Stacker II

Instrument Manual

Revision C

This manual was designed to guide Stacker II users through the basic hardware features of the automatic plate handling instrument Stacker II.

Headquarters
Germany
BMG LABTECH GmbH
Hanns-Martin-Schleyer Str. 10
77656 Offenburg
Phone: +49 781 96968-0
Fax: +49 781 96968-67
germany@bmglabtech.com

Subsidiaries

Australia
BMG LABTECH Pty. Ltd.
P.O. Box 469
Mount Eliza, Victoria 3930
Phone: +61 3 5973 4744
Fax: +61 3 5973 4711
australia@bmglabtech.com

China
BMG LABTECH Co. Ltd.
RM2-201, Hua Fu Jing Yuan
NO11. An Ding Men Wai Avenue
Dongcheng District
Beijing, P.R.China 100011
Phone: +86 10 64240632
Fax: +86 10 64258679
china@bmglabtech.com

France
BMG LABTECH S.A.R.L.
7, Rue Roland Martin
94500 Champigny s/ Marne
Phone: +33 1 48 86 20 20
Fax: +33 1 48 86 47 07
france@bmglabtech.com

Japan
BMG LABTECH Ltd.
2F TS-1 Building, 1-6-2, Shimo-cho
Omiya-ku, 330-0844
Saitama City, Japan
Phone: +81 48 647 7217
Fax: +81 48 647 7218
japan@bmglabtech.com

United Kingdom
BMG LABTECH Ltd.
PO Box 73
Aylesbury, HP 20 2 QJ
United Kingdom
Phone: +44 1296 33 66 50
Fax: +44 1296 33 66 51
uksales@bmglabtech.com

USA
BMG LABTECH Inc.
2415 Presidential Dr.,
Bldg. 204, Suite 118
Durham, NC 27703
Phone: +1 919 806 1735
Fax: +1 919 806 8526
usa@bmglabtech.com

Stacker II

The Stacker II is designed for use with BMG LABTECH microplate readers. In order to minimize manual microplate handling, you can load up to 50 microplates in a single batch. With the continuous load feature, you can add even more microplates during an active run.

Figure 1: Stacker II

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1 Technical specifications

Operating modes	Batch Mode
	Single Plate Mode
	Plate Movement
Plate capacity	50 microplates per magazine
Computer interface	RS232, 9600 baud, binary communication protocol
Power requirements	Autoranging power supply
	85 to 240V AC, 50 to 60 Hz, 100 VA
	Fuses: T1.25A/250V for main power 85 to 240V AC (use original type Wickmann only)
Dimensions	Width 45 cm, depth 68 cm, height 19 cm height with magazines 86 cm
Weight	15 kg
Ambient conditions	Operating Temperature: 10°C ... 40°C
	Storage Temperature: -10°C ... 50°C
	Humidity of atmosphere: 20% ... 80%
Instrument conforms to	Protection class I
	Overvoltage category II
	Contamination class II
Barcode Reader (optional)	Complies with: Code 128, Code 39, Codabar, Code 11, UPC/EAN and 2/5 Interleaved
	The Barcode reader uses a Class 2 laser that complies with US 21CFR1040.10, and IEC825-1: 1993, EN60825-1:1994+A11:1996.
	Wavelength 630-680 nm; max. output 1.0 mW.
	Class 2 lasers use a low power, visible light diode. Do not stare into the light beam. Momentary exposure to a Class 2 laser is not known to be harmful.

Specifications are subject to change without notice.

2 Installation

The shipping box for the Stacker II contains the instrument and several accessory components. When unpacking the instrument, please check to ensure that all the standard components, as well as any optional parts that you requested, are accounted for.

The shipping box contains:

- Stacker II instrument
- 2 Magazines
- Power cord
- RS232 cable
- PC software on CD
- Software and Operating manual
- Service parts (e.g. spare fuses and offset pin)

Call BMG LABTECH immediately if any of these items are missing.

The area designated for the instrument should be free of dust, liquids and acidic vapours. The table's surface should be flat and even. Avoid areas subject to vibrations and direct sunlight.

The operator of the Stacker II is assumed to be trained in the correct operation of the instrument and the safety issues. Throughout this manual the word "you" refers to this trained operator.

Upon unpacking and positioning the Stacker II, make sure to unlock the transport lock (section 2.1 Transport Lock) before any power connection (section 2.3 Power and Communication Connections).

The Stacker II should be unpacked and allowed to warm to room temperature before using in order to avoid condensation.

