TECHNIBLEND®

USER MANUAL

TechniBlend System

BEVERAGE BLENDING & CIP

SERIAL #: TB-210920

07/06/23 / V1.0 / Nutrakey

Introduction

Thank You for Purchasing this TechniBlend Batching System!

If you have questions, or need assistance, feel free to contact our Service Department at:

TechniBlend
21800 Doral Rd.
Waukesha, WI 53186
262-278-4940

Service Inquiries Email: service@techniblend.com

Parts Inquiries Email: parts@techniblend.com

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Safety

TechniBlend wants to ensure your personal safety and the safety of those around you when operating TechniBlend equipment. The following safety instructions have been prepared for your reference and use. Please read, review, and incorporate these instructions in daily practice whenever you are operating or maintaining TechniBlend equipment. These instructions are intended to help prevent personal injury and prevent damage to the equipment and your facility.

ALWAYS PRACTICE COMMON SENSE AND CAUTION. REMEMBER, SAFETY FIRST!

System Safety Recommendations

Safeguarding personnel that operate and/or maintain automated equipment is the primary consideration. The following general precautions are recommended for all personnel who perform system operation or maintenance.

- Do not attempt to operate the equipment until you understand how it functions. If you are not certain after studying the operation manual, contact TechniBlend Inc. for assistance.
- All operator and maintenance personnel should review and follow this safety information. New or inexperienced personnel should receive direct safety supervision and training from experienced personnel before performing any maintenance task or activity.
- Before performing maintenance, ensure all exits from the immediate work area are clear.
- Always notify co-workers in cases where maintenance activities must be performed alone or in remote plant areas, so that they can quickly come to aid in the event of an emergency.
- Do not attempt to make any safety device inoperative. Never operate equipment unless all protective guarding, shielding, etc., is in place, and control panel doors are closed.
- Never start the equipment until you are certain that all nearby personnel and foreign objects are clear.
- In cases where the equipment cycles automatically, advise nearby personnel that equipment operation will start and stop without human intervention.
- Check all safety switches and other safety devices daily to ensure they are operational.
- Never perform maintenance or repair work until you are sure the power and control voltages are turned off at the main control panel and cannot be turned back on without your knowledge. Follow safety lockout procedures. If electrical extension cords are needed to operate power tools near the equipment, make sure extension cords are water tight. Never allow an extension cord outlet or electrical power tool to come into contact with water as dangerous electric shock can occur.
- Do not operate or perform maintenance or repair on a machine when overly fatigued, or when taking any kind of medication, sedative, or drug. Never operate equipment or perform maintenance when under the influence of alcohol.
- Never reach into a moving or rotating section of the equipment to clear a jam.
- Do not wear loose clothing or jewelry of any kind which could get caught in moving or rotating parts.
- Keep the floor around the machine clean, and free of obstructions and water. If water is necessary at the machine, be sure to wear shoes with soles that do not slip on wet floors.

- If climbing is required to inspect, service, or maintain components on equipment, follow plant regulations for safe climbing practices, which may include use of harnesses. Secure and stabilize ladders and seek assistance of co-workers to obtain and establish steady climbing conditions. Use common sense to carefully lower heavy components from elevated positions to floor level to avoid injury to personnel below and to avoid equipment or component damage.
- Before working on pressurized lines, tanks, or components, always safely isolate these items and relieve connected liquid or gas pressures to atmospheric (0 psig) pressure. Provide adequate fan ventilation and keep water hose nearby when breaking CO2 or ammonia gas lines (fans will blow these gases away from personnel, and water will rapidly absorb ammonia vapor). After water, syrup, or product lines are fully depressurized, loosen clamps first to carefully allow liquid drainage before completely breaking connections.
- Do not spray electrical panels with water or liquids.
- Follow recommended safe ammonia servicing practices when maintaining product chilling or refrigeration equipment. Transfer ammonia charge from low side (PHE product chiller) to high side (compressors and evaporative condensers) prior to any major PHE chiller work. Consult chiller and compressor/evap condenser operation manuals for proper transfer procedures and safety practices and recommendations.
- Do not touch lines or equipment which heat up during production or CIP (clean-in-place) routines.
- Always wear safety glasses, hard hats, hearing protection, vests, shoes, gloves, and/or any other personal protection equipment per requirements by your company or by local safety laws, codes, and regulations.
- Pay strict attention to and follow all caution, warning and danger signs.
- Always use TechniBlend recommended spare parts to ensure compatibility with equipment design, operation, and protection of personal safety.

System Descriptions

Machine Specifications

System Required Specifications

- **Process Water –23.3 GPM MAX @ 40 PSI**
- **Concentrate – 1.7 GPM MAX @ 10 PSI**
- **Compressed Air –150 PSI**
- **Product Outlet – 25 GPM MAX @ 40 PSI**
- **CIP – 23 GPM MAX @ 20 PSI MAX**

System Terminology

- HMI – Human Machine Interface
  - The HMI system consists of 3 operator terminals. The terminals are in the lab and at each mixer. The HMI stations run FactoryTalk View version 12. The two mixer HMI screens are touchscreen enabled. An on-screen keyboard will display.
- PLC
  - The PLC is an Allen Bradley ControlLogix L83 Processor Version 32.
- Panel – Control Panels
  - Skid mounted 3 phase 480VAC mixed voltage panel containing all components of the skid control system.

Device Tag Naming on Process Flow Schematic (P&ID)

All TechniBlend components use alpha-numeric Device Tag names. This allows you to rapidly identify, locate, and understand component functionality. In addition, the HMI screen schematics use Device Tag names. TechniBlend components are physically tagged with Device Tag Plates for easy and quick Device identification. The following summarizes the Device-naming convention:

AV or **V**= Automatic Valve	**LS** = Level Switch	**SV** = Solenoid Valve
CT = Conductivity Transmitter	**LT** = Level Transmitter	**TCV** = Temperature Control Valve
CV = Check Valve	**MV** = Manual Valve	**TNK** = Tank
DT = Density Transmitter	**P** = Pump	**TT** = Temperature Transducer
FCV = Flow Control Valve	**PI** = Gages	**UV** = Ultraviolet Sensor
FT = Flow Transmitter	**PT** = Pressure Transmitter	**VP** = Vacuum Pump
FE = Filter Element	**REG** = Regulator	**VT** = Vacuum Transducer
HTX = Heat Exchanger	**ST** = Steam Trap	
I/P = Current over Pressure	**STR** = Strainer	

Reference Chart A (noted above) provides functional summaries of Device tag components and can be found in the Troubleshooting Section of this Manual.

