

# CONVERSION

INSTALLATION & OPERATION MANUAL



## JOHN DEERE XX20 - 9X10 TO 900F

09040101d



[HEADSIGHT.COM](http://HEADSIGHT.COM) | 574.546.5022



# About Headsight

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## About this Manual

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### How to use this manual

The instructions in this manual are in the order that they should be completed for new installations. Complete all applicable instructions in each section before proceeding. Note that some sections are labeled to indicate they only apply to certain machines or applications. An index is available in the front of the manual to help find technical information for previously installed systems.



This icon designates information of which you should take note.



This icon indicates a special tool needed for a given task.



This icon designates an important instruction.

## Suggestions

If you have any suggestions to improve this manual please call 574-546-5022 or email [info@headsight.com](mailto:info@headsight.com).

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# Installation



Before working on combine or under header always:

1. Perform all combine and header manufacturer safety precautions for servicing header.
2. Insert stop to prevent movement of header.
3. Set combine parking brake.
4. Turn off combine and remove key from ignition.
5. Disconnect all drive shafts from the header.



## Insight<sup>®</sup> Box Mounting

1. Position box at rear of header so Headsight Adapter harness can reach feeder house electrical connection of combine and header
2. Mark mounting hole locations.
3. Drill mounting holes using ¼" drill bit.
4. Secure box to header using hardware provided.

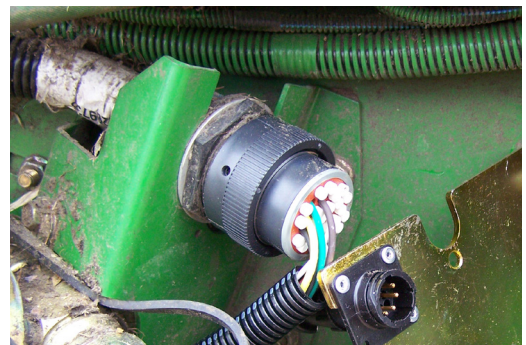


## Header Conversion harness

1. Use QP0-JD10-31J harness
2. Connect Y101 (24 pin rectangular plug) to the bottom of the Insight box.
3. Attach connector mounting plate to header within reach of combine electrical connector.
  - Drill mounting holes using ¼" drill bit
  - Use provided bolts



4. Connect Y204 31 pin header connector to the header.
5. Attach Y230 black ground wire to a clean ground bolt on header frame.
  - Required for all combines MY1990 & prior
6. Connect combine OEM 16 pin header connector to conversion harness plug mounted in plate
  - For xx20-series combines with earlier connector, also install an adapter and mount the ground strap to a clean header frame ground
    - pre '83 16 pin to 3 pin: p/n PFI-JD03-16
    - '83-'88 16 pin to 9 pin: p/n HT128923
7. Mate remaining connectors to combine and header.
  - 9 pin Feeder Harness (installed below)





# Install Light Bar

1. Mount the light bar within easy reach of the operator.



2. Route wiring from light bar out cab door, routing under floor mat.

- Alternate routing out right rear cab electrical access panel



3. Route under ladder platform and following existing hydraulic hoses/electrical wiring on the left side of feederhouse.



4. Zip tie harness to existing hydraulic hoses and wiring.

- Keep harness away from moving parts and leaving sufficient slack at header connector

- Tie harness next to OEM header plug

5. Connect the light bar feeder harness to mating 9 pin connector Y223 previously installed on head.



# Calibration

## Before Calibration

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To “power” the Insight Box for setup and calibration, different combines require different procedures. Please follow the correct procedure for your year combine.

### MY91-up 9x00, 9x10 w/DAM



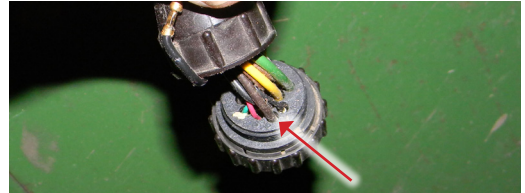
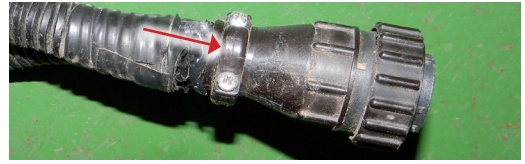
This procedure also applies to earlier combines that have had header stubble lights wiring added to the OEM header connection.

1. Make sure all connectors and harnesses are installed.
2. Turn the Dial-A-Matic switch OFF to prevent DAM activation.
3. Start the engine.
4. Turn on the header stubble lights if the combine is equipped.
  - This allows the Insight box to receive power without requiring the header and separator to be engaged
5. The LCD display should now be active on the Insight box.

## MY89-90 9x00 w/DAM

1. Install the power bypass harness PFI-JD10-P on the feeder.

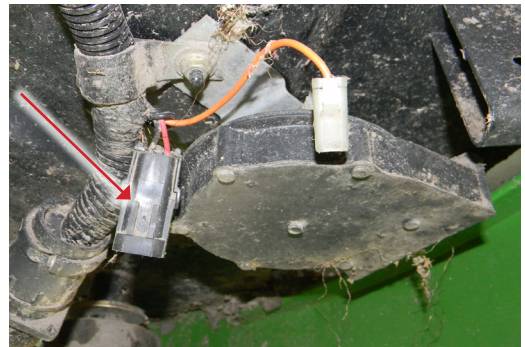
- Disassemble the shell on the back of the OEM combine header plug
- Insert the loose socket through the back shell and into cavity 15 on the OEM Header plug. (Where the Brown wire is shown in the picture)
- Route the Power wire up the feeder, around the pivot, and forward under the cab
- Connect the 2 pin plug to the plug shown next to the horn under the cab



2. Make sure all other connectors and harnesses are installed.

3. Power the Insight box.

- Turn the Dial-A-Matic switch OFF
- Start the engine
- The LCD display should now be active on the Insight box



4. The power bypass harness can remain connected during operation. If the header has stubble lights, the lights will be on whenever the combine key is on—this should not be a problem.

## 4400 - 8820 with AHC / DAM

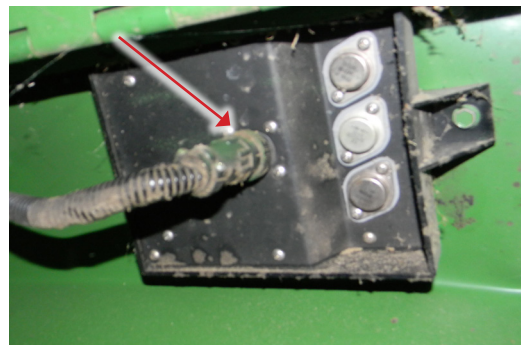
1. For '83 & up DAM, clean and disconnect the booster box plug on the sidewall of the grain tank next to the hydraulic tank.

- For pre-'83 AHC models, disconnect the electric valve solenoids electric connections above the left front tire

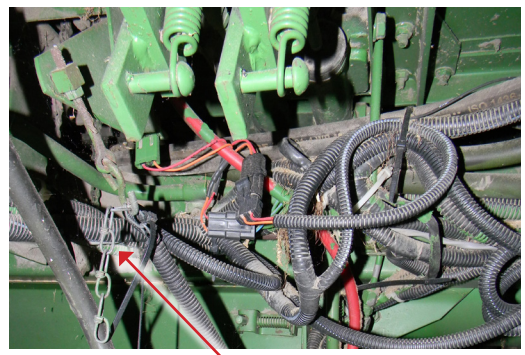
2. Make sure all other connectors and harnesses are installed.

