New Holland TC

Combine Manual
09010303a

HEADSIGHT INC.
HARVESTING SOLUTIONS

About Headsight

Headsight Contact Info

Headsight, Inc
3529 Fir Road
Bremen, IN 46506
Phone:574-546-5022
Fax: 574-546-5760
Email: info@headsight.com
Web: www.headsight.com

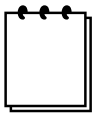
Technical Assistance

Phone: 574-220-5511

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

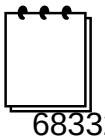


Table of Contents

1. System Application

This Headsight™ height control system is designed for New Holland TR series combines. It updates these machines from a single position “switch” height control to full range adjustable height control. This allows these combines to work with any of the newer OEM headers (74C, 98C) as well as Headsight™ sensors.

Due to the internal design of the OEM NH-TR system, the OEM auto header switch will not always turn off auto header control. When using the Headsight® system, the MODE switch replaces the OEM switch to turn ON/OFF the height control system. The OEM Auto Header Switch must be left ON. Make sure to turn OFF the MODE switch any time you do not want the header to auto lower or raise.

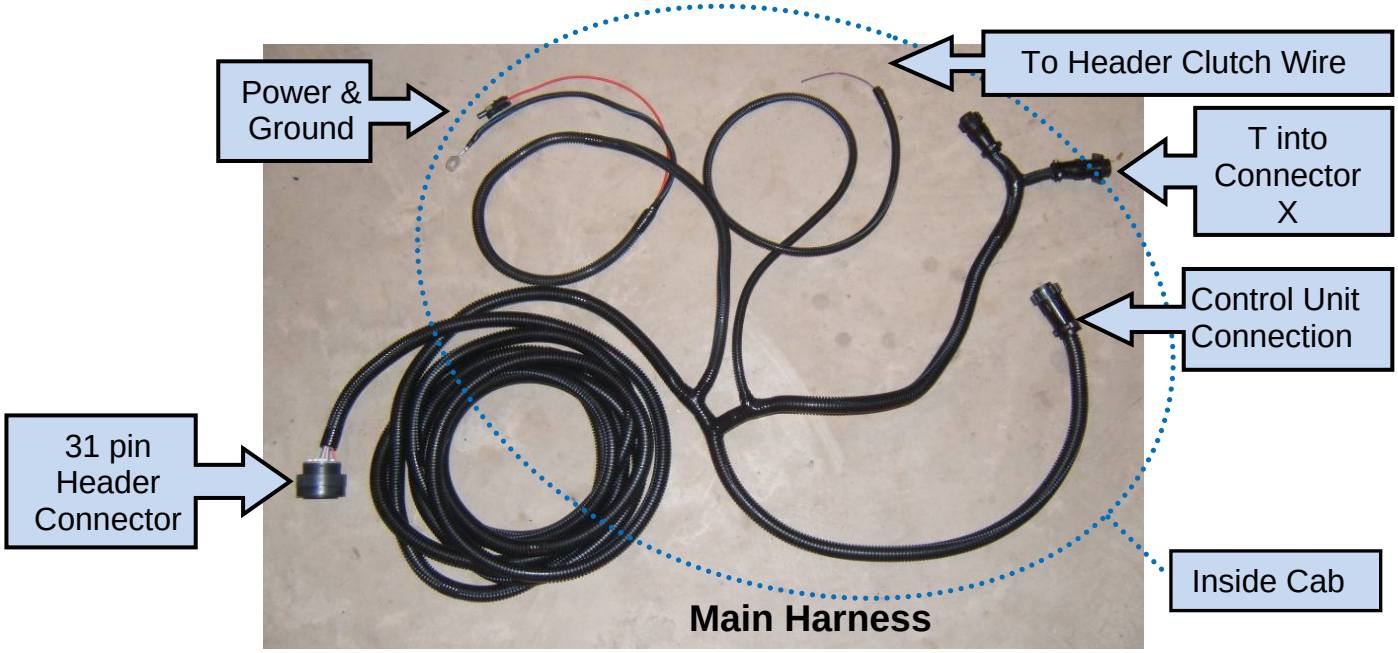
2. Installation

If you are installing a Headsight™ Sensor system on a header, complete the installation portion of the header manual before continuing.

