# SOFTWARE UPDATE NOTIFICATION
# MORPHOLOGI SOFTWARE v8.23: PSS0025-32

PARTICLE SIZE

PARTICLE SHAPE

CHEMICAL IDENTIFICATION

## Introduction

This document details the release of software PSS0025-32: the Morphologi Software Suite including version 8.23 software for the Morphologi G3 instrument family. It covers software issues that have been fixed. This information is required to perform a risk analysis to determine if the software should be installed. In this risk analysis the benefits of the resolved software issues must be weighed against the risk of new issues that may be introduced to vital areas of the software or possible changes to the results of future analysis. Installation instructions are provided.

In addition, Appendix A provides good practice guidance to help users get the best performance from the instrument based on our experience using it.

*Note:* If you are upgrading from a version of software that precedes version 8.21, additional information about the intermediary versions can be found in the relevant Software Update Notifications which can also be found on this installation CD. Appendix B summarizes the version numbers of all Morphologi software releases for your reference.

***Note: Please check for any updates to this Software Update Notification at www.malvernpanalytical.com/en/support/product-support/morphologi-range/morphologi-4***

## Installation

It is assumed that you have authority to install or update software within your facility. It is also assumed that you have Administrator rights for the system upon which the software is installed, as this is a requirement of the installation process. If you do not have this authority please consult with your I.T. support department before proceeding.

### Recommended System Requirements

The minimum requirements for running this software are highlighted in table 1 below. The software has been tested under Windows 7™ (32-bit) but can also using Windows 7™ (64-bit) and Windows 10 Pro (64 bit). Windows 7 (32-bit) is the preferred operating system.

*Note:* The Morphologi G3-ID family is only compatible with Windows 7 (32-bit) or Windows 10 Pro (64 bit) and requires English language.

*Note:* Power saving and USB selective suspend should be disabled, see Appendices C and D to ensure that the software can operate correctly during long measurements

*Note:* Some 3rd party software or OS patches may prevent the Morphologi software from running correctly.  It is not possible to test for compatibility with all windows programs.

## Supported Languages

The Morphologi software suite is available as an English language application.

**Table 1: Recommended system requirements for the Morphologi software.**

| Feature | Specification |
|---|---|
| **Processor Type** | Intel Core i7 4770 Processor |
| **Memory** | 4GB |
| **Hard Disk Storage** | 1Tb HDD |
| **Additional Storage Media** | DVD +/-R/RW drive |
| **Display** | 1 x 22" Widescreen Flat Panel Monitor for software |
| | 1 x 22" Widescreen Flat Panel Monitor for live video feed |
| **Connectivity** | 1 high speed USB port (not USB 3.0/Superspeed) |
| | 1 Firewire (IEEE1394) port |
| | *Note:* PCs using a Morphologi G3-ID instrument will require an extra USB port (not USB 3.0/Superspeed), and an extra RS232 port. |
| **Operating System** | Morphologi G3: Windows 7 (32 bit and 64 bit), Windows 10 Pro (64 bit), Version 10.0.17763 |
| | Morphologi G3-ID: Windows 7 32 bit, Windows 10 Pro (64 bit), Version 10.0.17763, English language |

## Installation Instructions

The software is supplied on a CD-ROM that will automatically start the installation process when inserted into the drive. If your system does not support this feature run the \Morphologi\setup.exe program from the root directory of your CD drive.

The software may also be installed from the web. To use this option, Run the web installer Malvern Morphologi v8.23 PSS0025-32 EN.exe.

In both cases the installer will prompt for the user to select Morphologi G3-ID mode or standard G3.

### Upgrading an Existing Installation

Always uninstall any existing version of the Morphologi software before installing any other.

*Note:* Upgrading an existing installation to this version of the Morphologi software may require the camera driver to be upgraded for older Morphologi G3 systems. To upgrade the camera driver once the Morphologi software has been upgraded, ensure that the camera is attached to the PC then open the windows device manager and uninstall the Baumer camera driver. Then, scan for hardware changes and direct windows to the drivers\camera folder inside the Morphologi installation folder when prompted for a driver. For details see Malvern technical note "Updating the camera driver on a Morphologi instrument" (MRK1516) available from Malvern helpdesk or your local Malvern representative.

