HOTTINGER BRÜEL & KJÆR

USER MANUAL

HBK 2755
Smart Power Amplifier

BE 1916 – 12
English

HBK 2755
Smart Power Amplifier

User Manual

BE 1916 – 11
October 2023

www.bksv.com

HEALTH AND SAFETY CONSIDERATIONS

This apparatus has been designed and tested in accordance with IEC/EN 61010 – 1 and ANSI/UL 61010 – 1 *Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use*. This manual contains information and warnings which must be followed to ensure safe operation and to retain the apparatus in safe condition.

Safety Symbols and Signal Words Used

The apparatus will be marked with this symbol when it is important that you refer to the associated danger or warning statement given in this manual

The manual uses this symbol when a danger or warning statement is applicable

Hazardous Voltage/Electricity. Both the apparatus and manual use this symbol when there is a risk for shock or electrocution

Hot Surface. This manual will use this symbol when there is a risk for burning or scalding

Earth (Ground) Terminal. The apparatus will be marked with this symbol when applicable

Protective Conductor Terminal. The apparatus will be marked with this symbol when applicable

Alternating Current. The apparatus will be marked with this symbol when applicable

Danger Signals an imminent hazardous situation, which, if not avoided, will result in death or serious injury

Warning Signals a possibly hazardous situation, which, if not avoided, will result in death or serious injury

Caution Signals a hazardous situation, which, if not avoided, could result in minor or moderate injury or damage to the apparatus

Notice Signals a situation or practice that requires attention, but does not directly result in personal injury if ignored

Risks and Hazards

Explosion Hazards

Danger: The apparatus is not designed to be used in potentially explosive environments. It should not be operated in the presence of flammable liquids or gases

Electrical Hazards

Warning: Any adjustment, maintenance and repair of the open apparatus under voltage must be avoided as far as possible and, if unavoidable, must be carried out only by trained service personnel

Electrical Hazards

Warning: The apparatus is capable of producing hazardous output voltages. To avoid electrical shock, do not touch any exposed loudspeaker wiring while the apparatus is operating

Caution: The apparatus is very powerful and can be potentially dangerous. Many loudspeakers can easily be damaged or destroyed by applying too much power. Always check the loudspeaker's continuous and peak power capabilities

Caution: The mains voltage selector on the rear panel indicates the AC mains voltage. Before connecting the mains power cable, ensure that the mains voltage selector is set to your mains power voltage. The warranty will not cover damage caused by connecting to the wrong type of AC mains power

Precautions During Operation

- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water. Do not spill water or other liquids into or on the apparatus. Do not operate the apparatus while it is wet or standing in liquid.
- Clean only with a dry cloth.
- Do not operate the apparatus near any heat-producing devices such as radiators, heat registers or stoves.
- Always operate the apparatus with the chassis connected to the electrical safety earth using a proper mains cable. Do not diminish the safety purpose of a grounding-type plug, which besides two pins has 1 or 2 grounding contacts, provided for your safety. If the provided plug does not fit into your outlet, there may be a fault with the power cable provided – contact HBK.
- Connect only to AC power outlets rated 230 V (ranging from 170 to 264 V) or 115 V (ranging from 85 to 132 V), 45 to 65 Hz (check the proper nominal voltage at the back of the apparatus.
- Do not use this apparatus if the power cable is broken or frayed. Protect the power cable, do not stand on it or pinch it, particularly at the plug and the point where it meets the apparatus.
- Do not connect either of the speaker output terminals to ground.
- Do not block the air inlet or air outlet aperture. Install the apparatus in accordance with instructions.
- Only use accessories specified by HBK.
- Unplug the apparatus during lightning storms or when not in use for long time periods.
- The input and output signals must comply with the specifications given in Chapter 4.
- Do not connect an apparatus output in parallel or series with any other apparatus' output. Do not connect the apparatus output to any other voltage source, such as battery, mains source, or power supply, regardless of whether the apparatus is turned on or off.
- Do not run the output of any apparatus back into another channel's input.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way.
- Do not remove the housing, the inner top cover or the front panel. Removal of any of these components will expose hazardous voltages. There are no serviceable parts inside and removal may void the warranty.
- An experienced user should always supervise the use of this professional audio equipment, especially if inexperienced adults or minors are using it.

WASTE HANDLING

HBK complies with the EU's Waste Electrical and Electronic Equipment (WEEE) Directive, which issues the following waste handling instructions:

- Do not dispose of electronic equipment or batteries as unsorted municipal waste
- It is your responsibility to contribute to a clean and healthy environment by using the appropriate local return and collection systems
- Hazardous substances in electronic equipment or batteries may have detrimental effects on the environment and human health
- The symbol shown to the left indicates that separate collection systems must be used for any discarded equipment or batteries marked with that symbol
- Waste electrical and electronic equipment or batteries may be returned to your local HBK representative or to Hottinger Brüel & Kjær A/S for disposal

HBK has made every effort to ensure the accuracy of the information contained in this document. No responsibility is accepted for any errors or omissions herein. It is the responsibility of the user to ensure compliance with any legal or statutory requirements in the country of use. Data may change, as well as legislation, therefore you are advised to obtain copies of the most recently issued applicable regulations, standards and guidelines.

All descriptions, illustrations and any other information relating to the product are made by way of general description, are approximate only and for the general guidance and information of the user. They cannot be construed to imply representation or warranty as to their accuracy, currency or completeness and are not intended to form the basis of any contract.

The information in this document does not constitute a warranty, representation or guarantee concerning the suitability or performance of the product.

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Teknikerbyen 28 · DK-2830 Virum · Denmark
Telephone: +45 77 41 20 00 · Fax: +45 45 80 14 05
www.bksv.com · info@hbkworld.com

For service and support, contact your nearest HBK Global Customer Care (GCC) team:

China (Shanghai): info@bksv.com.cn, +86 21 6113 3674
France: service.fr@bksv.com, +33 1 69 90 71 01
Germany: GCC_DACH@hbkworld.com, +49 421 1787 0
Italy: service.it@hbkworld.com, +39 02 45471616
Japan: info_jp@bksv.com, +81 3 6810 3500
The Americas: us.bkservice@bksv.com, +1 770 209 6907
Spain: servicio.es@hbkworld.com, +34 91 806 2610
British Isles: ukservice@bksv.com, +44 1223 389 800

To learn more about all HBK offerings, please visit: www.hbkworld.com

Contents

Chapter 1

Overview

1.1 About this Manual

This manual contains important information on setting up and operating your HBK 2755/2755-A Smart Power Amplifier correctly and safely. Please take the time to read this manual and familiarize yourself with the safety considerations and advanced features.

1.2 Important Safety Instructions

Before using your amplifier, carefully read through the Health and Safety Considerations at the beginning of the manual.

HBK provides a mains cable with IEC connector for the amplifier's mains socket and a moulded mains plug on the other end. The mains plug will be appropriate for the country where the amplifier was ordered.

⚠ WARNING: For safe operation, ensure that the mains outlet is equipped with an earth connection and that the protective earth conductor is not interrupted in any way. Do not use extension cables without protective earth conductors. See also Chapter 3.

1.3 About the Amplifier

The amplifier is available in two versions:

- **HBK 2755:** Includes Wi-Fi®, allowing you to configure and control the amplifier from a smart device through partitions in a building when needed
- **HBK 2755-A:** Does not include Wi-Fi and is only operated by controls on the front panel

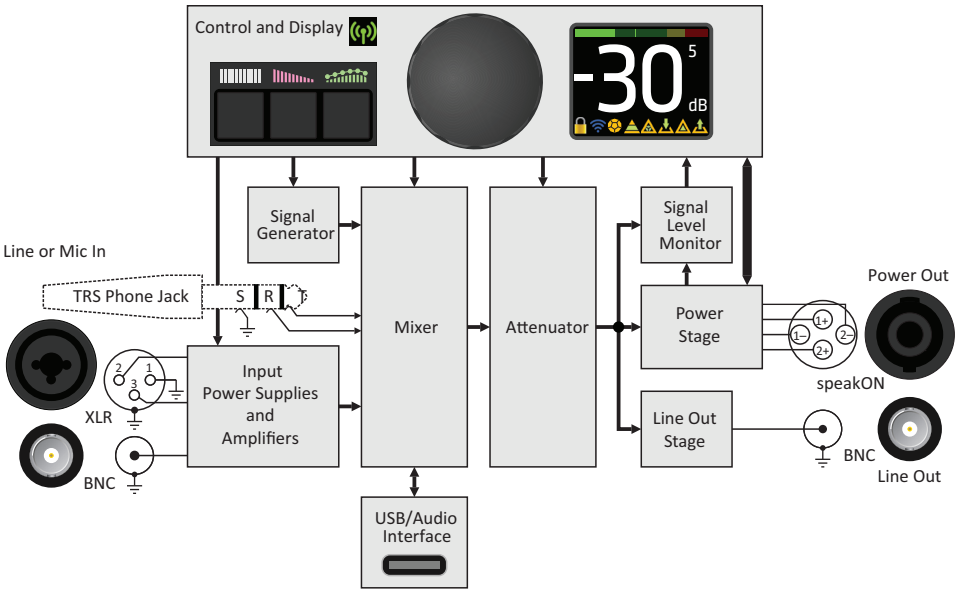
This manual uses the term 'the amplifier' to refer to both versions. Where there is a difference in features or usage, the individual type number will be used.

1.3.1 Description

The amplifier provides high-quality amplification and signal generation in one small, lightweight package. Designed for building acoustic measurements in the field, it has easy-to-access ports and includes a wireless control option (HBK 2755). The calibrated dials and indicators allow setups to be easily reproduced in future tests. The main functions are readily available upon power up, while additional functions and settings are accessible through a menu on the display.

1.3.2 Functional Diagram

Fig. 1.1 *The functional diagram of the amplifier*



The amplifier contains a signal generator, input conditioners, a USB/audio interface and an audio signal mixer that routes combined signals to the USB and the attenuator. The attenuated signals are fed to a level monitor, a loudspeaker power stage and a line output stage.

The audio functions are controlled digitally, enabling multiple ways of using the amplifier. At power up these functions adopt common settings and the unit is ready for typical use. Additional settings are available through the menu on the display, and with HBK 2755 via Wi-Fi using a connected device. All settings can be saved and loaded as presets.

For information about setting up the amplifier via the menu, go to section 4.2.

1.4 Documentation

To view the latest supporting documentation on the amplifier, including embedded help and safety and warranty information, go to https://www.bksv.com/2755-manuals.

