




# SampleXpress Lite

Sample Changer  
User Manual

Version 001



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# 1 About

## 1.1 This Manual

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This manual enables safe and efficient handling of the device.

This manual is an integral part of the device, and must be kept in close proximity to the device where it is permanently accessible to personnel.

Before starting any work, the personnel must have read the manual thoroughly and understood its contents. Compliance with all specified safety instructions and operating instructions is vital to ensure safe operation.

In addition, local accident prevention regulations and general safety instructions must be observed for the operational area of the device.

Illustrations in this manual are intended to facilitate basic understanding, and may differ from the actual design.

This SampleXpress Lite user manual must be kept with the device. In addition to the SampleXpress Lite user manual, instructions concerning labor protection laws, operator regulations tools and supplies must be available and adhered to.

## 1.2 Policy Statement

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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 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.

## **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.

---

### **Special Safety Instructions**

The following symbols are used in the safety instructions to draw attention to specific danger:



## **DANGER**

This combination of symbol and signal word indicates dangers posed by electric power. If the safety instructions are not observed, there is a danger of serious or fatal injuries.



## 2 Introduction

The new Bruker sample changer SampleXpress Lite allows automatic measurement of NMR samples with Bruker NMR spectrometers. It is the successor of the NMR CASE system. Its compact, exceptionally integrated design, drastically reduces sample transfer distances, delivering exchange times of just a few seconds, making SampleXpress Lite ideal for optimizing throughput in standard NMR service laboratories running up to 30 samples per day. In addition, efficiency is maximized thanks to exchangeable, easy-fill, carousel modules that can be loaded off-system and in parallel with current experiments.

### 2.1 Concept

SampleXpress Lite is controlled by TopSpin or ICON-NMR, Bruker's graphical user interface for fully-automated acquisition and processing.

Refer to "[Design and Function](#)" on page 33 for a complete description of the design and function of SampleXpress Lite.



Figure 2.1 SampleXpress Lite

## 2.2 Limitation 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.

The manufacturer accepts no liability for damage due to:

- Failure to observe this manual.
- Improper use (see ["Intended Use" on page 13](#)).
- Deployment of untrained personnel.
- Unauthorized modifications.
- Technical modifications.
- Use of unauthorized spare parts.

The actual scope of supply may differ from the explanations and depictions in this manual in the case of special designs, take-up of additional ordering options, or as a result of the latest technical modifications.

The undertakings agreed in the supply contract, as well as the manufacturer's Terms and Conditions and Terms of Delivery, and the legal regulations applicable at the time of the conclusion of the contract shall apply.

## 2.3 Copyright

---

This manual is protected by copyright and intended solely for internal use.

This manual must not be made available to third parties, duplicated in any manner or form – whether in whole or in part – and the content must not be used and/or communicated, except for internal purposes, without the written consent of the manufacturer.

Violation of the copyright will result in legal action for damages. We reserve the right to assert further claims.

## 2.4 Warranty Terms

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The warranty terms are included in the manufacturer's Terms and Conditions.

## 2.5 Customer Service

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Our customer service division is available to provide technical information. See ["Contact" on page 71](#) for contact details.

In addition, our employees are always interested in acquiring new information and experience gained from practical application; such information and experience may help improve our products.

## 2.6 EC Declaration of Conformity

### ● EC-DECLARATION OF CONFORMITY

Bruker BioSpin GmbH



The undersigned, representing the following manufacturer

**Manufacturer:** Bruker BioSpin GmbH  
**Address:** Silberstreifen 4, 76287 Rheinstetten,  
 Germany

herewith declares that  
 the product

**SampleXpress H15000  
 & SampleXpress Lite H15200**



is in conformity with the provisions of the following EC directives. (including all applicable amendments)

Reference no.	Title
2004/108/EC	Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC, former 89/336/EEG
2006/95/EC	Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits (Low Voltage Directive), former 73/23/EEG
2006/42/EC	Directive of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast), former 98/37/EEG

This declaration is in conformity with the following standard(s) or other normative document(s)  
 Harmonized standards:

Standard	Title
EN 61010 1:2002	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements (IEC 61010-1:2001)
EN 61326-1:2006	Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements (IEC 61326-1:2005);
EN 61000-3-2:2010	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current = 16 A per phase) (IEC 61000-3-2:2005);
EN 61000-3-3:2009	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current = 16 A per phase and not subject to conditional connection (IEC 61000-3-3:2008);
DIN EN ISO 12100-1 & DIN EN ISO 12100-2	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology (ISO 12100-1:2003) & Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology (ISO 12100-2:2003)

Rheinstetten, Germany  
 (Place)

*R&D Director*

(Name and function of the signatory empowered to bind the  
 manufacturer or his authorized representative)

13.07.2010

(Date)

*[Signature]*

(Signature)

## 2.7 EG-Konformitätserklärung

### • EG-Konformitätserklärung

Bruker BioSpin GmbH



Der Unterzeichner, der den nachstehenden Hersteller vertritt

**Hersteller:** Bruker BioSpin GmbH  
**Anschrift:** Silberstreifen 4, 76287 Rheinstetten, Germany



erklärt hiermit, dass das Produkt **SampleXpress H15000 & SampleXpress Lite H15200**

in Übereinstimmung mit den Bestimmungen der nachstehenden EG-Richtlinien (einschließlich aller zutreffenden Änderungen) ist.

Referenz No..	Title
2004/108/EG	Richtlinie 2004/108/EG des Europäischen Parlaments und des Rates vom 15. Dezember 2004 zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit und zur Aufhebung der Richtlinie 89/336/EWG (früher 89/336/EWG)
2006/95/EG	Richtlinie 2006/95/EG des Europäischen Parlaments und des Rates vom 12. Dezember 2006 zur Angleichung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen (früher 73/23/EWG)
2006/42/EG	Richtlinie 2006/42/EG des Europäischen Parlaments und des Rates vom 17. Mai 2006 über Maschinen und zur Änderung der Richtlinie 95/16/EG (Neufassung) (früher 89/392/EWG)

Standard	Folgende harmonisierte Normen wurden angewandt:
EN 61010-1:2002	Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte - Teil 1: Allgemeine Anforderungen (IEC 61010-1:2001); Deutsche Fassung EN 61010-1:2001
EN 61326-1:2006	Elektrische Mess-, Steuer-, Regel- und Laborgeräte - EMV-Anforderungen - Teil 1: Allgemeine Anforderungen (IEC 61326-1:2005); Deutsche Fassung EN 61326-1:2006
EN 61000-3-2:2010	Elektromagnetische Verträglichkeit (EMV) - Teil 3-2: Grenzwerte - Grenzwerte für Oberschwingungsströme (Geräte-Eingangsstrom = 16 A je Leiter) (IEC 61000-3-2:2005 + A1:2008 + A2:2009); Deutsche Fassung EN 61000-3-2:2006 + A1:2008 + A2:2008
EN 61000-3-3:2009	Elektromagnetische Verträglichkeit (EMV) - Teil 3-3: Grenzwerte - Begrenzung von Spannungsänderungen, Spannungsschwankungen und Flicker in öffentlichen Niederspannungs-Versorgungsnetzen für Geräte mit einem Bemessungsstrom = 16 A je Leiter, die keiner Sonderanschlussbedingung unterliegen (IEC 61000-3-3:2008); Deutsche Fassung EN 61000-3-3:2008
DIN EN ISO 12100-1 & DIN EN ISO 12100-2	Sicherheit von Maschinen - Grundbegriffe, allgemeine Gestaltungsleitsätze - Teil 1: Grundsätzliche Terminologie, Methodologie (ISO 12100-1:2003); Deutsche Fassung EN ISO 12100-1:2003 & Teil 2: Technische Leitsätze (ISO 12100-2:2003); Deutsche Fassung EN ISO 12100-2:2003

Rheinstetten, Germany

(Place)

*R&D Director*

(Name und Funktion des vom Hersteller oder von seinem Bevollmächtigten zur Unterschrift berechtigten Person)

13.07.2010

(Date)

*[Handwritten Signature]*

(Unterschrift)

# 3 Safety

This section provides an overview of the main safety aspects involved in ensuring optimal personnel protection, as well as safe and smooth operation.

Non-compliance with the action guidelines and safety instructions contained in this manual may result in serious hazards.

---

**i** The combined safety notices for this manual in **English** can be found in "[Safety Notices](#)" on page 73.

The combined safety notices for this manual in **French** can be found in "[Avertissements De Sécurité](#)" on page 83.

The combined safety notices for this manual in **German** can be found in "[Sicherheitshinweise](#)" on page 93.

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## 3.1 Intended Use

---

The device has been designed and constructed solely for the intended use described here.

The SampleXpress Lite must only be used for keeping NMR samples in a carousel module, inserting them into the NMR spectroscopy magnet and ejecting them after measurement back into the carousel.

Intended use also includes compliance with all specifications within this manual.

Any use which exceeds or differs from the intended use shall be considered improper use.

No claims of any kind for damage will be entertained if such claims result from improper use.

## 3.2 Owner's Responsibility

---

### Owner

The term 'owner' refers to the person who themselves operate the device for trade or commercial purposes, or who surrenders the device to a third party for use/application, and who bears the legal product liability for protecting the user, the personnel or third parties during the operation.

## Owner's Obligations

The device is used in the industrial sector, universities and research laboratories. The owner of the device must therefore comply with statutory occupational safety requirements.

In addition to the safety instructions in this manual, the safety, accident prevention and environmental protection regulations governing the operating area of the device must be observed.

In this regard, the following requirements should be particularly observed:

- The owner must obtain information about the applicable occupational safety regulations, and - in the context of a risk assessment - must determine any additional dangers resulting from the specific working conditions at the usage location of the device. The owner must then implement this information in a set of operating instructions governing operation of the device.
- During the complete operating time of the device, the owner must assess whether the operating instructions issued comply with the current status of regulations, and must update the operating instructions if necessary.
- The owner must clearly lay down and specify responsibilities with respect to installation, operation, troubleshooting, maintenance and cleaning.
- The owner must ensure that all personnel dealing with the device have read and understood this manual. In addition, the owner must provide personnel with training and hazards information at regular intervals.
- The owner must provide the personnel with the necessary protective equipment.
- The owner must warrant that the device is operated by trained and authorised personnel as well as all other work, such as transportation, mounting, start-up, the installation, maintenance, cleaning, service, repair and shutdown, that is carried out on the device.
- All personnel who work with, or in the close proximity of the device, need to be informed of all safety issues and emergency procedures as outlined in this user manual.
- The owner must document the information about all safety issues and emergency procedures in a laboratory SOP (Standard Operating Procedure). Routine briefings and briefings for new personnel must take place.
- The owner must ensure that new personnel are supervised by experienced personnel. It is highly recommended to implement a company training program for new personnel on all aspects of product safety and operation.
- The owner must ensure that personnel are regularly informed of the potential hazards within the laboratory. This is all personnel that work in the area, but in particular laboratory personnel and external personnel such as cleaning and service personnel.
- The owner is responsible for taking measures to avoid inherent risks in the handling of dangerous substances, preventing industrial disease, and providing medical first aid in emergencies.
- The owner is responsible for providing facilities according to the local regulations for the prevention of industrial accidents and generally accepted safety regulations according to the rules of occupational medicine.

- All substances needed for operating and cleaning the device samples, solvents, cleaning agents, gases, etc. have to be handled with care and disposed of appropriately. All hints and warnings on storage containers must be read and adhered to.
- The owner must ensure that the work area is sufficiently illuminated to avoid reading errors and faulty operation.
- The owner must ensure that the laboratory is equipped with an oxygen warning device, in case the device is operated with nitrogen.

Furthermore, the owner is responsible for ensuring that the device is always in a technically faultless condition. Therefore, the following applies:

- The owner must ensure that the maintenance intervals described in this manual are observed.
- The owner must ensure that all safety devices are regularly checked to ensure full functionality and completeness.
- Check whether the magnet drop-off plate is obstructed by the device or any cables. The cables must be fixed properly using cable binder.

## 3.3 Personnel Requirements

---

### 3.3.1 Qualifications

---

**i** Note: Only trained Bruker personnel are allowed to mount, retrofit, repair, adjust and dismantle the unit!

---

This manual specifies the personnel qualifications required for the different areas of work, listed below:

#### Laboratory Personnel

Laboratory personnel are health care professionals, technicians, and assistants staffing a research or health care facility where specimens are grown, tested, or evaluated and the results of such measures are recorded. Laboratory personnel are able to carry out assigned work and to recognize and prevent possible dangers self-reliant due to their professional training, knowledge and experience as well as profound knowledge of applicable regulations.

The workforce must only consist of persons who can be expected to carry out their work reliably. Persons with impaired reactions due to, for example, the consumption of drugs, alcohol, or medication are prohibited from carrying out work on the device.

When selecting personnel, the age-related and occupation-related regulations governing the usage location must be observed.

## 3.3.2 Unauthorized Persons



### ⚠ WARNING

#### **Risk to life for unauthorized personnel due to hazards in the danger and working zone!**

Unauthorized personnel who do not meet the requirements described in this manual will not be familiar with the dangers in the working zone. Therefore, unauthorized persons face the risk of serious injury or death.

- ▶ Unauthorized persons must be kept away from the danger and working zone.
- ▶ If in doubt, address the persons in question and ask them to leave the danger and working zone.
- ▶ Cease work while unauthorized persons are in the danger and working zone.

## 3.3.3 Instruction

Personnel must receive regular instruction from the owner. The instruction must be documented to facilitate improved verification.

Date	Name	Type of Instruction	Instruction Provided By	Signature

## 3.4 Personal Protective Equipment

Personal protective equipment is used to protect the personnel from dangers which could affect their safety or health while working.

Personnel must wear personal protective equipment while carrying out the different operations at and with the device.

This equipment will be defined by the head of the laboratory. Always comply with the instructions governing personal protective equipment posted in the work area.



## 3.5 Basic Dangers

---

The following section specifies residual risks which may result from using the device and have been established by means of a risk assessment.

In order to minimize health hazards and avoid dangerous situations, follow the safety instructions specified here as well as in the following chapters of this manual.

