



Simple Precision™



KAM® LRW™

LOW RANGE WATERCUT METER

LRW CONNECT SOFTWARE

User Manual
LRWCMANUAL 0322

TEL +1 713 784 0000
FAX +1 713 784 0001
Email Sales@Kam.com
KAM CONTROLS, INC.
3939 Ann Arbor Drive
Houston, Texas 77063 USA
www.KAM.com

An ISO 9001:2015 certified company

TABLE OF CONTENTS

SECTION	TITLE	PAGE
1	LRW Operation using LRW Connect software	3
	• Software installation	3
	• Software configuration	4
	• Software layout	5
	• Data Capture	7
	• In-line calibration and verification	8
	• Calibration with laboratory analysis	10
	• Process parameter values	11
	• Set percentage water for 4-20 mA	11
	• Changing temperature units	12
	• Setting alarm setpoints	13
	• Setting alarm mode	14
	• Enable/Disable Modbus	15
	• Changing the Modbus address	15
	• Changing density input	16
	• Changing density range	16
	• Changing density units	16
	• Disabling temperature LCD display	16
	• Change date and time	17

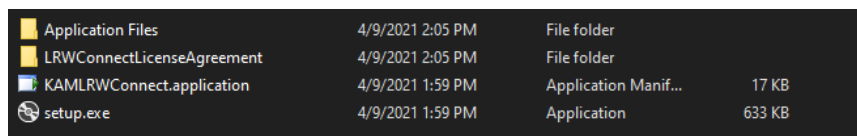
KAM LRW OPERATION LRW CONNECT

LRW CONNECT SOFTWARE INSTALLATION

LRW Connect is the software used for calibration, debugging & configuration of the LRW for firmware version 11-2020 and newer. The software is available as a free download from www.kam.com. For firmware versions older than 11-2020 LRW Connect Version 5-2019 is available.

1. The LRW software can be downloaded on <https://www.kam.com/product/lrw-low-range-watercut-meter/> under the heading "Download LRW Connect Software".
2. Run "setup.exe". FIG. 1-1.

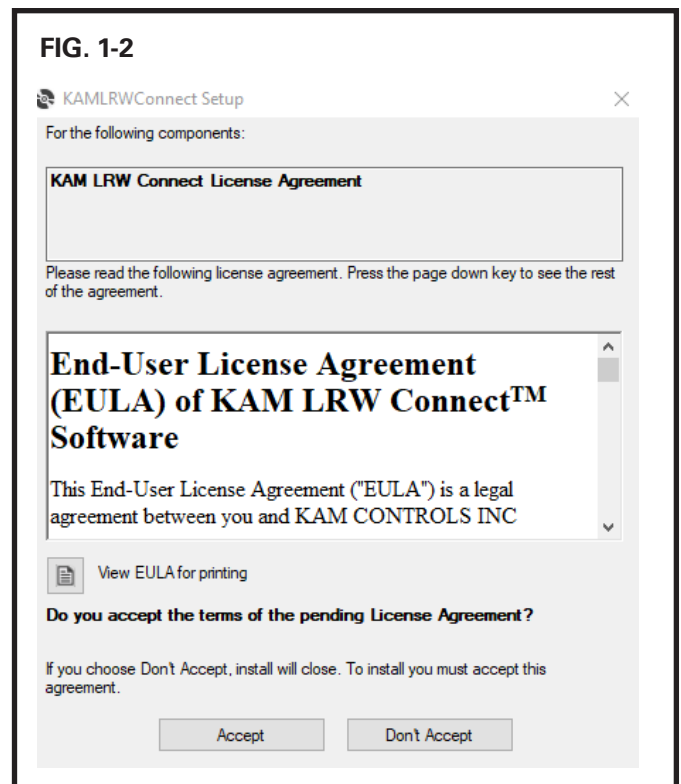
FIG. 1-1



Application Files	4/9/2021 2:05 PM	File folder	
LRWConnectLicenseAgreement	4/9/2021 2:05 PM	File folder	
KAMLRWConnect.application	4/9/2021 1:59 PM	Application Manif...	17 KB
setup.exe	4/9/2021 1:59 PM	Application	633 KB

3. Follow the on-screen instructions to install the LRW Connect software. Click the "Accept" button to the approve license agreement and approve any security warnings. FIG. 1-2.

FIG. 1-2

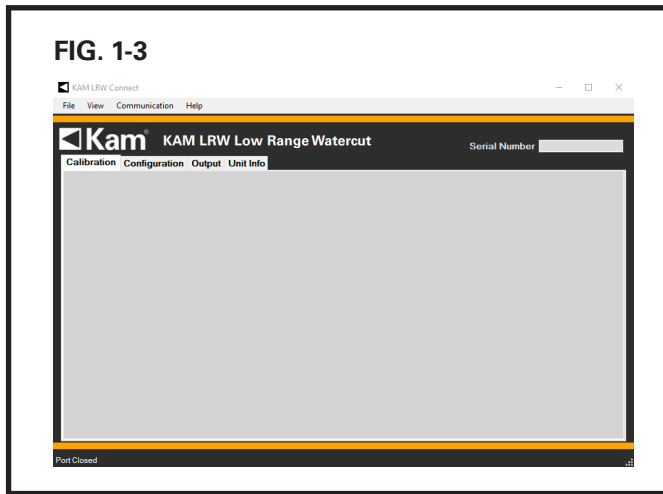


KAM LRW OPERATION LRW CONNECT CONTINUED

LRW CONNECT SOFTWARE CONFIGURATION

An RS232 cable for connecting your PC to the LRW has been supplied with the LRW along with a USB-to-serial converter, in case your computer does not have an RS232 serial port. Go to <https://www.kam.com/documentation/> and download the file "RS232 Driver" from the "Software" section. Once downloaded, unzip the file, double-click on the executable file (.exe) and follow on-screen instructions to install.

Ensure your PC is connected to the LRW sensor via the supplied RS232 serial cable and USB-to-serial converter as per wiring diagram on page 13 of the LRW manual. To access the boards, use a 7/16" wrench to remove the (6) hex screws on the Explosion Proof electronics enclosure and remove the cover.



1. Open the LRW Connect software by clicking on the shortcut icon on your desktop or from the start menu. A window will open. FIG. 1-3.

