

**HARVEST TEC, LLC**

**MODEL 464**

**AUTOMATIC HAY  
PRESERVATIVE APPLICATOR  
FOR  
LARGE SQUARE BALERS**

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# Table of Contents

	<b>Installation kit reference</b>	<b>3</b>
<b>Step 1:</b>	<b>Mounting and plumbing the pump plate</b>	<b>4</b>
<b>Step 2:</b>	<b>Mounting the star wheels on the baler</b>	<b>5</b>
	<i>*Case IH 8570,8575,8585, and Challenger LB33, LB34, and Hesston 4750,4755,4760, and 4790, and New Idea 7233, 7234, and 7333 balers</i>	<b>5</b>
	<i>*Case IH 8580, 8590, and Hesston 4900, 4910, and Challenger LB44, and New Idea 7244</i>	<b>6</b>
	<i>*Claas 2200</i>	<b>6</b>
	<i>*New Holland 590, 595, BB940A, BB960A, and Case IH LBX 331, 332, 431, and 432</i>	<b>7</b>
	<i>*Vermeer SQ2731 and SQ3347</i>	<b>7</b>
	<i>*John Deere 100</i>	<b>8</b>
<b>Step 3:</b>	<b>Wire the star wheel to the signal conditioner</b>	<b>8</b>
<b>Step 4:</b>	<b>Connecting flow meter to signal conditioner</b>	<b>8</b>
<b>Step 5:</b>	<b>Bale rate sensor installation</b>	<b>8</b>
<b>Step 6:</b>	<b>Main wiring harness installation</b>	<b>9</b>
	<b>Wire installation</b>	<b>10</b>
<b>Step 7:</b>	<b>Installation of the spray shield</b>	<b>11</b>
	<i>*4438A-Vermeer SQ2731</i>	<b>11</b>
	<i>*4439A-Vermeer SQ3347</i>	<b>11</b>
	<i>*4490A-Case IH 8570 and 8575, Hesston 4750 and 4755, and New Idea 7233</i>	<b>12</b>
	<i>*4491A-Hesston 4900, 4910, Challenger LB44, Case IH 8580,8590, and New Idea 7244</i>	<b>12</b>
	<i>*4492A-Hesston 4790, Case IH 8585, Challenger LB34, and New Idea 7234</i>	<b>13</b>
	<i>*4494A-Challenger LB33, Hesston 4760, and New Idea 7333</i>	<b>13</b>
	<i>*4495A-New Holland 590 and 595, BB940, BB960, and Case IH LBX331 and LBX341</i>	<b>14</b>
	<i>*4497A-Case IH LBX 331 and LBX441, and New Holland BB940 and BB960 roto cut</i>	<b>14</b>
	<i>*4498A-John Deere 100</i>	<b>15</b>
	<i>*4499A-Claas</i>	<b>15</b>
	<i>*4500A-Hesston 4760, New Idea 7333, and Challenger LB33 with Cutter Option</i>	<b>16</b>
<b>Step 8:</b>	<b>Plumbing</b>	<b>16</b>
<b>Step 9:</b>	<b>Install the mounting bracket inside the tractor cab</b>	<b>16</b>
<b>Step 10:</b>	<b>Install controller cable harness</b>	<b>16</b>
<b>Step 11:</b>	<b>Install the main power leads</b>	<b>17</b>
<b>Step 12:</b>	<b>Operating instructions</b>	<b>18</b>
<b>Step 13:</b>	<b>First time and annual start up instructions</b>	<b>19</b>
	<b>Priming and checking the pumps</b>	<b>19</b>
	<b>Turning the control on/off and the main menu</b>	<b>19</b>
	<b>To change application rates</b>	<b>20</b>
	<b>To change the moisture set points</b>	<b>20</b>
	<b>To change bale rate settings</b>	<b>21</b>
	<b>To run in the automatic bale rate mode</b>	<b>21</b>
	<b>To run in the manual bale rate mode</b>	<b>21</b>
	<b>Automatic mode or manual mode descriptions</b>	<b>21</b>
	<b>To run in automatic mode</b>	<b>22</b>
	<b>To run the applicator in manual mode</b>	<b>22</b>
	<b>To pause the unit</b>	<b>22</b>
	<b>To override the system and apply full application</b>	<b>23</b>
	<b>To read and reset the amount of preservative used</b>	<b>23</b>
	<b>Adjusting the volume of the control box alarm</b>	<b>23</b>
	<b>Common questions about the 464</b>	<b>23</b>
	<b>Routine maintenance</b>	<b>24</b>
	<b>Winter storage</b>	<b>24</b>
	<b>Trouble shooting checks on the 464 control system</b>	<b>25</b>
	<b>System error code guide</b>	<b>28</b>
	<b>Wiring plug diagram</b>	<b>29</b>
	<b>Parts breakdown for pump plate</b>	<b>31</b>
	<b>Parts breakdown for star wheel and hoses</b>	<b>32</b>
	<b>Parts breakdown for control box and wiring harnesses</b>	<b>33</b>
	<b>Parts breakdown for parts bag</b>	<b>34</b>
	<b>Installation kit parts breakdowns</b>	<b>35</b>
	<i>*4438A and 4439A</i>	<b>35</b>
	<i>*4490A and 4491A</i>	<b>36</b>
	<i>*4492A and 4494A</i>	<b>37</b>
	<i>*4495A and 4497A</i>	<b>38</b>
	<i>*4498A and 4499A</i>	<b>39</b>
	<i>*4500A</i>	<b>40</b>
	<b>Template</b>	<b>41</b>
	<b>Warranty statement</b>	<b>42</b>

The HARVEST TEC AUTOMATIC applicator is designed to automatically apply propionic acid, acid blends, and buffered acid. It is designed to apply 60 pounds of product per hour on the low end and up

to 550 pounds per hour on the upper end. This applicator is calibrated to apply Harvest Tec buffered propionic acid. Adjustments to applicator rate settings and flow meter values may be necessary if you are using a competitor's product. Please note, not all products are compatible with all components in this applicator. The operating moisture range of the applicator is 10% to 32%. The three pumps included in the applicator are needed to apply preservative at the specified application set-points. The applicator can also be run in manual mode, which turns a pump or pumps on at a fixed rate. This applicator includes a flow-meter to measure the rate during product application as well as the accumulated amount of product used. The applicator also has sensors to monitor the baling rate. The applicator will automatically adjust the preservative rate based on the updated tons/hr reading from the bale rate sensors.

### **Installation Kit Reference**

<b>Baler Brand</b>	<b>Model</b>	<b>Install Kit</b>
<b>Hesston</b>	4750	030-4490A
	4755	030-4490A
	4760	030-4494A
	4760 ROTO-CUTTER	030-4500A
	4790	030-4492A
	4900	030-4491A
	4910	030-4491A
<b>Case IH</b>	8570	030-4490A
	8575	030-4490A
	8585	030-4492A
	8580	030-4491A
	8590	030-4491A
	LBX331 & 332	030-4495A
	LBX431 & 432	030-4495A
	LBX331 & 332 ROTO-CUTTER	030-4497A
<b>Challenger</b>	LB33	030-4494A
	LB34	030-4492A
	LB44	030-4491A
	LB33 ROTO-CUTTER	030-4500A
<b>Claas</b>	2200	030-4499A
<b>New Idea</b>	7233	030-4490A
	7234	030-4492A
	7244	030-4491A
	7333	030-4494A
	7333 ROTO-CUTTER	030-4500A
<b>New Holland</b>	590	030-4495A
	595	030-4495A
	BB940 & BB940A	030-4495A
	BB960 & BB960A	030-4495A
	BB940 & BB940A ROTO-CUTTER	030-4497A
	BB960 & BB960A ROTO-CUTTER	030-4497A
<b>Vermeer</b>	SQ2731	030-4438A
	SQ3347	030-4439A
<b>All others</b>	Universal	030-4495A

Tools needed for installation:  
 Standard wrench set  
 Standard socket set  
 Hose cutter  
 Electric drill and bits  
 Hammer  
 Center punch  
 Standard screwdriver  
 Metal cutting tools (Sawzall, grinder, torch)  
 Standard nut driver set

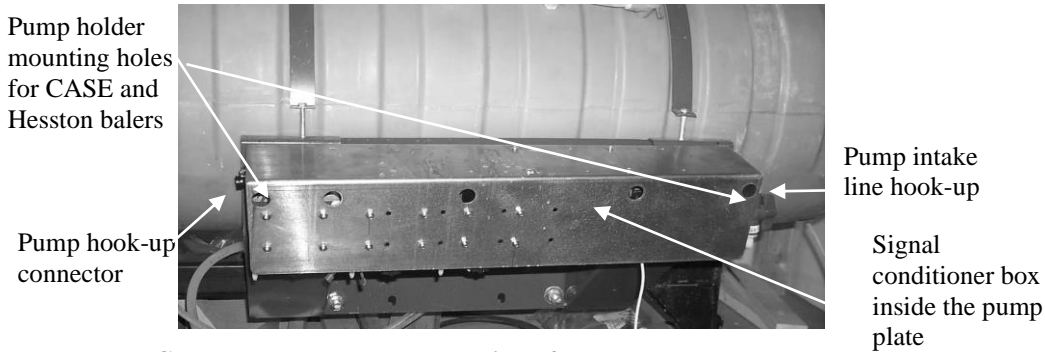
### ***STEP 1: MOUNTING AND PLUMBING THE PUMP PLATE***

For the New Holland, Case IH LBX Series, Claas 2200, and Vermeer SQ Series balers, the pump plate bolts through both the tank legs and saddle, (see mounting the tank on the baler for pictures of these balers on prior pages). After securing the pump plate, thread

the 3/4" by 1/2" (003-EL3412) elbow into the bottom of the tank. Next connect the 1/2" hose to the elbow and route it to the straight fitting on the pump plate. Cut to correct length and secure each end with hose clamp.

For Case, Hesston, Challenger LB Series balers, the pump holder will mount to the front of the tank saddle. Two 3/8" by 1" bolts will be used for mounting the pump holder to the saddle. Access holes are placed on the outside of the pump holder for easier installation. To aid in installing the pump holder, use a socket and long extension. After securing the pump plate, thread the 3/4" by 1/2" (003-EL3412) elbow into the bottom of the tank. Next connect the 1/2" (002-9001) hose to the elbow and route it to the straight fitting on the pump plate. Cut to correct length and secure each end with hose clamp.

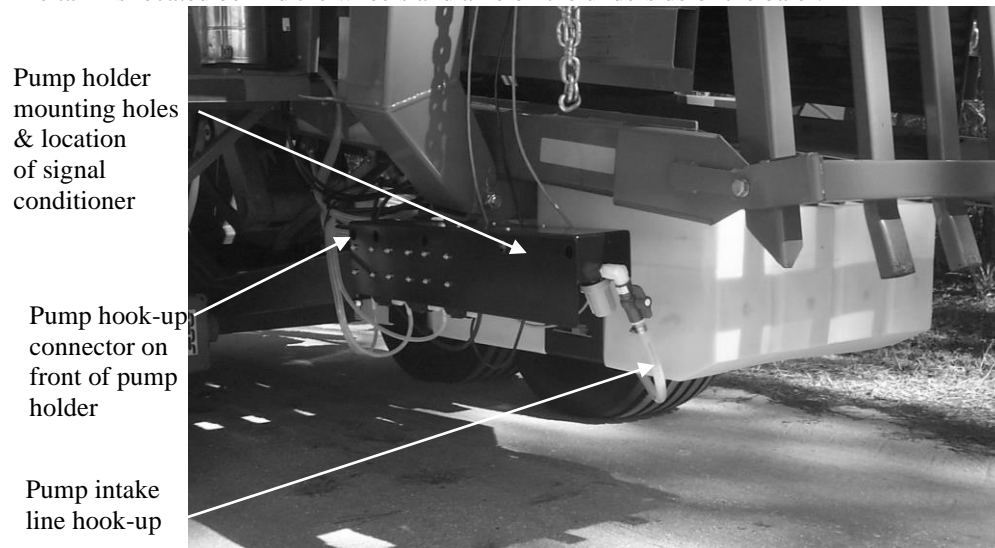
The quick slide connectors are connected to the appropriate pumps at the factory. A round connector is located on the side of the pump holder and should be connected to the adapting round connector on the main wiring harness (**see wiring diagram.**)



**Case and Hesston balers location of pump holder on saddle.**

### **Mounting Hangers on John Deere 100 Balers**

The tank is located behind the wheels and axle on the underside of the baler.



### **Mounting on Non Harvest Tec Tank Frames**

For frames not sold by Harvest Tec, locate the hanger on a solid surface that will secure the hanger in place. Make sure the location of the pumps is lower than the elevation of the bottom of the tank to ensure the pumps prime properly during operation. Holes will have to be drilled in the hanger to fit the holes in the baler or tank frame. Make sure two to four bolts are used to properly bolt down the hanger.

### **STEP 2: MOUNTING THE STAR WHEELS ON THE BALER**

Use the template located in the back of this manual as a guide for cutting a notch and locating the mounting holes for the star wheels. Carefully mark the location of the star wheel holes using the template and a center punch so the **star wheels will run true to the direction of the bales, otherwise, the star wheels may work themselves out of the block.** The star wheels must be mounted so

that they are no closer than 3/8" from any metal parts of the baler and come in contact only with the bale. Four 5/16" by 3/4" allen headed bolts will be used to mount the star wheel block and twine guard to the baler. The bolts must be inserted from the inside of the baler chamber. Use nuts and lock washers to hold the bolts in place before putting on the star wheel block, the block is counter-bored on one side so the block will fit over the nuts. The star wheel block has a plug on one side and a wire grommet on the other side. If there are interference problems with the star wheel wires on one side of the block, exchange the wire grommet with the plug so the wire can exit the block on the other side. Mount the twine guards using the two inner holes on the star wheel block. **\*\*The twine guard containing the bale rate sensors should be placed on the baler's right side, when looking from the back of the baler.**

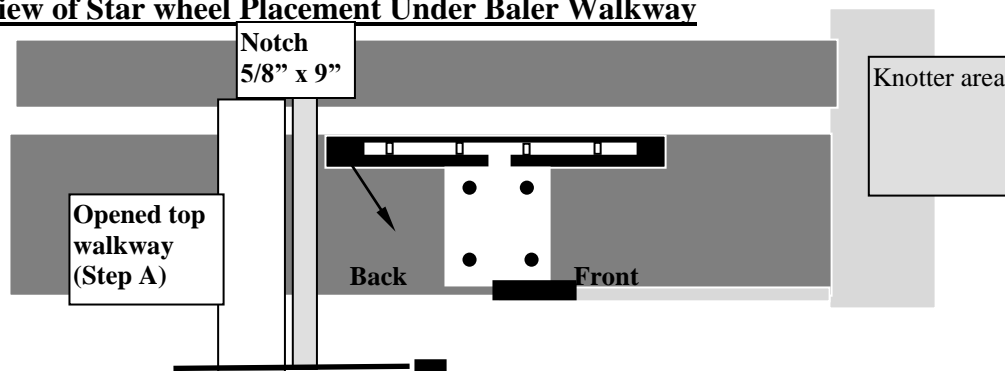
#### **Case IH 8570, 8575, and 8585, Challenger LB33, LB34, and Hesston 4750, 4755, 4760, and 4790, and New Idea 7233, 7333, 7234 balers**

The star wheels are mounted under the walkway on top of the baler behind the knotters. Remove the bale from the chute and tip the walkway up. Locate the star wheel template on the outside corners angles of the bale chute on the left and right side of the baler. The center of the wheel shaft will be approximately 5½ inches in front of the walkway support or about halfway between the walkway support and the cross frame almost directly in front of it. The notch will start just in front of the walkway support.

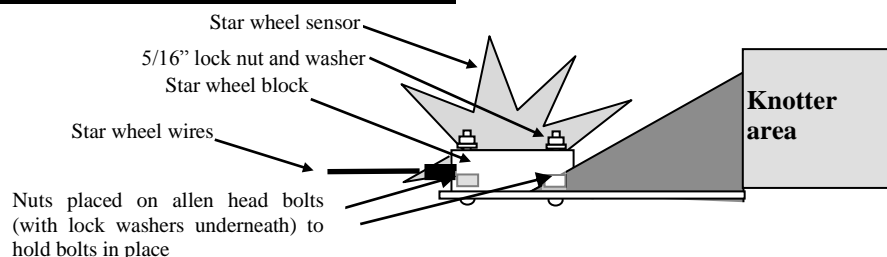
Two parts of the baler frame will have to be trimmed off on both sides to mount each star wheel.

The first is the outside corner angles of the chute. Use the template to mark the location of the star wheel notch as well as the location of the four holes for the star wheel block. The notch will be 5/8" by 9" long and will help keep the wheel away from the twine. Spray the ground areas with touch up paint to prevent rusting. The second portion of the baler to trim off is the end of the gusset that may interfere with the star wheel's plastic base support. Center the star wheel in the slots that was just notched and check for interference with the gusset shown in the figures below.

