CryoProbe Prodigy System

- Site Planning & Checklist

Version 001

Innovation with Integrity

NMR

Fällanden, Switzerland

P/N: Z33080

DWG-Nr.: Z4D12020

For further technical assistance on the CryoProbe Prodigy System, please do not hesitate to contact your nearest BRUKER dealer or contact us directly at:

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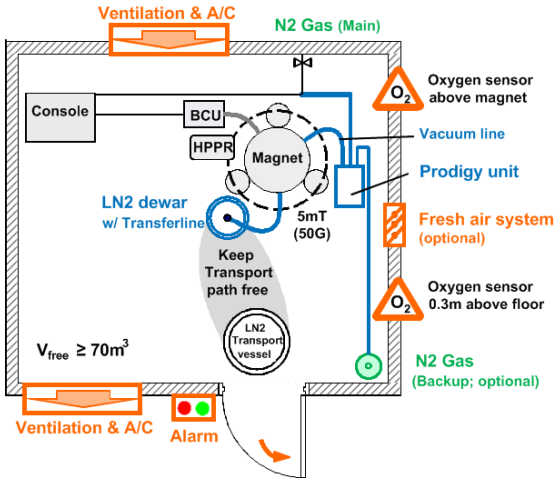
Prodigy System: Site Planning

The BRUKER CryoProbe™ Prodigy System (CPP-System) should be positioned in a lab such that it allows for convenient and safe operation. The customer needs access to the front of the Prodigy unit for operating the touch-screen, and to the LN2 dewar for periodic LN2 refills.

Example A (a suitable N_2 gas supply is available in the lab):

The Prodigy Platform components are shown in **blue**.

- Ideally, place the Prodigy unit to the right side, and the LN2 dewar to the left side of the magnet. A mirrored setup is also possible. This arrangement provides the user with simplicity and functionality when performing the regular LN2 dewar refill.
- The Prodigy unit must be placed outside the 5mT (50G) stray field of the magnet, but remain in its vicinity.
- The LN2 dewar is non-magnetic and will be placed directly adjacent to the magnet. There is only one length of the LN2 Transferline available (2m).
- An optional balance for the LN2 dewar is recommended (BH5450; with shielded magnets only). The balance is placed under the LN2 dewar.



The N_2 gas supply system is marked in **green**.

- The Prodigy unit needs a continuous supply of very dry N_2 gas (dew point <-60°C).
- The N_2 gas cylinder serves as backup for the aforementioned main N_2 gas source. It is optional, but strongly recommended when a sample safety system (BH0550 or BH0551) will be used.

The necessary safety infrastructure is marked in **orange**.

- The ventilation and air conditioning (A/C) system must provide fresh air. The use of totally recirculated air is not allowed.
- An additional supply of fresh air can be provided e.g. by an open window. Alternatively, the A/C can be switched to maximum fresh air supply while refilling the LN2 dewar.
- An oxygen monitoring and alarm system is required.
- The door of the lab must open outwards from the room.

Electricity supply:

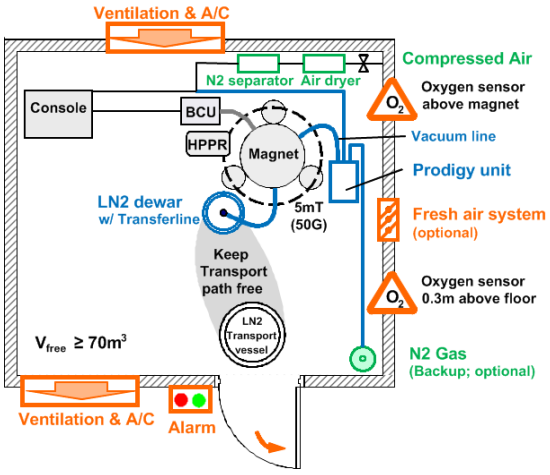
- A single phase supply 100-120VAC or 220-240VAC is sufficient for the Prodigy unit and the optional balance. Depending on customer's needs a UPS is recommended.

The system requirements are summarised on p. 9.

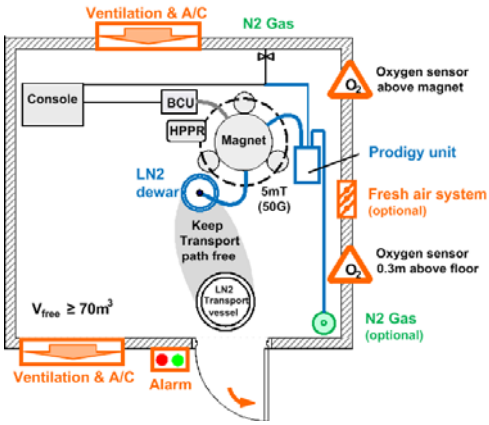
Example B (if no suitable N_2 gas supply is available):

Example B corresponds to example A except for the N_2 gas supply (see **green** items in the adjacent figure).

- The required N_2 gas is generated from a compressed air supply with a nitrogen separator.
- If the dew point of the compressed air is >-25°C, an air dryer is required in addition.



