

# **NORSTAR** **INDUSTRIES, INC.**

## ***NSC-IP6 Anti-icing Skid with ARC-6000 Controls***



### **NORSTAR INDUSTRIES, INC.**

#### **Western US Location**

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**Hydraulic Driven Anti-ice Skid Version 2.0**



# TABLE OF CONTENTS

## SECTION 1: ARC-6000 CONTROL SYSTEM

Switches & Controles .....	1
System Startup.....	2
System Operation.....	2
Error Messages .....	2
Master Diagram with Cannon Plug Connector .....	4

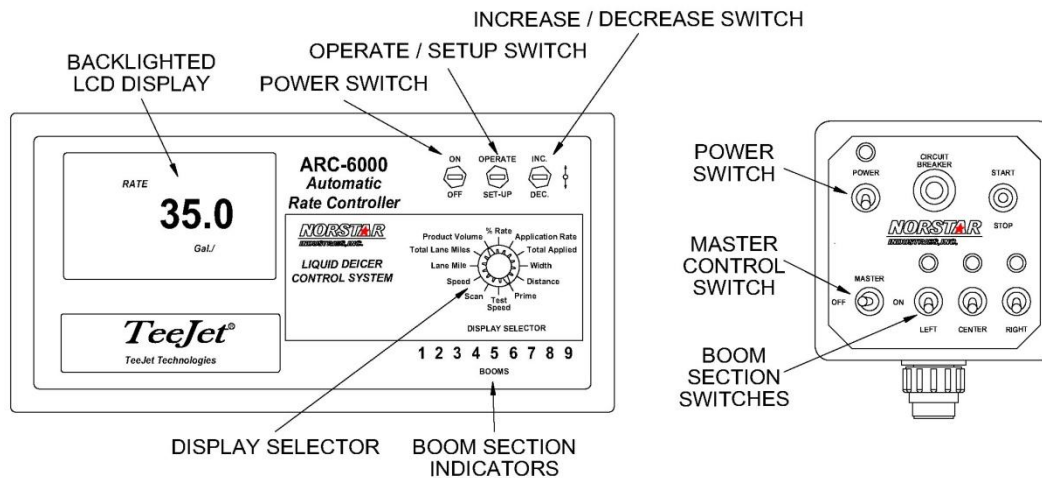
## SECTION 2: ASSEMBLY DRAWINGS

### Anti-ice Pump System

Inlet Plumbing .....	5
Outlet Plumbing .....	7
Hypro 9306 Stainless Pump .....	9
Hypro Water Pump Repair Instructions.....	10
346 Series Electric Autorange Valve.....	11
490 Series Electric Trunnion Lane Valve .....	13

### Anti-ice Spraybar

Spraybar Mounting.....	14
Anti-ice Spraybar with Variable Orifice Nozzles .....	15
Norstar Industries Warranty Statement .....	17



## **OPERATE Mode**

**SPEED:** The current vehicle speed in tenths of a Mile per Hour.

**LANE MILE:** Accumulated Lane Miles applied in hundredths of a Mile. Amount rolls over at 999.99. Zero value by holding INC/DEC switch down for 3 seconds.

**TOTAL LANE MILES:** Accumulated Lane Miles applied in tenths of a Mile. Amount rolls over at 9999.99. Zero value by holding INC/DEC switch down for 3 seconds.

**PRODUCT VOLUME:** Amount of product aboard vehicle. Resets to a pre-programmed, full load quantity by holding the increase switch up with ground speed at zero. Pre-programmed value can be overridden using the INC/DEC switch to set the desired value. Value counts down as the product is applied, and an alarm will sound with (10%)ten percent left aboard.

**% RATE:** The percentage of programmed application rate at which the product is being applied. With the Display selector in this position, the application rate can be changed by the preset percentage increment up or down using the INC/DEC switch.

**APPLICATION RATE:** Target application rate in Gallons per Lane Mile when the vehicle is stopped and actual rate during application. Rate can be set with INC/DEC switch if ground speed is zero or all boom switches are in the off position. Rate of change will increase by holding INC/DEC switch without releasing.

**TOTAL APPLIED:** The actual volume applied, as measured by flow meter. Zero value by holding INC/DEC switch down for 3 seconds.

**WIDTH:** Set at 99 inches for each boom section used.

**DISTANCE:** Accumulated distance in feet, Miles after 5,280 Ft. Amount rolls over at 99.99 miles. Zero value by holding INC/DEC switch down for 3 seconds.

**PRIME:** Initially displays a series of 5 dashes. Holding the INC/DEC switch up will open the control valve and display OPEN. Running pump and opening boom control valves will allow complete priming. The system will not accumulate in this mode.

**TEST SPEED:** Speed used to test sprayer when the vehicle is stationary. Changed by the INC/DEC switch.

**SCAN:** The display will scan Speed, Lane Mile, Product Volume, and Application Rate. Each value will be displayed for approximately 2 seconds then display next value.

## **SET-UP Mode**

**NOTE:** The values in **SET-UP** mode are calibration numbers and should be changed using the correct calibration procedures.

**SPEED:** The Ground Speed Override Value in tenths of a MPH. Sets a minimum speed to insure a good pattern at low ground speeds. The Console uses this value until the actual ground speed meets or exceeds it. A "Too Slow" message will flash with an audible alarm sounding to warn the operator of over application.

**LANE MILE:** Programmable Value causing the console to flash and beep for 3 seconds each time the lane mile accumulation increases by the value set in this position.

**TOTAL LANE MILES:** Displays ERR, No function in set-up Mode.

**PRODUCT VOLUME:** Use the INC/DEC switch to set the full load capacity of vehicle.

**% RATE:** The rate of change for each actuation of INC/DEC switch while in the Operate Mode.

**APPLICATION RATE:** Displays "1.00", this is a correction factor for calibrating pump inefficiencies. Not used for this application.

**TOTAL APPLIED:** The flow meter calibration number. The factory calibration number is normally accurate enough. (If required see calibration procedures in manual.)

Flow meter Cal. # \_\_\_\_\_

**WIDTH:** Turn on each individual boom section and set a value of 99 Inches using the INC/DEC switch.

**DISTANCE:** The Distance calibration number. (See calibration procedure in manual.)

Distance Cal. # \_\_\_\_\_

**PRIME:** No function in set-up Mode.

**TEST SPEED:** The ground speed value displayed on power up in the test speed position. Changed by the INC/DEC switch.

## SYSTEM START-UP

1. Fill tank with product, Open liquid pump suction valve.
2. Turn ARC 6000 power on, select the PRODUCT VOLUME position with the display selector. Hold the INC/DEC switch up until the full tank volume is displayed. If the tank was not completely filled, use the INC/DEC switch to change to the correct product volume on board.

**NOTE:** The values in SET-UP mode are calibration numbers and should be changed using the correct calibration procedures. (See calibration procedure in manual)

3. Select APPLICATION RATE position with the display selector, turn all boom switches off, and install desired rate per lane mile using the INC/DEC switch.
4. Zero out the accumulated values (LANE MILES, DISTANCE, TOTAL APPLIED, Ect.) if desired by selecting each position and holding the INC/DEC switch down for 3 seconds.
5. Initial priming is necessary if the unit was run out of material. Turn on liquid pump, select the PRIME position with the display selector, hold the INC/DEC switch up until the display reads OPEN. Turn a boom section and the master switch on until liquid has reached the boom. Shut the boom, master, liquid switches off, hold INC/DEC switch down until display shows 5 bars.

## SYSTEM OPERATION

The system is ready for application of liquid at the programmed rate set in the startup procedure. The speed range will vary with rate per lane mile and nozzle size changes. As the rate per lane mile is increased using the same nozzles, the maximum travel speed is reduced.

1. Turn on liquid pump and boom sections for desired application. Select any position on display selector with the exception of TEST SPEED or PRIME. **NOTE:** Selecting the TEST SPEED or PRIME positions will cause inaccurate application.
2. While operating vehicle at a speed within the system operating range, turn the Master switch and boom switches on and off as required.
3. If operating at a speed below the minimum GSO speed, the console will display A "Too Slow" message will flash with an audible alarm sounding to warn the operator of over application.

## ERROR MESSAGES

Err: Indicates an invalid SET-UP procedure. Check all switch settings.

Err 0: Indicates a constant set to zero. Check all constants and reenter as necessary.

Err 1: Output too low for programmed application rate. Slow down or change to larger nozzles.