2.1 Transport lock

To prevent damage during transport the Stacker II is equipped with a transport lock, which has to be unlocked before using the Stacker II.

Unlock the Stacker II

Once the instrument is in its permanent location, the transport lock must be removed to free the Stacker II's transport system. The transport lock is located on the front side of Stack 2 (see figure 2). Loosen and remove the screw.

Lock the Stacker II

When the Stacker II is shipped or moved to a different location, the transport lock should be fixed in order to prevent damage. To fix the Stacker II's transport system, move it to the far right side, and install and tighten the screw (see figure 2).

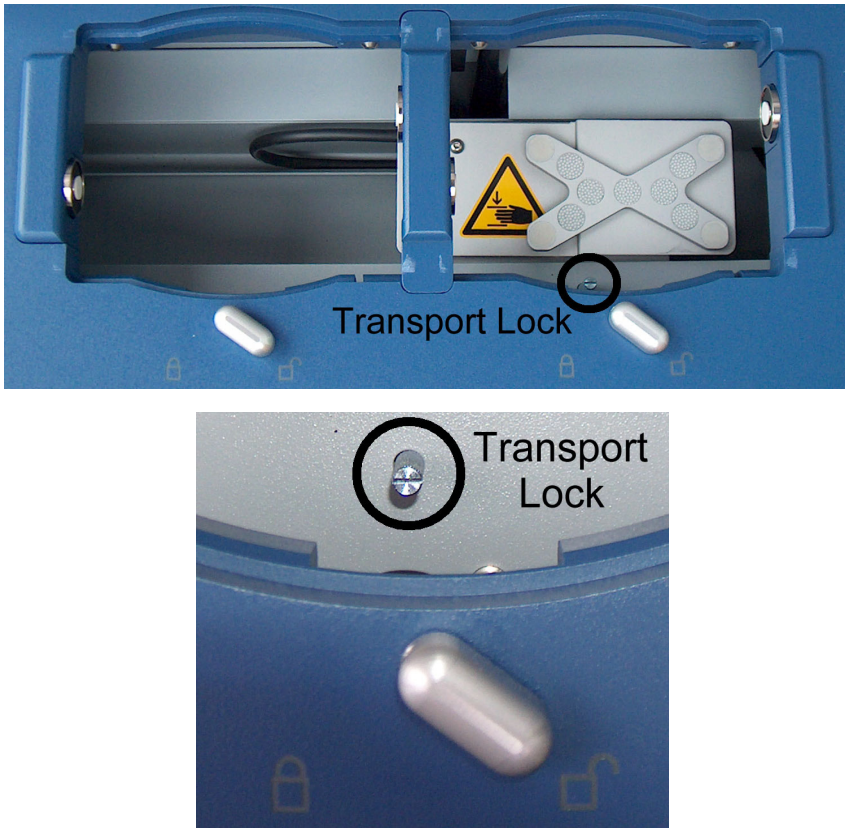

Figure 2: Top view of Stacker with installed transport lock

Never put fingers into magazine opening when Stacker II is active.

In case of a lost microplate: first recover it after turning off Stacker II.

2.2 Positioning the reader on top of the Stacker II

After unlocking the transport lock (see section 2.1 above) the BMG LABTECH reader can be placed on top of the Stacker II. The reader is in the correct position when the 4 feet of the instrument fit securely into the 4 holders of the Stacker II. If the reader is equipped with pegs (see figure 3 left) please remove these so that the reader is in the lowest possible position.

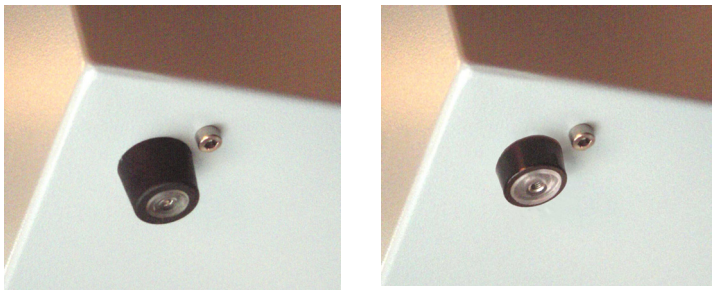

Figure 3: Bottom of PHERAstar (left with peg, right without peg).

Additionally, if the transport lock of the reader is in the locked position, it has to be unlocked (see reader operating manual for the procedure how to do this).

