

TS IH23/x088

Manual 09050202d



HEADSIGHT INC.
HARVESTING SOLUTIONS



About Truesight

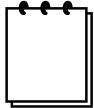
Contacting Headsight

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

About this Manual

How to use this manual

The numbered sections are instructions which should be completed for each system. The lettered appendices are information which may be of interest, but is not required for ordinary use.



This icon designates information of which you should take note.



This icon designates an important instruction.

Disclaimers

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Suggestions

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

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1 Quick-Start Guide



Note: Follow the steps in order in this Quick-Start section when installing the system for the first time. All of the calibration and tuning steps will be available in the Truesight menu.

1.1 Identify the components

1. Remote controller

- 1- -Remote
- 1- -Mount kit



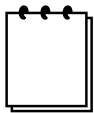
2. Base controller

- 1- -Base



3. Crop sensor assembly

- 1- HT2670 -Crop sensor asm



For parts breakdown see appendix.



4. Crop whiskers

- 2- HT2695 -Arm Truesight



5. Crop sensor mounting kit

- o May vary based on header

- 1- B2713 -Mounting kit
- 1- HT2713 -Bracket
- 2- 08200124 -Bolt M10x25
- 2- 08200134 -Bolt FI 5/16" x .75"
- 2- 08200133 -Washer 5/16"
- AR- 08100101 -Cable clamp small
- AR- 08100102 -Cable clamp large
- AR- 08300102 -Zip ties



6. Main harness

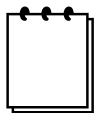
- o May vary based on system type

- 1- TS-IH23-TREZ -harness



7. Wheel angle sensor asm

- 1- HT2503 -Wheel sensor asm



For parts breakdown
see appendix.

8. Wheel sensor mounting kit

- 1- B2712 -mounting kit
- 1- HT2693 -tie rod asm
- 1- HT2712 -bracket wheel angle
- 1- HT2784 -bracket tie rod clip
- 2- 08100111 -3" hose clamp
- 2- 08200181 -Bolt FI 5/16" x 2.25"
- 2- 08200145 -Nut flange 5/16"
- 1- 08200176 -Bolt 3/4" x 7"
- 1- 08200165 -Nut 3/4"
- 1- 08100137 -Wire clip



9. Wheel angle sensor wiring extension

- 1- PFB33 -33' wiring extension



10. Footswitch

- AR- HT2809 -footswitch



AR- HT2806 -footswitch adapter



11. Harness attaching hardware

- 1- BTS1 -hardware kit
- 1- 08300109 -3/16" allen wrench
- 1- 08300108 -5/32" allen wrench
- AR- 08100101 -Cable clamp small
- AR- 08300102 -Zip ties



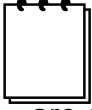
12. EZ-Steer Adapter

AR- HT2805 -EZ-Steer adapter



1.2 Install the system

Install the system following the instructions described in the Installation section of this manual.



Note: All directions and locations including left, right, front, and rear are oriented with respect to the operator when sitting in the driver's seat.

1.3 Learn how to use Truesight

Familiarize yourself with the use of the Truesight system by reading the Operation section of this manual. In particular, note how to use the controls and how to navigate the menu.

1.4 Perform the initial calibration steps

The first time that Truesight is powered up, it will ask a series of questions. Choose the appropriate choice or follow the instruction given, then press enter (Tap the Knob) to accept that choice.

1. The initial startup screen is:

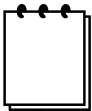
- Press enter to go on

```
TRUESIGHT  V1.00R
              V1.00B
```

2. Choose your system:

- Trimble AutoPilot
- EZ-Steer
- Ontrac

```
System Select
= JD-Auto Trac
```



Note: for 2000 and X088 Series with Accuguide, choose "Trimble Auto Pilot"

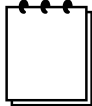
3. Scroll to your speed sensor choice:

- Scroll to "GPS" – then press enter

```
Speed Select
= Default
```

4. Scroll to your footswitch choice – then press enter.

```
Do you want to use
the Foot Pedal? YES
```



Note: to enable or disable the footswitch at a later time – go to:
Setup>>Aux Engage

5. Park in a generally level area.

```
Level Combine  
Then Press ENT 0.00V
```

6. Tilt the base controller to the left as shown

```
Tilt Box Left  
Then Press ENT 0.00V
```

- o Raise the Right(As sitting in the seat) side of the base controller
- o Picture is shown facing the rear of the combine.



- o Then press enter
- o Press enter once more to accept the tilt angle sensor calibration.

```
Calibration Complete  
Press Enter
```

7. Steer the wheels straight ahead (by using the steering wheel).

- o Drive directly ahead a short distance to verify that the wheels are straight.
- o Then press enter

```
Center Wheel Exactly  
Then Press ENT 2.5V
```

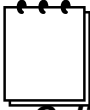
8. Turn the wheels fully to the right (by using the steering wheel).

```
Turn Wheel Right  
Then Press ENT 1.0V
```

- o Then press enter

- Press enter once more to accept the wheel angle calibration.

```
Wheel Sensor  
Calibration Complete
```



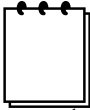
Note: To redo the wheel angle calibration at a later time – go to: **Calibrations>>Wheel Angle** in the Truesight menu.

9. Acknowledge that the wheels will move and that all people are clear of the machine before pressing enter.

```
Wheels will move  
Keep people clear
```

10. Drive forward at approximately 1mph in a clear area free from obstacles.

```
Drive Forward @ 1MPH  
-Don't Steer      OK?
```



Note: After you acknowledge this screen the wheels will steer automatically!!

11. Continue driving until calibration is complete.

```
Wheel Angle = 0.00V  
Output = 10% Right
```

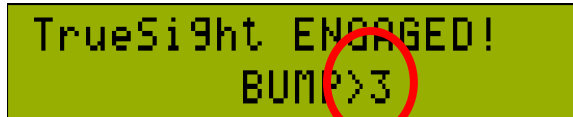
- Press enter

```
Calibration Complete  
Left= 25   Right= 25
```

1.5 Complete in-field tuning

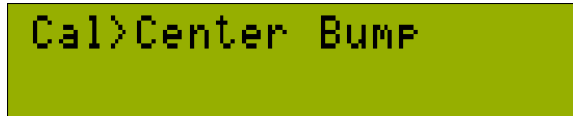
There are a few final adjustments to be made in the field.

1. Bump Truesight to center the snout on the row.
 - Twist the knob in the desired direction when in the run screen as shown below.



```
TrueSight ENGAGED!  
BUMP>3
```

2. If the display shows that you are not centered (see red circle above) - Calibrate the bump centered position.
 - Go to >>**Calibration**>>**Center Bump** in the menu.



```
Cal>Center Bump
```

- ...



```
TrueSight ENGAGED!  
=BUMP=
```

3. Adjust the range setting for your machine.
 - Go to >>**Setup**>>**Range** in the menu.



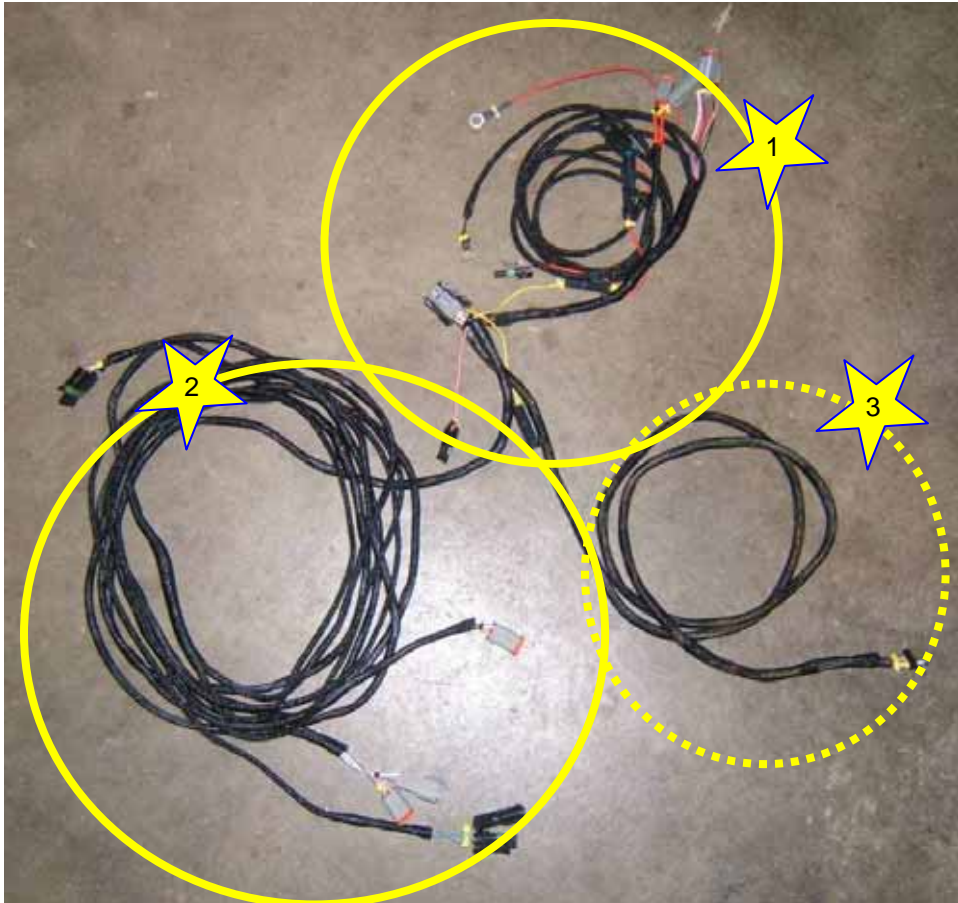
```
Setup>Range = 30
```

- See Settings section of this manual for details.

2 Installation

2.1 *Harness installation*

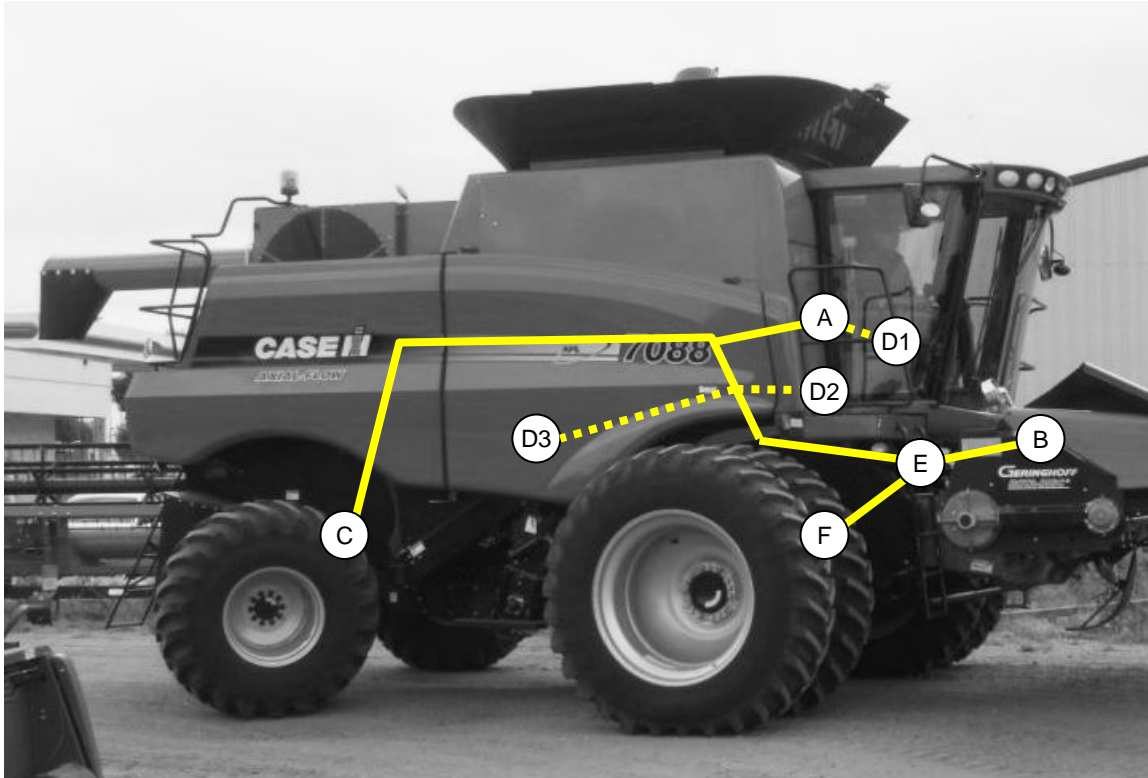
2.1.1 Wiring overview



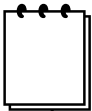
The main harness shown is the backbone of the Truesight system, connecting each of the components to the controllers. The harness is divided into three main legs designated by the circles above.

1. The “In-Cab” leg connects to:
 - Controllers
 - Power supply
 - Seat switch, etc
2. The “Outside” leg connects to:
 - Crop sensor
 - Wheel angle sensor
 - Feeder position sensor, etc

3. The “Steering Device” leg connects to the valve or motor which will steer the combine.
 - For EZ-Steer or other wheel-mount motors, and Outback valves, this leg will remain in the cab
 - For other valve systems this will exit the cab with leg 2



- A:** In-cab components (Leg 1)
- B:** Crop sensor (Leg 2)
- C:** Wheel angle sensor (Leg 2)
- D1:** EZ-Steer, OnTrac, Outback connector -in-cab- (Leg 3)
- D2:** CIH Valve connector (Leg 3)
- D3:** Trimble Valve connector (Leg 3)
- E:** Feeder position sensor (Leg 2)
- F:** Speed sensor (Leg 2)



Note: Truesight wiring should be routed along existing hydraulic or electric lines when available to reduce the chance of interference from moving parts. Use the provided zip ties to secure the wiring in safe locations before operating the machine.



