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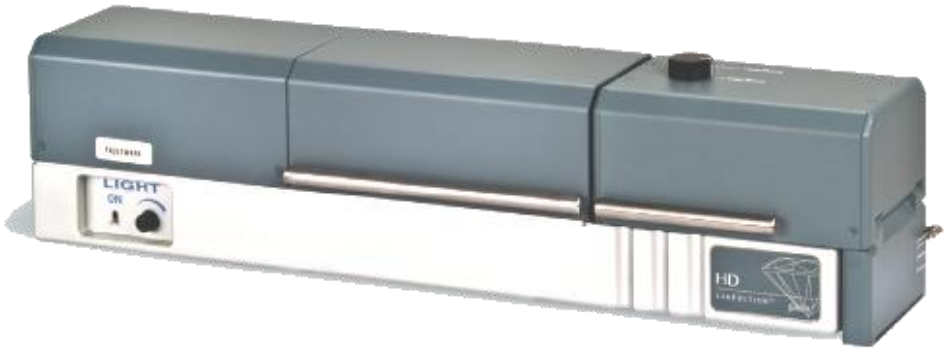
INSPIRE CONFIDENCE

DiaMension™ HD Technical Manual

2013



Version 1.0

DiaMension™ HD - Technical Doc

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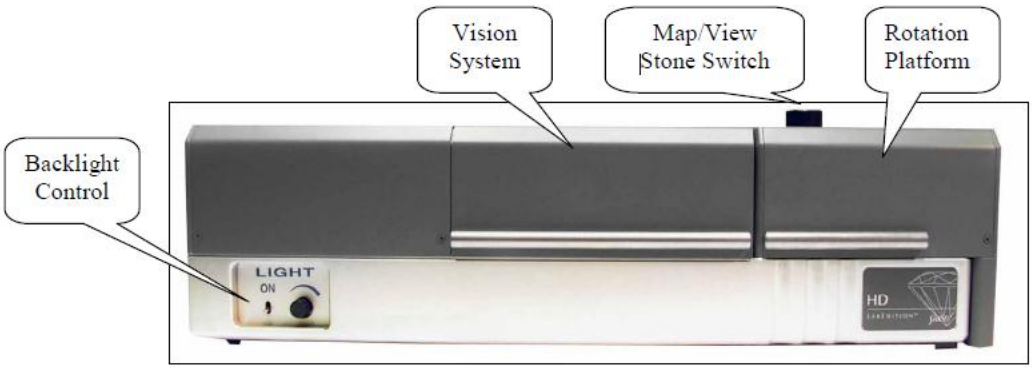
1 Components review

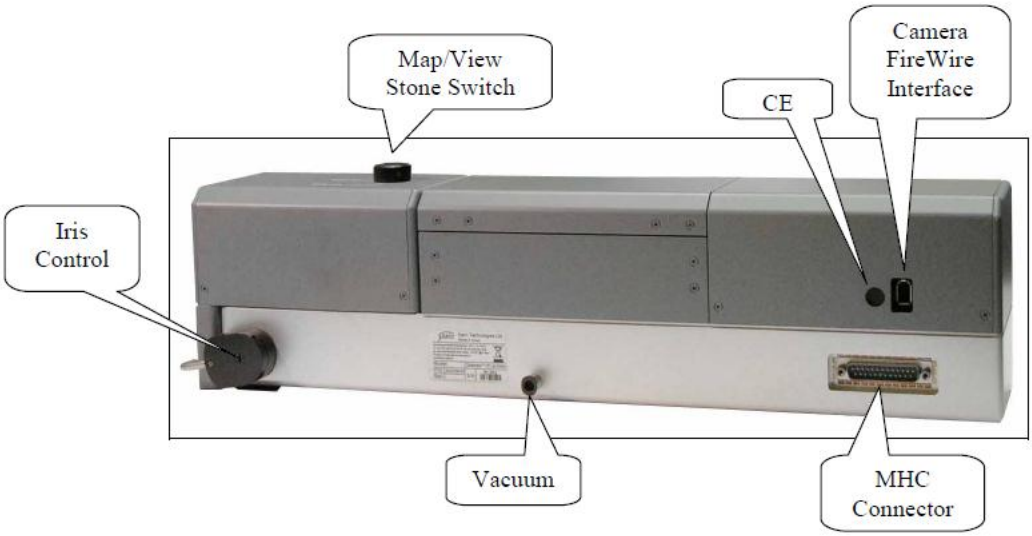
1.1 Overview

December 2012

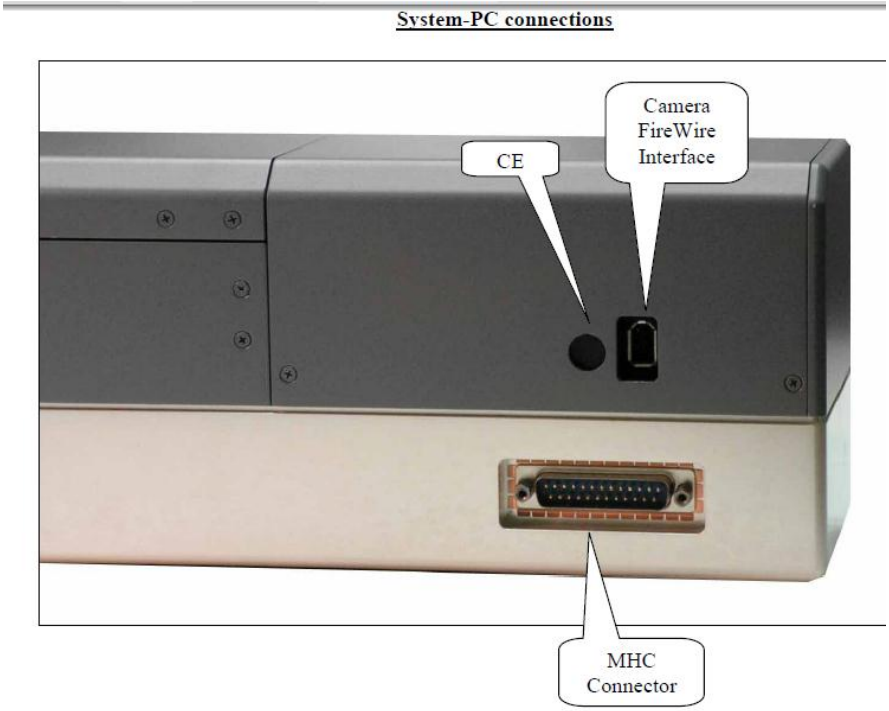
Front View



Back View

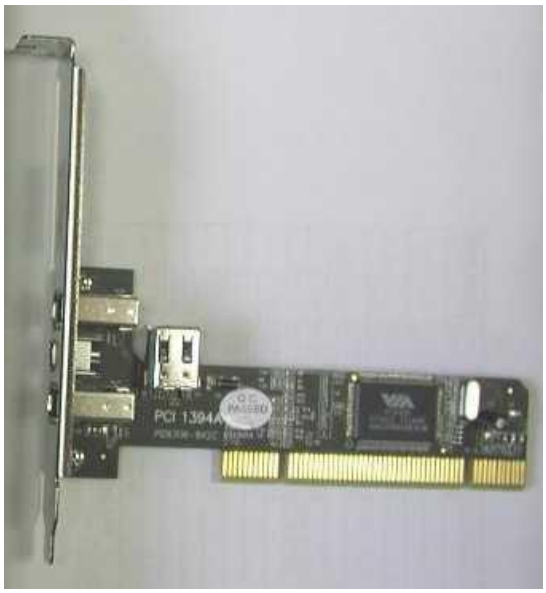


1.2 System's connections



1.3 Iris control

1.4 Firewire PCI card & Cable



1.5 Lenses and Stages set

1.6 Vacuum pump

1.7 MHC PCI data

1.8 Hasp Plug

2 Maintenance

2.1 Periodic Maintenance & Support levels

	Authorized	Daily	Weekly	Every 6 month	Every Year	Comments
Stage cleaning	User	√	√	√	√	Top & bottom stage & Top motor surface
Calibration - Light calibration	User	√	√	√	√	Make sure that the calibration done with the right Iris position (according the Lens)
Cleaning - Lens outer surface	User		√	√	√	Clean with clean Isopropanol (IPA)
Cleaning - Prism outer surface	User		√	√	√	Clean with clean Isopropanol (IPA)
Cleaning - Camera window	User		√	√	√	Clean with clean Isopropanol (IPA)
Calibration	Technician			√	√	Only if required (see Troubleshooting)
Stretch calibration	Technician				√	Only if required (see Troubleshooting)
Calibration - Stage tilt	Sarin			√	√	
Calibration - Local Axis	Sarin			√	√	
Master stone test	Sarin				√	

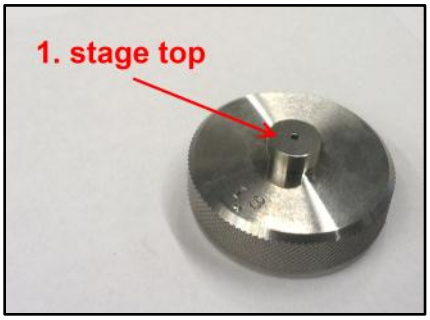
2.2 Items review:

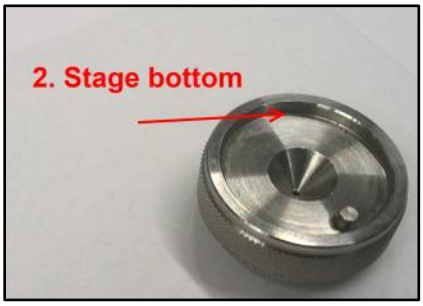
1. Air duster
2. Acetone liquid
3. Bicorn (small jar)
4. Lens
5. DiaMension™ HD
6. Rise paper – designated for Lens cleaning
7. Isopropanol liquid

2.3 ** Note - Cleaning warning

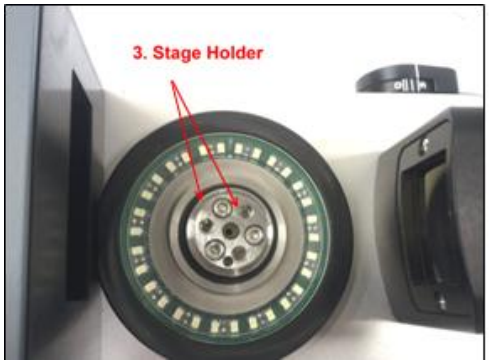
- **Always make sure the cleansing liquid / material is clean without any dirty or leftovers that may contaminate the cleaning material. (e.g. dirty Jar)**
- **Rise paper / cleaning cloth are without any oil / dirty spots …etc.**
- **Do NOT touch the cleaning area (i.e. rise prepare) with your fingers directly.**
- **If using Acetone liquid make sure NOT to use plastic equipment with it.**
- **Isopropanol / Acetone liquid are hazard materials, therefore only trained and qualified user is allowed to use those materials.**
- **Cleaning is only for EXTERNAL parts of the system, do not open any item to clean the inside of it, as this can be done only by Sarin factory.**

2.4 Cleaning the Stage

1. Use the the Air-duster for dust removal
2. Use Isopropanol liquid and rise paper to remove any dust / dirty over the stage
3. 

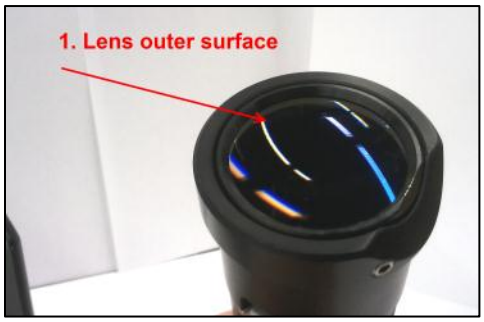
4. Make sure to clean stage top , upper flat section (pic1)
5. Clean the lower bottom, to insure stage position on the device is flat.
6. 

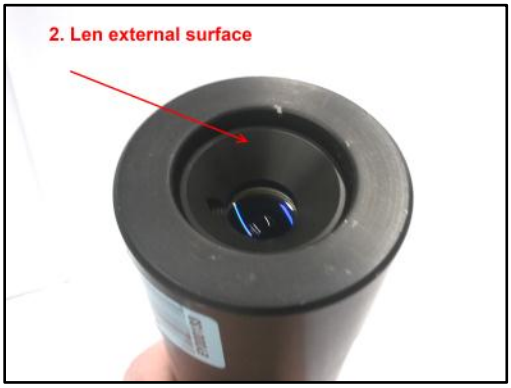
2.5 Cleaning the stage holder



7. Use the the Air-duster for dust removal
8. Use the Isopropanol liquid and duster to remove any dust or dirt found under the stage and make sure the stage sits accurately on the holder.
9. Clean both the top part and the step on which the stage sits on.

2.6 Cleaning the lens

1. Use isopropanol + Rise paper to clean only the external, outer surface of the lens.
2. Follow with the Air-duster to complete the dry and dust removal from the lens.
3. 

4. 

