On-Site Analysis
LubeTrak Inc.

www.lubetrak.com

MotorCheck™

User Manual

VERSION 3.12

Guide to the Motor Check™ Analyzer

PREFACE

This user manual is the first part of the complete guide to the MotorCheck™ analyzer. This manual is intended to guide operators of the analyzer through the normal procedures associated with processing oil samples. Setup procedures, analyzer configuration changes, and problem diagnoses are topics covered in the Owner's Supplement and in other supporting documents.

This manual is intended for mechanics, technicians, or anyone else who wants to learn the proper way to analyze oil samples using the MotorCheck™ analyzer. The introductory sections of this manual orient the user with the equipment and supplies that are used. The Standardization section covers the procedures that give the user confidence that the analyzer is performing to specifications. The largest section of this manual is the How To... section. The reader is taken through a step-by-step process of how to analyze an oil sample. The Printing and Flushing sections complete the start-to-finish organization of this manual.

On-Site Analysis manufactures the MotorCheck™ oil analyzer. On-Site Analysis also manufactures the TruckCheck™ oil analyzer. The information in this manual applies to both the MotorCheck™ and TruckCheck™ analyzers. In other manuals, where there are differences in the MotorCheck™ and TruckCheck™ applications, the differences will be stated.

This manual includes features that are designed to aid the reader in quickly referencing helpful information. The outlining is extensive so that reader can easily find the topic of interest. Useful tips are emphasized in boxes entitled "Key to Successful Oil Analysis." The electronic version of this document includes hyperlinks and bookmarks to further speed the reader's access to information.

User Manual Outline

I. INTRODUCTION

OVERVIEW

This is the User Manual for the MotorCheck™ oil analyzer. The MotorCheck™ oil analyzer is a tool for evaluating the condition of engines or transmissions. The analyzer tests for wear debris and other contaminates in the oil. The analyzer also tests the physical properties of the oil itself. By comparing test results to normal conditions, the MotorCheck™ oil analyzer can recommend if any maintenance or repair actions are necessary.

The MotorCheck™ analyzer is a tandem spectrometer that integrates an Optical Emissions Spectrometer (OES) and an Infrared Module. The OES burns a portion of the used oil sample and measures the concentration of sub-microscopic metals in solution. These metals are present due to component wear inside the engine or transmission. The Infrared Module scans a portion of the used oil sample to measure the physical properties of the oil and look for contaminants.

An onboard computer controls both spectrometers and tabulates the results gathered from each. Information about the oil and the vehicle provided by the operator, along with the test results, are evaluated by the analyzer's proprietary software. The software generates a report that includes the test results and a diagnostic statement. The diagnostic statement is a summary of the test results and an evaluation of the condition of the engine or transmission being tested. The diagnostic statement may also recommend maintenance for specific engine or transmission components.

This manual is about operating the MotorCheck™ analyzer. The introduction will acquaint you with the features of the analyzer and bring your attention to safety concerns. The Getting Started section will instruct you on the simple tasks associated with operating the analyzer and how to use the other items supplied with it. Standardizing the analyzer is an important first step in getting comfortable with its operation. In the following sections you will be given details on how to properly analyze a sample of oil and produce useful reports.

SAFETY INFORMATION

To reduce the risk of injury, do not open the instrument enclosure or remove access panels. There are no user serviceable parts inside. Refer servicing to qualified service personnel.

WARNING LABELS

Special labels are placed where hazards exist.

This symbol warns that dangerous voltages are near that present a risk of electrical shock or personal injury.

This symbol warns that hazards are near which are described in instructions accompanying the equipment.

SPECIFIC WARNINGS

- **Do Not Defeat the Spark Door Interlocks**

  Defeating Spark Door Interlocks may expose the user to UV Radiation that can cause permanent eye damage.

  Defeating the Spark Door Interlocks may expose the user to voltages that are lethal.

- **Operate in a Well Ventilated Area**

  The analyzer produces ozone when high voltage is arcing across the electrodes.

- **Do Not Introduce Flammable Fluids into the Analyzer**

  Never attempt to introduce fuels such as gasoline, kerosene, and diesel fuel into the analyzer. Fuels may ignite and explode causing injury.

  Only introduce used oil samples from diesel engines, gasoline engines, and transmissions.

Key to Successful Oil Analysis:

Never attempt to introduce anti-freeze, water, brake fluid, or power steering fluid into the analyzer. These fluids will cause irreparable damage.

ANALYZER FEATURES

The basic features of the MotorCheck™ analyzer are listed here. You should be familiar with these features, as you will need to interact with them routinely during the normal operation of the analyzer. Please refer to the Owner's Supplement for a more comprehensive description of the analyzer's features.

The photo at the end of this section illustrates the location of each of the following features of the MotorCheck™ Oil Analyzer.

- **Spark Door**

  This door should be closed at all times unless performing routine maintenance.

- **Oil Sipper**

  The Oil Sipper draws sample oil into the analyzer where it is pumped through the flow system for analysis.

- **Waste Bottle**

  Oil that has been analyzed and flushing solution that has been purged through the flow system drains into this container.

- **Flush Bottle**

  The Flush Bottle contains a flushing solution used to clean out the flow system and is used during the low standardization process. This bottle needs to be checked on a daily basis.

- **ON / OFF Switch**

  The power switch is an illuminated rocker switch located on a recessed bulkhead along the right side of the analyzer.

Key to Successful Oil Analysis:

The analyzer should remain on at all times to maintain a constant temperature inside the unit. Temperature variations may cause errors in analysis.

- **Keypad or Keyboard (application dependent)**
  The Keypad is used for entering information and operating the analyzer.

- **Computer Screen**
  The flat panel LCD screen displays operator keyed information and analyzer status.

- **Printer (not shown)**
  Analysis reports are printed from a printer located near the analyzer. Typically, the printer sits on the shelf of a cart supporting the analyzer.

- **Modem (not shown)**
  A computer modem connection to the analyzer facilitates problem diagnosis and maintenance from remote customer service centers. Keep a dedicated telephone line connected to the analyzer via the modem connection on the back panel.

II. GETTING STARTED

ROUTINE TASKS

- **Emptying the Waste Bottle**

  The waste bottle collects the used sample oil and flushing solution that has been circulated through the flow system. There is a sensor to alert you to empty the waste bottle. Check the waste bottle occasionally to be sure that the sensor is working properly.

- **Replacing the Flush Bottle**

  The Flush Bottle contains the fluid that cleans the instrument between samples and is used during low standardization. There is no sensor to alert you to a low level of flushing solution. Check the flush bottle regularly and replace it when it gets low.

Key to Successful Oil Analysis:

Keep an adequate level of flushing solution in the flush bottle. An inadequate level of flush will cause cross-contamination between oil samples.

- **Maintaining the Electrodes**

  The software will prompt you when required adjustments are needed. If it is necessary to adjust the electrode gap then you must also standardize the analyzer. Refer to the Standardization section of this manual for details.

  The electrodes are on a stand inside the spark box. The electrodes are made of silver held by brass fittings. The upper electrode and lower electrode are positioned vertically – one above the other.

The electrode gap is the distance between the upper and lower. The gap should be no more than the width of a 5/32 Allen wrench. A 5/32 Allen wrench is the same tool used to loosen the screw that holds the upper electrode and is included with the analyzer's supplies.

The Allen wrench is used as a “Go/No-Go” gage for measuring the electrode gap. The electrode gap should be set to 5/32”, which is the distance between the flat sides of the Allen wrench. The electrode gap will increase with use. The Electrode gap should not exceed 3/16”, which is the distance diagonally across the “points” of the Allen wrench. So, when the wrench will pass through the gap in any orientation, it is time to adjust the gap.

To reset the gap, first remove the upper electrode holder completely and closely inspect both electrodes. Remove the upper electrode holder by loosening the 5/32 socket-head cap screws and sliding the holder out, over the top of the spark stand.

Check the electrodes to see if they need to be changed. Change the upper electrode if you can see that it has been burning on an angle. The upper electrode can be removed from its holder by using a 3/32 Allen wrench. Remove the setscrew and slide the electrode out of the holder. The upper electrode is reversible. If the other end of the electrode is in good shape, replace the electrode with the other end out. The lower electrode is not reversible.

To check the lower electrode, view it from eye level. A brand new electrode is approximately 0.50 inches long with 0.25 inches of the electrode slotted like a pizza. If there is less than 0.10 inches of the slots visible, then the electrode needs to be changed. The lower electrode unscrews from its holder with the aid of a single edge razor blade.

Change electrodes if necessary and replace the upper electrode holder in the spark stand. Set the electrode gap with the Allen wrench and tighten the 5/32” socket head cap screw.

Key to Successful Oil Analysis:

Always test the analyzer's standardization after making any adjustment to the electrodes. Adjusting the electrode gap without testing the standardization may cause analysis errors.

- ## Servicing the Printer

Re-supplying paper is usually all you need to do for the printer. Check the paper tray and add paper as necessary, following the instructions included with the printer. When the printer needs service, it will indicate with the Light Emitting Diode (LED).

The LED on the printer should stay steadily illuminated when not actively printing a report. The LED blinks on and off while it is actively printing. If the LED is not illuminated, if the LED blinks rapidly, or if the LED blinks for over 2 minutes without printing a report then the printer needs your attention.

Most printing problems are easily remedied. Make sure the printer has paper and is powered on. Turning the printer off and back on can clear up other problems.

Occasionally the toner cartridge will need to be replaced. Patches of light printing on the report page are indications that the toner cartridge needs to be replaced. Please contact your customer service center for replacement toner cartridges.

NECESSARY SUPPLIES

- **Test Standard (29087-00)**

  The High Standard solution is a colored base-oil that contains precisely controlled amounts of each of the metals that the analyzer tests for. An analysis of the High Standard should yield around 50 parts per million of each wear metal.

- **Baseline Test Standard (29088-00)**

  The Low Standard solution is a clear base-oil that contains no metals. An analysis of the Low Standard should yield less than 10 parts per million of each wear metal.

- **Flush Solution (29093-00)**

  The flush solution is a non-toxic, environmentally friendly oil solvent. The flush solution is used to purge the flow system, run low standardization and can also be used to clean the electrodes.

- **Sample Bottles (29002-00)**

  Sample bottles are typically 1 to 4 ounces in capacity. The analyzer usually uses less than one ounce of oil for a complete analysis. The sample bottles are pre-cleaned and should not be re-used to avoid contamination.

- **Report Paper (29009-00)**

  Report paper is pre-printed having a logo on the front and an explanation of oil analysis results on the back. The explanations are helpful when interpreting oil analysis results.

