Bruker BioSpin

BGMU E

Great Master Unit
Technical Manual

Version 001

think forward

NMR Spectroscopy

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This manual describes the units as they are at the date of printing. On request, the manufacturer shall supply circuit diagrams, lists of components, descriptions, calibrating instructions and any other information for use by qualified personnel of the user, in charge of repairing the parts of the unit which have been stated by the manufacturer to be "repairable". Such supply shall in no event constitute permission to modify or repair the units or approval of the same.

This unit is not designed for any type of use which is not specifically described in this manual. Such use may be hazardous.

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Contents

Introduction 1

The BGMU E (**B**ruker **G**reat **M**aster **U**nit IPSO) device is the interface between the gradient controller (**G**-**C**ontroller), in addition to the DPP (**D**igital **P**re-emphasis **P**rocessor) if pre-emphasis feature is needed, and the gradient current amplifiers. The gradient amplifiers provide a nominal current of 40A or 60A. It replaces the previous Master Unit generation.

One of the important Master Unit functions is to route the digital gradient pulse information to four channels, the X, Y, Z gradients and the Great B0 compensation unit.

The Master Unit performs the required protection (safety parameters, power limitation, overheating protection…) in order to avoid any damages on the gradient coils or the imaging accessories.

The Master Unit presents an Ethernet interface for a remote control of the gradient amplifiers.

The user interface is SetPre, which is a software TopSpin module.

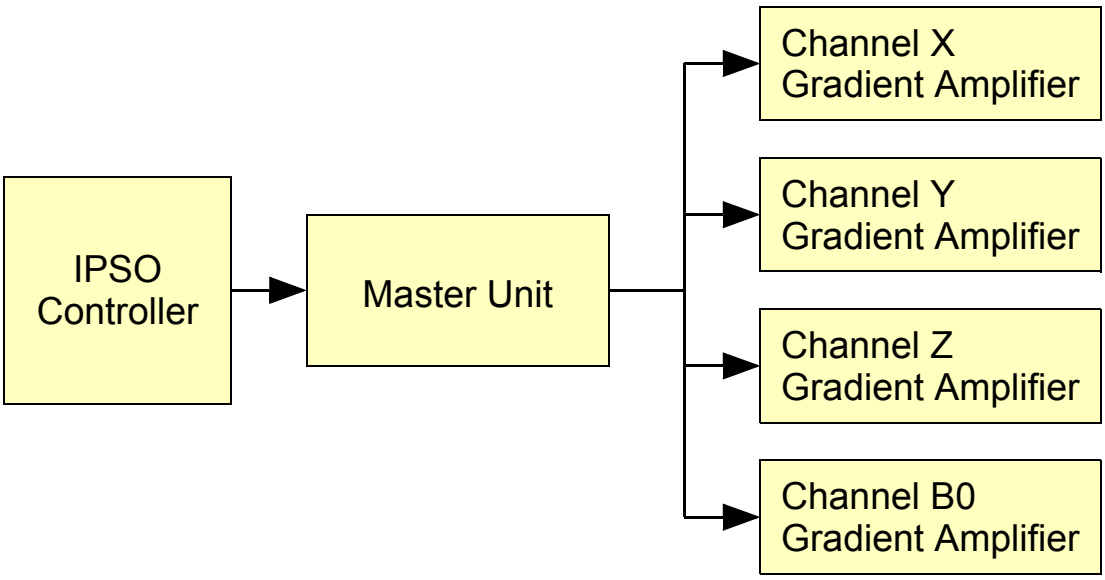

Figure 1.1. BGMU E Unit Diagram

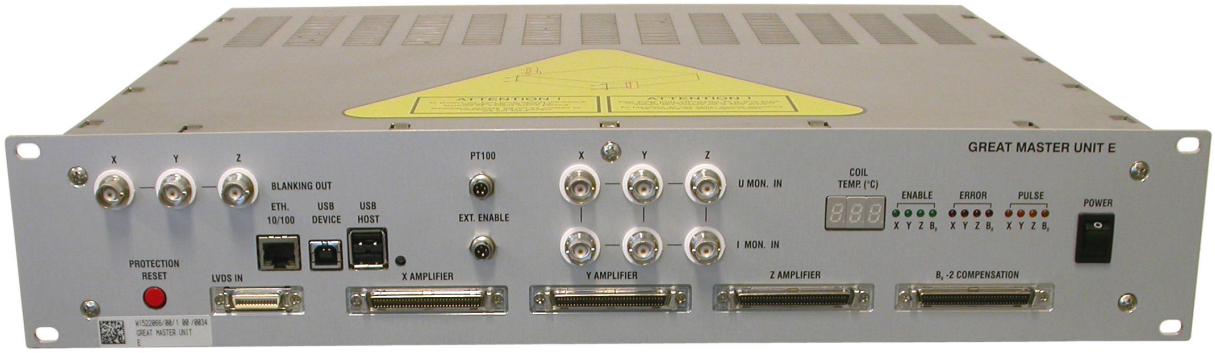

Figure 1.2. BGMU E Great Master Unit

Safety 2

Instructions 2.1

The BGMU E Unit contains live parts. Using the device with cover removed is forbidden.

Risk of electrical shock! Be sure of voltage absence before every intervention on the device.

The different wirings must be done by an authorized and qualified technician. Use only the provided cables. Never disconnect any cable during the use of the device.

Sprinkling or pouring liquids on the device is forbidden. Use a wet or alcohol soaked rag to clean the EMB.

For corrective actions contact the BRUKER BIOSPIN representative in your country.

Labels 2.2

Labels are provided to alert operating and service personnel to conditions that may cause personal injury or damage to the equipment from misuse or abuse. Please read the labels and understand their meaning.

Identifying Plate 2.2.1

The BGMU E can be identified by an identifying plate at the front panel of the unit that contains the following information.

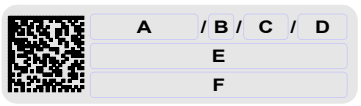

Figure 2.1. Identifying Plate

- **(A) Part Number**
  This field indicates the part number of the product.
- **(B) Variant**
  This field indicates the variant number that identifies the production category of the product. The default variant is 00.

- **(C) ECL**
  This field indicates the revision number that identifies the product configuration. The initial revision is 0.00.
- **(D) Serial Number**
  This field indicates the serial number of the product.
- **(E) Type**
  This field contains the designation of the product.
- **(F) Information**
  This field contains additional information about the product.

Manufacturer's Name Plate *2.2.2*

The BGMU E can be identified by a manufacturer's name plate at the back panel of the unit that contains the following information:

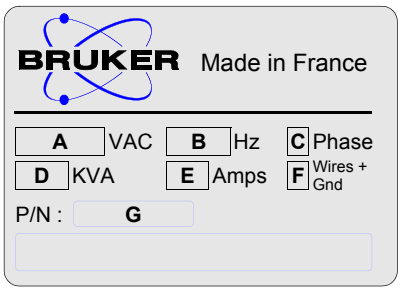

Figure 2.2. Manufacturer's Name Plate

- **(A) Voltage**
  This field indicates the input mains voltage of the product.
- **(B) Frequency**
  This field indicates the input mains frequency of the product.
- **(C) Phases**
  This field indicates the number of phases of the mains.
- **(D) Power**
  This field indicates the absorbed power of the product.
- **(E) Current**
  This field indicates the absorbed current of the product.
- **(F) Wires**
  This field indicates number of wires with the ground in the mains cord.
- **(G) Part Number**
  This field indicates the assembly number that identifies the part number of the product.

Warning Signs *2.2.3*

WARNING! *Risk of electrical shock!*

Figure 2.3. Warning Before Opening

Please disconnect the main supply before opening to prevent potential hazard such as:

- Electric shock from power supply.
- Contact burns from heatsink.

Installation 3

The installation of the device must be done only by an authorized and qualified technician, in total accordance with the running standards. Every breakdown due to a non-respect of the following instructions will not be attributable to Bruker and will not be covered by the guarantee clauses.

Initial Inspection 3.1

Mechanical Check 3.1.1

If damage of the shipping carton is evident, request the carrier's agent to be present when the instrument is unpacked. Check the equipment for damage and inspect the panel surfaces for dents and scratches.

Claim for Damage 3.1.2

If the unit is mechanically damaged or fails to meet specifications upon receipt, notify BRUKER or our representative immediately. Retain the shipping carton and packing material for the carriers inspection as well as for subsequent use in re-turning the unit if necessary.

Reshipment and Repackaging Requirements 3.1.3

Whenever possible, the original carton and packing material should be used for reshipment. If the original packing material is not available, wrap the instrument in heavy paper or plastic. Use a strong shipping container. If cardboard is used, it should be at least 200 lbs. test material.

Use shock absorbing material around all sides of the instrument to provide a firm cushion and to prevent from movement inside the container wall on each side. Protect the front panel by means of cardboard spacers inserted between the front panel and the shipping carton. Make sure that the instrument cannot move in the container during shipping. Seal the carton with a good grade of shipping tape and mark the container:

" FRAGILE ELECTRONIC INSTRUMENT. "

Environment Requirements *3.1.4*

This BGMU E unit is built for inside use only on a maximum elevation of 2000m above sea level (6600 feet).

No specific cooling or ventilation is required.

Be sure that the BGMU E unit has enough area around it so that the free air flow into and out of the BGMU E unit is not obstructed.

It should, however, be in an environment which conforms, the 5°C - 45°C (41°F - 113°F) thermal specifications, a 80% maximum relative humidity of air and a contamination level of two (means a normal non conductive contamination, temporary conductivity due to condensation is possible).

Installation Requirements *3.2*

No special precautions are necessary. Mount the equipment in an area which is relatively free of vibration, and has sufficient room for cable connections.