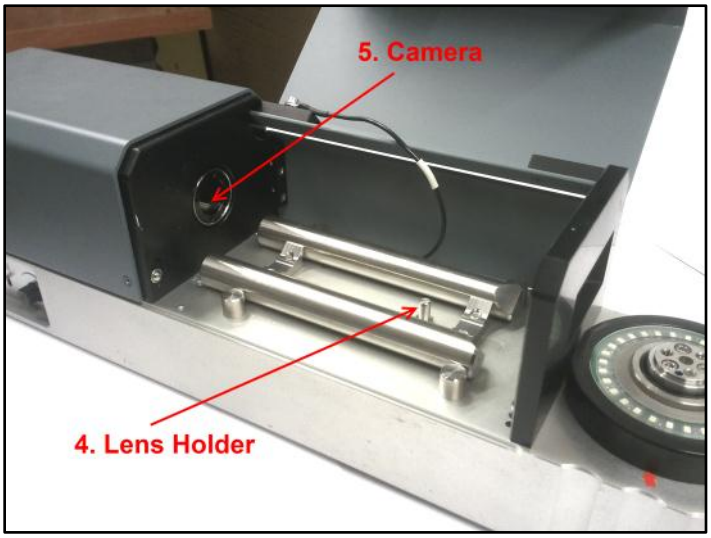
5. ** **Do not** open the HD lenses at any given time. If internal dirt is found within the lens please contact Sarin Support.*

2.7 Cleaning the Backlight

1. Use Isopropanol liquid and rise paper to remove any dust / dirty over the stage
2. Complete the cleaning with the Air-duster to remove all dust from the backlight prism (pic3)

2.8 Cleaning the Camera

1. Use isopropanol + Rise paper to clean only the external, outer surface of the lens.
2. Follow with the Air-duster to complete the dry and dust removal from the lens.



3 Trouble Shooting ('Debug')

The following 'debug' charts are for the HD machines maintenance, support and problem shooting. Each scenario is based on the exact path needed to go through in order to identify, support and resolve the specific issue.

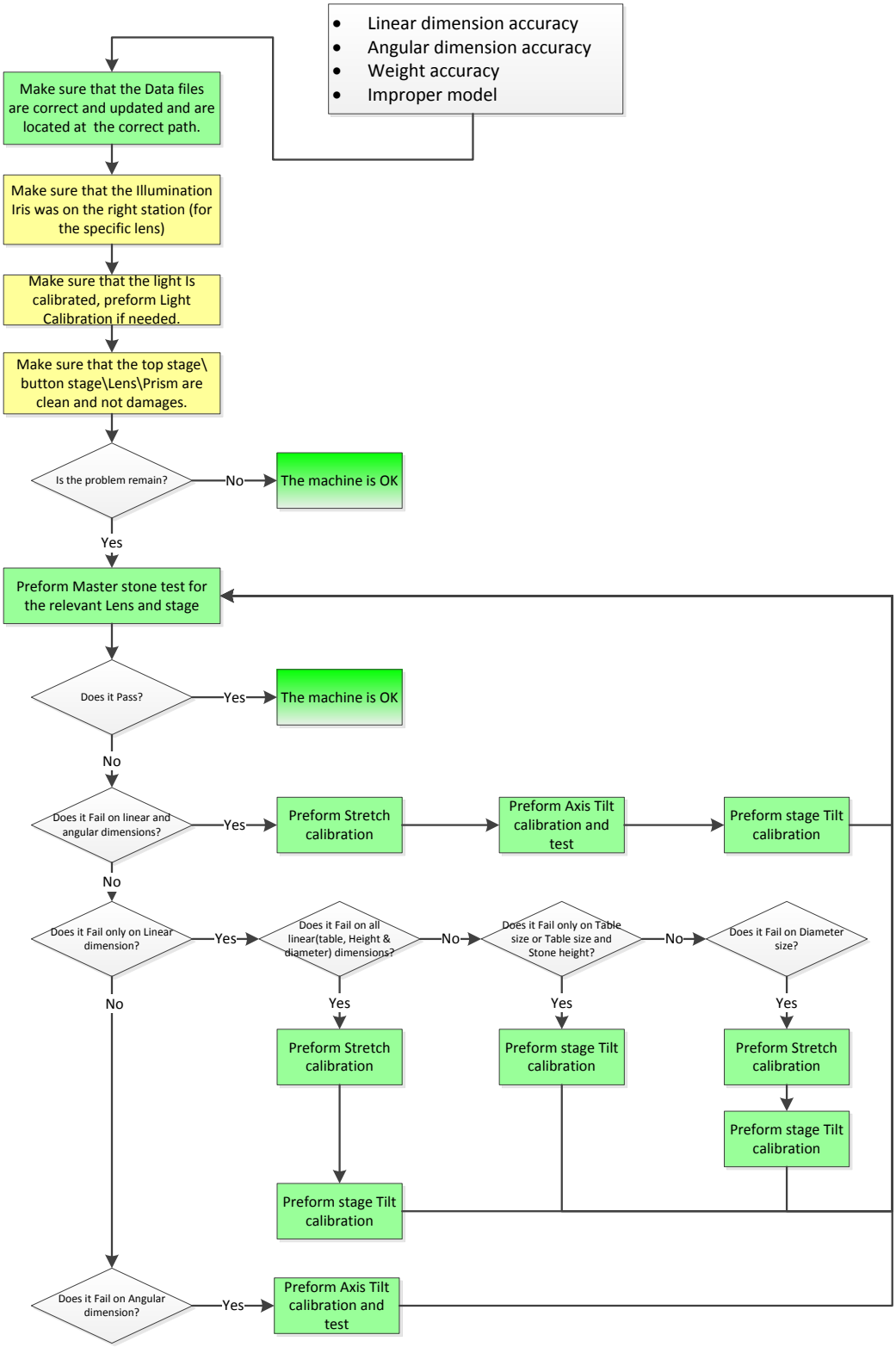
In the trouble shooting drawings below; each rectangles contain an action to be done, and rectangle's color indicates the minimal support level that is qualify to do that task according the below table:

Support level	Description
Customer	The end user
Technician	Authorized Field technician that qualify Sarin technician course
Factory	Sarin employee authorized to preform advanced parts replacement

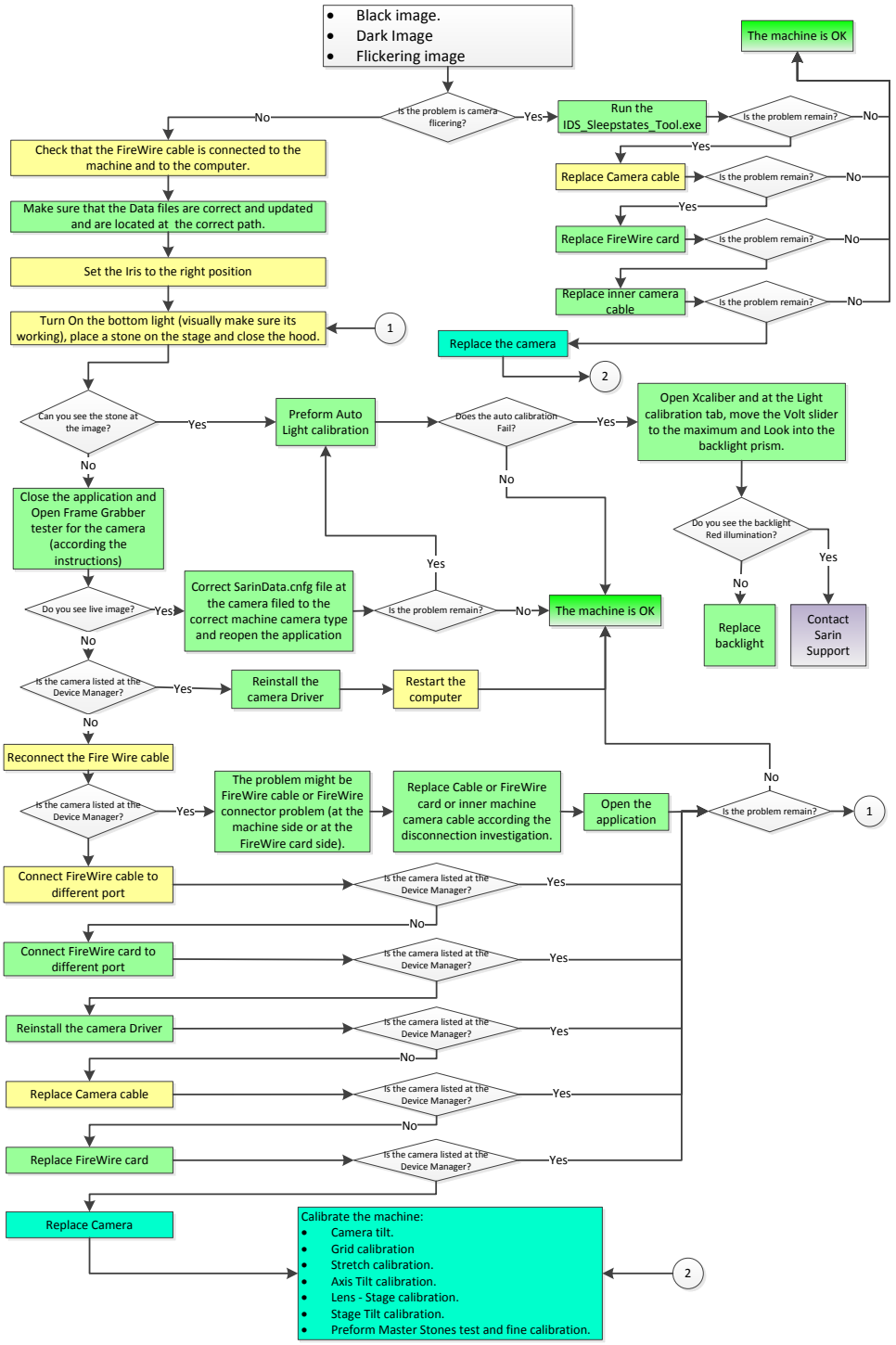
The debug charts contain the following issues:

- Linear dimension accuracy
- Angular dimension accuracy
- Weight accuracy
- Improper model
- Black image.
- Dark Image
- Flickering image
- Motor is not moving
- Vacuum is not working
- "Stone move" message
- Didn't detect Lens message

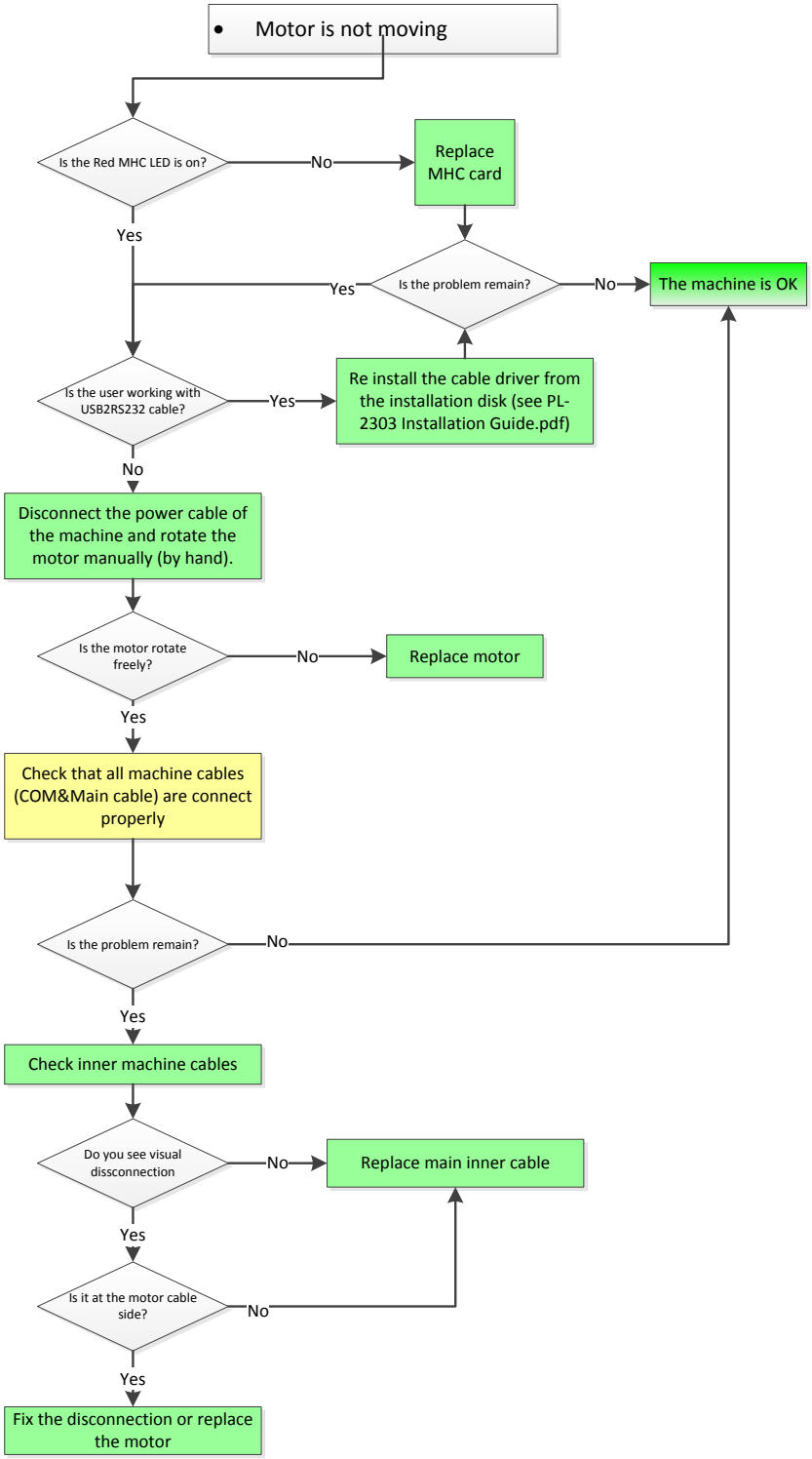
3.1 Linear / Angular / Weight accuracy & Improper model



