



TORNATECH

LISTEN DEVELOP LEAD

**INSTALLATION AND MAINTENANCE MANUAL FOR
DIESEL ENGINE FIRE PUMP CONTROLLERS
MODEL HFD**



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Diesel engine fire pump controllers are designed to automatically start a diesel engine driven fire pump upon detection of an automatic start pressure switch in the fire protection system. A diesel engine fire pump controller provides automatic & manual starting. An automatic start is controlled by a pressure switch or by remote automatic devices as deluge valve. The "Operate Manual Start Test Pushbutton" implements a way to simulate the use of the "Emergency Pushbutton" by being activated after an automatic start followed by a stopping of the Firepump, or following a "Engine Fail to Start" alarm. A manual start is controlled by an Emergency Start pushbutton, hardwired to the relay board, that can securely start the engine. The diesel engine fire pump controller includes two battery chargers to maintain the engine batteries continuously charged.

Types of Diesel Engine Fire Pump Controllers

FIRE PUMP CATALOG NUMBER

MODEL No. EXAMPLE : HFD-12-220

Model Prefix HFD

Battery Voltage 12 : 12V 24 : 24V

Incoming Voltage 220: 208/240V 50/60Hz

Methods of Starting/Stopping

The controllers are available as combination automatic / non-automatic.

METHODS OF STARTING

MANUAL START

The automatic engine cranking sequence can be started by pressing the START push button on the ViZiTouch.

REMOTE MANUAL START

The engine can be started from a remote location by momentarily closing a contact of a manual push button.

OPERATE MANUAL START TEST

The engine can be started by using this pushbutton after a "Fail to Start" alarm or after an automatic start followed by a stop. This method of starting will activate the last cranking starters that did not attempt to crank, and is in parallel with the "Emergency Start" button.

EMERGENCY START

The engine can be started from the Emergency Start Push Button located behind the breakable cover.

REMOTE AUTOMATIC START, DELUGE VALVE START

The engine can be started from a remote location by momentarily opening a contact of a pressure switch.

SEQUENTIAL START

In case of a multiple pump application, it may be necessary to delay the starting of each motor when there is a water pressure drop to prevent simultaneous starting of all motors.

METHODS OF STOPPING

MANUAL STOP

Manual stop is done by pressing the STOP push button. Note that pressing the stop push button will stop the engine only if all starting causes have disappeared.

EMERGENCY STOP

The emergency stop is always possible in any running condition and is done by pressing the Stop pushbutton for 8 seconds. This will activate the “Auto Mode Bypass”, stopping the engine and preventing the engine from starting automatically. Use only for maintenance operations..

Installation 2

The controller is built in accordance with the latest edition of the EN-12845 Standard, and also based on the National Fire Protection Association standard for the Installation of Centrifugal Fire Pumps, NFPA No.20 (Centrifugal Fire Pumps 2013 Edition).

This controller is designed to be used with non-approved engine, using the control by analog senders (Magnetic pickup, oil pressure and engine temperature senders, all shown using on-screen gauges on the ViZiTouch. Find more information on the senders section of this manual.

Location

The controller shall be located as close as practical to the engine/motor it controls and shall be within sight of the engine/motor. The controller shall be located or protected such that it will not be damaged by water escaping from pump or pump connections. Current carrying parts of the controller shall be not less than 12 in. (305 mm) above the floor level.

The controller is suitable for use in locations subject to a moderate degree of moisture, such as a damp basement. The pump room ambient temperature shall be between 39°F (4°C) and 104°F (40°C) (If a temperature option is included, see the rating label for maximum temperature).

The standard controller enclosure is rated IP 55. It is the installer's responsibility to insure that either the standard enclosure meets the ambient conditions or that an enclosure with an appropriate rating has been provided. Controllers must be installed inside a building and they are not designed for outside environment. The paint color may change if the controller is exposed to ultraviolet rays for a long period of time.

Mounting

The fire pump controller shall be mounted in a substantial manner on a single incombustible supporting structure. Wall mounted controllers shall be attached to the structure or wall using all four (4) mounting ears provided on the controller with hardware designed to support the weight of the controller at a height not less than 12 in. (305 mm) above floor level. Floor mounted controllers shall be attached to the floor using all holes provided on the mounting feet with hardware designed to support the weight of the controller. The mounting feet provide the necessary 12 in. (305 mm) clearance for current carrying parts.

Storage

If the controller is not installed and energized immediately, Tornatech recommend following the instructions from the chapter 3 of the NEMA ICS 15 standard.

Wiring and Connections

Electrical Connections

A licensed electrician must supervise the electrical connections. The dimension drawings show the area suitable for incoming power and motor connections. No other location shall be used. Only watertight hub fittings shall be used when entering the cabinet to preserve the IP rating of the cabinet. The installer is responsible for adequate protection of the fire pump controller components against metallic debris or drilling chips. Failure to do so may cause injuries to personnel, damage the controller and subsequently void warranty.

Energy Consumption

Diesel Controller with boost charger			
Model / State		220/ 240VAC	VDC Output
12VDC / @	No charge	1.0A	13.8V
12VDC / @	Full charge*	4A	
24VDC / @	No charge	0.5A	27.6V
24VDC / @	Full charge**	6A	

*12 amps through each battery

**10 amps through each battery

Sizing

Wiring between controller and engine (terminals 1,9,10,12) must be stranded #10AWG as minimum.
Wiring between controller and engine (terminals 6,8,11) must be stranded #8AWG as minimum.

Power supply wiring must be stranded #14 AWG as minimum.
Incoming power supply terminals are sized for #16 to #6 AWG wire.

Incoming Power Connections

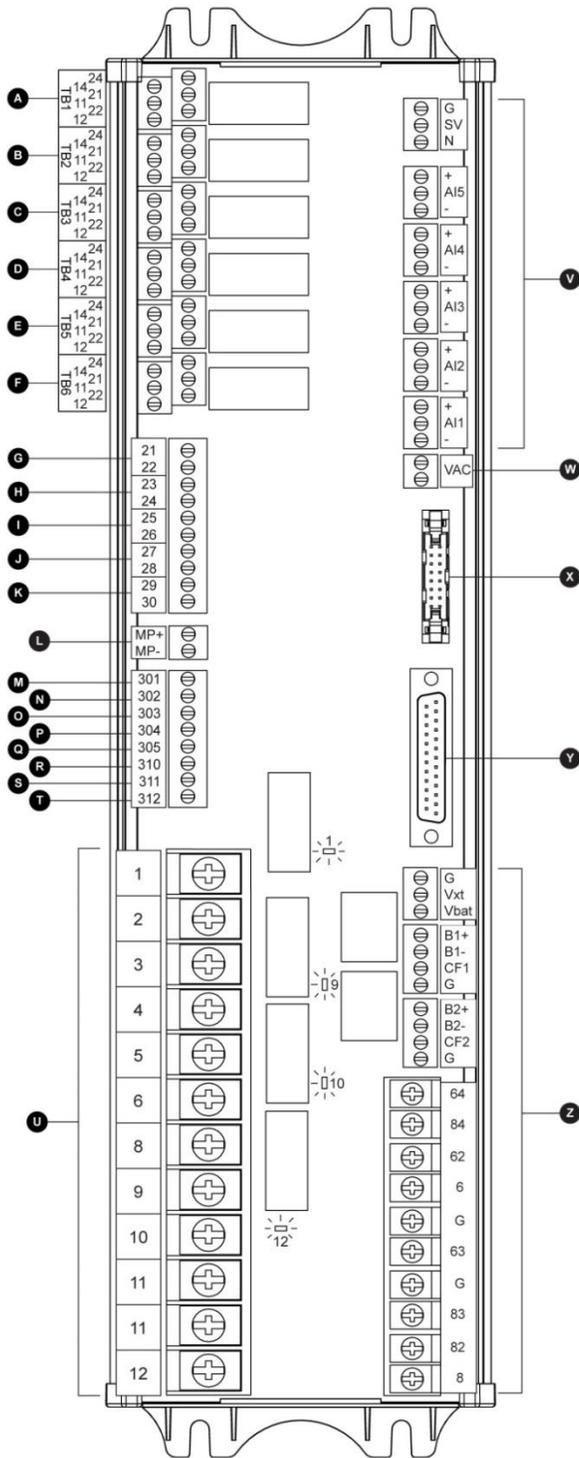
Diesel engine driven fire pump controllers shall be powered by a dedicated source protected by a fuse or circuit breaker. Verify the label on the cabinet to select the correct protection. Always follow this procedure when connecting or disconnecting the controller: Connect both batteries before connecting the AC power. Disconnect the AC power before disconnecting the batteries. Disconnecting the batteries while the AC is connected may result in severe damage to the controller electronic boards.

Circuit protection

CB1 protects battery charger 1 and CB2 protects battery charger 2. CB3 protects the control circuit from battery 1 and CB4 protects the control circuit from battery 2.

Always follow this procedure when connecting or disconnecting the controller: Connect both batteries before connecting the AC power. Disconnect the AC power before disconnecting the batteries.

Terminal Strip Descriptions



A-F : Alarm Output Terminals

(DPDT Relay, 11/21:Common, 12/22:Normally Closed, 14/24:Normally Open):

- A: Controller Trouble (Fail safe)
- B: Engine Run
- C: Automatic Mode Bypass (Fail safe)
- D: Fail to Start
- E: Engine Trouble
- F: Pump Room Alarm

G-T : Field Input Terminal

(Dry Contact Only: Voltage Free):

- G: Emergency Button
- H: Remote Automatic Start (NC)
- I: Deluge Valve (NC)
- J: Fuel Tank Leak (NO)
- K: Low Fuel Level (NO)
- L: Engine RPM Magnetic Pickup
- M: Not Used
- N: Not Used
- O: Not Used
- P: Not Used
- Q: Not Used
- R: Not Used
- S: Not Used
- T: Not Used

U : Engine Terminals :

The terminals are numbered according to the standard:

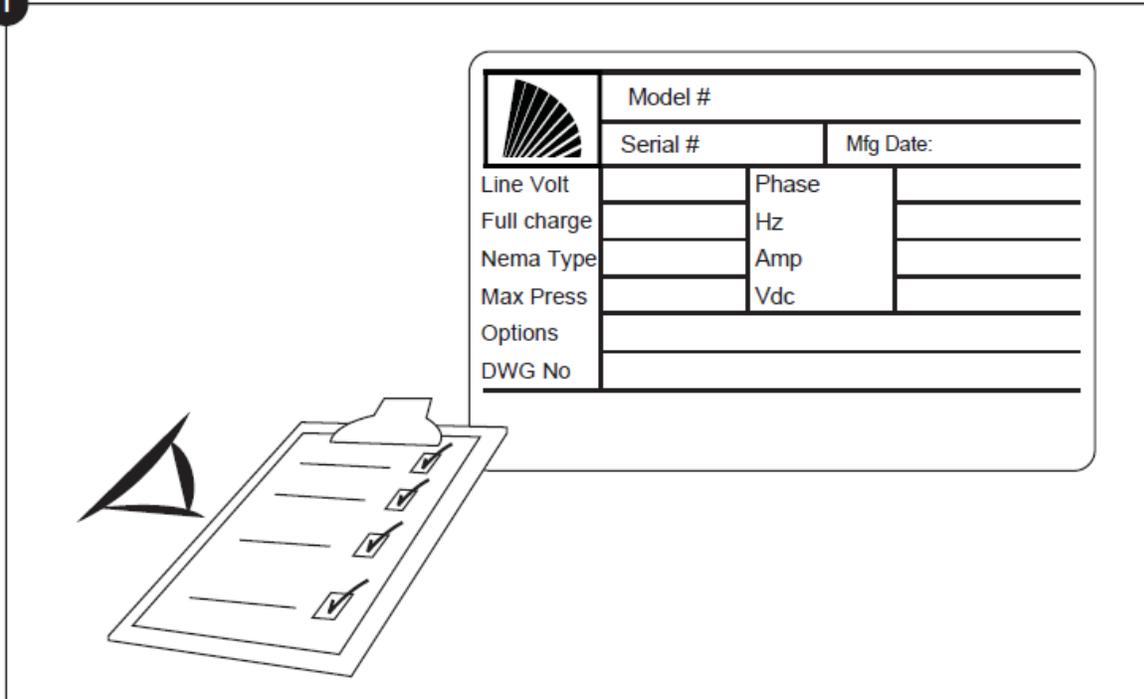
- 1 - FS : fuel solenoid valve (energized to start)
- 2 - Not used
- 3 - Not used
- 4 - Not used
- 5 - Not used
- 6 - B1 : battery #1 positive
- 8 - B2 : battery #2 positive
- 9 - C1 : start contactor #1
- 10 - C2 : start contactor #2
- 11 - GND : Ground
- 12 - ST : stop fuel solenoid valve (ETS - energized to stop)