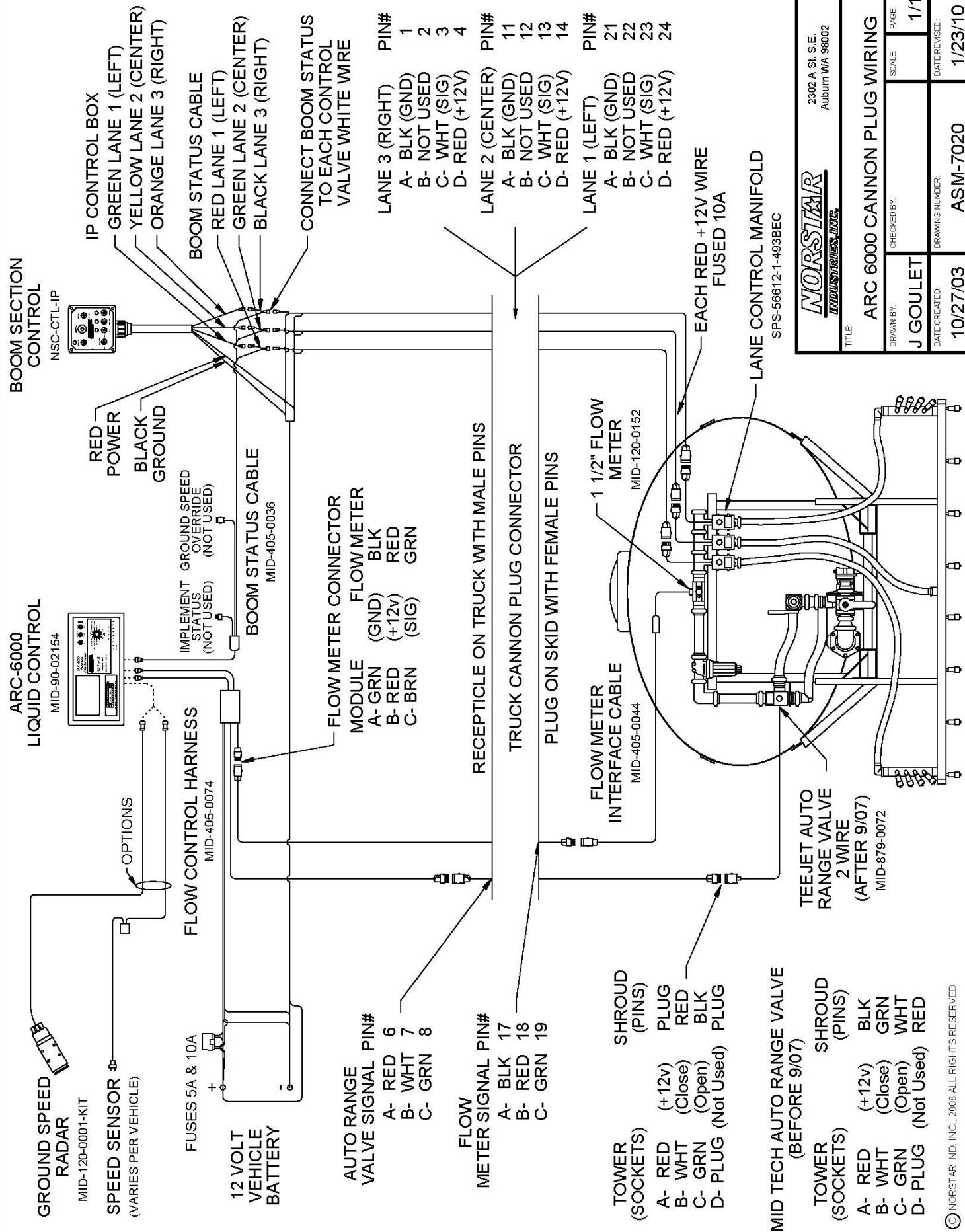
Err 3: No flow meter signal. Product pump not on, suction valve shut off, system not primed, or possible blockage.

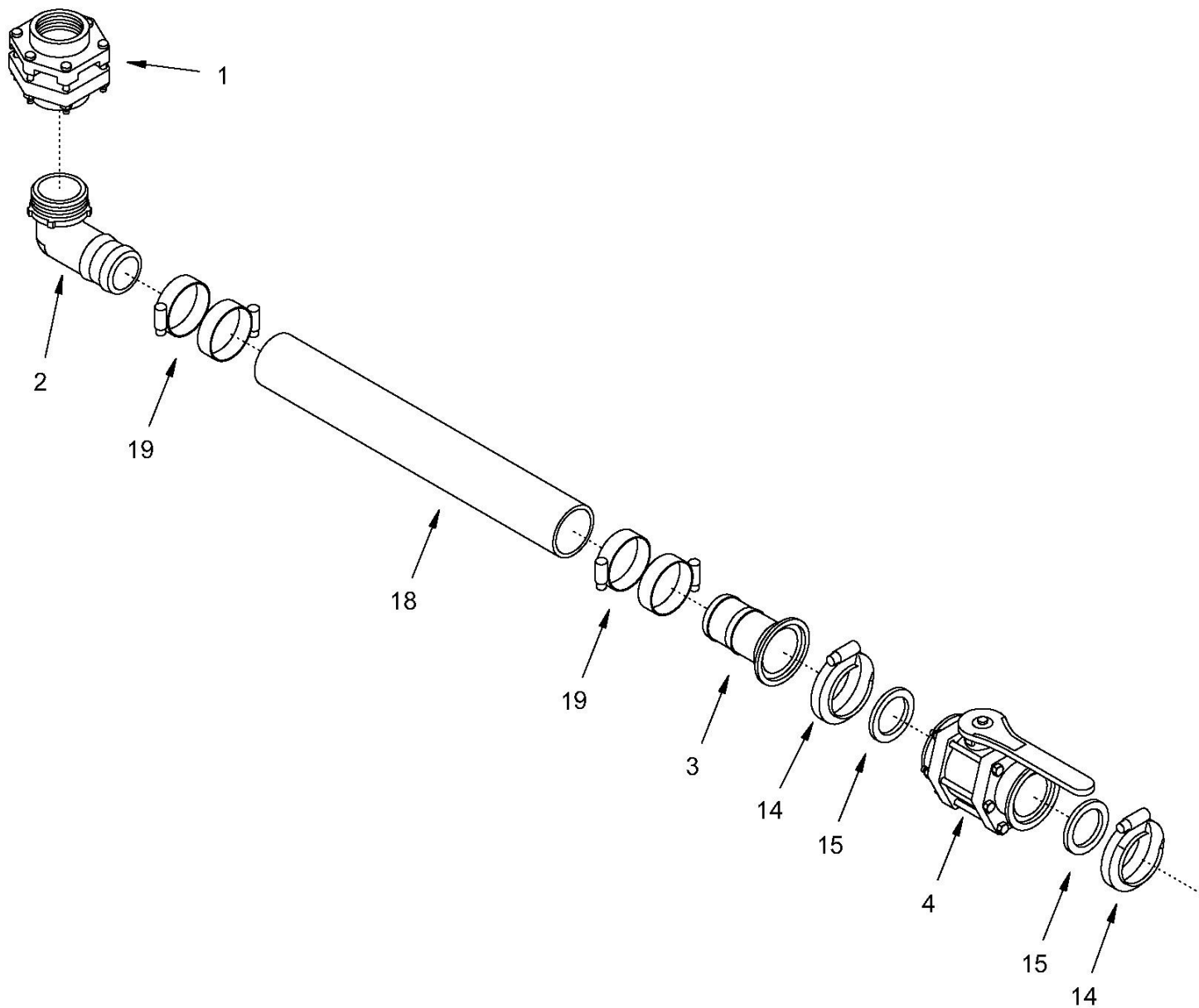
Err 5: Application rate is exceeding the target rate by 15%. The control valve is stuck and must be repaired.

Err L: Low vehicle battery voltage.

OFLO: Value is too large to display. Hold down on the INC/DEC switch until the display resets to zero.

