FurrowJet™

FurrowJet Owner's Manual

Precision Planting®

955697_4 01/13/2020

Contents

FurrowJet Compatibility

FurrowJet Mechanical Compatibility

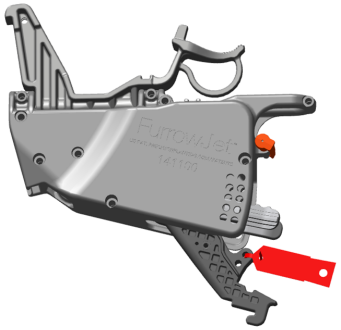
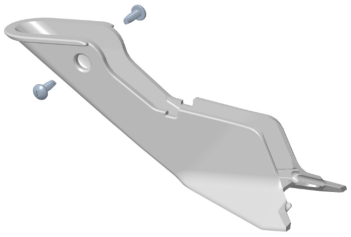
Compatible Row Units	Compatible Seed Tubes
John Deere ME through ME5 including ExactEmerge	Dickey John, WaveVision, SpeedTube, ExactEmerge
Kinze 2000, 3000, and 4900	Dickey John, WaveVision, SpeedTube, EdgeVac Seed Tube
Case IH 2100	Dickey John, SpeedTube
White 9000 and Precision Ready Row Unit	Dickey John, WaveVision, SpeedTube
Harvest International Laser Pro	Dicky John, WaveVision, SpeedTube

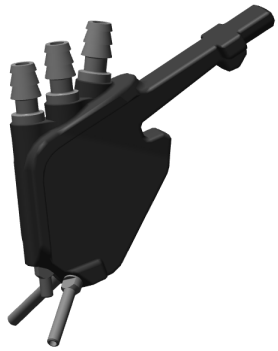
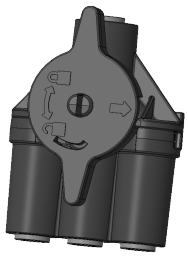
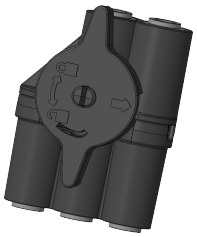
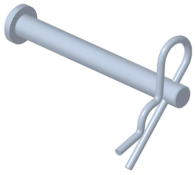
- Most banding style (high drop) dry insecticide tubes are compatible, but may require slight modification of the release position. Rear mount dry insecticide “low-drop” tubes that occupy the same space as FurrowJet are not compatible.
- Liquid application systems that occupy the same space as FurrowJet are not compatible.
- Oversized closing wheels can hit the wing or manifold tips and damage them.

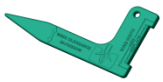
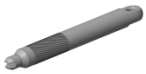
Field Condition Compatibility Concerns

- Sticky soil (ie. where firmers build up) will build up on FurrowJet wings
- Fields with a high density of rocks will significantly reduce wing wear life
- Open spoke gauge wheels are not recommended in high-residue conditions. They allow residue entrance, trapped by FurrowJet support bracket, jamming gauge wheels
- Planting less than one inch deep can place the wing too close to the surface

FurrowJet Parts, Descriptions, and Pictures

Part Number	Part Description	Part Visual
141100	FurrowJet Body Assembly	
141130	John Deere ME2, ME Plus, ME XP, ME5	
141150	John Deere ExactEmerge QA and Support Bracket Combination	
141131	Kinze 3000	
141137	White 9000/ Precision Ready Row Unit	
141133	Kinze 4900	
141134	Harvest International Laser Pro	
141135	John Deere MaxEmerge/ Kinze 2000	
141214	Case IH 2100	
141038	Wing Kit	
141039	Keeton Mini-Tail Seed Firmer	

141065	3 Port Manifold Assembly	
724455	Splitter with one (1/4”) inlet and three (1/4”) outlets	
724456	Splitter with one (3/8”) inlet and three (1/4”) outlets	
724457	Splitter with two (1/4”) inlets and three (1/4”) outlets	
141091	Wing Lock Up Pin	
141093	Wing Lock Up Tool	
141099	Retention Pins (10 pack)	

141034	Wing Adjustment Guage (FurrowJet Essential Kit)	
141072	Wing/nozzle cleaning brush (FurrowJet Essentials Kit)	
141071	Nozzle Removal Tool (FurrowJet Essentials Kit)	
141073	Liquid Measurement Pitcher (FurrowJet Essentials Kit)	
724220	Push-To-Connect (PTC) Removal Tool (FurrowJet Essentials Kit)	
141074	Torx Driver (FurrowJet Essentials Kit)	
141076	Wing Nozzle Cleaning Can	
724028	100’ Black 1/4” Liquid Tubing	Image Not Available
724090	100” Yellow 1/4” Liquid Tubing	Image Not Available
724291	Low Flow 80 Mesh Filter/ Strainer Kit	
724289	High Flow 80 Mesh Filter/ Strainer Kit	
724067	1/4” PTC Pressure Gauge for Diagnostics	Image Not Available

Note: The above part visuals are not to scale or guaranteed to contain every item within a part number. The part visuals are intended to help you identify what parts you have and not meant to be an all inclusive list for ordering.

FurrowJet Installation

Part Number	Description	QTY Per Row
141100	FurrowJet Body Assembly	1
141130, 141131, 141137, 141133, 141134, 141135, 141150, 141214	Support Bracket	1
724455, 724456, 724457	Splitter Assembly	1
141065	FurrowJet Manifold	1
141038	Wing Kit	1
141039	FurrowJet Mini-Tail	1

Note: All specific row unit instructions assumes the Keeton Quick Attach bracket is previously installed.

Note: When the support bracket install is complete for your specific row unit, move to **FurrowJet Housing Assembly and Mounting** to proceed with the installation of FurrowJet.

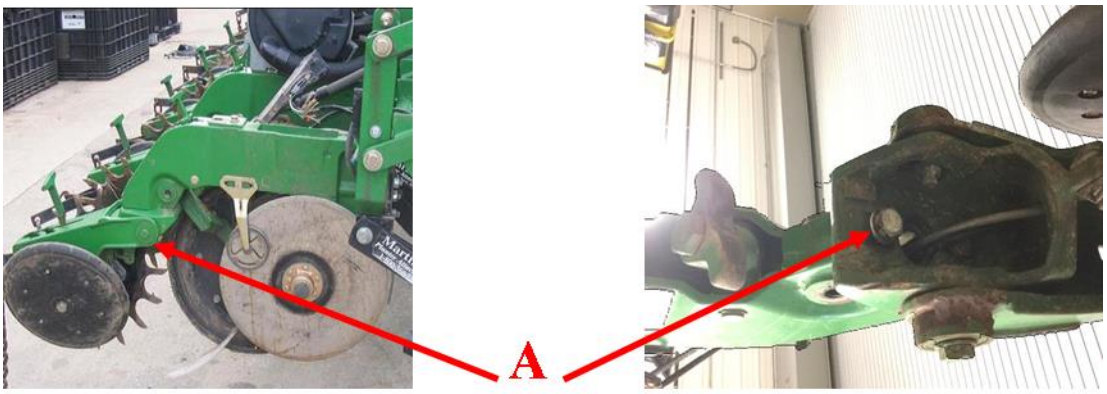
John Deere ME2–ME5 Support Bracket Installation

Step 1:
Remove the gauge wheels and left opener disc.

Note: The left opener disc is reverse threaded.

Step 2:
Loosen the right opener disc nut, but leave the disc in place.

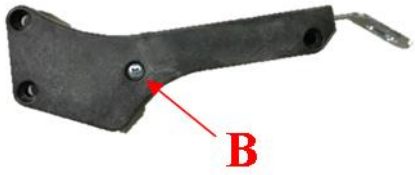
Step 3:
Remove the front closing frame bolt (A).



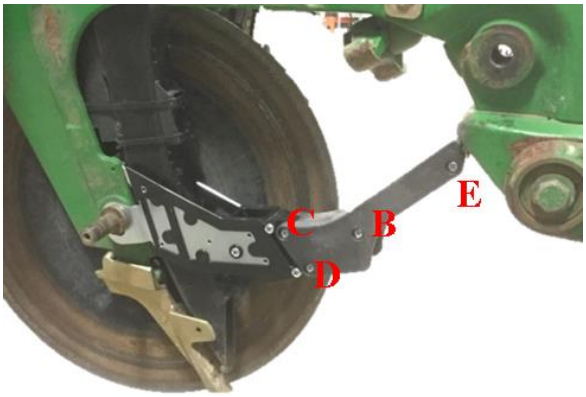
Step 4:
Clean dirt and other debris from the Keeton Quick Attach bracket to ensure a proper fit with the support bracket and the FurrowJet assembly.

Step 5:
Assemble the support bracket (141130) with the supplied metal tab. Align the tab as shown. The 141130 kit should have the closing frame bolt hole pointed down.

Step 6:
With the tab in position, assemble the other half of the bracket. For now, secure it in the center with only the supplied screw (B).



Step 7:
Next, slide the bracket over the two holes on the (150109) Keeton bracket and tighten screws (C and D) through the holes on the left side of the support bracket. **Insert screw (E), but leave loose until step 11.**



Step 8:
Install the provided closing frame bolt, washer, and lock washer **finger tight**. Do not reuse the old closing frame bolt.

Step 9:
Press down on the Keeton bracket to ensure it is fully seated in the down most position on both of the opener spindles.

Step 10:
Reinstall and tighten the opener discs making sure that the Keeton Bracket remains fully seated in the down most position on both sides.

Step 11:
Tighten screw (E) in the rear of the support bracket.

Step 12:
Tighten the closing frame bolt. Make sure that while you tighten the bolt, the support bracket tab does not twist with the bolt.

