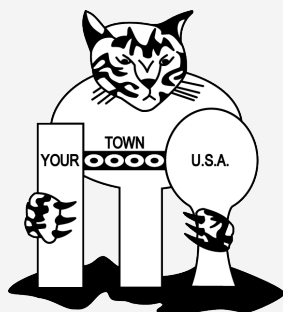
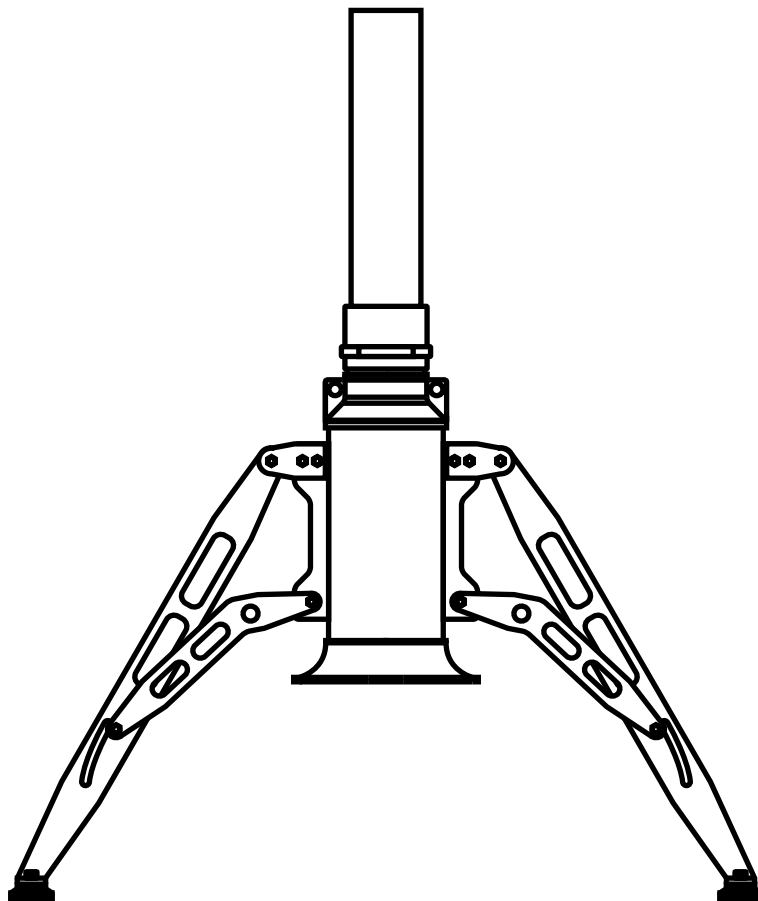




Operation and Maintenance Manual Models 275, 375 and 475



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ATTENTION!

THIS EQUIPMENT IS INTENDED FOR INSTALLATION BY TECHNICALLY QUALIFIED PERSONNEL. FAILURE TO INSTALL IT IN COMPLIANCE WITH AND NATIONAL AND LOCAL ELECTRICAL CODES MAY RESULT IN ELECTRICAL SHOCK OR FIRE HAZARD, UNSATISFACTORY PERFORMANCE, AND EQUIPMENT FAILURE. ALL WARNINGS AND GUIDELINES AS OUTLINED IN THE CURRENT FRANKLIN ELECTRIC AIM MANUAL FOR SUBMERSIBLE MOTORS SHOULD BE FOLLOWED.

WARNING!

SERIOUS OR FATAL ELECTRICAL SHOCK MAY RESULT FROM FAILURE TO CONNECT THE MOTOR, CONTROL ENCLOSURES, METAL PLUMBING, AND ALL OTHER METAL NEAR THE MOTOR OR CABLE, TO THE POWER SUPPLY GROUND TERMINAL USING WIRE NO SMALLER THAN THE MOTOR CABLE WIRES. TO REDUCE THE RISK OF ELECTRICAL SHOCK, DISCONNECT POWER BEFORE WORKING ON OR AROUND ALL ELECTRICAL COMPONENTS.

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Introduction

The powerMIX Active Mixing System is an electrically powered submersible storage tank mixer. These systems include a NEMA 3R outdoor rated control panel which cycles the mixing system through an adjustable on/off schedule and feature a single phase soft starter to increase motor lifespan.

Three standard power levels are available as follows:

powerMIX 275 @ 0.5hp
powerMIX 375 @ 1.0hp
powerMIX 475 @ 1.5hp

Depending on the storage tank geometry, maximum water column depth between the mixer outlet and high water level should be limited at 40 to 50 feet for proper functioning. Should the mixer be used in storage tanks of greater height to width ratios, such as standpipes, the EXT package should be purchased which includes an extended discharge tube that is attached to the mixer. The EXT package is available in any length necessary. Generally, the length of the EXT tubing should be ordered so that the discharge end of the tubing is within 20 to 30 feet below high water level.

When using the EXT package the standard power levels are modified as follows:

powerMIX 275 EXT @ 0.75hp
powerMIX 375 EXT @ 1.0hp
powerMIX 475 EXT @ 1.5hp

System Installation

Installation should only be carried out by persons with sufficient technical knowledge and skills to install such equipment properly. The basic steps of installation are as follows:

1. Position the submersible mixing system unit upright within the wet area of the tank and extend the collapsible tripod legs.
2. Drill a 1- 1/8" hole through the tank roof, within 12" of the roof hatch so as to be accessible from inside and outside the storage tank if no interior tank ladder exists. A bi-metal hole saw and power drill is a recommended method for drilling the hole.
3. Install the provided conduit hub and cord grip through the drilled hole (2) by threading the interior and exterior parts together so as to form a water tight seal (see Fig. 6 & 7). Apply Sikaflex 221 to the joint before tightening.
4. Thread an appropriate conduit body to the conduit hub (3), install conduit to ground level.

5. Route the mixer's submersible cable through the cord grip (3). Tighten the cord grip nut in order to secure the submersible cable. Tie a knot in the submersible cable as a secondary securing method (see Fig. 7). Leave sufficient cable within the conduit hub/body (3,4) in order to connect to the exterior electrical cable.
6. Feed #12 AWG THHN (two conductors with ground) electrical cable through the conduit from ground level and attach to the submersible cable within the conduit hub/body (3,4) using wire nuts.
7. Mount the provided control panel at ground level and attach conduit.
9. Make the appropriate electrical connections within the control panel as outlined in Fig. 9.

The following steps are only necessary when using the EXT package:

10. Drill a 7/8" hole through the side frame of the roof access hatch. A bi-metal hole saw and power drill is a recommended method for drilling the hole.
11. Insert the tubing hangar plate as shown in fig. 8 through the hole drilled in the roof hatch frame (10), fill the opening with Sikaflex 221 and tighten the exterior nut to secure the tubing hangar plate to the roof hatch frame.
12. Pull the chain attached to the EXT tubing discharge end towards the storage tank roof, attaching the chain to the tubing hangar plate (11) when the EXT tubing is drawn tight.

Figs. 1 & 2, provide an overview of typical system installation.

Figs. 3, 4 & 5 show a typical installation when using the EXT package within a standpipe storage tank.

Fig. 8 shows the provided hangar plate that is used to suspend the chain and tubing when using the EXT package.

