

JD D-A-M

Combine Manual
09010102a



HEADSIGHT INC.
HARVESTING SOLUTIONS



About Headsight

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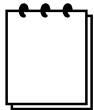
Technical Assistance

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About this Manual

How to use this manual

For new installations, follow all applicable instructions in each of the numbered sections (1, 2, etc) in the order that they are presented in this manual. The information in the lettered appendices (A, B, etc) is for service or advanced settings which you will not need for most installations, but may want to reference in the future.



This icon designates information of which you should take note.



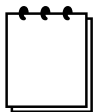
This icon designates an important instruction.

Disclaimers

Headsight, Insight, Foresight, FeatherSight and TrueSight are trademarks of Headsight, Inc. All other trademarks are property of their respective owners.

Suggestions

If you have any suggestions to improve this manual –please call 574-546-5022 or email info@headsight.com.



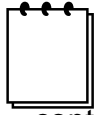
Portions of this product are protected by US Patents 6202395, 6833299, 7310931, and other US and international patents, issued and pending.

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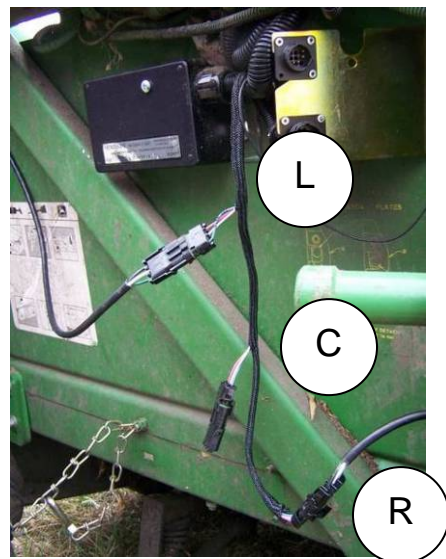
1. Installation



Complete the installation portion of the header manual before continuing.

1.1. Control Box

1. Hold box at rear of header within reach of feederhouse electrical connection on combine and mark mounting hole locations.
2. Drill mounting holes using ¼ “ drill bit.
3. Secure box to header using provided tie straps or optional ¼” bolts.
 - Mount connections downward to prevent dirt and water entry.
4. Attach connector mounting plate to header within reach of combine electrical connector.
5. Connect individual sensor wiring to the control box as described below.
 - Connect the left sensor to the input nearest the control box.
 - Connect the right sensor to the input farthest from the control box.
 - Connect remaining sensors in order from left to right using the remaining inputs. (3 sensor shown, 5 sensor similar)

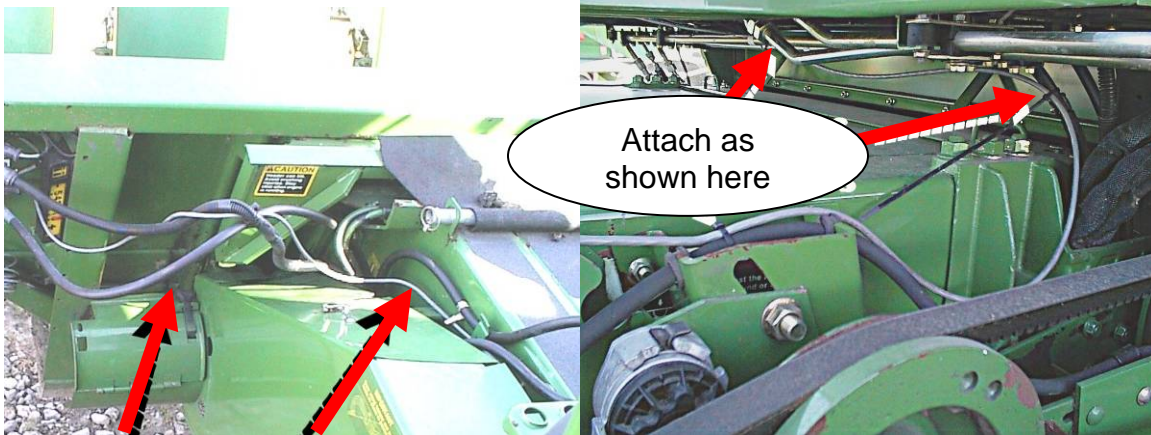


6. Attach black ground wire to header frame.
 - Required for all combines model 1990 and earlier.

7. Mate remaining connectors to combine and header.

1.2. Light Bar

1. Route the light bar wiring up the left hand side of the feederhouse.
 - Make sure you leave sufficient slack to connect to the header connector plate.
 - Secure away from moving parts.



