TMS

BIOFUELS BLENDING SYSTEM

INSTALLATION MANUAL

BBS

BIOFUEL BLENDING SYSTEM

Manual No. 577014-495 • Revision B

NOTICE

The documents in this library may be based on or include information originating from third-parties or other original equipment manufacturers ("OEMs"). The Veeder-Root Company disclaims all liability for such third-party/OEM information and users of this library are cautioned to verify the information within these documents with the OEM.

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.

Table of Contents

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 <u>MUST</u> 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 <u>MUST</u> 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 <u>MUST</u> 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

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

Figure 2: Intrinsically Safe Field Wiring Label affixed to the outside of the BBS Control Panel and Electrical conduit knockouts if 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.

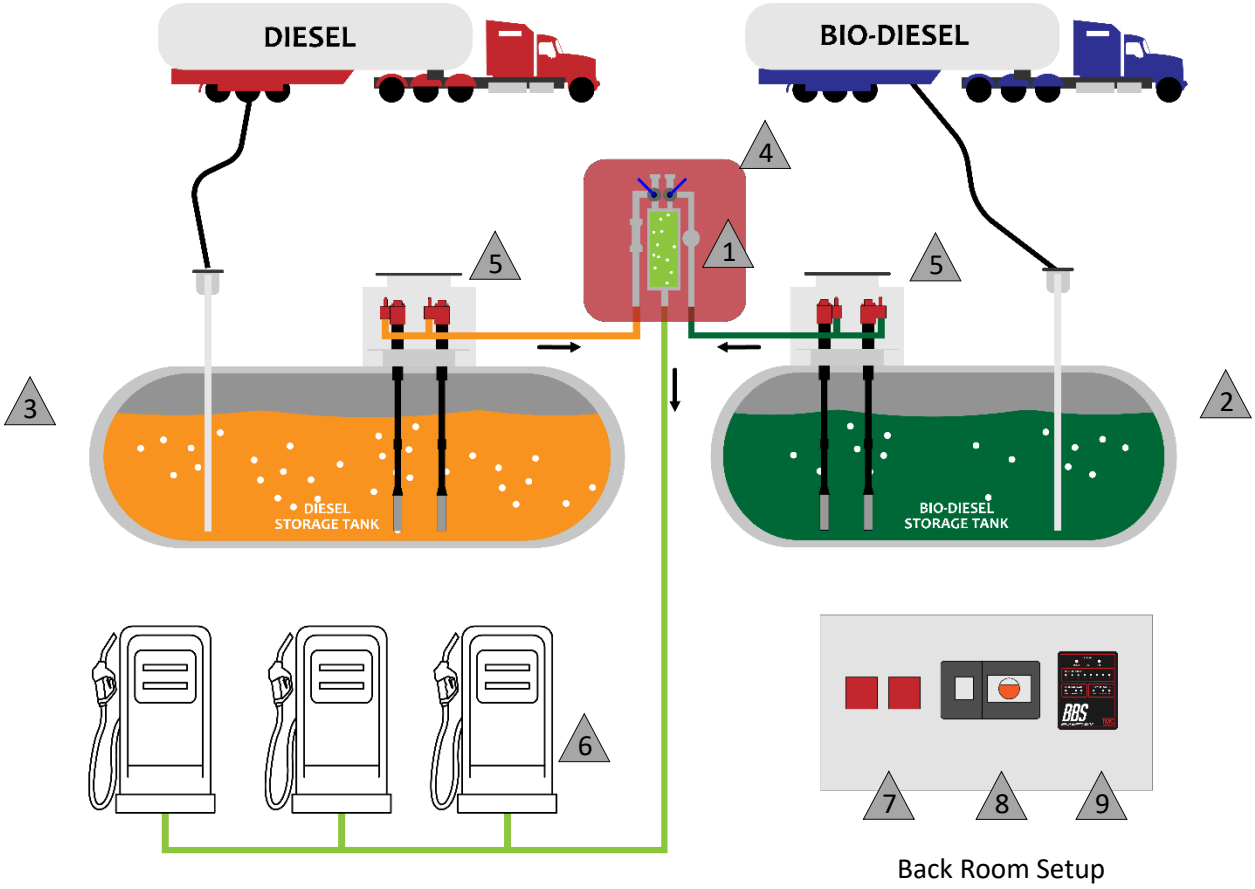


Figure 3: A typical BBS setup

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

Process

The Biofuel Blending System (BBS) is a sophisticated solution designed to continuously monitors the fuel flow through the main fuel meter and to calculate and add the predetermined amounts of biofuel to achieve the desired blend ratio.

The BBS utilizes the main fuel meter to identify the dispensing process and automatically initiates the injection process to achieve the predetermined blend ratio accordingly.

As the dispensing process starts, the BBS accurately calculate and inject an appropriate volume of biofuel into the blending chamber. The system can administer injections in the form of either a small dose or a continuous flow of biofuel, depending on the blend ratio, which facilitates a homogeneous mix of the two products. Biofuel injections continue until the dispensing process is completed.

The BBS comprises of:

- A precision blending chamber
- A biofuel pump
- Fuel flow meter
- Biofuel flow meter
- TMS BBS controller panel
- Flow control Solenoid valves

This combination of components allows the system to effectively monitor and inject appropriate levels of biofuels during the delivery procedure.

In the event of component failures, lost communications, or incorrect blend ratio, the BBS is designed to issue warning lights and initiate shut down procedures. All processes are saved to a database for summary reports and transactional printing.

The BBS also records all processes in a database for summary reports and transactional printing. It is important to note that the BBS must be connected to a network to remotely access its data. The existing tank level monitoring system should also be integrated with the BBS for optimal performance.