### 3.5.1 General Workplace Dangers

---

#### Dirt and Scattered Objects

#### CAUTION



#### **Danger of injury from tripping over dirt and scattered objects!**

Dirt and scattered objects may cause people to slip or trip. A fall may result in injuries.

- ▶ Always keep the work area clean.
- ▶ Remove objects which are no longer required from the work area and particularly from the floor.
- ▶ Indicate unavoidable hazards using marking tape.

#### Working in Heights

#### CAUTION



#### **Accident hazard from falling from ladder!**

It is possible to fall from a ladder when it is used to reach the SampleXpress on some magnets.

- ▶ Do not use a ladder.
- ▶ Use an approved platform to reach the device on the magnet.
- ▶ Wear non-slip shoes.

## Software Error

### **NOTICE**

#### **Material damage due to a software error!**

Samples or SampleXpress may be damaged due to a software error causing malfunction of the control system. Users may also be shocked by abrupt malfunction or unexpected system start.

- ▶ Dummy samples must be used during installation and service.
- ▶ Personnel should be alerted to unexpected malfunctions.

## Impacting Magnet

### **NOTICE**

#### **Material damage hazard due to impacting the magnet!**

Impacting the magnet may result in a quench.

- ▶ Mount the SampleXpress carefully on the magnet.
- ▶ Avoid banging the magnet during installation and operation, e.g. when replacing the sample cassette.

## Genuine Samples

### **NOTICE**

#### **Material damage due to the use of genuine samples during installation and maintenance!**

Using genuine samples during installation and maintenance may result in material damage.

- ▶ Use only dummy samples during installation and maintenance.

## 3.5.2 Dangers from Electric Power

---

### Stored Charges

#### DANGER



##### **Danger to life from stored charges!**

Electric charges may be stored in electrical components even after the system has been switched off and disconnected from the power supply. Contact with these components may result in serious or fatal injury.

- ▶ Before working on the specified components, ensure that they have been completely disconnected from the power supply. Allow 10 minutes to elapse in order to ensure that the internal capacitors have been fully discharged.

### Electric Current

#### WARNING



##### **Electrical hazard from electrical shock!**

A life threatening shock may result when the housing is open during operation.

- ▶ Disconnect the device from the electrical power supply before opening the device. Use a voltmeter to verify that the device is not under power!
- ▶ Be sure that the power supply cannot be reconnected without notice.

### Residual Electrostatic Potentials

#### WARNING




##### **Danger to life from residual electrostatic potentials!**

Friction between material being conveyed may result in significant development of electrostatic potential. Contact with parts immediately following the conveying operation may therefore be life-threatening.

- ▶ Therefore, potential equalisation must be ensured before making contact with parts, unless such equalisation is provided by the customer.

## Electrostatic Discharge

- 
-  Electrostatic discharge from friction may occur, resulting in an electric spark and loud bang. Use ESD flooring and wear ESD shoes.
- 

## 3.5.3 Mechanical Dangers

---

### Moving Parts



#### CAUTION

##### **Accident hazard from movement of mechanical parts!**

The fingers or hand may be pinched due to movement of mechanical parts.

- ▶ Shut off the device before accessing.

### Falling Objects



#### CAUTION

##### **Accident and material damage hazard from falling objects!**

Equipment may fall down during assembly, retrofitting, or dismantling. This may result in personal injury or equipment damage.

- ▶ If necessary, assemble/disassemble the device in multiple parts.
- ▶ Use a platform with railings instead of a ladder to reach the assembly area.
- ▶ Avoid working over the head. When this can not be avoided, wear a protective hard hat.
- ▶ Follow the mounting instructions in the installation manual.

### 3.5.4 Dangers from Gases Under Pressure

---

#### Pneumatics



#### **WARNING**

##### **Danger of injury due to movements caused by stored pneumatic forces!**

Pneumatically driven components may move unexpectedly due to stored residual forces, causing serious injuries.

- ▶ Work on the pneumatics system must only be carried out by trained pneumatics technicians.
- ▶ Before starting work on the pneumatics system, ensure that it has been completely depressurised. The pressure accumulator must be completely relieved.

#### Suffocation



#### **WARNING**

##### **Accident hazard from asphyxiation!**

A break in the pneumatic hose may result in the uncontrolled exit of nitrogen into the laboratory.

- ▶ An oxygen warning device should be present in the laboratory if the device is operated with nitrogen.
- ▶ Note that leakage from the main supply line cannot be stopped by the SampleXpress Lite!

## 3.5.5 Dangers from Radiation

---

### Strong Magnetic Fields

#### **WARNING**

##### **Danger to life from strong magnetic fields!**

Strong magnetic fields may cause serious injuries or death and significant damage to property.



- ▶ Persons fitted with heart pacemakers must be kept away from the appliance. The functionality of the heart pacemaker could be compromised.
- ▶ Persons with metal implants must be kept away from the appliance. Implants may heat up or be subject to magnetic attraction.
- ▶ Ferromagnetic materials and electromagnets must be kept away from the magnetic source. Such materials could be subject to magnetic attraction and may fly around the room, injuring or killing people. Minimum distance 3 meters.
- ▶ Remove magnetic items (jewelry, watches, pens etc.) before carrying out maintenance work.
- ▶ Keep electronic equipment away from the magnetic source. Such equipment could be damaged.
- ▶ Keep storage media, credit cards etc. away from the magnetic source. Data could be erased.

---

**i** Note: The magnetic field of the device does not cause any personal injuries or property damage. For further information see the manual of the magnet used.

---

### Bright LED Light

#### **CAUTION**



##### **Accident hazard from bright LED light!**

Peering into the lighting system of optical sensors, e.g. barcode reader, may result in temporary blinding of the eyes due to the bright light.

- ▶ Do not look into the ray of light.
- ▶ Switch off the equipment before maintenance work.

### 3.5.6 Dangers Due to High or Low Temperatures

---

#### Hot or Cold Air

#### CAUTION



#### **Accident hazard from hot or cold air escaping out of the unit.**

When the cassette is removed, hot or cold air may exit the unit or BST, which may result in serious burns.

- ▶ Ensure that personnel are aware of this risk.
- ▶ Refer to the unit manual for more information.

#### Hot or Cold Surfaces

#### CAUTION



#### **Accident hazard from contact with hot or cold surfaces on the unit.**

Contact with the hot or cold surfaces of the unit may result in serious burns.

- ▶ Do not touch device parts of cooled or heated units.
- ▶ Do not use damaged samples.
- ▶ After removing a sample or cassette allow it to cool or thaw before coming in contact.

#### Thermal Shock

#### NOTICE

#### **Material damage hazard from overflow of cryogenics.**

Material damage may result from the overflow of cryogenics.

- ▶ Turn off the device during magnet servicing.
- ▶ Cover the device with a protective cover, e.g. P/N 1804420 provided in the accessory case, to avoid contact with cold gases.
- ▶ Be sure to use sufficient transfer line and Teflon evacuation hose for nitrogen and helium refills based on recommendations in the magnet manual.
- ▶ After refilling cryogenics some parts of the magnet may be icy. Be sure to remove the ice to avoid its melting onto the device.

## 3.5.7 Danger from Chemical Substances

---

### Glass Tube Breakage



#### **DANGER**

##### **Danger of injury from glass tube breakage!**

Broken glass tubes may cause minor injuries or material damage, but may also result in a life threatening situation if hazardous substances are used.

- ▶ If a glass tube breaks, refer to the corresponding precautions and cleaning/disinfection instructions.
- ▶ Wear protective equipment.
- ▶ Perform all tasks with the carousel and glass tubes carefully.
- ▶ Before carrying out any maintenance work, remove the samples and use dummy samples if necessary.
- ▶ Strictly observe the correct sample adjustment, i.e. the maximum sample height.
- ▶ Never turn the carousel upside down or on it's side.

The **laboratory supervisor** is responsible for:

- ▶ Establishing and enforcing standard sample handling and cleaning procedures.
- ▶ Establishing and enforcing the use of protective clothing and equipment.
- ▶ Training laboratory personnel.
- ▶ Preparing an emergency plan.

### Vapor Formation



#### **WARNING**

##### **Danger of injury from vapor formation!**

During the work process, vapors may form which cause serious injury if inhaled.

- ▶ Only install the appliance in a well-ventilated room or ensure that an extractor is fitted.



## NMR Solvents

### NOTICE

#### Material damage hazard from material contact with NMR solvents!

Material damage may result when the device comes in contact with NMR solvents.

- ▶ Follow instructions provided in the manual for correct handling of solvents.
- ▶ Follow the sensor cleaning procedures described in this manual.
- ▶ If surface damage should occur, contact Bruker for repair of damaged parts.

### NOTICE

#### Material damage hazard from heavy samples!

Samples may be damaged due to incorrect sample lift pressure adjustment.

- ▶ Adjustment is valid only for 1 sample configuration and weight.
- ▶ Personnel must be trained.

## Protective Earth Conductor

### ⚠ WARNING



#### Danger to life from contact voltage!

Absent or faulty protective earth conductor may result in contact voltage. This may pose a risk of injury or death.

- ▶ Before the initial commissioning of the appliance, connect the main power supply to the socket and verify the complete functionality of the protective earth conductor.

## Overpressure Valve

The high pressure system includes an overpressure valve which safely reduces the excess pressure in the event of inadmissible pressure conditions developing as a result of faulty operation, component failure or other irregular events.

## 3.6 Environmental Protection

---

### **NOTICE**

#### **Danger to the environment from incorrect handling of pollutants!**

Incorrect handling of pollutants, particularly incorrect waste disposal, may cause serious damage to the environment.

- ▶ Always observe the instructions below regarding handling and disposal of pollutants.
- ▶ Take the appropriate actions immediately if pollutants escape accidentally into the environment. If in doubt, inform the responsible municipal authorities about the damage and ask about the appropriate actions to be taken.

#### **The following pollutants are used:**

- |                         |  |
|-------------------------|--|
| <b>Helium inert gas</b> | Helium inert gas may cause suffocation at high concentrations. Disposal of the empty gas cylinders must be performed by a specialized disposal company.                                    |
| <b>Nitrogen gas</b>     | Nitrogen gas may cause suffocation at high concentrations. Disposal of the empty gas cylinders must be performed by a specialized disposal company.  |
| <b>Cleaning liquids</b> | Cleaning liquids incorporating solvents contain toxic substances. They must not be allowed to escape into the environment. Disposal must be carried out by a specialized disposal company. |

### 3.7 Signage

---

The following symbols and information signs can be found in the work area. They refer to their immediate surroundings.

---

- i** Note: The identification and placement of warning labels are included in the manual. The laboratory supervisor is responsible for ensuring that all the warning labels are maintained in their proper place any time that the device is used.
- 

#### Electrical Voltage



Only qualified electricians are permitted to work in a work room marked by this sign. unauthorized persons must not enter the workplaces thus marked and must not open the marked cabinet.

#### Danger Spot



Warning indicating a danger spot in work rooms.

#### Hand Injury



Keep hands away from areas bearing this warning sign. There is a danger that hands could be crushed, drawn in or otherwise injured.

## 3.8 Spare Parts

---

### **NOTICE**

**Material damage hazard from glass tube breakage or sample blockage in the BST.**

Material damage from glass breakage or samples becoming stuck in the BST may result if non-OEM replacement parts are used.

- ▶ Replacement parts must meet OEM standards.

### **Loss of Guarantee**

If non-approved spare parts are used the manufacturer's guarantee is invalidated.

Purchase spare parts from authorised dealers or directly from the manufacturer. See "[Contact](#)" on page 71 for manufacturer's address.

# 4 Technical Data

## 4.1 General Information

---

Data	Value	Unit
Weight without carousel	9.7	kg
Weight with 16 sample carousel (without any sample)	12.6	kg
Carousel	2.9	kg
Length	31	cm
Width	40	cm
Height	38	cm

Table 4.1 Technical Data: General Information

## 4.2 Connection Values

---

### Electrical

Data	Value	Unit
Voltage	208 - 230	V C
Apparent power consumption, maximum	40	VA
Circuit protection	2 x 1.0 Slow Blow	A
Frequency	50/60	Hz

Table 4.2 Electrical Connection Values

## Pneumatic

Data	Value	Unit
Operating pressure	4-7	bar
Compressed air requirement, minimum	> 100	l/min.
Oiling, maximum	0.005	mg/m <sup>3</sup>

Table 4.3 Pneumatic Connection Values

**i** Pressure supply above 7 bar will be automatically repressed to avoid damage to the SampleXpress Lite.

## 4.3 Operating Conditions

### Environment

Data	Value	Unit
Temperature range	5-30	°C
Relative humidity at 31 °C, maximum	< 80	%
Decreasing linear till relative humidity < 50% at 40 °C, maximum	< 50	%

Table 4.4 Operating Environment

For the appropriate temperature see also the Bruker site planning guides on the BASH CD (Bruker Advanced Service Handbook):

Manual	Bruker Part Number
Site Planning for AVANCE Systems 300-700 MHz (UM)	Z31276
Site Planning for AVANCE Systems 750 -950 MHz (UM)	Z31686

Table 4.5 Bruker Site Planning Guides

## 4.4 Rating Plate

---



Figure 4.1 Rating Plate

The rating plate is located at the power input and includes the following information:

- Manufacturer
- Type
- Voltage
- Frequency
- Apparent power consumption, maximum
- Year of Production
- PN: Part Number
- SN: Serial Number
- Va: Variant
- ECL: Engineering Change Level

## 4.5 Sample Usage

---

SampleXpress Lite can handle any type of sample with standard spinner geometry:

- Standard NMR tubes (3-10 mm).
- Melted reference samples.
- Match spinner (1, 1.7, 2, 2.5, 3, 4, 4.25, and 5 mm).
- Shuttle POM for sample tubes 1-1.7 mm.
- Dummy samples.



Figure 4.2 Example of Samples That Can be Used with SampleXpress Lite

Samples with or without horizontal barcode labels can be used.

The maximum allowed sample height is 7" (180 mm).

