Serial Number: _____

MALDI Biotyper® Troubleshooting and Maintenance Guide

Version 1.0

Innovation with Integrity

MALDI-TOF

Content

This guide offers troubleshooting and maintenance information for RUO, GP and IVD-CE MALDI Biotyper systems, and requires accessing the MALDI Biotyper software in RUO mode. This document offers supplemental information and does not overrule any official document.

1. Hardware related issues

1. MALDI Biotyper not operational

Issue: MALDI Biotyper (MBT) is not responding, it's not possible to put in a target

- For microflex LT/SH and smart
  - Check whether the error LED on the front panel is lit
- For MBT sirius one/sirius
  - Check whether the LED strip is red
- When no LEDs are on
  - Check whether power supply is switched on at the back side (check whether the LED of the yellow power switch is lit)
- When the LED indicates an error
  - Check flexControl for an error message
  - Close all Bruker software and reboot the MBT as described in Section 4
  - If the issue persists, contact Bruker Support (see Section 6)

Figure 1.1 Power switch on the microflex LT/SH and smart

Figure 1.2 Power switch on MBT sirius one/sirius

2. Vacuum

Issue: Device takes longer than usual to be ready for a measurement

- Open flexControl
- Go to the Status tab
- Click on Details
- Go to the Vacuum tab
- Under Gauges > Source high
  - Red light indicates a failure of the vacuum

If this is the case:

- Eject the target to the OUT position
- Check vacuum O-ring of the loading port for hair, dust or other particles
- Wipe the O-ring clean with your fingertip, the sealing ring must be completely clean
  - **Do not use ethanol or any other disinfectant!** This could damage the O-ring
- Load the target again
- If the issue persists, contact Bruker Support (see Section 6)

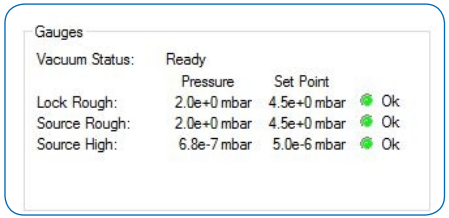

Figure 1.3 Vacuum status


Figure 1.4 Example of clean O-ring

2. Software related issues

1. Software freezes

Issue: Software is unresponsive or reacting slowly

- Try to close the software by pointing on the “cross” in the top right corner, or by right clicking on the software symbol in the taskbar and clicking on “close window”
- Restart the software
- If the issue persists, close the software again
  - Restart the computer
  - Open flexControl and wait a few seconds
  - Check if flexControl has a connection with the instrument
  - Open the MBT software and check whether the software works fine
- If the issue persists, contact Bruker Support (see Section 6)

2. MBT Local Host Error

- If the connection with the Bruker Server can’t be established, restart the computer
- If the issue persists, contact your local IT department to check if changes were made to port clearances on the local network’s firewall
- If the issue persists after restarting the software, contact Bruker Support (see Section 6)

3. Issues during an identification run

1. BTS QC fails in MBT Compass (IVD) after starting acquisition

- Make sure the BTS QC position was selected at the spot onto which you deposited the BTS
  - Repeat the measurement by reloading the project and restarting the identification run
- If the QC fails again:
  - Prepare a new BTS QC spot and start the run with the new BTS QC spot
- If QC fails again:
  - When using a reusable target:
    - Make sure the target cleaning was performed correctly (See MALDI Biotyper User Manual for more information)
    - Make sure there are no scratches or any other damage on the surface of the target plate
  - When using disposable targets:
    - Is the MBT Biotarget completely inserted in the target holder?
  - Check the consumables:
    - Did you use the recommended reagents?
    - Did you use the correct volume of standard solvent when preparing BTS?
    - Was the BTS solution properly mixed and incubated?
    - Did standard solvent possibly evaporate from the BTS solution?
    - Was the BTS stored properly after sample preparation? (5µL aliquots in screw cap tubes and stored at ≤18°C)
    - Were the standard solvent, BTS or Matrix possibly expired?
    - Did you use proper bottles/tubes, knowing that bottles/tubes containing plasticizers should not be used for storing the aliquots?