Checklist for Basic Site Planning

Lab space requirements		YES	NO
	The free volume of the lab is at least 70 m^3.	☐	☐
	It is possible to arrange the Prodigy Unit beside the magnet, but outside the 5mT (50G) stray field.	☐	☐
	It is possible to arrange the LN2 dewar beside the magnet.	☐	☐
	The LN2 dewar is freely accessible, and the site is adequately sized for the free movement of the LN2 transport vessel.	☐	☐

N2 gas requirements (green items)	YES	NO	Customer Responsibility
Case 1: An uninterrupted supply of nitrogen gas as specified will be available (at least from installation date onwards) at the NMR site (connector type Ø 8mm).	☐	☐	☐
Case 2: Compressed air with a dew point **< -25 °C** will be used → N_2-separator required.	☐	☐	☐
Case 3: Compressed air with a dew point **> -25 °C** will be used → Air dryer and N_2-separator required.	☐	☐	☐

Electrical requirements	YES	NO	Customer Responsibility
Electric power for the Prodigy unit is available at an electrical power outlet. 100-120VAC/max 10A or 220-240VAC/max 5A, 50-60Hz, 0.6kW max. Length of power cable: 7.6m / 25ft (with adapter for Schuko and US Plug).	☐	☐	☐
In case of voltage fluctuations which exceed +/-10% of the nominal voltage value: Is there a voltage stabiliser available for the Prodigy system?	☐	☐	☐
Will an uninterrupted power supply (UPS) be available to connect the Prodigy system as well?	☐	☐	☐

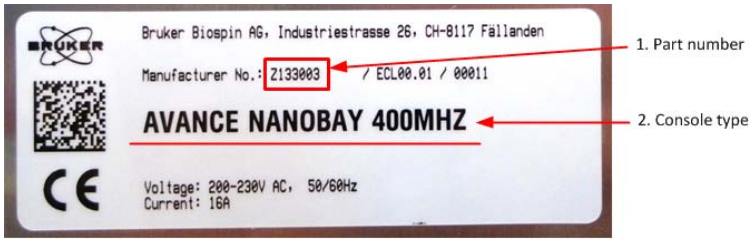
Electrical requirements	YES	NO	Customer Responsibility
Optional balance for the LN2 dewar: Is an additional electrical power socket for the electronic balance available? 100-120VAC or 220-240VAC / 50-60Hz Length of power cable: 7.6m / 25ft (with adapter for Schuko and US Plug).	☐	☐	☐

Safety (orange items)	YES	NO	Customer Responsibility
The exit doors of the magnet room open outwards.	☐	☐	☐
An oxygen monitoring and alarm system is installed in the lab.	☐	☐	☐
A fresh air supply system is available to provide adequate ventilation: normal operation @ fresh air supply rate ≥ $200m^3h^{-1}$ refill situation @ fresh air supply rate ≥ $400m^3h^{-1}$ (or open windows)	☐	☐	☐
The LN2 dewar will be secured against tipping over (earthquake risk; similar to magnet).	☐	☐	☐

In case of an existing console:	YES	NO
For 400 MHz magnets: Is a BOSS 1, a BOSS 2 or BOSS 3 Shim system of PLUG type available? (if not, an upgrade has to be performed)	☐	☐
For 500 MHz magnets and above: Is a BOSS 3 Shim system of PLUG type available? if not, an upgrade has to be performed	☐	☐
Is a BVT3000 or a BVT3200 or a BVT3200A or a BSVT unit available?	☐	☐
Is a GREAT 1/10 or 3/10 or a GAB respectively a GAB/2 available?	☐	☐
Is a Nanobay400 'V3' (Z133003) with AQS preamplifier available? (*type label on the back plane) If yes, the system is ready for a CPP BBO. Notice: 19F capability on 1H is supported via manual rewiring at the probe for CPP BBO.	☐	☐
Is one of the following consoles with AQS preamplifier available? • Nanobay400 'V2' (Z119572) (*type label on the back plane) • Nanobay400 'V1' (Z108356) (*type label on the back plane) • Microbay400 (H03128MB) (*type label inside cabinet, top right corner) If yes, the console has to be upgraded. Notice: 19F capability on 1H is supported via manual rewiring at the probe for CPP BBO.	☐	☐

In case of an existing console:	YES	NO
Is a console (AV II or newer) with HPPR/2 preamplifier available? If yes, an upgrade to CryoProbe-compatible HPPR/2 modules can be necessary. For CPPs with H & F feature an upgrade to HPLNA 1H is recommended.	☐	☐
In case of an existing console, is Topspin ≥3.1 PL 4 available? if no, the Topspin software has to be upgraded	☐	☐
Take a copy or print out of the configuration information of the existing system: *<topspin-home>/conf/instr/<instrument name>**/uxnmr.info***	☐	

*) Example of type label:



Is a detailed Site Planning necessary?	YES	NO
A magnet from BRUKER, but **not** one of the following types: • 400 MHz: US+ or Ascend • ≥ 500 MHz: US, US+ or Ascend	☐	☐
A magnet from another company	☐	☐
A widebore magnet	☐	☐
The magnet is placed in a pit	☐	☐
The magnet is equipped with a sample changer system	☐	☐
Any other unclear situation	☐	☐

If any of the questions in this section has been answered with YES, then contact cryoprobe.service@bruker.ch to clarify if an upgrade with a Prodigy system is possible.