2.1. Control Unit

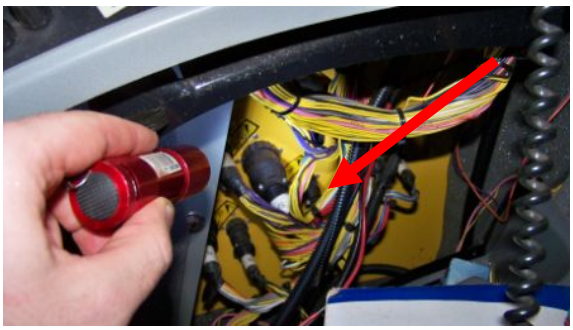
1. Mount the control unit and bracket in an easily accessible location with the two self tapping screws provided. Different model combines may require different mounting locations. Make sure to leave clearance for the harness to plug into the rear of the control unit.

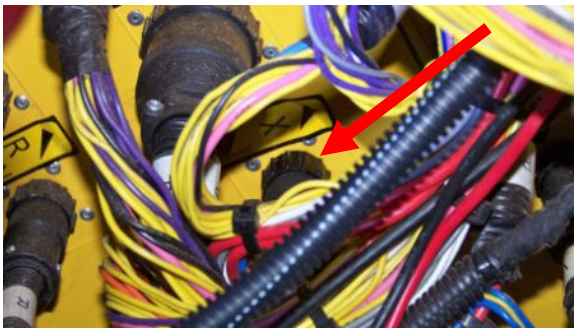
2.2. Main Harness



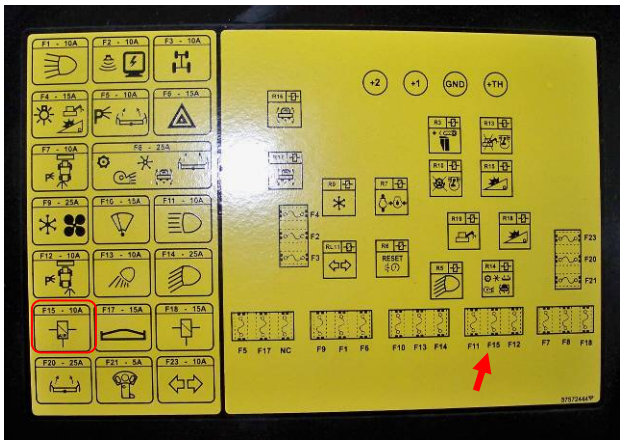
CABLE ROUTING NOTE: Cable routing properly takes time, but is essential to long life of electrical controls. Take the time to fully understand the routing requirements, and carefully route and tie all cables in safe locations away from heat, wear, or pinch points.

1. Lay the main harness on the feeder, and route the 16 pin connector end of the main harness into the cab. Pull all the other connections into the cab except the 31 pin Header plug and harness.
2. Connect the 16 pin connector to the back of the control unit.
3. Route the solenoid leg of the main harness into the cab wiring compartment under the fuse console. Disconnect the OEM connector labeled X and T in the 9 pin Amp Male / Female connector set on the Headsight ® main harness.

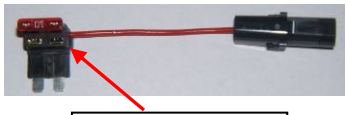




4. Open the fuse panel access door. Route the red, black, and purple wires into this area.

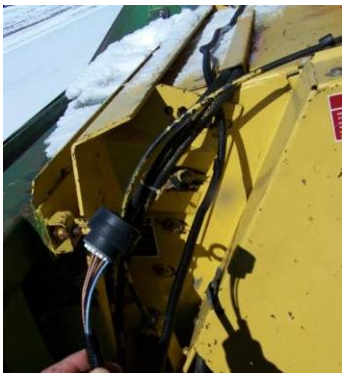


5. 12V Power connection
   - o Identify the solenoid functions fuse (F15 on this model combine).
   - o Make sure this fuse is key switched (only 12V when the motor is running).
   - o Remove the fuse and insert it into the provided fuse tap. Insert the fuse tap into the fuse slot.
   - o Connect the fuse tap to the red wire single pin plug.



Insert OEM fuse here

6. Connect the black wire to a good ground bolt.
7. Using the markings on the fuse panel, find the oz/br wire at the I connector, pin 6 in the fuse panel.
   - o This is the header clutch wire and should be 12V when the header clutch is engaged. Test this to verify wire selection.
   - o Use a wire tap or a crimp connection to splice the purple wire to the header clutch wire
8. Route the header part of the main harness (31 pin connector) out of the cab and follow OEM wiring/hoses to the left front of the feederhouse. Make sure to leave “slack” for the feederhouse motion.