2. From the top of the feederhouse route the wiring:

- Under the ladder
- Through the cab door
- Under the floor mat
- To the right hand side of the cab.

3. Mount the light bar to the dash within easy reach of the operator.



2. Calibration

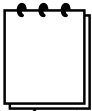


Before working under the header always:

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. Disconnect all drive shafts from the header.



2.1. Sensor Calibration



You will not need to calibrate the sensors for brand-new installations because they are precalibrated at the factory. You may recalibrate the sensors if you are unsatisfied with the operating range of the system. You should perform calibration if any of the components of the system are used or once annually.



This step will require 2 people. Its purpose is to “level” the sensors so the control system sees each the same.

1. Attach the light bar harness and all sensor wiring to the control box on the rear of the header.
 - At least one light on the light bar should be on.
2. Power the header control system.
 - Start the engine.
 - Engage header clutch (not the separator).
 - Put the Dial-A-Matic switch to position 1.
3. Move (any) one sensor arm back to the lowest position to which the ground could push the sensor during normal operation.



- This position will not be to the mechanical stop and will vary slightly depending on header type.
- The last (5th) light should just turn on at this low position.
- If the last light does not just turn on at the lowest point:
 - Loosen the nuts or screws which hold the sensor (the hall effect sensor or potentiometer – NOT the entire sensor assembly) and twist the sensor to a new position which does just turn on the last light. More details may be found in the header manual – Sensor Adjustment section.
- 4.** Repeat step 3 for each sensor – perform seasonally.
- 5.** If more than one light is on with all sensors hanging in the free position:
 - For corn systems:
 - Disconnect all sensors except one from the control box (leave the light bar connected).
 - If more than one light is on with only one sensor connected– loosen the downstop on that sensor and slide it up to allow the arm to hang farther. - Repeat for each sensor. See header manual – Sensor Adjustment section.
 - For grain systems:
 - Follow corn instructions except adjust cable length rather than downstop position for each sensor.

2.2. Combine Contour-Master Calibration



This calibration should be done each time a combine equipped with Contour-Master has been used on another header with a minimum of once per season. This calibration allows the combine to learn how to level the head.

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

3. Settings

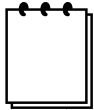
3.1. Combine Settings



Properly setting the combine is essential to having responsive header control. You should become very familiar with the steps in this section.



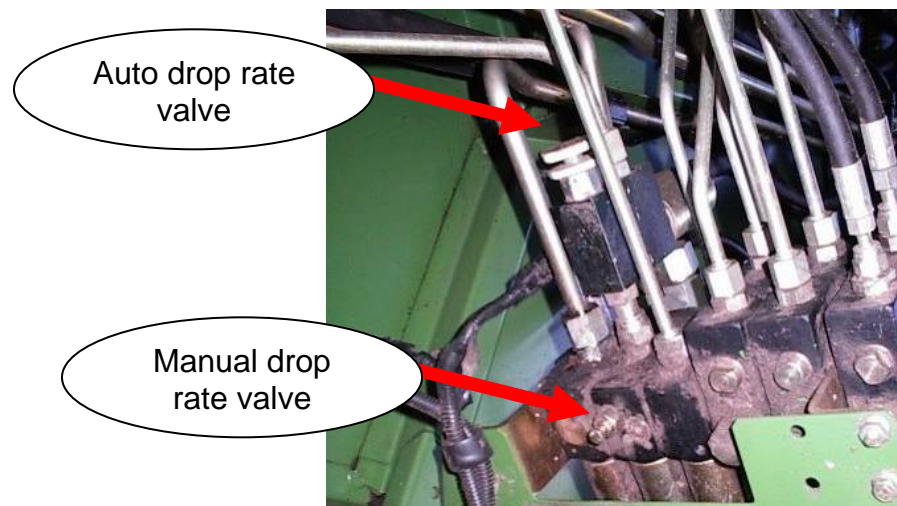
Set the automatic drop rate as high as you like without causing head “hunting”. If the head “hunts”, decrease the automatic drop rate.

