“ connector „BLACK“ column on the back of the control unit
8. Connect the cable to the „PREPREP“ connector on the control unit {Tool: Slot screwdriver 2}.
 9. Connect the black hose to the „BLACK“ column of the „RES1_P“ connector.

4.4 Installing the Cooling Carousel

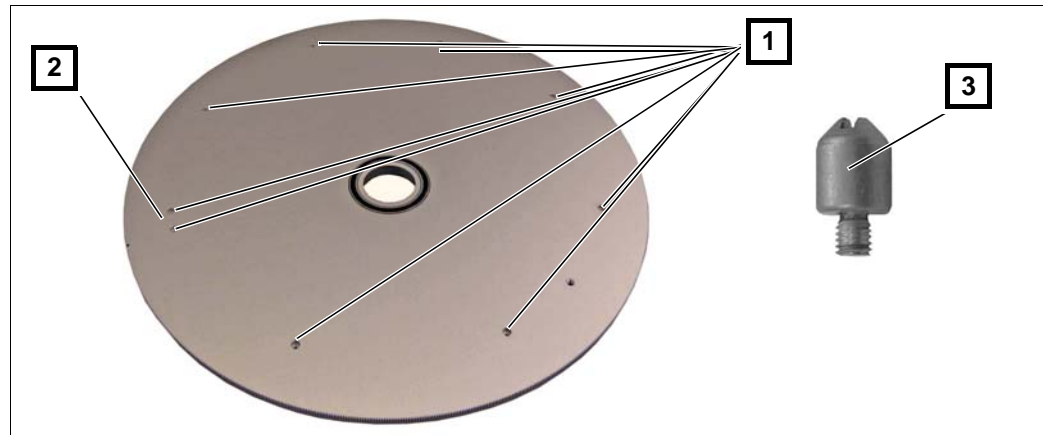


Figure 4.5 Placing the Tappets

- [1] Nine treads for the tappets [3] Tappet
 [2] Index position with double tappets

NOTICE

Do not squeeze the red cooling power cable.

Do not squeeze the red power cable when inserting the cooling carousel. Once damaged, the wires in the cable may break after a while from the movement.

- ▶ Insert the cooling carousel carefully.
- ▶ Let someone else guide the cable through the hole while inserting the carousel.

10. Place the 9 tappets on the rotating carousel {Tool: Slot screwdriver 2}
11. Feed the cable through the hole in the center and place the carousel on the tappets. Take care of the proper orientation. The carousel will not be screwed on the SampleJet.

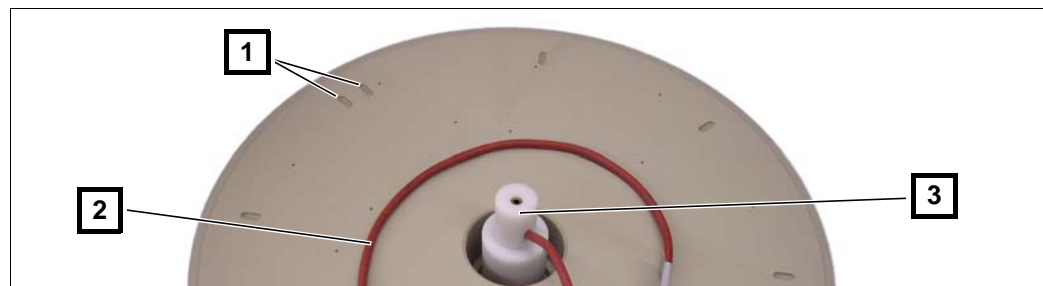


Figure 4.6 Bottom View of the Carousel Cooling 30/5

- [1] Index with the double cut-out [3] Coupler inner part
 [2] Red power cable

4.5 Connecting the BCU I SampleJet Adapter

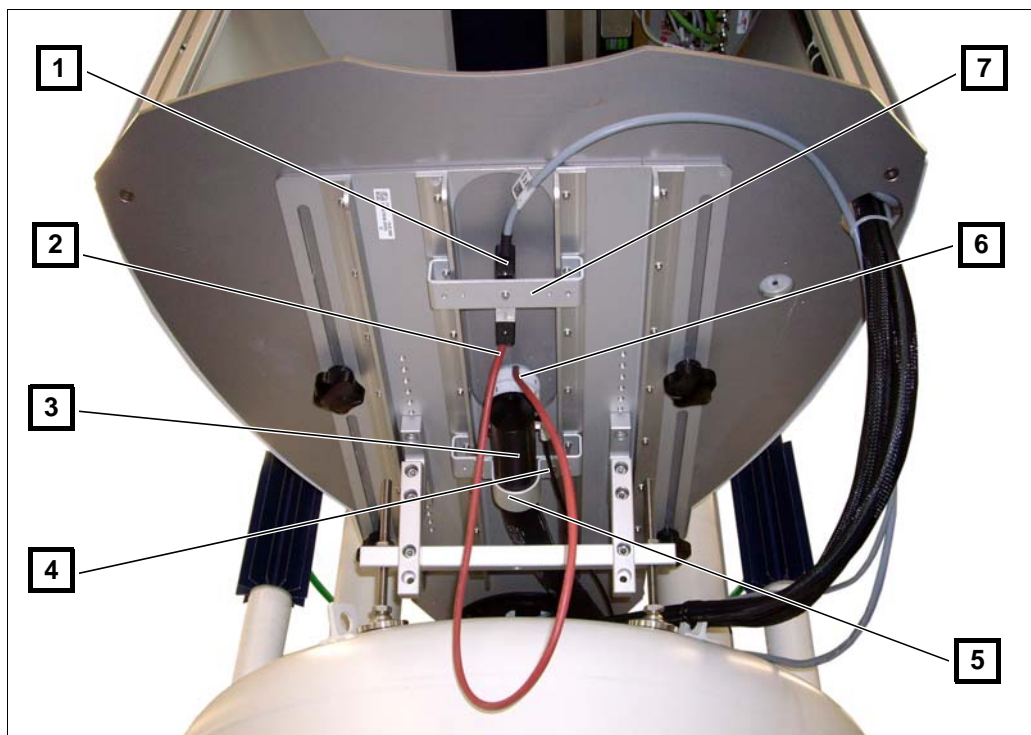


Figure 4.7 The Complete Coupler

- | | |
|---------------------------------|---|
| [1] Cable from the power supply | [5] Retaining plate for the coupler |
| [2] Red power cable | [6] Cable protection ring |
| [3] BCU I SampleJet adapter | [7] Retaining plate for the power connector |
| [4] Coupling drying gas | |



The retaining plates will be screwed with new M3 x 12 screws to the mounting hardware since the existing screws holding the L-profiles are too short.

12. Screw the retaining plates for the power connector and the for the coupler to the mounting hardware with the M3 x 12 screws {Tool: Allen key 2.5}.
13. Put the white cable protection ring on the inner coupler piece and keep it in place by slightly screwing in the 3 headless screws {Tool: Allen key 2.5}.
14. Attach the BCU I SampleJet adapter {Tool: Allen key 2.5}.
15. Plug in the black 4mm gas hose in the connector at the coupler.