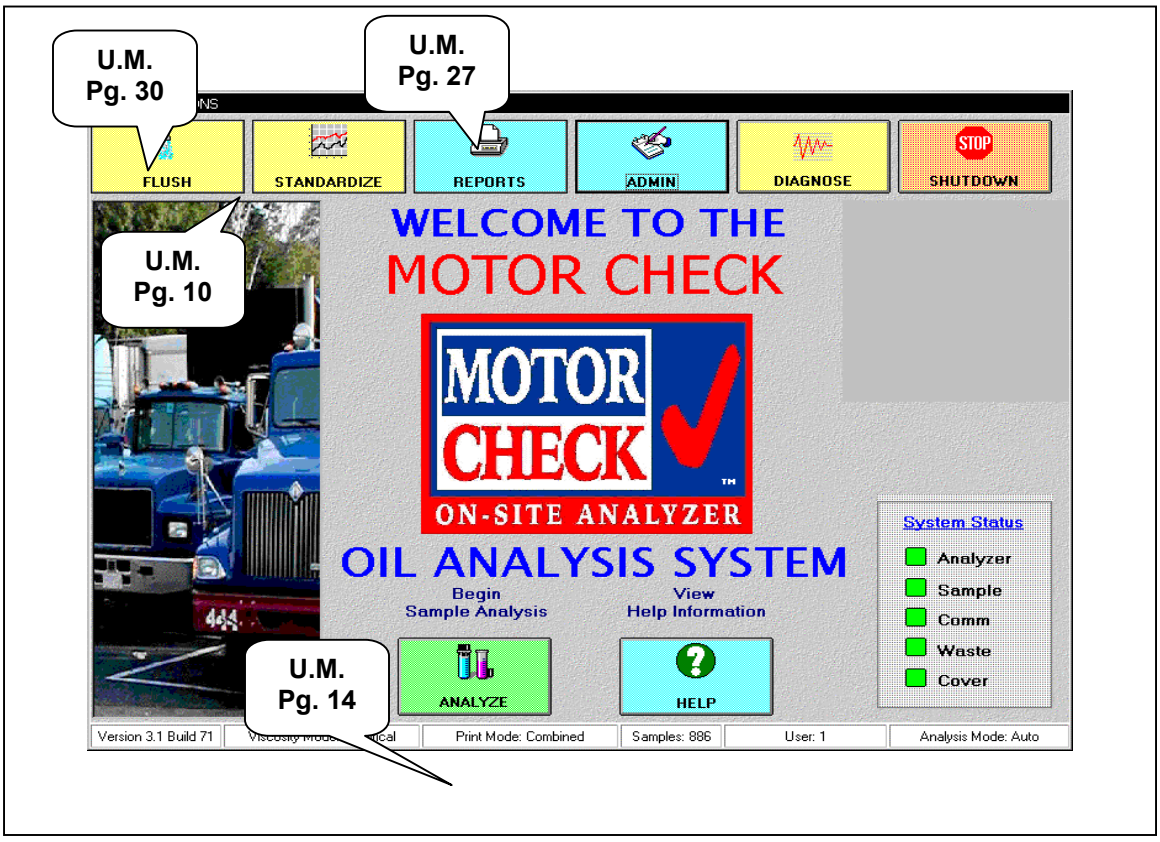
- **Input Sheets (29020-00)**

  Input sheets are half-sheet sized pre-printed forms that are helpful to fill-out when taking oil samples from vehicles. When several samples are being processed it is important that the input sheets can be identified as to which sample bottle they pertain to. Some input sheets have adhesive bar codes for this purpose.

- **Cleaning Supplies**
  - *Q-Tips (29033-00)*
    Only certain sized cotton swabs will fit properly through the upper electrode. Care should be taken so that the swap does not get stuck in the electrode.
  - *Electrode Cleaning Solution (29093-00)*
    The flush solution can be used to clean the electrodes.
  - *Shop Rags or Paper Towels*
    Shop rags or paper towels are used to wipe off the sipper and clean up any oil spills.

THE MAIN MENU

The main menu of the User Interface is the first screen that is displayed when the analyzer is powered-up. From the main menu, all of the analyzers functions can be accessed. The main menu is shown below. Page numbers for description of the main menu features are provided. Some items are described here elsewhere in the Users Manual [U.M.]



III. STANDARDIZATION

EXPLANATION

Occasionally, it is necessary to standardize the MotorCheck™ analyzer in order to compensate for minor changes affecting the analyzer's calibration.

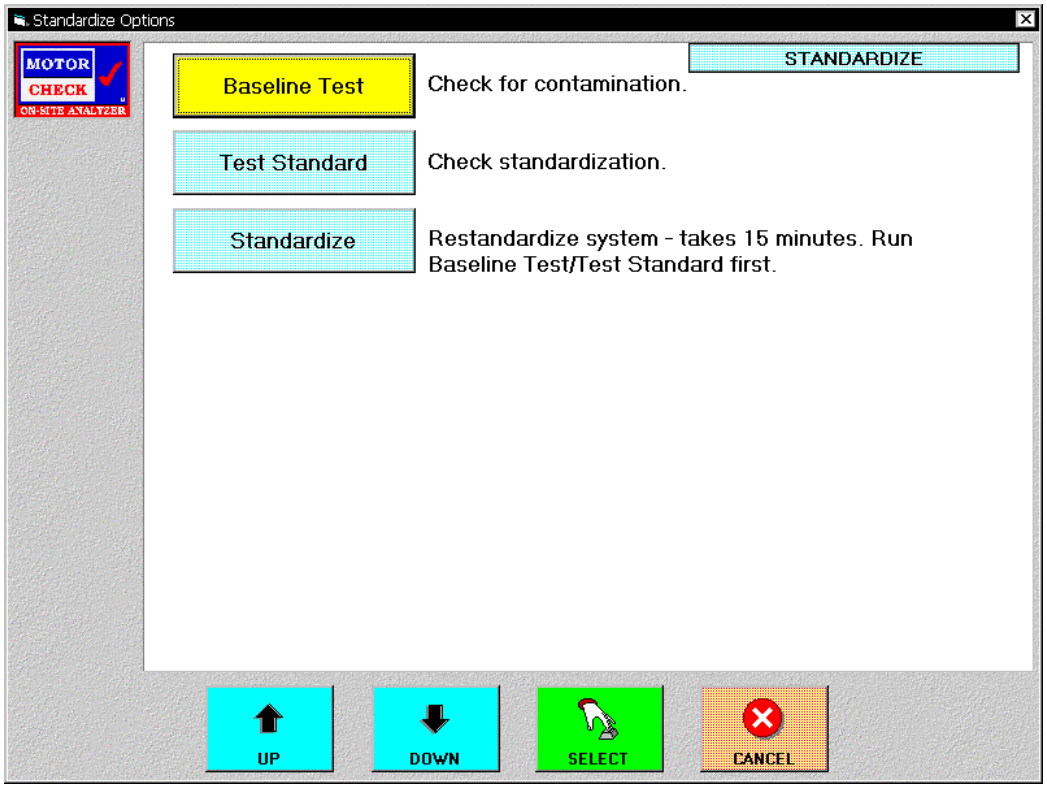
You do not have to standardize the analyzer unless 1) you have adjusted the Electrode Gap, or 2) the Test Standard routine prompts you to, or 3) the message box tells you to at the beginning of a sample run.

You should run the Test Standard routine at least twice a week or whenever you question the analyzer's performance.

Prior to running the Test Standard routine, it is good practice to perform the Baseline Test.

BASELINE TEST

The Baseline Test is used to determine if there is contamination in the flow system or on the electrodes of the analyzer. To run this test, simply press the STANDARDIZE button on the keypad or select the STANDARDIZE button from the Main Menu. The Standardize Options Screen will appear as shown below. Select BASELINE TEST from the list of options.



When the Baseline Test begins, you will be given instructions to clean the electrodes. Refer to Cleaning the Electrodes in the How to Analyze an Oil Sample section of this manual for a description of the proper technique. The Baseline Test will start immediately without prompting you to insert a sample. That is because this test uses the solution from the flush bottle to run this test.

After cleaning the electrodes, press the OK key and the analyzer will run the test. Or, press CANCEL to return to the main menu.

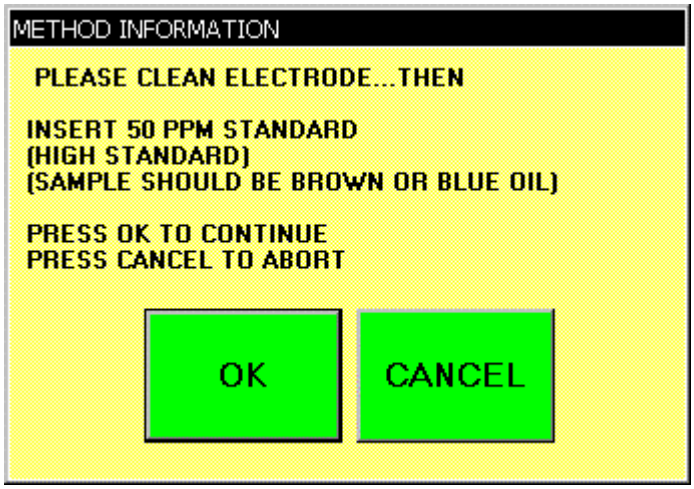
At the end of the test, a message box will display informing you if there is contamination, or that the System is clean, OK to proceed. If there is contamination, then the analyzer will give you instructions to flush, clean the electrodes, and try the test again.

Key to Successful Oil Analysis:

Clean the electrodes and sipper thoroughly prior to starting the Baseline test. A dirty electrode or sipper will cause the test to fail.

TEST STANDARD

The Test Standard function allows you to check the analyzer's standardization. To run this test, choose Test Standard from the Standardize Options screen and press ENTER. When Test Standard begins, you will be given instructions like those shown on the screen below. Refer to Cleaning the Electrodes in the How to Analyze an Oil Sample section of this manual for a description of the proper technique.



Press the OK key and the analyzer will run the test, or press CANCEL to return to the main menu. At the end of the test a message box will display informing you if the test of the analyzer is within specifications. If the Test Standard is not within specifications, then a message box will provide you with instructions to try the test again or to proceed to Standardization.

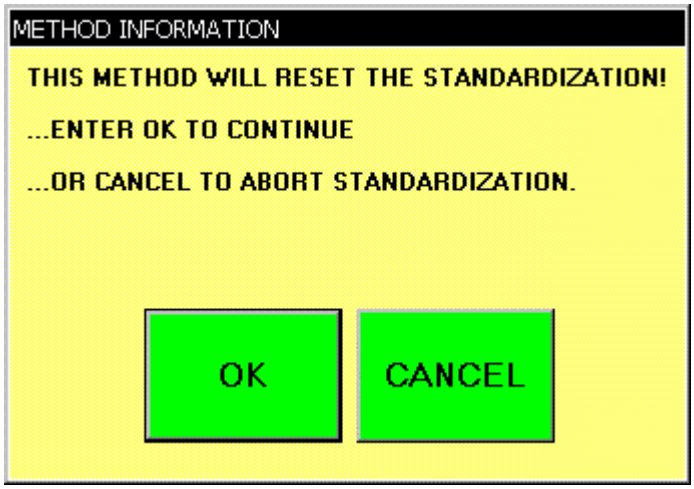
Key to Successful Oil Analysis:

Please clean the electrodes and sipper thoroughly prior to starting Test Standard. A dirty electrode or sipper will cause the test to fail.

STANDARDIZE

To standardize the analyzer, select Standardize from the Standardize Options screen. When the standardization process begins, you will be given instructions like those shown on the screen below. Press OK to continue or CANCEL to return to the main menu.