**The sample is handled at the spinner only!**

The long probe (exceeding 180 mm) shown in the following figure can not be used in the SampleXpress Lite!:



Figure 4.3 Example of a Sample That Cannot be Used in SampleXpress Lite



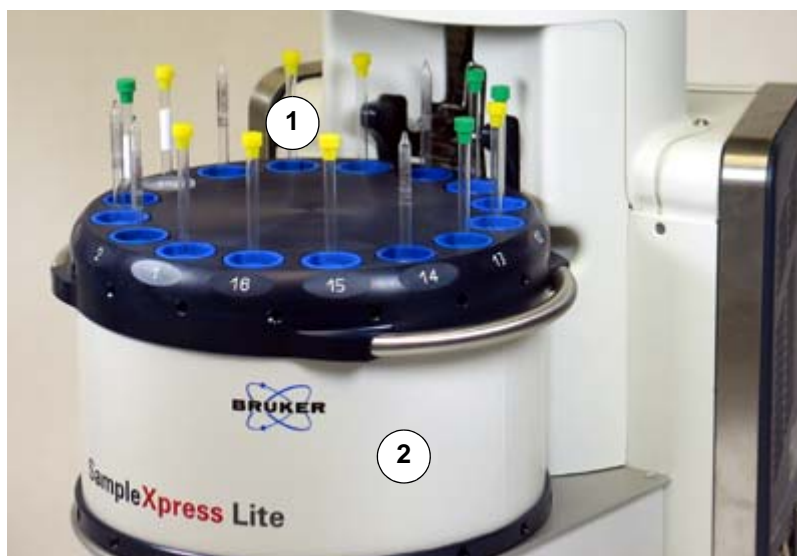
# 5 Design and Function

## 5.1 Overview



1. Status Light
2. NMR Access Position
3. Carousel
4. ON/OFF Button
5. Carousel Base
6. Base Plate
7. Base Unit
8. Connection Panel

Figure 5.1 Overview Left Side



1. Spinner with Sample
2. Carousel

Figure 5.2 Overview Right Side

## 5.2 Brief Description

---

The SampleXpress Lite sample changer allows the automatic measurement of samples in connection with an NMR magnet. The samples are inserted into the magnet by the SampleXpress Lite, and are stored in a removable carousel. It is possible to remove the carousel for filling/removing samples. The carousel has a capacity of 16 samples. Operation of the unit is controlled by TopSpin or IconNMR.

The SampleXpress Lite will not automatically move an actor during a running NMR measurement, unless it is desired by the operator, e.g. to move to another position.

## 5.3 Unit Description

---

### 5.3.1 Base Unit

---

The base unit is placed on the top of the base plate and contains all of the actuators and most of the sensors. The mechanical tolerances are fixed, there is no need to adjust anything between the base plate and the base unit.



1. Base Unit
2. Carousel Base

Figure 5.3 Base Unit and Carousel Base Mounted on Base Plate

## Pneumatic Cylinders

All actuators, except the motor driving the carousel, are pneumatic cylinders. All cylinders are single acting, this means they will move to their home position without electrical power or sufficient air supply.

Under normal operation the sample release lever and the carousel fixation are open.

## Carousel Motor

The SampleXpress Lite uses an electric DC motor to drive the carousel. To minimize the influence on the NMR measurement, the motor is mounted with special vibration damping parts.

## Carousel Fixation

The carousel fixation is driven by a pneumatic cylinder placed in the base unit. The pneumatic cylinder fits into the opening in the carousel.



**Fixation Inactive**



**Fixation Active**

Figure 5.4 Carousel Fixation

Another function of the carousel fixation is to mechanically lock the carousel chain. When a sample position is positioned in proximity of the NMR access position above the BST, the carousel contains a lot of deliberate play which makes it easier for the unit to align on the correct position. When the carousel is stopped near the correct position, the carousel fixation is activated and fixes it in the precise NMR access position required above the BST.

## Sample Release Lever

Each carousel position has its own sample release lever to hold the sample in place. This lever is pressed to its home position by a spring which is placed inside each carousel position. Each carousel position has a small hole, into which the sample release rod fits. When the carousel is positioned above the BST, the sample release rod is led through the opening in the carousel and thus releases the sample. The sample falls through the carousel into the magnet.



**Release Inactive**



**Release Active**

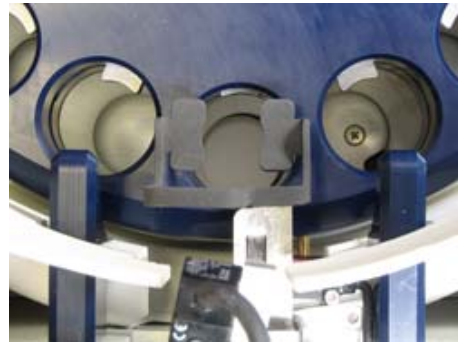
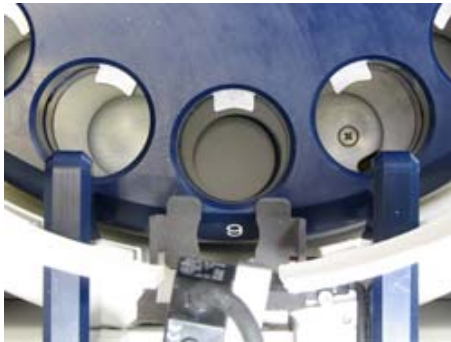


Figure 5.5 Sample Release

## Sample Brake



Figure 5.6 Sample Brake

The sample brake slows down the sample on its way back from the BST tube.

## Carousel Base

The carousel base contains:

- A gear box which drives the carousel disk.
- Electronics with 2 light barriers and a disk with holes which detects which position is above the magnet (NMR position).
- The ON/OFF button.
- Wheels which hold the carousel in place.

### 5.3.2 Carousel

---

The removable carousel has a capacity of 16 samples, which can be filled individually, or can be removed from the base unit and all the carousel positions can be filled at once. To ease the loading/unloading of samples from the sample position pool, the carousel can be placed on a desk or table.

## 5.4 Connections

The connections available are dependant on the configuration.



Figure 5.7 Connections Left Side

1. BST Interface Cable from SLCB BSMS
2. BST Interface Cable to BST
3. Gas Interrupt (future feature)
4. Status and Control
5. Console RS232
6. USB Connection
7. Ethernet Connection
8. Overpressure Exhaust
9. Air Supply Inlet
10. Air Supply Adjustment Knob
11. Air Pressure Gauge
12. Lift Adjustment Knob



Figure 5.8 Connections Right Side

1. Fuse Cartridge
2. DC In (unused)
3. Power Supply
4. Power Control from Control Panel

## 5.5 Indicator Lamp

The indicator lamp indicates the various operating status using different colored light signals.

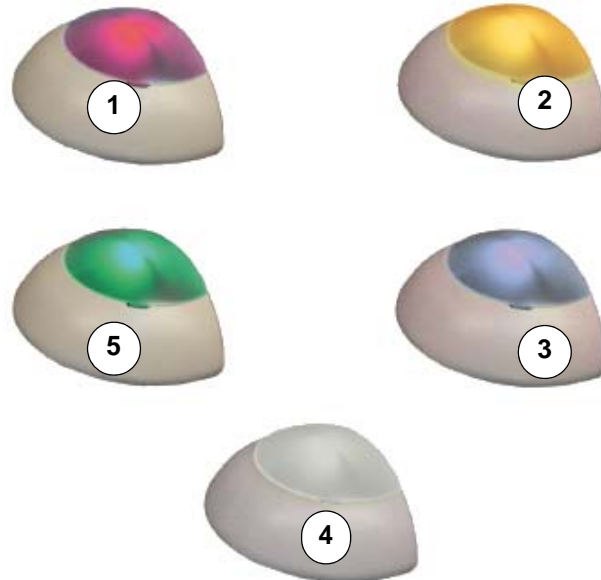


Figure 5.9 Indicator Lamps

Pos.	Light Signal	Description
1	Fault event (red)	The red indicator lamp is illuminated when an internal error occurs.
2	Service Mode (orange)	The orange indicator lamp is illuminated when the device is in service mode or when the system is booting.
3	Operating readiness (blue)	The blue indicator lamp is illuminated when user interaction is required, for example when the: <ul style="list-style-type: none"> <li>• Carousel is absent,</li> <li>• Carousel is processed,</li> <li>• Carousel is empty.</li> </ul>
4	Operating (white)	The white indicator lamp is illuminated during automatic operations.
5	Operating readiness (green)	The green indicator lamp is illuminated when the device is accessible.

Table 5.1 Indicator Lamps

## 5.6 Accessories

---

### Stair

It is recommended to use stairs when charging or changing the carousel:

Stair	Part Number
Stair with 2 steps	Z106255
Stair with 4 steps	Z106254

### Shortened Status Cupola for Cryofit and HR-MAS Changer Adaptation

Accessory	Part Number
Shortened Status Dome	HZ17007



### Cryofit Mounting Kit

Accessory	Part Number
Cryofit Mounting Kit	HZ16826



# 6 Transport, Packaging and Storage

---

**i** Installation, initial commissioning, retrofitting, repairs, adjustments or dismantling of the device must only be carried out by employees of the manufacturer or persons authorised by the manufacturer.

---

## 6.1 Symbols on the Packaging

---

The following symbols are affixed to the packaging material. Always observe the symbols during transport and handling.

### Top



The arrow tips on the sign mark the top of the package. They must always point upwards; otherwise the content may be damaged.

### Fragile



Marks packages with fragile or sensitive contents.

Handle the package with care; do not allow the package to fall and do not allow it to be impacted.

### Protect Against Moisture



Protect packages against moisture and keep dry.

## Attach Here



Lifting gear (lifting chain, lifting strap) must only be attached to points bearing this symbol.

## Center of Gravity



Marks the center of gravity of packages.

Note the location of the center of gravity when lifting and transporting.

## Weight, Attached Load



Indicates the weight of packages.

Handle the marked package in accordance with its weight.

## Permitted Stacking Load



Indicates packages which are partially stackable.

Do not exceed the maximum load-bearing capacity specified on the symbol in order to avoid damaging or destroying the content.

## Do not Damage Air-tight Packaging



The packaging is air-tight. Damage to the barrier layer may render the contents unusable.

Do not pierce.

Do not use sharp objects to open.

## Component Sensitive to Electrostatic Charge



The packaging contains components which are sensitive to an electrostatic charge.

Only allow packaging to be opened by trained personnel.

Establish potential equalisation before opening.

## Protect from Heat



Protect packages against heat and direct sunlight.

## Protect from Heat and Radioactive Sources



Protect packages against heat, direct sunlight and radioactive sources.

## 6.2 Inspection at Delivery

---

Upon receipt, immediately inspect the delivery for completeness and transport damage.

Proceed as follows in the event of externally apparent transport damage:

- Do not accept the delivery, or only accept it subject to reservation.
- Note the extent of the damage on the transport documentation or the shipper's delivery note.
- Initiate complaint procedures.

---

**i** Issue a complaint in respect to each defect immediately following detection. Damage compensation claims can only be asserted within the applicable complaint deadlines.

---

## 6.3 Packaging

---

### About Packaging

The individual packages are packaged in accordance with anticipated transport conditions. Only environmentally friendly materials have been used in the packaging.

The packaging is intended to protect the individual components from transport damage, corrosion and other damage prior to assembly. Therefore do not destroy the packaging and only remove it shortly before assembly.

### Handling Packaging Materials

Dispose of packaging material in accordance with the relevant applicable legal requirements and local regulations.

## 6.4 Storage

---

### Storage of the Packages

Store the packages under the following conditions:

- Do not store outdoors.
- Store in dry and dust-free conditions.
- Do not expose to aggressive media.
- Protect against direct sunlight.
- Avoid mechanical shocks.
- Storage temperature: 15 to 35 °C.
- Relative humidity: max. 60%.
- If stored for longer than 3 months, regularly check the general condition of all parts and the packaging. If necessary, top-up or replace preservatives.

---

**i** Under certain circumstances, storage instructions may be affixed to packages which expand the requirements specified here. Comply with these accordingly.

---

# 7 Installation and Initial Commissioning

---

**i** Installation, initial commissioning, retrofitting, repairs, adjustments or dismantling of the device must only be carried out by employees of the manufacturer or persons authorised by the manufacturer.

---



# 8 Operation

## 8.1 Safety

---

### Improper Operation

#### **WARNING**



#### **Danger of injury from improper operation!**

Improper operation can result in serious injury and significant damage to property.

- ▶ Carry out all operating steps in accordance with the specifications and instructions in this manual.
- ▶ Before starting work, ensure that
  - All covers and safety devices are installed and functioning properly.
  - No persons are in the danger zone.
- ▶ Never disable or bypass safety devices during operation.

### 8.1.1 General Operating Guidelines

---

There are several general rules and procedures that should be observed while operating the SampleXpress Lite.

#### **NMR Measurement**

Do not operate the unit, e.g. exchange sample carousels, during an NMR measurement as this may disturb the NMR system. The laboratory supervisor should define procedures regarding access to the unit and/or the 5 Gauss area around the magnet.

#### **Sample Mix-up**

Sample mix-up from improperly read sample labels or position markings may result when adequate lighting is not provided. The laboratory supervisor should define who should be allowed to be load or unload samples from carousels and at what point in the laboratory process.

---

**i** **Note:** When sample mix-up is a reoccurring problem in the laboratory, Bruker offers automation devices with unique sample identification using barcode collars which avoid sample mix-up.

---

## Temperature Changes

When the ambient temperature changes significantly (for example, after moving the SampleXpress Lite from the stock room before mounting), wait at least 1 hour until the device has achieved room temperature before turning on the device.

## Contamination of Samples

Reusing NMR glass tubes may result in contamination of a new NMR sample from the contents of the previous sample.

## 8.2 Switching On the Device

---

Press the button on the front of the device:



Figure 8.1 Location of the Power Button

- The device will start booting. When the device is ready, the indicator lamp switches to green (when a carousel is present) or blue (when a carousel is not present).



