Imprint

Product Identification:
Operation Manual (Original) X-Sential™
11594282

Publication date: 08.2021

NIR-Online GmbH
Altrottstrasse 31
D-69190 Walldorf
E-mail: info.nir-online@buchi.com
NIR-Online reserves the right to make changes to this manual as required on the basis of future insights, especially with respect to layout, illustrations and technical detail.
This manual is copyright. Information from it may not be reproduced, distributed, or used for competitive purposes, nor made available to third parties. The manufacture of any component with the aid of this manual without prior written agreement is also prohibited.
# Table of contents

1 About this document ........................................................................................................... 5
   1.1 Mark-ups and symbols ........................................................................................................ 5

2 Safety ........................................................................................................................................ 6
   2.1 Proper use ............................................................................................................................ 6
   2.2 Use other than that intended ................................................................................................. 6
   2.3 Warning notices in this document ......................................................................................... 6
   2.4 Warning and directive symbols ............................................................................................ 7
   2.5 Staff qualification .................................................................................................................. 7
   2.6 Personal protective equipment (production) .......................................................................... 8
   2.7 Personal protective equipment (laboratory) .......................................................................... 8
   2.8 Modifications ....................................................................................................................... 8

3 Product description .................................................................................................................. 9
   3.1 Description of function .......................................................................................................... 9
   3.2 Configuration ....................................................................................................................... 9
      3.2.1 Front view ....................................................................................................................... 9
      3.2.2 Rear view ....................................................................................................................... 10
   3.3 Scope of delivery .................................................................................................................. 10
   3.4 Type plate ............................................................................................................................ 11
   3.5 Technical data ..................................................................................................................... 12
      3.5.1 Sensor ............................................................................................................................ 12
      3.5.2 Installation box ............................................................................................................... 13
      3.5.3 Ambient conditions ........................................................................................................ 13
      3.5.4 Materials ....................................................................................................................... 13
      3.5.5 Software ....................................................................................................................... 14
      3.5.6 Computer system requirements ..................................................................................... 14
      3.5.7 Installation site (laboratory) ........................................................................................... 15
      3.5.8 Installation site (production) ........................................................................................... 15

4 Transport and storage .............................................................................................................. 16
   4.1 Transport ............................................................................................................................ 16
   4.2 Storage ................................................................................................................................ 16

5 Installation ............................................................................................................................... 17
   5.1 Establishing installation point ............................................................................................... 17
   5.2 Installation point in piping system (example) ...................................................................... 18
   5.3 Installation (example) .......................................................................................................... 19
   5.4 Sensor installation ............................................................................................................... 20
   5.5 Connecting the sensor ......................................................................................................... 21
   5.6 Establishing electrical connections ...................................................................................... 22

6 Operation ................................................................................................................................. 23
   6.1 Journal button ....................................................................................................................... 23
   6.2 Entering reference data in the journal .................................................................................. 23

7 Cleaning and servicing ............................................................................................................ 24
   7.1 Notes on servicing ................................................................................................................ 24
   7.2 Regular maintenance work ................................................................................................... 24
<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Taking out of service and disposal</td>
<td>25</td>
</tr>
<tr>
<td>8.1</td>
<td>Disposal</td>
<td>25</td>
</tr>
<tr>
<td>8.2</td>
<td>Returning the instrument</td>
<td>25</td>
</tr>
<tr>
<td>9</td>
<td>Appendix</td>
<td>26</td>
</tr>
<tr>
<td>9.1</td>
<td>Certificates</td>
<td>26</td>
</tr>
<tr>
<td>9.1.1</td>
<td>CE certificate</td>
<td>26</td>
</tr>
<tr>
<td>9.2</td>
<td>Spare parts and accessories</td>
<td>27</td>
</tr>
<tr>
<td>9.2.1</td>
<td>Accessories</td>
<td>27</td>
</tr>
<tr>
<td>9.2.2</td>
<td>Mounting accessories</td>
<td>27</td>
</tr>
<tr>
<td>9.2.3</td>
<td>Spare parts specifications</td>
<td>30</td>
</tr>
</tbody>
</table>
1 About this document

This operation manual is applicable for all variants of the instrument. Read this operation manual before operating the instrument and follow the instructions to ensure safe and trouble-free operation. Keep this operation manual for later use and pass it on to any subsequent user or owner. NIR-Online GmbH accepts no liability for damage, faults and malfunctions resulting from not following this operation manual. If you have any questions after reading this operation manual:

Contact NIR-Online GmbH Customer Service.

service.nir-online@buchi.com

1.1 Mark-ups and symbols

NOTE
This symbol draws attention to useful and important information.

☑ This character draws attention to a requirement that must be met before the instructions below are carried out.

► This character indicates an instruction that must be carried out by the user.

げる This character indicates the result of a correctly carried out instruction.