3.2 Black image / Dark Image / Flickering image

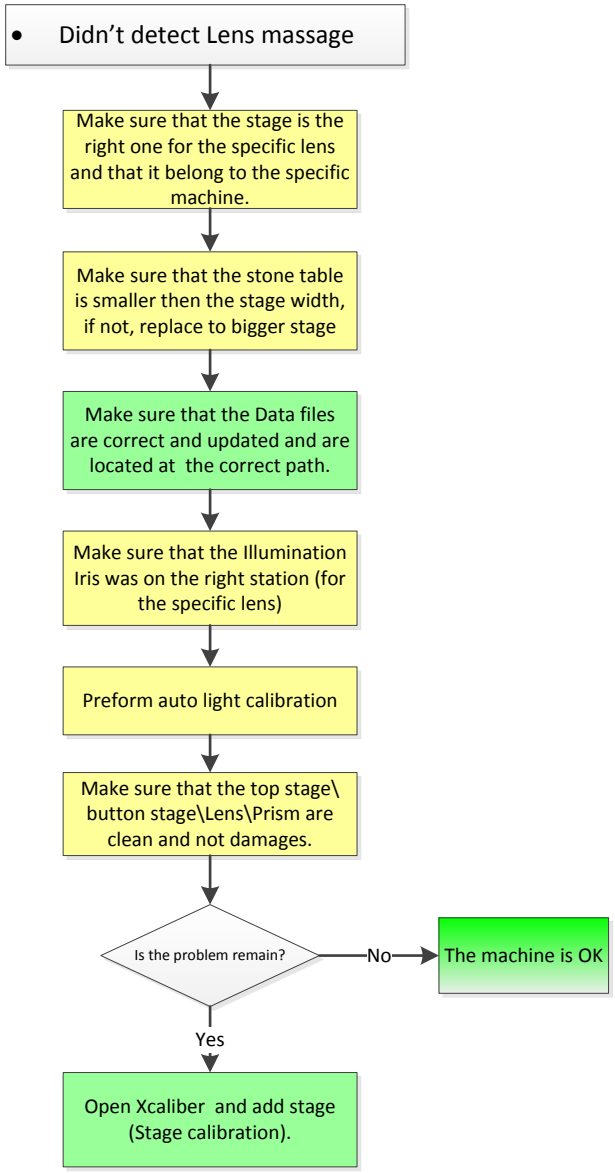


3.3 Motor is not moving



3.4 Vacuum is not working / “Stone move” message

3.5 Didn't detect Lens message



4 Installation

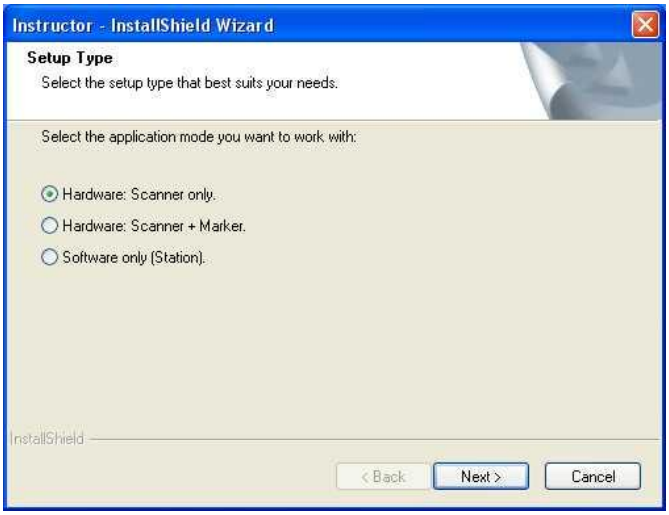
4.1 Instructor™ Installation

4.1.1 New installation on a clean PC (SW only)

For New ***Instructor™ 2.6*** installation on a clean Windows® operation system without ***DiaMark™HD*** installation (i.e. only hardware is: *DiaMension™, DiaScan™ S+ or HD-LabEdition™*):

1. Please refer and follow installation guide document under:
   Installation DVD\Documents\Instructor 1.0 Installation Guide.pdf
   **Note: few user flows/dialogs have been changed since version 1.0*

2. New installation dialog to choose the installation type, please choose "***Hardware Scanner only***"



Follow the rest of the installation regularly, as described in the installation guide.

4.1.2 Instructor™ with DiaMark™ HD installation

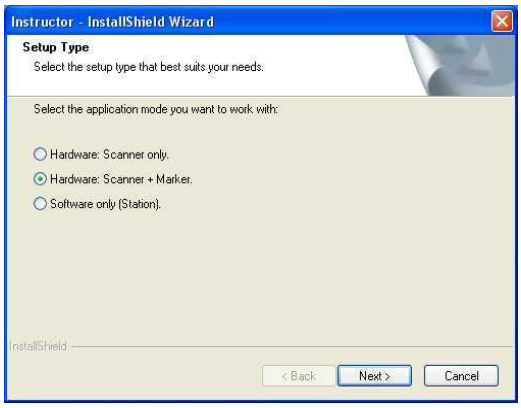
For new Instructor™ and new DiaMark HD installation on a clean operating system. It is highly recommended to read Hardware section 2.1 and the new *'DiaMark™HD user guide'* prior installation:

Prerequisites:* *before starting!

1. *Please uninstall any previous Instructor™ application. Upgrading DiaMension™ HD machine to DiaMark™HD requires a clean PC.*
2. *Please make sure DiaMark™HD hardware is plugged and installed on top the DiaMension™ HD machine correctly.*

Installation

1. On the new Installation mode dialog, please choose ***Hardware: Scanner + Marker :***



2. New Information message when using DiaMark™HD machine but LaserMarking.cnfg file(Calibration file) wasn't found inside your machine data:

LaserMarking.cnfg file is being created during the Laser Marking calibration process. More information can be found under XCaliber 2.3 section below.

3. New Warning Message when using DiaMark™HD with Teem Laser but "***Teem.cnfg***" file wasn't found inside your machine data:

- Press Ok if you are installing a different type of laser marking hardware and continue installation.
- Press Cancel to about installation and contact Sarin-Support for the required "Teem.cnfg" file.

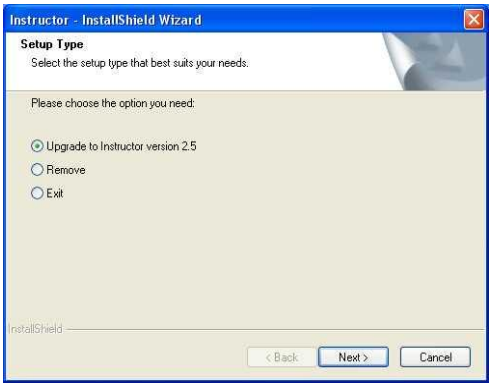
Note: When working with Teem laser, USB to RS232 must be connected between the computer and the laser power supply to allow controlling the laser power levels.

4.1.3 Upgrade Installation

For Instructor™ (version 1.0, 1.1, 2.0 or 2.5) users that are upgrading to instructor 2.6 (no ***DiaMark™ HD*** Hardware installation):

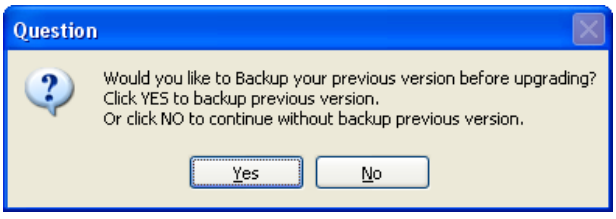
1. Please close Instructor™ application before continue with the installation.
   Note: upgrade warning (below) if Instructor™ is currently running during installation.

2. Upgrade Dialog, Please choose "**Upgrade to instructor version 2.5"**



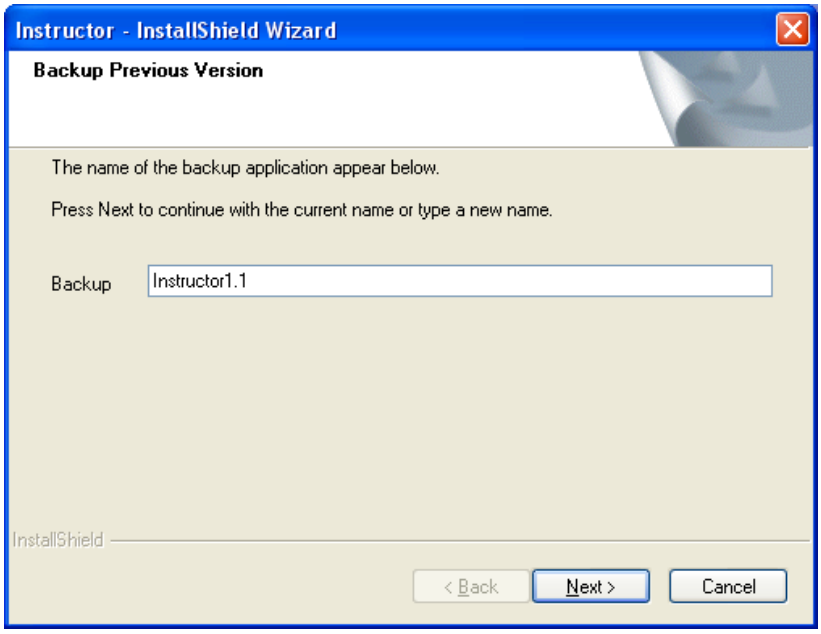
3. Continue the installation regularly, as describe in previous technical notes under:
   Installation DVD\Documents\Technical Notes\Instructor 1.0 Technical Notes.pdf
   Installation DVD\Documents\Technical Notes\Instructor 1.1 Technical Notes.pdf
   Installation DVD\Documents\Technical Notes\Instructor 2.0 Technical Notes.pdf

4. New Backup mechanism allows backup of previous version during the upgrade procedure.
   Question dialog allows backup of previous settings before upgrading.



Click yes to create backup of previous version.
Click No to continue without creating backup of previous version.

Click Yes → Backup Previous Version dialog will appear with your previous application name already written. Press Next to continue with this name or type your desirable name.

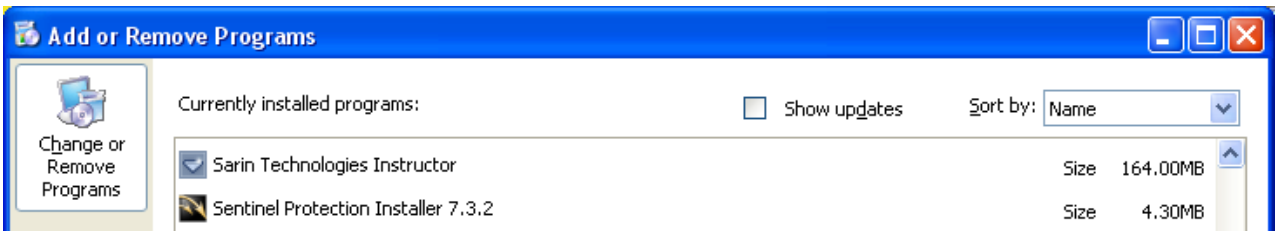


Backup Previous application message appears until the backup procedure is over.

❖ ***Warnings:*** ***Don't backup versions, copy builds, or configuration files manually without using "Folder Rename" application or upgrade procedure.***

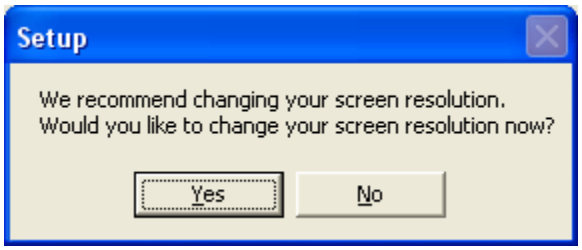
4.1.4 General

1. ***Instructor™*** indicates as "Sarin Technologies Instructor" under Add or Remove Programs.



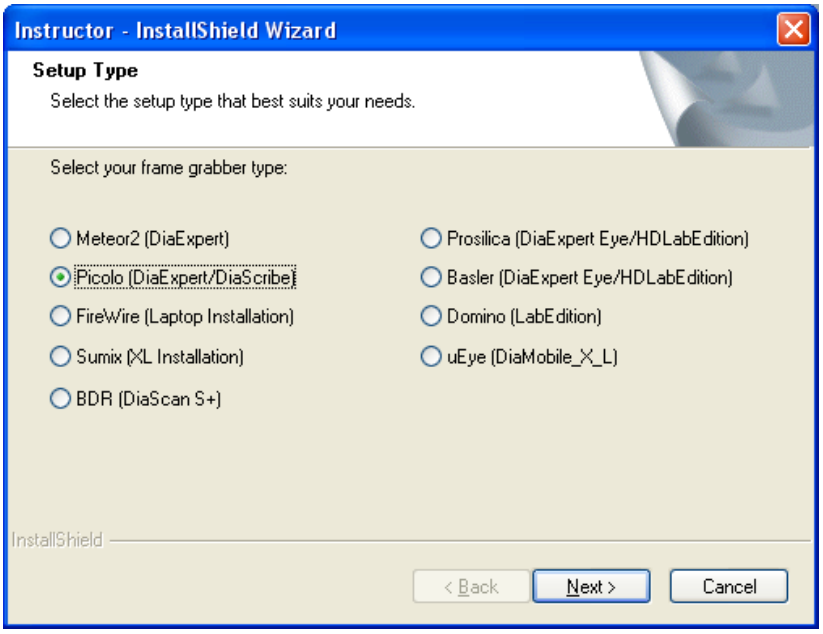
2. Screen Resolution

Instructor™ 2.6 supports only a screen resolution of 1280*1024 in order to fit more controls for its new features. Running the application on lower resolution will cause some of the buttons to disappear! During the installation you'll be asked to confirm automatic change of your screen resolution to the new settings. Notice it can change desktop icons positioning.



3. Setup Type

Improve "Select Frame Grabber Type" Dialog:



a) Default frame grabber is now **Picolo** instead of Meteor2.
b) Each frame grabber has now, in brackets, the machine types it can work with.

