



Simple Precision™



KAM® OWD® WATER CUT METER OWD CONNECT SOFTWARE

User Manual
OWDCMANUAL 0222

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CAUTION:

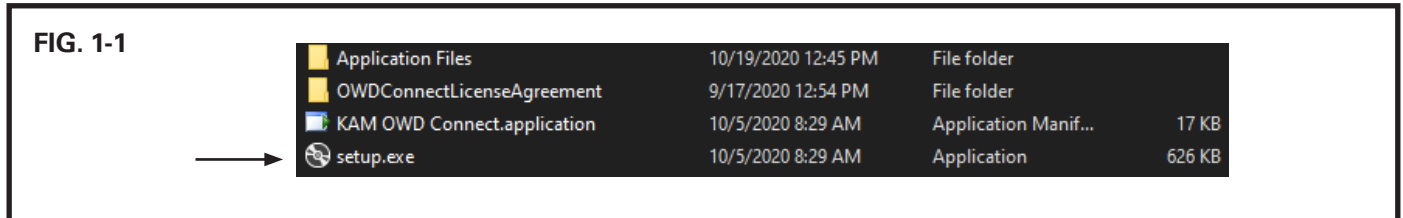
When installing the OWD[®] sensor in a pipeline containing petroleum products, petrochemicals, waste waters with the presence of pressure & temperature, and high-pressure steam refer to the Pipeline Operators' "Health, Safety and Environmental Policy Procedures" to ensure safe installation.

KAM OWD OPERATION OWD CONNECT

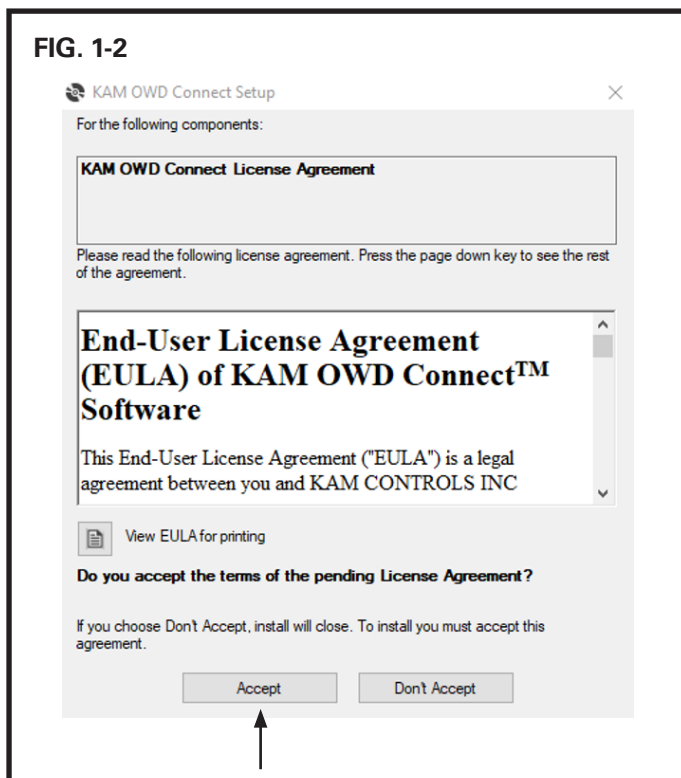
OWD CONNECT SOFTWARE INSTALLATION

OWD Connect is the software used for calibration, debugging & configuration of the OWD for firmware version 8-2020 and newer. The software is available as a free download from www.kam.com.

1. To download OWD Connect, go to <https://www.kam.com/documentation/> and download the file "OWD Connect" from the "Software" section. Once the zip file is downloaded, open and extract all the files in the folder.
2. Double-click on "setup.exe" to run the installer. FIG. 1-1.



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



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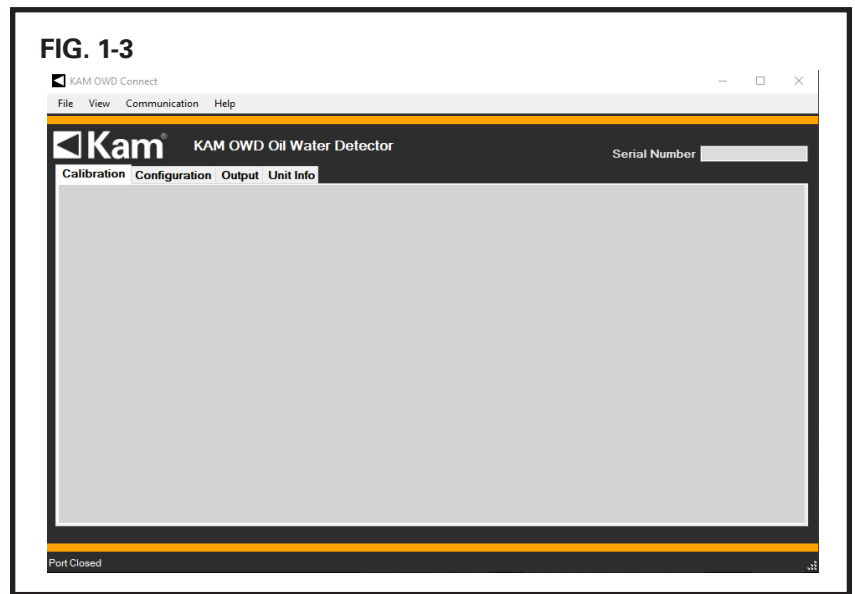
KAM OWD OPERATION OWD CONNECT CONTINUED

OWD CONNECT SOFTWARE CONFIGURATION

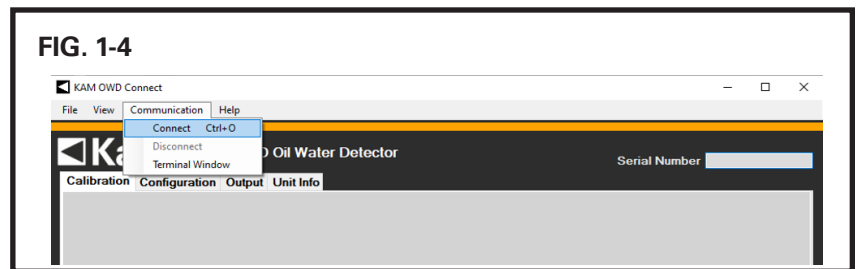
An RS232 cable for connecting your PC to the OWD has been supplied with the OWD along with a USB-to-serial converter in case your computer does not have an RS232 serial port. Go to <https://www.kam.com/documentation/> and download the file "RS232 Driver" from the "Software" section. Once downloaded,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

Ensure your PC is connected to the OWD sensor via the supplied RS232 serial cable and USB-to-serial converter as per wiring diagram on page 13 of the OWD user 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 OWD Connect software from the shortcut on your desktop or from the start menu. A window will open.
FIG. 1-3.