<table>
<thead>
<tr>
<th>Mark-up</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window</td>
<td>Software Windows are marked-up like this.</td>
</tr>
<tr>
<td>Tab</td>
<td>Tabs are marked-up like this.</td>
</tr>
<tr>
<td>Dialog</td>
<td>Dialogs are marked-up like this.</td>
</tr>
<tr>
<td>[Button]</td>
<td>Buttons are marked-up like this.</td>
</tr>
<tr>
<td>[Field names]</td>
<td>Field names are marked-up like this.</td>
</tr>
<tr>
<td>[Menu / Menu item]</td>
<td>Menus or menu items are marked-up like this.</td>
</tr>
<tr>
<td>Status</td>
<td>Status is marked-up like this.</td>
</tr>
<tr>
<td>Signal</td>
<td>Signals are marked-up like this.</td>
</tr>
</tbody>
</table>
2 Safety

2.1 Proper use
The sensor is used to analyze substances and samples in production and in the laboratory. The sensor is intended exclusively for that purpose. The sensor can be used in laboratories and production facilities for the following operations:
- Quality control
- Process optimization
- Reference measurements

2.2 Use other than that intended
The use of the instrument other than described in proper use and specified in technical data is use other than that intended. The operator is responsible for damages or hazards that are caused by use other than that intended. Specially the following uses are not permitted:
- Use of the sensor in areas which require explosion-safe devices.

2.3 Warning notices in this document
Warning notices warn you of dangers that can occur when handling the device. There are four danger levels, each identifiable by the signal word used.

<table>
<thead>
<tr>
<th>Signal word</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>DANGER</td>
<td>Indicates a danger with a high level of risk which could result in death or serious injury if not prevented.</td>
</tr>
<tr>
<td>WARNING</td>
<td>Indicates a danger with a medium level of risk which could result in death or serious injury if not prevented.</td>
</tr>
<tr>
<td>CAUTION</td>
<td>Indicates a danger with a low level of risk which could result in minor or medium-severity injury if not prevented.</td>
</tr>
<tr>
<td>NOTICE</td>
<td>Indicates a danger that could result in damage to property.</td>
</tr>
</tbody>
</table>
2.4 Warning and directive symbols
The following warning and directive symbols are displayed in this operation manual or on the instrument.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="General warning" /></td>
<td>General warning</td>
</tr>
<tr>
<td><img src="image" alt="Dangerous electrical voltage" /></td>
<td>Dangerous electrical voltage</td>
</tr>
<tr>
<td><img src="image" alt="Material damage" /></td>
<td>Material damage</td>
</tr>
<tr>
<td><img src="image" alt="Read manual" /></td>
<td>Read manual</td>
</tr>
</tbody>
</table>

![Location of safety notices and warning signs on the instrument](image)

Fig. 1: Location of safety notices and warning signs on the instrument

1

General warning

**Clean Unit when dust exceeds 5 mm thickness**

2.5 Staff qualification
Unqualified persons are unable to identify risks and are therefore exposed to greater dangers.
The device may only be operated by suitably qualified persons.
These operating instructions are aimed at the following target groups:
Users
Users are persons that meet the following criteria:
- They have been instructed in the use of the device.
- They are familiar with the contents of these operating instructions and the applicable safety regulations and apply them.
- They are able on the basis of their training or professional experience to assess the risks associated with the use of the device.

Operator
The operator is responsible for the following aspects:
- The instrument must be correctly installed, commissioned, operated and serviced.
- Only suitably qualified staff may be assigned the task of performing the operations described in these operating instructions.
- The staff must comply with the locally applicable requirements and regulations for safe and hazard-conscious working practices.
- Safety-related incidents that occur while operating the instrument are to be reported to the manufacturer.
  service.nir-online@buchi.com

NIR-Online service technicians
Service technicians authorized by NIR-Online have attended special training courses and are authorized by NIR-Online GmbH to carry out special servicing and repair measures.

2.6 Personal protective equipment (production)
Follow the rules regarding personal protective equipment that are applicable at the installation site.
The operation of the sensor does not require additional protective equipment.

2.7 Personal protective equipment (laboratory)
Depending on the application, hazards due to heat and/or corrosive chemicals may arise.
- Always wear appropriate personal protective equipment such as safety goggles, protective clothing and gloves.
- Make sure that the personal protective equipment meets the requirements of the safety data sheets for all chemicals used.

2.8 Modifications
Unauthorized modifications may impair safety and lead to accidents.
- Use only genuine NIR-Online accessories, spare parts and consumables.
- Technical modifications to the instrument or accessories should only be carried out with the prior written approval of NIR-Online GmbH and only by authorized NIR-Online service technicians.

NIR-Online GmbH accepts no liability whatsoever for damage arising as a result of unauthorized modifications.
3 Product description

3.1 Description of function
The sensor is an optical instrument for nondestructive determination of substances and concentrations in a sample.
A sample absorbs and reflects light across the entire wavelength spectrum according to its color and chemical composition. The signal reflected by the sample is recorded and analyzed by a spectrometer.

