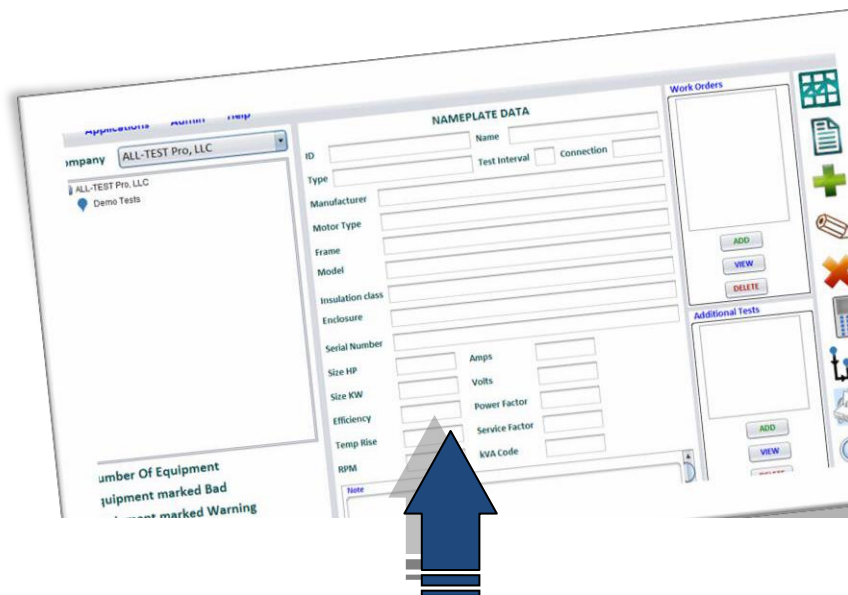




# Motor Circuit Analysis™ Software MCA Basic™, MCA PRO™, and MCA PRO™ Enterprise

## User Manual

Version 4.X.X or later





## Table of Contents

INTRODUCTION ..... 1

    Contact Information..... 1

SOFTWARE AND INSTALLATION..... 2

    MCA Software Installation Minimum Requirements..... 2

    Different Language Manuals..... 2

    Installation Steps..... 2

    Types of MCA Software and Accounts ..... 5

    MCA Software in Multiple Languages ..... 6

MCA Database Location ..... 7

QUICK START ..... 8

OPERATION ..... 9

    Login..... 9

    Main Screen ..... 9

    Motor File Commands ..... 10

        Overview ..... 10

        Add Company/Location/Equipment ..... 11

            Add Company..... 11

            Add Location ..... 12

            Add Equipment ..... 13

                Add Images..... 14

    Communication..... 17

        Upload Data ..... 17

            Invalid Test Upload ..... 19

        Map Data to Equipment..... 19

            Mapping Rule ..... 20

            Auto Map Data to Equipment ..... 22

        Clear Instrument Memory ..... 23



## Software User Manual

---

Data Analysis .....	23
Individual Test Analysis and Report .....	24
3 Phase AC Motor Test.....	24
Rules for Test Downloading .....	29
Transformer Test.....	30
DC and 1 Phase AC Motor Test .....	30
COIL Test .....	30
Trending Analysis .....	31
DC and 1 Phase AC Trend.....	32
Report .....	33
Rotor test .....	33
Reports.....	37
List of Equipment .....	37
Equipment for Review.....	38
Equipment to Test.....	39
Route Report.....	40
Print Selected Equipment .....	41
Edit .....	42
Delete.....	44
Route.....	45
ADD/VIEW/DELETE Route .....	45
Download a Route into Instrument .....	47
Rules for Route Downloading .....	49
Upload Route Test Data from Instrument .....	49
Contact.....	50
Search.....	51
Work Orders.....	54
Create a Work Order .....	54
View a Work Order.....	55

---

Print a Work Order .....	56
Additional Tests .....	57
Nameplate Data .....	58
Menu Bar.....	59
File Menu .....	59
Export Test Data.....	59
Exit.....	61
Applications Menu .....	62
Admin Menu .....	62
Users .....	62
ADD .....	63
VIEW.....	63
DELETE.....	63
Default Rotor Deviation Threshold .....	64
Help Menu.....	64
About.....	64
Manual .....	64
Support.....	64
Read Me .....	65
Database Structure .....	65
DISCLAIMER, COPYRIGHT & TRADEMARKS.....	67
MCA SOFTWARE AGREEMENT .....	69

Specifications Subject to Change Without Notice

## INTRODUCTION

ALL-TEST Pro's **Motor Circuit Analysis™ (MCA™)** Software Suite enables analysis, quality control, troubleshooting, and predictive maintenance for complete deenergized motor testing. This software integrates seamlessly with the ALL-TEST PRO 7™ (AT7™), ALL-TEST PRO 7™ PROFESSIONAL (AT7P), ALL-TEST PRO 34™ (AT34™) and ALL-TEST PRO 5™ (AT5™) MCA instruments to create a complete analysis package for monitoring and maintaining electric motors.

MCA Basic™ Software comes standard with the ALL-TEST PRO 7 and ALL-TEST PRO 34

- AT7 - single & 3-phase AC motor testing & AT34 - 3-phase AC motor testing

MCA PRO™ Software comes standard with the ALL-TEST PRO 7™ PROFESSIONAL

- Single and 3-phase AC motor testing
- DC motor testing- series, shunt, and compound wound
- Transformer testing
- Individual coil testing (test and compare up to 4 coils)
- Unique Rotor Grading System (RGS)

MCA PRO™ Enterprise Software is optional for the ALL-TEST PRO 34 and ALL-TEST PRO 7 PROFESSIONAL

- All the features and functions of MCA PRO PLUS multiple user accessibility - 2, 5, 10, & 25 user licenses available

## Contact Information

**ALL-TEST Pro, LLC**  
**PO Box 1139**  
**Old Saybrook, CT 06475**  
**USA**

**Phone:** ***1.860.399.4222***

**Fax:** ***1.860.399.7784***

**Email:** [\*support@alltestpro.com\*](mailto:support@alltestpro.com)

**Web:** [\*www.alltestpro.com\*](http://www.alltestpro.com)

## SOFTWARE AND INSTALLATION

### MCA Software Installation Minimum Requirements

- Operating system Windows 7, 8.1 and 10
- Installed Java Runtime Environment 7 or later
- Recommended 15-inch monitor
- Minimum screen resolution: 1280 x 800
- Computer Memory: recommended 2GB or larger
- USB port for USB cable and serial communication to instruments
- Color printer is recommended, but not required for reports. However, for colorful objects, e.g. multiple curves in different color on a graph, it's preferably to have a color printer.
- Dongle License – Only needed for MCA PRO users

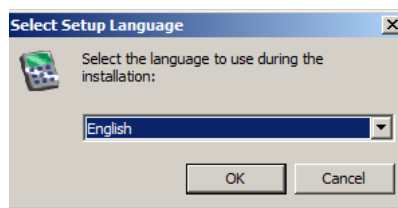
### Different Language Manuals

Currently the software is available in English, Spanish, Portuguese, Italian and Chinese languages. The manuals in corresponding languages will be released later. However, those manuals will be same as the English manual – the only differences will be the software images and the translations in other languages instead of English. All the chapters and sections will be the same as English manual.

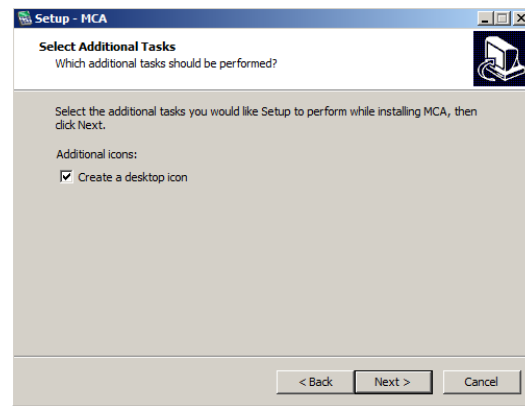
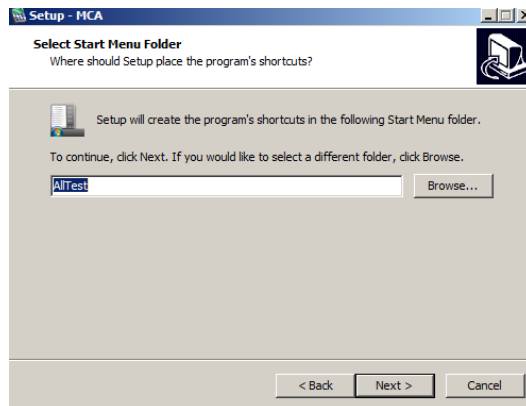
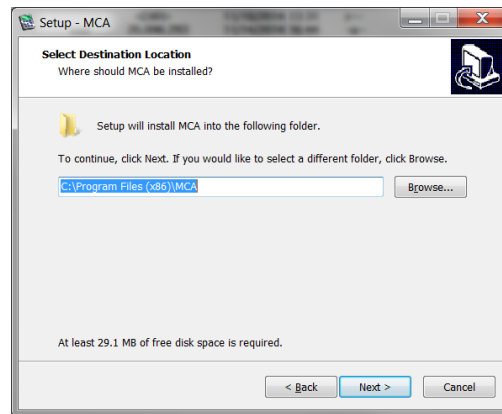
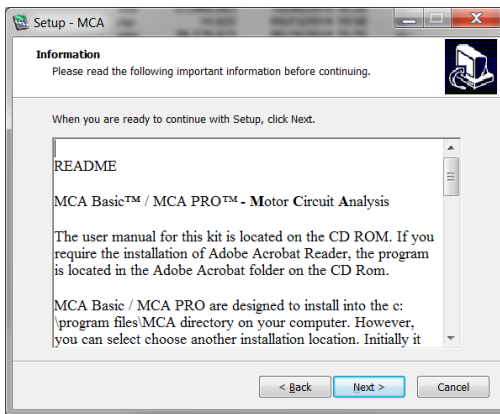
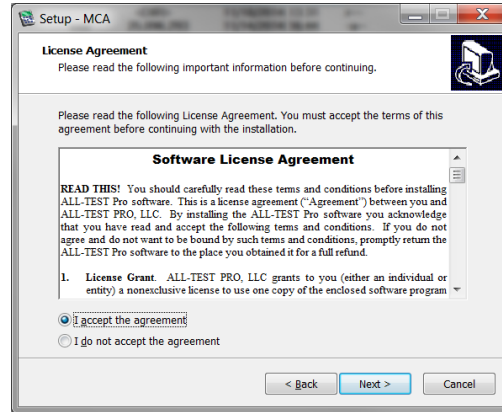
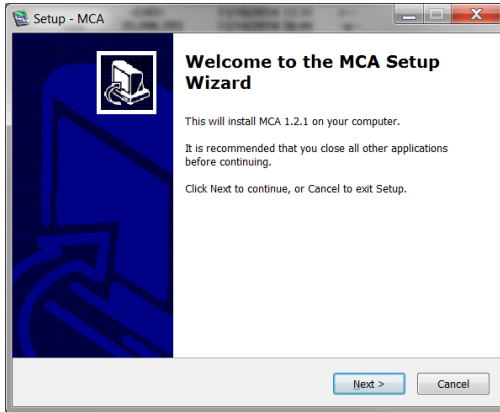
### Installation Steps

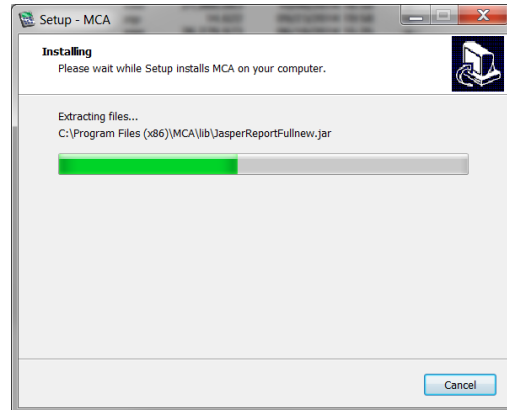
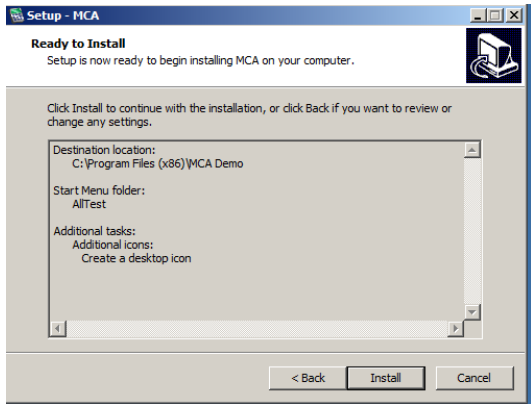
**Note:** Before installation of MCA software, do not connect the instrument to the computer.

1. Before MCA software installation, please make sure the computer has been installed with Java Runtime Environment (JRE) 7 or later.
2. Please download the MCA software set up file according to the instructions on the certificate enclosed in the instrument package.
3. Once the executable file is downloaded, double clicking it to start the installation.
4. Select “English” as other languages have not yet been implemented.

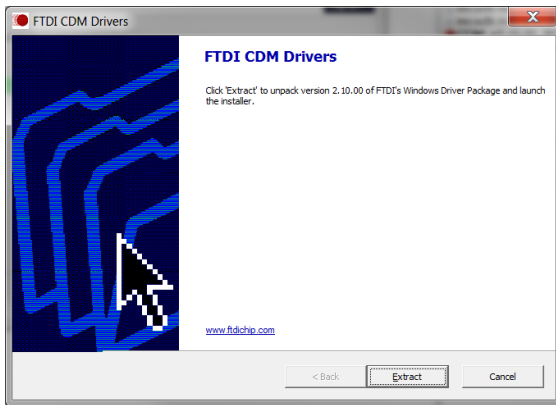


5. The Setup-MCA Icon will appear and follow the on-screen instructions as shown below:

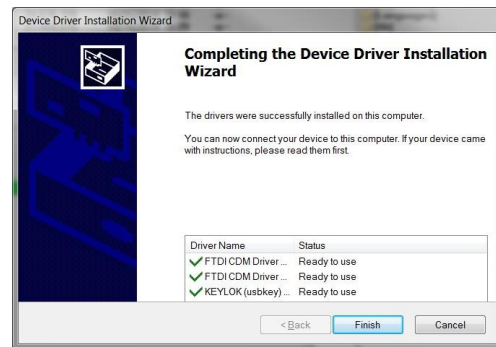
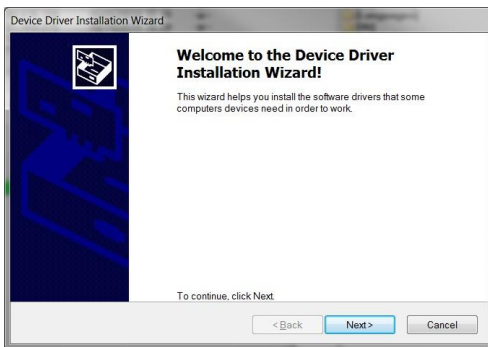




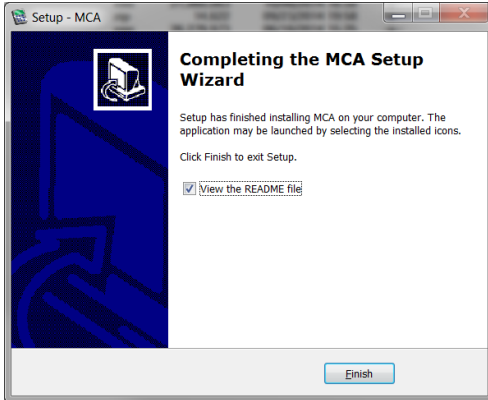
6. Then click on “Extract” to install the driver



7. Following the screen below to complete the installation.







8. The MCA software is now installed.

**Note:**

(1) The default login for single user license which is case-sensitive:

Username: Admin

Password: admin

(2) For enterprise version, please consult with the database administrator.

## **Types of MCA Software and Accounts**

There are three types of MCA software: MCA Basic, MCA PRO and MCA PRO Enterprise.

- **MCA Basic** software standard with an AT7 or AT34 instruments. It provides the functions for 3 Phase AC motor tests including the necessary communication and analysis.
- **MCA PRO** software standard with the AT7P instrument. MCA PRO requires a USB dongle that is supplied when you purchase this software. It has all the functions available including analysis of the tests on AC motor and generator, DC motor, transformer. It also provides the route functions: create route and download it into instrument, then upload the route with test data and perform corresponding analysis. Both MCA PRO and MCA Basic are a single user license.
- **MCA Enterprise** software is a multi-user license version for MCA PRO. It can be installed onto as many client computers as needed; however, the number of concurrent users is limited to the number of user licenses that was purchased. The database is installed on a server computer. The software provides a convenient way to share the test data across the company and for engineers to remotely analyze and create reports without access to the local computer. Available option for AT7P, AT5, and AT34.

For each type of software, there are three types of user accounts. The following provides general descriptions. Details will be presented in the later sections.

- **ADMIN user account:** It is administrative account hold all functionality of the software. ADMIN is also the only type of account that can create POWER or REGULAR user account.
- **POWER user account:** Power account can access almost all data analysis functions the same way as ADMIN account does, however, power account is only limited to work on the test data within one set up company in the database.
- **REGULAR user account:** Like power account, regular user account can do all the data analysis functions within one company. The major difference is regular user account cannot delete or move test records or location/equipment profiles which have been set up in the database.

This user manual focuses on describing the full functions of MCA software assuming login as an administrative account. For MCA Basic users, please refer to the 3 Phase AC motor sections only. For MCA PRO and MCA PRO Enterprise users, all functions are available.

### MCA Software in Multiple Languages

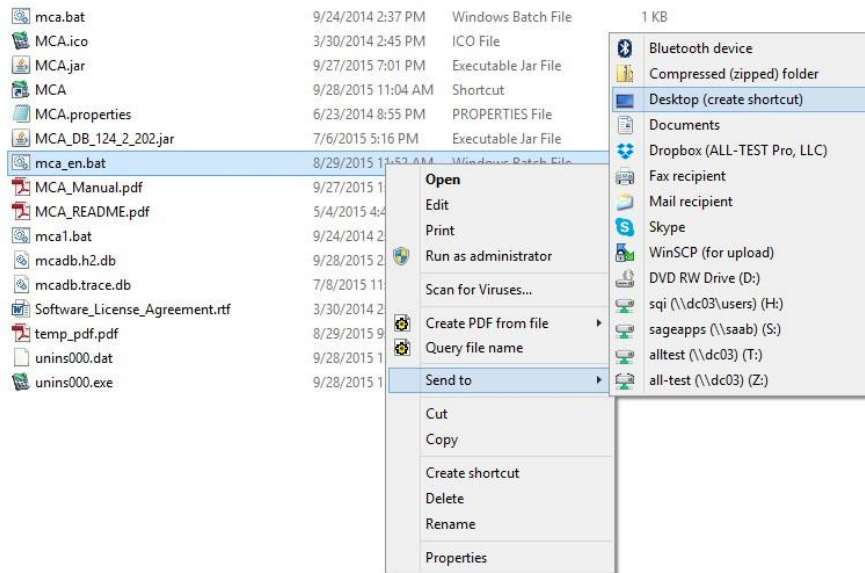
---

Currently MCA software have Spanish, Portuguese, Italian and Chinese version in addition to English version. More languages will be available.