*Note:* Upgrading an existing installation to use a 64-bit operating system may require a firmware upgrade for the camera on the instrument. Please contact your local Malvern representative for more information.

*Note:* Please read *MRK1059- xx CFR Part 11 compliance guide* and *MRK1058 - xx CFR Part 11 – User guide* (where –xx refers to the latest versions of these documents).

## Downgrading procedure

When downgrading the software from version 8.23 to an earlier version, the Morphologi G3-ID settings configuration file must be manually deleted.  To do this:

1.  Ensure that the Morphologi software is not running

2.  Open Windows Explorer (**Win + E**)

3.  Browse to 'C:\ProgramData\Malvern Instruments\Morphologi'
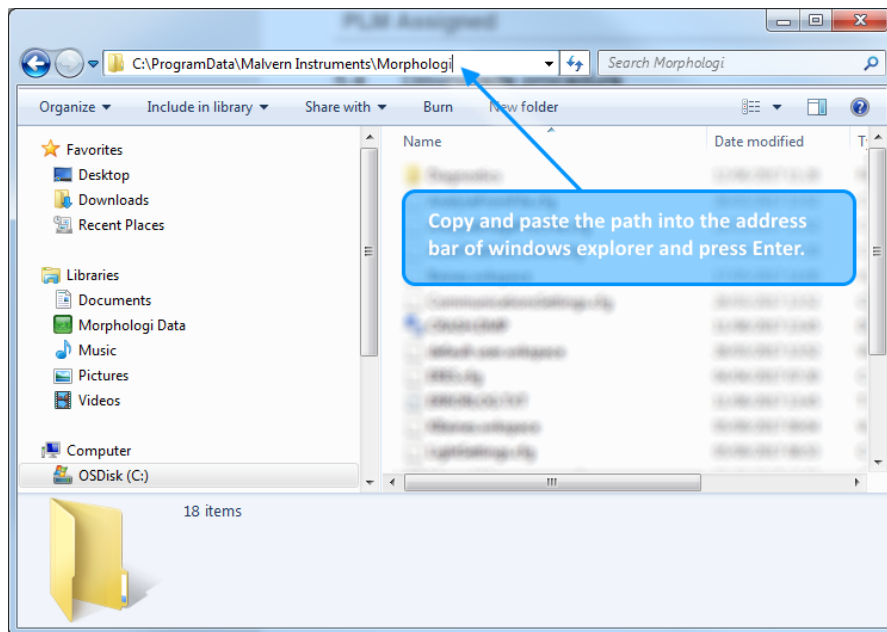


**Figure 1: the Morphologi G3-ID setting configuration file is located in 'C:\ProgramData\Malvern Instruments\Morphologi'.**

4.  Locate and delete the file called 'ID_settings.cfg'.

## Uninstall Procedure

The software can be uninstalled using the standard Add/Remove feature in the Windows 'Control panel'.

*Note:* uninstalling previous versions of the software will remove all the standard Malvern reports, even if they have been edited. Best practice is to avoid overwriting standard Malvern reports but instead create new reports.

## Backward Compatibility

This version of the Morphologi software is back compatible with all prior versions of the Morphologi software.

Morphologi G3, G3SE, G3-ID and G3SE-ID instruments are fully supported.  This release supports the use of the Sample Entrainment Spool disperser which is included with the Morphologi G3SE and G3SE-ID instruments, and as such is not backward compatible with the Sample Cartridge disperser supplied with Morphologi G3S and G3S-ID instruments. To upgrade to the latest hardware specification please contact your local Malvern representative.

# Fixed issues

The issues fixed in this version of the software are detailed below.

| Reference(s) | Issue | Comment |
| --- | --- | --- |
| **74760** | Improved laser power management | Enables laser power to be tuned to get the optimum spectrometer performance for individual Kaiser spectrometer benches |
| **78706** | Improved access to spectrometer settings controls | Facilitates diagnosis of faults and enables configuration of advance systems settings by providing access to all available spectrometer settings from within the engineering menu<br><br>Enables simple access to the COM port setting to configure the system accordingly |

# Known Issues

## System requirements

The software digital signature type has been updated so Windows 7 PCs that are not up-to-date with their security patches will see signing warnings on installation of the software.  This should not be a problem for users, although it is recommended that users might want to reconsider their computer security more generally if they want to use signed software and have unpatched PCs.