3. Power the Insight box.

- Turn the Dial-A-Matic switch ON
- Start the engine
- Manually lower the header until the header sensors are 6-8" clear of the ground (12-18" clearance for flex conversions)
- Adjust the chain switch until the switch is on
- The LCD display should now be active on the Insight box



4. After completing all calibration steps, reconnect the booster box or solenoids.



## Setup Insight<sup>®</sup> Box

These steps must be performed the first time the Insight box is powered up and each time it is reset. They do not need to be redone each time the Insight box is calibrated. Read the Insight Overview section for basic information about how to use the Insight box.

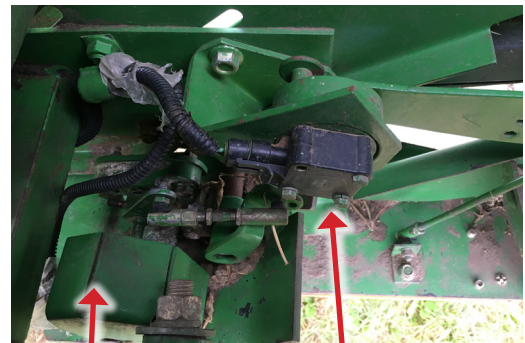
1. Connect all wiring to Insight box and combine as described in previous section.
2. Start Combine.
3. On the Insight box.
  - Choose Language
  - Choose “John Deere”
  - Choose “9x00/10 & xx20 DAM”

### JD Flex heads locked in Rigid mode, using drag rod sensors

- Choose “Standard (Default)”
- Choose the number of height sensors (do not include lift pressure sensor, if equipped)

### JD 900F heads in Flex mode

- Choose “Flex Conversion”
- If **HEADER** has only a height sensor, not contour sensors
  - Choose “Height Only”
  - This option is rare
- If **HEADER** is equipped with Height & Contour sensors
  - Choose “Height & Tilt”
- This question does not relate to how combine is equipped



Height

Contour



## Calibrate Insight

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When you initialize Insight, you will be led directly to this calibration routine. If you wish to recalibrate at any time - select ">>Perform Calibration" on the Insight main menu.

### Standard Calibration

1. Park the combine on a smooth, level surface - preferably a cement driveway or shop floor.
2. Follow on-screen instructions.
  - "Raise Header" all the way so that NO sensors touch the ground and press  enter
  - "Fully Lower Header" all the way down on the skids and press  enter
  - Go to Combine Ground Calibration section of this manual.



If an error appears on the Insight box - see the Diagnostic section of this manual.

## Combine Contour Calibration

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For combines with Contour Master, this calibration should be done at the beginning of each season and also every time a different header is put on. This calibration allows the combine to learn how to level the head.

1. Start the engine and attach the header.
2. Engage the header clutch.
3. Turn off the Contour-Master switch on the armrest.
4. Lower header to the ground (on a level surface) for 2 seconds.
5. Press header raise button.
6. Turn on the Contour-Master switch after the sensors have left the ground (while continuing to raise the header).
7. If the header does not run level, retry the calibration.



# Settings

## Combine Settings



Properly setting the combine is essential to having responsive header control. Automatic, drop rate, accumulator and tilt speed must all be properly adjusted for good header performance.



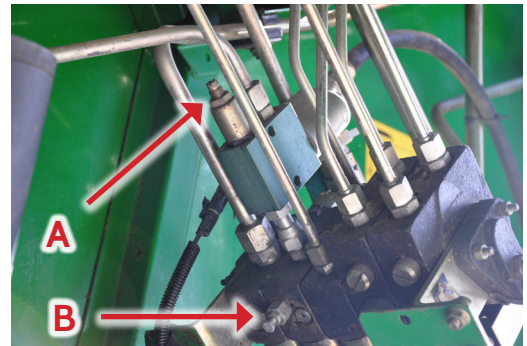
Always perform the combine contour calibration before adjusting settings. Set each sensitivity setting by increasing until header hunting occurs then decreasing until header becomes stable.



For 20 series combines see owners manual for location of drop rate valve and accumulator – 9000-9010 series are shown.

### Set the Automatic Drop Rate

- Use the adjustment on the valve block marked A
- Turn in all the way then out ½ turn for initial guess
- If the speed is too fast – hunting will occur
- If the speed is too slow – the system will not be responsive enough
- Common range is 6-8 seconds from header full up to full down in automatic mode



The maximum automatic drop rate is limited by manual drop rate marked B.

### Set the Hydraulic Accumulator

- Close the accumulator valve all the way
- Open the accumulator valve 1 full turn (from closed position)
- Opening the accumulator too far will give a sloppy response
- Not opening the accumulator far enough will give a jerky response
- Make sure the accumulator is properly charged for your header (contact your JD service department)



## Tilt Sensitivity

1. To change this setting go to >>Settings>>Tilt Sensitivity in the Insight™ box. The range is from 5 to 95 with a default setting of 50.
  - If the head is too jumpy from side to side – decrease sensitivity.
  - If you would like the head to be more responsive – increase sensitivity.
  - Typical setting for 30' flex platforms = 15-25
  - Adjust the setting as high as possible without rocking.
2. If changing the tilt sensitivity down to 10 does not stop header from rocking, you will need to change the tilt orifice in the valve body. See Advanced Information.

## Tilt Balance

If the head is consistently running higher on one end than the other, Tilt Balance manually tweaks the combine height inputs to level it out. Use tilt balance only after eliminating other possible solutions.

1. Before adjusting tilt balance,
  - Double check to make sure head frame is level and snouts are adjusted correctly
  - Re-calibrate Insight or Horizon box on a flat, level surface
  - Re-calibrate combine on a flat, level surface
2. If head is still not running level, adjust the tilt balance setting.
  - Default tilt balance value is 100
  - Lowering the tilt balance number will lower the left end of the head
  - Raising the tilt balance number will lower the right end of the head
3. Tilt balance setting will only last until the next calibration.
  - Do not recalibrate combine without resetting tilt balance to 100

# Operation

## Enabling Height Control

### 9x00 and 9x10 Series

1. If equipped, turn on Contour Master switch



2. Turn Dial-a-Matic switch ON . (Any position except OFF.)



3. Engage header clutch



4. Press header lower button



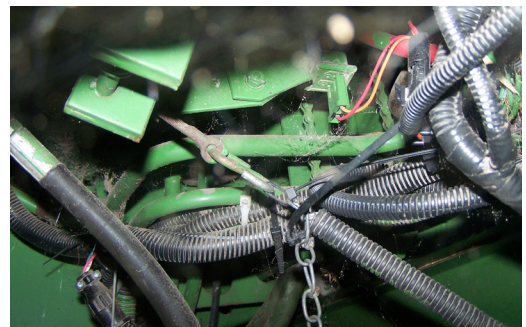
On all 9x00 and 9x10 John Deere combines, the manual raise switch should **ALWAYS** override/shutoff auto height control. If not, test / replace the DAM control board in the combine.

### 4400 - 8820 with AHC / DAM



Adjust the chain length on the DAM switch under the cab to turn on header control above the height at which the header first contacts the ground.

1. Turn Auto/Dial-a-Matic switch ON.
2. Lower header until height control engages (adjust chain if necessary).
3. Make sure AHC/DAM turns off when head is raised up (adjust chain if necessary).





## Adjusting Header Height



If a Light Bar is not connected, preset raise and lower points are used, allowing basic operation at one midrange height.