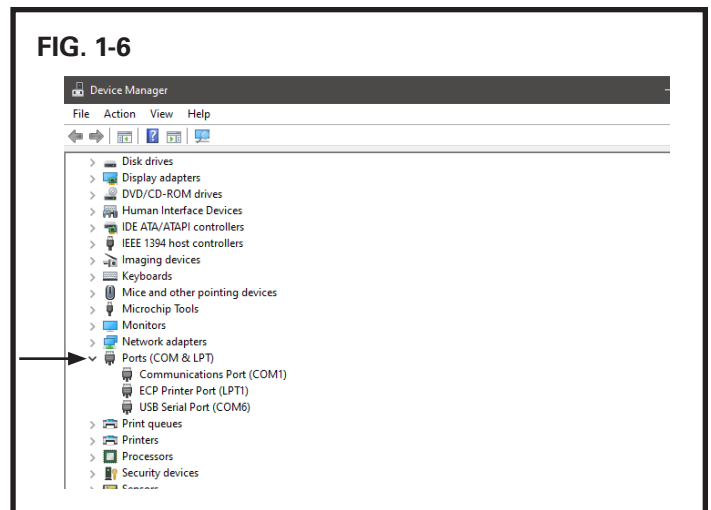
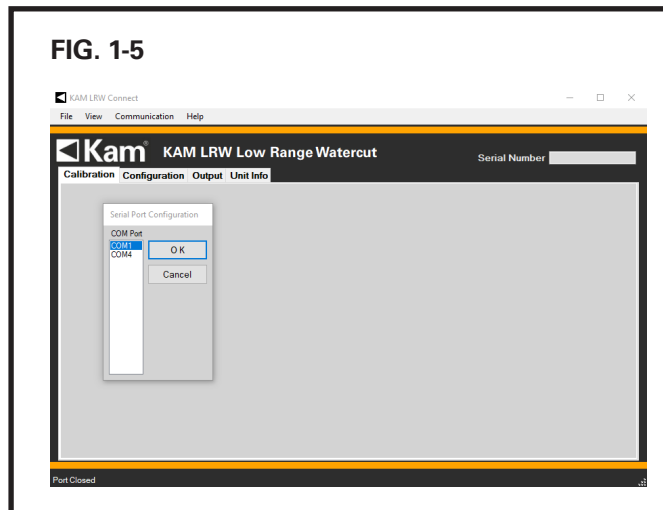
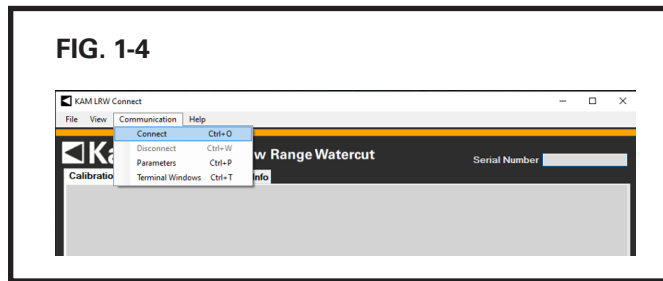
2. Click on the "Communication" menu, then click on "Connect." FIG. 1-4.

3. In the "Choose Serial Port" box, select the port number assigned to your serial port or USB port connected to the converter. FIG. 1-5.

You can find this information in the Device Manager of your PC under "Ports." FIG. 1-6.

4. Click on the "OK" button to save these settings.

5. The LRW Connect software configuration is complete.



KAM LRW OPERATION LRW CONNECT CONTINUED

LRW CONNECT SOFTWARE LAYOUT

Once the LRW Connect has been installed and configured as per the instructions on the "LRW Connect Software Configuration" section, the software offers information within three tabs, as shown below.

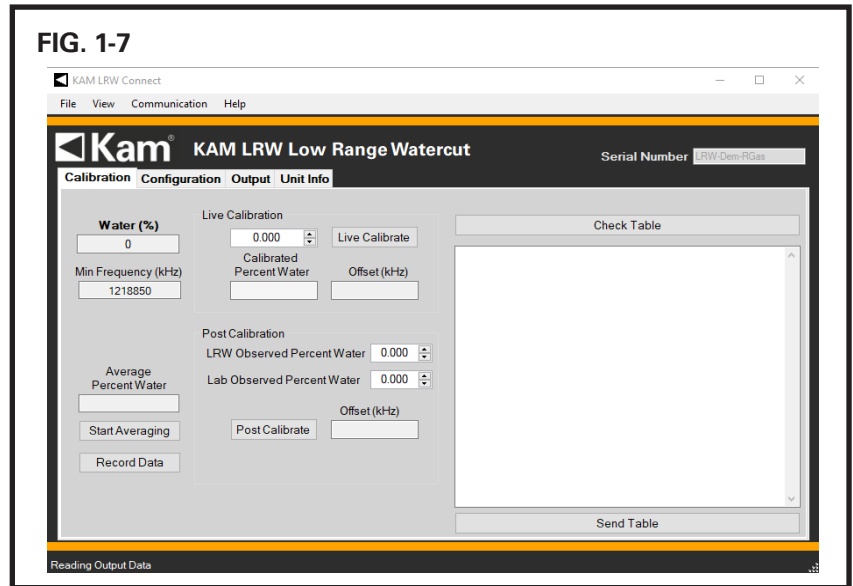
Calibration Tab

Available information:

- Percent Water Output
- Minimum Frequency

Available commands:

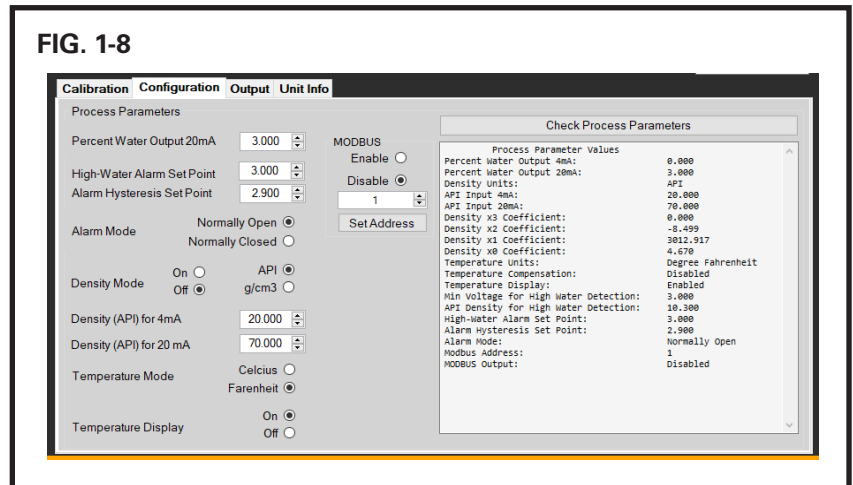
- Average Percent Water
- Record Data
- Live Calibrate
- Post Calibrate
- Check Table
- Send Table



