


BCU-I

- Quick Start Guide
User Manual
Version 004



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@ Monday, July 22, 2013 Bruker BioSpin AG

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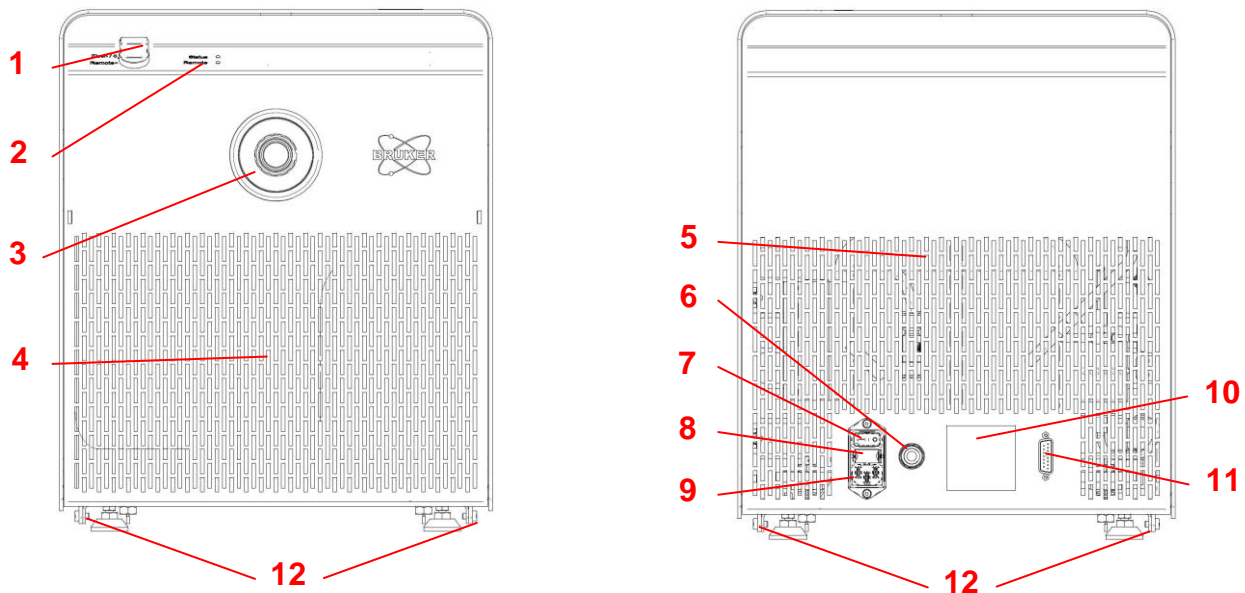
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BCU I

Quick Start Guide

i Read the following Information and safety messages carefully in order to achieve safe operation and optimal performance of the BCU I.

Overview:



- | | | |
|--------------------------------|--------------------------------|---------------------------|
| (1) Rotary switch | (5) Air outlet grid | (9) Power socket |
| (2) LEDs (2x) | (6) VT gas IN Ø8mm (max. 6bar) | (10) Label (Voltage) |
| (3) Transfer line – VT gas OUT | (7) Main switch | (11) D-Sub 15 socket |
| (4) Air inlet grid | (8) Fuse (2 x 5x20mm 10AT) | (12) Hexagon sockets (4x) |

Fig. 1: Overview of the BCU I

Preparation:

Before installing, prepare the BCU I as follows:

1. Unscrew and remove the two butterfly nuts **(13)** (transport lock; see Fig. 2) at the bottom of the BCU I housing.
2. Unscrew and remove the white protective cover **(14)** (see Fig. 2) at the end of the transfer line before pressurizing the BCU I with VT gas (max. 6bar).