4.2 64 Bit installation

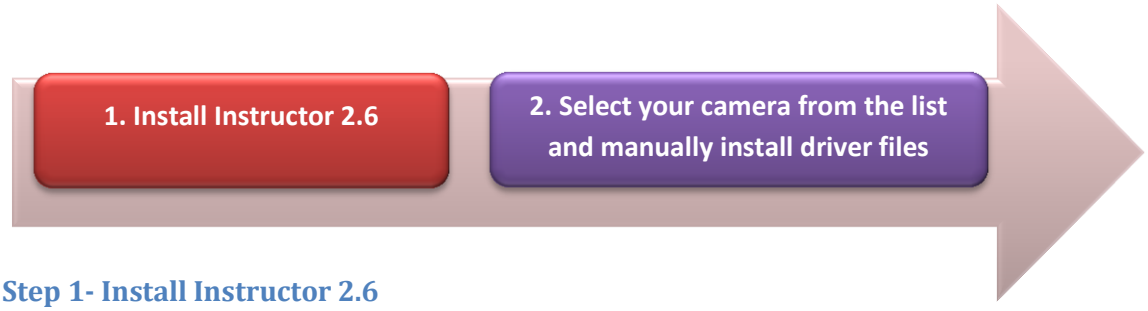
4.2.1 Introduction:

This document describes how to install **Instructor™** software on **Windows 7 64 bit** operating system.

Please note:

- Each type of camera requires different driver installation.
- This procedure installs **Instructor™ 2.6 as 32 bit** application over Windows 7 64bit, and NOT as a full 64bit application.

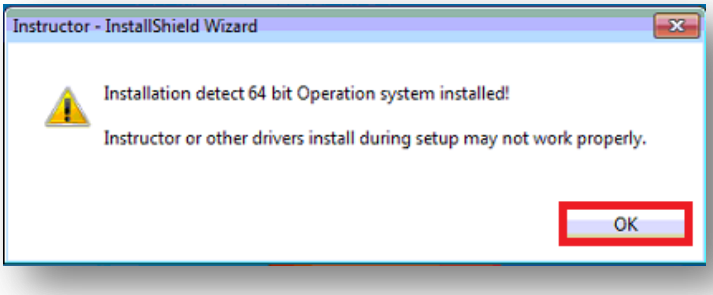
Procedure Description:



4.2.2 Step 1- Install Instructor 2.6

First, Instructor™ has to be installed on a Win7 64 bit platform.

Installation will identify a 64 bit operating system is in use and therefore presents the following message:



Click ***"OK"*** to proceed.

Once installation process is complete and your computer has been restarted, a 64 bit version of the camera driver has to be installed.

4.2.3 Step 2 - Manual Camera driver installation

Install only the proper driver with regards to your camera type:

- *Baslar Camera*
  1. Download the file: ***"BaslerWin7_x64.exe"*** from the following link: http://www.sarin.com/downloads/BaslerWin7_x64.exe
  2. Run the file.

- *Prosilica Camera*
  1. Download the file: ***"ProWin7_x64.exe"*** from the following link: http://www.sarin.com/downloads/ProWin7_x64.exe
  2. Run the file.

In any problem or for any additional information please contact Sarin support

email: Sarin-Support@sarin.com

4.3 Drivers

New Drivers listed below are installed silently along the installation process. No User interference is needed. All information below is for technicians only.

Note: Instructor™ is currently not supporting 64 bit O/S.

4.3.1 Hasp

Hasp plug is required for installation, upgrade, and remove (uninstall – unless you would like to remove application without hardware - **not recommended**). **In case of remove application without hasp plugged, and before installing new configuration, it is required to manually clean program files application folder, program data (user files) application folder, common folder, and all Hardware drivers.**

New Hasp driver, which included several bug fixed, was update to version 6.23. In case of a failure of HASP recognition, use the new driver or ClickI6.23.exe, located under:
Install Disk\HASP\SRMHASP

4.3.2 Microsoft .NET Framework 4.0

New Microsoft .NET Framework 4.0, Instructor™ installation **required** Windows XP Service Pack 3 or above. If not, the following message will appear:

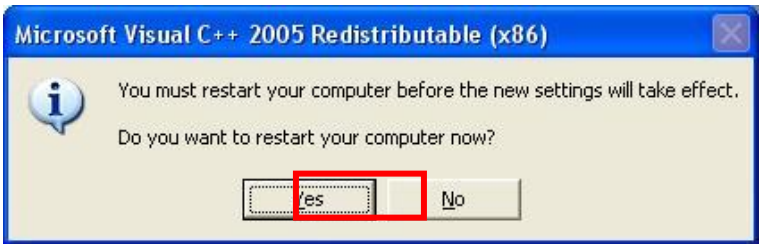
Note: Refer only for XP O/S. no problem with Win7 O/S.

4.3.3 Microsoft Visual C++ Redistributable

3 new VCredist files were updates:

1. vcredist_x86_2005
2. vcredist_x86_2008
3. vcredist_x86_2010

Note: During installation procedure, you may encounter with the following Microsoft message:



a. Select **No** and continue the installation procedure. **(Important!!!!)**
b. Select Restart at the end of the installation procedure.

4.3.4 Prosilica Driver

New Prosilica driver, same as in Win7, is now using on XP O/S which fixed flickering issues.

Note –

1. **New Prosilica driver is only for new and clean installation.**
2. **The new frame grabber name (METEOR_TYPE entry in the common SarinData.cnfg) is "ProWin7" instead of "Prosilica".**
3. For Prosilica users that already work on XP O/S, during upgrade from previous Instructor™ versions, METEOR_TYPE entry will remain 'Prosilica'.

For more information please refer to the file ProWin7.pdf under:
Installation DVD \Prosilica\ProWin7-HotFix\ProWin7 - Read Me

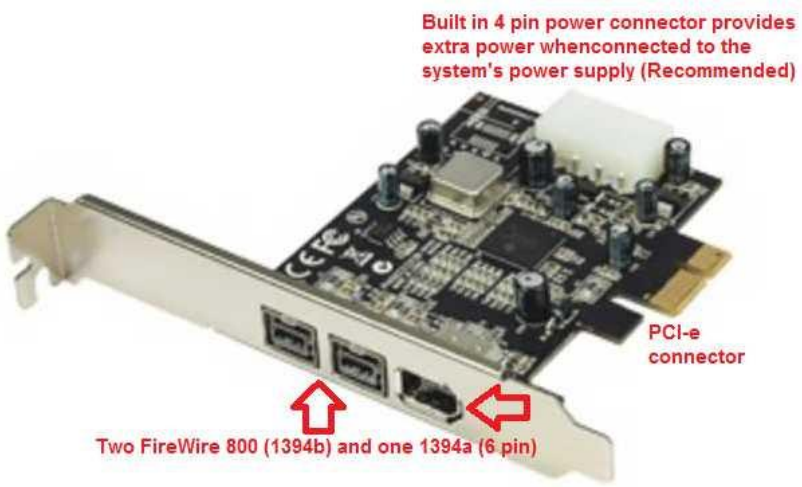
4.3.5 Basler Driver

New Firewire camera named Basler Supports Win XP as well as Win7 O/S.
The driver is the same for both O/Ss.
For more information please refer to the file Basler - Read Me.pdf under
Installation DVD \Basler\Basler - Read Me.pdf

Note – The new frame grabber name (METEOR_TYPE entry in the common SarinData.cnfg) is "Basler"

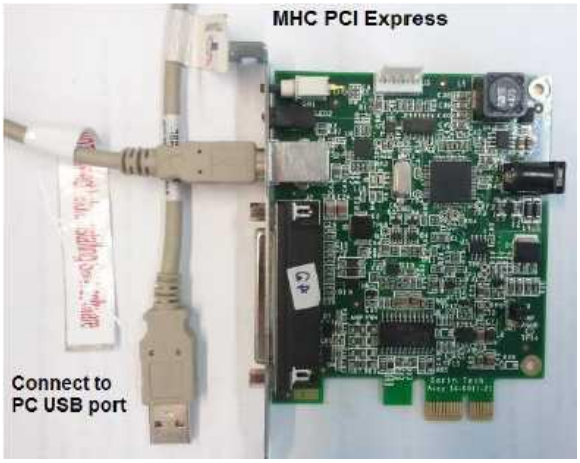
4.3.6 Firewire PCI Express

Firewire PCI-Express cards are now supported by Sarin's Applications. The new card contain (STLab manufacturer) 2 Firewire b type (will be used by Sarin in the future) and one Firewire a type. It is **recommended**, by the manufacturer, to connect the card to the computer power supply.



4.3.7 MHC PCI-Express Support:

MHC PCI-Express cards are now supported by Sarin's Applications..



For **Instructor™ 2.5** users, a manual PCI-Express installation procedure is available at the installation CD: *Install Disk\Documents\Technical Notes\MHC PCI Express manual installation*

Note: Installation should detect the MHC type (PCI or PCI-Express) automatically. If not, this dialog appears:

Select the MHC type you have and continue the installation process.

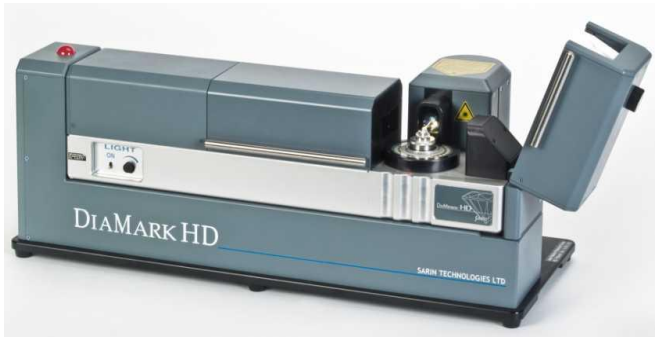
4.4 Important notes & issues

4.4.1 Hardware

4.4.1.1 New DiaMark™HD

Instructor™ 2.5 now supports the new DiaMark™HD machine enabling marking capabilities on the polish stone.

For more information please refer to the file: Installation DVD\Documents\New Feature Operation\Instructor 2.5\Instructor™ Marking feature – User guide



Notice:

- When working with Teem laser, *Teem.cnfg* file should be found inside your machine data.
- When working with Teem laser, USB to RS232 must be connected between the computer and the laser power supply to allow controlling the laser power levels.

4.4.1.2 Application settings

Instructor settings are located under three separate cnfg files.

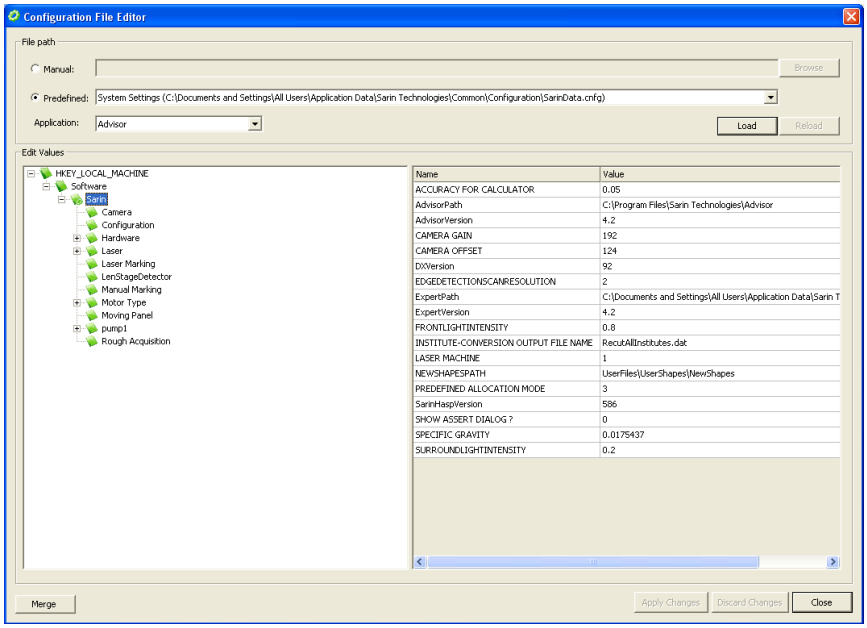
1. Current User->Sarin Technologies->Instructor is located under:
    a. XP computers: C:\Documents and Settings\<User Name>\Application Data\Sarin Technologies\Instructor\Configuration\AppData.cnfg
    b. Win7 computers: C:\Users\<User Name>\AppData\Roaming\Sarin Technologies\Instructor\Configuration\AppData.cnfg
2. Local Machine->Sarin Technologies->Instructor is located under:
    a. XP computers: C:\Documents and Settings\All Users\Application Data\Sarin Technologies\Instructor\Configuration\AppData.cnfg
    b. Win7 computers: C:\ProgramData\ Sarin Technologies\Instructor\ Configuration\AppData.cnfg
3. Local Machine->Sarin is located under:
    a. XP computers: C:\Documents and Settings\All Users\Application Data\Sarin Technologies\Common\Configuration\SarinData.cnfg
    b. Win7 computers: C:\ProgramData\ Sarin Technologies\ Common\Configuration\SarinData.cnfg

❖ Note: some computers might have different prefixes than the common mentioned above, such as All Users.WINDOWS instead of All Users.

4.4.1.3 CNFG Tool

Instructor™ 2.6 includes CNFG tool – the only way to manual configuration and importing of CNFG settings. The tool is located under the "C:\Program Files\Sarin Technologies\Instructor\Extra Files\XML Tools". The new tool replaces existing XML editing tool (same name).

Configuration Data Editor



ConfigDataEditor

- ConfigDataEditor.exe: Replaces the previous ConfigDataEditor.exe which handled XMLs:
  1. New abilities were added by mouse right click over a category (folder) to perform the additional tasks:

  2. Click the Merge button and select .cnfg file in order merge a .cnfg file (new file or exported) to the opened Sarin CNFG file (merge a partial CNFG tree into the full application setting tree. For example, after upgrading the motors, you would like to merge the relevant motor settings into the existing tree. The installation CD contains packages of different configurations that could be merged to the existing tree like \Utils\XMLSets\Motor16KHighRes.cnfg).
  3. .cnfg file types will automatically opened by double-click with this ConfigDataEditor.