1. Turn the height position knob on the light bar with header control engaged.

- Clockwise = higher
- Counter-Clockwise = lower



2. Because the Headsight box is designed to work with many OEM sensors, it may be possible for the operator to choose a height that is too low for proper operation, meaning the sensors would never send a raise signal.
  - To test if the height you have chosen is too low, engage the system, then tap the lower button on the hydro handle
  - If the header bounces back up to its original position, the chosen height is fine
  - If the header stays in the new position, the height chosen on the light bar is too low
    - Do not operate header control at or below this height
3. The 5 LED indicators show the relative position of the header sensor(s), emulating the old “red ball”.
  - The top LED is a system “power” Indicator
  - LED 2-5 are height position, with 5 being smashed

## Adjusting Height Sensitivity

- Increase height sensitivity (turn CW) for more responsive performance
- Decrease height sensitivity (turn CCW) to reduce hunting
- You **MUST** set the drop rate and accumulator before adjusting sensitivity knob
  - Set the knob to 12 O’Clock
  - Adjust the auto drop rate & accumulator for acceptable performance
  - Use the knob to fine tune in-field response.







# Overview





## Insight® Navigation

### How to Navigate



When in a menu (selection arrow appears to left side)

-  Enter: chooses the selected menu choice
-  Esc: backs up one menu level
-  Up: moves up within the menu choices displayed
-  Down: moves down within the menu choices displayed

When in a screen which allows setting of parameters

-  Enter: saves value and exits to menu
-  Esc: backs up to last menu level without saving
-  Up: increases the value
-  Down: decreases the value

### Meaning of Status Light

- Solid Green:
  - System is operating
  - No errors detected
- Solid Red:
  - System is NOT operating
  - No height or tilt signals are sent to combine
  - You have changed settings which require calibration of Insight, are currently in a menu which will force a calibration if you make any changes, or are in calibration mode
-  Solid Green with Flashing red:
  - System is operating
  - An error has been detected
  - Repair problem then clear errors
-  Flashing Red:
  - System is operating
  - A sensor has been ignored
  - See note in Troubleshooting by Error - ER16
  - Repair system - Recalibrate Insight

### Screen Contrast Adjustment

To change contrast:

- Press and hold Esc  +  Up or  Down to increase or decrease contrast

## Resetting Insight<sup>®</sup> to Defaults

To reset all settings hold  +  for 5 seconds

## Updating Insight<sup>®</sup> Software with USB Drive



Updating software may cause the Foresight option to be disabled. If you have purchased Foresight, contact Headsight before updating software.

### 1. You will need:

- USB drive
- Means of loading USB Stick (computer with USB)

### 2. Load USB drive with new software files.

- Place insightf.hex in the root directory of USB drive (ex. E:\insightf.hex)
- Do not change file names

### 3. If you do not have the new files you may:

- Download updated software from [www.headsight.com](http://www.headsight.com)
- Order pre-loaded USB drive from Headsight, Inc.



### 4. Remove cap from USB on front of Insight controller.

### 5. Insert USB drive card into USB slot on front of Insight.

### 6. Power Insight.

- Turn on key switch

### 7. Wait for software to download.

-  Yellow light will blink while download is in progress
-  Green light will turn on solid when download is complete

### 8. Verify update is successful.

- Go to >>About Insight>>Software Version and read software version number

### 9. Remove USB drive.

### 10. Install cap on USB on front of Insight controller.

### 11. Remove power from Insight.

- Turn off key

# Advanced Information

## Theory of Operation

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A review of the following points will help the service technician to understand the complete system, which will help diagnose specific problems.

1. Each sensor returns a variable voltage depending on header height.
  - High header height = high voltage (approximately 4 volts)
  - Low header height = low voltage (approximately 1 volt)
2. Each sensor has 3 wires:
  - black or lt blue= ground
  - white = signal returned to combine (varies 1-4 volts)
  - green or pink = 5 volt power
3. The Insight box adjusts signals as needed then sends them to combine using the same combine wiring as OEM system would use.
  - All sensors are scaled to an appropriate range for combine
  - Insight will reverse the direction of swing if needed
  - Insight box reads all sensors and sends signals to combine that will cause appropriate height and or tilt response
  - If Foresight is enabled - the Insight box magnifies the voltage change below the point where the snout tips touch the ground
4. The voltages the combine sees are exactly like what it would see with an OEM system.  
All existing combine controls and settings may be used.

## Basic Requirements

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**Each sensor must meet basic requirements for the combine to accept the calibration. If any sensor does not meet the requirements below, you must correct it and then recalibrate the Insight box.**

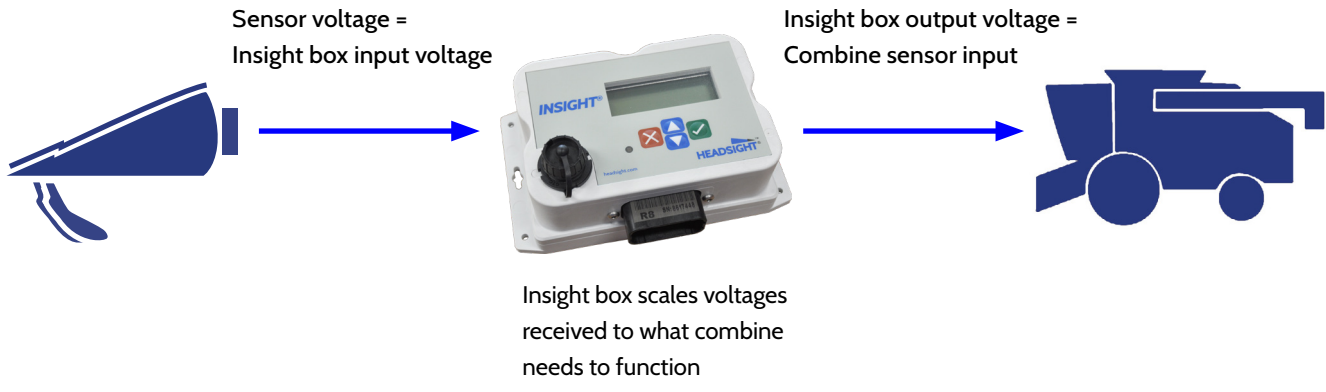
- See the header manual for sensor adjustment instructions.
- Sensor output voltage must always be between .3 and 4.7 volts.
- Sensor output voltage must change more than 1.0 volts from raised to lowered position for each sensor.

# Reading Voltages

## Before you Start



The Insight box can display both the input voltages it receives from each sensor and the output voltages it is sending to the combine.