Configuration Tab

Available commands:

- Percent Water for 20mA
- High-Water Alarm Set Point
- Alarm Hysteresis Set Point
- Alarm Mode
- Density Mode
- Density Range
- Temperature Mode
- Temperature Display
- Modbus State
- Modbus Address
- Process Parameters

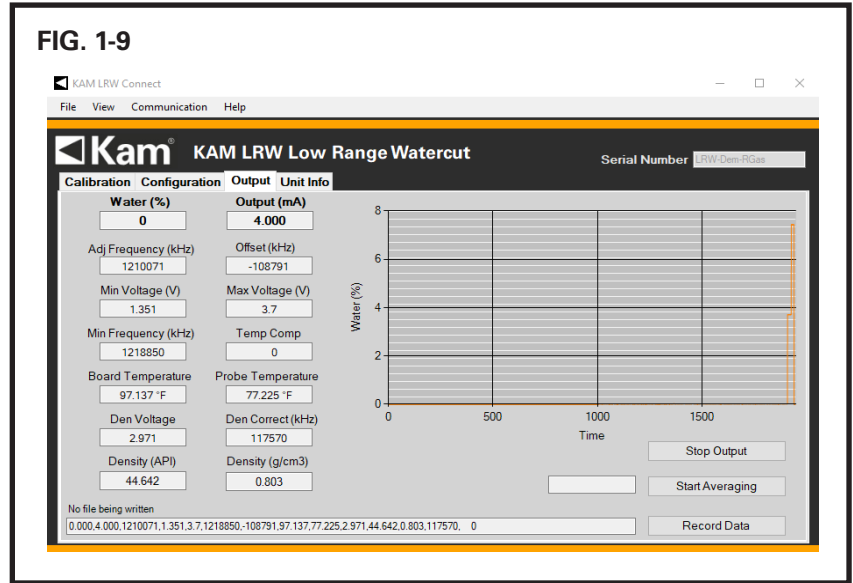


KAM LRW OPERATION LRW CONNECT CONTINUED

Output Tab

Available information:

- Percent Water Output
- 4-20mA Output
- Adjusted Frequency
- Frequency Offset
- Minimum Voltage
- Maximum Voltage
- Minimum Frequency
- Temperature Compensation
- Board Temperature
- Probe Temperature
- Density Loop Voltage
- Density Correction Frequency
- Density in API Gravity
- Density in g/cm3 units
- Line Output Data
- Water Percentage vs Time Graph



Available commands

- Stop Output
- Averaging of the percent water
- Record Data

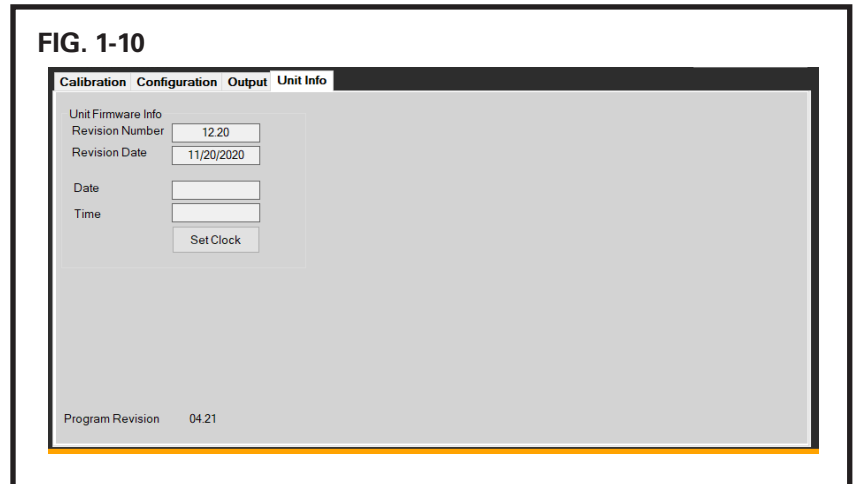
Unit Info Tab

Available information:

- Revision Number
- Revision Date
- Program Version

Available commands:

- Set clock



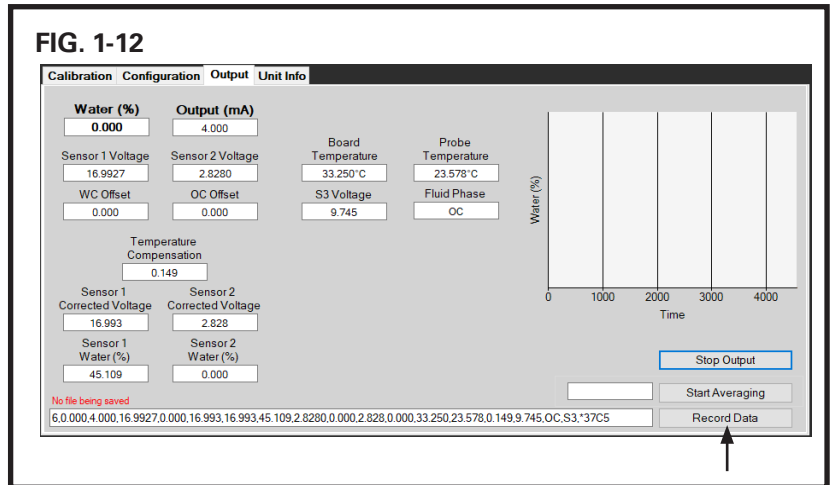
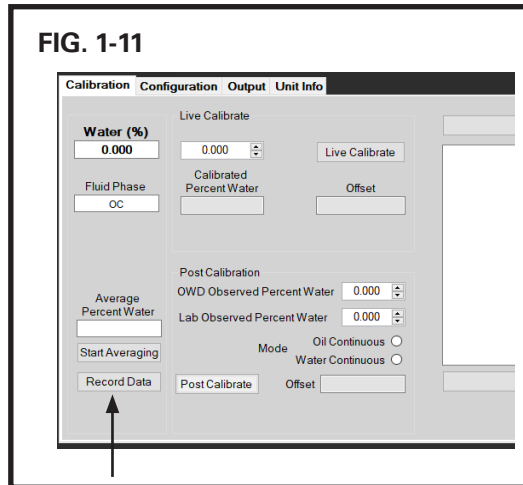
Detailed usage of the commands is given in the sections below.

