RESEARCH

hornberg

hb1 MIDI Breath Station

User's Guide

Contents:

Please read the safety instructions on page 24 and the section on the USB power supply unit on page 25 of the Quick Start guide. Read the operating instructions to get an overview of hb1 functions. Keep this manual in a safe place for further reference.

1. INTRODUCTION:

Thank you for your purchase of the hb1 MIDI Breath Station produced by Hornberg Research.

Our goal was to develop a new generation of MIDI controllers. The hb1 MIDI Breath Station enables breath-generated MIDI control of every electronic musical instrument or peripheral device with a MIDI or USB MIDI interface. Our special wooden mouthpieces with a built-in precision sensor combined with a MIDI Merger, an integrated MIDI interface and innovative Attack, Boost Attack, Release and Boost Release parameters allow you to achieve precise, sensitive live and studio performances.
In multi mode you can use up to four hb1 presets simultaneously and with this feature it is possible to control up to four MIDI CCs streams independently. This state-of-the-art concept goes far beyond what's possible with other breath-controllers on the market. Thanks to storable parameters and the integration of standard MIDI and USB interfaces, hb1 can be used with or without a computer.
The hb1 is handcrafted in Germany with a passion for detail and strong focus on sustainability.

2. SCOPE OF DELIVERY:

- Controller unit
- Pressure sensor unit
- Two interchangeable mouthpieces /
  one stainless steel tube with an adjustable air intake valve
- hb1 Neck Set
- Silicone hose - 2 m sensor cable (4-pole)
- 1.8 m USB cable
- 5V USB power supply unit
- Cleaning swab for the mouthpiece
- Wool felt carrying case

3. MINIMUM SYSTEM REQUIREMENTS:

- 1x USB 2.0 port
- Works with any standard operating system
- Recommendation: use current operating systems
- No driver installation necessary (Plug &Play)

4. HARDWARE DETAIL:

Built using high-quality materials

Note:

Compared to plastics, the high-quality wood minimizes salivation and has antibacterial and anti-fungal qualities.
Two mouthpieces are supplied in different sizes so that the most comfortable can be chosen for use.

Connections:

1. USB connection for a computer or USB adapter (5V, min. 100mA)
2. MIDI OUT 2 (MIDI-inferface)
3. MIDI OUT
4. MIDI IN
5. Connection for the sensor unit

5. hb1 PARAMETERS:

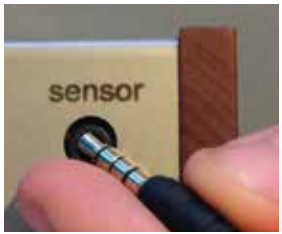
	Preset 1 – 25	Preset storage
	Drive -10 - +10	Pressure sensor sensitivity control
	Offset 0 – 126	Default output value
	Attack 0 – 40	Rising behavior
	Boost Attack 0 - 5	Boost Attack control
	Release 0 – 40	Decreasing behavior
	Boost Release 0 - 5	Boost Release control
	Limit 1 - 127	Maximum output value
	Data Reduction 0 – 20	Real-time data reduction
	Continuous Controller 0 – 127	Midi Continuous controller
	MIDI Channel 1 – 16	MIDI Channel
	Combined Preset 1 - 25	Combine Presets in multi mode

6. SET UP:

6.1 Applicable for all operation modes:

Push one end of the silicone hose over the hose connector of the mouthpiece. Connect the other end of the silicone hose to the hose connector on the pressure sensor unit in the same manner.
Connect the sensor unit to the sensor connector of the hb1 controller unit via the connector cable included (3.5 mm jack, 4-pin) (*see illustrations*).

Hang the leather strap with the connected pressure sensor unit around your neck.



