

NORSTAR **INDUSTRIES, INC.**

NSC-IP7 Anti-icing Skid with Dj Controls



NORSTAR INDUSTRIES, INC.

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Hydraulic Driven Anti-ice Skid

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Operator Quick Start

Power up the Control Point system.

1. Start the truck or turn on the ignition.
2. Briefly press the console button if the Control Point system did not power on with the ignition switch.
3. If equipped, flip the mode select switch to anti-icing.

Select Materials to be applied.

Note: If only one liquid product is enabled and operator manual speed is disabled the material select screen will not be accessible.

4. Turn on the liquid switch on the switch module.
5. Press and hold the console button until the console beeps to switch to the material select screen. For 7.X software the button must be pressed twice to reach the material select screen.
6. Press the liquid product increase/decrease switch to move the arrow to the desired liquid product.
7. Press and hold the console button until the console beeps to switch to the current totals screen.

Clear current totals (if programmed to allow operator clearing).

8. Press the liquid increase switch.
9. Once prompted, press the liquid decrease switch to clear the totals. (To cancel the operation, press and hold the console button until the console beeps.)
10. Press and hold the console button until it beeps to switch to the season totals screen. Make note of season totals if needed.
11. Press and hold the console button until it beeps to return to the operate screen.

Check application rates.

12. Press the liquid increase/decrease switch to set the desired target application rates for the liquid material.

Apply Material

13. Turn on truck hydraulics.
14. Turn on the sander switch
15. Turn the master switch on the switch module to AUTO when ready to apply material.
16. Drive and apply material.

Granular Product Status

The selected product label is displayed on the top line.

When the master switch is OFF the current target application rate is shown in small numbers.

When the master switch is ON the current application rate is shown in large numbers as shown.

The selected application rate units are displayed on the bottom line.

Spread Width

Displays the spinner width as a percentage of full the maximum spread width.

Date Display / Temperature Display

The date is displayed here if the temp sensors are disabled.

Road and air temperatures are displayed here if the air and road temp sensors are enabled.

System Warnings

System warnings are displayed above the Spread Width bar.

Time Display

Displays the current set time.

Liquid Product Status

The selected product label is displayed on the top line.

When the master switch is OFF the current target application rate is shown in small numbers.

When the master switch is ON the current application rate is shown in large numbers as shown.

The selected application rate units are displayed on the bottom line.

Ground Speed

Displays the actual vehicle speed as measured from the vehicles speedometer output.

Console Button

Turns system on and off.

Press and hold until a beep is heard to cycle displays.

Display order: Operate Screen, Material Select, Current Totals, Season Totals.

NOTE: The master switch must be off to access the Current Totals and Season Totals screens. Console must have no ground speed to access the Material Select screen.



MASTER Switch

OFF - Disables system.

AUTO - System operates relative to ground speed.

UNLOAD - Runs system at maximum speed to unload product, when stationary.

NOTE: Master switch must be in the OFF position when starting the system.

Liquid INC/DEC (+/-) Switch

Increases or decreases (+/-) the target application rate between the pre-programmed minimum and maximum application rates.

Liquid ON/OFF Switch

Turns liquid channel on or off.

BLAST Button

Initiates a rapid pre-programmed dispersal product rate.

Granular INC/DEC (+/-) Switch

Increases or decreases (+/-) the target application rate between the pre-programmed minimum and maximum application rates.

Granular ON/OFF Switch

Turns granular channel on or off.



WIDTH ADJUST Knob

Adjusts spread width by changing spinner speed.

F4 Liquid Appl. Rate Menu

To enable the liquid anti-icing mode at least one anti-icing product channel must be enabled. Generally, the anti-icing liquids are configured on product channels 2, 3, or 4.

To enable anti-icing liquid channels press the F4 key to bring up the Liquid Application Rate menu as shown in Figure 3.4. Choose the liquid channel to enable and configure by pressing the corresponding key on the keyboard (1-4).

After the liquid channel is selected the console will display the application rate screen as shown in Figure 3.5 or Figure 3.6.

Set the ENABLE option for the selected product channel to YES by pressing Y. Select the desired rate change method by setting the STEP METHD option to YES or NO by pressing Y (YES) or N (NO) (refer to page 28 of the Control Point manual for an explanation of the rate change methods). Once the rate change method is selected enter the desired application rate values.

The product channel may be renamed to the material being used in the CHNL LBL option (a maximum of 9 characters may be used).

APPLICATION RATE	
SELECT A MENU ITEM	
1	Prewet disabled
2	deicing enabled
3	Liquid 3 DISABLED
4	Liquid 4 DISABLED

Figure 3.4: Liquid application rate configuration menu.

deicing APP RATES		
ENABLE	Yes	
STEP	YES	
METHD		
APP START	20.0	Gal/mile
IC/DC STP	5.0	Gal/mile
MIN APP	10.0	Gal/mile
MAX APP	50.0	Gal/mile
BLST RATE	40	Gal/mile
CHNL LBL	Deicing	

Figure 3.5: Screen display when the STEP METHD option is set to YES.

deicing APP RATES		
ENABLE	yes	
STEP	NO	
METHD		
RATE 1	5.0	Gal/mile
RATE 2	10.0	Gal/mile
RATE 3	15.0	Gal/mile
RATE 4	20.0	Gal/mile
RATE 5	25.0	Gal/mile
RATE 6	30.0	Gal/mile
RATE 7	35.0	Gal/mile
RATE 8	40.0	Gal/mile
RATE 9	45.0	Gal/mile
RATE 10	50.0	Gal/mile
BLST RATE	50.0	Gal/mile
CHNL LBL	deicing	

Figure 3.6: Screen display when the STEP METHD option is set to NO.

F5 Liquid Config. Menu

Once the liquid channel has been enabled the control settings must be adjusted properly control the system.

To configure the settings for the liquid product channel press the F5 key to bring up the Liquid Configuration menu as shown in Figure 3.7. Choose the liquid channel to configure by pressing the corresponding key on the keyboard (1-4).

After selecting the liquid channel to configure the console displays the configuration screen as shown in Figure 3.8. Set the PRE WET option to NO by pressing N.

The K-FACTOR can be manually entered with the K-FACTOR specified on the flow meter or set by running a liquid product calibration found under the F6 Cal menu (refer to page 42 of the Control Point User manual for instructions).

Set the SRVO DRV option to YES by pressing Y. Set the DRV FREQ to 100, TANK LEVEL to NO, and VALVE LOCK to YES.

The remaining values on this screen are set by running a system response test which is found under the F11 System Resp menu (refer to page 37 of the Control Point User manual for instructions). The Control Point console will indicate a system response completion by displaying the message "SYS RESPNS DONE". If during a system response the screen shown in Figure 3.8 is displayed an error has occurred and the system response will have to be restarted.

The values can be manually adjusted if necessary (refer to page 25 of the Control Point manual for adjustment definitions and options).

configuration	
SELECT A MENU ITEM	
1	Prewet disabled
2	DEICING enabled
3	Liquid 3 DISABLED
4	Liquid 4 DISABLED
5	boom

Figure 3.7: Liquid configuration menu

Deicing configuration		
Pre wet	no	
k-factor	590.52	p/gal
Srvo drv	YES	
Drv freq	100	Hz
Pwm offset	5	
Pwm sat.	98	
Sys respns	5.000000	
Valv boost	0.0	
Afilt	0.078500	
Tank level	No	
Valve lock	YES	

Figure 3.8: Liquid system control settings

Part Number	Description	K-FACTOR
PM00370040S1	1 ½" Poly Flow meter	590.52

F5 Liquid Config. Menu (Continued)

The boom sections must also be configured before the system can be used. Return to the Liquid Configuration menu (Figure 3.7). Choose option 5 to enter the Boom Configuration menu as shown in Figure 3.9.

Select the section to configure by pressing the corresponding key (1-5). Once a selection is made the console will display the configuration screen as shown in Figure 3.10. Set SECTN ENABLED to YES, 12V ON to YES, NUM OF NZZLS to 1, and NZZLE SPCNG to 99. These settings can be used for all sections if desired though generally sections 1-3 will only be enabled.