KAM LRW OPERATION LRW CONNECT CONTINUED

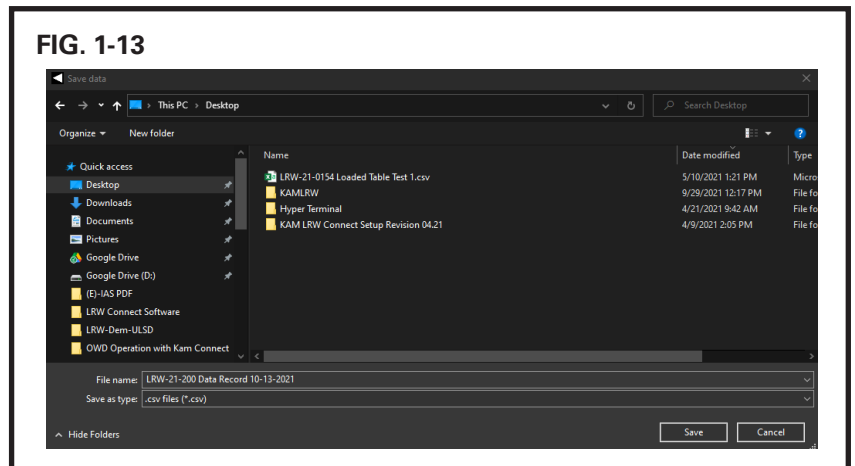
DATA CAPTURE

NOTE: This process is recommended to keep records of the instrument's operation.

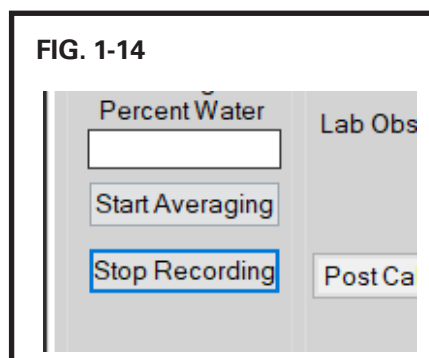
1. Launch OWD Connect. Go to the "Calibration" tab or the "Output" tab and click on "Record Data" button. FIG. 1-11, FIG. 1-12.



2. A new window will open. If a folder is not already selected, choose a folder, and click on "Open." Name the data file and save to selected folder. Click on "Save." FIG. 1-13.



3. The program will return to the tab capturing all data and the button will change to "Stop Recording." FIG. 1-14.
4. Click on "Stop Recording" to stop data capturing. The saved file can be opened either in MS Excel or in Notepad as a comma separated value file (.csv).

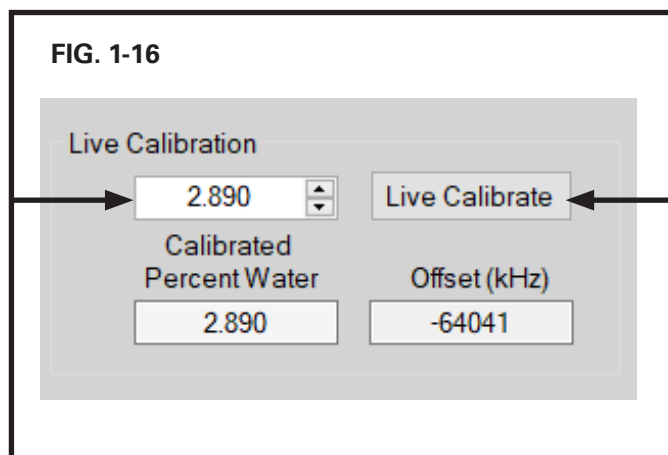
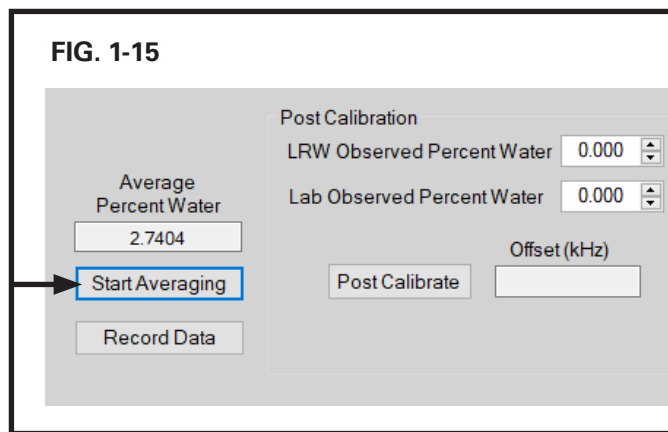


KAM LRW OPERATION LRW CONNECT CONTINUED

IN-LINE CALIBRATION AND VERIFICATION

PLEASE NOTE: The following calibration steps are to be conducted during initial installation with existing process conditions; during routine verification procedures; or when LRW readings indicate a slight drift off acceptable accuracies. You will need an RS232 cable (supplied) or an USB-to-serial converter (supplied), a PC equipped with LRW Connect software, and a means for manually collecting and measuring samples.

1. Launch the LRW Connect software and click on the Calibration tab. Manually draw (3) samples of fluid according to API MPMS Chapter 8.1, waiting at least 15 minutes in between.
2. Each time a sample is drawn, click on the "Start Averaging" button (FIG. 1-15) while the sample is being drawn and click "Stop Averaging" button at least 10 seconds after the sample is collected. The value in box above this button will produce the average from the water percentage readings during the sample draw.
3. Determine water percentage in each sample using centrifuge or the best available method to measure the amount of water required.
4. Average the water content from the three manual samples per API Chapter 10.
5. Calculate the difference between manual sample average and LRW average and add or subtract that value to the current average reading of the LRW in the calibration tab of the LRW Connect software. This value is the calculated percent of water to be entered to calibrate the LRW. See Calibration Example on page 10.
6. Type the calculated percent water (i.e. 2.89 for 2.89%) in the box below the Live Calibration section and click on the "Live Calibrate" button. When the calibration is complete, the Calibrated Percent Water and Offset boxes will update. FIG. 1-18.



