



Fuel Technologies International

Model FTI-20A

Multi-Tank

Automated Diesel Fuel Maintenance System

Controller Programming and Operating Instructions

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1. Introduction

- a. This manual assumes the system is installed and ready for operation. If the system has not yet been installed, please refer to the installation manual for instructions.

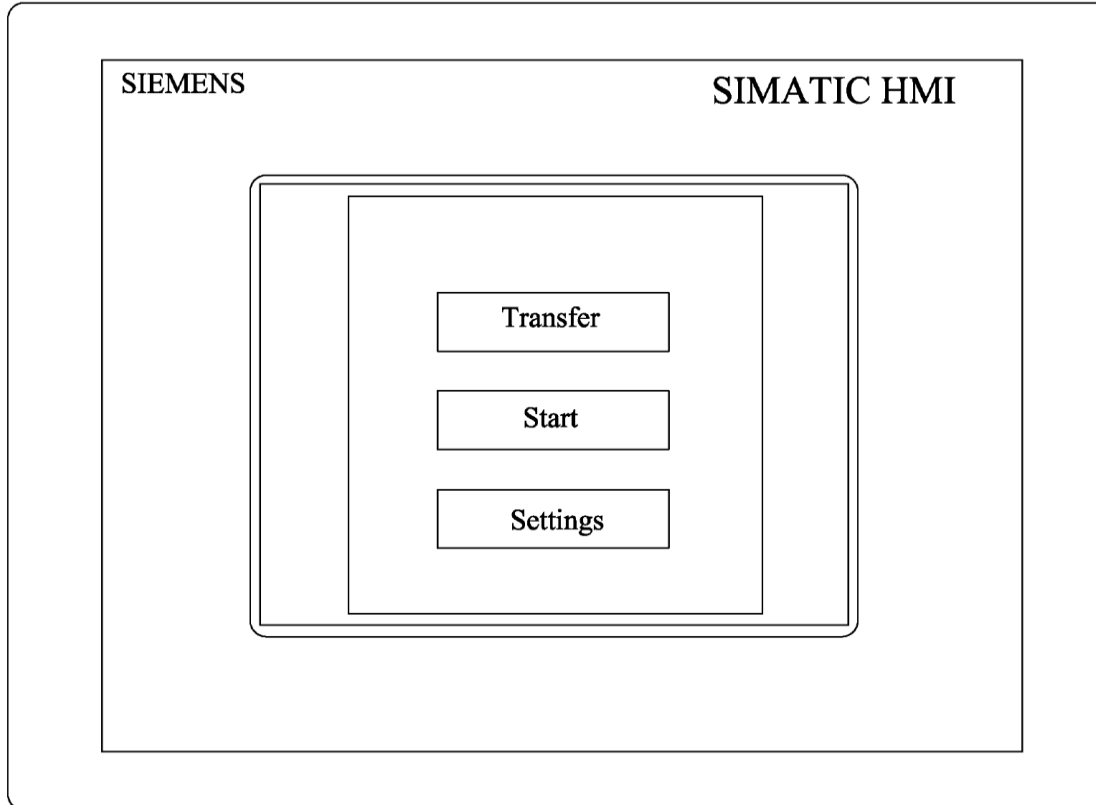
2. Overview

- a. FTI Fuel Monitoring and Maintenance Systems are designed for ease of use. Once installed, the system will operate automatically to schedule your program into it. The schedule should be determined by your specific needs, fuel and tank conditions, weather, etc. and can be changed at any time. **It is recommended to filter approximately 20% of the tank per week.** (If you are not sure what your optimum schedule might be, your FTI representative can assist you)
- b. Your FTI system will maintain all data input by you, such as the time, run time hours, etc. **This will last for up to 100 hours without power. After that, the data will have to be re-entered.**
- c. If the system is in auto mode and stopped for any reason, it will resume schedule during the 1st hour, when the interruption is complete. You can also switch to manual mode at any time. The system will resume with the preprogrammed schedule when put back into auto mode during the 1st hour. **After the 1st hour re-program the start time.**
- d. Depending on the condition of the fuel to be maintained, you may initially be changing filters more frequently than expected. Your FTI system will stop operation and signal you when filters are full. It will also let you know which particular filter should be changed, and will resume the program when restarted after the filter is replaced. As the fuel quality progressively increases, you will notice a dramatic drop in filter usage.
- e. In cases of Serious Contamination, it is recommended that you have your Fuel Polished prior to initial use of your FTI system. Since the FTI system is proactive, continued use prevents the fuel from deteriorating again and maintains a healthier environment to protect both the fuel and the tank.