Security

Security Principles

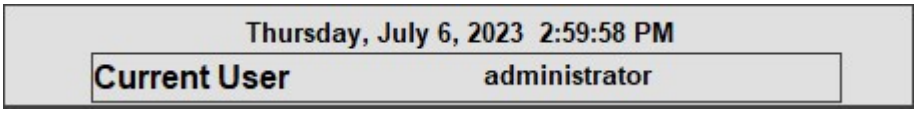
The HMI system provides user level access controls to prevent unauthorized operation of key process functions. All users can navigate and view overview screens. A username and password must be provided to access protected functions. A user will automatically be logged out after a period of inactivity.

User maintenance is the responsibly of the plant management team.

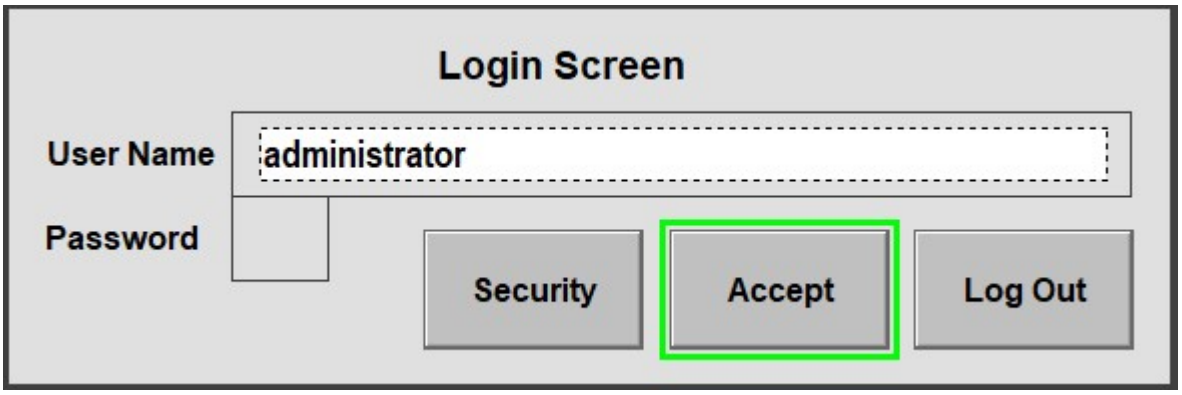
Most secured functions can be identified by button animations. An unavailable button will be invisible.

Logging in and Out

The method of logging in is by username and password. Clicking or touching the Current User area on the banner of any screen will bring up a login prompt.

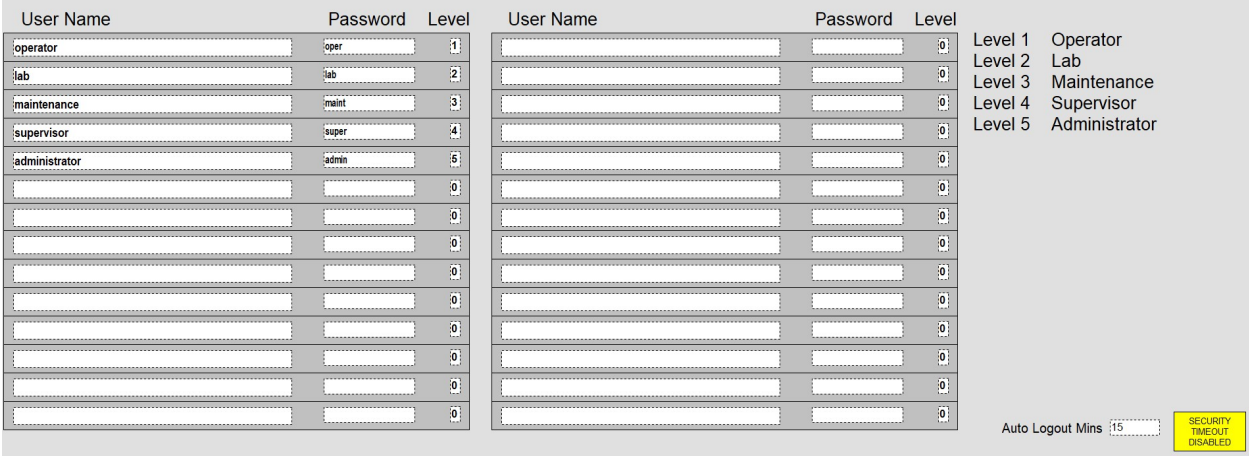


Enter the username and password to log into the terminal.



User Maintenance

The security maintenance tool can be accessed by touching or clicking the Security button on the login popup.



Add New User

To create a Username the person creating the Username must have level 5 security clearance. Once the password has been entered, the Login Screen showing the Security button is displayed. Press the Security button as shown on the picture above.

Set Default Auto Logout Setting

Select the **Security Timeout Enabled** mode from the button on the bottom right. **Customer** will set the logout time for all users. **Disabled** will allow all users to remain logged in until they manually log out or another user logs in.

