


# SampleXpress

- Sample Changer  
User Manual  
Version 002



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# 1 About

## 1.1 This Manual

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

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. In addition, instructions concerning labor protection laws, operator regulations tools and supplies must be available and adhered to.

This manual is planned for use by the service engineer in the installation of the device or accessory, and for the user in performing existing experiments and for the setup of new experiments.

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. In addition, instructions concerning labor protection laws, operator regulations tools and supplies must be available and adhered to.

**Before starting any work, personnel must read the manual thoroughly and understand its contents.** Compliance with all specified safety and operating instructions, as well as local accident prevention regulations, are vital to ensure safe operation.

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

## 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

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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**

**Danger indicates a hazardous situation which, if not avoided, will result in death or serious injury.**

This is the consequence of not following the warning.

- ▶ This is the safety condition.
- 1. This is the safety instruction.

 **WARNING**

**Warning indicates a hazardous situation, which, if not avoided, could result in death or serious injury.**

This is the consequence of not following the warning.

- ▶ This is the safety condition.
- 1. This is the safety instruction.

 **CAUTION**

**Warning indicates a hazardous situation, which, if not avoided, may result in minor or moderate injury.**

This is the consequence of not following the warning.

- ▶ This is the safety condition.
- 1. This is the safety instruction.

**NOTICE**

**NOTICE indicates a property damage message.**

This is the consequence of not following the notice.

- ▶ This is a safety condition.
- 1. This is a safety instruction.



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

## 2 Introduction

### 2.1 Concept

The new Bruker sample changer SampleXpress allows automatic measurement of NMR samples with Bruker NMR spectrometers. It is the successor for the B-ACS sample changer system. Its compact, exceptionally integrated design drastically reduces sample transfer distances, delivering exchange times of just a few seconds, making SampleXpress ideal for optimizing throughput in standard NMR service laboratories running 30-200 samples per day. In addition, efficiency is maximized thanks to exchangeable, easy-fill cassette modules that can be loaded off-system and in parallel with current experiments.



Figure 2.1: SampleXpress

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

The system is also equipped with integrated barcode reader registration, which is under control of SampleTrack, Bruker's information and data management software.

Refer to Design and Function [▶ 37] for a complete description of the design and function of SampleXpress.



Figure 2.2: Operator Access



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**Note:**

This manual describes features which require firmware version 20120330\_1321 or newer.

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**See also**

📄 Design and Function [▶ 37]

## 2.2 Installation and Initial Commissioning

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Installation, initial commissioning, retrofitting, repairs, adjustments or dismantling of the device must only be carried out by Bruker Service or personnel authorized by Bruker.

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## 2.3 Limitation of Liability

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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.

- 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.

## 2.4 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 the chapter Contact [▶147] for contact information.

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/EWG
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/EWG
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/EWG

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

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 + A1:2009 + A2:2009
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)

[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.

---

### Combined Safety Notices



The combined safety notices for this manual in English can be found in English: Safety Notices [▶ 149].

The combined safety notices for this manual in French can be found in Avertissements De Sécurité [▶ 157].

The combined safety notices for this manual in German can be found in Sicherheitshinweise [▶ 166].

---

### 3.1 Intended Use

---

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

The SampleXpress 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 himself operates 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.

## 3.3 Personnel Requirements

---



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

---

### 3.3.1 Qualifications

---

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.

1. Unauthorized persons must be kept away from the danger and working zone.
2. If in doubt, address the persons in question and ask them to leave the danger and working zone.
3. 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 Position of the Emergency Stop Button

#### EMERGENCY STOP Button

The position of the EMERGENCY STOP button is indicated in the illustration by an arrow.



Figure 3.1: Position of the Emergency Stop

## 3.5.1 Description of the Emergency Stop Button

Pressing the EMERGENCY STOP button triggers an emergency stop. After the emergency stop button has been pressed, it must be unlocked by rotating it in order to enable a restart.



Figure 3.2: Emergency Stop Button

## 3.6 Location of the Safety Label



Figure 3.3: Location of Cassette Warning Label



Figure 3.4: Warning Labels inside the Cassette



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.

## 3.7 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.

### 3.7.1 General Workplace Dangers

#### **WARNING**



#### **Danger to life from nonfunctional safety devices!**

If safety devices are not functioning or are disabled, there is a danger of serious injury or death.

1. Check that all safety devices are fully functional and correctly installed before starting work.
2. Never disable or bypass safety devices.
3. Ensure that all safety devices are always accessible.

## CAUTION



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

Dirt and scattered objects may cause people to slip or trip, resulting in personal injuries.

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

## 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.

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

## NOTICE

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

Samples or the device 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.

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

## NOTICE

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

Impacting the magnet may result in a quench.

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

## 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.

1. Use only dummy samples during installation and maintenance.

### 3.7.2 Dangers from Electric Power

#### **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.

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

#### **WARNING**



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

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

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

#### **WARNING**



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

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

1. Potential equalisation must be ensured before making contact with parts, unless such equalisation is provided by the customer.



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

#### **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.

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

## 3.7.3 Mechanical Dangers



### CAUTION

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

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

1. Shut off the device before accessing.



### 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.

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



### CAUTION

#### **Accident hazard from loose clothing or long hair becoming caught in magazine chain!**

Wearing loose clothing or long hair around the magazine chain may result in the clothing or hair being pulled into the magazine chain causing injury.

1. Do not wear loose clothing or jewelry in the vicinity of the magazine chain.
2. Long hair should be tied back, or placed in a hair net or cap, while working around the magazine chain.

#### **See also**

-  Dangers from LED or Laser Light [▶ 25]

## 3.7.4 Dangers from Gases Under Pressure



### 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.

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

**! WARNING****Accident hazard from asphyxiation!**

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

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

**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.

**3.7.5 Dangers from Magnetic Fields****! WARNING****Danger to life from strong magnetic fields!**

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

1. Persons fitted with heart pacemakers must be kept away from the appliance. The functionality of the heart pacemaker could be compromised.
2. Persons with metal implants must be kept away from the appliance. Implants may heat up or be subject to magnetic attraction.
3. 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.
4. Remove magnetic items (jewelry, watches, pens etc.) before carrying out maintenance work.
5. Keep electronic equipment away from the magnetic source. Such equipment could be damaged.
6. Keep storage media, credit cards etc. away from the magnetic source. Data could be erased.



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.

## 3.7.6 Dangers from LED or Laser Light

### CAUTION



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

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

1. Do not look into the ray of light.
2. Switch off the equipment before maintenance work.

## 3.7.7 Dangers Due to High or Low Temperatures

### 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.

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

### CAUTION



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

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

1. Do not touch cassette parts of cooled or heated cassettes.
2. Do not use damaged cassettes.
3. After removing a cassette allow it to cool or thaw before coming in contact.

### 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.

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

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

Material damage may result from the overflow of cryogenics.

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

**3.7.8 Danger from Chemical Substances****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.

1. If a glass tube breaks, refer to the corresponding precautions and cleaning/disinfection instructions.
2. Wear protective equipment.
3. Perform all tasks with the cassette and glass tubes carefully.
4. Before carrying out any maintenance work, remove the samples and use dummy samples if necessary.
5. Strictly observe the correct sample adjustment, i.e. the maximum sample height.
6. Always transport the cassette with the cover. Never turn the cassette upside down or on it's side.
7. **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.

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

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

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



## NOTICE

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

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

1. Follow instructions provided in the manual for correct handling of solvents.
2. Follow the sensor cleaning procedures described in this manual.
3. 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.

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

## 3.8 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.

1. Always observe the instructions below regarding handling and disposal of pollutants.
2. 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 specialist disposal company.
<b>Coolants</b>	When released, coolants develop decomposition products which are hazardous to the environment. Maximum care and caution are required when handling coolants. Always observe the safety data sheet issued by the manufacturer. Ensure that personnel handling coolants are regularly informed about potential dangers and are instructed in the safe handling of coolants.
<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.

### 3.9 Signage

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



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.

Bruker Part Number 67470

#### 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.

Bruker Part Number 86675

#### Maximum Sample Height



There is a danger that the sample breaks, if the sample exceeds the maximum sample height.

## 3.10 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.

1. Replacement parts must meet OEM standards.

#### **Loss of Guarantee**

The use of non-approved spare parts will invalidate the manufacturer's guarantee.

Purchase spare parts from authorised dealers or directly from the manufacturer. See Contact for manufacturer's address.



## 4 Technical Data

### 4.1 General Information

Data	Value	Unit
Weight without cassette	17	kg
Weight with 60s cassette (without any sample)	25	kg
Length	85	cm
Width	65	cm
Height	50	cm

Table 4.1: Technical Data: General Information

### 4.2 Operating Conditions

#### Environment

Data	Value	Unit
Temperature range	5-30	°C
Relative humidity at 30 °C, maximum	< 80	%

Table 4.2: 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 300-750 MHz (UM)	Z31276
Site Planning for AVANCE Systems 800-950 MHz (UM)	Z31686

Table 4.3: Bruker Site Planning Guides

### 4.3 Connection Values

#### Electrical

Data	Value	Unit
Voltage	110 - 230	V AC
Apparent power consumption, maximum	120	VA
Circuit protection	2 x 1.0 Slow Blow	A
Frequency	50/60	Hz

Table 4.4: Electrical Connection Values

#### Pneumatic

Data	Value	Unit
Operating pressure	4-7	bar
Compressed air requirement, minimum	> 100	l/min.
Oiling, maximum	0.005	mg/m3

Table 4.5: Pneumatic Connection Values



**Note:**

Pressure supply above 7 bar will be repressed to avoid damage to the SampleXpress.

### 4.4 Rating Plates and Device History

Part Number	Revision Number	Features
H15000	ECL 02	First customer release. Samples up to 7" with cover. Shortened status light cupola option.
H15000-01 The part number was changed to indicate the new version in the customer order.	ECL 03	Samples up to 9" with cover. LPV valve tubes allowed. Wide bore mountable. Shortened status light per default. The old shortened status light HZ17007 is not compatible with this device.
H15000-01	ECL 04	Fast lock mechanics for base unit on base plate useful especially for Wide bore magnets.

Table 4.6: History Table

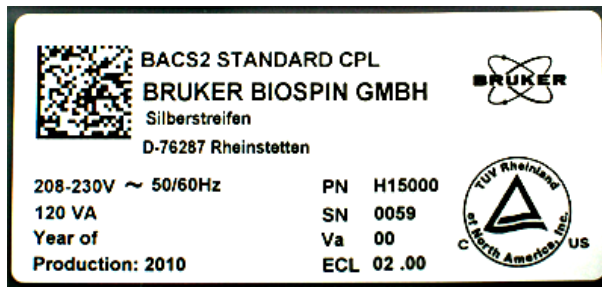


Figure 4.1: SampleXpress Rating Plate H15000 ECL 02.00



Figure 4.2: SampleXpress Rating Plate H15000-01 ECL 03.00



Figure 4.3: SampleXpress Rating Plate H15000-01 ECL 04.00

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



This product has been tested to the requirements of CAN/CSA-C22.2 No. 61010-1, second edition, including Amendment 1, or a later version of the same standard incorporating the same level of testing requirements.

**Note:** The number within the “C” may be incremented if different test requirements are adopted in the future.

## 4.5 Sample Usage

SampleXpress 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. Please be sure that the shuttle has a black/white spinning label (see the next figure) when **using the device with the BSMS lift feature**, refer to chapter Lift Settings [▶ 102].



Figure 4.4: Shuttle Part Number Z106492

- Dummy samples.
- Samples with or without horizontal barcode label.

**New, beginning with ECL 03.00 or above:**

- Long sample tubes up to 9.5“ = 240 mm.
- LPV samples
- J. Young samples without cap.



Figure 4.5: Example of Samples That Can be Used with SampleXpress

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

**To prevent glass tube breakage or slipping, the sample must be tightly fixed on the spinner.**

## New Sample Geometry and Sample Length

With the SampleXpress EC level H15000 ECL $\geq$ 03 the device is able to handle samples up to a length of 9.5 inch = 240 mm. The recommended length with cover on the cassette is 9 inch = 230 mm to have some clearance for tolerances in length.

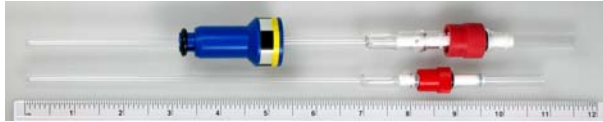


Figure 4.6: J. Young and LPV Sample

The upper sample is equipped with a J. Young valve and can be used **WITHOUT** the cover on the cassette; the lower sample is equipped with a LPV valve and can be used **WITH** the cover on the cassette.



---

### Note:

Samples having an LPV valve at the top are allowed. Samples having a J. Young valve at the top can be used **WITHOUT** the cover on the cassette.

---

Be sure that the lift adjustment is done correctly corresponding to the higher sample weight. As an alternative you can use the BSMS lift remotely, please refer to chapter Administrator Settings on the Control Panel – Lift Configuration for configuration and setup details.

### See also

- ▣ [Sample Adjustment and Maximum Sample Height \[▶ 63\]](#)



## 5 Design and Function

### 5.1 Overview

The SampleXpress consists of the following main components:



Figure 5.1: Overview SampleXpress

1	Status Light	6	Touch Screen
2	Base Unit	7	Control Panel
3	NMR Access Position	8	Magnet
4	Cassette Guide	9	Base Plate
5	Emergency Stop		



Figure 5.2: Overview SampleXpress Cassette

1	Cassette Cover	5	NMR Access Position
2	Sample Conveyor Chain	6	Cassette
3	Spinner with Sample	7	Sample Pool
4	Operator Access Position		

## 5.2 Brief Description

The SampleXpress sample changer allows the automatic measurement of samples in connection with a spectroscopy magnet. The samples are inserted into the magnet by the SampleXpress, and are stored in a removable cassette. It is possible to remove the cassette for filling/removing samples. The cassette has a capacity of 60 samples. Operation of the unit is controlled by the application software.

The SampleXpress 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

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### 5.3.1 Base Unit

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*Figure 5.3: Base Unit Mounted on Base Plate*

The base unit contains all of the actuators and most of the sensors. It is placed on top of the base plate and fixed with 4 screws on the bottom side, and 2 screws on the top side of the base plate. The mechanical tolerances are fixed; there is no need to adjust anything between the base plate and the base unit.

#### **Pneumatic Cylinders**

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

Under normal operation the sample release lever, cassette clamp mechanism, and the sample guide are in open position.

#### **Conveyor Chain Motor**

The SampleXpress uses an electric DC motor to drive the sample conveyor chain in the cassette. To minimize influence on the NMR measurement, the motor is mounted with special vibration damping parts.

As an option for very strong magnetic fields, the motor can be placed outside the 5 Gauss line.

## Cassette Clamp Mechanism



Figure 5.4: Clamp Closed

1	Gripper
---	---------



Figure 5.5: Clamp Open

When a cassette is moved into the SampleXpress, it is fixed by a clamping mechanism. This is a special kind of gripper adapted to a pneumatic gripper cylinder.

The gripper is placed behind a metal shield to avoid injury to personnel while the unit is operating.

## Sample Guide



*Figure 5.6: Sample Guide*

The sample guide serves to guide the samples into the magnet. As the samples drop down from the cassette into the magnet, they have to be safely guided into the proper position.

The sample guide is driven by a pneumatic cylinder placed in the base unit. The pneumatic cylinder fits into the opening on the rear side of the cassette. In this opening there is a movable half shell and a fixed half shell, which interact with the sample guide.



Figure 5.7: Cassette

1	Movable Half Shell
---	--------------------

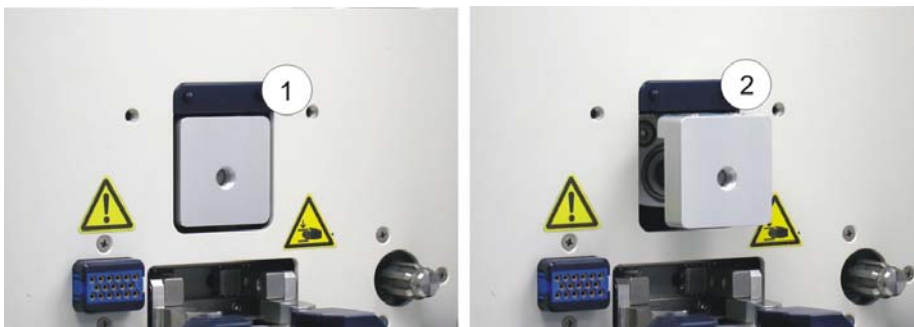


Figure 5.8: Sample Guide Inactivated / Activated

1	Guide inactivated
2	Guide activated

Another function of the sample guide is to mechanically lock the conveyor chain. When a conveyor chain link is positioned in proximity of the NMR access position above the BST, the chain link contains a lot of deliberate play which makes it easier for the unit to align on the correct position. When the conveyor chain link is stopped near the correct position, the sample guide is

activated and works as a conveyor chain block lever, whereas the movable half shell clasps the lower part of the conveyor chain link and fixes it in the precise NMR access position required above the BST.

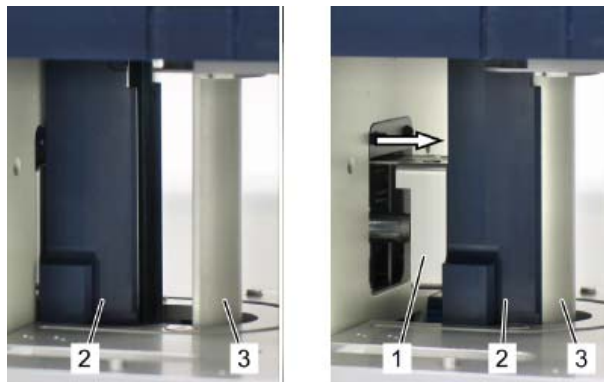


Figure 5.9: Inside the Cassette

1	Sample Guide (active)
2	Moveable Half Shell
3	Fixed Half Shell

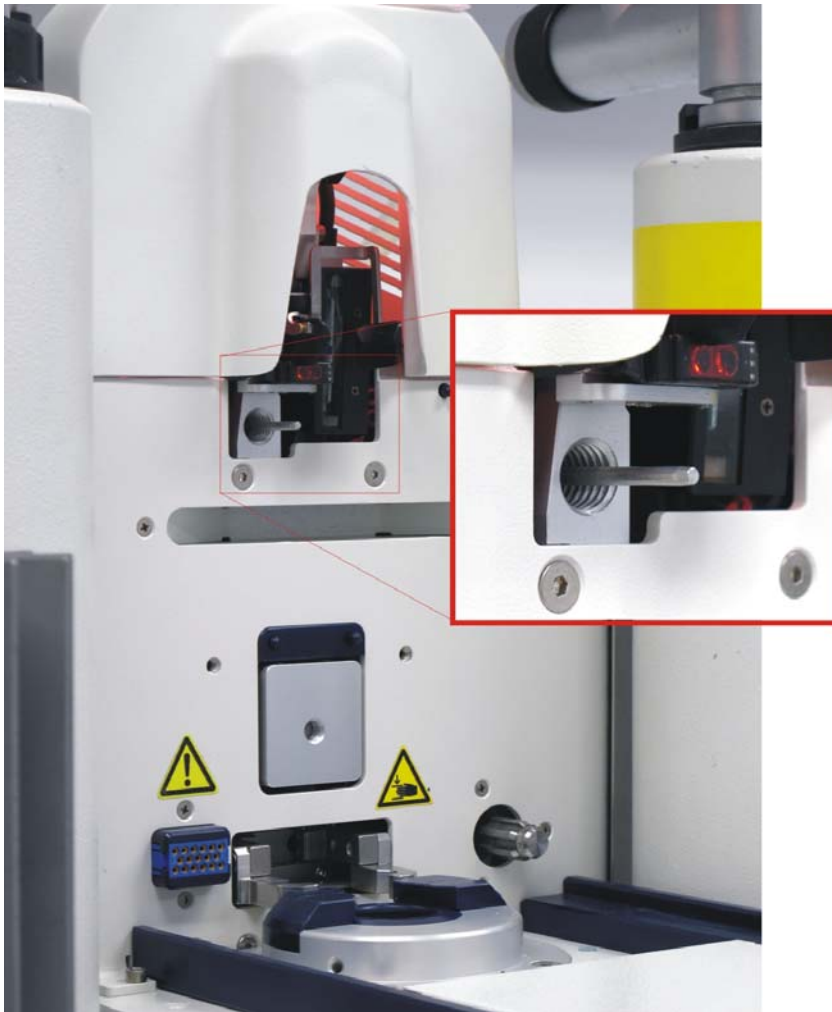


Figure 5.10: Base Unit with Sample Release Lever Detail View

Each conveyor chain link 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 conveyor chain link. Each conveyor chain link has a small hole, which the sample release lever fits into. When the conveyor chain link is positioned above the BST, the sample release lever is directed through the opening in the conveyor chain link which causes it to release the sample. The sample falls through the conveyor chain link into the magnet.



Figure 5.11: Conveyor Chain Link

1	Lever of conveyor chain link
2	Opening for sample release lever
3	Sample release lever



Figure 5.12: Sample Brake

The sample brake is used to slow down the sample as it makes its way back from the BST tube.

### 5.3.2 Cassette

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The removable cassette has a capacity of 60 samples, which can be filled individually, or all at once when the cassette is removed from the base unit.

To ease the loading/unloading of samples from the sample pool, the cassette can be placed on a desk or table.

#### Single Access Mode

In Single Access mode the cassette is connected to the base unit and the cassette cover is installed. The cassette can then be filled with samples one by one at the operator access position. This is the standard operation mode when SampleTrack is used as the control software.

#### Random Access Mode

In Random Access mode the cassette cover is removed. The samples can be filled in any available position. This mode is often used in closed laboratories with frequent sample exchange.

See also Operation Modes [▶69].

### 5.3.3 The Control Panel

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The control panel is the central operating control for the device. It is mounted on a swivel arm on the front side of the device. The control panel is equipped with a touch screen, which is used to navigate through the control software.

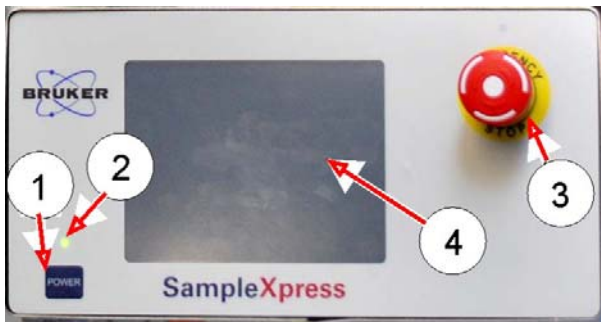


Figure 5.13: Control Panel

1	Push button <b>Power</b>
2	Power LED (Green, Red, Orange)
3	<b>EMERGENCY-STOP</b> button
4	Touch screen



### Battery

The control panel contains a battery which powers the date and time clock. The expected life time of the battery is about six years. Replacement of the battery must only be carried out by Bruker service personnel.

## 5.4 Connections



Figure 5.14: Connections Left Side

1	BST Interface Cable from SLCB BSMS	8	Air Supply
2	BST Interface Cable to BST	9	External R232 (currently not available)
3	Gas Interrupt (currently not available)	10	Console RS232
4	Lift Adjustment Knob	11	CAN Network to Control Panel
5	Status and Control	12	External Signal 1 (currently not available)
6	Pressure Gauge	13	External Signal 2 (currently not available)
7	Air Supply Adjustment Knob	14	External Signal 3 (currently not available)



**Note:**

The connections available are dependent on the configuration.

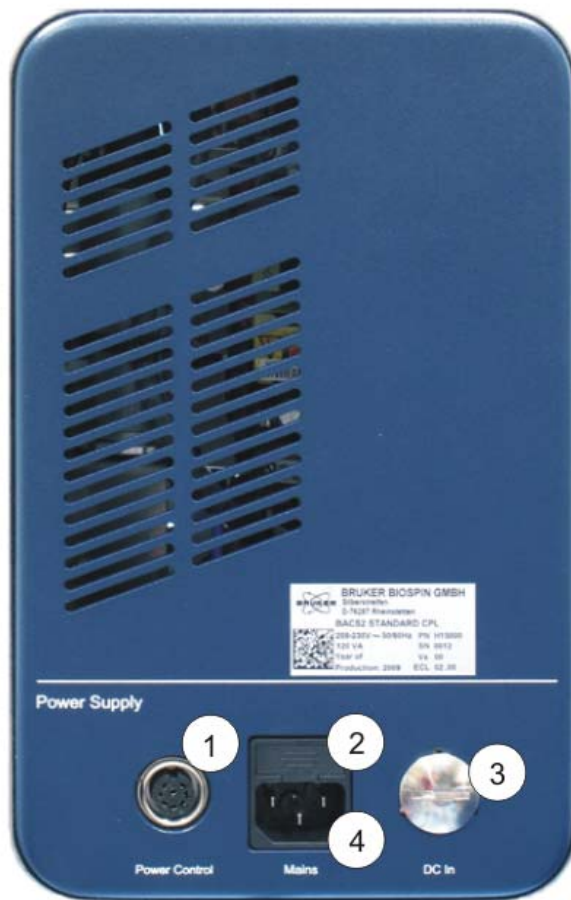


Figure 5.15: Connections Right Side

1	Power Control from Control Panel	3	DC In (currently not available)
2	Fuse Cartridge	4	Power Supply

## 5.5 Indicator Lamp

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

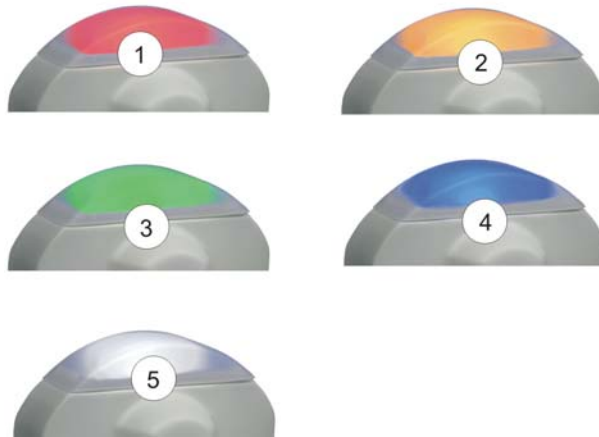


Figure 5.16: Indicator Lamps

Pos.	Light Signal	Description
1	Fault event (red)	The red indicator lamp is illuminated when an 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>• Cassette is absent</li> <li>• Cassette is processed</li> <li>• Cassette 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 Work and Danger Zones

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### NMR Access Position



*Figure 5.17: NMR Access Position*

The red colored area indicates the danger zone. When no cassette is present, the danger exists that the device operator may become caught in the gripper claws.

