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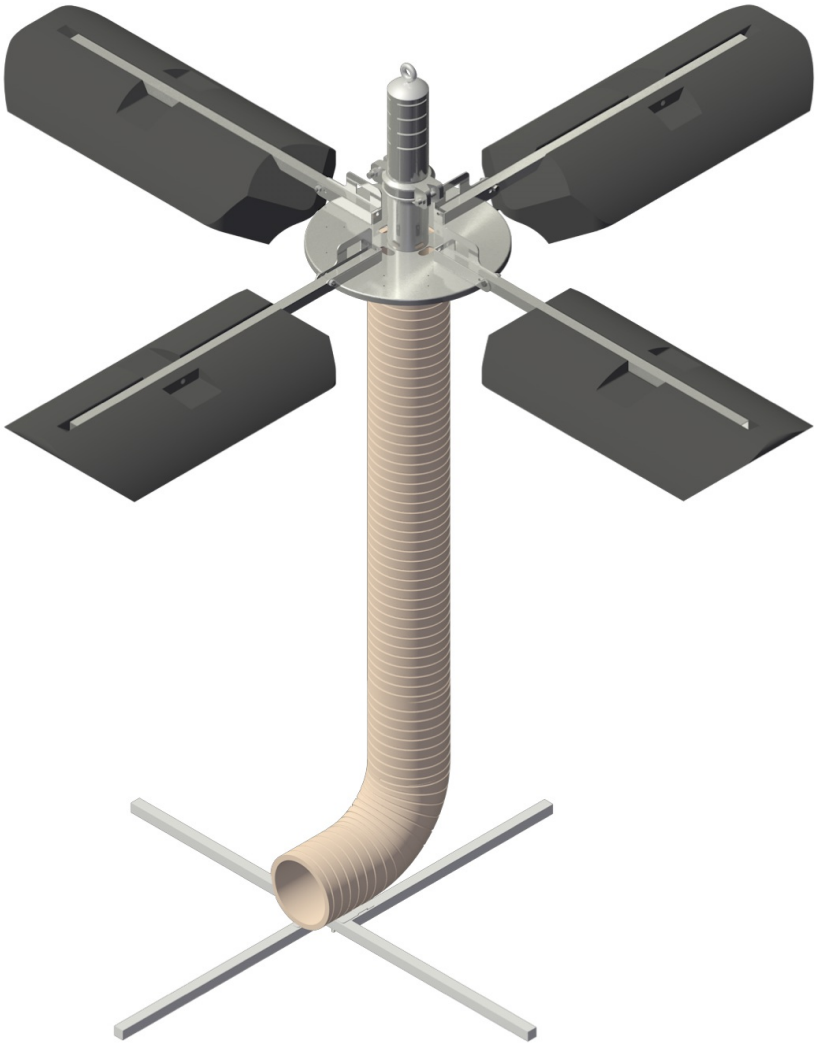
GridBee SN5

Owner's Manual



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GridBee SN5

Owner's Manual

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About Ixom

Ixom combines knowledge and experience from across the water quality spectrum to help solve real-world problems. Whether in Lakes, Stormwater Retention Ponds, Raw Drinking-Source Reservoirs, Water Treatment Plants, Potable Storage Tanks, or Wastewater Treatment Processes, Ixom equipment continues to be at the forefront as the #1 world leader for in-situ water body treatment.

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Safety

IMPORTANT

YOU MUST COMPLETELY READ AND FULLY UNDERSTAND THESE INSTRUCTIONS BEFORE INSTALLING, OPERATING, OR SERVICING THIS UNIT.

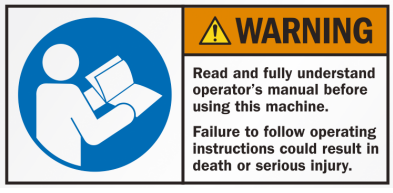
Be sure you have read all installation, operation, maintenance and safety instructions before you install, service or begin to operate this unit.

Accidents occur every year because of careless use of industrial equipment. You can avoid hazards by following these safety instructions, and applying some ordinary common sense when operating or servicing this unit.

Keep in mind that ***full operator attention and alertness*** are required when operating or servicing this unit.

USE COMMON SENSE!! Most accidents can be avoided by using ***common sense and concentration*** on the job being done.

Carefully read safety information when you see any safety symbols.



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Safety

IMPORTANT

YOU MUST COMPLETELY READ AND FULLY UNDERSTAND THESE INSTRUCTIONS BEFORE INSTALLING, OPERATING, OR SERVICING THIS UNIT.

Identify all possible hazards. Determine what safeguards are needed and implement them. **Only you, the user,** understand your product and system characteristics fully. ***The ultimate responsibility for safety is with you. Your safety ultimately rests in your hands.*** Do your part and you will enjoy safe, trouble free operation for years to come. This instruction manual is not intended to include a comprehensive listing of all details for all procedures required for placement, operation and maintenance. If you have a question about a procedure or are uncertain about any detail, **Do Not Proceed.** Please contact Ixom Customer Service at **866-437-8076** to speak to a representative.

IMPORTANT!!!

Follow all federal and state laws in regards to safety regulations of working at heights, confined spaces, rescue, etc. as required by the U.S. Department of Labor, Occupational Safety and Health Administration. Use necessary PPE when placing and servicing this unit.

ELECTRICAL HAZARD

WARNING: THIS EQUIPMENT CONTAINS HIGH VOLTAGE! ELECTRICAL SHOCK CAN CAUSE SERIOUS OR FATAL INJURY. ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT PLACEMENT, OPERATION AND MAINTENANCE OF ELECTRICAL EQUIPMENT. REMOVE ALL SOURCES OF ELECTRICAL POWER BEFORE PERFORMING ANY SERVICE WORK TO THE MACHINE. USE PROPER LOCKOUT TAGOUT (LOTO) PROCEDURES TO ENSURE A SAFE WORK ENVIRONMENT.

Crush Hazard

WARNING: DO NOT REMOVE ANY FLOAT ASSEMBLY BOLTS OR PINS WHILE EQUIPMENT IS FLOATING IN WATER. EQUIPMENT MUST BE SECURELY SUPPORTED BEFORE PERFORMING SERVICE.

Rotating Hazard

CAUTION: KEEP BODY APPENANDAGES OR LOOSE CLOTHING AWAY FROM EQUIPMENT WHILE OPERATING. ENSURE EQUIPMENT IS OFF BEFORE ATTEMPTING SERVICE.

Entanglement Hazard

WARNING: ENSURE THAT PERSONNEL ARE CLEAR OF THE ELECTRIC CORD AND CHAIN TO AVOID ENTANGLEMENT.

Thin Ice Hazard

WARNING: ICE SURROUNDING MACHINE MAY NOT SUPPORT WEIGHT, KEEP CLEAR OF THIN ICE.