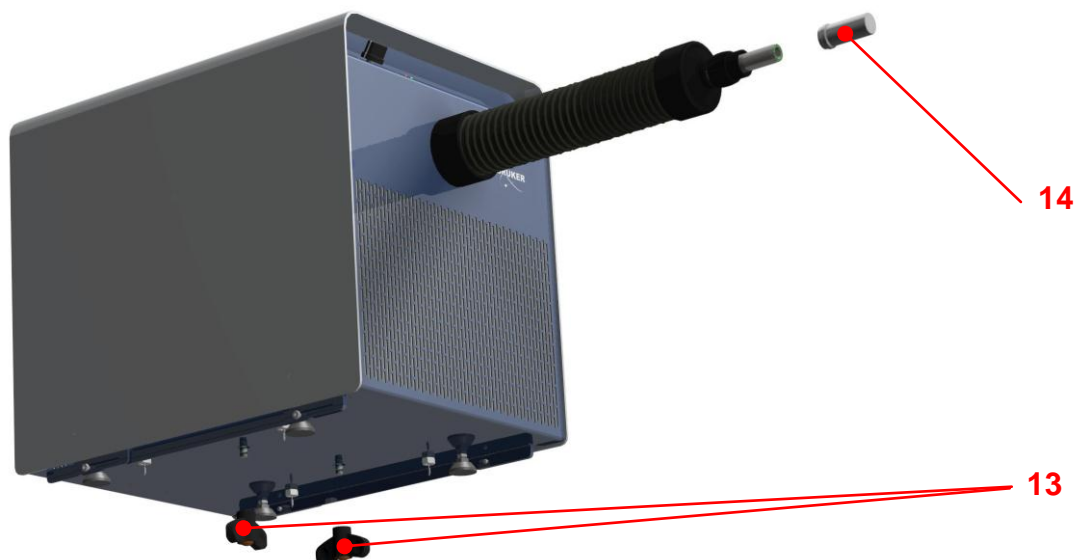


Fig. 2: Butterfly nuts (2x) – transport lock (13) White protective cover (14)

3. Position the BCU I. For positioning the BCU I observe strictly the magnetic stray field of the NMR magnet:
For Ascend™ (all frequencies) and all other magnets $\leq 700\text{MHz}$: Place the BCU I **outside** the **5 Gauss** line and **not less** than 1m from the axis of the magnet.
For magnets $\geq 750\text{MHz}$: Place the BCU I **outside** the **50 Gauss** line and **not less** than 2.7m from the axis of the magnet.

NOTICE

Instability and poor damping of the BCU I during operation:

- Unscrew and remove the two butterfly nuts (13) (transport lock) at the bottom of the BCU I housing. Keep these two butterfly nuts (13) in case of transport or shipping of the BCU I.
- Do not put any object on top of the BCU I.

Damage of the transfer line of the BCU I:

- Do not pull on the transfer line in order to position the BCU I.



Transport or shipping of a BCU I without transport lock will damage the BCU I:

- Mount and tighten the two butterfly nuts (13) (transport lock) at the bottom of the BCU I housing.

Overheating of the BCU I:

- Do not cover (partially or fully) the air inlet and/or outlet grid. Minimal clearance to a wall: 30cm.

⚠ CAUTION



Risk of impact due to flying objects:

White protective cover at the end of the transfer line shoots away.

- Unscrew and remove the white protective cover (14) at the end of the transfer line before pressurizing the BCU I with VT gas (max. 6bar).

⚠ WARNING



The BCU I is magnetic and presents a potential hazard in the vicinity of a magnet (e.g. magnetic stray field of the NMR magnet):

- **Ascend™ (all frequencies) and all other magnets ≤ 700MHz:** Place the BCU I **outside** the **5 Gauss** line and **not less** than 1m from the axis of the magnet.
- **Magnets ≥ 750MHz:** Place the BCU I **outside** the **50 Gauss** line and **not less** than 2.7m from the axis of the magnet.



4. Install the SUPPORT CLAMP (19) (Z53660, see Fig. 7) to the magnet flange.
5. Assemble and install the transfer line support BSCU SUPPORT CPL. (20) (Z119100, see Fig. 8).

Note: This support is only included for a BCU I with a transfer line length ≥ 3m.

Installation:

6. Plug in the communication cable from the BSVT into the D-Sub 15 socket (11) of the BCU I.
Note: If you operate the BCU I with a BVT, order the cable BSCU CABLE RETROFIT LONG (Z118350).
7. Connect and screw the transfer line to the NMR probe and align and level the transfer line using the SUPPORT CLAMP (19) (Fig. 7) and the SUPPORT CPL. (20) (Fig. 8).

Note: For NMR probes with a VT gas coupler as indicated in Fig. 3 order the adapter Z121532 (see Fig. 4). For a CryoProbe order the adapter BSCU-ADAPTER CRYOPROBE KPL. (Z119688) shown in Fig. 5.