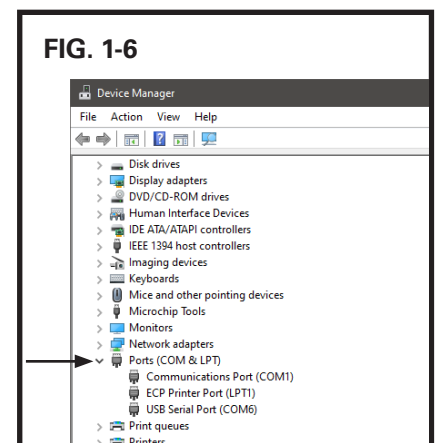
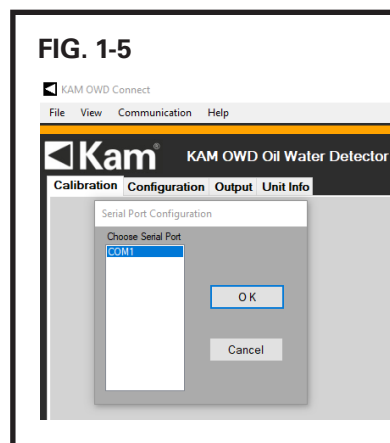
2. Click on the "Communication" menu, then click on "Connect." FIG. 1-4.



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 OWD Connect software configuration is complete.



KAM OWD OPERATION OWD CONNECT CONTINUED

OWD CONNECT SOFTWARE LAYOUT

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

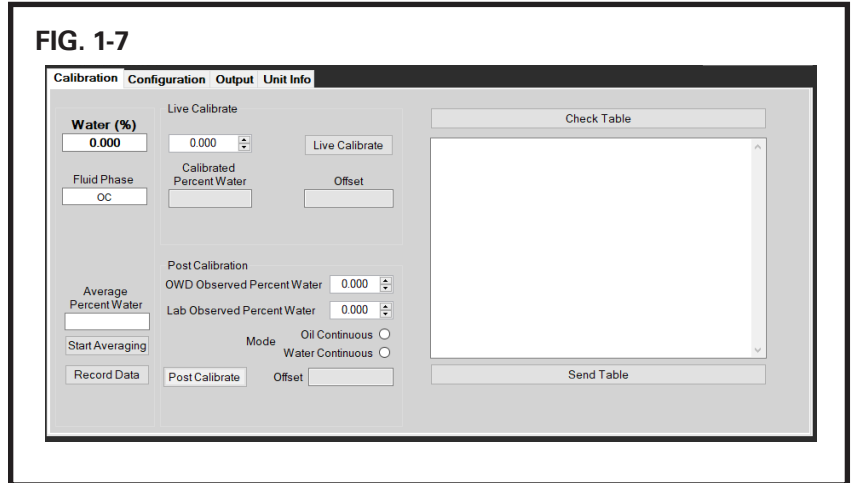
Calibration Tab

Available information:

- Percent Water Output
- Fluid Phase

Available commands:

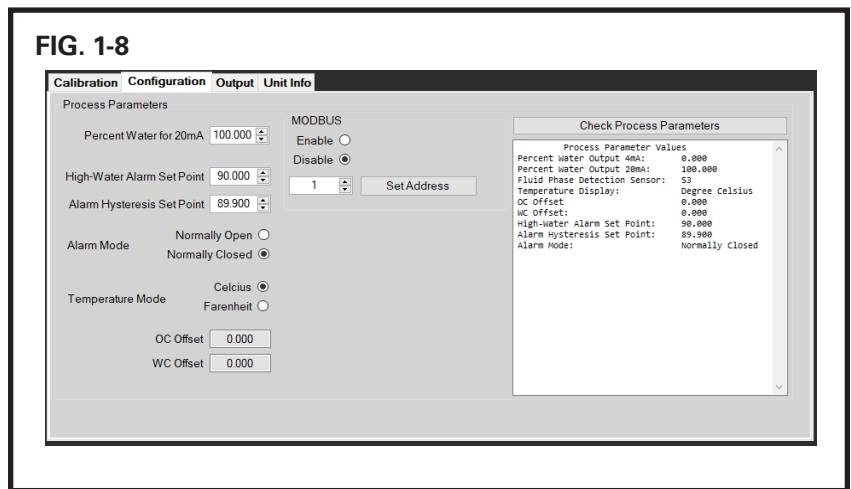
- Average Percent Water
- Record Data
- Live Calibrate
- Post Calibrate
- Check Table
- Send Table



Configuration Tab

Available commands:

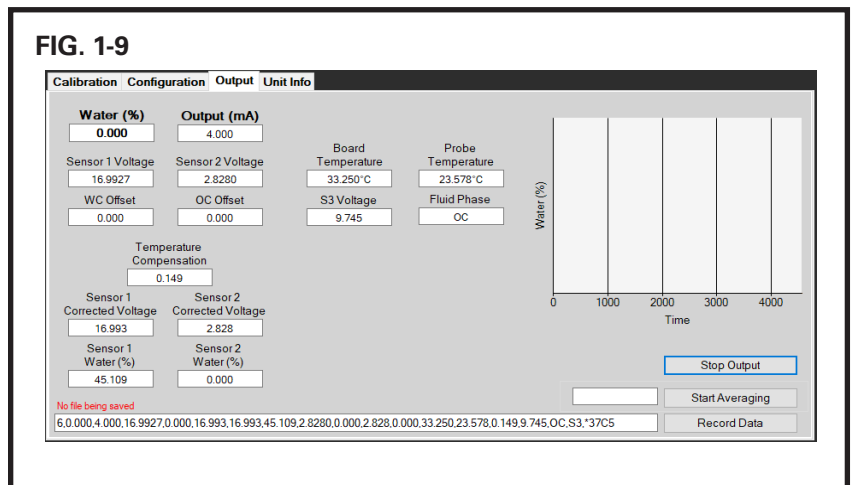
- Percent Water for 20mA
- High-Water Alarm Set Point
- Alarm Hysteresis Set Point
- Alarm Mode
- Temperature Mode
- Modbus State
- Modbus Address
- Process Parameters



Output Tab

Available information:

- Percent Water Output
- 4-20mA Output
- Sensor 1 Voltage
- Water Continuous Mode Offset
- Sensor 2 Voltage
- Oil Continuous Mode Offset
- Temperature Compensation
- Sensor 1 Corrected Voltage
- Sensor 1 Water Percentage Calculation
- Sensor 2 Corrected Voltage
- Sensor 2 Water Percentage Calculation



KAM OWD OPERATION OWD CONNECT CONTINUED

Unit Info Tab

Available information:

- Version Number
- Version Date
- Program Version

Available commands:

- Set clock
- PC Output Update Rate

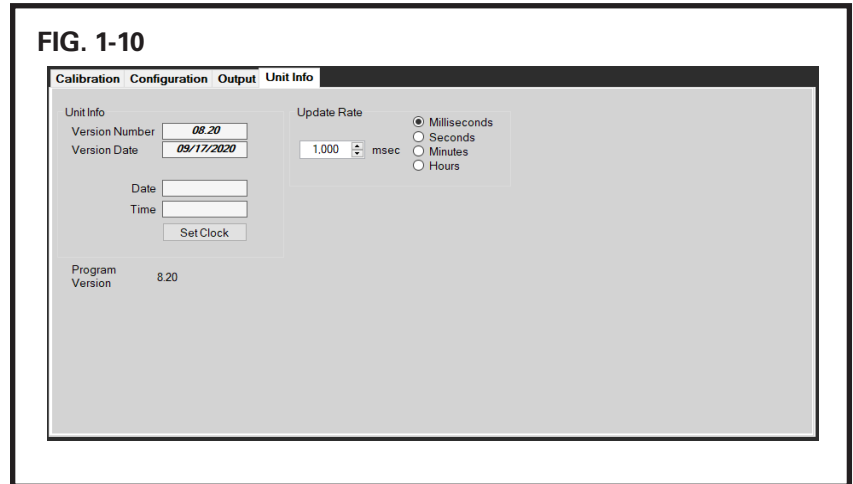


FIG. 1-10

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

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.