## On the Insight<sup>®</sup> Box : Sensor Voltages

1. From main menu, go to >> Diagnostics>>Display Voltages

- This shows real-time voltage coming from each sensor.

```

L  LC  CTR  RC  R
0.0 0.0  0.0  0.0  0.0
Sensors^ L  C  R
Outputs> 0.0 0.0 0.0
    
```

2. For more information about sensor history and status see >>Diagnostics>>Detailed Diagnostics>>(parameter of interest)

- Sensor = signal from sensor in volts
- Max = the maximum voltage sent to Insight box from sensor since last calibrated
- Min = the minimum voltage sent to Insight box from sensor since last calibrated
- Enabled = is this sensor enabled to control height? Yes or No
- SetH = the “header raised” voltage set-point recorded during calibration
- SetL = the “header lowered” voltage set-point recorded during calibration
- Reversed = is the polarity of this sensor reversed? Yes or No

```

Left Sens  =0.00V
Max=0.00V SetH=5.00V
Min=0.00V SetL=0.00V
Enabled=N Reversed=N
    
```

## On the Insight® Box : Output Voltages

### 1. From main menu, go to >> Diagnostics>>Display Voltages

- L & R - shows ContourMaster voltage sent to the combine
  - 1.0V with head fully lowered
  - 4.0V with head raised
- C - Shows ↑ (Raise) or ↓ (Lower) signal to DAM on combine
  - Same as Raise/Lower Outputs below

```

L   LC   CTR   RC   R
1.0 1.0   1.0   1.0 1.0
Sensors^
Outputs> 1.0  ↑   1.0
    
```

### 2. Alternately: From main menu, go to >> Diagnostics>>Detailed Diagnostics>> (parameter of Interest).

- Shows actual voltage being sent to the combine.
- Available selections depend on combine model

```

Pressure/aux Sensor
->Left Height Out
Right Height Out
Sensor Status
    
```

- Raise/Lower Outputs
  - ON or OFF (12V signal)

```

Dial-A-Matic OUTPUT

Raise=OFF
Lower=ON
    
```

- Left or Right Height\* Output = X.XVolts
  - 1.0V with head fully lowered
  - 4.0V with head raised
  - \*For ContourMaster in this application

```

Right Height OUTPUT
      =1.00V

Raise = (1.0v-4.0v)
    
```

# Adjusting Sensors



If any sensor on the head exceeds the allowable voltage range (0.3-4.7V) the sensor will need to be mechanically adjusted.

## 1. Height Sensor:

- Adjust the linkage shown
  - Example is 900F
- Set sensor voltage to 1.0V with head fully on ground
- Make sure the sensor does not exceed 4.5V when head is raised



## 2. CM Sensors:

- Adjust the linkage shown
- Set sensor voltage to 1.0V with head fully on ground
- Make sure the sensor does not exceed 4.5V when head is raised
- For OEM JD sensors only
  - The linkage can be adjusted with the drawrod or by moving holes
  - Changing the drawrod length or moving to an upper or lower hole will change the entire voltage range
  - Moving the linkage IN on the sensor arm will increase the “swing” on the sensor (greater voltage difference between high & low).
  - Moving the linkage OUT on the sensor arm will decrease the swing





# Changing Tilt Orifices



Only change orifices if the system cannot be set properly by adjusting the tilt sensitivity on Insight or the Contour-Master card. Orifices may still need to be changed for wide headers.

1. Manually move header from full right tilt to full left tilt.
  - The target tilt speed is 5-8 seconds
  - If not correct go on to step 2
2. Perform all combine and header manufacturer safety precautions for servicing header.
3. Remove header from combine.
4. Insert stop to prevent movement of feederhouse.
5. Release all pressure in hydraulic cylinders.
  - Lower feeder house against lock and hold button for 10 seconds to relieve hydraulic pressure
6. Turn off combine and remove key from ignition.
7. Set combine parking brake.
8. Using 1/8" allen wrench, remove original orifice from valve block in tilt cylinder supply lines.
  - Keep orifice in secure location for later use if needed
9. If tilt speed is too fast, install an orifice that is smaller than the original orifice removed.
10. If tilt speed is too slow, install an orifice that is larger than the original orifice removed, or remove orifice completely



## JD orifice availability:

- .26" Z60904 (Original on 50/60 series)
- .31" H135777 (Original on 00/10 series)
- .46" H149804



# Diagnostics



**Before working on combine or under header always:**

1. Perform all combine and header manufacturer safety precautions for servicing header.
2. Insert stop to prevent movement of header.
3. Set combine parking brake.
4. Turn off combine and remove key from ignition.
5. Disconnect all drive shafts from the header.



## Troubleshooting Overview

Several Troubleshooting Sections are available, depending on the type of problem or symptoms.

### 1. Troubleshooting -Sensors & Harnesses

- Use this section to troubleshoot a specific sensor that is not working or out of adjustment.
- Typical symptom:
  - Sensor fault code displayed - example: "Err XX, Left sensor > 0.3V"

### 2. Troubleshooting by Symptom

- Use this section to diagnose poor operation symptoms
  - Not usually accompanied by an Error message or Fault Code
- Typical Symptoms
  - Header won't tilt
  - Header 'hunts'

### 3. Troubleshooting by Error Code

- Use this section to help determine the problem when a fault code has been displayed.

# Troubleshooting—Sensors and Harnesses



To properly test the wiring and sensors on the header, follow the steps below in order. Use a Volt Meter as needed.

The sensor connector pattern is as follows:

- Pin A is Ground (Black or Lt Blue)
- Pin B is Signal (White)
- Pin C is 5V (Green or Pink)



A very common problem during install is to reverse the wires at the connector after removing the plug to route the cables. Make sure that the wires/voltages are as shown. If A & C are reversed, the sensor output voltage will be 4.7V and not change.

The following requirements must be met before testing:

- Key on, combine engine running
- Header connected

Symptom	Problem	Solution
Bad Harness Wiring Disconnect Sensor Plug  (Measure voltage on harness plug at sensor)	Measure C to Frame Ground  Voltage should be 5V	If not, check harness for continuity or short on 5V wire  Check Combine 5V source
	Measure C to A  Voltage should be 5V	If not check harness for continuity on ground wire  Check combine sensor ground source
	Jump C to B in harness plug  Voltage should be 5V  (For Insight systems, see “Diagnostics/ Display Sensor Voltages”. For all others, use Combine Diagnostics*)	If not check signal wire for broken harness or bad connection
	All of the above are correct	Harness & combine connections pass test.
If you have a Headsight Sensor tester, use it to test the sensor. For all other:	Verify sensor is connected to extension harness  Sensor voltage should be 0.5- 4.5V  (For Insight systems, see “Diagnostics/ Display Sensor Voltages”. For all others, use Combine Specific Diagnostics)	If sensor cannot be adjusted to achieve a voltage within the range, replace sensor.

# Troubleshooting by Symptom



Nearly every problem with the header control system may be resolved by one of the following simple steps:

- Make sure each sensor meets basic requirements discussed in Advanced Info section
- Properly calibrate Insight box
- Properly calibrate combine AHHC (“Header Cal”)
- Enable appropriate AHHC functions on combine
- Properly set combine electronics and/or hydraulics
- 

## Sections

- Insight Status Light Diagnostics
- AHHC Diagnostics
- Lateral Tilt Diagnostics
- Light Bar Diagnostics
- Common Combine Problems
- General Insight Problem

Symptom	Problem	Solution
<b>Insight Status Light Diagnostics (Status not green)</b>		
No light	Combine does not supply 12V to pin 4 of the Insight connector	See Common Combine Problems: “No Power to Insight”
	No Ground to Pin 6 of the Insight connector.	Check Grounds. Attach ground ring to frame (MY90 & older)
	Insight defective	Replace Insight
Solid red	Wiring is not connected properly or calibration has not been completed	See Installation and Calibration sections of manual
Flashing Red or Green/Red	Insight box has detected an error	Correct problem, clear error codes, and recalibrate Insight box

