CIH 2xxx, 1xxx

K series Combine Manual
09010203

HEADSIGHT INC.
HARVESTING SOLUTIONS

About Headsight

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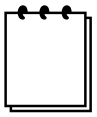
About this Manual

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.



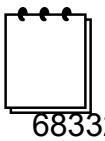
This icon designates information of which you should take note.

This icon designates an important instruction.

Disclaimers

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.

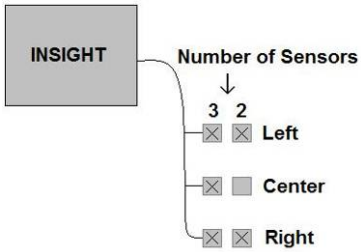
Table of Contents

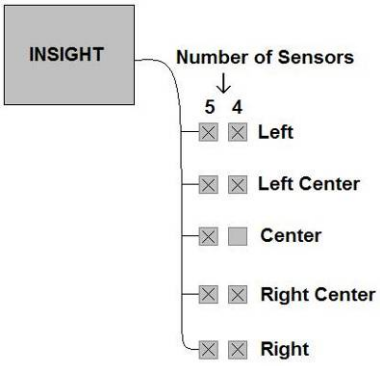
1. Installation

Complete the installation portion of the header manual before continuing.

1.1. Interface Unit Mounting

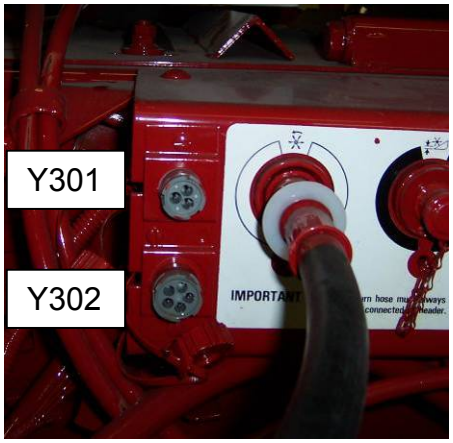
1. Hold box at rear of header within reach of feederhouse electrical connection on combine and mark mounting hole locations.
2. Drill mounting holes using ¼" drill bit.
3. Secure box to header
   - Use provided tie straps or ¼" bolts.
4. Attach Y101 to bottom of interface unit. Unit must be within reach of the header electrical connectors.
5. For Corn / Wheat systems, 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.
   - Note: 2 and 4 sensor systems have no center sensor.





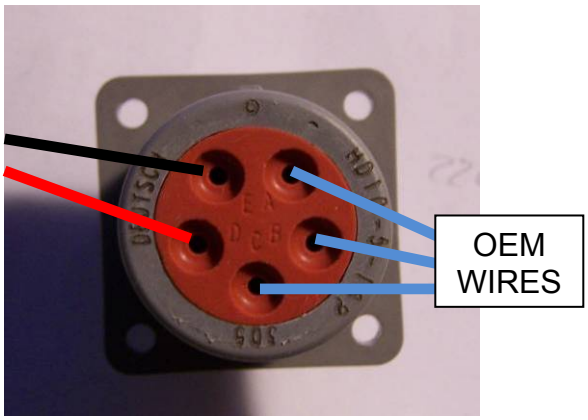
6. For JD 900F and CIH 2020 Flex platform conversions, plug the connector S0 into the OEM header connector.

7. Mate 3 (Y301) and 5 (Y302) pin connectors to combine.
8. Connect the hazard lights plug (Y303) to the combine.

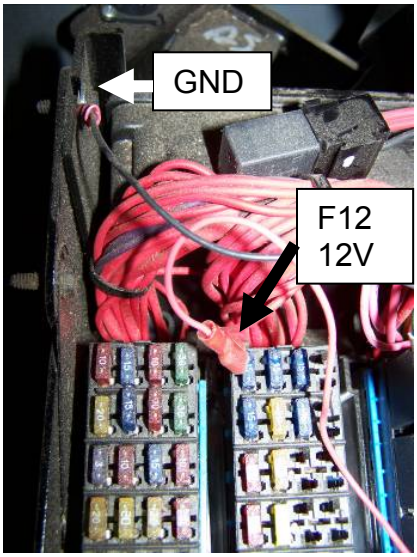


1.2. Interface Unit Power Wire Installation

1. If your combine DOES HAVE Field-Tracker (lateral tilt)
    - Remove the two white plugs from rear of round grey 5 pin Deutsch plug on the combine (Field Tracker plug) pins D and E. Leave the existing wires in place.
2. If your combine DOES NOT HAVE Field-Tracker
    - Use the 5 pin plug included with the power wire
3. Press the pin of the red wire of the Headsight® power wire into Pin D of the 5 pin plug until you hear a click.
4. Insert the pin of the black wire into pin E of the 5 pin plug.



5. Run the power wire to the fuse box
    - Up the left-hand side of the feederhouse (follow existing wiring)
    - For 21-2500 combines, into the cab door, under the floor mat, and into the fuse compartment.
    - For 21-2500 combines, connect the red wire to the fused side of F12 by snapping the provided gold clip around the fuse.
    - For 14-1600 combines, Remove right hand cab panel, route wire into console wiring area from under cab, and connect the red wire to a 12V fused, switched power source.
6. Connect the black wire to a screw tied to frame ground.