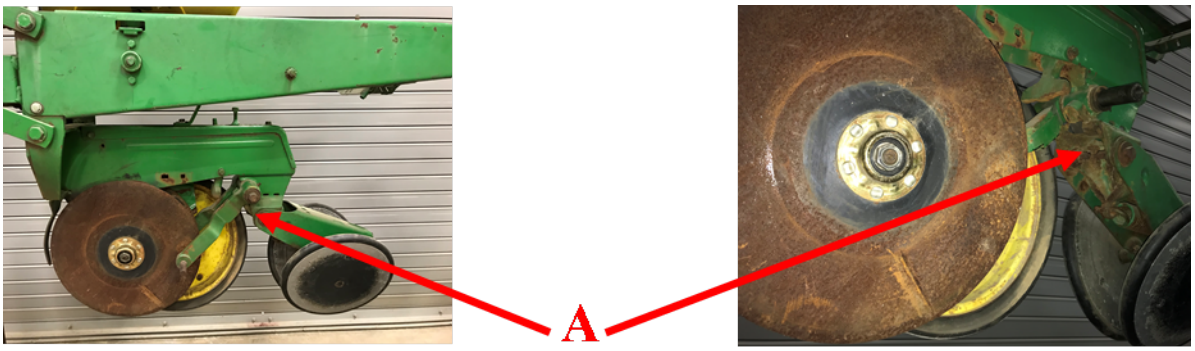
John Deere MaxEmerge (7000) Support Bracket Installation

Step 1:
Remove the gauge wheels and left opener disc

Note: The left opener disc is reverse threaded.

Step 2:
Loosen the right opener disc nut, but leave the disc in place.

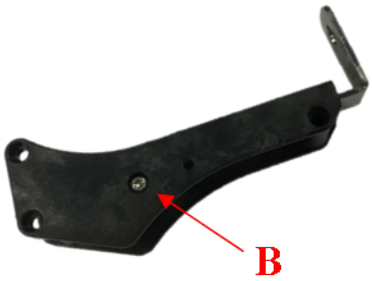
Step 3:
Remove the front closing frame bolt (A).



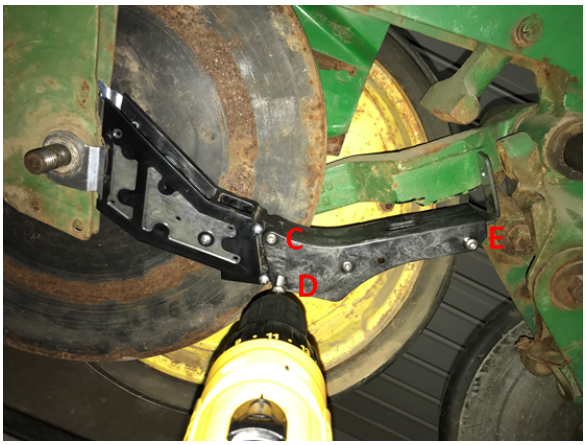
Step 4:
Clean dirt and other debris from the Keeton Quick Attach bracket to ensure a proper fit with the support bracket and the FurrowJet assembly.

Step 5:
Assemble the support bracket (141135) with the supplied metal tab. Orient the tab as shown below. The 141135 kit should have the closing frame bolt hole pointed up.

Step 6:
With the tab in position, assemble the other half of the bracket and, for now, secure it in the center with only the supplied screw (B).

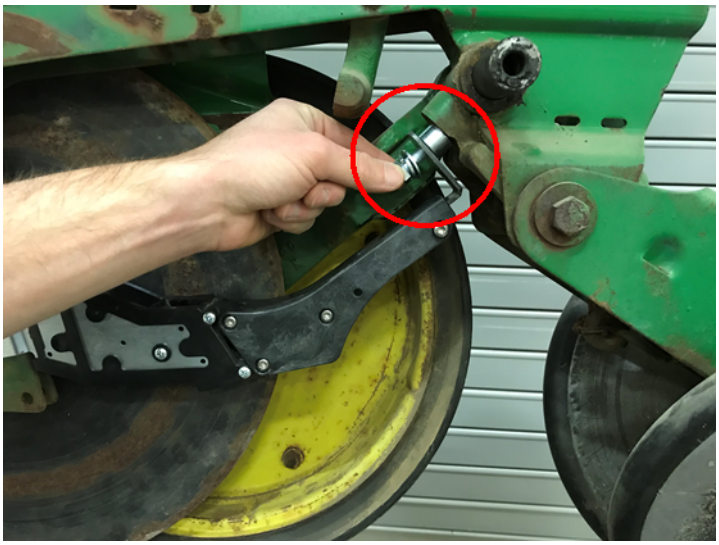


Step 7:
Next, slide the bracket over the two holes on the (150109) Keeton bracket and tighten screws (C and D) through the holes on the left side of the support bracket. **Insert, but leave screw (E) loose until step 11.**



Step 8:
Once the support bracket is in place, install the provided bolt, washer, lock washer and spacer to the closing frame **finger tight.**

Note: The spacer will need to be placed between the support bracket tab and the row unit with the tab pointing upward as seen below.



Step 9:
Press down on the Keeton bracket to ensure it is fully seated in the down most position on both of the opener spindles.

Step 10:
Reinstall and tighten the opener discs making sure that the Keeton bracket remains fully seated in the down most position on both sides.

Step 11:
Tighten screw (E) in the rear of the support bracket.

Step 12:

Tighten the closing frame bolt as seen below. Make sure that while you tighten the bolt, the support bracket tab does not twist with the bolt.

Note: Pay close attention during the installation to confirm that the gauge wheel arms do not hit the FurrowJet support bracket in their down most position or while the planter is raised. If the gauge wheel arms do hit the support bracket, they will need to be trimmed or replaced. Replacement arms can be purchased from Shoup(GWK7000).

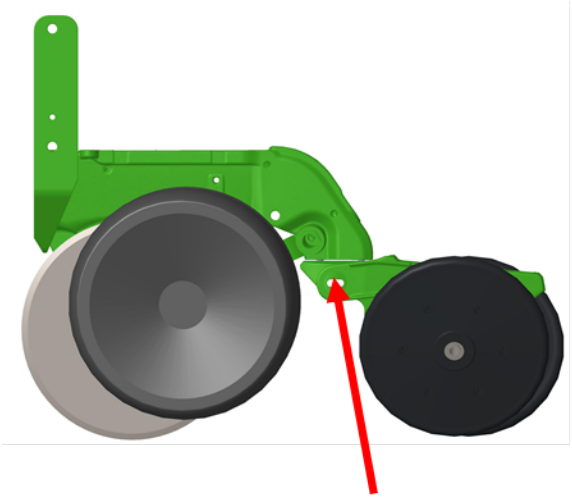
Note: If ordering replacement arms from Shoup, no trimming is required. The new arms do not contain the surface that would be trimmed.

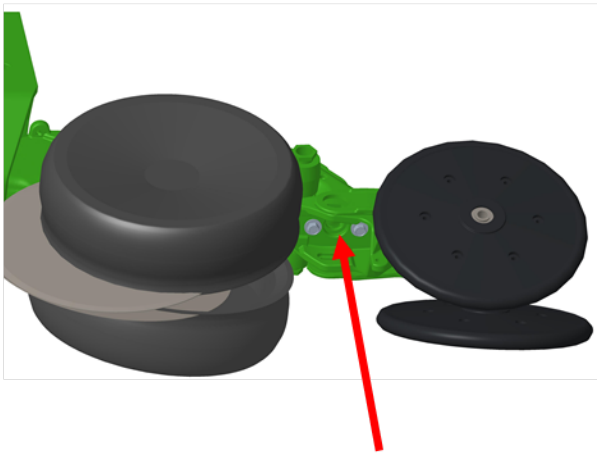
John Deere ExactEmerge Quick Attach and FurrowJet Support Bracket Installation

Note: The installation of this bracket combination will move the closing system 5.4 inches rearward.

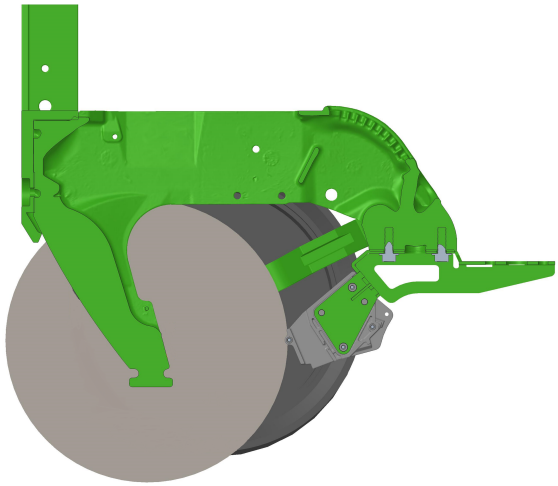
Step 1:

Remove the two closing system bolts

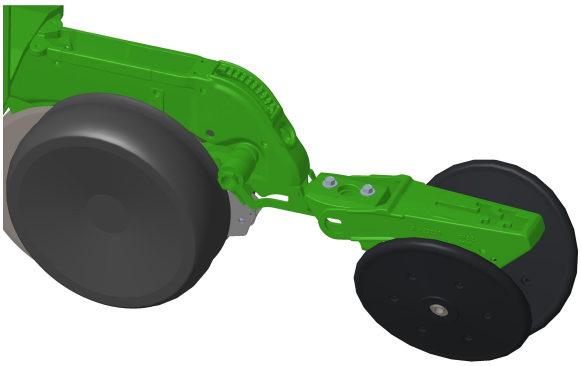




Step 2:
Once the closing system is removed, Install the Quick Attach and Support Bracket Assembly(141150) using the supplied bolts. These bolts will replace the two previously removed bolts.



Step 3:
Re-install the closing system on top of the Quick Attach and Support Bracket Assembly(141150) using the supplied bolts and nuts.



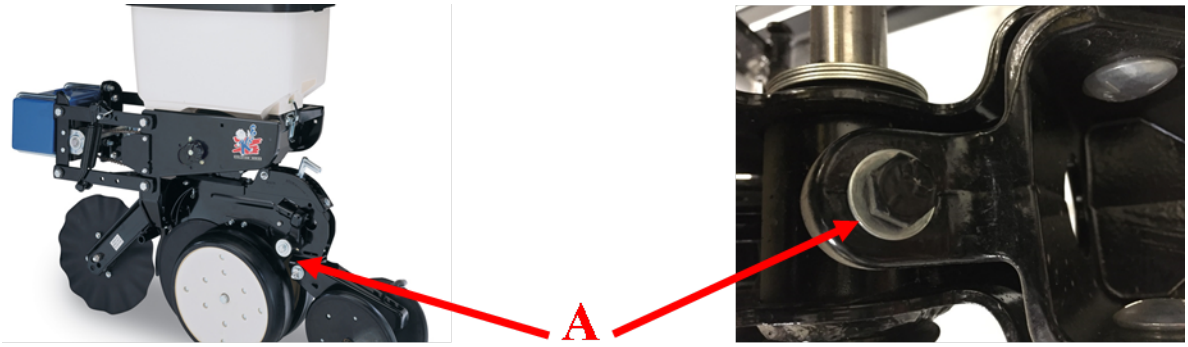
Kinze 3000 Non EdgeVac Seed Tube Support Bracket Installation

Step 1:
Remove the gauge wheels and left opener disc

Note: The left opener disc is reverse threaded.