Symptom	Problem	Solution
<b>AHHC Diagnostics</b>		
No automatic operation height or tilt  (If the Insight box does not have a green status light, go to "Insight Status Light Diagnostics")	Wiring is not connected properly	Check wiring from sensor to combine
	Header control is not enabled with cab controls	See Operation/Enabling Height Control section of this manual
	Defective light bar	Go to: "Light Bar Diagnostics"
	Wrong combine type selected in the Setup menu of the Insight box	Verify that "9x00/10 & xx20 D-A-M" is chosen on the Insight box and that the correct header type has been selected
	Power supply from combine less than 10V to Insight.	Check 12V power source
	D-A-M loop is not wired in Headsight harness (applies only to 9x00-9x10 series)	Unplug 16 pin header plug and measure continuity across pins 4 & 11 of connector Y221. Resistance must be <5 Ohms
	Combine D-A-M board or module defective	Test / repair D-A-M module
	Feederhouse position chain is mis-adjusted (applies only to 4400-8820)	Check combine operators manual for instructions on adjusting feederhouse position chain
	Combine is not receiving a lower signal. To check, set the height position knob on the light bar at min. When the head is fully raised, the lower signal should be on. The signal can be viewed on the Insight box. Go to >>Diagnostics>>Detailed Diagnostics>>Raise/Lower Outputs	If lower signal is on but header does not lower, check connections and combine for an issue (see Common Combine Problems)
	Wire shorted on head	See "Multiple sensors failed"
Insight box/wiring failure	Contact Headsight	
Multiple Sensors failed or Multiple errors at once	No 5V Power or ground to head. Make sure Insight has power. Disconnect 31p header connector and measure from pin 10 to 20 on the Insight adapter harness Y204. Should be 5V	If not, repair Adapter harness If so, see next line.
	Bad header harness. Reconnect 31p plug Y204. Measure across outer 2 terminals at any sensor plug. Should be 5V. If Insight goes blank, or no 5V is available at any one sensor:	Find broken or shorted wire in header harness. (Look for rodent damage where harness goes thru restricted areas like the crosstube.)

Symptom	Problem	Solution
<b>AHHC Diagnostics</b>		
No Power to Insight (Initial Setup & Activation)	Stubble Lights circuit not ON (MY91 & up)	Turn on Field Lights
	Stubble Lights wire to header defective (MY91 & up)	Check combine OE header connector pin 15 for 12V. Repair combine wiring
	MY89-90 (No pin 15).	Install Power Adapter
	No Ground. Measure pin 4 to pin 10 in OE header plug. Should be 12V.	Prior to MY91: Attach ground ring to header frame MY91 & up: Repair combine Ground wire
No Power to Insight (Field Operation)	DAM switch or Feeder Clutch not ON	See Operation section of this manual
	Power from combine < 10V	See "Common Combine Problems"
	No Ground. Measure pin 4 to pin 10 in OE header plug. Should be 12V.	Prior to MY91: Attach ground ring to header frame MY91 & up: Repair combine Ground wire
Head drops all the way to ground or head lowers but will not raise  (If the Insight box does not have a green status light, go to "Insight Status Light Diagnostics")	Height position knob on light bar set too low	Rotate knob CW until head raises
	Height sensitivity knob on light bar set too low	Rotate knob CW to narrow deadband - until head responds
	Combine is not receiving a raise signal. To check, set the height position knob on the light bar at max (CW). When the head is fully lowered, the raise signal should be on. Go to >>Diagnostics>>Detailed Diagnostics>>Raise/Lower Outputs	If raise output is ON but header does not raise, check connections and combine for an issue. Often a broken wire in feeder harness.
Head raises all the way up or head raises but will not lower  (If the Insight box does not have a green status light, go to "Insight Status Light Diagnostics")	Height position knob on light bar set too high	Rotate knob CCW until head lowers
	Cutterbar locked up in rigid position	Unbolt cutterbar
	Flex platform sensing rod stuck	Free rod or repair return spring
	Combine is not receiving a lower signal. To check, set the height position knob on the light bar at min (CCW). When the head is fully raised, the lower signal should be on. Go to >>Diagnostics>>Detailed Diagnostics>>Raise/Lower Outputs	If lower output is ON but header does not lower, check connections and combine for an issue. Often a broken wire in feeder harness.
	Feederhouse position chain is mis-adjusted (applies only to 4400 -8820)	Feederhouse position chain is mis-adjusted (applies only to 4400 - 8820)
Header is too jumpy	Combine is improperly set	See - Setting section of this manual Reduce Auto Drop Rate Decrease sensitivity
	Insight or combine needs to be re-calibrated	See Calibration section of this manual

Symptom	Problem	Solution
<b>AHHC Diagnostics</b>		
Header responds to slowly	Insight or combine needs to be re-calibrated	See Calibration section of this manual
	Combine is improperly set	See - Setting section of this manual Increase Auto Drop rate Increase sensitivity
Head Jumps and Jerks whole combine	Drop rate too fast	See Combine Settings section of this manual)
	Unopened accumulator	Open accumulator valve 1-2 turn
	Discharged accumulator	Test accumulator as described in combine owner's manual, replace or recharge as necessary
Cannot operate head high enough	Calibration not properly completed	Perform Insight and Combine calibration on flat level surface
	Cutterbar float range limited	Clean out and loosen cutterbar linkages so it floats properly.
Cannot operate head low enough	Calibration not properly completed	Perform Insight and Combine calibration on flat level surface
	Cutterbar float range limited	Clean out and loosen cutterbar linkages so it floats properly.
Header dives to ground and recovers entering crop	Lower Rate set too High	See Combine Specific Settings
	Accumulator too far open or discharged.	Adjust/check Accumulator

Symptom	Problem	Solution
<b>Lateral Tilt Diagnostics</b>		
Height works but not Tilt	Increase Tilt Sensitivity.	>>Setup>>Tilt Sensitivity Increase Tilt sensitivity
	Contour Master switch is off	Turn ON switch
	Turn on power to Insight box. In the Insight box go to >>Diagnostics >>Detailed Diagnostics>>Left & Right Outputs. Voltage range should be 1.0 - 4.0V and decrease as the head is lowered  Caution: header may move unexpectedly with auto header height control engaged!	If the box outputs are correct, service the combine  If box outputs are incorrect, reset the Insight box to defaults (see overview section of this manual). Then recalibrate Insight box and combine. If problem persists, replace Insight box
Head rocks back and forth	Tilt Sensitivity too high	Adjust sensitivity in combine  >>Setup>>Tilt Sensitivity Decrease Tilt sensitivity Press Check
	Insight not calibrated properly (do Cal on flat surface)	See Calibration Section
	Wrong orifices installed	Refer to Changing Tilt Orifices section of manual
Header tips wrong way (Once head is moved off level, it continues all the way in either direction)	Left and Right sensor harnesses reversed	Connect sensor harnesses to correct plugs on adapter harness.
Head tips all the way one direction	Improperly adjusted sensors	Adjust the sensors to both be about 1-1.2V when sitting flat on the ground
	Sensor harnesses improperly connected	Verify that the individual sensor wiring is connected to the main wiring harness at the rear of the header properly See Installation section for details. This symptom will occur if the Left and Right sensor wiring are in the incorrect position
	Poor connection	Check harness and connectors for cut/ torn wire or loose terminals  Make sure terminals are properly latched, not "pushed back", in connector body
	Sensor or harness fault	See Diagnostics: Sensor & Harness
	Insight box failure	>>Diagnostics>>Detailed Diagnostics>>Left & Right Height Outputs  1.0V head fully lowered 4.0V sensors off ground
	Combine problem	Test combine on a different header

Symptom	Problem	Solution
<b>Lateral Tilt Diagnostics</b>		
Header runs slightly out of level	Insight or combine not calibrated correctly	Recalibrate Insight and combine on flat surface
	Sensor physically mis-adjusted	Make sure both end sensors mount the same and hang at the same angle
	Header not adjusted correctly	Make sure the frame to snoot angle adjustment is the same across the width of the head  Lower and tilt head until snoot tips just touch on a flat surface. Make sure frame is level to ground within 1" from left to right. Readjust snoots if necessary.
	Flex heads: Header float not working correctly	Verify float range across entire cutterbar is the same and that all sensors can move freely through their entire range.
	All the above fails to correct problem:	>>Settings>>Tilt Balance  Adjust balance to level Head  (Must be reset to 100 before calibrating combine)