1.3. Calibration

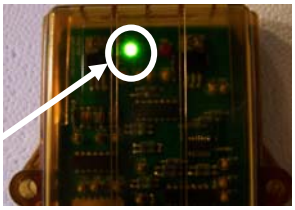
Before working under the header always:

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.

1.4. Calibrate Sensors

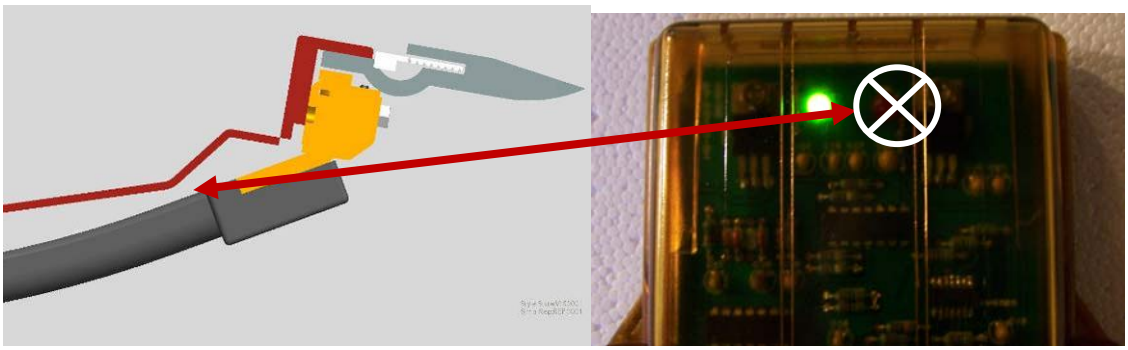
These steps must be performed each season, or after any sensor is replaced or adjusted. They do not normally need to be done each time on a new installation as sensors are factory calibrated.

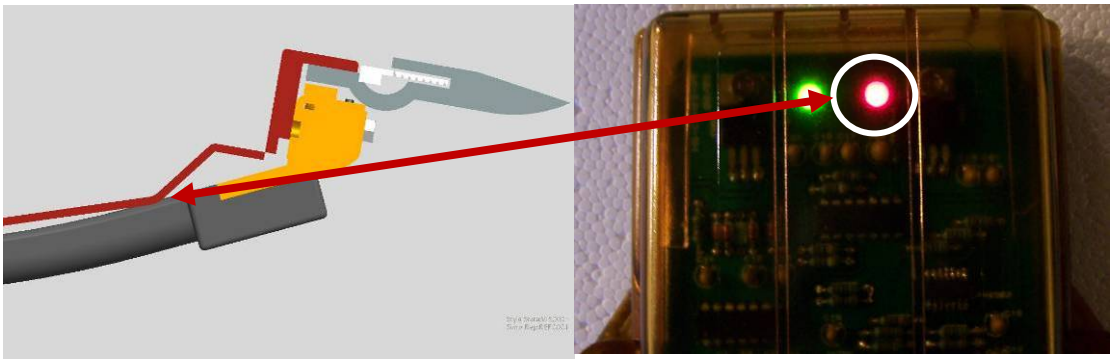
1. Connect all wiring to the Interface box and combine.
2. Start the combine.
3. On the Interface unit, make sure the Green (power) LED is on.



4. For flex platform conversions only (not wheat systems), set head all the way on ground. Unplug all sensors. Connect only one sensor at a time and adjust each sensor linkage so that Red LED just comes on.
5. Raise head all the way to the top and lower safety stop.

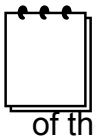
6. Smash each sensor fully up against the bottom of the header. The red LED should come on just before the sensor is fully up. Each sensor should cause the red LED to come on at the same spot in the stroke.





7. If any sensor does not cause the LED to come on, or causes it to come on at a different place in the stroke, follow the instructions in the header sensor installation manual to test or adjust that sensor.

1.5. Combine Ground Calibration (21-2500 Only)



A full-combine calibration must be completed only if any component of the header control system on the combine is changed. See combine operators manual for details. This is NOT the ground calibration shown here.

1. Start Combine (!!!!!CYCLE KEY off/on before starting calibration if engine is already running!!!!!)
2. Rev engine to full throttle
3. Turn raise rate knob under armrest to MAX.
4. Lower header to ground and hold down button for 2 seconds
5. Raise header all the way without releasing the raise button

If calibration is done correctly, the header will pause momentarily just AFTER the sensor arms leave the ground – continue to hold the raise button until reaching the top of the stroke

6. If the header does not pause or if the cornerpost display shows “S1”
   - Cycle the combine key off and back on
   - Check to make sure sensors are properly calibrated (see above).
   - If the header still does not pause or the display still shows “S1”
     - Go to Troubleshooting by Symptom – Combine calibration fails.

If you are testing Headsight® on a machine other than the one on which it will be used and powering the Headsight® system with a battery pack, you MUST connect the ground of the battery pack to the frame of the combine.

