



BIOFUELS BLENDING SYSTEM

SERVICE MANUAL

BBS
BIOFUEL BLENDING SYSTEM

NOTICE

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Disclaimer

The information provided in the installation manual for the TMS Biofuel Blending System (BBS) is for reference purposes only and is not intended to replace any local codes and standards which must be followed during the installation of the BBS system. TMS does not accept any responsibility for incorrect installation or operation of the BBS.

TMS will not guarantee the performance of the BBS and does not provide any warranty, either express or implied, for the BBS, its components, or any related systems and equipment if installed incorrectly. TMS will not be responsible for any damage, loss, or injury resulting from the improper use of the BBS.

The user is solely responsible for ensuring the proper installation, operation, and maintenance of the BBS and all its components. The user must carefully read and follow the instructions provided in the installation manual and all relevant local safety guidelines. The user should seek the assistance of a professional technician if they have any doubts or difficulties with the installation or operation of the BBS.

TMS reserves the right to modify the BBS, its components, and the information provided in the installation manual without notice. The latest information and updates can be obtained by contacting TMS directly.

By using the BBS, the user accepts and agrees to the terms of this disclaimer statement.

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Warnings and Precautions



Warning: Failure to disconnect and lock out / tag out the supply power before installation or service may result in damage to the devices or permanent or fatal injury.



Warning: Failure to follow instructions for equipment installation may result in non-intrinsically Safe operation. Incorrect operation may result in fire or explosion, and permanent or fatal injuries.



Warning: Failure to follow manufacturer's instructions on electrical installation will void the warranty and may result in damage to the device. Do not connect to power other than a connection at the rating listed in the installation manual.

Warning-Explosion Hazard: Potential Electrostatic charging hazard. To reduce the potential Electrostatic charging or discharging hazard, clean enclosure surfaces using water and/or other commercially available anti-static cleaner as part of the regular maintenance

Warning: Explosion Hazard: Substitution of components may impair intrinsic safety

Warning: Explosion Hazard: To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing



Warning: The installation team **MUST** follow the manufacturer's instructions for installation of the mechanical equipment including all torque requirements for fittings. Failure to follow instructions may result in the release of hazardous product into the environment.












Warning: The device must always be protected from mechanical shock. Failure to protect the device from mechanical shock will void the warranty and may damage internal components.

Warning-Explosion Hazard: Avoid ignition hazard due to friction and impact



Caution: All sump work **MUST** be performed by a team of more than one installer and make use of a harness and tripod rescue system as well as a hazardous atmosphere detector. Any confined space work **MUST** be performed by a contractor holding valid certification for their jurisdiction. Failure to conform may result in permanent or fatal injury.

READ ALL FOLLOWING WARNINGS AND CAUTIONS BEFORE INSTALLATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN DAMAGE TO EQUIPMENT, FIRE OR EXPLOSION HAZARD, PERSONAL INJURY OR DEATH. ALWAYS REFER TO THE MANUFACTURER’S INSTALLATION AND SERVICE MANUALS FOR ALL EQUIPMENT BEING INSTALLED OR SERVICED ON SITE.

RISK	ASSESSMENT	MITIGATION
Toxic or Hazardous Fumes  	During service, the product contained in the meter may emit hazardous or toxic fumes into the environment.	Use of a hazardous atmosphere detector (“sniffer”) is required during any confined work. All service is to be performed in a ventilated environment or outdoors if possible.
Electrical shock or damage  	Incorrect or backwards installation of voltage and neutral lines to the control box may create a situation where electrical shock or electrical damage to equipment may occur.	Always isolate and de-energize all circuits during installation and service. Always follow the installation manual and circuit diagrams during installation and electrical service. Never install live wires.
Mechanical damage    	Dropping the control panel or meter may damage the devices and impair safe operation of the devices. Damaged device components may create electrical, or chemical dangers. Mechanical shock may cause impingement of the mechanical components. Friction or impact may cause fire or explosion.	Manage all equipment with care. Do not drop equipment. Install correctly according to installation manual, and do not over-torque any of the product line fittings. If any of the equipment is damaged, contact manufacturer for replacement parts. Never attempt to use damaged equipment. Installation crew must wear Appropriate PPE (gloves, boots, glasses) to prevent personal injury if the equipment is dropped.
Intrinsically safe (I.S.) circuit segregation 	Incorrect installation of the I.S. wiring, or failure to segregate the I.S. wiring from signal or supply voltage wiring may result in arcing inside of hazardous atmosphere, creating a risk of explosion or fire	Only install the I.S. wiring to the terminals as shown on the wiring diagram, and as shown. Always keep I.S. wiring segregated from all other voltages and wiring using the shielded section of the control panel.

Safety

As parts of the BBS system are installed within the areas containing highly combustible vapors and gasses, all safety precautions must be understood prior to construction and strictly followed. Working in these hazardous environment presents a risk of severe injury or death, all standard practices and the instruction from this guide must be followed. Before installing the BBS, read and understand the following instructions.

- All work must be performed by qualified and certified personnel who are trained in the proper application, installation, and maintenance of equipment and/or systems in accordance with all applicable codes and standards.
- All Warning and Cautions labels must be always followed.
- Power must be disconnected, locked out and tagged out prior to installation or servicing the equipment.
- While working in the confined spaces proper ventilation, temperature control, fire prevention, evacuation, and fire management must be provided.
- Replace unreadable or missing labels with new ones before operating equipment.
- Before disassembling any piping components, all the pressure in the lines must be relieved and all the liquid must be safely drained from the system. No attempts should be made to block burst hoses, pipes, or fittings with hands. Fluids under pressure can cause severe injury.
- Always wear the task specific, recommended, personal protective equipment (PPE). Protective clothing can include a hard hat, safety glasses, ear protection, close fitting clothes, steel toed boots, gloves, and a high visibility vest.
- Follow the recommended site-specific steps to ensure safe off loading of fuel.
- Never use unauthorized containers for fluid storage or transfer

Labels

				
<p>Explosion Hazard: To Prevent Ignition Of Flammable Or Combustible Atmospheres, Disconnect Power Before Servicing</p> <p>Intrinsically Safe Barrier Provides Intrinsically Safe Circuit Extension For Use In Hazardous Location When Installed.</p> <p><u>Control Panel Parameters:</u></p> <p>Model: TMS-CP-18053821-2 Voltage: 100-240 V AC @ 50/60 Hz Rating: 3 A Must Be Installed Indoors in Non-Hazardous Environment [Ex ia Ga] IIC; [AEx ia Ga] IIC Operating ambient: 0 to 40 °C</p>		<p>Risque d'explosion: Pour empêcher l'inflammation d'atmosphères inflammables ou combustibles, coupez l'alimentation avant l'entretien</p> <p>La barrière à sécurité intrinsèque fournit une extension de circuit à sécurité intrinsèque pour une utilisation dans un endroit dangereux lorsqu'elle est connectée selon le schéma de contrôle.</p>		
<p>TMS TOTAL METER SERVICES INC. 70 Worcester Road, Toronto, ON M9W 5X2 TEL: 416-255-5867 www.totalmeter.com</p>		<p>BBS BIOFUEL BLENDING SYSTEM</p> <p>Cert. to CAN/CSA Std. C22.2 No. 61010-1 Conforms to UL Std. 61010-1 and 698A</p>		
		<p> Intertek XXXXXXXX</p>		

Figure 1: Sample Intertek Approval Label affixed to the outside of the BBS Control Panel

<p>Intrinsically Safe Field Wiring Terminal</p>	
	
<p>Explosion Hazard: Substitution Of Components May Impair Intrinsic Safety</p> <p>Risque d'explosion: Le remplacement de composants peut nuire à la sécurité intrinsèque.</p>	
<p>Intrinsically Safe Circuits</p>	

Figure 2: Intrinsically Safe Field Wiring Label affixed to BBS Panel as required

Introduction

Overview

The TMS Biofuel Blending System (BBS) is part of TMS' blending and injection system family that seamlessly integrates into your fuel dispensing operations and precisely blends fuel with biofuels on demand to deliver a consistent and high-quality blended product to the customers.

This fully automated system utilizes a combination of mechanical, electrical, and software components to blend the precise ratios of biofuels into your main products, without any customer intervention. As a result, the marketers will provide a consistent, homogenized blend of product and better-quality fuels to their customers at a fraction of the current cost of pre-blended fuel.