2.3. Header Harness

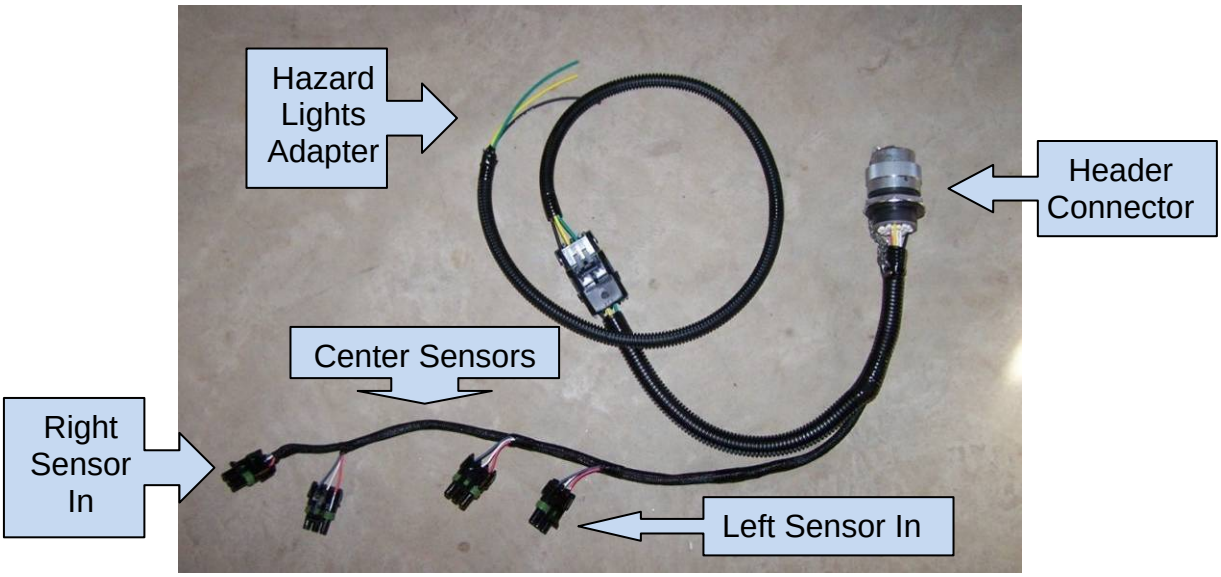
1. **For newer 74C, 98C type headers with preexisting sensors**

   - For 98C type heads, no harness is necessary, attach the header connector directly.
   - For 74C headers, no harness is necessary, attach the header connector directly. However, the right end sensor must be reversed. Please order a reversing module from Headsight®.

2. **For headers without existing sensors**

Mount the header interface harness 31pin connector on the left rear of the header near the feederhouse using the included bracket. Connect the Headsight ™ combine header connector.

- **For sensor installation instructions**, see the appropriate **Header Sensor Installation Guide.**



3. **For other headers with existing sensors**

See note below.

Adapter harnesses are available to connect OEM Headers with preexisting OEM sensors to the Headsight™ height control. Contact Headsight™ for the correct part number for your specific application.

3. Calibration

Before working under the header always:

1. Perform all combine and header manufacturer safety precautions for servicing header.
2. Lower stop to prevent movement of header.
3. Set combine parking brake.
4. Disconnect all drive shafts from the header.

3.1. Sensor Calibration

You will not need to calibrate the sensors for new installations because they are pre-calibrated 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 the same ground height for each.

1. Attach all harness and sensor wiring.
2. Power the header control system.
   - Start the motor, raise the head and install safety stop. Leave motor running.
   - Set the MODE switch to OFF.
   - Turn the OEM Header Height switch OFF.

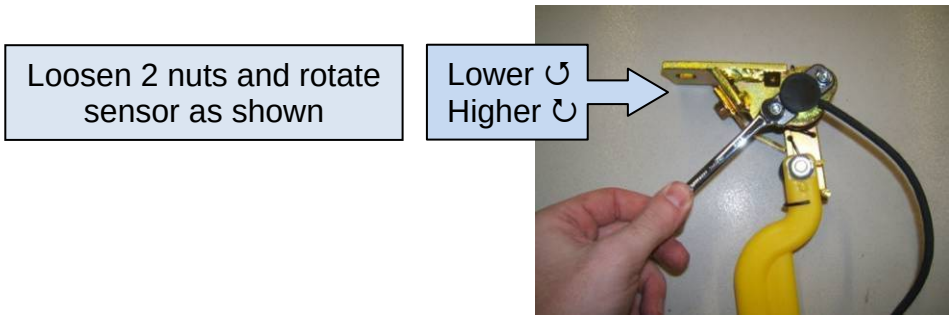
3. Move (any) one sensor arm back to the lowest position to which the ground could push the sensor during normal operation.