KAM LRW OPERATION LRW CONNECT CONTINUED

CALIBRATION EXAMPLE

Manual samples water content:

1. 2.51%

2. 2.75%

3. 2.62%

Average = 2.63%

LRW water content during samples draw:

Average = 2.74%

Difference of averages:

$2.74\% - 2.63\% = 0.11\%$

According to the averages, the LRW is reading 0.11% high.

Current reading: 3.0%

To adjust the LRW, the reading needs to be lowered by 0.11%.

$3.0\% - 0.11\% = 2.89\%$.

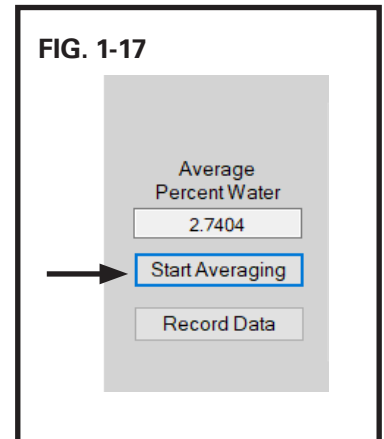
This is the new value to be entered into the LRW.

KAM LRW OPERATION LRW CONNECT CONTINUED

CALIBRATION WITH LABORATORY ANALYSIS

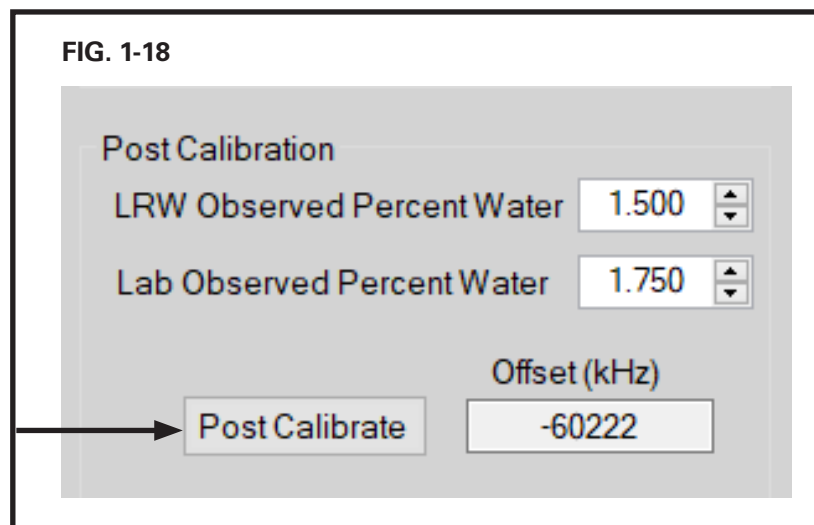
In cases where on-site reference measurement (Karl Fischer or centrifuge) is not available, the LRW™ can be verified after obtaining results of manual sample analysis at a laboratory.

1. Launch the LRW Connect software. Go to the calibration tab.
2. Manually draw three (3) samples of fluid according to API MPMS Chapter 8.1, waiting at least 15 minutes between sample draws.
3. Each time a sample is drawn, click on the "Start Averaging" button while the sample is being drawn and click "Stop Averaging" button at least 10 seconds after the sample is collected. The value in the box above this button will produce the average from the water percentage readings during the sample draw. FIG 1-17.
4. Send the samples to the lab for water content determination.
5. Once results have been received from the lab, average the water content from the three samples. This value is the "Lab Observed Water %."
6. The water content from the three LRW readings from step 3. This value is the "LRW observed percent water."



NOTE: The "LRW observed percent water" should be more than 0.

7. Type the LRW Observed Percent Water and the Lab Observed Percent Water in their respective boxes in the post calibration section and click on the "Post Calibrate" button. For instance, if the LRW observed water was 1.5% and the Lab observed % water was 1.75%, you would input 1.5 in the LRW Observed Percent Water box and 1.75 in the Lab Observed Percent Water box. FIG. 1-18.



8. Calibration results will be displayed in the boxes besides the Post Calibrate button. If not, calibrate once more or contact KAM Technical Support for further assistance.

KAM LRW OPERATION LRW CONNECT CONTINUED

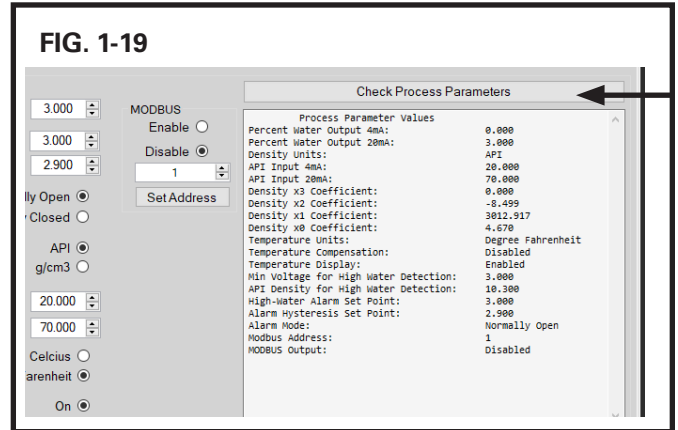
PROCESS PARAMETER VALUES

The overall configuration of the instrument is shown within the process parameter values which include the 4-20 mA loop (water percent range), density units, density range, density coefficients, temperature units, temperature compensation, temperature display, high water detection settings, alarm settings, and Modbus settings.

The parameters will be displayed on the window under the "Configuration" tab.

To update the parameters:

1. Launch LRW Connect. Click on the "Check Process Parameters" button and the information will be updated in the window below. FIG. 1-19.