- The sensor uses a lamp to produce near-infrared radiation that interacts with the molecules of the sample. The interaction between sample and light produces a characteristic spectrum.
- The light reflected from the sample is collected through two sets of fiber optics that direct the light to the NIR and visible spectrophotometers, respectively. The visible spectrophotometer consists of a diffraction grating to spatially disperse the light according to wavelength and a silicon photodiode array containing multiple elements which measure the light intensity for specific wavelength intervals. The NIR spectrophotometer consists of a diffraction grating to spatially disperse the light according to wavelength and an indium-gallium-arsenide photodiode array containing multiple elements.
- The produced measurement results are converted to data sequences.
- The data sequences are transferred to a computer via an interface.
- A computer program compares the data sequence curve with a calibration model and in that way determines the chemical composition of the sample.

3.2 Configuration

3.2.1 Front view

![Diagram of the sensor showing measurement window, flange, and heat sink.]

Fig. 2: Front View

1 Measurement window
2 Flange
3 Heat sink
3.2.2 Rear view

Fig. 3: Rear view

1 Journal Button  
2 Power and scanning indicator light

3 Type plate (part)  
4 Ground connection  
   (Equipotential bonding)

5 Power and signal connector  
6 Type plate (part)

3.3 Scope of delivery

NOTE
The scope of delivery depends on the configuration of the purchase order.

Accessories are delivered as per the purchase order, order confirmation, and delivery note.
3.4 Type plate

The type plate identifies the instrument. See Chapter 3.2.2 "Rear view", page 10.

![Type plate diagram]

Fig. 4: Type plate

1. Company name and address
2. Product option
3. Revision number
4. Product name
5. Serial number
6. Production date
7. IP class
8. ATEX information
9. Power consumption (nominal)
10. Power consumption (maximum)
11. Ambient temperature
12. Current draw (maximum)
13. Certificates
14. Operating voltage
15. Product type

The following product options are possible:

<table>
<thead>
<tr>
<th>Letter</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>NIR</td>
</tr>
<tr>
<td>D</td>
<td>VIS</td>
</tr>
<tr>
<td>E</td>
<td>Gold reflector (X-One)</td>
</tr>
<tr>
<td>G</td>
<td>Lamp position rev. 1.3.2</td>
</tr>
<tr>
<td>N</td>
<td>System temperature 0 - 80 °C</td>
</tr>
<tr>
<td>O</td>
<td>Humidity sensor 0-100% RH</td>
</tr>
<tr>
<td>S</td>
<td>X-Quvette (Fiber lens (approx. 0 - 2 cm))</td>
</tr>
</tbody>
</table>
### 3.5 Technical data

#### 3.5.1 Sensor

<table>
<thead>
<tr>
<th>Specifications</th>
<th>X-Sential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (W x D x H)</td>
<td>200 x 200 x 100 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>5 kg</td>
</tr>
<tr>
<td>Max. operating pressure</td>
<td>30 bar at flange</td>
</tr>
<tr>
<td>Product temperature (temperature at flange with water cooling)</td>
<td>-10 °C to +130 °C</td>
</tr>
<tr>
<td>Product temperature (temperature at flange without water cooling)</td>
<td>-10 °C to + 70 °C</td>
</tr>
<tr>
<td>Vibrations</td>
<td>0.2 G at 0.1 - 150 Hz</td>
</tr>
<tr>
<td>Wavelength spectrum NIR range</td>
<td>900 - 1700 nm; 11100 - 5880 cm⁻¹</td>
</tr>
<tr>
<td>Wavelength spectrum Visible range</td>
<td>350 - 900 nm; 28500 - 11100 cm⁻¹</td>
</tr>
<tr>
<td>Detector</td>
<td>Diode array</td>
</tr>
<tr>
<td>Average measurement time</td>
<td>20 spectra/s</td>
</tr>
<tr>
<td>IP Code</td>
<td>IP69 / IPX9K</td>
</tr>
<tr>
<td>Type of lamp</td>
<td>Tungsten-halogen dual lamp</td>
</tr>
<tr>
<td>Lifetime lamp</td>
<td>18000 h (2 x 9000 h)</td>
</tr>
<tr>
<td>Minimum clearance on all sides</td>
<td>100 mm</td>
</tr>
<tr>
<td>Connection Voltage</td>
<td>85 to 264 VAC</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>30 W</td>
</tr>
<tr>
<td>Temperature stabilization</td>
<td>ASDC (Advanced Spectral Drift Control): active temperature control to ±1°C from set system operating temperature. Deviations will lead to automatic white reference measurement to account for spectral drifts.</td>
</tr>
</tbody>
</table>
3.5.2 Installation box