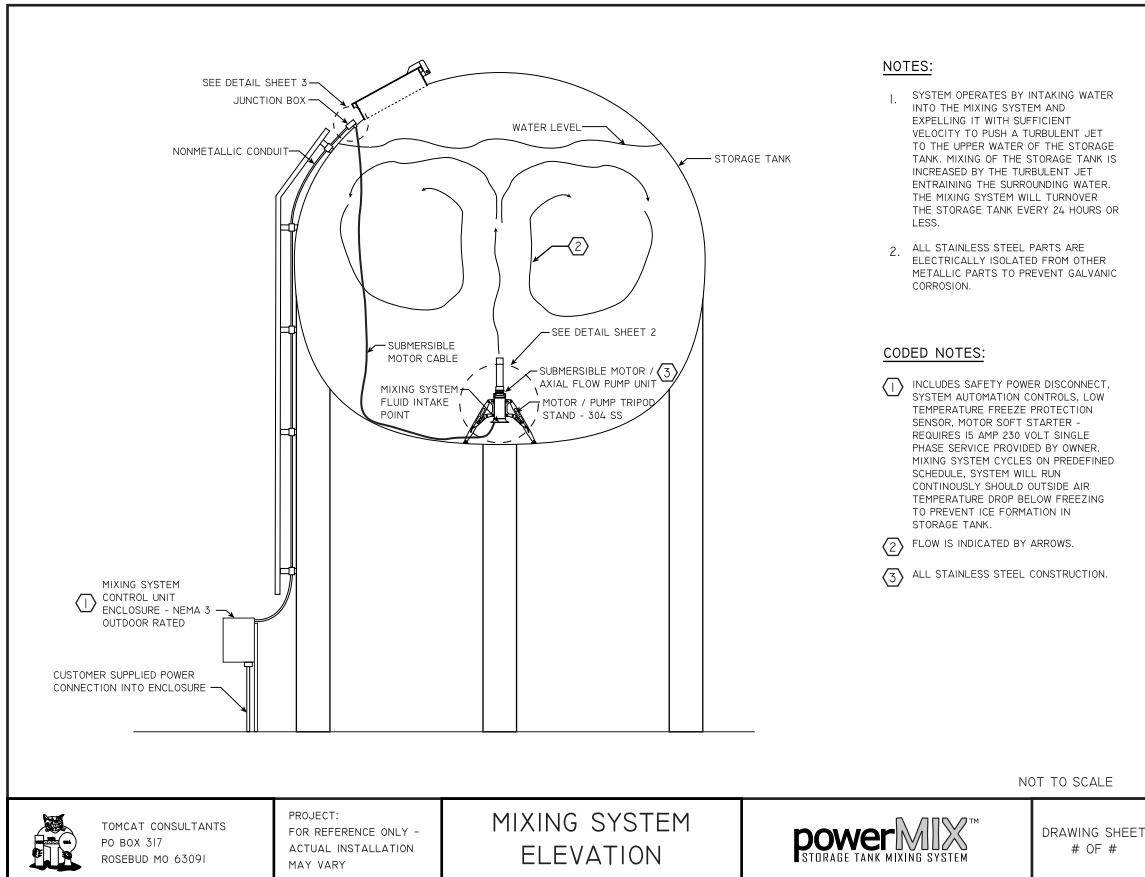


Fig. 1

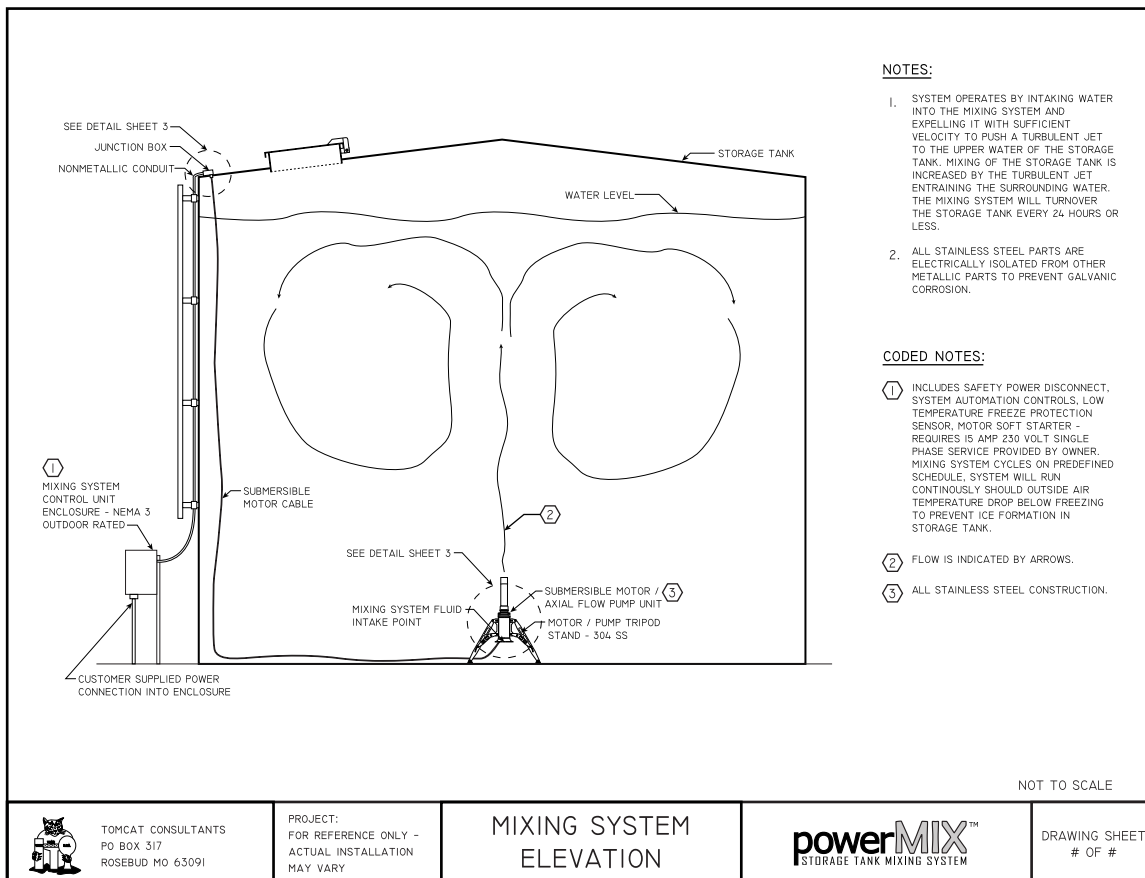


Fig. 2

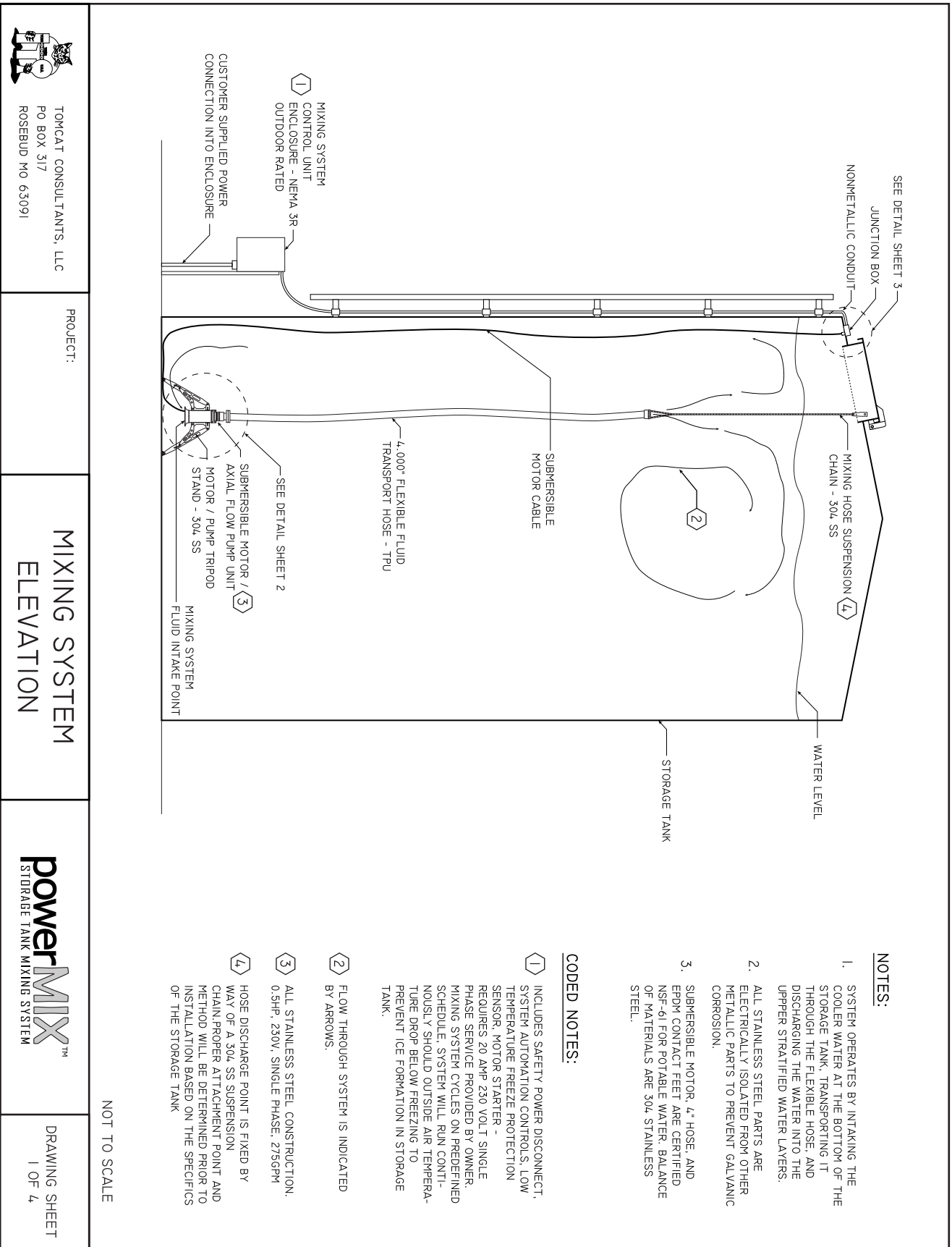


Fig. 3