V: Analog inputs

- SOL V: Not Used
- AI1: Not Used
- AI2: Not Used
- AI3: Oil Pressure transducer
- AI4: Fuel Level analog input
- AI5: Engine Temperature transducer
- W: AC Voltage reading
- X: CANBUS to IO cards
- Y: CANBUS to ViZiTouch
- Z: Factory reserved power connections

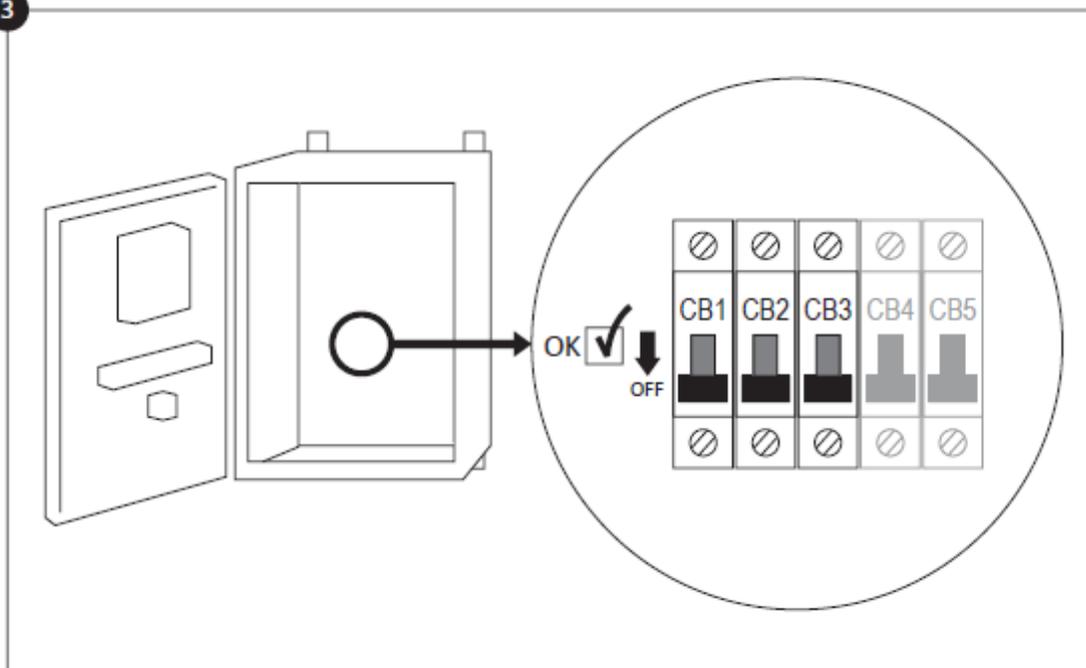
Quick Start-Up Guide

1

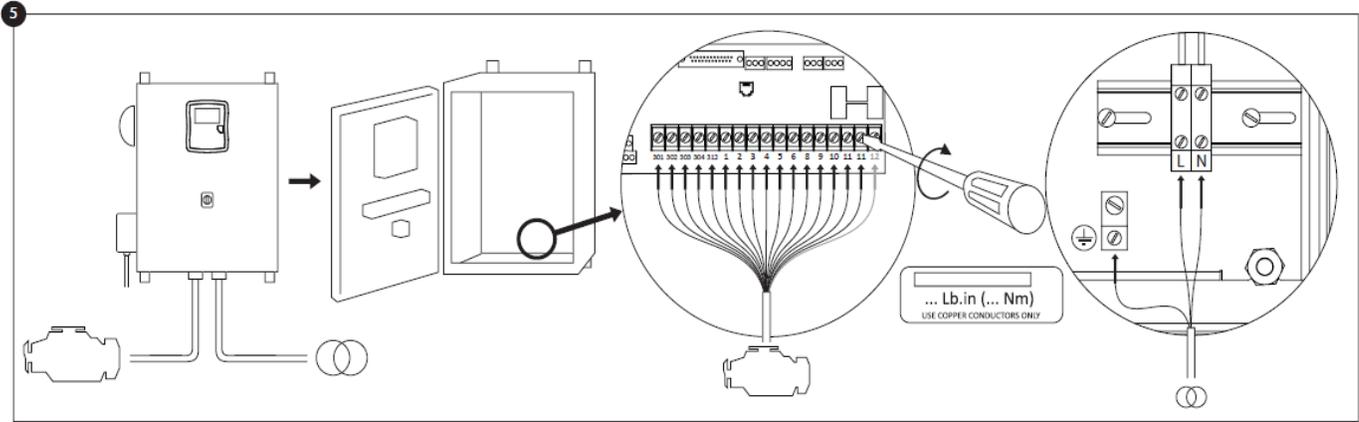


The rating label is the most important label. It must be read carefully to ensure the compatibility between the controller and the installation.

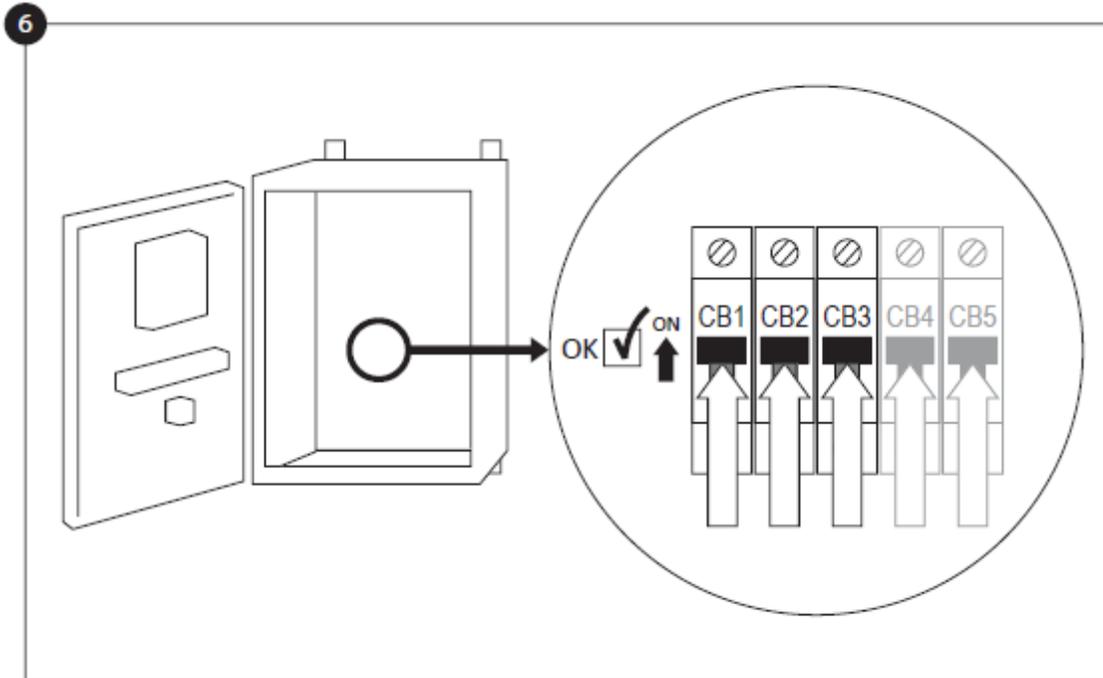
3



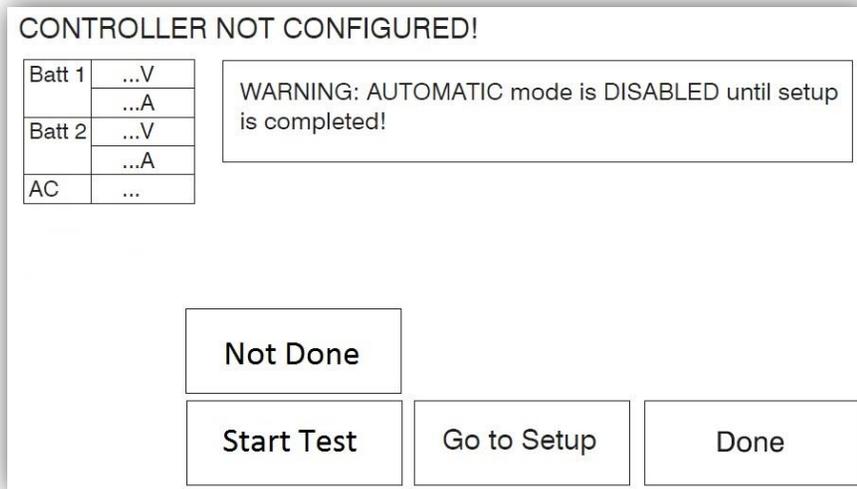
Open the controller's door and verify all circuit breakers are in the lower "OFF" position.



Connect all engine cables between the control panel and the controller engine terminals (Identified as “S” on the IO board diagram that is displayed in the Terminal Strip Descriptions in the manual). Secure with the appropriate torque as indicated on the torque label and verify all connections. Connect the AC main lines and ground to the AC terminals in the controller.



Activate the disconnect switch (if present) and all breakers by setting them to the "on" position. The controller will boot up for the first time.



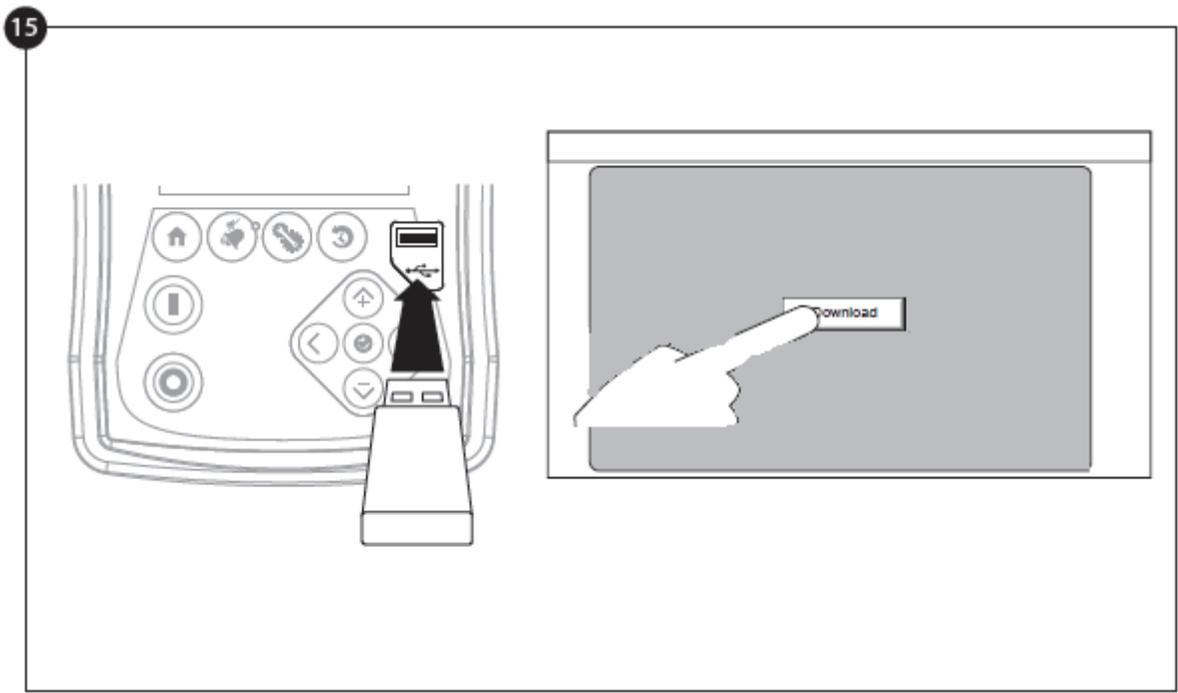
The “First Setup” page replaces the Homepage until the “First Setup” is done. Verify that the controller reads the batteries voltage and current. Verify the “AC” is “OK” and not “FAIL”. Verify that the pressure reading is correct.

Before trying to start the engine, verify that the engine setup is complete and the exhaust pipe is connected properly. Verify that the engine has started and is running properly.

Click on the “Go to Setup” button. The “Config” page is now visible. Click on the “padlock” button to log in with your password. If needed, read the “User Login / Keypad” section for more information on how to enter your password. Once a valid password is confirmed, the “Config” page will be visible again with the “padlock” showing that it is open the actual user security level.

Once the configuration is done, click on the “Home” membrane button. The “First Setup” page will be displayed

When satisfied with the controller settings, press the "Home" button on the membrane, acknowledge the changes by pressing the done button. If the done button is unavailable, ensure that a sufficient authorization code has been entered.



Proceed with the download step to save the report.

Press the home page button to verify that the displayed values are correct.