The BCU I SampleJet adapter will be parallel to the bottom of the SampleJet if installed correctly. If not, the coupler is not fully inserted.



Do not tighten the headless screws of the coupling too much. The coupler will be deformed and can leak.

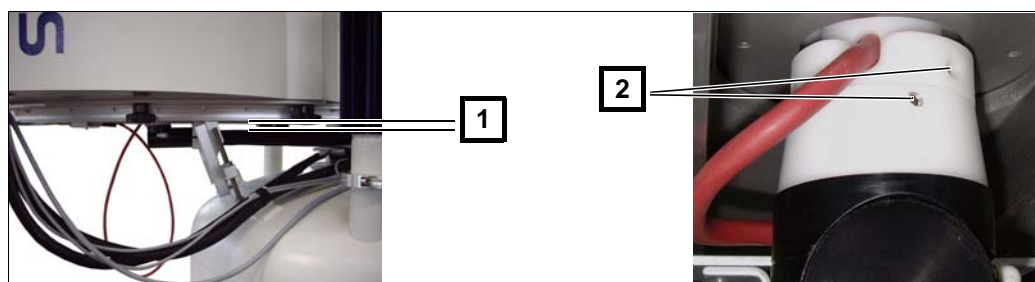


Figure 4.8 Correct installation of the coupler

[1] Parallel gap between coupler and SampleJet [2] Headless screws

16. Tighten all the six headless screws on the coupler carefully {Tool: Allen key 2.5}.

4.6 Installing the BCU I

CAUTION

Instable hardware.
Therefore: Do not stack the BCU I on top of one another.

WARNING

The drop-off plate is a safety valve.
Therefore: Do not block this plate with the transfer line.

NOTICE

Do not pull on the BCU I SampleJet adapter.

After and during the installation the BCU I transfer line should not pull on the BCU I SampleJet adapter. The insulation may be damaged or the adapter may leak.

- ▶ Hang the BCU I transfer line on the magnet.

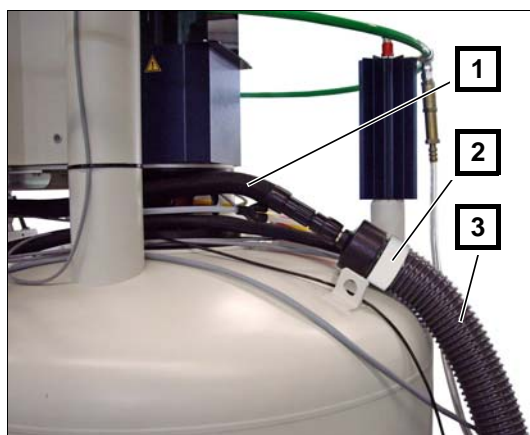


Figure 4.9 Connection the BCU I

- [1] BCU I SampleJet adapter
- [2] Velcro fastener
- [3] BCU I transfer line

17. Connect the BCU I to the BCU I SampleJet adapter and secure the transfer line with the Velcro fastener on the magnet.
18. Remove the transport securing screws underneath the BCU I.
19. Situate the BCU I in the lab and feed the transfer line towards the back of the SampleJet.

4.7 Power Supply for the Carousel

The power supply is powering the temperature control in the carousel by heating the rack slots to a constant low temperature. The power supply is connected also to the BCU I to remotely switch the cooler on and off together with those heaters inside the carousel.

The power supply cable on the carousel is protected by the firmware from being wrapped around the gas coupling. If the firmware should fail the connector will be pulled out and protects the cable.

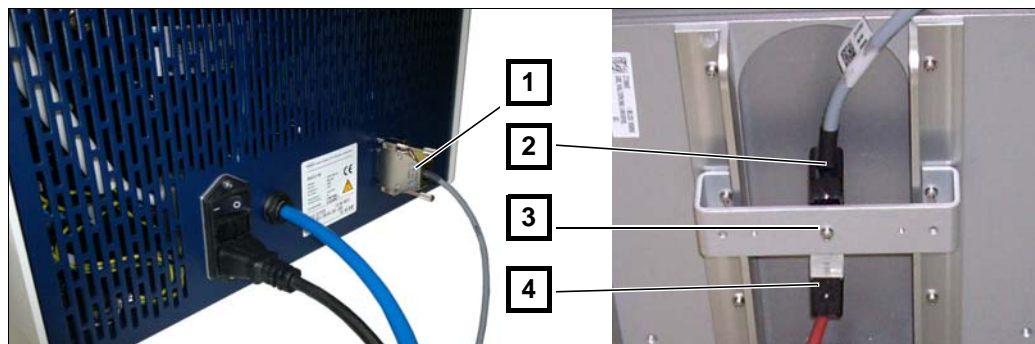


Figure 4.10 The Power Cable Connections

- | | |
|---|--|
| [1] Remote control connector on the back of the BCU 1 | [3] Loose screw for the connector |
| [2] Fixed connector from the power supply | [4] Pull-out connector towards to carousel |
20. Place the power supply into or on the console next to the SampleJet power supply. (Make sure the customer can distinguish the two power supplies)
 21. Connet the cable to the power supply and the ground cable to the grounding point on the console.
 22. Connect the mains cable to the power supply. It can be plugged in on an outlet on the console if available or directly on the wall.
 23. Install the power cable from the console to the carousel and connect the power connector.
 24. Mount the connector loosely on the retaining plate. The connectors need to swing to both sides {Tool: Allen key 2.5}.

4.8 Gas Supply

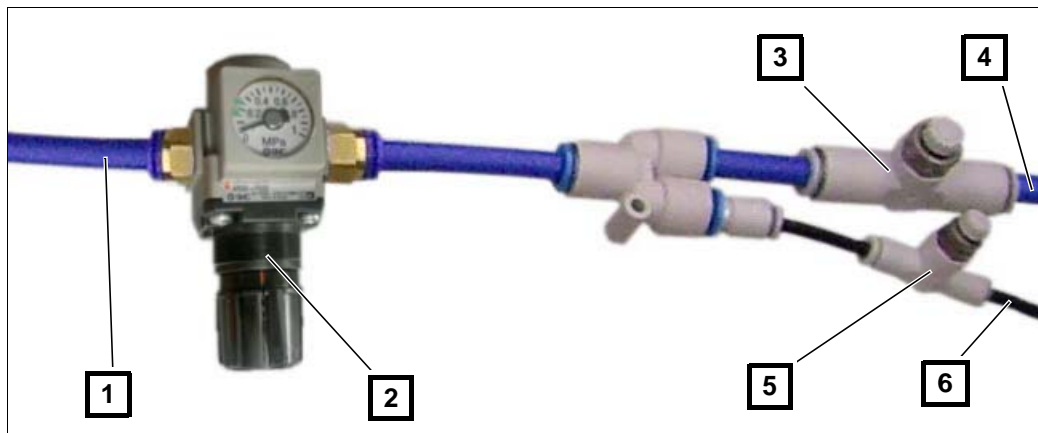


Figure 4.11 The Gas Flow Reduction

- | | |
|---|---|
| [1] Compressed air inlet (40 NI/min) | [4] Chiller gas outlet |
| [2] Pressure regulator (0.2 MPa) | [5] Gas reduction for the coupler (set from factory to 10 NI/min) |
| [3] Gas reduction for the chiller (set from factory to 30 NI/min) | [6] Coupler gas outlet |

WARNING

Risk of suffocation with nitrogen gas.
Therefore: Connect the cooling to compressed air.