Symptom	Problem	Solution
<b>Light Bar Diagnostics</b>		
No Lights	Insight box does not have power	Make sure Insight box is on
	Power not supplied to light bar Pin 6 of connector Y225 should be 12V Pin 5 should be ground	Check harness from Hydro Handle Tee Check Ground connection Y230 in rear of cab
	Defective light bar	If 5V & ground are being supplied to Y223, replace light bar
AHHC height range is not working correctly	Go to >>Diagnostics>>Detailed Diagnostics>>Height Setting IN,	Voltage should be between 1-4V. If not replace Light bar or fix wiring
AHHC sensitivity is not working correctly	Go to >>Diagnostics>>Detailed Diagnostics>>Height Sensitivity,	Voltage should be between 1-4V. If not replace Light bar or fix wiring
LED's do not change when head is raised or lowered (within sensor travel)	Flex Pressure too high	Lower pressure until cutterbar hangs fully down
	Sensor problem on header	Check Insight for sensor errors Check head for stuck sensor or linkage
	Go to >>Diagnostics>>Detailed Diagnostics>>Lightbar Output	Voltage should be between 1-4V. & change when head is moved thru sensor travel. If not assume header problem.
	Light bar "frozen"	Cycle Power





To Test AHC Power on all DAM combines, the following steps are required:

- One person on the seat in the cab
- DAM switch in position 1,2,or 3.
- Header clutch engaged.



The John Deere D-A-M combines only provide power to the Height Control system when the Feeder House Switch is engaged and the DAM rotary Switch is NOT “OFF”. If these switches are on and Pin 4 of the combine header connector is not 11-14 Volts , have the combine serviced

Symptom	Problem	Solution
<b>Common Combine Problems</b>		
Header bounces	Drop rate too fast	Drop rate must be set to 6-10 seconds
Head Jumps and Jerks whole combine	Unopened accumulator	Open accumulator valve 1 turn
	Discharged accumulator	Test accumulator as described in combine owner’s manual, replace or recharge as necessary
No power to Insight No 12V power available on pin 4 of header plug to power Insight box  D-A-M switch is on and feederhouse clutch is engaged	Damaged wires on OEM harness (typically on feederhouse)	Find and fix damaged wires
	Bad D-A-M relay in armrest or bad D-A-M switch. To test, have operator in seat and engage header clutch (D-A-M switch can be in position 1, 2, or 3)	If there is still no 12V available on the header plug, replace relay in the armrest and if necessary replace D-A-M switch
	xx00-xx20 series combines: Feederhouse position chain is not properly adjusted to pull rocker free of switch under cab or switch is not working	Check combine operators manual for instructions on adjusting feederhouse position chain, and if necessary, replace switch
Raise, lower, or both raise and lower will not work	Insight box is not outputting the correct raise lower commands	See “AHC Diagnostics”
	Bad wiring on Feederhouse or defective relays on D-A-M board	Contact JD dealer for service
Manual raise switch does not disengage auto height control	On all 9x00 and 9x10 JD combines, the manual raise switch should ALWAYS override/shutoff auto height control	Replace D-A-M card in combine
Manual lower switch does not engage auto height control when D-A-M switch is on and feederhouse clutch is engaged	No 12V available on pin 4 of header plug to power Insight box	See solution for problem: “No 12V available on pin 4 of header plug”
D-A-M randomly disengages while operating (C-M equipped combines only)	Electrical glitch with a few random combines, cause not determined	Contact Headsight for more info

Symptom	Problem	Solution
<b>General Insight Problem</b>		
Display dim, blank, or hard to read	Screen contrast improperly adjusted	See Insight Settings
	Weak power supply to Insight™ box	See Installation, 12V Power Test
	Short in sensors/wiring powered by Insight box  (Reversed polarity to hall-effect sensors may cause this symptom)	Individually disconnect sensors to isolate problem – screen will regain contrast when faulty sensor is disconnected.  Correct short in wiring  Insight will need reset after correction of wiring short
	Control box failure	Contact Headsight
Insight does not respond to buttons	Control box or overlay failure	Contact Headsight

# Troubleshooting by Insight® Error Codes

Error Code	Problem	Solution
<b>ER11</b> Left sensor signal less than 0.3V	Left sensor temporarily disconnected.	Repair wiring or bad connector Calibrate Insight Box Calibrate Combine
	Wiring open	Check sensor harness for pinched/ broken wiring
	Sensor failure	See sensor test instructions
<b>ER12</b> Left sensor signal greater than 4.7V	Wiring problem	Ground wire to sensor is open Signal short to power Calibrate Insight Box Calibrate Combine
	Sensor failure	See sensor test instructions
<b>ER13</b> Left sensor swing less than 0.6V	Left sensor mechanical range is restricted	Verify sensor is not obstructed in swing Verify sensor can collapse fully with header lowered Adjust down stop to allow greater range
	Sensor failure	See sensor test instructions
<b>ER16</b> Left sensor expected but not detected	Left sensor not properly connected	Verify harness is connected to sensor 1 Verify harness is connected properly to control box harness Verify that signal wire (Pin B white wire of sensor cable) is connected to PIN7 of connector Y101 (Insight box)
	Not enough swing during cal	Make sure sensor meets requirements in - Advanced Information - Basic Requirements section of this manual
	Incorrect number of sensors selected in setup	Go to >>Initial Setup>>Number Sensors and choose the correct number of sensors
	Sensor failure	See sensor troubleshooting instructions
<b>ER17</b> Left sensor detected but not expected	Control box /wiring failure	Contact Headsight
	Incorrect number of sensors selected in setup	Go to >>Setup>>System Select and choose the correct number of sensors
	Harness wiring error	Verify that no wires contact PIN7 of connector Y101
	Control box /wiring failure	Contact Headsight

<b>Error Code</b>	<b>Problem</b>	<b>Solution</b>
<b>ER21</b> Left Center sensor signal less than 0.3V	Left Center sensor temporarily disconnected.  Wiring open  Sensor failure	Repair wiring or bad connector Calibrate Insight Box Calibrate Combine  Check sensor harness for pinched/ broken wiring  See sensor test instructions
<b>ER22</b> Left Center sensor signal greater than 4.7V	Wiring problem  Sensor failure	Ground wire to sensor is open Signal short to power Calibrate Insight Box Calibrate Combine  See sensor test instructions
<b>ER23</b> Left Center sensor swing less than 0.6V	Left Center sensor mechanical range is restricted  Sensor failure	Verify sensor is not obstructed in swing Verify sensor can collapse fully with header lowered Adjust down stop to allow greater range  See sensor test instructions
<b>ER26</b> Left Center sensor expected but not detected	Left Center sensor not properly connected  Not enough swing during cal  Incorrect number of sensors selected in setup  Sensor failure  Control box /wiring failure	Verify harness is connected to left center sensor Verify harness is connected properly to control box harness Verify that signal wire (Pin B white wire of sensor cable) is connected to PIN13 of connector Y101 (Insight box)  Make sure sensor meets requirements in - Advanced Information - Basic Requirements section of this manual  Go to >>Initial Setup>>Number Sensors and choose the correct number of sensors  See sensor troubleshooting instructions  Contact Headsight
<b>ER27</b> Left Center sensor detected but not expected	Incorrect number of sensors selected in setup  Harness wiring error  Control box /wiring failure	Go to >>Setup>>System Select and choose the correct number of sensors  Verify that no wires contact PIN13 of connector Y101  Contact Headsight

