



LumetriScan Software Suite V4.2

User Manual

Revision: B

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2 Introduction

LumetriScan Software Suite is an advanced software package designed to control Lumetrics' LumetriScan family of products. Using LumetriScan Software Suite, the user is able to coordinate the motion control of LumetriScan hardware with the highly accurate OptiGauge optical measurement sensor.

Using LumetriScan Software Suite allows the user to create specialized scan routines to inspect a variety of parts repeatedly, reproducibly, and accurately.

3 Notices

3.1 Manual Revision History

- A. 2011-12-09 Initial release
- B. 2013-06-20 Windows 7 Compliance

3.2 Software Release Notes

LumetriScan Software Suite V 3.0

- 1) Initial software release

LumetriScan Software Suite V 3.1

- 1) Various bug fixes and enhancements

LumetriScan Software Suite V 4.2

- 1) Windows 7 compliance
- 2) Recipe creation tool for tubes

3.2.1 Known Issues

- 3.2.1.1 The Part Recipe Editor may ask you to “Save Changes” upon exiting, even when no changes have been made.
- 3.2.1.2 When using the + or – Jog Button in the manual control tab, the numerical stage readout may show an incorrect readout. This does not indicate a controller error.
- 3.2.1.3 You may encounter a false positive on the limit switch sensor during manual moves. Click OK to dismiss the message.
- 3.2.1.4 Tripping a limit switch may not trigger the “Limit Detected” message. The system will still properly sense the limit and stop appropriately, just without displaying the message.
- 3.2.1.5 When performing software uninstall, not all LumetriScan related files are removed. These files are recipes, profiles, data, as well as software setting files. This is by design. To remove, locate and delete the following directories in Windows 7:
 - C:\Program Data\Lumetrics;
 - C:\Lumetrics\LumetriScan
 - C:\Users\<username>\AppData\Local\Lumetrics\LumetriScan
 - C:\Users\<username>\AppData\Roaming\Lumetrics\LumetriScan

- 3.2.1.6 The Digital Input Indicators UI response time is associated with the OCC Noise Reduction level. As Noise Reduction increases, UI response time is decreased.
- 3.2.1.7 Attempting to run a report with an improperly configured Work Order Summary tab, while the Work Order Summary feature is enabled in the software, may crash the system, requiring a restart of OCC services and LumetriScan Software Suite.
- 3.2.1.8 The software may incorrectly detect the E-STOP status if the software is started without the OCC services running. The OCC services automatically run on startup to avoid this issue, but in the event the services encounter a problem and crash, the computer may need to be restarted.
- 3.2.1.9 Software is currently only compatible with the LumetriScan 360 hardware.
- 3.2.1.10 A buffer of 1000 points is used in UI Trend charts. If the total number of points exceeds 1000, only the last 1000 will be visible.
- 3.2.1.11 UI Trend charts do not update smoothly if the total number of points exceeds 3500. As a result, UI becomes sluggish or unresponsive.
- 3.2.1.12 Scan Duration timer will become inaccurate if UI becomes sluggish and the total number of collected points exceeds 3500.
- 3.2.1.13 Repeated clicking of UI buttons (such as the start button) can result in instability, requiring system restart.

3.3 Required Software

The following software packages must be installed in order to use LumetriScan Software Suite

- 1) OptiGauge Control Center 7.0 (or higher)
- 2) Microsoft Excel 2010
- 3) RS-485 to USB Drivers
- 4) National Instruments 9.6.2 Drivers

3.4 Compatible Hardware

LumetriScan Software Suite is only designed for use with the following Lumetrix devices:

- 1) LumetriScan 360-12
- 2) LumetriScan 360-36
- 3) LumetriScan RoLSS (formerly known as RoLSS)
- 4) LumetriScan XY – Standard (formerly known as XY Scanner)
- 5) LumetriScan XY – High Speed

4 Getting Started

The Getting Started section is intended for new users that are just getting acquainted with the measurement process on an already existing and configured LumetriScan system.

4.1 User Login

The user begins by logging into Windows on the OptiGauge Controller using their username and password. This username can be configured locally or as part of your company's internal network.

4.2 Opening the Program

Double-click the LumetriScan Software Suite icon on the desktop. Once opened, the software will automatically home all axes, then notify the user via the Status Bar when the system is ready.

4.3 Load Profile and Recipe

Click "Fixture Profile," select the desired item and click load. Repeat steps for "Part Recipe." Profiles may be created edited or deleted at this step.

4.4 Begin Work Order

Click "Work Order" and type the name of a new or existing work order. The User may select from a dropdown menu of existing work orders.

4.5 Enter Part IDs

The user then optionally enters text for any or all of the three PartID fields. These fields are used in naming the data files created following the completion of a scan.

4.6 Load Sample

The user loads a sample into the device using the pneumatic clamps and intermediary supports. The user checks the regulator pressure to ensure the system is set as desired. Clamps may then be engaged and balloons inflated where applicable. Refer to your internal product inspection test sheet for pressure levels to set each regulator prior to activation.

4.7 Measure the Sample

The user clicks the Measure button. The system performs the scan according to the loaded recipe. A status message appears above the measurement button indicating the next steps required in the measurement process.

4.8 View the Report(s)

Following the completion of the scan, the system displays on screen the measurement data and whether the parts passed or failed inspection, and saves a report for the sample.

4.9 Remove the Sample

The sample may be removed from the device after motion ceases. The user may elect to continue scanning more samples or end the work order and move on to a different task.

5 Software Installation

All software comes pre-installed from the factory. This section is for reference only or in the event you must reinstall software following a hard drive failure.

5.1 Install LumetriScan Software Suite

- 1) Load the LumetriScan Software Suite disc into the DVD drive.
- 2) Navigate to the following path and double-click the setup file found here:
E:\setup.exe
("E:" is the drive letter of the DVD drive, this may differ on your computer)
- 3) Click "Next" or "Continue" to all prompts.

5.2 Hardware Drivers (optional)

- 1) Load the disc labeled "LumetriScan 360-36 Hardware Drivers" into the optical drive.
- 2) Copy the contents of the disc to the computers desktop.
- 3) Run "setup.bat"
- 4) Verify the command prompt indicates "1 file has installed successfully"

5.3 Install Microsoft Excel

- 1) Log in as a user with sufficient program installation privileges.
- 2) Install Microsoft Excel according to the instructions that came with the software.
- 3) Use all default installation paths.
- 4) Make sure a CUSTOM installation is performed, where all software options are selected to 'Run from my computer.

5.3.1 Microsoft Excel Configuration

This section must be configured every time a new user establishes a local profile on the OptiGauge Controller.

Once the software is installed, it must be specially configured for use with the LumetriScan Software Suite.

- 1) Open Microsoft Excel 2010. (Directions for Microsoft Excel 2007 may differ slightly)
- 2) Navigate to OPTIONS under the File menu
- 3) Select CUSTOMIZE RIBBON
- 4) Check the DEVELOPER checkbox seen on the right column of MAIN TABS
- 5) Click TRUST CENTER located on the left most column of Excel Options
- 6) Click TRUST CENTER SETTINGS seen on the lower right of the screen
- 7) Under TRUSTED LOCATIONS, check the box labeled "ALLOW TRUSTED LOCATIONS ON MY NETWORK (NOT RECOMMENDED)"
- 8) Under TRUSTED DOCUMENTS, check the box labeled "DISABLE TRUSTED DOCUMENTS"
- 9) Under ACTIVEX SETTINGS, click the radio button labeled "ENABLE ALL CONTROLS WITHOUT RESTRICTIONS AND WITHOUT PROMPTING"

- 10) Under MACRO SETTINGS, click the radio button labeled “ENABLE ALL MACROS”
- 11) Check the box labeled “TRUST ACCESS TO THE VBA PROJECT OBJECT MODEL”
- 12) Under EXTERNAL CONTENT, click the two radios buttons labeled “ENABLE ALL DATA CONNECTIONS” and “ENABLE AUTOMATIC UPDATE FOR ALL WORKBOOK LINKS”

5.4 Load Motion Controller Communication Drivers

The LumetriScan Motion Controller communicates over the RS-485 protocol. An internal RS-485 to USB converter allows the device to operate over a USB cable. This converter must be virtualized in windows to function properly. The first step is to get Windows to recognize the USB converter as a virtual COM port. The second step is to configure the not Virtualized COM Port as an RS-485 Port

5.4.1 To Set Up the Virtualized COM Port

1. Make sure the Motion Controller is connected to the OptiGauge Controller via the USB cable and powered on. Never connect or disconnect the USB cable while the power is on.
2. Load the LumetriScan Software Suite DVD into the DVD drive.
3. Windows will recognize that a new device has been plugged in. Click the pop-up message to continue install.
 - a. Alternatively, you can access System Properties by right clicking the “My Computer” on the desktop or in Windows Explorer or pressing Windows Key+Break key
 - b. Select “Hardware”
 - c. Select “Device Manager”
 - d. Select “Ports”
 - e. When the drivers are not installed, there will be an error icon next to the port that needs to be configured.
 - f. Find that port, right-click, and choose Properties
 - g. Find the option to “Update Driver”
4. A window will pop up. Choose “Specify drivers from a remote location”
5. Select “I want to install software from a disk”
6. Select the option allowing you to navigate to a folder to find a driver.
7. Navigate to the LumetriScan Software Suite DVD folder named “Communication Drivers”.
8. Click OK.
9. The software will now install.
10. Click OK or Continue to any prompt that pops up.
11. Now the virtualized COM port has been created.

6 Software Layout

6.1 Overall Layout



Figure 1 - Primary Screen of the LumetriScan Software Suite

6.2 Menus

There is a menu bar with six options:

1. File
2. Recipes
3. Report
4. Tools
5. Window
6. Help

6.2.1 File

File contains two commands:

1. Disable/Enable DAC
2. Exit

Disable/Enable DAC is a command to disable or enable the OptiGauge. In the event that a separate application is closed while LumetriScan is running, the OptiGauge communication will be interrupted. This function allows the user to re-enable that communication.

Exit will close down the program. The user must still separately log out of windows. When the program exits, it will move all axes at their defined park location. This speeds up the home process the next time the software is opened.

6.2.2 Report

Report contains four options:

1. Run Report
2. Open Data Directory
3. Start/Stop Work Order
4. Show Summary Form

6.2.3 Tools

Tools contains several options:

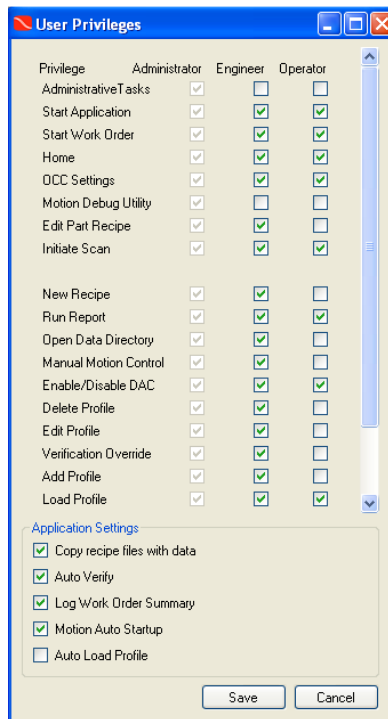
1. Reconnect Controller
2. Show DIO Status
3. Manual Control
4. Directories
5. User Privileges
6. Edit ID Fields
7. Options
8. Jump Start

Show Digital IO enables an on-screen diagnostic graphic that displays the ON/OFF status of the IO card's inputs and outputs.

