

Measure2D™ Software User Guide



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Use of the Software is subject to our End Users License Agreement (EULA). Our Software License of the Measure2D™ Software is one license per computer/Keyence measurement device.

Warranty

Roth Technologies, LLC warrants to the original purchaser that its products and any supplied component parts thereof, will be free from defects in workmanship and materials for a period of twelve (12) months from the date of purchase. We will, without charge, repair or replace (at OUR option) defective product or component parts.

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This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

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I. Introduction

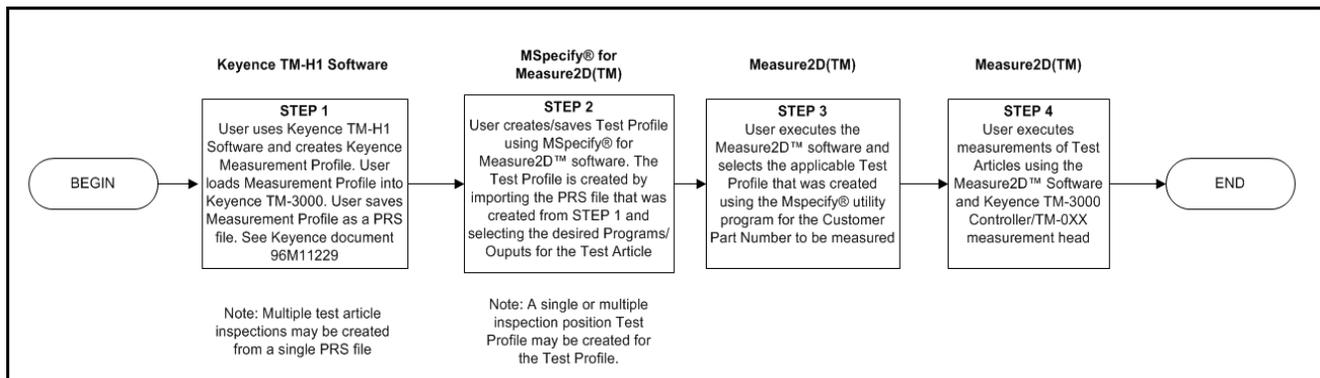
Welcome to the Measure2D™ User Guide. The User Guide will provide basic instructions on how to implement and use the Software. Use of this software is subject to the End Users License Agreement (EULA) which is located on our website at www.Measure2D.com.

II. Background Information

The following documents include additional information w/ regards to the Measure2D™ Software program. There are additional Keyence documents that include information about the Keyence TM-3000 controller and TM-0XX measurement heads that are not listed here.

- **End User License Agreement (EULA)**, Roth Technologies, LLC
- **Keyence OM Connection Guide**, Roth Technologies, LLC
- **Measure2D™ (Software) Installation Guide**, Roth Technologies, LLC
- **Mspecify® for Measure2D™**, Roth Technologies, LLC

The flowchart below illustrates the process flow structure between the Measure2D™ Software, the Keyence TM-H1 Navigator Software, and the Keyence TM-3000 controller/TM-0XX measurement head. The User shall follow this process flow in order to proper execute measurements using the Measure2D™ software.



III. Necessary Components

The following components are necessary in order to run the Software:

1. The Installation Software that was provided with your order. This may have been provided to you on a USB Flashdrive, from our website, and/or directly via a Dropbox link
2. The MySQL ODBC driver must be loaded on your test computer per the Installation Guide

3. Your computer that is used to run the software MUST be connected to the Internet and Port 3306 must be open on your Test Computer and Network for our **Server Static IP Address 74.208.165.58**.

There is an interchange of material data between the computer and the MySQL Server. If the interchange of data is slow and/or interrupted, the program may not run correctly or timeout.