2.3 Power and communication connections

After positioning of the reader on top of the Stacker II (see section 2.2 above) the power cable can be connected. Be sure that the instrument is connected to the protective earthed conductor of the local main power.

- **Communication connections**

Only connect computers corresponding EN 60950 and UL 1950 for data processing instruments.

If the reader does not have a Stacker II port then connect the RS 232 cable from the Stacker II to a RS232 COM port on the PC. We recommend COM port 1 should be used for the Stacker II. The RS232 cable is a 9-pin null-modem type cable with 2 female connectors.

If the BMG reader has a Stacker II port (marked "Connection to Stacker", see figure 4) then connect the RS232 cable from the Stacker II to the reader. This RS232 cable is a 9-pin null-modem type cable with male and female connectors.

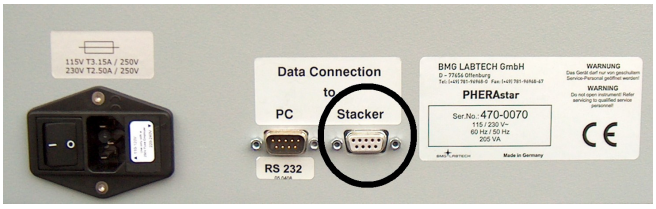

Figure 4: Stacker port on BMG Labtech reader.

2.3.1 Connection check

In the Stacker II setup menu, you can perform a connection check (instructions for installing the software can be found in the reader software manual). Go to ‘Setup | System Configuration | Communication’ and press the ‘Initialize System’ button. If there is connection, a "Connection OK" message will appear. If there is no connection an error box will appear after a few seconds, then try another COM port (make sure that the power for the instrument is switched on).

If the Stacker II is connected with the RS232 cable directly to the reader then contact BMG LABTECH for procedures.

2.4 Aligning the Stacker II / reader system

If the Stacker II is bought together with a reader, the Stacker II - reader constellation have been aligned at the factory.

If the Stacker II is connected with the RS232 cable directly to the PC, then the alignement settings needs to be typed in. The procedure for aligning the Stacker II and the reader are described here below.

If the Stacker II is connected with the RS232 cable directly to the reader, then the values for the alignement are predefined in the reader EEPROM. The settings should be checked as described here below.

If the Stacker II is an upgrade to an existing stand-alone reader then the constellation needs to be aligned as described here below.

The ‘Plateout’ positions of the reader plate carrier must be adjusted to the Stacker II.

Before starting the Stacker Control software, turn the magazine-holders to the locked position.

Figure 5: Magazine-holder in locked position.

Upon starting the Stacker Control software, the program will initialize the Stacker II and start the reader control software.

If the software is started with the magazine-holders in the open position, the Stacker II will not be automatically initialized and this must then be done manually (see the software manual).

For exact operation, it is necessary to calibrate the "X" and "Y" positions of the reader plate carrier with the Stacker II. The Plateout Positions window (figure 6 and figure 7) is protected with a password. The password is ‘bmg’.

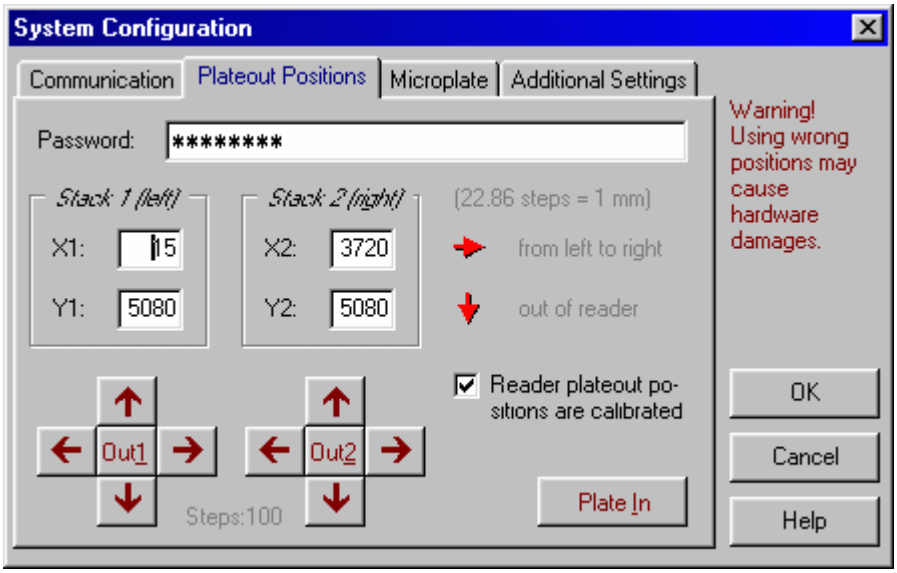

Figure 6: Configuration window (Stacker II - PC connected version).
Command: ‘Setup | System Configuration | Plateout Positions’