Standardization is comprised of two parts, Low Standardization and High Standardization. However these processes are seamless and will run straight through without any user intervention. All the operator has to do is put a Test Standard fluid (Blue 50 ppm standard) under the sipper and follow the instructions. Carefully follow all on-screen instructions completely. The total process will take about 15 minutes to complete. Upon completion, the analyzer will display a message stating whether or not the standardization was successful. If unsuccessful, the software will prompt you on what to do next.



IV. HOW TO ANALYZE AN OIL SAMPLE

COLLECTING THE OIL SAMPLE & SAMPLE DATA

To analyze oil from an engine or transmission, you must first obtain a sample. There are two methods for sampling the oil from an engine or transmission. You can either catch a sample during a drain or you can pull a sample through the dipstick. Provisions for sampling have either been provided with the MotorCheck™ analyzer or you may obtain sampling kits from your retailer.

Refer to the Training Manual or other supporting documents for detailed instructions on the proper method of drawing oil samples from engines and transmissions.

SAMPLE INTRODUCTION

When you have a sample to analyze, remove the lid from the sample bottle and place the bottle under the “sipper” as shown in the picture below.

Key to Successful Oil Analysis:

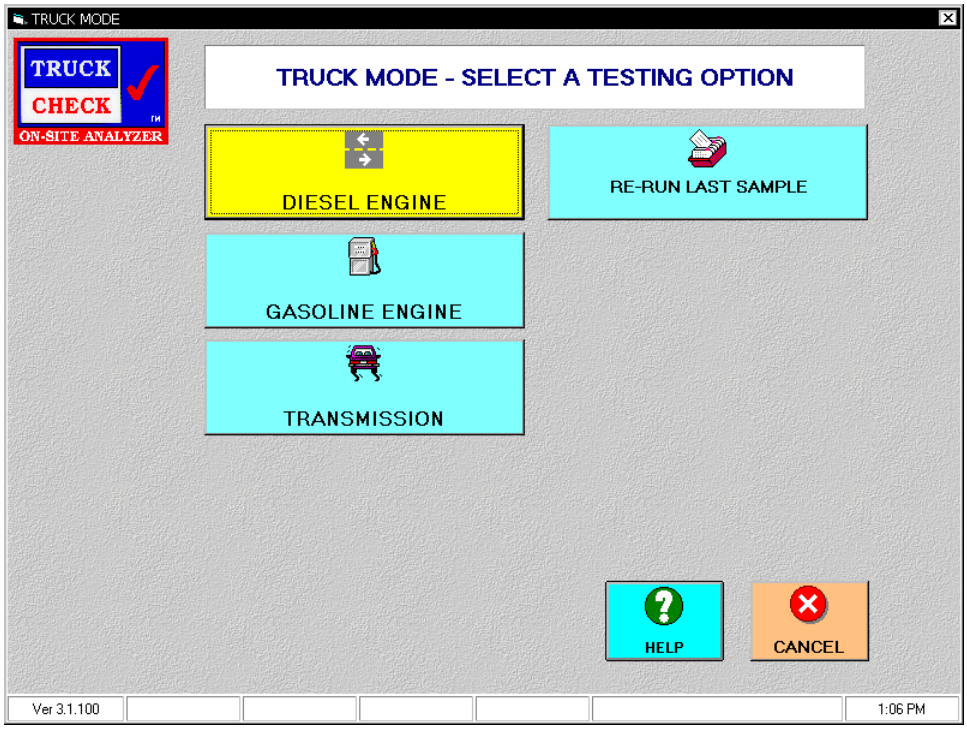
Use a rag to wipe off any oil left on the sipper from a previous sample. Lower the sipper all the way into the oil in the sample bottle. The sipper must remain in the oil throughout the analysis cycle.

TEST SELECTION

The analysis of your oil depends on what type of sample it is. You must specify if the sample comes from a transmission, gasoline or diesel engine. Press the ANALYZE button from the main menu to bring up the Test Selection screen shown below.

Select the GASOLINE key on the keypad to analyze a sample of crankcase oil from gasoline powered cars and light-duty trucks. Select the DIESEL key to analyze a sample of crankcase oil from a diesel powered medium- or heavy-duty truck. Select the TRANSMISSION key to analyze a sample of transmission fluid. Select the GEARBOX key to analyze a sample of gearbox fluid. The Re-Run Last Sample Button allows you analyze the last sample again without having to re-enter all of the sample information. There is a selection for PREVIOUSLY ENTERED SAMPLES that allows barcode use for samples already entered in the system or PREVIOUSLY ENTERED SAMPLES that can be selected from a list

After making selection, a Customer Selection List will be shown.



SAMPLE DATA ENTRY

Information about your sample of oil must be entered prior to starting the analysis. The information you provide is vitally important to the analysis. The more accurate the information, the better the analysis.

Sample data includes information about the customer, the vehicle, and the oil. The MotorCheck(tm) system keeps lists of your customers and their vehicles. Lists keep you from having to re-enter information.

The lists can also be sorted by Customer Name, Customer ID, or right and left justified VIN number.

SELECT A CUSTOMER

When selecting a customer, you have three options: use the default customer, select a customer from the list, or add a new customer.

If the Customer ID for the customer you want is already displayed in the box next to "Enter Customer ID", then press OK to use the default customer name.

If the Customer ID you want is not displayed in the box, but it is in the customer list, then highlight the customer you want by using the UP and DOWN Arrow Keys and use the ENTER key to make your selection. Press OK to continue.

If the customer you want is not the default customer and is not displayed in the list of customers, then you must add your customer name to the list. Press the New Customer button to add your customer.

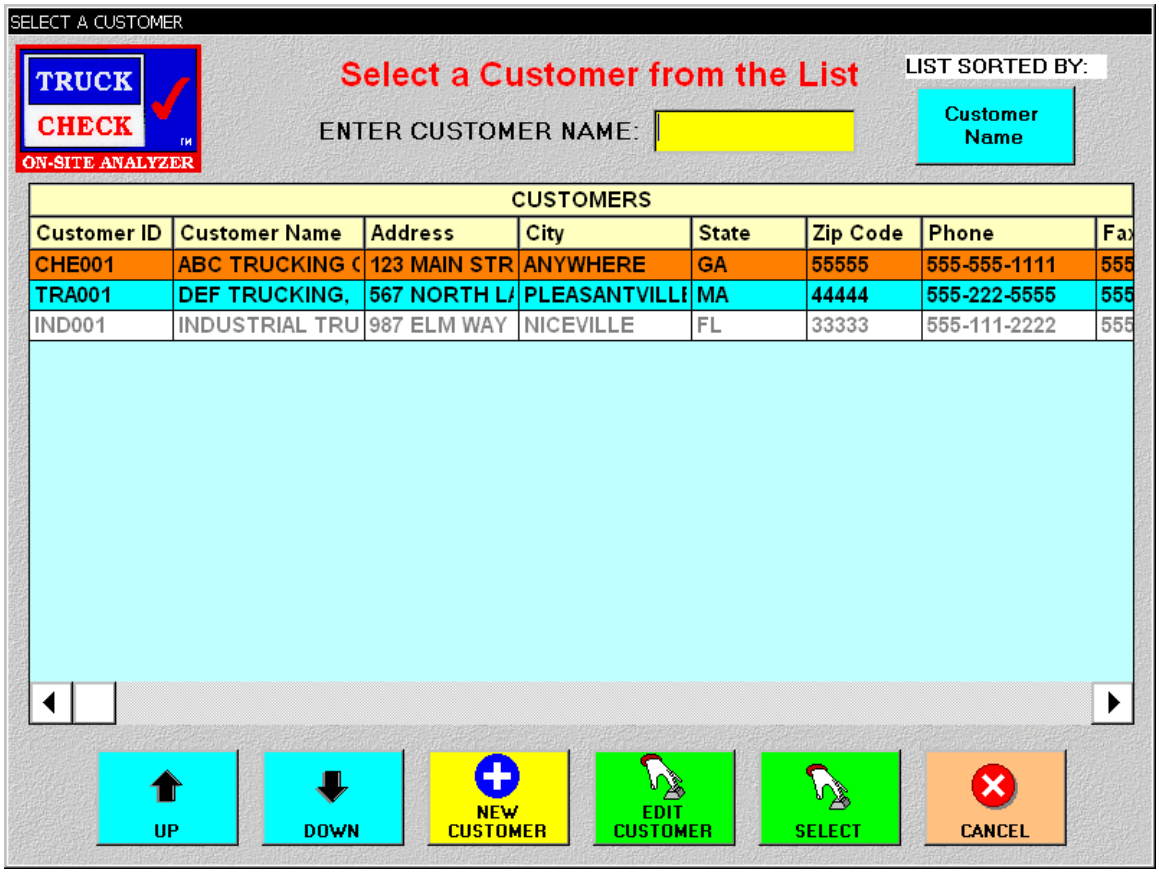
Each option is discussed in detail below.

Default Customer

The default customer name is setup by your MotorCheck(tm) service representative. If a default customer has been setup, the default customer's Customer ID will always appear in the box next to "Enter Customer ID." Having a default customer name is useful when the majority of samples analyzed are for one particular customer.

To use the default customer name, press OK.

To use a customer other than the default, follow the instructions below for choosing a customer from the list or adding a new customer.



Listed Customer

Listed customers are the names of customers that have had their oil analyzed previously. Choosing from the list keeps you from having to enter the customer's information each time their oil is analyzed.

Using the UP and DOWN arrow keys, see if the customer you want is on the list.

If the customer name you want is on the list, then highlight the name, select it by pressing SELECT.

If the customer's name you want is not on the list, then press the NEW CUSTOMER key to enter a new customer.

If you want to edit the highlighted customer select the EDIT CUSTOMER key.