4.5 Software

4.5.1.1 USB Power Management

Now, when most of the connections are doing via USB port (HASP, USB2RS232, Camera…), it is highly important to follow the Guide how to disable power management for USB plugs, in order to achieve the maximum capability for the device and to prevent errors in the future.

For more information please follow: ***How To Disable Power Management For USB Root Hubs.doc*** under: *Installation DVD\Documents\Technical Notes\How To Disable Power Management For USB Root Hubs.doc*

4.5.1.2 Windows 7 SP1

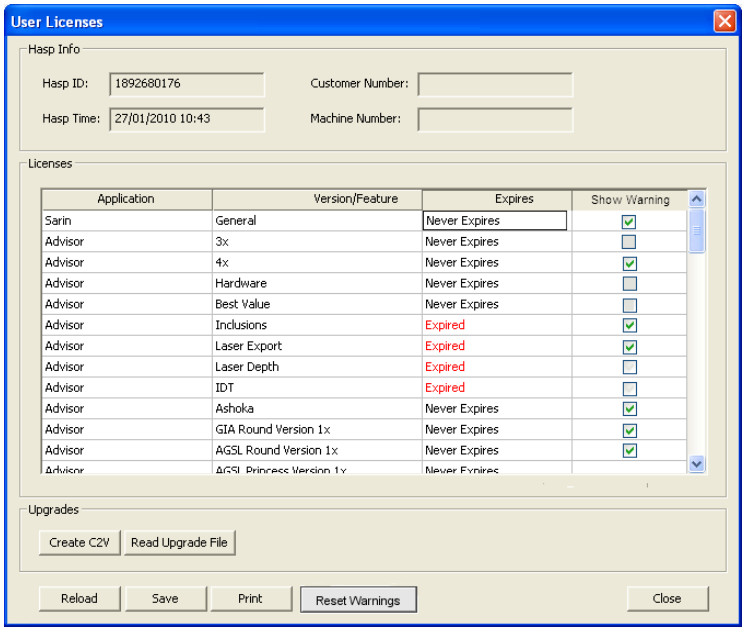
Instructor™ 2.5 fully supports Win7 SP1 O.S including all Hardware components. For this purpose the following drivers were changed and automatically installed when selected or added and installed when Win7 O.S is recognized by installation:

- All new frame grabber drivers have compatible frame grabber testers located under: Installation DVD\Utils\Support\Framegrabber testers
- USB to RS232 Cable – Support both XP and Win7 (SP1 as well) O.S Located under: Installation DVD\Utils\USB2RS232CABLE\ST-LAB\PL2303.exe

4.5.1.3 Hasp Show

Instructor™ includes HASP show feature: HASP expiry warning messages:

- This feature enables getting a warning before HASP feature is expired – time limited and executions limited, and gives you enough time to initiate the upgrade and renewal process
- The HASP Show dialog (Help→Show HASP) is now :



Whenever application is launched, there is a checking if there is any feature one or more that is about to expire:

For time limited features check if feature is about to expire in 30 days.

For executions limited features check if feature is about to expired in 50 executions.

If that check result is that expiration is about to occurred, the user gets a warning indicates feature(s) is about to expired

In the new "**Show Warning**" column, the user will be able to set whether or not to get expiration warning for specific feature. The default value is TRUE, for existing features and once upgrading or renewing (using the "Read Upgrade File")

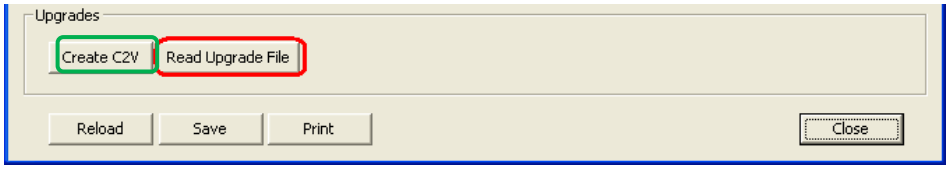
Each feature that is about to expire, time or executions (reached the "50 days before" or "M executions left") should be highlighted in RED text.

Using thee "Reset Warnings" button will change features' "Show Warning" checkbox flags to TRUE.

On Exit this dialog, all "Show Warning" setting is being saved.

You can "Read Upgrade File" (V2C format) files (small size upgrade files produce by Sarin) in order to format or upgrade the customer's HAPS within Instructor™ application. Click on the "Read Upgrade File" in the HASP Show dialog (Help→Show HASP) and select the relevant V2C file.

You can "Create C2V" file (small size information files) which need sending to Sarin in order to get new upgrade file



4.5.1.4 XCaliber 2.3

New XCaliber 2.3 version which includes:

1) Laser marking calibration support.
2) Allows controlling motor movements even if the camera wasn't properly installed.
3) Several bugs fix.

Note: New calibration procedure guide was made. Please go over before using under:
Installation *DVD\ Documents\Calibration\XCaliber - Motor Type, Laser Marking & Micron Per Pulse Calibration Procedure.pdf.*

5 Calibration

5.1 Preliminary Conditions

**Required Calibration Equipment

Each section lists the specific tools required for the calibration process of that section.

5.1.1 Stretch calibration

Lens		Streach Ball size - HD Lab [mm]		
		1	2	3
0	D mm (inch)	13	17 (11/16")	20 (13/16")
	PN	0031-83	0034-83	0035-83
1	D mm (inch)	6	10	14 (9/16")
	PN	0025-83	0029-83	0032-83
2	D[mm]	4	8	11
	PN	0024-83	0049-83	0051-83
3	D[mm]	2	4	6
	PN	0048-83	0024-83	0025-83

Stretch Calibration

Ball ID	Sarin PN	Qty
13/16" (20mm)	0035-83	1
11/16" (17mm)	0034-83	1
9/16" (14mm)	0032-83	1
13	0031-83	1
11	0051-83	1
10	0029-83	1
8	0049-83	1
6	0025-83	1
4	0024-83	1
2	0048-83	1

5.1.2 Engine rotation axis angle Calibration

Affix the different ball identification (Ball ID) labels to the matching platform/stage

(Stage ID) according to the following chart:

Axis Calib

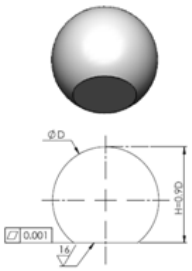
Lens	Stage		Ball	
	Stage ID	Stage PN	Ball ID [mm]	Ball PN
0	Platform i#0	14-0158-00	8	0049-83
1	Platform,#I1	14-0108-00	6	0025-83
2	Platform,#I2	14-0109-00	4	0024-83
3	Platform,#I3	14-0110-00	2	0048-83

5.1.3 Calibration fix, height and stage (Fix Plate)

Lens		Fix Plate Ball size - HD Lab [mm]		
		1	2	3
0	D[mm]	13	17 (11/16")	20
	PN	03-0117-03	03-0125-03	03-0120-03
1	D[mm]	6	9	13
	PN	03-0112-03	03-0114-03	03-0117-03
2	D[mm]	4	6	8
	PN	03-0111-03	03-0112-03	03-0113-03
3	D[mm]	4	6	
	PN	03-0111-03	03-0112-03	

Fix Plate calibration

Graund Ball ID	Sarin PN	Qty
20	03-0120-03	1
17	03-0125-03	1
13	03-0117-03	1
9	03-0114-03	1
8	03-0113-03	1
6	03-0112-03	1
4	03-0111-03	1



5.1.4 Calibration BOM (P/N) HD

Calib Stage	Lens	Description	PN	Mfg	Field - Support	Comment
Stretch	0	13/16" (20mm)	0035-83	√	√	
	0	11/16" (17mm)	0034-83	√	√	
	1	9/16" (14mm)	0032-83	√	√	
	0	Ball 13	0031-83	√	√	
	2	Ball 11	0051-83	√	√	
	1	Ball 10	0029-83	√	√	
	2	Ball 8	0049-83	√	√	
	1,3	Ball 6	0025-83	√	√	
	2,3	Ball 4	0024-83	√	√	
	3	Ball 2	0048-83	√	√	
Axis Calib	0	Platform i#0	14-0158-00	√	√	Glow the stones to the stages
	1	Platform,#I1	14-0108-00	√	√	
	2	Platform,#I2	14-0109-00	√	√	
	3	Platform,#I3	14-0110-00	√	√	
	0	Ball 8	0049-83	√	√	
	1	Ball 6	0025-83	√	√	
	2	Ball 4	0024-83	√	√	
	3	Ball 2	0048-83	√	√	
Fix Plate	0	Ground Ball 20	03-0120-03	√	√	
	0	Ground Ball 11/16" (17mm)	03-0125-03	√	√	
	0,1	Ground Ball 13	03-0117-03	√	√	
	1	Ground Ball 9	03-0114-03	√	√	
	2	Ground Ball 8	03-0113-03	√	√	
	1,2,3	Ground Ball 6	03-0112-03	√	√	
	2,3	Ground Ball 4	03-0111-03	√	√	

5.2 Calibration and Stretch Testing

1. Insert the first lens into the machine.
2. Insert the wide stage that is used with this lens and clean it thoroughly.
3. Adjust the aperture of the illumination and that of the lens you are using for this calibration.
4. Go to the **Lens/Stage Controls** tag.
5. Insure you are using the correct lens.
6. Click the 

button

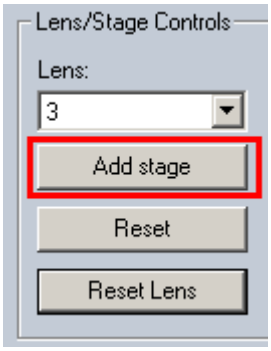


fig.1.1

7. Click **Save** and then **Accept**.
8. Go to the **Stretch Calibration** tab (fig. 1.2)

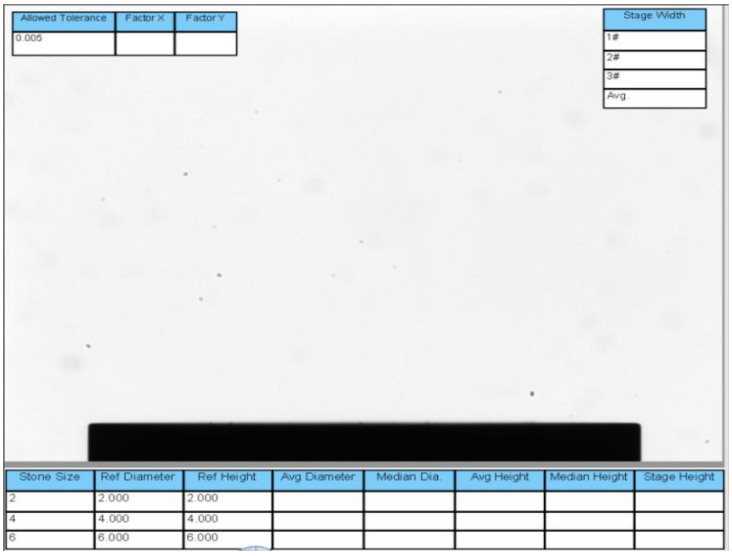


Fig. 1.2

9. Confirm that the right parameters are according to picture 1.3 and according to the mounted lens. The left chart presents the types of balls to use for calibration in the **HD LAB** machine.

Lens	Streach Ball size - HD Lab [mm]		
	1	2	3
0	13	17	20
1	6	10	14
2	4	8	11
3	2	4	6

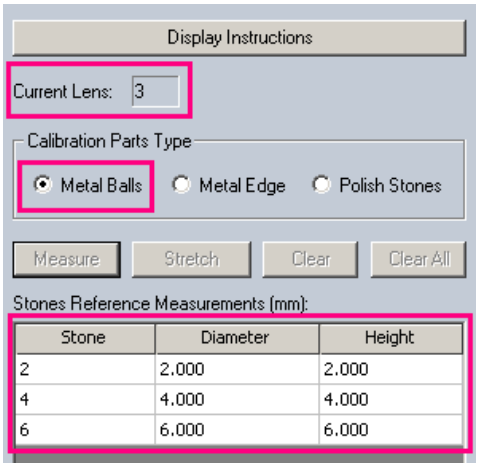


Fig 1.3

If the Stones **Reference Measurement** table does not reflect the actual ball sizes you require you can change the table values to the required sizes.

If you are using **Advisor** go to:

C:\Documents and Settings\AllUsers\ApplicationData\SarinTechnologies \Advisor\XCaliber\ Configuration\Calibration

OR

If you are using **DiaVision** go to:

C:\Documents and Settings\All Users\Application Data\Sarin Technologies\ DiaVision\XCaliber\Configuration\Calibration

10. Right click on the **StretchReference.xml** & Edit file
11. Update the parameters of the stones under **HDLabEdition -ML**

12. Click **File** and then **Save**.
13. Close **XCaliber** and reload it again to update the ball size parameters.
14. Make sure the stage and ball are perfectly clean.
15. Place a ball on the center of the stage.
16. Depending on the ball size mounted on the stage, select the correct line entry as shown in the table below (2.00).