4. Keyence TM-3000 Measurement System:

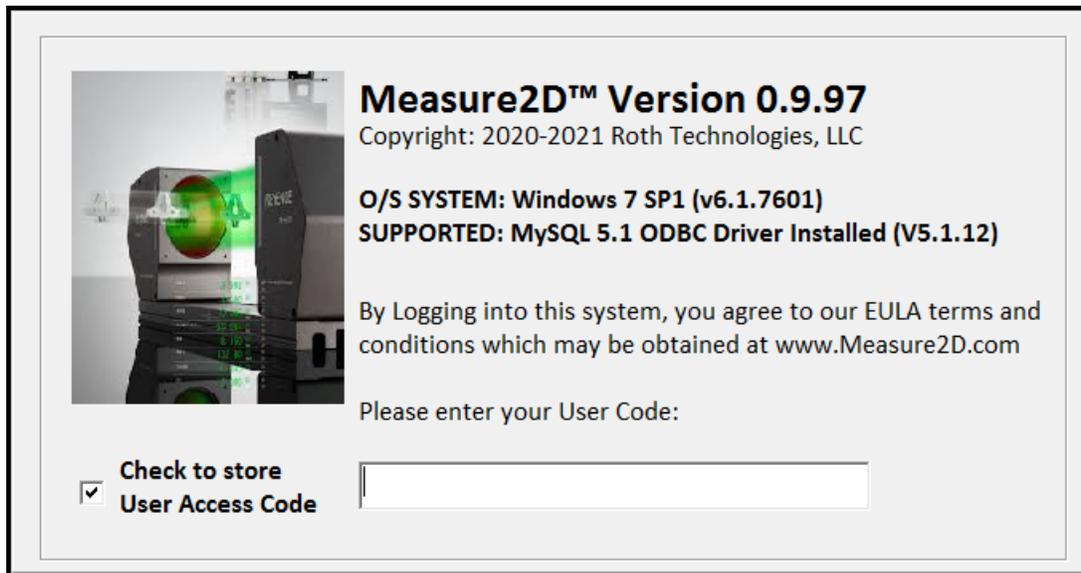
- Test Computer: The test computer performs the following functions:
 - (a) Runs the software,
 - (b) Communicates with your Keyence TM-3000 Controller via USB and over the Serial Port
 - (c) Communicates with the MySQL database which contains the configuration data and optionally stores the test results as well as Software faults for debugging purposes
- Keyence Measurement System (not provided)
 - Keyence TM-3000 Controller
 - Applicable Keyence TM-0XX measurement head micrometer
- Applicable connection between the Test Computer and the Keyence Micrometer System which includes one serial port and one USB port.

5. Customer supplied equipment to fixture the item to be measured (and rotated) as required. The precision and accuracy of said equipment will affect the measurement accuracy.

V. Software User Access Code (UAC)

In a production environment, the following steps may be taken for obtaining data using the Software.

Step 1: Log into the system. Your company was provided a sixteen character length access code for logging into the Software. This character string identifies your company within the Software. Optionally check the [Check to store User Access Code] to store your UAC on your computer’s harddrive which allows it to be automatically loaded at the time of software login.

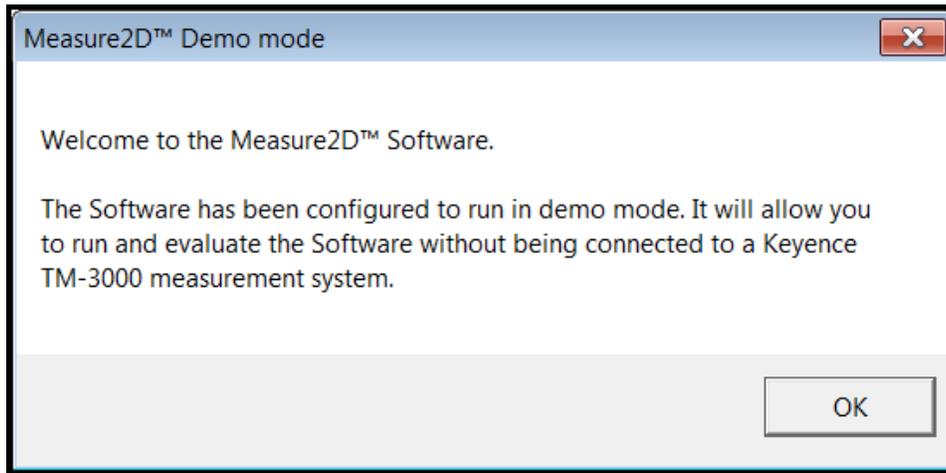


After logging into the system, the Main Form will appear on the screen as shown. The software at this point will perform the following operations (unless in DEMO mode)

- Connect to the MySQL database and download all applicable Test Profiles associated with your company
- Connect to the Keyence TM-3000 Controller via the Serial Port

If your company is setup for DEMO mode an introductory screen will appear at the program starts before the Software begins to fully execute – just select OK to continue. Note that when the Software is in DEMO mode the Software will “generate” readings rather than read them from the Keyence TM-3000 controller.