#### **Top View of Star wheel Placement Under Baler Walkway**



#### **Side View of Star Wheel Placement**

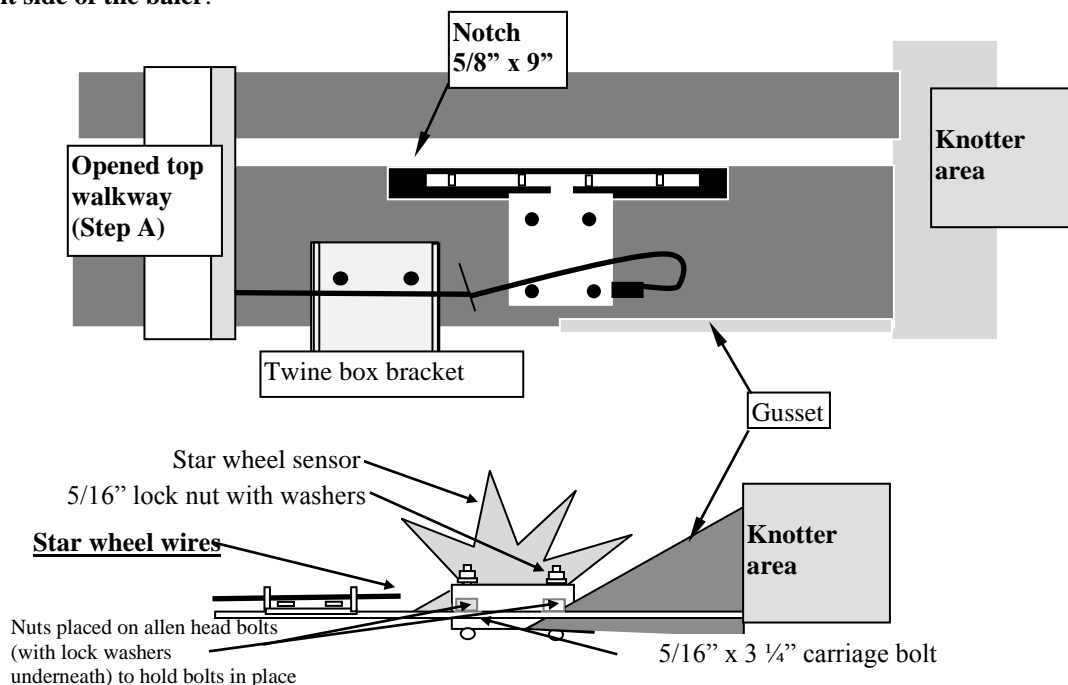


Drill 5/16" holes for the star wheel block. Insert the 5/16" by 3/4" bolts up through the chute and use nuts to hold the bolts in place. Place the star wheel block over the nuts and install the twine guards using the two inner holes of the star wheel block. **The twine guard containing the bale rate sensors will be placed on the right side of the baler.**

#### **Case IH 8580 and 8590, Hesston 4900 and 4910, Challenger LB44, and New Idea 7244 balers**

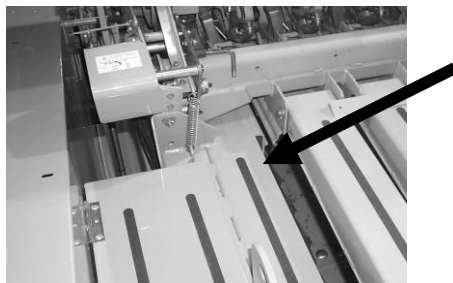
The star wheels are mounted on top of the baler, just behind the knotters under the walkway on both sides. Use the template at the back of the manual to mark the location and dimension of the notch and holes. Remove the bale from the chute. Tip the walkway up and locate the wheels on the top outside corner angles of the bale chute, one on each side. The star wheel block is located just in front of the horizontal channels holding the twine boxes. Using the template, mark the location of the notch (5/8" wide and 9" long) and the location of the four 5/16" holes for the star wheel base using a center punch. The bare metal edge of the angle should be sprayed with touch up paint to prevent corrosion.

Once the above modification to the baler is made on both sides of the chute, the wheels can be mounted. Insert the 5/16" by 3/4" bolts up through the chute and use nuts to hold the bolts in place. Place the star wheel block over the nuts and install the twine guards using the two inner holes of the star wheel block. **The twine guard containing the bale rate sensors will be placed on the right side of the baler.**



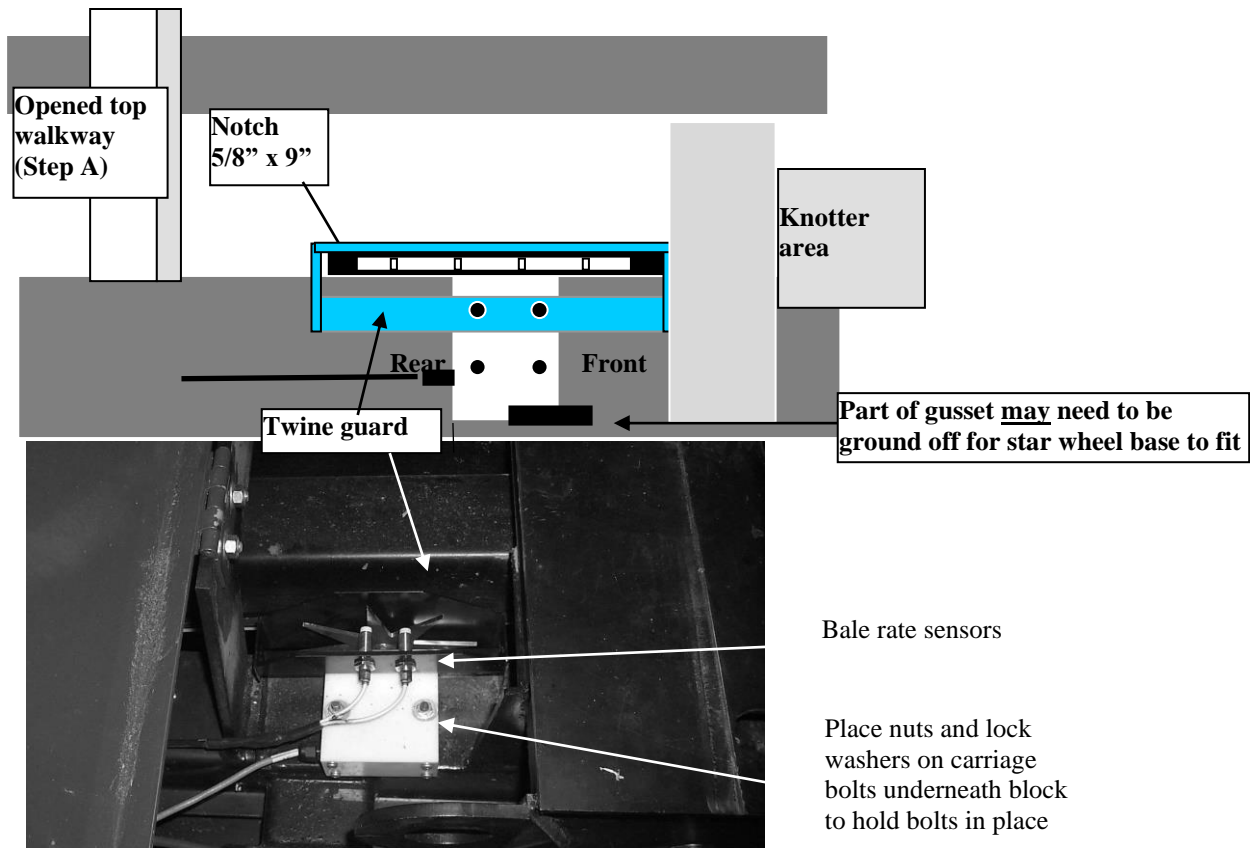
#### **Claas 2200 baler**

Use the template located in the back of the manual as a guide for cutting the notch and mounting holes for the star wheels. The star wheels are to be mounted on top of the baler, just behind the knotters and as far forward as possible. Remove the bale from the chute, tip the walkway up and locate the wheels on the top outside corner angles of the bale chute, with one on each side. Mark the location of the notch (5/8" wide and 9" long) and the location of the four 5/16" holes for the star wheel base. After cutting the notch and drilling the holes, spray with touch up paint to prevent corrosion. Insert the 5/16" by 3/4" allen head bolts up through the chute and use nuts to hold the bolts in place. Place the star wheel block over the nuts and install the twine guards using the two inner holes of the star wheel block. The twine guard containing the bale rate sensors will be placed on the right side.



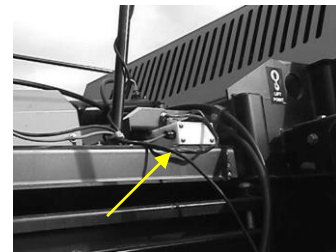
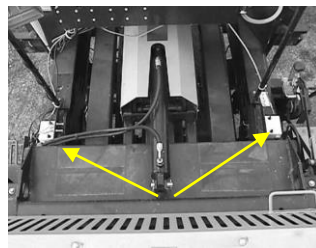
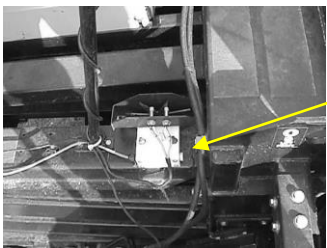
#### **New Holland 590, 595, BB940A, and BB960A and Case IH LBX331,332,431, and 432 balers**

Use the template located in the back of the manual as a guide for cutting the notch and mounting holes for the star wheels. The star wheels are to be mounted on top of the baler, just behind the knotters and under the walkway on both sides. Remove the bale from the chute, tip the walkway up and locate the wheels on the top outside corner angles of the bale chute, one on each side. Mark the location of the notch (5/8" wide and 9" long) and the location of the four 5/16" holes for the star wheel base. After cutting the notch and drilling the hole, insert the 5/16" by 3/4" black allen head bolts up through the chute and use nuts to hold the bolts in place. Place the star wheel block over the nuts and install the twine guards using the two inner holes of the star wheel block. **The twine guard containing the bale rate sensors will be placed on the right side.**



### **Vermeer SQ2731 and SQ3347**

Locate the steel cross-beam that goes across the bale chamber in between the knotters and shield for the hydraulic cylinder. The yellow shield is located in the middle and runs in the same direction as the bale chamber. Using the provided star wheel template, locate the template as far forward as possible behind the cross-beam. Position the template so the edge of the star wheel base is aligned with the outside of the bale chamber. Mark the hole positions for drilling and mark the notch for the star wheels. The notch will be 5/8" by 9" long and will help keep the wheel away from the twine. Repeat this process on the other side of the bale chamber for the second star wheel. After making the notch, center the star wheel in the slots to assure that they fit. Double-check the marked hole positions, and drill the four holes for each star wheel base. After notching and drilling, spray the ground areas with touch up paint. Insert the 5/16" by 3/4" allen head bolts up through the chute and use nuts to hold the bolts in place. Place the star wheel block over the nuts and install the twine guards using the two inner holes of the star wheel block. **The twine guard containing the bale rate sensors will be placed on the right side**



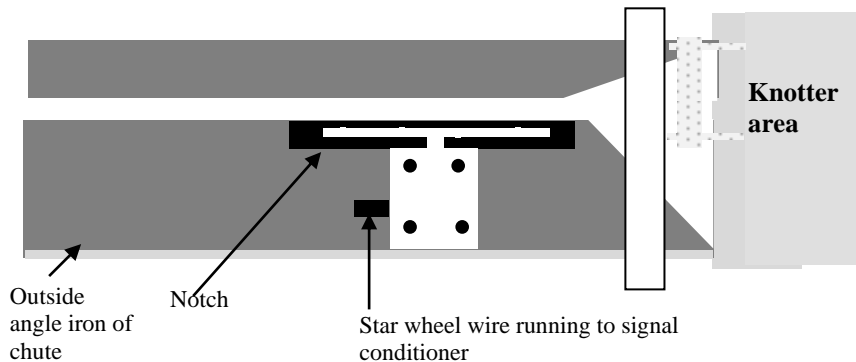
### **John Deere 100**

Use the template located at the end of the manual as a guide for cutting a notch and locating the mounting holes for the star wheels. Carefully mark the location of the star wheel holes using the template and a center punch so the star wheels will run true to the direction of the bales, otherwise, the star wheels may work themselves out of the block. The star wheels must be mounted so that they are no closer than 1/4" from any metal parts of the baler and come in contact only with the bale. Four 5/16" allen headed bolts will be used to mount the star wheel block and twine guard. The bolts must be inserted from the inside of the baler chamber. Use nuts to hold the bolts in place before putting on the star wheel block, the block is counter-bored on one side so the block will fit over the nuts. The star wheel block has a plug on one side and a wire grommet on the other side so if there are interference problems with the star wheel wires on one side of the block exchange the wire grommet with the plug so the wire can exit the block on the other side. Mount the twine guards using the two inner holes on the star wheel block—**the twine guard containing the bale rate sensors should be placed on the baler's right side.** Follow these instructions below for location of the star wheels on the respective baler.

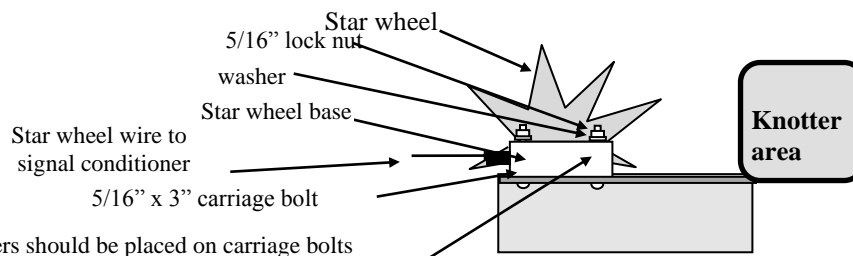
### **Top View of Baler Frame and Star Wheel Placement**

**Step A:** Mark and notch out a 5/8" wide by 9" long section at forward most point of baler's angle iron.

**Step B:** Drill 5/16" holes in the four locations of the star wheel's base and mount the star wheel.



### **Side View of Baler Frame and Star Wheel Placement**



Nuts and lock washers should be placed on carriage bolts underneath block to hold bolts in place.

## **STEP 3: WIRE THE STAR WHEEL TO THE SIGNAL CONDITIONER**

First, remove the cover from the star wheel block and use a 1/4" nut driver to remove the nut from the electronic swivel. Next, run the star wheel sensor wire through the black strain relief and place the eye loop onto the electronic swivel on the end of the star wheel sensor. Replace and tighten the nut on the sensor, and put the star wheel cover back on the block. Next, tighten the dome nut around the strain relief to form a tight seal around the wire. Repeat for other star wheel. Run the wires along the baler frame to the signal conditioner and connect to the 9-pin star wheel sensor plug on the signal conditioner. Secure any loose wires with zip ties. (See wiring installation on the following page.)

## **STEP 4: CONNECTING FLOW METER TO SIGNAL CONDITIONER**

The flow meter is located on the pump intake line underneath the pump plate. Connect the flow meter to the signal conditioner's flow meter sensor plug. (See wiring installation on the following page.) Secure any loose wires with zip ties. On some models the flow meter is already connected.

## **STEP 5: BALE RATE SENSORS**

The bale rate sensors will be factory installed on the right side twine guard in the correct position. The sensor with the longer sensor wire should say "FRONT", which indicates it should be placed in the front sensor hole. The sensor wire with the shorter wire should say "BACK." The tip of the sensor should be placed no more than 1/4" away from the star wheel teeth and no less than 1/8" from the star wheel teeth. Connect the bale rate sensor wires to the signal conditioner located on the underside of the pump plate. Each sensor will have a LED light located by the wire connection. Once the unit is powered up spin the wheel and make sure that both sensor turn on and off the LED lights. If they don't turn on and off, adjustments may need to be made. (See wiring installation on the following page.) Secure any loose wires with zip ties.

## **STEP 6: MAIN WIRING HARNESS INSTALLATION**

Start by unrolling the long communication cable (006-4640C3) along the side of the baler. The end that has the two wires connected by a mesh loom (labeled Control Box) should be facing the tractor. Leave enough cord that will allow you to connect this end of cable to the 464 monitor in the cab of the tractor (in step 12). Run the wire, with the 7-pin plug (labeled Pumps) through the right side of the baler as pictured below. Connect this plug to the right side of pump plate. Run the other wire, with the 16-pin plug (labeled Signal Conditioner), on the other side of the baler in the same location. Connect this plug to the conditioner, located under the left side of the pump plate. Secure with cable ties and other clips provided. (**Note** do not connect wires to hydraulic lines. The temperature may melt them.) The short gray wire, with a 4-pin plug (labeled Crop Eye Option) coming out of the main harness by the mesh loom is for the optional crop sensor eye kit (not included.)





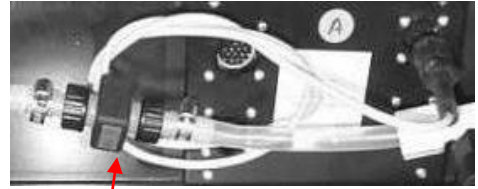
# Wire Installation

## Step 6



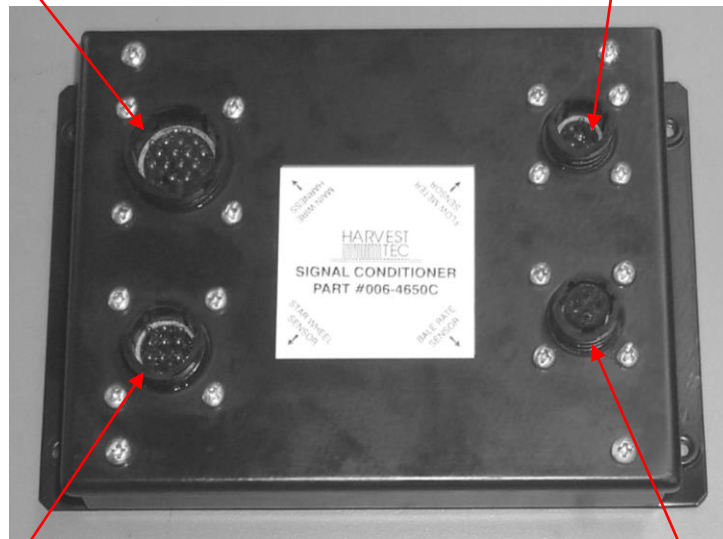
U.S. Patent # 6,377,058B1

## Step 4



Connection for main  
wiring harness going  
to tractor

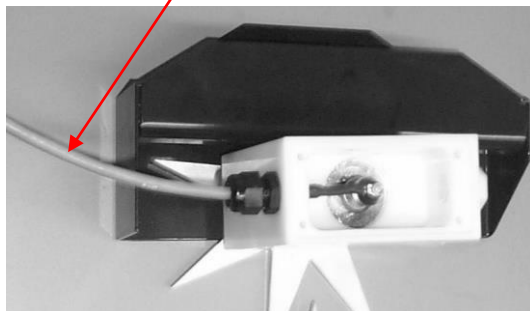
Connection  
for flow meter



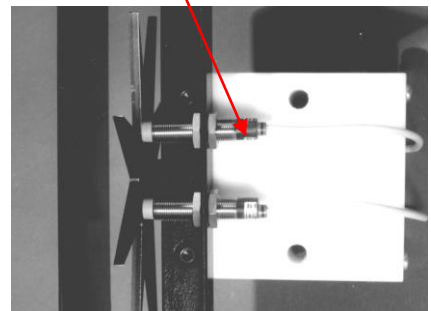
Location for star wheel  
wire connection to  
electronic swivel

Connection for bale rate  
(proximity) sensors

## Step 3

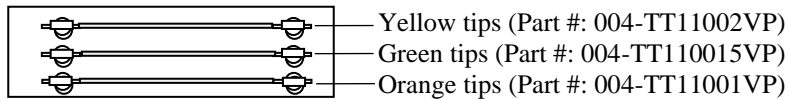


## Step 5



## STEP 7: INSTALLATION OF THE SPRAY SHIELD

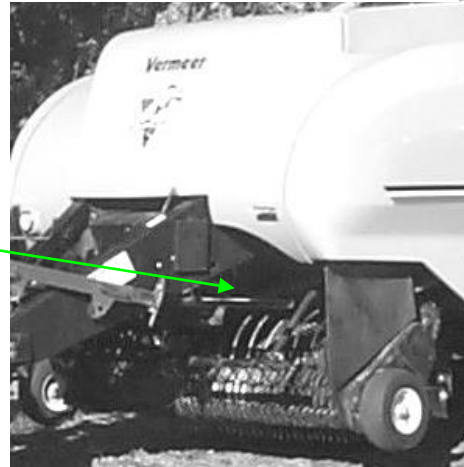
The spray shield assembly is designed to spray the hay evenly as it is picked up by the baler. A sketch of the spray shield nozzle holder is shown below.



