Honey Bee



Flex Header Service Manual Model Year 2018 and Below





#: 95281



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## 2 - Torque Recommendations

Note: All torques are dry threads

	Recommended Torque											
Size	Grade 2		Grade 5		Grade 8		18-8 S/S		Bronze		Brass	
	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine
* #4	-	-	-	-	-	-	5.2	-	4.8	-	4.3	-
* #6	-	-	-	-	-	-	9.6	-	8.9	-	7.9	-
* #8	-	-	-	-	-	-	19.8	-	18.4	-	16.2	-
*#10	-	-	-	-	-	-	22.8	31.7	21.2	29.3	18.6	25.9
1/4	4	4.7	6.3	7.3	9	10	6.3	7.8	5.7	7.3	5.1	6.4
5/16	8	9	13	14	18	20	11	11.8	10.3	10.9	8.9	9.7
3/8	15	17	23	26	33	37	20	22	18	20	16	18
7/16	24	27	37	41	52	58	31	33	29	31	26	27
1/2	37	41	57	64	80	90	43	45	40	42	35	37
9/16	53	59	82	91	115	129	57	63	53	58	47	51
5/8	73	83	112	128	159	180	93	104	86	96	76	85
3/4	125	138	200	223	282	315	128	124	104	102	118	115
7/8	129	144	322	355	454	501	194	193	178	178	159	158
** 1	188	210	483	541	682	764	287	289	265	240	235	212

\* Sizes from 4 to 10 are in *in.-lbs.* 

Sizes from 1/4 up are in ft.-lbs.

\*\*Fine thread figures are for 1-14.

Grade 2, 5, and 8 values are for plated bolts.

#### Metric Bolts

Nominal Dia. (mm)	Pitch		4.6 CI	ass 4.6		B	8 0	ass 8.8		(10.9) Class 10.9			
		Clamp	Tightening Torque			Clamp	Te	phtening Torq	ue	Clamp	Tightening Torque		
		Load (Ibs)	Lubricated (ft-lbs)	Zinc Plated (ft-lbs)	Plain&Dry (ft-lbs)	Load (lbs)	Lubricated (ft-lbs)	Zinc Plated (ft-lbs)	Plain&Dry (ft-lbs)	Load (lbs)	Lubricated (ft-lbs)	Zinc Plated (ft-lbs)	Plain&Dry (ft-lbs)
4	0.7	333	0.7	0.7	0.9	858	1.7	1.9	2.3	1228	2.4	2.7	3.2
5	0.8	538	1.3	1.5	1.8	1387	3.4	3.9	4.5	1985	4.9	5.5	6.5
6	1	763	2.3	2.6	3.0	1968	5.8	6.6	7.7	2816	8.3	9.4	11.1
7	1	1095	3.8	4.3	5.0	2822	9.7	11.0	13.0	4039	13.9	15.8	18.5
8	1.25	1389	5.5	6.2	7.3	3580	14.1	16.0	18.8	5123	20.2	22.9	26.9
10	1.5	2200	10.8	12.3	14.4	5671	27.9	31.6	37.2	8115	39.9	45.2	53.2
12	1.75	3197	18.9	21.4	25.2	8240	48.7	55.1	64.9	11792	69.6	78.9	92.8
14	2	4379	30.2	34.2	40.2	11289	77.8	88.1	103.7	16154	111.3	126.1	148.4
16	2	5943	47	53	62	15320	121	137	161	21924	173	196	230
18	2.5	7301	65	73	86	18822	167	189	222	26934	239	270	318
20	2.5	9286	91	104	122	23938	236	267	314	34256	337	382	449
22	2.5	11509	125	141	166	29669	321	364	428	42457	460	521	613
24	3	13372	158	179	211	34471	407	461	543	49329	582	660	777
27	3	17428	232	262	309	44924	597	676	796	64288	854	968	1139
30	3.5	21266	314	356	419	54819	809	917	1079	78448	1158	1312	1544
33	3.5	26310	427	484	570	67821	1101	1248	1468	97055	1576	1786	2101
36	4	30982	549	622	732	79866	1415	1603	1886	114291	2024	2294	2699



## 3 - Safety Information

## 3.1 - Recognize Safety Information

This is a safety-alert symbol. When you see this symbol, be alert to the potential for personal injury. Follow recommended precautions and safe operating practices.



### 3.2 - Understand Signal Words

The following are safety terms used around the equipment and throughout this manual. Please read and understand their descriptions.

## 

Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be

## 

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe

## **CAUTION**

Indicates a potentially hazardous station that, if not avoided, may result in minor or moderate injury. It may also be used to

## **IMPORTANT**

Warns of potential damage to the header if proper procedures are not followed.

#### **NOTE**

Notifies you of important information to which you should pay attention.

#### 3.3 - Read and Understand Instructions and Warnings

Please read and understand all warnings and safety information contained within this manual and the signs located on your equipment.

You may find additional safety information on after-market equipment not included in this manual.

Only allow trained individuals to operate the header.

Unauthorized equipment modifications can cause injury or equipment failure that is not covered under warranty.

### 3.4 - Protective Clothing

## **WARNING!**

When working around running equipment, secure all loose items such as long hair, jewelry, or loose clothing are secured so they do not contact moving parts. Failure to do so will result in injury or death.

Wear hearing protection to protect against hearing damage.

Operating equipment safely requires your full attention, do not wear headphones while operating the header.

### 3.5 - In Case of Emergency

#### **NOTE:**

Keep a first aid kit and fire extinguisher with your header at all times. Keep phone numbers for emergency services near your telephone.

## 3.6 - Store the Header Safely

### 1 WARNING!

Ensure your header and all attachments are secured when not in use. Keep bystanders away from equipment and storage area. Failure to comply can result in injury or death.



# 3.7 - Safety Around moving parts

#### 1 DANGER!

Never attempt to service your equipment while in operation. Always shut off the combine and wait for all moving parts to come to a complete stop before approaching the header.

Keep guards and shields in place at all times. Ensure that they are serviceable and installed correctly.

Cutterbar, auger, reel, drive shafts, and drapers cannot be completely shielded due to their function. Stay clear of these moving elements during operation.

### 3.8 - High Pressure Hydraulics

### 1 DANGER!

High pressure hydraulic leaks can penetrate the skin causing serious injury. Always relieve pressure before disconnecting hydraulic lines and tighten all connections before applying pressure.

Hydraulic leaks can be extremely small and difficult to see. Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source.

#### 3.9 - Transporting the Header

## IMPORTANT!

When transporting the header, frequently check for traffic from the rear, especially in turns. Always use headlights, flashing warning lights, and turn signals (when turning) day and night. Follow local regulations for equipment lighting and marking. Keep lighting and marking visible, clean, and in good working order, replace if necessary.

Whenever possible avoid transporting the header on public roadways with header attached to the combine.

If combine must be transported with header attached, ensure all warning lights are operating, and reflective material is clean and visible.

Completely retract and lower the reel before transporting.

Use of a spotter or pilot vehicle is recommended on busy, narrow or hilly roads and when crossing bridges.

Drive at a speed safe for conditions.

Do not exceed 25 mph (40 kph) when transporting the header on the optional transport package.

## 3.10 - Using Correct Torque Values

## **IMPORTANT!**

It is extremely important that you use the correct torque values when servicing your AirFLEX header. Failure to follow the torque recommendations on page 149 can result in equipment damage.



### 3.11 - Practice Safe Maintenance

#### **WARNING!**

Before attempting to service your equipment, ensure that you fully understand any procedure that you are about to attempt.

Ensure all equipment is secured against sudden drops.

Keep the work area clean and dry.

Keep all parts in good condition and properly installed. Fix damage immediately. Replace worn or broken parts. Remove buildup of grease, oil, or debris.

If welding on the header, first disconnect battery ground cable (-). before making adjustments to electrical systems or welding on the header.

The header must be lowered to the ground before servicing. If the work requires that the header or reel be lifted, provide secure support. If left in a raised position, hydraulically supported devices can settle or drop suddenly.

Do not support the header on cinder blocks, hollow tiles, or props that may crumble under continuous load. Do not work under a header that is supported only by a jack.

Do not attempt to clean drive belts or drapers with flammable cleaning solvents.

### 3.12 - Fire Safety

## 🗥 WARNING!

Build up of chaff and crop debris near moving parts is a fire hazard. Check and clean these areas frequently. Before inspection or service, shut off engine, engage the parking break, remove the key and wait for all moving parts to come to a stop.

Keep a fire extinguisher with your equipment at all times and ensure the operator is educated in its operation.

### 3.13 - Keep Equipment Clean

#### **IMPORTANT!**

Inspect and clean your equipment before every use. Clear away all material buildup. Pay special attention to all moving parts such as drive belts, drive shafts, and bearings. Failure to keep the equipment clean can result in fire.



## 4 - Safety Decal Locations



00



#### Possible loss of control Properly ballast combine when using this header Failure to comply could result in death or serious injury.

























Not Shown in Main Illustration



Reel tine Warning Not Shown in Main Illustration



## 5 - Main frame Header Height Control

There are two separate HHC (header height control) on the main frame

- Flex system
- Rigid system.

This section of the manual covers the mechanical part of the system. See the electrical section for anything dealing with the wiring or troubleshooting the electrical section.

Note: The SDX only has the flex system

#### 5.1 - Flex HHC

The flex HHC system is split between the left and right side. All of the adjustments and repair are the same between the two sides.

The components of the system are listed in Figure 1:

- A. The activation tabs
- B. The strut sensing rollers.
- C. The HHC tube
- D. HHC sensors
- E. HHC mechanical link between the tube and the sensors



Figure 1

- 1. To remove the HHC flex tube, remove all of the activation tabs on the tube.
- On the end of each tube is a lock collar on the inside of the outer strut. Loosen the inside lock collar. Leave the outside collar tight to help in positioning the tube. Figure 2.
- 3. This will allow you to slide the tube out of the bushings in each strut.

 Before assembly make certain that the bushings in the struts are clean and free of rust. The HHC tube should also be clean.



Figure 2





- Install the tube and all of the activation tabs. Leave the tabs loose but snug the tab that is attached to the sensor
- The activation tabs for each paddle need to be set properly. This will make sure that the sensor reads the movement of the paddles. The outside tab should be set slightly tighter than the middle tabs. This will account for the "wind up" of the tube.
- 7. The header must be on the combine and off the transport, lifted off the ground. The air system must have at least 100 psi.
- 8. The following items are model year specific:

#### Note:

**On model Year 2014-2016** the link between the activation tab and the sensor is an

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adjustable link. Figure 4. This link should be adjusted to 9 15/16" as shown in Figure 4.



#### Figure 4

**On Model Year 2017** and above the link is solid and non-adjustable.

- All Flex HHC components are installed and the activation tabs (other than middle activation tab where spring is attached to) are loose on the HHC tube.
- Place a 1/8" piece of steel spacer (sickle section, etc.) between the middle paddle activation tab (paddle where the sensor is installed) and the roller. Figure 5
- 11. Set the outside tab so that it is in the center of the roller and against the tab.
- 12. Roll the activation tab forward until it touches the roller and tighten the U-bolt nuts (must have 3-4 U-bolt threads showing past the top of each C-lock nuts Figure 6). Note: Make certain that all the tabs are set as close to the center of the roller as possible before the clamp nuts are tightened.
- 13. When the end paddle activation tabs are set into place, remove the 1/8" spacer from the middle paddle.
- 14. After the spacer is removed, you will notice that the middle paddle activation tab (the one the sensor linkage is attached to) should relax back close to the roller. There should be less than a 1/16" gap between the middle paddle activation tab and the roller.
- 15. If there is more than 1/16" of gap then redo the following steps with a thinner spacer (thinner than 1/8")
- 16. If there is less than 1/16" of a gap and the activation tab is pushing hard on the roller, then a thicker spacer is needed in the above steps.
- 17. The roller should spin underneath the middle paddle activation tab, the roller underneath the end paddle activation tab should not spin.

- 18. Set the remaining tabs on the tube to a gap of 1/16" between the tabs and the rollers. Note: The wider the head the more tabs are on the tubes to set.
- If more movement is needed reduce each of the stop bolts on the end struts so that there are only one thread showing on the stop bolts. Figure 7





Figure 6





Figure 7

#### 5.2 - Rigid Frame HHC

**On Model Years 2014-2016** the rigid sensing has two different type of control. The divider sensing or the frame sensing using wheel sensors. Figure 8

- On most units there are two-wheeled sensors on the middle struts. On some heads there are an additional two wheeled sensors on the next outside struts. Figure 8
- 2. Each of the arms are connected to the sensor with an adjustable link. Figure 9



Figure 8



Figure 9

 The dividers are controlled by a sensor on each end strut. This sensor is attached to the end divider mount. The sensor is connected to the frame with an adjustable turn buckle. Figure 10



Figure 10

 The links for both the center and divider sensors is adjusted to the same dimension of 3-11/16" Figure 11



- 5. Note: On Model Year 2017 and above the adjustable links were replaced by solid links and do not need to be adjusted.
- 6. The center wheels are held in the position by cables on each wheel. When not in use



the cables pull the wheels in the up position and the control box must be set for divider or flex sensing. Figure 12



#### Figure 12

7. **On Model Year 2017 and 2018**, the sensors are held on with two mounting bolts. The sensors can be replaced by removing the bolts and replacing the sensor. Figure 13



Figure 13

- The sensor does have a range. The proper installation of the sensor is the connector should be on the same side as the arm of the sensor. The mounts are slotted for voltage adjustment.
- Figure 14 shows the proper range of the sensor. The sensor is a 0-5-volt range, but the sensor will operate the best in the blue or green area. After installation the arm should stay in this area. The sensor range is the 1-4-volt range.