Demo Mode confirmation screen



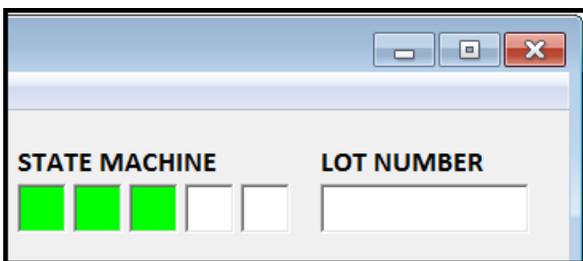
The following screenshot shows the overall User Software form/interface. If your configuration has only one Test Profile the Software will automatically load it at run time which is demonstrated below. If you have more than one Test Profile then you will be required to select one from the Test Profile dropdown list. If you do not have a Test Profile – the Software will be unable to execute.

TEST	PROG	OUT	USL	LSL	MEASURE	PASS/FAIL	MEAN	STD DEV	COVAR	MAX	MIN	CPK
01	1	1	6.400	6.000								
02	1	2	7.550	7.150								
03	1	3	6.400	6.000								
04	1	4	7.550	7.150								
05	1	5	6.400	6.000								
06	1	6	7.550	7.150								
07	1	7	15.000	13.000								
08	1	8	6.400	6.100								
09	1	9	2.400	2.000								
10	1	10	6.580	6.180								
11	1	11	12.900	12.500								
12	1	12	19.250	18.750								
13	1	13	22.400	22.000								
14	1	14	25.500	25.100								
15	1	15	34.900	34.500								
16	1	16	40.200	39.600								
17												
18												
19												
20												

Software/Keyence Connection Status

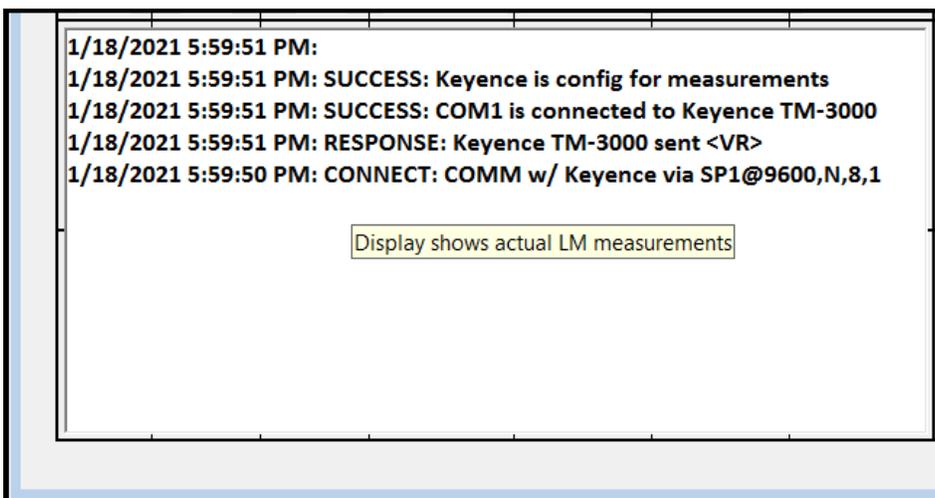
The current status of the connection between the Software and the Keyence Controller is displayed in the upper right hand corner of the User Form. The State Machine indicators provide an instantaneous of the following items:

- (1) Connection to the Keyence Controller
- (2) Test Profile are available from the Customer database
- (3) Test Profile was successfully loaded
- (4) Last communication with the Keyence Controller resulted in valid measurements received from the Keyence Controller to the Software