Spray shield showing nozzle placement and tubing.

### Installation kit 4438A for Vermeer SQ2731

The spray shield is installed on the gathering fork guard located in the back of the pick up head. Existing bolts are used to fasten the spray shield bracket to the gathering fork guards. Route hoses so they will not interfere with moving parts. This can be checked by rotating the flywheel by hand. **Don't fasten hoses to metal hydraulic lines!** A parts breakdown is located in the back of the manual.

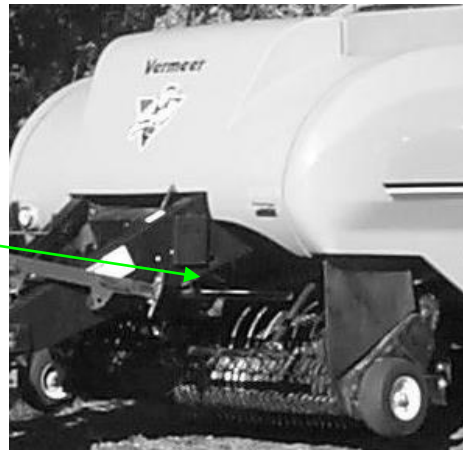
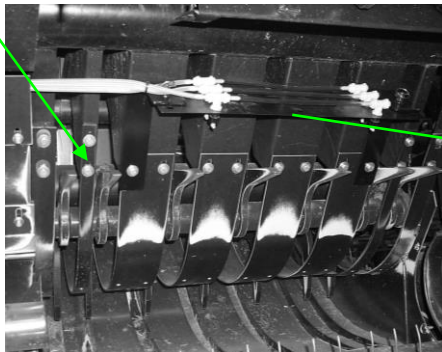


Spray shield placement for Vermeer SQ2731

### Installation kit 4439A for Vermeer SQ3347

The spray shield is installed on the gathering fork guard located in the back of the pick up head. Existing bolts are used to fasten the spray shield bracket to the gathering fork guards. Route hoses so they will not interfere with moving parts. This can be checked by rotating the flywheel by hand. **Don't fasten hoses to metal hydraulic lines!** A parts breakdown is located in the back of the manual.

Use existing hardware when mounting the spray shield bracket.

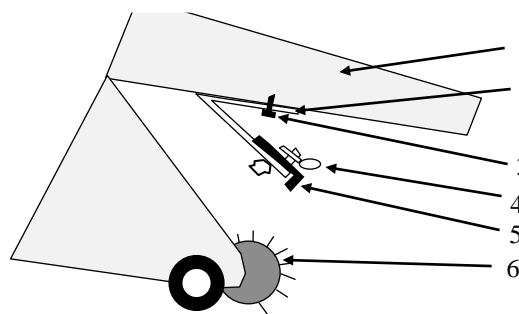


Spray shield placement for Vermeer SQ3347

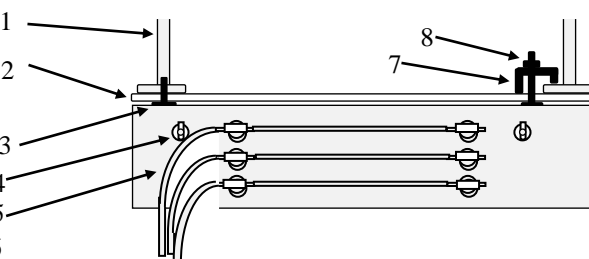
### Installation kit 4490A for Case IH 8570 and 8575, Hesston 4750 and 4755, and New Idea 7233 balers

The spray shield holder will be installed underneath the baler's tongue. Bolt the right side up using the existing hole on the bottom lip of the baler. Use the clamp on the left hand side to tighten the shield against the underside of the tongue. Tighten the clamp with the two bolts provided. A parts breakdown of the 4490A is located in the back of this manual.

**Side View of Spray Shield**



**Front View of Spray Shield Assembly**



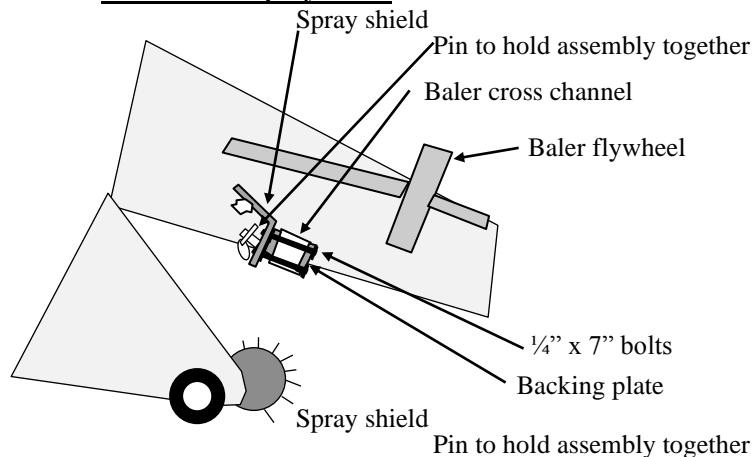
**Ref# Description**

1. Baler frame / tongue
2. Top part of spray shield assembly mounted to baler
3. Existing bolt in baler used to hold spray shield
4. Pins used to hold two spray shield assemblies together
5. Nozzle holder part of spray shield assembly
6. Hay pick-up attachment
7. Clamping mechanism that holds spray shield to baler frame
8. Bolts (quantity 2) to hold clamp to spray shield

**Installation kit 4491A for Hesston 4900 and 4910, Challenger LB44, Case IH 8580 and 8590, and New Idea 7244 balers**

Install the spray shield behind the baler's cross channel, which is located on the bottom side of the tongue behind the flywheel. Note the position of the bevel on the spray shield. Clamp the spray shield around the channel using the backing plates and the 1/4" by 7" bolts provided. A parts breakdown of the 4491A install kit is shown in the back of this manual.

**Side View of Spray shield**

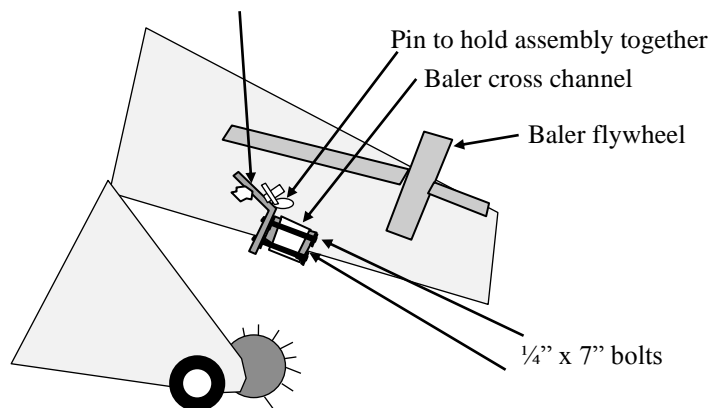


**Installation kit 4492A for Hesston 4790, Case IH 8585, Challenger LB34, and New Idea 7234 balers**

Install the spray shield behind the baler's cross channel, which is located on the bottom side of the tongue behind the flywheel. Note the position of the bevel on the spray shield. Clamp the spray shield around the channel using the backing plates and the 1/4" by 7" bolts provided. A parts breakdown of the 4492A is located in the back of this manual.

**Side View of Spray shield**

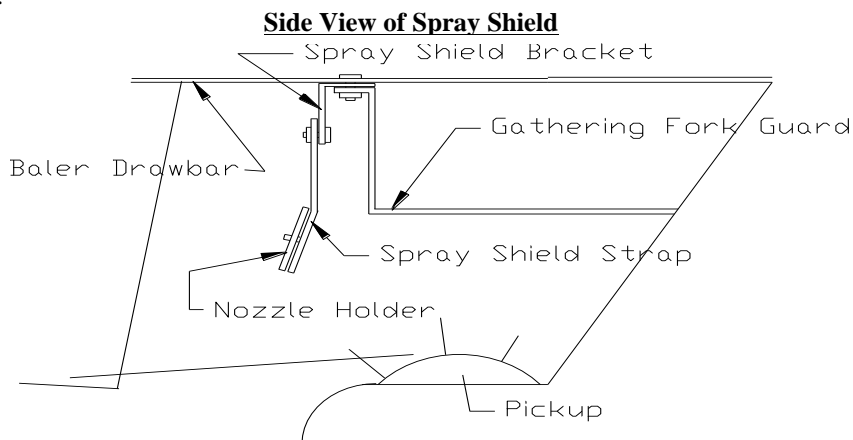
Spray shield



### **Installation kit 4494A for Challenger LB33, Hesston 4760 Non-Cutter, and New Idea 7333 balers**

The spray shield assembly will be installed underneath the baler's tongue and behind the baler's flywheel.

Begin by removing the two  $\frac{3}{4}$ " nuts and washers that fasten the gathering fork guard to the frame. Reach through the holes on the inside of the frame and remove the carriage bolts. Then pull the gathering fork guard down so the spray shield bracket can be slide between the frame and fork guard. Line up the holes in the frame and spray shield bracket with slots in the fork guard. Fasten the spray bracket and fork guard to the frame with existing carriage bolts, washers, and nuts. Next, attach the spray shield straps to the spray shield bracket using the  $\frac{1}{4}$ " hardware provided in the kit. Slide the nozzle holder over the studs on the spray shield straps and fasten with two key rings provided. Finally, mount the spray nozzles in the nozzle holder as instructed. A parts breakdown is located in the back of the manual.

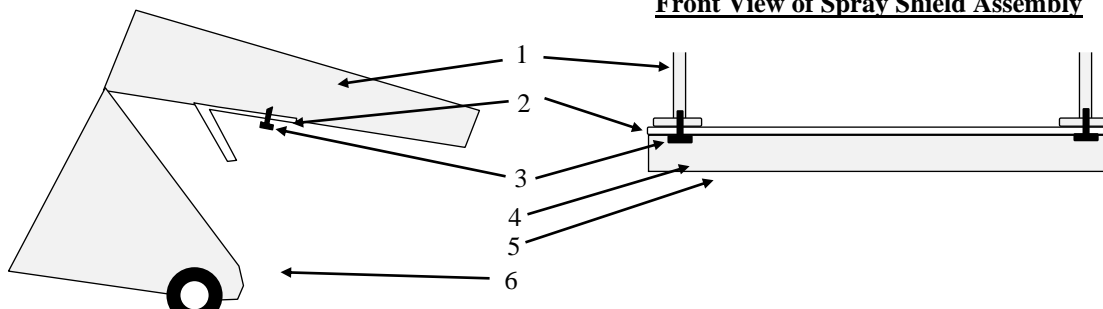


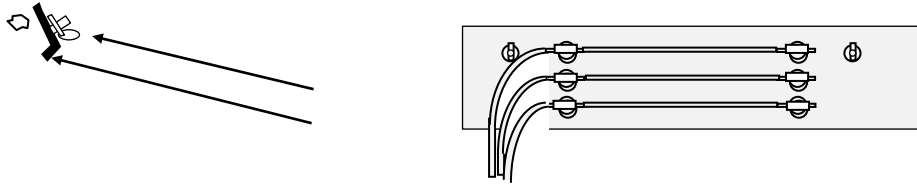
### **Installation kit 4495A for New Holland 590, 595, BB series, and Case LBX series balers non-roto-cutter**

Install the spray shield under the tongue of the baler, behind the flywheel. There are two existing bolt holes 6" to 12" above the gathering fork guards, connect the spray shield using these holes. The tips should be pointing to the throat of the baler chamber. A parts breakdown of the 4495A install kit is located in the back of the manual.

**Side View of Spray Shield**

**Front View of Spray Shield Assembly**





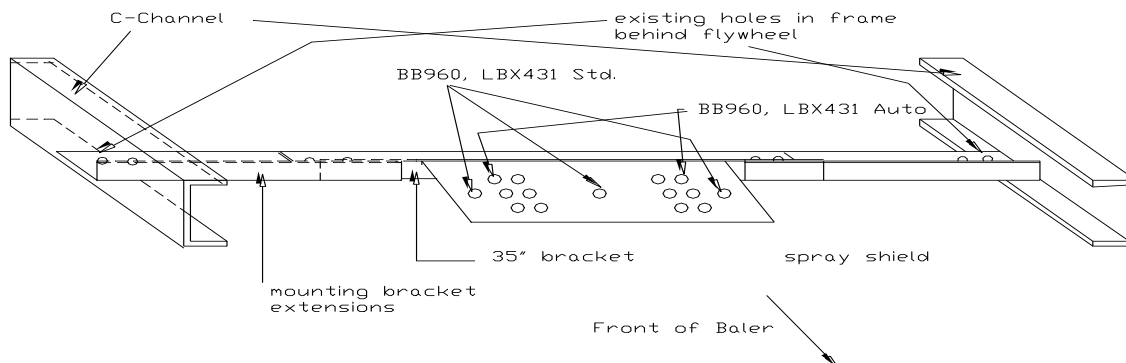
### Spray shield assemblies for New Holland 590, 595, BB series, and LBX series balers non-roto-cutter

Ref#	Description
1.	Baler frame / tongue
2.	Top part of spray shield assembly mounted to baler
3.	Existing bolts in baler used to hold spray shield
4.	Key ring used to hold two spray shield assemblies together
5.	Nozzle holder part of spray shield assembly
6.	Hay pick-up attachment

### Installation kit 4497A for Case LBX series and New Holland BB series balers with Roto-Cutter option

#### New Holland BB960, BB960A, Case IH LBX431, and LBX432

The spray shield assembly will be installed underneath the baler's tongue and behind the baler's flywheel. For installation on a BB960, BB960A, LBX431, or LBX432, bolt a mounting bracket extension to each end of the 35" long mounting bracket using the 5/16" hardware supplied in the kit. Locate the two holes through the bottom flanges of the tongue's C-channels behind the flywheel. Position the cross pieces of the mounting bracket so that shorter leg of the bracket's angle iron is vertical and the longer leg is pointed toward the balers intake throat. Bolt through the two holes on the baler using the bolts provided. Fasten the mounting bracket through the bottom lip of the tongue frame on each side with the hardware in the kit. Finally, slide the spray shield studs through the mounting bracket and fasten with the two key rings provided. A parts breakdown is located in the back of this manual.



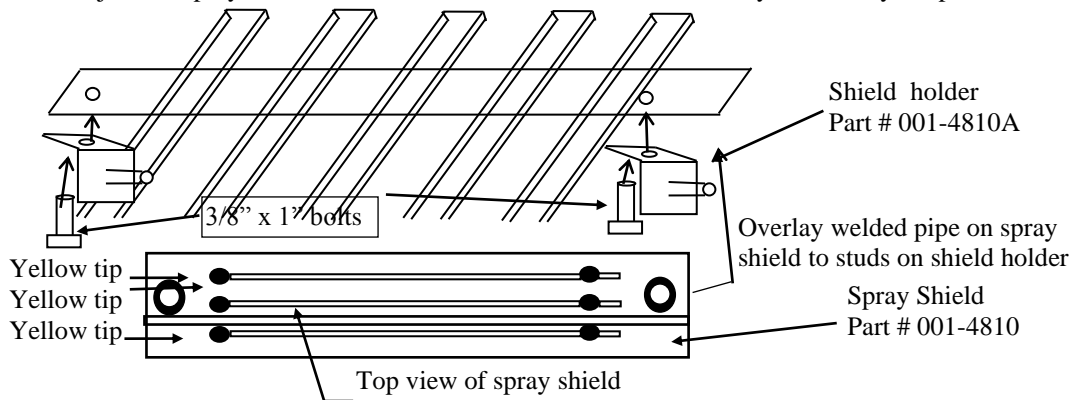
#### New Holland BB940, BB940A, Case IH LBX 331, and LBX 332

**ATTENTION:** This install is factory set for a 3x4 baler. To mount this kit on a New Holland BB940, BB940A, Case IH LBX331, or LBX332, you must adjust the nozzle spacing. Failure to adjust nozzle spacing when mounting this kit on a 3x3 baler, will result in improper preservative coverage on your bale.

The mounting bracket extensions are not needed for assembling the unit on a BB940, BB940A, LBX331, or LB 332 baler. Move the three nozzles on each side to the inside set of three holes. Modify the hose length between the nozzles after adjusting the nozzle spacing. Finally, follow the BB960, BB960A, LBX431, and LBX432 procedure for installing the mounting bracket and spray shield. A parts breakdown is located in the back of the manual.