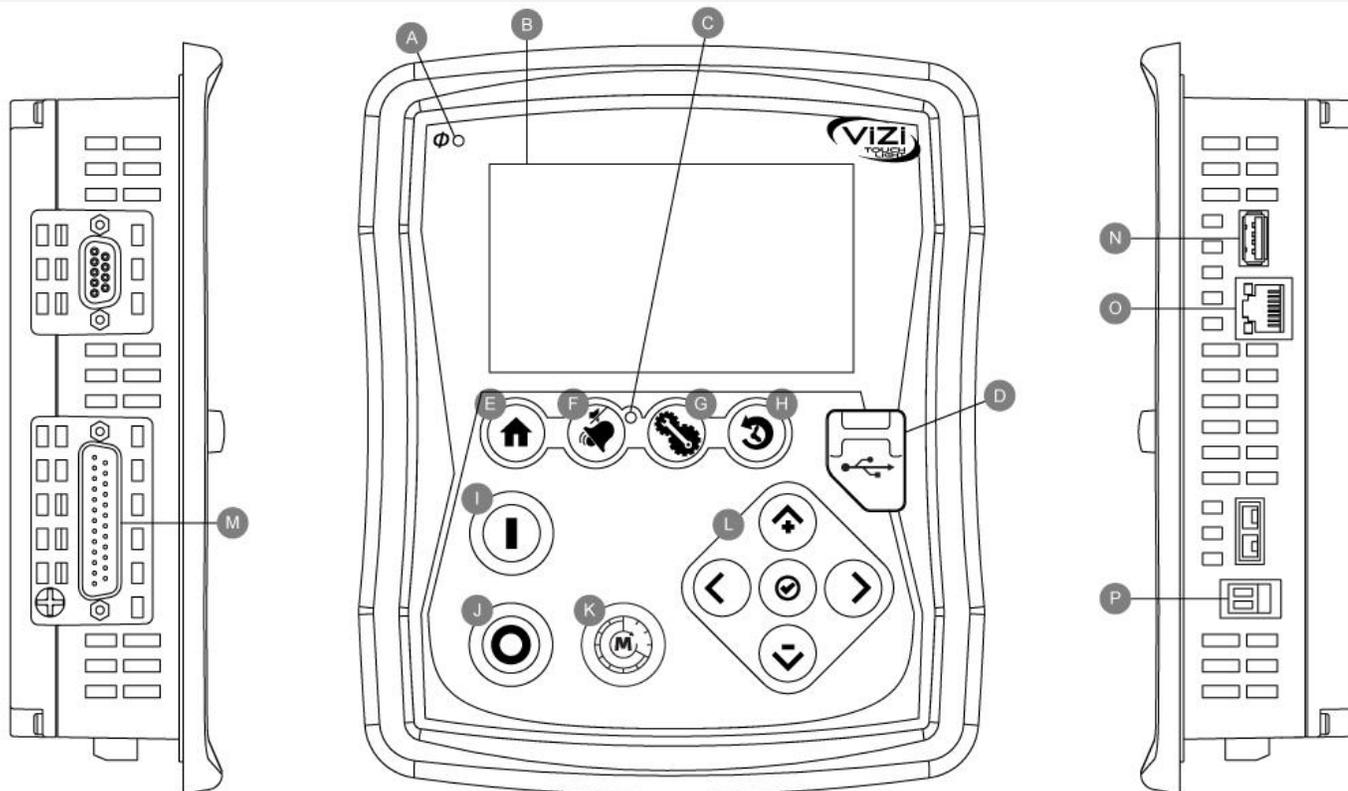


The "First Start up" is now completed. The controller is fully installed and configured.

Main Features

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The ViZiTouch



A: Power LED: Indicates if the ViZiTouch is properly powered.

B: Touch Screen: 4.2 inches color touch screen LCD.

C: Alarm LED: Indicates if an alarm is currently active.

D: Front USB Connector: USB Device connector used for file download, software updates, service reports.

E: Home button: Used to navigate to the Home page.

F: Alarm button: Used to navigate to the Alarm page. It also allows the user to silence the alarm bell, hence the small "no speaker" symbol in the upper right corner of the button.

G: Config button: Used to navigate to the Configuration page.

H: History button: Used to navigate to the History page.

I: Manual Start button: Used to start the automatic cranking sequence.

J: Stop button: Used to stop the engine if all starting conditions are gone.

K: OPERATE START TEST PUSH BUTTON: The engine can be started by using this pushbutton after a "Fail to Start" alarm, after an automatic start followed by a stop, and during the first setup procedure. The last method will not activate the "Fuel Solenoid" relay, therefore creating an intentional "Fail to Start". This method of starting will activate both cranking starters.

L: Contextual navigation pad: Used to facilitate the navigation on specific pages. A small icon representing the contextual navigation pad will appear at the bottom right corner of a page if the pad is active. By clicking on the small pad icon, a menu explaining the specific functions of the arrows will appear. For example, it is possible to switch between the graphical or the table mode on the logs page, as well as navigate through the tables.

M: CAN bus connector to IO cards

N: USB 2.0 connector

O: Ethernet connector

P: Alarm Bell connector

Warning

After 2 years of service, the Vizitouch battery may become less efficient and could lose the time after a shutdown.

Alarm Bell

The alarm bell is activated under default faulty conditions and under optional or user defined conditions. Any of these conditions will energize the alarm bell but may be silenced, by pressing on the “Alarms / Silence” membrane button. When silenced, the alarm bell restarts ringing if a new fault occurs or if the alarm conditions remain unchanged after 24 hours. The alarm bell automatically stops ringing if alarm conditions are not present anymore.

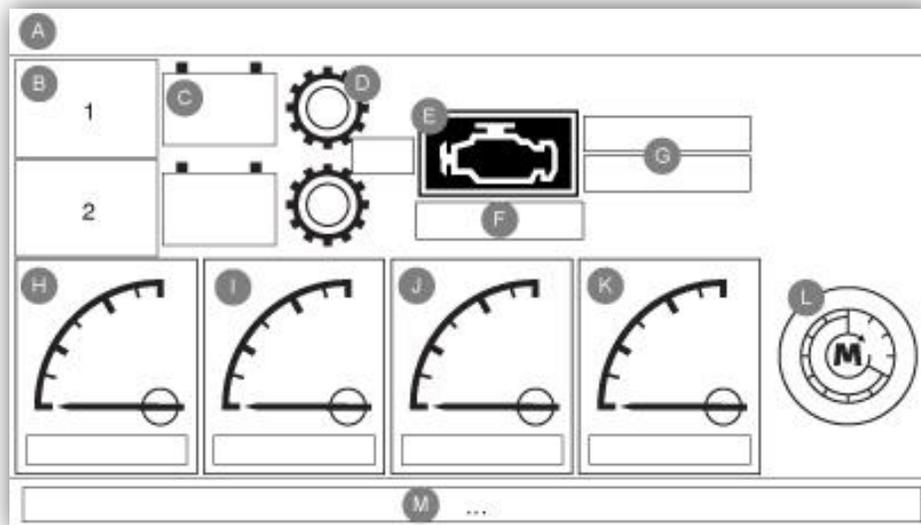
Note: other external conditions may trigger optional conditions depending of the factory settings. Verify drawings affixed inside the cabinet.

Default Conditions :

- Engine Overspeed
- Engine Low Oil Pressure
- Engine High Coolant Temperature
- Engine Fail to Start
- Battery Failure 1-2
- DC Failure
- AC Fail
- I/O Cards Communication Loss
- CAN System Failure
- File System Failure

First Setup

The First Setup must be done prior to using the controller. Completing the First Setup is the only way to access the homepage and enable the automatic mode of the controller.



The home page displays all controller statuses and important values of the controller. All voltages, currents, engine state and status, as well as all timers and cranking sequences.

The entire background will become red if an alarm becomes active. This feature will help the user identify a problem even at a significant distance away from the controller.

A: Navigation bar which contains general information about:

- The language (the language may be changed by pressing on it)
- The page title
- The alarm banner (warning and alarm messages may be shown)
- The date and time (adjustable in the Configuration page)

B: Battery charger state. It may become one of three colors and also explicitly describes the current battery charger state.

- POWER UP – Green
- BULK – Green
- OVER_CHARGE – Green
- FLOAT – Green
- CHARGER_FAIL – Red
- NO_AC – Red
- BATTERY_FAIL – Green

An orange rectangle between the battery and the charger will appear periodically. It is the boost mode. This charging mode enables the boost function on the charger, allowing a shorter charging time of the battery. Also, it allows the controller to detect a missing battery, and/or a problem with the charger.

C: Battery. The battery will be red if it is in failure and green otherwise. The first line of data shows the actual voltage of the battery in volts and the second line shows the actual current in amperage.

D: Starter gear. It represents the current step of the cranking sequence. The counter inside indicates the step remaining time, counting down from 10 to 0 seconds. As there are two cranking modes, "waiting for crank" and "cranking", the gear will alternate between yellow and green, allowing the user to know exactly the state of the cranking sequence. Between the two contactors, a counter is visible. It indicates the current step inside the cranking sequence. It will stay on a step during the 10 seconds of wait and on the 10 seconds of cranking and then will count on until the sixth step, which is the end of the cranking sequence.

E: Diesel engine. It will be grey if the engine is stopped, green if an "Engine Run" signal is detected and red if an "Overspeed" or "Fail to start" occurred, after 6 unsuccessful cranking attempts. The engine will be yellow if running in test mode.

F: Representation of the motor starting or stopping cause. A green capsule will indicate the reason why the engine is running, and a red capsule will indicate reason it is not running when it should. Possible choices are:

Local – Optional: This start cause is triggered if the engine is locally started directly from its own control panel and the option is enabled.

Manual – It receives a manual crank request from one or both of the manual crank membrane buttons while the selector switch is the "HAND" position.

Emergency – It receives a manual crank request from the emergency pushbutton.

Remote manual: Manual engine starting activated by a remote start contact.

Deluge: Automatic engine starting activated by a deluge valve.

Remote auto: Automatic motor starting activated by remote equipment

Alternative current failure – Alternative current failure will count the time following an AC Failure and at the end of a predetermined timer, will start the engine with an Alternative current failure request when this option is enabled.

A red capsule will indicate the reason why the motor is not running despite the fact that a request is being made. Possible causes are:

Fail to start – This failure happens when the controller receives a request to start, but a "Fail To Start" alarm is active after a cranking sequence failure, thus preventing its ability to effectively start the engine until this alarm is reset.

Locked: An interlock signal is preventing the motor from running.

G: Operations timers including the sequential start timer and the AC Fail timer.

H, I, J, K: Please refer to chapter 6 "Configuration", the section on the sensors for detailed information on the gauges.

L, M: The "M" section shows the text: "Operate manual start test push button". It is grey when the corresponding button is offline. When the button becomes active, the message color turns Yellow, and the button's logo appear on screen ("L"), sending the message that the controller is ready for this test.

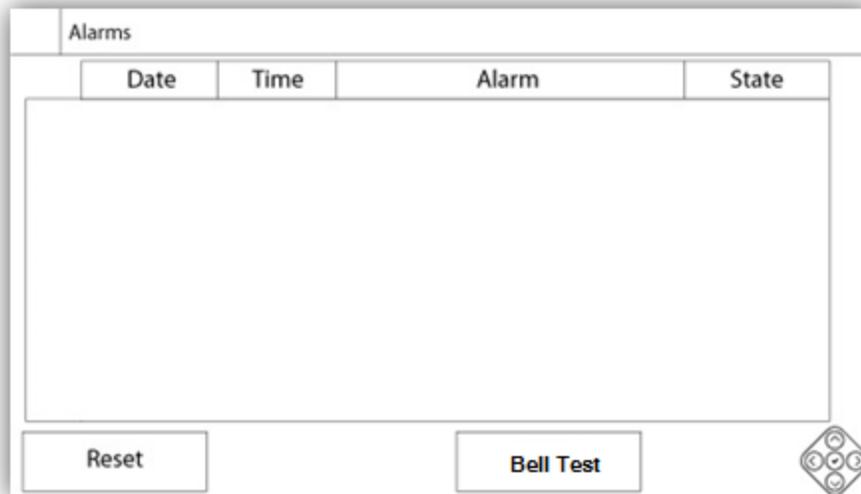
Screen Saver

After 5 minutes of inactivity on the ViZiTouch, the screen will dim its brightness to 25%. After 10 minutes of inactivity on the ViZiTouch, the "Black Screen" screen saver will activate. Its goal is to expand the lifetime of the LCD screen. The screen saver will be instantly deactivated if the engine is running or if an alarm is activated. To manually deactivate it, simply touch the screen or any membrane button. After deactivation, the screen saver will always redirect to the "Home" page. It will also log off any user by resetting the security level to 0 and save any new modifications to the settings.

Alarms 5

Alarms (Membrane button)

Alarms



Displays the list of currently active and occurred alarms. An alarm is called ACTIVE when its triggering condition is present. An alarm is called OCCURED when its triggering condition has been active, but is no longer true. Alarms representing serious concerns are RED. Alarms representing simple warnings are YELLOW. To silence the bell press the ALARM button or it will silence itself after the expiration of a factory set timer. Pressing on the RESET button will reset OCCURED alarms only.

The bell test button will activate the alarm bell for 3 seconds.

