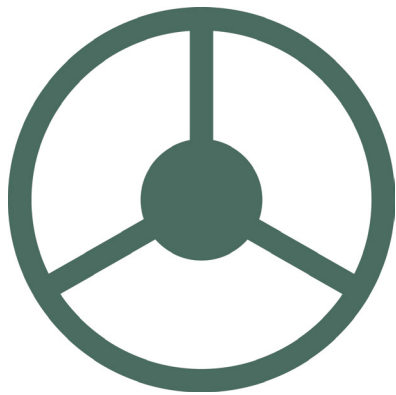


TRUESIGHT 2[®]

ROW GUIDANCE SYSTEM



USERS MANUAL FOR ISOBUS

09050001a



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About Headsight

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About this Manual

How to use this manual

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



This icon designates information of which you should take note.



This icon indicates Install Instructions or a special tool needed for a given task.



This icon designates an important instruction.

Suggestions

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

Disclaimers

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US10244680; EP2955993(DE,ES,FR,IT,UK); EP2956851 AU2004203614;
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Safety Information

Safety Stop



Before working on combine or under header always:

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



Speed Safety Software Update

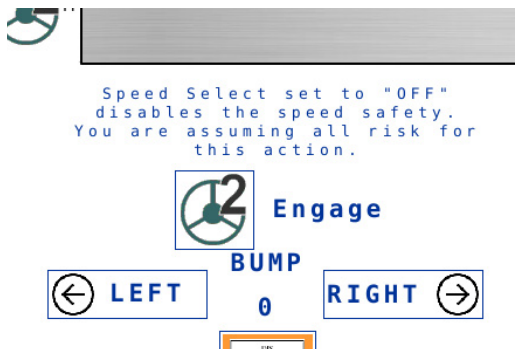


Software versions 2.16.4 and newer have improved speed safety features and include screen prompts to ensure the system is configured correctly. Update or confirm that system is using the current software release.



ALL Truesight systems should have a valid speed signal during normal use.

- If you receive one of these screen prompts, the system does not have a valid speed signal and may control the machine incorrectly. Return to the Setup portion of the manual to correctly configure the system.



Getting Started



If your system is equipped with a remote display instead of a ISOBUS (VT) display, STOP. Please use Truesight Remote Users Manual instead.

Installation Overview



To install your Truesight system, follow the steps below in order.

1. Install the Header components.
 - See the header model specific Installation Manual
2. Install the Combine components.
 - See the combine model specific Installation & Operation Manual
 - If using aftermarket steering valves or motor, see the relevant Aftermarket Installation & Operation Manual
3. Find the ISOBUS (VT) application on your display
 - For OEM displays, see the combine model specific Installation & Operation Manual
 - For aftermarket displays, see the relevant aftermarket Installation & Operation Manual
4. Use this manual to properly set & adjust your system.

Finding VT applications

1. Access VT application on display.
 - See “Finding VT Applications” section in:
 - OEM combine model specific Operation manual
 - Aftermarket Display Operation Manual
 - Some displays show Apps on Home page
 - Some displays have a “VT” tab to access Apps.
2. Choose Truesight 2 VT app on display.



Headsight ISOBUS (VT) Application Guide

The following is a guide to the Headsight ISOBUS Applications you may see.



Horizon Bridge



Truesight2



Horizon Base (Main)



Truesense +



Horizon - Header App

Truesight2 Main Screens

HOME

- Main Run screen
 - On-Screen Engage button & Indicator
 - Bump Adjustment
 - Road Mode Engage

CAL(ibration)

- Calibrations for sensors, valves, etc.
- See “Calibration”

SETUP

- All settings (combine, steering type, adjustment values, etc)
- See “Setup”

DIAG(nostics)

- Diagnostics and Error screens
- See “Diagnostics Screens”

ABOUT

- All other - Hardware & software versions, contact info, etc.



Initial Setup



If Truesight Icon does not appear, temporarily remove any USB memory attached to the Pro700 or IV4, and cycle power.



The first time that Truesight 2 is powered up, it will ask a series of questions. Choose the appropriate choice or follow the instruction given. For more detailed information on the choices, see the Calibrations and Settings sections

1. Access Truesight 2 VT screen on display.

- See “Getting Started/Finding VT Applications”



2. Follow the on-screen instructions and choose appropriate choices for your system, then follow steps for calibration procedure. For more detailed information on the choices, see the Calibrations and Settings sections

3. Enter Type & Make

- Machine Type - Combine
- Machine Make - Combine Make & Model

4. Select Steering system

- For OEM systems:
 - Steering Type - OEM
 - Steering Make - Combine Make
 - Steering Choice - Select from options
 - Press Next
- For Aftermarket Valve or Motor systems:
 - Steering Type - Aftermarket
 - Steering Make - Valve or Motor MFG (AgLeader, Trimble, etc)
 - Steering Choice - Select from options
 - Press Next

5. Connector Orientation

- Front or rear
- Press Next

6. Wheel Angle Calibration

- Follow on screen instructions
- Press Next

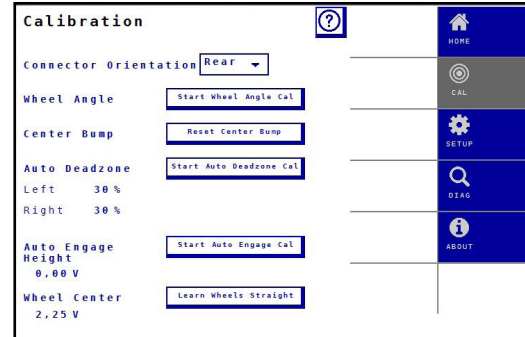
7. Deadzones Calibration

- Follow on screen instructions
- Press Finish

Calibration

Accessing Calibrations

1. Access Truesight 2 VT screen on display.
 - See “Getting Started/Finding VT Applications”
2. Press CAL(ibration) tab.
3. Perform Tilt Sensor, Wheel Angle and Auto Deadzone Calibrations.
 - These calibrations must be completed for system to operate
 - Follow instructions on screen



Calibrations

Connector Orientation

This setting determines the slope compensation direction. Choosing the wrong end will make the machine correct backwards, ie move the machine further down the slope instead of up.

- The Truesight base must be installed correctly, flat on the floor & facing fore/aft
- Choose if the connector on the Truesight base is facing toward the front or rear of the machine

Wheel Angle

Calibrates the maximum motion and direction of the wheel angle sensor

Center Bump

Allows “centering” the “bump” settings so combine runs down the center of the row at 0 bump. This calibration does not change system operation, it just adjusts the center reference the operator sees.