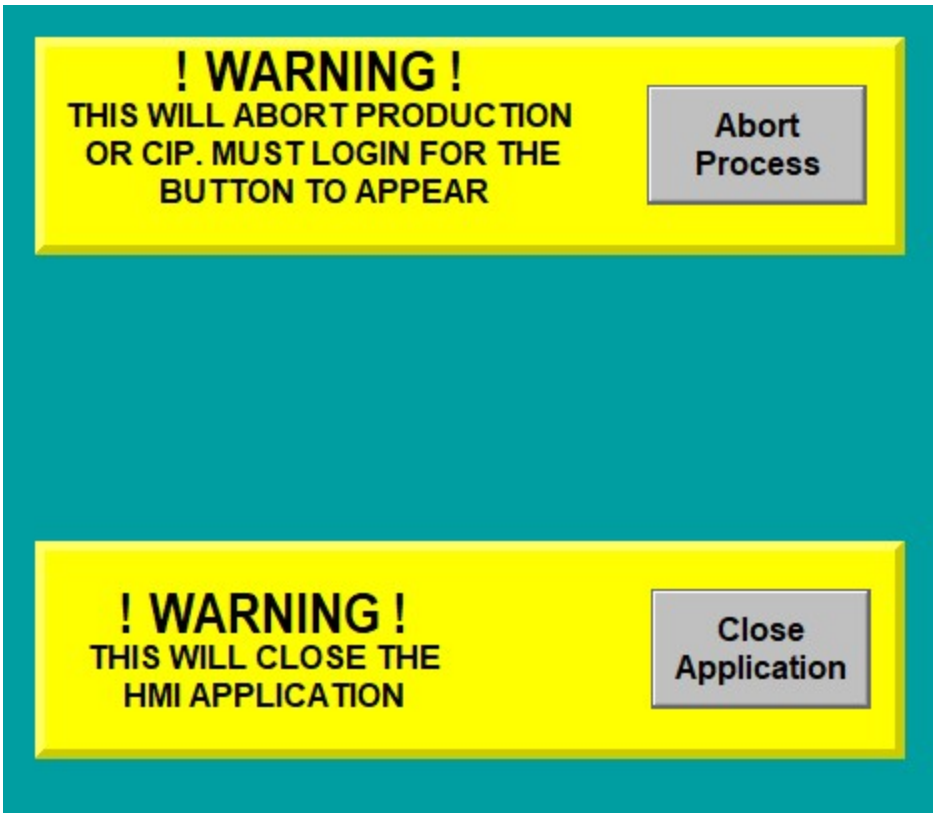
Navigation

Navigation Menu

The Navigation Menu is available on all screens. Navigation is done by clicking on the function you wish to navigate to.

Settings

The settings screen contains configurations that are only available to TechniBlend engineers and technicians. These are setup parameters that can negatively affect system operation if not set correctly. Contact a member of the TechniBlend team for assistance if you believe parameters are not set correctly. Additionally, the abort sequence and close application buttons are available on this screen. This allows the system to be forced to Idle, or to shut down the HMI applications if PC troubleshooting is required.



Manual Operation Popup

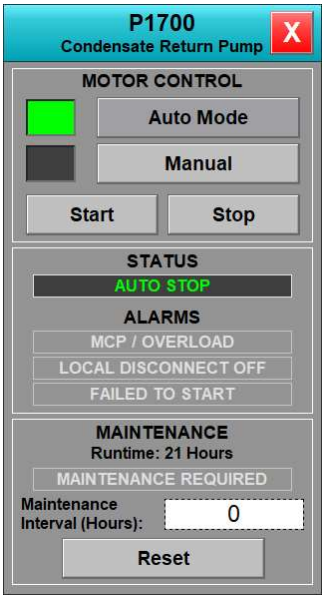
Manual Principles

Manual operation of devices allows forcing the state of a device from the HMI. The force is unconditional. E-stop circuitry will prevent operation of all devices. All devices will have their outputs disabled if the air pressure switch from the control panel does not detect air pressure. Either of these conditions can be identified by viewing the alarm summary.
Manually forcing mix-proof valves will inhibit automatic functions. These valves are used to prevent cross-contamination and manual operation puts this protection at risk. Putting a mix proof valve in manual will pause any automatic functions that require a path that through any port on that valve body.

Manual Security

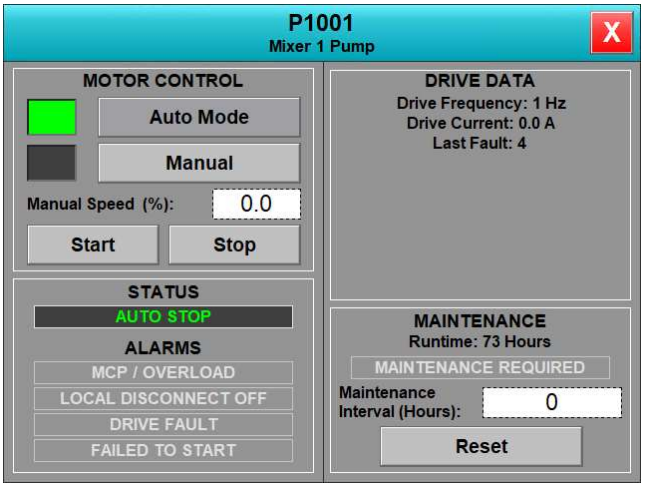
Manual control requires the MOA security level.

Discrete Motor Popup



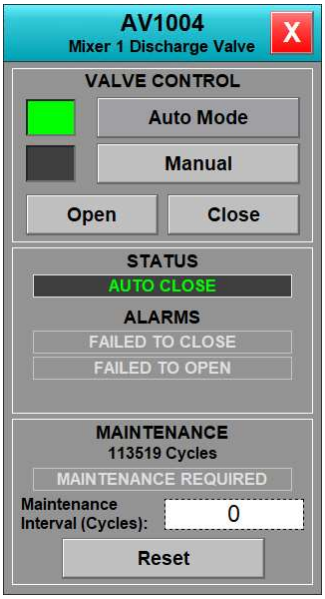
- Manually Start Motor
  - Press the **Manual** button. Press **Start**.
- Manually Stop Motor
  - Press the **Manual** button. Press **Stop**.
- Resume Automatic Control
  - Press the **Auto Mode** button.
- Set Maintenance Interval
  - Press the cell next to **Maintenance Interval (Hours).** Enter the new interval.
- Reset Runtime Hours
  - Press the **Reset** button.

Motor With VFD Popup



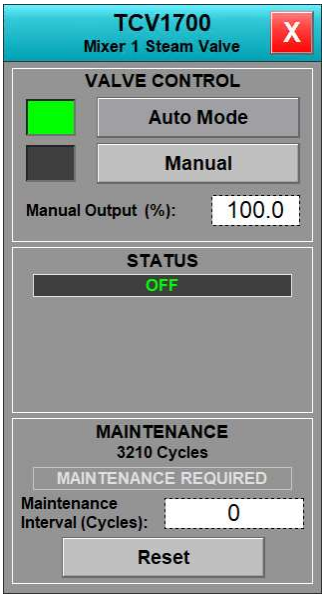
- Manually Start Motor
  - Press the **Manual** button. Press **Start**.
- Manually Stop Motor
  - Press the **Manual** button. Press **Stop**.
- Set the Speed
  - Press the **Manual** button. Press the cell next to **Manual Speed**. Enter the new speed.
- Resume Automatic Control
  - Press the **Auto Mode** button.
- Set Maintenance Interval
  - Press the cell next to Maintenance Interval (Hours). Enter the new interval.
- **Reset Runtime Hours** – Press the **Reset** button.

Discrete Valve Popup



- Open Valve Manually
  - Press the **Manual** button. Press **Open**.
- Close Valve Manually
  - Press the **Manual** button. Press **Close**.
- Resume Automatic Control
  - Press the **Auto Mode** button.
- Set Maintenance Interval
  - Press the cell next to **Maintenance Interval (Cycles).** Enter the new interval.
- Reset Cycles
  - Press the **Reset** button.

