AS7500

User Manual

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AS7500 User Manual

Written for AS7500 software Version 1.3

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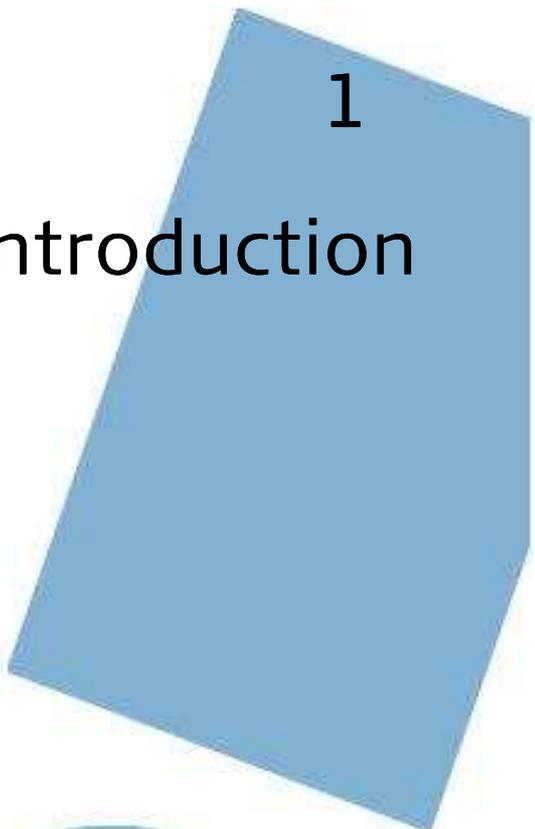
Heerbrugg, July 1, 2002

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1
Introduction

Welcome to the AS7500 User Manual.

The AS7500 system is designed to connect with virtually any GPS receiver and either a Spray Rate Controller (SRC), or to the Tru Count clutches. Once installed the AS7500 provides automatic shut-off for individual boom sections on a boom spray, or planter boxes on a planter. This will greatly reduce the need for manually switching sections On or Off when going over previously worked area. The ability of the AS7500 to automatically control the state of the sections relieves the operator from a strenuous task which requires split second timing on multiple switches.

Unlike other automatic section controllers, which are typically incorporated with a guidance system, the AS7500 is an autonomous system. It can be interfaced with virtually any existing SRC, or planter equipped with Tru Count clutches. Furthermore the AS7500 will connect with most GPS receivers or GPS guidance systems which can output a GPS message.

Throughout this manual the use of section control, whether it be for boom spray rigs or, planters fitted with Tru Count clutches the principal operation is the same. Where necessary, details specific to planters or boom sprays will be delineated accordingly.

This manual is designed to assist users of the AS7500 in the installation and operation of the AS7500.

Figure 1-1   AS7500 Controller

This manual contains important safety directions as well as instructions for setting up the product and operating it. Refer to Section 5 for further information. Read carefully through the User Manual before you switch on the product.

To ensure safety when using the system, please also observe the directions and instructions contained in the User Manual and Safety Handbook issued by the:

• Agricultural machinery manufacturer.

1.1 AS7500 Standard Features

The AS7500 can be used in many situations and offers the following features.

Spray or plant around obstacles

Automatically minimise over-application around trees or rock piles. AS7500 detects areas previously worked and shuts down sections and reactivates as necessary.
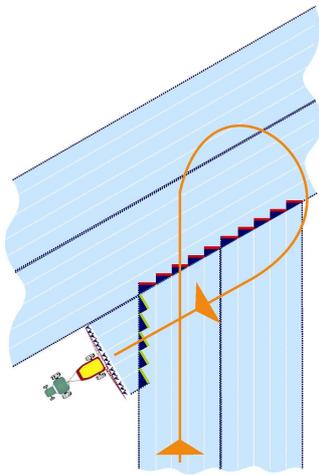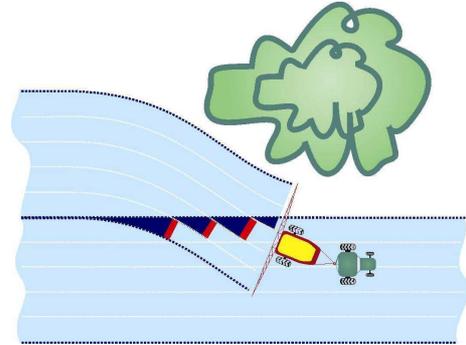
Planting or Spraying headlands