### 8.3 Sample Adjustment and Maximum Sample Height

---



#### **! DANGER**

##### **Danger of injury due to glass tube breakage!**

Broken glass tubes may cause minor to severe injuries as well as material damage. Substances escaping the broken glass tubes may be hazardous or allergenic and therefore cause minor or severe injuries or even death.

- ▶ Wear protective equipment.
- ▶ Refer to the corresponding precautions and cleaning/disinfection instructions.
- ▶ Perform all tasks with the cassette and glass tubes carefully.
- ▶ Never turn the cassette upside down or turn it on one side.

---

**i** Adjust the spinner using the sample depth adjustment gauge before inserting the spinner into the carousel.

---

### 8.4 Adding/Removing Samples

---

The SampleXpress Lite allows samples to be added or removed from the carousel at any time. Each position is clearly marked with a position number, be sure to add/remove a sample from the correct position.

When a sample is inserted into the magnet by the SampleXpress Lite, the carousel remains locked, it is not possible to turn or remove the carousel from the SampleXpress Lite. This prevents the empty carousel position of the sample in the magnet from being unintentionally filled. When the sample is ejected from the magnet, you can turn the carousel to any position or remove it.

Under special circumstances it may be desirable to rotate the carousel to access a position, even when a sample is still in the magnet under measurement. In this case the blocking mechanism can be invalidated by a Bruker service engineer, by setting the switch "Release Carousel Block" on the service pages to "Yes".

Be aware that rotating the carousel during an experiment effects the lock signal and therefore reduces spectra purity!

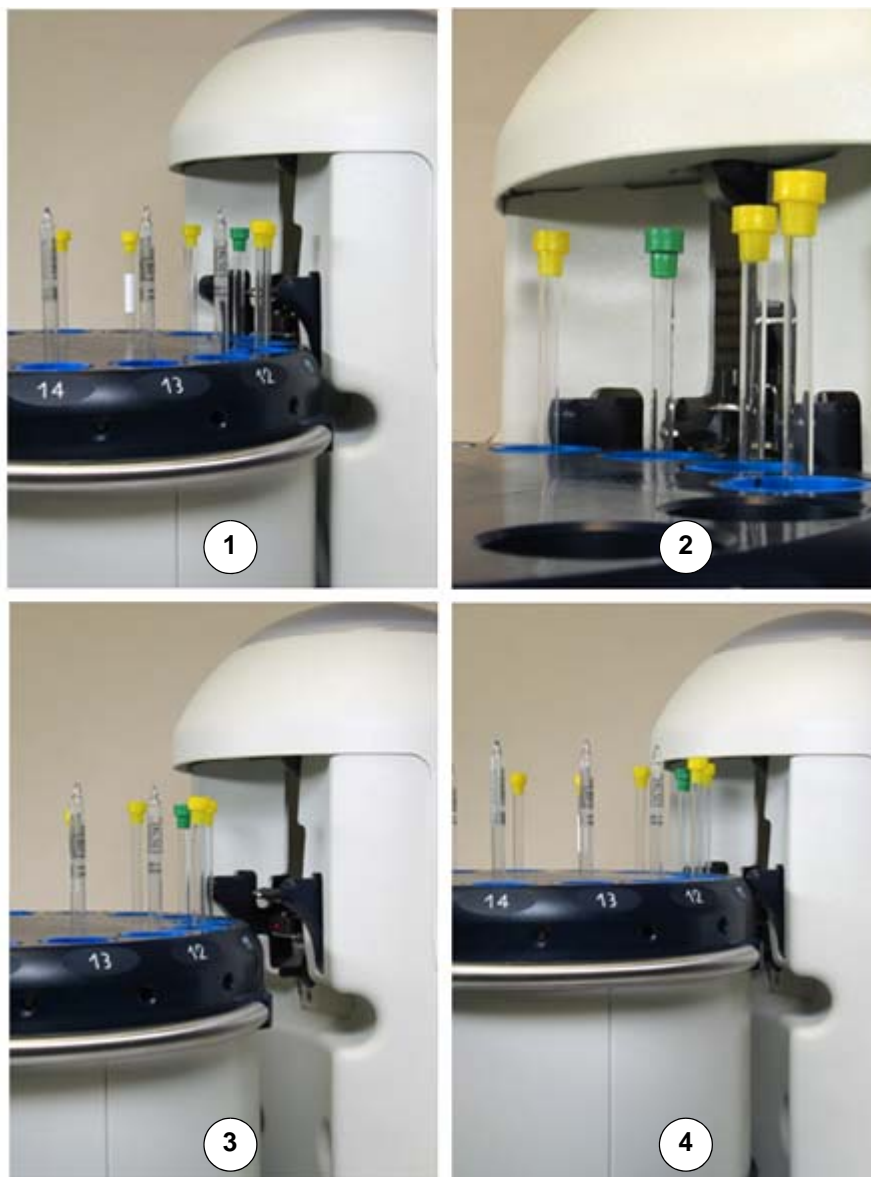
### 8.5 Removing and Inserting the Carousel

---

This function enables the carousel to be removed from the device. This allows the carousel to be filled outside of the unit.

## 8.5.1 Removing the Carousel

1. Stop the IconNMR run and eject the sample using the command **sx ej**.
2. Rotate the carousel until you can grasp both handles.
3. Lift the carousel slightly upwards, then outwards, being careful that the samples pass below the status cupola so they do not break.



1. Carousel ready to be removed.
2. Lift the carousel slightly.
3. Move the carousel outward while watching the samples!
4. Don't raise the carousel too high or it may break the samples!

Figure 8.2 Removing the Carousel

## 8.5.2 Inserting the Carousel

---

Be sure that only correctly adjusted samples are in the cassette! See "[Sample Adjustment and Maximum Sample Height](#)" on page 49 for more information.

1. Place the carousel on the carousel disk, being careful to watch that the samples in the back of the carousel don't bang against the base unit and break.

Be careful when pushing the carousel to the center of the carousel disc, it may fall down if pushed too far to the side!

2. Rotate the carousel slowly until it drops down into the disk.

## 8.6 Switching Off the Device

---

Press the button the front of the device and hold for at least 5 seconds.



# 9 Maintenance

## 9.1 Safety

---

### Samples

#### DANGER

##### **Danger of injury from glass tube breakage!**

Broken glass tubes may cause minor injuries or material damage, but may also result in a life threatening situation if hazardous substances are used.

- ▶ If a glass tube breaks, refer to the corresponding precautions and cleaning/disinfection instructions.
- ▶ Wear protective equipment.
- ▶ Perform all tasks with the carousel and glass tubes carefully.
- ▶ Before carrying out any maintenance work, remove the samples and use dummy samples if necessary.
- ▶ Strictly observe the correct sample adjustment, i.e. the maximum sample height.
- ▶ Never turn the carousel upside down or on it's side.

The **laboratory supervisor** is responsible for:

- ▶ Establishing and enforcing standard sample handling and cleaning procedures.
- ▶ Establishing and enforcing the use of protective clothing and equipment.
- ▶ Training laboratory personnel.
- ▶ Preparing an emergency plan.



### Electrical System

#### WARNING

##### **Electrical hazard from electrical shock!**

A life threatening shock may result when the housing is open during operation.

- ▶ Disconnect the device from the electrical power supply before opening the device. Use a voltmeter to verify that the device is not under power!
- ▶ Be sure that the power supply cannot be reconnected without notice.



## Improperly Performed Maintenance

### WARNING

#### **Danger of injury due to improperly performed maintenance!**

Improperly performed maintenance may lead to serious injury and significant material damage.



- ▶ Provide for sufficient mounting clearance before starting to work.
- ▶ Keep the assembly area tidy and clean! Loose components and tools lying around or on top of each other may lead to accidents.
- ▶ When reinstalling previously removed components, make sure that the components are mounted properly, all fixing elements are reinstalled, and all screws are tightened to torque.
- ▶ Before putting the device back into operation:
  - Make sure that all maintenance work has been performed and completed following the instructions and information provided in this manual.
  - Make sure that no persons are still in the danger zone of the device.
  - Make sure that all covers and safety devices have been installed and function properly.

## Securing to Prevent Restart

### WARNING



#### **Danger to life from an unauthorized restart!**

In the event of an unauthorized restart of the power supply during maintenance, there is a danger of serious injuries or death for persons in the danger zone.

- ▶ Switch off all power supplies before starting work and make sure they cannot be switched on again.

## Moving Parts

### CAUTION



#### **Accident hazard from movement of mechanical parts!**

The fingers or hand may be pinched due to movement of mechanical parts.

- ▶ Shut off the device before accessing.

### Environmental protection

Observe the following environmental protection instructions during maintenance work:

- In respect to all lubrication points supplied manually with lubricant, remove any escaping, used or surplus grease and dispose of in accordance with applicable local regulations.

## 9.2 Replacement Parts

Part Number	Description
H15240	BACS2 Lite Main Unit Complete
H15250	BACS2 Lite Carousel 16 Standard Complete
H15260	Carousel Base with Gearbox and Position Detection Unit

Table 9.1 Bruker Replacement Parts

Replacement parts must be exchanged by Bruker Service staff! The only exception is the carousel.

Only original parts from Bruker are to be used for the SampleXpress Lite. Use of any parts other than from Bruker invalidates all warranty.

Parts which are returned to Bruker for repair or disposal must be accompanied by a repair declaration (see "[Repair Declaration](#)" on page 103).

## 9.3 Preventative Maintenance

All parts in the SampleXpress Lite have been designed to work reliably without routine preventative maintenance.

## 9.4 Lift Adjustment

### NOTICE

#### Material damage hazard from heavy samples!

Samples may be damaged due to incorrect sample lift pressure adjustment.

- ▶ Adjustment is valid only for 1 sample configuration and weight.
- ▶ Personnel must be trained.

**i** Not all connections may be available depending on the configuration.

1. Check the pressure gauge (Figure 5.7/11).
2. If the pressure is below 4 bar, turn the adjustment (Figure 5.7/10) clockwise until the pressure gauge displays 4 bar.

The speed of the sample transported out of the magnet can be varied by regulating the outlet air flows of the cylinder supply connections. A small needle valve is fitted on the exhaust outlet and can be manually set to change the linear speed.

## 9.5 Magnet Service

---

### 9.5.1 Refilling

---

Before refilling helium or nitrogen in the magnet:

1. Turn the SampleXpress Lite off.
2. Unplug the main power supply connector.
3. Cover the SampleXpress Lite with a protective cover, e.g. the cover supplied in the accessory case (part number 1804410).
4. Use the exhaust tubes on the nitrogen towers.

#### After Refilling

1. If parts are icy wait until the ice is thawed and no more water is visible on the cold parts.
2. Remove the protective cover from the SampleXpress Lite.
3. Reconnect the main power supply cable.
4. Restart the SampleXpress Lite.

### 9.5.2 After a Quench

---

After a quench or an explosive release of the drop-off plate:

1. Disconnect the SampleXpress Lite from the power supply.
2. Contact Bruker service immediately. In the event of a quench it is possible that the SampleXpress Lite may be damaged. In this case the SampleXpress Lite should be returned to Bruker for repair.

## 9.6 Maintenance Schedule

---

The sections below describe the maintenance work required to ensure optimal and smooth operation of the device.

If increased wear is found during regular checks, the required maintenance intervals



should be shortened in accordance with the actual wear occurrences. Contact Bruker in the event of questions regarding maintenance work and intervals (see ["Contact"](#) on page 71).

Interval	Maintenance Work	Reference
Daily	Clean the working area.	Laboratory SOP.
Weekly	Clean the machine compartment.	<a href="#">"Cleaning the Outside of the SampleXpress Lite Chassis and Units"</a> on page 60
	Check air maintenance unit.	<a href="#">"Lift Adjustment"</a> on page 55
Annually	Clean the carousel Light Barrier.	<a href="#">"Cleaning the Carousel Light Barrier"</a> on page 60
As needed	Clean Outer Shell of the Device.	<a href="#">"Cleaning the Outer Shell of the Device"</a> on page 60
	Update Firmware.	<a href="#">"Firmware Upgrade"</a> on page 58

Table 9.2 Maintenance Schedule for Laboratory Personnel

## 9.7 Software

The SampleXpress Lite logs all information in a file. With the help of this file Bruker customer service can diagnose the system. In case of troubleshooting as a result of an unknown error, Bruker customer service may ask you to send the log files and the system data. From these files the customer service can obtain additional debugging information. These files do not contain any information about your company, samples or spectra. Bruker will not give any information to a third party.

Information exchange is accomplished via a USB memory stick which has sufficient free space and is FAT32 formatted.

### 9.7.1 Device Report File

In case of problems with the device, a report can be sent to Bruker customer service.

1. Stop all automatic actions.
2. Plug the USB memory stick into the USB port on the rear left side of the device.
  - The 7-segment display will show "UB"
  - The application software searches service files on the USB memory stick. This may take several minutes. Normally there is no service file available (see ["Service File"](#) on page 58).
  - The Device Report File is copied to the memory stick.
  - When the device is ready, the indicator lamp switches to green or blue and the 7 segment display will show "30".
3. Disconnect the USB memory stick from the device.
4. Send the memory stick containing the service file to Bruker customer service.

- 
- i** The file is saved in the directory \Bruker\Automation\logs\ on the USB stick. The file name consists of device name, model number, serial number, date (YYYYMMDD) and time (hhmmss),

e.g. X:\Bruker\Automation\logs\SampleXpressLite\_modelno\_serialno\_YYYYMMDD\_hhmmss.log.

---

- i** The log file is written only if no service file (see "[Service File](#)" on page 58) is available for this device on the USB memory stick.
- 

## 9.7.2 Service File

---

Bruker customer service can send a service file to carry out maintenance automatically. The service file is valid only once for a specific device (based on the P/N and serial number).

1. Stop all automatic actions.
2. Plug the USB memory stick into the USB port on the rear left side of the device.
  - The 7-segment display will show "UB".
  - The application software searches the service files on the USB memory stick. This may take several minutes.
  - The indicator lamp switches to "yellow". The processes written in the service file will be executed. Be patient, this may take some time, do NOT disconnect the USB memory stick.
  - When the device is ready, the indicator lamp switches to green or blue and the 7 segment display will show "30".
3. Disconnect the USB memory stick from the device.

