



Bruker Smart Magnet control System (BSMS) supports

- Ultra-stable shim current sources (SCB20) for Bruker RT shim systems
- Optional Ethernet based Bruker Digital NMR Lock (2G DigiLock™) for 2H and/or 19F nuclei (L-TRX, L-19F) together with ultra-stable, ultra-low noise B0 current source (ELCB)
- Bruker Smart Variable Temperature control (BSVT) controls with up to 4 independent VT channels, optional Bruker SmartCoolers™ (e.g. BCU-I), optional Low Temperature accessories (LN2 exchanger / evaporator) and High Temperature equipment
- 10A High Resolution NMR gradient amplifiers (GAB/2, optional)
- NMR Sample Transport for Bruker standard and wide bore magnet sample transport systems (BST)

Systems equipped with 2G DigiLock™ and SmartVT™ support intrinsically the unique Bruker NMR Thermometer™ (e.g. to monitor and regulate the sample temperature within the sample tube).

High performance and high power preamplifier system (HPPR)

- Multi-receive ready up to 8 receiver channels. No extra wiring or other component required
- Stray field compliant touch screen based human machine interface (HMI). Easy magic angle setup on the probe
- RF power supervision for fast shut downs built-in (probe safety together with PICS)
- Accurate tuning and matching with factory calibrated preamplifiers (Network analyzer technology) and fully integrated automatic tuning and matching (with ATM probe). No separate unit needed
- Supports up to 8 RF preamplifiers

Magnet System

The spectrometer will use the existing magnet system, Stand, and Helium Transfer line.

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|----|--------|--|---|
| 2. | AH0243 | <p>SHIM CURRENT BOARD (SCB20)</p> <p>The SCB20 high precision, ultra-stable shim current board provides 20 shim current sources with each 20Bit digital resolution and +/- 1A shim current range. Depending on shim system type two units might be necessary. The current sources are compatible with all Bruker Orthogonal and Matrix shim systems (e.g. BOSS-3).</p> | 2 |
| 3. | AH1206 | <p>10A GRADIENT AMPLIFIER (GAB/2)</p> <p>The GAB/2 is a fast single channel offset free gradient amplifier unit for pulsed field gradient shimming and single axis gradient enhanced spectroscopy (GRASP). It provides pulsed field gradients up to 10A (50ms per second) and a built-in pre-emphasis. On-axis (Z) and off-axis (XYZ) gradient shimming using real-time shim current control together with TopShim™ for single axis gradient probes. TopShim™ proprietary gradient shimming including lineshape optimization; see JMR 182(1), 38-48, 2006. Triple axis pulsed field gradient (XYZ) operation requires three GAB/2 units (option).</p> | 1 |
| 4. | BH0264 | <p>1H GaAs PREAMPLIFIER (HPLNA 1H)</p> <p>Highly linear, low noise, GaAs based preamplifier for 1H and 19F observe and decoupling with</p> <ul style="list-style-type: none"> • Noise Figure (NF) ~1dB including all internal filters and active transmit-receive switch • Max. 4kW peak power RF capability • Build in RF power detection • Factory calibrated for accurate tuning and matching | 1 |
| 5. | BH0269 | <p>BB19F GaAs PREAMPLIFIER (HPPR XBB19F 2HP)</p> <p>Linear, low noise, GaAs based broad banded preamplifier for observe and decoupling of nuclei from 57Fe up to 19F with</p> <ul style="list-style-type: none"> • Noise Figure (NF) ~1.4dB including all internal filters and active transmit-receive switch • Max. 500W peak power RF capability • Factory calibrated for accurate tuning and matching • Built-in 1H stop filter <p>This broad banded RF preamplifier module is designed to be used with broad banded probes.</p> | 1 |
| 6. | BH3072 | <p>2H LOCK TRANSCIEVER (L-TRX)</p> <p>Integrated lock RF transceiver (L-TRX, transmit and receive unit) with incorporated 5W RF amplifier for field lock operation on deuterated solvents provides</p> <ul style="list-style-type: none"> • Fast and accurate gradient shimming on 2H together with TopShim™ • Easy and reliable locking on multiple lock signal solvents (e.g. Pyridine) even in automation • Accurate sample temperature determination with NMR Thermometer™ <p>TopShim™ proprietary gradient shimming including lineshape optimization; see JMR 182(1), 38-48, 2006. Can be extended with separate 19F lock option.</p> | 1 |



