

Owner's Manual

Model 721 Dew Simulator

Natural Dew Simulation Machine



*Equipment and Products
for Quality Hay.™*

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Introduction

The new Model 721 Dew Simulator allows for the precise addition of hot water mist to windrowed alfalfa. The windrow will be as soft as if it had just received the ideal amount of dew. By spraying into the windrow prior to baling, moisture is added to all of the plant material. The hot water mist softens the hay, giving the hay the appearance and test of hay made with natural dew.

Right and Left sides are determined by facing in the direction of forward travel.

Requirements

- Tractor size and horsepower
 - Min 80 horse power, Approximately 9,000lbs, 1000 rpm PTO
- Suggested trailer and tank
 - Tandem axle 1,000 gallon water trailer

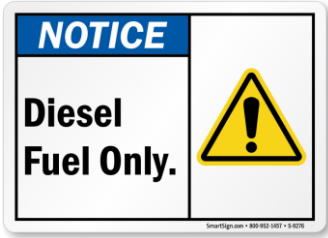
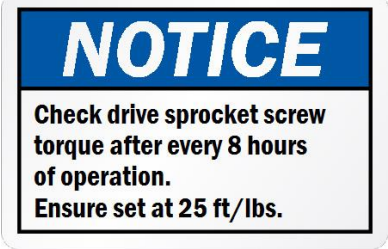
Below is an example of a water tank, Dew Simulator and tractor setup.



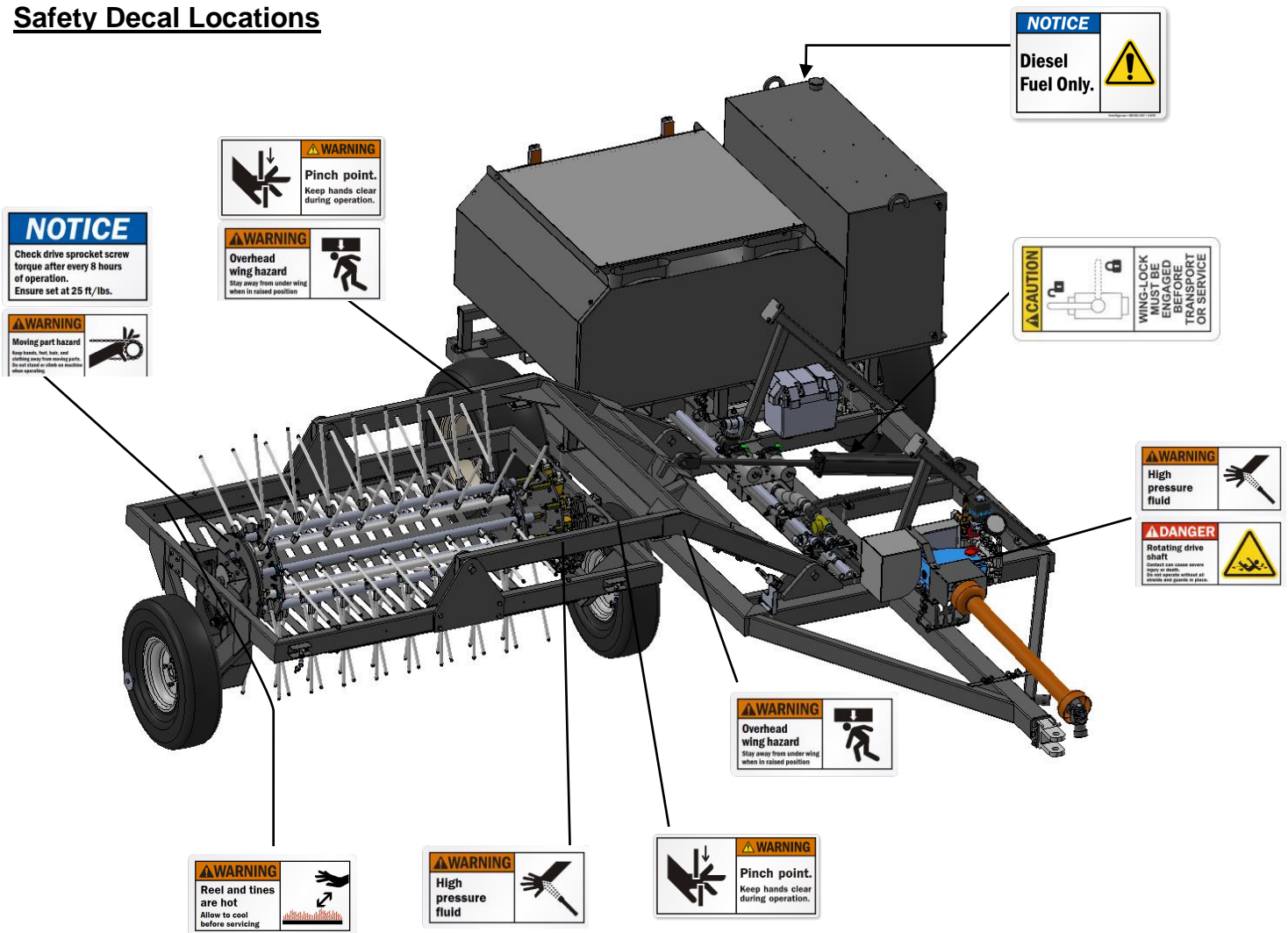
Safety

Carefully read all the safety signs in this manual and on the equipment before use. Keep signs clean and in clear view. Replace missing or damaged safety signs. Replacement signs are available from your local authorized dealer. Keep your Dew Simulator in proper working condition. Unauthorized modifications to the system may impair the function and/or safety of the machine. Carefully read and understand all of the safety signs before installing or servicing the 721 Dew Simulator.

Safety Decal Definitions

 <p>NOTICE Diesel Fuel Only.</p> <p>DCL-720-03</p>	 <p>NOTICE Check drive sprocket screw torque after every 8 hours of operation. Ensure set at 25 ft/lbs.</p> <p>DCL-720-06</p>
 <p>WARNING Pinch point. Keep hands clear during operation.</p> <p>DCL-720-04</p>	 <p>DANGER Rotating drive shaft Contact can cause severe injury or death. Do not operate without all shields and guards in place.</p> <p>DCL-720-05</p>
 <p>CAUTION WING-LOCK MUST BE ENGAGED BEFORE TRANSPORT OR SERVICE</p> <p>DCL-720-07</p>	 <p>WARNING High pressure fluid</p> <p>DCL-720-08</p>
 <p>WARNING Moving part hazard Keep hands, feet, hair, and clothing away from moving parts. Do not stand or climb on machine when operating.</p> <p>DCL-720-09</p>	 <p>WARNING Overhead wing hazard Stay away from under wing when in raised position</p> <p>DCL-720-10</p>
 <p>WARNING Reel and tines are hot Allow to cool before servicing</p> <p>DCL-720-11</p>	<div style="display: flex; justify-content: space-around;"> <div data-bbox="812 1690 1128 1911">  <p>DCL-Yellow Reflector 2" x 9"</p> </div> <div data-bbox="1144 1690 1429 1911">  <p>DCL-Red Reflector 2" x 9"</p> </div> </div>

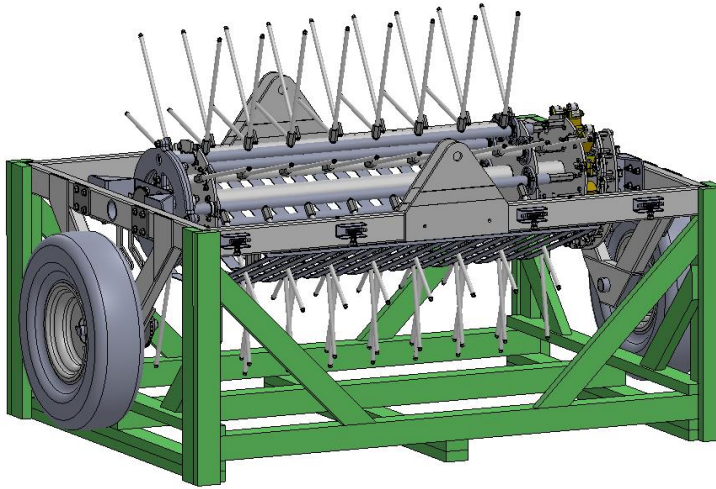
Safety Decal Locations



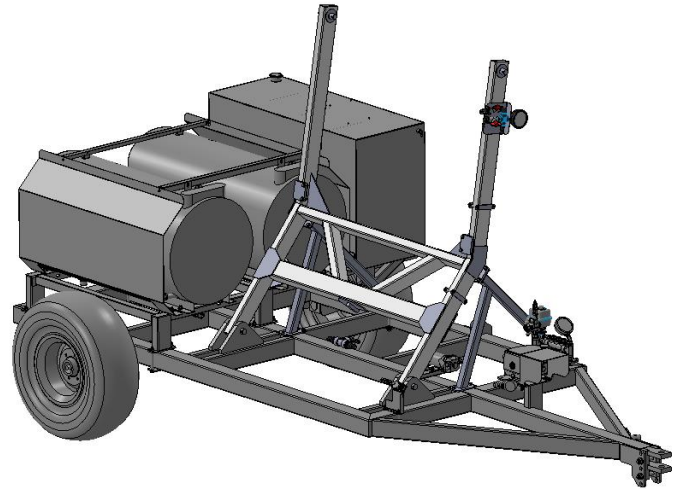
Setup

Unloading the machine

1. Unload the reel skid assembly and the cart assembly shown below and remove packaging. The reel skid is designed to be handled from the front side (valves to right side) with pallet forks.

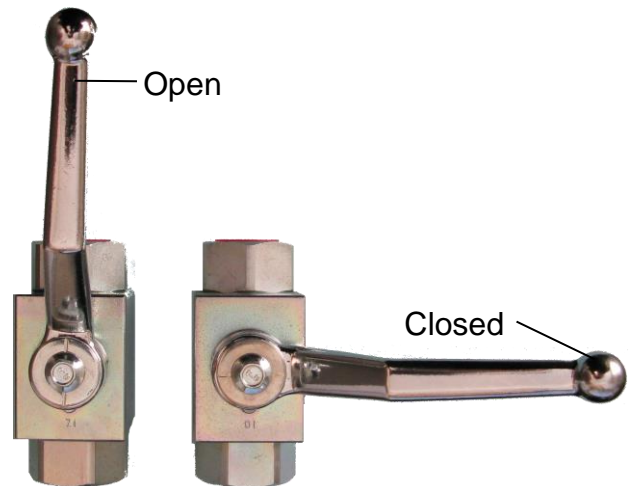


Reel Skid Assembly



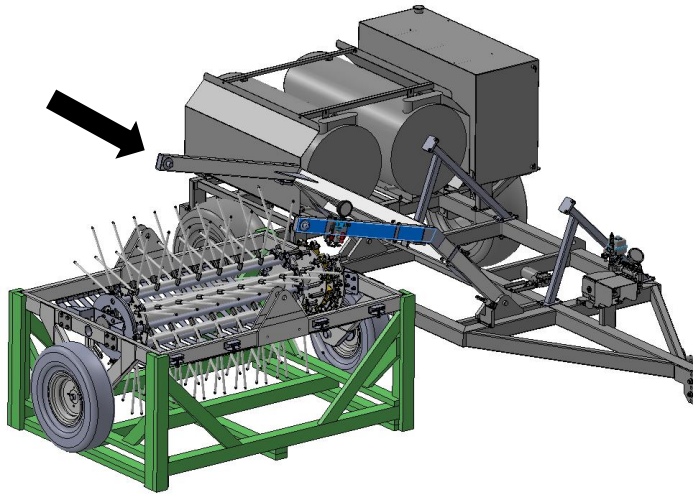
Cart Assembly

2. Attach the cart assembly to a tractor and connect the hydraulic couplers
3. Turn the hydraulic valve to the unlocked position

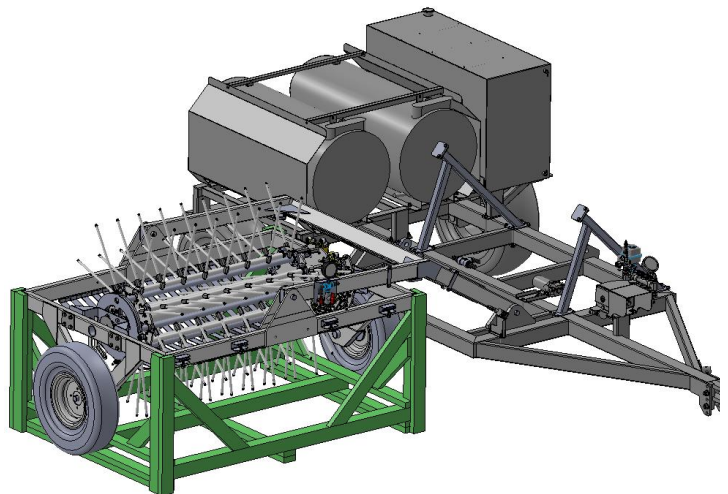


Connecting the Reel

1. Position the reel skid assembly next to the cart assembly. Lower the lift arm partially with the hydraulics and position the reel so it is aligned, *side with valves goes towards the cart (below left).

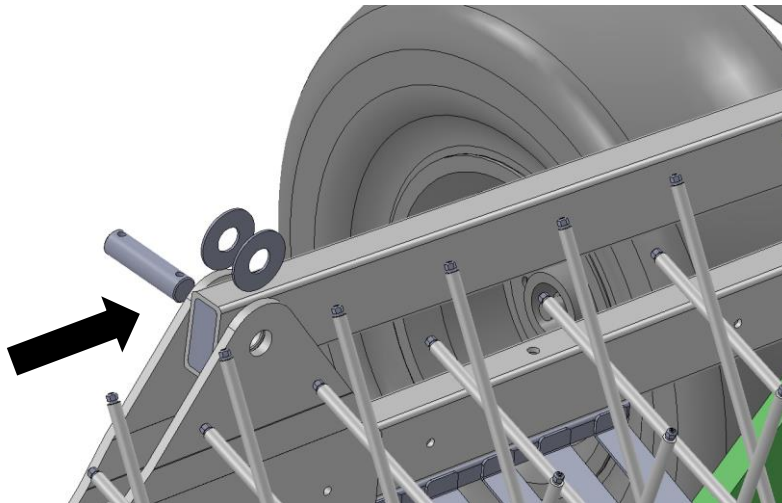


Reel & Cart assemblies w/ lift arm being lowered



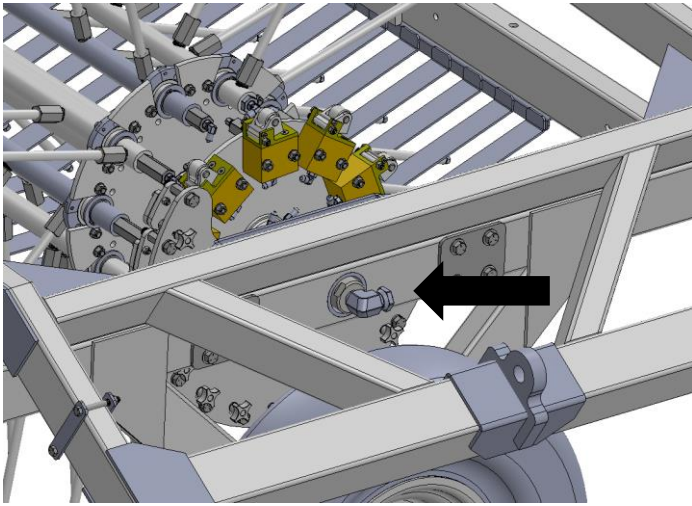
Reel & Cart assembly aligned

2. Align the holes in the lift arms with the mounting holes in the reel frame (above right).
3. Install the Pins & bushings (found in the cart parts box) as shown below. The bushings are located between the inside of the reel frame brackets and the lift arm on the front and back side of the lift arm. After the pins and bushings have been installed, install the roll pins in each end of the pivot pins. Lift the now connected reel assembly slowly to remove the reel shipping skid, then raise into full transport position so the lift arm is resting against the stops.

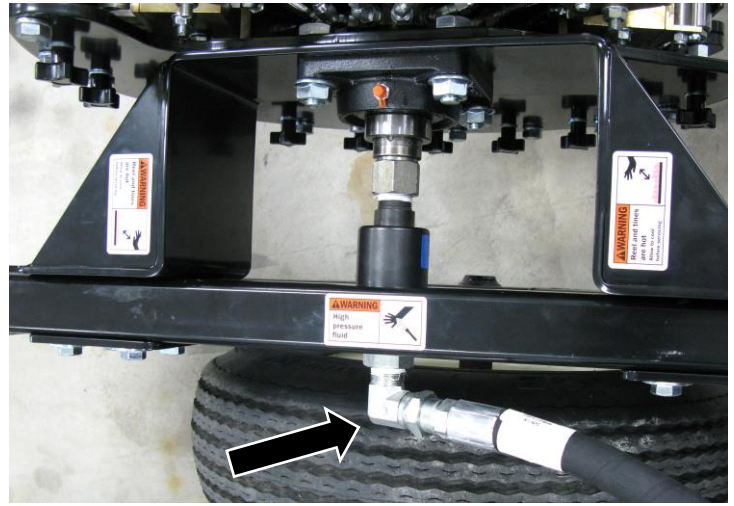


Connecting Hoses

Lower the reel from the transport position to the field operating position so both reel tires are on the ground. Connect the stainless steel 3/4" water line attached to the swivel on the reel to the 45-degree elbow in the KZ valve on the lift arm.

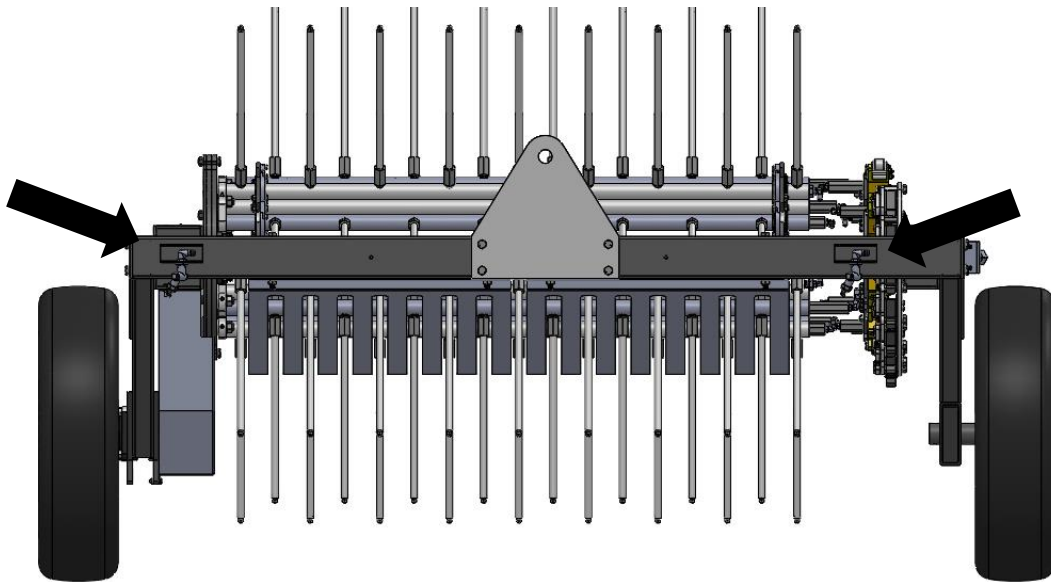


Connection location on the reel assembly



Above view of the water line reel connection

Connecting the Perimeter Nozzle Hoses (Optional Accessory)



1. Locate the perimeter nozzle hoses coiled on the lift arm and remove the black zip ties holding them in place.
2. Locate the black 1/2" hose that has the blue zip tie on the end. Attach this hose to the INSIDE nozzle assembly and secure with the attached hose clamp. Hose may be trimmed to length but leave enough slack to allow for movement of the reel frame when lifting into the transport position.
3. Locate the black 1/2" hose that has the red zip tie on the end. Attach this hose to the OUTSIDE nozzle assembly by following the routing of the other 1/2" hose, then routing it through the rear of the inside assembly and across the front of the reel frame to the outside nozzle assembly. Use the two P-clips installed on the front of the frame to secure the hose. Trim hose to proper length and secure to outside nozzle assembly with the attached hose clamp.

Preparing the Water Supply Trailer

The 721 Dew Simulator will require a water supply trailer (not included). The following step will explain the installation of the supply, return fittings and hoses.

1. Install the 2" bulkhead connector in the bottom of the tank. Then install the 2" elbow (003-EL2020) fitting in the bulkhead.

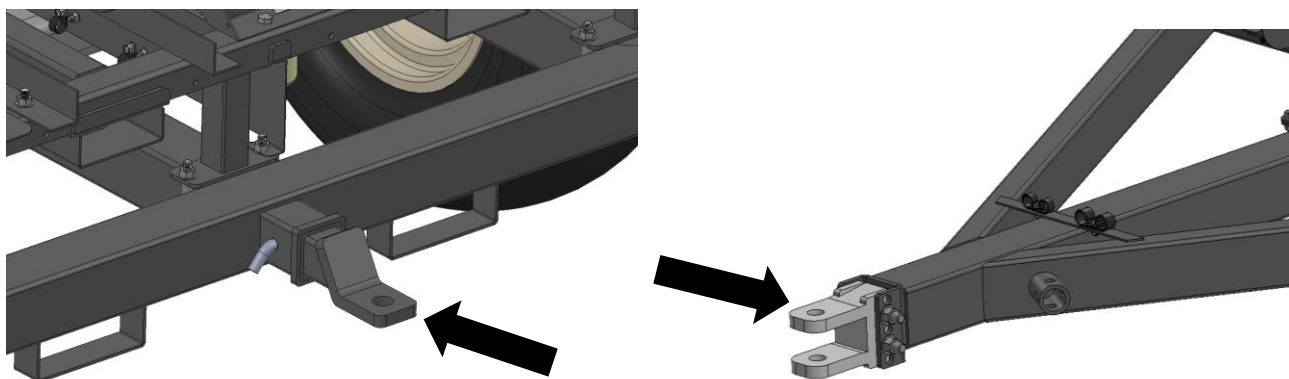


2. Attach the 2" hose (provided) to the 2" elbow fitting, route to front of trailer where the valve can be easily accessed, cut hose to length, and install 2" valve assembly. From the remaining 2" hose, cut a section to length that will run from the 2" valve assembly to rear of the machine. Install the 2" coupler fitting and connect to the machine. Ensure hose is free to move when turning both directions with the machine. Secure all connections with 2" hose clamps.
3. Install 1/2" stainless steel bulkhead in bottom of the tank, or front side towards the bottom of tank. Install the steel 1/2" NPT x 3/4" Elbow (003-DSEL1234) and black green stripe hose. Route hose to rear of Dew Simulator, cut hose to length, then attach to the aluminum coupler (002-2204B). Locate the 3/4" On/Off valve with hose barb fittings and attach to green stripe hose in an accessible location between the coupler at the hitch and fitting at the bottom of the tank. Secure the green stripe hose to each fitting with the provided hose clamps. *Note that water returning to the tank through this line will approach 200 F.



Hooking up Tractor, Dew Sim, and Trailer Tank

1. Connect the tractor to the cart assembly with a 1" draw pin (below, right).



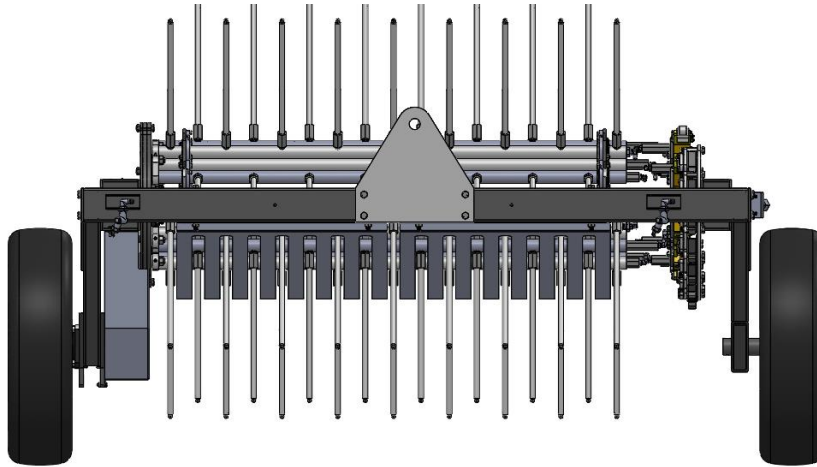
2. Adjust the front hitch position to level the cart assembly to the tractor drawbar. The hitch can be moved up or down as needed.
3. Connect the water trailer to the rear of the cart assembly with a 1" draw pin (shown above, left).
4. Adjust the rear hitch position to level the water trailer with the cart assembly by flipping the receiver hitch.
5. Connect the 2" valve/coupler from the water trailer to the coupler at the rear of the Dew Simulator.
6. Connect the $\frac{3}{4}$ " green stripe valve assembly female coupler to the aluminum male coupler at the rear of the Dew Simulator.
7. Connect the trailer lighting connector to the rear of the Dew Simulator. See trailer wiring schematic for additional information.



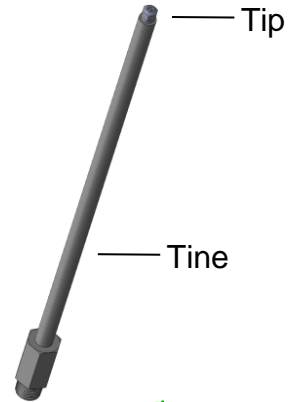
Machine Setup

Installing Tines & Tips

The reel assembly is shipped with 65 tines installed, each with a size MW11 tip (below left). There are 20 plugs installed on the outermost holes of the reel assembly as well that can be removed using a 3/8" Allen wrench and replaced with additional tines & tips (below right) if operating in wide windrows.