Laceration Hazard

CAUTION: EDGES MAY BE SHARP AND CAUSE LACERATION IF PROPER CARE IS NOT USED.

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Safety

Protect Yourself

It is important that you comply with all relative OSHA and local regulations while installing and performing any maintenance to the mixer circulation equipment.

Key OSHA Compliance Standards that must be followed (and not limited to) are:

- **1910.146 Permit-required confined spaces**
- **1910.147 Lockout/Tagout**
- **1926.500 Fall Protection**

Fall Protection Tips

- Identify all potential tripping and fall hazards before work starts.
- Look for fall hazards such as unprotected floor openings/edges, shafts, open hatches, stairwells, and roof openings/edges.
- Inspect fall protection and rescue equipment for defects before use.
- Select, wear, and use fall protection and rescue equipment appropriate for the task.
- Secure and stabilize all ladders before climbing.
- Never stand on the top rung/step of a ladder.
- Use handrails when you go up or down stairs.
- Practice good housekeeping. Keep cords, welding leads and air hoses out of walkways or adjacent work areas.

Refer to 29 CFR 1926.500 for complete regulations set by OSHA. Refer to your state's regulations if your state established and operates their own safety and health programs approved by OSHA.

Lockout Tagout

When the On/Off switch is in the "ON" position, the mixer may start up at any time if not already operating. The mixer's On/Off switch can be locked out by placing a pad lock thru the door latch of the controller after the switch has been turned to the "OFF" position. The On/Off switch is to be used as the emergency stop.

Permit-Required Confined Spaces

A confined space has limited openings for entry or exit, is large enough for entering and working, and is not designed for continuous worker occupancy. Confined spaces include underground reservoirs, ground storage tanks, elevated tanks, silos, manholes, and pipelines.

Confined Space Tips

- Do not enter permit-required confined spaces without being trained and without having a permit to enter.
- Review, understand and follow employer's procedures before entering permit-required confined spaces and know how and when to exit.
- Before entry, identify any physical hazards.
- Before and during entry, test and monitor for oxygen content, flammability, toxicity or explosive hazards as necessary.
- Use fall protection, rescue, air monitoring, ventilation, lighting and communication equipment according to entry procedures.
- Maintain contact at all times with a trained attendant either visually, via phone, or by two-way radio. This monitoring system enables the attendant and entry supervisor to order you to evacuate and to alert appropriately trained rescue personnel to rescue entrants when needed.

Refer to 29 CFR 1910.146 for complete regulations set by OSHA. Refer to your state's regulations if your state established and operates their own safety and health programs approved by OSHA.

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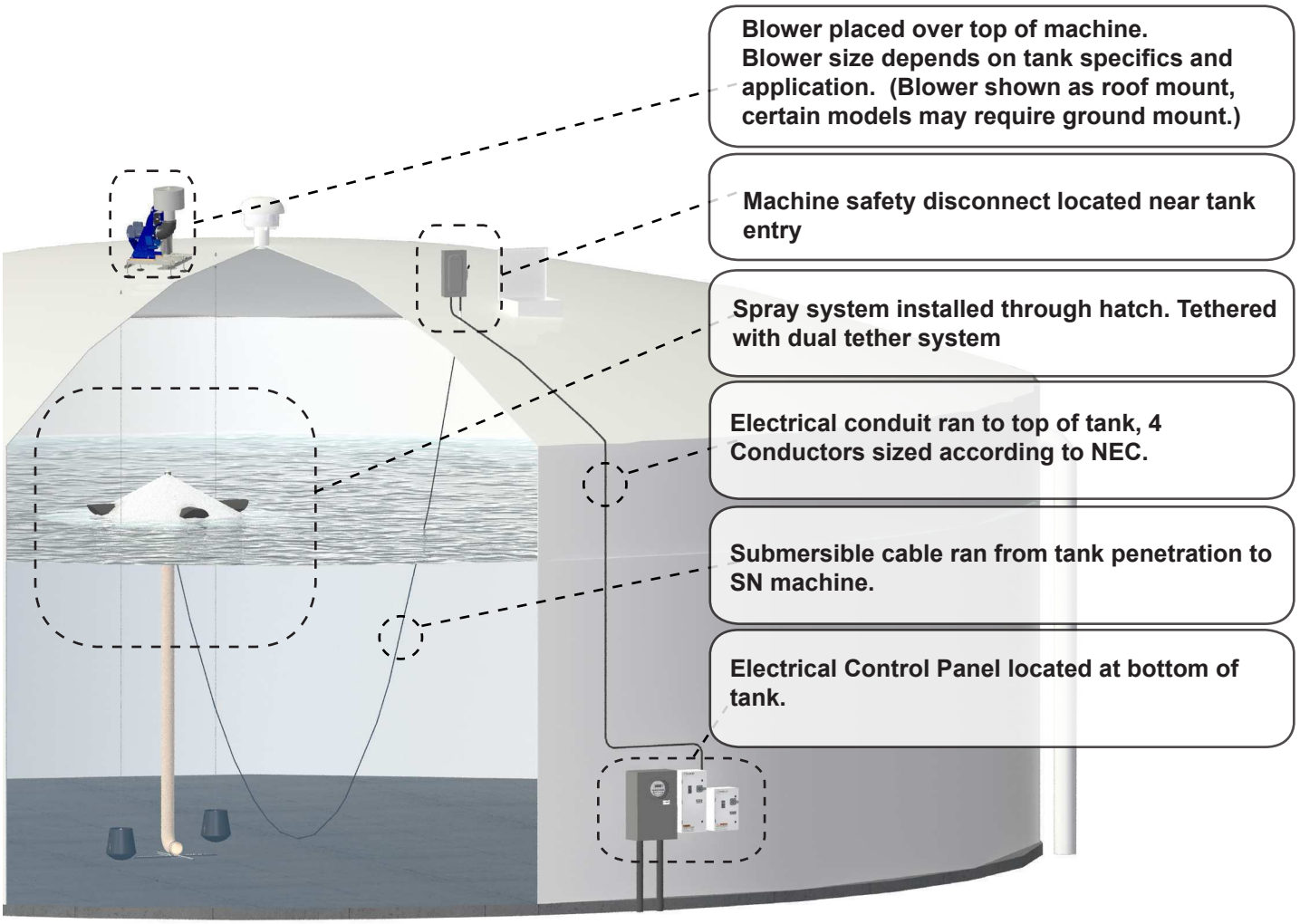
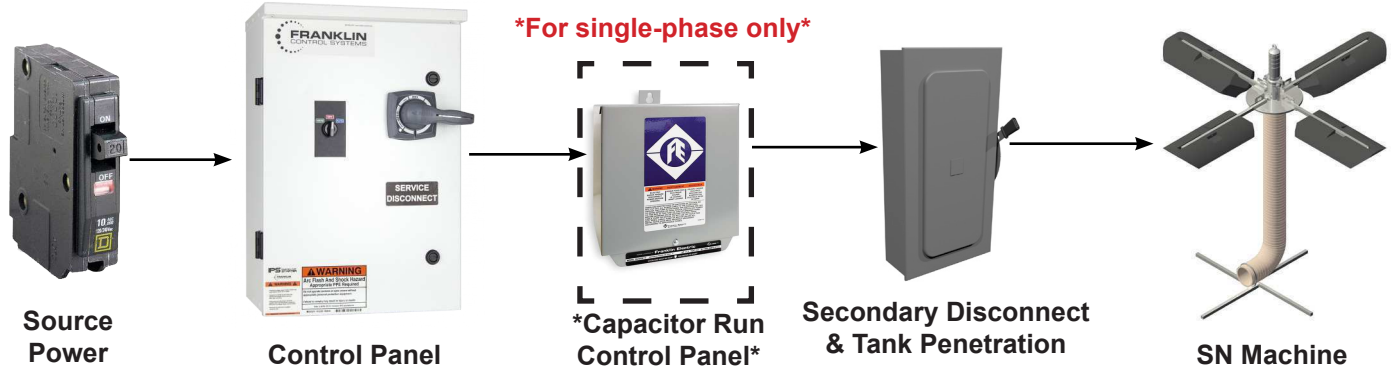
Placement Overview