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# 5.3 - Rigid Frame HHC Model year 2018

On the Model year 2018 the center sensor wheels were eliminated and a suspended subframe and sensors were used. There were also some of the Model Year 2016 and 2017 units that had suspended subframes.

The suspended subframe are the only models that have gauge wheels. Model year 2017 is the only year the gauge wheel mounts are bolts. Model year 2018 and above the mounts are welded.

10. The suspended subframe uses air bags to provide the suspension. The pressure in the suspension air bags must be the same as the pressure in the rest of the system, therefore the valve on the airlines for the suspension system should remain open. The sensors are mounted on the subframe. They are attached with 2 bolts. Figure 15



#### Figure 15

11. The subframe is controlled by the gauge wheels. The gauge wheels will move the frame and this will move the sensor.

12. The gauge wheels should be set so that wheels are on the ground and the rod is compressed 1.5 to 2 inches or half the distance of the rod. Figure 16.



Figure 16

- 13. To remove the gauge-wheels remove the clamp bolts, A. Figure 16
- 14. To install the gauge-wheels install the clamp loose to hold the gauge wheels on the frame. The wheels should be clamped 12 inches from the frame extension flange, B. Figure 16
- 15. Tighten the clamp bolts to 75 ft. lbs to secure the gauge wheels.



## 6 - Subframe Assembly

#### 6.1 - Subframe Auger

To remove the auger, install the header on the transport. This will allow you to lay the subframe assembly back to expose the auger.

- 1. Remove the driveshafts that are attached to the subframe on the left-hand side.
  - Remove the wire lead from the drum Stop Sensor if equipped.
  - Remove the feeder-deck drive belt or chain drive.
  - Remove the linkage to the subframe sensors.
- Attach a suitable lifting device to the subframe. Remove the bolts that retain the tilt cylinder and the safety strap to the subframe. Figure 17



Figure 17

- With the lifting device the subframe can be lowered to the rear. Note: Support the drum with a 4X4 piece of wood. The subframe will not go all the way to the ground so it must be supported. On a CNH adapter watch that the safety latch does not get bent when the subframe is lowered.
- 4. On the left-hand side remove the bearing flangette, limit stop bracket, and the sensor if equipped. Remove the mounting plate by

removing the rear attachment bolt. Figure 18





Figure 18

 On the right-hand side remove the Finger timing arm and the limit bracket. The mounting plate assembly can now be removed by removing the rear mounting bolt. Figure 19



Figure 19

6. The auger can now be removed from the subframe by pushing the auger to the left and twisting it out of the subframe.



- On headers with a 69" auger the spider can be removed from the auger and then the auger removed without the spider.
- The lifting straps can be installed though the access panels in the auger as shown in Figure 20.
- 7. After the auger is out of the subframe the auger can be disassembled as needed.
- The auger cross shaft can be removed. To gain access to the auger remove all the covers on the auger tube. Figure 20



#### Figure 20

 Remove the fingers by removing the lower retaining bolts. This will allow the fingers and the clamps to be removed. Figure 21



Figure 21

- At this time check the finger guides for wear. If any wear is found they balls in the finger guides should be replaced. Figure 22
- 11. To replace the auger finger guides remove the finger.
- 12. Unbolt the guide assembly. The worn finger ball can be replaced



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Figure 22

- 13. With all the fingers and the clamps removed the cross shaft can be removed. This will allow the cross shaft to be removed from the spider end of the auger. Note: The fingers do not need to be removed if the cross shaft is not removed.
- 14. On the right-hand side of the auger remove the lock collar and bearing.
- 15. On the left end of the auger remove the shaft and spider assembly. Remove the lock collar on the bearing. Take the remaining two bolts out to the end disc pulling the disc out of the auger. This will allow the cross shaft to be pulled out of the auger. Figure 23



#### Figure 23

16. To reassemble install all the finger clamps, leaving the fingers out of the clamps, on the shaft. Install the bearing in the right-hand side of the auger. Slide the shaft in from the left-hand end. Install the flanges and bearing on the disc. Slide the shaft in the auger and in the right-hand bearing. Bolt the disc in place.



- 17. Install each of the fingers in the clamps and through the bushings in the auger.
- Install the lock collars but do not tighten. Align the cross shaft in the auger so all of the fingers are centered in the bushings.
- Install both collars on the bearings and tighten the set screws in the lock collars to 97 in. lbs. Note: On Model year 2014-2016 an eccentric lock collar is used. The new Peer bearing with the clamp lock collar can be installed.
- 20. Install Left-hand spider on the auger. Use red Loctite on the mounting hardware and torque the bolts to 23 ft. lbs.
- 21. Place auger back in the subframe and install the right-hand shaft.
- 22. Center the auger in the subframe and tight the lock collars.
- 23. Assemble the auger mounting bracket on each side and tighten all hardware.
- 24. Raise the subframe back into place and attached safety strap and tilt cylinder. Figure 24



Figure 24

## 6.2 - Air Bag Replacement (suspended subframe)

On Model year 2017 and above a suspended subframe is available and is standard on the 200 Series AirFlex. This subframe will pivot slightly and is cushioned by an air bag on each side. This airbag receives the air from the air system on the header.

- 1. Remove the strap in the front of the frame. Inflate the system to 110 PSI. use the valve to lock the air in the suspended subframe air bags.
- 2. Place a block between the plates that retain the airbag. Figure 25



Figure 25

 Release the air pressure from the air tank by removing the Schrader valve. The block should hold the frame members apart. Remove the bolts on the top and bottom of the frame securing the airbag. Figure 25



- Install the new airbags in the frame. DO NOT USE LOCTITE ON THE BOLTS. Torque the bolts to 15-20 ft lbs.
- Install the air hose on the bag and turn the valve to air up the system. Remove the block from the subframe. See 14.2 - Air



Lines and Air bags for proper location of the airbags.

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### 6.3 - Tilt Cylinder Position

• Position One (Factory position): Top hole for the front of the cylinder and lower hole for the rear position. Figure 27



Figure 27

 Position Two: Bottom hole for the front of the cylinder and lower hole for the rear of the cylinder. This can be used in some crop conditions if the guards need to tilt forward or keep the guard's level to the ground. Figure 28





 Position 3: Top hole on the front of the cylinder and top hole on the bottom of the cylinder. This can be used on combines with a steeper feeder house angle to lower the guard angle. Figure 29



Figure 29

There are two positions for the shorter hydraulic cylinder (4-inch-long barrel length). In most cases position 1 Figure 30 should be used. Only use position 2 if a steeper guard angle is needed. For combines that do not have an adjustable feeder house the top hole must be used.





## 7 - Drives

Note: Adjusting the tension when the belt is at room temperature. If adjusted when the belt is cold can cause the belt to be to not be the proper tension when it is warmed up by operation. The belt tension should be checked after at least one hour of operation.

Note: Do not bend or fold the belts to less than a 4-inch diameter. If the belt is bent too small the cords could be damaged

Note: The pulleys for the drive on each brand of combine and Model Year of header are different sizes. See Section Pulley Size Information.

Note: On all drives without a spring-loaded idler the belts must be adjusted when at operating temperature.

There are two specifications

- A new belt (0-24 hours)
- A used belt (24+ hours)
- The belts without a spring tension system will need to be adjusted to the correct HZ setting.
- 2. This is done by using an app on a smart phone.
- 3. Use a wrench to tap the long span of the belt while holding the phone as close as possible to the belt span. Figure 31



#### Figure 31

4. Honey Bee recommends the following apps as they have been tested for

accuracy. Take note of the app icon and developer name as there are multiple apps with similar names.

#### **NOTE:**

Using an app to measure belt frequency requires a quiet location in order to take accurate measurements.

Please note this is a 3rd party application which is not published by Honey Bee. The software may be removed or changed without notice, this is beyond Honey Bee's control.

5. Apple Devices (IOS) App Name: Fine Tuner

> Developer Name: 9928189 Canada Inc. Link: <u>http://www.finetunerapp.</u> <u>Com</u>





6. Android Devices



#### Figure 33

#### 7.1 - Feed Auger Drive Removal

- Remove the drive shafts from the righthand GT case. This is done by pressing the release on each end of the shaft. Remove the bolt retaining the clutch shaft to the GT case. Figure 34
- Loosen the lock nuts at the front of the GT case and remove the adjusting bolt under the left-hand GT case. Figure 35
- Loosen the tension bolt for the feed lefthand GT drive belt, remove the bolt retaining the idler and remove the belt.
- 4. Remove the left-hand draper drive belt.
- 5. Remove the auger drive belt by removing the adjusting bolt and the idler retaining bolt.
- Remove the pulleys by removing the allen-head screws in the pulley and use one of the screws to push the hub off the shaft.

- 7. All cogged pulleys on the Airflex use a tapered hub that tightens the pulley to its shaft.
- 8. To remove a cogged pulley from its shaft, remove both of the set-screws that keep it tight. Figure 37
- 9. Screw one of the set screws back in the third hole and use the set screw to push the pulley away from the hub
- 10. If threading this set screw into the central hole does not separate the hub from pulley, tap with a pipe or similar press tool and a hammer on the pulley and NOT the hub.
- 8. Remove the 4 bolts retaining the bearing housings to the GT Case. Figure 36





Figure 35





Figure 36



#### Figure 37

Replace the complete bearing housing assembly. (Note: In most cases if a bearing is out it is better to replace the complete assembly)

## 7.2 - Feed Auger Drive Installation

- 1. If any shims were found under the bearing housing replace the shims in the same positions.
- 2. Tighten mounting hardware on each housing replaced to 75 ft. lbs (101Nm).
- 3. Install the drive pulleys and hubs.
- 4. Use Red Loctite on the set screws and torque the drive pulley hub set screws to

the torque as described in Figure 38 and Figure 39.

- The 5/16" setscrews in the draper drive hubs are torqued to 15 ft. lbs.
- The 3/8" setscrews in the remaining pulleys are torqued to 24 ft. lbs.



Figur<u>e 38</u>



Figure 39

- Install Idlers and tighten idler mounting bolts on the left-hand and right-hand drives Figure 38 and Figure 39 to 150 ft. lbs. (203 Nm)
- 6. Install the auger drive belt and tighten it to
  - 0-24 Hours of use 195-200HZ
  - 24+ of use 165-170HZ.
- Install the draper drive belt and use the tension bolt on the underside of the gearbox assembly to tighten the belt.
  - Note: Pick up the end of the GT case and move around so that the GT case will "find home". Then Recheck the tension of the belt.



 Retighten the lock nut and lock bolts when desired tension is achieved. Figure 40



Figure 40



### 7.3 - Right-Hand Knife Drive Bearing Removal

 Remove the right-hand drive shaft that connects the GT case to the combine. Remove the knife drive shaft by removing the 4 mounting bolts on each end of the shaft. Figure 41



Figure 41

 Loosen the jam nuts and spring assembly holing the right-hand draper belt. Figure 42



Figure 42

- 3. Remove the right-hand draper drive cogbelt
- 4. Remove the bearing housing assembly

## 7.4 - Installation Right Hand Drive

- 1. If any shims were found under the bearing housing replace the shims in the same positions.
- 2. Tighten mounting hardware on each housing replaced to 75 ft. lbs (101Nm).
- Install the right-hand GT drive cog-belt. Figure 43 Use the adjustment bolt to tighten the belt to
  - 0-24 hours of use 180-190Hz
  - 24+ hours of use 160-170Hz



- 4. Install the Right-hand draper drive cogbelt.
  - Adjust the cog-belt tension via the adjustment bolt. Note: Pick up the end of the GT case and move around so that the GT case will "find home". Then Recheck the tension of the belt.
- 5. Retighten the lock nut when desired tension is reached. Figure 42
- Install the knife drive shaft on the front bearing mount. Tighten the mounting bolts to 75 ft. lbs (101Nm)



#### 7.5 - Knife Drive Belt Removal

1. Remove the 4 bolts that retain the drive shaft to the knife drive Figure 44



Figure 44

- 2. Remove the two bolts holding the tie rod arm.
- Loosen the lock nut and lock bolt but do not remove. Loosen the top bolt. Figure 45



Figure 45

- 4. Remove the belt.
- 5. Replace the belt and tighten the belt using the locking cam.
- 6. Correct tension is achieved when the belt vibrates at 60-70Hz when being tapped with a wrench.
- Install the knife drive shaft on the front bearing mount. Tighten the mounting bolts to 75 ft. lbs (101Nm)

#### 7.6 - Knife Drive Bearing

- After removing the belt if the bearings need to be replaced remove the 4 bolts that retain the top pulley.
- 2. Remove the 4 bolts retaining the top bearing. Figure 46



#### Figure 46

- 3. This bearing can be replaced as a complete assembly.
- The lower knife drive bearing can be replaced by removing the connecting arms. Figure 47

Note: The pitman arms will need to be removed before the connecting arms can be removed. The connecting arms can be removed with two long pry bars or with a gear puller. If using a gear puller be sure not to damage the threaded hole in the hub shaft. A 3/8" bolt should be threaded in the center hole and place the puller on the bolt when removing the connecting arms.