Technical Specifications

Drawings

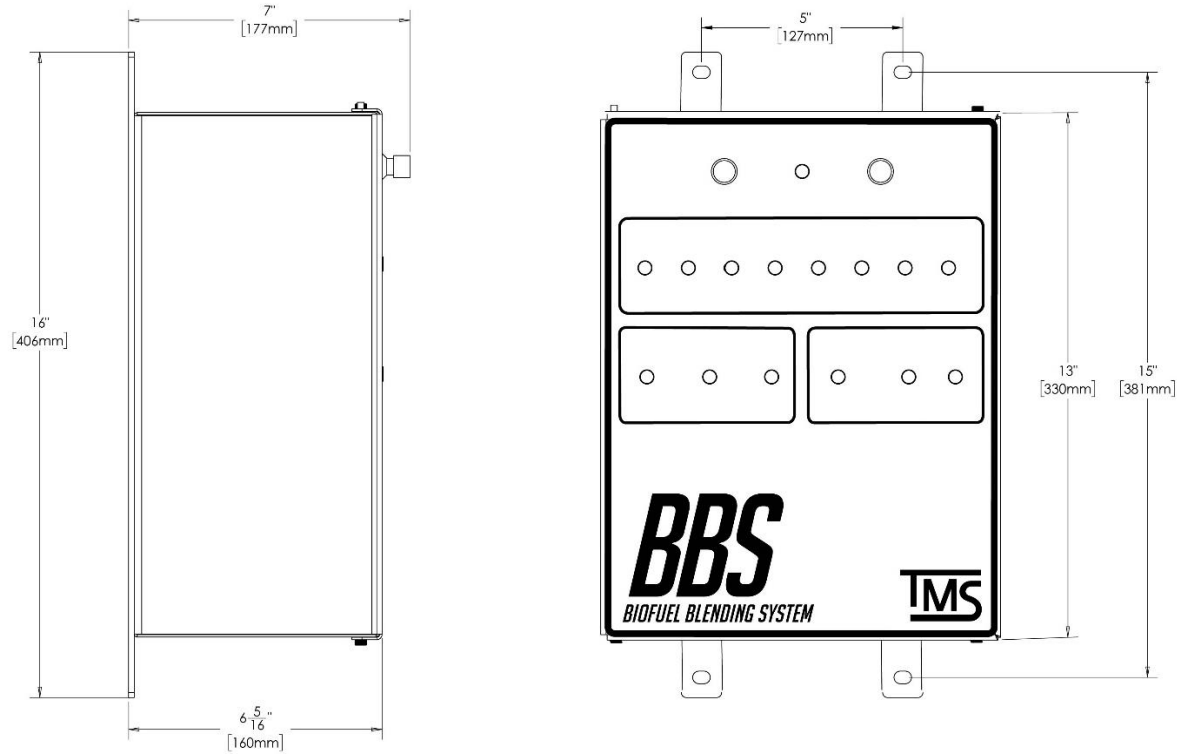


Figure 4: BBS controller with Dimensions

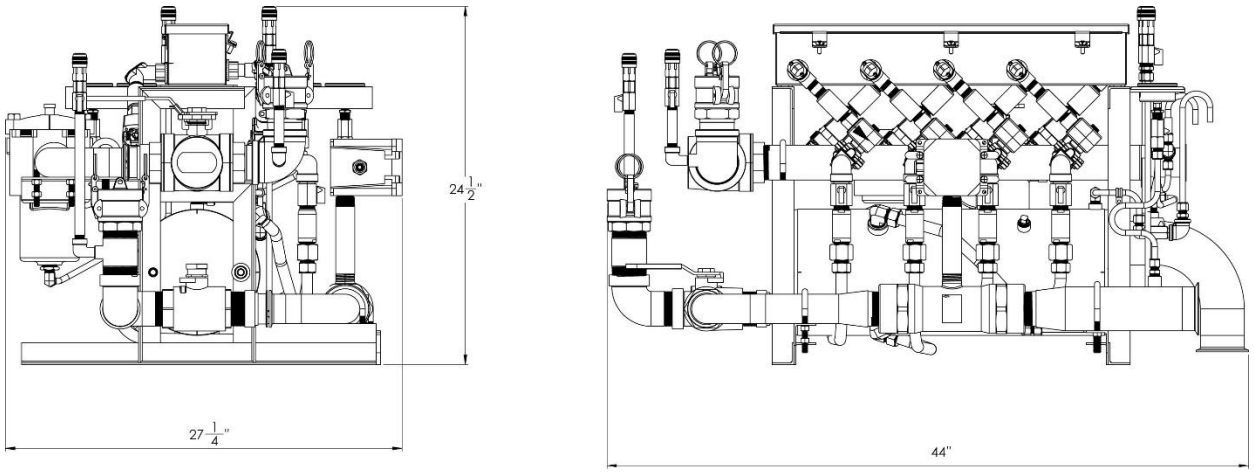


Figure 5: Belowground BBS Manifold with Dimensions

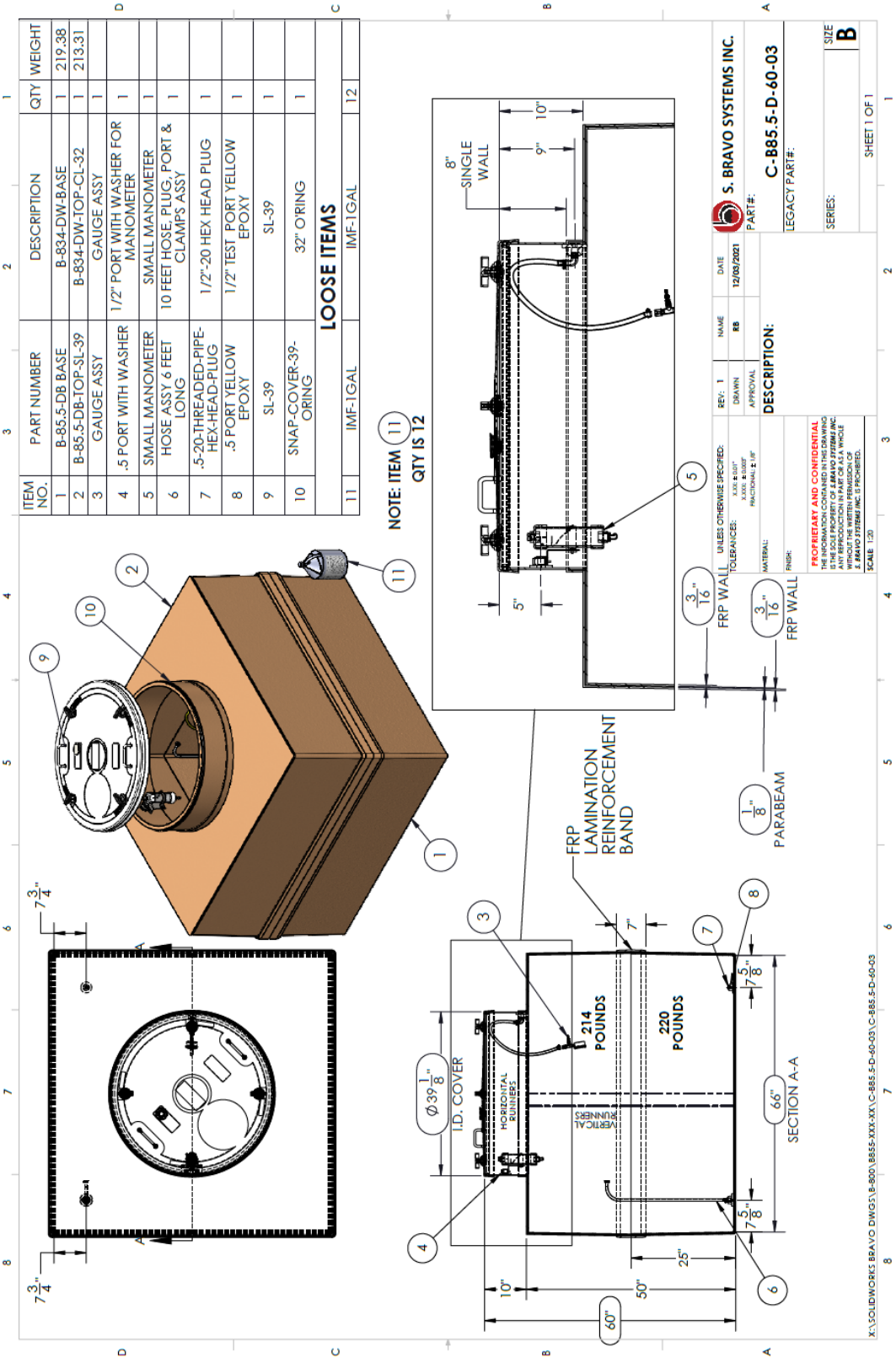


Figure 6: An example of Underground blending Sump

System OK light indicates that BBS Blending system is working as intended

Stop button to stop the BBS Blending operations

Reset button to reset/restart BBS Blending Operations

Solenoid control valve lights 1-8 indicate which solenoid valve is currently injecting

Pump light to indicate that the BBS Bio-Diesel pump is running

Network status fault light the BBS has lost connection with the ATG, and system is not currently blending

Blending Status Warning light to indicate that some error has occurred during blending operation

Network status warning light to indicate intermittent problems with the network connection with the ATG

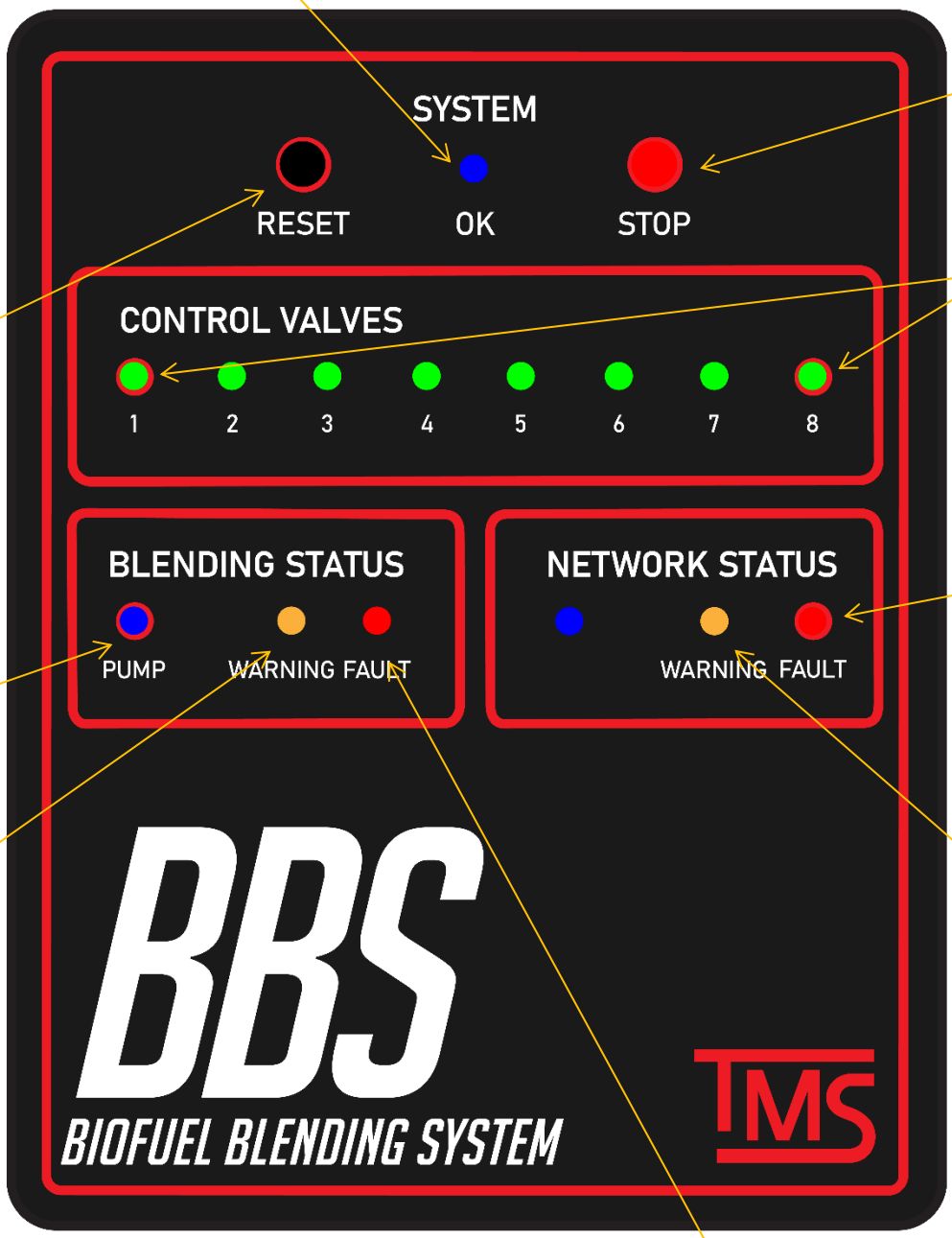


Figure 7: BBS front panel details

Blending Status Fault light to indicate that a fault has occurred during blending operation and the system is not currently blending

BBS Controller Specifications

BBS Controller	
Power	100-240 VAC @ 50/60Hz, single phase supply
Power Draw	Max 3A
Connection to ATG	Network Connection using Cat-5 or CAT-6 cable
Alarm Features	Pump Status, Relay Fault, System Fault, Tank Status

Environmental Specifications	
Operating Temp.	32°F (0°C) to 104°F (40°C)
Storage Temp.	32°F (0°C) to 104°F (40°C)
Relative Humidity	0-75%

Installation Locations	
BBS Controller	NEMA 1 enclosure. The controller must be installed indoors only[1]
Mechanical Equip.	Zone 0, Div. 1 hazardous environment. Indoor or outdoor installation

Approvals and Manuals	
Component Approval	Cert to CAN/CSA Std. C22.2 No.61010-1 Conforms to UL Std. 6101-1 and 698A
Documentation	Installation Manual and Service Manual

Features

The proprietary software and patented blending chamber enable the BBS to deliver distinct advantages to the market:

- Continuous blending operations with up to 180 US Gal/min with the 2-inch models and up to 350 US Gal/min with 3-inch models.
- Can be installed both aboveground and belowground to meet the site and customer requirements.
- Precision measurement allows for full traceability to blend ratio and automatic adjustments to maintain blend ratios.
- Automated injections drive efficient fuel delivery process – No operator intervention needed during blending process.