The dew point for the chiller gas supply needs to meet the specification according to the documentation for the BCU I. See "[References](#)" on page XIII.

25. Connect the pressure regulator to compressed air(see [Figure 4.11 \[1\]](#))
26. Connect the BCU I with the blue 8mm hose to chiller gas outlet (see [Figure 4.11 \[4\]](#)).
27. Connect the coupler with the black 4mm hose to the coupler gas outlet (see [Figure 4.11 \[6\]](#))
28. Check if the input pressure is set to 2 Bar (0.2 MPa).

4.9 Power Up and Check the Function

29. Switch on the BCU I with the mains switch on the back of the cooler.
30. Switch the BCU I to position „Remote“.
31. Power up the power supply and check if the 5 displays on the Carousel 30 / 5 Cooled are showing room temperature. The BCU I should start simultaneous with the power supply.
32. After approximately one hour the temperatures of all the 5 rack slots in the carousel should show the same stable temperature.



The new carousel and the pre-heating has to be configured from the SampleJet web interface. Before this the cooling option is not ready to be used.

33. Configure the cooling carousel on the „System Configuration“ web site from the „Advanced Service“ menu.
34. Configure the pre-heating on the „System Configuration“ web site from the „Advanced Service“ menu.

4.10 Cooling Overview

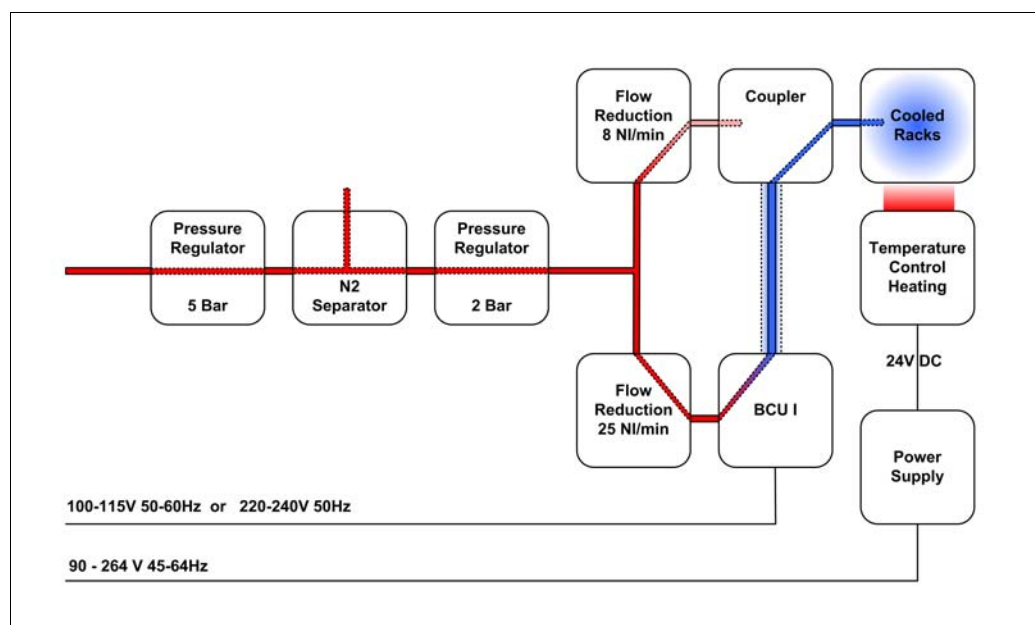


Figure 4.12 Cooling Overview

5 Remote Control Option

5.1 Introduction

The remote control is a device that is used to rotate the carousel without accessing the touchscreen. The use of the remote control is simpler than the touchscreen and is therefore easier to handle for untrained users.

The remote control will lock the system while the user is loading or unloading tubes.

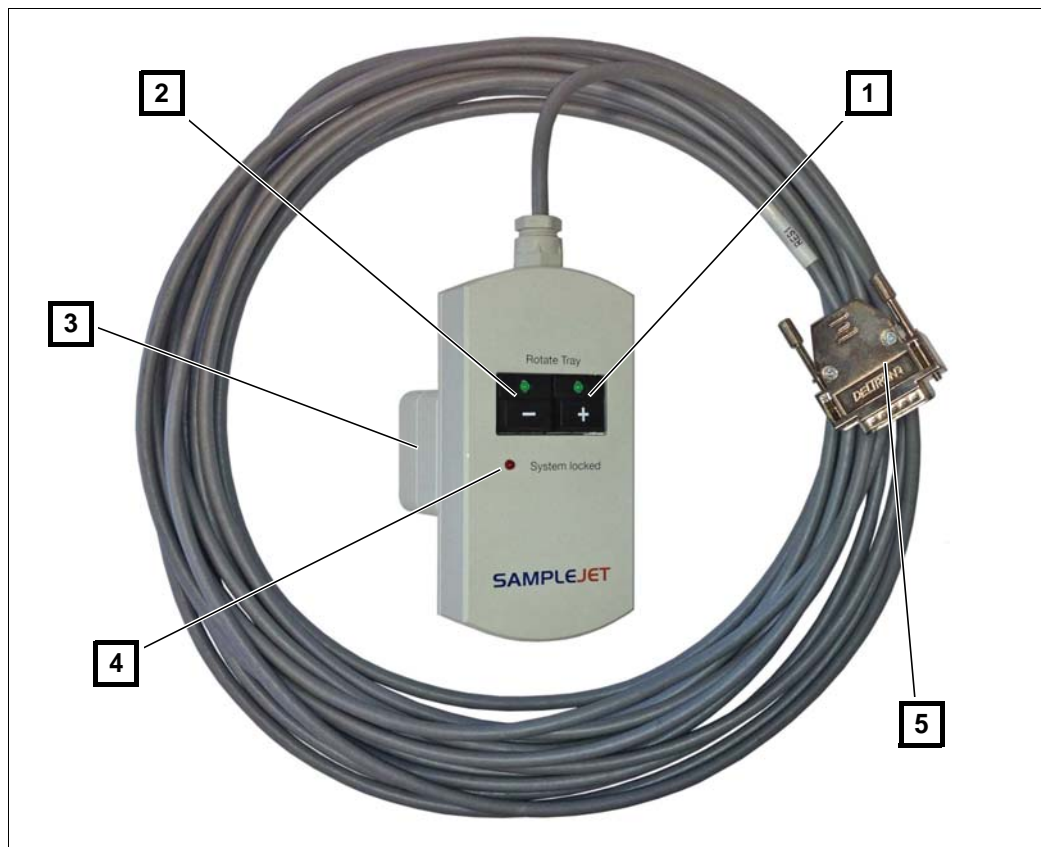
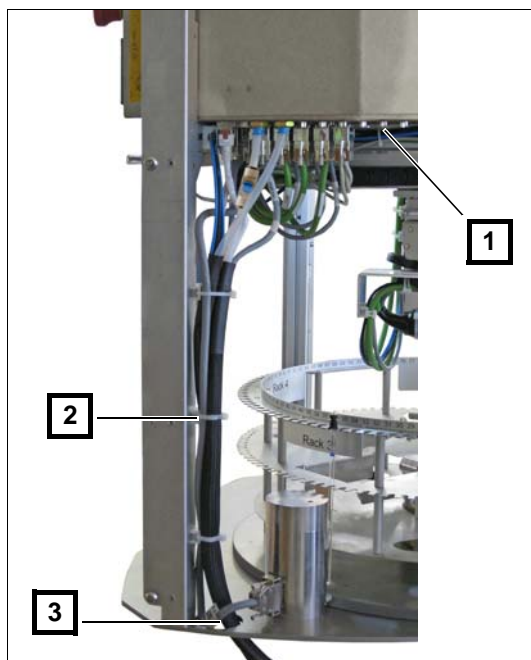