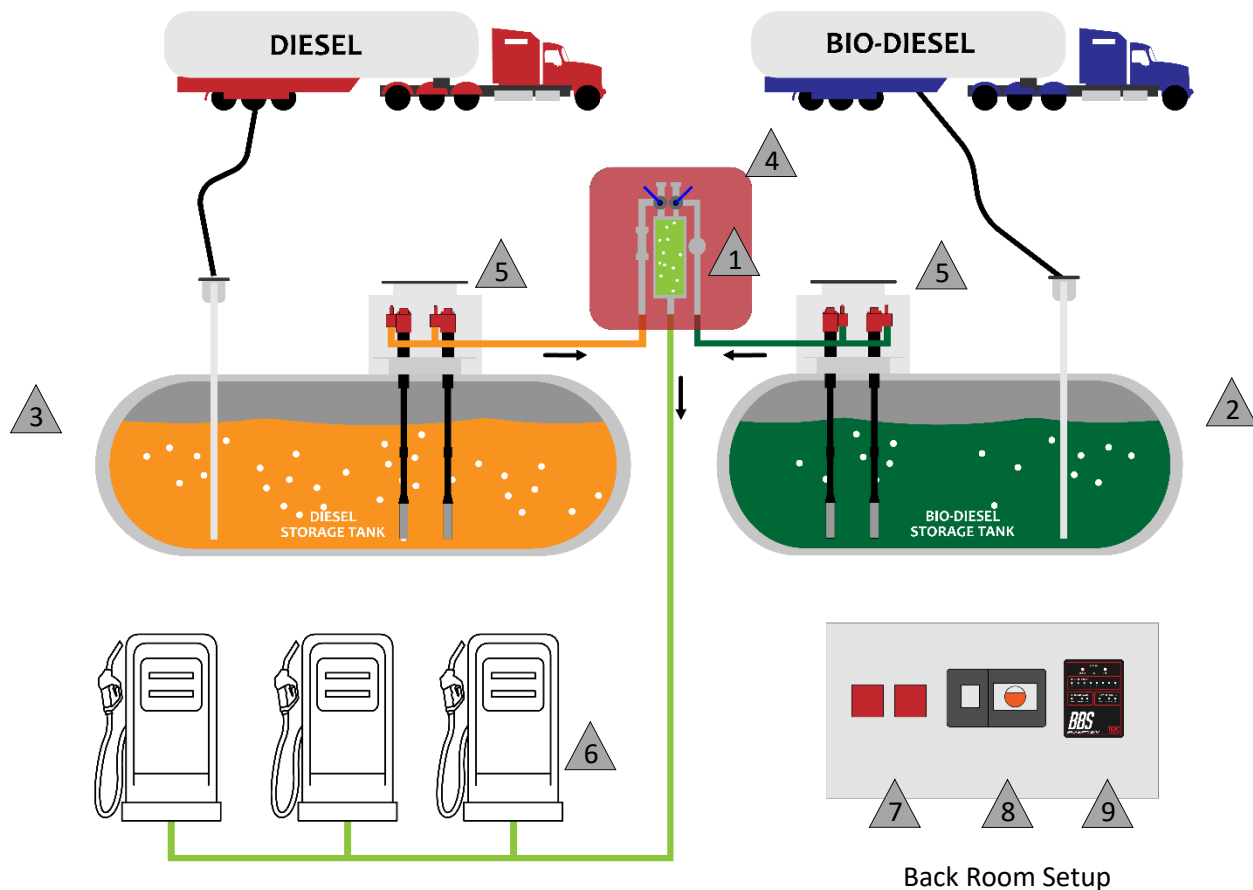


Figure 3: A typical BBS setup

- | | | |
|-----------------------------|-------------------------|--------------------|
| 1 TMS BioFuel Blending Unit | 4 UG Sump or AG Cabinet | 7 Pump Controllers |
| 2 Bio Fuel Storage Tank | 5 STP Sumps | 8 ATG |
| 3 Fuel Storage Tank | 6 Fuel Dispenser | 9 BBS Controller |

Network Connections

Modifying the IP of a Device

To troubleshoot the Biofuel Blending System (BBS) it may be necessary to configure the IPv4 settings of either or both ethernet ports on the BBS controller, as well as the device used by the technician to connect to the controller. The steps to access and configure the IPv4 settings on a windows 10 device are as follows:

1. Access the network and sharing center.
2. Change the network adapter settings as required.
3. Verify the network settings

***Note:** the steps listed below are for modifying the network on a Windows 10 device. Older or different versions of Windows will have different procedures to access the adapter settings. Consult your IT department, or Technical Support for assistance. For sites where a customers internal network will be used, contact the IT department of the client for all network info.

Step 1: In the Start menu search bar, type “Control panel”, and click the icon when it appears.

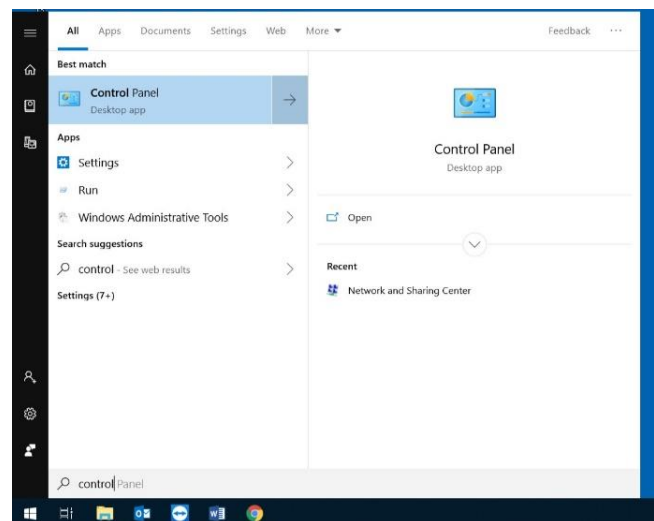


Figure 4: Typical Start Menu

Step 2: In the control panel, locate and select Network and Internet. Next, Select Network and Sharing Center to bring up the connection status screen.



Figure 5: Typical Control Panel Window



Figure 6: Typical Network and Internet Menu

Step 3: In the left hand menu, select “Change adapter settings”, as highlighted. This will show all installed adapters on the current device.

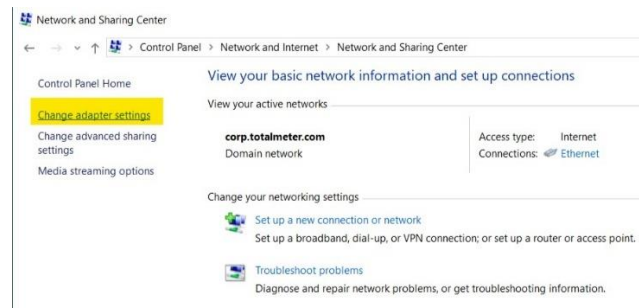


Figure 7: Typical Network Settings with Adapter Settings Highlighted

3.1) If you are changing a laptop’s IP to connect to the BBS, right click on the ethernet adapter and select “properties”.

3.2) If you are modifying the IP address on the BBS, right click either wireless OR ethernet adapter 2 as required and then

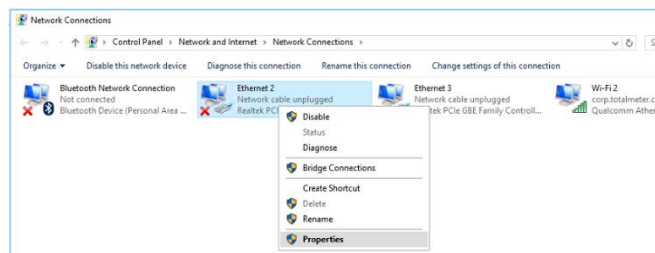


Figure 8: Adapter Settings Menu

Step 4: Scroll down the list to “IPv4” and click it once to highlight it. Then, click “properties” to access the IP address settings.

Step 5: Use the following settings, depending on the device being changed:

5.1) BBS: The BBS has 2 built-in LAN ports on the computer box, as well as a wireless adapter for Wi-Fi connection.

The default settings are:

Ethernet 2:

IP- 192.168.1.52

Netmask- 255.255.255.0

Ethernet 3:

IP- 192.168.1.51

Netmask- 255.255.255.0

Wireless* (if adapter is present)

The wireless connection should be set to “obtain an IP automatically” instead of a manual entry. Verify that this setting is checked.