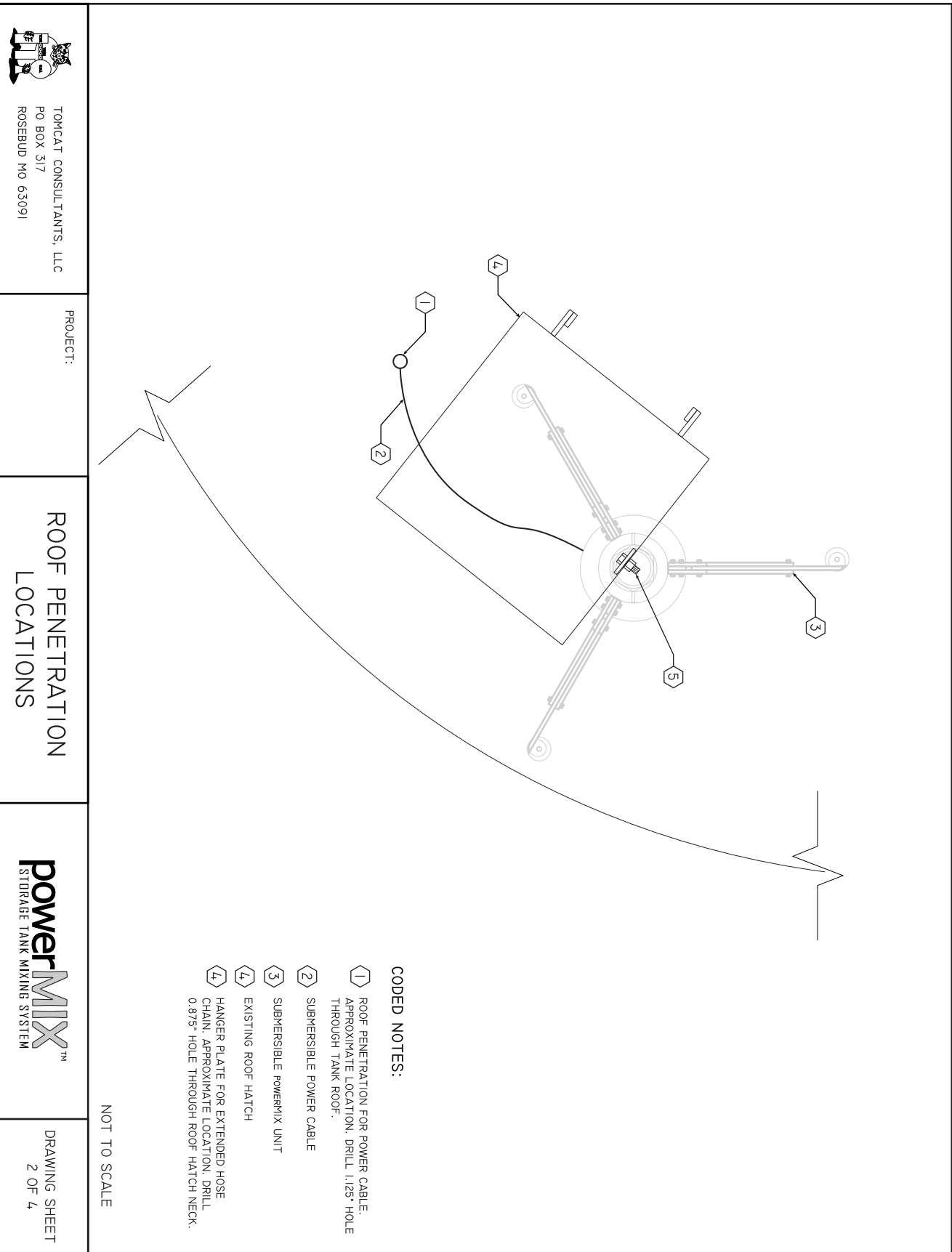


Fig. 4

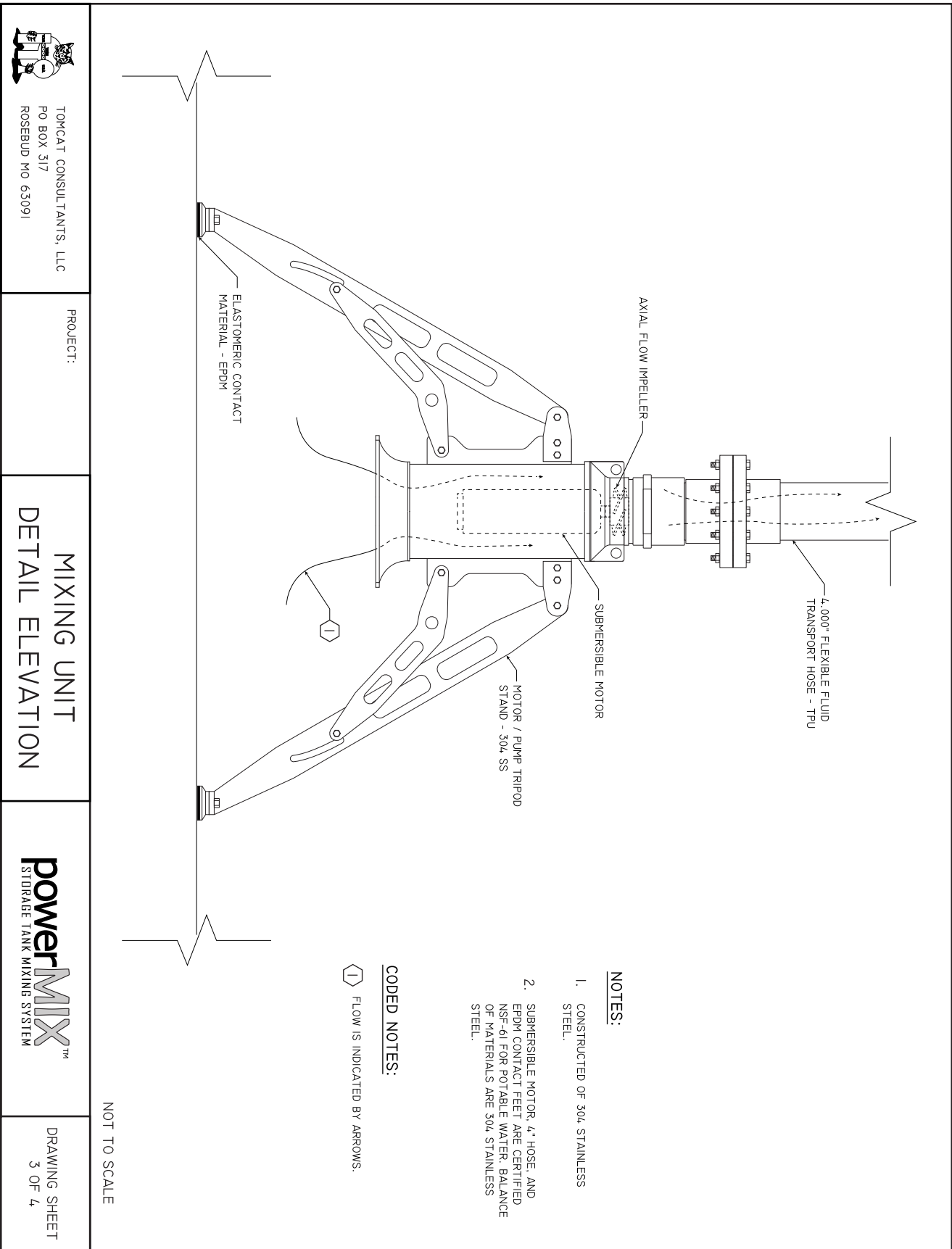
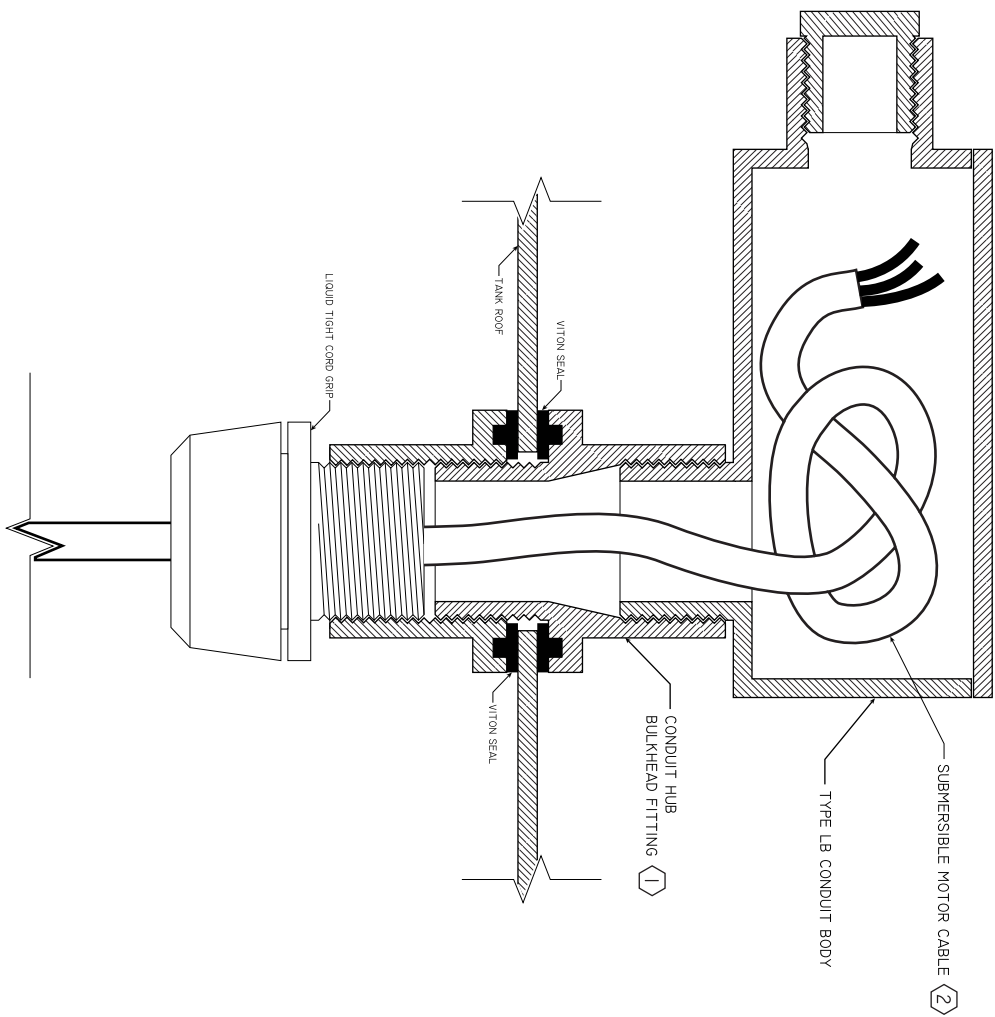


Fig. 5



CODED NOTES:

- (1) PROVIDES DAMAGE RESISTANT LIQUID TIGHT SEAL WITH REDUNDANT VITON SEALS.
- (2) SUBMERSIBLE MOTOR CABLE MUST BE KNOTTED INSIDE CONDUIT LB BODY LEAVING MIN 12" LEAD