AS7500 detects areas previously worked as the headlands are approached and shuts down sections and reactivates as necessary

Timing Delays   The AS7500 can be adjusted for delays from electrical to mechanical switching.

Variable Overlap   Allows the operator to configure the required tolerance to over-sprays and misses.

Vehicle Modelling   Allows the operator to accurately define vehicle and boom dimensions for greater accuracy.

Antenna Offsets   Allows the operator to define the GPS antenna offsets.

Compatibility   The AS7500 is designed to work with both serial and CANBus GPS receivers, and with SRC requiring serial data or voltage-controlled section solenoids, or with Tru Count clutches.

1.2 AS7500 Components

When the AS7500 system is first opened, please check that all of the components detailed in Table 1-1 have been supplied.

Quantity	Description	Part Nō.
1	AS7500 controller	1-0490
1	RAM Mount ®	1-0279
1	DC power cable	1-2408
1	AS7500 User manual	1-1252
1	AS7500 Quick reference guide	1-1323
1	Data cable	1-2207
1	Data cable	1-2208

Table 1-1 AS7500 Standard Packing List

Inspect all items for visual damage. If any component appears to be damaged, contact the supplier immediately.

1.3 Care of the Product

Transport in a road vehicle

Ensure that the product is mounted in accordance with the instructions and never carry the product loose in a road vehicle, as it can be affected by shock and vibration.

Shipping

If it is necessary to transport the product by rail, air or sea, always use the complete original Leica Geosystems packaging, transport container and cardboard box, or its equivalent, to protect against shock and vibration.

Storage

Respect the temperature limits when storing the equipment, particularly in summer if the equipment is inside a vehicle. Refer to Appendix H for information about temperature limits.

Cleaning the product and accessories

Use only a clean, soft, lint-free cloth for cleaning. If necessary, moisten the cloth with water or pure alcohol. Do not use other liquids; these may attack the polymer components.