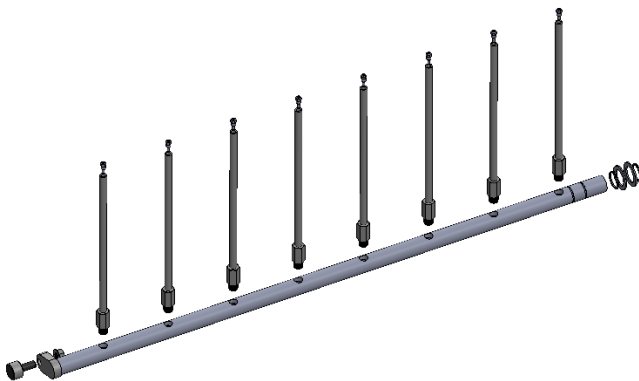
Reel Assembly



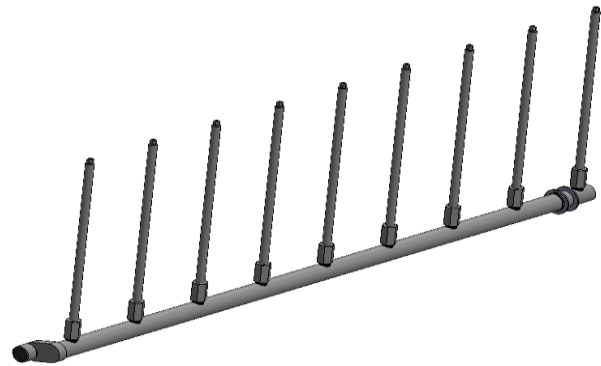
Tine / Tip Assembly

Tine Assemblies

Below are illustrations of the 8 and 9 Tine Cross Tube Assemblies located on the reel assembly. There are five of each cross-tube assemblies (below).



8-Tine Cross Tube Assembly (x5)



9-Tine Cross Tube Assembly (x5)

Each cross tube has two holes with a plug in the tube. If the width of the windrow is wider than 45.5" covered by the initial 65 tine & tip assemblies installed, adding additional tips will be necessary. Remove the plugs using a 3/8" Allen and add in the new tine & tip assemblies. Each additional set of 10 tips will increase the width of coverage by 6.5" with a maximum increase of 13". It is recommended to use Teflon tape or liquid thread sealant on the threads and tighten to approximately 150ft/lbs.

Tip and tine assemblies can also be removed and replaced with plugs to reduce the coverage for thin, light, or narrow windrows. *****For two windrows that are raked together and are laying side by side forming a 'valley' between the two windrows, it may be beneficial to remove a row or two of tines in the center of the reel and move them to the outside to prevent applying too much moisture to the lighter material between the two windrows.***

Tip Rate Chart

Use the chart below to determine the output (GPM) required by the dew simulator based on the field (ton/acre, swath width, desired speed) and windrow (# of trips active) conditions. If tips need to be changed, a 7/16" wrench or socket will be required to remove the tip currently installed. MW5 and MW11 tips, as well as additional tines, can be purchased as spare parts from Harvest Tec. **Do not use a socket and impact driver to remove or install tips as thread damage will occur.

MW5	<i>Pump PSI</i>	<i>Trips Active</i>	<i>65 Tips</i>	<i>70 Tips</i>	<i>75 Tips</i>	<i>80 Tips</i>	<i>85 Tips</i>
	400	5	3.2	3.6	3.9	4.2	4.6
	400	7	4.2	4.6	4.9	5.3	5.8
	400	9	5.4	5.9	6.4	6.9	7.5
	400	11	6.4	6.9	7.5	8.1	8.6
	600	5	3.6	4.0	4.4	4.8	5.2
	600	7	4.8	5.2	5.6	5.9	6.5
	600	9	6.1	6.7	7.3	7.9	8.4
	600	11	7.3	7.9	8.4	9.2	9.8
	800	5	4.1	4.5	4.9	5.4	5.8
	800	7	5.4	5.8	6.2	6.6	7.3
	800	9	6.9	7.5	8.1	8.8	9.4
	800	11	8.1	8.8	9.4	10.3	10.9
	1000	5	4.5	5.0	5.4	5.9	6.4
	1000	7	5.9	6.4	6.9	7.3	8.0
	1000	9	7.6	8.3	9.0	9.7	10.4
	1000	11	9.0	9.7	10.4	11.4	12.1
	1200	5	4.9	5.4	6.0	6.5	7.0
	1200	7	6.5	7.0	7.5	8.0	8.8
	1200	9	8.3	9.1	9.8	10.6	11.4
	1200	11	9.8	10.6	11.4	12.4	13.2

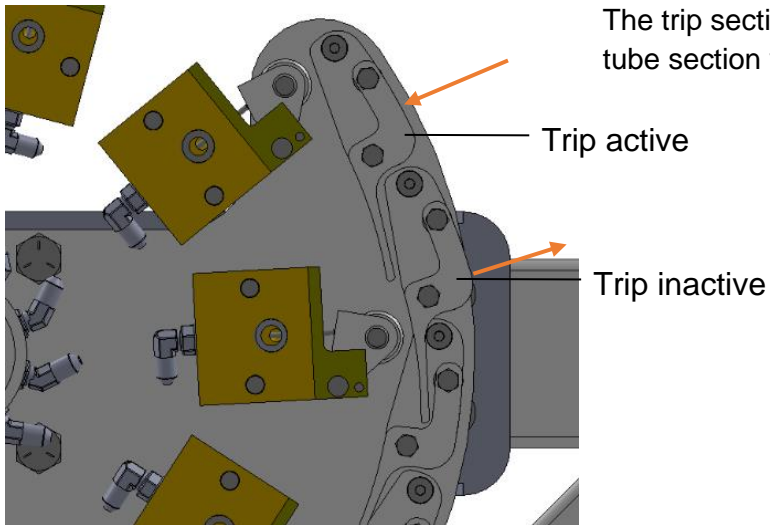
MW11	<i>Pump PSI</i>	<i>Trips Active</i>	<i>65 Tips</i>	<i>70 Tips</i>	<i>75 Tips</i>	<i>80 Tips</i>	<i>85 Tips</i>
	400	5	5.5	6.1	6.7	7.3	7.9
	400	7	7.3	7.9	8.5	9.1	9.9
	400	9	9.3	10.2	11.1	12.0	12.8
	400	11	11.1	12.0	12.8	14.0	14.9
	600	5	6.6	7.3	8.0	8.7	9.4
	600	7	8.7	9.4	10.1	10.8	11.9
	600	9	11.2	12.2	13.3	14.3	15.3
	600	11	13.3	14.3	15.3	16.7	17.8
	800	5	7.7	8.5	9.3	10.1	11.0
	800	7	10.1	11.0	11.8	12.6	13.8
	800	9	13.0	14.2	15.4	16.6	17.9
	800	11	15.4	16.6	17.9	19.5	N/A
	1000	5	8.8	9.7	10.6	11.6	12.5
	1000	7	11.6	12.5	13.4	14.3	15.7
	1000	9	14.8	16.2	17.6	19.0	N/A
	1000	11	17.6	19.0	N/A	N/A	N/A
	1200	5	9.9	10.9	11.9	13.0	14.0
	1200	7	13.0	14.0	15.1	16.1	17.7
	1200	9	16.6	18.2	19.7	N/A	N/A
	1200	11	19.7	N/A	N/A	N/A	N/A

Drive Chain

The Model 721 Dew Simulator comes with a drive chain installed, which allows the reel to be ground driven at a rate where rotation of the reel matched forward movement. This gearing allows the tines to enter and exit the windrow without significant disturbance or movement of the windrowed material. In heavier windrows, or windrows that have been raked tightly or raked multiple times, it is possible to run the machine without the drive chain installed, letting the windrow turn the reel in conditions where the tines are not exiting the windrow cleanly without pulling excess stems into the wrap guard.



Trip Sections

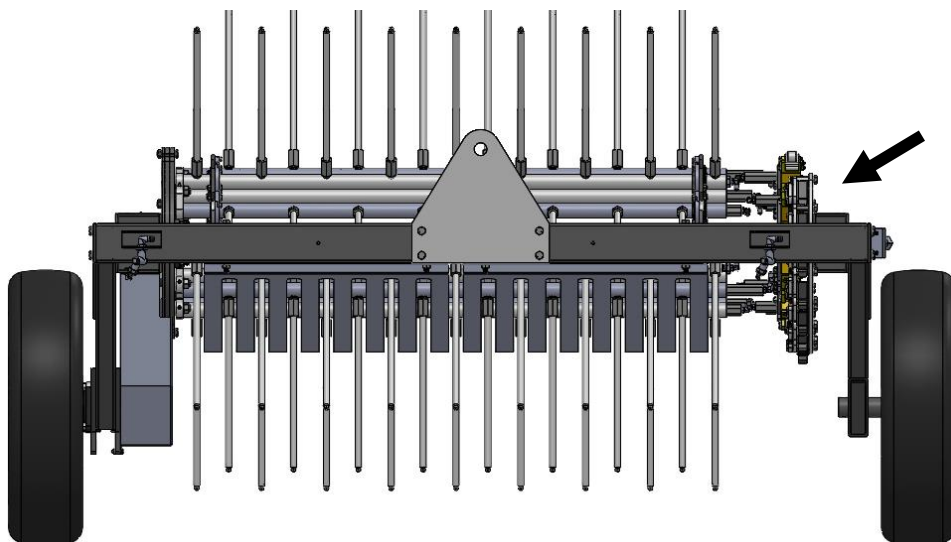


Adjusting Trip Sections

Adjust trip sections that are active based on windrow size/shape/and condition.

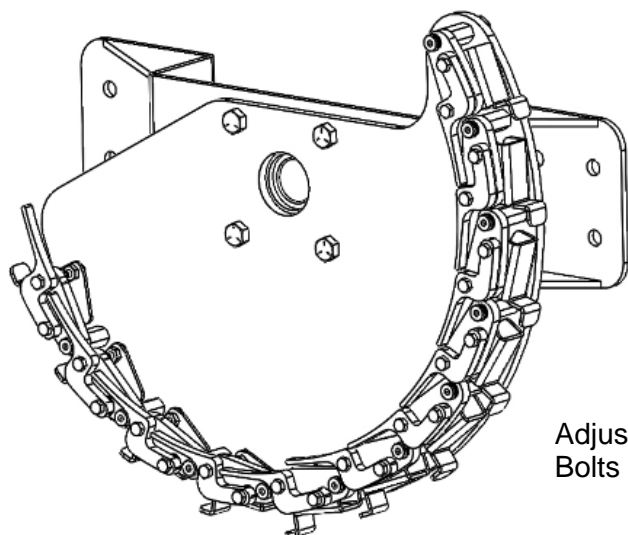
- If the windrow is tall and fluffy, adjust the sections so the tines turn on as soon as they enter the windrow.
- If the windrow is shorter, shut off the leading trip sections so the tines do not turn on until they are about to enter the hay.
- If less water is required to be added to the windrow, turn off rear trip sections so the tines don't spray the entire time they're in the windrow.
- If there is moisture in the bottom of the windrow but the top 2/3 of the windrow is dry, turn off trip sections at the bottom of the arc so the tines turn on as they enter the windrow, turn off for the bottom 1/3, then turn back on until they exit the windrow.

To activate, loosen the adjustment bolt on the backside of the valve plate with a 3/8" wrench. Rotate the reel so the trip section is contacting a valve roller, slide the assembly up in the slot until the roller is pressed down, then retighten the bolt. To deactivate sections, loosen the bolt, slide down in the slot away from the valves, then tighten in position.

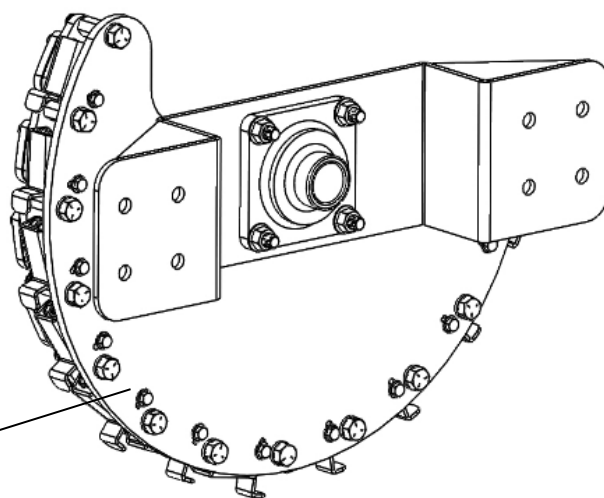


Adjusting Trip Sections (continued)

Front View Reel Trip Section



Reverse View Reel Trip Section



Adjustment
Bolts

- Loosen and raise in slot, tighten to activate section
- Loosen and slide down in slot to deactivate section

Operation of Perimeter Nozzles (Optional Accessory)

The perimeter nozzles are used to apply ambient temperature (non-heated) water in a coarse spray as a supplement to the heated reel spray when evaporative conditions are high (due to extremely low humidity or the presence of wind). The perimeter nozzle spray is selectable and controlled in the cab. It can be sprayed on either side individually, or both sides at the same time. It can also be focused on the sides, or the tops and the sides of the windrow by manually adjusting the angle and position of the nozzles.

Each perimeter nozzle operates off its own separate pump that is controlled by the switches and dial on the perimeter nozzle cab controller. The toggle switch turns the control on, and the dial is used to increase or decrease the flow to the nozzles. The two red switches control which pump is active. The perimeter nozzle pumps will automatically turn off when the Arm Switch is not activated and the Arm Override is not activated. With the controller turned on, the two red switches will flash when the Arm Switch or Arm Override aren't active, and will show solid red when they are Active and the switch is turned on. The chart below provides an estimate of the GPM for 1 and 2 pump operation at varying dial settings.

Perimeter Nozzle Controller Perimeter Nozzle GPM



Setting	One Nozzle		Two Nozzles	
	GPM	GPH	GPM	GPH
1	0.84	50	1.56	94
2	1.20	72	2.52	151
3	1.44	86	3.00	180
4	1.80	108	3.24	194
5	1.92	115	3.72	223
6	2.04	122	3.96	237
7	2.10	126	4.32	259
8	2.16	129	4.44	266
9	2.28	137	4.56	273
10	2.52	151	4.68	281

Description of Electric Valves and Sensors

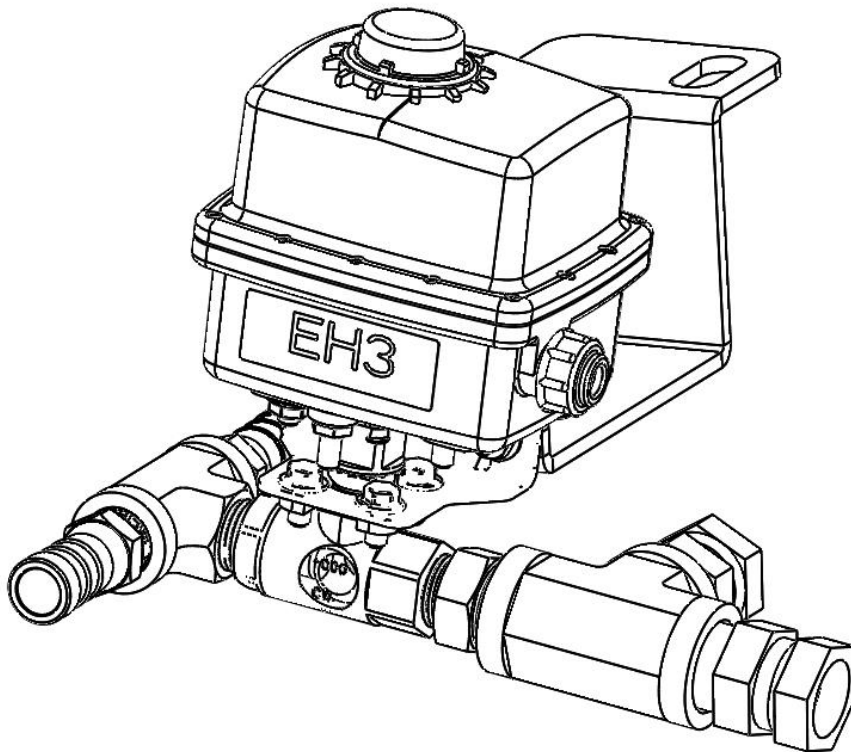
2Way Valve

The 2way valve is located on the pressurized side of the pump on the lift arm. When inactive, this valve is normally closed. In its normally closed state, fluid from the outlet of the pump is returned to the tank. When it is open, fluid is forced through the heaters then to the reel.



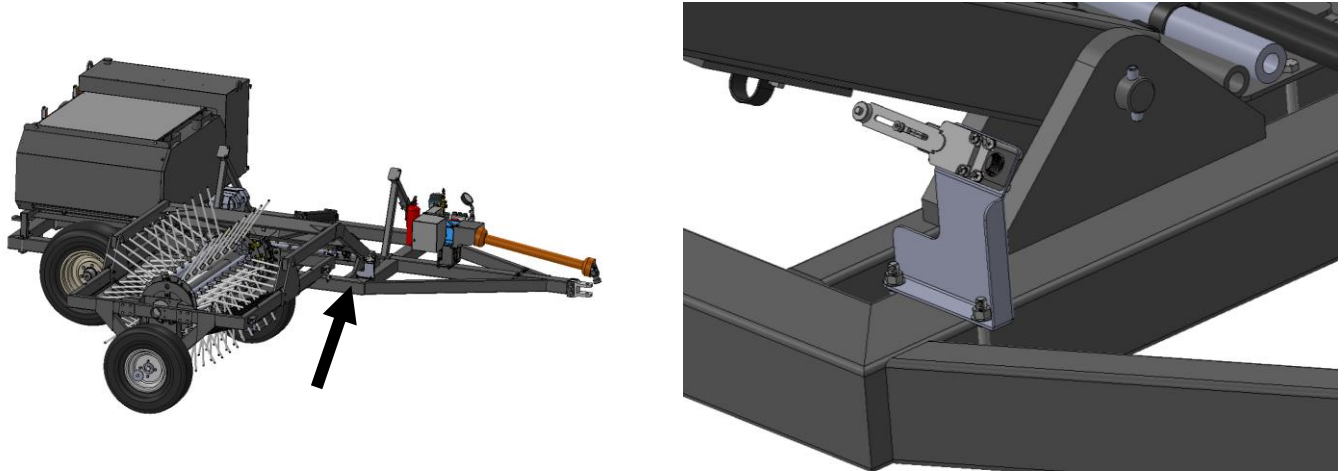
Warming Valve

The 2way warming valve is located towards the rear of the machine in between the heaters. The valve is on the outlet side of heater #2 and is normally open. When Warmup Valve is activated on the main screen of the control, it closes the 2way valve on the lift arm and allows flow that has gone through the heaters to be returned to the supply tank. When the heaters are activated and heating water, the warming valve, when opened, will allow heated water to be bypassed back to the supply tank until the water temperature reaches 200F. Once the water temp reaches 200F, the warmup valve will automatically close and shut off on the main screen, forcing the heated, pressurized water out to the reel. The warmup valve is used for initial priming (allowing bypass water back to tank) and for initial heating of the system so water does not need to be sprayed on the ground until after the temperature has reached 200F. The warmup valve will also automatically open to vent hot water back to the tank if the output temperature rises above 270F and the flow stops. When this occurs, the green indicator light for the warmup valve will illuminate to indicate that the valve is in the open position.



Arm Switch

The Arm Switch is located towards the front of the machine on the right side of the lift arm (shown below). This is a mechanical switch that senses when the reel lift arm is in the field operating position. The arm switch is active when it senses the lift arm. The arm switch must be active for the 2way valve to close, thus directing flow out to the heaters. When the arm switch is deactivated (normally open), flow from the pump is recirculated back to the tank.

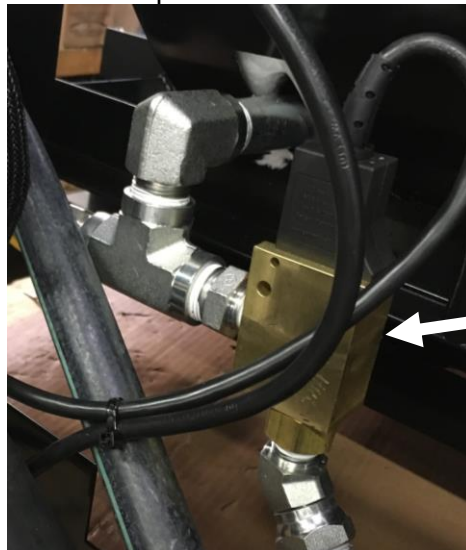


For instance, if you are treating a windrow and raise the reel 12" off the ground, either when turning at the headland or stopping in the windrow, the arm switch becoming deactivated will cause the 2way valve to open and divert flow to the tank, shutting off flow to the reel. Similarly, for the heaters to run, the arm switch must be active, so when the reel is raised the heaters will automatically turn off. Additionally, the system must also be seeing a flow rate (GPM) from the flow meter before the heaters will run.

****For system priming and diagnostics, the arm switch can be overridden by the "ARM OVERRIDE" button on the controller. Activating that button will cause the 2way valve to close and allow flow to go through the heaters regardless of the lift arm position.**

Flow Switch

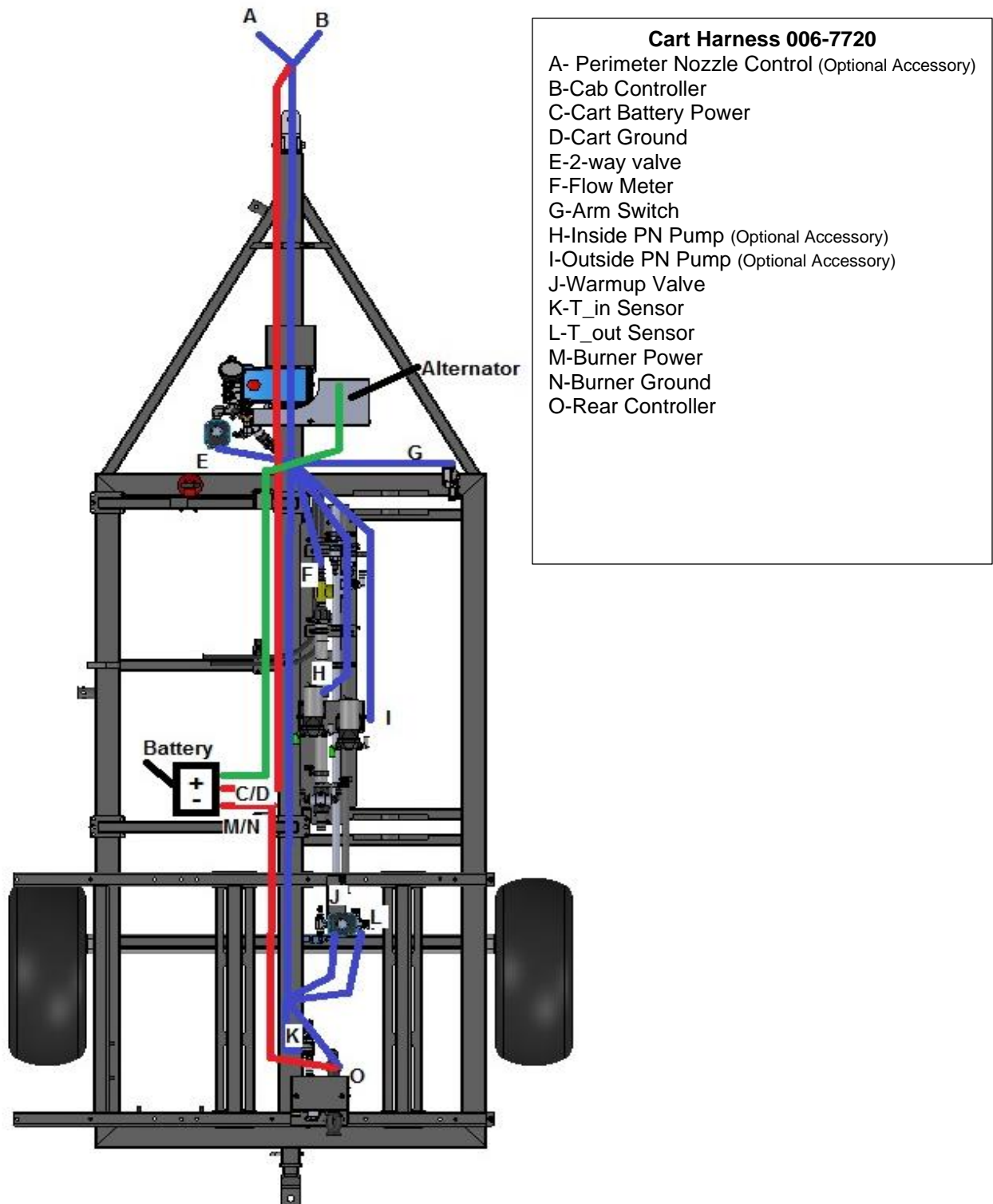
The flow switch is a safety sensor located at the inlet to Heater #1 that detects flow going through the heaters. When flow is detected, the internal circuit closes and allows the burner motors to run. When flow is absent and the internal circuit is opened, all flow of electrical power to the burner motors is stopped.



Installing Controls

1. Connect 10 Pin extension harness (006-7722) to 10 pin connector on cart harness, route into tractor cab.
2. Connect 4 Pin extension harness (006-7717) to 4 pin connector on cart harness, route into tractor cab.
3. Mount Controller (006-7721) securely in cab with bracket and knobs on each side.
4. Mount Optional Perimeter Nozzle Controller (006-7726)- Secure in cab w/ bracket and knobs on each side.
5. Connect 10 pin extension harness to Controller (006-7721)
6. Connect 4 pin extension harness to Perimeter Nozzle Controller (006-7726)

Wiring Diagram



Initial Operation

Turning on the Dew Simulator

The Dew Simulator controller will turn on by activating the red switch at the bottom of the control. For the controller to turn on, it must be connected to the cart harness. The perimeter nozzle controller will turn on by activating the toggle switch.

Priming the system

1. Initial priming of the system should be done with the heaters turned off. Ensure Heater 1 and Heater 2 are in the off position. Ensure the 2" valve on the hose between the tank and the dew simulator is open, as well as the $\frac{3}{4}$ " valve returning from the warmup valve to the tank.
2. Lower the reel so it is approximately 12" above the ground (below).