### Installation kit 4498A

The spray shield is designed to accurately distribute product evenly across the hay at the baler's pick-up head. The spray shield is designed so that the spray nozzles can be easily removed for cleaning. Lower the wind guard of the baler to maximize the installation working space. Locate the guards between the hay intake fingers. Hold the spray shield up so it straddles the top of the guards. Locate the holes on the baler that line up with the spray shield holders. Connect the spray shield to the baler using 3/8" x 1" bolts. Adjust the spray shield so it can be removed and reinstalled freely once the lynch pins are removed.



### **Installation kit 4499A for Claas 2200 baler**

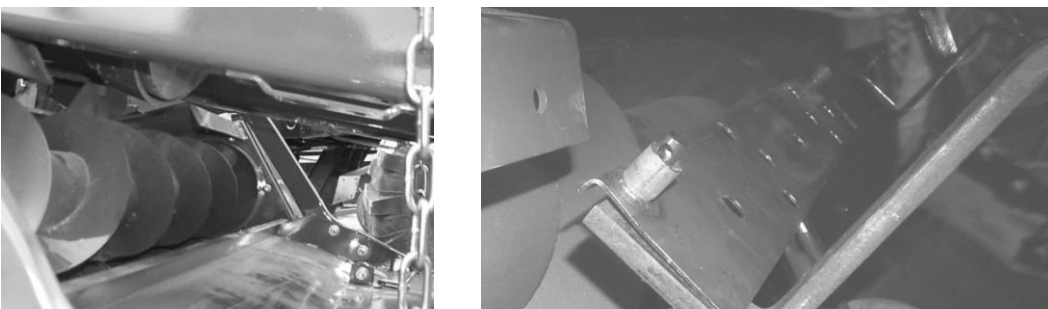
Install the spray shield-mounting bracket between the two flat vertical plates above the rotor as indicated in the picture below. Use the existing bolt holes with the hardware from the applicator kit to mount the spray shield bracket to the baler. Fasten the spray shield onto the spray shield bracket already mounted. Route hoses along the spray shield bracket towards the right side of the baler, and then back to the tank. When routing the hose avoid moving parts.



Mount the spray shield bracket between these two bolts above the rotor.

### **Installation Kit 4500A for Hesston 4760, New Idea 7333, and Challenger LB33 with Cutter Option**

The spray shield assembly will be installed underneath the baler's tongue and in front of the baler's flywheel. Use the existing holes found on underside of tongue for mounting shield holder brackets to the position pointed to below. The bends of shield holder brackets will be pointing towards the pickup head. Use the 3/8" carriage bolts to secure to the under side of the tongue. Next place the spray shield over the pins of shield holder brackets and secure with lynch pins.





## STEP 8: PLUMBING

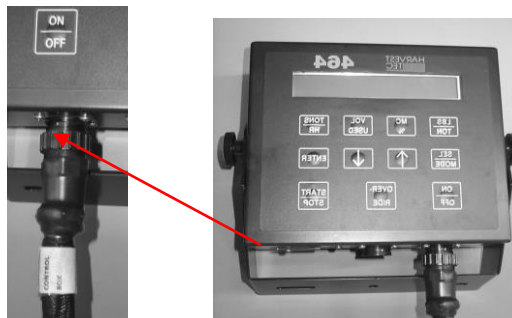
- A) Use warm soapy water when connecting the three color hoses (clear, blue, and green) to the pumps located inside the pump plate. Each color goes to a particular pump or nozzle. **NOTE:** The pump closest to the filter bowl and valve is **pump #1** and the pump farthest from the filter bowl and valve is **pump #3**.
- B) Route the hose from the pumps to the spray shield. Do not cut the hoses to length in case more hose length is needed later; rather, wrap the hose in an isolated location. **KEEP HOSE AWAY FROM: MOVING PARTS, SHARP METAL, AND HYDRAULIC LINES. WORKING TEMPERATURE FOR THE HOSE IS 140° F AND UNDER.**
- C) Connect the hoses from the pumps to the spray shield as follows:
  - Pump #1 to Orange nozzles (PUMP #1 IS CLOSET TO THE FILTER)**
  - Pump #2 to Green nozzles**
  - Pump #3 to Yellow nozzles**
- D) Tie the hose down at secure locations on the baler using the enclosed tie straps and cable clamps.
- E) Wrap the hose with the coil cable in spots that are higher risk of rubbing or being caught in moving parts.

## STEP 9: INSTALL THE MOUNTING BRACKET INSIDE THE TRACTOR CAB

Mount the bracket in a secure area that is easy to reach in the cab and away from any obstructions. Adjust the bracket position as required to provide easy display viewing before tightening the screws.

## STEP 10: INSTALL CONTROLLER CABLE HARNESS

Locate the end of the main wire harness labeled Control Box installed in Step 8. Route this end of the harness in close proximity to the mounting bracket installed in Step 11. Allow enough service loop to facilitate installation and removal of the 464 control. Make sure the controller is located away from two-way radios and cell phones. Connect the main wire harness to the left plug on the bottom of the box.



U.S. Patent # 6,377,058B1

## STEP 11: INSTALL THE MAIN POWER LEADS

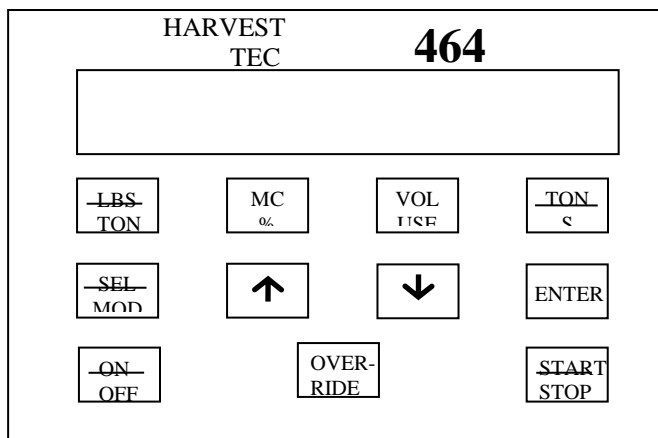
- A. Locate the power harness that came with the applicator.
- B. Connect the red eye loop to the positive and the black eye loop to the negative **non-keyed** 12-volt battery power supply on the tractor (separate connections from 2-way radios and cell phones).
  - NOTE:**
    - 1. **It is strongly recommended to connect the power leads directly to the battery!** The unit draws up to 25 AMPS with all pumps running, which is more than the rating of most in-cab convenience outlets.
    - 2. **This unit will not function correctly on positive ground tractors.**
    - 3. **If the unit loses power while operating, the accumulated pounds of product used will be lost from its memory.**
- C. Route the power harness up to the Control Box.



- D. Finally connect the power harness to the right plug on the bottom of control box. After connecting the power cord, the control box should light up for a second or two and then go back to its off state. If the communication cord is not connected to the controller prior to connecting the power cord, you will not be able to run the controller.

## ***STEP 12: OPERATING INSTRUCTIONS***

This system is calibrated for use with Harvest Tec buffered propionic acid. It is designed to apply rates of 60 to 550 lbs and at 10-32% moisture levels. The 464 monitor will allow you to preset your bale size, weight, single bale formation time, moisture levels, and application rates. The automatic mode option will automatically adjust the application level as the moisture levels vary and bale speed changes. The option of manual mode will allow you to manually control your application rates on the go. The following control box drawing will give you an overview of each button's function.



U.S. Patent # 6,377,058B1

## **DESCRIPTION OF BUTTONS**

<b>ON OFF</b>	This is the main power button. <b>NOTE:</b> that power cannot be turned off in any screen other than the opening selection screen-“AUTO MODE” “MANUAL MODE.” Press “ENTER” from any other screen to get back to the opening screen.
<b>OVER- RIDE</b>	Used to kick the system into full application rate.
<b>START STOP</b>	Used to temporarily pause the unit.
<b>SEL MODE</b>	Used to change selections on any screen.
<b>↑</b>	<b>↓</b> Adjustment keys for changing values.
<b>ENTER</b>	
<b>LBS TON</b>	Used to set application rates.
<b>MC %</b>	Used to set percent moisture content at which each level is activated.
<b>VOL USED</b>	Used to read the amount of product used.
<b>TONS HR</b>	Used to switch between auto and manual bale rate control and enter bale time, bale length, and weight.

## ***STEP 13: FIRST TIME AND ANNUAL START UP INSTUCTIONS***

### **After installation, check this unit out!**

Prior to powering up the pumps, be sure to tighten up the filter bowl, flow meter fittings, and check any other plumbing fittings that could have vibrated loose.

### ***PRIMING AND CHECKING THE PUMPS:***

1. Put 10 gallons of water in the tank and open main valve on tank.

2. **Turn Control On:** Press the **ON/OFF** button to turn the controller on.
3. **Change the Tons/Hr setting:** Press the **ton/hr** key. In the upper left corner of the display will say either Auto or Manual. Use the **sel/mode** key to make the box flash next to auto or manual. Push the ↓ key to change the upper left corner to say Manual. The time in the upper right corner should be 1:00 and the wt in the lower right corner should be 800#. Push **enter** to return to the main menu screen.
4. **Selecting Manual Mode:** From the main menu screen use the **sel/mode** key to select “Manual Mode”. Press **enter**. The following screen will display.

M	C							L	B	S	/	T	O	N
P	1	:	O	F	F			P	2	:	O	F	F	
								P	3	:	O	F	F	

5. **Turning on and off the Pumps:** A pump than has the box flashing next to it can be turned on by pressing the ↑ key. Turn the pump off with the ↓ key. Used the **sel/mode** key to move from one pump to the next. Turn on all three pumps to prime and purge the air out of the lines. If the one of the pumps does not prime, remove the red plug from the bottom of the pump that is not running and turn the pump on from the control box in the cab. With the red plug removed, the liquid should start rapidly flowing out the bottom of the pump. Turn pump off and replace the red plug and the pump should be primed. After each is primed turn all the pumps off.
6. **Checking the Pump output:** Turn each pump on individually and let it run without any of the other pumps turned on to see if each one is properly primed. When pump one (P1) is running by itself the average flow meter reading should be 4-5 lbs per/ton at a baling rate 24 ton per hour, which is an average flow rate of  $4 \times 24 = 96$  lbs per hour. (To get a baling rate of 24 tons per hour the bale weight should be set at 800 pounds and the bale time at one minute in the TONS/HR menu). When pump two (P2) is running by itself the average flow meter reading should be 5-7 lbs per ton at a baling rate of 24 tons per hour, which is an average flow rate of  $6 \times 24 = 144$  lbs per hour. When pump three (P3) is running by itself the average flow meter reading should be 9-10 lbs per ton at a baling rate of 24 tons per hour, which is an average flow rate of  $9 \times 24 = 216$  lbs per hour.
7. **Exiting Manual Mode:** Press **enter** key to exit the manual mode back to the main menu screen.
8. **Resesting Ton/Hr:** From the main menu screen press the **tons/hr** key. Using the ↑ and **sel/mode** key to change the upper left corner back to read auto. Exit back to the main menu screen by pressing **enter**. The control is now set back to automatically adjust tons per hour.
9. **Check the moisture reading:** Use the **sel** key to go back to automatic mode, and press **enter**. The screen will display a % moisture of “LO”, without a bale in the chamber. Have an assistant climb up on top of the baler and grab both wheels at the same time. Most people test between 17% and 25% moisture depending on how moist their hands are.
10. **Checking the speed of baling:** With the unit in “automatic mode” have an assistants turn the right hand star wheel forward at a slow speed. The tons per hour reading should respond in 15 seconds. Push the **enter** key to get back to the main screen.
11. **Checking the flowmeter:** Push the **vol used** key to read “field” This value should correspond to water removed from the tank during test (1 gallon is 8 pounds). Rest field and total to “0” by pushing the ↑ key. **Note:** If the flow rate is not close to the average readings listed above see troubleshooting.

***Your 464 is now ready for initial set up for lb/ton,% moisture, and tons/hr. Do not use the unit until checking these setting (see setup and operating instructions.)***

## **SETUP AND OPERATING INSTRUCTIONS**

### **TURNING THE CONTROL ON/OFF AND THE MAIN MENU:**

1. To turn the control on press the **ON/OFF** key. The display will show the version number and any warnings before displaying the main menu screen shown below. AUTO MODE or MANUAL MODE should be flashing, which indicates which mode selected. Press the **SEL/MODE** key to go between the modes listed above, and press **ENTER** to choose the

specified mode. Whenever the control is on the main screen, you can select any of the top row keys or enter into auto or manual mode.

2. To turn the control off, the control must be on main menu screen, press the **ON/OFF** key.

A	U	T	O	M	A	N	U	A	L
M	O	D	E	M	O	D	E		

**NOTE:** If the voltage supplied is lower than 11.5 volts, a warning “Low Voltage” will appear. If the voltage supplied is higher than 14.5 volts, a warning “High Voltage” will appear. This warning is to alert operators that the output from the pumps may be off the target rates. There is internal protection in the box to prevent damage from extremely low voltage (below 9.5 volts) or from extremely high voltage (above 18 volts.) If the voltage is outside this range, the box will not operate.

### **CHANGING APPLICATION RATES:**

To change the application rates, the control monitor must be on the main menu screen (the screen that says **AUTO MODE** and **MANUAL MODE**.) Push the **LBS/TON** button and the following screen will appear, which indicates the application rates at the three levels:

L	E	V	E	L	1	L	E	V	E	L	2	L	E	V	E	L	3
L	B	/	T	_	_	L	B	/	T	_	_	L	B	/	T	_	_

Move between the levels using the **SEL/MODE** button. When the level requiring adjustment is highlighted use the up ↑ and down ↓ arrow keys to change the application rate. When the desired rates are set, push the **ENTER** key. You will see the **SYSTEM UPDATING SCREEN**, indicating the new levels are being saved. The main menu screen will then appear.

### **CHANGING THE MOISTURE SET POINTS:**

To change the moisture set points, the monitor must be in the main menu screen (the screen that says **AUTO MODE** and **MANUAL MODE**.) Push the **MC%** button and the following screen will appear, which indicates the application rates at the three levels:

M	C	%	L	1	:	_	_	M	C	%	L	2	:	_	_
M	C	%	L	3	:	_	_	A	L	A	R	M	:	_	_

Move between the levels using the **SEL/MODE** button. When the level requiring adjustment is highlighted use the up ↑ and down ↓ arrow keys to change the application rates. When the desired rates are set, push **ENTER**. You will see the **SYSTEM UPDATING SCREEN** indicating the new levels are being saved. The main menu screen will then appear.

### **CHANGING BALE RATE SETTINGS:**

It is important to set the bale rate as close to actual baling conditions as possible. The default tons/hr reading used in the auto mode is the same bale rate used in manual bale rate mode and is based from the time it take to make a bale and bale weight. The default tons/ hr is used for the first 15 seconds of operation in auto mode and after the system is unpaused.

### **TO RUN IN THE AUTOMATIC BALE RATE MODE:**

Auto bale rate mode will automatically calculate bale rate from of the preset length, weight, and real time baling speed. Push the **TON/HR** button and if the bale rate is currently in manual mode, the following screen will appear.

M	A	N	U	A	L	T	/	H	R	T	I	M	E	_	_	_	_
L	E	N	G	T	H	N	A	W	T	:	_	_	_	_	_	_	#

Use the **SELECT/MODE** key move the blinking box over to the time. Use the ↑ and ↓ to change the time to the actual time it takes make a bale. Use the **SELECT/MODE** key to move the blinking box is next to the manual in the upper left corner. Press the up ↑ key to change it to auto in the upper left corner. The following screen will appear:

A	U	T	O	T	/	H	R	T	I	M	E	N	A				
L	E	N	G	T	H	_	_	I	N	W	T	:	_	_	_	_	#

The length is the bale length measured in inches and the bale weight (WT:) is in pounds. Use the **SEL/MODE** button to move between **BALE LENGTH** and **BALE WEIGHT**. Use the up ↑ and down ↓ arrow keys to change the values. When the desired values are set, push **ENTER**. You will see the **SYSTEM UPDATING SCREEN** indicating the new levels are being saved. The main screen will then appear. The displayed baling rate value, while running in automatic mode, will display the baling rate that is updated every 15 seconds.

### TO RUN IN THE MANUAL BALE RATE MODE:

Manual bale rate will manually calculate the bale rate from the preset time of baling and weight. Push the **TON/HR** button and if the bale rate is currently in auto mode, the following screen will appear.

A	U	T	O	T	/	H	R	T	I	M	E	N	A					
L	E	N	G	T	H	_	9	6	I	N	W	T	:	_	_	_	_	#

To change bale rate sensing into manual mode, press the ↓ key, when Auto mode is flashing and the following screen will appear: The time to make a bale and the bale weight need to be inputted on this screen. The bale time is in seconds. Use **Sel/Mode** key to

M	A	N	U	A	L	T	/	H	R	T	I	M	E	_	_	_	_
L	E	N	G	T	H	N	A	W	T	:	_	_	_	_	_	_	#

move between Time and Weight. Use the ↑ and ↓ keys to change the values. When the desired values are set, push **ENTER**. You will see the **SYSTEM UPDATING SCREEN** indicating the new levels are being saved. The main screen will then appear.

### AUTOMATIC MODE OR MANUAL MODE DESCRIPTIONS

**AUTO MODE** will automatically apply product to the hay based on the moisture content sensed by the star wheels and the operators presets (to adjust see changing application rates, changing moisture set points and changing bale rate settings).