## Software bugs

The following software bugs have been discovered within the software, and will be investigated as part of a future release. Please follow the suggested work-around where one is available.
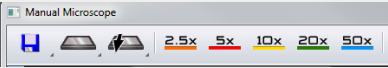
| Issue | Work around | Comment |
| --- | --- | --- |
| The filter analysis check box is not displayed as ticked if running an SOP originally created in software version 7.xx. The top light settings and light calibration over sample still operate as intended. | SOP will still run as intended with correct settings. DO NOT tick the check box as this will reset the SOP to default settings. | Issue has been logged as bug #58363 |
| If uninstalling software versions between 8.00 and 8.20 and the 21CFR registry values will be removed unless software version 7.xx was present previously. | If registry values are removed reinstall them using the 21CFR installer CD supplied with the system or contact the Malvern Helpdesk. | This bug was logged as #57279 and has been fixed so will not occur if uninstalling software version 8.21. |
| Refine Scan area before measurement does not function for multiple areas.  The scan area refinement dialog is only shown once. | DO NOT use refine scan area with multiple areas. | Issue has been logged as bug #58138 |

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| Legacy Z-Stacking does not work. During a measurement with legacy z-stack in the SOP no particles are detected and a crash will occur at the end. | Use differential z-stack instead. | Issue has been logged as bug #58361 |
| Camera drivers may not properly install/update | Install/update driver in device manager and when it asks for driver location navigate to C:\Program Files | Issue has been logged as bug #59682 |
| If an SOP is extracted from a measurement, and the "Grab New Image." button is pressed on the threshold page, the manual microscope is opened but no connection occurs to the instrument.<br><br>Since the SOP has been extracted it should not be possible to change the Threshold so the "Grab New Image" should not be available. | To change the threshold save the extracted SOP first and then open for editing from the main software window. | Issue has been logged as bug #31151 |
| Stop on particle limit does not work with multiple optics. The measurement does not stop on particle limit, whether the limit is reached on the first or subsequent optics scans. | We do not recommend applying particle count limit when using multiple optics, as this can cause sample biasing. | Issue has been logged as bug #30871 |
| If a measurement is stopped and a new measurement is started from the open live measurement manager display window, the 2nd measurement will not complete if it is set up to use a different slot in the slide holder. | Close the live measurement manager display window and start a new measurement. | Issue has been logged as bug #30307 |
| If the user runs an SOP requiring multiple slides but does not select them all at the beginning of the measurement but instead selects them-one by-one via the live measurement manager display, the measurement only succeeds in measuring the first slide. | Select all the intended slides at the beginning of the measurement. | Issue has been logged as bugs #31966 #52918 & #52921 #52546 |
| It is not possible to abort a measurement during the plate level operation | Wait till the plate level operation is complete. Note: if the coverslip option is selected in the SOP the plate level operation takes several minutes. | Issue has been logged as bug #46662 |
| The Bright Field (BF) or Dark Field (DF) setting is not automatically controlled during SOP threshold image acquisition | Ensure that instrument is in the right BF/DF condition prior to editing the SOP. | Issue has been logged as bug #29158 |
| 1-Click measurements with merged slide results will not do a Chemical ID measurement. | We do not recommend merging slides on ID measurements. Instead, it is better to measure separately then combine the measurements afterwards. | Issue has been logged as bug #28786 |
| If a wet cell is fitted in the instrument, and a SDU dispersion is attempted, the software will not recognize that an unsuitable plate type is fitted, and will continue with the dispersion process. This may damage the wet cell windows. | Users are advised to ensure that a wet cell is not fitted before carrying out a dry powder dispersion. | Issue has been logged as bug #31285 |