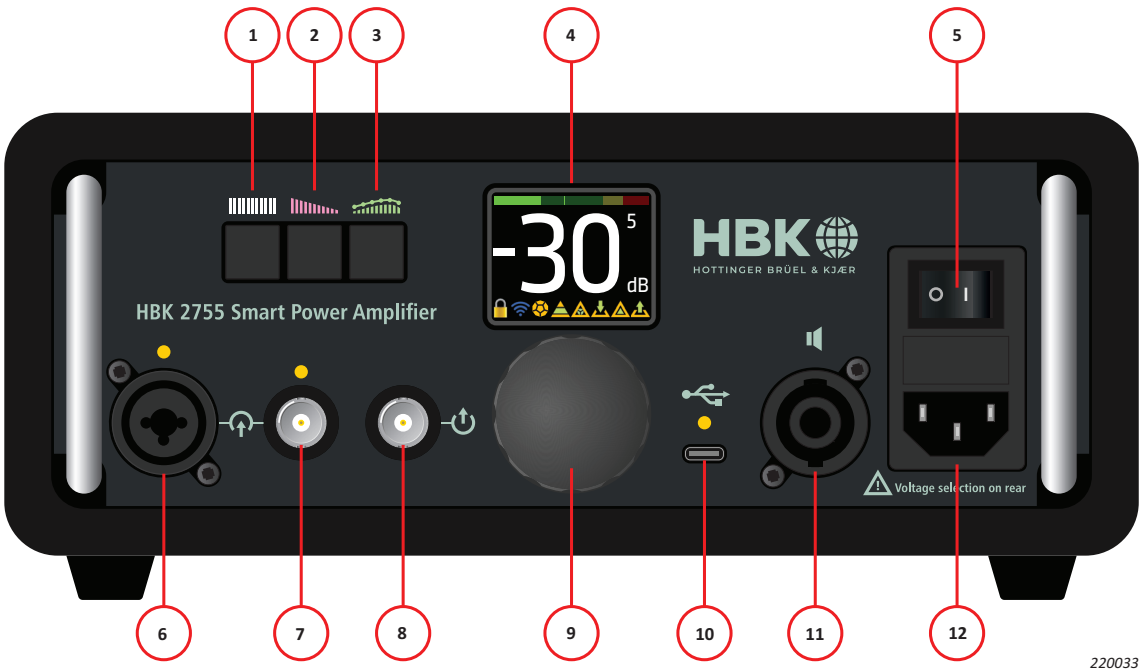
Chapter 2

Description

2.1 Front Panel

The figure below shows all control, display and connector functions. See the table for descriptions.

Fig. 2.1 *Overview of the front panel*



Please note: Most of the front panel functions described below depend on menu settings that are volatile and will return to their default values upon switching on the amplifier. Exceptions are the amplifier mode, the network settings, the menu language, the brightness of the indicators, and settings in a particular preset, named *Startup*, which are non-volatile and considered part of the installation (see section 3.2).

NUMBER	COMPONENT	DESCRIPTION	OPERATION INSTRUCTION
1	Generator button* 1	Toggles white noise (in 4292-L mode) or LF noise (in 4250 VVS mode) on and off. When active, the indicator above the button illuminates white	See section 4.8
2	Generator button* 2	Toggles pink noise (in 4292-L mode) or MF noise (in 4250 VVS mode) on and off. When active, the indicator above the button illuminates pink	See section 4.8
3	Generator button* 3	Toggles equalized noise (in 4292-L mode), HF noise (in 4250 VVS mode) or a user-selected signal (from "User signal" menu) on and off. Default signals are equalized noise or HF noise (indicator colour when active: light-green). With a user signal selected, the indicator will illuminate light blue when active	See section 4.8
4	Display	In Operational mode: Shows the level indicator, attenuation and status bar In Menu mode: Shows menu selection	See section 4.7 for level and attenuation information
5	Mains power switch	Switches amplifier power on and off NOTE: To ensure the switch is fully engaged in the left or right position, use quick, deliberate movements	See section 3.1
6	Input signal Neutrik® combo jack connector	Accepts both a balanced XLR and a ¼-in TRS phone jack plug. The XLR input is balanced and features an input amplifier and a phantom power supply with phantom power indicator above the socket. The TRS input can be configured as single-channel balanced or dual-channel unbalanced	See section 4.4
7	Input signal BNC connector	Features an input amplifier and an IEPE power supply with IEPE power indicator above the socket	See section 4.4
8	Output signal BNC connector	Line-level output. The signal from this socket is a basic mix of the internal generator, input and USB signals	See section 4.5
9	Attenuator selector or Menu selector	Dual-purpose selector (hold down to toggle): • Operational mode: Sets the amplifier attenuation, shown as a negative gain in dB • Menu mode: Scrolls through the menus. Press to select a menu item	See section 4.2 and section 4.7

NUMBER	COMPONENT	DESCRIPTION	OPERATION INSTRUCTION
10	USB-C connector	Audio interface to the host computer†. The USB indicator above the socket illuminates when the interface is active. When connected to the PC, the amplifier turns into a 'power sound device' with 6) and 7) providing versatile audio inputs and 8) and 11) providing versatile audio outputs	See section 4.6
11	Output signal (Neutrik speakON® connector	Power output to loudspeakers. Provides a balanced high-power output or two separate unbalanced moderate-power outputs	See section 4.5
12	Mains power socket	Above the socket is the fuse drawer that contains both the operational mains power fuse (T5A) and a spare fuse	See section 3.1 and section 4.1

* Generator signals are mutually exclusive, only the most recently selected button is active
† Connecting to a host computer is optional and not the typical setup

2.2 Display Overview

2.2.1 Operational Display

At power up, the display is in Operational mode and will show the level indicator, the attenuation and status bar.

There are two operation modes: 4292-L mode ( ) and 4250 VVS mode ( ).

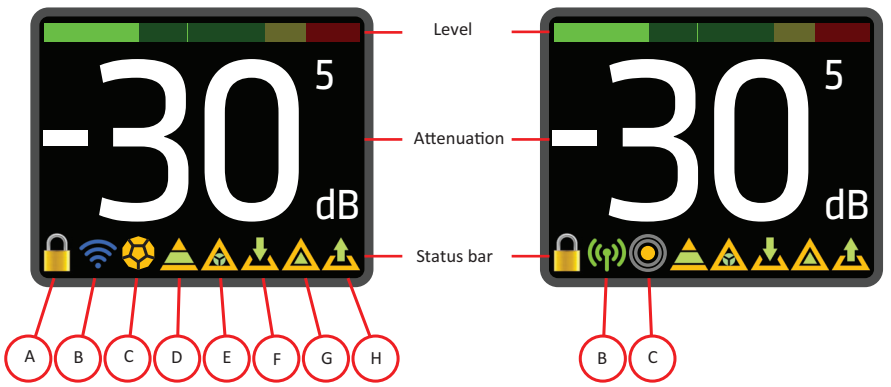
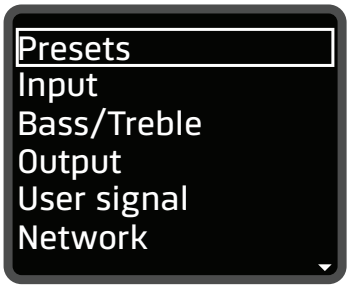


Fig. 2.2
Display: Operational mode.
Left: *4292-L mode*
Right: *4250 VVS mode*

NUMBER	SYMBOL MEANING	DESCRIPTION	MORE INFORMATION
A	Attenuation locked	Avoids attenuation changes due to unintentional contact	See section 4.7.1
B	Wi-Fi mode	(HBK 2755 only) Shows Wi-Fi activity (Off/Station/ Hotspot)	See section 3.2.3 and section 4.9
C	Amplifier mode	Selects 1 of 2 default internal noise signal sets upon power up. 4292-L mode is optimized for use with an omnidirectional source; 4250 VVS mode for use with a volume velocity source	See section 4.8
D	Power compression on	Stabilizes loudspeaker output power when using internal noise generator: Constant power vs Constant gain	See section 4.5.3
E	Fan control overruled	Avoids (changing) fan noise or provides maximum cooling: fan On or Off versus Auto	See section 4.10
F	Input changed	At least one input deviates from default regarding configuration, gain or power	See section 4.4
G	Filter active	At least one internal treble and/or bass filter deviates from neutral	See section 4.5.3
H	Output changed	The power output deviates from Bridge mode configuration, Constant gain or the attenuator settings deviate from 0 dB gain limit	See section 4.5.1

2.2.2 Menu Display

Fig. 2.3
Display: Menu mode. The triangle at the bottom right shows there are more menu items



Holding down the large selector knob on the front panel (9), opens the Menu. To toggle back to Operational mode without performing an action, hold down the selector.

An overview of the entire menu is provided below.

Please note: Most sub-level menus also include two items: **Up** (move up one level) and **Exit** (leave the menu, go back to the attenuation display).

Table 2.1 *Menu structure*

MAIN MENU	SUB LEVEL	LAST LEVEL	MORE INFORMATION
Presets	Load setup	Select from actual list	See section 4.3
	Save setup	Enter new setup name	
	Delete setup	Select from actual list	
Input	XLR input gain	**0**, **10**, **20** or **30** [dB]	See section 4.4
	BNC input gain	**0**, **10**, **20** or **30** [dB]	
	Phantom power	**On** or **Off**	
	IEPE power	**On** or **Off**	
	TRS mode	**Differential** or **Single-ended**	
Bass/Treble	Bass gain	Turn selector: [– 18 to 18] dB in steps of 3 dB	See section 4.5
	Treble gain		

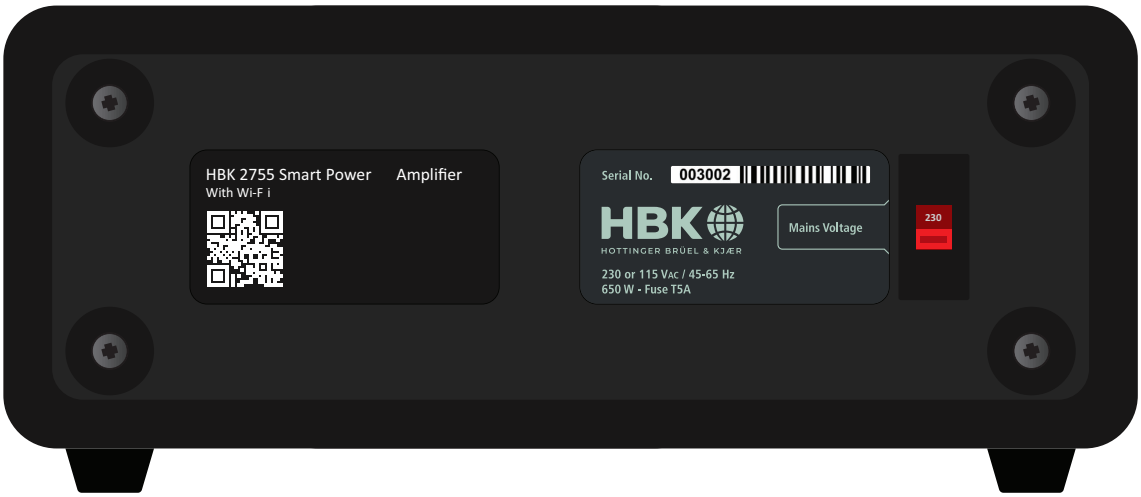
Output	Lock gain	**Enabled** or **Disabled**	See section 4.5
	Output mode	**Bridge** (high power), **Dual channel**, **Single-ended ch.1**, **Single-ended ch.2**, or **Single-ended ch.1+2**	
	Power compression	**Constant gain** or **Constant power**	
	Gain limit	**0**, **–10**, **–20** or **–30** [dB]	
	Gain step	**1.0** or **0.5** [dB]	
User signal	–	Select from list	See section 4.8
Network (HBK 2755 only)	Wi-Fi mode	**Off**, **Station** or **Hotspot**	See section 3.2.3 and section 4.9
	Connect	Select from actual SSID list	
	Forget	Select from actual SSID list	
	Hotspot password	Enter suitable password	
	Webserver	**Enabled** or **Disabled**	
	Info	SSID, IP address	
Settings	Fan control	**Auto**, **On** or **Off**	See section 4.10
	Brightness	**Low** or **High**	See section 3.2.2
	Language	**English**	See section 3.2.1
	Mode	**4292-L** or **4250 VVS**	See section 4.8

About	Version info	Type number, serial number, software version number, software version date, API version number, hardware version number	See section 3.2.5
	Software update (HBK 2755 only)	Available update status	
	Help	QR code to Help web page URL	
	Legal notices	QR code to Legal notices web page URL	
Exit	–	Leave the menu	

2.3 Rear Panel

The red voltage selector at the rear panel toggles between a nominal mains voltage of 230 V and 115 V. The QR code will take you to the product download page on the website (bksv.com/2755-manuals).

