



Bruker BioSpin

# Nanobay NMR Console ●

Technical Manual

Version 002

think forward

NMR Spectroscopy

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# Safety Instructions

## Terms and symbols



## 1.1

Table 1.1. Symbols used on the equipment or in this manual

	<p>Note: Hint for good operating practice.</p> <p>Note: Conseil pour la bonne pratique en matière d'opération</p>
	<p>High voltage: Throughout this manual, this symbol indicates necessary actions which imply a risk of being injured by high voltages. On the equipment, the symbol indicates dangerous voltages. Do not open a cover with this label!</p> <p>Haute tension: Dans tout ce manuel, ce symbole indique les actions nécessaires qui impliquent un risque de blessure par des tensions élevées. Sur l'équipement, le symbole indique des tensions dangereuses. N'ouvrez pas les couvercles avec cette étiquette !</p>
	<p>Dangerous device: Throughout this manual, this symbol denotes hints or instructions whose non-compliance could lead to erroneous or incalculable behaviour of the system or can lead to an injury of the user. On the equipment, the symbol implies also a danger and alerts the user. It is necessary for the user to refer to the manual prior to the use of marked items.</p> <p>Dispositif dangereux: Dans tout ce manuel, ce symbole indique les conseils ou les instructions dont le non-respect pourrait mener au comportement incorrect ou incalculable du système ou peut blesser l'utilisateur. Sur l'équipement, le symbole indique également un danger et prévient l'utilisateur. Au préalable, l'utilisateur est tenu de lire le manuel avant l'utilisation des articles marqués.</p>
	<p>Hot device: On the equipment, the symbol indicates hot surfaces and alerts the user.</p> <p>Dispositif chaud: Sur l'équipement, le symbole indique les surfaces chaudes et prévient l'utilisateur</p>

## Safety Instructions

Table 1.1. Symbols used on the equipment or in this manual

 or	<p>Electrostatic sensitive device: Observe precautions for handling.</p> <p>Dispositif sensible aux décharges électrostatique: Observez les précautions d'emploi</p>
	<p>Protective ground (earth) terminal: Used to identify any terminal which is connected to the external protective conductor for protection against electrical shock in case of fault.</p> <p>Borne de terre (Protection par la terre): Utilisé pour identifier toute borne qui est reliée au conducteur protecteur externe pour la protection contre les chocs électrique en cas de défaut.</p>

### Technical documentation, schematics and images

1.2

**Important note:** The published images, technical drawings and schematics in this manual are displayed for a comprehensive understanding of the Nanobay and sub-assemblies.

The actual versions may slightly differ. The images, technical drawings and schematics printed in this manual won't be updated for minor design changes. However, major design changes will be introduced into the manual for better understandability.

### Disclaimer

1.3

The following general safety precautions must be observed during all phases of operation and service of the Nanobay system. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the Nanobay system.

BRUKER assumes no liability for the customer's failure to comply with these requirements and is therefore not responsible or liable for any injury or damage that occurs as a consequence of non-approved manipulations on the Nanobay system.

### Emergency

1.3.1

The mains switch on the Nanobay chassis back provides the EMERGENCY OFF function. Under normal conditions, this switch is used for both, power up and shut down of the system.

### General safety considerations

1.4

These safety instructions refer to the whole Nanobay system including its sub-units.

The Nanobay system can be damaged by inappropriate usage. In this case, it is necessary to check the equipment by the service before it can be used again.

The user should inspect the equipment at regular intervals for correct operation. In case of any damage, wear or abnormal behavior, the user is expected to inform the service immediately.



**Danger**

**Do not use the equipment and inform the service staff, if you are in doubt about the correct state of any component.**

**N'utilisez pas l'équipement et informez le personnel de service, si vous suspectez un défaut .**

In the unlikely case of one of the following, stop using the equipment, interrupt the current supply, disclose this circumstance to the service staff and ask for instructions:

- The power cord, power plug or power supply are cracked, brittle or damaged
- Signs of excessive heat appear
- There is evidence or suspicion that a liquid has intruded into any enclosure
- The power cord or the power supply have been in contact with any liquid
- The Nanobay system has been damaged in any way
- The equipment does not work correctly

**Do not try to service the equipment by yourself, unless you are specifically asked to do so and are given instructions by the service staff. In case of questions or problems, please contact your nearest BRUKER office or representative.**



**Danger**

**N'essayez pas d'entretenir l'équipement par vous-même, à moins que vous soyez invité à le faire ainsi et instruit par le personnel de service. En cas de questions ou de problèmes, prenez contact avec le plus proche représentant de BRUKER svp.**

As a general rule, servicing must be performed by BRUKER qualified personnel. However, there are several Nanobay sub-assemblies that can be replaced or installed by the customer. These units are called „Field Exchangable Units“, see also chapter **"Field Exchangable Units" on page 16.**

**Instructed operating personnel must not remove chassis covers except as described in this manual. Do not replace Nanobay units with mains switch turned on.**



**Warning**

**Le personnel de service ne doivent pas enlever les couvercles de châssis excepté comme décrit dans ce manuel. Ne remplacez pas les unités Nanobay tandis que l'interrupteur principal est mis en circuit**

Before maintenance or repair always switch off and unplug the power cable. Under certain conditions dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them. The Nanobay chassis has been designed to provide maximum

## Safety Instructions

safety for the User. Under normal operation, the Nanobay chassis requires **NO** user access to the inner components of the unit.



### Warning

**All electrical connectors must be used as supplied by BRUKER. Do not substitute them by other types.**

**Seules les prises électriques fournies par BRUKER doivent être utilisées. Ne les substituez pas par d'autres types.**

User interface, system messages, and manuals require a good understanding of the English language.

Warnings and danger alerts are printed in English and partially in French.

## Manufacturer and Conformity

1.5

### Manufacturer

1.5.1

The individual units of the Nanobay system are manufactured at different BRUKER production sites. The manufacturer can be identified by the part number prefix according to the following table.

Table 1.2. *Manufacturer Identification*

Part No. Prefix	Z . . . . .	H . . . . .	W . . . . .
Manufacturer Address	<b>Bruker BioSpin AG</b> Industriestr. 26 8117 Fällanden <b>Switzerland</b>	<b>Bruker BioSpin GmbH</b> Silberstreifen 4 76287 Rheinstetten <b>Germany</b>	<b>Bruker BioSpin S.A.</b> 34, rue de l'industrie 67166 Wissembourg Cédex <b>France</b>
Phone	+41 (44) 825 91 11	+49 (721) 5161 - 0	+33 (3) 88 73 68 00
Fax	+41 (44) 825 96 96	+49 (721) 5171 01	+33 (3) 88 73 68 79
E-Mail	sales@bruker-biospin.ch	nmr@bruker-biospin.de	bruker@bruker.fr
Internet	www.bruker.com		

### Conformity

1.5.2

The Z104671AVANCE CONSOLE NB WIRED and Z119572 AVANCE CONSOLE NB-E WIRED V2 is in conformance with IEC/EN 61010-1 and IEC/EN 61326-1.

**Technical Specifications**

1.6

**Non-Intended Usage**

1.6.1



**Warning**

The Nanobay system is not qualified to be used beyond its “Intended Usage”.

**Do not use the Nanobay system for a purpose other than the described “Intended Usage”.**

**N'employez pas le système Nanobay pour un but autre que celui prévu.**

- Do not connect any other units to the rear power outlets except as described in this manual.
- Do not insert any other subunits into the mainframe except as described in this manual.

**Intended Usage**

1.6.2

The Nanobay system is dedicated only for the specific NMR purpose of being used as the electronics system of the *AVANCE III* spectrometers of BRUKER.



**Warning**

**Operation of the Nanobay chassis in a manner not consistent with 'Normal Operation' as described and recommended in this document may expose the user to unsafe conditions and may result in damage to the instrument. Service calls that arise from a failure to observe these recommendations are NOT covered by the instrument warranty**

**L'utilisation du châssis Nanobay non conforme avec l'usage normal décrit et recommandé dans ce document peut exposer l'utilisateur à des conditions dangereuses et pourrait conduire à la destruction de l'instrument. Des interventions qui résultent d'une inobservance de ces recommandations ne sont pas couvertes par la garantie.**

**Environmental Requirements**

1.6.3

Permissible ambient temperature:	5 to 35	°C
Permissible altitude: (above sea level)	up to 2000	m
Relative humidity:	max 80% up to 31°C and linear decreasing to 50% at 40°C	
Permissible storage temperature:	5 to 40	°C

The Nanobay system is designed as a subsystem of the spectrometer. For further environmental conditions outside the cabinet please refer to the appropriate BRUKER site planning guide of the spectrometer system.

## Safety Instructions

### Weight and Dimensions

1.6.4

Dimensions (height x width x depth)	710 x 450 x 880	mm
Weight without subunits (Z108356 only)	60	kg
Weight with subunits	130	kg

### Preparation and Transportation

1.7

Because of the Nanobay system contains a large amount of sensitive parts and assemblies, it must be handled with care and protected from mechanical shock.

#### Storage

1.7.1

If the Nanobay system is not installed immediately, it has to be inspected for any damage during shipment and must be stored in the original packing. Attention has to be paid to the recommended storage conditions, the temperature and the protection from moisture.

#### Unpacking

1.7.2

All packing materials have to be removed. The equipment must be inspected for any damage during shipment. If damage has occurred during transit, all the shipping cartons should be stored for further investigation. A claim for shipping damage has to be advised immediately.

### Operating Instructions

1.8

Prior to the first use after installation, make sure that the Nanobay system is properly configured. Please refer to the chapters "**Configuration of a Nanobay V1**" on page 23, "**Installation**" on page 69 and "**Wiring and cable sets**" on page 33 in this manual.

**Before first power up, pay particularly attention to the correct setting of the mains selector, as described in chapter "Mains Selector Setting" on page 28.**



**Warning**

**Avant la première mise sous tension, vérifiez la position correcte du sélecteur de tension, comme décrit dans le chapitre "Mains Selector Setting" on page 28.**

The only user operations permitted are:

- Starting up and shutting down the Nanobay system
- Operating the users software interface
- Connecting RF and data interface cables that are accessible outside of the Nanobay

- Replacing or installing field exchangeable units (by instructed operating or service personal)

### ***Operator Protection***

**1.8.1**

---

The electronic circuitry of Nanobay systems is operating with low and safe voltages, except for the power supply and its connection to mains and the RF excitation. Nevertheless, any electrical equipment can become a source of danger under extreme conditions.

Installation and servicing should only be done by BRUKER qualified personnel. Always disconnect the mains power cord before servicing. Under certain conditions dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge the circuits before touching them.



**Warning**

L'installation et la maintenance doivent être faites seulement par le personnel qualifié de Bruker. Déconnectez toujours le câble d'alimentation secteur avant tout entretien. Dans certaines conditions l'installation peut rester sous tension même si le câble d'alimentation secteur est déconnecté. Pour éviter des dommages, toujours déconnectez l'alimentation et déchargez les circuits avant de toucher.

Operating personnel must not remove chassis covers except as described in this manual. Do not replace Nanobay sub-assembly units without the mains switch turned OFF and the mains cord disconnected.



**Warning**

Le personnel de service ne doivent pas enlever les couvercles de châssis excepté comme décrit dans ce manuel. Ne remplacez pas les unités Nanobay tandis que l'interrupteur principal est mis en circuit.

DO NOT attempt to make adjustments, replacements or repairs to the instrument except as described in the accompanying user documentation. Only a Bruker Service Representative or similarly trained and authorized person should be permitted to service the instrument.



**Warning**

N'essayez pas de dépanner, d'ajuster ou de remplacer l'instrument ou ses parties excepté ce qui est décrit dans la documentation de l'utilisateur. Seulement un technicien de Bruker ou une personne qualifiée et autorisée sont autorisés à entretenir l'instrument.

Service on electrical components should be performed only by a qualified Bruker Service Representative or similarly trained and authorized person.



**Warning**

Le service des composants électriques devrait être effectué seulement par un technicien qualifié de Bruker ou une personne pareillement qualifiée et autorisée

**Warning**

To minimize the shock hazard, the Nanobay chassis must be connected to protective earth (electrical ground).

Pour réduire le risque d'électrocution au minimum le châssis de Nanobay doit être relié à la terre protectrice (la terre électrique).

Do only use power cables supplied or approved by BRUKER.

**Warning**

Utilisez seulement les câbles électriques fournis ou approuvés par BRUKER.

The electronics cabinet is equipped with a three-conductor ac power cable compliant with IEC/EN safety standards.



**Danger**

Do not loosen, connect or touch any cable during lightning.  
Do not use a cable that shows signs of damage or that have been stressed and could be damaged.

Ne détendez, ne reliez ou ne touchez aucun câble pendant un orage (foudre). N'employez pas un câble endommagé.



**Danger**

Do not open the power supply modules. There may be dangerous voltages present.

N'ouvrez pas les modules d'alimentation. Ils peuvent être sous tension.



**Warning**

Pay attention to the special safety symbols.

Respectez les symboles spéciaux de sécurité.



**Warning**

**Heavy equipment:**

At least four people are needed to lift the Nanobay cabinet. However, this is normally not necessary, since there are four wheels at the bottom of the cabinet.

**Équipement lourd:**

Au moins quatre personnes sont nécessaires pour soulever le coffret Nanobay. Normalement ce n'est pas nécessaire, puisqu'il y a quatre roues sous le châssis .



**Warning**

Handling under ESD safety conditions is absolutely necessary.

Use the ECD discharge bracelets while servicing the Nanobay. Don't touch uncovered metal surfaces on the PCBs, electronic devices or connectors before being grounded by the ESD bracelet.

Mettez le bracelet ESD avant de toucher les surfaces métallique sur le PCBs, les appareils électroniques ou les connecteurs.

The Nanobay system has many Field Exchangable Units located at the front and back of the chassis (mainframe). Basically all units in slide-in module style can be exchanged in the field. Types and position in the chassis are highly dependent on the configuration of the spectrometer.

Field Exchangable Units should only be replaced according to the configurations chapter in this manual. Make sure that the new units are inserted at their designated location in the chassis.

**Before a unit can be unplugged for exchange, the Nanobay must be completely switched off and the cables to the unit must be disconnected. ESD precautions must be observed for handling.**



### Warning

Avant qu'une unité puisse être débranchée pour l'échange, le Nanobay doit être complètement hors tension et le câble de réseau doit être débranché. Il faut observer des précautions d'ESD pour la manipulation.

Any EN61010 safety relevant items such as (but not limited to) the mains inlet module, mains wiring and main transformer in the chassis must not be removed from the chassis. Do not attempt to replace this unit in the field! In case of failure replace the mainframe as a whole. An exchange of safety relevant units requires a mandatory safety retest as defined by the EN61010 Annex F, Routine Tests.



### Danger

Aucun dispositif approprié de la sécurité EN61010 tel que (mais non limité) le module "système d'alimentation principal de forces", le câblage des forces et le transformateur principal dans le châssis ne doivent pas être enlevé du châssis. N'essayez pas de remplacer cet dispositif chez le client! Seulement remplacez l'unité entière avec toutes les despositives. Un échange des dispositives appropriées de sécurité demande une vérification de sécurité obligatoire comme défini par EN61010 l'annexe F, vérification individuels de série.

In case of the AQS IPSO unit, the replacement should be left to qualified service personnel.

The fan tray at the right side of the chassis is a Field Exchangable Unit as well. For replacement instructions please refer to the corresponding chapter "**Fan maintenance**" on page 73.

## Maintenance and Cleaning

1.10

### Cleaning

1.10.1

Cleaning the surface of the enclosure and/or front panel can be carried out by the customer, if the following instructions are adhered to:

1. Switch off the equipment and unplug the power cable.
2. Clean up the outside surface with a soft, lint-free cloth dampened in water.

**Use only water. Do not use any detergent or other cleaning solvents.**



### Warning

Employez seulement de l'eau. N'employez aucun détergent ni d'autres dissolvants de nettoyage.

3. Let all surfaces completely dry before installing.
4. Connect all cables and power up.

The Nanobay system can be expected to have a long and trouble-free life without preventive maintenance. However, it may be necessary to replace the filter fleece (part of the fan tray) if it is dusty, and it may be necessary to exchange the filter for compressed gas (see chapter **"Maintenance" on page 72**).

Environmental issues are essential in determining the reliability. The temperature and humidity have to be within specifications. The area around should be kept relatively clean and dust free.

In case of questions or problems, please contact your nearest BRUKER office or representative.

A list of all our offices is published on the web:

[http://www.bruker-biospin.com/contact\\_us.html](http://www.bruker-biospin.com/contact_us.html)

# Overview

## Introduction

## 2.1

The Avance Nanobay is a reduced size variant of the MicroBay console for Avance III systems. With its basic infrastructure (fan cooling, transformer, Ethernet switch and back plane), the Nanobay integrates also the functions of the AQS and BSMS chassis, which are both taken up in the system.

Functional units (IPSO, Receiver, Signal Generation, Power Amplifiers, Preamplifiers, Shim Boards, Lock, VT, etc.) are identical with the MicroBay configuration. For extended applications, it is also possible to connect external preamplifiers (e. g. for cryo probes).

Currently there are two generations of Nanobay systems available:

- Z108356 AVANCE CONSOLE NB-E WIRED: BVT3200 VT system
- Z119572 AVANCE CONSOLE NB-E WIRED V2: BSVT VT system and BOSS-3 support

Figure 2.1. Nanobay console

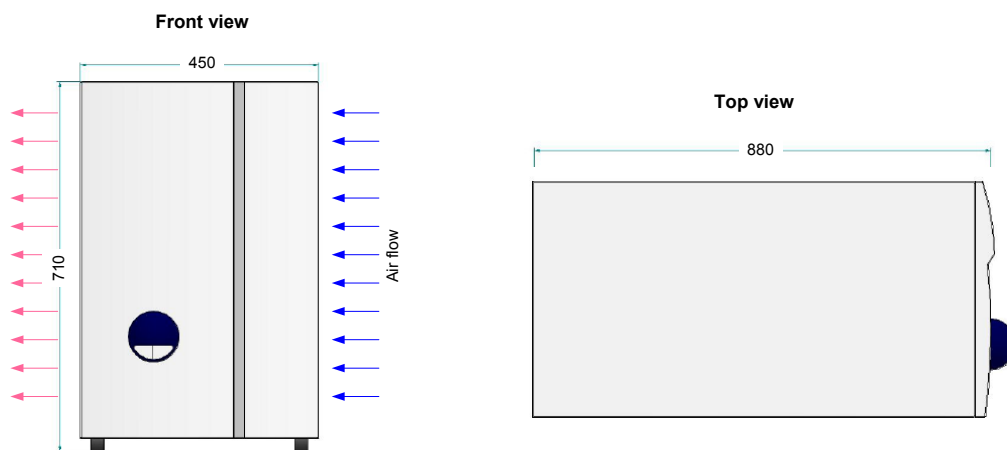


In the Nanobay, the AQS and BSMS (respectively the related sub-units) are integrated into one system. However, there are still the two distinguishable sections for the AQS and the BSMS. The IPSO can be considered as a separate subsystem as well.

Since the functional units are installed in a similar way as in the AQS and BSMS, this manual covers only the Nanobay specific information (considerations for safety, main frame, Nanobay specific configuration information, etc.). Detailed information about the functional units and their cooperation in the AQS and BSMS are described in the related manuals:

- IPSO section: „**IPSO AQS Unit for AVANCE III**“
- AQS section: „**AQS/3 with IPSO Systems**“ and „**HPPR/2**“ (preamplifiers) in the HPPR directory.
- BSMS section: „**BSMS/2 systems with ELCB**“
- Fundamental description of NMR lock: „**BSMS Lock**“
- Lift, Spin HE level and N2 level measurement: „**Sample and Level (SLCB)**“ and „**BSMS/2 systems with ELCB**“ (Nanobay V2)

Figure 2.2. Dimensions of the Nanobay cabinet



The side panels can be easily removed by quick snap-in fastenings, which are described in chapter **"Fan filter fleece replacement" on page 74.**

Table 2.1. Differences between Noanobay versions

Part Number	Description	Lock	VT System	Supported Shim System	Power Supply
Z108356	AVANCE CONSOLE NB-E WIRED	L-RX / L-TX	BVT3200(A)	BOSS-1	PSB3
		L-TRX			PSB6
Z119572	AVANCE CONSOLE NB-E WIRED V2	L-TRX	BSVT	BOSS-1 BOSS-3	PSB6 ECL >=02.00



# Nanobay Console Z108356 (V1)

## Overview

## 3.1

The pictures below show the Nanobay cabinet with removed housing. In contrast with the other consoles (TwoBay, OneBay and MicroBay), the units of back and front side are reverse - the power supplies and BVT3200 are accessible from the front side, whereas the other units (IPSO, DRU, REF, etc.) are at the rear side of the console.

Figure 3.1. Front side (left) and back side (right) of a Nanobay



## Configuration of a Nanobay V1

## 3.2

The diagram below shows the three sections with the corresponding sub-units. Most of them are uniform, only the preamplifiers and the Lock RF board L-TRX are proton frequency specific.

