

## 1150 Software Guide

The 1150 Staticon incorporates an embedded computer to control injection rates and to store and maintain data records. The system is designed to function without any direct operator control, however understanding the software is necessary to fully utilize the system capabilities.

The Staticon setup falls into one of two basic categories. The first category is only a monitor function. As a monitor, the system will measure the conductivity and temperature of the liquid sample. During the monitoring operation several features are available.

- 1 A Digital Display indicates the sample conductivity in pS/m.
- 2 A 4-20 mA output is available to forward the sample conductivity reading to other equipment.
- 3 A 4-20 mA output is available to forward the sample temperature reading to other equipment.
- 4 An internal relay provides a closed set of contacts when the sample is within settable low and high conductivity limits.
- 5 A data file is generated with each sample load. The file is maintained on the hard drive for review.
- 6 When an optional computer monitor is installed a real time visual presentation is available which includes all variable data.
- 7 If the installation includes an interface with the pipeline system turbine, the display will also indicate the flow rate and total volume for each sample load.
- 8 The loading record will be started automatically with the turbine flow detector, it can also be activated via a contact closure.

The second category the Staticon can be set up for is a simultaneous monitor and injection control system. To utilize this feature it is necessary to interface the pipeline system turbine so a proportional injection control pulse can be generated.

In some cases the pipeline flow may be at constant rate and turbine data may not be available. In that case an optional pulse generator set to emulate the pipeline flow can be triggered with a flow switch.

The features available using the monitor & injection mode are as follows:

1. All of the monitor features listed above are still present.
2. A requested conductivity is entered into the software via switches on the rear of the console.
3. In the automatic mode the proportional injection rate is continually adjusted to maintain the requested conductivity level. This is done by the onboard computer and automatically corrects for variation in product temperature as well as variations in the additive concentration.
4. In the manual mode the proportional injection rate is set on the rear panel and this rate will be used without changes from the computer.
5. The monitor screen will be expanded to provide flow rate, volume loaded and injections of additive.
6. The data file maintained on the hard drive will also be expanded to include flow rate, volume loaded and total injections of additive mix. A progressive result file is also generated during the loading for analysis of the system.

The 1150 Console can also be configured as a two channel instrument. When the two channel option is setup all functions described are totally independent for each channel. Both channels can be monitors, injector controllers, or one of each. Each channel has its own fuel cell module and can handle separate lines and products such as Jet and Diesel fuels.

## **Software Overview**

The entire software package consist of several programs, each program is briefly described here. Detail program operation will be described later.

- 1 The operational program (1150-VB.EXE) is the actual run and control program for the monitor and injection system. This program will automatically start when the instrument is turned on and will run unassisted. The monitor screen is not necessary for all automatic features to be present, however with an attached monitor screen the loading operation can be followed with data available relative to above settings.
2. The configuration editor program (CFG-150VB.EXE) is used to set the Company Name, Product title, High and Low Conductivity Limits and selection of a Hardcopy Printer output. An additional menu is available for technical support personnel. This menu is only necessary for initial setup and is therefore hidden from normal view.
3. The File viewing program (FILES-150-VB.EXE) is used to examine the data stored during fuel loading. Depending on the setup configuration, the files include both a load average file with time started, conductivity and temperature (with turbine data present total volume and injections are included). A detail record can also be viewed for each load which provides a progressive record taken several times during the load. The record save timing is adjustable during setup.
4. A test program is also available (TEST-150VB.EXE) and is primarily intended for technical support personnel, in case of difficulty this program may be used to assist the factory via telephone service. An optional program PCAnywhere can be installed to allow remote computer monitoring, factory service and program updating.

The standard installation includes a sub directory on drive C named Staticon. The Staticon sub directory is further divided into two sub directories Program and Data.

## **Software Details**

### Operational Program (1150-VB.EXE)

Since this program runs automatically there are few details to deal with, however several precautions should be taken.

1. When this program starts it reads the configuration file to acquire all special setup instructions, therefore if the configuration editor program is used it is necessary to stop this program and restart it to load in the modified configuration instructions.
2. If the operator wants to view previous load information it is not necessary to stop the operational program. By minimizing the operational program (Mouse clicking the (Standby) box in the top right hand corner) the operator can then run the File viewing program . The operational program is still running in the background and will maintain conductivity levels and data recording as necessary. When the File view program is closed, return the screen to the operational program by mouse clicking the Return to Display. 'CAUTION' Do not click the 1150-VB Icon on the desktop screen. This will load a second copy of the program which will create an error when both copies try to connect to the same I/O board.
3. To Stop the operational program to either reload the configuration or for some other purpose simply hold down the Ctrl Button and Press the Break Key. This will stop the program, pressing the enter key will then return you to the desktop screen.

4. When the operational program (1150-VB.EXE) is not running several features are still functional for redundancy purposes. The instrument will still detect pipeline flow and will display the conductivity on the digital display meter. The alarm limits set in the software will not be active, however there is a fixed high and low limit to shut down the control relay if the pipeline fuel exceeds 900 or goes below 50 pS/m. All record keeping is only functional when the 1150-VB.EXE program is running.

#### Configuration Editor (CFG-150VB.EXE)

The configuration editor program is available as an icon on the desktop. The primary purpose is to set the Company name, Product title ( Such as Jet-A), as well as High and Low Conductivity Limits. Another option is to select a printer for hard copy of each load. 'CAUTION' If a printer is selected it is necessary to have the printer attached, On, and On-Line. The program will send a summary to the printer as soon as a loading process is completed. This is detected by the pipeline turbine or the flow switch. If the printer is not on at this time the program will get an error which may stop the program. All data is routed to the hard drive which makes use of the printer option unnecessary for normal operation.