When given an instruction for a connector with a number beginning with “Y” (e.g. Y345) this refers to a Headsight connector. If the instructions say to “connect Y123 and Y234 inline” this means you will disconnect the OEM connector indicated, connecting Headsight connectors Y123 and Y234 to the mating connectors indicated.

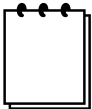
2.1.2 Cab exit

1. Route main harness leg 2 (and leg 3 for valve systems) out the cab door – keeping leg 1 of the harness in the cab.
 - o Note: connector Y705 (wheel angle sensor) should be on the outside of the door.



2.1.3 Seat safety switch

1. Connect Y377 & Y378 inline to the OEM seat switch connector
 - o 2 pin Deutsch
 - o Located behind/under the operators seat.



Note: Combines older than approximately serial number 270,000 will not have the Deutsch connector shown for the seat switch. For these machines – splice the orange “Seat Switch” wire to the combine’s SWITCHED seat switch line.

2.1.4 Power supply

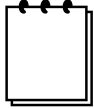
1. Connect the power eyelet Y380 to the switched 12V power junction.
 - o Located at the rear of the fuse box on the right side of the cab.
 - o The junction is covered in insulation.



2. Connect the Y379 ground eyelet to any frame ground in the fuse box.

2.1.5 Auxiliary switch

1. Use of the auxiliary switch is optional. If you choose to use the Truesight auxiliary switch- connect Y721 to the footswitch
 - o 3 pin Deutsch



Note: Adapter HT2806 may be used with an existing EZ-Steer footswitch in place of the Truesight footswitch.



2.1.6 Remote controller

1. Connect Y731 to the remote controller
 - o 4 pin Deutsch
2. Attach controller to side window using provided suction-cup mount

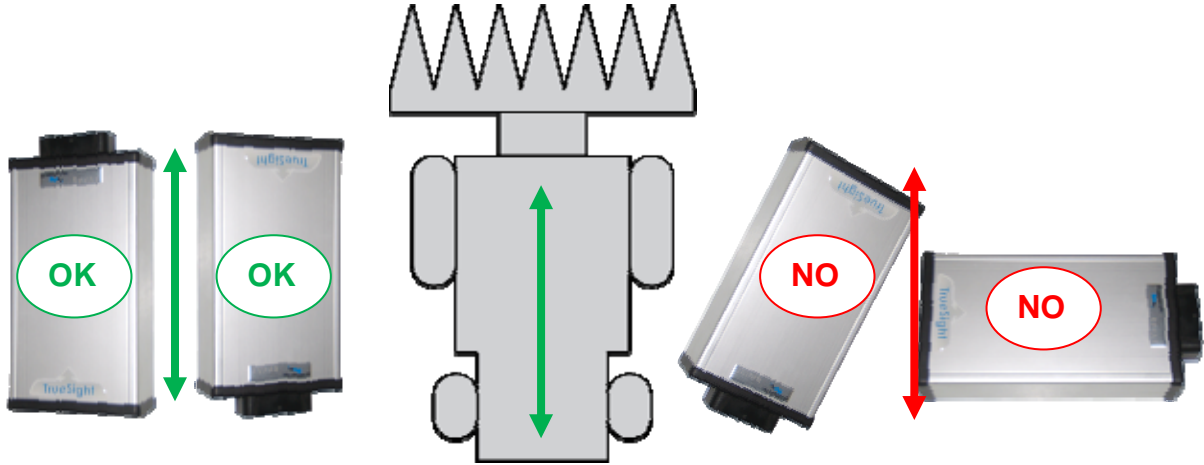


2.1.7 Base controller

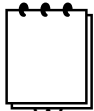
1. Connect base controller to Y702 of main harness
 - o 40 pin Deutsch
 - o Use 5/32" Allen wrench to tighten
 - o The base must rest on the cab floor.



2. The controller must be oriented with the direction of travel of the combine.
 - The connector may point forward or back.
 - See the graphic below.



2.1.8 Safety connectors



Note: all connectors mentioned in this section are single pin WeatherPack and are located on the main Truesight harness near the base controller.

1. Connect Y716 (yellow – “12V Safety”) to Y719 (orange – “Seat Switch”)
2. Connect Y718 (yellow – “5V Safety”) to Y717 (pink – “SENSPWR”)

2.1.9 Feeder position sensor: 2xxx series

3. Connect Y373 & Y374 inline to the combine feederhouse position sensor
 - 3 pin Deutsch
 - Located above the top left corner of the feederhouse just inside the left front tire.
 - Connect Y368 to Y367 on the main harness.



2.1.10 Feeder position sensor: x088 series

1. Connect Y385 & Y386 inline to the combine feederhouse position sensor
 - o 3 pin WeatherPack
 - o Located above the top left corner of the feederhouse just inside the left front tire.
 - o Note: Follow OEM harness forward on feeder house side and then back up to the sensor.
 - o Connect Y368 to Y367 on the main harness.



2.1.11 Crop sensor

1. Route Y703 to the left front of the feederhouse near the combine's existing header connector.
 - o 4 pin Deutsch
 - o This will connect to wiring installed on the header

2.1.12 Speed sensor

1. Connect Y375 & Y376 together, as this feature is no longer needed.

2.1.13 GPS Unit

1. Mount the GPS on the mirror arm on the right side of the cab, using the magnet on the bottom of the unit. Other locations may be used, as long as the GPS unit has a clear view of the sky.



2. Run the wire around the weather stripping, following the edge of the door, to connector Y725 located near the Truesight base unit.



2.1.14 Wheel angle sensor wiring

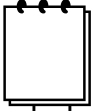
1. Route the 3 pin WeatherPack extension harness from Y705 to the rear wheel angle sensor.
 - 3 pin WeatherPack
 - Y705 should be just outside the cab door
 - Follow existing wiring and hoses as shown.
 - For final placement of wheel angle sensor see below.



2. CIH x088 wiring should be routed from Y705, just outside the right cab door, across the top of the rotor to the left side of the combine. Continue to the location of the wheel angle sensor, as shown by the starred route, pictured below.



2.2 Wheel angle sensor installation



Note: A preferred installation of the wheel angle sensor is shown below. If the combine has a rear axle option different than the one shown, it may be necessary to install the sensor or linkage in a different way. The linkage must always clear obstructions; the block is preferably mounted as shown with the sensor on top of the block.

1. Choose an installation location where the sensor and linkage will be out of the path of travel of the tie rod and the components will be out of the flow of chaff as much as possible.
2. Fasten the sensor block to the mounting bracket using the supplied 5/16" by 2-1/4" bolts. Attach the bracket to the rear axle using the existing or supplied hardware.
3. Loosely fasten the clip to the tie rod using the provided clamps.
 - o Orient the clip in such a way that the linkage will be generally level.
4. Install the linkage between the clip and the swing arm as shown.
5. Slide the clip along the tie rod so that the swing arm points directly forward when the wheels are pointed straight ahead.
6. Start the machine – slowly turn the steering wheel full left and full right while observing the sensor and linkage to make sure that it clears any obstructions and does not bind.



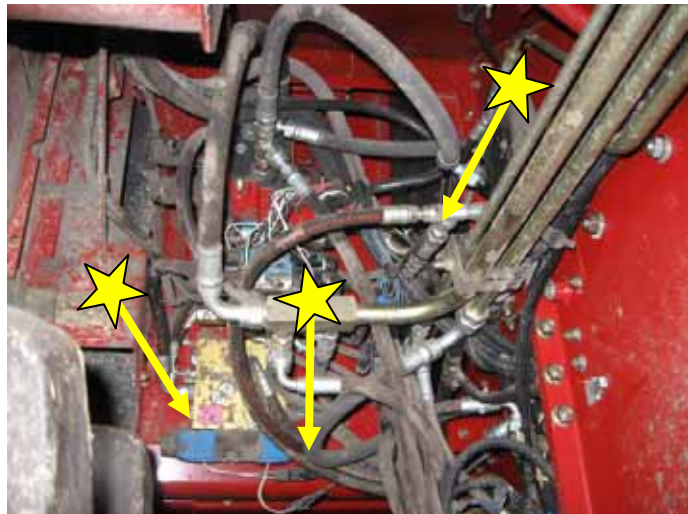
7. Tighten the clamps.
8. Route wire securely to avoid any pinch points.



2.3 Steering device wiring

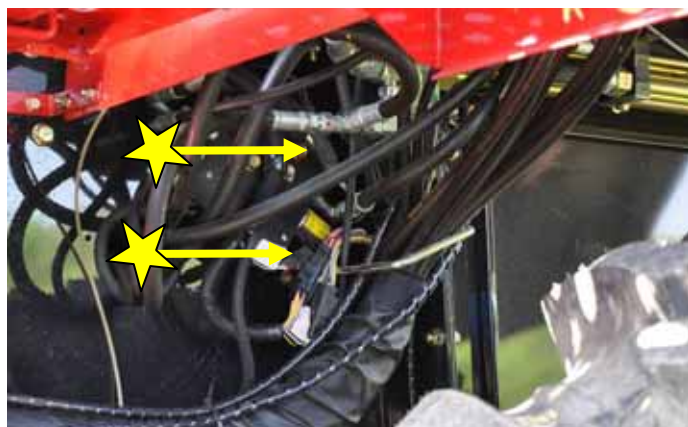
2.3.1 Trimble AutoPilot –All / CIH AccuGuide - 2xxx

1. Connect Y793 and Y794 inline to the Trimble steering valve wiring “Steer Left” valve.
 - 2 pin WeatherPack
 - Located near valve block over left front wheel.
2. Connect Y795 and Y796 inline to the Trimble steering valve wiring “Steer Right” valve.
 - 2 pin WeatherPack
3. Connect Y789 and Y790 inline with the flow sensor
 - 3 pin WeatherPack

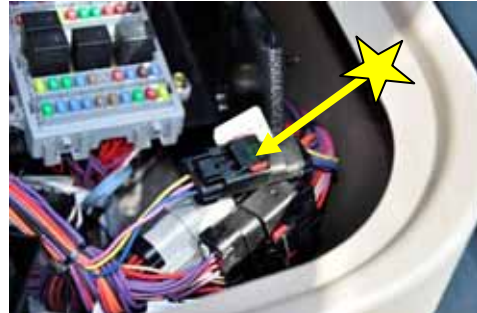


2.3.2 CIH AccuGuide - x088

1. Connect Y387 and Y388 inline to the steering valve wiring
 - 4 pin Deutsch
 - Located near valve block over left front wheel.



2. Connect Y389 and Y390 inline to the “Master” valve.
 - 2 pin Deutsch
 - Located near valve block over left front wheel.
3. Connect Y391 and Y392 inline with the steering wheel sensor plug.
 - 3 pin APEX
 - Located in fuse compartment.



2.3.3 OnTrac motor

1. Connect Y771 plug directly to the 15 pin connector on the motor.

2.3.4 EZ-Steer motor

1. If the harness has connector Y771 with 15 pins
 - Connect Y771 to adapter HT2805.
2. Connect the adapter to the 9 pin connector on the motor.



2.3.5 Outback valve

1. Connect Y777 and Y778 inline to the Outback controller valve harness.
 - 7 pin MaxCon.
 - Located at controller
2. Connect Y775 and Y776 inline to the Steering sensor.
 - 7 pin Weatherpack.
 - Located near steering column.

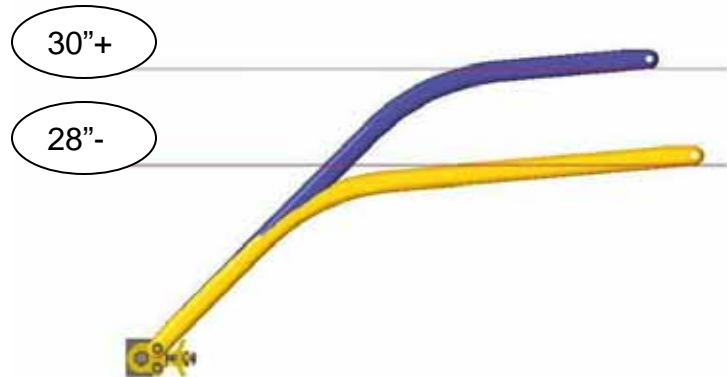


2.4 Crop sensor installation

2.4.1 Sensor assembly

1. Choose your headers row spacing range.

- For row spacings 30" and above use the arm position shown by the blue arm.
- For row spacings less than 30" use the arm position shown by the yellow arm.



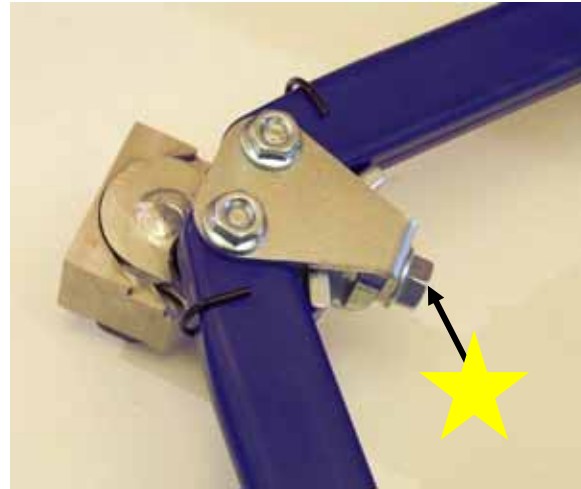
2. Install the arms on the crop sensor

- Remove the crop sensor lower shield.
- Hold the arms and spring as shown – slide the spring hooks over both arms – then the arms over the pivot posts of the sensor.
- Replace the lower shield.