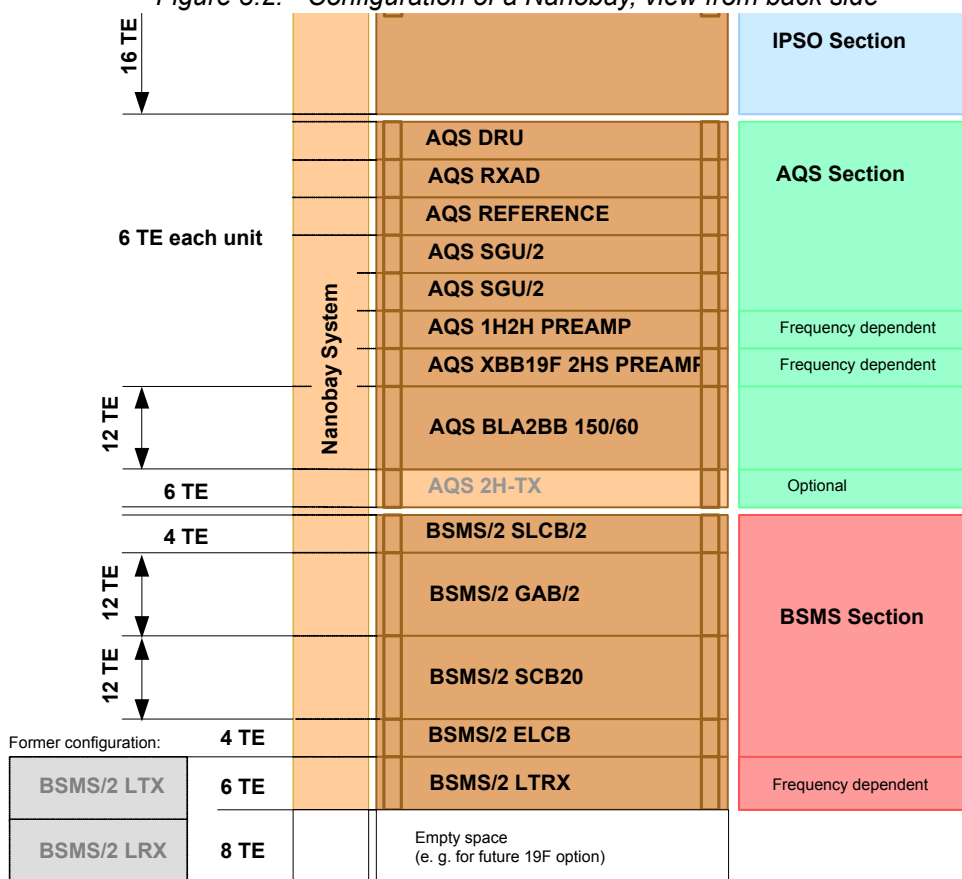
Since the L-TRX provides an integrated, compact 2H amplifier for gradient shimming, the high power AQS 2H-TX is optional (depending on the applications).

In former configurations, there are two separate Lock RF boards (LTX and LRX) installed instead of the new L-TRX.

Note: The former Lock RF boards LTX and LRX require the former power supply board PSB3 instead of the new PSB6. Make sure that the correct power supply is installed!

At the bottom, there is a free space, which can be used for a future 19F option. In the mean time, while there is no appropriate 19F option for the new L-TRX available, configurations for 19F lock have to be equipped with the former LTX / LRX boards.

Figure 3.2. Configuration of a Nanobay, view from back side



Also the opposite side (front side with power supplies) can be divided into the three sections (IPSO, AQS and BSMS), but there are some relations between the sections (power supply).

- The 12V of the IPSO power supply is used also for the fan tray and for the Ethernet switch.
- The TX-P28V power is provided for all amplifiers, the BLA2BB, the (optional) 2H-TX and the L-TRX, which is part of the BSMS section.

Note: New configurations with L-TRX have the INES PSB6 installed, whereas former configurations with LTX and LRX are equipped with the INES PSB3.

Figure 3.3. Configuration of a Nanobay, view from front side

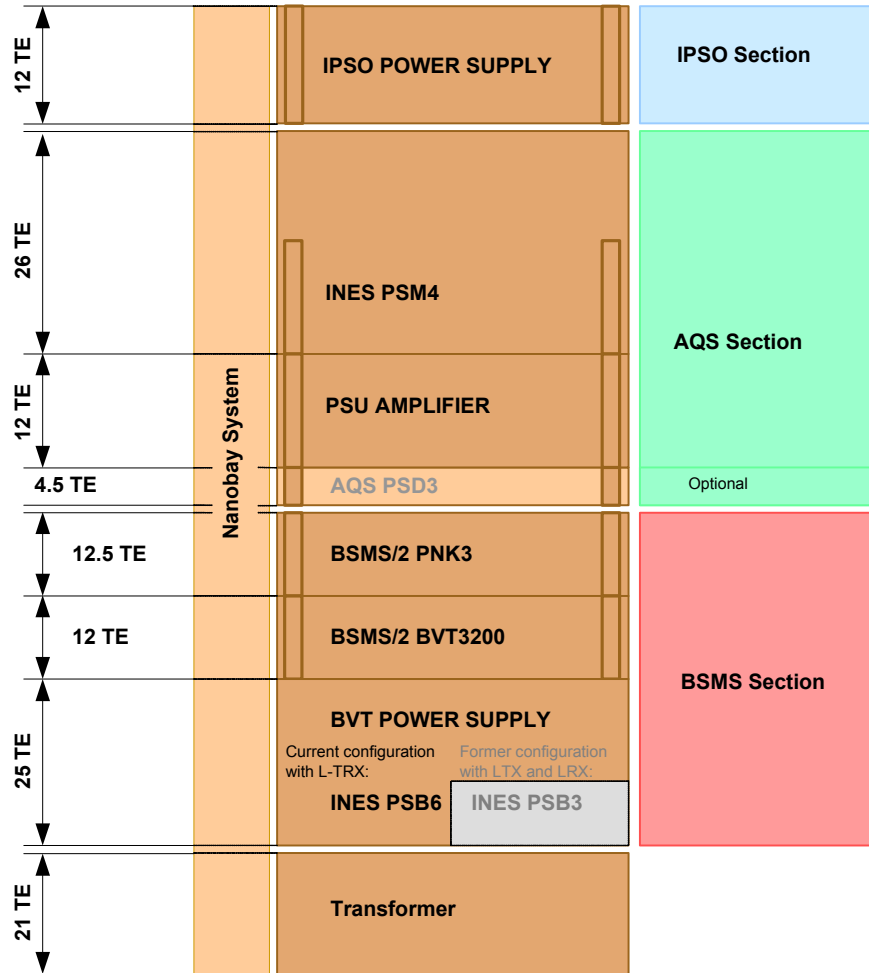
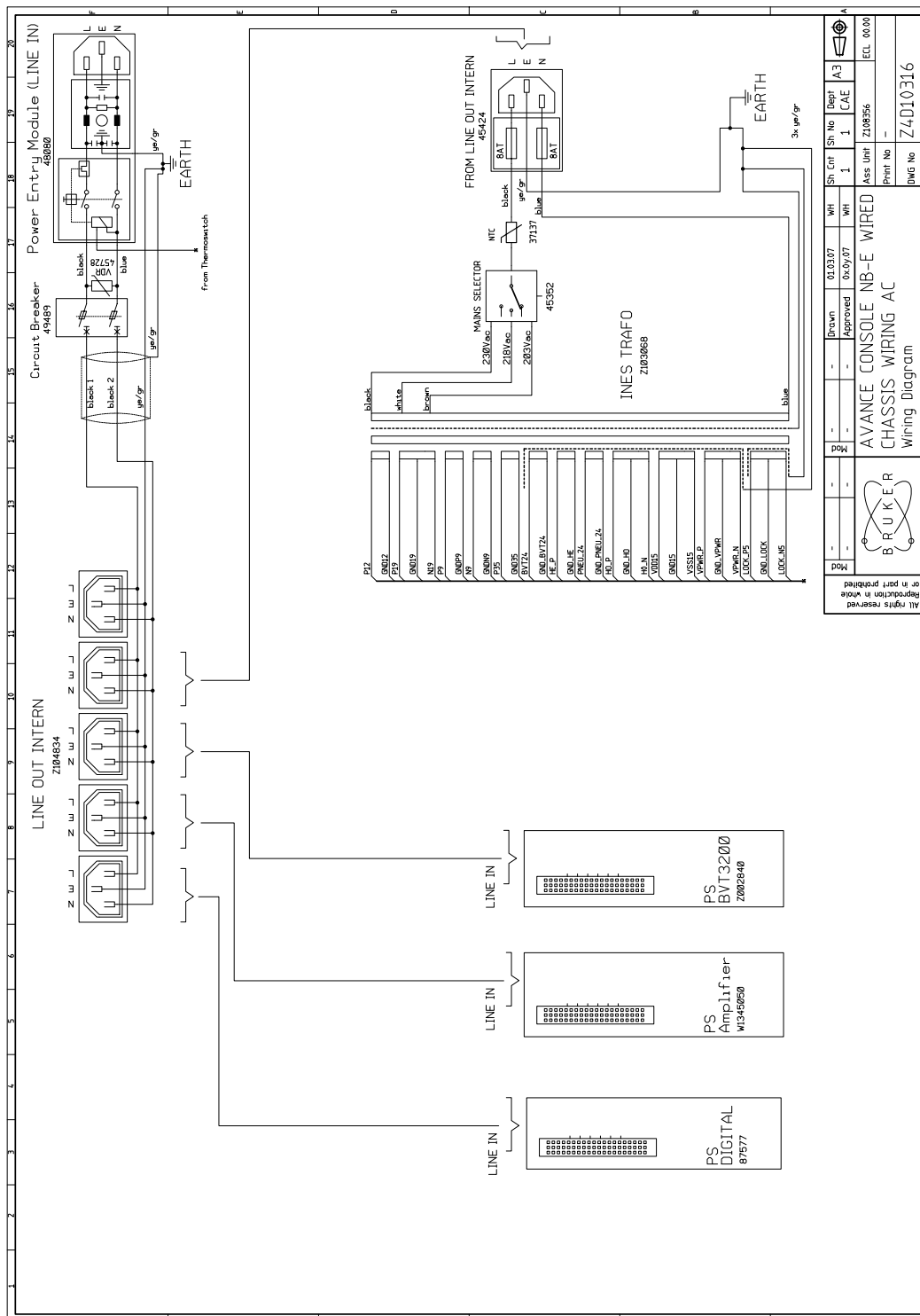


Figure 3.4. Nanobay internal AC wiring, overview



The diagram above shows the AC wiring inside the Nanobay console.

- The mains power is connected to the entry module with power switch (automatic shut down when there is no input voltage), including filters.
- A circuit breaker provides fast overcurrent shut down (< 8 ms)
- A thermal safety relay switches off the console when the hot spot temperature exceeds a specific limit (the sensor is mounted on the PSM4 heat sink).
- All AC power supplies (PS DIGITAL for IPSO, PS AMPLIFIER and PS BVT3200) and also the transformer unit are connected to the internal line connectors, which are all protected by the mechanisms above mentioned.
- The transformer (part of INES TRAF0 UNIT) is additionally protected by two fuses, and there is a NTC for limiting the inrush current during power up.
- There is a power range switch for adaptation to the local mains voltage (see next chapter **"Mains Selector Setting" on page 28**).



Note: After shut down, the Nanobay should stay at least 30 seconds off before it is powered up again.

Figure 3.5. Mains power connector, circuit breaker and power switch

1. Push circuit breaker to upper position
2. Power button for power up (and for shut down)



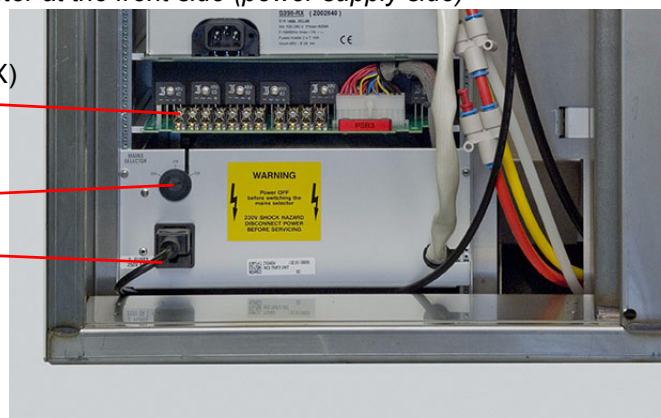
In case of over current the circuit breaker shuts down the mains power. It is then in the lower position and needs to be pushed to the upper position again before the Nanobay console can be switched on.

Figure 3.6. Mains selector at the front side (power supply side)

DC fuses on PSB6  
(configuration with L-TRX)  
or on PSB3 (LTX / LRX)  
respectively

mains selector

AC fuses (transformer)



Prior to the first power-up of the Nanobay console, it must be ensured that the mains selector switch is in the correct position (see **"Mains selector at the front side (power supply side)" on page 27**).

The Nanobay is safe to operate at all settings within an input voltage range of 208..230V~ ±10% according to IEC/EN 61010-1. However because the size of the linear power supply modules is designed for minimal power dissipation, the transformer input voltage should be matched to the mains voltage at the installation site. The input voltage ranges for optimal performance are as follows:

Table 3.1. Mains selector settings for optimal performance

Input voltage range	Mains selector setting
183 .. 223 V~	<b>203</b>
197 .. 240 V~	<b>218</b>
207 .. 253 V~	<b>230</b>

= factory preset

In countries with 100-120V~ mains supply such as USA, Canada or Japan combined line voltages may be used.

- Connect the mains input between two phases of the mains supply to obtain a nominal input voltage of 200..208V~
- Set the selector switch to **203**

Alternatively an external step-up voltage converter with an output voltage of 208..230V~ may be used.

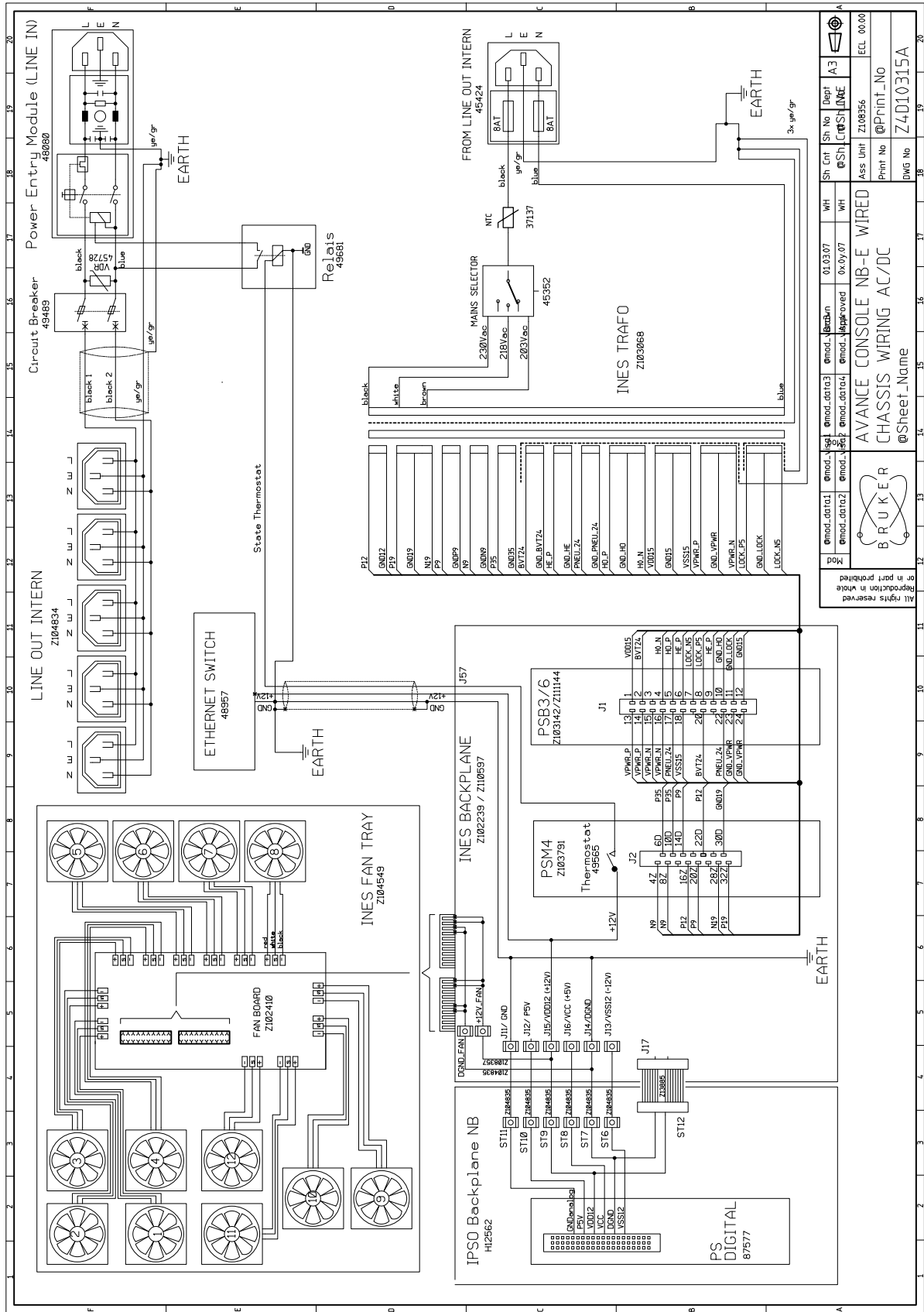
The diagram **"Nanobay internal AC wiring with fan tray and linear power supplies" on page 29** shows in detail the power supply wiring, including the connection of the two linear power supplies PSM4 and PSB6 (L-TRX) or PSB3 (LTX / LRX) respectively to the transformer.

For powering the fans, the power supply (+12V) from the IPSO power supply is used (shared), and there is a fan supervision built in on the backplane.

Also the Ethernet switch is powered by the +12V IPSO power supply.

The thermal shut down requires +12V from the IPSO power supply as well (control signal for the mains relay).

Figure 3.7. Nanobay internal AC wiring with fan tray and linear power supplies



AVANCE CONSOLE NB-E WIRED  
CHASSIS WIRING AC/DC  
@Sheet\_No: Z4D10315A

BRUKER

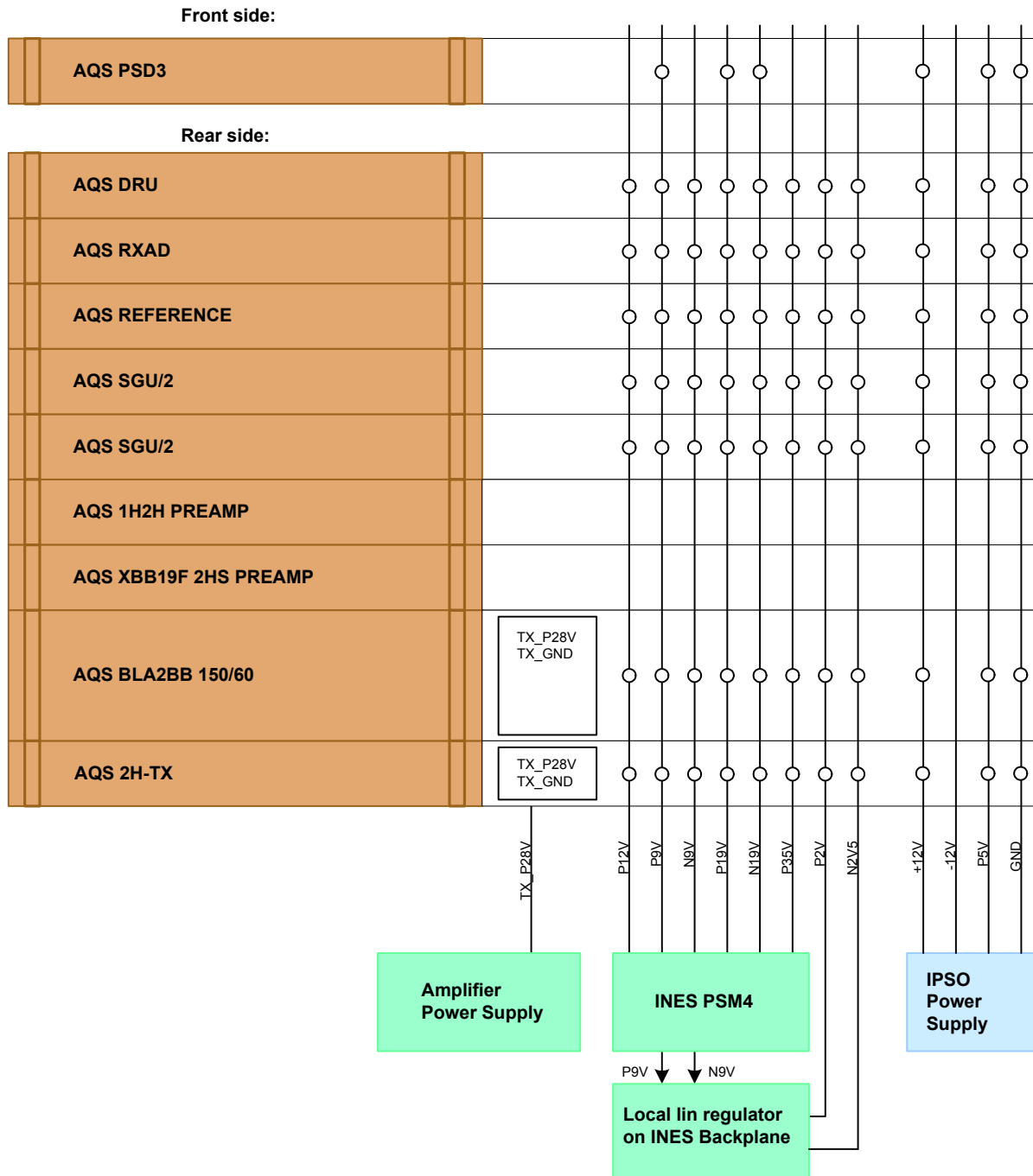
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or in part prohibited

Mod.	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	

SH. Cnt. SH. No. Depr. A3  
① SH. Cnt. SH. No. Depr. A3  
WH 01.03.07 WH 0x.07.07  
Ass. Unit Z108356  
Print No. Z4D10315A  
DWG No. Z4D10315A