SN Small Frame Series





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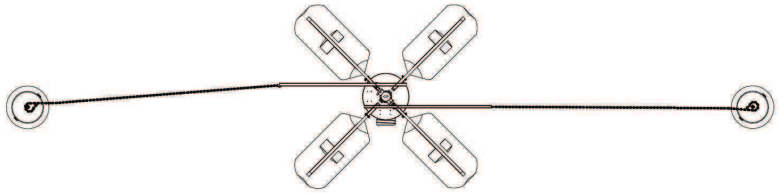
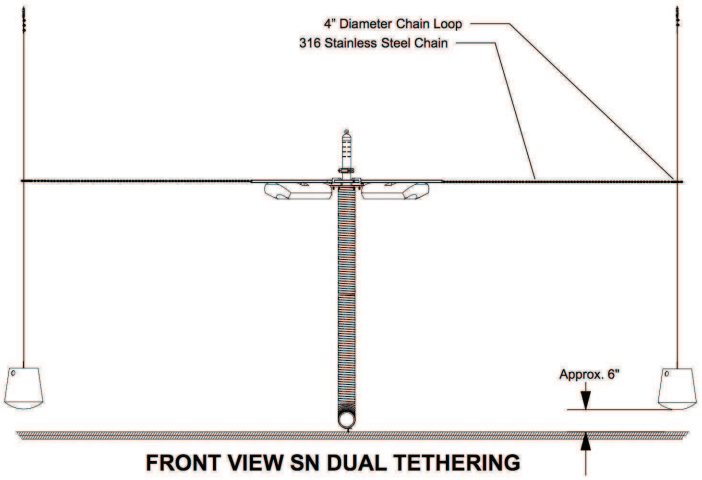
Visual Dual Tethering

SN Small Frame Series



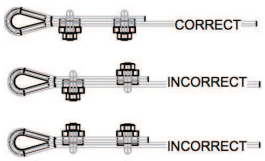
TOP VIEW SN DUAL TETHERING



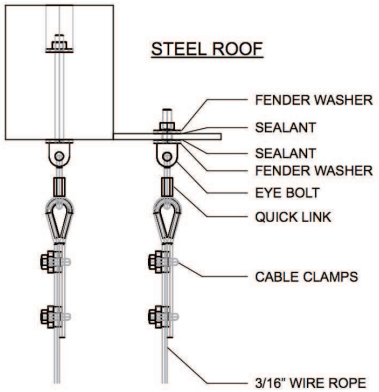
FRONT VIEW SN DUAL TETHERING

CONCRETE ROOF
*ANCHOR PROVIDED BY CONTRACTOR / TANK MANUFACTURE

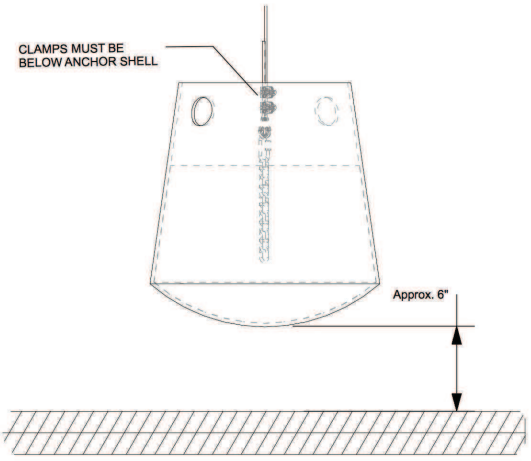
CORRECT WIRE ROPE CLIP PLACEMENT



CABLE CLAMP DETAIL



ROOF CONNECTION DETAIL



MOORING CONNECTION DETAIL

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Single Phase Wiring for THM SN Spray Units

SN Small Frame Series

Single-Phase Motor Specifications (60 Hz) 3450 rpm:

TYPE	RATING					FULL LOAD		MAXIMUM LOAD		WINDING (1) RES. IN OHMS	EFFICIENCY		POWER FACTOR %		LOCKED ROTOR AMPS	KVA CODE
	HP	KW	VOLTS	HZ	S.F.	(2) AMPS	WATTS	(2) AMPS	WATTS	M=MAIN RES. S=START RES.	S.F.	F.L.	S.F.	F.L.		
4" 3-Wire	5	3.7	230	60	1.15	Y23.0 B15.9 R11.0	4830	Y27.5 B19.1 R10.8	5500	M0.71-0.82 S1.8-2.2	78	77	100	100	129	G

(1) Main winding - yellow to black
Start winding - yellow to red

(2) Y = Yellow lead - line amps
B = Black lead - main winding amps
R = Red lead - start or auxiliary winding amps

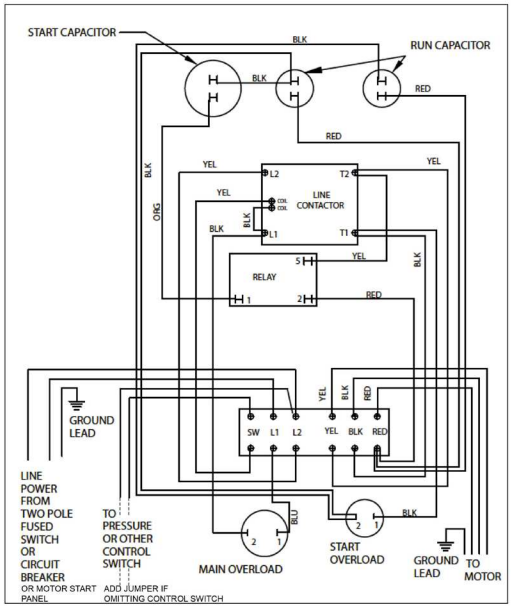
5 hp Control Boxes date coded 01M and older have **60 MFD** run capacitors. Current values should be:

Y23.0 @ FL	Y27.5 @ Max. Load.
B19.1	B23.2
R8.0	R7.8

Single-Phase Motor Fuse Sizing:

TYPE	RATING			CIRCUIT BREAKERS OR FUSE AMPS (MAXIMUM PER NEC)			CIRCUIT BREAKERS OR FUSE AMPS (TYPICAL SUBMERSIBLE)		
	HP	KW	VOLTS	STANDARD FUSE	DUAL ELEMENT TIME DELAY FUSE	CIRCUIT BREAKER	STANDARD FUSE	DUAL ELEMENT TIME DELAY FUSE	CIRCUIT BREAKER
4" 3-Wire	5	3.7	230	80	45	60	70	30	60

Capacitor Run Control Panel and Wiring Schematic



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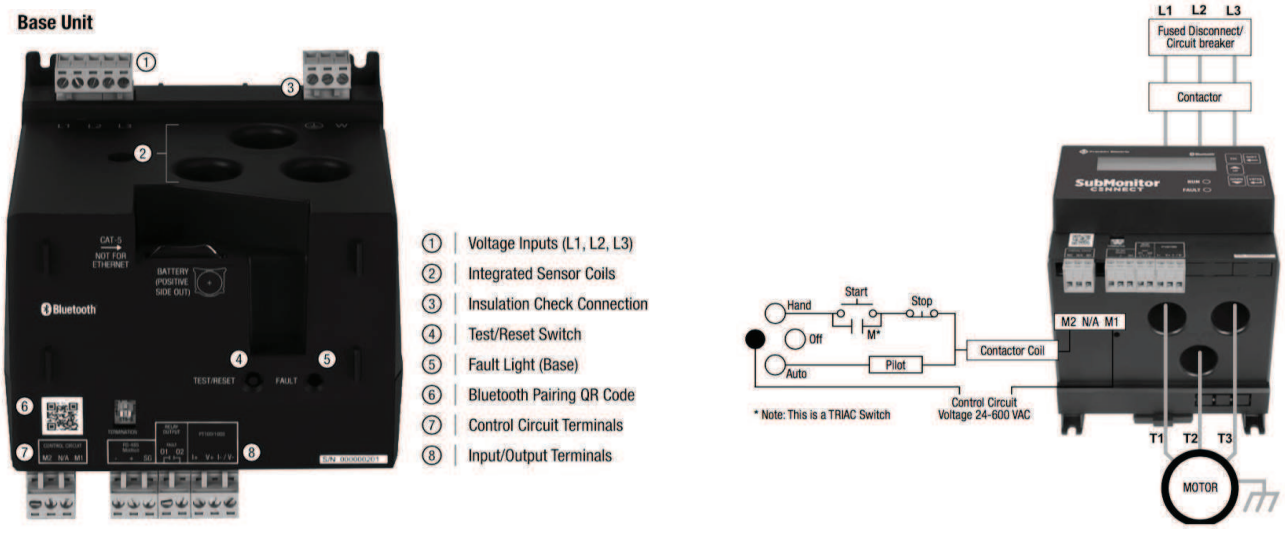
Three Phase Wiring for THM SN Spray Units

Three Phase Motor Specifications (60 Hz) 3450 RPM:

TYPE	RATING					FULL LOAD		MAXIMUM LOAD		LINE TO LINE RESISTANCE OHMS	EFFICIENCY		LOCKED ROTOR AMPS	KVA CODE
	HP	KW	VOLTS	HZ	S.F.	AMPS	WATTS	AMPS	WATTS		S.F.	F.L.		
4" STD	5	3.7	200	60	1.15	18.3	4800	20.5	5500	.68-.83	78	78	116	K
			230	60	1.15	15.9	4800	17.8	5500	.91-1.1	78	78	102	K
			460	60	1.15	8.0	4800	8.9	5500	3.6-4.4	78	78	53.7	K
6 " STD	10	7.5	230	60	1.15	28.4	9400	32.2	10800	.47-.57	79	79	172	H
			380	60	1.15	17.6	9400	19.6	10800	1.2-1.5	79	79	104	H
			460	60	1.15	14.2	9400	16.1	10800	1.9-2.4	79	79	86	H
	15	11	380	60	1.15	25.8	13700	28.9	15800	.77-.95	81	81	161	H
			460	60	1.15	20.8	13700	23.7	15800	1.1-1.4	81	81	133	H

TYPE	RATING			CIRCUIT BREAKERS OR FUSE AMPS (MAXIMUM PER NEC)			CIRCUIT BREAKERS OR FUSE AMPS (TYPICAL SUBMERSIBLE)		
	HP	KW	VOLTS	STANDARD FUSE	DUAL ELEMENT TIME DELAY FUSE	CIRCUIT BREAKER	STANDARD FUSE	DUAL ELEMENT TIME DELAY FUSE	CIRCUIT BREAKER
4" STD & HI-TEMP	5	3.7	200	60	35	50	60	25	50
			230	50	30	40	45	20	40
			460	25	15	20	25	10	20
6 " STD.	10	7.5	230	90	50	80	90	40	80
			380	60	35	45	50	25	45
			460	45	25	40	45	20	40
	15	11	380	80	50	70	80	35	70
			460	70	40	60	60	30	60