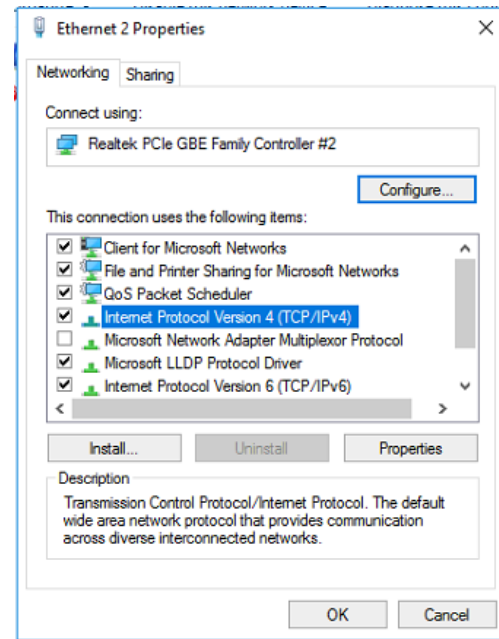


Figure 9: Typical Ethernet port settings

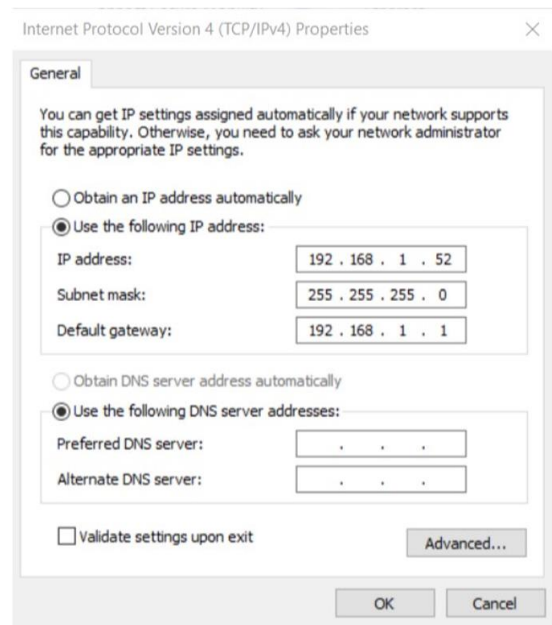


Figure 10: Typical IPv4 Settings

**Note: The wireless adapter option may not be present on the system if no adapter is installed. If there is no wireless adapter, ignore this step.*

**Attention: record the settings of your laptop/computer's initial settings before changing the IP, so that it can be returned to default after disconnecting from the BBS.*

5.2) Laptop / External Computer:

Change the port you are connecting to a cable so that it matches the following:

IP- 192.168.1.235

Netmask- 255.255.255.0

Gateway- 192.168.1.1

Step 6: Verify network settings

After configuring network settings, it is good practice to verify that all adapter settings are correct. To do this, open the command prompt by searching for "CMD" in the start menu search bar and selecting the command prompt.

Next, in the prompt, type in "ipconfig /all" without quotation marks, and press enter. This will display all adapters on the current machine, and all their settings. Make sure that the network adapter IPv4 addresses match what was entered.

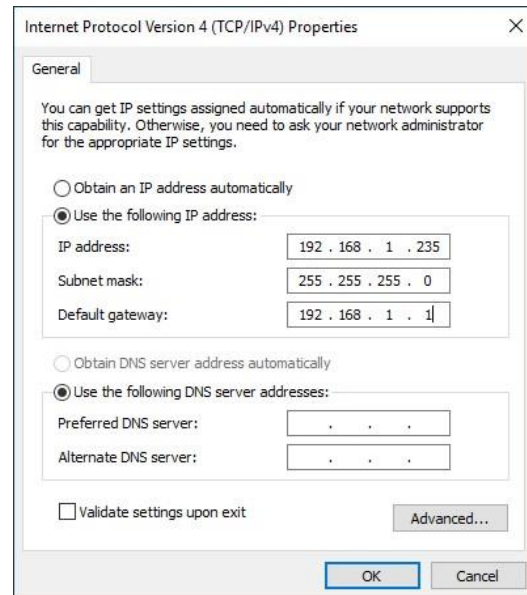


Figure 11: Typical IPv4 Setting for the Service Computer

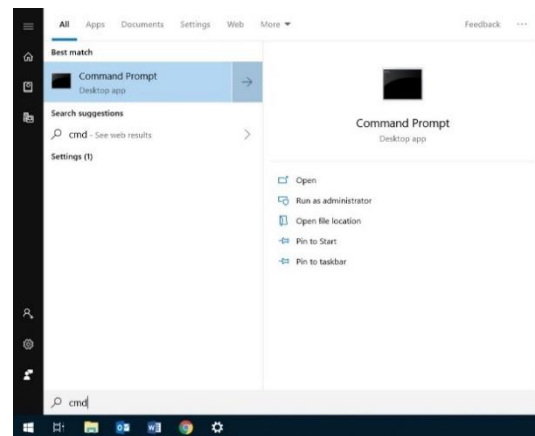


Figure 12: Command Prompt Application at Start Menu

To make sure that BBS and the Laptop are on the same network and have compatible configuration, it is good practice to send a “ping” command to the BBS controller from the laptop. To do this, make sure that the BBS and the Laptop are both plugged into the network, and that the Laptop IPv4 settings have been configured for the address of the local network. Next, open the command prompt on the laptop as outlined previously.

From the command prompt on the laptop, type “ping 192.168.1.51” if the BBS is connected to internet via port 1, and “ping 192.168.1.52” if it is connected to port 2. If it is successfully connected, the command prompt text will indicate a “reply” from the device with a “TTL” value. If the settings are incorrect, or the device is not connected to the network, the prompt will indicate that either the destination host is unavailable, or that the request has timed out. If the ping command is unsuccessful, the IP settings and physical connection will need to be checked and corrected.

The picture below shows an example of a successful ping command, and a failed ping command to devices on the network.

```

Command Prompt

Ethernet adapter Ethernet 3:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . : 
    Description . . . . . : Realtek USB GbE Family Controller
    Physical Address. . . . . : 9C-E8-E8-24-56-D9
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes

Ethernet adapter Ethernet 2:

    Connection-specific DNS Suffix  . : corp.totalmeter.com
    Description . . . . . : Intel(R) Ethernet Connection I217-LM
    Physical Address. . . . . : 34-E6-D7-5C-76-89
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
    Link-local IPv6 Address . . . . . : fe80::6101:79e7:e307:398b%5(Preferred)
    IPv4 Address. . . . . : 
    Subnet Mask . . . . . : 255.255.255.0
    Lease Obtained. . . . . : Monday, February 25, 2019 9:53:02 AM
    Lease Expires . . . . . : Friday, March 1, 2019 8:49:48 AM
    Default Gateway . . . . . : 192.168.1.1
    DHCP Server . . . . . : 192.168.1.21
    DHCPv6 IAID . . . . . : 87353047
    DHCPv6 Client DUID. . . . . : 00-01-00-01-23-F7-DA-8F-34-E6-D7-5C-76-89
    DNS Servers . . . . . : 192.168.1.21
    NetBIOS over Tcpip. . . . . : Enabled

Wireless LAN adapter Local Area Connection* 1:

```

Figure 13: Typical Command Prompt window

```

H:\>ping 192.168.1.52

Pinging 192.168.1.52 with 32 bytes of data:
Reply from 192.168.1.52: bytes=32 time=2ms TTL=128
Reply from 192.168.1.52: bytes=32 time=1ms TTL=128
Reply from 192.168.1.52: bytes=32 time=1ms TTL=128
Reply from 192.168.1.52: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.52:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

```

Figure 15: Typical "ping" results of a Successful connection

```

C:\Users\User>ping 192.168.1.51

Pinging 192.168.1.51 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.1.51:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\Users\User>

```

Figure 14: Typical "ping" results of a unsuccessful connection

Remote Viewing

For remotely and troubleshooting the BBS, different type of desktop viewers can be used. Following are couple of examples of these software which are pre-installed and configured on the BBS Computer.

VNC Viewer and Configuration:

Step 1: Make sure that the device has UltraVNC installed already. If it is not already installed, go to <https://www.uvnc.com/downloads/ultravnc.html> and install the latest version. If connecting via a laptop to view the BBS, the laptop must also have VNC installed and set up.