2.4.2 Width adjustment

1. Loosen the jamb nut indicated.
2. Turn arm adjustment screen using a hex (Allen) wrench.
 - Adjust arm width to row spacing plus 2 inches (e.g. adjust to 32" for 30" row spacing)
3. Tighten jamb nut



2.4.3 Safety reminder



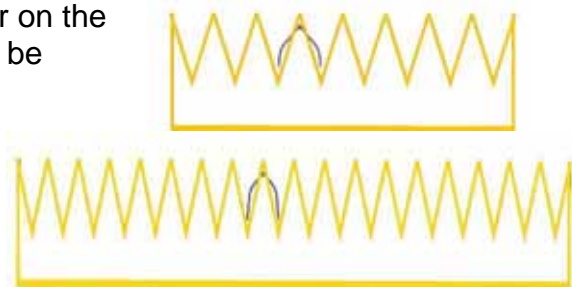
Before working under the header always:

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



2.4.4 Snout choice

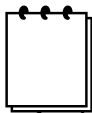
1. Choose which snout of the header to mount the crop sensor.
 - If there is no header height sensor on the center snout the crop sensor may be mounted there.
 - For most headers, mount the crop sensor on the snout which is one row to the left of center as shown.



2.4.5 Sensor mounting

2.4.5.1 Case/IH heads (2000+ series)

1. Remove the cast iron snout tip from the snout.
2. Cut out the poly as shown
 - o Use a large drill bit to make rounded corners to avoid weakening snout.
3. Attach sensor to mounting bracket using provided hardware.

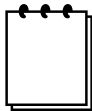


The sensor should be as far into the snout as possible without causing the arms to rub the bottom of the snout frame.

4. Insert bracket between cast iron snout tip and snout as shown. Fasten with provided hardware.



2.4.5.2 Other heads



Specific sensor mounting instructions for other header and snouts are included with the sensor mounting bracket kit for that header.

2.4.6 Wiring instructions



Properly routing the wiring is the most critical part of the installation process. Please take time to ensure that you have allowed sufficient slack for snout motion as well as sufficient clearance from moving header parts or crop flow.

1. Lay out wiring to appropriate snout.
 - Wiring will run from the sensor to the rear of the header near the combine's feederhouse connection.
2. Connect the wiring to the sensor.
 - Ensure connection is properly aligned and seated.
 - Push gently but firmly until you hear or feel a slight "click".
3. Fasten wiring with cable clamps on both sides of the connection.
 - Allow slight (1/2") slack near sensor.
4. Fasten with cable clamps near snout hinge points.
 - Lift snout to see full range of motion.
 - Leave enough slack to prevent tension on the wiring when snout is raised OR lowered.
 - Route near outer edge of snout, as near pivot point as reasonable.
5. Route wiring to rear of header
 - Route to rear of head near the combine feederhouse electrical connectors – avoiding moving parts.
6. Secure wiring with cable clamps and zip ties approximately every 12-24" as needed.
 - Follow existing wiring where possible.

3 Operation

3.1 Controls description



There are only two controls on Truesight:

1. "The Button"
 - Tapping the button
 - Engages/Disengages Truesight
 - Holding the button for more than 1 second
 - Enables/Disables the Auto-Engage feature
2. "The Knob"
 - The knob functions differently in the menu and the run screen
 - See below for details
 - The knob may be twisted to scroll
 - For Bumping left and right
 - For choosing next or previous in the menu
 - The knob pressed like a button
 - Tap = Enter
 - Press and hold = Escape

3.2 Run screen controls

During ordinary operation, Truesight will be in the Run Screen.

```
TrueSight ENGAGED!  
=BUMP=
```

- The Knob
 - Pressing and holding the Knob
 - Enters the Truesight menu
 - See “Menu Controls” for more information
 - See Menu Layout in the Appendix for a menu overview
 - Twisting Left/Right
 - Bumps the system in the direction twisted
 - For example:
 - If the system runs slightly off-center to the left – bump (twist the knob) to the right.



3.3 Menu controls

```
Setup>Range = 30
```

- The Knob
 - Twisting Left
 - Scrolls to the previous menu selection
 - Twisting Right
 - Scrolls to the next menu selection
 - Holding the Knob
 - ESC – backs up one menu level
 - Does not save changes
 - Returns to the Run Screen from the root level of the menu
 - Tapping the Knob
 - ENTER – Chooses the displayed option
 - Saves any modified values

4 Settings

4.1 **Range** (Default = 40)

The range setting controls the aggressiveness of the Truesight system. Increasing the range increases the angle to which the wheels turn. To adjust the range – go to: **Setup>>Range** in the menu.



Properly adjusting the range is the most important step for optimum steering response.

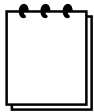
Increase the range if:

- You notice a gentle weave from side to side in the row
- The system performs well on straight rows but does not turn sharply enough to go around a curve



Decrease the range if:

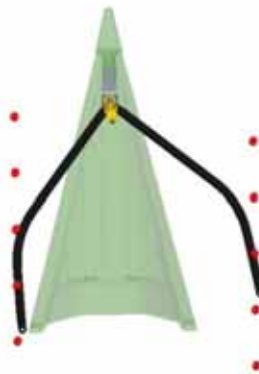
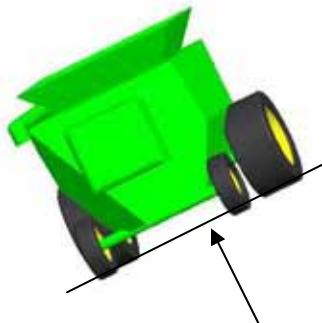
- The rear wheels jerk constantly and suddenly from side to side



Notice: you may notice weaving from side to side in the row if the range is set either too high or too low. Read the description above to determine the proper adjustment to make.

4.2 **Tilt range** (Default = 20)

The Tilt Range setting allows Truesight to automatically ‘bump’ the combine up a slope to compensate for the natural tendency of the combine to slide down. A higher tilt range setting compensates more; a lower tilt range compensates less. To adjust the tilt range – go to: **Setup>> Tilt Range** in the menu.



Increase the tilt range if:

- The snout is centered on the row when on level ground but crowds the downhill side of the row when on a slope. (As shown in the graphic)

Decrease the tilt range if:

- The snout is centered on the row when on level ground but crowds the uphill side of the row when on a slope.

4.3 Auxiliary engage

The Auxiliary Engage setting allows the auxiliary (foot) switch type to be chosen. To change this setting – go to: **Setup>>Aux Engage** in the menu. If you choose to use the Headsight provided footswitch – choose “Default”. If you do not wish to use any auxiliary switch – choose “Off”. If you wish to use a switch other than the one provided, contact Headsight for assistance.

4.4 Alert timer

The Alert Timer allows the operator to have an audible alert sound at a preset time after the engagement of Truesight. The setting ranges from off to 20 minutes in 30 second intervals. To enable or adjust the alert timer – go to: **Setup>>Alert Timer** in the menu.

4.5 LCD backlight (Default = 10)

The LCD Backlight setting allows the operator to adjust the brightness of the display. To adjust the brightness of the backlight – go to: **Setup>>LCD Backlight** in the menu. A higher number results in a brighter screen.

4.6 LCD contrast (Default = 10)

The LCD Contrast setting allows the operator to adjust the contrast (darkness) of the text of the remote controller. To adjust the contrast – go to: **Setup>>LCD Contrast** in the menu. A higher number results in darker text.

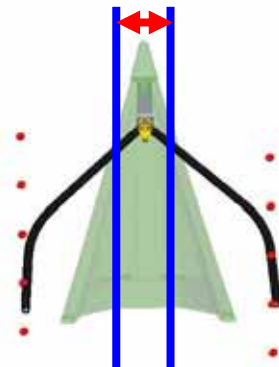
4.7 Gain (Default = 6)

The Gain setting controls the speed of steering response for a given error from the center of the row. A higher gain setting will result in a quicker response. To adjust the gain – go to: **Setup>>ADV Settings>>Gain** in the menu.

Increasing the gain may improve responsiveness, but will have a tendency to make the system jerky or unstable.

4.8 Deadband (Default = 8)

The Deadband setting adjusts the maximum swing of the crop sensor before Truesight issues a steer command. To adjust the deadband – go to: **Setup>>ADV Settings>>Deadband** in the menu.



Decrease the deadband if:

- The system wanders in the row without even trying to turn the wheels.

Increase the deadband if:

- The system is steering excessively often even on relatively straight rows.

4.9 Auto-engage delay (Default = 2.5 sec)

The Auto-Engage Delay adjusts the time delay between when the operator lowers the header and Truesight engages when using the Auto-Engage feature. The delay period starts when the feederhouse lowers below the setpoint chosen in the Auto-Engage calibration. The delay allows the operator a few seconds to manually guide the machine to the beginning of the row at the headland. To adjust the Auto-Engage delay – go to: **Setup>>ADV Settings>>Auto-Engage Delay** in the menu.

4.10 Override value (Default = 6)

The Override Value setting allows the operator to adjust how much motion of the steering wheel is required to disengage Truesight. Increasing the override value will make it harder to disengage the system. To adjust the Override Value – go to: **Setup>>ADV Settings>>Override Value** in the menu.

If Truesight disengages with only a slight nudge of the steering wheel, the Override Value may be increased to prevent accidental disengagement.

4.11 Speed select (Default = GPS)

The Speed Type setting properly configures Truesight to read the speed sensor. If the Speed Type is set to “OFF”, the minimum and maximum speed limits to engage Truesight will be disabled. If you wish to allow the min and max speed limits, choose the option that best matches your combine. To change this setting – go to: **Setup>>ADV Settings>>Speed Select** in the menu.

4.12 Speed value (Default = 10,700)

The Speed Value setting allows manual manipulation of the value obtained by the Speed Calibration. Changing this setting allows the operator to manually tune the speed computed by Truesight if desired. To change this setting – go to: **Setup>>ADV Settings>>Speed Value** in the menu.

4.13 Gain balance (Default = 0)

The Gain Balance setting allows manual manipulation of the right-hand gain value with respect to the base value set by the “Gain” setting. Changing this setting allows the operator to manually adjust the gain when turning right to a value different from the base value. To change this setting – go to: **Setup>>ADV Settings>>Gain Balance** in the menu.

4.14 Left Deadzone (*Default = Calibrated Value, 0 if not calibrated*)

The Left Deadzone setting allows manual manipulation of the minimum output of the Truesight system when turning left. This value is expressed in % of the maximum speed. To change this setting – go to: **Setup>>ADV Settings>>Left Deadzone** in the menu.

4.15 Right Deadzone

See Left Deadzone

4.16 System select

The System Select setting allows the configuration of Truesight for use with different valve and motor systems. This value will not be changed for a given system. To change this setting – go to: **Setup>>ADV Settings>>System Select** in the menu

4.17 Fine Control (*Default = 0*)

The Fine Control setting is a control used on systems with fast hydraulics to help smooth out the transition when it tries to just start to turn the wheels. This setting is optional and is not needed for most applications. For applications which require finer resolution, a setting of 30-40 is recommended. To change this setting – go to: **Setup>>ADV Settings>>Fine Control** in the menu

4.18 Range2 (*Default = 20*)

The Range2 setting allows additional compensation for curve aggressiveness after Range has been properly adjusted for straight rows. Range2 should be increased if the tip of the snout favors the outside of the row while going around a curve. Increasing Range2 will bring the tip of the snout back to the inside of the curve. Adjust this setting to the lowest value possible while still getting acceptable performance around curves. To change this setting, go to: **Setup>>ADV Settings>>Range2** in the menu.

5 Calibration

5.1 Bump centering calibration

The bump centering calibration only serves to simplify the display on the remote controller; it does not affect the operation of the Truesight system. To perform the bump centering calibration – go to: **Calibration>>Bump Center** in the menu.

Before:



After:



5.2 Wheel angle sensor calibration

The wheel angle sensor calibration allows Truesight to learn the orientation of the feedback sensor on the steering axle. To perform the wheel angle sensor calibration – go to: **Calibration>>Wheel Angle** in the menu.

1. Point wheels straight ahead then press enter.



Verify that the wheels are pointed straight by driving a short distance before pressing enter.

2. Turn the steering wheel all the way to the right then press enter.

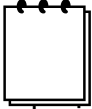


5.3 Auto-engage sensor calibration

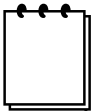
The Auto-Engage sensor calibration learns a feederhouse position at which to engage Truesight. To perform the Auto-Engage calibration – go to:

Calibration>>Auto-Engage in the menu.

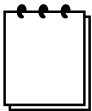
When the header passes below the chosen height, Truesight will delay a short time (see Auto-Engage Delay in the Settings section) and then begin steering.



Choose a feederhouse height ABOVE that which the feeder would be in ordinary operation. If the combine is equipped with automatic header height control, it may raise the head – which would disengage Truesight.



Once Auto-engage is calibrated it needs to be enabled before it will work. To enable Auto-engage, Press and hold the Engage button until the screen says “Auto Engage is turned ON”. Pressing or twisting the knob will return you to the previous screen.