Boom section 5 is a special input section that is used to switch between anti-icing and pre-wet modes on combo deicer/sander units. For a liquid only system set the BOOM INPUT setting to YES (Figure 3.11). This will ensure proper operation in the liquid only mode.

```
Boom configuration
SELECT A MENU ITEM
1  Section 1
2  Section 2
3  Section 3
4  section 4
5  Section 5/auto anti-
   icing
```

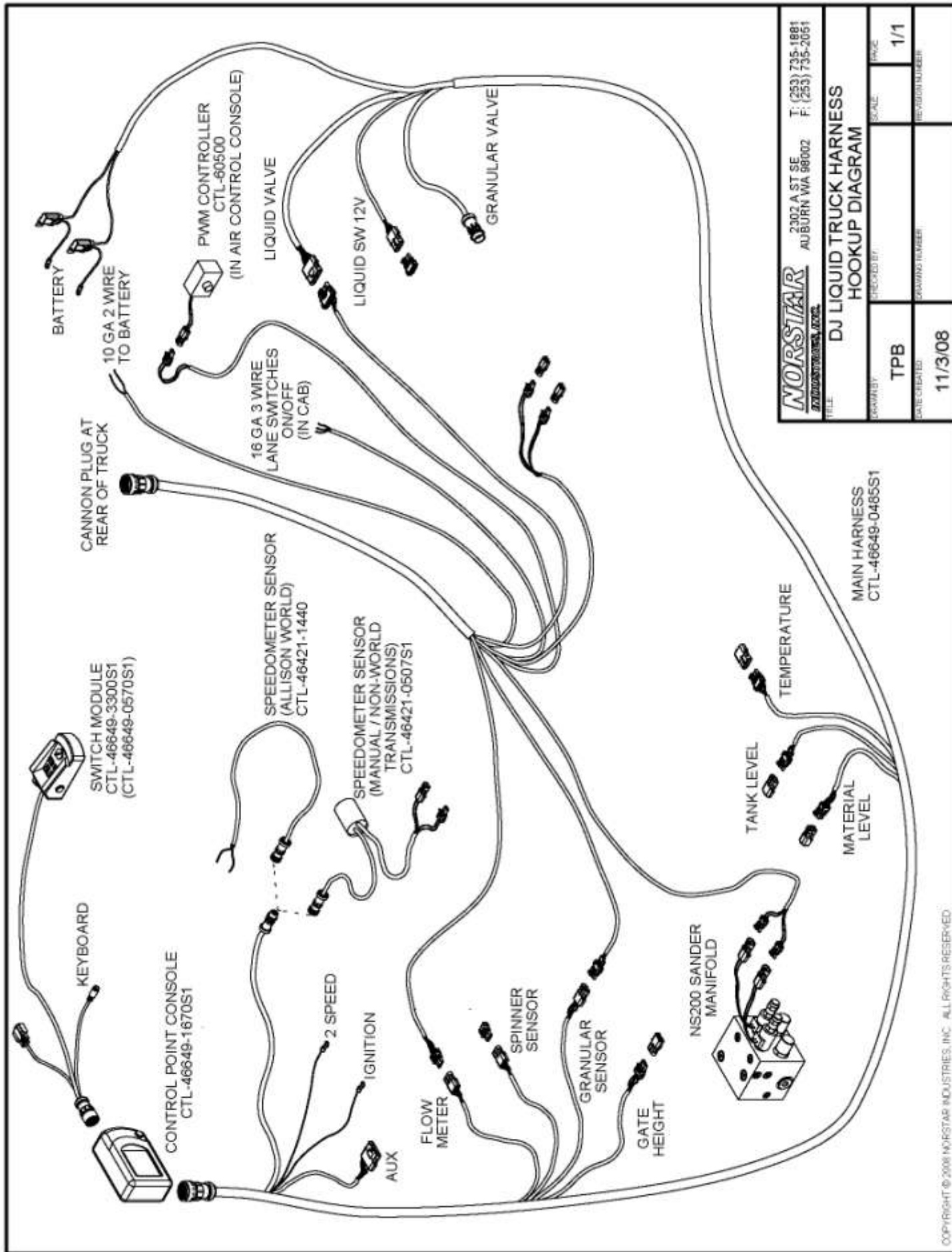
Figure 3.9: Liquid configuration menu

```
Section 1 configuration
Sectn enbled   Yes
12v on         Yes
Num of nzzls   1
Nzzle spcng    99.0 in
```

Figure 3.10: Liquid system control settings

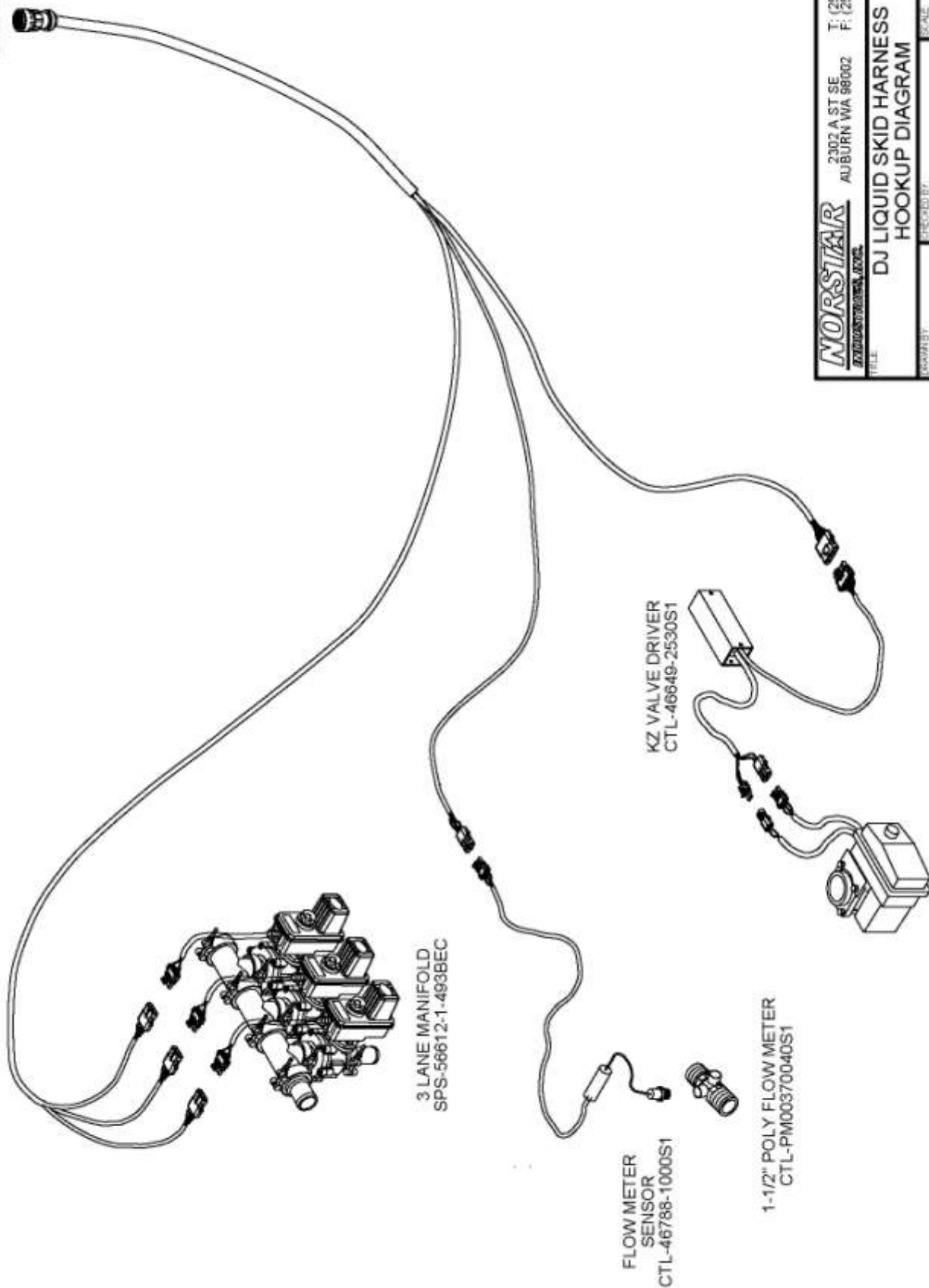
```
Section 5 configuration
Sectn enbled   Yes
12v on         Yes
Num of nzzls   1
NzZle spcng    99.0 in
Boom input     Yes
```