Figure 5.1 The Remote Control Option

- | | |
|---|--|
| [1] Button with LED for counterclockwise rotation | [4] System locked LED |
| [2] Button with LED for clockwise rotation | [5] Connector („RES 1“) with 10m cable |
| [3] Clamp | |

5.2 Connecting the Remote Control



- [1] „RES 1“ socket at the control unit
- [2] Cable holder
- [3] Cut-out for cables

Figure 5.2 Connecting the Remote Control

1. Remove the right side panel {Tool: Allen key 2.5}.
2. Feed the cable through the cutout in the hole (see [Figure 5.2 \[3\]](#)).
3. Connect the remote control on the „RES 1“ connector (see [Figure 5.2 \[1\]](#)) of the control unit {Tool: Slot screwdriver 2}.
4. Attach the cable to the cable holders (see [Figure 5.2 \[2\]](#)).
5. Either attach the remote control with its clamp to a handrail (diameter 32.0 to 33.7mm) of a ladder/platform or let the remote control hang through the cut-out by attaching the cable of the remote control side to a cable holder {Tool: Allen key 2.5}.
6. Reinstall the side cover {Tool: Allen key 2.5}.

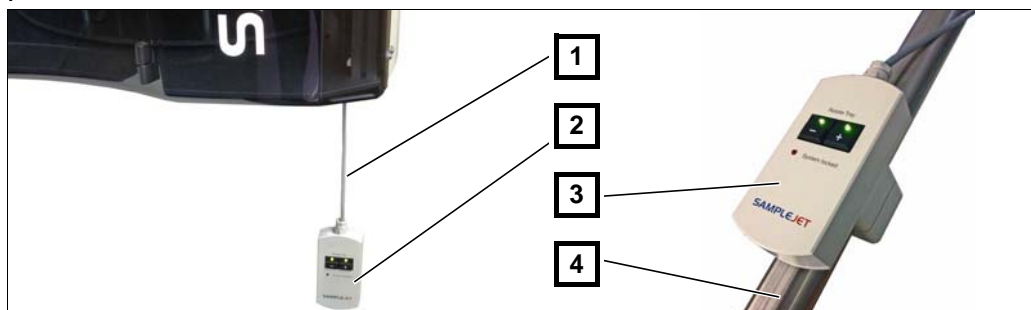


Figure 5.3 Situating the Remote Control

- [1] Remote control hanging under the SampleJet
- [2] Approx. 20cm cable
- [3] Remote control clamped to a handrail
- [4] Handrail of a ladder or platform

6 Acceptance

6.1 Introduction

At the end of the installation the SampleJet has to be handed over to the customer. In this process tests have to prove that the system is working and the customer should receive a short training. Tests and training are important for safety and quality reasons and will reduce problems and service calls after the installation.

The acceptance has these steps:

- "Acceptance Test"
Different test will show that the SampleJet is working properly.
- "Customer Training"
After the installation the customer should learn the basic operations on the systems. These are all described in details in the users manual.
- "Sample Changer Acceptance Report" (optional)
A form that will document the acceptance.



Filling out the acceptance report is not in any case necessary.



The acceptance of the sample changer can be also noted on the acceptance report for the complete NMR system if installed together.

Here some reasons to fill out the acceptance report:

- For general documentation purpose for Bruker service offices.
- If a payment of an outstanding balance is pending.
- The customer is requesting the report in order to meet the companies quality standard.

6.2 Acceptance Test

6.2.0.1 Checking Fixation of the Hardware

- Double check all the screws holding the SampleJet in place.
- Check if the SampleJet is approximately leveled relative to the magnet.

6.2.0.2 Testing Operating Modes

- Automated change of operating modes (includes matrix code reading).
Select all operating modes that the customer can work with (depending on the shuttles) once.
- Bar code reading
If the customer needs to read the barcodes on the side of the racks, then check the barcode reading with the „Read rack labels“ function from the „Self test“ web site.

6.2.0.3 Accessing User Interfaces

- Web interface and Display
Check that the SampleJet can be operated from the web interface and the display.
- Topspin or XwinNMR
Use „sx“ and „sx ej“ commands from Topspin or XwinNMR to insert and eject a tube.
- IconNMR
Set up some short experiments in IconNMR and start the run.
- Emergency stop
Press the emergency stop while the SampleJet is moving. The SampleJet should stop immediately. Restart the application by releasing the emergency button and do an error recovery to bring the system in the idle state again.
- Door switches
Both switches, front and back door, have to be tested. If you open a door, the light should turn on.

6.2.0.4 Performing Self Test

The results of these test does not need to be interpreted by the engineer but they are stored in the configuration and can later serve as a reference.

- Run the „Measure drive current profiles“ test from the „Self test“ web site.
- Run the „Test Gripper light barriers“ test from the „Self test“ web site.
- Run the „Measure Gold finger to Pincer distance on Gripper “ test from the „Self test“ web site.

6.2.0.5 Running Test Loops

- Let the SampleJet do a loop test with the „Transport Sample“ function from the self test web site. Let the test loop run for some minutes while observing the system.

6.2.0.6 Testing Options

- Cooling (if a cooling is installed)
Check if all the temperatures are as expected and stable.
- Pre-heating (if a pre-heating unit is installed)
The pre-heating dries the cold and therefore fogged sample tubes. Check if the drying gas flows by putting some short tubes in the heater and switch the heater on. The tubes are moving a little bit when there is a gas flow. Then check if a chosen target temperature can be reached.
- Remote control (if a remote control is installed)
Try to rotate the carousel in both directions.

6.3 Customer Training

6.3.0.7 Providing the User's Manual

- Download the User's Manual from the web interface and store it on the desktop of the spectrometer computer where the customer can easily find it (see ["How to Get the Users Manual" on page 14](#)).

6.3.0.8 Teaching Safety Instructions

- Make sure the customer knows about the moving parts when opening one of the two doors (see ["Safety Symbols" on page 69](#)).

6.3.0.9 Training Operators

The user has to be informed about these basic operations:

- How to access the web interface and log in.
- How to navigate through menu on the display on the SampleJet.
- The „busy“, „idle“ and „error“ state of the SampleJet.
- How to change between the operating modes.
- Knowing the function of the shuttles, tube caps and pincer.
- How to insert racks and open-shop samples.
- How to run the SampleJet from Topspin and IconNMR.