NOT TO SCALE



TOMCAT CONSULTANTS, LLC
PO BOX 317
ROSEBUD MO 63091

PROJECT:

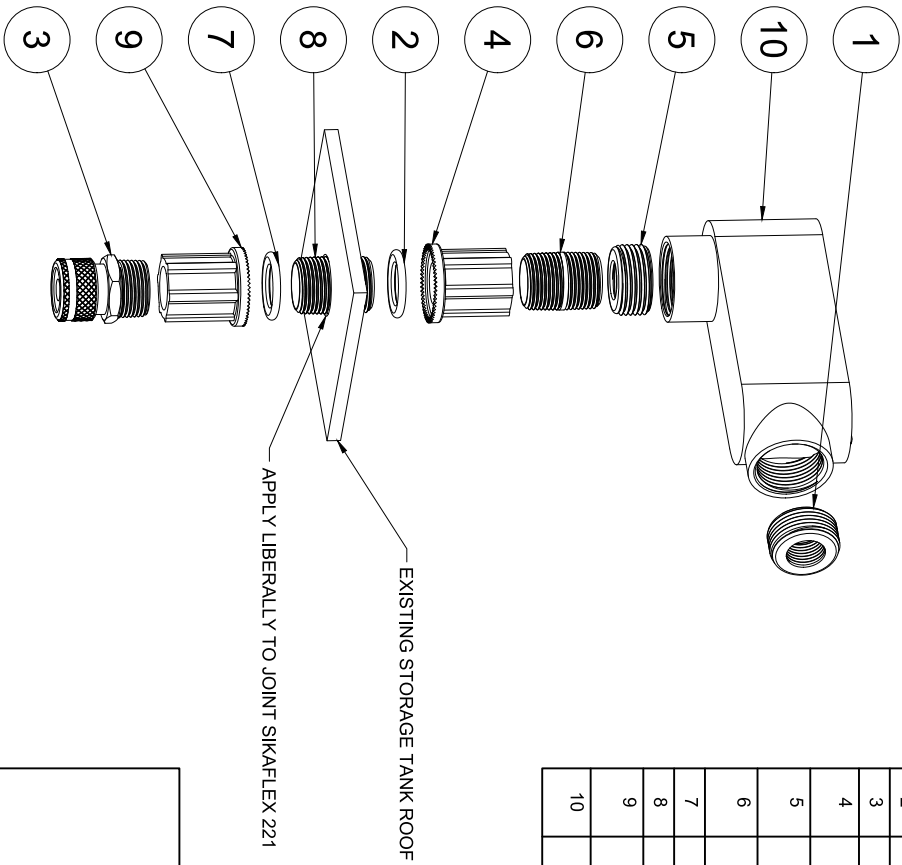
**ROOF PENETRATION
DETAIL**

powerMIX™
STORAGE TANK MIXING SYSTEM

DRAWING SHEET
4 OF 4

Fig. 6

PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION MATERIAL
1	1	1.000" TO 0.750" NPT BUSHING	ALUMINUM
2	1	O-RING	RUBBER, NITRILE
3	1	CORD GRIP	ALUMINUM
4	1	0.750" BULKHEAD HUB	ALUMINUM
5	1	1.000" TO 0.750" NPT BUSHING (1)	ALUMINUM
6	1	0.750" NPT NIPPLE (1)	ALUMINUM
7	1	O-RING (1)	RUBBER, NITRILE
8	1	0.750" NPT NIPPLE	ALUMINUM
9	1	0.750" BULKHEAD HUB (1)	ALUMINUM
10	1	1.000" NPT THREADED LB	ALUMINUM



PROJECT			
TITLE			
ROOF PENETRATION ASSEMBLY			
APPROVED	SIZE	CODE	DWG NO
CHECKED	B		
DRAWN	Morgan Zelch	3/20/2019	SCALE 1:2
		WEIGHT	SHEET 1/1
			REV

Fig. 7

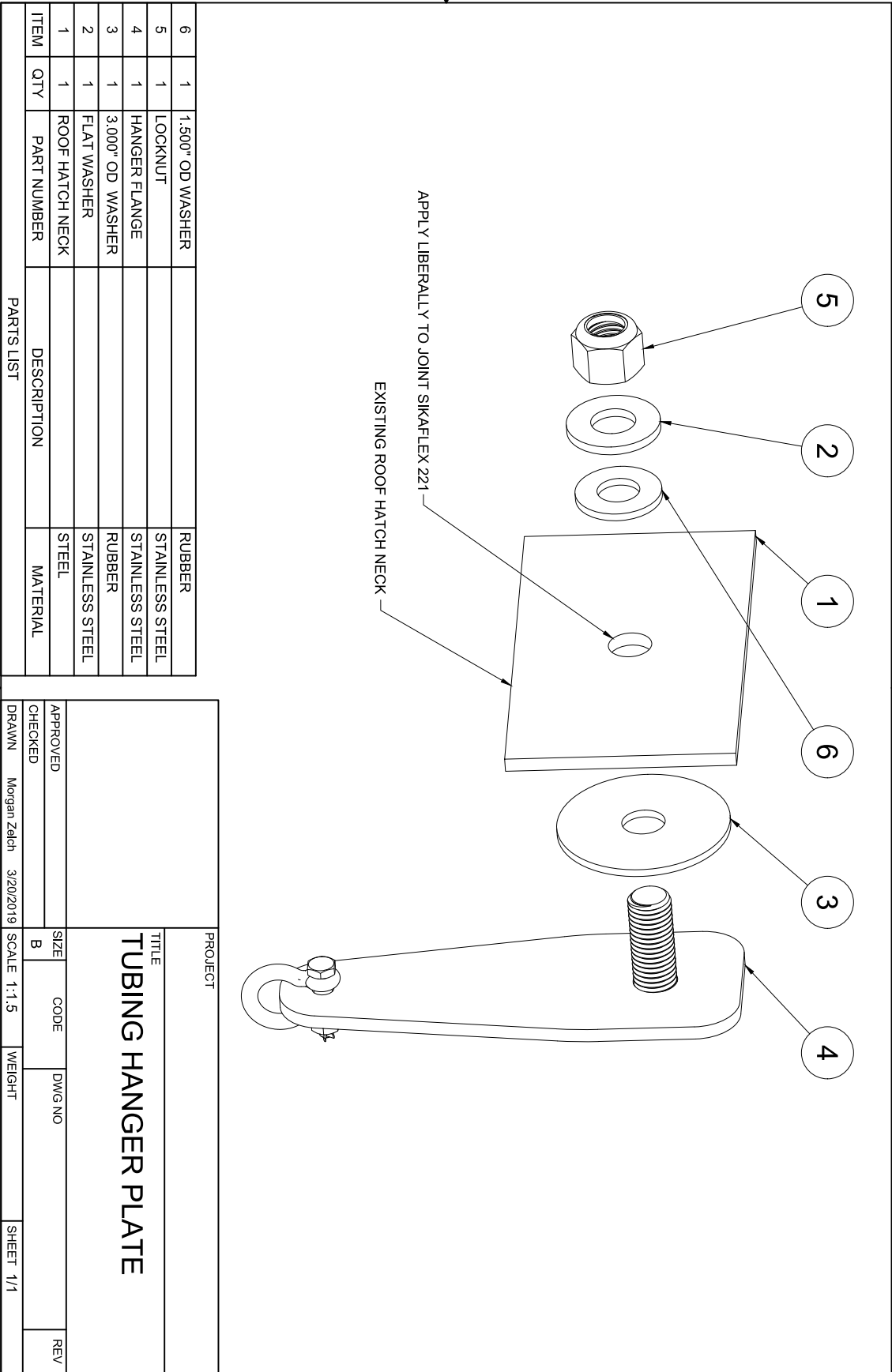


Fig. 8

SCADA Integration

(optional, must be requested)

When requested, two interfaces for SCADA integration are available as illustrated in Figs. 9 & 10.