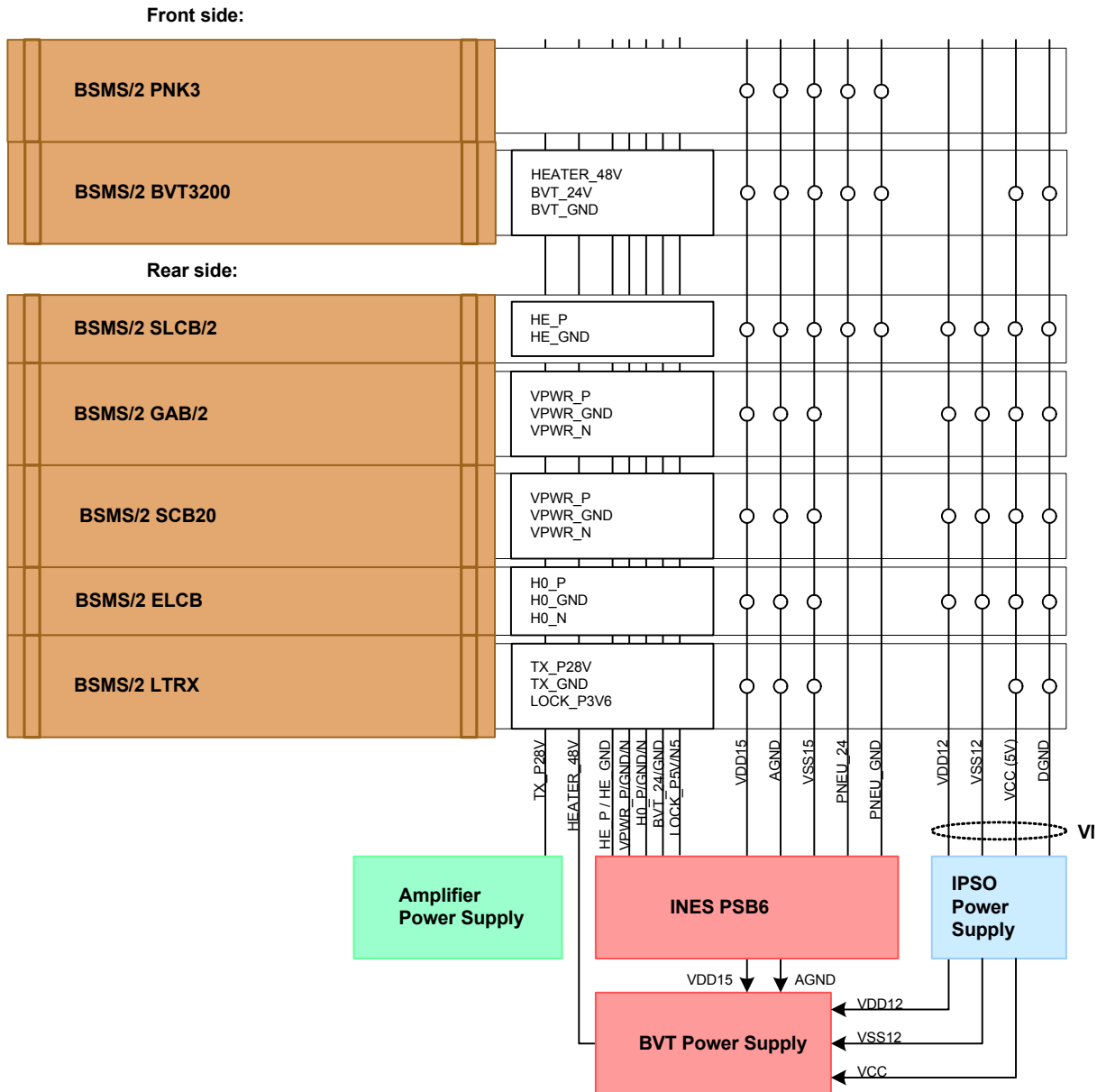
Each of the three sections (IPSO, AQS and BSMS) can be considered separately for the DC wiring. The IPSO is supplied by a dedicated power supply, which is at the opposite side (front side).

Figure 3.8. DC wiring of the AQS section



The AQS PSD3 is optional (required if there are external preamplifiers used).

Figure 3.9. DC wiring of the BSMS section

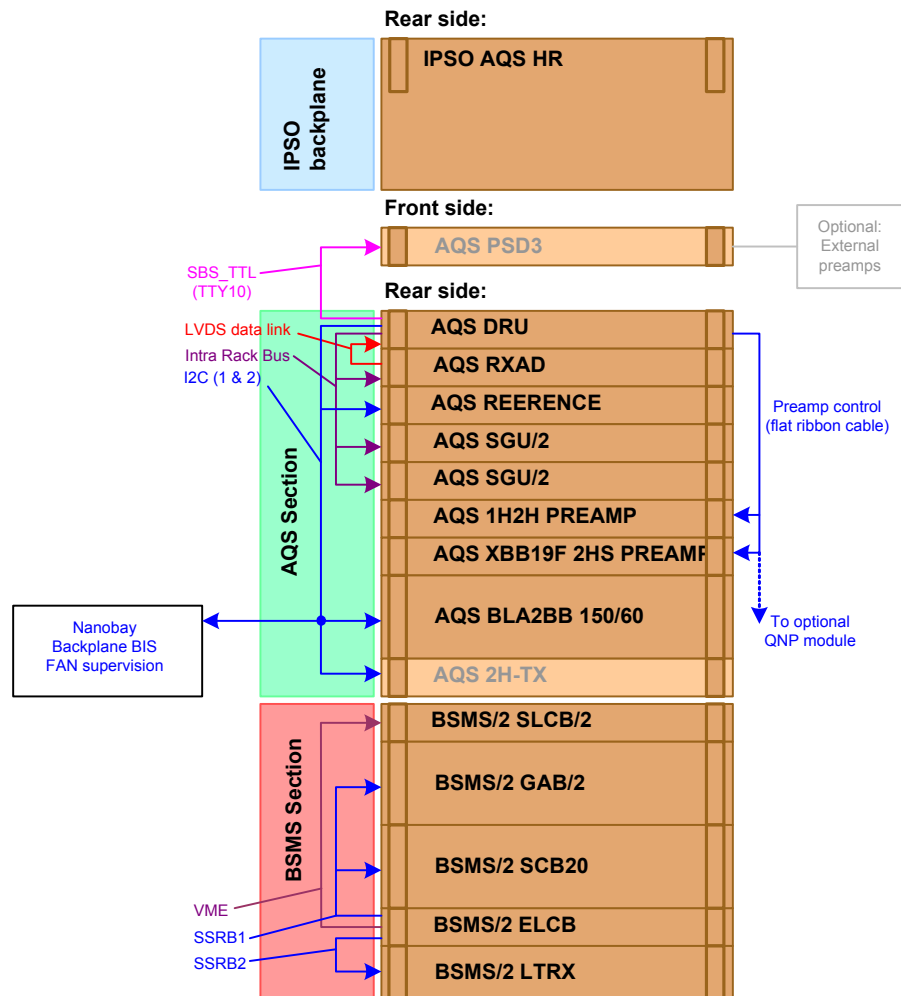


Some of the unit connectors provide specific voltages (e. g. high voltage for HE level measurement, etc.). These specific voltages are not available on the other connectors.

The BSMS section is mainly supplied by the INES PSB6, the BVT power supply provides the high power for heating and (optional) N2 evaporator. In addition, the amplifier supply voltage is used for the L-TRX, and the IPSO power supply provides the necessary voltages for the VME bus section.

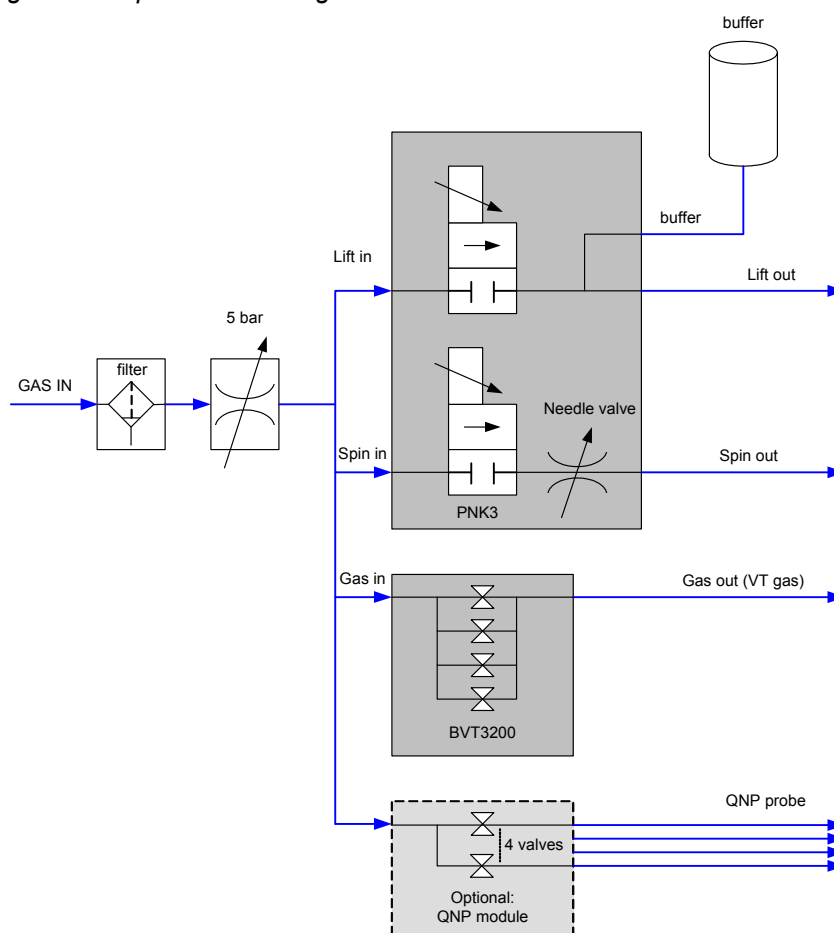
The backplane communication is shown in the diagram below. The AQS section is managed by the DRU, whereas the BSMS part is managed by the ELCB. Both, DRU and ELCB, are Ethernet devices and part of the Spectrometer network.

Figure 3.10. Back plane communication



The Nanobay requires also compressed air or N<sub>2</sub> gas (see in the site planning manual for exact specifications). Inside the cabinet, there is a filter and a pressure reduction valve providing clean gas to the pneumatic module (for spin and lift), the variable temperature unit (gas flow for probe temperature control) and an optional QNP probe.

Figure 3.11. pneumatics diagram



The particle filter must be clean (visible through a transparent cover). It may be necessary to replace it (part number **48290**), e. g. when it has been polluted. Accumulated liquids can be drained by a valve at the bottom of the filter (see also **"Maintenance of the particle filter for compressed gas" on page 76**).

### Wiring and cable sets

There is a cable set internal (H14042) providing all cables that are necessary for the internal wiring (variant with L-TRX). In addition, the 26 pin LVDS cable (part of gradient cable set H14036) has to be connected between the AQS IPSO (F/G-Controller 4) and the GAB/2 (G-Con).

For the optional AQS 2H-TX, there will be a separate cable set defined.

Figure 3.12. Cable set H14043 for internal wiring (page 1 of 2)

# CABLE SET NANOBAY AVIII/L-TRX INTERNAL

Part: **H14043**

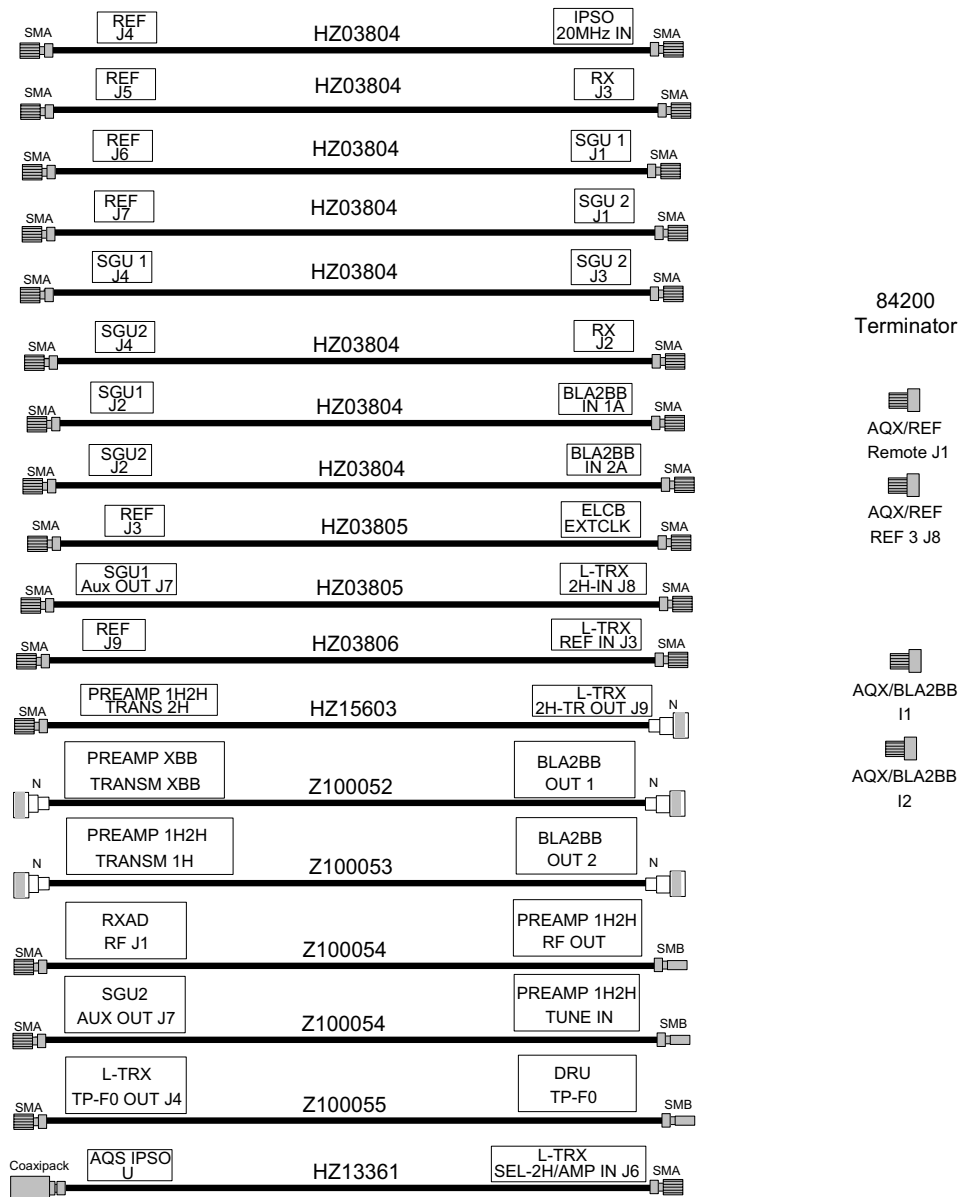


Figure 3.13. Cable set H14043 for internal wiring (page 2 of 2)

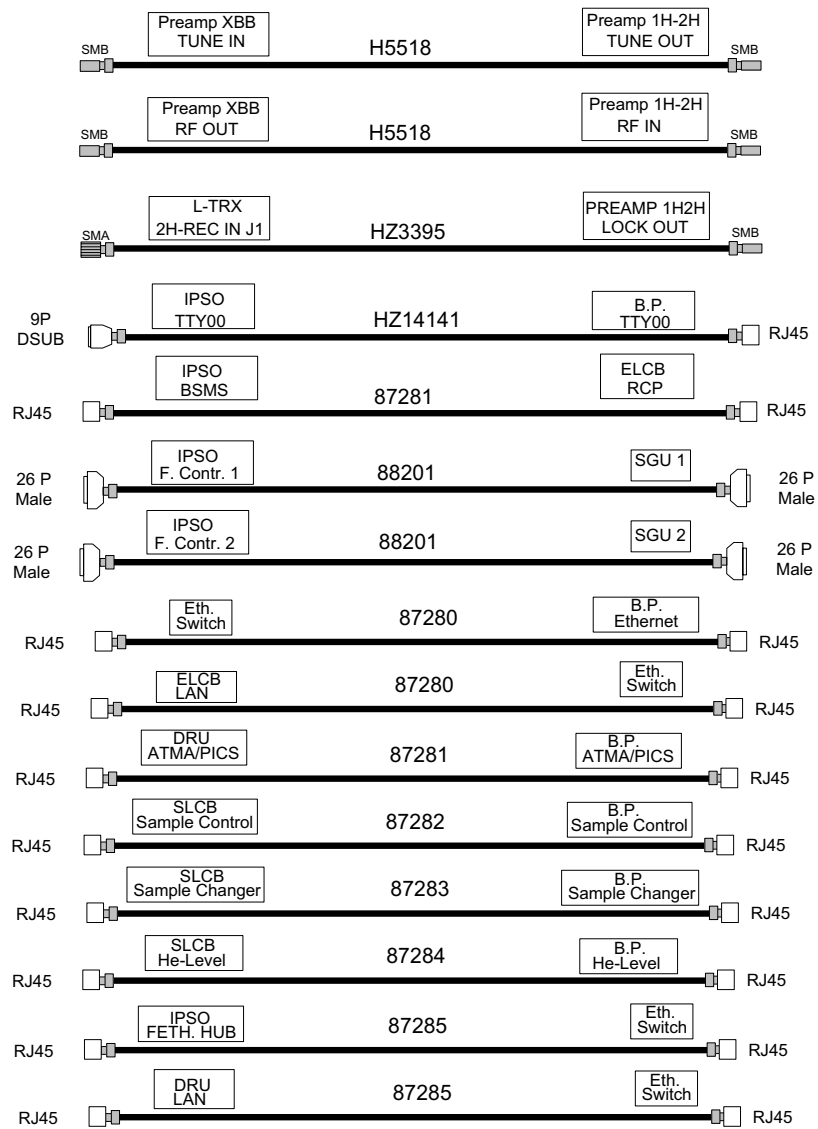
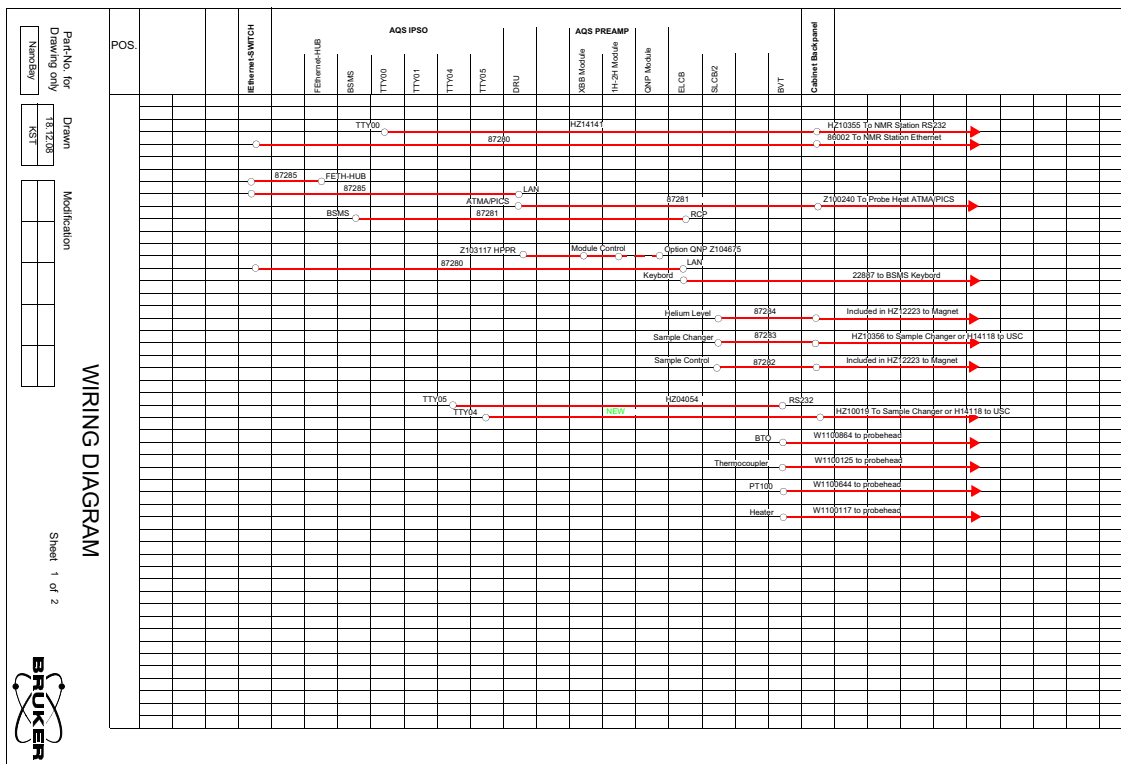
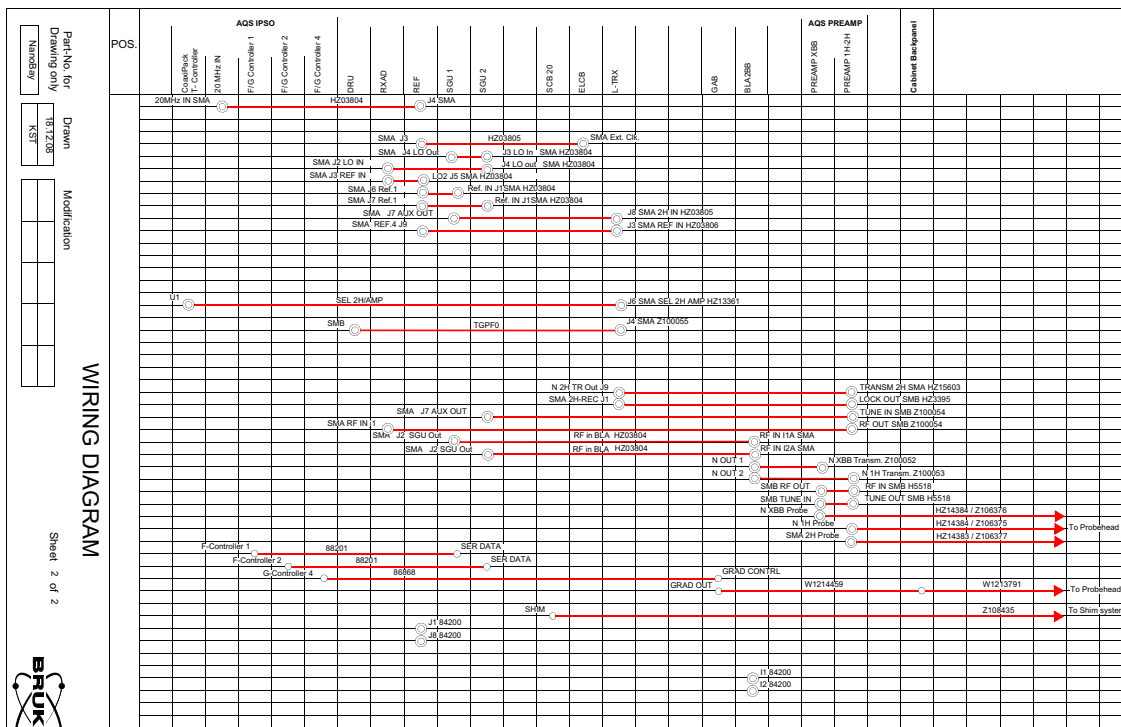