To install UltraVNC, run the UltraVN_Setup.exe file downloaded from the link above, and follow the prompts. Leave the default options selected from the installation screen, and then click on “Next” to complete the installation process.

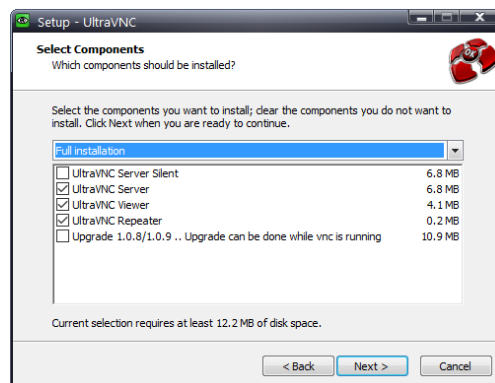


Figure 16: Typical UltraVNC setup window

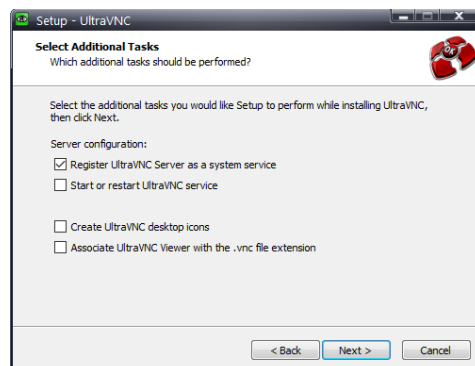


Figure 17: Typical UltraVNC setup window

Step 2: To connect to the BBS using UltraVNC, open UltraVNC and enter the IP address of the BBS computer and press “Connect”.

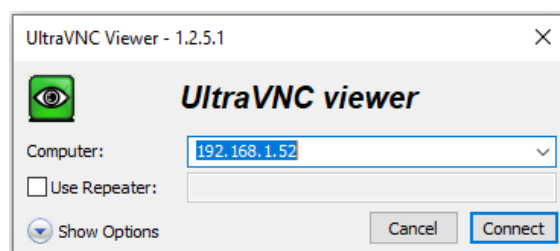


Figure 18: Typical UltraVNC connection window

**Note: Incorrect BBS Network settings will render the device inaccessible remotely, and will terminate the UltraVNC session.*

TeamViewer Configuration

Step 1: Make sure that the device has **TeamViewer** installed already. If it is not already installed, go to <https://www.teamviewer.com/en/download/> and make sure that you download and install TeamViewer. *Note: the default installation is TeamViewer 13, a newer version is NOT required.* If connecting via a laptop to view the BBS, the laptop must also have TeamViewer installed and set up.

To install TeamViewer, run the TeamViewer_Setup.exe file downloaded from the link above, and follow the prompts. Select the “Basic Installation”, and “Personal/Non-Commercial use” options from the installation screen, and then click on “Accept – finish” to complete the installation process.

Once installed, TeamViewer will run on startup of the device it is installed on. This can be disabled within the settings under the “Extras” menu tab in TeamViewer.

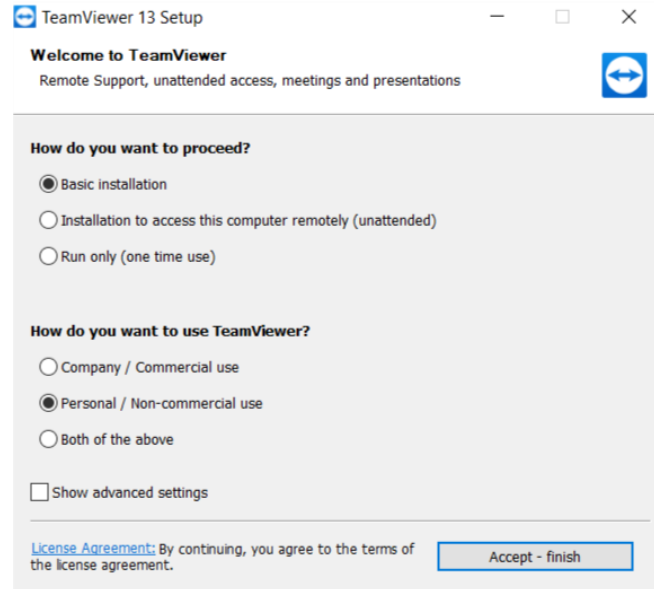


Figure 19: Typical TeamViewer Setup window

Step 2: Open TeamViewer and make note of the “Your ID” field. Record this number for reference.

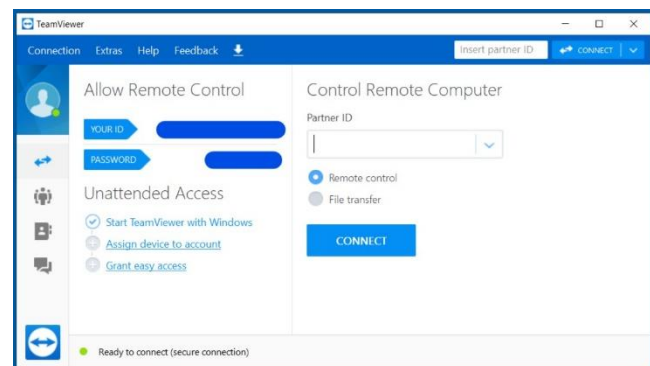


Figure 20: Typical TeamViewer User Window

Step 3: Check the TeamViewer server connection status in the bottom left corner of the TeamViewer window. The icon should be a green circle with “Ready to connect” if you are connected to a wireless hotspot or will display “Only LAN Connections are possible”. If the icon is red or yellow, check network settings and verify that there is connectivity to the outside network.

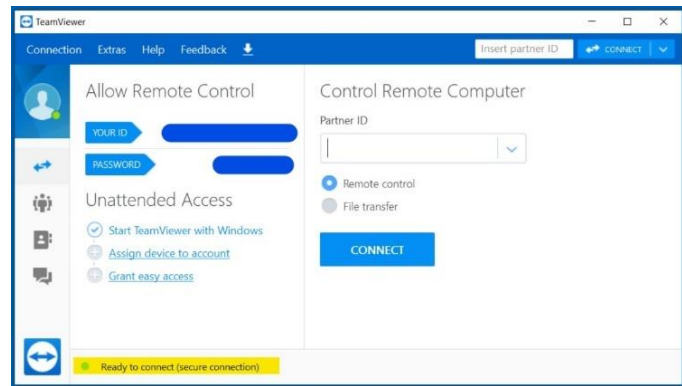


Figure 21: Typical TeamViewer window showing "Only LAN Connections are possible"

Step 4: to connect to the BBS using teamviewer, in the “partner ID” field type in the IP address of the BBS network port that the ethernet cable is connected to. Click “connect” and teamviewer will open a new window to the BBS desktop. The remote desktop can be used exactly like a regular desktop. The default connection password is **6697010** for version 13 or older, and **TM\$6697010** for newer versions of teamviewer.

**Note: Incorrect BBS Network settings will render the device inaccessible remotely, and will terminate the Teamviewer session.*

