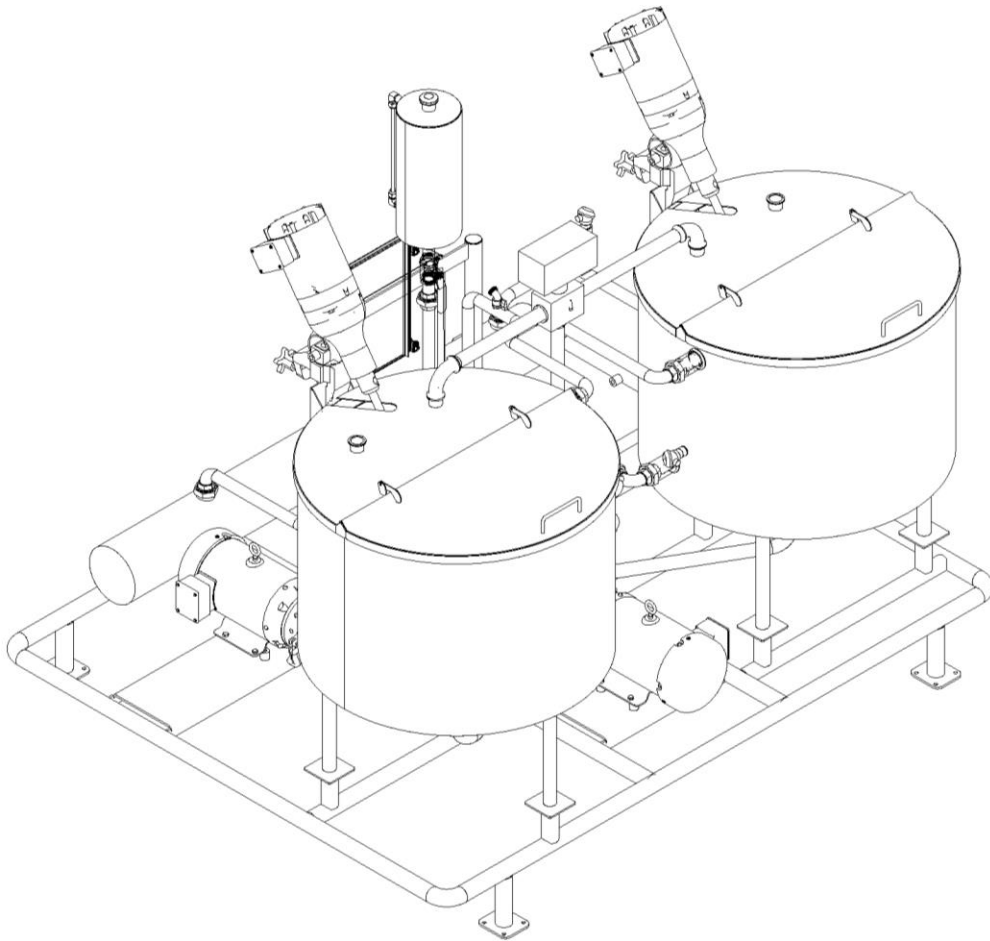


Twin Tank slurry mixing system



Installation Operation and Maintenance Manual

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INTRODUCTION

1 INTRODUCTION

Thank you for buying your equipment from PPM Technologies. This manual will help you to understand how your equipment operates and what is required to maintain peak performance. Please read it thoroughly and keep it on file for reference. Your satisfaction is very important to us. Please direct any comments, questions or concerns to our Service Department.

Date Purchased: _____

Serial No.: _____

Factory Order No.: _____

General Arrangement Drawing No.: _____

1.1 SAFETY INSTRUCTIONS



WARNING: PPM Technologies is not liable for any damage or reduced performance that may occur as a result of improper equipment assembly and installation, or due to unauthorized alterations. Such actions will void any and all warranties.



WARNING: These instructions and safety precautions must be followed. There is danger of electrical shock to the operator.



WARNING: The unit must be properly grounded and verified at installation.



WARNING: The electrical power supply connection to the PPM-supplied unit must be made through a customer-supplied safety disconnect switch. Incorporation of an emergency stop may also be required, according to local codes.



CAUTION: Local safety codes and regulations must be considered when installing and/or operating this equipment.