## Cassette and Control Panel



Figure 5.18: Cassette and Control Panel

The arrow indicates the danger zones. The danger exists that a device operator may bang their head against the SampleXpress, due to the height of the control panel or the cassette.

## 5.7 Accessories

### Access Stairs

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

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

### Protective Cover

Accessory	Part Number
BACS2 Protective Cover for Magnet Service	1804420

During magnet maintenance it is recommended to cover the SampleXpress with the protective cover.

### Barcode Collar Set

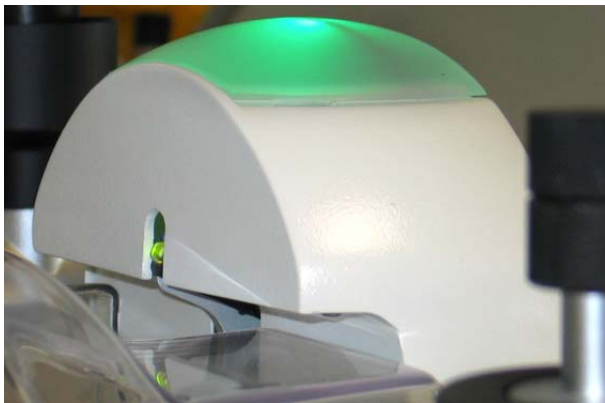
Accessory	Part Number
Barcode Collar Set	H10113

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



The shortened status light dome is necessary, but will fit only on SampleXpress H15000 before or equal ECL 02. The SampleXpress with ECL 03 and above has a shortened status light dome per default, mounted in the production facility.

Accessory	Part Number
Shortened Status Dome	HZ17007



## Cryofit Mounting Kit

Accessory	Part Number
Cryofit Mounting Kit	HZ16826

## External Control Panel

Accessory	Part Number
External Control Panel	H118947



*Figure 5.19: External Control Panel*










## 6 Transport, Packaging and Storage



Installation, initial commissioning, retrofitting, repairs, adjustments or dismantling of the device must only be carried out by Bruker Service or personnel authorized by Bruker.

### 6.1 Symbols on the Packaging

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

<b>Top</b>		The arrow tips on the sign mark the top of the package. They must always point upwards; otherwise the content may be damaged.
<b>Fragile</b>		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.
<b>Protect Against Moisture</b>		Protect packages against moisture and keep dry.
<b>Attach Here</b>		Lifting gear (lifting chain, lifting strap) must only be attached to points bearing this symbol.
<b>Center of Gravity</b>		Marks the center of gravity of packages. Note the location of the center of gravity when lifting and transporting.
<b>Weight, Attached Load</b>		Indicates the weight of packages. Handle the marked package in accordance with its weight.
<b>Permitted Stacking Load</b>		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.





<b>Do not Damage Air-tight Packaging</b>		<p>The packaging is air-tight. Damage to the barrier layer may render the contents unusable.</p> <p>Do not pierce.</p> <p>Do not use sharp objects to open.</p>
<b>Component Sensitive to Electrostatic Charge</b>		<p>The packaging contains components which are sensitive to an electrostatic charge.</p> <p>Only allow packaging to be opened by trained personnel.</p> <p>Establish potential equalisation before opening.</p>
<b>Protect from Heat</b>		<p>Protect packages against heat and direct sunlight.</p>
<b>Protect from Heat and Radioactive Sources</b>		<p>Protect packages against heat, direct sunlight and radioactive sources.</p>

Table 6.1: Symbols on the Packaging

## 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.



**Note:**

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. 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.



#### **Note:**

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

---



# 7 Operation Overview

## 7.1 Safety

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### Improper Operation



#### **WARNING**

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

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

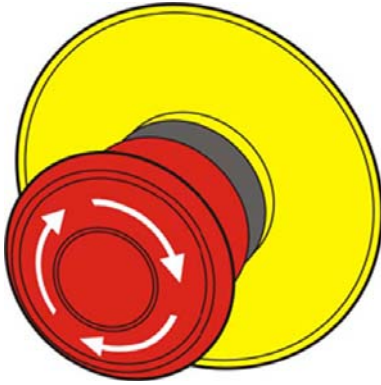
1. Carry out all operating steps in accordance with the specifications and instructions in this manual.
2. Before starting work, ensure that
  - All covers and safety devices are installed and functioning properly.
  - No persons are in the danger zone.
3. Never disable or bypass safety devices during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

### 7.1.1 Emergency Shutdown

---

In dangerous situations, it is vital to stop moving components as quickly as possible and to switch off the power supply. In an emergency proceed as follows:

1. Immediately use the emergency stop device to trigger an emergency stop, whereas:
  - All valves are closed, which deactivates all actuators.
  - All motors stop running.
2. If warranted by the gravity of the emergency, notify a doctor, fire brigade, and/or responsible authorities.
3. Notify those responsible for the area of use.
4. Switch off the mains switch and secure to prevent a restart: Switching Off the Device [▶ 61].
5. Keep the access routes clear for emergency service vehicles.
6. Delegate specialist personnel to rectify the fault.
7. Before the restart, check the device and ensure that all safety devices are installed and fully functional.



See also Position of the Emergency Stop Button [▶ 18]

## 7.2 Switching On the Device

To switch on the device, press the Power button on the control panel.



Figure 7.1: Power Button

The SampleXpress immediately starts initialization, which lasts about one minute. The indicator lamp turns orange (see also Indicator Lamp [▶ 49]) and the following screen is displayed:

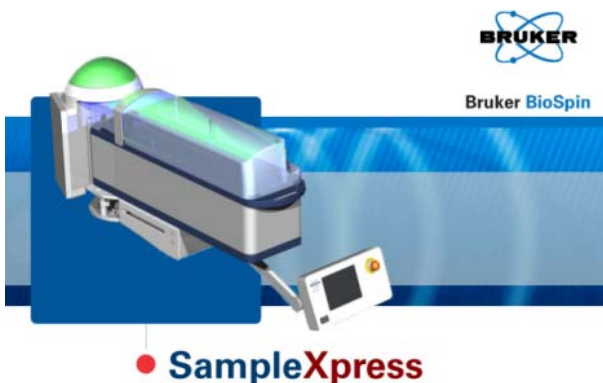


Figure 7.2: SampleXpress Initialization Screen

If a cassette is present on the SampleXpress it will automatically be recognized and the indicator lamp will turn green.



## Initialization

During an initialization with a cassette on board the SampleXpress might try to eject a sample from the magnet. This is done to verify that no sample is stuck and to prevent sample breakage. Please ensure that no experiment is running before turning the SampleXpress on!

If no cassette is on the SampleXpress the indicator lamp will turn blue.

When an error occurs the indicator lamp will turn red, see also the chapter Device Failure [▶132].

If the SampleXpress is configured to work with the BSMS lift it will only be able to complete its initialization when TopSpin is running. Otherwise it will stay in the “Trying to connect to BSMS lift...” state and might display an error message. Please see BSMS Lift [▶127] Troubleshooting for more information.

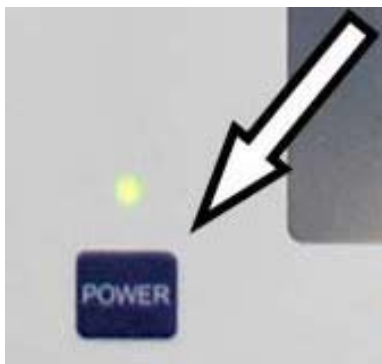
## See also

- Indicator Lamp [▶127]
- Troubleshooting [▶123]

## 7.3 Switching Off the Device

To switch off the device,

- Press the **Power** button at the control panel.



- A window is displayed and you will be prompted to press the power button a second time.
- Press the **Power** button once again **within the next 30 seconds** and the shutdown will begin.

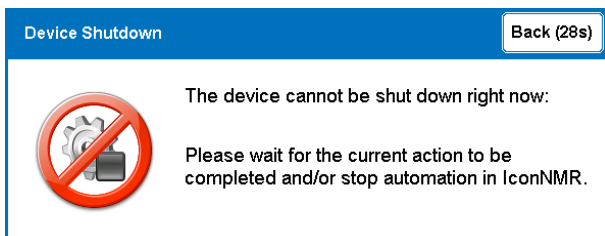
Device is being shut down...



Please wait while the device is being shut down...

## Exception:

If the device is currently working, e.g. inserting a sample, a warning will be displayed that the device cannot shutdown in the moment.



In this case wait until the current job has finished and then repeat the shutdown procedure.



## Note:

Pressing and holding the Power button for 5 seconds will also shut down the device. This procedure should only be used, when the shutdown procedure described above does not work.



## Important

Remove the cassette before shutting down the SampleXpress.

## 7.4 General Operating Guidelines

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

### 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. Use the operator access position for monitored sample loading/unloading, or place the cassette on a desk before loading/unloading samples.

The laboratory supervisor should define who should be allowed to load or unload samples from cassettes, and when. The operator should work carefully and, optimally use tube ID barcode collars.

### ID Barcode

When the sample ID barcode is dirty it should be cleaned according to established instruction or an incorrect barcode reading may result.

## Temperature Changes

When the ambient temperature changes significantly (for example, after moving the SampleXpress 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 old substance.

## 7.5 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.

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



Before the spinner is inserted into the cassette:

1. Adjust the spinner using the sample depth adjustment gauge.
2. Insert the spinner into the holder at the **Operator Access Position**.
3. Check if the sample (Figure 8.2/2) is under the maximum sample height. **The glass tube must be below the yellow line, otherwise it will break.**  
If the sample is too long, **do not use it** in the SampleXpress!



### Important

A check of the maximum sample height is not possible when working in the mode **Adding Samples - Go to Free Position** or **Adding/Replacing Samples in Sequence**.

See also:

Adding Samples - Go to Free Position [▶ 77]

Adding/Replacing Samples in Sequence [▶ 78]

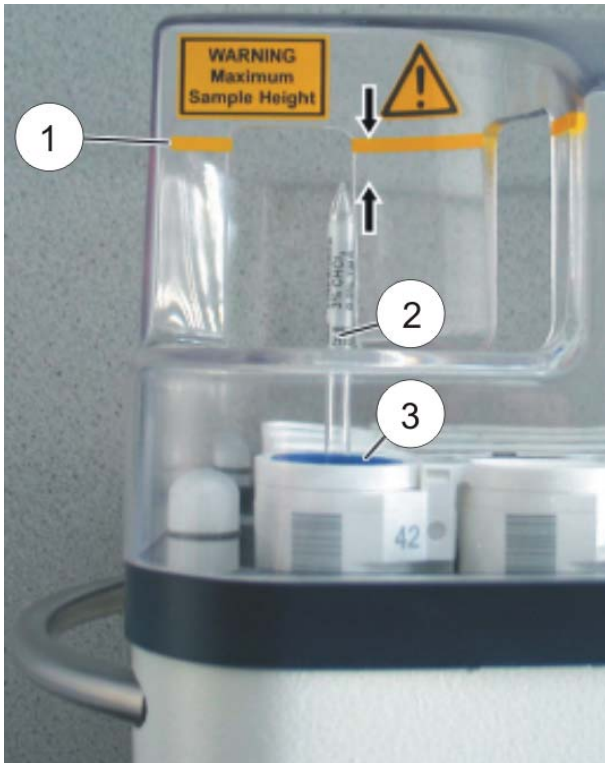


Figure 7.3: Maximum Sample Height

1	Maximum Sample Height
2	Sample
3	Spinner

## 7.6 User Interface

The SampleXpress provides a touch screen based user interface. The basic principles are explained here:

### Screen Organization

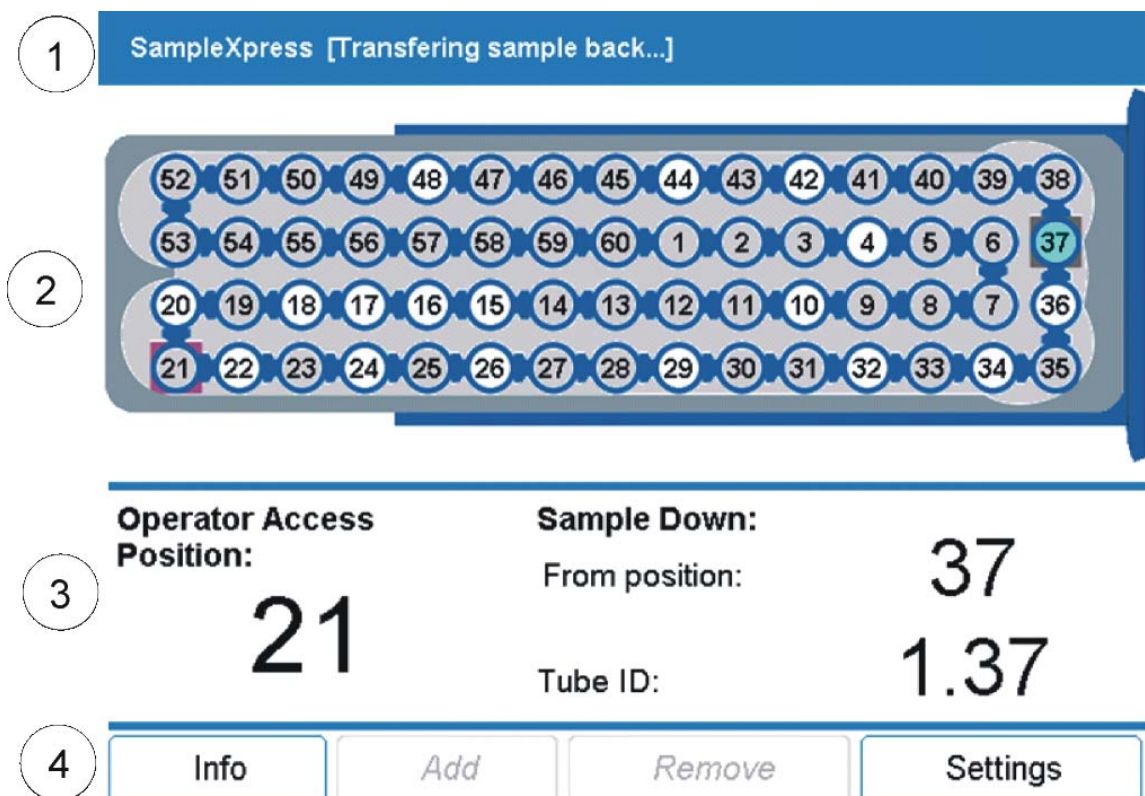


Figure 7.4: Interface Overview

1	<p><b>Title and Activity</b></p> <p>The device name SampleXpress is always displayed.</p> <p>The text between the brackets, here „Transferring sample back”..., shows the current activity.</p>
2	<p><b>Cassette Display</b></p> <p>The current state of the cassette. How the cassette is displayed depends on the current operation mode. See also chapter Operation Modes.</p>
3	<p><b>Position and Sample Down Information</b></p> <p>This area is used to show the current cassette position. How this information is displayed depends on the current operation mode. See also Operation Modes [ 69].</p> <p>The right part of this area shows the information related to the sample currently in the magnet. The information is only displayed when a sample is inserted.</p>
4	<p><b>The main menu</b></p> <p>The buttons offered depend on the current operation mode. The Settings button is always available.</p>

See also Operation Modes [ 69].

## Buttons and Controls

As default the buttons are displayed with a blue frame and a white background.

When a button is pressed, its border turns orange.

A disabled button has a gray frame and text, and italic letters.

Some buttons show a countdown in seconds. This means that the button will be automatically activated when the countdown reaches zero.



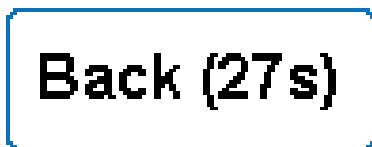
*Figure 7.5: Button Default Color*



*Figure 7.6: Button Pressed*



*Figure 7.7: Button Disabled*



*Figure 7.8: Countdown*

## Pop-ups

Pop-ups are screens that appear above the main display. They must be closed before you can continue on the main display. In this case the main display is dimmed.

Most pop-ups provide a **Back** button. Clicking it will close the pop-up.

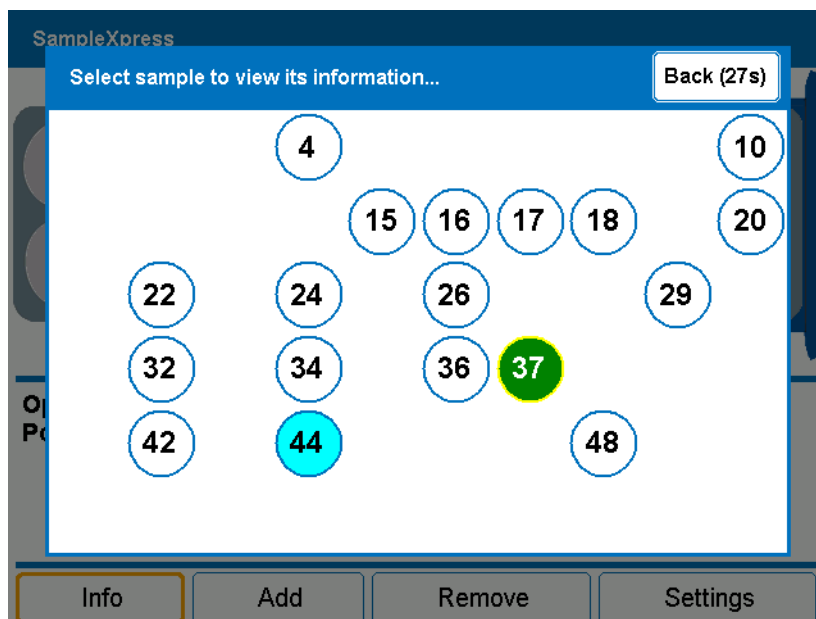


Figure 7.9: Pop-up Example

## 7.7 Conveyor Chain Motion Warning

The right front cover holder also provides an LED that lights when the conveyor chain starts moving or is already in motion.



Figure 7.10: Conveyor Chain Motion Warning LED Signal

Before the conveyor chain starts moving, it will blink three times to warn the user that the conveyor is about to move.

**If you are about to add a sample and the cover holder begins to blink,**

➔ **remove the sample. Failure to do so can lead to sample breakage!**

**If you are about to remove a sample and the cover holder begins to blink,**

➔ **leave the sample where it is. Failure to do so can lead to sample breakage!**

If you cannot secure the sample before the chain motion starts, press the emergency stop.

If the chain motion is initiated from the control panel (e.g. menu Add > Go to free position), the cover holder will blink 3 times quickly. This reduces the need for the user to have to wait for the device during **Add** or **Remove** sample operations, but still provides a warning before a cassette motion.

When the chain motion is initiated from IconNMR or TopSpin the cover holder will blink 3 times slowly before the chain motion starts.

## 8 Operation

The SampleXpress is operated through the control panel or TopSpin/Icon-NMR. In this chapter the operation with the control panel is described.

This chapter provides an overview of the different displays and the operating steps to be performed. Be sure to read the safety and related operational instructions in Operation Overview [▶59] before operating the device.

### 8.1 Operation Modes

---

The SampleXpress can be used in three different modes:

#### Single Access Mode

In Single Access Mode the cassette is used with the cover in place. The only way to fill the cassette is at the Operator Access Position. This allows a controlled assignment of sample and position which leads to high throughput operation.

This is the recommended operation mode for optimal use of SampleXpress.

#### Random Access Mode

In Random Access Mode it is possible to place the samples in any empty holder as the cassette is not covered. In this mode the SampleXpress does not know where samples are in the cassette, which results in lower throughput operation.

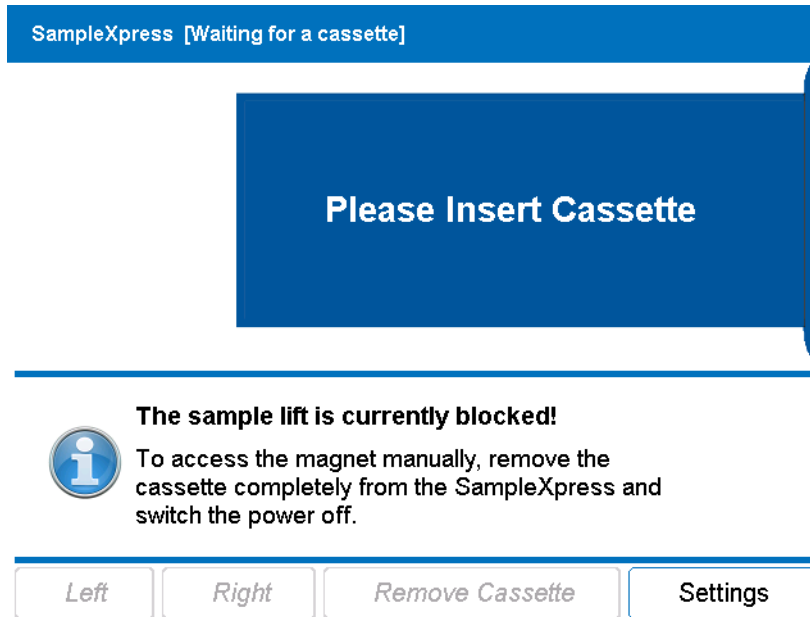
#### Manual Mode

In Manual Mode the SampleXpress is shut down and the cassette is removed to allow use of the spectrometer without the SampleXpress. See also Manual Mode [▶92].

### 8.2 Inserting the Cassette

---

When no cassette is present on the SampleXpress, the following screen is displayed:



**Before** inserting the cassette, you will need to decide whether you want to use the cassette with or without cover.

The SampleXpress detects the presence of the cover when the cassette is inserted.

**The cover will not be recognized by the system if it is added or removed after the cassette is inserted, always add or remove the cover with the cassette removed!**

To insert the cassette

1. Lift the cassette using its hand holds.
2. Fit the cassette onto the cassette guide.
3. Push the cassette carefully into the SampleXpress.
  - ➡ The engagement will be clearly audible.
  - ➡ The indicator lamp will switch from blue to white.
  - ➡ The SampleXpress immediately clamps the cassette in place.
  - ➡ When the cassette is covered, SampleXpress begins to scan all the samples.

When the indicator lamp switches to green the SampleXpress is ready for use.

See also

Single Access Mode [▶70]

Random Access Mode [▶89]

## 8.3 Single Access Mode

To work in Single Access Mode, insert a cassette with a cover onto the SampleXpress.

The SampleXpress immediately scans all positions of the cassette and keeps track of their history.

Add and remove sample operations can only be performed at the Operator Access Position on the right front of the cassette.

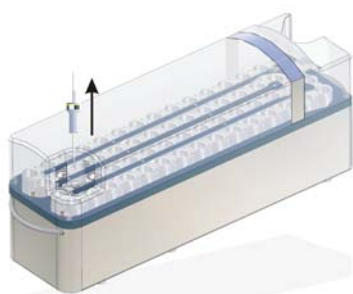


Figure 8.1: Operator Access Position

Information about the sample is displayed on the main screen of the SampleXpress user interface.

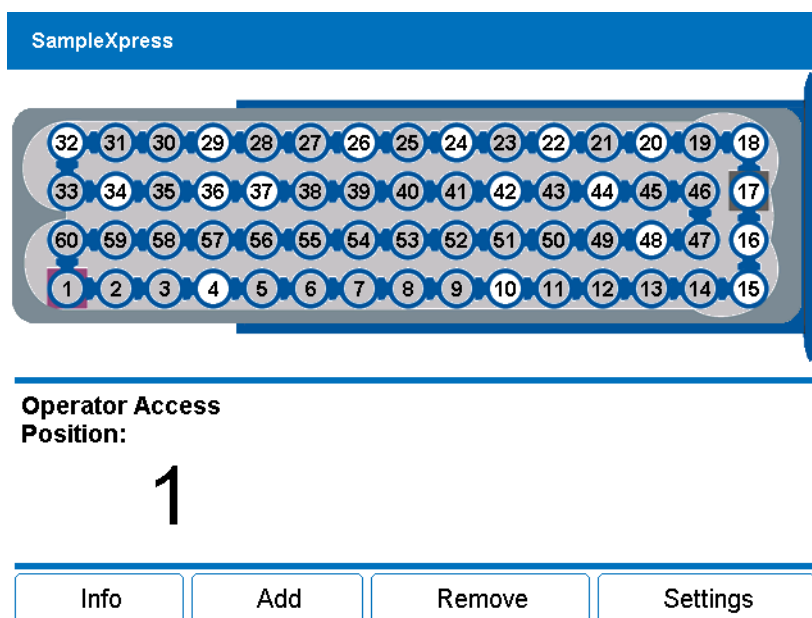










Figure 8.2: Main Screen

## Cassette View

The cassette displayed on the control panel is an exact reflection of the actual content of the cassette.

The bottom left position is the Operator Access Position number one. In the figure above position 1 is currently at the Operator Access Position.

Each position can have one of the following colors:

Icon	Color	Description
	Gray	The position is empty and available.
	White	The position is occupied, but not measured.
	Green	The position is occupied and the measurement is finished.
	Blue	The position is reserved for the sample currently in the magnet. The position is not available for other samples.
	Red	An error has occurred with the sample in this position. Use the Info button on the main display to display detailed information. See also Displaying Sample Information [▶ 73].
	Pink	The sample in this position is on the way to the NMR Access Position for measurement. The state is queued.
	Orange Rectangle Border	The current position selected for adding/removing a sample.
	Yellow Circle Border	The sample in this position was ejected from the magnet during the security eject.

See also Displaying Sample Information [▶ 73].

## Operator Access Position and Sample Down

Just below the cassette view is the information panel.

The left side of the panel displays the number of the position currently at the Operator Access Position.

The right side of the panel displays information about the sample currently in the magnet. The information that is displayed depends on the current status of the sample:

- When the right panel display is empty this is an indication that there is no sample down, or it has not yet been tested.

---

Operator Access  
Position:

1

---

- When a sample is down, but SampleXpress does not recognize where it comes from, the Sample Down information is displayed but the Position and Tube ID fields remain empty. This will typically occur when a sample is down when the SampleXpress is powered on while a cassette is mounted.

<b>Operator Access Position:</b>	<b>Sample Down:</b>
1	From position:
	Tube ID:

- When a sample has been correctly inserted by the SampleXpress and is down, both the Position and Tube ID fields are displayed. The Tube ID displays the barcode for the sample. If the sample has no barcode, the Tube ID will be generated as 1.[Position Number], for example 1.17 in the following figure:

<b>Operator Access Position:</b>	<b>Sample Down:</b>
1	From position: 17
	Tube ID: 0378

## Menu

The menu options available in Open Access Mode include: Info, Add, Remove and Settings. The Info, Add and Remove functions will be covered in the following sections, the Settings function will be discussed in the chapter Settings and Administration [95].