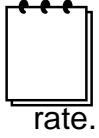


For 20 series combines see owner's manual for location of drop rate valve and accumulator – 9000-9010 series are shown.

3.1.1. Automatic drop rate

1. Use the automatic drop rate valve adjustment knob on the main valve block.
 - Turn in all the way then out $\frac{1}{2}$ 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.
2. Common range is 6-8 seconds from header full up to full down in automatic mode.





The maximum automatic drop rate is limited by the manual drop

3.1.2. Hydraulic accumulator

1. Close the accumulator valve all the way
2. Open the accumulator valve 1 full turn (from closed position).
 - Opening the accumulator too far will give sloppy response.
 - Not opening the accumulator far enough will give a jerky response.

Accumulator
valve



4. Operation

4.1. Enabling height control

4.1.1. 9x00 and 9x10 series

1. Turn Dial-a-Matic switch ON



2. Engage header clutch



3. Press header lower button.



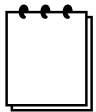
4.1.2. xx20 series



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

1. Turn Auto/Dial-a-Matic switch ON.
2. Lower header until height control engages.

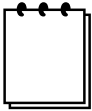
4.2. Adjusting header height



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

Height position knob



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 operation – meaning that 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.

4.3. Adjusting height sensitivity

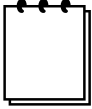
1. Increase height sensitivity (turn CW) for more responsive performance.
2. Decrease height sensitivity (turn CCW) to reduce hunting.
 - o You MUST set your accumulator and drop rate before adjusting the sensitivity knob.

Height sensitivity knob



A Advanced Information

1 Changing Tilt Orifices



The purpose of changing the orifices is to increase the maximum speed that the Contour-Master can tilt. The factory configuration will be satisfactory for all except the most extreme conditions. Very few customers will need to perform the steps detailed here.

The target tilt speed is 5-8 seconds from full right to full left for most machines.

1. 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.
2. If tilt speed is now too fast – install an orifice that is larger than the original orifice removed.

JD orifice availability:

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



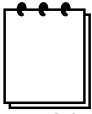
B Diagnostics

1 Theory of Operation

All JD Dial-a-Matic (20/00/10 series) combines height control systems work in a similar way. A review of the following points will help the service technician to understand the complete system which will help when diagnosing specific problems.

1. Each sensor returns a variable voltage to the control box at the rear of the header depending on its height.
 - high height = high voltage (approximately 4 volts)
 - low height = low voltage (approximately 1 volt)
2. Each sensor has 3 wires
 - red = 5V power
 - black = ground
 - white = signal returned to the control box (varies between approximately 1.0 and 4.0 volts)
3. The control box compares the lowest (most smashed) sensor to the desired height chosen on the light bar in the cab.
 - If any one sensor has a lower voltage (is nearer the ground) than the height setpoint voltage – the box sends a raise signal to the combine on pin #5 of the 16 pin header connector.
 - This means that any one sensor can raise the head.
 - If all sensors have a higher voltage (are farther from the ground) than the height setpoint voltage plus the deadband chosen by the sensitivity knob – the box sends a lower signal to the combine on pin #3 of the 16 pin header connector.
 - This means that all sensors must agree to lower the head.
4. The sensitivity knob on the light bar adjusts the size of the deadband.
 - The deadband is a small area where the system will neither raise nor lower.
 - This helps prevent hunting of the header.
5. The lights on the light bar are visual indicators to the operator.

- LED #1 is a power light
- LEDs #2-#5 will progressively light as the head lowers to the ground.



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

6. The left and right sensor signals are scaled to the correct range (0.5-4V) then sent on to the combine on pins 7 and 9 respectively for Contour-Master operation.



The following symbols are used in the troubleshooting guide:



Denotes a problem or symptom.

- Read through the problems and select the one that most closely represents your problem.