MCA software will automatically run in the different language at the corresponding language operating system. For example, if a computer with Spanish Microsoft Windows 10, then MCA will run in Spanish.

While the users can create company, location, equipment etc. in their preferred language, for certain non-Latin languages, e.g. Chinese, the characters will not be displayed correctly on the instrument after downloaded from MCA into the instrument by either downloading function (See the Section “Download a Route”) or route function (See the Section “Download TVS™ data into Instrument”). In such case, it is suggested using the combination of letters, numbers and underscore “\_” to make those names.

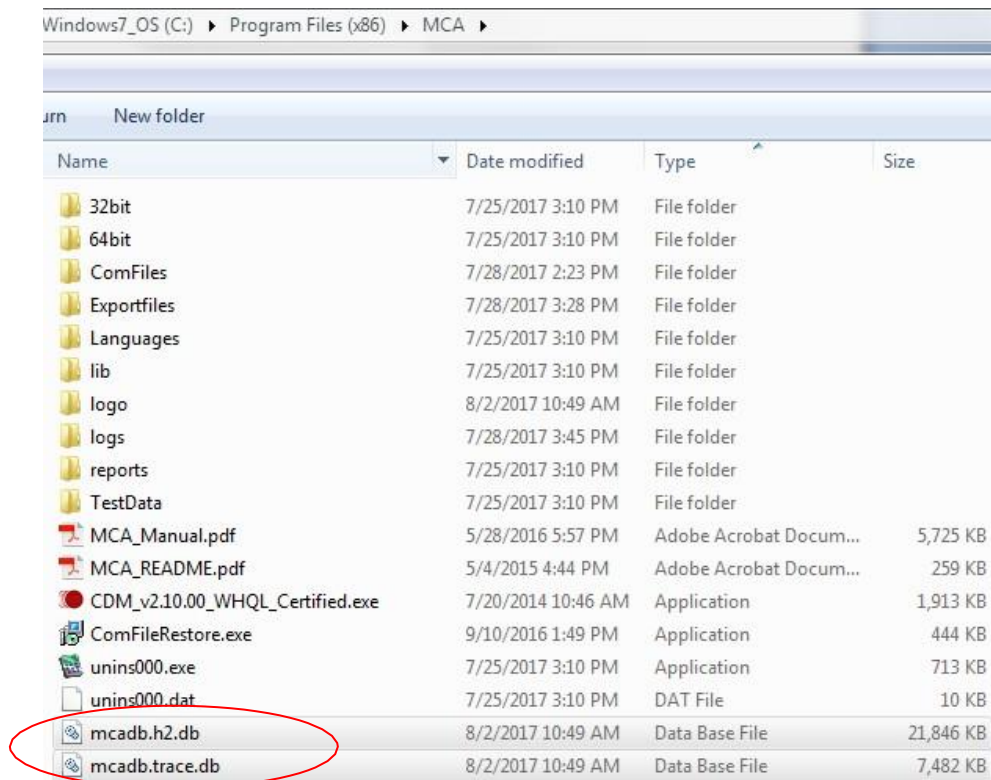
If a user wishes to run MCA in English mode while his computer’s operating system is in one of the languages MCA has, then manually run the file “mca\_en.bat” under MCA installation folder which can be located at "c:\Program Files (x86)\MCA" depending on the specific operating system. The user can also create a shortcut by right clicking on the file and select “Send to / Desktop (Create shortcut)” as shown below.



302 bytes

## MCA Database Files

The MCA database is made up of two (2) files located at C:/Program Files (x86)/MCA (mcadb.h2.db and mcadb.trace.db). It is recommended that these (2) database files be routinely backed up to prevent or minimize loss of data.



### QUICK START

The purpose of this chapter is to provide a quick guide for beginners to use the major functions of MCA software under the default administrative account “Admin”.

1. Installation of MCA Software – refer to Section “Installation Steps”
2. Log into MCA software with default “Admin/admin” – Section “Login” under next Chapter “operation”
3. Create a company in the database, then add location and equipment – Section “Add Company/Location/Equipment” under Chapter “operation”
4. Choose the company and assign it to the account “Admin” – Section “Users/ADD” under Chapter “Menu Bar/Admin Menu”
5. Assuming the instrument already has saved data in the memory, upload the test data – Section “Upload Data from instrument” under Chapter “Communication”
6. Then map the data to the equipment – Section “Map Data to Equipment” under Chapter “Communication”
7. Then you are ready to review the individual analysis and trending analysis – Section “Individual Test Analysis and Report” and “Trending Analysis” under Chapter “Data Analysis”

## OPERATION

### Login

When MCA software starts, the following screen pops up.



Use the default setting to log into the software:

**User ID:** Admin

**Password:** admin

*Note: It is always recommended not to change the password for the default user ID “Admin”. The user can always create different administrative accounts by logging into “Admin” account to perform all the software operations.*

### Main Screen

The main screen of the software shows up as shown below which is divided into seven domains which will be described in detail. The following is an overview:

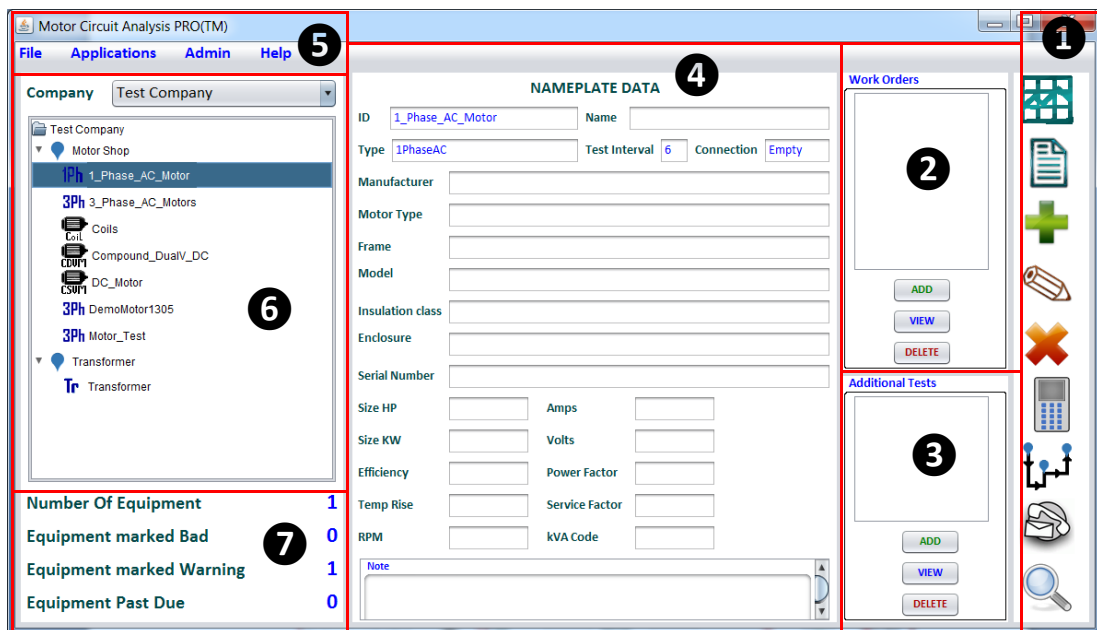


Figure 1: Main Screen

- ❶ - Commands include all the important data analysis functions.
- ❷ - Work Orders facilitate the device management by providing a platform so that details of work order on each device can be clarified.
- ❸ - Additional Tests provides a convenient way for users to record the test results on the same device from other methods, e.g. ESA test, vibration test, infrared test etc.
- ❹ - Nameplate lists the general information about the device being tested.
- ❺ - Menu bar provides convenience performing some relatively easy tasks, e.g. exporting test data, running other ATP products' application software, manage the user accounts and help.
- ❻ - Database structure consisting of Company, Location and Equipment. Different user accounts have different authorization on managing them.
- ❼ - Test Results Summary provides brief test status statistics on all the devices under each company or location.

## Motor File Commands

In area ❶ on Figure 1: Main Screen, There are 9 functional icons. Each of the functions are described below.

*NOTE: when you hold the mouse over the Icon, the corresponding name will appear.*

### Overview

The following is an overview of all the functional icons.

	<b>Analysis</b> (Analyze Test Results)
	<b>Reports</b> (Test Reports etc.)
	<b>Add</b> (Company, Location, Equip)
	<b>Edit</b> (Edit user entered information)
	<b>Delete</b> (Company, Location & Equip)
	<b>COM</b> (Communication with AT5)
	<b>Routes</b> (Create & Download routes)
	<b>Contacts</b> (View/Edit/Delete info of company)
	<b>Search</b> (Search Database)

### Add Company/Location/Equipment

Company, location and equipment must be created in the data base before any analysis or communication can be performed.

*NOTE: Users accounts are linked to a Company, see Section “Users”. Therefore, a Company must be set up first before a new User account can be created. Only administrative account can create and assign companies to Power account or Regular account. Power account and Regular account cannot create any company while they can create location or equipment under the company they belong to.*

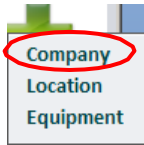
Also, if the user needs to download the test back into the instrument later or create a route consisting of this equipment, there are certain rules for creating the profile. See Section “Rules for Test Downloading” and Section “Rules for Route Downloading”.

#### Add Company

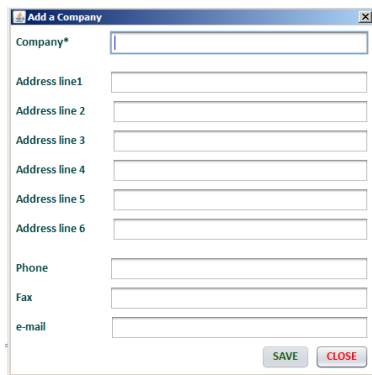
1. Click on the “Add” icon.



2. From the pull-down menu that appears mouse click on **Company**.

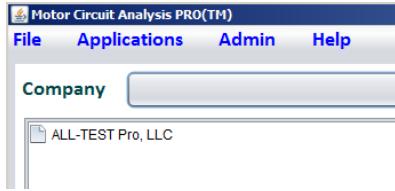


3. The screen shown below appears. The area marked with asterisk is mandatory field. Other lines are optional.



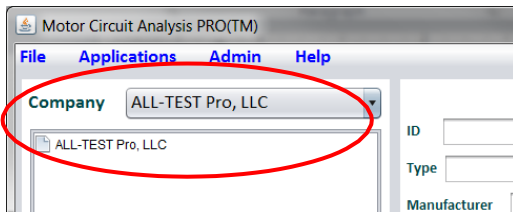
4. Enter the name of Your Company. The name appears in the Company entry box.
5. Click on **SAVE** to complete the 1<sup>st</sup> company set up.
6. The same window of “Add a Company” stays for the next company set up. After all companies are set up, click on “CLOSE” button to close the window.

Note the Company name will now appear on the main screen.



## Add Location

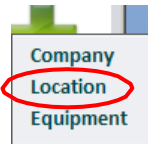
1. To add a location under a company, first select the company from the top menu of "Company\*".



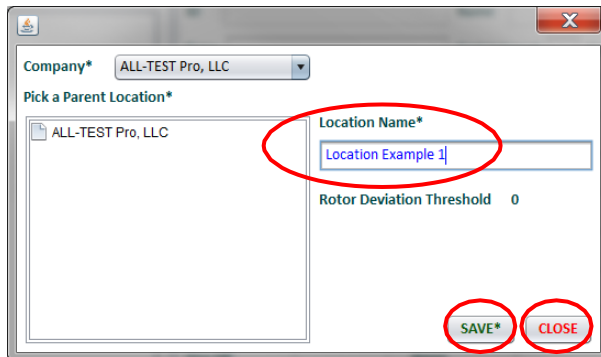
2. Click on the "Add" icon.



3. From the pull-down menu that appears, select **Location**.



4. The following window pops up. Fill in the "Location Name", then click on "SAVE\*" button. You can continue to add a location, then clicking on "SAVE\*" button. When all locations are added, click on "CLOSE" button.



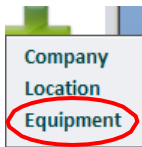


### Add Equipment

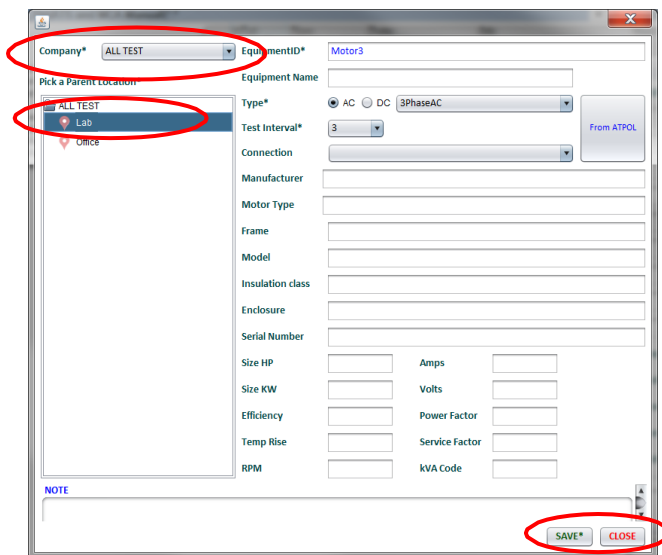
1. To add a piece of equipment, select the “Add” icon.



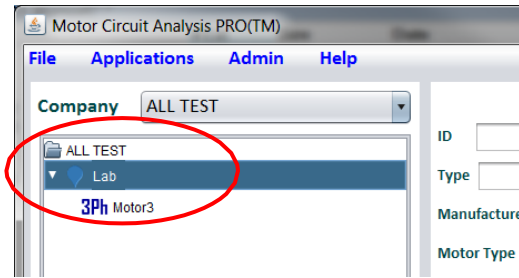
2. From the pull-down menu that appears, left click on **Equipment**.



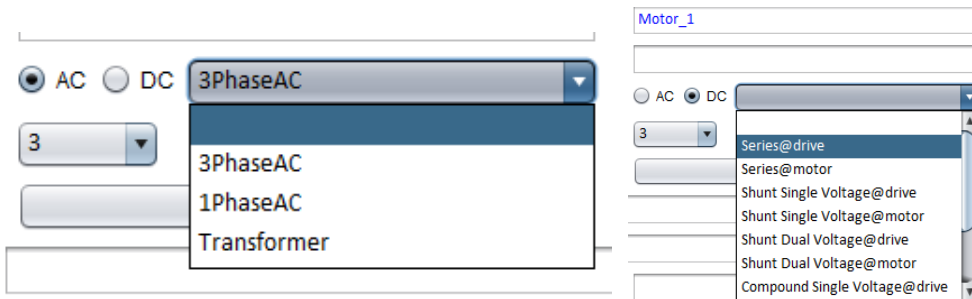
3. Left mouse click on the dropdown menu “Company\*” to select the company, then click on the locations where the equipment belongs to.



4. Fill in the information as shown above. The fields marked with “\*” are required to be filled. Then click on “SAVE\*” button. Multiple equipment can be created this way without exiting the present window. Once all equipment is added, click on “CLOSE” button. The database structure will look like the following.
5. Equipment information should consist of only letters A-Z, a-z, numbers 0-9, and/or underscore “\_”. Any other characters will not be downloaded correctly. It is recommended to use only capital letters when creating equipment. For example, creating a piece of equipment using “XYZ” instead of “xyz”.



*Note: Only one type can be selected for each equipment. The correct type of equipment must be selected properly. Otherwise, the proper data uploaded from the instrument will not be able to map to the equipment properly. The following are the screenshots on the types of AC and DC equipment.*



*Note: Under the same company, two pieces of equipment cannot have the same name. The equipment name is case sensitive. For example, equipment named “ABC” is different from equipment name “abc”.*

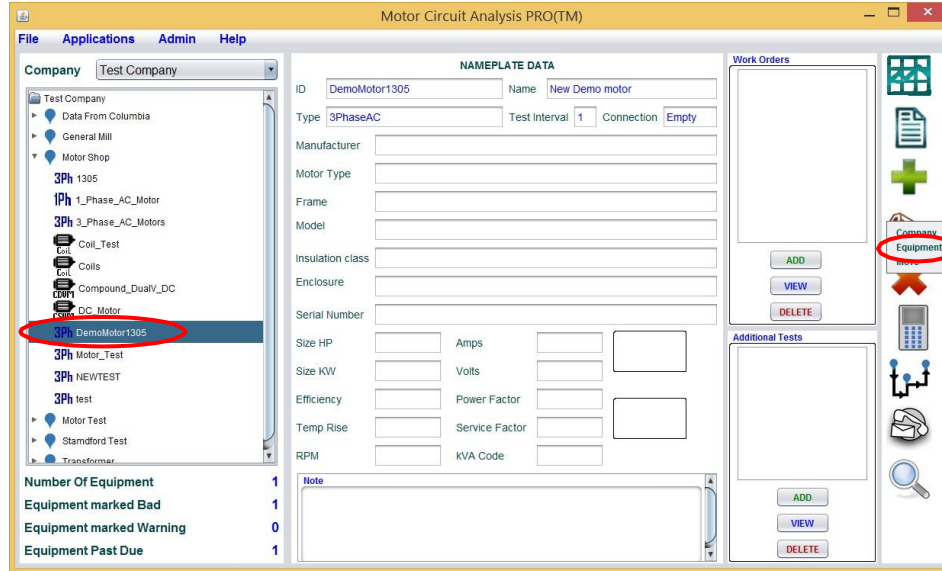
### Add Images

For each piece of equipment created, multiple images can be added to the equipment profile while up to two images can be incorporated into the test report.

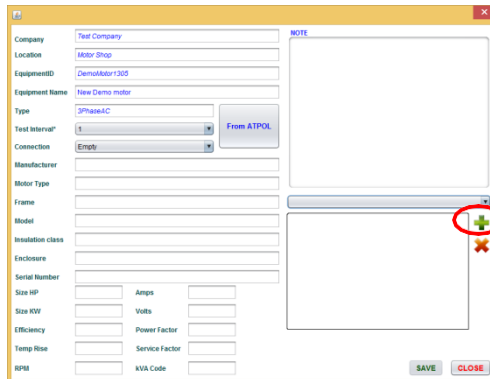
**Note:** Adding images can increase the software database file size significantly which may lead to issues with opening or running the software normally.