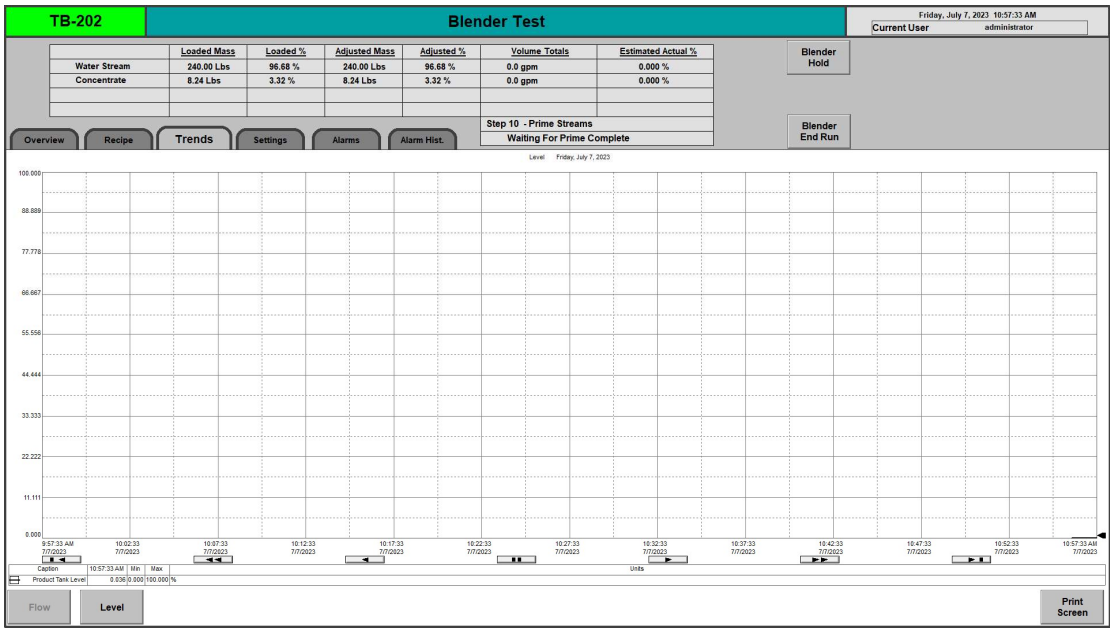
Control Valve Popup



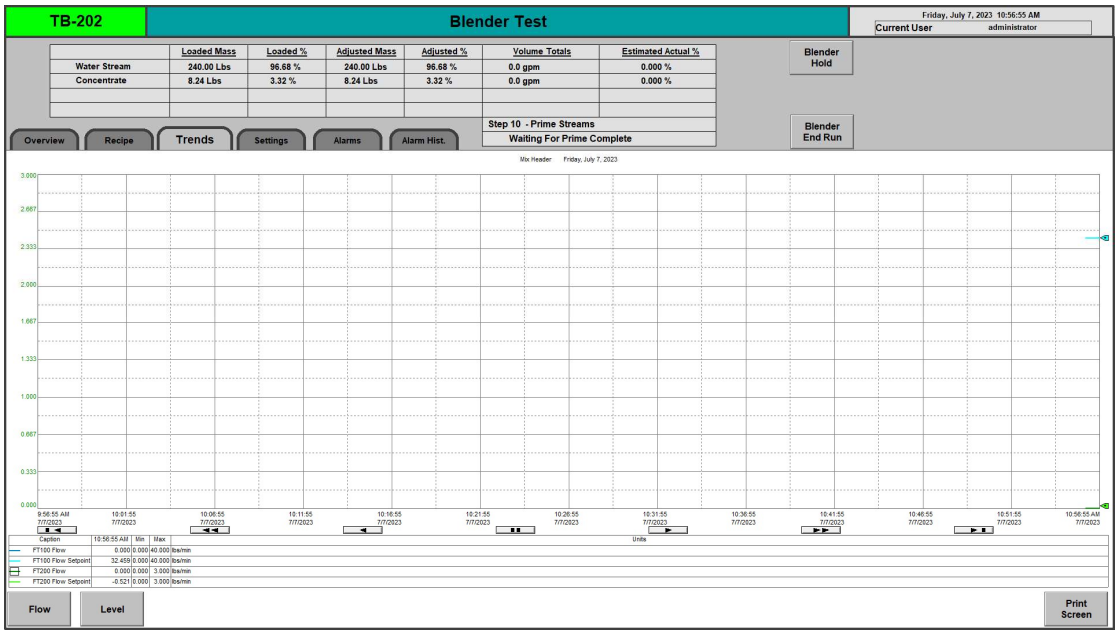
- Open Valve Manually
  - Press the **Manual** button. Press the cell next to **Manual Output (%).** Enter the new output value.
- Close Valve Manually
  - Press the **Manual** button. Press the cell next to **Manual Output (%).** Enter 0.
- Resume Automatic Control
  - Press the **Auto Mode** button.
- Set Maintenance Interval
  - Press the cell next to **Maintenance Interval (Cycles)**. Enter the new interval.
- Reset Cycles
  - Press the **Reset** button.