- This position should not be to the mechanical limit and will vary slightly depending on header type and “angle”.
- The ACTIVE [CAL] light should just turn on at this low position.

You will not be able to adjust OEM sensors (such as JD) properly. If you cannot adjust the sensors as described below, use a voltmeter to set all sensor voltages equal (within 0.2V), and read the note under 5.3 “Adjusting header height”.

- If the ACTIVE [CAL] 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 CAL light. More details may be found in the header manual.



4. Repeat step 3 for each sensor – perform seasonally.
5. If needed, adjust the down stops for an equal hang angle for all sensors.

4. Settings

4.1. Combine Settings

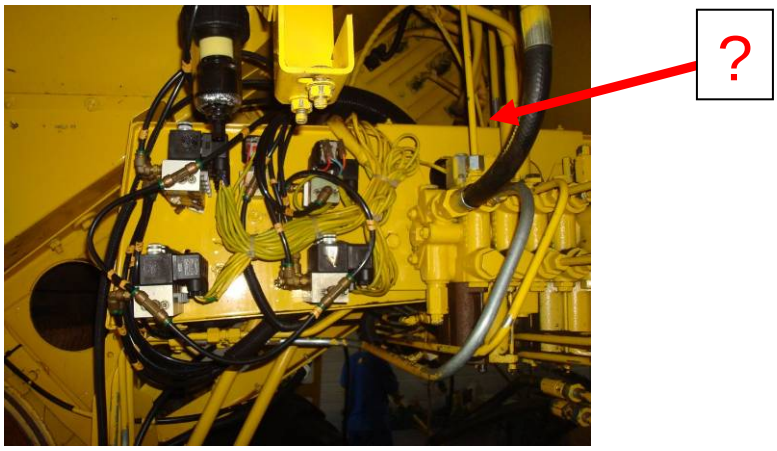
Properly setting the combine is essential to having responsive header control. You should become very familiar with the steps in this section.

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

See owner’s manual for location of drop rate valve and accumulator.

4.1.1. Header drop and raise rates

1. If this setting is adjustable on your combine model, adjust the lower rate adjustment on the main valve stack to approx. 8-10 seconds from header full up to full down. To adjust, loosen lock nut and turn bolt in (slower) or out (faster).
   - If the speed is to fast – hunting will occur.
   - If the speed is to slow – the system will not be responsive enough.
2. Fine tune lower rate as needed.



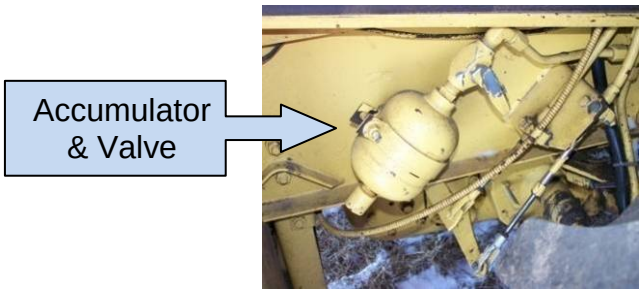
4.1.2. Hydraulic accumulator

If you do not have any accumulator, please contact either your local dealer to install one. It will result in much improved operation and less stress to both you and the machine in all situations, manual or auto.

1. Make sure that your height accumulator is properly charged (see your NH owners' manual). To properly set accumulator, follow the instructions below. Some accumulators are non-adjustable, use this procedure only if you have a adjustable accumulator.

   - Close the accumulator valve all the way
   - Open the accumulator valve 1 full turn (from closed position). Fine tune as necessary during field operation to remove the "jolt" without making head response "mushy"

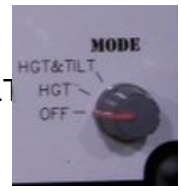
- Opening the accumulator too far will give a "mushy" response. If the header constantly overshoots, even after drop and raise rates are slowed down, close the accumulator valve or recharge it.
- Not opening the accumulator far enough will give a jerky response.