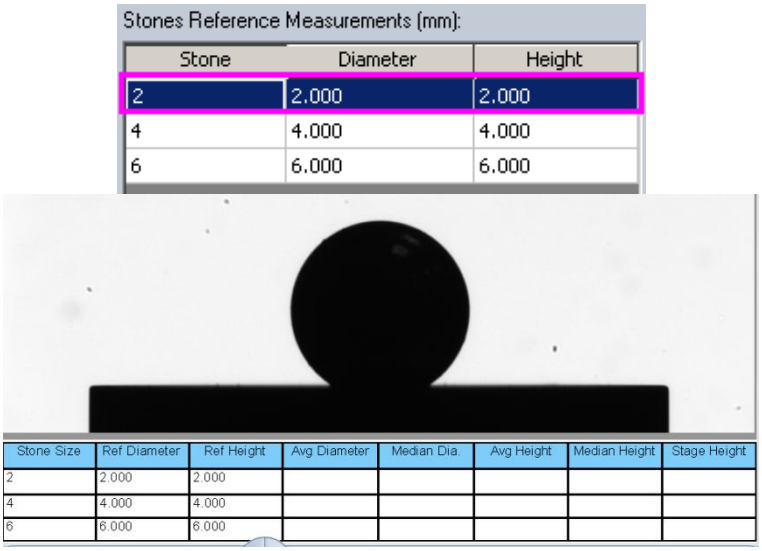


Fig. 1.4

17. Click the **Measure** button.
18. Repeat the above sequence of instructions for the remaining balls.

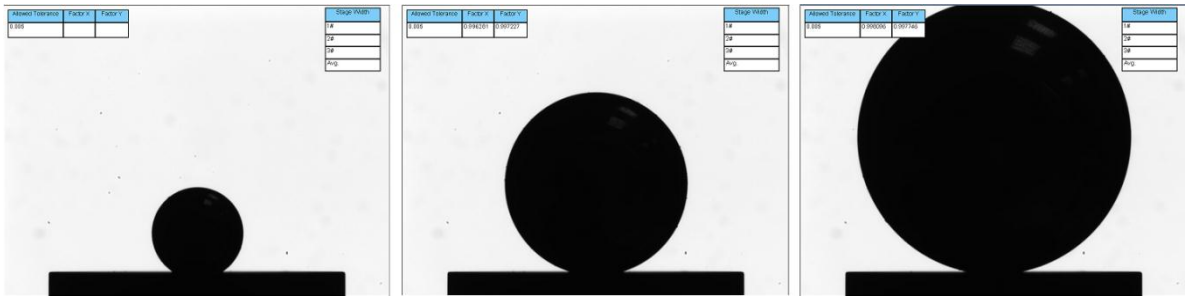


Fig 1.5

19. When you have completed the calibration with all three balls, the three results are displayed on the screen.

    When the results show a large deviation of more than ± 1 mm (1000 micron) you cannot continue as it means that the ball parameters were incorrect. You must go back and correct the parameters and then do a recalibration until the maximum deviation is less than 1 mm.

    If the results do not deviate more than 1 mm, click the **Stretch** button.(Fig.1.6) and XCaliber will execute a repair.

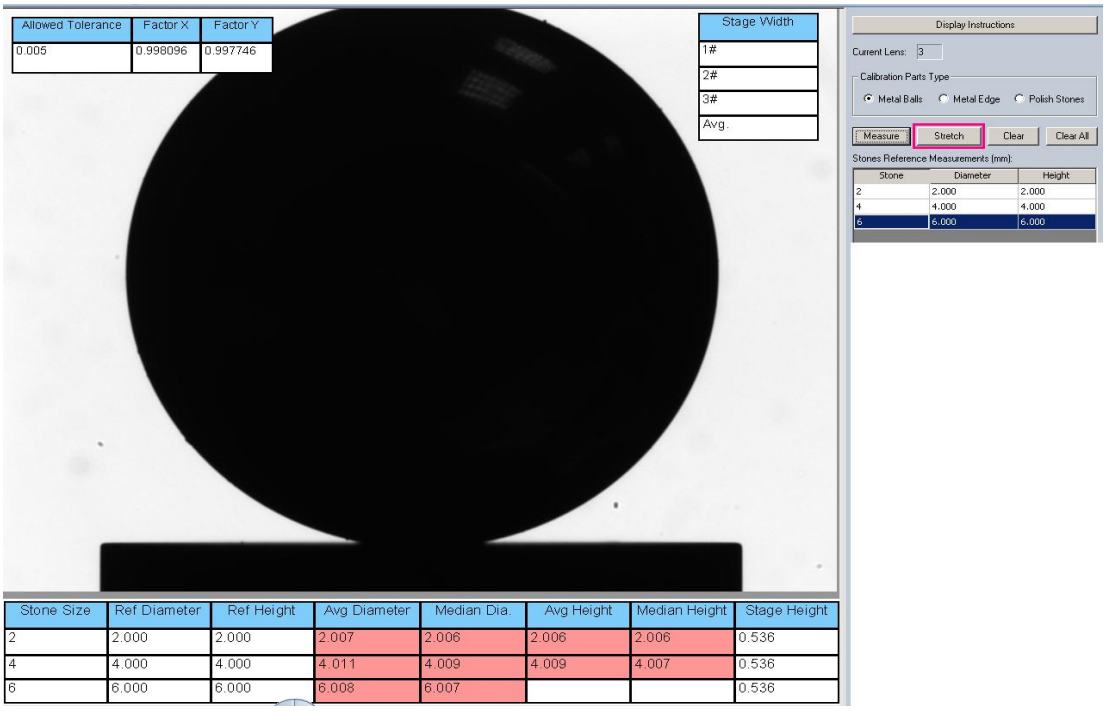


Fig. 1.6

20. A message asking you to save the Stretch is displayed.

21. Confirm the Stretch.
22. Repeat the measuring of the three balls as shown in figures 1.5 – 1.6, the four columns as shown in fig 1.7 need to have a white background. If one or more columns are colored red you will have to click the Stretch button and re-measure. Sometimes because of an error in the measurement it is sufficient to perform another measurement to get a result in the required range. In this case you do not have to perform another Stretch.

Stone Size	Ref Diameter	Ref Height	Avg Diameter	Median Dia.	Avg Height	Median Height	Stage Height
2	2.000	2.000	2.003	2.001	2.001	2.001	0.534
4	4.000	4.000	4.001	4.000	3.998	3.998	0.534
6	6.000	6.000	5.996	5.996			0.534

Fig 1.7

23. Repeat stages 1-14 for all the machine lenses.

5.3 Measuring and calibrating the motor axis deviation (Local Axis)

1. Install lens number 3 (or the next big lens after that if you don't have one) and its corresponding stage.
2. It is necessary to clean the bottom of the stage.
3. Align the illumination aperture (Iris) according to the lens.
4. In the Light Calibration tag chose the appropriate lens.
5. Move to the Accuracy Calibration tag.
6. Clean the stage and place a suitable calibration ball as indicated in the software to the suitable lens.
7. Clean the ball.

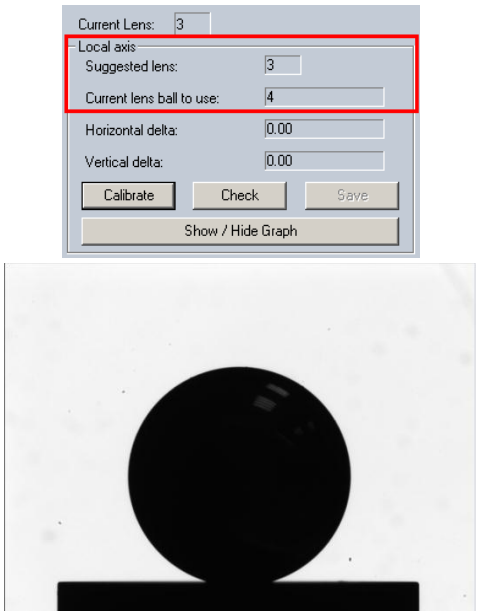


Fig. 2.1

8. Click **Calibrate**.

   XCaliber now measures the deviation of the engine axis multiple times as part of the calibration process.

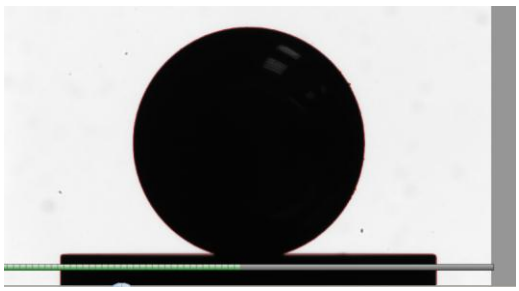


Fig 2.2

9. At the conclusion of the calibration process, in the **Local axis** pane (shown below), make sure the results are less than **0.5µm**.

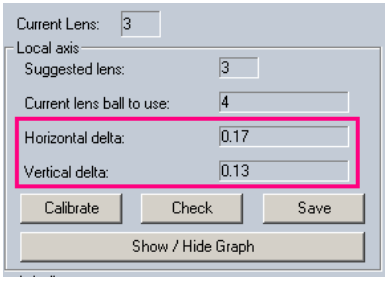
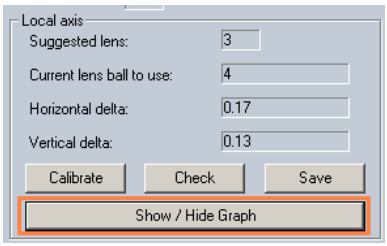


Fig 2.3

10. If the results meet the requirements, click the **Save** button.

    The results are saved and a graph describing the variation of the motor spindle is displayed.

11. Click the **Show / Hide Graph** button.



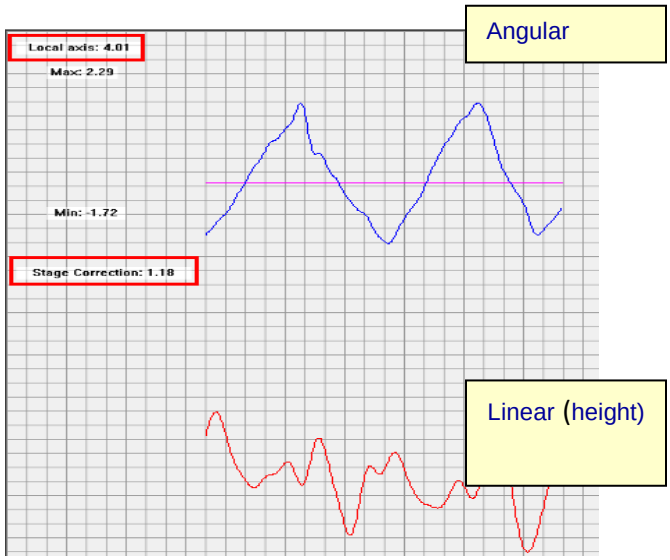


Fig 2.4

12. Make sure the values of **Local Axis<5.5** and **Stage Correction<1.6**.

13. You now have to confirm that the starting point of the angular graph and its end part (see fig 2.5) continue one another, if not, you probably did not measure the whole engine perimeter or this is a different recurring engine (motor) problem, it is recommended to measure again after making sure that the ball is clean.

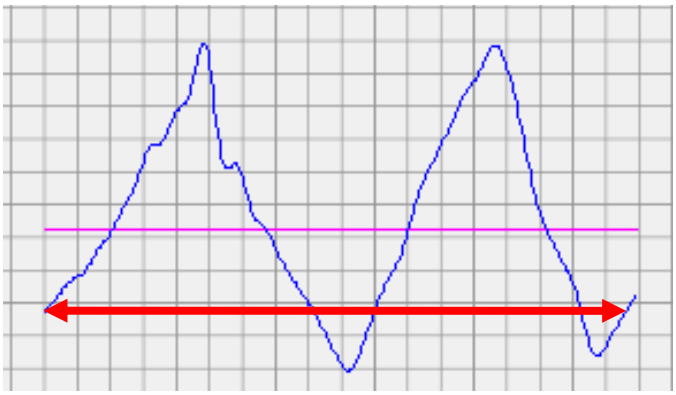


Fig 2.5

Press the **Show / Hide Graph** button again in order to exit the graph and return to the program.

Note:

- If the results are more than the allowed (limit values), then clean the stage and the ball, and re-calibrate again.
- In case those values are more than the allowed specified limits, than Motor replacement and recalibration is required (refer to motor replacement procedure, see trouble shooting).

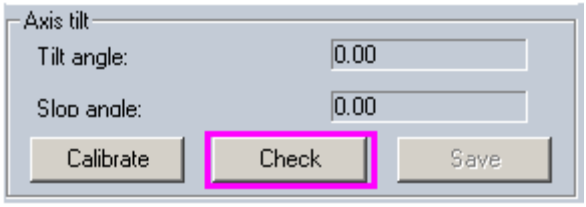
5.4 Testing and calibration of Engine axis rotation angle (Axis Tilt)

1. Install the first lens and its matching stage and ball.

   It is important to clean the bottom of the stage and align the aperture of the illumination according to the lens.

Fig 3.1

2. In the **Light Calibration** tag, select the correct lens.
3. Select the **Accuracy Calibration** tag.
4. Clean the stage and ball, then click on **Check**, make sure that the result for the **Tilt** and\or the **Slop** is less than 0.2, if it's higher than 0.2, contact Sarin Support for instructions.