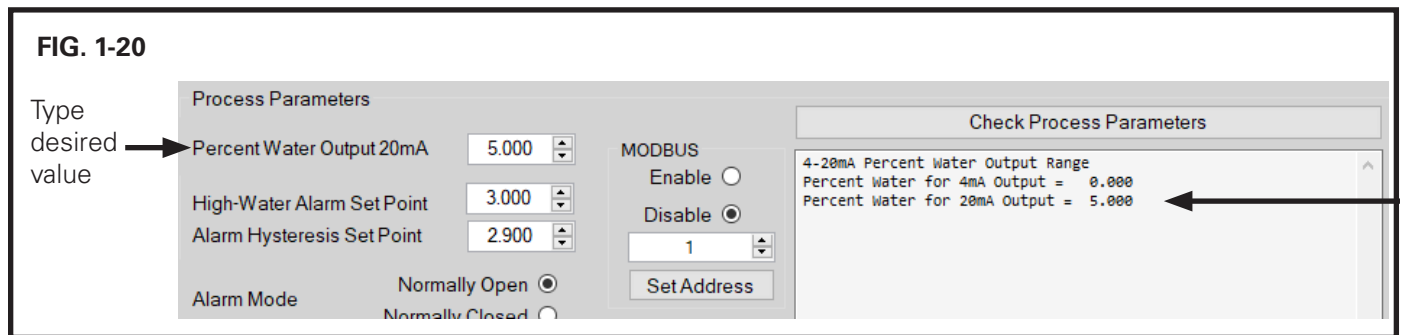


SETTING THE PERCENT WATER FOR THE 20 mA OUTPUT

The default percent water for the 20.0 mA output is the one requested at the time of order. To set a lower percent water for the 20.0 mA loop output:

1. Launch the LRW Connect. Go to the configuration tab. Click on the box beside the label "Percent Water for 20mA" type the desired value, and wait 5 seconds. For example: enter "90," 90 is the water percent equivalent to the 20mA of the output loop. The change will be confirmed in the process parameter window. FIG. 1-20.

NOTE: Setting this value does not change the accuracy of the instrument +/- 1.0

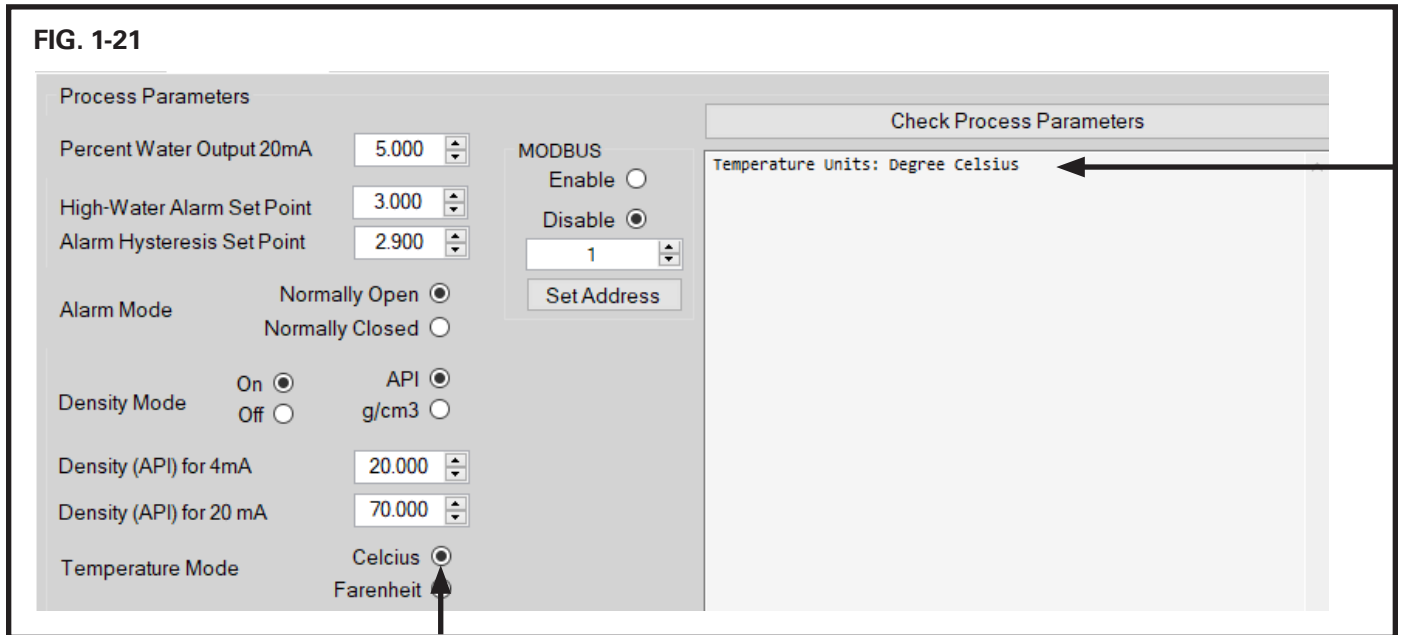


KAM LRW OPERATION LRW CONNECT CONTINUED

CHANGING TEMPERATURE UNITS

To change the temperature unit (The default unit for temperature is degrees Celsius):

1. Launch LRW Connect. Go to the "Configuration" tab. Click on the radio button beside either the "Celsius" or the "Fahrenheit" label to change the units. The change will be confirmed in the process parameter window. FIG. 1-21.