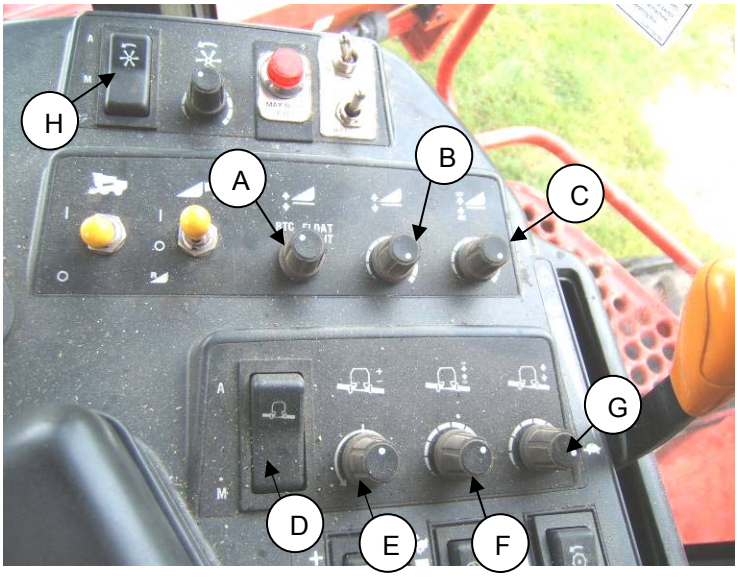
2. Settings

2.1. Combine Settings

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

ALWAYS perform the combine ground calibration if available before adjusting settings. Set each of the following settings as high as you prefer without causing head “hunting”. If the head “hunts”, decrease the appropriate setting.

- Set the automatic drop rate (21-25xx inside armrest)
  - Common range is 6-8 seconds from full up to full down in auto mode
- Set the automatic raise rate (21-25xx inside armrest)
  - Common range is 5-7 seconds from full down to full up in auto mode
- Open the hydraulic accumulator
- Set height sensitivity
- Set tilt sensitivity



2.1.1. CaseIH 2100-2500 controls

A. Header control mode selector switch

- M: Manual Mode – Operator controls header height - No Auto mode
- RTC: Return to Cut Mode – Automatically returns to preset height based on feederhouse position sensor
- FLOAT: Float Mode – Automatically adjusts header height based on pressure in header lift cylinders
- HT: Height Sensing Mode – Automatically controls header height based on ground-contacting sensors

B. Height position knob

- Turning right increases (Turning left decreases) header height setting in automatic height control mode

C. Height sensitivity knob

- Turning right increases (Turning left decreases) height sensitivity
- Increase sensitivity to increase height control performance
- Decrease sensitivity to reduce height ‘hunting’ of header

D. Field-Tracker enable switch

- A: enables automatic Field-Tracker (lateral tilt) control
- M: Operator controls header lateral tilt. Auto mode is off

E. Lateral tilt balance knob

- Turning right tilts header to right (Turning left tilts header to left) as baseline for operating mode
- Use this knob to set the header parallel to the ground on level terrain

F. Tilt sensitivity knob

- Turning right increases (turning left decreases) lateral tilt sensitivity.
- Sensitivity adjusts the allowable difference between the sensors before the combine decides to tilt the header
- Increase sensitivity to increase lateral tilt performance
- Decrease sensitivity to reduce tilt ‘hunting’ of header

G. Tilt gain knob

- Turning right increases (Turning left decreases) the gain
- Gain adjusts the amount that the header will tilt (time the tilt valve will fire) once the combine decides to tilt (see knob F)

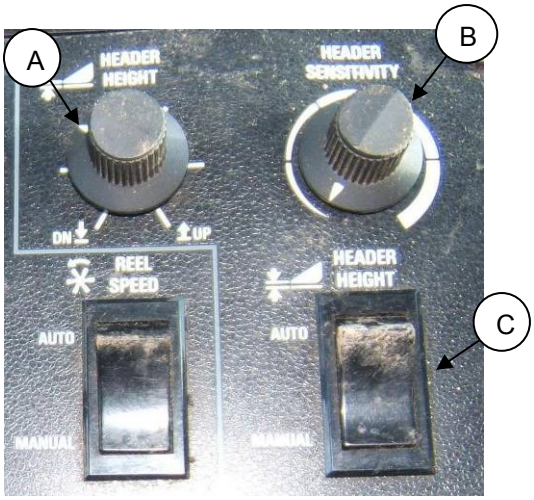
- Increase gain for increased tilt response (especially on narrow headers)
- Decrease gain to reduce tilt ‘hunting’ or on wider headers

H. Reel Mode Selector Switch

- A: Automatic Mode – Reel speed to changes automatically with ground speed
- M: Manual Mode – Operator controls reel speed
- Corn: Disables reel function
- Header must be calibrated in the same mode as it will be operated in the field.
- The height range and sensitivity may vary between settings.

2.1.2. CaseIH 14-1600 series controls

A. Height position knob



- Turning right increases (Turning left decreases) header height setting in automatic height control mode. The range is fixed (no calibration).

B. Height sensitivity knob

- Turning right increases (Turning left decreases) header height sensitivity
- Increase sensitivity to increase height control performance
- Decrease sensitivity to reduce height ‘hunting’ of header

C. Header control mode selector switch

- AUTO: Height Sensing Mode – Automatically controls header height based on ground-contacting sensors
- MANUAL: Manual Mode – Operator controls header height. Auto mode is off.

D. Field Tracker Controls

- Field tracker controls are almost identical to those on the 21-2500 series. See D-G in the section above for the descriptions.

3. Operation

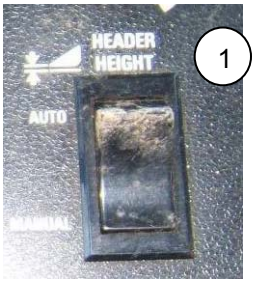
Operate the Headsight system exactly like you would use a CIH system.