Trends

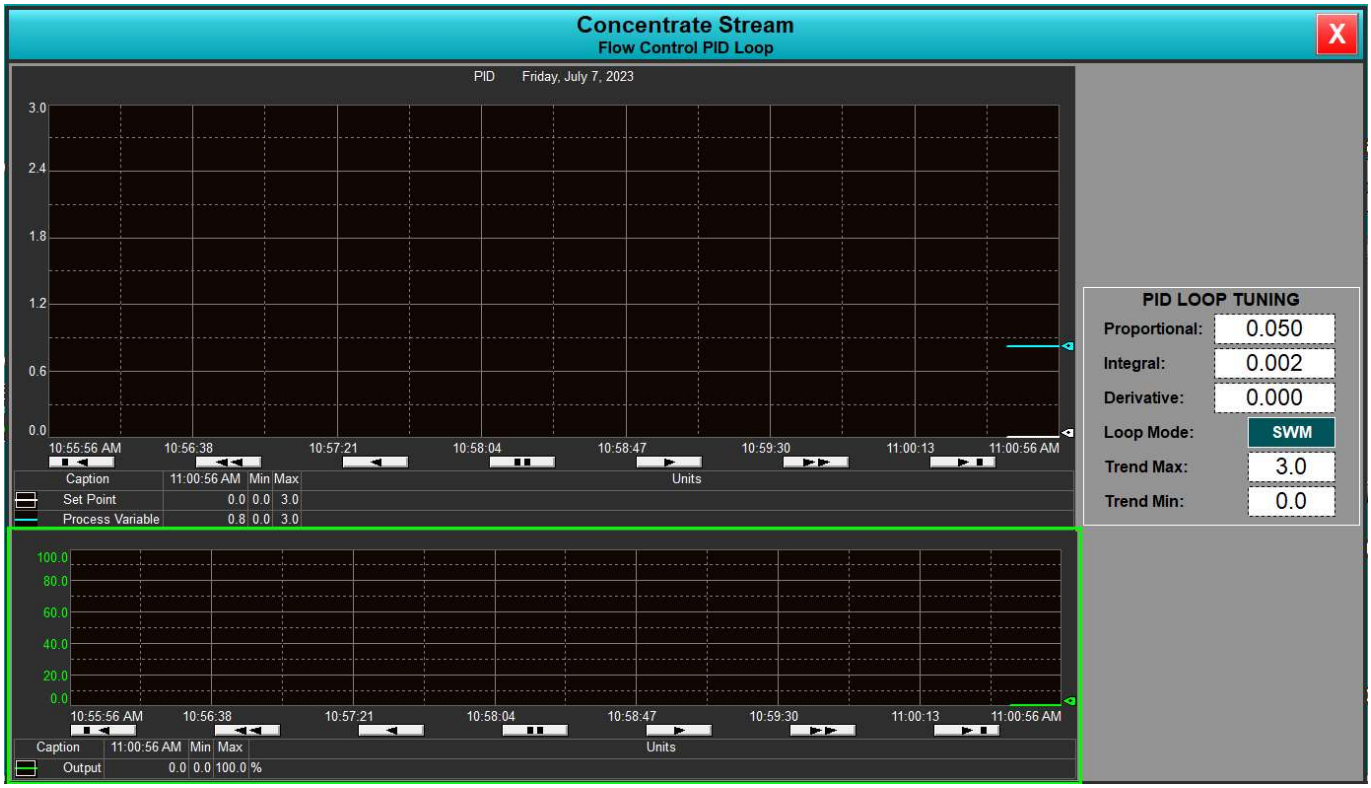
Flow Trend



Level Trend



PID Trend

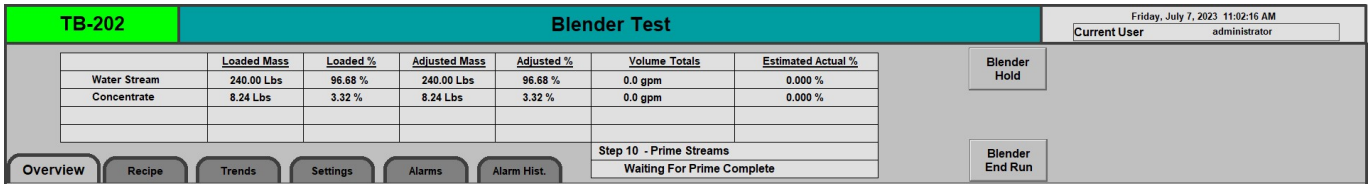


- Trend Max
  - Press the cell next to **Trend Max**. Enter the new scaling value.
- Trend Min
  - Press the cell next to **Trend Min**. Enter the new scaling value.

System Information

Banner

The Banner is the teal-colored bar at the top of every screen. The center displays the title of the active screen. The area to the right displays date/time and current user logged in.



Alarm Management

Alarm Principles

Alarms are hardware or process conditions that indicate incorrect process operation. They can be viewed from the alarm summary page. The alarm summary can be accessed from the navigation popup. Also touching or clocking the alarms section of any device popup will open the alarm summary.

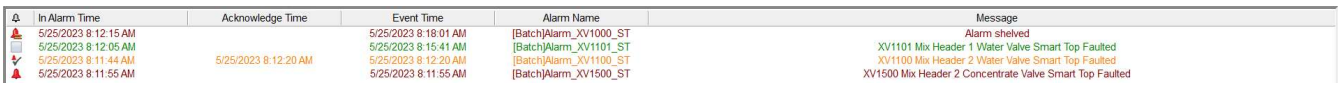
The alarm summary displays a list of active alarms and allows operator interaction with the alarms. Operator activities include acknowledge, disable and shelve.
Acknowledging an alarm will allow the alarm to clear from the summary once the alarm condition is corrected. An alarm will always remain in the summary until it is acknowledged. Alarms can be acknowledged individually,

Disabling an alarm will turn off the alarm in the PLC and allow the process to continue. The alarm will remain in the alarm summary until acknowledged. Once acknowledged the alarm is automatically re-enabled and will alarm again when the conditions for the alarm are met.

Shelving an alarm will turn off the alarm in the PLC for 5 minutes and allow the process to continue. After 5 minutes the alarm will reenable. If a shelved alarm remains in the alarm summary until acknowledged. After 5 minutes if the condition is not corrected the alarm will go back to actively in alarm.

Historical alarm activity can be viewed in the activity log.

Alarm Summary



Active alarms are listed in the alarm summary. Alarms are sorted by event time then in time then acknowledge time. **In Alarm Time** is when an alarm condition went true. **Acknowledge Time** is when an operator acknowledges an alarm**. Event time** is the last time the state on an alarm changed. A new alarm will have the same in time and event time. Acknowledging disabling and shelving an alarm are all events that get time stamped. Each event will get logged into the **Activity Log** and can be viewed there.

The status and activity can be determined by the information presented for each alarm.

Color indicates the state of an alarm.

- **Red** indicated the alarm is active and unacknowledged.
- **Orange** indicates the alarm is active and acknowledged.
- **Green** indicated the alarm is no longer active and unacknowledged.

The icons in the left-hand column tell the state of an alarm.

The alarm is active.

The alarm is acknowledged.

The alarm is disabled.

The alarm is shelved.

Alarm Tool Bar

The alarm toolbar contains the commands an operator can execute. The commands that act on an alarm require an alarm to be selected by touching or clicking it in the summary.

Acknowledge the selected alarm.

Acknowledge the selected alarm and enter a comment.

Acknowledge the current page of alarms and enter a comment.

Acknowledge all alarms and enter a comment.

Disable the selected alarm and enter a comment.

Shelve the selected alarm and enter a comment.

Unshelve all shelved alarms and enter a comment.

Open the alarm status explorer. This allows viewing of all alarm attributes of any alarm.

Open the alarm detail for the selected alarm.

Print the alarm summary.

(No Choose a filter. Common Filters have been pre-defined.

Define a custom filter.

Clear filters.

Turn the details at the bottom of the summary on and off.

 Refresh the alarm list.