Figure 3.11: Liquid system control settings

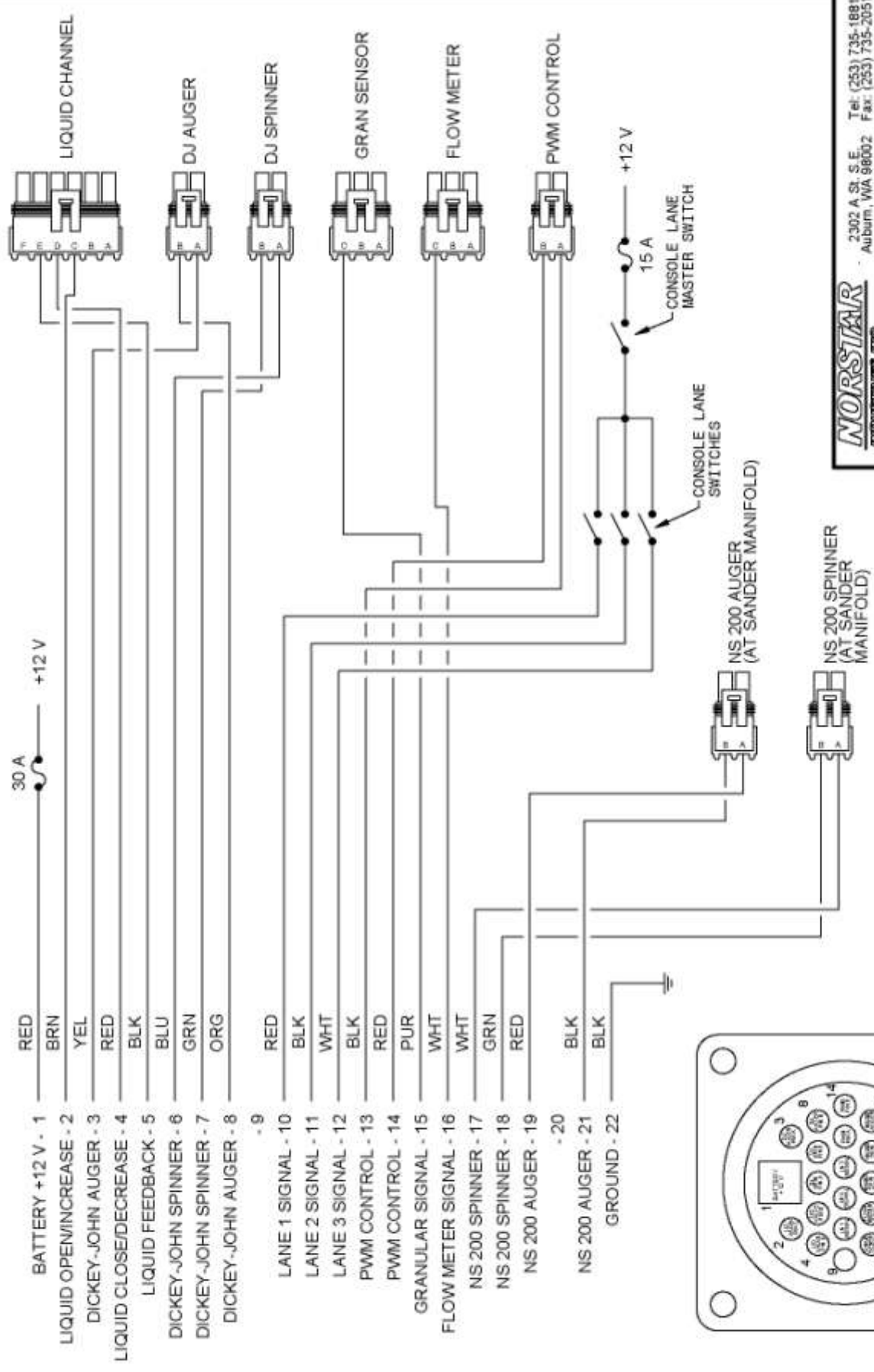


NORSTAR INDUSTRIES, INC.		2302 A ST SE AUBURN WA 98002		T: (253) 735-1881 F: (253) 735-2051	
DJ LIQUID TRUCK HARNESS HOOKUP DIAGRAM					
DRAWN BY TPB		CHECKED BY		SCALE	PAGE 1/1
DATE CREATED 11/3/08		DRAWING NUMBER			

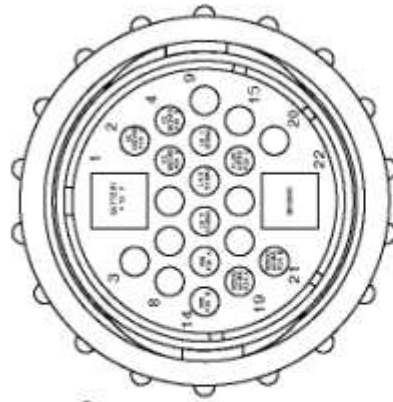
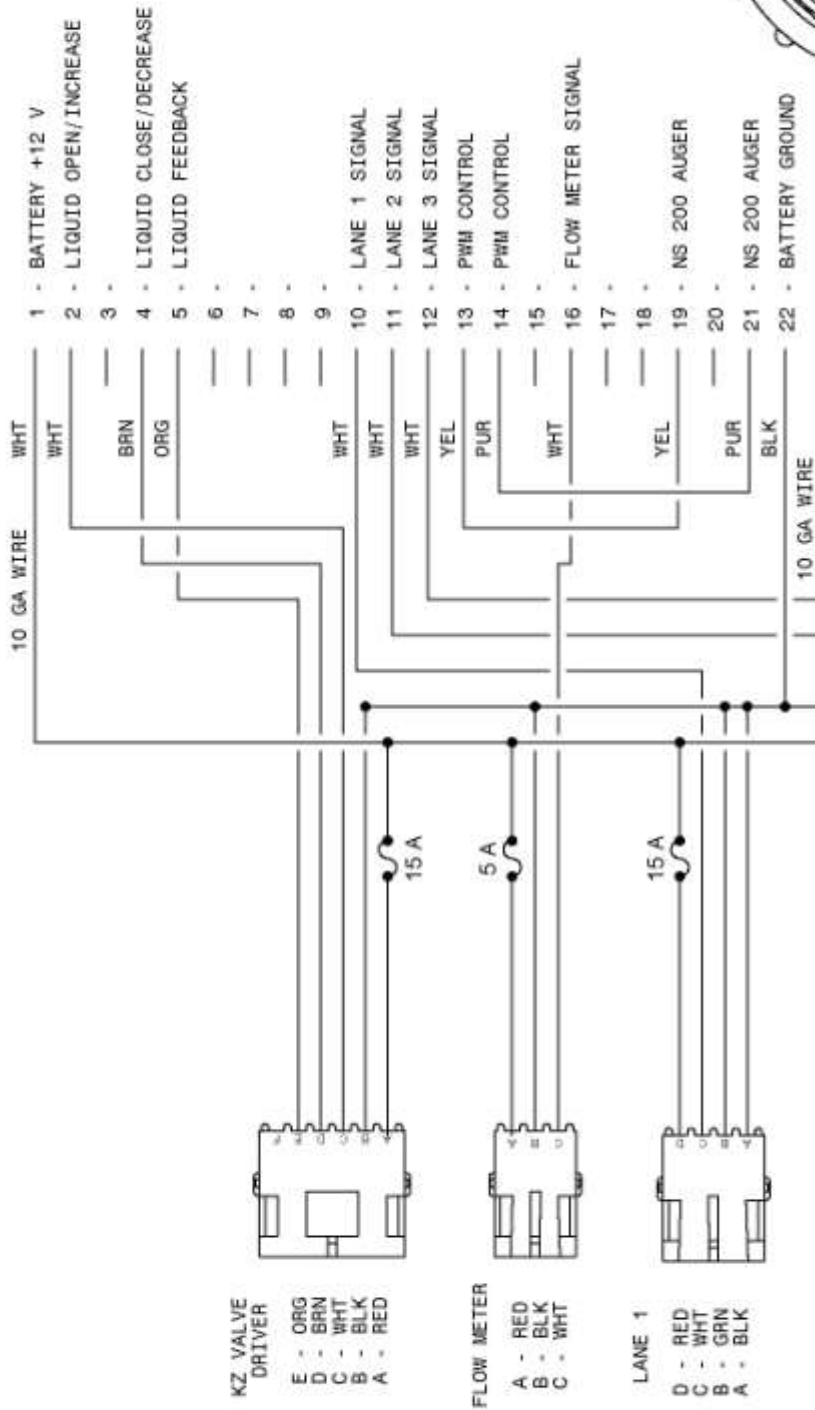
CANNON PLUG
ON SKID



NORSTAR <small>INDUSTRIES, INC.</small>		2302 A ST SE AUBURN WA 98002	T: (253) 735-1881 F: (253) 735-2061
DJ LIQUID SKID HARNESS HOOKUP DIAGRAM			
TITLE:	DRAWN BY: TPB	CHECKED BY:	SCALE:
DATE CREATED: 11/3/08	DRAWING NUMBER:	REVISION NUMBER:	PAGE: 1/1



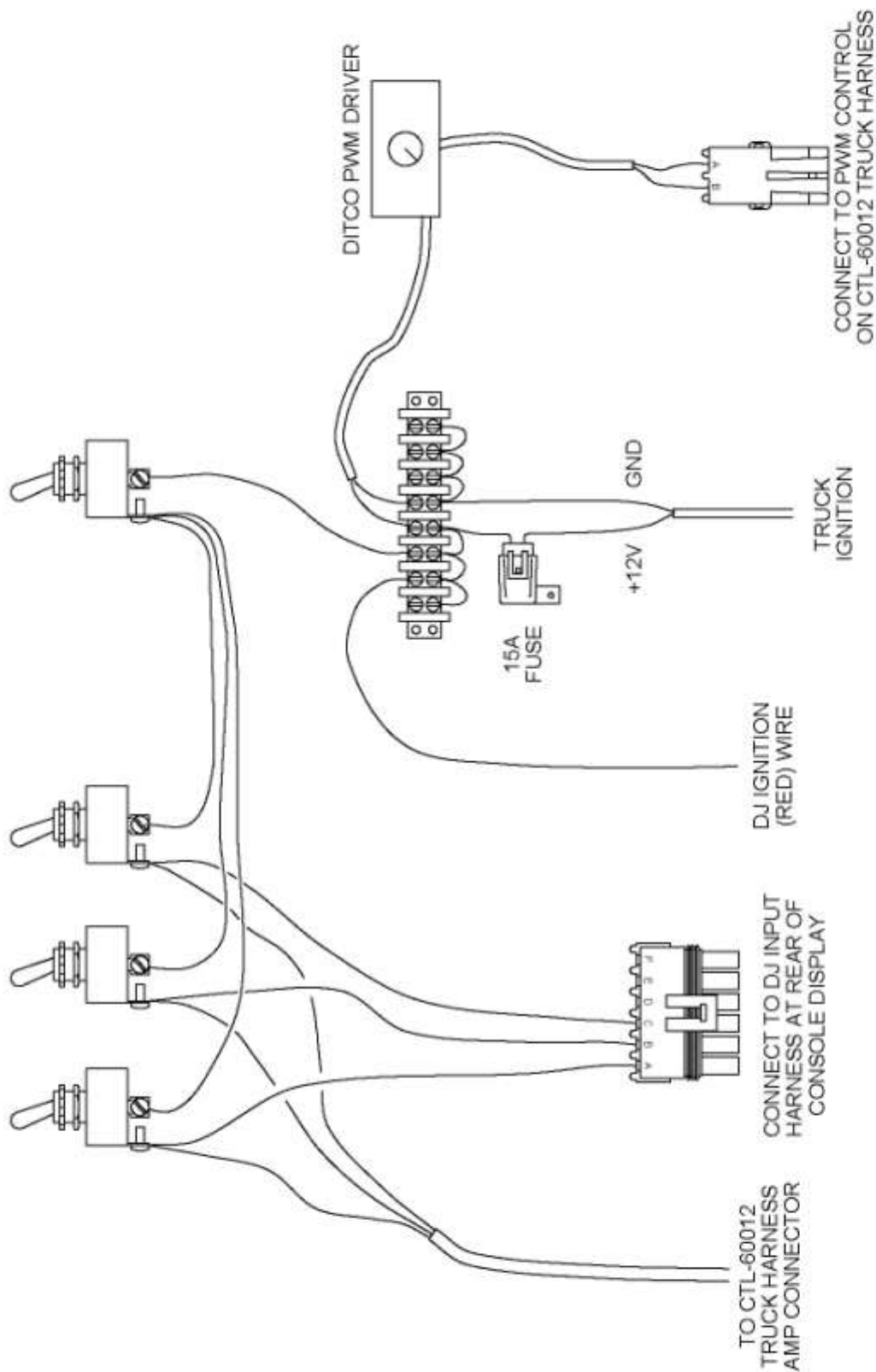
NORSTAR <small>ADJUSTMENT, INC.</small>		2302 A St. S.E. Auburn, WA 98002		Tel: (253) 735-1881 Fax: (253) 735-2051	
DJ LIQUID TRUCK HARNESS					
DRAWN BY TPB	CHECKED BY	SCALE	PAGE 1/1	DATE REVISED	
DATE CREATED 05/11/2005	DRAWING NUMBER				