To add images:

1. Select on the equipment by left mouse clicking on it, then right clicking on the Edit icon and selecting “Equipment”.



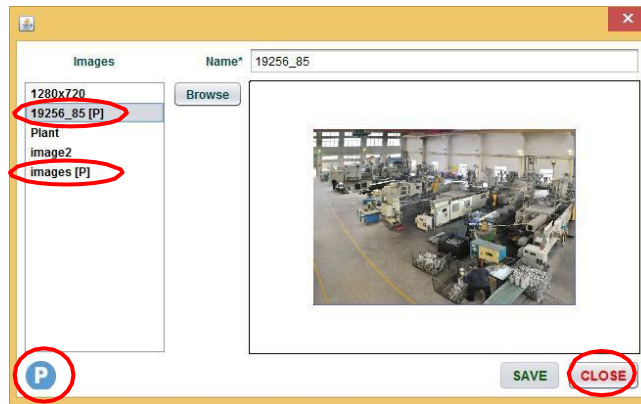
2. Click on the “+” icon on the right lower part.



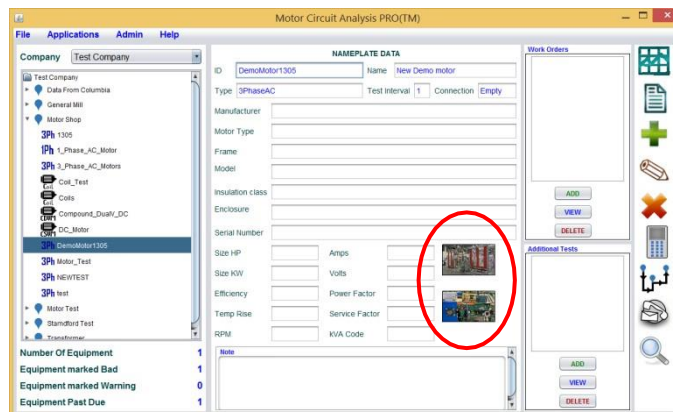
3. Click on “Browse” button, select the image file, then click on “SAVE\*” button to save the images.
  - a. If the file name includes characters other than letters, numbers or \_, then the file name needs to be changed. Duplicate name is not accepted.
  - b. While as many as images can be uploaded, large size images will slow down the software running.



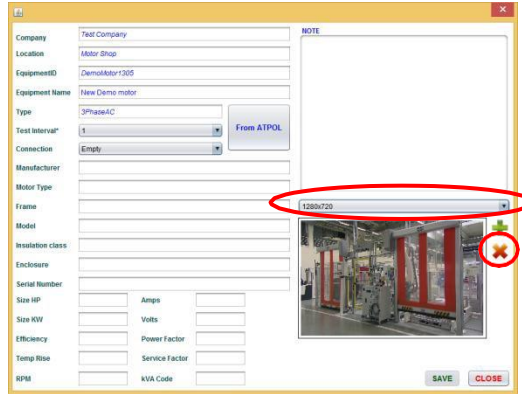
- To select up to two images to be included in the report, pick up the image name, then click on the “P” button below which will mark the image name with “[P]”. If the user wants to change the image selected, simply choose the image name and click on “P” button again to remove the selection.



- Click on “CLOSE” to exit the image selection window, as shown above. Then the two images selected for report will show up along with the NAMEPLATE DATA. Clicking on either one will pop up a window showing the full image.



- To delete certain images, use the dropdown bar to select the image first, then click on the delete button “X” as circled below.



- An example of report with two images is shown below. The user can always save it in MS Word version and edit the images.



## Communication

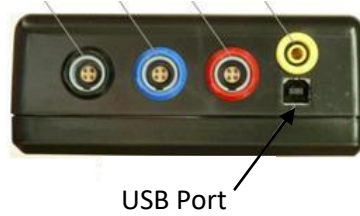
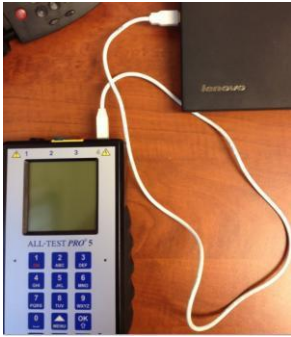
The communication icon provides functions of uploading data from the instruments to the MCA software, mapping test data to corresponding equipment and erase the whole memory.

Note:

- To download individual test's TVS REF from software to instrument, please refer to the Section "Download TVS data into Instrument"
- To download a route from software to instrument, please refer to the Section "Download a Route"

## Upload Data from Instrument

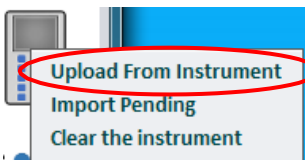
- Connect the instrument to the PC using the supplied USB to PC cable.



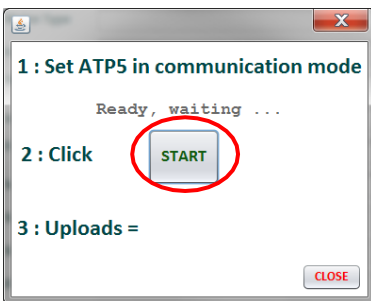
2. Click on the instrument communication icon



3. From the pull-down menu select "Upload from Instrument"

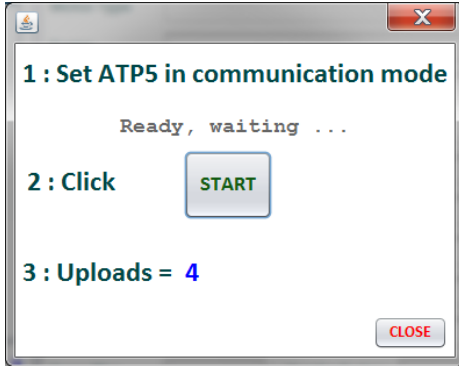


4. Make sure instrument is set in Communication mode (Refer to the instruments user manual), then click on "START" button below.



*Note: A company must be assigned to user before uploading can be performed. Please refer to Section "Users" on how to create a user and assign company to it.*

5. Once the uploading is completed, it will show the number of test records uploaded while the instrument is discharged from communication mode.



*Note: all test data uploaded from instrument are stored only under the company which has been assigned to the current user. The test data is not available in other companies' database.*

### Invalid Test Upload

Occasionally some test records with invalid information can exist in the instrument. Those invalid test records will not be uploaded into the software. For example, if there are 603 test records saved in the instrument while 3 of them are invalid, then there will be 600 test records uploaded into the software in total.

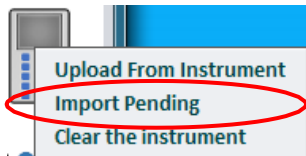
***To locate the invalid tests in the instrument, the user can find a log file "BadRecords.txt" saved under the "logs" folder at the software installation directory, e.g. in Windows 7 it is located at "c:\Program Files (x86)\MCA\logs\BadRecords.txt ". In the file it shows the index number of the invalid test records saved in the instrument to help the users to locate and check those invalid test records if necessary. For example, if it shows "BAD INDEX:479 --> testid ... ..", then it means the test with index 479 in the instrument is an invalid test record. Each invalid test is noted in a separate line in the file.***

### Map Data to Equipment

1. Click on the instrument communication icon

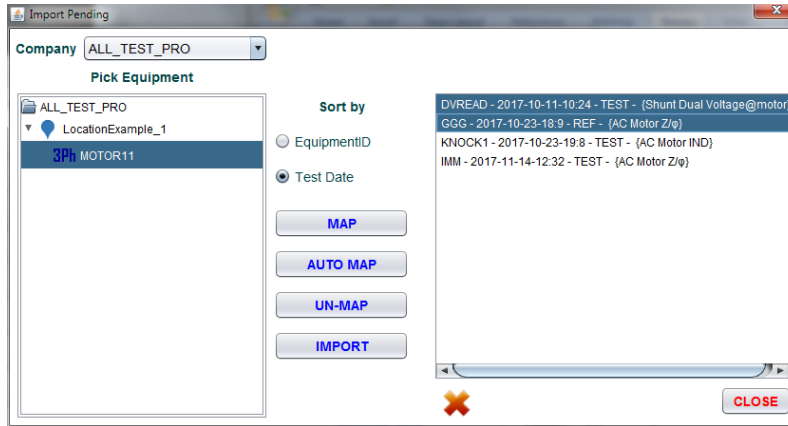


2. From the pull-down menu select "Import Pending"

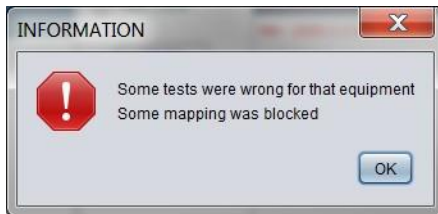


3. First select the instrument on the left screen, then select the test data on the right screen. To select multiple test data, use Ctrl + Mouse left click, or use Shift + Mouse left click on two

test data which will select all the test records between the two-test data. Clicking on “Test Date” will sort all test data in chronological order.



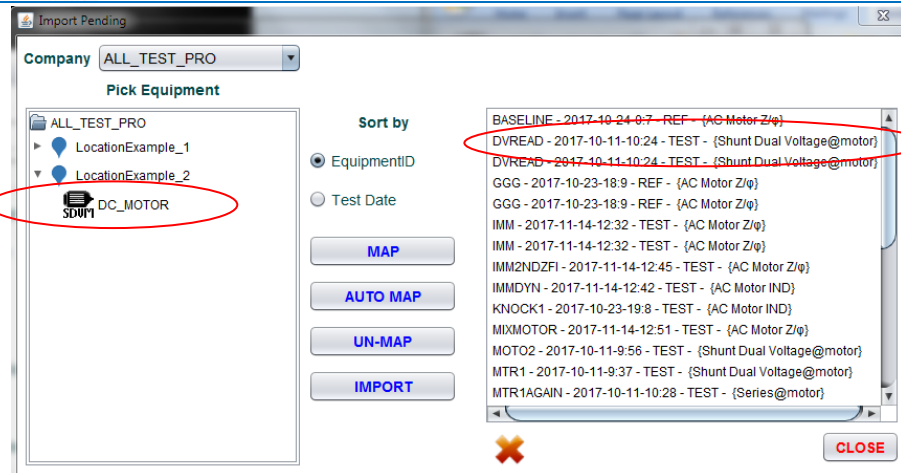
*Note: the test data type can only be mapped to certain equipment. See “Mapping Rule” below. Otherwise, an error message will show up without data mapping performed as shown below.*



## Mapping Rule

1. For 3 Phase AC equipment, test data of AC Motor IND, AC Motor DYN and AC Motor Z/φ can be mapped
2. For other equipment, only the same type of test data can be mapped. For example, for Shunt Single Voltage motor tested at Drive, only the test data of the same type can be mapped. For 1 Phase AC equipment, only 1 Phase AC data can be mapped.
3. When there are many data displayed on the right screen, as shown in the example below, the type of test is labeled at the end of each test record, for example, “Shunt Single Voltage@drive” has to be mapped to an equipment on the right screen showing “DC\_Motor” with SSVD abbreviation, as circled below.





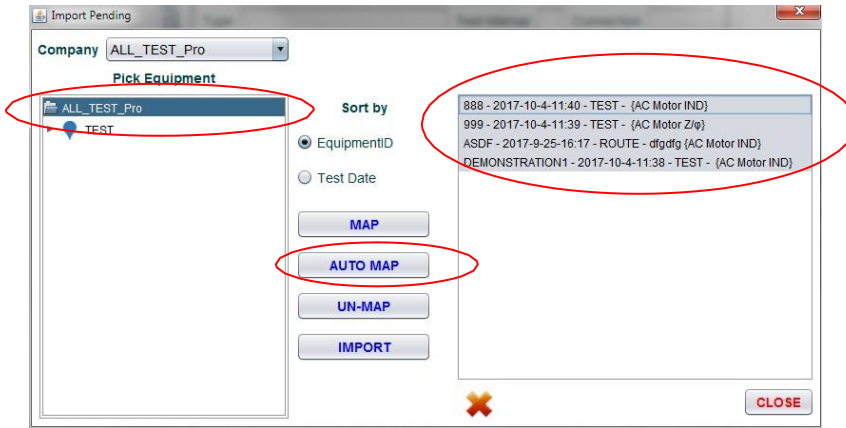
4. After tests are selected, click on “MAP” button, those files will show up in blue color. Then click on “IMPORT” button. All tests will be mapped to the corresponding equipment on the left and removed from the right screen.



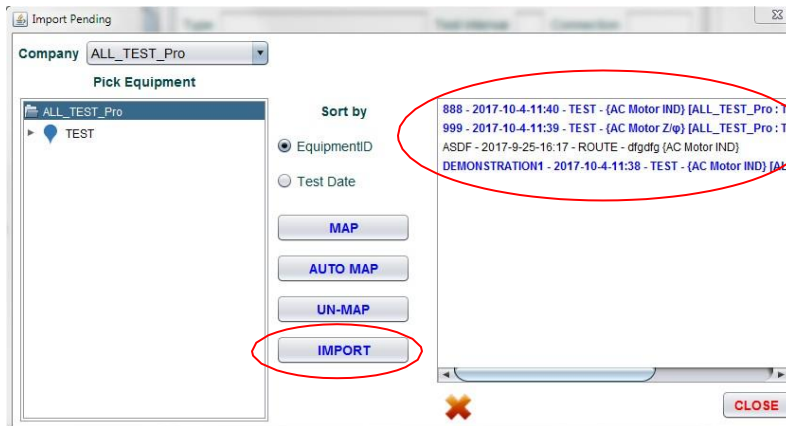
*Note: if the same tests have been uploaded multiple times, then the same test with same Equipment ID and Test Data will show up on the list multiple times on the right screen. To remove redundant test records, users can select those tests first according to #3 above, then click on “X” located on the lower right screen above.*

## Auto Map Data to Equipment

The same rules apply when mapping individual test data, see *Add Equipment*. All data saved in the instrument with the exact Equipment ID name in the database will automatically map to the equipment. When the Auto Map feature is utilized it is recommended that the piece of equipment in the database be created using only capital letters, numbers, and/or under score (\_).



1. Select the entire Company or Location to Auto Map on the left.
2. Then highlight the entire list with a left mouse click at the top and hold the shift key and left click on the last test on the import pending table and select "Auto Map".



3. All data that is an exact match will automatically turn blue. *Any data that is not an exact match will remain black and stay on the import pending table. This data must be imported individually, See Map Data To Equipment.*
4. Press the Import button. All data highlighted in blue before are removed from the Import Pending Table and are now moved to the equipment in the database. *Auto Map feature ignores capital letters when mapping. If a piece of equipment has an exact name but*

*different capital letters are used it will map to the all capital entry first. For example, DEMO will be mapped first, and Demo will be the next piece of equipment to be mapped.*

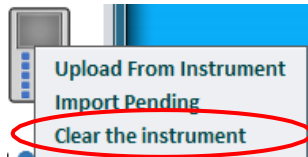
**Clear Instrument Memory**

In certain cases, users need to clear all the data on the instrument, then this function provides the operation since the instrument itself can delete the test data one by one which can be time consuming to clear the whole memory.

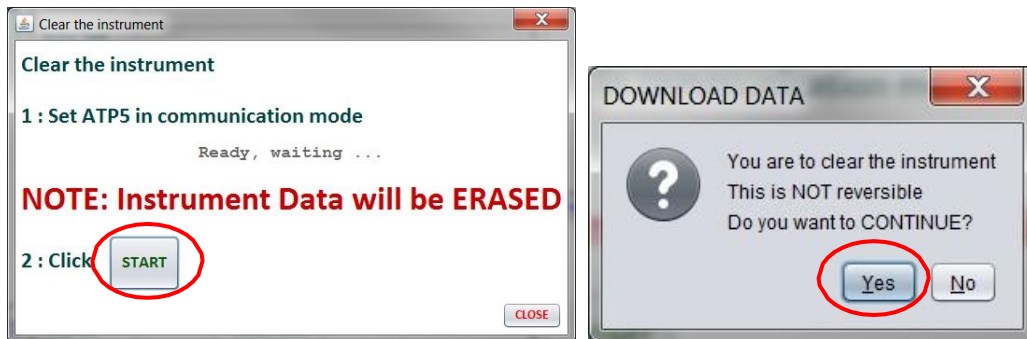
1. Click on the instrument communication icon



2. From the pull-down menu select “Clear the Instrument”

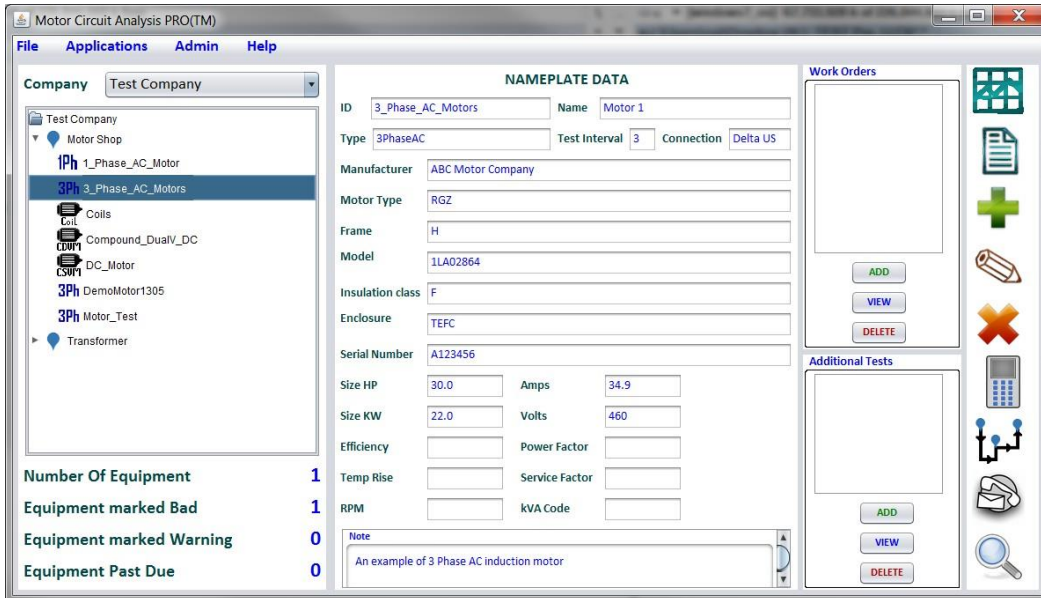


3. Make sure instrument is set in Communication mode (Refer to instruments user manual), then click on “START” button on the left screen below, then confirm it by clicking on “Yes” on the right screen.



**Data Analysis**

*Once data is uploaded and mapped to the proper equipment, users can start to analyze the data. To view and analyze the test data mapped to an equipment, first users need to select the proper company, location, and equipment on the left screen shown below. Some of the nameplate information can be modified by clicking on the “Edit” icon. For details, please see Section “Edit”.*



With the equipment selected and highlighted, click on the “Analysis” icon located on the top right column of the main screen.



**Analysis Icon**

## Individual Test Analysis and Report

### 3 Phase AC Motor Test

The following is an example of 3 Phase AC motor test.

