



**Hemisphere**  
GPS

# Outback eDrive

## User Guide

Part No. 875-0171 Rev. B1



This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference that may cause undesired operation.

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# **1: OVERVIEW**

Product Overview

What's Included

Parts Listing



## PRODUCT OVERVIEW

Congratulations on the purchase of an Outback eDrive®. The Outback eDrive GPS assisted steering system extends the functionality of the Outback Guidance® systems. The eDrive electronic components have been designed to work with a wide range of agricultural equipment and applications. A series of equipment specific kits have been developed with the necessary components and detailed instructions to install the eDrive on specific equipment models. A complete system consists of an Outback guidance controller (examples: Outback®S, Outback®S2 (sold separately)), an equipment model specific eDrive install kit, and the eDrive electronic components. This manual covers the installation of the electronic components along with the eDrive setup and operation.



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**Note:** The equipment model specific kit should be installed first. Please refer to the instructions included with the model specific kit prior to completing the electronic installation and setup.

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This chapter provides the following:

- Equipment
- Installation
- Powering the unit
- System Configuration
- eDriveTC System Configuration



## WHAT'S INCLUDED

The following equipment is included with the Outback eDrive:

- eDrive console
- CAN/Power cable
- CAN/Expansion cable
- CAN/Battery cable
- Auxiliary power cable
- Tie straps
- Screws (#8 x 3/4")

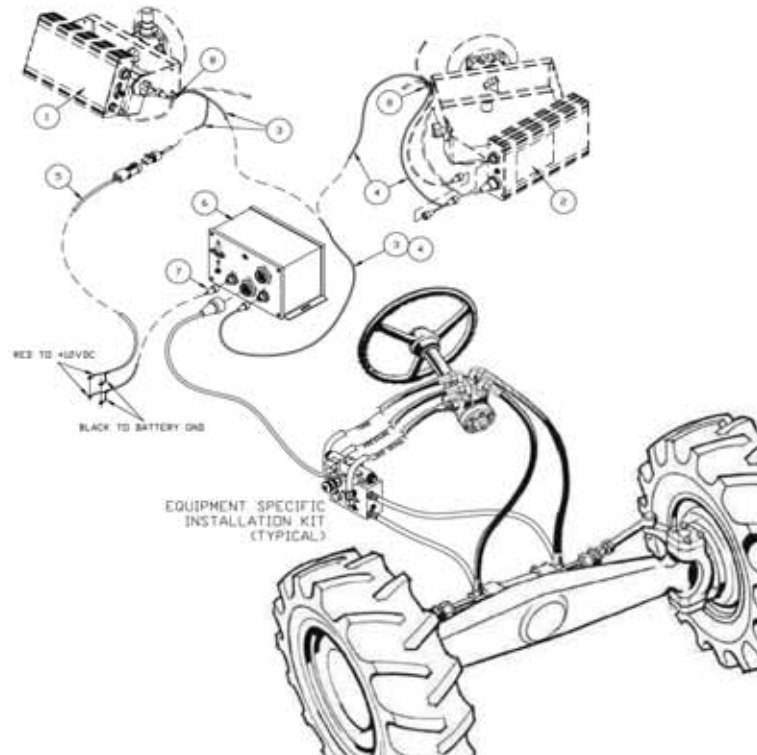


Figure 1-1. Outback eDrive and Equipment



1: Overview

## PARTS LISTING



**Table 1-1: Outback eDrive Guidance System**

Ref.	P/N	Description	Qty.
1		Outback Guidance Controller (required)	
2		Outback External CAN Device (optional)	
3	051-0101-001#	CAN/Power Cable, OKB-eDrive - 10ft Lg/15ft Lg, WP	1
4	051-0067-005#	CAN/Expansion Cable, OBK-eDrive - 10ft	1
5	054-0065-000#	CAN/Battery Cable, OBK-eDrive - 5ft Lg.	1
6	806-1007-03A	Console, OBK-eDrive	1
7	054-0044-003#	Auxiliary Power Cable, OBK-eDrive - 12ft Lg.	1
8	677-2002	Tie Strap, #7 - Releasable	12
	675-1137-000	SCR, #8-18 x 3/4", SD, HEX COMBO, ZP	2
	485-1154	Decal, "Outback Equipped" - reverse printed	1



## 1: Overview





## **2: GETTING STARTED**

Overview

Intalling the eDrive

Powering the Unit

System Configuration

## 2: Getting Started

### **OVERVIEW**

Before using the Outback eDrive for the first time, you'll need to:

- install the eDrive
- turn on the power,
- and set basic features.