Fig. 2.4 *Rear panel of the amplifier (shown: HBK 2755)*



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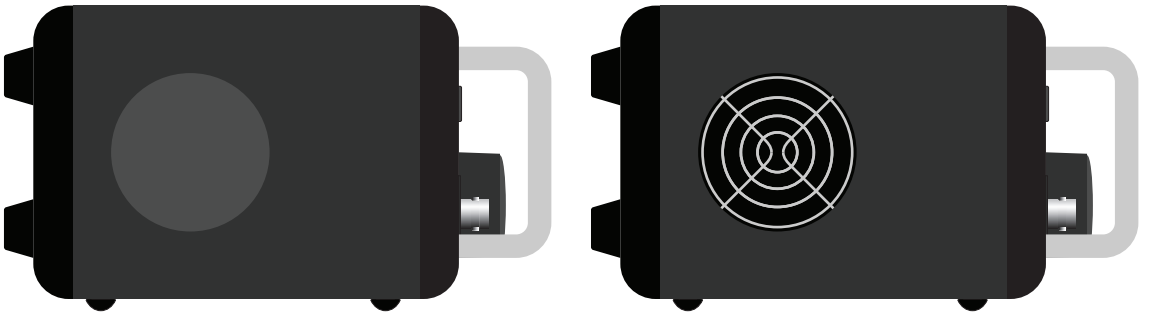
2.4 Side Panel

The amplifier is equipped with a filter over the air intake. When the amplifier is used in dusty environments, while demanding high power and intensive fan operation, the air filter is imperative, however the filter reduces the fan cooling capacity somewhat. In clean environments, it can be removed to maximize operating time (that is, without getting overheated) at high power.

Fig. 2.5 *Left side panel, with and without the air intake filter*



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Chapter 3

Installation

CAUTION: The mains voltage selector on the rear panel indicates the AC mains voltage. Before connecting the mains power cable, make sure the mains voltage selector is set to your mains power voltage. The warranty will not cover damage caused by connecting to the wrong type of AC mains power.

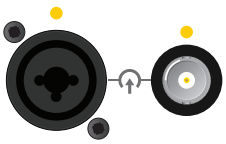
HBK provides a mains cable with IEC connector for the apparatus' mains socket and a moulded mains plug on the other end. The mains plug will be appropriate for the country where the apparatus was ordered. If the provided plug does not fit into your outlet, there may be a fault with the power cable provided – contact HBK.

⚠ WARNING: For safe operation, ensure that the mains outlet is equipped with an earth connection and that the protective earth conductor is not interrupted in any way. Do not use extension cables without protective earth conductors. See information about grounding in step 6) below.

Do not use this apparatus if the power cable is broken or frayed. Protect the power cable, do not stand on it or pinch it, particularly at the plug and the point where it meets the apparatus.

3.1 Setting Up the Amplifier Hardware

1) Place the amplifier horizontally or vertically.
2) Connect your external signal source to one of the input connectors on the front panel.



Inputs can be balanced or unbalanced and equipped with an input amplifier and/or power supply. Compared to unbalanced signal connections, balanced connections are better able to cancel out AC ground loop hum or picked-up radiated interference that might emerge with low-level signals. On the other hand, unbalanced connections are usually simpler.

Signals from high-impedance devices or devices coupled to the mains power, directly or through peripherals, may be disturbed in particular. In those cases, a balanced input may improve the transfer, even from unbalanced source signals, if a proper connection cable is used.

See section 3.1.1 to find out more about balanced and unbalanced inputs.

Please note: The TRS input defaults to 'Differential' at power-up.

3) Connect an external device (sound recorder, voltmeter, external power amplifier, etc.) to the line output connector.

Please note: The line output connector delivers low-level signals, while loudspeakers or sound sources typically require high-power signal from the power output connector.

4) (Optional) Connect your PC to the USB connector.

5) Connect a loudspeaker to the power output connector.

At power-up, this Neutrik speakON output defaults to **Bridge** output mode, delivering maximally 500 W (sine) into a 4 Ω load (250 W into 8 Ω) at a limited duty cycle, or 300 W into 6 Ω continuously from the internal noise generator, such as with OmniPower™ Sound Source Type 4292-L.

In this mode, to provide a 1-channel output, connect the speaker wires + and – to pins 1+ and 1– of the connector, as shown schematically below. The power outputs can drive loads down to 3 Ω. The operating voltage on pins 1+ and 1– ranges from –30 to 30 V. Therefore, to prevent electric shock, do not operate the amplifier with any of the conductor portion of the speaker wire exposed.

NOTICE: Do not connect either of the speaker output terminals to ground.

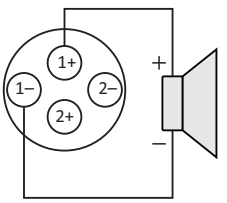


Fig. 3.1
Power output bridge configuration and associated speakON socket connections

You can also set up a 2-channel output. See section 4.5.3 for setup instructions.

6) Unpack the mains cable from its separate cardboard box and connect it to the mains socket. Please respect all warnings and instructions above.

Hint: The chassis is connected to the protective earth terminal of the mains cable connector as well as to all visible metal connector parts. In case of noise or hum on the BNC input due to a low impedance ground loop, use a balanced input instead. See section 3.1.1.

3.1.1 Balanced and Unbalanced Input Connections

A balanced source can be connected to the Neutrik combo jack on the front panel through an XLR or ¼-inch (6.3 mm) phone/stereo TRS jack with three poles. When using a TRS jack, the input should be configured as **Differential** (the default mode at power-up). Fig. 3.2 schematically depicts this type of connection.

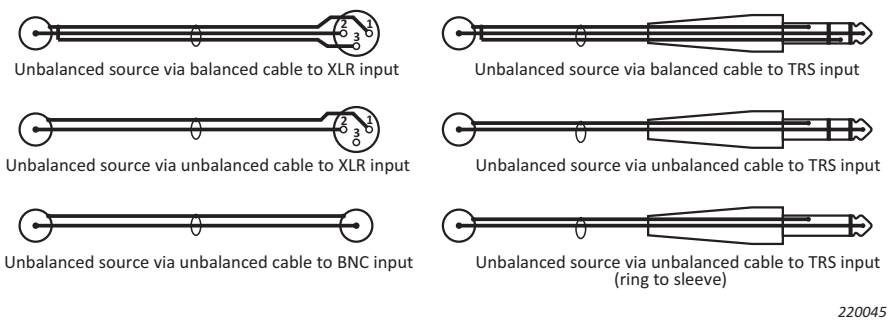
Please note: The preferred balanced input is **XLR** type.

Connecting a balanced source to an unbalanced input is also possible, but because this is less useful with a balanced input available, that option is not described here.

Fig. 3.2
Connecting a balanced source (left end of cable) to an amplifier balanced input (right end of cable). Usually, the balanced source connector is an XLR type with pin 1 connected to the source chassis ground

An unbalanced single-channel source can be connected to any input on the front panel. Fig. 3.3 gives an overview of several connection options from such sources. Technically, the preferred connection is via a balanced cable to the **XLR** input.

Fig. 3.3
Connecting an unbalanced single-channel source (left end of cable) to any amplifier input (right end of cable). An unbalanced source connector can for instance be a BNC, a 3.5 mm TRS phone jack or an RCA phono type



Please note: An unused pin of a balanced input may also be connected to ground, as shown with the bottom right example in the above figure, where the ring is connected to the sleeve (ground).

An unbalanced dual-channel source can be connected to the Neutrik combo jack on the front panel using a 6.3 mm TRS plug. The TRS input should then be configured as two single-ended inputs for dual-channel applications (**Input** > **TRS mode** > **Single-ended**). Fig. 3.4 schematically shows two examples of such a connection type.

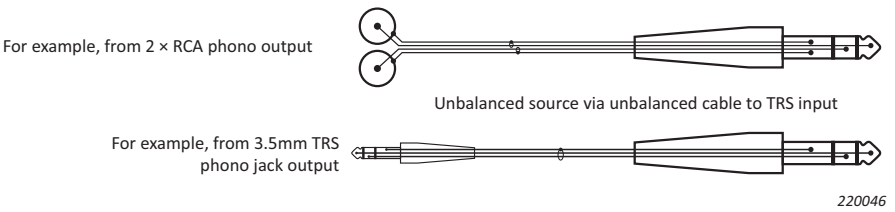


Fig. 3.4
Connecting an unbalanced dual-channel source (left end of cable) to the amplifier TRS input (right end of cable). Unbalanced output connectors can for instance be two RCA phono types or a 3.5 mm TRS phone jack

3.2 Setting Up the Amplifier Software

Amplifier software settings are changed through the menu. To use the menu, use the large selector knob on the front panel.

1) Hold down the selector until the menu appears.
2) Turn the selector to the right to move the cursor down to the desired entry.
3) Press the selector to make a selection.

For detailed instructions on using the menu, including how to enter text, see section 4.2.

Most settings are reset to default at each power-up. Exceptions are the menu language, the brightness of the indicators, the network settings and the amplifier mode setting, described below.

3.2.1 Set the Language

The default and (currently) only language is English.

3.2.2 Set the Brightness

The brightness of the display and all LED indicators can be set to **Low** or **High**. Go to **Settings** > **Brightness**.

3.2.3 Set the Network Setting for HBK 2755

HBK 2755 can be controlled wirelessly by mobile device (tablet, smartphone, laptop). To enable remote control, a Wi-Fi connection has to be established, either directly or through a wireless local area network ('wireless LAN' or 'WLAN').

The following advise you how to set up the wireless connection. For detailed information on HBK 2755's web server and remote control, see section 4.9.

Direct Connection via Hotspot

You can make HBK 2755 a hotspot and connect a supported device to the amplifier.

1) In the menu, switch on the built-in web server by going to **Network** > **Webserver** > **Enabled**.
2) Go to **Network** > **Wi-Fi mode** > **Hotspot**. When first powered-on, HBK 2755 will be in Hotspot mode with the SSID *HBK2755-nnnnnn*, where *nnnnnn* is the amplifier's serial number.
3) Enter a password by going to **Network** > **Hotspot password**. The default password is *hbk2755pwd*.

Hint: You are advised to change this password (**Network** > **Hotspot password**).

Indirect Connection via Wireless LAN

An indirect connection can be made if both HBK 2755 and the controlling device are connected to the same Wi-Fi network.

To set up the Wi-Fi connection:

1) In the menu, switch on the built-in web server by going to **Network** > **Webserver** > **Enabled**.
2) Set the Wi-Fi mode by going to **Network** > **Wi-Fi-mode** > **Station**.
3) Go to **Network** > **Connect** and the relevant network from the list that are available.
4) Enter the network password.