Cables and plugs

Keep plugs clean and dry. Blow away any dirt lodged in the plugs of the connecting cables.
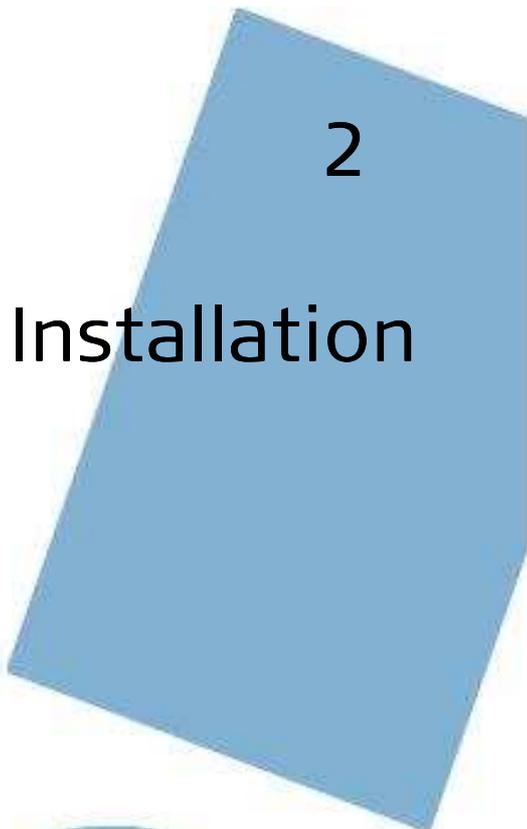
2
Installation
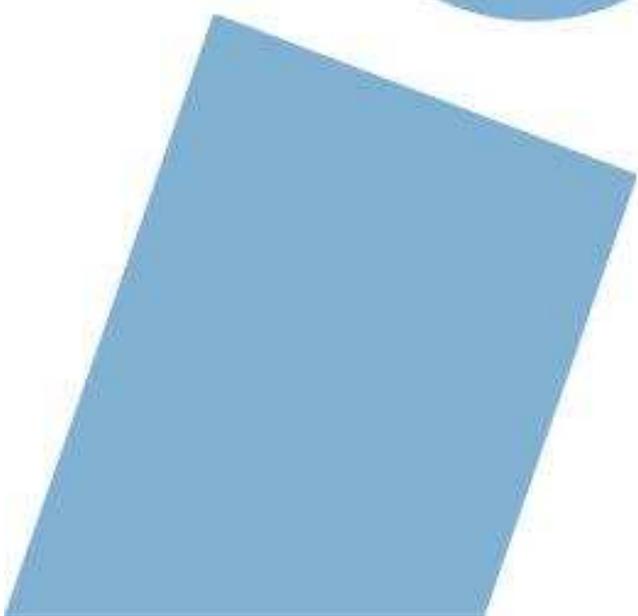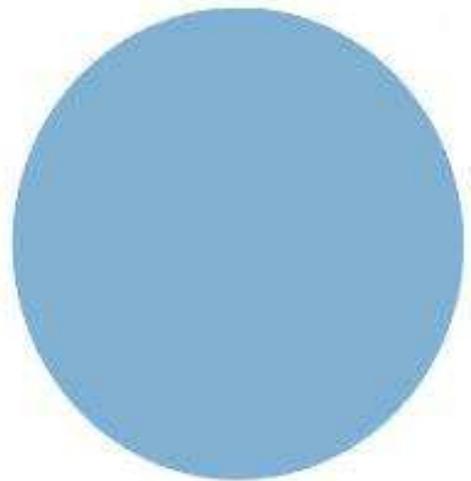
This section describes how to connect and install the components of the AS7500 system. A schematic of the AS7500 and how it connects to a typical SRC and GPS receiver is shown in Figure 2-1 and Figure 2-2.
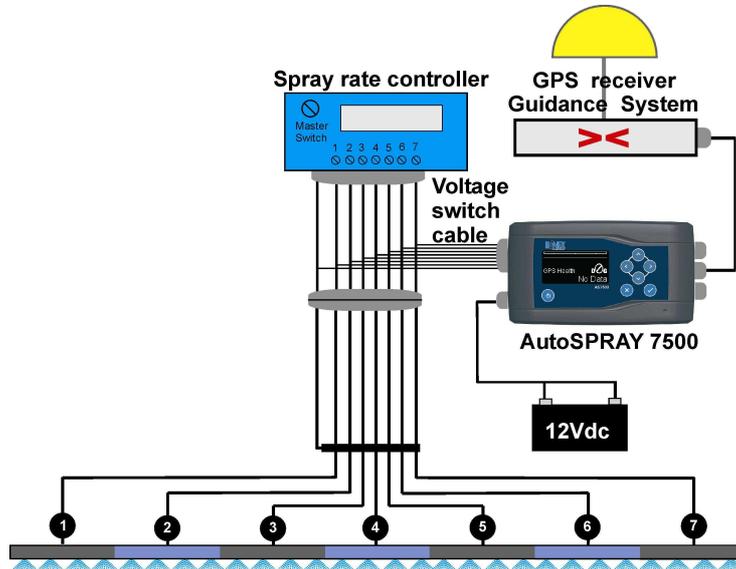
Figure 2-1 Schematic layout of the AS7500 with voltage switch cable
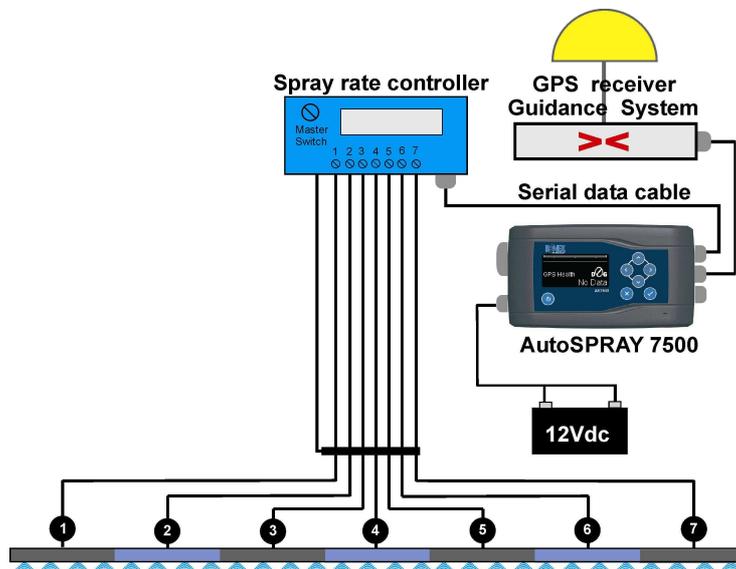
Figure 2-2 Schematic layout of the AS7500 with serial data cable