If a sensor cable is not connected or defective, the following message code will be displayed:

6.1 Applicable for all operation modes:

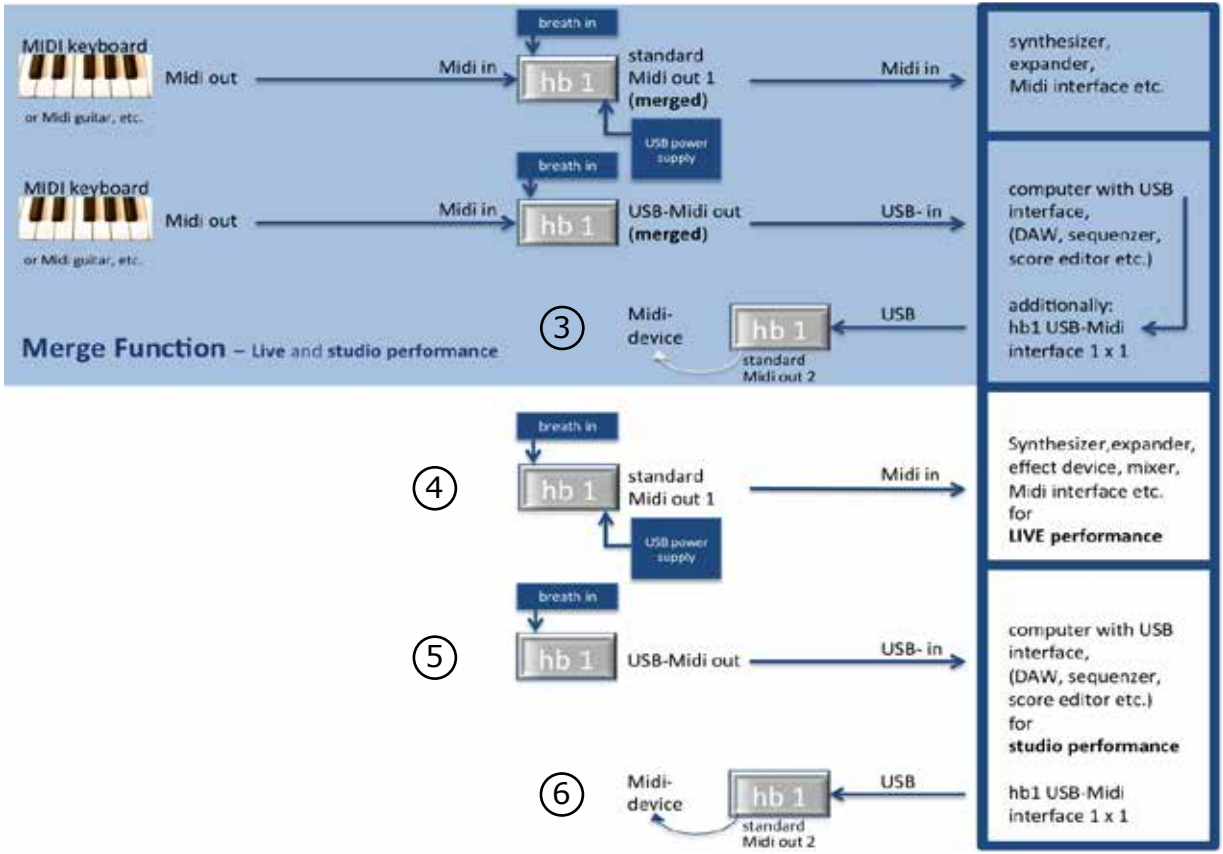
The hb1 includes a Neck Set which enables the mouthpiece to be set in a fixed position in front of the mouth. This is particularly helpful for live performances. The hb1 Neck Set is made from a flexible but robust metal tube which can be easily shaped and adapted for the musician‘s comfort and musical needs.

hb1 Neck Set

front view

side view

6.2 Connecting diagram for operation modes:



6.3 Set up of operation modes:

Code: see wiring diagram on ***page 8***

Using the hb1 on stage (using the MERGE function without a computer):

First connect the hb1 with the included USB power supply using the USB cable. You can connect the hb1 with any MIDI OUT instrument (piano,master keyboard, synthesizer, MIDI guitar, etc.) (see (1))

Using a MIDI cable, connect the MIDI OUT of your instrument to the MIDI IN of the hb1.
Next connect the MIDI OUT of the hb1 to the MIDI IN of your sound equipment (MIDI-interface, synthesizer, expander, etc.). The merged signals of the hb1 and your instrument are sent to the MIDI OUT on the hb1. It is possible to send hb1 data to any MIDI channel. In this case, the MIDI OUT2 of the hb1 is irrelevant.