3. Installation Precautions:

- a. Models FTI-20A Multi-Tank has no protection against thermal expansion for the fuel lines. If the fuel lines are installed without pressure relief, damage may occur to the pump, motor or filters.
- b. Installer should prevent any closed loop with the FTI-20A system in the middle.
- c. FTI will not be responsible for any damage due to excessive line pressure caused by thermal expansion.

Controller Set-up with the Touch Screen

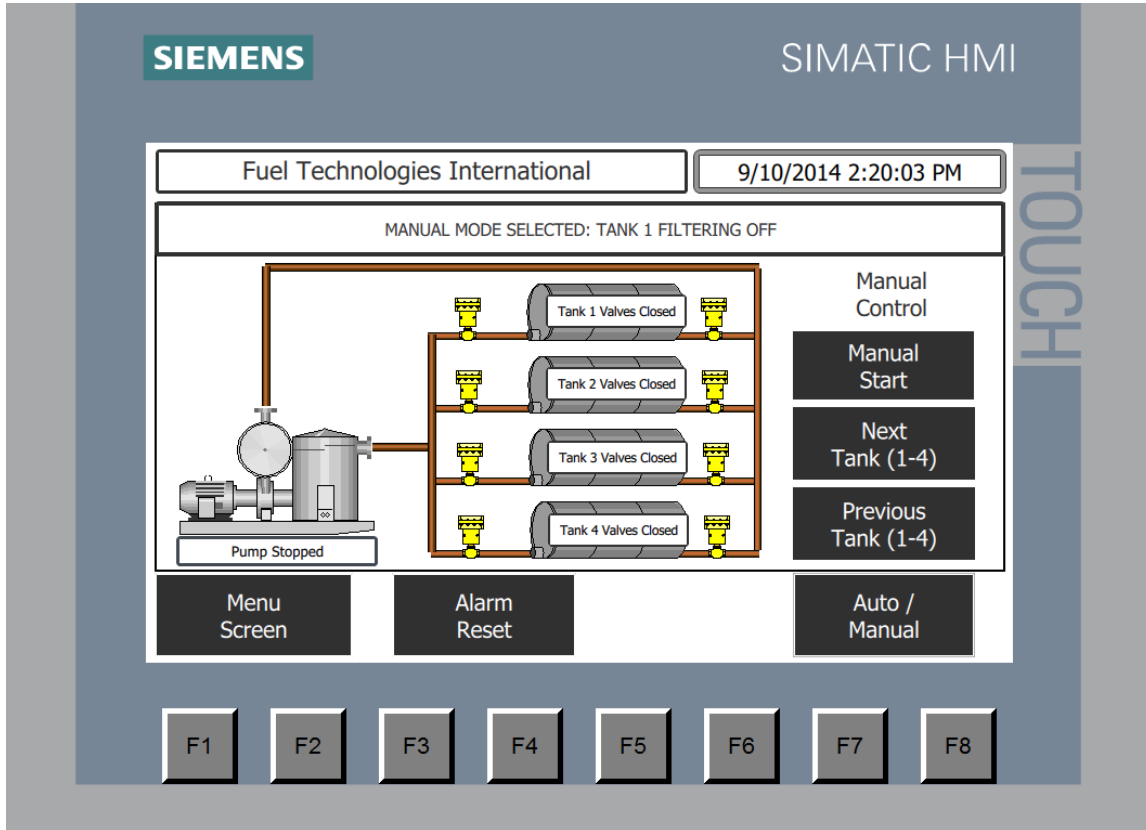


Once the Fuel Management system is installed, you’re ready to program the controller.

1. Programming the controller:

- a. When you apply power to the system, the display will go through a boot-up sequence, and the screen above will appear for roughly 15 seconds. **DO NOT PUSH ANY BUTTONS ON THIS SCREEN UNLESS: The Auto Start function is not working then push START.**
- b. Button descriptions
 - i. TRANSFER button is used to download the program to the touch screen.
 - ii. START button is used to start the boot sequence after doing any adjustments.
 - iii. SETTINGS button is where some settings can be changes, such as; sounds, transfer, network display, contrast and SCREEN SAVER
 - iv. To prolong the touch screens life, set the SCREEN SAVER to 2 hours**
- c. After going through the settings, press START and the system will continue to boot.
 - i. Wait until this screen above changes to the default **Main Operations Screen** (next page)