2.1 Installing the AS7500

Prior to installing the AS7500 it is recommended that the operator reviews Section 3 to familiarise themselves with the individual components of the system.

Step	Instruction
1	Select a suitable location for the AS7500 which is convenient for the operator and does not impede upon the vision of the operator or restrict access to any vehicle controls.
2	Attach the supplied RAM mount ball to a suitable mounting point in the vehicle. A variety of RAM mount options are available from RAM suppliers which may facilitate in this mounting point.
4	Attach the RAM arm to the mounting point and then to the RAM mount on the rear of AS7500 controller.
5	Ensure that the Isolation Switch is set to the Off Position (0). Connect the DC power cable to a clean 12Vdc power source in the vehicle, then connect to the AS7500. Secure the cable using the supplied cable ties. See Section 2.2 for additional notes.
6	Connect the GPS data cable to Port B on the AS7500 and the GPS receiver output port. Secure the cable using the supplied cable ties. See Section 2.3 for additional notes.
7	Connect the SRC cable as per the instructions supplied with the SRC cable. Then connect the cable to the Section Controller Port on the AS7500. Secure the cable using the supplied cable ties. See Section 2.4 for additional notes.
8	Slide the Isolation Switch is set to the On Position (1).
9	The AS7500 has been installed and is now ready to be calibrated for use. See section 2.5 to confirm the system has been correctly installed in the vehicle.

2.2 Connecting to 12Vdc power

The AS7500 is designed to operate from a clean 12Vdc power source. The use of a cigarette lighter socket is not recommended as the plug may become loose and cause intermittent power to the AS7500.

The AS7500 is fitted with an internal self-resetting fuse, hence it is not necessary to fit an in-line fuse to the power cable. However if the cable is connected directly to the vehicle's batteries it is recommended that a fuse be fitted accordingly.

The AS7500 is fitted with an Isolation Power Switch (IPS) on the rear panel, this switch completely removes power from the AS7500 controller. The IPS should be set to the Off Position (0) if the vehicle will not be used for several months to prevent any power drain from the vehicle.

The standard 12Vdc power cable (P/n 1-2408) supplied with AS7500 is designed for a maximum of 8A operation. An optional power cable may be purchased for a maximum of 16A operation, see Appendix B for details. The AS7500 may be configured to start automatically after the vehicle has started by sensing the vehicle's ignition. An optional power cable, with the ignition sense, may be purchased for this feature, see Appendix I for details.

DC Power Cautionary Notes

⚠️ The power cable should be carefully routed so as not to rub or wear through which may lead to a short circuit on the vehicle.