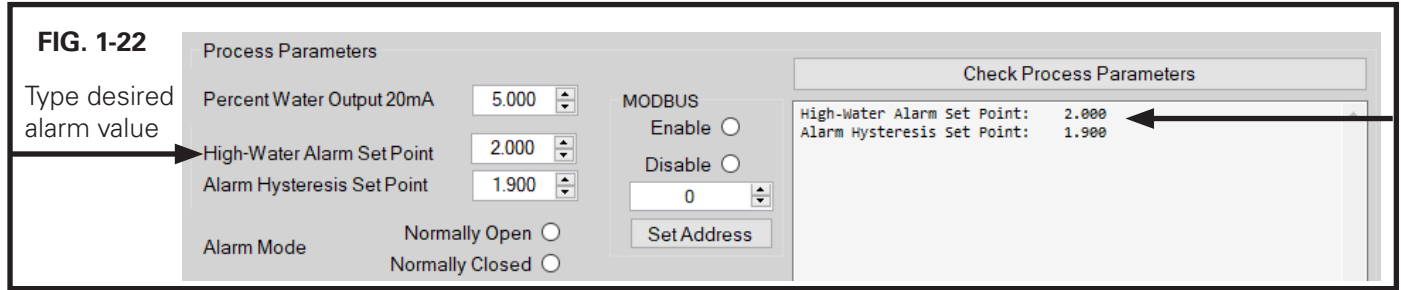


KAM LRW OPERATION LRW CONNECT CONTINUED

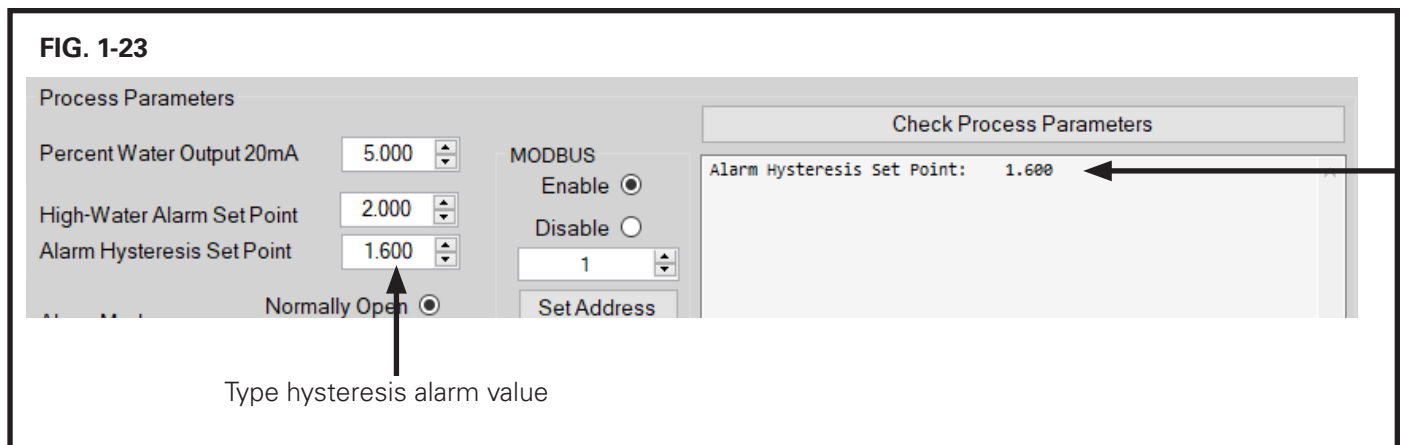
SETTING THE ALARM SETPOINTS

To set the alarm [Digital Out (+)]:

1. Launch LRW Connect. Go to the "Configuration" tab, type the desired alarm value in the number box beside the labeled "High-Water Alarm Set Point" and wait 5 seconds. FIG. 1-22.
2. The configured value for the alarm set point will be displayed in the process parameters window. For example, type "2" when 2 is the percent water where the alarm will activate.



3. The hysteresis point is adjusted automatically to 0.1% lower than the high set point.
4. To adjust the hysteresis point manually, type the new hysteresis value into the box labeled "Alarm Hysteresis Set Point." The hysteresis percent must lower and have a difference higher than 0.1% from the high setpoint. FIG. 1-23.
5. Click anywhere outside the box. The new hysteresis alarm value will be displayed. For example, "1.6" when 1.6 is the water percent lower limit where the alarm will clear the high-water status and be able to reactivate.



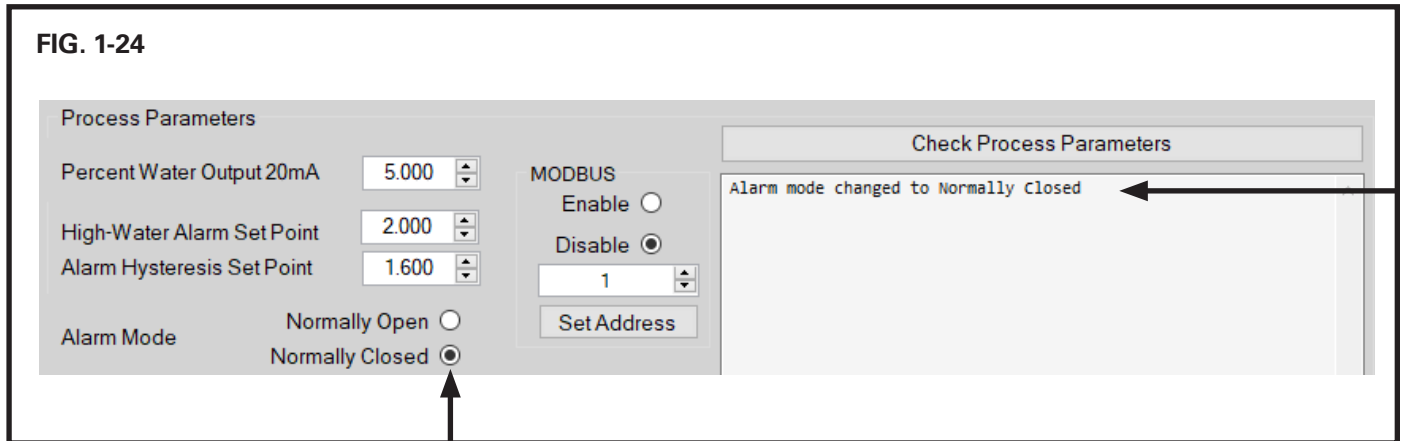
KAM LRW OPERATION LRW CONNECT CONTINUED

SETTING THE ALARM MODE

The alarm mode is set to "Normally Open" by default, follow the steps below to change the mode to "Normally Closed."

To set the alarm mode:

1. Launch LRW Connect, go to the "Configuration" tab, and click on the radio button labeled "Normally Closed." The update will be displayed in the "Check Process Parameters" window. FIG. 1-24.



2. To change the alarm mode back to "Normally Open," click on the radio button labeled "Normally Open."

KAM LRW OPERATION LRW CONNECT CONTINUED

ENABLE/DISABLE MODBUS

Unless requested, MODBUS is usually disabled prior to shipment from KAM.

1. Launch LRW Connect. Go to the "Configuration" tab, click on the "Enable" radio button in the MODBUS section.
2. When the radio button is selected, the button below changes to "Setting Status" while making the update, then switches back to "Set Address" once the update is successful. The confirmation will be displayed in the "Check Process Parameters" window. FIG. 1-25.