The following points are important.

- Never interrupt a „busy“ state.
- Never apply any forces to the drives.

Also inform the customer about how to get help and information.

1. Contact information of the local Bruker Biospin representative.
2. If this will not solve the problem refer to the „Contact“ chapter in every SampleJet manual.

6.3.0.10 Instructing about Customer Maintenance

These basics can be done by the customer.

- Calibrating (coordinates, vision and lift) the device.
- Replacing a pincer.
- Cleaning the SampleJet.
- Storing the system data and the log files.
- Loading new firmware.

6.3.0.11 Briefing Exception Handling

- How to handle an error.
- The function of the emergency button (it just switches the drives off, the power is still on!).

6.3.0.12 Informing About Safety Shutdown Procedure

- How to switch off power and gas correctly. See ["De-Energize the System" on page 19](#)

6.4 Sample Changer Acceptance Report

1 Customer Information			
Customer Name	.....	
Company / Institute	.....	
Building / Room / Address	.....	
Postal Code / City / Country	.....	
Phone / Fax / E-mail	.....	
2 Bruker Information			
Engineers Office / Division	.....	
Engineers Contact	.....	
Bruker Service Contact	.....	
3 System Information		4 Test Report	
Accessory Order No.	.....	Fixation of the Hardware	<input type="checkbox"/>
Contract No.	.....	Operation Modes Tested	<input type="checkbox"/>
NMR System Order No.	.....	User Interfaces Tested	<input type="checkbox"/>
Magnet Type / Stand	.....	Self-Test Passed	<input type="checkbox"/>
Topspin Version	.....	Test Loops Passed	<input type="checkbox"/>
Sample Changer / S/N	.....	Options Tested	<input type="checkbox"/>
Changer Options / S/N	.....	
5 Installation Summary		6 Customer Training Report	
Used Installation Manual	.....	User's Manual Provided	<input type="checkbox"/>
Applied Parameters	.....	Safety Instructions	<input type="checkbox"/>
Connected Interfaces	.....	Operator Training	<input type="checkbox"/>
Installed Firmware	.....	Maintenance	<input type="checkbox"/>
Topspin / IconNMR Setup	.....	Exception Handling	<input type="checkbox"/>
Implemented Modifications	.....	Safety Shutdown Procedure	<input type="checkbox"/>
7 Exclusions and Remarks			
Exclusions	.....	
Remarks	.....	
8 Acceptance ^a			
[1]	I agree that the above sample changer is installed and tested and meets the published or contractually agreed specifications.		
[2]	In accordance with the terms of sale, the period of warranty will begin on with the duration of months.		
[3]	I accept that this installation is complete as per the sales agreement and I authorise payment of the outstanding balance due for this system.		
[4]	The use and risk of the accepted equipment are transferred to the above company or institution, which will ensure that all relevant personnel are trained to use the equipment safely in accordance with the product documentation and applicable regulations.		
Place:.....	Date:	Place:.....	Date:
...../...../...../...../.....
Customer representative signature / Name in print		Bruker representative signature / Name in print	

Table 6.1 Quality Report for Sample Handler Installations

a. Without the exclusions noted in section 7 under „Exclusions“

7 Equipment Clearance

7.1 Information Regarding Service

After the complete NMR system or additional subcomponents has been installed and handed over to the customer they are potentially contaminated. This has to be considered whenever Bruker employees are working on NMR systems after the initial installation. Here some examples:

- Service (planned or unplanned)
- Repair (customer or factory site)
- Disposal
- Transfer
- Upgrade (NMR system or its sub components)
- Exchange (egg. loan return)

It is strongly recommended to all Bruker employees to get an equipment clearance through the form "[Safety and Repair Declaration](#)" on [page 68](#) for work at the customer site. For any hardware leaving the customer this form must be used.

WARNING



Hardware exposed to hazardous substances.

The product could be contaminated by hazardous substances by customers. Infection, contamination, or other health endangerment could happen as a result of contact with the hardware, e.g. from broken samples.

- ▶ The customers safety representative needs to declare that product is absolutely free of any hazardous substances with the "[Safety and Repair Declaration](#)" on [page 68](#).
- ▶ If the product needs to be shipped, attach this declaration to the delivery note on the package exterior.

7.2 Safety and Repair Declaration¹

Equipment Clearance Form for Service, Repair, Disposal or Transfer:

Use this form, whenever a probe or another unit situated in a magnet room or an analytical instrument might be exposed to hazardous substances by customers, when it is to be returned to Bruker.

Whenever a customer returns a system or its components to Bruker, e.g. for repair, upgrade, loan returns, exchange, etc., the customer accepts the following obligation:

It is the explicit responsibility of the customer to make sure that the returned products are absolutely free of any hazardous substances. In case of omission to do so, Bruker will hold the customer liable for any resulting injuries and/or damages, caused to employees of Bruker and/or to other persons exposed to the hazardous substances. The customer is further liable for all damage caused to Bruker, e.g. decontamination, security measures, etc. The customer is finally liable for all other direct and/or indirect damages caused to Bruker by the hazardous substances.

I ACCEPT THIS OBLIGATION

The repair declaration, completed and signed by the safety representative, has to be attached to the returned product. The declaration must be attached to the delivery note on the package exterior. Any returned product without a properly completed and duly signed declaration cannot be repaired. If we think that there is a risk of damage because of a contaminated returned product, we must dispose the hazardous material at the expense of the customer.

The safety & repair declaration form may be signed by a Bruker service engineer if the system was never operated by the customer (e.g. prior to completion of the installation).

The customer/signatory confirms that the returned product is absolutely free of any hazard substances (e.g. toxic, corrosive, explosive, biologically dangerous or radioactive).

PRODUCT PART NO:	SERIAL NO.:
FAULT DESCRIPTION (reason for return):	
DATE FAILURE OCCURED:	SYSTEM ORDER NO. / DISPATCH NO.:
COMPANY/INSTITUTE:	SIGNATURE: DATE:
NAME:	
MAILING ADDRESS:	
CITY / POSTAL CODE:	
COUNTRY:	
EMAIL:	

1. This form is a corrected copy of the original form ZFQS0083 version 03

8 Safety Symbols

8.1 Warning Stickers

There are three warning signs close to the doors of the device. If the warnings should be missing please, contact Bruker and ask for replacement.