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| When reanalyzing a record with a large amount of spectra, the software can crash if the reanalyzed record is viewed immediately after it is created. | None. However, the measurement data is saved correctly. If users experience poor software performance following a reanalysis, we would recommend restarting the software. | Issue has been logged as bug #31286 |
| When the file permissions for the Morphologi documents library are set up to deny deletion of files or folders, it is not possible to save new spectra or signed reports from Adobe Acrobat directly. | Save into a different folder and then copy into the controlled folder | Issue has been logged as bug #35255 |
| Slow stage on start-up after unexpected power down of the instrument | Wait for the stage to initialize. This may take 10 minutes or more depending on the stage position when it was powered down. | Issue has been logged as bug #25263 |
| Some Morphologi G2 instruments can lose the position of the optical turret when switching optics. | Restart the measurement. Note that this does not affect Morphologi G3 or Morphologi G3-ID instruments. | - |
| Stopping a merge measurement while measuring with the first optic only aborts the measurement with the current optic. The system then goes on to measure with the next optic. | Stop the measurement for each optic in the merge measurement process. | Issue has been logged as SCR5901 |
| In manual microscope, aborting Raman acquisition can lead to a software crash if abort is clicked during spectrometer bench set up. Bench set up happens after the acquisition settings have been changed. | 1) For short acquisition times avoid aborting, allow acquisition finish<br>2) for long acquisition times do not press abort until laser spot is seen on the sample | Issue has been logged as bug #31442 |
| Reanalysis of records whilst acquiring a Raman spectrum in manual microscope may cause a software crash | Do not reanalyze records whist capturing a Raman spectrum. | Issue has been logged as bug #31397 |
| Stopping or aborting automated Raman measurement during spectrometer bench set up can lead to a software crash | Do not stop or abort an automated Raman analysis until the laser spot is seen on sample particles. | Issue has been logged as bug #23756 |
| The manual targeting dialog can generate a high memory load on some PCs and may result in a crash. | Do not leaving the manual targeting dialog open when not in use | Issue has been logged as bug #52004 |
| When re-running measurement without closing the Live Display, fixed focus, single slide measurements using a different slide index from the first measurement results in an unspecified error. | Always close the live display between sop runs. | Issue has been logged as bug #52546 |

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| If plate tilt compensation is disabled and the selected magnification is greater than 5x, the recorded focus in SOPs is not portable between instruments | Use plate tilt compensation for magnifications greater than 5x. | Issue has been logged as bug #53225 |
| Turret error in the manual microscope or when running an SOP,<br><br>The user may:<br><br>• Experience difficulty when swapping objectives using the manual microscope where no objectives are highlighted and the instrument will not move the turret.<br><br><br><br>• Observe an error when running an SOP<br><br> | Ensure instrument is switched on **BEFORE** starting the software. | Issue has been logged as bug #33408 |
| If the user clicks Close on the live display during a measurement, the measurement stops but the live display does not close. | If the user clicks on Close for a second time, once the measurement process has terminated, the live display will close as intended. | Issue has been logged at bug #52892 |
| When a particle is viewed in its original image from a measurement that used the Thin-Path Wet Cell, the manual microscope will show the Thin-Path Wet Cell in the navigation panel on the right, but it will show the SDU glass in the toolbar at the top. | | Issue has been logged as bug #53239 |
| The 'G3/G3-ID' icon in the bottom-right-hand corner can disappear off the right edge of the software if the application window is made too narrow. | | Issue had been logged as bug #57124 |
| Report pages can render badly when the user provides long text inputs. | | Issue has been logged as bug #58039 |
| An exception is thrown in the Multi-Statistic reports if a record contains no particles or if it is a Point Spectra record. | | Issue has been logged as bug #58132 |

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| If the computer goes into standby mode after a period of inactivity the measurement can hang. Since measurements of large areas can take some time this is a likely event. | Disable the power saving options of the computer using the instructions in Appendix B: Disabling power saving.<br><br>USB suspend must also be disabled on the PC. See Appendix C: Disabling USB selective suspend. | - |
| Installation of software for remote PC support and desktop sharing can interfere with the live display on the second monitor and cause the software to crash during measurement. | None. | - |
| Backup of data to external devices like external hard drives or network servers during measurement can slow down the measurement or cause the software to crash. | Automatic backups should be scheduled at times when the instrument is not in use. | - |
| If .Net 4.5 is not present before installation of Morphologi, the Morphologi installer may display a warning about files being in use by a running application. | Install .Net 4.5 before installing the Morphologi software. Alternatively, press the Ignore button – the installer will then ask you to reboot when it has finished. | - |

## Error Reporting

Should persistent problems occur contact the local Malvern Helpdesk. To speed up response time include all of the following.