Default Start-up Screen



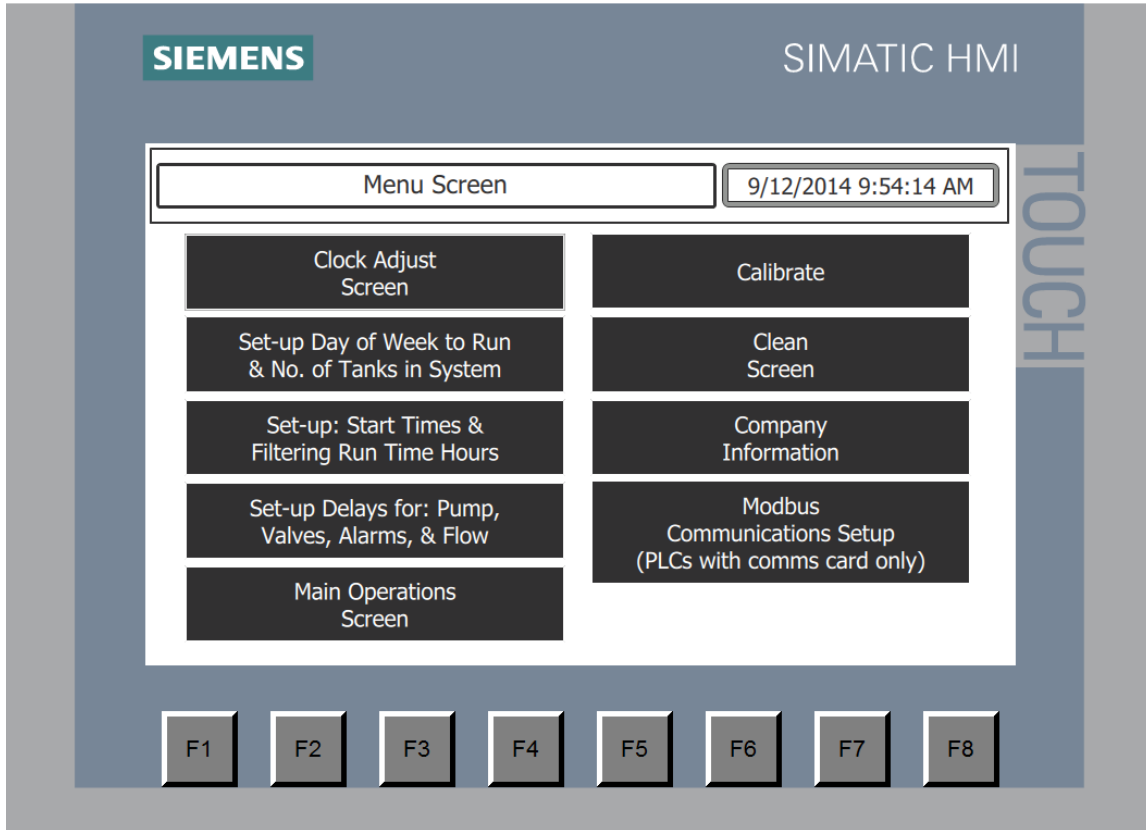
1. Functions from this screen:

- a. Go to the Menu Screen.
- b. Switch from Auto mode to Manual mode.
- c. Reset all alarms. (Alarm reset button only shows when system is in alarm mode)
- d. Turn system On & Off in Manual mode.
- e. The **Next Tank Button** & the **Previous Tank Button** only appear when the number of tanks selected is greater than one.
- f. Buttons F1-F8 are inactive at this time.

2. Set-Up Controller:

- a. Press the **MENU SCREEN** button
- b. Continue to page 5 for Menu Screen functions.

Menu Screen



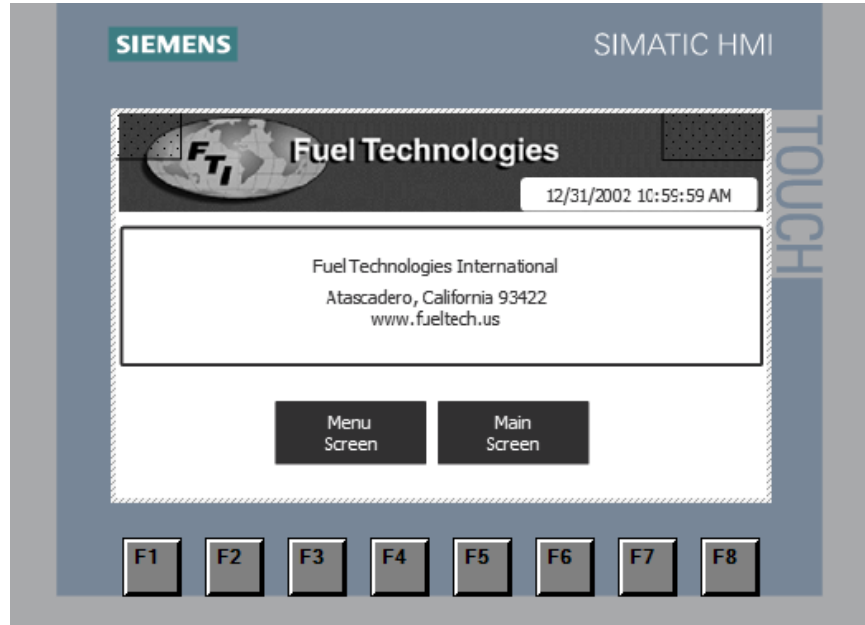
1. Functions (Left hand column):