The table displays system events:

- Date and Time: Date and time stamp of the alarm in the YYYY.MM.DD format
- Message: Alarm message
- State: OCCURED or ACTIVE
- Color Code:
 - Red: The event is an alarm
 - Yellow: The event is a warning

Complete list of alarms :

Common Alarms:

Engine Trouble: The Engine Trouble common alarm is active when one or more of these conditions are active :

- Engine High Coolant Temperature
- Engine Low Coolant Temperature
- Engine Low Oil Pressure
- Engine Fail to Start
- Engine Overspeed*
- Battery Failure 1-2

Pump Room Trouble: A common alarm activated when the following events occur:

- Fuel Tank Leak
- Low Fuel Level
- High Fuel Level
- AC Failure
- Water Reservoir Low
- Water Reservoir High
- Water Reservoir Empty

CTRL Trouble: Important: this relay is normally energized when controller is in normal condition. The relay is de-energized when controller trouble is detected (fail safe). The controller trouble common alarm is active when one or more of these conditions are active :

- Charger Failure 1-2

- DC failure

- AC Failure: Monitors the AC power and activates on a failure.

- Battery 1-2 Fail: Monitors the status of battery 1 and activates on a failure. This occurs when the battery is disconnected, is the wrong type or is unable to be recharged. When disconnecting a battery, there will be a delay before the alarm is activated. The boost signal will be active a minute later, or more if a ghost current is detected. If there is no response from the battery, it will execute a second test 30 seconds later, and then activate the battery failure alarm.

- Charger 1-2 Fail: Monitors the state of battery charger 1 and activates on a failure. This occurs when the battery charger has a defect, is not properly powered, or is unable to provide the needed current. It will also change to Boost Fault mode if during a boost test, the voltage does not rise. A NC dry contact is also connected from the charger to the I/O Board. If this contact opens for 1 minute, the alarm will be activated. Chargers readings are not updated during cranking and/or running, due to reading instability under load. As soon as the engine returns to an idle state, all readings and failure analysis are reactivated.

(Note: With the option NiCad batteries, no boost is used and there is no NC dry contact. The "Charger Fail" alarm is detected when the battery voltage goes under the float voltage and no current is detected between the charger and the battery.)

- Loss of Continuity 1-2: Activates if the engine start contactors are disconnected from the controller.

- Water Res. Low: Activates if the "Water Reservoir Low" contact input is triggered or if the analog readout of the water reservoir is enabled and is lower than the water reservoir low set point in the "Water Level" sensor page.

- Water Res. Empty: Activates if an external contact triggers the optional "Water Reservoir Empty" input.

- Main Relief Valve Open: Activates if an external contact triggers the optional "Main Relief Valve Open" input.

- Fuel Tank Leak: Activates if the "Fuel Tank Leak" contact input is triggered.

- Low Fuel Level: Activates if the "Low Fuel Level" contact input is triggered or if the analog readout of the fuel level is enabled and goes lower than the low fuel level set point in the "Fuel Level" sensor page.

- High Fuel Level: Activates if the "High Fuel Level" contact input is triggered or if the analog readout of the fuel level is enabled and goes higher than the high fuel level set point in the "Fuel Level" sensor page.

- Engine Fail When Running: Activates if the "Engine is running" signal is lost while the engine is running. The engine will try to start the cranking sequence once again if the starting causes are not back to normal.

- Engine Fail to Start: Activates if the engine fail to start after the complete 6 attempts crank sequence. The engine will turn red.

- Engine High Temperature: Activates if the specific "High Temp" input is triggered on the engine connector strip and the engine is running. This alarm will stop the engine only if triggered during a manual run test.

- Engine Low Temperature: Activates if the specific "Low Temp" input (15) is triggered on the engine connector strip.

- Engine Low Oil Pressure: Activates if the specific "Low Oil Pressure" input is triggered on the engine connector strip and the engine is running. This alarm will stop the engine only if triggered during a manual run test.

- Engine Overspeed*: Activates if the speed read is higher than the set Overspeed value and the engine is running. This alarm will stop the engine only if triggered during a manual run test.

- I/O_expX-inX alarm: Activates if the specific expansion programmable input on the specific expansion board is activated and triggered.

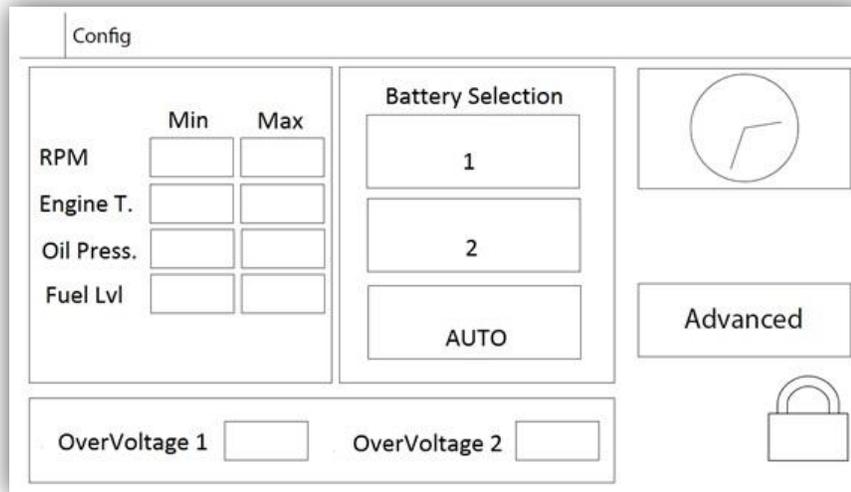
- Battery1-2 Overvoltage: Activates if the voltage of the specific battery is higher than the specified overvoltage set point.

- I/O Diesel Communication Error: Activates if no communication with the diesel I/O board could be established for 15 seconds. This alarm is critical and triggers the bell. If this alarm persists for more than 1 minute the controller will reboot to try and fix the problem.

- I/O Expansion Communication Error: Activates if no communication with the Expansion I/O board could be established for 15 seconds.

- Communication System Failure: Activates when the communication task has stopped responding. This alarm condition is critical and will be followed by a controller reboot to try and fix the problem.

- File System Failure: Activates when a file system error is detected. This alarm condition is critical and will be followed by a controller reboot to try and fix the problem.



Setup all basic configuration parameters.

The main configuration page provides a quick means of changing the most common settings. The padlock icon indicates the current authorization level. A locked padlock indicates that only basic settings can be changed. Press on the padlock to enter an authorization code to unlock additional settings. An unlocked padlock showing an authorization number indicates that some settings are unlocked. Press on the padlock again when you have concluded your operation.

Access Level 0:

- The “Advanced” button activates the advanced configuration pages.
- Date and Time adjustment are accessed by pressing the clock. Refer to the “Date and Time” page for more information.

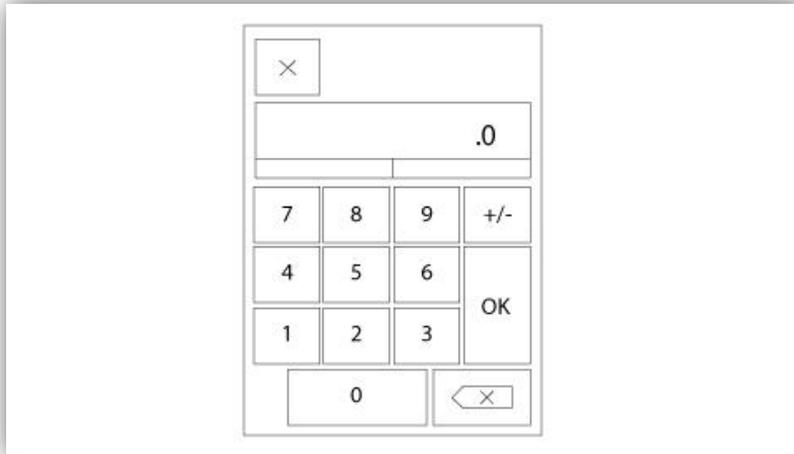
Access Level 1:

Inside the left box, the engine speed parameters can be set. Adjustment of the Minimum and the Maximum of the speed gauge displayed on the Homepage.

Inside the middle box, a battery selection can be made. This setting should always be “AUTO”, unless if doing maintenance on one battery or for testing purposes.

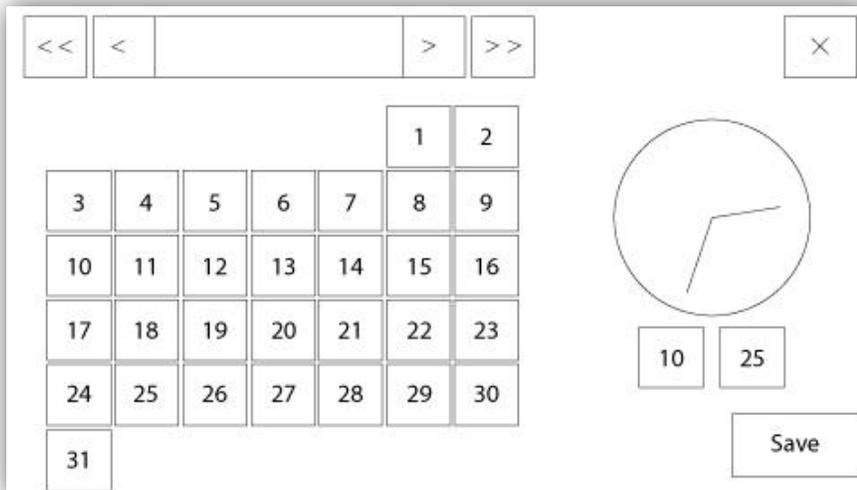
Inside the lower box, two “overvoltage” set points can be adjusted to trigger battery Overvoltage alarms.

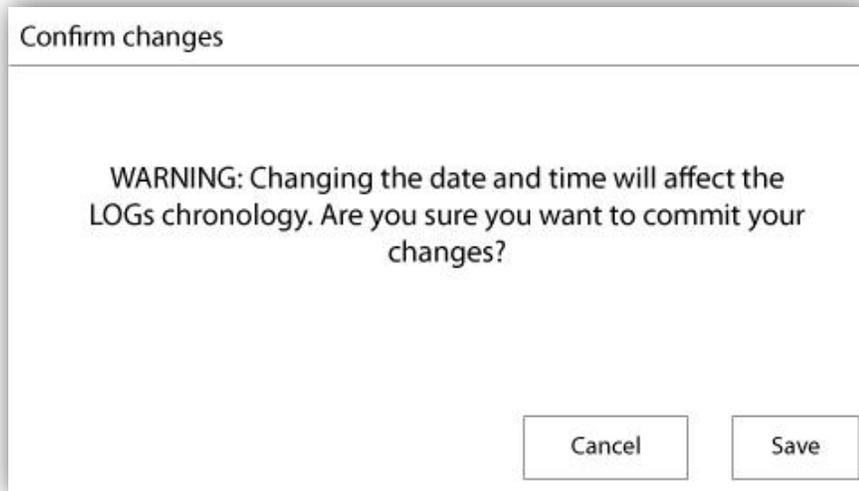
NumPad Page



The NumPad is activated every time the user clicks on a white square box representing a number that can be set. On top of the NumPad, the current parameter is shown. The text will flash red if the value entered is invalid and the OK button will be black, indicating that the value is out of range. The MIN and MAX show the range of values accepted for that particular parameter. The "X" button allows the user to cancel editing the value. The back arrow erases the last entered number and the "CA" button clears the whole text field. Simply click the "OK" button once the value is set.

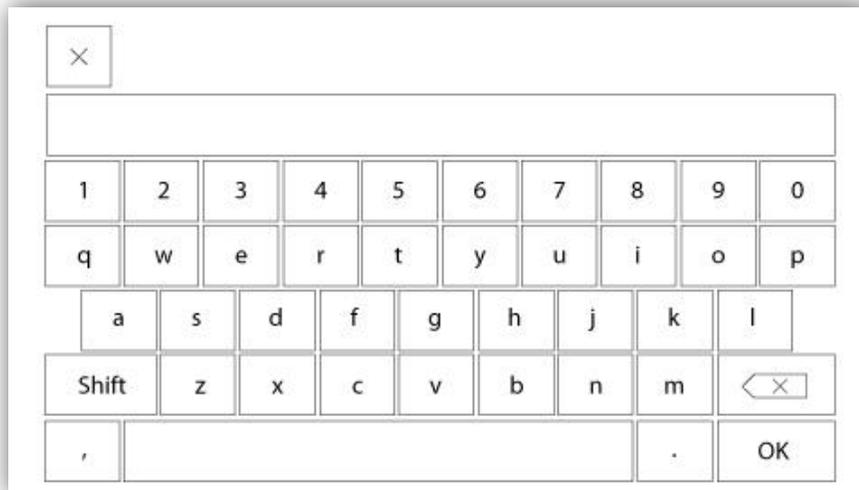
Date and Time Page





The Date and Time can be configured by selecting the current month and year by pressing the arrow buttons on each side of the "Month-Year" display and selecting the day of the month by selecting the actual day. The time is set by pressing the two square boxes under the clock; the left sets the hours and the right sets the minutes. Press the Save button to commit the changes. A dialog box will appear to confirm the change "Date and Time". The user may cancel the changes by pressing the "Cancel" button. Please note that changing the date and time will have an effect on the logs chronology.