Figure 3.14. Wiring of a Nanobay console



Avance III Nanobay with L-TRX

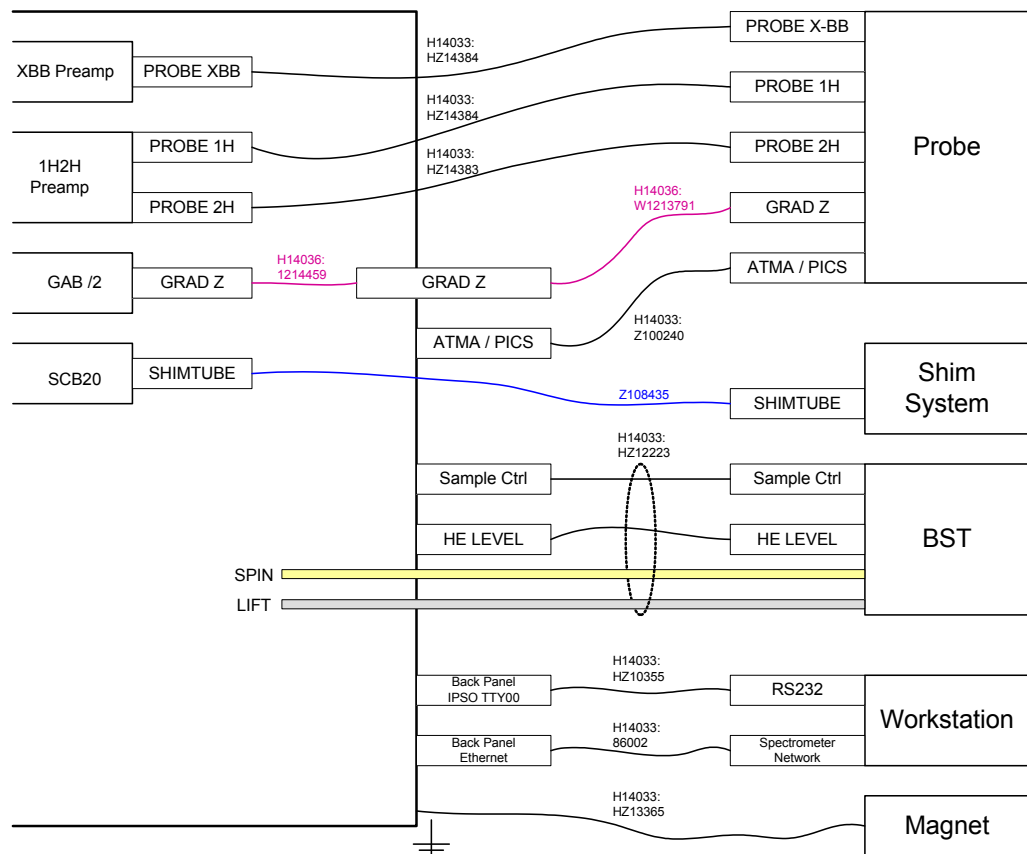


Avance III Nanobay with L-TRX

For the external wiring, there are the following cable sets necessary:

- external cable set H14033 containing most of the external cables (indicated in black color in the diagram below)
- Shim cable Z108435 (indicated in blue color)
- gradient cable set H14036 containing the gradient cable (indicated in red color)

Figure 3.15. External wiring of Nanobay console

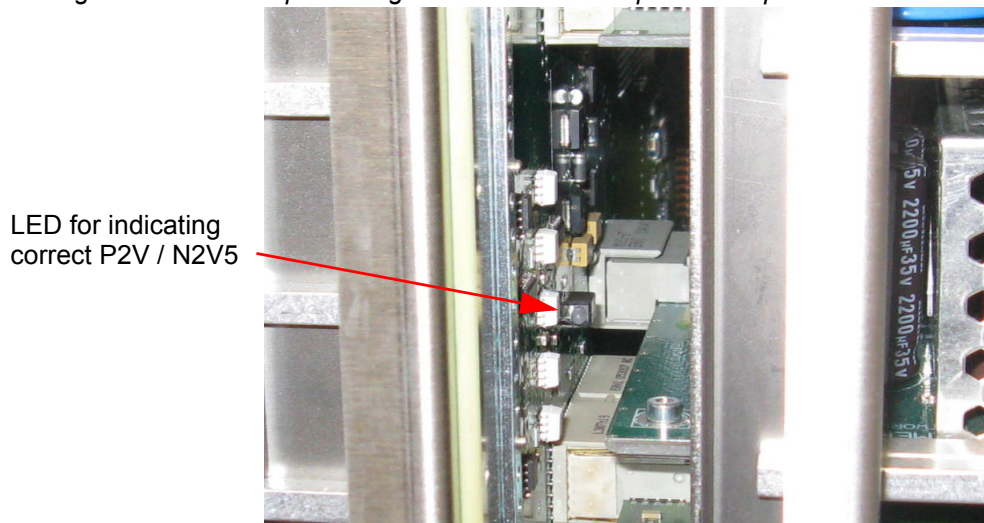


In this chapter there is a detailed description of the transformer and the Nanobay specific power supplies INES PSM4 and INES PSB6.

The transformer is part of the cabinet and can not be exchanged in the field. It provides the cables with the appropriate connectors for the PSM4 and PSB6.

For the low skew clock network, there are two additional supply voltages required (P2V and N2V5), which are provided by linear power regulators on the Nanobay back plane. The related LED (common for both voltages) for indicating correct operation is located on the backplane as well and can be inspected when the left side panel is removed.

Figure 3.16. Linear power regulators on the back plane with power LED



**Power supply INES PSM4**

**3.8.1**

There is a common ground for all PSM4 supply voltages

On the PSM4 heat sink there is an over temperature sensor providing shut down of the Nanobay console in case of excess temperature.

Table 3.2. PSM4 Electrical Characteristics

Voltage Name (LED)	Voltage @ rated load	Current @ rated load	ripple (mV <sub>eff</sub> )	Fuse	Fuse Number
P19	19.0 +/- 0.7 V	3.0 A	25 mV	5.0 AT	F1
N19	-19.0 +/- 0.7 V	0.73 A	15 mV	5.0 AT	F2
P12	12.0 +/- 0.6 V	5.7 A	25 mV	10 AT	F3
P9	9.0 +/- 0.5 V	6.1 A	25 mV	10 AT	F4
N9	-9.0 +/- 0.5 V	1.9 A	15 mV	8.0 AT	F6
P35	34.5 +/- 1.5 V	0.14 A	10 mV	0.5 AT	F5

**Power supply INES PSB6 (PSB3 for systems with LTX / LRX)**

**3.8.2**

The power supply PSB6 is used for operation with the L-TRX, whereas the PSB3 has to be installed with the former LTX / LRX boards.

Behind each LED on the PSB6 or PSB3 respectively (indicators that the according voltage is available) there is the corresponding fuse, which can be exchanged even when the PSB is installed in the console.

Table 3.3. PSB6 Electrical Characteristics (L-TRX configurations)

Voltage Name (LED)	Reference	Voltage @ rated load	Current @ rated load	ripple (mV <sub>eff</sub> )	Fuse
BVT_24V	BVT_GND	24.0 +/- 1.0 V	1.65 A	10 mV	3.15 AT
H0_P	H0_GND	29.6 +/- 1.2 V	0.55 A	10 mV	1.0 AT
H0_N	H0_GND	-29.6 +/- 1.2 V	0.28 A	10 mV	1.0 AT
LOCK_P3V6 <sup>1)</sup>	LOCK_DGND	3.6 +/- 0.1 V	2.0 A	20 mV	-
HE_P	HE_GND	36 .. 46 V	0.4 A	1 V	1.00 AT
PNEU_24V	PNEU_GND	22 .. 29 V	2.1 A	1.5 V	4.00 AT
VDD15	AGND	15 +/- 0.6 V	1.45 A	20 mV	2.5 AT
VSS15	AGND	-15 +/- 0.6 V	0.9 A	20 mV	2.5 AT
VPWR_P	VPWR_GND	20 .. 27 V	4.2 A	1 V	8.0 AT
VPWR_N	VPWR_GND	-20 .. -27 V	4.2 A	1 V	8.0 AT

Note: The shaded rows indicate that the referred voltages are non-regulated.

Note <sup>1)</sup>: Voltage from DC/DC converter, input voltage is PNEU\_24V

Table 3.4. PSB3 Electrical Characteristics (LTX / LRX configurations)

Voltage Name (LED)	Reference	Voltage @ rated load	Current @ rated load	ripple (mV <sub>eff</sub> )	Fuse
BVT_24V	BVT_GND	24.0 +/- 1.0 V	1.65 A	10 mV	3.15 AT
H0_P	H0_GND	29.6 +/- 1.2 V	0.55 A	10 mV	1.0 AT
H0_N	H0_GND	-29.6 +/- 1.2 V	0.28 A	10 mV	1.0 AT
LOCK_P5	LOCK_DGND	5 +/- 0.2 V	0.63 A	10 mV	1.25 AT
LOCK_N5	LOCK_DGND	-5 +/- 0.2 V	0.45 A	10 mV	1.25 AT
HE_P	HE_GND	36 .. 46 V	0.4 A	1 V	1.00 AT
PNEU_24V	PNEU_GND	22 .. 29 V	2.1 A	1.5 V	4.00 AT
VDD15	AGND	15 +/- 0.6 V	1.45 A	20 mV	2.5 AT
VSS15	AGND	-15 +/- 0.6 V	0.9 A	20 mV	2.5 AT
VPWR_P	VPWR_GND	20 .. 27 V	4.2 A	1 V	8.0 AT
VPWR_N	VPWR_GND	-20 .. -27 V	4.2 A	1 V	8.0 AT

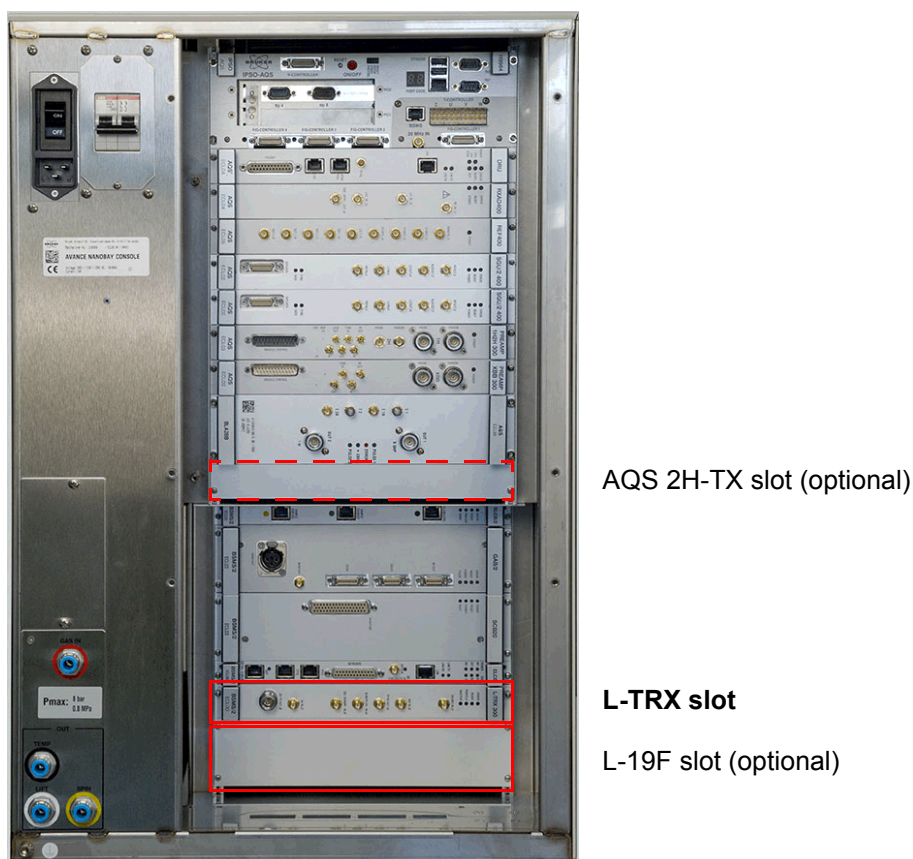
New Nanobay systems are delivered with the L-TRX installed. Former Nanobay consoles (Z108356, ECL  $\geq$  02) with LTX / LRX can be upgraded for the L-TRX system. For the upgrade, the power supply board INES PSB3 must be replaced, and a jumper must be configured. The installation is described in detail in the following sub-chapters.

### Installation of a L-TRX in a Nanobay

Since the L-TRX contains a compact, integrated 2H-TX (e. g. providing the required power for 2H gradient shimming), the strong AQS 2H-TX becomes optional.

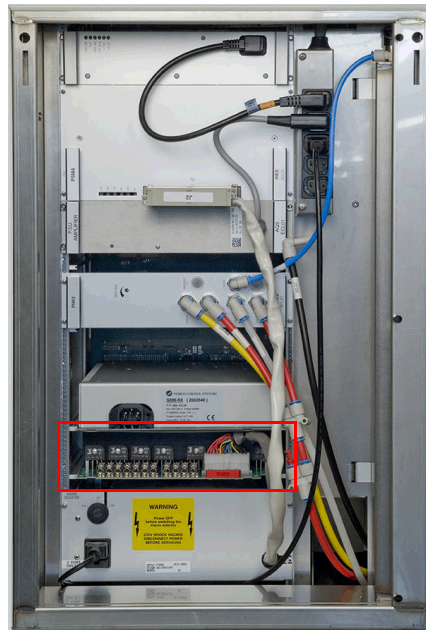
For upgrading, the former LTX and LRX are removed, and the new L-TRX is inserted into the LTX slot. The LRX slot has to be covered by an appropriate blind plate. It is reserved for a future 19F option.

Figure 3.17. L-TRX slot in NanoBay (Rear View)



The new L-TRX requires different supply voltages, so that the formerly used INES PSB3 has to be replaced by the PSB6. There is a modified covering plate for the power supply, indicating the correct voltage values next to the power LED's.

Figure 3.18. PSB6 slot in NanoBay (Front View)



**230V SHOCK HAZARD**  
Disconnect power  
before servicing!



**Risque d'électrocution 230V**  
déconnecter le câble  
de réseau avant opérations  
de maintenance

- Remove the coverplate over the power supply boards
- Replace PSB3 with PSB6 (Z111144)
- Replace the coverplate

**Configuration for L-TRX (Jumper settings and BSMS Service Web configuration) 3.9.2**

**Wiring of BLNKTR\_2H~ Pulse via Backplane:**

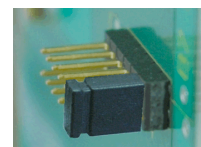
The pulse is wired on the backplane via jumper J64 to the BLNKTR(3)~ pulse.

Figure 3.19. Jumper J64 installation



- Remove the right side panel of the console and the fan tray behind it
- Locate jumper J64: It is situated on the lower left side of the backplane at the rear of the BSMS/2 BVT3200 TEMP unit. It has six positions.

- Insert a jumper (3033) at the rightmost position (first position towards you)



- Reinstall the fan tray and side panel

**Blanking Control selection:**

In the BSMS Service Web (see also BSMS Technical Manual with ELCB) select the correct blanking control signal routing:

- Go to the Service Web page „main“->“Lock“->“Lock Configuration“
- Set BLNKTR-2H~ source to ‚Backplane‘

**2H-TX Control (Router Address):**

In the BSMS Service Web enable or disable the internal power amplifier for gradient shimming:

- Go to the Service Web page „main“->“2H-TX“

If no AQS 2H-TX is present then enable the internal power amplifier for gradient shimming:

- Set router address to ‚3‘

If an AQS 2H-TX is present, disable the internal power amplifier:

- Set router address to ‚255‘.

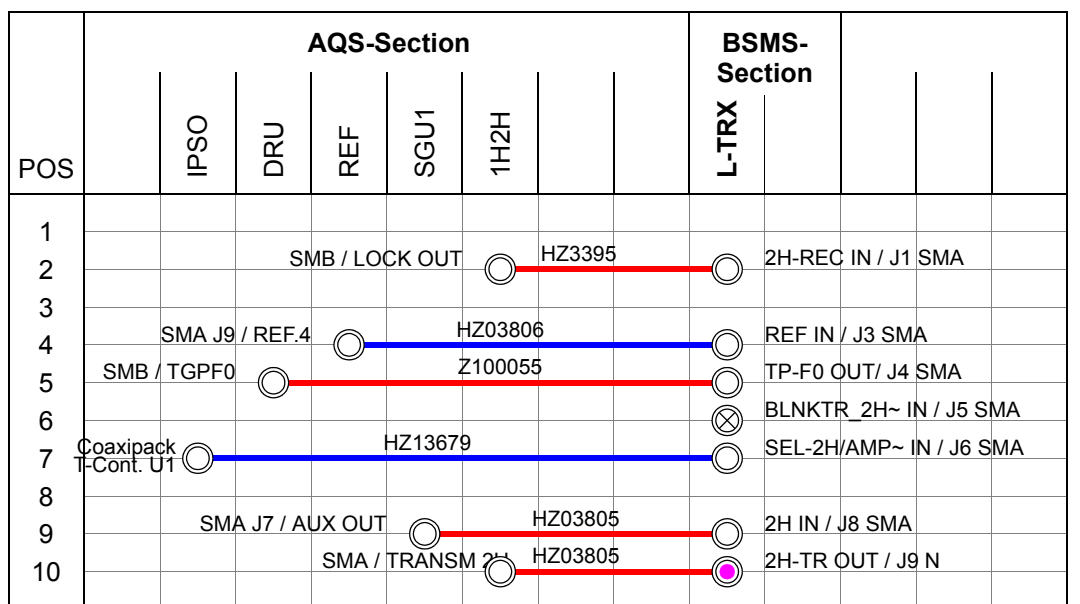
With this setting the internal power amplifier is only used for ‚2H Lock‘ operation.

**Wiring**

**3.9.3**

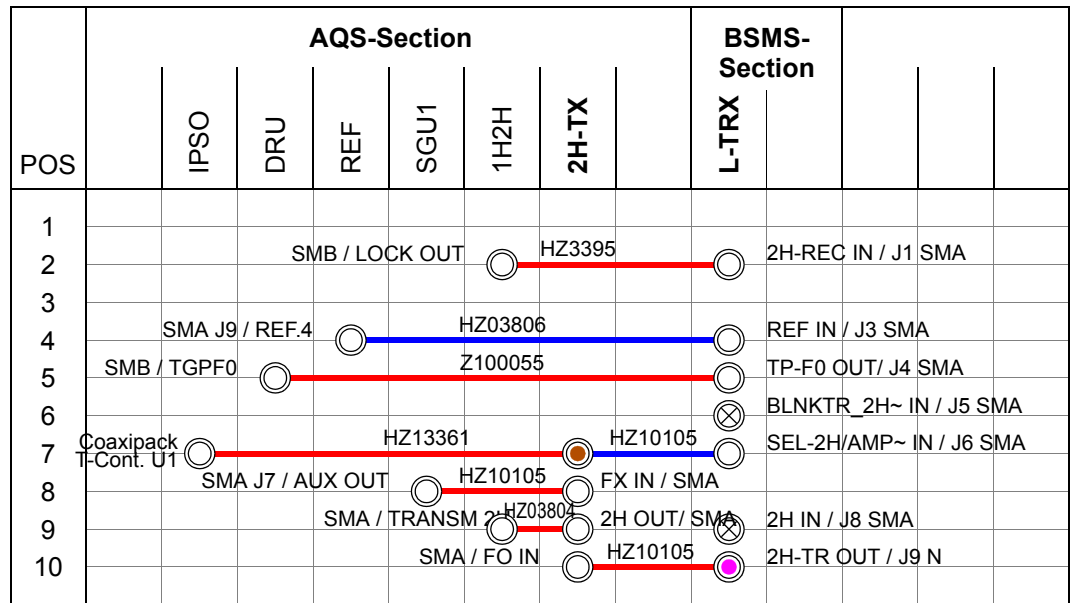
The following figures describe the wiring of the L-TRX (in case of an upgrade), using the CABLE SET L-TRX UPGRADE (H14042, blue). The BLNKTR\_2H~ Pulse must be routed correctly by the related jumper setting (see previous picture).