- In case no mistakes in preparation were identified and the Instructions for Use were correctly followed, run the automatic calibration procedure on a BTS spot using flexControl software
  - See Section 4.3
- If issues persist, contact Bruker Support (see Section 6)

2. BTS: QC passes, no identification on BTS

The BTS QC consists of three steps. The first step is an automatic calibration. When this is completed successfully, the BTS QC will proceed with a validation step. During this second step, the BTS QC is automatically measured multiple times before the run proceeds. The following parameters are checked:

- Correct mass (m/z value), width and height of the calibration peaks
- Spectrum baseline

These parameters are combined to provide an overall quality value from which the final BTS QC validation outcome is determined. If this step fails, the run is stopped and the message "QC on position <X> failed" will be displayed. If the validation step is successful, the third and last step is performed: an identification (ID) run for which the log(score) value should be 2.0 or higher. It may happen that the BTS QC spot does not achieve this log(score). However, if the second step (validation) passes, the instrument is anyway working fine and can be used for the identification of the samples.
If this observation occurs more often, see section 3.1.

3. QC passes, sample identification gives issues

- Check sample preparation:
  - Did you use too much sample with the (extended) Direct Transfer procedure?
  - Did you use too little sample with the (extended) Direct Transfer procedure?
    - If both the extended and Direct Transfer procedures result in low log(scores), it is recommended to use the Extraction procedure (See the MBT Compass (IVD) manual or SOPs for more information)
  - Check the sample in flexControl:
    - Select the sample spot
    - Check whether the crystallization is homogeneous (see Figure 3.1)
    - Check if good quality signals from the sample can be obtained by manually acquiring spectra (select sample spot and press on "Start", see Figure 3.1 and 3.2)
    - If you can get good quality signals, rerun the sample
    - If no signals are obtained, prepare a new sample
  - Check the target when using a reusable target:
    - Make sure the target cleaning was performed correctly
    - Make sure there are no scratches or any other damage on the target
    - Use a new steel target if needed
  - If issues remain, contact Bruker Support (see Section 6)

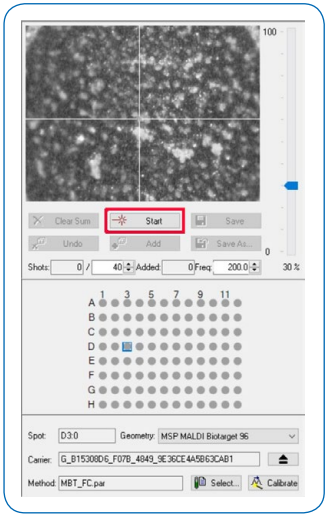

Figure 3.1 Manually acquiring spectra

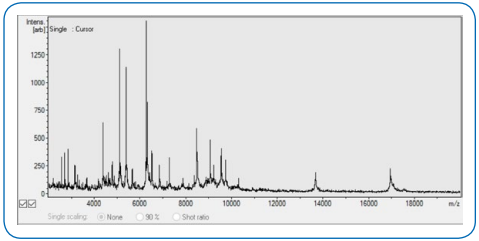

Figure 3.2 Example of a good spectrum

4. Maintenance

1. Source cleaning

Recommended to do at the start of each week

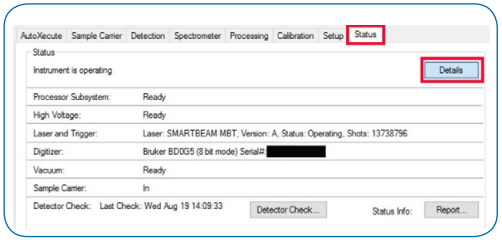

Figure 4.1 Status window in flexControl

- Open flexControl
- Go to the "Status" tab and click on "Details" (see Figure 4.1)
- The spectra window is now replaced by the „Details window", with several tabs (see Figure 4.2)
- In the upper window, select the "Processor Subsystem" tab and click "Start Cleaning" to start the source cleaning procedure (see Figure 4.2)
- A new window will pop up with source cleaning information (see Figure 4.3)
- **Important:** the target table is automatically driven in the "out"-position (releases the IR laser – do not open the lid!)
- The „Maintenance Interval" is set back to 0% automatically after the process is completed (see figure 4.4)
- After source cleaning, perform a calibration with fresh BTS (see Section 4.3)