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Installation box</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (W x D x H)</td>
<td>300 x 300 x 167 mm</td>
</tr>
<tr>
<td>Weight (excluding cables)</td>
<td>6 kg</td>
</tr>
<tr>
<td>Weight (inc. cables, 2 x 10 m)</td>
<td>7.4 kg</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>30 W</td>
</tr>
<tr>
<td>Power supply</td>
<td>85 - 264 VAC</td>
</tr>
</tbody>
</table>

3.5.3 Ambient conditions

Max. altitude above sea level 2500 m
Ambient temperature -10 °C ≤ Tamb ≤ +40 °C
Max. relative air humidity < 90 % non-condensing
Storage temperature max. 45 °C

3.5.4 Materials

<table>
<thead>
<tr>
<th>Component</th>
<th>Materials of construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing</td>
<td>Aluminium (nickel coated), SS 316L 1.4404 flange</td>
</tr>
<tr>
<td>Seals</td>
<td>NBR (standard sealing material)</td>
</tr>
<tr>
<td></td>
<td>FFKM (optional)</td>
</tr>
</tbody>
</table>
3.5.5 Software

The sensor is controlled via the SX-Suite software package. It consists of the following components:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Typical usage</th>
<th>User</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>SX-Server</td>
<td>Instrument driver / usage of special functions</td>
<td>Read out instrument status</td>
<td>Operator</td>
<td>As required</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Setup of instrument hardware</td>
<td>NIR admin</td>
<td>For installation and maintenance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Special function</th>
<th>Description</th>
<th>User</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>SX-Server</td>
<td>Conveyor belt</td>
<td>Optimized for measurement of moving objects on a conveyor belt</td>
<td>NIR admin</td>
<td>As required</td>
</tr>
<tr>
<td>Mix</td>
<td>Control endpoint of mixing processes</td>
<td></td>
<td>NIR admin</td>
<td>As required</td>
</tr>
<tr>
<td>Sample movement detection</td>
<td>Verify sample flow</td>
<td></td>
<td>NIR admin</td>
<td>As required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Typical usage</th>
<th>User</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>SX-Center</td>
<td>User interface (online/lab mode)</td>
<td>Recipe/product and calibration management</td>
<td>Operator</td>
<td>Daily workflow (if not fully automated)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>View results (table, trend, charts, reports)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reference data management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SX-Backup</td>
<td>Data backup scheduler</td>
<td>Automated backup of measurement data, results and calibrations</td>
<td>NIR admin</td>
<td>During installation</td>
</tr>
</tbody>
</table>

3.5.6 Computer system requirements

The system requirements for the computer are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Windows 10 Pro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating system</td>
<td></td>
</tr>
<tr>
<td>Central processing unit</td>
<td>Intel Core i5 generation 6600 or later</td>
</tr>
<tr>
<td>RAM</td>
<td>At least 4 GB</td>
</tr>
</tbody>
</table>
Hard disk space | At least 80 GB free disk space  
Use a hard disk suitable for continuous operation.

Data backup | At least 0.5 GB free disk space
Network or external hard disk | Additional 20 MB per day and sensor

Screen resolution | At least 1280x1024

LAN | At least 1 x 100 Mbit/s LAN
USB 2.0/3.0 | At least 1 USB connection per sensor and 1x USB per Data-Lab I/O box

PCI/PCl | 1 slot for Profibus card  
(for Profibus connection)

Software | Word and Microsoft Excel 2003 or later

### 3.5.7 Installation site (laboratory)
- The installation site has a firm, level surface.
- The installation site meets the safety requirements. See Chapter 2 “Safety”, page 6
- The installation site has enough space that cables can be routed safely.
- The installation site has no obstacles (e.g. water taps, drains, etc.).
- The installation site has an own mains outlet socket for the instrument.
- The installation site is not exposed to external thermal loads, such as direct solar radiation.
- The installation site allows that the power supply can be disconnected at any time in an emergency.
- The installation site meets the specifications according to the technical data (e.g. weight, dimension, etc.). See Chapter 3.5 "Technical data", page 12

### 3.5.8 Installation site (production)
- The installation site has a firm, level surface.
- The installation site meets the safety requirements. See Chapter 2 "Safety", page 6
- The installation site has enough space that cables can be routed safely.
- The installation site is not exposed to external thermal loads, such as direct solar radiation.
- The installation site meets the specifications according to the technical data (e.g. weight, dimension, etc.). See Chapter 3.5 "Technical data", page 12
- The installation site meets the specifications according to the installation point. See Chapter 5.1 "Establishing installation point", page 17
- The installation site has a own mains outlet socket for the instrument.
- The installation site has a sample removal point at a distance of < 1 m.
- The installation site allows a direct product measurement.
- The installation site has constant product flow.
- The layer thickness of the product to be measured is at least 30 mm.
4 | Transport and storage

4.1 Transport

**NOTICE**

Risk of breakage due to incorrect transportation

- Make sure that all parts of the device are safely packed in such a way as to prevent breakage, ideally in the original box.
- Avoid sharp movements during transit.