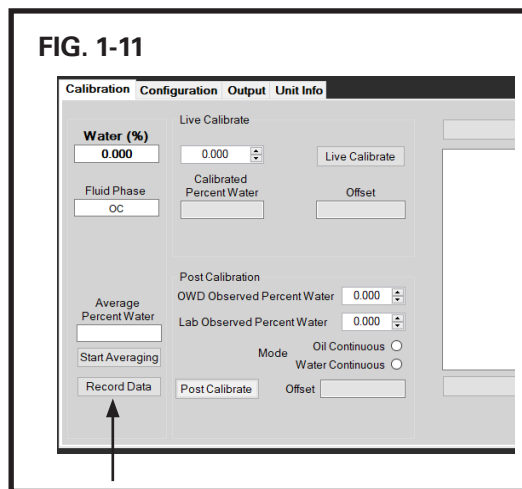


FIG. 1-11

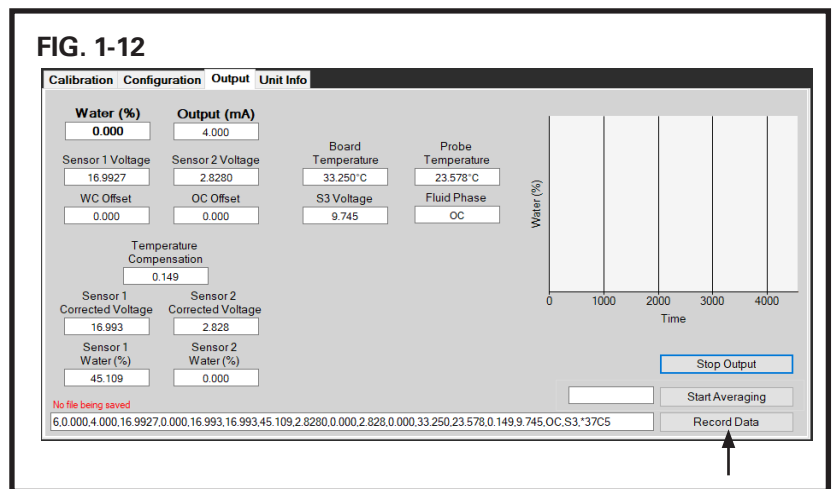
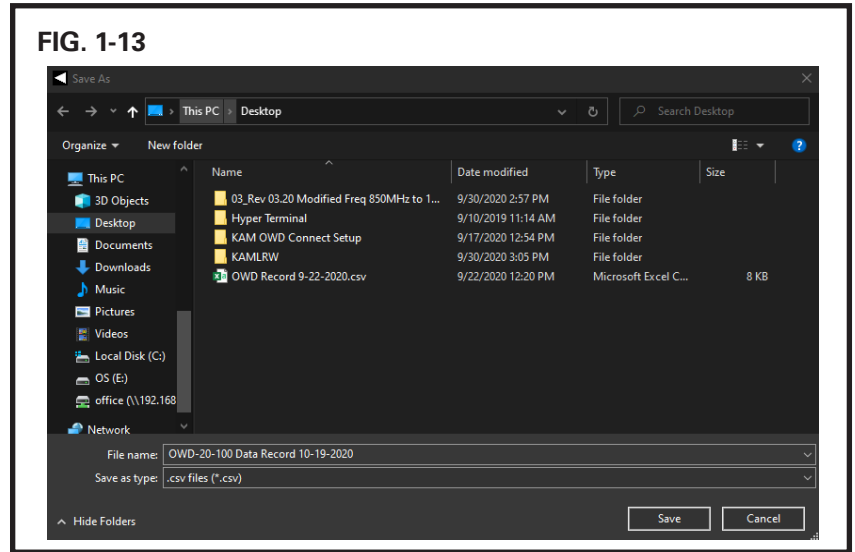


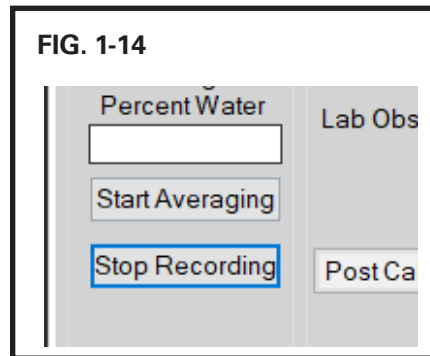
FIG. 1-12

KAM OWD OPERATION OWD CONNECT CONTINUED

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).



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KAM OWD OPERATION OWD CONNECT CONTINUED

OFF-LINE CALIBRATION

NOTE: This procedure should be used in applications where manual samples are not easily collected from the main line.

Although the OWD has been calibrated in the factory, it should be calibrated in process conditions prior to use. This can be done using 100% brine (produced water) and 100% dry oil in buckets as outlined below. Once installed, it will need to be adjusted per the steps in the following "In-Line Calibration and Verification" section.

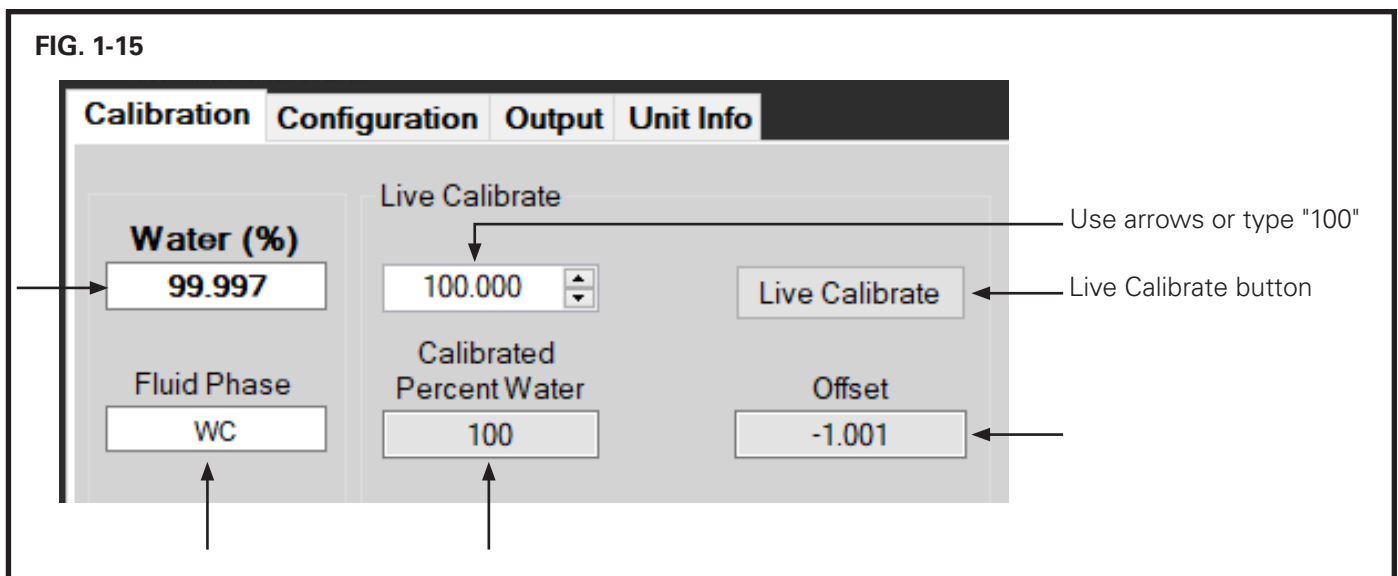
For the brine/dry oil method, in addition to fluid samples, operators will need appropriate tools for the extraction of the OWD, an RS232 cable (supplied) or an USB-to-serial converter (supplied), and a PC equipped with OWD Connect software. Follow instructions on pages 2-3 of this manual to install and configure OWD Connect.