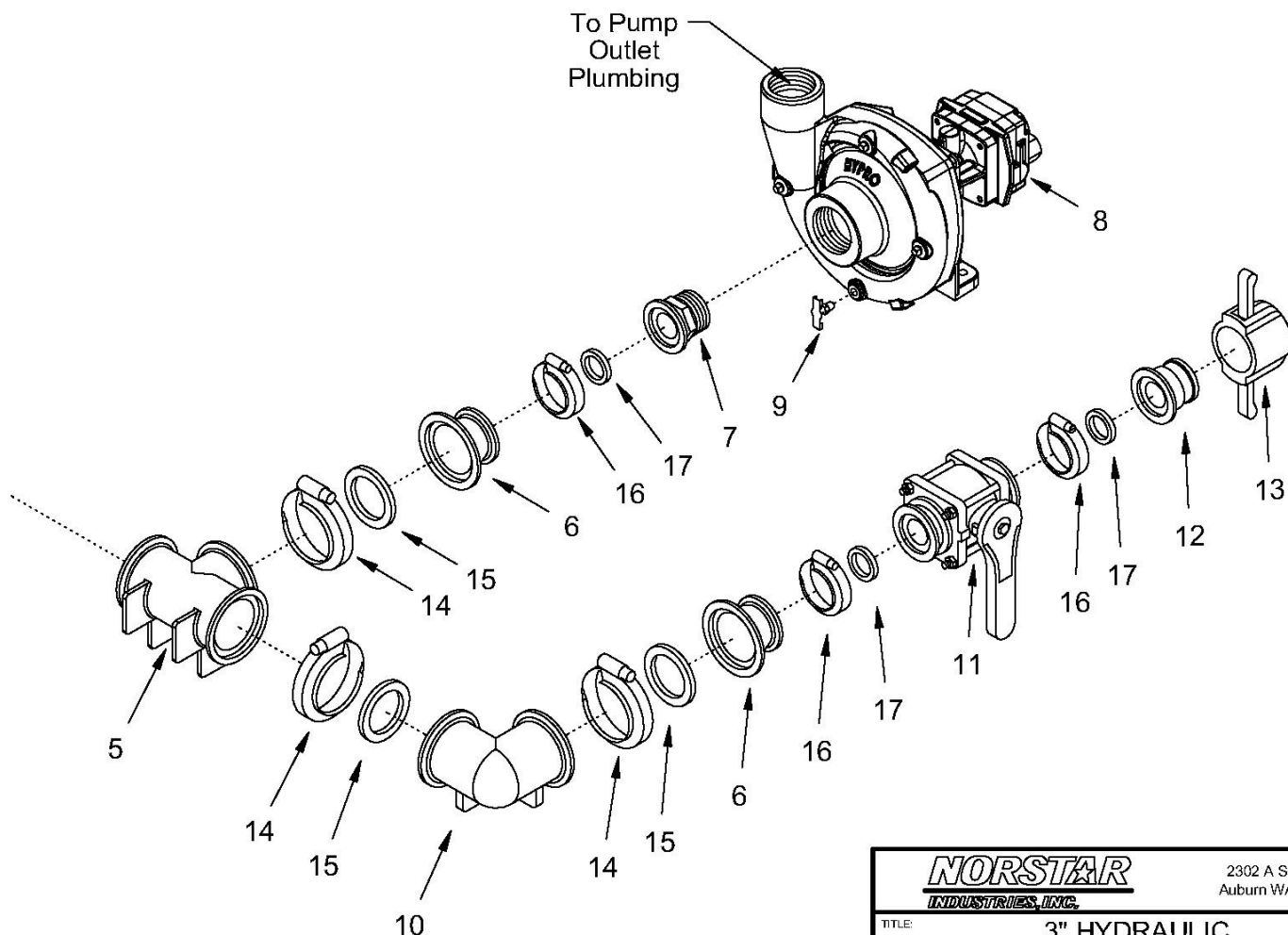




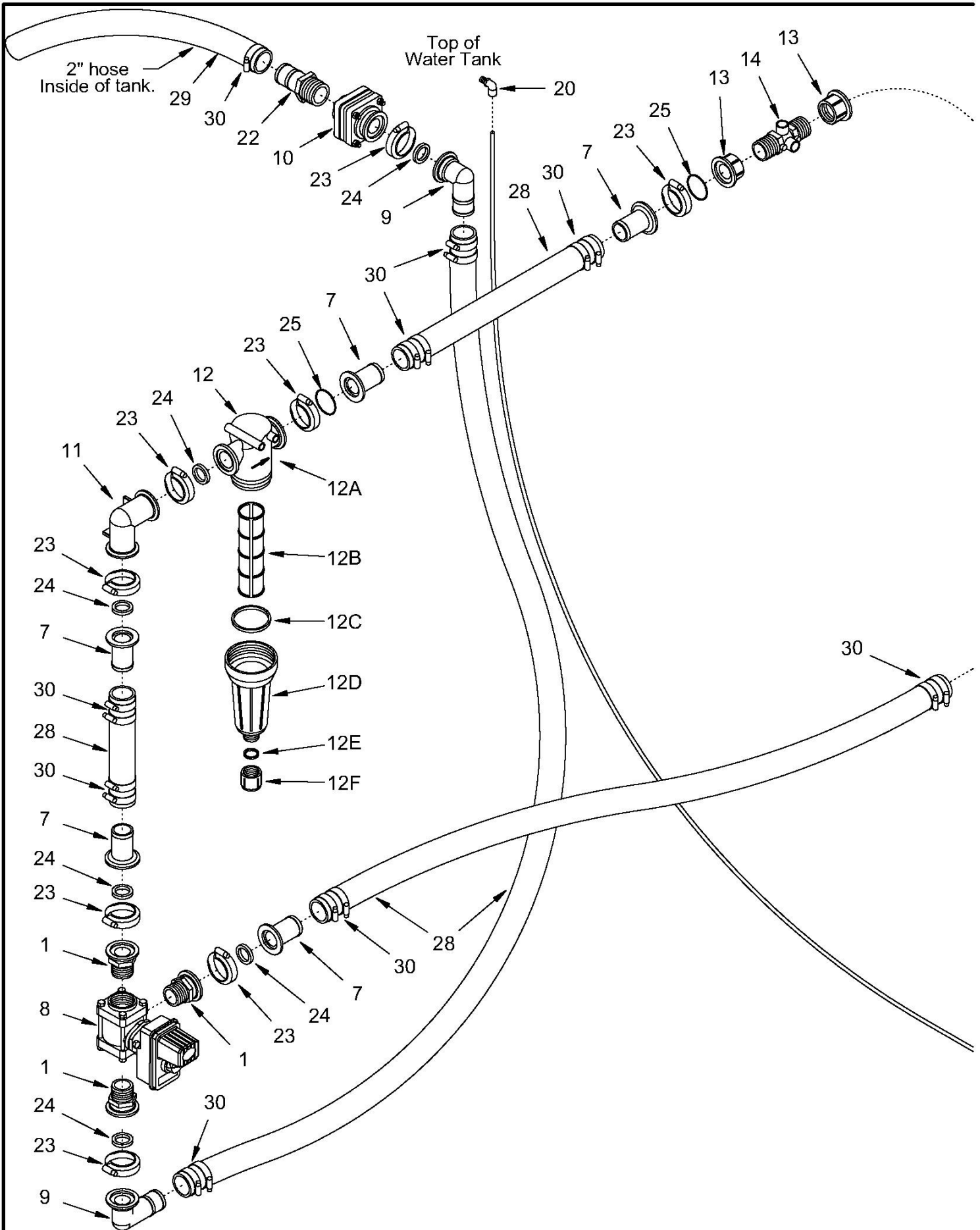


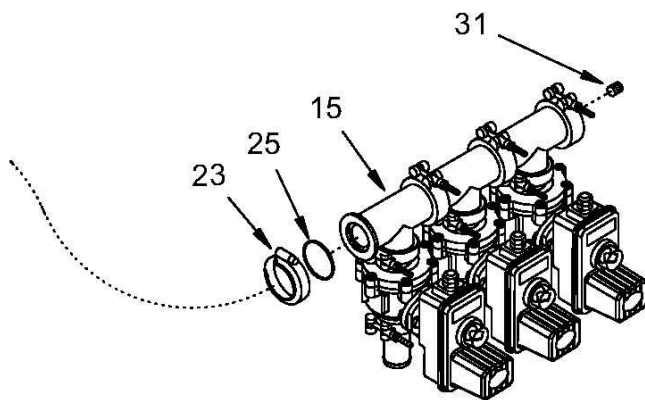


Item	Qty	Part Number	Description
1	1	PPF-BHD-48-BOLTED-BD	3" Poly Bottom Drain Bolted Bulkhead
2	1	PPF-9BR-48BX48MP	3" 90° Hose Barb
3	1	PPF-SBR-48BX48FL	3" Flange Hose Barb
4	1	PPF-V2B-48FL	3" Flange Ball Valve Bolted
5	1	PPF-TEE-48FL	3" Flange Tee
6	2	PPF-CPL-48FLX32FL	3" Flange x 2" Full Port Flange Coupler
7	1	PPF-ADP-32FLX32MP	2" Full Port Flange x 2" MPT Adaptor
8	1	HYP-9306S-HM5C	Stainless Steel Hydraulic Water Pump
9	1	SPR-5421	1/8" Drain cock
10	1	PPF-9EL-48FL	3" Flange 90° Elbow
11	1	PPF-V2B-32FL	2" Full Port Flange Bolted Ball Valve
12	1	PPF-MQD-32FL	2" Full Port Camlock
13	1	PPF-FQD-32X	2" Camlock Cap
14	5	PPF-BJO-48-CLAMP	3" Full Port Flange Screw Clamp
15	5	PPF-BJO-48-GASKET	3" Full Port EPDM Gasket
16	3	PPF-BJO-32-CLAMP	2" Full Port Flange Screw Clamp
17	3	PPF-BJO-32-GASKET	2" Full Port EPDM Gasket
18	4'	HSE-7226-48	3" Low Temp Suction Hose
19	4	FAS-7655-52	3" Hose Clamp