Step 2:
Loosen the right opener disc bolt, but leave the disc in place.

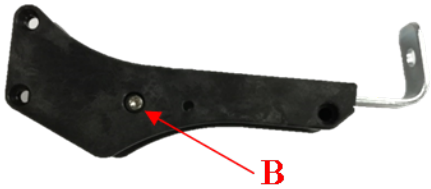
Step 3:
Remove the front closing frame bolt (A).



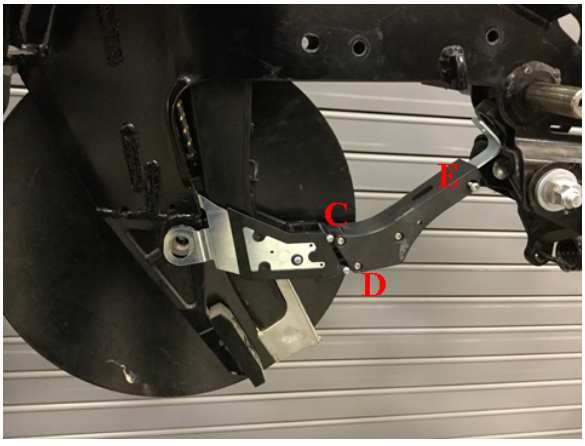
Step 4:
Clean dirt and other debris from the Keeton Quick Attach bracket to ensure a proper fit with the support bracket and the FurrowJet assembly.

Step 5:
Assemble the support bracket (141131) with the supplied metal tab. Orient the tab as shown below. The 141131 kit should have the closing frame bolt hole pointed up.

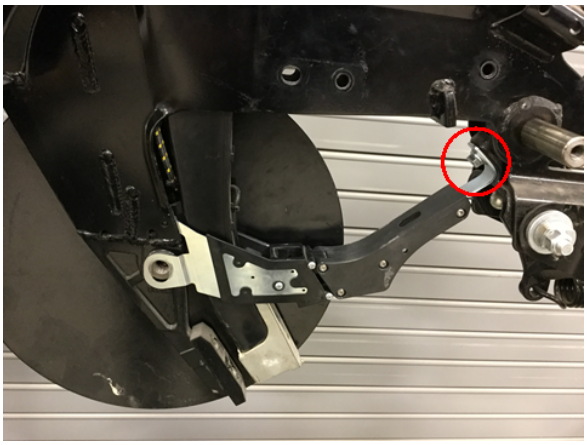
Step 6:
With the tab in position, assemble the other half of the bracket and, for now, secure it in the center with only the supplied screw (B).



Step 7:
Next, slide the bracket over the two holes on the (150120) Keeton bracket and tighten screws (C and D) through the holes on the left side of the support bracket. **Insert, but leave screw (E) loose until step 10.**



Step 8:
Install the provided closing frame bolt, washer, and lock washer **finger tight**. We will not reuse the old closing frame bolt.



Step 9:
While reinstalling and tightening the opener discs make sure that the Keeton Bracket remains fully seated in the down most position on both sides.

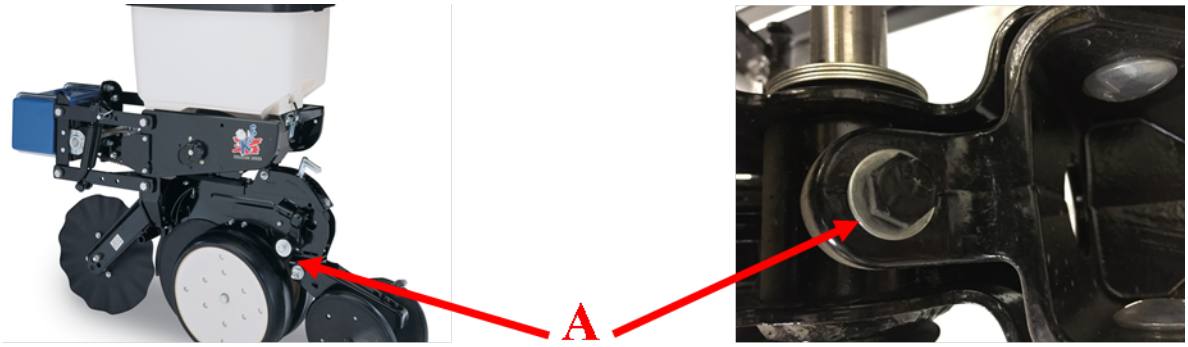
Step 10:
Tighten screw (E) in the rear of the support bracket.

Step 11:
Tighten the closing frame bolt. Make sure that while you tighten the bolt, the support bracket tab does not twist with the bolt.

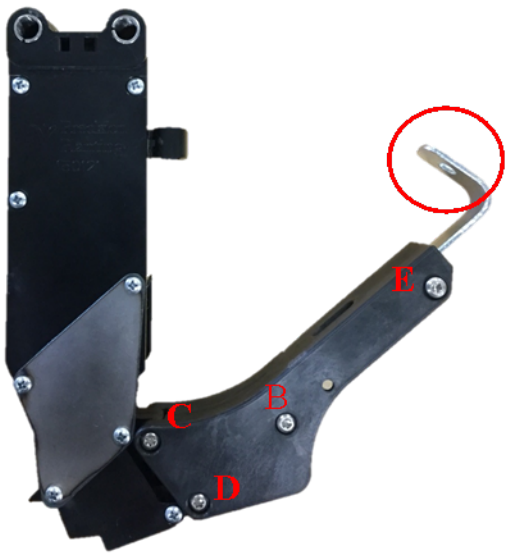
Kinze 3000 EdgeVac Seed Tube Support Bracket Installation

Step 1:
Remove both the left and right gauge wheels as well as both disc scrapers.

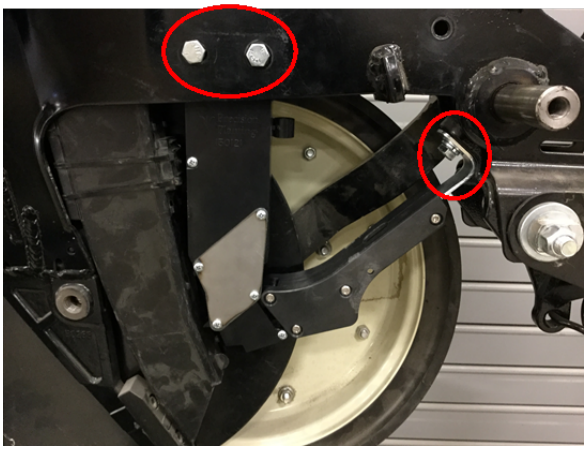
Step 2:
Remove the front closing frame bolt (A).



Step 3:
Secure the support bracket (141131) on the Quick Attach bracket (150121) using screws C, D, and B as shown below. The 141131 kit should have the hole in the metal tab pointed up (circled below). **Insert, but leave screw E loose until step 6** Also, install the metal support plate (141097) that is supplied with the Quick Attach kit (150121).



Step 4:
Once assembly is complete, align the top two holes of the Quick Attach bracket with the row unit scraper holes as seen below. Install the provided closing frame bolt, washer, and lock washer.**Make sure that this bolt is finger tight.**



Step 5:
Re-install the disc scrapers.

Step 6:
Tighten screw (E) in the rear of the support bracket.

Step 7:
Tighten the closing frame bolt as seen in step 4. Make sure that while you tighten the bolt, the support bracket tab does not twist with the bolt.

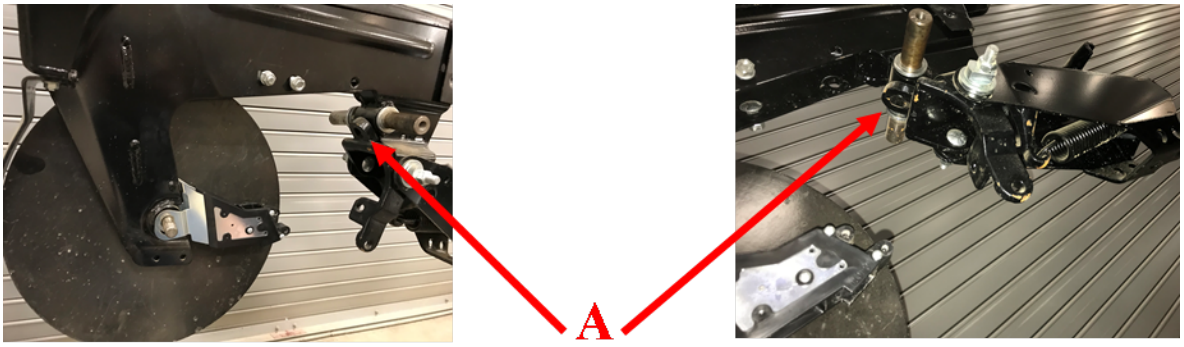
Kinze 2000 Support Bracket Installation

Step 1:
Remove the gauge wheels and left opener disc

Note: The left opener disc is reverse threaded.

Step 2:
Loosen the right opener disc nut, but leave the disc in place.

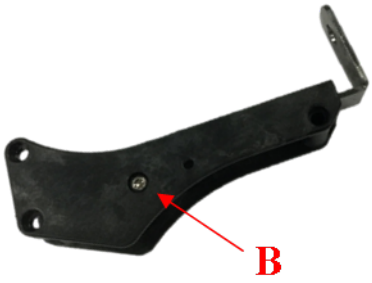
Step 3:
Remove the front closing frame bolt (A).



Step 4:
Clean dirt and other debris from the Keeton Quick Attach bracket to ensure a proper fit with the support bracket and the FurrowJet assembly.