1. If the OWD has been installed, remove from the line according to the instructions on page 11 of the OWD user manual. Clean the OWD sensor according to the guidelines on page 41 of the OWD user manual.
2. Restore power to the OWD. Connect your PC to the OWD sensor via supplied RS232 serial port or USB-to-serial converter as per the wiring diagram on page 13 of the OWD user 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.
3. Launch OWD Connect. Let the OWD warm up for 20 minutes. This will stabilize the electronics temperature.
4. Insert the sensor in a bucket with brine (produced water). Probe should remain in brine until a stabilized temperature is observed. In the "Calibration" tab of OWD Connect, the "Water (%)" box should show 100% water or something close to 100% and the "Fluid Phase" box should show WC. FIG. 1-15.

NOTE: As all water in crude oil has salt, the OWD sensor has already been calibrated for salt water. You will not get an accurate reading if you use fresh water for testing. Salt water content should match stated content on approved drawings/data sheet. It should also show 20 mA if the mA range is calibrated for 0-100%, which you can measure at the output terminal. Regardless of readings, the sensor must be recalibrated.

WARNING: If the sensor is submerged in brine and the "Fluid Phase" box on the "Calibration" tab does not display "WC" (Water Continuous), do not perform the calibration and contact KAM Technical Support for further assistance.

5. While on the "Calibration" tab, type "100" in the box below the "Live Calibrate" section and click on the "Live Calibrate" button. When the calibration is complete, the "Calibrated Percent Water" and "Offset" boxes will update. FIG. 1-15.

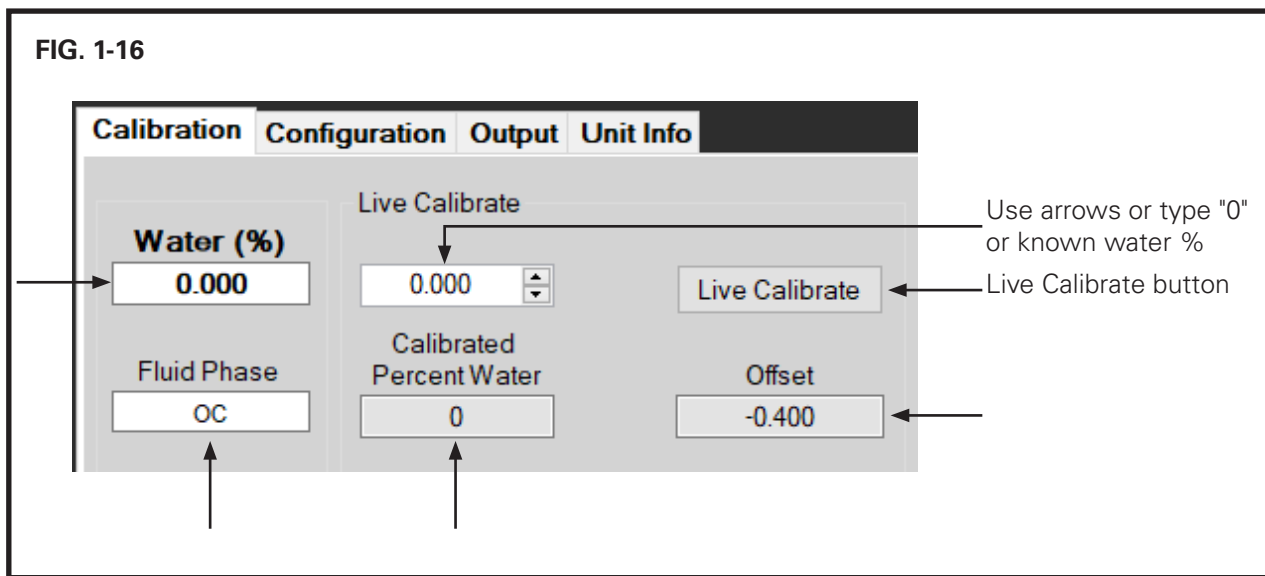


KAM OWD OPERATION OWD CONNECT CONTINUED

6. Remove the instrument from brine, and thoroughly clean and dry the probe.
7. Insert the OWD sensor into a bucket or a jar filled with a sample of dry oil. To accurately test the OWD, you must use oil that does not have any water in it or which has a known, low percentage of water (preferably <1%). Sample water percentage can be determined by Karl Fischer, centrifuge or distillation per API Chapter 10. In the "Calibration" tab of the OWD connect, the "Water (%)" box should show 0% or reflect the known water percentage and the "Fluid Phase" box should show OC. FIG. 1-16.

WARNING: If the sensor is submerged in dry oil and "Fluid Phase" box on the "Calibration" tab does not display "OC" (Oil Continuous), do not perform the calibration and contact KAM Technical Support for further assistance.

8. While on the "Calibration" tab, type "0" or the known percentage of water in the box below the "Live Calibrate" section and click on the "Live Calibrate" button. When the calibration is complete, the "Calibrated Percent Water" and "Offset" boxes will update. FIG. 1-16.



9. The OWD has now been calibrated to process conditions and can be installed.

KAM OWD OPERATION OWD CONNECT CONTINUED

IN-LINE CALIBRATION AND VERIFICATION

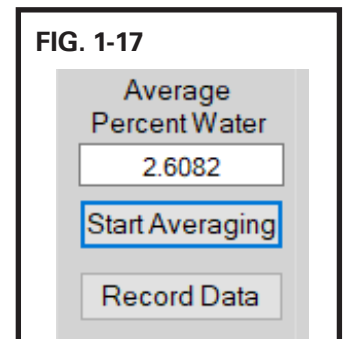
PLEASE NOTE: The following calibration steps are to be conducted during initial installation with existing process conditions; during routine verification procedures; or when OWD readings indicate a slight drift off acceptable accuracies in continuous operation. You will need an RS232 cable (supplied)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

Before proceeding, install and configure OWD Connect software as per instructions on pages 2-3 of this manual. Ensure your PC is connected to the OWD sensor via the supplied RS232 serial cable and USB-to-serial converter as per wiring diagram on page 13 of the OWD user 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.