Three Phase Submersible Motor and Pump Protection Wiring



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Universal Fixture Assembly

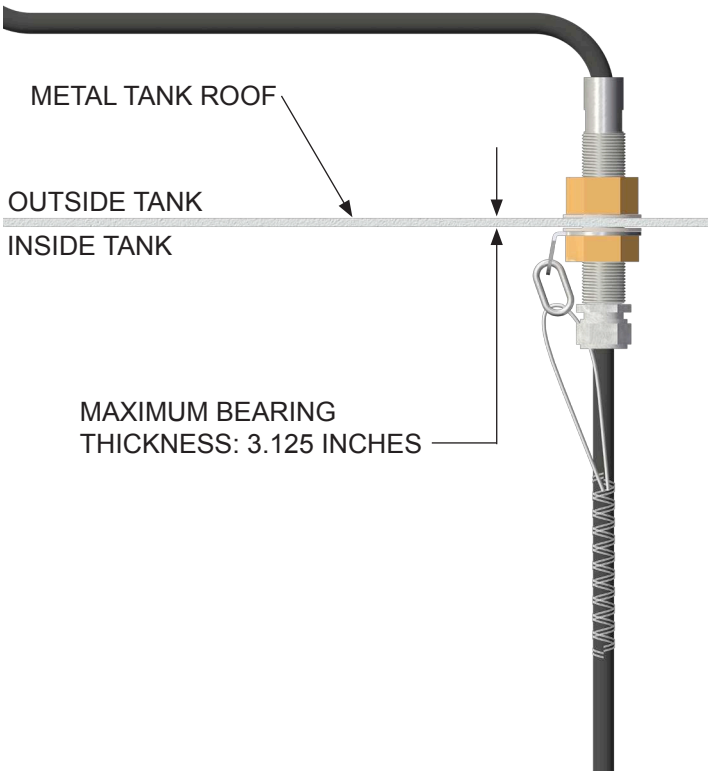
Tank Penetration

TANK PENETRATION IS SEALED WITH
HDPE WASHERS ACCOMPANIED BY
LEXEL® CO-POLYMER RUBBER-BASED SEALANT

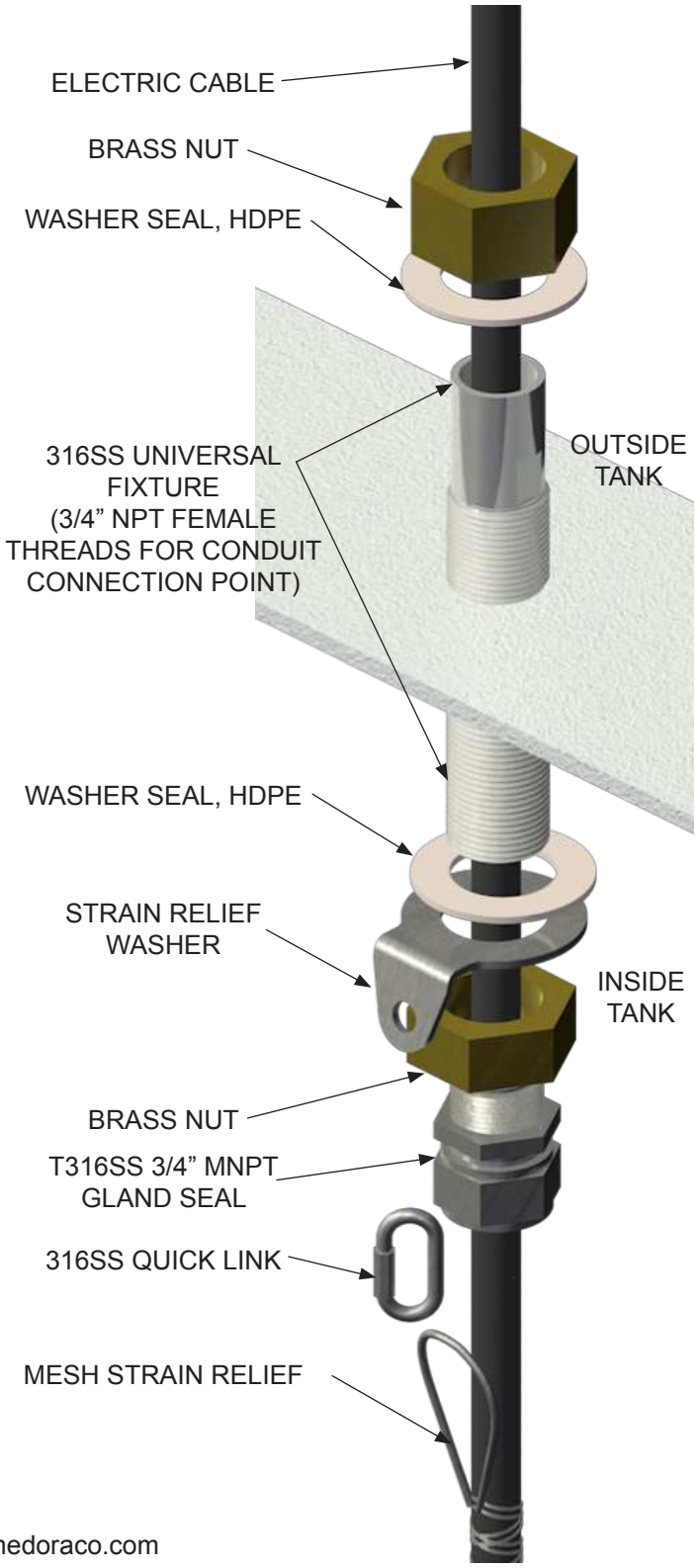
1 CORD BOLT PER GRIDBEE:

NUT/GASKET OD:	2.250”
THREADED FIXTURE OD:	1.250”
BORE REQUIRED:	1.3125”

CROSS-SECTIONAL VIEW



NOT DESIGNED AS A SUBMERSIBLE PENETRATION.



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SN Startup and Operation

Wiring

Placement Checks

Before starting the SN Spray Unit a few checks need to be done to confirm the placement is correct.

Placement Check	Check
Is the SN Spray Unit properly tethered? (Assembly)	
Is the cord ran through the cord seal and cord seal tightened at the interior of the cord fixture? (Assembly)	
Is the top splice between submersible cable conductors and exterior electric conductors insulated from each other and individually sealed to protect from corrosion? (Assembly)	
Is the control panel wired correctly? (Control Panel Diagram)	
Is the SN Spray Unit submerged within the minimum water depth required? (Technical Specifications)	
Is the Motor rotating the correct direction? (See Rotation Check below)	

Final Checks

Now that the install checks have been completed. Now to confirm the continuity and discontinuity and then start the SN Spray Unit.

Check	Reading			
	Single Phase	Three Phase		
Continuity Check (Motor Windings + Splice + Wire) Reference Wiring for Line to Line Ohms	L1:L2	L1:L2	L2:L3	L1:L3
Discontinuity Check (Power to Ground) Should be Open to Ground	L1: GND	L1: GND	L2:GND	L3:GND
Source Voltage Reading (while unit is running)	L1:2	L1:2	L2:L3	L1:L3
Amperage Reading (while unit is running) Reference Wiring Full Load / Max Load	L1	L1	L2	L3
Flow Check Auditory				
Flow Check Visual				

Rotation Check - (Three Phase Only)

Before finalizing the placement, the motor rotation needs to be checked. With someone observing the SN Spray Unit, briefly turn the unit on for several seconds and observe the flow pattern, look for how far out the spray reaches. Turn unit off, isolate power, and have a qualified person switch 2 of the 3 motor leads of outgoing power. Repeat operation again for several seconds and observe the SN Spray Unit flow pattern again. Determine which wiring configuration produced the flow pattern that reaches out the furthest and finalize with that wiring of the outgoing power leads. See Figure 1 for proper flow direction.