NORSTAR INDUSTRIES, INC. 2302 A St. S.E. Auburn, WA 98002 Tel: (253) 735-1881 Fax: (253) 735-2051		DJ LIQUID SKID HARNESS	
DRAWN BY TPB	CHECKED BY	SCALE 1/1	PAGE 1/1
DATE CREATED 5/10/2005	DRAWING NUMBER CTL-60011	DATE REVISED 6/18/09	

LANE MASTER

LEFT LANE CENTER LANERIGHT LANE

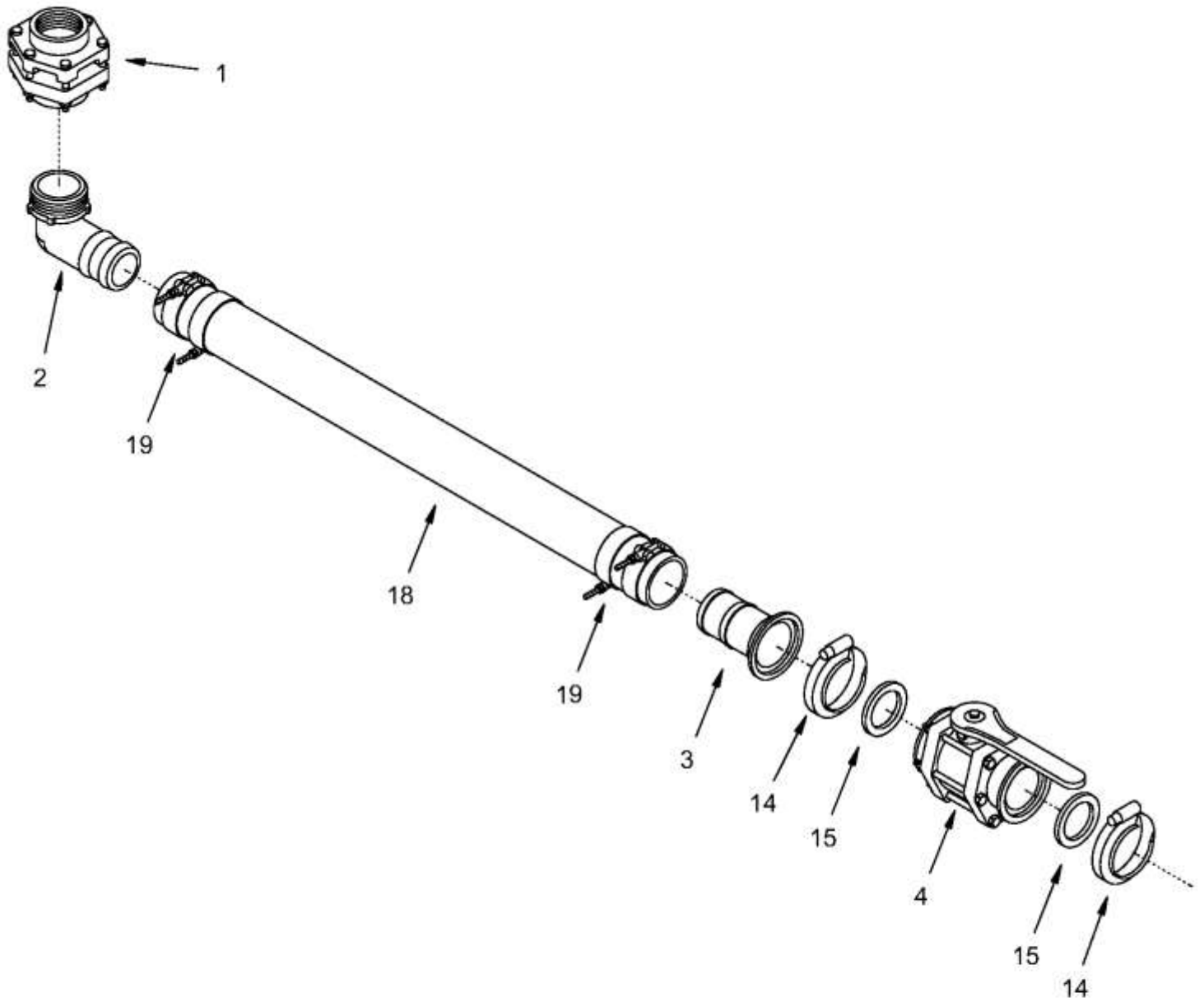


NORSTAR 2302 A St. S.E. Tel: (253) 735-1881
Auburn, WA 98002 Fax: (253) 735-2051
NORSTAR INDUSTRIES, INC.

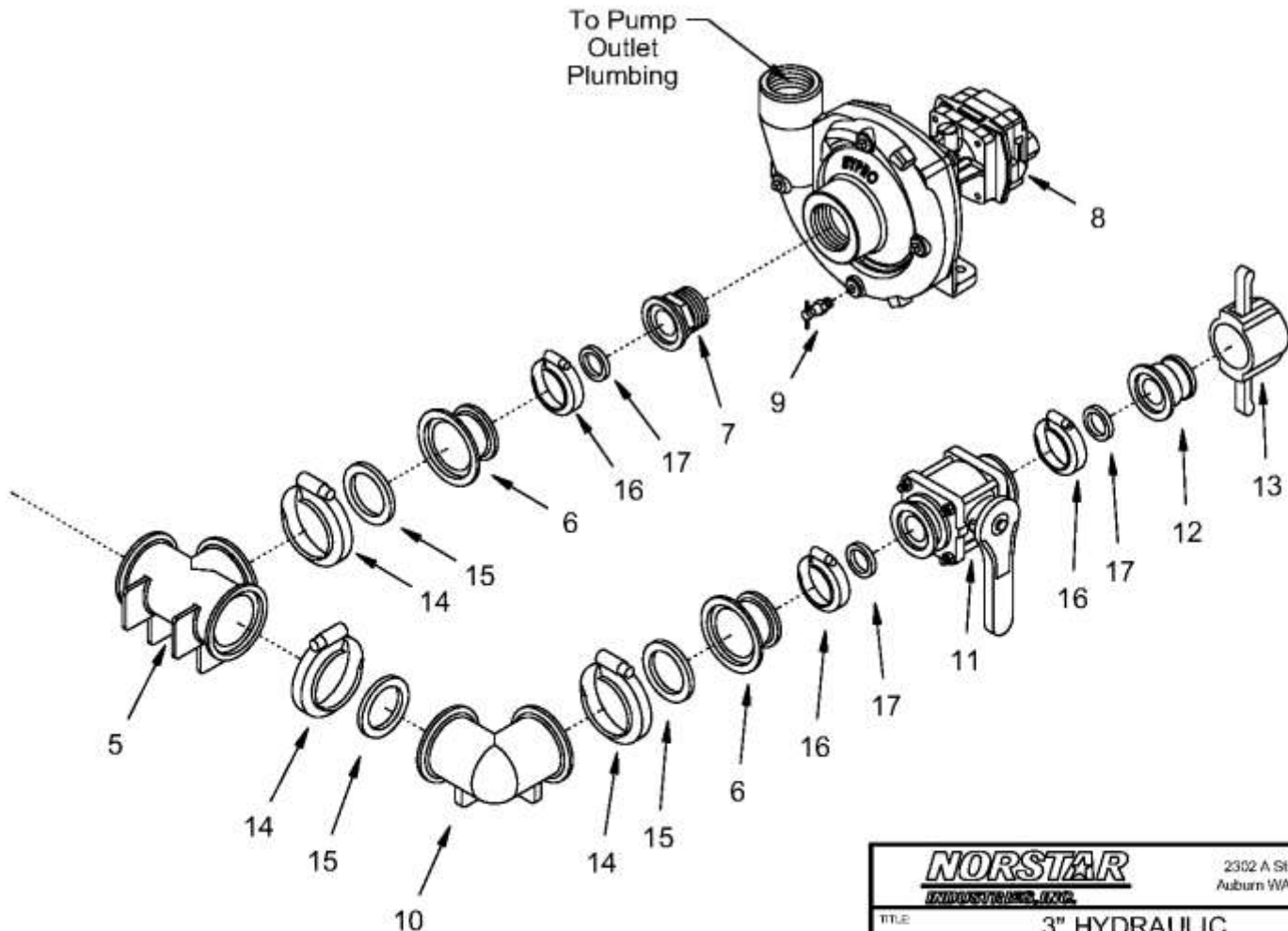
FILE

DJ LIQUID CONSOLE WIRING

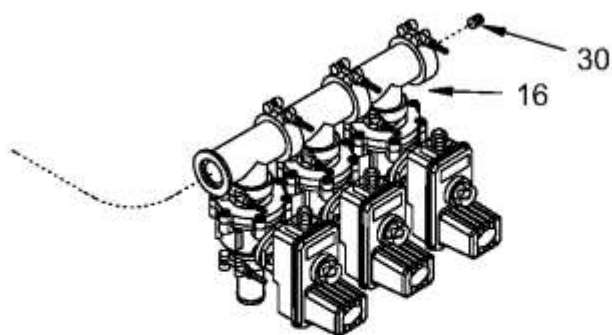
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TPB			1/1
DATE CREATED	DRAWING NUMBER	DATE REVISED	
07/10/09			