Responsible partner at customer's site	
Name	
Telephone	
Email	
Company / Institution	
Address	
Ordering No. of the Prodigy System	
Ordering No. of the spectrometer	
Date and Signature	19 Oktober, 2012

Prodigy System: Requirements

Equipment dimensions	
Prodigy Unit	60 x 40 x 46 cm^3 (L x W x H); add 15cm for rear connections
LN2 dewar	50 x 62 x 135 cm^3 (L x W x H; W includes dewar handles)
Electrical requirements	
Prodigy Unit	100-120 VAC / 50-60 Hz / max 10 A / max 0.6 kW 220-240 VAC / 50-60 Hz / max 5 A / max 0.6 kW
Optional weight scale	100-120 VAC or 220-240 VAC / 50-60 Hz
N_2 gas requirements	
Case 1: In-house N_2 gas supply used as main N_2 source	Pressurised N_2 Gas: - N_2 content > 95% by volume - Dew point < -60°C @ 1 bar - Pressure 6 - 10 bar - Oil content: < 0.005 ppm (0.00425 mg/m^3) - Solid impurities: Use 5 micron filters. Filters should retain 99.99% of the specified particles Capacity: - Prodigy Unit: 40 l/min (1.4 cfm) + VT gas: 11 l/min (0.4 cfm) - Sample protection option: Add 40 l/min (1.4 cfm) to above values
Case 2: Compressed air with dew point **<-25 °C** available	Use an N_2-gas separator to generate on site the required N_2 gas (as specified in Case 1). *Please contact Bruker, if you need help choosing a suitable N2 gas separator*. Requirements for compressed air: - Pressure: 7-10 bar - Oil content: < 0.005 ppm (0.00425 mg/m^3) - Solid impurities: Use 5 micron filters. Filters should retain 99.99% of the specified particles. - Capacity: >200 l/min (7 cfm)
Case 3: Compressed air with dew point **>-25 °C** available	Use an additional Air dryer in order to obtain compressed air with a dew point < -25°C @ 1 bar (as specified in Case 2 above). *Please contact Bruker, if you need help choosing a suitable Air dryer.*
Backup N_2 gas supply (optional; in addition to any of the main gas supply variants above)	Independent N_2 gas source, e.g. a N_2 gas cylinder fitted with a pressure reducing valve. Specifications: See Case 1 above.

Ventilation requirements:	
Free room volume (exchangeable gas volume) $V_{free} = V_{room} - V_{furniture}$	≥ 70 m^3
Fresh air supply rate	≥ 200 $m^3\ h^{-1}$ During LN2 refill: ≥ 400 $m^3\ h^{-1}$
Further local regulations may apply.	

Safety in the Lab:






WARNING ⚠

Risk of suffocation.

Risk of injury due to very low temperature liquids & metal parts.

Contact with the skin may cause cold burns.

Contact with the eyes may cause blindness.

Therefore:

- The lab must have a free room volume of ≥70 m^3 with a steady fresh air supply rate of ≥200 m^3 h^{-1} for each CryoProbe Prodigy System.
- Before the refill process is started, the fresh air supply rate must be increased to ≥400 m^3 h^{-1}.
- Windows and doors must be opened before starting the LN2 refill.
- The lab must be equipped with oxygen monitors to detect a possible drop in the oxygen level. One oxygen monitor must be above the magnet and one oxygen monitor approx. 30 cm off the floor of the magnet room in order to detect low oxygen levels. Where the magnet is located inside a pit, an additional oxygen monitor located approx. 30 cm from the bottom of the pit must be fitted. All detectors should be located outside the 0.5 mT (5 G) line.
- Persons must not accompany a liquid nitrogen transport vessel inside an elevator (observe local regulations).
- The fill or refill procedure of the LN2 dewar must be carried out by trained laboratory personnel or trained personnel from a nitrogen supply company.
- During the entire refill process protective gloves, goggles, apron and personal oxygen monitor must be worn.
- Never look directly into the openings of components without eye protection (e.g. the Transferline) because liquid nitrogen droplets may spill out.
- The transport vessel for dispensing liquid nitrogen must be equipped with a safety pressure release valve, be non-ferromagnetic and must be placed outside the 0.5 mT (5 G) line.
- If the LN2 dewar is placed on the scale (optional equipment): The scale must be positioned outside the 0.5 mT (5 G) line of a shielded magnet.

Contact

NMR Hotlines:

Bruker Corporation provides dedicated hotlines and service centers. 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

Contact our NMR service centers, so that our specialists can respond as quickly as possible to all your service requests, application questions, software or technical needs.

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