When the amplifier has logged in successfully to the network, a suitable device having access to the same network will be able to control the amplifier.

The network and password will be saved. With the amplifier set to Station, it will try to find a known network from a list. If not found, the amplifier will turn into a hotspot.

If you want to stop using a wireless LAN, you can remove it from the known network list through **Network** > **Forget**.

3.2.4 Set the Mode

The amplifier mode determines which standard noise signals the generator will produce. To define the mode, go to **Settings** > **Mode** and select either:

- **4292-L** for use with an omnidirectional sound source
- **4250 VVS** for use with a volume velocity source

For more information, see section 4.8.

3.2.5 View Amplifier Information

To view version information, go to **About** > **Version info**. This provides the serial number and all software and hardware version information.

To see if a software update is available for your HBK 2755 amplifier, go to **About** > **Software update**. You can install the update via the Wi-Fi connection.

Please note:
- This option is not available for HBK 2755-A.
- This option requires that the Network setting for HBK 2755 is set to **Station** and the amplifier has access to the Internet.

To see where you can view and download online information such as help pages and legal notices, go to **About** > **Help** and **About** > **Legal notices**.

Please note: Requires a mobile device that has Internet access and can read QR codes.

Chapter 4

Operation

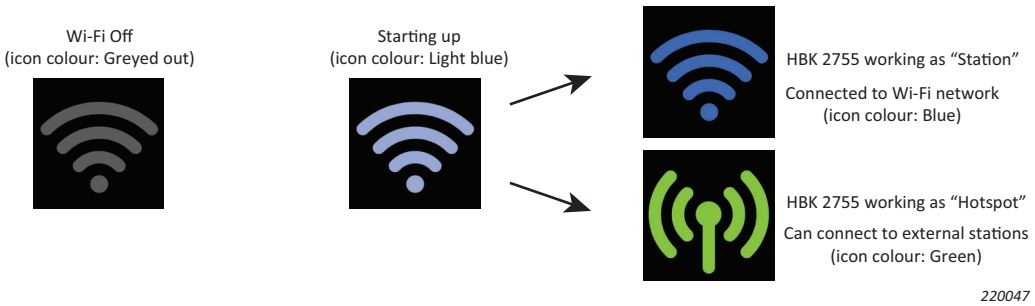
4.1 Powering Up

Switch on the amplifier using the power switch on the front panel. After turning on the amplifier, it takes 5 seconds for the software to complete start-up.

For HBK 2755 with Wi-Fi enabled (**Network** > **Wi-Fi mode** > **Station** or **Hotspot**), it will take another 5 seconds to connect to a Wi-Fi network or present itself as a hotspot. The Wi-Fi icon in the display's status bar will either:

- Turn bright blue if the amplifier connects to a Wi-Fi network
- Change to a green Wi-Fi hotspot icon

Fig. 4.1 *Wi-Fi start-up sequence of the HBK 2755 (status bar)*



4.1.1 Power-up Conditions

In order to reduce sudden noise or speaker damage, the attenuator is set to –30 dB at power-up. At this attenuation, an internal generator would produce 0.5 W into 6 Ω, which is safe (although it may still be considered loud in an otherwise quiet office).

Most settings are reset to default at each power-up, except:

- Menu language
- Indicator brightness setting
- Network settings
- Amplifier mode setting
- Settings in a *Startup* preset (default or customized), which is automatically loaded during power-up

You can create a preset *Startup* (see section 4.3) and the saved settings within it will survive a power cycle. While this may, in some cases, be preferable to a safe and predictable default power-up state, for safety and clarity's sake, it is recommended to delete this preset as soon as it is not used anymore.

At power-up the display will appear in Operational mode.

Fig. 4.2
Display in Operational mode

4.2 Menu

Holding down the large selector knob on the front panel, opens the Menu. To toggle back to Operational mode without performing an action, hold down the selector.

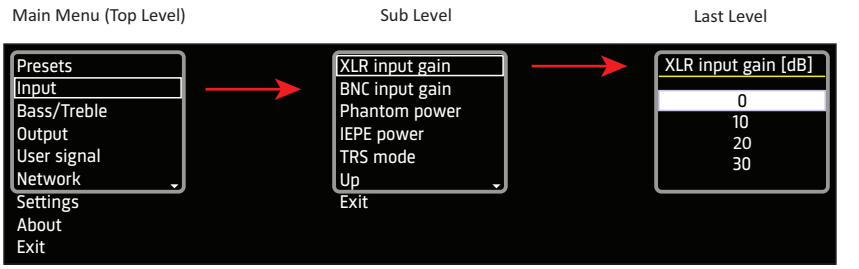
In Menu mode, any selectable setting is entered in maximally three knob rotations and clicks.

To select a menu entry:

1) Turn the selector to the right to move the cursor down to the desired entry.
2) Press (short press) the selector to make a selection.

The current position in the menu is framed. Selected menu items are highlighted. A triangle next to a menu item, lets you know that there are more items below. The example in Fig. 4.3 shows the setting of input type of XLR with a gain setting of 0 dB (**Input** > **XLR input gain** > **0**).

Fig. 4.3
Example of menu levels

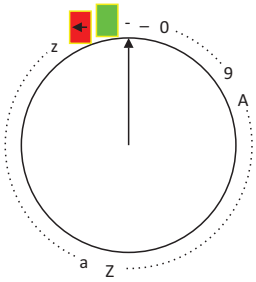


To leave the menu without performing an action (cancel), select **Exit** or long-press the knob.

4.2.1 Entering Text

Entering text is more elaborate, yet easy to learn. When a text field appears, you can then use the selector knob to scroll through characters. Character order is as depicted schematically in Fig. 4.4. The green block denotes 'OK' and the left-arrow in red denotes 'backspace'.

Fig. 4.4
Character scrolling order while entering text using the selector knob. Note that there are no navigational text or arrows on the UI

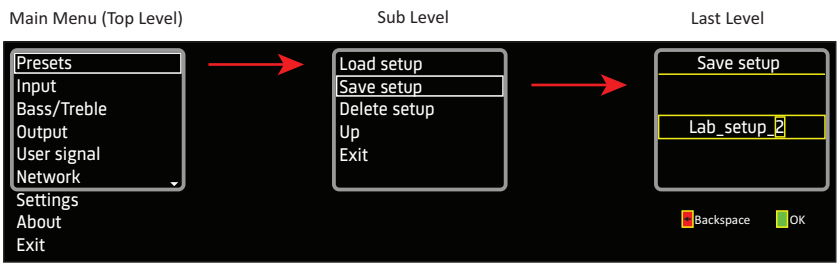


Press the selector to confirm the character selection at the cursor position and to continue to the next position. Click the red backspace to move the cursor left. Click the green OK to save the text and go up one level.

Please note: Holding down (pressing for an extended time) discards the input and leaves the menu.

An example of entering text is given in Fig. 4.5, where a preset is being saved with the name Lab_setup_2.

Fig. 4.5
Example of text entry level



The number of characters available for selection depends on the particular input field. For the setup name, the character set is limited to:

-_0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz

For passwords, the character set is:

0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz{|}~ !"@#$%&'()*+,-./:;<=>?[\\]^_`

4.3 Presets

To easily recall specific settings, for example, for a specific test setup, you can save and load presets. Settings generally do not survive a power cycle, but you can quickly enable all desired settings by loading a preset right after power-up.

Hint: Settings in a preset named 'Startup' (factory default or user-defined) are non-volatile. Therefore, if you want specific settings to survive a power cycle, save them in a preset with the name 'Startup'. While this may, in some cases, be preferable to a safe and predictable default power-up state, for safety and clarity's sake, it is recommended to delete this preset as soon as it is not used anymore.

These predefined setups are loaded via the Menu display: **Presets** > **Load setup** > *setup name*.

To save current settings as a preset, go to **Presets** > **Save setup** and enter a setup name.

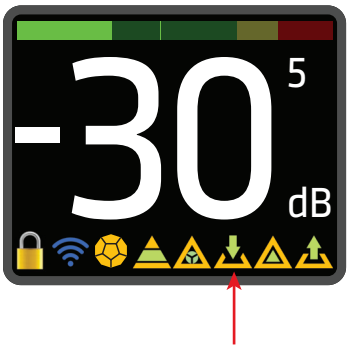
To delete a preset, go to **Presets** > **Delete setup** > setup name.

4.4 Audio Inputs

4.4.1 Overview

The colours of the input icon in the display's status bar, give a basic indication of input settings and signals.

Fig. 4.6
Display showing status bar at bottom. The input icon is highlighted



Please note: For more information about balanced and unbalanced connections, see section 3.1.1.

Input icon colour legend:

	Colour: Greyed out	All inputs have default settings: • All input gains are **0** dB • All input power supplies are switched off • The TRS input mode is set to **Differential** (balanced)
	Colour: Yellow/ Green	At least one of these settings: • At least one input gain is set to **10**, **20** or **30** dB • At least one input power supply is switched on • The TRS input mode is set to **Single-ended** (unbalanced)
	Colour: Red	At least one input is causing an overload

4.4.2 Input Levels

Table 4.1 *Available input gains and nominal rms and maximum peak input voltages*

INPUT GAIN [dB]	NOMINAL RMS INPUT VOLTAGE [Vrms]	MAXIMUM PEAK INPUT VOLTAGE [Vp]	HEADROOM [dB]
0	2.0	15	17
10	0.63	4.7	17
20	0.20	1.5	17
30	0.063	0.47	17

The **nominal (rms) input voltage** is defined as the rms input voltage at which the output power is 500 W into 4 Ω.

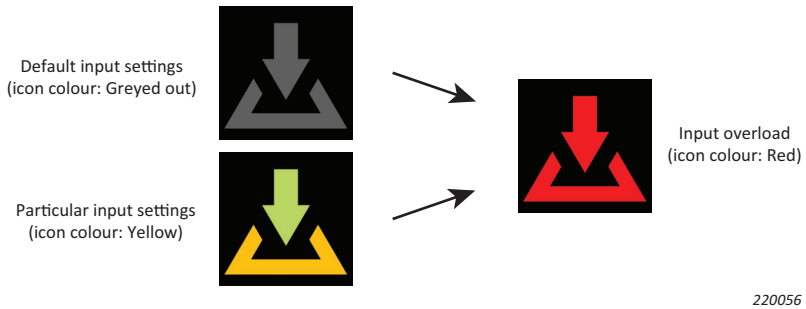
The **maximum peak input voltage** is defined as the input peak voltage that can be handled by the input circuits.

Both voltage types depend on the input gains, as shown in Table 4.1.

The **headroom**, defined as the ratio in dB between the two voltages, equals the maximum allowable crest factor at the nominal input voltage and exceeds 17 dB for all inputs and their gains. Lower rms input voltages allow higher crest factors. For example, the input voltage at 300 W into 6 Ω is 5% below nominal with an allowable crest factor of 18 dB.

If the source voltage exceeds the maximum peak input voltage, clipping of the signal (overload) occurs, which is indicated by the input icon turning red (Fig. 4.7).

Fig. 4.7
Input overload indication



Input clipping can only be undone by reducing the source signal level or by means of an input pre-attenuator cable.

4.4.3 XLR Input Gain and Phantom Power

Connection:

- Neutrik combo jack socket using an XLR connector

Settings:

- **Input** > **XLR input gain** > value
- **Input** > **Phantom power** > **On**

The XLR input is balanced and its gain can be set to **0**, **10**, **20** or **30** dB. At power up it is reset to 0 dB.