2.3 Connecting the GPS

A GPS receiver / guidance system must be connected to the AS7500 for the system to function. The GPS data cable is normally connected to Port B on the rear of the AS7500. The AS7500 kit is supplied with two different data cables (P/n1-2207 & 1-2208). Typically one of these cables will suit most GPS receivers. See Appendix B for optional cables and peripherals to suit the AS7500 for non-standard GPS receivers.

The AS7500 is also capable of connection to GPS receivers with a CANbus interface, using the CAN port on the rear of the AS7500. The set up details for these receivers are supplied with the appropriate cable. Non-genuine data cables should not be used as these may damage the AS7500 or GPS receiver.

In order for the AS7500 to function correctly, the GPS receiver must be configured to receive the NMEA data message $GPGGA.

For optimal use, the GPS receiver should be configured with the following parameters;

NMEA message	GGA, VTG
Update rate	5Hz
Baud rate	19,200 baud

Consult the GPS receiver / guidance system user manual for details on configuring the output data if required.

☞ *If the AS7500 is connected to a spray rate controller with a serial interface at baud rate 9600 (see Appendix N) then the GPS baud rate must also be set to 960 baud.*

The AS7500 will operate with a slower Update rate (1Hz), however the functionality of the AS7500 will be compromised.

The VTG NMEA string is optional and not essential for the AS7500 to function correctly.

GPS Accuracy

The relative accuracy of the GPS system will determine the overall performance of the AS7500 system. The more accurate the GPS, the more accurate boom section shut off will be with the AS7500.

Many GPS receivers quote their accuracy as "pass to pass", which relates to a short time period, typically ten minutes or so. However when spraying a field this may take several hours, hence it is important to consider this accuracy statement.

RINEX recommend that the AS7500 always be used with a DGPS to provide optimal accuracy with the overall system. It is the operator's responsibility to determine the accuracy of the GPS. See Section 3.4 for further details.

2.4 Connecting the Spray Rate Controller

The AS7500 is compatible with numerous Spray Rate Controllers (SRC), these typically have unique cables for the respective installation. At the time of ordering the AS7500 kit the SRC cable should have been ordered. Each SRC cable is supplied with relevant installation instructions. See Appendix B for a list of SRC cables.

The AS7500 is compatible with both, voltage switching SRC installations, and serial data installations. Accordingly, the connection for the AS7500 controller will be determined by the SRC cable. The SRC may connect to either the Section Controller Port, Port A, or the CANBus port on the rear of the AS7500 controller.

In addition to connecting the SRC cable it may also be necessary to connect to the SRC Master switch. If necessary, instructions will be supplied with the SRC cable.

See Section 3.5 for further details.

Mapping the SRC sections

The AS7500 will output the status of the boom sections, that is whether they are On or Off, so that third party guidance and/or mapping devices can accurately map the field where it has been sprayed.

To enable other mapping devices to display the current state of the sections, the AS7500 outputs the boom section status, On or Off, using the data format string for a RAVEN 460 controller. This data string is output on Port A at 9600 baud rate whenever the Controller is set to Voltage. The GPS Port will also be set to 9600 baud and it will be necessary to set the GPS receiver also to 9600 baud rate.

2.5 Connecting to Planters

The AS7500 is compatible with a number of planters including John Deere, Kinze, Case and White which are fitted with Tru Count clutches. The Tru Count logo is shown in for easy identification of their product.
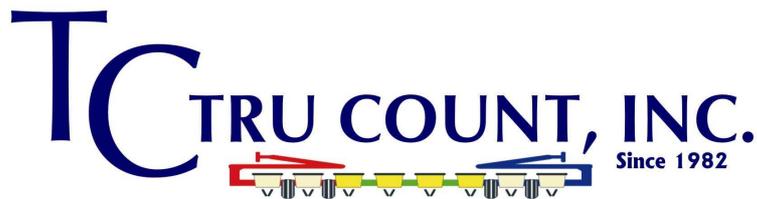
Figure 2-3 Tru Count for Planters

The AS7500 connects to the Tru Count clutches the same as a voltage section controller via the Section Controller Port on the rear. Tru Count will supply the necessary cables to connect the AS7500 to their clutches.