### 8.3.1 Displaying Sample Information

To display sample information, press the **Info** button in the main screen window.  
 ➔ A new screen will appear displaying all the positions which are filled with a sample:

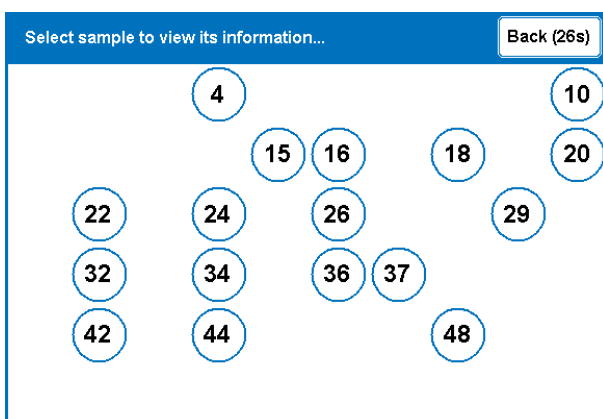
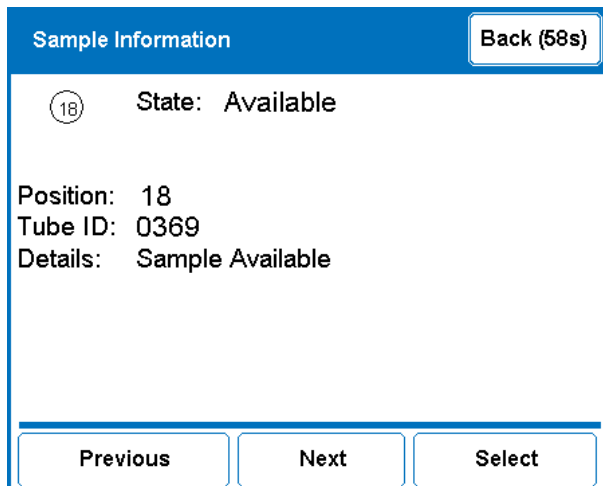


Figure 8.3: Select Sample Screen

To view the details of a sample, press on the corresponding position.  
 ➔ A Sample Information screen will appear:



In the Sample Information screen you can press the **Previous** or **Next** buttons to see the details of the samples in the previous or next loaded position. To select another position, press the **Select** button to return to the Select Sample screen.

To return to the main screen, press the **Back** button.



**Note:** The Sample Information screen will automatically close after 60 seconds of inactivity. The automation is not paused while the sample information is displayed.

## 8.3.2 Adding or Replacing Samples



**Note:** The laboratory supervisor is responsible for adding/removing samples. Never add or remove samples without the permission of the laboratory supervisor.

### To add a sample

1. Press the **Add** button.

- ➔ The Add selection window appears displaying three buttons.
- ➔ When no empty position is left the **Go to free** button is disabled and grayed.

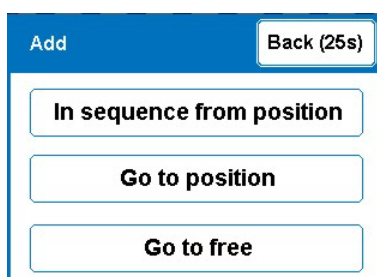


Figure 8.4: The Add Selection Window

2. Press the **Go To Position** button to choose the sample position.

➔ The Select Next Position screen is displayed:

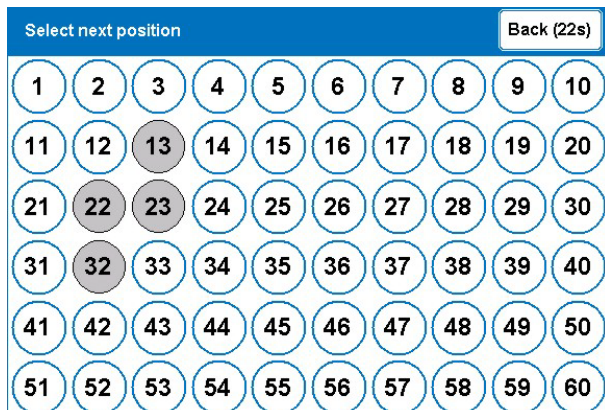


Figure 8.5: Select Next Position Screen

3. Press a **gray** position to add another sample.

➔ The conveyor chain rotates the selected position to the **Operator Access Position**.

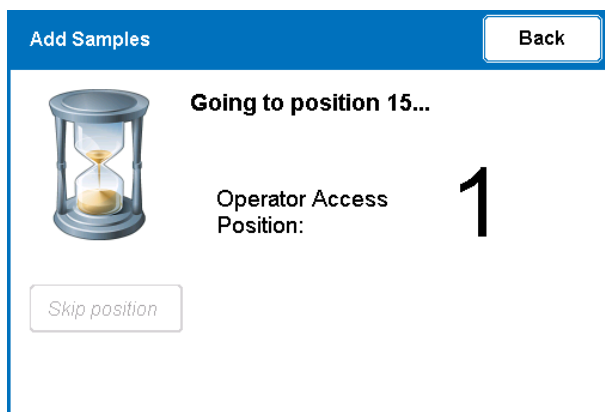


Figure 8.6: Moving the Selected Position to the Operator Access Position

➔ When the operator access position is reached and you have pressed an empty position, the following screen is displayed:

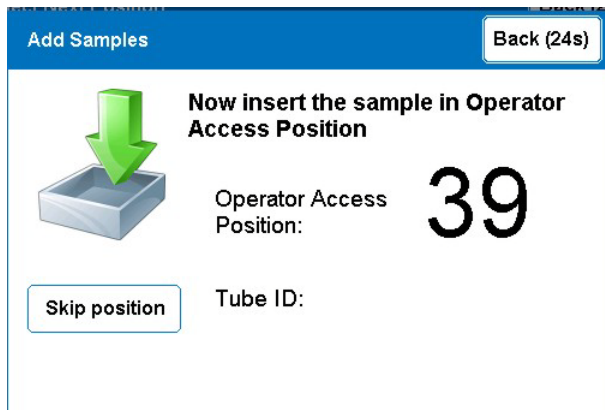


Figure 8.7: Insert Sample Screen

4. Insert the sample into the Operator Access Position.



**Note:** Before inserting the sample, please ensure that the sample height is within the limits, see also Sample Adjustment and Maximum Sample Height [▶63].

## To Replace a Sample

1. Press the **Add** button.

- ➔ The Add selection window appears displaying three buttons.
- ➔ When no empty position is left the **Go to free** button is disabled and grayed.

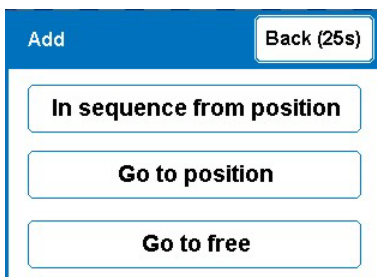


Figure 8.8: The Add Selection Window

2. Press the **Go To Position** button to choose the sample position.

- ➔ The Select Next Position screen is displayed:

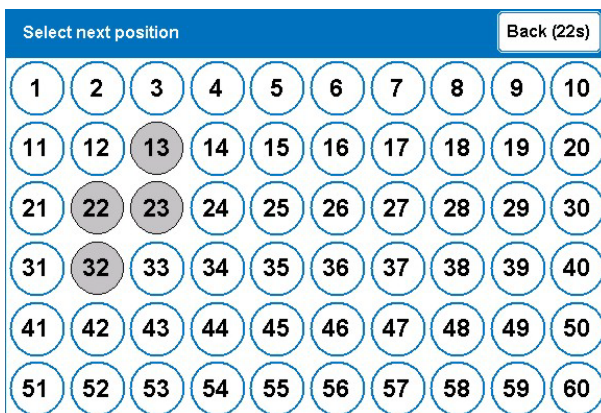
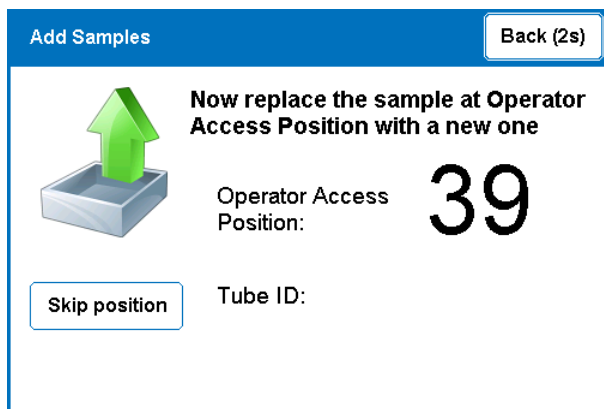


Figure 8.9: Select Next Position Screen

3. Press a **white** position to replace a sample.

- ➔ When the operator access position is reached and you have pressed a white (filled) position, a screen is displayed with the requirement to replace the sample.



4. Remove the sample from the Operator Access Position, the screen will not change.
5. Add a new sample at the Operator Access Position, the Position Selection screen will be displayed again.

### 8.3.2.1 Adding Samples - Go to Free Position

When samples do not need to be in any specific order, e.g. when working with barcodes, it is faster to add a sample in the nearest free position:

1. Press the **Add** button in the main screen.

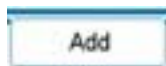


Figure 8.10: The Add Button

- ➡ The Add selection screen is displayed:

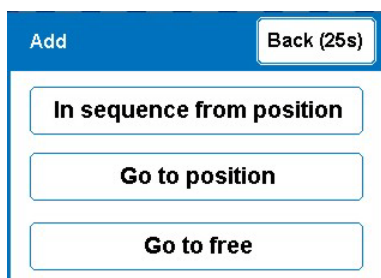


Figure 8.11: The Add Menu

2. Press the Go to free button.
  - ➡ The chain rotates to the next free position.
3. Insert a new sample, or press the **Skip position** button to continue to the next available position.

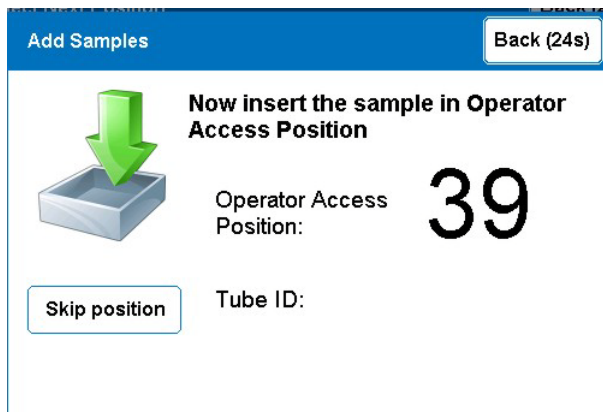


Figure 8.12: Inserting the Sample

4. When a sample has been inserted the chain rotates automatically to the next free position.

**Exception:** When the chain has been completely filled an information screen is displayed:

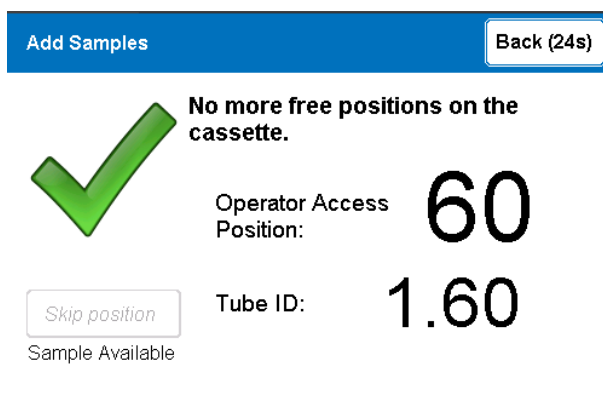


Figure 8.13: Display: No more free positions

5. When all samples have been inserted press the **Back** button to return to the main menu.

### 8.3.2.2 Adding/Replacing Samples in Sequence

This functions allows samples to be added or replaced sequentially, in ascending order, until the **Back** button is pressed.

1. Press the **Add** button in the main screen.

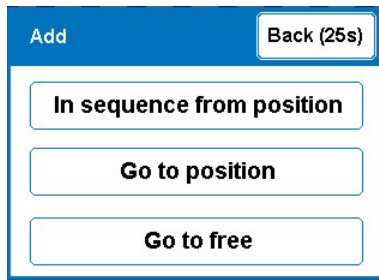


Figure 8.14: The Add Menu

2. Press the **In sequence from position** button.

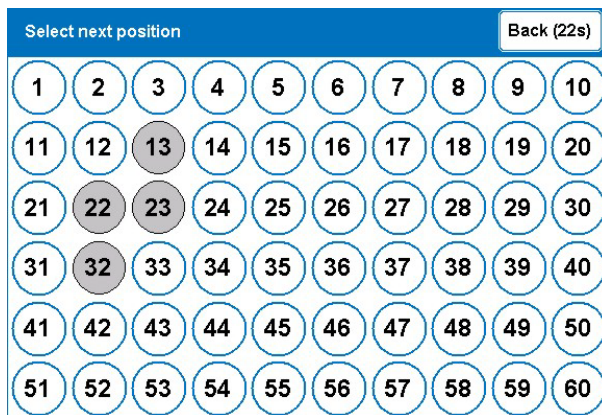


Figure 8.15: Select Next Position Screen

3. Select a position where the sequence should begin.

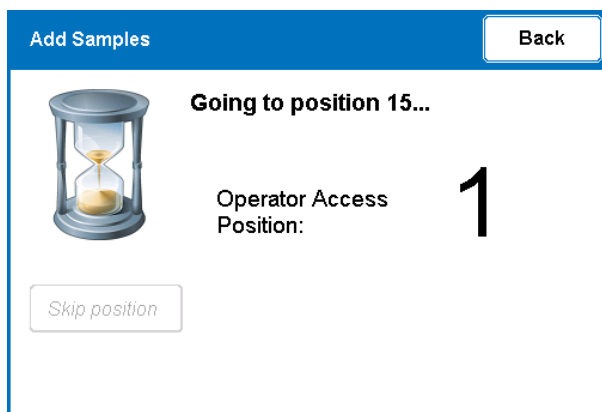
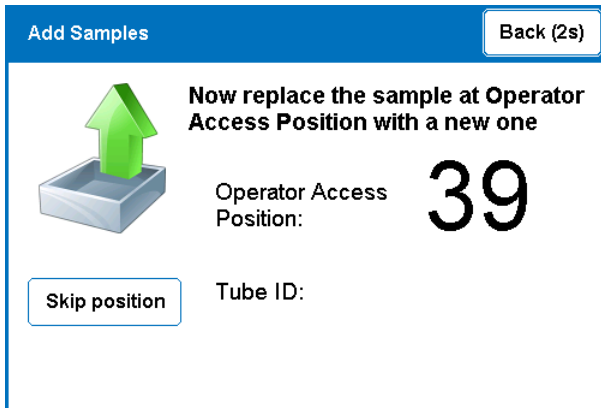


Figure 8.16: Moving the Selected Position to the Operator Access Position

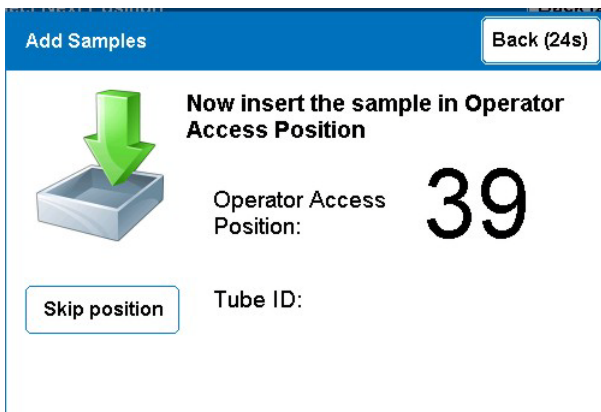
When the operator access position has been reached and the position is **filled**, an Add Samples screen is displayed with the requirement to **replace** the sample.



4a. Remove the sample from the Operator Access Position, the screen will not change.

5a. Add a new sample at the Operator Access Position; the Position Selection screen will be displayed again.

When the operator access position is reached and the position is **empty**, an Add Samples screen is displayed with the requirement to **add** a sample.



5b. Add the sample to the selected position.

➔ The chain rotates in ascending order to the next position, whereas another sample can be added or replaced.

6. Use the **Skip Sample** button to skip a sample.

7. Use the **Back** button to return to the main menu.

### 8.3.3 Removing Samples

1. Press the **Remove** button in the main screen.

➔ The Remove selection screen is displayed:

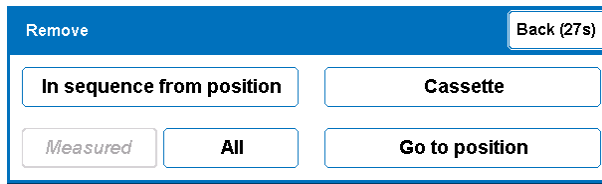


Figure 8.17: Remove Selection Screen

2. Press the **Go to position** button to choose the sample position.

➡ The Select Next Position screen appears:

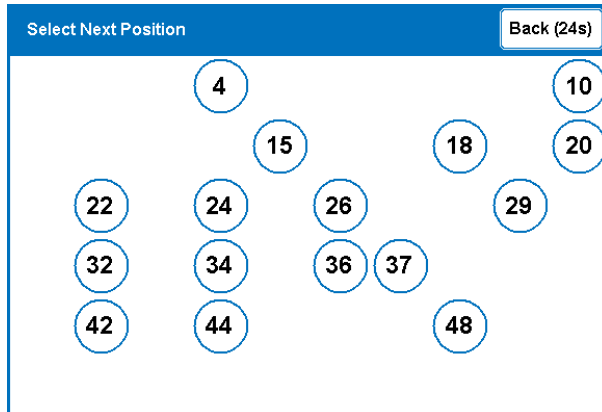


Figure 8.18: Position Selection Screen

3. Select a position to remove.

➡ As the conveyor chain rotates to the selected position to the Operator Access Position, a message is displayed on the screen:

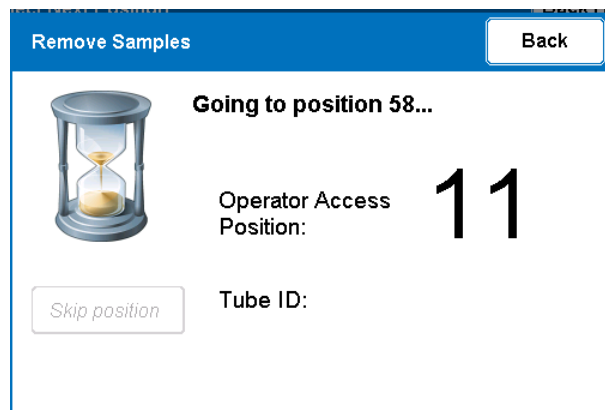


Figure 8.19: Going to Position

➡ When the sample arrives at the Operator Access Position the following message is displayed:

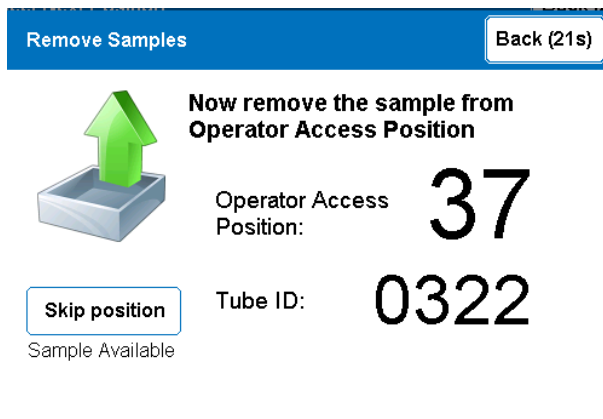


Figure 8.20: Remove Sample Screen

4. Remove the sample from the Operator Access Position.

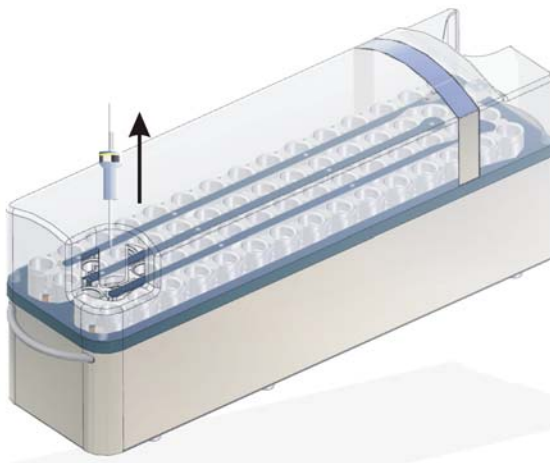
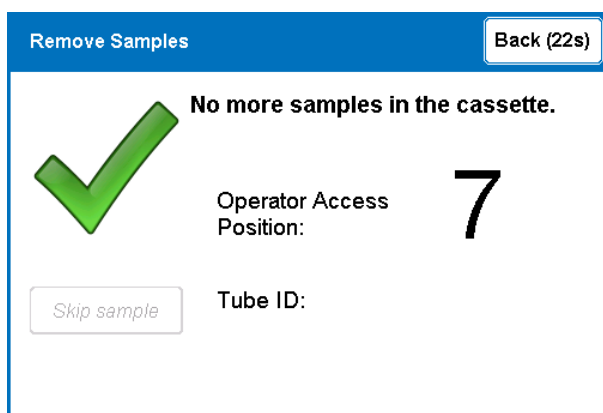


Figure 8.21: Removing Samples at the Operator Access Position

The Position Selection Screen will be displayed again.

**Exception:**

Once you have removed the last sample from the cassette, the following message is displayed:



5. A) To finish this function:

➔ Press the **Back** button,

or

5. B) To remove another sample,

➔ Select a position.

### 8.3.3.1 Removing All the Samples

To remove all the samples individually through the Operator Access Position.

1. Press the **Remove** button in the main screen.

➔ The Remove selection menu is displayed.

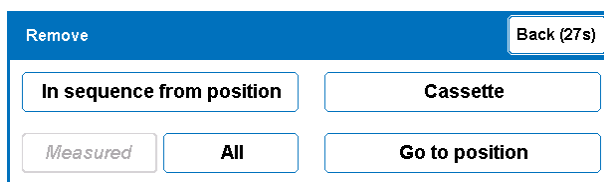
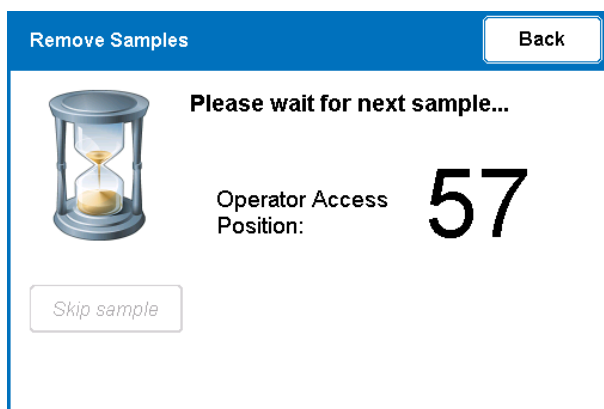


Figure 8.22: Remove All

2. Press the **All** button.

➔ The chain rotates to the next position filled with a sample and a message is displayed:



3. Once the sample is at the Operator Access Position, the following message is displayed:

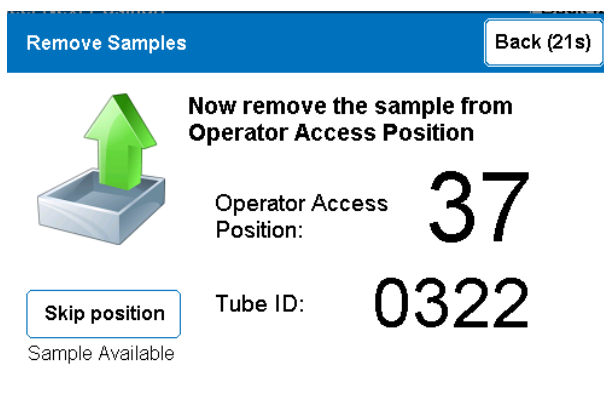


Figure 8.23: Remove Sample Screen

4. A) Remove the sample.

- ➔ The chain rotates to the next position occupied with a sample.
- ➔ Remove the sample.
- ➔ The device will automatically move forward to the next filled position and so on.

Or

4. B) Skip the sample

To skip a sample, press the **Skip position** button.

Or

4. C) Press the **Back** button to return to the main menu.

### Exception:

When all samples have been removed, a message is displayed that no more samples are in the cassette (apart from any skipped samples):

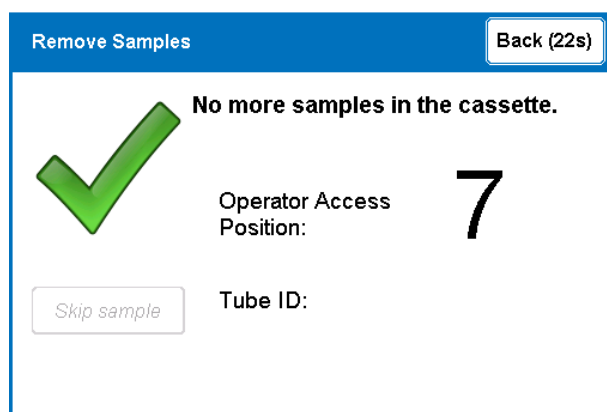


Figure 8.24: Remove Samples - No more samples in the cassette

### 8.3.3.2 Remove Measured Samples from the Cassette

It is possible to remove only the measured samples from the cassette. The measured sample positions are green colored, their state is **Finished**.

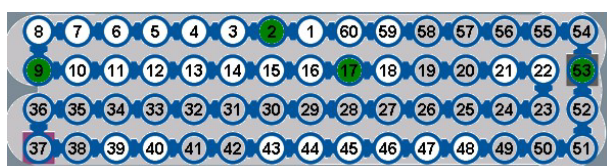


Figure 8.25: Measured Samples



**Important:** When more than one experiment has been defined for a sample, and IconNMR has been configured to switch samples between two experiments, then the Measured/Finished state on the SampleXpress control panel is not valid.

In this case there is no synchronization between the SampleXpress and IconNMR concerning the sample states. The SampleXpress will consider a sample measured when the sample has been transferred at least once to the magnet and back to the SampleXpress.

To remove all measured samples individually from the operator access position:

1. Press the **Remove** button (Figure 9.16) in the main screen.

➔ When measured samples exist, the **Measured** button is enabled.