3.1. CIH 2100-2500 Series

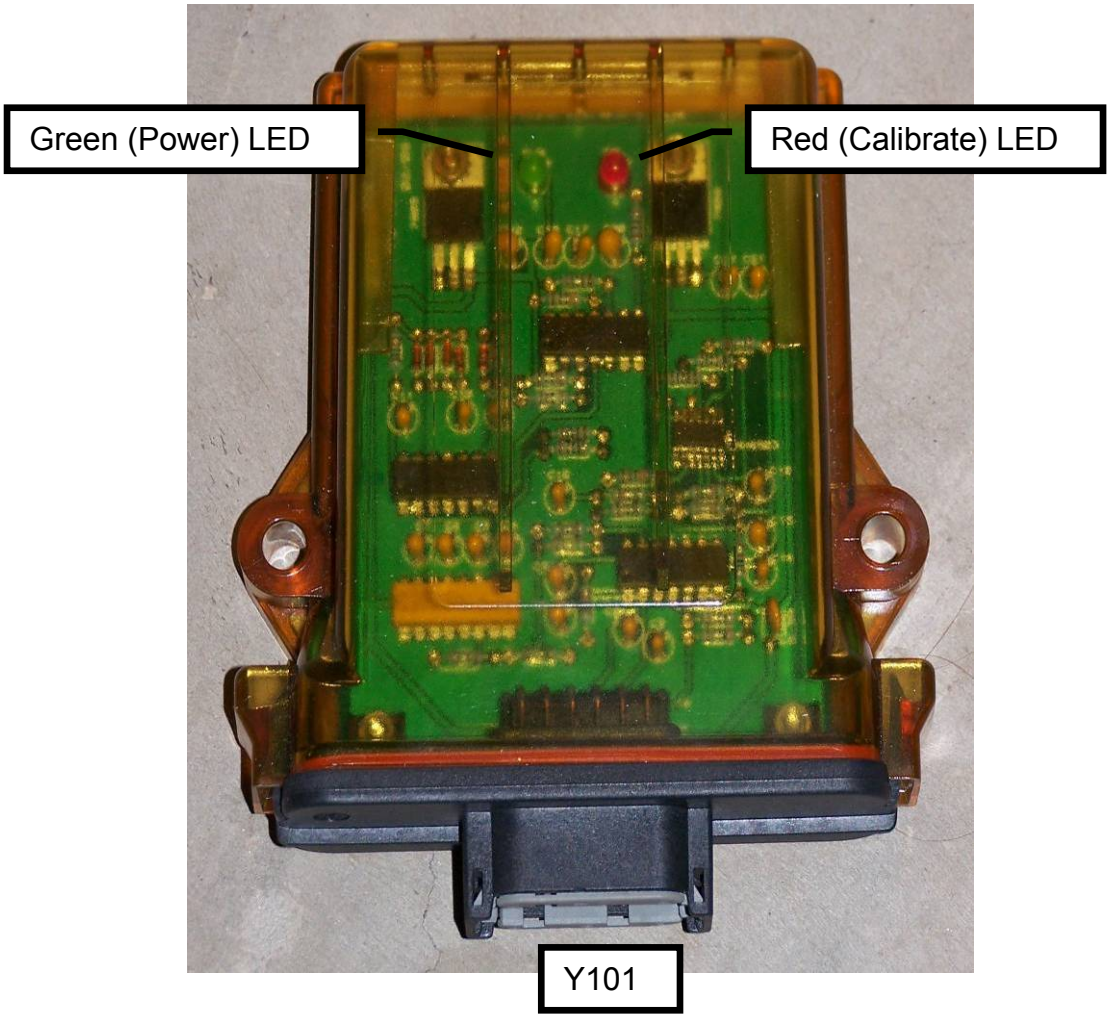
1. Set height mode selector switch to "**HT**"
2. Set Field-Tracker enable switch to "**A**"
3. Turn on separator and header clutch
4. Press lower button

3.2. 1600 Series

1. Set header height mode switch to **"Auto"**
2. Turn on separator and header clutch
3. Press lower button



A Interface Unit Overview



1 Meaning of the status lights

- Green LED
  - o System is operating, has power, and 5V is being sent to the sensors
  - o
- Red LED
  - o Calibration point. This LED turns on when any sensor return voltage drops below 1.0V. This allows an easy way to test/set each sensor. See Sensor Calibration for more information.

B Advanced Instructions

1 CaseIH 21-2500 series Full-Cal (Perform only if needed)

1. Perform calibration over a ditch; feederhouse MUST be fully lowered to stops during this procedure.
2. Start engine while holding both “Engine” and “Speed” buttons
   - Screen will display “Hdr”
3. Release “Engine” and “Speed” buttons
   - Screen will display “r302” or similar then
   - Screen will display “CAL”
4. Press header raise button
   - Screen will display “1”
5. Press header raise button
   - Screen will display “2CYL”
   - This refers to the number of feederhouse lift cylinders
     - Press header raise button to select 2 lift cylinders OR
     - Press header lower button to move to “3CYL” then header raise to select
   - Screen will display “hd 1”
6. Press header raise button
   - Screen will display “CONC”
7. Press header lower button
   - Screen will display “dn”
8. Turn “Height” knob fully counterclockwise press header raise to continue
   - Feeder will lower fully!
   - Screen will display “----“
   - Wait about 30 seconds

9. Turn “Height” knob fully clockwise press header raise to continue

- Feeder will raise fully!
- Screen will display “----“
- Wait about 30 seconds
- Screen will display “CAL“