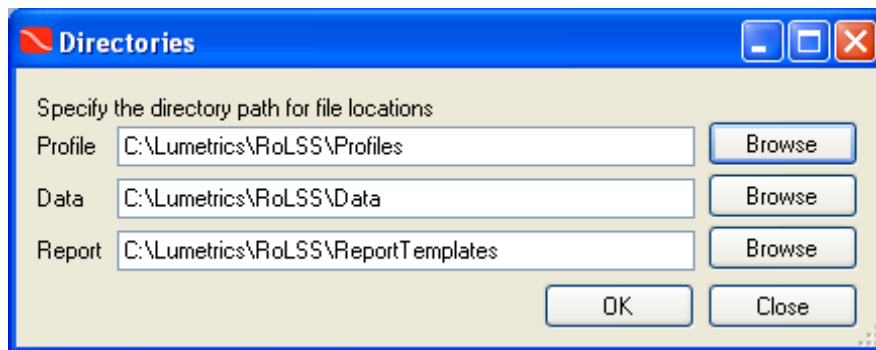


Manual Control enables a manual way of overriding on-demand manual control of the axes, even when the system is in a Work Order. Normally this manual functionality is temporarily disabled to avoid an inadvertent system change when running a Work Order.

User Permissions Configuration allow for the restriction of user access to the system, depending on what Windows User Group they belong to. In order to take advantage of the multi-tiered security model, a system administrator must assign each individual user to a group names Administrator, Engineer, or Operator.



Data Directory Setup allows the user to define locations (local or remote) for Fixture Profiles, Data, and Report Templates.

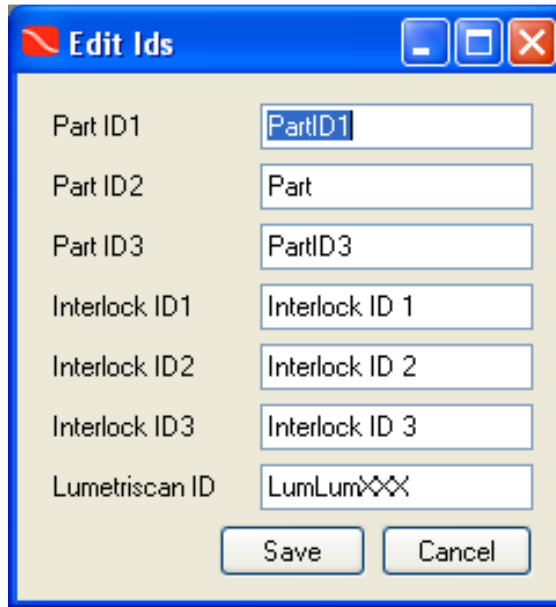


Important!!!

When specifying directory locations, all users must have full read/write access to the new location.

If the directory is located remotely, the location must be mapped using Windows' Map Network Drive feature. The drive letter and exact path must be identical for all users.

Edit ID Labels opens up a form that allows the user to customize the title of the three PartID fields and the three Interlock ID fields, as well as enter a LumetriScan ID (or Serial Number)

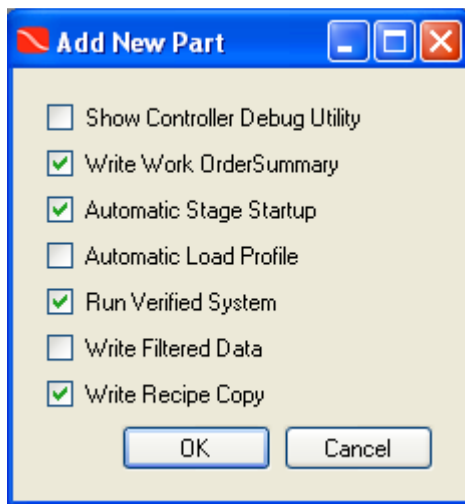


The **Edit Ids** dialog box contains the following fields and buttons:

Field Name	Current Value
Part ID1	PartID1
Part ID2	Part
Part ID3	PartID3
Interlock ID1	Interlock ID 1
Interlock ID2	Interlock ID 2
Interlock ID3	Interlock ID 3
Lumetriscan ID	LumLumXX

Buttons: Save, Cancel

Options brings up a form that allows for the configuration of several software features:



The **Add New Part** dialog box contains the following options:

Option	Checked
Show Controller Debug Utility	<input type="checkbox"/>
Write Work Order Summary	<input checked="" type="checkbox"/>
Automatic Stage Startup	<input checked="" type="checkbox"/>
Automatic Load Profile	<input type="checkbox"/>
Run Verified System	<input checked="" type="checkbox"/>
Write Filtered Data	<input type="checkbox"/>
Write Recipe Copy	<input checked="" type="checkbox"/>

Buttons: OK, Cancel

1. **Show Controller Debug Utility** enables an on-screen direct link to the internal motion controllers. It appears as a window on the Manual Control tab. This is for troubleshooting. Use only under the guidance of a Lumetrics employee
2. **Write Work Order Summary** enables the system option to create a Work Order Summary report with every Work Order. The report template used during a scan must contain a properly configured "WorkOrder Template" tab to function.
3. **Automatic Stage Startup** will save the Hardware Profile presently loaded and automatically select it the next time the software is started up.
4. **Automatic Load Profile** will configure the software automatically load the previously loaded Fixture Profile.

5. **Run Verified System** will enable System Verification functionality. When this is enabled, the system will allow configuration of the built-in System Verification Probe. This feature is only available on certain LumetriScan hardware.
6. **Write Filtered Data** enables the system option to write a data file using the Specification Range filtering information following a scan.
7. **Write Recipe Copy** enables the system option to write a copy of the recipe files used during a scan alongside the data files created with every scan.

Jump Start will trigger a command to continue a recipe in the event that it is noticed that a scan has paused and will not progress. It is not expected that this command will ever be required. It exists as a contingency plan for robustness of the software.

6.2.4 Windows

Windows contains one option:

1. **Cascade** separates overlapping windows in a manner that makes them easy to select

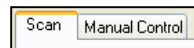
6.2.5 Help

Help contains two options:

1. **User Guide** – launches a .PDF copy of this user manual
2. **About** - brings up a window describing software build and version information

6.3 Scan Tab

The Scan tab is the primary tab used when measuring parts.



Configurations

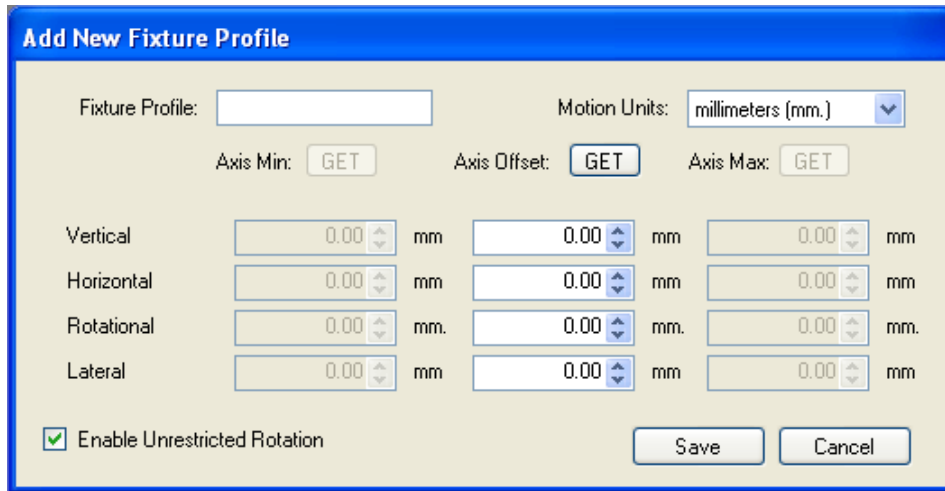
The Configurations area has three actions for the user to execute:

1. Fixture Profiles
2. Part Recipes
3. Work Orders



To the immediate right of each button shows of a label of the currently loaded Fixture Profile, Part Recipe, and Work Order, respectively.

Fixture Profiles are configuration profiles that establish travel limits and start points for each motorized axis.



Fixture Profile Name allows the user to enter in name for the Fixture Profile

Motion Units allows the user to setup the system to work in the measurement system of their choosing. Motion Units has two options:

1. Millimeters (mm.)
2. Inches (in.)

There are three columns of values for a given axis:

1. Axis Min
2. Axis Offset
3. Axis Max

Each column has a “GET” button. When clicked, the system will populate the column with the system’s current axis position, as long as the values do not conflict with the set Axis Offset.

Axis Min sets the minimum travel limits, relative to the Axis Offset position, to which the stages are free to travel. These values must be negative numbers.

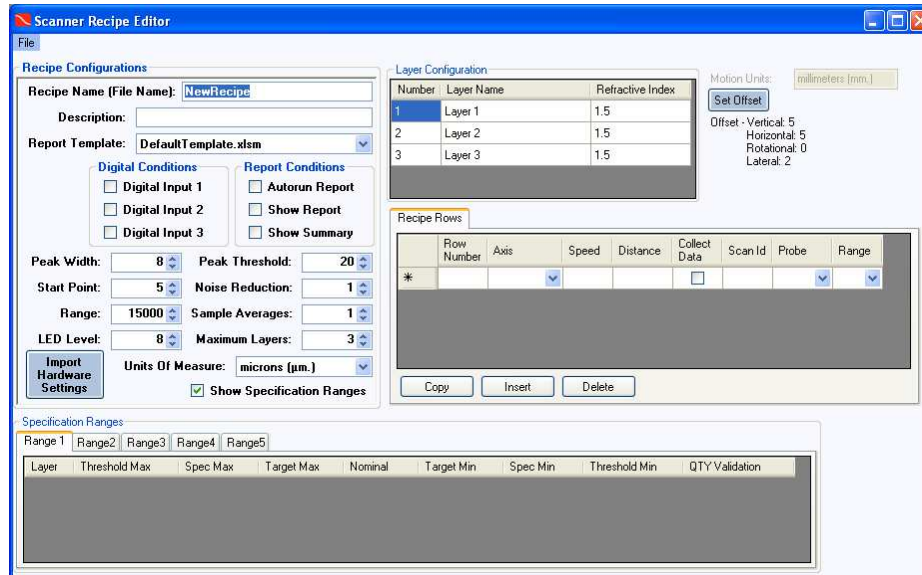
Axis Offset sets the starting position all axes travel to when the Fixture Profile is loaded. These values must be positive.

Axis Max sets the maximum travel limits, relative to the Axis Offset position, to which the stages are free to travel. These values must be positive numbers

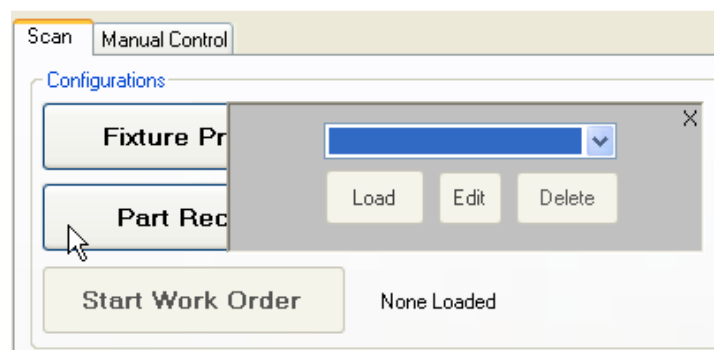
A checkbox labeled “**Enable Unrestricted Rotation**” is definable. This allows the rotational stage to rotate in the positive or negative direction infinitely and not restrict its travel.