The hb1 can also be used without the MERGE function. (see (4))

6.3 Set up of operation modes:

Using the hb1 on stage or in the studio (using the MERGE function on a computer):

First connect the hb1 with your computer via the USB cable. (see ②)

As described above, you can connect any MIDI OUT instrument (piano, master keyboard, synthesizer, MIDI guitar, etc.) to the hb1; simply connect the MIDI OUT of your instrument to the MIDI IN of the hb1 using a MIDI cable.

Hb1 appears as a MIDI device in your recording software and can be routed as usual.
(no driver **installation necessary**)

You can record the data compositely on a track in your sequencer. In order to record the hb1 data separately on another track, set hb1 to another MIDI channel and set the sequencer to multirecord (if necessary).

Make sure to route the output device of the recorded hb1 track to the same "sound target".
In this operation mode, the MIDI OUT2 of the hb1 can also be used as a routable MIDI Output and appears as „hb1" (Ch1-16) (MIDI interface function) in your MIDI output device list (see ③ and ⑥).
The hb1 can also be used without the MERGE function. (see ⑤)

7. hb1 OPERATION:

The hb1 has 12 parameters. Their corresponding values may be freely set and selected on either T1 or T2 (button/rotary encoder). Up to 25 presets may be stored.
The following description assumes that the hb1 is in its original factory setting.

Pool-Parameter
Pr (Preset)
dr (Drive)
oF (Offset)
At (Attack)
bA (Boost Attack)
rL (Release)
br (Boost Release)
Ll (Limit)
rd (Data Reduction)
CC (Continuous Controller)
Ch (MIDI Channel)
CP (Combined Preset)

7. hb1 OPERATION:

Wire hb1 according to the instructions in this manual.
Connect the USB cable to your computer or the power supply included.

The hb1 will now start up in the preset (Pr) that was last used, in this case Pr 1.
The display will then indicate the current value of the pressure sensor (breath value). A dot in the upper left hand corner (before the first digit) indicates that the „breath value display unit" is active.

If you briefly press button 1 (**T1**) or button 2 (**T2**) , the following display sequence appears:

Selected parameter name → parameter value → breath value display (BVD)

Example:

1) Briefly press **T1**:

2) Briefly press **T2**:

7.1 Selecting parameters:

There are two ways to select parameters:

1) Briefly press either **T1** or **T2** . You can access Pool 1 parameters via T1; you can access Pool 2 parameters via T2 (see pool splitting factory setting).

2) Hold down **T1** (for example by pressing down with your thumb) and **immediately** turn **T2** to the left or right. This provides quick access to all pool parameters.

7.2 Modifying parameter values:

To modify the value of a parameter, select the desired parameter as described above.

The parameter remains active in the background until another parameter is selected.
The value of the parameter can be modified by turning T2 and will appear in the display.
The change in value is indicated by a dot illuminated before the third digit (shown in the parameter and parameter value display).

If you turn T2 slightly to the left or right with active BVD (breath value display), the active parameter will be displayed briefly.

7.2 Modifying parameter values:

Example: At = selected parameter

1. briefly press **T1** (because At in Pool 1) →  →  →  → turn **T2**

example →  (At value with dot)

2. To check: briefly press **T1** again →  →  → 

IMPORTANT:

When you now move to another parameter by briefly pressing T1, a dot before the second digit indicates that changes have been made previously to another parameter.

In the example above, changes in At were made.

Both dots disappear as soon as you reset or save the modified parameters. In order to see which parameter is active or to call up the modified value of the active parameters, briefly press the respective key of the pool in which the parameter is located. The display sequence described above appears.

7.3 Modifying presets:

If you modify the number of the preset, the hb1 does not revert to the breath value display until you confirm the changes (the display blinks) by briefly pressing either T1 or T2. This is particularly helpful for live performances.

7.4 Resetting parameters:

There are two ways to reset the value of a modified parameter.

1. By turning T2 to the original value, identifiable by the disappearance of the dot before the third digit.

2. Select another preset and go back.

7.5 Saving parameters:

Modified parameters can be stored in the current preset by pressing and holding T1 or T2 (at least 2.5 sec). The parameters have been stored when the two dots described above disappear.