5. Operation

5.1. Control Unit Layout

5.2. Enabling Height Control

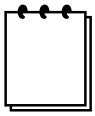
1. Turn MODE switch to HGT or HGT & TILT 

Due to the internal design of the OEM NH-TC system, the OEM auto header switch will not turn off auto header control. When using the Headsight® system, the MODE switch replaces the OEM switch to turn ON/OFF the height control system. Make sure to turn OFF the MODE switch any time you do not want the header to auto lower or raise when the header clutch is on.

2. Press header lower (or enable) button. The AUTO light should now be lit.
3. To disable, press header raise. The Auto Light should be off.

5.3. Adjusting Header Height

1. Turn the head height knob on the control unit with header control engaged.
   - Clockwise = higher
   - Counter-clockwise = lower
2. Find and mark the minimum acceptable height as noted below, do not operate below this point.



Because the Headsight™ control unit 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 is too low – do not operate header control at or below this height.

5.4. Adjusting Height Sensitivity

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

5.5. Adjusting Tilt Sensitivity

1. Increase tilt sensitivity (turn CW) for more responsive performance.
2. Decrease tilt sensitivity (turn CCW) to reduce hunting.
   - You may need to adjust the hydraulic flow rate before adjusting the sensitivity knob. The head should take at least 5 seconds to tilt fully from one side to the other, more for wider heads.

A. Theory of Operation

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

1. Control Unit: Front Panel Controls

The control unit contains both the height control analysis circuitry, and the interface to work with the manual controls of the harvester.

- The MODE switch allows the user to operate height control without lateral tilt.
- The control unit will not activate the outputs unless the OEM header clutch switch is on, and the manual header lower switch has been pressed.
- The ACTIVE [CAL] light performs two functions. During sensor calibration, it acts as a “low point” indicator to help set all sensors at the same point. During operation, it will light when the auto height control system is activated.

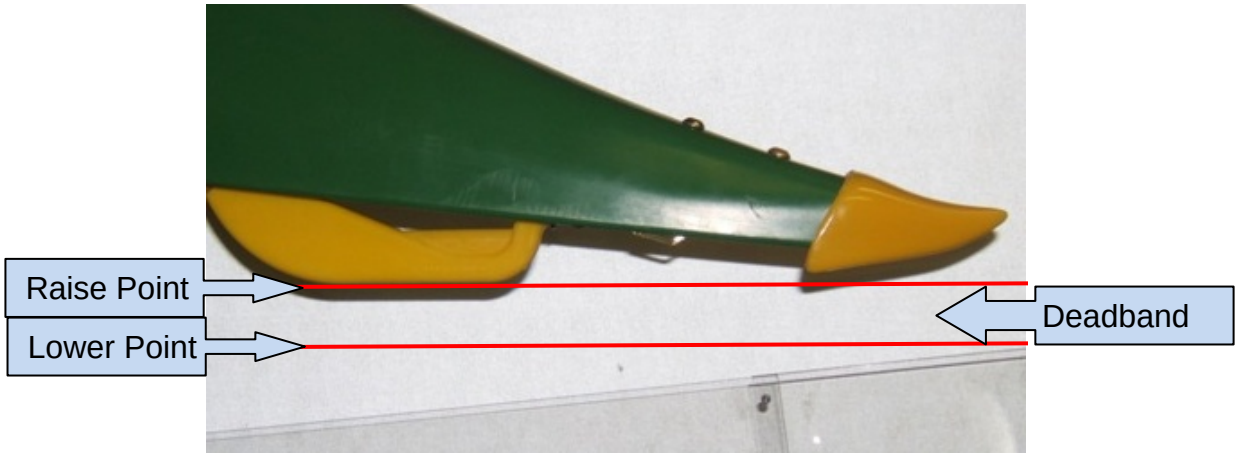
2. Sensors

Further information on sensors is available in the Header manual.

- Each sensor returns a variable voltage to the control unit depending on its height.
  - high height = high voltage (approximately 4 volts)
  - low height = low voltage (approximately 1 volt)
- Each sensor has 3 wires (colors of OEM sensor wires vary)
  - red = 5V power
  - black = ground
  - white = signal returned to the control unit (varies between approximately 1.0 and 4.0 volts)

3. Height Operation

- **Head Height**
  - The control unit compares the lowest (most smashed) sensor to the desired height chosen with the height knob.
  - If *any* sensor has a lower voltage (is nearer the ground) than the height setpoint voltage – the box energizes the raise output.
    - 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 control unit energizes the lower output.
    - This means that all sensors must agree to lower the head.