- After transportation, check the device for damage.
- Damage that has occurred in transit should be reported to the carrier.
- Keep packing for future transportation.

4.2 Storage

- Make sure that the ambient conditions are complied with (see Chapter 3.5 "Technical data", page 12).
- Wherever possible, store the device in its original packaging.
- After storage, check the device for damage and replace if necessary.
5 Installation

5.1 Establishing installation point

The fixing points or bolts conform to M6 A2-70/7.3 Nm.

Establish the installation point according to the specified data of the flange.

![Diagram of flange dimensions]

Fig. 5: Dimensions of flange
### 5.2 Installation point in piping system (example)

![Diagram of installation point in piping system](image)

**Fig. 6: Configuration**

1. Flow restrictor
2. Bypass
3. Analyser
4. Sample removal point
5. Flow restrictor
5.3 Installation (example)

Production

- Product flow
- Sensor cables (power supply, RS 422)
- Installation box with mains adapter
- 1 sensor per measurement point

Server/Control room

- Frame grabber card
- USB converter
- Data cable (RS422)
- Up to 4 sensors per computer

Control center

- Process control system
- Optional interfaces:
  - Profibus
  - 4-20 mA/1-9 V
  - TCP/IP
  - OPC/XML/SQL
  - Modbus
- Remote access via Ethernet
- Remote computer
  - SX-Client
    - Display
      - Results
      - Charts
  - SX-Plus
    - Chemometric software
    - Manual calibration

Data cable (RS422)
5.4 Sensor installation

The following installation positions are possible:

![Fig. 7: Fixing sensor with screws](image)

Tools required:

- Torque wrench, size Torx T30

Tightening torque: 8.4 Nm ±1

Precondition:

- Installation point has been established. See Chapter 5.1 “Establishing installation point”, page 17.
- The fixing points or bolts conform to M6 A2-70 15 mm
  - Fix the sensor to the installation point using the bolts.
5.5 Connecting the sensor

Tools required:
- Torque wrench, size 7 mm AF
- Torque wrench, size Torx T20

**NOTE**
Make sure that the power is not switched on when connecting the sensor.

**NOTE**
Loss of performance due to use of unsuitable device cables

Max. cable length between installation box and sensor 10 m.

- Put the cable guard over the sensor cable.

- Connect the sensor cable to the sensor.
- Secure the connector.

Tightening torque: 2.5 Nm ± 0.5
- Attach the cable guard to the sensor.

Tightening torque: 2 Nm ± 0.5
- Attach the ground cable to the sensor.
5.6 Establishing electrical connections

**NOTICE**

Risk of instrument damage because of not suitable power supply cables.

Not suitable power supply cables can cause bad performance or an instrument damage

- Use only BUCHI power supply cables.

Precondition:
- The electrical installation is as specified on the type plate.
- The electrical installation is equipped with a proper grounding system.
- The electrical installation is equipped with suitable fuses and electrical safety features.
- The installation site is as specified in the technical data. See Chapter 3.5 "Technical data", page 12

- Connect the power supply cable to the connection on the instrument. See Chapter 3.2 "Configuration", page 9
- Connect the mains plug to an own mains outlet socket.
6 **Operation**

The instrument is operated via the SX-Suite software on a computer. See "SX-Suite User Manual" and "SX-Plus User Manual".

6.1 **Journal button**

Pressing the button generates a journal entry.

6.2 **Entering reference data in the journal**

To perform a calibration and continuously check the calibration, reference data is required.

Continuous checking of the calibration is performed according to the requirements of the production process.

**NOTE**

The journal entry is identified by date and time.

- Press and hold the journal button for one second.
- The connected software creates a journal entry.
- Remove the sample at the sample removal point.
- Mark sample with date, time and sensor number.
- Carry out a laboratory analysis.
- Insert the reference data in the journal for creating the calibration model. See "SX-Suite User Manual" and "SX-Plus User Manual".
7 Cleaning and servicing

NOTE
Users may only carry out the servicing and cleaning operations described in this section.

Any servicing and repair work which involves opening up the casing may only be carried out by NIR-Online service technicians.

► Use only genuine NIR-Online consumables and spare parts in order to ensure correct operation of the device and preserve the warranty.

7.1 Notes on servicing

NOTICE
Risk of property damage due to failure to remove dust from heat sink
If dust is not cleaned off the heat sink it may cause the sensor to fail.

► Make sure that the layer of dust is no thicker than 5 mm.