This input is equipped with a P48 phantom power supply, enabling the use of, for instance, a condenser microphone. Phantom power is switched off at power-up and enabled and disabled through the menu. There is a phantom power indicator above the connector on the front panel.

4.4.4 BNC Input Gain and IEPE Power

Connection:

- BNC socket using a BNC connector

Settings:

- **Input** > **BNC input gain** > value
- **Input** > **IEPE power** > **On**

The BNC input is unbalanced and its gain can be set to **0**, **10**, **20** or **30** dB. At power-up it is reset to 0 dB.

The input is equipped with an IEPE power supply, enabling the use of, for instance, an HBK CCLD* microphone. IEPE power is switched off at power-up and enabled and disabled through the menu. There is an IEPE indicator above the connector on the front panel.

4.4.5 TRS Input Mode

Connection:

- Neutrik combo jack socket

Setting:

- **Input** > **TRS mode** > **Single-ended**

TRS input is either single-channel balanced or dual-channel unbalanced but has a fixed 0 dB input gain. At power-up the mode defaults to Differential (balanced).

Set to **Single-ended** (unbalanced) or **Differential** through the menu.

* CCLD: Constant current line drive, also known as DeltaTron® (ICP and IEPE compatible)

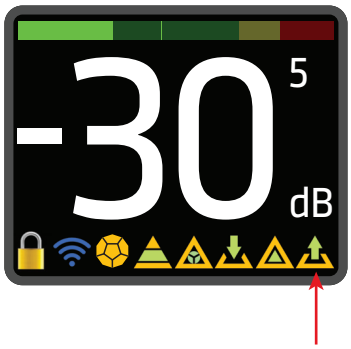
4.5 Audio Outputs

4.5.1 Overview

The amplifier is equipped with a line output and two loudspeaker power outputs that can be combined to a high-power bridge output featuring a power stabilization option. The output attenuation is set by a central knob that can be locked and limited for safety, and optionally set to fine-stepping.

The colours of the output icon in the display's status bar, give a basic indication of output settings and signals.

Fig. 4.8
Display showing status bar at bottom. The output icon is highlighted



NOTICE: Do not connect either of the speaker output terminals to ground.

Output icon colour legend:

	Colour: Greyed out	All outputs have default settings: • The power output is set to **Bridge** mode • Power compression is set to **Constant gain** (compensation off) • Gain limit is set to **0** dB
	Colour: Yellow/ Green	At least one of these settings: • The power output is set to one of the **Single-ended** modes • Power compression is set to **Constant power** (compensation on) • Gain limit is set to **–10**, **–20** or **–30** dB

4.5.2 Line Output

The signal on the (line) output BNC is a basic mix of signals from:

- Internal generator output 1
- USB audio output 1 (only if a USB cable is connected to a host PC)
- If no USB cable is connected, the input:
  - XLR
  - TRS (differential or channel 1)
  - BNC

The line output delivers a maximum peak voltage of 15 Vp, has an impedance of 100 Ω and is short-circuit proof.

4.5.3 Power Output

1-channel Output

Connection:

- Neutrik speakON connector

Settings:

- **Output** > **Output mode** > **Bridge**
- **Output** > **Power compression** > **Constant gain**
- **Settings** > **Mode** > **4292-L**

At power-up, this Neutrik speakON output defaults to Bridge output mode. In Bridge mode, the signal on this output is the basic mix (see Line Output section above).

In Bridge mode and with the internal generator noise signals in 4292-L mode, you can reduce the effect of power compression* through the menu: **Output** > **Power compression** > **Constant power**. The acoustic output power will then stabilize with regard to the loudspeaker temperature. At power-up, Power compression defaults to **Constant gain** (power compression not compensated).

For example:

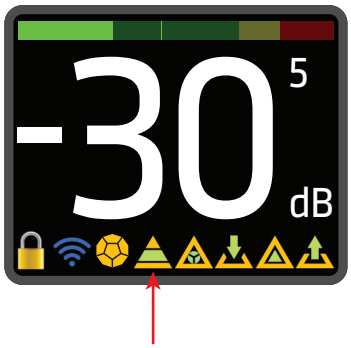
Internal noise at the maximum output power applied to a loudspeaker sound source produces an initial sound power level of 121 dB, but due to the loudspeakers heating up, the level eventually drops to 120 dB. While a constant level of 120 dB would be fine, if for some reason this is unacceptable, you can select **Output** > **Power compression** > **Constant power**.

Now, the amplifier will control the output voltage so as to keep the sound power level constant at the set attenuation. The actual output level depends on the connected sound source. For instance, OmniPower Sound Source Type 4292-L will typically produce a sound power level of 120 dB at a constant power attenuation of –4 dB, which is stable within 0.0 dB over 15 minutes and within –0.3 dB over 1 hour.

If **Constant power** control is active, but its control limit is reached, for example due to heated loudspeakers, the Power compression icon turns red. In that case you can step down the attenuation until the Power compression icon turns yellow/green again to resume control, albeit at a lower level.

* Power compression is a phenomenon typical for dynamic loudspeakers driven at high power. The temperature increase of the voice coil increases its resistance, hence the loudspeaker efficiency and acoustic output power level decreases. When set to Constant power, the amplifier will significantly reduce this effect, thereby stabilizing the loudspeaker output level.

Fig. 4.9
Display showing status bar at bottom. The power compression icon is highlighted



Power compression icon colour legend

	Colour: Greyed out	Power compression compensation is set to **Constant gain** (default)
	Colour: Yellow/ Green	Power compression compensation is set to **Constant power** and there are no issues
	Colour: Red	Power compression compensation is set to **Constant power**, and the internal White, Pink or 4292-L noise generator is switched on, but the power output is not in bridge mode or the demanded output power is too high

2-channel Output

Connection:

- Neutrik speakON connector

Settings:

- **Output** > **Output mode** > **Single-ended**
- **Settings** > **Mode** > **4292-L**

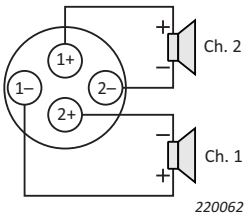
The speakON loudspeaker output can alternatively be configured to one of four single-ended modes:

- **Dual channel**
- **Single-ended ch.1**
- **Single-ended ch.2**
- **Single-ended ch.1+2**

Single-ended outputs can deliver 125 W (sine) into 4 Ω (63 W into 8 Ω) and are obviously the preferred choice for lower power loudspeakers.

In Single-ended mode, one speaker can be connected to pins 1+ and 2– and a second speaker to pins 1– and 2+, as shown schematically in Fig. 4.10. A dual-channel single-ended connection can be realized using a speakON splitter cable.

Fig. 4.10
Power output Single-ended configuration and associated speakON socket connections



See Table 4.2 for configuration of power output modes.

Table 4.2 *Power output modes. The signal on any output is the basic mix (see section 4.5.2), unless noted otherwise*

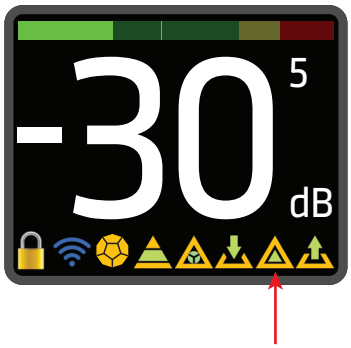
POWER OUTPUT MODE	DESCRIPTION
Bridge (high power)	Default output mode
Dual channel	Two single-ended outputs. The signal on output 2 is a mix of signals from: • Internal generator output 2 • USB audio output 2 (only if a USB cable is connected to a host PC) • If no USB cable is connected, TRS input channel 2
Single-ended ch.1	Single-ended output 1, output 2 muted
Single-ended ch.2	Single-ended output 2, output 1 muted
Single-ended ch.1+2	Two single-ended outputs with the same signal

The **Single-ended ch.1** mode is used to feed the basic mix signals to a moderate power loudspeaker connected to output 1. By selecting the **Single-ended ch.2** mode, the same signals are routed to output 2 to feed another moderate power loudspeaker at a different position.

The **Single-ended ch.1+2** mode can be used for mono music reproduction.

In **Dual channel** mode, a separate signal can be applied to each channel, such as from the TRS socket in single-ended mode, from the internal USB sound device or from the signal generator. This enables setups with two sound sources either sequentially driven from one stimulus signal or simultaneously from two different stimulus signals. Two sources can be useful with separate low-/high-frequency range loudspeakers, in occupied rooms where measurement setup changes during a session are unacceptable, or for stereo music reproduction using the shelf filters (**Bass/Treble** > **Bass gain**) and (**Bass/Treble** > **Treble gain**). The colours of the filter icon in the display's status bar give an indication of the filter status.

Fig. 4.11
Display showing status bar at bottom. The filter icon is highlighted



Filter icon colour legend:

	Colour: Greyed out	Filters set neutral
	Colour: Yellow/ Green	At least one of the Bass or Treble filters deviates from 0 dB

4.6 Audio USB Port

When the amplifier USB-C socket is connected to a host PC via a USB cable (not included), it turns into a 'power sound device'. Audio input signals are then transferred digitally to the host PC, and digital audio signals from the host PC are transferred via the attenuator to the audio outputs.

4.7 Level Control & Display

4.7.1 Attenuator

The overall gain from any input to the outputs is determined as follows:

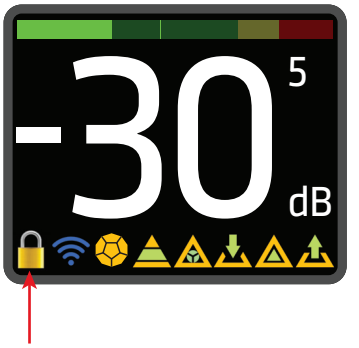
- Overall gain to line output = Set input gain + Attenuation
- Overall gain to speaker output (Bridge output mode) = Set input gain + Attenuation + 27 dB
- Overall gain to speaker output (Single-ended output mode) = Set input gain + Attenuation + 21 dB

Attenuation is represented by a negative gain, with default value – 30 dB at power-up. The input gains and attenuation both affect the overall gain, but a lower input gain will allow a higher input signal level, while the attenuation leaves the maximum input level unchanged.

To change the attenuation, use the selector knob. To avoid unintentional changes, for example during a measurement session, lock the gain (**Output** > **Gain lock** > **Enabled**). The colours of the lock icon in the display's status bar show the lock status. If you attempt to change the attenuation while the knob is locked, the display will quickly show a full-screen lock.

Hint: It may be convenient to set the attenuation or gains with the loudspeaker cable disconnected.

Fig. 4.12
Display showing the default gain of –30 dB and the status bar at bottom. The attenuator lock icon is highlighted



Lock icon colour legend:

	Colour: Greyed out	Attenuator knob is operational (default)
	Colour: Gold	Attenuator knob is locked. To unlock, go to **Output** > **Gain lock** > **Disabled**

To reduce the risk of damaging a connected low-power speaker, the attenuation/gain can be limited by selecting in the menu **Output** > **Gain limit**. Table 4.3 shows the available limits and the corresponding maximum powers into 6 Ω using one of the standard noise signals of the internal generator.