Bench Operation *3.2.1*

The unit can be placed onto a secure flat surface.

Power Requirements *3.3*

The controller is designed with a built-in switched power supply. The mains line connector type is IEC 10A.

One Phase Line requirements:

AC input voltage:	90-264VAC
Input current max:	0.12A / 230V
Inrush current max:	< 30A at 230V
Frequency:	47-63Hz

System Check *3.4*

Before applying power for the first time the following items should be checked:

- The AC input voltage range must be compatible with the specification of the ***"Power Requirements"***.
- All the necessary cables are connected regarding the labels.

Start-up Procedure *3.5*

The following list describes how to turn on the BGMU E unit and what should be seen as this occurs.

Before starting this procedure, make sure that you have properly followed the instructions in section ***"System Check" on page 12***.

1. Verify that the circuit breakers from the BGMU E and from the gradient amplifiers are switched off.
2. Connect the Master Unit to the AC line.
3. Switch on the gradient amplifiers.
4. Switch on the BGMU E.
5. Observe the indicators on the BGMU E front panel :
   - The ON/OFF switch lights green.
   - All the front panel LEDs light up and the hardware initialization process is started.
6. After a few seconds, the LEDs turn off. The Master Unit is ready for use if the code **C01** is displayed. If an other code is displayed, please refer to the ***"Gradient Codes Definition" on page 36***.
7. Perform a '**gradsafe**' via the SetPre interface in order to set the safety parameters. The green LEDs lights up when the corresponding amplifier is connected and the probe temperature is displayed.

Features

4

General Fonctions 4.1

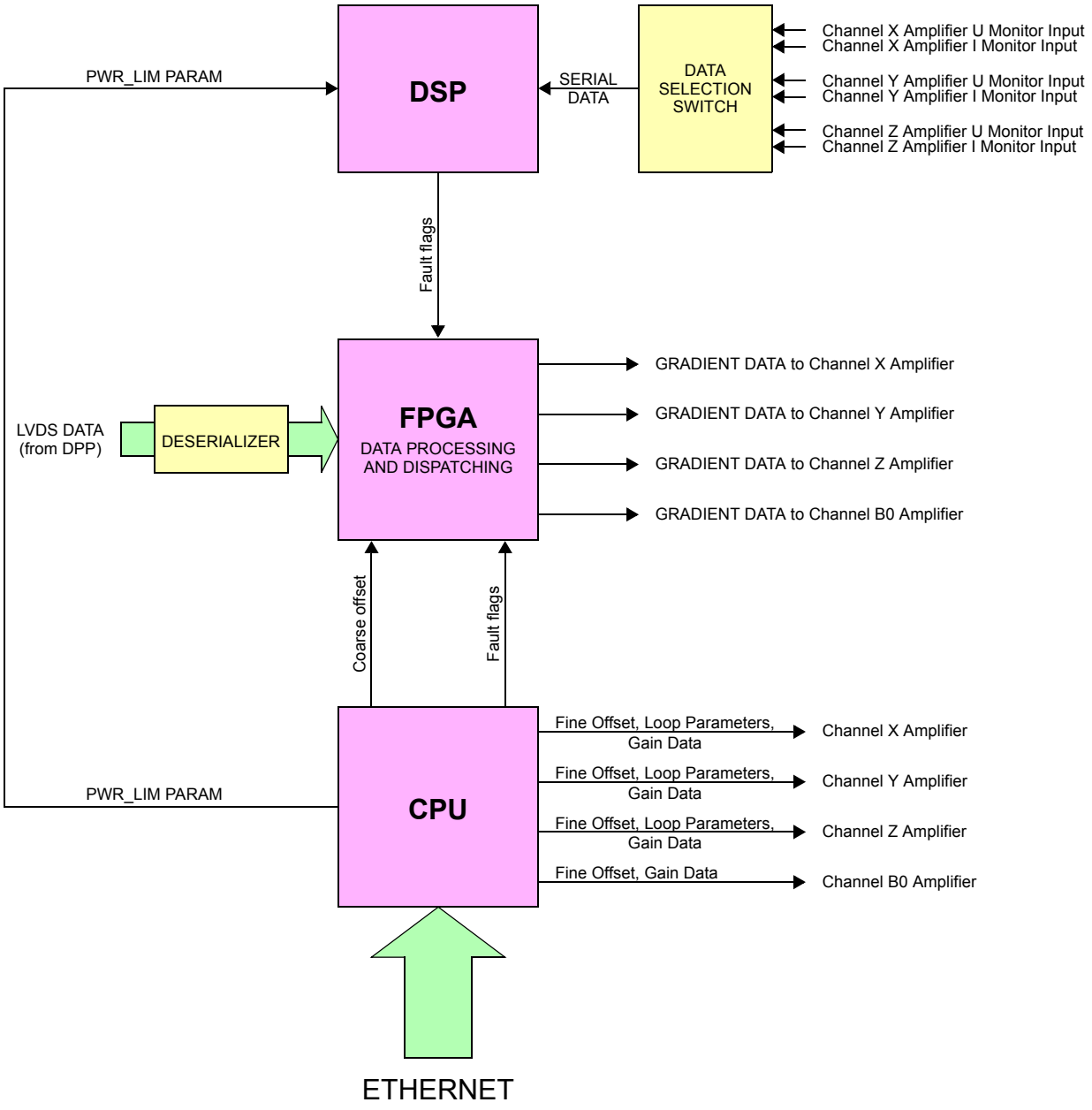

Figure 4.1. Functional Block Diagram

Data Display and Protection 4.2

Safety Parameters 4.2.1

The Master Unit receives the safety parameters values corresponding to a given gradient coil from the software application. Once the parameters are set for each channel used, the gradient amplifiers are enabled.

The safety parameters are:

- Maximum Voltage [V]
- Maximum Current [A]
- Coil Resistance [Ohms]
- Total Power[W]
- Mean Power [W]
- Capacitors [%]
- Resistors [%]
- Gain [A]

Power Limitation 4.2.2

In order to avoid hardware damages on gradient coils, the applied electrical power must be monitored and limited. In micro-imaging systems, this monitoring is performed by the Master Unit with the current and voltage monitoring signals provided by the gradient amplifier (GREAT 1/40 and 1/60).

Other Protections 4.2.3

The imaging probes temperature

The temperature of the gradient coil is monitored during the experiments. The temperature control is performed via a PT100 sensor. If the PT100 is not connected, the Master Unit doesn't enable the gradient amplifier. If it exceeds the temperature limit value (default limitation value: 50°C, accuracy: 0.6°C; range: 0°C to 50°C), the amplifier channel are disabled and an overheat measurement error is reported.

The gradient water cooling

The BCU20 gradient water cooling unit, BCU20 might be connected to the Master Unit. If this device detects an error condition (overheating for instance), the gradient system will be disabled by the Master Unit.

Green LED

The Master Unit has four green LED on the front panel for each gradient amplifier. The green Led indicates that the amplifier is enabled.

Red LED

The Master Unit has four red LED on the front panel for each gradient amplifier. The red Led indicates that an error occurred on the corresponding gradient channel.

Yellow LED

The Master Unit has four yellow LED on the front panel for displaying gradient pulse presence on the corresponding amplifier output.

Coil temperature display

The coil temperature value can be read on the front panel display when the Master Unit is in the operating mode. The displayed temperature unit is 1°C.

The temperature value is replaced by a code when the Master Unit is in an other mode than the operating mode (failure mode, firmware download mode..).

The displayed codes format is composed by one letter, which described the code type ('E' for an error code and 'C' for an information code) followed by the code number.

The codes definition is available in the section ***"Servicing the BGMU E" on page 27*** and as it's shown in ***"Gradient Codes Definition" on page 36***.

Technical description

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General Description 5.1

The BGMU E is a 19" unit with following dimensions :

- Height : 2U
- Width : 19"
- Depth : 400mm
- Weight : 6.34kg (14lbs)

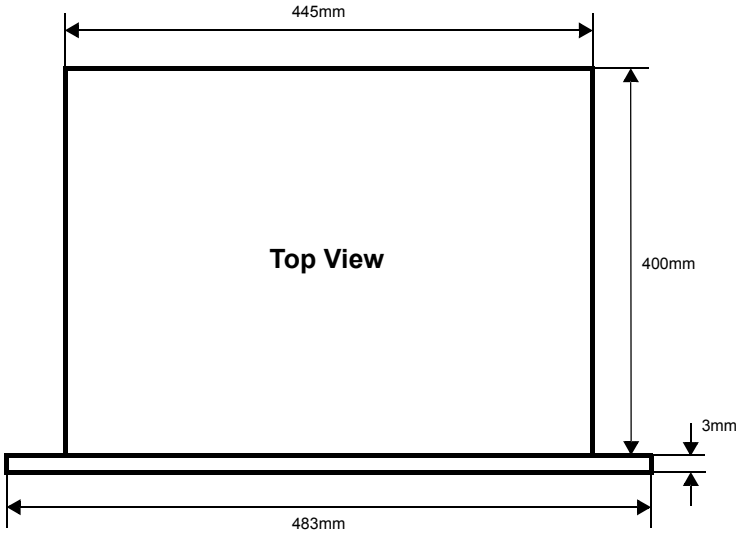

Figure 5.1. Housing Dimensions

Power Requirements 5.2

The BGMU E Unit is powered by the mains input.

Main characteristics

- AC input voltage range : 90~264VAC ±10%
- AC inrush current : <30A at 230VAC
- Power consumption : 230VAC 120mA
- Fuses : 2 x 1A T 250VAC

Internal Overview 5.3

The unit includes:

- 1 CPU board plugged on to an interface board.
- 1 interface board with the controller logic.
- 1 power supply board providing 3.3V/5A 5V/5A 12V/1A.
- 1 display board connected to the interface board by a ribbon flat cable.