- Use the bump buttons to center the machine in the row during normal operation
- Press “Reset Center Bump”

Auto Deadzone

Calibrates the amount of current required to start turning the wheels in each direction

- Park combine in flat open area where there is room to drive forward slowly & steer
- Select “Start Auto Deadzone Cal”
- Follow on-screen instructions
- Calibrated values are displayed

Auto Engage Height

Sets the “auto engage/disengage” position of the feederhouse. This feature is only available on combines equipped with feederhouse position sensors.

- Lower the feederhouse to the height you want the system to engage below.
- Press “Start Auto Engage Cal”
- Calibrated feederhouse sensor voltage is displayed

Wheel Center

Calibrates the “straight ahead” position of the wheel angle sensor

- Drive straight forward with no crop deflecting the crop sensor
- Select “Learn Wheels Straight”
- Calibrated “straight” sensor voltage is displayed

Setup



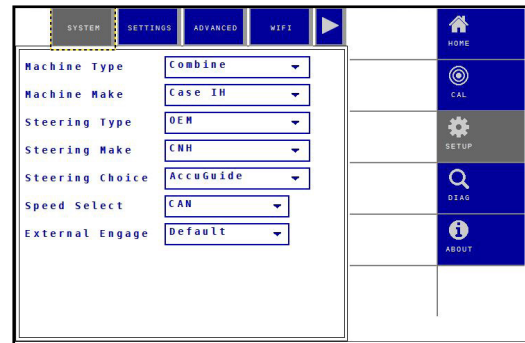
If your system is equipped with a remote display instead of a VT display, follow “Truesight Remote” manual for settings.



Properly setting the Truesight® 2 system is essential to having responsive row guidance control. You should become very familiar with the steps in this section.

Access Settings

1. Access Truesight 2 VT screen on display.
 - See “Getting Started/Finding VT Applications”
2. Choose the Setup tab at right then Setup, Settings or Advanced tab at top of screen menu.
 - Adjust the desired setting or settings



System Select



System Setup values typically will not be changed for a given system, once set.

Refer to the combine specific or aftermarket system specific instructions for correct values to enter in these selections.

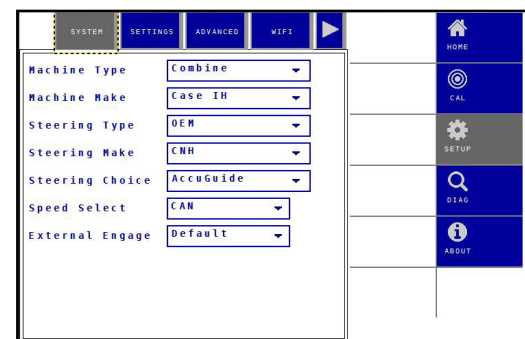
Machine Type & Make

- Machine Type - Combine
- Machine Make - Choose

Steering Type, Make & Choice

The Steering Type settings allows the configuration of Truesight 2 for use with different valve and motor systems.

- Type: OEM,
 - Make: Choose
- Type: Aftermarket
 - Choose valve or motor system as required



Speed Select

The Speed Select setting properly configures Truesight 2 to read the available speed sensor. Truesight will automatically disengage at speeds below 0.5 mph, or over 12 mph.

1. Choose CAN or GPS to enable speed safety feature.

- Select “CAN” for systems on:
 - CIH Flagship 2013 & up
 - NH ‘Dot’ & up
 - JD 70 series & up
 - Gleaner Sx8 & S9x & up
 - Fendt Ideal
- Select GPS
 - All others
 - Make sure GPS antenna* is installed & connected (see combine specific Installation)
- Speed Safety should never be disabled unless instructed by a Headsight technician for diagnostic purposes
 - Disabling the speed safety will require you to acknowledge that you accept the risks each time Truesight is powered on



Speed Select is a IMPORTANT Safety Feature of Truesight 2. Unexpected engagement while stopped or at road travel speeds can lead to accident, injury, or death. Disable at your own risk! Disabling Speed Safety may also degrade field performance.

*If you wish to use GPS units other than one supplied with kit you must supply NMEA string \$GPRMC at baud rate 4800 to pin number 3 of connector Y725. (Adapter wiring is not provided by Headsight)

External Engage

The External Engage turns on and off the Auxiliary switch (foot switch)

- Off - auxiliary switch disabled
- Default - auxiliary switch enabled
- Inverted - not currently used

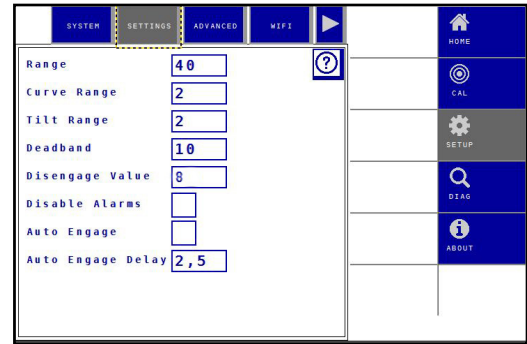
Settings

Range (Default = 40)

The range setting controls the aggressiveness of the Truesight 2 system. Increasing the range increases the angle to which the wheels turn. Combine steering may weave from side to side in the row if the range is set either too high or too low.



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

Curve Range (Default = 10)

The Curve Range setting allows additional compensation for curve aggressiveness after Range has been properly adjusted for straight rows. Increasing Curve Range 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.

Increase Curve Range:

- If the tip of the snout favors the outside of the row while going around a curve.

Tilt Range (Default = 2)

The Tilt Range setting allows Truesight 2 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.

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

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

Deadband (Default = System Dependent)

The Deadband setting adjusts the maximum swing of the crop sensor before Truesight 2 issues a steer command.

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.

Disengage Value (Default = System Dependent)

The Override Value setting allows the operator to adjust how much motion of the steering wheel is required to disengage Truesight 2. Increasing the override value will make it harder to disengage the system.

- If Truesight 2 disengages with only a slight nudge of the steering wheel, the Override Value may be increased to prevent accidental disengagement.

Disable Alarms (Default = Off)

Turns off the Truesight Engaged/Disengaged popups.

- Must be reset to “Disabled = On” each key cycle

Auto Engage (Default = Off)

The Auto Engage feature allows automatic activation/deactivation of Truesight when the feederhouse is lowered/raised through the setpoint chosen in the Auto Engage calibration. This allows “touchless” operation while turning on the end-rows.

- Auto Engage must be manually turned ON after every combine key cycle

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.

Advanced Settings

Right/Left Deadzone (Default = Calibrated Value, 0 if not Calibrated)



The Left Deadzone and Right Deadzone settings allow manual adjustment of the valve/motor deadband. This value is set by the deadzone calibration.