## INSTALLING THE eDRIVE

### Exchange Power Cable

Install an Outback guidance controller, using the instruction booklet provided. Do not use the power cable provided with it. If the power cable currently used with the guidance controller does not have a second CAN connector then it will need to be replaced by the CAN/Power cable in the eDrive package. If the current power cable used with the guidance controller has a second CAN connector then proceed to the next page.

1. Locate the CAN/Power cable in the eDrive package.
2. Install the right angle connector into the Outback guidance controller CAN/Power port as shown.
3. Twist the connector firmly until it locks into place.
4. Loop the CAN/Power cable and antenna cable back to the console mounting base and secure with tie straps to provide strain relief.



**Note:** The Outback eDrive may also be used in combination with an optional Outback external CAN device (example: Outback 360.) If an external CAN device is already installed, it is not necessary to exchange the power cable. Instead, a three-connector CAN/Expansion cable is installed between the external CAN device and the eDrive as described below.





## 2: Getting Started

### Daisy Chain Power Cable

Install an optional Outback external CAN device, using the instruction booklet provided.

1. Locate the CAN/Expansion cable in the eDrive package.
2. Disconnect the CAN connector from the external CAN device and insert the 'Y' end of the CAN expansion cable as shown.

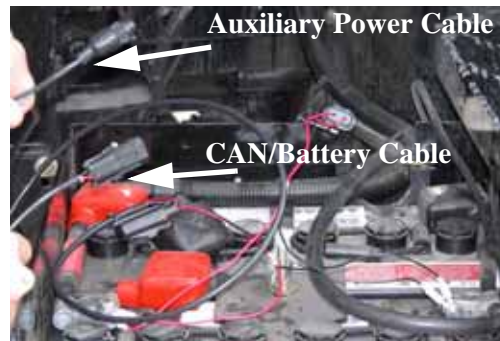
CAN/Expansion Cable



3. Twist connectors firmly until they lock into place.
4. Loop the cables back to the console mounting base and secure with tie straps.

### Connect Cables To Battery

1. Locate the Auxiliary Power cable in the eDrive package. It has a 2-pin round connector on one end and a pair of ring terminals on the other.
2. Locate the short CAN/Battery cable. It has a 2-pin flat connector on one end and a pair of ring terminals on the other.



3. Connect the ring terminal ends of both cables directly to the battery. The red wire goes to the positive terminal, and the black wire goes to the negative.
4. Route both cables into the cab, securing with tie straps. Avoid sharp edges and pinch points which could damage the cables and cause a short circuit.



**Note:** Outback electronic components are designed for 12 volt negative ground automotive systems. Make certain there are good solid connections to 12 volts and ground. Connect the red wire to positive(+) and the black wire to negative(-) or ground.

**Connect CAN/Battery Cable:** - Connect the CAN/Battery cable to the CAN/Power cable.



## 2: Getting Started

**Mounting the Console:** - It is best to mount the console as far forward as possible. This optimizes the internal gyro's ability to measure the vehicle's steering rate.



**Note:** If the eDrive is equipped with Tilt Compensation (TC), the console must be mounted securely on a flat surface perpendicular to the plumb line created by the GPS antenna. Additionally, it must be oriented so that the connectors are facing to the left of the machines' direction of travel. (See Appendix A for an example.)



1. Find a desirable mounting location inside the cab. The eDrive console must be securely mounted, with the eDrive logo facing upward. An arrow on the console face indicates proper mounting direction.
2. Secure the console using the provided mounting screws as shown



**Install Auxiliary Power Cable: -**

1. Connect the Auxiliary Power cable to the eDrive console.
2. Twist the connector firmly until it locks into place.



**Install CAN/Power Cable: -**

1. Connect the CAN/Power cable to the eDrive console.
2. Twist the connector firmly until it locks into place.



## 2: Getting Started

### Install Valve Control Cable: -

1. Connect the valve control cable (supplied with the model specific installation kit) to the eDrive console.
2. Twist the connector firmly until it locks into place.



### Install Steering Wheel Switch Cable: -

1. Connect the steering wheel switch cable (supplied with the model specific installation kit) to the eDrive console.
2. Twist the connector firmly until it locks into place.



## POWERING THE UNIT

### To power up both units

Turn on the power switches of the Outback guidance controller and eDrive in any order. The Outback guidance controller will boot up and begin acquiring a DGPS signal. The eDrive will establish communication with the guidance controller and wait for the DGPS signal to be acquired. The S present light on the eDrive console indicates that communication has been established.



### To power up the Outback Guidance Controller only

Turn the power switch of the Outback guidance controller on and leave the Outback eDrive off. This causes the Outback guidance controller to operate as normal. Refer to the Outback guidance controller manual for operation instructions.