[1] The installation must meet all local electrical codes and standards

Installation

Site Information

Prior to the installation of the BBS hardware on site, the installation crew must check and confirm the following information.

✓	Site Parameters
	The installation contractor has developed an installation plan clearly stating the: • Purpose of the installation • Systems effected by the installation (what will work, what will not work) • System expectations and operation after the installation • Installation time frame (start time, end time) • Location of work zone (hazzard pylons in place) • Team members identified **The plan must be relayed and approved by customer and/or site representatives**
	All product deliveries have been blocked out for the time of the proposed installation
	The Main Product tank(s) is installed on site
	The Biofuel tank(s) is installed on site
	Each product tank is connected to BBS Sump in case of belowground installation or BBS Cabinet in case of aboveground installation
	The Biofuel tank has correct size, type and number of pump(s) installed to meet the blending demand **~the Biofuels pumps must be able to produce higher pressure as compared to the main product pump and rated of a minimum of 20% of the flowrate of the main product**
	ATG is installed on site and has spare Ethernet port available for communication to the BBS system
	The site/contractor has received one (1) BBS Controller & one (1) BBS blending manifold
	All necessary equipment is available on site for confined space work as required by local jurisdictions
	A trained technician is present on site for the installation and troubleshooting of BBS Controller and is equipped with the required tools such as: • Ethernet cables • Mini Display to HDMI cable (if reqd.) • Portable monitor with HDMI port (if reqd.) • USB Mouse and Keyboard

Site Installation

A Biofuel Blending System uses combination of industry standard equipment such as on site ATG and STPs in conjunction with supplied BBS blending manifold and proprietary software to provide accurate blends as the products gets dispensed to the fuel dispensers. Before placing the order, please refer to the Order Guide for the BBS

There are 6 versions of the BBS System which can be purchased to meet the site requirements. Each kit includes the following components:

Aboveground 2" BBS System – Horizontal

- BBS Controller
- 2" BBS Manifold
    - Strainer
    - Flow Meters
    - Injection Solenoid Valves
    - Blending Chamber
    - Optional - Above ground cabinet

Aboveground 3" BBS System – Horizontal

- BBS Controller
- 3" BBS Manifold
    - Strainer
    - Flow Meters
    - Injection Solenoid Valve
    - Blending Chamber
    - Optional - Aboveground Cabinet

Note: Contractor to use appropriate sump and shear-valve setup required for the aboveground installation

Belowground 2” BBS System

- BBS Controller
- 2” BBS Manifold
    - Strainer
    - Flow Meters
    - Inch Solenoid Valve
    - Blending Chamber

Belowground 3” BBS System

- BBS Controller
- 3” BBS Manifold
    - Strainer
    - Flow Meters
    - Inch Solenoid Valve
    - Blending Chamber

Note: TMS will recommend the sump required for the belowground installation which will be procured and installed by the installation contractor prior to the installation of the BBS system.

Figure 8: Typical Underground Installation Sump

Installation of Blending Manifold

Aboveground equipment

The BBS Blending manifold is delivered fully assembled and mounted in a stainless-steel cabinet (If purchased along with Blending system) designed for aboveground installations. Prior to the installation of the cabinet, it is the responsibility of the installation contractor to install the specified transition sump, a concrete pad of appropriate size as outlined in the Installation drawing, and the necessary piping and electrical conduits. The following lines must be installed and terminated with sufficient length inside the sump:

- Main Product Inlet Lines
- Biofuel Inlet Lines
- Blending Product Dispensing Lines
- I.S. Conduit
- Power Conduit

To install the aboveground cabinet, simply lower it onto the transition sump and securely anchor it to the ground using appropriate lag bolts into the concrete pad.

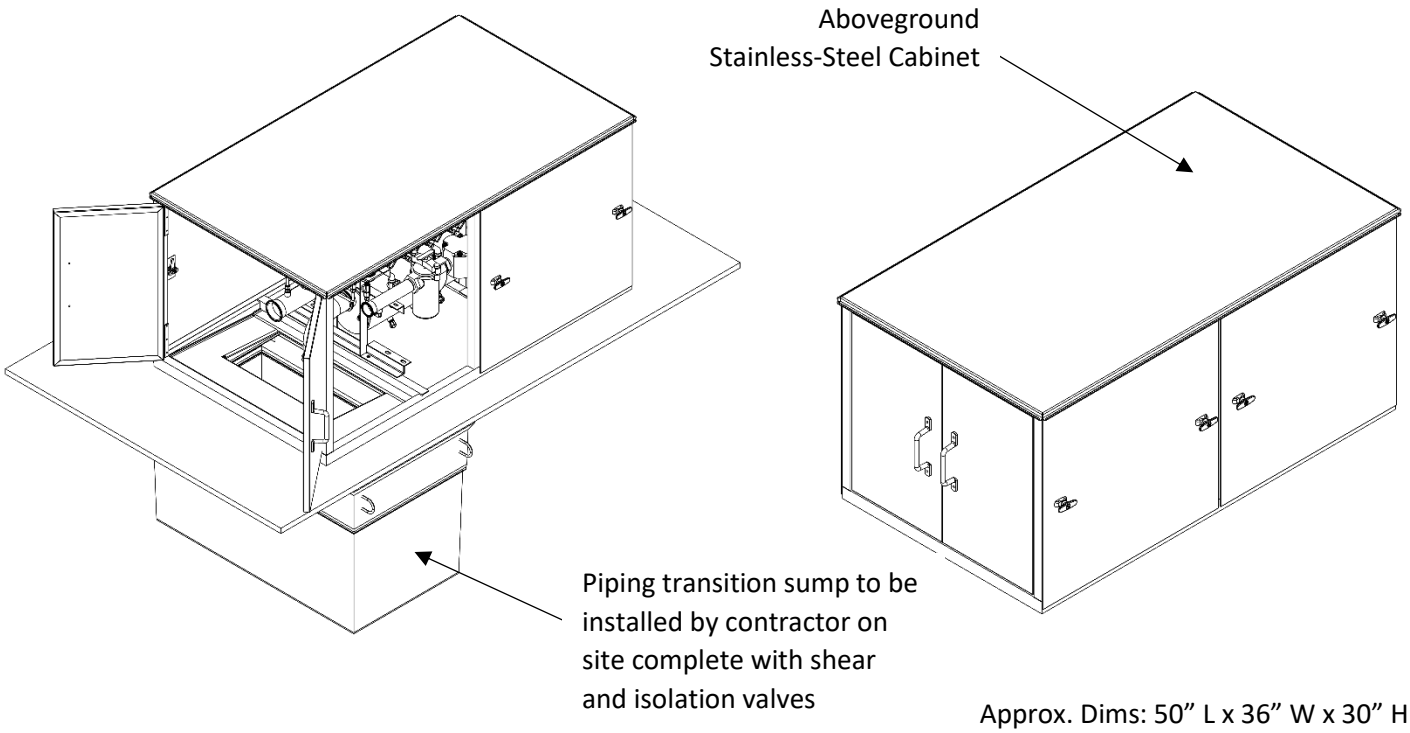


Figure 9: BBS with heated Aboveground Cabinet

Belowground equipment

For belowground installations, the BBS Blending Chamber arrives on site without a sump or cabinet. It is the responsibility of the installation contractor to install the recommend or their preferred transition sump before installing the BBS blending equipment and to ensure that the necessary electrical conduits, including the following product lines, are properly installed and terminated with sufficient length inside the sump:

- Main Product Inlet Lines
- Biofuel Inlet Lines
- Blending Product Dispensing Lines
- I.S. Conduit
- Power Conduit

Given the limited space inside the below ground sump, it is important to plan ahead to ensure that the inlet and outlet piping can reach their necessary connections on the BBS Blending equipment.

To install the BBS Blending Chamber, lower it inside the sump and secure it in place using the mounting brackets along the base of the equipment and the appropriate supports provided inside the sump.

Please note that the blending chamber weighs approximately 220 lbs (100 kg), so it is crucial that the sump supports are strong enough to securely hold the equipment.

Figure 10: Lowering BBS unit into an underground sump

Inlet Piping Connections

The product inlet side of the blending equipment, as indicated in the image below, is equipped with connections for both main product and biofuel inlet. The factory connections provided by TMS are

- 2” EZ fitting for the Biofuel line
- For main product there are
    - 2” EZ fittings 2” Models
    - 3” EZ fitting for 3” models

The installation team must bring the piping from the main product pumps and biofuel pumps to the sump that houses the blending manifold. It is recommended to use tri-clamp style EZ fitting to reduce the risk of leaks and enhance ease of maintenance. There is a quick tap fitting available close to the Biofuel inlet, providing a convenient location for attachment of a standard PLLD testing equipment.