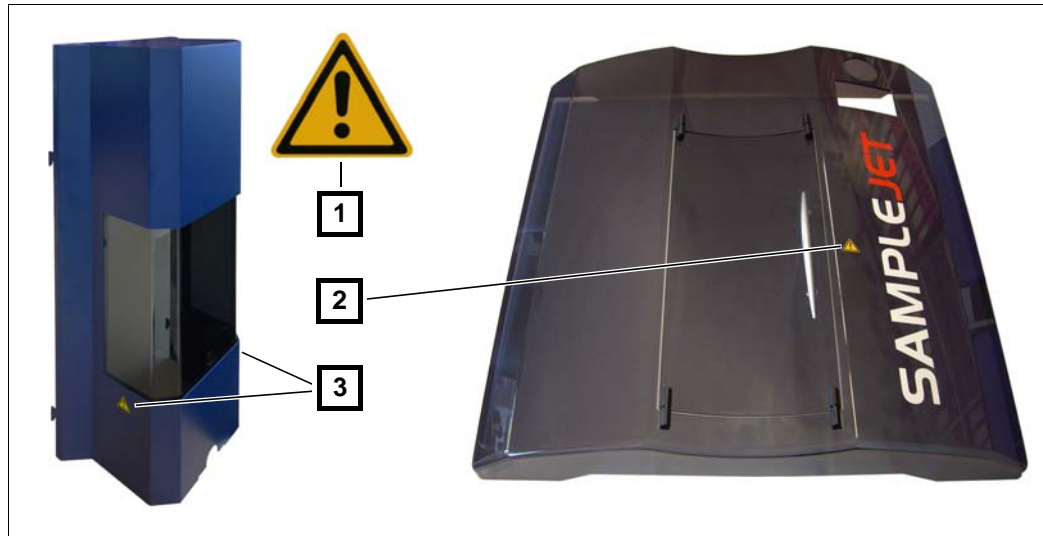


Figure 8.1 The Locations of the Safety Signs

- [1] Safety symbol sticker
- [2] Safety symbol at door in the front cover
- [3] Safety symbols on both sides at the door of the back cover


Symbol	Explanation
	<p>⚠ CAUTION</p>
	<p>Warning of moving parts.</p> <p>The doors and covers are enclosing all moving parts of the SampleJet. Operators and bystanders must be aware of moving parts whenever the doors are open or the covers were removed. Specially hands, arms and eyes are in danger when they are close to the moving parts.</p> <ul style="list-style-type: none"> ▶ Always close the doors when not accessing the inside of the device. ▶ Do only remove the covers when the SampleJet is not in use.

Table 8.1 Description of the Safety Symbol

9 Technical Data

9.1 Shipping Dimensions

Data	Value	Unit
SampleJet Standard: Euro-pallet		
Length	120	cm
Width	80	cm
Height	120	cm
Weight	~ 100	kg
Cooling Option: Carousel Box		
Length	56	cm
Width	56	cm
Height	33	cm
Weight	~ 10	kg
Cooling Option: Chiller		
The chiller comes in a separate box ^a	-	-
Disassembled Components		
Main frame with axes and controller	~ 40	kg
Mounting hardware	~ 10	kg
Control unit	~ 6	kg
BST adapter	~ 1.5	kg

Table 9.1 Shipping Dimensions

a. See documentation of the chiller ["References" on page XIII](#)

9.2 Operating Conditions

Data	Value	Unit
Temperature range ^a	17 to 25	°C
Relative humidity	30 to 80	%RH

Table 9.2 Operating Environment

a. For details see site planning manuals ["References" on page XIII](#)

9.3 Electrical Connection Values

Data	Value	Unit
SampleJet Mains		
Voltage	100 to 240	V AC
Maximum Current (with Cooling option)	3 (6)	A
Frequency	50 to 60	Hz
SampleJet Device		
Voltage	24	V DC
Maximum Current (with Cooling option)	7.5 (15)	A
Chiller for Cooling Option		
Country specific connection values ^a	-	-

Table 9.3 Electrical Connection Values

a. See documentation of the chiller "[References](#)" on page XIII

9.4 Pneumatic Connection Values

Data	Value	Unit
SampleJet Standard		
Operating pressure	6 to 8	bar
Gas ^a supply requirement	> 100	NI/min
Gas consumption: 7" tubes	~ 20	NI/cycle
Gas consumption: 4" tubes	~ 5	NI/cycle
Cooling Option		
Operating pressure	6 to 8	bar
Constant gas ^b consumption	40	NI/min
Gas dew point temperature	^c	-

Table 9.4 Pneumatic Connection Values

a. Compressed air or nitrogen

b. Compressed air, nitrogen is dangerous and requires ventilation/alarms for safety reasons

c. See documentation of the chiller "[References](#)" on page XIII

9.5 SampleJet Parameters

Data	Value	Unit
Actuators		
Generals absolute precision	< 0.5	mm
Maximum axis speed	0.6	m/s
Nominal axis force	< 40	N
Nominal axis power	< 30	W
Force of moving sliders	~ 50	N
Cycle Times^a		
Short tubes in unclamped shuttles	35	s
Short tubes in clamped shuttles	40	s
Long tubes in clamped shuttles	50	s
Long tubes in spinners	65	s

Table 9.5 General SampleJet Parameters

a. Nearby tube without pre-heating at 100% axes speed, closed doors with matrix code reading.

9.6 Sample Parameters

Data	Value	Unit
Sample geometries		
Supported sample length	4 and 7	inch
Supported sample diameter	1/ 1.7/ 3/ 5	mm
Supported sample shape	round	-
Temperature Limitations		
Allowed temperatures for shuttles ^a	-20 to 150	°C
Allowed temperatures for spinners ^b		
Sample Insertion Depth		
Absolute insertion depth tolerance	+/- 1	mm
Relative insertion depth tolerance	+/- 0.2	mm
Insertion depth for unclamped tubes ^c	-	mm
Insertion depth offset for clamped tubes ^d	-15 / +2	mm

Table 9.6 General SampleJet Parameters

a. Older shuttles do have a lower temperature limit. See specification of the shuttles.

b. Depending on the spinners and probe heads. See probes manual ["References" on page XIII](#)

c. The insertion depth for unclamped tubes as 1mm and 1.7mm is defined by the probe head.

d. The insertion depth offset is calculated from the probe heads default insertion depth (standard = 20mm) where 0mm refers to the magnetic center of the magnet. Short tubes in shuttle do have additional limitations given by the design off the shuttle.

9.7 Cooling Option

Data	Value	Unit
Storage		
Nominal temperature	279	K
Temperature tolerance ^a	+/- 1	K
Read-out accuracy	0.1	K
Pre-Heating		
Capacity ^b	8	Tubes
Temperature range ^c	293 to 324	K
Absolute temperature tolerance	+/- 1	K
Relative temperature tolerance	+/- 0.25	K
Read-out accuracy	0.07	K
Overheat protection	343	K
Temperature offset indicated as stable ^d	0.5	K

Table 9.7 Cooling Parameters

a. The temperature of each rack is individually controlled

b. 4" tubes with diameter from 1 to 5mm

c. The lower temperature range is limited by the room temperature.