Note: Pressing and holding the Engage button will toggle Auto-engage on and off. Auto-engage will also be disabled after power is turned off or if the speed of the combine is over 10MPH.

5.4 Speedometer calibration

The Speedometer calibration allows fine tuning of the speed engagement limits for variations based on tire size, final drive ratios etc. To perform the Speed calibration place two reference markers 400 ft apart. Go to: **Calibration>>Speedometer** in the menu. Drive the 400ft distance then press enter.

5.5 Tilt calibration

The tilt calibration allows Truesight to verify the orientation of the angle sensors mounted in the base controller. Go to: **Calibration>>Tilt Calibration** in the menu.

5.6 Auto Dead Zone

The Auto Dead Zone calibration allows Truesight to automatically determine the outputs that cause the wheels to turn for a given valve or motor. Go to: **Calibration>>Auto Dead Zone** in the menu.

A Menu Layout

- Setup
 - Range
 - Tilt Range
 - Timer
 - Aux Engage
 - LCD Backlight
 - LCD Contrast
 - ADV Settings
 - Deadband
 - Gain
 - Auto Engage Delay
 - Override Value
 - Speed Select
 - Speed Value
 - Gain Balance
 - Right Dead Zone
 - Left Dead Zone
 - System Select
 - Range 2
- Calibrate
 - Center the Bump
 - Wheel Angle
 - Auto Engage Height
 - Speedometer
 - Tilt Sensor
 - Auto Dead Zone
- Diagnostics
 - Inputs/Outputs
 - Crop
 - Crop2
 - Wheel Angle
 - Tilt
 - Steering Wheel
 - Disengage Pressure
 - Safeties
 - Auto Engage Height
 - Motor L/R
 - Valve L/R
 - Speedometer
 - Last Disengage
 - Steering Test
 - Error Codes
 - Clear Errors
- About Truesight
 - Hardware
 - Software
 - Headsight
 - Box Timers
 - Bootload Base
 - Reset Defaults

B Troubleshooting

1 Troubleshooting by Truesight™ service code

Error 1 or 3 – Comm Failed

Theory of Operation:

This error occurs when the user tries to engage the system or the system is already engaged and the communication between the Remote and Base has failed. There is a Red/Green light located on the front of the Base that indicates the status of the communication. When this light is Green communication is good and the problem is fixed.

Possible causes of this problem are:

- Software lockup:
Cycle power to the Remote or whole combine(if the Remote doesn't have a power switch). The long-term remedy is to update Truesight software to the current version if your software version is older than 1.20.
- Wires not connected properly:
Unplug connector Y731, look inside both connectors and make sure all pins and sockets are fully seated and not pushed back or bent. Check continuity on the Yellow and Green wires in this connection.
Y731 pin 3 to Y702 Pin 4 (Yellow)
Y731 pin 4 to Y702 Pin 3 (Green)
- The software versions on the Base and Remote don't match:
Go to "**About Truesight>>Software**", if the software versions are different, this could be the cause and updating to the current version is recommended.

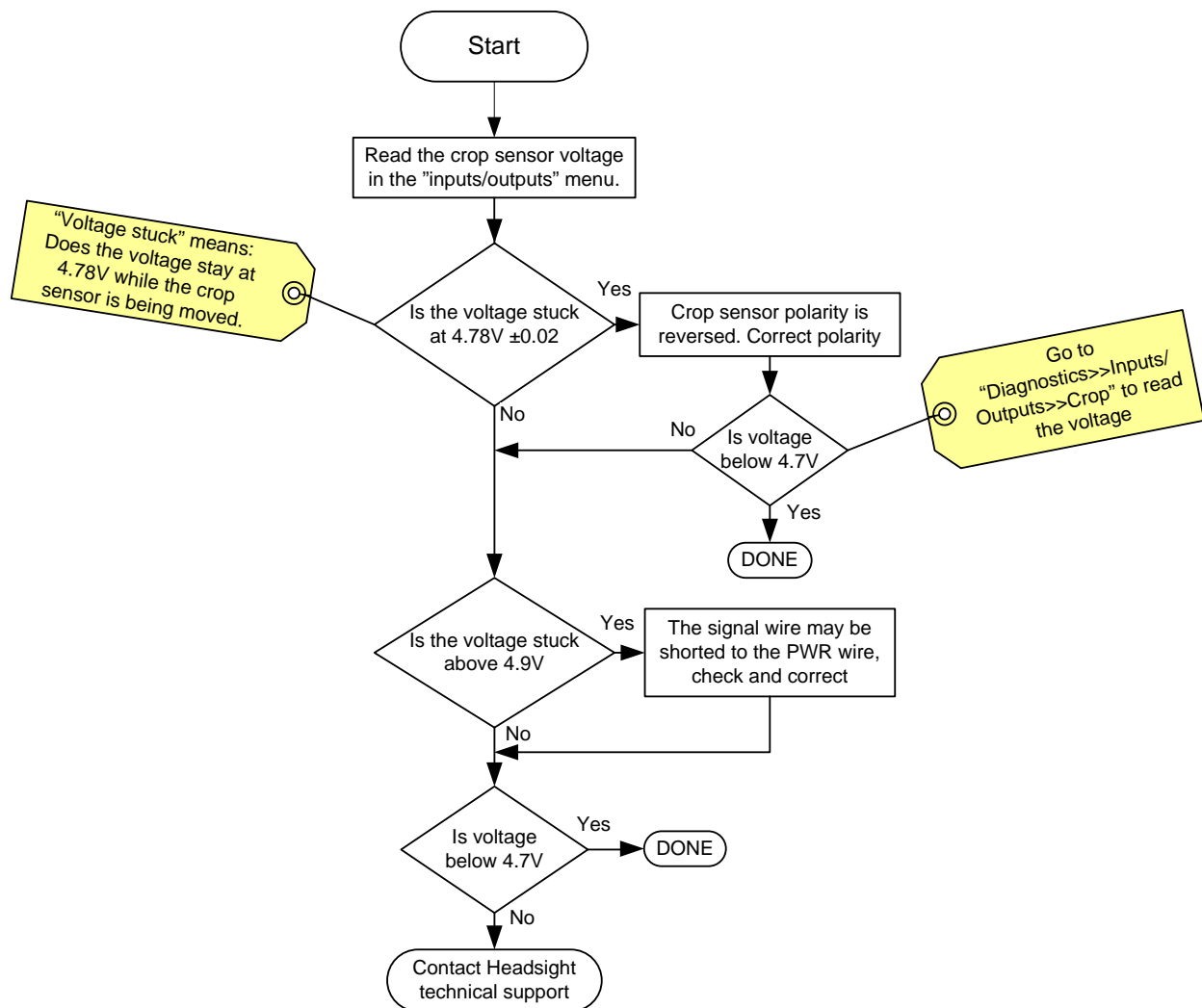
Error 11 - Crop Sensor > 4.7V

Theory of Operation:

The crop sensor is a 5V hall effect sensor (works similar to a potentiometer) that sends an analog voltage to the Truesight controller. This error is caused when the analog voltage coming from the crop sensor is greater than 4.7V. To read the current voltage, go to "**Diagnostics>>Inputs/Outputs>>Crop**". Once the voltage is less than 4.7V in this screen, the problem is fixed.

Possible causes of this problem are:

- Polarity is reversed
- Signal wire may be shorted to the power wire



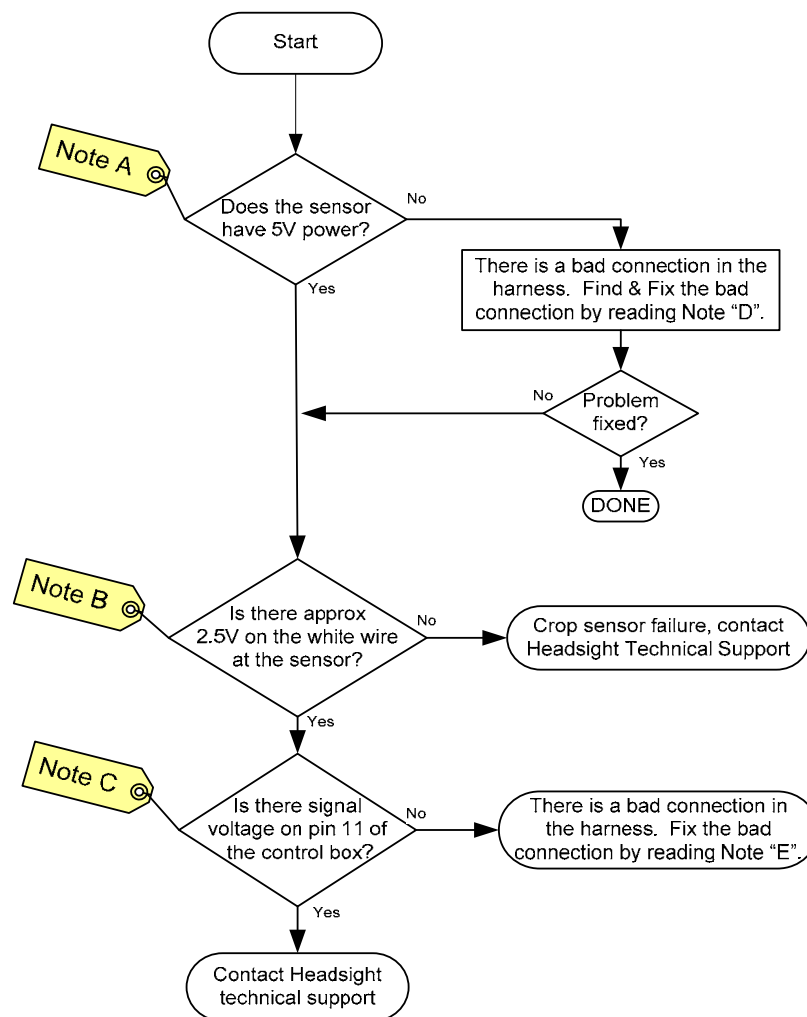
Error 12 - Crop Sensor < 0.3V

Theory of Operation:

The crop sensor is a 5V hall effect sensor (works like a potentiometer) that sends an analog voltage to the Truesight controller. This error is caused when the analog voltage coming from the crop sensor is less than 0.3V. To read the current voltage, go to “**Diagnostics>>Inputs/Outputs>>Crop**”. Once the voltage is greater than 0.3V in this screen, the problem is fixed.

Possible causes of this problem are:

- Bad or no connection in the power or ground circuit to the sensor
- Bad or no connection in the signal wire back to the controller

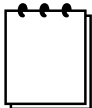




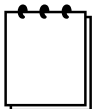
Note A - To measure, unplug the crop sensor connector under the snout. On the harness running back to the combine, use a voltmeter and measure voltage across pins A & C. $\pm 5V$ means the sensor does have supply power.



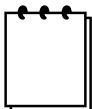
Note B - Plug the 3-pin connector back together. Using something sharp like a needle or the tips of your voltage probes, measure the voltage on the White wire. Do this by piercing the Blue wire with the Black probe and the White wire with the Red probe.



Note C - On the control box on the floor in the cab, measure the voltage on the White wire coming out of Pin-11 of the big black 40-pin plug. Note 1: You may need to pierce the wire like described in Note B above. Note 2: Pin 2 is ground.



Note D - Starting from the connection at the feederhouse (square 4 pin Deutsch plug), unplug that connection and measure voltage across pin 1 & 3 of the combine side plug (male). If $\pm 5V$ is not present, you have a problem with your main harness. If $\pm 5V$ is present, you have a problem with the harness on the header. If your system is under warranty, Contact Headsight technical support for a replacement harness. Otherwise, you can repair the harness or purchase a replacement from Headsight Inc.



Note E - Starting from the connection at the feeder house (square 4 pin Deutsch plug), using the same method as in Note B, measure the voltage across pin 1 & 2 of the combine side plug (male). If $\pm 2.5V$ is present, you have a problem with your main harness. If $2.5V$ is not present, you have a problem with the harness on the header. If your system is under warranty Contact Headsight technical support for a replacement harness. Otherwise, you can repair the or purchase a replacement from Headsight Inc.