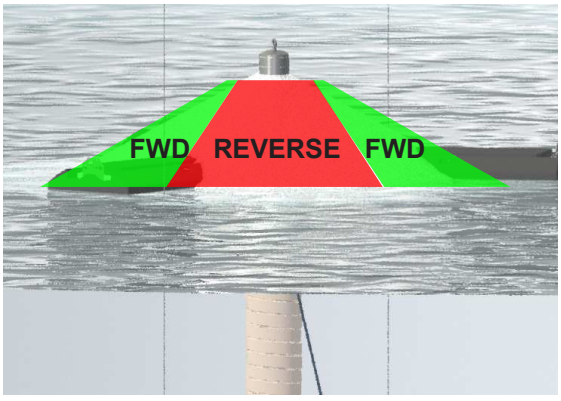

Figure 1: *Flow Check*

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SN Troubleshooting

Operation

For suspected issues regarding SN Spray Unit operation, observing and recording motor current and voltage during operation is a good starting point. The normal operating values can be referenced from initial Startup & Operation records and/or from the Wiring document. In addition to motor voltage and current measurements, with power isolated, continuity (ohm) value measurements are helpful in pinpointing issues.

Check	Reading			
Flow Check Visual				
Flow Check Auditory				
Electric measurements should only be performed by qualified personnel	**Single Phase**	**Three Phase Only**		
Source Voltage Reading (while unit is running)	L1:L2	L1:L2	L2:L3	L3:L1
Amperage Reading (while unit is running) Reference Wiring Full Load / Max Load	L1	L1	L2	L3
Continuity Check (Motor Windings + Splice + Wire) Reference Wiring for Line to Line Ohms	L1:L2	L1:L2	L2:L3	L3:L1
Discontinuity Check (Power to Ground) Should be Open to Ground	L1: GND	L1: GND	L2:GND	L3:GND

Symptom	Possible Issue / Remediation
Motor Amperage is low	Blocked pump inlet screen, clean debris from inlet Blocked spray nozzle(s), clean spray nozzle(s) Broken, severely worn coupling between pump and motor, pump and/or motor replacement
Motor Amperage is high	Low / Unbalanced line voltage, check source power Phase loss, check source power Short to ground, check continuity to ground leads, bad electric cord, splice, or motor failure, replace faulty component(s) Motor or pump failure, replace motor and/or pump
Fault Message from Three-Phase Motor Protection device	Reference motor protection device manual for detailed problems/conditions resulting in fault message.

Rotation Check - (Three Phase Only)

If wiring was disconnected during troubleshooting steps, the motor rotation needs to be checked. With someone observing the SN Spray Unit, briefly turn the unit on for several seconds and observe the flow pattern, look for how far out the spray reaches. Turn unit off, isolate power, and have a qualified person switch 2 of the 3 motor leads of outgoing power. Repeat operation again for several seconds and observe the SN Spray Unit flow pattern again. Determine which wiring configuration produced the flow pattern that reaches out the furthest and finalize with that wiring of the outgoing power leads. See Figure 1 for proper flow direction.

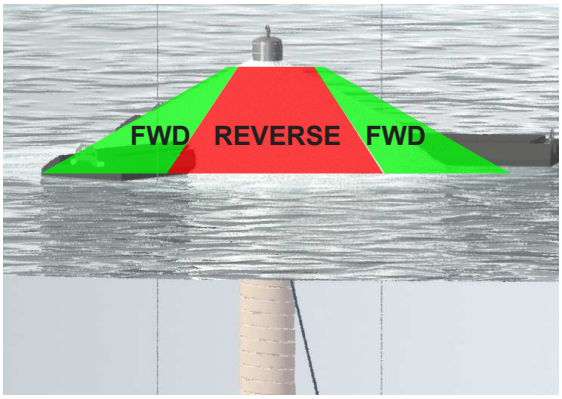

Figure 1: *Flow Check*

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SN5

Technology Description- Floating, electric powered, circulation and Trihalomethane (THM) removal equipment for potable water tanks and reservoirs. Designed for continuous operation and Factory installed through 18-inch sq. minimum clear roof opening.

Materials of Construction - T316 stainless steel, thermoplastic rubber, High Density Polyethylene construction. GridBee® Machines are constructed using safe materials for contact with potable water. See certifications section below.

TTHM Reduction Range - 20% to 70%, dependant on THM Species, Daily Inflow and other variables, see Ixom for proposal.

Spray Unit Direct Flow Rate - 0.33 Million Gallons Per Day, MGD. *Ixom application engineering evaluations often require sizing systems based on site specific conditions and NOT the spray aeration direct flow rate.*

Minimum Access Opening - Machine can be placed through 18 inch (0.5m) diameter opening.

Minimum Water Depth - Minimum of 4ft (1.2m) operating depth required, do not operate out of water.

Minimum Head Space - Minimum of 24in (0.6m) head space between water level and reservoir/tank ceiling required.

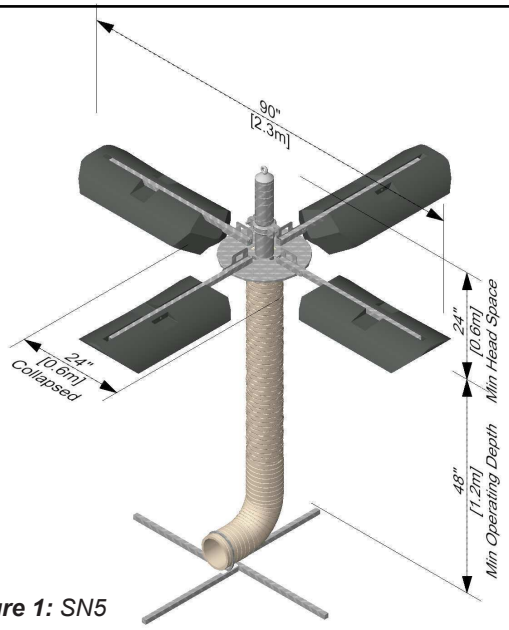

Figure 1: *SN5*

Intake - 20 to 100+ feet (6 to 30+ m) available in 6-inch (15.2 cm) diameter X 20 feet (6 m) sections, thermoplastic rubber, NSF/ANSI 61 approved. Includes low elevation intake that draws water in a horizontal layer within 6 inches (15 cm) of the tank or reservoir floor. Includes intake retrieval chain constructed of 316 stainless steel.

Electrical Requirements - Requires 240VAC/1PH, 240VAC/3PH or 480VAC/3PH, 60Hz power. Ixom recommends secondary disconnect to be located near equipment access hatch. Optional Franklin SubMonitor three-phase motor protection unit highly recommended and available from Ixom. *All switches, breakers, emergency stop buttons, control panels and other controls shall be installed in accordance to all NEC, State, and local regulations. (Not supplied by Ixom.)*

Motor - 5HP stainless steel submersible, designed for continuous operation, low power requirement, direct drive, no gearbox and no lubrication schedule required. See certifications section below.