10. Cycle Reel Auto/Manual switch to exit

11. Connect Combine to Header

12. Return to Calibration Section of this manual

C Technical Information

1 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. Each sensor returns a variable voltage depending on its height.
   - high height = high voltage (approximately 4 volts)
   - low height = low voltage (approximately 1.5 volt)
2. Each sensor has 3 wires
   - red = 5V power
   - black = ground
   - white = signal returned to the combine
     - varies between approximately 1.0 and 4.0 volts
3. The Interface unit adjusts the signals as needed then sends them on to the combine using the same combine wiring as an OEM system would use.
   - All sensors are scaled to an appropriate range for the combine (3-5V).
   - The lowest of all the sensors is used to determine the combine height input.
4. The Interface unit simulates the CIH Field-Tracker wiring.
   - The left and right sensors are compared – a tilt signal is sent to the combine tilt input (3-5V)
   - The Interface unit reads the tilt sensitivity from the combine and adjusts the output signal accordingly. If there is any problem in the combine system, the Headsight® system will not function correctly.
5. The voltages the combine sees are exactly like what it would see with an OEM flex head system. All existing combine controls and settings may be used.

2 Reading voltages for troubleshooting

- Most voltage readings listed in the troubleshooting guide are given as 4.0V, etc. This reading is a true voltage to chassis (battery) ground. To test these voltages, hook the BLACK probe from any good voltmeter to any clean metal bolt, etc on the frame of the combine, and use the RED probe to measure the voltage on the wire.
- NOTE: If the instructions say the connection must remain connected, use an ordinary safety pin to pierce thru the wiring and then measure from the pin to ground as above.
- If any voltage is listed as “between two wires”, then measure with the two probes placed on those two wires.
- To measure resistance, set the Voltmeter on OHMS and measure between the two wires or points noted in the instructions. Most resistance measurements are taken with the connections NOT connected.

3 Basic Requirements

If any sensor does not meet the requirements below you must correct it (to meet the requirements) and then recalibrate the sensor. See the header manual for sensor adjustment instructions. Each sensor must meet basic requirements for the combine to accept the calibration.

- Signal from each sensor must always be between .5 and 4.7 volts.
- Signal from each sensor must be approx. 1.5 volts when the head is fully on the ground, and approx 3.5-4.5 when all the way up.

4 Troubleshooting

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.

…Troubleshooting by Symptom

Header is too jumpy or responds too slowly

- ★ Calibration is not properly completed.
  - ○ Recalibrate sensors
  - ○ Recalibrate combine.
- ★ Combine is improperly set.
  - ○ See Settings section.

Combine Quick-calibration fails

- ★ Sensors not properly calibrated
  - ○ Verify all sensors are free to move through full range during calibration
  - ○ Verify that sensors swing through similar range
  - ○ Verify red LED lights at same spot for each sensor.
- ★ Header is not properly connected
  - ○ Verify all combine harnesses are properly connected
  - ○ Cycle key switch off –on then recalibrate
- ★ Combine computer needs reset
  - ○ Cycle key switch off/on then recalibrate
- ★ Full calibration required
  - ○ Make sure to fully lower the feederhouse
- ★ Combine does not recognize header.
  - ○ Verify 2K Ohms reading across pin A & C (two green wires) on the 3 pin Height connector that plugs into the combine.
  - ○ Cycle key off/on

? If the cornerpost display of the combine alternates “S1” and “hdr”

- ○ Contact your dealer or Headsight.

? If the cornerpost does not display “S1”

- ○ See “Common Combine Problems”

Cannot operate header low enough

- ★ Perform combine Full-Cal and Quick Cal

Cannot operate header high enough.

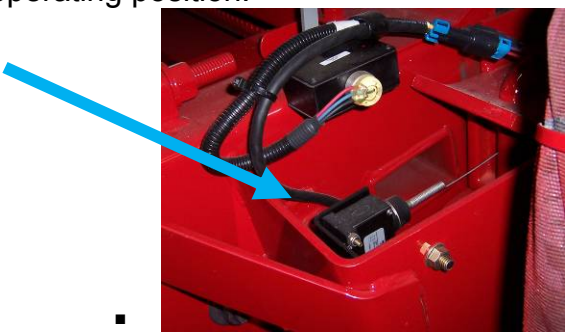
- ★ Perform combine Full Calibration, then Quick-Cal.
  - ○ If symptom persists, see “Common Combine Problems”
- ★ For corn heads: verify that the extensions are installed at the proper position.

No automatic operation – height or tilt

- ★ Wiring is not connected properly or calibration has not been completed.
- ★ Header control is not enabled with cab controls.
  - ○ See Operation section for instructions about how to enable.
- ★ Power supply from combine less than 8V to Insight.
  - ○ Measure power supply voltage with key on.
    - o Pin D of header connector Y302.
    - o Pin 1 of connector on Interface unit.
- ★ Control box /wiring failure
  - ○ Measure voltage on PIN B of height connector Y301 with control box connected
    - o Should be approx 3V with any sensor fully collapsed (header down)
    - o Should be approx 5V with ALL sensors hanging (header raised)
  - ○ Measure voltage on PIN B of tilt connector Y302 with control box connected (must remain connected)
    - o Should be approx 4V with sensors level
    - o Should be halfway between PIN A and PIN C measurements (connector Y302) with sensors level
- ★ Combine problem
  - ○ Contact your CIH service technician

Height works but not Tilt

- ★ Lateral tilt not enabled
  - ○ Enable appropriate lateral tilt cab controls
  - ○ See Operation section or combine operators manual
- ★ Wiring not connected properly
  - ○ Verify all wiring connectors are properly connected
- ★ Feederhouse position switch improperly adjusted
  - ○ Adjustable spring trigger switch (Early models use mercury switch) on top left of feederhouse must not contact the pivot brace when the head is lowered into operating position. It may contact when the head is raised above operating position.