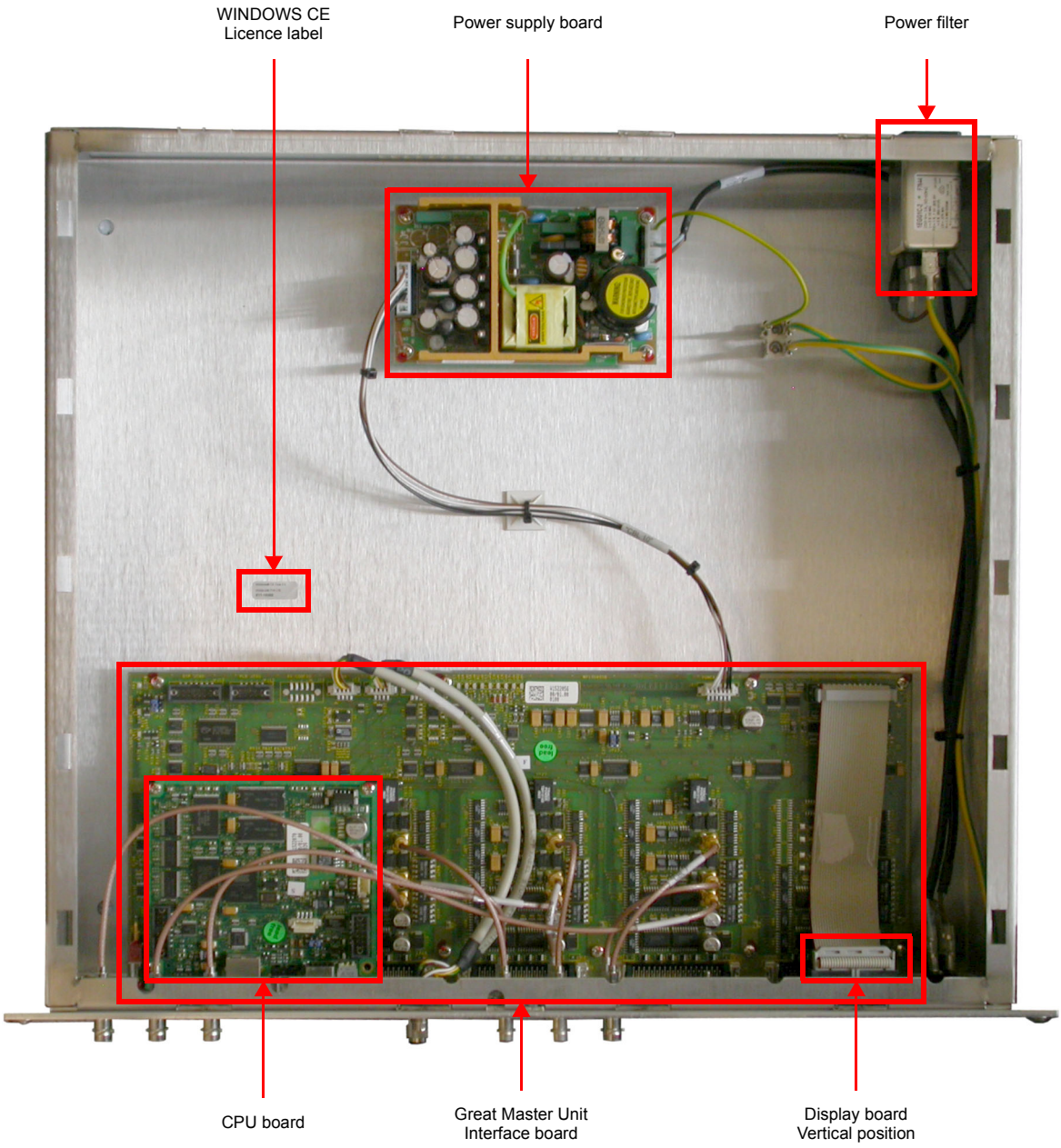

Figure 5.2. Master View Inside Annotation

Front Panel Overview *5.4*

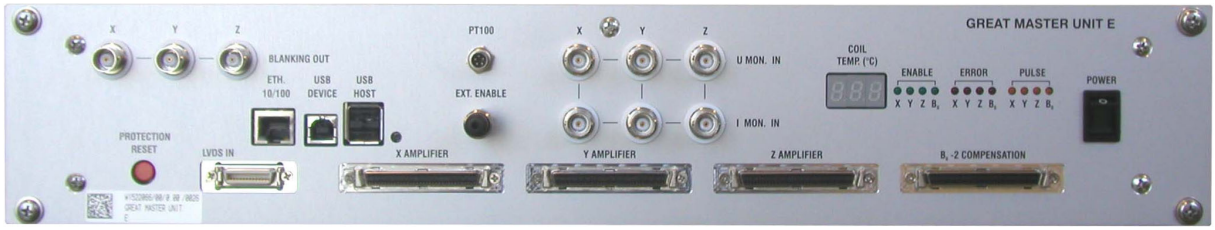

Figure 5.3. Front Panel View

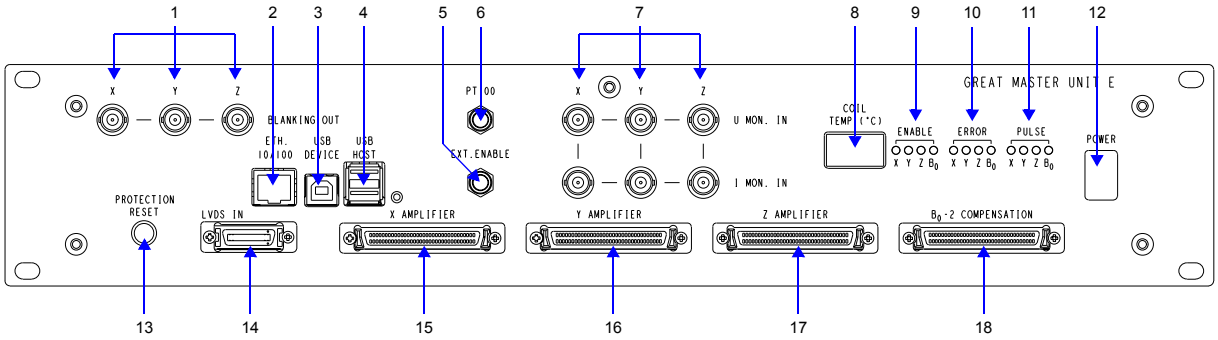

Figure 5.4. Front Panel Annotation

Table 5.1. Front Panel Description

Part	Name	Function
1	X, Y, Z channels blanking out	Blanking output signal for the X, Y, Z channels
2	Ethernet 10/100 connector	10/100Mb/s Ethernet LAN communication
3	USB Device connector	USB Device Interface (for future use)
4	USB Host connector	USB Host Interface (for future use)
5	External Enable connector	BCU20 device connection
6	PT100 connector	PT100 Probe head temperature sensor connection
7	X, Y, Z channels U, I monitor IN	Voltage and current monitoring input signal from the X, Y, Z channels for the power limitation system
8	Coil temperature display	Coil Temperature is displayed in degree celsius if no error occurs (see safety part)
9	X, Y, Z, B0 Enable led	Green led indicates that the individual amplifier channel X, Y, Z or B0 is enabled

Part	Name	Function
10	X, Y, Z, B0 Error led	Red led indicates that an error occurred on the individual amplifier channel X, Y, Z or B0
11	X, Y, Z, B0 Pulse led	Yellow led, when it lights, a gradient pulse signal is led to the individual amplifier channel X, Y, Z or B0
12	Main power switch	Switch on/off the Master Unit
13	Protection Reset button	Puts the system into working condition after a fault condition
14	LVDS IN connector	LVDS input signal from the gradient controller
15	X amplifier connector	Connection to the gradient amplifier channel X
16	Y amplifier connector	Connection to the gradient amplifier channel Y
17	Z amplifier connector	Connection to the gradient amplifier channel Z
18	B0 amplifier connector	Connection to the gradient amplifier channel B0

Connections and Wiring *5.5*

PT100 *5.5.1*

The probe heater connector is a round 5 pins male model connector.

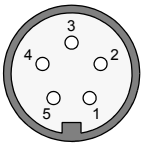

Figure 5.5. PT100 Connector

Table 5.2. PT100 Pin Assignment

Pin	Signal
1	PT100_I+
2	PT100_I-
3	Frame
4	PT100_U+
5	PT100_U-

External Enable 5.5.2

The External Enable connector is a round 4 pin male model connector.

Figure 5.6. External Enable Connector

Table 5.3. External Enable Pin Assignment

Pin	Signal
1	BCU_ERR
2	DGND
3	EXT_ENABLE
4	DGND

Ethernet 10/100 5.5.3

The RJ45 connector for the Ethernet 10/100 Mbps link is mounted directly on the CPU-A Board.

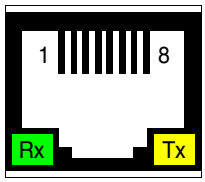

Figure 5.7. RJ45 8 Pin Connector

Table 5.4. RJ45 8 Pin Assignment

Pin	Signal	Pin	Signal
1	Transmit + (Tx+)	4	N/A
2	Transmit - (Tx-)	5	N/A
3	Receive + (Rx+)	6	Receive - (Rx-)

48-Bit LVDS 5.5.4

The 48-Bit LVDS connector is a 26 pin male connector (10226-1210VE).