1. MIXER DEMAND: Terminals (A) and (B) [Fig. 9] provide a normally open relay interface that closes when the mixer control panel calls for a mixer RUN state. This relay can be used to provide a signal to SCADA to communicate that the mixer control panel is calling for the mixer to RUN.
2. CURRENT SENSOR: An appropriate current sensor can be placed on the load side of the mixer control panel in order to provide verification to SCADA that the mixer is running. This interface is available, but the current sensor is not provided by the manufacturer. See Fig. 10 for the appropriate circuit location for a SCADA current sensor.

System Operating Procedures

The mixing system should never be energized without sufficient water depth in the storage tank. The mixer features a water lubricated motor and may be damaged if operated without being submerged. When using the EXT package, the discharge end of the extended tubing must be submerged before the system is energized.

Before operating, it should be verified that the proper voltage is available to the control panel (240Vac, 60Hz, Single Phase, min. 20Amp service).

After installation, the storage tank should be filled to a depth of not less than 1 foot of water above the lowest intake point of the mixer. At this time the mixer may be energized by turning the HAND, OFF, AUTO switch (HOA switch) to the HAND position to verify proper mixer function. In the HAND position the RED indicator light should be on. Water should be visible exiting the top of the mixer. The mixer should not be run for more than 10 minutes at this water level.


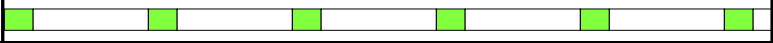
After proper functioning is verified the mixer should be deenergized by turning the HOA switch to the OFF position (the RED indicator light should be off) and the storage tank should be filled to normal operating level.

Standard Operating Position

Once the storage tank has reached normal operating level, the HOA switch should be turned to the AUTO position, which is the standard operating position for the mixer. In the AUTO position, the mixer will begin to automatically cycle through RUN and IDLE conditions on an hourly schedule as set by the

manufacturer. The first automatic cycle is the RUN cycle, the mixer will be energized, the RED indicator light will be on. After the RUN cycle is complete, the control panel will switch to the IDLE cycle. During IDLE, the mixer will deenergize, the RED indicator light will be off. While the HOA switch is in the AUTO position, the mixer will continue to cycle indefinitely through RUN and IDLE conditions unless the HOA switch is moved to the OFF position.

While the HOA switch is in the AUTO position, a green LED will blink on the CYCLE TIMER RELAY to indicate that the cycle timer is operating appropriately. The indication of the LED can be interpreted as follows:

Cycle Timer Relay Indicator LED	
CYCLE	LED PATTERN
RUN	
IDLE	

Should atmospheric conditions drop below freezing, the system will RUN automatically to prevent storage tank icing until temperatures increase. During a RUN condition that is due to freezing temperatures, both the RED and the BLUE indicator lights will be on.

Maintenance Procedures

Before the storage tank is drained for any reason, or before any maintenance is performed, the mixing system should be deenergized by turning the HOA switch to the OFF position and turning the Disconnect Switch to the OFF position.

Under normal conditions no scheduled maintenance of this product is necessary within the first 10 years of use. While the expected motor lifespan exceeds 10 years, the owner may elect to preventively replace the motor during otherwise scheduled storage tank maintenance that takes place near the 10th year of service. The powerMIX System utilizes Franklin Electric brand submersible motors. It is recommended that any maintenance necessary be coordinated through the installing Contractor and Tomcat Consultants, LLC. Technical specifications and maintenance information is also available within the Franklin Electric AIM Manual for Submersible Motors.

Figure 1: Powermix Submersible Mixing Unit Control Panel. The diagram illustrates the control panel with numbered callouts 1 through 10. 1: Main power switch. 2: Emergency stop button. 3: Start/Stop button. 4: Mode selector switch (OFF, HAND, AUTO). 5: Run (R) indicator light. 6: Break (B) indicator light. 7: Stop (S) indicator light. 8: Line 1 terminal. 9: Line 2 terminal. 10: Ground terminal. The diagram also shows the wiring connections for the 240 VOLT, 1 PHASE INCOMING POWER and the POWERMIX SUBMERSIBLE MIXING UNIT, including the MIXER DEMAND (TO SCADA) signal.

Item #	Description	Part Number
1	Thermostat	A421ABC-02C
2	Contactor	CWC016-10-30V24
3	Overload Relay	RW17-1D3-U017
4	Single Phase Soft Starter	ATS01N112FT
5	Hand Off Auto Switch	6749K1
6	Indicator LED - Red	7380K5R
7	Indicator LED - Blue	7380K5B
8	Disconnect Switch	SD1-025-RR
9	Cycle Timer Relay	88827155
10	RCCB 30ma Circuit Breaker	RP2203