7.2 Regular maintenance work

<table>
<thead>
<tr>
<th>Component</th>
<th>Action</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing</td>
<td>► Wipe down the casing with a damp cloth.</td>
<td>Weekly</td>
</tr>
<tr>
<td>Warning symbols</td>
<td>► Check that the warning symbols on the sensor are legible.</td>
<td>Weekly</td>
</tr>
<tr>
<td>Optics</td>
<td>NOTICE! Have operation carried out by NIR-Online service technician ► Replace lamps.</td>
<td>Annually</td>
</tr>
<tr>
<td>Casing</td>
<td>NOTICE! Have operation carried out by NIR-Online service technician ► Check and replace seals</td>
<td>Annually</td>
</tr>
</tbody>
</table>
8 Taking out of service and disposal

8.1 Disposal
The operator is responsible for proper disposal of the instrument.
- When disposing of equipment observe the local regulations and statutory requirements regarding waste disposal.
- When disposing, observe the disposal regulations of the materials used. Materials used see Chapter 3.5 "Technical data", page 12

8.2 Returning the instrument
Before returning the instrument, contact the NIR-Online GmbH Service Department. service.nir-online@buchi.com and ask for an RMA number.
Appendix

9.1 Certificates

9.1.1 CE certificate

Declaration of conformity
Konformitätserklärung
Déclaration de conformité
 Dichiarazione di conformità
Declaración de conformidad

Büchi NIR-Online GmbH
Altrottsstr. 31
60190 Walldorf
Germany

Declares, that the products / erklärt, dass die Produkte / Déclare par la présente que les produits /
Dichiarà che i prodotti / Declara que los productos:

Process Analyser X-Sential

comply with the requirements of the European Directives / den Anforderungen der Europäischen
Richtlinien / est conforme aux exigences des directives européennes / soddisfa i requisiti delle norme
europee / cumple los requerimientos de las Directivas Europeas:

IEC 61326-1:2012
Electrical equipment for measurement, control and laboratory use. EMC requirements: General requirements.

EN 60529 (VDE 470 Teil 1):2014-09
Ingress protection testing – IP69 / IP69k

RoHS 2 directive 2011/65/EC

Walldorf, July 1st, 2021

Michael Markus     Michael Eckert
Managing Director     Product Management
9.2  Spare parts and accessories

**NOTE**
Any modifications of spare parts or assemblies are only allowed with the prior written permission of NIR-Online GmbH.

9.2.1 Accessories

<table>
<thead>
<tr>
<th>Order no.</th>
<th>USB-RS422 interface</th>
<th>11060741</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Analog interface (DataLabIO)</td>
<td>11060742</td>
</tr>
<tr>
<td></td>
<td>Profibus card (PCI, High Profile)</td>
<td>11060743</td>
</tr>
<tr>
<td></td>
<td>Profibus card (PCI, Low Profile)</td>
<td>11062589</td>
</tr>
<tr>
<td></td>
<td>Profibus card (PCI Express, High Profile)</td>
<td>11063000</td>
</tr>
<tr>
<td></td>
<td>Profibus card (PCI Express, Low Profile)</td>
<td>11063001</td>
</tr>
</tbody>
</table>

9.2.2 Mounting accessories

Mounting accessories are hardware interfaces between the instrument and the process. Depending on the setup, specific mounting accessories might be needed for an implementation into the production facility.

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Image</th>
<th>Weld-in Flange</th>
<th>11060754</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Provides the ability to remove instrument while keeping the process sealed. Flange with sapphire window and purge port.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Adapter plate, Ø140/106 mm, for wall thickness up to 8,5 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Material: Stainless steel DIN 1.4404 (SST316L) / DIN 1.4571 (SST316Ti)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sealing material FFKM White G74S, FDA compliant 15°C (+59°F) to 260°C (+500°F)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Operating pressure -0.5 to 30 bar. Max. pressure 100 bar short term</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Purge port M5 (Ø4mm tube adapter needed) to prevent condensation or detect leakage</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• High grade sapphire crystal optical lens, polished for reduced adhesion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Dead volume max. 60 mm³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Order no.</td>
<td>Image</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-------</td>
<td>-------------</td>
<td></td>
</tr>
</tbody>
</table>
| 11068800  | ![Image](image1.png) | Weld-in Flange Pipe  
Flange with sapphire window and purge port for installation in pipes or bended surfaces.  
- Outer diameter: 140 mm.  
- Material: Stainless steel DIN 1.4404 (SST316L)  
- Sealing material: FFKM White G74S  
- Operating pressure: -0.5 to 30 bar. Max. pressure 100 bar short term  
- Purge port M5 (ø4mm tube adapter needed) to prevent condensation or detect leakage  
- The pipe diameter has to be specified upon order |
| 11068801  | ![Image](image2.png) | Weld-in Flange Hopper  
Flange with sapphire window and purge port for installation in hopper or bended surfaces with different diameters.  
- Outer diameter: 140 mm  
- Material: Stainless steel DIN 1.4404 (SST316L)  
- Sealing material: FFKM White G74S  
- Operating pressure: -0.5 to 30 bar. Max. pressure 100 bar short term  
- Purge port M5 (ø4mm tube adapter needed) to prevent condensation or detect leakage  
- The upper and lower hopper diameter has to be specified upon order |
| 11060753  | ![Image](image3.png) | Weld-in Plate  
For instruments in direct contact with the product.  
Plate with opening, fitting to instrument flange.  
- Dimensions: 160 x 241 x 3 mm  
- Material: DIN 1.4301 (SST304)  
- Thread bolts M6  |
| 11061670  | ![Image](image4.png) | Bypass Sampler  
For free flowing goods (mealy / grainy).  
Bypass with feeder and sampling point.  
- Pneumatic sampler (min. 5 bar / 72.5 psi water or oil free compressed air DIN ISO 8573 Class 1)  
- Screw-conveyor (feeding capacity 1.5 t/h)  
- Motor (380V/50Hz ATEX A22 0.25 KW)  
- Requires bypass-installation box and a Data-Lab IO device |
X-Square
For all free flowing powders and granulates.
The X-Square can be inserted in the product stream or bypass.
• Inspection panel (Plexiglas)
• Adapted for Jacob pipes Ø150 mm
• Stainless steel DIN 1.4301 electro polished