- A **fullscreen** screen shot of any error message and everything behind it.
- Full description of what was happening at time of issue and ideally leading up to it.
- Instrument serial number  - found under the triangular cover right side of instrument (e.g. MAL1060289)
- Software version  - go to Help>About Morphologi (e.g. 8.23; all digits are important)
- System information – double click on the G3 or G3ID logo at bottom right corner of the Software. Take a screen shot of system information and include on error report.
- Additional system setting export – go to tools>maintenance. Enter the password (maintenanceon). Select Export and save the text file to include on error report

## Appendix A: Good Practice Guidance.

| Size range<br><br>Consider particle size range of interest.<br><br>Is analysis Morphological only or is Chemical Identification required?<br><br>Table provides guidance. | **Magnification** | | | | | |
|---|---|---|---|---|---|---|
| | | **2.5x** | **5x** | **10x** | **20x** | **50x** |
| | Morphological size range (µm) | 1000-13 | 420-6.5 | 210-3.5 | 100-1.8 | 40-0.5 |
| | Potential range for chemical ID (µm) | 1000-100 | 420-25 | 210-20 | 100-20 | 40-1 |

Morphological: Maximum size is when using default frame overlap, Minimum size related to adequate number of pixels for shape.

Chemical ID: Minimum size (2.5x – 20x) related to ability to return to particle when measurement made with objective other than 50x, Minimum size for 50x is dependent on sample type.

| **Multiple measurement for ID analyses** | If performing an ID analysis, in the SOP do not select any of the following:<br><br>• multiple slides<br>• multiple objectives<br>• multiple scan areas |
|---|---|
| **Maximum number of particles to target for an ID analysis** | The maximum number of particles analyzed using an ID measurement during instrument development was 10,000 with a 1 second acquisition time. Analysis time was >1.5 days.<br><br>If targeting a larger number of particles and/or using a longer acquisition time it is recommended to perform separate morphological scans followed by Raman analysis on each independently and then combine the data later.  Note when combining data sets, any particle tags will be lost. |
| **Chemical classes in full Morphologi and Chemical 1-click SOPs** | If running a chemical measurement, either as part of a 1-click SOP or from a base morphological measurement, you must ensure any classes in the SOP or result do not contain both chemical correlation parameters and have the 'exclude unclassified' particles option selected.<br><br>This is because at the end of the morphological analysis no particles are classed (as no chemical data yet exists) thus all particles will be excluded and therefore will not be available for chemical measurement. |

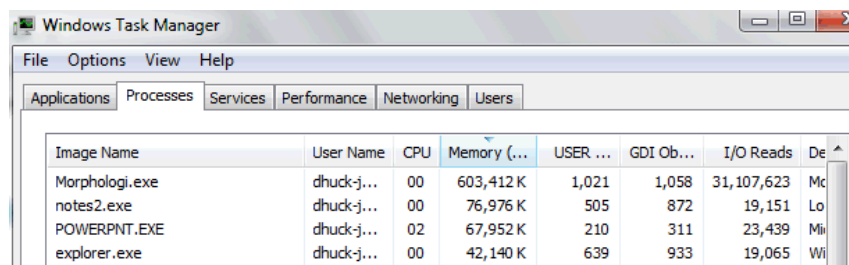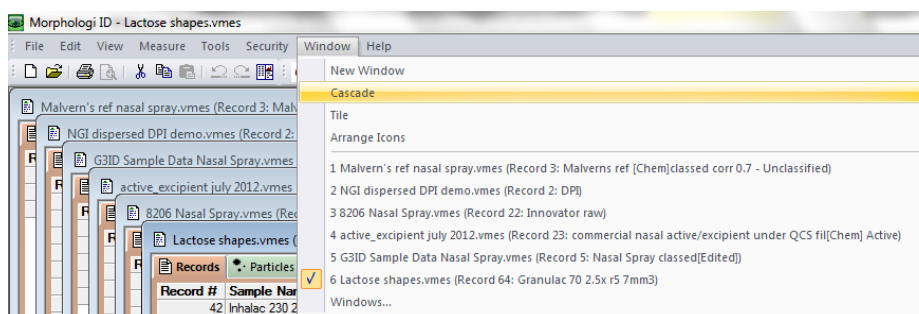| | |
|---|---|
| **File Management and memory load management**<br><br>Insufficient memory may lead to aborted measurement.<br><br>If the memory load goes above 1,200,000 K during a measurement it can fail.<br><br>Minimize RAM usage by closing any measurement files not in use and minimizing number of records in each measurement file. | The amount of PC RAM available for an analysis is reduced and may not be sufficient to run the measurement if:<br><br>• several measurement files are open,<br>• measurement files contain a large number of records and/or large numbers of particles,<br>• if they contain large amounts of Raman data<br><br>To check the memory load go to the Windows task Manager. If the Morphologi.exe process load is more than 400,000 K BEFORE you start the measurement it is recommended that you close open measurement files and/or open a new measurement file if the number of records in the open measurement is high(>10).<br><br>To check the number of measurement files open go to View>Cascade<br><br>If several measurement files can be seen, close all those that are not in use.<br><br>Look at number of records and number of particles in results including any filtered particles that may not be included in the particle number count in the workspace.<br><br>In the example shown there were over 60 results and some contain more than 150000 particle images before considering filtered/excluded particles.<br><br>If the memory load rises above 1,200,000Kb during a measurement the software can cease to operate leading to a failed measurement. |
| **Avoid viewing previous results whilst measurement is running.** | Viewing results may increase memory load on PC and affect the measurement, see above. As such it is especially important to avoid viewing results if several hours through a long ID measurement to avoid loss of data.<br><br>Additionally, editing results during a measurement is not recommended, including applying filters/classes and saving as new record. If editing the results is required it is recommend to copy the data to another PC. |