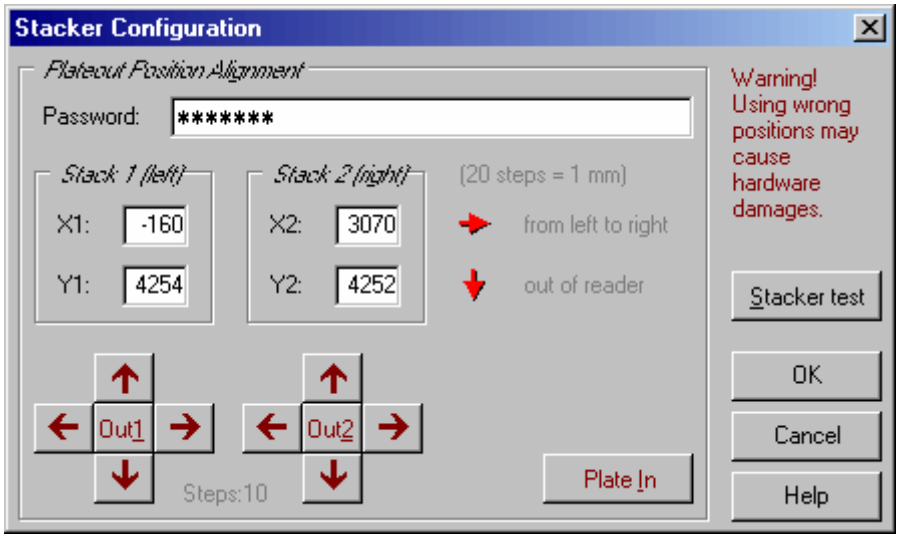

Figure 7: Configuration window (Stacker II - Reader connected version).
Command: ‘Setup | Stacker Configuration’

Use the ‘Out1’ button to move the reader plate carrier to the position under stack one. Insert the offset pin into the hole at the bottom right corner of stack 1 (see figure 8).

Figure 8: Top view of Stacker II (circles at calibration pin positions)

If the pin does not fit into the hole of the plate carrier, the Plateout Positions X1 and Y1 have to be changed. Use the arrow buttons to change the position step by step (figure 6 and 7). By pressing an arrow button, the corresponding value will increase or decrease by one step (0.05 mm) and the plate carrier will move this distance. If you hold the [Ctrl] key down while using an arrow button, the value will change by 10 steps (0.5 mm) and using [Shift] will move the plate carrier 20 steps (1 mm). Change the position until the pin fits into the hole of the plate carrier.

If it is not possible to move the plate carrier to a position where the pin will smoothly fall into the hole, please see "additional possibilities for adjustment" below.

After successful adjustment, remove the pin and repeat this procedure for stack 2.

Remember always to remove the offset pin after it has fallen into the hole.

After calibrating these positions, you need to click the checkbox ‘Reader plateout positions are calibrated’ to enable the ‘PlateIn’ and ‘PlateOut’ functions of the program.

2.4.1 Additional adjustment possibilities

If the plate carrier adjustment is not possible to carry out it is likely because the possible positions of the reader's plate carrier does not comply with that of the Stacker II. If this is the case, the position of the holders in the Stacker II needs to be adjusted (see figure 9).

For PHERAstar plate reader this is the case when X1 is lower than "-190" (steps) or when X2 is higher than "3070" (steps).

For all other BMG LABTECH readers, the adjustment is needed if X1 is below "0" (steps) or X2 higher than "3750" (steps)