Figure 3.20. Wiring AVANCE III NanoBay



Additional requirements: ● N/SMA adapter (33100)  
 ⊗ not used (BLNKTR\_2H~ IN must b

Figure 3.21. Wiring AVANCE III NanoBay with AQS 2H-TX



Additional requirements: ● SMA-T adapter (67072)/SMA adapter (33100) ⊗ not used (BLNKTR\_2H~ IN must b



# Nanobay Console Z119572 (V2)

## **Introduction**

**4.1**

The Avance Nanobay V2 is an enhanced version of the Nanobay console Z108356.

The Nanobay V2 has full support of the new BSVT system (Bruker Smart Variable Temperature System) and L-TRX with integrated 2H amplifier for gradient shimming. However, it does no longer support former L-TX and L-RX boards and AQS 2H-TX. The Nanobay V2 requires a PSB6 with ECL02.00 or newer.

## **Overview**

**4.2**

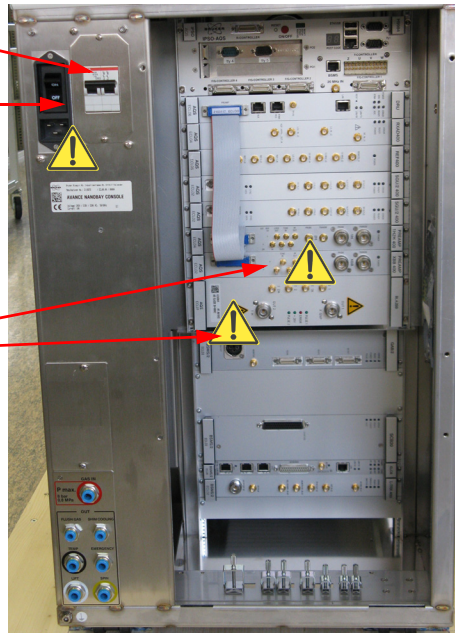
The pictures below show the Nanobay cabinet with removed housing. In contrast with the other consoles (TwoBay, OneBay and MicroBay), the units of back and front side are reverse - the power supplies, pneumatics and VT are accessible from the front side, whereas the other units (IPSO, DRU, REF, etc.) are at the rear side of the console.

Figure 4.1. Front side (left) and back side (right) of a Nanobay

Mains breaker

Mains inlet system (switch and line connector)

RF power amplifier and preamplifier outputs



### **Mains inlet system:**



Connects to the cart mains distribution box (230V AC).  
Do not use any other cables than the one supplied by Bruker.  
Do not remove any protective cover panels inside the Nanobay.  
Consult **"Field Exchangable Units" on page 16** for service information.

### **Système d'alimentation principal (des forces):**



Reliez le système d'alimentation principal avec le boîtier d'alimentation présent dans le chariot (230V AC).  
N'employez aucun autre câble que celui fourni par Bruker. N'enlevez aucun panneau protecteur à l'intérieur du châssis de Nanobay.  
Consultez **"Field Exchangable Units" on page 16** pour l'information de maintenance.

### **Amplifier RF Out:**

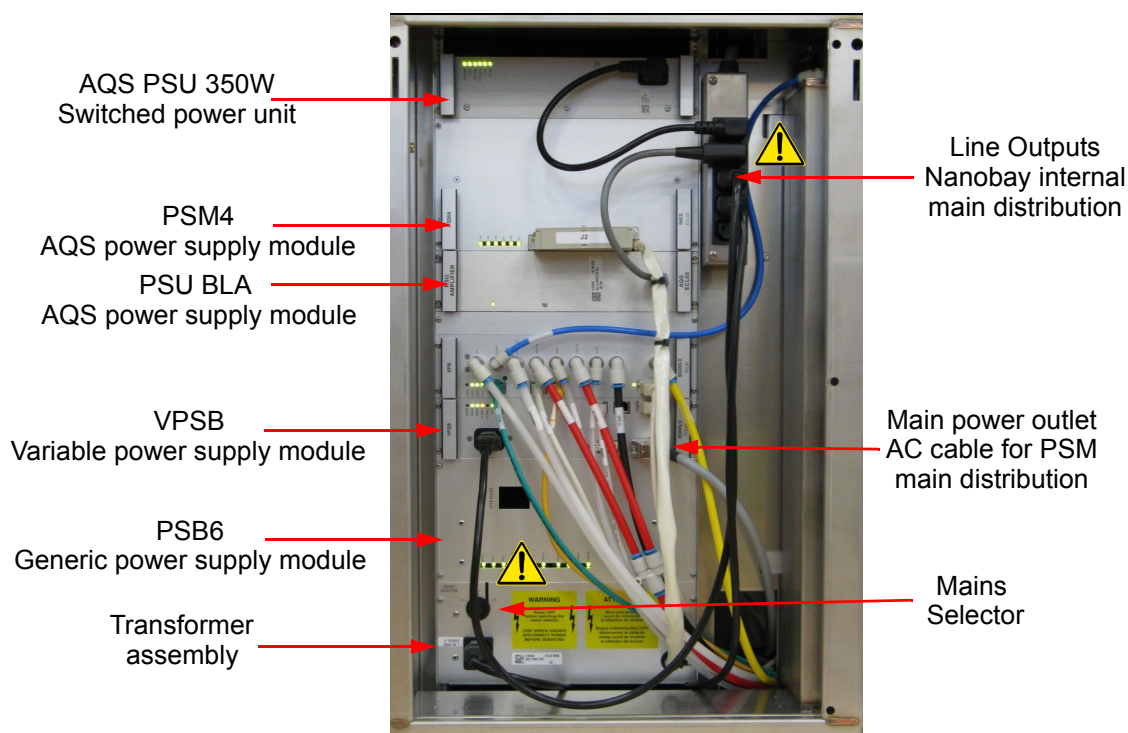


High Power RF output (300W), connects to the Preamplifier.  
Do not unplug the cable while the amplifier mains power is ON.  
Verify cabling before turning the amplifier ON

### **Amplifier RF Out:**



Reliez la sortie de l'amplificateur de puissance RF (300W) au préamplificateur.  
Ne débranchez pas ce câble tant que l'appareillage est sous tension (interrupteur principal)  
Vérifiez le câblage avant de mettre l'amplificateur EN MARCHÉ



Note: Nanobay appearance may slightly vary depending on the console hardware version.

#### **Line Outputs:**

Only connect these units to the main outlet distribution box:



Reliez seulement ces modules avec la boîte de distribution électrique principale:

- IPSO AQS POWER SUPPLY INCL.CABLE (H12588)
- INES TRAFO UNIT (Z104454)
- BSMS/2 VARIABLE POWER SUPPLY BOARD (Z115193)
- AQS POWER SUPPLY BLA 28V 20A (W1345050)



#### **Main selector:**

Selector configured during the system installation by the Bruker service engineer. Consult a service engineer before reconfigure the selector. False selector settings may cause severe system damage.

Consult **"Field Exchangable Units" on page 16** for service information.



#### **Sélecteur principal de tension:**

Le sélecteur est configuré pendant l'installation du système par le technicien de Bruker. Consultez un technicien de Bruker avant de modifier le sélecteur.

Un mauvais positionnement du sélecteur peut endommager gravement le système.

Consultez "**Field Exchangable Units**" on page 16 pour l'information de maintenance.

## System parts

### 4.2.3

The diagram below shows the three sections with the corresponding sub-units. Most of them are uniform, only the preamplifiers and the Lock RF board L-TRX are proton frequency specific.

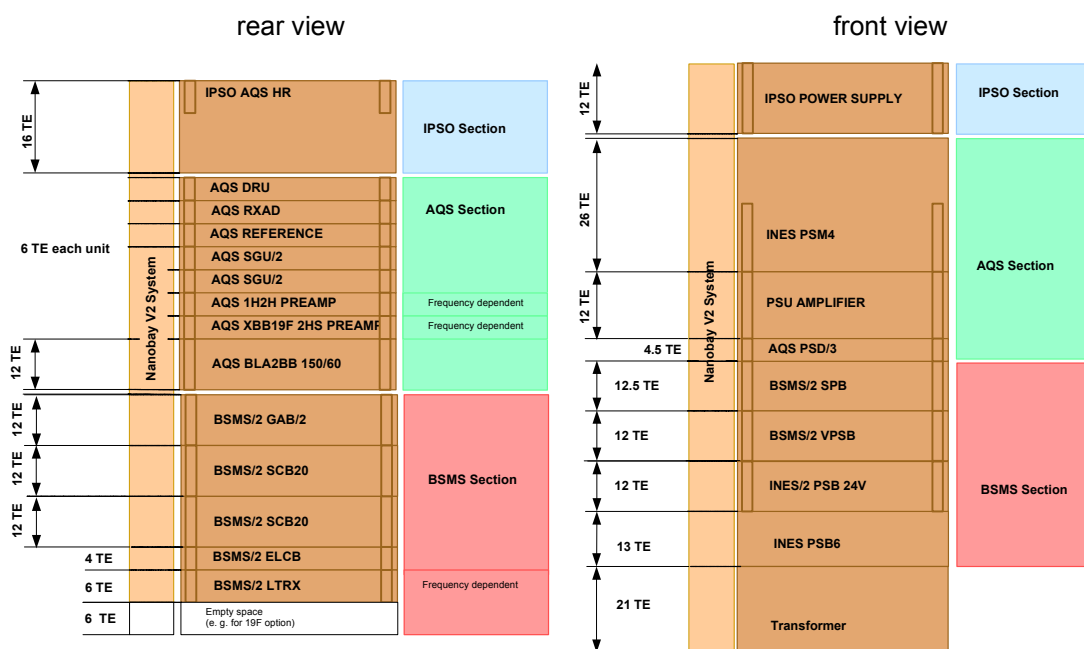
The L-TRX provides an integrated, compact 2H amplifier for gradient shimming.

Note: Make sure that the correct power supply PSB6 ECL02.00 or newer is installed!

At the bottom, there is a free space, which can be used for a 19F Lock option. Also the opposite side (front side with power supplies) can be divided into the three sections (IPSO, AQS and BSMS), but there are some relations between the sections (power supply).

- The 12V of the IPSO power supply is used also for the fan tray and for the Ethernet switch.
- The TX-P28V power is provided for all amplifiers, the BLA2BB and the L-TRX, which is part of the BSMS section.

Figure 4.2. Functional sections of a Nanobay V2



**Configuration of typical 2 channel Nanobay V2 (Z119572) HR (300-400MHz) 4.3**

**Bill of Material**

**4.3.1**

**Standard units:**

Tabelle 4.1. Bill of material for a HR 2 channel Nanobay

Pos.	Units	Part Number	Description
1	1	H9984	IPSO AQS HR UNIT
2			
3			
4	1	Z100977	AQS DRU <b>ECL ≥ 02</b>
5	1	Z102116	AQS RECEIVER BOARD RXAD400
6	1	Z003265	AQS REFERENCE BOARD 400
7	1	Z003080	AQS SGU/2 400
8	1	Z103080	AQS SGU/2 400
9	1	See table " <b><u>System frequency units</u></b> "	
10	1		
11	1	W1345049	AQS BLA2BB 200-400
12			
13	1	Z104844	BSMS/2 GAB/2 GRADIENT AMPLIFIER BD
14	1	Z12170 Z102930	BSMS FRONTPLATE BLIND 12TE BSMS/2 SCB20 SHIM CURRENT BOARD (optional)
15	1	Z102930	BSMS/2 SCB20 SHIM CURRENT BOARD
16	1	Z100818	BSMS/2 ELCB EXTENDED LOCK CTRL BOARD
17	1	See table " <b><u>System frequency units</u></b> "	
18	1		
19	1	H12588	IPSO AQS POWER SUPPLY
20	1	Z103791	INES POWER SUPPLY MODULE4 (PSM4)
21	1	H14109	AQS PSD/3 BOARD
22	1	W1345050	POWER SUPPLY COMPACT 28V 20A
23	1	Z115191	BSMS/2 SPB SENSOR & PNEUMATIC
24	1	Z115193	BSMS/2 VPSB

## Nanobay Console Z119572 (V2)

Tabelle 4.1. Bill of material for a HR 2 channel Nanobay

Pos.	Units	Part Number	Description
25	1	Z122989	INES/2 POWER SUPPLY BOARD 24V (optional)
26	1	Z111144	INES POWER SUPPLY BOARD 6 (PSB6) <b>ECL ≥ 02</b>
27	1	Z104454	INES TRAFU UNIT

### Frequency dependend units

Tabelle 4.2. System frequency units

Pos.	Units	Part Number	Description
300 MHz Systeme			
9	1	Z003950	AQS 1H2H PREAMP 300
10	1	Z003954	AQS XBB19F 2HS PREAMP 300
17	1	Z109887	BSMS/2 LOCK TRANSCEIVER 300 (L-TRX 300)
18	1	Z12489 Z120014	AQR FRONTPLATTE BLIND 6TE BSMS/2 19F LOCK TRANSCEIVER 300-1000
400 MHz Systeme			
9	1	Z003951	AQS 1H2H PREAMP 400
10	1	Z003955	AQS XBB19F 2HS PREAMP 400
17	1	Z109888	BSMS/2 LOCK TRANSCEIVER 400 (L-TRX 400)
18	1	Z12489 Z120014	AQR FRONTPLATTE BLIND 6TE BSMS/2 19F LOCK TRANSCEIVER 300-1000

Figure 4.3. Nanobay HR 2 Channel / ECL:00.00

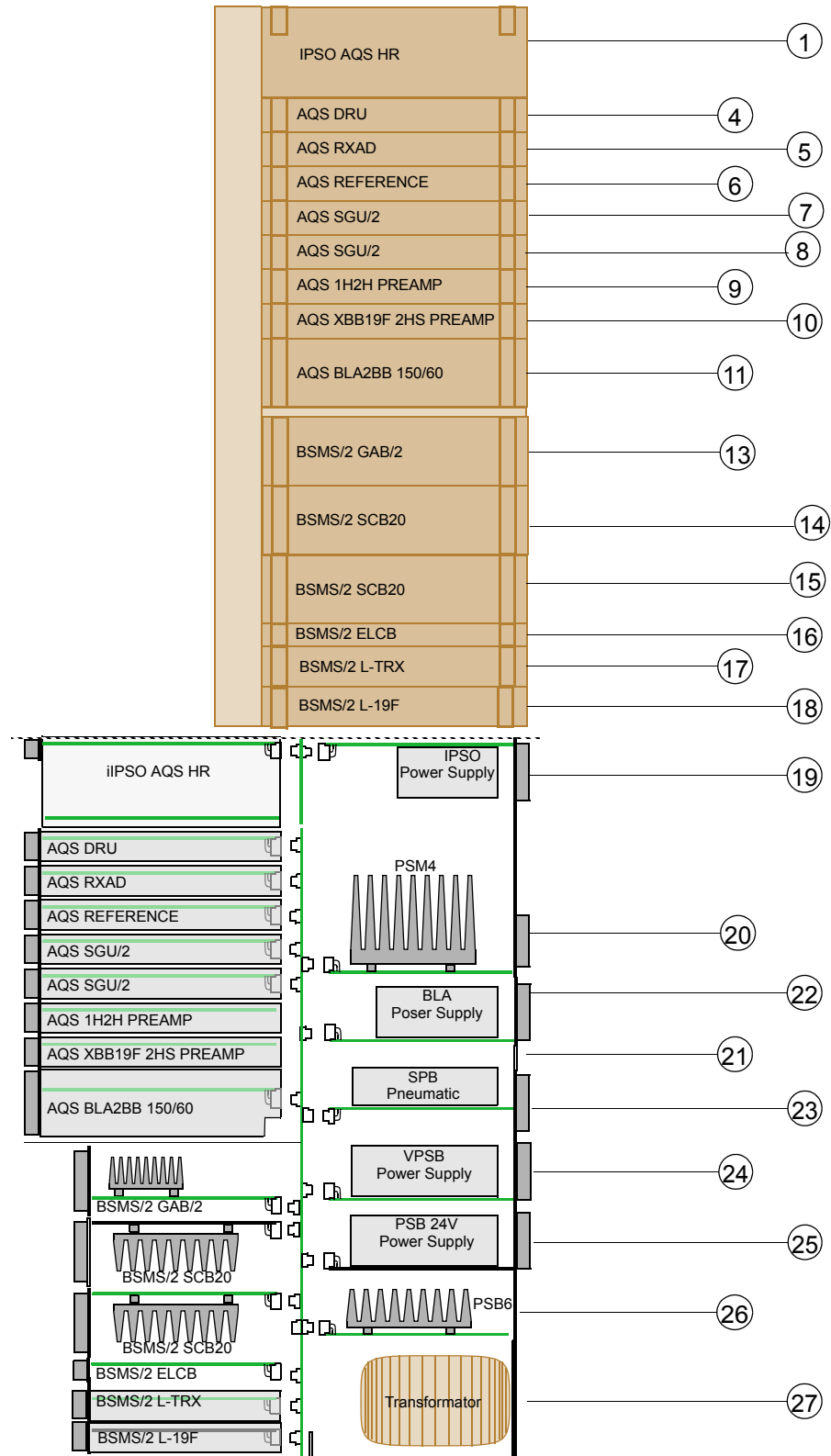
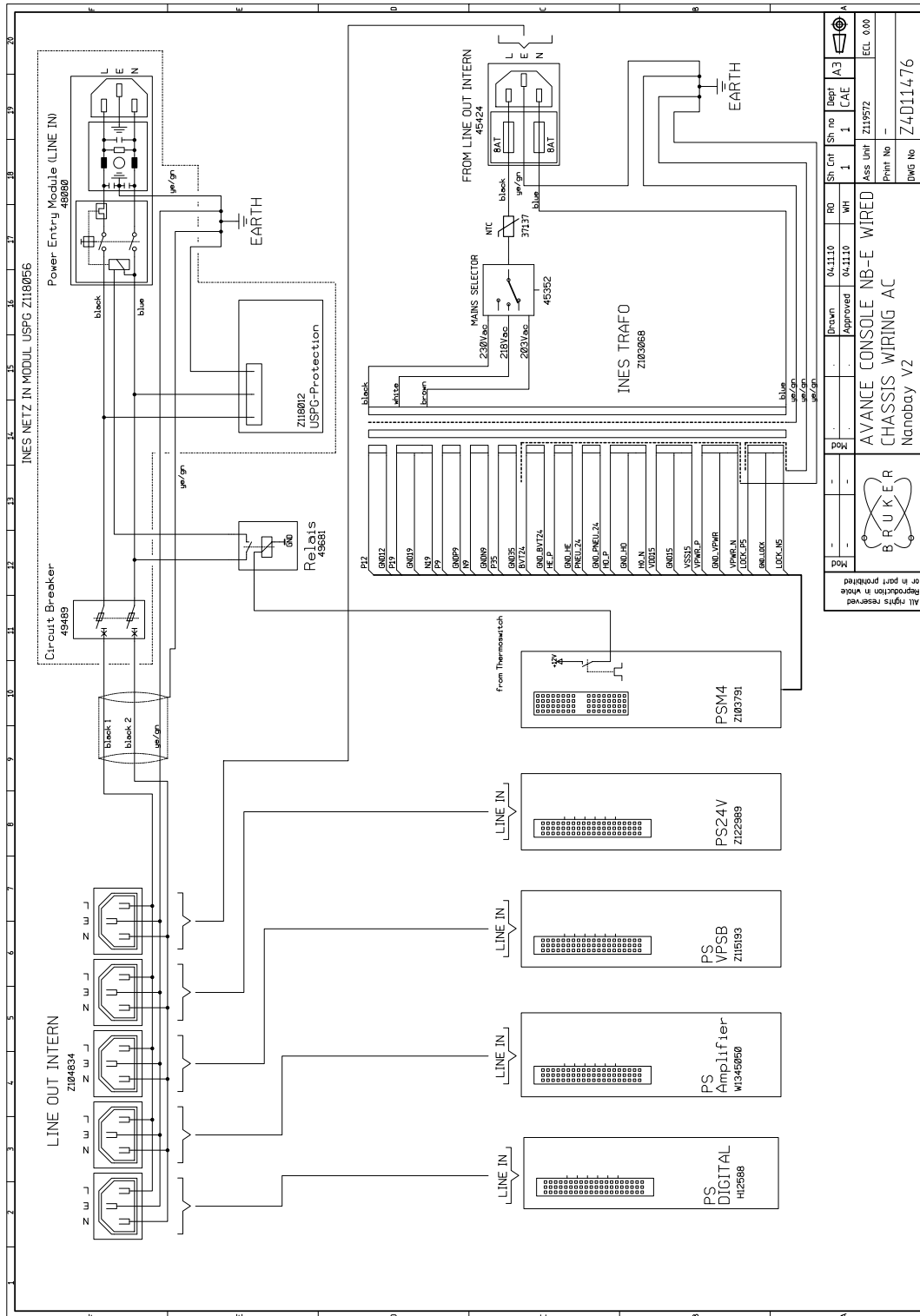


Figure 4.4. Nanobay V2 internal AC wiring, overview



The diagram above shows the AC wiring inside the Nanobay console.

- The mains power is connected to the entry module with power switch (automatic shut down when there is no input voltage), including filters.
- A circuit breaker provides fast overcurrent shut down (< 8 ms)
- A thermal safety relay switches off the console when the hot spot temperature exceeds a specific limit (the sensor is mounted on the PSM4 heat sink).
- All AC power supplies (PS DIGITAL for IPSO, PS AMPLIFIER and BSMS/2 VPSB) and also the transformer unit are connected to the internal line connectors, which are all protected by the mechanisms above mentioned.
- The transformer (part of INES TRAF0 UNIT) is additionally protected by two fuses, and there is a NTC for limiting the inrush current during power up.

There is a power range switch for adaptation to the local mains voltage (see next chapter ***"Mains Selector Setting" on page 54***).