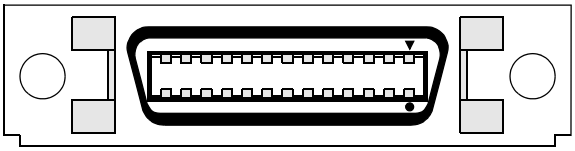

Figure 5.8. 48-Bit LVDS Connector

Table 5.5. 48-Bit LVDS Pin Assignment

Pin	Signal	Pin	Signal
1	USB+	14	USB-
2	USB_GND	15	RxIN_M0
3	RxIN_P0	16	RxIN_M1
4	RxIN_P1	17	RxIN_M2
5	RxIN_P2	18	RxCLK_M
6	RxCLK_P	19	USB_PWR
7	CHANNEL_DETECT0	20	CHANNEL_DETECT1
8	USB_GND	21	RxIN_M3
9	RxIN_P3	22	RxIN_M4
10	RxIN_P4	23	RxIN_M5
11	RxIN_P5	24	RxIN_M6
12	RxIN_P6	25	RxIN_M7
13	RxIN_P7	26	LVDS_GND

Gradient Amplifier Channel 5.5.5

The gradient amplifier connector is a SCSI 68 pins female model connector.

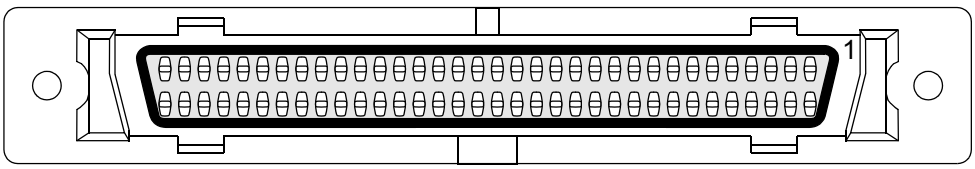

Figure 5.9. Gradient Amplifier Channel Connector

Table 5.6. Gradient Amplifier Channel Pin Assignment

Pin	Signal	Pin	Signal
1	DATA_DOUT0	35	+5V_AMP
2	GND	36	+5V_AMP
3	DATA_DOUT1	37	+5V_AMP
4	GND	38	+5V_AMP
5	DATA_DOUT2	39	+5V_AMP
6	GND	40	+5V_AMP
7	DATA_DOUT3	41	SDATA
8	GND	42	GND
9	DATA_DOUT4	43	SCLK
10	GND	44	GND
11	DATA_DOUT5	45	INT
12	GND	46	GND
13	DATA_DOUT6	47	WRMUX
14	GND	48	GND
15	DATA_DOUT7	49	ENABLE
16	GND	50	GND
17	DATA_DOUT8	51	RESET
18	GND	52	GND
19	DATA_DOUT9	53	PULSE-
20	GND	54	GND
21	DATA_DOUT10	55	PULSE+
22	GND	56	GND
23	DATA_DOUT11	57	BLANK
24	GND	58	GND
25	DATA_DOUT12	59	Not used
26	GND	60	Not used
27	DATA_DOUT13	61	Not used
28	GND	62	Not used
29	DATA_DOUT14	63	Not used
30	GND	64	Frame
31	DATA_DOUT15	65	Not used
32	GND	66	Frame
33	STROBE	67	Not used
34	GND	68	Frame

X, Y, Z Channels Blanking Out and X, Y, Z Channels U, I Monitor *5.5.6*

The X, Y, Z channels blanking output and the X, Y, Z channels U, I monitor input are BNC female model connectors.

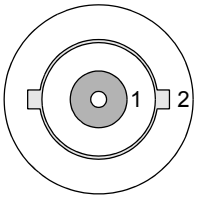

Figure 5.10. X, Y, Z Blanking Out and U, I Monitor In Connectors

Table 5.7. X, Y, Z Channels Blanking Out Pin Assignment

Pin	Signal
1	BLANKING OUT
2	BLANKING OUT GND

Table 5.8. X, Y, Z Channels U, I Monitor In Pin Assignment

Pin	Signal
1	MONITOR IN
2	MONITOR IN GND

Rear Panel Overview *5.6*

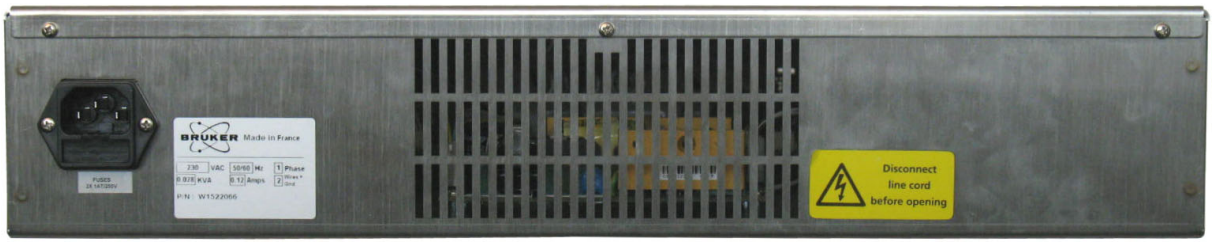

Figure 5.11. Rear Panel View

Servicing the BGMU E

6

The BGMU E provides servicing Web pages. You can open this page either in the TopSpin interface using the "***ha***" order after selection of the BGA push button or directly via a Web browser by entering the BGA IP address attributed to the Master Unit by the workstation.

BGA Information Page *6.1*

The default BGA page is the BGA Information page shown on figure the below.

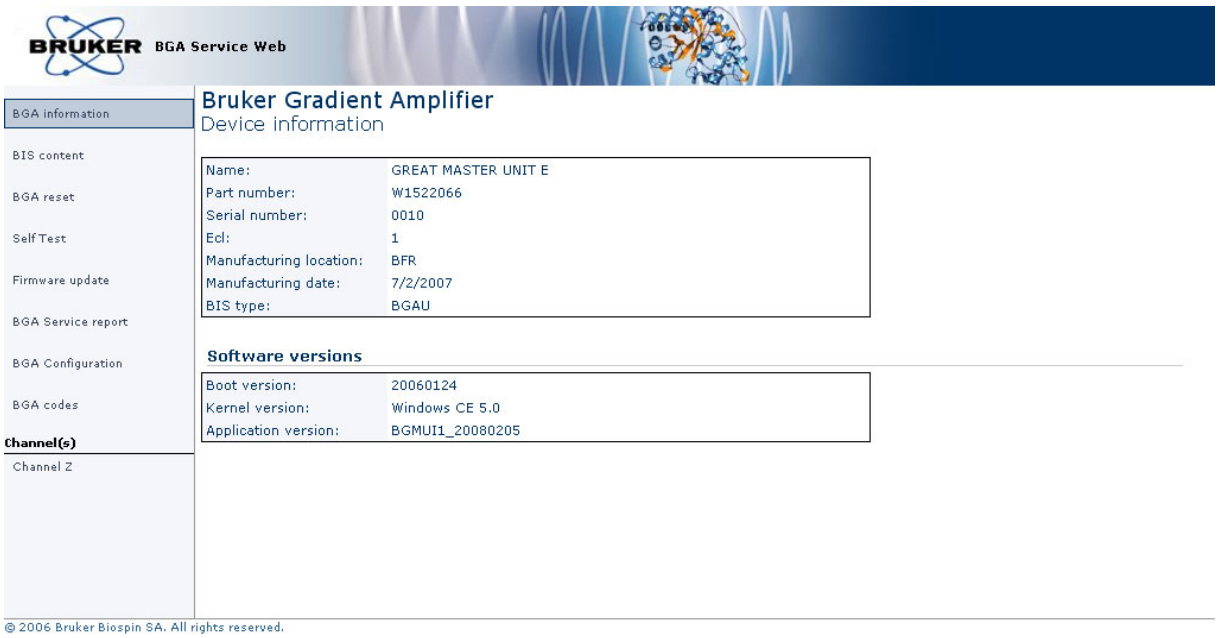

Figure 6.1. Device Information

Display of the BGA Information page. The Device information and the software versions are displayed.

BGA BIS Content Page *6.2*

The BIS content page shows all the parameters stored in the Master Unit and in the GREAT amplifiers BIS like part number, serial number, nominal current, etc.

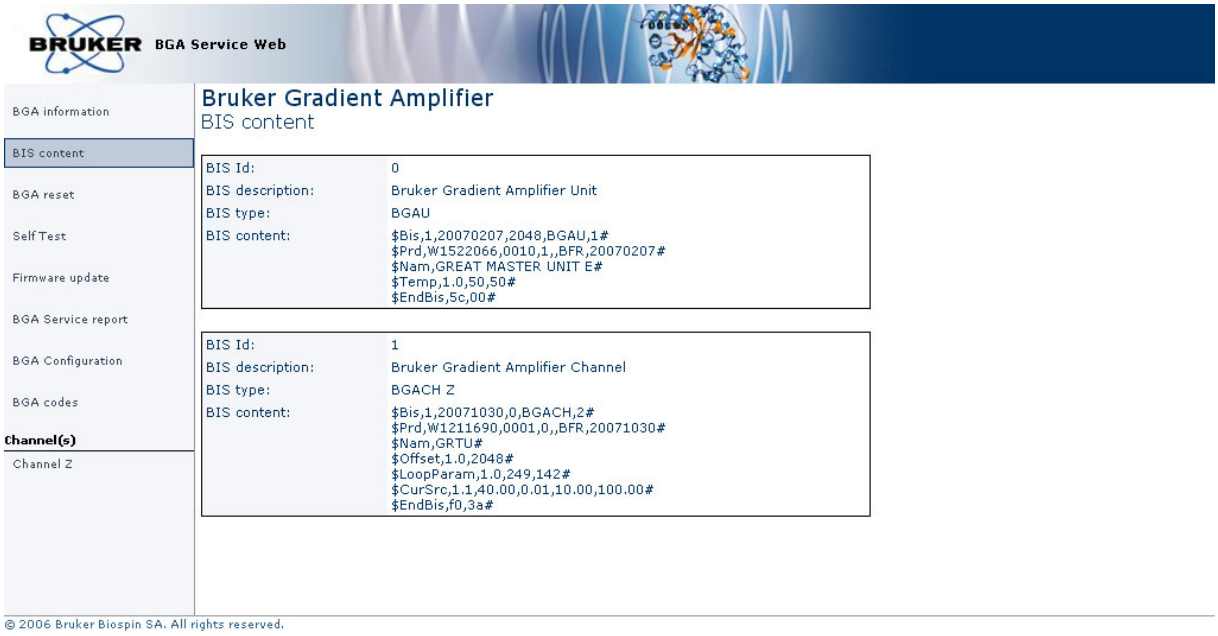

Figure 6.2. BIS Content

Display of the BGA BIS content page. In this example, the BIS content of the device BGAU and BGACH are shown.