Fig. 3: VT gas coupler



Fig. 4: Adapter Z121532



Fig. 5: Adapter Z119688

Connect the VT gas:

8. Connect the VT gas line (Ø8mm) from the B(S)VT to the VT gas connection (6) of BCU I.

NOTICE

VT gas overpressure will damage the BCU I:

- Use VT gas with a pressure of max. 6bar.

Freezing and clogging of the BCU I with VT gas:

- To prevent freezing and clogging of the BCU I use dry clean air or nitrogen VT gas at room temperature with a dew point temperature $\leq -50^{\circ}\text{C}@1\text{bar}$.
- For the BCU I & BCU II Bruker recommends the dryer **1808577** ($\leq 60\text{nl}/\text{min}$).*
- For all tubing (particularly after the gas dryer!) use only hoses from TPS (low water permeability).
- Install the gas dryer before the B(S)VT!

Connect the power:

9. Connect the power cord to the power socket (9) of the BCU I.
10. Plug the power cord into a power socket with the voltage indicated on the label (10).
11. Switch on the BCU I with the main switch (7).

NOTICE

Wrong power supply voltage will damage the BCU I:

- Be sure that the voltage indicated on the label of the BCU I corresponds to the power supply voltage of the power socket.

Rotary switch:

With the rotary switch (1) four operation modes are possible:

- **"Remote"**: The BCU I is controlled by the BVT or BSVT.
Note: The cable from the D-Sub 15 socket (11) of the BCU I to the BVT or BSVT must be plugged in!
- **"Flush / 0"**: This setting is used when VT gas at room temperature has to be fed to the NMR probe or the VT gas tubing of the BCU I has to be dried and purged. In this setting the compressor does not run! **
Note: Purge with dry clean air or nitrogen gas at room temperature with a dew point temperature $\leq -50^{\circ}\text{C}@1\text{bar}$.
- **"1"**: In this mode, the VT gas is cooled only slightly with reference to room temperature T_{RT} ($T = T_{\text{RT}} - 10\dots 20^{\circ}\text{C}$). **
- **"2"**: In this mode, the VT gas is cooled to the lowest specified temperature. **

^{*)} For flows of dry gas higher than 60 nl/min (e.g. with a MAS pneumatic unit) Bruker recommends the AD-SP dryer 220nl/min (W1215319 for 230V/50Hz or W1215320 for 115V/60Hz)

^{**)} The BCU I is in a manual mode and cannot be controlled with the BVT or BSVT. In manual mode the BCU I can be operated without a communication cable to the B(S)VT.

“Status” and “Remote” LED:

The BCU I has two LEDs (2) (see also the chapter “Overview”): “Status” and “Remote” LED. The “Status” and the “Remote” LEDs indicate the following states of the BCU I:

Status:	Remote:
Green flashing: Cooling down	Green flashing: Connecting (B(S)VT
Green on: Ready, stable temperature	Green on: Connected to BVT or BSVT
Red flashing: WARNING, overheating *	Red flashing: Connection to BVT or BSVT failed
Red on: ERROR **	Off *** No communication with B(S)VT

*) e.g. blocked dust filter

***) Clean dust filter or call service

***) The communication cable between BCU I and B(S)VT is not connected

Dust filter cleaning:

There is a dust filter inside the BCU I. For optimal performance and maximum lifetime of the BCU I it has to be cleaned every 6 months. For cleaning the filter one has to proceed as follows:

1. First loosen (but do not unscrew completely) the four hexagon sockets (12) (see Fig. 1).
2. Then push the housing cover (15) backwards as far as it will go (~30...40mm).
3. Unlock the two fasteners (16) and remove the filter grid (17) with the dust filter (18).
4. Then clean the dust filter (18) with a vacuum cleaner and reinstall the dust filter (18).