Note: It is not recommended to enable this option if the LumetriScan is fitted with pneumatic lines that will tangle as the rotation stage rotates. The recommended travel limits for the rotational axis when fitted with pneumatic lines are +360 degrees and -360 degrees.

Part Recipes are configuration profiles that contain all the necessary system settings, options, and commands to design and run an automated scan.



Work Orders are part of a file organization that creates directories to store scan data. The user can create new Work Orders, append to existing Work Orders by selecting them from a list, or remove Work Orders from the list by archiving.



Clicking Fixture Profile or Part Recipes shows a panel allowing the user to Load, Edit, or Delete the profile or recipe.

Clicking Work Order shows a panel allowing the user to Create, Continue, or Archive a Work Order. Archiving move specified Work Order archive folder in the work order directory.

Part Identification

The Part Identification area allows the user to input text into three fields.



A dialog box titled "Part Identification" with three input fields labeled PartID1, PartID2, and PartID3.

The labels in the image (PartID1, PartID2, and PartID3) can be customized by the system administrator to suit by clicking the label text. These labels are also displayed in the data files generated by the system.

For example, name the three labels could be the following:

Sample No.

Lot No.

OperatorID

The text that the user inputs into the three fields serves as an identifying parameter that is brought into the report after the scan is complete, and also serves as a variable in the system's file naming convention. Files created by LumetriScan 360 appear as follows:

SystemID_PartID1_PartID2_PartID3_TimeDateStamp

For example, the operator, when measuring parts, would input into the three fields:

11056; A1078; KJH

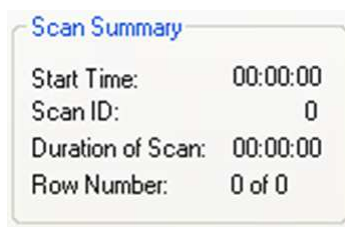
SystemID is a serial number assigned to each physical LumetriScan unit. For example, a LumetriScan360 may have a SystemID value of **LS001**.

Once the scan is complete, the example file name would result in:

LS001_11056_A1078_KJH_2011-05-03-1145.xxx

where "xxx" may represent one of many types of files created at the time of a scan, such as an Excel file (.xls), a recipe file (.recipe), etc.

Scan Summary



A dialog box titled "Scan Summary" displaying four values: Start Time, Scan ID, Duration of Scan, and Row Number.

Start Time:	00:00:00
Scan ID:	0
Duration of Scan:	00:00:00
Row Number:	0 of 0

The next area is named Scan Summary. This area shows the user four values:

1. Start Time
2. Scan ID
3. Duration of Scan
4. Row Number

Start Time represents the time at which the “Measure” button was clicked, beginning a scan.

Scan ID refers to the specific identification tag that is currently being measured.

Duration of Scan is a real-time updating value that increments every second while the scan is progressing. Once the scan completes, the value will remain visible for the user to take note of. The value will reset once the next sample’s scan begins.

Row Number is a value that updates during the scan that shows the user what recipe row the scan is currently on, compared against how many total lines of scan code are programmed into the recipe. This gives the user a way to gage the progress during a scan.

Scan Execution

The Scan Execution area has four buttons and a notification message:

1. Measure
2. Stop
3. Run Report
4. Work Order Summary



The **Measure** button begins scanning according to the currently loaded recipe, assuming interlocks are satisfied

The **Stop** button will immediately abort a running scan. No data will be saved or processed. The user will be prompted via pop-up window to press “OK” to return to the recipe start position.

The **Run Report** button will execute a command to manually run the Report Template specified in the recipe. Alternatively, the recipe can be configured to automatically run the report without user intervention and either display the report, or run it in the background.

The **Work Order Summary** button will launch a form that displays a file of scan summary data for all scans completed under the current Work Order. The scan template must be configured with a worksheet for the Work Order Summary.

System Information



The Login Information area displays the username of the currently signed in user to the system. Their access level, Administrator, Engineer, or Operator is also displayed.

Interlock Indicators

The system shows the status of up to three system interlocks. These represent the status of three digital inputs on certain LumetriScan products. For example, there are three electronically controlled pneumatic solenoid valves on the LumetriScan 360. Per recipe instruction, if a combination of these interlocks (referred to as Digital Inputs 1-3 in the recipe) is not satisfied, the user cannot begin a scan.



The interlocks in the image are labeled as Digital Input 1, Digital Input 2, and Digital Input 3. These labels may be customized by the system administrator to a more meaningful label, depending on the LumetriScan360's configuration.

Data Collection Summary

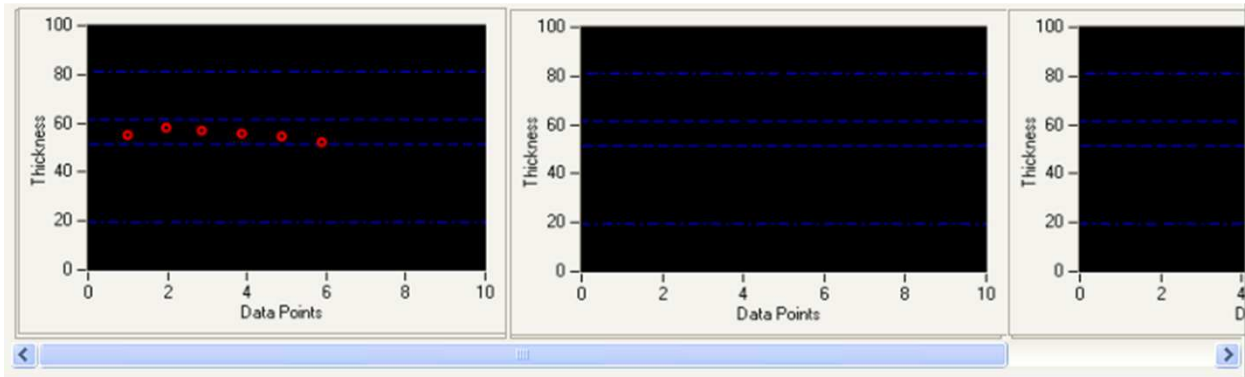


The **Data Collection Summary** is a specialized data grid used to display summary information pulled from the Summary tab in a Report Template. The user is able to configure the Summary tab in their report template however they want (independent of formatting), and display measurement calculations, such as Minimum, Maximum, Wall, ID, OD, Ovality, Concentricity, through the use of Excel-based formulas.

A certain cell, A1, is a specially designated cell. The user has the ability to program a formula into this cell to check any or all measurements for passing or failing, and generate an overall "Pass" or

“Fail” result. Based on this cell’s result, the green “Pass” signal or the red “Fail” indicator will illuminate, informing the user of the scan’s result.

Dataview



The Dataview is an area used to show graphically the results of the scan. These charts are configurable in the part recipe to establish the nominal value for a given dimension, along with tolerance ranges. These graphs serve as a quick and easy way to visualize the results from a scan. More in-depth analysis and trending can be performed in the Report Template.

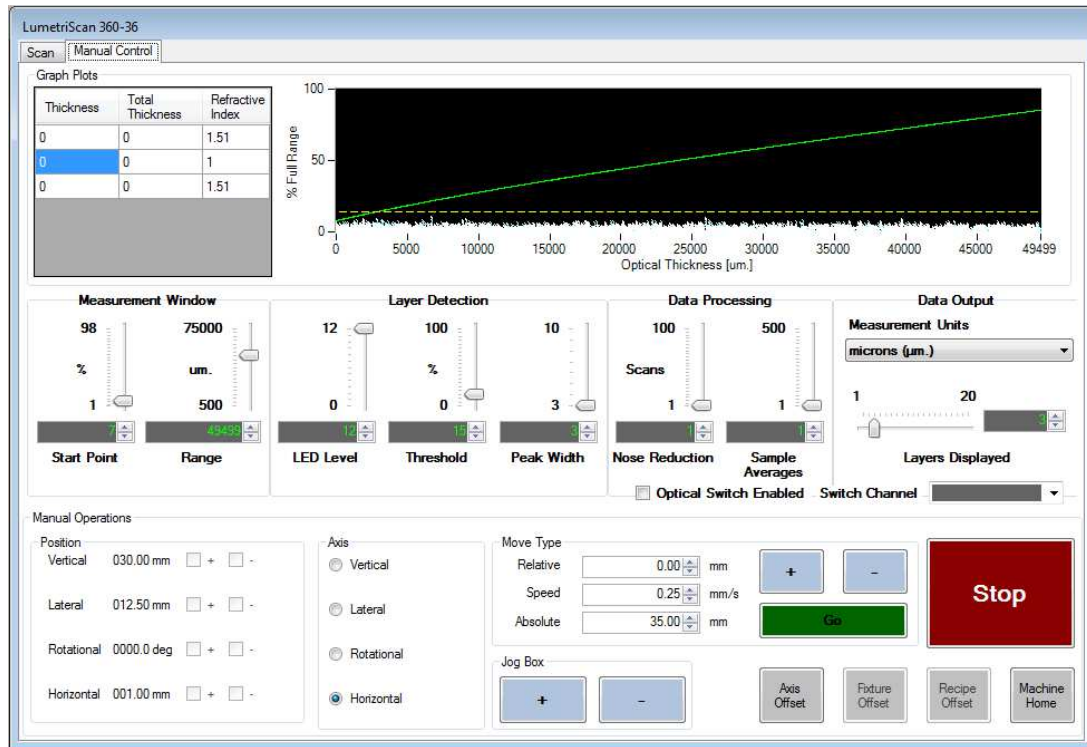
Special Features:

Zoom-In - Hold the SHIFT key and left-click with the mouse on a spot in the dataview.

Zoom-Out - Hold the SHIFT key and right-click with the mouse on a spot in the dataview.

Zoom-Window - Hold the SHIFT key; left-click and drag to draw a in the dataview.

6.4 Manual Control

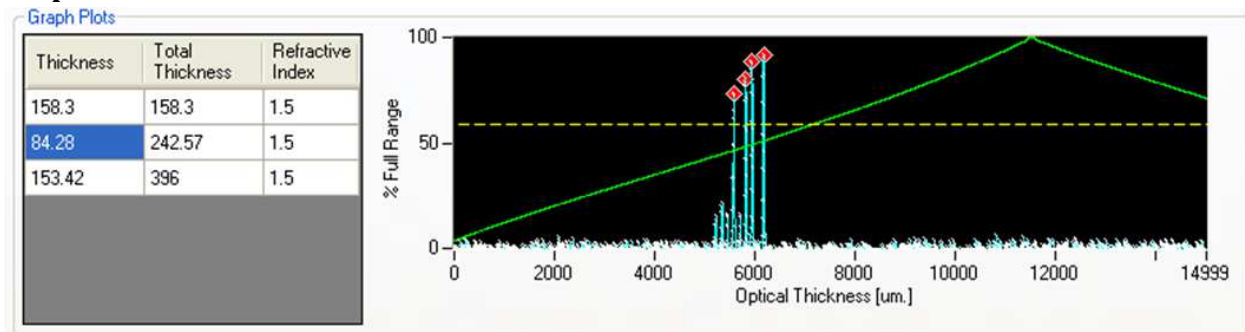


The Manual Control tab is used primarily during setup and design of recipes. It allows a user of sufficient privilege full control over the OptiGauge, its settings, and any motorized stages. These tools are invaluable to creating recipes and determining the ideal settings, speeds, and scan procedures to measure parts in the desired manner.