X-Cell DN50, Standard Flange DN50, PL1, 10 bar
For gas, liquid and paste-like products.
The cell can be inserted in the product stream or bypass.
• Material DIN 1.4404 (SST316L)
• Sealing material: FFKM White G74S
• Operating pressure up to 10 bar (145 psi). TÜV certificate upon request
• Measurement slit 26 mm, configurable between 1 and 15 mm with additional adapter
• DN 50 flange (other sizes upon request)
• Clearance volume max. 120 mm³ Cells can be customized with different diameter and flanges

There are various dimensions of the X-Cell available in the pricelist.

X-Cell 4 Edge DN50
For liquid and paste-like products.
The cell can be inserted in the product stream or bypass.
• Material: DIN 1.4404 (SST316L)
• Sealing material: FFKM White G74S
• Operating pressure: max 3bar
• Flange: DN50
• Path length: 34mm
• Typical use: Wine Applications
<table>
<thead>
<tr>
<th>Order no.</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>VARINLINE Sensor Adapter Flange, Type N, 10bar</td>
<td>11061674</td>
</tr>
</tbody>
</table>

For opaque products like powder or granules.

In combination with a path length adapter also for transparent liquid, gel or pasty products.

- Material DIN 1.4404 (SST316L)
- Sealing material FFKM White G74S (FDA compliant), or custom
- Operating pressure up to 10 bar (145 psi). TÜV certificate upon request
- Build for DN50 DIN 32676, process connection type N
- Product temp. -14 °C(+5 °F) to 230 °C (+446 °F)
- Path length adapter configurable between 0,5 to 42 mm

Path Length Adapter

To measure transparent liquids with the X-Cell.
The reflector reduces the length of the optical path.

- Material DIN 1.4404 (SST316L)
- Gap 1 / 2 / 5 / 10 / 15 mm available
- Diffuse or polished surface

Water Cooler Flange

- Can be used with all instruments, only in combination with X-Cell or Weld-in Flange
- Product temperature above 70 °C to 130 °C. A flow rate of 5 l water per hour at 20 °C is required
- 40 °C over temp switch for external alarm purpose, NO (Normally Open) circuit
- Water connectors for 8/6 mm hose

| 9.2.3 Spare parts specifications |

**Power supply**

**NOTICE**

Risk of property damage due to incorrectly connected mains adapter

An incorrectly connected mains adapter may cause the sensor to fail.

- Make sure that the current limiter is set to more than 4.5 A.
- Make sure that the voltage is 12.7 VAC.
## Specification

- **Power supply input voltage:** 85 - 264 ± 10% VAC
- **Rated voltage:** 12 VDC
- **Rated current:** ≥ 4.5A
- **Typical peak-to-peak residual ripple:** 50 mV
- **Max. peak-to-peak residual ripple:** 200 mV

## Device cables

**NOTE**
Loss of performance due to use of unsuitable device cables

Max. cable length between installation box and sensor 10 m.

## Sensor Cable

Pin assignment on device connector viewed from rear of instrument:

![Sensor Cable Diagram]

**Fig. 8: Pin assignment**

<table>
<thead>
<tr>
<th>PIN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PIN 1- blue, ground</td>
</tr>
<tr>
<td>2</td>
<td>PIN 2- red, 12.7 VDC</td>
</tr>
<tr>
<td>3</td>
<td>PIN 3- green, RxD-</td>
</tr>
<tr>
<td>4</td>
<td>PIN 4- yellow, TxD+</td>
</tr>
<tr>
<td>5</td>
<td>PIN 5- white, TxD-</td>
</tr>
<tr>
<td>6</td>
<td>PIN 6- brown, RxD+</td>
</tr>
<tr>
<td>7</td>
<td>PIN 7- not connected</td>
</tr>
<tr>
<td>8</td>
<td>PIN 8- not connected</td>
</tr>
</tbody>
</table>
RS422 Data Cable

Pin assignment on the Moxa viewed from rear of the Moxa:

Fig. 9: Pin assignment

<table>
<thead>
<tr>
<th></th>
<th>PIN 1 green, TxD- (A)</th>
<th>2</th>
<th>Pin 2 white (from green), TxD+ (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pin 3 orange, RxD+ (B)</td>
<td>3</td>
<td>Pin 4 white (from orange), RxD- (A)</td>
</tr>
</tbody>
</table>

When using the supplied Moxa D-Sub 9-pole connector, swap the cables on pin 1 and 2.
Quality in your hands

BUCHI Affiliates:

Europe

Switzerland/Austria
BUCHI Labortechnik AG
CH – 9230 Flawil
T +41 71 394 63 63
F +41 71 394 64 64
buchi@buchi.com
www.buchi.com

Benelux
BUCHI Labortechnik GmbH
Branch Office Benelux
NL – 3342 GT Hendrik-Ido-Ambacht
T +31 78 684 94 29
F +31 78 684 94 30
benelux@buchi.com
www.buchi.com/bx-en

France
BUCHI Sarl
FR – 91140 Villebon-sur-Yvette
T +33 1 56 70 62 50
F +33 1 46 86 00 31
france@buchi.com
www.buchi.com/fr-fr

Germany
BUCHI Labortechnik GmbH
DE – 45127 Essen
T +800 414 0 414 0 (Toll Free)
T +49 201 747 49 0
F +49 201 747 49 20
deutschland@buchi.com
www.buchi.com/de-de

Italy
BUCHI Italia s.r.l.
IT – 20010 Cornaredo (MI)
T +39 02 824 50 11
F +39 02 575 12 855
italia@buchi.com
www.buchi.com/it-it

Russian
BUCHI Russia/CIS
RU – 127006 Moscow
T +7 495 36 36 495
russia@buchi.com
www.buchi.com/ru-ru

Spain
BUCHI Ibérica S.L.U.
ES – 08960 Barcelona
T +34 936 06 8010
iberica@buchi.com
www.buchi.com/es-es

United Kingdom
BUCHI UK Ltd.
GB – Suffolk CB8 7SQ
T +44 161 633 1000
F +44 161 633 1007
uk@buchi.com
www.buchi.com/gb-en

America

Brazil
BUCHI Brasil Ltda.
BR – Valinhos SP 13271-200
T +55 19 3849 1201
F +55 19 3849 2907
brasil@buchi.com
www.buchi.com/br-pt

India
BUCHI India Private Ltd.
IN – Mumbai 400 055
T +91 22 667 75400
F +91 22 667 18986
india@buchi.com
www.buchi.com/ind-in

USA/Canada
BUCHI Corporation
US – New Castle, DE 19720
T +1 877 692 8244 (Toll Free)
T +1 302 652 3000
F +1 302 652 8777
us-sales@buchi.com
www.buchi.com/us-en

Asia

China
BUCHI China
CN – 200233 Shanghai
T +86 21 6280 3366
F +86 21 530 8821
china@buchi.com
www.buchi.com/cn-zh

India
BUCHI India Private Ltd.
IN – Mumbai 400 055
T +91 22 667 75400
F +91 22 667 18986
india@buchi.com
www.buchi.com/ind-in

Japan
Nihon BUCHI K.K.
JP – Tokyo 110-0008
T +81 3 3821 4777
F +81 3 3821 4555
nihon@buchi.com
www.buchi.com/jp-ja

Korea
BUCHI Korea Inc.
KR – Seoul 153-782
T +82 2 6718 7500
F +82 2 6718 7599
korea@buchi.com
www.buchi.com/kr-ko

Malaysia
BUCHI Malaysia Sdn. Bhd.
MY – 47301 Petaling Jaya,
Selangor
T +60 3 7832 0310
F +60 3 7832 0309
malaysia@buchi.com
www.buchi.com/my-en

Singapore
BUCHI Singapore Pte. Ltd.
SG – Singapore 609919
T +65 6565 1175
F +65 6565 7047
singapore@buchi.com
www.buchi.com/sg-en

Thailand
BUCHI (Thailand) Ltd.
TH – Bangkok 10600
T +66 2 862 08 51
F +66 2 862 08 54
thailand@buchi.com
www.buchi.com/th-th

Middle East

South East Asia
BUCHI (Thailand) Ltd.
TH – Bangkok 10600
T +66 2 862 08 51
F +66 2 862 08 54
bachi@buchi.com
www.buchi.com/th-th

BUCHI Labortechnik AG
UAE – Dubai
T +971 4 313 2860
F +971 4 313 2861
mideast@buchi.com
www.buchi.com

Latin America
BUCHI Latinoamérica
S. de R.L. de C.V.
MX – Mexico City
T +52 55 9001 5386
latinoamerica@buchi.com
www.buchi.com/es-es

BUCHe Support Centers:

We are represented by more than 100 distribution partners worldwide.
Find your local representative at: www.buchi.com