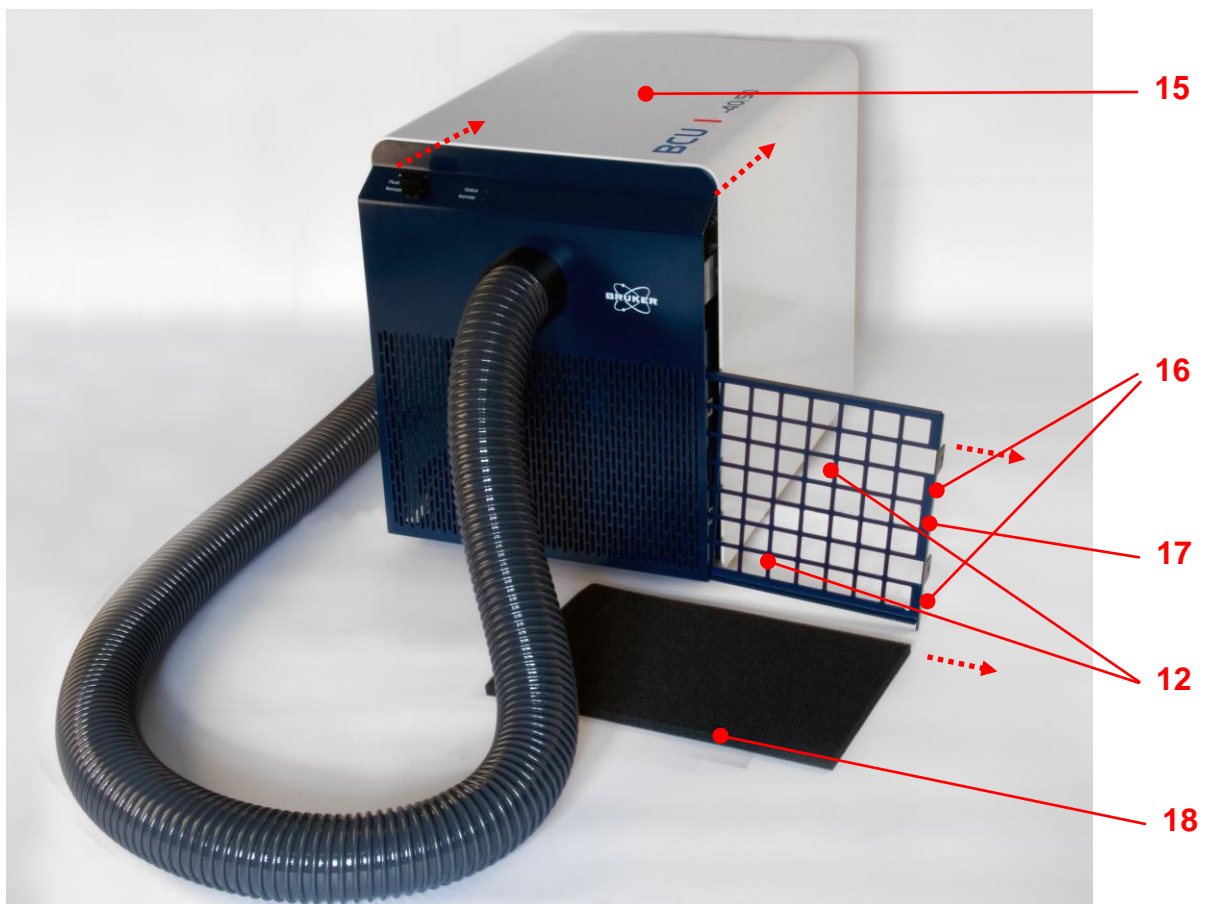


Fig. 6: Dust filter cleaning

Packing list:

The following components are included in the package:

1. 1 x BCU I
2. 1 x Z53660, SUPPORT CLAMP (19), see Fig. 7
3. 1 x Z119100, BSCU SUPPORT CPL. (20), see Fig. 8 *
4. 1 x power cord
5. 1 x O-ring 13x1,5mm Viton FPM75 GR (for coupler at the end of the transfer line)
6. 2 x Fuse 5x20mm 10AT

*¹) This support is only included for a BCU I with a transfer line length ≥ 3 m.



Fig. 7: Support clamp



Fig. 8: BSCU support cpl.

Specifications:

Electrical specification:

Indicated on the label (10)

2.1A@220V - 240V ~ 50Hz

or

4.7A@100V ~ 50Hz / 100 - 115V ~ 60Hz

or

2.7A@208V - 220V ~ 60Hz

Power:

280W / 600VA

Min. gas temperature (end of transfer line):

-40°C@0 – 3000l/h & 17...25°C ambient temp.

Ambient operating temperature range:

min. 17°C; max. 32°C; 17...25°C specs fulfilled

Gas dew point temperature:

$\leq -50^\circ\text{C}@1\text{bar}$

Flow rate:

0...3000nl/h

Cool down time

~15min

Transfer line length:

2m, 3m, 5m or 8m

Dimensions:

480mm x 351mm x 425mm

Max. gas input pressure:

6bar

Weight:

~30kg





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Order No: Z31950