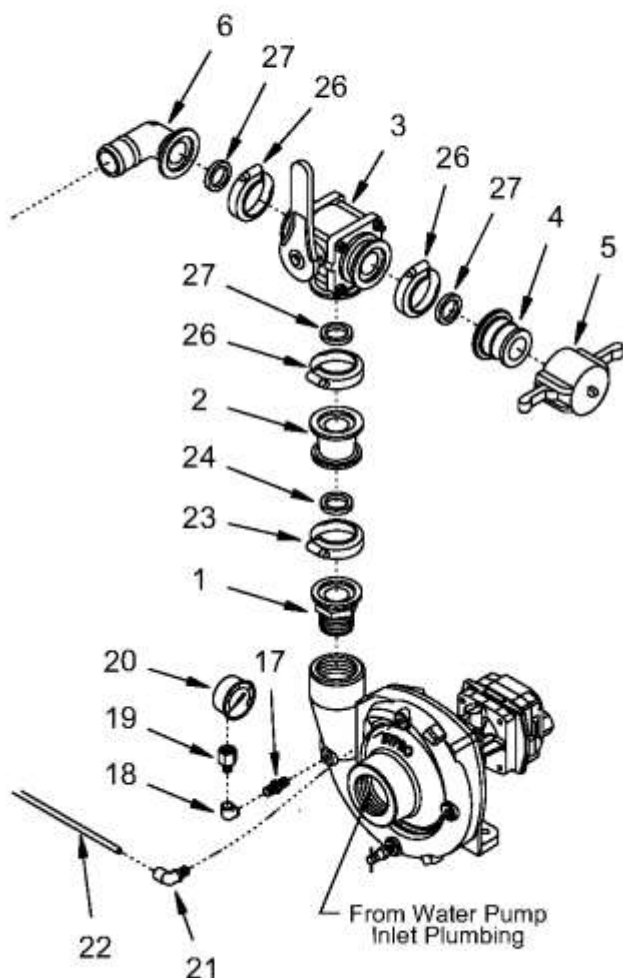
Item	Qty	Part Number	Description
1	1	PPF-BHD-48-BOLTED-BD	3" Poly Bottom Drain Bolted Bulkhead
2	1	PPF-9BR-48BX48MP	3" 90° Hose Barb
3	1	PPF-SBR-48BX48FL	3" Flange Hose Barb
4	1	PPF-V2B-48FL	3" Flange Ball Valve Bolted
5	1	PPF-TEE-48FL	3" Flange Tee
6	2	PPF-CPL-48FLX32FL	3" Flange x 2" Full Port Flange 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	PPF-BJO-48-HOSECLAMP	3" Heavy Duty Hose Clamp



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

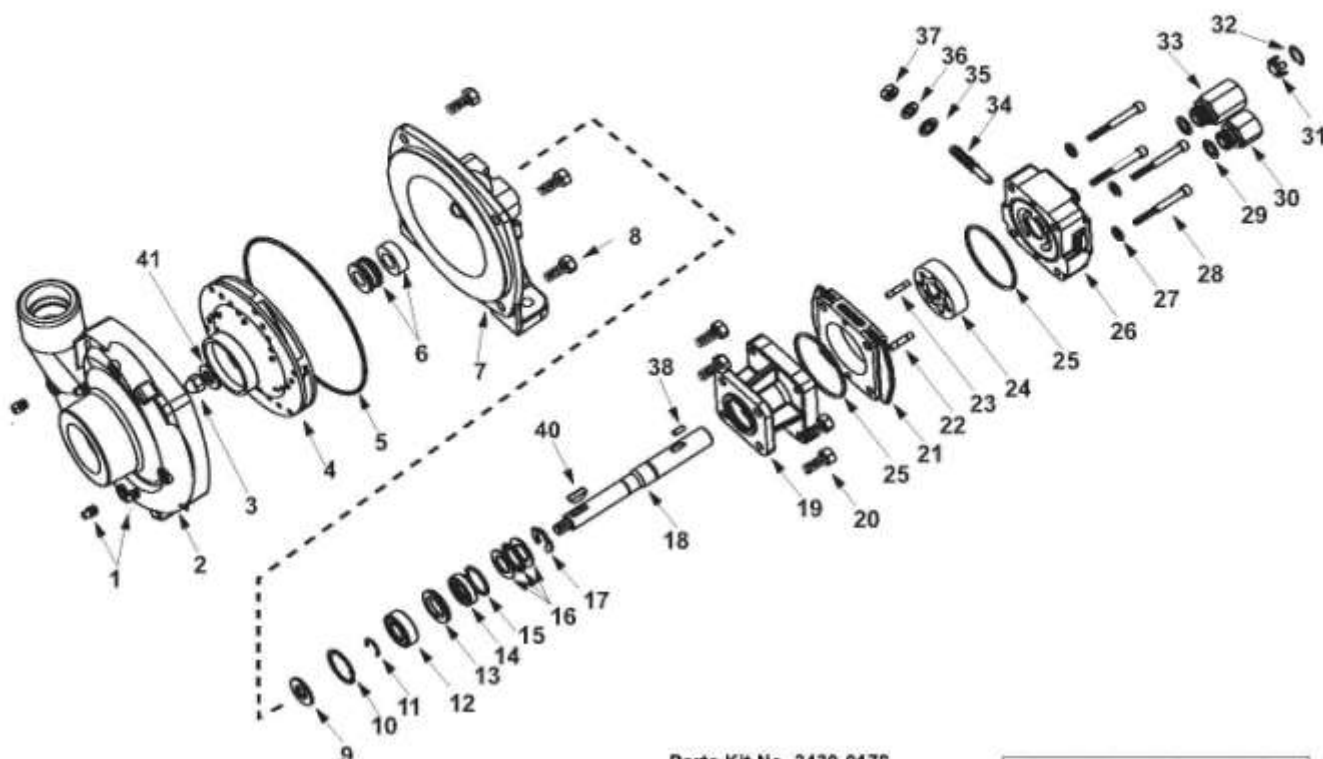


To Spraybar
Lane Hoses



Item	Qty	Part Number	Description
1	1	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	KZC-F6H-50KE-Y	KZ Flow Control Valve
9	1	SPS-CP48164-PP	75 Series Flange x 2" 90° Hose Barb
10	1	PPF-9BR-32BX24FL	2" 90° Hose Barb x 2" Std. Port Flange
11	1	PPF-BHD-24-FL	2" Std. Port Flange Bulkhead
12	1	PPF-9EL-24FL	2" Std. Port Flange 90° Elbow
13	1	SPS-AA126ML-F75-80	AA126 Strainer 75 Series Flange
13A	1	SPS-CP63025-F-PP	75 Series Flanged Strainer Head
13B	1	SPS-CP15941-4-SSPP	Screen 80 mesh
13C	1	SPS-CP48656-EPR	EDPM Gasket
13D	1	SPS-CP48654-PP	Strainer Bowl
13E	1	SPS-CP63150-EPR	EDPM Drain Cap Gasket
13F	1	SPS-CP48655-PP	Poly Drain Cap
14	2	PPF-ADP-24FLX24FP	2" Std. Port Flange x 1 1/2" FPT Adaptor
15	1	CTL-PM00370040S1	1 1/2" Flowmeter
15A	1	MID-120-0160	1 1/2" Flowmeter Bearing Kit (Not Shown)
16	1	SPS-56612-1-493BEC	Electric Ball Valve Bank Assembly
16A	1	SPS-AB356-KIT	Electric Ball Valve Repair Kit (Not Shown)
17	1	BRF-HXN-02MP	1/8" Brass Hex Nipple
18	1	BRF-9EL-02FP	1/8" 90° Brass Elbow
19	1	BRF-ADP-04FPX02MP	1/4" x 1/8" Brass Adapter
20	1	SPR-4826	Liquid Filled Pressure Gauge 0-100 psi
21	2	NHP-36942	Air Fitting Elbow 1/4" x 1/4"
22	5'	NHP-39251	DOT Air Line 1/4"
23	10	PPF-BJO-24-CLAMP	2" Std. Port Flange Screw Clamp
24	4	PPF-BJO-24-GASKET	2" Std Port EPDM Gasket
25	6	SPS-CP7717-2-229-VI	75 Series Viton 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	16	FAS-7655-36	2" Hose Clamp
30	1	BRF-HHP-04MP	3/8" Brass Hollow Hex Plug

NORSTAR <small>HYDRAULIC SYSTEMS, INC.</small>		2302 A St. S.E. Auburn WA 98002	
TITLE: 2" HYDRAULIC ANTI-ICE OUTLET PLUMBING (KZ VALVE)			
DRAWN BY: J GOULET	CHECKED BY:	SCALE: 1:11	PAGE: 1/1
DATE CREATED: 10/9/08	DRAWING NUMBER: ASM-7009-HYD-V3	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.