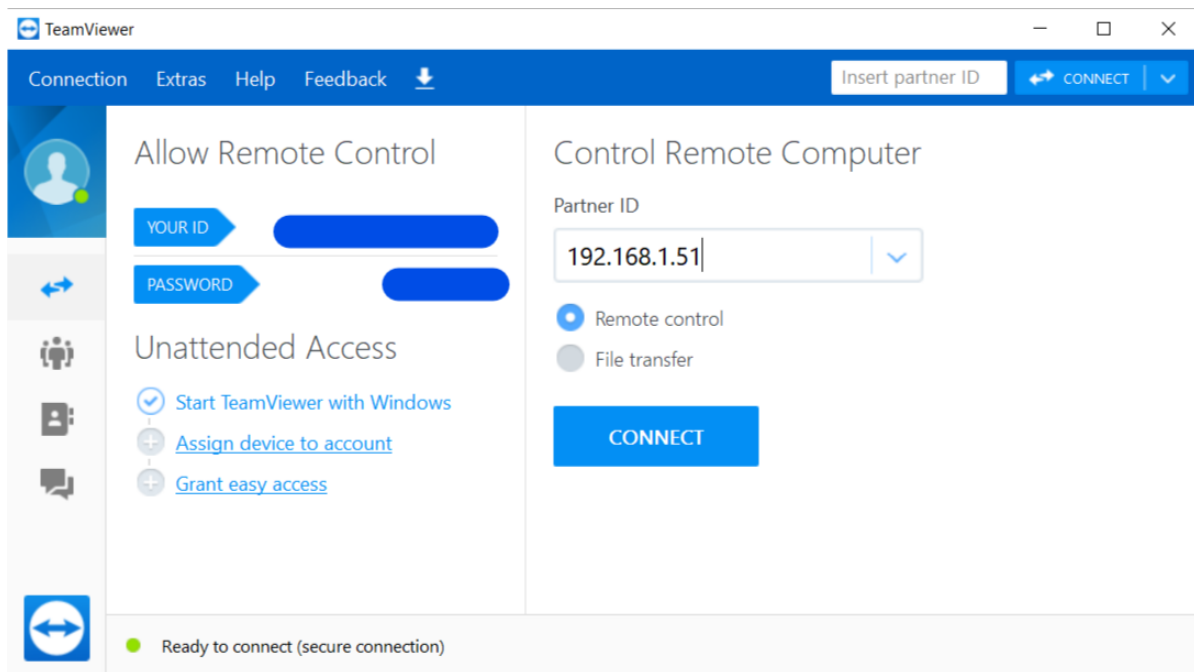


Figure 22: Typical TeamViewer connection window

Navigating BBS Interface

Utilities

The BBS interface is made up of several key applications:

- BBS Utility
- TLS Utility
- BBS Config and Calibration Utility

It is important to be familiar with each application and their functions, as explained below.

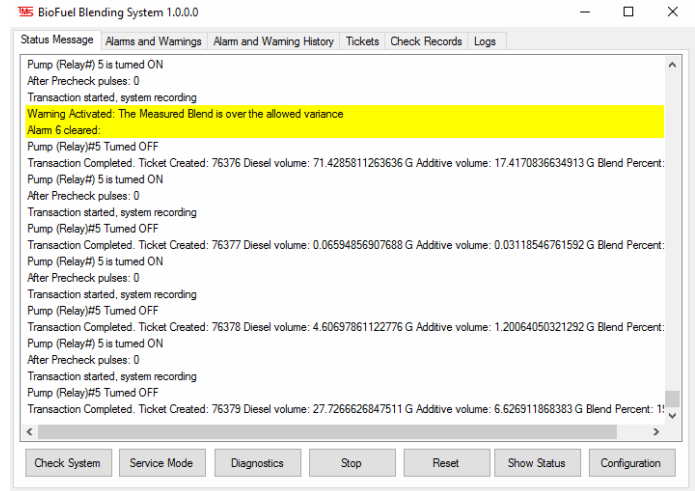


Figure 23: Typical BBS desktop view

BBS Utility

Note: BBS Software interface may look different based on the version installed.



The BBS utility always runs in the background while the unit is powered on and gives a window that displays all internal logic of the BBS as it operates.

It indicates pump runs, solenoid operation, delivery volume, additive volume, additive pulses, and target blend percentage. The BBS Utility also contains information about the Check Process, Diagnostics process, and will indicate if the system is put into service mode (these are explained in the Service section). The utility keeps track of transactions and will create the transaction tickets at the end of each delivery.



Figure 24: Typical BBS status screen

BBS Configuration and Calibration Utility

BBS configuration is an application used for troubleshooting and testing the configuration of the BBS relay board output, as well as for calibrating the additive meter when used in conjunction with a certified proved. To access the Configuration, turn on the “Service Mode” by pressing the “Service Mode” button and then clicking the “Configuration”

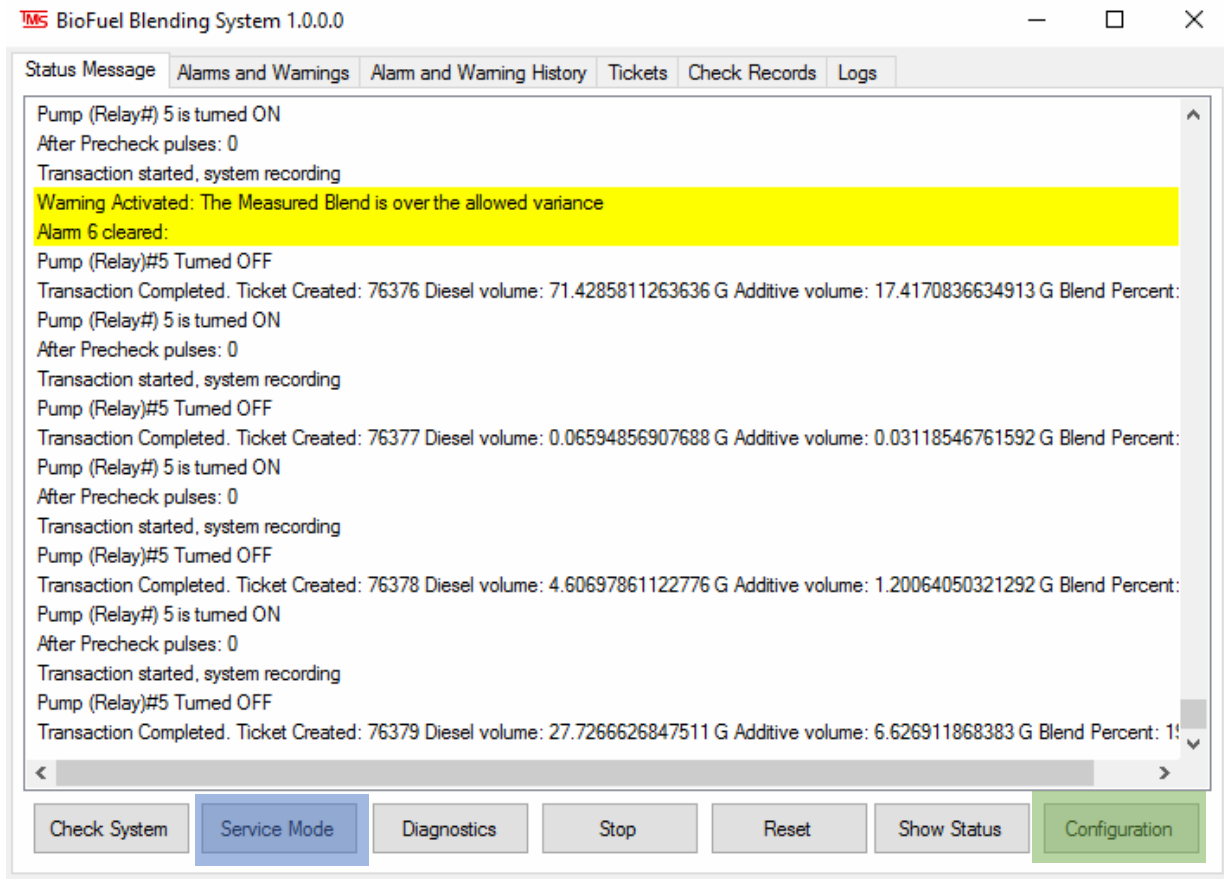


Figure 25: Service Mode and Configuration buttons

Configuration

When opened, BBS configuration shows the current relay configuration, blend percentage settings, relay timer settings, solenoid settings, meter factor, and allows for toggling individual relays to test pump starts, solenoids, and BBS indicator lights.

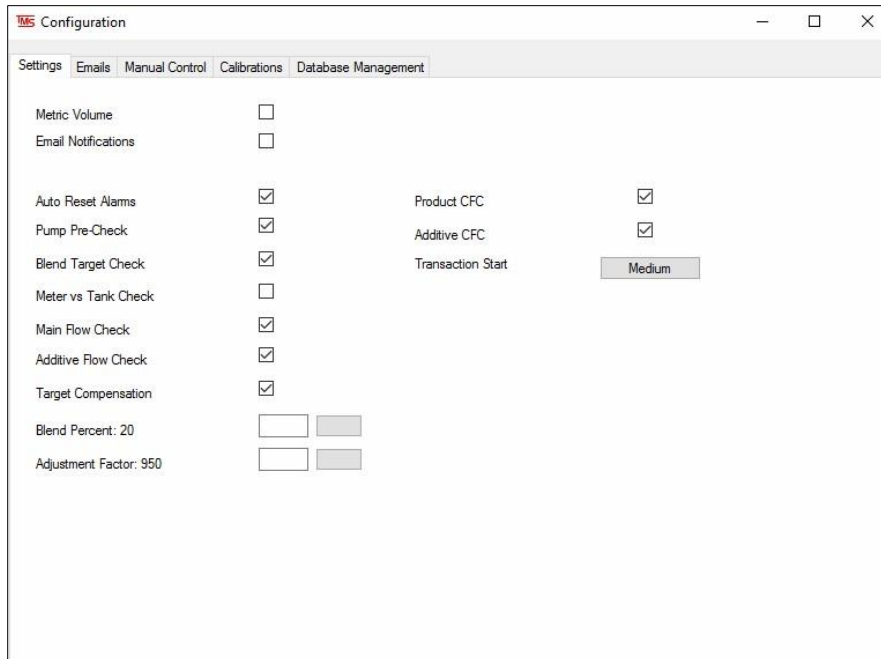


Figure 26: Main setting screen for BBS

Clicking on the ON/OFF button on each relay under the “status” column will change the output status and toggle the relay. “Status” indicates the current output status of the relay. “Condition” indicates the enable/disable status of the indicated component. Meter factor is determined during calibration and cannot be manually edited.