Wiring - 4-conductor, submersible power cable for submersible motor wiring terminated exterior at top of tank.

Sealed Penetration Fitting - T316 stainless steel tank fitting with a 3/4" NPT female connection. Not designed as a submersible penetration.

Shipping Size / Weight

- **Crate -** 72in x 16in x 16in (1.83m x 0.41m x 0.41m) / 100lbs (46kg) *Exact weight and dimensions varies dependent on machine configuration.*

Certifications - Ixom's potable water products are certified to ANSI/NSF Standard 61, and 372 for lead-free content. Learn more at: www.medoraco.com/std61

Maintenance / Warranty - Limited maintenance. Limited 2-year parts and labor warranty. See Warranty Statement for details.

Patent Pending

Subject to change without notice.

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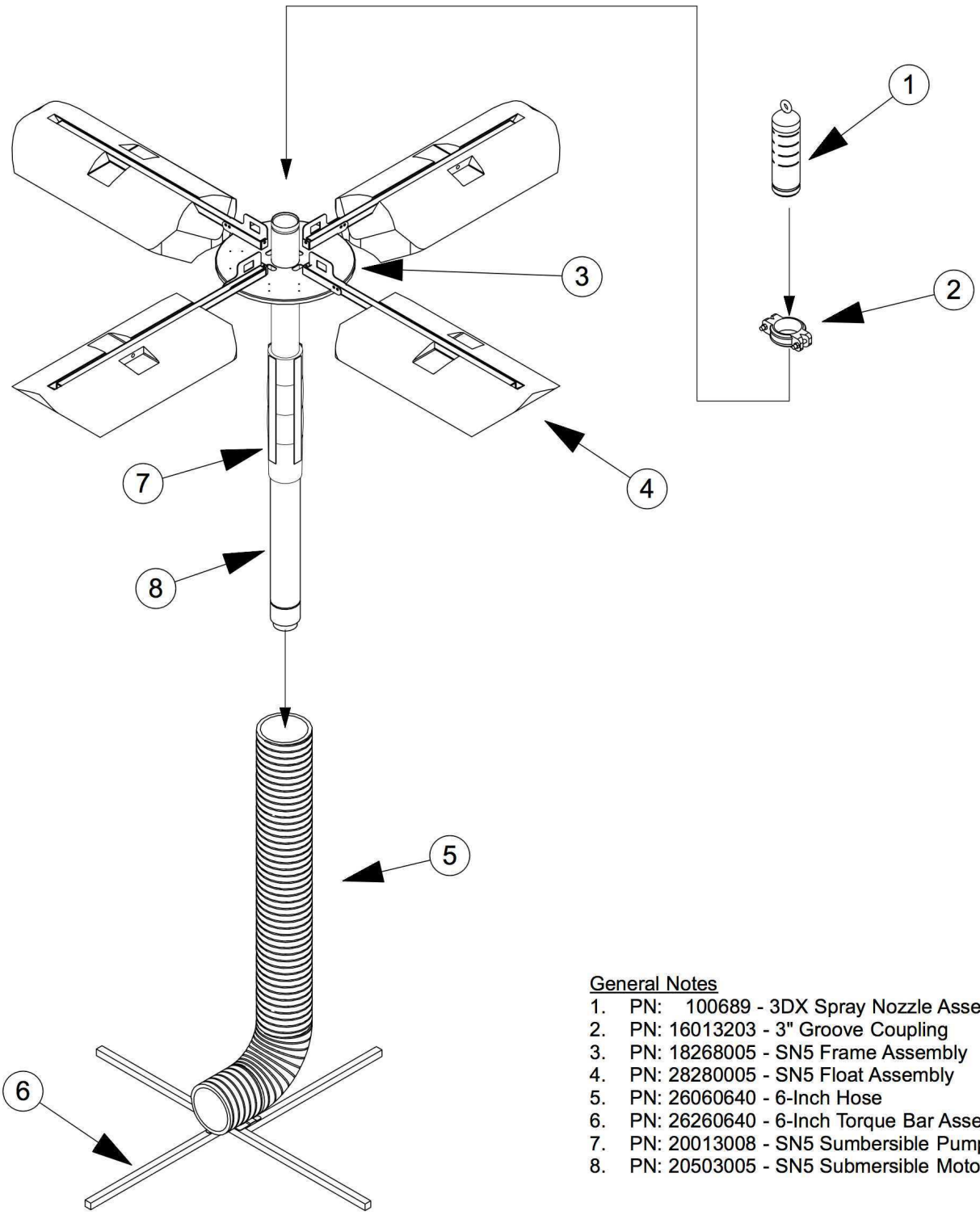
SN5

Exploded Parts Diagram



General Notes

1. PN: 100689 - 3DX Spray Nozzle Assembly
2. PN: 16013203 - 3" Groove Coupling
3. PN: 18268005 - SN5 Frame Assembly
4. PN: 28280005 - SN5 Float Assembly
5. PN: 26060640 - 6-Inch Hose
6. PN: 26260640 - 6-Inch Torque Bar Assembly
7. PN: 20013008 - SN5 Sumbersible Pump
8. PN: 20503005 - SN5 Submersible Motor