Figure 47

5. Remove the bolt through the center of the bearing and remove both flywheels.

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 Remove the hose, fittings and drain the oil from the bearing. Note on model year 2019 and newer the drain plug on the bottom of the bearing will need to be removed to drain the oil. Figure 48



Figure 48

- 7. The bolts clamping the bearing to the drive paddle can be removed and the bearing can be slid out of the drive paddle. Note it may be necessary to drive a wedge in the clamp to loosen the clamps.
- 8. Install the new bearing assembly in the drive paddle. Tighten the clamp bolts enough to hold the bearing in place.
- Install both flywheels. Make certain to line up the roll pins and cross-hatch on the flywheels and bearing housing. The bearing pin on the flywheels should be 180 degrees from each other. Retain the flywheels with the center bolt. Use Red Loctite and tighten the center nut to 315 ft. lbs. Figure 49



Figure 49

10. Center the bearing assembly in the drive paddle making certain that the flywheels are the same distance from the paddle. Use red Loctite and tighten the bolts to 120 ft. lbs. Figure 50



Figure 50

11. Install the connecting arms on the flywheels and torque the bolts to 23 ft. lbs.

Note: When installing the connecting arm, make certain the snap ring points to the outside of the flywheels. The inner race of the connecting rod bearing must be flush with the stub on the flywheel. Figure 51





Figure 51

- 12. Install lower fitting and hose and fill the bearing housing with 75W-90 gear oil until it is halfway in the tube.
- 13. Install top fittings and hose.
- 14. Install the knife drive belt and tighten the belt to 60-70 Hz.
- 15. Install the tie rods to the connecting arms and place Loctite on the threads of the carriage bolts and torque the carriage bolts to 68 ft. lbs (92 Nm)

Note: Check timing after installation per section 9.3 - Knife Drive Timing



## 7.7 - Slip Clutch

#### 7.7.1 - For MY2017 and newer units.

The slip clutch is a friction type clutch. It has two friction discs to maintain the torque on the auger drive.

- 1. With the header on the combine open the left-hand shield to expose the clutch.
- 2. Remove the slip clutch from the header. Figure 52



Figure 52

Loosen the bolts retaining the clutch spring. Figure 53



Figure 53

- 3. Disassemble the clutch and replace the friction discs.
- 4. Tighten the clutch bolts up finger tight.
- 5. Replace the clutch on the drive shaft on the drive.
- 6. Install the other end of the shaft on the auger stub shaft.

- 7. Run the header for about 30 seconds with the clutch slipping. This will burnish the new friction discs.
- 8. When tightening the bolts use a crossing pattern. Figure 54



- Once the clutch is burnished tighten the bolts in the same crossing pattern until the dimension of between the spring and plate is reached at each bolt location, Figure 54. Tighten the bolts 2 flats and then go to the next bolt.
- There are two different clutches. One clutch has a single spring, Figure 55, for all early production Model Year 2017. The distance between the spring and the top plate should be 17.5 +or – 0.3 mm
- 12. After installation make certain that all of the shields are reinstalled.
- During the Model Year 2017 and all Model years after a double spring was used, Figure 56. On these clutches the distance between the spring and the top plate should be adjusted to 20.7mm + or – 2mm.



Figure 55

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Figure 56

## 7.7.2 - For Model Year 2016 and Older

This clutch is a can type clutch with a single spring in the top of the clutch to maintain the pressure on the clutch discs.

- 1. With the header on the combine open the left-hand shield to expose the clutch.
- 2. Remove the clutch from the header.
- 3. Loosen the nuts on the clutch in a crossing pattern, Figure 58, until the clutch discs are loose.
- 4. Replace the clutch friction discs.
- 5. When installing the spring make certain the cupped side of the spring is facing the clutch discs.
- 6. Install the clutch back on the machine.
- 7. Leave the nuts, Figure 58, that compress the spring loose.
- 8. Run the machine for 5 seconds and allow the clutch to slip.
- Once the clutch is burnished tighten the nuts in the same crossing pattern to 30 Ft. Lbs. at each location. Only tighten one turn at a time when tightening the nuts in a cross-pattern Figure 58.



Figure 57 Figure 6



Figure 58

14. After installation make certain that all of the shields are reinstalled.

## 8 - Decks

The common (or center deck) is driven from a PTO shaft off the LH GT case. The drive goes through a belt or a chain, depending on Model Year, to a pulley on the drive roller of the draper drive.

#### 8.1 - Center Deck Drive System

- 1. The idler assembly can be removed by loosening the spring-loaded idler and removing the belt.
- 2. Remove the bolt holding the front spring support.
- 3. Remove the pivot pin and remove the idler assembly. Figure 59



Figure 59

4. The idler can be taken apart for repair by removing the pulley. To remove the pulley, take out the set screws and pull off the tapered hub. One of the set screws can be threaded in the additional hole to pull the hub out of the pulley Figure 60.



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Figure 60

- 5. Remove the set screws from the lock collars on the shaft.
- 6. Remove the bearing flangettes and the bearings off the shaft. Figure 61
- 7. On some units the bearing is held to the shaft with a set-screw on the bearing.
- 8. On some units the bearings are held on with an eccentric locking collar.
- On Model Year 2017 and above the bearings are held on with a split lock collar bearing, Figure 62. Torque the Torx screws in this lock collar to 97 in. lbs.







Figure 62

- 10. Assembly in the reverse order.
- Install belt and tighten the belt by turning the bolt in and out of the turnbuckle until the gauge aligns with the washer. Figure 63. Do not adjust the jam nuts on the spring.



Figure 63

#### 8.2 - Center Deck Draper Belt

The center deck has two rollers and a belt tension system. The following is disassembly of the deck.

- 1. Before the tension is off roll the draper belt, roll the belt around to expose the splice.
- 2. To remove the draper belt, loosen the tension off the belt by loosening the spring tension off on both sides of the deck. Figure 64
- 3. Remove all the bolts in the splice and pull the belt off the center frame Figure 64



- 4. After the draper belt is removed the rollers can be removed from the frame.
- 5. On the right-hand side remove the bearing flange and bearing from the rear roller.
- 6. Remove the drive pulley on the left-hand side of the roller.
- 7. Remove the tension system from the front roller. The bearing can now be removed from the front roller. Figure 65




#### Figure 65

- 8. Remove the front tension assembly and bearing.
- 9. The rollers can now be removed from the right-hand side of the frame.

### Assembly

- 10. Before installing the new bearing, the size of the shaft must be checked,
- 11. A new shaft is 1.250" in diameter.
- 12. If the shaft diameter is worn where the bearing is on the shaft measures 1.249" nothing else is needed and the bearing can be installed.
- 13. If the shaft diameter is 1.247" to 1.249", clean the shaft and apply Loctite 648 to the shaft when installing the new bearing.
- 14. If the shaft diameter is below 1.247" a new roller must be installed.
- 15. Make certain that the V-guides on the rollers are aligned. If they are not aligned the belts will not track correctly.
- 16. Slide the collar on the bearing and tighten the set-screws on the collar to hold in place. Just tighten the screws enough to hold into place. DO NOT overtighten the set screws. Then tighten the Torx screw in the collar to 97 in.lbs. Figure 66



### Figure 66

- Install the drive pulley, belt or chain and sprocket depending on Model Year. Make certain that the belt is aligned with the idler pulley assembly on the subframe.
- 18. Make sure that the rock trap is in the open position prior to installing the draper belt on the deck. Place draper belt bundle on the top of deck runners, and unroll with the slats facing up. Be sure to align the v-guide with the notched side of the roller toward the rear end of the header. Wrap draper around one of the rollers and feed draper into the bottom runner of the deck. The bottom runners will support the draper, and prevent it from hanging down.
- 19. Pull draper through bottom runner, and wrap around the other roller. Pull the ends of the draper together.
- 20. Install a connector bar to close the joint. The curved sides of the connector bar are together. The heads of the screws for the connector bar should be installed pointing to the rear when the connector bar is on the top side of the feeder-deck. This helps prevent the crop being caught on the screws.

### 8.3 - Lateral Deck Drive Rollers

The lateral deck is assembled in the same manner for all width headers.

1. To remove the draper and rollers loosen the tension by flipping the over-center latch on the outside of the draper.



 Move the splice to the end of the header and remove all the bolts in the splice. Figure 67



Figure 67

- Loosen the bolts on the bottom of the gearbox. Remove the tension bolt and remove the belt from the gearbox. Figure 68
- 4. On the end of the deck, closest to the center deck, remove the shield, belt, and drive pulley. Figure 69



Figure 68

 Remove bearings assemblies on the drive side by removing the two retaining bolts. Figure 69



Figure 69

 On the front side remove the retaining bolt the holds the roller in place. Figure 70 The roller can now be removed.





### **Idler Roller Removal**

 Remove the shield and lock collar. Remove the bolts holding the bearing holder and remove the bearing and holder. Figure 71



Figure 71

8. Remove the bolt from opposite side of the roller. This will allow the roller to be removed from the deck.

### 8.4 - Roller Bearing Replacement

- 1. The bearings in the non drive end of the rollers can then be replaced. The roller bearings are pressed into the rollers with a friction fit and held in place with a retaining ring.
- 2. Remove seal that holds the bearing assembly in place. Be prepared to replace the seal with a new one upon replacement. Remove the snap ring that secures the bearing in place.



 Use a slide hammer to remove the stub shaft and bearing from the roller Figure 72



Figure 72

### Assembly

 Assemble the bearing and the stub shaft. Install the snap rings to the stub shaft to hold it in place. Install the bearing assembly and the seal in the roller Figure 73



Figure 73

- 2. Install the rollers in the deck.
- Install the bearings. Install the slider onto the shaft and the deck frame. Slide the collar on the bearing and tighten the plastic set-screws on the collar to hold in place. Just tighten the screws enough to hold into place. DO NOT overtighten the set screws. Then tighten the Torx screw in the collar to 97 in.lbs. Figure 74 and Figure 75



Figure 74





4. Install the drive pulley. Make certain that it is aligned with the pulley on the drive gearbox.

# 8.5 - Draper Belt Installation

 After the rollers are installed the rollers need to be square to the frame. Use a square to make certain the roller is perpendicular to the frame. If the roller is not square, loosen the lock nut and reposition the drive roller via the adjustment nut. Figure 77









### Figure 77

2. Make sure that the *quick release handle* is in the open position prior to installing the draper on the deck. Figure 78



Figure 78

3. Place draper bundle on the top of deck runners, and unroll with the slats facing up. Be sure to align the v-guide with the notched side of the roller toward the rear of the header. Figure 79



Figure 79

- 4. Wrap *draper* around one of the *rollers* and feed draper into the bottom runner of the deck. The bottom *runners* will support the *draper*, and prevent it from hanging down.
- 5. Pull draper through bottom runner, and wrap around the other roller. Pull the ends of the draper together on the top

surface of the *deck*. Install a *connector bar kit* to close the joint. The heads of the screws for the connector bar should be installed pointing to the rear when the connector bar is on the top side of the feeder-deck.

6. The head of the *screws* for the *connector bar kit* should be installed in the direction of travel. This helps prevent crop being caught on the *screws*. Figure 80



- 7. Once the draper is installed close the quick release lever to apply tension to the draper.
- 8. Turn the adjuster bolt until the indicator is aligned with the washer. Lock the handle and tighten the lock nut. Figure 81.



Figure 81



# 8.6 - Draper Drive Gearbox Replacement

Each lateral deck has a 90-degree gearbox that drive the draper. This gearbox is driven from either the Right-hand GT case or the lefthand GT case. If there is an issue in the gearbox it is best to replace the gearbox.

Right-Hand Draper drive Belt

 Loosen the two jam nuts and bolts that secure the drive housing. Loosen the jam nut and tensioner spring bolt on top of the case. This will loosen the drive belt to the input gear and the belt can be removed. Figure 82.