7.	BH0243	<p>2H GaAs PREAMPLIFIER (HPPR 2H)</p> <p>Linear, low noise, GaAs based preamplifier for 2H observe, decoupling and lock operation with</p> <ul style="list-style-type: none"> • Noise Figure (NF) ~1.4dB including all internal filters and active transmit-receive switch • Max. 500W peak power RF capability • 2H lock / observe RF routing built-in • Fast, pulse program controlled mode switching (lock / decouple) • Factory calibrated for accurate tuning and matching <p>This highly selective module is designed to be used for selective probes without the need of external filters.</p>	1
8.	BH0266	<p>2H-Stop Filter</p>	1
9.	BH2075	<p>RF CHANNEL (TRX1200)</p> <p>The TRX1200 is a highly integrated NMR RF transceiver (transmit and receive) unit with built-in pulse program engine (sequencer, waveform memory) providing</p> <ul style="list-style-type: none"> • RF signal bandwidth of 5 to 1200 MHz for transmit and receive • Timing resolution of 12.5 ns • Simultaneous RF amplitude, phase & frequency setting within 12.5ns • High speed ADC, 240 MSPS @ 16 Bit, Digital Down Converter (DDC) • High speed DAC, 960 MSPS, Digital Up Converter (DUC) • High intermediate frequency (IF) for transmit and receive of 1852 MHz (e.g. no unwanted LO windows) • Sequencer waveform memory 1GB (e.g. pulse shaping, optimal control applications, composite pulse decoupling) • Spectral width up to 7.5 MHz • Effective dynamic range >17 Bit (5 MHz) / >19 Bit (1 MHz) / >23 Bit (6 kHz) 	2
10.	BH3400	<p>2CH RF AMPLIFIER (BLABBH500/100)</p> <p>Linear 2 channel RF amplifier for observe and decoupling with</p> <ul style="list-style-type: none"> • Min. 100W RF peak power @ 180 – 600 MHz (max. 25W CW) • Min. 500W RF peak power @ 15 – 600 MHz (max. 50W CW) <p>Pulse program controlled blanking and ultra-fast rise/fall times. The broad band RF channel provides two identical RF outputs connecting to different preamplifiers when appropriate (no manual re-wiring).</p> <p>Built-in computer controlled RF amplifier safety with forward / reflected RF power monitoring. Ethernet interface for service and NMR system integration.</p>	1
11.	PCWIN	<p>WORKSTATION AND SOFTWARE</p> <p>Acquisition PC with Windows OS</p> <p>HP Windows 10 Pro 64Bit PC equipped according to latest configuration: e.g. HP Z440 Intel Xeon E5-1620v4 3.8GHz, Quad Core 16 GB RAM, 2TB Hard Disc DVD +/-RW DL Drive HP USB Laser Mouse <i>(configuration may change without prior notice)</i></p>	1
12.	AP2521	<p>24 inch TFT MONITOR</p>	1
13.	SHS000-04	<p>TopSpin4 acquisition and processing licence</p> <p>TopSpin 4 acquisition and processing license including:</p> <ul style="list-style-type: none"> • NMR data acquisition (arbitrary dimensions) and processing (1D, 2D, 3D, 4D and 5D) • TopGuide, menu guided acquisition setup • NMRGuide for training of users in use of 1D and 2D experiments with NMR literature library • Icon NMR automation interface <p>Structure Analysis Software:</p> <ul style="list-style-type: none"> • Relaxation analysis (T1/T2) • integration of 1D and 2D spectra • deconvolution of 1D and 2D spectra • NMRSIM for experiment simulation • Daisy spectrum simulation software • TopSpin interactive and automatic multiplet analysis • TopSpin solid state lineshape analysis • TopSpin integrated structure editor • TopSolids integrated solid state NMR set-up • CMC-assist, supporting NMR Data Interpretation • SmartDriveNMR for fully automated structure verification on the spectrometer • processing of Non Uniformly Sampled (NUS) data for 2D spectra 	1