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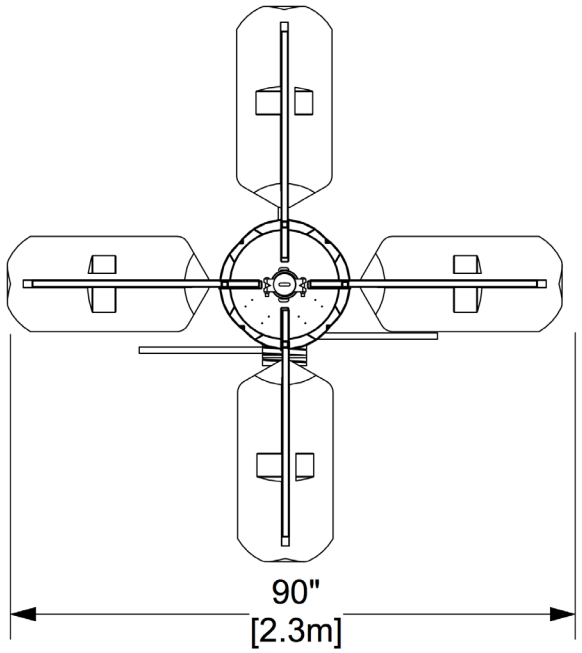
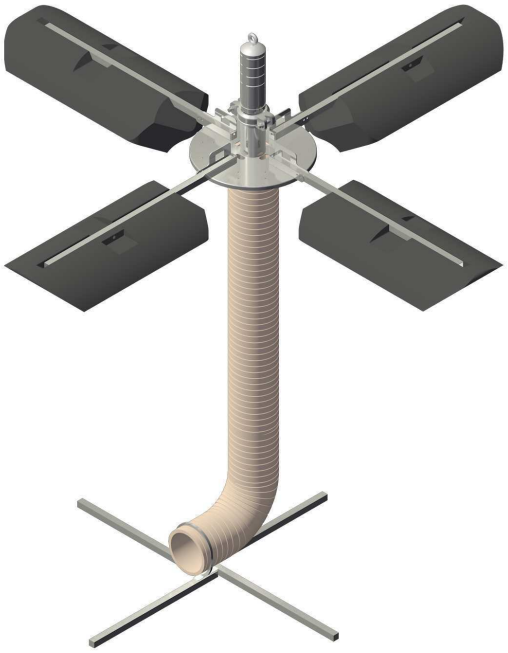
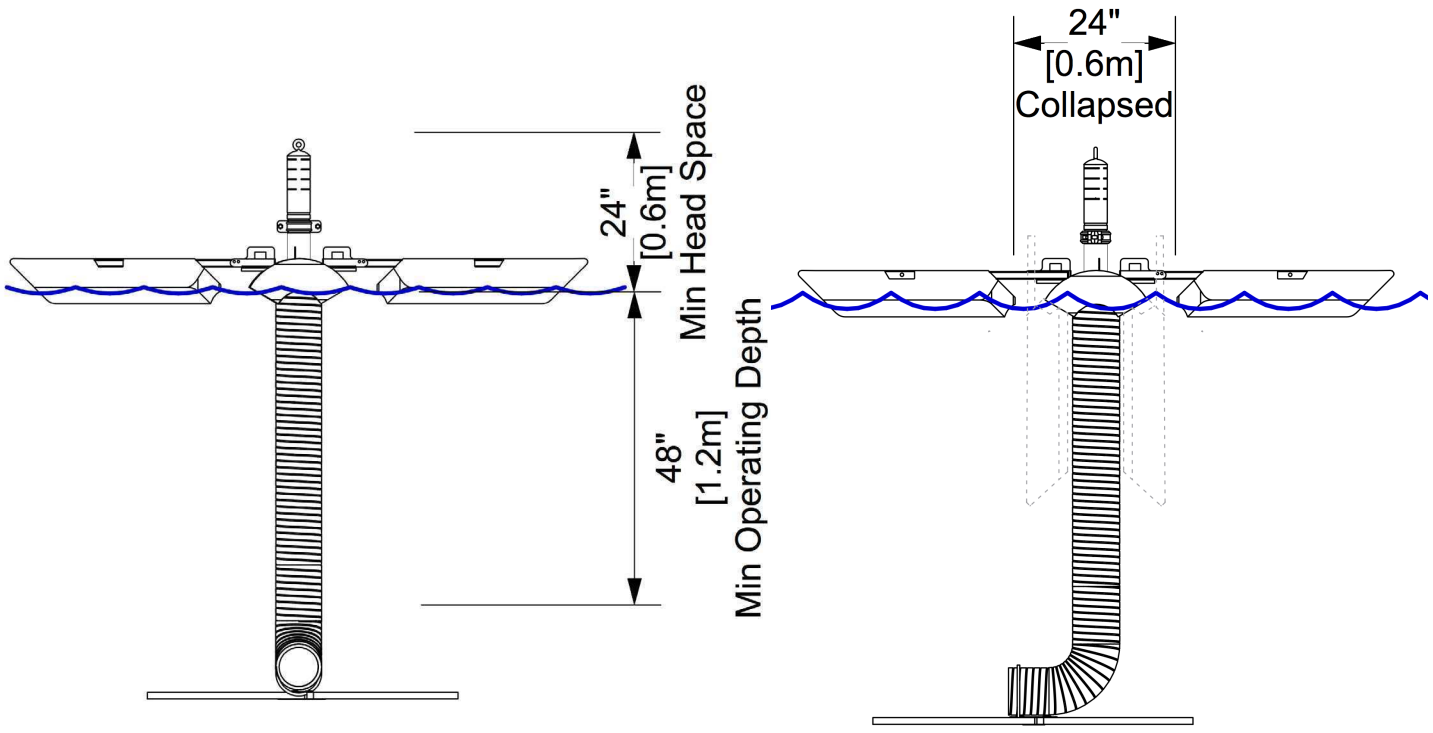
SN5

Dimension Drawing







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GridBee THM Removal Systems Limited Replacement Warranty

GridBee SN Spray Units. GridBee SN Spray Units and blowers are warranted to be free of defective parts, materials, and workmanship for a period of two years from the date of purchase. The optional control panels, by other manufactures, are covered by a manufacturer's warranty of one year from date of purchase. This warranty is valid only for use of the GridBee THM Removal System in accordance with the owner's manual and any initial and ongoing factory recommendations. This warranty is limited to the repair or replacement of defective components only and does not apply to normal wear and tear. If the factory's service crews performed the original on-site placement and startup, then this warranty also includes labor. Where labor is included, in lieu of sending a factory service crew to the site for minor repairs, Ixom may choose to send the replacement parts to the owner postage-paid and may pay the owner a reasonable labor allowance, as determined solely by Ixom, to install the parts. There is no liability for consequential damages of any type. The warranty that is submitted and provided with the purchased equipment is the valid warranty.

GridBee control panels, and any optional accessories. These items are considered "buyout" items for Ixom, and as such include a warranty against defects in material and workmanship for one year from the date of purchase. This warranty covers parts only, not labor. Parts that are determined by Ixom to be defective in material or workmanship under normal use during the one year warranty period will be repaired or replaced. Shipping charges are the responsibility of the customer.

Terms applicable to all equipment. This Limited Replacement Warranty is subject to the terms of Ixom's General Terms and Conditions of Sale. In the event of any inconsistency between the terms of this Limited Replacement Warranty and Ixom's General Terms and Conditions of Sale, the terms of this Limited Replacement Warranty shall prevail to the extent of that inconsistency.

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Ixom Service & Support

Ixom employs qualified highly trained Service and Placement Technicians certified to perform the necessary tasks required to install or remove SolarBee and GridBee circulation equipment

Ixom's specialized Service and Placement Technicians are trained in Confined Space, Fall Protection, and other related subjects as required by OSHA to perform the necessary work to install or remove SolarBee and GridBee equipment, and are knowlegeable in the regulations and standards of OSHA.

If you feel the need to service your SolarBee or GridBee circulation equipment, please contact Ixom's Customer Service Department at:

+1 866 437 8076

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