Product safety labels must be highly visible on the equipment. Check visibility regularly. If safety labels need replaced, contact PPM Technologies for an additional supply, free of charge.



Supporting information that may be attached (e.g., drawing) take precedence over corresponding information printed in this manual.

Safety is a basic factor in the maintenance and operation of Twin Tank slurry mixing systems. Proper clothing, tools and methods of handling can prevent serious injury to you or a fellow worker. A number of safety precautions are listed throughout this manual. Please study and follow the precautions and insist that your coworkers do the same.

1.2 SPECIAL CONSIDERATIONS

Each slurry mixing system, by design, has components or properties that may require special consideration. These items are noted here to avoid potential problems when operating or servicing Twin Tank slurry mixing systems.

1.3 DESCRIPTION

The Twin Tank slurry mixing systems utilize a mix and use tank. This allows the user to use one slurry mix while making a second mix. This limits downtime allowing for continuous production. The tanks on this system are jacketed; This allows the user to heat up the slurry mixture to maintain a smooth liquid state. This also means it can be difficult to cool since the jackets insulate the system. The figure below (**Figure 1**) shows a plumbing view of how the slurry and water for the jacketed tanks flow through the system.

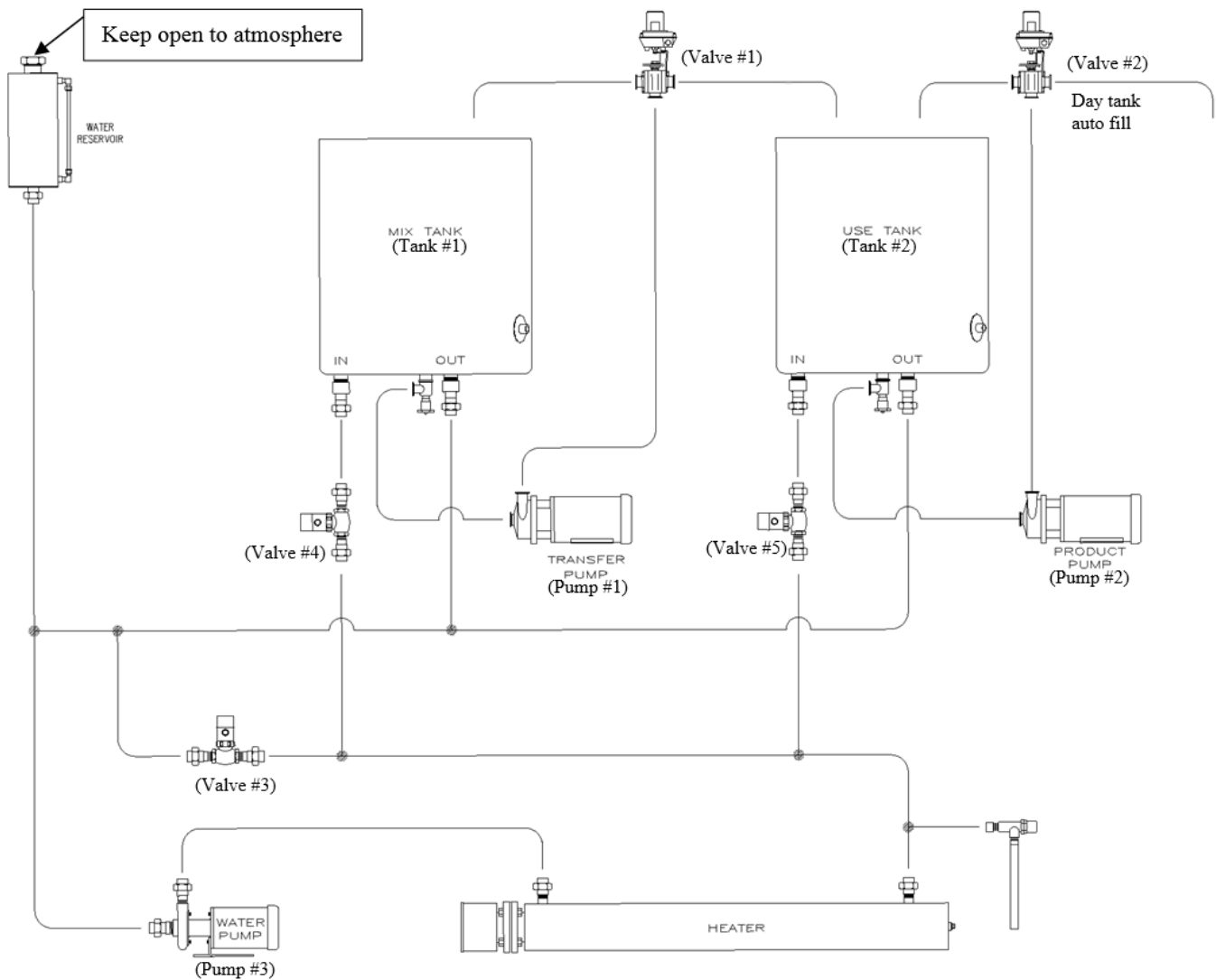


Figure 1: Plumbing Schematic

2 INSTALLATION

2.1 LONG TERM STORAGE

TWIN TANK slurry mixing systems should be stored indoors. If stored off-site, place on cribbing, and cover with plastic.

2.2 SITE PREPARATION

The TWIN TANK slurry mixing systems have 6 footplate support locations. The system weighs 3761lbs unfilled with product or water. The system can hold an additional 120 gallons of product (60 gallons per tank) weighing roughly 940lbs. The most consistent point of access to the system is at the tanks. For maintenance and cleaning, it is important to provide access to the entire skid.



WARNING: PPM Technologies is not responsible for damage or personal injury resulting from improperly designed or constructed supports. Installation of the slurry system on improperly designed or constructed supports will void any and all warranties.

Regardless of whether this equipment is installed at grade level, elevated, or on upper floors, the system should be leveled to ensure proper circulation of water through the jacketed tanks. Keep the system level to ensure that the tank will drain when needed.