New Customer

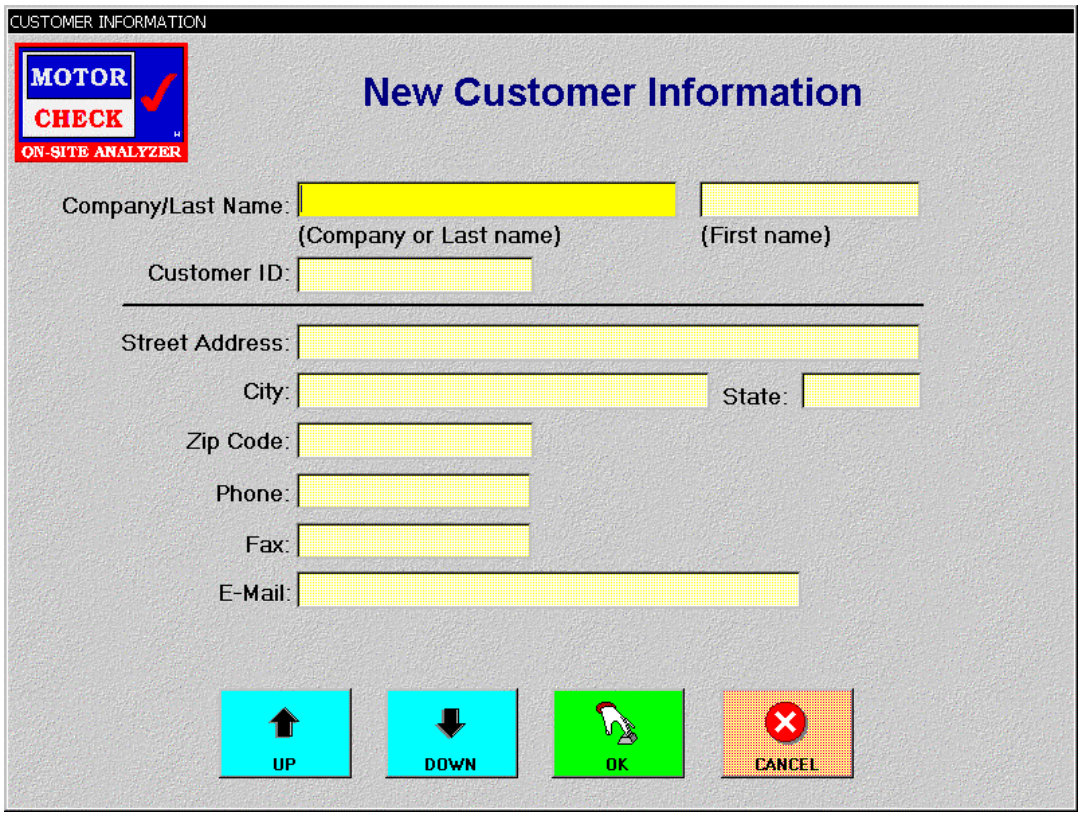
If a customer has not had their oil analyzed previously, their name is probably not on the list. The first time a customer has their oil analyzed you must enter all of their information. Once you have entered the customer's information, the analyzer will keep it on the list for the next time. The new customer information screen is shown below.

Enter the customer's last name or enter a company name and press ENTER to move to next field.

Enter the customer's first name or press OK to leave it blank.

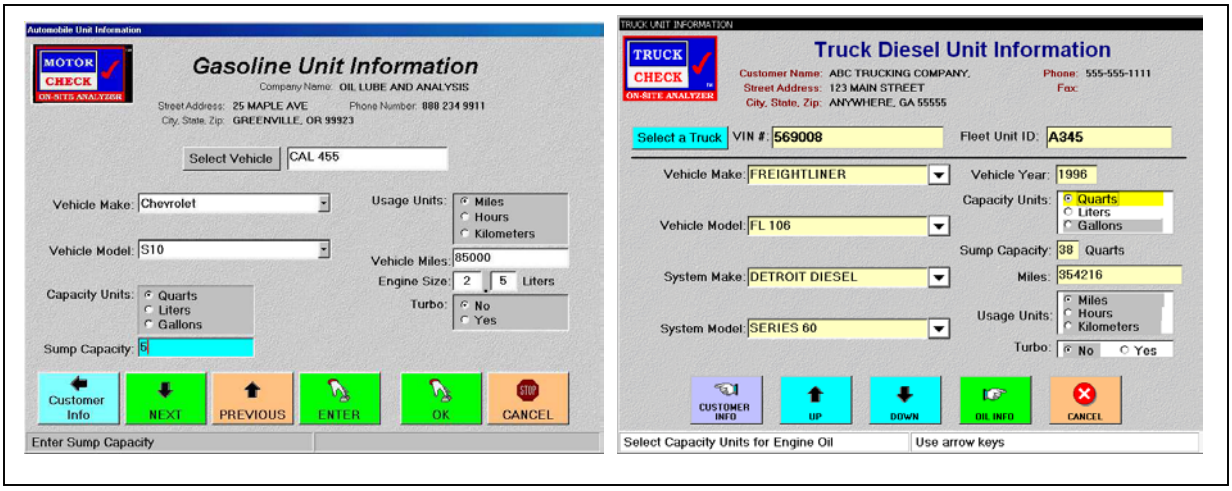
The analyzer's software will automatically assign a Customer ID. Press OK to continue. Enter the rest of the information using the OK key to move through the fields

When you are finished entering or selecting a customer name, Press OK to continue.



ENTERING VEHICLE INFORMATION

Unit Information screens are shown below. The screens are different depending on which test you have selected. On the Unit Information screen, you provide information about the vehicle. If the information about this vehicle has been previously entered, then the information is filled-in for you when you select the vehicle from the list. If the vehicle is not listed, then you must enter the information manually.



Selecting Vehicle Information From A List

Each customer may have one or several vehicles. A Vehicle ID is a way of identifying a specific customer's vehicle. New customers will not have any vehicles listed and you will have to manually enter the vehicle information. After you select the desired Customer the Select a Vehicle will flash red and all the known Vehicles will appear on the list. Existing customers will have a list of Vehicle IDs associated with their name. An example screen listing Vehicle IDs is shown below.

Use the UP and DOWN arrow key to view the list of Vehicle IDs. If the name you want is on the list, then highlight the desired Vehicle ID and press SELECT. After selecting a vehicle from the list and pressing SELECT, the Unit Information screen is re-displayed with the vehicle information you selected.

Manually Entering Vehicle Information

On the Sample Data Entry screen, information about the vehicle is entered along with information about the oil. Enter the information as complete and accurate as possible. If you are not sure about some of the information, you may leave the entry as “unknown” but all fields must have an entry.

Depending on the type test (Gasoline, Diesel Engine, Gearbox or Transmission) selected, different information is requested in the Unit Information screen. Not all of the following information items will be requested on every analysis.

VEHICLE MAKE AND MODEL

Select the vehicle make and model from the drop-down list. Use the drop-down arrow key to view the list of vehicle makes. Scroll through the list using the arrow keys and select an item. Now select the vehicle model using the same keys and press down to continue. You can also select makes and models by entering the first letter of the type you want; for example press C to go to the beginning of the C makes.

If the item you want is not in the drop-down list, you must specify it as "unknown," or “General” or select CUSTOM and an extra field will appear for filling out custom entries.

ENGINE MAKE AND MODEL (DIESEL ENGINE ONLY)

Select the engine model from the drop-down box. If you do not know the model or your model is not on the list, you must specify unknown.

VEHICLE YEAR (DIESEL ENGINE ONLY)

Enter the vehicle year information in the appropriate box.

CAPACITY UNITS / SUMP CAPACITY

Enter in the appropriate units.

USAGE UNITS / VEHICLE MILES

Select the appropriate units using the arrow keys to designate whether the maintenance interval is measured in miles, hours, or kilometers, then enter the miles (or hours) that have accumulated on the engine or transmission.

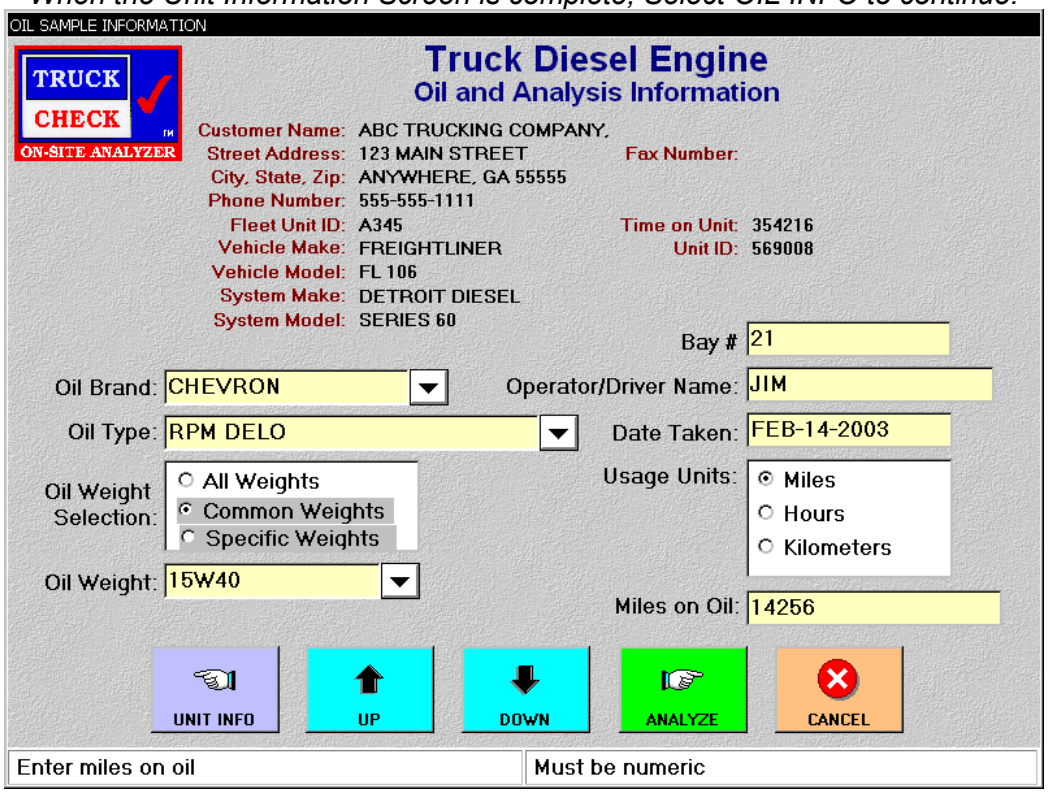
Key to Successful Oil Analysis:

A re-built engine or transmission may have less miles/hours on it than the vehicle does. Where appropriate, enter Miles/Hours since last re-build.

ENGINE SIZE (Gasoline Only) AND TURBO CHARGING

Enter the engine size in liters, and specify whether or not the vehicle is turbocharged.

When the Unit Information Screen is complete, Select OIL INFO to continue.



ENTERING OIL SAMPLE INFORMATION

Oil Brand, Type, and Weight

Select the oil brand, type, and weight of your sample. In the Oil Weight Selection box you can scroll between selections to designate what type of weights will be displayed in the Oil Weight field. If you do not know the any of this information you may leave it as “unknown.”

Usage Units and Miles on Oil

Enter the number of miles (or hours) that have accumulated on the engine or transmission since the last oil change.

User Sample ID

A User Sample ID is a way of uniquely identifying a sample. This ID may be a bar code that is affixed to the sample bottle and data entry sheet.

Operator Name

Enter the name of the vehicle's driver here. The information is useful for fleet owners who may have several drivers for each vehicle.

After completing the Oil Sample Information screen, press Analyze to continue.

CUSTOMER NOTES

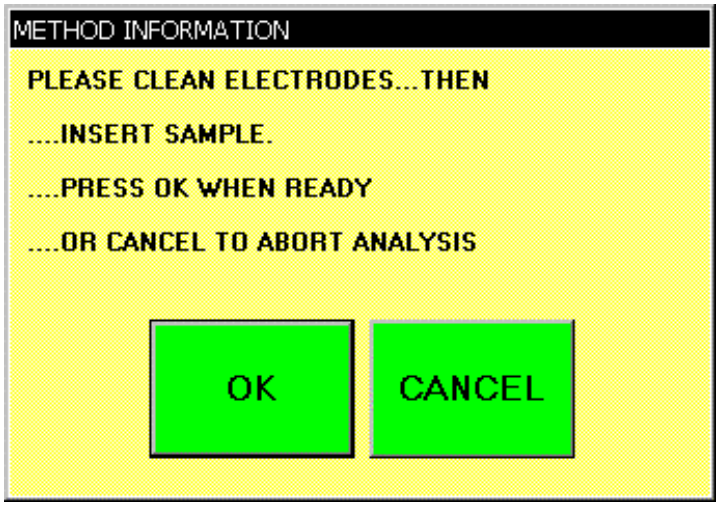
REVIEW ENTRIES

The analyzer checks the information you entered when you exit the data entry screens. If there are no data entry errors, the Oil Analysis Activation Screen is displayed. Your sample, vehicle, and oil data will be displayed on the screen. Review this information for accuracy.