## SYSTEM CONFIGURATION

Configuration of the Outback eDrive is accomplished through the menu system of either the Outback guidance controller, or an external CAN device. During power-up, the eDrive is detected, and an additional menu options are included to configure the eDrive for operation.



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**Note:** Refer to the Menu Map in your guidance controller's owner manual to determine the location of the eDrive Setup Menu on your system.

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### Using the menu

To access the menu, press the MENU button. Choose the item you want using the UP and DOWN ARROW buttons. The > character points to the active menu item. Press ENTER to select.



### Initial system startup sequence

After completing the eDrive system installation, perform the following startup sequence prior to field operation.

1. Select the eDrive STEERING ADJUST menu item. Press the DOWN (left steer) arrow and verify steering moves left. Reverse valve cable connections, or output hoses, if operation is backward.
2. Determine the cycle time and adjust the steering control rate. See equipment specific installation manual for adjustment procedure and suggested initial steering cycle time.
3. Test drive the vehicle in straight guidance mode, and fine tune the steering control rate for smooth response and minimum tracking errors. See Appendix B for tips on fine tuning.



**Table 2-2: eDrive Setup Menu Options (only if eDrive is present)**

<b>Menu Item</b>	<b>Display Sequence</b>	<b>Defaults</b>	<b>Description</b>
Steering Adjust	<=DN UP=> ENTER TO STOP	<<<DN UP>>> Enter to Stop.	<p>Press DOWN ARROW to move vehicle steering to the left. Press ENTER to stop at left extreme.</p> <p>Press UP ARROW to move vehicle steering to the right. Press ENTER to stop at right extreme.</p> <p>Adjust steering control rate knob to achieve desired end to steering cycle time.</p>
Auto Engage	Auto Engage >Off	[On, Off] Default= Off	Select if Auto Engage feature is enabled.
Sensitivity (only in Wheel Mode)	Sensitivity > 10	[1 to 10] Default= 10	Allows the user to adjust the sensitivity of the eDrive to prevent over-reaction in difficult to control machines.
Diagnostics	Ver 2.87 Gyro 0		Displays current eDrive console software version, and internal gyro sensor data. The number indicates vehicle turning rate, negative to the left, positive to the right.





## 2: Getting Started

**Table 2-2: eDrive Setup Menu Options (only if eDrive is present)**

Menu Item	Display Sequence	Defaults	Description
Additional Menu Items (not available on the Outback S.)			
Vehicle Type	Vehicle Type >Wheel	[Wheel, Track] Default= Wheel	Allows the user to change steering mode if using eDrive on a machine equipped with tracks and differential steering.
Dampening (only in Wheel Mode)	Dampening >Off	[On, Off] Default= Off	When turned ON, it provides a smoothing effect to machines that have large amounts of body roll with may induce steering oscillations.
Steering Speed (only in Track Mode)	Steering Speed > 35	[0 to 100] Default= 35	Adjusts how rapidly the track machine will make a steering correction when given a command.
Max Turn Rate (only in Track Mode)	Max Turn Rate > 100	[0 to 100] Default= 100	Determines the percent of maximum steering speed that can be commanded to the track machine.



## eDriveTC System Configuration

If the eDrive features Tilt Compensation(TC), the configuration is accomplished through the Outback guidance controller's menu system.

**Tilt Compensation setup sequence:** - After completing initial system startup sequence, perform one of the following tilt setup sequences prior to field operation.



**Note:** Be sure the vehicle is parked on a level surface before calibrating the accelerometer value. It may be necessary to use a long bubble level against a rigid vehicle surface to verify that it is indeed level.

**Single Point Installation** - A simple installation procedure that allows for roll compensation performance within 1.0 degrees on a slope of 20 degrees or less.

1. Select the TILT menu item.
2. Set the TILT COMP item to ON.
3. Select the ANTENNA HEIGHT menu item.
4. Set the Antenna Height to the appropriate value. This should be the distance from the ground to the GPS antenna in either feet or meters.
5. Select the SET LEVEL menu item.
6. Press the ENTER button twice to set the accelerometer value to ZERO.



## 2: Getting Started



**Note:** If the installation of the eDrive console has caused the accelerometer to be more than 2 degrees from level then the two point method will need to be followed.

**Two Point Installation** - This installation procedure provides the tilt sensor with a more precise setup allowing for increased accuracy in angle measurements within 0.5 degrees.

1. Select the TILT menu item.
2. Set the TILT COMP item to ON.
3. Select the ANTENNA HEIGHT menu item.
4. Set the Antenna Height to the appropriate value. This should be the distance from the ground the GPS antenna to in either feet or meters.
5. Select the SET LEVEL menu item.
6. Press the ENTER button once. The screen will display the current angle measurement of the eDriveTC console.
7. Use a thin shimming material to raise the appropriate side of the eDrive console until the displayed angle measurement is within +/- 0.10 degrees of zero.
8. Make sure the console is properly secured, and still reading the proper angle.
9. Press the ENTER button.