? A question or condition needed for the following steps that the technician must answer.

- Read through the possible options and select the one that most closely represents your problem.

★ A possible answer to the previous question or problem

- Evaluate each possible answer to determine the cause of the problem.
- Answers are given in order from most to least likely.

○ **Gives further explanation or testing instructions.**

2 Troubleshooting.....by symptom



Header is too jumpy or responds too slowly

★ Combine is improperly set.

- See Settings section – adjust drop rate and accumulator.

★ Sensors need to be recalibrated.

- See Calibration section.



Header is not level with Contour-Master enabled.

- ? If the header tilts completely to one side:
 - ★ Verify that the individual sensor wiring is connected to the main wiring harness at the rear of the header properly.
 - This symptom will occur if the Left and Right sensor wiring are in the incorrect position.
 - See Installation section for details.
 - ★ Check individual sensors
- ? If the header is slightly out of level but functions correctly:
 - ★ Verify that all sensors can move freely through the entire range.
 - ★ Verify that all sensors are connected, functioning and calibrated as per the Calibration section of this manual.
 - ★ Recalibrate combine Contour-Master. -See Calibration section.



Height control works but Contour-Master does not

- ★ Mate all connectors and engage system.
- ★ Keep one person in the seat and all connectors mated (remove back shell and probe through rear of connector).
- ? If Pins 7 and 9 of the 16 pin header connector are .5-4 volts and change as the sensors are moved
 - Service combine.
- ? If pins 7 and 9 are not as described above
 - troubleshoot and calibrate sensors or control box.



No automatic operation - height or tilt

- ★ Wiring is not connected properly
- ★ Header control is not enabled with cab controls.
 - See Operation section for instructions about how to enable.
- ? If at least 1 LED is lit on the light bar.
 - ★ D-A-M “loop” not wired in Headsight™ harness (9000-'10)

- Unplug 16 pin header plug and measure continuity across Pins 4 & 11 in the Headsight™ half. Pins must be <5 Ohms (short circuit).
- ★ Combine D-A-M booster box defective ('20 series only).
 - Test / repair booster box
- ★ Suspect defective Headsight™ system.
 - Test Headsight system by following raise/lower diagnostics below.
- ? If NO LEDs are lit on the light bar:
 - ★ Ensure light bar is properly connected to the control box.
 - ★ Ensure black ground wire on the control box is securely attached to the header frame.
 - ★ Combine does not supply 12V on pin 4 of the header connector.
 - Follow steps in “Troubleshooting.....common combine problems” below
 - ★ Suspect defective Headsight control box.



Head drops all the way to ground.

- ★ Height position knob on light bar set too low
 - Rotate knob CW until head raises.
- ? If ONLY 1 LED is on with the head on the ground:
 - ★ ALL sensors are disconnected - Reconnect sensors.
 - ★ Bad ground circuit to sensors. - Repair.
 - ★ Polarity is reversed to hall effect sensors.
 - Should be +5VDC on pin C (red wire) of sensors.
 - ★ All sensors and/or wiring have failed. – Diagnose/Replace.
- ? If more than 1 LED is on with the head on the ground:
 - ★ Disconnect light bar from the control box at the rear of the header and engage system.
 - If header control operates in a low-mid position – repair/replace light bar.

- If header control does not operate – suspect failed control box.



Head raises all the way to top.

- ★ Height position knob on light bar set too high.
 - Rotate knob CCW until head lowers.

? If all LEDs are lit with the head off the ground.

- ★ Sensor stuck up under head. – remove obstruction.
- ★ Defective sensor or harness (any sensor signal < 1V). To test - Disconnect all sensors from control box then connect and operate one sensor at a time to identify defective sensor(s).
 - Check wiring polarity to potentiometer sensors (pin C = +5V except some grain sensors)
 - +5V wire broken to sensor
 - Signal (white wire) shorted to ground.
 - Defective sensor.

? If all LEDs are not on with the head off the ground.

- ★ Disconnect light bar from the control box at the rear of the header and engage system.
 - If header control operates in a low-mid position
 - Repair/replace light bar.
 - If header control does not operate
 - Suspect failed control box.



Head raises over obstacle but does not lower.