When designing the site layout for the slurry mixing systems, it is important to make sure that all components of the TWIN TANK slurry skid can be accessed for maintenance, cleaning, safety and troubleshooting issues. It is recommended to keep a 24 to 36 inch (610 - 915 mm) clearance on all sides of the skid. It is also important to provide clearance in the layout for flexible tubing that will run between the day tank skid and Twin Tank skid. Avoid placing the skid up against a wall or in a corner, this will make it difficult to access all sides of the machine.

TWIN TANK slurry mixing systems are designed to operate in wet or dry environments. The ambient temperature should be between 34°F (1°C) and 80°F (27°C). For some slurry recipes the agitation of the mixture can cause a resultant buildup of heat. For many mixtures this excess heat can cause the slurry to flow improperly through the system. The jacketed tanks insulate the slurry even when not pumping hot water through it. In order to prevent unwanted heat, circulating water through the system without heating it can help reduce temperature build up in the system. **NOTE: Ambient air and slurry temperatures must be specified when ordering a slurry system.**

The air supply (if required) must be clean, dry or slightly oily, and regulated. Normally 80 psi is more than adequate for accessory operation. Refer to the drawings supplied with each order for specific air pressure recommendations.

2.3 EQUIPMENT INSTALLATION

For proper operation, the system needs to be placed where the tanks can be easily accessed. The system comes with optional hook-ups to supply product liquid. If these are going to be used it is important to install the system in a location where that supply can be connected without interfering with access to the lids of the Twin Tanks or access to the water reservoir. It is recommended to keep the TWIN TANK slurry mixing system no farther than 25' away from the day tank system.

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WARNING: The electrical power supply connection to the PPM Technologies-supplied control must be made through a customer-supplied disconnect switch which must be mounted next to the controls. If possible, install the control at a location where it will receive adequate ventilation. This will ensure prolonged component life.



CAUTION: The conductor, between the TWIN TANK slurry system and control, must be of sufficient size to carry the current designated on the equipment nameplate.



CAUTION: Be certain that the equipment is properly grounded.



WARNING: PPM Technologies is not responsible for damage or personal injury resulting from improperly designed or constructed supports. Installation of the slurry system upon improperly designed or constructed supports will void any and all warranties.



CAUTION: Do not make any alterations to the slurry system without first contacting PPM Technologies. PPM Technologies will not assume any responsibility for poor slurry system performance or mechanical failure as a result of unauthorized alterations to the equipment. Such actions will void any and all warranties.