There are three subsections to the Manual Control tab:

1. Graph Plots
2. OptiGauge Settings
3. Manual Operations

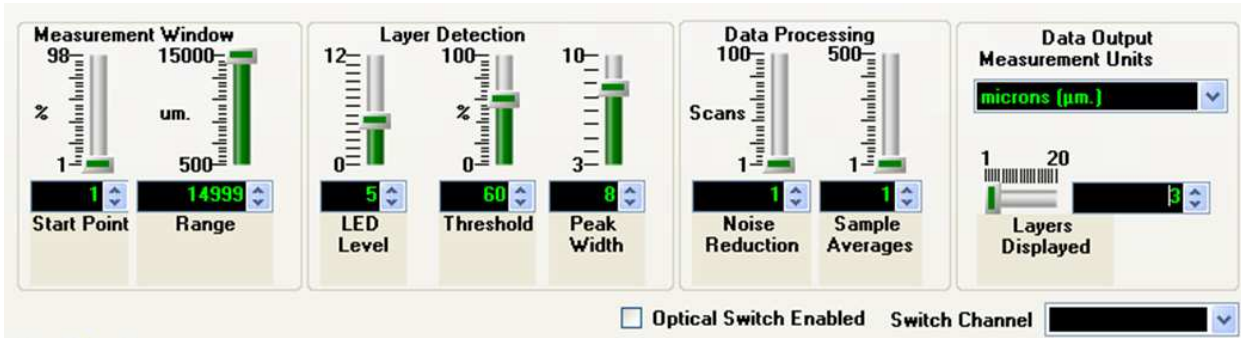
Graph Plots



The graph plots show the real-time thickness information for individual layers alongside the layer's entered refractive index.

The graph to the right is the OptiGauge waveform. The waveform allows the user to view readings from the OptiGauge. Here, peaks on the screen refer to the surface between two differing indices of refraction, and the horizontal distance between any two peaks is the optical distance between them.

OptiGauge Settings



There are eleven OptiGauge settings that are adjustable by the user; ten of which are also recipe setpoints. These eleven settings are as follows:

1. Start Point
2. Range
3. LED Level
4. Threshold
5. Peak Width
6. Noise Reduction
7. Sample Averages
8. Measurement Units
9. Layers Displayed
10. Optical Switch Enabled
11. Switch Channel

Start Point is a value between 1 and 98. Start Point specifies a beginning point on the Optical Thickness Axis (seen on the waveform) to allow the processing of the optical signal following this point in optical space.

Range is a value between 500 and 15000 microns. Range sets the amount of optical distance following the Start Point within which to process the optical signal.

LED Level is a value from 0 to 12. This controls the power output of the 1310nm light source used by the OptiGauge. A value of zero turns the 1310 source off all together, while 12 is running the light source at its maximum allowed value.

Threshold is a value from 0 to 100. This is seen as the yellow line visible on the waveform. Threshold acts as a filter that makes the system's peak finding algorithm ignore any optical peak that appears fully below the threshold value.

Peak Width adjusts the system's peak finding algorithm, optimizing its ability to read very thin samples (typically less than 50 microns). When measuring thin-walled samples, their respective peaks will appear very close together and begin to overlap one another, beginning at the base of the peaks. Lowering the peak width reduces the amount of points needed for the curve fit algorithm to find the center of an individual peak, and in turn, measure the peak to peak optical thickness.

Noise Reduction is a signal processing tool to reduce the appearance of noise in the waveform. This type of processing is not recommended in applications where the sample and probe are moving relative to one another.

Noise Reduction directly affects the OptiGauge measurement rate. A value of 1 means no noise reduction is being performed and the OptiGauge is running at its normal capture rate (50Hz, 100Hz, or 200Hz, depending on model). however, a value of 2 reduces the OptiGauge capture rate to 1/2 its nominal, while a value of 4 reduces the capture rate to 1/4 its nominal, etc.

In most cases, Noise Reduction is not recommended for use with LumetriScan360.

Sample Averages is a signal processing tool that takes the number of points specified and combines those data points into a single averaged value.

Similar to Noise reduction, this type of processing is not recommended in applications where the sample and probe are moving relative to one another.

Sample Averages directly affects the OptiGauge measurement rate. For example value of 1 means no sample averaging is being performed and the OptiGauge is running at its normal capture rate (50Hz, 100Hz, or 200Hz, depending on model). A value of 2, however, reduces the OptiGauge capture rate to 1/2 its nominal, while a value of 4 reduces the capture rate to 1/4 its nominal, etc.

Sample Averages does not filter out zeros during data capture so any miss-reads or signal dropouts will negatively affect any data taken with averaging turned on.

In most cases, Sample Averaging is not recommended for use with LumetriScan360. All data processing should be done via Excel-based Report templates

Measurement Units allows the user to specify the unit of measure desired. Units available are:

1. Microns
2. Millimeters
3. Inches
4. Mils
5. Microinches

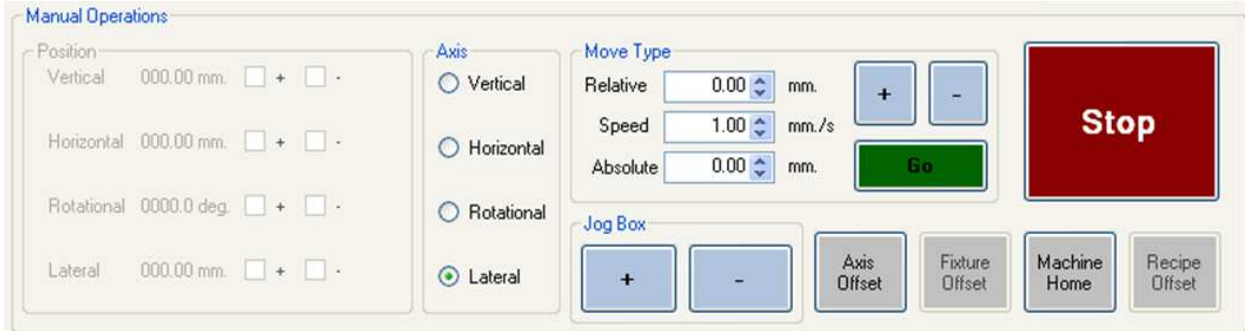
Layers Displayed is a value between 1 and 20. This controls the number of layers the OptiGauge will display data for. The system will read the first X many layers specified, as long as they pass the threshold filtering. Even if more than the amount of layers specified rise above the threshold, only the amount specified counted from left to right on the screen, will be measured.

It should be noted that this does not limit peaks appearing in the waveform, nor does it limit the way the 1310nm light course penetrates the sample.

Optical Switch Enabled is a software switch that turns on or off communication to the Lumetrics 8-Post Switch, if equipped.

Switch Channel is a dropdown menu, allowing the user to switch between probes 1 through 8, using the Lumetrics 8-Port Optical Switch.

Manual Operations



There are 6 subsections to the Manual Operations subsection:

1. Position
2. Axis Selection
3. Move Type
4. Jog Box
5. Set Points
6. Stop

The **Position** area shows the current positional readout of all axes of the system. Checkboxes located to the right of the positional readout indicate the status of the end-of-travel limit switches on each axis.

Note: The horizontal axis has an additional sensor designed to prevent potential collisions with sample fixturing hardware. In the event that the sensor is triggered, it will display as the far end limit switch triggering.

Axis Selection enables the user to select an available axis for a manual move

Move Type enables the user to perform an absolute or relative move of the currently selected axis.

For a relative move, the user enters the desired distance and speed, followed by clicking the + or – button to move in the desired direction.

For an absolute move, the user enters the desired position and speed, followed by clicking the “Go” button.

The **Jog Box** enables the user to jog the specified axis by holding down the + or – buttons. The jog speed is controlled by the speed entered in the Move Type area.

The **Set Point** area contains 4 set points:

1. Axis Offset
2. Fixture Offset
3. Machine Home
4. Recipe Offset

Axis Offset moves the currently selected axis to the currently loaded recipe’s start position. If no recipe is loaded, the system will move the axis to the fixture profile’s start position. If no recipe or fixture profile is loaded, the system will move to the systems startup park location.

Fixture Offset will move all axes to their fixture profile starting positions.

Machine Home will run all axes through a homing procedure. This feature should not be needed unless the system encounters an issue that stalls an axis while attempting to move.

Recipe Offset will move all axes to their recipe starting positions.

The **Stop** button will immediately halt any currently moving axis.

STATUS BAR



The **Status Bar** provided useful system information relating to the current state of the device. The Status Bar is divided up into six sections:

1. Status
2. Current Profile
3. Current Recipe
4. Verification Status
5. Verify Button
6. System Mode

The **Status** displayed describes the state of the system and what, if any, action is being performed. A progress bar displays a visual indication of the completion status of certain system actions.

Current Profile shows the name of the currently loaded Fixture Profile.

Current Recipe shows the name of the currently loaded Recipe.

Verification Status shows whether the system is in a state of good working order. If the system fails a verification test, the status will turn red and disable measurement functionality until the system's verification is restored.

The **Verify Button** allows the user to bring up commands to run verification diagnostics

System Mode is displayed as either Measurement Mode or Verification Mode.

DATA REPORTING

Data reporting is configurable depending on the needs of the end-user. By default, the system uses a standardized reporting template that simply saves data to an Excel file in the first sheet. The user can create or modify this standardized template to their liking, using the built-in Excel and VBA functions available.

7 Configure Software

7.1 Setup User-Specific Permission Levels

The LumetriScan Software Suite is designed to be used in conjunction with the Windows Server 2008 Active Directory security model or the built-in Windows XP local security model.

You are able to use your- company-configured domain and user log-in structure to log into the LumetriScan Software Suite. The network administrator can create a specialized “Lumetrics User Groups” and assign existing users to the appropriate group. These users will be granted specialized or restricted access to specific software functions.

The LumetriScan Software Suite allows users to be assigned to one of the following groups:

- 1) Administrators
- 2) Engineers
- 3) Operators

The group labeled Administrators is the same “Administrators” group created by Windows.

While the specific user privileges are customizable, the theory behind these three user groups is that a department may want to limit the access privileges of certain people in order to avoid potential system damage or data insecurity.

“Administrators” are typically given all privileges, and have full user power to do anything on the system and change any software setting.

“Engineers” are typically given most software privileges, with access to special software features restricted when they require network and IT experience to configure.

“Operators” typically have software privileges limited to the minimum required to operate the machine and do not have the option to change any software settings.