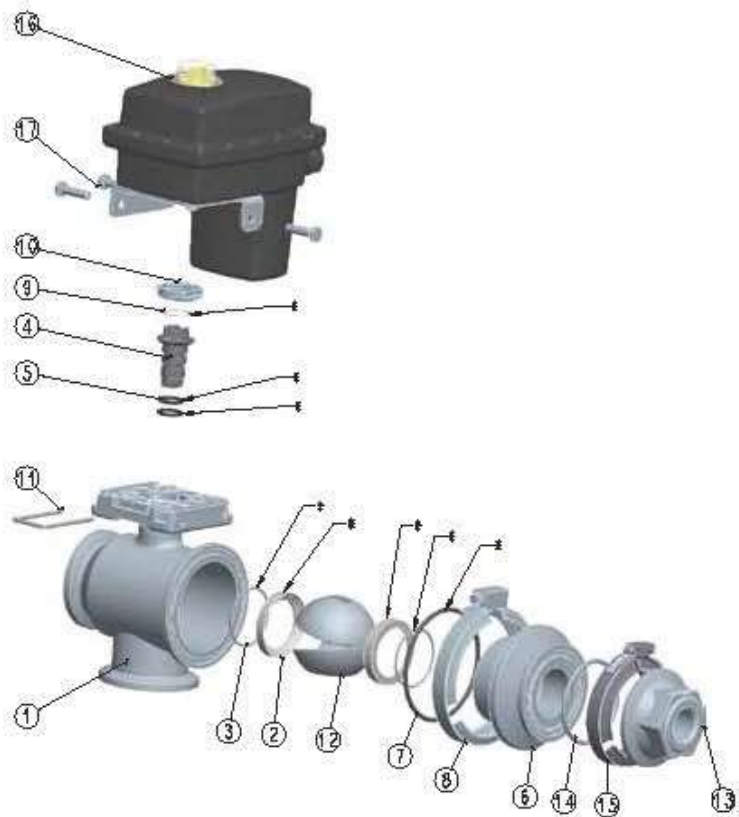
Ref. No.	Qty. Req'd.	Part No.	Description
1	4	2406-0016	Drain/Vent Plug
2	1	0154-9200S1	Pump Casing (Volute)
3	1	2253-0006	Impeller Nut
4	1	0405-9200P2	Impeller
5	1	1720-0083	O-ring
6	1	3430-0589	Mechanical Seal (Silicon Carbide)
7	1	0750-9300C	Mounting Flange
8	4	2210-0125	Hex Head Cap Screw
9	1	1410-0056	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
19	1	0511-2501	Shaft (HM1C & HM5C Models) 7" long
20	4	0151-2500C	Motor Body (Includes Main Bearing)
21	1	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

Materials List

No.	P/N	Description	Qty
1	QX5-161	Valve Body, 3-Way BL 1.5" FNPT	1
2	QX5-149	Seat, PTFE	2
3	QX5-180	O-Ring, #131, EPDM	2
4	QX4-120	Stem, SS Inline	1
5	QC3-130	O-Ring, #113, VITON	2
6	QX5-145*	End Cap, 1.5" Flange	1
	QX5-146	1.5" FNPT	
	QX5-147	1.25" FNPT	
7	QX5-181	O-Ring, #236, EPDM	1
8	QX5-210	V-Clamp, SS	1
9	QC3-170	Thrust Washer PTFE	1
10	QX4-121	Stem Retainer Bushing	1
11	QX-103	Hair Pin, SS	1
12	QX5-154**	Valve Ball, SS "V-Ball"	1
13	QX4-129**	End Cap, 1" Closed FNPT V-ball	1
14	QC3-134**	O-Ring	1
15	QX4-200	V-Clamp, SS	1
16		EH2 Actuator	1
17	100340	Bolt, 1/4" - 20 x 1" SS	3
*	QX5-RKT	Valve Repair Kit	
	QX5-RKTV	VITON Repair Kit	

Note: Polypropylene standard, nylon available
 *Shown in assembly **Requires 210° operation

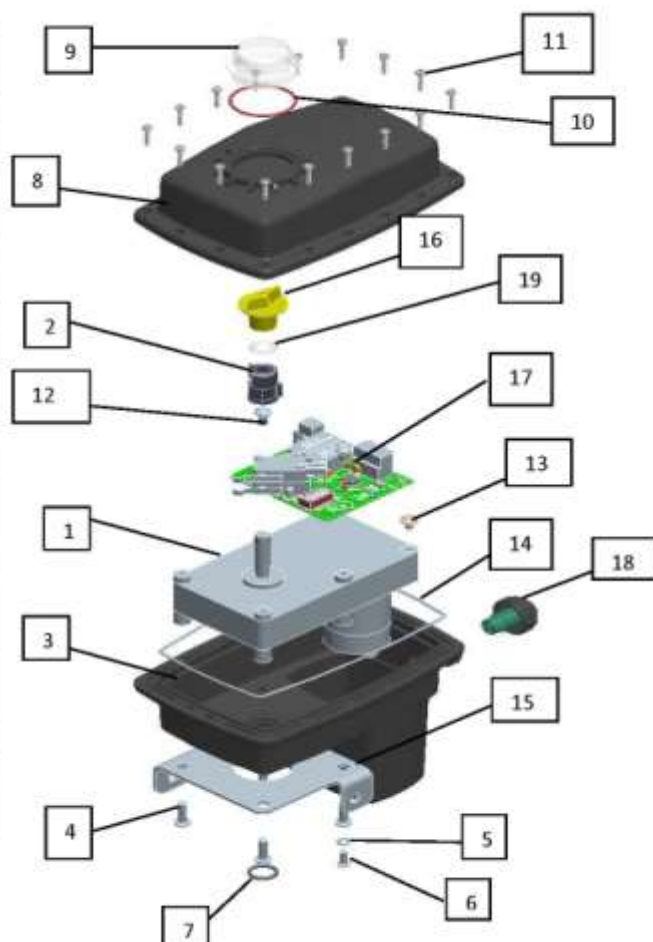


MATERIALS LIST

No.	P/N	Description	Qty
1	**	Gear Motor	1
2	499-0100	Cam Assembly, bump style	1
3	EH2-1200-N	Lower case, nylon	1
4	100-0018	Screw, 10-32 x 5/8" FHH SS - Flanged Hex	4
5	EH-139	O-ring, #008, Viton	1
6	EH-157	Screw, 8-18 x 3/8" SS	1
7	EHPT-140	O-ring, #112, Viton	1
8	EH2-1201-N* EH2-1202-N	Upper case, nylon Upper case, blank, nylon	1
9	EH3-114	Dome, Lexan	1
10	EH-130	O-ring, #027, Silicone	1
11	EHPT-1103	Screw, #5 x 9/16", SS	16
12	EHPT-143	Screw, 10-32 x 3/8", SS	2
13	EH2-1178	Screw, 10-32 x 1/4", Nylon	2
14	EH2-1221	O-ring, Silicone	1
15	100437	Bracket, SS	1
16	EH3-115-Y* EH3-115-R	Flag, yellow, poly Flag, red, poly	1
17	**	PCB Assembly	1
18	**	Wire Harness	1
19	EH-104	Cam Retainer	1

* shown in assembly

** consult factory – will vary by actuator part number



Motorized Valve Troubleshooting

KZCO motorized valve actuators are built to provide years of maintenance free use when properly installed in compatible applications. Disregarding feedback signals, there are two primary types of control circuits; variable positioning (commonly polarity reversing) and on/off (commonly one or two switched signals). Always refer to the standard wiring diagrams for testing of the control harness before opening the actuator housing. As a general rule, standard actuators will rotate clockwise (viewed from top) while running to a valve closed position and counterclockwise while running to a valve open position. All KZCO motorized actuators currently require power to operate in either direction.