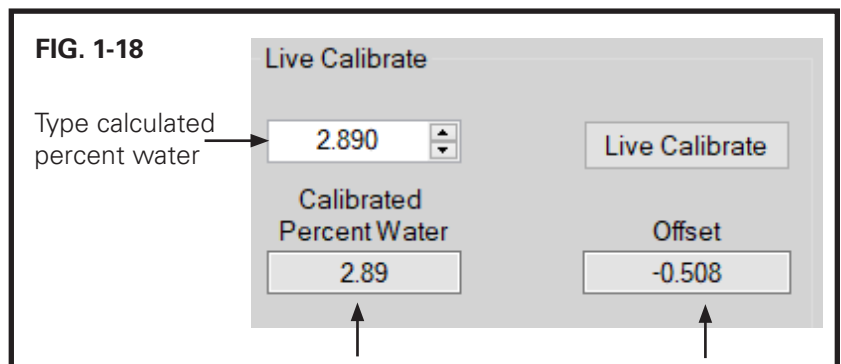
1. Launch OWD Connect software and go to the "Calibration" tab. Manually draw (3) samples of fluid according to API MPMS Chapter 8.1, waiting at least 15 minutes in between each sample draw.

NOTE: It is preferable to take the manual samples when you have steady OWD readings not varying by more than 1%.

2. Each time a sample is drawn, click on "Start Averaging" while the sample is being drawn and click on "Stop Averaging" 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. Note or take a screenshot of this value for each sample.
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. Average the water content from the three OWD averages from step 2.
6. Calculate the difference between manual sample average and OWD average and add or subtract that value to the current average reading of the OWD in the "Calibration" tab of the OWD Connect software. This value is the calculated percent of water to be entered to calibrate the OWD. See Calibration Example on page 10.



7. Type the calculated percent water (i.e. 2.89 for 2.89%) in the box below the "Live Calibrate" 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.



NOTE: For 0-100% water applications, calibration is required on both oil-continuous and water-continuous phase. If the OWD will operate on the water-continuous phase (approximately 75% to 100%) range only, water-continuous phase calibration alone is required. If the OWD will operate on the oil-continuous phase (approximately 0 to 40%) range only, oil-continuous phase calibration alone is required.

KAM OWD OPERATION OWD CONNECT CONTINUED

CALIBRATION EXAMPLE

Manual samples water content:

1. 2.51%

2. 2.75%

3. 2.62%

Average = 2.63%

OWD screenshots water content:

1. 2.60%

2. 2.91%

3. 2.70%

Average = 2.74%

Difference of averages:

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

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

Current reading: 3.0%

To adjust the OWD, 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 OWD.



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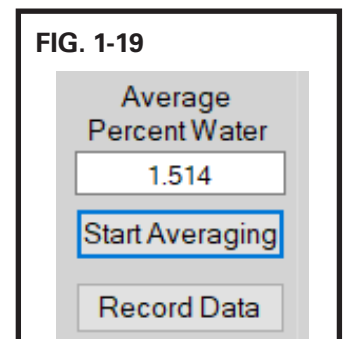
CALIBRATION WITH LABORATORY ANALYSIS

In cases where on-site reference measurement (Karl Fischer or centrifuge) is not available, the OWD can be verified after obtaining results of manual sample analysis at a laboratory. The oil-continuous mode and water-continuous mode need to be calibrated separately.

Before proceeding, install and configure OWD Connect as per instructions on pages 2-3 of this manual. Ensure your PC is connected to the OWD sensor via the supplied RS232 serial cable and USB-to-serial converter as per wiring diagram on page 13 of the OWD user 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.

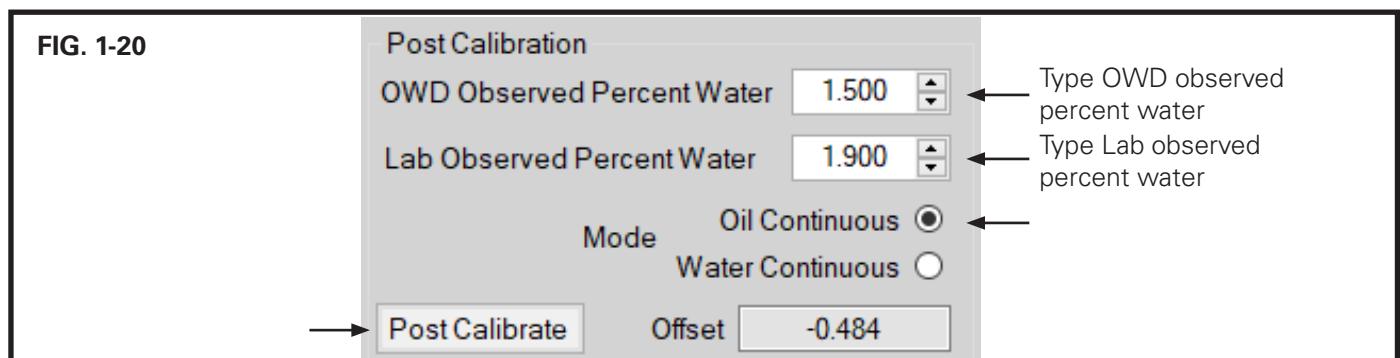
OIL CONTINUOUS CALIBRATION

1. Launch OWD Connect software and go to the "Calibration" tab.
2. Check the box labelled "Fluid Phase" and ensure that the OWD is in "OC" (Oil Continuous) mode.
3. Manually draw (3) samples of fluid according to API MPMS Chapter 8.1, waiting at least 15 minutes between sample draws.
4. Each time a sample is drawn, click on the "Start Averaging" button while the sample is being drawn and click on the "Stop Averaging" button at least 10 seconds after the sample is collected. The value in "Average Percentage Water" box will produce the average from the water percentage readings during the sample draw. FIG. 1-19. Note or take a screenshot of this value for each sample.
5. Send the samples to the lab for water content determination.
6. Once results have been received from the lab, average the water content from the three samples. This value is the "Lab Observed Percent Water".
7. Average the water content from the three OWD averages from step 4. This value is the "OWD Observed Percent Water."



NOTE: The "OWD Observed Percent Water" should be more than 0.

8. Type the OWD Observed Percent Water and the Lab Observed Percent Water in their respective boxes in the "Post Calibration" section. Click on the radio button labeled "Oil Continuous" and click on the "Post Calibrate" button. For instance, if the OWD Observed Percent Water was 1.5% and the Lab Observed Percent Water was 1.9%, you would input "1.5" in the "Observed Percent Water" box and "1.9" in the "Lab Observed Percent Water" box. FIG. 1-20.

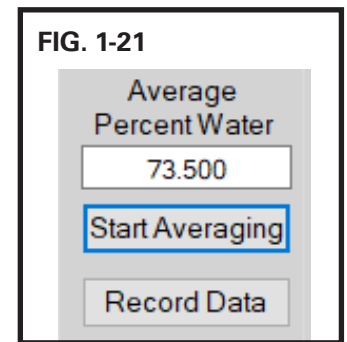


9. Calibration results will be displayed in the boxes next to the "Post Calibrate" button. If not, calibrate once more or contact KAM Technical Support for further assistance.