Wing in Transport Position



Wing in Operating Position

3. Turn the tractor PTO on and run at an idle. The pump will prime and start returning water back to the tank. This will be indicated by the actual flow rate (GPM) being displayed on the screen.
4. When an actual flow rate (GPM) is displayed on the screen, activate the "ARM OVERRIDE" button on the main screen. You may hear the 2way valve close. This will allow water to be pumped through the heaters. Run the machine on "ARM OVERRIDE" until the system fully primes and fluid starts spraying out of the nozzles.
5. Activate the "WARMING VALVE" button on the main screen. You may hear the warming valve open. This will allow the water that is being pumped through the heaters to be bypassed back to the supply tank.
6. Turn the "warming valve" button to the OFF position on the main screen. This will close the warming valve and divert flow to the reel, which will pressurize. Once the reel starts spraying, the system is primed.

Determining Operation Settings

On the second screen of the control (SETUP) under the Field Setup header, input the estimated Ton/Acre yield of the field (1.75), desired driving speed in mph (usually matched w/ baler speed →6.0mph), swath width in ft. (30.0).

After inputting the field setup settings, input the moisture setup settings the starting moisture content (8.0%), desired moisture content (15.0%), and the desired water temp (240F).

Based on the condition and size of the windrow, input under the Machine Setup header the number of trip sections that are active (5-11). Input the number of tips installed (65, 70, 75, 80, or 85), and input the size of the tip (either 5 for MW5's or 11 for MW11's) *standard size is 11. In most situations, the number of tips installed and the tip size will not need to be changed often, maybe occasionally when going from a heavy cutting to a light cutting.

Based on the inputted values for the field, moisture, and machine setup settings, the Target GPM and SET PRESSURE values will be calculated. **Depending upon the number of tines installed (usually a function of windrow width) and the Target GPM, reference the tip charts to confirm that your tip size is correct. If you tend to operate at lower GPM's (<9GPM), it may be beneficial to run the MW5 tips. **the SET PRESSURE value should be between 300 and 1200 PSI. If your calculated pressures are outside of those ranges, modification may need to be made to i) desired driving speed, ii) trip sections, or iii) # of tips.

Settings Pressures

Once the Target GPM and Set Pressure values are derived, adjust the trip sections for the windrow conditions.

With the reel lowered so it is 12" off the ground and the system primed, activate the arm override button and turn the PTO on. Run the PTO at approximately 800 rpm. Adjust the pressure relief valve at the rear of the pump until the gauge matches, approximately +/- 50 PSI, the SET PRESSURE value.

After the pressure is set, turn off the arm override. This will cause the flow to divert back to the tank until the reel is lowered to the operating position.

With arm switch active or switch override selected, increase PTO speed to approximately 750-800 rpm

Adjust pressure regulator valve until the desired pressure setting is achieved

Warming Up System

To reduce a waste of water, the warming valve can be used to bypass the water coming out of the heaters to the tank until it reaches a preset temp, at which time the valve will close and water will be directed to the reel.

Start with the reel raised 12" above the ground, system primed, arm override button activated, and the warming valve button activated.

Turn on Heater 1 and Heater 2. The buttons will show blue, but the indicator lights on the heaters will not be illuminated, indicated that the heater are not firing.

Turn on the PTO and run at approximately 800rpm. As soon as a flow meter reading is measured, the heaters will turn on and start heating, indicated by the indicator lights being illuminated on the heaters.

Since the warming valve is activated (open), the heated water will bypass to the tank until the output temperature reaches 200F. Once the output temperature reaches 200F, the warming valve will automatically become inactive and close, forcing the heated water out of the reel.

The output temperature can be observed on the main screen of the controller on the lower left side, below the target temperature. Once the system has reached 205F, it will display an "OK" operating status (shown in the top center of the main screen). Once the system reaches 205F or "OK", you can turn off the arm override button, which will cause the 2 way valve to open and cause the heaters to turn off. At this point, you will still see a flow meter reading as the pump pumps water from the tank through the pump and back to the tank.

Operating

Once the system has been heated up, you can proceed to treating windrows. With the PTO still running, you can lower the reel to the operating position and pull into the windrow running at the 'desired mph' to match the baler's speed. The arm switch will control the open/close of the 2 way valve. When the reel is in the operating position, the heaters will turn back on and modulate their heat output as needed to achieve a stable output temperature very close to the target temperature. The heaters will do this by cycling on and off as needed. This can be observed by watching the indicator lights for heater 1 and heater 2 on the back of the heaters.

While operating, ensure that the gauge pressure that you set remains close to the Set Pressure value (calculated by the control). You can also observe your target vs actual GPM on the lower right side of the main screen of the controller. Pressure and Actual GPM's may be able to be adjusted by throttling up or down.

****Do not exceed 1000 rpm on the PTO or 1200 PSI on the pump pressure.**

Control Box



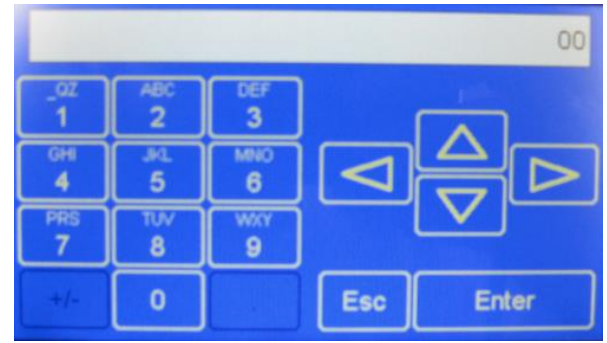
Screen Definition (Control)

Setup Screen

Field	Yield 1.50 T/ac	Speed 7.0 mph	Swath Width 30.0 ft
Machine	Trips Active 11	Tips Installed 65	Tip Size 11
Moisture	Start Moisture 7.0 %	Target Moisture 15.0 %	Target Temp 240 F
Targets	GPM 12.2	Gal/T 19.2	SET PSI 470
Main Menu		Diagnostics	

Field Setup Screen Steps

1. Input the estimated Tons/Acre expected to be produced in the field by pressing Ton/Acre. When selecting any of the input tabs the screen shown on right will appear to input your information. Pressing Enter will save the information.
2. Input the starting moisture content in the field by selecting Start MC%.
3. Input the number of Trips Active. Refer to Adjusting Trip Sections if unsure on how to activate Trips
4. Input the Target MPH, which needs to be the same as the baler
5. Input the target moisture content by pressing Target MC%.
6. Input the number of tips installed by pressing Tips Installed.
7. Input the width of the windrow by pressing Swath FT.
8. Input the target temperature by pressing Target Temp.
9. Input the tip size being used by pressing Tip Size.
10. After the information has been updated press the Main Menu button to move to the main screen.



Min & Max Levels




Target GPM and Gal/T will be automatically populated after the field details have been inputted.

Set Pressure information will be populated after the field details have been inputted. Use this information to adjust the pressure valve on the Dew Simulator.

-The number of hours on each heater will be shown on the bottom of the screen.







Min GPM MW5 Tips 2.1	Min GPM MW11 Tips 4.5	Minimum PSI Set 300
Max GPM MW5 Tips 12.0	Max GPM MW11 Tips 20.0	Maximum PSI Set 1200

Diagnostic Screen:

T_in 63 F	T_out 238.5 F	Prev T_out 237.2 F
GPM 12.5	Req'd BTU's 1382500	Actual BTU's 1350000
H1 	Heater #1 140.7 Hrs	Heater #2 145.2 Hrs
		VER: 1.2.E
		

T_in: Temperature at the inlet to Heater #1
T_out: Temperature at the outlet of Heater #2
Prev T_out: Temperature measured at T_out 5 seconds prior
GPM: Gallons per minute
Req'd BTU's: BTU's required based on the inputted variables to obtain target Temp
Actual BTU's: BTU's currently being produced
Heater #1 Hrs: Number of hours that heater #1 has been firing, not overall machine hours
Heater #2 Hrs: Number of hours that heater #1 has been firing, not overall machine hours
H1 & H2 Lights: Indicate when heaters are firing
Software Version: Indicates version of software and language

Main Screen:

Target	Output	Heater #1 
240 F	60.3 F	Heater #2 
12.2 GPM	0.0 GPM	Arm Override 
470 PSI	Temp Status LOW	Warmup Valve 
		

Tab Descriptions

1. Heater #1: Used to turn on the heater located on the left of the Dew Simulator (closest to diesel tank).
 - PTO must be running, flow meter must have reading, flow switch must sense flow, and arm switch or arm override must be active for heater to turn ON
2. Heater #2: Used to turn on the heater located on the right of the Dew Simulator (farthest from diesel tank).
 - PTO must be running, flow meter must have reading, flow switch must sense flow, and arm switch or arm override must be active for heater to turn ON
3. Target Temp: Displays the temperature you have selected as the desired temp to output (220F-260F).
4. Output Temp: Displays the temperature of the water being applied.
5. Operating Temp Status: Will display the status of the water heat Low, Ok, or High (<205=Low, 205-270=OK, >270= High).
6. Target PSI: Displays the Target PSI determined from SETUP screen inputs (300-1200 PSI).

Main Screen (continued)

7. Arm Override: This function will allow water to flow to the reel assembly by bypassing the arm switch, allows flows to reel when the reel is not in the operating position (12" above the ground)
8. Warming Valve: Used for initial warming of water in combination with Arm Override.
 - With PTO running and Dew Sim reel lifted 12" off the ground turn **ON** Heater #1, Heater #2, Arm Override, and Warming Valve. Warming Valve function recirculates water back to the tank until Output Temp reaches 200 deg F at which point the Warming Valve will automatically turn **OFF** and spray from the nozzles
9. Target GPM: Displays the Gallon per Minute determined from SETUP screen inputs.
10. Actual GPM: Display the Gallons per Minute being applied.
11. Setup: This selection will change the screen to the Setup Screen

Heater #1 & #2

Prior to turning on heaters lift reel assembly 12" above the ground.

Target	Output	Heater #1	Heater #2	Arm Override	Warmup Valve
240 F	236.3 F	ON	ON	OFF	OFF
12.2 GPM	12.5 GPM				
470 PSI	Temp Status OK				
Diagnostics		Setup			

- Turn on Heaters #1 & 2 by pressing the OFF button. ON will display and appear in Blue when Heater 1 & 2 are active
- Heater is firing when the indicator light back on the heater is illuminated
- Heater Firing Requirements:
 - 1) Heater On
 - 2) Arm Switch Override Active
 - 3) Requires Flow

Arm Override

Target	Output	Heater #1	Heater #2	Arm Override	Warmup Valve
240 F	85.6 F	OFF	OFF	ON	OFF
12.2 GPM	12.4 GPM				
470 PSI	Temp Status LOW				
Diagnostics		Setup			

- Activate *Arm Override* by sliding the button right. ON will display and appear in Blue to indicate the Arm Override is active

Located towards the front of the machine on the right side, is a mechanical switch that senses when the reel lift arm is in the field operating position. The arm switch is active when it senses the lift arm. The arm switch must be active for the 2way valve to close, thus directing flow out to the heaters. When the arm switch is deactivated (normally open), flow from the pump is circulated back to the tank.

For instance, if you are treating a windrow and raise the reel 12" off the ground, either when turning at the headland or stopping in the windrow, the arm switch becoming deactivated will cause the 2way valve to open and circulate back to the tank, shutting off flow to the reel. Similarly, for the heaters to run, the

Arm Override (continued)

Arm Override arm switch must be active, so when the reel is raised the heaters will automatically turn off. Additionally, the system must also be seeing a flow rate (GPM) from the flow meter before the heaters will run.

**For system priming and diagnostics, the arm switch can be overridden by the "ARM OVERRIDE" button on the controller. Activating that button will cause the 2way valve to close and allow flow to go through the heaters regardless of the lift arm position.

Warming Valve (Slider)

Target	Output	
240 F	198.3 F	Heater #1 <input checked="" type="checkbox"/>
12.2 GPM	11.7 GPM	Heater #2 <input checked="" type="checkbox"/>
470 PSI	Temp Status LOW	Arm Override <input checked="" type="checkbox"/>
		Warmup Valve <input checked="" type="checkbox"/>
Diagnostics		Setup

- Active *Warmup Valve* by sliding the button right. ON will display and appear in Blue.
- The Warmup Valve button will stay activated until it is either manually turned off by sliding the button to the left, or until the Output Temp has exceeded 200F, at which time the warmup valve will automatically deactivate.

The 2way warmup valve is located towards the rear of the machine in between the heaters. The valve is on the outlet side of heater #2 and is normally closed. When activated on the main screen of the control, it opens and allows pressurized flow that has gone through the heaters to be returned to the supply tank. When the heaters are activated and heating water, the warmup valve, when opened, will allow heated water to be bypassed back to the supply tank until the water temperature reaches 200F.

Once the water temp reaches 200F, the warmup valve will automatically close and shut off on the main screen, forcing the heated pressurized water out to the reel. The warmup valve is used for initial priming (allowing bypass water back to tank) and for initial heating of the system so water does not need to be sprayed on the ground until after the temperature has reached 200F.

- Target Temp / Output Temp (Display)
Target Temp can be adjusted. The recommended temp is approximately 240F degrees.

Operating Temp Status

Target	Output	
240 F	198.3 F	Heater #1 <input checked="" type="checkbox"/>
12.2 GPM	11.7 GPM	Heater #2 <input checked="" type="checkbox"/>
470 PSI	Temp Status LOW	Arm Override <input checked="" type="checkbox"/>
		Warmup Valve <input checked="" type="checkbox"/>
Diagnostics		Setup

The Operating Temp Status will display the area will show if the temperature of the water in the burner is at an adequate temperature by displaying Low, Ok or High.

Low - Temp under 205 degrees

Ok - Temp 205-270 degrees

High - Temp above 270 degree

Target PSI (Display)

Target	Output	Heater #1	Heater #2	Arm Override	Warmup Valve
240 F	198.3 F	ON	ON	ON	ON
12.2 GPM	11.7 GPM				
470 PSI	Temp Status LOW				
Diagnostics		Setup			



Once the setup screen has had the information inputted the Target PSI will display. After the PSI info is displayed, go to the Dew Simulator and adjust the PSI regulation valve (shown above right).

*Tractor PTO needs to be at operating speed for this.

Target GPM / Actual GPM (Display)

Once the setup screen has had the information inputted the Target Gallons per Minute (GPM) will display. The Actual GPM will show the amount of the water being applied.

Operation of the Dew Simulator

When the reel is on the ground, the hydraulics should be in the **FLOAT POSITION** to enable the hydraulic cylinder to float. This allows the lift arms and reel to pivot and follow the contours of the ground and eliminates having "down pressure" on the reel frame.

The machine is designed to straddle the windrow while the tractor drives alongside of it. While operating in the field, it is not advised to turn at the headland while the reel is in the down position. You don't have to raise the reel completely, but while turning around in the field, lift the reel 1-2 feet off of the ground, enough to deactivate the arm switch and allow water flow to be diverted back to the tank. This will conserve water.

During some operating conditions, you may be required to use perimeter nozzle(s) to reduce the effects of evaporation or wind on the outside surface of the windrow. Operate the perimeter nozzles, either for daytime operation or for just wetting the outside of the windrow, by turning on control and adjusting output as needed using the dial on the controller.

Keep an eye on the level of the fluid in the tank. Running the coils dry while very hot may cause damage. It is recommended to stop before running the tank is dry and refill. If you stop before you run out of solution to refill, it is possible to disconnect the 2" quick coupling and use the tank suction line as a fill line for the tank.

Before disconnecting the quick coupler, close the 2" ball valve on the trailer. Disconnect the coupler and connect to the fill source. Harvest Tec recommends that you have an inline screen on your fill source. Open the ball valve and begin filling. When filling is completed, shut off the fill source and close the 2" ball valve. Reconnect the quick connect and reopen the 2" ball valve. This should allow the pump to begin without priming. If you are filling directly from a well or riser, fill from top of the tank to prevent water contamination.

Removal of the Ground Drive Chain

In heavy windrow conditions, it is possible to remove the ground drive chain as the windrow itself will turn the tines more smoothly than relying on the chain. This normally takes a minimum of two windrows raked together for a field yielding over 1.25 ton per acre.

Field Operation

The re-moisturizing of hay before baling will take some learning on the part of the operator. There are three important factors to keep in mind:

1. It will take between 30 seconds and 30 minutes for the moisture to soak into the alfalfa and soften the plant depending on conditions. Application of excess water will require additional wait time for the excess moisture to evaporate.
2. The added water will eventually evaporate from the windrow over time. More rapidly in low humidity or windy conditions. No wind 15-20 minutes, wind up 10 mph 8-12 minutes.

Other conditions, such as ground moisture, humidity and windrow density could affect these recommendations. Start with these, but keep feeling the hay to determine what works best. Once the most optimum interval is determined, **keep the gap between the dew simulator and baler constant.**

INTERVAL GUIDELINES BETWEEN TREATING AND BALING			
WIND CONDITION	TEMPERATURE	HAY MATURITY	SUGGESTED INTERVAL
low (under 5 mph)	under 80°	young	30 minutes
medium (5-12 mph)	under 80°	young	15 minutes
high (12+ mph)	under 80°	young	12 minutes
low (under 5 mph)	over 80°	young	20 minutes
medium (5-12 mph)	over 80°	young	12 minutes
high (12+ mph)	over 80°	young	10 minutes
low (under 5 mph)	under 80°	more mature	35 minutes
medium (5-12 mph)	under 80°	more mature	20 minutes
high (12+ mph)	under 80°	more mature	10 minutes
low (under 5 mph)	over 80°	more mature	25 minutes
medium (5-12 mph)	over 80°	more mature	12 minutes
high (12+ mph)	over 80°	more mature	8 minutes

Using Surfactant

The Harvest Tec 721 Dew Simulator is designed to add moisture to windrowed hay and works best with a surfactant added to the water. The surfactant will improve coverage and speed the absorption rate. While some **Feed Grade** surfactants will work with the Dew Simulator, Harvest Tec has tested and recommends Schaeffer Oil *WET-SOL* 233. The recommended dilution rate is 1.0% (10 gallons in a 1000 gallon tank). Add the surfactant to the tank while filling with water. *WET-SOL* mixes easily and will not settle out.

Maintenance

If you are unsure how to perform any of the maintenance steps have your local authorized dealer perform the tasks.

Maintenance Schedule

	Daily	10 hrs	25 hrs	100 hrs	Season
Chain tension	X				
Check Filters (002-4319A & 002-4321E)	X				
Descaling heaters					X
Change heater fuel filters					X
Check pump oil level	X				
Grease PTO driveline			X		
Plumbing, Seals & Valves	X				
Open Flush Valve to flush in-line filter	X				
Grease wheel bearing on cart				X	
Grease cam follower bearings		X			
Check tightness of set screws on reel shaft				X	
Check for leaking liquid connections/hoses	X				
Grease flange bearings on both ends of reel and on drive wheel shaft			X		
Verify valve trip adjustment/settings	X				
Check valve rollers			X		
Remove and clean Nozzles			X		

Preventative Maintenance Check List

- Check tightness of fittings before use
- Valve rollers spin freely
- Check filters for debris or damage

Maintenance Details

How to check pump oil level

- Pump oil level can be checked by viewing the sight glass on the reel side of the pump, fluid level should be to the top of the sight glass. Use only CAT Pump oil (009-7227oil -21 oz. Two required for oil change)
- Oil should be changed after first 50 hours of use. Then seasonally or every 500 hours.

Chain tension

- If chain is installed, tensioner should be on back side of chain and no slack in chain

Heater Coil Descaling Procedure

In time, a heating coil will accumulate lime or mineral scale deposits. The severity of lime or scale build-up will depend on the hardness or mineral content of your water supply. As illustrated below, liming will first start in the inner windings of a coil, then become less severe as it progresses through the outer coil windings. It is possible for the inner coil windings to become partially clogged, and in some instances, completely plugged before liming or mineral deposits can be noticed in fittings at the coil discharge outlet.

If your water has a high mineral content or hardness, a preventive maintenance schedule to descale the coil at the end of each season, prior to winterizing, is recommended.

Before you begin -- There are different types of coil cleaning chemicals. It is recommended you contact Harvest Tec for the supply of the descaling kit, descaling chemicals, and instructions for use of these chemicals. If this is not possible, the instructions below should be closely followed:

1. A sulfamic acid powder, containing a corrosion inhibitor should be used to remove lime and scale from coil.
2. In a clean 55 gallon drum (preferably plastic), mix approx. 25lbs of acid powder into 25 gallons of water.
3. Turn off the water supply. Disconnect the suction hose and return hose from the tank where they connect to the rear of the dew simulator. Connect the descaling kit suction line to the 2" inlet at the rear of the dew simulator. Connect the descaling kit return line to the 3/4" outlet at the rear of the dew simulator. Insert both lines into the 55 gallon drum. Locate the end of the suction hose so the strainer is 3-4 inches above the bottom of the container.
4. Prior to turning on the PTO, activate the Arm Override and Warmup Valve on the cab controller. This will allow the cleaning solution to be circulated through the heater coils and be returned to the 55 gallon drum. **DO NOT ALLOW CLEANING SOLUTION TO REEL.** Turn on the PTO and with it running at slightly higher than an idle, circulate the acid solution through the system for 20-30 minutes. Whether the solution stops foaming or not, do not circulate for more than 30 minutes. Soon after the solution has started circulation, turn on Heater #1 and Heater #2 for approximately 10 seconds, then turn both heaters off. After 15 minutes of circulation, turn on Heater #1 and Heater #2 for approximately 10 seconds, then turn both heaters off. After circulation for 20-30 minutes total, turn off PTO.
5. Remove the acid suction hose from the rear of the machine. Reconnect the 2" line from the water trailer to the rear of the dew simulator. Remove the 3/4" discharge hose from the 55 gallon drum and secure it to the dew simulator frame so it is aimed at the ground. **DO NOT ALLOW CLEANING SOLUTION TO REEL.** Ensure the tank has approximately 75-100 gallons of clean water in it, turn the water supply on. Turn the PTO back on at an idle and pump clear water through the system for three to four (3-4) minutes. Turn the PTO off.
6. Add one pint of household ammonia to the water in the tank. Reconnect the tank return line to the rear of the dew simulator. Turn the PTO on at approximately 700rpm and circulate this solution back into the tank for approximately five (5) minutes, then turn PTO off. Turn off the 2" valve and disconnect the suction line from the dew simulator. Open the valve and drain on ground. Close valve when done and reconnect to machine.
7. Refill tank with approximately 75-100 gallons of clean water. Turn 2" valve on. Disconnect the tank return line and reconnect the descaling discharge line, once again securing it so it is aimed at the ground. Turn the PTO back on at 700rpm and flush the system with clean water, discharging onto the ground for about 5 minutes or until the supply tank is empty. Turn off PTO and deactivate the Arm Override and the Warmup valve on the cab controller.

CAUTION: Coil cleaning acids or chemicals are hazardous. Protective gloves, clothing, and safety glasses and face shield should be worn when handling. Dispose of drum contents (used acid solution) accordingly.

Winterizing Procedures

NOTE: Failure to properly winterize your machine may result in serious and costly damage to wetted components (pump, heater coils, and reel components) of your Model 721 dew simulator if your machine is exposed to freezing temperatures. Outlined is the recommended method for all occasions during freezing weather, including long-term storage. It is highly recommended that pressurized air be used to blow as much water as possible out of the system. Additionally, **Propylene Glycol based RV Antifreeze** be used. Do not use an Ethanol based RV antifreeze. It is possible to reclaim some of the RV antifreeze to be used for subsequent use. When using this method, occasionally check the strength of your antifreeze, as there will be a slow but steady dilution through repeated use.

1. Turn off the incoming water supply and return lines to your machine. Disconnect the water supply and return hoses and drain them and the tank thoroughly.
2. With the reel in its upright transport position, disconnect the 3/4" supply line to the reel. Spin the reel by hand to allow any water trapped in the reel to drain out through the swivel.
3. Remove the elbows from the perimeter nozzle pumps by sliding the tabs on the pumps back. Use pressurized air to blow out these lines.
4. Disconnect the 1" cam coupler between the flow meter and the pump and allow water in pump and intake line to drain out. Empty the intake filter bowl assembly at the rear of the machine. Use pressurized air to blow any water in the intake line out. Once drained, reconnect the cam coupler.
5. Locate the 1/4" Tee fitting directly below the pressure gauge. Remove the 1/4" plug from the Tee and install an air coupler. Connect a pressurized air source to the coupler and blow any water out of the system. Activate the Arm Override button on the controller to close the 2-way valve and force the air flow through the heaters. Open the warm up valve to flush out, then close the warm up valve. Open the flush valve and allow water to be blown out. Once the system is blown out with air, remove the air coupler and reinstall the 1/4" plug and deactivate the arm override on the control.
6. Drain the fluid in the lines for the perimeter nozzles by disconnecting the elbow fittings at the pump and allowing to drain. Perimeter nozzle tips can be removed to drain more fully. Once drained, reinstall.
7. Place approximately 25 gallons of Propylene Glycol based RV antifreeze in a 55 gallon drum. Connect the 2" suction line from the descaling kit to the inlet of the dew simulator and place the other end in the drum of RV antifreeze. Connect the 3/4" discharge line from the descaling kit to the dew simulator and place the discharge end into the drum.
8. Activate the Arm Override and Warmup Valve on the cab controller. Turn on the PTO and run at an idle to allow the system to draw RV antifreeze from the drum, prime, and circulate back to the drum. Allow the RV antifreeze to circulate back into the 55 gallon drum for 5 minutes. Deactivate the Warmup Valve on the cab controller to force antifreeze towards the reel. Turn off the PTO when RV antifreeze starts to exit the 3/4" high pressure discharge hose. Turn off the Arm Override on the cab controller.
9. Disconnect the suction and discharge hoses from the rear of the Dew Simulator.
10. To reclaim your RV antifreeze, repeat steps 3-5 to manually drain the reclaimable RV antifreeze from the system.
11. To return unit to operation, reconnect the 3/4" high pressure discharge hose to the reel swivel. Reconnect the tank suction line and discharge lines to the rear of the dew simulator. Fill the supply tank with approximately 100 gallons of clean water. Turn on the water supply. Lower the reel to the operating position and turn on the PTO to flush the system of all remaining antifreeze until discharge water is clear.