- **Sensitivity**
  - The sensitivity knobs on the control unit adjust the size of the deadband.
  - The deadband is a small area where the system will neither raise nor lower (or tilt).
  - This helps prevent the header from hunting.
- **Tilt**
  - The left and right sensor signals are compared and a tilt output is enabled as needed. The tilt sensitivity knob sets the deadband.

B. Troubleshooting.....by Symptom

The following troubleshooting guide is to be used as follows:

- 🛠 Denotes a problem. Read through the problems and select the one that most closely represents your problem.
- ? Asks a question. Read through the possible options and select the one that best describes your system's operation.
- ★ Denotes a possible solution. Test each solution in the order given, as a solution may depend on proper operation of previous solutions.
- ○ Gives further explanation or testing instructions.

🛠 **Header is too jumpy or responds too slowly**

- ★Combine is improperly set.
  - o See Settings section – adjust drop rate and accumulator.
- ★Sensors need to be recalibrated.
  - o See Sensor Calibration section.

🛠 **Height control works but tilt does not.**

- ★Turn MODE switch to HGT & TILT.
- ★Turn up tilt sensitivity.
- ★Control unit defective
  - o Tilt Head fully to left and set lower end fully on ground (set Height to MIN). Turn Tilt Sensitivity to MAX.
  - o Orange wire to X6 plug should be 12V. If 0V, suspect defective control unit.
  - o Tilt head to right and test Dk. Blue wire to X5 plug. If 0V, suspect defective control unit.
- ★ If both wires test 12V, combine wiring defective, test and repair.

- **Header is not level with tilt enabled.**
  - If the header tilts completely to one side:
    - Sensors incorrectly connected
      - Verify that the individual sensor wiring is connected to the sensor inputs of the main header harness properly. This symptom will occur if the left or right sensor wiring is in the incorrect position. See Header Installation Manual for details.
    - Outer sensor(s) or wiring defective
      - Check individual sensors and wiring.
  - 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. (See the Calibration section of this manual).
- **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 ACTIVE LED is lit on the control unit.
    - Suspect defective Headsight™ system.
      - Test Headsight™ system by following raise/lower diagnostics below.
  - If NO LEDs are lit on the control unit:
    - Ensure fuse is not blown and unit has good ground and 12V.
    - Suspect defective Headsight™ control box.
- **Head drops all the way to ground.**
    - Height position knob set too low.
      - Rotate knob CW until head raises.
  - If lower indicator 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 raise indicator is on with the head on the ground:

- ★ Defective raise solenoid connection—X4 (plug).

🛠 **Head raises all the way to top.**

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

? If raise indicator is lit with the head off the ground

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

? If lower indicator is on with the head off the ground.

- Test lower solenoid – X3 (plug)
- Open drop rate valve

🛠 **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.
- ★ Drop rate valve too far closed → Open valve
- ★ Combine not receiving lower signal.
  - Test wiring to lower solenoid—X3 (plug).

- Lt. Green wire to X3 (plug) be 12V when lower indicator is lit.

🛠 **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.

- o Rotate CW to narrow deadband.

★Defective sensor or harness

- o 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 raise signal.

- o Test wiring to raise solenoid.
  - Brown wire to X4 (plug) should be at 12V when raise indicator is lit.

🛠 **Manual raise switch does not disengage auto height.**

★Test combine system.

- o Hold header raise switch.
- o Raise signal wire, yellow—X4 (receptacle) should be 12V.

★Defective control unit (highly unlikely).

🛠 **Manual lower (or Enable) switch does not engage auto height.**

★Test combine system.

- o Header clutch not engaged, engage header clutch.
- o Hold lower switch.
  - Dk. Green wire at X3 (receptacle) should be 12V.