- a. **Clock Adjust Screen:** Adjust clock
- b. **Set-up: Start & Stop Times:** Set schedule for operation
- c. **Set-up: Delays for Alarms:** Set delays for alarms to trip.
- d. **Modbus RTU Settings:** Manually change Modbus functions
- e. **Main Operations Screen:** Manually turn system on or off.

2. Functions (Right hand column):

- a. **Re-calibrate the screen:** Fixes troubles with touch calibration
- b. **Increase Brightness:** Brightness increased
- c. **Decrease Brightness:** Brightness decreased
- d. **Clean Screen:** Temporally disables the screen so you can wipe it off
- e. **Company Information:** Fuel Technologies International Information

Company Information Screen



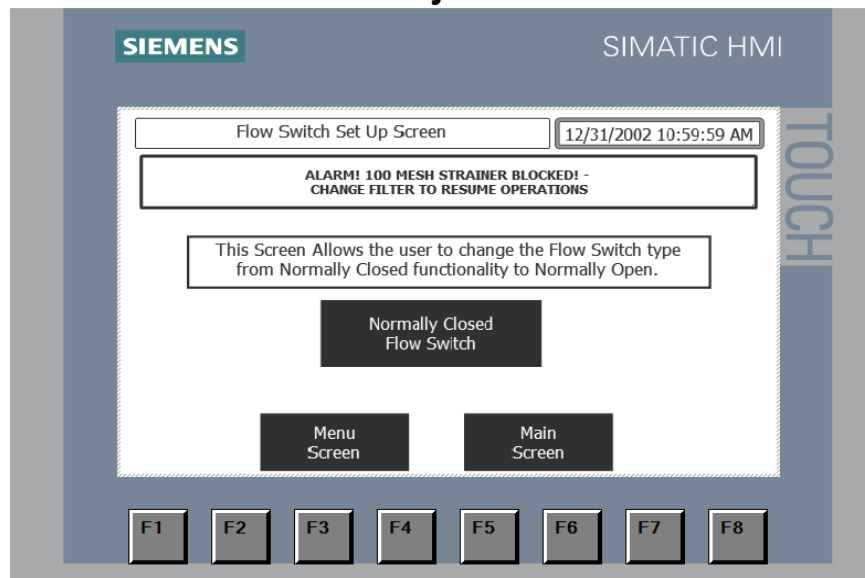
1. Fuel Technologies International contact:

- a. Address and Website information [fueltech.us]