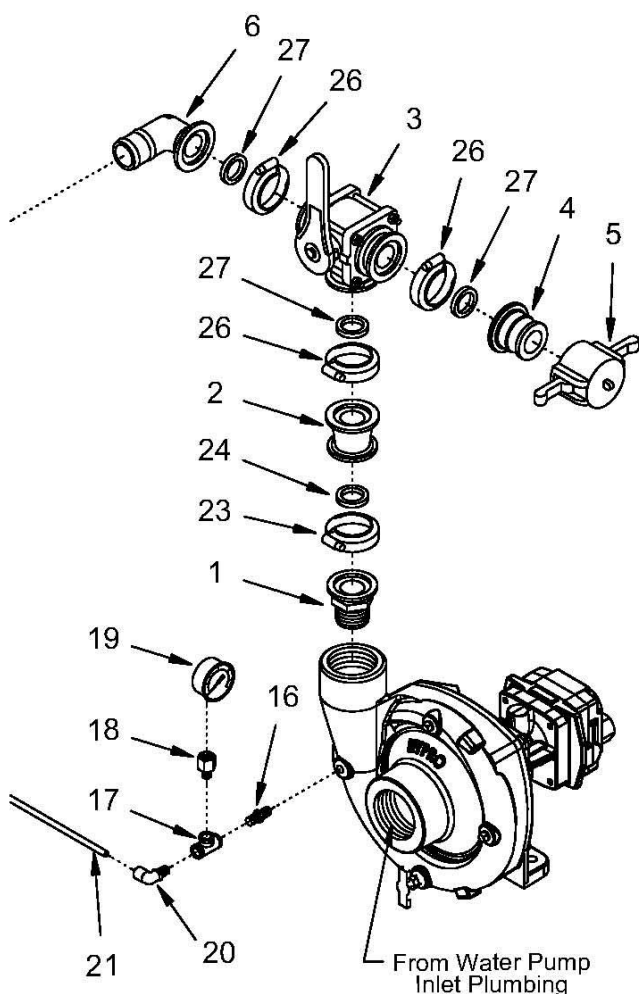


<b>NORSTAR</b> INDUSTRIES, INC.		2302 A St. S.E. Auburn WA 98002	
TITLE: <b>3" HYDRAULIC ANTI-ICE INLET PLUMBING</b>			
DRAWN BY:	CHECKED BY:	SCALE:	PAGE:
J GOULET		1:9	1/1
DATE CREATED:	DRAWING NUMBER:	DATE REVISED:	
12/15/03	ASM-7005-V2	10/18/04	





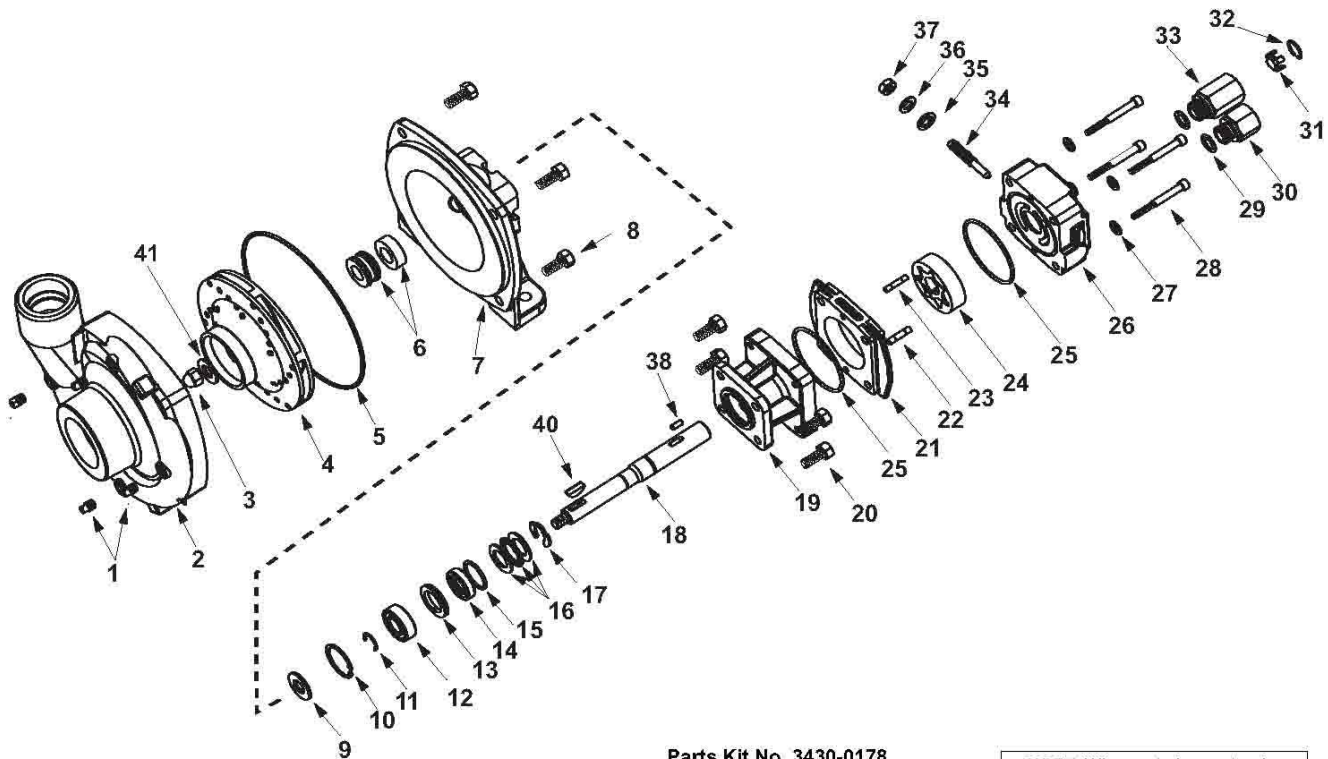
To Spraybar  
Lane Hoses



From Water Pump  
Inlet Plumbing

Item	Qty	Part Number	Description
1	4	PPF-ADP-24FLX24MP	2" Std. Port x 1 1/2" MPT Adaptor
2	1	PPF-CPL-32FLX24FL	2" Full Port x 2" Std. Port Flange Coupling
3	1	PPF-V3B-32FL-SL	2" Full Port Flange 3 way Side Load Valve
4	1	PPF-MQD-32FL	2" Full Port Camlock
5	1	PPF-FQD-32X	2" Camlock Cap
6	1	PPF-9BR-32BX32FL	2" 90° Hose Barb x 2" Full Port Flange
7	5	SPS-CP48161-PP	75 Series Flange x 2" Hose Barb
8	1	MID-879-0072	1 1/2" Autorange Control Valve
8A	1	SPS-AB346B-KIT	Autorange Valve Repair Kit (Not Shown)
9	2	PPF-9BR-32BX24FL	2" 90° Hose Barb x 2" Std. Port Flange
10	1	PPF-BHD-24-FL	2" Std. Port Flange Bulkhead
11	1	PPF-9EL-24FL	2" Std. Port Flange 90° Elbow
12	1	SPS-AA126ML-F75-80	AA126 Strainer 75 Series Flange
12A	1	SPS-CP63025-F-PP	75 Series Flanged Strainer Head
12B	1	SPS-CP15941-4-SSPP	Screen 80 mesh
12C	1	SPS-CP48656-EPR	EDPM Gasket
12D	1	SPS-CP48654-PP	Strainer Bowl
12E	1	SPS-CP63150-EPR	EDPM Drain Cap Gasket
12F	1	SPS-CP48655-PP	Poly Drain Cap
13	2	PPF-ADP-24FLX24FP	2" Std. Port Flange x 1 1/2" FPT Adaptor
14	1	MID-120-0150	1 1/2" Flowmeter
14A	1	MID-120-0160	1 1/2" Flowmeter Bearing Kit (Not Shown)
15	1	SPS-56612-1-493BEC	Electric Ball Valve Bank Assembly
15A	1	SPS-AB356-KIT	Electric Ball Valve Repair Kit (Not Shown)
16	1	BRF-HXN-02MP	1/8" Brass Hex Nipple
17	1	BRF-TEE-02FP	1/8" Brass Tee
18	1	BRF-ADP-04FPX02MP	1/4" x 1/8" Brass Adapter
19	1	SPR-4826	Liquid Filled Pressure Gauge 0-100 psi
20	2	NHP-36942	Air Fitting Elbow 1/4" x 1/4"
21	5'	NHP-39251	DOT Air Line 1/4"
22	1	PPF-SBR-32BX32MP	2" Hose Barb x 2" MPT
23	10	PPF-BJO-24-CLAMP	2" Std. Port Flange Screw Clamp
24	7	PPF-BJO-24-GASKET	2" Std Port EPDM Gasket
25	3	SPS-CP7717-2-229-VI	75 Series Flange O-Ring
26	3	PPF-BJO-32-CLAMP	2" Full Port Flange Screw Clamp
27	3	PPF-BJO-32-GASKET	2" Full Port EPDM Gasket
28	5.5'	HSE-7211-32	2" Horizon Hose
29	8'	HSE-7225-32	2" PVC Suction Hose
30	17	FAS-7655-32	2" Hose Clamp
31	1	BRF-HHP-06MP	3/8" Brass Hollow Hex Plug

<b><i>NORSTAR</i></b> <b>INDUSTRIES, INC.</b>		2302 A St. S.E. Auburn WA 98002	
TITLE: <b>2" HYDRAULIC ANTI-ICE OUTLET PLUMBING</b>			
DRAWN BY: <b>J GOULET</b>	CHECKED BY:	SCALE: <b>1:11</b>	PAGE: <b>1/1</b>
DATE CREATED: <b>4/21/13</b>	DRAWING NUMBER: <b>ASM-7009-HYD-V4</b>	DATE REVISED:	



**Silicon Carbide Seal Kit  
No. 3430-0589**

Contains one each:  
mechanical seal (Ref. 5) and  
o-ring (Ref. 6).