One major difference between the Tru Count clutches and a conventional SRC is that the voltage is supplied through the Section Controller Port in reverse logic. Hence when the voltage is On for a SRC it is Off for the Tru Count clutches. This is handled by the AS7500 and does not require any intervention by the operator.

The operator is required to select the Tru Count clutches in the Setup mode menu 6.1 SETTINGS-Controller Type ‹ Tru Count ›. The setup of planter rows to match the sections automatically controlled by the AS7500 is at the operator's discretion.

The maximum number of sections that can be controlled is 13. Hence in a 36 row planter it may be set with 3 boxes per section which would use only 12 sections and provide optimal control.

Tru Count Valve Box – Upgrade

⚠️   The Tru Count valve boxes must be upgraded to work with the AS7500. If the upgrade kit is not fitted, the AS7500 may fail to operate correctly when powering clutches.

2.6 Testing the Installation

Prior to commencing operations with the AS7500 the system should be checked for operational status as per the following instructions. If the system does not perform as per the instructions, the local dealer should be consulted for assistance.

Step	Instruction
1	Confirm that the 12Vdc power cable, GPS data cable and SRC are all connected as per the installation notes and to the correct ports on the AS7500.
2	On the rear panel of the AS7500, slide the IPS to the On position(1),if not already done so.
3	Press the power button on the front of the AS7500 unit. There will be a delay of approximately 15 seconds while the AS7500 powers up.
4	The display panel will be activated, showing the Operational menu information. This confirms that the AS7500 has been correctly installed and powered.
5	Press the Power button on the front panel to turn Off the AS7500.

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3
Getting Started
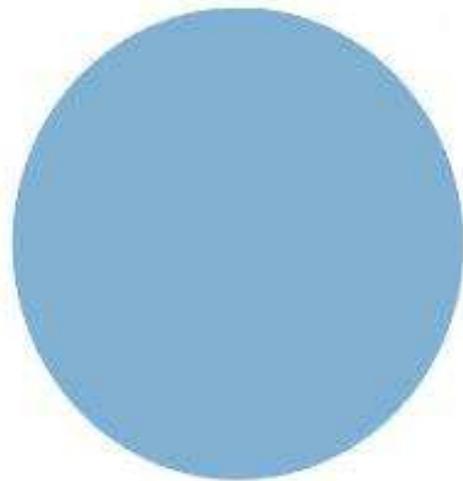
This section details the steps taken for the first time user of the overall system. In particular this section describes the components of the AS7500 and their respective functions.

It is important that the components and connectors of the AS7500 are correctly identified to gain the maximum benefit from the system. The terminology used with the AS7500 and the connected devices including the GPS receiver and spray rate controller is equally important.

Furthermore this section describes the necessary information which includes measurements of the vehicle to ensure that the system will operate correctly.

3.1 The Front Panel of the AS7500

The AS7500 controller incorporates the display, speaker and keypad on the front face panel. The display and keypad of the AS7500 controller is illustrated in Figure 3-1.

Figure 3-1   AS7500 controller front panel & keypad

The function of the individual keypad buttons are described below.

Button	Description
(power)	• Turns the AS7500 On and Off.
(up/down)	• Moves Up and Down through the setup menu sections. • Increases and decreases field values when in edit mode. • Selects display options when in Operational mode.
(left/right)	• Moves to individual setup menu options within a section. • Moves the highlighted edit position in edit mode. • Selects boom sections when override is active.
(X)	• Switches between operational mode and setup menu. • Pressing and holding down for two seconds while in Operational mode clears all treatment data.
(check)	• Enters and exits edit mode in the setup menus. • Turns the master switch On in Operational mode. • Selects all/none boom sections when override is active. • Pressing and holding down for two seconds while in Operational mode opens the Boundary menu.