- ★ Control box /wiring failure
  - ○ Note: Combine tilt power and common must be in the ranges below when interface unit is connected
    - o Pin C (Y302) = 4.2 to 5.0 volts
    - o Pin A (Y302) = 3.0 to 3.8 volts
  - ○ Measure voltage on PIN B of connector Y302 with control box connected
    - o Should be approx 4V with sensors level
    - o Should be halfway between PIN A and PIN C measurements (connector Y302) with sensors level
    - o Should vary smoothly as EITHER right or left sensor is collapsed – near 4V, not exceeding the range of 3V-5V
- ★ Combine problem
  - ○ Service combine

Tilt works but not Height

- ★ Height control not enabled
  - ○ Enable appropriate height control functions with cab controls
  - ○ See Operation section or combine operators manual for control description
- ★ Wiring not connected properly
  - ○ Verify Y301 is properly seated
- ★ Control box / wiring failure
  - ○ Measure voltage on PIN B of connector Y301 with control box connected
    - o Should be approx 3V with any sensor fully collapsed (header down)
    - o Should be approx 5V with ALL sensors hanging (header raised)
- ★ Combine problem
  - ○ Service combine

Header is not level with header control engaged.

? If the header tilts completely to one side:

- ★ Wiring connected improperly
  - ○ 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.

? If the header runs slightly out of level but functions correctly:

- ★ Adjust using the Tilt balance knob on the armrest.

…Troubleshooting by CIH service codes

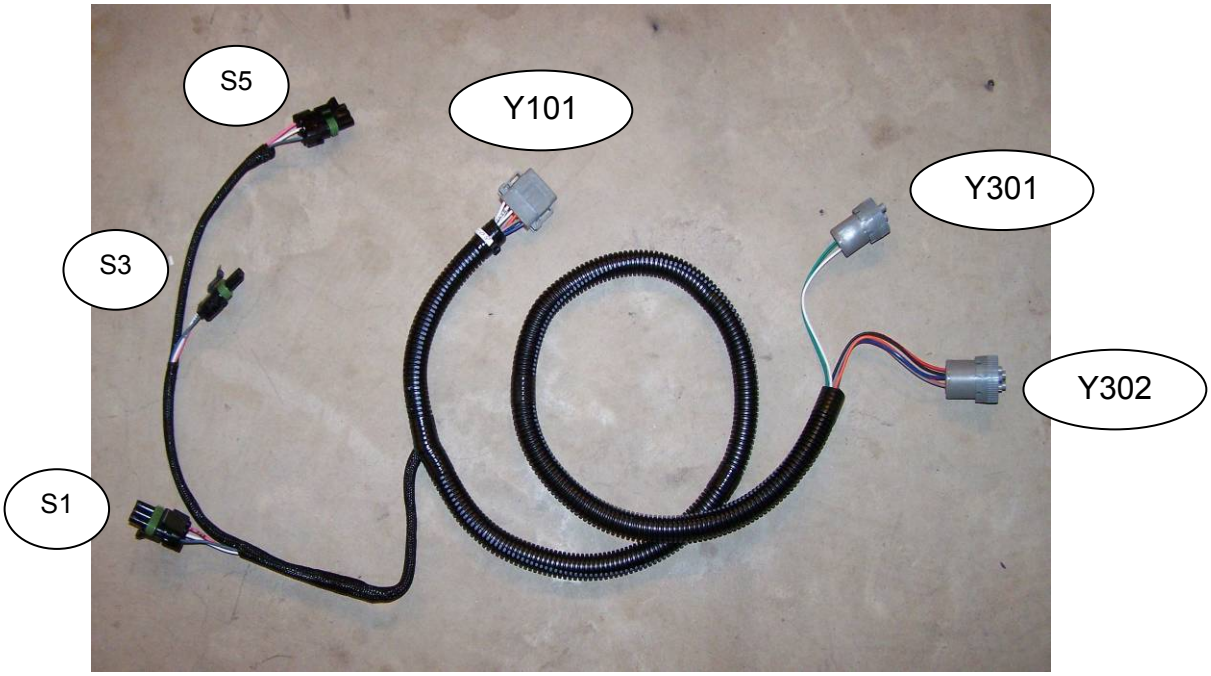
- “S1” displayed on combine corner post during calibration
  - ★ This error code can mean almost anything associated with the header control
    - ○ See “Troubleshooting by Symptom - Calibration fails”
- “S1” and “Hdr” displayed alternately on combine corner post during combine startup
  - ★ The combine does not detect the header control / Insight® box
    - ○ Verify that all header connectors are properly connected
    - ○ Contact Headsight if problem persists