**Hydraulic Motor Part Nos.**  
2500-0009C (HM1C Models)  
2500-0011C (HM3C Models)  
2500-0018C (HM5C Models)

**Parts Kit No. 3430-0178**

Contains: One each ball bearing  
(Ref. 12), motor shaft seal (Ref.  
14), thread seal gasket (Ref. 35),  
and washer (Ref. 36); two each  
motor housing o-rings (Ref. 25),  
and port adapter o-rings (Ref. 29).

**NOTE:** When ordering parts, give  
QUANTITY, PART NUMBER,  
DESCRIPTION, and COMPLETE  
MODEL NUMBER. Reference  
numbers are used ONLY to identify  
parts in the drawing and are NOT  
to be used as order numbers.

Ref. No.	Qty. Req'd.	Part No.	Description
1	4	2406-0016	Drain/Vent Plug
2	1	0154-9200S1	Pump Casing (Volute)
3	1	2253-0006	Impeller Nut
4	1	0405-9200P2	Impeller
5	1	1720-0083	O-ring
6	1	3430-0589	Mechanical Seal (Silicon Carbide)
7	1	0750-9300C	Mounting Flange
8	4	2210-0125	Hex Head Cap Screw
9	1	1410-0056	Slinger Ring
10	1	1820-0013	Retaining Ring
11	1	1810-0014	Snap Ring
12	1	2000-0010	Ball Bearing
13	1	1410-0073	Spacer
14	1	2104-0005	Shaft Seal
15	1	1410-0074	Seal Spacer
16	1	2029-0014	Thrust Bearing Assembly - Consists of: (1) Thrust Bearing & (2) Thrust Brg. Races
17	1	1810-0026	Snap Ring
18	1	0510-2500	Shaft (HM3C Model) 7-1/2" long
18	1	0511-2501	Shaft (HM1C & HM5C Models) 7" long
19	1	0151-2500C	Motor Body (Includes Main Bearing)
20	4	2210-0005	Hex Head Cap Screw
21	1	0700-2500C1	Gerotor Housing (HM1C Model) 1/2" wide
21	1	0702-2500C1	Gerotor Housing (HM3C Model) 1" wide
21	1	0704-2500C1	Gerotor Housing (HM5C Model) 5/8" wide

Ref. No.	Qty. Req'd.	Part No.	Description
22	1	1600-0052	Dowel Pin (HM3C Models)
22	1	1600-0044	Dowel Pin (HM1C and HM5C Models)
23	1	1600-0068	Dowel Pin (HM3C Model)
23	1	1600-0037	Dowel Pin (HM1C and HM5C Models)
24	1	3900-0022	Gerotor (HM1C Model)
24	1	3900-0024	Gerotor (HM3C Model)
24	1	3900-0048	Gerotor (HM5C Model)
25	2	1720-0110	O-ring
26	1	0251-2500C2	Motor End Plate (Includes Main Bearing)
27	4	2270-0039	Washer
28	4	2220-0044	Cap Screw (HM3C )
28	4	2220-0021	Cap Screw (HM1C)
28	4	2220-0032	Cap Screw (HM5C )
29	2	1720-0108	O-ring
30	1	3360-0021	Pressure Port Adapter
31	1	3260-0068	Poppet
32	1	1820-0038	Retaining Ring
33	1	3320-0049	Tank Port Adapter
34	1	3220-0029	Bypass Adjusting Screw
35	1	1700-0047	Gasket
36	1	2270-0027	Washer
37	1	2250-0038	Lock Nut
38	1	1610-0031	Roll Pin (HM1C and HM5C Models)
38	1	1610-0055	Roll Pin (HM3C Models)
40	1	04432	Woodruff Key (Stainless)
41	1	2270-0071	Washer

# Repair Instructions

Recommended repair tools for  
use with these instructions:



**Always flush pump with water, or neutralizing agent, before servicing.**

## Pump Housing Disassembly (All Models)

In most cases, seal replacement requires disassembly of only the pump half of the unit.

**NOTE:** Instructions following in *italics* describe procedures for the polypropylene centrifugal pumps when different than the cast iron pumps.

1. Remove the four casing cap screws with 9/16" box end wrench. Tap pump casing on discharge port with rubber hammer, if necessary, to break loose from mounting flange. Check inside of pump casing including suction port.

If badly eroded [or damaged], pump casing should be replaced. Remove o-ring and discard. O-ring should always be replaced. [Using a 1/2" wrench, remove the six bolts from the front. Also remove the 5/16" screw from the rear near the outlet port.]

2. To remove the impeller nut, clamp the flange in a vise and insert a large screwdriver or file (at least 10" long) into impeller vanes to prevent impeller from turning when loosening nut. Use a socket wrench (3/4" for Series 9000C or 5/8" for Series 9200C and 9400C) to remove the impeller nut by turning it counterclockwise (Fig. A). [Use 7/8" deep socket wrench to remove plastic seal nut, then 9/16" deep socket to remove metal jam nut, rubber gasket and washer.]
3. Once the nut [and washer] is removed, place a screwdriver on each side (Fig. B) behind the impeller and pry away from the mounting flange. Remove woodruff key from the shaft (for Series 9000 only). Remove o-ring from the mounting flange. **NOTE:** Fig. B shows 9000C gear flange. The same general procedure applies for the other pumps.

## Pump Seal Removal

1. Lightly lubricate shaft for easier removal of seal. Using two screwdrivers positioned opposite each other, pry the rotary portion of the seal from the shaft (Fig. C).
2. [Remove plastic back cover flange. Knock seal out from back with a hammer and screwdriver.]
3. Remove stationary seat and boot by prying out with two small screwdrivers in manner similar to impeller removal. (Caution: The seal will be damaged by removal in this manner. A new seal and rubber gasket **MUST** be used when pump is reassembled.)

## Cleanup Of Pump Housing

1. Using the circular bottle-type wire brush with air or hand drill, clean the discharge port, suction port and the sealing areas of the o-ring on the pump casing and mounting flange. [The last step should not be performed on the polypropylene models.]
2. After wire brush cleaning, it is recommended that the pump casing and mounting flange be further cleaned in a solvent tank to remove rust and corrosion particles.

## Pump Shaft and Bearing Assembly Removal and Replacement

1. While the pump is disassembled (see the Pump Housing Disassembly section), the driven pulley on the pump shaft must be removed. Remove the large retainer ring in pump bearing bore on the pulley side of housing. Press out the shaft and bearing assembly from the pump side using an arbor press.
2. Bearings must be pressed off each end of shaft and replaced in the same manner. **NOTE:** Shaft diameter between bearings is larger.
3. For reassembly, reverse the order of instructions.

## Seal Replacement/Pump Housing Reassembly

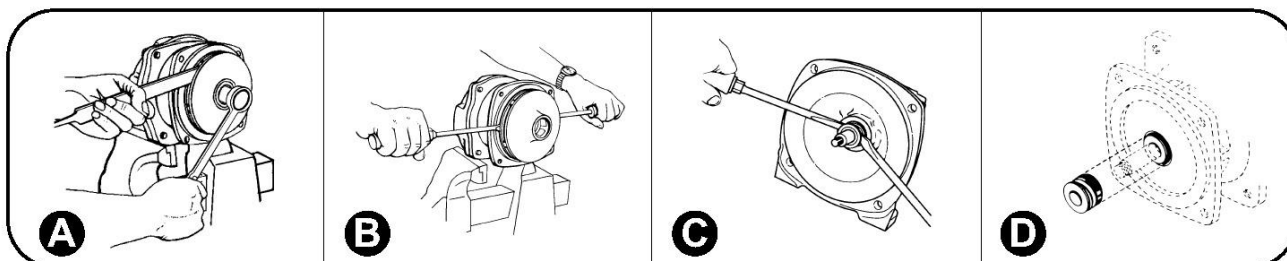
**NOTE:** Reassemble if drive end is not to be repaired.

Be extremely careful with the new seal. Take special care not to scratch the lapped sealing faces of the rotary washer and stationary seat.

1. Lubricate seal cavity in mounting flange with WD-40, LPS or equivalent.
2. Install the stationary portion of the mechanical seal by sliding over the shaft with the ceramic side out.

**IMPORTANT:** Make sure the seal cavity is clean and lubricated. Never run the sealing faces dry.

3. To seat the seal in the seal cavity, use a piece of 3/4" PVC pipe 4" to 6" in length. Press it in firmly and squarely.
4. To install the rotary portion of the mechanical seal, place it over the shaft with the carbon side facing in, and press until it bottoms out against the stationary portion (Fig. D).
5. Insert key into shaft key slot. Place impeller on shaft. Put [washer, jam nut and gasket] impeller nut on shaft end, and using a large screwdriver or file in the impeller vanes for support, tighten impeller nut securely.
6. Install o-ring on mounting flange. Replace o-ring if worn or damaged.
7. Place pump casing on mounting flange, insert and tighten bolts evenly.