User Login Page / KeyPad Page



User Login KeyPad:

This page allows the user to log into a higher security level by entering a password. If the password is valid the text field will turn green and if it is invalid, the text field will turn red. A "X" button appears in the text field as soon as a character is entered, allowing for a quick erase of the written password.

If the password is invalid for a consecutive number of times, the user will be redirected to the "Service Dealer" page, allowing the user to communicate with the appropriate Service Dealer.

If the password is valid, the "Configuration" page will reload and the access security level will be shown inside the lock. To log off, click on the lock and the user security level will return to "0"

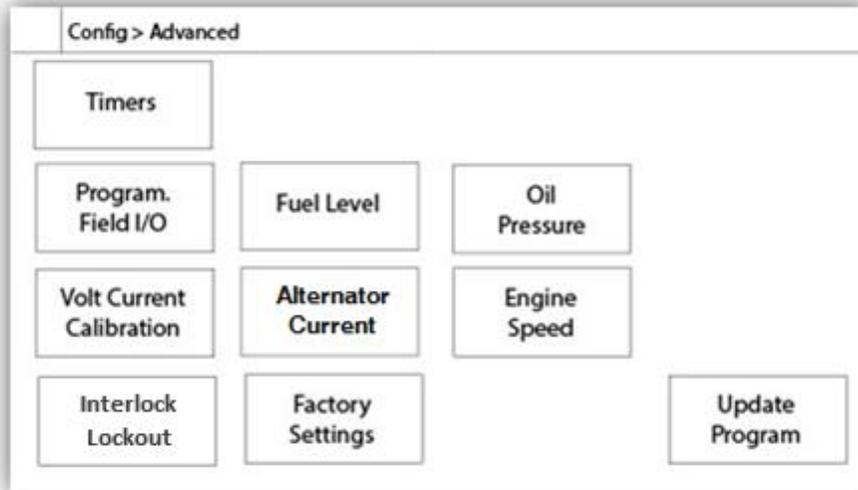
Other KeyPads:

The KeyPad is activated every time the user clicks on a grey rectangle box with white text representing a text that can be set. The "X" button allows the user to cancel editing the value. The back arrow erases the last entered

character and the "CA" button clears the whole text field. Simply click the "OK" button once the value is set. This type of text field is mostly used to generate a digital text indication for a custom alarm input.

Advanced Configuration Page

Config > Advanced



This page is the portal to all the advanced configuration parameters of the ViZiTouch.

All timers, sensors, factory settings, software update, service dealer and debug pages may be accessed simply by clicking on the appropriate buttons.

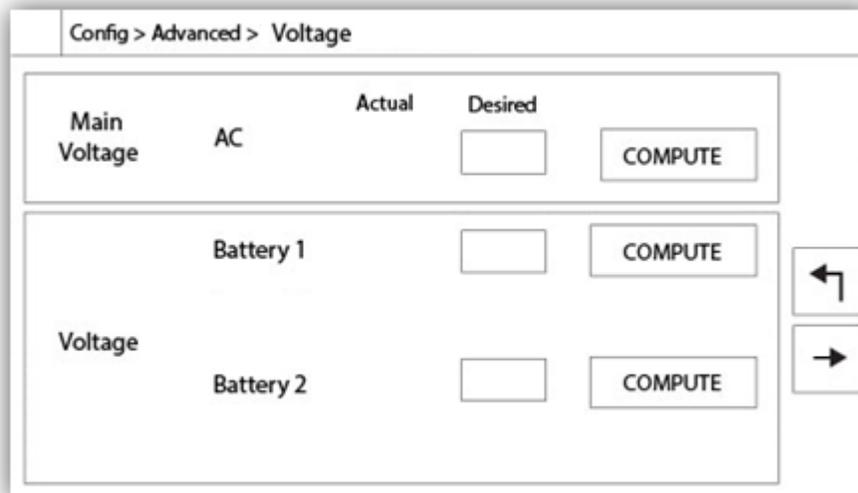
Since two of the analog inputs are using the same physical connector, only one of these can be installed at once. These analog inputs are shown in the grey box surrounded by a black dotted line. Each time one of these sensors is installed, the other will turn orange, preventing the dual installation of these sensors.

All buttons are set to security "Level 0" except "Update Program" which is set at "Level 1" security.

Details of the Advanced Configuration Page

Volt-Current Calibration

Config > Advanced > Calibration Voltage-Current



This page is used to calibrate all analog voltages. The actual column shows the actual value calculated by the ViZiTouch. The "desired" column allows a level 2 user to enter the desired value read from a calibrated external device (multimeter). For the AC voltage and the 2 DC voltage, the calibration is done by entering the desired value and pressing on the "COMPUTE" buttons. The DC values must be entered with no batteries connected, to allow the

calibration of the battery chargers in the “power supply” mode. To do so, simply turn the batteries circuit breaker to OFF.

Config > Advanced > Current

mA

Battery 1 2650

2650 Read < 8880 Read ZERO COMPUTE

Battery 2 2725

2725 Read < 8880 Read ZERO COMPUTE

This page is used to calibrate all analog currents. The first number right beside the Battery 1 and Battery 2 text shows the actual current reading. First, Set the CB3 Breaker in the OFF position. This will disconnect the battery. Press the ZERO button. Then, put the CB3 breaker back in the ON position. Connect a small charge to the 6 and 11 terminals, to create a low current around 2600 mA. Enter this value in the most left field of battery 1, and press the Read button. Then, connect a bigger charge to the 6 and 11 terminals, around 8800 mA. Write the measured value in the second text field, and press the second read button. Finally, press the COMPUTE button to complete the calibration. Repeat for the second battery, linked to CB4 Breaker and terminals 8 and 11.

Battery Test Configuration

Number of Missing Test Before Alarm Battery Test

Battery Missing Current Threshold

Max Current for Boost Test Batt.1 Batt.2

Voltage Coast Drop Detection Enable

Battery Fail From Engine RPM During Crank

Charger 1 Power Supply Voltage Reference

Charger 2 Power Supply Voltage Reference

Disconnect Battery

This page is used to adjust the calibration of the battery test.

Number of Missing Test Before Alarm : It is the number of consecutive fail test that must occurred before triggering the Battery Failure alarm.

Battery Missing Current Threshold : It is the threshold, in Amps, to test if a battery is connected. This is the amount that the current in Amps has to rise during a boost test to determine that the battery is connected. If a false battery failure alarms appears, it may be necessary to lower this value.

Max Current for Boost Test : Under this current value in Amps, no test on the battery is made.

Voltage Coast Drop Detection Enable : If enable, this second condition on the battery test is activated. On smaller battery, the rise in current during a boost test might be too small to have a conclusive test. This second test verifies the capacitive effect on the battery line after a boost sequence.

Battery Fail From Engine RPM During Crank : If enable, the Battery Fail alarm will be activated if no RPM is read after a crank cycle

Charger 1-2 Power Supply Voltage Reference : This is the voltage that is applied by the battery charger in power supply mode (no battery connected). To measure this voltage, the battery must be disconnected.

Timers Page

Config > Advanced > Timers1-2

Config > Advanced > Timers1

Engine Starting and Stopping		Local Request Detection	
Sequential Start Timer	<input type="text"/> s	Timer On	<input type="text"/> s
Fail When Running Timer	<input type="text"/> s	Energize to Stop	
		<input type="checkbox"/> Permanent	Timer On <input type="text"/> s

Config > Advanced > Timers2

Low Oil Pressure	AC Failure
Delay <input type="text"/> s	Enable <input type="checkbox"/> Start Delay <input type="text"/> m
High Water Level Alarm	High Fuel Level Alarm
Timer On <input type="text"/> s	Timer On <input type="text"/> s
Low Water Level Alarm	Low Fuel Level Alarm
Timer On <input type="text"/> s	Timer On <input type="text"/> s

Most common timers for fire pump control can be configured here. Note that any timer set to 0 will remove the delay in the decision process.

Access level 1:

- Engine starting and stopping:
The "Sequential Start Timer" allows a delayed response on an automatic start request.
- Energize to Stop:
This timer sets the time in seconds the fuel solenoid valve will close after a stop.
- Fail When Running Timer:

If Enabled, this timer will delay the "Fail When Running Alarm".

- Local Request Detection:

This is the delay it will take to the controller to detect a Local start of the pump.

The other timers are self explanatory and set the time delay on alarms.

Inputs/Outputs Configuration

Config > Advanced > IO Diesel Input Selection -
Config - Output Config

Config > Advanced > IO Diesel Input Selection

Field programmable Input 3

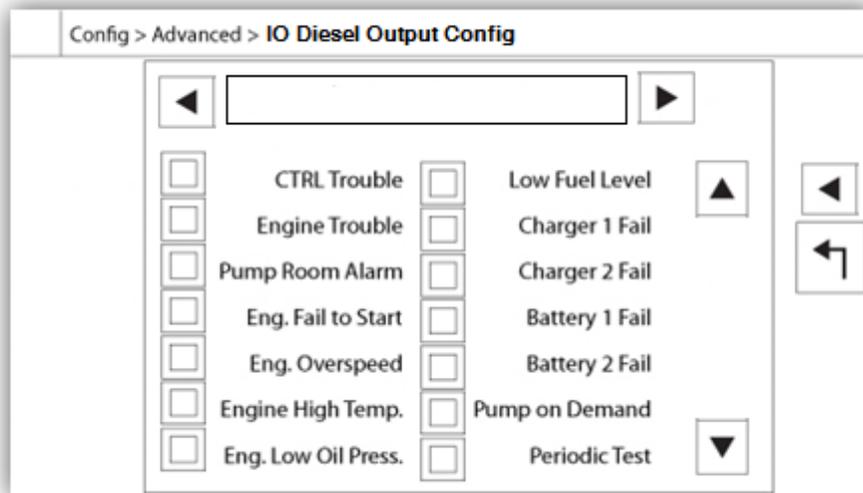
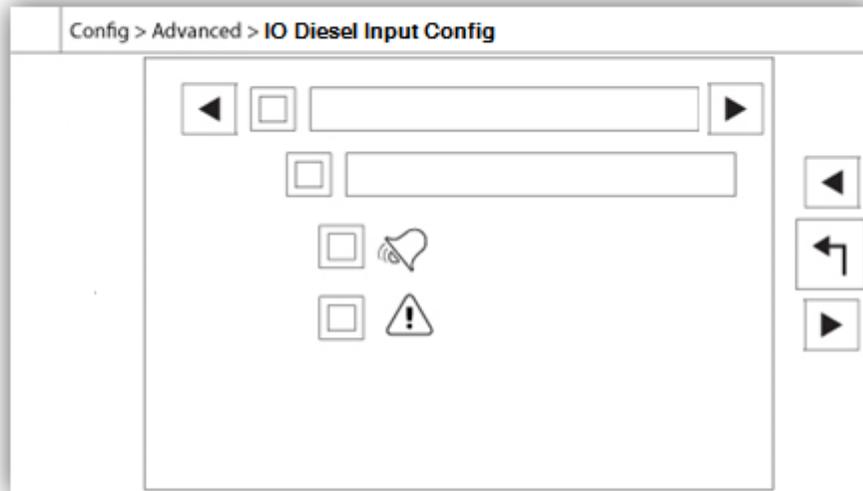
Field programmable Input 4

Field programmable Input 5

The Deluge Valve Start Signal is Normally Closed
Alarms Signals are configurable on the next page

This page, if logged in, allows the re-assignment of 3 programmable inputs by pressing on the signal name. If the Deluge Valve signal is selected, it will be assigned as a normally closed input. Proceed with caution as this may cause the engine to start. If an alarm signal is chosen, it can be configured on the next page (Enabled, NO/NC, Audible, Importance (Alarm or Warning)). The available signals are:

- Low Fuel Level, High Fuel Level, Fuel Tank Leak
- Water Reservoir Empty, Water Reservoir Low, Water Reservoir High
- Flow Meter ON, Main Relief Valve Open
- Low Suction Pressure
- Lockout
- Remote Manual Start
- Deluge Valve Start (NC)



This page allows the configuration of alarm signals on the inputs, and outputs relay signals. Two buttons located far right navigates between the input and output section of the page.

Input:

The input page has four elements: The NO/NC setting, the “Digital Text Indication” field, the “Alarm Bell Icon” and the “Alarm Icon”. Each one can be enabled or disabled. The first step is to click on the square button beside the text field to activate the management of the input signal. If the “Alarm Bell Icon” is enabled, the input signal will trigger the Alarm Bell. If the “Alarm Icon” is enabled, the input signal will be treated as an alarm, if not, as a warning. As on the output page, the buttons at the top allow for an easy navigation between all available inputs of the diesel board.

Output:

The configuration is performed by pressing on the square box located beside one of the signal needed. The box will swap between BLANK (none), a NO (normally open) and a NC (normally close) symbol, allowing the desired configuration to be obtained. The final state of the output signal is a logical “OR” combination of all selected signal.