CAUTION: Local safety codes and regulations must be considered when installing and/or operating this equipment.

2.3.1 INSTALLATION EQUIPMENT AND TOOLS

The following equipment and tools are required or recommended for slurry system installation:

- Transit
- Crane or forklift and come-along
- Lifting straps
- Digital level
- Tape measure
- Heavy duty drill and masonry bits

2.4 PRIMING THE HEATER WITH WATER

- Step 1: Remove the cap on the water reservoir and place the water source into the reservoir. Place a garden hose on the high point vent valve positioned at the junction of the Twin Tank water outlets, and the other end place into a drain and open the vent valve (**Figure 2**).
- Step 2: Start the system in manual mode. Begin filling the water reservoir, when the reservoir is $\frac{3}{4}$ full on the site tube turn on Pump #3 (water pump), then turn on Valve #4 (tank valve). Water should now begin to fill the mix tank jacket. Watch the vent line in the drain for a continuous flow of water with no air venting.
- Step 3: When you observe no air in the flow, turn on Valve #5 (use tank valve) and turn off Valve #4 (mix tank valve). Watch the flow at the vent line in the drain for flow with no air venting. When that is observed, turn on Valve #3 (bypass valve) and turn off Valve #5.
- Step 4: Turn off the water fill and stop the Pump #3 water pump. Close the high point vent valve. Fill the water reservoir about 1" below the top of the sight tube and place the cap back on.

INSTALLATION

Disclaimer

PPM and its agents to ensure the accuracy and reliability of the information contained in this reference guide have put every reasonable effort forth. However, neither PPM, its agents, nor its consultant(s) make any representation, warranty, or guarantee in connection with the publication of these recommended methods and procedures. PPM hereby disclaims any reliability for loss or damage resulting from their use; for the violation of any federal, state, county, or municipal regulations with which these recommended methods and procedures may conflict; or for the infringement of any patent resulting from use of these recommended methods and procedures. These handling and installation instructions are not intended to preclude normal safety procedures, which should be followed to prevent injury to personnel. SAFE INSTALLATION PROCEDURES SHALL BE ENTIRELY THE RESPONSIBILITY OF THE INSTALLER.

IN NO EVENT SHALL PPM BE LIABLE FOR CLAIMS OF PERSONAL INJURY OR FOR SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR REVENUE, LOSS OF USE OF THE TWIN TANK SLURRY SYSTEM OR ANY ASSOCIATED EQUIPMENT, COST OF CAPITAL, COST OF THE SUBSTITUTE EQUIPMENT, FACILITIES OR SERVICES, DOWNTIME COST, CLAIMS OF CUSTOMERS OF THE OWNER FOR SUCH DAMAGES, OR FOR DAMAGE TO PROPERTY, WHETHER SUCH CLAIM SHALL BE FOR BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE OR STRICT LIABILITY, AND WHETHER SUCH CLAIM ARISES OUT OF OR RESULTS FROM THIS LIMITED WARRANTY, OR EXPRESS OR IMPLIED WARRANTIES, OR FROM THE DESIGN, MANUFACTURE, SALE, DELIVERY, RESALE, INSTALLATION, TECHNICAL DIRECTION OF INSTALLATION, INSPECTION, REPAIR, OPERATION OR USE OF THE CONVEYOR OR SAFETY CABLES.

All specifications are subject to change without notice.

3 OPERATION

3.1 TWIN TANK SLURRY MIXING OPERATION

Twin tank slurry mixing systems utilize 2 tanks: one to mix ingredients (Tank #1) and one to supply your application system with slurry (Tank #2) see the figure below (**Figure 2**). The system comes standard with jacketed tanks and a hot water heating system. On the skid there are 3 pumps: One to move a mixture from the mix tank to the use tank (Pump #1); One to move the slurry from the use tank to the day tank slurry skid (Pump #2); One to circulate water from the heater through both jackets of the tanks (not shown).