Figure 82

2. On the left-hand draper, loosen the two jam nuts on the GT case. Loosen the jam nut and bolt on the bottom of the case. This will loosen the drive belt to the input gear and the belt can be removed. Figure 83



Figure 83

- Note: The rest of the procedure works on either the left-or-right hand side gearbox removal.
- Remove the spring tension system off the gearbox assembly. Loosen the gearbox mounting bolts and remove the drive belt. Figure 84



Figure 84

5. The bolts on the bottom of the gearbox can now be removed. Figure 4



Figure 85

 Note the locations of the pulleys on the gearbox shafts. Remove the pulleys from the gearbox by removing the set-screws in the tapered hub on the pulley and use one of the screws to "push" the hub out of the pulley. Figure 86

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Figure 86

# 8.7 - Installation of the Draper Deck Gearbox.

- Install the pulley on the gearbox before installing the gearbox on the mounting plate. Make certain there is clearance between the gear and the deck frame. Set the pulley at the same location and tighten the set screws with Red Loctite to 15 ft. lbs. (20 Nm)
- 2. Install the gearbox on the plate and install the mounting bolts, leaving the bolts loose so the gearbox will slide.
- Install the draper drive belt. Tighten the jam nuts on the tension system until the spring gauge is at the washer. Tighten the mounting bolts to 17 ft. Lbs.(22Nm) DO NOT USE LOCTITE. Recheck the spring gauge to make certain the tension did not change.
- 4. Install the belt from the GT case to the gearbox. Tighten the adjusting bolt pushing the GT case out. Tighten the bolt until the spring gauge is even with the edge of the spring. Pull up on the end of the case and tighten the jam nuts. Figure 87



 Fill the gearbox about halfway which will be to the check plug, with 75W90 oil. Remove the plug on the top of the gearcase and fill until oil comes out the side plug. Figure 88



Figure 88

### 8.8 - Draper Belt Splicing

Regular maintenance will extend the life of your draper. Tears in the draper can be caused by poor tracking, foreign materials, or from careless use. If only a portion of draper is damaged, a splice may be installed.

Before beginning this repair, you will need an additional connector bar set and a section of draper that is at least 2  $\frac{1}{2}$ " longer than the piece to be removed.

Note: If the damaged section is not near an existing connector bar, you will need 2 connector bar sets and a piece of

draper 5" longer than the damaged piece.

### **⚠ WARNING!**

Engage the park brake on the combine, shut the engine down, and wait for all moving parts to stop before leaving the cab.

- 1. Raise the header and install lift cylinder locks. (If this is too high for comfortable access, the table can be set on blocks or lowered to the ground.)
- 2. Raise the reel and place the locks on the lift cylinders to prevent the reel from falling.
- 3. Release the draper tension.
- 4. Remove draper connecting bar.
- 5. Correct the cause of the draper failure.
- 6. The draper should be cut midway between two slats to provide ample material for the new join. With a measuring tape, measure, and mark a line six inches from a slat on a good portion of the draper. Place a board directly under the line you have marked, to support the section you will be cutting. With a utility knife and a straight edge cut the draper along the marks. This cut must be accurate, and square, to assure that the draper will track properly. Repeat this step on the other side of the damaged area. Lay the piece you have removed flat, and measure the width, then add 3 1/2 inches. The total will be the length of material you require for the splice. (If you need two new connector bar sets, add 5".)
- To mark the location for holes, measure
  1" in from each edge to be joined, and mark a line parallel to the cut edges.
- On each of these lines, measure 1-1/8" from the front edge of the draper, and make a mark for the first hole. Figure 89



Figure 89

- 9. Drill 3/16" holes through each mark.
- 10. Place the backs of the draper together, lining up these drilled holes.
- 11. Place a connector bar on each side, line up the holes, and secure with a machine screw and nut. Be sure the round edges of the connector bar are aligned with the edge of the canvas. Figure 90



- 12. Match up the edges of the draper and drill a hole at the opposite end on the 1" line, using the connector bar as a template. Insert a screw and secure in place. Drill the remaining holes through the holes in the connector bar, insert screws and secure.
- 13. Adjust draper tension. Trim all joins to 1/2" above connector bar.
- 14. Adjust tracking.



# 9 - Knife Assemblies

### 9.1 - RH/LH Knife Drive Installation Standard Cutting System

- With RH/LH knives installed in cutter bar and center guards installed it is time to properly shim the knife head off the bell crank.
- 2. Ensure timing rod is installed in drive paddle pulleys so bell cranks are parallel to one another.
- 3. Also ensure the knife head is fully installed onto the knife head. The knife head should be able to be installed fully onto the knife head by hand. DO NOT use a hammer or bench top vise to install knife head onto knife head. If this is required, the bearing is not aligned onto the inner race properly or the bearing/inner race are too tight to start with. See instructions below.

Note: Special attention is needed when starting to install the knife head assembly onto the knife head. You need to first get the seal installed onto the inner race prior to installing the bearing onto the inner race. See below for instructions.



Figure 91 Figure 1

- 4. CRITICAL: Make sure the seal is installed this way to make sure it is not damaged during installation. The knife head cannot be simply installed straight onto the knife head without damaging the seal.
- 5. At this point once, the seal is on inner race, push the knife head further onto the inner race by hand. DO NOT use a hammer or bench top vise to install knife head onto knife head. At the same time,

you are pushing down slightly rotate back and forth to get the rollers aligned onto the inner race. Figure 92



Figure 92

- Image showing how to install bearing fully onto inner race by rotating back and fore while pushing both together by hand. Figure 92
- 7. Make sure the knife head in fully installed on the knife head until it bottoms out. There is a thrust washer installed in the knife head that allows the top of the knife head/inner race to run against it
- Put Red Loctite on knife head mounting bolts and loosely connect knife head to bell crank. Figure 93



Figure 93

 Start installing shims between the knife head and bell crank and watch for clearance between the knife assembly (knife head on top and knife back on



bottom.



Figure 94

- Figure 94 Image showing the knife head fully installed onto knife head. Roughly 1/8" clearance between bottom of knife head and face of knife head.
- 11. Adjusting the position of the Knife head bearings and knife assembly.



Figure 95

- Image showing minimum clearance (1/32" to 1/16") between knife assembly and center guards.
- 13. Before the knife head mounting bolts are tightened, we need to set the vertical position of both knifes.
- 14. Start with the LH knife and insert a 0.030" shim between the center guard (right in front of LH knife head) and the bottom of the sickle section. We install this shim in this area to make sure the LH knife does not have too much down pressure onto the guard. See Figure 95.
- 15. With 0.030" shim installed, press with light hand pressure down onto top of LH knife head (will lightly pinch 0.030" shim between sickle section and guard) and tighten mounting bolts to 170 ft-lbs. Remove shim after tightening.

NOTE: This process may not work every time as when you tighten the two main mounting bolts it actually twists the knife head slightly downward onto the shim and puts a lot of pressure between the sickle section and guard. So, the shim may be stuck in place. We are most worried about having minimal down pressure of the LH knife down onto the center guards. This is all we are worried about. So, if you need to set without shim try to make sure there is hardly any down pressure of the LH knife down onto the center guards. This process can be confirmed by checking cutting system temperature in this area after running the header for 5-10 minutes. We will now install the RH knife head onto the bell crank. Take the 0.050" shim and place between LH knife and RH knife head. See Figure 97

- 16. With 0.050" shim installed, press with light hand pressure down onto top of RH knife head (will lightly pinch 0.050" shim between RH/LH knife assemblies) and tighten mounting bolts to 170 ft-lbs. Remove shim after tightening.
- 17. Now with everything tightened, remove timing pin on knife drive pulleys and have someone stroke the knife by hand (pull on knife drive belt) and another person inspect the RH and LH knife for any tight spots.
- Make sure the RH or LH knife is not interfering with the front/rear of the center guards. If significant interference is present check out the shimming.
- 19. Also make sure the top and bottom of the LH/RH sickle sections are not interfering with the center guards through the whole range of travel. If significant interference is present between the sickle sections recheck shimming as detailed in steps 6-9. Also check for any bent up/down guards.
- 20. Your last step is to install the grease zerks into the knife head assemblies. The grease zerk was left out in order to install knife head onto the knife head.

- 21. This process will be confirmed during the run-in stage and checking the guard temperatures.
- 22. It is also critical to check the knife head/knife head bearing temperature after it has been fully assembled. Run the knife at full speed for at least 10 minutes to check for any abnormal temperature in the knife head/knife head bearing. It can simply be checked by grabbing the knife head with your hand and if it is too hot to hold onto then the bearing should be checked. If you have a laser temperature gun, check the knife head temperature close to the bearing and if reading anything over 80C please check the bearing.



Figure 96



Figure 97

### 9.2 - Knife Hold-Down Adjustment Standard Cutting System

- Stroke the knife so that the sickle sections are directly underneath the holddowns (A).
- Push the knife sickle section (B) down against the guard and insert a 0.020" shim (C) between the sickle section (B) and the hold down (A). If there is a large gap or shim is easily inserted or cannot insert the shim, then the hold down needs to be adjusted. When the hold down is properly adjusted the shim should be able to be inserted with light resistance while pushing down the sickle section against the guard.
- Adjust hold-down (A) by turning the hold down adjustment bolt (D) clockwise to lower the front of the hold-down and decrease clearance, or counter clockwise to raise the front of the hold down and increase clearance.

NOTE: For larger adjustments, it may be necessary to loosen the hold down mounting nuts (E), turn adjuster bolt (D), and then retighten nuts (40 ft. Lbs)

4. Recheck clearance and readjust each hold down as required.



Figure 98

# 9.3 - Knife Drive Timing AirFlex,

- Disconnect the drive shaft PTO from the knife drive system to allow you to move the knives freely while aligning.
- Run a long bolt or rod through the alignment hole of the two flywheels to keep them aligned with each other. Figure 99
- 3. Remove the feather plate from above the two knife heads on the cutter bar.
- Remove the knife head bearings and use a straight edge to set the bell cranks parallel. This is the starting point for the timing. Figure 100
- 5. Loosen the large jam nuts on the ball joints.
- Remove the bolts from the rear of the tie rods. Adjust the tie rods until the bell cranks are parallel. Figure 99



Figure 99

- 7. Once bell cranks are parallel screw RH pitman arm in (clockwise rotation looking at back of pitman arm) 3 turns.
- Apply Loctite to jam nuts and tighten the jam nuts to 230 ft. lbs. (311 Nm)
  Note: Make certain the tie rods stay straight when tightening the jam nuts. Use a pry bar to hold the tie rods in place while tightening the jam nut. Figure 100



Figure 100

 Install the carriage bolts to secure the connecting rods on the flywheel. Use red Loctite on the nuts and torque to 68 ft. lbs.

## 9.4 - Knife/Bell Crank Drive

The Knife drive bell crank assemblies have changed over the past years. The assembly is about the same with some added items.

- To remove the bell crank assemblies, install a bolt in the rear bearing drive for timing. Figure 99 in timing section.
- 2. Remove the feather plates above the knife drive assembly.
- Remove the knife head bearings by removing the bolts. Figure 101. Note the location of any shims behind the knife head bearings.





Figure 101

- 4. Remove the clamp bolts on the tie rods. Note: the clamps must be used with the bell crank that it came off of as it is a matched set.
- 5. Remove the two nuts retaining the bell cranks to the drive paddle. Remove the stabilizer arm between the bell cranks.
- 6. The bell cranks can be removed and the bearings replaced.
- Remove the snap ring and press the bearing from the bell crank. Note the bell crank can be replaced as a complete assembly. If a complete assembly is installed follow the instructions in the kit for the Model Year of header that you are working on.
- 8. If replacing just the bearing follow the instructions in the bearing kit. Make certain that you use the tool provided to press on the OD of the bearing. The letters on the bearing are up when pressing in the bearing. If the bearing is replaced with the non-greaseable bearing the grease fitting in the head of the bolt must be removed and replaced with a plug. Figure 102.





Figure 102

 Install the bell cranks on the drive paddle. Insert the bolts from under the cutter bar and install the stabilizer bar with an Oring between the top of the bearing and stabilizer. Figure 103 Use grease to hold the O-ring in place. Put the nuts on the bolts finger tight to hold in place. Figure 104







Figure 104 Figure 5

10. Use Green 648 Loctite on the shaft of the tie rod end before installing the clamps.

During assembly make certain the snap rings align with the grooves in the clamps. Figure 105



Figure 105

 Install the clamps on the tie rods. Use new clamp bolts every time the clamp bolts are removed. If the bolts are reused too much they can fail. Use red Loctite on the nuts for the clamp bolts. Tighten to clamp bolts to 100 ft. lbs. (180 Nm) Figure 106



#### Figure 106

Note: Do not use Loctite on the bell crank nuts. Torque the nuts to 765 ft. lbs. (1033 Nm)

12. **On Model year 2019** and above a stabilizer with a 1 3/16" hole is being used. The stabilizer has a washer under the stabilizer between the stabilizer arm and inner race of the bearing. This washer goes between the stabilizer and the top of the bearing with the convex side down. Figure 107.



### Figure 107

- Two O-rings used under the stabilizer. The O-rings are placed between the stabilizer and the bearing and over the seal of the bearing. Figure 108
- The O-ring between the stabilizer and bearing is used on all units, item 1. The O-ring around the bearing is used on Model Year 2019 and above, item 2.





### 9.5 - Cutter bar Connector Kits

 The connector bar is used to repair a broken knife back. The break should be cut out and ground smooth. A cutting section should bridge the break and the connector bar should be installed on the top of the knife back. Figure 109 Note: This is for the standard cutting system.





Note: Knife sections must be installed on the bottom side of the knife back.

# 10 - Electrical

### 10.1 - Electrical components 200 series (Model year 2018 and below)

The 200 series headers have their own electrical system. The system contains a wire harness unique to the 200 series along with a controller and display. The following are the components of that system.

This display Figure 110 is mounted in the cab of the combine with a wire harness that is connected to the main power harness that is installed on the combine. The wires connect to the power harness at the power plug and the CAN 1 plug



Figure 110

The controller takes information from the header and converts it to the information that the combine is looking for. Figure 111

The controller is located behind the shield over the air compressor tank. The controller has three connections:

- RH harness
- LH Harness
- Multi-coupler harness that goes to the combine



Figure 111

The HHC system has several sensors. The number and location of the sensors is determined by the year that the header was manufactured.