Note: After shut down, the Nanobay should stay at least 30 seconds off before it is powered up again

Figure 4.5. Mains power connector, circuit breaker and power switch

1. Push circuit breaker to upper position
2. Power button for power up (and for shut down)



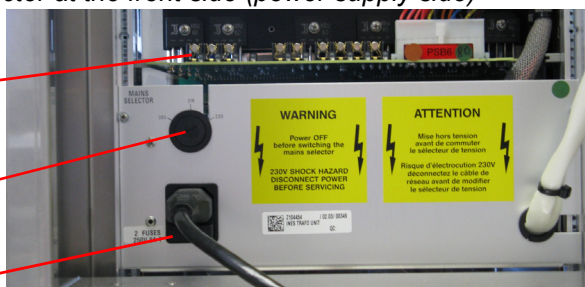
In case of over current the circuit breaker shuts down the mains power. It is then in the lower position and needs to be pushed to the upper position again before the Nanobay console can be switched on.

Figure 4.6. Mains selector at the front side (power supply side)

DC fuses on PSB6

mains selector

AC fuses (transformer)



Prior to the first power-up of the Nanobay console, it must be ensured that the mains selector switch is in the correct position (see **"Mains selector at the front side (power supply side)" on page 53**).

The Nanobay is safe to operate at all settings within an input voltage range of 208..230V~ ±10% according to IEC/EN 61010-1. However because the size of the linear power supply modules is designed for minimal power dissipation, the transformer input voltage should be matched to the mains voltage at the installation site. The input voltage ranges for optimal performance are as follows:

Table 4.3. Mains selector settings for optimal performance

Input voltage range	Mains selector setting
183 .. 223 V~	<b>203</b>
197 .. 240 V~	<b>218</b>
207 .. 253 V~	<b>230</b>

= factory preset

In countries with 100-120V~ mains supply such as USA, Canada or Japan combined line voltages may be used.

- Connect the mains input between two phases of the mains supply to obtain a nominal input voltage of 200..208V~
- Set the selector switch to **203**

Alternatively an external step-up voltage converter with an output voltage of 208..230V~ may be used.

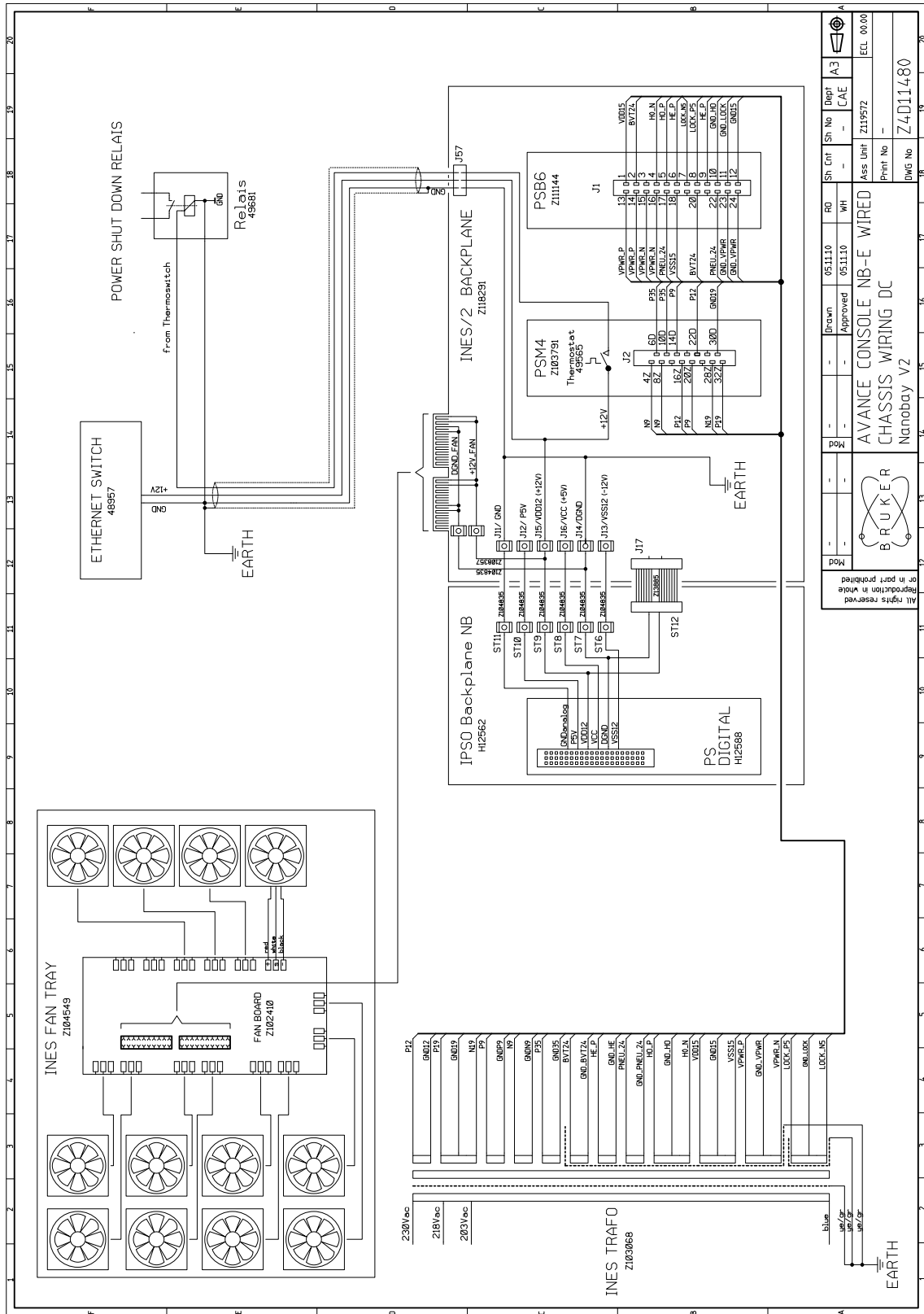
The diagram **"Nanobay internal DC wiring with fan tray and power supplies" on page 55** shows in detail the power supply wiring, including the connection of the two linear power supplies PSM4 and PSB6 to the transformer.

For powering the fans, the power supply (+12V) from the IPSO power supply is used (shared), and there is a fan supervision built in on the backplane.

Also the Ethernet switch is powered by the +12V IPSO power supply.

The thermal shut down requires +12V from the IPSO power supply as well (control signal for the mains relay).

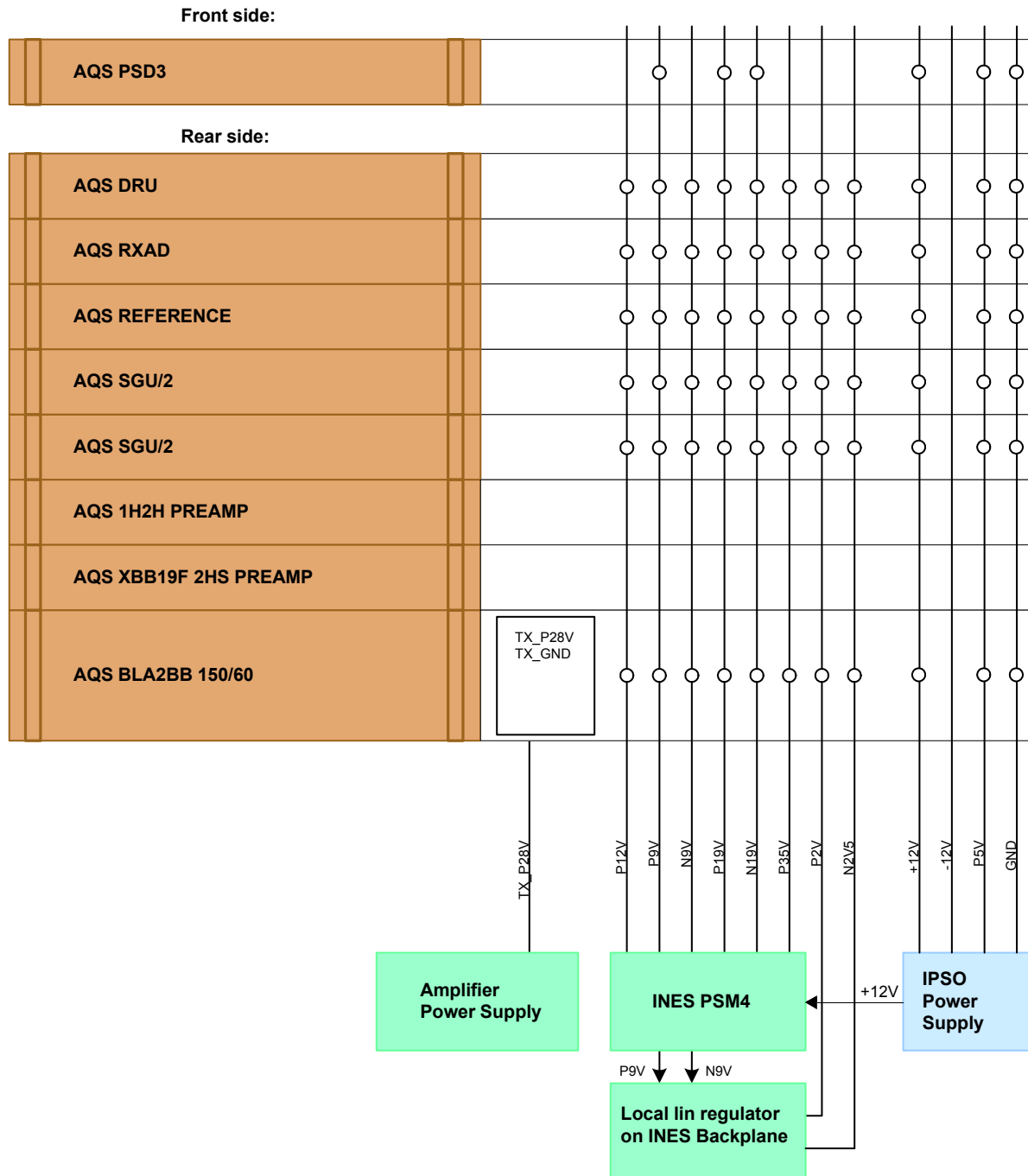
Figure 4.7. Nanobay internal DC wiring with fan tray and power supplies



Sh	Cnt	Sh No	RO	051110	WH	051110	Drawn	Approved	051110	CAE	Dept	A3	ECL	00/00
AVANCE CONSOLE NB-E WIRED CHASSIS WIRING DC										Ass Unit	Z119572	ECL	00/00	
Nanobay v2										Print No				
										DWG No	Z4D11480			

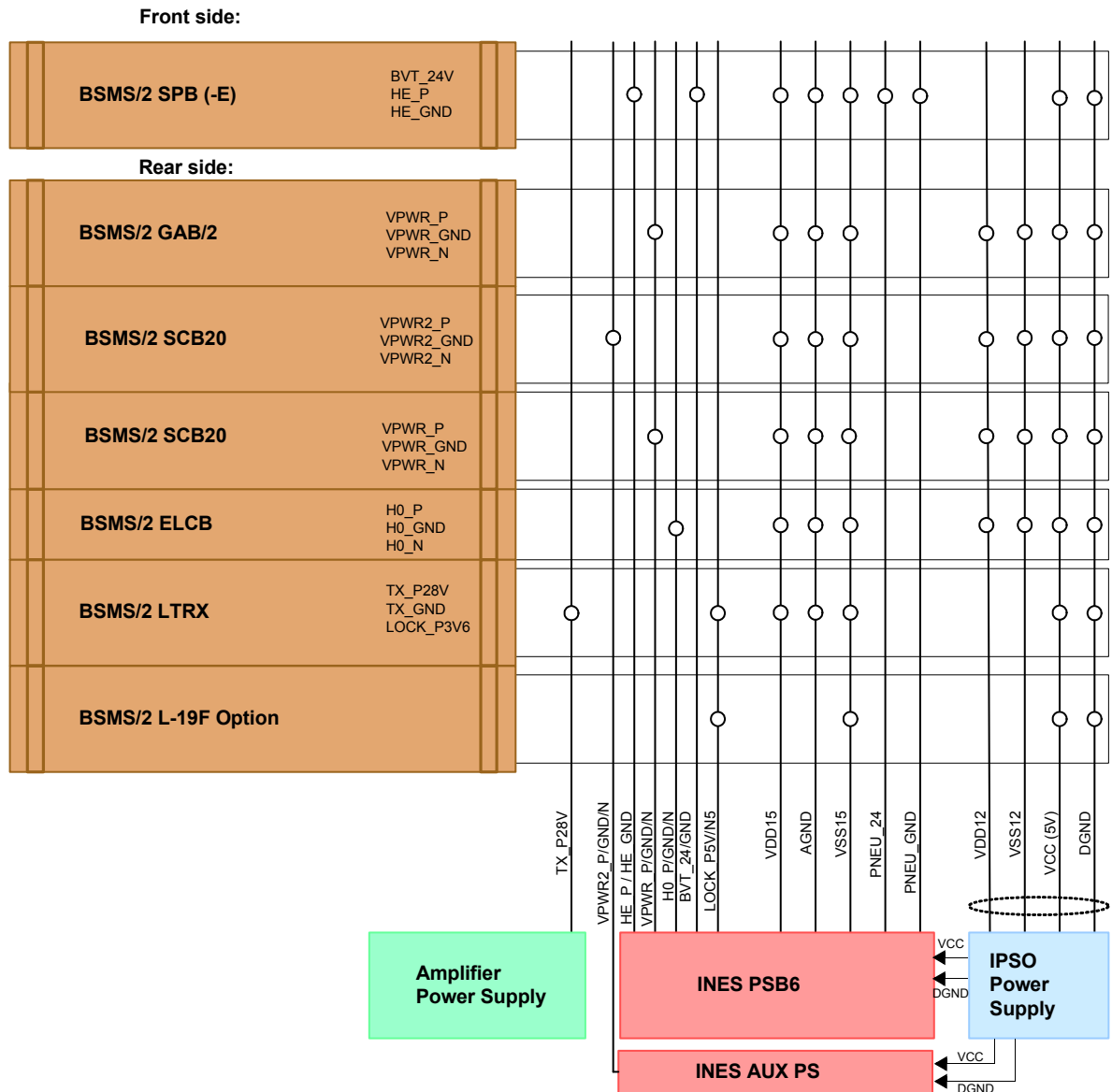
Each of the three sections (IPSO, AQS and BSMS) can be considered separately for the DC wiring. The IPSO is supplied by a dedicated power supply, which is at the opposite side (front side).

Figure 4.8. DC wiring of the AQS section



The AQS PSD3 is optional (required if there are external preamplifiers used).

Figure 4.9. DC wiring of the BSMS section

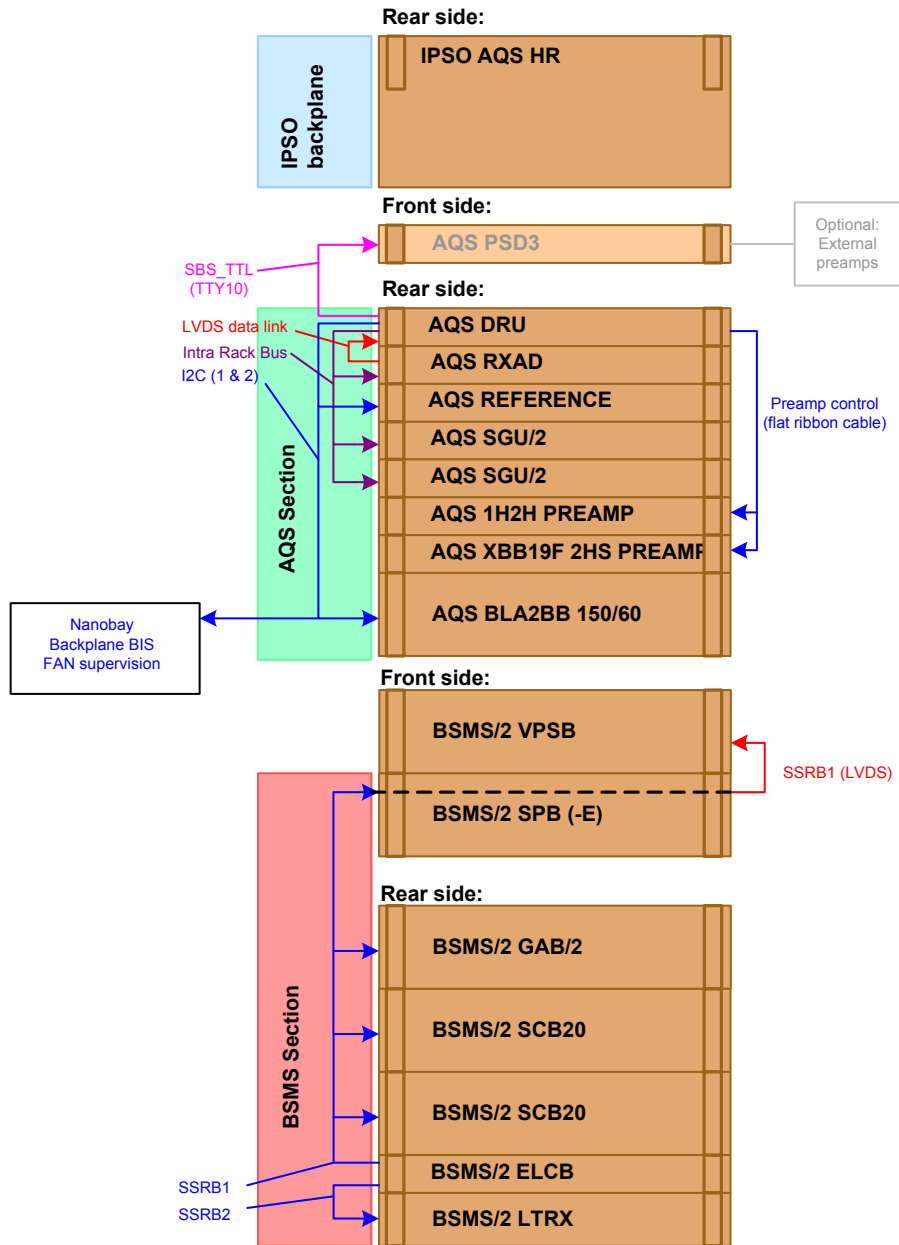


Some of the unit connectors provide specific voltages (e. g. high voltage for HE level measurement, etc.). These specific voltages are not available on the other connectors.

The BSMS section is mainly supplied by the INES PSB6. In addition, the amplifier supply voltage is used for the L-TRX.

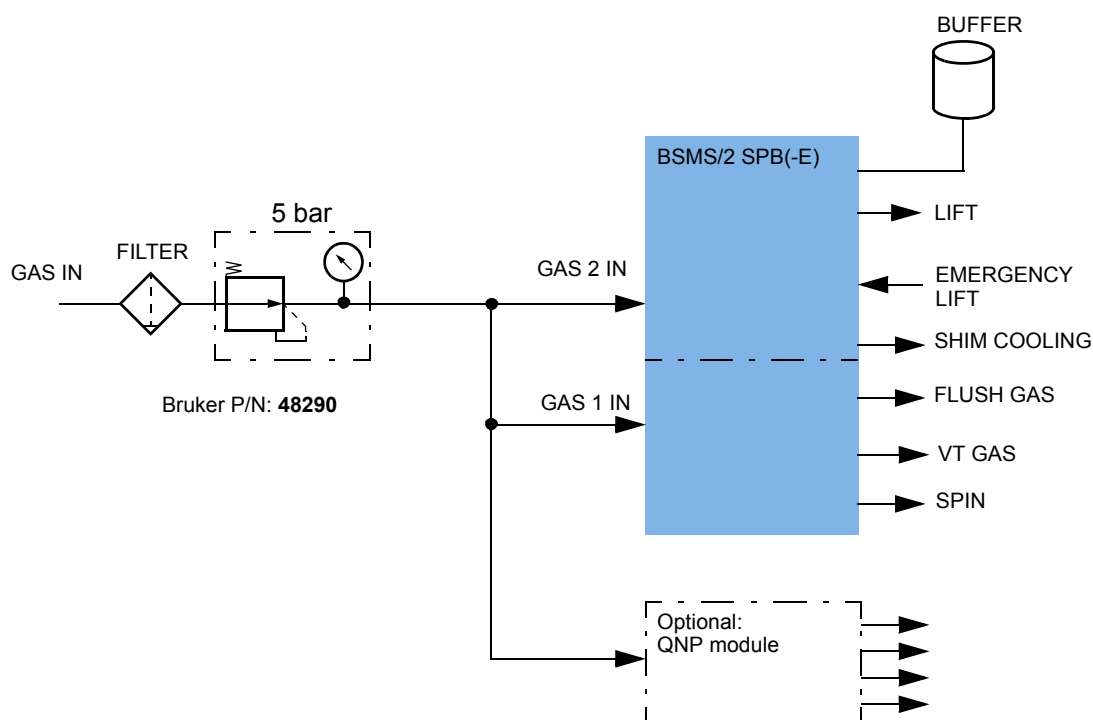
The backplane communication is shown in the diagram below. The AQS section is managed by the DRU, whereas the BSMS part is managed by the ELCB. Both, DRU and ELCB, are Ethernet devices and part of the Spectrometer network.

Figure 4.10. Back plane communication



The Nanobay requires dry compressed air or N<sub>2</sub> gas (see in the site planning manual for exact specifications). Inside the cabinet, there is a filter and a pressure reduction valve providing clean gas to the pneumatic module (for spin and lift), the variable temperature unit (gas flow for probe temperature control) and an optional QNP probe.

Figure 4.11. Pneumatics



The particle filter must be clean (visible through a transparent cover). It may be necessary to replace it (part number **48290**), e. g. when it has been polluted. Accumulated liquids can be drained by a valve at the bottom of the filter (see also **"Maintenance of the particle filter for compressed gas" on page 76**).