BGA Reset Page *6.3*

The BGA reset page command allows to perform a software reset without switching off the amplifier units.

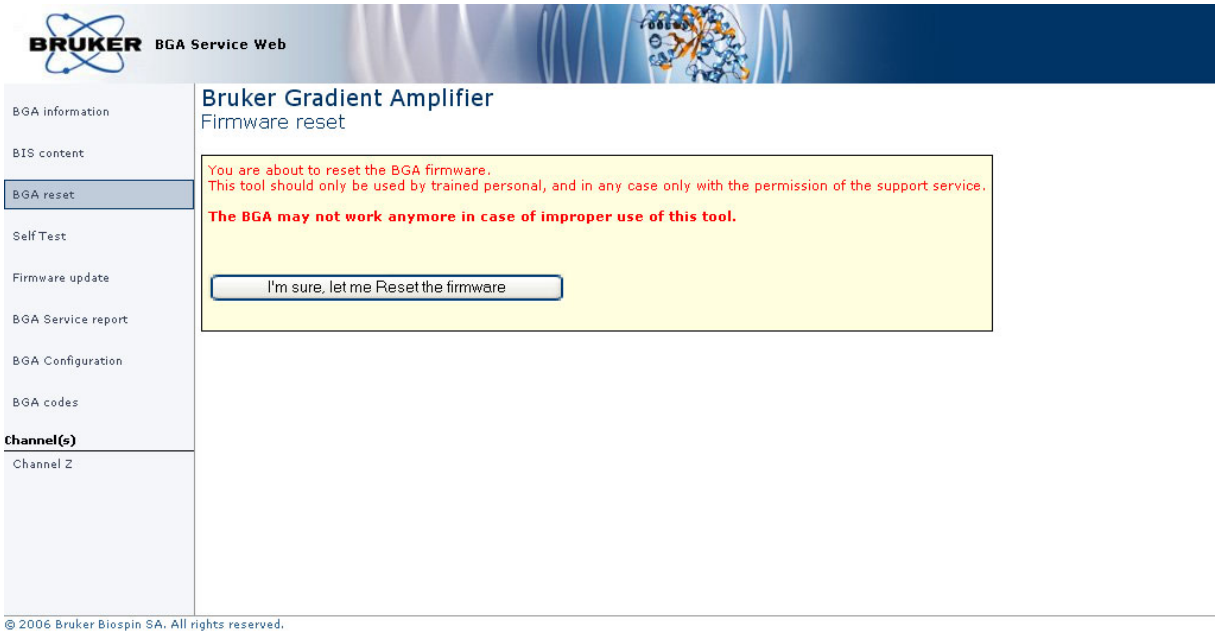

Figure 6.3. Firmware Reset

Display of the BGA Reset page.

BGA Self Test Page 6.4

The Self Test page is dedicated to the service staff. After a self test procedure, the results are displayed in this page.

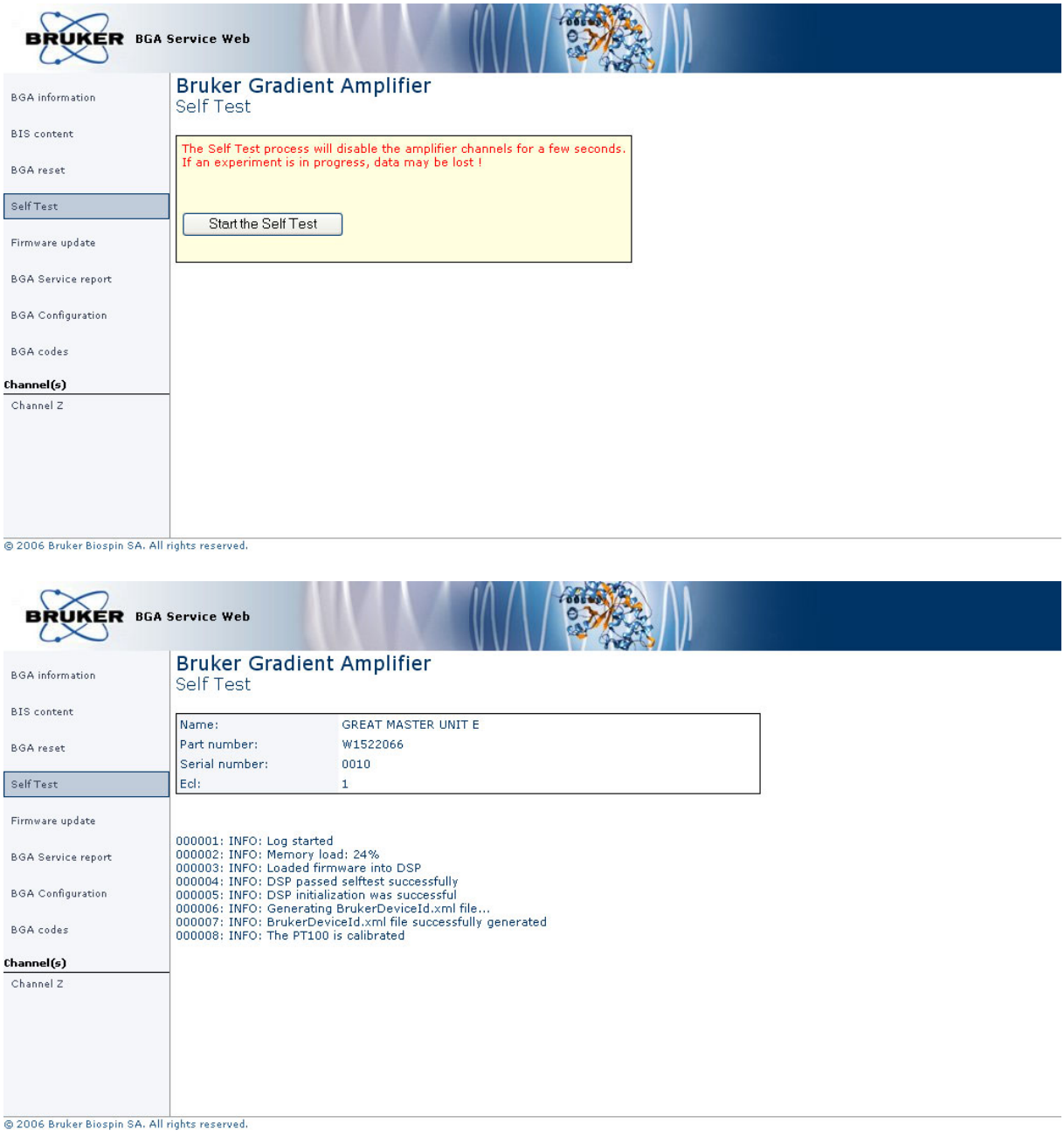

Figure 6.4. Self Test and Self Test Result

Display of the Self Test and Self Test Results pages.

BGA Firmware Update Page *6.5*

The firmware update page allows to upgrade an old firmware version with a new current version. The Boot and the application firmware version is displayed on the BGA Information page. As it is the case for all other spectrometer devices, if a new firmware is required, it would be delivered with the appropriate TopSpin version or by a Bruker service engineer. It can be downloaded from every kind of electronic data storage device. The gradient firmware should be found in the <TopSpin inst.>/conf/instr/servtool/bga directory.

The firmware path is searched with the Browse... button and the procedure is started with the update button.