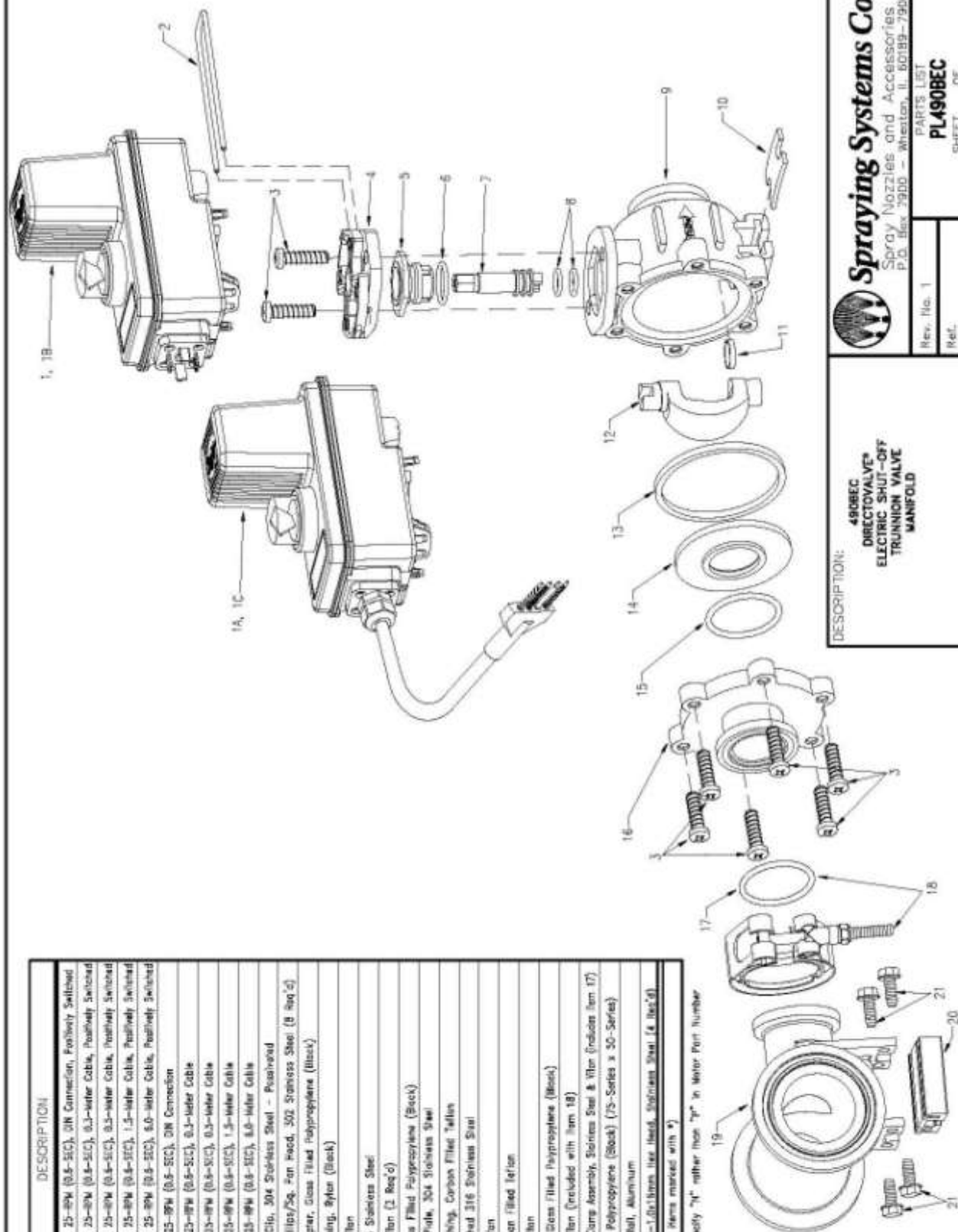
ACTUATOR Problem	Possible Cause	Solution
A. Motor will not run at all	<ul style="list-style-type: none"> a) Limit switch problem b) Cam assembly problem c) Integrated circuit breaker tripped d) Dead or open short in control harness e) Dead or open short in actuator control circuit f) Failed gear motor 	<ul style="list-style-type: none"> a) Check and adjust limit switches per instruction b) Check and adjust cams per instruction c) Disconnect power to unit for 20 seconds; reconnect power d) Check harness for cuts in insulation or sharp pinch point. Check for continuity of each wire in the harness. Check connectors for damage/corrosion. Repair or replace as needed. e) Check actuator housing for damage or missing hardware. Check actuator for internal corrosion. Check for loose motor lead. Clean circuit with electrical contact cleaner and compressed air. Solder connections if necessary. Replace circuit board assembly if required. f) Disconnect motor leads at circuit board or motor. Apply power directly to motor terminals. Motor should run continuously when power is applied. Replace motor if rotation is not smooth.
B. Motor runs continuously	<ul style="list-style-type: none"> a) Limit switch problem b) Cam assembly problem c) Defective or damaged circuit board component 	<ul style="list-style-type: none"> a) Check and adjust limit switches per instruction b) Check and adjust cams per instructions c) Replace circuit board assembly
C. Constantly tripping integrated circuit breaker or blowing of line fuse	<ul style="list-style-type: none"> a) Valve operating torque excessive; tight from incompatible valve or media, or buildup b) Defective or damaged circuit board component c) Failed gear motor 	<ul style="list-style-type: none"> a) Remove motorized actuator from valve. Manually turn valve with torque wrench when possible. Confirm that valve torque is within actuator capacity. Refer to actuator information chart in Engineering section of catalog. Disassemble and clean valve. b) Many models have internal relays. Listen for audible click upon activation. Bypass circuit board assembly to test motor. (See c.) c) Disconnect motor leads at circuit board or motor. Apply power directly to terminals. Motor should run continuously when power is applied. Replace motor if rotation is not smooth.
VALVE Problem	Possible Cause	Solution
D. Valve is leaking past ball	<ul style="list-style-type: none"> a) Seats damaged or worn out b) Valve is not stopping at proper closed position 	<ul style="list-style-type: none"> a) Install repair kit b) Adjust limit switches of actuator
E. Valve stem leaks	<ul style="list-style-type: none"> a) Worn stem seals b) Damaged stem or stem bore. 	<ul style="list-style-type: none"> a) On metal valves, tighten stem packing nut ~ ¼-½ turn. CAUTION! Over tightening stem nut could cause excessive operating torque and trip internal circuit breaker. If leak continues or for plastic valves, install repair kit. b) Replace valve stem if available, otherwise replace valve.
F. Valve body leaks	<ul style="list-style-type: none"> a) Loose body bolts or excessive operating pressure. b) Defective body seals 	<ul style="list-style-type: none"> a) Check bolts and confirm application is within recommended pressure ratings. b) Install repair kit or replace valve.
G. Valve operating torque excessive	<ul style="list-style-type: none"> a) Swollen seals or particulate buildup in valve chamber b) Valve bolts too tight c) Stem nut too tight or damaged stem seal 	<ul style="list-style-type: none"> a) Check valve for compatibility with product. May require valve cleaning, repair kit or new valve. b) Loosen bolts slightly. (plastic, bolted valves only) c) Loosen stem nut slightly. Install repair kit if needed.

ITEM	PART NO.	DESCRIPTION
1	50515-250P ■	REC Motor, 25-8PM (0.8-SEC), DIN Connection, Footedly Switched
	50515-250P03 ■	REC Motor, 25-8PM (0.8-SEC), 0.3-meter Cable, Footedly Switched
	50515-250P05 ■	REC Motor, 25-8PM (0.8-SEC), 0.5-meter Cable, Footedly Switched
1A	50515-250P15 ■	REC Motor, 25-8PM (0.8-SEC), 1.5-meter Cable, Footedly Switched
	50515-250P40 ■	REC Motor, 25-8PM (0.8-SEC), 4.0-meter Cable, Footedly Switched
1B	50533-250	EE Motor, 25-8PM (0.8-SEC), DIN Connection
	50533-250C3	EE Motor, 25-8PM (0.8-SEC), 0.3-meter Cable
	50533-250C5	EE Motor, 25-8PM (0.8-SEC), 0.5-meter Cable
1C	50533-250C15	EE Motor, 25-8PM (0.8-SEC), 1.5-meter Cable
	50533-250C40	EE Motor, 25-8PM (0.8-SEC), 4.0-meter Cable
2	CP60037-SSPV	Relining Clip, 304 Stainless Steel - Pushrod
3	CP45317-1 1/8-SS	Screw, Phillips/Sq. Flat Head, 302 Stainless Steel (8 Req'd)
4	CP50514-PP	Motor Adapter, Glass Filled Polypropylene (Black)
5	CP50514-RTDN	Stem Bushing, Nylon (Black)
6	CP7717-2-117-VI	G-Ring, Viton
7	CP50532-318SS	Stem, 316 Stainless Steel
8	CP7717-M12X2.5-VI	G-Ring, Viton (3 Req'd)
9	CP50501-PP	Body, Glass Filled Polypropylene (Black)
10	CP50507-X04SS	Mounting Pad, 304 Stainless Steel
11	CP50509-C10F	Lower Bushing, Carbon Filled Teflon
12	CP50508-318SS	Ball, Polished 316 Stainless Steel
13	CP50504-VI	Gasket, Viton
14	CP50503-C10F	Seal, Carbon Filled Teflon
15	CP7717-2-223-VI	G-Ring, Viton
16	CP50502-PP	End Cap, Glass Filled Polypropylene (Black)
17	CP7717-2-222-VI	G-Ring, Viton (Included with Item 18)
18	46272-50	50-Series Cartridge Assembly, Stainless Steel & Viton (Includes Item 17)
19	CP46717-PP	Top Body, Polypropylene (Black) (75-Series x 50-Series)
20	CP45216-AL	Mounting Rail, Aluminum
21	CP45258-SS	Screw, M8-1.0x16mm Hex Head, Stainless Steel (4 Req'd)

46356-VI, Spare Parts Kit (Includes all items marked with *)

Note: For Regulator Switched Motors Specify "N" rather than "P" in Motor Part Number

Example: 50515-250N05



DESCRIPTION:

**4908EC
DIRECT VALVE®
ELECTRIC SHUT-OFF
TRUNNION VALVE
MANIFOLD**



Spraying Systems Co.®
Spray Nozzles and Accessories
P.O. Box 2900 - Wheaton, IL 60189-7900