A second menu is available by selecting (6) Exit And Save and entering 999. This menu is very technical in nature and some settings will effect the timing for injection control and calibration of the system. We will cover some of the items which may have field use, other items will be addressed via telephone if problems arise.

1. # Of Fuel Cells - Describes to the CPU if you have a single channel or a 2 channel system.
2. Data Location - Describes the default location of data storage. If this is changed you must make certain the new sub-directory is created prior to running the operational program or the File View program.
3. Injector / Turbine (Ch-1) - This item will set up codes for either monitor/injector mode and if a turbine/flow switch option is used for Channel #1.
4. Injector / Turbine (Ch-2) - This item will set up codes for either monitor/injector mode and if a turbine/flow switch option is used for Channel #2.
5. Alarm Delay (Ch-1) - This item sets up a delay time to prevent short term out of limits from triggering the shut-down relay. The recommended value is 6.
6. Alarm Delay (Ch-2) - This item sets up a delay time to prevent short term out of limits from triggering the shut-down relay. The recommended value is 6.
7. Max Injector Rate (Ch-1) - This item is not currently changeable. It prevents the injector pump from operating at too fast a rate.
8. Max Injector Rate (Ch-2) - This item is not currently changeable. It prevents the injector pump from operating at too fast a rate.
9. Analog Divisor (Ch-1) - This item is not currently changeable. It is for reference only and is modified during initial calibration.
10. Analog Divisor (Ch-2) - This item is not currently changeable. It is for reference only and is modified during initial calibration.
11. Product Name (Ch-1) - The product name can be changed either here or on menu-1.
12. Product Name (Ch-1) - The product name can be changed either here or on menu-1.

13. Counter #1 (Ch-1) - Timing control for Data Averaging. Default = 3
14. Counter #1 (Ch-2) - Timing control for Data Averaging. Default = 3
15. Counter #2 (Ch-1) - Timing control for Updating Injector Ratio. Default = 5
16. Counter #2 (Ch-2) - Timing control for Updating Injector Ratio. Default = 5
17. Counter #3 (Ch-1) - Timing control for Saving Detail Data in Record. Default = 20
18. Counter #3 (Ch-2) - Timing control for Saving Detail Data in Record. Default = 20
19. Display Terminology (Ch-1) - Allows 1 of 5 selections of Displayed Volume measurement, selection is based on local preference.
20. Display Terminology (Ch-2) - Allows 1 of 5 selections of Displayed Volume measurement, selection is based on local preference.
21. Fixed Ratio (Ch-1) - Allows correction required to delay injection ratio change until the previous change has been detected. A large diameter pipeline or low flow rates will require longer times between adjustments to prevent overshoot of actual vs requested conductivity.
22. Fixed Ratio (Ch-2) - Allows correction required to delay injection ratio change until the previous change has been detected. A large diameter pipeline or low flow rates will require longer times between adjustments to prevent overshoot of actual vs requested conductivity.
23. High Alarm (Ch-1) - The High limit can be changed here or on menu-1.
24. High Alarm (Ch-2) - The High limit can be changed here or on menu-1.
25. Low Alarm (Ch-1) - The Low limit can be changed here or on menu-1.
26. Low Alarm (Ch-2) - The Low limit can be changed here or on menu-1.
27. PSM Multiplier (Ch-1) - The pS/m screen display can be corrected for internal voltage variances as well as mechanical tolerances internal to the fuel cell. It is suggested to leave this setting alone unless the cell has been serviced or a board has been changed.
28. PSM Multiplier (Ch-2) - The pS/m screen display can be corrected for internal voltage variances as well as mechanical tolerances internal to the fuel cell. It is suggested to leave this setting alone unless the cell has been serviced or a board has been changed.
29. Alarm Mode (Ch-1) - The normal operation is to trigger the alarm when fuel is out of limits for some time as determined in selection #5. When the alarm is triggered the alarm relay will open and stay open until the loading is stopped and then restarted. This will be automatic if the relay contacts are controlling the pipeline flow. If the relay is used to alert other equipment it may be desirable to re-close the relay as soon as the fuel is back within limits. The default (Latching mode is code 0).
30. Alarm Mode (Ch-2) - The normal operation is to trigger the alarm when fuel is out of limits for some time as determined in selection #5. When the alarm is triggered the alarm relay will open and stay open until the loading is stopped and then restarted. This will be automatic if the relay contacts are controlling the pipeline flow. If the relay is used to alert other equipment it may be desirable to re-close the relay as soon as the fuel is back within limits. The default (Latching mode is code 0).
31. Increment Terminology (Ch-1) - Turbine data is normally in either Gallons or Liters. Determine the correct increment for the turbine being used and select it with this option.

32. Increment Terminology (Ch-2) - Turbine data is normally in either Gallons or Liters. Determine the correct increment for the turbine being used and select it with this option.

33. Increment Value (Ch-1) - The Turbine input for the 1150 is pulse data. The volume represented by each pulse should be entered with this option. If available a quantity of 0.1 gallons is recommended. Electrically a jumper is provided to interface with either voltage or switch closure outputs from the turbine.

34. Increment Value (Ch-2) - The Turbine input for the 1150 is pulse data. The volume represented by each pulse should be entered with this option. If available a quantity of 0.1 gallons is recommended. Electrically a jumper is provided to interface with either voltage or switch closure outputs from the turbine.

September 10, 2007