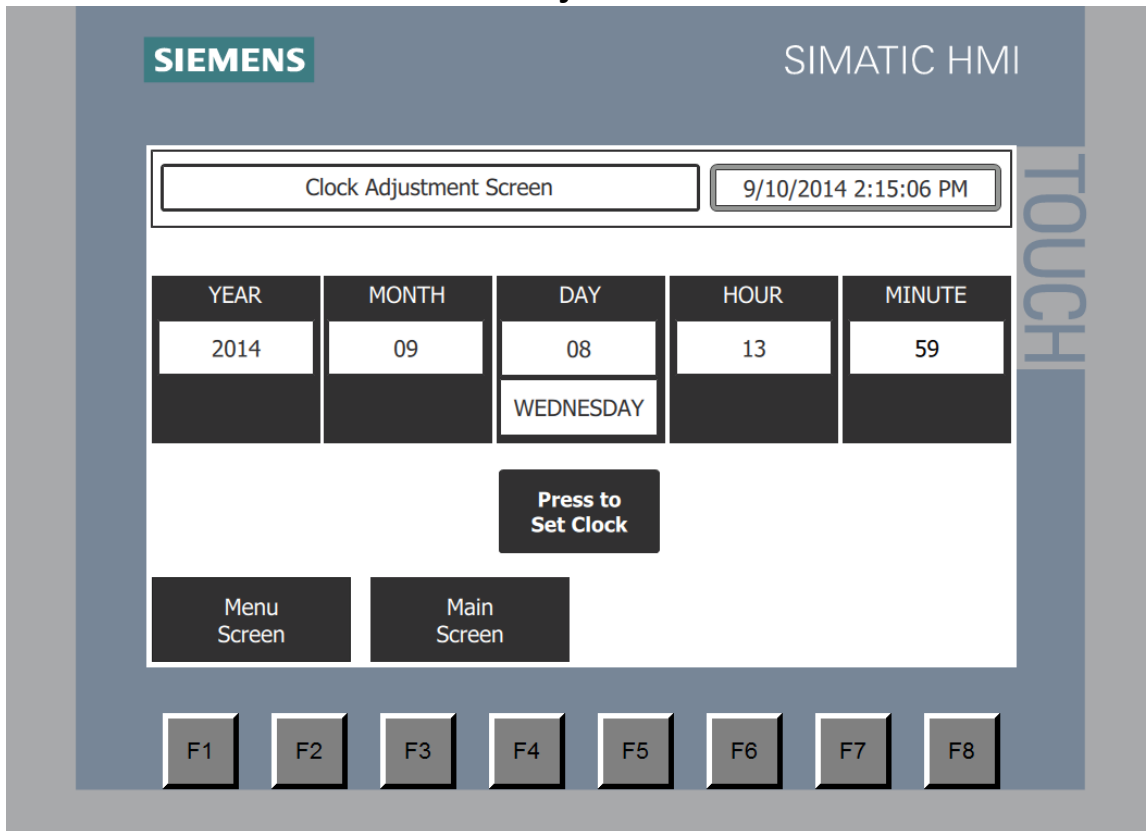
2. Flow Switch Adjustment Function

- a. Here you can switch the Flow Switch between normally open and normally closed. There is a hidden button in the upper right corner. Touch the upper right corner in the black area. A dotted button will appear. (see dotted button) Hold the button for 5 seconds. The screen below will appear.

Flow Switch Adjustment Screen



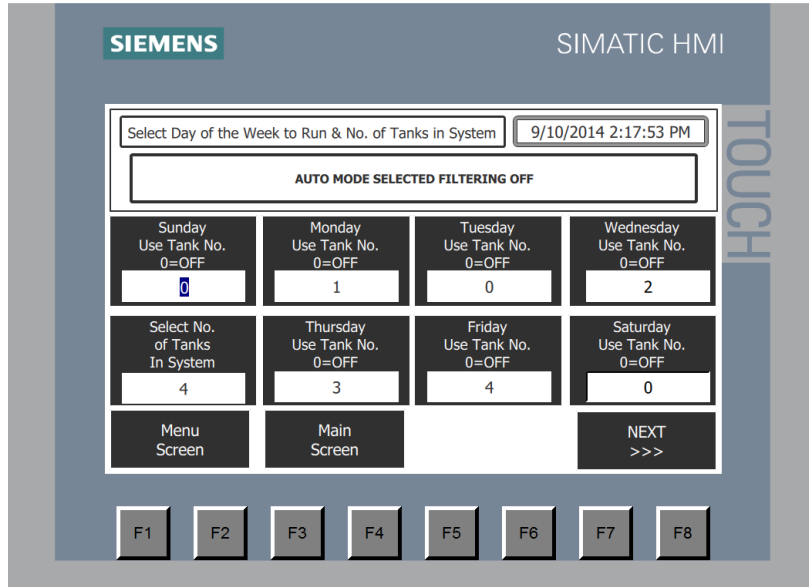
Clock Adjust Screen



1. Clock Adjust Screen

- a. Start on the left column under **Year**; Press the white box area and enter the year.
- b. Do the same for **Month, Day, Hour** and the **Minute**.
- c. After all 5 settings are entered push the **“Press the set clock”** button. This will enter your settings. The 5 settings in the white boxes will not change with the real time. The real time is in the upper right hand corner. To change settings, just enter the changes and press the set clock button.
- d. When completed press the Menu Screen Button, then the: Set-up Day of Week to Run & No. of Tanks in System Button.