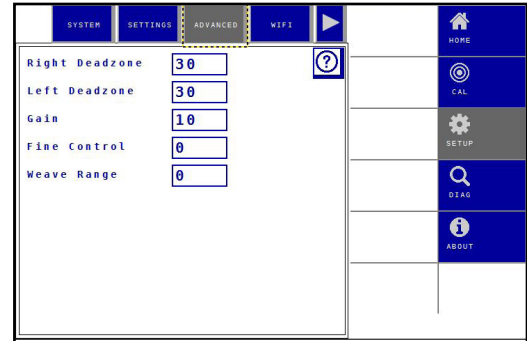
- A higher value will decrease the valve/motor deadband.
- A lower value will increase the valve/motor deadband.

Increase the calibrated Deadzones by up to 5 if:

- The steering response seems to lag or be sluggish

Decrease the calibrated Deadzones by up to 5 if:

- The steering is constantly hunting (overshooting)



Gain (Default = System Dependent)

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.

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

Fine Control (Default = 0, except Out-back)

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 normally unnecessary for systems with steering motors and AccuGuide valves, but a value of 15 is recommend for aftermarket steering valve systems.

Weave Range (Default = 0)

The Weave Range setting allows dampening small overshoots in steering, when adjusting Range & Gain is not sufficient. Normally, adjusting Weave Range should not be necessary.

Increase Weave Range:

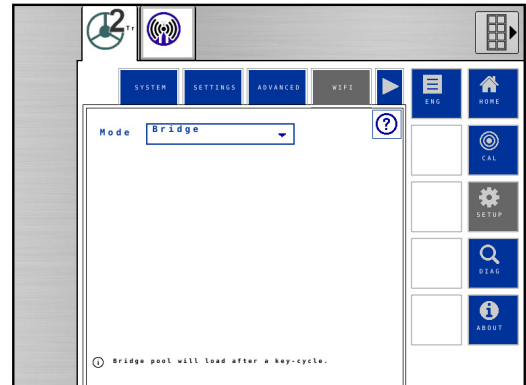
- If the combine seems to constantly overshoot or weave in the row, and this cannot be corrected by adjusting the Range or Gain Settings

WIFI



Changing a WIFI mode is only needed when operating with Horizon

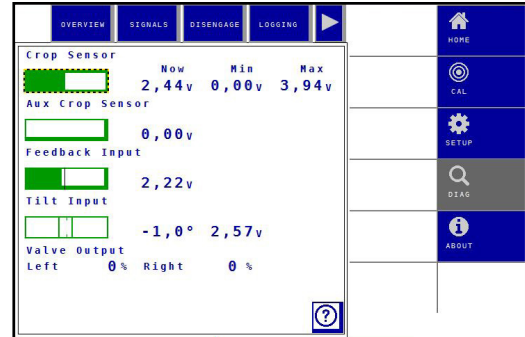
1. Select SETUP>>WIFI on Truesight2 VT application.
 - If you are running Horizon header height control select “Bridge”
 - If you are not running Horizon header height control select “Base”
2. You must cycle the key after this choice for it to be enabled.



Diagnostics

Accessing Diagnostics

1. Access Truesight 2 VT screen on display.
 - See “Getting Started/Finding VT Applications”
2. Choose the Diag tab at right then Overview, Disengage, or Signals at top of screen menu.



Overview Tab



Tapping a display item gives more information (Min & Max values)

Crop Sensor

- Main crop sensor voltage
- 2.5V centered 1-4V range
- Voltage decreases when stalks push left side of wand
- Voltage increases when stalks push right side of wand

Aux Crop Sensor

- Optional second crop sensor voltage
- 2.5V centered 1-4V range
- Voltage decreases when stalks push left side of wand
- Voltage increases when stalks push right side of wand

Feedback Input

- Steering angle sensor
- 2.5V centered 1-4V range (2.7 centered OEM sensor)
- Voltage decreases when turned one way
- Voltage increases when turned opposite way

Tilt Input

- Internal Slope sensor
- Displays in degrees of center
- “Bubble” around center shows approximate level

Valve Output

- Displays Left/Right valve output percentage

Motor Output

- Displays Left/Right motor output percentage

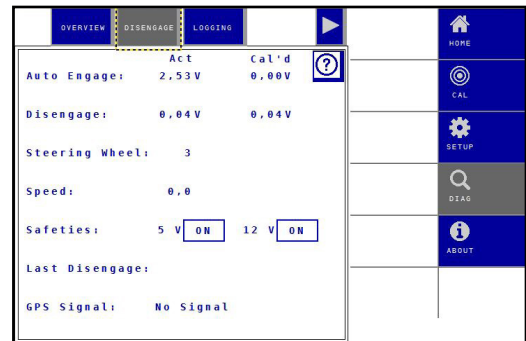
Disengage

Auto Engage

- Displays actual voltage reading and calibrated voltage
 - System engages when actual voltage goes below calibrated voltage
 - System disengages when actual voltage goes above calibrated voltage

Disengage

- For systems with pressure or flow sensor on steering system
- Displays actual voltage reading and calibrated voltage
 - System disengages when actual voltage changes from calibrated voltage



| | Act | Cal'd | |
|-----------------|---------------------------------|----------------------------------|---|
| Auto Engage: | 2,53V | 0,00V | ? |
| Disengage: | 0,04V | 0,04V | |
| Steering Wheel: | 3 | | |
| Speed: | 0,0 | | |
| Safeties: | 5 V <input type="checkbox"/> ON | 12 V <input type="checkbox"/> ON | |
| Last Disengage: | | | |
| GPS Signal: | No Signal | | |

Steering Wheel

- For systems with encoders/counters on steering wheel
- Displays combine steering wheel encoder count
- Number count increases with any steering motion

Speed

- Displays actual GPS or CAN speed

Safeties

- Both safeties have to be “ON” for system to engage
- Displays status of 12V seat safety
 - ON - operator in seat
 - OFF - operator out of seat
- Displays if 5V sensor bus is on/off
 - ON - 5V power supply is good
 - OFF - 5V power supply shorted

Last Disengage

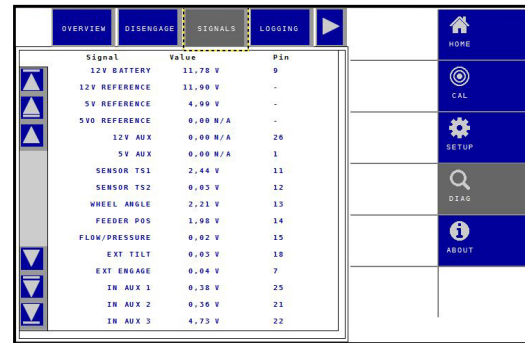
- Displays last known cause of Truesight 2 disengage
 - None
 - Auto engage
 - Steering Wheel
 - Speed out of range
 - Auxiliary switch