ITEM	PART NO.	DESCRIPTION
1	50516-01C---	REG. MOTOR, 1-RPM (18-SEC), 2-WIRE JACKETED CABLE
	50516-03C---	REG. MOTOR, 3-RPM (6-SEC), 2-WIRE JACKETED CABLE
	50516-06C---	REG. MOTOR, 6-RPM (3-SEC), 2-WIRE JACKETED CABLE
1A	50516-01D	REG. MOTOR, 1-RPM (18-SEC), DIN CONNECTION
	50516-03D	REG. MOTOR, 3-RPM (6-SEC), DIN CONNECTION
	50516-06D	REG. MOTOR, 6-RPM (3-SEC), DIN CONNECTION
2	CP50517-SSPV	RETAINING CLIP, 304 STAINLESS STEEL
3	CP46073-2S-302SS	HEX HEAD CAP SCREW, STAINLESS STEEL (2 REQ'D)
4	CP50514-PP	MOTOR ADAPTER, POLYPROPYLENE (BLACK)
5	CP23550-TEF	THRUST WASHER, TEFLON
6	CP56619-SS	STEM, 303 STAINLESS STEEL (2-WAY)
6A	CP56634-SS	STEM, 303 STAINLESS STEEL (3-WAY)
7	CP7717-2-208-VI	O-RING, VITON (2 REQ'D)
8	CP23546-PP	BODY, POLYPROPYLENE (BLACK) (2-WAY)
	CP23547-1-1/4-PP	BODY, POLYPROPYLENE (BLACK) (3-WAY) (1-1/4" NPT THD.)
8A	CP823547-1-1/4-PP	BODY, POLYPROPYLENE (BLACK) (3-WAY) (1-1/4" BSPT THD.)
	CP23548-1-1/2-PP	BODY, POLYPROPYLENE (BLACK) (3-WAY) (1-1/2" NPT THD.)
	CP823548-1-1/2-PP	BODY, POLYPROPYLENE (BLACK) (3-WAY) (1-1/2" BSPT THD.)
9	CP20126-FELT	DUST PLUG, FELT
10	CP38435-M8-SSNY	ELASTIC LOCKNUT, STAINLESS STEEL (2 REQ'D)
11	CP23543-PP	BALL, POLYPROPYLENE (WHITE) (2-WAY)
11A	CP46079-SS	BALL, 303 STAINLESS STEEL (2-WAY)
11B	CP23545-PP	BALL, POLYPROPYLENE (WHITE) (3-WAY)
12	CP7717-2-145-VI	O-RING, VITON (2 REQ'D)
13	CP23549-TEF	SEAL, TEFLON (2 REQ'D)
14	CP7717-2-222-VI	O-RING, VITON (2 REQ'D)
	CP23552-1-1/4-PP	END CAP, POLYPROPYLENE (BLACK) (1-1/4" NPT THD.) (2 REQ'D)
15	CP823552-1-1/4-PP	END CAP, POLYPROPYLENE (BLACK) (1-1/4" BSPT THD.) (2 REQ'D)
	CP23551-1-1/2-PP	END CAP, POLYPROPYLENE (BLACK) (1-1/2" NPT THD.) (2 REQ'D)
	CP823551-1-1/2-PP	END CAP, POLYPROPYLENE (BLACK) (1-1/2" BSPT THD.) (2 REQ'D)
15A	CP46064-PP	END CAP, POLYPROPYLENE (BLACK) (50-SERIES FLANGE) (4 REQ'D)
16	CP46073-110-302SS	HEX HEAD CAP SCREW, STAINLESS STEEL (4 REQ'D)
17	CP46078-302SS	FLAT WASHER, STAINLESS STEEL (8 REQ'D)
18	CP46074-302SS	HEX NUT, STAINLESS STEEL (4 REQ'D)
19	CP48156-PP	#50 X 1-1/2" THREADED FITTING, POLYPROPYLENE (BLACK)
AB3468-KIT, SPARE PARTS KIT (INCLUDES ALL ITEMS MARKED WITH * )		

NOTE: (B) IN PART NUMBER INDICATES B.S.P.T. INLET AND OUTLET CONNECTIONS  
 ■ NOTE: FOR JACKETED CABLE MOTORS SPECIFY CABLE LENGTH IN PART NUMBER—  
 03 (0.3-METER), 05 (0.5-METER), 15 (1.5-METER) OR 60 (6.0-METER).  
 EXAMPLE: 50516-01C05

DESCRIPTION: 3468R  
DIRECT VALVE  
ELECTRIC REGULATING  
BALL VALVE

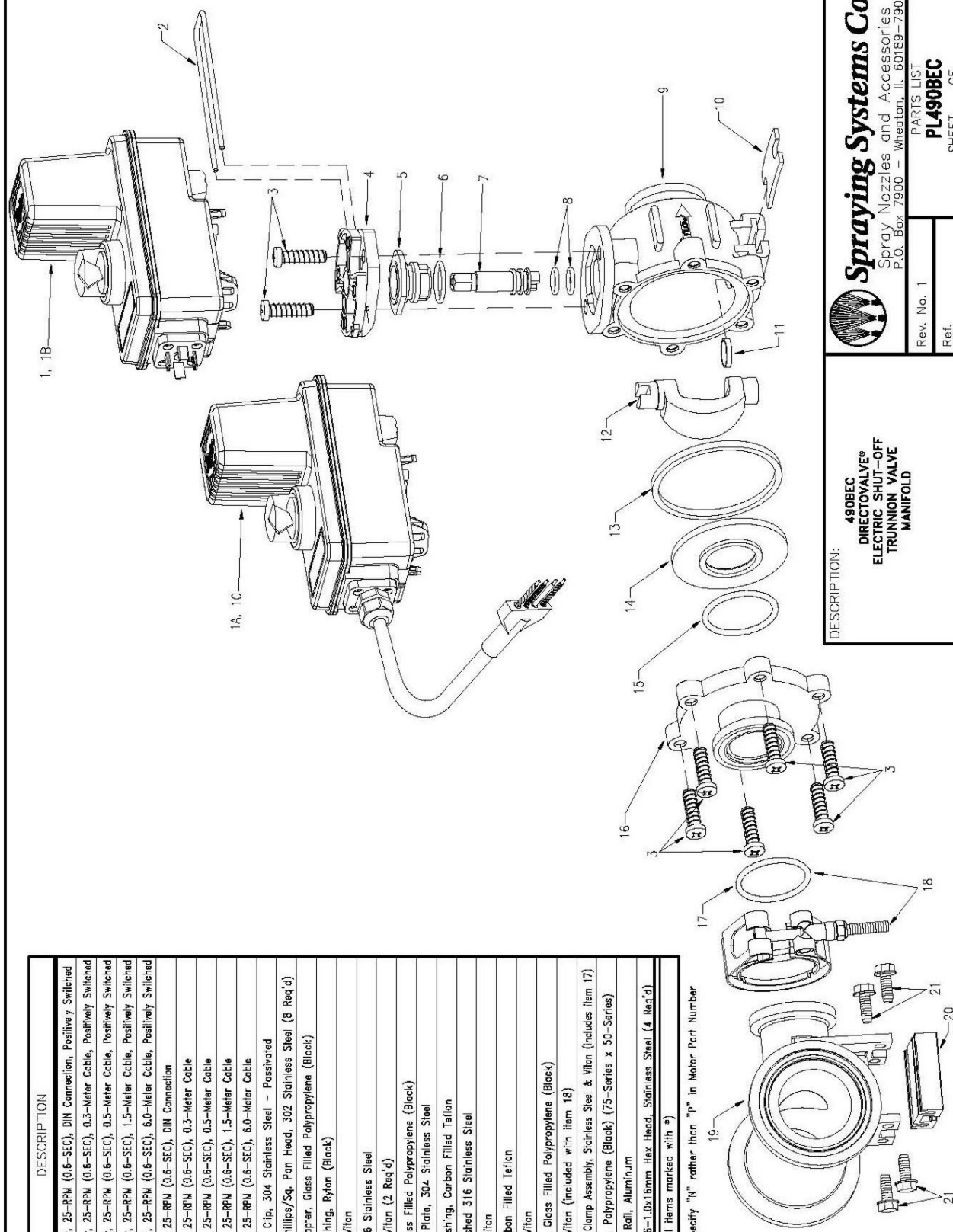
**Spraying Systems Co.**  
 Spray Nozzles and Accessories  
 P.O. Box 7900 — Wheaton, IL 60189-7900

Rev. No. 1  
 Ref.