**MANUAL MODE** will apply product to the hay at a fixed rate regardless of the moisture content.

### TO RUN IN AUTOMATIC MODE:

From the main menu screen select **AUTOMATIC MODE** and press **ENTER**. In the automatic mode, the following screen should be displayed:

M	C	%	:	_	_	L	E	V	E	L	:	_	_					
T	O	N	/	H	R	:	_	_	L	B	S	/	T	O	N	:	_	_

**MC%** is the percent moisture content of the hay. Below 10%, the monitor will read LO. Above 32% MC, the monitor will read HI. This reading is an average of multiple readings and is taken every 3 seconds. **TONS/HR** is the baling rate based on the calculations done from the bale rate sensors and user inputted bale length and bale weight (to adjust see changing bale rate setting). **LEVEL** will display 0,1, 2, or 3. The unit will apply preservative at three pre-set application rates per ton of hay being baled and this level displays which level the unit is working at (to adjust rates see changing application rates and changing moisture set points).

**LBS/TON** is a reading from the electronic flow meter. It should match the preset application rates that correspond to the level the unit is working at. If it does not match, consult the trouble shooting section of this manual. **NO CHANGES TO APPLICATION RATE CAN BE MADE ON THIS SCREEN.**

### **TO RUN THE APPLICATOR IN MANUAL MODE:**

From the main menu screen use the **SEL/MODE** button to select the manual mode and press **ENTER**, and the following screen will appear.

M C						L B S / T O N
P 1	:	O F F		P 2	:	O F F P 3 O F F

**MC%** is the percent moisture content of the hay. Below 10%, the monitor will read **LO**. Above 32% MC, the monitor will read **HI**. This reading is an average of multiple readings and is taken every 3 seconds. The **LBS/TON** will be the actual flow rate divided by the current baling speed or default tons/hr. Use the **SEL/MODE** button to move from one pump to the next. Use the **↑** key to turn the selected pump on. Use the **↓** key to turn the selected pump off.

*Manual application rates are fixed at:*

**Pump 1            100lbs/Hr**

**Pump 2            150lbs/Hr**

**Pump 3            216lbs/Hr**

**You must use any combination of pumps to get close to the desired application rate.**

### **TO PAUSE THE UNIT:**

Push the **START/STOP** button, which will pause the system until the button is pressed again. The following screen will be displayed as follows when paused:

( U N I T S T O P P E D )
P U S H S T A R T T O R E S U M E

Push the **START/STOP** button to resume application. After the unit is paused, the tons/hour will come back at the default setting. The default is based off the time to make a bale and bale weight that the operator has entered in the tons/hr screen. If the crop sensor eye option pause is installed on the baler, the crop sensor eyes will automatically start and stop the unit in either automatic or manual mode. The start stop button can be used to stop the unit at any time but the unit will not start when the unit is stopped by the crop sensing eyes. If you wish to run the applicator with the crop sensors eye option not sensing any hay, then they will need to be disconnected back on the baler communication cable. However, **ENTER** can be pressed while in pause.

**\*NOTE: REMEMBER THAT ANY TIME YOU WORK ON A BALER THAT HAS CROP EYES. SHUT BOX OFF OR DISCONNECT THEM FROM THE MAIN WIRE HARNESS**

After resuming normal operation, the tons/hr will display the default reading for 15 seconds.

### **TO OVERRIDE THE SYSTEM AND APPLY FULL APPLICATION:**

Push the **OVERRIDE** button. Use this when an extremely wet spot of hay is about to enter the baler. All three pumps will be pumping at full rate and the following screen will be displayed.

P U S H O V E R R I D E A G A I N
F O R N O R M A L O P E R A T I O N

Push the **OVERRIDE** button to resume normal operation. After resuming normal operation, the tons/hr will display the default reading for 15 seconds.

## TO READ AND RESET THE AMOUNT OF PRESERVATIVE USED:

Push the **VOL USED** button and the following screen will appear.

F	I	E	L	D	-	↑	-	#	T	O	T	A	L	-	-	-	-	#
(	P	U	S	H	-	↑	-	T	O	R	E	S	E	T	-	L	B	)

If you want to reset the total amount used in the indicated FIELD to zero, push the ↑ key once. To reset all field TOTALS to zero, push the ↑ key twice. Push the **ENTER** button to return to the main screen. If the recorded amounts are not reset with the arrow key, they will be saved. *(Note: Always check the accuracy of the flow meter by comparing actual pounds used against the reading. If the amounts are not close, consult the trouble shooting section of this manual).* Also values will roll over to “0” when they reach their maximum number.

## ADJUSTING THE VOLUME OF THE CONTROL BOX ALARM:

The alarm opening is located on the bottom side of the control box (where all the wiring harnesses hook up to.) A small strap is located near the alarm opening and can be adjusted to vary the volume of the alarm.

## COMMON QUESTIONS ABOUT THE 464

### 1) How to turn the control box OFF?

The unit must be in the main menu screen to turn off, the main selection screen looks like the following:

A	U	T	O	M	A	N	U	A	L
M	O	D	E	M	O	D	E		

Press **Enter** to get to the main menu screen from any of the other operating screens.

### 2) How to get in the LBS/TON, MC%, VOL USED, and TONS/HR menus?

The unit must be in the opening main menu screen (shown directly above) to get into the LBS/TON, MC%, VOL USED, and TONS/HR menus. Press **Enter** from auto or manual mode to get into the main selection screen.

### 3) The unit is stuck in the MC% screen.

In the MC% screen, level 1 must be less than level 2, and level 2 must be less than level 3. For example, if level 1 is set at 16, level 2 must be set at 17 or higher, and level 3 must be set higher than level 2.

### 4) How does OVERRIDE work?

Override turns on all three pumps at full output.

### 5) The flow meter reading is more or less than the programmed level set in the box.

Some variation in flow meter readings compared to the programmed set-point is normal due to factory tolerances on the pump motors as well as varying tractor voltages inputted to the control box. The flow meter reading is an accurate measure of how much is actually being applied so adjust the set-points in the box to try and attain the desired flow meter reading.

### 6) Why don't all the pumps turn on even at higher application rates?

The selection of what pumps turn on when are automatically controlled by the control box's flow rate look up chart. Thus, not all the pumps turn on at once and the combination of what pumps turn on when is automatically controlled by the software. If you want to make sure all three pumps are working, run the unit in auto mode and hit override. This will turn all three pumps on at once at their maximum output.

### 7) The moisture content displays “LO” or “HI” all the time.

When the moisture content display does not change frequently while baling, there is likely a faulty star wheel connection. One of the first places to check is inside the white star wheel block. Check to see if the electronic swivel is in the star wheel shaft and check to see that the star wheel shaft is not working out of the block. Also, check all star wheel wires and connectors to see if there is a continuity problem.

## ROUTINE MAINTENANCE

- 1) **Clean the tip strainers and main strainer** every 10 hours of operation or more frequently if required.
- 2) Depending on the product being used, the system may need to be flushed with water at a regular interval (consult with manufacturer of the chemical.) If Harvest Tec product is being used, flushing is not necessary.
- 3) Although the pump can run dry, extended operation of a dry pump will increase wear. Watch the preservative level in the tank.
- 4) Cover the electronic cab control box on open station tractors if left outside.
- 5) Pump performance may start to decline after 400 hours (10,000 bales on large square balers) of use. Rebuilding the pump is a simple procedure if the motor is not damaged. Order pump rebuilding kit #007-4581 for the automatic unit.
- 6) Check and clean wire connections at beginning of each cutting.

## WINTER STORAGE

- 1) It is okay to leave Harvest Tec preservative in your system down to 50 below zero. If you are not using Harvest Tec preservative you must thoroughly flush the system with water.
- 2) Remove the filter bowl and run dry until the water has cleared out of the intake side.
- 3) Remove the red plug from the bottom of the pump, drain, and run the pump for 30 seconds or until it is dry.
- 4) Drain all lines.
- 5) Never use oils or alcohol based anti-freeze in the system.
- 6) For spring start-up, or anytime the pump is frozen, turn off the power immediately to avoid burning the motor out. The pump head can be disassembled and freed or rebuilt in most cases.
- 7) **\*\*\*\*When using other products other than Harvest Tec product, make sure to flush the system thoroughly!**



## TROUBLESHOOTING

<b><u>Symptom</u></b>	<b><u>Problem</u></b>	<b><u>Solution</u></b>
<b><u>Moisture reading errors</u></b> The use of a moisture standard (008-4651) may aid in troubleshooting any problems		
<b>Moisture readings seem low or high</b>	Wire disconnected or bad connection between star wheels and signal conditioner box	Reconnect, clean connection, or replace
	Low power supply to signal conditioner	Check voltage at the box-minimum of 11 volts required
	Wet hay over 32% moisture	Move to different spot in field
	Ground contact with either or both star wheels and signal conditioner box	Reconnect
	Break in star wheel harness	Replace star wheel harness
	Short in star wheel harness	Replace star wheel harness
	Check hay with hand tester verify.	
	Bad or loose swivel on end of star wheel	Repair by recrimping star wheel insert and reinsert swivel or replace swivel.
	Problems persisting	Call Harvest Tec service department
	Short in signal conditioner box	Send in for repair
	Short in main control box	Send in for repair
<b>Erratic moisture readings</b>	Erratic windrow conditions	Test bales with hand tester to verify that cab monitor has more variation than hand tester.
	Loose connection	Check all wiring connections
	Erratic power supply	Check, power supply in tractor, the tractor power should deliver a constant voltage between 12 and 14 volts. Alternators should be equipped with voltage surge protectors.
<b><u>Flow meter readings do not match up with product usage</u></b>		
<b>Product shown on VOL used is less than actual product used</b>	Voltage supply to meter is low	Unplug flow meter wire at signal conditioner and check for minimum 6 volts supplied to Pin 1 and 2
	Wiring short in signal from flow meter	Inspect wire especially at flow meter plug Run having assistance watch the screen display of "pound per ton" while moving all wires and connections to see if the value jumps when any section is moved.
	Clog in meter	<b><u>Do not use air to clean meter.</u></b> Back flush with water
	Non-compatible product being used	Check product being used
<b>Product shown on meter is more than actual product used</b>	High voltage supplied to meter	Unplug wire at meter and check for high voltage on power supply(maximum 18 volts)
	Light interference with meter	Reflection into the meter can cause high readings
	Air leak in intake	Look for air bubbles in line and fix leak
<b><u>Pump problems</u></b>		
<b>Pump doesn't work</b>	Wiring short or broken wire to pump	Trace with continuity tester (see wiring diagram for the position of the wire on the pump involved.)

## TROUBLESHOOTING

<u><b>Symptom</b></u>	<u><b>Problem</b></u>	<u><b>Solution</b></u>
		Test all three pumps individually in manual mode. To do this, first change tons/hr to manual setting, then press enter, and finally run unit in manual mode to find which is not working
	Bad pump motor.	Unplug pumps power leads and hook pump directly to 12 volts source to test pump if fails replace
	Bad control box component	Send box in for repair
<b>Pump runs full speed all the time</b>	Outside grounding to the pumps	Check for outside grounding at pump and through wiring harness.
		Check for outside grounding through wiring harness
	Control has a blown a component	Send in control for repair
<b>Pump will not prime</b>	Dirt in the filter	Check and clean filter
	Main intake line valve closed	Open intake line valve
	Check valve in pump wore out	Replace with pump rebuild kit
	Pump air locked	Remove red plug from pump head to purge pump and reinsert
	Air leak in intake line causes airlock	Check for air leak on intake side and tighten fittings
	Fault check valve in intake line will not open	Clean check valve or replace
<b>Warning supplied voltage is “High”</b>	This is just a message to let you know that incoming voltage to the monitor is higher than normal	
	Pump outputs may be higher	Check your batteries and your alternator
<b>Warning-Supplied voltage is “Low”</b>	This is just a message to let you know that incoming voltage to the monitor is lower than normal	
	Pump outputs may be lower	Check your batteries or alternator
<b>Application Rate higher or lower than programmed</b>		
<b>Lbs/ ton is higher than desired rate</b> It is typical to see some variation from desired rate	Voltage is higher than 14 volts	Readjust application rate, REMEMBER THE OPERATOR IS RESPONSIBLE FOR THE FINAL AMOUNT OF PRODUCT APPLIED
	Desired lbs/hour application rate is lower than system limits	Increase baling speed or tons per hour put through baler
	Tip is broken	Replace tip
	Line is broken or cracked	Fix line
<b>Lbs/ton is lower than desired or reads 0 lbs/ton</b>	Voltage is lower than 12.5 volts	Readjust application rate, REMEMBER THE OPERATOR IS RESPONSIBLE FOR THE FINAL AMOUNT OF PRODUCT APPLIED
	Desired lbs/hour application rate is higher than system limits	Call dealer for different size tips
		Decrease baling speed or tons per hour put through baler
	Inspect proximity switches on right star wheel	Each proximity switch has a LED light where the wire comes out of it. These LEDs should light up and turn off when the star wheel passes in front of it. (See step 7)

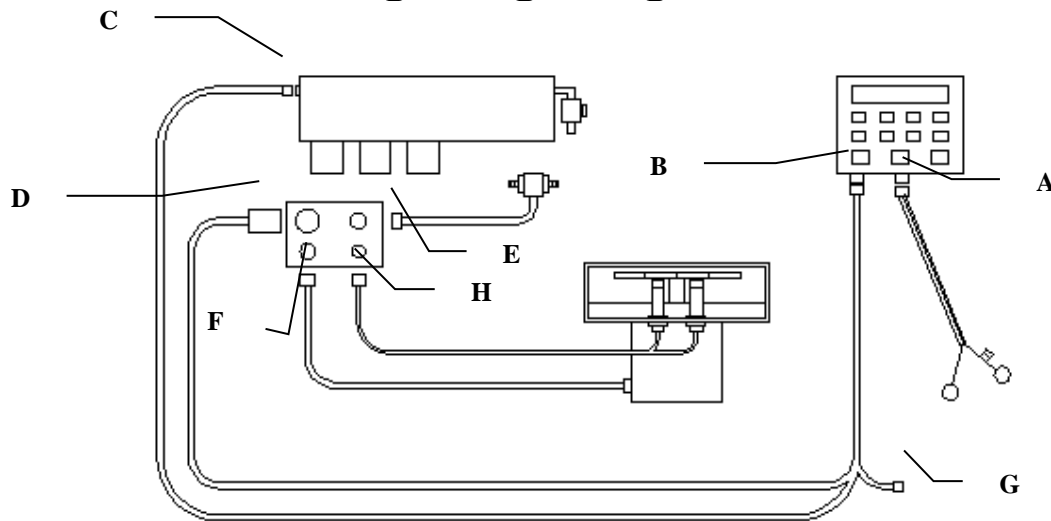
<b><u>Symptom</u></b>	<b><u>Problem</u></b>	<b><u>Solution</u></b>
	Pumps not working	See “trouble shooting pump does not work”
<b>Tons/hour Reading</b>		
<b>Tons/hour incorrect</b>	Proximity switches broke or out of adjustment	Each proximity switch has a LED light where the wire comes out of it. These LEDs should light up and turn off when the star wheel passes in front of it. (See step 7)
	Wrong bale length, weight, and/or time entered	See “To run in automatic bale rate mode and To run in manual bale rate mode”
<b>Tons/hour stays on default</b>	Bale rate is in manual	See “To run in automatic bale rate mode”
<b>Tons/hour stays on 10 tons/hour</b>	Operator is baling less than 10 tons/hour	Bale more than 10 ton/hour
	Proximity switch broke or out of adjustment	Each proximity switch has a LED light where the wire comes out of it. These LEDs should light up and turn off when the star wheel passes in front of it. (See step 7)
<b>Communication Failure</b>		
<b>System Error 2</b>	Main wire harness is disconnected from the cab control box and/or the signal conditioner box	Reconnect for main wire harness
	Poor power supply	Connect to battery and check for a minimum of 11.5 volts between pin 11 and 12 on main harness by the signal conditioner
	Corroded connection	Inspect, clean and put die electric grease on all connections
	Pin pushed back	Repair or replace pin
	Intermittent pin	Repair or replace pin
	Broken wire in main wire harness	Continuity test main harness checking pins 11, 12, 13, and 14
	Wires in main wire harness are shorting between each other	Test and replace
	Defective flow meter	Unplug all wire harnesses from signal conditioner except main harness and reconnect each one at a time
	Faulty control box or signal conditioner box	Send in for repair
<b>Other</b>		
<b>System leaks product out of tips after shut down</b>	Dirty or defective check valves on spray shield	Clean or replace valves
<b>Part of display is missing</b>	Defective display screen	Send in for repair
<b>Box will not power up</b>	No power supplied	Check to make sure a least 12 volts is supplied
	Blown external fuse	Check and replace inline 25 amp fuse
	Blown internal fuse	Carefully check and replace the internal 3 and 20 amp fuse
<b>Blown fuses</b>	Short in main wire harness or crop-eye harness	Inspect wire for pinched, cut, broken, or exposed wire

## SYSTEM ERROR CODE GUIDE

If a message comes up on the display, **SYSTEM ERROR:** (NUMBERS 1 THRU 255), push the ENTER key to reset. If the problem has been corrected, the system will function again. If the problem persists, the unit will display the error code again and will not let the operation continue or let the unit shut down (unless power is pulled.) The following guide will help locate and correct the problem.

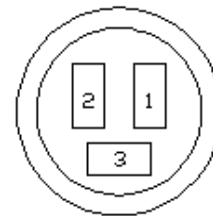
<b><u>System error</u></b>	<b><u>Cause</u></b>	<b><u>Solution</u></b>
1	Communication failure in either the in-cab box or the baler's signal conditioner box.	Send in both boxes for inspection and repair.
2-3	Communication problem between the in-cab box and the baler's signal conditioner box.	Check connections in large cable between cab and baler. Faulty signal conditioner. Low voltage supplied to the signal conditioner. <b><u>SEE TROUBLESHOOTING</u></b>
4-6	Communication failure in the in-cab box.	Send box in for repair.
127	Communication failure between the in-cab box and the baler's signal conditioner box.	Send in both boxes for inspection and repair.
129-134	In-cab box memory failure.	Send box in for repair.
152	In-cab box micro-processor failure.	Send box in for repair.
153	Bale rate calculation came in too high or too low.	Run the unit in the manual baling rate mode on the TONS/HR key until baling resumes at a rate between 10 and 100 tons per hour.
154	In-cab box voltage detection failure.	Send box in for repair.
255	Internal failure in either the the in-cab box or the baler's signal conditioner box.	Send in both boxes for inspection and repair.