Troubleshooting

1. Pump runs, but no flow or pressure at reel.

Possible Cause	Solution
1a. Water supply is turned off.	1a. Turn water supply on.
1b. 2 way valve is open	1b. Reel is in transport position or reel is suspended above the ground, Arm Switch is not activated. Lower reel to operating position or activate Arm Override on cab controller to close valve.
1c. Warmup valve is open	1c. Warmup valve is open and allowing fluid to recirculate to tank, ensure Warmup valve button is deactivated on cab controller
1d. Flowmeter not running reading flow	1d. Air in the flowmeter

2. Pump runs rough, pulsation of discharge hose, and pressure low.

Possible Cause	Solution
2a. Pump not primed	2a. Follow priming sequence
2b. Inadequate fluid supply	2b. tank level low, add fluid to tank
2c. Inlet filter clogged	2c. Remove intake filter and clean. Based on water source, a 2 nd inline filter on the tank side of the 2" valve may be required
2d. Air leak of considerable volume in pump suction inlet system.	2d. Check all suction fittings and lines for leaks. Pay attention to thread sealant on fittings and tightness of fittings and clamps – check water level in tank. Sufficient water depth must be maintained in the tank at all times during operation, and depth must account for slopes in the field.
2e. Blockage in fluid lines on reel assembly	2e. Blockage in lines, fittings, or nozzles on the reel assembly. With the unit running, suspend 12" above the ground. Activate Arm override and manually turn the reel to ensure all nozzles are spraying. Remove blocked nozzles, disassemble, and soak in CLR or similar cleaner. Reassemble. Blockages due to corrosion or sediment buildup are most likely found on nozzles, ends of tines, and 90 degree elbows. Replace blocked components as needed.

3. Pump alternately runs smooth and rough, pressure fluctuates.

Possible Cause	Solution
3a. Air leaks in the suction inlet system. Frequency of pump roughness and pressure loss are dependent on severity of air leaks.	3a. Check for air leaks. Check lines and clamps.
3b. Fluid leak on discharge side of pump	3b. Visually inspect all fluid connections for loose fittings or damaged hoses.

Troubleshooting (continued)

4. Operating pressure excessive < 1250 PSI

Possible Cause	Solution
4a. Restricted discharge nozzle or plumbing	4a. Clean/Replace nozzles or components
4b. Pressure relief valve set to high, or PTO speed too high	4b. Reduce pressure setting, reduce PTO speed
4c. Restriction in coil	4c. See "Descaling Instructions"
4d. Insufficient number of valve trip sections activated	4d. Ensure that a minimum of 3 valve trip sections are up

5. Heaters will not run motor, igniter, or pump fuel

Possible Cause	Solution
5a. Rear controller not connected	5a. Connect control, ensure harness is connected to each heater. Verify internal wiring connections are good inside heater housing.
5b. Arm Switch and Arm Override are both deactivated	5b. Active by lowering to operation position or activating Arm Override on cab control
5c. No flow of fluid being directed through heaters. Pump is not running or fluid is being bypassed in pump.	5c. Turn on PTO and either lower to operational position or activate Arm override to direct fluid through the heaters
5d. No flow meter reading, No target temperature	5d. Ensure flow meter reading is being read by controller. 0 GPM flow indicated a) pump not on-turn pump on b)fluid bypassing in pump-lower reel or activate Arm override c)faulty/damaged flow meter-replace d)no target temp-set temp to 240F

6. Burner motor runs, but burner will not ignite.

Possible Cause	Solution
6a. Fuel tank empty.	6a. Add diesel to fuel tank.
6b. Fuel pump air-locked -- pump lost prime when fuel tank ran dry, changed fuel pumps and did not install fuel bypass plug in pump.	6b. Secure a small container to catch fuel flow and get heater to turn on. Open prime valve on fuel pump and allow to run until steady stream of fuel flows from prime valve, catching it in the container. Turn the heater to the "OFF" position, close prime valve and resume operation. NOTE: Always install bypass plug in fuel pump when installing a new pump, or you will have to prime each time the tank runs dry.
6c. The fuel filter or fuel line fitting is plugged -- considerable air leak in inlet line or fitting.	6c. Check for or consider need for change of fuel filter -- check for fuel flow through outlet fitting on bottom of fuel tank. Sludge build-up over time can plug the fitting -- check inlet line, fittings and clamps for security and possible air leaks. If pump fails to prime after above replace fuel pump.
6d. Motor blowing spark away from fuel nozzle	6d. Adjust air settings on heater as need
6e. Igniter damaged, or in contact with nozzle	6e. Reference Beckett manual to troubleshoot igniter damage. Ensure igniter is not shorted to nozzle, as will result in no spark

Troubleshooting (continued)

7. Burner motor runs, but burner will not heat.

Possible Cause	Solution
7a. Low fuel pump pressure.	7a. Check fuel pump pressure, adjust or replace if needed. (Pressure should be checked by an authorized technician).
7b. Dirty fuel nozzle.	7b. Replace.
7c. Improper air adjustment setting.	7c. Adjust setting.

8. Excessive smoke from exhaust stack.

NOTE: There are a number of causes for dirty fires of oil burners in general. Only the more likely or plausible reasons are noted.

Possible Cause	Solution
8a. Not enough combustion air, or too much combustion air.	8a. White smoke on startup, too much air, reduce adjustment band setting on burner housing. Black smoke on startup, not enough air, increase adjustment band setting on burner housing. NOTE: Final burner adjustments are best made after the combustion chamber is hot. Wait five (5) minutes after startup for final adjustment.
8b. Poor grade of fuel -- dirty or restricted fuel supply -- loose fuel -- leak between fuel nozzle adaptor and fuel pipe of gun assembly.	8b. Use only recommended fuels. Check for restricted fuel inlet to pump, or air leaks. Remove burner housing and check for a loose fuel nozzle or fuel nozzle adaptor and tighten. NOTE: Just before a fuel filter, fuel nozzle filter screen, or a fuel pump internal filter =screen plugs up, the burner will start smoking excessively.
8c. High altitude -- unit manufactured at a lower elevation and shipped to elevation of 5,000 ft. or above.	8c. Change to a fuel nozzle approximately ¼ GPH smaller, and increase fuel pump pressure by 15-25 PSI to make up for fuel loss with better atomization. Replace with the same type nozzle, "A" and "B" nozzle, and at the same angle.
8d. Fuel pump pressure too low -- or too high for size and angle of fuel nozzle.	8d. Maintain fuel pump pressure between 100 PSI and 140 PSI. Pressures below 100 PSI may cause delayed ignition and dirty burns through collapsing of the fuel pattern. Pressures in excess of 140 PSI may provide more fuel for the size and angle of the fuel nozzle than the combustion area will allow.

17. Excessive fumes from exhaust stack. Does not smoke -- burns eyes, acrid smell.

Possible Cause	Solution
9a. Air adjustment band on burner open too wide.	9a. Close air band.
9b. Burner has been worked on and air handler parts altered.	9b. Do not change the size of the blower fan or remove the increment rings from the static disc on the burner gun assembly. If the fuming condition is too excessive and cannot be removed by air band adjustment, contact Harvest Tec. NOTE: delayed ignition will also create excessive fumes.

Troubleshooting (continued)

10. Excessive temperature of discharge water.

Possible Cause	Solution
10a. T_in or T_out temperature sensors not working properly, system not receiving proper feedback	10a. If either temperature sensor is not functioning properly, replace
10b. Water pump delivery volume has decreased.	10b. Maintain appropriate flow rate

11. Inadequate temperature rise of discharge water.

Possible Cause	Solution
11a. Inlet water supply cold with winter weather.	11a. Too many BTU's required to achieve desired temperature. Reduce flow requirement.
11b. Heating coil closing off with scale or lime deposits.	11b. See descaling instructions.

Pin Outs

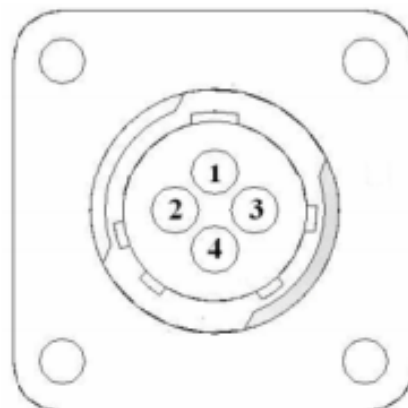
Controller Harness 006-720B at Cab

Pin 1	Yellow	Flow Meter Sig
Pin 2	Orange	Key +12v
Pin 3	White	Arm Override Sig
Pin 4	Green	H1R-
Pin 5	Yellow	H2R-
Pin 6	Red	Battery 12V+
Pin 7	Green	Tin Sig+
Pin 8	Gray	VTank Sig+
Pin 9	Black	Bat Gnd
Pin 10	Blue	Tout Sig+



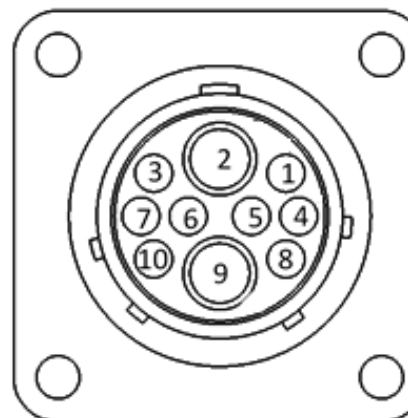
PN Controller Harness 006-720L

Pin 1	Red	Bat_ +12V
Pin 2	Black	Bat_Gnd
Pin 3	Blue	PNP1_+
Pin 4	Gray	PNP2_+



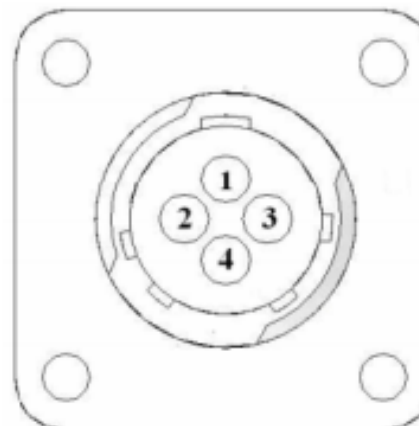
Rear Controller Harness 006-720D

Pin 1	Red	Key +12V
Pin 2	Red	Bat +12V
Pin 3	N/A	Not Used
Pin 4	Green	H1R-
Pin 5	Yellow	H2R-
Pin 6	N/A	Not Used
Pin 7	Purple	PN1 Gnd
Pin 8	Brown	PN2 Gnd
Pin 9	Black	Bat Gnd
Pin 10	White	PValve Sig+



Flow Meter Assembly 006-4730P

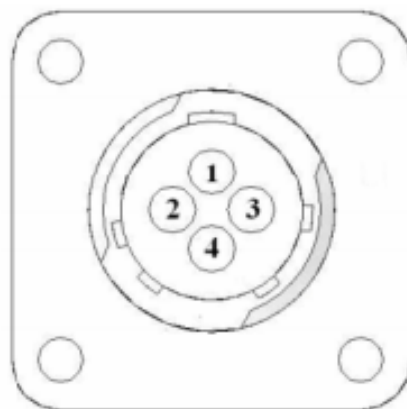
Pin 1	Red	12V+
Pin 2	Black	Bat Gnd
Pin 3	White	Sig+
Pin 4	N/A	Not Used



Pin Outs (continued)

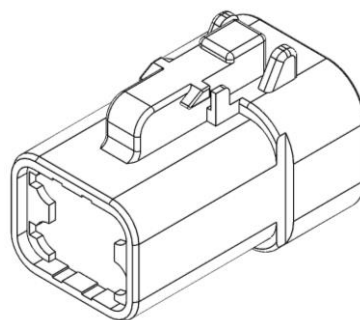
Temp Sensor Assembly 006-4732P

Pin 1	Red	12V+
Pin 2	N/A	Not Used
Pin 3	White	Sig+



Control to Drawbar Harness 006-7717 (Optional Accessory)

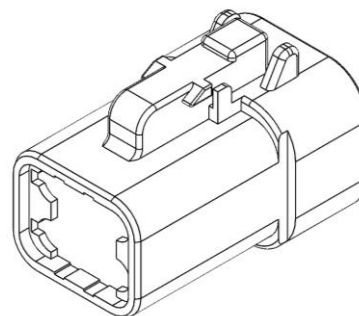
Pin 1	Red	PN_Bat_12V+
Pin 2	Black	PN_Bat_Gnd
Pin 3	Blue	PNP1_+
Pin 4	Gray	PNP2_+



Dew Simulator Cart Harness 006-7720

A-PN Power Connector

Pin 1	Red	Bat_12V+
Pin 2	Black	Bat_Gnd
Pin 3	Blue	PNP1_+
Pin 4	Gray	PNP2_+



B-Cab Controller Connector

Pin 1	Yellow / White	Flow Meter Sig
Pin 2	Orange	Key 12V+
Pin 3	White	Arm Override
Pin 4	Green	12V+
Pin 5	Yellow	H1R1-
Pin 6	Red	H2R2-
Pin 7	Red	Bat_12V+
Pin 8	Green / White	Arm - Sig+
Pin 9	Gray	VTank-Sig+
Pin 10	Black	Bat-Gnd
	Blue / White	Tout Sig+



Pin Outs (continued)

E-2 Way Valve

Pin 1	Red	12V+
Pin 2	Black	Bat Gnd
Pin 3	White	Sig+



F- Flow Meter

Pin 1	Re	12V+
Pin 2	Black	Bat Gnd
Pin 3	Yellow/ White	Sig+
Pin 4	Not Used	N/A



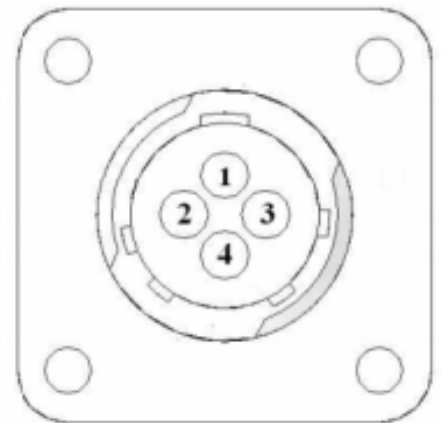
G- Arm Switch

1/4" MQC	Red	ArmOR_IN
1/4" FQC	Orange	ArmOR_OUT



K- T-in Sensor

Pin 1	Red	12V+
Pin 2	Not Used	N/A
Pin 3	Green/ White	Tin_Sig+
Pin 4	Not Used	N/A



Pin Outs (continued)

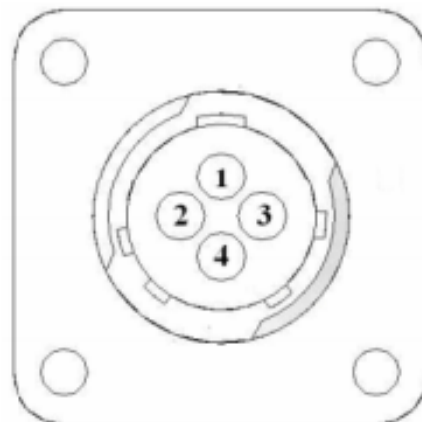
J- Warmup Valve

1	Red	12V+
2	Black	Bat Gnd
3	White	Sig+



L- T-Out Sensor

Pin 1	Red	12V+
Pin 2	Not Used	N/A
Pin 3	Blue/ White	Tin_Sig+
Pin 4	Not Used	N/A



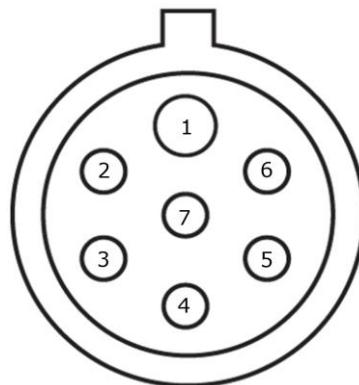
O- Connection to Rear Controller

Pin 1	Red	Key +12V
Pin 2	Red	Bat +12V
Pin 3	N/A	Not Used
Pin 4	Green	H1R-
Pin 5	Yellow	H2R-
Pin 6	N/A	Not Used
Pin 7	Purple	PN1 Gnd
Pin 8	Brown	PN2 Gnd
Pin 9	Black	Bat Gnd
Pin 10	White	PValve Sig+



Trailer Plug

Pin 1	Blue	Ground
Pin 2	Black	Marker
Pin 3	Yellow	Left Signal
Pin 4	Red	Stop Lamp
Pin 5	Green	Right Signal
Pin 6	Brown	Tail Lamps
Pin 7	Not Used	N/A



Pin Outs (continued)

Control to Drawbar Harness 006-7722

Pin 1	Yellow / White	Flow Meter Sig
Pin 2	Orange	Key 12V+
Pin 3	White	Arm Override 12V+
Pin 4	Green	H1R1-
Pin 5	Yellow	H2R2-
Pin 6	Blue	Bat-12V+
Pin 7	Green / White	Arm – Sig+
Pin 8	Gray	VTank-Sig+
Pin 9	Black	Bat-Gnd
Pin 10	Blue / White	Tout Sig+

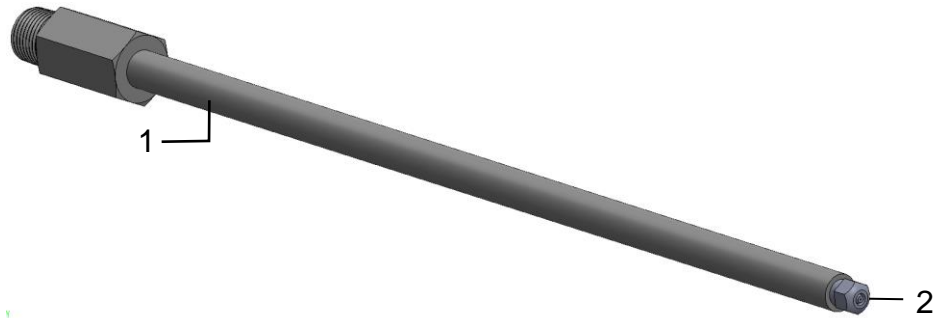


Hose Matrix

<u>Hose Description</u>	<u>Part No.</u>	<u>Qty.</u>	<u>Hose Description</u>	<u>Part No.</u>	<u>Qty.</u>
Perimeter Nozzles Hoses			Supply Hose		
Supply- 3/4" EPDM	002-9007	15 ft.	11 ft Pump to H1	002-9715	1
Nozzle Supply- 1/2" EPDM	002-9017	16 ft.	Return Lines		
Suction Hose			Green Strip Heater Hose	002-9717	33.75
1" Suction Tubing	002-9005	6 ft.	Sight Tube		
1-1/2" Suction Tubing	002-9008	7 ft.	Diesel Tank	002-9709	2 ft.
2" Suction Tubing	002-9004	15 ft.	Heater Hose		
Hydraulic Hoses			H1 to H2	002-9716B	51 in.
*All hydraulic hoses have 1/2" NPT on each end			Reel KZ Valve to Reel	002-9718B	56 in.
1/2" x 14 ft Hyd Hose OAL	002-9714	2	Warmup Valve to 2" Y-Strainer	002-9718B	56 in.
1/2" x 68" Hyd Hose OAL	002-9714-68	1	H2 to Warmup Valve	002-9718D	23 in.
1/2" x 80" Hyd Hose OAL	002-7914-80	1	Fuel Line		
1/2" x 12.5" Hyd Hose OAL	002-9714-12.5	1	3/8" Fuel Line	002-9710	10 ft.
1/2" x 20" Hyd Hose OAL	002-9714-20	1	1/4" Fuel Line	002-9711	10 ft.
1/2" x 20" Hyd Hose OAL	002-9714-24	1			

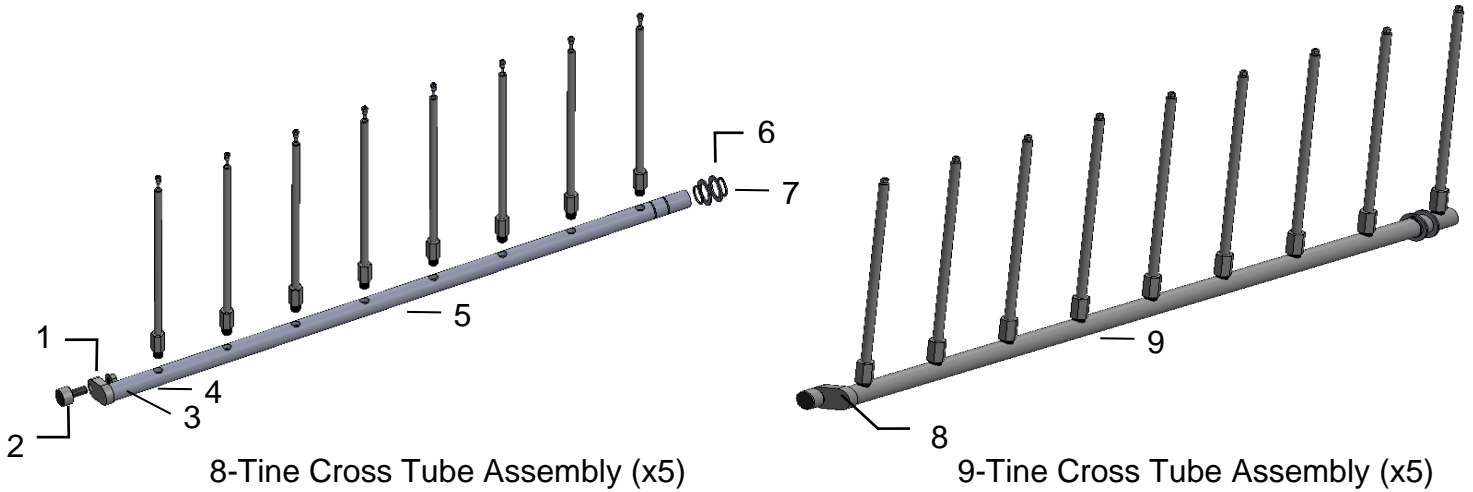
Parts Breakdown

Tine Assembly



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Tine Assembly	001-7202	69
2	Tip for Tines (MW11)	004-7125	69
NP	Tip of Tines (MW5)	004-7123	
NP	1/2" Crosstube Plug	003-DSP12	20

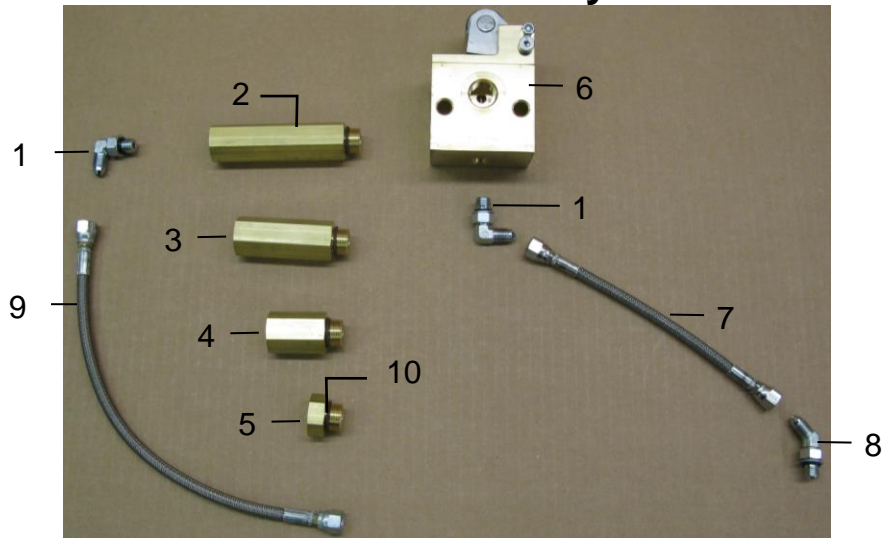
Cross Tube Assembly



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Cam Grease Zerk	008-7121Z	1
2	1 1/2" Cam Bearing	008-7121	1
3	X-Tube Bearing Insert	001-7243B	4
4	X-Tube Bearing Holder	001-7243A	4
5	8-Tine X-Tube	001-7207	1

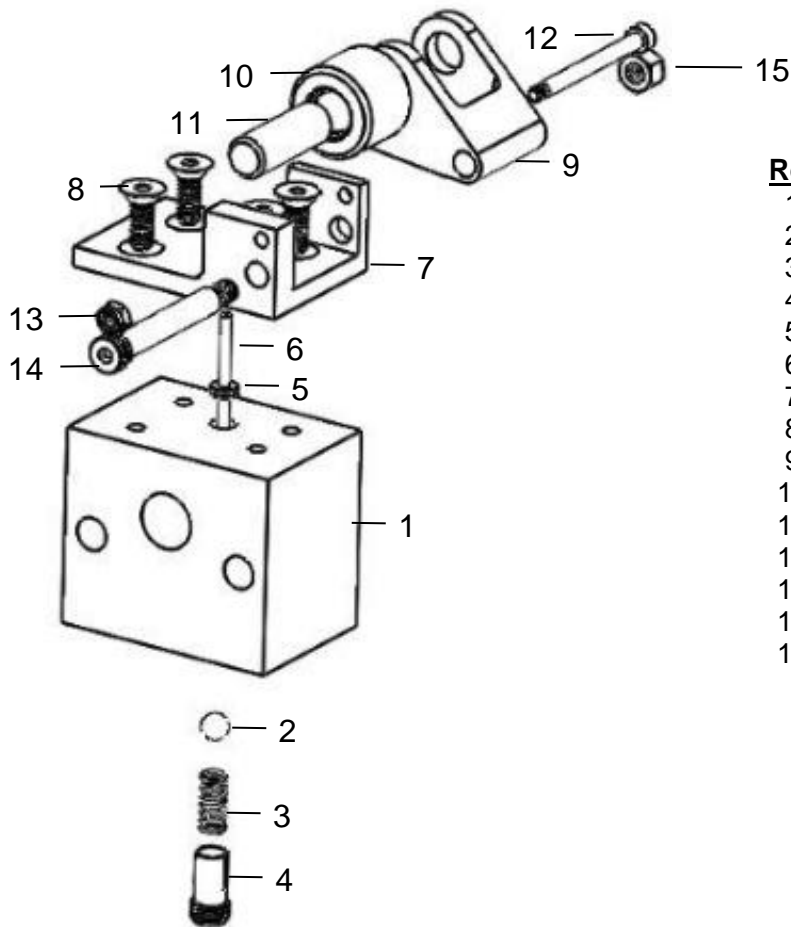
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
6	Plastic Bearing Washer	008-4527	2
7	1 1/2" Snap Roto Clip	008-4577	2
8	1/2" Plug DS Regulator	003-DSP12	1
9	9-Tine X-Tube	001-7206	1