If you need to make corrections, press the OIL INFO button. If the information is correct you can now press START to continue with the analysis.

START ANALYSIS

When the analysis starts, you will be prompted to perform a few necessary tasks. A message box will be displayed like the one shown below. Follow the on-screen instructions.

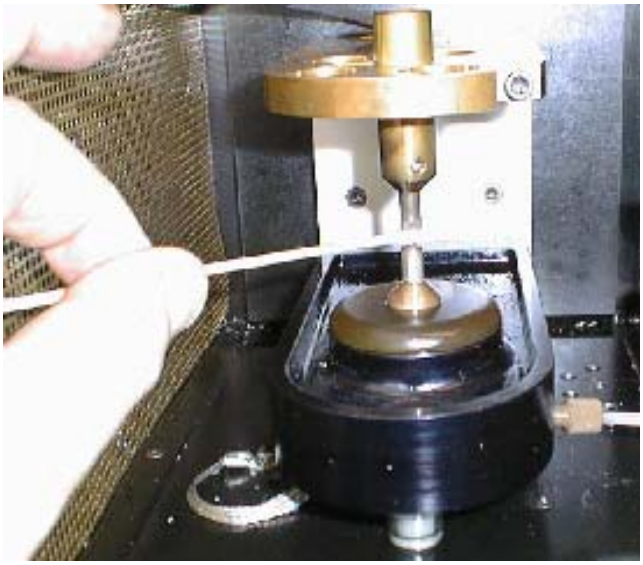


Customer Notes

CLEANING THE ELECTRODES

It is necessary to clean the electrodes prior to the analysis of every sample. Residue from the previous sample can affect your results. Use the proper cleaning technique that is illustrated below.

Close the spark box cover when you have finished cleaning the electrodes and press OK.



Use a cotton swap dipped in cleaning solution to clean the upper electrodes. First, wipe the outside of the upper electrode. Then, clean the inside of the upper electrode by inserting the swab down through the center of the electrode.

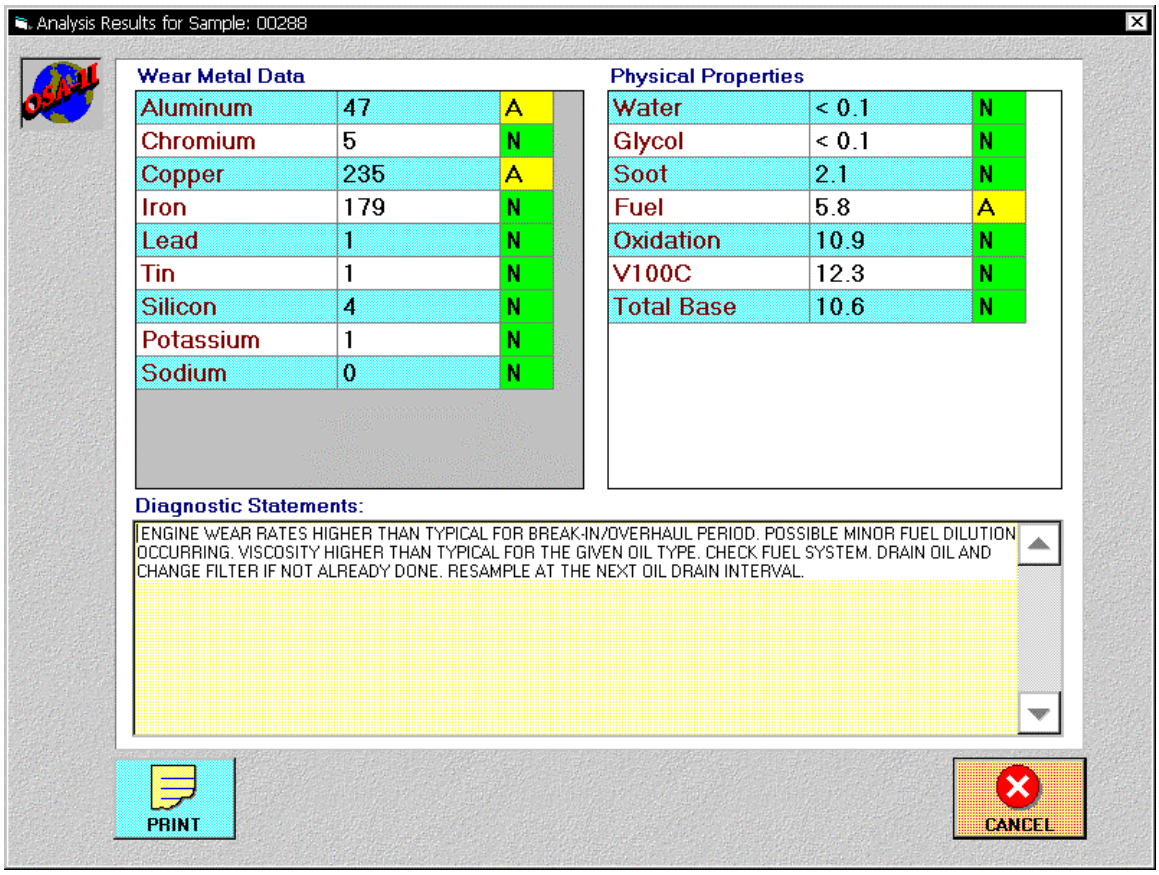
THE ANALYSIS CYCLE

The analysis takes about 5 to 7 minutes to complete after the data entry and manual tasks have been performed. The status bar indicates progress as the sample is processed. If you want to stop the analysis, press the STOP button. The stop process takes 15-30 seconds to complete.

ON-SCREEN REPORTING

When the analysis is complete, an analysis report may be briefly displayed on the screen. An example of the on-screen report is shown below. The report will include the results of the analytical tests along with a diagnostic statement. Severity codes will also be printed with the test results. Green indicates normal conditions.

After the results are displayed, the analyzer will begin the Auto Flush process and ask you to perform the task of removing the sample. Remove the sample and press OK so that analyzer can reset and be ready for the next analysis.



V. PRINTING REPORTS

OPTIONAL REPORT FORMATS

Depending on how the analyzer has been configured, the analyzer may automatically print a hardcopy of the analysis in one of the following formats.

DIAGNOSTIC REPORT

The Diagnostic Report is a simplified report designed for consumers. This numberless style report provides information on engine components wear and oil condition. This report is typically used when oil analysis is performed on cars and light duty trucks. Test results are reported as “normal”, “monitor”, and “inspect.” Reasons for abnormal test results are suggested and service actions are recommended.

NUMERIC REPORT

The Numeric Report is a standard laboratory style report with wear metal concentrations reported in parts-per-million and physical properties are quantified in their appropriate units. The severity of results range from normal to severe. A diagnostics statement is included which suggests problem sources and recommended service actions. Typically, the numeric report is used when oil analysis is performed on heavy-duty trucks.

COMBINED REPORT

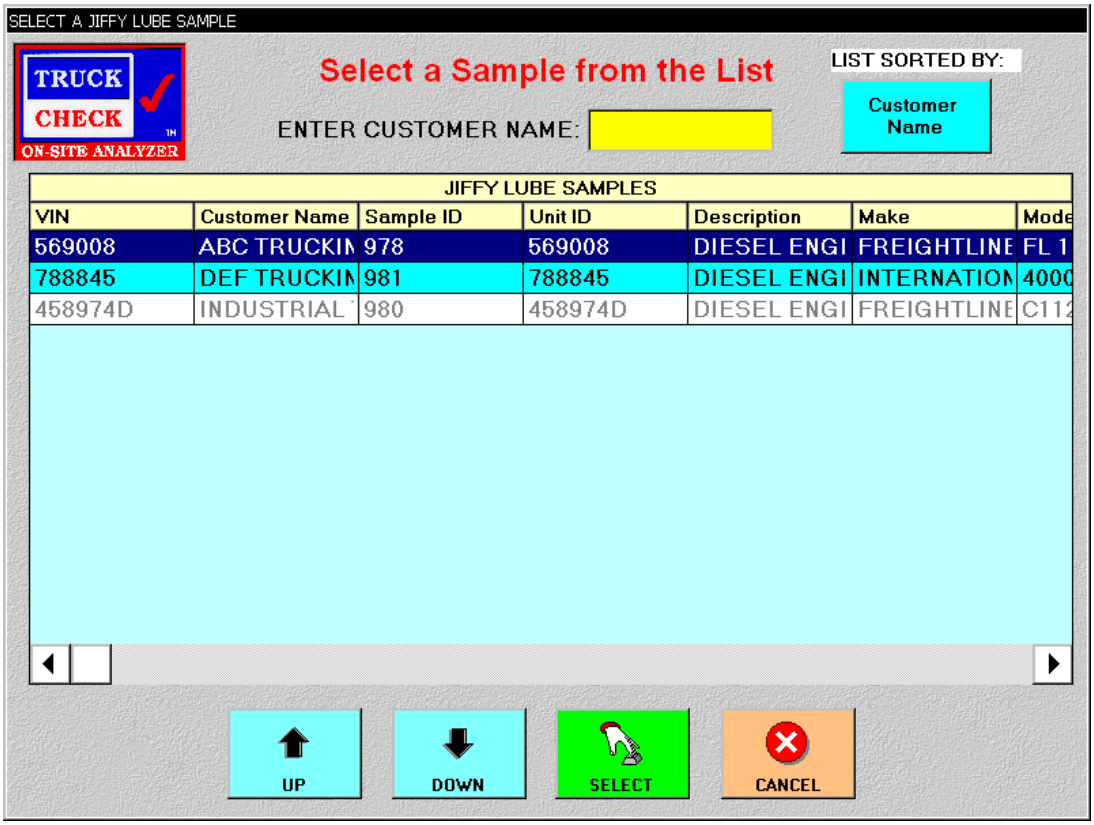
The Combined Report is a printout of both the Diagnostic Report and the Numeric Report. This selection is typically used when the Diagnostic Report is given to the customer and the Numeric Report is kept for reference.