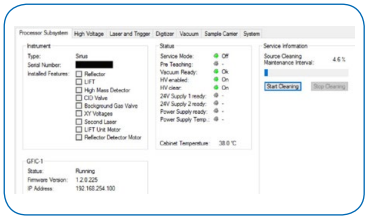

Figure 4.2 Processor Subsystem Tab

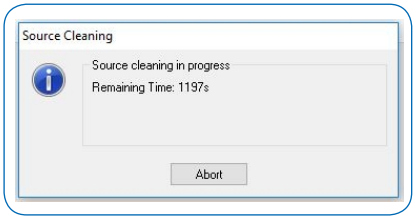

Figure 4.3 Source cleaning status window

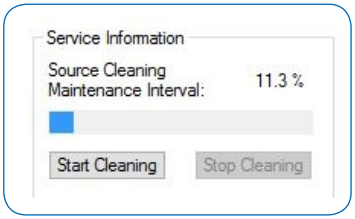

Figure 4.4 Resetting of Maintenance Interval

2. Detector Check

Recommended to do every 2-3 months

- Prepare a single spot with freshly prepared HCCA matrix only
- Prepare a single spot with fresh BTS and HCCA matrix
- Load the target
- Open flexControl
- Select the spot with HCCA matrix in the left window by clicking on the spot (see Figure 4.5)
- Go to the "Status" tab (see Figure 4.6)
- Click on "Detector Check" (see Figure 4.6)
- The Detector Check window will open (see Figure 4.7)
- In the new window, click on „Start Check" (see Figure 4.7)
- A new window will open with a check list (see Figure 4.8)
- Confirm the questions by checking the boxes
  After ticking the last box, the Detector Check starts automatically
- The procedure will take ~5 minutes
- After the procedure, results are shown in the "Detector Check" window (see Figure 4.9)
- The detector voltage should be set to the "Recommended Voltage" value (see Figure 4.9)

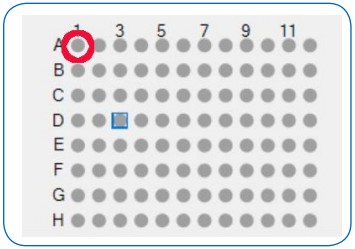

Figure 4.5 Selecting the spot with HCCA (e.g. spot A1)

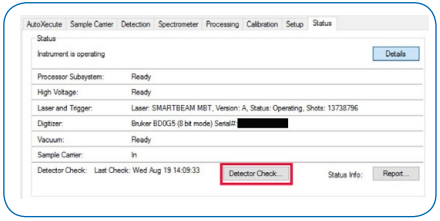

Figure 4.6 Clicking on the Detector Check in the Status Tab

- If the voltage is more than 50 V, the recommended voltage should be adapted under „Detection“ – „Detector Gain“ by changing the slider (see Figure 4.10)
  - After changing the detector voltage, save the method under „File“ – „Save Method“ (see Figure 4.11)
  - Perform a calibration on the spot with fresh BTS (see Section 4.3)