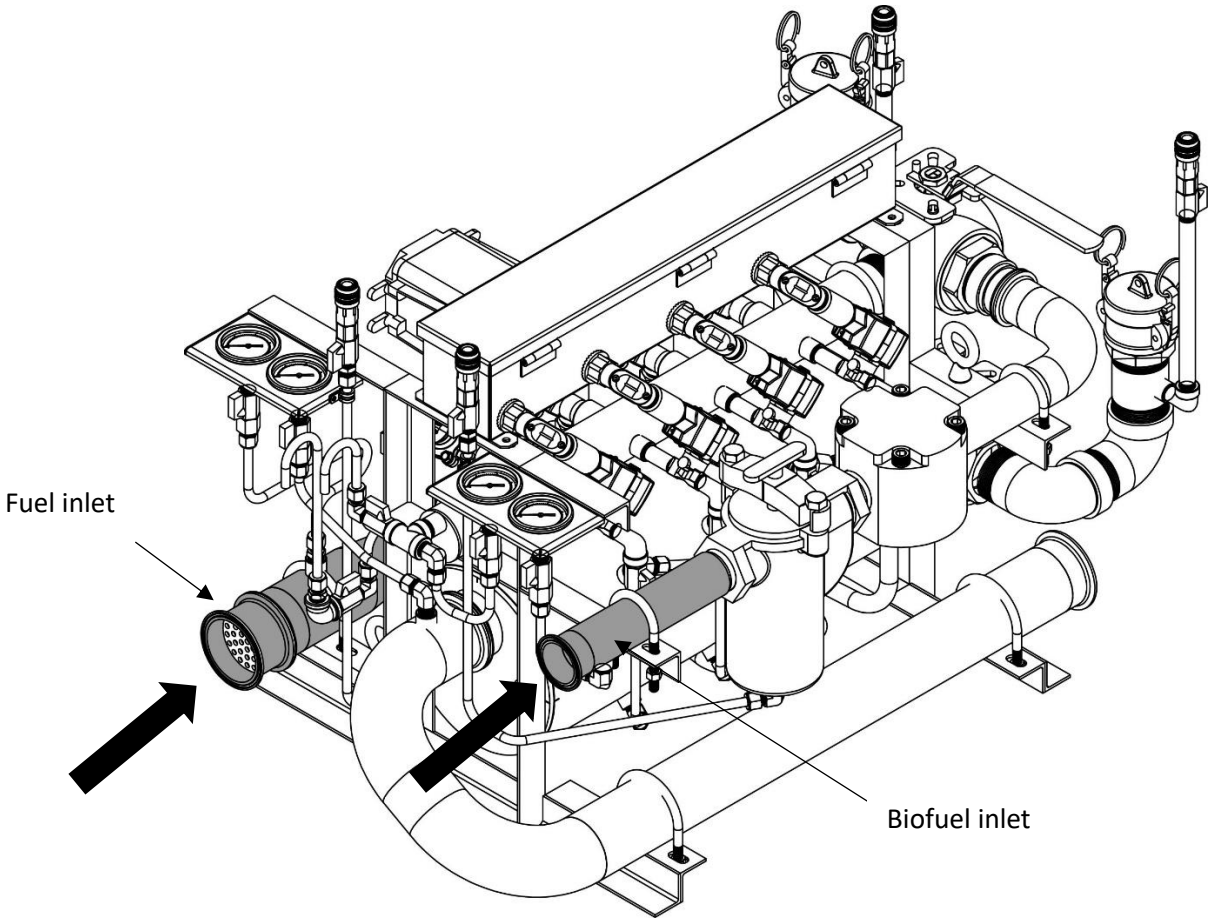


Figure 11: Fuel and Biofuel Inlet pipes for a Below Ground Setup

Outlet Piping Connections

The outlet piping connection features a 3” EZ fitting style that can be set up in two different configurations. For above ground installations, the piping can be placed on the same side as the inlet piping, while for below ground installations, it is recommended to route the piping to the opposite side. The choice of configuration will depend on the specific installation requirements and conditions.

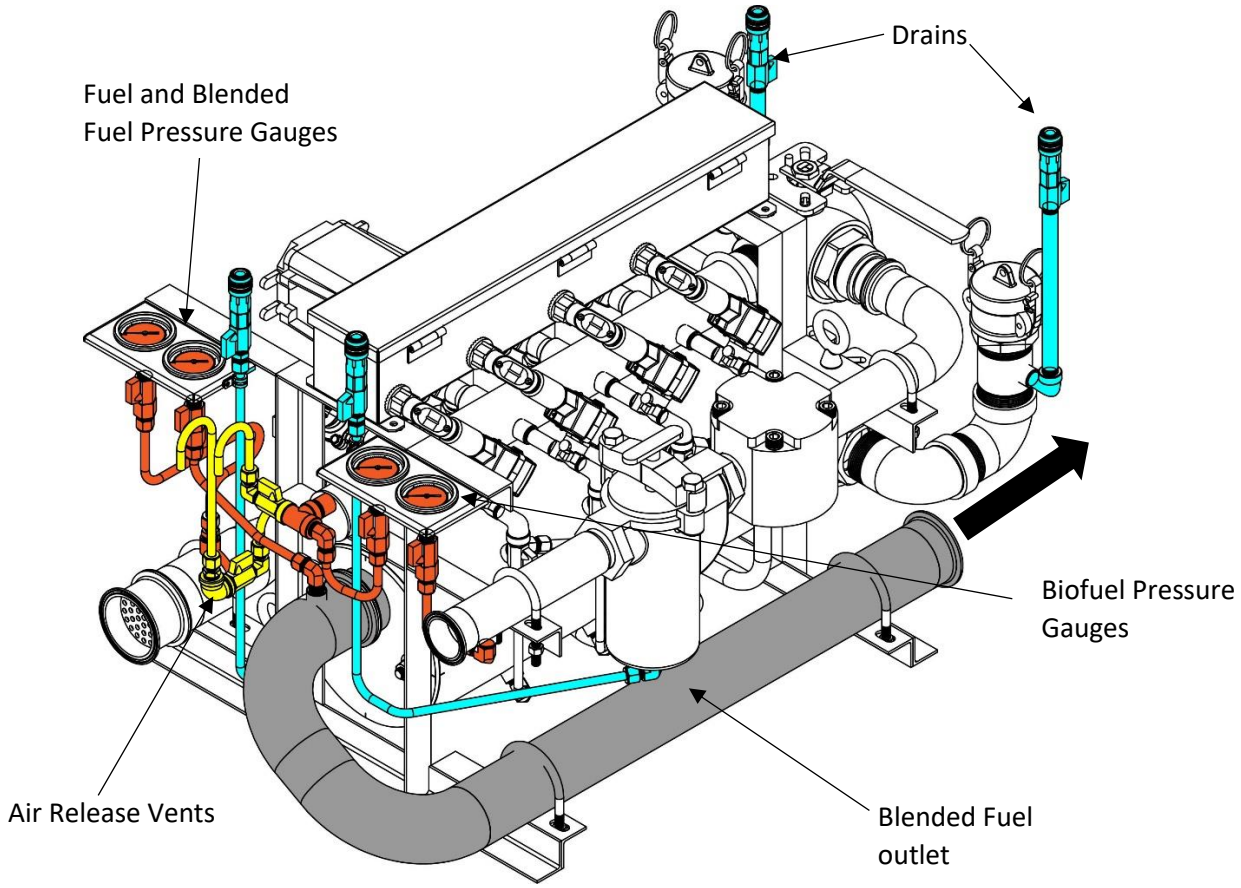
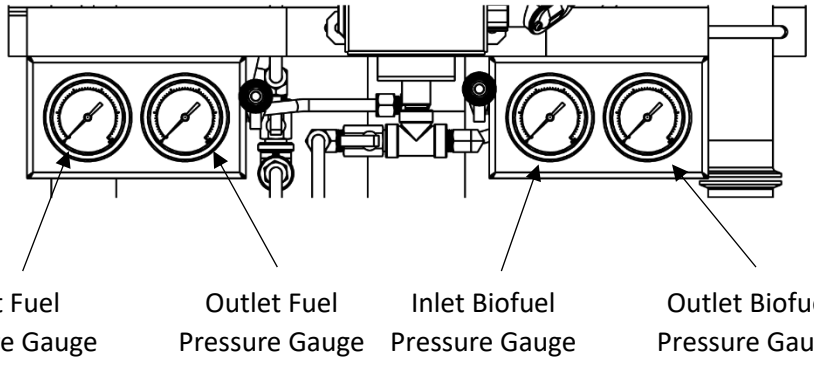