Table 4.3 *Available attenuation limits and maximum power from internal noise generator*

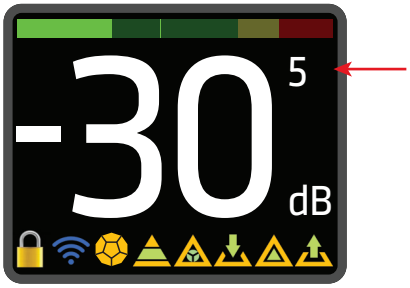
GAIN LIMIT [dB]	MAXIMUM OUTPUT POWER INTO 6 Ω [W]
[0]	300
−10	30
−20	3
−30	0.3

Please note:

- The set attenuation/gain limit is reset at each power-up of the amplifier
- High level input signals may result in higher output powers, even with limited attenuation

For research purposes, such as in laboratories, the attenuation/gain stepsize can be reduced to 0.5 dB in the menu by going to **Output** > **Gain step**. A 0.5 dB step is denoted by an added decimal (0 or 5) in superscript in the display, as depicted in Fig. 4.13. The default stepsize at power-up is 1 dB (no added decimal visible).

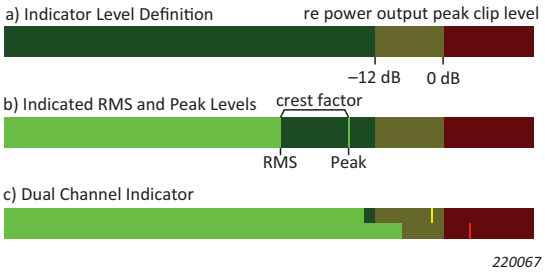
Fig. 4.13
Fine-step indication by an added decimal



4.7.2 Level Indicator

The level indicator depicted in the figure below reflects the power output signal. The yellow/red border denotes the power output clipping level. This border should not be crossed during measurements or recordings requiring low distortion signals, such as with impulse response measurements. At 0 dB input gain, the clipping input voltage is 2.8 V. For instance, USB Audio Interface ZE-0948 with its maximum output voltage of 2 Vp will always stay below clipping level, even at 0 dB attenuation. This is also true if the amplifier is used as 'power sound device' when attaching a USB host PC.

Fig. 4.14
Level indicator at several signal conditions: a) Very low level, b) Moderate level, c) Dual channel



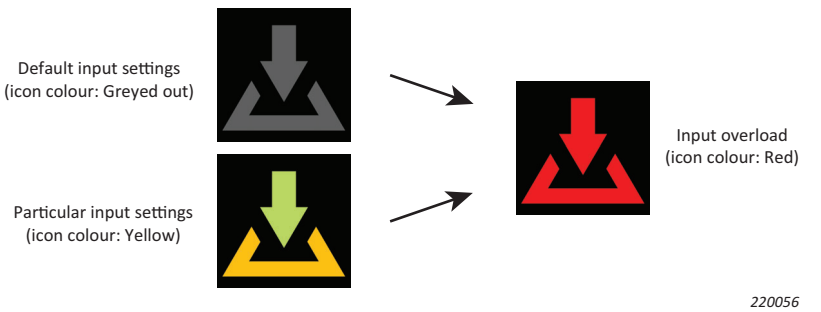
In situations where high-level energy spectra are more important than low distortion, it may be preferred to have the clipping border crossed and let a fraction of the signal peaks clip at the power output. This is, for instance, true for external noise signals that are normally set at high levels in sound insulation measurements.

The line output clipping level is 14.5 dB higher than the power output clipping level and represented by the rightmost side of the level indicator.

The rms level of the output signal is shown by the horizontal highligted bar, while the peak level is denoted by a vertical thin highlighted line. The difference represents the signal crest factor (Fig. 4.14 b).

In dual-channel mode, the level indicator splits up into two independent indicators, one for each output channel (Fig. 4.14 c).

Fig. 4.15
Input overload indication



Please note: For accurate input overload detection, the attenuation value should not be too negative (greater than −80 dB).

If any input signal causes an internal overload, the input icon in the display's status bar turns red (Fig. 4.15). In that case turning the selector knob counter-clockwise will not help and the input gain or source signal level should be reduced. See section 4.4.2.

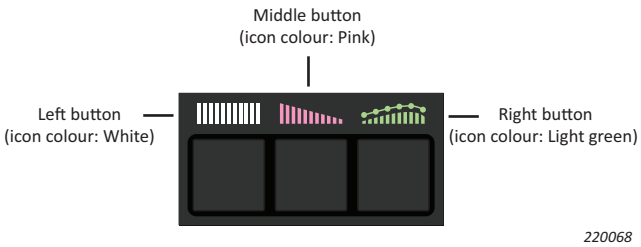
4.8 Signal Generator

The generator produces standard noise signals and user-defined signals.

4.8.1 Standard Noise Signals

The standard noise signals are selected one at a time by the three buttons on the front panel.

Fig. 4.16
Generator signals buttons



Most internal noise signals can be described by four parameters:

- Type of noise:
  - White: Has a frequency-independent energy density
  - Pink: The spectral energy density decreases by 1 dB per third-octave to get equal energy in each frequency band
- Lower frequency limit
- Upper frequency limit
- Level

The signals are optimized for particular applications. There are two sets (each of three noise signals) that can be selected through the amplifier mode (**Settings** > **Mode**).

- **4292-L** mode is intended for use with an omnidirectional sound source, such as HBK's Type 4292-L
- **4250 VVS** mode is intended for use with an HBK volume velocity source

Table 4.4 shows the relation between amplifier mode, push buttons and noise signals. The noise signal while in 4292-L mode (right button) is neither white nor pink, but has a spectrum that flattens the OmniPower sound source frequency band spectrum.

Table 4.4 *Signal generator standard noise signals*

MODE	FRONT PANEL BUTTONS											
	LEFT				MIDDLE				RIGHT*			
	Noise Name	Type	f_L [Hz]	f_H [kHz]	Noise Name	Type	f_L [Hz]	f_H [kHz]	Noise Name	Type	f_L [Hz]	f_H [kHz]
4292-L	*White*	white	50	5	*Pink*	pink	50	5	*Equalized (4292)*	shaped	50	5
4250 VVS	*LF*	pink	10	1.6	*MF*	pink	20	6.3	*HF*	white	100	12.5

* Right button indication: light-green colour

All standard noise signals have a 0 dB voltage of 42 Vrms at the speakON output in bridge mode (300 W into 6 Ω) and 1.9 Vrms at the output BNC.

4.8.2 User-defined Signals

In 4292-L mode, the signal of the button on the right can be modified to a user-defined signal (**User signal** > list of signals), which changes the light green indicator into light blue.

Fig. 4.17
Generator signals buttons

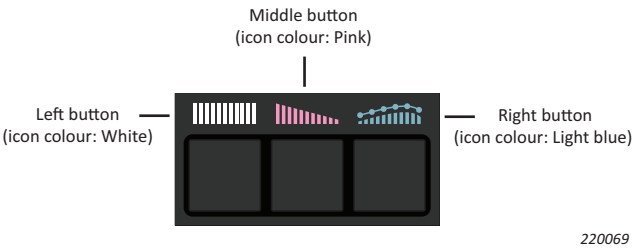


Table 4.5 describes other signals that are user-selectable from the menu (**User signal**).

Table 4.5 *Signal generator user signals*

USER SIGNAL*	TYPE	f_L [Hz]	f_H [kHz]	LINE OUT VOLTAGE [Vrms]	POWER OUT VOLTAGE [Vrms]
pink-ext	pink	50	10	1.9	42
white-ext	white	50	10	1.9	42
sine 1 kHz	–	–	–	1.0	22

* Right button indication: light blue colour

The signals turn off rapidly to allow the measurement of short reverberation times when using the interrupted noise measurement technique, without creating disturbing transients.

Please note: Before turning on the noise generator remotely, make sure that everybody within hearing distance of the loudspeaker is aware of this action.

4.9 Web Server

With HBK 2755, you can control attenuation, the generator and the presets via Wi-Fi (remotely). To do so, switch on the built-in web server by going to **Network** > **Webserver** > **Enabled**. Then, connect your device (smartphone, tablet or laptop) to the amplifier in either of two ways:

1) Directly: The amplifier is set up as a hotspot (**Network** > **Wi-Fi mode** > **Hotspot**) and you connect your device to this hotspot using your defined password (**Network** > **Hotspot** password).
2) Indirectly: The amplifier connects to an external wireless LAN (**Network** > **Wi-Fi mode** > **Station**), which is the same network your device is connected to.

Please note:

- Only two devices at a time can connect to the amplifier in Hotspot mode
- Multiple devices can connect to the amplifier in Station mode, which might result in unexpected behaviour with uncoordinated actions

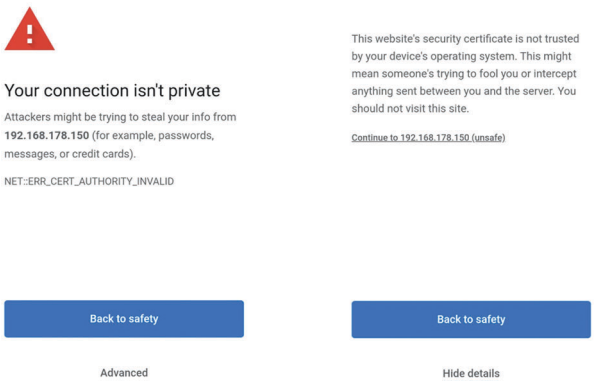
4.9.1 Using the Web Page

With the web server enabled, you can visit your HBK 2755's web page using URL: *https://amplifier IP address* (for example: *https://192.168.68.121*). The amplifier's IP address is found in **Network** > **Info**.

Depending on the network router, you might also use HBK 2755's serial number as the URL: *https://HBK2755-Serial*. For example, if your HBK 2755 serial number is 002001, the web server URL would be *https://HBK2755-002001*.The serial number can be found on the backside of the amplifier or in **About** > **Version info**.

Before entering the web page for the first time, you will see security warnings, such as those depicted in Fig. 4.18 (from Microsoft® Edge browser). Your browser may display similar messages. These warnings appear because the SSL certificate in the amplifier cannot be traced to any certificate authority. You can just accept and/or continue.

Fig. 4.18
Example of warnings on certificate authority



The HBK 2755 web page displays the generator buttons and the attenuation knob. Each page is captioned with the device name, such as HBK2755-002001 as shown in the figures below. When the device name is green, there is a valid connection to the device. When the device name is red, the connection is lost.

Fig. 4.19
The HBK 2755 web page (not available on HBK 2755-A). The colour of device name (at the top) indicates the connection status: Red: No connection Green: Connection

To start signal playback, click a generator button with the cursor. The button frames will turn red momentarily while the command is being sent to the amplifier. Once the signal playback is started, the button for the active signal turns green.

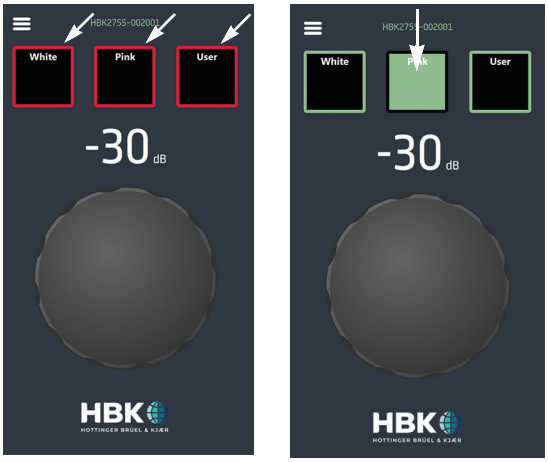


Fig. 4.20
Left: *Button frames will light red while commands are being sent*
Right: *A button will light green when active*

To change the attenuation, turn the attenuation knob by swiping the cursor from the bottom left to the top right and back again (click+drag on a laptop). While the changed attenuation value is being sent to the amplifier, the displayed value shortly turns red.