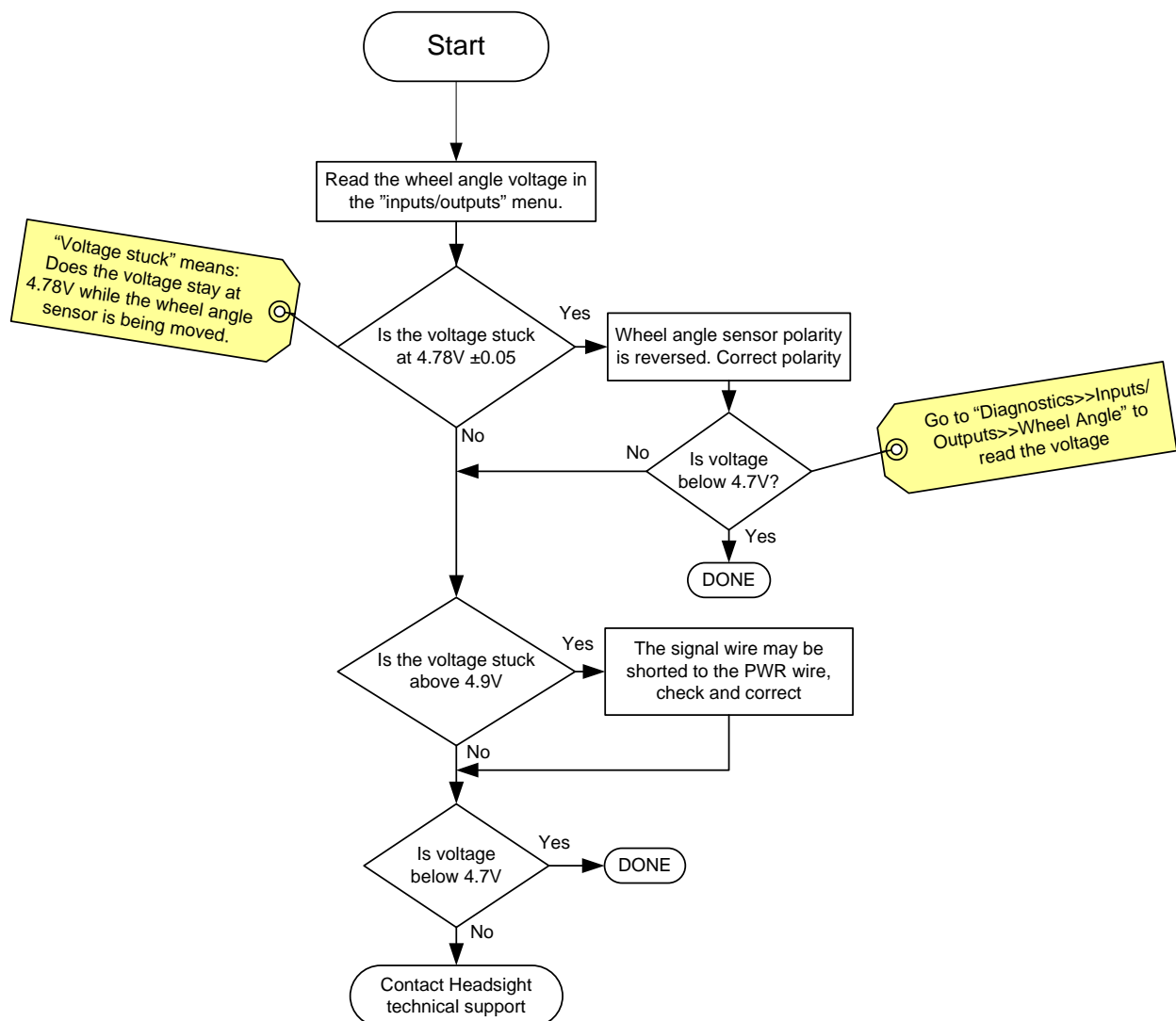
Error 21 - Wheel Angle Sensor > 4.7V

Theory of Operation:

The Wheel Angle sensor is a 5V hall effect sensor (works like a potentiometer) that sends an analog voltage to the Truesight controller. This error is caused when the analog voltage coming from the Wheel Angle sensor is less than 0.3V. To read the current voltage, go to "**Diagnostics>>Inputs/Outputs>>Wheel Angle**". Once the voltage is less than 4.7V in this screen, the problem is fixed.

Possible causes of this problem are:

- Polarity is reversed
- Signal wire may be shorted to power wire



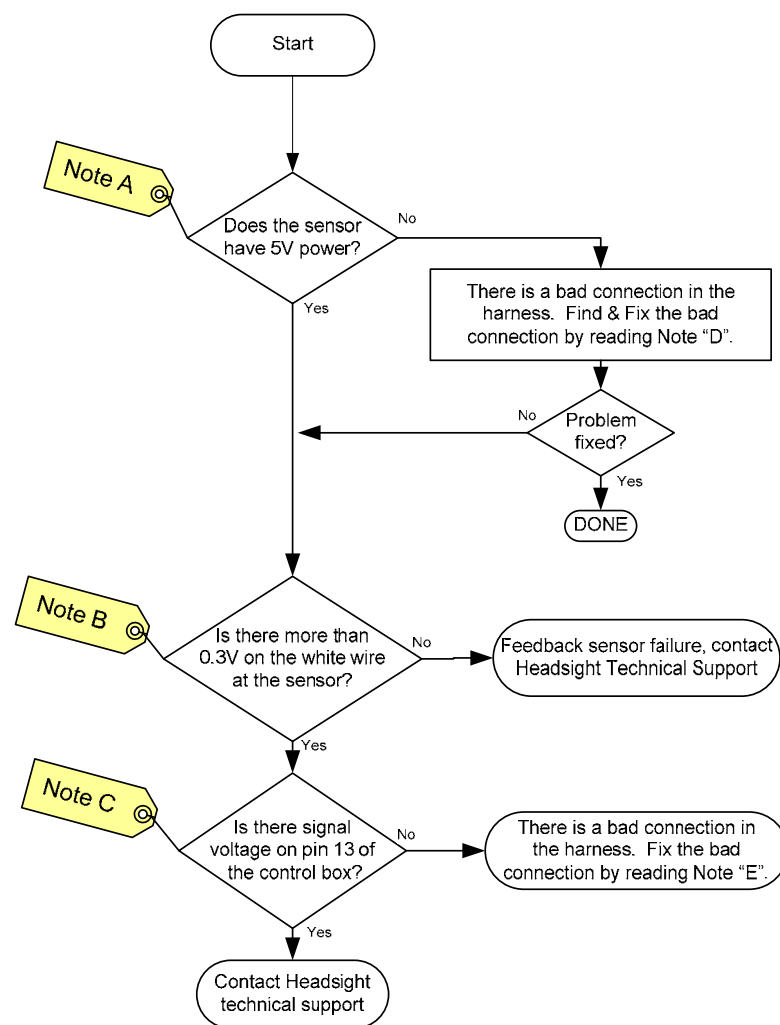
Error 22 - Wheel Angle Sensor < 0.3V

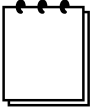
Theory of Operation:

The wheel angle sensor is a 5V hall effect sensor (works like a potentiometer) that sends an analog voltage to the Truesight controller. This error is caused when the analog voltage coming from the wheel angle sensor is less than 0.3V. To read the current voltage, go to "**Diagnostics>>Inputs/Outputs>>Wheel Angle**". Once the voltage is greater than 0.3V in this screen, the problem is fixed.

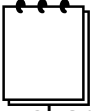
Possible causes of this problem are:

- Bad or no connection in the power or ground circuit to the sensor
- Bad or no connection in the signal wire back to the controller

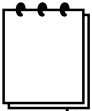




Note A - To measure, unplug the feedback sensor connector by the rear axle. On the harness running from the cab, use a voltmeter and measure voltage across pins A & C. $\pm 5V$ means the sensor does have supply power.

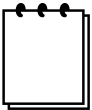


Note B - Plug the 3-pin connector back together. Using something sharp like a needle or the tips of your voltage probes, measure the voltage on the White wire. Do this by piercing the Blue wire with the Black probe and the White wire with the Red probe.

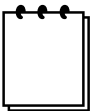


Note C - On the control box on the floor in the cab, measure the voltage on the White wire coming out of Pin-13 of the big black 40-pin plug.

- You may need to pierce the wire like described in Note B above.
- Pin 2 is ground.



Note D - Starting from the Y705 connection near the cab, unplug that connection and measure voltage across pin 1 & 3 of the combine/controller side plug(male). If $\pm 5V$ is not present, you have a problem with your main harness. If $\pm 5V$ is present, you have a problem with the harness that runs down to the rear axle. If your system is under warranty Contact Headsight technical support for a replacement harness. Otherwise, you can repair the harness or purchase a replacement from Headsight Inc.



Note E - Starting from the Y705 connection near the cab, use the same method as in Note B to measure the voltage on the white wire on the combine side of the plug (male). If $\pm 2.5V$ is present, you have a problem with your main harness. If $2.5V$ is not present, you have a problem with the harness on the header. If your system is under warranty Contact Headsight technical support for a replacement harness. Otherwise, you can repair the harness or purchase a replacement from Headsight Inc.

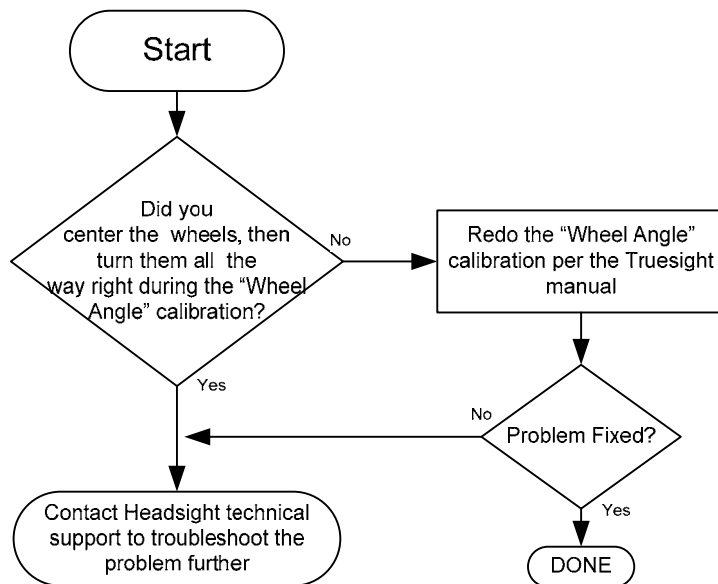
Error 23 - Wheel Angle Swing < 1V

Theory of Operation:

During the “Wheel Angle” calibration, Truesight ask you to center the rear wheels and press Enter then turn all the way to the right and press Enter to learn what direction the voltage swings when from center to right. Truesight needs to see at lease a 1V change from center to full right of the calibration to function properly. This Error is caused when Truesight saw a voltage change, but less than 1V of a change.

Possible causes of this problem are:

- Steering wheel not turned far enough during “Wheel Angle” calibration
- Wheel Angle sensor linkage not installed or working properly
- Wheel Angle sensor failure



Error 24 - Wheel Angle Not Found

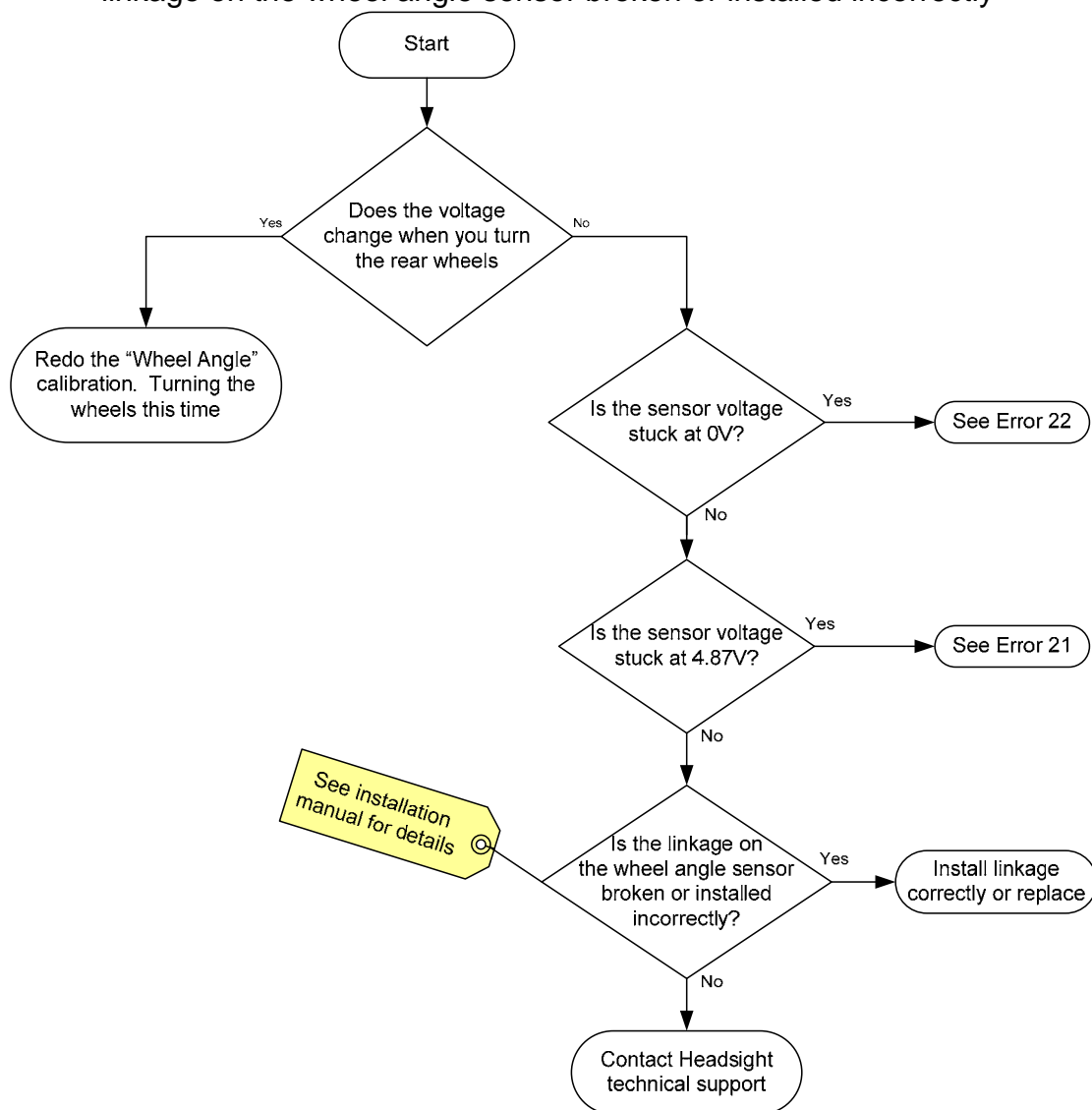
Theory of Operation:

This error is caused when the Wheel Angle sensor voltage does not change during the Wheel Angle calibration.