**Note: there is a delay of approximately 1 second when toggling relay status*

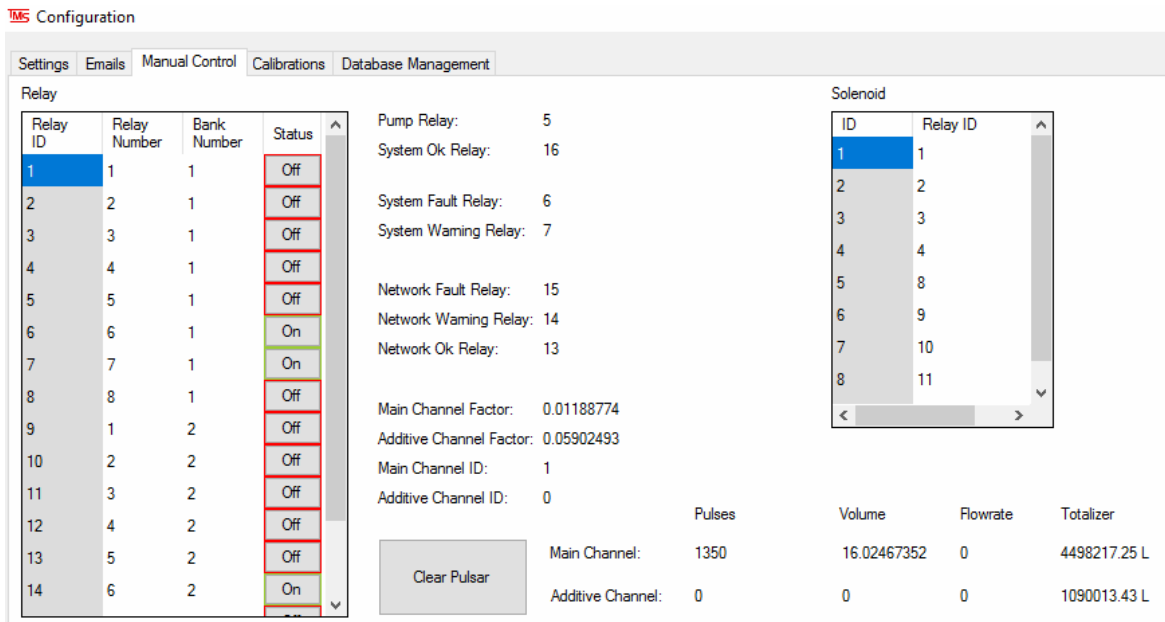


Figure 27: Configuration Tab of the Configuration and Calibration Utility

Relay mapping

Relay ID	Relay Number	Bank Number	Operation
1	1	1	Controls Solenoid 1
2	2	1	Controls Solenoid 2
3	3	1	Controls Solenoid 3
4	4	1	Controls Solenoid 4
5	5	1	Controls Bio Diesel Pump request to TLS
6	6	1	Controls System Fault LED
7	7	1	Controls System Warning LED
8	8	1	Controls Solenoid 5
9	1	2	Controls Solenoid 6
10	2	2	Controls Solenoid 7
11	3	2	Controls Solenoid 8
12	4	2	Spare
13	5	2	Controls Network OK LED
14	6	2	Controls Network Warning LED
15	7	2	Controls Network Fault LED
16	8	2	Controls System OK LED

Configuration

Settings | Emails | Manual Control | **Calibrations** | Database Management

Meters

☒ Additive Meter ☐ Main Product Meter

Start **Stop** **Reset**

☒ Pump Control ☒ Using Gallons Prover

Prover Volume:

Calculate Meter Factor

Calculated Factor: New Factor

Update Meter Factor

Current Factor: 0.05902493

Measured Volume: 0G

0 L Liters

Flow Rate 0 GPM

Ready for Calibration

Manual Factor:

Manual Factor

Figure 28: Calibration Tab of the Configuration and Calibration Utility

Calibration

TMS recommends using a 100-gallon prover to calibrate the Diesel and the Bio diesel meter on the BBS unit.

To Calibrate the BBS system, follow these steps and refer to the figures xx and xx:

1. The Calibration units are defaulted to Liters. When calibrating in Gallons, ensure the Convert to Gallons is checked.
2. Use the calibration hose with ball valve and connect it to the calibration camlock inside the meter sump.
3. The other end of the calibration hose should be inserted into the 100-Gal calibration measure with another ball valve.
4. Once the setup is completed, press the green Start button on the calibration tab of the utility.
5. Wait a few seconds to ensure the meter does not creep. If the meter does creep, press the Stop to clear out, then press Start again. If the creep does not stop, follow the troubleshooting guide for unauthorized flow.
6. The next step will be to turn on the associated relay for the pump and the solenoid valve for the meter that is being calibrated using the configuration tab of the utility.
7. Fill the 100-Gal prover up to calibration mark and close the ball valve. Press Red STOP button and note down the volume in the prover.
8. Enter the prover volume into the Prover Volume section.
9. Click the "Calculate meter factor" button to generate a new meter factor.
10. Select the new factor with the corresponding "prover volume" from the list, and then click "Apply new meter factor"
11. Repeat the process 3 times or until the Prover Volume and Measured volume are nearly identical for each meter
12. If the volumes are off, select the latest calibration run from the table then press Update Meter Factor. Re-calibrate as needed.