5 Common Combine Problems

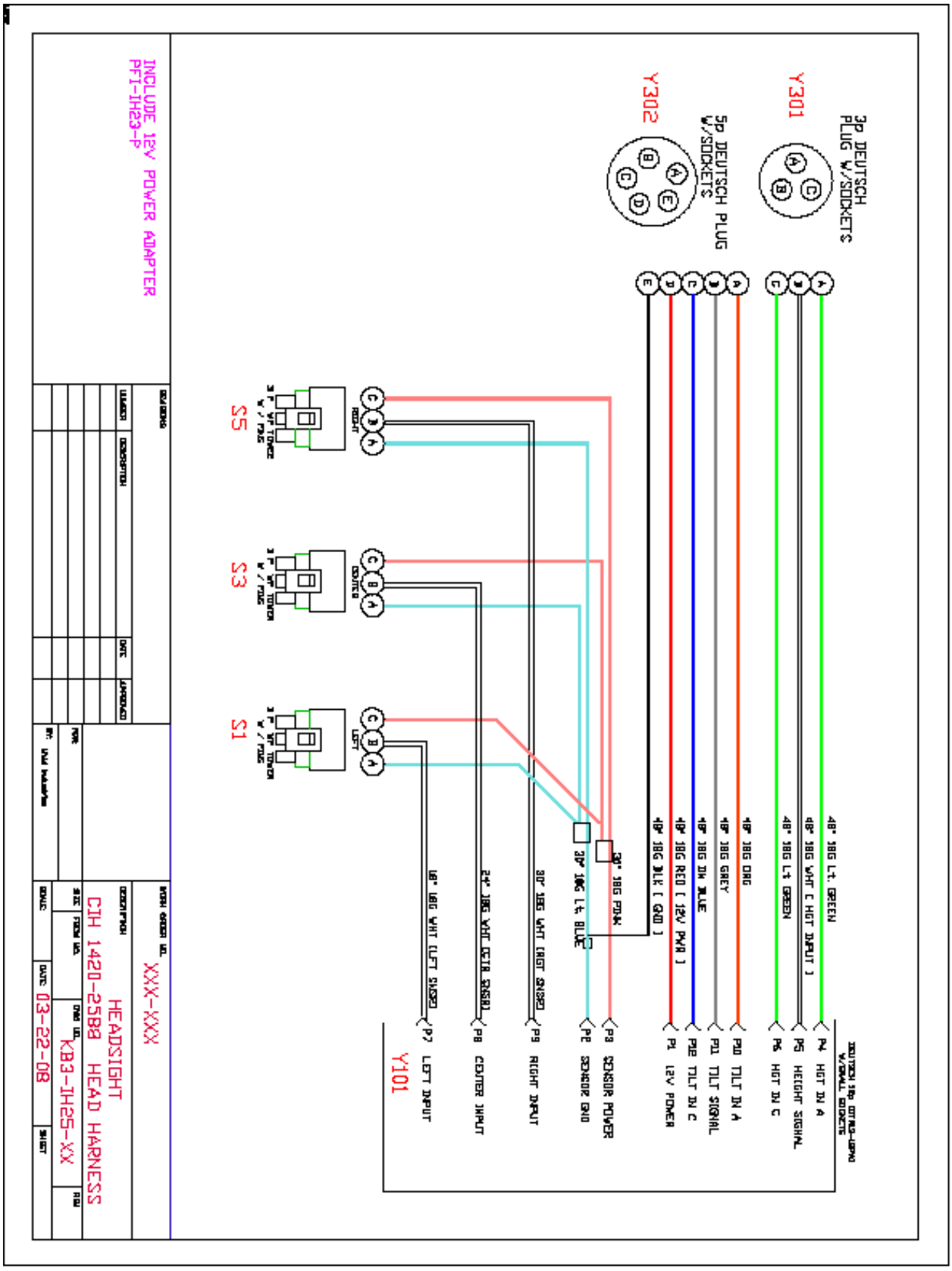
The combine expects the height control sensors to move through their full range and the feederhouse position sensor to begin motion within a limited time after beginning the raise segment of the combine quick-cal procedure.

- Bad feederhouse position pot
  - ★ To test feederhouse position pot: set header control mode selector switch to “RTC” –
  - **?** If height can be adjusted full range with the height selector KNOB
    - ○ Feederhouse position pot is ok
  - **?** If height cannot be adjusted full range,
    - ○ Suspect bad feederhouse position pot
  - **?** IF “S1” error code appears AFTER the header pauses and resumes movement during quick calibration
    - ★ Cycle Key off and back on
    - ★ Lower header to ground and continue to press header lower button for 2 seconds after the head reaches the ground
    - ★ Raise header without releasing raise button until it pauses – RELEASE immediately after motion resumes
- The combine needs to be ‘tricked’ during calibration
  - ★ Ensure that the quick-cal is done at full throttle
  - ★ Corn headers only…Carefully!
    - ○ Have one person in the cab and one at each sensor.
    - ○ Lower the header to the ground.
    - ○ Manually raise the snouts and collapse each sensor.
    - ○ On operators signal, operator presses the raise button and the people at the snouts allow the sensors to fall.
  - ★ Grain headers…Carefully!
    - ○ Disconnect the feederhouse position potentiometer.
    - ○ Hold this pot in the ‘down’ position until the sensors are almost off the ground during calibration then throw to the ‘up’ position.
  - ★ All headers…technicians only!
    - ○ Begin calibration procedure – lower header to ground and hold for 2 seconds
    - ○ Raise header to ALMOST off the ground using the service raise button on the header lift valve
    - ○ Complete calibration – press and hold header raise button until header reaches the top of the stroke