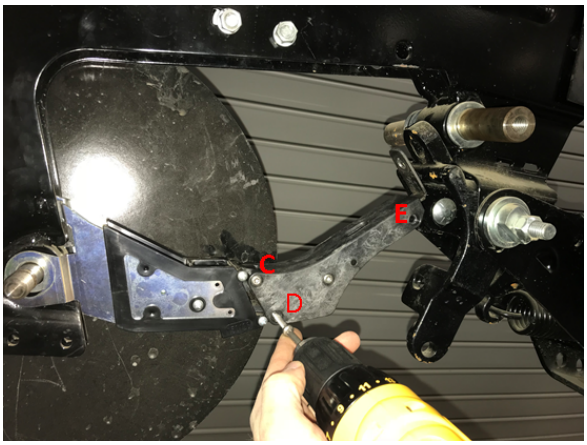
Step 5:
Assemble the support bracket (141135) with the supplied metal tab. Orient the tab as shown below. The 141135 kit should have the closing frame bolt hole pointed up.

Step 6:
With the tab in position, assemble the other half of the bracket and, for now, secure it in the center with only the supplied screw (B).

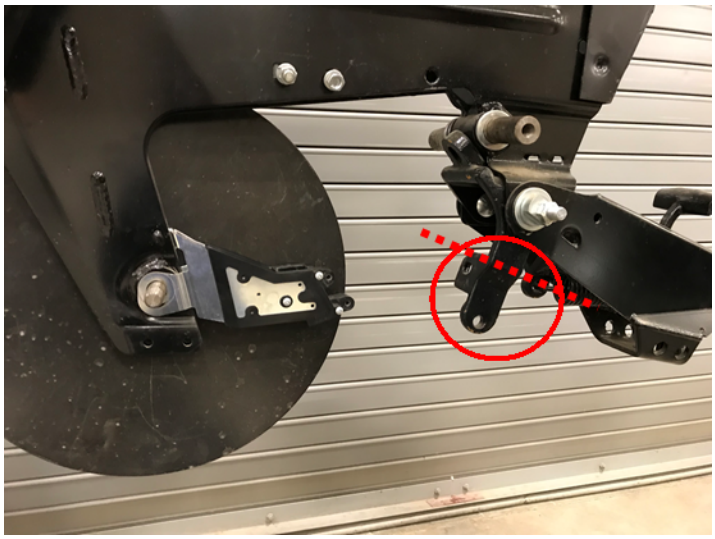


Step 7:

Next, slide the bracket over the two holes on the (150120) Keeton bracket and tighten screws (C and D) through the holes on the left side of the support bracket. **Insert, but leave screw (E) loose until step 11.**



Note: If the low hanging black tab is still attached to the closing frame, it will need to be trimmed or replaced for proper fit.



Step 8:
Once the support bracket is in place, install the provided bolt, washer, lock washer and spacer to the closing frame **finger tight.**

Note: The spacer will need to be placed between the support bracket tab and the row unit with the tab pointing upward as seen below.

Step 9:
Press down on the Keeton bracket to ensure it is fully seated in the down most position on both of the opener spindles.

Step 10:
Reinstall and tighten the opener discs making sure that the Keeton Bracket remains fully seated in the down most position on both sides.

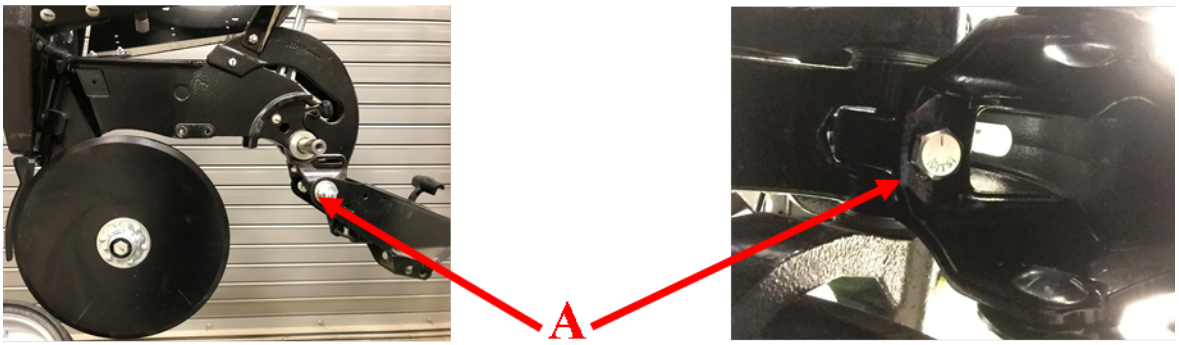
Step 11:
Tighten screw (E) in the rear of the support bracket as shown in step 7.

Step 12:
Tighten the closing frame bolt as seen below. Make sure that while you tighten the bolt, the support bracket tab does not twist with the bolt.

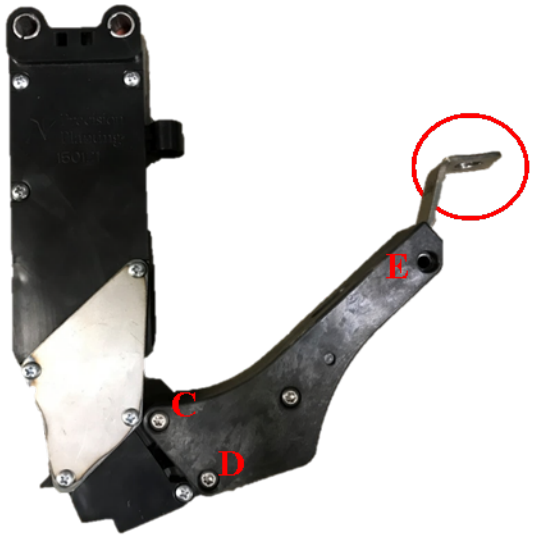
Kinze 4900 Support Bracket Installation

Step 1:
Remove both the left and right gauge wheels as well as both disc scrapers.

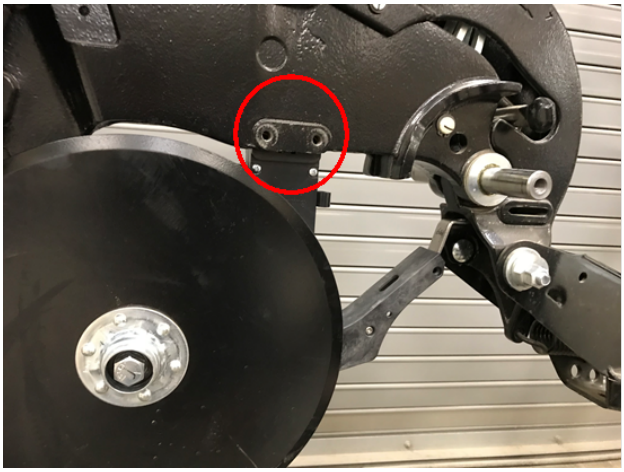
Step 2:
Remove the front closing frame bolt (A).



Step 3:
Secure the Support Bracket (141133) on the Quick Attach Bracket (151121) using screws C, D, and B as shown below. The 141133 kit should have the hole in the metal tab pointed down (circled below). **Insert, but leave screw E loose until step 6.** Also, install the metal support plate (141097) that is supplied with the Quick Attach kit (150121).



Step 4:
Once assembly is complete, align the top two holes of the Quick Attach bracket with the row unit scraper holes as seen below. Re-use the existing front closing frame bolt, adding **two** of the supplied nylon washers to help secure the support bracket tab. **Make sure that this bolt is finger tight.**



Note: If the washers remain loose after finger tightening the bolt, add the third nylon washer that was also included in the hardware kit.

Step 5:
Re-install the disc scrapers.

Step 6:
Tighten screw (E) in the rear of the support bracket.

Step 7:

Tighten the closing frame bolt as seen below. Make sure that while you tighten the bolt, the support bracket tab does not twist with the bolt.

Case 2100 Quick Attach and FurrowJet Bracket Installation

Note: The installation of this bracket combination will move the closing system 7.25 inches rearward.

Step 1:

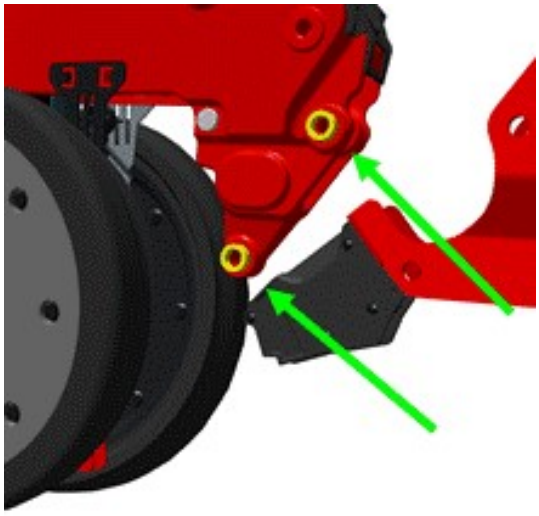
Remove the closing system.

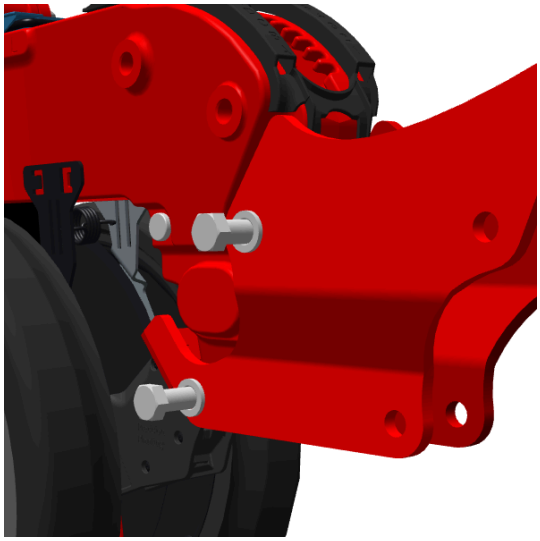
Remove the two upper and one lower 5/16” bolts (shown in green in the picture).

Step 2:

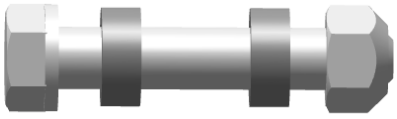
Install the extension bracket (141214).