Config > Advanced > Expansion Board 1

	1	2	3	4	5	6	7	8
Input	<input type="checkbox"/>							
CTRL Trouble			<input type="checkbox"/>		Low Fuel Level			<input type="checkbox"/>
Engine Trouble			<input type="checkbox"/>		Charger 1 Fail			<input type="checkbox"/>
Pump Room Alarm			<input type="checkbox"/>		Charger 2 Fail			<input type="checkbox"/>
Eng. Fail to Start			<input type="checkbox"/>		Battery 1 Fail			<input type="checkbox"/>
Eng. Overspeed			<input type="checkbox"/>		Battery 2 Fail			<input type="checkbox"/>
Engine High Temp.			<input type="checkbox"/>		Pump on Demand			<input type="checkbox"/>
Eng. Low Oil Press.			<input type="checkbox"/>		Periodic Test			<input type="checkbox"/>

IN ▲
▼ OUT

←

Config > Advanced > Expansion Board 1

IN ▲
▼ OUT

[Text Field]

[Alarm Bell Icon]

[Warning Icon]

←

This page allows the configuration of both programmable inputs and outputs available on an IO Expansion board. Two buttons located far right navigates between the input and output section of the page.

Input:

The input page has four elements: The NO/NC setting, the "Digital Text Indication" field, the "Alarm Bell Icon" and the "Alarm Icon". Each one can be Enabled or disabled. The first step is to click on the square button beside the text field to activate the management of the input signal. If the "Alarm Bell Icon" is Enabled, the input signal will trigger the Alarm Bell. If the "Alarm Icon" is Enabled, the input signal will be treated as an alarm, if not, as a warning. As on the output page, the buttons at the top allow for an easy navigation between all available inputs of the diesel board.

Output:

The configuration is performed by pressing on the square box located beside one of the signal needed. The box will swap between BLANK (none), a NO (normally open) and a NC (normally close) symbol, allowing the desired configuration to be obtained. On top of all outputs signals available, it is possible to link in the same way the expansion board inputs to the selected output in any combination. The final state of the output signal is a logical "OR" combination of all selected signals.

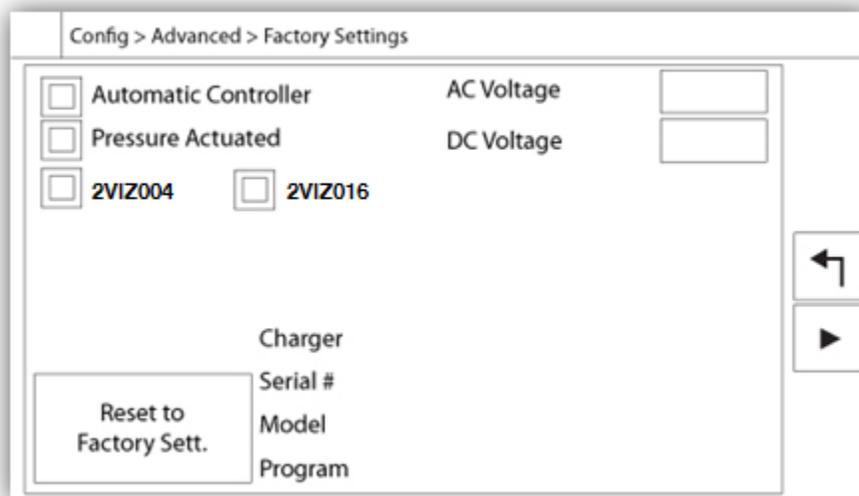
Update Program Page



This procedure is highly important and must be attempted with care. Please make sure to contact the factory prior to using the Update Software function.

Factory Settings

Config > Advanced > Factory Settings



This page is only available if one or more Expansion Board is installed as an option.

The factory settings are always pre-configured at the factory and set the main parameters of the controller.

Left Section:

Automatic Controller – Non-Automatic Controller: An automatic controller will respond to automatic start requests, like a pressure drop announced by a pressure transducer or a pressure switch, a deluge valve signal or a remote automatic start trigger. A non-automatic controller will only start the engine on manual requests.

2VIZ004 – 2VIZ016: These refer to older version of the IO Diesel Board. If the controller hosts one of these version, the corresponding check box must be activated.

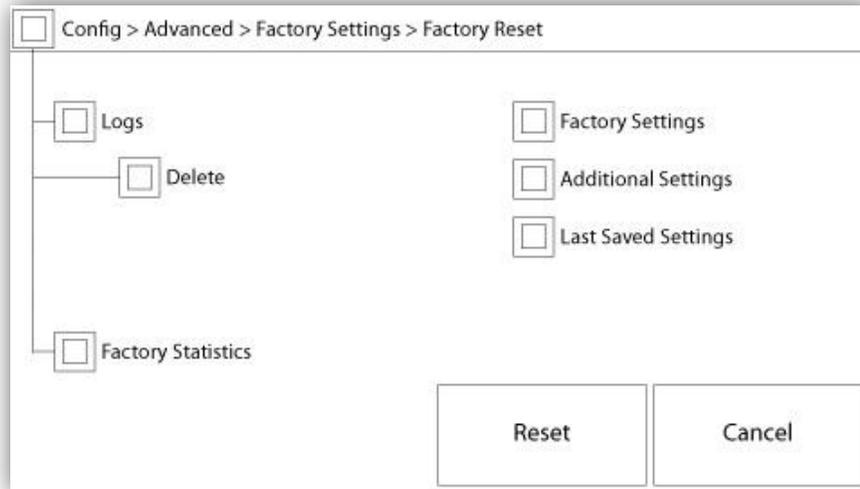
“Reset to Factory Settings”: This button redirects to the “Reset to Factory Settings” page. This is a major operation that must be used with care and only if the factory was contacted first. See the “Reset to Factory Settings” help for more details.

Right Section:

The first two settings set the nominal AC and DC voltage for the controller.

Technical information about the controller: Serial Number, Battery Charger Type, Model Name and Software Revision.

Reset to Factory Settings Page



This page will reset the ViZiTouch to the original factory configuration, thus clearing all subsequent configurations performed during the life of the controller.

This procedure should only be used as a last attempt to bring back the controller to a usable state.

User "Level 2":

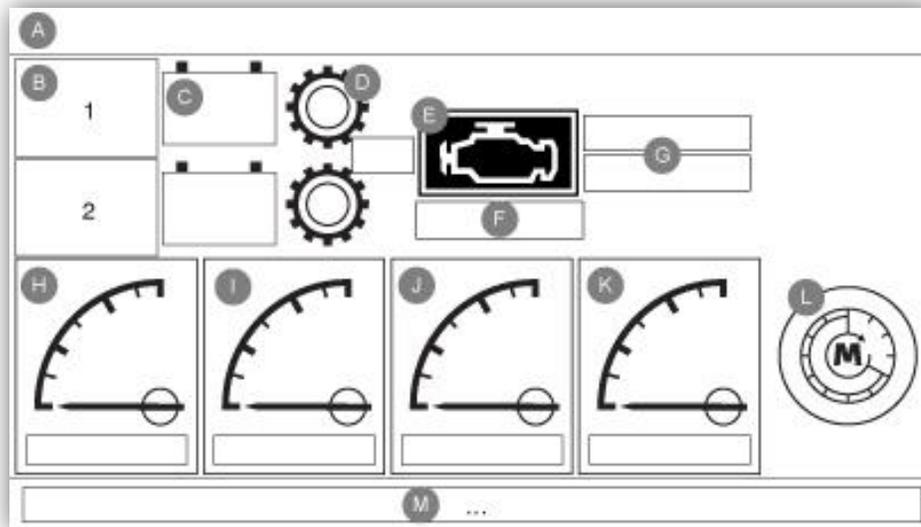
The "RESET" button will be activated (will become blue) only if no square buttons from the left column are activated and the "Last Saved Settings" from the right column is not activated as well. A "Level 2" user can only reset the "Factory Settings" and/or the "Additional Settings" from the right column.

The "Factory Settings" reset will restore the controller to its original factory configuration and service state. This means that the first service will be undone, automatic mode settings, as well as the controller's "Homepage" will be deactivated until "First Service" is completed again. Please refer to the "Quick Start-Up" guide for more information on how to perform the "First Start-Up" and how to complete the "Field Acceptance Test Report".

Please note that all logs, pump curves and statistics will not be reset.

The "Additional Settings" reset will update the controller with an additional configuration sent by the manufacturer. It does not perform a true "Factory Reset". Its purpose is to allow an update of configuration variables that can only be updated by Tornatech Inc.

All other square buttons on this page are "Level 9" security and can only be used by certified Tornatech representatives, unless otherwise specified. The first square in the upper left corner performs the "Select all" function for these parameters.



Important Notice!

Every analog sensor cable used for this controller should be shielded. The shield has to be grounded on the motor side. Not complying to these recommendations may affect the controller good functioning and void its warranty.

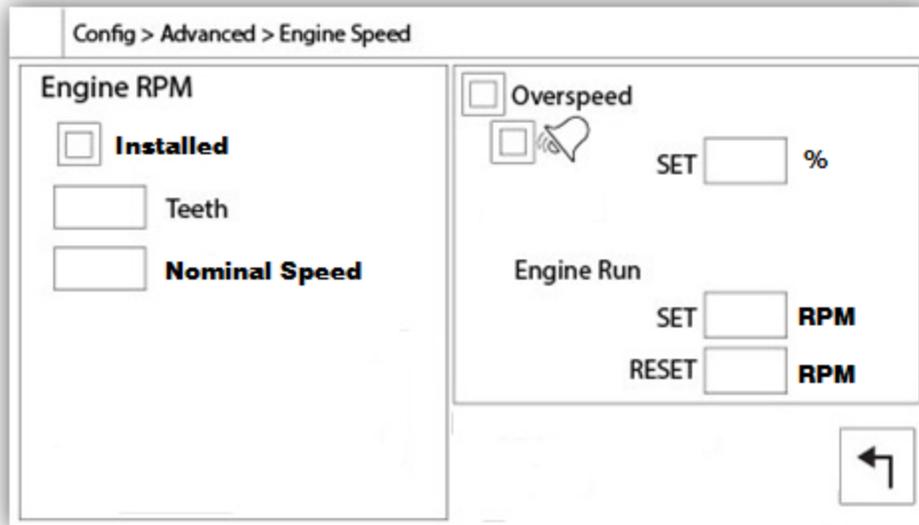
H) Tachometer (Engine Speed Switch)

The tachometer (analog speed reading) gives the possibility to support engine with no electronic speed switch. The magnetic pickup must be connected to the MP+MP- inputs on the I/O Board.

The first small green line and small red line on the gradations shows the Set point of the “Engine Run” Signal. When the engine runs with a speed above this threshold, the ViZiTouch will consider it is running, and when it slows down under the red line, it will be considered stopped. The second red line, usually set high on the gauge, represents the “Overspeed” threshold. If the engine reaches that speed, the “Overspeed” alarm will be activated.

The rectangle box below the gauge is the odometer, showing the run time of the engine since the first startup.

Pressing on the gauge will bring the user to the “Config > Advanced > Engine Speed” page.



The left section is used to show the “Disable/Enable” state of the engine RPM Counter. The “teeth” input box allows the user to match the number of teeth on the flywheel. This is an important setting to allow a precise calculation of the RPM. The digital RPM value is shown just under to acknowledge the calculated RPM.

The right section’s purpose is to configure the set points of both “Engine Run” and “Overspeed” signal. The top square box enables/disables the “Overspeed” alarm, and should always be activated. The following square box links the alarm bell to the alarm, and the third one sets the signal category (alarm or warning). The “SET” input field sets the trigger threshold for the “Overspeed” alarm. The next two input fields allow the configuration of the “Engine Run” signal set/reset points, preventing the “Engine Run” signal to toggle too fast. “Reset” should be at least 300 RPM lower than the “Set” point.

I) Engine Coolant Temperature

The “Engine coolant temperature” analog input gives the possibility to support engine with no electronic “Low-High Engine Temperature” switch. The sender must be connected to the AI5 analog inputs on the I/O Board.

The first small green line and small red line on the gradations shows the Set point of the “Low Engine Temperature” Signal. It is active if the temperature goes below the set point and the engine must not be running.

The second small green line and small red line on the gradations shows the Set point of the “High Engine Temperature” Signal. It is active if the temperature goes above the set point and the engine must be running.

The rectangle box below the gauge displays the actual value.

Pressing on the gauge will bring the user to the “Config > Advanced > Engine Temperature” page.