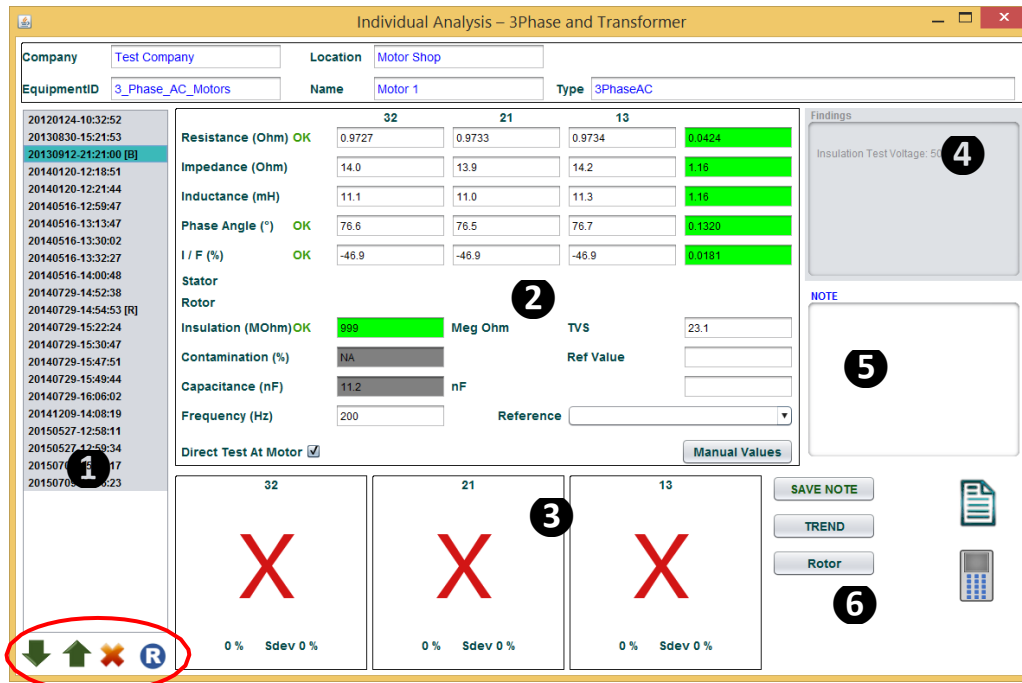


Figure 2 An Example of individual analysis on 3 Phase AC Motor

To view a specific individual test results, first click on the test record listed in Area 1 - the test results will be displayed in Area 2. Area 3 will display the dynamic test results when it's available, i.e. when the test type is AC Motor IND or AC Motor DYN. Area 4 displays the findings based on the test data. On the bottom of the finding, the type of test is labeled. In the example shown above, it is "AC Motor Z/φ" type of test. Users have the option to make note on this individual test at Area 5 and save it by clicking on "SAVE NOTE" button below the area. Area 6 includes Trending Analysis ("TREND") and Rotor test ("Rotor") which will be described in later sections.

### Operation on Test Data

Four buttons are provided on the bottom of Area 1:



1. The upward and downward arrows are used to select the test data as a baseline to be used for trending analysis. The baseline test will be marked with "[B]".
2. To delete a test record, select it first, then click on "X" located on the bottom of Area 1.
3. The "R" label is used to choose a test as the reference test to be downloaded into the instrument along with a route which includes the equipment. It provides convenience for users to compare the existing test data with the new test performed in a route for the same equipment. The user has the option to download the reference test into the instrument or not when downloading the route. Refer to Section "Download a Route into instrument".

## Test Data Display

The Area ② displays the individual test data. For trending analysis on multiple test data, please refer to Section “Trending Analysis”.

1. Meaning of the color of the last column is based on the internal calculation
  - a. **Green**: OK
  - b. **Yellow**: WARN
  - c. **Red**: BAD

	32	21	13	
Resistance (Ohm)	0.960	0.960	0.960	0.009
Impedance (Ohm)	14.0	14.2	13.8	1.47
Inductance (mH)	11.1	11.3	10.9	1.46
Phase Angle (°)	76.5	76.6	76.2	0.213
I / F (%)	-46.7	-46.8	-46.7	0.049
Stator				
Rotor				

2. The OK/WARN/BAD right after each parameter comes from the instrument which should be consistent with the calculation performed in the software as shown in #1 above.
3. NA: When it shows in the measurement results field, it means either the corresponding test is not performed, or the measurement is out of range.

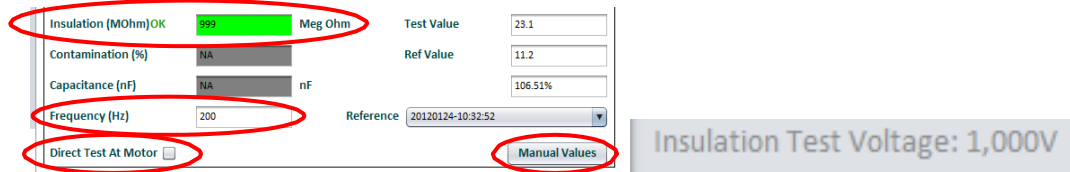
*Note: Sometimes the software will show NA while the instrument displays the value. In such case, keep in mind that the test values on instrument may not be reliable.*

4. The TVS is displayed on the bottom left corner of Area ②, as shown below. The TVS of current test is displayed as “Test Value”. The Reference TVS can be selected in the pull-down menu of “Reference” with corresponding TVS displayed in “Ref Value”. The absolute deviation of TVS is displayed as percentage.

n	Test Value	23.1
	Ref Value	119
		80.62%
Reference	<div style="border: 1px solid black; padding: 2px;">           20140120-12:18:51            20120124-10:32:52            20120124-10:32:52            20130912-21:21:00            20140120-12:18:51            20140120-12:21:44            20140516-12:59:47            20140516-13:13:47            20140516-13:30:02         </div>	

5. Insulation Test

- a. The “Insulation (MOhm)” circled below is uploaded from instrument memory. The test voltage of 500 V or 1,000V is displayed in Area 4 Findings, as shown on the right screen below.



- b. The software also gives an option for users to input the insulation to ground test from other instruments by clicking on “Manual Values” button.



- c. The manual input option requires the users to put the resistance, test voltage and the diagnostic conclusion of OK, WARN or BAD. The “Insulation (GOhm)” and test voltage displayed in Findings on the Individual Analysis screen (Figure 2) will be changed accordingly.

**Note:** Users’ manual input will override the insulation test results from the instrument, i.e. color of the data field as well as the diagnostics conclusion will be based on the users’ input instead of instrument. For example, even if a test from the instrument shows insulation resistance “>5” Gig Ohm and status is “OK” in green, after a user manually inputs “4” Meg Ohm and status of “Bad”, then the software will show red color highlighting the data field and status of “Bad”. The report also uses the manual input value.

- d. In case the user wants to remove the manual input, values and resume the original test data, simply remove all the manually input values and make those fields empty, then click on “SAVE” button.

6. Frequency

It displays the test frequency corresponding to the present test data

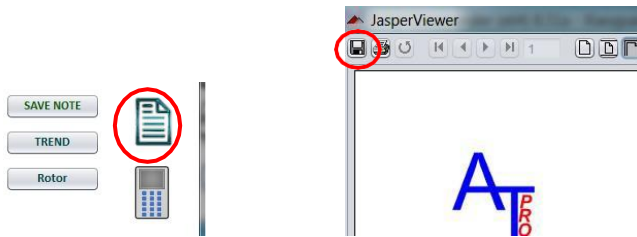
7. Direct Test at Motor

If the test is performed directly on the motor, then check this box. Otherwise, leave it empty. When there is certain unbalance for the measurements, the first thing to make sure is if the significant deviation comes from the motor under test or other factors, e.g. remote

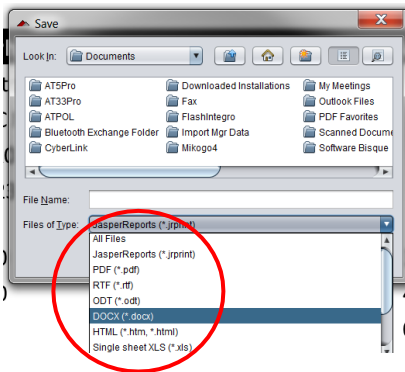
measurement on motor drive can contribute to the deviation. So, it is always recommended to perform the test directly on motor.

## Report

On the bottom right corner of Individual Analysis screen Figure 2, clicking on the report icon as circled below will pop up the individual analysis report window.



Clicking on the “SAVE” button as shown on the right screen above will provide the different saving options including PDF or MS Word DOCX files.

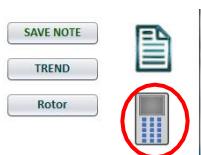


The report includes all the nameplate information, test data, findings and notes made by the users. If the users only need nameplate information, please refer to the Report icon function “Print Selected Equipment” for print options.

To add images to a report, please refer to Section “Add Images”.

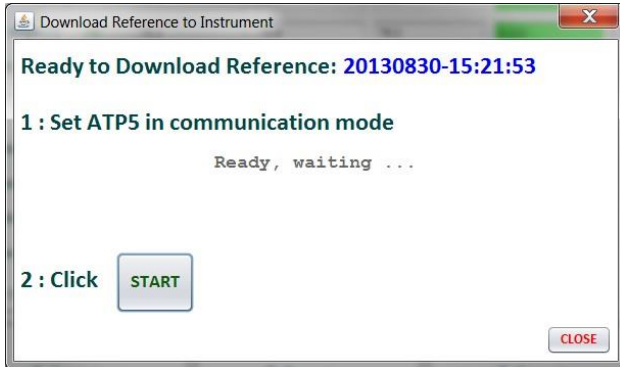
## Download TVS data into the Instrument

The software also provides the option to download the TVS for a test record back to instrument as a baseline for comparison with new test data. The download icon is located below the Report icon, as circled below.



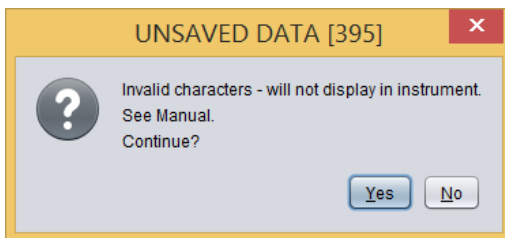


The following window shows up after clicking on the icon. Then click on “START” button to start the process.



*Note: Only TVS value is downloaded into the instrument for comparison purpose.*

After clicking on START, the software will check the syntax of the test’s profile. If any of the characters will not be displayed on the instrument correctly after being downloaded, the following message shows up. The user can choose “No” to stop the downloading or choose “Yes” to continue anyway. The test will still be downloaded into the instrument and TVS value will still be available as reference while the equipment’s profile info, e.g. ID, location and company may have invalid characters.



Please refer to Section “MCA Software in Multiple Languages” for more details.

### Rules for Test Downloading

When a test record is downloaded back into the instrument , it will include:

- 1) Location
- 2) EquipmentID
- 3) Motor Type

This information should consist of only letters A-Z, a-z, numbers 0-9 and under score “\_”. Any other characters will not be downloaded correctly. So, when users create the profile, see the Section “Add Company/Location/Equipment” these rules must be followed for downloading purpose.

## Transformer Test (AT7 PROFESSIONAL)

The 3 Phase transformer test uses the same screen as a 3 Phase motor test. There are not dynamic tests available for transformer test. Also, the diagnostic rule is different from motor test results analysis.

## DC and 1 Phase AC Motor Test (AT7 PROFESSIONAL)

An example of the individual analysis screen is shown below. It displays all the test data. Only the Insulation and Contamination test data are analyzed for the individual analysis. Please see Section “DC and 1 Phase AC Trend” for more details.

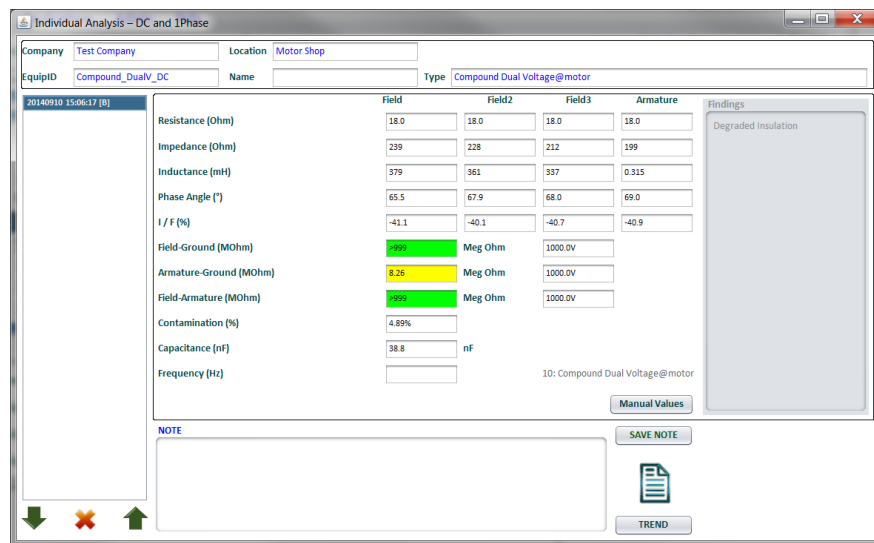
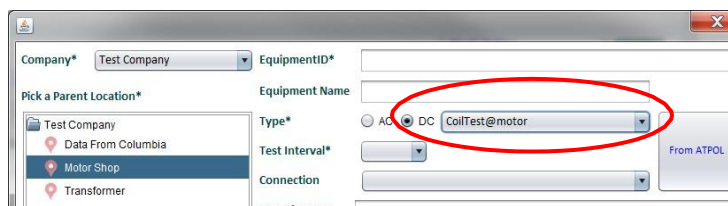


Figure 3 An example of individual analysis for a Compound Dual Voltage DC test

## COIL Test

### (AT7 PROFESSIONAL)

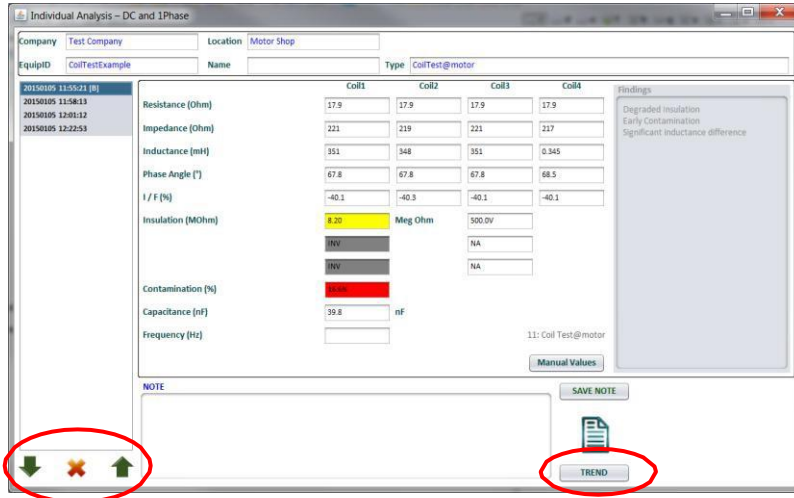
Like all other equipment, the equipment of “CoilTest@motor” must be created firstly before any coil analysis can be performed. As shown below, the user must choose “DC” type of test first.



There are two types of analysis available: individual analysis and trend analysis.

### Individual Analysis

Up to 4 coils can be compared in the individual analysis. The physical quantities for comparison include resistance, impedance, inductance, phase angle and I/F. It also performs analysis on contamination and insulation resistance values, as shown in the example below.



### Trend Analysis for Coil Tests

The trending analysis for AC or DC motors analyzes trending of different physical quantities over time which will be discussed in detail in next Section: Trending Analysis. The present discussion is only limited to the coil test trending which can be trended the same way as AC or DC motor. In addition, another important application is to compare different coils when there are more than 4 coils which is the maximum number of coils for one test.

The trending function analyzes and compares the baseline data and the latest test data. Therefore, multiple baseline data may need to be chosen so that all coils can be compared. The arrows for users to choose baseline are circled on the left bottom of the screenshot above.

*Note: For trending purpose the number of coils for each test must be the same. Also, the available coils in any one set of tests must follow the numerical order. For example, in one test there are 2 coils tested, then the two coils must be the #1 and #2 coils and cannot be tested and saved as #3 and #4 coils while skipping Coil #1 and #2.*

The trending function for coil test can be accessed by pressing on the “TREND” button as circled on the right bottom corner of the screenshot above.

### Trending Analysis

The following steps are based on 3 Phase AC motor, however, the way to analyze trending or create report for DC, 1 Phase AC Motor or transformers is similar to a 3 Phase AC Motor.

Before trending analysis, a test record has to be set as a baseline by using upward/downward arrow located on the bottom of Area ① on Figure 2. The test record set as baseline will be marked with “[B]”. Different baseline test data will lead to different findings.

An example of trending curves for 3 Phase AC motor is shown in Figure 4 below. To plot the curves of the trending, select test records on the left. Multiple test records can be chosen by using Ctrl + Left Mouse Click or Shift + Left Mouse Click. Then check the parameters to be plotted. The status indication of OK/WARN/BAD located to the left the parameters column come from the trending analysis.

In the Findings field located on the right of the screen, all findings are displayed disregarding what parameters or test records are selected to be plotted.

For certain test record, some test data may not be available, either no tested or not exist, e.g. 3 AC IND test does not include Phase Angle data, those data will be skipped on the curves.

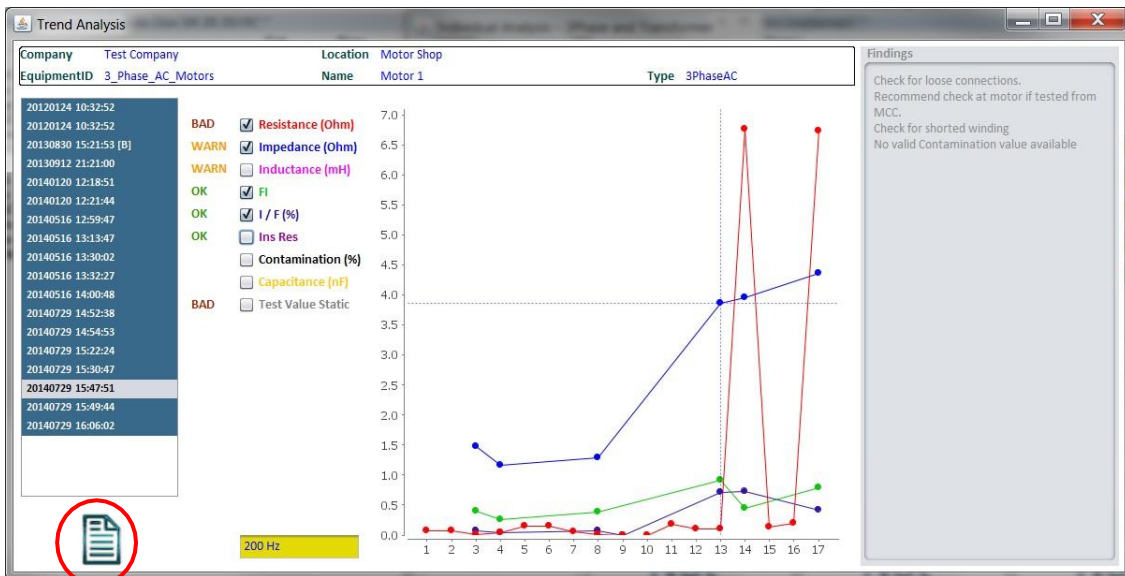


Figure 4 An example of trending analysis for a 3 Phase AC Motor

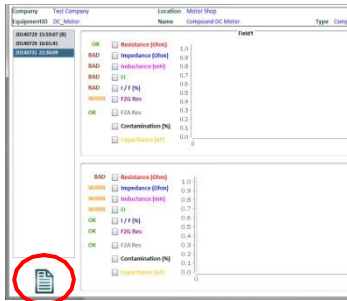
Mouse left clicking on a data point on the curve will display dashed cross lines so that the coordinates of the data points can be located accurately. To amplify a part of the curve, hold left mouse from left to right to draw a rectangular shadow over the region. To resume the zoom, hold right mouse from right to left on any part of the graph.