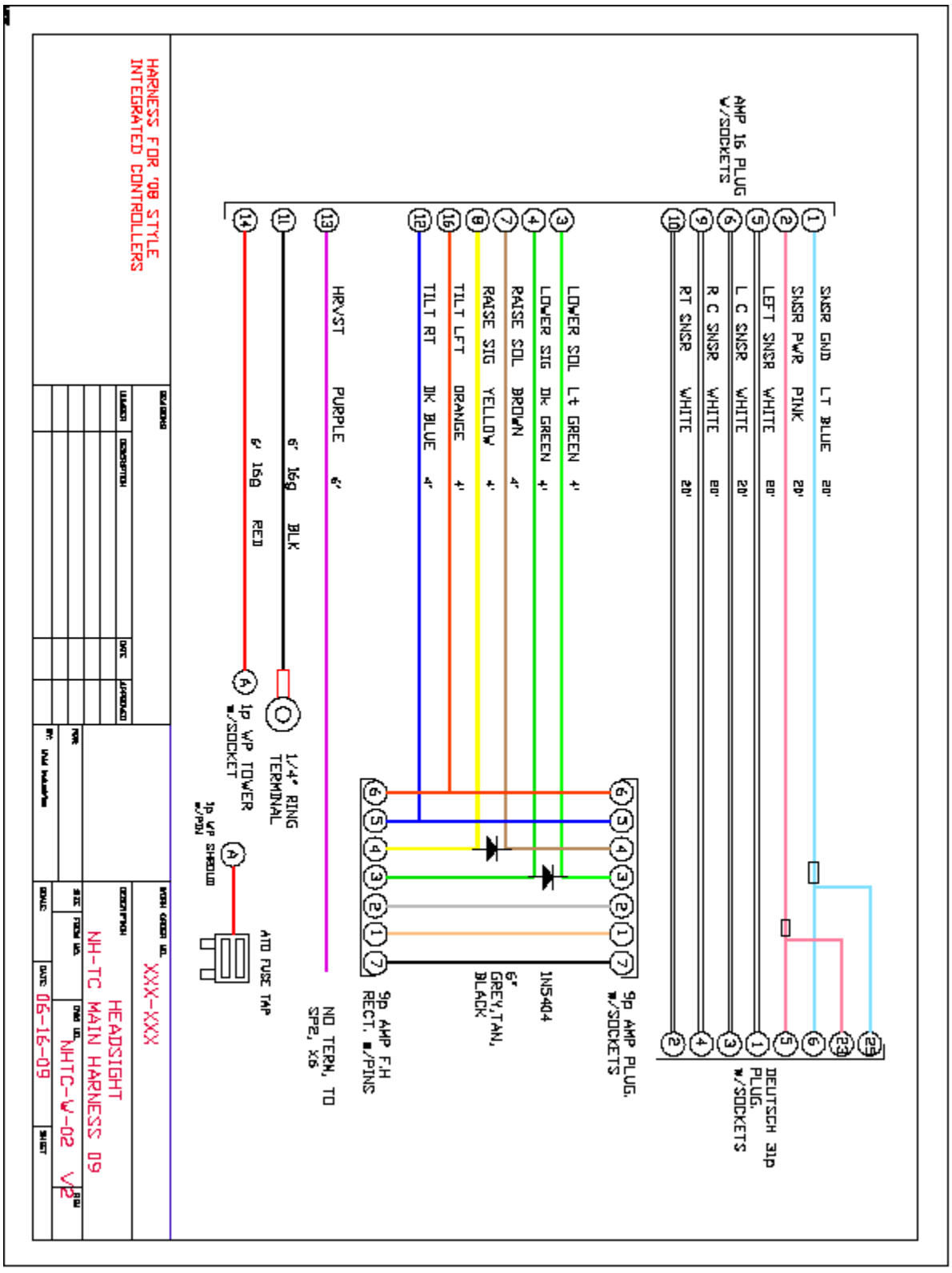
★Purple wire not 12V with header clutch engaged. Check connection.

★Bad purple wire from connection to pin 13 at control unit. Test for continuity and repair as needed.