<b>Error Code</b>	<b>Problem</b>	<b>Solution</b>
<b>ER31</b> Center sensor signal less than 0.3V	Center sensor temporarily disconnected.	Repair wiring or bad connector Calibrate Insight Box Calibrate Combine
	Wiring open	Check sensor harness for pinched/ broken wiring
	Sensor failure	See sensor test instructions
<b>ER32</b> Center sensor signal greater than 4.7V	Wiring problem	Ground wire to sensor is open Signal short to power Calibrate Insight Box Calibrate Combine
	Sensor failure	See sensor test instructions
<b>ER33</b> Center sensor swing less than 0.6V	Center sensor mechanical range is restricted	Verify sensor is not obstructed in swing Verify sensor can collapse fully with header lowered Adjust down stop to allow greater range
	Sensor failure	See sensor test instructions
<b>ER36</b> Center sensor expected but not detected	Center sensor not properly connected	Verify harness is connected to center sensor Verify harness is connected properly to control box harness Verify that signal wire (Pin B white wire of sensor cable) is connected to PIN8 of connector Y101 (Insight box)
	Not enough swing during cal	Make sure sensor meets requirements in - Advanced Information - Basic Requirements section of this manual
	Incorrect number of sensors selected in setup	Go to >>Initial Setup>>Number Sensors and choose the correct number of sensors
	Sensor failure	See sensor troubleshooting instructions
	Control box /wiring failure	Contact Headsight
<b>ER37</b> Center sensor detected but not expected	Incorrect number of sensors selected in setup	Go to >>Setup>>System Select and choose the correct number of sensors
	Harness wiring error	Verify that no wires contact PIN8 of connector Y101
	Control box /wiring failure	Contact Headsight

<b>Error Code</b>	<b>Problem</b>	<b>Solution</b>
<b>ER41</b> Right Center sensor signal less than 0.3V	Right Center sensor temporarily disconnected.  Wiring open  Sensor failure	Repair wiring or bad connector Calibrate Insight Box Calibrate Combine  Check sensor harness for pinched/ broken wiring  See sensor test instructions
<b>ER42</b> Right Center sensor signal greater than 4.7V	Wiring problem  Sensor failure	Ground wire to sensor is open Signal short to power Calibrate Insight Box Calibrate Combine  See sensor test instructions
<b>ER43</b> Right Center sensor swing less than 0.6V	Right Center sensor mechanical range is restricted  Sensor failure	Verify sensor is not obstructed in swing Verify sensor can collapse fully with header lowered Adjust down stop to allow greater range  See sensor test instructions
<b>ER46</b> Right Center sensor expected but not detected	Right Center sensor not properly connected  Not enough swing during cal  Incorrect number of sensors selected in setup  Sensor failure  Control box /wiring failure	Verify harness is connected to right center sensor Verify harness is connected properly to control box harness Verify that signal wire (Pin B white wire of sensor cable) is connected to PIN14 of connector Y101 (Insight box)  Make sure sensor meets requirements in - Advanced Information - Basic Requirements section of this manual  Go to >>Initial Setup>>Number Sensors and choose the correct number of sensors  See sensor troubleshooting instructions  Contact Headsight
<b>ER47</b> Right Center sensor detected but not expected	Incorrect number of sensors selected in setup  Harness wiring error  Control box /wiring failure	Go to >>Setup>>System Select and choose the correct number of sensors  Verify that no wires contact PIN14 of connector Y101  Contact Headsight

<b>Error Code</b>	<b>Problem</b>	<b>Solution</b>
<b>ER51</b> Right sensor signal less than 0.3V	Left sensor temporarily disconnected.  Wiring open  Sensor failure	Repair wiring or bad connector Calibrate Insight Box Calibrate Combine  Check sensor harness for pinched/ broken wiring  See sensor test instructions
<b>ER52</b> Right sensor signal greater than 4.7V	Wiring problem  Sensor failure	Ground wire to sensor is open Signal short to power Calibrate Insight Box Calibrate Combine  See sensor test instructions
<b>ER53</b> Right sensor swing less than 0.6V	Right sensor mechanical range is restricted  Sensor failure	Verify sensor is not obstructed in swing Verify sensor can collapse fully with header lowered Adjust down stop to allow greater range  See sensor test instructions
<b>ER56</b> Right sensor expected but not detected	Right sensor not properly connected  Not enough swing during cal  Incorrect number of sensors selected in setup  Sensor failure  Control box /wiring failure	Verify harness is connected to right sensor Verify harness is connected properly to control box harness Verify that signal wire (Pin B white wire of sensor cable) is connected to PIN9 of connector Y101 (Insight box)  Make sure sensor meets requirements in - Advanced Information - Basic Requirements section of this manual  Go to >>Initial Setup>>Number Sensors and choose the correct number of sensors  See sensor troubleshooting instructions  Contact Headsight
<b>ER57</b> Right sensor detected but not expected	Incorrect number of sensors selected in setup  Harness wiring error  Control box /wiring failure	Go to >>Setup>>System Select and choose the correct number of sensors  Verify that no wires contact PIN9 of connector Y101  Contact Headsight
<b>ER61</b> Sensor 6 (aux sensor) signal less than 0.3V	Wiring open  Sensor failure	Check sensor harness for pinched/ broken wiring  See sensor test instructions

<b>Error Code</b>	<b>Problem</b>	<b>Solution</b>
<p>ER62</p> <p>Sensor 6 (aux sensor) signal greater than 4.7V</p>	<p>Wiring problem</p> <p>Sensor failure</p>	<p>Ground wire to sensor is open</p> <p>See sensor test instructions</p>
<p>ER92</p> <p>Tilt Sensitivity greater than 4.0V</p>	<p>Wiring problem</p>	<p>Turn the Tilt sensitivity knob in the cab to Maximum CW. Read under &gt;&gt;Diagnostics&gt;&gt;Detailed Diag.&gt;&gt;Tilt Sens In, on the Insight box</p> <p>Reading between 4.0 and 4.5. Call Headsight for instructions</p> <p>Reading &gt; 4.5V, Combine problem- Check wiring on combine</p>