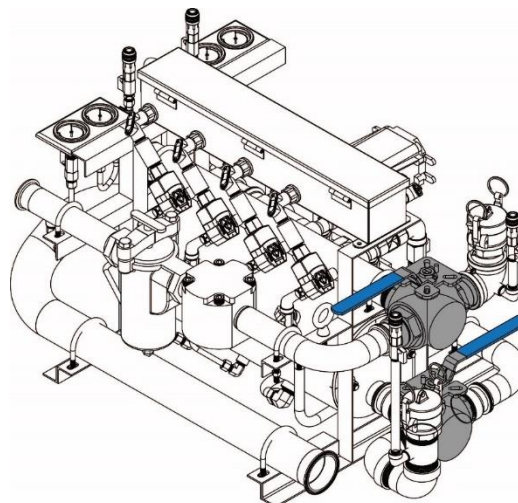


Figure 29: Fuel and Biofuel 3-way valve Highlighted



Figure 30: Calibration using a 100 Gal Volumetric Prover

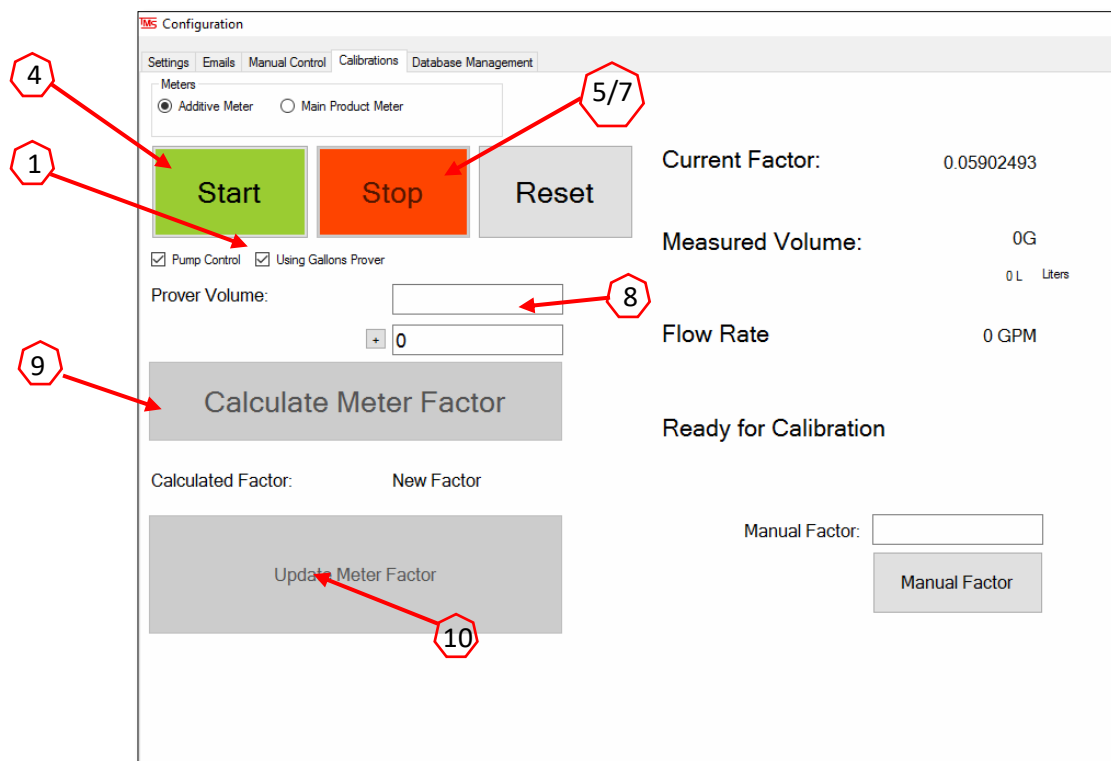


Figure 31: Calibration Tab of the Configuration and Calibration Utility

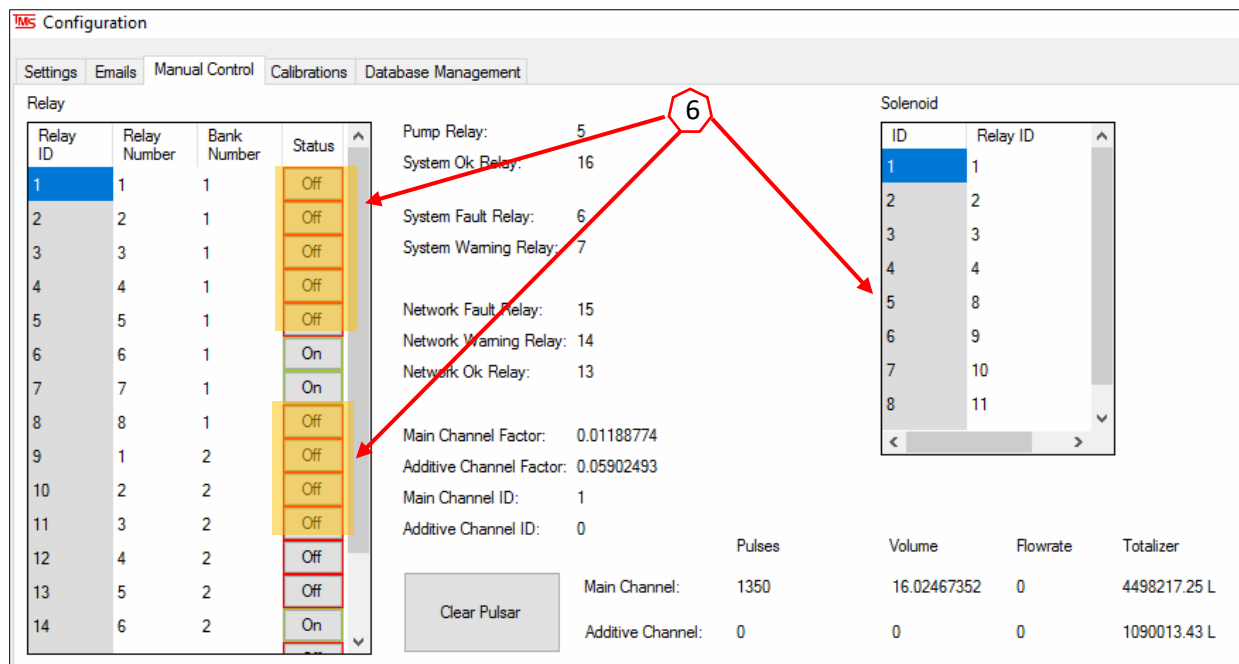


Figure 32: Configuration Tab of the Configuration and Calibration Utility

Service

BEFORE SERVICING: ensure that the Biofuel Blending System (BBS) “service mode” is ON before servicing ANY components of the system, and ALWAYS use service mode if the TLS system is being serviced.

If service must be performed on the BBS system or any of the mechanical components associated with it, there are some important considerations and procedures that must be followed. Failure to properly follow service procedures can result in injury, product loss, spills, or blending inaccuracies. At all times, care should be taken to minimize or contain all possibility of product spillage through drips or leaks. Service must only be performed by qualified personnel familiar with mechanical fuel systems. More than one person may be required for safe service procedures, such as in situations where confined space entry is required or when remote equipment controls must be activated to run pumps and solenoids. The technician must assess the situation and ensure they are able to perform any service work without risking injury or product loss/spillage.

Procedural consideration

- Always put the system into service mode when service is being performed.
- Never cross-thread any fittings. Cross threading will cause leaks and product loss, as well as irreversibly damaging equipment.
- Any compression-type fittings should be tightened hand tight + $\frac{3}{4}$ turn with the proper tool. NEVER use PTFE-tape or pipe-doping compounds with a compression-type fitting, as it will cause improper seating and will not seal. PTFE-tape or doping-compounds must only be used to secure pipe threads in a standard fitting, and must be selected to meet the requirements of the environment they will be used in.
 - For any electrical work or servicing of moving equipment that could pose a safety hazard, proper Lock-Out Tag-Out procedures must be followed. Failure to do so may result in serious injury or death.
- When servicing the tank monitoring system (TLS) it is important to first put the BBS into “Service mode” as described in the Service Mode section. Failure to do so may result in severe over or under blending
- Always isolate product flow before working on any mechanical fuel system components by closing upstream and downstream valves. Always double check and “walk the lines” to visually ensure that there is no possibility of product spills by siphoning or gravity feed.

Built-in Service Functions

The BBS has 3 built-in functions to aid in diagnosing, troubleshooting, and servicing the system. Mounted inside the BBS panel, on the right-hand side of the enclosure, there are 3 buttons. They are the Check Process, Diagnostics Process, and Service Mode. Each of the built-in processes will display within the BBS Utility window and will also give a printout of the process from the Veeder-Root TLS printer.



Figure 33: Typical location and type of Service buttons

Check Button

The check process will test all the outputs of the BBS as well as the pulser and the stop and reset buttons on the front of the panel. During the check process, the BBS will attempt to inject a small quantity of biofuel into each tank while running the pump, to test solenoid operation. The entire process can be viewed from the BBS Utility window as well as from the TLS ticket printer and monitored for discrepancies.

```
C:\Program Files (x86)\TMS\AISetup\TMSAdditiveSystem.exe
>>> Checking Gasoline
>>> Starting pump
2/28/2019 3:02:05 PM Open pump
>>> * Injecting tank 1 *
>>> Clearing pulser
>>> Pulser reading from
>>> channel 0 = 0
>>>
>>> Solenoid # 1 opened
>>> Solenoid energizing
>>> time delay = 10 mSec
>>>
>>> No pulses
>>>
>>> Closing solenoid
>>> Injected Vol =0
>>> time delay = 1000 mSec
>>> Number of pulses
>>> after closing
>>> solenoid = 0
>>>
>>> Tank injection %
>>> Before = 100
```

Figure 34: Typical BBS Utility window when check button is pressed

Diagnostics Button

The diagnostics function is used to check the system for active faults, the current blend percentages in each tank, and the injector system status. The diagnostics will print out from the TLS ticket printer and can be used to determine overall system operation.

```
C:\Program Files (x86)\TMS\AISetup\TMSAdditiveSystem.exe

>>> Diagnostic Ticket
>>> 2/28/2019 2:16:29 PM
>>>
>>> Active faults:
>>> Relay board not connected
>>>
>>> No active warning
>>>
>>> Tank# 1 T1_Reg
>>> Additize disabled
>>> Additive % = 100
>>>
>>> Tank# 2 T2_Reg
>>> Additize disabled
>>> Additive % = 100
>>>
>>> Tank# 3 T3_Pre
>>> Additize disabled
>>> Additive % = 100
>>>
```

Figure 35: Typical BBS Utility window when Diagnostics button is pressed

Service Mode Button

The service mode button is used any time that **ANY** of the connected systems must be disconnected for service. Pressing the Service mode button will put the system into service mode, which prevents the BBS from attempting to inject biofuel or calculate required biofuel volume. Service mode is indicated by the “System OK” and “Fault” LEDs on the front of the panel blinking on and off. Service mode is turned off by pressing the reset button, which then returns the system to normal operation. The service mode operation will also print from the TLS printer.