Figure 12: Blended Fuel outlet piping for Below ground Setup



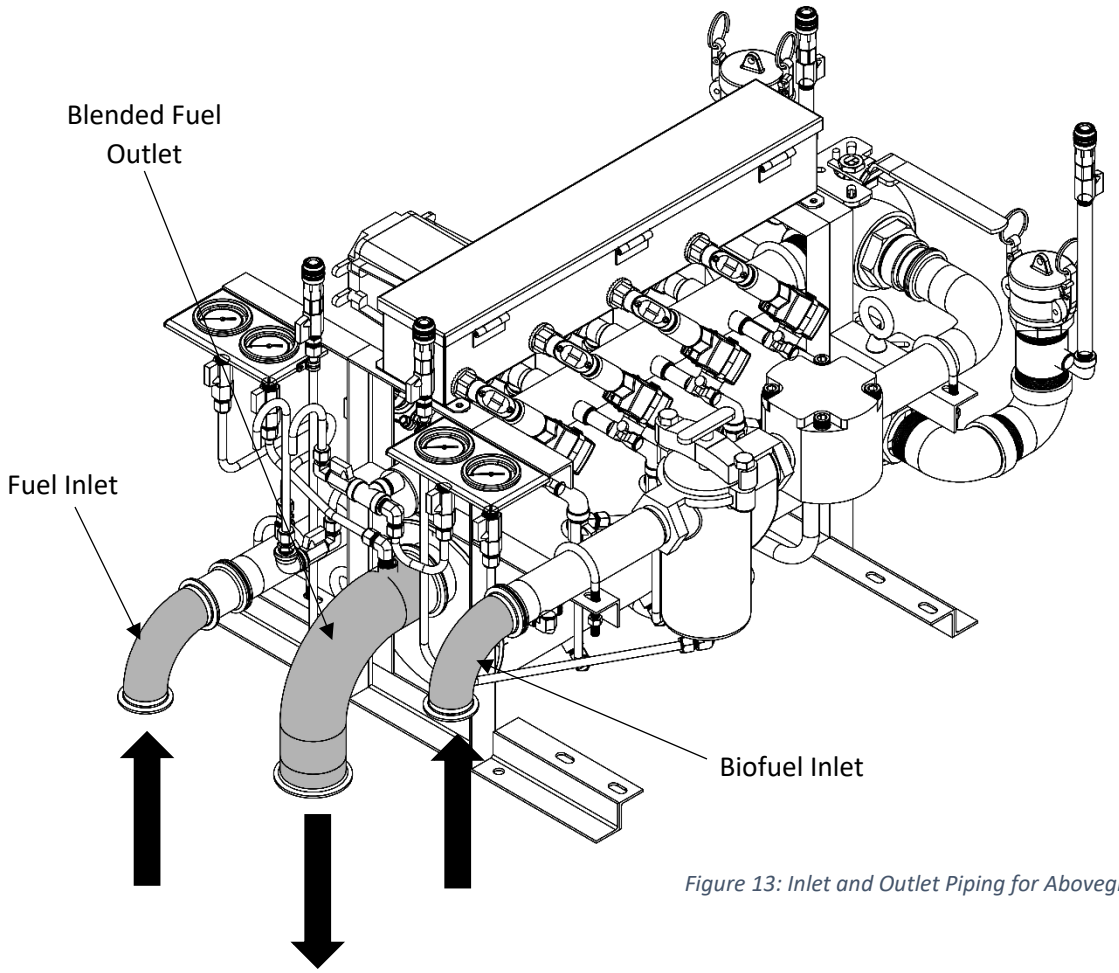


Figure 13: Inlet and Outlet Piping for Aboveground Setup

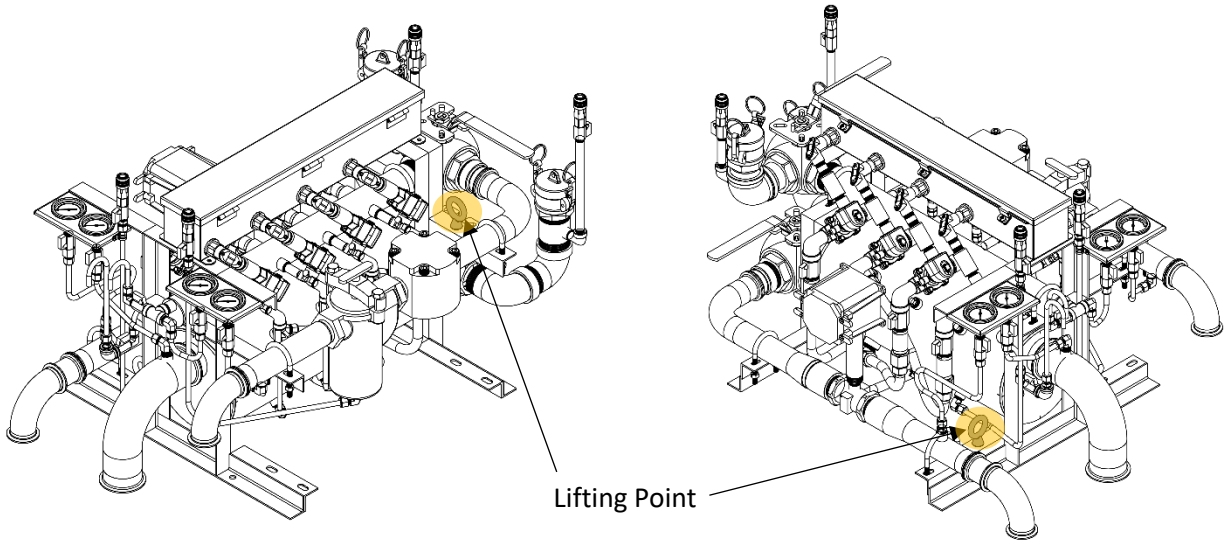


Figure 14: Lifting Points

Electrical Connections

The BBS Blending Manifold requires two separate electrical connections to be made from the controller unit to the electrical junction panel on the Blending Manifold. In order to comply with intrinsically safe wiring standards, separate conduits must be used for the 24VDC solenoid wires and for the I.S. meter wires.

A minimum ¾" conduit is required for the solenoid power wiring and should be installed by a licensed electrician in accordance with local electrical code. The solenoids operate at 24V 0.8A DC and the installer must choose the correct wire size as per the local electrical code requirements. The solenoid conduit requires a total of 8+1 wires, including one signal wire for each solenoid (8) and a common 0V DC return wire (1).

The connection for the Intrinsically Safe meter wiring, if included in the purchased package, is located on the top of the electrical junction box on the blending manifold. A minimum ½" conduit fitting is provided for connecting the bio meter to the BBS controller panel. TMS recommends using 18 awg 2 pair cable or a similar shielded conductor to prevent electromagnetic interference with the low-current meter readings. It is crucial to terminate the shielded wire to a tested ground in the controller panel to ensure proper protection.