### DC and 1 Phase AC Trend (AT7 PROFESSIONAL)

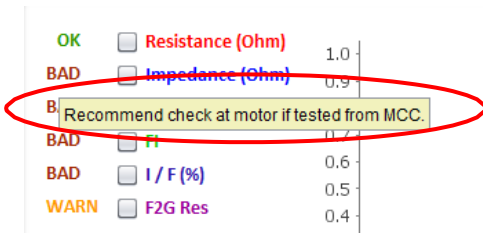
For DC and 1 Phase AC Trending plot, it always plots based on all available data points for any selected parameter. no matter if the users select any data or not. The diagnostic is also based on the full set of data.

In case of DC or 1 Phase AC trending, the “Findings” will not be displayed on the screen due to the limited space. There are two ways to review the trending-based findings:

1. Create a report by clicking on the “Report” button as shown below



2. Put mouse over the “BAD” or “WARN” alarms next the parameter, the message will show up. An example is shown below with mouse over “BAD” from “Inductance”.



### Report

To get a report based on trending analysis, click on the report icon located on the bottom of Figure 4. To save the report to different format, refer to the Section “Report” under Chapter “Individual Test Analysis and Report/3 Phase AC Motor Test”. Add images to the report, please refer to Section “Add Images”.

### Rotor test (AT7 PROFESSIONAL)

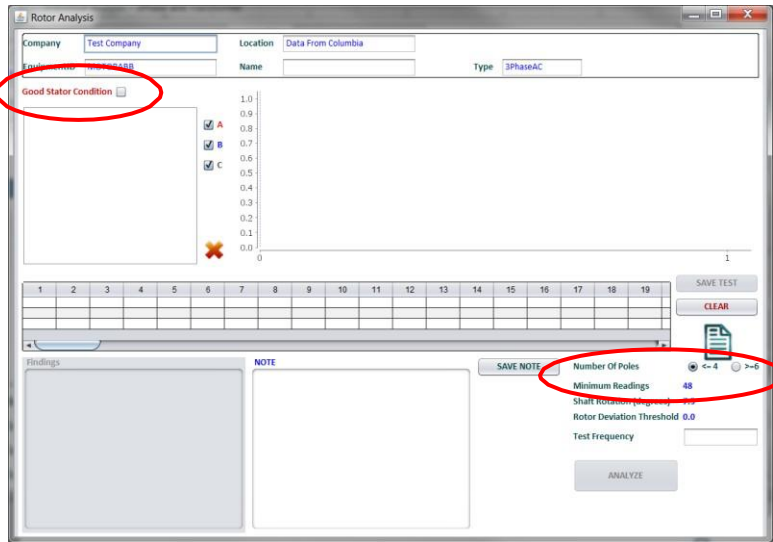
Basically, rotor test performs inductance test on all three phases at the same rotor position. Then rotor is rotated to a different position and the inductance is measured again on the three phases. This test continues for a full turn of rotor. For the detailed test procedures to perform rotor test, please refer to the instrument’s user manual.

By clicking on the “Rotor” button in Area ⑥ of the Individual Analysis screen Figure 2 will pop up the rotor test window.

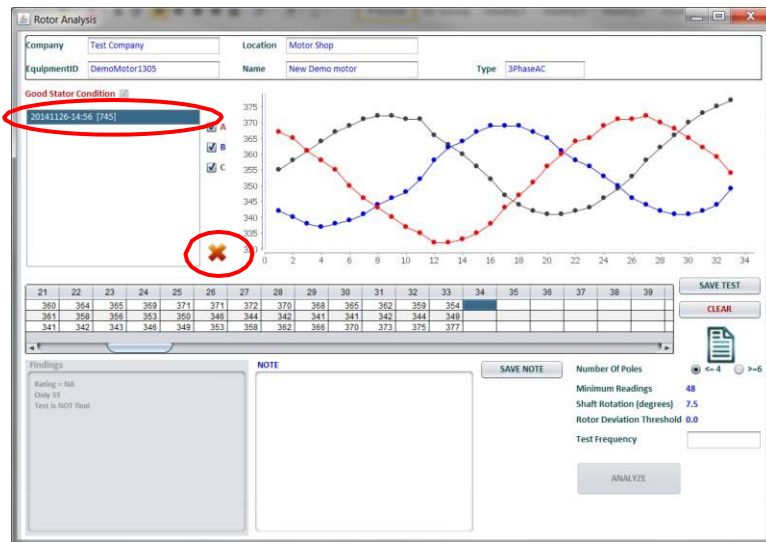
The number of rotor test data depends on the pole number of the motor. First, the user must choose the number of poles, as shown below. For motor with 4 poles or less, minimum number of 48 sets of data are required. For motor with 6 poles or more, minimum number of 72 sets of

data are required. Then manually input all the data on the table. Up to 180 sets of data can be input.

*Note: Currently the user can select and copy the rotor test data from MCA software to other spreadsheet software, however, cannot copy from the other software to the MCA software.*



Before the rotor test is performed to diagnose problems with rotor, the user must make sure the stator is good first. In such case, check the box “Good Stator Condition” box as circled above.



While the data being input, the rotor curves are drawn at the same time. If there is any peculiar data shown up on the curve, please double check the accuracy of the data input.

The data can be saved by clicking on “SAVE TEST” button during input to avoid data loss.

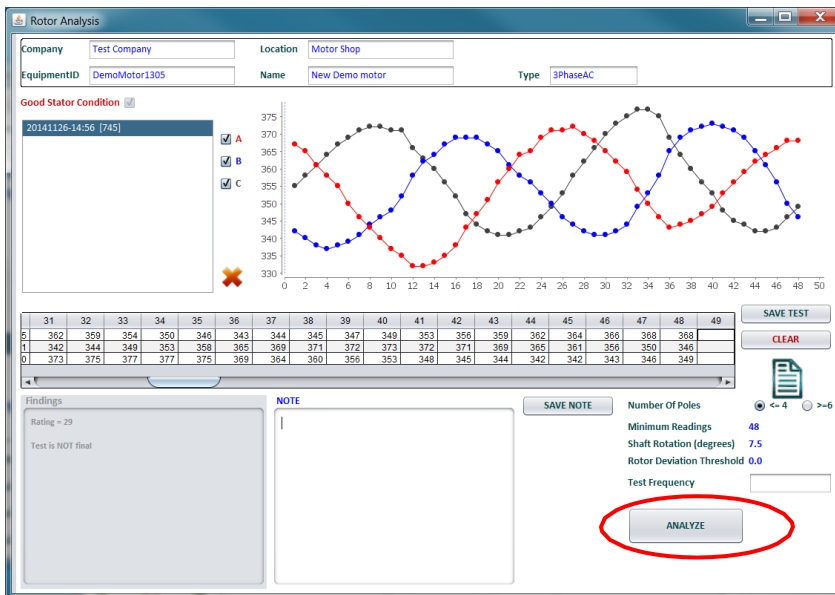
Highlight the test data first before saving it to make sure the data is updated on the same file.

Otherwise, multiple files will be saved. Of course, the user can always select the files and delete them by clicking on the “X” button as circled above.

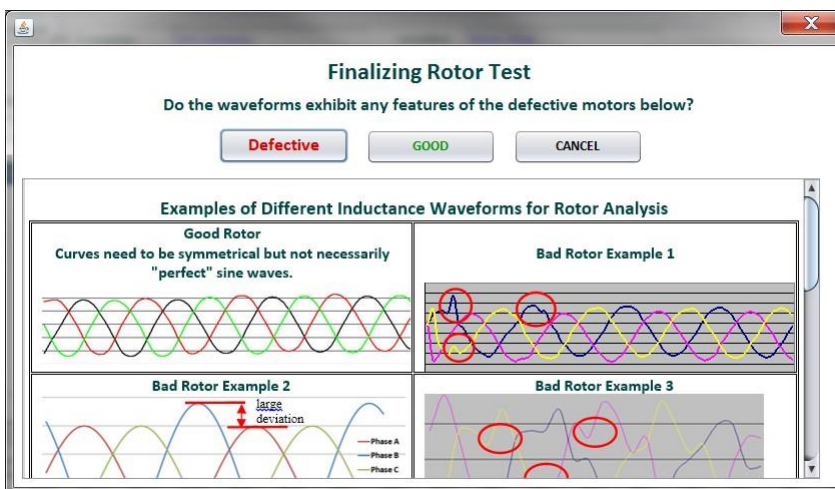
There is also an option of input “Test frequency” located on the right bottom of the screen which help the user to recall the test frequency used when it comes to next rotor test.

Once all data are input, click on “ANALYZE” button.

*Note: the “ANALYZE” button will be activated only after a minimum number of data has been input.*

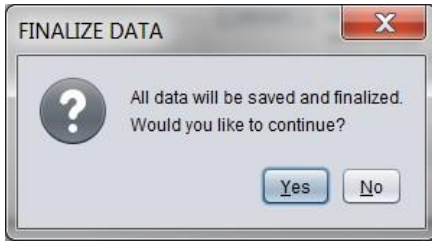


Next, the software needs the user’s input about the condition of the rotor as a supplementary information in addition to the automatic rating calculation performed by the software. Some examples are displayed to help the user to compare the existing rotor curves to the problematic rotor curves to make a decision.



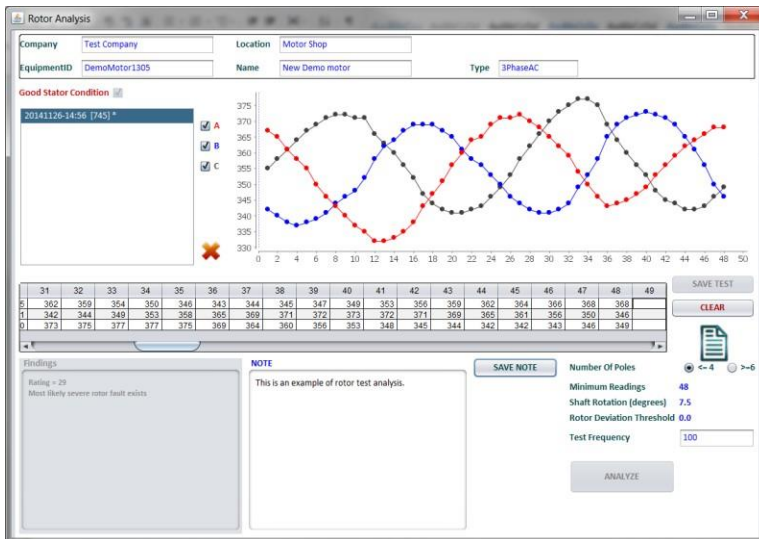


The following window pops up, click on “Yes” if all data has been input correctly.



*Note: once “Yes” button is clicked on, all data will be finalized, which means no further modification including changing data or adding data will be allowed. If the user wants to go back to edit the test data, click on “No” button.*

As an example, “Defective” button is pressed and the final screen with findings are shown below.



In certain cases, the finding provides low influence inductance warning. It means the inductance variations at different rotor positions are so small that the findings may not be accurate. The threshold to determine if the motor is at low influence is set on the pull-down menu “Admin”. Only administrative account users can change it. Please refer to the section Default Rotor Deviation Threshold.

The user can make any note any time and pressing “SAVE NOTE” button to save it along with the rotor test data.

To input the data from another rotor test for the same motor, click on “CLEAR” button to clear the table, but the saved data file will not be changed.



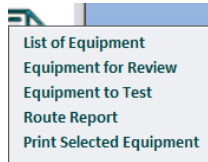
**Reports**

In addition to the test reports for individual test analysis and trending analysis in Data Analysis chapter, five additional reports are available.

To access the reports options, select the “Report” icon and then perform a right mouse click. Select the report type from the menu.



**Report Icon**



**Mouse right click on report icon**

**List of Equipment**

This function provides a list of chosen equipment. As shown in the example below, it lists Equipment name with location (Path: xxx), type of equipment, number of test data (TDs), power rating (HP), test interval (TI), voltage rating (Volt), name of motor and manufacturer.



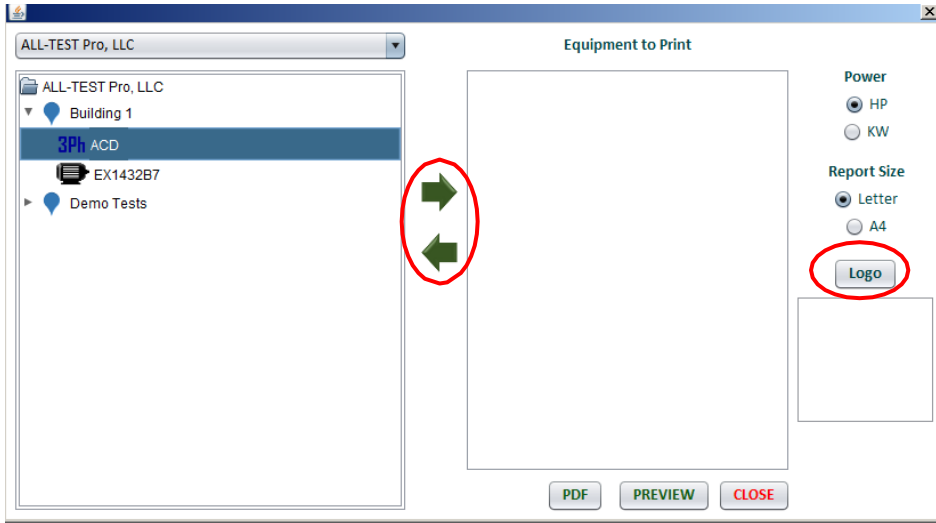
**List of Equipment - asdf asdf**

Equipment	Type	TDs	HP	TI	Volt	Name	Manufacturer
Path: Motor Shop							
1305	3PhaseAC	2		3			
1_Phase_AC_Mo	1PhaseAC	3		5			
3_Phase_AC_Mo	3PhaseAC	18	30.0	3	460.0	Motor 1	ABC Motor Company
Coils	CoilTest@motor	2		6			
Compound_Dual	Compound Dual	1		1	475.0		XXX
DC_Motor	Compound Single	3		4		Compound DC Motor	
DemoMotor1305	3PhaseAC	4		1		New Demo motor	
Motor_Test	3PhaseAC	6		1			
test	3PhaseAC	2		1		asdfasdf	

Equipment Count: 9

The report can be saved in various format in the same way as described in Section “Report”.

To select the proper equipment to be listed, first select the desired company, location or equipment(s), then use the Right and Left Arrows in the middle of the screenshot below to add to the list located as the right screen.



Users also have the option to choose power unit, HP or kW and Report Size, letter or A4. “Logo” button also provides an option for users to add their customized logo image onto the report.

## Equipment for Review

This function summarizes the WARN or/and BAD status from Individual Analysis or/and Trend for all the equipment listed.

*Note: the WARN or BAD status come from the latest test data only. Any tests performed earlier are not counted.*

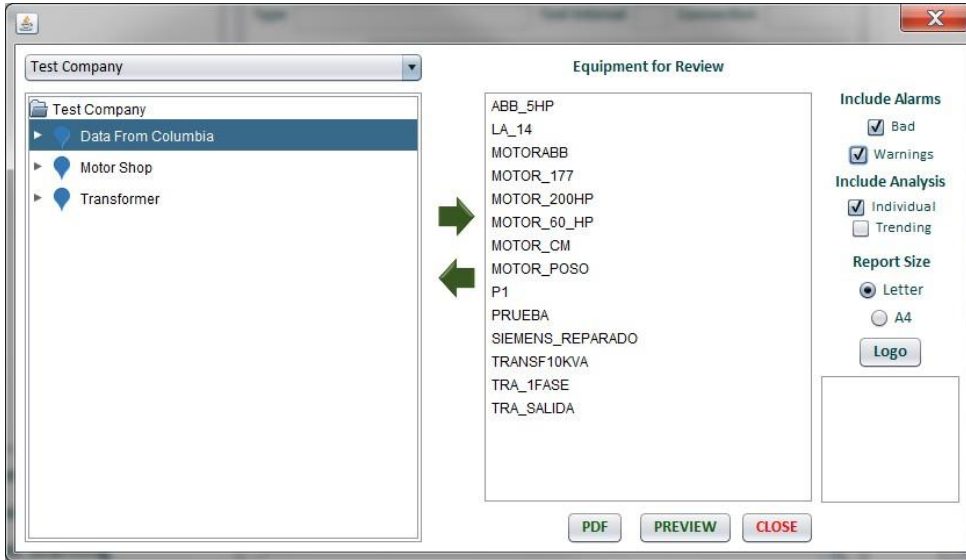


### Equipment for Review - Test Company

Equipment	Type	Name	Bad		Warnings	
			Individ	Trend	Individ	Trend
Path: Data From Columbia						
ABB_5HP	3PhaseAC		0	0	0	0
LA_14	3PhaseAC		3	3	3	0
MOTORABB	3PhaseAC		1	4	0	0
MOTOR_177	3PhaseAC		0	0	0	0
MOTOR_200HP	3PhaseAC		0	0	3	0
MOTOR_60_HP	3PhaseAC		0	0	0	0
MOTOR_CM	3PhaseAC		1	2	0	0
MOTOR_POSO	3PhaseAC		1	0	2	0
P1	3PhaseAC		0	0	0	0
PRUEBA	3PhaseAC		0	0	0	0
SIEMENS_REPAR	3PhaseAC		2	0	0	0
TRANSF10KVA	Transformer		1	0	1	0
TRA_1FASE	1PhaseAC		1	0	0	0
TRA_SALIDA	1PhaseAC		1	0	0	0

Equipment Count: 14

The steps to choose the equipment or save the report are exactly the same in Section “List of Equipment” as described above. On the other hand, the software offers the flexibility for the users to choose either or both alarm type, analysis type and report size.