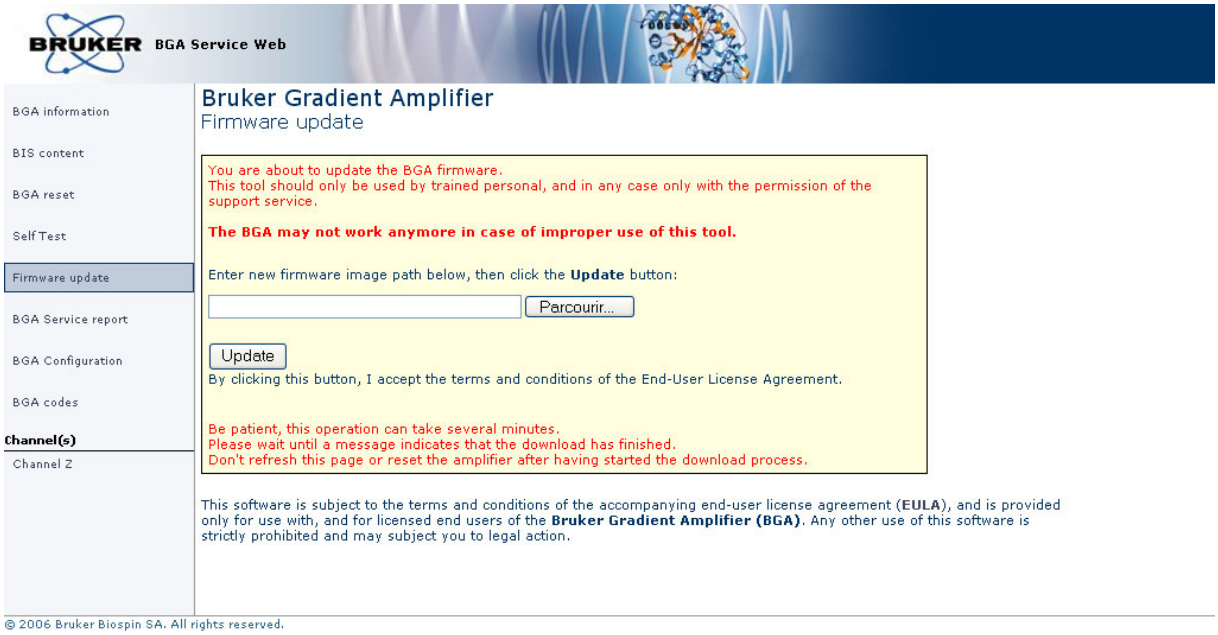

Figure 6.5. Firmware Update

Display of the firmware update page.

BGA Service Report Page *6.6*

The status information are refreshed automatically every 10s on the Service Report page or by the user if the page is refreshed manually. These information are useful to know which red indicators are used to show errors. The individual actions which have to be done are given below depending on the error displayed (red box in the corresponding error line of the page).

The global status register is related to the Master Unit and a specific status register exists for each of the channels X, Y, Z and B0 compensation unit.

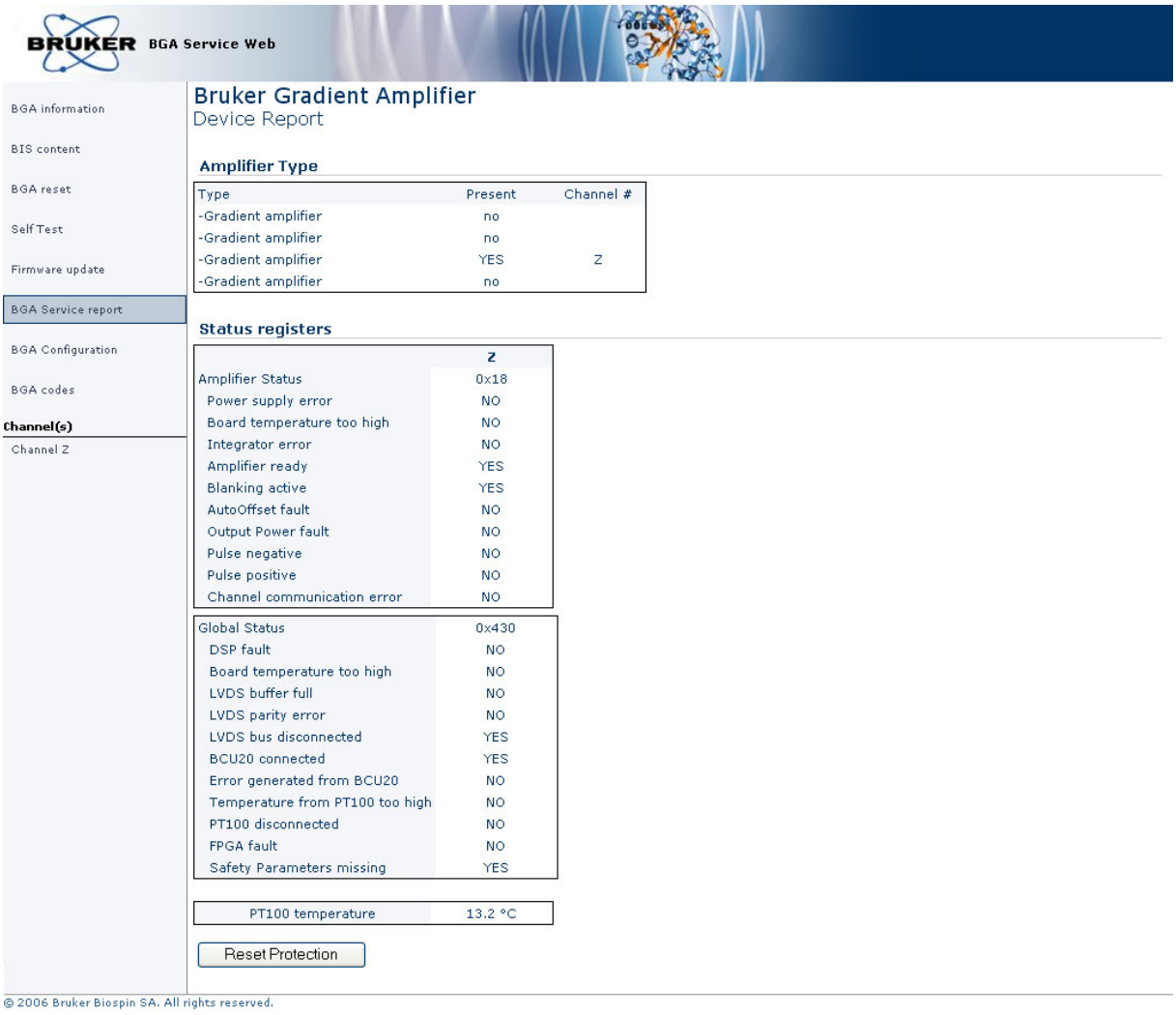

Figure 6.6. Device Report

Display of the BGA Service Report page. In this example, only the channel Z is present.

Master Unit:

1. DSP fault or Board temperature too high : Toggle the power supply ON/OFF on the Master Unit and set the gradient safety parameters. If the error remain, please call your BRUKER office.
2. LVDS buffer fault : It is necessary to reboot the IPSO computer and sometimes to toggle the Master Unit power supply ON/OFF. Set the safety parameters in the "SetPre" interface (check also the LVDS connections and the LVDS cable itself).
3. LVDS parity error : It is necessary to reboot the IPSO computer and sometimes to toggle the Master Unit power supply ON/OFF. Set the safety parameters in the "SetPre" interface (check also the LVDS connections and the LVDS cable itself).
4. LVDS bus disconnected : It is necessary to reboot the IPSO computer and sometimes to toggle the Master Unit power supply ON/OFF. Set the safety parameters in the "SetPre" interface (check also the LVDS connections and the LVDS cable itself)
5. Error parameter from BCU20 : Check if there is a connector on the BCU20 female connector (7 connector on the Master Unit front panel). If it is the case, check if the BCU20 unit is working properly.
6. Temperature from PT100 to high : Be sure that the gradient coil is properly cooled with water. Be sure that there is no problem with the cooling circuit. (This failure occurs when the Master Unit measures a coil temperature higher then 50°C).
7. FPGA fault : Toggle the Master Unit power supply ON/OFF. Set the safety parameters in the "SetPre" interface. If this doesn't help, please call your BRUKER office.

Amplifier X, Y, Z or B0 Compensation Unit:

1. Power Supply error : Check if the amplifier power supply is connected. If it is the case have a look on the fuse located on the GREAT amplifier back panel. If the fuse is OK, the power supply may be damaged ➜ contact your BRUKER office.
2. Board temperature too high : Check if the fan are working properly. If it is not the case call your BRUKER office.
3. Integrator Error : Check the safety parameters (e.g. the loop parameter and the gain). If it does not help, call your Bruker office.
4. Output Power fault : There is probably a gradient amplifier parameter (maximal current/voltage, mean power etc.) which is set to low in the gradsafe interface. Click on the Reset Protection button to remove this error. If the error remains, push on the CPU-A reset button (2 on the Master Unit front panel) and do a "***cf***". If the amplifier remains in protection toggle the power supply ON/OFF on the master unit and on the concerned gradient amplifier (be sure to respect the sequence described in ***"Start-up Procedure" on page 13***).
5. This is an auto-offset fault, be sure that the coarse offset is properly set and the coil cables are connected on the amplifier outputs. If this is the case and the failure remains ➜ call your BRUKER office.
   Note that this line is not displayed for the B0 Compensation Unit.
6. Communication error : Please check if the cable which connects the GREAT digital input to the Master Unit digital output is properly connected or if the

cable is not damaged. If the connection is OK, please toggle the power supply ON/OFF on the Master Unit and on the concerned gradient amplifier. If this doesn't help ➜ call your BRUKER office.

BGA Configuration Page *6.7*

The BGA configuration page allows the setting of some GREAT parameters like the pulse display position or the blanking threshold.

It is possible to choose if the pulse Led's on the Master Unit front panel shows the real amplifier output pulses or the potential pulses received on the LVDS interface from the DPP board. The default values displayed are the output pulses measured on the GREAT output.