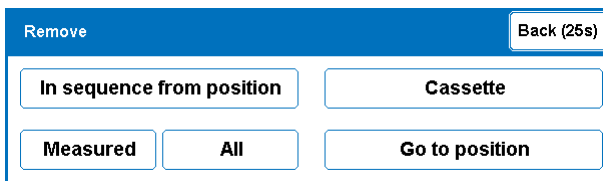


Figure 8.26: Remove Measured Samples

2. Press the **Measured** button.

➔ The chain rotates the nearest measured sample to the operator access position.

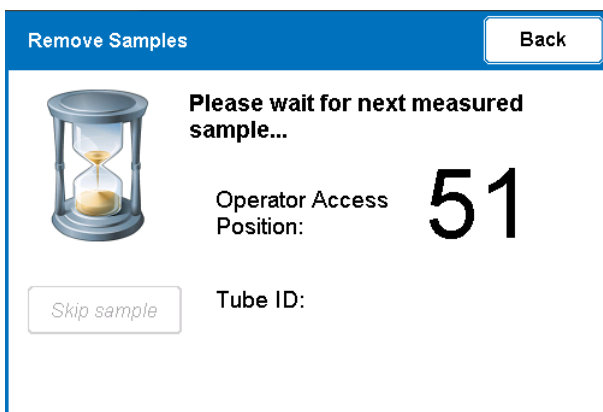


Figure 8.27: Removing Measured Samples - Please wait for next measured sample

When the measured sample arrives in the operator access position, a message is displayed:

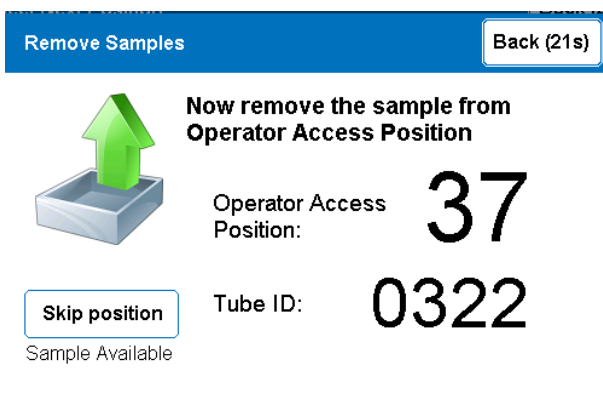


Figure 8.28: Remove Sample Screen

3. Remove the sample.

➔ The chain rotates to the next position occupied with a measured sample.

This procedure will be repeated until all measured samples are removed from the cassette. To skip a measured sample, press the **Skip Position** button.

When all finished samples have been removed, a message is displayed that no more finished samples are in the cassette (apart from any skipped samples):

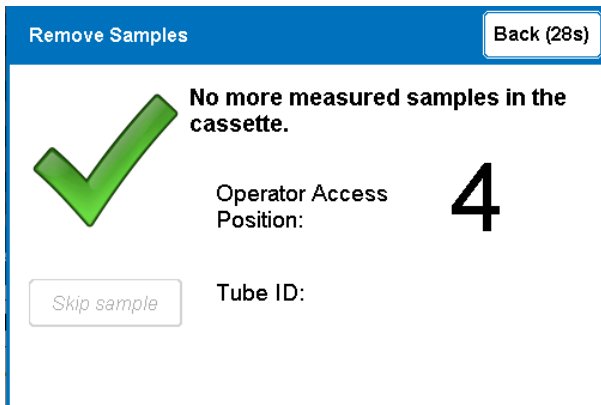


Figure 8.29: Remove Samples - No more measured samples in the cassette

4. Press the **Back** button to return to the main menu.

### 8.3.3.3 Removing Samples in Sequence

This functions allows the removal of samples sequentially in ascending order from a selected position, until the next empty position has been reached.

1. Press the **Remove** button in the main screen.

➔ The Remove Selection Menu is displayed.

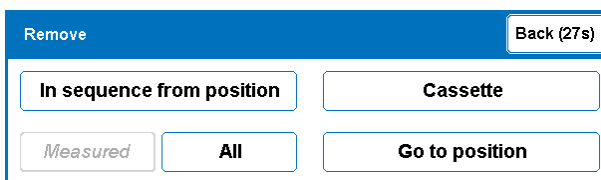


Figure 8.30: Remove Samples in Sequence from Position

2. Press the **In sequence from position** button.

➔ The Position selection screen appears.

3. Select a position to be removed.

Once the sample is at the operator access position, the following message is displayed:

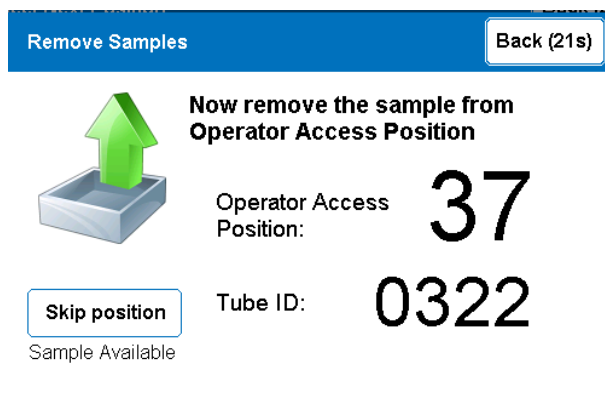


Figure 8.31: Remove Sample Screen

4. A) Remove the sample.
  - ➔ The chain rotates to the next position occupied with a sample.
  - ➔ Remove the sample.
  - ➔ The device will automatically move forward to the next occupied position and so on.
- or
4. B) Skip the sample  
To skip a sample, press the **Skip Position** button.
- or
4. C) Press the **Back** button to return to the main menu.

#### See also

📄 Removing Samples [▶ 80]

## 8.3.4 Removing the Cassette

To remove the cassette

1. Press the **Remove** button in the main menu.
  - ➔ The Remove Menu is displayed.



Figure 8.32: Remove Menu

2. Press the **Cassette** button.
  - ➔ The SampleXpress will ask for a confirmation.

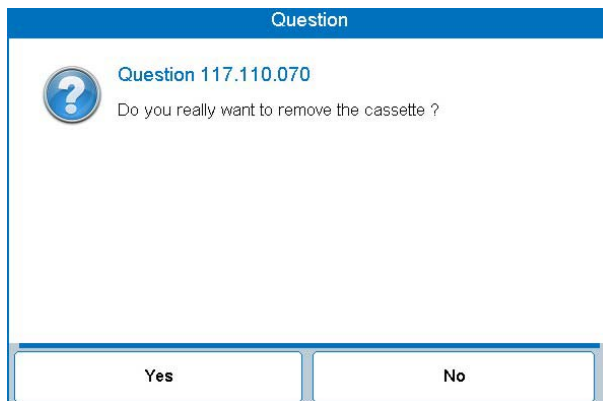


Figure 8.33: Query for Removing the Cassette

3. Press **Yes** to confirm.

- ➔ The conveyor chain position 1 moves to the operator access position.
- ➔ The lamp indicator switches to blue.
- ➔ The cassette will be released and a message is displayed:

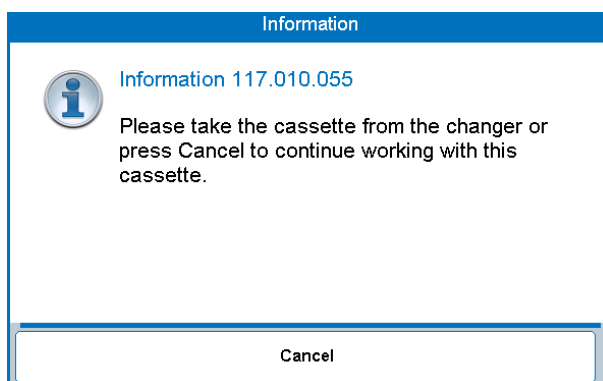


Figure 8.34: Information Screen

4. Lift the cassette using the hand holds, or press the **Cancel** button to continue working with this cassette.

- ➔ You should feel a slight resistance.

5. Carefully remove the cassette.

- ➔ When the cassette is removed the buttons will no longer be accessible (gray colored) and a message is displayed:

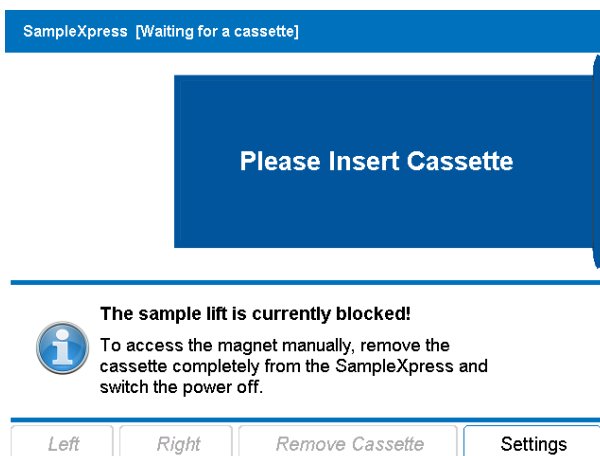


Figure 8.35: Screen without Cassette

## 8.4 Random Access Mode

When operating the SampleXpress with an uncovered cassette, Random Access Mode is used.

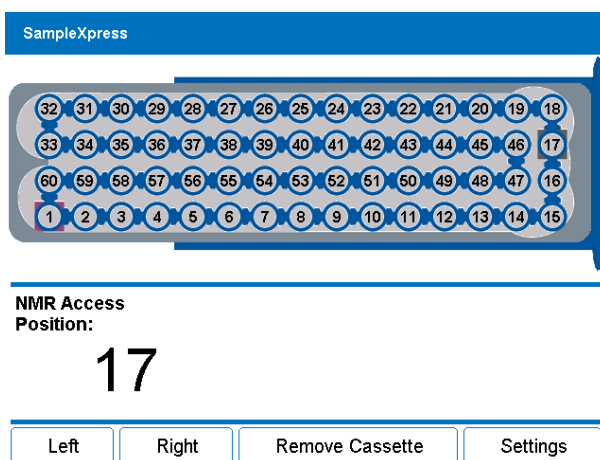


Figure 8.36: Main Screen in Random Access Mode

### Cassette View

In this mode the SampleXpress does not have accurate information about where samples are in the cassette, thus no samples will be displayed on the cassette view.

The cassette view will still display the correct positioning of the conveyor chain.

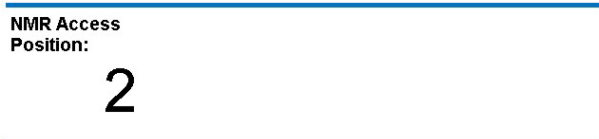
### NMR Access Position and Sample Down

Just below the cassette view is the information panel.

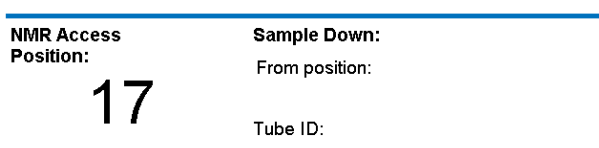
The left side of the panel permanently displays the number of the position currently at the NMR Access Position.

The right side of the panel displays information about the sample currently in the magnet:

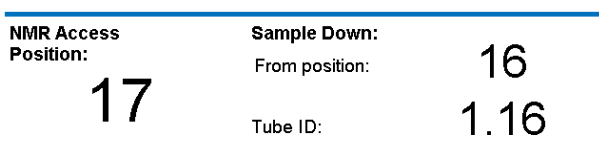
- When the position is empty: There is no sample down, or the sample is down and has not been tested yet.



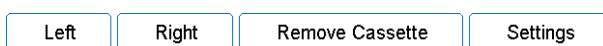
- When a sample is down, but the SampleXpress does not know where it comes from: The Sample Down information is displayed but the Position and Tube ID fields will be empty. This typically happens if a sample is down when the SampleXpress is powered on and a cassette is present.



- A sample which has been inserted by SampleXpress is down: Both the Position and Tube ID fields are displayed. The Tube ID shows the barcode of the sample. If the sample has no barcode, the Tube ID will be generated as 1.[Position Number], e.g. 1.16 in the following figure:



## Menu



The functions of **Left**, **Right** and **Remove Cassette** buttons are covered in this section.

To view the functions of the **Settings** button, refer to chapter Settings and Administration [▶ 95].

### 8.4.1 Moving the Conveyor Chain

Even if there is no cover on the cassette all position are not accessible for adding or removing samples. For example some positions might be too far from the user.

The **Left** and **Right** buttons can be used to move the conveyor chain to the next left or right position.

Keeping the button pressed will cause the chain to continuously move in the corresponding direction. Releasing it will cause the chain to stop.

## 8.4.2 Removing the Cassette

1. Press the Remove Cassette button.

➡ The SampleXpress will ask for confirmation.

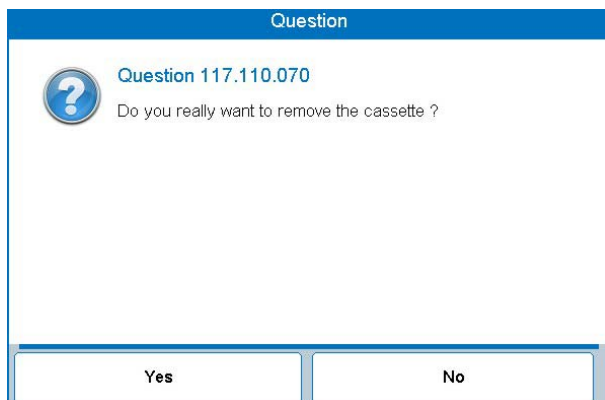


Figure 8.37: Query for Removing the Cassette

2. Press **Yes** to confirm.

➡ The conveyor chain position 1 moves to the operator access position.

➡ The cassette will be released and a message is displayed:

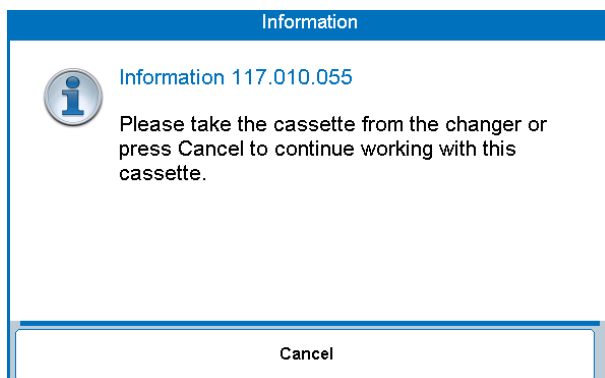


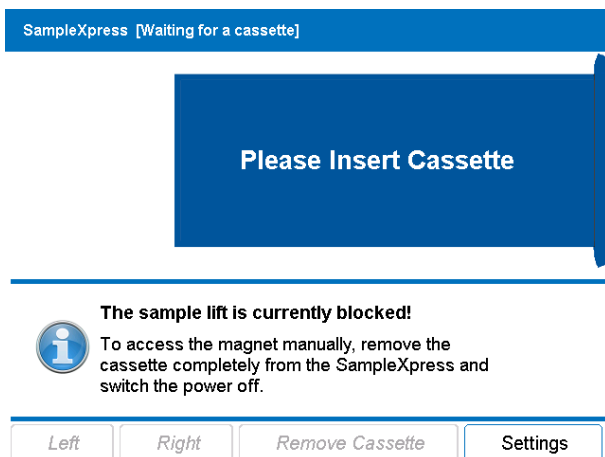
Figure 8.38: Information Screen

3. Lift the cassette using the hand holds, or press the **Cancel** button to continue working with this cassette.

➡ You should feel a slight resistance.

4. Remove the cassette carefully.

➡ The buttons will no longer be accessible (gray colored) and a message is displayed:



## 8.5 Manual Mode

The SampleXpress can be used without a cassette, whereas the spectroscopy magnet will need to be loaded manually.

### Inserting the sample manually into the magnet:

1. Wait until the outstanding job is finished.
  - ➔ The lamp indicator will switch to green.
2. Remove the cassette (see Removing the Cassette [▶ 87]).
3. Switch the SampleXpress off (see Switching Off the Device [▶ 61]).
4. Insert the sample manually into the BST at the sample NMR Access Position.



Figure 8.39: Sample Transfer Position

## WARNING

### **Danger of injury from an unexpected restart!**

In the event of an unexpected restart of the power supply during manual mode, there is a danger of serious injuries for persons in the danger zone. The gripper grips the spinner with the sample with its claws. If the cassette is not inserted, the claws can shear and crimp the limbs.

1. Switch off all power supplies before starting work and make sure they cannot be switched on again.
2. Do not put your fingers into the small opening where the gripper is behind.





## 9 Settings and Administration

All configuration and administration tasks can be performed from the control panel.

The SampleXpress also provides Web pages that allow the same tasks to be performed from the spectrometer computer using a Web browser.

Both methods are described in this chapter.

### 9.1 Web Pages



#### Limitation

The Web pages are only available on AVANCE spectrometers with TopSpin Version 2.1 or above.

#### 9.1.1 Accessing the Web Pages

Before opening the device Web page, make sure TopSpin is running and the device is powered on.

TopSpin provides a list of all devices in your spectrometer with Web pages. From this list it is possible to directly access the Web page of a given device.

To open the list, enter the **HA** command on TopSpin command line. Building the list may take up to several minutes, during this time the following window is displayed:

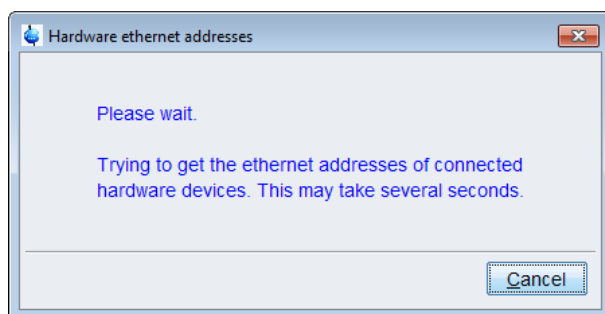
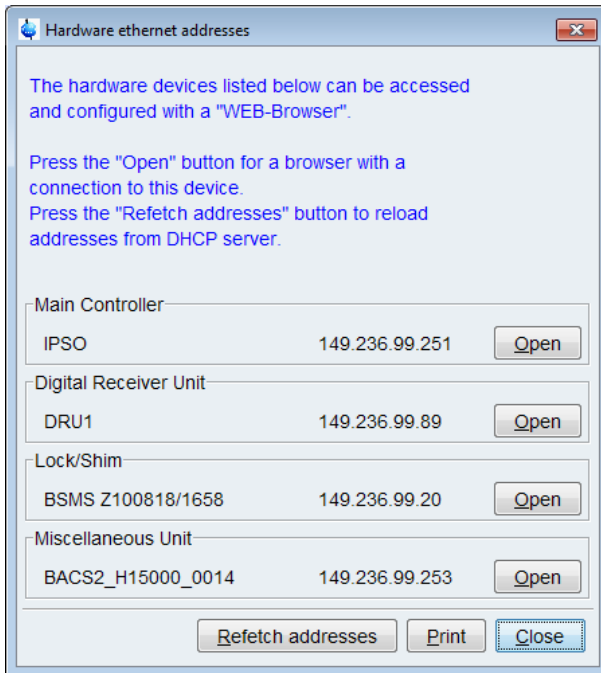


Figure 9.1: Topspin

When TopSpin has found all devices the following window is displayed:



Devices are grouped into categories. For each device the name, the network IP address and an **Open** button are displayed. Click the **Open** button to start the default browser on the corresponding device Web page.

The SampleXpress is located in the **Miscellaneous Unit** category. The device is not listed as **SampleXpress** but as **BACS2\_H15000\_XXXX** or **BACS2\_H15000-01\_XXXX** where XXXX is the device serial number.

Click the **Open** button on the BACS2 line.



### Mismatch in Configuration

A red **Mismatch in configuration** warning may be displayed, even if the spectrometer and the device have been successfully configured using the CF command. In such cases the warning can be ignored.

## 9.1.2 Web Pages Layout

When the SampleXpress main Web page is opened, it appears in the browser that was opened by TopSpin:

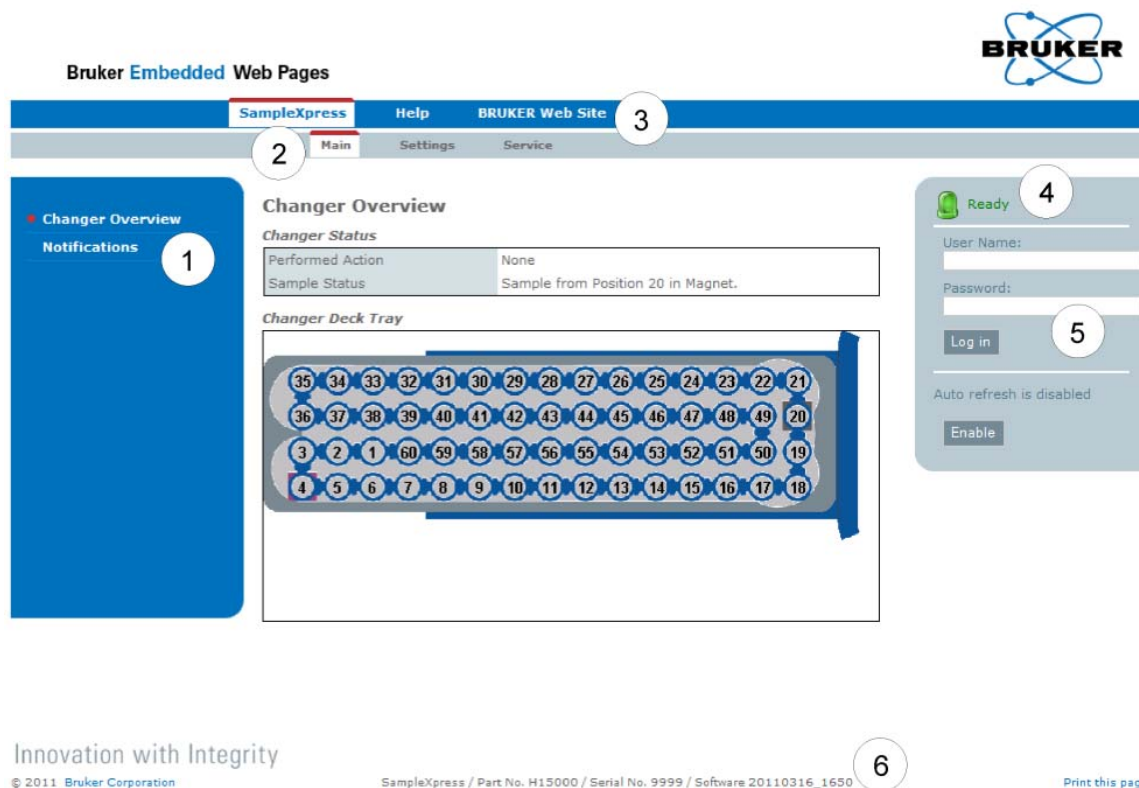


Figure 9.2: Web Main Page

The following elements are always present on all SampleXpress Web pages:

1	Sub Menu
2	Main Menu
3	Top Level Menu: SampleXpress, Help and Bruker Internet Web Site
4	Device Status
5	Log in Area
6	Device Identification Information

## 9.2 General Settings

Pressing the **Settings** button on the control panel will open a settings window containing several tabs:

- A **User** tab for touch screen calibration and for setting the date and time.
- An **Administrator** tab, which is password protected and should only be used by the laboratory supervisor.
- A **Service (Bruker)** tab, which is password protected and can only be used by Bruker service.

## 9.2.1 Touch Screen Calibration

1. Press the touch screen **Settings** button in the main menu.

➔ The settings screen will appear:

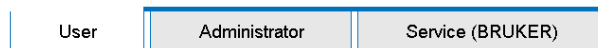
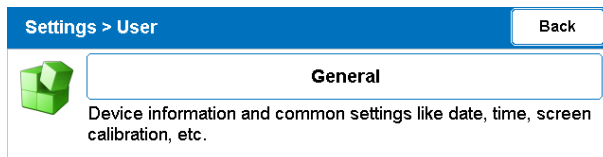


Figure 9.3: Setting Screen

2. Press the **General** button on the user tab.

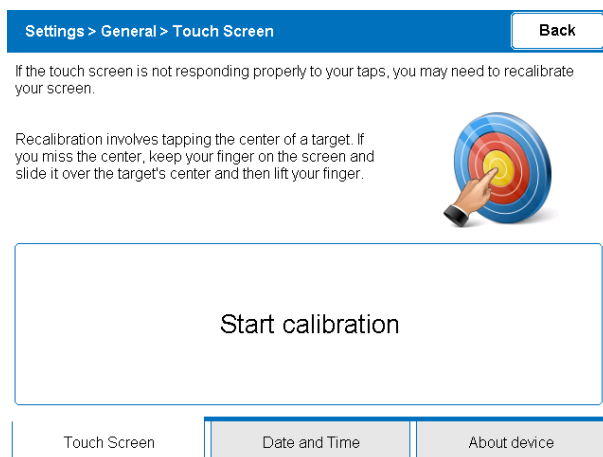


Figure 9.4: Calibration Touch Screen

3. Select the **Touch Screen** tab and press the **Start Calibration** button.

➔ A calibration screen will appear:

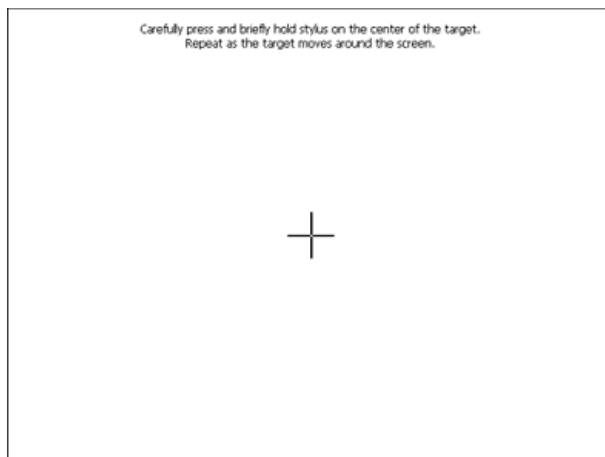


Figure 9.5: Calibration Screen

4. Follow the instructions on the screen, using your fingers to move the cross for calibration.



It is important to press the middle of the cross where it appears on the screen.

After the calibration is complete the program will automatically return to the general setting screen.