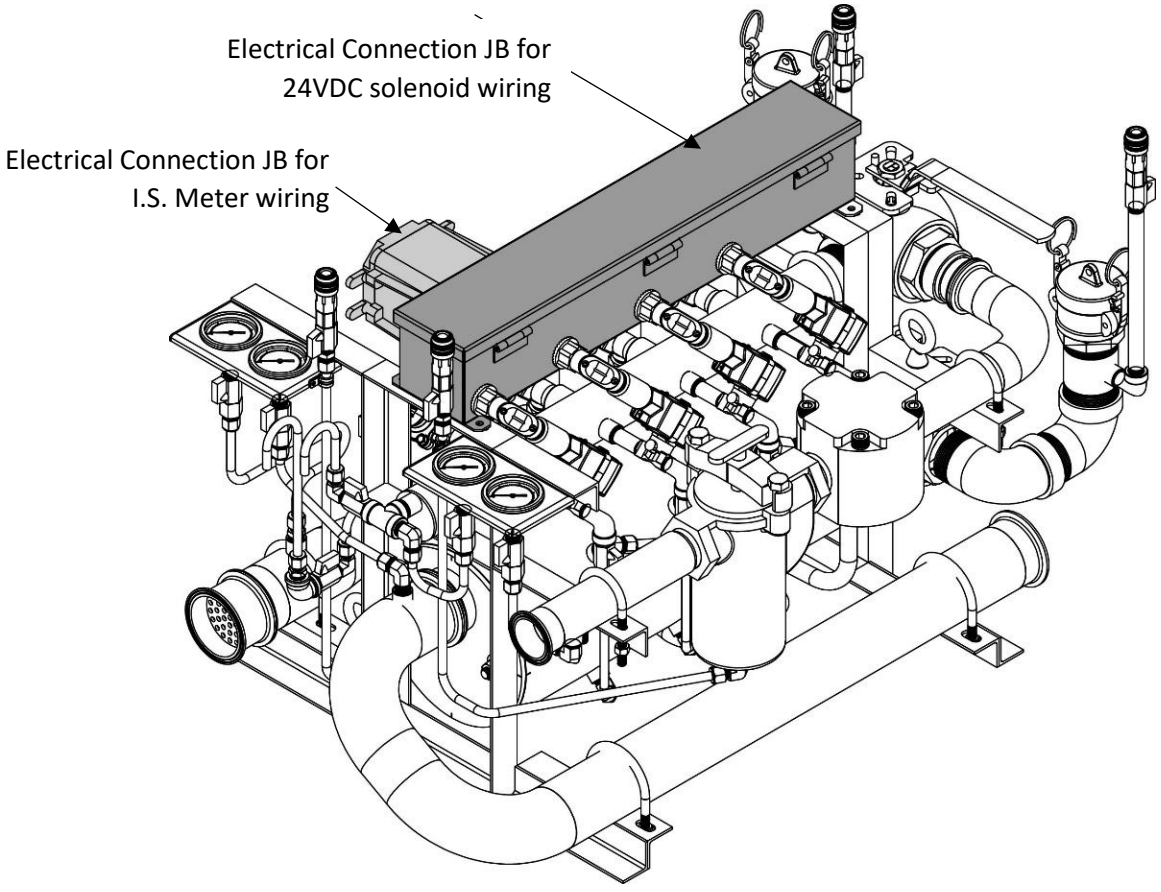


Figure 15: Electrical connection locations

Control Panel

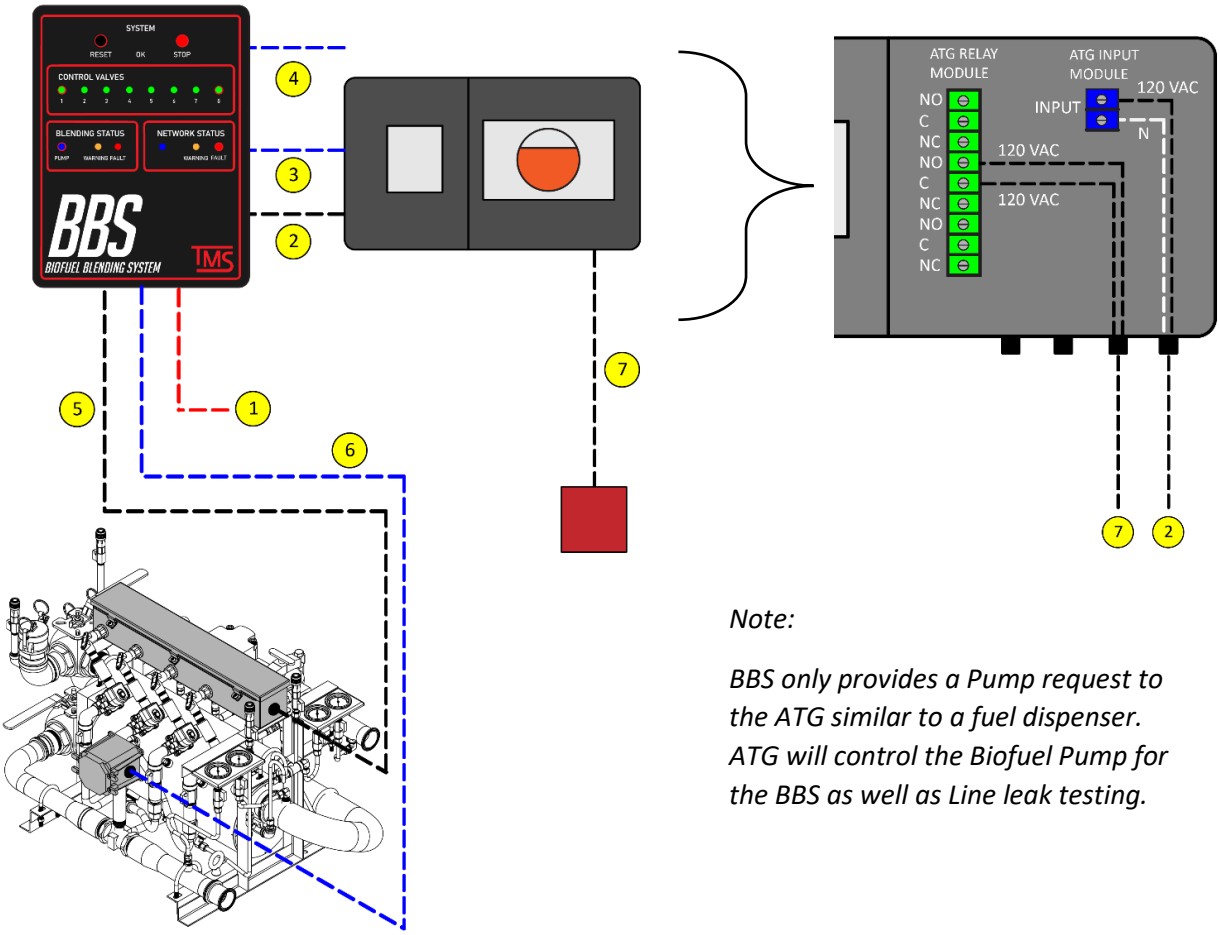
The BBS Controller Panel should be installed indoors or in an isolated, weather protected NEMA enclosure. The panel should be positioned near the Tank Level System and replace the original bio-blending control panel if present. The following steps should be followed during installation:

- Verify that the power sources feeding the pump and control panel are turned off and utilize lock-out/tag-out procedures.
- Secure the panel to the wall or enclosure.
- Attach the power and communication wires to their corresponding terminals on the panel, following the Field Wiring diagram.
- Reactivate the power and communication wires.

Figure 16: Typical lock-out

Figure 17: Typical mounting of BBS control panel in the back office

Control schematic



Note:

BBS only provides a Pump request to the ATG similar to a fuel dispenser. ATG will control the Biofuel Pump for the BBS as well as Line leak testing.

Figure 18: Typical BBS controls layout

Cable	Use	Recommended Wire Size and Type	Illustration
1	Power	120VAC / 3A | 2 Conductor / 14AWG	
2	Pump Request	120 VAC Hook Signal | 2 Conductor / 14AWG | **1 Signal for one or multiple pumps**	
3	Comm.	Cat 5E or Cat 6 Ethernet cable from ATG to BBS	
4	Comm.	Cat 5E or Cat 6 Ethernet cable from Site Network Switch to BBS	
5	Solenoid	24 VDC | THWN type / 10 Conductor + GND / 14AWG / Multi Strand | For Solenoids	
6	Pulse	2 X 2 Pairs Shielded / 16AWG | **For Diesel Meter and Biodiesel meter | Separate IS Conduit | Belden 83704 or equal**	
7	Pump	120 VAC Pump Signal | 2 Conductor / 16AWG | **For Each Pump Controller**	

Panel Layout

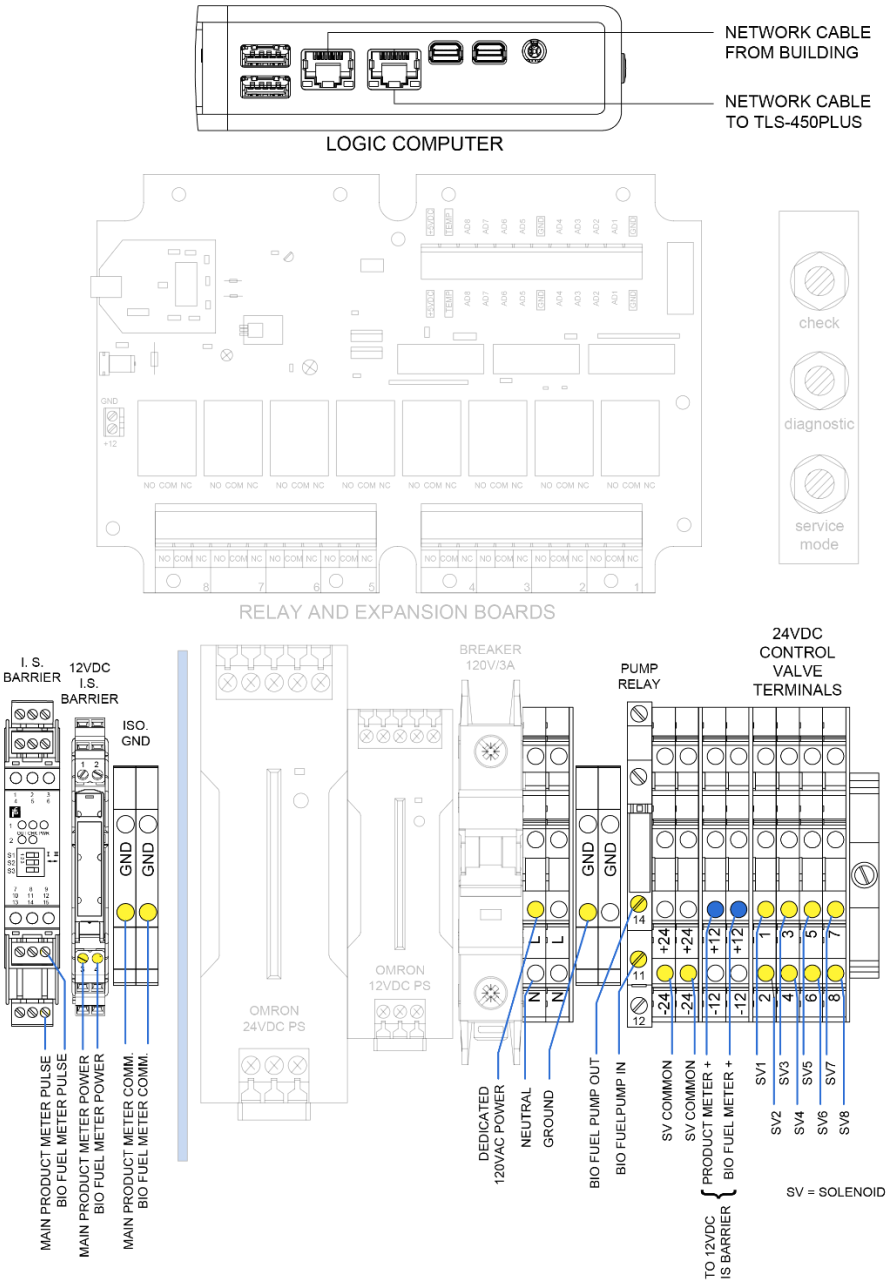


Figure 19: Typical BBS panel layout and field wiring locations

Recommended Installation

Figure 20: Recommended installation with high point vents

Configuration and Calibration

Initial Startup

This section of the manual outlines the steps to be followed to properly install the TMS BBS control panel in your facility. Follow the steps below to ensure the system is configured and operating optimally.

Before starting, ensure that ALL the components have been installed correctly.

Step 1: Power Up the TMS BBS Control Panel

To power up the TMS BBS control panel, follow these steps:

1. Remove the locks (lockout tags).
2. Turn on the power breakers the BBS control panel.

Note: When the power is turned on, the initial alarm LEDs on the blending control panel should turn off, and the OK light should turn on. If the alarm LED remains on and a ticket is printed, please follow the troubleshooting steps.

Step 2: Power Up the Pump Contactor Box

To power up the pump contactor box, follow these steps:

1. Turn on the power breaker to the pump contactor box.

Note: The pilot light should not turn on.