For general operation the user fills the mix tank (Tank #1) with the needed ingredients to create a batch of slurry (liquid and powder). The mixing motor is engaged to combine the ingredients and the transfer pump (Pump #1) circulates product through the mixing tank. Once the mixture is properly combined, the transfer pump is activated to move product from the mix tank, into the use tank. There is a mixing motor in the use tank which is used to keep the slurry from separating. When the system is ready to run, second transfer pump is used to move product from the use tank to the day tank located on the day tank skid. It is recommended to only supply the day tank with enough slurry to operate for a few minutes as it will not be continuously mixed. This time will vary on a number of factors unique to each plant. Once the system is running, the controls should automate the transfer of slurry from the use to the day tank. While the system is running the user should check the Twin Tanks to decide if a slurry mixture needs to be made or needs to be transferred to the use tank.

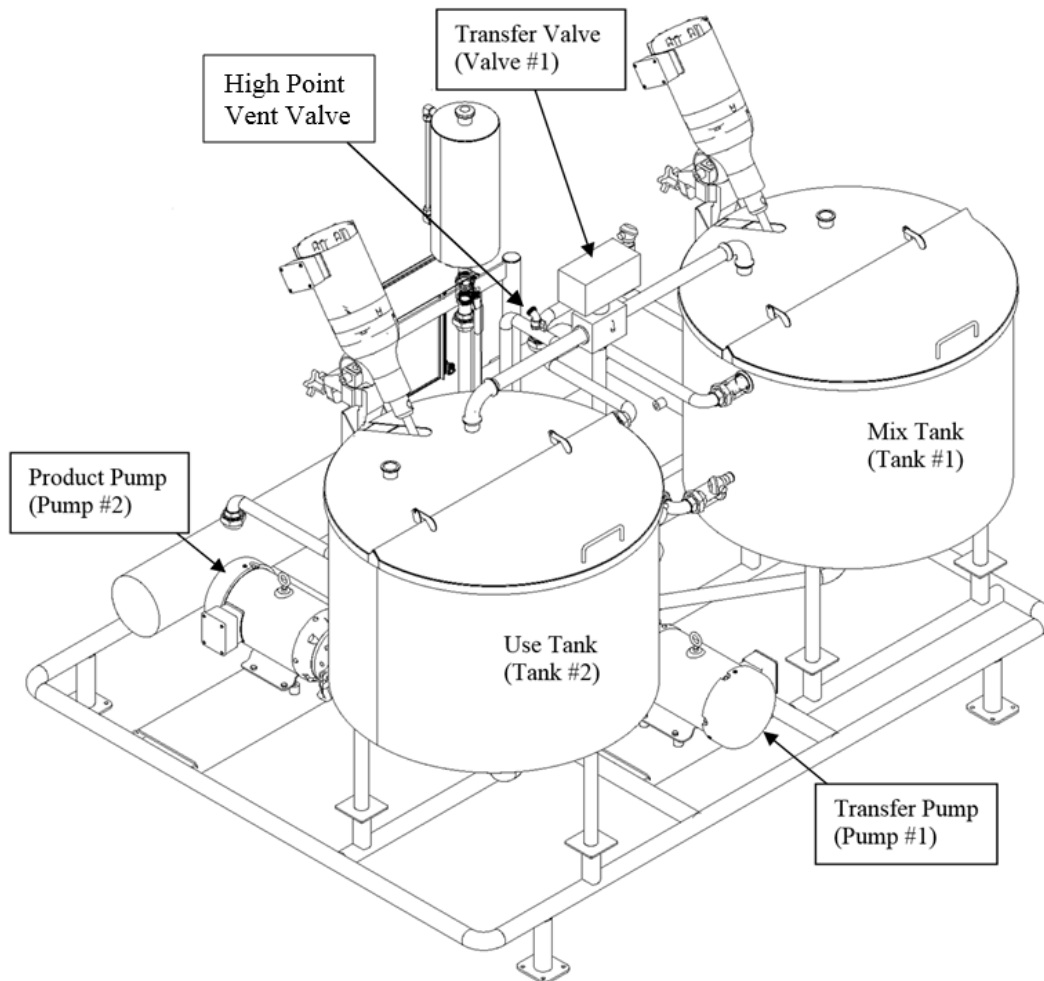


Figure 2: Plumbing Schematic



CAUTION: Do not operate the TWIN TANK mixing system and control on a supply voltage other than the designated voltage.

3.2 TWIN TANK CLEANING

For general operation it is best to clean out the system whenever the system you will be stopped for longer than it takes for the system to settle, when switching out product or at the end of use. General cleaning is done by running the system with oil (the same as in the recipe) until all slurry is out. This is a great method if you are going to run the system relatively soon after shut down. A deep clean should be done when the system will no longer be in use for more than a day.