# Wiring Plug Diagram



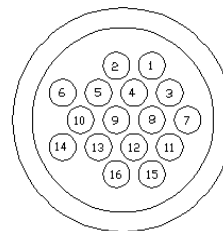
## A. Main power connector mounted on cab enclosure

Pin 1	Red	+12V input from tractor supply
Pin 2	Black	Ground from tractor supply
Pin 3	Not used	



## B. Connector mounted in the cab for data communication

Pin 1	Black with orange markings	Pump 1 Ground
Pin 2	Black with green markings	Pump 2 Ground
Pin 3	Black with yellow markings	Pump 3 Ground
Pin 4	White	End of row/crop sensor input
Pin 5	Orange with black markings	Pump 1 Positive (+)
Pin 6	Green with black markings	Pump 2 Positive (+)
Pin 7	Yellow with black markings	Pump 3 Positive (+)
Pin 8		Not used
Pin 9		Not used
Pin 10	Silver	Shield for 18 ga. wires
Pin 11	Red(Large)	+12 V supply (signal conditioner)
Pin 12	Black(Large)	Ground (signal conditioner)
Pin 13	Orange	Data (+) from cab enclosure
Pin 14	Blue	Data (-) from cab enclosure
Pin 15	Red (Small)	+12 V supply for crop sensors
Pin 16	Black (Small)	Ground for crop sensors



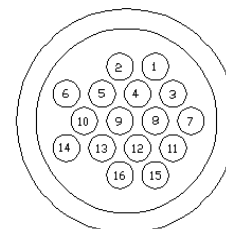
## C. Pump wire harness colors

Pin 1	Black with orange markings	Pump 1 Ground
Pin 2	Black with green markings	Pump 2 Ground
Pin 3	Black with yellow markings	Pump 3 Ground
Pin 4	Not used	
Pin 5	Orange with black markings	Pump 1 Positive
Pin 6	Green with black markings	Pump 2 Positive
Pin 7	Yellow with black markings	Pump 3 Positive



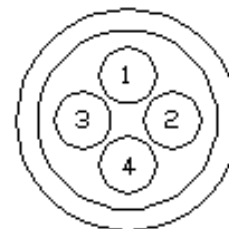
#### **D. Connector mounted on signal conditioner**

Pin 1	Not used
Pin 2	Not used
Pin 3	Not used
Pin 4	Not used
Pin 5	Not used
Pin 6	Not used
Pin 7	Not used
Pin 8	Not used
Pin 9	Not used
Pin 10	Silver Shield for 18 ga. wires
Pin 11	Red +12V supply (signal conditioner)
Pin 12	Black ground (signal conditioner)
Pin 13	Orange Data (+) from cab enclosure
Pin 14	Blue Data (-) from cab enclosure
Pin 15	Not used
Pin 16	Not used



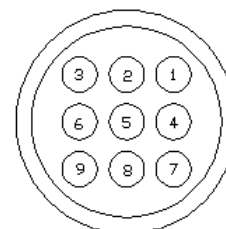
#### **E. Flow meter connection mounted on signal conditioner**

Pin 1	White	5 - 12 V (+) supply
Pin 2	Green	Ground
Pin 3	Brown	Signal
Pin 4	Black	Shield



#### **F. Star wheel connector mounted on signal conditioner**

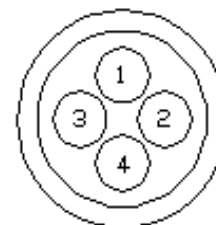
Pin 1	Brown	Star wheel input 1
Pin 2	Blue	Star wheel input 2
Pin 3	Brown	Diagnostic 1
Pin 4	Blue	Diagnostic 2
Pin 5	Silver	Shield
Pin 6	Silver	Shield
Pin 7		Not used
Pin 8		Not used
Pin 9		Not used



#### **G. Connector for crop sensor option (4 pin plug on 006-4640C3)**

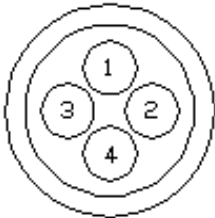
Note: Crop sensors are an add-on option for the 464 that will automatically turn the applicator on when entering a windrow and turn the applicator off when exiting the windrow. The connector for the crop sensors are located on the main baler communication cord near the tractor to baler junction.

Pin 1	Red	+12V
Pin 2	Black	Ground
Pin 3	White	Signal wire
Pin 4		Not used

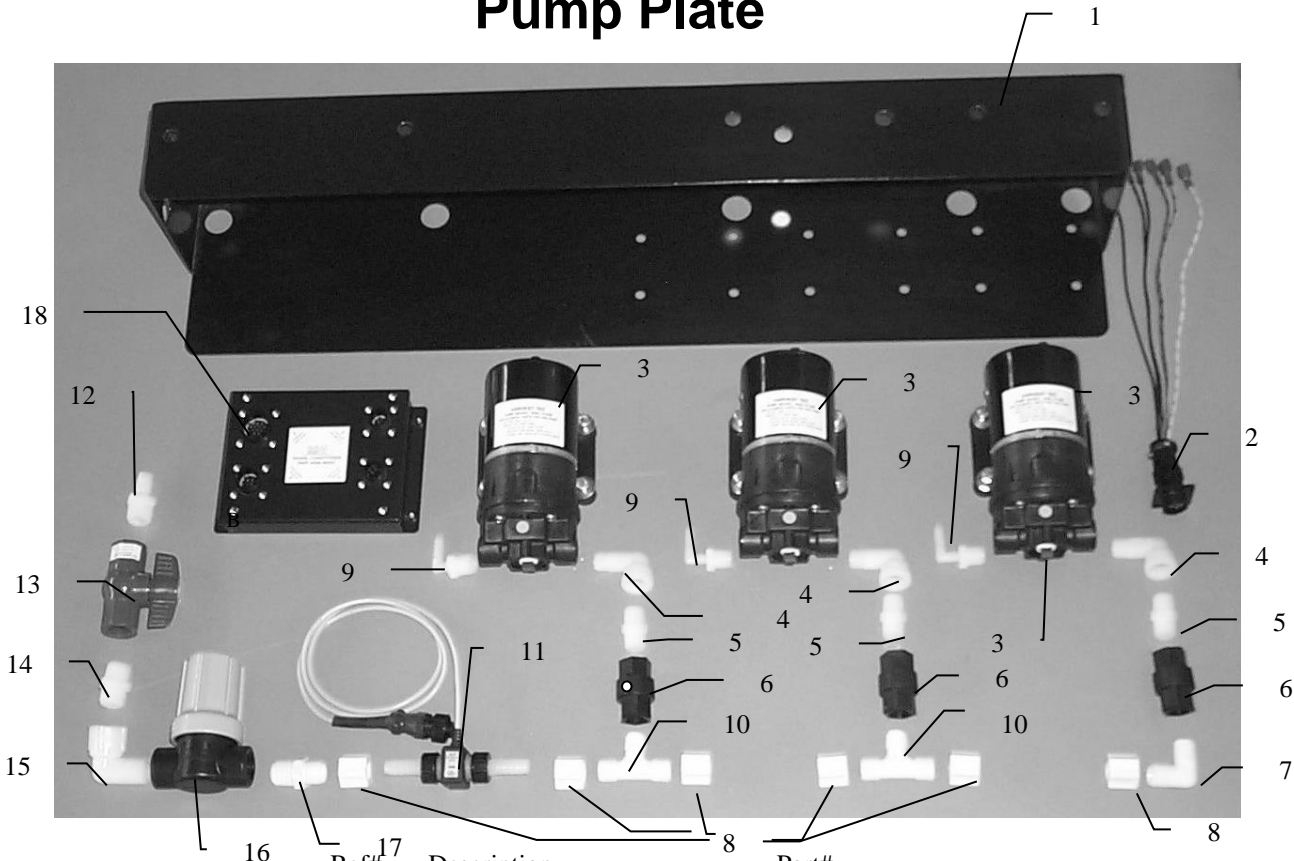


**H. Proximity sensors**

Pin1	Brown	Sensor power
Pin2	Black	Signal for front prox. sensor
Pin3	Blue	Sensor ground
Pin4	Black	Signal for back prox. sensor

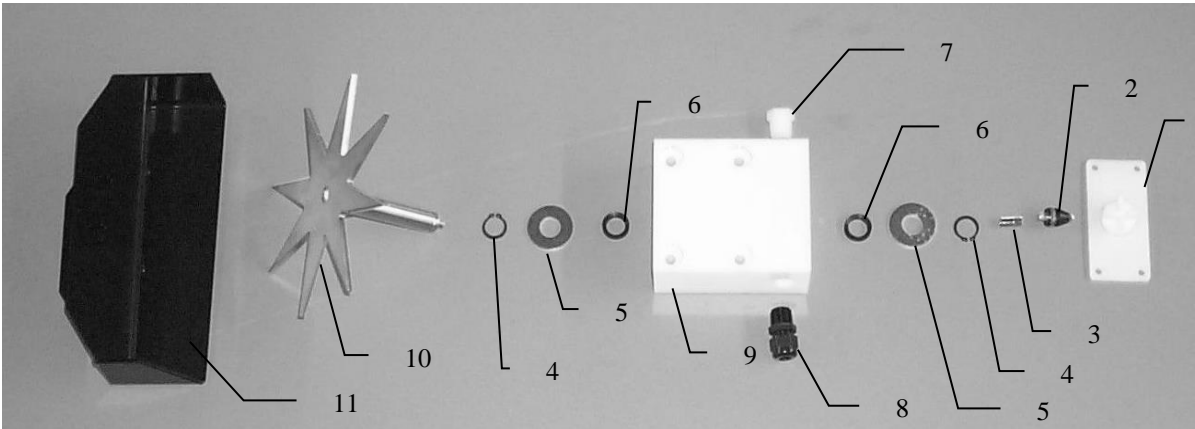


**Parts Breakdown for  
Pump Plate**



Ref#	Description	Part#
1.	Pump plate	001-4642
2.	Plug lead	006-4640F
3.	Pump	007-4120S
4.	Street elbow fitting	003-SE38
5.	Nipple fitting	003-M3838
6.	Check valve	002-4566F
7.	Jaco elbow fitting	003-JEL1238
8.	Jaco nut fitting	003-JN12
9.	Elbow fitting	003-EL3814
10.	Jaco tee fitting	003-JT3838T
11.	Flow meter assembly	006-4725A
12.	Straight fitting	003-A1212
13.	Ball valve	002-2212
14.	Nipple fitting	003-M1212
15.	Street elbow fitting	003-SE12
16.	Filter bowl (100 mesh filter)	002-4315
17.	Straight jaco fitting	003-JA1212
18.	Signal conditioner	006-4650C

# 



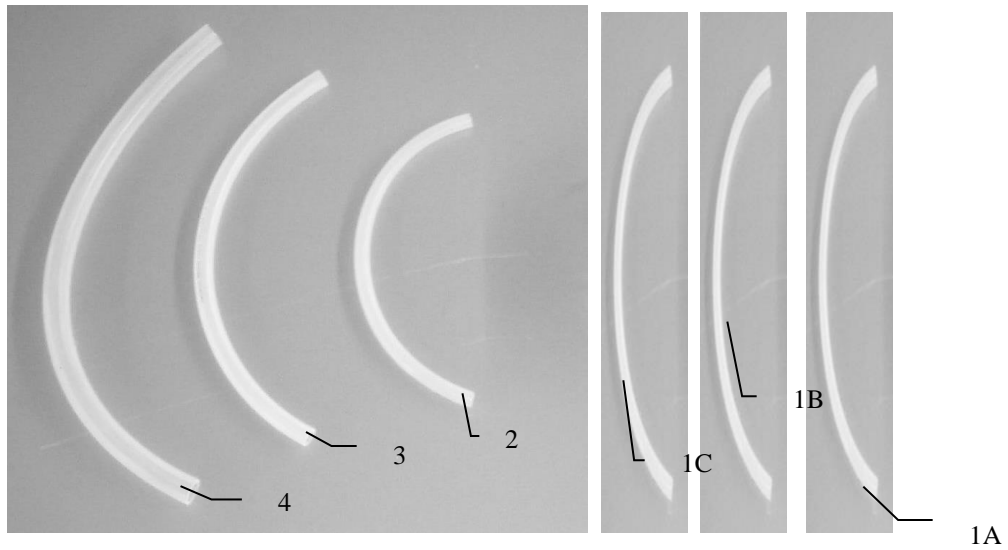
<u>Ref</u>	<u>Description</u>	<u>Part#</u>
1.	Block cover	006-4641B
2.	Electronic swivel	006-4642A
3.	Swivel insert	006-4642B
4.	Snap ring	
5.	Washer	
6.	Dust seal	
7.	Plug fitting	003-F38
8.	Wiring grommet	008-0821A
9.	Star wheel block	006-4641A
10.	Star wheel sensor	006-4641C
11.	Twine guard-left	001-4645
	Twine guard-right(prox)	001-4644
	Star wheel assembly	030-4641

\*\*\*\*\*Note: Star wheel assembly includes Ref#'s 1-10.

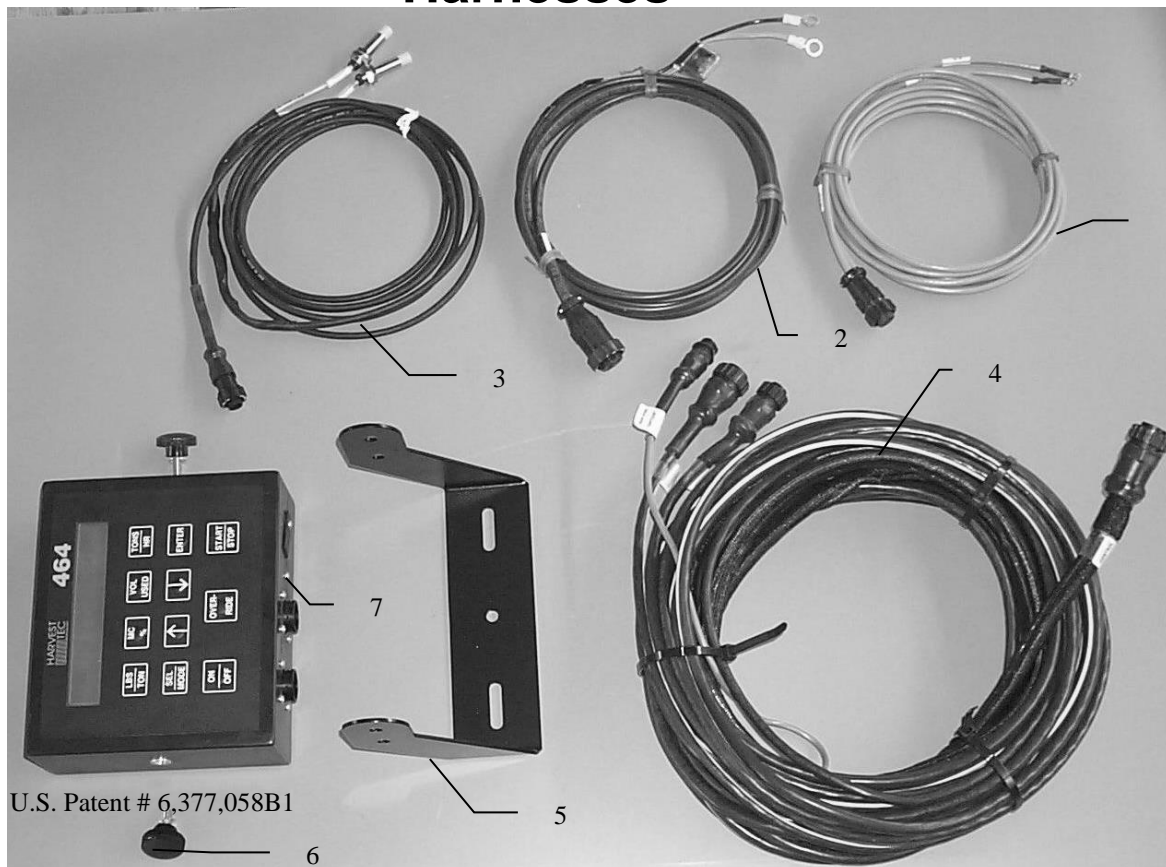
<u>Ref</u>	<u>Description</u>	<u>Part#</u>
1A.	¼" Hose-clear	002-9006
1B.	¼" Hose-light blue	002-9006
1C.	¼" Hose-green	002-9006
2.	3/8" Hose (filter to pumps)	002-9003
3.	½" Hose (tank to filter)	002-9001
4.	¾" Hose (tank to drain/fill valve)	002-9002