## 9.2.2 Date and Time Setting

### 9.2.2.1 On the Control Panel

To set the date and time from the control panel:

1. Press the touch screen **Settings** button in the main menu.

➔ The Settings > User screen will appear:

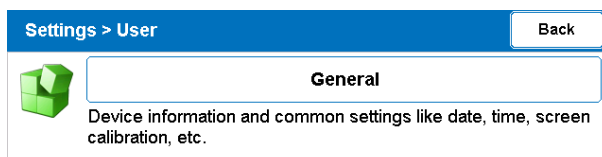


Figure 9.6: Setting Screen

2. Press the **General** button on the User tab.
3. Press the **Date & Time** tab.

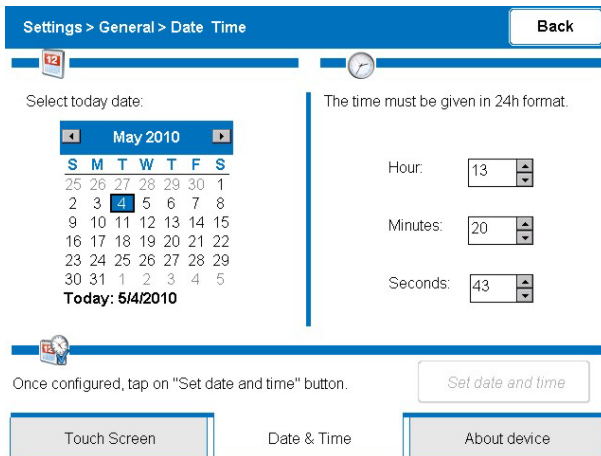


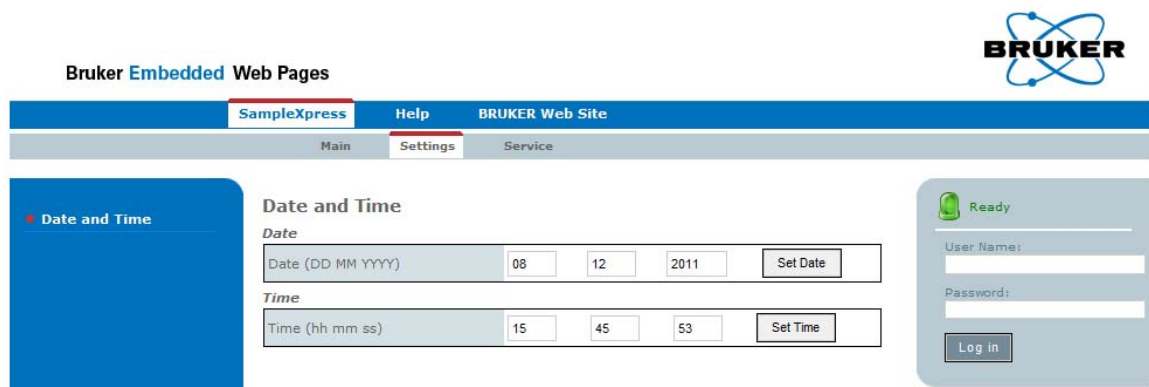
Figure 9.7: Date and Time Screen

4. Change the date and time.
  - ➔ The **Set Date and Time** button will be activated.
5. Save the settings by pressing the **Set Date and Time** button.

## 9.2.2.2 From the Web Pages

To set the date and time from the Web pages:

1. Open the Web pages (see Accessing the Web Pages [ 95]).
2. Click on **Settings** in the main menu (gray horizontal bar)



3. Click the **Set Date** button to set the SampleXpress date to the one displayed in the Date field.
4. Click the **Set Time** button to set the SampleXpress time to the one displayed in the Time field. The time format is 24 hours.



**Note:** It is not possible to set both the date and time at once.

## 9.2.3 About the Device

Information about the device is broken down and displayed in two separate areas, on the control panel and on the bottom of the individual Web pages (see Web Pages Layout [▶97]).

### 9.2.3.1 On the Control Panel

To view information for the device on the control panel:

1. Press the **Settings** button in the main menu.

⇒ The Settings screen will appear:

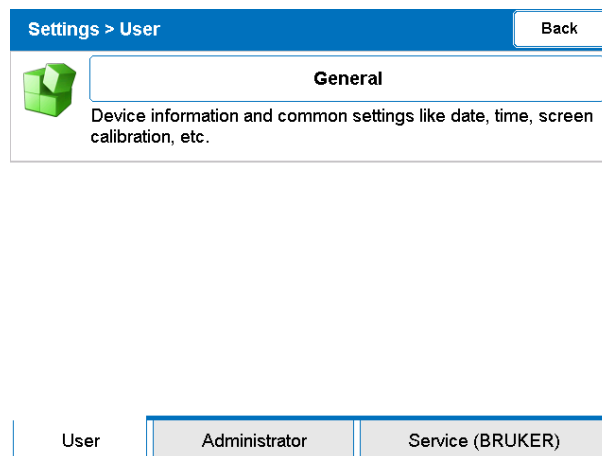


Figure 9.8: Setting Screen

2. Press the **General** button on the **User** tab.
3. Select the **About device** tab to view the device data.

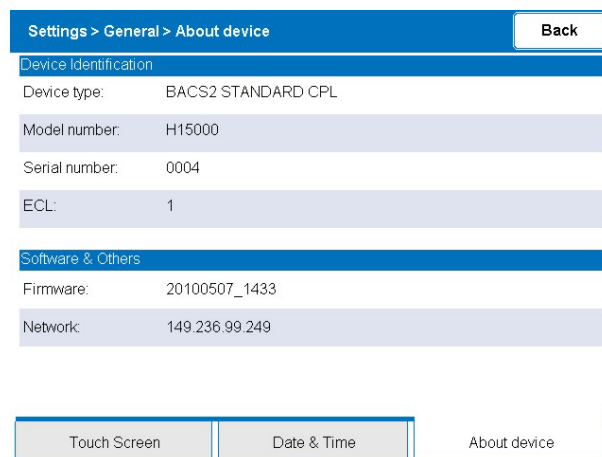


Figure 9.9: About Device Screen

4. Press the **Back** button to return to the previous screen.

## 9.3 Lift Settings

The SampleXpress provides its own “embedded lift” which works especially well when you are using the same kind of samples. As an alternative you may use the spectrometer “BSMS lift”, which is advantageous when using samples with different weight. The drawback of using the BSMS lift is that it is slower than the embedded lift mode.

To use the BSMS lift mode TopSpin version 3.1 p14 or higher and a spectrometer with an ELCB board are required.



### NOTICE

If you upgraded the SampleXpress firmware yourself, please contact Bruker Service to verify that the ELCB/BSMS firmware version matches the one required.

The BSMS lift also needs to be recalibrated before it can be used with the SampleXpress, otherwise the BSMS lift mode of the SampleXpress will not work correctly.

The following sections explain how to switch between the embedded and the BSMS lift modes using either the control panel or the Web pages.

### 9.3.1 On the Control Panel

To switch to another lift mode using the control panel:

1. Click the **Settings** button on the SampleXpress screen and select the **Administrator** tab.

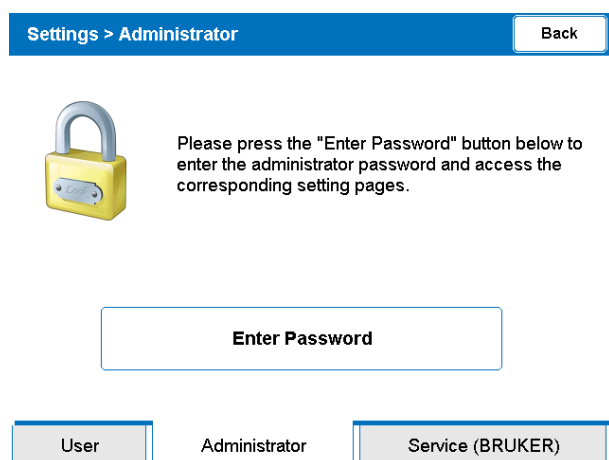


Figure 9.10: Enter Password Screen

2. Click the **Enter Password** button.

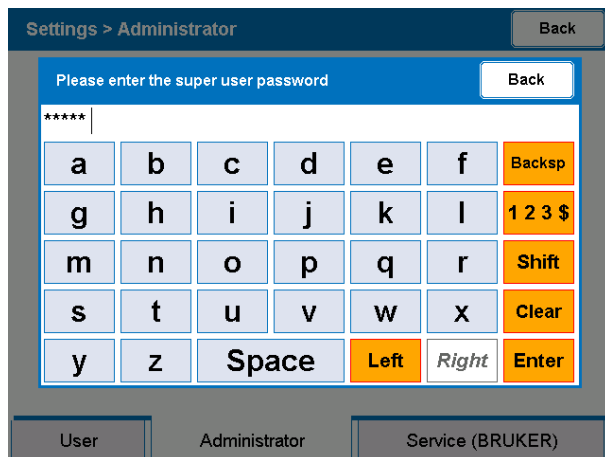


Figure 9.11: Super User Password

3. Enter the following password: **admin**



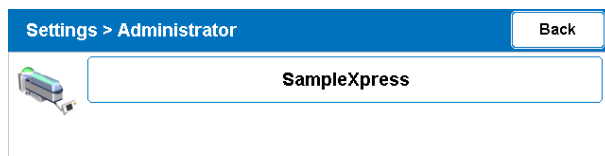
## Password

The password (admin) cannot be changed.

4. Click on **Enter** (bottom right of the keyboard)

If the entered password is wrong, the keyboard closes and the **Enter Password Screen** is displayed again.

When the correct password was entered the following screen is displayed:



5. Click the **SampleXpress** button.

➡ The Lift Mode drop down list displays the lift the SampleXpress is currently using.

Settings > SampleXpress > Sample Lift

Back

The following list allows you to choose which kind of sample lift the SampleXpress will use.

The BSMS lift has to be used if you are using spinners of different kinds and weights. In this case TopSpin version 3.1 p4 or newer is required on the spectrometer computer.

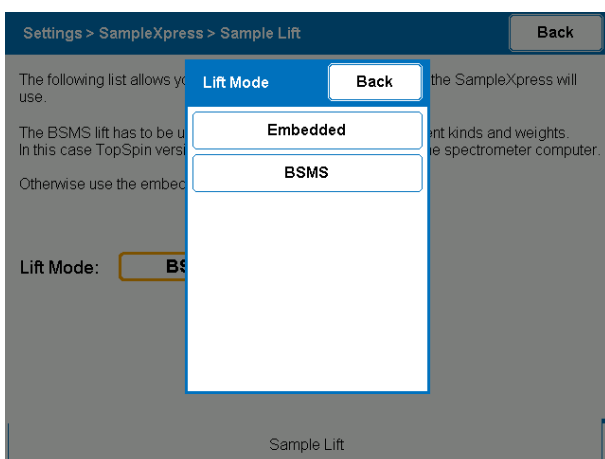
Otherwise use the embedded lift.

Lift Mode: **BSMS** ▼

Sample Lift

1. To change the lift mode, click on the drop down list arrow symbol.

➡ A selection screen appears:



2. Click on the lift you want to use, or the **Back** button to cancel.
3. Once you have selected the lift mode, press the **Back** button twice to return to the main screen.

The SampleXpress will complete any operation that is currently running and then switch to the selected lift mode.

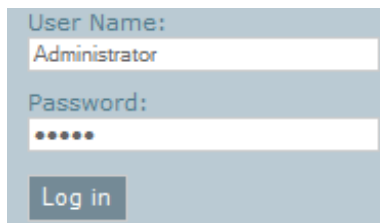
A warning might come up, that the SampleXpress tries to connect to the BSMS.

For more information on using the BSMS lift refer to the section [BSMS Lift \[▶127\]](#).

## 9.3.2 From the Web Pages

To switch to another lift mode using the Web pages:

1. Open the Web Pages as described in the chapter Accessing the Web Pages [▶ 95].



User Name:  
Administrator

Password:  
.....

Log in

2. Log-in using the following information:

User Name: Administrator

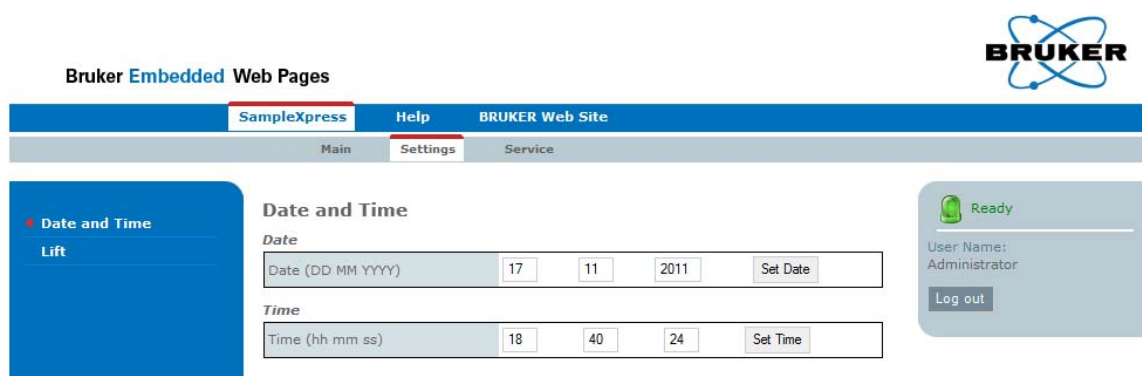
Password: admin

When the log-in is successful, the log-in area will display the user name and the **Log out** button. In case of an unsuccessful log-in, you will be asked to reenter the user name and the password.



**Note:** The password (admin) cannot be changed.

3. Click on **Settings** in the main menu (gray horizontal bar):



Bruker Embedded Web Pages

SampleXpress Help BRUKER Web Site

Main Settings Service

Date and Time

Date

Date (DD MM YYYY) 17 11 2011 Set Date

Time

Time (hh mm ss) 18 40 24 Set Time

Ready

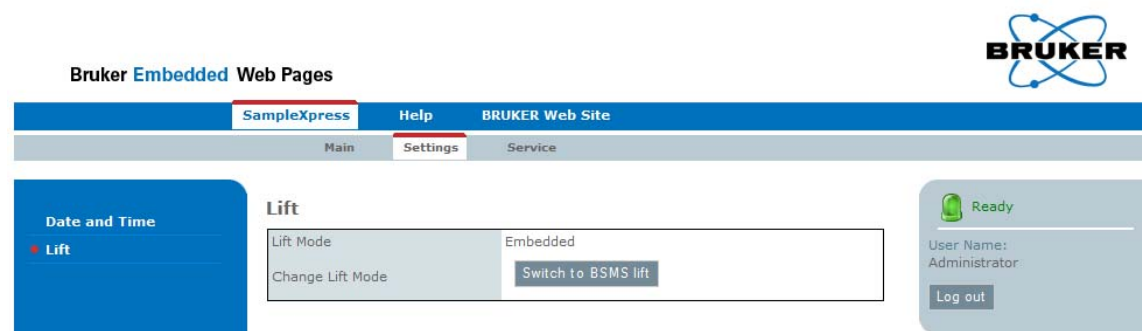
User Name: Administrator

Log out

Figure 9.12: Web Pages – Settings Tab

4. Click on **Lift** in the sub menu on the left.

The **Lift Mode** field shows the currently used lift mode.



Bruker Embedded Web Pages

SampleXpress Help BRUKER Web Site

Main Settings Service

Date and Time

Lift

Lift Mode Embedded

Change Lift Mode Switch to BSMS lift

Ready

User Name: Administrator

Log out

5. Click on either **Switch to BSMS Lift** or **Switch to Embedded Lift** to switch to the other lift mode.



**Note:** When you click the button, the page needs a few seconds to reload. Please be patient and do not click on the button again.

---

The SampleXpress will first complete any operation that is currently running and then switch to the selected lift mode. The **Lift Mode** field value will change once the page has reloaded.

You can now log-out and close the web browser.

# 10 Maintenance

## 10.1 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.

1. If a glass tube breaks, refer to the corresponding precautions and cleaning/disinfection instructions.
2. Wear protective equipment.
3. Perform all tasks with the cassette and glass tubes carefully.
4. Before carrying out any maintenance work, remove the samples and use dummy samples if necessary.
5. Strictly observe the correct sample adjustment, i.e. the maximum sample height.
6. Always transport the cassette with the cover. Never turn the cassette upside down or on it's side.
7. **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.

1. Disconnect the device from the electrical power supply before opening the device. Use a voltmeter to verify that the device is not under power!
2. 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.



1. Provide for sufficient mounting clearance before starting to work.
2. Keep the assembly area tidy and clean! Loose components and tools lying around or on top of each other may lead to accidents.
3. 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.
4. 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.



1. 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.



1. 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.
- Catch replaced oils in suitable containers and dispose of in accordance with applicable local regulations.

## 10.2 Replacement Parts

Part Number	EC Level (SampleXpress)	Description
H15040	<=2	BACS2 Main Unit for SampleXpress H15000
H15040-01	>=3	BACS2 Main Unit for SampleXpress H15000-01
H15020		BACS2 Control Panel Complete
H15050		BACS2 Cassette 60 Standard Complete
HZ16216	<= 2	BACS2 Cassette Top Cover
H128414	>= 3	The BACS2 Cassette Top Cover can only be mounted on SampleXpress with ECL >= 3.

Table 10.1: Bruker Replacement Parts

For details about the hardware versions of the SampleXpress see also the device history table in the chapter Rating Plates and Device History [▶ 32].



Replacement parts must be exchanged by Bruker Service personnel! The only exception is the cassette and the cover. Only original parts from Bruker are to be used for the SampleXpress, use of any other parts invalidates all warranty. Parts which are returned to Bruker for repair or disposal must be accompanied by a repair declaration (see Repair Declaration [▶ 175]).

## 10.3 Preventive Maintenance

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

## 10.4 Embedded Lift Adjustment

### NOTICE

#### Material damage hazard from heavy samples!

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

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



Figure 10.1: Connections Left Side

1	BST Interface Cable from SLCB BSMS	8	Air Supply
2	BST Interface Cable to BST	9	External R232 (future feature)
3	Gas Interrupt (future feature)	10	Console RS232
4	Lift Adjustment Knob	11	CAN Network to Control Panel
5	Status and Control	12	External Signal 1 (future feature)
6	Pressure Gauge	13	External Signal 2 (future feature)
7	Air Supply Adjustment Knob	14	External Signal 3 (future feature)



Not all connections may be available depending on the configuration.

1. Check the pressure gauge (see also Connections [ 47] )
2. If the pressure is below 4 bar, turn the adjustment (see also Connections [ 47]) 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.

## 10.5 Magnet Service

---

### 10.5.1 Refilling

---

#### Before refilling the helium or nitrogen in the magnet:

1. Turn the SampleXpress off.
2. Unplug the main power supply connector.
3. Cover the SampleXpress 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 water is visible on the cold parts.
2. Remove the protective cover from the SampleXpress.
3. Reconnect the main power supply cable.
4. Restart the SampleXpress.

### 10.5.2 After a Quench

---

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

## 10.6 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 based on the actual wear occurrences. Contact Bruker with questions regarding maintenance work and intervals; see the service address listed under Contact.

Interval	Maintenance Work	Reference
Daily	Clean the working area.	Laboratory Personnel
Weekly	Clean the machine compartment. See Cleaning the Outer Shell of the Device [▶118]	Laboratory SOP
	Check air maintenance unit, see Embedded Lift Adjustment [▶109].	
Semi-annually	Check the safety switch.	
Annually	Clean the Magazine Light Barrier, see Cleaning the Magazine Light Barrier [▶119].	
As needed	Clean Outer Shell of the Device, see Cleaning the Outer Shell of the Device [▶118].	
	Update Firmware, see Firmware Update [▶112].	

Table 10.2: Maintenance Schedule for Laboratory Personnel

## 10.7 Firmware Update

The SampleXpress firmware can be updated using either a USB memory stick or the Web pages.



**Note:** Only update the firmware through guidance from Bruker service.

Before updating the firmware, ensure that:

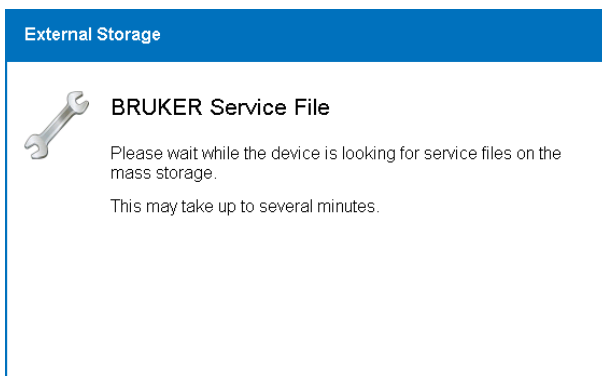
- All automatic operations have stopped (e.g. IconNMR is stopped run).
- The power supply will not be cut off during the entire procedure (otherwise you will have to send the device back to Bruker for repair).
- The SampleXpress is powered on and is ready (status light green or blue).

### 10.7.1 With an USB Memory Stick

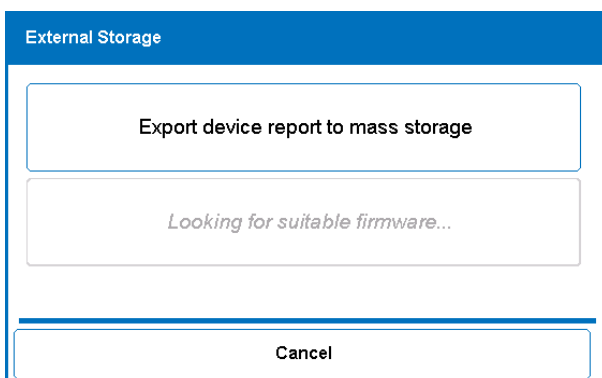
To update the firmware using a USB stick:

1. Copy the firmware file from Bruker anywhere on a FAT32 formatted USB memory stick.
2. Plug the USB memory stick into the USB port on the side of the SampleXpress control panel.

After a few seconds, the following screen will appear:



3. Wait until the following screen is displayed:

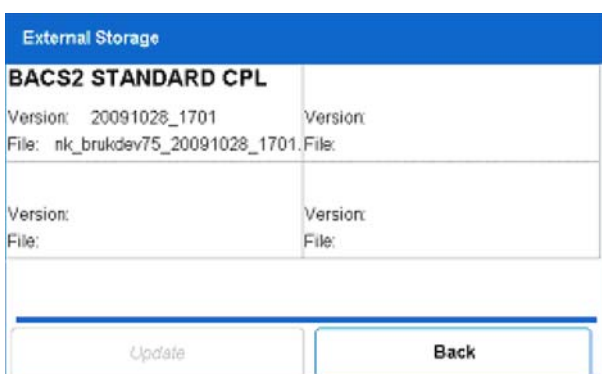


4. Wait until the **Looking for suitable firmware...** button switches to either:

**1. No suitable firmware found:** - In this case contact Bruker service.

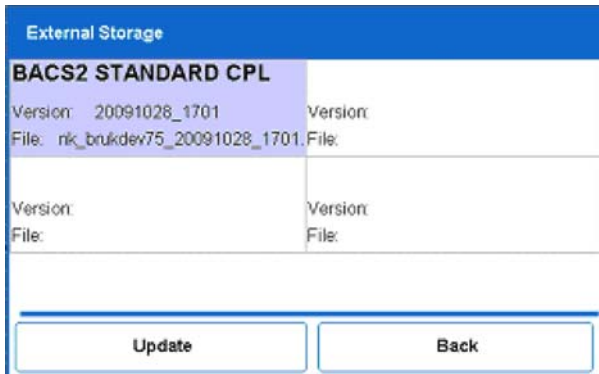
or

**2. Update Firmware (1 found):** - In this case click on the **Update Firmware** button.

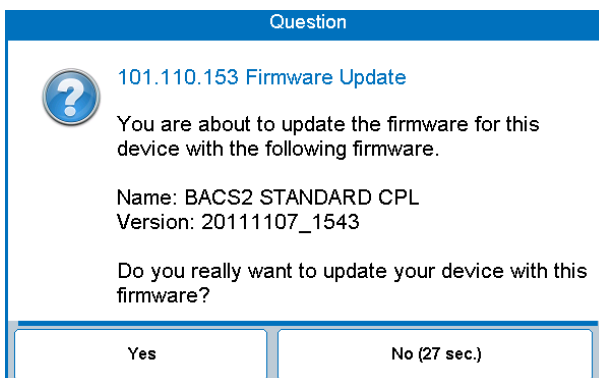


5. Select the firmware version that you want to update to the device. If you are not sure which to use, contact Bruker service.

The selected firmware version will be highlighted purple.



6. Press the **Update** button.



7. Press the **Yes** button.

The firmware update will start immediately. The device status light will switch to Orange and the following notice will appear on the touch screen:



**Important:** The update will take several minutes, please be patient and never unplug the device or USB stick for any reason. If the device hangs for a longer period of time, leave the device powered on and contact Bruker service. Interrupting the firmware update in any way will require that the device be returned to Bruker for repair.

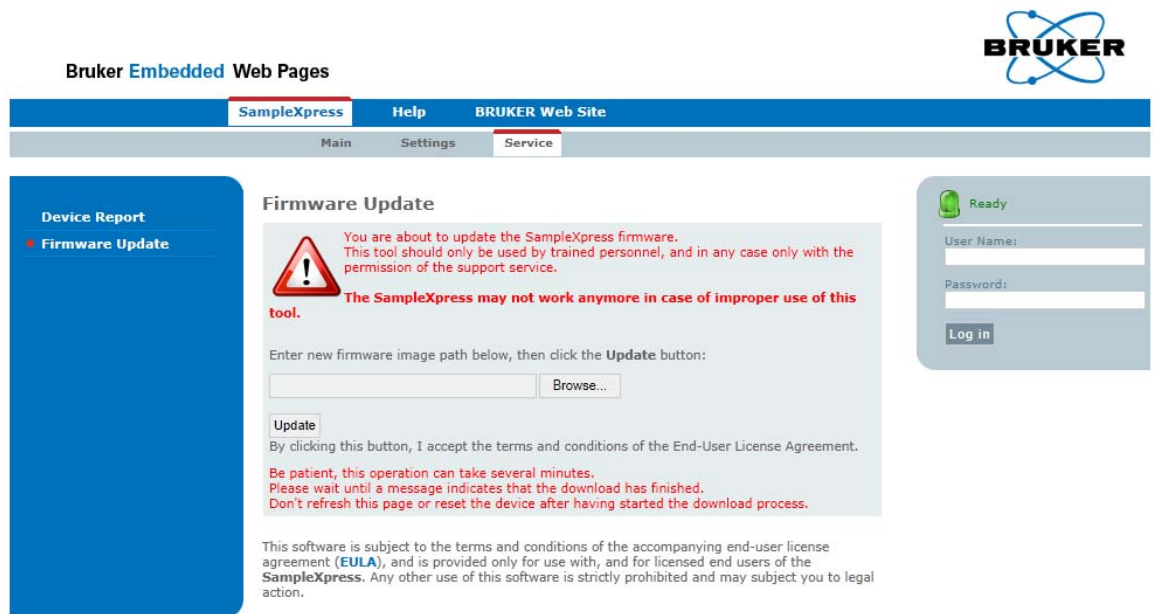
8. When the firmware update is finished, the SampleXpress will automatically restart. It is now safe to remove the USB Memory Stick.