PROBES AND OTHER FEATURES

14.	BH5410	BH5410 Cryo Platform PRODIGY N2-Cryo-Platform for Prodigy probe, cryo cooling unit with pumps; 2m of length (standard), basic system; 100 l dewar for 12 days; control electr.; on initial order of new system only	1
15.	BH5450	BH5450 Balance for N2 level	1
16.	PA5011_BB/H_EZ	CRPN2-DR-BB/1H&19F-5mm-EZ 5mm X-nuclei optimized double resonance cryo probe designed for X-nuclei observation with ¹ H decoupling and ¹ H observation with X-nuclei decoupling (Prodigy™). The X-nuclei range includes ³¹ P- ¹⁹ N with the excluded region between ¹⁹⁹ Hg and ¹⁵³ Eu. Probe includes cooled preamplifiers for ¹ H(¹⁹ F), ³¹ P- ¹⁵ N range and ² H. ¹ H-circuit is tunable to ¹⁹ F. Features (BBO H&F BBO-H-D-05 Z): <ul style="list-style-type: none"> • ²H lock • VT range -40°C to +80°C • Z gradient with 6 G/A*cm • Automated tuning & matching (ATM) 	1
17.	AH0171	AH0171 SampleCase Features: <ul style="list-style-type: none"> - Convenient sample access at user height - Safe operation - 24 easily accessed sample positions - Random access for sequential- or batch automation - Unique manual push-button sample exchange - Supports all common sample-tubes in spinners or shuttles - Compatible with MAS and CryoFIT 	1
18.	Z42516A	Type A POM Spinner standardbore shimsystems (5 mm) Type A Spinner Plastic (POM) - selected quality for use 500MHz and higher 5 mm, standardbore, Tmax = 80°C	24
19.	AH1015	VARIABLE TEMPERATURE CONTROL (BSVT) The Bruker SmartVT (BSVT) is a highly integrated unit to provide <ul style="list-style-type: none"> • Digital temperature sensor resolution better than 5mK • Temperature stability depends on environment and probe (e.g. 10mK/K for HR RT probes) • Supports various temperature sensor types (e.g. thermocouple T or E, PT100) • VT gas flow monitoring up to 3000lph with mass flow regulation • Anti-freeze mode for CryoProbes built-in (probe safety) • Up to 4 independent heater channels (e.g. flow probes) • High temperature measurements ready (up to 600°C with high temperature probes), no separate heater (booster) needed • Intelligent VT gas flow control for easy sample insertion with different kind of spinners (ceramic, KEL-F, etc.). No manual adjustments needed (e.g. SampleCase, SampleJet) • Intelligent SmartCoolers™ (BCU) and low temperature accessories control (LN2 exchanger/evaporator) • Accurate Sample Temperature determination and regulation with NMR Thermometer™ <i>NOTE: System to make use of existing low temperature accessory.</i>	1
20.	AH0039	PROBE VT ADAPTER THERMOCOUPLE TYPE T The VT adapter TC-2T provides two thermocouple type T sensor channels and one heater channel for corresponding NMR probes. It also connects to the heater safety sensor to prevent the probe from overheating in case of missing VT gas.	1



SUPPORT AND INSTALLATION

- 21. Complete system installation by qualified personnel. Standard samples will be provided by Bruker BioSpin on a temporary basis for meeting specifications
- 22. Complete set of system documentation and manuals provided in BASH CDROM format.
- 23. HKURSV1 **ONE DAY ON-SITE APPLICATION VISIT** 2
Charge for on-site applications or training visit by qualified Bruker personnel to be scheduled within one year of system installation at times mutually agreeable to both the customer and Bruker. Quantity reflects the total days.
- 24. HKURSV1 **ONE DAY TRAINING COURSE TUITION** 8
Charge for tuition to Bruker BioSpin training courses held at Bruker facilities. Tuitions must be used within one year of system delivery. Quantity reflects the combined total days of all training courses.
Course registration is required in advance and enrollment may be limited. See www.bruker.com for a list and schedule of training courses.
Does not include any customer travel, lodging and meals costs; those costs are the sole responsibility of the customer.

Net Purchase Price 569,970 USD

TERMS & CONDITIONS AND WARRANTY INFORMATION

Please refer to the latest documents located on the Bruker.com website at the following link:
<https://www.bruker.com/service/information-communication/terms-and-conditions.html>

TERMS OF PAYMENT

60% on order, 30% on shipment, 10% on acceptance payable Net 30 Days

If delivery of the system is delayed by request of the purchaser, then the amount due upon delivery will be considered payable on the quoted delivery date. Additional charges will apply for shipping, rigging and storage of the system in such cases.

In the event Customer has not accepted the System within ninety (90) days after receipt of the System by the Customer, through no fault on the part of Bruker, the System shall be deemed to be accepted by the Customer as of the expiration of such ninety (90) days.

ORDER SUBMISSION INSTRUCTIONS

Purchase orders can be submitted via e-mail to order.processing@Bruker.com or in writing to Bruker BioSpin Corporation, 15 Fortune Drive, Billerica, MA 01821, United States to the attention of Order Processing Department. Fax copies may be transmitted to +1 (978) 667-0132, if followed within 10 days by a written confirmation.

To remit payment by credit card, please call 978-667-9580 ext. 5611.

*** To minimize processing delays, Purchase Orders must include the Bruker quotation number and your organization's Billing & Shipping addresses ***

DELIVERY

The estimated delivery stated in the header of this document is based on average production time of items quoted herein. Delivery time may vary based on production capacity at time of receipt of order.

INCO TERMS

DDP Destination

Zhengtian "Titan" Gu
Vice President
Analytical Development

06 JUN 2018

DATE





Analysis Development
For President
Education Trust Co