TABULAR HISTORY

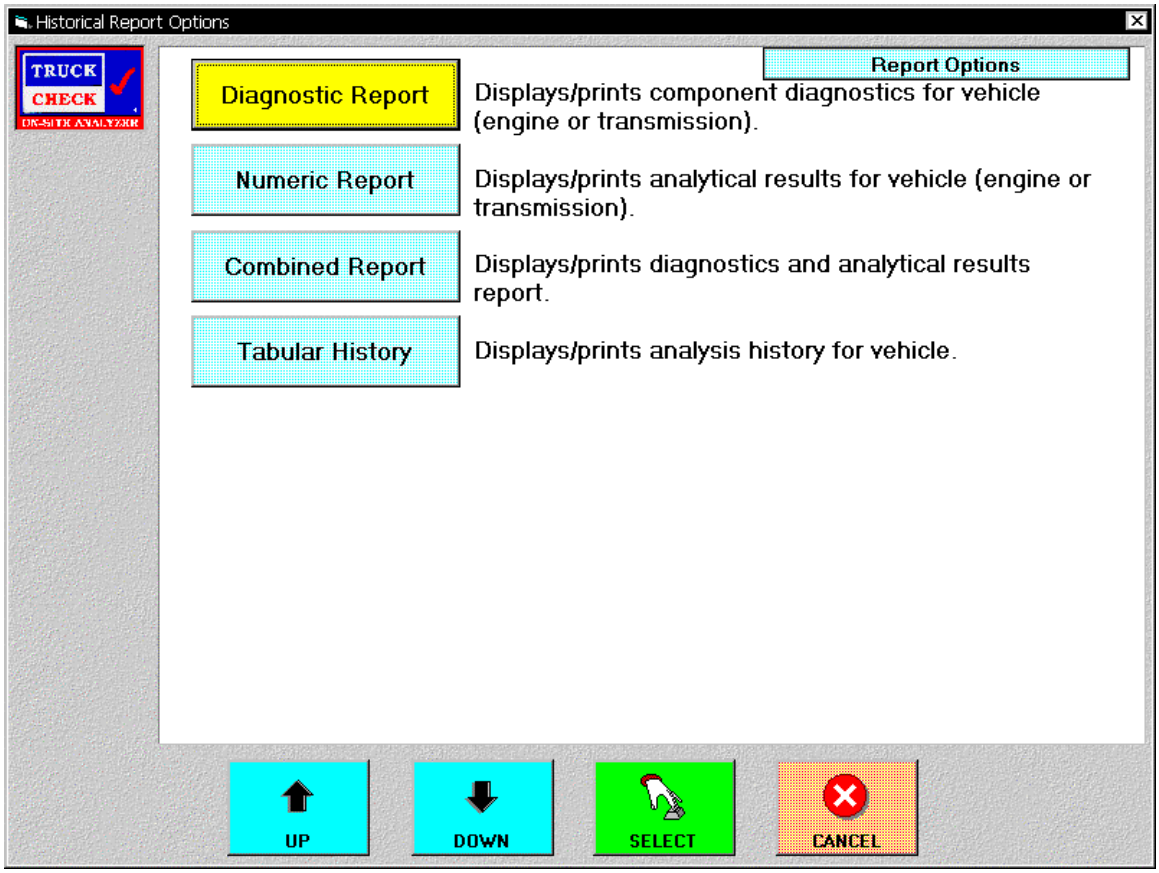
The Tabular History report is a laboratory style report. Like the Numeric Report, the Tabular History Report states Wear Metal concentrations in parts-per-billion and physical properties are quantified in their appropriate units. The Tabular History report includes the records of all the previous oil analysis results. The Tabular History report is useful to repeat customers who routinely have their oil analyzed.

PRINTING HISTORY REPORTS

To print the report for a sample that has just been analyzed, select the REPORTS button. A list of all the reports for the particular customer will be displayed.



The Sort button on the right top can be used to change the sorting options from Customer Name, Sample ID, VIN right justified and VIN left Justified. Once the vehicle is found, select it and then the screen below is shown.



Select the style of report to be printed and a screen report will appear. You can then select PRINT or CANCEL.

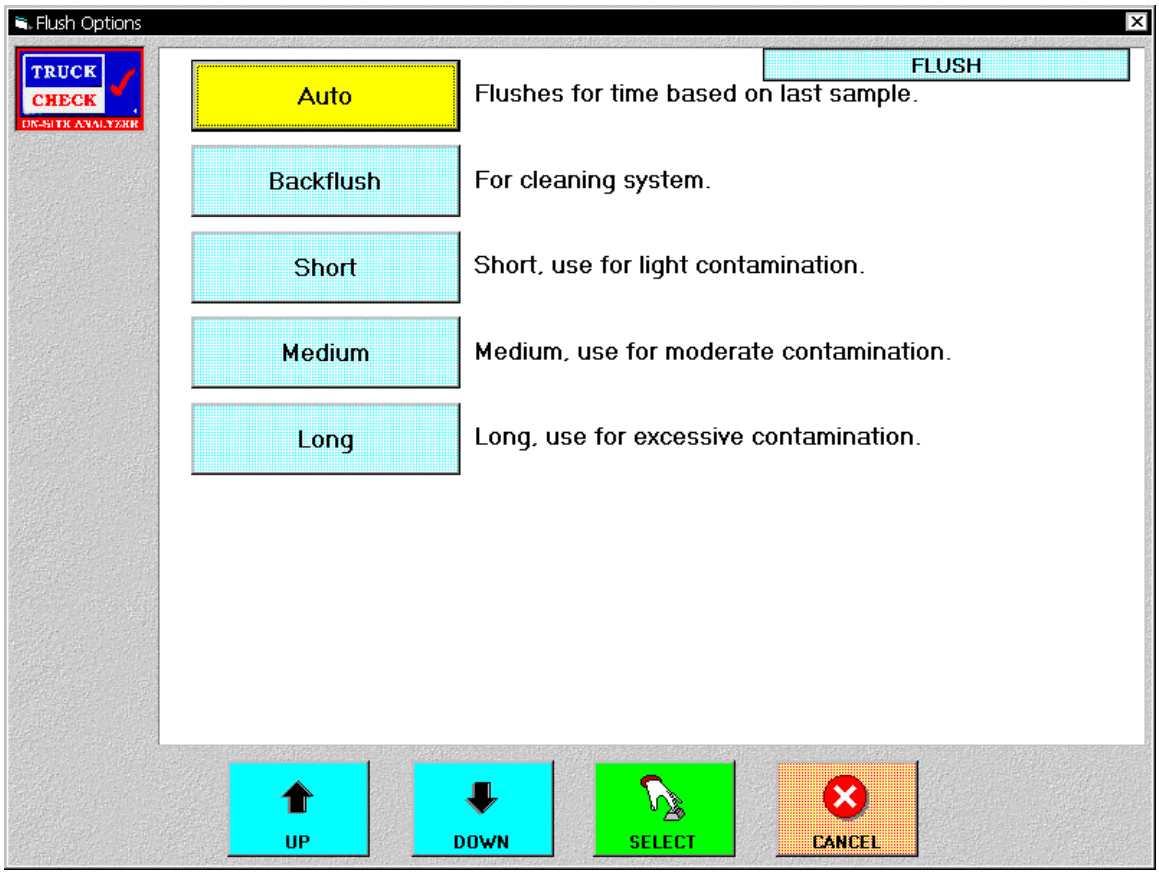
VI. FLUSHING

AUTO FLUSH

The computer controls the Auto Flush. The computer evaluates the last sample's level of contamination and determines what type of flush to perform on the system. The user has no control over the duration of the Auto Flush.

MANUAL FLUSH

The Manual Flush allows the user to perform additional cleanings. This function gives the user additional tools to fight sample carry over and contamination. To perform a Manual Flush, press FLUSH from the main menu. The Flush screen, show below, will offer you various selections. Select the flush you want and press SELECT. The system will execute the flush selected.



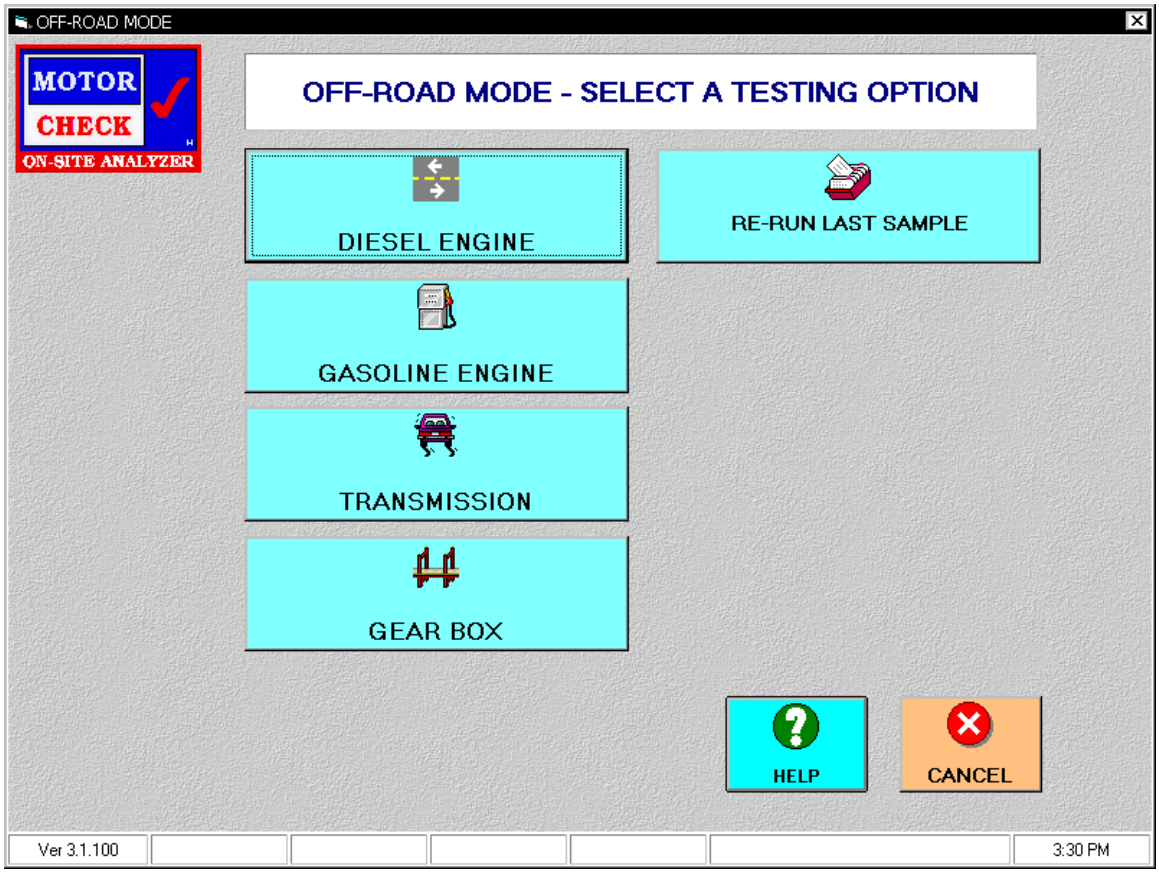
VII. OFF ROAD

Before running a sample, the Analysis mode must be changed from the current configuration, Truck, Auto, Marine, Cycle, to Off Road. Selecting the 'Admin' button at the Main Menu does this. Tab down to the Analysis Mode, select this button and simply change to Off Road.

TEST SELECTION IN OFF ROAD

The analysis of your oil depends on what type of sample it is. You must specify if the sample comes from a diesel or gasoline engine or from a transmission or gearbox. Press the ANALYZE button to bring up the Test Selection screen shown below.