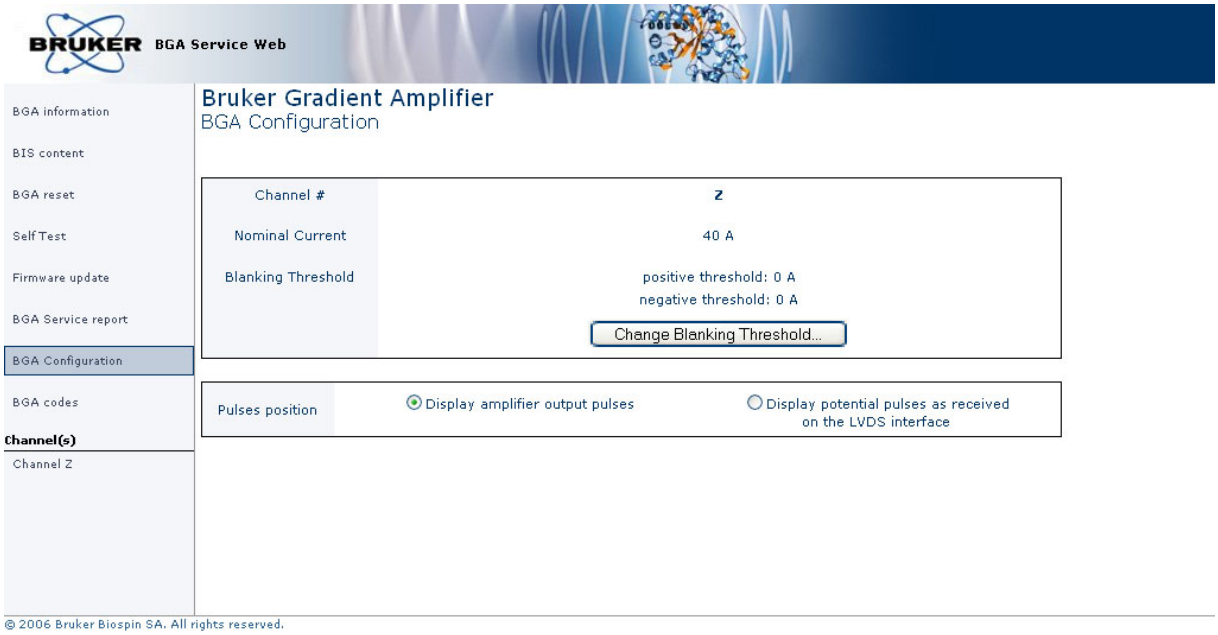

Figure 6.7. BGA Configuration

Display of the BGA configuration page.

The Blanking threshold change is available in the dedicated page shown on the figure below.

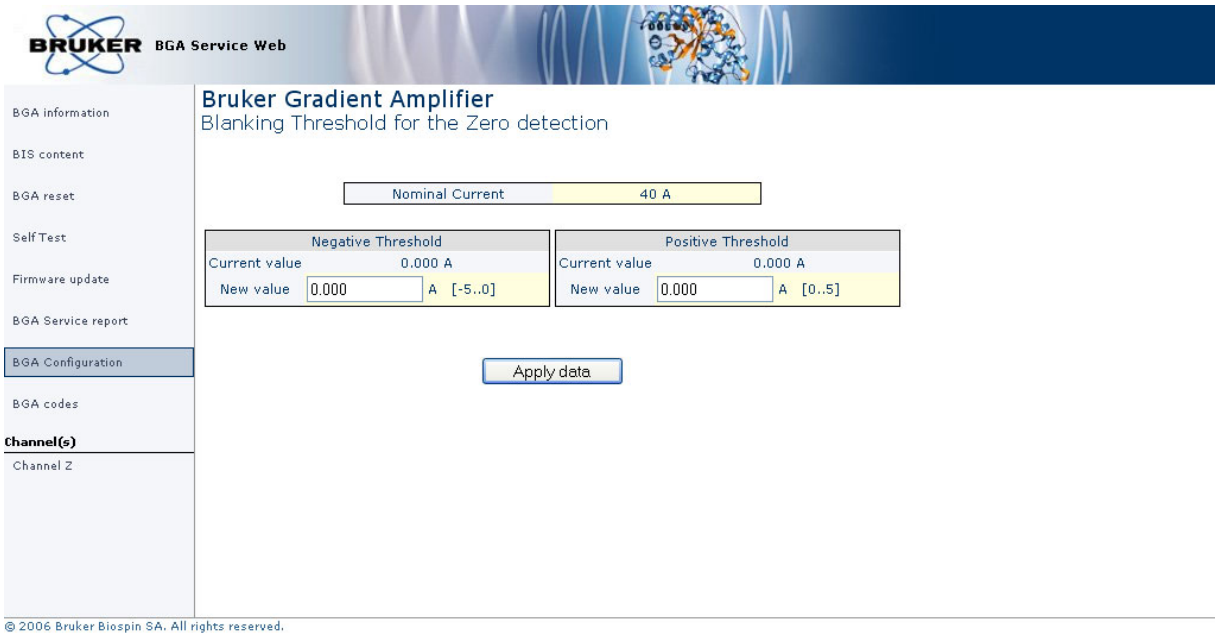

Figure 6.8. Blanking Threshold Setup

The negative and positive blanking thresholds values might be modified as shown in figure above. The blanking is driven by the ***ctrlgrad*** order included in the Grad.incl file and set inside the BLK/UNBLKGRAD order found in all the pulse programs where gradient pulses are involved.

The blanking threshold mechanism works as follows:

- When a given gradient channel is not blanked (i.e. the channel is working) and the G-Controller, via the DPP, sends a blanking order to the given channel, the Master Unit then enables the blanking signal for the given channel when the gradient amplifier output current value lays between the negative and the positive blanking threshold.

BGA Codes Page *6.8*

The BGA Codes page allows to interpret the information or error codes displayed on the Master Unit's front panel with the respective description. If one of the following code is displayed instead of the gradient coil temperature, please have a look on the following messages list. If there are more than one error code to display, the more critical error code will be displayed (i.e. with the highest numerical value) on the front panel.

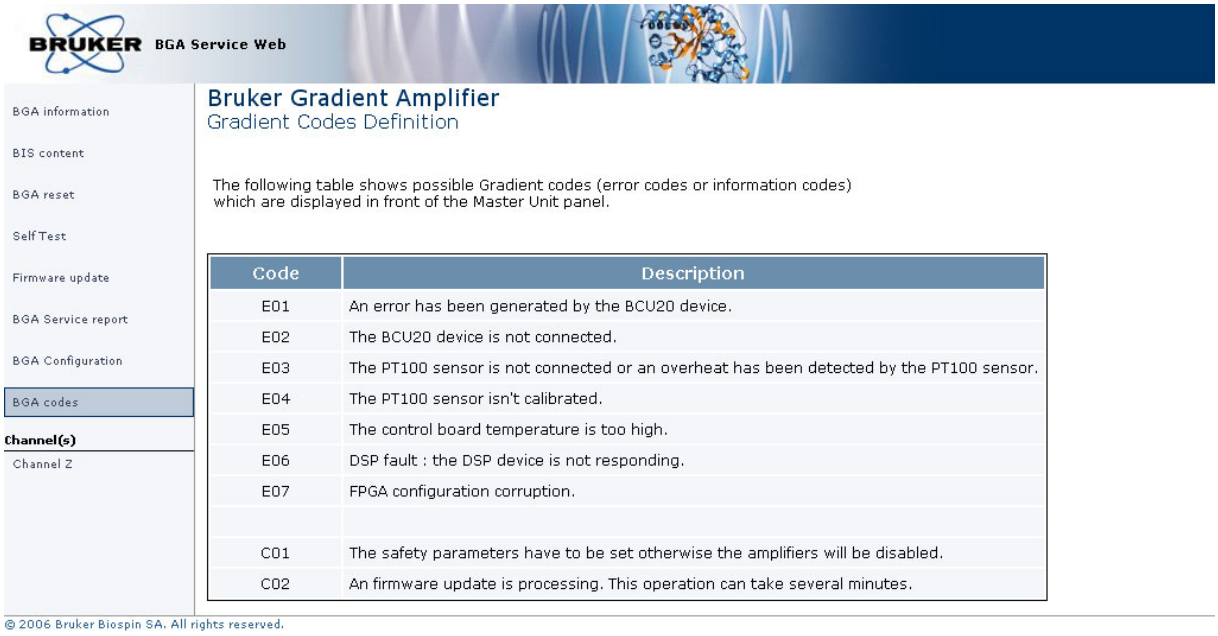

Figure 6.9. Gradient Codes Definition

Display of the BGA Codes page.

BGA Channel Page *6.9*

There is one Service commands page for each gradient channel (X, Y, Z) connected to the Master Unit and switched on. A similar page exists for the B0 Compensation Unit.