Step 3: Test and Configure the System

To test and configure the system, follow these steps:

1. Check that solenoids are opening and closing (sound) by using the configuration utility.
2. Prime the lines with product and purge any air that might be present in the lines.
3. Turn on the bio pump using the configuration utility and test for leaks in the bio line.
4. Turn on the bio pump and use the 3-way calibration valves on the bio manifold on the blender to calibrate the bio meter. Calibration is done with the configuration utility. ***Note: Confirm the metered volume with prover volume. Adjust calibration factor as required. The BBS calibration utility will automatically adjust based on volume.***
5. Record calibration data and leave a record on current meter factors inside the BBS cabinet.
6. Turn on the fuel pump and check for leaks in the fuel line.
7. Repeat the calibration procedure for the fuel meter.

Configuration Utility

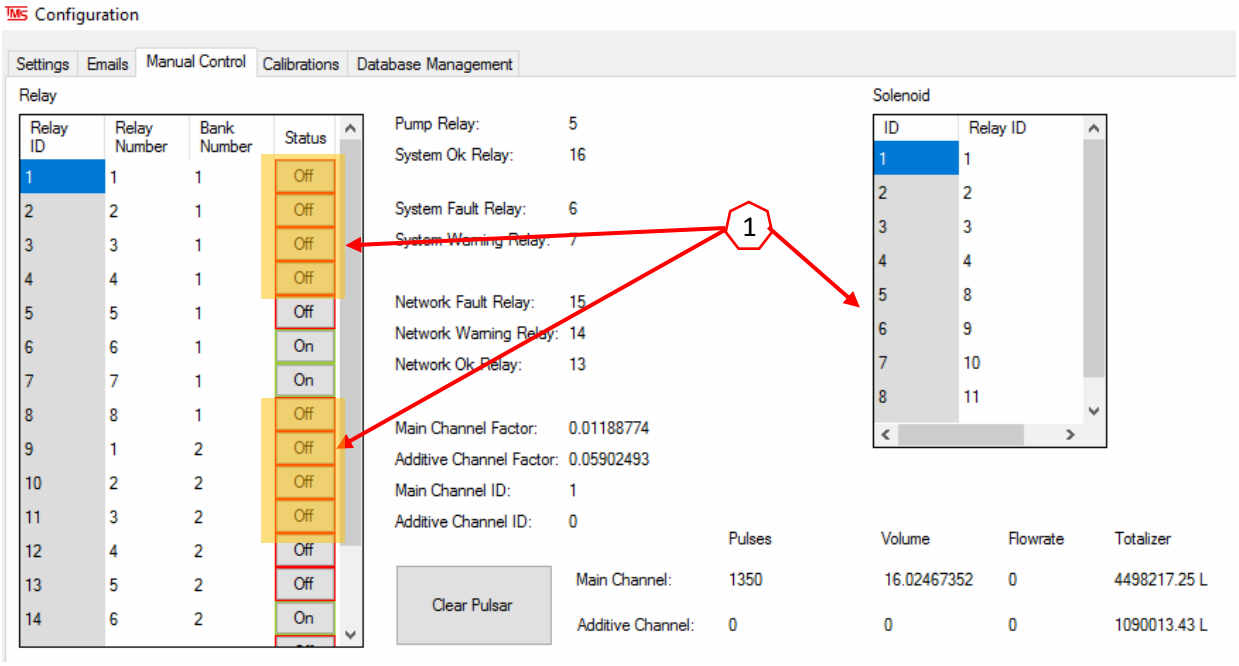


Figure 21: BBS Configuration utility layout

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

Step 4: Calibration

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

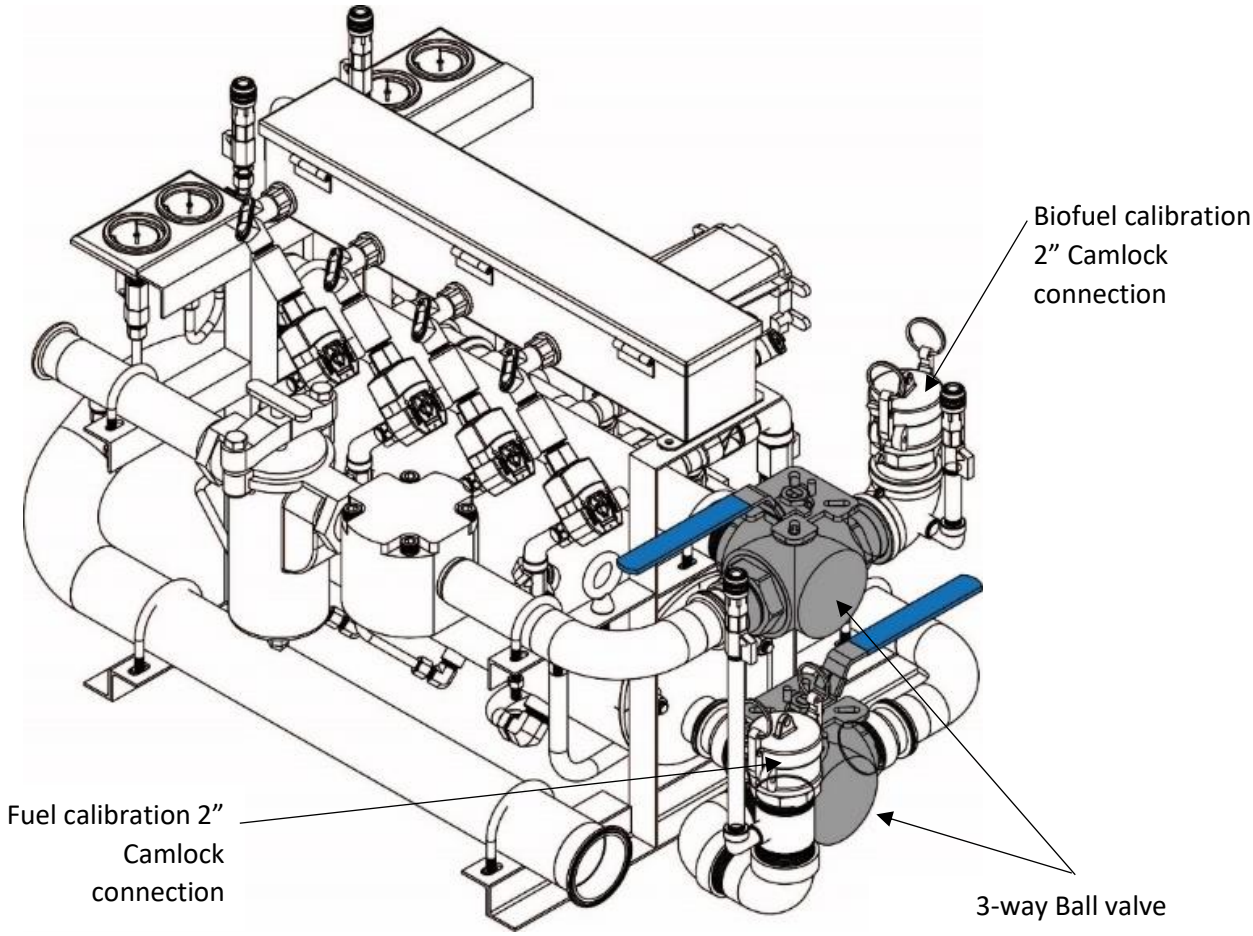


Figure 22: Fuel and Biofuel 3-way valve highlighted

Figure 23: 3-Way Handle Position for Fuel

Figure 24: 3- Way Handle Position for Biofuel

To Calibrate the BBS system, follow these steps and refer to the figures 22 till 27:

1. Please the 3-Way ball valve for the product being calibrated in calibration position based on Fig. 23 or 24.
2. Connect 2” hose with ball valve and female camlock to the 2” male camlock connection on the BBS.
3. Insert the other end of the calibration hose with a controlling ball valve and spout into the calibration prover.
4. Connect to the BBS computer and use the Calibration utility to start the calibration process.
5. The Calibration units are defaulted to Liters. When calibrating in Gallons, ensure the Convert to Gallons is checked.
6. Once the setup is completed, press the green Start button on the calibration tab of the utility.
7. 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.

Figure 25: Calibration using a 100 Gal Volumetric Prover

8. 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.
9. 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.
10. Enter the prover volume into the Prover Volume section.
11. Click the “Calculate meter factor” button to generate a new meter factor.
12. Select the new factor with the corresponding “prover volume” from the list, and then click “Apply new meter factor”
13. Repeat the process 3 times or until the Prover Volume and Measured volume are nearly identical for each meter
14. If the volumes are off, select the latest calibration run from the table then press Update Meter Factor. Re-calibrate as needed.