**Table 2-3: Tilt Setup Menu (only if tilt sensor is present)**

<b>Menu Item</b>	<b>Display Sequence</b>	<b>Defaults</b>	<b>Description</b>
Tilt Comp	Tilt Comp >Off	[On, Off] Default= Off	Allows the user to enable or disable the tilt sensor functionality.
Antenna Height (if Tilt Comp ON)	Antenna Height > 10.0 um	'+/-XX.X Feet Default= 10.0 um = [ft, m]	The user must input the distance from the ground to the GPS antenna in feet or meters (depending on the unit of measure mode) for proper tilt compensation.
Calibrate (if Tilt Comp ON)	Press Enter to Calibrate 0.24 Enter when Level	2.5 Retry when > 2°	Allows the user to see the current angle measurement of the tilt sensor for mounting adjustment and to enter a zero angle calibration point (refer to tilt compensation setup sequence).
Diagnostics (if Tilt Comp ON)	Ver 2.87 Angle +0.2		Displays the current software version and the calibrated angle measurement produced by the tilt sensor.



## 2: Getting Started





## **3: EDRIVE OPERATION**

Guidance Overview

Auto-Disengage

Auto-Engage

### 3: eDrive Operation

## GUIDANCE OVERVIEW

Operation of the Outback eDrive is an intuitive extension of the stand-alone Outback guidance modes. If you are a first time user of Outback products, carefully review the instruction booklet provided with the Outback guidance controller.

### General Operation

1. Select the appropriate guidance mode.
2. Manually steer the vehicle close to the guideline. After a guideline is acquired, the eDrive prompts the operator to engage.

eDrive icon indicating eDrive is active and may be engaged.



3. Press ENTER to engage the eDrive. The console indicate that the eDrive is engaged.
4. Just Let Go™

eDrive Engaged Indicator Light



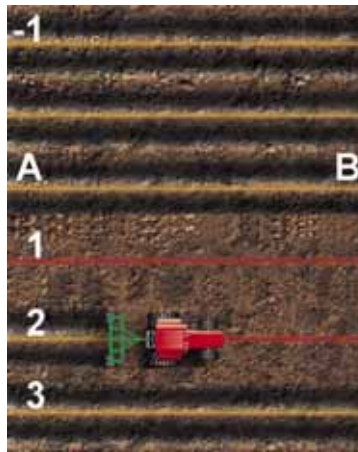
### Warning!

ALWAYS KEEP ALERT. eDrive cannot detect trees, gullies, fences, and other field obstacles. To avoid personal injury and/or significant property damage, stay alert at all times. Disengage the eDrive and manually steer the vehicle around obstacles.



### For Straight Driving

1. Enter the STRAIGHT GUIDANCE mode and establish the guideline following the prompts given by the guidance controller.
2. Manually steer the vehicle close to the guideline and engage the eDrive.
3. At the end of the pass, manually turn the vehicle around and line up on the next pass.





### 3: eDrive Operation

#### For Contour Driving

1. Enter the CONTOUR GUIDANCE mode and make the initial pass. Anytime you approach a previous pass, the Outback guidance controller begins to display guidance.
2. Manually steer the vehicle close to the guideline and engage the eDrive. For sharp turns, slow down, or manually steer the vehicle.



In either straight or contour mode, the eDrive automatically disengages when manually steered off the guideline. In contour mode, the eDrive also disengages when the vehicle crosses into a previously applied area.



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#### Warning

SWITCH OFF POWER to the eDrive console when traveling between fields at road speeds. This will prevent the chance of a false engagement of the automated steering, which may cause unexpected steering behavior or dangerous steering reactions.

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## AUTO-DISENGAGE

To ensure safe and reliable automated steering, the auto-disengage feature is always active and continually monitoring vehicle operation. The eDrive will automatically disengage whenever:

1. The current position error exceeds 3 feet (or 5% of swath width, whichever is larger).
2. The steering wheel switch sensor reads two edges of a polar magnet.
3. The vehicle's ground speed is less than 1 m.p.h. or greater than 20 m.p.h.




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**Note:** If your system has RTK corrections, the eDrive will automatically disengage if your ground speed is less than .25 m.p.h. or greater than 20 m.p.h.