**Windows Task Manager**

| Image Name | User Name | CPU | Memory (... | USER ... | GDI Ob... | I/O Reads | De |
|---|---|---|---|---|---|---|---|
| Morphologi.exe | dhuck-j… | 00 | 603,412 K | 1,021 | 1,058 | 31,107,623 | Mc |
| notes2.exe | dhuck-j… | 00 | 76,976 K | 505 | 872 | 19,151 | Lo |
| POWERPNT.EXE | dhuck-j… | 02 | 67,952 K | 210 | 311 | 23,439 | Mi |
| explorer.exe | dhuck-j… | 00 | 42,140 K | 639 | 933 | 19,065 | Wi |

| | | | | |
|---|---|---|---|---|
| 54 | Spherolac 100 2.5x r5 | 29 January 2009 17:08:24 | False | 13471 |
| **55** | **Granulac 70 5x r1** | **29 January 2009 19:11:4** | **False** | **158346** |
| 56 | Granulac 70 2.5x r1 | 30 January 2009 11:14:49 | False | 50660 |
| 57 | Granulac 70 5x r2 | 30 January 2009 13:58:34 | False | 154010 |
| 58 | Granulac 70 2.5x r2 | 30 January 2009 14:52:40 | False | 56442 |
| 59 | Granulac 70 5x r3 7mm3 | 30 January 2009 17:01:12 | False | 123322 |

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|  | In particular **do not** do the following:<br><br>• Switch between measurement files – the active file at the end of the measurement run must always be the one open when the measurement was started to ensure the result data is saved into the correct measurement<br>• Create a mean spectrum<br>• Edit chemical correlation based classes or filters |
| **Save data locally and back up to network, storage drive or shared PC.** | Morphologi data set can be very large.  Many network drives may not support such files.  Direct saving to a network may affect the system performance, resulting reduced analysis speed and cause the system to be affected by other network traffic. It is recommended to back up data to a network, shared access drive or PC when the instrument in not in use, e.g. overnight. Software can be installed on alternative PCs for data review. |
| **Avoid virus scans, windows updates etc. occurring during a measurement.** | If any other PC activity causes the Software to crash or causes the PC to shut down measurements in progress will be lost. |
| **USB Ports** | Use USB SS(USB 3.0) ports for Keyboard and mouse only and **not** for any system connection.<br><br>Morphologi G3 instruments **must** be connected to a different bank of USB ports to the mouse and keyboard.<br><br>For Morphologi G3-ID instruments the Raman bench connection **must** be in a different bank of USB ports to any other connection. |