Fig. 4.21
Swipe the knob with the cursor to change the attenuation. The value will be in red as the value is sent to the amplifier

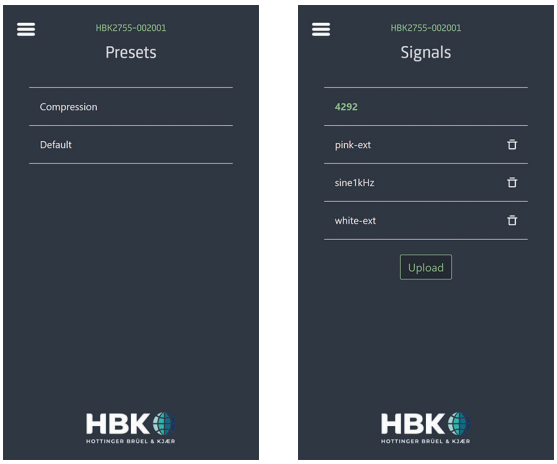
Click the menu (☰) at the top left to access the other pages:

- **Presets** page: Activate a preset from the list of stored presets in the amplifier
- **Signals** page: Activate a signal from the list of user-defined signals stored in the amplifier. The currently selected signal is displayed in green.

  You can also:

  – Click **Upload** to send new signals to the amplifier (in .wav format)
  – Click 🗑 to delete the user-defined signal

Fig. 4.22
Other pages in the HBK 2755 web page:
Right: *Presets*
Left: *Signals*



To playback the selected user-defined signal:

1) Click ☰ to go back to the Home page.
2) Click the **User** button.

4.10 Fans

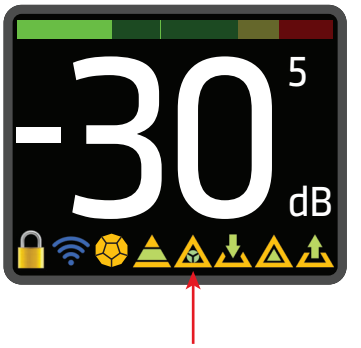
To deliver the highest power available, the amplifier is equipped with a cooling fan.

At a moderate ambient temperature and a low average output power, the fan stays off. At an internal heat sink temperature of 55 °C (131 °F), the fan speed is temperature-controlled, starting at a low speed and producing a very low acoustic noise level.

When the amplifier is used in dusty environments, while demanding high power and intensive fan operation, the air filter is imperative, and regular cleaning is required. See section 5.2.

If any (change in) fan noise is unacceptable, for instance during a special laboratory test, the fan control can be overruled and the fan can be forced On/Off via the menu (**Settings** > **Fan control**), in which case the fan icon in the display status bar will illuminate.

Fig. 4.23
Display showing status bar at bottom. The fan icon is highlighted



If the fan is forced off while, based on the loudspeaker power stage temperature, the fan control would have turned it on, the fan icon will turn red. The colours of the fan icon give a basic indication of the fan control settings.

Fan icon colour legend:

	Colour: Greyed out	Fan control is active (default), and the fan speed is based on the loudspeaker power stage temperature
	Colour: Yellow/ Green	Fan control is inactive. The fan is set permanently to maximum speed or it is permanently turned off and currently would not run with active fan control
	Colour: Red	Fan control is inactive. The fan is permanently turned off but would currently run with fan control active

Forcing the fan to run at maximum speed may be useful to quickly cool down the power stage, for instance to prepare a new fan-less test run.

Chapter 5

Maintenance, Service and Repair

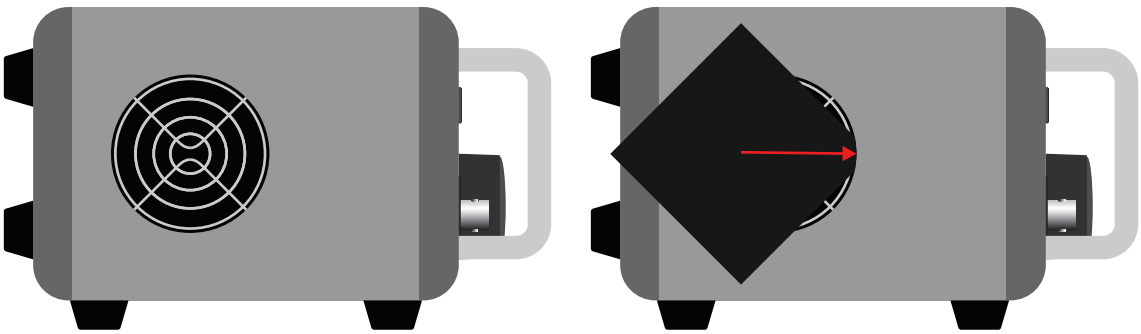
5.1 General Maintenance Instructions

- Clean only with a dry cloth
- Do not use the amplifier if the power cord is broken or frayed.
- Protect the power cord, do not stand on it or pinch it, particularly at the plug and the point where it meets the housing
- Do not remove the housing, the inner top cover or the front panel. Removal of any of these components will expose hazardous voltages. There are no serviceable parts inside and removal may void the warranty

5.2 Cleaning the Air Filter

The amplifier is standard-equipped with an air filter that will have to be cleaned from time to time if the amplifier is used in dusty environments. To clean, gently pull out the filter and shake or swat out the dust with your fingers. To re-insert the filter, start with the filter corners (Fig. 5.1), then push further in.

Fig. 5.1 *Inserting the air filter: start with the corners*



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If a filter is worn out or clogged, replace it. Contact your local customer care team to restock your supply.

5.3 Protection Features

The amplifier is equipped with several protection features. Should a fault condition arise, one of the protection circuits will activate. It may shut down the amplifier and show a full-screen icon on the display.

Fig. 5.2
Protection icons

A protection circuit activates under one of the following conditions:

Thermal Protection	If the amplifier temperature becomes too high, the amplifier power stage shuts down and the fan is turned on. This protection circuit is self-resetting. After cooling down sufficiently, the power stage will switch on again
Overload Protection	A high-amplitude continuous low-frequency signal in loads lower than 4 Ω may cause the power supply voltage to drop. However, the amplifier will not shut down because of under voltage – it stays operational with a softly shaped audio signal
Over-current/ Short-circuit Protection	If the output current exceeds 30 A for too long, which would eventually cause overheating, the amplifier shuts down. This protection circuit is self-resetting. The current is periodically sampled and as soon as it has returned to an acceptable value, the shut-down state is cleared
Long-term HF Protection	In case of long-term, high-frequency signals on the output, the input signal is limited, thereby avoiding damage to a loudspeaker. The HF protection circuit has a built-in time constant, so it is possible to deliver a high-frequency, high-amplitude signal for a short time. If the high-frequency, high-amplitude signal is sustained for too long, the amplifier shuts down. This protection circuit is not self-resetting and the amplifier has to be power cycled

5.4 Replacing the Fuse

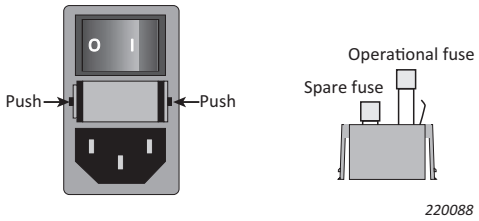
If the amplifier does not respond to the mains power switch, while the mains power supply seems to be okay, the fuse might be blown. Although this normally indicates a fault in the amplifier, it might be a spurious fault, and replacing the fuse might solve the problem.

To do so, pull out the fuse drawer while pushing the side locks inward, either with your fingernails or two small screwdrivers, paperclips, etc. (see Fig. 5.3).

Hint: A loose spare fuse is inside the drawer, so be careful not to drop it while taking the drawer out.

Check the operational fuse. If it is blown, replace it with the spare fuse.

Fig. 5.3
Replacing the fuse



Please note: After replacing the operational fuse, do not forget to replace the spare fuse too. Littelfuse® T 5 AH 250 V 215 series fuses (part number 215005.MXP) are recommended.

If after replacement the amplifier is functioning again and continues to function, the problem may have been solved. In all other cases, (fuse blows again, amplifier is still not responding, etc.) the fault is more serious. In that case, return the amplifier to your supplier or an approved service centre.

5.5 Troubleshooting

If the amplifier seems to be faulty, apply the following checklist.

No signal on the output:	
	If the level indicator does not show any activity, there is probably very little input signal. You can verify this by checking the internal noise generator (be careful to turn the gain down or disconnect the speaker first) and the other output. Check the attenuation settings as well as the input signal, for example, by trying another input
	If the level indicator shows activity, there is a signal on the input. In that case there should be also a signal on the other output. Check the cable from the faulty output as well as the connected device
The amplifier goes into protection when driven at low level:	
	Check that nothing causes a short-circuit at the power output
The amplifier cannot be turned on:	
	Check the mains cable and the presence of the outlet voltage, for example, with other equipment
	Check the fuse in the fuse drawer on the front panel (see section 5.4)

If the amplifier does not respond even after checking the above possibilities, or if another serious fault occurs, disconnect it completely and secure it against unintended operation. Contact your local HBK customer care team and give details of any errors found.

Under no circumstances should repair be attempted by persons not qualified in the service of electronic instrumentation!

5.6 Service

Under normal use, the amplifier should provide years of trouble-free service. In some extreme cases, however, it may be necessary for authorised service personnel to clean the inside of the amplifier. These conditions usually occur after prolonged use in dusty environments.