Valve Assembly



Ref	Description	Part #	Qty	Ref	Description	Part #	Qty
1	Elbow 1/4" x 1/4"	003-DS1414EL	20	6	Valve Assembly	001-7204	10
2	3 3/4" Brass Standoff	001-7105D	4	7	Valve Hose 8"	002-7204A	10
3	2 5/8" Brass Standoff	001-7105C	6	8	45 Deg Elbow 1/4x1/4"	003-DS1414EL45	10
4	1 1/2" Brass Standoff	001-7105B	6	9	Valve Hose 12.5"	002-7204B	10
5	3/8" Brass Standoff	001-7105A	4	10	O-Ring	001-7105G	20

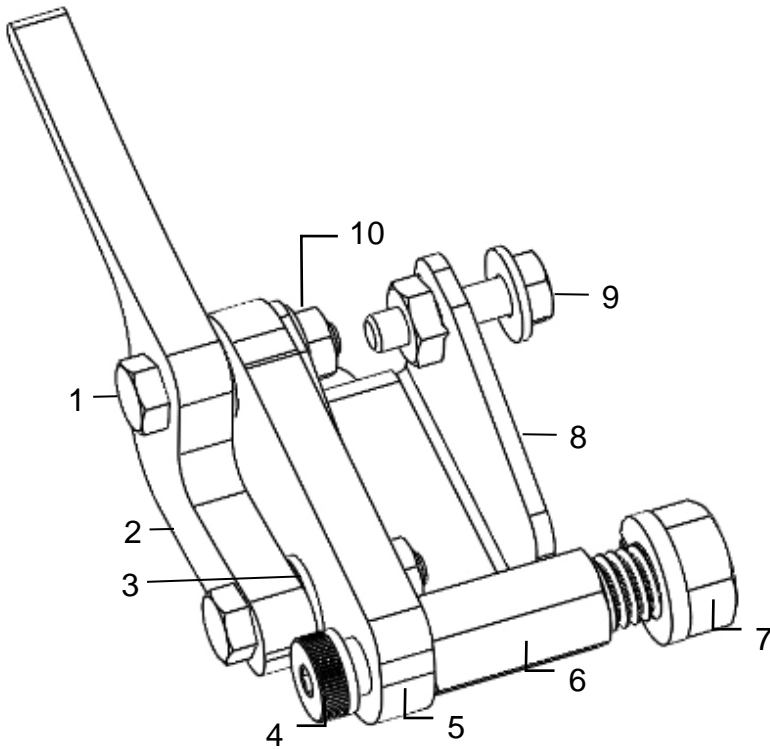
Valve Assembly (Exploded View)



Ref	Description	Part #	Qty
1	Valve Block	001-7204VD	1
2	Valve Ball	001-7104VF	1
3	Valve Spring	001-7104VG	1
4	Spring Retainer	001-7104VH	1
5	Quad Ring	001-7104VL	1
6	Plunger Pin	001-7104VE	1
7	Valve Plate	001-7204VB	1
8	Valve Screws	001-7204VK	4
9	Roller Bracket	001-7104VA	1
10	Roller	001-7204VI	1
11	Roller Pin	001-7204VJ	1
12	Stop Pin	001-7204VC	1
13	Stop Pin Nut	8-32 Nylock Nut	1
14	Pivot Pin	001-7204VB-2	1
15	Pivot Pin Nut	1/4"-20 Nylock Nut	1

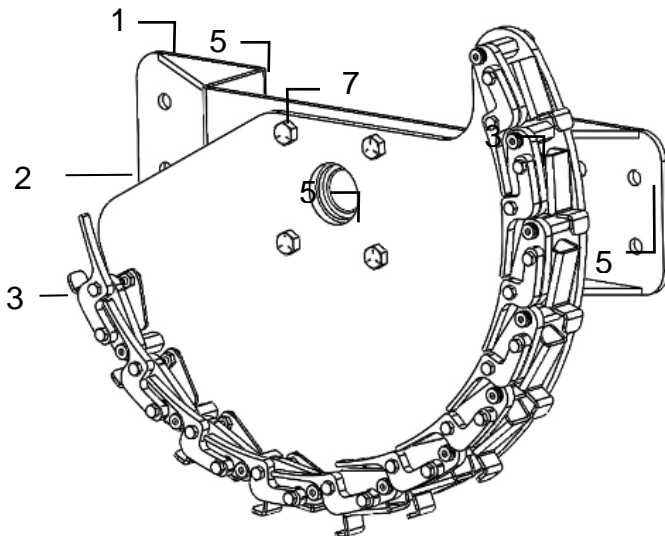
Valve Rebuild Kit 001-7204R
(Ref 2-6,12,14)

Valve Trip Assembly

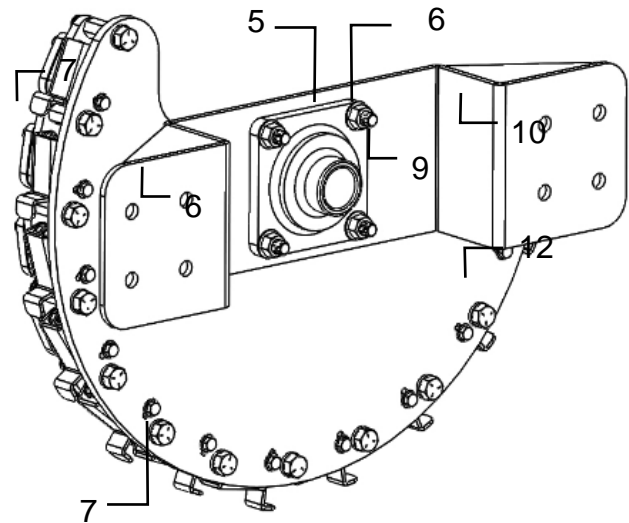


<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Flange Bolt 1/4-20x1-1/4	Hardware	2
2	Trip Outline	001-7210C	1
3	1/4" Flat washer	Hardware	2
4	Shoulder Bolt	001-7210D	1
5	Trip Inside	001-7210B	1
6	5/16" – 1/2" Standoff	001-7210E	1
7	1/2-13x1 Flange Bolt	Hardware	1
8	Trip Bracket	001-7210FA	1
9	1/4-20x1 Flange Bolt	Hardware	1
10	1/4-20 Flange Nut	Hardware	2

Trip Assembly



Front View

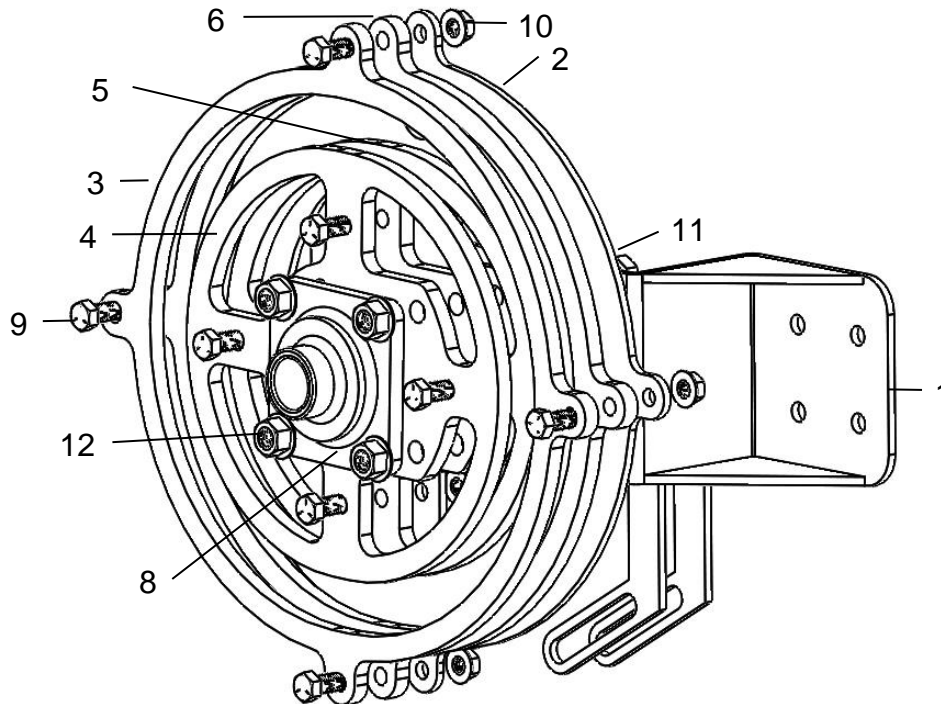


Reverse View

<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Valve Side Bracket	001-7208	1
2	Trip Plate	001-7210A	1
3	Valve Trip Assembly	Previous pg	11
4	1/2-13 Flange Bolt	001-7210D	4

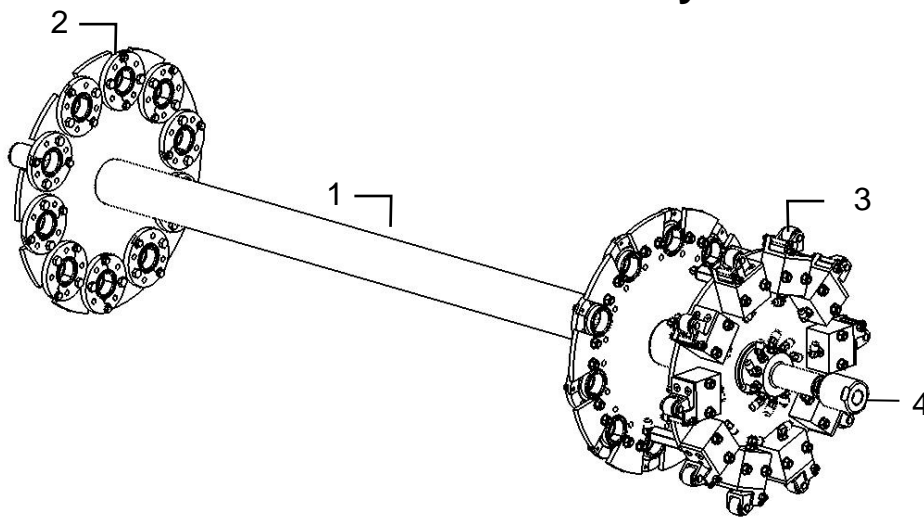
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
5	1 1/2" Bearing 4 Bolt	008-7137	1
6	1/2-13 Flange Nut	Hardware	4
7	1/4 x 1" Adjustment Bolt	Hardware	

Cam Mount Assembly



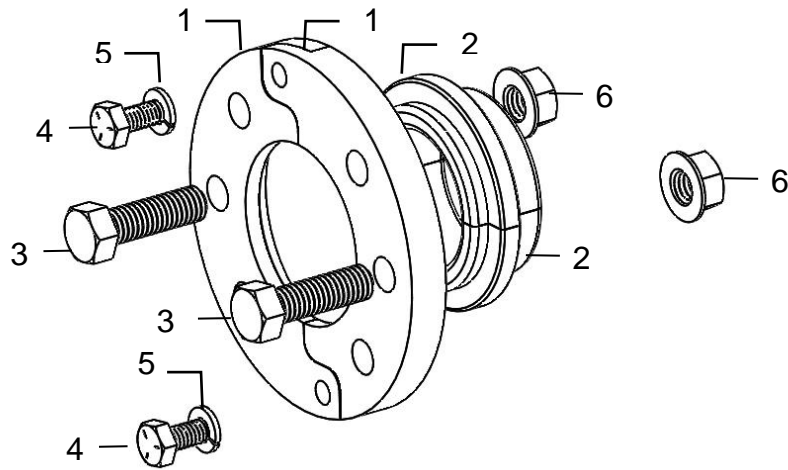
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Cam Side Bracket	001-7209	1	9	1/2"-13 x 1 3/4" Bolt	Hardware	8
2	Cam Track Back Plate	001-7203A	1	10	1/2"-13 Flange Nut	Hardware	8
3	Cam Track Outside Ring 1/2"	001-7203B	1	11	1/2"-13 Flange Bolt	Hardware	4
4	Cam Track Inner Ring 1/2"	001-7203C	1	12	1/2"-13 Flange Nut	Hardware	4
5	Cam Track Inner Ring 1/4"	001-7203D	1	NP	Idler Sprocket	001-7125	1
6	Cam Track Outer Ring 1/4"	001-7203E	1	NP	5/8"-11 x 3" Bolt	Hardware	1
7	Cam Track Bearing Spacer	001-7203F	1	NP	9/16" Flat washer	Hardware	8
8	1 1/2" Bearing 4-Bolt	008-7137	1	NP	5/8"-11 Nylock Nut	Hardware	1

Reel Dumbbell Assembly



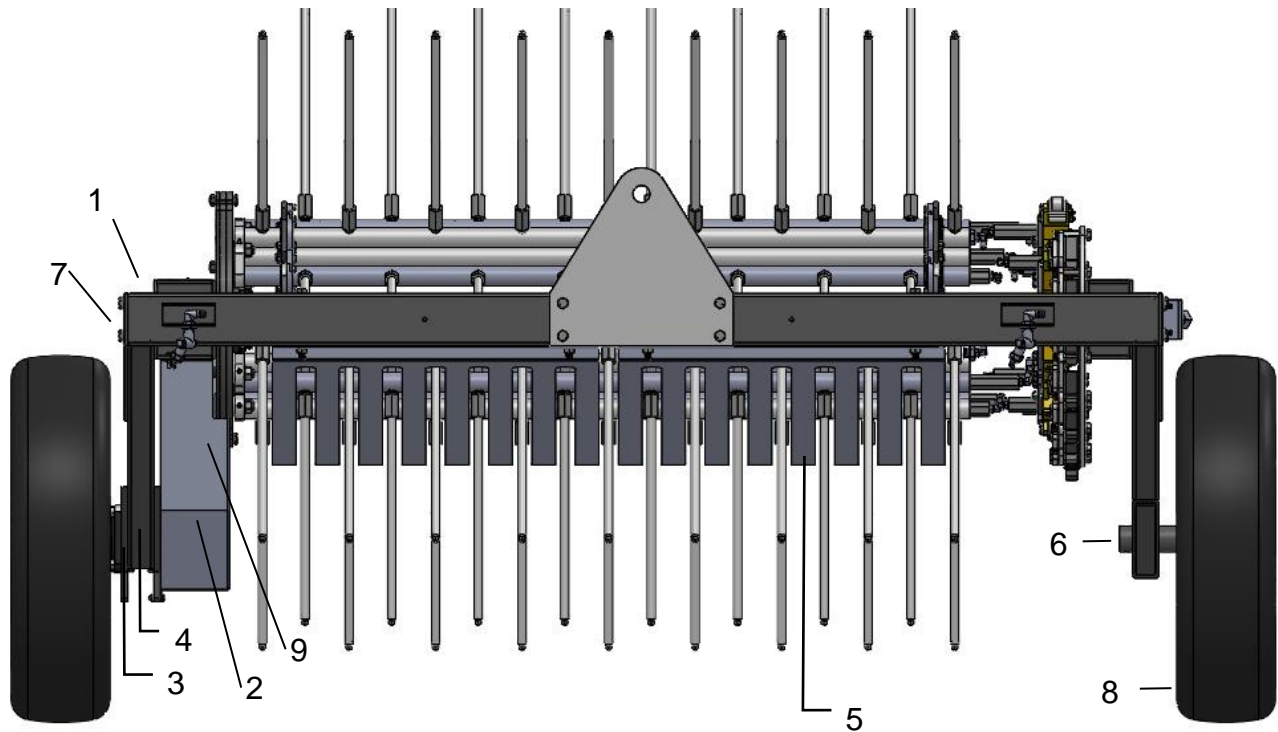
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Reel Dumbbell	001-7201	1	3	Valve Assem	001-7204	10
2	X-Tube Bearing Assm-Refer to Parts Bkd		40	4	Inline Swivel	001-7222	1
					Swivel Rebuild	001-7222RBK	

X-Tube Bearing Assembly



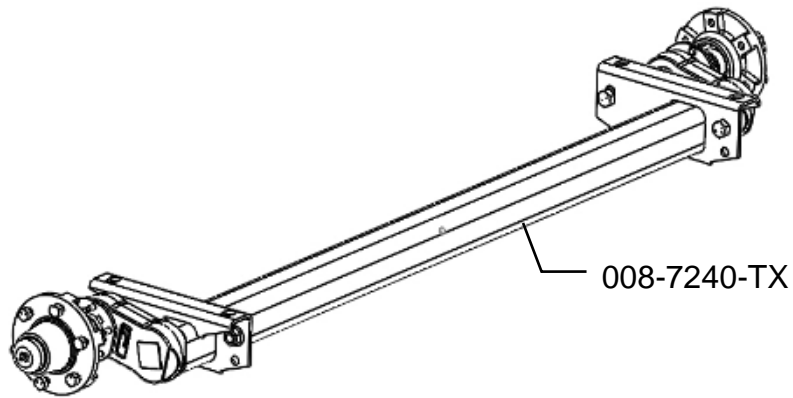
Ref	Description	Part #	Qty	Ref	Description	Part #	Qty
1	X-Tube Holder	001-7243A	2	4	1/4"-20 1/2" Bolt	Hardware	2
2	X-Tube Insert	001-7243B	2	5	1/4"-Lock Washer	Hardware	2
3	3/8"-16 1 1/4" Bolt	Hardware	4	6	3/8"-16 Flange Nut	Hardware	4

Reel Assembly

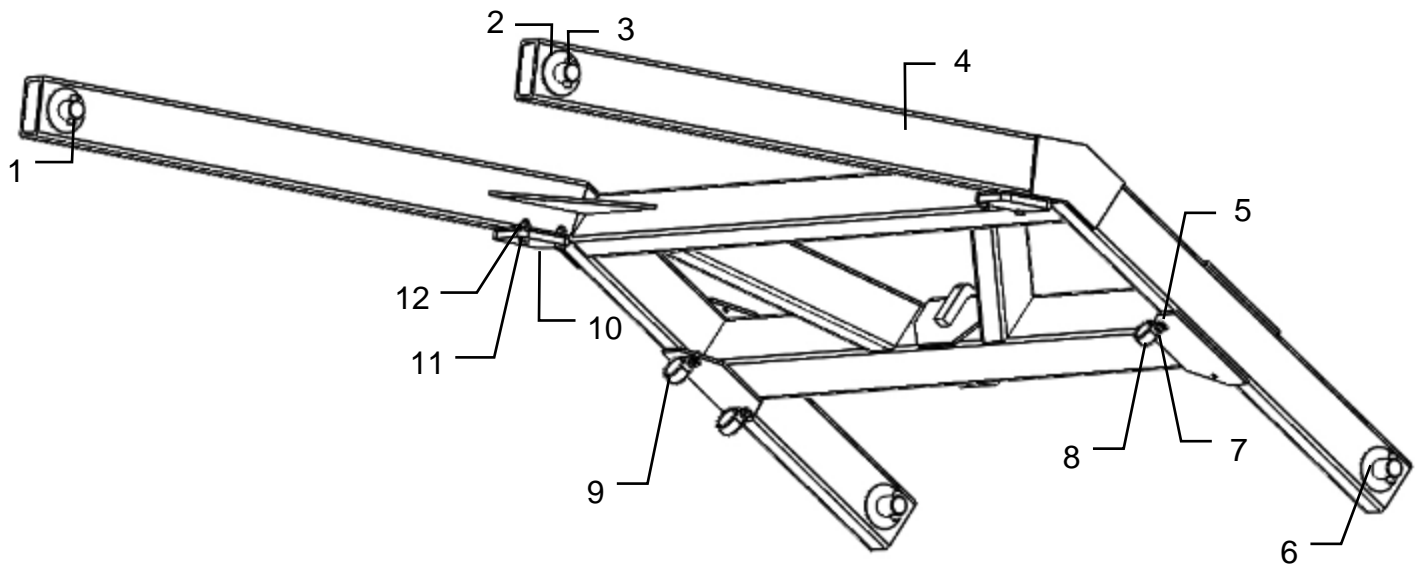


Ref	Description	Part #	Qty	Ref	Description	Part #	Qty
1	Reel Frame Assembly	001-7218	1	9	Chain Shield	001-7233	1
2	1 1/2" Drive Sprocket	001-7124C	1	NP	Rim - 4 Bolt	008-7130	2
3	1 1/2" Bearing Bolt-on	008-7137	2	NP	Rim Bolts for 4 Bolt	008-7130B	4
4	Drive Wheel Shaft	001-7241	1	NP	Roller Chain #50	008-7142	4
5	Windguard Assembly	001-7217	2	NP	Roller Chain Splice #50	008-7142A	1
6	Hub Spindle Assembly	001-7218B	1	NP	Roller Chain 1/2 Link #50	008-7142B	1
7	Reel Backing Plate	001-7209E	4	NP	Key 3/8" x 3/8" x 1 1/2"	001-7124D	1
8	Reel Tire	008-7139	2				

Torsion Axle

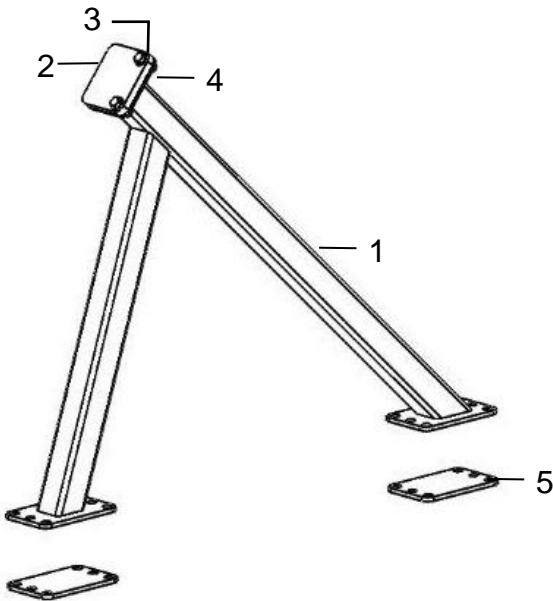


Lift Arm Assembly



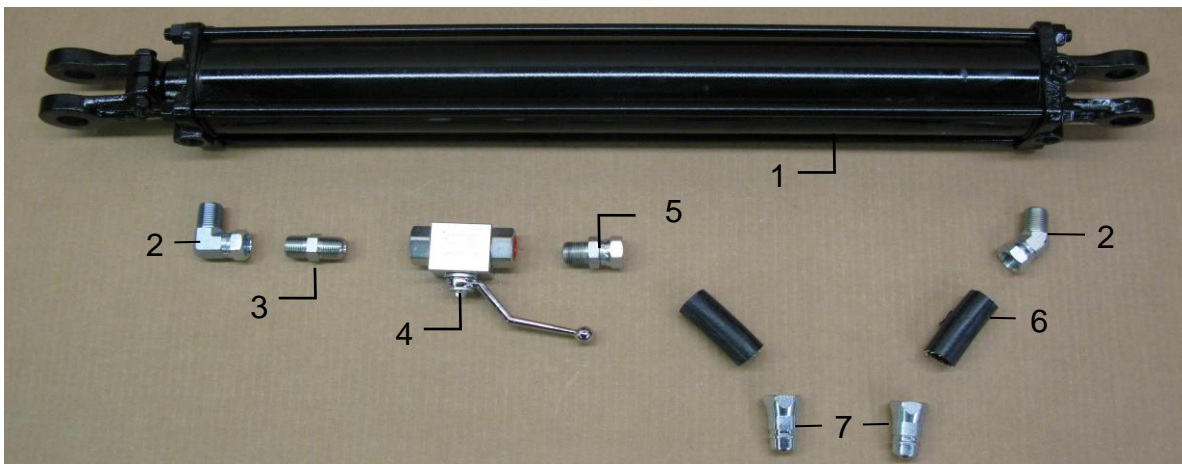
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Reel Pin	001-7216A	2	7	5/16"-18 Flangebolt	Hardware	2
2	Thrust Bushing	008-7146B	8	8	1" Jiffy Clip	008-9009	4
3	Zinc Roll Pins	001-7144	8	9	1-1/2" Jiffy Clip	008-9112	2
4	Lift Arm Assembly	001-7211	1	10	Lift Arm Bumper	001-7223B	2
5	5/16"-18 Flange nut	Hardware	2	11	3/8"-16 Flange bolt	Hardware	4
6	Cart Pin	001-7216B	2	12	3/8-16 Flange nut	Hardware	4

Lift Arm Support Assembly



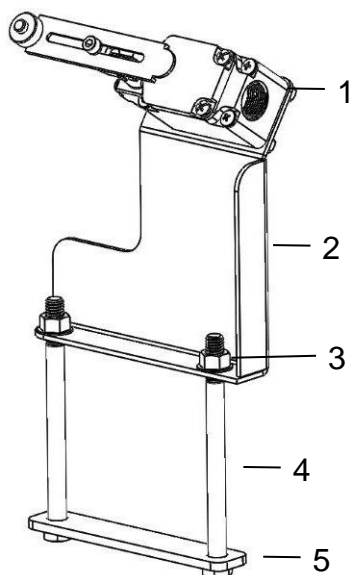
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Support Bracket	001-7223	1
2	Rubber Bumper	001-7223B	2
3	3/8"-16 x1 1/2" Flange Bolt	Hardware	2
4	3/8"-16 Flange Nut	Hardware	2
5	Support Bracket Plate	001-7223A	2
NP	1/2"-13x5" Flange Bolt	Hardware	6
NP	1/2"-13 Flange Nut	Hardware	6