PARTS LIST  
**PL3468R**  
 SHEET OF

ITEM	PART NO.	DESCRIPTION
1	50515-250P ■	BEC Motor, 25-RPM (0.6-SEC), DIN Connection, Positively Switched
	50515-25CP03 ■	BEC Motor, 25-RPM (0.6-SEC), 0.3-Meter Cable, Positively Switched
	50515-25CP05 ■	BEC Motor, 25-RPM (0.6-SEC), 0.5-Meter Cable, Positively Switched
1A	50515-25CP15 ■	BEC Motor, 25-RPM (0.6-SEC), 1.5-Meter Cable, Positively Switched
	50515-25CP60 ■	BEC Motor, 25-RPM (0.6-SEC), 6.0-Meter Cable, Positively Switched
1B	50533-250	BE Motor, 25-RPM (0.6-SEC), DIN Connection
	50533-25C03	BE Motor, 25-RPM (0.6-SEC), 0.3-Meter Cable
	50533-25C05	BE Motor, 25-RPM (0.6-SEC), 0.5-Meter Cable
1C	50533-25C15	BE Motor, 25-RPM (0.6-SEC), 1.5-Meter Cable
	50533-25C60	BE Motor, 25-RPM (0.6-SEC), 6.0-Meter Cable
2	CP05017-SSPV	Retaining Clip, 304 Stainless Steel - Passivated
3	CP45317-1 1/8-SS	Screw, Phillips/Sq. Pan Head, 302 Stainless Steel (8 Req'd)
4	CP50514-PP	Motor Adapter, Glass Filled Polypropylene (Black)
5	CP50505-RTON	Stem Bushing, Nylon (Black)
6	CP7717-2-117-VI	O-Ring, Viton
7	CP50532-316SS	Stem, 316 Stainless Steel
8	CP7717-M12X2.5-VI	O-Ring, Viton (2 Req'd)
9	CP50501-PP	Body, Glass Filled Polypropylene (Black)
10	CP50507-304SS	Mounting Plate, 304 Stainless Steel
11	CP50509-CTEF	Lower Bushing, Carbon Filled Teflon
12	CP50506-316SS	Ball, Polished 316 Stainless Steel
13	CP50504-VI	Gasket, Viton
14	CP50503-CTEF	Seal, Carbon Filled Teflon
15	CP7717-2-223-VI	O-Ring, Viton
16	CP50502-PP	End Cap, Glass Filled Polypropylene (Black)
17	CP7717-2-222-VI	O-Ring, Viton (included with item 18)
18	46072-50	50-Series Clamp Assembly, Stainless Steel & Viton (includes item 17)
19	CP46717-PP	Tea Body, Polypropylene (Black) (75-Series x 50-Series)
20	CP45216-AL	Mounting Rail, Aluminum
21	CP45259-SS	Screw, M6-1.0x16mm Hex Head, Stainless Steel (4 Req'd)
490BEC-KIT, Spare Parts Kit (includes all items marked with *)		

\*Note: For Negatively Switched Motors Specify "N" rather than "P" in Motor Part Number  
Example: 50515-25CN05



DESCRIPTION:  
490BEC  
DIRECT VALVE®  
ELECTRIC SHUT-OFF  
TRUNNION VALVE  
MANIFOLD

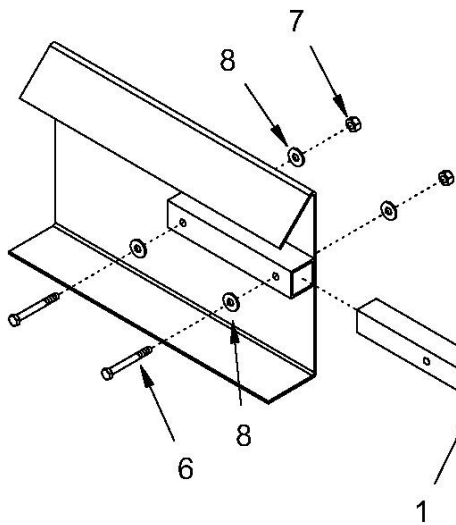

**Spraying Systems Co.®**  
 Spray Nozzles and Accessories  
 P.O. Box 7900 - Wheaton, IL 60189-7900

PARTS LIST  
**PL490BEC**  
 Rev. No. 1  
 Ref.

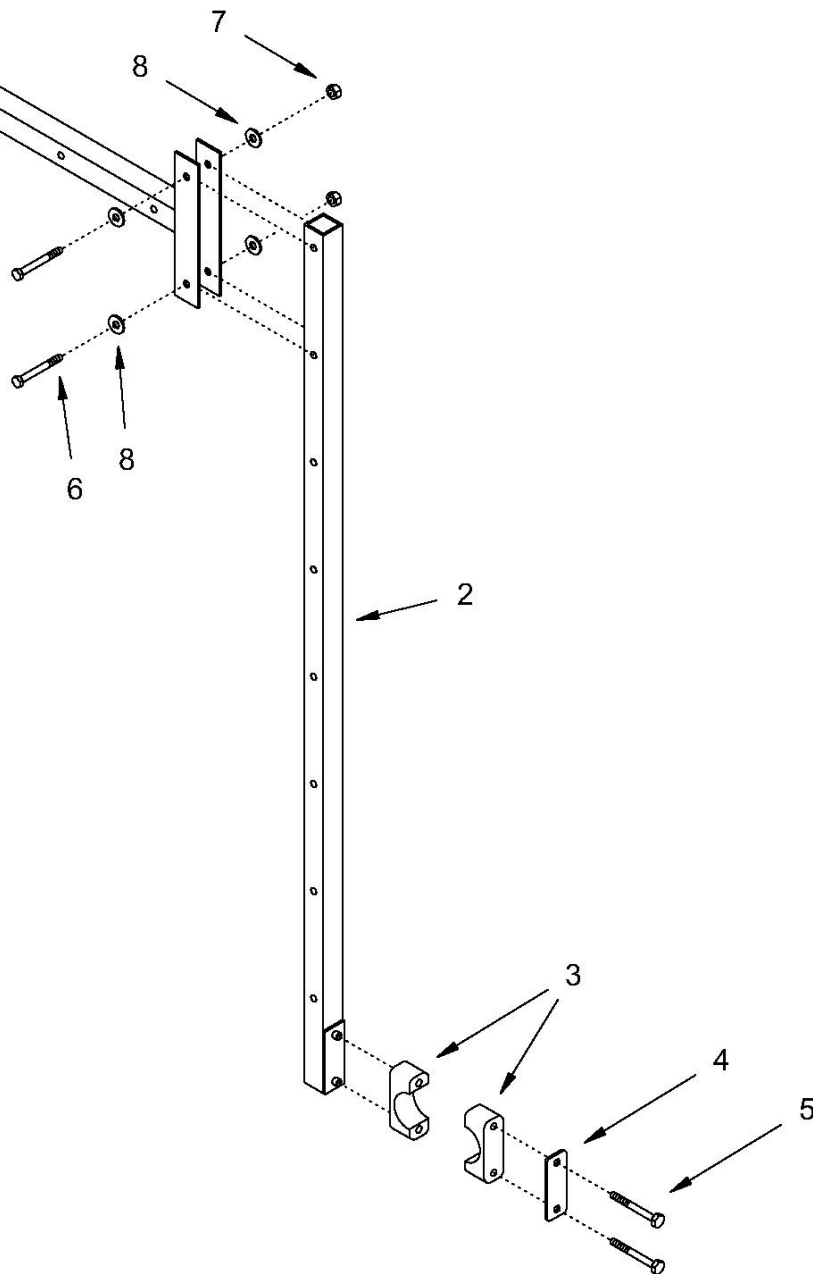
SHEET 1 OF 1







Item	Qty	Part Number	Description
1	1	FAB-3007-V2	Spray Bar Mount
2	1	FAB-3008	Spray Bar Mount: Vertical
3	2	LHA-CLH-6200-PP	Set 2T Block
4	1	LHA-SCP-6	Cover Plate
5	2	LHA-SHB-6	Ø1/4-20 Bolt
6	4	FAS-SHC-5/16-18X2 1/2-SS	Ø5/16-18 x 2 1/2 Stainless Hex Cap Screw
7	4	FAS-NYS-5/16-18-SS	Ø5/16-18 Stainless Nyloc Nut
8	8	FAS-WSA-5/16-SS	Ø5/16 Stainless Washer