## Appendix B: Table of previous Morphologi Software versions.

The Software Update Notifications (SUNs) for all of the previous versions of Morphologi software can be found on the software installation disk in the \Documents\Release History folder.

| Software release reference | Release month |
|---|---|
| PSS0025-31 Morphologi v8.22 | July 2017 |
| PSS0025-30 Morphologi v8.21 | June 2016 |
| PSS0025-29 Morphologi v8.20 | November 2015 |
| PSS0025-28 Morphologi v8.13 | April 2015 |
| PSS0025-26 Morphologi v8.12 | June 2014 |
| PSS0025-25 Morphologi v8.11 | September 2013 |
| PSS0025-24 Morphologi v8.10 | May 2013 |
| PSS0226-01 Morphologi v8.00 | September 2012 |
| PSS0025-23 Morphologi v7.43 | August 2012 |
| PSS0025-22 Morphologi v7.42 | June 2012 |
| PSS0025-21 Morphologi v7.41 | August 2011 |
| PSS0025-20 Morphologi v7.40 | July 2011 |
| PSS0025-019 Morphologi v7.21 | June 2011 |
| PSS0025-018 Morphologi v7.21 | August 2010 |
| PSS0025-016 Morphologi v7.20 | April 2010 |
| PSS0025-015 Morphologi v7.12 | August 2009 |

| PSS0025-013 Morphologi v7.11 | November 2008 |
| PSS0025-12 Morphologi v7.10 | September 2008 |
| PSS0025-08 Morphologi v7.00 | February 2008 |
| PSS0025-06 Morphologi v6.02 | March 2007 |
| PSS0025-05 Morphologi v6.01 | August 2006 |
| PSS0025-04 Morphologi v6.00 | July 2006 |
| PSS0025-03 Morphologi v5.02 | January 2006 |
| PSS0025-02 Morphologi v5.01 | December 2005 |
| PSS0025-01 Morphologi v5.00 | November 2005 |

## Appendix C: Disabling power saving

To disable the power saving options of the computer use the Power Options available in Control Panel.

Modify the default settings to those highlighted below for your OS.

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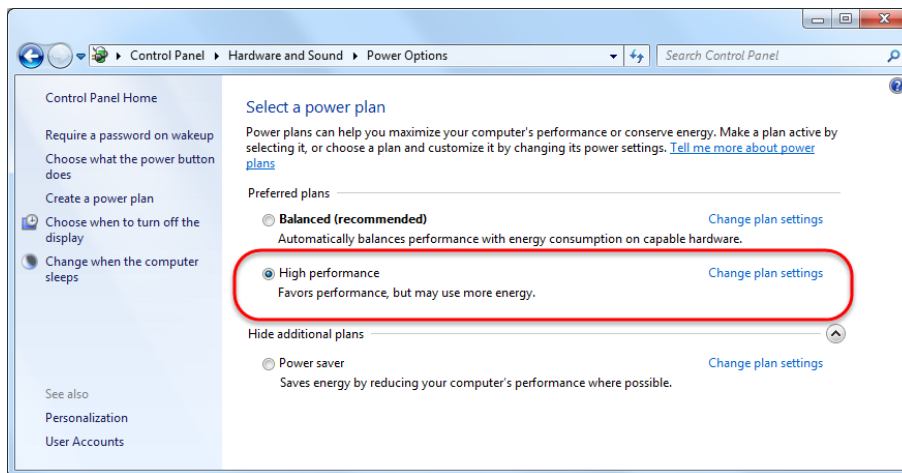
## Appendix D: Disabling USB selective suspend

From the power options dialog shown in Appendix B, select Change plan settings and set USB selective suspend setting to Disabled.
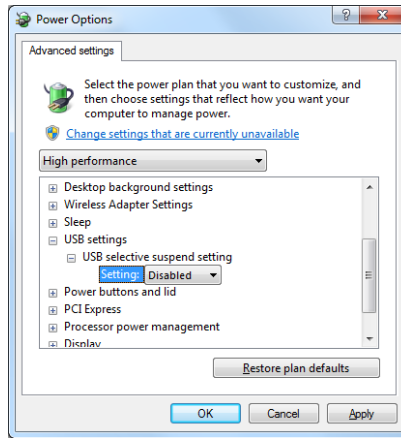


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