Rev. No. 1

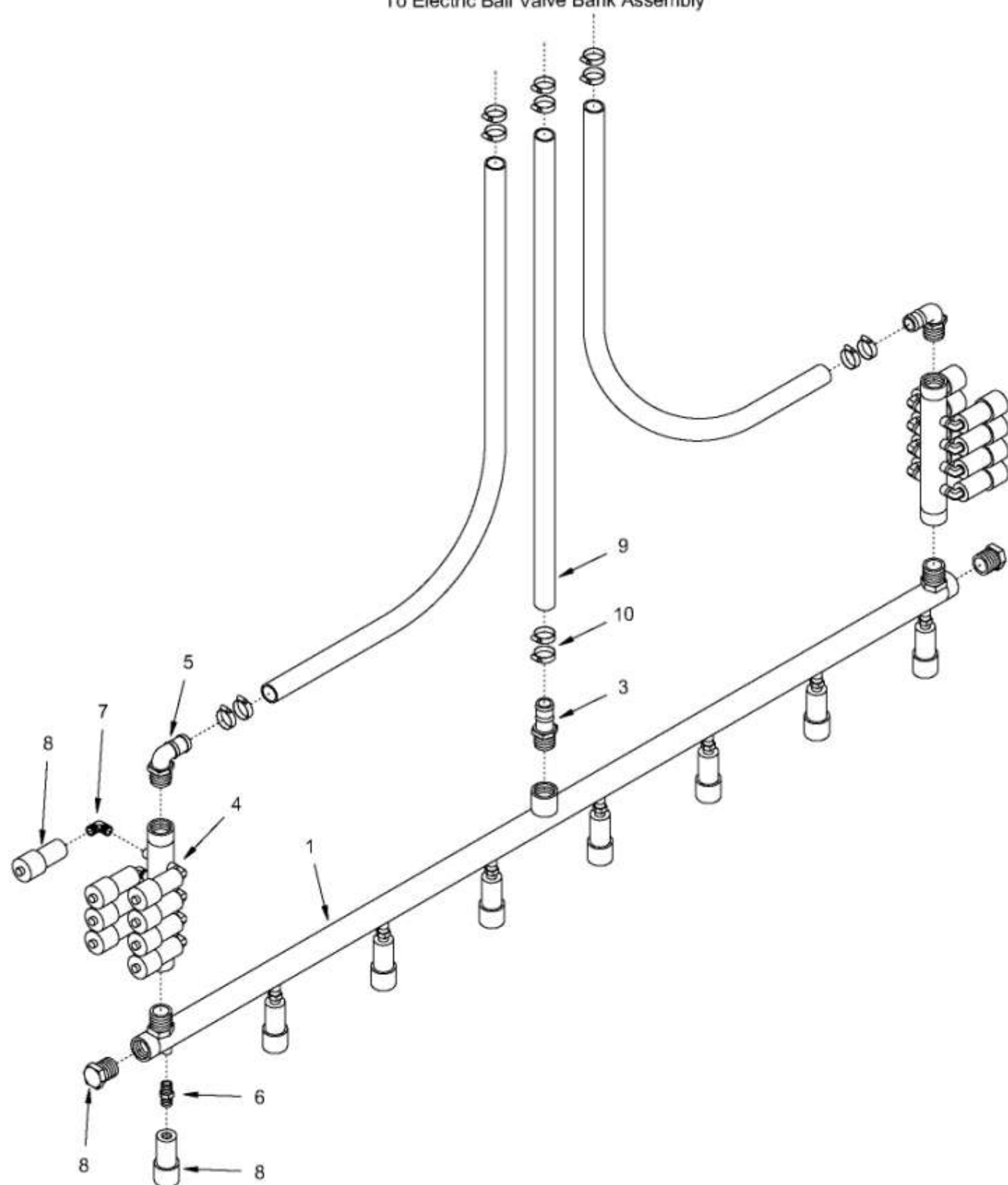
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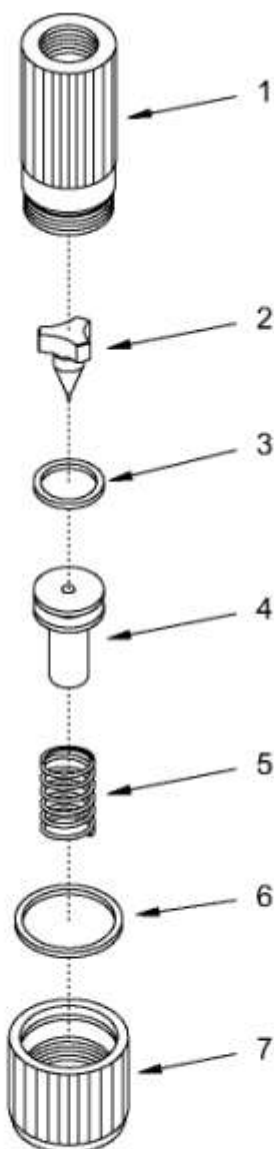
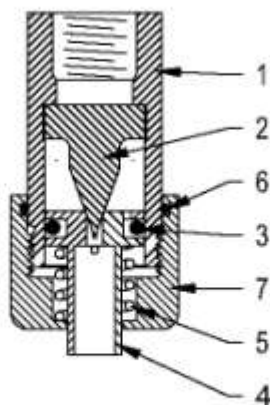
PARTS LIST

PL4908EC

SHEET OF

To Electric Ball Valve Bank Assembly





Item	Qty	Part Number	Description
1	1	FAB-3157-V2	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-V2	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

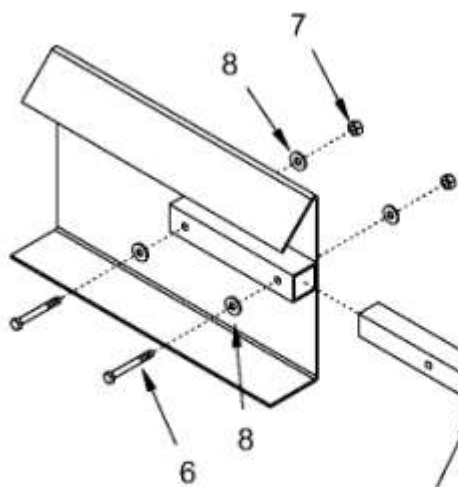
ASM-3175 Variable Orifice Nozzle Assembly

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

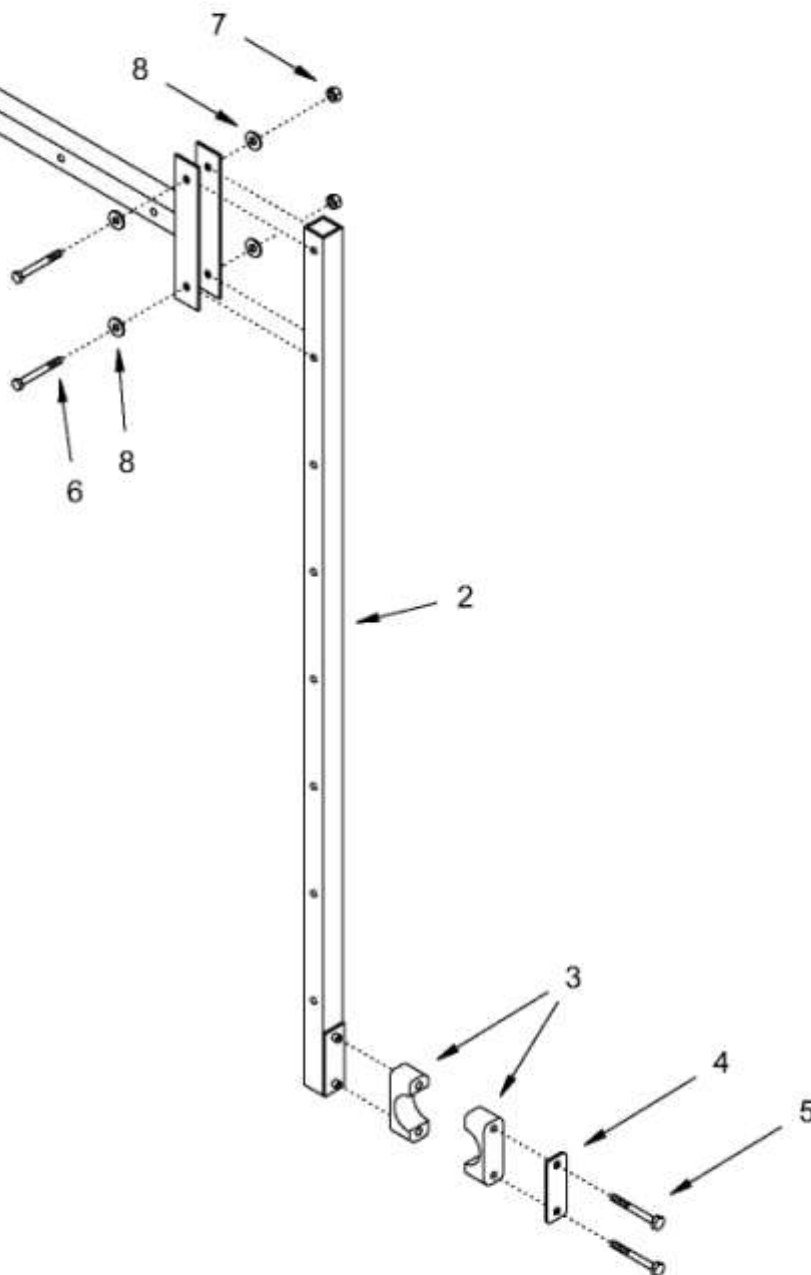
NOZZLE ADJUSTMENT:

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.

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



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

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

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.