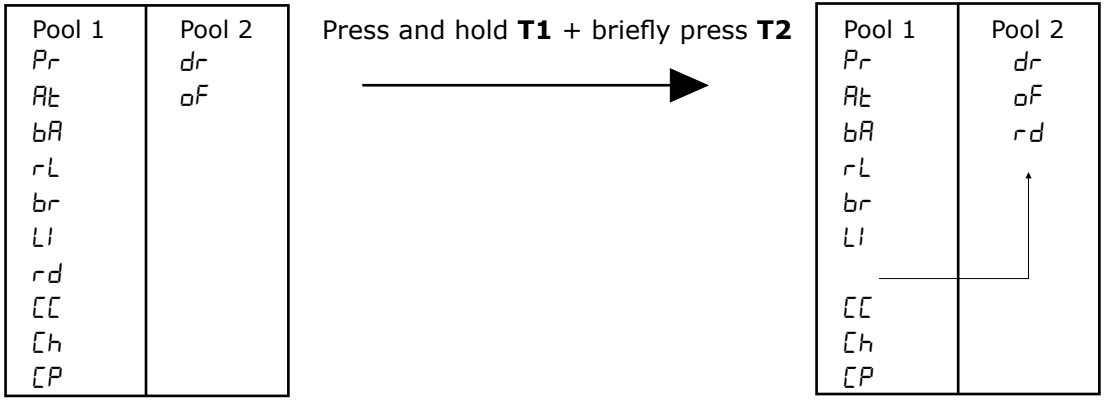
It is also possible to store the modified parameters in another preset. Switch to Pr.

The current preset number will be displayed. Turn **T2** until you reach the desired preset for storing the parameter (display blinks). Press and hold **T2** or **T1** (at least 2.5 sec) until the dot before the last digit disappears.

7.6 Moving parameters:

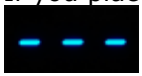
To move a parameter between pools, first choose the respective parameter. Wait until the breath value is displayed. Press and hold the button of the source pool for this parameter and then quickly press the button of the target pool (less than 2.5 sec, otherwise it will be stored).
The selected parameter has now been moved.

Example: rd has been moved.



Note:

1) If you place all parameters in one pool, the following display will appear if the empty pool is selected.:



2) The order of the parameters within a pool cannot be changed.

8. PARAMETERS DESCRIPTION:

 **Presets** (1-25)

There are 25 presets that can be individually set according to your requirements.

 **Drive** (-10 - +10)

Drive controls the sensitivity of the pressure sensor, i.e. you can adjust the hb1 to your breathing pressure. The larger the value, the more sensitively the hb1 will react to your breathing.
If Drive 0 the pressure sensor unit will be switched off. The display shows oFF.

For a negative drive value, the output signal and the values of all parameters are inverted (except Pr, rd, CC and Ch). In principle, exhaling will turn into inhaling; in other words, exhaling decreases the output value while inhaling increases the output.

At the same time, some parameters are mirrored and must be set accordingly.

8. PARAMETERS DESCRIPTION:

Drive (-10 - +10)

oF: Is Offset at 0 it is now at 127. To start from volume „0“, reset oF to 0.

At: Attack is active with an increase in pressure (when you breathe into the device).
In this case, when volume/timbre/etc. decreases.

rL: Release is active with a decrease of pressure (when you stop breathing into the device or you breathe in air). In this case, when volume/timbre/etc. increases.

LI : Was LI at 127 it is now at 0, limited downwards (reduces to 0) and no longer upwards.

As you can see everything is mirrored. Therefore, you can customize the settings according to your personal requirements.

For example, this feature is very useful when „ducking“.

8. PARAMETERS DESCRIPTION:

Offset (0-126)

The base value starting point is set here prior to breathing into the mouthpiece.
However, it is possible to fall below this value by breathing in.

Attack (0-40)

Attack determines the speed at which output data follows the pressure curve when pressure is increased. With breath controllers, it is often very difficult (particularly with brass instruments) to achieve a sensitive, controlled "crescendo". The crescendo rises too quickly.
To achieve smooth transitions, hb1 has been equipped with „dynamic" attack parameter which is dependent on the drive parameter.
The combination of Drive, Attack and Release form the basis for a sensitive musical performance.