Common Issues:

- If there is residual slurry caked onto the tank walls, it needs to be removed.
- Most slurry recipes, when left alone, separate into oil and a solid thick mass. This will clog the system.
 - If the system does clog, the best way to resolve this is to take apart as much of the system as possible and clean each piece.
- Slurry can be left to solidify if each operating step is not activated to run cleaning oil through all pipes



CAUTION: Do not operate the TWIN TANK mixing system with any residual water in the system. Only clean with water once all slurry is removed.

3.2.1 Recommended cleaning Procedure

When the system will be shut down for an extended period of time it is recommended to use the steps below for cleaning. First, enable Valve #1 (transfer valve) to transfer all remaining slurry from the mix tank to the use tank, then disable Valve #1. Leave Pump #1 transfer pump running and fill the mix tank with an appropriate amount of hot water. (Note at the operator interface you can adjust the temperature of the tank to the temperature that works best). The system will reset to the temperature that is in the active recipe when power is cycled. You can continue production until the use tank is empty of slurry. When the production run is completed, disable Valve #2 (day tank auto fill valve) and Pump #2 (product recirculation pump). Disconnect the recirc line from the use tank and place into a waste bin, then turn on Pump #2 and pump any remaining slurry into the waste bin. When the use tank is empty, replace the recipe line. Transfer the water from the mix tank to the use tank and start Pump #2. For cleaning out the slurry day skid and manifold, reference Slurry Manual.

4 MAINTENANCE

4.1 TWIN TANK MAINTENANCE



WARNING: Before performing any maintenance, the electrical power supply must be disconnected at the safety disconnect switch.

The Twin Tank slurry mixing system comes standard with jacketed tanks. These jacketed tanks are heated by a water heater system. This system is an open system. At the top of the TWIN TANK slurry mixing system there is a water reservoir. This reservoir is open to the atmosphere around it. This reservoir has the potential to lose water overtime and will need to be filled.



WARNING: Do not connect the water reservoir inlet up to a closed system. The water reservoir must remain open to atmosphere for safety reasons.

4.2 SPARE PARTS LIST

- INGV01-00078 (2-way valve)
- PFS-80-041 (Thermocouple)
- INGP04-00012 (Main product pump)
- INGV01-00032 (Solenoid)
- INGP04-00062 (Water pump)
- Replacement motor for the mixer (Part number dependent on customer product and flow rate)

4.3 TROUBLE SHOOTING

The TWIN TANK Slurry Mixing System can be divided into 3 sub components. 1. The heating system, 2. The mixing system and 3. The controls. Each have their own potential issues that should be considered and addressed when troubleshooting.

1. The Heating system utilizes 1 pump, 1 heater, 3 valves and 3 RTDs. Any one of these parts could fail and may need to be replaced. Each valve has a physical visual indicator of direction, you can utilize this signal to compare against the control system is saying to trouble shoot flow problems. If the control panel says the system is not heating, you can check the heater to make sure it is receiving power using a volt meter. You can also do a physical touch test or use an infrared heat gun to gain a measurement of the tanks. If the system is hot while the control says it is not than one or all of your RTDS are faulty. In this case you should check the wiring to ensure a proper signal is being sent and, if need be, replace the sensor.
2. The mixing system has very few moving parts. It utilizes 2 pumps, 4 valves (2 pneumatic, 2 manual) and 2 mixing motors. If things are not pumping properly always check the manual valves located at the bottom of the tank. The top 2 transfer valves have physical visual indicators of their position. You can use those indicators to check the true flow direction of the system compared to the controller. If the valves are all in the

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correct positions, then the pump should be examined. The Pump could be broken, wired to run in the wrong direction or not being supplied power. If running in the wiring direction, it needs to be rewired. This can be done by switching 2 of the 3 wire leads. If not getting power, the wiring should be examined and rewired, also check the control panel for blown fuses. If the mixer motors are not functioning, they most likely need to be replaced. You can check the control panel and the power supply to the mixer motors.

3. The control panel is very complex and different for each and every project. Please consult the electrical drawings for any potential parts that are wired incorrectly.

NOTES

MAINTENANCE