The upper bolts and both sides of the lower bolt will use washers, and a spacer between the extension bracket and shank.





The bottom bolt will be one of the supplied M16 x90mm bolts and will run through the bracket and secure with the lock nut.

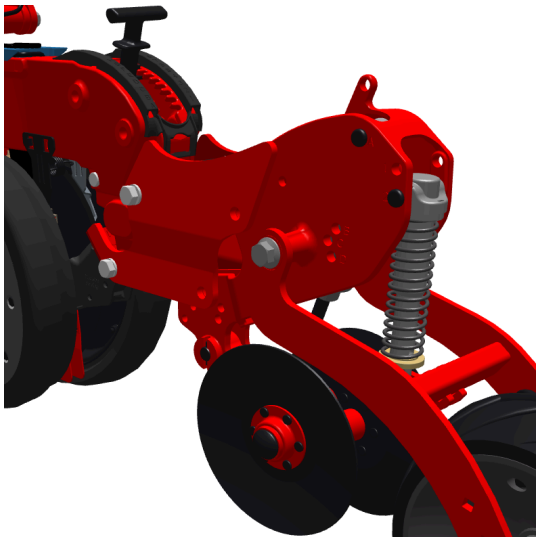


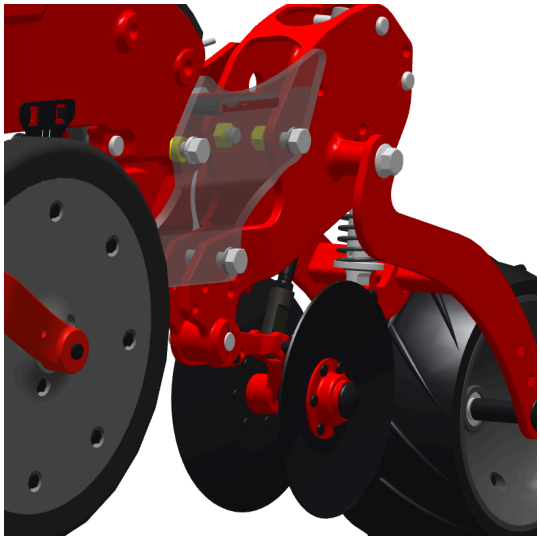
The top bolts will be 2 (of the 4 supplied) M16x45mm bolts and will thread into the shank casting on both sides.

Step 3:

Mount the Case OEM closing system to the extension bracket

These rear mounting bolts will use washers but no spacers.





The bottom bolt will be the other supplied M16 x90mm bolt and will run through the bracket and secure with the lock nut.

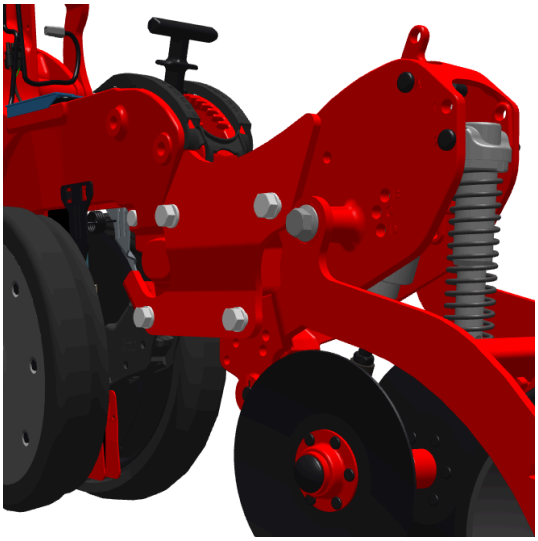
The top bolts will be the final 2 M16x45mm bolts and will thread into the shank casting on both sides.

Step 4:

Installation of the FurrowJet Extension/Support Bracket is complete.

The FurrowJet assembly will mount directly to this extension/support bracket. Move to the **FurrowJet Housing Assembly and Mounting** to proceed with the installation.

Note: If the CNH pneumatic closing system is installed, additional length of the air lines will be needed.



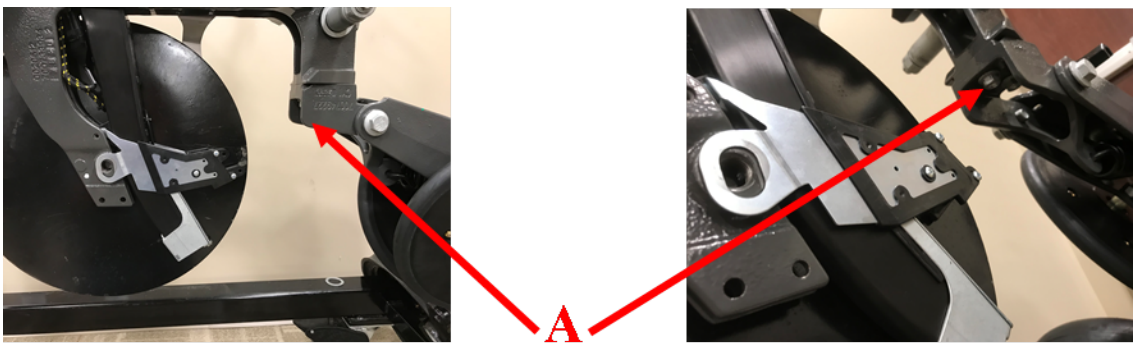
White 9000/Precision Ready Row Unit Support Bracket Installation

Step 1:
Remove the gauge wheels and left opener disc

Note: The left opener disc is reverse threaded.

Step 2:
Loosen the right opener disc bolt, but leave the disc in place.

Step 3:
Locate and remove the front closing frame bolt (A).

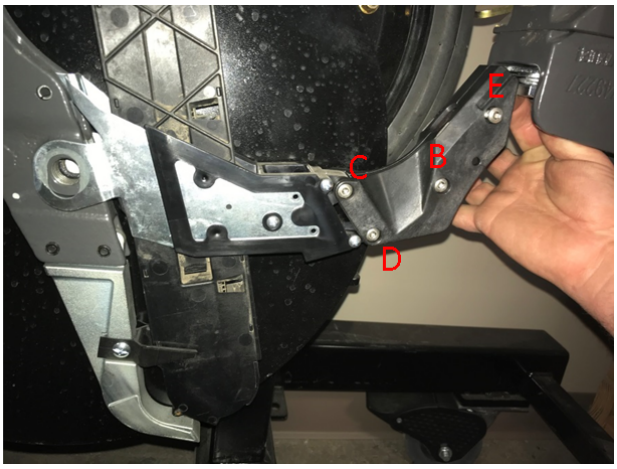


Step 4:
Clean dirt and debris from the Keeton Quick Attach bracket to ensure a proper fit with the support bracket and the FurrowJet assembly.

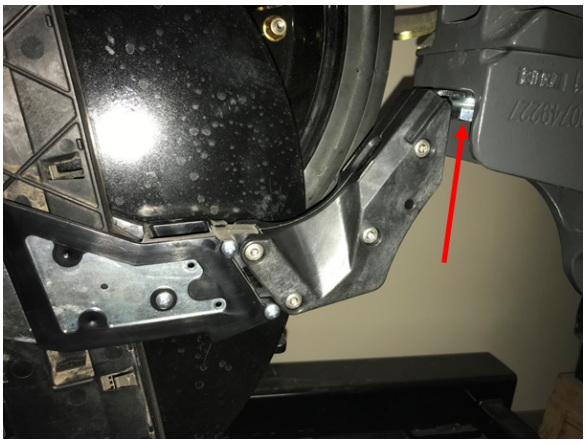
Step 5:
Assemble the support bracket (141137) with the supplied metal tab. Orient the tab as shown below. The 141137 kit should have the closing frame bolt hole pointed down.

Step 6:
With the tab in position and **centered**, assemble the other half of the bracket and, for now, secure it in the center with the supplied screw (B).

Step 7:
Next, slide the bracket over the two holes on the (150111) Keeton bracket and tighten screws (C and D) through the holes on the left side of the support bracket. Insert, but leave screw (E) loose until step 10.



Step 8:
Install the provided closing frame bolt, washer, and lock washer finger tight. We will not re-use the old closing frame bolt.



Step 9:
Re-install and tighten both opener discs. **Be sure to hold the Quick Attach bracket level and in the down most position while tightening the opener bolts.**

Step 10:
Tighten screw (E) in the rear of the support bracket.

Step 11:
Tighten the closing frame bolt installed in Step 8. Make sure that while you tighten the bolt, the support bracket tab does not twist with the bolt.

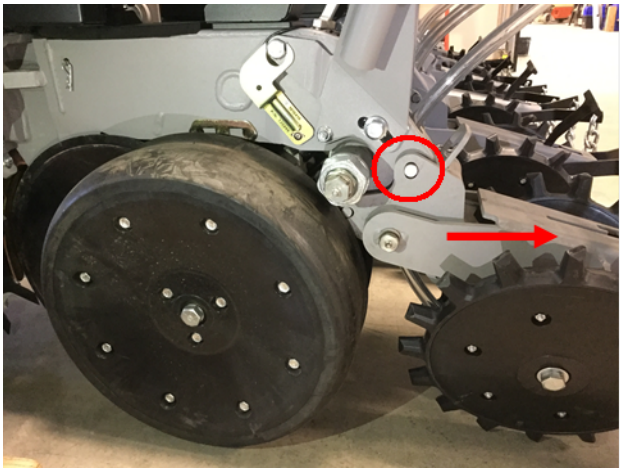
Harvest International Laser Pro Support Bracket Installation

Step 1:
Remove the gauge wheels and left opener disc

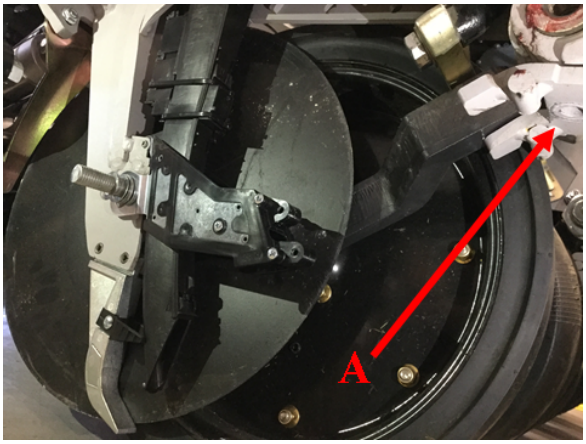
Note: The left opener disc is reverse threaded.