### 10.2 - Flex sensor system

- The flex sensor system has two potentiometers mounted on the back struts of the main frame. They are connected to the knife struts by a sensing tube in the rear and a series of arms on each strut. See section 5.1 - Flex HHC for mechanical adjustments of the flex sensors. Figure 112
- 2. The sensors can be adjusted by the turnbuckles. The sensors should have a minimum range of1.5 volt to work properly.
- 3. The sensors follow the movement of the struts through the sensing tube. Power is provided through the combine to the sensor.
- 4. The sensor has three wires connected to the sensor. Figure 113
  - Power wire (this is combine sensor voltage). Red wire (C)
  - A ground wire. Black wire (A)
  - A signal wire which sends voltage from the sensor to the controller. Yellow wire (B)



Figure 112



Figure 113

### 10.3 - Rigid Sensor System MY2017 and below. Center Drop-Down Sensors

- The rigid sensing system has a sensor on each divider and two centers drop down sensors. The divider sensor is attached to the end divider and is controlled by the divider. Figure 114
- The center divider sensors have wheels that follow the ground and will sense ground contours. On some units there may be 2 sensors in the center or a total of four drop down sensor's outer struts. Figure 115

 The sensors can be adjusted by the turnbuckles. The sensors should have a 1.5-volt range

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- 4. The system can be set for either divider or center sensors.
- 5. Each of the sensors send a signal to the controller in the same manner as the flex sensors. The wiring is connected to the sensors as show in Figure 113
  - Power wire (this is combine sensor voltage). Red wire (C)
  - A ground wire. Black wire (A)
  - A signal wire which sends voltage from the sensor to the controller. Yellow wire (B)



Figure 114



Figure 115

### 10.4 - Rigid Sensor System MY2018 Gauge Wheel and Subframe Sensors

Starting in MY18 instead of center sensors under the header the subframe is suspended and has sensors installed on each side of the subframe. There is a gauge wheel on each side of the main frame. The subframe has a sensor on each side. The subframe sensors measure the movement between the combine feederhouse and the mainframe of the header.

Figure 116





Figure 117



### 10.5 - Troubleshooting 2018 and below 200 Series

When issues occur with the electrical system it is very easy to troubleshoot. The use of a volt/ohm meter will give you the information that you need. The ATMX system also has some tests that you can use to troubleshoot the system.

# 10.5.1 - Problem: AMTX box will light up but then go out. Red BEE on left side of the box.





Figure 118

- 1. Turn ignition on the combine.
- 2. Check for power at the IGN wire coming from the combine. Note the IGN wire is different on each brand of combine.
- Check for power at pin 13 on controller connector. If there is power at pin 13 then the issue is the controller. Figure 119
- 4. If there is no power then the issue is the wire between the single point connector and the controller. Trace the wire from the controller to the single point to find the break in the wire.





 At the single point check for 12 volts at the two large and two small terminals on the power harness from the combine. Figure 120 and Figure 121



Cav	NO.	Col.	Spec	Type	Cavity Plug
1	-BATT PWR1	BLK	8AWG	GXL	-
2	-BATT PWR2	BLK	12AWG	GXL	•2
3	+BATT PWR1	RED	8AWG	GXL	
4	+BATT PWR2	RED	12AWG	GXL	-
5	•	•		-2 8	114017
6	2	-	20 		114017
7	CAN1-S	WHT	20AWG	GXL	S
8	CAN1-H	YLW	18AWG	GXL	-
9	CAN1-	GRN	18AWG	GXI	-

Figure 120





Cav	No.	Col.	Spec	Туре
1	CAN 1H	YLW	18AWG	PVC
2	CAN 1L	GRN	18AWG	PVC
3	+AUX-PWR	RED	14AWG	GXL
3	+BATT PWR	RED	6AWG	GXL
4	-BATT PWR	BLK	6AWG	GXL
4	GND-1	BLK	18AWG	GXL
4	GND-2	BLK	16AWG	GXL
5	HSOUT 13	RED	18AWG	GXL
6	HSOUT 13 RTN	BLK	18AWG	GXL

#### Figure 121

If there is no power at the larger terminals, check the 100-amp fuse by the combine battery.

- 1. Note: Pin Outs are on the Model year 2017 and above
- 2. If there is power at both side of the fuse put the ground probe of the multimeter on the battery and check for power at the number 3 pin. If there is power the issue is the ground wire.
- 3. If there is no power the issue is the 12volt large wire in the harness.
- 4. If there is power at the large wires check for power and ground at pin 2 and 4.
- 5. If there is no power on pin 2 or 4 check the 20-amp fuses.
- 6. If fuses are good then the power or ground wires are broken.

# 10.5.3 - Problem: CAN communications error

# SUPER CRITICAL ERROR CANBUS COMMS FAILURE

### Figure 122

 Make certain to check for loose wires at the power connection. There are several wires that are joined in one connection. Sometimes the wires can come loose from the connectors. It is best to move the wires to find any kind of a break at this point.



- 2. Turn the IGN on the combine and wait a few seconds, does the error clear. If not move to step 3.
- On the power/display harness check for continuity between the following pins. Check both connectors for the display, Figure 10
  - Pin 9 and pin B on the three-pin display connector.
  - Pin 8 and pin A on the three-pin display connector
  - Pin 7 and Pin C on three-pin display connector



Figure 124



- 4. If any wire does not have continuity the wire must be repaired. Remember to check all connections at the plug.
- 5. Check wires to make certain that they are seated and will not pull loose from the connector when stretched.
- If wires are good check for continuity on the Mutli-coupler harness between the single point and the controller. Figure 125
- Check continuity between pin 1 on controller connector and pin 8 on the single point connector.
- Check continuity between pin 4 on controller connector and pin 9 on the single point connector.
- Check continuity between pin 5 on controller connector and pin 7 on the single point connector.



#### Figure 125

7. If all wires have continuity then the issue is in the controller.

### 10.5.4 - Problem: Air Valve does not hold air in tank or does not regulate the air.

This could give you a slow fill warning on the display, or the air tank not filling on the SDX. There could be two issues

**Issue 1**: Air valve installed incorrectly. The air valve must have the arrow on the valve pointing down away from tank. If the valve is not installed correctly the air will continue to leak from the valve. The arrow on the valve must be turned pointing the ground. This could also be a cracked compressor head or a faulty check valve.



### Figure 126

**Issue 2:** The solenoid is sticking or dirty.

**Note:** On a cold morning the valve could be frozen either open or closed due to condensation in the tank. The valve can be disassembled and clean, but the tank should also have the water drained out of the tank. To drain the tank set the pressure at zero and release all the air.

 Remove the diaphragm by removing the 4 screws on the back of the valve. Figure 127





2. Remove the diaphragm and clean the surface area off the valve. Figure 128





Figure 128

# 10.5.5 - Problem: Air Compressor will not operate.

Note: For checking any of the terminals on the connectors on the controller the connectors must remain attached to the controller. To check the connections, remove the cap by cutting the wire tie on the rear of the connector. Figure 129

- 1. Turn on the compressor by going to flex mode and increasing the air pressure.
- 2. Check to see if the air compressor is running.
- Check for 12 volts at the air compressor connector. Note: The compressor will need about 50 amps for start-up.
- If there is 12 volts present replace the compressor. If no voltage is present go to Step 5.
- Check for 12 volts at pin 57 and 58 on the left plug on the controller. Figure 13 and 14
- 6. Check for ground at pin 60 and 61 of the controller.

**Note:** The two pins that supply power and ground are spliced together a short distance from the Amp connector on the controller.



Figure 129



Figure 130

7. If power and ground are present at the pins then the issue is wires between the connector and the compressor.



# 10.5.6 - Problem: The HHC sensors are not working.

 Check the raw voltages for the sensors. This will indicate if the sensors are getting voltage and sending it back to the controller. To access these voltages, press the info button once. Figure 131



### Figure 131

- Arrow Info button
- Screen Top Row:
  - Center numbers are the flex sensor voltages.
  - Outside numbers are the divider sensor voltages.
- Screen Bottom Row
  - Outside numbers are the additional drop-down sensors that can be added.
  - Center numbers are the center dropdown sensors (MY2017 and below) or the subframe sensors (MY2018)

Note: If there is an asterisk, it indicates the sensor has not been calibrated. Calibrate the header before proceeding. Figure 132



#### Figure 132

2. If the display for any of the sensors reads zero or does not change check connections the sensor wires.

Note: When testing the wires, the connectors will need to remain plugged

# together and probe the back of the connectors.

Check for 5 volts at the red wire C pin on the sensor. Figure 133



Cav	No.	Col.	Spec	Type
A	FLX-HH-R-A	BLK	18AWG	GXL
в	FLX-HH-R-B	YLW.	18AWG	GXL
С	FLX-HH-R-C	RED	18AWG	COL

### Figure 133

# Note: All HHC sensor connectors are the same back to the controller.

- 3. Check for ground at the Blk wire at A pin.
- 4. If you do not have 5 volts at pin, C, or a ground at pin, A, follow wires to controller.
- 5. On MY17 and 18 check for 5 volts at connector on rear of main frame.
- If you do not have voltage there check at controller at the proper pin for that sensor. If there is no voltage at the pins on the controller replace the controller. If there is find the broken red or black wire.

The following are the pin locations for each sensor:

### Left-hand Harness





17 CTR1-HH-L-C RED

subframe sensor or drop down sensor

### **Right-hand Harness**

Left Hand divider

sensor





13	DIV-HH-R-C	RED
14	DIV-HH-R-B	YLW
15	DIV-HH-R-A	BLK

# **RH** Divider

### sensor

7. If there is 5 volts at the sensor check for changing voltage at the yellow wire at B pin.

drop down sensors

RED

YLW

8. Follow the yellow wire back to the controller checking along the way for changing voltage.

### 10.5.7 - Problem: Bad Sensor Error Code

The display will have and error code of Bad Sensor Power. Figure 134



### Figure 134

This error indicates that a sensor is not reading the correct voltage. The air pressure may also read 999. This could be either a bad sensor or a wire shorted to ground. The raw voltages for on the display screen will not show correct voltage and will not change.

### On a model year 2016 and below

- 1. Examine the wires that are exposed to stubble and crop for wear or pulled wires.
- 2. Disconnect each large AMP connector at a time. When the error goes away this will tell you which side of the header is the issue. Figure 135



- 3. Disconnect all sensors including the air pressure sensor. If the problem goes away then issue is one of the sensors are shorted to ground.
- 4. If disconnecting the sensors does not resolve the issue the it is a broken wire or wire shorted to ground. Use a voltmeter and check for continuity between the Red Wire and the Black wire on each Sensor. Figure 136.



### Figure 136

### Figure 20

- If there is continuity between the power and Ground wire then there is a short between that point and the controller. Follow the harness back until the short is found.
- 6. If there is no continuity then each wire will need to be followed back to the controller.

### On Model Year 2017 and 2018

Testing on these two model years are similar to the model year 2016 and below.

 Disconnect all sensors including the air pressure sensor on the rear main beam of the header. Figure 137. If the problem goes away the issue is one of the sensors are shorted to ground. If the problem does not go away go to Step 5.



#### Figure 137

2. Connect each connector one at a time. When the error comes on the screen that is the circuit with the issue. Use a voltmeter and check for continuity between the Red Wire and the Black wire on each Sensor. Figure 138.



Figure 138

3. If there is continuity between the power and Ground wire then there is a short between that point and the connector on the beam. Follow the harness back until the connector until the short is found.

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- 4. If there is no continuity then each wire will need to be followed back to the connector on the beam.
- 5. Test for continuity between the Red and Black wire at each of the connectors for the sensors. If there is continuity the problem is with the main harness running through the headers beam.
- 6. If there is no continuity between the Red and Black wires then the issue is a broken wire in the main harness.



### 10.5.8 - Problem: Header Height Sensors not showing voltage

The header height sensors send a signal to the display and to the combine. The sensors have three wires leading to them. The sensors have a 5-volt reference voltage, a ground, and an output signal wire. If there is not a reading on the display for a sensor the three wires will need to be checked. Figure 139



Figure 139

- Check the C pin for 5-volt reference voltage. This voltage is from the combine through the display harness. If no voltage is present follow the wire back to the display harness
- 2. Check the ground at pin A. The sensor receives the ground through the back side of the multi-coupler harness on the relay panel.
- 3. Check the connector at Pin B. The voltage should vary as the sensor is moved. The wire goes to the combine as well as the display. Each sensor (Left and right) will go on a separate pin to the combine.
- 4. There are splices in the main harness and on the signal wire it is possible to have a signal going to the display and not to the combine. When testing make sure you test for signal at the combine and not just the display.

**Note:** Follow the wire harness to check for splices as well as the proper diagram for the combine brand.

### 10.5.9 - Problem: An error code "no Recognition Module" or 'Recognition module shorted" appear on the combine screen.

Note: This issue will only occur on a CNH combine.