---

4. The vehicle's turning rate exceeds stable operation.




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**Note:** When operating in contour mode, the Outback guidance controller's free-style method continuously searches for a previous pass to guide along. If no previous pass is found nearby, the display will show LOGGING PASS, and the eDrive is disabled. Once a previous pass has been detected, guidance indicators will be displayed, and the eDrive can be engaged. In complex contour/terrace applications where multiple previous passes exist nearby, the free-style method selects the closest path. This can result in unexpected eDrive auto-disengage, and/or guiding along the wrong pass. To minimize this effect, clear the Outback guidance controller's guidance memory as each sub-area is completed, particularly after making the outside passes around the field.

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## AUTO-ENGAGE

The Auto-Engage™ feature is optional. It allows the vehicle operator to turn around at the end of one pass, line up on the next guideline, and automatically re-engage eDrive without pressing the ENTER button. The auto-engage feature may be turned on or off through the eDrive setup menu.

1. Initiate guidance and manually engage the eDrive, using the normal operating procedure.
2. At the end of the pass, manually steer off the guideline to auto-disengage eDrive. The eDrive engage lights will begin flashing on and off, indicating the auto-engage feature is active.



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**Note:** The period in which the auto-engage feature will automatically activate (i.e. flashing lights) is limited to 45 seconds. If the eDrive is not reengaged within this time, the lights will stop flashing, and the eDrive must be manually reengaged.

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3. Turn the vehicle around and manually steer to the next pass. Center both the current position and steering guide™ lights for one second. The eDrive will automatically re-engage.



---

**Note:** If you continue to manually steer after the vehicle is on the guideline, the eDrive will sense the movements in the steering wheel and disengage.

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## **4: TROUBLESHOOTING**

Fine Tuning Performance

Troubleshooting Tips

Vehicle Type Setup Table

## FINE-TUNING PERFORMANCE

The Outback eDrive GPS assisted steering system uses a constant, fixed rate steering control method. Variations in application equipment, travel speeds, and field conditions have an affect on the eDrive's performance. Proper setting and periodic adjustments of the steering control rate are required to achieve smooth steering response, minimize tracking errors, and optimize the eDrive's performance.

### **Increasing the Steering Control Rate: -**

- Results in more aggressive steering corrections and reduced guidance tracking error.
- Setting the control rate too high will result in unstable steering corrections and larger errors.

### **Decreasing the Steering Control Rate: -**

- Results in more stable steering corrections and smoother response.
- Setting the control rate too low will result in sluggish steering corrections and large tracking errors.

### **Contour Operation: -**

- The steering control rate should be adjusted while operating in straight guidance mode.
- The eDrive tracking errors in contour guidance can be minimized by reducing travel speed on sharp curves.



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**Note:** The overall accuracy of the eDrive system depends on many factors. Refer to Appendix A: Making the Most of Automated Steering for more information.

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## **TROUBLE-SHOOTING TIPS**

### **No eDrive Setup Menu on Outback guidance controller: -**

- Verify Outback guidance controller application software is the appropriate version.
- Verify the S Present light is lit on the eDrive console.
- Check CAN communication cable and connections.

### **No Steering Output @ eDrive Steering Adjust Menu: -**

- Check the valve control cable and connections.
- Verify indicator lights, or voltage, at the hydraulic valve solenoid connection.
- Verify hydraulic operation (refer to equipment specific installation sheet for details).

### **Erratic or No Steering Corrections While Engaged: -**

- Verify eDrive console is securely mounted and correctly oriented in the upright position.
- Check the gyro sensor data using eDrive Diagnostics Menu. Drive the vehicle in a straight line. Sensor data should be near zero. Turning to the left, data should display negative. Turning to the right, data should display positive.
- Fine-Tuning the steering control rate for smooth response and minimum tracking errors.



#### 4: Troubleshooting

### VEHICLE TYPE SETUP TABLE

Machine Type	GPS Antenna Location	Sensitivity	Dampening
MFWD or 2WD Row-Crop Tractor	Leading edge of the vehicle cab	10	OFF
Articulated 4WD Tractor	Leading edge of the vehicle cab	10, In some cases it may be necessary to lower the sensitivity to prevent erratic movements. Start with the sensitivity at 10 and adjust the oil flow as close as possible then move the sensitivity down by 1 number at a time to reduce any jerking movements.	OFF
Self Propelled Sprayers	Back edge of the vehicle cab	10	OFF, Some applications may require turning the dampening term ON to reduce oscillations. In general these machines are CaseIH SPX Sprayers, Nitro Sprayers, and Hagie Sprayers.
Combines	Leading edge of the vehicle cab	10	OFF



Machine Type	GPS Antenna Location	Sensitivity	Dampening
Track Machines (Differential Steering only, use Track Mode. A CaseIH QuadTrac is not considered a track machine because it does not use differential steering, refer to Articulated 4WD tractors)	Leading edge of the vehicle cab	N/A	N/A





#### 4: Troubleshooting





## **APPENDICES**

- A: Making the Most of Automated Steering
- B: Sales and Service Information

## **A: MAKING THE MOST OF AUTOMATED STEERING**

Hemisphere GPS Crescent Receiver Technology sets new standards for accuracy and flexibility in precision ground agriculture.