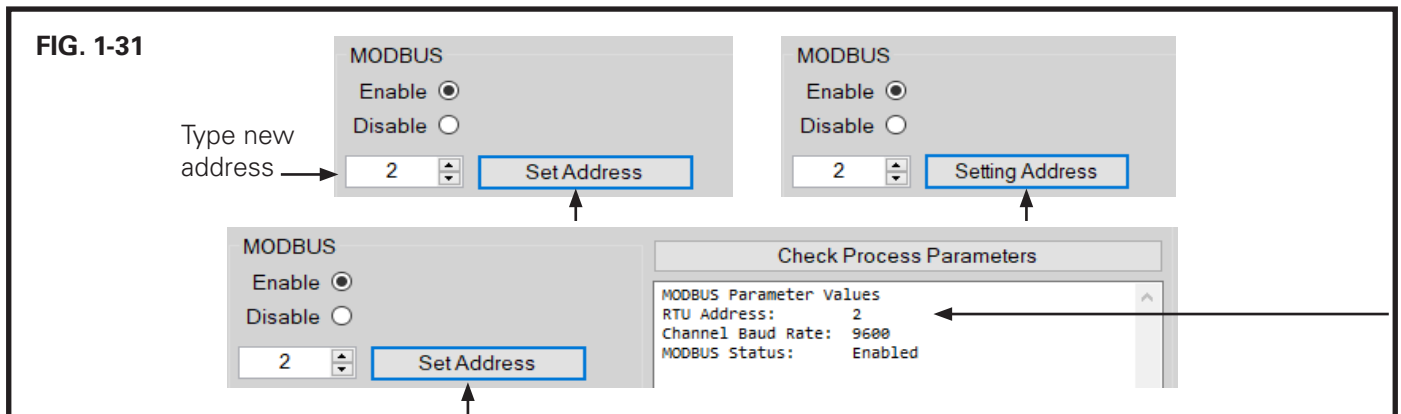


3. Power cycle (turn off and on) the LRW to start the Modbus communication.

CHANGE THE MODBUS ADDRESS

The default Modbus address is 1. This address can be change to any number from 1 to 247. Follow the steps below to change the Modbus address.

1. Launch the LRW Connect, go to the "Configuration" tab. Type the new address in the number box next to the "Set Address" button and then click on it. The button will change to "Setting Address" while making the update and change back once done. The confirmation will be displayed in the "Check Process Parameters" window. FIG. 1-31.



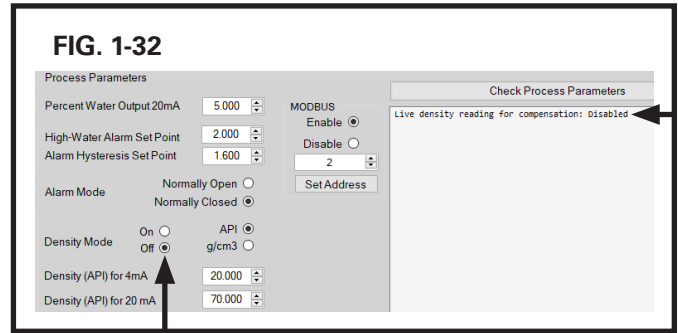
KAM LRW OPERATION LRW CONNECT CONTINUED

DENSITY INPUT

The LRW will arrive with density input already enabled. Density input values are configured at the factory according to information provided by the customer. These values must match output values from the mass flow meter/densitometer for accurate operation of the LRW.

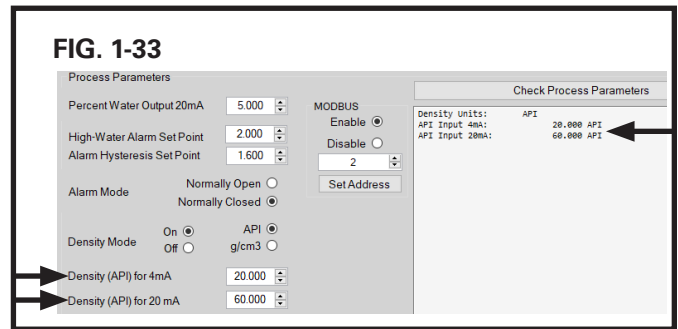
DISABLING DENSITY INPUT

1. Go to the "Configuration" tab and click on the "Off" button next to "Density Mode." The update will be displayed in the "Check Process Parameters" window. FIG. 1-32.



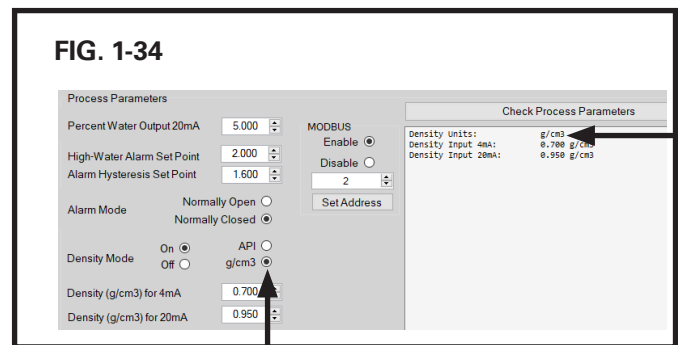
CHANGING DENSITY RANGE

1. Go to the "Configuration" tab and type the desired value for the high end on the "Density (API) for 20mA" box. The update will be displayed in the "Check Process Parameters" window. FIG. 1-33.
2. Type the desired value for the low end on the "Density (API) for 4mA" box. The update will be displayed in the "Check Process Parameters" window. FIG. 1-33.



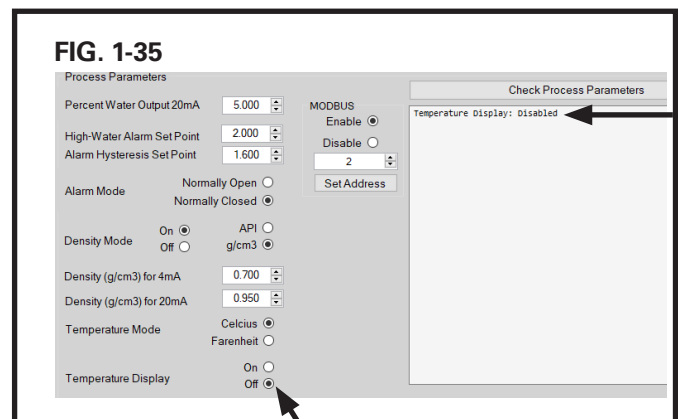
CHANGING DENSITY UNITS

1. Go to the "Configuration" tab and click on the button next to the density unit of your choosing: "API" or "g/cm3". The update will be displayed in the "Check Process Parameters" window. FIG. 1-34.



DISABLING TEMPERATURE LCD DISPLAY

1. Go to the "Configuration" tab and click on the "Off" button next to "Temperature Display". The update will be displayed in the "Check Process Parameters" window. FIG. 1-35.



KAM LRW OPERATION LRW CONNECT CONTINUED

CHANGE DATE AND TIME

1. Go to the "Unit Info" tab and click on the "Set Clock" button. The date and time will be updated as per your computer settings. FIG. 1-36.