To read the Wheel Angle sensor voltage, go to “**Diagnostics**»**Inputs/Outputs**»**Wheel Angle**”.

Possible causes of this problem are:

- Rear wheels not turned during “Wheel Angle” calibration
- Voltage stuck at 0V – See Error 22
- Voltage stuck at 4.87V – See Error 21
- linkage on the wheel angle sensor broken or installed incorrectly



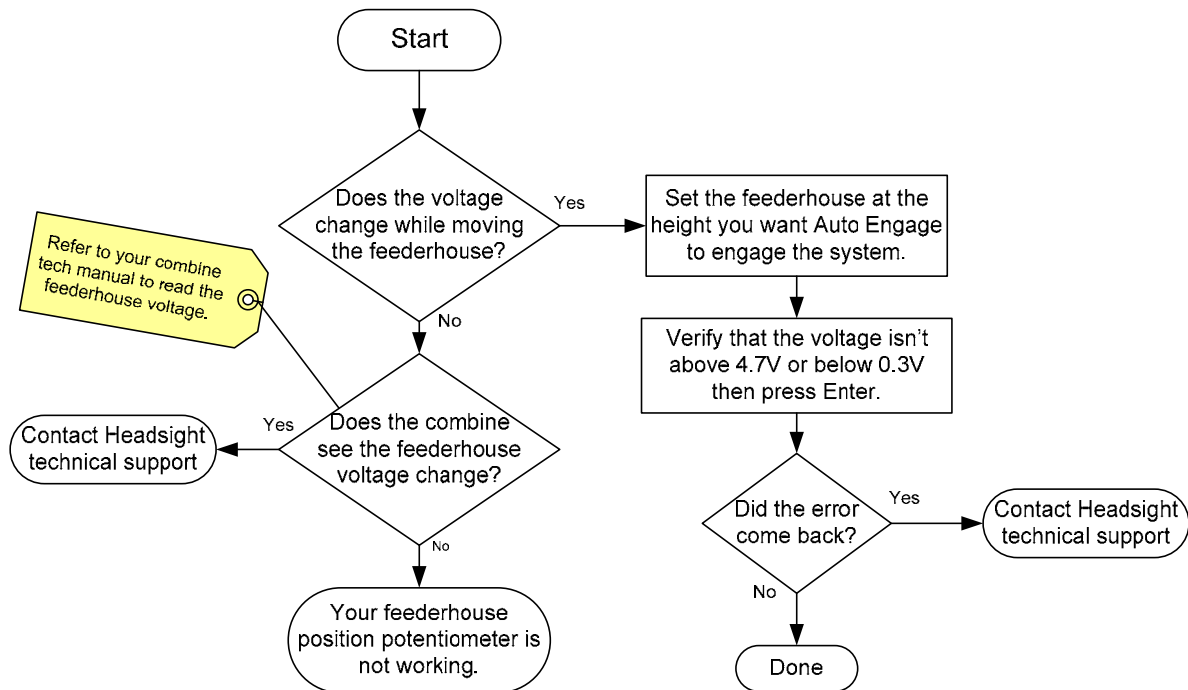
Error 31 - Feederhouse > 4.7V

Theory of Operation:

This error is caused when the feederhouse voltage is set above 4.7V during the “Auto Engage Height” calibration. To fix this problem, in the menu go to “Calibration>>Auto Engage HGT” then start the flowchart below. When the flowchart says voltage, it is referring to the voltage displayed in this screen.

Possible causes of this problem are:

- Feederhouse position potentiometer failed
- Auto Engage HGT calibration not done correctly



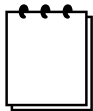
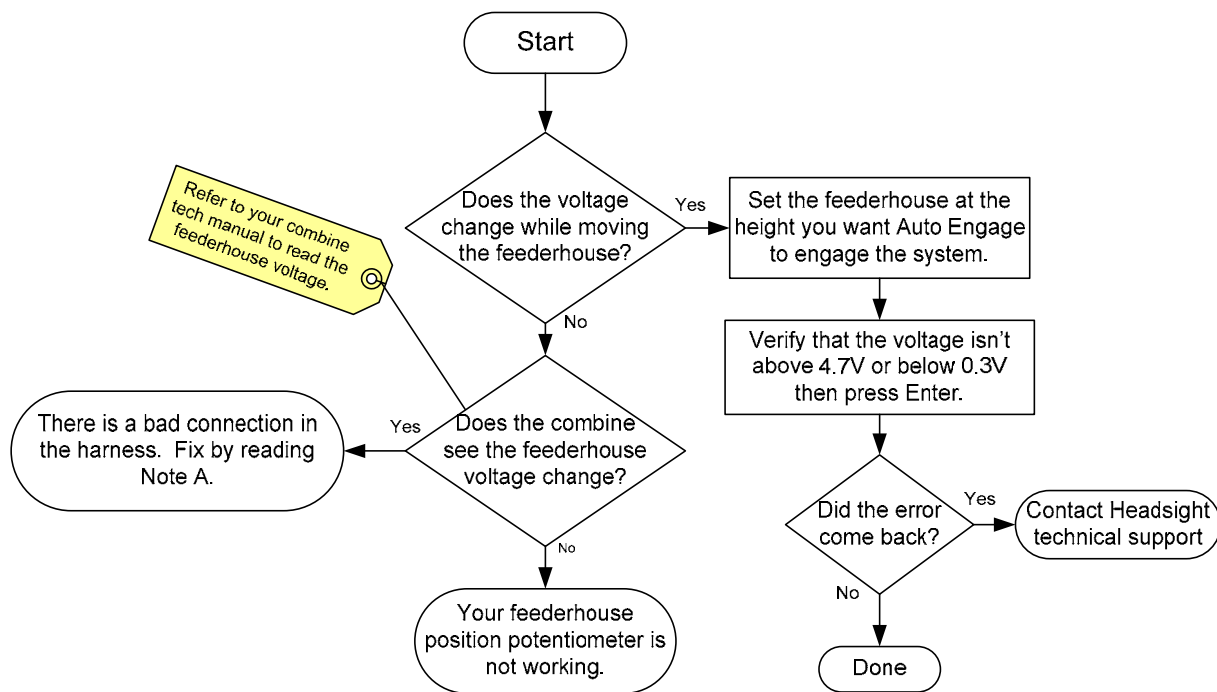
Error 32 - Feederhouse < 0.3V

Theory of Operation:

This error is caused when the feederhouse voltage is set below 0.3V during the "Auto Engage Height" calibration. To fix this problem, in the menu go to "**Calibration>>Auto Engage HGT**" then start the flowchart below. When the flowchart says voltage, it is referring to the voltage displayed in this screen.

Possible causes of this problem are:

- Feederhouse position potentiometer failed
- Bad or no connection in feederhouse sensor harness
- Auto Engage Height calibration not done correctly



Note A - Verify all connectors are connected and all pins are fully seated. If problem persists, contact Headsight technical support

Error 46 or 47 - Speed out of Range

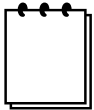
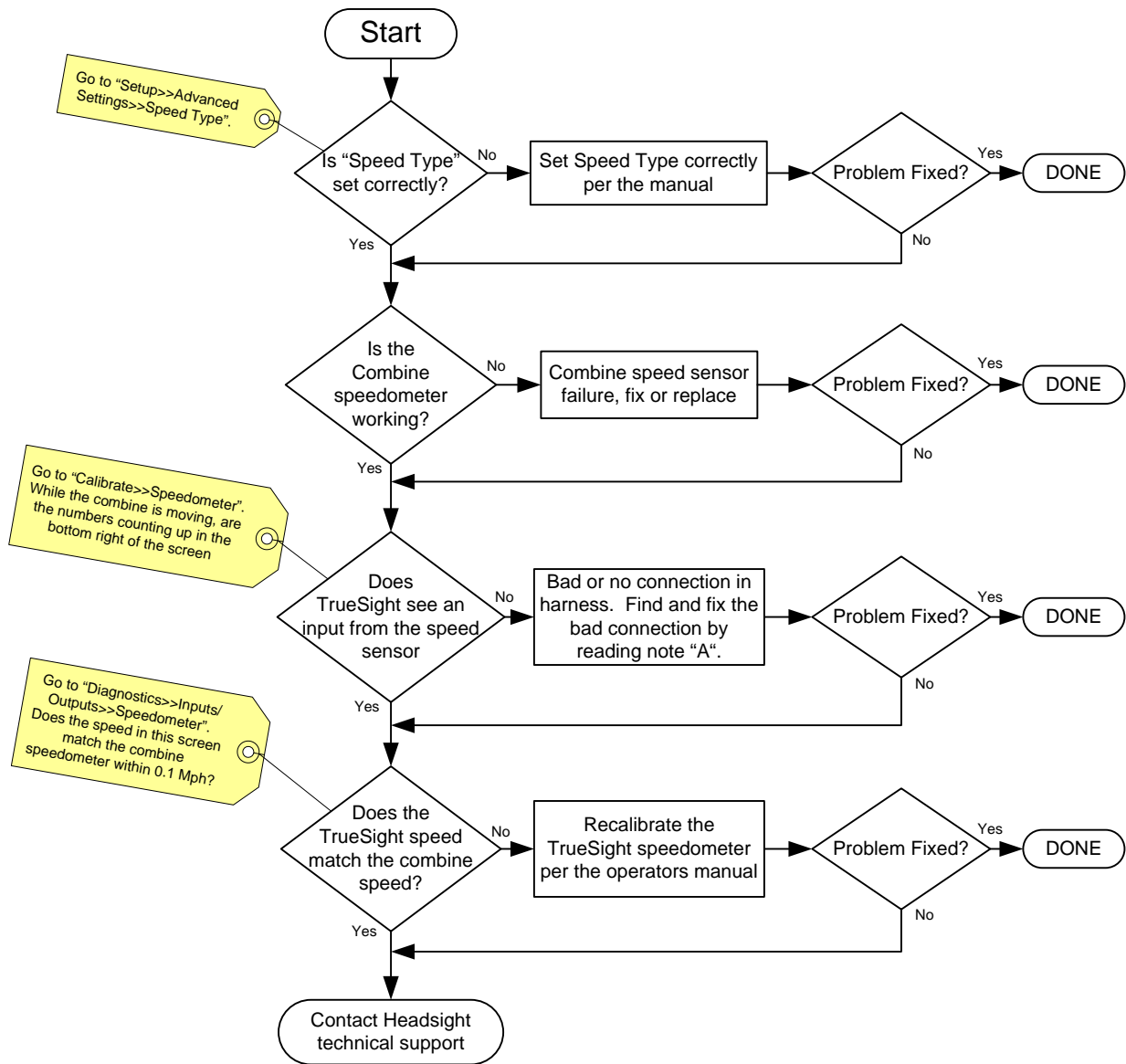
Theory of Operation:

This error is caused when Truesight is Engaged and the ground speed of the combine is above 10mph or below 0.3mph. Truesight reads the combine speed either from an OEM gear tooth speed sensor usually in the transmission, or an external GPS receiver provided by Headsight. The flowchart below assumes you are trying to engage the system while your speed is between 0.8 and 10 Mph. If you are using the external GPS receiver from Headsight, then contact Headsight technical support now and skip this flowchart.

Truesight reads the combine speed only for safety so that Truesight doesn't engage while on the road or standing still. You can disable this feature by going to "Setup>>Advanced Settings>> Speed Type" and setting it to "Off". Please note that you are actively removing a safety feature by doing this.

Possible causes of this problem are:

- Combine ground speed is above 10 mph or below 0.8 mph.
- "Speed Type" not selected correctly.
- Speed not calibrated or not done correctly
- Bad or no connection in harness
- Speed sensor failure



Note A - Verify all connectors are connected and all pins are fully seated. If problem persists, contact Headsight technical support.