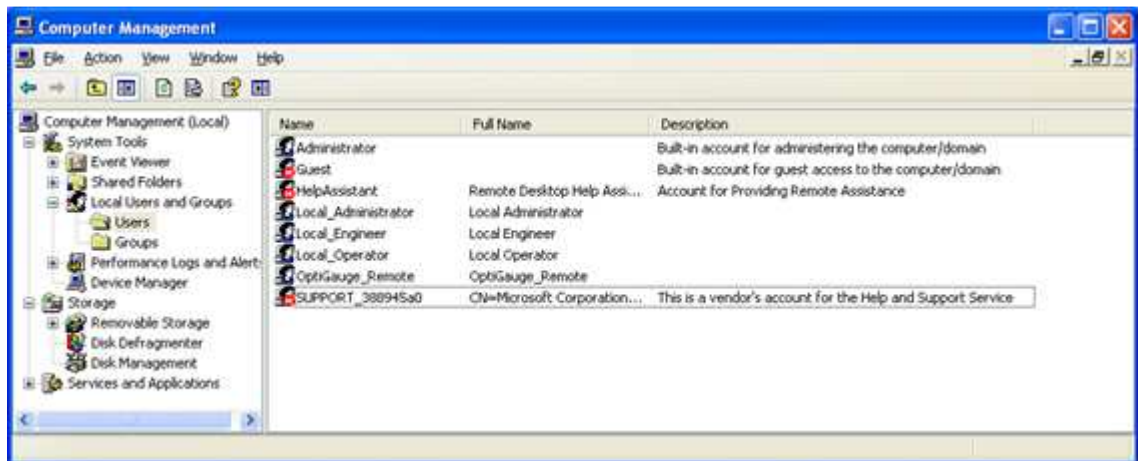
It is up to the Administrator to set these user privileges in the LumetriScan Software Suite to levels acceptable to your company if the default settings are unacceptable.

7.1.1 Create the Local Administrator Account

These steps are performed at the factory. You do not need to perform the steps listed here in this section unless you are reinstalling the Windows XP Operating System

Before you are able to configure the Lumetrics Controller for your company’s network, you should establish a new local administrator account and delete the default user account.

1. Open the Control Panel and select Administrative Tools.
2. Open “Computer Management”



3. Click on the "Users" folder located under System Tools and Local Users and Groups.
4. Right click on the empty space where the users are listed and select "New User"



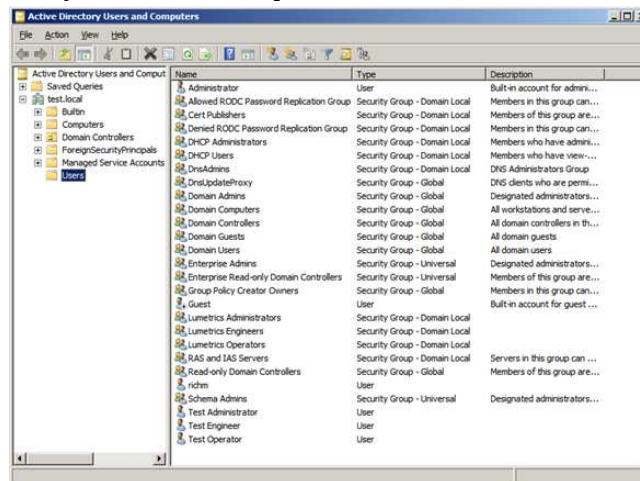
5. Create an administrative account called: Local_Administrator
6. Set the password to: Local_Administrator
7. Go to **Groups**.
8. Add Local_Administrator to the Administrators group
9. Log out of windows and log back in with this newly created account.
10. Navigate to the user management screen as previously described.
11. Remove any unwanted local users.

7.1.2 Create User Groups on Company Domain

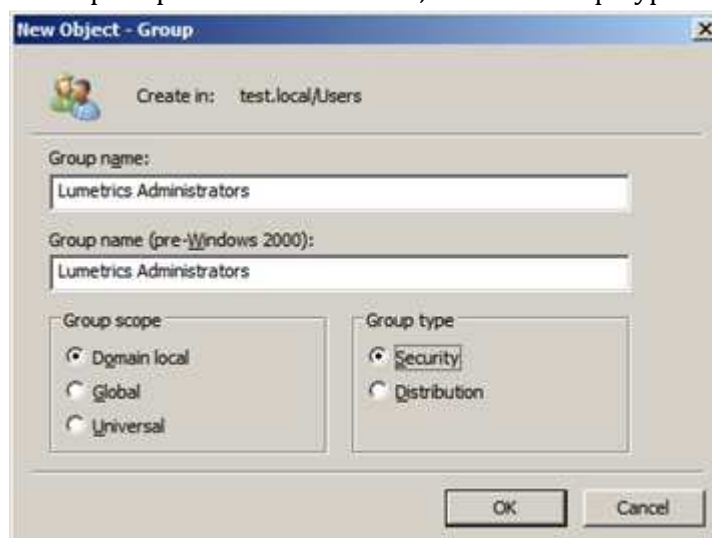
These steps must be performed by a Network Administrator.

Creating a Lumetrics-specific user group on your company's domain is an effective way to manage employee permission levels on Lumetrics equipment without interfering with your company's global security model. Once domain user groups are created, those user groups can be added as members to the local user groups. This gives members of the domain's user groups a specified permission level on the local LumetriScan machine. This method makes having to add, change, or remove users more simple when many LumetriScan products are linked to your company's network instead of configuring each LumetriScan individually.

1. Log into your company's network with sufficient administrative privileges to create or modify groups.
2. Open the Active Directory Users and Computers window.



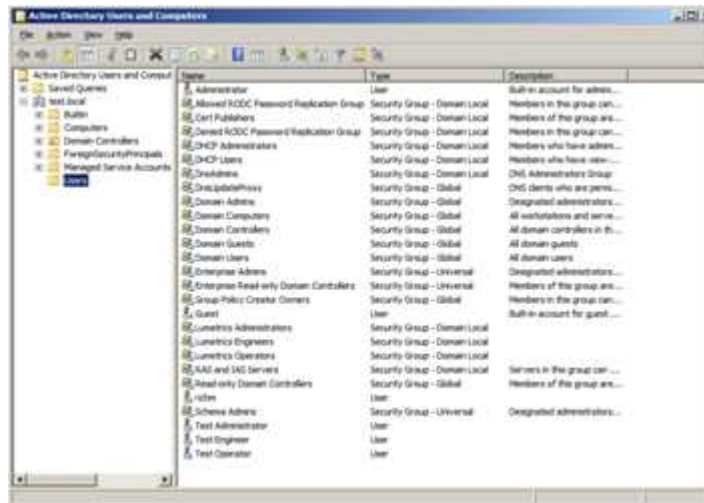
3. Right click the white space where users and security groups are shown and select "New", then "Group"
4. A window will pop up allowing you to create the "Lumetrics Administrators" group. Make sure to specify the Group Scope as "Domain Local", and the Group Type as "Security".



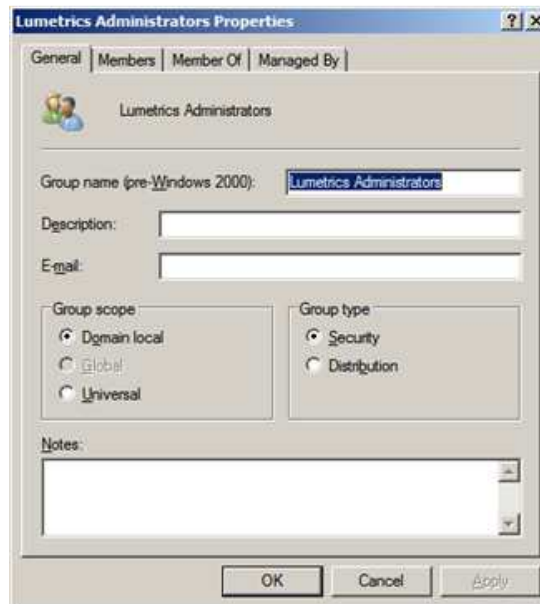
5. Repeat this process by creating groups named "Lumetrics Engineers" and "Lumetrics Operators"

7.1.3 Add Domain Users to Domain User Groups

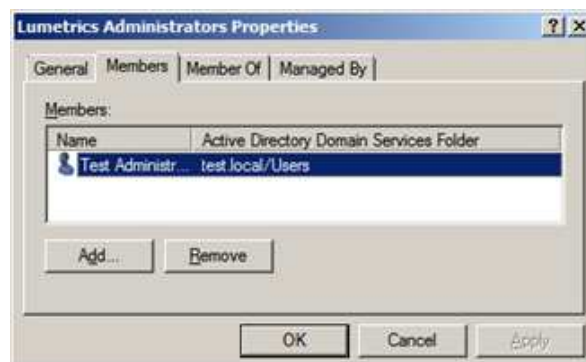
1. Log into your company's network with administrative privileges to create or modify groups.
2. Open the Active Directory Users and Computers window.



3. Right click on the "Lumetrics Administrators" group and select "Properties".



4. Select the "Members" tab.



5. Click “Add...”



6. Type into the text field the name of the domain user you would like added to the Lumetrics Administrators group, then click “Check Names”
7. If the user is found properly, it will underline the name and allow you to continue adding more names, or finish by clicking OK.
8. Repeat this process for adding users to the Lumetrics Engineers and Lumetrics Operators user groups created in the previous section.

7.1.4 Create User Groups on the Lumetrics Controller (Local PC)

These steps are performed at the factory. You do not need to perform the steps listed here in this section unless you are reinstalling the Windows XP Operating System.

User Groups are what the LumetriScan Software Suite uses to identify a logged in user as being part of the Administrators, Engineers, or Operators work modes. Two of these groups, Engineers and Operators, are not created by Windows by default and must be created manually by an administrator on the local computer.