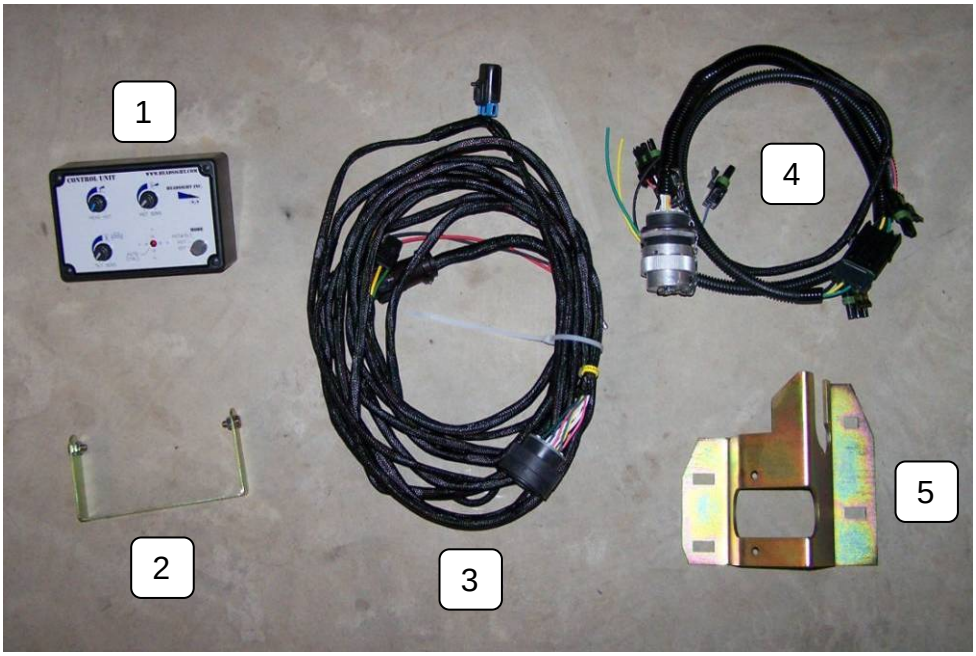
★Defective control unit (highly unlikely).

C. Troubleshooting...Common Harvester Problems

- 🛠 **Head jumps and jerks whole harvester**
  - ★Unopened or discharged accumulator
    - o Test accumulator as described in harvester owner's manual
    - o Replace or recharge as necessary
- 🛠 **No 12 Volts available at fuse.**
  - ★Start combine engine
  - ★Test OEM Fuses
  - ★Check OEM harness for damaged wires.
- 🛠 **No 12 Volts available on header clutch wire.**
  - ★Engage header clutch switch.
    - o Purple wire should be 12V.
  - ★Repair combine.


HARNESS FOR '08 STYLE
INTEGRATED CONTROLLERS
XXX-XXX
HEADSIGHT
NH-TC MAIN HARNESS 09
NHTC-M-02
V2
06-16-09
SNSR GND LT BLUE 20'
SNSR PWR PINK 20'
LEFT SNSR WHITE 20'
L C SNSR WHITE 20'
R C SNSR WHITE 20'
RT SNSR WHITE 20'
AMP 16 PLUG W/SOCKETS
DEUTSCH 31p PLUG W/SOCKETS
LOWER SOL Lt GREEN 4'
LOWER SIG DK GREEN 4'
RAISE SOL BROWN 4'
RAISE SIG YELLOW 4'
TILT LFT ORANGE 4'
TILT RT DK BLUE 4'
1N5404
9p AMP PLUG W/SOCKETS
6' GREY/TAN, BLACK
9p AMP F.H RECT. W/PINS
HRVST PURPLE 6'
NO TERM, TO SP2, X6
6' 16g BLK
6' 16g RED
1/4" RING TERMINAL
1p W/P TOWER W/SOCKET
1p W/P SHROUD W/PIN
ATO FUSE TAP

D. Parts



Key#	Part#	Description	PARTS KEY Qty	Notes
1	HT9114	OXBO CONTROL UNIT	1	’08 W/MODE SWITCH
2	HT9112	TOP MOUNTING BRACKET FOR (1)	1	
3	HT9128	MAIN HARNESS	1	
4	HT9127	HEADER HARNESS	1	(Header system only)
5	HT2250	HEADER CONNECTOR MOUNT	1	(Header system only)

E. Warranty Information

Statement of Limited Warranty for Corn Products

Headsight Inc. (Headsight) warrants its new corn sensors assemblies for a period of thirty-six (36) months, and its electronic wiring and interface control boxes for a period of twelve (12) to be free from defects in material and workmanship following the date of purchase by the retail purchaser.

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 must be done between customer and Headsight through Headsight's 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 sixty (60) days of the occurrence of the claim and within the warranty period.
- All parts removed during warranty repair should be held for a period of 60 days after the warranty claim has been submitted to Headsight.
- Headsight, Inc. reserves the right to either inspect the product at the original retail purchaser's location or require it to be returned to Headsight, Inc. 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 foods 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, NO 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 of 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: 1/2007

HEADSIGHT INC.
HARVESTING SOLUTIONS

3529 Fir Rd. Bremen, IN 46506
Ph: 574-546-5022 Fax: 574-546-5760
info@headsight.com www.headsight.com