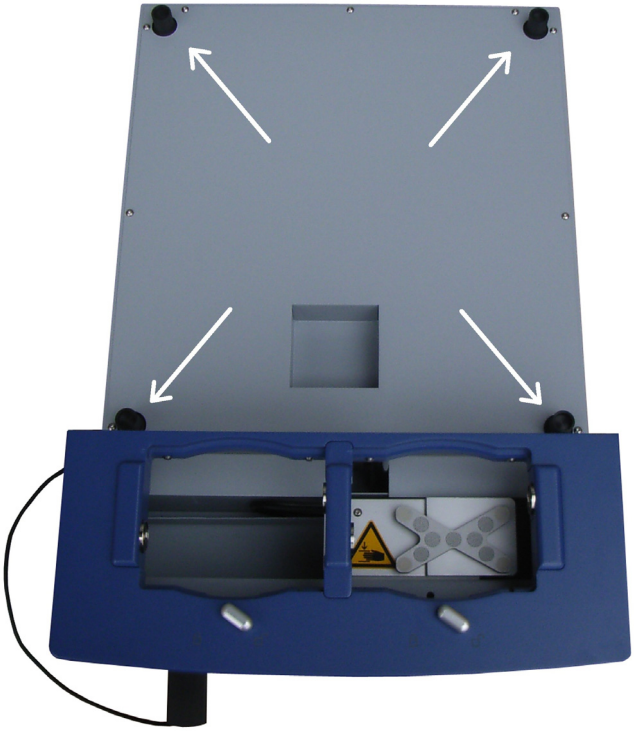

Figure 9: Stacker II with holders

To access and adjust the holders, the reader and Stacker II magazines first need to be removed. Hereafter, turn the Stacker II in a vertical position to access the screws (which fix the holders) underneath the Stacker II (see figure 11).

Now adjust the four holders one-by-one by loosen the screw and adjust all four to the left (bottom view) if X1 is problematic, as can be seen in figure 11, or adjust all four holders to the right (bottom view), as can be seen in figure 12, if X2 is problematic.

Figure 10: Bottom view of feet and screw that fixes the holder with the adjustment

Figure 11: Stacker II bottom view. If "X1" is out of range: Move all holders clockwise (left) so the pin will fit into the left hole.

Figure 12: Stacker II bottom view. If "X2" is out of range: Move all holders counter-clockwise (right) so the pin will fit into the right hole.

Hereafter the screws can be tightened, the Stacker II can return to a horizontal position with a reader on top and the procedures for aligning the Stacker II with the reader can be carried out as described above.

3 Stacker II status display

For a Stacker II to PC RS232 connected solution: The magazine-holder must be in the "locked" position in order for the Stacker II to operate.

This is valid with or without magazines. Without magazines the reader will function as an ordinary reader and a plate can be positioned on the plate carrier through the Stackers II left opening.

The LED light on the front of the Stacker II will blink 2,5 times per second (typically noticed as a "calm" blinking) to indicate that magazines are unlocked. The LED light will light continuously when the Stacker II is ready for operation.

If something is wrong the LED will blink 5 times per second, e.g. if something blocks the operation of the Stacker II.

4 Disinfection

Please follow all instructions carefully for a successful disinfection of the Stacker II.

All parts of the instrument, which have the possibility of contacting patient sera or positive samples, have to be handled as if they are hazardous. For this reason, it is recommended that gloves be worn while maintaining or working with the instrument.

It is very important that the instrument is thoroughly disinfected before maintenance or before removing the instrument from the laboratory. Be sure that the instrument is disinfected before you send it to your distributor or to the producer. For safety reasons, you have to fill out the Disinfection Certificate, or the instrument may not be accepted by the service center or by customs authorities.

If the laboratory has no experience disinfecting the instrument, use the following solutions:

- Formaldehyde solution: 10%
- Alcohol: 70%

(Please ensure that the national regulations for the handling of formaldehyde are observed).

The procedure for disinfection has to be performed only by authorized personnel wearing disposable gloves and protective clothing. The location should be well ventilated.

Disinfection steps

1. Disconnect the instrument from the main power supply.
2. Remove the RS232 cable.
3. Clean all outside surfaces of the instrument carefully with cotton wool, which has been soaked in formaldehyde solution.
4. Place the instrument in a large plastic bag along with the cotton wool that has been soaked in formaldehyde. Ensure that the wool does not touch the instrument.
5. Close and seal the bag.
6. Keep the instrument in the plastic bag for at least 24 hours.
7. After the disinfection time has lapsed, remove the instrument from the plastic bag and clean all outside surfaces of the instrument with cotton wool that has been soaked in alcohol solution.
8. Repeat the procedure for disinfection on any accessories, which will be returned with the instrument.
9. Complete the Certificate for Disinfection.

Disinfection Certification

This instrument and its inventory have never been in contact with any dangerous biological material, or if so, the instrument and its inventory have been disinfected according to the instructions of the operating manual of instrument.

Name: _____

Firm: _____

_____

_____

_____

Date, Signature: _____