Boost Attack (0-5)

The Boost Attack is achieved by blowing especially strongly which cancels the effect of the Attack-Parameter. Consequently, the end value can be reached immediately - even with a high Attack value.

8. PARAMETERS DESCRIPTION:

 **Release (0-40)**

Release regulates the decay time.
Slowly decreasing pressure (decrescendo) along with breathing in seamlessly are particularly challenging technical functions for breath controllers. The Release parameter was developed to address this issue. Thanks to this parameter, it is no longer necessary to blow along with the decaying sound (release sample). Furthermore, you can use release as an effect parameter, e.g. as “auto-fade-out”.

 **Boost Release (0-5)**

The Boost Release is achieved by very strongly inhaling the air so as to cancel the effect of the Release-Parameter. Consequently, the null value can be reached immediately - even with a high Release Value.

 **Limit (1-127)**

Using the Limit function, you are able to set a maximum value (as the name suggests) that will not be exceeded.

8. PARAMETERS DESCRIPTION:

 **Data Reduction (0-20)**

The hb1 works generally at a maximum resolution (1ms).
However, it is sometimes useful to reduce data (e.g. overloaded MIDI bus).
Using the intelligent „ algorithm reduction" of the hb1 you can reach the upper limit without risk of losing important information and occurrence of artefacts.

 **Continuous Controller (0-127)**

All MIDI Continuous Controllers are supported.
In some libraries, several controllers are already in use and therefore not available.
(*see MIDI CC table on page 27 of the Appendix*)

 **MIDI Channel (1-16)**

Use to set the MIDI channel for sending controller data.

 **Combined Preset (1-25)**

With the parameter CP you can activate the „multi mode". You can use up to four hb1 presets simultaneously and with this feature it is possible to control up to four MIDI CCs streams independently, as if you were using four parallel hb1. (see multi mode video on our homepage)
If you combine presets, two points appear on the display. 

9. CARE/MAINTENANCE:

Silicone hose:
The silicone hose should be cleaned regularly. Separate hose from the mouthpiece and pressure sensor. Flush hose first with warm water, then rinse with cold water. Dry the tube by blowing it out with air.

Mouthpiece:
Remove valve. Pull the included cleaning swab through the stainless steel tube. Wipe dry with a clean, dry cloth.

10. TECHNICAL DATA:

Manufacturer: Hornberg Research GbR

Model: hb1

Description: MIDI Breath Station

Electrical supply: U=5.0V, I < 100mA

via USB interface or USB power supply (included)

connection via USB Model B socket

internal resolution: 1ms

Connections: DIN MIDI IN 31250 Bit/s, 5mA

2x DIN MIDI OUT 31250 Bit/s

USB 2.0

11. DECLARATION OF CONFORMITY:

This device is in compliance with directives 2004/108/EG, 2006/95/EG, 2009/125/EG and 2011/65/EU. The CE marking indicates that this product from Hornberg Research GbR conforms with all applicable EU standards and requirements.

CE

FCC:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Disposal instructions:

In conformance with European WEEE guidelines, electric and electronic devices must not be disposed of with general household waste. These devices must be properly separated for recycling or disposal as certain components cause lasting damage to the environment.

12. SAFETY INSTRUCTIONS:

- Observe the safety instructions and operating instructions of the devices you would like to connect to hb1.
- Use the device only with the equipment included (cable, power supply etc.).
- Do not open or modify the device in any way.
- Keep device out of the reach of children and ensure that small parts cannot be swallowed.
- Keep the controller and pressure sensor unit away from water and other liquids.
- Do not put the device next to sources of intense heat such as heaters, furnaces, etc.
- Do not expose the device to strong fluctuations in temperature.
- Avoid severe vibrations and jolts and do not drop the device.
- Do not apply pressure to the display.
- If you have any questions or problems concerning the device, its proper connection, functioning or safety issues, please contact support.