Step 2:
Loosen the right opener disc nut, but leave the disc in place.

Step 3:
To make installation easier, it is best to remove the rear closing wheel assembly. This is done by removing the pin, as seen below, and pulling the handle of the closing system to the rear.



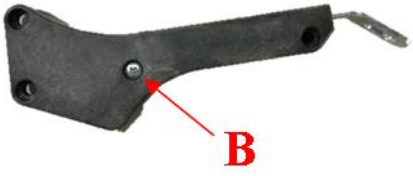
Step 4:
Remove the front closing frame bolt (A).



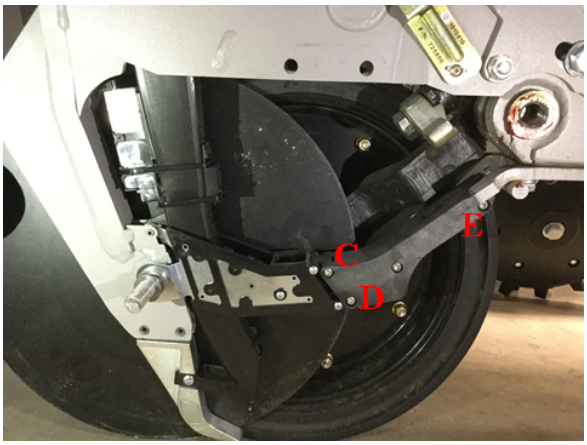
Step 5:
Clean dirt and other debris from the Keeton Quick Attach bracket to ensure a proper fit with the support bracket and the FurrowJet assembly.

Step 6:
Assemble the support bracket (141134) with the supplied metal tab. Orient the tab as shown below. The 141134 kit should have the closing frame bolt hole pointed down.

Step 7:
With the tab in position, assemble the other half of the bracket and, for now, secure it in the center with the supplied screw (B).



Step 8:
Next, slide the bracket over the two holes on the (150109) Keeton bracket and tighten screws (C and D) through the holes on the left side of the support bracket. **Insert, but leave screw (E) loose until step 12.**



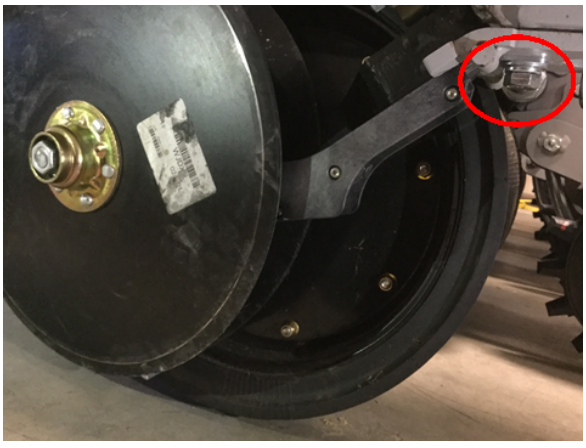
Step 9:
Install the provided closing frame bolt, washer, and lock washer **finger tight**. We will not reuse the old closing frame bolt.

Step 10:
Press down on the Keeton bracket to ensure it is fully seated in the down most position on both of the opener spindles. The thickness of the roll pin can make the Quick Attach brackets want to walk off the roll pin while tightening the disc opener bolts and make the bracket sit uneven.

Step 11:
Reinstall and tighten the opener discs making sure that the Keeton Bracket remains fully seated in the down most position on both sides.

Step 12:
Tighten screw (E) in the rear of the support bracket.

Step 13:
Tighten the closing frame bolt. Make sure that while you tighten the bolt, the support bracket tab does not twist with the bolt.



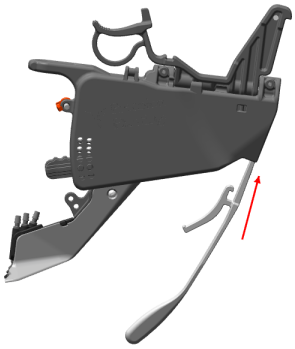
FurrowJet Housing Assembly and Mounting

Step 1:
Install the wing kit (141038) by sliding it rearward on the swing arm.

Step 2:
Install the two wing screws (f). Do not over tighten.

Step 3:
Next install the FurrowJet manifold by pushing it into place. You will hear it snap once it is pushed in completely. Visually confirm that the tab on the front of the manifold is seated. The tab will be flush with the top of the wing when it is snapped into place.

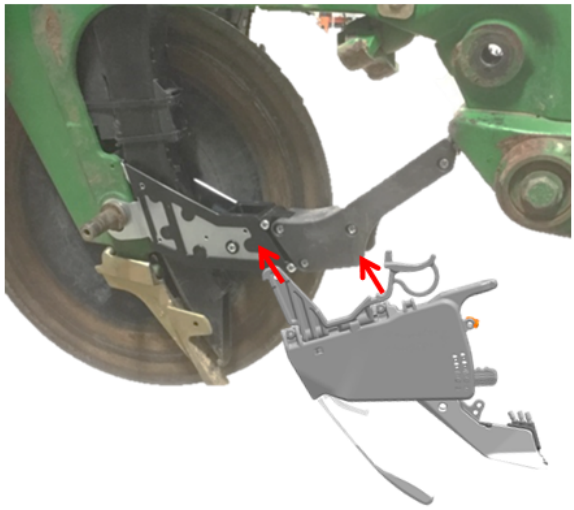
Step 4:
When installing the seed firmer (141039), slide it into the front slot on the FurrowJet assembly and push it in until it snaps into place. You should not be able to pull the firmer back out without pushing the seed firmer tab.



Step 5:

Install the FurrowJet assembly (141100).

- During installation, keep the plugs in the manifold ports and the liquid lines clean.
- Make sure there is no dirt or debris on the Keeton QA bracket or the FurrowJet support bracket.
- First insert the top of the assembly into the rear slot of the QA bracket, and then rotate the FurrowJet assembly upwards until the rear latch clips into the support bracket.
- Once installed, make sure the FurrowJet assembly is tight and it cannot be pulled out by hand.

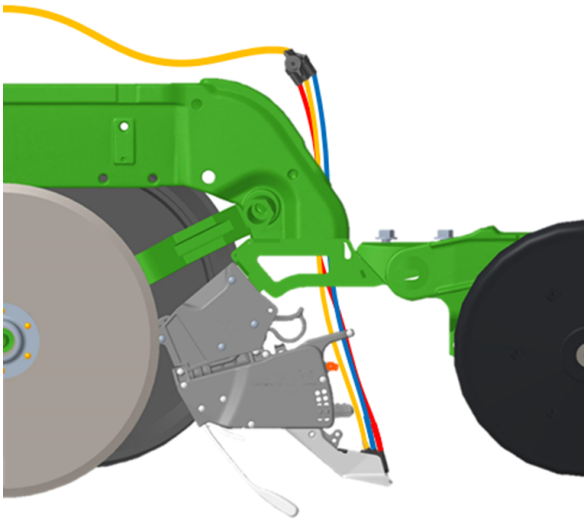


Step 6:

Reinstall the gauge wheels.

FurrowJet Plumbing

Step 1:
The three 1/4” lines can be routed through the insecticide hole on your row unit or the hole in the center of the support bracket.



Step 2:
Once the hoses are routed, connect them to the splitter as close to the support bracket, or insecticide hole, as possible.

Step 3:
Run the liquid system to flush any debris out before you connect the three hoses to the FurrowJet fittings. After flushing the system, the lines can be connected to the ports on the top of the manifold.

Step 4:
The rear port on the manifold is for in-furrow liquid , the middle is for the right wing, and the rear is for the left wing.

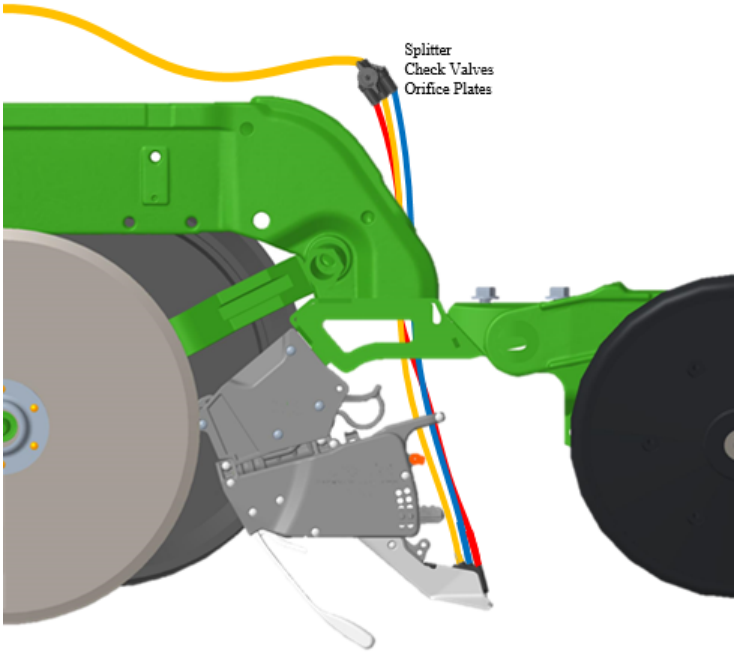
Step 5:
After the FurrowJet assemblies are installed and the plumbing is set up, you should run water through the system for several minutes to confirm that there are no blockages and that everything is plumbed correctly

Step 6:
Complete Fertilizer Rate Check Procedure and In-Field Adjustment before planting.