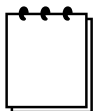
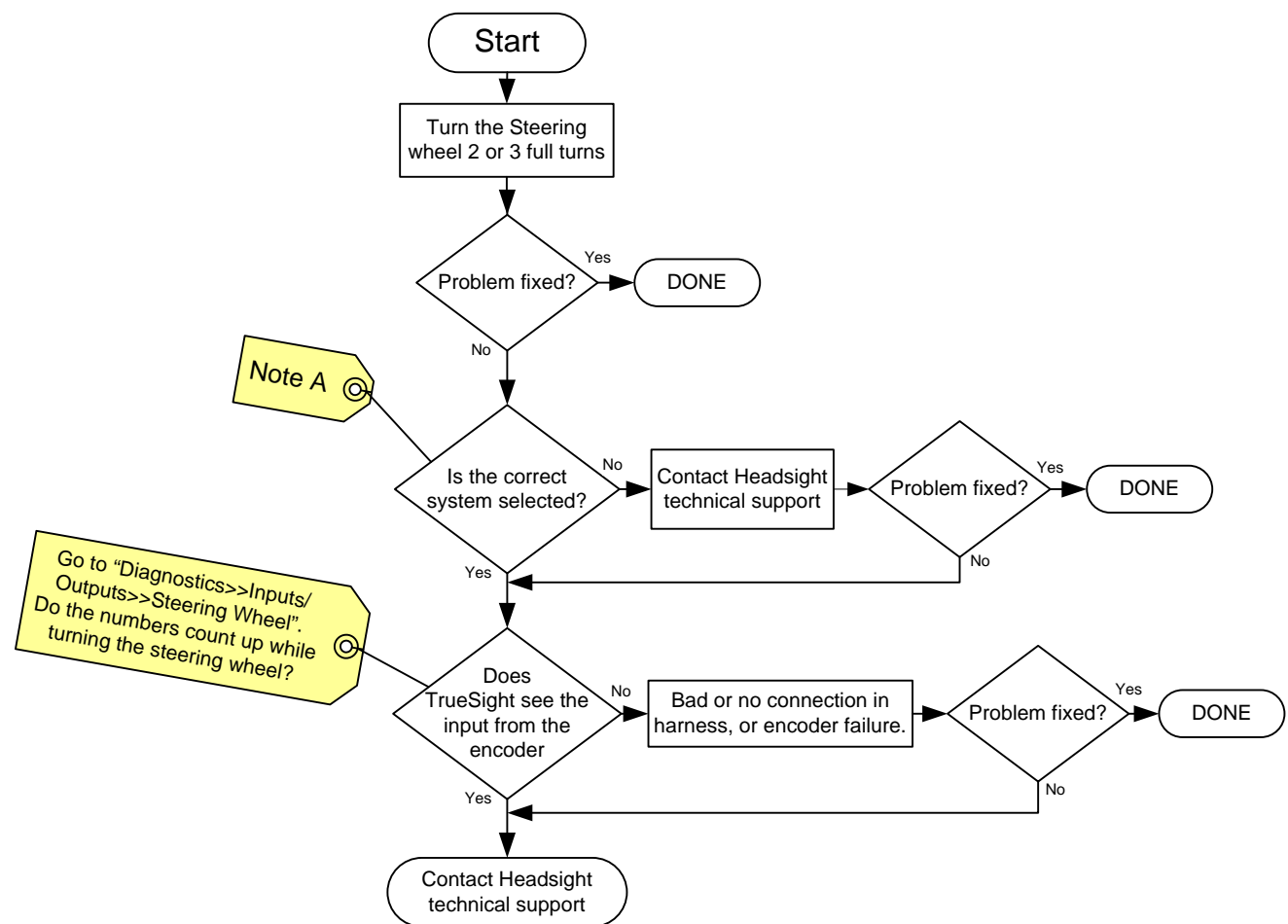
Error 54 - Encoder Not Detected

Theory of Operation:

The first time Truesight is engaged after power up, Truesight checks to make sure it can see the steering wheel encoder (electronics in the steering wheel) that tells Truesight to disengage when the steering wheel is being turned. This error is thrown if Truesight cannot see the encoder.

Possible causes of this problem are:

- The steering wheel hasn't moved since power up
- Wrong system selected
- Bad or no connection in the harness
- Encoder failure



Note A – To find the system, Go to “**Setup>>Advanced Settings>>System Select**”.

Error 66 – Steering Wheel Moving

Theory of Operation:

For systems that use a “Hydraulic pressure transducer” for manual override, Truesight ties into that same sensor to know when the user is turning the steering wheel. During the “Auto Deadzone” calibration Truesight looks at the voltage level of the pressure transducer and saves it as the “Steering Wheel Not Moving” voltage or SWNM for short. During operation, when the sensor voltage is significantly different than the SWNM, Truesight knows the steering wheel is being turned.

This error occurs when the voltage coming from the pressure transducer is different than the calibrated SWNM voltage at the moment the user tried to engage the system. To view both the sensor and the SWNM voltage, go to “***Diagnostics>>Inputs/Outputs>>Disengage***”. When these 2 voltages are approximately within 0.2V of each other, the problem is fixed.

Possible causes of this problem are:

- The steering wheel is being turned while the system is trying to engage
- Auto Deadzone calibration needs redone
- Wrong System is selected: if Truesight is tied into an encoder sensor on or under the steering column, you likely have the wrong system selected
- If the combine engine is running and the voltage on the screen “***Diagnostics>>Inputs/Outputs>>Disengage***” is 0.0V, you likely have a wiring or connection problem
- Hydraulic pressure transducer problem

Error 74/78/88 – No 12V or 5V Safety

Theory of Operation:

Truesight has 2 safety circuits that need to be satisfied before Truesight will engage or complete some of the calibrations. See “Safety connectors” in the Installation Section for more info on how to connect them properly.

To read the condition of either safety, go to “***Diagnostics>>Inputs/Outputs>>Safeties***”. When both the 12V and 5V say “ON” the problem is fixed

Possible causes of this problem are:

- One or both of the safeties are not connected or connected improperly
- The operator is not sitting in the seat

Error 99 – Outputs are Reversed

Theory of Operation:

During the Deadzone calibration, Truesight turns the wheels to learn how much power it takes to turn them and what direction they turn. This error is thrown when the wheels turn the wrong direction.

Possible causes of this problem are:

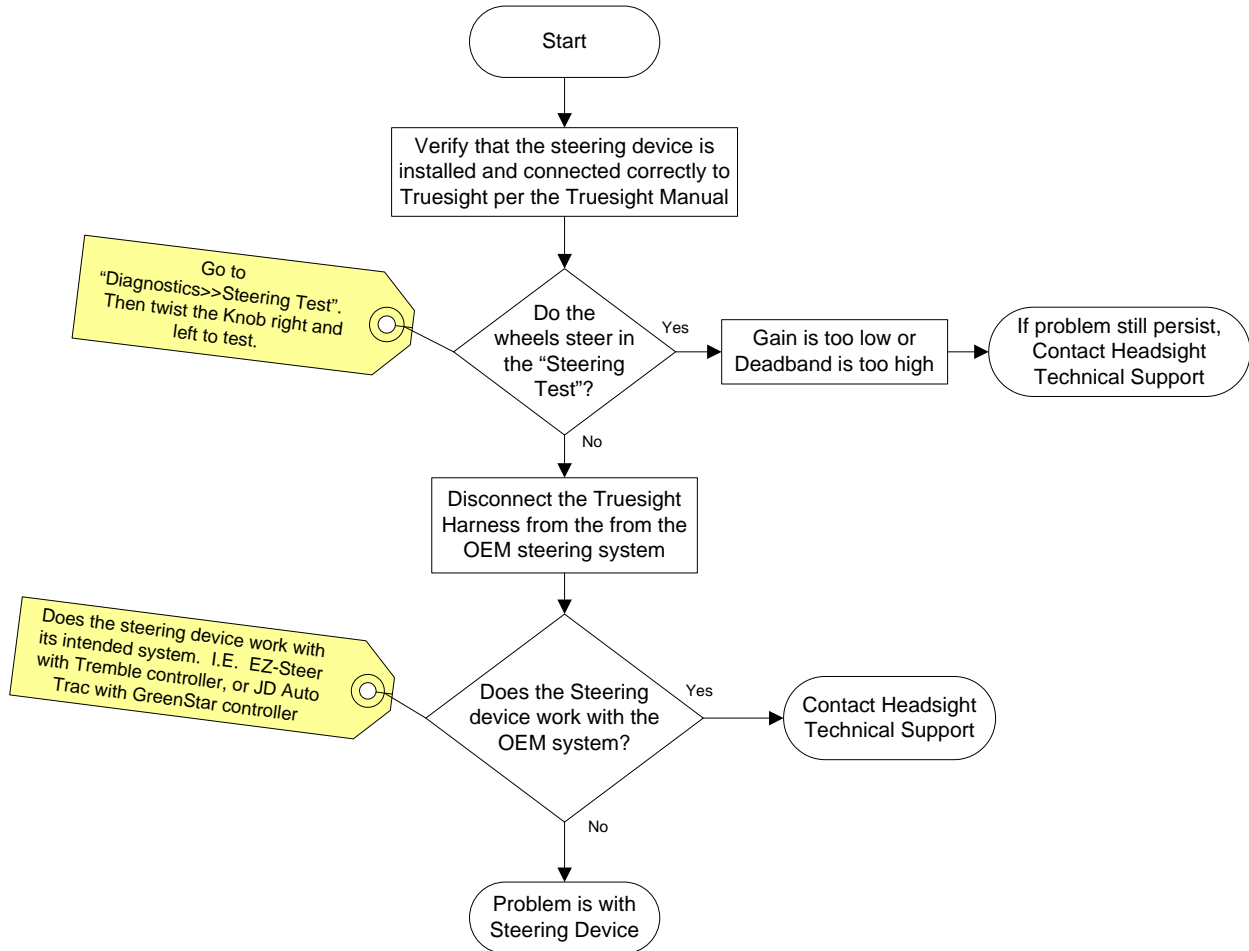
- The steering system is connected backwards (Right turns the wheels left and Left turns the wheel right). To fix this problem, reverse the steering system if possible (for example, swap the right and left solenoid connectors). Otherwise contact Headsight technical support.
- When asked to turn the steering wheel to the right (in the “Wheel Angle” calibration) the operator actually turned it left. To fix this problem, redo the “Wheel Angle” calibration and turn the steering wheel all the way to the Right when prompted.

2 Troubleshooting by symptom

System is engaged, but doesn't steer

Possible causes are:

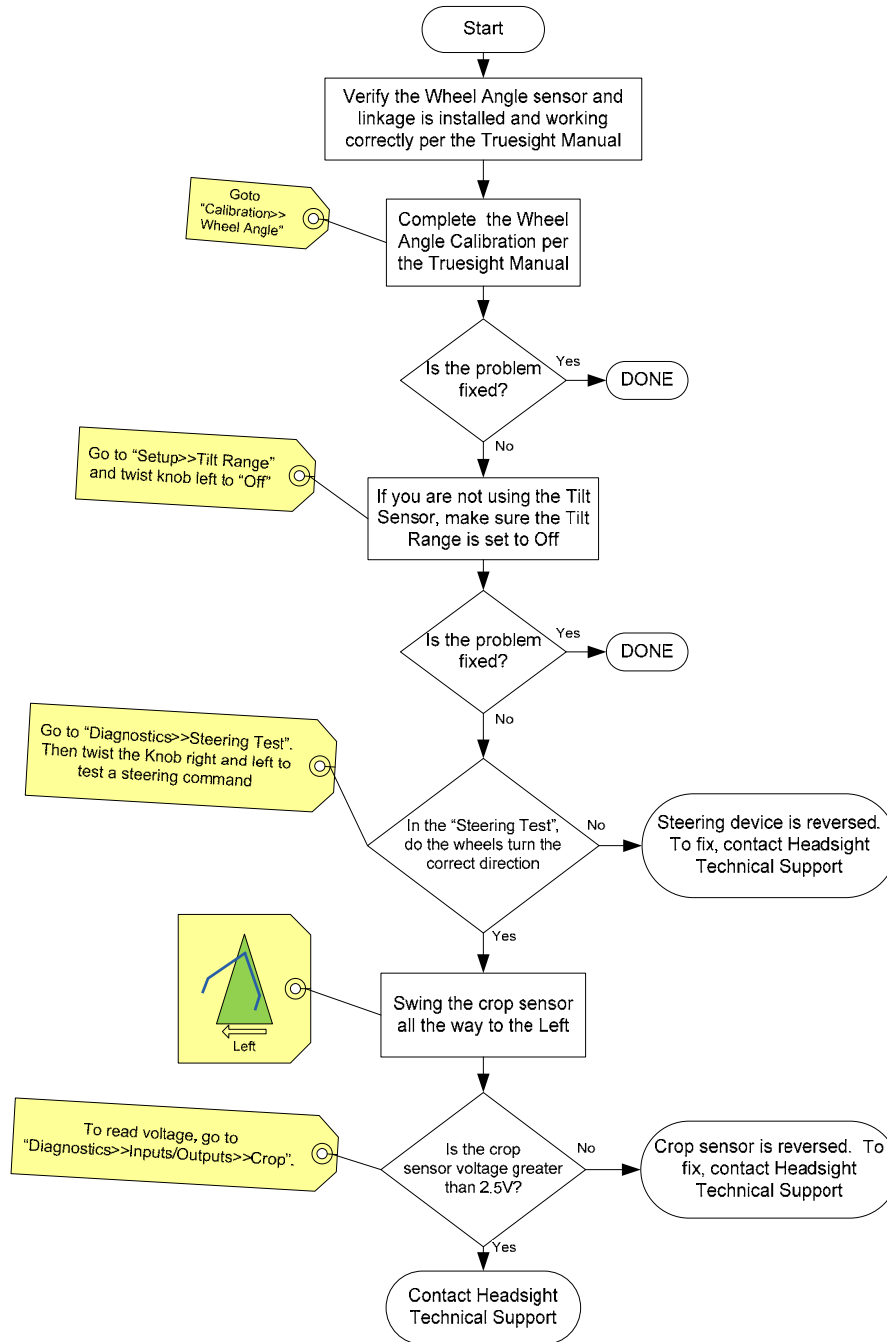
- Steering device not working or installed incorrectly
- Deadband too high or Gain too low
- Controller failure