**Solution:** The CNH combine needs a device to tell the combine what header is on the combine. If the combine does not see this signal it will not set the combine to the correct header. The error can be bypassed and the header can be chosen through the screen. The error may occur anytime the key is turned on.

The multi-coupler harness has a recognition module wired in the system. The module has resistors wired in.

1. Remove the module, Figure 140, from the harness. The module is 16 inches back from the combine connector at the single point.



Figure 140

2. Check the resistance across the terminals noted in Figure 141. If the readings are not correct the recognition module needs to be replaced.





### Figure 141

3. If the recognition module is working then the wire harness needs to be checked. Check the wires between the plug on the harness and the plug that goes into the combine harness per the list in Figure 142.



Pin on Recognition plug	Pin on combine connector
1	12
2	27
4	13

Figure 142

4. If continuity is found on all the pins then the issue is with the combine and not the header.

# 10.6 - Transport Electrical System

The transport system has two electric brakes on the trailer. It also provides the electrical control for the road lights on the header.

The front trailer has a harness to the tow vehicle. The harness either has an RV plug, Ag Plug, or a plug for European vehicles.

- Figure 143 RV Plug
- Figure 144 Ag Plug
- Figure 145 European Plug



**RV TRAILER PLUG** 

Cav	NO.	Col.	Spec	Туре
(1) WHT	GND	WHT	12AWG	PVC
(2) BLU	E-BRAKES	BLU	14AWG	PVC
(3) GRN	TAIL1	YEL	14AWG	PVC
(3) GRN	TAJL2	GRN	14AWG	PVC
(4) BLK	-	-0	-1 -	-
(5) RED	LT-TRN	RED	14AWG	PVC
(6) BWN	RT-TRN	BWN	14AWG	PVC
(7) YEL	-	-	-	-



Front view



Name: A Conn PN	G TRAILER 82-2140	PLUG	•	
Cav	No.	Col.	Spec	Туре
1-(WHT)	GND	WHT	12AWG	PVC
2-(BLK)	-	•	•	-
3-(YEL)	LT-TURN	YEL	14AWG	PVC
4-(RED)	STOP	RED	14AWG	GXL
5-(GRN)	RT-TURN	GRN	14AWG	PVC
6-(BWN)	TAIL	BWN	14AWG	PVC
7-(BLU)	-	- 2	-11	-

#### Figure 144



EUROPE TRAILER PLUG

Name: E Conn PN	UROPE 1 EP01	RAILE	R PLUG	
Cav	No.	Col.	Spec	Туре
(1) YEL	LT-TRN	YEL	14AWG	PVC
(2) BLU	-	1	-	4
(3) WHT	GND	WHT	12AWG	PVC
(4) GRN	RT-TRN	GRN	14AWG	PVC
(5) BWN	R-TAIL	BWN	14AWG	PVC
(6) RED	STOP1	RED	14AWG	PVC
(6) RED	STOP2	BLU	14AWG	PVC
(7) BLK	L-TAIL	BLK	14AWG	PVC

#### Figure 145

On the RV plug a flasher is wired in the system to flash the yellow lights when the daytime running lights are on the tow vehicle. This flasher is wired in the system at the Rear of the adapter harness. Figure 146



Figure 146

The Europe and Ag plugs do not have a flasher wired in the system. Figure 147 shows pin connections.

E-BRAKES BLU 14AWG TAIL2

GRN 14AV



Ag trailer connector

av	NO.	Col.	Spec	Type	Cavity Plug
ļ	.s	S .,	3	-	114017
	GND	WHT	12AWG	PVC	-
81	R-STOP	RED	14AWG	PVC	-
33	L-STOP	BLK	14AWG	PVC	-
91	LT-TURN	YEL	14AWG	PVC	-
	RT-TURN	GRN	14AWG	PVC	-
1	•	-			114017
	TAIL	BWN	14AWG	PVC	2 S

Europe Trailer connector

Cav	No.	Col.	Spec	Туре	Cavity Plug
1	-	-	28	-	114017
2	GND	WHT	12AWG	PVC	
3	STOP1	RED	14AWG	PVC	-8
4	STOP2	BLU	14AWG	PVC	•5
5	RT-TRN	GRN	14AWG	PVC	-
6	LT-TRN	YEL	14AWG	PVC	-
7	6 0	-	•x - X	•	114017
8	TAIL	BWN	14AWG	GXL	-

#### Figure 147

The lights are on the right-hand shielding. There are two amber lights and two red taillights. The amber lights will flash anytime the tow vehicle has the lights on or if the tow vehicle is equipped with daytime running lights, when the RV plug is used. The red lights work as taillights and turn signals. Figure 148



### Figure 148

### Model year 2016 and below

The power for the trailer brakes and tail lights does not go through the controller on the header. The brakes are connected to the headers with a flat plug at the trailer cart. Figure 149 shows the pin connections to the cart.



Power from this plug goes through the lefthand harness and into the right-hand harness. The power goes through a light module. This module is attached to the bracket for the controller. Figure 150-Figure 153.



Figure 150



TC-INTER						
Cav	No.	Col.	Spec	Туре		
+	TC-12V	RED	12AWG	GXL		
S1	TC-LT-TRN	YLW	14AWG	GXL		
S2	TC-BRK	BLU	14AWG	GXL		
P1	TC-TAIL	BWN	14AWG	GXL		
P2	TC-RT-TRN	GRN	14AWG	GXL		
-	TC-GND	WHT	12AWG	GXL		







### Figure 153

The brakes are connected to the harness with a flat plug at the transport cart. Power from the vehicle goes into the brakes through a flat plug on the wire harness. The only power is the brakes. There are other connectors for future items. The brakes have 12 volts and a ground wire. Each brake has a coil to move the shoes against the housings. Figure 154





## 10.7 - Wire Connector Repair Deutsch Connectors

 All wires and contacts are removed and installed from the rear of the connector. If you try to remove from the front or with out the correct removal tool the contact and connector will be damaged. The tool will release the barbs inside the connector. Figure 155.



Figure 155

- 2. Put the handle of the removal tool over the wire. There are different tools for the different size of wires. While pulling the handle away from the wire carefully push the tip of the tools over the wire.
- Slide the tool straight into the connector along the wire, without twisting the tool. Push the too into the connector until it unlocks the contact and you feel resistance. If you force the tool into the connector the tool will break. Figure 156.



Figure 156 Figure 2

> Carefully slide the wire contact and removal tool straight out of the connector. Figure 157



Figure 157

- 5. If the wire has pulled out of the contact leaving the contact in the receptacle the contact can be removed in the following manner:
  - A. Fully insert the proper size removal too into the receptable.
  - B. Locate a solid wire the proper size and grind a point on one end. Then grind one side of the pointed end flat so that it has a slight flat surface on it
  - C. Carefully insert the pointed end of the wire into the receptable through the removal tool. Apply light pressure to the wire to force it into the contact.
  - D. Once the wire has seated into the contact carefully slide the wire, removal tool and contact out of the receptable. Figure 158





- 6. Choose the correct AWG for the contact being used.
- 7. Measure the end of the wire for the contact length
- 8. Use a wire stripping tool to remove the installation.
- Remove a small portion of the insulation. Figure 159



### Figure 159

- 10. Check for broken or dented strands of wires.
- If broken or dented strands of wire are found cut and strip the wire again. Figure 160



### Figure 160

12. A special tool must be used to install a new contact on the wire end. The contact cannot simply be compressed with a pliers. Figure 161



Figure 161

- The wire must be stripped correctly. There must not be any strands of the wire missing or any nicks in the wires.
- 14. Set the crimping tool for the proper size wire and contact.
- Loosen the lock nut and turn the adjusting screw in until it stops Figure 162



### Figure 162

- 16. Put the contact in the crimping tool with the opening for the wire out. Turn the adjusting screw out until the end of the contact is even with the indent cover. Tighten the lock nut and remove the wire.
- 17. Put the stripped end of the wire into the contact. Make sure that all the strands of wire are inside the contact. Make sure that you can see the strands of wire the hole in the side of the contact. Figure 163



18. Put the contact and wire in the crimping tool with the contact centered between the stops in the crimping tools while holding the wire in the contact push the handles together until the stops are together. Release the handle and removed the crimped contact and wire. Figure 164



### Figure 164

- Make sure all of the wire strands are inside the crimped contact. Look through the hole in the side of the contact for the wire strands. Figure 163
- 20. To install the wire with the contact into the connector make certain that you are inserting the pin and the socket in the correct connector. The connector for the pins will have PIN and for the sockets SKT will be printed on the rear grommet (wire end) of the connector Figure 166



Figure 165



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Figure 166

- 21. Hold the wire approximately 1 inch from the contact
- 22. Hold the connector with the rear grommet (wire end) toward you
- 23. Push the contact wire straight through the rear grommet and into the connector until movement is stopped. You will hear a snap as the locking tab fingers lock behind the contact. A small pull on the wire indicates that the contact is correctly locked in place. Figure 167



24. To remove the contacts on the smaller DT series connector, remove the wedge from the center of the connector using a needle nose pliers. Figure 168



#### Figure 168

25. To remove the contacts, gently pull the wire backwards while releasing the lock finger by pushing the contact to the center of the connector. Figure 169



#### Figure 169

- 26. Hold the seal in place and remove the wire and the contact.
- 27. The contact installation is the same as the larger connectors. Make certain that you set the tool for the correct size contact and wire.
- To install the wire in the connector, hold the wire about 1 inch from the contact. Hold the connector with the rear grommet (wire end) facing you.
- 29. Push the contact into the grommet until a click is heard. Tug on the wire slightly to confirm that the contact is locked into place. Figure 170



Figure 170

30. Once all the contacts are in place insert the wedge in the front of the connector. On three terminal connectors make certain that the arrow is pointing to the exterior locking mechanism. On the other connectors the wedge will only insert one way. Figure 171



Figure 171



### 10.8 - Downloading Software 200 Series Model Year 2018 and below.

The software can be upgraded in both the controller and the ATMX display This is done by using the *WINTOOL* Figure 172 and a USB to mini. The tool can be downloaded off the website.



Figure 172

- 1. To load the tool, go to honeybee.ca
- 2. Go to the wintool software under the manuals section AirFlex, Figure 174





HONEY BEE Harvest Faster		PRODUCTS - MANUALS PARTS	VIDEOS WHERE TO BUY ABOUT US + CON
AIRFLEX AIRFLEX SDX	4000 SERIES HEADER	SRAIN BELT / RICE BELT HEADER GRAIN BELT PLUS	SWATHERS INSTALLATION MANUALS
AirFLEX			
Warranty Registration	<b>Operator Manuals</b>	Parts Books	Quick Start Guides
± Download (0.1 MB)	<b>±</b> 2022	± 2021	<b>±</b> 2022
Delivery Inspection	± 2022 Russian	± 2020	± 2022 Russian
± Download (0.1 MB)	<b>±</b> 2021	<b>±</b> 2019	<b>±</b> 2021
	± 2021 Russian	± 2018	± 2021 Russian
	± 2020 (9 MB)	± 2017	± 2020 (9 MB)
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### Figure 174

Wintool package

Download information

- 3. Download the information to your computer
- 4. Make a folder and name it ATMX or anything so that you know where it is.
- 5. Once the file is downloaded move the Zipped file to the folder and unzip the file,



### Figure 175

6. When the file is unzipped click on the application and allow it to load. Use the wizard to load the tool.



7. This should also put an Icon on your desktop.



Figure 176



Figure 177

Wintool Menus

There are several different tabs on the tool.

- Main tool toolbar.
- Devices-This is used for programing
- Parameters-For settings within the tool.
- Date/Time sets the local time (no changes needed)
- Files-not used
- Live data- looking at current information
- Event Log-not used
- Data logging- To follow performance
- Diagnostic-not used






Figure 178



Figure 179

- 8. Check the software version before downloading.
- 9. In main menu on the ATMX display scroll to system Information using the arrows on the left of the display.
- 10. Accept and scroll using the arrows to software version.
- 11. Make certain that the current version is lower than the version you are downloading, Figure 181
- 12. Escape to the main menu.







#### Figure 181

To start the installation process.

- 13. Open the service tool on the computer.
- 14. Connect the USB to Mini B wire to the USB port on the computer and on the Mini port on the display.
- 15. Make certain that computer is charged and the battery on the combine is also charged. Leave the combine running during the download to make certain that the combine battery stays charged.







- 16. Once the connection is established between the WinTool and the display the screen will show connected.
- 17. Click on the first line so that it is highlighted. Figure 184
- 18. When connected on the bottom of the screen start to reprogram device.
- 19. This will give you a screen and make certain that you are using the latest software.





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20. Make certain the USB line is highlighted in blue.

- 21. After everything is verified click on the reprogram device button at the bottom. The programming will start and the status bar will be moving
  - The lower line gives the status. Remember that there are two devices to program, controller and display.
  - When completed the status bar will state *programming successful* Figure 185
  - During the software download the screen on the ATMX display will read "DO NOT POWER OFF UPDATING CONTROL.
  - Do not remove power or stop the download. This could damage the controller or display.