## 9.7.3 Firmware Upgrade

---

- i** Note: Make sure that the power supply is not cut off during the entire procedure. Otherwise you will have to send for a service technician.

The firmware update is done using a service file.

---

1. Stop all automatic actions.
2. Plug the USB memory stick in the USB port on the rear left side of the device.
  - The 7-segment display will show "UB".
  - The application software searches the service files on the USB memory stick. This may take several minutes.

- The indicator lamp switches to "yellow". Be patient, the download sequence may take some time, do NOT disconnect the USB memory stick.
- While the firmware is being downloaded, the following patterns will occur on the 7-segment display:

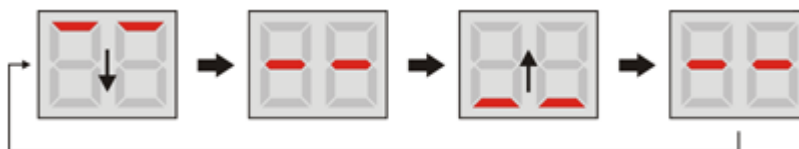


Figure 9.1 Firmware Download Pattern Part 1

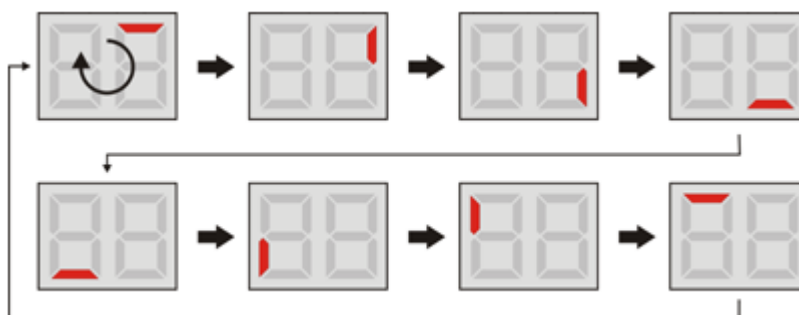


Figure 9.2 Firmware Download Pattern Part 2

- When the device is ready, the indicator lamp switches to green or blue and the 7-segment display will show "30".
3. Disconnect the USB memory stick from the device.

## 9.8 Cleaning

### 9.8.1 Before Cleaning

1. Stop the submitted jobs in the IconNMR automation mode.
2. Stop the SampleXpress Lite from doing any actions.
3. Switch the power off (see "[Switching Off the Device](#)" on page 51).
4. Disconnect the power supply ([Figure 5.8/3](#)).

## 9.8.2 Cleaning the Outside of the SampleXpress Lite Chassis and Units

---

Do not use any detergent or other cleaning solvents. Use only water or neutral cleaning fluids. Usage of volatile cleaners like thinner or benzine may damage the surface of the unit.

1. Clean the outside of the SampleXpress Lite chassis and units with a soft, lint-free cloth dampened in water.
2. Wait until the unit is completely dry before you reconnect the power cable!

## 9.8.3 Cleaning the Outer Shell of the Device

---

- Use only water as a cleaning fluid.
- Do not disassembly the device for cleaning.
- Do not use acetone for cleaning.
- Clean only the outer shell of the device with a lint-free cloth dampened in water.

## 9.8.4 Cleaning the Carousel Light Barrier

---



Excessive dust or dirt at the lens surface of the optics reduces the optics recognition performance.

Clean the carousel light barrier with warm water and a damp lint-free cotton cloth or towel.

Figure 9.3 Carousel Light Barrier

## 9.8.5 Cleaning the Carousel

---

1. Remove the carousel.
2. Clean the rotor container with warm water and a damp lint-free cotton cloth or towel.
3. Let the carousel dry before using!

### 9.8.6 Other Cleaning Operations

---

For all other cleaning operations contact Bruker service for advice and support. It may be necessary to send in the device for a cleaning service.

No special precautions have been taken in SampleXpress Lite to avoid contamination from a leaking sample tube. Bruker accepts no responsibility for any damage which may occur when samples are used containing radioactive or other hazardous materials.

In case of an accident with toxic, radioactive, explosive, or biologically active substances, the device and associated equipment must be cleaned in such a way that no danger emanates from the device and associated equipment, especially for all uninformed personnel. If a device has to be cleaned of all remains of a substance for safety reasons, contact Bruker service for advice and support.

Note that in serious cases it may be necessary for the owner to exchange the device with a new one, contact Bruker service for details.

#### Repair Declaration Form

Use the Repair Declaration Form, whenever a device might be exposed to hazardous substances by customers, when it is to be returned to Bruker.

You will find the Repair Declaration Form in the appendix. "[Repair Declaration](#)" on page 103.



# 10 Troubleshooting

The following chapter describes the possible causes of faults, and the steps required to rectify them.

In the event of repeated faults, shorten the maintenance interval (see "[Maintenance Schedule](#)" on page 56) in accordance with the actual load.

If a failure occurs during operation:

- The sample changer interrupts the current procedure and the red indicator lamp switches to red.
- An error message is displayed on the touch screen, i. e. a code number with a corresponding text.

1. Write down the code number and complete error message. Also note the following information:
  - Part number and serial number of the SampleXpress Lite.
  - Spectrometer type and order number.
  - Magnet type.
2. With this information contact the Bruker customer service (see "[Contact](#)" on page 71).

Also contact the manufacturer in the event of faults which cannot be rectified in accordance with the instructions found in this chapter.

## 10.1 Safety

---

### Electrical System



#### **WARNING**

##### **Electrical hazard from electrical shock!**

A life threatening shock may result when the housing is open during operation.

- ▶ Disconnect the device from the electrical power supply before opening the device. Use a voltmeter to verify that the device is not under power!
- ▶ Be sure that the power supply cannot be reconnected without notice.

## Securing to Prevent Restart

### NOTICE

Before you restart the device after an error, make sure that no samples are in an incorrect position, for example, stuck part way down into the magnet, or at an incorrect level in the carousel.



Figure 10.1 Sample Stuck in the Carousel

## Improperly Executed Troubleshooting Procedures

### ⚠ WARNING

#### **Danger of injury from improper troubleshooting!**

Improperly executed troubleshooting work may result in serious injury and significant damage to property.

- ▶ Ensure sufficient assembly space before starting work.
- ▶ Pay attention to orderliness and cleanliness in the assembly location! Loosely stacked or scattered components and tools could cause accidents.
- ▶ If components have been removed, pay attention to correct assembly, refit all fixing elements and comply with bolt tightening torques.
- ▶ Before the restart, ensure that:
  - all troubleshooting work has been carried out and completed in accordance with the information and instructions in this manual.
  - no persons are in the danger zone.
  - all covers and safety devices are installed and functioning properly.





## Moving Parts



### CAUTION

#### **Accident hazard from movement of mechanical parts!**

The fingers or hand may be pinched due to movement of mechanical parts.

- ▶ Shut off the device before accessing.

## Behavior in the Event of Faults

The following principles apply:

3. Ascertain the cause of the fault.
4. If fault rectification requires work in the danger zone, shut down the device and secure to prevent restarting.
5. Immediately notify those responsible at the place of use about the fault.
6. Depending on the nature of the fault, have it rectified by authorised specialised personnel or rectify it yourself.

## 10.2 Fault Indicator Lamp

---

The fault indicator lamp indicates the various operating statuses and device errors using different colored light signals. Refer to "[Indicator Lamp](#)" on page 39 for details.

When a device error occurs the indicator lamp will turn red and the two-digit 7-segment error code will be displayed (see "[Two Digit 7-Segment Device Status](#)" on page 67).

## 10.3 Start-up Following Fault Rectification

---

After rectifying the fault, perform the following steps to restart the system:

1. Turn off the device (see "[Switching Off the Device](#)" on page 51).
2. Turn on the device (see "[Switching On the Device](#)" on page 48).



# 11 Device Status

## 11.1 Two Digit 7-Segment Device Status

The two-digit, 7-segment status shows the last action started. If the action does not terminate correctly, the 7-segment gives a hint of the action that failed.

Display		Meaning
Left	Right	
Off	Off	SampleXpress Lite is powered down.
Off	1	Boot up sequence, contact Bruker service!
Off	2	
Off	3	
Off	4	
Off	5 - 8	
Off	9	
1	0	
2	1	
2	2	
2	3	
2	4	
2	5	

Table 11.1 Device Main Board Boot-up Sequence

Display		Meaning
Left	Right	
7	0	Initializing Lite main board.
3	0	Windows application program finished initialization and is waiting in idle loop.
7	7	Reading BIS from the Lite main board.

Table 11.2 Windows Application Bootup

Display		Meaning
Left	Right	
A	2	Release sample: activate / deactivate
A	3	Carousel fixation: open/close
A	4	Lift: on/off

Table 11.3 Actions Started; Activation / Deactivation of Pneumatic Actuators

Display		Meaning
Left	Right	
B	1	BST sample present.
B	2	BST sample hovering.

Table 11.4 Sensor Plausibility Checks

Display		Meaning
Left	Right	
C	2	Cassette motion: Fine positioning.
C	3	Cassette motion: Go to destination position.
C	4	Cassette motion: Searching.
C	5	Cassette motion: Scan all positions.
C	6	Cassette motion: Other motion.

Table 11.5 Cassette Motion

Display		Meaning
Left	Right	
E	0	CAN bus error.
E	1	Sample not present but expected (in carousel).
E	2	Sample present but not expected (in carousel).
E	3	Sample hovering but not expected.
E	4	Sample not hovering but expected.
E	5	Sample not down but expected.
E	7	Sample down but not expected.
E	F	Device failure.
A	P	Insufficient air pressure.

Table 11.6 Errors

Display		Meaning
Left	Right	
U	b	Working on the USB stick.
S	E	Service mode active.

Table 11.7 Others

In all other cases save the device report file on a memory stick and contact Bruker customer service (see "[Device Report File](#)" on page 57).

# 12 Dismantling and Disposal

Following the end of its operational life, the device must be dismantled and disposed of in accordance with the environmental regulations.

- 
- i** Installation, initial commissioning, retrofitting, repairs, adjustments or dismantling of the device must only be carried out by employees of the manufacturer or persons authorised by the manufacturer.
- 

## 12.1 Safety

---

### Electrical System

#### **WARNING**



##### **Electrical hazard from electrical shock!**

A life threatening shock may result when the housing is open during operation.

- ▶ Disconnect the device from the electrical power supply before opening the device. Use a voltmeter to verify that the device is not under power!
- ▶ Be sure that the power supply cannot be reconnected without notice.

### Improper Dismantling

#### **WARNING**



##### **Danger of injury due to improper dismantling!**

Stored residual energy, angular components, points and edges on and in the device or on the tools needed can cause injuries.

- ▶ Ensure sufficient space before starting work.
- ▶ Handle exposed, sharp-edged components with care.
- ▶ Dismantle the components properly.
- ▶ Secure components so that they cannot fall down or topple over.
- ▶ Consult the manufacturer if in doubt.

## 12.2 Dismantling

---

Before starting dismantling:

1. Shut down the device and secure to prevent restarting.
2. Physically disconnect the power supply from the device; discharge stored residual energy.
3. Remove consumables, auxiliary materials and other processing materials and dispose of in accordance with the environmental regulations.
4. Clean assemblies and parts properly and dismantle in compliance with applicable local occupational safety and environmental protection regulations.

## 12.3 Disposal

---

If no return or disposal agreement has been made, send the dismantled components for recycling.

- Scrap metals.
- Send plastic elements for recycling.
- Sort and dispose of other components in accordance with their material composition.

### **NOTICE**

#### **Danger to the environment from incorrect handling of pollutants!**

Incorrect handling of pollutants, particularly incorrect waste disposal, may cause serious damage to the environment.

- ▶ Always observe the instructions below regarding handling and disposal of pollutants.
- ▶ Take the appropriate actions immediately if pollutants escape accidentally into the environment. If in doubt, inform the responsible municipal authorities about the damage and ask about the appropriate actions to be taken.

# 13 Contact

**Manufacturer:**

Bruker BioSpin NMR  
am Silberstreifen  
D-76287 Rheinstetten  
Germany  
Phone: +49 721-5161-0  
<http://www.bruker-biospin.com>

**NMR Hotlines**

Contact our NMR service centers.

Bruker BioSpin NMR provide dedicated hotlines and service centers, so that our specialists can respond as quickly as possible to all your service requests, applications questions, software or technical needs.

Please select the NMR service center or hotline you wish to contact from our list available at:

[http://www.bruker-biospin.com/hotlines\\_nmr.html](http://www.bruker-biospin.com/hotlines_nmr.html)





# Appendix A

## A.1 Safety Notices

---

- i** Installation, initial commissioning, retrofitting, repairs, adjustments or dismantling of the device must only be carried out by employees of the manufacturer or persons authorised by the manufacturer.
- 

### CAUTION



#### **Accident hazard from bright LED or laser light!**

Peering into the lighting system of optical sensors, e.g. bar code reader, may result in temporary blinding of the eyes due to the bright light.

- ▶ Do not look into the ray of light.
- ▶ Switch off the equipment before maintenance work.

### WARNING



#### **Biological, chemical hazard!**

Infection, contamination, or other health endangerment as a result of contact with biological or chemical substances, e.g. from broken samples.

- ▶ Clean the device before maintenance work and/or returning to Bruker for repair.
- ▶ Prepare a list of materials in which the device came into contact with or measured.
- ▶ A signed confirmation of correctly carrying out cleaning/disinfection is required from the customer. Without this confirmation the parts delivered for repair will be rejected and returned to the customer.

## CAUTION



### **Accident and material damage hazard from falling objects!**

Equipment may fall down during assembly, retrofitting, or dismantling. This may result in personal injury or equipment damage.

- ▶ If necessary, assembly/disassembly the device in multiple parts.
- ▶ Use a platform with railings instead of a ladder to reach the assembly area.
- ▶ Avoid working over the head. When this can not be avoided, wear a protective hard hat.
- ▶ Follow the mounting instructions in the installation manual.

## NOTICE

### **Material damage hazard from heavy samples!**

Samples may be damaged due to incorrect sample lift pressure adjustment.