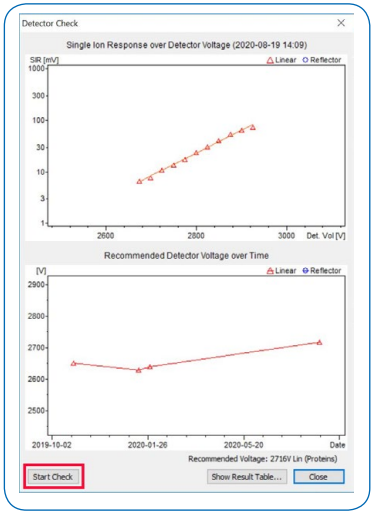

Figure 4.7 Detector Check

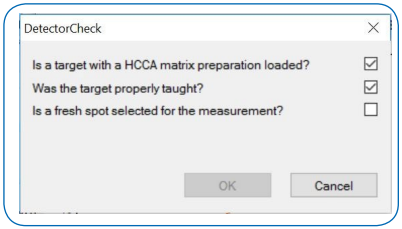

Figure 4.8 Detector Check

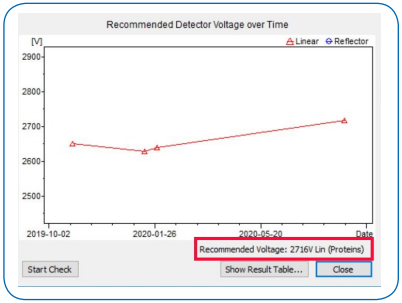

Figure 4.9 Result of the Detector Check

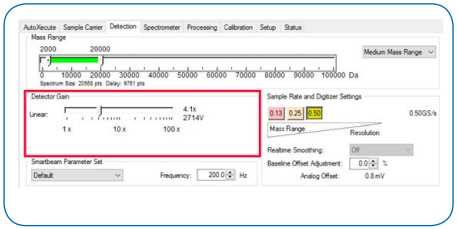

Figure 4.10 The Detector Gain Slider under the Detection Tab

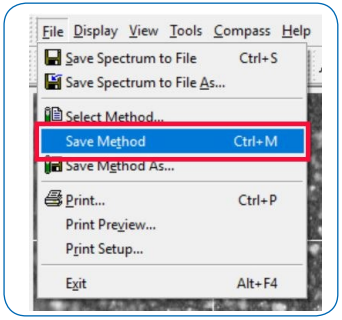

Figure 4.11. Saving the method

3. Calibration in flexControl
Recommended after a Source Cleaning and Detector Check

- Prepare a target with freshly prepared BTS or from a frozen aliquot
- Load the target
- Open flexControl
- Select the spot with BTS (see Figure 4.12)
- Click on “Calibrate” (see Figure 4.12)
- After calibration a new window will open with the calibration result (see Figure 4.13)
- If the calibration fails, try again on the same spot
  - If the calibration fails again, try with a new freshly prepared BTS
  - If the calibration fails again, contact Bruker support, see Section 6

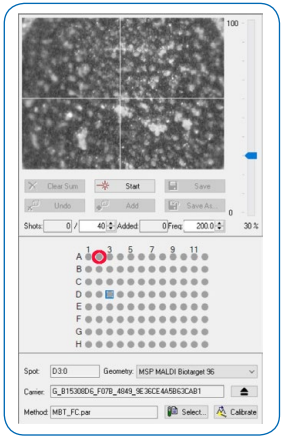

Figure 4.12 Selecting the BTS spot (e.g. A2) and the Calibrate button

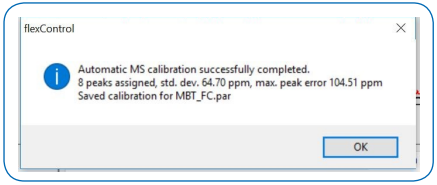

Figure 4.13 Calibration result window

4. Rebooting/shutting down of the MALDI Biotyper

A reboot of the instrument can be necessary to re-establish the PC connection or to fix software freezes. A shutdown can also be necessary to prepare for a scheduled power outage at the facility.

i. Rebooting/shutting down microflex LT/SH and smart

- Close all Bruker software and shut down the PC
- Turn the key on the front of the instrument in the "Off" position, wait 5-10 seconds
- Toggle the orange switch on the back of the device to the "off" position (O) (see Figure 4.14)
- Wait 30-60 seconds, all the lights on the front panel should have turned off and the instrument is silent
- Toggle the orange switch on the back of the device to the "on" position (I)
- Turn the key on the front of the instrument in the "On" position and make sure that the green "MAINS" LED on the front panel is lit
- Depending on how long the instrument has been shut down, it may take some time before vacuum will be restored. In case of a reboot, this should not take long.
- Wait until the lights on the front panel stop flashing
- Switch on the computer and open the Bruker software

Figure 4.14 Power switch on the microflex LT/SH and smart

ii. Rebooting MALDI Biotyper sirius one/sirius

- Close all Bruker software
- Shut down the computer
- Toggle the power switch at the back to the “off” position (O) (see Figure 4.15)
- Wait for 30-60 seconds
- Toggle the power switch at the back to the “on” position (I)
- Depending on how long the instrument has been shut down, it may take some time before the vacuum will be restored
- Wait for the LED to stop flashing
- Switch on the computer and open the Bruker software

Figure 4.15 Power switch on the MBT sirius one/sirius

5. Checkup

It is good practice to perform a checkup at the start of a new week. This includes small checks, source cleaning, detector check (every 2-3 months) and calibration of the instrument.