KAM OWD OPERATION OWD CONNECT CONTINUED

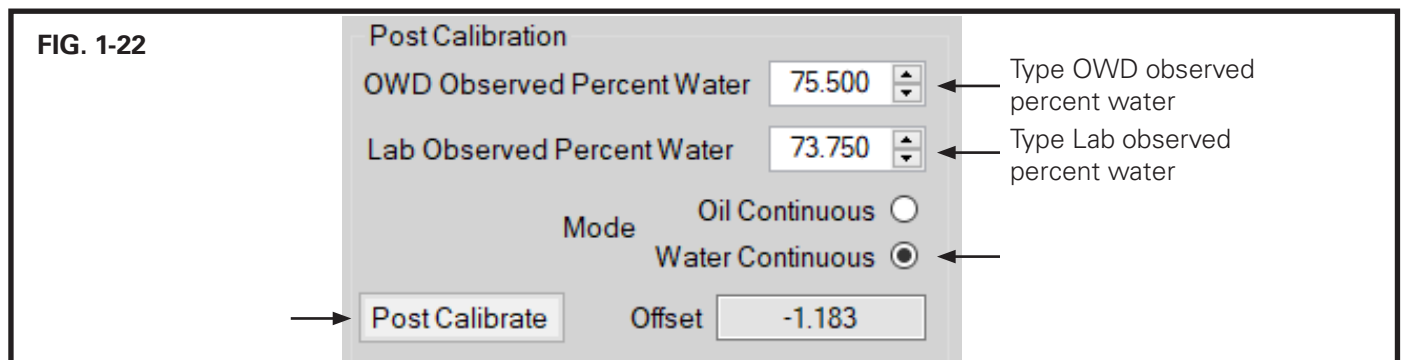
WATER CONTINUOUS CALIBRATION

1. Launch OWD Connect software and go to the "Calibration" tab.
2. Check the box labelled "Fluid Phase" and ensure that the OWD is in "WC" (Water Continuous) mode.
3. Manually draw (3) samples of fluid according to API MPMS Chapter 8.1, waiting at least 15 minutes between sample draws.
4. Each time a sample is drawn, click on the "Start Averaging" button while the sample is being drawn and click on the "Stop Averaging" button at least 10 seconds after the sample is collected. The value in the "Average Percentage Water" box will produce the average from the water percentage readings during the sample draw. FIG. 1-21. Note or take a screenshot of this value for each sample.
5. Send the samples to the lab for water content determination.
6. Once results have been received from the lab, average the water content from the three samples. This value is the "Lab Observed Percent Water".
7. Average the water content from the three OWD averages from step 4. This value is the "OWD observed percent water."



NOTE: The "OWD Observed Percent Water" should be more than 0.

8. Type the OWD Observed Percent Water and the Lab Observed Percent Water in the appropriate boxes in the "Post Calibration" section. Click on the radio button labeled "Water Continuous" and click on the "Post Calibrate" button. For instance, if the OWD observed water was 75.5% and the Lab observed percent water was 73.75%, you would input "75.5" in the "OWD Observed Percent Water" box and "73.75" in the "Lab Observed Percent Water" box. FIG. 1-22.



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

KAM OWD OPERATION OWD CONNECT CONTINUED

PROCESS PARAMETER VALUES

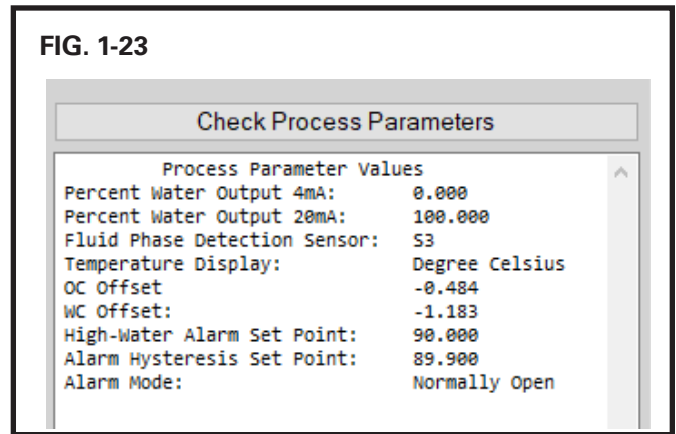
The overall configuration of the instrument is shown within the process parameter values, which include the 4-20 mA loop (water percent range), fluid phase, temperature coefficients, temperature units, OC-WC offsets, and alarm settings.

Before proceeding, install and configure OWD Connect as per instructions on pages 2-3 of this manual. Ensure your PC is connected to the OWD sensor via the supplied RS232 serial cable and USB-to-serial converter as per wiring diagram on page 13 of the OWD user 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.

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

To update the parameters:

1. Launch OWD Connect. Click on the "Check Process Parameters" button and the information will be updated in the window below. FIG. 1-23.

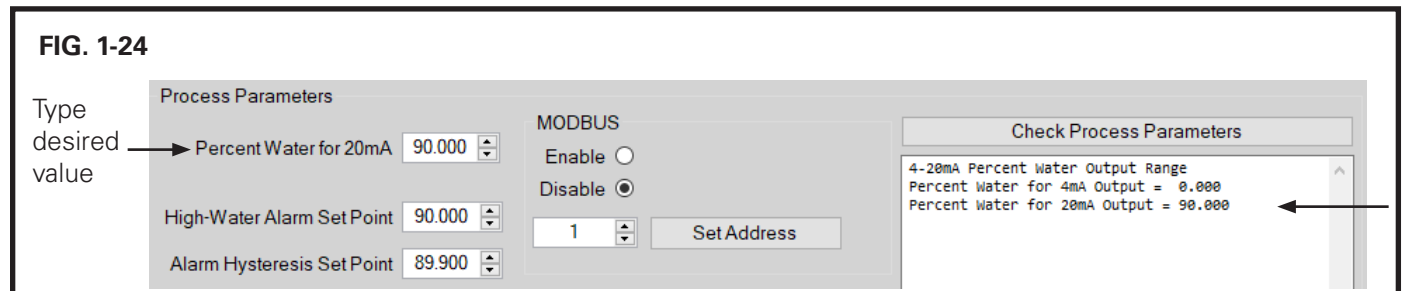


SETTING THE PERCENT WATER FOR THE 20 mA OUTPUT

The default percent water for the 20 mA output is 100%. To set a lower percent water for the 20 mA output:

1. Launch OWD Connect. Go to the "Configuration" tab. Click on the box labeled "Percent Water for 20mA," type the desired value and wait 5 seconds. For example: enter "90," when 90 is the water percent equivalent to the 20 mA of the output loop. The change will be confirmed in the "Check Process Parameters" window. FIG. 1-24.