d. SampleJet will display a steady „H“

9.8 Required Space in the Lab

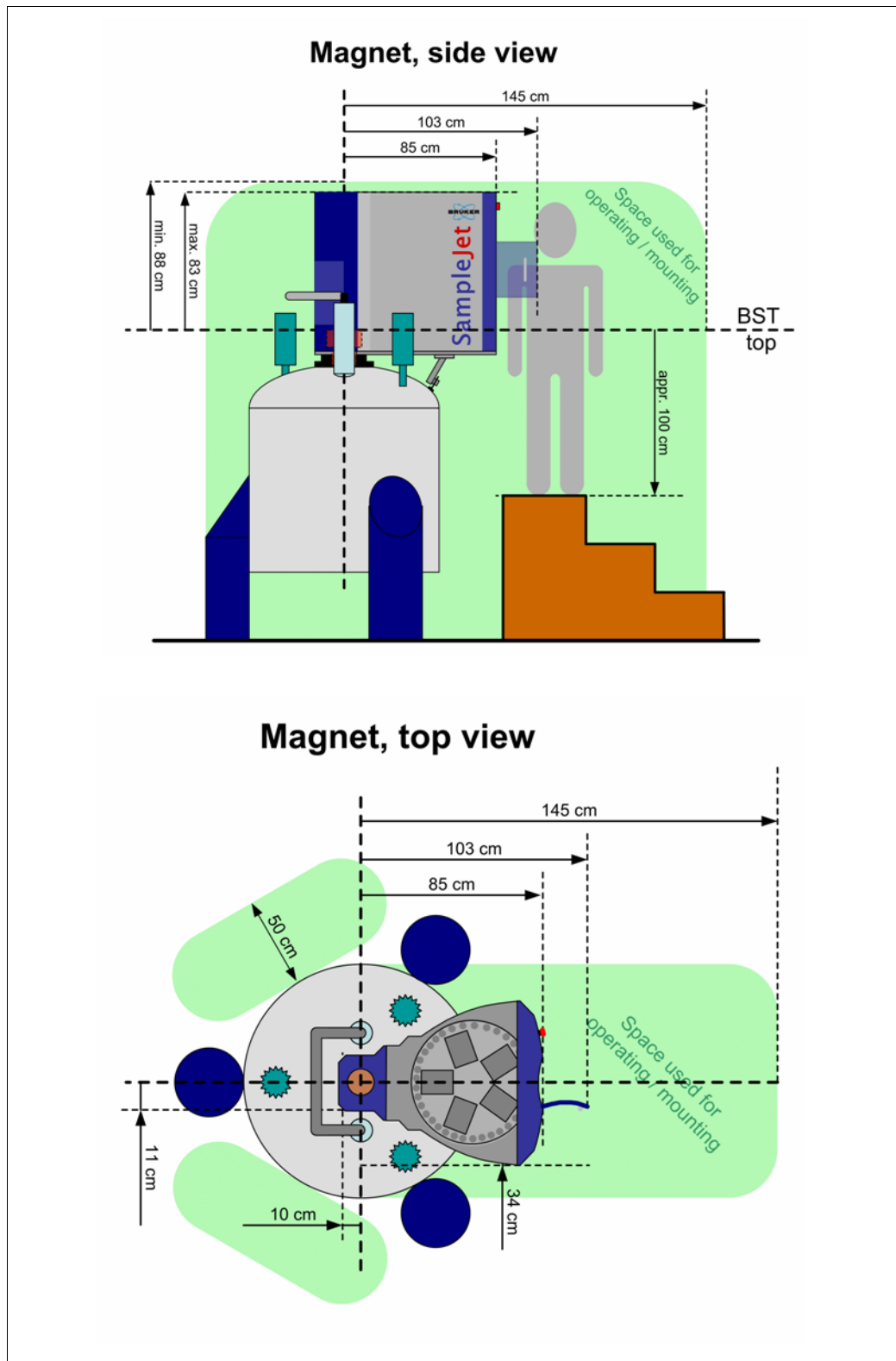


Figure 9.1 SampleJet Space in the Lab

9.9 Rating Plate



Figure 9.2 SampleJet Rating Plate

10 Contact

10.1 General Questions

Submit your inquiries regarding SampleJet sales and service to your local Bruker Biospin representative. Use the following address to acquire further information.

10.2 Contact for Sales Information

For further technical assistance, please do not hesitate to contact us directly at:

Bruker Biospin AG
SampleJet Info
Industriestrasse 26
8117 Fällanden
Switzerland
Phone:[+41] 44 825 98 80

samplejet-info@bruker.ch

10.3 Contact for Additional Technical Assistance

For further technical assistance, please do not hesitate to contact us directly at:

Bruker Biospin AG
SampleJet Service
Industriestrasse 26
8117 Fällanden
Switzerland
Phone:[+41] 44 825 98 90

samplejet-service@bruker.ch
<ftp://ftp.bruker.ch/NMR/download/SampleJet/>

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A.1 Warning Signs

Caution

Avoid access through cut-outs in the side covers.	22
De-energize the system for installation and service.	19
Do not extend the adjustable bolt over the maximum.	30
Do not extend the support feet over the maximum.	32
Do not lift the SampleJet out of the cardboard boxes.	18
Do not move the SampleJet in magnetic fields when switched on.	19
Do not stack the BCU I on top of one another.	15
Risk of electrostatic discharge (ESD)	20
Sharp edges on the covers.	22
Tools will be attracted by the field of the magnet.	21
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Warning of moving parts.	69

Notice

Disclaimer of liability	10
Do not pull on the BCU I SampleJet adapter.	54
Do not squeeze the red cooling power cable.	51

Safety

Always follow this procedure to shutdown the SampleJet.	19
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Warning

Do never cover the drop-off plate.	17
Do not carry the SampleJet alone.	18
Do not remove multiple screws at the same time from the magnet flange ...	28
Ensure SampleJet is mounted properly on the magnet.	14
Risk of suffocation when operating the cooling with nitrogen gas.	15
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SampleJet filled with hazardous tubes.	14, 67
The magnet might get unstable together with a SampleJet.	16