Figure 185



22. After the software download the serial number of the header will need to be put in the controller.

- 23. Go to parameters.
- 24. Run Info.
- 25. Product Info.
- 26. RUNP\_honeybee\_serial\_number.
- 27. Type in the serial number of the header in the box.
- 28. Hit the set button







- 29. Make certain the software version that you downloaded is the same that is in the system. In main menu on the ATMX display scroll to system Information using the arrows on the left of the display.
- 30. Accept and scroll using the arrows to software version.





### **10.8.1 - Function of the Blue Light AirFlex**

 These models have the controller on the header. The blue light is mounted on the single point connection. It indicates when there is communication between the display and the controllers Figure 186



Figure 186

- 2. The light is turned on when power is supplied by pin 3 and 11 on the controller connector.
- 3. On Model year 2017 and below there is a red light on the center reel arm. This light works in conjunction with the speed sensor and will illuminate when the auger stalls. Figure 187.





## 11 - Hydraulics

The hydraulic system is a simple system on both the AirFlex and SDX. Oil for any hydraulic function is supplied by the combine. The hydraulic diagram shows the oil flow for the headers Figure 188. The manifold at the back of the header has all of the hydraulic connections from the combine.





**For Model year 2016 and Older the hydualic diagram is slightly different**. The tilt is controled by the reel fore and aft circuit. Since this is a double acting circuit the header has two solinoid valves to control the flow between the fore/aft circuit and the tilt circuit. Figure 189



Figure 189

The Manifold Figure 190 directs oil from the combine to the rest of the headers.

- RL- To the cylinders for reel lift. This circuit on Model Year 2017 and above also provides oil for the header tilt cylinder. The oil goes through an electric over hydraulic valve that sends the oil to the desired system
- F- The reel fore side of the cylinder

- A- This goes to theblock on the solinoid valve. From there is goes to the rod end of the tilt cylinder or the rod end of the RH Fore and Aft cylinder.
- P-Goes to the reel drive motor to provide hydraulic flow to the reel motor in the center of the header
- R-Is the return oil for the reel drive motor. This is also the return of the oil from the right hand lift cylinder.





Figure 190

## 11.1 - Tilt Valve

The tilt valve is controlled by the display box in the combine cab. On the AirFlex Model Year 2018 and below the power for the tilt valve control comes from the display on the header. On all SDX and Model Year 2019 and above the power comes from the display box.

The tilt valve has a solinoid that is activated by the display box. This valve has three ports. On Model year 2016 and below two valves are used. With no power to the valve oil flows from port 2 to port 1. When power to the solinoid is applied a spool shifts and send oil to port 3. Figure 191. The oil flows as follows:

#### Model Year 2017 and above/one valve.

- RL port on hydraulic manifold to port 2 on valve.
- No Power from port 2 to port 1 LH reel lift cylinder.
- Power to solinoid from port 2 to port 3 rod end of the tilt cylinder.

#### Model Year 2016 and below/two valves

- Bottom valve
  - Aft port on hydraulic manifold to port 2 on valve.
  - No power from port 2 to port 1 and rod end of RH fore/aft cylinder
  - Power to solinoid from port 2 to port 3 to rod end of tilt cylinder.
- Top valve
  - From Foreport on hydraulic manifold to port 2 on valve.

- No power from port 2 to port 1 LH barrel end of fore/aft cylinder.
- Power from port 2 to port 3 barrel end of tilt cylinder.



Figure 191

On CNH combines the tilt can be controlled by the button on the back of the Hydrostatic handle. By pressing this button, power is sent from the combine throught the number 20 pin in the combine connector. This can be done by plugging in the one connector (MY2017 and above) or the two connectors (MY2016 and below) into the connections on the tilt valve. Figure 192.





#### Figure 192

On some combines the function for the button on the back of the handle will need to be turned on. Consult the combine manufacture for this process.

## 11.2 - Hydraulic Cylinders.

## ▲ DANGER!

High pressure hydraulic leaks can penetrate the skin causing serious injury. Always relieve pressure before disconnecting hydraulic lines and tighten all connections before applying pressure.

Hydraulic leaks can be extremely small and difficult to see. Search for leaks with a piece of cardboard. Protect hands and body from high-pressure fluids.

If an accident occurs, see a doctor immediately. Any fluid injected into the skin must be surgically removed within a few hours or gangrene may result. Doctors unfamiliar with this type of injury should reference a knowledgeable medical source.

The reel lift cylinders are single acting cylinders. These cylinder are difficult to reseal. If a reel lift cylinder leaks the cylinder should be replaced

The Fore and aft cylinders are double acting cylinders and should also be replaced.

## 11.3 - Single Point Connector

1. The single point connector can be rebuilt if the couplings leak. To remove the

couplings remove the valve assembly off the hoses.

2. Each cartridge can then be removed from the valve. Figure 193



#### Figure 193

- 3. To remove the cartridge unscrew the cartridge from the valve housing.
- 4. The cartidge can then be replaced as a complete assembly. When assembling the coupler make sure the ring is setting in the valve body completely and flat against the valve body. Figure 194



# Honey Bee

# 11.4 - Reel Drive Motor and Assembly

The reel drive is powered by a hydrualic motor with oil from the combine. The hydrualic motor drives a set of gears in a gearbox. There is no lubrication in this gearbox.

The oil is supplied by the combine. If the reel does not turn use a flow meter to check the flow at the motor. If there is no flow at the motor check at the single point connection. If no oil flow is present then the issue is a combine problem. The flow should be up to 9GPM. See the combine brand for more information and how to test the flow rate from the combine.

 If there is flow at the motor, remove the motor from the gearbox. This is done by removing the two bolts on that retain the motor to the gearbox. Figure 195



Figure 195

## 11.5 - Reel Drive Gearbox Repair

- 1. To remove the gearbox assembly support both reel assemblies.
- 2. Remove the coupler covers to remove the rubber couplings. Figure 195
- Disconnect the hoses and the electrical connections. The bolts at the front of the reel arm can now be removed. This will allow the gearbox to be pulled from the reel arm. Figure 196



Figure 196

 To disassemble the gearbox remove all the bolts that hold the covers to the gearbox. Figure 197



Figure 197

- 5. Remove the lock collars from the driveshafts. Remove the covers and bearing assemblies.
- Replace the parts as needed. To assemble install the bearings in the RH case assembly. Figure 198

# Honey Bee



#### Figure 198

 Assemble the motor on the gearcase. Install the input drive gear on the motor shaft.

#### Figure 199



#### Figure 199

 Install the drive key in the shaft. Press the drive gear on the output shaft. Install the washers on each side of the gear. Figure 200



#### Figure 200

9. Install the output shaft in the gearcase. Figure 201



Figure 201

10. Assemble the LH side of the gearcase with the bearings and flanges. Figure 202



#### Figure 202

 Install the left hand gearcase on the input and output shafts. Install spacers on each bolt as the bolts a placed in the right hand gearcase. Make certain the gears are aligned and tighten the lock collars. Figure 203





12. Once the gearbox is assembled install it back on the center arm. Make certain that the bolt holding the gearbox to the arm is secured. Figure 204





#### Figure 204

13. Install new flex couplers in the reel if the old couplers are damaged. Place the flex couplers on the reel shaft and wrap tape to hold them in place. Install the coupler covers in place and secrue the the mounting bolts. Figure 205



Figure 205

- 14. Install the hydraulic hoses to the reel drive motor.
- 15. Adjust the sensor to the gear in the gearbox to a .030 inch gap between the sensor and the gear. Figure 206.
- 16. Note: the sensor is not exposed. This was done for clarity.
- 17. Note: Some headers will not have a sensor as the combine can not read reel speed.



Figure 206

## 11.6 - JD Line Lock

On 2016 and newer John Deere combines a line lock must be installed on the header to keep the reel from drifting fore and Aft. In 2016 John Deere took the check valve out of the combine hydrualic system.

The line lock is a valve that is bolted on to the hydraulic manifold and provides the check valve needed on those combines. Figure 207.

Hydraulic oil is supplied from the manifold, "F" and "A" ports, through the valve then to the cylinders on the header.



#### Figure 207

The lock valve has a spool inside that valve that will shift as oil is supplied to the reel

As oil is applied to one port the spool will shift to release the oil and allow the oil to flow through the valve.. When the oil flow is stopped the spool shifts and blocks the oil. Figure 208





#### Figure 208

If the cylinders drift, remove the spool and make certain that it moves freely in the valve body.

## 12 - Reel

## 12.1 - Reel Bats

The Honeybee reel has 6 bats and Plastic teeth.

1. To remove a tooth on the reel remove the spacer between the teeth. This can be done by using a needlenose vise-grips and pulling the spacer out Figure 209



#### Figure 209

2. Once the spacer is removed the finger can be turned 90 degrees by a wrench and pulled out of the bat. Figure 210



#### Figure 210

 If more than one tooth needs to be replaced simply slide the spacers down to replace the teeth.

## 12.2 - Replacing a Reel Bat

 The reel bat can be replaced by removing the mounting bolt on each reel spider. This will allow the entire reel bat to be removed. Figure 211



Honey Bee

#### Figure 211

2. After the reel is removed the spider clamp can be removed by removing the clamp bolts. Figure 212



Figure 212

 When installing the spider clamps on the reel tube the spacing should be checked. This will aid in assembling the reel bat back on the spiders. Make certain the diamensions for the clamps on the cam end of the reel are as shown in. Figure 213





4. On the inner end of the reel the outside clamp should be positioned to 8" from the end of the reel tube. Figure 214.



#### Figure 214

 The center clamps are installed depending on the size of the header. On the 25 foot headers the clamps are installed 65 1/8" from the inside clamps. On the 30-50 foot headers the center clamps are placed 125 1/8" from the inside clamps. Figure 215



#### Figure 215

 Remove the spider arms from the cam. The cam can now be removed by removing the bolts that hold the rollers on the cam. Figure 216



#### Figure 216

7. Replace worn parts. Note if the cam assembly is disassembled the rollers on

the cam should be replaced if they have been used.

Honey Bee

- Install the bearings on the center ring. Leave the mounting bolts loose at this time. Install the center plate into the ring. Figure 14
- 9. Note: Make certain that the arrow on the center ring is pointing in the direction of rotation for the reel. Figure 217



- Install the spiders on the center ring. Slide the assembly on the shaft, bolt the spiders to the reel bats.
- Slide the mounting plate on the shaft and secure the assembly with a washer and snap-ring. Slide the assembly back on the reel arm and secure. The end shields can be installed on the outside spiders. Figure 218





Figure 218

12. The link from the cam to the reel bat control arm Figure 219 must be installed properly. If the hardware is not install properly control arm link wear is possible.



#### Figure 219

13. In order to retain the control, arm the 5/16" bolt should be torqued to 22 ft. lbs. (30 Nm) The head and nut of the bolt should be secured on the spacer that goes through the bushing. Figure 220. This will make sure that the arm turns on the bushing and not the nut or head of the bolt.





## 13 - Cross Auger (Optional)

The cross auger is optional and can be installed on all AirFlex headers. The cross auger is mounted on the rear beam of the header. It is supported by jack assemblies to allow the height to be changed. It is driven on the left side by a hydraulic motor with oil supplied by the combine reel circiut. Figure 221



### Figure 221 13.1 - Cross Auger and Drive

 The auger is driven by a hydraulic motor on the left side of the auger. Figure 222 This motor gets the combine oil through the reel circuit and a control valve mounted on the back of the header. Figure 223



Figure 222



#### Figure 223

- 2. To remove the motor, remove the shield on the auger. Support the end of the auger with a suitable lifting device. Figure 224
- 3. The bolt retaining the drive joint can be removed. The hoses can be removed from the motor. Note: Cover the fittings and port on the motor after the hoses are removed to avoid getting dirt in the motor.
- 4. Remove the bolts holding the motor. The motor can now be removed from the auger. A wedge may need to be driven in the drive joint to loosen the joint off the motor shaft.



Figure 224

5. To remove the cross auger completely once the motor is removed, support the left hand end of the center auger and the entire left end of the auger.

# Honey Bee

6. Remove the shield covering the joint at the left and center auger. Figure 225.



#### Figure 225

7. With the cover removed and the augers supported the pin that retains the left-hand auger to the center auger can be removed. Figure 226



#### Figure 226

- 8. The bearing mount can now be removed by removing the nuts securing the bearing mount. The same process can be used to remove the right -hand bearing mount. This will allow the center auger to be removed.
- 9. The right hand auger can be removed by removing the 3 bolts holding the bearing mount to the retaining tab. Figure 227



#### Figure 227

10. To install the auger, install the bearings and mounts on the auger. Support the center auger and secure each bearing with the bolts and and nuts. Make certain that the auger is centered between the supports and lock the shft in place with the lock collars. Figure 228



#### Figure 228

11. With the center auger on the header, install the yoke on the right-hand auger. Install the bearing mount on the end of the shaft and secure the bearing mount to the tab on the frame. Do not tighten any hardware at this time. Figure 229



Figure 229

12. Install the left-hand auger to the center auger with the yoke and bolt. Do not tighten any hardware at this time. Install the yoke and motor on the left hand end of the shaft. Figure 230.