Hydraulic Cylinder Assembly



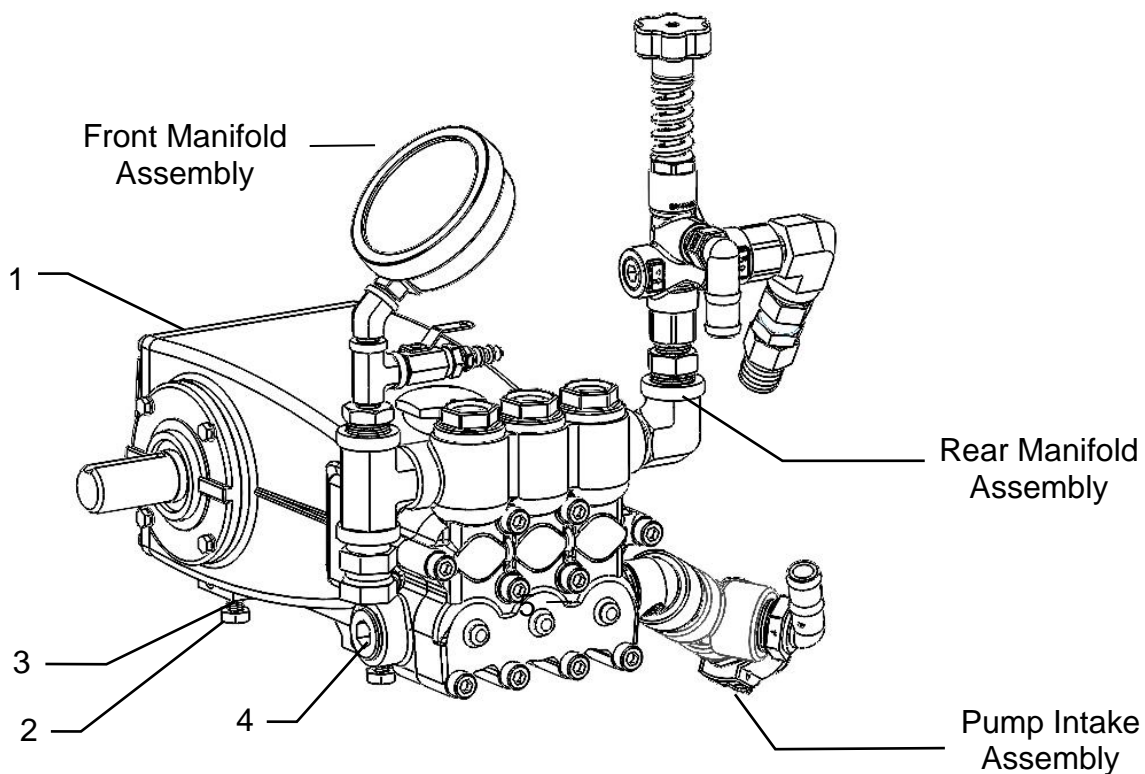
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	3"x24" Hydraulic Cylinder	008-7132	1	5	Restrictor	003-9716	1
2	1/2" Swivel Elbow	003-DSEL1212	2	6	1/2" Hydraulic Hose 14'	002-9714	2
3	1/2" Nipple	003-DSM1212	1	7	Pioneer Coupler	003-9715	2
4	Ball Valve	002-2221	1				
5	Restrictor	003-9716	1				

Limit Switch Assembly



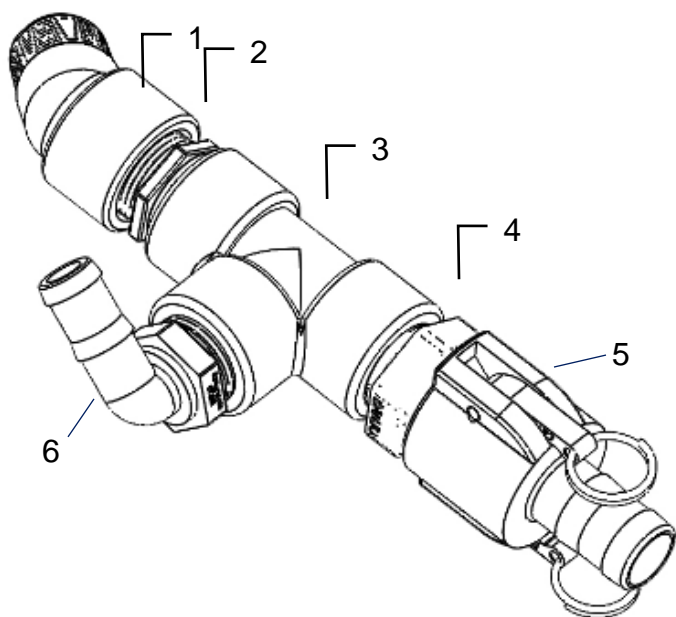
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Limit Switch Lift Arm	006-7200LS	1
2	Limit Switch Bracket	001-7221	1
3	3/8"-16 Flange Nut	Hardware	2
4	3/8"-16 Bolt	Hardware	2
5	Nozzle Backing Plate	001-7225	1
NP	3/8 x 1/2 Elbow	003-EL3812P	1

Pump Assembly



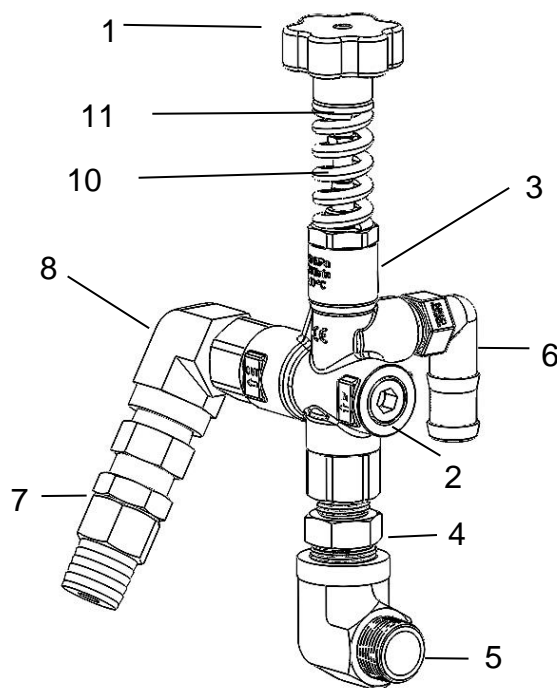
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Main Pump	007-7227	1	NP	Key M8x7x40	007-7227B	1
2	M10x1.0x25mm	Hardware	4	NP	PTO Shaft Cover	007-7227C	1
3	M10 Lock washer	Hardware	4	NP	PTO Driveline	008-7226	1
4	1" Pump Plug	003-DSP100	1	NP	Pump Oil	009-7227oil	2

Pump Intake Assembly



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	1"x1" 45 Deg Elbow	003-SE45100HP	1
2	1" Nipple	003-M100100HP	1
3	1" Tee	003-TT100HP	1
4	Male Coupler	002-2204O	1
5	1"x1" Female Coupler	002-2205J	1
6	1"x3/4" Elbow	003-EL10034HP	1

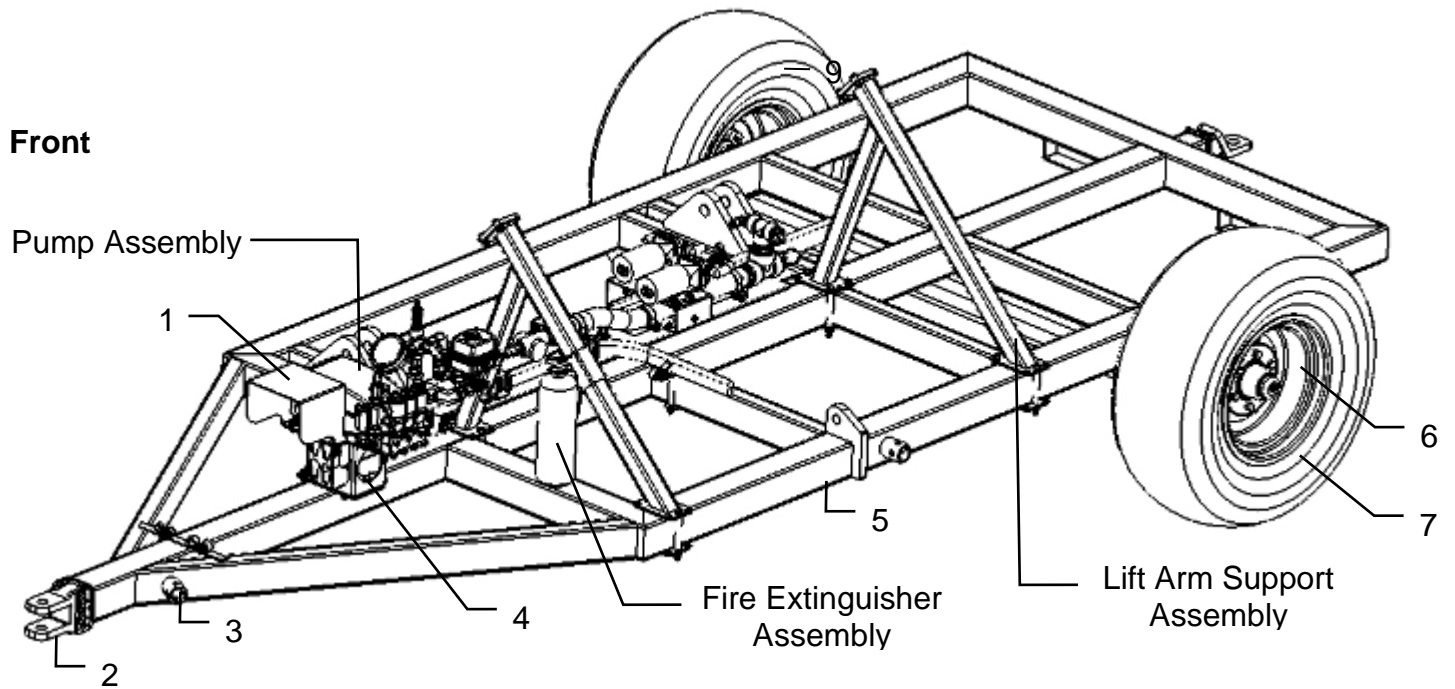
Pump Rear Assembly



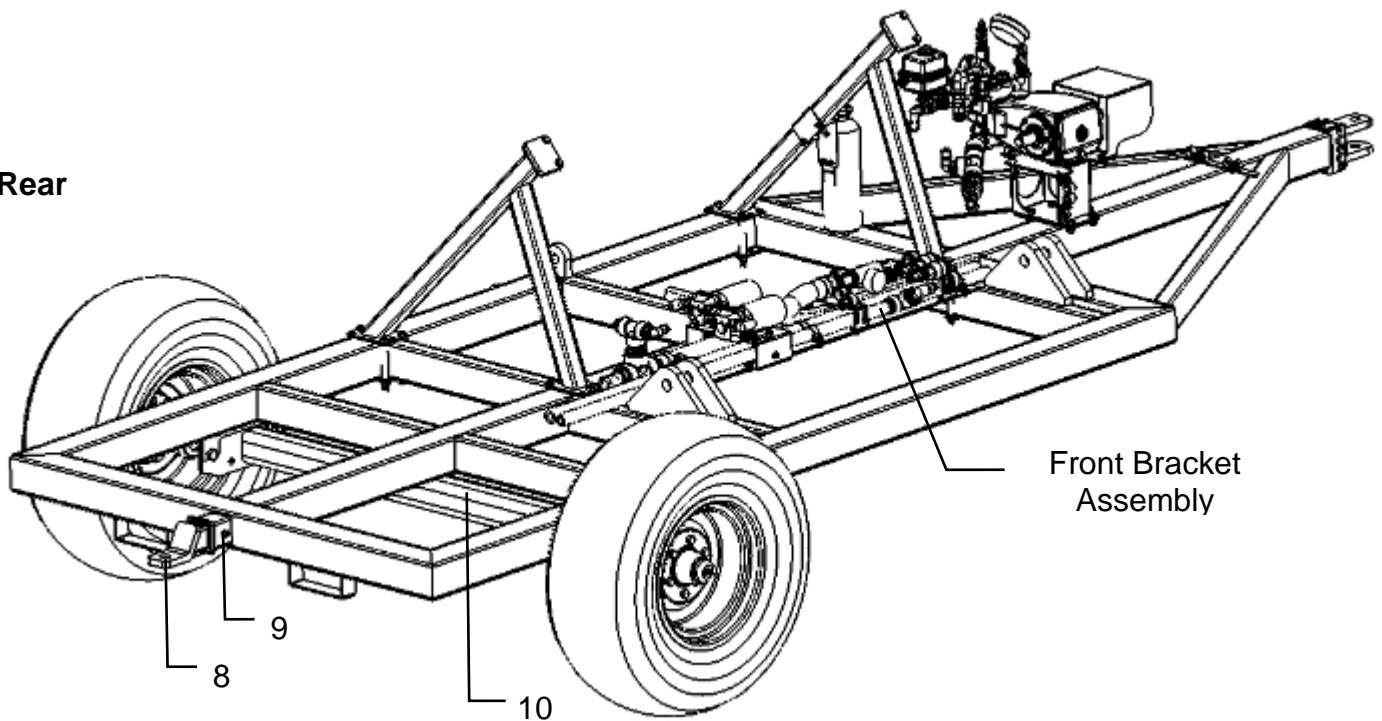
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Unloader Knob	002-7135L	1
2	1/2" Regulator Plug	003-DSP12	1
3	Unloader Valve	002-7133	1
4	3/4"x1/2" Nipple	003-DSM3412	1
5	3/4"x3/4" Elbow	003-DSSE34	1
6	1/2"x3/4" Elbow HB	003-EL1234HP	1
7	Pop-Off Valve	002-7132	1
8	1/2"x3/4" Elbow	003-DSSE1234	1
10	Regulator Spring	002-7133SP	1
11	Spring retainer washer	002-7133SRT	1

Cart Frame

Front

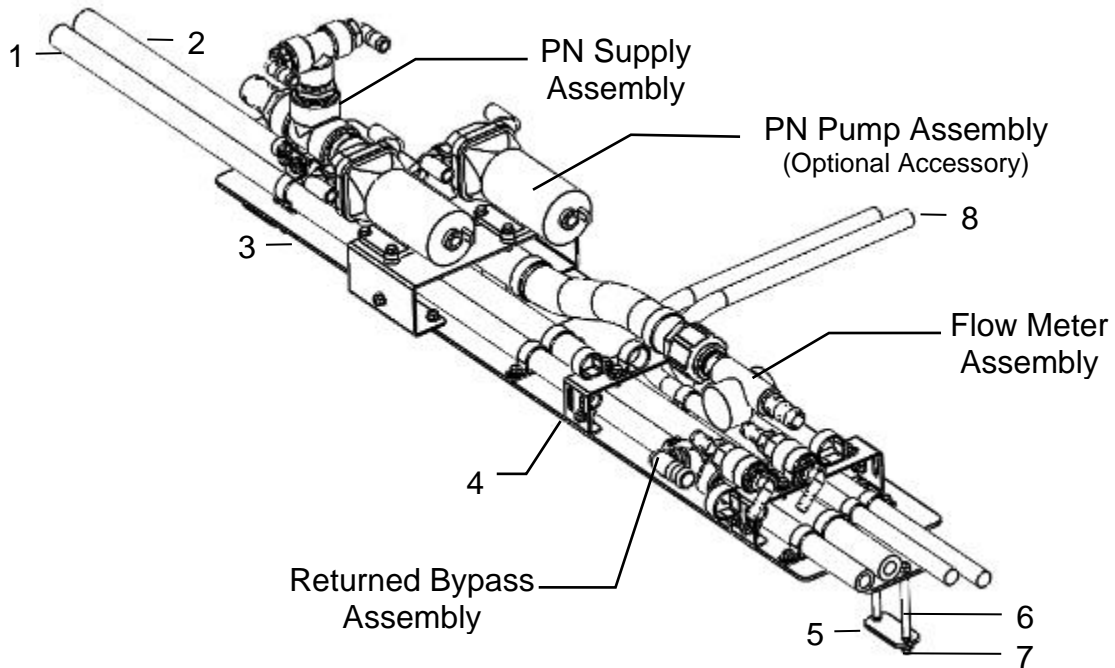


Rear



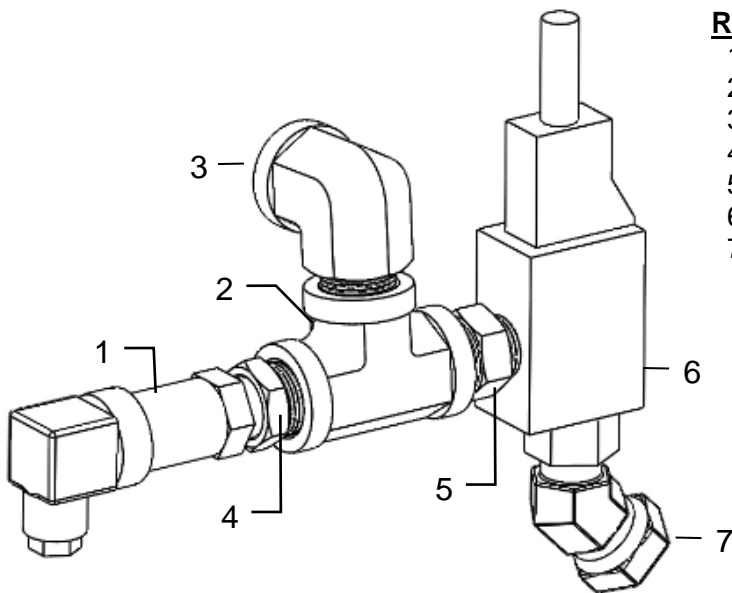
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	PTO Shield	001-7248	1	6	Cart Rim	008-7231	2
2	Clevis Hitch	001-7219A	1	7	Tire	008-7240	2
3	Jack Topwind	008-7133	1	8	2-12"x8 Receiver Hitch	001-7219B	1
4	Pump Bracket	001-7220A	1	9	Receiver Pin	001-7219C	1
5	Cart Frame Assembly	001-7220	1	10	Torsion Axle	008-7240-TX	1
				NP	PTO Yoke	008-7226MY	

Front Bracket Assembly



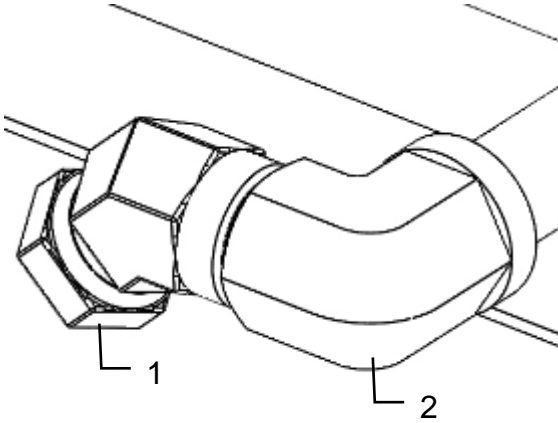
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	3/4" Rubber Hose	002-9007	1	5	2" Tye Clamp	001-7224G	2
2	Supply Hose	002-9715	1	6	3/8-16 Hex Bolt	Hardware	4
3	FS Base Plate	001-7224E	1	7	3/8-16 Flange Nut	Hardware	4
4	FS #1 Bracket	001-7224F	2	8	1/2" Hydraulic Hose 14'	002-9714	2

H1 Inlet Assembly



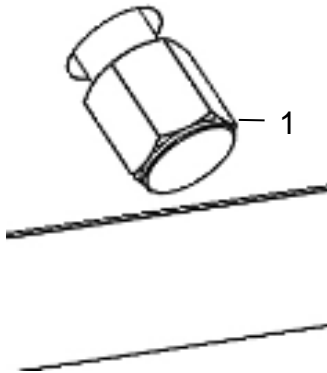
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Temperature Probes	006-4732	1
2	3/4" Tee	003-DSTT34	1
3	3/4" 90 Deg Elbow	003-DSSE34	1
4	3/4"x1/2" Reducer	003-DSRB3412	1
5	3/4"x1/2" Nipple	003-DSM3412	1
6	Flow Switch	006-4731	1
7	1/2"x3/4" 45 Deg Elbow	003-DSEL1234S	1

H1 Outlet Assembly



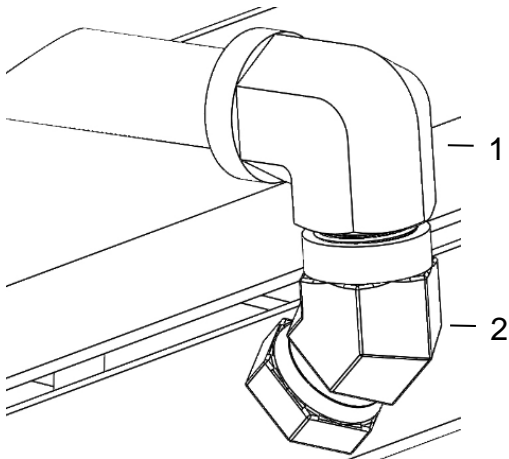
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	3/4" 45 Deg Swivel	003-DSSE4534S	1
2	3/4" 90 Deg St Elbow	003-DSSE34	1

H1 Teeport Plug



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	3/4" Female Plug	003-DSP34F	1

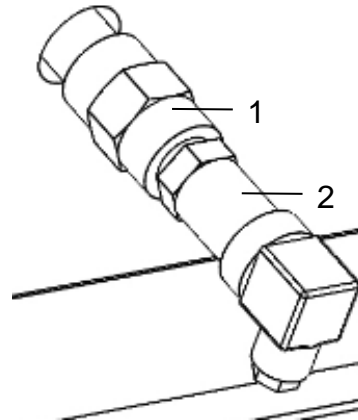
H2 Inlet Assembly



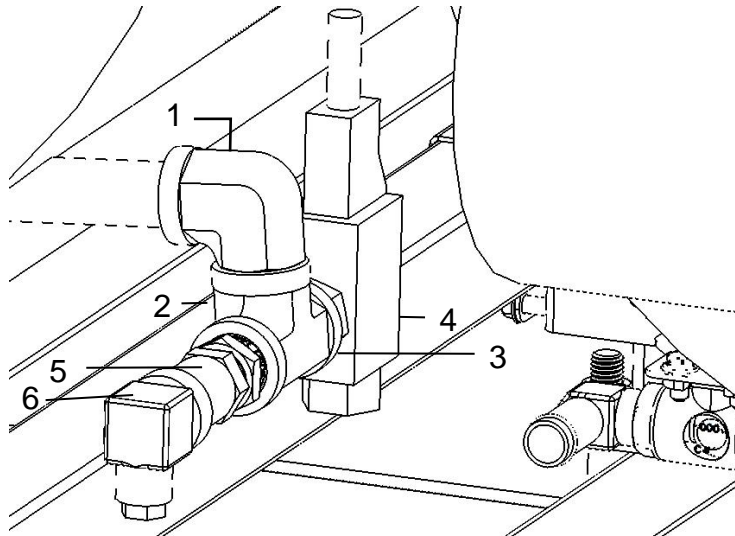
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	3/4" 90 Deg St Elbow	003-DSSE34	1
2	3/4" 45 Deg Swivel	003-DSSE4534S	1

H2 Teeport Sensor

<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	3/4"x1/2" Nipple	003-DSM3412F	1
2	Temp Probe	006-4732	1

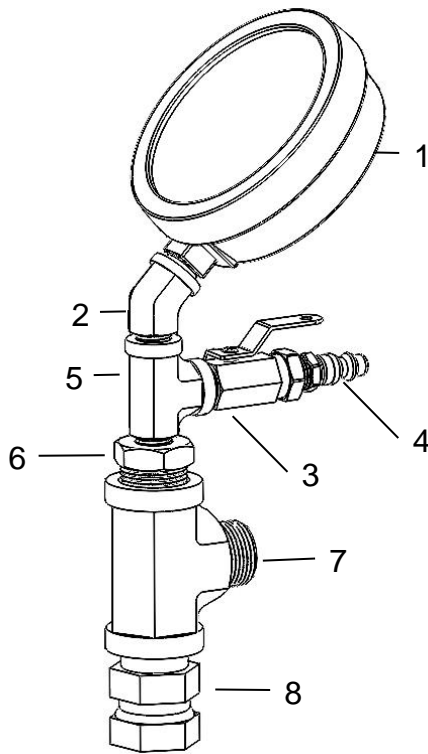


Flow Switch Assembly



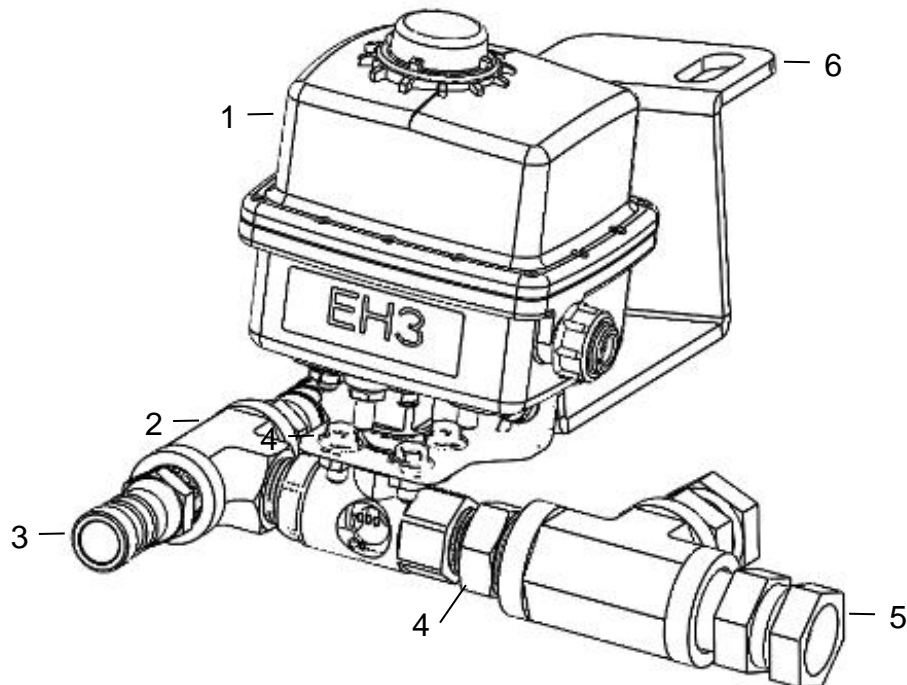
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	3/4" x 3/4" Elbow (90)	003-DSSE34	1	5	3/4" x 1/2" Reducer	003-DSRB3412	1
2	3/4" Tee	003-DSTT34	1	6	Temp Probes	006-4732	1
3	3/4" x 1/2" Nipple	003-DSM3412	1	NP	1/2" x 3/4" Elbow (45)	003-DSEL1234S	1
4	Flow Switch	006-4731	1				