**Equipment to Test**

When the users want to review if any equipment is due for testing, this function gives a full list of equipment name, type, last test date, test interval (TI) and the number of days the test has been late.



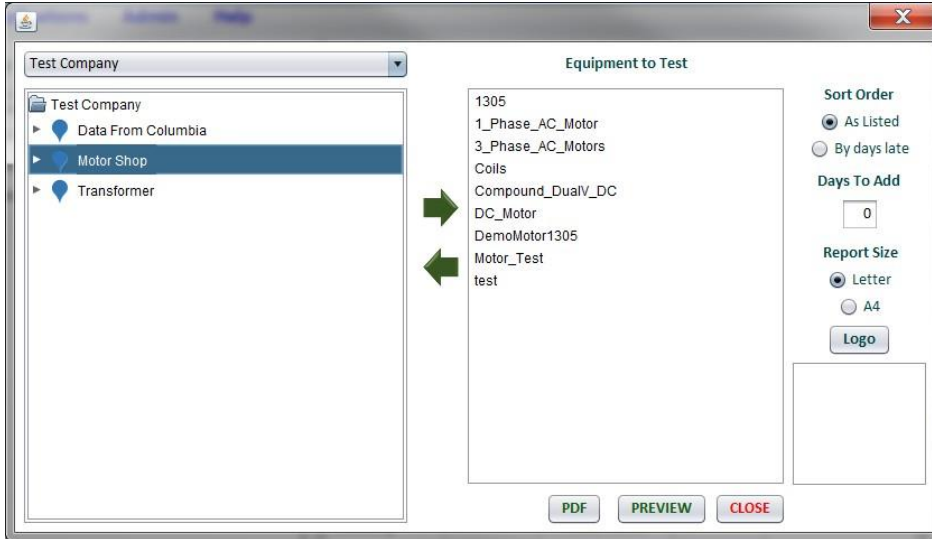
Equipment to Test - Test Company

Equipment	Type	Name	Last Test	TI	Days Late
Path: Motor Shop					
1305	3PhaseAC		2014-Oct-14	3	0
1_Phase_AC_Mo	1PhaseAC		2014-Oct-15	5	0
3_Phase_AC_Mo	3PhaseAC	Motor 1	2014-Jul-29	3	35
Coils	CoilTest@motor		2014-Jul-29	6	0
Compound_Dual	Compound Dual Voltage@motor		2014-Sep-10	1	52
DC_Motor	Compound Single Voltage@motor	Compound DC Motor	2014-Jul-31	4	3
DemoMotor1305	3PhaseAC	New Demo motor	2014-Sep-26	1	36
Motor_Test	3PhaseAC		2014-Sep-10	1	52
test	3PhaseAC	asdfasdf	2014-Nov-03	1	0

Equipment Count: 9

The steps to choose the equipment or save the report are the same in Section “List of Equipment”. On the other hand, the software offers the flexibility for the users to choose equipment listed order and report size.

For “Days To Add”, if a user puts 30 in the space, the report will provide a review of the equipment which will be past due in 30 days or when how many days left before it’s due in 30 days.



## Route Report

A user can choose a route created under a company with customized logo image by clicking on the “Logo” button below.



The route report lists all the equipment included in the route selected. An example is provided below.



## Route Report - Test Company

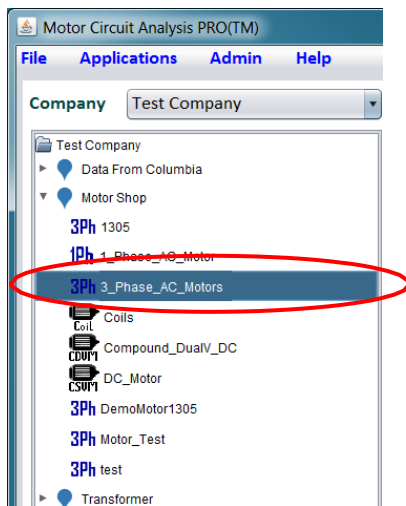
Route Name	Path	Equipment	Type	TDs	Name
Motor Shop Route 1 [October_Test]					
	Motor Shop				
		3_Phase_AC_Mo	3PhaseAC	18	Motor 1
		DemoMotor1305	3PhaseAC	4	New Demo motor
		1_Phase_AC_Mo	1PhaseAC	3	
		DC_Motor	Compound Single	3	Compound DC Motor
		Motor_Test	3PhaseAC	6	
Equipment Count: 5					

*Note: This report provides all equipment under a route. However, it does not mean all data available comes from tests in a route. For example, the 1<sup>st</sup> 3\_Phase\_AC\_Mo contains 18 test records. It does not mean all 18 tests were performed by way of route. On the other hand, from the analysis point of view, it does not matter how the tests were performed. All test records under the same equipment are treated the same in the software.*

For details on routing, please refer to Section “Route “.

### Print Selected Equipment

It provides the option to print all related information on some specific equipment. Before click on this function, firstly select the equipment on the left screen, as shown below.



An example of the 1<sup>st</sup> page of report is shown below:



## Equipment - Motor 1

Equipment:	3_Phase_AC_Motors	Type:	3PhaseAC	TI:	3
Name:	Motor 1	Manufacturer: ABC Motor Company		Motor Type:	RGZ
Manufacturer:	ABC Motor Company	Model:		1LA02864	
Model:	1LA02864	Serial No:		A123456	
Serial No:	A123456	Size HP:	30.0	Amps:	34.9
Size HP:	30.0	Size KW:	22.0	Volt:	460.0
Size KW:	22.0	Efficiency:	0	Power Fact:	0.0
Efficiency:	0	Temp Rise:	0	Service Fact:	0.0
Temp Rise:	0	RPM:	0	kVA Code:	
RPM:	0	Ins. Class:		F	
Enclosure:		TEFC		Frame:	
Frame:		H			

An example of 3 Phase AC induction motor

This page only includes information on motor without any test data. On the other hand, the individual analysis report includes the test data analysis as well as most of the information listed on this report. Please refer to Section “Report” in individual analysis descriptions for more details.

2<sup>nd</sup> Page of the report will show the “Work Order” and “Additional Test” corresponding to this equipment. Please refer to Sections “Work Orders” and “Additional Tests” for details.

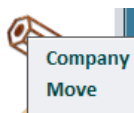
### Edit

The edit function by right mouse clicking on the icon below provides the option to move and edit location or equipment depending on the user account types.

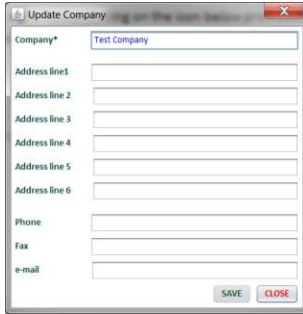
*Note: For power and regular user accounts, the “Move” function is available to move equipment under the one company assigned to the account but “Company” operation, i.e. to edit the company information is not allowed. For regular user, the option to edit the equipment information is not available either.*



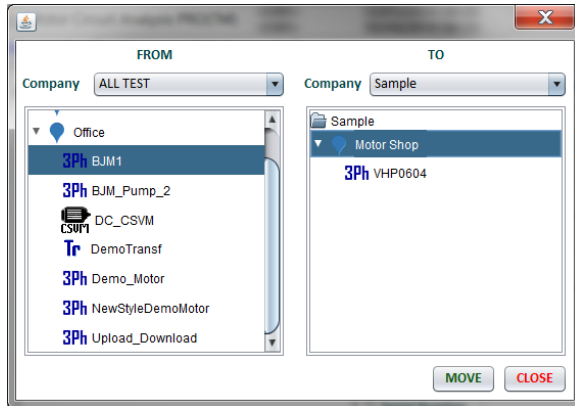
When a company or location is highlighted, right clicking on the icon will shows up the following.



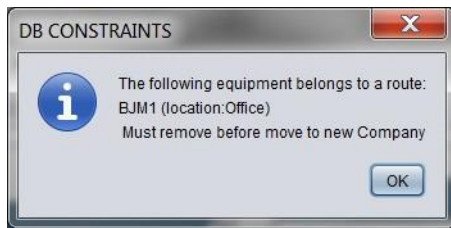
- Choosing “Company” option will pop up the window below. Users can modify the company name and add the company’s information.



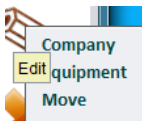
- Choosing “Move” option will pop up the window below.



*Note: To move an equipment, it cannot be any item including in an existing route. Otherwise, the following message will show up and the equipment must be removed from the route first before being moved.*



When a company or location is highlighted, “Company” and “Move” options provide the same function as described above.



- Choosing “Equipment” option pops up the window below enabling users to modify the nameplate information of the motor except the fields filled with *italic fonts* as shown below.

- Clicking on “From ATPOL” provides the option to automatically import the corresponding information from ATPOL test files.

## Delete

Select a company, location or equipment first, then right clicking on this icon will enable the delete the function.



It needs to be confirmed as shown in the dialog box below.

*Note: This function is disabled for regular user account while available to power user account.*



**Route**



Routing is an important function of the MCA software. It provides the convenience to manage the maintenance tests on multiple equipment which could be located at different locations in a company.

Basically, a route containing up to 100 equipment with proper equipment information must be created firstly in the MCA software, then downloaded into the instrument. The instrument provides the function to start the route to test the equipment listed one by one or skip any equipment and come back to test it later. When a route test is completed, the instrument also provides the option to save it in the route or in a regular way. When all or partial tests in a route are completed, users can upload all test data in the same way as upload the regular saved test data into MCA software. Any route tests not performed will be displayed in red font. Route tests with data are handled the same way as any regular tests handled in the software.

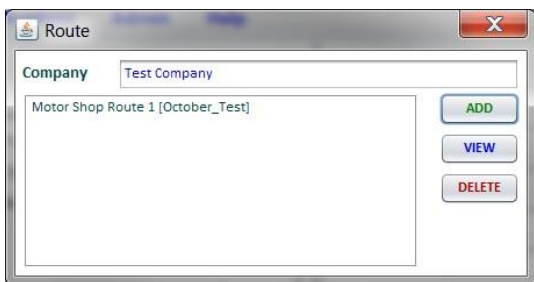
Refer to instrument’s user manuals for details on how to perform route testing.

*Note: all existing data in the instrument memory will be cleared when a route is downloaded. Users can do different tests from any route test and save them in the memory in a regular way. In other words, only one route can exist in the instrument at one time, but regular tests can be performed and saved in a normal way.*

**ADD/VIEW/DELETE Route**

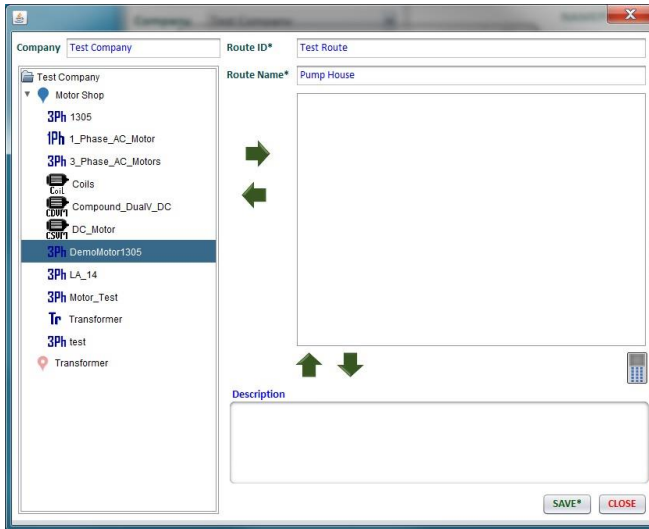
1. Clicking on Route icon will show the box

*Note: there is already an existing route, however, it does not have any influence on creating a new route.*

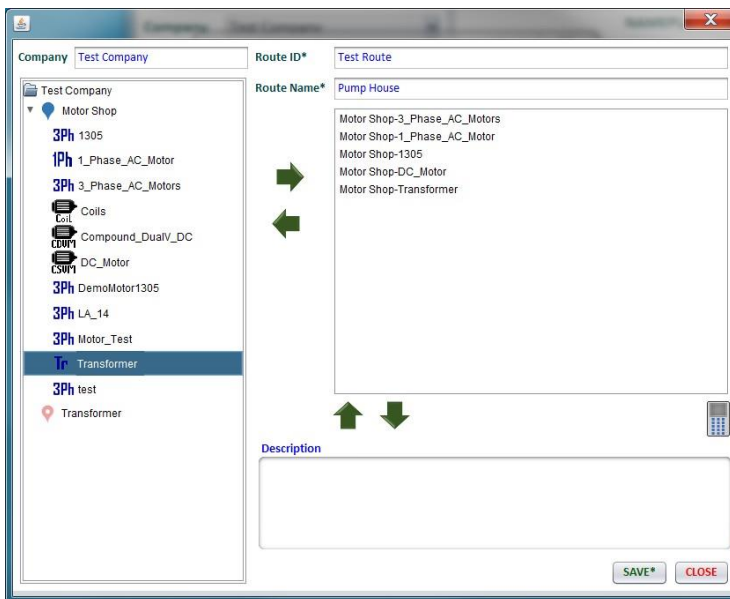


2. Select **ADD** and enter the Route ID and Name (maximum 18 characters).

*Note: there are certain limitations on creating route ID, see the later Section “Rules for Route Downloading”.*

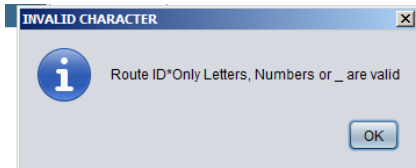


3. Select EquipmentID among the existing equipment list to be included in the Route, then click on the right arrow to add the equipment. Open each Location to gain access to those pieces of equipment within each Location. Each Route can have up to 100 EquipmentID.
  - a. Right arrow: select equipment on the left screen, then add an equipment to the route
  - b. Left arrow: select equipment on the right screen, then remove it from the route
  - c. Up and down arrow: arrange the order of the equipment placed in the route.

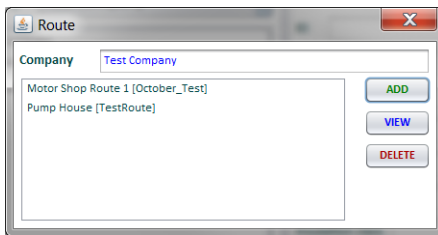


4. Select SAVE to save the Route.

*Note: a RouteID cannot have spaces.*

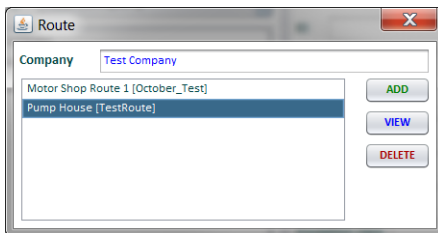


5. The software will display all the existing under the selected company.



6. To view the route(s), select the route first, then click on VIEW button.

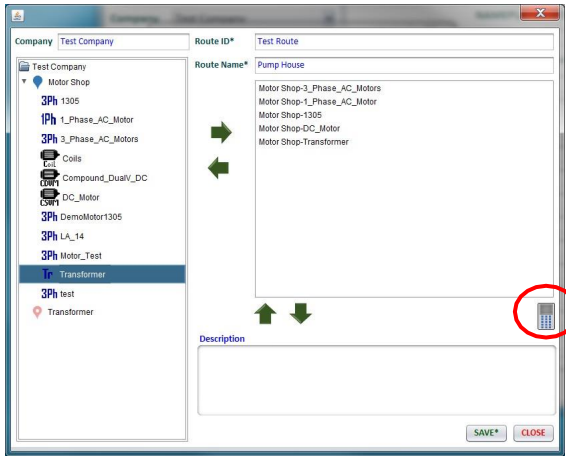
*Note: each route belongs to one company. So before viewing any route(s), make sure to select the proper company first.*



7. To delete a route, select the route first, then click on DELETE button.

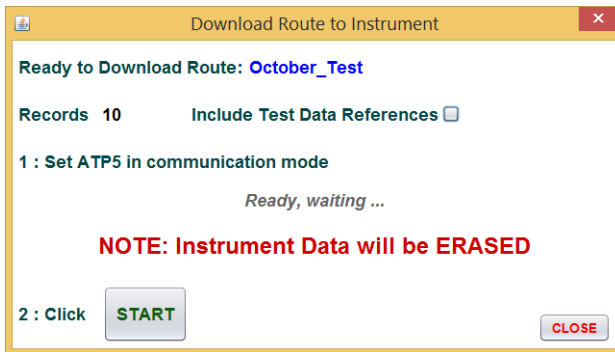
### **Download a Route into the Instrument**

1. On the screen of viewing a route or after saving a route, click on the instrument icon as circled below.

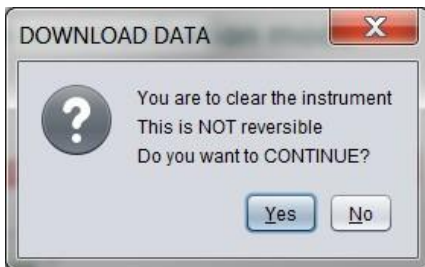


2. The following window pops up. The user can select whether to “Include Test Data References” by checking or unchecking the box behind it. Clicking on “START” button.

**Note:** When downloading a route into the instrument, the “Include Test Data References” check box provides users the option to download a reference test for each equipment so that upon completion of the test for the equipment in a route, the user can compare the new TVS with previous TVS value. Refer to Section “Operation on Test Data” for details on how to select the reference test data for each equipment.



3. Clicking on “Yes” button will trigger the route downloading process.



Rules for Route Downloading

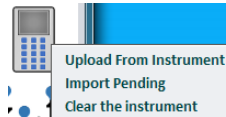
When a route is downloaded into the instrument, it will include the following info:

- 1) Route ID
- 2) Company
- 3) Location
- 4) Equipment ID
- 5) Motor Type
- 6) Manufacturer

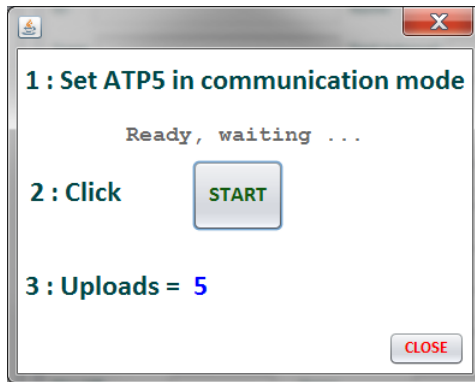
This information should consist of only letters A-Z, a-z, numbers 0-9 and under score “\_”. Any other characters will not be downloaded correctly. So when users create the profile, see the Section “Add Company/Location/Equipment” and Section “ADD/VIEW/DELETE Route”, these rules have to be followed for downloading purpose.