Communication with the Keyence Controller via Serial Port

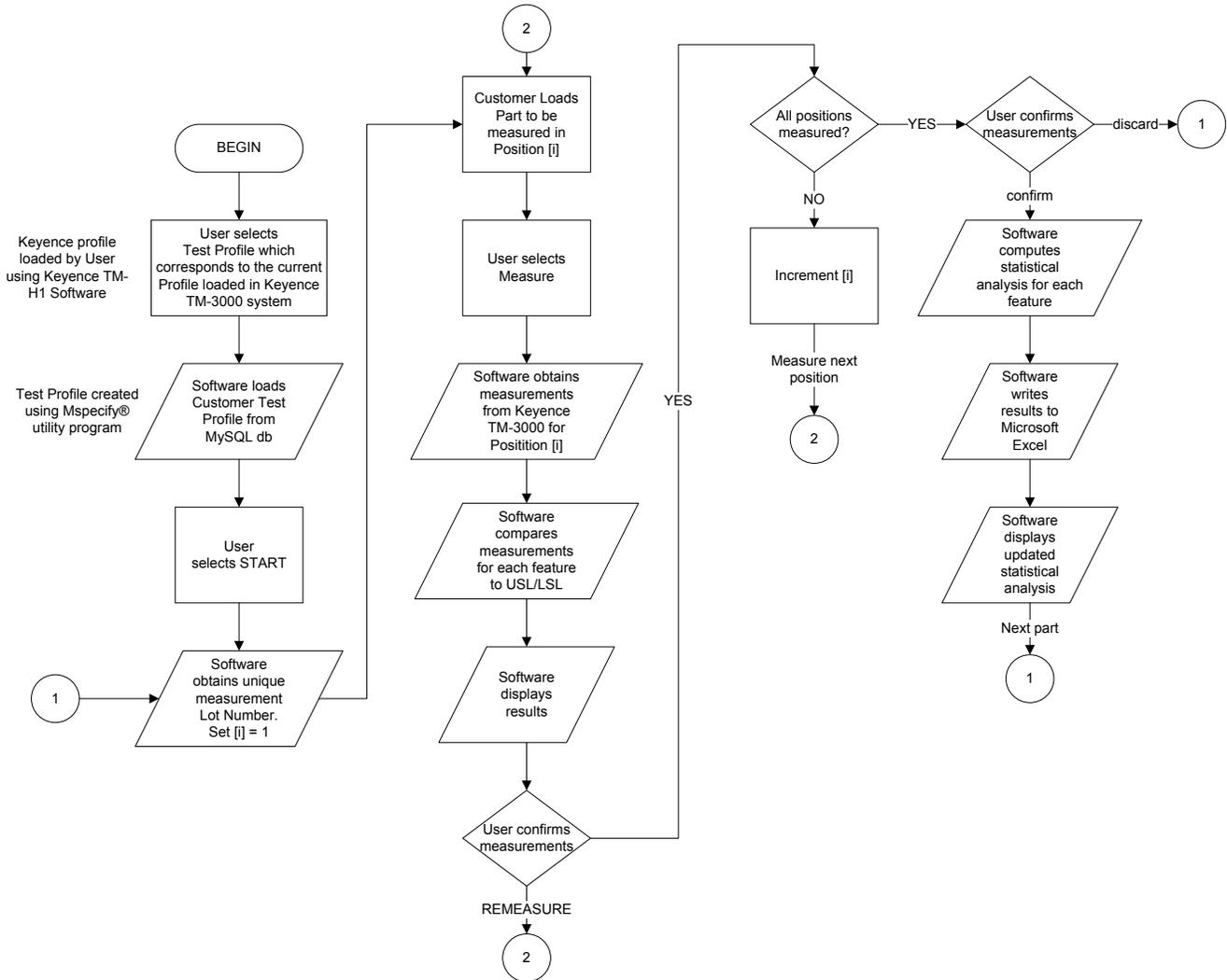
When the Software is first executed (non-demo mode) the Software will (a) find the Keyence TM-3000 controller and (b) send the required commands to reset the Serial Port communication (clear) between the controller and the Software. This communication requires the use and installation of the Serial Port adapter and cable (see the Keyence Installation Guide).



Note: If the Serial cable is NOT installed the Software will be unable to communicate with the Keyence controller. The Measure2D™ Software does NOT use the USB cable.