For more information read the section Restart After Firmware Update [▶ 116].

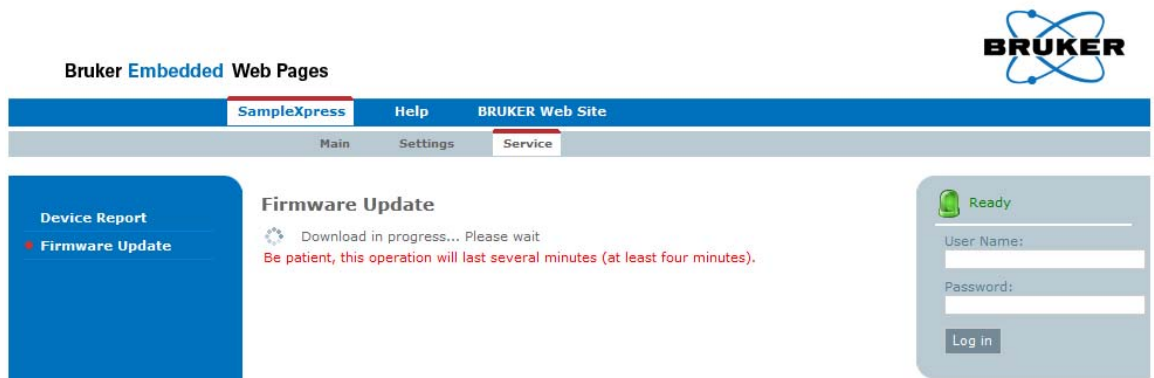
## 10.7.2 From the Web Pages

To update the firmware from the embedded Web pages:

1. Open the Web pages as described in Accessing the Web Pages [▶95].
2. Click on the **Service** tab in the gray horizontal bar of the main menu.
3. Click on **Firmware Update** in the sub-menu.

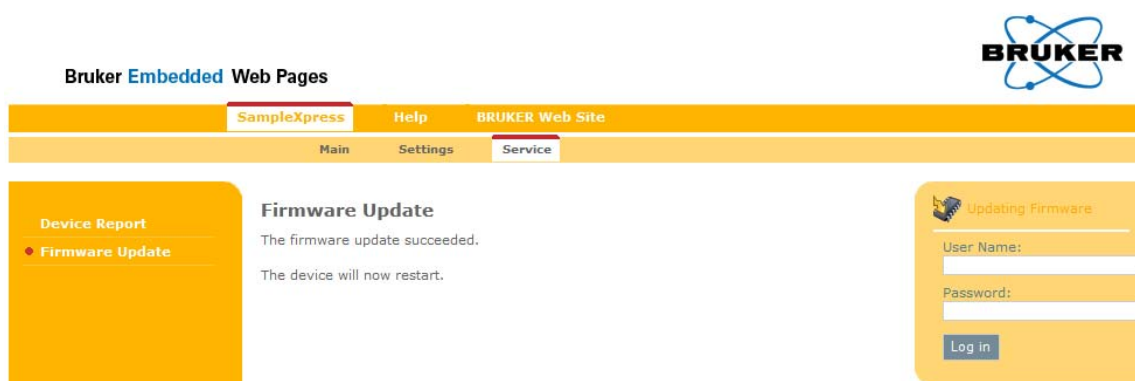


4. Click on the **Browse...** button and choose the firmware file provided by Bruker.
5. Click on the **Update** button:



The page will be displayed while the firmware is being updated. **The update will take about 5 minutes** . During this time please do not refresh the Web page.

When the firmware update has been completed the following page is displayed:



The firmware update is now complete, wait for the device to restart before using.

For more information read the section [Restart After Firmware Update \[116\]](#).

### 10.7.3 Restart After Firmware Update

It may occur that the automatic restart fails after a firmware update. When this occurs, the screen will be black and the power LED on the control panel will be green or red.

In this case the firmware update has been successfully installed, only the device has failed to restart. To restart the SampleXpress do the following:

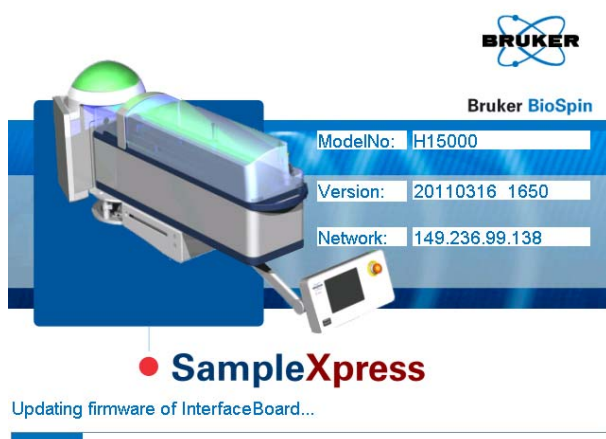
1. Press the power button until the power led switches to orange (about 5 seconds).
2. Wait 10 seconds.
3. Press the power button again.

If it still does not work:

1. Disconnect the device's power supply.
2. The power led on the control panel switches off.
3. Wait 10 seconds.
4. Plug the device's power supply.
5. Press the power button.

#### Firmware update of internal boards

When booting the SampleXpress for the first time after a firmware update the SampleXpress may update one or more other internal firmware. During this time, which may take several minutes, the following screen will be displayed on the control panel:



The SampleXpress will be operational immediately after the update operations have been completed.

## 10.8 Cleaning

---

The cleaning procedures in the following sections may be performed by trained laboratory personnel.

### 10.8.1 Before Cleaning

---

1. Stop the submitted jobs in the IconNMR automation mode.
2. Stop any SampleXpress actions.
3. Switch power off.
4. Disconnect the power supply from connector (1).

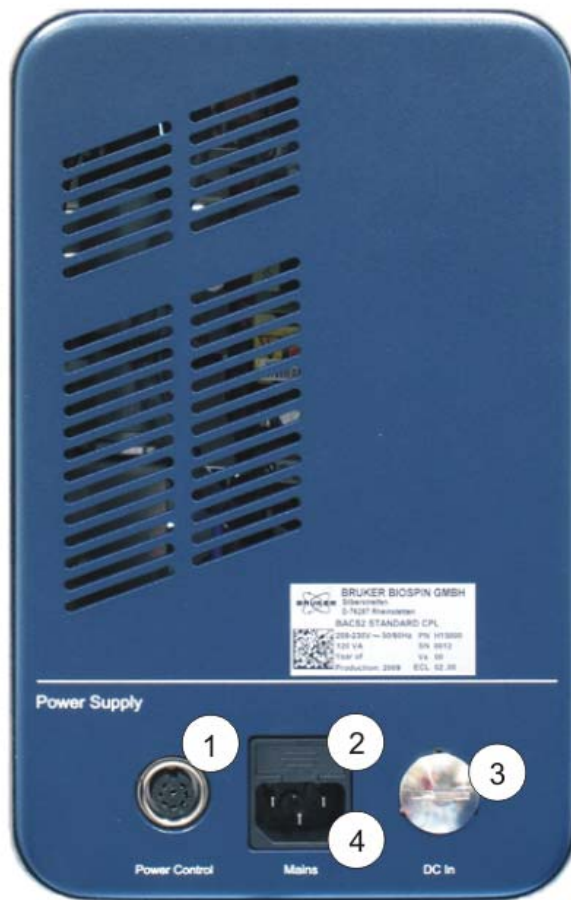


Figure 10.2: Connections Right Side

1	Power Control from Control Panel	3	DC-In (currently not available)
2	Fuse Cartridge	4	Power Supply

### 10.8.2 Cleaning the Outside of the Chassis and Units

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

- Clean the outside of the chassis and units using a soft, lint-free cloth dampened in water.



**Note:** Wait until the unit is completely dry before reconnecting the power cable.

### 10.8.3 Cleaning the Outer Shell of the Device

To clean the outside shell of the device:

- Use only water as a cleaning fluid, do not use acetone!
- Do not disassembly the device.

- Clean only the outer shell of the device with a lint-free cloth dampened in water.

## 10.8.4 Cleaning the Magazine Light Barrier

---

To clean the magazine light barrier, use warm water and a damp lint-free cotton cloth or towel.



Figure 10.3: Magazine Light Barrier

The upper red circle indicates the position of the sensor behind the cover.



**Note:** Excessive dust or dirt on the lens surface of the optics reduces the optics recognition performance, keep these surfaces clean.

---

## 10.8.5 Cleaning the Cassette

---

To clean the cassette:

1. Remove the cassette.
2. Lift the cassette cover.
3. Clean the magazine with warm water and a damp lint-free cotton cloth or towel.



**Note:** Let the cassette dry before using.

---

### 10.8.6 Opening the Side Cover and Cleaning the Inside

#### CAUTION

##### Accident Hazard from Removal of the Cassette Side Cover and Reaching into the Conveyor Chain!



Removal of the cassette side cover and deliberate reaching into the danger zone can result in injured fingers.

1. Do not reach into the conveyor chain!
2. Only operate the device with closed cassette side cover!
3. Press the emergency stop button before opening the cassette side cover!
4. Notice the labels when removing the side cover!

The cassette housing can be easily opened on both sides for cleaning purposes. Before cleaning the inside of the cassette, be sure that no motion has been requested. This can either be done by stopping the ICONNMR run, or by pressing the emergency stop button (safest way).

1. Insert a small metal tool (e.g. coffee spoon) at the opening shown in the figure below:



Figure 10.4: Location for Opening the Cassette Side Cover

2. Carefully pull the housing outwards to avoid any damage to the lacquered surface.
3. Pull the housing parts downwards and remove them.



Figure 10.5: Cassette with Removed Side Cover

Now you can easily clean the inside of the cassette. This is especially important after a sample glass tube breakage when the sample liquid is in the cassette.

## Before restarting the device:

1. Replace the cassette housing. The cassette housing must be closed during normal operation to avoid any injury to personnel.
2. Release the emergency stop button and restart the ICONNMR run.

## 10.8.7 Other Cleaning Operations

---

For any other cleaning operations contact your authorized Bruker service station for advice and support. In some cases it may be necessary to send in the device for a cleaning service.

No special precautions have been taken with the device 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 involving toxic, radioactive, explosive, or biologically active substances, the device and associated equipment must be cleaned so that no danger emanates from the device and associated equipment. If a device has to be cleaned for safety reasons, contact your authorized service representative for advice and support.

Note that in serious cases it may be necessary for the owner to properly dispose of the device and replace it with a new one.

## Repair Declaration Form

When a device must be returned to Bruker and has been exposed to hazardous substances, a Repair Declaration Form(see Repair Declaration [▶ 175]) must be filled out and returned with the device.



## 11 Troubleshooting

This chapter describes the possible causes of errors, and the steps required to rectify them.

In the event of repeated errors, shorten the maintenance interval (see Maintenance Schedule [▶111]) in accordance with the actual sample load.

When a failure occurs during operation, the sample changer interrupts the current procedure and the red indicator lamp turns red. The touch screen will display an error message, including a code number with corresponding text. Write down the code number and complete error message. Also note the following information:

- The SampleXpress part number and serial number.
- Spectrometer type and order number.
- Magnet type.

Extract the device report file from the SampleXpress (see Device Report File [▶133]) and generate a TopSpin log file (see TopSpin Log File [▶135]).

Contact the Bruker customer service and provide them with this information (see Contact [▶147]).

Bruker should also be contacted in the event of errors which cannot be rectified in accordance with the instructions found in this chapter.



### Important

In case of errors always extract the Device Report File (see Device Report File [▶133]), BEFORE restarting the device.

## 11.1 Safety

### Electrical System



### WARNING

#### Electrical hazard from electrical shock!

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

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

## Securing to Prevent Restart

### **WARNING**



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

An uncontrolled restart may cause serious injuries or death.

1. Before a restart, ensure that the cause of the emergency stop has been rectified and that all safety devices are fitted and completely functional.
2. Do not unlock the EMERGENCY STOP button until the danger is no longer present.
3. For a software restart, the green Restart Button on the control panel display must also be pressed.

### **NOTICE**

#### **Restart after an error**

Before restarting the device after an error, make sure the samples are correctly positioned, for example, that no samples are stuck part way down into the magnet, or at an incorrect level in the cassette.



*Figure 11.1: Sample Stuck in the Magnet*



Figure 11.2: Sample Too Deep in the Cassette

## 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.

1. Ensure sufficient assembly space before starting work.
2. Pay attention to orderliness and cleanliness in the assembly location! Loosely stacked or scattered components and tools could cause accidents.
3. If components have been removed, pay attention to correct assembly, refit all fixing elements and comply with bolt tightening torques.
4. 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.

1. Shut off the device before accessing.



## Behavior in the Event of an Error

The following principles apply:

1. Immediately initiate an emergency stop in the event of errors posing an immediate danger to people or property.
2. Ascertain the cause of the error.
3. If error rectification requires work in the danger zone, shut down the device and secure to prevent restarting.
4. Immediately notify those responsible at the place of use about the error.
5. Depending on the nature of the error, have it rectified by authorized specialized personnel or rectify it yourself.

## 11.2 Error Indicators

The following touch panel and indicator lamps display device errors:

### 11.2.1 Touch Panel

**NOTICE**

**Error Message**

Contact Bruker customer service!

► In the event of a error, an error message may appear on the touch screen.

1. Do not use the device.
2. Contact Bruker customer service (see Contact [▶ 147]) and follow the instructions provided.

The error message code consists of 9 digits, in the following format: xxx.xxx.xxx.

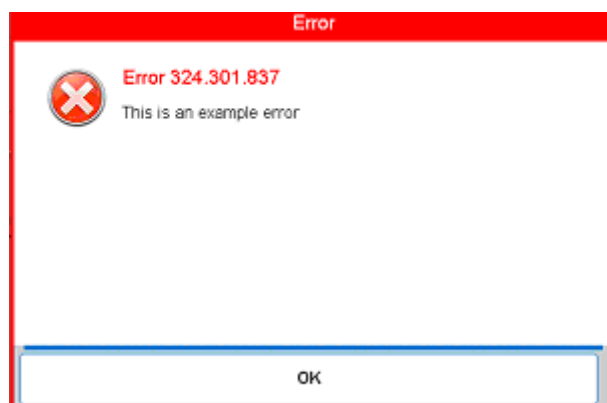


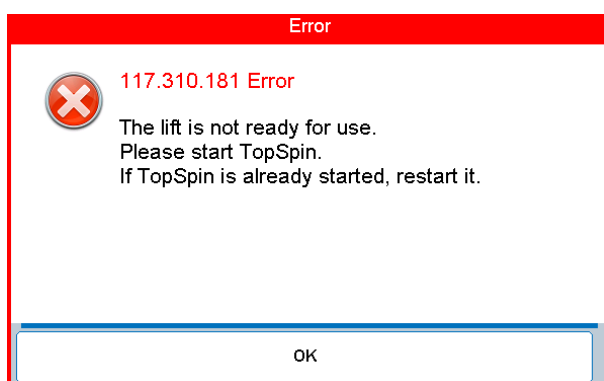
Figure 11.3: Error Message

## 11.2.2 Indicator Lamp

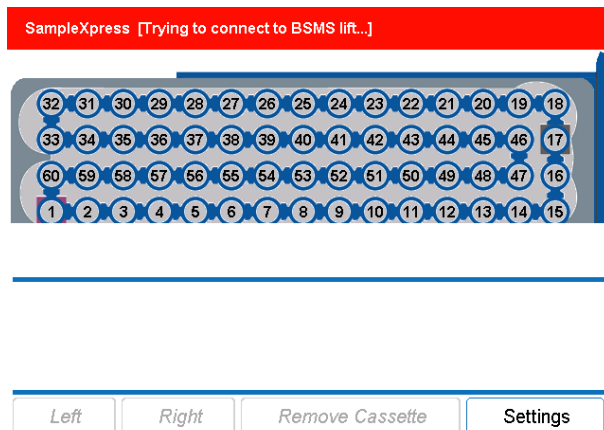
The indicator lamp indicates the various operating status using different colored light signals. Refer to the section Indicator Lamp [ 49] for details.

## 11.3 BSMS Lift

The SampleXpress controls the BSMS lift through TopSpin, therefore make sure that TopSpin is running before starting SampleXpress. When SampleXpress has been configured to work with the BSMS Lift it will try to connect to the BSMS lift after startup. When an error occurs and the connection cannot be established, the indicator lamp will turn red and the following error message appears on the screen:



If you click OK, the message will disappear, but the SampleXpress will remain in an error state and will keep trying to communicate with the BSMS lift.



If TopSpin was already running before the SampleXpress startup:

1. Close TopSpin
2. Wait 2 minutes (required because of some network timeouts).
3. Restart TopSpin.
4. Wait a maximum of 2 minutes for the SampleXpress to connect to the BSMS lift.

If the SampleXpress takes more than two minutes to connect to the BSMS lift, check the following:

- You are running TopSpin 3.1 pl4 or newer.
- SampleXpress is connected to the spectrometer Ethernet network. Check that you can open its Web pages (see chapter Accessing the Web Pages [ 95]).
- SampleXpress has been detected as an Ethernet Sample Changer during the last CF command in TopSpin.

If you are not sure, repeat the CF command and check, that in the configuration summary (at the very end of the CF wizard) the following information is displayed:

**1. Sample Changers at the spectrometer subnet**

**2. The SampleXpress is listed as BACS2\_H15000\_XXXX or BACS2\_H15000-01\_XXXX.**  
XXXX indicates the serial number.

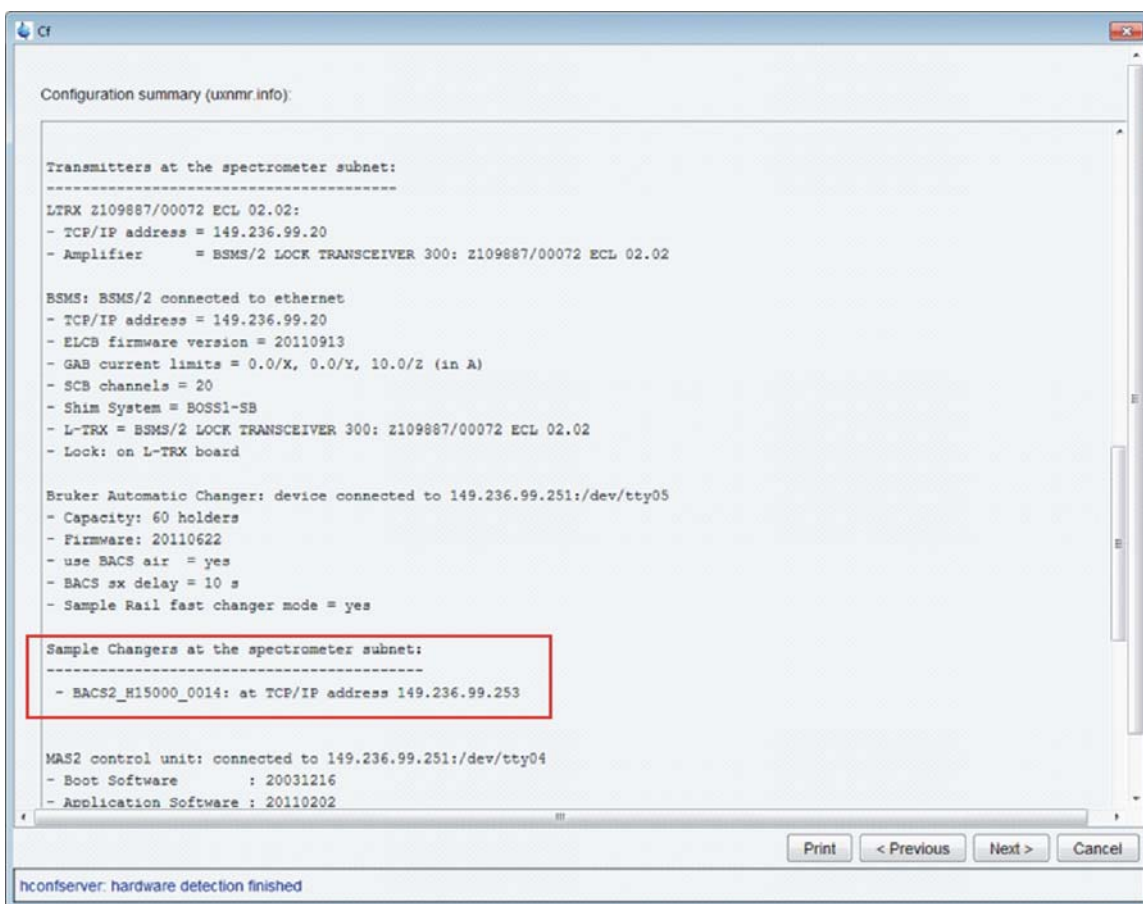


Figure 11.4: TopSpin CF Configuration Summary

- The firewall of the computer running TopSpin has not been changed since the last TopSpin installation. TopSpin setup program configures the firewall (if not rejected by the user).



**Important:** Do not make changes to the firewall configuration or disable the firewall without authorization from the laboratory supervisor and/or the IT department.

If the BSMS lift mode is still not working, contact BRUKER customer service and provide the following information:

- SampleXpress Device Report File [▶ 133]
- TopSpin Log File [▶ 135]

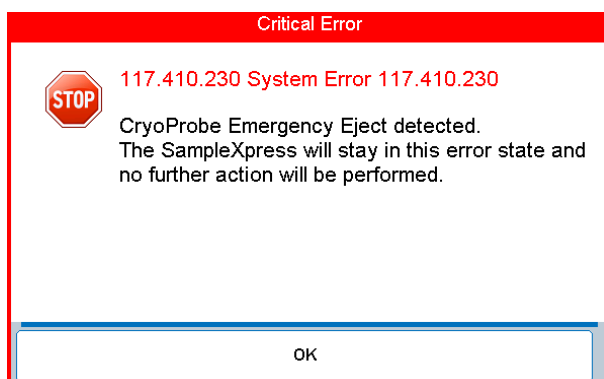
## 11.4 CryoProbe Emergency Eject

After the first sample has been transferred, the SampleXpress is able to detect the CryoProbe Emergency Eject.



**Important:** If you plan on using SampleXpress with a CryoProbe, first contact Bruker service and make sure that the sample down detection has been correctly configured. Otherwise the **CryoProbe Emergency Eject** detection will not work, which can lead to sample breakage.

When the CryoProbe Emergency Eject begins the SampleXpress will immediately stop any conveyor chain motion and display the following error message:

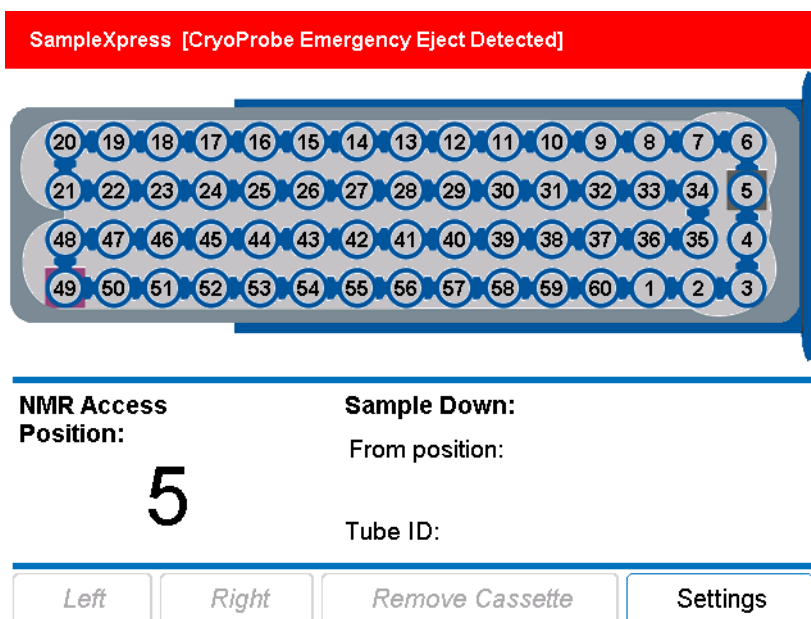


### NOTICE

#### Risk of Sample Breakage

DO NOT REMOVE THE CASSETTE! The sample has been lifted up to the bottom of the cassette by the Emergency Eject Lift. Removing the cassette will break the sample.

SampleXpress will stay in this error state even if you acknowledge the error:



## Procedure to recover the sample:

When the CryoProbe Emergency Eject occurs any chain motion will immediately stop. When the SampleXpress was moving the sample chain to another position when the stop occurs, it may be possible that either the sample chain is not positioned correctly above the BST, or the NMR access position is already occupied.



**Important:** Do not switch off or reboot the SampleXpress, a restart might automatically start a sample chain motion that will break the sample, which is hovering on the lift air with its top in the SampleXpress cassette!

When this situation occurs:

1. Wait until the CryoProbe has warmed up and the sample automatically goes down into the magnet, **or**, Load the sample down into the NMR magnet using the CryoProbe Control Panel. For more information refer to the CryoProbe System User Manual Z31551.
2. Switch off the SampleXpress and pull out the cassette.
3. Switch on the BSMS lift to eject the sample out of the magnet.

## 11.5 Sample Stuck

The device tried to insert/eject a sample without success. The sample cannot be detected down in the magnet or in the cassette. It must be stuck somewhere in the BST or cassette, see also the figure below. This information is stored in the non-volatile memory of the device, to ensure that even after a power off the device does not start any motion which could lead to sample glass tube breakage.

1. Look closely from the top of the cassette down into the BST. Use a mirror if you cannot look directly into the tube.
2. If you can see a sample try to get it down into the magnet, e.g. by opening the side cover of the cassette housing and jar the sample carefully.

3. Switch off the device and remove the cassette.
4. Eject the sample using the BSMS keyboard lift function.
5. Check if the sample is damaged and clean the BST and probe if necessary.
6. Close the cassette side cover.
7. Restart the device and confirm the Sample Stuck message.