Page 12 of 18

POWERMIX 0.5 - 2.0 HORSEPOWER CONTROL PANEL ELECTRICAL SCHEMATIC

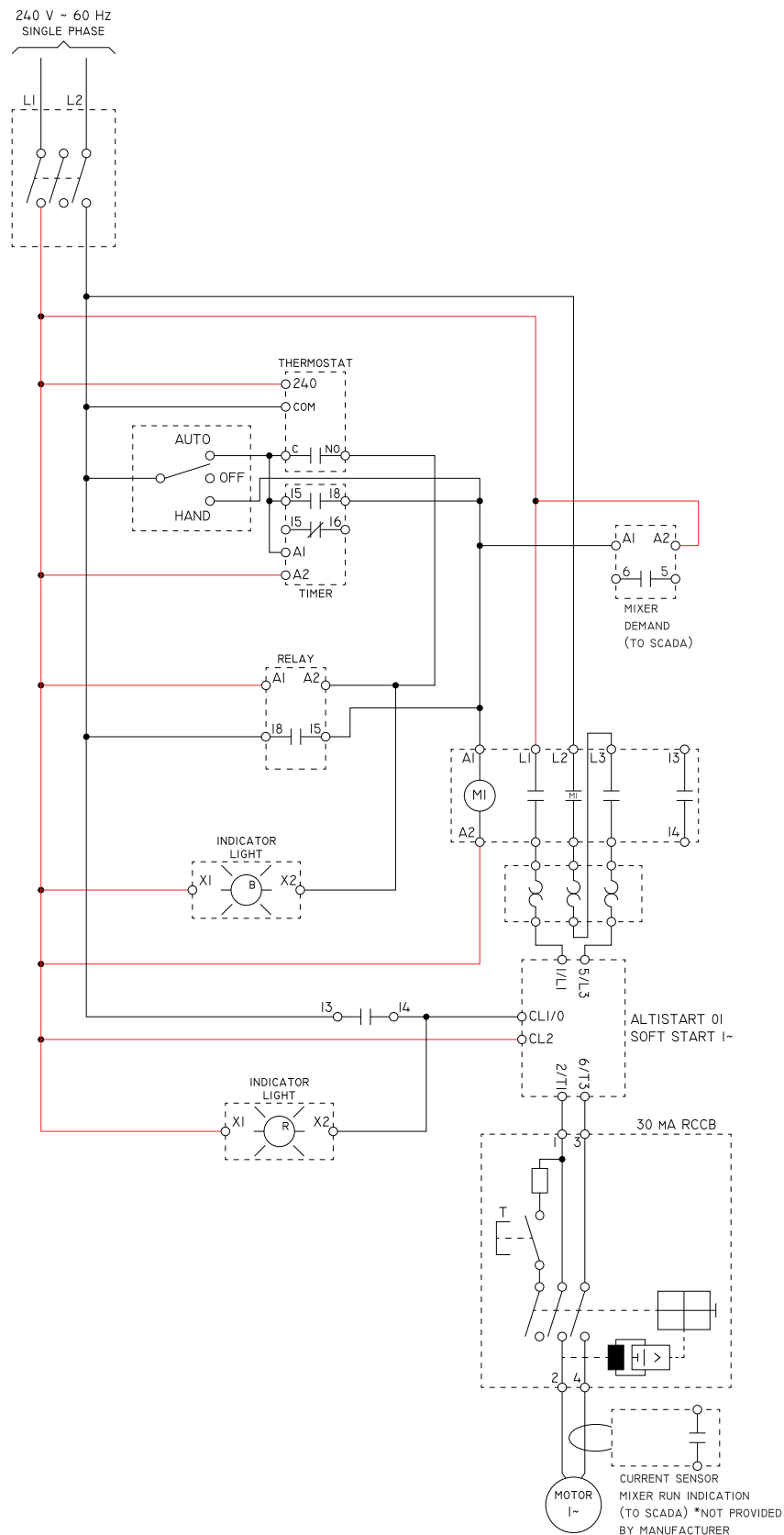
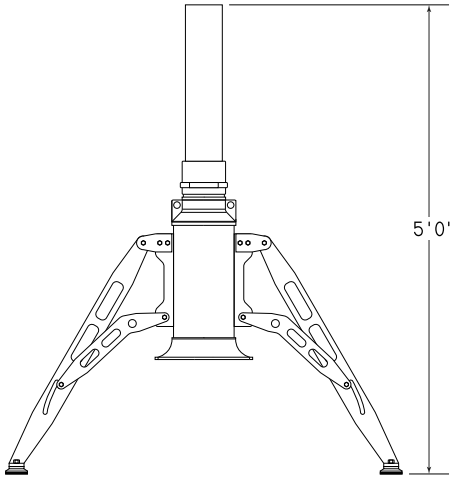


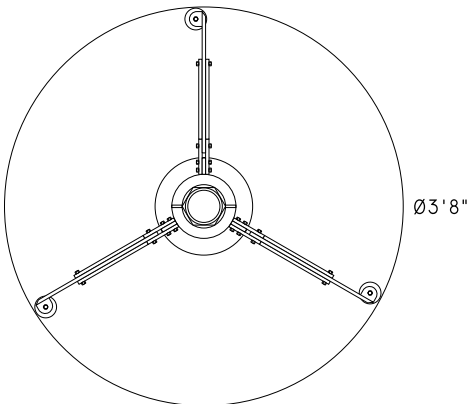
Fig. 10

powerMIX 275 Technical Specifications

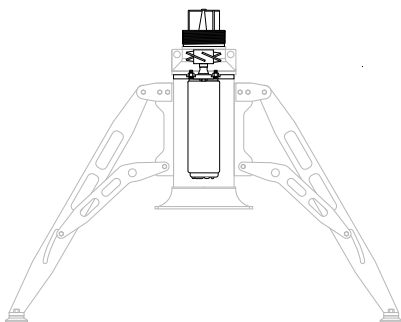
SIDE VIEW



TOP VIEW



INTERIOR VIEW



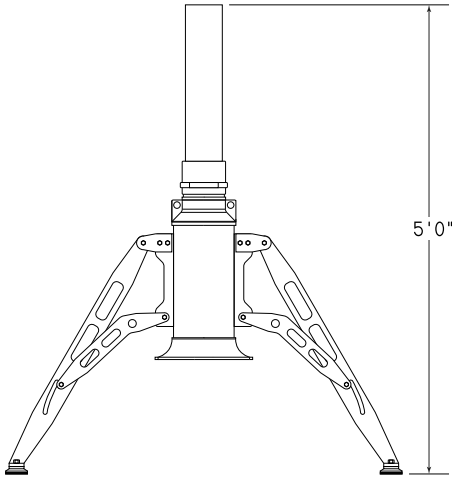
The powerMIX System is an electrically powered submersible storage tank mixer. An axial flow impeller produces a vertical jet of water directed upward through the water column. The vertical jet entrains the surrounding water, increasing turnover and effectively eliminating thermal stratification and stagnation.

TECHNICAL SPECIFICATIONS

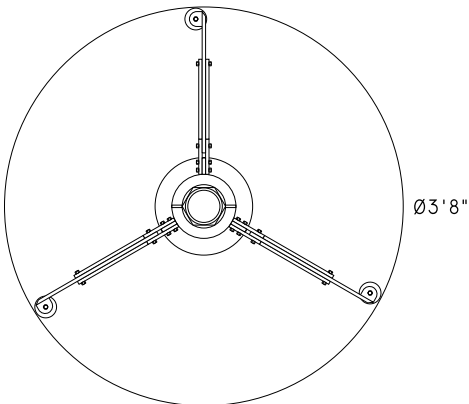
Power Supply Requirement	240 VAC, 60 Hz, Single Phase, 20 Amp Circuit
Motor Type	0.5 HP Franklin Electric Submersible, Stainless Steel Shell, Water Lubricated, NSF-61
Motor Cable	14 AWG 3 Conductor, (UL) CSA ANSI NSF-61
Power Draw	670 Watts
Impeller	11 Degree Axial Impeller, 303 Stainless steel
Footprint Diameter	3'8"
Total Height	5'0"
Intake Height	1'1-1/2" Above Floor Level
Weight	65 lbs
Leg Material	304 Stainless Steel
Hardware Material	304 Stainless Steel
Impeller Housing Material	304 Stainless Steel Shell, 303 Stainless Steel Cast Base, Crown, and Recuperator
Foot Contact Material	EPDM NSF-61

powerMIX 375 Technical Specifications

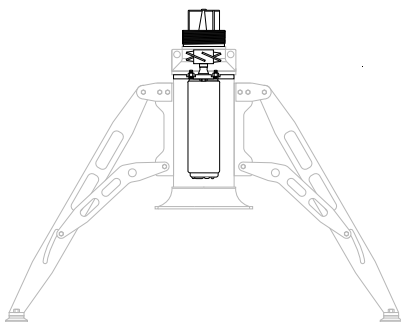
SIDE VIEW



TOP VIEW



INTERIOR VIEW



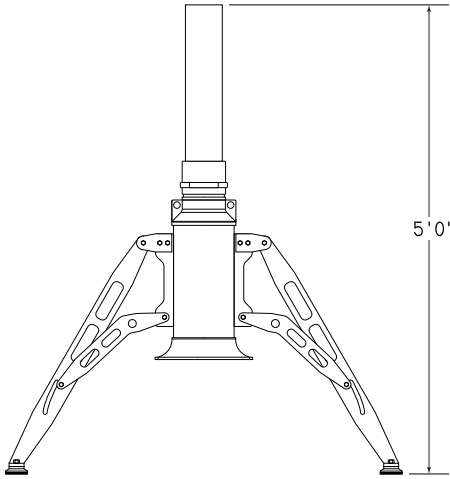
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TECHNICAL SPECIFICATIONS