VI. Software Process Flow

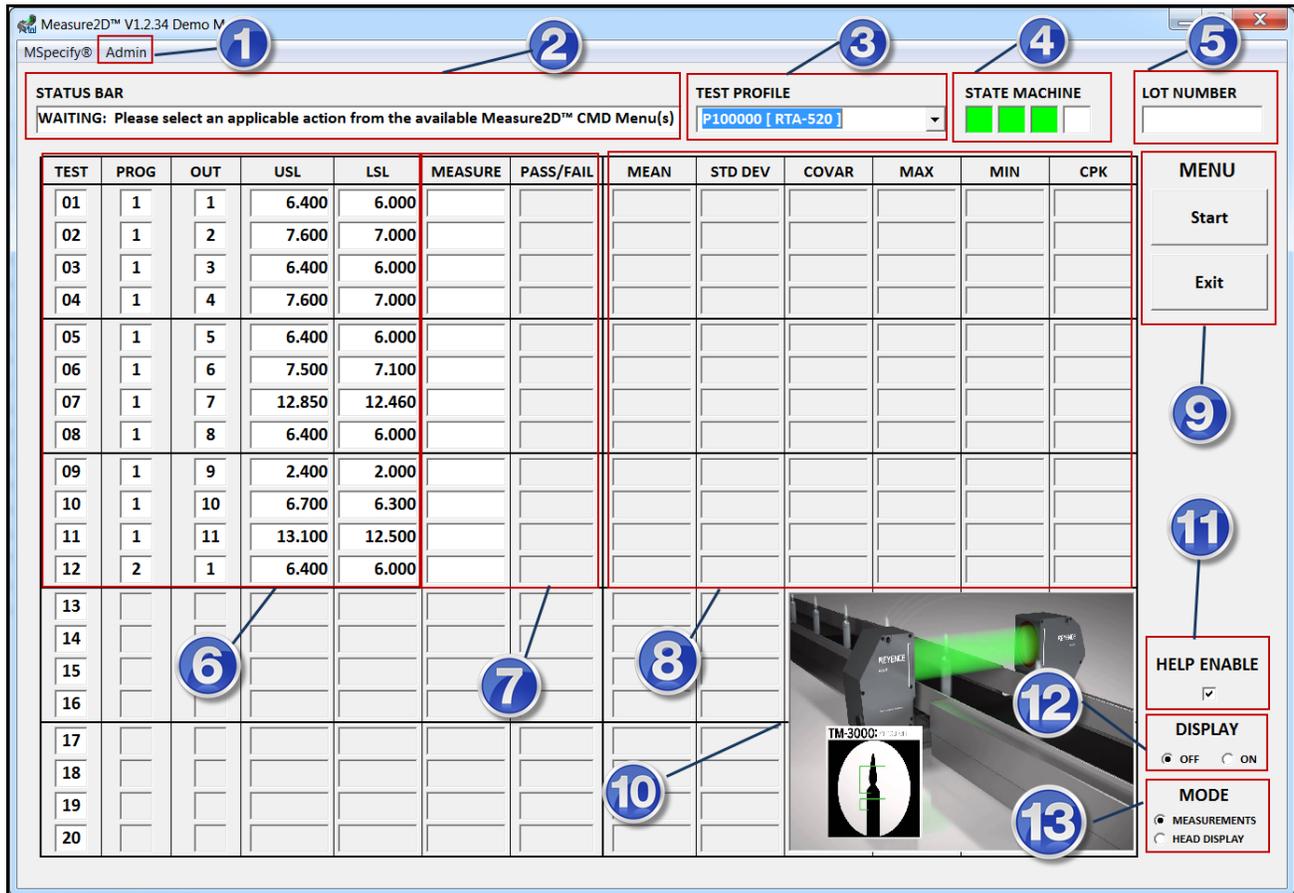
The following flowchart summarizes the Software process flow:



Section VII of this document illustrates where the User selected menus/command buttons that supports the flowchart.

VII. Measure2D™ User Interface

This section illustrates the Measure2D™ User Interface and the applicable menu buttons/command buttons that support the flowchart shown in Section IV of this document. The following detailed summaries are organized by the numerical identifications shown on the figure below.



Summary

- (1) Admin: This menu option allows the User to change the CPK value and the number of values used when computing the statistics (mean, standard deviation, etc) for the measurements
- (2) Status Bar: The Status Bar provides information to the User about the current state of the Software
- (3) Test Profile: The User selects the applicable (defined) Test Profile that is programmed into the Keyence TM-3000 controller via the Keyence TM-H1 Navigator software. Measure2D™ does NOT have the ability to program the Keyence controller. The Software does have the ability to “switch” programs within the defined Test Profile.