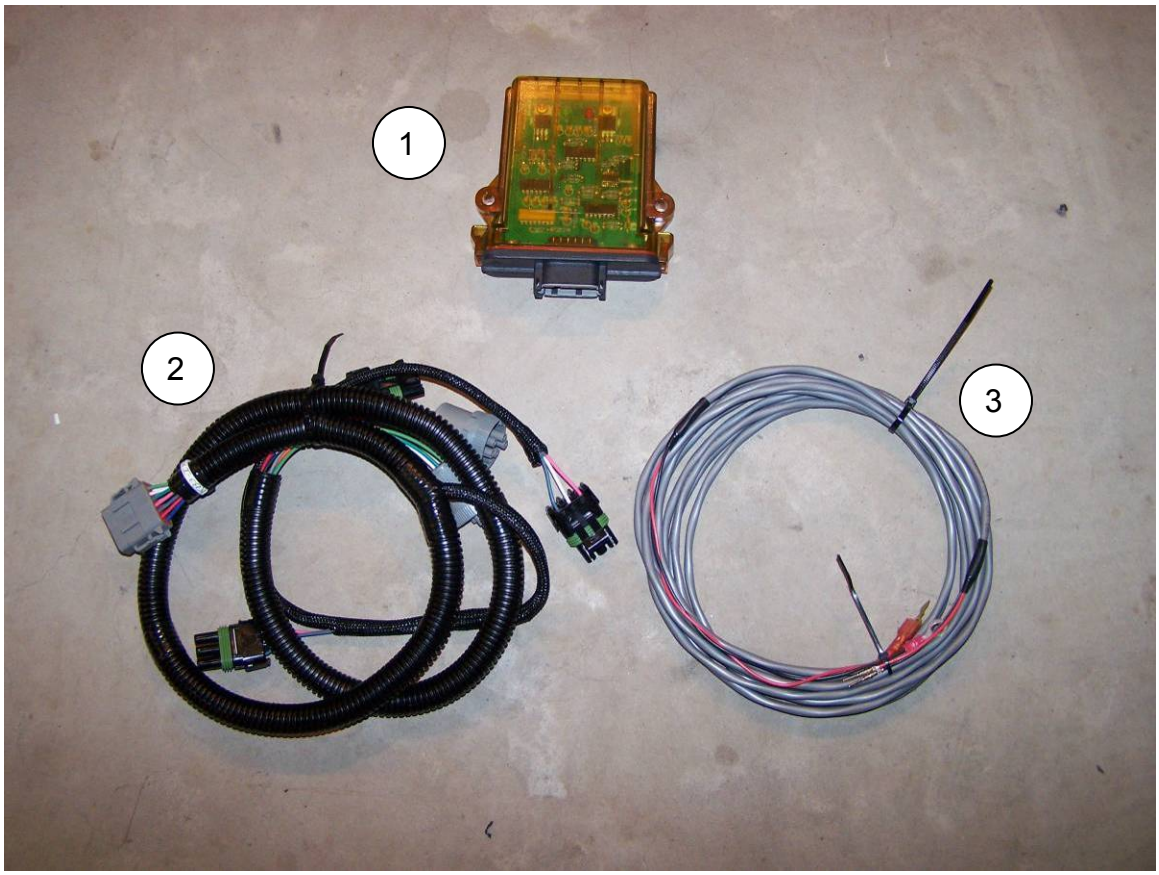
6 Wiring



Connector	Description	Connects to
S0	31 pin for appl.	OEM Flex platform (not shown)
S1	3 pin WeatherPack	Left height sensor
S3	“	Center height sensor
S5	“	Right height sensor
Y101	12 pin Deutsch	Interface unit
Y301	3 pin Deutsch	Combine height circuit
Y302	5 pin Deutsch	Combine tilt circuit


3P DEUTSCH PLUG W/SOCKETS
Y301
5P DEUTSCH PLUG W/SOCKETS
Y302
48" 18G Lt. GREEN
48" 18G WHT [HGT INPUT]
48" 18G Lt GREEN
48" 18G ORG
48" 18G GREY
48" 18G DK BLUE
48" 18G RED [12V PWR]
48" 18G BLK [GND]
30" 18G PINK
30" 18G Lt BLUE
30" 18G WHT [HGT SENSE]
24" 18G WHT [CTR SENSE]
18" 18G WHT [LFT SENSE]
P4 HGT IN A
P5 HEIGHT SIGNAL
P6 HGT IN C
P10 TILT IN A
P11 TILT SIGNAL
P12 TILT IN C
P1 12V POWER
P3 SENSOR POWER
P2 SENSOR GND
P9 RIGHT INPUT
P8 CENTER INPUT
P7 LEFT INPUT
Y101
S5
S3
S1
INCLUDE 12V POWER ADAPTER PT1-1H20-P
XXX-XXX
HEADSIGHT
CIH 1420-2588 HEAD HARNESS
KB3-1H25-XX
03-22-08

D Parts



Key#	Part#	Description	Qty	Notes
1	HB3IH25-KI	INTERFACE UNIT	1	(CORN/WHEAT, 2020)
1	HP3IH25-KI	INTERFACE UNIT	1	(JD FLEX PLATFORM)
2	KB3IH25-XX	INTERFACE HARNESS	1	(CORN/WHEAT, 2020)
2	KP0IH25-31J	INTERFACE HARNESS	1	(JD FLEX PLATFORM)
3	PFI-CIH-P	POWER WIRE	1	

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