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

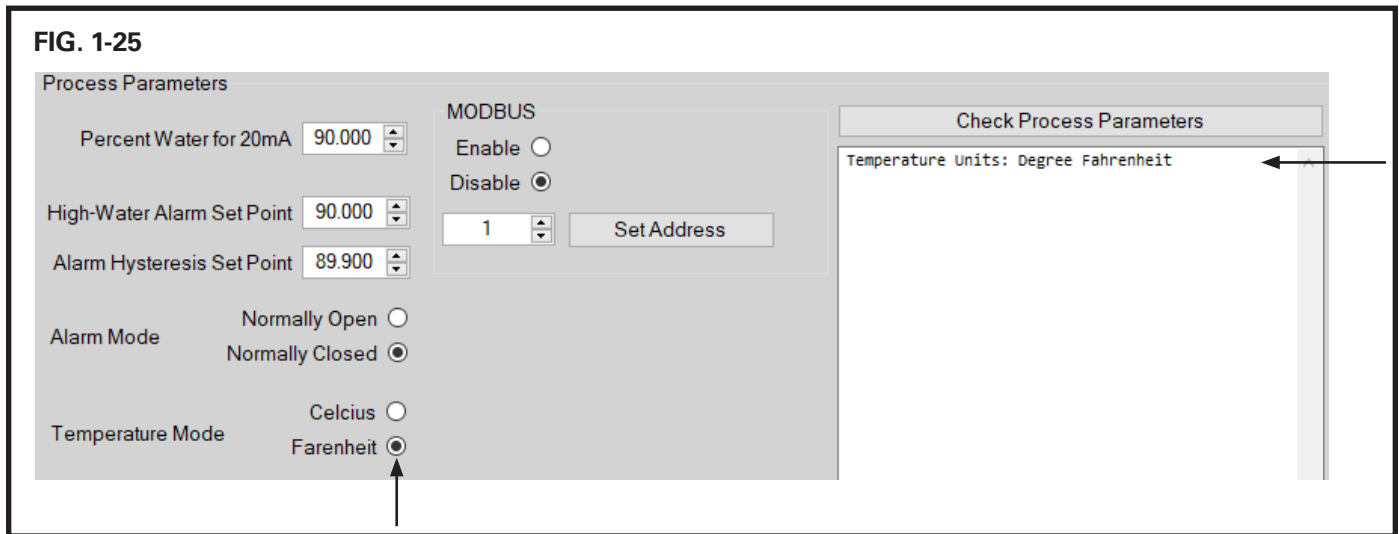


KAM OWD OPERATION OWD CONNECT CONTINUED

CHANGING THE TEMPERATURE UNITS

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

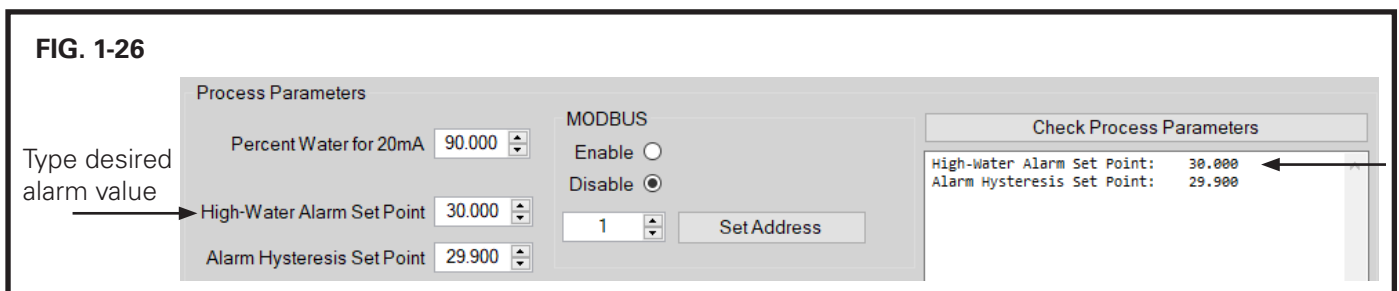
1. Launch OWD Connect. Go to the "Configuration" tab. Click on the radio button labeled Celsius or Fahrenheit to change the units. The change will be confirmed in the "Check Process Parameters" window. FIG. 1-25.



SETTING THE ALARM SETPOINTS

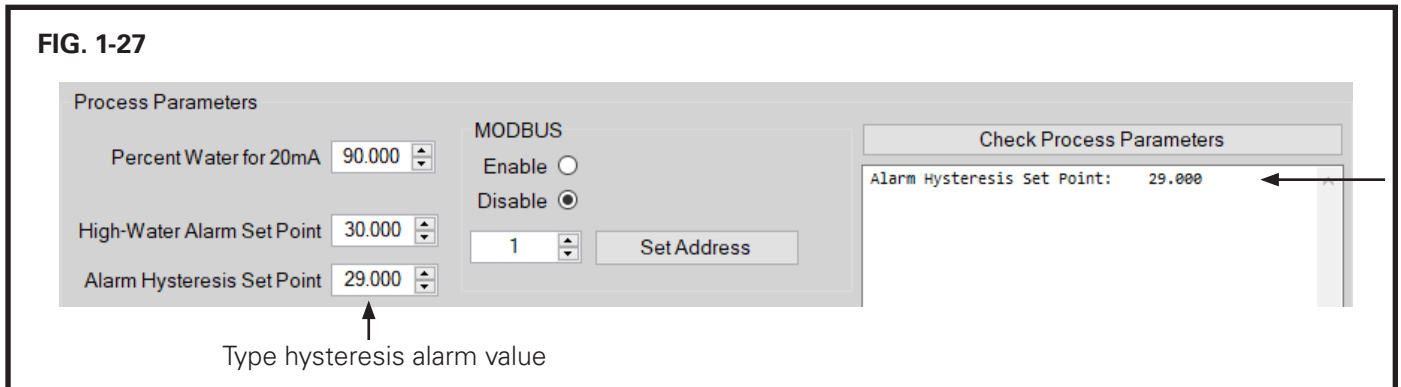
To set the alarm [Digital Out (+)]:

1. Launch OWD Connect. Go to the "Configuration" tab, type the desired alarm value in the number box labeled "High-Water Alarm Set Point" and wait 5 seconds. FIG. 1-26.
2. The configured value for the alarm set point will be displayed in the process parameters window. For example, type "30" when 30 is the percent water where the alarm will activate.



KAM OWD OPERATION OWD CONNECT CONTINUED

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" and click outside the box. The hysteresis percent must have a difference higher than 0.1% from the high alarm set point. For example, if the water percent lower limit where the alarm will clear the high-water status and be able to reactivate is 29, you would type "29" and click outside the box. The new hysteresis alarm value will be displayed. FIG. 1-27.