GPS Signal

- Displays status of GPS speed signal
 - No Signal
 - Signal Aquiring
 - Signal Aquired

Signals

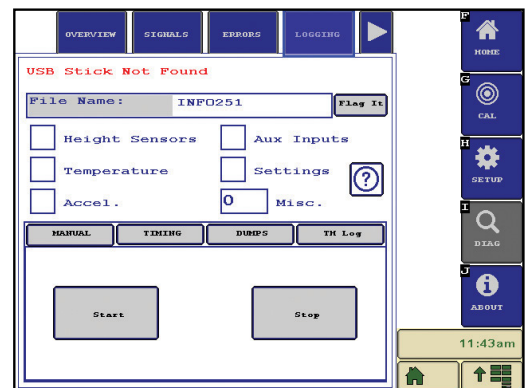
- General reference to power, inputs and outputs of Truesight 2
- Displays - Signal, Value, and pin location on 40 pin connector



| Signal | Value | Pin |
|---------------|----------|-----|
| 12V BATTERY | 11,78 V | 9 |
| 12V REFERENCE | 11,90 V | - |
| 5V REFERENCE | 4,99 V | - |
| 5V0 REFERENCE | 0,00 M/A | - |
| 12V AUX | 0,00 M/A | 26 |
| 5V AUX | 0,00 M/A | 1 |
| SENSOR TS1 | 2,44 V | 13 |
| SENSOR TS2 | 0,03 V | 12 |
| WHEEL ANGLE | 2,21 V | 13 |
| FEEDER POS | 1,98 V | 14 |
| FLOW/PRESSURE | 0,02 V | 15 |
| EXT TILT | 0,03 V | 18 |
| EXT ENGAGE | 0,04 V | 7 |
| IN AUX 1 | 0,38 V | 25 |
| IN AUX 2 | 0,26 V | 23 |
| IN AUX 3 | 4,73 V | 22 |

Logging

- Allows logging specific inputs/outputs to a USB stick
- For diagnostics use if requested by Headsight engineering only



USB Stick Not Found

File Name: INFO251

Height Sensors Aux Inputs

Temperature Settings ?

Accel. Misc.

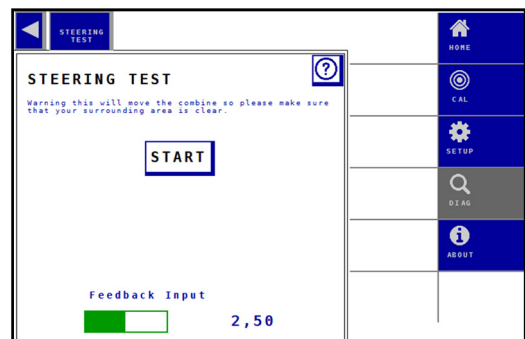
11:43am

Steering Test



Operator must be in seat to proceed with Steering Test.
Ensure area around machine is clear of people or hazards.

1. On VT go to Diag >> Tab Right >> Steering Test.
2. Make sure the area around the machine is clear.
3. Press Start button.
4. Repeatedly press Right or Left button to increase wheel steer command until the wheels steer.
 - Verify wheels are steering in correct direction
 - Press Left or Right to return steer command to zero
5. Press Stop button to end test.



STEERING TEST

Warning this will move the combine so please make sure that your surrounding area is clear.

Feedback Input

Operation



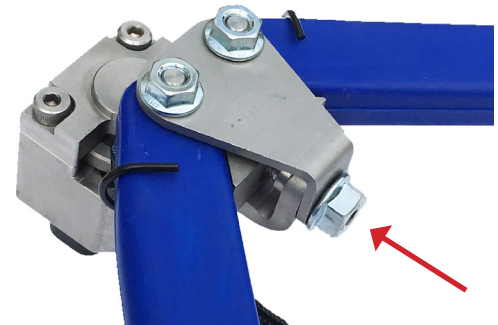
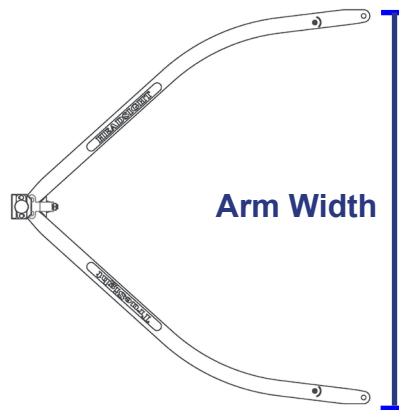
If your system is equipped with a remote display instead of a ISOBUS (VT) display, STOP. Please use Truesight Remote Users Manual instead.

Maintain Width Adjustment



The poly arm width setting gradually decreases. Reset spacing after the first day of running and continue to check every day for first week & once a week thereafter, or until dimension stabilizes.

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.



Opening Truesight2 Application

1. Access Truesight 2 application on VT display.
 - See “Finding VT Applications” section in:
 - OEM combine model specific Operation manual
 - Aftermarket Display Operation Manual
 - Choose the Home Tab



Operation with Horizon



When operating Truesight 2 with Horizon header height control, Truesight 2 will replace the Horizon bridge.

1. Go to Setup>>WiFi>>Mode.
 - If you are running Horizon header height control select “Bridge”
 - If you are not running Horizon header height control select “Base”
2. You must cycle the key after this choice for it to be enabled.

Requirements for Operation



Engage Truesight 2 Road Mode any time you're not using the Truesight system. Road Mode will lock the automatic steering enable features.



Five requirements must be met before the Truesight 2 system will engage:

1. Seat switch safety must have contact
 - Operator must be sitting in seat to engage system
2. Road mode must be disabled.
3. Speed must be within range
 - Speed must be between 0.8 and 10 mph to engage system
4. Steering wheel rotation must be recognized before engagement.
 - Every power cycle rotate steering wheel at least ½ turn to relearn encoders
5. Steering wheel must be stationary during engagement.



When operating Truesight with an EZ-Pilot motor, disconnect the IMD 600, 900, TM200, etc. so that the CAN does not interfere. (Does not apply to EZ-Pilot Pro.)

Road Mode

1. Truesight always powers up in road mode.
2. Truesight must be in road mode outside of field.
3. Before engaging Truesight, disable road mode
4. Before leaving field, enable road mode.



Engaging Truesight 2

1. Press the Engage button.
2. Press foot switch/aux switch.
 - See Settings>>Auxiliary Engage section of this manual
3. Auto engage.
 - See Settings>>Auto Engage section of this manual



Disengaging Truesight 2

1. Manually turn steering wheel.
2. Press the Engage button.
3. If foot switch is installed and enabled, press foot pedal.
4. If Auto Engage is enabled, raise head above auto engage height that was set during the calibration.