However, in-the-field accuracy for automated steering applications is influenced by a variety of factors, not just the inherent accuracy of the GPS system.



**Figure A-2. Factors Influencing Automated Steering Accuracy.**

### **GPS Signal Accuracy**

#### **GPS Antenna Location -**

Make sure to install the GPS antenna on the vehicle in a location that will optimize its performance. In most cases (with exception of high-speed self-propelled sprayers,) it is best to have the GPS antenna mounted on the leading edge of the vehicle cab. This usually provides an open view of the sky, and prevents multi-path reflections and signal masking from near-by vertical obstructions.

In the case of high-speed self-propelled sprayers, installing the GPS antenna on the back edge of the vehicle cab allows more stable automated steering control.





**Figure A-3. GPS antenna installed on the leading edge of the vehicle cab and centered left to right.**

It is also important to install the GPS antenna in the center (left and right) of the vehicle. This prevents swath offsets resulting in skips and overlaps. If the center of the working implement is not in line with the center of the guided vehicle, be sure to enter an appropriate Swath Offset into the guidance controller during setup.

#### **Cable Installation -**

To prevent problems with signal interference and power fluctuations, give careful consideration when installing the GPS antenna cable, rover radio cable, and power cables.

Try to route antenna and radio cables away from any other RF (radio frequency) cables. Also, be careful to avoid any cables carrying high amperage electrical pulses. Be sure that all cables are routed and secured properly to prevent crimping and abrasion.

Connect power cables to stable 12-volt power supplies such as vehicle power outlets or direct battery connections. Avoid using cigarette lighter adapters.



### **Steering Controller and Tilt Compensation Installation -**

The automated steering controller contains sensors for the yaw (left/right turn) and roll (tilt side to side) axes so it is important to install it in the appropriate orientation.

For proper operation, calibrate the tilt compensation sensor according to the operator's manual. Also, be sure to install the steering controller on a level cab surface with the connectors facing left with regard to the direction of travel. Additionally, it is important to mount the controller level on a plane perpendicular to the plumb line created by the GPS antenna.



**Figure A-4. Automated steering controller mounted in the front right corner of vehicle cab floor. (Level surface perpendicular to plumb line of the GPS antenna.)**

The yaw (left/right movements) sensor needs special consideration when choosing a mounting location. Install the steering controller as far forward in the vehicle cab as possible in order to make the yaw sensor more sensitive to turn rate (steering movements).



## Machine / Vehicle Control

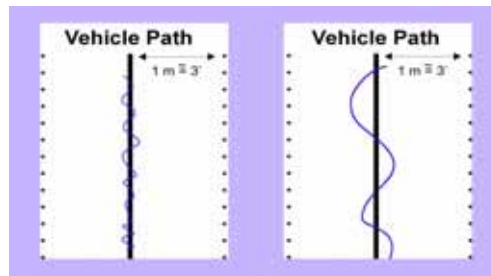
### Automated Steering Hydraulic Tuning -

It is necessary to adjust the steering speed on the automated steering hydraulic valve to optimize machine control accuracy. Make adjustments when the vehicle hydraulic oil is at operating temperature. To fine-tune the steering speed, make several straight test passes.

Adjust the steering speed until the vehicle can maintain the GPS guideline accurately without rapidly overshooting or sluggishness.

If the steering corrections are too rapid causing the machine to jerk erratically back and forth across the line, the hydraulic steering speed is too fast.

If the machine slowly weaves down the guideline, the hydraulic steering speed is too slow.



**Figure A-5. If the steering is causing the machine to jerk back and forth across the intended line, reduce hydraulic steering speed. If the machine is slowly weaving over the intended line, increase the hydraulic steering speed.**

Once the hydraulic steering speed is tuned, then it should not be necessary to adjust the steering speed again unless there is a major change in the vehicle or application. For example, adding an implement with significantly more draft, adding duals or ballasting, dramatically increasing operational ground speed.



**Vehicle Setup: Steering Maintenance, Ballasting and Stance, Traction Aids -**

It is important to consider the physical characteristics of a vehicle that may affect the ability of the automated steering system to perform at an optimal level.

When preparing a vehicle for use with automated steering it is necessary to inspect all of the vehicle steering components including cylinders, joints, linkages, wheels, and tires. All mechanical steering connections must be within the manufacturer's specifications for free play in order to achieve maximum machine control accuracy.

Wheels must be true, properly aligned, and spaced evenly from side to side. For optimal automated steering performance, it is best to have the vehicle properly ballasted and a wide wheel stance. Ballasting improves traction for more rapid and precise steering corrections.

Additionally, a wider wheel stance with front and rear duals (where applicable) will dramatically improve vehicle stability allowing for increased steering accuracy.



**Figure A-6. Machine ballasted with full set of front suitcase weights and rear wheel weights. Wide stance with duals front and rear for stability and traction.**



Lastly, it is important to use vehicle traction aids, when possible. The use of mechanical front wheel drive and differential lock will improve vehicle traction and steering making it easier to maintain the guideline. The use of differential lock may not be appropriate in some field conditions; however, most straight-line guidance scenarios will have improved tracking with the use of differential lock

### **Implement Tracking**

The tracking performance of the implement plays a major role in accuracy. Implements can often move back and forth across the guideline independent of the guided vehicle, especially in rolling terrain or tough soil conditions. In addition, non-uniform draft loads created by an implement can actually work against the automated steering system, degrading accuracy.

#### **Drawn Implements -**

Implements with long drawbar connections to the vehicle can often move back and forth behind a vehicle that is driving in a straight path. It is important to use stabilizing methods such as disk coulters to help the implement track inline with the towing vehicle.

#### **3-Point Implements -**

In the case of 3-point mounted implements, make sure to balance the implement behind the vehicle. That is, all ground engaging elements should be evenly spaced and in proper adjustment. It is common for items such as cultivator shanks or bedder row-units to gradually slip left or right on a tool bar causing uneven draft. Regular checking and adjustment will minimize this problem.

In addition, on 3-point implements, it is necessary to adjust the sway blocks on the vehicle draft arms. Allow only a very small gap at the sway blocks to prevent large side-to-side movements of the implement.





## Appendices

Similar to drawn implements, 3-point implements will benefit from evenly spaced coulters set deep enough to prevent side-to-side movements. As implement widths grow in 3-point applications, it may be necessary to use draft chains connected from the ends of the implement to the front of the vehicle to prevent deflection in the outer sections of the implement.



**Figure A-7. Vehicle 3-point sway block set tight and spaced evenly on both sides.**

### Field Conditions

Field conditions can also play a role in accuracy. Smooth, flat fields with uniform tilth will obviously allow for the best possible accuracy. However, this ideal scenario is usually not reality. Many fields have rolling terrain, contour terraces, old crop rows, varying soil conditions and other characteristics. Understanding these elements and how they effect steering will help to maximize the guidance accuracy.

### Rolling Terrain -

Be sure the implement is setup with stabilizing coulters for proper tracking behind the tow vehicle.



### **Contour Terraces -**

Similar to rolling terrain, but may require the use of contour guidance mode. Contour guidance mode uses a smoothing feature to gradually reduce curve severity with every consecutive pass. Therefore, each pass will have some amount of error at the transitions of each curve. In addition, drawn implements do not track directly behind the tow vehicle when navigating curves inherently reducing accuracy. When possible, use straight mode guidance and work up and over mild terraces in high accuracy situations.

### **Old Crop Rows -**

Old rows can create non-uniform draft loads on an implement pulling it and possibly the tow vehicle off line. Working against old rows at an angle will improve the draft uniformity. In some cases, it may be necessary to completely work down old rows in order to develop new, very accurate rows.

### **Soil Conditions -**

Very loose soil may require more steering effort and traction from the guided vehicle. To improve accuracy, it may be necessary to add weight over the steering wheels, use mechanical front wheel drive, and/or differential lock. Irregular and tight soil conditions, such as those encountered when working with old crop rows, can cause similar conditions. To improve accuracy, it is critical to use stabilizing elements on the implement and have the proper ballasting on the tow vehicle.

### **Consistent Accuracy and Increased Productivity**

Special attention to the four main factors effecting automated steering accuracy can help you achieve consistent results that maximize productivity.



## **B: SALES AND SERVICE INFORMATION**

### **Contacting the Factory**

U.S:	Canada:
Outback Guidance	Outback Canada
Hemisphere GPS, Inc.	Hemisphere GPS, Inc.
2207 Iowa Street	3244 Portage Avenue
Hiawatha, KS 66434	Winnipeg, MB R3K 0Y9
USA	CANADA

**ONLINE:** <http://www.outbackguidance.com>

**PHONE:** Monday Through Friday 8AM-5PM U.S. Central Time

- **U.S:** 1-800-247-3808 (Customer Service & Ordering)
- **Canada:** 1-866-888-4472 (Customer Service & Ordering)
- **From all other countries:** 01-785-742-2976

**E-MAIL:** 24 hours / 7 days a week, your inquiry will receive a response from one of our Customer Support Representatives within one business day.

- **Sales:** [outbacksales@outbackguidance.com](mailto:outbacksales@outbackguidance.com)
- **Customer Service:** [outbackcs@outbackguidance.com](mailto:outbackcs@outbackguidance.com)
- **Website Feedback:** [outbackweb@outbackguidance.com](mailto:outbackweb@outbackguidance.com)

**FAX:** 24 hours / 7 days a week, your inquiry will receive a response from one of our Customer Support Representatives within one business day.

- 1-785-742-4584



**U.S. REGIONAL SALES OFFICES:**

- Outback Nebraska - Hastings, NE 1-877-777-6142
- Outback Texas - Hewitt, TX 1-866-857-4448
- Outback Dakotas - Watertown, SD 1-888-825-6031
- Outback Illinois- Jacksonville, IL 1-888-477-6070



## Appendices

### Outback eDrive Extended Service Plan (ESP) Summary

U.S. and Canada Only

Item	Standard Term	Extended Term
Price	Free	\$299
Term	1 Year ESP	3 Year ESP (Standard +2 Years)
Exchange Service	Yes	Yes
Software Revision Updates	No Charge	No Charge
Software Revision Installation	Provided by Customer or OGCTM	Provided by Customer or OGCTM
Damage During Shipments	Covered	Covered
Damage After Customer Receipt	Not Covered	Not Covered
Shipping, Outback to Customer	Outback Paid (Next Day Air & Saturday* Delivery)	Outback Paid (Next Day Air & Saturday* Delivery)
Shipping, Customer to Outback	Outback Paid (Ground Service)	Outback Paid (Ground Service)

\* Saturday delivery may not be available in all service areas.



### **Limited Outback eDrive Extended Service Plan**

The Outback eDrive ESP (U.S. and Canada only) applies only to the non-software portions of the electronic components of the product, including the console and related cables. Coverage for the mechanical portions of the Outback eDrive is described in the warranty notice. The limited plan term is one-year standard, or three-years extended if purchased at the time of the original order, beginning on the date of invoice to the original purchaser.

Damage caused by shipping the product(s) to the original purchaser is covered under this limited plan. Otherwise, this limited plan does not cover damage due to external causes, including accident, abuse, misuse, problems with electrical power, servicing not authorized by Hemisphere GPS, usage not in accordance with product instructions, failure to perform required preventive maintenance and problems caused by use of parts and components not supplied by Hemisphere GPS.

This limited plan does not cover any items that are in one or more of the following categories: software (except for Hemisphere GPS authorized revision updates), external devices (except as specifically noted), accessories or parts added to an Outback eDrive system after the system is shipped from Hemisphere GPS, accessories or parts that are not installed in the Hemisphere GPS factory.

Hemisphere GPS will provide, on an exchange basis and subject to the Hemisphere GPS Exchange Policy in effect on the date of the exchange, replacement parts (up to and including a complete Outback eDrive system) for the Outback eDrive product(s) covered under this limited plan when parts require replacement. To request service, you must call Hemisphere GPS (U.S. 800-247-3808, Canada 866-888-4472) or go to [outbackguidance.com](http://outbackguidance.com) for information, within the plan period. If replacement is required, Hemisphere GPS will issue a Return Material Authorization Number and will ship by UPS Next Day Air & Saturday Delivery the replacement part(s) within 1 business day. You must ship by UPS Ground Service collect, the original product(s) back to Hemisphere GPS in this packaging. For Canadian customers, Saturday delivery is not available and the shipping carrier is Purolator.



## Appendices

In any instance in which Hemisphere GPS issues a Return Material Authorization Number, Hemisphere GPS must receive the original part(s) prior to the expiration of the plan period in order for the replacement(s) to be covered by the limited plan. Failure to return original part(s), for which replacement(s) have been sent, within 30 days of initial shipment, will result in the issuance of an invoice for the cost of the sent part(s). Failure to pay the invoice, or return the part(s), will result in cancellation of this limited plan.

Hemisphere GPS owns all parts removed from repaired products. Hemisphere GPS uses new and reconditioned parts made by various manufacturers in performing service repairs and building replacement products. If Hemisphere GPS repairs or replaces a product, its plan term is the remainder of the limited plan term.

These provisions apply to the Limited Outback eDrive Extended Service Plan only. Hemisphere GPS 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. No one is authorized to alter, modify or enlarge this Limited Outback eDrive Extended Service Plan nor the exclusions, limitations, and reservations.





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