- (4) The State Machine indicators provide an indication to the User with regards to (a) connection state of the Software to the TM-3000 controller, (b) whether test profiles are available to the User, (c) if a test profile was loaded by the Software, and (d) measurement process is working
- (5) Lot Number: The Lot Number is obtained by the Measure2D™ from the MySQL table allocated to the Customer. The Lot number is a unique sequential number. It provides traceability to the measurements made by the Keyence TM-3000 controller that is read by the Software.
- (6) Programs/Output: The program/output section shows the applicable (defined) programs and outputs that are assigned to the programs that will be used by the Test Profile
- (7) Measurements: This section shows the actual measurements made by the Keyence TM-3000 controller/TM-0XX measurement head. These measurements are obtained by the Software by polling the Controller. These measurements are compared to the USL/LSL (upper and lower specification limit) that are defined by the Test Profile.
- (8) Statistical Analysis: This section summarizes the computed mean, standard deviation, covariant, min, max, and CPK values computed from the measured values.
- (9) Menu: This section shows the active menu (command) buttons available to the User (see Section IV).
- (10) Help Images: Help images may be loaded by the User as part of the developing the Test Profile. These images are shown during the measurement process to guide the User on how to load the part in the Keyence TM-3000/TM-0XX measurement head.
- (11) Help Enable: The Help Images may be shown/hidden by selecting/deselecting this check box.
- (12) Display: The background communication between the Software and the Keyence TM-3000 controller may be shown by selecting this checkbox.
- (13) Mode: The display mode affects the display of information that is provided on the Display that is attached directly to the Keyence TM-3000 controller.

VIII. Exporting to Microsoft Excel

The Software will automatically export measurement data to Microsoft Excel if the Excel software is loaded on the computer.

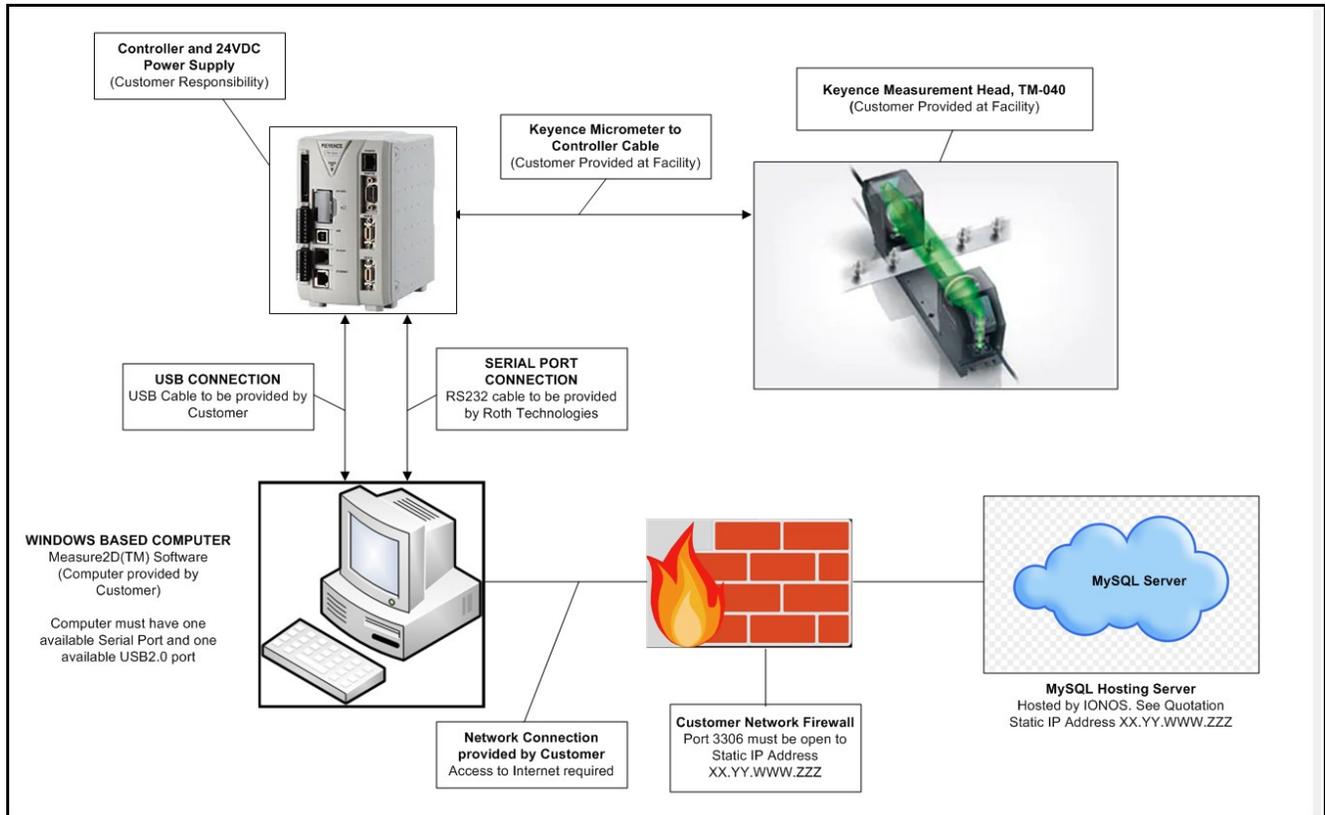
- The file will be stored on the [My Documents] directory
- The filename will include a datetime stamp and the Software Test Profile number