General Troubleshooting

Faults and Alarms

A fault is a condition where a device is acting improperly or not as intended. The most common faults are VFD and valve faults. An alarm is a deviation in the process that could compromise product quality. Examples are low mix pressure or CIP parameter deviations.

Next go to the alarm summary. Evaluate any alarms and their descriptions. Look for key words or at the alarm timestamp. If your process stopped 2 minutes ago what alarm came in at that time? Look at the graphical overview screens. Identify any devices with flashing red indicators.

Call TechniBlend support. TechniBlend service technician can assist by viewing the process in the PLC to help diagnose problems.

Interventions

Sometimes situations happen that are outside of the normal designs of the system. There are some interventions built into the system to help in these cases. Interventions should be used with caution. There is great risk involved in using interventions because the process is running without important protection in place. Injury, damage, or product loss can occur. A risk analysis should be done for each intervention performed.

- What is the protection being offered?
- Is it possible that this intervention will exploit that condition?
- What are the consequences if it does?

Manual Operation

Devices can be run in manual outside of pre-defined process programming.

Alarm Bypass

Alarms can be shelved or disabled. Shelved alarms are ignored for 5 minutes. A disabled alarm will remain disabled until acknowledged. It will then be re-enabled.

Trends

Review historical trends. Use the scroll buttons at the bottom of the trend to view past data. Right click on a trend to change configurations like time, pens, colors. These configurations are lost as soon as the trend is closed.

Blend Process

Blend Principles

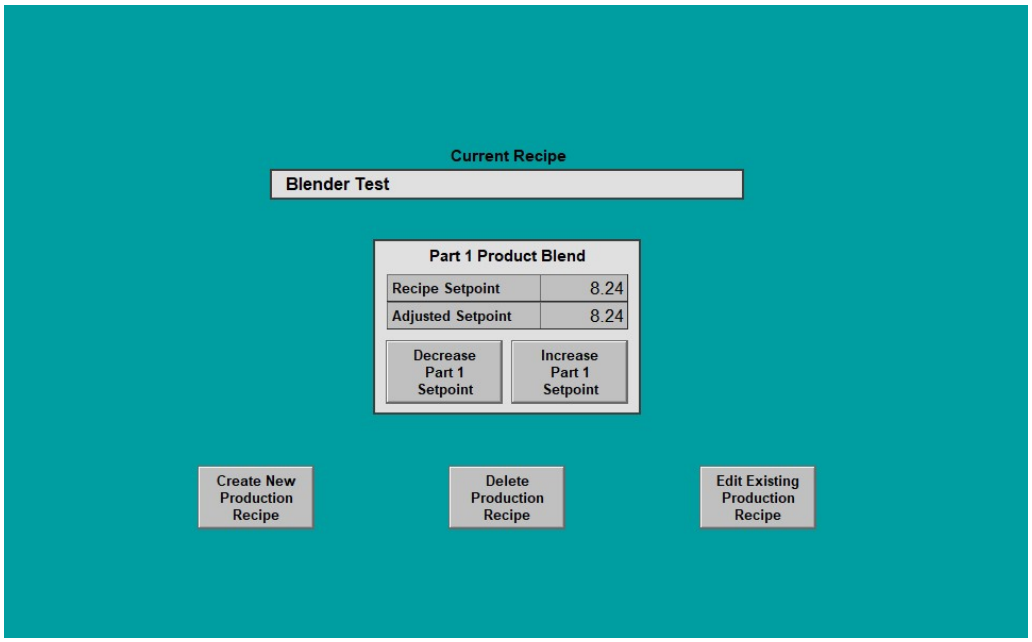
The blend system consists of a small number of key components.

- Water Meter (FT100)
- Water Flow Control Valve (FCV100)
- Water Inlet Valve (AV100)

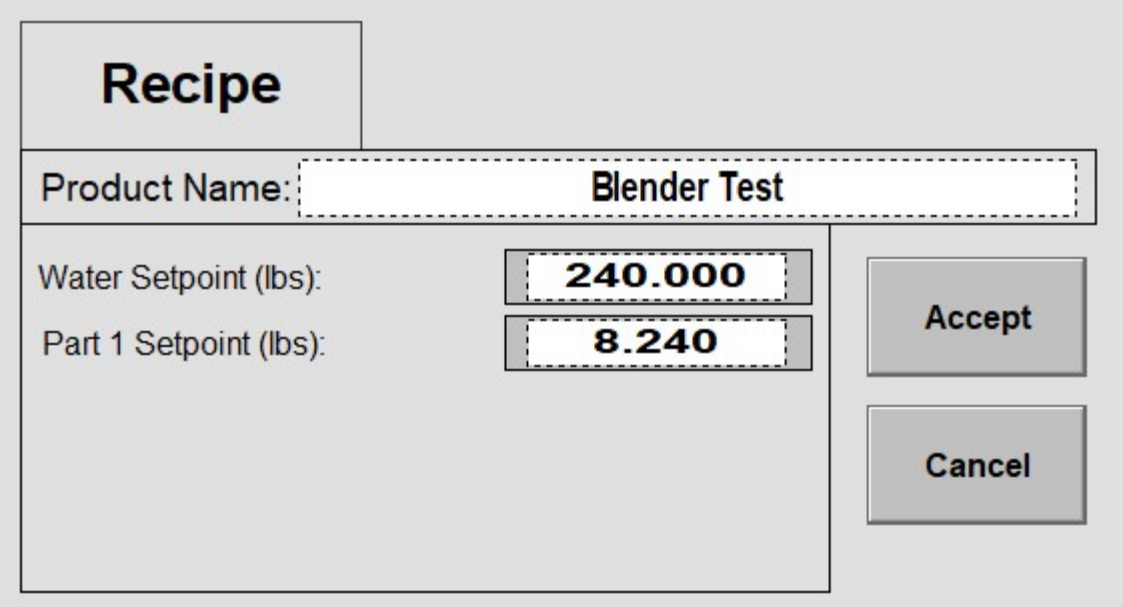
- Concentrate Meter (FT200)
- Concentrate Pump (P200)
- Concentrate Inlet Valve (AV200)
- Concentrate Drain Valve (AV201)

- Product Tank Pump (P600)
- Product Tank Level (LT600)
- Product Tank Inlet Valve (AV600)
- Product Tank Inlet Drain Valve (AV601)
- Product Tank Sprayball Valve (AV602)
- Product Tank Outlet Valve (AV603)
- Product Tank Outlet Drain Valve (AV604)

Recipes are managed with the recipe editor. The recipes are stored in the PLC and edited from any HMI terminal. The system has the capability to store 400 recipes. Recipes are accessed from the recipe screen. From this screen you will be able to create, edit, or delete recipes as needed.