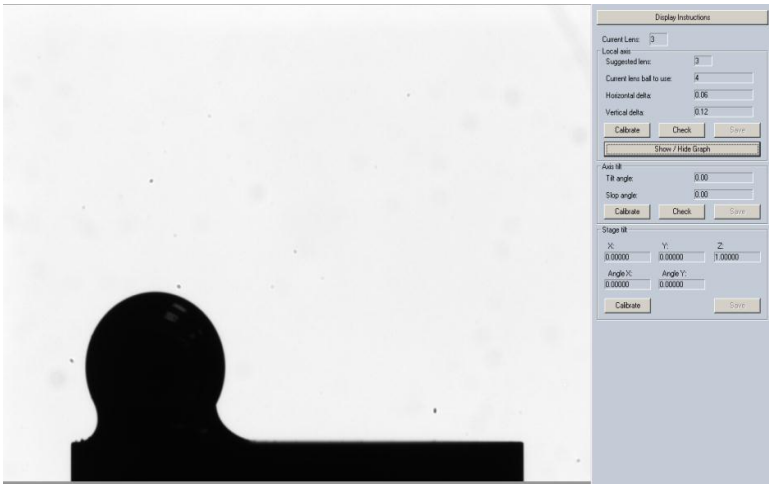


Fig 3.2

5. Click **Calibrate**.

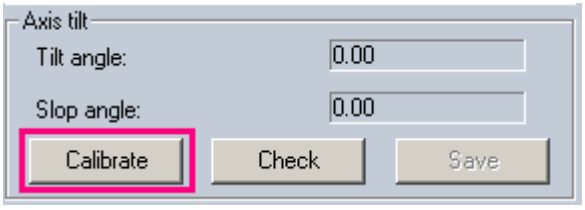
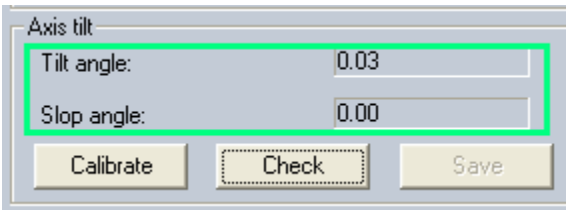


Fig 3.3

6. At the end of the measurement the slope Tilt and the slope results are displayed.



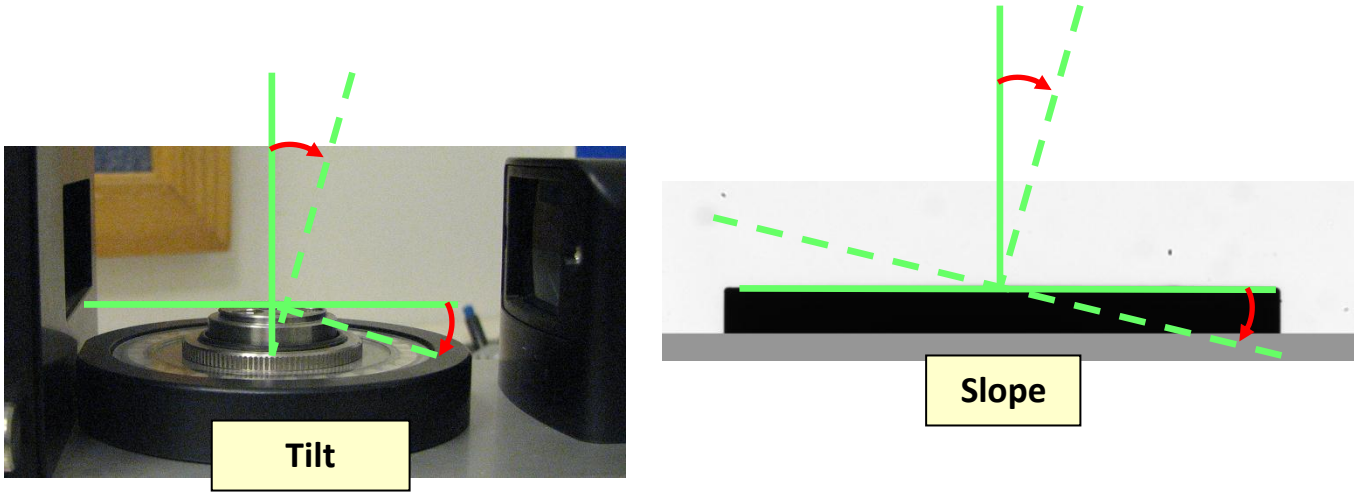


Fig 3.4

7. Make sure the results are less than **0.05**.
8. The axis **Slope** is repaired by the software.
9. Repeat stages **1-9** on all the machine lenses.
10. If the results are higher than the allowed spec, contact Sarin support.

5.5 Lens – Stage calibration and Stage – Angle calibration (Stage Tilt)

This section shows you how to teach the machine to identify the stage for each lens as well as measure the circumference of the installed stage. XCaliber then creates correction tables for each lens and stage pair (set) enabling it to compensate for any tilt in the stage and drive mechanism.

NOTE: This process must be performed for each lens/stage pair you have for each machine.

When selecting a specific lens XCaliber must be able to determine the correct stage to mount using the following table. (Select a lens from those available for your machine).

		Stages Names									
		Wide					Narrow				
		0_1	0_2	1	2	3	0	1	2	3_1	3_2
	Stage names	W0		W1	W2	W3	N0	N1	N2	N31	N32
Tool Lenses	0	X		X			X	X			
	1			X	X			X	X		
	2				X	X			X	X	X
	3					X				X	X

Fig 4.1

1. Select the **Lens/Stage Selection** tag and click the **Reset Lens** button

   WARNING This will erase all the lens and stage definitions in the machine.
2. If you have read the warning above, click the **Save** button.
3. Insert a lens into to the machine and define the illumination aperture (Iris) that is suitable to this lens.
4. Place a stage in the machine according to table 4.1.

   i.e. – lens 2 should be able to identify 5 stages after this calibration, stages W2, W3, N2, N31 and N32. 'W' for 'Width' stages, 'N' for 'Narrow' stages, the number attached to the latter is the lens which the stage originally designed for (W3 is Wide stage of lens 3).
5. First clean the bottom of the stage and the machine stage before installing it.
6. Clean the upper part of the stage.
7. Enter a name of the stage according to table 4.1. See figure 4.2.

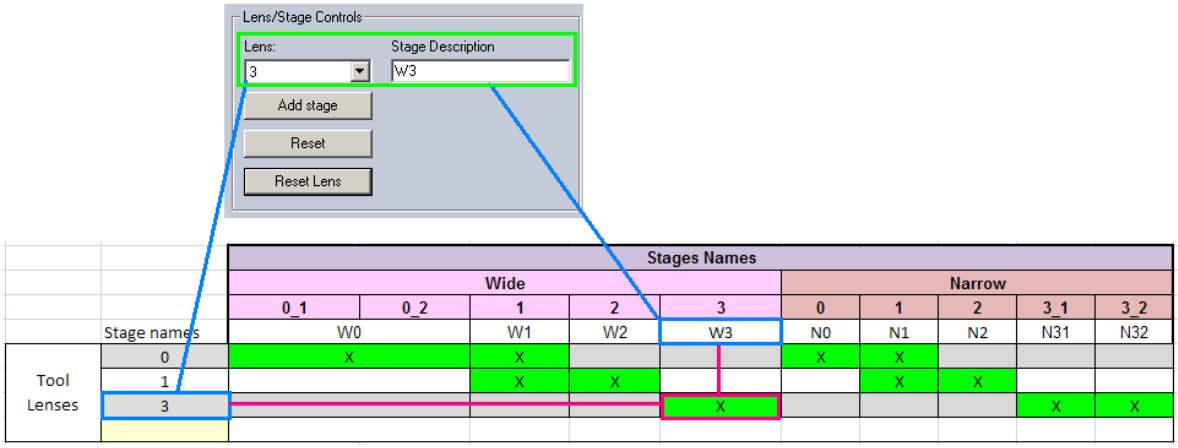


Fig 4.2

In the following example (Figure 4.2) lens 3 with stage 3 wide are installed (W=Width) and is named W3.

8. Click the **Add Stage** button and then **Accept**.
9. Click the **Save** button and then **Accept**.

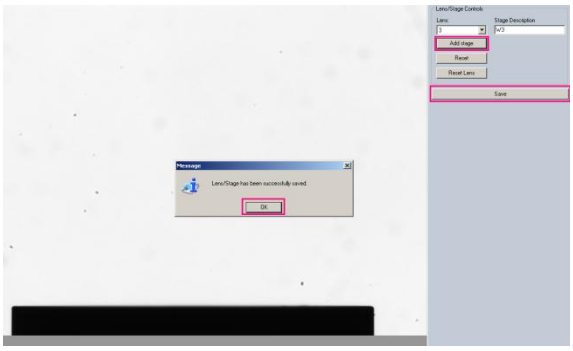


Fig 4.3

10. Select the **Accuracy calibration** tag and in the **Stage Tilt** pane, click **Calibrate**.

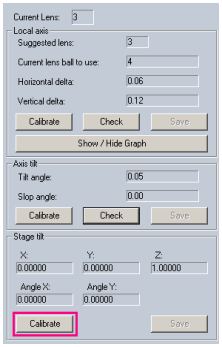


Fig 4.4

11. The machine measures the slope of the stage.

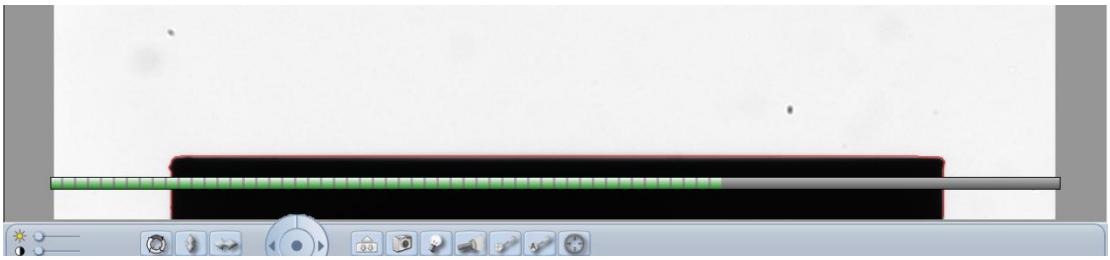


Fig 4.5

12. After the measurement is completed, click the **Save** button and confirm that the angle values are not larger than 0.05. If they are, clean the stage (or\and clean under it too, if required) and perform the measurement again, if the problem persist, replace the stage or contact Sarin Support.

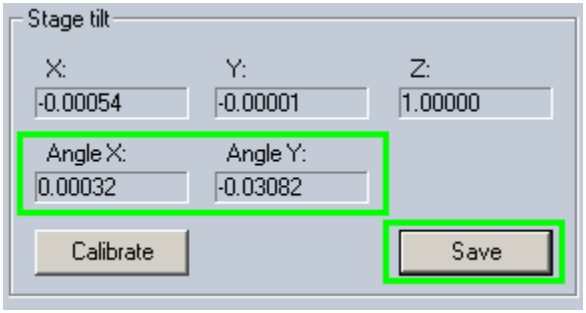


Fig 4.6

13. Repeat stages **4-13** for all stages on the current lens.
14. Repeat stages **3-14** on all the machine lenses.

5.6 Height and Table calibration repair

1. Install a lens and wide stage (suitable to the lens), adjust the illumination aperture (Iris) that is suitable to the lens and define the correct illumination.

Note: there are lenses with more than one wide\narrow stage. The calibration should be done for all stages which is suitable for the specific lens. According to the table, it's possible to know which stages to calibrate per lens.

Lens – Stage כיול

		Stages Names									
		Wide					Narrow				
		0_1	0_2	1	2	3	0	1	2	3_1	3_2
	Stage names	W0		W1	W2	W3	N0	N1	N2	N31	N32
Tool Lenses	0	X		X			X	X			
	1			X	X			X	X		
	2				X	X			X	X	X
	3					X				X	X

Fig 4.7

When observing the following table (figure 4.7) you can see that for lens '2' stages 'W2', 'W3', 'N2', N3_1 and N3_2 will have to be calibrated according the fix plate calibration

2. Clean the stage and select the **Fix Plate Calibration** tag

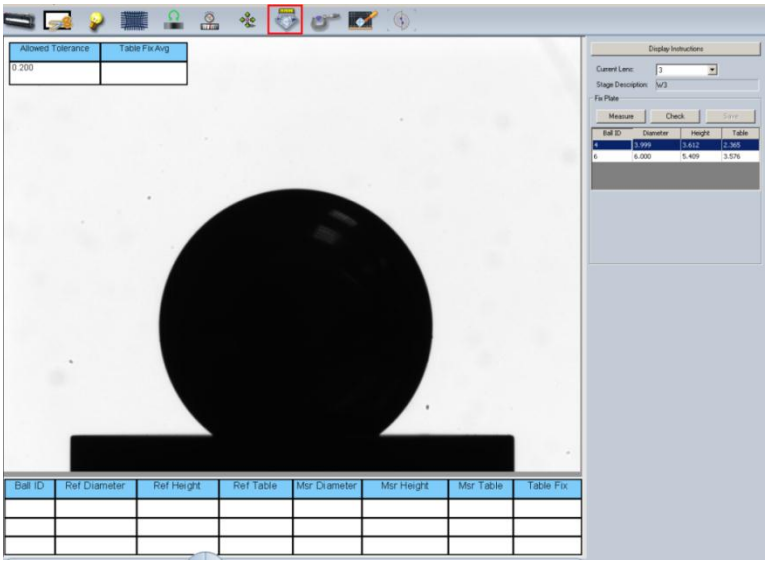
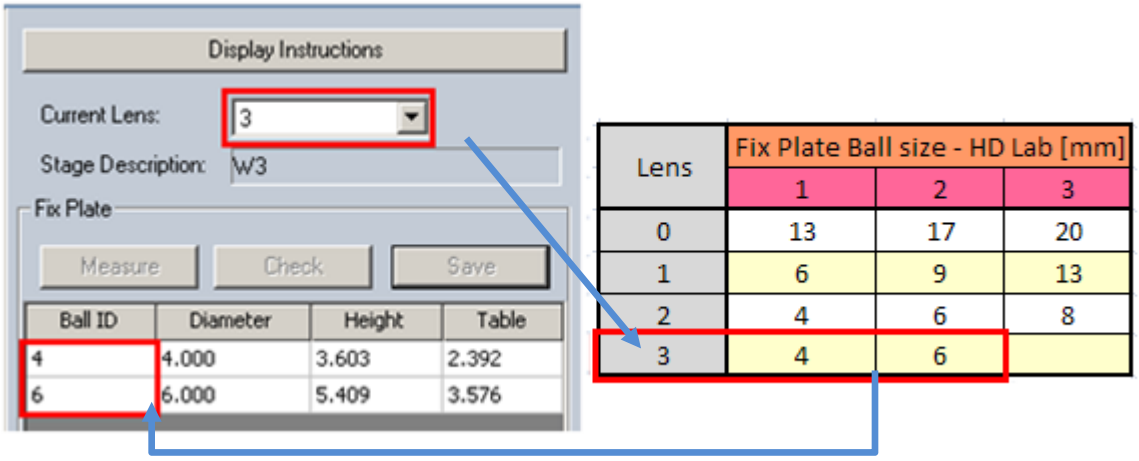


Fig 4.8

3. Ensure that the stone parameters are correct according to the lens. See figure 4.9.



Lens	Fix Plate Ball size - HD Lab [mm]		
	1	2	3
0	13	17	20
1	6	9	13
2	4	6	8
3	4	6	

Fig 4.9

4. Ensure that the diameter, height and size of the ball table are compatible to the physical size of the measured balls.