Config > Advanced > Engine Temperature

Sensor		Alarms	
<input type="checkbox"/> Installed	<input type="text"/>	<input type="checkbox"/> High Engine Temperature	
Calib.	<input type="text"/>	<input type="checkbox"/>  SET	<input type="text"/>
Fixed Resistor	<input type="text"/>	<input type="checkbox"/>  RESET	<input type="text"/>
		<input type="checkbox"/> Low Engine Temperature	
		<input type="checkbox"/>  SET	<input type="text"/>
		<input type="checkbox"/>  RESET	<input type="text"/>
Gain	Offset	<input type="button" value="COMPUTE"/>	
<input type="text"/>	<input type="text"/>	<input type="button" value="↶"/>	

The left section is used to show the “Installed” state of the Engine Temperature Sender. The rest of the page is already explained in the “Analog sensors” section of the manual.

If the “Calibration Type” is selected to be “Log. Resistor”, the bottom section will allow the user to directly change the “Gain” and Offset” value, depending on the sender’s model. The “Fixed Resistor” value is linked to the hardware resistor installed between the “+” and the “IN” inputs of the corresponding analog input.

J) Engine Oil Pressure

The “Engine Oil Pressure” analog input gives the possibility to support engine with no electronic “Low Oil Pressure” switch. The sender must be connected to the AI3 analog inputs on the I/O Board.

The first small green line and small red line on the gradations shows the Set point of the “Low Oil Pressure” Signal. It is active if the pressure goes below the set point and the engine must not be running.

The rectangle box below the gauge displays the actual value.

Pressing on the gauge will bring the user to the “Config > Advanced > Oil Pressure” page

Config > Advanced > Oil Pressure

Sensor		Alarms	
<input type="checkbox"/> Installed	<input type="text"/>	<input type="checkbox"/> Low Oil Pressure	
Calib.	<input type="text"/>	<input type="checkbox"/>  SET	<input type="text"/>
Fixed Resistor	<input type="text"/>	<input type="checkbox"/>  RESET	<input type="text"/>
First Point	Second Point	<input type="button" value="COMPUTE"/>	
<input type="text"/> Ω <input type="text"/> PSI	<input type="text"/> Ω <input type="text"/> PSI	<input type="button" value="↶"/>	

The left section is use to show the “Installed” state of the Oil Pressure Sender. The rest of the page is already explained in the “Analog sensors” section of the manual.

If the “Calibration Type” is selected to be “Lin. Resistor”, the bottom section will allow the user to directly enters the First point (resistor-pressure) and Second point (resistor-pressure) values, depending on the sender’s model. The “Fixed Resistor” value is linked to the hardware resistor installed between the “+” and the “IN” inputs of the corresponding analog input.

K) Fuel Level

The “Fuel Level” analog input gives the possibility to support engine with no electronic “Low-High Level;” switch. The sender must be connected to the AI4 analog inputs on the I/O Board.

The first small green line and small red line on the gradations shows the Set point of the “Low Fuel Level” Signal. It is active if the level goes below the set point.

The second small green line and small red line on the gradations shows the Set point of the “High Fuel Level” Signal. It is active if the Level goes above the set point.

The rectangle box below the gauge displays the actual value.

Pressing on the gauge will bring the user to the “Config > Advanced > Fuel Level” page.

The left section is use to show the “Installed” state of the Fuel Level Sensor. The rest of the page is already explained in the “Analog sensors” section of the manual.

If the “Calibration Type” is selected to be “ON/OFF” (to be use with powered low fuel level switch), the frame at the bottom of the page will be empty, and a “NO/NC” setting will be available to configure the signal.

Details of the Debug Page

Calibration

Config > Advanced > Debug > Calibration

This table displays all calibration parameters. The “Scaled” value is the final calculated value used in the ViZiTouch. It is calculated by multiplying the “Raw” value by the “Gain” coefficient and by adding the “Offset” value. This information is useful when debugging the analog inputs on the IO board.

IO Debug

Config > Advanced > Debug > IO

The small white circle beside each signal is a representation of its state. If the white circle is filled with a green dot, then the signal is activated. Comparing these software signals and the physical state of the signal on the electronic board is the best way to troubleshoot. In the right column, additional “TEST” buttons are located beside each output signal. Clicking on these buttons will toggle the output state of this signal, again allowing a comparison between the software and hardware state of these signals to help troubleshoot.

Inputs/Outputs Debug

Config > Advanced > Debug > Expansion

The screenshot shows a web interface titled "Config > Advanced > Debug > Exp. 1". It features a table of signals and their states:

<input type="radio"/> Installed Comm. No.: <input type="text"/>			
IN1	<input type="radio"/>	OUT1	<input type="radio"/> TEST
IN2	<input type="radio"/>	OUT2	<input type="radio"/> TEST
IN3	<input type="radio"/>	OUT3	<input type="radio"/> TEST
IN4	<input type="radio"/>	OUT4	<input type="radio"/> TEST
IN5	<input type="radio"/>	OUT5	<input type="radio"/> TEST
IN6	<input type="radio"/>	OUT6	<input type="radio"/> TEST
IN7	<input type="radio"/>	OUT7	<input type="radio"/> TEST
IN8	<input type="radio"/>	OUT8	<input type="radio"/> TEST
		OUT9	<input type="radio"/> TEST
		OUT10	<input type="radio"/> TEST

Navigation buttons (back and home) are located to the right of the table.

The small white circle beside each signal is a representation of its state. If the white circle is filled with a green dot, then the signal is activated. The first element in the left column is the indication of whether or not the optional Expansion board is installed. In the box, the corresponding Expansion board number is displayed. Comparing between these software signals and the physical state of the signal on the electronic board is the best way to troubleshoot. In the right column, additional “TEST” buttons are located beside each output signal. Clicking on these buttons will toggle the output state of this signal, again allowing a comparison between the software and hardware state of these signals to help troubleshoot.

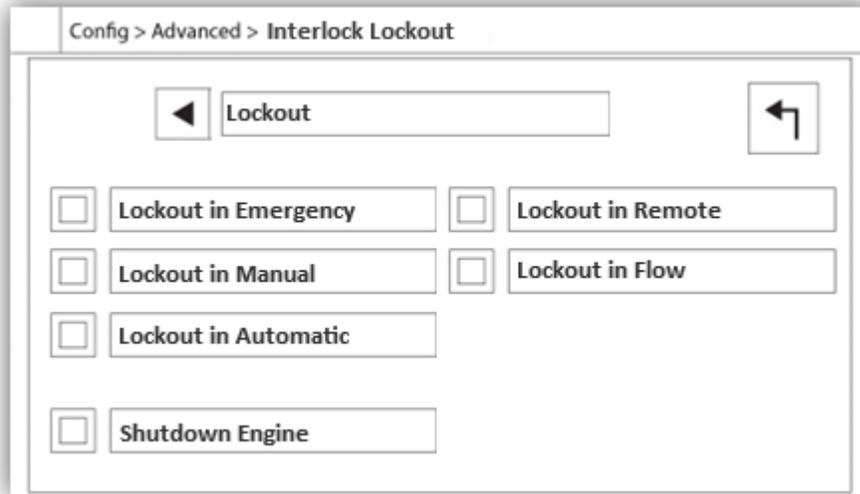
Interlock Lockout

Config > Advanced > Interlock Lockout

The screenshot shows a web interface titled "Config > Advanced > Interlock Lockout". It features a search bar and several checkboxes for interlock settings:

Interlock

<input type="checkbox"/> Interlock in Emergency	<input type="checkbox"/> Interlock in Remote
<input type="checkbox"/> Interlock in Manual	<input type="checkbox"/> Interlock in Flow
<input type="checkbox"/> Interlock in Automatic	
<input type="checkbox"/> Engine Run Required	



These pages allow to configure the Lockout input and the interlock output parameters. To be active, those options need to be assigned to an Input or an Output on the I/O board.

Lockout is an Input that disables the engine from starting.

- Enable in emergency: If checked, this option will prevent the electronic assistance on an Emergency start.
- Enable in manual mode: If checked, this option will prevent the Manual start.
- Enable in automatic mode: If checked, this option will prevent the Automatic start.
- Enable in remote manual mode: If checked, this option will prevent the Remote Manual start.
- Enable in "start/stop" mode: If checked, this option will prevent the "start/stop" mode.
- Shutdown Engine: If enabled, the lockout signal will also act as a shutdown and will stop the engine if it is running.

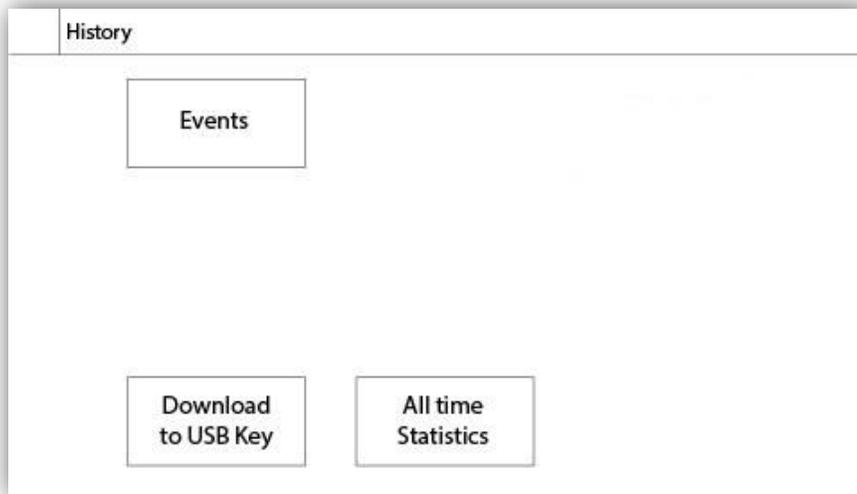
Interlock is an Output that prevents a second engine from starting.

- Enable in emergency: If checked, this option will activate the output "interlock" on an Emergency start.
- Enable in manual mode: If checked, this option will activate the output "interlock" on a Manual start.
- Enable in automatic: If checked, this option will activate the output "interlock" on a Automatic start.
- Enable in Remote Manual mode: If checked, this option will activate the output "interlock" on a Remote Manual start.
- Enable in "start/stop" mode: If checked, this option will activate the output "interlock" on a "start/stop" mode.
- Engine Run required: If enabled, the controller will wait to have the Engine Run signal before activating the Interlock output.

History 7

History (Membrane button)

History

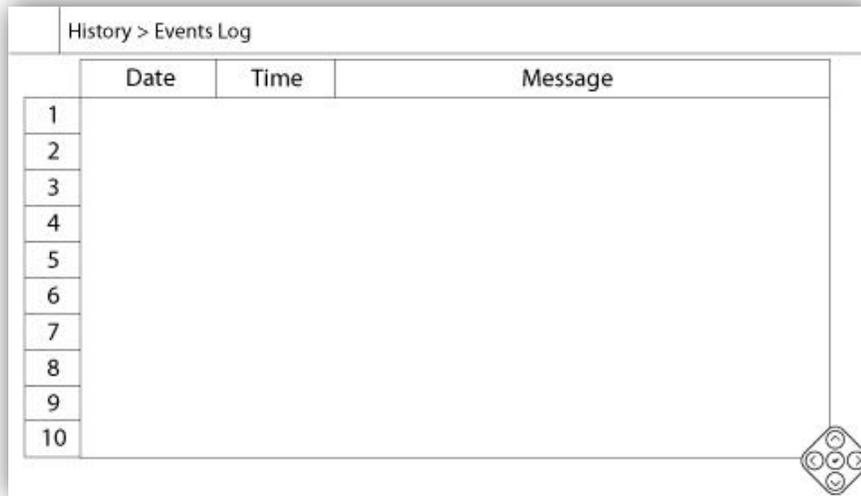


Select specific pages within the History section. Everything related to the statistics, events, pressure, power logs and the download to USB is available within the History page.

-Events: This button leads to the “Events” page, which displays the most recent 500 events. Each event log contains the date and time of occurrence as well as a brief description of the event.

-Download to USB Device: This button leads to the “Download to USB Device” page, which allows the user to download information, including the user manual, drawings, logs, statistics and configuration.

-All Time Statistics: This button leads to the “All Time Statistics” page, which displays the date and time of the first power up, the date and time when the first start-up was completed and the total “On Time” of the controller. These statistics can never be reset.

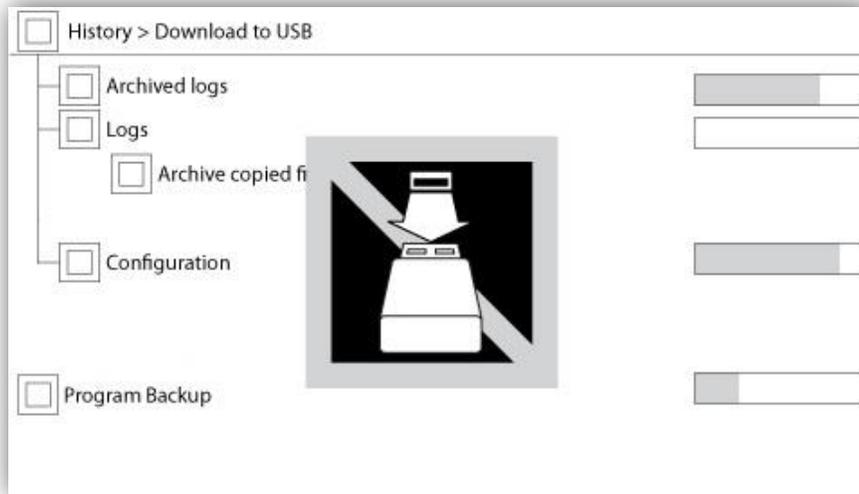


	Date	Time	Message
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

It shows the last 500 events which occurred in chronological order. The first column is the date, the second one is the time of occurrence and the third column is the “Event message”. To obtain a log that is older than 500 events, visit the “Download to USB Device” page and select “Events”. This method will generate a file containing all events logs in the ViZiTouch history.