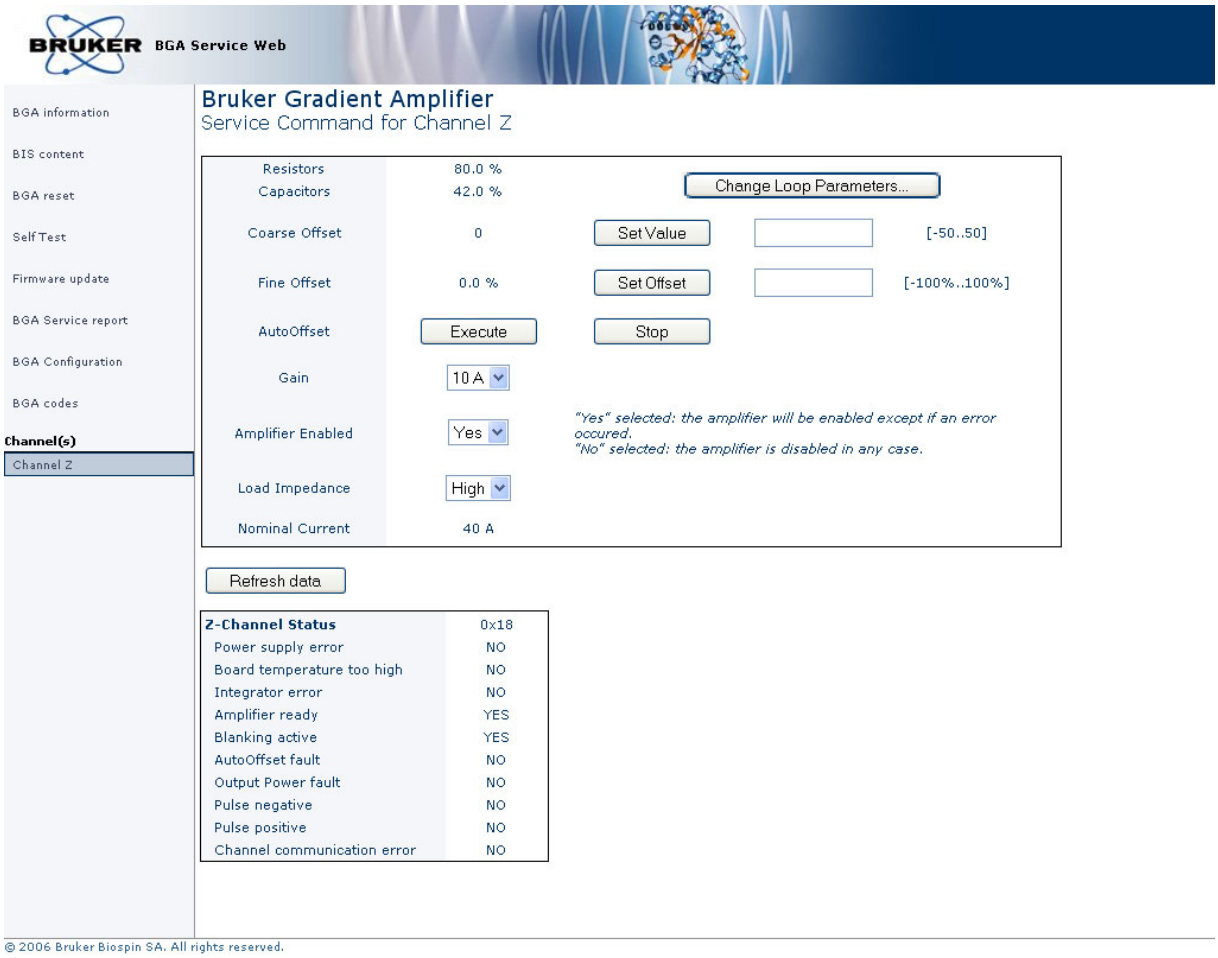

Figure 6.10. Service Command for Channel Z

Display of the BGA Z Channel page.

The following functions are available on the channel (X, Y, Z) page:

1. Current regulation loop resistors and capacitors setting as indicated in the ***"Loop Parameters for Channel Z" on page 39***. These parameters are probe head dependent.

***Warning**: never change these values if you are not sure what you are doing. If these values does not fit with the probehead you are using, the probehead will be seriously damaged.*

2. Manual compensation setting of the coarse offset which occurs if the GREAT 40/60 amplifiers are used with dithering in Micro Imagery applications.
3. Manual fine offset setting by looking at the lock level (if the probe has one) or on the FID amplitude.
4. Fine auto offset function. The offset is first calibrated and then adjusted against the reference built in the GREAT amplifier.
5. Amplifier gain setting. Six gain ranges are available in the pull down menu: 10A, 20A, 30A, 40A, 50A and 60A. If the amplifier is a GREAT 1/40, the number is reduced to four gain ranges.

***Warning**: never change these values if you are not sure what you are doing. If these values does not fit with the probehead you are using, the probehead will be seriously damaged.*

6. Amplifier Enable/Disable pulldown menu.
7. High/Low Impedance choice in a pull down menu. In most cases, working in High impedance mode is recommended.
8. Refresh Data button: Allows to refresh the page if some parameters are changed in the "SetPre" window.

The following functions are available on the B0 Compensation Unit page:

1. Manual Fine Offset setting by looking at the lock level (if the probe has one) or on the FID amplitude.
2. Amplifier Enable/Disable pulldown menu.
3. B0+H0 ON/OFF pulldown menu.
4. Refresh Data button: Allows to refresh the page if some parameters are changed in the "SetPre" window.

On the gradient channel (X, Y, Z) "Web" page, it is possible for each of the Gradient channels X, Y and Z to set the current regulation loop resistor and capacitor values. This parameters are probe head dependent. The values are defined in % of the maximum available resistor (in Ohm) and in % of the maximum available capacitor (in µF). Note that there is no loop parameters for the B0 compensation unit. A table which summarizes commonly used values for different types of probe heads are given in the ***"Coil Parameters Values Indications" on page 39***.

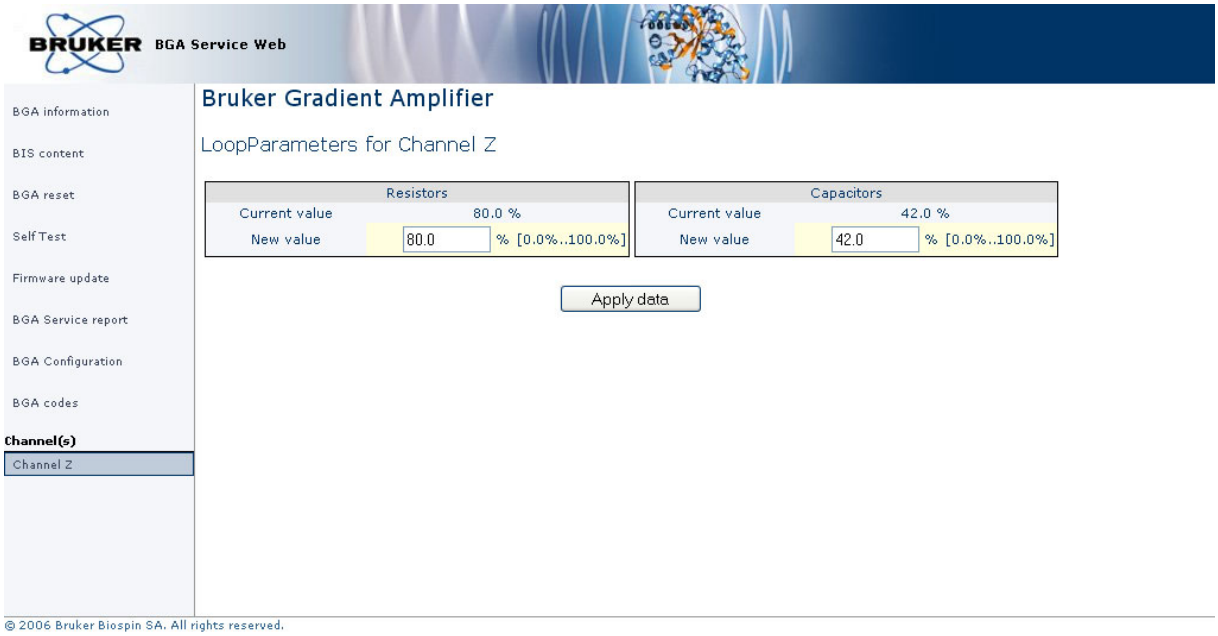

Figure 6.11. Loop Parameters for Channel Z

Display of the Web page on which the loop current parameters can be changed for each of the gradient channel's X, Y and Z. These parameters may also be changed in the SetPre window.

The values given in this table are indications. If the user wants to adjust this parameters to his coil, it is necessary to do it in the way mentioned in section "GREAT calibration operations" in the "User manual of the GREAT 40/60 AV III".

Table 6.1. Coil Parameters Values Indications

Probehead	Resistor R in %	Capacitor C in %
High resolution Z gradient coil	80.0	14.3
HR X, Y, Z gradient coil	85.3	13.7
HRMAS Z gradient coil	74.0	14.0
Micro Imaging X, Y, Z gradient coil		
Diff 30/60 Z gradient coil	32.0	9.8

Specifications 7

General Specifications 7.1

Table 7.1. BGMU E Unit Specifications

Constant Internal Protection	Power monitoring and limitation, current and voltage limitation on the 3 channels, control board overheat protection
Front Panel Indicators	ON/OFF switch light 4 green Leds, Enable Led for channel X, Y, Z and B0 4 red Leds, Error Led for channel X, Y, Z and B0 4 yellow Leds, Pulse Led for channel X, Y, Z and B0 Probe temperature display
Front Panel Connectors	3 x BNC, blanking output signal for channel X, Y, Z 1 x Ethernet connector 1 x LVDS connector 1 x USB Device connector 2 x USB Host connector 1 x External Enable connector 1 x PT100 connector 4 x SCSI 68 from Master Unit to Gradient Amplifier and to B0 Compensation Unit 6 x BNC, Input Monitor for channel X, Y and Z
Front Panel Controls	AC Line ON / OFF Error Reset button
Rear Panel Connectors	AC Line Connector
Rear Panel Interface	48 bit LVDS from GCON or DPP 10/100 Base T Tx Ethernet
Cooling System	Natural Convection
Size	19" rack cabinet x 2U height x 400mm depth
Weight	6.34kg
Power requirements	90 - 264VAC, 47-60Hz, 120V-370VDC Bruker part number W1522066 AC inrush current: <30A at 230V

Inputs / Outputs Specifications *7.2*

Table 7.2. BGMU E Unit Inputs / Outputs Specifications

Ouputs	Blanking signal for gradient channel X Blanking signal for gradient channel Y Blanking signal for gradient channel Z
Inputs	±10 VDC for current monitoring on gradient channel X ±10 VDC for voltage monitoring on gradient channel X ±10 VDC for current monitoring on gradient channel Y ±10 VDC for voltage monitoring on gradient channel Y ±10 VDC for current monitoring on gradient channel Z ±10 VDC for voltage monitoring on gradient channel Z

Figures

Tables

End of Document

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