1. Log into the computer locally as: Local_Administrator
2. Navigate to the Control Panel
3. Navigate to Administrative Tasks
4. Navigate to Computer Management

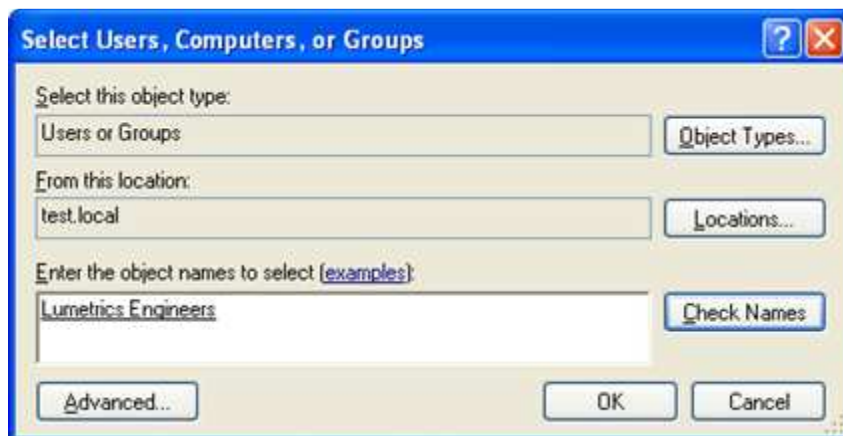


5. Expand the section called “Groups”

6. Right click the empty white space where groups are listed and select “Add New Group”



7. Call the group name “Engineers”
8. Click Create
9. Click the “Add...” button



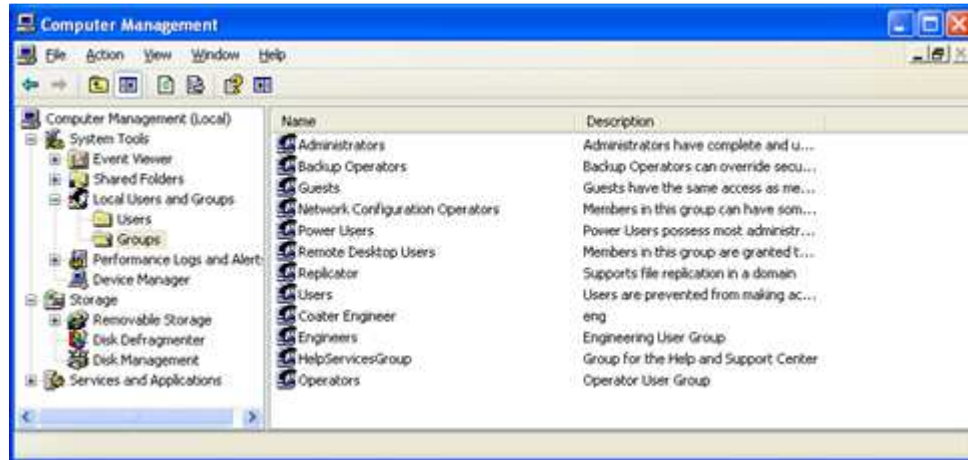
10. Type into the text field “Lumetrics Engineers” and click the button labeled “Check Names”.
11. The system will underline the group name if the group is found on the network.
12. Click OK
13. Now any user that is added to your companies domain group called “Lumetrics Engineers” will be granted Engineer-level access when using LumetriScan Software Suite
14. Repeat Steps 6-11 to create the “Operators” group name and add “Lumetrics Operators” to the group membership.

7.1.5 Assign Users to User Groups

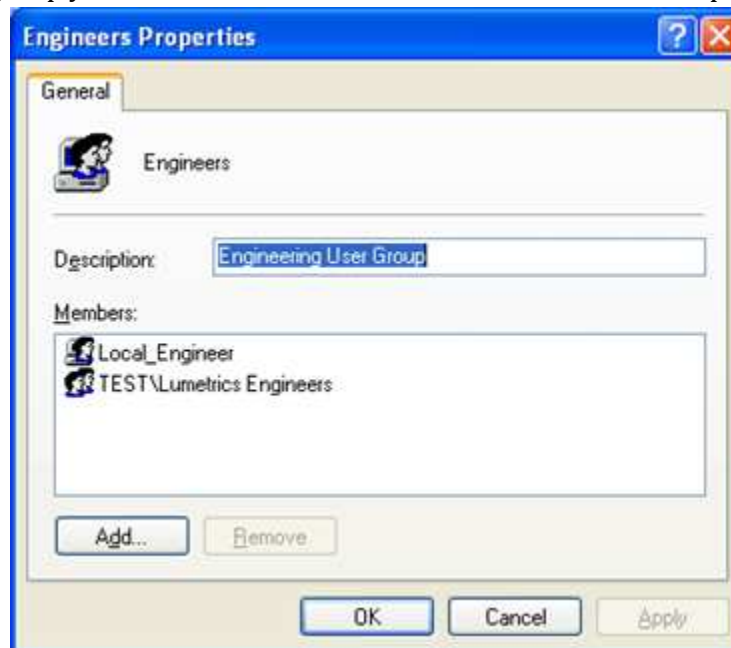
You do not need to hook up your LumetriScan to the network to take advantage of the security model. You may create local user names and add them to the local user groups in the same manner

1. Log into the computer locally as: Local_Administrator
2. Navigate to the Control Panel

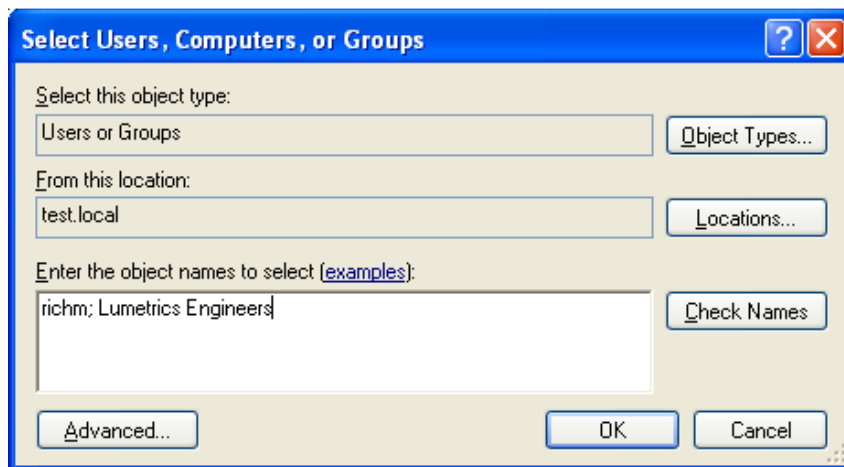
3. Navigate to Administrative Tasks
4. Navigate to Computer Management



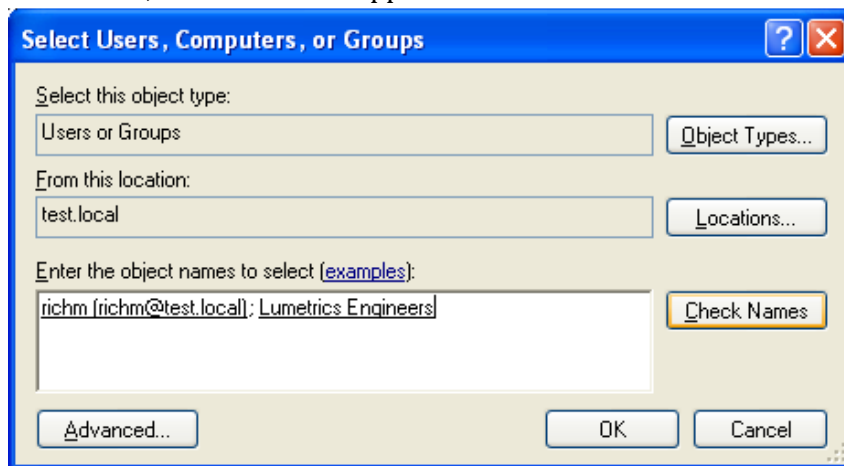
5. Expand the section called "Groups"
6. Right click the group you wish to add members to and click "Add to Group"



7. Click the "Add..." button
8. Type into the text field the name of the domain users or domain groups you want added to the local user group. Multiple names must be separated with a semi-colon.



9. Click the “Check names” button and the system will verify the users and or groups entered are valid. Once verified, their name will appear underlined.



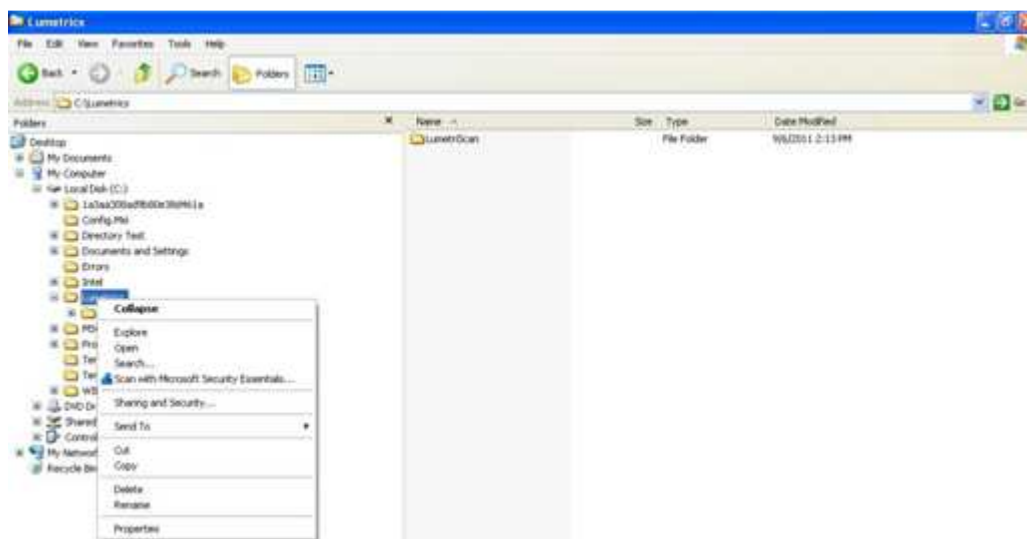
Note: If there are issues finding the specified username or user group, verify that the “From This Location:” field properly reflects where the users and/or groups are located.

10. The system will underline the group name if the group is found on the network.
11. Click OK
12. Now the specified users and/or groups are classified under the specified local group and, when operating the LumetriScan Software Suite, will be granted the appropriate privileges.
13. Repeat steps 6-11 until all users or groups are classified as desired.

7.1.6 Configure User Group File Management Privileges

In order to allow non-administrators to use the system, the computer must be configured to allow read/write access to C:\Lumetrics folder (and all child directories) as well as any remote location configured through the software that users could be reading or writing.

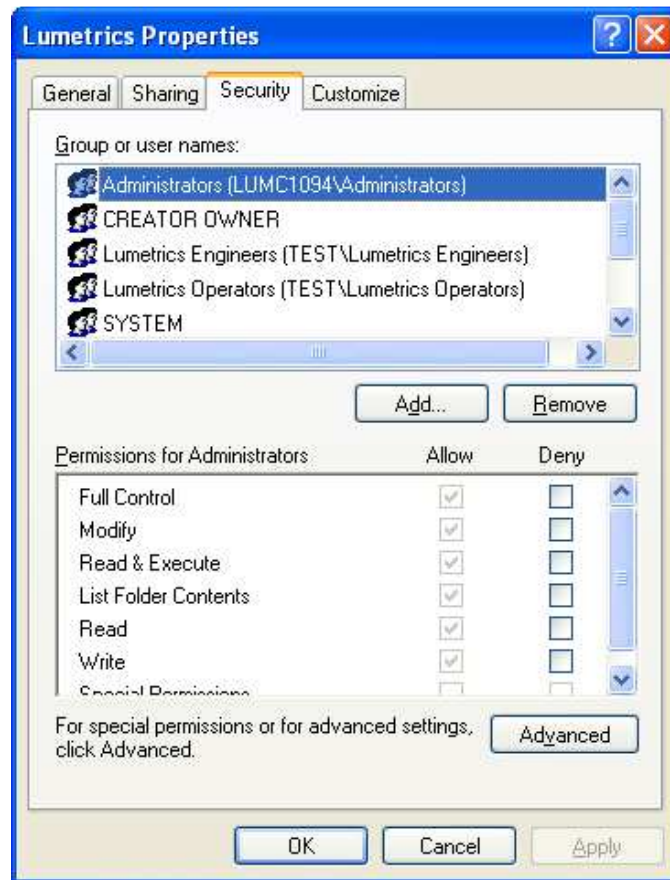
1. Log in as an administrator with full access to the local computer and the network.
2. Select C:\Lumetrics from Windows Explorer and click **Properties**



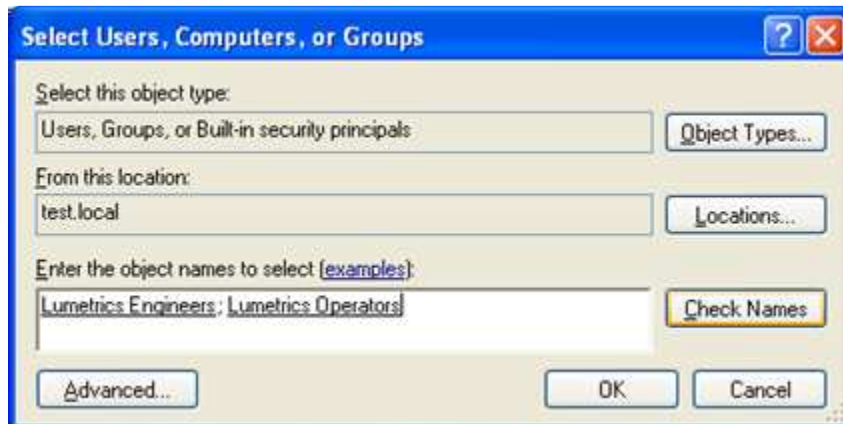
3. Click **Security**



4. Click **Add**



- Enter in the Groups: **Lumetrics Engineers; Lumetrics Operators** and click **Check Names**



- Click **OK**
- Select the newly added groups or users from the list and check the **Full Control** box. This now allows those users to read, edit, and write to the directory.
- Repeat this process for any remote location the LumetriScan Software Suite has been configured to interact with.