Manifold and Splitter Information

The FurrowJet manifold is not intended to be the orifice or flow divider for the fertilizer. The manifold is designed to make sure the placement of the fertilizer is correct. To maintain proper flow and pressure to each of the FurrowJet manifold nozzles you will need to orifice all three of the inputs individually. We do offer a compact option that combines a three way splitter and the ability to have three orifices in one assembly

- **Splitter Placement**
  - It is best to put the splitter as close to the FurrowJet as possible, but it still must be above the FurrowJet support bracket. Make sure you put it in a place that is easily accessible.
- **Sizing Orifices**
  - Even if you intend to divide flow equally between each FurrowJet nozzle outlet, it is still required to install three orifices within the splitter. To properly size orifices you will want to use an orifice chart from the orifice manufacturer. When sizing orifices you should target the high end of the GPM (or GPA) you will be applying , and target a minimum of 30 psi at the orifice. This will help keep the output balanced and keep the nozzles free from soil buildup. **Also be aware that orifices need to be selected based on the GPM or GPA through each passage.**
  - **For Example:** *If you intend to apply 6 GPA through FurowJet split three ways, then you will select the appropriate orifice for 30 psi for 2GPA (6GPA divided by 3). In this case three of size X orifice plate (30" spacing, 5mph) would be installed in the divider for each row.*



FurrowJet Rate Check Procedures

It is recommended that you run a calibration check to confirm your wing and in-furrow nozzles are setup to apply the correct liquid rate before going out to the field to plant. To run a calibration check, you will need to know your average planting speed, desired application rate in gallons per acre, row spacing in inches, and have the ability to run your fertilizer pump at the same RPM and pressure that it runs while at your desired planting speed and rate. Once you have this information you can use the following equation. Rate checks are easiest with the manifold unhooked and hanging down to help catch the liquid effectively. Use a clear pitcher with accurate measurement lines under the FurrowJet nozzles and catch the liquid as you run the liquid pump at your desired planting speed and pressure.

$$\text{Formula: } \frac{\text{GPA x MPH x W(row spacing in inches)}}{5{,}940} = \text{Gallons Per Minute}$$

$$\text{Example: } \frac{\text{10GPA x 5MPH x 30”}}{5{,}940} = 0.2525$$

$$\text{GPM= } \frac{\text{Ounces Per Minute}}{128}$$

The example grower wants to apply 10 GPA at 5 MPH with 30” row spacing. The planter in the example should be outputting 0.2525 gallons per minute out of **each row**. Keep in mind if you are using water in the test, you will need to multiply your GPM by the fertilizer conversion factor that is found in the chart below.

Weight of solution	Conversion Factor
7.0 lbs/gal	0.92
8.0 lbs/gal	0.98
8.34 lbs/gal (water)	1.00
9.0 lbs/gal	1.04
10.0 lbs/gal	1.09
10.65 lbs/gal	1.12
11.0 lbs/gal	1.14
12.0 lbs/gal	1.20
14.0 lbs/gal	1.29

In-Field Required Adjustments

Step 1:

The operator is responsible for inspecting the planter and knowing how to adjust the planter to achieve row unit and planter bar levelness. The best way to confirm planter levelness is to use a magnetic level on the bar and the row units while walking beside the planter and watching the level. While doing this, someone else should be operating the tractor and planter in a level part of the field. If the row unit or planter bar is not level, you will need to adjust the planter, hitch, or replace the worn parts causing the issue before you plant with FurrowJet.

Step 2:

After you have done your in-field levelness check, you can move to the in-field wing height check. Keep in mind that the goal of setting the wing height is to ensure the wing is high enough to allow seed to pass without contacting the wing, but low enough the wing will still be cutting into moist soil. Increasing planting depth does not necessarily require a lower height setting.

- Engage the down force system.
- Engage the row cleaners.
- Lower the planter into the ground while pulling forward at least 10 yards.
- Slide the supplied wing height gauge (141034) under the FurrowJet wing from behind, directly beneath the manifold, and then adjust the height with the two tabs on the rear of the FurrowJet until the gauge can slide under without being forced. If the gauge is a tight fit, it is best to error wing height on the high side.

Step 3:
If the soil is loose or if for any reason you are unsure you have enough wing clearance, follow these additional steps.

- Follow all of the previously stated preparation steps.
- Excavate the side of the furrow as seen below.
- The firmer should not contact the wing. Reference the picture below.
- Using the supplied height gauge measure from the front of the wing down to the bottom of the furrow. This distance should be at least 3/4”. If it is less raise the wing height.

Note Using the lowest point of the seed firmer can help find the bottom of the furrow.

Step 4:
Wing height will need to be checked and adjusted on each row before planting starts. This step should be repeated as your disc openers wear and as the soil conditions change.

Wing/Manifold/Mini-Tail Installation and Service

Parts List

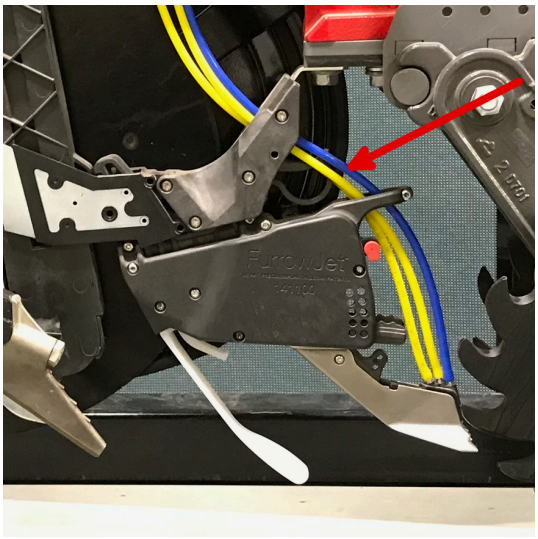
Part Number	Description	Quantity Per Row
141065	FurrowJet Manifold	1
141038	Wing Kit	1
141039	FurrowJet Mini-Tail	1

Note: Tools needed: Torx driver (141074), flat screw driver

FurrowJet Removal From Row Unit

Step 1:
Pull the two 1/4” liquid lines out of the FurrowJet manifold. **Cap the lines and the Push-to-Connect fittings on the manifold**(getting dirt or debris in the lines at this point may clog the nozzles when you start planting).

Step 2:
To remove the FurrowJet assembly, pull back and down on the assembly’s rear latch quick release handle.



Step 3:
Once removed you should clean the entire assembly with water.

FurrowJet Disassembly/Assembly

Step 1:

Remove the manifold.

- Insert a flat screwdriver under the manifold latch hook as shown.
- Rotate the tool to lift the latch and push the manifold out of the wing.

Step 2:
Remove the two screws that hold the wing to the FurrowJet swingarm.

Step 3:
Remove the wing from the swing-arm by sliding it forward.

Step 4:
Clean the manifold, FurrowJet arm, and the inside of the wing before reassembling them.

Step 5:
Install the new wing by sliding it backwards on the arm.

Step 6:
Reinstall the two wing screws.

Step 7:
Next, install the FurrowJet manifold by sliding it into the wing from the rear until the latch hook is fully engaged (flush with top of wing).

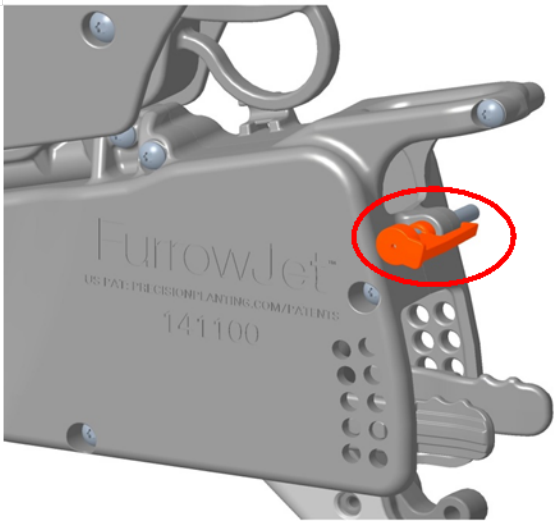
Step 8:
Remove the Mini-Tail firmer by pressing on the release tab and pulling it out.

Step 9:
When reinstalling the seed firmer, slide it into the slot and push it in until it snaps into place. You should not be able to pull the firmer back out without pushing the seed firmer tab.

Step 10:
Reinstall the FurrowJet assembly and reconnect the liquid lines into the appropriate ports on the manifold, taking care to ensure that the manifold and lines do not get contaminated.

Wing Latch-Up Feature

The wing latch-up feature allows the FurrowJet wing to lock in an upward position to extend the wear life when not applying fertilizer. The FurrowJet body assembly no longer needs to be completely removed when not in use. To utilize this feature, the wing latch up tool (141093) and pin (141091) are required. The pin (141091) comes installed on the FurrowJet body assembly.



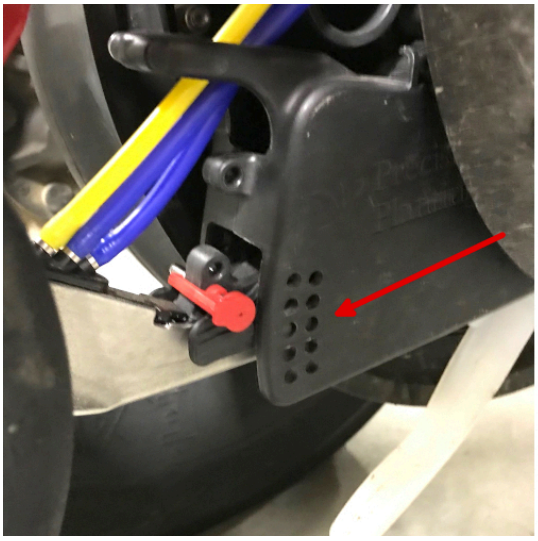
Step 1:
Make sure the wing height is not set to the lowest position. If it is, raise the wing height at least one notch from the bottom.

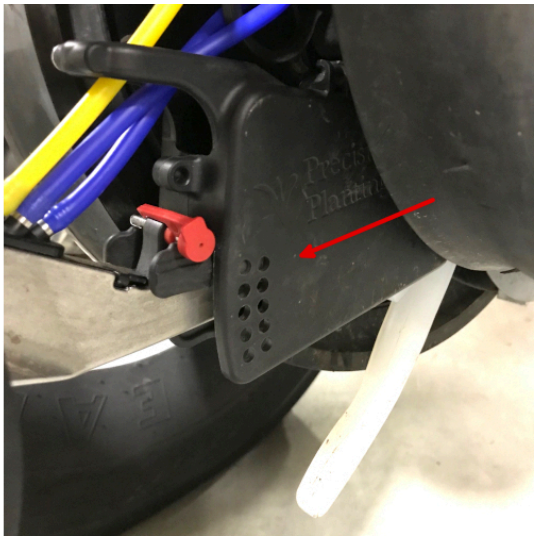
Step 2:
To Latch the wing in an up position, use the wing tool to raise the wing.