Refer all servicing to qualified service personnel. Servicing is required when the amplifier has been damaged in any way, such as:

- Liquid has been spilt on the unit
- An object has fallen on the unit
- The unit has been exposed to rain or moisture
- The unit does not operate normally
- The unit has been dropped or the enclosure damaged

Chapter 6

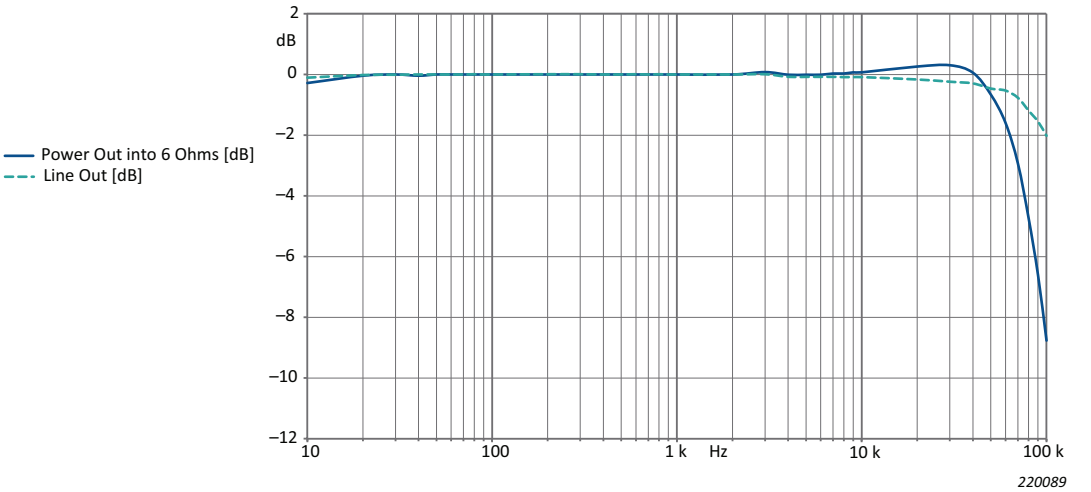
Specifications

General Specifications

MAXIMUM OUTPUT POWER	**T_A = 25 °C, 230 V_{AC}/50 Hz, 1 kHz, THD <10%**	**4 Ω**	500 W
		6 Ω	330 W
		8 Ω	250 W
CONTINUOUS OUTPUT POWER (1 kHz, 6 Ω)		**T_A = 25 °C with air filter**	250 W
		T_A = 25 °C without air filter	330 W
		T_A = 35 °C	175 W
INPUT VOLTAGE	**Nominal Voltage @ Input Gain:**	**0 dB**	2.0 V
		10 dB	0.63 V
		20 dB	0.20 V
		30 dB	0.063 V
	Headroom at Nominal Input Voltage		17 dB
	Common Mode Rejection (1 kHz)	**XLR**	80 dB
		TRS	55 dB
	Maximum DC Voltage	**BNC**	−15 to +24 V
		XLR	±15 V
		TRS	±30 V
INPUT CURRENT Microphone power supply DC Current		**BNC**	4.5 mA
		XLR (Max. per input)	7 mA
INPUT IMPEDANCE	**1 kHz, Unpowered**	**Balanced**	20 kΩ +0/−2%
		Unbalanced	10 kΩ +0/−2%
	DC, Unpowered	**Balanced (XLR)**	220 kΩ ±1%
		Balanced (TRS)	20 kΩ ±1%
		Unbalanced	10 kΩ ±1%
OUTPUT VOLTAGE	**Power Output Peak Voltage**		32 V
	Line Output Peak Voltage		14.5 V
	Power Output DC Voltage		0 V
OUTPUT IMPEDANCE (1 kHz)	**Line Output**		100 Ω
	Line Output Load		≥0 Ω
	Power Output		Typical 18 mΩ
	Power Output Load		≥3 Ω

FREQUENCY RESPONSE (20 Hz – 20 kHz) See also Fig. 6.1	**Input Gain and Attenuation 0 dB, from BNC Input to:**	**Line Output**	– 0.2 dB
		Power Output	0.3 dB
SNR (MAX POWER 1 kHz)/(SILENCE 0 – 20 kHz)		**Line Output**	100 dB
		Power Output	106 dB
THD+N (20 Hz – 20 kHz)	**Input Gain 0 dB, Attenuation 0 dB, 1 kHz**	**Line Output (1 Vrms)**	– 90 dB
		Power Output (1 – 450 W, 4 Ω)	1%
GAINS AND ATTENUATION	**Input Gains**		0, 10, 20, 30 dB
	Input Gain Error (No Error @ 0 dB)		±0.1 dB
	Attenuation Range		– 90 to 0 dB
	Attenuation Stepsize		0.5, 1 dB
	Attenuation Error (No Error @ 0 dB)		±0.1 dB
	Total Gain (Input gain = Attenuation = 0 dB), Any Input to:	**Line Output**	0 ±0.2 dB
		Bridge Mode Power Output	27 ±1 dB
		Single-ended Mode Power Output	21±1 dB
LEVEL INDICATOR	**Trigger Levels re Power Output Clip Level**	**Yellow/Red Transition**	0 dB
		Green/Yellow Transition	– 12 dB
OPERATING TEMPERATURE (non-condensing)			– 5 to + 40 °C (+23 to 104 °F)

Fig. 6.1 *Frequency responses with both input gain and attenuation at 0 dB, power output connected to 6 Ω load and BNC input voltage of 1 V_{rms} from 10 Hz to 20 kHz and 316 mV_{rms} from 20 to 100 kHz. Reference at 1 kHz*



Signal Generator

INTERNAL STANDARD NOISE TYPES	**4292-L Mode and Frequency Range (1/3-octave bands)**	**White**	50 Hz – 5 kHz
		Pink	50 Hz – 5 kHz
		Equalized (4292)	50 Hz – 5 kHz
	4250 VVS Mode and Frequency Range (1/3-octave bands)	**LF**	10 Hz – 1.6 kHz
		MF	20 Hz – 6.3 kHz
		HF	100 Hz – 12.5 kHz
CREST FACTOR			3.5 dB
PERIOD TIME			10.9 s
1/3-OCTAVE SPECTRAL ERROR (Type 4292-L standard noise signals)			±0.35 dB
LINE OUTPUT VOLTAGE		**Attenuation = 0 dB**	1.9 V_{rms}
TURN OFF: EQUIVALENT RT IN 1/3-OCTAVES			<100 ms @ 50 Hz <1 ms @ 5 kHz

Power

MAINS POWER	
Voltage Selector (rear panel)	230/115 V
Mains Voltage Range	@ 230 V: 200 – 240 V
	@ 115 V: 100 – 125 V
Mains Frequency Range	45 – 65 Hz
Fuse	Littelfuse T 5 AH 250 V 215 series, part no. 215005.MXP
Maximum Power Consumption	650 W
Minimum Power Consumption	15 W

Fan

Turn On Heat Sink Temperature	55 °C
L_w at Min Speed	25 dB re 1 pW
L_w at Max Speed	52 dB re 1 pW

Mechanical

Minimum Dimensions W × H × D (carry handle folded down)	294 × 120 × 190 mm (11.6 × 4.7 × 7.5″)
Weight	2.2 kg (4.9 lb)

User Interface

CONNECTORS	**Input Socket**	**BNC**	
		Neutrik Combo Jack	3-pole XLR (balanced) and TRS (¼-in jack, 1 × differential or 2 × single-ended)
	Line Output Socket		BNC
	Power (Speaker) Output Socket		Neutrik 4-pole speakON type (1 × bridge or 2 × single-ended output)
	Mains Power Inlet		IEC type
CONTROLS	**Generator Buttons (3×)**		Toggling between On and Off
	Attenuation Rotary/Push Knob		Attenuation or menu
	Mains Power Rocker Switch		2-pole
STATUS INDICATORS	**Display (Operational)**	**Output Level**	Single or dual green/yellow/red bar
		Attenuation	In dB
		Status Bar	• Attenuation lock • Wi-Fi • Amplifier mode • Constant power • Fans • Inputs • Filters • Output
STATUS INDICATORS	**Display (Main Menu)**		• Presets • Input • Bass/Treble • Output • User signal • Network • Settings • About • Exit
	Full-screen Attention Icons		• Attenuator locked • Power stage over-temperature • Power stage over-current/over-load/long-term high frequency
	Generator Indicators	**4292-L Mode**	• White noise: White • Pink noise: Pink • Equalized noise: Light green • User signal: Light blue
		4250 VVS Mode	• LF noise: White • MF noise: Pink • HF noise: Light green
	Input Power Indicators	**BNC input**	IEPE power on: Amber
		XLR input	P48 phantom power on: Amber
	USB Active LED		Amber

Supported Products

Only use accessories specified by HBK

FOR ARCHITECTURAL ACOUSTICS APPLICATIONS

- DIRAC Type 7841
- ½″ Prepolarized, Free-field Microphone Type 4966-H-041 with CCLD preamplifier Type 1706
- OmniPower Omnidirectional Sound Source Type 4292-L

FOR SOURCE PATH CONTRIBUTION (SPC) APPLICATIONS

- Volume Velocity Source Type 4250
- BK Connect® Pass-by Viewer Type 8441
- BK Connect® Indoor Pass-by Type 8441-C
- BK Connect® Pass-by SPC Type 8441-D
- BK Connect® VVS Measurements Type 8442

OTHER OPTIONAL ACCESSORIES

HBK Accessories:

- Country-specific Power Cable UO-0753
- Signal Cable AO-0523, LEMO triaxial to XLR, 10 m (32.8 ft)
- Signal Cable AO-0524, LEMO triaxial to BNC, 10 m (32.8 ft)
- Speaker Cable AQ-0673, 10 m (32.8 ft)
- USB Cable AO-0821-D-010, USB-C (M) with ferrite to USB-A (M) black, 1.0 m (3.3 ft) max.+ 70 °C (+ 158 °F)
- BNC Cable AO-0087-D-xxx*, coax single-screen, BNC (M) to BNC (M), max.+ 8 5°C (+ 185 °F)
- Splitter Cable AO-2030, 0.3 m (1 ft)

Third-party Accessories:

- Littelfuse® T 5 AH 250V 215 series fuses (part number 215005.MXP)

SERVICE PRODUCTS

For information about our calibration services, go to www.bksv.com/en/Service/Calibration-and-verification

* Available in various lengths. D = decimetres, xxx = length. Please specify when ordering

Compliance with Standards

	The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives. RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME. China RoHS mark indicates compliance with administrative measures on the control of pollution caused by electronic information products according to the Ministry of Information Industries of the People's Republic of China. WEEE mark indicates compliance with the EU WEEE Directive. FCC mark is a certification mark employed on electronic products manufactured or sold in the United States, which certifies that the electromagnetic interference from the device is under limits approved by the Federal Communications Commission. The UKCA (UK Conformity Assessed) marking is a UK product marking that is used for goods being placed on the market in Great Britain
Safety	EN/IEC 61010-1-2010: Safety requirements for electrical equipment for measurement, control and laboratory use
Radio	ETSI EN 300 328 V2.2.2 (2019-07): Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz band; Harmonised Standard for access to radio spectrum FCC Rules, Part 15C: Intentional Radiators
EMC Emission	EN/IEC 61000-6-3: Generic standards – Emission standard for residential, commercial and light industrial environments. EN/IEC 61000-6-4: Generic standards – Emission standard for industrial environments EN 61326-1: Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements. FCC Rules, Part 15B: Unintentional radiators – Complies with the limits for a Class B digital device. This ISM device complies with Canadian ICES-001 (interference-causing equipment standard)
EMC Immunity	EN/IEC 61000-6-1: Generic standards – Immunity for residential, commercial and light industrial environments. EN/IEC 61000-6-2: Generic standards – Immunity for industrial environments EN 61326-1: Electrical equipment for measurement, control and laboratory use – EMC requirements. **Note:** The above is only guaranteed using accessories listed in this document
Temperature	EN 60068-2-1: Environmental testing – Part 2-1: Tests – Test A: Cold EN 60068-2-2: Environmental testing – Part 2-2: Tests – Test B: Dry Heat Storage Temperature: –25 to +70 °C (–13 to +158 °F) Operating Temperature (non-condensing): –5 to +40 °C (+23 to 104 °F)
Humidity	EN 60068-2-78: Damp Heat: 93% RH (non-condensing at 40 °C (104 °F))
Mechanical	Non-operating: EN 60068-2-6: Vibration: 0.15 mm, 20 m/s^2, 10 – 500 Hz EN 60068-2-27: Shock: 1000 m/s^2 EN 60068-2-29: Bump: 1000 bumps at 250 m/s^2
Enclosure	EN 60529: Protection provided by enclosures: IP 20

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