**Note:** When ordering hose make sure indicate which color of hose you want.





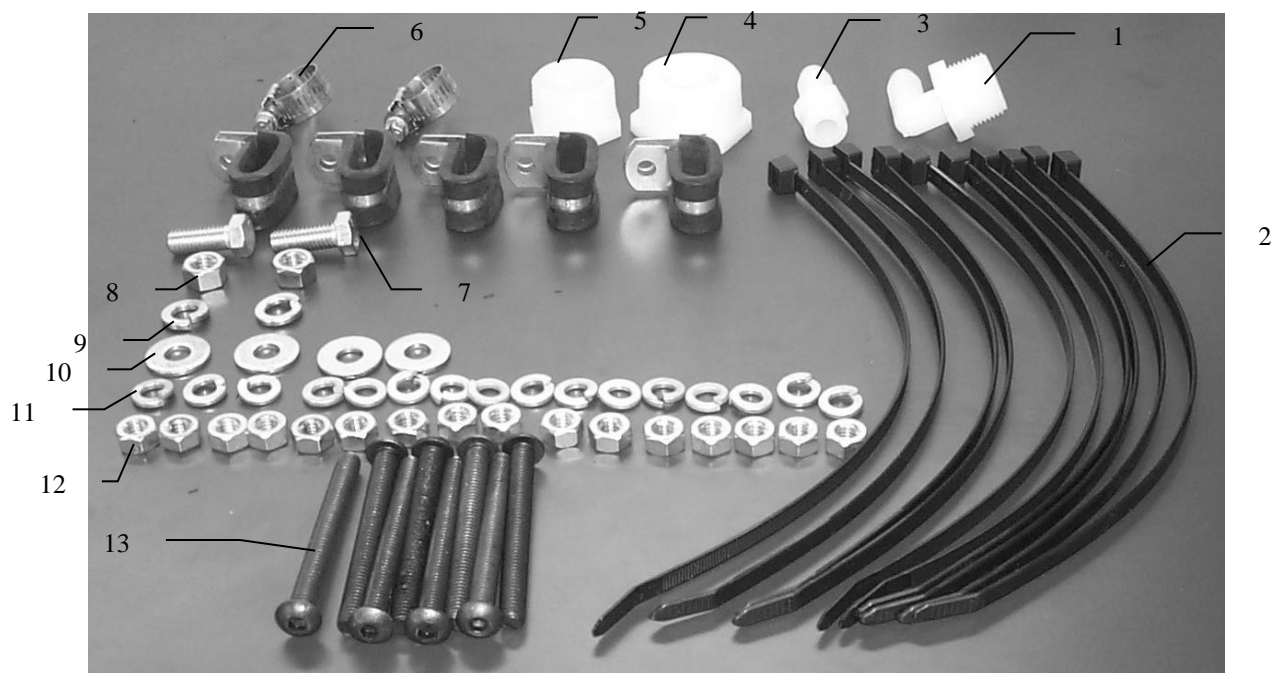
## Parts Breakdown for Control Box and Wiring Harnesses



<u>Ref.</u>	<u>Description</u>	<u>Part#</u>
1.	Star wheel harness	006-4640D

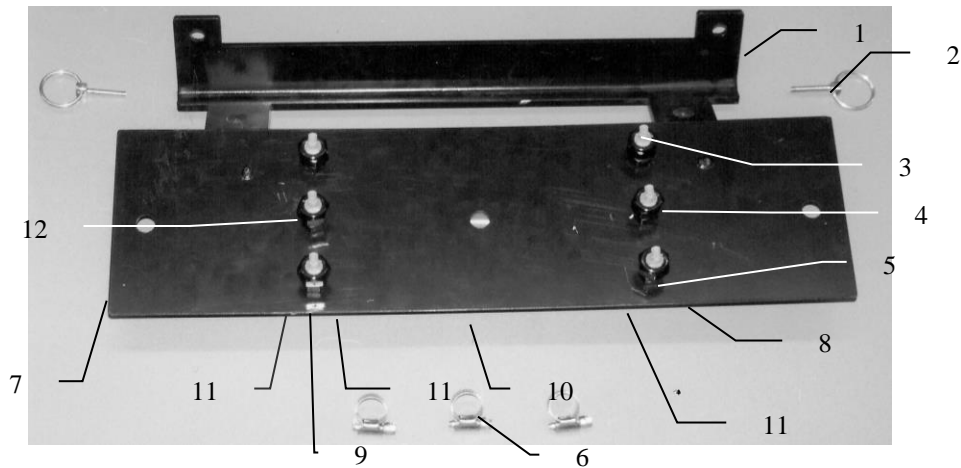
2.	Power supply harness	006-4640A
3.	Proximity sensor and harness	006-7202
4.	Main control harness	006-4640C3
5.	Control box bracket	001-2012G
6.	Control box knobs	008-0923
7.	464 control box	006-4650A

# PARTS BREAKDOWN FOR PARTS BAG



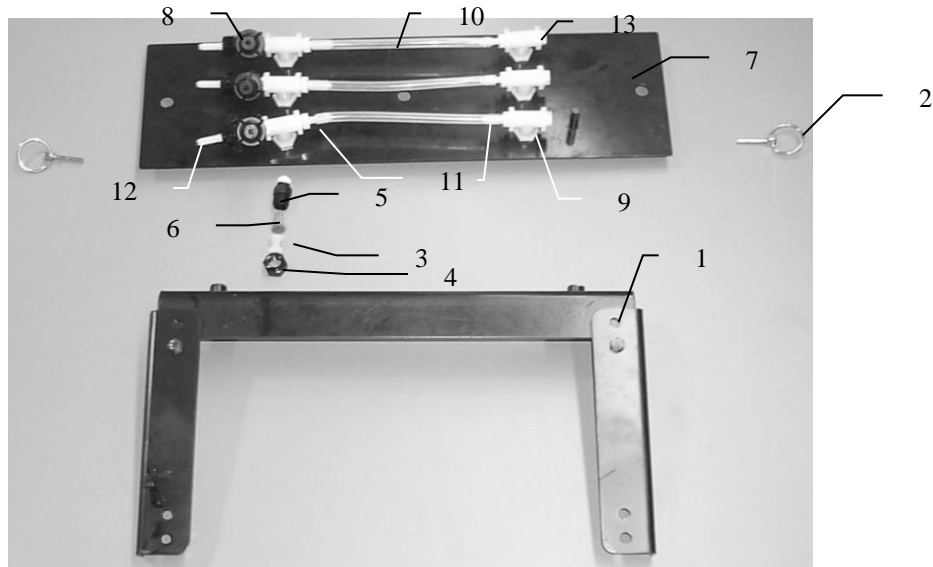
<u>Ref</u>	<u>Description</u>	<u>Part#</u>
1	Elbow	003-EL3412
2	Cable ties	
3	Straight fitting	003-A3812
4	Reducing bushing	003-RB11434
5	Reducing bushing	003-RB10034
6	Hose clamp	003-9003
7	Bolts-3/8"X1"	
8	Nuts-3/8"	
9	Lock washer-3/8"	
10	Flat washer-5/16"	
11	Lock washer-5/16"	
12	Nuts-5/16"	
13	Allen head bolts-5/16"X3"	

# 4438A INSTALLATION KIT



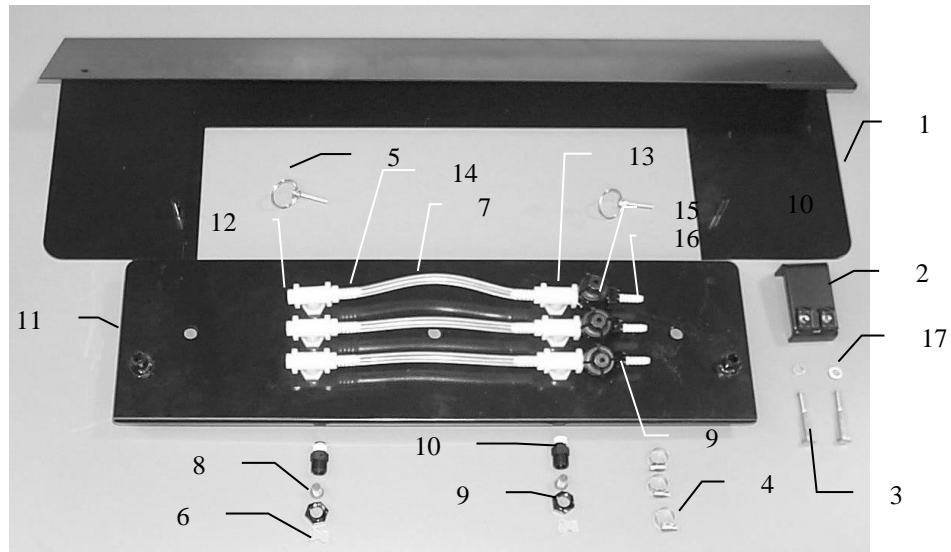
Ref	Description	Part#	Ref	Description	Part#
1.	Mounting bracket	001-4438B	8NP.	Check valve	004-1207VB
2.	Lynch pin	008-4576		With/Nut	004-4723
3.	Tips	004-TT11002VP		With/Straight fitting	004-1414VB
	Tips	004-TT11001VP	9NP.	Tee	003-TT14
	Tips	004-TT110015VP	10NP.	Hose	002-9006
4.	Nozzle cap	004-4723	11NP.	Straight fitting	003-A1414
5.	Nozzle body	004-4722	12NP.	Strainer-100 mesh	003-1203-100
6.	Hose clamp	003-9002	NP.	Not pictured	
7.	Spray shield	001-4438A			

## 4439A Installation Kit



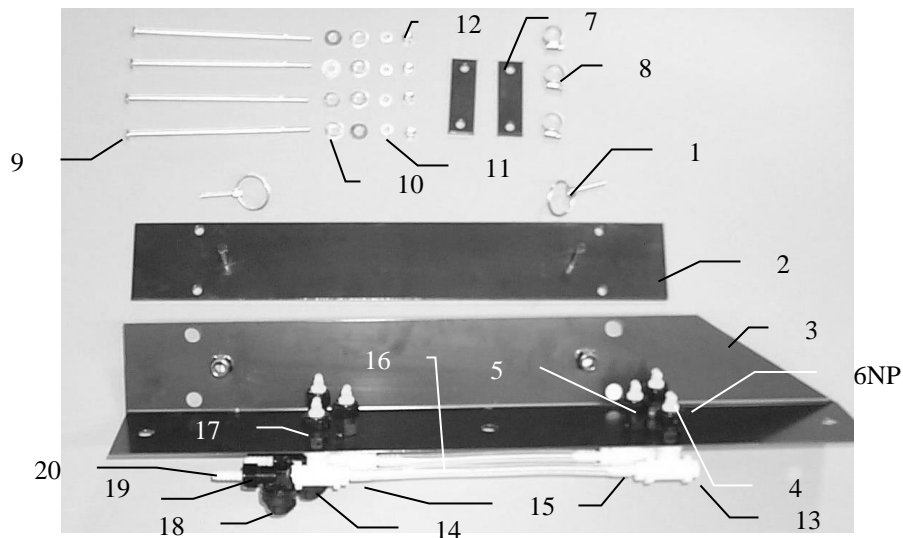
Ref	Description	Part#	Ref	Description	Part#
1.	Mounting bracket	001-4439B	8.	Check valve	004-1207VB
2.	Lynch pin	008-4576	9.	Tee	003-TT14
3.	Tip	004-TT11002VP	10.	Hose	002-9006
	Tip	004-TT11001VP	11NP.	Straight fitting	003-A1414
	Tip	004-TT110015VP	12.	Straight fitting	004-1414VB
4.	Nozzle cap	004-4723	13.	Plug	004-F14
5.	Nozzle body	004-4722	NP.	Not pictured	
6.	Strainer-100 mesh	003-1203-100			
7.	Spray shield	001-4439A			

## 4490A INSTALLATION KIT



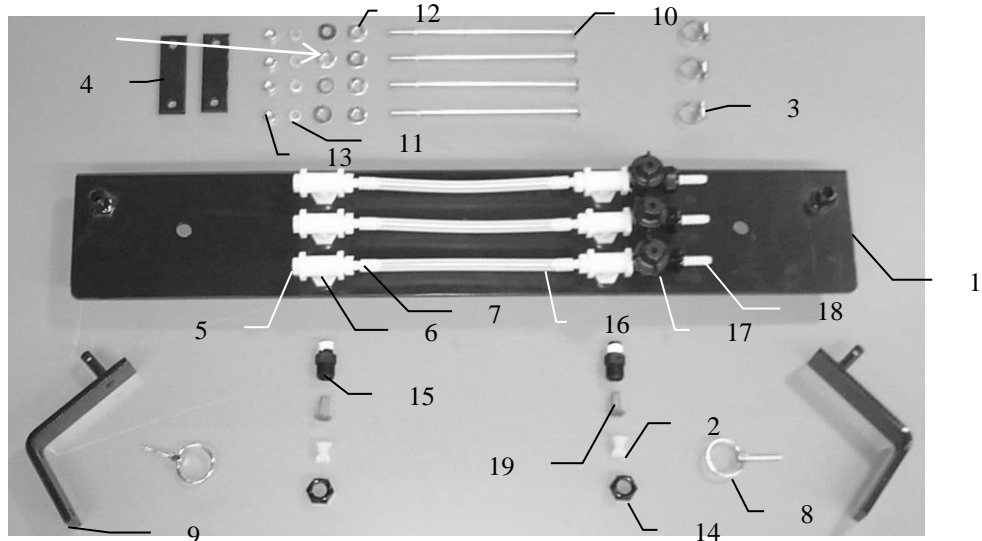
Ref	Description	Part#	Ref	Description	Part#
1.	Shield holder	001-4421B	10.	Nozzle body	004-4722
2.	Shield clip	001-4421A	11.	Spray shield	001-4421
3.	Bolts-5/16"x2 1/4"		12.	Plug	003-F14
4.	#4 Hose clamp	003-9003	13.	Tee	003-TT14
5.	Lynch pins	008-4576	14.	Straight fitting	003-A1414
6.	Tips	004-TT11002VP	15.	Check valve	004-1207VB
	Tips	004-TT11001VP	16.	Straight fitting	004-A1414VB
	Tips	004-TT110015VP	17.	Lock washers-5/16"	
7.	Eva hose-1/4"	002-9006	18NP.	Spacer plate	004-6702S
8.	Strainer-100 mesh	004-1203-100			
9.	Nozzle cap	004-4723			

## 4491A INSTALLATION KIT



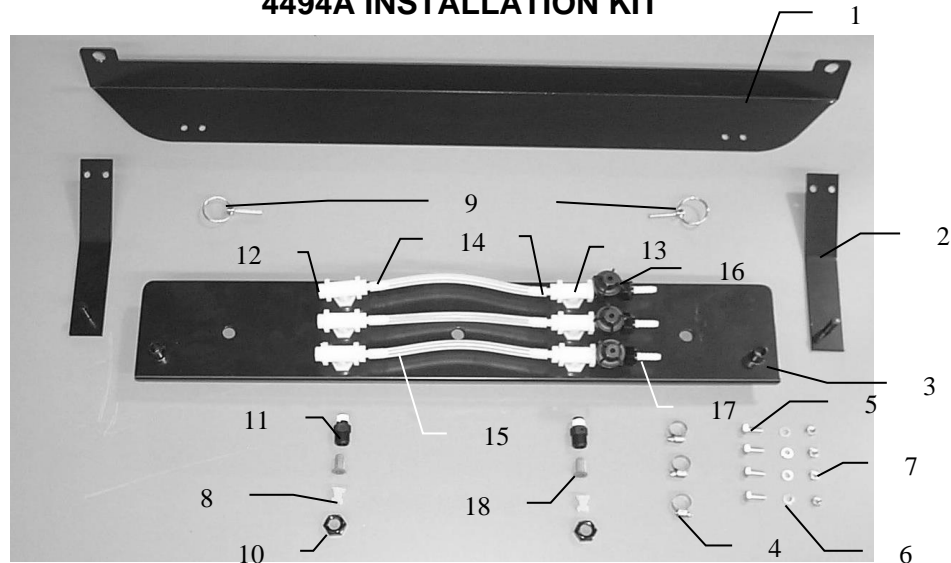
Ref	Description	Part #	Ref	Description	Part #
1.	Lynch pin	008-4576	11.	1/4" lock washers	
2.	Shield holder	001-4422B	12.	1/4" nuts	
3.	Spray shield	001-4422	13.	Plug	003-F14
4.	Tip	004-TT11002VP	14.	Tee	003-TT14
	Tip	004-TT11001VP	15.	Straight fitting	003-A1414
	Tip	004-TT110015VP	16.	Eva hose- 1/4"	002-9006
5.	Nozzle cap	004-4723	17.	Nozzle body	004-4722
6NP.	Strainer-100mesh	004-1203-100	18.	Check valve	004-1207VB
7.	Backing plates	001-4422A	19.	Nut	004-4723
8.	#4 Hose clamps	003-9002	20.	Straight fitting	003-A1414VB
9.	Bolts-1/4"x7"		NP.	Not pictured	
10.	Washers- 1/4"				

## 4492A INSTALLATION KIT



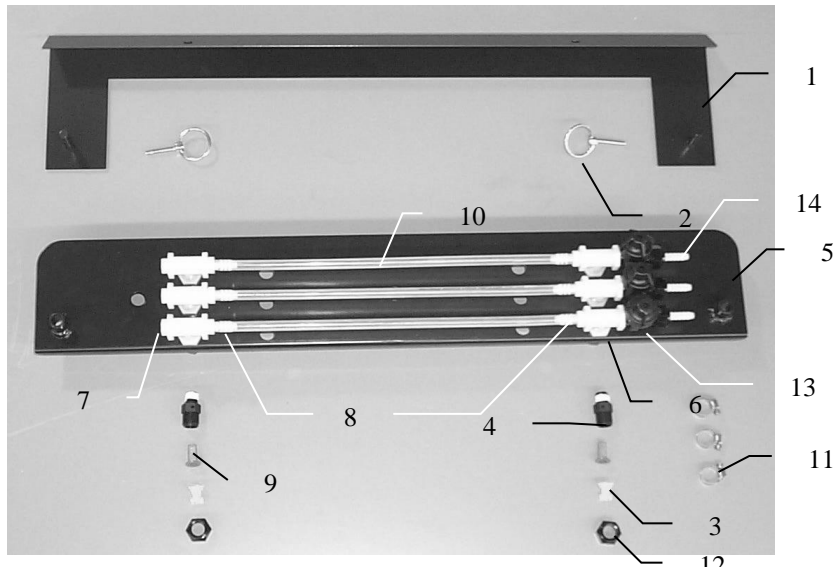
Ref	Description	Part #	Ref	Description	Part#
1.	Spray shield	001-4432A	11.	Lock washers-1/4"	
2.	Tip	004-TT11002VP	12.	Washers-1/4"	
	Tip	004-TT11001VP	13.	Nuts-1/4"	
	Tip	004-TT110015VP	14.	Nozzle cap	004-4723
3.	#4 Hose clamp	003-9002	15.	Nozzle body	004-4722
4.	Backing plates	001-4432C	16.	Eva hose-1/4"	002-9006
5.	Plug	003-F14	17.	Check valve	004-1207VB
6.	Tee	003-TT14	18.	Straight Fitting	003-A1414VB
7NP.	Straight fitting	003-A1414	19.	Strainers-100mesh	004-1203-100
8.	Lynch pin	008-4576	NP.	Not pictured	
9.	Shield holders	001-4432B			
10.	Bolts-1/4"x7"				