**Upload Route Test Data from Instrument**

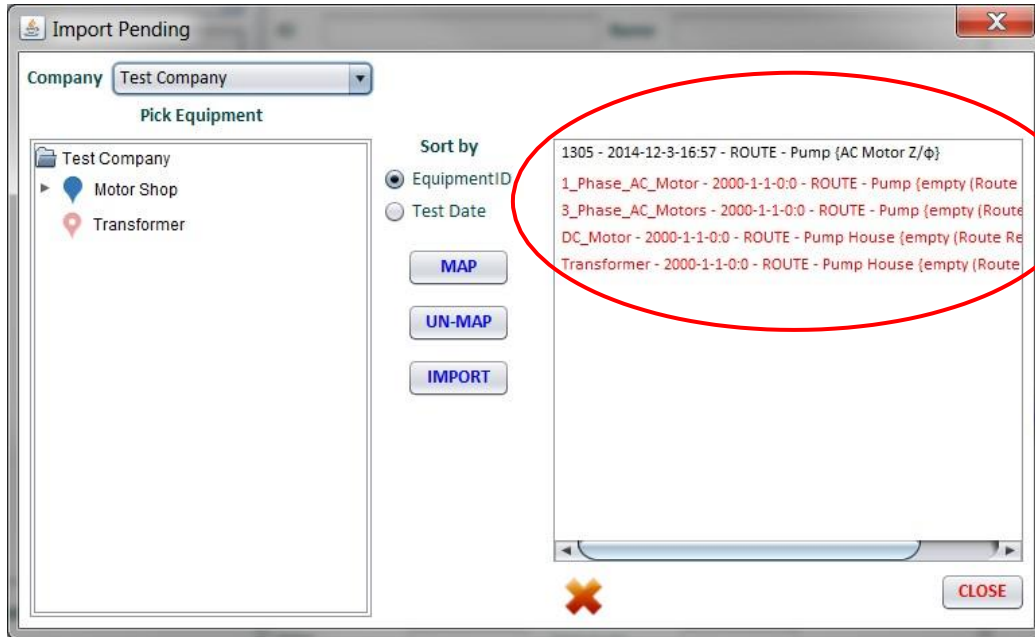
1. Upload test data from instrument by clicking on Communication icon. Refer to Section “Upload Data from instrument” for details.



2. It shows there are 5 test records uploaded, which corresponds to the 5 tests created as described above. Then click on “CLOSE” button.



3. Then right click on Communication icon again and choose “Import Pending”. See details in Section “Map Data to Equipment”.



4. Only one test in the route was performed and saved in the instrument. Therefore, as shown above the test performed is displayed in black font while the other 4 tests not performed are shown in red color which means there are no test data in those items.
5. All test data are handled the same way as regular test data. Refer to Section “Map Data to Equipment” for how to map the test data to proper equipment. And refer to Section “Data Analysis” for how to analyze the data.
6. Report: for data analysis report, refer to individual analysis and trending reports description under Section “Data Analysis”. For report on route information, refer to Section “Route Report”.

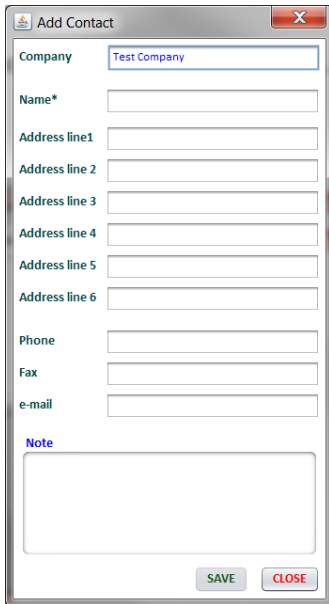
## Contact



First highlight the company or location on the left of the screen, clicking on the Contact icon will show the option to add the contact information. An example is shown below.



Clicking on the “ADD” button will pop up the following window

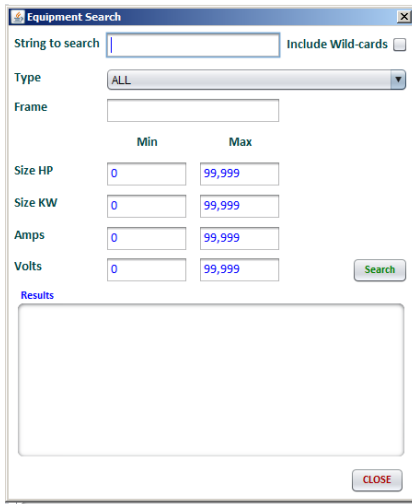


Fill in all the information available and save it for later use.

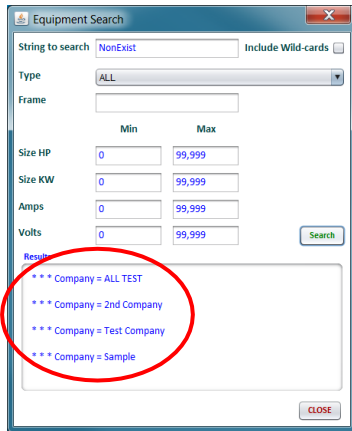
## Search



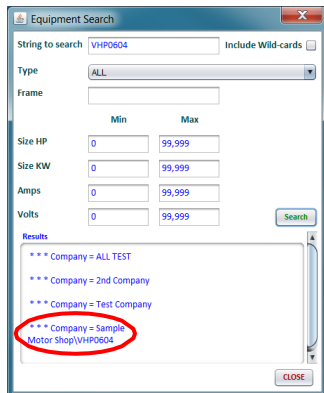
The search function provides a way for users to find out if certain equipment is included in the database. Clicking on the Search icon opens the search window.



1. **String to search:** fill in the equipment name to be searched for. The string is case insensitive even though the equipment name is sensitive in the database.
  - a. If an equipment is not found, all the companies searched are listed, as shown below.



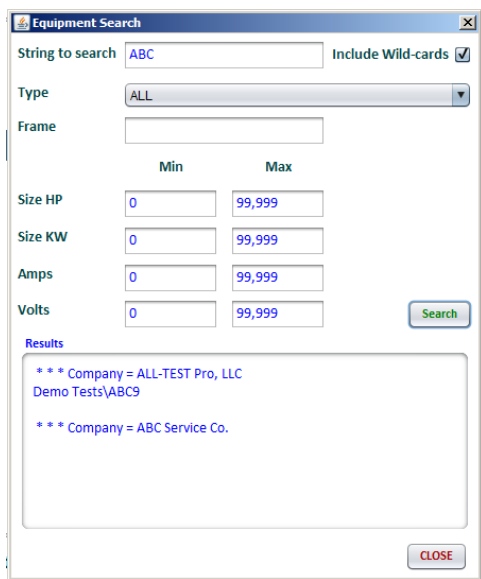
- b. If an equipment is found, both the company and location will be displayed. For example, a motor named “VHP0604” is found in the example below.





2. **Include Wild-cards:** \*Wildcards” are useful when initiating a search. They can be used when the full Equipment ID is either unknown or when you want to view all equipment that contains similar characters in the Equipment ID.

For example- view all Equipment IDs that contain the characters ABC. Place a check in the “Include Wildcards” box and search function will report back all equipment ID that includes the characters ABC. Search results will include Company and Location. With this example it found an ABC9 located with ALL-TEST Pro, LLC. ABC Service Co. is empty as no EquipmentID of “ABC” exists.



3. **Type:** equipment type to be searched
4. **Frame, Size HP, Size KW, Amps, Volts:** Options for users to limit the search range based on the equipment nameplate information. Please refer to Section “Search” for details.

## Work Orders

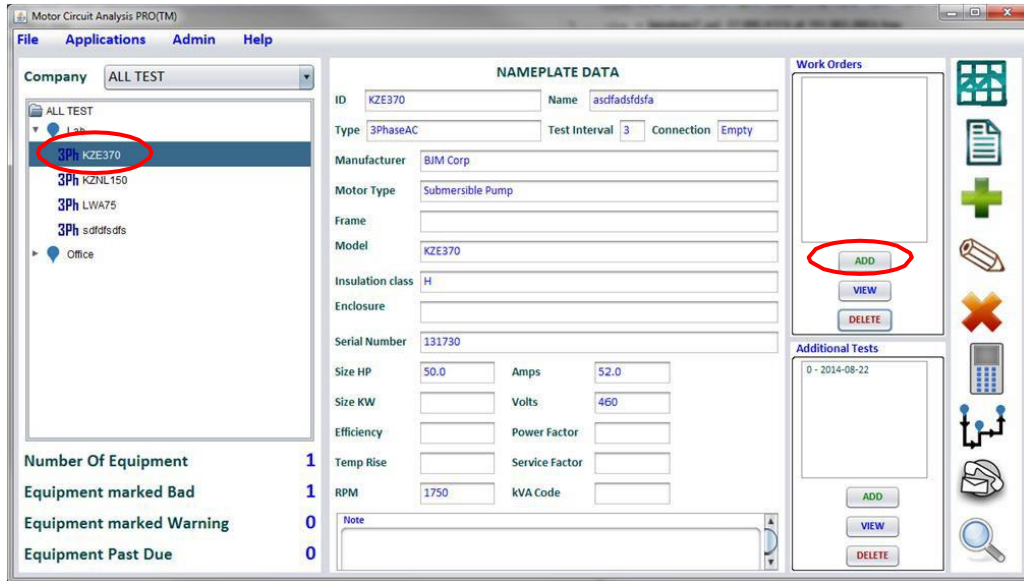
The following are the detailed description of the Work Orders as shown in area ② in the Figure 1: Main Screen.

*Note: A Word Order must be highlighted first in order to print it.*

### Create a Work Order

A work order for a specific piece of equipment can be created using the Work Order creation functions.

1. Highlight the equipment for which the work order is to be created.



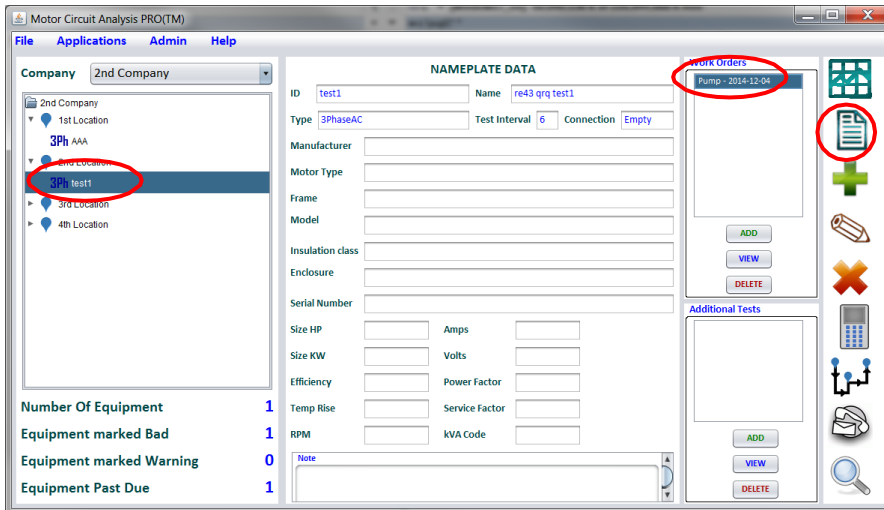
2. Click on the **ADD** button in the Work Orders menu.
3. The Screen shown below appears with the EquipmentID, Name and By (user account)
4. Fill in the information
  - Work Order Name
  - Any pertinent instructions
  - Findings
  - If the test has been completed, check the box of “Completed”

5. Click on **SAVE** button. The WO number will appear in the WO window.

### View a Work Order

First highlight the equipment on the left, then select the work order, and click on **VIEW** button.

## Print a Work Order



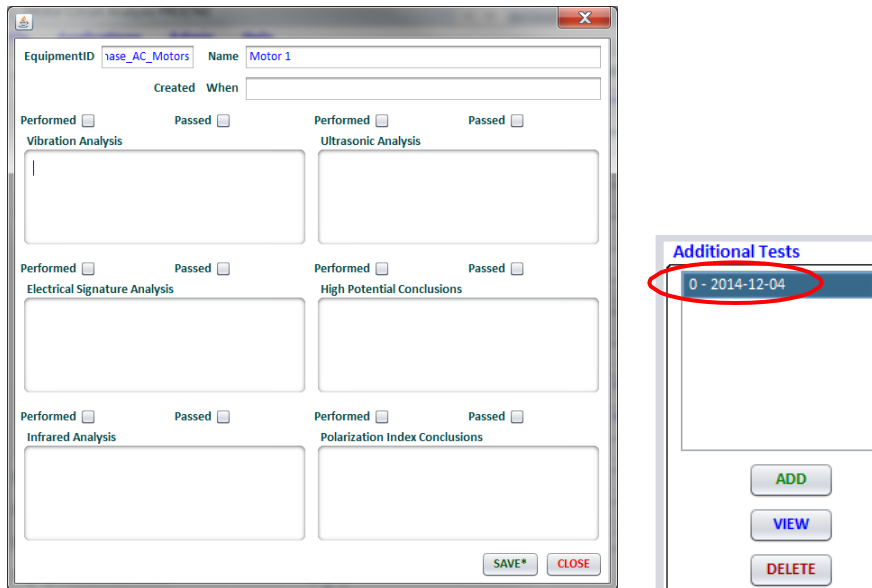
1. First highlight the equipment on the left, then select the work.
2. Click on "Reports" icon and select "Print Selected Equipment".
3. Refer to Section "Print Selected Equipment" under "Reports" description.
4. The Work Order will show up on the 2<sup>nd</sup> page of the report.

## Additional Tests

The following are the detailed description of the **Additional Tests** as shown in area ③ in the Figure 1: Main Screen. **Additional Tests** provides a means for users to record some other common tests in addition to the instrument. It includes the input fields for the following tests and analysis:

- Vibration Analysis
- Ultrasonic Analysis
- Electrical Signature Analysis
- High Potential Conclusions
- Infrared Analysis
- Polarization Index Conclusions

First highlight the equipment for which the additional tests are to be added, then click on the **ADD** button, a window will pop up as shown below.

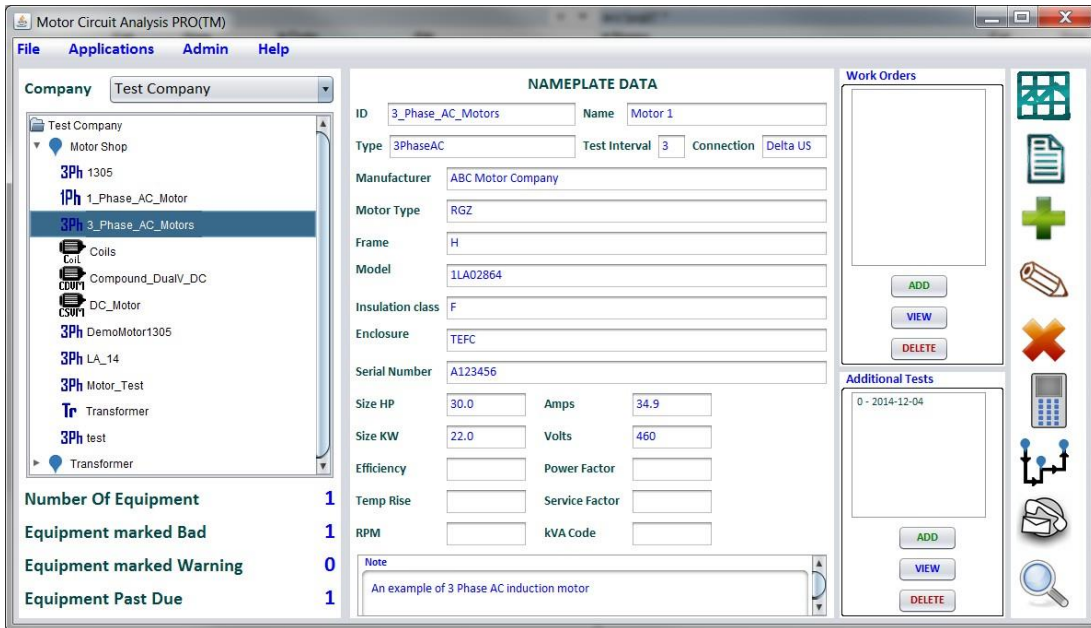


The fields of “EquipmentID”, “Name” and “Created When” will be filled automatically by the software. The users can put the test results and check “Performed” or “Passed” for each test field.

To print the additional tests, make sure to highlight the test, as shown on the right screen above, then right click on the “Reports” icon and select “Print Selected Equipment”. Please refer to Section “Print Selected Equipment” under “Reports” description. The additional tests will be printed on the 2<sup>nd</sup> page of the report.

## Nameplate Data

The following are the detailed description of the **Nameplate Data** as shown in area ④ in the Figure 1: Main Screen. The Name Plate Data displays the data for the highlighted equipment. When an equipment is created, EquipmentID, Type and Test Interval are required to be filled. The other information can be filled later by right clicking on “Edit” icon where there is also an option to import the nameplate information from ATPOL software if available – an online motor test equipment software provided by ATP. For details, please refer to Section “Edit”.



For “Size HP” or “Size kW”, only one field can be filled, and the other field will display the proper value automatically.

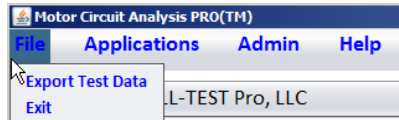
*Note: if there are multiple settings from a motor’s nameplate, for example, the voltage rating can be 230V and 460V, only input the voltage corresponding to the configuration when the test is performed.*

*Note: some parameters can be used during equipment search in the database, for example, Frame, Size HP, Size KW, Volts and Amps. Refer to Section “Search” for more details.*

## Menu Bar

The following are the detailed description of the area 5 in the Figure 1: Main Screen.

### File Menu

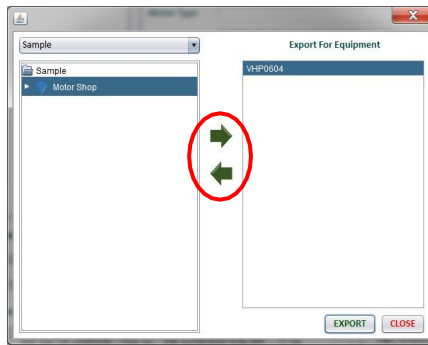


This pull-down menu in area has the following selections:

### Export Test Data

This function exports the equipment name, date, type of test and test results to a TEXT file. It provides flexibility for users to handle or store the data in their own way.

1. When select this option, the following window pops up. Use Right and Left arrow to select or remove the equipment with test data to be exported.



2. The data file will be saved in the folder named "Exportfiles" under MCA software installation directory. The location of MCA installation directory can be different on different computer and operating systems. An example is: c:\Program Files (x86)\MCA\Exportfiles\
3. The exported data file is in format of ".txt". It can be opened with a text editor software, e.g. Notepad, or can be opened by MS Office Excel using "Tab" delimited option.