Creating or editing a recipe consists of three simple parameters:



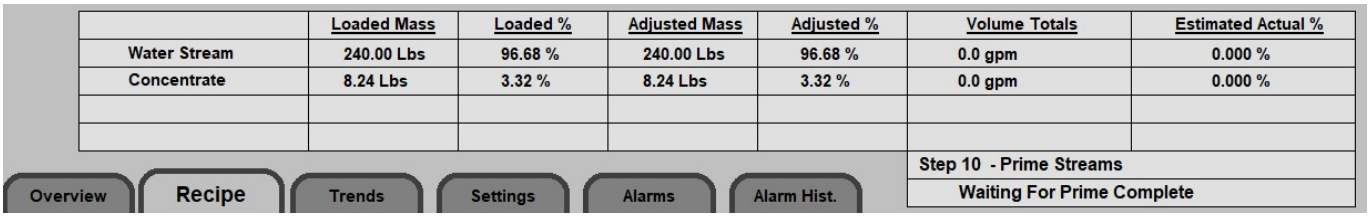
- Recipe Name
- Water Setpoint in pounds
- Part 1 Setpoint in pounds

The system operates on the simple principal of ratio blending. Water and concentrate stream percentages are calculated using the values entered. The water stream acts as the master stream and will aim to achieve the flow rate calculated based on the recipe entered. Concentrate will track the water stream with real time error correction to make sure the blend is consistent with any variation in water flow.

Live changes can be made based on feedback from QA lab tests. Increasing or decreasing the setpoint for the concentrate stream will adjust the blend ratios accordingly. Any changes made using the live adjustments will not be saved to the recipe and will be lost when the current recipe is completed or cleared. Adjustments will need to be saved back into the recipe if desired.

Live Blending Information

Live information regarding the current blending sequence is available on the main header.



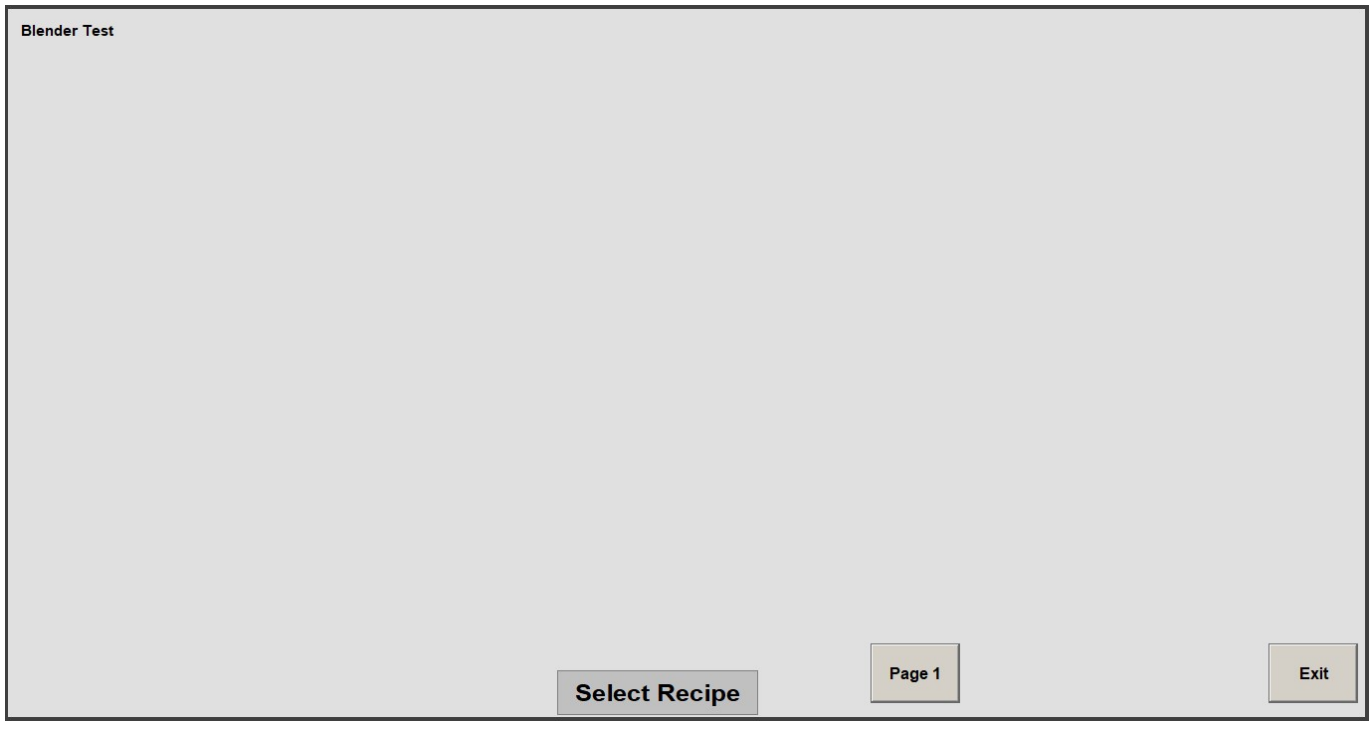
- Loaded Mass
  - Indicates the original setpoints loaded from the recipe system.
- Loaded Percent
  - Indicates the calculated ratio as a percent for the loaded recipe.
- Adjust Mass
  - Indicates live adjustments made to the active recipe. These are the current targets for blending.
- Adjusted Percent
  - Indicates live adjustments as a percent made to the active recipe.
- Volume Totals
  - Indicates the live totals of the current blend sequence in volume.
- Estimated Actual Percent
  - Indicates a live running estimated calculation of the current blend sequence as a percent.

The bottom right text indicators show what step the blender is in. Any waiting conditions will be shown here.

Blending Sequence

Select Recipe

Clicking on the gray box under **Current Recipe** will open the recipe selection popup.



Blend Controls

The blend sequence is controlled by 4 main buttons located on the main banner.

- Blender Start
    - Starts the production sequence. If an alarm occurs during blending this will show as a blender restart button. After alarms have been corrected and acknowledged the sequence can be restarted.
- Blender Hold
    - Pauses the production sequence.
- CIP Mode
    - Puts the blender in CIP mode.
- Blender End of Run
    - Begins the end of run sequence.

Buttons will be visible based on the current state of the blender so incorrect selections can't be made during operation.

Step 0 – Idle

System is Idle

- Step Advancements
    - Blender Start button pressed – Move to step 10.