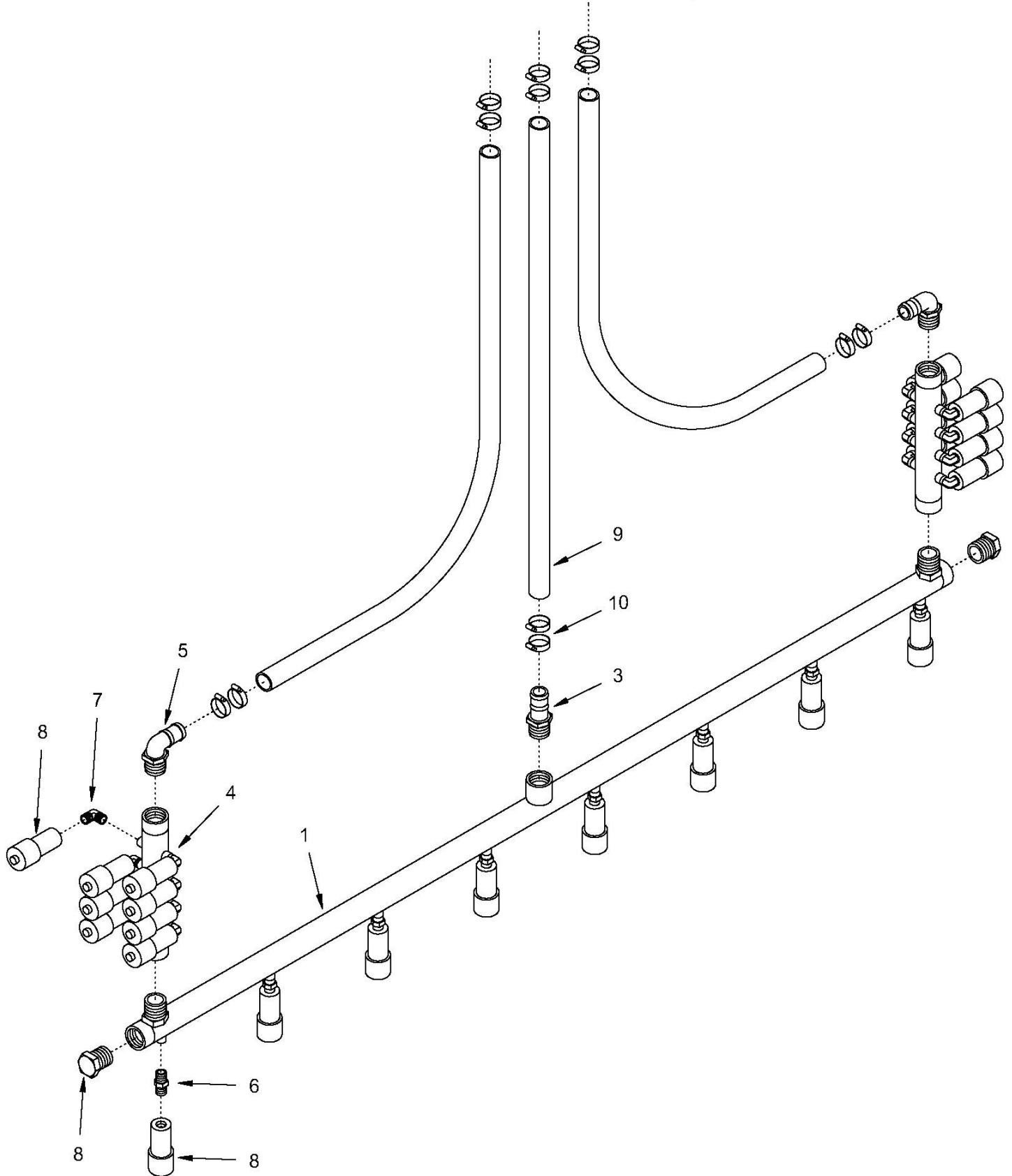


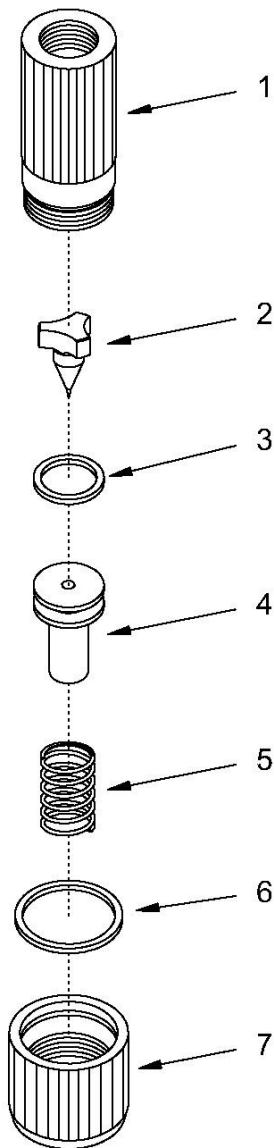
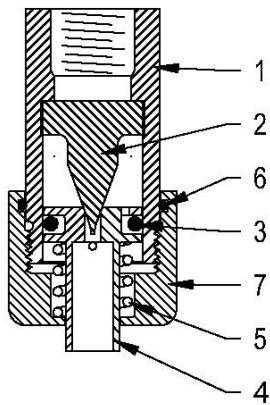
## NOTES:

1. 2 Sets per Assembly

<b>NORSTAR</b> INDUSTRIES, INC.		2302 A St. S.E. Auburn WA 98002	
TITLE: <b>ANTI-ICE SKID SPRAYBAR MOUNTING</b>			
DRAWN BY: <b>J GOULET</b>	CHECKED BY:	SCALE: <b>1:10</b>	PAGE: <b>1/1</b>
DATE CREATED: <b>12/23/03</b>	DRAWING NUMBER: <b>ASM-7003-V2</b>	DATE REVISED: <b>1/3/06</b>	

To Electric Ball Valve Bank Assembly





Item	Qty	Part Number	Description
1	1	FAB-3157-V/2	Stainless Steel Spray Bar
2	2	PPF-HXP-20MP	1 1/4" Poly Hex Plug
3	1	PPF-SBR-20BX20MP	1 1/4" Poly Hose Barb
4	2	FAB-3158-V/2	Stainless Steel Side Manifold
5	2	PPF-9BR-20BX20MP	1 1/4" Poly 90° Hose Barb
6	8	BRF-HXN-06MP	3/8" Brass Hex Nipple
7	16	BRF-9EL-06MP	3/8" Brass Double Male Elbow
8	24	ASM-3175	Variable Orifice Nozzle Assembly
9	3	HSE-7211-20	8' length 1 1/4" Black Horizon Hose
10	12	FAS-7655-20	1 1/4" Gear Clamp
ASM-3175 Variable Orifice Nozzle Assembly			
Item	Qty	Part Number	Description
1	1	FAB-3160	Nozzle Body
2	1	FAB-3166	Meter Stub
3	1	ORI-2-206	O-Ring
4	1	FAB-3165	Orifice Piston
5	1	SPR-4670	Spring
6	1	ORI-2-022	O-Ring
7	1	FAB-3167	Retainer Cap

## NOZZLE ADJUSTMENT:

TIGHTEN THE ADJUSTING CAP UNTIL IT BOTTOMS OUT AND CAN BE TIGHTENED NO FURTHER. LOOSEN THE CAP UNTIL THE SCORE MARKS LINE UP. CONTINUE TO BACK THE CAP OFF, IN A COUNTER-CLOCKWISE DIRECTION, FOR TWO FULL TURNS. THE SCORE MARKS SHOULD BE ALLIGNED AND THE NOZZLE IS CORRECTLY ADJUSTED.

<b>NORSTAR</b> INDUSTRIES, INC.		2302 A St. S.E. Auburn WA 98002	
TITLE: <b>ANTI-ICE SPRAYBAR VARIABLE ORIFICE NOZZLE</b>			
DRAWN BY: <b>J GOULET</b>	CHECKED BY:	SCALE: <b>1:10</b>	PAGE: <b>1/1</b>
DATE CREATED: <b>12/10/03</b>	DRAWING NUMBER:	DATE REVISED:	

## **WARRANTY STATEMENT**

NORSTAR INDUSTRIES, INC. warrants to Purchaser for use, that, if any part of the product proves to be defective, in material or workmanship, within one (1) year from date of original installation, and is returned to NORSTAR INDUSTRIES, INC. within thirty (30) days after such defect is discovered, NORSTAR INDUSTRIES, INC. will, (at its option) either replace or repair said part. All returns shall be authorized prior to shipment. Freight will be prepaid by customer.

This warranty does not apply to normal deterioration, due to wear and/or exposure to the elements, damage resulting from misuse, neglect, accident, improper installation and/or maintenance, or use of non-compatible chemicals.

Said part will not be considered defective if it substantially fulfills the performance specifications.

Auxiliary power equipment resold by NORSTAR INDUSTRIES, INC. (gasoline engine) is warranted by the manufacturer, **NOT** by NORSTAR INDUSTRIES, INC. Electronic components are not to be disassembled, without the express written permission of NORSTAR INDUSTRIES, INC.

In the event of a defect in the sprayer control or injection pump, Norstar Industries, Inc. will provide a loaner injection sprayer control (computer) and/or injection pump, within twenty four (24) hours from the time user and Norstar Industries determine repairs cannot be made in the field.

Defective parts returned to NORSTAR INDUSTRIES, INC. must include a packing slip with the following information: Sprayer Model, Serial Number, Date Installed, Dealer from whom purchased.

NORSTAR INDUSTRIES, INC. neither assumes, nor authorizes anyone to assume for it, any other obligation or liability in connection with said part, and will not be liable for consequential damages.

**THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES OF MERCHANTABILITY FITNESS FOR PURPOSE AND OF ANY OTHER TYPE, OF WARRANTY, WHETHER EXPRESS, OR IMPLIED. NO AGREEMENT MODIFYING, OR EXTENDING THIS WARRANTY, WILL BE BINDING ON NORSTAR INDUSTRIES, INC., UNLESS IN WRITING AND SIGNED BY AN AUTHORIZED EMPLOYEE OF NORSTAR INDUSTRIES, INC.**