Use suitable ladders or platform. 14

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B.1 CE Conformity

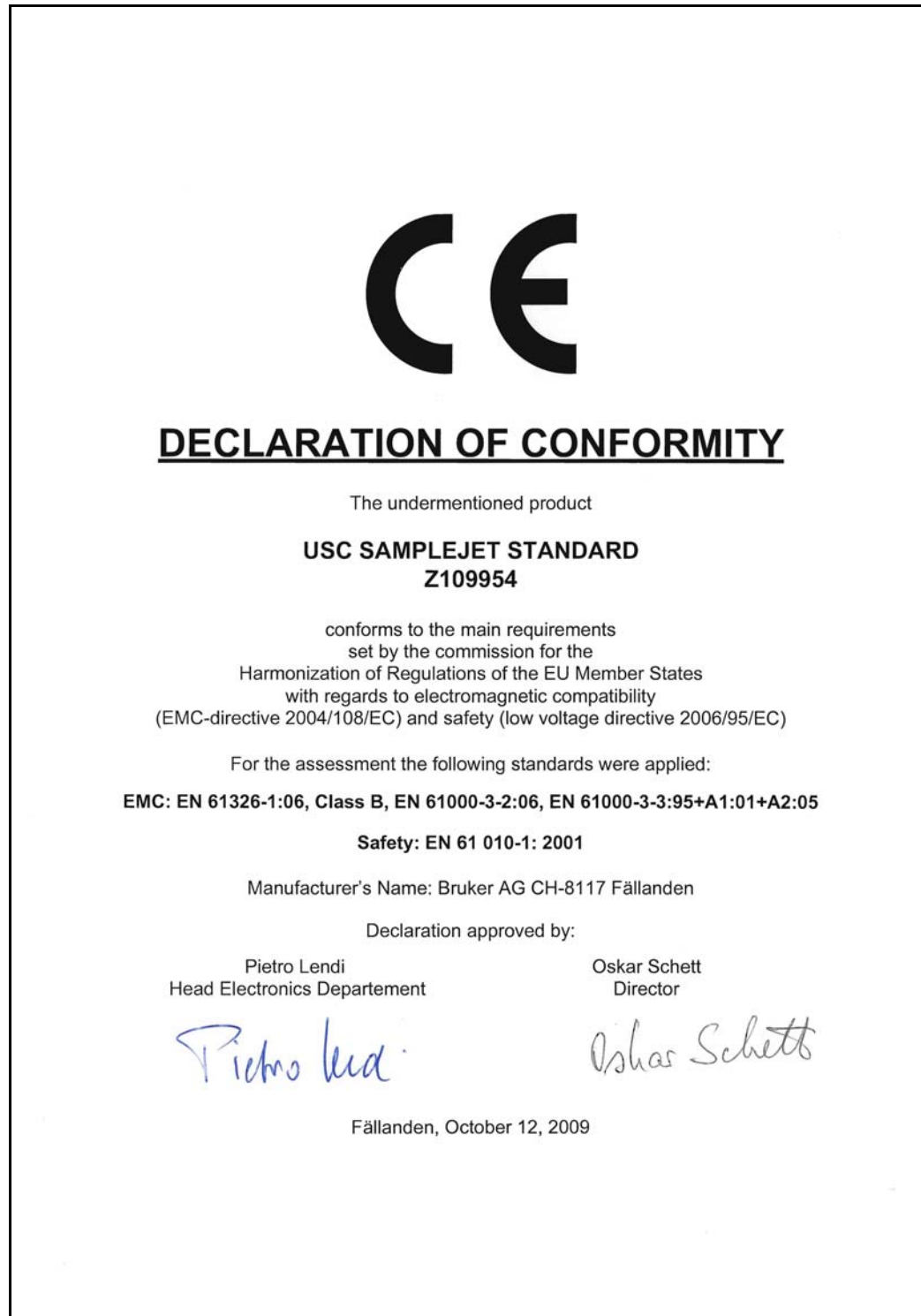


Figure B.1 CE Declaration of Conformity

C.1 References

- [1] Bruker BCU I Quick Start Guide (Z31950)
Daniel Guy Baumann et al., August 6, 2010
Bruker BioSpin AG, Fällanden, Switzerland
- [2] Bruker Site Planning AVANCE Systems 300-750MHz (Z31276)
Stanley J. Niles / Daniel B. Baumann, September 20, 2011
Bruker Biospin GmbH, Rheinstetten, Germany
- [3] Bruker Site Planning AVANCE Systems 800-950 MHz (Z31686)
Razvan Teodorescu / Stanley J. Niles, September 20, 2011
Bruker Biospin GmbH, Rheinstetten, Germany
- [4] Bruker Probes Users Manual (Z31339)
D. Marek / R. Triebe/ M. Waden / D. Wilhelm, September 2009
Bruker BioSpin AG, Fällanden, Switzerland

D.1 Adjustment Gauge

If the adjustment gauge is missing for the installation, then cut out this picture to get an improvised replacement. When printing or coping this manual make sure the scale does not change.

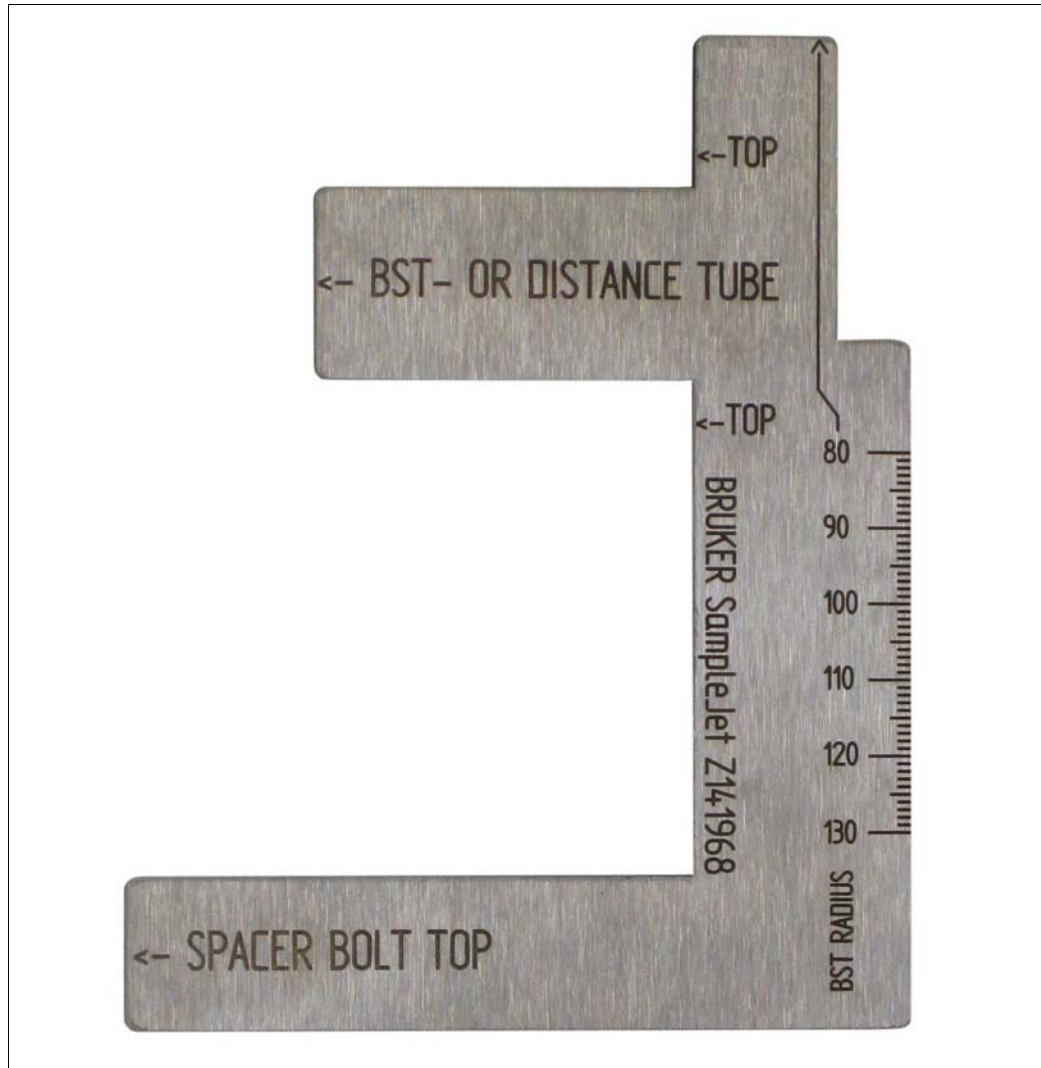



Figure D.1 The Adjustment Gauge in Original Size



 **Bruker Corporation**

info@bruker.com
www.bruker.com

Order No: Z31750