- ▶ Adjustment is valid only for 1 sample configuration and weight.
- ▶ Personal must be trained.

## CAUTION



### **Accident hazard from hazardous materials!**

An allergic reaction may be caused by sample substances.

- ▶ Protective clothing should be used as directed by the laboratory supervisor.
- ▶ Proper handling of sample substances must be followed.

## NOTICE

### **Material damage hazard software error.**

Samples or the device may be damaged due to software error causing malfunction of the control system. Users may also be shocked by abrupt malfunction or unexpected system start.

- ▶ Dummy samples must be used during installation and service.
- ▶ Personal should be alerted to unexpected malfunctions.

## NOTICE

### **Material damage hazard due to impacting the magnet.**

Impacting the magnet may result in a quench.

- ▶ Mount the device carefully on the magnet.
- ▶ Avoid banging the magnet during installation and operation, e.g. when replacing the sample carousel.

## NOTICE

### **Material damage hazard from unsafe assembly practices!**

Material damage may result from falling from the ladder during assembly, retrofitting, or dismantling. This may result in personal injury or equipment damage.

- ▶ Use a platform with railings instead of a ladder to reach the assembly area.
- ▶ Where appropriate clothing, e.g. slip-free shoes.

## NOTICE

### **Material damage hazard from illicit sample movement!**

Material damage may result from illicit sample movement during installation and maintenance.

- ▶ Use only dummy samples during installation and maintenance.

## WARNING



### **Accident hazard from suffocation!**

A break in the pneumatic hose may result in the uncontrolled exit of nitrogen into the laboratory.

- ▶ An oxygen warning device should be present in the laboratory if the device is operated with nitrogen.
- ▶ Note that leakage from the main supply line cannot be stopped by the device!

## NOTICE

### Material damage hazard from overflow of cryogenics!

Material damage may result from the overflow of cryogenics.

- ▶ Turn off the device during magnet servicing.
- ▶ Cover the device with a protective cover to avoid contact with cold gases.
- ▶ Be sure to use sufficient transfer line and Teflon evacuation hose for nitrogen and helium refills based on recommendations in the magnet manual.
- ▶ After refilling cryogenics some parts of the magnet may be icy. Be sure to remove the ice to avoid its melting onto the device.

## ⚠ CAUTION



### Accident hazard from movement of mechanical parts!

The fingers or hand may be pinched due to movement of mechanical parts.

- ▶ Shut off the device before accessing the device.

## ⚠ CAUTION



### Accident hazard from contact with hot or cold surfaces on the carousel!

Contact with the hot or cold surfaces of the carousel may result in serious burns.

- ▶ Do not touch carousel parts of cooled or heated carousels.
- ▶ Do not use damaged carousels.
- ▶ After removing a carousel allow it to cool or thaw before coming in contact.

## NOTICE

### Material damage hazard from glass tube breakage or sample blockage in the BST!

Material damage from glass breakage or samples becoming stuck in the BST may result if non-OEM replacement parts are used.

- ▶ Replacement parts must meet OEM standards.

## DANGER



### Danger of injury from glass tube breakage!

Broken glass tubes may cause minor injuries or material damage, but may also result in a life threatening situation if hazardous substances are used.

- ▶ If a glass tube breaks, refer to the corresponding precautions and cleaning/disinfection instructions.
- ▶ Wear protective equipment.
- ▶ Perform all tasks with the carousel and glass tubes carefully.
- ▶ Before carrying out any maintenance work, remove the samples and use dummy samples if necessary.
- ▶ Strictly observe the correct sample adjustment, i.e. the maximum sample height.
- ▶ Always transport the carousel with the cover. Never turn the carousel upside down or on a side.

The **laboratory supervisor** is responsible for:

- ▶ Establishing and enforcing standard sample handling and cleaning procedures.
- ▶ Establishing and enforcing the use of protective clothing and equipment.
- ▶ Training laboratory personnel.
- ▶ Preparing an emergency plan.

## NOTICE

### Material damage hazard from material contact with NMR solvents!

Material damage may result when the device comes in contact with NMR solvents.

- ▶ Follow instructions provided in the manual for correct handling of solvents.
- ▶ Follow the sensor cleaning procedures described in this manual.
- ▶ If surface damage should occur, contact Bruker for repair of damaged parts.

## CAUTION



### Accident hazard from falling from ladder!

It is possible to fall from a ladder when it is used to reach the device on some magnets.

- ▶ Do not use a ladder.
- ▶ Use an approved platform to reach the device on the magnet.
- ▶ Wear non-slip shoes.

## CAUTION



### **Accident hazard from hot or cold air escaping out of the BST!**

When the carousel is removed, hot or cold air may exit the BST, which may result in serious burns.

- ▶ Ensure that personnel are aware of this risk.
- ▶ Refer to the BST or probe manual for more information.

## WARNING



### **Risk to life for unauthorized personnel due to hazards in the danger and working zone!**

Unauthorized personnel who do not meet the requirements described in this manual will not be familiar with the dangers in the working zone. Therefore, unauthorized persons face the risk of serious injury or death.

- ▶ Unauthorized persons must be kept away from the danger and working zone.
- ▶ If in doubt, address the persons in question and ask them to leave the danger and working zone.
- ▶ Cease work while unauthorized persons are in the danger and working zone.

## CAUTION



### **Danger of injury from tripping over dirt and scattered objects!**

Dirt and scattered objects may cause people to slide or trip. A fall may result in injuries.

- ▶ Always keep the work area clean.
- ▶ Remove objects which are no longer required from the work area and particularly from the floor.
- ▶ Indicate unavoidable hazards using marking tape.

## DANGER



### **Danger to life from stored charges!**

Electric charges may be stored in electrical components even after the system has been switched off and disconnected from the power supply. Contact with these components may result in serious or fatal injury.

- ▶ Before working on the specified components, ensure that they have been completely disconnected from the power supply. Allow 10 minutes to elapse in order to ensure that the internal capacitors have been fully discharged.

## WARNING



### **Danger of injury due to movements caused by stored pneumatic forces!**

Pneumatically driven components may move unexpectedly due to stored residual forces, causing serious injuries.

- ▶ Work on the pneumatics system must only be carried out by trained pneumatics technicians.
- ▶ Before starting work on the pneumatics system, ensure that it has been completely depressurized. The pressure accumulator must be completely relieved.

## WARNING



### **Danger to life from strong magnetic fields!**

Strong magnetic fields may cause serious injuries or death and significant damage to property.

- ▶ Persons fitted with heart pacemakers must be kept away from the appliance. The functionality of the heart pacemaker could be compromised.
- ▶ Persons with metal implants must be kept away from the appliance. Implants may heat up or be subject to magnetic attraction.
- ▶ Ferromagnetic materials and electromagnets must be kept away from the magnetic source. Such materials could be subject to magnetic attraction and may fly around the room, injuring or killing people. Minimum distance 3 m.
- ▶ Remove magnetic items (jewelry, watches, pens etc.) before carrying out maintenance work.
- ▶ Keep electronic equipment away from the magnetic source. Such equipment could be damaged.
- ▶ Keep storage media, credit cards etc. away from the magnetic source. Data could be erased.

## WARNING



### **Danger of injury from vapor formation!**

During the work process, vapors may form which cause serious injury if inhaled.

- ▶ Only install the appliance in a well-ventilated room or ensure that an extractor is fitted.

## WARNING



### **Danger to life from contact voltage!**

Absent or faulty protective earth conductor may result in contact voltage. This may pose a risk of injury or death.

- ▶ Before the initial commissioning of the appliance, connect the main power supply to the socket and verify the complete functionality of the protective earth conductor.

## NOTICE

### **Danger to the environment from incorrect handling of pollutants!**

Incorrect handling of pollutants, particularly incorrect waste disposal, may cause serious damage to the environment.

- ▶ Always observe the instructions below regarding handling and disposal of pollutants.
- ▶ Take the appropriate actions immediately if pollutants escape accidentally into the environment. If in doubt, inform the responsible municipal authorities about the damage and ask about the appropriate actions to be taken.



## **WARNING**



### **Danger of injury from improper operation!**

Improper operation can result in serious injury and significant damage to property.

- ▶ Carry out all operating steps in accordance with the specifications and instructions in this manual.
- ▶ Before starting work, ensure that
  - all covers and safety devices are installed and functioning properly.
  - no persons are in the danger zone.
- ▶ Never disable or bypass safety devices during operation.



## A.2 Avertissements De Sécurité

---

- i** L'installation, la mise en service initiale, la rénovation "retrofit", les réparations, les réglages et le désassemblage de l'appareil doivent être effectués exclusivement par les employés du fabricant ou par les personnes dûment autorisées par le fabricant.
- 

### ATTENTION



#### **Risque d'accident lié à la luminosité des LED ou à la lumière du laser !**

Ne fixez pas des yeux le système d'éclairage des capteurs optiques (par ex. : lecteur de codes-barres) ou vous risquez d'être temporairement aveuglé par la forte luminosité.

- ▶ Ne regardez pas dans le rayon de lumière.
- ▶ Eteignez l'équipement avant d'effectuer les tâches de maintenance.

### AVERTISSEMENT



#### **Risque biologique ou chimique !**

Risque d'infection ou de contamination ou autre risque d'exposition préjudiciable à la santé en conséquence du contact avec des substances biologiques ou chimiques, par ex. à cause d'échantillons brisés.

- ▶ Nettoyez l'appareil avant d'effectuer les tâches de maintenance et/ ou de retourner l'appareil à Bruker pour réparation.
- ▶ Préparez une liste des matières avec lesquelles l'appareil a été en contact ou pour lesquelles l'appareil a effectué des mesures.
- ▶ Le client est tenu de faire parvenir à Bruker une confirmation dûment visée attestant que les opérations de nettoyage/ désinfection ont été correctement effectuées. Sans cette confirmation, les pièces qui sont livrées à Bruker pour réparation seront rejetées et renvoyées au client.

## ATTENTION



### **Risque d'accident et d'endommager le matériel si des objets tombent!**

L'équipement peut tomber par terre au cours de l'assemblage, de la rénovation "ret-rofit" ou du désassemblage, entraînant un risque de blessures aux personnes ou de dommages à l'équipement.

- ▶ Si nécessaire, assemblez/ désassemblez l'appareil en pièces multiples.
- ▶ Utilisez une plateforme munie de garde-fous plutôt qu'un escabeau pour atteindre la zone d'assemblage.
- ▶ Evitez de travailler les bras au dessus de la tête. Si vous ne pouvez l'éviter, portez un casque de protection.
- ▶ Respectez les instructions de montage figurant dans le manuel d'installation.

## **MISE EN GARDE**

### **Risque d'endommager le matériel à cause d'échantillons trop lourds !**

Des échantillons peuvent être endommagés à cause d'un réglage incorrect de la pression de levage des échantillons.

- ▶ Chaque réglage n'est valide que pour un seul poids et un seul type de configuration d'échantillon.
- ▶ Le personnel doit être dûment formé.

## ATTENTION



### **Risque d'accident lié aux matières dangereuses !**

Les substances échantillonnées peuvent provoquer des réactions allergiques.

- ▶ Utilisez les vêtements de protection individuelle imposés par le superviseur du laboratoire.
- ▶ Respectez scrupuleusement les instructions inhérentes à une manipulation correcte des substances échantillonnées.

### **MISE EN GARDE**

#### **Risque d'endommager le matériel à cause d'une erreur logicielle !**

Les échantillons ou l'appareil peuvent être endommagés à cause d'une erreur logicielle ayant provoqué un dysfonctionnement du système de commande. L'utilisateur peut également être commotionné à cause d'un dysfonctionnement abrupt ou de la mise en route inopinée du système.

- ▶ Des échantillons factices doivent être utilisés au cours de l'installation et de l'entretien.
- ▶ Le personnel devra être averti du risque de dysfonctionnements inopinés.

### **MISE EN GARDE**

#### **Risque d'endommager le matériel à cause d'un choc sur l'aimant !**

Tout choc sur l'aimant peut provoquer un "quench".

- ▶ Installez avec précaution l'appareil sur l'aimant.
- ▶ Evitez de cogner l'aimant au cours de l'installation et du fonctionnement, par ex. lorsque vous remettez la carousel d'échantillonnage en place.

### **MISE EN GARDE**

#### **Risque d'endommager le matériel à cause d'un manque de sûreté dans les pratiques d'assemblage !**

Le matériel risque d'être endommagé en tombant du haut de l'escabeau au cours de l'assemblage, de la rénovation "retrofit" ou du désassemblage, risquant du même coup de blesser les personnes ou d'endommager l'équipement.

- ▶ Utilisez une plateforme munie de garde-fous plutôt qu'un escabeau pour atteindre la zone d'assemblage.
- ▶ Portez des vêtements appropriés, par ex. chaussures à semelles antidérapantes.

### MISE EN GARDE

#### Risque d'endommager le matériel à cause d'un mouvement injustifié des échantillons !

Le mouvement injustifié des échantillons au cours de l'installation et de la maintenance peut conduire à endommager le matériel.

- ▶ Utilisez uniquement des échantillons factices au cours de l'installation et de la maintenance.

### ⚠ AVERTISSEMENT



#### Risque d'accident par asphyxie !

Si le flexible pneumatique de l'appareil se casse, une quantité incontrôlée d'azote peut se répandre dans le laboratoire.

- ▶ Un détecteur d'oxygène doit être installé dans le laboratoire si l'appareil est destiné à fonctionner à l'azote.
- ▶ Veuillez noter qu'une fuite au niveau du circuit principal d'alimentation ne peut pas être stoppée à l'aide du SampleXpress Lite !!

### MISE EN GARDE

#### Risque d'endommager le matériel à cause d'un débordement de cryogènes !

Le débordement de cryogènes peut endommager le matériel.