Step 3:

With the wing raised, insert the pin in one of the holes on the swingarm.

Note: In most cases, use the lower of the two holes on the swingarm to ensure the wing has as much clearance as possible as seen below to the left. You will only need to use the upper of the two swingarm holes if the wing height pegs are in the highest notch as seen below to the right. If desired, placing the wing height adjustment to its highest notch will maximize ground clearance.





Step 4:

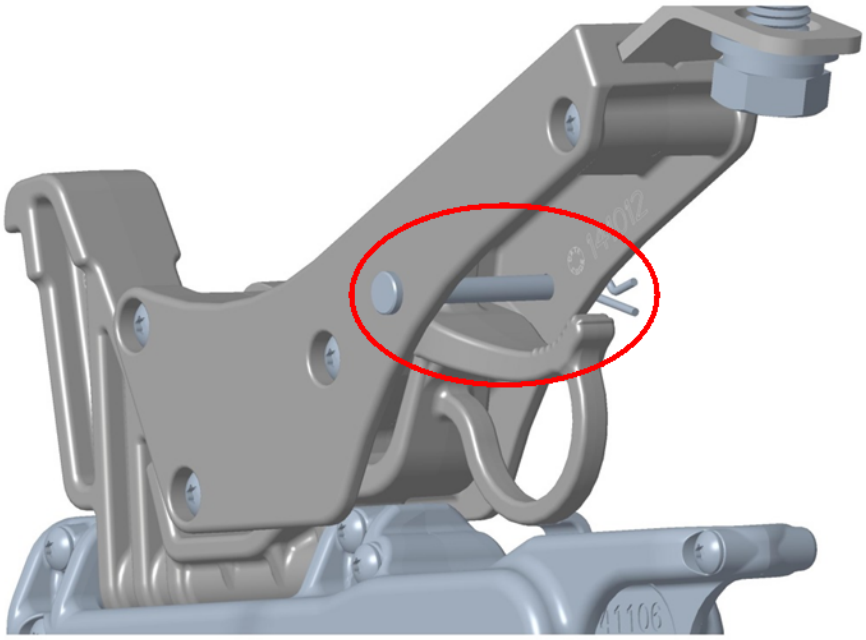
In the latched-up position, check to make sure your closing wheels do not contact the wing for the entire range of motion of the closing system and pivot of FurrowJet.

*****Do <u>NOT</u> operate FurrowJet with the pin in the swingarm unless the wing is in the latched up position. Operating with the pin in the swingarm without the wing latched up will damage the swingarm and the height adjustment tabs.*****

Retention Pin Instructions

The retention pins are used on an as-needed basis if you are struggling with FurrowJets coming unlatched from the support bracket. The clevis pins (141099) can be installed as shown below to keep the pivot bracket from breaking away from the support bracket.

Note: It is no longer a “Quick Attach” system once the pin is installed. The pins can only be installed on 2018 and newer support brackets. The 2017 support brackets can be modified to accommodate the pin.



Mini Firmer Securing Instructions

Step 1:

Close to the top of the Mini Firmer, locate the cross shaped marking as shown. (If there is no cross shape marking, contact Product Support).

Step 2:

Carefully align the screw (141114) with the center of the cross shaped marking on the Mini Firmer.

Step 3:

Drive the screw in at a low torque setting. Make sure to not over tighten.

FurrowJet Nozzle Cleaning and Service Instructions

1. If the wing and/or nozzles get covered with mud or other debris, use the brush (141072) that is included in the essentials kit (141078) to clean them off.
2. If the exterior of the nozzle is completely clean but still plugged, clean and then disconnect the corresponding liquid line from the top of the manifold.
3. Then use the compressed air can (141076) that is included in the essentials kit to push air through the end of the nozzle, to help dislodge the blockage and push it out through the feed port.
4. If you have used the brush and the compressed air unsuccessfully, you can remove the clogged nozzle to assist in clearing it out.
5. Use the manifold service instructions to properly remove the manifold from the FurrowJet assembly and the wing.
6. Loosen the nozzle or nozzles that you wish to clean or replace with the nozzle removal tool (141071) that is included in the FurrowJet essentials kit.
7. Once the nozzle and the manifold have been cleaned out, reinstall the nozzle on the manifold using the supplied nozzle tool. Do not over tighten the nozzles. Overtightening can result in damage to the manifold threads.
8. Run liquid through the system, before returning to the field, to confirm there is no debris remaining in the manifold or nozzle.

FurrowJet Maintenance

1. Keep nozzles and manifolds clean especially during installation. Contamination can cause plugging of nozzles. After removing FurrowJet, always plug open lines on the planter as well as the FurrowJet manifold.
2. Replace the wing when it reaches the wing replacement mark on the wing height tool. Failing to do so may cause nozzle damage and incorrect flow.
3. Make sure the disc openers are at least 14.5” and shimmed properly so that 3mm blades touch for 1.5-2” and 3.5mm blades touch for 1-1.5 (White 9000 and Precision Ready Row Unit disc openers are at least 15” and shimmed properly so that the blades touch for 2–2.5”).
4. You will need to confirm your wing height as your disc openers wear and soil conditions change.
5. Perform periodic system flushes throughout the season and an end of the year cleanout.
6. **Do not reverse with the planter in the ground**. Backing up with the FurrowJet wings in the ground can damage the FurrowJet assembly and clog the nozzles.
7. Replace the Keeton Mini-Tail seed firmer if it has less than 12 ounces of force or worn out, they are wearing unevenly, or they are permanently deformed.
8. **When parked, leave planter in the raised position.**

Why are maintenance and proper setup important with FurrowJet?

1. Excessive wing wear can place fertilizer too close to seed and it will wear the ends of the nozzles.
2. Improper wing setting could cause the wing to drag seed.
3. If the row unit is not level, the wing will run at the wrong angle, and that could cause furrow plowing, seed dragging, and improper liquid placement.
4. Row cleaners help to keep trash out of the furrow. Trash could get stuck on the wing and damage the furrow or drag seed.
5. Periodic system flushes and an end of the year flush will extend the life of the manifold and the nozzles.
6. Worn out disk openers will place the FurrowJet assembly too close to the bottom of the furrow trench. This can cause the firmer to be less effective, dirt to catch on the housing, possible seed dragging, and damage to the FurrowJet Assembly.
7. If the Mini-Tail seed firmer force gets too low, seeds may not be adequately pressed into the furrow, leaving them more prone to inconsistent depth, poorer germination, or movement by the wing.

FurrowJet Troubleshooting Tips

1. Nozzle plugged (internal or external):
   - External — Use brush
     a. If external plugging becomes frequent, confirm you are using the updated FurrowJet manifold and splitter assembly..
     b. If running the wings too high, dry soil can stick to the wet nozzle tips and make plugging more frequent.
     c. If the plugging only happens in a swathed off situation, you may not be able to run the FurrowJets with swath engaged.
   - Internal — Can be from improperly strained fertilizer or installation/repair contamination
     a. Clean the strainer.
        - May need a finer strainer
        - It can also be helpful to use in-line strainers at each row's check valve
     b. Use the air can to blow debris from the nozzle and out of the manifold.
     c. Use the removal tool to remove and clean the nozzle.
     d. If internal plugging remains frequent after the above steps have been completed and you are using small or medium sized manifolds, you may need to switch to the updated manifold and splitter assembly.
2. My furrow is not closing properly:
   - Confirm the row unit is level.
   - Confirm soil is not building up on the wing.
   - Confirm the wing is not running too high and disrupting the dry top soil.
   - Confirm the closing wheels are set to the correct width and down pressure.
3. Excessive wear on the FurrowJet housing:
   - Confirm that the opener disks are not worn out.
     a. This can cause the assembly to run too low
     b. The opener disks may be shimmed too close
   - Confirm the bushings on the top pivot point are not worn out or missing.
4. Not able to hit a desired rate:
   - System may be unable to supply sufficient flow or GPM to the FurrowJets.
     a. Pump capabilities
     b. Plumbing too small or kinked
     c. Orifices are too small
     d. Strainer plugged
     e. Confirm nozzles aren't plugged.

5. Mini Firmer is detaching:
    - If the firmer is weak or deformed, it should be replaced.
    - If the firmer is in good condition, it can be secured to the FurrowJet body using a screw. See **Mini Firmer Securing Instructions.**
6. FurrowJet assembly will not clip in properly:
    - The Support bracket and/or QA bracket may be installed incorrectly.
    - The assembly pivot bracket may be bent/broken.
    - Confirm dirt has not built up on the QA bracket or the support bracket preventing if from clipping in.
7. Seed is being drug by the wing/firmer/or furrow debris:
    - Confirm the row unit is level.
    - Confirm the wing is not running too low (should error on the high side).
    - In most cases you should have row cleaners to help keep the furrow clean.
    - If the problem persists, as a last resort, you can attempt to run without the Mini Firmer.
8. Excessive mud build up
    - Confirm that the disc openers are not worn past 14.5” and that they are properly shimmed so that 3mm blades touch for 1.5-2” and 3.5mm blades touch for 1-1.5” (White 9000 and Precision Ready Row Unit disc openers are at least 15” and shimmed properly so that the blades touch for 2–2.5”).
    - Confirm that the gauge wheels are properly shimmed.
    - Confirm that the wing height is set properly.
    - If the problem persists, as a last resort, you can attempt to run without the Mini Firmer.
    - You may need to run without FurrowJet until the planting conditions improve.
9. FurrowJet assembly is breaking or falling off the row unit:
    - Make sure that the assembly is clipping tightly into the support bracket.
    - Do not reverse with FurrowJet in the ground.
    - It is best to be moving when raising and lowering the planter.
    - Do not turn sharp with FurrowJet in the ground.
    - You can put a retention pin (see **Retention Pin Instructions** for more details) through the hole on the FurrowJet support bracket to lock the FurrowJet onto the row unit.
    - Try running with wing height set one notch higher.
    - If none of these suggestions help, you may need to run **without** FurrowJet until the planting conditions improve.