Pump Discharge Front



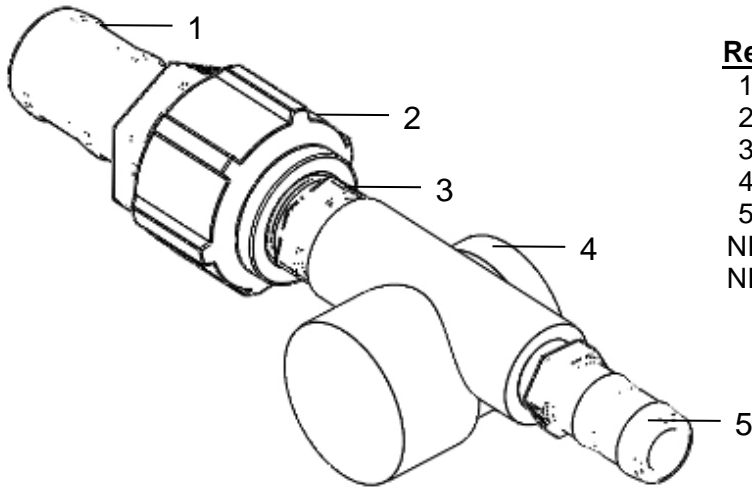
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	4" Gauge (1500 PSI)	002-7236	1
2	1/4" x 1/4" Elbow (45 Deg.)	003-DSSE4514	1
NP	1/4" Hex Socket Plug	003-DSP14	1
3	Valve- 1/4" NPT M x F	002-2222	1
4	Quick Disconnect Hose Coupling-Air 1/4" NPT	003-A1414AP	1
NP	Coupler Plug		
5	1/4" Tee	003-DSSETT14	1
6	3/4"x1/4" Reducer Bushing	003-DSRB3414	1
7	3/4" Tee	003-DSBT34	1
8	3/4"x3/4" Swivel	003-DSM3434S	1

Warmup Valve Assembly



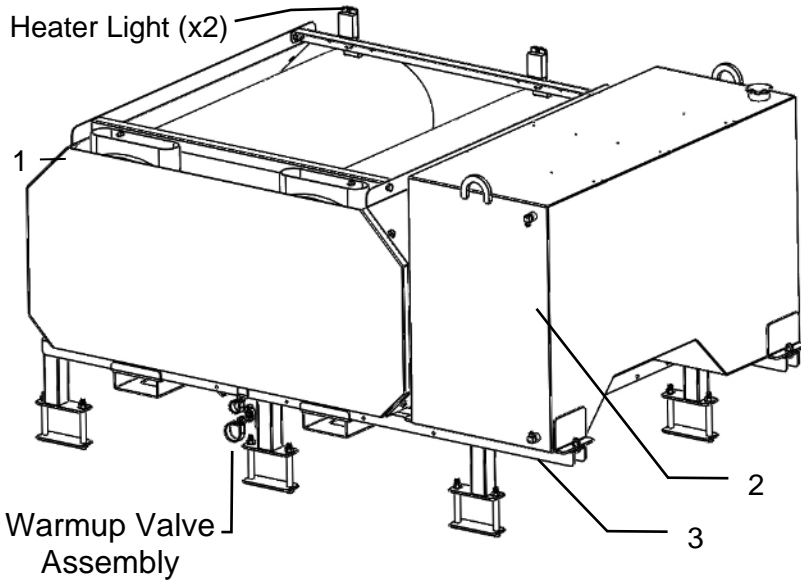
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	1/2" Ball Valve	002-2203DV	1	5	3/4" x 3/4" Swivel	003-DSM3434S	2
2	1/2" Tee FXMXF	003-DSBT12	1	6	Valve Clamp Bkt	001-7224D	1
3	1/2" MPT x 3/4" HB	003-DS1234	2	NP	1/4-20 Flange Bolt	Hardware	2
4	3/4" x 1/2" Fitting	003-DSM3412	1	NP	1/2-20 Flange Bolt	Hardware	2

Flow Meter Assembly



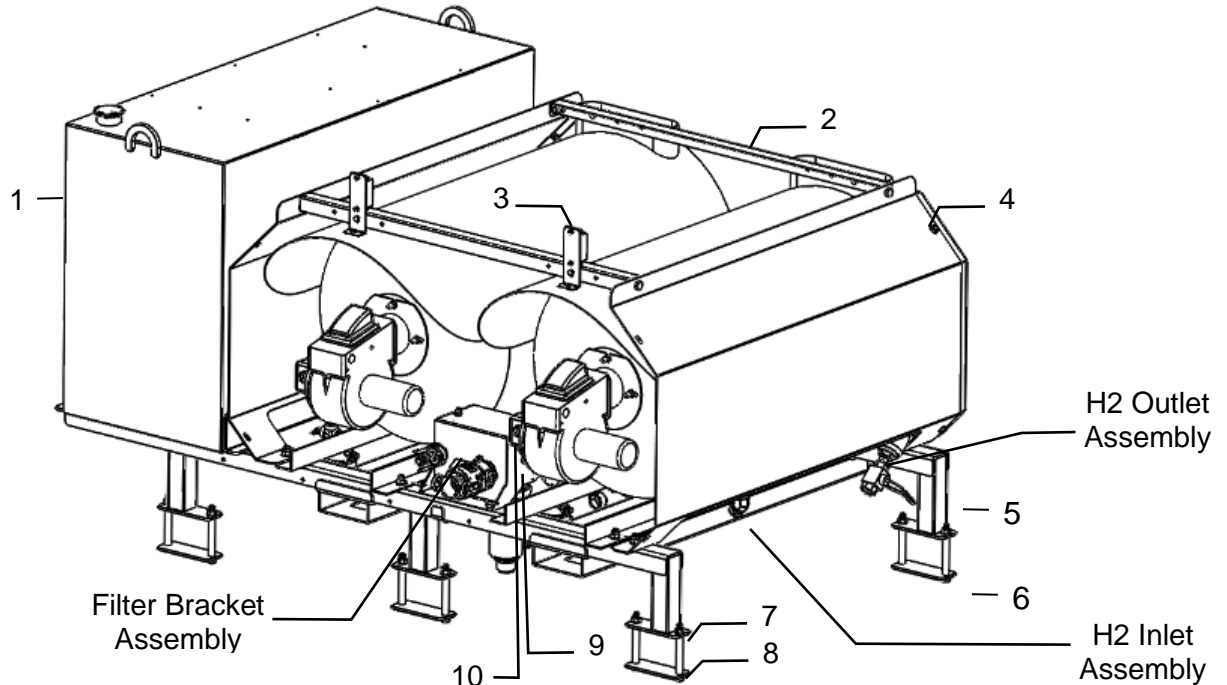
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	1-1/2"x1-1/2" Barb	003-A112112HP	1
2	1-1/2"x1" Union	003-M112100FHP	1
3	1"x3/4" Nipple	003-M10034HP	1
4	DS Flow Meter	006-4730R	1
5	3/4"x1" Fitting	003-A34100HP	1
NP	1-1/2" Suction Hose	002-9008	1
NP	1" Suction Hose	002-9005	

Heater Skid Assembly – Front View



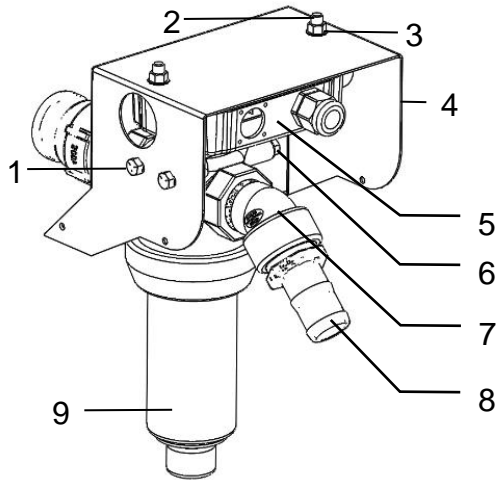
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Front Heat Shield	001-7215E	1
2	Sight Gauge Hose	002-9709	1
3	3/8"x3/8 Fitting	003-EL3838BF	2
4	Heat Shield Top	001-7215F	1

Heater Skid Assembly – Rear View

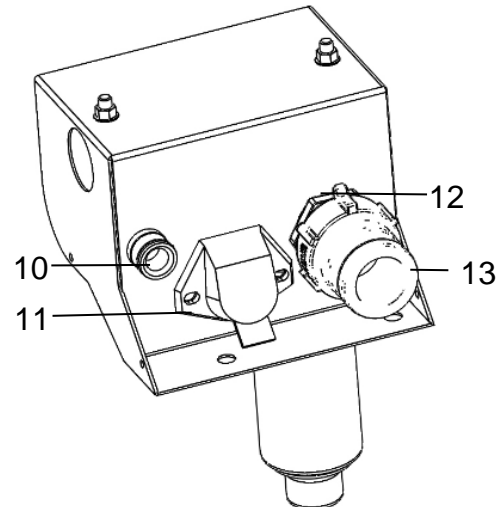


<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Diesel Tank	001-7212		NP	Warmup Valve Assembly	Refer to Breakdown	
2	Heat Shield Bracket	001-7215B	2	NP	Fuel Filter Assembly	Refer to Breakdown	
3	Heat Shield Brkt Rear	001-7215C	2	NP	H1 Inlet Assembly	Refer to Breakdown	
4	Heat Shield	001-7215A	2	NP	H1 Outlet Assembly	Refer to Breakdown	
5	Heater Skid	001-7213	1	NP	1/4" (I.D.) Fuel Hose	002-9711	
6	Skip Clamp Plate	001-7214	6	NP	3/8" (I.D.) Fuel Hose	002-9710	
7	1/2"-13 Flange Nut	Hardware	12	NP	1/4" Hose Clamp	003-9001	8
8	1/2"-13 Flange Bolt	Hardware	12	NP	Mini Hose Clamp	003-9002	4
9	1/4"x1/4" Fitting	003-A1414BF	2	NP	Hi Temp Valve Bracket	001-7224C	1
10	1/4"x1/4" Elbow	003-EL1414BF	2	NP	Burner Gasket - Large	007-7209GL	4
NP	Fuel Outlet Assembly	Refer to Breakdown		NP	Fuel Filter Element	006-7209F	2
NP	Fuel Return Assembly	Refer to Breakdown		NP	Heat Shield Top	001-7215F	1
NP	Fuel Filter (Serial# 0009 & Up)	007-7209FFE		NP	SS Heater Coil kit	007-7210COILKIT	
NP	Fuel Filter (Serial# Pre-0008)	007-7208FFA			Heater with SS Coil	007-7210R	

Filter Bracket Assembly



Front View

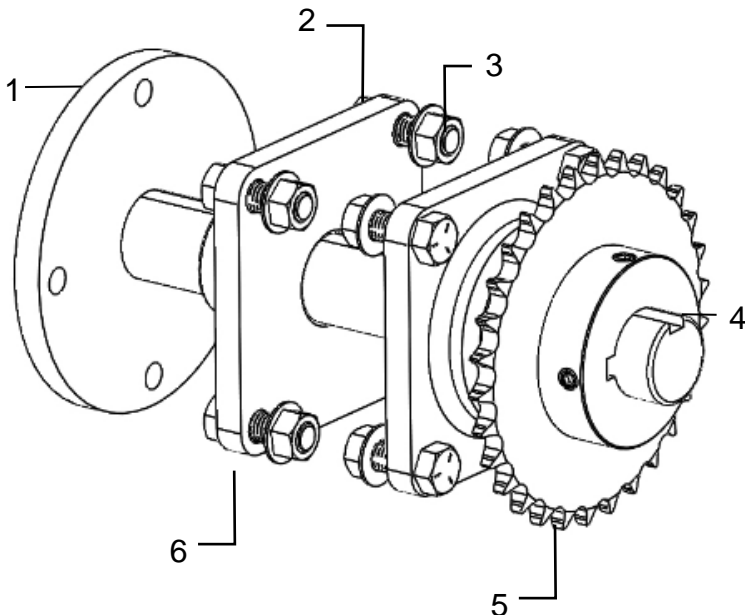


Rear View

<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	3/8-16 Flange Bolt	Hardware	2
2	5/16-18 Flange Bolt	Hardware	2
3	5/16-18 Flange Nut	Hardware	2
4	Pump Filter Bracket	001-7224	1
5	Heater Control Module	006-7723	1
6	3/8-16 Flange Nut	Hardware	1
7	1-1/2" 45 Deg. St. Elbow	003-SE45112HP	1

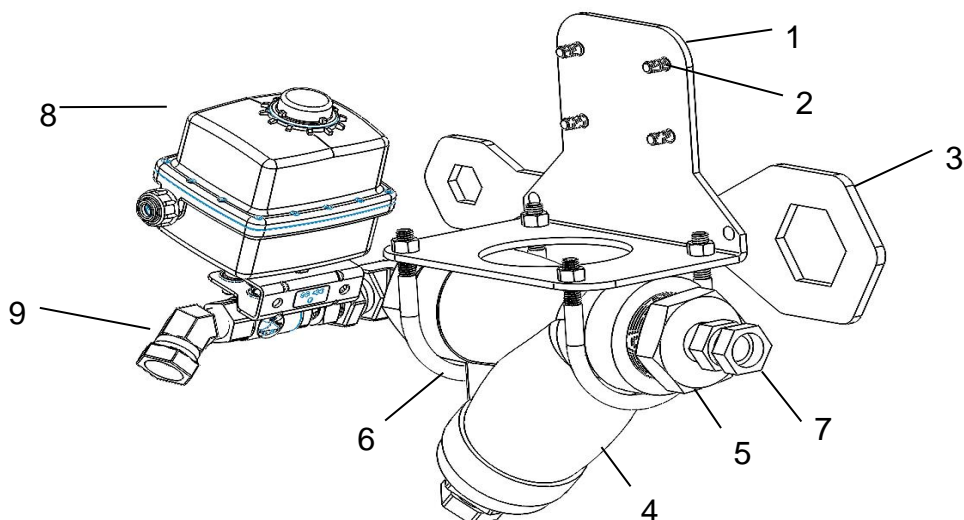
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
8	1-1/2"x1-1/2" Barb	003-A112112HP	1
9	Filter Bowl Asm.	002-4319	1
NP	Filter only-100 mesh	002-4319A	1
NP	Filter Bowl Only	002-4319F	1
NP	Filter Bowl Head	002-4319H	1
10	3/4" Cam Plug	002-2204B	1
11	Wiring Harness Plug	006-7999	1
12	2"x1-1/2" Nipple Nut	003-M200112HP	1
13	2" Cam Coupler	002-2204J	1
NP	2" Female Coupler	002-2204H	1

Drive Hub Assembly



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Drive Wheel Shaft	001-7241	1
2	1/2-13 Flange Bolts	Hardware	8
3	1/2-13 Flange Nuts	Hardware	8
4	Key 3/8x3/8x1-1/2	001-7124D	1
5	Drive Sprocket	001-7124C	1
6	1-1/2" Bearing	001-7137	2

2" Y-Strainer / KZ Assembly



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	2" Y-Strainer Bracket	001-7211B	1	6	U-bolt, 3/8" x 3-1/2"	001-4714UBY	2
2	5/16-18 x 1" TC	Hardware	4	7	3/4" x 3/4" Swivel	003-DSM3434S	1
3	Filter Wrench	001-7211C	1	NP	3/4"x3/4" Elbow Swivel	Hardware	1
NP	SS Hose Gauge		1	NP	3/4"x1/2" Nipple	003-DSM3412	1
NP	Clip	008-4576	2	8	1/2" SS 2Way Valve	002-2203DV	1
4	2" Y-Strainer Asm.	002-4321	1	9	1/2"x3/4" 45 Deg Elbow	003-DSEL1234S	1
5	Reducer 2" M 3/4" F	003-DSRB20034	2	NP	2" Y-Strainer Filter	002-4321E	
				NP	2" Y-Strainer Gasket	002-4321G	

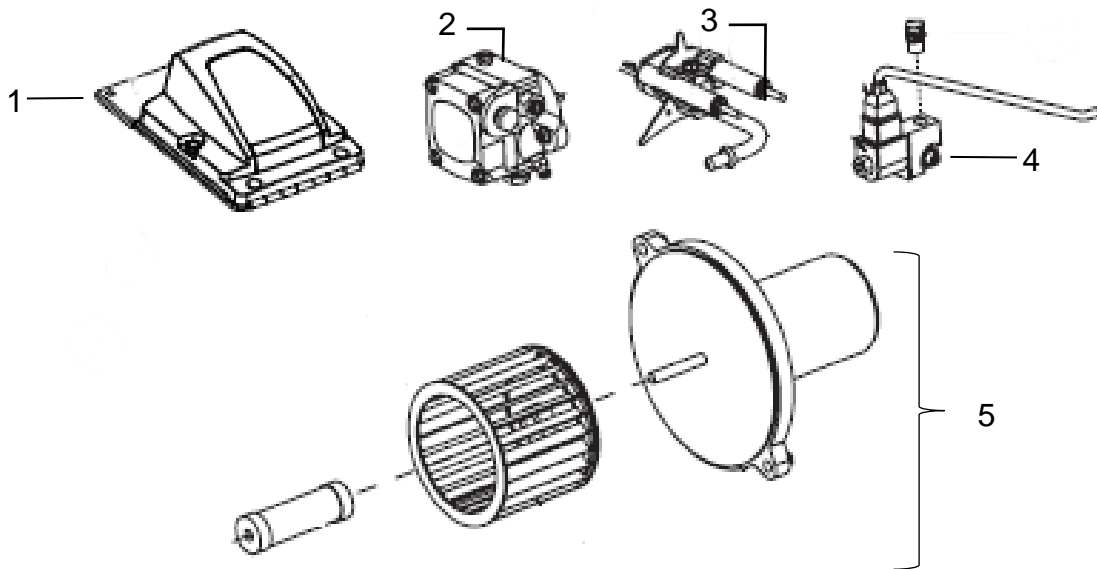
Chain Tensioner Assembly

<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Floating Roller Chain Tensioner	001-7209FRCT	1

1

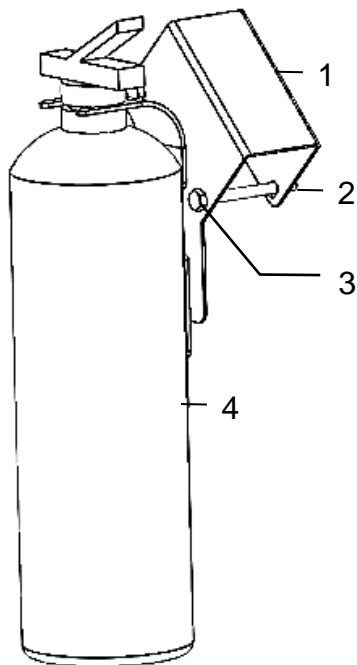


Burner Motor Replacement Parts



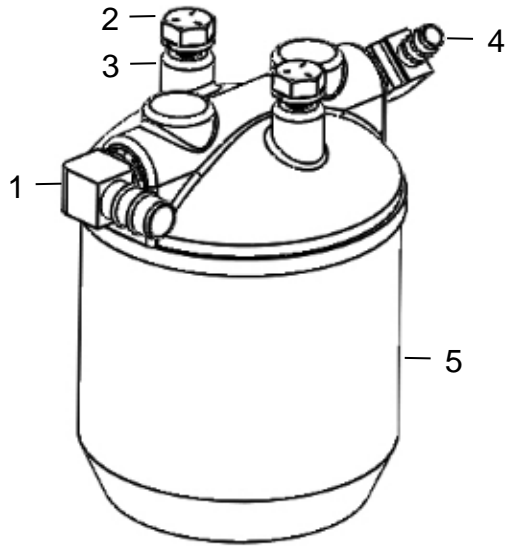
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Burner Igniter	007-7203	1	NP	Tip (optional)	007-7207-4.5	2
2	Fuel Pump	007-7204	1	NP	Complete Burner Assembly	007-7201	1
3	Nozzle Assembly	007-7206	1	NP	Tip (Standard)	007-7207-4.0	2
4	Burner Shut Off Valve	007-7205	1	NP	Fuel Filter	007-7208	2
5	Burner Motor	007-7202	1				

Fire Extinguisher Assembly



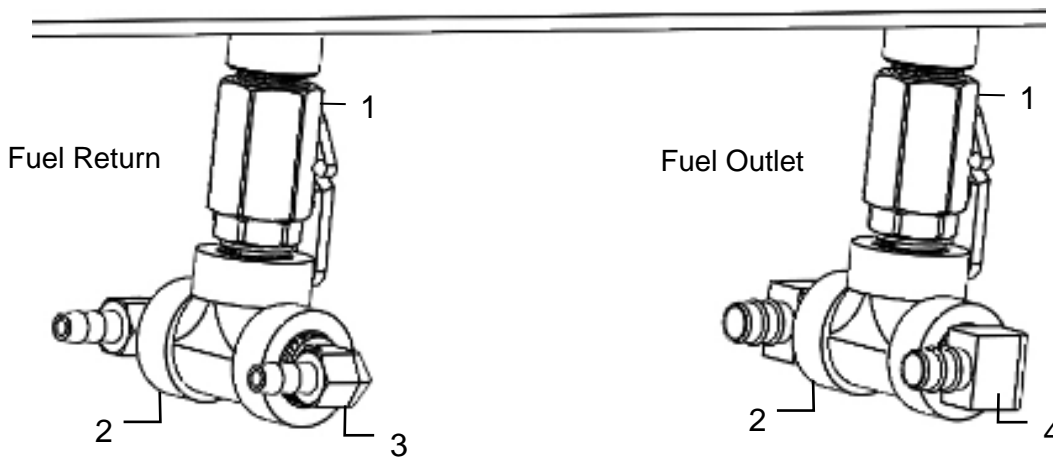
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Fire Ext. Bracket	001-7224J	1
2	1/4-20 Flange Nut	Hardware	5
3	1/4-20 Flange Bolt	Hardware	2
4	Fire Extinguisher	008-8900	1
NP	NP 1/4-20 Flange Bolt	Hardware	3

Fuel Filter Assembly



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	1/4"x3/8" Fuel Elbow	003-EL1438BF	1
2	1/4-20 Hex Bolt	Hardware	2
3	1/4" Lock Washer	Hardware	2
4	1/4"x1/4" Elbow	003-EL1414BF	1
5	Fuel Filter Assembly	007-7208FFA	1

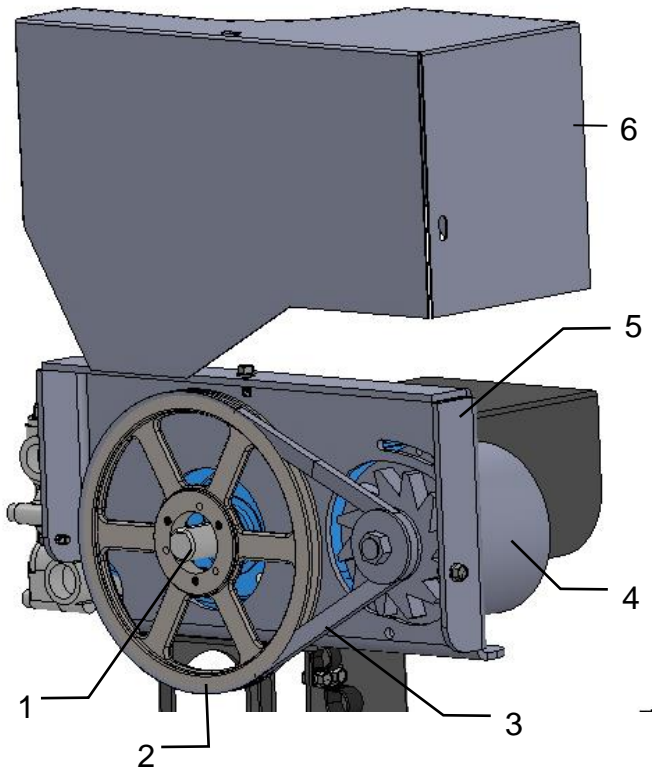
Fuel Return & Fuel Outlet



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	3/8" Fuel Valve	002-2217	1
2	3/8" Tee	003-TT38BF	1

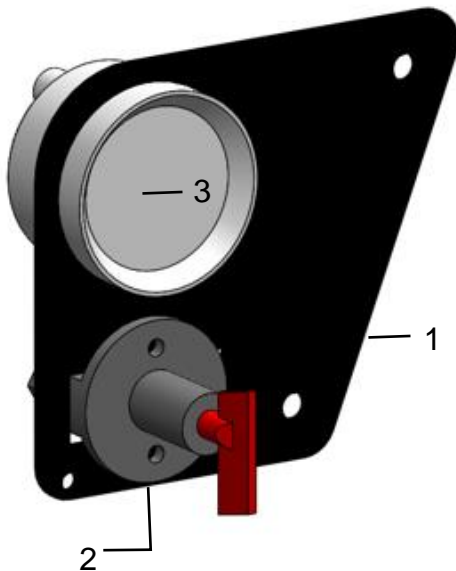
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
3	3/8"x1/4" Elbow	003-EL3814BF	2
4	3/8"x3/8" Elbow	003-EL3838BF	2