The following is the list of the parameters in the exported file:

Parameters	Description	Parameters	Description
equip	Equipment name	year, month, day, hour, minute, seconds	Time of the test performed on AT5. Military time is adopted, e.g. hour of 19 means 7 pm.
mcase	<p>Provides test type corresponding to a number as indicated below.</p> <p>-6: Dynamic test only under DYN menu            -5: AC Motor IND test under IND menu            -4: Rotor Compensated Test Z/φ menu            -3: 1-Phase test under MAN menu            -2: AC Transformer test under Z/φ menu            -1: AC Motor test under Z/φ menu            0: Reserved</p> <p>The following are the DC menu:            1: Series @ drive            2: Series @motor            3: Shunt Single Voltage @drive            4: Shunt Single Voltage @motor            5: Shunt Dual Voltage @drive            6: Shunt Dual Voltage @motor            7: Compound Single Voltage @drive            8: Compound Single Voltage @motor            9: Compound Dual Voltage @drive            10: Compound Dual Voltage @motor            11: Coil Test@motor</p>	freq	Test frequency
		res	Diagnostic conclusion of resistance test <ul style="list-style-type: none"> <li>-1 → Bad</li> <li>0 → Warning</li> <li>1 → OK</li> <li>2 → No Reading</li> </ul>
		if	Diagnostic conclusion of current frequency I/F test <ul style="list-style-type: none"> <li>-1 → Bad</li> <li>0 → Warning</li> <li>1 → OK</li> <li>2 → No Reading</li> </ul>
		phase	Diagnostic conclusion of phase angle test <ul style="list-style-type: none"> <li>-1 → Bad</li> <li>0 → Warning</li> <li>1 → OK</li> <li>2 → No Reading</li> </ul>
imp	Diagnostics on impedance - not provided	ind	Diagnostics on impedance - not provided
stator	Diagnostics on stator signature in dynamics test <ul style="list-style-type: none"> <li>-1 → Bad</li> <li>9 → CC Bad</li> <li>0 → Warning</li> <li>10 → CC Warning</li> <li>1 → OK</li> <li>11 → CC OK</li> <li>2 → Not Analyzed               <ul style="list-style-type: none"> <li>12 → CC Not Analyzed</li> </ul> </li> </ul>	rotor	Diagnostics on stator signature in dynamic test <ul style="list-style-type: none"> <li>-1 → Bad</li> <li>0 → Warning</li> <li>1 → OK</li> <li>2 → Not Analyzed</li> </ul>

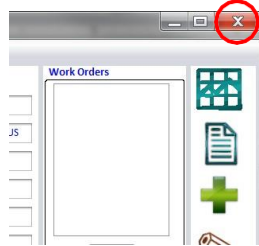


cont	<p>Contamination diagnostics</p> <ul style="list-style-type: none"> <li>-1 → Bad</li> <li>0 → Warning</li> <li>1 → OK <ul style="list-style-type: none"> <li>2 → No Reading</li> <li>3 → Out of Range</li> </ul> </li> </ul>	ins	<p>Diagnostics on insulation test</p> <ul style="list-style-type: none"> <li>-1 → Bad, tested at 500V</li> <li>0 → Warning, tested at 500V</li> <li>1 → OK, tested at 500V</li> <li>2 → No Reading</li> <li>9 → Bad, tested at 1kV</li> <li>10 → Warning, tested at 1kV</li> <li>11 → OK, tested at 1kV</li> </ul>
df	<p>Contamination (dissipation factor) value – multiplied by 100 to be expressed in percentage.</p> <p>Note: the DF must be in the range of 1% ~ 100%. When it's out of the range, e.g. -97 is displayed, it is invalid test data.</p>	r32, r21, r13, r45, r	<p>Resistance measurement</p> <ul style="list-style-type: none"> <li>AC test: R32, R21, R13 are resistances between corresponding phases, e.g. R32 is resistance between Phase 3 and Phase 2. R45 is not used.</li> <li>DC test: R32, R21, R13 and R45 are used for the resistance measured 1<sup>st</sup> time, 2<sup>nd</sup> time, 3<sup>rd</sup> time and 4<sup>th</sup> time as included in the DC test option.</li> <li>r: deviation of the resistance which may not be available for DC test</li> </ul>
z32, z21, z13, z45, z4	<p>Impedance measurement</p> <p>Refer to the “R32, R21, R13, R45, r” to the right – the same rule applies</p>		
l32, l21, l13, l45, l4	<p>Inductance measurement</p> <p>Refer to the “R32, R21, R13, R45, r” to the right – the same rule applies</p>		
if32, if21, if13, if45, if4	<p>I/F measurement</p> <p>Refer to the “R32, R21, R13, R45, r” to the right – the same rule applies</p>		
fi32, fi21, fi13, fi45, fi4	<p>Phase angle measurement</p> <p>Refer to the “R32, R21, R13, R45, r” to the right – the same rule applies</p>		
rx, rx2, rx3	<p>Insulation resistance value</p> <ul style="list-style-type: none"> <li>AC test: Rx is the insulation resistance value while Rx2, Rx3 are not used</li> <li>DC test: Rx, Rx2, Rx3 are used for the insulation resistance tested 1<sup>st</sup> time, 2<sup>nd</sup> time and 3<sup>rd</sup> time as included in the DC test option.</li> </ul>	tvS	TVS value

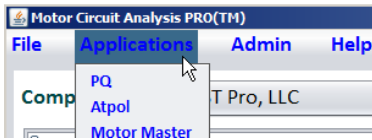
**Exit**

Clicking it will enable fully exiting the MCA software, i.e. all windows opened originating from the MCA main screen will be closed.

Another way to close the software is to click on the “X” on the right top corner of the software.



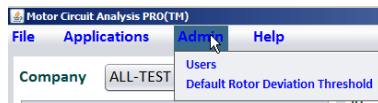
## Applications Menu



This pull-down menu provides convenience of running the other software of online monitoring.

- PQ – Power System Manager
- Atpol – Data analysis for ATPOL II™ Energized Electrical Signature Analysis data
- Motor Master

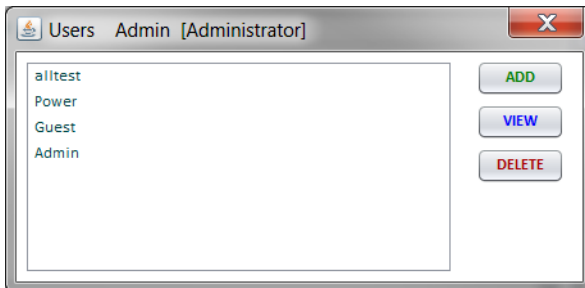
## Admin Menu



There are two functions:

### Users

For power user and regular user, this option only allows the user to change the password or report page size. For administrative account, it provides administrative management on all the accounts with the following window showing up:



**ADD**

To add a new account, click on “ADD” button.

**User ID:** Assign an account name to be used for software login

**Password:** Minimum of 6 characters are required.

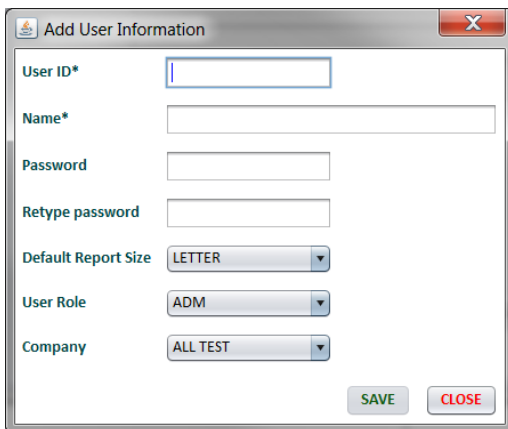
**User Role:** Type of accounts. Please refer to “” section for details on each type of account.

**ADM:** administrative account

**POW:** power user account

**REG:** regular user account

**Company:** Assign the user account to a company which has been created. Only after the company assignment, all data communication between software and instrument can be performed. Please refer to Section “Upload Data from instrument” for how to upload the data from instrument. Only administrative account can perform this operation.



**VIEW**

For power user and regular user, this option only allows the user to change the password or report page size. Administrative users can also change the company assignment after selecting the user account with left mouse first.

*Note: the type of account cannot be changed. If a user needs to change the type of account, the only way is to delete the account and re-create it with the same ID with proper type assigned.*

**DELETE**

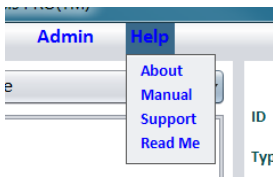
For administrative account, select the user account first, then clicking on “DELETE” will pop up the following window. Clicking on “Yes” will delete the account selected.



## Default Rotor Deviation Threshold

The default rotor deviation threshold is used to set threshold for low inductance influence rotor test. The default is 1%. Only administrative account can change the value. For details on rotor test, please refer to the manual section of Rotor test.

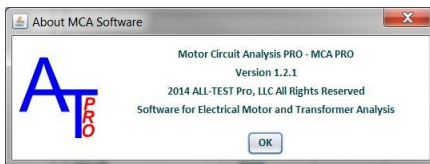
## Help Menu



This pull-down menu has the following selections

### About

It provides the software information including the version.



### Manual

It will pop up MCA software manual. If there is an updated manual, the users can manually replace the file MCA\_Manual.pdf under the MCA software installation directory with any updated manual which has to be changed to the name MCA\_Manual.pdf before replacement. The location on different computers may be different, but a common directory is located at c:\Program Files (x86)\MCA\.

### Support

Contact information on how to get support on the software.

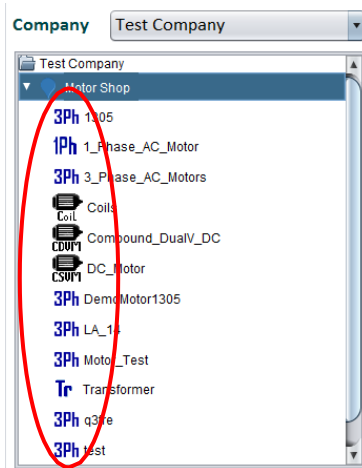


**Read Me**

Additional information on the software. It is provided as an option to review when the software installation is completed.

**Database Structure**

The following is a detailed description of the area ⑥ in the Figure 1: Main Screen. When a user logs into the MCA software, the company assigned to the user accounts will always be displayed. For regular and power user account, there is no option to view other companies. For administrative account user, the company can be changed by changing the “Company” pull down menu on the top.



The column circled at the left displays the equipment ID and its type, for example “3Ph” means 3 Phase AC equipment.

*Many operations can only be performed after the equipment, location or company is highlighted first, for example, to view data analysis an equipment must be chosen first. To add or view a work order, an equipment must be chosen first. Refer to corresponding sections for descriptions.*

## Equipment Tests Statistics

This option is located at the bottom left corner of the main screen and is marked as area 7 in the Figure 1: Main Screen. It gives an overall review of the status of all equipment under a company or location.

<b>Number Of Equipment</b>	<b>15</b>
<b>Equipment marked Bad</b>	<b>10</b>
<b>Equipment marked Warning</b>	<b>1</b>
<b>Equipment Past Due</b>	<b>12</b>

There are four statistics available:

- Number Of Equipment:** Displays the total number of pieces of equipment under the highlighted company or location. If piece of equipment is highlighted, then it always displays “1”.
- Equipment marked Bad & Equipment marked Warning:** Displays the number of pieces of equipment with any test parameter marked “BAD” or “WARN”. It takes into account the latest individual and trending analysis. Older individual tests are not included. If both “BAD” and “WARN” both show up for the instrument, then “BAD” overrides “WARN”. Therefore, any equipment included in “Equipment marked Bad” is not included in “Equipment marked Warning”.
- Equipment Past Due:** Displays the number of pieces of equipment for which the time period between the latest test and the present date and time exceeds the test interval for those



### Disclaimer, Copyright & Trademarks

#### Notice of Service/Trademark Rights

The trademarks, service marks and logos (collectively, the "Marks") set forth below are registered and unregistered trademarks and/or service marks owned by ALL-TEST Pro, LLC in the United States and certain other countries throughout the world. Nothing contained in this manual should be construed as granting, by implication, estoppels or otherwise, any license or right to use any of the Marks without the written permission of ALL-TEST Pro, LLC. Any misuse of the Marks or any Content, except as provided in this Statement, is strictly prohibited and may violate trademark laws. Other brands or product names used in this manual are trademarks and/or service marks of their respective owners, should be treated as such, and may be registered in various jurisdictions.

- 1) ALL-TEST PRO® is a Registered Trademark of ALL-TEST Pro, LLC**
- 2) MCA Basic™, MCA PRO™, ALL-TEST PRO 7™ PROFESSIONAL, ALL-TEST PRO 7™, ALL-TEST PRO 5™, ALL-TEST PRO 33™, and ALL-TEST PRO 34™ are all Trademarks of ALL-TEST Pro, LLC.**

#### Disclaimer:

**Documents published by ALL-TEST Pro, LLC are provided "as is" without warranty of any kind, either expressed, implied or statutory, including, but not limited to any warranties of merchantability, fitness for a particular purpose, or non-infringement.**

**ALL-TEST Pro, LLC shall not under any circumstances be liable to any person for any special, incidental, indirect or consequential damages, including, without limitation damages resulting from use of or reliance on the information presented, loss of profits or revenues or costs of replacement goods, even if informed in advance of the possibility of such damages.**

Reasonable efforts have been made to ensure the accuracy of the information presented. However, ALL-TEST Pro, LLC assumes no responsibility for the accuracy of the information. Product information is subject to change without notice. ALL-TEST Pro, LLC may make improvements and/or changes in the products and/or the programs described in these publications at any time without notice.

Information in this document is: © 2019 ALL-TEST Pro, LLC All Rights Reserved

You may cite or refer to information published in this manual, except as provided below, but you may not reproduce or distribute such information in whole or in part without the prior written permission of ALL-TEST Pro, LLC. You may not reproduce or distribute any image from the Manual, without securing advance written consent from ALL-TEST Pro, LLC. To request such permission, send email to [info@alltestpro.com](mailto:info@alltestpro.com), including your name, address and a description of the purpose of your intended distribution and the information you would like to distribute.

You may print, reproduce and use the information in, and retrieve files containing software or images from ALL-TEST Pro, LLC for non-commercial, personal, or educational purposes only, provided that you (i) do not modify such information, and (ii) include any copyright originally included with such information and this notice in all such copies.

Nothing contained herein shall be construed as conferring by implication or otherwise any license or right under any patent or trademark of ALL-TEST Pro, LLC or any third party. No other rights under any copyrights of ALL-TEST Pro, LLC or any other party are granted herein, except as expressly stated above.





### MCA SOFTWARE AGREEMENT

**READ THIS!** You should carefully read these terms and conditions before installing ALL-TEST Pro, LLC software. This is a license agreement (“Agreement”) between you and ALL-TEST Pro, LLC. By installing the ALL-TEST Pro, LLC software you acknowledge that you have read and accept the following terms and conditions. If you do not agree and do not want to be bound by such terms and conditions, promptly return the software to the place you obtained it for a full refund.

**1. License Grant.** ALL-TEST Pro, LLC grants to you (either an individual or entity) a nonexclusive license to use one copy of the enclosed software program solely for your own personal or business purposes on a single computer (whether a standard computer or a workstation component of an Enterprise network). The ALL-TEST Pro, LLC software is in use on a computer when it is loaded into temporary memory (RAM) or installed into permanent memory (hard disk, CD ROM, or other storage device). ALL-TEST Pro, LLC reserves all rights not expressly granted herein. Enterprise version(s) of the enclosed software program may be installed onto any number of client computers (whether a standard computer or a workstation component of an Enterprise network), but the number of concurrent users is limited to the number of purchased licenses.

**2. Ownership** ALL-TEST Pro, LLC is the owner of all right, title, and interest, including copyright, in and to the compilation of ALL-TEST Pro, LLC software recorded on the disk(s) or CD ROM (“Software Media”). Copyright to the individual programs recorded on the Software Media is owned by the author or other authorized copyright owner of each program. Ownership of ALL-TEST Pro, LLC software and all proprietary rights relating thereto remain with ALL-TEST Pro, LLC and its licensors.

#### **3. Restrictions on Use and Transfer**

- 3.1. You may only (i) make one copy of the Software for backup or archival purposes, or (ii) transfer the Software to a single hard disk, provided that you keep the original for backup or archival purposes. You may not (i) rent or lease the Software, (ii) copy or reproduce the Software through a LAN or other network system or through any computer subscriber system or bulletin-board system, or (iii) modify, adapt, or create derivative works based on the Software.
- 3.2. You may not reverse engineer, de-compile, or disassemble the Software. You may transfer the Software and user documentation on a permanent basis, provided that the transferee agrees to accept the terms and conditions of this Agreement and you retain no copies. If the Software is an update or has been updated, any transfer must include the most recent update and all prior versions.

#### **4. Limited Warranty.**

- 4.1. ALL-TEST Pro, LLC warrants that the Software and Software Media are free from defects in materials and workmanship under normal use for a period of sixty (60) days from the date of purchase. If ALL-TEST Pro, LLC receives notification within the warranty period of defects in materials or workmanship, ALL-TEST Pro, LLC will replace the defective Software Media.

**4.2. ALL-TEST Pro, LLC and the author of the software disclaim all other warranties, express or implied, including without limitation implied warranties of merchantability and fitness for a particular purpose, with respect to the software, the programs, the source code contained therein, and/or the techniques described in this software. ALL-TEST Pro, LLC does not warrant that the functions contained in the software will meet your requirements or that the operation of the software will be error free.**

4.3. This limited warranty gives you specific legal rights, and you may have other rights that vary from jurisdiction to jurisdiction.

## 5. Remedies.

5.1. ALL-TEST Pro, LLC's entire liability and your exclusive remedy for defects in materials and workmanship shall be limited to replacement of the Software Media, which may be returned to ALL-TEST Pro, LLC at the following address: ALL-TEST Pro, LLC, 813 Boston Post Rd, Old Saybrook, CT 06475 or email: [info@alltestpro.com](mailto:info@alltestpro.com). Please allow three to four weeks for delivery. This Limited Warranty is void if failure of the Software Media will be warranted for the remainder of the original warranty period or thirty (30) days, whichever is longer.

5.2. In no event shall ALL-TEST Pro, LLC or the author be liable for any damages whatsoever (including without limitation damages for loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising from the use of or inability to use the software, even if ALL-TEST Pro, LLC has been advised of the possibility of such damages.

**6. U.S. Government Restricted Rights.** Use, duplication, or disclosure of the Software for or on behalf of the United States of America, its agencies and/or instrumentalities (the "U.S. Government") is subject to restrictions stated in paragraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause of DFARS 252.227-7013, or subparagraphs (c)(1) and (2) of the Commercial Computer Software – Restricted Rights clause at FAR 52.227-19, and in similar clauses in the NASA FAR supplement, as applicable.

**7. General.** This Agreement constitutes the entire understanding of the parties and revokes and supersedes all prior agreements, oral or written, between them and may not be modified or amended except in writing signed by both parties hereto that specifically refers to this conflict herewith. If any one or more provisions contained in this Agreement are held by any court or tribunal to be invalid, illegal, or otherwise enforceable, each and every other provision shall remain in full force and effect.

Contact:

Jorgen Bjorkman

CEO

Email: [info@alltestpro.com](mailto:info@alltestpro.com)