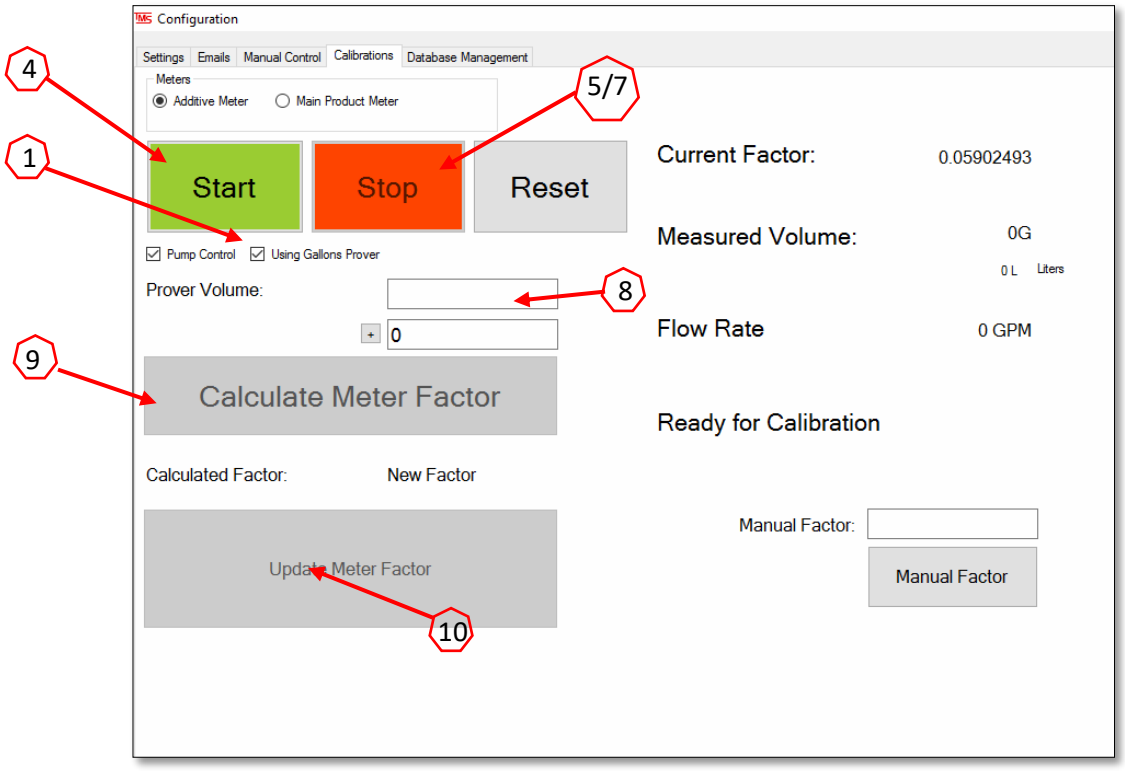


Figure 26: Calibration Tab of the Configuration and Calibration Utility

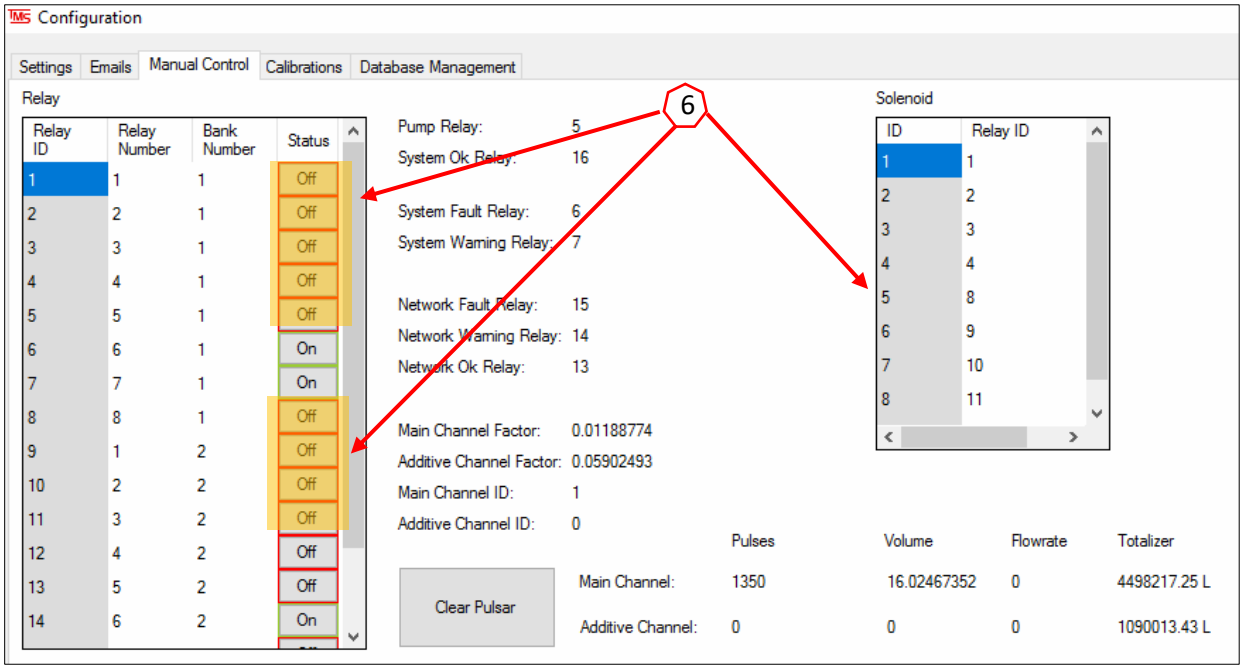


Figure 27: Configuration Tab of the Configuration and Calibration Utility

Step 5: Test the System

To test the system, follow these steps:

1. Connect a container to a refueller or dispenser that is fed by the BBS.
2. Begin flowing blended product to the vehicle tank.
3. Monitor the TMS BBS panel for warning and alarm LEDs.
4. Check fill and transition sumps for leaks at installation points and at new components.
5. Review TMS BBS data in the BBS software window for quantities and final blend.

By following these steps, you will be able to properly install and configure the TMS BBS control panel, ensuring that it is functioning correctly and delivering blended product to your customers.

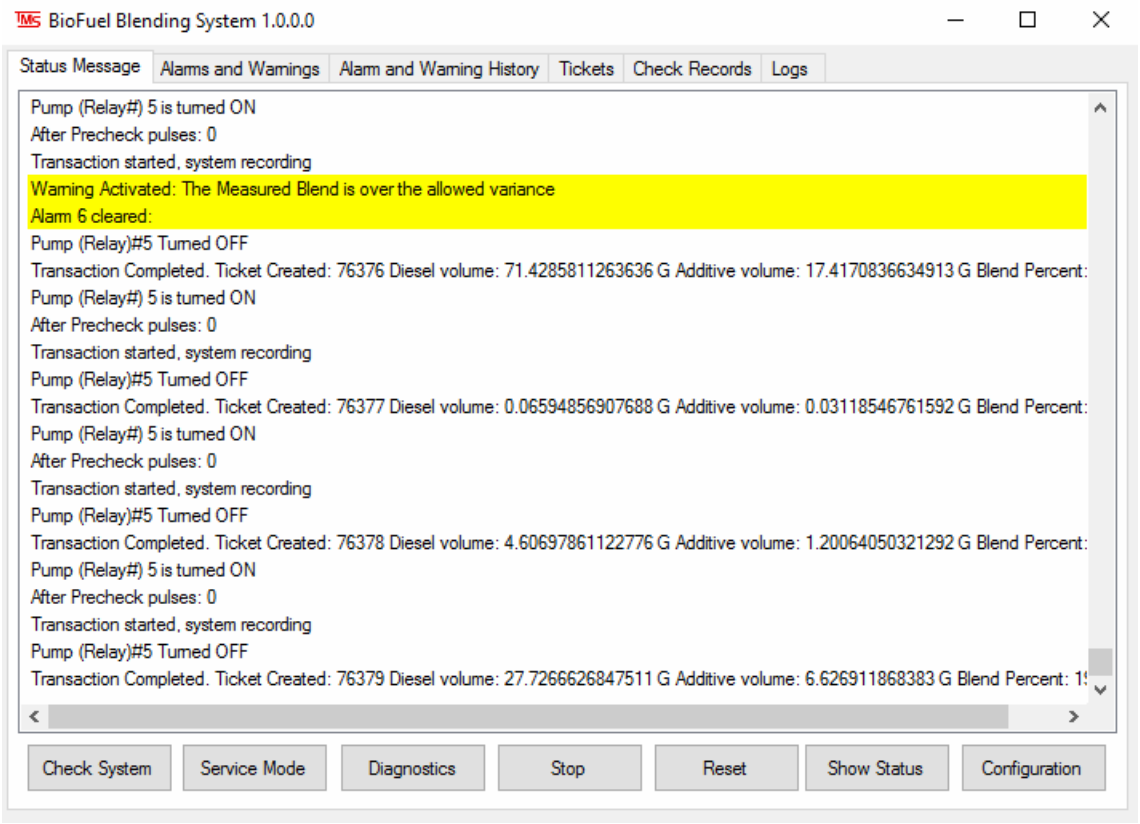


Figure 28: Typical BBS information screen

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	1. USB cable not seated properly. 2. Faulty communication board module 3. Faulty relay board module 4. Incorrect software configuration	1. Reseat USB cable at BBS computer & communication module 2. Gently press on edges of module to ensure it is seated properly in the socket. 3. Verify there are no lose wires. 4. Contact Tech Support.
Pulser Board not connected	1. USB cable not seated properly 2. Faulty communication board module 3. Faulty relay board module 4. Incorrect software configuration	1. Reseat USB cable at BBS computer & communication module 2. Gently press on edges of module to ensure it is seated properly in the socket. 3. Verify there are no lose wires. 4. Contact Tech support.
Solenoid Valve	1. Faulty or incorrect wiring to the Solenoid 2. Debris in the solenoid valve causing error 3. Faulty Relay Board	1. Verify there are no lose 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	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	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 lose 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	1. Closed Valves 2. Pump not running 3. No product in the storage tank 4. Faulty Pressure Gauge	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	1. Incorrect programming 2. Meter requires calibration 3. Solenoid Valve Issue 4. Low flow pump Issue	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	1. Air in the system 2. Leak in the line	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	1. Solenoid Valve Issue	1. Refer to “Solenoid Valve” Above
Unauthorized Flow	1. Solenoid Valve Issue	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.