Select the GASOLINE key on the keypad to analyze a sample of crankcase oil from gasoline-powered cars and light-duty trucks. Select the DIESEL key to analyze a sample of crankcase oil from a diesel powered medium- or heavy-duty engine. Select the TRANSMISSION key to analyze a sample of transmission fluid. Select the GEARBOX button to sample Gearbox fluid. The Re-Run Last Sample Button allows you analyze the last sample again without having to re-enter all of the sample information.



SELECT A CUSTOMER IN OFF HIGHWAY MODE

When selecting a customer, you have three options: use the default customer, select a customer from the list, or add a new customer.

If the Customer ID for the customer you want is already displayed in the box next to "Enter Customer ID", then press OK to use the default customer name.

If the Customer ID you want is not displayed in the box, but it is in the customer list, then highlight the customer you want by using the UP and DOWN Arrow Keys and use the ENTER key to make your selection. Press OK to continue.

If the customer you want is not the default customer and is not displayed in the list of customers, then you must add your customer name to the list. Press the NEW CUSTOMER button to add your customer.

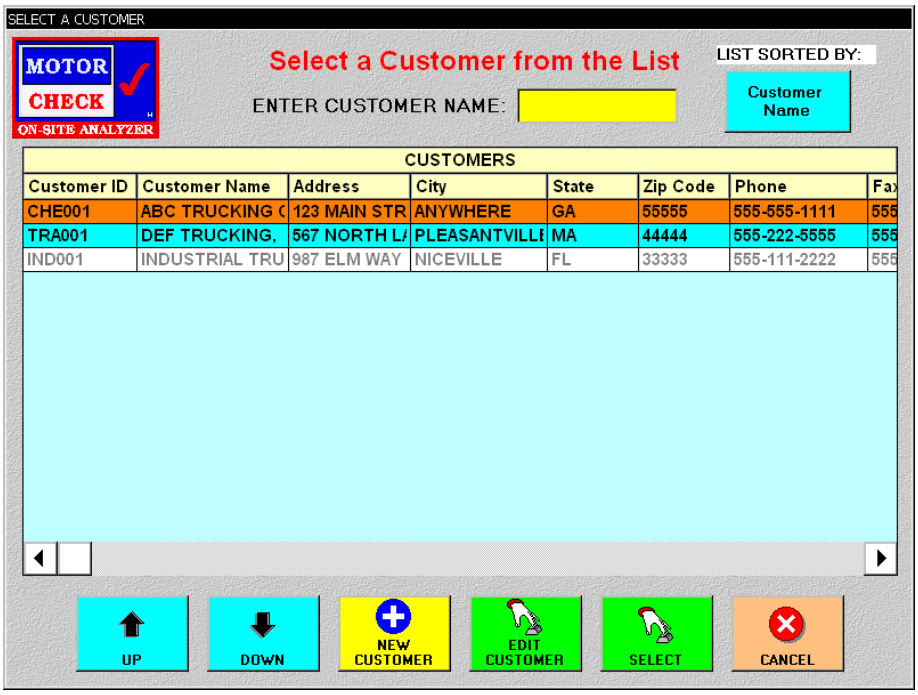
Each option is discussed in detail below.

Default Customer

The default customer name is setup by your MotorCheck™ service representative. If a default customer has been setup, the default customer's Customer ID will always appear in the box next to "Enter Customer ID." Having a default customer name is useful when the majority of samples analyzed are for one particular customer.

To use the default customer name, press OK.

To use a customer other than the default, follow the instructions below for choosing a customer from the list or adding a new customer.



Listed Customer

Listed customers are the names of customers that have had their oil analyzed previously. Choosing from the list keeps you from having to enter the customer's information each time their oil is analyzed.

Using the UP and DOWN arrow keys, see if the customer you want is on the list.

If the customer name you want is on the list, then highlight the name, select it by pressing OK.

If the customer's name you want is not on the list, then press the NEW CUSTOMER key to enter a new customer.

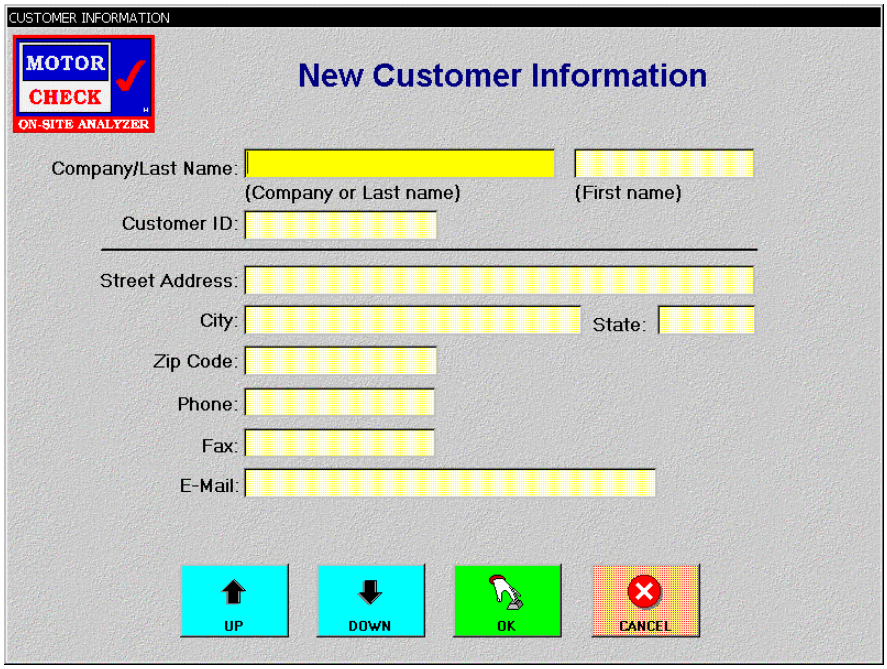
New Customer

If a customer has not had their oil analyzed previously, their name is probably not on the list. The first time a customer has their oil analyzed you must enter all of their information. Once you have entered the customer's information, the analyzer will keep it on the list for the next time. The new customer information screen is shown below.

Enter the customer's last name or enter a company name and press OK to move to next field.

Enter the customer's first name or press OK to leave it blank.

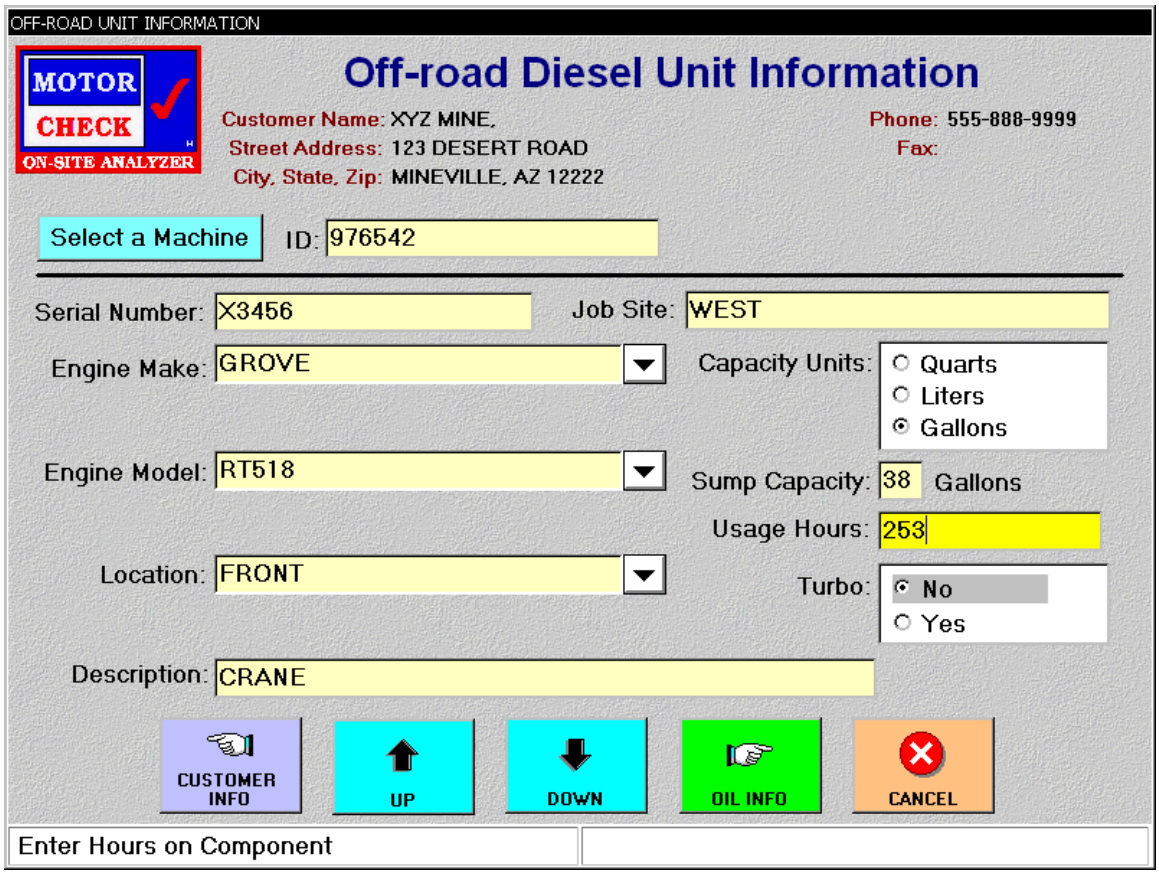
The analyzer's software will automatically assign a Customer ID. Press OK to continue. Enter the rest of the information using the OK key to move through the fields



When you are finished entering or selecting a customer name, Press OK to continue.