- ▶ Eteignez l'appareil pendant les opérations d'entretien de l'aimant.
- ▶ Recouvrez l'appareil avec un capot de protection pour éviter tout contact avec des gaz froids.
- ▶ Veillez à utiliser un circuit de transfert et un flexible d'évacuation en Téflon de longueurs suffisantes pour permettre les appoints en azote et en hélium en se basant sur les recommandations figurant dans le manuel de l'aimant.
- ▶ Après avoir fait l'appoint en cryogènes, certaines parties de l'aimant peuvent se couvrir de glace. Veillez à retirer la glace afin d'éviter qu'elle ne fonde sur l'appareil.

### ATTENTION



#### **Risque d'accident à cause du mouvement des parties mécaniques !**

Les doigts ou la main peuvent se retrouver pincés par le mouvement des pièces mécaniques de l'appareil.

- ▶ Eteignez l'appareil avant d'intervenir dessus.

### ATTENTION



#### **Risque d'accident à cause du contact avec des surfaces chaudes ou froides de la carousel !**

Le contact avec les surfaces chaudes ou froides de la carousel peut provoquer des brûlures graves.

- ▶ Ne portez pas la main sur les parties refroidies ou échauffées des carousels.
- ▶ N'utilisez pas de carousel endommagée.
- ▶ Après avoir retiré une carousel, laissez-la refroidir ou dégeler avant d'y porter la main.

### **MISE EN GARDE**

#### **Risque d'endommager le matériel à cause d'un tube en verre brisé ou du blocage d'un échantillon dans le BST !**

L'utilisation de pièces de rechange qui ne sont pas des pièces d'origine constructeur accroît le risque d'endommager le matériel car les tubes en verre risquent de se casser et les échantillons risquent de rester coincés dans le BST.

- ▶ Les pièces de rechange utilisées doivent satisfaire aux normes établies par le constructeur.

### DANGER

#### **Danger de blessure à cause d'un tube en verre brisé !**

Les éclats de verre des tubes brisés peuvent non seulement causer des blessures mineures et endommager le matériel mais aussi créer une situation sanitaire extrêmement sérieuse si les substances utilisées sont dangereuses.

- ▶ Si un tube en verre se casse, référez-vous aux précautions de sécurité et aux instructions de nettoyage/ désinfection correspondantes.
- ▶ Portez des équipements de protection.
- ▶ Effectuez avec précaution toutes les opérations impliquant la carousel et les tubes en verre.
- ▶ Avant d'effectuer toute tâche de maintenance, retirez les échantillons et, si nécessaire, utilisez des échantillons factices.
- ▶ Respectez scrupuleusement les indications pour le réglage de la hauteur maximum d'échantillon.
- ▶ Transportez toujours la carousel avec son couvercle. Ne tournez jamais la carousel sur un côté et ne la retournez pas tête en bas.

#### **Le superviseur du laboratoire est tenu:**

- ▶ d'établir des procédures standards pour la manipulation des échantillons et le nettoyage et se doit de les faire appliquer.
- ▶ d'instaurer l'usage de vêtements et d'équipements de protection et de veiller à ce qu'ils soient portés.
- ▶ de former le personnel du laboratoire.
- ▶ de préparer un plan d'urgence.



### **MISE EN GARDE**

#### **Risque d'endommager le matériel à cause de la mise en contact du matériel avec des solvants pour RMN !**

Le matériel risque d'être endommagé quand l'appareil est mis en contact avec des solvants pour RMN.

- ▶ Suivez les instructions fournies dans le manuel pour savoir comment manipuler correctement les solvants.
- ▶ Respectez les procédures de nettoyage de la sonde décrites dans ce manuel.
- ▶ Dans l'éventualité d'un dégât de surface, contactez Bruker qui se chargera de réparer les parties endommagées.



## ATTENTION



### **Risque d'accident pour cause de chute de l'escabeau !**

Sur certains aimants, il est nécessaire d'utiliser un escabeau pour atteindre l'appareil, ce qui rend possible le risque de chute.

- ▶ N'utilisez pas d'escabeau.
- ▶ Utilisez une plateforme approuvée pour atteindre l'appareil sur l'aimant.
- ▶ Portez des chaussures à semelles antidérapantes.

## ATTENTION



### **Risque d'accident à cause de jets d'air chaud ou froid s'échappant du BST !**

Lorsque la carousel est retirée, des jets d'air chaud ou froid peuvent s'échapper du BST et entraîner un risque de brûlures graves.

- ▶ Veillez à ce que le personnel soit sensibilisé à ce risque.
- ▶ Référez-vous au manuel du BST ou de la sonde pour de plus amples informations.

## AVERTISSEMENT



### **Danger de mort pour les personnes non autorisées, à cause des risques encourus dans la zone de danger et la zone de travail !**

Le personnel non autorisé qui ne satisfait pas aux exigences décrites dans ce manuel ne peut pas être averti des dangers inhérents à la zone de travail. Par conséquent, toute personne non autorisée encourt un risque de blessure grave ou de mort.

- ▶ Les personnes non autorisées doivent être tenues à l'écart de la zone de danger et de la zone de travail.
- ▶ En cas de doute, adressez-vous aux personnes en question et demandez-leur de quitter la zone de danger et la zone de travail.
- ▶ Cessez de travailler si des personnes non autorisées pénètrent dans la zone de danger et la zone de travail.

### ATTENTION



#### **Danger de blessure par trébuchement si les sols sont encrassés ou encombrés !**

Les sols encrassés et encombrés peuvent provoquer des chutes par glissade ou trébuchement et entraîner par conséquent des blessures.

- ▶ Maintenez toujours la zone de travail propre.
- ▶ Retirez de la zone de travail tous les objets qui n'y sont plus indispensables et dégagez plus particulièrement le sol.
- ▶ Signalez les dangers qui ne peuvent être évités à l'aide d'adhésif de marquage.

### DANGER



#### **Danger de mort à cause de charges emmagasinées !**

Des charges électriques peuvent rester emmagasinées dans les composants électriques même après que le système ait été éteint et déconnecté de l'alimentation électrique. Le contact de ces composants peut entraîner des blessures graves, voire fatales.

- ▶ Avant de travailler sur les composants spécifiés, veillez préalablement à ce qu'ils soient complètement déconnectés de l'alimentation électrique. Laissez s'écouler 10 minutes afin de garantir que les condensateurs internes se sont totalement déchargés..

### AVERTISSEMENT



#### **Danger de blessure dû aux mouvements causés par des forces pneumatiques emmagasinées !**

Des composants à commande pneumatique peuvent bouger de façon inopinée à cause de forces résiduelles emmagasinées, causant ainsi des blessures graves.

- ▶ Les opérations réalisées sur le système pneumatique ne doivent être effectuées que par des techniciens en pneumatique dûment formés.
- ▶ Avant de commencer toute intervention sur le système pneumatique, veillez à ce qu'il soit complètement vidé de sa pression. L'accumulateur de pression doit être complètement purgé.

## AVERTISSEMENT

### **Danger de mort à cause de champs magnétiques forts !**

Des champs magnétiques forts peuvent causer des blessures graves ou la mort et endommager de manière significative les biens alentour.

- ▶ Les personnes dotées d'un stimulateur cardiaque doivent être tenues à l'écart de l'appareil. Le fonctionnement du stimulateur cardiaque pourrait être compromis.
- ▶ Les personnes dotées d'implants métalliques doivent être tenues à l'écart de l'appareil. Ces implants pourraient s'échauffer ou subir l'attraction magnétique.
- ▶ Les matériaux ferromagnétiques et les électroaimants doivent être tenus à bonne distance de la source magnétique. Ces matériaux peuvent subir l'attraction magnétique et se mettre à voler à travers la pièce, d'où le risque de blessures ou de mort. Distance minimum à respecter : 3 m.
- ▶ Débarrassez-vous de tous les objets magnétiques (bijoux, montres, crayons, etc.) avant d'effectuer toute tâche de maintenance.
- ▶ Conservez les équipements électroniques à bonne distance de la source magnétique. Ces équipements pourraient être endommagés.
- ▶ Conservez tous vos moyens de stockage, cartes de crédit, etc. à bonne distance de la source magnétique. Leurs données pourraient être effacées.



## AVERTISSEMENT

### **Danger de blessure à cause de la formation de vapeur !**

Au cours du processus opératoire, des vapeurs peuvent se former et provoquer des blessures graves par inhalation.

- ▶ Avant d'installer cet appareil, vérifiez que la salle qui l'accueille est bien ventilée ou équipée d'un extracteur.



## AVERTISSEMENT

### **Danger de mort à cause d'une tension de contact !**

L'absence ou la défaillance d'une terre de protection peut susciter l'apparition d'une tension de contact, qui peut elle-même engendrer un danger de blessure ou de mort.

- ▶ Avant la mise en service initiale de l'appareil, raccordez l'alimentation électrique principale à la prise et vérifiez le bon fonctionnement de la terre de protection.



## MISE EN GARDE

### **Danger pour l'environnement à cause de la manipulation incorrecte de polluants !**

La manipulation incorrecte de polluants, et plus particulièrement leur élimination incorrecte avec les ordures, peut causer de sérieux dommages à l'environnement.

- ▶ Respectez toujours les instructions ci-dessous concernant la manipulation et l'élimination des polluants.
- ▶ Prenez les mesures immédiates appropriées dans le cas où des polluants s'échapperaient accidentellement dans l'environnement. En cas de doute, informez les autorités municipales responsables du sinistre et renseignez-vous sur les actions appropriées à entreprendre.

## AVERTISSEMENT

### **Danger de blessure à cause d'une action impropre !**


Toute opération incorrecte peut avoir pour conséquence des blessures graves et des dommages significatifs aux biens alentour.

- ▶ Menez à bien toutes les phases opératoires de l'appareil en vous conformant aux spécifications et instructions contenues dans ce manuel.
- ▶ Avant de commencer à travailler, assurez-vous que tous les capots et les dispositifs de sécurité sont installés et fonctionnent correctement. Vérifiez que personne ne se trouve dans la zone de danger.
- ▶ Ne désactivez jamais les dispositifs de sécurité pendant le fonctionnement de l'appareil. Ne les bypassiez pas.



## A.3 Sicherheitshinweise

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-  Arbeiten zur Installation, ersten Inbetriebnahme, Nachrüstung, Reparatur, Einstellarbeiten oder zum Zerlegen des Geräts dürfen nur durch Mitarbeiter des Herstellers oder vom Hersteller autorisierte Personen durchgeführt werden.
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### VORSICHT



#### **Unfallgefahr durch helles LED- oder Laserlicht!**

Der direkte Einblick in Beleuchtungssysteme optischer Sensoren, z.B. von Barcodelesern, kann wegen des verwendeten hellen Lichts zu einer vorübergehenden Beeinträchtigung der Sehleistung des Auges durch das helle Licht führen.

- ▶ Blicken Sie nicht in den Lichtstrahl.
- ▶ Schalten Sie das Gerät vor Wartungsarbeiten aus.

### WARNUNG



#### **Biologische und chemische Gefahren!**

Gefahr von Infektion, Ansteckung oder anderer Gesundheitsgefährdung durch den Kontakt mit biologischen oder chemischen Substanzen, z.B. bei zerbrochenen Probenbehältern.

- ▶ Reinigen Sie das Gerät vor allen Wartungsarbeiten bzw. bevor Sie es zur Reparatur an Bruker einsenden.
- ▶ Erstellen Sie eine Liste der Stoffe, mit denen das Gerät in Berührung gekommen ist oder an denen Messungen vorgenommen worden sind.
- ▶ Der Kunde muss eine unterzeichnete Bestätigung vorlegen, dass die Reinigung bzw. Desinfektion korrekt durchgeführt worden ist. Ohne diese Bestätigung werden die zur Reparatur eingesandten Teile nicht angenommen und stattdessen zum Kunden zurückgesandt.

## VORSICHT



### **Gefahr von Unfällen und Sachschäden durch herabfallende Objekte!**

Beim Zusammenbau, bei Nachrüstungen sowie beim Zerlegen des Geräts können Teile herabfallen. Dadurch können Personen- oder Sachschäden verursacht werden.

- ▶ Falls erforderlich, sollten Sie das Gerät in mehreren Teilen montieren bzw. zerlegen.
- ▶ Benutzen Sie für den Zugang zum Montagebereich statt einer Leiter eine Arbeitsbühne mit Geländer.
- ▶ Vermeiden Sie es, über Kopf zu arbeiten. Falls dies nicht möglich ist, sollten Sie einen Schutzhelm tragen.
- ▶ Beachten Sie die Montageanweisungen im Installationshandbuch.

## *HINWEISE ZUM BETRIEB*

### **Gefahr von Sachschäden durch schwere Proben!**

Die Proben können bei einer falschen Einstellung des Drucks am Probenlift beschädigt werden.

- ▶ Die Einstellung gilt jeweils nur für eine Probenkonfiguration und ein bestimmtes Gewicht.
- ▶ Es dürfen nur entsprechend geschulte Mitarbeiter eingesetzt werden.

## VORSICHT



### **Unfallgefahr durch Gefahrstoffe.**

Bestimmte Probensubstanzen können allergische Reaktionen auslösen.

- ▶ Es ist die vom Laborleiter vorgeschriebene Schutzkleidung zu tragen.
- ▶ Die Anweisungen zur korrekten Handhabung der untersuchten Substanzen sind unbedingt zu beachten.

## HINWEISE ZUM BETRIEB

### **Gefahr von Sachschäden durch Softwarefehler.**

Die Proben oder das Gerät können durch Softwarefehler, die zu Funktionsstörungen des Steuersystems führen, beschädigt werden. Außerdem können plötzlich auftretende Funktionsstörungen oder ein unerwartetes Anlaufen des Systems bei den Bedienern zu Schreckreaktionen führen.

- ▶ Während der Installation und der Wartung dürfen nur Dummy-Proben verwendet werden.
- ▶ Die mit der Bedienung beauftragten Mitarbeiter sollten auf die Möglichkeit unerwarteter Funktionsstörungen hingewiesen werden.

## HINWEISE ZUM BETRIEB

### **Gefahr von Sachschäden durch Anstoßen am Magnet!**

Beim Anstoßen am Magnet besteht die Gefahr, dass Teile eingequetscht werden.