- Open flexControl
- Check the vacuum status
  - See Section 1.2
- Perform the source cleaning
  - See Section 4.1
- During the source cleaning:
  - Prepare a fresh BTS and HCCA matrix following Bruker IFUs
  - Prepare a target with the fresh BTS
  - When a detector check is required, also prepare a spot with HCCA matrix only
- Load the target
- When a detector check needs to be performed
  - See Section 4.2
- Select the spot with fresh BTS
  - Check if the BTS is properly prepared
  - Check if good signals can be obtained by aiming laser shots at different places
- Calibrate the instrument
  - See Section 4.3
- The instrument is now ready to be used
- In order to install Windows updates, it is recommended to perform a reboot of the MALDI Biotyper acquisition PC once a week

6. Hotline/Support

In case of remaining/recurring problems, errors or questions, please contact us:

- For technical support about hardware and software, call or mail our support team:
  Support hotline: +49 (0) 421-2205-1401
  Support email: biotyper.support@bruker.com

  SW Support hotline: +49 (0) 421-2205-2341
  SW Support email: biotyper.sw.support@bruker.com

- For application support via email:
  EMEA: Biotyper.appl.support.EMEA@bruker.com

When contacting us by phone, please have the serial number of the instrument at hand.
When sending an email please include the following:

- Instrument serial number (see below)
- Zip file with the instrument status report (see below)
- Description of the issue and/or malfunction

Serial number: to be found in flexControl

- In the “Status” tab, click on “Details”
- In the new window under “Processor Subsystem” the serial number can be found (see Figure 6.1)

Status reports: to be generated in flexControl:

- Go to the “Status” tab and click on “Report” (see Figure 6.2)
- This will open the “Status Report” wizard (see Figure 6.3)
- Select a folder for the status report to be saved and click on “Next”
- In the next step, select all the data to be included in the zip file. Click on “Next” (see Figure 6.4)
- The final screen of the “Status Report” wizard will open, with the location of the status report and the name of the zip file (see Figure 6.5)
- Please send the zip file to Bruker Support

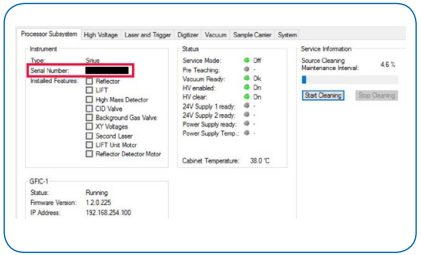

Figure 6.1 Location of the instrument serial number

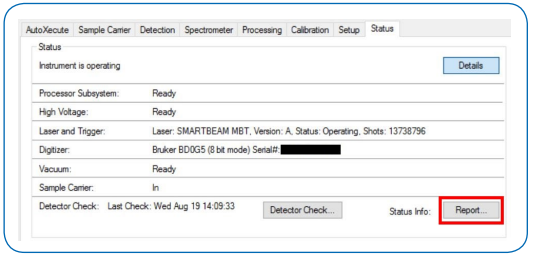

Figure 6.2 The Status Tab

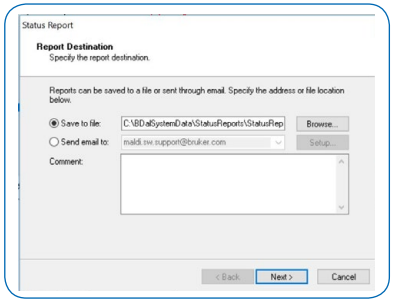

Figure 6.3 Status Report Wizard, selecting a folder

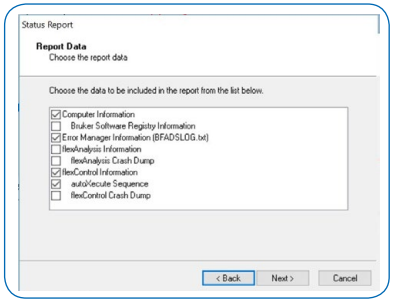

Figure 6.4 Status Report wizard, choosing data to be included in the status report

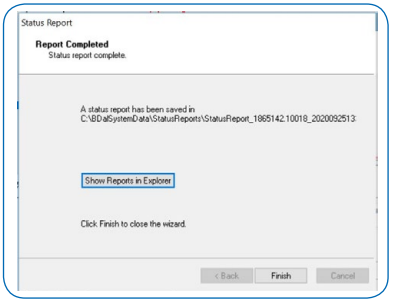

Figure 6.5 Status Report wizard, showing the location and name of the zip file with the status report

Remote support

- In case the Bruker Technical Support needs direct access to the instrument, set up Teamviewer or WebEx (https://bruker.webex.com) or VPN
- Contact the local IT-department to make sure that the Bruker Technical Support can access the instrument with one of the options above from outside the local network

www.bruker.com/microbiology