7.1.7 Configure LumetriScan User Group Privileges

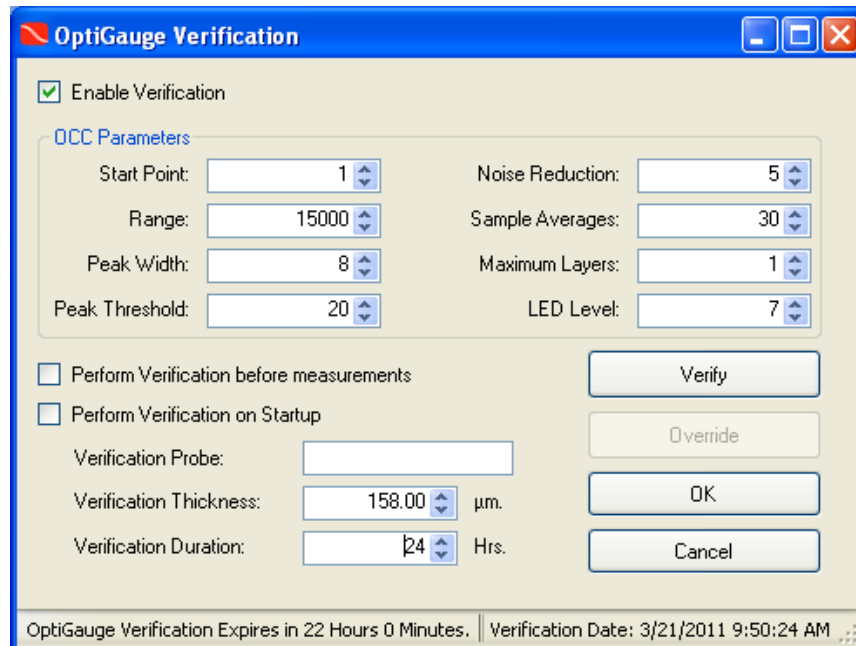
User group privileges as specified by the LumetriScan Software Suite may be configured by accessing the Tools—User Privileges menu located in the top menu bar. There are many privileges that can be enabled or disabled depending on your company’s internal guidelines on machine use.

7.1.8 Configure Local Security Policy

1. Select Start -> Control Panel -> Administrative Tools -> Local Security Policy.
2. Open Local Policies by clicking the plus (+) to the left of the directory.
3. Select “User Rights Assignments”
4. Double-click “Impersonate a client after authentication” to open its properties.
5. Click Add User or Group.
6. Click Object Types.
7. Ensure the Groups checkbox is checked and click OK.
8. Enter the group Engineers and click OK
9. Repeat from step 1 to add the groups Operators and Users

7.2 Verification Probe Configuration

Built into certain LumetriScan products is a self-contained Verification Probe. Systems with this built-in verification probe can be configured to run an automatic or manual system diagnostic to verify that the OptiGauge is performing properly and that the system’s measurement accuracy meets its specification.



The image shows a screenshot of the 'OptiGauge Verification' dialog box. It has a blue title bar with the text 'OptiGauge Verification' and standard window controls. The main area is light yellow. At the top left, there is a checked checkbox labeled 'Enable Verification'. Below this is a section titled 'OCC Parameters' in blue. It contains two columns of settings, each with a label and a spin button: 'Start Point' (1), 'Range' (15000), 'Peak Width' (8), 'Peak Threshold' (20) on the left; and 'Noise Reduction' (5), 'Sample Averages' (30), 'Maximum Layers' (1), 'LED Level' (7) on the right. Below the parameters are two unchecked checkboxes: 'Perform Verification before measurements' and 'Perform Verification on Startup'. To the right of these are three buttons: 'Verify', 'Override', and 'OK'. At the bottom left, there are two more fields: 'Verification Probe' (empty), 'Verification Thickness' (158.00 μm), and 'Verification Duration' (24 Hrs.). At the bottom right is a 'Cancel' button. A status bar at the very bottom shows 'OptiGauge Verification Expires in 22 Hours 0 Minutes.' and 'Verification Date: 3/21/2011 9:50:24 AM'.

The OCC Parameters needed for use are specific to each OptiGauge and Verification Probe combination. Refer to the Verification Probe setup sheet found in the serialized LumetriScan Factory Settings Guide

7.3 Configure ID Labels

ID labels add a level of customizability to the software that allows you to personalize certain UI labels that closely align to your specific application.

There are two groups of ID labels you can customize:

1. PartID labels
2. InterlockID labels

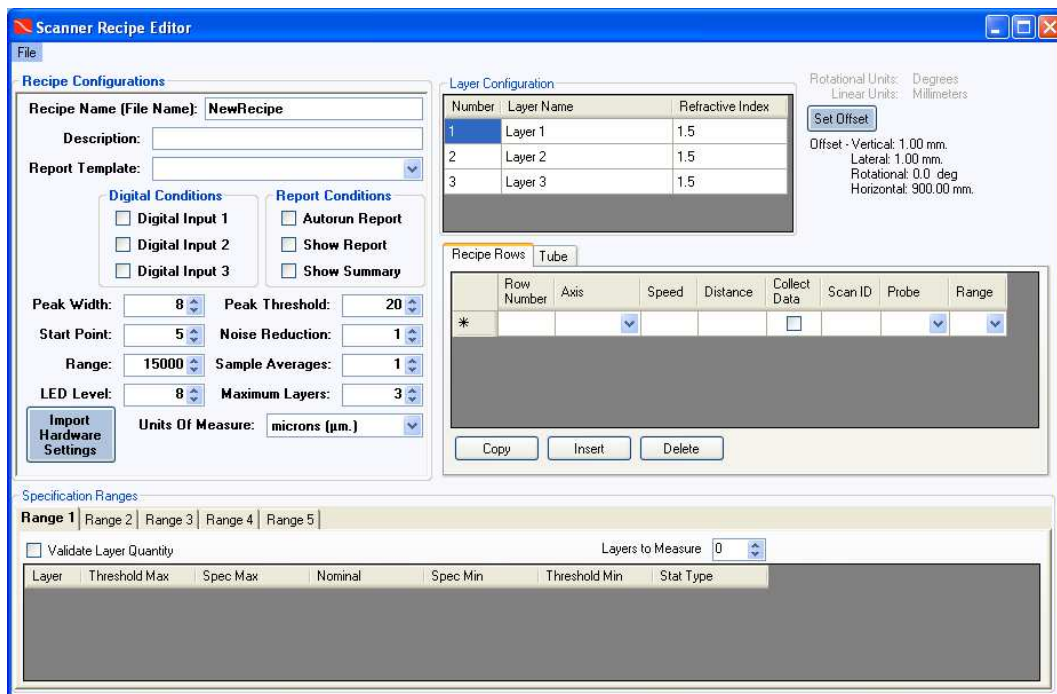
These labels can be modified by accessing them through the top menu bar option **TOOLS**, and scrolling down to the option called **ID LABELS**.

8 Create Fixture Profile

The Fixture Profile is an important aspect of the software that establishes minimum and maximum travel limits for each axis. When creating recipes, user inputs are checked against these minimum and maximum values to ensure the user does not attempt to exceed the defined three-dimensional scan envelope and potentially crash into any customized hardware or fixturing beyond what comes standard with a LumetriScan product.

9 Create Part Recipes

Part Recipes control how a LumetriScan product inspects a part. Contained in a part recipe are all the required parameters to configure the OptiGauge, how to program a scan routine, as well as how to specify special reporting features.



The screenshot shows the **Scanner Recipe Editor** window. It contains several sections for configuring a recipe:

- Recipe Configurations:** Includes fields for **Recipe Name (File Name):** (NewRecipe), **Description:**, and **Report Template:**. It also has checkboxes for **Digital Conditions** (Digital Input 1, 2, 3) and **Report Conditions** (Aurorun Report, Show Report, Show Summary).
- Layer Configuration:** A table with columns: Number, Layer Name, and Refractive Index. It lists three layers, all with a refractive index of 1.5.
- Rotational Units:** Degrees, Linear Units: Millimeters. Includes a **Set Offset** button and offset values: Vertical: 1.00 mm, Lateral: 1.00 mm, Rotational: 0.0 deg, Horizontal: 900.00 mm.
- Recipe Rows:** A table with columns: Row Number, Axis, Speed, Distance, Collect Data, Scan ID, Probe, and Range. It shows a single row with an asterisk in the Row Number column.
- Specification Ranges:** Includes a **Range 1** tab, a **Validate Layer Quantity** checkbox, and a **Layers to Measure** dropdown set to 0.
- Units Of Measure:** microns (µm.)
- Import Hardware Settings** button.

9.1 Naming



Recipe Configurations

Recipe Name (File Name):

Description:

The naming of a recipe is restricted to alphanumeric characters and dashes.

Note: If an attempt is made to enter a non-standard character, the system interprets that as a dash.

When naming recipes, be aware that the name you give will be the same name the barcode reader will use to load a recipe, with the addition of the start and end characters (') and (~).

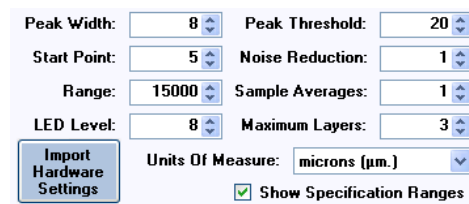
This name also functions as the file name of the recipe using the .recipe file extension.

For example, should you wish to load a recipe by using the barcode reader, and your recipe is called **Recipe_1_Rev_A**, your barcode must read **`Recipe_1_Rev_A~**

Optionally, a description can be typed in in the **Description** box.

9.2 OptiGauge Parameters

All OptiGauge parameters are configurable in a part recipe.