Step 10 – Prime System

Starts the flow meter totalizers for the blend sequence and primes the concentrate stream flow meter. Valves will open and the syrup pump will start until a small quantity is totalized through the concentrate meter.

- Wait Conditions
    - Concentrate Meter Prime Complete

- Step Advancements
    - Prime meter complete – Move to step 15.
    - End of Run button pressed – Move to step 0.

Step 15 – Prime Product Tank

Enabled water and concentrate streams and begin initial blending into the product tank.

- Wait Conditions
    - Waiting For Prime Complete

- Step Advancements
    - Prime tank complete (30% full) – Move to step 16.
    - End of Run button pressed – Move to step 30.

Step 16 – Filler Ready

Blending halts and waits for operator acknowledgement that the filler is ready to receive product.

- Wait Conditions
    - Waiting On Filler.

- Step Advancements
    - Filler Ready pushbutton pressed – Move to step 20.
    - End of Run button pressed – Move to step 30.

Step 20 – Product Run

Blending continues and the product tank outlet opens and supplies product to the filler with P600.

- Wait Conditions
    - None.

- Step Advancements
    - Product Tank reaches high level (85%) – Move to step 25.
    - End of Run button pressed – Move to step 30.

Step 25 – Hold For Product Tank Low Level

Blending halts and waits for the product tank level to drop.

- Wait Conditions
    - None.

- Step Advancements
    - Product Tank reaches blend resume level (70%) – Move to step 20.
    - End of Run button pressed – Move to step 30.

Step 30 – End of Run – Ramp Down

Blending halts and product tank outlet remains active to allow the filler to continue to pull product.

- Wait Conditions
    - None.

- Step Advancements
    - After the water and concentrate blending streams halt the system waits for 10 seconds for flow to fully cut off and then proceeds to step 35.

Step 35 – End of Run – Product Push

Product tank outlet remains active and the system pushes a volume of water through the header to push all product in the mix line into the product tank.

- Wait Conditions
    - Waiting for Pushout Totalizer

- Step Advancements
    - End of Run product push quantity reached – Move to step 36.

Step 36 – End of Run – Run Out Product Tank

Product tank outlet remains active and the system waits for the product tank to empty.

- Wait Conditions
    - Waiting for Product Tank low level.

- Step Advancements
    - When the product tank goes below 3% full the system will pop up a production complete confirmation. When production completion is confirmed move to step 39.

Step 39 – End of Run – Drain Product Line

Product tank outlet goes inactive and the system drains any residual quantity.

- Wait Conditions
    - Waiting for Product Tank low level.

- Step Advancements
    - The system waits for 30 seconds with the drains open and then proceeds to step 40.

Step 40 – Run Complete

Sets the run as complete and returns to idle.

CIP Sequence

CIP Mode

When in the idle state the system can be set into CIP mode. CIP mode is a basic operation where the blender will automatically open the headers and attempt to control them to pre-defined setpoints. This operation is fully automatic and when flow is detected it will clean the system through the Sprayball and return out of the product outlet.

When the blender is taken out of CIP mode it will automatically drain its lines for a preconfigured amount of time (60 seconds).

This sequence is currently set to be started manually. It is easily integrated into any plant control systems that are available, such as a PLC controlled CIP system. These integrations can allow CIP mode to be activated automatically but depends on the system the plant has available. These features are currently disabled.

Alarms

Blender Emergency Stop Pressed

The system has detected the emergency stop has been pressed. To clear pull the emergency stop button out and press the green button on the front of the panel to re-engage the emergency stop circuit. If the green light doesn't go active this may indicate an issue with control power.

Low Air Pressure Alarm

Pressure switch PS01 has detected low incoming plant air supply. Check air supply utilities.

Syrup Room Communication Lost

Used when integrating the system with existing plant controls. Indicates an issue with communications.

Concentrate Pump Motor Failed to Start

Concentrate pump motor run feedback wasn't received from the VFD. Check VFD for any faults and clear them if necessary.

Transfer Pump Motor Failed to Start

Transfer pump motor run feedback wasn't received from the VFD. Check VFD for any faults and clear them if necessary.

Concentrate Pump Motor VFD Fault

Concentrate pump motor VFD is in a faulted state. Check the VFD for fault conditions and correct them before clearing the fault on the VFD.

Transfer Pump Motor VFD Fault

Transfer pump motor VFD is in a faulted state. Check the VFD for fault conditions and correct them before clearing the fault on the VFD.

Product Tank Level Out of Range

Product Tank level transmitter signal is out of range. May indicate the sensor has gone bad or a possible issue with control power or wiring.

Product Tank Level High

Product level has gone above 90%. This is a system alarm that prevents the syrup tank from overflowing if a condition exists that allows the blender to not stop at the product tank stop level.

Water Flowmeter No Flow Detected

Water flow hasn't been detected while the water stream is active. Check plant water supply utility and confirm flow meter communication is active.

Water Supply Low Deviation

Water supply flow is lower than required to meet proper blending rates. Check plant water supply utility.

Water Supply High Deviation

Water supply flow is higher than required to meet proper blending rates. May indicate an issue with the water stream flow control valve.

FT100 Communication Fault

Communication has been lost to FT100. May indicate an issue with meter power or network wiring, or an issue with the meter configuration.

FT200 Communication Fault

Communication has been lost to FT200. May indicate an issue with meter power or network wiring, or an issue with the meter configuration.

Concentrate Flowmeter No Flow Detected

Concentrate flow hasn't been detected while the Concentrate stream is active. Check concentrate supply, concentrate supply pump, and confirm flow meter communication is active.

Concentrate Supply Low Deviation

Concentrate supply flow is lower than required to meet proper blending ratio. The blending error correction has stayed low for too long and there is a risk of bad product being produced. Check concentrate supply, concentrate supply pump, and confirm flow meter communication is active. This may also indicate an issue with water supply consistency.

Concentrate Supply High Deviation

Concentrate supply flow is higher than required to meet proper blending ratio. The blending error correction has stayed high for too long and there is a risk of bad product being produced. Check concentrate supply, concentrate supply pump, and confirm flow meter communication is active. This may also indicate an issue with water supply consistency.

TechniBlend is a leading supplier of beverage and liquid processing equipment & systems utilizing cutting edge technology, innovative components, and optimal design features to serve the food & beverage industry, as well as the consumer products, and household & personal care industries. With over 150-years of combined experience, TechniBlend continues to develop new & innovative technologies aimed to deliver quicker changeovers, greater flexibility, higher yield, and improved product quality while producing a great rate of return on investment.

Learn more about TechniBlend at www.TechniBlend.com and more about ProMach at ProMachBuilt.com.

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