Cart Electrical Assembly



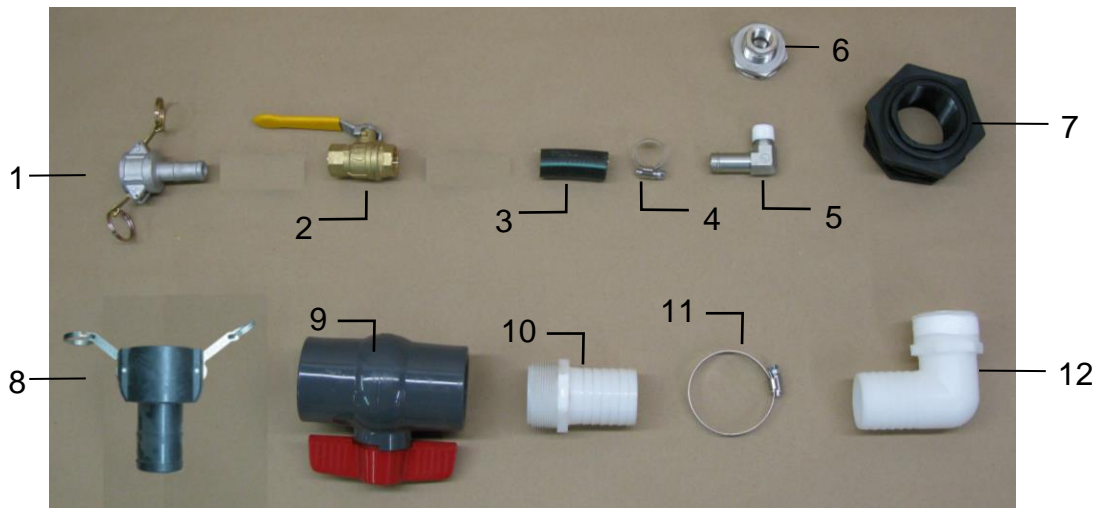
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	QD Bushing 30mm	001-7221H	1
2	3V 10.6" Sheave QD	001-7221P	1
3	3VX400 Belt	001-7221B	1
4	Alternator 105A	001-7221A	1
5	Alternator Bracket	001-7220B	1
6	Alternator Shield	001-7220C	1
NP	Alternator to Battery + / -	006-7221WH	1
NP	Battery 12VDC, 47AGM	006-7221BAT	1
NP	Battery Box Bracket	001-7220D	1
NP	Battery Box, Ser24	006-7221BB	1
NP	Battery Post Adapter +	006-7221BTR	1
NP	Battery Post Adapter -	006-7221BTB	1

Battery Disconnect Switch



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Mounting Plate- Gauge and Switch	001-7220J	1
2	Battery Disconnect Switch	006-7221BDS	1
3	Battery Voltage Gauge	006-7221BVG	1
NP	Wire Battery to Cut off Switch 36"	006-7221WH2	1

Trailer Parts



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	3/4" Cam Socket	002-2204E	1	8	2" Female Coupler	002-2205Y	1
2	3/4" Brass Valve	002-2200B	1	9	2" Valve	002-2220	1
3	3/4" Heater Hose	002-9719	15	10	2" x 2" Fitting	003-A2020	2
4	3/4" Hose Clamp	003-9004	4	11	2" Hose Clamp	003-9006	4
5	1/2" x 3/4" Elbow	003-DSEL1234	1	12	2" x 2" Elbow	003-EL2020	1
6	1/2" Fitting	005-9104SS	1	NP	2" PVC Tubing	002-9004	15
7	2" Tank Fitting	005-9102	1	NP	3/4"x3/4" Barb	003-A3434AL	2

Tractor Parts



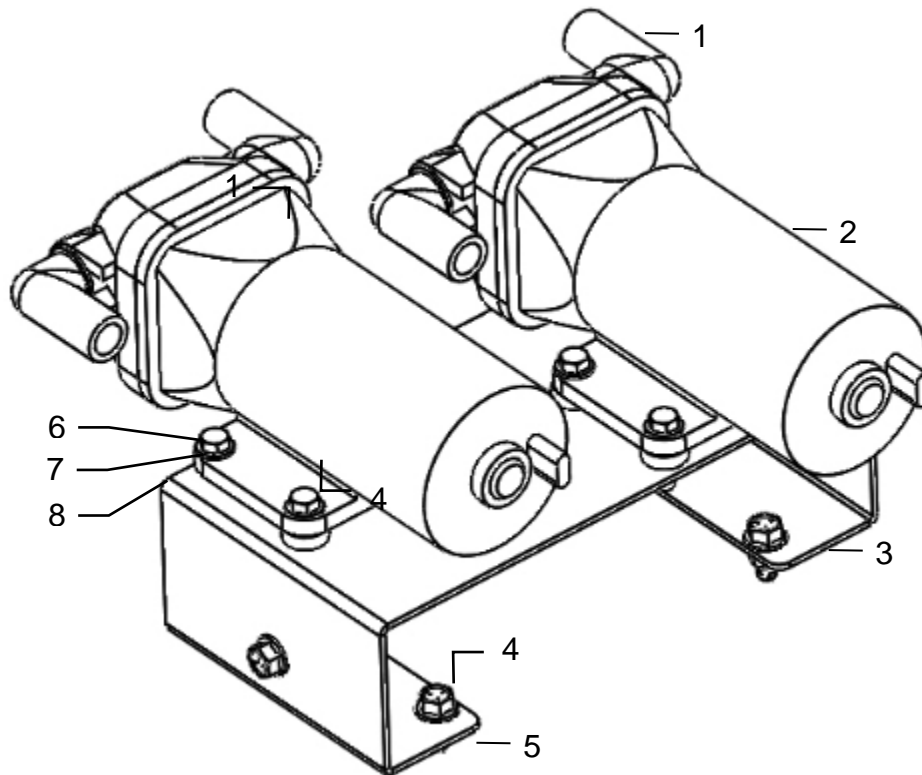
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Perimeter Nozzle Control (Optional Accessory)	006-7726	1	4	Cab Control U-Bracket	001-7230	1
2	Perm. Noz. Control Bracket (Optional Accessory)	001-7234C	1	5	Cab Control Assembly	006-7721	1
3	Perimeter Nozzle Harness (Optional Accessory)	006-7717	1	6	Cab-Drawbar Harness	006-7722	1
					Harness locking nut	006-ANL	1

Optional Accessories Parts Breakdown

Perimeter Nozzles

Complete Perimeter Nozzle Kit (030-0721PN) includes the following components as well as mounting hardware (not shown):

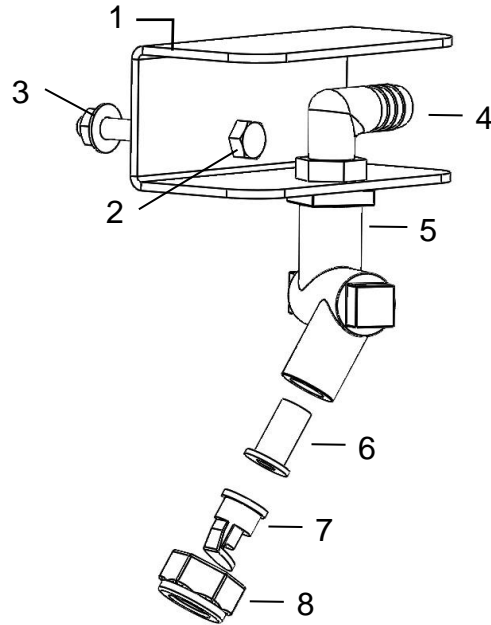
Perimeter Nozzle Pump Assembly



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	3/4" Elbow	007-4121K	4	5	5/16"-18 Flange Nut	Hardware	4
NP	12V Pump Motor only	007-4121Q		6	1/4"-20 Hex bolt	Hardware	8
2	12V Pump	007-4210	2	7	1/4" Flat washer	Hardware	8
3	Perimeter Nozzle Brkt	001-7224A	1	8	1/4"-20 Hex Nut	Hardware	8
4	5/16-18 Flange Bolt	Hardware	4	NP	Pump top section	007-4122B	
NP	Pump Rebuild Kit	007-4584		NP	Pump top sec cap	007-4122C	

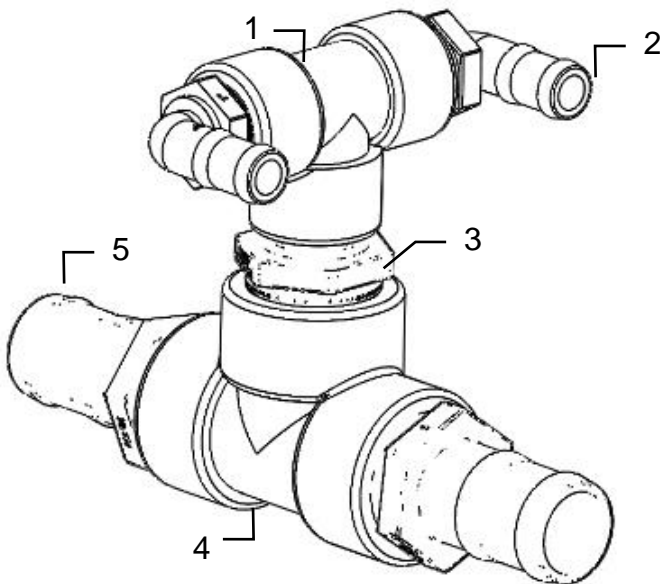
Complete PN Pump
Assembly Kit 030-0721PN

Perimeter Nozzle Assembly



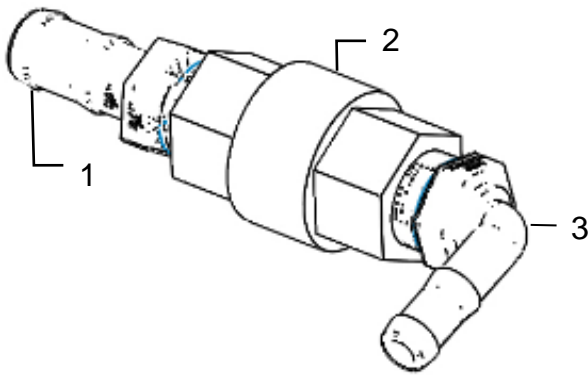
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>	<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Nozzle Bracket	001-7227	2	6	Tip Strainer	004-1203-100	2
2	1/4\" x 2-3/4 Hex Bolt	Hardware	2	7	Tips	004-TK-VP-100	2
3	1/4\" Flange Nut	Hardware	4	8	Nozzle Cap	004-4723	2
4	1/4\" x 1/2\" Elbow	003-EL1412P	1	NP	Hose Clamp	003-9003	2
5	Swivel Body	004-4733	2	NP	1/2\" Hose	002-9017	14

Perimeter Nozzle Supply Assembly



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	1\" Tee	003-TT100HP	1
2	1\"x3/4\" Elbow	003-EL10034HP	2
3	1-1/2\"x1\" Nipple	003-M112100HP	1
4	1-1/2\" Tee	003-TT112HP	1
5	1-1/2\"x1-1/2\" Barb	003-A112112HP	2

Perimeter Nozzle Check Valve Assembly



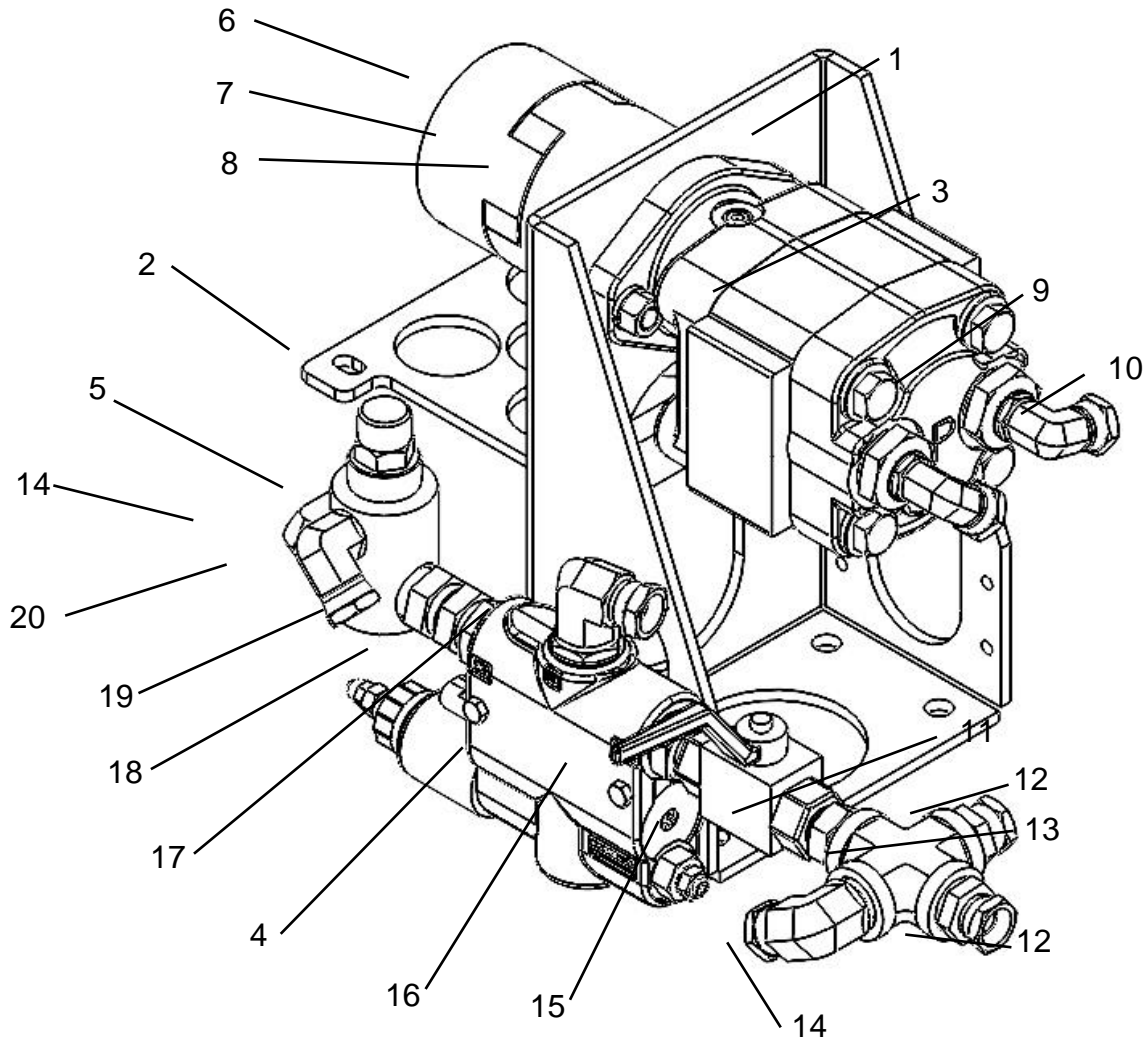
<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	3/4"x3/4" Fitting	003-A3434P	1
2	3/4" Check Valve	002-4566X	1
3	3/4"x1/2" Elbow	003-EL3412HP	1

Perimeter Nozzle Control (Tractor Part)



<u>Ref</u>	<u>Description</u>	<u>Part #</u>	<u>Qty</u>
1	Perimeter Nozzle Control	006-7726	1
2	Perimeter Nozzle Control Bracket	001-7234C	1
3	Perimeter Nozzle Harness	006-7717	1

Hydraulic Drive Assembly Kit (030-0720HYD)



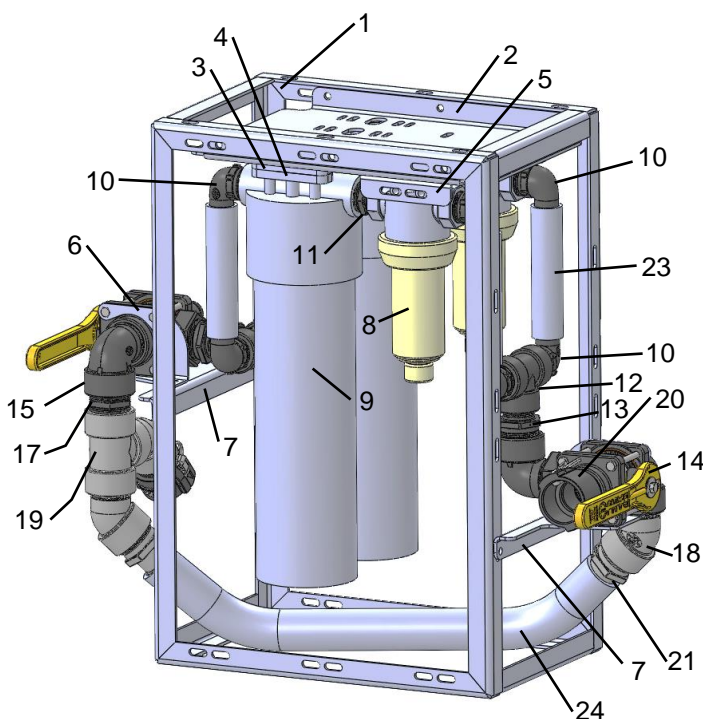
Ref	Description	Part #	Qty	Ref	Description	Part #	Qty
1	Hyd. Motor Bracket	001-7220F	1	6	Love-Joy Coupler 30mm	001-7220JC	1
2	Hyd. Motor Support Brkt.	001-7220G	1	7	Love-Joy Spider	001-7220JA	1
3	Hydraulic Motor	007-7155	1	8	Love-Joy Coupler 1"	001-7220JB	1
4	Electric Hyd. Valve	007-7154	1	9	1" ORBM x 1/2" ORBF	003-DSM1ORB12ORB	2
5	Hyd. Relief Valve	007-7152	1	10	1/2" ORBM x 1/2" FPTF Swivel	003-DSEL12ORB12FS	2
NP	1/2" Hyd. Hose, 12.5"	002-9716-12	1	11	Nipple 3/4 NPTM x 1/2 NPTM	003-DSM3412	1
NP	1/2" Hyd. Hose, 20"	002-9714-20	1	12	3/4 NPTM x 1/2 NPTF Swivel	003-DSM3412S	2
NP	1/2" Hyd Hose, 26"	002-9714-24	1	13	3/4" NPTF Cross	003-DSC34F	1
NP	1/2" Hyd. Hose, 68"	002-9714-68	1	14	3/4 NPTM x 1/2 NPTF Swivel	003-DSEL3412FS	
NP	1/2" Hyd. Hose, 80"	002-9714-80	1	15	1/2" Ball Valve	002-2221	1
NP	Check Valve	007-7153	1	16	3/4 ORBM x 1/2 NPTM	003-DSM34ORB12M	1
NP	Hydraulic Coupler	003-9715	2	17	Elbow, 3/4 ORBM x 1/2 NPTFS	003-DSEL34ORB12FS	1
				18	3/4 ORBM x 3/4 NPTM	003-DSM34ORB34M	1
				19	3/4 NPTM x 3/4 NPTFS	003-DSM3434S	1
				20	Elbow, 1/2 NPTM x 1/2 NPTFS	003-DSEL1212FS	1
				21	Elec. Hyd. Valve Control	006-7725	1



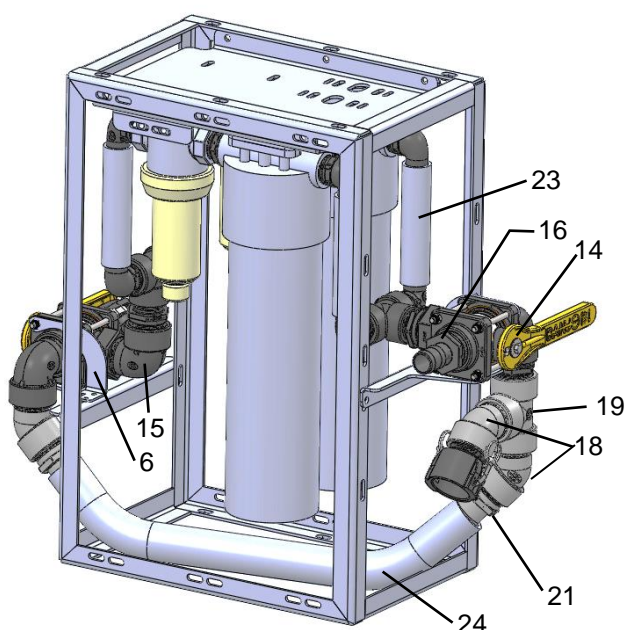
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Water Filtration System (030-0721FS)

View from Inlet Side



View from Tank Side



Ref	Description	Part #	Qty
1	Water Inlet Frame	001-7200L	1
2	Filter Mounting Plate	001-7200LD	1
3	Giant Filter Spacer	001-7200LT	2
4	Giant Filter Shim	001-7200LS	4
5	Filter Bracket	001-7200LF	2
6	3-way Valve Bracket	001-7200LP	2
7	Valve Support	001-7200LJ	2
8	1 1/2" Filter 100 Mesh	002-4319*	2
*Replacement Components Listed Below			
9	Giant filter Asm 20 micron	002-4322*	2
*Replacement Components Listed Below			
10	90deg Elbow 1.5" NPT x 1.5" HB	003-EL112112HP	8
11	1.5" NPT Nipple	003-M112112HP	2
12	1.5" Tee FxFxF	003-TT112HP	2
13	1.5" NPT x 2" NPT Nipple	003-M200112HP	2
14	Banjo 3-way Valve 2"x2"x 2"	002-2223	2
15	2" Street Elbow 90deg	003-SE200HP	3
16	2" NPTM x 1.5" HB	003-A200112HP	1
17	2" Nipple	003-M200200HP	1
18	2" Street Elbow 45deg	003-SE45200HP	3
19	2" Tee FxFxF	003-TT200HP	1
20	Female Coupler x MPT 2"	002-2204G	2
21	2" NPT x 2" HB	003-A200200HP	2
NP	2" HB x 2" Male Coupler	003-2204R	2
23	1 1/2" 4450 Suction Tube	002-9008	3
24	2" 4450 Suction Tube	002-9004	3
25	Hose Clamp for 1 1/2" OD	003-9118	9
26	Hose Clamp #40 2"OD	003-9006	3

Replacement Filter Parts

1 1/2" Filter Screen	002-4319A
1 1/2" Filter Bowl Gasket	002-4319D
1 1/2" Filter Bowl Only	002-4319F
1 1/2" Filter Bowl Head	002-4319H
Giant Filter Replacement Element	002-4322E

Complete Assembly 030-0721FS

RECOMMENDED PARTS STOCKING LIST

Item	Description	Qty
001-7104VG	VALVE SPRING	5
001-7104VL	QUAD RING	10
001-7202	TINE ASSEMBLY	5
001-7204VE	1/8"X1 1/2" PLUNGER PIN SS	10
001-7204VJ	1/2" X 1 1/2" ROLLER PIN SS	1
001-7204R	VALVE REBUILD KIT	1
002-4319A	SCREEN 100 MESH	1
002-4321E	2" Y STRAINER 150 MESH	1
002-4321G	2" Y STRAINER GASKET	1
002-7204A	SS VALVE HOSE ASMBLY 8"	2
002-7204B	SS VALVE HOSE ASMBLY 13.5"	4
003-DSP12	1/2" CROSSTUBE PLUGS	10
004-7125	TIP FOR TINES - DEW SIM MW11	15
006-7221B	ALTERATOR BELT	1
002-4322E	GIANT FILTER REPLACEMENT	2

HARD WATER CONDITIONS

Common hard water scale formation is the result of calcium carbonate precipitation and accumulation in equipment employing hard water. ERADI(Ca)TE PLUS will bind with calcium, magnesium and iron, preventing the formation of common hard water scale. For hard water conditions contact Harvest Tec.

009-0905P5 GALLON PAIL ERADI(Ca)TE PLUS
 009-0905DR55 GALLON DRUM ERADI(Ca)TE PLUS

Notes

Model 720 Dew Simulator (2018 – 2022)

- SN: DSH0001-DSH0047

Model 721 Dew Simulator (2023 -)

- SN: DSH0100 -

Harvest Tec LLC. Warranty and Liability Agreement

Harvest Tec, LLC. will repair or replace components that are found to be defective within 12 months from the date of manufacture. Under no circumstances does this warranty cover any components which in the opinion of Harvest Tec, LLC. have been subjected to negligent use, misuse, alteration, accident, or if repairs have been made with parts other than those manufactured and obtainable from Harvest Tec, LLC. .

Our obligation under this warranty is limited to repairing or replacing free of charge to the original purchaser any part that in our judgment shows evidence of defective or improper workmanship, provided the part is returned to Harvest Tec, LLC. within 30 days of the failure. If it is determined that a non-Harvest Tec branded hay preservative has been used inside the Harvest Tec applicator system where the failure occurred, then Harvest Tec reserves the right to deny the warranty request at their discretion. Parts must be returned through the selling dealer and distributor, transportation charges prepaid.

This warranty shall not be interpreted to render Harvest Tec, LLC. liable for injury or damages of any kind, direct, consequential, or contingent, to persons or property. Furthermore, this warranty does not extend to loss of crop, losses caused by delays or any expense prospective profits or for any other reason. Harvest Tec, LLC. shall not be liable for any recovery greater in amount than the cost or repair of defects in workmanship.

There are no warranties, either expressed or implied, of merchantability or fitness for particular purpose intended or fitness for any other reason.

This warranty cannot guarantee that existing conditions beyond the control of Harvest Tec, LLC. will not affect our ability to obtain materials or manufacture necessary replacement parts.

Harvest Tec, LLC. reserves the right to make design changes, improve design, or change specifications, at any time without any contingent obligation to purchasers of machines and parts previously sold.

Revised 6/22

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