Select Day of the Week to Run with Start / Stop Times

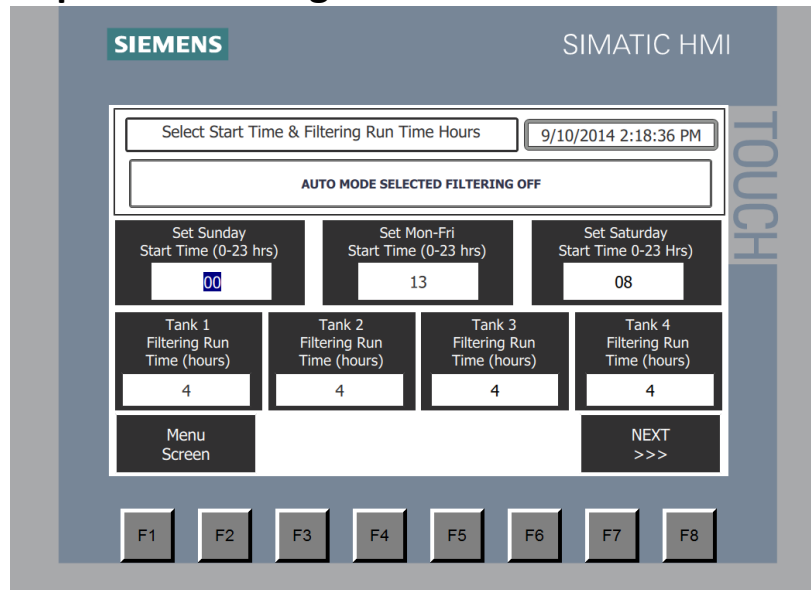


1. Start / Stop Set-up Screen

- a. First decide the number of tanks plumbed to the system (1-4). This system is capable of filtering up to four (4) tanks.
- b. To Set-up the number of Tanks, touch or press the number in the box. The **keyboard screen below** will appear.
- c. Then press the number 1, 2, 3 or 4, and then the **large arrow button**. ↵ (same as enter key), If you select the wrong number use the arrow button ← to back space (erases numbers selected)
- d. Then you need to decide what days of the week you want your system to run, & which tank you want to filter on each day.
- e. To select the day of the week to run, touch or press the number in the day of week box. Input tank 1-4, then the press the **large arrow button**.
- f. The example screen above shows a 4 tank system, with filtering schedule as follows: Tank 1 on Monday, Tank 2 on Wednesday, Tank 3 on Thursday, & Tank 4 on Friday.



Set-up Tank Filtering Start Times & Run Time Hours



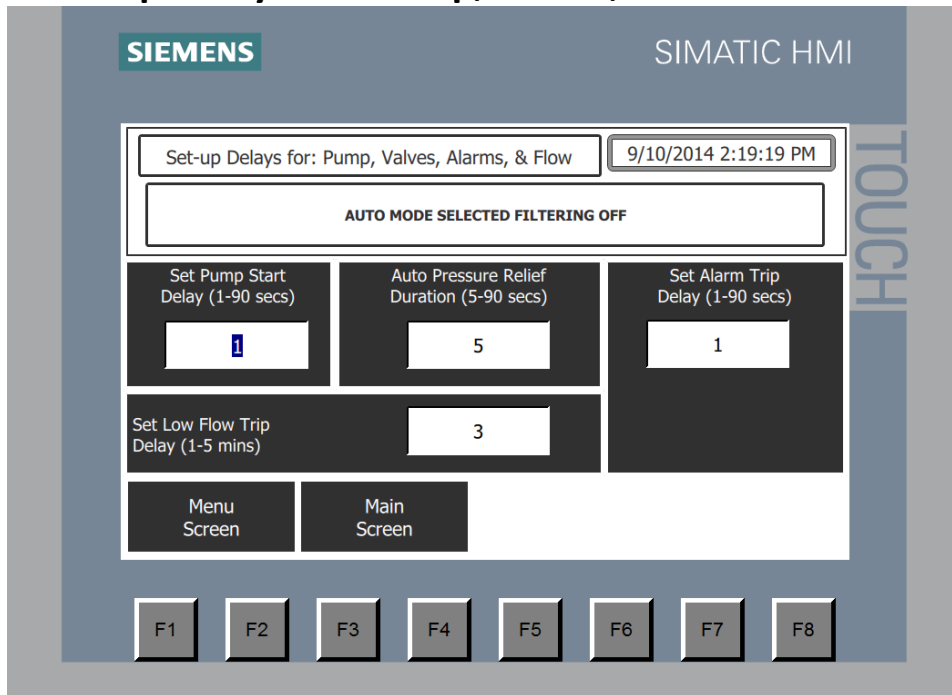
2. How to estimate the Run Time Hours

- a. First decide which day & time of day to start the filtering process. (To adjust, touch or press the number in the box as described on page 9.)
- b. You can select only one start time for (Sunday), on start time for (Monday – Friday), and one start time for (Saturday)
- c. The clock settings are (1-23) hours
 - i. Above Example: Set Saturday start time 8 = 8:00AM
 - ii. Above Example: Set Saturday start time 13 = 1:00PM