Center Bump

- Press the Right button to shift machine to right until centered on row
- Press the Left button to shift machine to left until centered on row

Advanced Information

Truesight 2 Status LED

LED Blink Sequences

- Yellow LED blinks fast (approx. every 0.1 sec):
 - Loading Data from USB
- Green LED blinks twice a second:
 - Unit looking for VT
- Green LED will stay on and have a little “blip” every 3 second:
 - Normal Operation
- Green LED blinks fast (an alarm mask will prompt the user on the VT):
 - User interaction required (Update)

Setup/Reset

Reset Defaults

- Will reset the “Settings” to factory default
 - Range, Deadband, etc
 - Advanced Settings, etc
- Will not change selections in “System” tab
 - Machine Make
 - Steering Type
 - Etc.

Reset All

- Will reset all “System” & “Settings” features to default/unselected
- Will not affect Software updates

Updating Software



If you are running Headsight's Horizon header height control, select the WiFi network of the Horizon base unit and it will automatically pass the update to Truesight 2 as well. If you are not running Horizon, select the Truesight 2 WiFi Network.

Updating with Techlink™ App

1. Download Headsight Techlink App on your iDevice or Android from the App store.
 - Must have Horizon 2.10.0 or later software
 - Login in following on screen instructions
 - Then go to Help Info to learn how to use app

Updating Truesight 2 with USB

2. Download latest version of Truesight 2 from website.
3. Unzip files, copy file insght2.bin onto root directory on USB flash drive.
 - If you are using Truesight remote display you will need to place agreMOTE.hex file on a SD card that is 2GB or less.
4. Plug USB flash drive into USB port on Truesight 2 unit in combine cab.
 - If unit is not yet powered up, cycle key on combine
 - It should start blinking yellow shortly after applying power. If this doesn't happen, unplug and plug the Truesight 2 power.
 - Press accept on VT (Update Firmware) to start software update.
5. Wait until Truesight 2 unit has a green indicator light (should be no longer than 5 min)
 - If you have Truesight Remote Display attached, power cycle Truesight Remote Display unit.

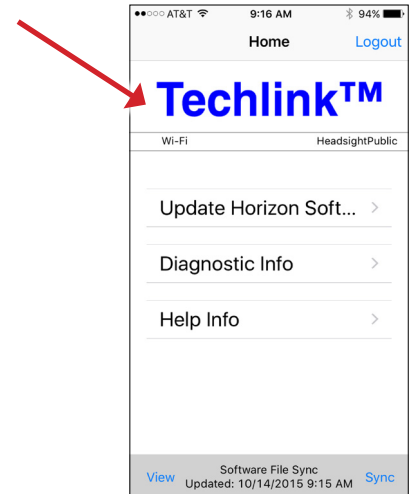


If the Remote display light is rapidly flashing red, then Truesight Remote Display is updating. Don't cycle power while it is updating. If display flashes "COMM FAILED" then call Headsight

6. You can now safely remove the USB flash drive.
 - Be sure to replace USB cover cap
7. Wait for Truesight 2 to appear on VT.
 - A power cycle might be needed after update
8. Your Truesight 2 is now updated. Please verify that your Truesight 2 initial settings are correct.



If your Truesight 2 units fail to update you must do a complete format on USB drive to a (FAT) file type and then recopy insght2.bin to the root directory.



Theory of Operation

Truesight 2 systems use a single Hall Effect crop sensor assembly mounted on the head to sense the corn rows and return a voltage to the combine (1-4 volt output). If centered in the row, the crop sensor output voltage should be 2.5 volts; when stalks fully push the right side wand, the voltage should raise to 4 volts; when stalks fully push the left side wand the voltage should drop to 1 volt. The output voltage from both the crop sensor and the combine wheel angle sensor are used by the Truesight 2 controller to determine the direction the combine needs to be steered. The controller communicates the steer command by sending a voltage to the autosteer valves or steering motor on the combine (factory or aftermarket). The operator's primary interface with the Truesight 2 system is through a VT display, used for setup, calibration, adjusting settings and running the system. The Truesight 2 controller also receives information from the operator through the various safeties and sensors. Truesight's safeties can include the seat switch, GPS speed sensor, and steering wheel motion sensor. The system can be disengaged by: rotating the steering wheel, pressing the steering wheel button on the VT, raising the feederhouse (auto-engage mode), or pressing the foot switch. The system can be engaged by: pressing the steering engage button on the VT display, lowering the feederhouse (auto-engage mode), or pressing the foot switch.



Troubleshooting



Before working on combine or under header always:

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



Troubleshooting Overview

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

1. Troubleshooting -Sensors & Harnesses

- Use this section to troubleshoot a specific sensor that is not working or out of adjustment.
- Typical symptom:
 - Sensor fault code displayed - example: "Err 12, Crop Sensor < 0.3V"

2. Troubleshooting by Symptom

- Use this section to diagnose poor operation symptoms
 - Not usually accompanied by an Error message or Fault Code
- Typical Symptoms
 - Weaving in row
 - Won't engage

3. Troubleshooting by Error Code

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

Troubleshooting—Sensors and Harnesses



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

The sensor connector pattern is as follows:

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



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

The following requirements must be met before testing:

- Key on, combine engine running
- Header connected

| Test Component | Testing Steps | Solution |
|---|---|---|
| Test for defective harness wiring Disconnect sensor plug (Measure voltage on harness plug at sensor) | Measure C to Frame Ground Voltage should be 5V | If not, check harness for continuity or short on 5V wire Check For Reversed A & C Check Combine 5V source |
| | Measure C to A Voltage should be 5V | If not check harness for continuity on ground wire Check combine sensor ground source |
| | Jump C to B in harness plug “Sensor” voltage should be 5V at controller or combine* | If not check signal wire for broken harness or bad connection |
| | All of the above are correct | Harness & combine connections pass test. |
| Test the sensor If you have a Headsight Sensor Tester, use it to test the sensor. For all other: | Verify sensor is connected to extension harness Sensor voltage should be 0.5- 4.5V* | If sensor cannot be adjusted to achieve a voltage within the range, replace sensor. |
| | *For Insight, Horizon & TrueSight systems, see “Diagnostics”. For all others, use combine specific Diagnostics | |

Troubleshooting by Symptom



Nearly every problem with the Truesight 2 may be resolved by one of the following simple steps:

- Make sure each sensor meets the basic requirements discussed above
- Properly calibrate Truesight system
- Enable Truesight
- Properly set the Truesight performance settings

| Symptom | Problem | Solution |
|--------------------------------------|--|---|
| System will not engage | Still in Road Mode | Exit Road Mode |
| | Seat switch not ON | Sit on seat or repair switch |
| | Safety Enables not connected | See Installation |
| | Steering wheel not turned since last key cycle | Rotate steering wheel |
| | Setup & Calibration not completed | Complete calibrations. |
| | Not moving 1-12 mph | Drive forward at least 1 mph |
| | Sensors out of range | Check Diagnostics |
| System is engaged but does not steer | Steering device not working or installed incorrectly | Correct in accordance with the installation section of this manual |
| | Wheels do not steer while driving but do work during steering test (Go to >>Diag>>Tab Right>>Steering Test) | Adjust Range, Deadband, Gain and other settings in accordance with Settings section of this manual. |
| | Steering System Failure (Steering device does not work with intended system. Example: EZ-Steer with Trimble controller.) | |
| | Truesight Controller Failure (Steering device works with intended system but not with Truesight installed.) | Contact local dealer to fix steering device. Contact Headsight to repair or replace controller. |
| Truesight is weaving in rows | Blue wands on sensor are not spaced 2 inches wider than corn row width | Correct spacing of corn arms |
| | Settings are not correct | Go to Settings section of manual and adjust |

| Symptom | Problem | Solution |
|--|---|---|
| When system is engaged, it steers fully to the right or left | Wheel Angle Sensor linkage broken or installed incorrectly (visually inspect wheel angle sensor and installation based on the manual) | Correct or replace broken or incorrectly installed parts |
| | Wheel Angle Calibration not done correctly | Go to>>Cal>>Wheel Angle and complete calibration |
| | Steering system is connected backwards (Diag>>Tab Right>>Steering Test) | Reverse the steering system if possible (for example, swap the right and left solenoid connectors). |
| | Crop sensor wiring is reversed (Diag>>Overview>>Crop Sensor, Swing sensor toward main door side of cab. If voltage increases, wiring is reversed) | Contact Headsight for technical support to reverse sensor wiring |
| Truesight does not auto-engage when the head is lowered | Auto engage is turned off | Go to >>Setup>>Advanced>>Auto Engage |
| | Auto engage height chosen during the calibration is lower than the run height, or auto engage needs to be calibrated" | Redo the auto engage calibration, make sure the auto engage height set during the calibration is between the run height and the height the header is raised to at the end of the field. |

Troubleshooting by Error Codes

| Error Code | Problem | Solution |
|---|---|--|
| ER2 Wheel Angle Calibration Incomplete | The Wheel Angle calibration has not been completed. | Go to >>Cal>>Wheel Angle, and redo calibration |
| ER11 Crop Sensor > 4.7V Description: 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 greater than 4.7V. To read the current voltage, go to >>Diag>>Overview >>Crop Sensor | The crop sensor voltage remains stuck at 4.78 ±0.05 volts when the crop sensor is moved. | Switch wires A & C in the harness that connects to the crop sensor to reverse polarity. |
| | The crop sensor voltage remains stuck above 4.9 volts when the crop sensor is moved. | The signal wire (B) may be shorted to the power wire (C). Find short and correct. |
| ER12 Crop Sensor < 0.3V Description: 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 >>Diag>>Overview >>Crop Sensor | There is not 5V between pins A & C of the sensor harness (Unplug sensor under snout tip to measure) | Unplug square 4 pin Deutsch connection at feederhouse (Y703) and measure voltage between pins 1 & 3 of wire coming from combine. If 5V is present, there is a problem with extension harness under header. If 5V is not present, continue to follow the wiring up toward the cab and unplug square 4 pin Deutsch connection Y7004/Y7003 and measure voltage of pins 1 & 3 of connector Y7003. If 5 volts is present there is a problem with the extension harness that runs up the feederhouse, or in the CIH feeder wiring. If 5V is not present, there is a problem with main TS harness. Repair or replace appropriate harness to supply power to sensor. |
| | Sensor is receiving 5V but there is not 2.5V±1V between pins A & B of crop sensor (back probe with sensor centered and harness connected) | Crop sensor failure, replace sensor |
| | Sensor is receiving 5V but there is not signal voltage on pin 11 of large connector on Truesight base in cab (check with back probes, Reference pin 2 for ground) | With crop sensor centered and harness connected, back probe 4 pin Deutsch connection at feederhouse (Y703) and measure voltage between pins 1 & 2. If 2.5V is not present, there is a problem with extension harness under header. If 2.5V is present, continue to follow the wiring up toward the cab and back probe pins 1 & 2 of the 4 pin Deutsch connector Y7003. If 2.5V is not present, there is a problem with the extension harness that runs up the feederhouse, or in the CIH feeder wiring. If 2.5V is present, there is a problem with main TS harness. Repair or replace appropriate harness so signal voltage returns to Truesight 2. |

| Error Code | Problem | Solution |
|---|---|---|
| <p style="text-align: center;">ER21 Wheel Angle Sensor > 4.7V</p> <p>Description: 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 greater than 4.7V. To read the current voltage, go to >>Diag>>Overview >>Feedback Input</p> | <p>The wheel angle voltage remains stuck at 4.78 ±0.05 volts when the wheel angle sensor is moved.</p> <p>The wheel angle voltage remains stuck above 4.9 volts when the wheel angle sensor is moved.</p> | <p>Switch wires A & C in the harness that connects to the wheel angle sensor to reverse polarity.</p> <p>The signal wire (B) may be shorted to the power wire (C). Find short and correct.</p> |
| <p style="text-align: center;">ER22 Wheel Angle Sensor < 0.3V</p> <p>Description: 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 >>Diag>>Overview >>Feedback Input</p> | <p>There is not 5V between pins A & C of the Wheel angle harness (Unplug sensor near rear axle to measure)</p> <p>Sensor is receiving 5V but there are not more than 0.3 volts between pins A & B of wheel angle sensor (back probe with sensor connected)</p> <p>Sensor is receiving 5V but there is not signal voltage on pin 13 of large connector on Truesight base in cab (check with back probes, Reference pin 2 for ground)</p> | <p>Unplug connector Y705 near the cab and measure voltage between pins 1 & 3 of wire coming from combine. If 5V is present, there is a problem with extension harness that runs toward the rear axle. If 5V is not present, there is a problem with main harness. Repair or replace appropriate harness to supply power to sensor.</p> <p>Crop sensor failure, replace sensor</p> <p>With harness connected and wheels steering straight, back probe pins 1 & 2 of Y705 connector near cab. If 2.5V±1V is not present, there is a problem with extension harness that runs toward rear axle. If 2.5V±1V is present, there is a problem with main harness. Repair or replace appropriate harness so signal voltage returns to Truesight 2.</p> |
| <p style="text-align: center;">ER23 Wheel Angle Swing < 1V</p> <p>Description: During “Wheel Angle” calibration, Truesight asks you to center rear wheels and press Enter, then turn all the way to the right and press Enter. It must see at least a 1V swing to learn which way is right and proceed with calibration.</p> | <p>Wheel angle changes less than 1V when turning steering wheel from straight to fully right. Check on VT display, go to >>Diag>>Overview >>Feedback Input</p> <p>Steering wheel was not fully turned to correct location during calibration.</p> | <p>Check that wheel angle sensor is correctly attached to axle to maximize sensor movement.</p> <p>Redo the Wheel Angle calibration per calibration instructions in this manual and turn the steering wheel as instructed</p> |