- ▶ Gehen Sie bei der Montage am Magneten besonders vorsichtig vor.
- ▶ Vermeiden Sie es, bei der Installation und im Betrieb, z.B. beim Austausch der Probenkassette, den Magneten hart anzustoßen.

## HINWEISE ZUM BETRIEB

### **Gefahr von Sachschäden durch unsicheres Arbeiten bei der Montage!**

Beim Zusammenbau, bei Nachrüstungen sowie beim Zerlegen des Geräts besteht die Gefahr von Sachschäden, wenn Teile von der Leiter herabfallen. Dadurch können Personen- oder Sachschäden verursacht werden.

- ▶ Benutzen Sie für den Zugang zum Montagebereich statt einer Leiter eine Arbeitsbühne mit Geländer.
- ▶ Tragen Sie geeignete Kleidung, z.B. Schuhe mit rutschfesten Sohlen.

## HINWEISE ZUM BETRIEB

### Gefahr von Sachschäden durch unbeabsichtigte Bewegung der Proben!

Bei der Installation und Wartung besteht die Gefahr von Sachschäden durch unbeabsichtigte Bewegung der Proben.

- ▶ Verwenden Sie bei der Installation und der Wartung nur Dummy-Proben.

## WARNUNG



### Unfallgefahr durch Ersticken!

Bei einer Beschädigung des Pneumatikschlauchs kann es dazu kommen, dass unkontrolliert Stickstoff in das Labor strömt.

- ▶ Wenn das Gerät mit Stickstoff betrieben wird, sollte das Labor mit einer Warneinrichtung für den Sauerstoffgehalt der Atemluft ausgestattet sein.
- ▶ Beachten Sie, dass der Austritt von Stickstoff an der Hauptversorgungsleitung von Seiten des SampleXpress Lite nicht abgestellt werden kann!

## HINWEISE ZUM BETRIEB

### Gefahr von Sachschäden durch überlaufendes Kühlmittel!

Gefahr von Sachschäden durch überlaufendes Kühlmittel.

- ▶ Schalten Sie das Gerät während Servicearbeiten am Gerät aus.
- ▶ Decken Sie das Gerät mit einer Schutzabdeckung ab, um die Berührung mit kalten Gasen zu vermeiden.
- ▶ Achten Sie darauf, beim Nachfüllen von Stickstoff und Helium ausreichend lange Nachfüllleitungen und Teflon-Ablaufschläuche zu verwenden. Beachten Sie hierzu die Empfehlungen im Handbuch zum Magneten.
- ▶ Nach dem Nachfüllen des Kühlmittels können Teile des Magneten vereist sein. Achten Sie darauf, dieses Eis zu entfernen, damit beim Abtauen kein Wasser auf das Gerät tropft.



## VORSICHT



### **Unfallgefahr durch sich bewegende Teile!**

Es besteht die Gefahr von Quetschungen an Hand oder Fingern durch sich bewegende Teile.

- ▶ Schalten Sie das Gerät ab, bevor Sie hinein greifen.

## VORSICHT



### **Unfallgefahr durch Berühren heißer oder kalter Oberflächen an der Kassette!**

Beim Berühren heißer oder kalter Oberflächen an der Kassette besteht die Gefahr schwerer Verbrennungen.

- ▶ Berühren Sie keine gekühlten oder erhitzten Teile der Kassetten.
- ▶ Verwenden Sie keine beschädigten Kassetten.
- ▶ Lassen Sie die Kassetten nach dem Entnehmen abkühlen bzw. abtauen, bevor Sie sie berühren.

## **HINWEISE ZUM BETRIEB**

### **Gefahr von Sachschäden durch zerbrochene Glasbehälter oder Blockieren der Proben im BST!**

Bei Verwendung nicht zugelassener Ersatzteile kann es zu Sachschäden durch zerbrochene Glasbehälter oder Blockieren von Proben im BST kommen.

- ▶ Die Ersatzteile müssen den OEM-Standards entsprechen.

## **GEFAHR**

### **Verletzungsgefahr durch zerbrochene Glasbehälter!**

Zerbrochene Glasbehälter können zu geringfügigen Sachschäden oder Verletzungen, ebenso aber auch zu lebensbedrohlichen Situationen führen, wenn Gefahrstoffe freigesetzt werden.

- ▶ Falls ein Glasbehälter zerbricht, beachten Sie bitte die entsprechenden Anweisungen zu Vorsichtsmaßnahmen und zur Reinigung bzw. Desinfektion.
- ▶ Tragen Sie geeignete Schutzausrüstung.
- ▶ Gehen Sie bei allen Arbeiten mit Kassette und Glasbehältern besonders vorsichtig vor.
- ▶ Entfernen Sie vor allen Wartungsarbeiten noch vorhandene Proben und verwenden Sie bei Bedarf Dummy-Proben.
- ▶ Beachten Sie unbedingt die Angaben zur korrekten Einstellung der Proben, d.h. die maximale Probenhöhe.
- ▶ Transportieren Sie die Kassette nur mit der Abdeckung. Stellen Sie die Kassette nicht auf den Kopf und drehen Sie sie nicht auf die Seite.



### **Der Laborleiter ist verantwortlich für:**

- ▶ die Festlegung und Durchsetzung von Standardverfahren zur Handhabung der Proben und zur Reinigung.
- ▶ die Festlegung und Durchsetzung der Anweisungen zur Schutzkleidung und -ausrüstung.
- ▶ die Schulung des Laborpersonals.
- ▶ die Erstellung eines Notfallplans.

## **HINWEISE ZUM BETRIEB**

### **Gefahr von Sachschäden durch Kontakt mit NMR-Lösungsmitteln!**

Wenn das Gerät mit NMR-Lösungsmitteln in Berührung kommt, besteht die Gefahr von Sachschäden.

- ▶ Beachten Sie die Anweisungen im Handbuch zur korrekten Handhabung der Lösungsmittel.
- ▶ Beachten Sie die Beschreibung zur Reinigung des Sensors im Handbuch.
- ▶ Falls Oberflächen beschädigt werden, sollten Sie sich zur Reparatur der beschädigten Teile an Bruker wenden.

## VORSICHT



### **Unfallgefahr durch Sturz von der Leiter!**

Beim Versuch, das Gerät an einigen Magneten mit einer Leiter zu erreichen, besteht Sturzgefahr.

- ▶ Benutzen Sie keine Leiter.
- ▶ Benutzen Sie stattdessen eine zugelassene Arbeitsbühne, um das Gerät am Magneten zu erreichen.
- ▶ Tragen Sie Schuhe mit rutschfesten Sohlen.

## VORSICHT



### **Unfallgefahr durch aus dem BST austretende heiße oder kalte Luft!**

Beim Entnehmen der Kassette kann aus dem BST heiße oder kalte Luft austreten. Dadurch besteht die Gefahr schwerer Verbrennungen.

- ▶ Sorgen Sie dafür, dass den Mitarbeitern diese Gefahr bewusst ist.
- ▶ Verweisen Sie für weitere Informationen auf die Probenkopf- bzw. BSTHandbücher.

## WARNUNG



### **Lebensgefahr für nicht autorisiertes Personal durch verschiedene Risiken im Gefahren- und Arbeitsbereich!**

Nicht autorisiertes Personal, das die in diesem Handbuch beschriebenen Bedingungen nicht erfüllt, ist mit den Gefahren im Arbeitsbereich nicht vertraut. Daher besteht für nicht autorisiertes Personal die Gefahr von Unfällen mit schweren Verletzungen oder Todesfolge.

- ▶ Nicht autorisierte Personen dürfen keinen Zugang zum Gefahren- und Arbeitsbereich erhalten.
- ▶ Sprechen Sie die fraglichen Personen im Zweifelsfall an und fordern Sie sie auf, den Arbeits- und Gefahrenbereich zu verlassen.
- ▶ Stellen Sie die Arbeiten ein, während sich nicht autorisierte Personen im Gefahren- und Arbeitsbereich aufhalten.

## VORSICHT



### **Verletzungsgefahr durch Ausrutschen auf Verschmutzungen oder Stolpern über herumliegende Gegenstände!**

Schmutz und herumliegende Gegenstände führen zu Gefahren durch Ausrutschen oder Stolpern. Bei einem Sturz besteht Verletzungsgefahr.

- ▶ Halten Sie den Arbeitsbereich jederzeit sauber.
- ▶ Entfernen Sie alle Gegenstände, die nicht mehr benötigt werden, aus dem Arbeitsbereich und insbesondere vom Boden.
- ▶ Machen Sie unvermeidliche Gefährdungen durch Markierungsband kenntlich.

## GEFAHR



### **Lebensgefahr durch gespeicherte elektrische Ladung!**

In den elektrischen Bauteilen können auch nach dem Abschalten des Systems und dem Trennen von der Spannungsversorgung elektrische Ladungen gespeichert sein. Bei Berührung dieser Komponenten besteht die Gefahr schwerer oder sogar tödlicher Verletzungen.

- ▶ Prüfen Sie vor Arbeiten an den angegebenen Komponenten, ob diese vollständig von der Spannungsversorgung getrennt worden sind. Warten Sie 10 Minuten, damit sich die Kondensatoren im Inneren des Geräts vollständig entladen können.

## WARNUNG



### **Verletzungsgefahr durch Bewegungen von Teilen auf Grund gespeicherter pneumatischer Energie!**

Pneumatisch angetriebene Komponenten können sich wegen noch im System befindlicher Druckluft unerwartet bewegen und so zu schweren Verletzungen führen.

- ▶ Arbeiten an den Druckluftsystemen dürfen nur von geschulten Pneumatiktechnikern ausgeführt werden.
- ▶ Prüfen Sie vor allen Arbeiten am Druckluftsystem, dass dieses vollständig drucklos ist. Der Druckspeicher muss vollständig drucklos gemacht worden sein.

## **WARNUNG**

### **Lebensgefahr durch starke Magnetfelder!**

Starke Magnetfelder können zu schweren oder sogar tödlichen Verletzungen und erheblichen Sachschäden führen.

- ▶ Personen mit Herzschrittmachern dürfen sich nicht in der Nähe der Anlage aufhalten. Die Funktion der Herzschrittmacher könnte beeinträchtigt werden.
- ▶ Personen mit Implantaten aus Metall dürfen sich nicht in der Nähe der Anlage aufhalten. Die Implantate könnten sich erwärmen oder vom Magnetfeld angezogen werden.
- ▶ Ferromagnetische Werkstoffe und Elektromagnete dürfen nicht in die Nähe der Quelle des Magnetfelds gebracht werden. Derartige Werkstoffe könnten angezogen werden und durch den Raum fliegen. Dabei bestände die Gefahr von schweren oder sogar tödlichen Verletzungen. Mindestabstand 3 m.
- ▶ Legen Sie vor allen Wartungsarbeiten magnetische Gegenstände (Schmuck, Uhren, Schreibgeräte usw.) in sicherer Entfernung ab.
- ▶ Bringen Sie keine elektronischen Geräte in die Nähe des Magnetfelds. Diese Geräte könnten beschädigt werden.
- ▶ Bringen Sie keine Speichermedien, Kreditkarten usw. in die Nähe des Magnetfelds. Hierbei könnten die Daten gelöscht werden.



## **WARNUNG**

### **Verletzungsgefahr durch verdunstende Flüssigkeiten!**

Während des Betriebs können sich Dämpfe bilden, die beim Einatmen zu schweren Verletzungen führen.

- ▶ Betreiben Sie die Anlage nur in einem gut belüfteten Raum oder sorgen Sie dafür, dass eine Absaugeinrichtung installiert wird.



## **WARNUNG**

### **Lebensgefahr durch Berührungsspannung!**

Bei nicht vorhandener oder fehlerhafter Schutzerdung können gefährlich hohe Berührungsspannungen anliegen. Diese Spannungen können schwere oder sogar tödliche Verletzungen verursachen.

- ▶ Bevor Sie die Anlage erstmals in Betrieb nehmen, verbinden Sie die Spannungsversorgung mit der entsprechenden Wanddose und überprüfen Sie die einwandfreie Funktion der Schutzerdung.



## HINWEISE ZUM BETRIEB

### **Gefährdung der Umwelt bei nicht sachgemäßer Handhabung von Gefahrstoffen!**

Die unsachgemäße Handhabung von Gefahrstoffen, insbesondere die nicht sachgemäße Entsorgung, kann zu schwerwiegenden Umweltschäden führen.

- ▶ Beachten Sie grundsätzlich die nachstehende Anweisungen, bevor Sie Gefahrstoffe handhaben oder entsorgen.
- ▶ Ergreifen Sie sofort die erforderlichen Maßnahmen, wenn Gefahrstoffe unbeabsichtigt in die Umwelt gelangen. Informieren Sie in Zweifelsfällen die zuständigen örtlichen Behörden über den Schaden und erfragen Sie dort die erforderlichen Maßnahmen.

## **WARNUNG**

### **Verletzungsgefahr bei nicht sachgemäßer Bedienung!**

Bei nicht sachgemäßer Bedienung besteht die Gefahr schwerer Verletzungen und erheblicher Sachschäden.



- ▶ Führen Sie alle Schritte bei der Bedienung entsprechend den Spezifikationen und Anweisungen in diesem Handbuch aus.
- ▶ Prüfen Sie vor Beginn der Arbeit, ob alle Abdeckungen und Sicherheitseinrichtungen installiert sind und einwandfrei arbeiten.
- ▶ Es dürfen sich im Gefahrenbereich keine Personen aufhalten.
- ▶ Sicherheitseinrichtungen dürfen im Betrieb keinesfalls blockiert oder umgangen werden.



# Appendix B

## B.1 Repair Declaration

---

The Equipment Clearance Form on the following page needs to be used for Service, Repair, Disposal or Transfer of the SampleXpress Lite.

● **Safety and Repair Declaration**

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 hazardous substances (e.g. toxic, corrosive, explosive, biologically dangerous or radioactive).

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



# Appendix C

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## C.4 Glossary

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<b>BSMS</b>	Bruker Smart Magnet Control System
<b>BST</b>	Bruker Sample Transport
<b>NMR</b>	Nuclear Magnetic Resonance
<b>SLCB</b>	Sample Level Control Board





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