- ★ Follow instructions in “Head raises all the way to the top.”
- ★ Height sensitivity knob on the light bar set too low.
 - Rotate knob CW to narrow deadband.
- ★ Feederhouse position chain mis-adjusted ('00-'20 series).
- ★ Combine not receiving lower signal.
 - Raise head and lower safety stop.

- Bypass feeder house chain switch ('00-'20).
- Turn on Auto/D-A-M switch.
- Engage header clutch (9000-'10)
- Rotate height dial on Light Bar fully CCW
- Keep one person in the seat and measure voltage on Pin 3 of the 16 pin plug while connected. (Remove back shell and measure DC Voltage to a chassis ground).
 - If you have 12V on Pin 3. Repair wiring/circuitry on combine.
 - If 0V on Pin 3 and 12V on Pin 4. Repair or replace Headsight control box.



Head lowers to selected height but does not raise over obstacles.

- ★ Follow instructions in “Head drops all the way to ground”.
- ★ Height sensitivity knob on light bar set too low.
 - Rotate CW to narrow dead band.
- ★ Defective sensor or harness
 - Any single sensor defective or disconnected will cause the head to not raise over an obstacle seen only by that sensor. Other sensors should function normally.
- ★ Combine not receiving lower signal.
 - Manually lower head FULLY.
 - Turn on auto/D-A-M switch
 - Engage header clutch (9000-'10).
 - Rotate height dial on light bar fully CW (max).
 - Keep one person in the seat and measure voltage on Pin 5 of the 16 pin plug while connected. (Remove back shell and measure DC voltage to a chassis ground.)
 - If you have 12V on Pin 5. Repair wiring/circuitry on combine.

- If 0V on Pin 5 and 12V on Pin 4. Repair or replace Headsight control box.

3 Troubleshooting.....common combine problems



Unopened or discharged accumulator - Head jumps and jerks whole combine.

- ★ Test accumulator as described in combine owner's manual
- ★ Replace or recharge as necessary



No 12 Volts available on the header plug.

- ★ Check OEM harness on feeder house for damaged wires.
- ★ For JD9x00-9x10 series test with
 - One person on the seat in the cab
 - DAM switch in position 1, 2, or 3.
 - Header clutch engaged.
 - If still no 12V –
 - Replace DAM relay in armrest.
 - Test/Replace DAM switch.
- ★ For xx00-xx20 series test as above and also:
 - Make sure feeder house position chain is properly adjusted to pull rocker free of switch under cab. Check switch for proper operation.



The John Deere D-A-M combines only provide power to the Height Control system when the Feeder House Switch is engaged and the D-A-M 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.



Manual raise switch does not disengage auto height.

- ★ Replace relays on D-A-M controller board in combine.



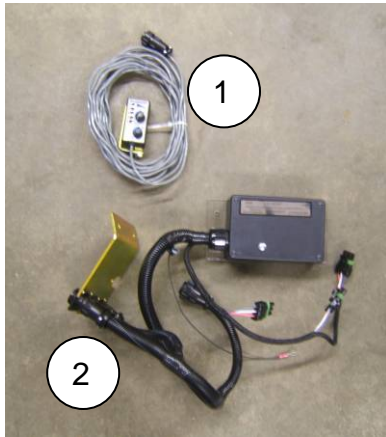
On all 9000 and 9010 John Deere combines, the manual raise switch should ALWAYS override/shutoff auto height control. If not, test / replace the relays on the D-A-M control board in the combine. This is not a Headsight™ problem.



Manual lower switch does not engage auto height.

- ★ Test Headsight™ system as described in “No operation”
- ★ Test combine 12 V supply as above.
- ? If all systems appear to be working, with both raise and lower signals sent to the combine.
 - ★ Check OEM raise/lower wiring
 - ★ Test D-A-M controller board in combine.

C Parts



<u>Key#</u>	<u>Part#</u>	<u>Description</u>	<u>Qty</u>	<u>Notes</u>
1	HT999LB-5	LIGHTBAR	1	2 knobs
2	HC3JD10-16	CONTROL BOX	AR	Corn
	HW3JD10-16	CONTROL BOX	AR	Grain

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