3. Then proceed to Set-up the Filtering Run Time in Hours:

- a. On the same screen you can select the run time hours to filter your fuel. (The recommended amount of fuel to clean is 20-25% of the tank per week)
- b. Example: 20% of 30,000 Gallon Tank = 6,000 gallons.
- c. Then take the pump size: 20 GPM (gallons per minute) x 60 minutes = 1,200 gallons per hour.
- d. Then divide 1,200 (gallons per hour) into 6,000 gallons (20% of tank) = 5 hours per week.
- e. Round up to a whole number if you get a decimal per week.
- f. The screen above will only show the number of tanks in your system that you selected in the set-up Numbers of tanks screen (Tank1, Tank 2, Tank 3, or Tank 4)
- g. Above Example: Above screen shows a 4-tank system, filtering all 4 tanks for 4 hours ea.

Set-up Delays for: Pump, Valves, Alarms and Flow

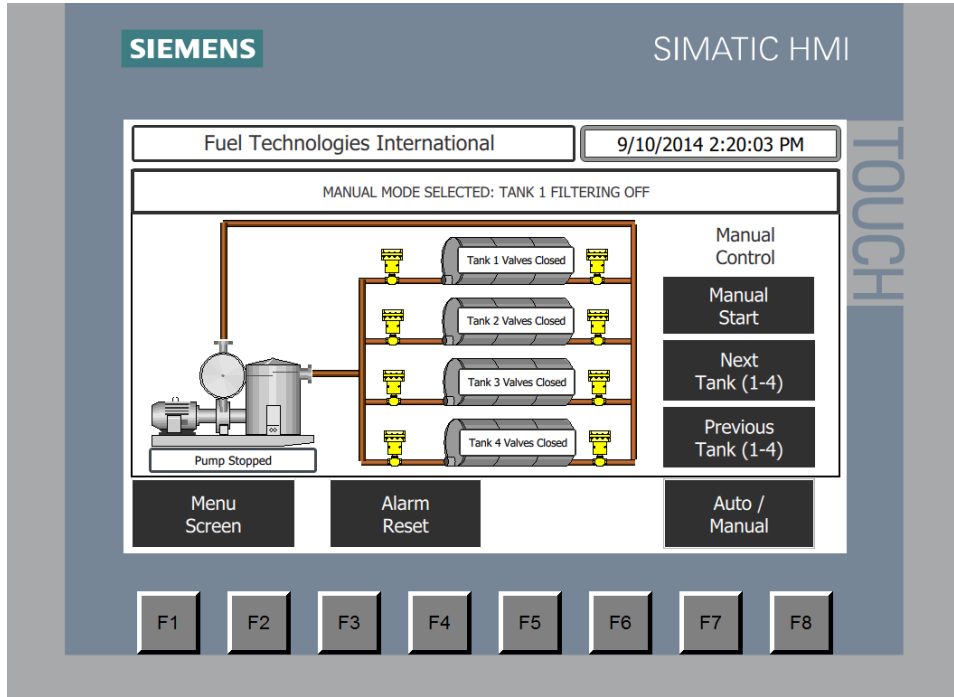


If you have special circumstances that require you to **delay the pump to start, delay the valves to open and close** (multi-tank systems), **delay the alarms from going off**, or **change the low flow alarm delay**, then continue with this step, if not skip forward. All of the alarm descriptions will show up on the right hand window as shown, and also on the Main Operations Screen.

1. Different Delays

- a. The pump from turning on by 1-90 seconds.
 - i. When using ACTUATED BALL VALVES, the pump will need to be displayed allowing valve to open before pump is turned on. Adjust the pump delay start seconds to the ball valve opening time.
- b. **Auto Thermal Expansion Pressure Relief:** (Set seconds to the time it takes to fully open the actuated ball valves.) Set the solenoid or electric actuated ball valves delay from closing by 5-90 seconds. (multi-tank systems)
- c. The alarms from going off by 1-90 seconds.
- d. **The Low Flow Alarm** (1-5 minutes – default is 3 minutes) this is a Flow or No Flow alarm. (The flow is monitored by the low set-point on the pressure gauge.)
 - i. The low flow alarm task is to protect the pump in case it has lost its prime. The pump will run for the time selected and then it will shut off and sound an alarm to notify maintenance personal the fuel supply line is dry)
- e. To adjust the settings, touch or press the number in the box as described for the keyboard on page 8.