## 4494A INSTALLATION KIT



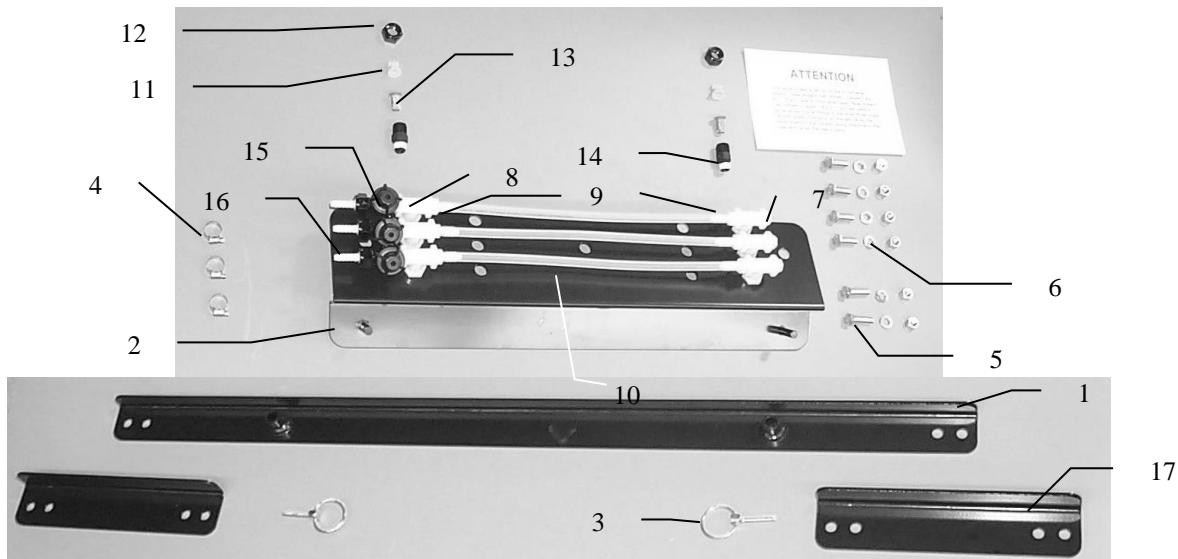
Ref	Description	Part #	Ref	Description	Part #
1.	Mounting plate	001-4436A	11.	Nozzle body	004-4722
2.	Mounting brackets	001-4436B	12.	Plug	003-F14
3.	Spray shield	001-4432A	13.	Tee	003-TT14
4.	Hose clamp	003-9002	14.	Straight fitting	003-A1414
5.	Bolt-1/4"x3/4"		15.	Hose-1/4"	002-9006
6.	Lock washer-1/4"		16.	Check valve	004-1207VB
7.	Nut-1/4"		17.	Straight fitting	003-A1414VB
8.	Tip	004-TT11002VP	18.	Strainer-100 mesh	004-1203-100
	Tip	004-TT11001VP	19NP.	Spacer plate	001-6702S
	Tip	004-TT110015VP	NP.	Not pictured	
9.	Lynch pins	008-4576			

## 4495A INSTALLATION KIT



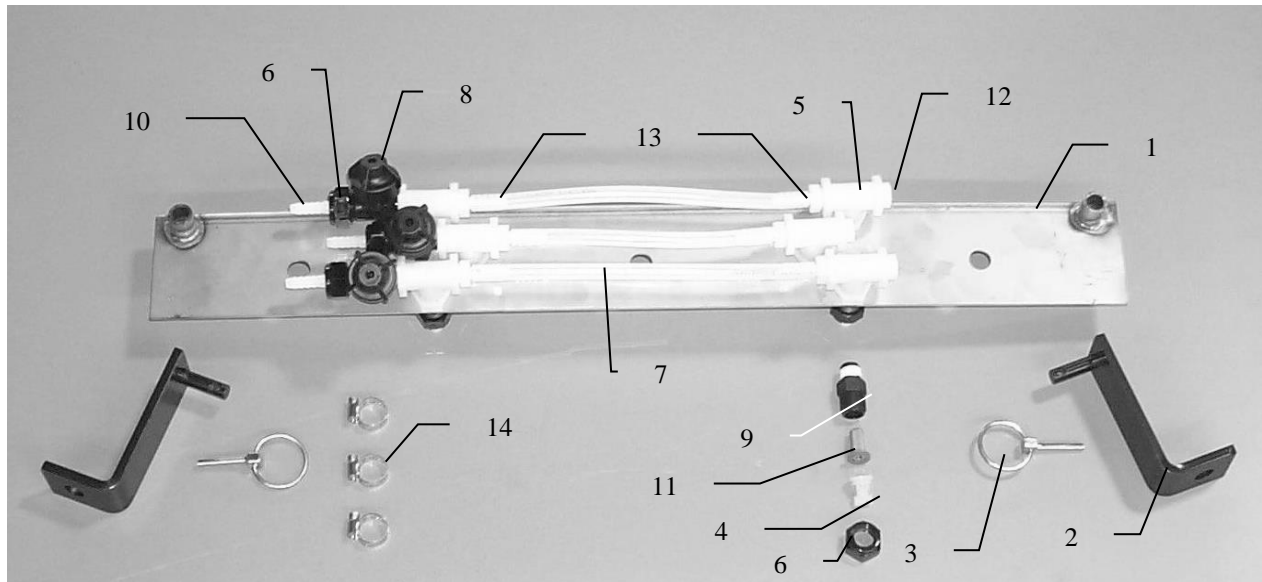
Ref	Description	Part#	Ref	Description	Part#
1.	Shield holder	001-4431B	8.	Straight fitting	003-A1414
2.	Lynch pin	008-4576	9.	Strainer-100 mesh	004-1203-100
3.	Tip	004-TT11002VP	10.	Eva tubing	002-9006
	Tip	004-TT11001VP	11.	#4Hose clamp	002-9002
	Tip	004-TT110015VP	12.	Nozzle cap	004-4723
4.	Nozzle body	004-4722	13.	Check valve	004-1207VB
5.	Spray shield	001-4431	14.	Straight fitting	003-A1414VB
6.	Tee	003-TT14			
7.	Plug	003-F14			

### 4497A INSTALLATION KIT



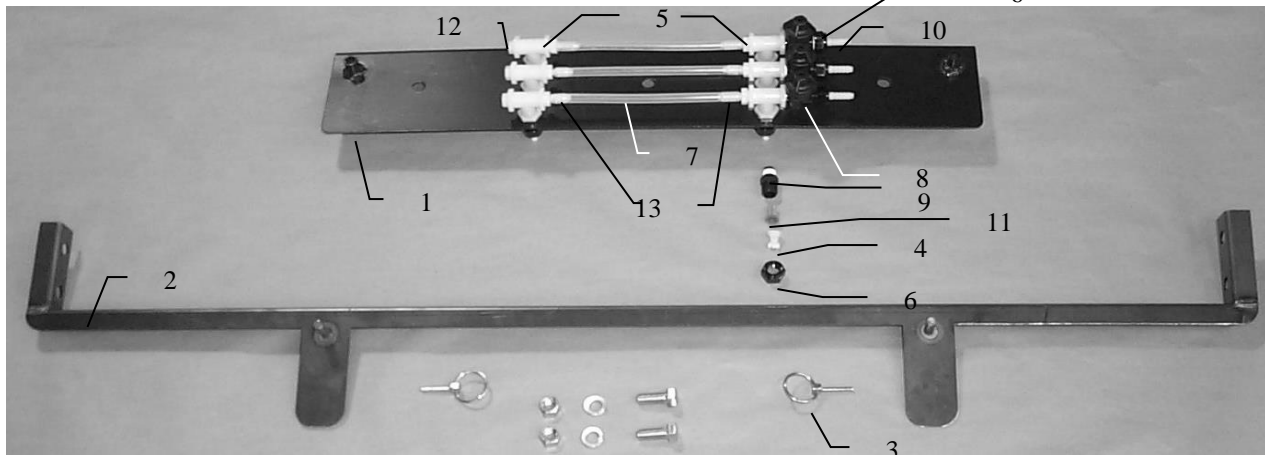
Ref	Description	Part#	Ref	Description	Part#
1.	Mounting bracket	001-4435A	10.	Hose 1/4"	003-9006
2.	Spray shield	001-4435B	11.	Tip	004-TT11002VP
3.	Lynch pins	008-4576		Tip	004-TT11001VP
4.	Hose clamps #4	003-9003		Tip	004-TT110015VP
5.	Bolts-3/8" x 11/4"		12.	Nozzle cap	004-4723
6.	Lock washer-3/8"		13.	Screen checks	004-1203-100
7.	Plug	003-F14	14.	Nozzle body	004-4722
8.	Tee	003-TT14	15.	Check valve	004-1207VB
9.	Straight fitting	003-A1414	16.	Straight fitting	004-A1414VB
			17.	Extension piece	001-4435C

## 4498A INSTALLATION KIT



<u>Ref</u>	<u>Description</u>	<u>Part#</u>	<u>Ref</u>	<u>Description</u>	<u>Part#</u>
1	Spray shield	001-4810	8	Check valve	004-1207VB
2	Shield holder	001-4810A	9	Nozzle body	004-4722
3	Lynch pin	008-4576	10	W/Straight fitting	004-1414VB
4	Tip	004-TT11002VP	11	Tip screen	004-1203-100
	Tip	004-TT11001VP	12	Plug	003-F14
	Tip	004-TT110015VP	13	Straight fitting	003-A1414
5	Tee fitting	003-TT14	14	Hose clamp-#4	003-9002
6	Nozzle cap	004-4723			
7	Eva hose-1/4"	002-9006			

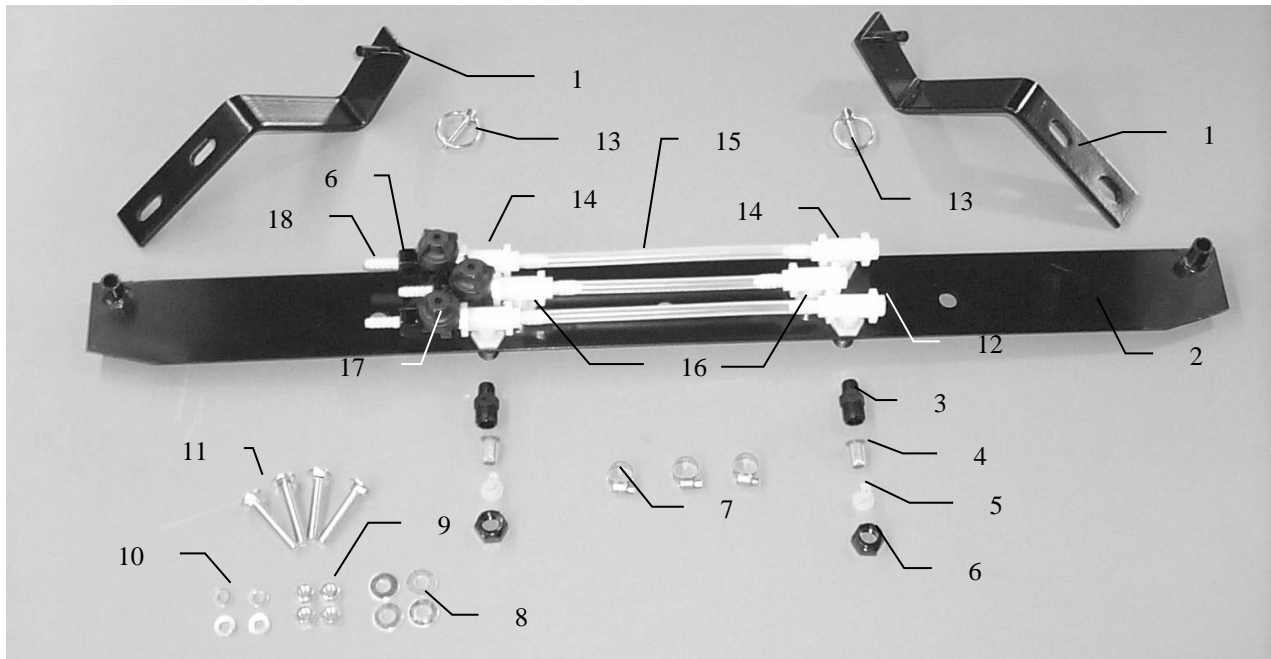
## 4499A INSTALLATION KIT



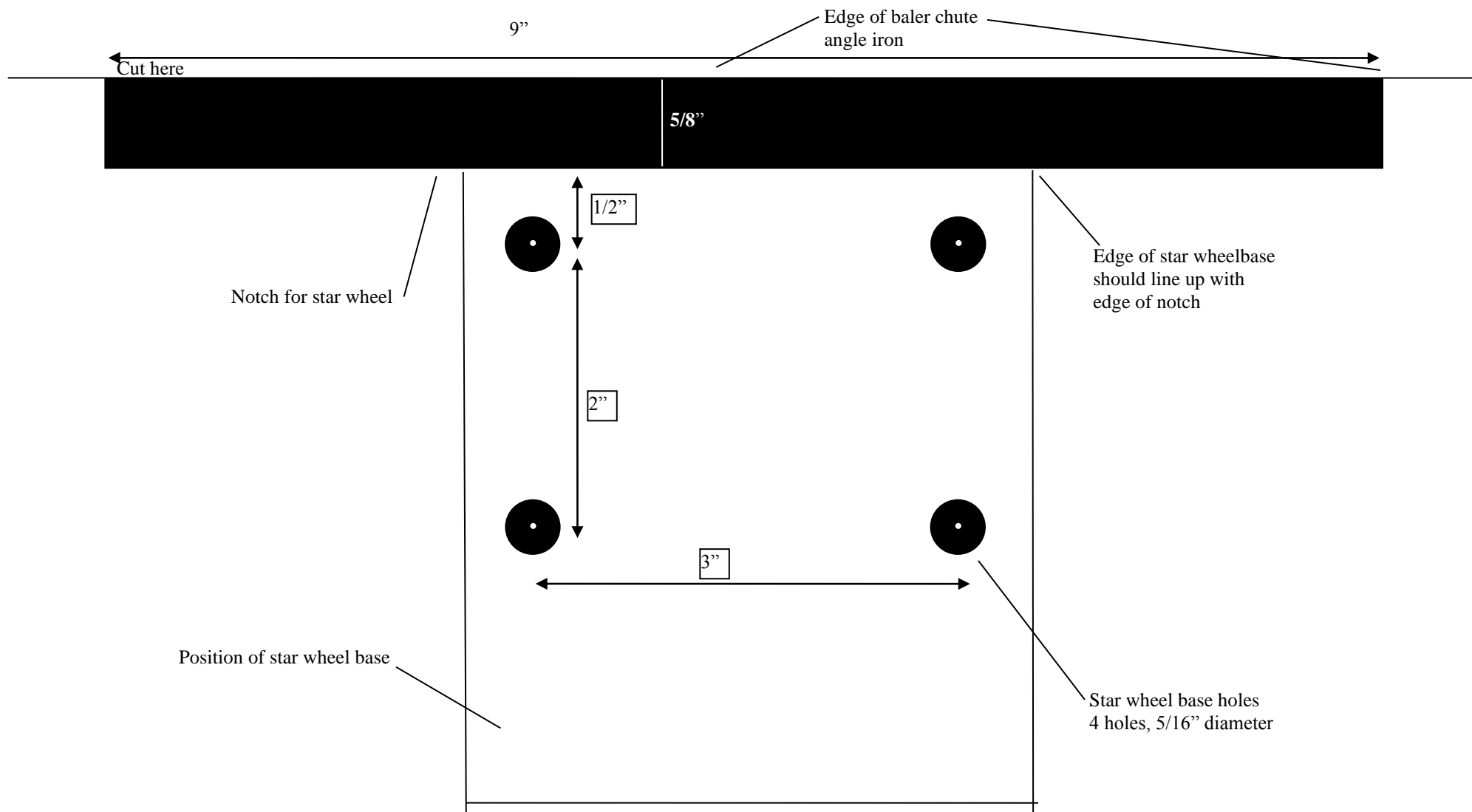
<u>Ref</u>	<u>Description</u>	<u>Part#</u>	<u>Ref</u>	<u>Description</u>	<u>Part#</u>
1	Spray shield	001-4499A	6	Nozzle cap	004-4723
2	Shield holder	001-4499B	7	Eva hose-1/4"	002-9006
3	Lynch pin	008-4576	8	Check valve	004-1207VB
4	Tip	004-TT11002VP	9	Nozzle body	004-4722
	Tip	004-TT11001VP	10	W/Straight fitting	004-1414VB
	Tip	004-TT110015VP	11	Tip screen	004-1203-100
5	Tee fitting	003-TT14	12	Plug	003-F14
			13	Straight fitting	003-A1414



## 4500A INSTALLATION KIT



<b>Ref</b>	<b>Description</b>	<b>Part#</b>
1.	Spray shield holder	001-4811B
2.	Spray shield	001-4811A
3.	Nozzle body	004-4722
4.	Tip screen	004-1203-100
5.	Tip	004-TT11001VP
	Tip	004-TT11002VP
	Tip	004-TT110015VP
6.	Nozzle and hose barb cap	004-4723
7.	Mini hose clamp	003-9002
8.	Washer-3/8"	
9.	Nut-3/8"	
10.	Lock washer-3/8"	
11.	Bolts-3/8"x11/4"	
12.	Plug	003-F14
13.	Lynch pin	008-4576
14.	Tee	003-TT14
15.	Hose-1/4"	002-9006
16.	Hose barb fitting	003-A1414
17.	Check valve assembly	004-1207VB
18.	Hose barb fitting	004-A1414VB
19NP.	Spacer plate	001-6702S
NP	Not pictured	



## **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 purchase. 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 purchase 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. Parts must be returned through the selling dealer and distributor, transportation charges prepaid. It will be the purchaser's responsibility to provide proof of such purchase.

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.