5. If the values are wrong and you need to update them, go to:

If you are using **XCaliber under DiaVision** go to:

C:\Documents and Settings\AllUsers\ApplicationData\SarinTechnologies \DiaVision\XCaliber\ Configuration\Calibration

Or if you are using **XCaliber under Advisor** go to:

C:\Documents and Settings\AllUsers\ApplicationData\SarinTechnologies \Advisor\XCaliber\ Configuration\Calibration

right click the file **FixPlateReference.xml** and edit.

Update the parameters under **HDLabEdition-ML**: See path below.

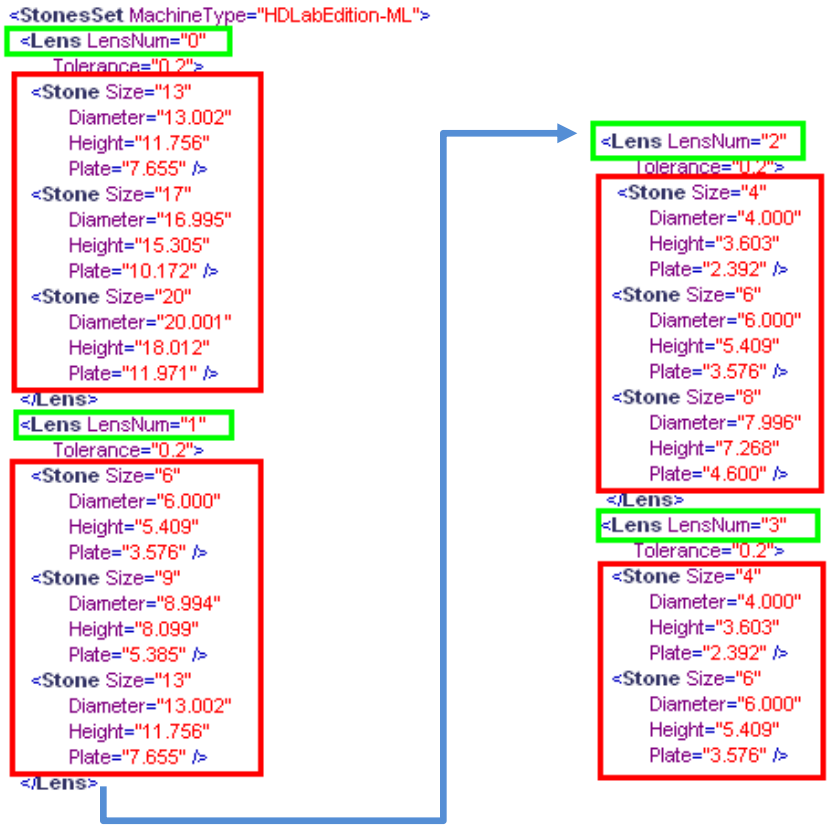


Fig 4.10

If one of the balls was replaced and the height and diameter parameters were measured differently, the measured parameters will have to be updated to the XML file (before starting the calibration process, in order to allow XCaliber to update its parameters before the calibration), Sarin Support should supply the balls parameters with the balls.

6. Click **File** and then click **Save**.
7. Close XCaliber and then reopen so that the changes can be updated.

8. Take a sharpened ball, clean it well and place it on the stage.
9. In the **Fix Plate** chart mark the measured ball and click **Measure** (figure 4.11).

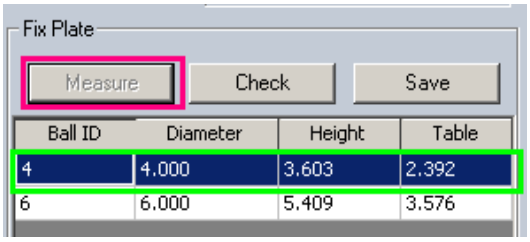


Fig 4.11

10. Repeat steps 8- 10 for the remaining balls of the current lens.

    At the end of each measurement you will get the diametrical, height and width result of the stage for the sharpened ball. For each ball, make sure the measure diameter is deviate no more than ±0.005 μm from the reference diameter value of the sharpen ball. If it deviates more than the spec, measure again after cleaning the ball thoroughly, if the problem consists, there might be problem with the stretch calibration.

11. After measuring all balls for the lens, make sure the Table Fix doesn't deviate more than ±0.005 from one to another, if there is a deviation, measure again the ball with the higher deviation.

12. If the test passed, click **Save**, and then **OK**.

    The value displayed on the pop up message is the height and table repair average for all the measurements to the same lens.

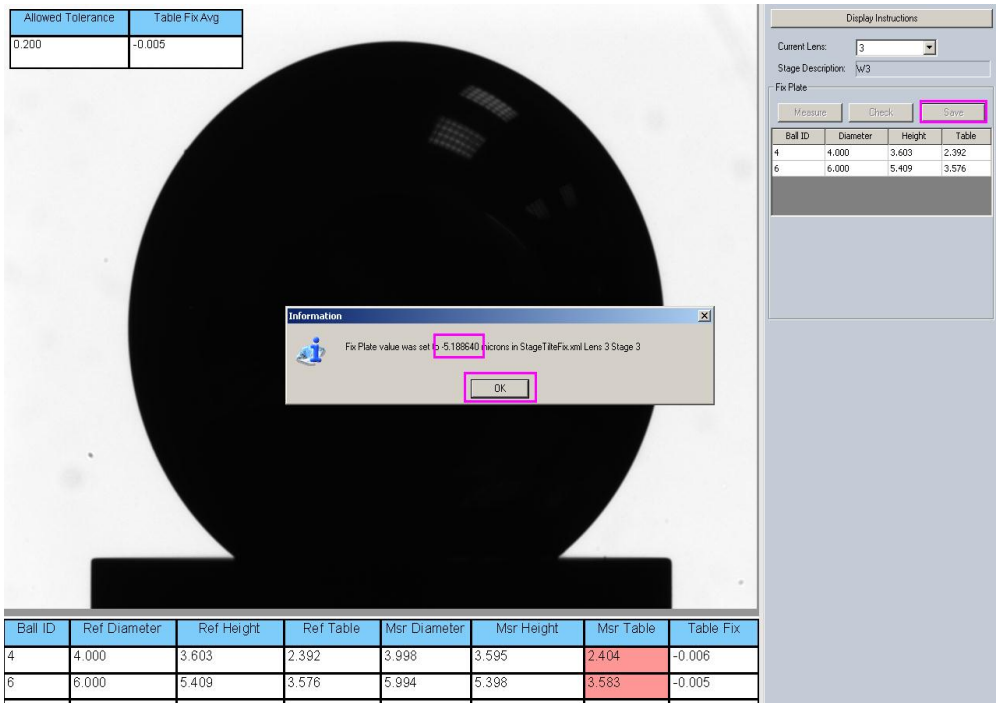


Fig 4.12

13. To test, place one of the balls, already perfectly cleaned, and place it on the stage

…Continue next page

14. In the **Fix Plate** chart mark the measured stone and then click **Check** (figure 4.13).

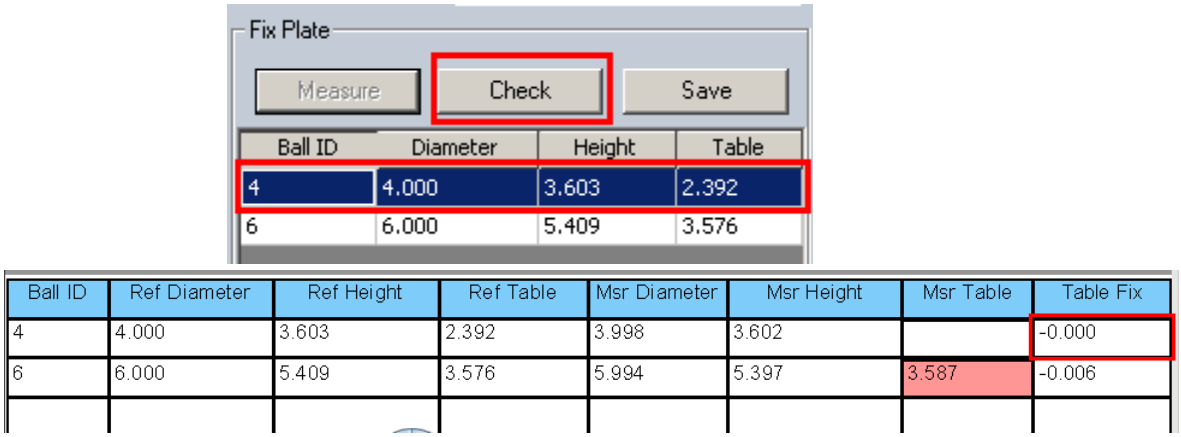
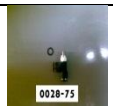


Fig 4.13

15. Ensure that you get the proper result (the background of the Table fix should be white).

16. Repeat sections **1-16** for all the machine lenses and for all the stages that match those lenses as described in the table 4.1 (Figure 4.1).

6 Parts and P/N

#	Picture	Part Description	Part Number (P.N)
		HASP HL Time Ver 3.21-6.1 RoHS	0191-95
		Fuse 5x20 SLOW-BLOW 0.2A P-230v	13202E
		External Pump Assy 230VAC	14-0005-10
		Pump Relay	20001E
		Wiring Pump 115v	50006A
	Picture	***Part Description***	***Part Number (P.N)***
		EC1380 High Sensitivity CCD camera with IEEE 139	0006-73
		Run Tee pd 6-M6M	0028-75

		Back Light With IRIS Assy	03-0160-10
		Magnet for Hood.	10037E
		External Cable	14-0001-19
		Motor Assy Exp	14-0002-10
		Sensor Card Assy	14-0002-21
		Internal Cable	14-0007-19
		Prosilica Camera Holder Assy	14-0012-10
		Basler Camera Assy	14-0061-10
		Prism Housing Assy	14-0018-10

		Prism Ring	19626M
		Silicon 'O' Ring 2-0008	30001M
		Mirror Assy. (Expert)	30009A
		Hood	40008A
		Pump Wiring 230v	50005A
		Bottom Light assy Board	60202E
		Motor Flange (16000) DIM/EXP/XL	60203M
		ON/OFF Switch	61106E
		Bottom Light Cable	70504AC

			
		MHC-PCI to Com1 Cable	70505AC
		Pump Control Cable	70540AC
		Optic Cover Ground Cable	70549AC
		Light Hood Ground Cable	70550AC
		MHC-PCI (Jumper DM/EXP/SL/DS/DP)	80016E
			
		PCI e card	0260-95
		Fire Wire Cable IEEE1394 2m male to male	0060-89
		Fire Wire inner cable 7" male to female B to B	0048-89

		Fire Wire inner cable 7" male to female A to B	0061-89

6.1 Lens – Stage configuration (P.N. included)

	Lens 0	**Lens 1**	**Lens 2**	**Lens 3**
HD machine	03-0203-10	03-0204-10	03-0205-10	03-0206-10
Stages that fit Lens	03-0259-10 03-0262-10 03-0263-10 14-0326-00 14-0328-00	03-0259-10 03-0260-10 14-0328-00 14-0328-00	03-0260-10 03-0261-10 14-0330-00 14-0331-00 14-0332-00	03-0261-10 14-0331-00 14-0332-00

6.2 Calibration kit P/N per DiaMension-HD lens

6.2.1 Each kit Includes:

1. Set of Balls – stretch balls
2. Axis Calibration (stage + ball)
3. Set of grounded balls - Fix Plate Balls

Lens 0	Ball 13/16" (20mm)	0035-83
	Ball 11/16" (17mm)	0034-83
	Ball 13	0031-83
	Platform i#0 + Ball 8	03-0255-10
	Ground Ball 20	03-0120-03
	Ground Ball 18	03-0119-03
	Ground Ball 13	03-0117-03

Lens 1	Ball 9/16" (14mm)	0032-83
	Ball 10	0029-83
	Ball 6	0025-83
	Platform,#I1 + Ball 6	03-0256-10
	Ground Ball 13	03-0117-03
	Ground Ball 9	03-0114-03
	Ground Ball 6	03-0112-03

Lens 2	Ball 11	0051-83
	Ball 8	0049-83
	Ball 4	0024-83
	Platform,#I2 + ball 4	03-0257-10
	Ground Ball 9	03-0114-03
	Ground Ball 8	03-0113-03
	Ground Ball 6	03-0112-03

Lens 3	Ball 6	0025-83
	Ball 4	0024-83
	Ball 2	0048-83
	Platform,#I3 + Ball 2	03-0258-10
	Ground Ball 4	03-0111-03
	Ground Ball 6	03-0112-03