Hornberg Research GbR accepts no liability for any damages and disruptions resulting from human error, failure to comply with these operating instructions, improper connection of components, use of non-original accessories or non-original spare parts other than those from the original manufacturers or use of the device other than for the intended purpose.

Quick Start Guide for non-extendable charging and data cables

ATTENTION! Read the instructions carefully and completely. It is part of the product and contains important notes for use. Keep this document!

1 Safety Instructions:

ATTENTION! Only skilled electricians may assemble and disassemble the housing of the product.

DANGER! Risk of life by electric shock! Avoid contacting mains voltages!

ATTENTION! Risk of burning by overloading! Attend to the maximum output currents of the product!

ATTENTION! Risk of short-circuit! Never bridge contacts! Do not put things into ventilation slots or ports!

ATTENTION! Risk of injury by stumbling! Attend to safe cable installation!

2 Description and Function:

Your data or charging cable is made for operating/charging small devices or to transfer data from/to it. Compare the specifications of your small device with those of your cable for being compatible. Extendable cables are variable in length. Do not bend too much!

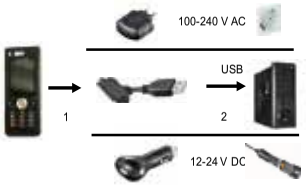
Cables with mains connection: **Only operate with 100-240 V AC mains power.**
Cables with car connection: **Only operate with 12 V DC vehicle inputs.**
(24 V DC truck use, only when marked on the product!)
Cable with USB connection: **Only operate small USB devices with provided USB voltage sources like notebook or PC.**

The input current (INPUT) of your small device may not excess the maximum output (OUTPUT) of the product!

3 Connecting and Operating:

Sample figure:

1. Connect small device to the cable.
2. Connect cable to data or (USB) voltage source.
3. Disconnect all cable connections after use.



4 Warranty and Responsibility:

- As the manufacturer has no influence on installation, warranty only applies to the product itself.
- The manufacturer is not liable for damages to persons or property caused by improper installation, operation or maintenance, not described in this manual.
- Do not alter or modify the product or its accessories.
- Any use other than described in this user`s manual is not permitted and causes loss of warranty, loss of guarantee, and non-liability.
- We reserve our right for misprints and changes of the device, packing, or user`s manual.

5 Disposal Instructions:

According to the European WEEE directive, electrical and electronic equipment must not be disposed with consumers waste. Its components must be recycled or disposed apart from each other. Otherwise contaminative and hazardous substances can pollute our environment.

You as a consumer are committed by law to dispose electrical and electronic devices to the producer, the dealer, or public collecting points at the end of the devices lifetime for free. Particulars are regulated in national right. The symbol on the product, in the user`s manual, or at the packaging alludes to these terms. With this kind of waste separation, application, and waste disposal of used devices you achieve an important share to environmental protection.

WEEE Directive: 2002/96/EC WEEE N°: 82898622

6 CE Declaration:

This device corresponds to EU directive 2004/108/EC and depending on construction also to 2006/95/EC and/or 2006/28/EC: With the CE sign the Goobay®, a registered trademark of the Wentronic GmbH ensures, that the product is conformed to the basic standards and directives. These standards can be requested online on www.wentronic.com. All trademarks and registered brands are the property of their respective owners.

7 Specifications:

Cable length	Marked on the product
Input voltage (products with USB connection)	5 V DC
Input voltage (products with car connection)	12 V DC (24 V DC, when marked on the product)
Input voltage (products with mains connection)	100-240 V AC
Output voltage	5 V DC
Output current (Always check with small device!)	Marked on the product

Revision Date: 2011-03-25
Version 2

Goobay®
Wentronic GmbH
Pillmannstrasse 12
D-38112 Braunschweig / Germany

Allergy information:

This device is developed exclusively using allergologically-safe materials. However, from a medical standpoint, allergic reactions cannot be 100% excluded. Discontinue use of the device in the event of any allergic reaction.