Peak Width: Peak Threshold:

Start Point: Noise Reduction:

Range: Sample Averages:

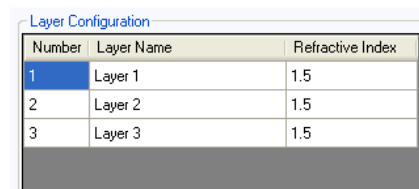
LED Level: Maximum Layers:

Units Of Measure:

☒ Show Specification Ranges

Clicking the **Import Hardware Settings** button will take whatever settings the OptiGauge is presently set to and fills in every field to match.

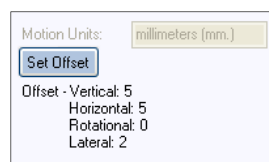
9.3 Layer Configuration



Number	Layer Name	Refractive Index
1	Layer 1	1.5
2	Layer 2	1.5
3	Layer 3	1.5

The layer configuration area allows you to specify a unique refractive index value for each layer.

9.4 Recipe Offset Position



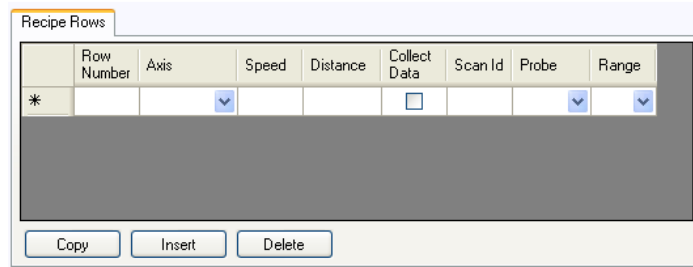
Motion Units:

Offset - Vertical: 5
Horizontal: 5
Rotational: 0
Lateral: 2

Recipe Offset Position allows for a recipe start position to be defined at a location other than the default position (The Fixture Profile Offset location).

To set a new Recipe Offset Position, manually move one or more axes to the desired location and click the **Set Offset** button. If one or more axes have moved beyond the hardware limits set in the Fixture Profile, an error box will alert the user and require that the axes be moved back within their respective limits to save the new position.

9.5 Scan Routine



	Row Number	Axis	Speed	Distance	Collect Data	Scan Id	Probe	Range
*					<input type="checkbox"/>			

Copy Insert Delete

A scan routine is created by issuing commands line-by-line to the data grid. There are eight configurable columns for every row:

1. Row Number
2. Axis
3. Speed
4. Distance
5. Collect Data
6. ScanID
7. Probe
8. SpecID

Row Number identified the data entry row.

Axis allows you specify what axis you wish to control with the subsequent options

Speed is definable from 0 to the specific stages maximum speed. Attempting to issue a speed greater than the stage's maximum speed will cap the entry to the stage's maximum speed.

Distance is definable from 0 to the distance remaining in the desired direction (up to the limit established in the Fixture Profile). If you attempt to enter a value greater than what is permitted, an error message will pop up indicating the problem.

For example, if you are presently at position **10mm** on the horizontal axis, and the fixture profile limits travel to the **60mm** absolute position, you may only enter a maximum value of 50mm into the **distance** box.

Collect Data tells the system whether during the entire duration of the move the system should be collecting data or not. Checking the box enable data collection for that move, leaving the box empty will not collect data.

ScanID are tags used to associate a series of data points with the area of the part scanned. This data tag is written to a column next to every data point. Entering a new ScanID value for each data collection move allows the user to identify where the data points came from.

Probe is an option for certain LumetriScan products that are designed for use with multiple measurement probes. Selecting the desired probe will switch your optical signal to that probe at the beginning of the move.

SpecID is an option that specifies the **Specification** and **Filter** values to be used during a data collection move.

Three buttons (Copy, Insert, and Delete) are useful in creating these recipes. Begin by selecting a row (or rows) by clicking the column to the left of the column called "Row Number". This selects the entire row.

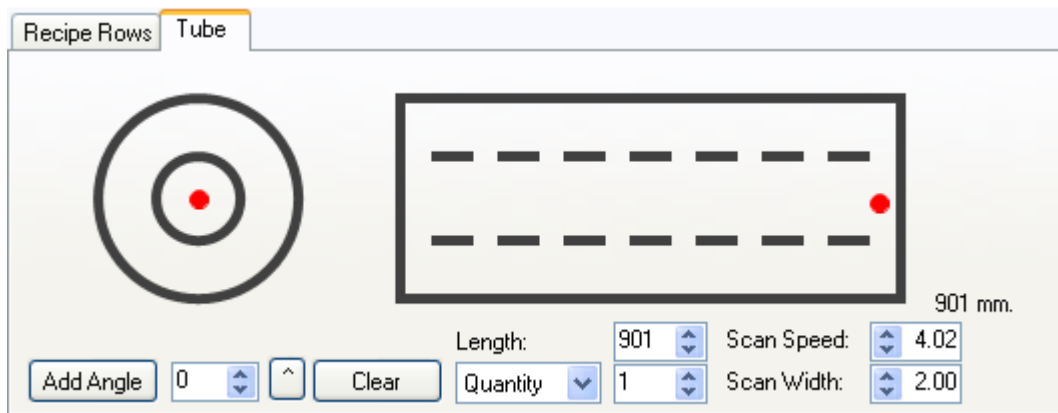
COPY will copy the row to the end of the list of rows.

INSERT inserts a blank row immediately below the row selected.

DELETE will delete the row selected.

9.6 Tube Recipe Definition Tool

For large uniform parts, creating many scan rows with repeating information can be cumbersome. There is a tool for avoiding this activity for tube type samples.



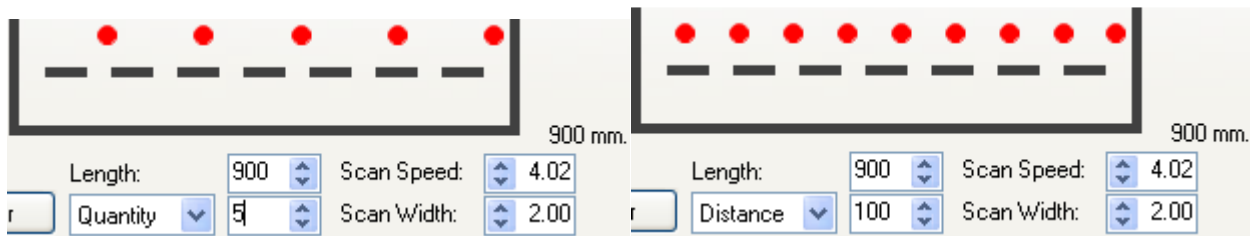
Scan

In the normal scan method applied by Lumetrics, Inc. a scan performed laterally along the cross-section of the tube achieves the best results for determining the most accurate characteristic of the tube. Using this tool, the user may select both the speed of the cross-sectional scan and the width

cross-section to be examined. The number of points collected can be determined by multiplying the data collection rate by the scan distance and dividing the scan speed. In a standard system, you might have $(50 \text{ pts./s}) * (2\text{mm}) / (4\text{mm/s}) = 25 \text{ pts.}$

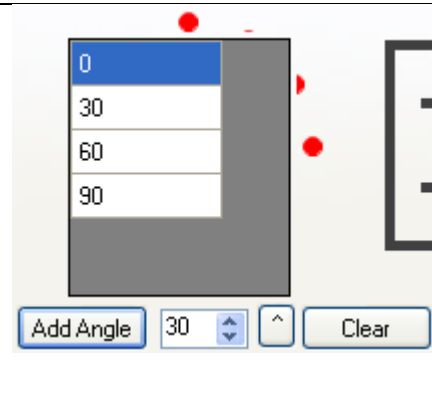
Locations

The number of locations can be selected along the tube by either the distance between the scan locations or the total number of locations to scan along the tube. This preference is selectable by a drop down menu. A red dot will be placed representing each scan location. The maximum distance between points is the length of the tube and the maximum quantity is dependent on the length of the tube as well.

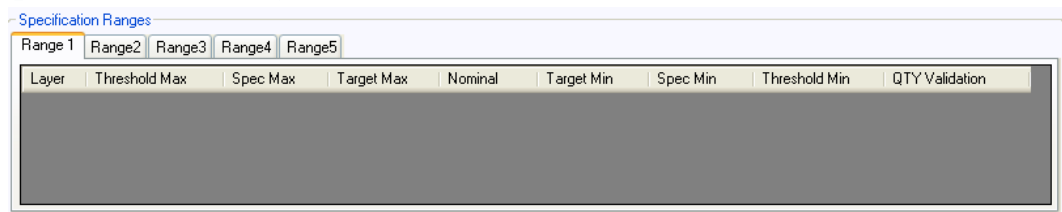


Angles

At each location, all listed angles will be measured. A red dot will be placed representing each angle to be measured

Add Angle	Clicking this button will add an angle to the measurement list according to the value entered	
Numeric Entry	Angle of measurement values can be entered here from 0 to 360 in 1 degree increments	
^	Shows and hides a panel listing all angles of measurement	
Clear	Clears the selected angle from the list or all angles when the panel is not visible.	

9.7 Specification Ranges



Specification Ranges control a simple data processing algorithm that is intended to remove obviously erroneous data points and establishes markers for post-scan charts. There are eight configurable columns for up to five independent **Ranges**.

Number of Layers is a field used to specify how many layers are being inspected for a given range. Adjusting this value will reveal Range options accordingly.

Threshold Max sets the upper limit where a data point falling above this limit would be considered erroneous.

Spec Max configures a line to act as an upper boundary when data is displayed on a chart on the **Scan Tab** following a scan.

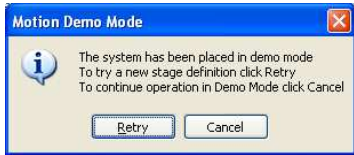
Nominal configures a line to act as the target value when data is displayed on a chart on the **Scan Tab** following a scan.

Spec Min configures a line to act as a lower boundary when data is displayed on a chart on the **Scan Tab** following a scan.

Threshold Min sets the lower limit where a data point falling below this limit would be considered erroneous.

QTY Validation is a selectable checkbox. When the checkbox is unchecked, individual data points will be removed based simply whether they fall outside the **Threshold Range**. When the checkbox is checked, the filtering algorithm is slightly modified such that if any one of the layers with the box checked falls outside the threshold, all the data points with layers that have the box checked get removed.

10 Troubleshooting

Error Code	Description	Cause(s)	Solution(s)	Error Window
0001	Communication Failed	Motion Controller not plugged in	With power to the motion controller turned OFF, plug in the USB cable	
		Motion Controller not powered on	Power on Motion Controller	
		Hardware Selection does not match the device	Select the proper Hardware Profile	
0002	Data Missing	OptiGauge Kernel not running or corrupt	Restart PC Controller	Blank/Static Waveform
0003				

11 Contact Us

11.1 Technical Support

In order to receive service, you must have an active Service Agreement. You may contact the sales department through sales@lumetrics.com or 1-585-214-2455x102 to establish a service plan.

Once a service plan is active, you may contact Customer Service by emailing service@lumetrics.com or calling 1-585-214-2455 x123. Be prepared to describe your issue in detail and have the following information:

Contact Name:

Company:

Phone Number:

Email Address:

Street Address:

City, State, Zip Code

Country:

OptiGauge Serial Number:

Problem Description: