STEERABLE HITCH QUICK SETUP GUIDE

Home Screen

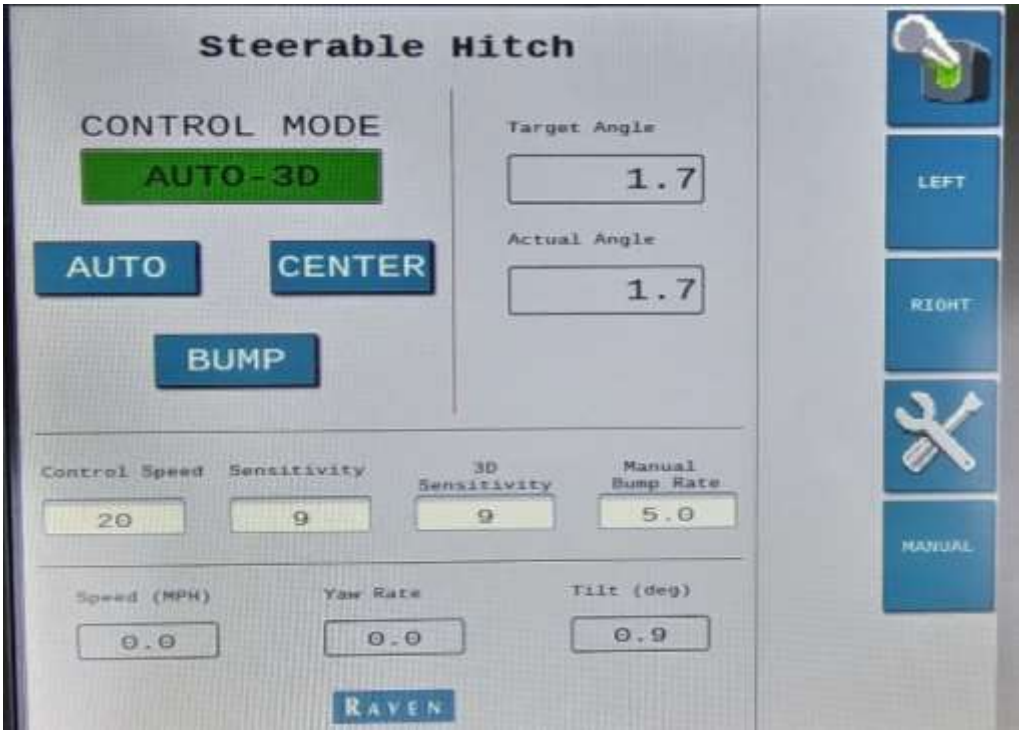

Figure 1: Steerable Hitch home screen

1. Ensure ISO/IBBC Hitch harness from implement is connected to the ISO/IBBC connection on the tractor.
2. After making sure the pressure and return lines go to the “P” and “T” respectively on the block, engage and detent the SCV in constant flow at 3.0-4.0 (30%-40% for the hydraulic flow setting on the tractor.
3. Unfold the implement. The Steerable Hitch system can only move when the booms/toolbar are in field position.
4. Press the “Manual” icon on the home screen, then press “Engage Max”. Verify that Control Mode is now in “Max”.
5. Press and hold the “Left” icon on the home screen to verify that the Hitch moves to the left. Repeat this Step to the right by pressing the “Right” icon. If the Steerable Hitch is non-responsive or moves in the opposite direction, swap the hydraulic hoses going to the tractor and/or verify hydraulic connection is secured to the tractor. There are ports pressure (P) and tank/return (T) that must be correctly connected.

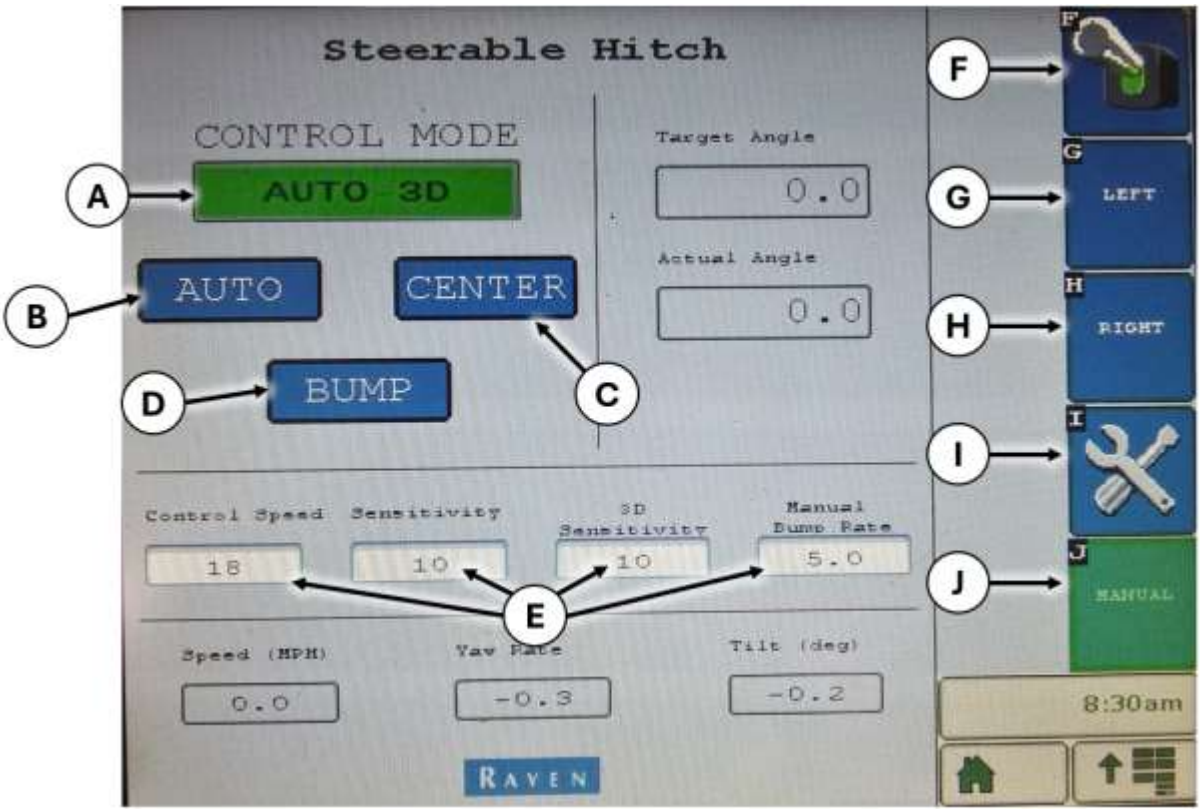

Figure 2: Home screen

Notes per function control on the Home screen are listed below with their **normal operation/status in bold.**

A. CONTROL MODE
   a. **"AUTO 3D"**: the system is actively steering with hillside compensation.
   b. "PROX SW" or "MASTER SW": the system is not active since it registers the Boom as folded in Transport position.
   c. "CENTER R": reverse motion detected, and it will center itself.
   d. "AUTO": the system is actively steering with the assumption of flat ground.

B. AUTO
   a. Return the system to its auto compensation state.

C. CENTER
   a. Press to center the Hitch.

D. BUMP
   a. Press to manually shift the Hitch. This must be followed by any combination of presses of buttons G and H.

E. PID Values (all min. = 0, max. = 20)
   a. Control Speed: **Recommended range 16 – 20**: automatic reaction speed. Increase or decrease for quicker or slower moves when the Steerable Hitch system detects that it needs to move.
   b. Sensitivity: **Recommended range 7 – 12**: turn compensation reactivity. High values can produce a "walking" motion in-field. Increase if the Steerable Hitch system is slow to respond; decrease if the implement "walks" when driving in a straight line.
   c. 3D Sensitivity: **Recommended range 7 – 12**: Hillside sensitivity control for hillside compensation.
   d. Manual Bump Rate: **5.0**: This is the quantity in degrees for each manual Bump move to the left or right. This mode is not typically used in field operation

F. Master Control
   a. Double tap to reset and activate the system.

G. LEFT
   a. Bump the Hitch to the left.

H. RIGHT
   a. Bump the Hitch to the right.

I. SETUP
   a. Enter the Setup or settings menu.

J. MANUAL
   a. Enter a manual control menu.

Centering the Hitch

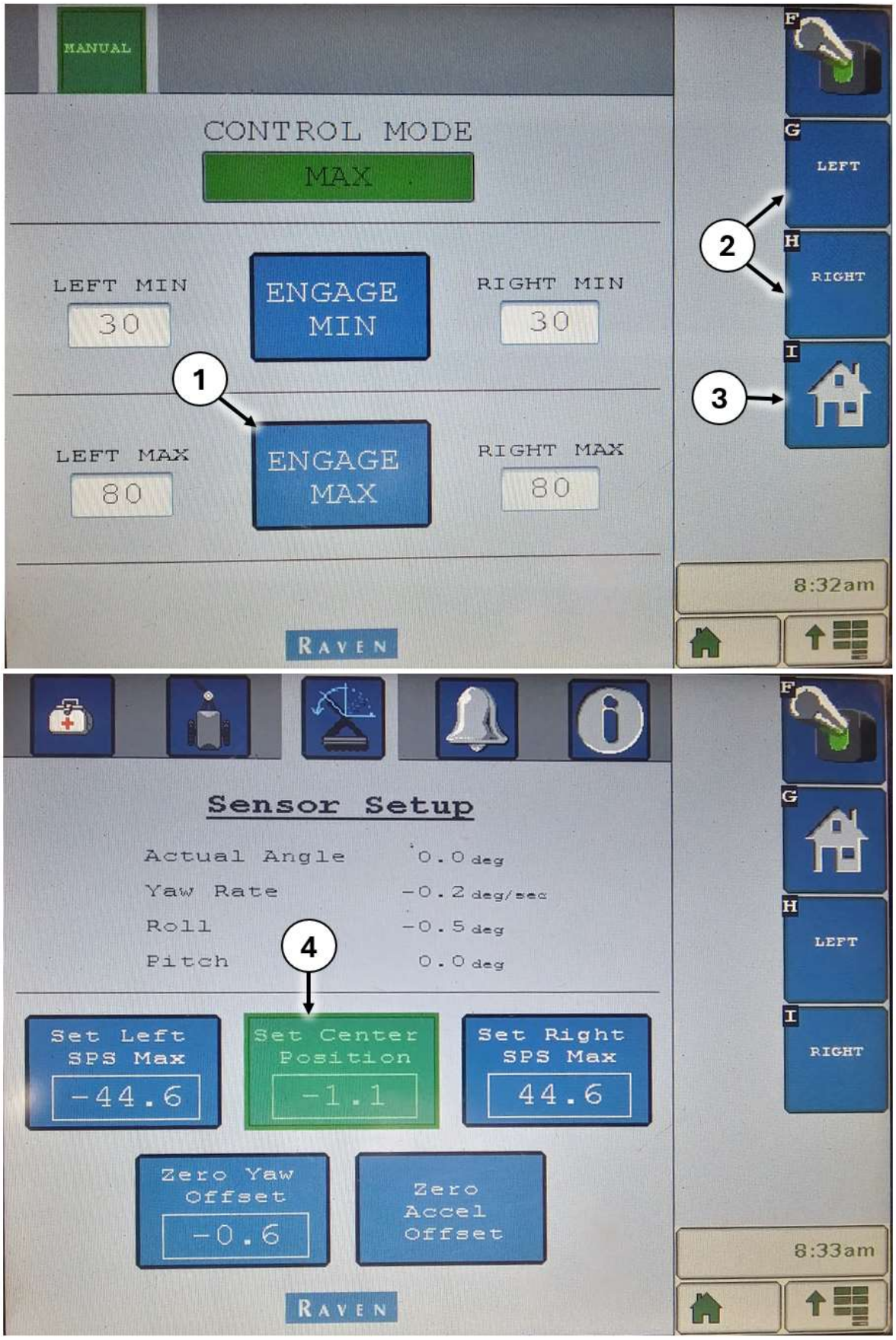

Figure 3: Process for centering the Hitch

Centering the Hitch (continued)

If the implement is not square to the tractor when the Hitch is centered, proceed with the following steps:

- ⚠ **WARNING: Make sure to have a clear and open area to work before proceeding.**
- ⚠ **IMPORTANT: The Main Wings must be unfolded before calibration can occur.**
- ⚠ **IMPORTANT: The Left and Right positions of the hitch must be set before the Center position.**
- ⚠ **NOTE: This adjustment must be done while traveling in a straight line on a level surface.**

After entering the "MANUAL" control screen,

1. Press "ENGAGE MAX" once. This will command the hydraulic cylinders to move as quickly as possible during the next few movements. This can be done while the tractor and implement are in motion or are stationary.
    a. "LEFT MAX" and "RIGHT MAX" are recommended to be left at their default values.
    b. "LEFT MIN" and "RIGHT MIN" control the reaction of micro-movements of the Hitch near center and are recommended to range from 30 to 38 depending on hydraulic flow.
        i. Too high of a value here will cause the Hitch to wag when going in a straight line.
        ii. Too low of a value will result in slow turn compensation.
        iii. If adjustment is necessary, it is recommended to only change the value(s) by 1 or 2 at a time.
2. Press "LEFT" and/or "RIGHT" as necessary. Continue manually moving the Hitch until the implement is square with the tractor while driving in a straight line on flat ground.
3. Press the Home button and move to the Setup screen.
4. In the Setup screen (button I, Figure 2: Home screen), press "Set Center Position" once to save the centered position. The "Set Center Position" angle shown should be updated to the angle that the Hitch is currently in.
5. In the Setup screen, press "Zero Yaw Offset" and "Zero Accel Offset" to reset their values.

The "Sensor Setup" screen should appear with similar ranges to those shown in Figure 4.

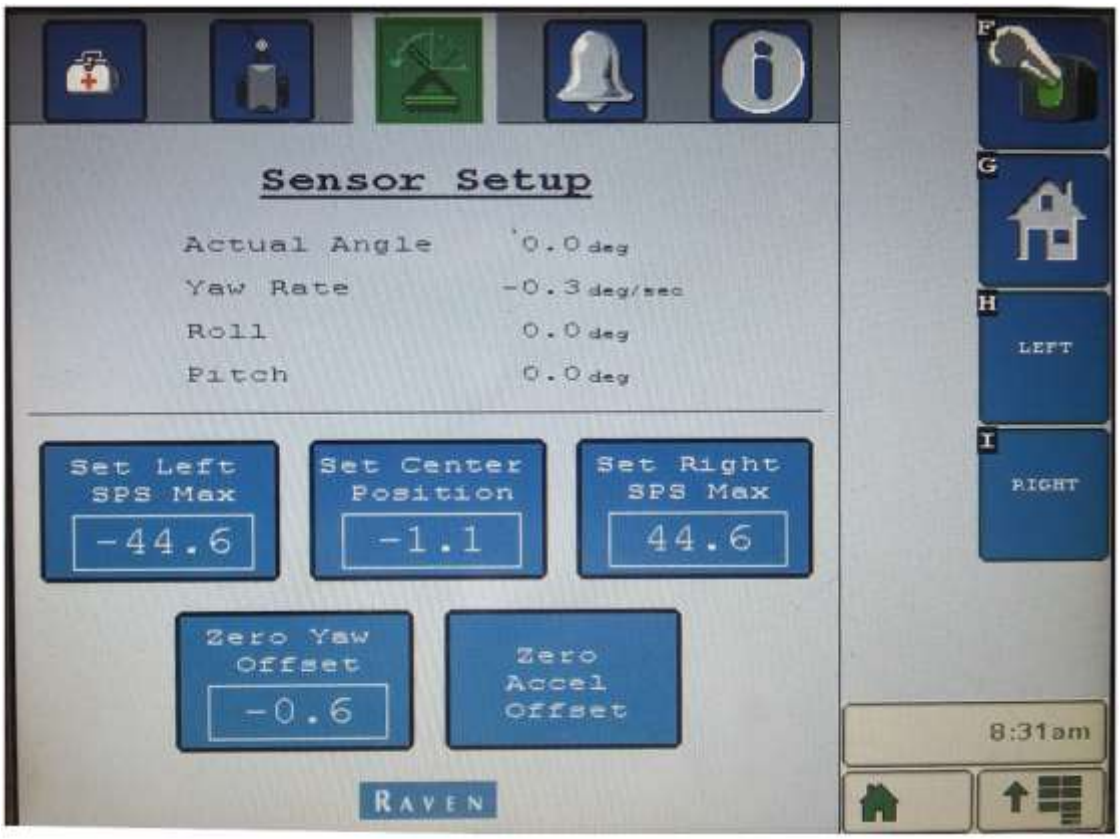

Figure 4: Sensor Setup during normal operation

Confirm Reverse Detection

Verify Operation

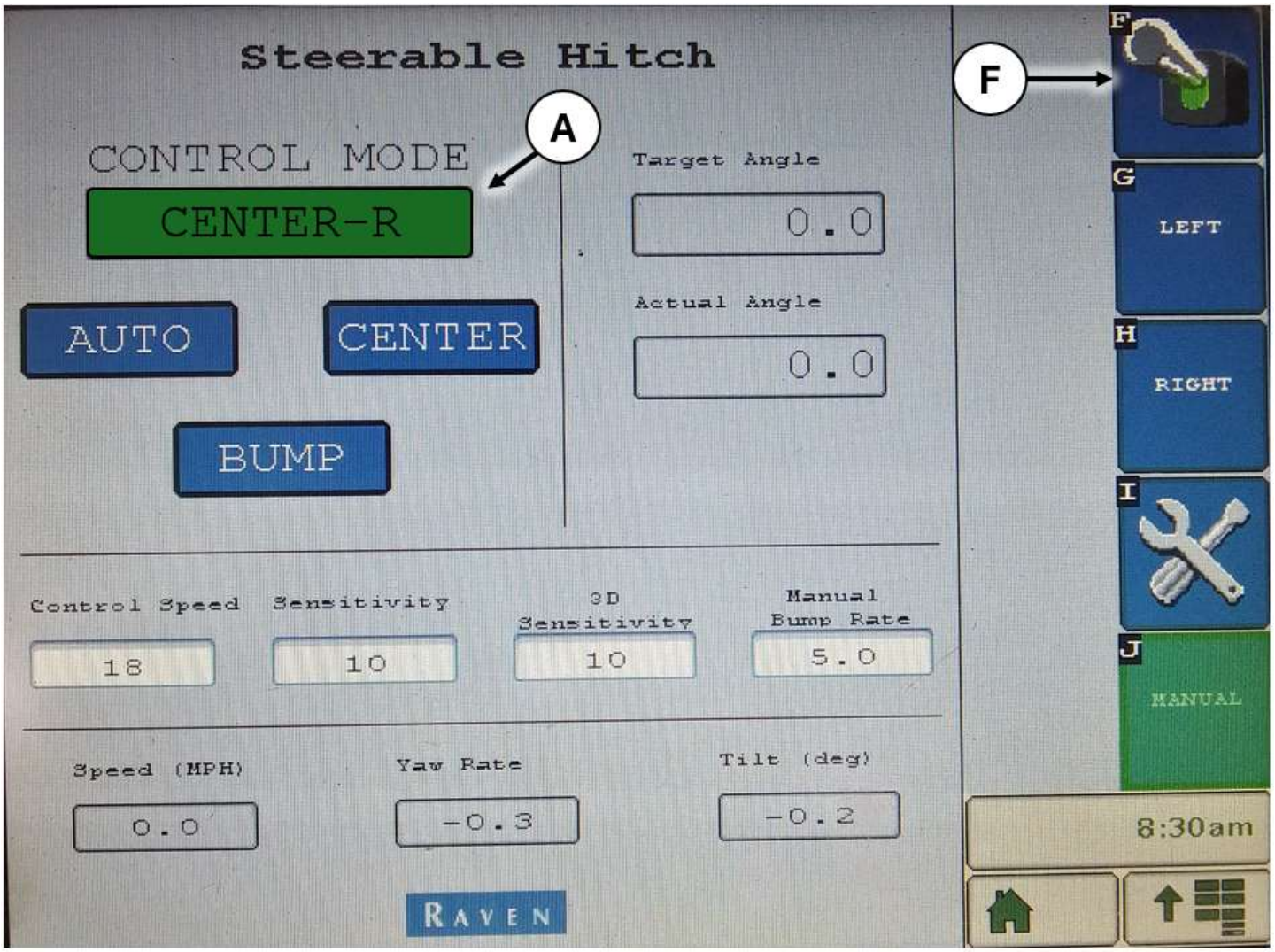

Figure 5: Reverse detection during normal operation

1. Turn the system on (F).
2. Back up the implement more than 10 feet (3m) at a minimum speed of 2 mph (3.2 kph).
3. Verify the Control Mode (A) changes to “CENTER-R” while backing up.
4. Verify the Control Mode (A) changes to “AUTO” or “AUTO-3D” when forward motion is resumed.
5. Also verify that speed registers on the Home Screen when the tractor is moving. The Steerable Hitch will not automatically compensate unless speed is registered on the Home Screen.
6. If Steps (3 - 5) are verified, the Auto Reverse Detection is properly operating. If the Control Modes do not properly switch between “Auto-3D” and “Center-R”, refer to the Reposition the Reverse Detection Sensor to properly position the reverse detection sensor.

Reposition the Reverse Detection Sensor

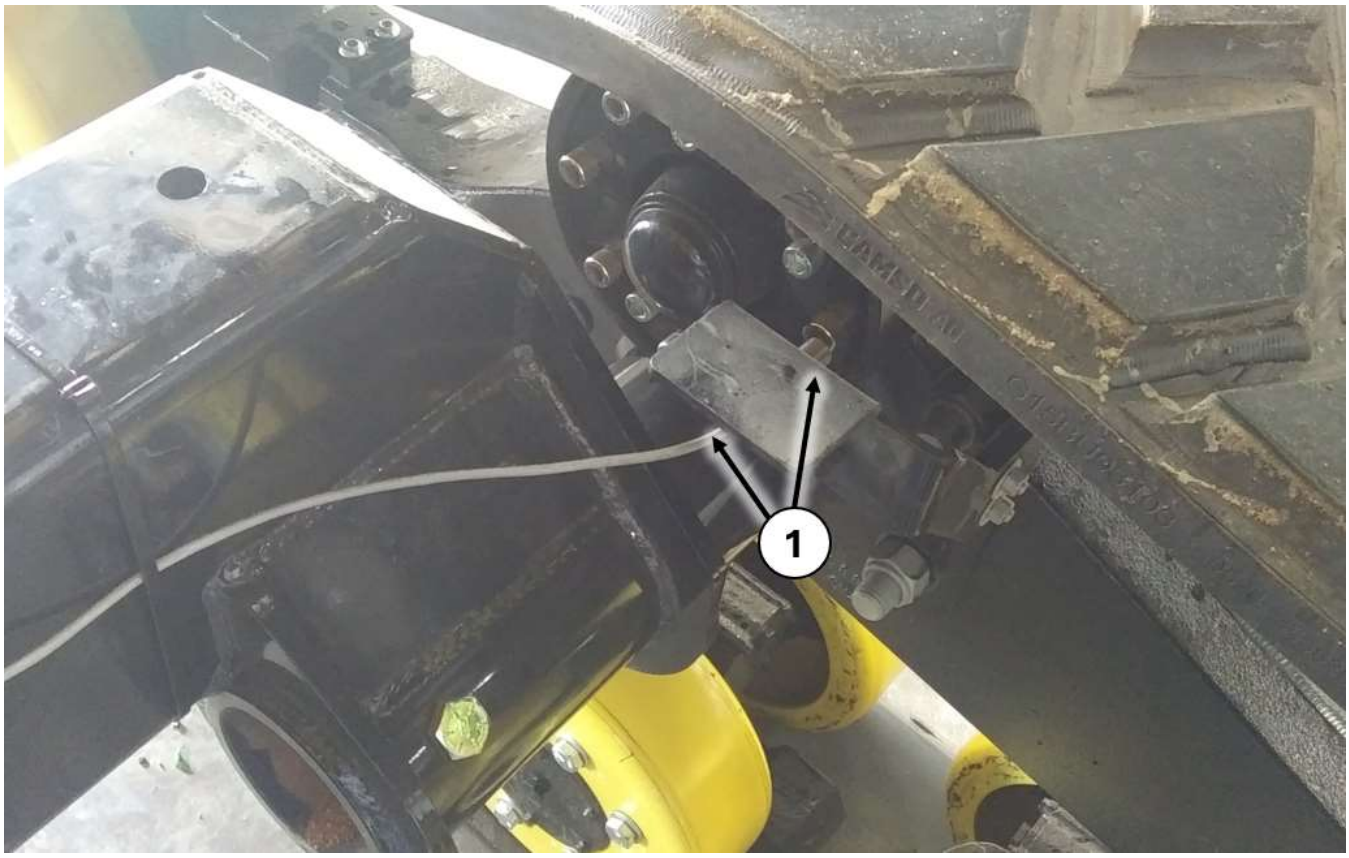

Figure 6: Reverse detection sensor location

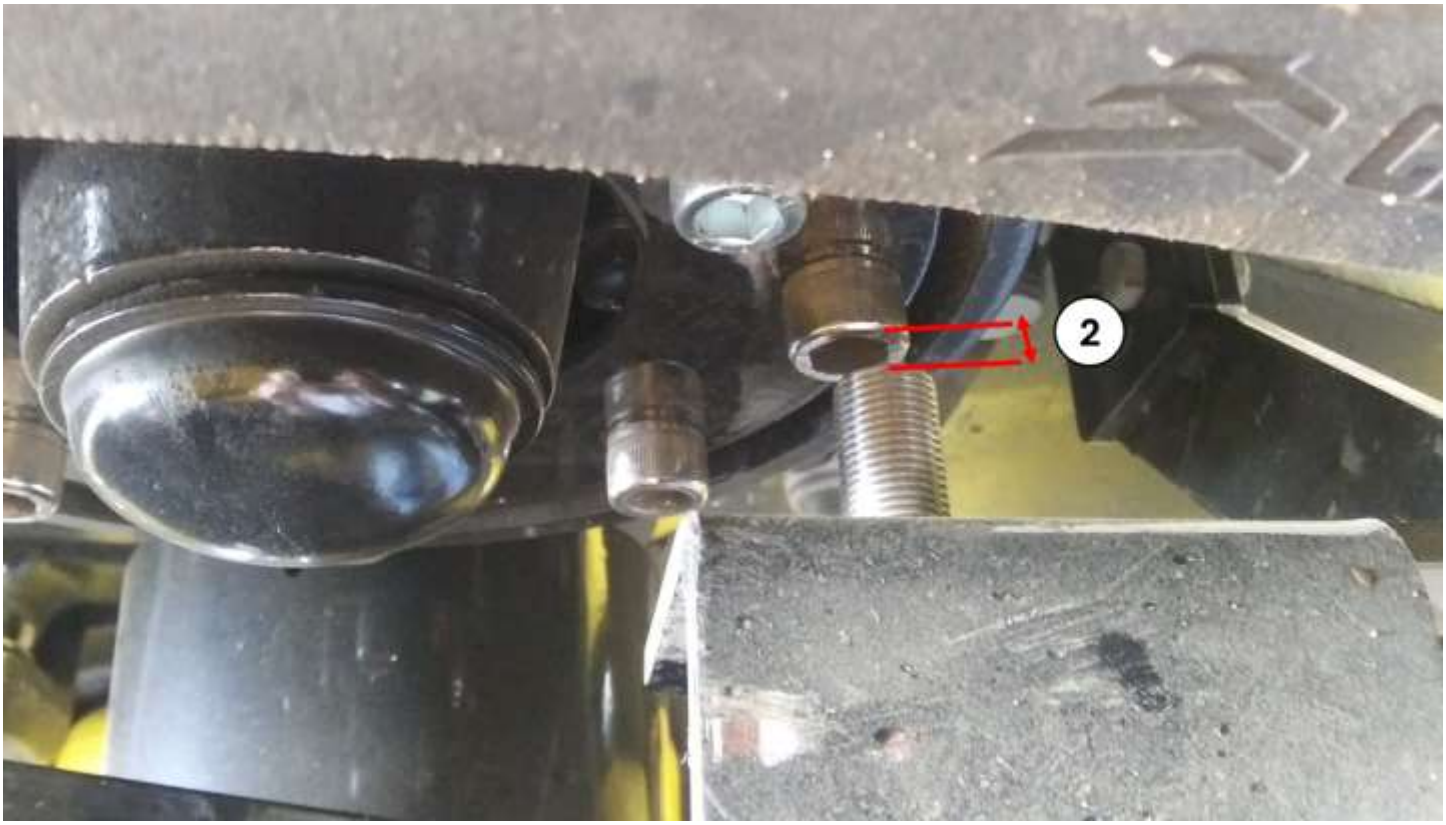

Figure 7: Properly gapped distance between magnet head and sensor face

Reposition the Reverse Detection Sensor (continued)

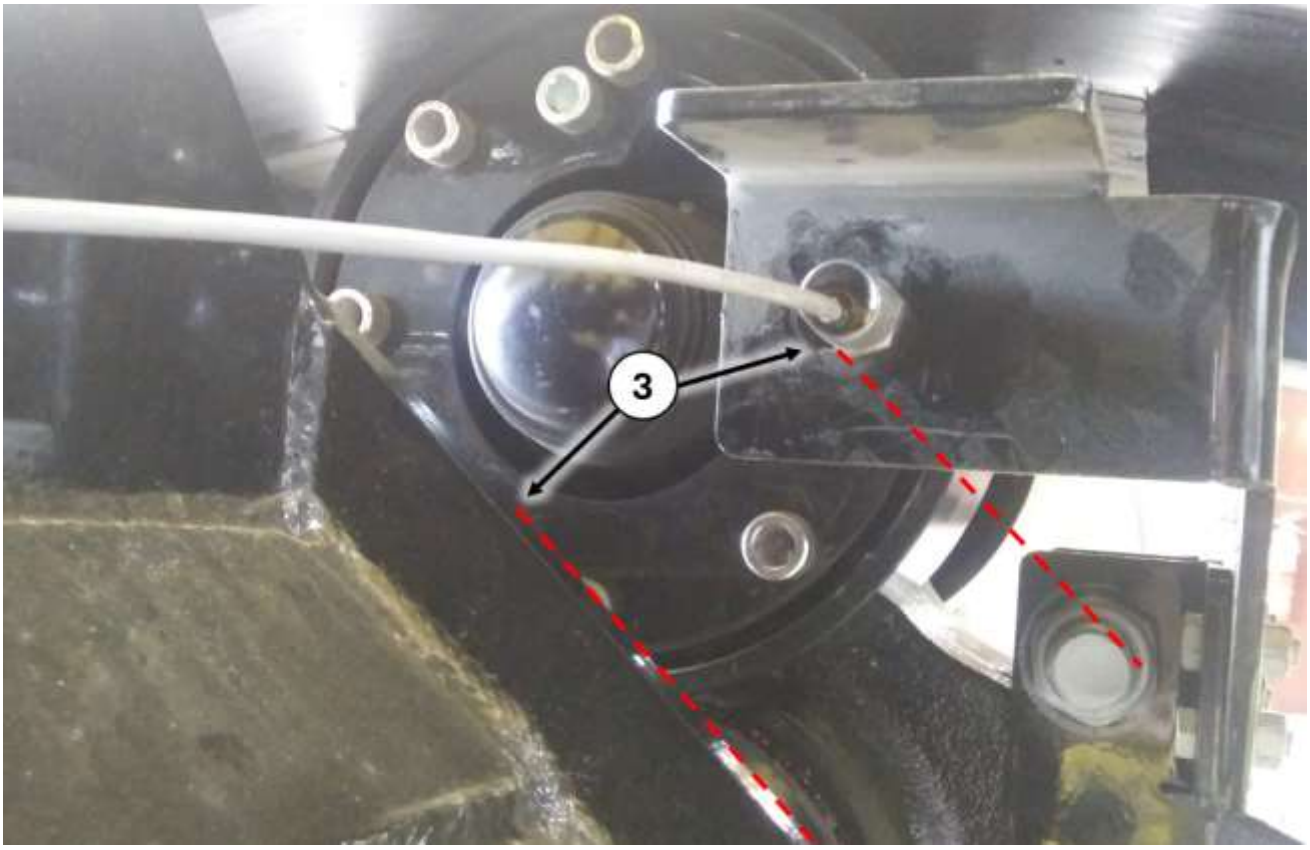

Figure 8: Parallel faces of axle and sensor flat

1. Locate the sensor near the right rear of the axle assembly.
2. Set the air gap to 0.188 inches – 0.250 inches (4.8 mm – 6.4 mm) between the magnet head(s) and the sensor's face.
3. Rotate the sensor such that its flat (on the side of the frame-side cylinder) is parallel to the axle weldment's face.
4. If modes continue to incorrectly switch between "Auto-3D" and "Center-R", continue to rotate the sensor in 45 degree turns and repeat Steps (1 - 4) in the Verify Operation section until control modes properly switch.

Machine Setup

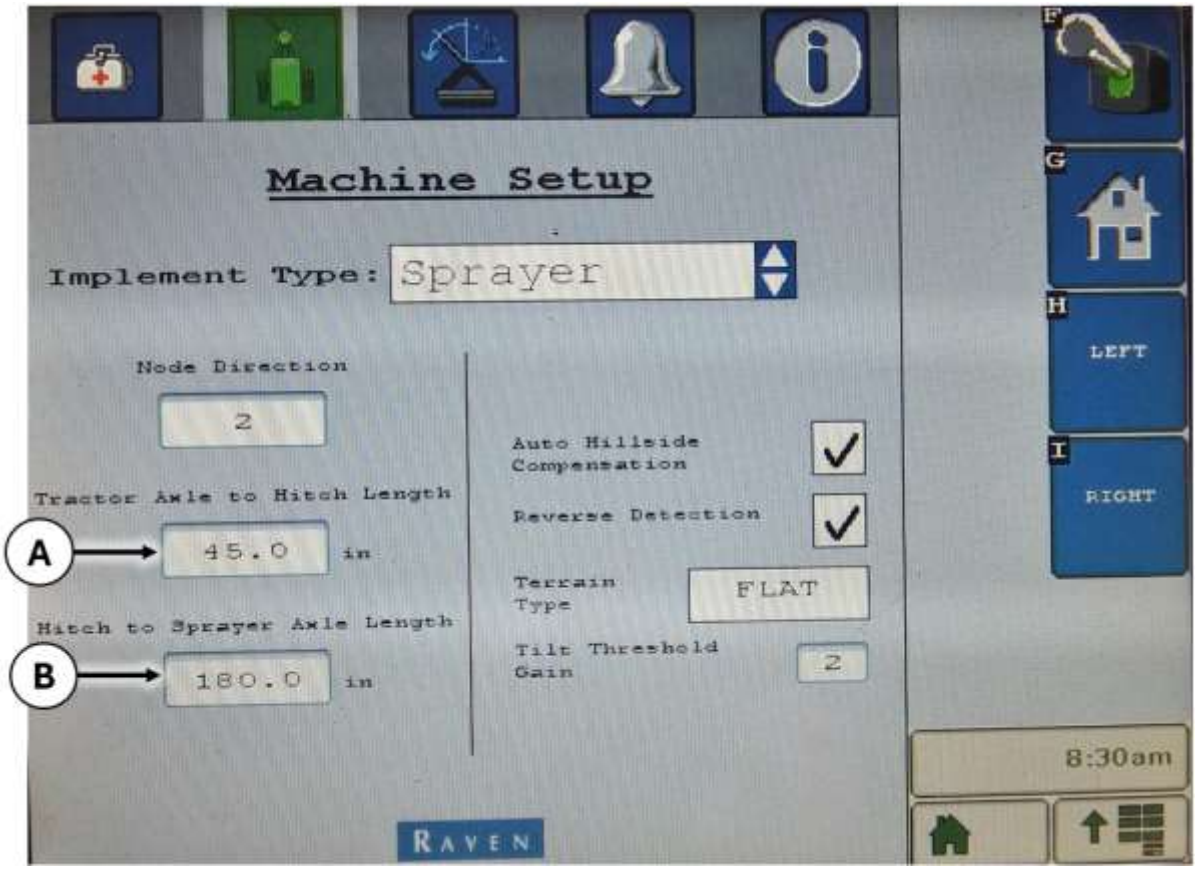

Figure 9: Steerable Hitch Setup screen

1. Most Steerable Hitch systems are left at 45 inches for operation, and it is not recommended to change this value. If adjustment is required, measure the distance between the tractor's rear axle and the center of the Hitch. *The typical starting value is 45 inches*. Enter this value into box (A) of the Setup screen
2. Start with 180 inches for the "Hitch to implement axle" value in box (B). Fast Ag Solutions commonly uses 160 inches if the Operator is using a 2-track style of tractor and 180 inches if using a wheeled tractor.
3. Ensure that the Control Mode is set to "Auto-3D" and drive through multiple left and right turns as you normally would during normal field operation.
4. If the implement is:
    - Understeering while in the middle of the turn (tracking inside of the tractor's arc)
        - Increase the Hitch-to-implement-axle value by 5 inches and repeat Step 3.
    - Oversteering while in the middle of the turn (tracking outside of the tractor's arc)
        - Decrease the Hitch-to-implement-axle value by 5 inches, and repeat Step 3.
5. When the implement's tires or tracks closely follow in the path of the tractor's tires or tracks, save the calibration by exiting the Setup screen.

Initial Calibration Steps

The steps below are completed by Fast Ag Solutions prior to delivery. These steps would need to be completed if a Steerable Hitch node is reset or replaced.

Activate Reverse Detection and Hillside Compensation

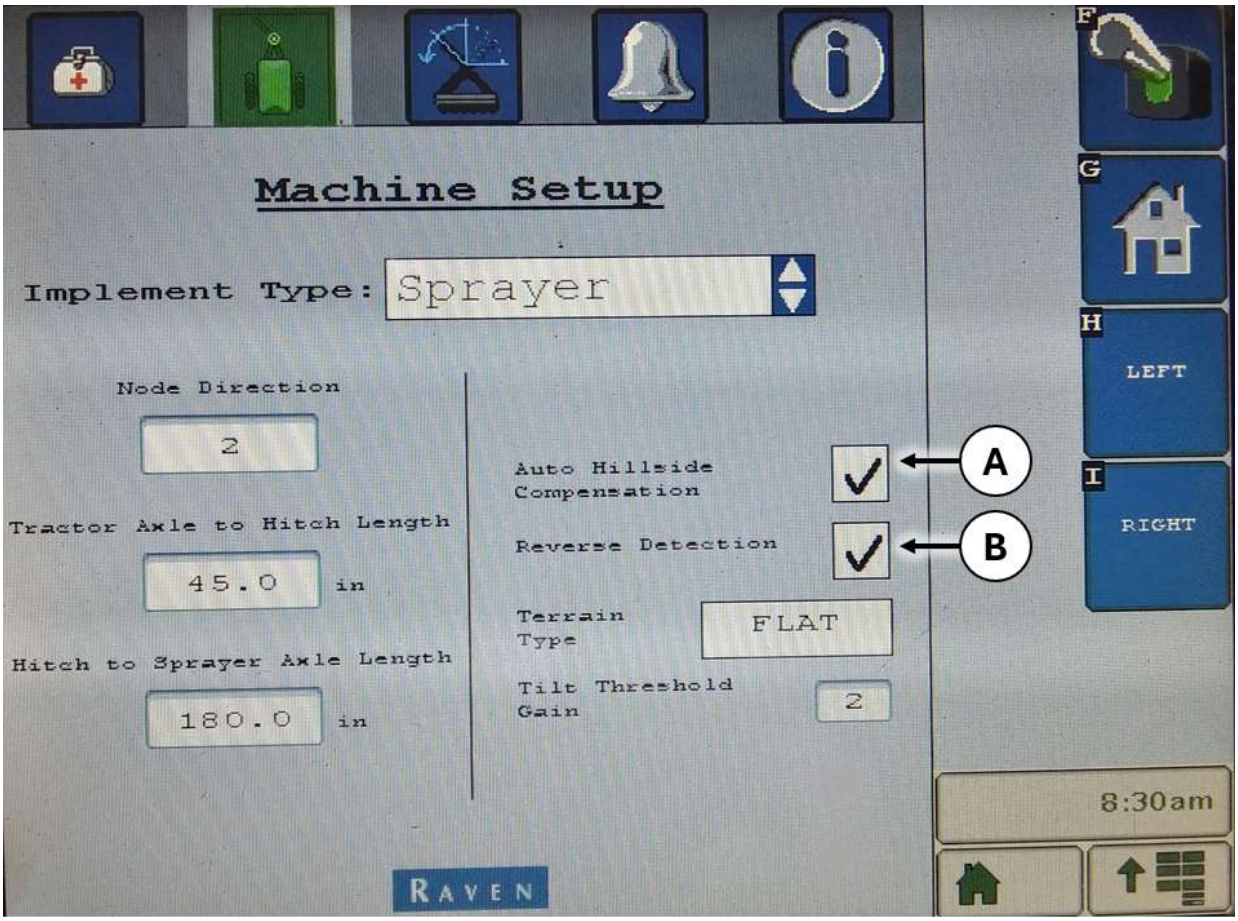

Figure 10: Machine Setup screen with checked boxes

From the Home Page, press the "Setup" icon (wrench icon), and press the 2nd tab on the top portion of the screen that looks like an implement. From this screen, press the boxes (A & B) next to both "Auto Hillside Compensation" and "Reverse Detection" so they have a checkmark next to them.

Set Max and Center

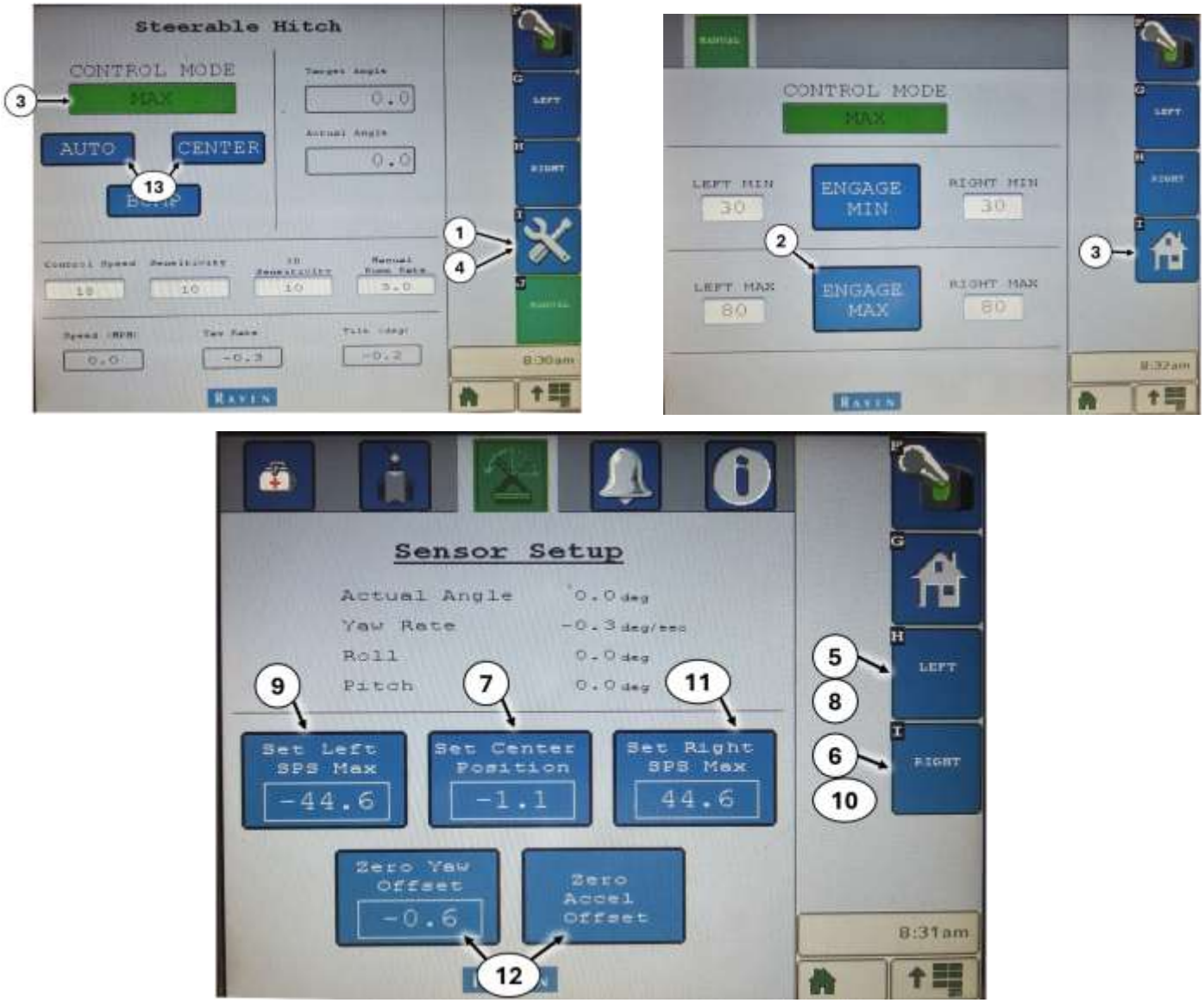

Figure 11: Factory initialization of Center, Left, and Right positions

1. Verify that the tractor hydraulics are activated and that the booms/toolbar are folded out.
2. From the Home Page, press the “Manual” icon, then “Engage Max”. Verify that Control Mode on the Home Page is now set to “Max”.
3. Press the “Setup” icon (wrench icon) and press the 3rd tab on the top portion of the screen that looks like an angle sensor.
4. By utilizing the “Left” and “Right” icons on the page, press and hold to move the Hitch to its center position. Once in its center position, press the “Set Center Position” icon to save the center position. Note that centering must be the last adjustment if there are others to make. Refer to the Centering the Hitch section of this guide for more precise calibration.

5. By utilizing the “Left” icon on the page, press and hold to move the Hitch to its max left position at the end of the cylinder stroke. Once in its max left position, press the “Set Left SPS Max icon” icon to save the max left position.
6. Repeat Step (5) to the right and set the max SPS right position.
7. Verify that the implement is parked on flat ground. Press the “Zero Yaw Offset” and “Zero Accel Offset” icons.
8. Verify that the settings shown on the page are similar (within 5 degrees) to the settings shown in Figure 4.
9. Navigate back to Home Screen and center the Hitch or activate “Auto-3D” mode.

Initial calibration is now complete. Refer to the procedures in the earlier sections of this Quick Setup Guide to fine-tune and verify that the Steerable Hitch is properly operating.


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