*Figure 11.5: Sample Stuck in the Magnet*

## 11.6 Start-up Following Fault Rectification

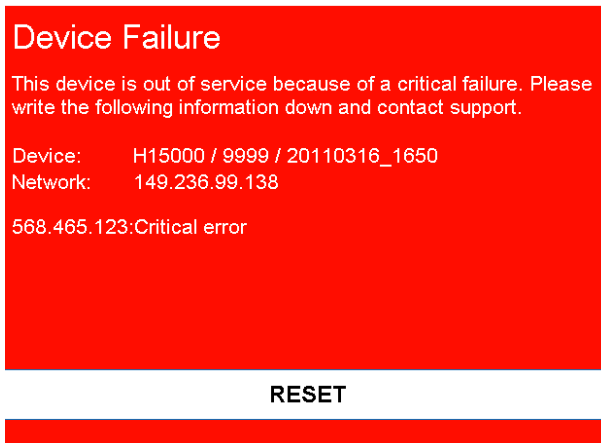
---

After rectifying an error, perform the following steps to restart the system:

1. Acknowledge the error at the controller.
2. Ensure that no persons are in the danger zone.
3. Reset the emergency stop devices.
  - ⇒ Screens appear on the touch screen.
  - ⇒ A new initialization will begin.

## 11.7 Device Failure

In case of a fatal error the indicator lamp turns red and the following screen is displayed:



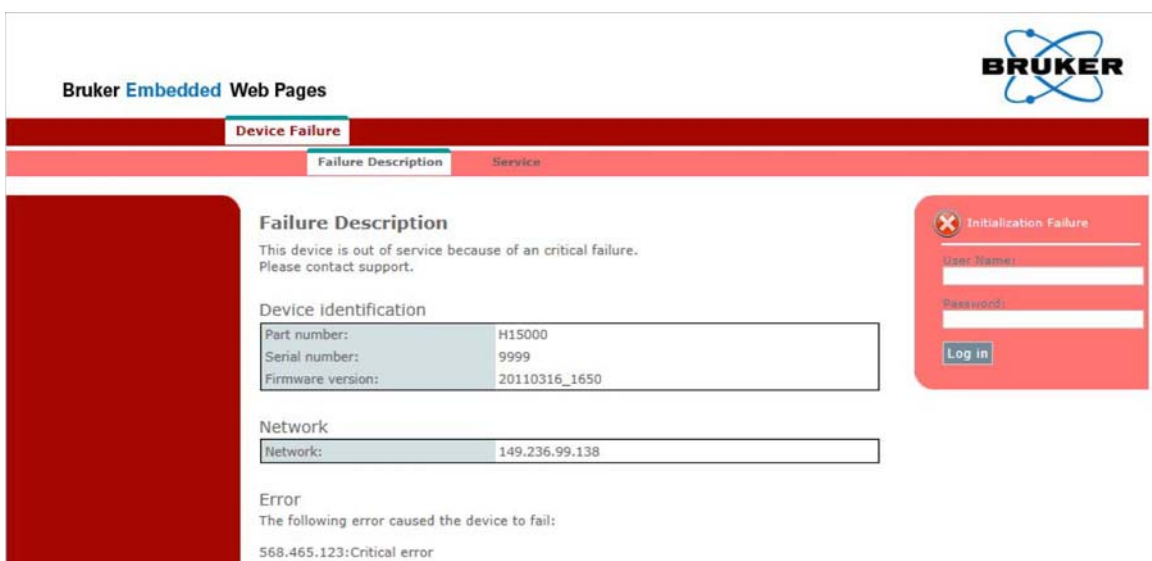
BEFORE trying to reset the SampleXpress write down the information displayed on the screen:

- Device identification information
- Network IP
- Error number (xxx.xxx.xxx)

Also make sure to export the device report using either an USB Stick or the Web Pages (see Device Report File [▶ 133]).



**Note:** To open the device Web page when a device failure occurs, open a browser and enter the network IP address, which is displayed on the control panel (see the figure above). The Web pages are different from the control panel display when no failure has occurred (see screenshot below). The instructions in the Device Report File From the Web Pages [▶ 135] are still valid.



Contact Bruker service (see Contact [▶ 147]) and provide the following information:

- The Device Report File [▶ 133].
- A TopSpin Log File [▶ 135].
- The information displayed on the control panel.

## 11.8 Device Report File

The device report file provides Bruker service with important information used for troubleshooting.

You can get the device report file using a USB Memory Stick or download it to the spectrometer computer using the SampleXpress web pages.



### Note:

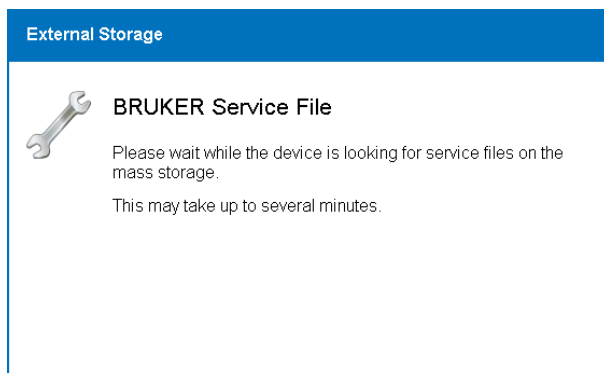
In failure mode the generation of the device report can be much slower than in normal operation.

### 11.8.1 With a USB Memory Stick

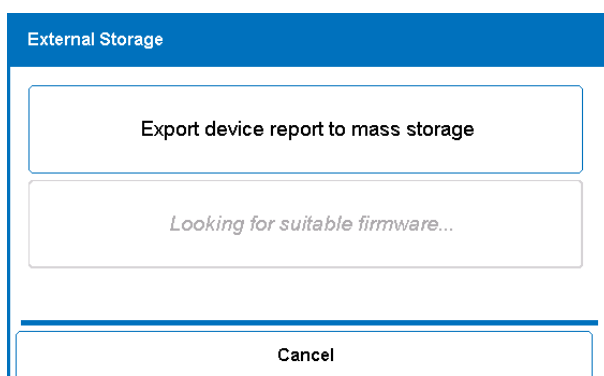
To download the Device Report File using a USB memory stick:

1. Plug a FAT32 formatted USB memory stick in the USB port on the SampleXpress control panel side. The stick should not be write protected and have at least 30 Mb of free space.

⇒ After a few seconds, the following screen will appear:



2. Wait until the screen switches to:

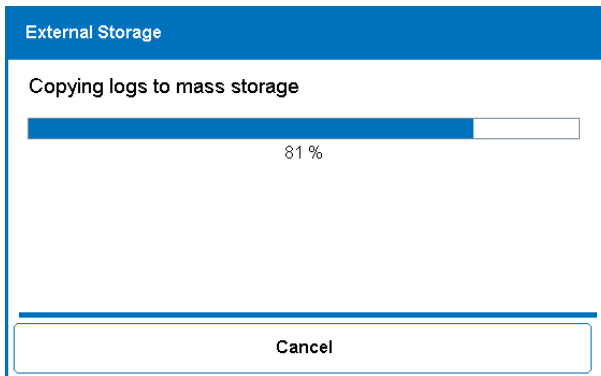


3. Click on **Export device report to mass storage**.

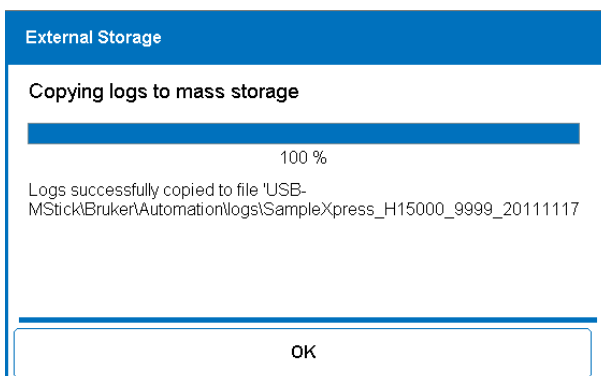
⇒ The device report file will be copied to the USB memory stick. This can take up to several minutes.



**Note:** The progression indicator is not time based and may appear to stop at a given percentage (especially at 90%), wait patiently until the file copy is finished.

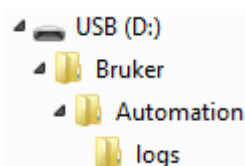


⇒ Once the report file has been successfully copied to the USB memory stick, the following screen is displayed, indicating where the file was copied to:



4. Click **OK** and unplug the USB Memory Stick.

During the download procedure the following folder structure is created on the USB Memory Stick if it does not exist, and the report file is copied into the **logs** folder.



The report file name is:

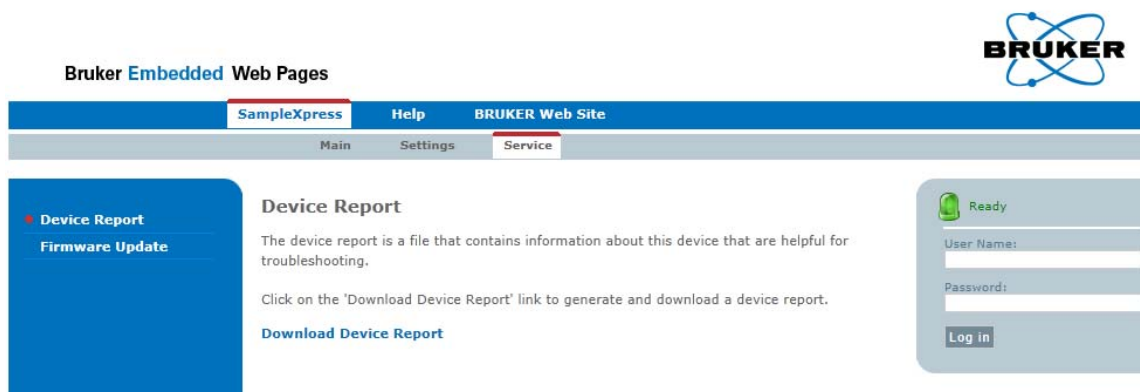
SampleXpress\_H15000-01\_XXXX\_DATE\_TIME.brukreport

The XXXX in the file name is the SampleXpress serial number.

## 11.8.2 From the Web Pages

To download the Device Report File from the Web pages:

1. Open the Web Pages as described in the chapter Accessing the Web Pages [▶ 95].
2. Click on **Service** in the main menu (gray horizontal bar)
  - ⇒ The Device Report page will be displayed:



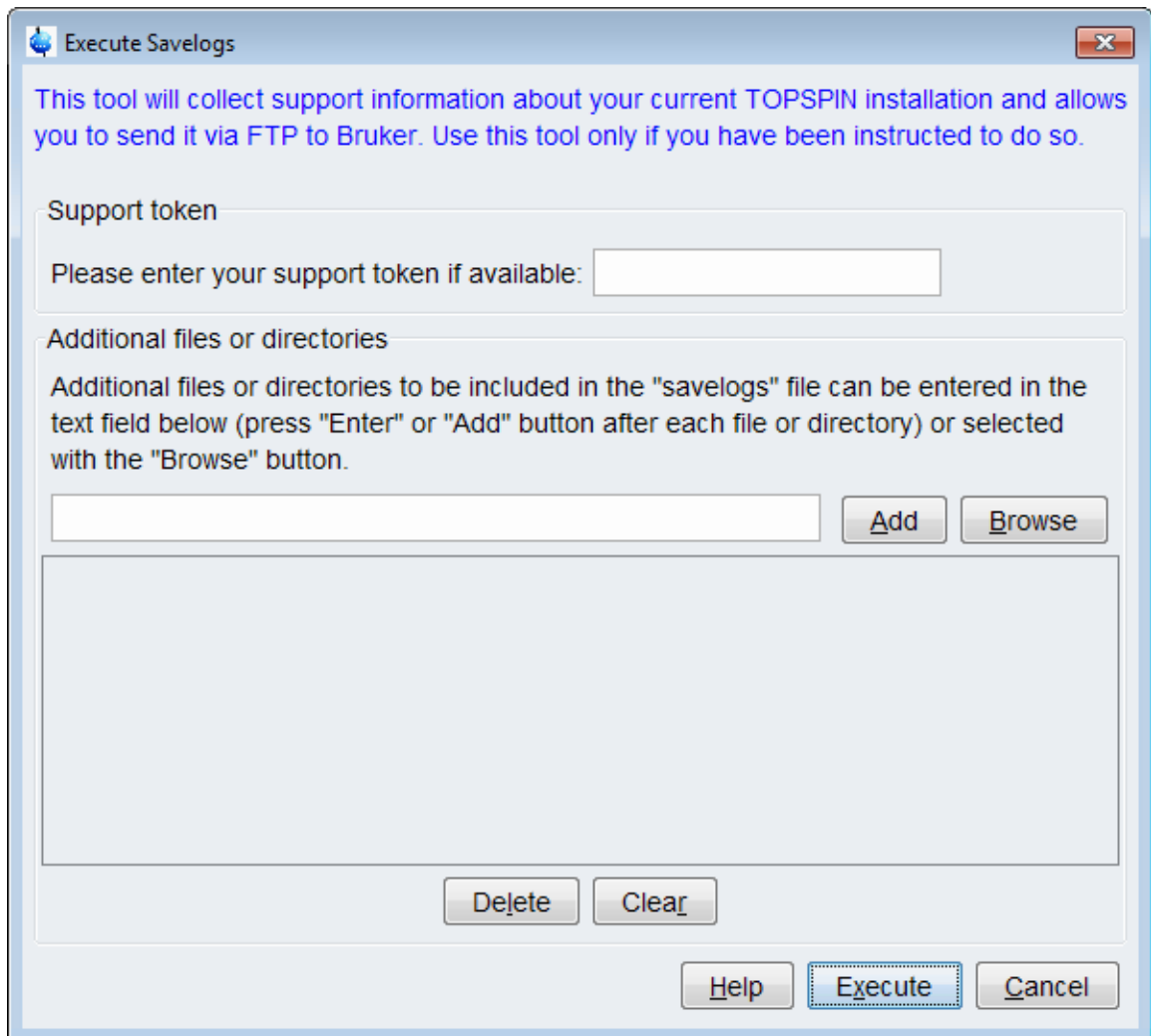
3. Click the link **Download Device Report**.
  - ⇒ After a short pause you will be queried on where to save the file.
4. Select the path where you want the file to be saved.

## 11.9 TopSpin Log File

The TopSpin log files are also required to troubleshoot errors that occur, especially when the SampleXpress was controlled by IconNMR or TopSpin. This section provides a brief description on how to obtain the TopSpin log files, for more detailed information refer to the TopSpin User Manual.

For more detailed instruction please refer to TopSpin User Manual.

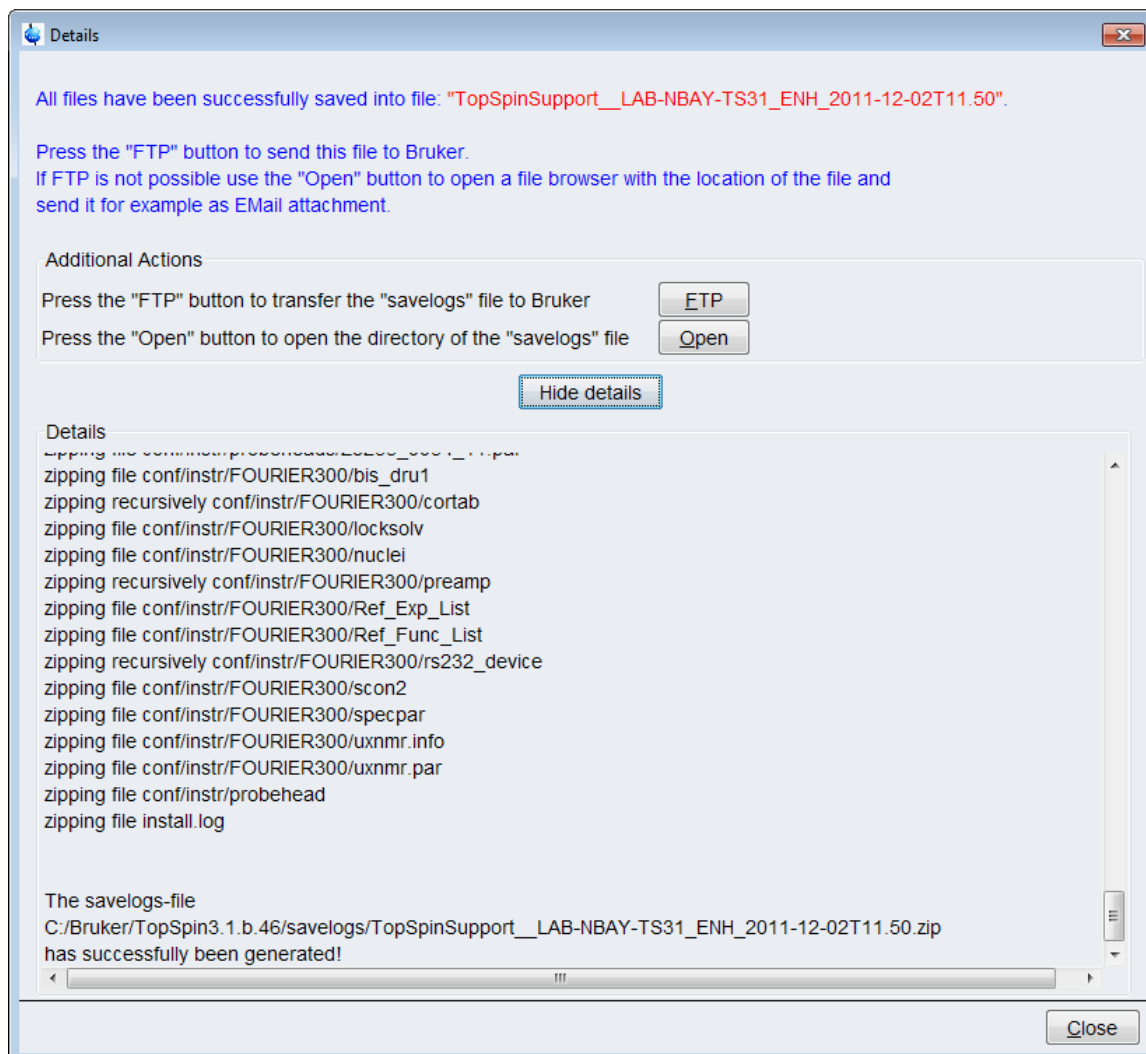
1. Enter **savelogs** on the TopSpin command line.
  - ⇒ The Execute Savelogs window will appear:



2. When Bruker service has provided a support token enter the support token text.

3. Click **Execute**.

⇒ The TopSpin log file will be prepared, when completed the following window will appear:



4. Click **Open** and locate the file named listed in the Details window.
5. Send this file with the device report file to Bruker service for use in troubleshooting.

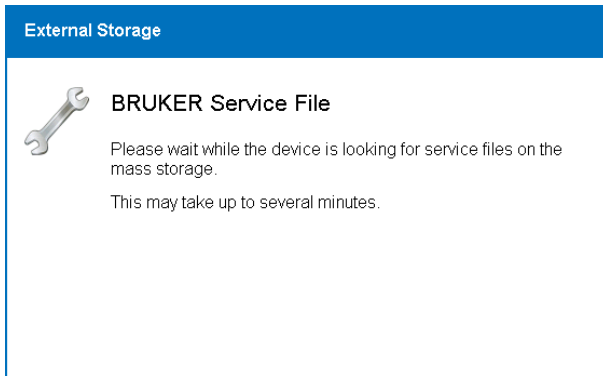
## 11.10 Service File

Some troubleshooting operations can be performed automatically through a **service file** from Bruker Service.

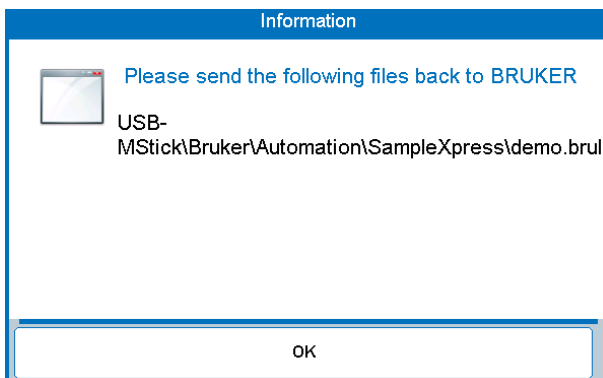
The service file can only be uploaded from a USB memory stick, it is not possible thru a Web page.

To perform the automatic troubleshooting operations through a service file:

1. Stop all automatic operations
2. Copy the service file to an FAT32 formatted USB memory stick. The memory stick should not be write protected.
3. Plug the USB memory stick in the USB port on the side of the SampleXpress control panel.
  - ⇒ After a few seconds, the following screen appears:



⇒ The automatic troubleshooting will be performed and the following screen displayed:



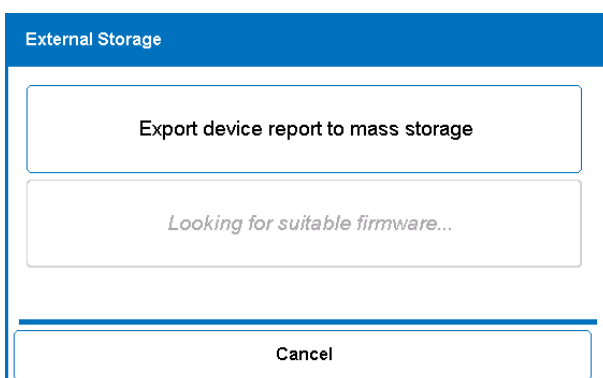
4. Click **OK** and unplug the USB memory stick.



**Important:** During the troubleshooting process SampleXpress will add information to the service file on the USB memory stick.

5. The updated service file on the USB memory stick must be returned to Bruker Service.

Exception: When the following message is displayed, the service file was not detected. In this case contact Bruker Service.



## 12 Error Codes

All the actors named in the following section (cassette clamp, guide, release and sample chain block) have two sensors for detecting the real system state: one sensor detects the inactive state and the other the active state of the corresponding actor. Physically it is never possible that both sensors are active at the same time, but during a malfunction the SampleXpress may produce errors.

If errors continue to occur after following the hints offered in the following section, you may need to exchange the corresponding sensors.

### 12.1 List of Error Codes

Error Code	Error Text	Error Description	Error Hints
103.310.004	Unknown Tube ID or position.	The requested Tube ID is not recognized by the device.	Check if there is a sample available in the sample pool with this Tube ID. Clean the barcode reader detection surface. Clean/replace the barcode collar used.
103.310.130	Unknown Tube ID.	The requested Tube ID is not recognized by the device.	Check if there is a sample available in the sample pool with this Tube ID. Clean the barcode reader detection surface. Clean/replace the barcode collar used.
103.310.001 103.310.005 117.310.021	Cassette is missing or could not be identified correctly.	The cassette is missing or the identification failed, the cassette cannot be used.	Check the electrical connection to the cassette. Replace the cassette with another one.
103.310.008	Invalid Tube ID.	The Tube ID format received from the reader is not consistent with the requested format. It has an invalid length and the Tube ID read will be ignored.	Clean the barcode reader detection surface. Clean/replace the barcode collar used.
103.310.007 103.310.098 103.310.151	Missing sample in magnet.	There is no sample in the magnet, the operation (e.g. Eject) requested cannot be executed.	Check if there is really no sample in the magnet.

Error Code	Error Text	Error Description	Error Hints
103.310.107 117.310.126	Missing empty position for security eject.	The cassette was searched for an empty position for executing a security eject attempt, but the cassette is completely filled.	<p>Activate Sample Down Detection Mode (Bruker service only).</p> <p>This allows a completely filled cassette to be added to the SampleXpress. Otherwise at least 1 empty position is needed in the cassette in order to execute a Security Eject of a potential sample in the magnet.</p>
103.310.012 103.310.032	Missing empty position.	The cassette was searched for an empty position for executing a security eject attempt, but the cassette is completely filled.	<p>Leave at least 1 empty position in the cassette.</p> <p>If the cassette is not filled completely, then clean the sensor surfaces.</p> <p>Adjust sample detection sensor threshold (Bruker service only).</p>
103.310.063 117.310.198	Sample Detect at magnet failed.	A sample was not detected in the magnet for the requested eject.	<p>Check if:</p> <p>There is really no sample in the magnet (or the sample down detection sensor threshold is set up not correctly).</p> <p>The lift air flow is strong enough to eject the sample back into the magazine.</p> <p>The sample detection sensors are working correctly.</p>
103.310.094 103.310.096 117.310.058 117.310.038 117.310.124 117.310.207	Missing empty position for eject.	The position where the sample from the magnet should be ejected to is occupied. Allow at least 1 empty position in the cassette.	<p>Check if there is really a sample in the position.</p> <p>Clean sensor surfaces.</p> <p>Adjust the sample detection threshold (Bruker service only).</p>
103.310.097	Sample from magnet was placed in position XX.	The source position of the sample in the magnet is unknown.	
103.310.099 103.310.100 103.310.101	Source position not empty.	The position in the cassette from where the sample was inserted into the magnet is occupied.	Do not fill the position from the sample down into the magnet.
103.310.103	Source position not empty, no other empty position found.	The position in the cassette from where the sample was inserted into the magnet is occupied and there is no other empty position available.	Do not fill the position from the sample down into the magnet.

## Error Codes

Error Code	Error Text	Error Description	Error Hints
103.310.131 103.310.134 103.310.136	Missing empty position.	There is no empty position in the cassette for the requested operation.	Leave at least 1 empty position in the cassette. If the cassette is not filled completely, then clean the sensor surfaces. Adjust the sample detection threshold (Bruker service only).
103.310.123 103.310.124 103.310.125 103.310.126 103.310.127 103.310.128	Missing Cassette.	There is no cassette available to execute the requested operation.	Insert a cassette into the SampleXpress to allow full functionality of the device.
103.310.143 103.310.144 117.310.209	Magnet already occupied.	There is already a sample down in the magnet. Inserting further samples is prohibited.	Check if there is really no sample in the magnet. Adjust the sample detection sensor threshold (Bruker service only).
103.310.148	Tube ID changed unexpectedly for position XX. Already registered: XXX - New Read: YYY	The Tube ID for this position was read in the past and has now changed unexpectedly to another Tube ID.	Check the barcode collar Tube ID. Clean the barcode reader detection surface. Clean/replace the barcode collar.
103.310.149	Insufficient air pressure.	The pressure supply fell below 3.0 bars. Device has been halted and all pneumatic valves have been switched off.	Check the main air pressure supply.
117.310.020	Emergency Stop active.	The emergency stop button is currently activated.	Be sure that the device and all of its samples are in a secure state before you release the emergency stop button and restart the device.
117.310.022 117.310.023 117.310.024 117.310.025 117.310.113 117.310.115 117.310.116 117.310.117	Moving to destination position failed.	The requested destination position could not be reached.	Check if something (e.g. broken glass tubes) blocks the sample conveyor chain motion.