Main Operations Screen



1. Main User Screen Functions:

- a. **Auto/Manual Mode Button:** Here you can select the **Auto Mode** or **Manual Mode**.
- b. **Auto Mode:** Run system automatically by the **Start & Run Times** you have entered. If time has not yet been reached, it will sit idle.
 - i. If the power is interrupted, the previous mode setting (Auto or Manual) will come back on. **Auto Mode** will resume with the pre-programmed schedule. If power is out longer than 1 hour, Re-programing **Start / Stop Times** is necessary. See page 8
- c. **Manual Mode:** System will stand idle
 - i. Once in **Manual Mode**, Pressing **Manual Start Button** will turn the system **ON** and begin to pump fuel through the system. Pressing **Manual Stop Button** will turn system **OFF**.
 - ii. If you have a **Multiple Tank System** and want to isolate a particular tank, press the Next Tank (1-4) Button until the display reads the tank number you wish to process. Then press the **Manual Start Button** to start the system.
 - iii. **Changing Filters:** Put in Manual Mode for servicing. When changing filters supply line and return line ball valves must be **closed** prior to opening system.

2. How to cancel system alarms

- a. Read the Alarm Description on the screen, then push the **Alarm Reset Button** to stop the alarm and reset the system. (Alarm description will appear in the **Manual Mode Selected** box above)
- b. The system will return to the previously selected mode when alarm status is reset. Be sure the system is in **Manual Mode**, and is not running, before attempting any maintenance operations. This is to avoid leakage or other possible hazards. Once maintenance has been performed (such as changing filters), turn system on manually to check for leaks. Then reset to **Auto Mode** and resume the scheduled program.

If a problem is detected in the following areas, the system will stop filtering, display the appropriate alarm message on the screen, and will sound an audible alarm to alert the operator. The alarm consists of a sequence of steady high-pitched beeping sounds that continue until the operator pushed the reset button and corrects the problem.

Touch-Screen Alarm Messages	Alarm Locations & Action required to fix the problem
100 MESH STRAINER BLOCKED	Vacuum / Strainer Gauge
Change Filter & Reset	Action: Check inlet strainer and supply line valves
10 MICRON FILTER BLOCKED	10 Micron Differential Switch Gauge
10 Micron filter plugged	Action: Replace 10 Micron filter
3 MICRON FILTER FAULT	3 Micron Differential Switch Gauge
3 Micron filter plugged	Action: Replace 3 Micron filter
1 MICRON FILTER BLOCKED	1 Micron Differential Switch Gauge
1 Micron filter plugged	Action: Replace 1 Micron filter
SYSTEM HIGH PRESSURE	System pressure caused by blockage in the system or return line. Possible Causes:
Check Valves & Reset	<ol style="list-style-type: none"> 1. Failed Solenoid valve, Ball valve, Relief valve, or Check valve. 2. <u>Auto Pressure Relief</u>: he FTI control panel will open & close all electrically actuated valves 24/7, one tank at a time. If the pressure builds up and purging does not relieve all of the pressure, adjust the auto pressure relief delay to match your valve opening time in seconds. This feature is to purge thermal expansion pressure build up in the fuel lines. Action: <ol style="list-style-type: none"> 1. Cancel error, restart system and locate reason for high pressure 2. Eliminate thermal expansion with pressure relief valve
HIGH WATER LEVEL	Water level sensor
Drain and Reset	Action: Drain water from the water separator.
SYSTEM LEAK	Leak Sensor: Leakage has occurred within the cabinet area.
Repair Leak & Reset	Action: Locate and repair leak in the cabinet.

Continue on next page

Touch-Screen Alarm Messages	Alarm Locations & Action required to fix the problem
GENERATOR RUNNING Filtering Off	This is a 24V DC dry contact to be used with Gen Set Run Relay. It will shut off the filtration system while the generator is running. (See wiring Diagram for electrical connections) Action: This contact is only used when the FTI system is sharing the Same Fuel supply line as the Gen Set. It will turn the FTI system off when the Gen Set turns on. (Do not schedule filtration system run times on the same day of Gen Set testing)
MOTOR OVERLOAD Reset Overload & Reset Panel	This will occur if pump/motor is over heated or over loaded. Action: Find cause and repair <ol style="list-style-type: none"> 1. Push the touch screen reset and then; 2. Push the reset button on the overload inside of the control panel
LOW FLOW ALARM	Lost Prime. Fuel flow has stopped while pump is running. Action: Locate reason for fuel not flowing.