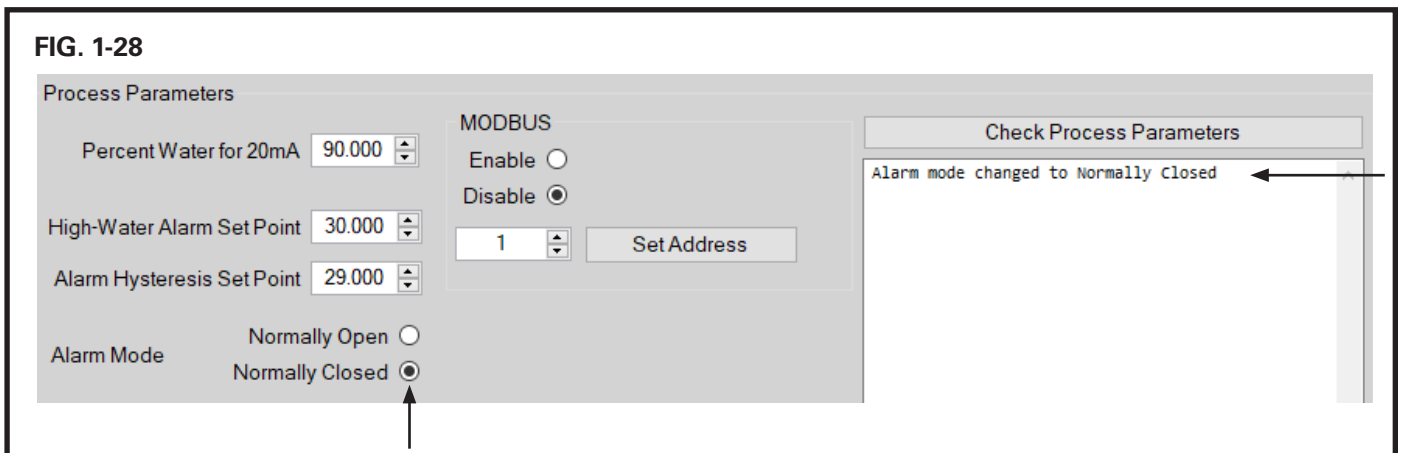


SETTING THE ALARM MODE

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 OWD 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. 1-28.



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

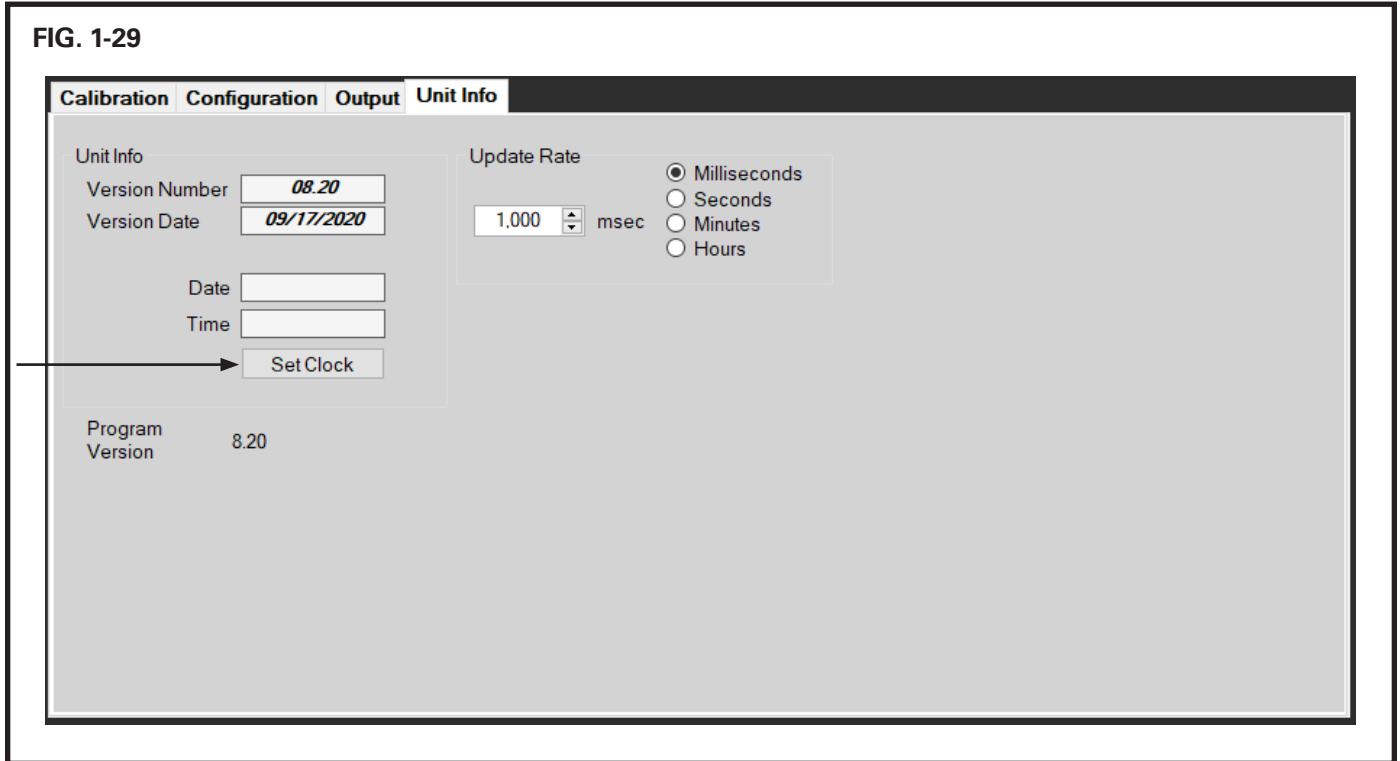
KAM OWD OPERATION OWD CONNECT CONTINUED

CHANGE THE DATE AND TIME

To change the date and time:

1. Launch OWD Connect. 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. 1-29.

FIG. 1-29



KAM OWD OPERATION OWD CONNECT CONTINUED

ENABLE/DISABLE MODBUS

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

1. Launch OWD 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 Address" 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. 1-30.

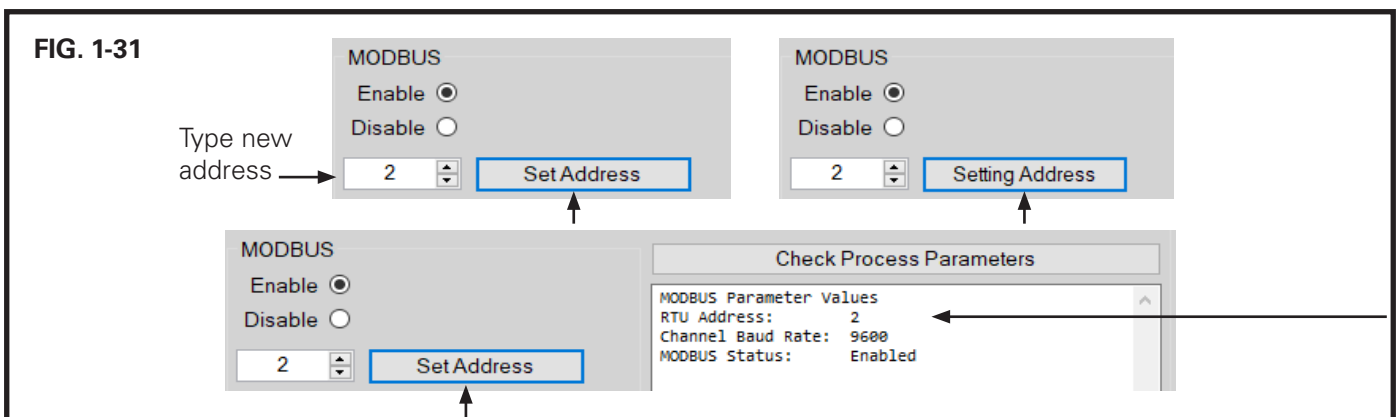


3. Power cycle (turn off and on) the OWD to start the Modbus communication.

CHANGE THE MODBUS ADDRESS

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

1. Launch the OWD 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.



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