ENTERING OFF ROAD VEHICLE UNIT INFORMATION

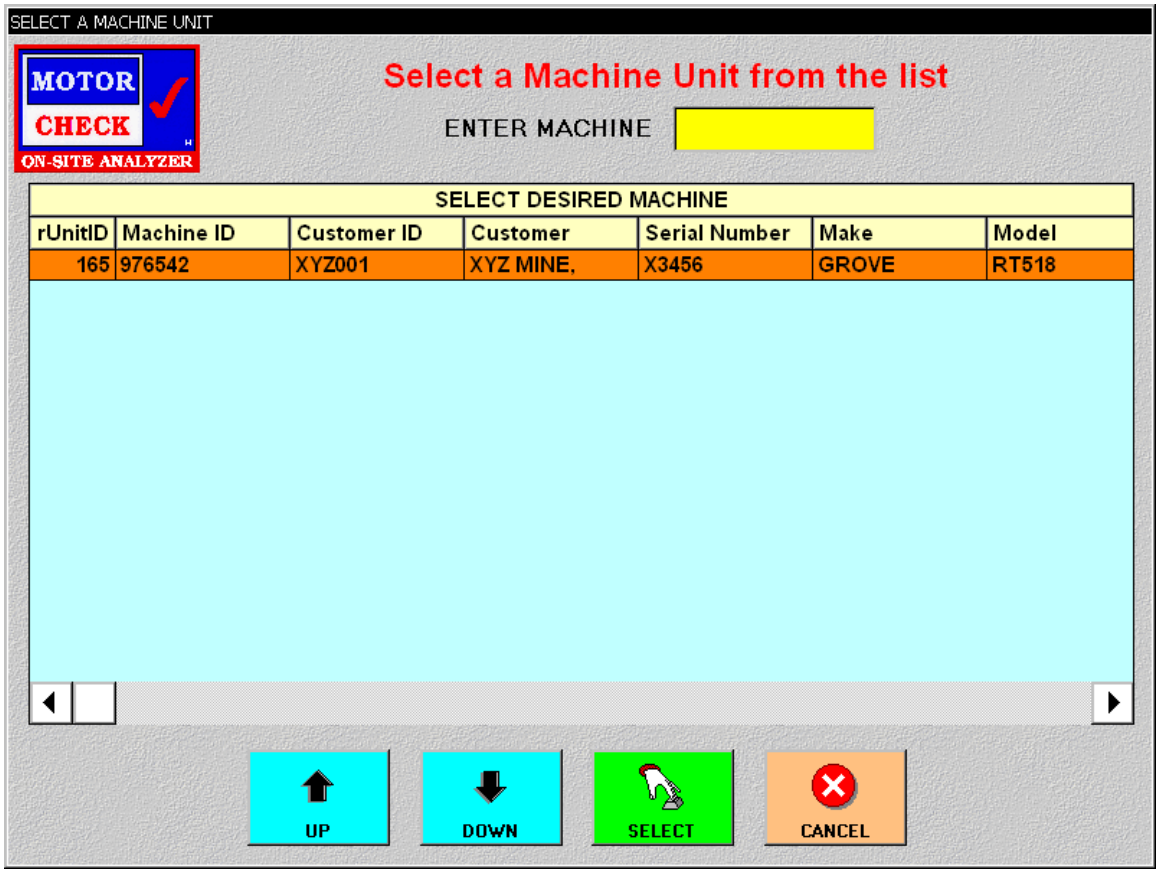
The Unit Information screen is shown below. The screen shown is for Diesel Unit Information. Depending on which selection you use (Diesel, Gasoline, Transmission or Gearbox) will determine the differences in the screen. On the Unit Information screen, you provide information about the vehicle. If the information about this vehicle has been previously entered, then the information is filled-in for you when you select the vehicle from the list. If the vehicle is not listed, then you must enter the information manually.



Selecting Machine Information From A List

Each customer may have one or several machines. A Machine ID is a way of identifying a specific customer's machine. New customers will not have any machines listed (as shown below) and you will have to manually enter the vehicle information. Existing customers will have a list of Machine IDs associated with their name. An example screen is shown below. Once you select the customer, the ID button will flash red and give you a list of machines available.

Use the UP and DOWN arrow key to view the list of Machine IDs. If the name you want is on the list, then highlight the desired Machine ID and press Enter. If the Machine ID you want is not on the list then simply enter a machine ID in the ID box. After selecting a machine from the list the Unit Information screen is re-displayed with the machine information you selected. If your machine is not listed, then it is ready for you to manually enter the machine information.



Manually Entering Machine Information

On the Sample Data Entry screen, information about the machine is entered along with information about the oil. Enter the information as complete and accurate as possible. If you are not sure about some of the information, you may leave the entry as “unknown”.

MACHINE MAKE AND MODEL

Select the vehicle make and model from the drop-down list. Scroll down to view the list of vehicle makes. Scroll through the list using the arrow keys and select an item using the SELECT key. Now select the vehicle model using the same keys and continue to the next field. The ‘Custom’ selection under make and model may be used to enter units that do not appear in the drop down lists.

COMPONENT UNIT INFORMATION

Enter the component Serial Number, the Job Site, and the total Hours on the component

USAGE UNITS

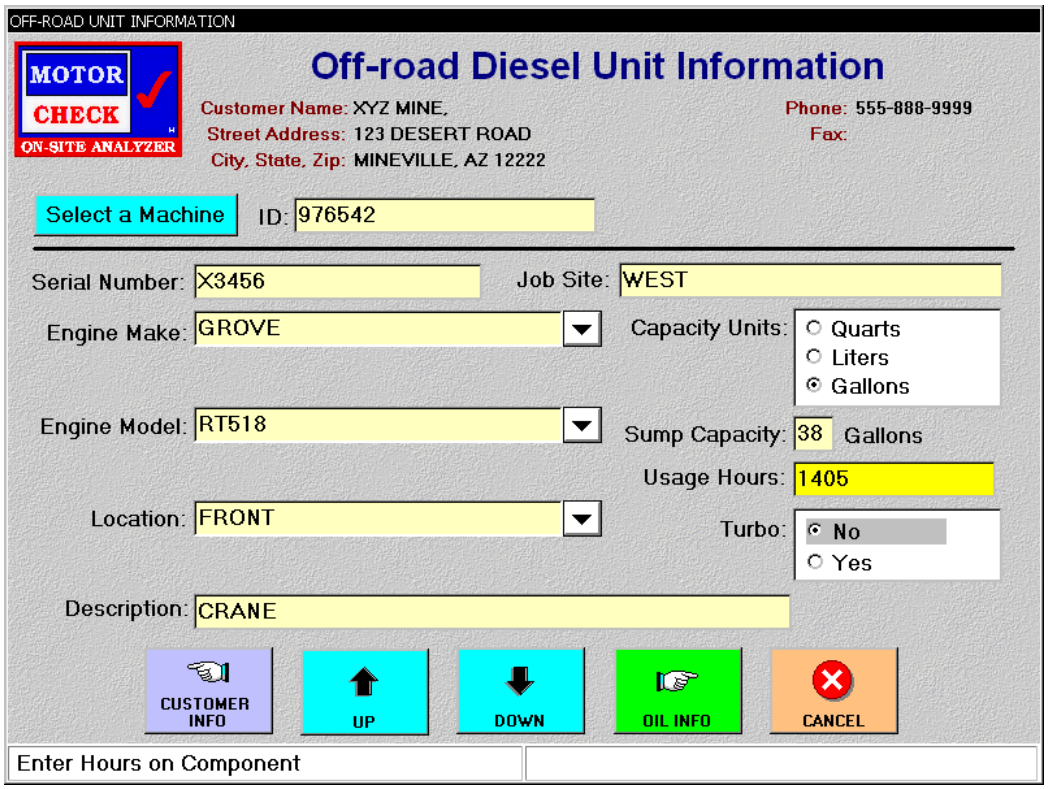
Select the appropriate units using the arrow keys to designate whether the sump capacity is measured in Quarts, Gallons, or Liters.

LOCATION / SUMP CAPACITY

Select the correct location of the component, then the sump capacity.

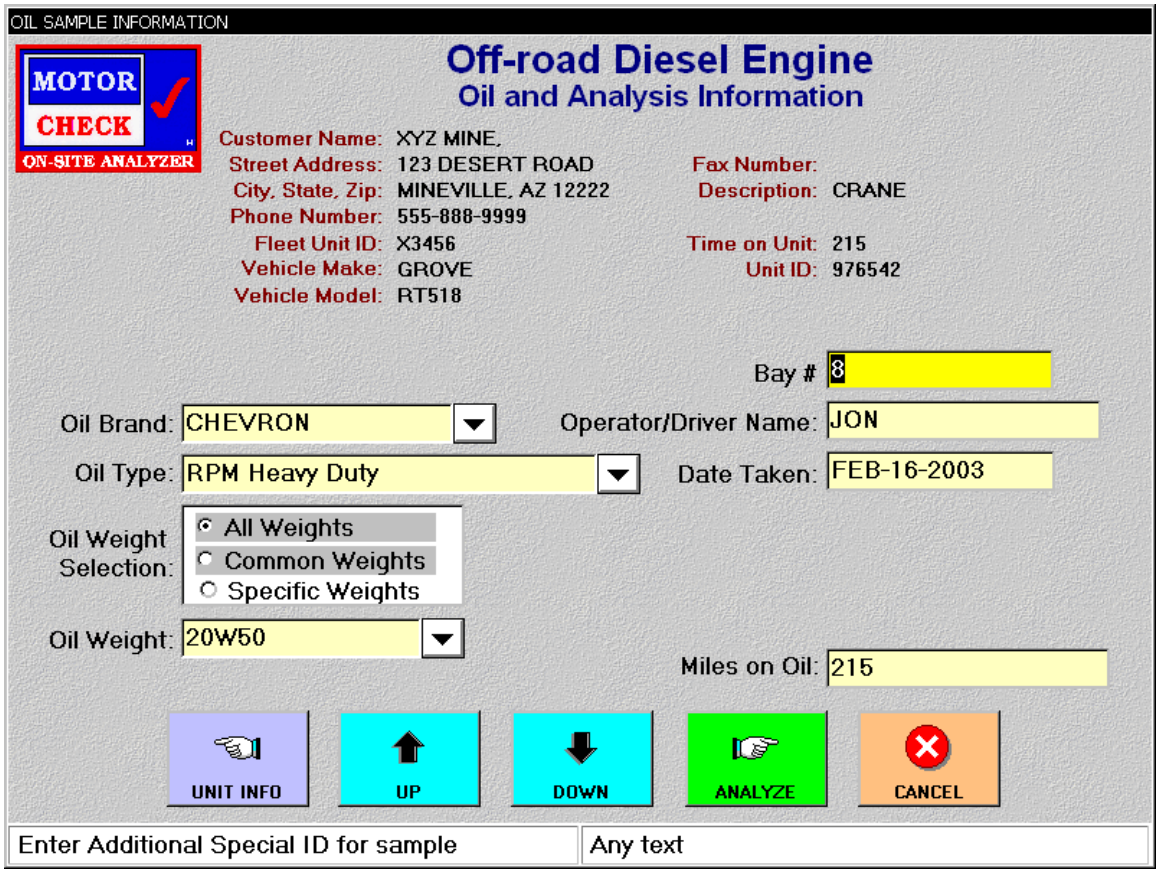
TURBO

Select yes or no using the space bar if the component is turbocharged.



When the Unit Information Screen is complete, press OIL INFO to continue.

Entering Oil Sample Information



Oil Brand, Type, and Weight

Select the oil brand, type, and weight of your sample. If you do not know the any of this information you may leave it as “unknown.”

Usage Units and Miles on Oil

Enter the number of hours that have accumulated on the component since the last oil change.

User Sample ID

A User Sample ID is a way of uniquely identifying a sample. This ID may be a bar code that is affixed to the sample bottle and data entry sheet.

Operator Name

Enter the name of the vehicle’s driver here. The information is useful when there is more than one operator on the unit.

After completing the Oil Sample Information screen, press ANALYZE to continue.

REVIEW ENTRIES

The analyzer checks the information you entered when you exit the data entry screens. If there are no data entry errors, the Oil Analysis Activation Screen is displayed. Your sample, vehicle, and oil data will be displayed on the screen. Review this information for correctness.

If you need to make corrections, press the OIL INFO button. If the information is correct you can now press START to continue with the analysis. Go to How to Analyze a Sample for complete information on running an Analysis.

Customer Notes