The contextual navigation pad is implemented in this page. It allows quick navigations functions, like “previous page”, “next page”, “first page” and “last page”. As always, clicking on the Navigation Pad Icon in the lower right corner of the screen will pop-up the Navigation Pad functions specific for this page.





To download information from the ViZiTouch to a USB Device a user with at least a "level 1" password must be logged in. The first square beside the title is a "Select All" button. Pressing it will select all categories except "Archive copied files", which serves a separate purpose. The "Download to USB" button will execute the command. The entire right side is filled with different progress bars, to help monitor the current transfer. If a USB Device is not present or if there is an error, a message saying "Could not mount USB drive" will appear and any further action is cancelled. To try again, remove the device, re-insert and press the button once more.

-Archived logs: All logs files that were archived using the "Archive copied files" square button. The purpose of archiving files is to free up memory on the ViZiTouch by archiving older log files.

-Logs: All logs are currently available in the ViZiTouch memory. A "Comma Separated Values" or ".csv" file is created every day and is named accordingly. Most software in modern computers will be able to read and interpret these files. The log files contain the event logs, the pressure logs and the power logs.

-Configuration: All configuration parameters contained in a ".txt" file, including but not limited to nominal values, serial number, calibration parameters.

Program Backup: A compressed and encrypted file, only readable by the ViZiTouch. This allows the user to copy a complete ViZiTouch to another one. **IMPORTANT:** The ViZiTouch is not in service while downloading the program backup.

History > All Time Statistics	
First Power Up	
First Start Up	
On Time	

All statistics shown here are calculated since the controller's first start-up was done. All dates are in the YYYY.MM.DD format and all time references are in the HH:MM:SS format.

- First Power Up: Date and time of when the controller was first powered up.
- First Start Up: Date and time of when the controller's first start-up was completed.
- On Time: Total duration of controller powered on since the first power-up. In Day.Hour.Minutes.

How to Test:

Charger 1 Fail

Unpower the charger 1 by putting the circuit breaker in the off position.

Charger 2 Fail

Unpower the charger 2 by putting the circuit breaker in the off position.

DC Failure

Switch Circuit Breaker 3 (CB3) and Circuit Breaker 4 (CB4) in Off position or disconnect #6 and #8 engine wires (See drawing for more details).

Controller Trouble

To activate this common alarm, at least one of the following alarms must be active: Charger Failure 1, Charger Failure 2, DC Failure, Faulty Pressure Transducer or Weekly Test Check Solenoid Valve.

Low Fuel Level

Disconnect Fuel Level connector. Depending of your sensor type, put a jumper between positive pin (left) or negative pin (right) and signal pin (middle) of this connector (See drawing for more details).

High Fuel Level

Disconnect Fuel Level connector. Depending of your sensor type, put a jumper between positive pin (left) or negative pin (right) and signal pin (middle) of this connector (See drawing for more details).

Fuel Tank Leak

Put a jumper between Fuel Tank Leak input and ground (See drawing for more details).

AC Failure

Make sure both batteries are connected and all circuit breakers are in On position. Switch Circuit Breaker 1 (CB1) and Circuit Breaker (CB2) in Off position. Disconnect J44 from the I/O board.

Water Reservoir Empty

Put a jumper between Water Reservoir Empty input and ground (See drawing for more details).

High Water Level

Disconnect Water Level connector. Depending of your sensor type, put a jumper between positive pin (left) or negative pin (right) and signal pin (middle) of this connector (See drawing for more details).

Water Reservoir Low

Disconnect Water Level connector. Depending of your sensor type, put a jumper between positive pin (left) or negative pin (right) and signal pin (middle) of this connector (See drawing for more details).

Pump Room Alarm

To activate this common alarm, at least one of the following alarms must be active: Low Fuel Level, High Fuel Level, Fuel Tank Leak, AC Fail, Low Ambient Temperature, High Ambient Temperature, Low Suction Pressure, Water Reservoir Empty, High Water Level or Water Reservoir Low.

Fail to Start

Disconnect #1, #9, #10 and #12 engine wires (See drawing for more details). Start the cranking sequence (Example: Remove Remote Automatic Start jumper). Wait until the cranking sequence ends.

Overspeed

You need to be logged in to do this test. Press Config button (On the membrane). Go to Config>Advanced>Engine Speed. Start your engine. Press Overspeed Test button.

Electronic Control Module Selector Switch in Alternate Position (301)

Disconnect #301 engine wire. Put a jumper between #301 input and ground (See drawing for more details).

Fuel Injection Malfunction (302)

Disconnect #302 engine wire. Put a jumper between #302 input and ground (See drawing for more details).

Electronic Control Module Warning (303)

Disconnect #303 engine wire. Put a jumper between #303 input and ground (See drawing for more details).

Electronic Control Module Fault (304)

Disconnect #304 engine wire. Put a jumper between #304 input and ground (See drawing for more details).

Low Engine Temperature (312)

Disconnect #312 engine wire. Put a jumper between #312 input and ground (See drawing for more details).

Low Oil Pressure

Disconnect Oil Pressure connector. Depending of your sensor type, put a jumper between positive pin (left) or negative pin (right) and signal pin (middle) of this connector (See drawing for more details).

High Engine Temperature

Disconnect Engine Temperature connector. Depending of your sensor type, put a jumper between positive pin (left) or negative pin (right) and signal pin (middle) of this connector (See drawing for more details).

Battery 1 Failure

Disconnect #6 engine wire (See drawing for more details).

Battery 2 Failure

Disconnect #8 engine wire (See drawing for more details).

Weak Battery 1

You need to be logged in to modify these settings. Press Config button (On the membrane). Go to Config>Advanced>Factory Settings 2. Change Weak Battery 1 setpoint to maximum allowable.

Weak Battery 2

You need to be logged in to modify these settings. Press Config button (On the membrane). Go to Config>Advanced>Factory Settings 2. Change Weak Battery 2 setpoint to maximum allowable.

Battery 1 Overvoltage

You need to be logged in to modify these settings. Press Config button (On the membrane). Go to Config>Advanced>Factory Settings 2. Change Overvoltage Battery 1 setpoint to minimum allowable.

Battery 2 Overvoltage

You need to be logged in to modify these settings. Press Config button (On the membrane). Go to Config>Advanced>Factory Settings 2. Change Overvoltage Battery 2 setpoint to minimum allowable.

Loss of Continuity 1

Disconnect #9 engine wire (See drawing for more details). Wait 1-2 minutes.

Loss of Continuity 2

Disconnect #10 engine wire (See drawing for more details). Wait 1-2 minutes

Low Pneumatic Pressure

Put a jumper between the Low Pneumatic Pressure input and ground (See drawing for more details). Take note that this alarm will stop the pneumatic cranking sequence.

Engine Trouble

To activate this common alarm, at least one of the following alarms must be active: Fail to start, Overspeed, Electronic Control Module Selector Switch in Alternate Position (301), Fuel Injection Malfunction (302), Electronic Control Module Warning (303), Electronic Control Module Fault (304), Low Engine Temperature (312), Low Oil Pressure, High Engine Temperature, Battery 1 Failure, Battery 2 Failure, Loss of Continuity 1, Loss of Continuity 2, Overpressure or Low Pneumatic Pressure

Low Spare Temperature

Disconnect the Spare Temperature connector. Depending of your sensor type, put a jumper between positive pin (left) or negative pin (right) and signal pin (middle) of this connector (See drawing for more details).

Flow Start

Put a jumper between the Flow Start input and ground (See drawing for more details).

Cooling No Flow

Put a jumper between the Cooling No Flow input and ground (See drawing for more details).

Flow Meter On

Put a jumper between the Flow Meter On input and ground (See drawing for more details).

Engine Fail When Running

Start the engine. Depending of your engine type, disconnect #1 or put a jumper between #12 and #6 to stop the engine. (See drawing for more details).

IO Diesel Communication Error

Press Reset button of the Diesel IO Board (Small button close to the phone jack)

IO Expansion 1 Communication Error

Press the Reset button of the Expansion 1 IO Board (Small button close to the phone jack)

IO Expansion 2 Communication Error

Press the Reset button of the Expansion 2 IO Board (Small button close to the phone jack)

IO Expansion 3 Communication Error

Press the Reset button of the Expansion 3 IO Board (Small button close to the phone jack)

IO Expansion 4 Communication Error

Press the Reset button of the Expansion 4 IO Board (Small button close to the phone jack)

Low Pump Room Temperature

Put a jumper between Low Pump Room Temperature input and ground (See drawing for more details).

Main Relief Valve Open

Put a jumper between Main Relief Valve Open input and ground (See drawing for more details).

Pneumatic Fail to Start

Disconnect the TB6 relay connector. Disconnect #1, #9, #10 and #12 engine wires (See drawing for more details). Start cranking sequence (Example: Remove Remote Automatic Start jumper). Wait until the cranking sequence ends.

Hydraulic Fail to Start

Disconnect the TB6 relay connector. Disconnect #1, #9, #10 and #12 engine wires (See drawing for more details). Start cranking sequence (Example: Remove Remote Automatic Start jumper). Wait until the cranking sequence ends.

Patents

Country	Title	Grant No
CA	Mechanical activator for contactor	2741881
US	Mechanical activator for contactor	US8399788B2
CA	Mechanical activator for electrical contactor	165512
CA	Mechanical activator for electrical contactor	165514
US	Mechanical activator for electrical contactor	D803794
US	Mechanical activator for electrical contactor	Patent pending
EP	Mechanical activator for electrical contactor	002955393-0001/2
AE	Mechanical activator for electrical contactor	Patent pending
AE	Mechanical activator for electrical contactor	Patent pending
CA	Fire pump digital operator	163254
US	Fire pump digital operator interface	D770313
AE	Fire pump digital operator interface	Patent pending
EP	Fire pump digital operator interface	002937250-0001
CA	System and method for detecting failure in a pressure sensor of a fire pump system	Patent pending
US	System and method for detecting failure of a pressure sensor in a fire pump system	Patent pending

**TORNATECH MODEL HFD DIESEL FIRE PUMP CONTROLLER
PRE- FIELD ACCEPTANCE TEST
CHECK LIST**

Note: This document should be an official indication of whether or not the installation and general condition of the equipment is adequate for a field acceptance test. This document should also aid the individual responsible for executing the field acceptance test to decide whether or not to carry out the field acceptance test of the equipment.

Installation Check List:		YES	NO
1	Verify that the nameplate voltages of the Fire Pump Controller corresponds with the AC voltage available and the DC starting voltage of the engine.		
2	Visual inspection for any damage to the exterior of the Fire Pump Controller. Make sure the enclosure, alarm bell, selector switch, membrane and display are not damaged.		
3	Verify that the Fire Pump Controller has been installed within sight of the pump and engine or motor.		
4	Verify that the Fire Pump Controller has been installed not less than 12 inches from the floor of the mechanical room.		
5	Verify that all electrical connections to the Fire Pump Controller are done using liquid tight conduit and connectors.		
6	With the Fire Pump Controller door open, visually inspect for any drill chips, dirt or foreign objects in the bottom of the enclosure, loose wires, broken components and general proper electrician workmanship.		
7	Verify that the correct AC voltage is supplied to the controller by taking a voltage reading at the L & N (220-240) terminals.		
8	Verify that the terminal connections between the Fire Pump Controller and the engine (1 to 11 and 12 for Caterpillar engines) are properly done.		
9	Verify that wiring to terminals #6, #8 (batteries) and #11 (ground) are of the appropriate gauge size. See label inside controller.		
10	Verify proper grounding of the Fire Pump Controller.		
Initial Power-Up Check List:		YES	NO
1	With the Fire Pump Controller door open, turn to "ON" the circuit breakers CB3 and CB4 (DC) then CB1 and CB2 (AC), then IS1. This sequence is very important.		
2	Close the Fire Pump Controller door. Verify on the ViZiTouch Homepage that the correct battery voltage appears.		
Manual and Automatic Start Check List:		YES	NO
1	Verify starting of engine by pressing the "Start" membrane button.		
2	Stop engine by pressing the "Stop" membrane button.		
3	Verify the starting of engine by pressing the emergency push button.		
4	Stop engine by pressing the "Stop" membrane button.		

Tornatech Controller S/N: _____

Installation address: _____

Check list completed? _____ Yes _____ No

Check list completed by: _____

Company: _____

Date: _____

Witnessed By: _____

Comments: _____

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