# Schematics



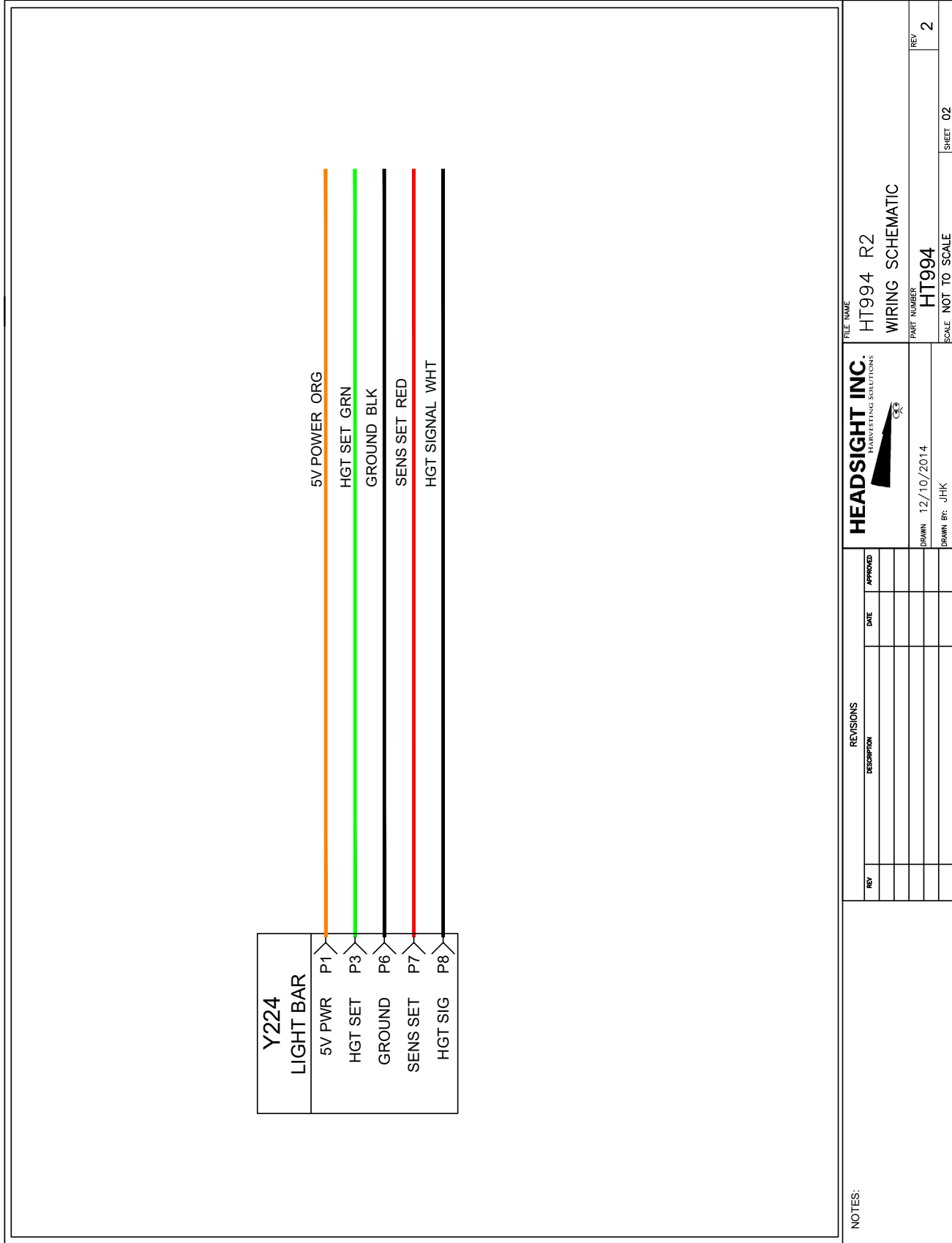
The Insight Harness schematic is the main harnesses used for all applications in this manual, each uses one of the following valve harnesses depending on your steering device.



The following schematics are provided for troubleshooting and installation purposes only. Unauthorized uses, such as using them to replicate harnesses for resale, are strictly prohibited under copyright law.



# Light Bar - Cab harness



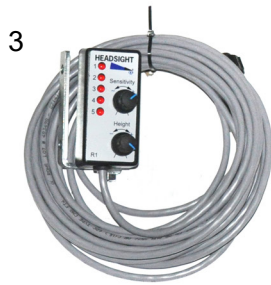
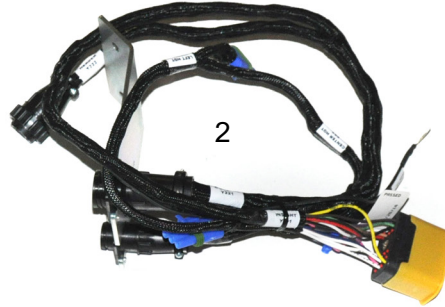
NOTES:

HEADSIGHT INC HARVESTING SOLUTIONS		FILE NAME HT994 R2	REV 2
		WIRING SCHEMATIC	
		PART NUMBER HT994	
		SCALE NOT TO SCALE	SHEET 02
		DRAWN 12/10/2014	
		DRAWN BY JHK	

REV	REVISIONS		DATE	APPROVED
	DESCRIPTION			

# Parts

## Conversion Components and Harnesses



<u>ITEM</u>	<u>QTY.</u>	<u>PART NUMBER</u>	<u>DESCRIPTION</u>
1	AR	INSIGHT	Insight Control Box
2	1	QP0-JD10-31J*	Insight Harness, platform conversion
3	1	HT999LB-07	2 Knob Light Bar
4	1	B2250	Bracket Hardware Kit

\*Parts may vary for specific application, please call for more information

# Statement of Limited Warranty

## For Headsight® Products

Precision Planting DBA Headsight Harvesting Solutions (Headsight) warrants its new products to be free from defects in material and workmanship for a period of twelve (12) consecutive months following the date of purchase by the retail purchaser.

Headsight warrants its new corn sensors assemblies for a period of thirty-six (36) months.

Headsight warrants genuine Headsight replacement parts and components to be free from defects in material and workmanship for a period of six (6) consecutive months following the date of purchase or the remainder of the original equipment warranty period, whichever is longer.

Headsight's obligation under these warranties shall be limited to repairing or replacing, free of charge to the original purchaser, any part that, in Headsight's judgment, shows evidence of such defect.

## Limitations to Warranty

This warranty does not cover:

- Warranty claims directly resulting from improper installation of the product.
- Any product damaged by accident, abuse, misuse, or negligence after shipment from Headsight.
- Any unauthorized product alteration or modification.
- Any unauthorized repairs made with parts other than genuine Headsight parts.
- Any repairs performed by anyone other than Headsight or an authorized Headsight dealer unless specifically authorized by Headsight.

## Warranty Procedure

- Troubleshooting should be done between farmer/dealer and Headsight through our technical assistance @ **574.220.5511**.
- Labor reimbursement will occur only pre-arranged through Headsight technical assistance and be scheduled to a flat rate basis or reasonable time allowance in Headsight's judgment.
- There is no mileage reimbursement.
- Diagnostic time will not be reimbursed except in pre-arranged circumstances.
- Warranty claims should be on typical dealer service work order with a number and name to be attached for any future correspondence.
- All warranty work must be performed, and claims submitted, within thirty (30) days of the occurrence of the claim and within the warranty period.
- All parts removed during warranty repair must be returned to Headsight with Headsight's Return Form within thirty (30) days of the occurrence of the claim and within the warranty period.
- Headsight reserves the right to either inspect the product at the original retail purchaser's location or require it to be returned to Headsight for inspection.

## Limitation of Liability

Headsight makes no express warranties other than those, which are specifically described herein. Any description of the goods sold hereunder, including any reference to buyer's specifications and any descriptions in circulars and other written material published by Headsight is for the sole purpose of identifying such goods and shall not create an express warranty that the goods shall conform to such description.

**THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED.** There are no implied warranties of merchantability or fitness of a particular purpose. This warranty states Headsight's entire and exclusive liability and buyer's exclusive remedy or any claim for damages in connection with the sale of furnishing of Headsight products, their design, suitability for use, installation or operation, or for any claimed defects herein. **HEADSIGHT WILL IN NO EVENT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, NOR FOR ANY SUM IN EXCESS OF THE PRICE RECEIVED FOR THE GOODS FOR WHICH LIABILITY IS CLAIMED.**

No representative of Headsight nor any dealer associated with Headsight has the authority to change the items of this warranty in any manner whatsoever, and no assistance to purchaser by Headsight in the repair or operation of any Headsight product shall constitute a waiver of the conditions of this warranty, nor shall such assistance extend or revive it.

Headsight reserves the right to make improvements in design or changes in specifications at any time, without incurring any obligation to owners of units previously sold. Warranty: **1/2022**



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