The format of the dataset followings the format shown below.

	A	B	C	D	E	F	G	H	I	J	K
	Date / Time	Test Profile	Customer PN	Measurement Number	Program	Output	Measured Value	Upper Tolerance	Lower Tolerance	PASS / FAIL	
1											
2	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	DIA001	6.159	6.400	5.900	PASS	
3	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	DIA002	7.372	7.600	7.000	PASS	
4	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	DIA003	6.142	6.400	5.900	PASS	
5	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	DIA004	7.307	7.600	7.000	PASS	
6	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	DIA005	6.112	6.400	5.900	PASS	
7	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	DIA006	7.372	7.600	7.000	PASS	
8	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	DIA007	14.433	15.000	13.000	PASS	
9	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	DIA008	6.159	6.400	5.900	PASS	
10	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	DIA009	2.120	2.400	2.000	PASS	
11	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	LEN001	6.273	6.600	6.000	PASS	
12	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	LEN002	12.577	13.000	12.500	PASS	
13	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	LEN003	18.972	19.250	18.500	PASS	
14	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	LEN004	22.173	22.500	21.500	PASS	
15	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	LEN005	25.452	25.500	24.500	PASS	
16	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	LEN006	34.923	35.100	34.100	PASS	
17	1/18/2021 21:10	P100006	RTA-520C	2000107	RTA-520A VERT10	LEN007	39.997	40.200	39.200	PASS	
18											
19											

IX. Schematic and Algorithm Overview

The following schematic illustrates the connection between all the applicable required equipment

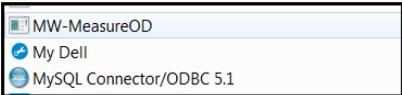


The applicable Static IP Address of the supporting Server that supports the Measure2D™ software is 74.208.165.58.

Please review our Measure2D™ Installation guide if you have any questions.

X. Reporting Errors

Please report errors or setup issues via email to sales@cathcad.com. Please provide as much information as possible with regards to the setup of the program when the error occurred. We have provided a summary of key installation items that we will need for your configuration.

Key Installation Item	VERIFICATION METHOD	INITIALS	Example screenshots. If you run into technical difficulties with installing and running your system we will be asking for similar information to be provided.
The Keyence TM-3000 Controller is connected to the Keyence TM-0XX Measurement Heads per Keyence User's Manual 96M11193	Visual		N/A
A 24VDC Power Supply is connected to the Keyence TM-3000 Controller	Visual		N/A
A USB cable connection has been made between the Windows based Computer and the Keyence TM-3000 Controller per Keyence User's Manual 96M11193	Visual		Provide Picture
A Serial port cable connection has been made between the Windows based Computer and the Keyence TM-3000 Controller per Roth Technologies Document Measure2D™ Keyence TM-3000 Connection Guide	Visual		Provide Picture
The MySQL ODBC driver has been loaded on the Windows based Computer to Roth Technologies Document Measure2D(TM) Software Installation Guide	Control Panel/ Programs		Provide Screenshot 
The Measure2D(TM) software program has been installed on the Windows based computer per Roth Technologies Document Measure2D(TM) Software Installation Guide	Control Panel/ Programs		Provide Screenshot
When executing the Measure2D(TM) program -- the Software was able to CONNECT with the Keyence Controller (i.e. all status bars are GREEN).	Visual		Provide Screenshot from Software 