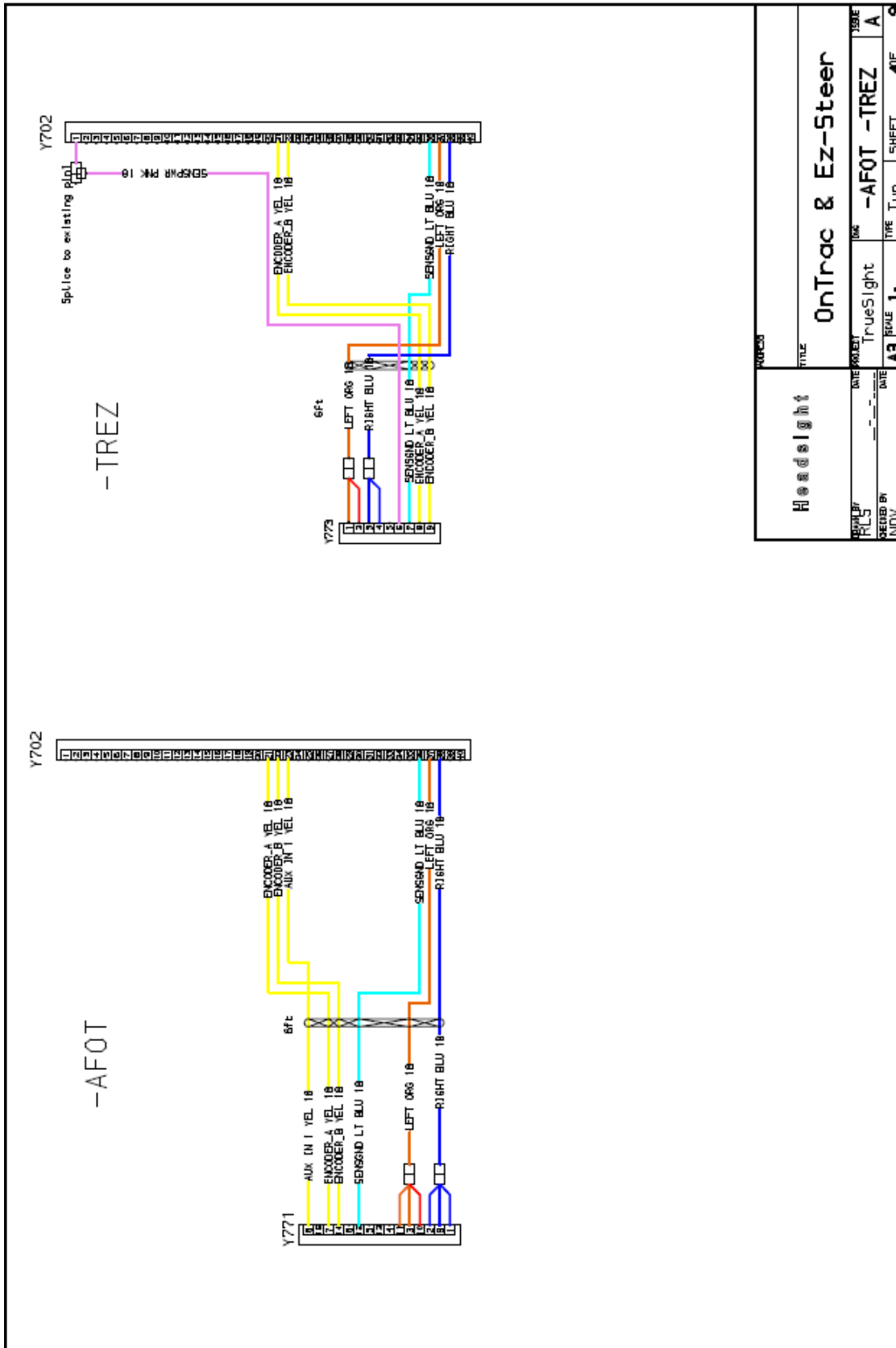
When the system is engaged, it steers fully to the right or left

Possible causes are:

- Wheel Angle Sensor linkage broken or installed incorrectly
- Wheel Angle Calibration not done correctly
- If not using the Tilt Sensor, Tilt Range needs to be set to “OFF”
- Steering device is reversed (e.g. When commanded to steer right, it turns left)
- Crop sensor swing is reversed

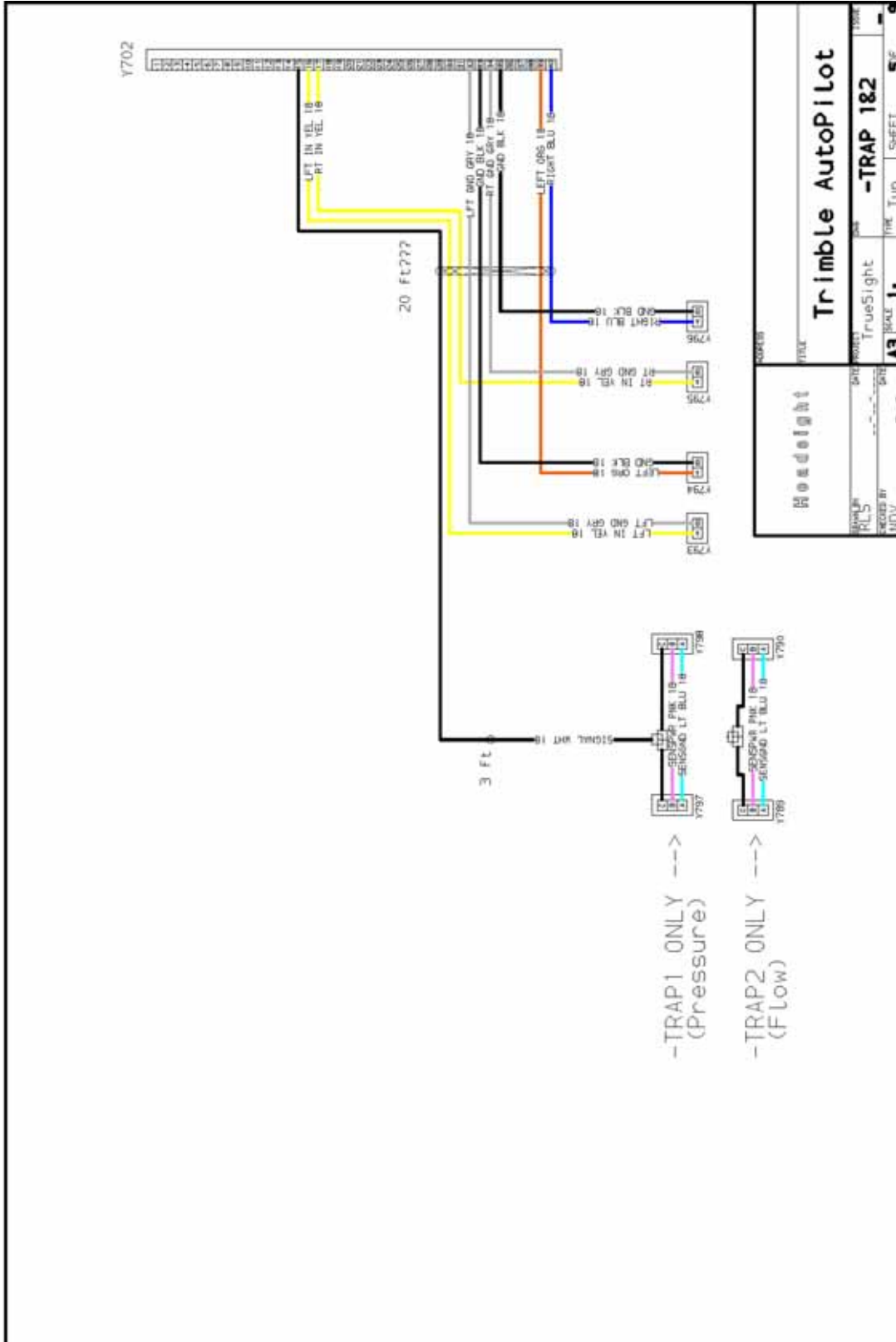


EZ-Steer & Ontrac



RUCS		TITLE	
Headlight		OnTrac & Ez-Steer	
DESIGNED BY R/S	DATE	PROJECT TrueSight	ISSUE A
DRAWN BY NDV	DATE	SCALE 1.	TIRE Typ SHEET 40F
			9

Trimble AutoPilot



C Software Updates

1 Basic preparation

1. Download the latest version of Truesight software.
 - The latest version of Truesight software may be obtained by contacting Headsight @ 574-546-5022 or info@headsight.com.
2. Unzip the software into the root directory of an 2GB or lower SD card(4GB won't work).
 - “root directory” means for example “f:” and NOT “f:\myfolder\”
 - If copying the files to the SD card fails, make sure that the write-protect switch is not on the SD card.
3. Remove the left-hand cover of the Truesight remote.
 - Remove and keep the 4 attaching screws.



2 Updating the Base controller

1. Insert the SD card into the slot on the remote with the Power already turned ON.
2. Go to and select **>>About Truesight>>Bootload Base** in the Truesight remote menu.
 - If the screen says “Flashing Line” with numbers counting up:
 - Wait until the screen says “Bootload complete”. Then go to step 3
 - If the screen says “No Card Detected”:
 - Verify that the files are on the root directory of the card.

- Verify that the SD card is fully seated in the slot.
- Retry update.
- If the screen says “Comm Error”:
 - Contact Headsight @ 574-546-5022.

3 Updating the Remote controller

Note: Updating the remote will reset all settings and user preferences to the factory default.

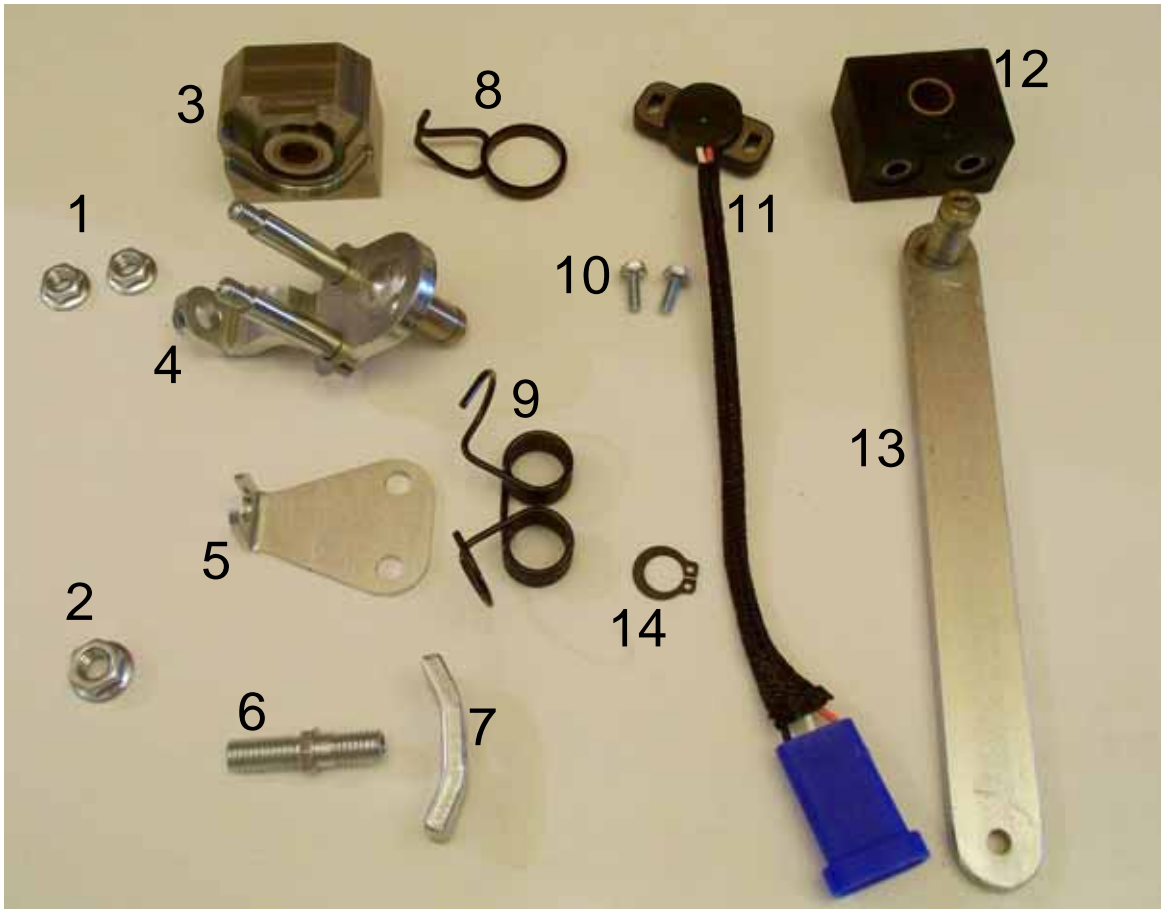
1. With the SD card already in the slot, cycle Power to the Truesight system.(If equipped, use the power switch on the side of the Remote)
2. Wait until the yellow “loading” light stops flashing.
 - The yellow light is behind the SD card in the Truesight remote.

4 Finishing up

1. Verify that the update was successful by noting the new Remote and Base software version numbers displayed on the startup screen.
2. Reinstall the cover on the remote.
3. Follow setup and calibration instructions found in the Quick-Start guide of this manual.



D Sensor Parts



Item	QTY	Part Number	Description
1	2	08200145	nut flange 5/16"
2	1	08200131	nut flange 3/8"
3	1	HT2688	crop sensor block
4	1	HT2672	arm
5	1	HT2687	shield
6	1	HT2685	adjustment shaft
7	1	HT2681	adjustment plate
8	1	HT2690	spring centering
9	1	HT2692	spring return
10	2	08200157	screw 10-24 x .75"
11	1	HT2128	sensor
12	1	HT2689	wheel angle sensor block
13	1	HT2701	wheel angle sensor arm short
14	1	08100132	retaining ring

HEADSIGHT INC.

HARVESTING SOLUTIONS



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