Figure 230

- 13. Tighten the motor mounting bolts. Center both the left and right augers between the tabs and tighten all hardware.
- 14. **Model Year 16 and below**: The motor was installed with the hoses pointing down. The front port on the motor goes to the return on the manifold. The rear port on the motor goes to the hose the CF port on the valve. Install the hoses on the motor
- 15. **On Model year 17 and above**: The motor is installed with the hoses on top. Figure 11. In this configuration the front hose is the pressure hose and the rear hose is the return hose. Note: The hose lengths had to be changed in order to reverse the motors.



Figure 231 16. Install and secure all shields.

## 13.2 - Hydraulic Testing (MY2018 and below)

- The hydraulic drive for the cross auger motor comes from the combine through the manifold on the rear of the header. To test the hydrualic flow make certain that the combine is in the manual reel drive mode. This will allow the oil to flow without the combine moving.
- 2. At the manifold tee into the pressure line from the combine. The flow should be checked at the line leading to the cross auger valve the "IN" port. Make certain the cross auger control valve is set to maximum flow. The maximum flow is 10 GPM at 1800 PSI. Figure 232.





- 3. If there is no flow but the reel is turning indicates that there is not enough flow from the combine to supply the cross auger circuit.
- 4. If there is flow and can be varied with the combine controls check the flow from the line at the cross auger control valve to the cross auger motor. Figure 234. If there is no flow then the issue is the control valve is sending the oil to the reel circut.
- If the reel turns but the auger does not the flow rate maybe set too high and bypassing the relief valve at port EF. The flow control handle should not be set higher then 4 on the indicator. Figure 233

# Honey Bee



## IMPORTANT!

Setting the flow control handle to values higher than 4 will result in excessive vibration in the cross auger resulting in possible equipment damage.

#### Figure 233



#### Figure 234

- 6. If there is no flow in this line without any pressure on the flowmeter then the issue is the valve.
- If there is flow until pressure is placed on the line then the issue is the relief valve. The flow should be at least 80% of 10GPM at 1800 PSI. The return from the relief vavle goes throught the valve and will go into the reel circuit. If the cross auger stalls and the reel speeds up this is a goo indication the issue is with the relief valve. Figure 235



#### Figure 235

8. If there is good flow going to the motor but the motor still will not turn the issue is the motor.

#### On Model Year 2018 and below

If the reel needs to reverse while reversing the combine feeder house a kit is available to put on the older headers.

The kit Part number is 206513. This kit adds an external check valve to allow the oil to flow in

the opposite direction. Figure 236 and Figure 237

The kit includes:

ITEM NO.	EM NO. QTY DESCRIPTION   7 1 HH08 14 8MPT-10FFX TCVR		PartNo
7			206515
6	1	HH08 4 10FFX-10FFX TCVR	206514
5	1	ELBOW 8MPT-10MF -90	28070
4	2	ELBOW 10MF -10FFX -90	27931
3	1	TEE SW 10MF-10MF-10FFX	27794
2	1	CHK VLV-1/2NPT LT50-0	25505
1	1 1 ELBOW SW 8FP- 8FPX-90		21689

#### Figure 236



#### Figure 237 Installation Instructions per Figure 237

A. Remove the cap from the Tee on the back of the valve. Attach the elbow Item number 4.



- B. To the elbow attach the hose item 6. Attach the elbow item number 5 to the hose.
- C. Attach the swivel end of the elbow item 1 to the pipe thread on the elbow item 5.
- D. Attach the female end of the check valve item 2 to the 14" long hose item number 7.
- E. Attach the male end of the check valve to the non-swivel side of the elbow item 1.
- F. Attach the other elbow item 4 to the other end of the 14" long hose.
- G. Remove the hose from the "IN" port on the valve.
- H. Attach the tee item 3 to the valve and attach the pressure hose to the inline tee item 3, on the
- I. "IN" port of the valve.
- J. Attach the elbow item 4 and hose to the side port of the tee on the "IN" port

## 14 - Air System

The air system is made up of a

- Electric Air Pump
- Air Tank
- Air Manifold
- Air Lines
- Air Bags

## 14.1 - Air Compressor

Note: The electrical part of the system is described in Section 9.

 The air compressor is mounted to the frame behind the shield on the left-hand side of the header. Figure 238



#### Figure 238

- 2. The compressor is powered through the power harness on the combine. (see electrical section for details)
- 3. The compressor keeps the tank filled with air so that the air bags maintain a constant pressure.
- 4. In the line leading to the tank is a check valve that keeps the air from escaping out the tank through the compressor Figure 239.
- 5. If the air system is leaking and it appears to be coming out of the air compressor the check valve in the bottom of the tank is leaking



Honey Bee

#### Figure 239

- Install the check valve in the air tank. using a 6-point socket to tighten the valve in the air tank. Using an open-end wrench or over-tightening the valve will cause the plunger in the valve to stick and cause a leak. Use a thread sealant on the end of the valve. DO NOT USE TEFLON TAPE. Torque the check valve to 12-15 ft. lbs (16-20 Nm).
- 7. Note: A new check valve kit is available through service parts.
- 8. The pump has two filters in the head that should be changed once a year.
- Remove the cap on the pump and replace the filter cartridge. Figure 240 and Figure 241



# Honey Bee



#### Figure 241

10. At the bottom of the tank is a dump valve. This dump valve will keep the pressure in the system. This valve is controlled by the electrical system when the air pressure needs to be changed. Figure 242



#### Figure 242 14.2 - Air Lines and Air bags

From the air compressor tank, the air goes through a manifold. This manifold directs the air to the different air bags on the header. In the valve is a relief valve that keeps the pressure in the tank below 125PSI. If the pressure goes above 125PSI the valve will relief the pressure in the tank. The air pressure is consistent through out the system, except for the ball valve and subframe air bags. Figure 243

1. The valve can be changed to 150PSI. The higher relief valve can be installed in older headers. The issue is during transport or at the end of the field the cutterbar can bounce and air is lost through the relief valve. The higher air pressure keeps the relief valve from "popping" during these operations.



#### Figure 243

 Through a series of lines, the air is directed to the air bags on the unit. There is an airbag on each of the cutter bar struts to support the cutter bar assembly. Figure 244



Figure 244

3. Each strut has a supply line and air bag that is retained by 4 bolts. Figure 245



Figure 245

4. If the AirFLEX air system does not maintain pressure, there may be an air



leak. To check for leaks: Fill a spray bottle with soapy water and spray the all the lines and the fittings while watching for air bubbles. Re-seal all leaking fittings. Check the fittings on the air tank and air manifold located just to the left of the feeder house.

- 5. The subframe also has two airbags on the frame. These airbags maintain a cushion on the subframe when using the subframe HHC. The following is the recommended air pressure for the subframe and cutter bar. The pressure is maintained in the subframe by closing the valve on the right-hand side of the frame. The header is calibrated with 100 PSI in the system.
- 6. Note: Model Year 2018 are the only headers with air bags on the subframe.



**Note:** This is 200 Series AirFlex only Figure 246

- 25 ft 90 psi
- 30 ft 95 psi
- 36 ft 102 psi
- 40 ft 95 psi
- 45 ft 105 psi
- 50 ft 115 psi



#### Figure 246

The airbags can be positioned to give the subframe or the cutter bar more cushion. Figure 253 and Figure 254 shows the factory setting for each of the airbags and also the direction to move them to change the pressure on the cutter bar or subframe. The torque on the mounting bolts is 15-20 ft. lbs and no Loctite should be used on the bolts. (Note larger view of diagram in section 15 Specification section)

## Note: Model Year 2018 are the only headers with air bags on the subframe.





Figure 248

## 15 - Specifications

Important Torque Specification	Torque Spec (Ft.lbs)	Torque Spec (NM)	Use Red Loctite
AirBag Mounting bolts	15-20 Ft. lbs.	20-27Nm	No
Bell Crank Nuts	765 Ft. Lbs.	1037Nm	No
Knife Head Bolts	170 Ft. Lbs	203 Nm	Yes
Tie Rod Clamp Bolts	100 Ft. Lbs	135Nm	Yes
Tie Rod Nut.	230 Ft. Lbs.	311Nm	Yes
Do not put Loctite on the threads of the tie rod end that screw into the tie rod			
Connecting Rod Carriage Bolts	68 Ft. Lbs	92Nm	Yes
Guard Bolt	40 Ft. Lbs	54Nm	No
Drive Paddle Mounting bolts	200 Ft. Lbs	271NM	Yes
Rear Bearing Clamp Bolts	120 Ft. Lbs	163Nm	Yes
Rear Bearing Center Bolt	315 Ft. Lbs	427Nm	Yes
Flywheel Drive Hub RH side	38 Ft. Lbs	52Nm	Yes
Flywheel drive Hub LH Side	28 Ft. Lbs	38Nm	Yes
Auger Spider Mounting Bolts	23 Ft. Lbs	31Nm	Yes
Connecting Rod Bearing Hub	23 Ft. Lbs	31Nm	Yes

## 15.1 - Belt Adjustment Guide



Figure 249

## 15.2 - Lubrication Guide







## 15.3 - Drive Paddle Assembly Information









Figure 253

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## 15.5 - Pulley Size Information

Combine	Rear pulley (Item #1)	Pulley PN (Item #1)	Front Knife Drive Pulley (Item #2)	Pulley PN (Item #2)	Front Draper Drive Pulley (Item #3)	Idler Tensioner Bolt	Knife Speed (RPM)
AGCO	50T	101448	50T	101448	40T (PN#101453)	4" (HB#29079)	612
Claas/Lexion	45T	101447	56T	101450	40T (PN#101453)	4.5" (HB#29080)	608
CNH	50T	101448	47T	203059	40T (PN#101453)	3.5" (HB#29085)	604
JD 490	56T	101450	45T	101447	40T (PN#101453)	4.5" (HB#29080)	602
JD 520	56T	101450	47T	203059	40T (PN#101453)	4.5" (HB#29080)	612
CIH 2100- 2500	50T	101448	45T	101447	40T (PN#101453)	4.5"(HB#29080)	592
Rostselmash	50T	101448	45T	101447	40T (PN#101453)	3.5" 29085	579

## 15.5.1 - Model Year 2018 Right-Hand Drive Pulleys





## 15.5.2 - Model Year 2018 Left-Hand Drive Pulleys

Combine	Auger Drive Pulley (Item #4)	Pulley PN (Item #4)	Rear draper drive Pulley (Item #5)	Pulley PN (Item #5)	Front draper drive Pulley (Item #6)	Pulley PN (Item #6)
AGCO	45T	101447	40T	101453	45T	101454
Claas/Lexion	40T	101445	32T	101452	45T	101454
CNH	50T	101448	45T	101454	45T	101454
JD 490/520	56T	101450	53T	101455	45T	101454
CIH 2100- 2500	50T	101448	45T	101454	45T	101454
Rostselmash	56T	101450	45T	101454	45T	101454





# 15.5.3 - Model Year 2017 and below Right-Hand Drive Pulleys With an 8.65" Knife Drive Pulley

	Rear pulley (from back of table) (Item #1)	Pulley PN	Front Knife Drive Pulley (Item #2)	Pulley PN	Front Draper Drive Pulley (Item #3)	Knife Speed (RPM)
AGCO	50T	101448	50T	101448	40T (PN#101453)	536
Claas/Lexion	45T	101447	50T	101448	40T (PN#101453)	597
CNH	50T	101448	45T	101447	40T (PN#101453)	552
JD	56T	101450	45T	101447	40T (PN#101453)	559 (520 FDR House Speed), 527 (490 FDR House Speed).
CIH 2100- 2500	56T	101450	45T	101447	40T (PN#101453)	581
Rostselmash	56T	101450	45T	101447	40T (PN#101453)	568





## 15.5.4 - Model Year 2017 and Below Left-Hand Auger Drive Pulleys

Combine	Auger Drive Pulley (Item #4)	Pulley PN (Item #4)	Rear draper drive Pulley (Item #5)	Pulley PN (Item #5)	Front draper drive Pulley (Item #6)	Pulley PN (Item #6)	Idler Tensioner Bolt
AGCO	45T	101447	40T	101453	45T	101454	4" (HB#29079)
Claas/Lexion	40T	101445	32T	101452	45T	101454	3.0" (HB#28654)
CNH	50T	101448	45T	101454	45T	101454	4.5" (HB#29080)
JD	56T	101450	53T	101455	45T	101454	4.5" (HB#29080)
CIH 2100- 2500	56T	101450	53T	101455	45T	101454	4.5" (HB#29080)
Rostselmash	56T	101450	53T	101455	45T	101454	4.5" (HB#29080)





## 15.6 - Knife Bolt Size Information

## 15.6.1 - Standard Right-Hand Knife



Location #	Bolt Size
1	6mm X 16mm Spline
2	6mm X 25mm CL10.9 Bolt
3	6mm X 28mm CL 8.8 Loctite
4	6mm X 25mm CL10.9 Bolt
5	6mm X 1in X16 Countersunk


#### 15.6.2 - Standard Left-Hand Knife



Figure 260







Location #	Bolt Size	
1	6mm X 16mm Spline	
2	6mm X 25mm CL 10.9 Bolt	

Figure 261

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## 16 - Wiring Diagrams

## 16.1 - Transport System Model Year 2017 and above

## 16.1.1 - Transport Harness















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## 16.2.3 - Agco "Bee-Box" Harness







## Honey Bee

## 16.2.5 - John Deere Multi-Coupler Harness