## Wiring and cable sets

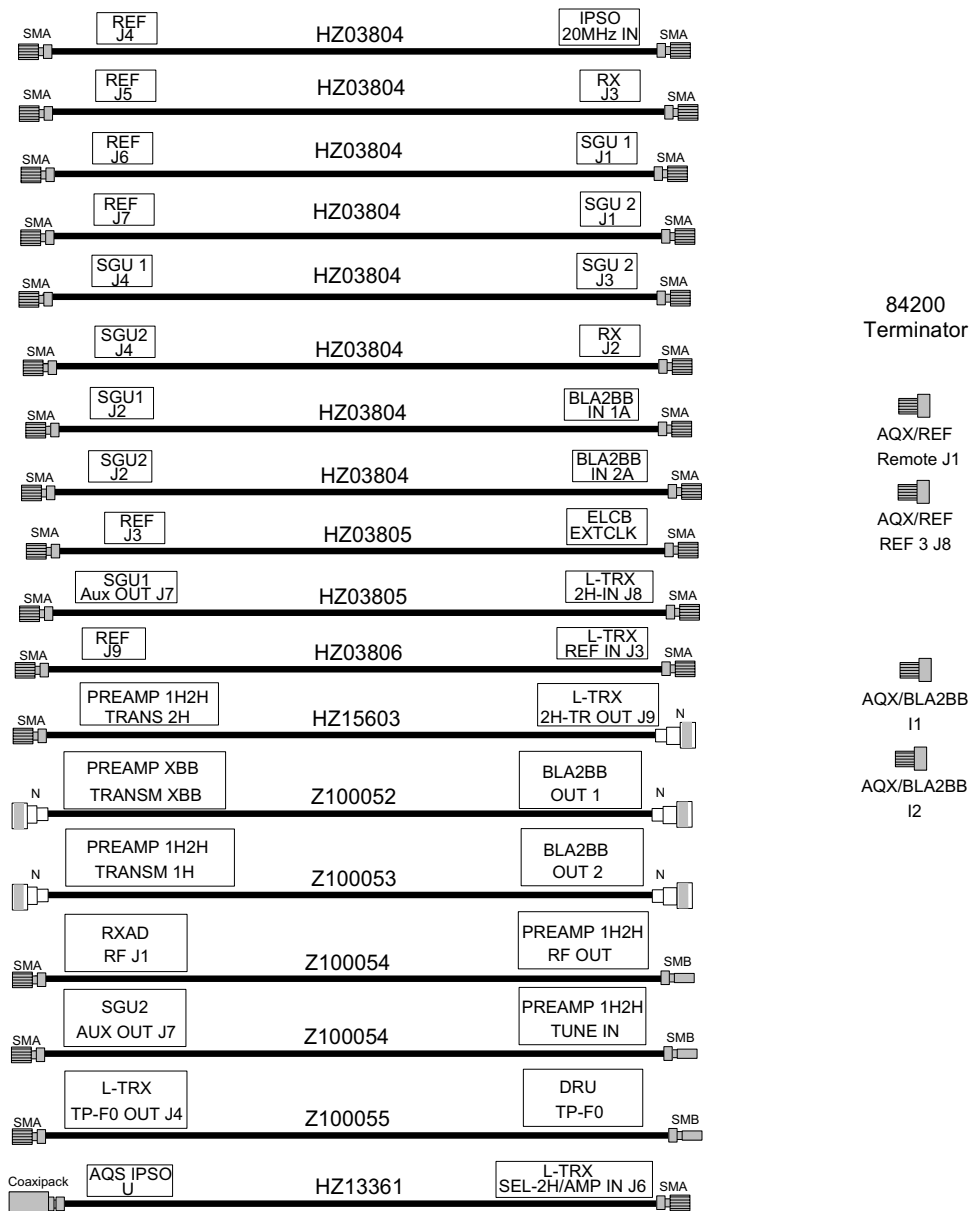
## 4.8

There is a cable set internal (H120708) providing all cables that are necessary for the internal wiring (including new L-TRX and BSVT). In addition, the 26 pin LVDS cable (part of gradient cable set H14036) has to be connected between the AQS IPSO (F/G-Controller 4) and the GAB/2 (G-Con).

Figure 4.12. Cable set H120708 for internal wiring (page 1 of 2)

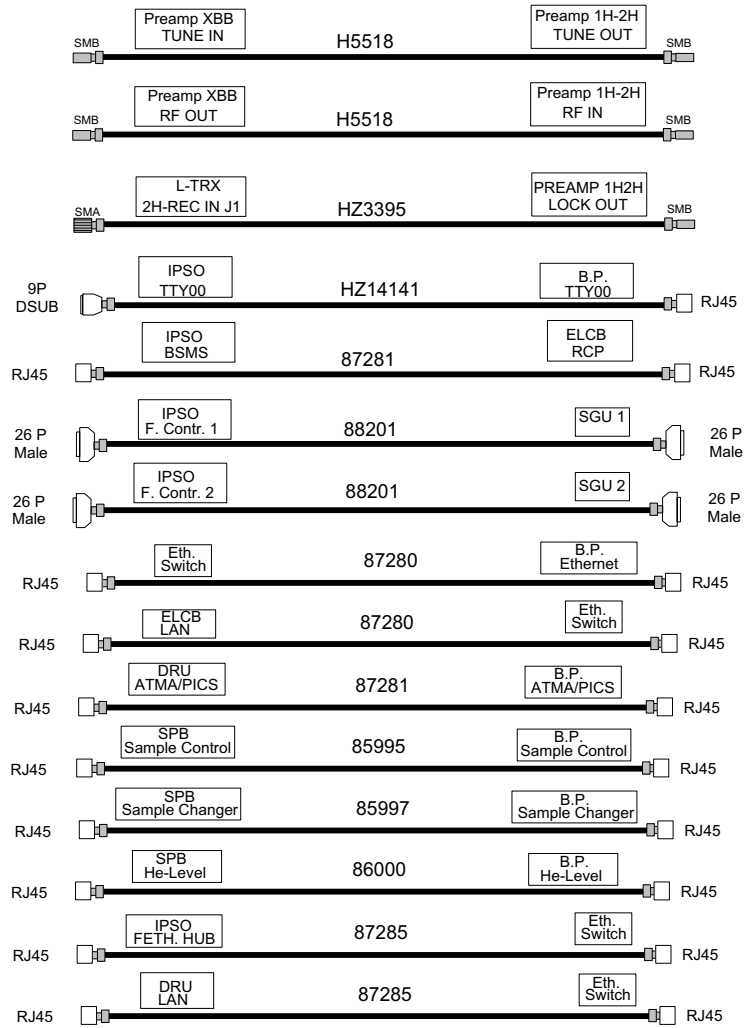
# CABLE SET NANO BAY AVIII-BSVT INTERNAL

Part: **H120708**



KST h120708-100223.DSF

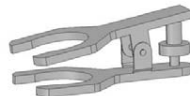
Figure 4.13. Cable set H120708 for internal wiring (page 2 of 2)



W1100510



2166



1801084

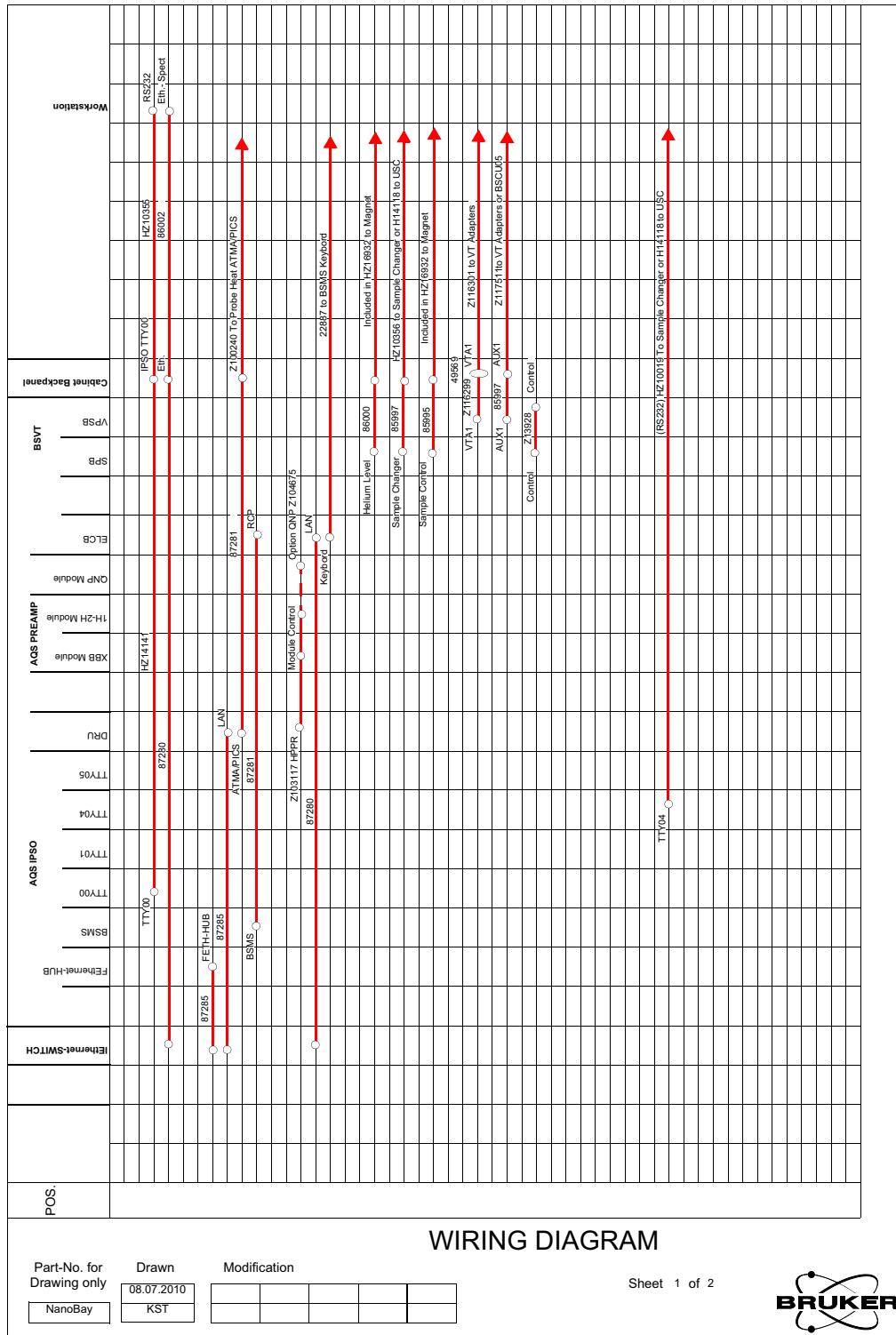


1803506



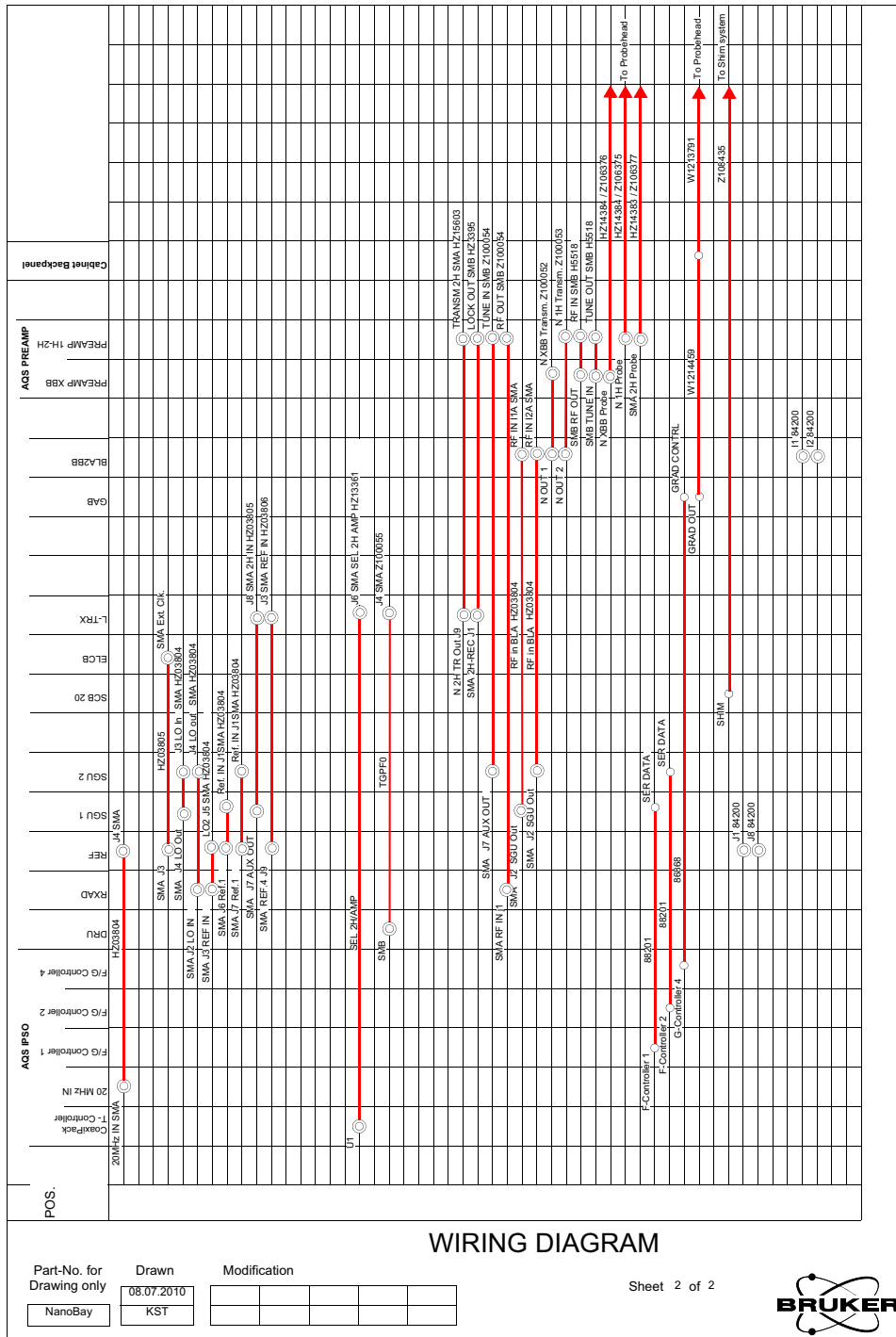
Figure 4.14. Wiring of a Nanobay V2 console (page 1)

Avance III NanoBay with L-TRX\_BSVT



Figur 4.15. Wiring of a Nanobay V2 console (page 2)

Avance III NanoBay with L-TRX\_BSVT



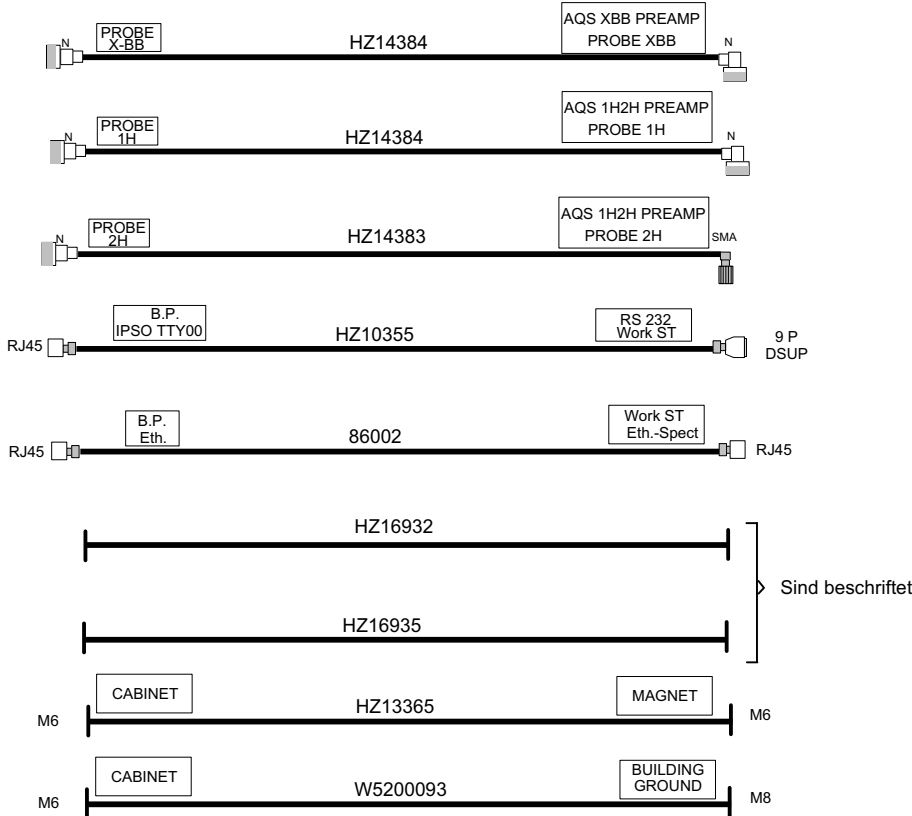
For the external wiring, there are the following cable sets necessary:

- external cable set H120707 containing most of the external cables (indicated in black color in the diagram below) and pneumatic tubes
- Shim cable Z108435 (indicated in blue color)
- gradient cable set H14036 containing the gradient cable (indicated in red color)
- If the system uses a VT option, the cable sets Z119851 CABLE SET BSVT BASIC and Z119853 CABLE SET BSVT 4.5M HEATER
- If the system uses additional VT accessory (LN2 exchanger or evaporator) Z119854 CABLE SET BSVT AUXILIARY HEATER

Figur 4.16. Cable set external

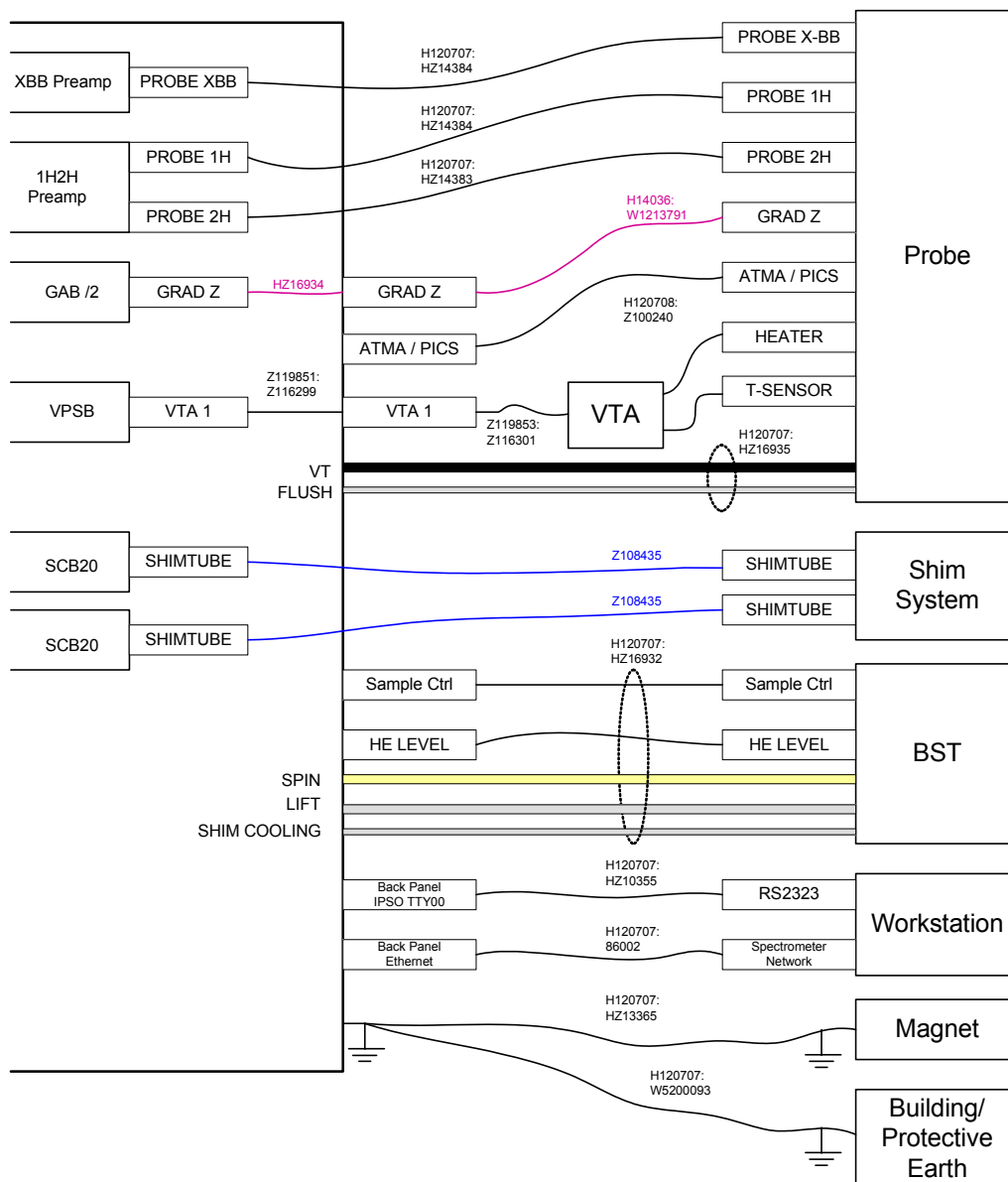
# CABLE SET NANOBAY AVIII-BSVT EXTERNAL

Part: **H120707**



KST h120707-100519.DSF

Figure 4.17. External wiring of Nanobay console



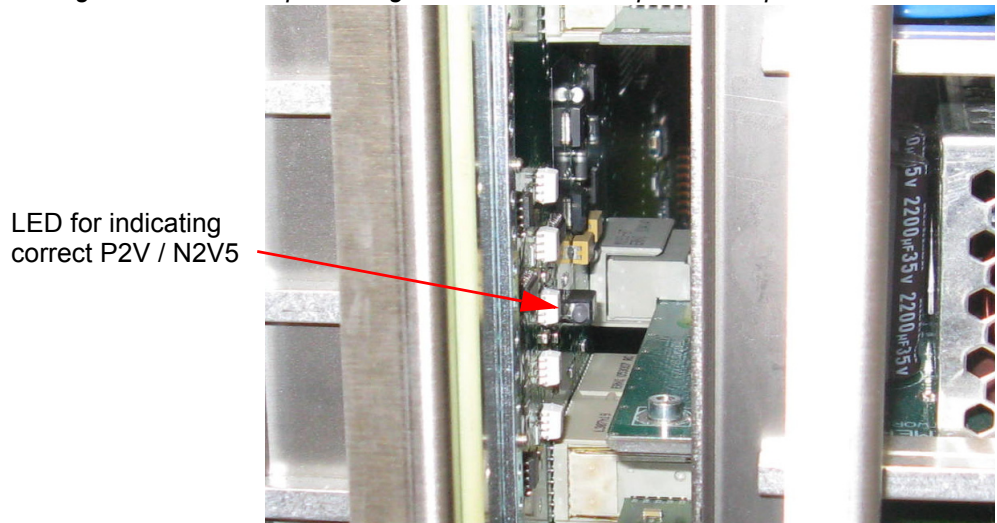
**Nanobay specific power supplies**

In this chapter there is a detailed description of the transformer and the Nanobay specific power supplies INES PSM4 and INES PSB6.