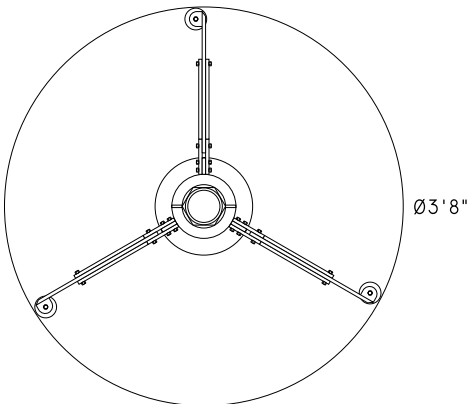
Power Supply Requirement	240 VAC, 60 Hz, Single Phase, 20 Amp Circuit
Motor Type	1.0 HP Franklin Electric Submersible, Stainless Steel Shell, Water Lubricated, NSF-61
Motor Cable	14 AWG 3 Conductor, (UL) CSA ANSI NSF-61
Power Draw	1210 Watts
Impeller	17 Degree Axial Impeller, 303 Stainless steel
Footprint Diameter	3'8"
Total Height	5'0"
Intake Height	1'1-1/2" Above Floor Level
Weight	71 lbs
Leg Material	304 Stainless Steel
Hardware Material	304 Stainless Steel
Impeller Housing Material	304 Stainless Steel Shell, 303 Stainless Steel Cast Base, Crown, and Recuperator
Foot Contact Material	EPDM NSF-61

powerMIX 475 Technical Specifications

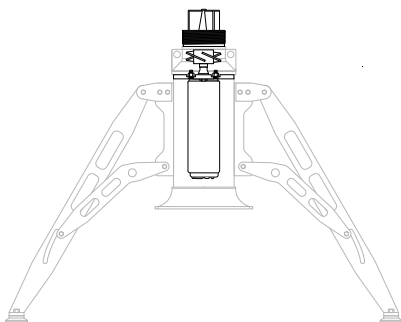
SIDE VIEW



TOP VIEW



INTERIOR VIEW



The powerMIX System is an electrically powered submersible storage tank mixer. An axial flow impeller produces a vertical jet of water directed upward through the water column. The vertical jet entrains the surrounding water, increasing turnover and effectively eliminating thermal stratification and stagnation.

TECHNICAL SPECIFICATIONS

Power Supply Requirement	240 VAC, 60 Hz, Single Phase, 20 Amp Circuit
Motor Type	1.5 HP Franklin Electric Submersible, Stainless Steel Shell, Water Lubricated, NSF-61
Motor Cable	14 AWG 3 Conductor, (UL) CSA ANSI NSF-61
Power Draw	1770 Watts
Impeller	23 Degree Axial Impeller, 303 Stainless steel
Footprint Diameter	3'8"
Total Height	5'0"
Intake Height	1'1-1/2" Above Floor Level
Weight	78 lbs
Leg Material	304 Stainless Steel
Hardware Material	304 Stainless Steel
Impeller Housing Material	304 Stainless Steel Shell, 303 Stainless Steel Cast Base, Crown, and Recuperator
Foot Contact Material	EPDM NSF-61

Limited Warranty

Product: powerMIX Storage Tank Mixing System

The warranty obligations of Tomcat Consultants for this product are limited to the terms set forth below:

What is Covered

This limited warranty covers defects in materials and workmanship in this product.

How Long Does this Coverage Last

This limited warranty lasts for Five (5) years from the date of installation of this product.

What is Not Covered

This limited warranty does not cover any damage, deterioration or malfunction resulting from any alteration, modification, improper or unreasonable use or maintenance, misuse, abuse, accident, neglect, fire, lightning, power surges, or other acts of nature. This limited warranty does not cover any aesthetic degradation of the product. This limited warranty does not cover any damage, deterioration or malfunction resulting from the removal of this product from any installation, any unauthorized tampering with this product, any repairs attempted by anyone unauthorized by Tomcat Consultants LLC to make such repairs, or any other cause which does not relate directly to a defect in materials and/or workmanship of this product. Labor to repair or replace this product will not be covered under this warranty.

Who is Covered

Only the original purchaser of this product will be covered under this warranty.

What Tomcat Consultants LLC Will Do

Tomcat Consultants LLC will, at its sole option, provide one of the following three remedies to whatever extent it shall deem necessary to satisfy a proper claim under this limited warranty:

1. Elect to repair or facilitate the repair of any defective parts within a reasonable period of time, free of any charge for the necessary parts to complete the repair and restore this product to its proper operating condition.
2. Replace this product with a direct replacement or with a similar product deemed by Tomcat Consultants LLC to perform substantially the same function as the original product.
3. Issue a refund of the original purchase price less depreciation to be determined based on the age of the product at the time remedy is sought under this limited warranty.

What Tomcat Consultants LLC will not do Under This Limited Warranty

Tomcat Consultants LLC will not be responsible for facilitating the removal or re-installation of, or any costs related to the removal or re-installation of this product, or any replacement product, from or into any installation.

How to Obtain a Remedy under this Limited Warranty

To obtain a remedy under this limited warranty, you must contact Tomcat Consultants LLC by phone or email. At that time Tomcat Consultants LLC will review the validity of the claim and make every effort to remedy the situation in a reasonable time.

Limited Warranty Continued...

Limitation on Liability

THE MAXIMUM LIABILITY OF TOMCAT CONSULTANTS LLC UNDER THIS LIMITED WARRANTY SHALL NOT EXCEED THE ACTUAL PURCHASE PRICE PAID FOR THE PRODUCT. TO THE MAXIMUM EXTENT PERMITTED BY LAW, TOMCAT CONSULTANTS LLC IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY. Some countries, districts or states do not allow the exclusion or limitation of relief, special, incidental, consequential or indirect damages, or the limitation of liability to specified amounts, so the above limitations or exclusions may not apply to you.

Exclusive Remedy

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS LIMITED WARRANTY AND THE REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. TO THE MAXIMUM EXTENT PERMITTED BY LAW, TOMCAT CONSULTANTS LLC SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF TOMCAT CONSULTANTS LLC CANNOT LAWFULLY DISCLAIM OR EXCLUDE IMPLIED WARRANTIES UNDER APPLICABLE LAW, THEN ALL IMPLIED WARRANTIES COVERING THIS PRODUCT, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, SHALL APPLY TO THIS PRODUCT AS PROVIDED UNDER APPLICABLE LAW.