13. WARRANTY:

Each individual hb1 undergoes comprehensive quality control and testing. The use of high-grade components and materials permits us to offer a six months limited warranty.
Your receipt serves as proof of warranty. In the event of any product defect, please contact support.
The warranty does not cover damage caused by improper handling. Replacement or repair in such cases can only be carried out at the owner's expense. The warranty expires if the device has been tampered with by a third-party.
Only use accessories specified by the manufacturer.
Wearing parts including the wooden part of the mouthpiece and the silicone hose are not covered under the warranty. Claims for damages of any kind, especially consequential loss or damage are excluded from the warranty. Liability is limited to the value of the hb1.This warranty does not authorize the right to claim damages, including damages from lost profit or because of other financial losses. The general terms and conditions of the Hornberg Research GbR are applicable.

All entries in this user's guide have been thoroughly reviewed; however, HORNBERG RESEARCH GbR does not assume any liability for incomplete or incorrect information contained herein.

We reserve the right to make technical and formal changes to our products in the interest of technical advancement.

14. APPENDIX:

MIDI CC number	MIDI CC function	MIDI CC number	MIDI CC function
MIDI CC 0	Bank Select	MIDI CC 76	Sound Controller 7
MIDI CC 1	Modulation	MIDI CC 77	Sound Controller 8
MIDI CC 2	Breath Controller	MIDI CC 78	Sound Controller 9
MIDI CC 3	Undefined	MIDI CC 79	Sound Controller 10
MIDI CC 4	Foot Controller	MIDI CC 80	General Purpose MIDI CC Controller
MIDI CC 5	Portamento Time	MIDI CC 81	General Purpose MIDI CC Controller
MIDI CC 6	Data Entry Most Significant Bit (MSG)	MIDI CC 82	General Purpose MIDI CC Controller
MIDI CC 7	Volume	MIDI CC 83	General Purpose MIDI CC Controller
MIDI CC 8	Balance	MIDI CC 84	Portamento CC Controller
MIDI CC 9	Undefined	MIDI CC 85-90	Undefined
MIDI CC 10	Pan	MIDI CC 91	Effect 1 Depth
MIDI CC 11	Expression	MIDI CC 92	Effect 2 Depth
MIDI CC 12	Effect Controller 1	MIDI CC 93	Effect 3 Depth
MIDI CC 13	Effect Controller 2	MIDI CC 94	Effect 4 Depth
MIDI CC 14	Undefined	MIDI CC 95	Effect 5 Depth
MIDI CC 15	Undefined	MIDI CC 96	(+1) Data Increment
MIDI CC 16-19	General Purpose	MIDI CC 97	(-1) Data Decrement
MIDI CC 20-31	Undefined	MIDI CC 98	Non-Registered Parameter Number LSB (NRPN)
MIDI CC 32-63	Controller 0-31 Least Significant Bit (LSG)	MIDI CC 99	Non-Registered Parameter Number MSB (NRPN)
MIDI CC 64	Damper Pedal/Sustain Pedal	MIDI CC 100	Registered Parameter Number LSB (RPN)
MIDI CC 65	Portamento On/Off Switch	MIDI CC 101	Registered Parameter Number MSB (RPN)
MIDI CC 66	Sostenuto On/Off Switch	MIDI CC 102-119	Undefined
MIDI CC 67	Soft Pedal On/Off Switch	**MIDI CC 120 to 127 are "Channel Mode Messages"**	
MIDI CC 68	Legato Foot Switch	MIDI CC 120	All Sound Off
MIDI CC 69	Hold 2	MIDI CC 121	Reset All Controllers
MIDI CC 70	Sound Controller 1	MIDI CC 122	Local On/Off Switch
MIDI CC 71	Sound Controller 2	MIDI CC 123	All Notes Off
MIDI CC 72	Sound Controller 3	MIDI CC 124	Omni Mode Off
MIDI CC 73	Sound Controller 4	MIDI CC 125	Omni Mode On
MIDI CC 74	Sound Controller 5	MIDI CC 126	Mono Mode
MIDI CC 75	Sound Controller 6	MIDI CC 127	Poly Mode

15. ADDITIONAL INFORMATION:

For news and further information on our products, spare parts and company, see: www.hornberg-research.de

Production and marketing:

Hornberg Research GbR
Authorised representative partners: Martin Raschke, Mick Baumeister
Barbarossastrasse 32
73529 Schwäbisch Gmünd
Germany

Support:

e-Mail: support@hornberg-research.de