The transformer is part of the cabinet and can not be exchanged in the field. It provides the cables with the appropriate connectors for the PSM4 and PSB6.

For the low skew clock network, there are two additional supply voltages required (P2V and N2V5), which are provided by linear power regulators on the Nanobay back plane. The related LED (common for both voltages) for indicating correct operation is located on the backplane as well and can be inspected when the left side panel is removed.

Figure 4.18. Linear power regulators on the back plane with power LED



**Power supply INES PSM4**

**4.9.1**

There is a common ground for all PSM4 supply voltages

On the PSM4 heat sink there is an over temperature sensor providing shut down of the Nanobay console in case of excess temperature.

Table 4.4. PSM4 Electrical Characteristics

Voltage Name (LED)	Voltage @ rated load	Current @ rated load	ripple (mV <sub>eff</sub> )	Fuse	Fuse Number
P19	19.0 +/- 0.7 V	3.0 A	25 mV	5.0 AT	F1
N19	-19.0 +/- 0.7 V	0.73 A	15 mV	5.0 AT	F2
P12	12.0 +/- 0.6 V	5.7 A	25 mV	10 AT	F3
P9	9.0 +/- 0.5 V	6.1 A	25 mV	10 AT	F4
N9	-9.0 +/- 0.5 V	1.9 A	15 mV	8.0 AT	F6
P35	34.5 +/- 1.5 V	0.14 A	10 mV	0.5 AT	F5

**Power supply INES PSB6 (ECL 02.00 and newer)**

**4.9.2**

The power supply PSB6 is used for operation with the L-TRX and BSVT.

Behind each LED on the PSB6 (indicators that the according voltage is available) there is the corresponding fuse, wich can be exchanged even when the PSB is installed in the console.

*Table 4.5. PSB6 Electrical Characteristics (ECL 02.00 and newer)*

Voltage Name (LED)	Reference	Voltage @ rated load	Current @ rated load	ripple (mV <sub>eff</sub> )	Fuse
BVT_24V	BVT_GND	24.0 +/- 1.0 V	1.65 A	10 mV	3.15 AT
H0_P	H0_GND	29.6 +/- 1.2 V	0.55 A	10 mV	1.0 AT
H0_N	H0_GND	-29.6 +/- 1.2 V	0.28 A	10 mV	1.0 AT
LOCK_P3V6 <sup>1)</sup>	LOCK_DGND	3.6 +/- 0.1 V	2.0 A	20 mV	-
HE_P	HE_GND	36 .. 46 V	0.4 A	1 V	1.00 AT
PNEU_24V	PNEU_GND	24 V +/- 0.3 V	1.0 A	20mV	4.00 AT
VDD15	AGND	15 +/- 0.6 V	1.45 A	20 mV	2.5 AT
VSS15	AGND	-15 +/- 0.6 V	0.9 A	20 mV	2.5 AT
VPWR_P	VPWR_GND	20 .. 27 V	4.2 A	1 V	8.0 AT
VPWR_N	VPWR_GND	-20 .. -27 V	4.2 A	1 V	8.0 AT

Note: The shaded rows indicate that the referred voltages are non-regulated.

Note <sup>1)</sup>: Voltage from DC/DC converter, input voltage is PNEU\_24V

# Service

## Installation

## 5.1

For installation of a Nanobay, the site planning manuals have to be considered.

- Connect the Ethernet cable of the Spectrometer network to the Nanobay. It is recommended to use an intermediate Ethernet switch between workstation and console (see service information SI0346).
- Z119572 Nanobay V2 require Topspin 3.0 and newer installed
- Make sure that the external units (probe, shim system, BST, HE-level sensor, etc.) are connected correctly (see chapter „Wiring“).
- Connect the hose for compressed gas / air to the Nanobay.
- Verify, that the pressure reduction valve is set to about 5 bar and that there is actually the required pressure available.

**Before first power up, pay particularly attention to the correct setting of the mains selector, as described in chapter "Mains Selector Setting" on page 28.**



### Warning

**Avant la première mise sous tension, vérifiez la position correcte du sélecteur de tension, comme décrit dans le chapitre "Mains Selector Setting" on page 28.**

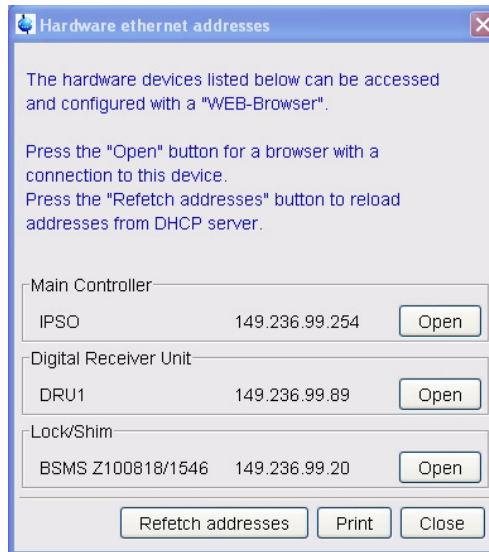
- Connect the Nanobay to the mains power supply, according to the instructions in the site planning manual.
- After power up of the console, it must be prepared for NMR operation (Topspin configuration „cf“, initialisation of the hardware „ii“, setup correct values for shim, lock, etc.).
- When the console is operational, some calibrations have to be made (e. g. calibration of the HE-level measurement), and some specific configurations have to be set. For this step, please refer to the related AQS and BSMS manual.

## Diagnostics and trouble shooting

## 5.2

Each of these three sections (IPSO, AQS and BSMS) has its own service access (Bruker Service Web) providing maintenance, diagnostics and troubleshooting by using a standard web browser. Typing „ha“ on the TopSpin command line brings up a dialog, where each of the three Service Web Servers can be accessed.

Figure 5.1. TopSpin menu after typing command „ha“



The Nanobay infrastructure (BIS and fan supervision) can be accessed by the DRU service web. It is also on the list of units that are hosted by the DRU (on page „Main“->“Hosted Devices“->“AQS Control Overview“).

Figure 5.2. units hosted by DRU, including Nanobay infrastructure

ts										Reset and Re-Scan AQS-Rack completely
Rack	Slot	ID	ECL	FW	Addr	Code	HW-Version	Name		
1	--	RAC1	2.00	--	32	D0	00	<a href="#">Nanobay 1</a>	read Chassis 1 BIS	
1	2	RX_1	4.03	AR	16	72	04	<a href="#">AQS RXAD 1</a>	read RXAD 1 BIS	
1	3	REF1	5.01	--	52	02	01	<a href="#">AQS REF 1</a>	read REF 1 BIS	
1	4	SGU1	2.02	AC	36	11	08	<a href="#">AQS SGU 1</a>	read SGU 1 BIS	
1	5	SGU2	2.02	AC	37	11	08	<a href="#">AQS SGU 2</a>	read SGU 2 BIS	
1	8	BLA1	7.00	--	54	05	00	<a href="#">AQS BLA2BB</a>	read BLA2BB BIS	

In addition to the Service web, the AQS units can be accessed by the Unitool for maintenance, diagnostics and trouble shooting. Accessing the AQS units is described in detail in the related manual „AQS/3 with IPSO Systems“.

Selecting the link „Nanobay 1“ in the diagram above opens the following window:

Figure 5.3. Fan status monitor for Nanobay

**Device Status**  
Ready

**Diagnostic**

Fan	Status
1	running
2	running
3	running
4	running
5	running
6	running
7	running
8	running
9	running
10	running
11	running
12	running

Refresh

To check the fans remove the right side cover

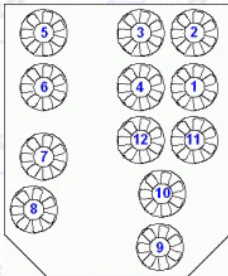


Figure 5.4. Reading BIS of Nanobay backplane

**Chassis BIS groups**

```

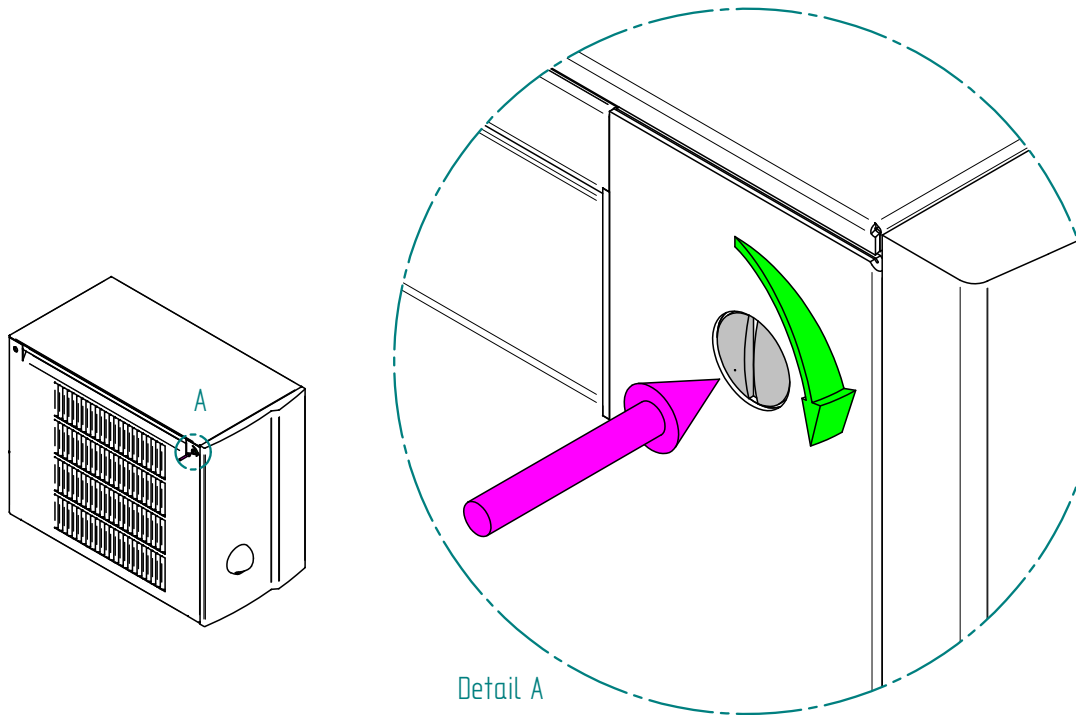
$Bis,1,20080306,256,AQSRACK,1#
$Prd,Z108356,00038,2.0,0,BCH,20080306#
$Nam,NANOBAY CONSOLE#
$Fan,1.0,12,1,2#
$EndBis,E4,16#
    
```

You may copy/paste BIS groups into any text file

System or unit specific diagnostics and trouble shooting is described in the related manuals, which are separate for IPSO, AQS and BSMS units (see in the beginning of this manual).

There is a simple quick fastening mechanism for removing the covering plates at both sides of the Nanobay console (quick snap-in fastening).

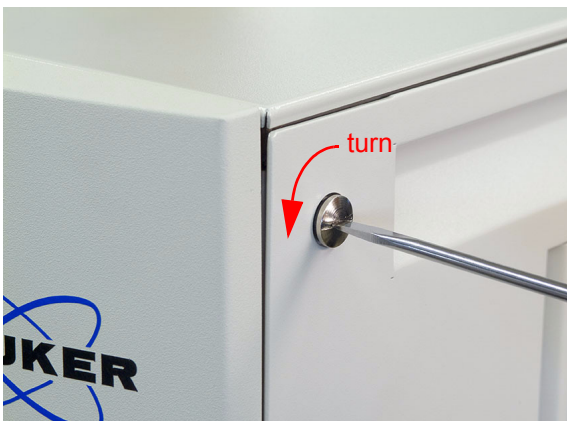
Figure 5.5. Quick snap-in fastening



The fastening can be opened like a screw by a quarter-turn to the left or to the right, as indicated by the green arrow.

Figure 5.6. Side panel removal

1. Open the two quick snap-in fastenings



2. Detach the covering panel



Figure 5.7. Front panel removal

1. Push the handle inside the blue dome



2. Detach the front panel at the upper side



3. Lift the front panel carefully



4. Now it can be removed



Figure 5.8. Back panel removal

1. Open the 4 screws of the upper panel

2. Remove the upper panel

3. Open the screws of the lower panel



NOTE: Connectors and inlets shown on this picture are different from Nanobay variant Z108356 to Z119572.

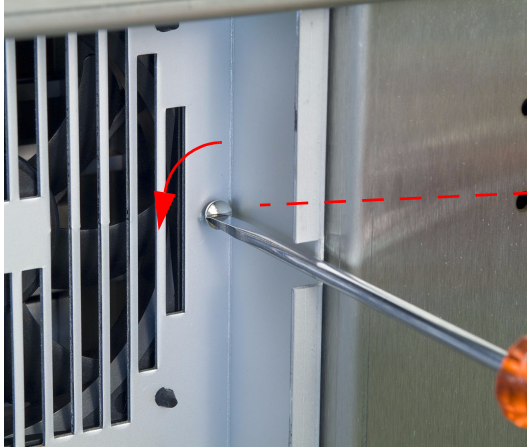
### Fan maintenance

### 5.3.1

The fan tray can be easily removed from the Nanobay console. First, the panel at the right side has to be detached (see description above). Then the four quick snap-in fastenings can be opened and the fan tray can be pulled out by a handle.

Figure 5.9. Fan maintenance

1. Open the 4 quick snap-in fixes



2. pull out the fan tray by the handle



Fan filter fleece replacement

5.3.2

The filter is integrated in the covering panel. It can be taken out when the covering grid has been removed (open related fastenings). Both, the fan tray and the grid which fixes the filter fleece, are mounted by a quick snap-in fastening (see description above).

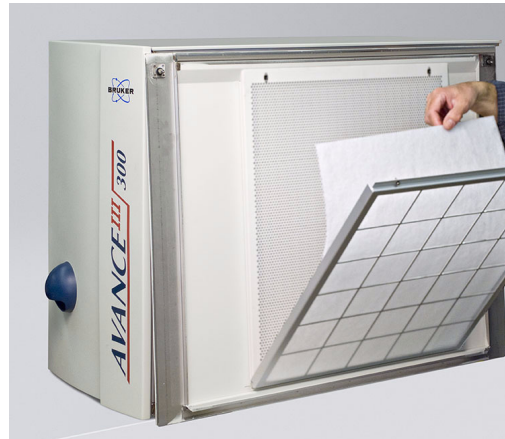
Important: Check the filter in regular intervals. Replace dusty filters in order to provide correct fan operation (filter fleece part number **Z104570**).

Figure 5.10. Replacement of fan filter fleece

1. remove the grid covering the filter fleece



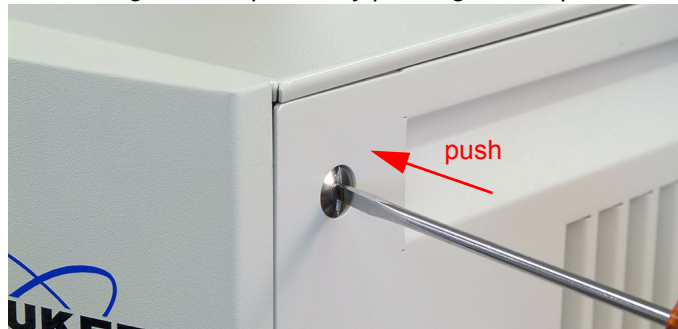
2. replace the filter fleece



**Attaching the panels after servicing****5.3.3**

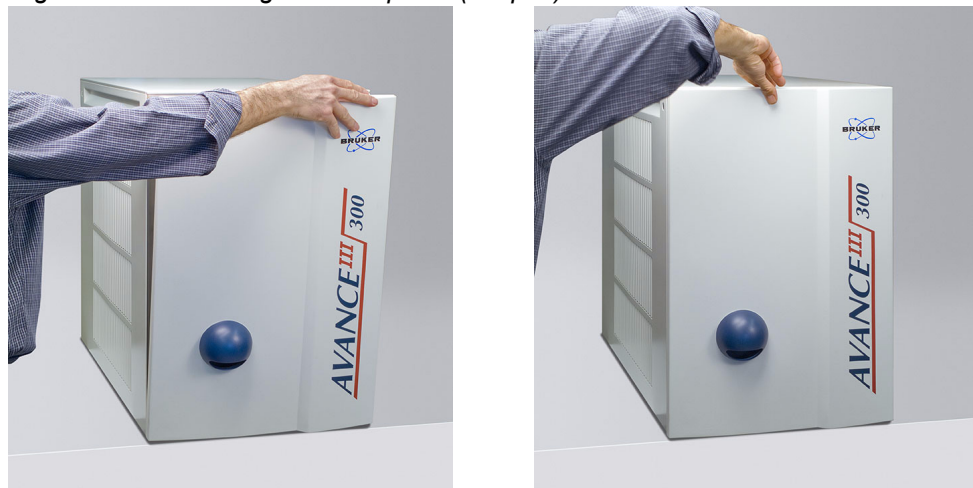
For attaching the side panel after servicing, move the grooves of the quick snap-in fastening into vertical position. In this position the fastening can be pushed until it snaps in.

*Figure 5.11. Attaching the side panels by pushing the snap in fastenings*



The front panel fits at the bottom into the groove of the chassis. For mounting the panel, it has to be pushed at the upper part until it snaps in.

*Figure 5.12. Attaching the front panel (snap in)*



The particle filter<sup>1)</sup> must be clean (visible through transparent cover<sup>2)</sup>). It may be necessary to replace it (part number **48290**), e. g. when it has been polluted:

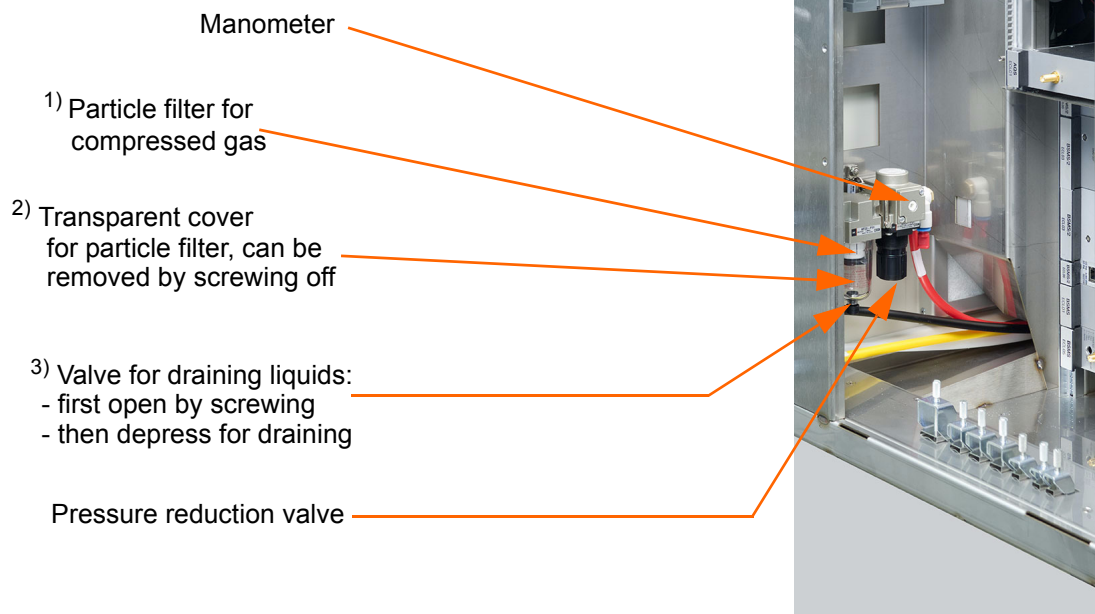


**Note:** Before servicing, make sure that the compressed gas supply is off and there is no pressure at the gas inlet.

- Remove the transparent cover (screw it off)
- Remove the particle filter which is attached by a crosshead screw. A short screw driver is required for this operation.

Accumulated liquids can be drained by a valve at the bottom of the filter<sup>3)</sup>.

*Figure 5.13. infrastructure for compressed gas*



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**End of Document**

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