Error Code	Error Text	Error Description	Error Hints
117.310.028 117.310.030 117.310.121 117.310.199 117.310.200	Sample hovering failed.	The sample could not be detected hovering at the lift air flow.	Check the sensor operation and clean the sensor detection surface.
117.310.029 117.310.206	Open Guide failed.	The movable half shell of the guide did not reach its open position.	Check the guide operation manually.
117.310.031 117.410.065 117.410.143 117.410.144	Sensor Error: Sample hovering without lift.	A sample was detected to be hovering without the lift being activated.	Check the sensor operation. Clean the sensor detection surface.
117.310.032	Security Eject failed.	A sample was detected in the magnet but could not be placed back into the magazine.	Check if the sensors are working. Adjust the sample detection sensor threshold (Bruker service only).
117.310.033	Security Eject failed.	A sample was detected in the magazine but was expected to be in the magnet.	Check if the sensors are working. Adjust the sample detection sensor threshold (Bruker service only).
117.310.034 117.310.210 117.310.212	Activate release failed.	The sample release lever could not be activated to insert the sample into the magnet.	Check if the sample conveyor chain link release lever at this position is working correctly.
117.310.037 117.310.081 117.310.082 117.310.205	Insert failed.	The sample could not be inserted into the magnet, e.g. was not detected down in the magnet.	Check if the sample gets stuck somewhere on its way down into the magnet. Adjust the sample down detection sensor (Bruker service only).
117.310.039 117.310.201	Sample Detect at Magazine failed.	The sample was ejected from the magnet, but was not detected in the magazine.	Check if there is really a sample in the magnet. Adjust the sample down detection sensor threshold (Bruker service only). Clean the sensor detection surfaces and adjust the sensor detection threshold (Bruker service only).
117.310.067	No more measured samples available.	There are no more samples in the sample pool which are marked as „measured“.	
117.310.111 117.310.204	Adapting cassette failed.	The cassette could not be adapted successfully.	Try again.

## Error Codes

Error Code	Error Text	Error Description	Error Hints
117.310.112	Closing clutch failed.	The mechanical adaptation of the driving unit failed, and as a result the clutch could not be closed.	Try again. Use another cassette.
117.310.114	Open Cassette Clamp failed.	The cassette clamp which fixes the cassette could not be opened successfully.	Lift the front of the cassette a few millimeters and try again.
117.310.118 117.310.197	Close Guide failed	The movable shell half of the guide did not reach its closed position.	Check guide operation manually. Check if chain position is really correct. Check if something (e.g. broken samples) prevents smooth guide motion.
117.310.122 117.310.213	Deactivate Release failed.	The sample release lever could not be deactivated.	Check if sample conveyor chain link release lever is working correctly at this position.
103.310.145 117.310.123 117.310.208	Sample missing at Insert Position.	The requested insert position is empty.	Check if there is really no sample in this position. Clean the sensor surfaces. Adjust the sample detection sensor threshold (Bruker service only).
117.310.254	Sample Down After Eject	A sample has been ejected but one is still detected down in the magnet.	Switch off the SampleXpress and remove the cassette. Switch on the BSMS lift and remove the sample from the magnet.
117.310.256	Sample Stuck	A Sample might be stuck in the BST.	See also the chapter Sample Stuck [▶ 130].
117.410.011	Sensor Error: Cassette: both sensors active!	The internal plausibility check for the sensors failed. The system stopped to prevent damage to the equipment.	Contact Bruker about replacing the defective parts.
117.410.012	Sensor Error: Clutch: both sensors active!	The internal plausibility check for the sensors failed. The system stopped to prevent damage to the equipment.	Contact Bruker about replacing the defective parts.
117.410.013	Sensor Error: Cassette Clamp: both sensors active!	The internal plausibility check for the sensors failed. The system stopped to prevent damage to the equipment.	Contact Bruker about replacing the defective parts.

Error Code	Error Text	Error Description	Error Hints
117.410.014	Sensor Error: Sample Guide: both sensors active!	The internal plausibility check for the sensors failed. The system stopped to prevent damage to the equipment.	Contact Bruker about replacing the defective parts.
117.410.015	Sensor Error: Sample Release: both sensors active!	The internal plausibility check for the sensors failed. The system stopped to prevent damage to the equipment.	Contact Bruker about replacing the defective parts.
117.410.016	Sensor Error: Sample Chain Block: both sensors active!	The internal plausibility check for the sensors failed. The system stopped to prevent damage to the equipment.	Contact Bruker about replacing the defective parts.
117.310.202	Lift Error	The lift did not turn off within the expected time.	<p>If the lift is still on: Try turning the lift off using the BSMS keyboard or the BSMSDISP command in TopSpin. If successful, restart the device.</p> <p>If unsuccessful: Restart SampleXpress by pressing the power button 2 times., then use the BSMS keyboard or the BSMSDISP command in TopSpin to switch the lift off.</p> <p>Otherwise, if the error message comes up and the lift is turned off: Restart the SampleXpress.</p>
117.310.203	Sample is still in the magazine	The sample is expected to be down but is still detected in the magazine.	Contact Bruker service.
117.410.230	CryoProbe Emergency Eject Detected	The CryoProbe initiated an emergency eject.	See chapter CryoProbe Emergency Eject [▶ 129].

# 13 Dismantling and Disposal

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



Installation, initial commissioning, retrofitting, repairs, adjustments or dismantling of the device must only be carried out by Bruker Service or personnel authorized by Bruker.

## 13.1 Safety

### WARNING



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

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

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

### 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.

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

## 13.2 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.

## 13.3 Disposal

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If no return or disposal agreement has been made with Bruker, dispose of the dismantled components according to local recycling guidelines. In general these include:

- Scrap metals.
- Plastic components.
- 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.

1. Always observe the instructions below regarding handling and disposal of pollutants.
2. 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.

# 14 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)



# 15 Appendix A

## 15.1 English: Safety Notices



Installation, initial commissioning, retrofitting, repairs, adjustments or dismantling of the device must only be carried out by Bruker Service or personnel authorized by Bruker.

### CAUTION



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

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

1. Do not look into the ray of light.
2. 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.

1. Clean the device before maintenance work and/or returning to Bruker for repair.
2. Prepare a list of materials in which the device came into contact with or measured.
3. 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.

1. If necessary, assemble/disassemble the device in multiple parts.
2. Use a platform with railings instead of a ladder to reach the assembly area.
3. Avoid working over the head. When this can not be avoided, wear a protective hard hat.
4. 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.

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

 **CAUTION****Accident hazard from hazardous materials!**

An allergic reaction may be caused by sample substances.

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

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

Samples or the device 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.

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

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

Impacting the magnet may result in a quench.

1. Mount the device carefully on the magnet.
2. 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.

1. Use a platform with railings instead of a ladder to reach the assembly area.
2. Wear 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.

1. Use only dummy samples during installation and maintenance.

## WARNING



### Accident hazard from asphyxiation!

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

1. An oxygen warning device should be present in the laboratory if the device is operated with nitrogen.
2. 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.

1. Turn off the device during magnet servicing.
2. Cover the device with a protective cover to avoid contact with cold gases.
3. Be sure to use sufficient transfer line and Teflon evacuation hose for nitrogen and helium refills based on recommendations in the magnet manual.
4. 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.

1. Shut off the device before accessing.

## CAUTION



### Accident hazard from loose clothing or long hair becoming caught in magazine chain!

Wearing loose clothing or long hair around the magazine chain may result in the clothing or hair being pulled into the magazine chain causing injury.

1. Do not wear loose clothing or jewelry in the vicinity of the magazine chain.
2. Long hair should be tied back, or placed in a hair net or cap, while working around the magazine chain.

**CAUTION****Accident hazard from contact with hot or cold surfaces on the cassette!**

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

1. Do not touch cassette parts of cooled or heated cassettes.
2. Do not use damaged cassettes.
3. After removing a cassette allow it to cool or thaw before coming in contact.

**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.

1. If a glass tube breaks, refer to the corresponding precautions and cleaning/disinfection instructions.
2. Wear protective equipment.
3. Perform all tasks with the cassette and glass tubes carefully.
4. Before carrying out any maintenance work, remove the samples and use dummy samples if necessary.
5. Strictly observe the correct sample adjustment, i.e. the maximum sample height.
6. Always transport the cassette with the cover. Never turn the cassette upside down or on it's side.
7. **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 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.

1. Replacement parts must meet OEM standards.

## NOTICE

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

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

1. Follow instructions provided in the manual for correct handling of solvents.
2. Follow the sensor cleaning procedures described in this manual.
3. 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.

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

## CAUTION



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

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

1. Ensure that personnel are aware of this risk.
2. 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.

1. Unauthorized persons must be kept away from the danger and working zone.
2. If in doubt, address the persons in question and ask them to leave the danger and working zone.
3. 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 slip or trip, resulting in personal injuries.

1. Always keep the work area clean.
2. Remove objects which are no longer required from the work area and particularly from the floor.
3. 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.

1. Before working on the specified components, ensure that they have been completely disconnected from the power supply.
2. 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.

1. Work on the pneumatics system must only be carried out by trained pneumatics technicians.
2. 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.

1. Persons fitted with heart pacemakers must be kept away from the appliance. The functionality of the heart pacemaker could be compromised.
2. Persons with metal implants must be kept away from the appliance. Implants may heat up or be subject to magnetic attraction.
3. 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.
4. Remove magnetic items (jewelry, watches, pens etc.) before carrying out maintenance work.
5. Keep electronic equipment away from the magnetic source. Such equipment could be damaged.
6. 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.

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



## **WARNING**

### **Danger to life from nonfunctional safety devices!**

If safety devices are not functioning or are disabled, there is a danger of serious injury or death.

1. Check that all safety devices are fully functional and correctly installed before starting work.
2. Never disable or bypass safety devices.
3. Ensure that all safety devices are always accessible.



## **WARNING**

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

An uncontrolled restart may cause serious injuries or death.

1. Before a restart, ensure that the cause of the emergency stop has been rectified and that all safety devices are fitted and completely functional.
2. Do not unlock the EMERGENCY STOP button until the danger is no longer present.
3. For a software restart, the green Restart Button on the control panel display must also be pressed.



**⚠ 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.

1. Before the initial commissioning of the device, 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.

1. Always observe the instructions below regarding handling and disposal of pollutants.
2. 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.

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

**⚠ CAUTION****Accident Hazard from Removal of the Cassette Side Cover and Reaching into the Conveyor Chain!**

Removal of the cassette side cover and deliberate reaching into the danger zone can result in injured fingers.

1. Do not reach into the conveyor chain!
2. Only operate the device with closed cassette side cover!
3. Press the emergency stop button before opening the cassette side cover!
4. Notice the labels when removing the side cover!

## WARNING



### **Danger of injury from improper handling of the drop-off plate**

If the drop-off plate is not free from any cables, there is a danger of serious injury or death.

1. Do not place cables above the drop-off plate!
2. After a pressure release of the drop-off plate send the device back to Bruker.

#### See also

 English: Safety Notices [▶ 149]

## 15.2 Avertissements De Sécurité



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.

1. Ne regardez pas dans le rayon de lumière.
2. 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.

1. Nettoyez l'appareil avant d'effectuer les tâches de maintenance et/ ou de retourner l'appareil à Bruker pour réparation.
2. Préparez une liste des matières avec lesquelles l'appareil a été en contact ou pour lesquelles l'appareil a effectué des mesures.
3. 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 "retrofit" ou du désassemblage, entraînant un risque de blessures aux personnes ou de dommages à l'équipement.



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

**NOTIFICATION****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.

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

**⚠ ATTENTION****Risque d'accident lié aux matières dangereuses !**

Les substances échantillonnées peuvent provoquer des réactions allergiques.



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

**NOTIFICATION****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.

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

### NOTIFICATION

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

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

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

### NOTIFICATION

#### 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.

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

### NOTIFICATION

#### 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.

1. 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.

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



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

Le débordement de cryogènes peut endommager le matériel.

1. Eteignez l'appareil pendant les opérations d'entretien de l'aimant.
2. Recouvrez l'appareil avec un capot de protection pour éviter tout contact avec des gaz froids.
3. 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.
4. 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.

1. Eteignez l'appareil avant d'intervenir dessus.

**! ATTENTION****Risque d'accident à cause de vêtements trop amples ou de cheveux longs pris dans la chaîne du magasin !**

Vous risquez d'être blessé si vous portez des vêtements amples et les cheveux longs. Ils risquent d'être happés par la chaîne du magasin.

1. Ne portez pas de vêtements amples, ni de bijoux si vous travaillez à proximité de la chaîne du magasin.
2. Toutes les personnes portant les cheveux longs doivent rester à distance de la chaîne du magasin.

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

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

1. Ne portez pas la main sur les parties refroidies ou échauffées des cassettes.
2. N'utilisez pas de cassette endommagée.
3. Après avoir retiré une cassette, laissez-la refroidir ou dégeler avant d'y porter la main.

## NOTIFICATION

### **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.

1. 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.

1. Si un tube en verre se casse, référez-vous aux précautions de sécurité et aux instructions de nettoyage/ désinfection correspondantes.
2. Portez des équipements de protection.
3. Effectuez avec précaution toutes les opérations impliquant la carousel et les tubes en verre.
4. Avant d'effectuer toute tâche de maintenance, retirez les échantillons et, si nécessaire, utilisez des échantillons factices.
5. Respectez scrupuleusement les indications pour le réglage de la hauteur maximum d'échantillon.
6. Transportez toujours la carousel avec son couvercle. Ne tournez jamais la carousel sur un côté et ne la retournez pas tête en bas.
7. **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.



**NOTIFICATION****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.

1. Suivez les instructions fournies dans le manuel pour savoir comment manipuler correctement les solvants.
2. Respectez les procédures de nettoyage de la sonde décrites dans ce manuel.
3. 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.

1. N'utilisez pas d'escabeau.
2. Utilisez une plateforme approuvée pour atteindre l'appareil sur l'aimant.
3. 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.

1. Veillez à ce que le personnel soit sensibilisé à ce risque.
2. 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.

1. Les personnes non autorisées doivent être tenues à l'écart de la zone de danger et de la zone de travail.
2. En cas de doute, adressez-vous aux personnes en question et demandez-leur de quitter la zone de danger et la zone de travail.
3. Cessez de travailler si des personnes non autorisées pénètrent dans la zone de danger et la zone de travail. Unauthorized persons must be kept away from the danger and working zone.

### 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.

1. Maintenez toujours la zone de travail propre.
2. Retirez de la zone de travail tous les objets qui n'y sont plus indispensables et dégagez plus particulièrement le sol.
3. 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.

1. Avant de travailler sur les composants spécifiés, veuillez 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.

1. Les opérations réalisées sur le système pneumatique ne doivent être effectuées que par des techniciens en pneumatique dûment formés.
2. Avant de commencer toute intervention sur le système pneumatique, veuillez 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.

1. Les personnes dotées d'un stimulateur cardiaque doivent être tenues à l'écart de l'appareil. Le fonctionnement du stimulateur cardiaque pourrait être compromis.
2. 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.
3. 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.
4. Débarrassez-vous de tous les objets magnétiques (bijoux, montres, crayons, etc.) avant d'effectuer toute tâche de maintenance.
5. Conservez les équipements électroniques à bonne distance de la source magnétique. Ces équipements pourraient être endommagés.
6. 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.

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



**WARNING**
**Danger de mort à cause de dispositifs de sécurité inopérants !**

Si les dispositifs de sécurité ne fonctionnent pas ou sont désactivés, il y a danger de blessure grave ou de mort.

1. Vérifiez que tous les dispositifs de sécurité sont totalement fonctionnels et correctement installés avant de commencer à travailler.
2. Ne désactivez jamais les dispositifs de sécurité et ne les bypassiez pas.
3. Veillez à ce que l'ensemble des dispositifs de sécurité soient à tout moment accessibles.



### **WARNING**

#### **Danger de mort à cause d'une remise en route non contrôlée !**

La remise en route non contrôlée de l'appareil peut causer des blessures graves ou la mort.

1. Avant toute remise en route, veillez à ce que la cause de l'arrêt d'urgence soit totalement rectifiée. Veillez également à ce que l'ensemble des dispositifs de sécurité soient installés et complètement opérationnels.
2. Déverrouillez le bouton ARRET D'URGENCE seulement si tout danger est écarté.
3. En cas de remise en route logicielle, il faut également appuyer sur le bouton vert "Restart" situé sur l'afficheur du panneau de commande.



### **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.

1. 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.



### **NOTIFICATION**

#### **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.

1. Respectez toujours les instructions ci-dessous concernant la manipulation et l'élimination des polluants.
2. 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.

1. Menez à bien toutes les phases opératoires de l'appareil en vous conformant aux spécifications et instructions contenues dans ce manuel.
2. 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.
3. Ne désactivez jamais les dispositifs de sécurité pendant le fonctionnement de l'appareil. Ne les bypassiez pas.



**! ATTENTION****Risque d'accident lors de l'ouverture d'un couvercle latéral de la cassette et lors de l'accès à l'intérieur de la chaîne du magasin.**

Enlever un couvercle latéral de la cassette et délibérément accéder à l'intérieur de la zone de danger peut entraîner des blessures aux doigts.

1. Ne pas accéder à l'intérieur de la chaîne du magasin.
2. N'utiliser l'appareil qu'avec une cassette dont les côtés sont fermés par les couvercles.
3. Enfoncer le bouton d'arrêt d'urgence avant d'ouvrir un côté de la cassette.
4. Tenir compte des indications sur les étiquettes lorsque vous enlevez un couvercle.

**! AVERTISSEMENT****Risque de blessure suite à une mauvaise manipulation de la « Drop Off Plate »**

La présence de câbles sûr et/ou au-dessus de la Drop Off Plate peut causer de graves blessures ou entraîner la mort.

1. Ne pas placer de câbles sûr et/ou au-dessus de la Drop Off Plate.
2. Une fois la pression relâchée par la Drop Off Plate, renvoyer l'appareil à Bruker.

**See also**

 English: Safety Notices [▶ 149]

**15.3 Sicherheitshinweise**

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.

**! 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.

1. Blicken Sie nicht in den Lichtstrahl.
2. 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.



1. Reinigen Sie das Gerät vor allen Wartungsarbeiten bzw. bevor Sie es zur Reparatur an Benutzer einsenden.
2. Erstellen Sie eine Liste der Stoffe, mit denen das Gerät in Berührung gekommen ist oder an denen Messungen vorgenommen worden sind.
3. 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.



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

## **HINWEIS**

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

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

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

## **VORSICHT**

### **Unfallgefahr durch Gefahrstoffe!**

Bestimmte Probensubstanzen können allergische Reaktionen auslösen.



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

**HINWEIS****Gefahr von Sachschäden durch Softwarefehler!**

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

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

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

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

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

**HINWEIS****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.

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

**HINWEIS****Gefahr von Sachschäden durch unbeabsichtigte Bewegung der Proben!**

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

1. 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.

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



## HINWEIS

### **Gefahr von Sachschäden durch überlaufendes Kühlmittel!**

Gefahr von Sachschäden durch überlaufendes Kühlmittel.

1. Schalten Sie das Gerät während Servicearbeiten am Gerät aus.
2. Decken Sie das Gerät mit einer Schutzabdeckung ab, um die Berührung mit kalten Gasen zu vermeiden.
3. 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.
4. 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.

1. Schalten Sie das Gerät ab, bevor Sie hinein greifen.

## **CAUTION**



### **Unfallgefahr durch Verfangen lose hängender Kleidungsstücke oder langer Haare in der Magazinkette!**

Falls in der Nähe der Magazinkette mit lose herabhängenden Kleidungsstücken oder langen Haaren gearbeitet wird, besteht Verletzungsgefahr dadurch, dass Haare oder Kleidungsstücke in die Magazinkette geraten.

1. Tragen Sie bei Arbeiten in der Nähe der Magazinkette keine lose herabhängende Kleidung oder Schmuckstücke.
2. Personen mit langen Haaren sollten sich nicht in der Nähe der Magazinkette aufhalten.

## **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.

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

**HINWEIS****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.

1. 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.

1. Falls ein Glasbehälter zerbricht, beachten Sie bitte die entsprechenden Anweisungen zu Vorsichtsmaßnahmen und zur Reinigung bzw. Desinfektion.
2. Tragen Sie geeignete Schutzausrüstung.
3. Gehen Sie bei allen Arbeiten mit Kassette und Glasbehältern besonders vorsichtig vor.
4. Entfernen Sie vor allen Wartungsarbeiten noch vorhandene Proben und verwenden Sie bei Bedarf Dummy-Proben.
5. Beachten Sie unbedingt die Angaben zur korrekten Einstellung der Proben, d.h. die maximale Probenhöhe.
6. Transportieren Sie die Kassette nur mit der Abdeckung. Stellen Sie die Kassette nicht auf den Kopf und drehen Sie sie nicht auf die Seite.
7. **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.

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

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

1. Beachten Sie die Anweisungen im Handbuch zur korrekten Handhabung der Lösungsmittel.
2. Beachten Sie die Beschreibung zur Reinigung des Sensors im Handbuch.
3. 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.

1. Benutzen Sie keine Leiter.
2. Benutzen Sie stattdessen eine zugelassene Arbeitsbühne, um das Gerät am Magneten zu erreichen.
3. 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.

1. Sorgen Sie dafür, dass den Mitarbeitern diese Gefahr bewusst ist.
2. 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.

1. Nicht autorisierte Personen dürfen keinen Zugang zum Gefahren- und Arbeitsbereich erhalten.
2. Sprechen Sie die fraglichen Personen im Zweifelsfall an und fordern Sie sie auf, den Arbeits- und Gefahrenbereich zu verlassen.
3. 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.

1. Halten Sie den Arbeitsbereich jederzeit sauber.
2. Entfernen Sie alle Gegenstände, die nicht mehr benötigt werden, aus dem Arbeitsbereich und insbesondere vom Boden.
3. 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.

1. Prüfen Sie vor Arbeiten an den angegebenen Komponenten, ob diese vollständig von der Spannungsversorgung getrennt worden sind.
2. 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.

1. Arbeiten an den Druckluftsystemen dürfen nur von geschulten Pneumatiktechnikern ausgeführt werden.
2. 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.

1. Personen mit Herzschrittmachern dürfen sich nicht in der Nähe der Anlage aufhalten. Die Funktion der Herzschrittmacher könnte beeinträchtigt werden.
2. Personen mit Implantaten aus Metall dürfen sich nicht in der Nähe der Anlage aufhalten. Die Implantate könnten sich erwärmen oder vom Magnetfeld angezogen werden.
3. 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.
4. Legen Sie vor allen Wartungsarbeiten magnetische Gegenstände (Schmuck, Uhren, Schreibgeräte usw.) in sicherer Entfernung ab.
5. Bringen Sie keine elektronischen Geräte in die Nähe des Magnetfelds. Diese Geräte könnten beschädigt werden.
6. 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.

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

## **WARNUNG**



### **Lebensgefahr durch nicht funktionierende Sicherheitseinrichtungen!**

Falls Sicherheitseinrichtungen nicht funktionieren oder außer Funktion gesetzt werden, besteht die Gefahr schwerer oder sogar tödlicher Verletzungen.

1. Prüfen Sie vor Beginn der Arbeit, dass alle Sicherheitseinrichtungen korrekt installiert sind und einwandfrei arbeiten.
2. Sicherheitseinrichtungen dürfen in keinem Fall blockiert oder umgangen werden.
3. Sorgen Sie dafür, dass alle Sicherheitseinrichtungen ständig zugänglich sind.

## **WARNUNG**



### **Lebensgefahr durch unkontrollierten Wiederanlauf!**

Bei einem unkontrollierten Wiederanlauf besteht die Gefahr schwerer oder sogar tödlicher Verletzungen.

1. Prüfen Sie vor dem Wiedereinschalten, dass die Ursache der Notabschaltung behoben worden ist, dass alle Sicherheitseinrichtungen vorhanden sind und dass diese einwandfrei funktionieren.
2. Entriegeln Sie die NOT-AUS-TASTE erst dann, wenn keine Gefahr mehr besteht.
3. Für einen Neustart der Software muss außerdem die grüne Neustart-Taste auf dem Bedienfeld gedrückt werden.

## **WARNUNG**



### **Lebensgefahr durch Berührungsspannung!**

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

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

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

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

1. Beachten Sie grundsätzlich die nachstehenden Anweisungen, bevor Sie Gefahrstoffe handhaben oder entsorgen.
2. 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.



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

**! VORSICHT****Vorsicht: Unfallgefahr beim Entfernen der Kassetten-Seitenabdeckung und Hineingreifen in die Kettenbahn!**

Entfernen der Kassetten-Seitenabdeckung und Hineingreifen in die Gefahrenzone kann zu Verletzung der Finger führen.



1. Greifen Sie nicht in die Kettenbahn!
2. Betreiben Sie das Gerät nur bei geschlossener Kassetten-Seitenabdeckung!
3. Drücken Sie die NOT-AUS-TASTE, bevor Sie die Kassetten-Seitenabdeckung öffnen!
4. Beachten Sie die Sicherheitsaufkleber, wenn Sie die Kassetten-Seitenabdeckung öffnen!

**! WARNUNG****Verletzungsgefahr durch unsachgemäßen Umgang mit der „Drop Off Plate“**

Wenn die Drop Off Plate nicht frei von Kabeln ist, besteht die Gefahr schwerer Verletzungen oder Tod.



1. Verlegen Sie keine Kabel an oder über der Drop Off Plate.
2. Senden Sie nach Auslösen der Drop Off Plate das Gerät zurück an Bruker.

**See also**

📖 English: Safety Notices ▶ 149]

# 16 Appendix B

## 16.1 Repair Declaration

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

● **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:	



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# Glossary

## **BSMS**

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The Bruker Smart Magnet control System (BSMS) provides computer control of various functions associated with the magnet, magnetic field, and sample.

## **ECL**

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ECL: Engineering Change Level.

## **ELCB**

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The Extended Lock Control Board (ELCB) combines two former boards, the CPU and the LCB. Therefore it provides two main functions - the Digital Lock (as it is described in the Deadalus Lock Manual) and the control of the complete BSMS/2, (e. g. Shim, Lift, Gradient Amplifier).



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# End of Document



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