| Error Code | Problem | Solution |
|--|---|--|
| <p style="text-align: center;">ER24 Wheel Angle Not Found</p> <p>Description: Wheel Angle sensor voltage doesn't change during the Wheel Angle calibration. Check feedback on VT display, go to >>Diag>>Overview >>Feedback Input</p> | Wheel angle displayed on VT display changes when turning steering wheel. | Go to >>Cal>>Wheel Angle, and redo calibration |
| | Wheel angle displayed on VT display stays at 0 when moving steering wheel. | See Problem/Solution for Error 22. |
| | Wheel angle displayed on VT display stays at 4.87V when moving steering wheel. | See Problem/Solution for Error 22. |
| | Linkage or wheel angle sensor is visually broken or installed incorrectly. | Correct or replace. |
| <p style="text-align: center;">ER31 Feederhouse > 4.7V</p> <p>Description: Signal voltage from feederhouse position sensor is above 4.7V during the "Auto Engage Height" calibration. To view feederhouse voltage being sent to Truesight system, go to >>Diag>>Disengage >>AT Engage</p> | Feederhouse sensor voltage viewed on VT display changes when moving feederhouse. | Set the feederhouse at the height you want to auto engage, verify the feederhouse voltage displayed on the VT display is not above 4.7V, press the green check mark to select. |
| | Feederhouse sensor voltage viewed on VT display does not change when moving feederhouse. | Check to see if combine sees the feederhouse voltage change. If not, contact your local dealership to have feederhouse sensor replaced. |
| <p style="text-align: center;">ER32 Feederhouse < 0.3V</p> <p>Description: Signal voltage from feederhouse position sensor is below 0.3V during the "Auto Engage Height" calibration. To view feederhouse voltage being sent to Truesight system, go to >>Cal>>Auto Engage Height</p> | Feederhouse sensor voltage viewed on VT display changes when moving feederhouse. | Set the feederhouse at the height you want to auto engage, verify the feederhouse voltage displayed on the VT display is not below 0.3V, press the green check mark to select. |
| | Feederhouse sensor voltage viewed on VT display does not change when moving feederhouse. The feederhouse voltage is not changing when viewed on the combine | Contact your local dealership to have feederhouse sensor replaced. |
| | Feederhouse sensor voltage viewed on VT display does not change when moving feederhouse. The feederhouse voltage is changing when viewed on the combine | Check that all connectors are connected and pins are fully seated. Check for shorts or breaks in harness. |
| <p style="text-align: center;">ER46 or ER47 Speed out of Range</p> <p>Description: Combine ground speed is supplied to Truesight through the GPS receiver provided by Headsight. If Truesight is engaged and combine ground speed is not in the range of 0.8-10 mph, it will automatically disengage for safety. To disable this safety, go to >>Setup>>Advanced >>Speed Select Type and set it to "Off", then clear all errors. Note that you are actively removing a safety feature by doing this.</p> | Speed type is not set correctly, | Go to >>Setup>>Advanced >>Speed Select and set to GPS |
| | GPS receiver blocked | Move GPS antenna to area with clear shot to sky |
| | GPS receiver defective or disconnected | Make sure GPS receiver is plugged in to Y725 and wiring is good |

| Error Code | Problem | Solution |
|--|--|---|
| <p>ER53 Auto Steering Mode is OFF</p> <p>Description: Used with Ontrac3 motor</p> | Ontrac3 motor switch is off | Turn switch ON before engaging TS |
| <p>ER54 Encoder Not Detected:</p> <p>Description: The first time Truesight is engaged after power up, it will throw this error if it has not received signal from the steering wheel encoders (steering wheel shaft rotation sensors).</p> | Encoder has not yet sensed location | Turn steering wheel 2 or 3 full turns |
| | The wrong steering system is selected. To check go to >>Setup>>Settings>>System | Select the correct steering system |
| | Bad connection in harness | See ""ER46 or ER47"" for diagnostics and solution |
| <p>ER66 Steering Wheel Moving</p> <p>Description: For systems that use a hydraulic pressure transducer for manual override, a significant change in the transducer output voltage disengages the Truesight system. The amount of change required is measured during the Auto Deadzone calibration. This error occurs when the system senses that the steering wheel is being moved while trying to engage Truesight.</p> | Steering wheel is being turned while try to engage system. | Retry engaging Truesight while you are not turning the steering wheel |
| | Truesight incorrectly senses that the steering wheel is being turned. | Redo the Auto Deadzone calibration |
| | Wrong system is selected. | If Truesight is tied to an encoder on the steering column instead of a pressure transducer, select the correct steering system. Go to >>Setup>>Settings>>System |
| | Wiring connection problem (Check by going to >>Diag>>Disengage >>Disengage, if voltage is 0.0V there is probably a wiring problem) | Check wire and connections and fix problem |
| | Hydraulic pressure transducer problem | Contact local dealer to fix or replace transducer |
| <p>ER74 or ER78 or ER88 No 12V or 5V Safety</p> <p>Description: Truesight has 2 safety circuits that need to be satisfied before Truesight will engage or complete some of the calibrations.</p> | One or both of the safeties are not connected (To check go to >>Diag>>Disengage>>Safeties to check if they are ""ON"") | Follow installation instructions in this manual to properly connect safeties |
| | Seat switch is not sensing a person | Sit in operators seat before engaging or calibrating |
| <p>ER99 Outputs are Reversed</p> <p>Description: 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.</p> | Steering system is connected backwards (Right turns the wheels left and Left turns the wheel right). | Reverse the steering system if possible (for example, swap the right and left solenoid connectors). |
| | Combine received wrong signal during calibration. | Redo the "Wheel Angle" calibration and turn the steering wheel all the way to the right when prompted. |