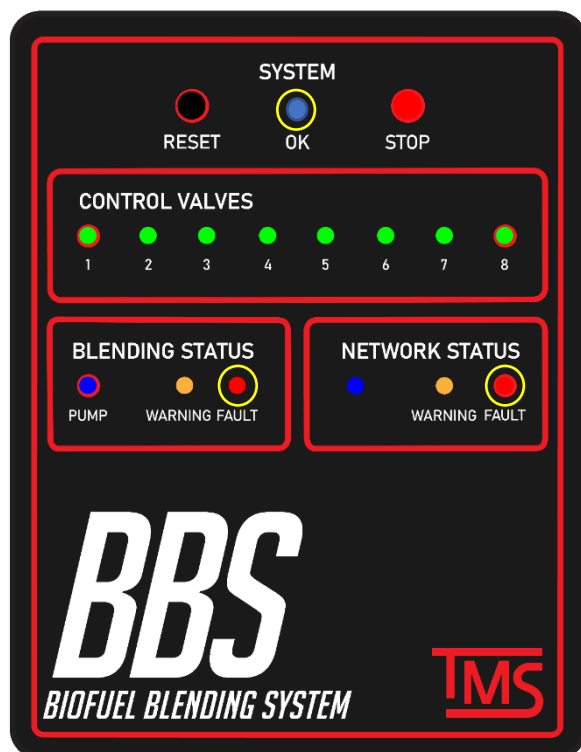


Figure 36: Typical BBS cover lights when Service button is pressed

Examples of Check and Diagnostic tickets printed from the BBS to the TLS printer:

<pre> AIS Checking mode 3/5/2019 11:04:26 AM TMS-450 Is Connected Relay board Is connected Pulser board Is connected Checking Gasoline Starting PUMP * Injecting tank 1 * Clearing pulser Pulser reading from channel 0 = 0 Solenoid # 1 opened Solenoid energizing time delay = 10 mSec No pulses Closing solenoid Injected Vol =0 time delay = 1000 mS Number of pulses after closing solenoid = 6 Tank injection % Before = 54.4 After = 54.4 </pre>	<pre> TLS connected Diagnostic Ticket 3/5/2019 11:03:34 AM Active faults: Relay board not conn No active warning Tank# 1 T1_Res Additize disabled Additive % = 54.4 Tank# 2 T2_Res Additize disabled Additive % = 101.2 Tank# 3 T3_Pre Additize disabled Additive % = 0 Ticket# 1077 Tank Id= 1 Delivery Start 3/5/2019 10:55:51 AM Delivery End 3/5/2019 10:55:51 AM Vol before: 11641 Vol after: 21700.4 CompenVol: 0 TotalVol 10059.4 Total Addi: 0 %Additive: 54.4 </pre>
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Troubleshooting

Quick Troubleshooting References

In the event of an error in the BBS system, the user will be notified through a message printed on the networked ATG printer, as well as a display of the error message in the program window. The software is designed to produce various messages that may correspond to different underlying causes. The following are the messages that can be printed by the software, along with the possible causes associated with each message:

ERROR	POSSIBLE CAUSE	POSSIBLE SOLUTION
Relay board not connected	<ol style="list-style-type: none">1. USB cable not seated properly.2. Faulty communication board module3. Faulty relay board module4. Incorrect software configuration	<ol style="list-style-type: none">1. Reseat USB cable at BBS computer & communication module2. Gently press on edges of module to ensure it is seated properly in the socket.3. Verify there are no loose wires.4. Contact Tech Support.
Pulser Board not connected	<ol style="list-style-type: none">1. USB cable not seated properly2. Faulty communication board module3. Faulty relay board module4. Incorrect software configuration	<ol style="list-style-type: none">1. Reseat USB cable at BBS computer & communication module2. Gently press on edges of module to ensure it is seated properly in the socket.3. Verify there are no loose wires.4. Contact Tech support.
Solenoid Valve	<ol style="list-style-type: none">1. Faulty or incorrect wiring to the Solenoid2. Debris in the solenoid valve causing error3. Faulty Relay Board	<ol style="list-style-type: none">1. Verify there are no loose wires and the wiring is as per the provided wiring diagram.2. Run check procedure a few times or manually open and purge through solenoid. If the error persists, remove the solenoid valve out to inspect for any foreign material which could be causing the issue.3. Refer to "Relay board not connected" above

No Meter Pulse, Low flow or No flow detected	<ol style="list-style-type: none"> 1. Closed Valves 2. Pump not running 3. No product in the storage tank 4. Faulty or incorrect wiring to the Meter 5. Faulty Solenoid valve 6. Faulty or incorrect wiring of the I.S. barrier 7. Clogged strainer 8. Debris in the Meter causing meter jam 9. Faulty Pulser Board 10. Faulty Meter 	<ol style="list-style-type: none"> 1. Verify ALL ball valves/3-way valves are open/correction position. 2. Verify ALL pump(s) are installed and working properly. 3. Check to verify if there is enough product in the storage tank. 4. Verify there are no loose wires and the wiring is as per the provided wiring diagram. 5. Refer to "Solenoid Valve" above. 6. Check the basket strainer on the Biofuel line for any foreign material which could be clogging the strainer 7. Pull the meter out to inspect for any foreign material which could be causing the meter jam. 8. Refer to "Pulser Board not connected" above 9. Contact Tech Support
No Pressure shown on the pressure gauge panel	<ol style="list-style-type: none"> 1. Closed Valves 2. Pump not running 3. No product in the storage tank 4. Faulty Pressure Gauge 	<ol style="list-style-type: none"> 1. Verify ALL ball valves/3-way valves are open/correction position. 2. Verify ALL pump(s) are installed and working properly 3. Check to verify if there is enough product in the storage tank. 4. Contact Tech Support
Under Injections	<ol style="list-style-type: none"> 1. Incorrect programming 2. Meter requires calibration 3. Solenoid Valve Issue 4. Low flow pump Issue 	<ol style="list-style-type: none"> 1. Recalibrate the Biofuel meter. The meter must be recalibrated once per 2 years. 2. Refer to "Solenoid Valve" above 3. Refer to "Low flow" above

PLLD test fail	<ol style="list-style-type: none"> 1. Air in the system 2. Leak in the line 	<ol style="list-style-type: none"> 1. Ensure adequate and recommended high point vents have been installed and purge the air out of the BBS system 2. Visually check all lines for signs of leaks 3. Use the onsite ATG to perform the Line leak test
Pulses after solenoid close	<ol style="list-style-type: none"> 1. Solenoid Valve Issue 	<ol style="list-style-type: none"> 1. Refer to "Solenoid Valve" Above
Unauthorized Flow	<ol style="list-style-type: none"> 1. Solenoid Valve Issue 	<ol style="list-style-type: none"> 1. Refer to "Solenoid Valve" Above

Technical Support

For all initial troubleshooting of units and all technical dispatches contact the Veeder-Root Technical Support team at:

1-800-323-1799

technicalsupport@veeder.com

Ask for technical support, and ask the tech for Level 1 support and give your location ID.

If an alarm is present that cannot be cleared and has been deemed to be a Level 3 issue, or if further information on the BBS line of products is required please contact us at:

****Note: A Service Request Number is required when calling TMS.***

Monday to Friday, 8 a.m. to 5 p.m. EST: (416) 225-5867
OR: (416) call TMS option #2
Toll Free: (844) 425-5867

After Hours: (416) 225-5867
OR: (416) call TMS option #2
Toll Free: (844) 425-5867

Note: If calling after hours, please clearly leave your name, telephone number and the nature of your call. A technician will contact you as soon as possible.