Schematics



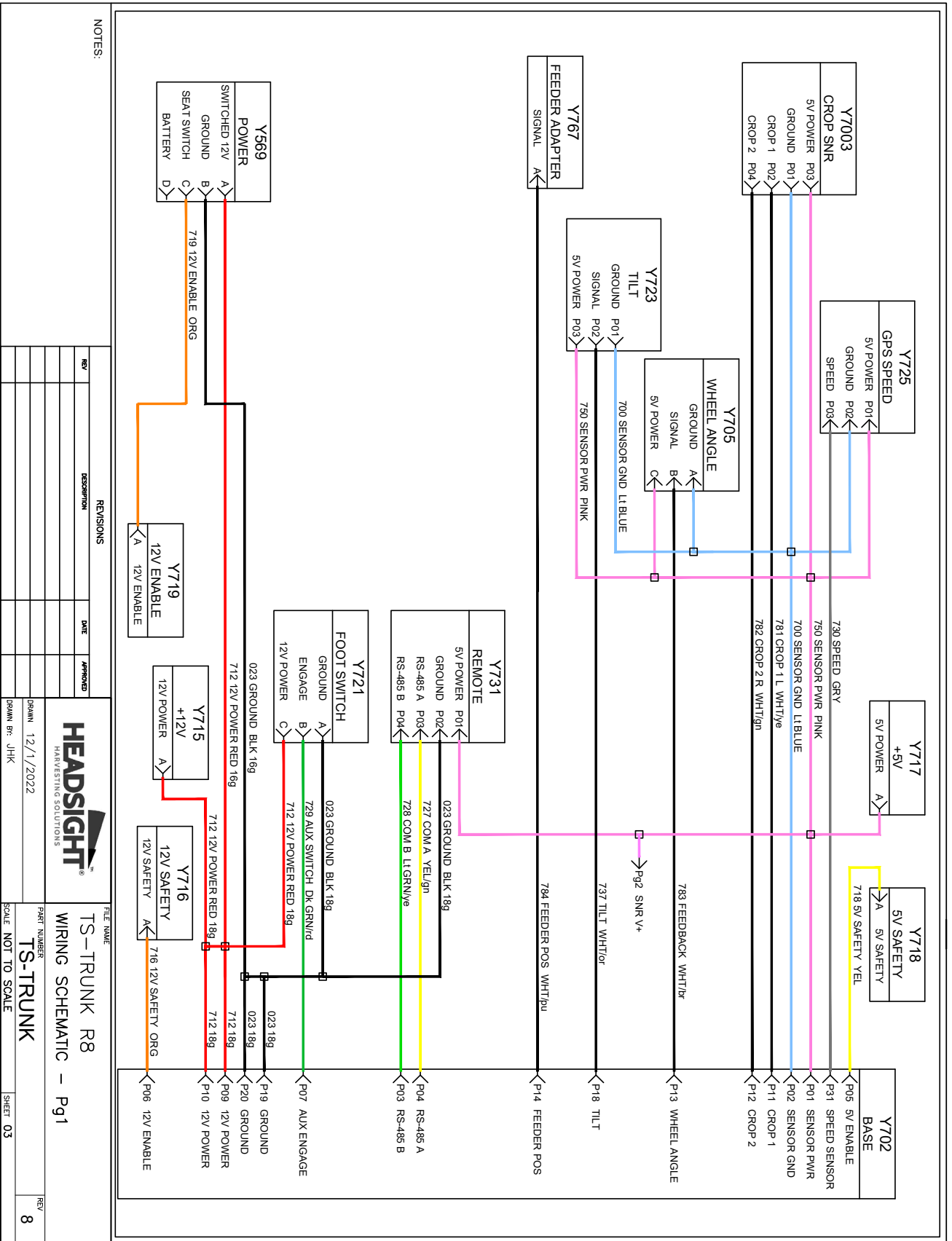
The TS-TRUNK schematic is the main harness used for all applications in this manual, Various other harnesses & adapters are provided as required.

1. Every TS-Trunk harness also includes the CAN plug.
2. A different VT (CAN) adapter harness is provided depending upon your combine or display.
 - See combine specific Installation Manual
3. A valve or motor harness is provided depending on your steering device.
 - See combine or aftermarket system specific Installation Manual



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

TS-TRUNK



NOTES:

REVISIONS

FILE NAME

TS-TRUNK R8
WIRING SCHEMATIC - Pg1

| REV | DESCRIPTION | DATE | APPROVED |
|-----|-------------|------|----------|
| | | | |
| | | | |
| | | | |
| | | | |

HEADSIGHT HARVESTING SOLUTIONS
DRAWN 12/1/2022
DRAWN BY: JHK

PART NUMBER: TS-TRUNK
SCALE: NOT TO SCALE
SHEET: 03
REV: 8

FCC and IC Compliance Statements

The Truesight2 Box Contains Transmitter Module ESP32

WARNING: To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance of 20cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operations at closer distances than this are not recommended.

ATTENTION: This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The FCC requires the OEM to be notified that any changes or modifications not expressly approved by SyChip, LLC may void the user's authority to operate the equipment. While an application of the ESP32 module in a product is not required to obtain a new FCC authorization for the module, this does not preclude the possibility that some other form of authorization or testing may be required for that end product.

This device using the integrated antenna has been tested to comply with FCC CFR Part 15. The device meets the requirements for modular transmitter approval as detailed in the FCC public notice DA00.1407.

ATTENTION: The term "IC" before the certification/registration number only signifies that the Industry Canada technical specifications were met.

Le terme "IC" devant le numéro de certification /d'enregistrement signifie seulement que les spécifications techniques Industrie Canada ont été respectées.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to

The following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme avec Industrie Canada RSS standard exempts de licence (s). Son utilisation est soumise à Les deux conditions suivantes: (1) cet appareil ne peut pas provoquer d'interférences et (2) cet appareil doit accepter Toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement du dispositif.

This device complies with Health Canada's Safety Code 6 / IC RSS-210. The installer of this device should ensure that RF radiation is not emitted in excess of the Health Canada's requirement. Information can be obtained at: http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct-eng.php

Cet appareil est conforme avec Santé Canada Code de sécurité 6 / IC RSS-210. Le programme d'installation de cet appareil doit s'assurer que les rayonnements RF n'est pas émis au-delà de l'exigence de Santé Canada. Les informations peuvent être obtenues: http://www.hc-sc.gc.ca/ewh-semt/pubs/radiation/radio_guide-lignes_direct-eng.php

Statement of Limited Warranty

For Headsight® Products

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

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

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

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

Limitations to Warranty

This warranty does not cover:

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

Warranty Procedure

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

Limitation of Liability

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

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

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

Headsight reserves the right to make improvements in design or changes in specifications at any time, without incurring any obligation to owners of units previously sold. Warranty: **1/2023**



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