3.1.1 The Display Panel

The AS7500 display panel can be set for maximum brightness and contrast, which allows for optimal viewing, as either a positive or negative image. The display is shown as either a positive image, black text on white background as shown in Figure 3-2. Alternatively the AS7500 can be configured as negative image, white text on a black background as shown in Figure 3-3.
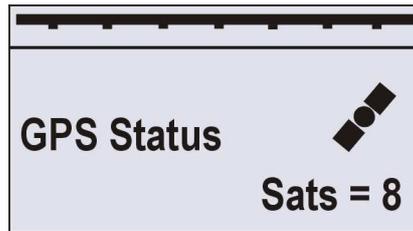
Figure 3-2   AS7500 positive image display
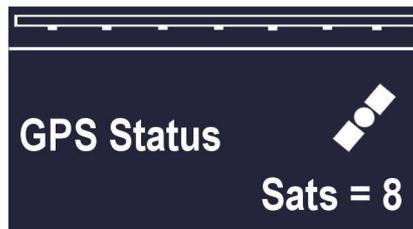
Figure 3-3   AS7500 negative image display

The setting for screen is configured in the Setup Mode at 1.2 GENERAL ‹Brightness›. Throughout this manual, the display panel is only shown as white text on a black background, a negative image.

3.2 The Rear Panel of the AS7500

The back panel of the AS7500, see Figure 3-4, is used to connect to all cables to the system. This includes the spray rate controller, the GPS receiver and optional devices.

Figure 3-4 AS7500 controller
rear panel and connectors

The function of the individual ports and switches is described below.

Component	Description
Port A	Used for connecting to serial SRC.
Port B	Used for connecting to GPS receivers.
CANbus Port	Used for connecting to CANbus GPS receivers and/or SRC.
Section Controller Port	Used to connect to voltage switching SRC cable. See SRC cable instructions.
Isolation Power Switch (IPS)	The IPS is used to isolate all DC power from the AS7500.
USB Port	Used to connect USB thumb-drives for software upgrades.
DC Power Port	Connects the 12Vdc power cable.

3.3 Functional Modes of the AS7500

The AS7500 has two functional modes, Setup and Operational mode. Information shown in the display panel will be different depending upon the functional mode the AS7500.

The ⊗ key toggles the AS7500 between Operational and Setup mode. The functional mode is easily distinguished on the display panel.

3.3.1   Setup Mode

The Setup mode allows the user to configure the AS7500 as required. The Setup menu is indexed to allow the user to easily step through the menu as required. See Section 6 for further detail on the menu system.

The display panel of AS7500 in Setup mode will be similar to the picture as shown in Figure 3-5.

Menu name → 2.1 BOOM ← Setup icon

Menu item → Number Sections

13 ← Item Value
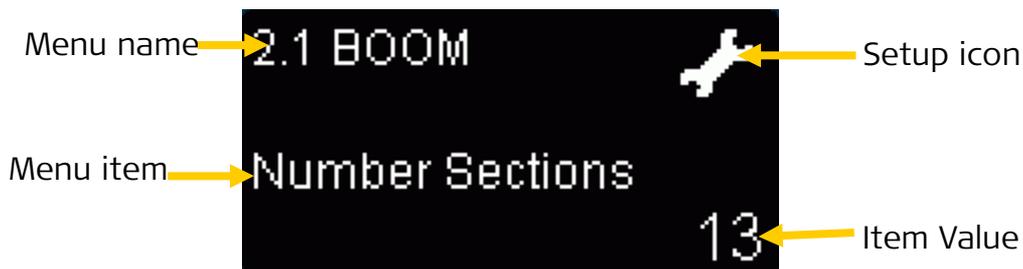
Figure 3-5   AS7500 display panel in Setup Mode

The individual areas of the Setup mode display are described below.

Component	Description
Menu name	Displays the Menu item number followed by the Menu name.
Menu Item	Displays the selected item within a menu
Item value	The value of the selected menu item.
Setup Icon	Icon showing that the AS7500 is in Setup Mode.

☞ *The AS7500 does not record any spraying when in Setup Mode.*

3.3.2 Operational Mode

The Operational mode allows the AS7500 to automatically control the boom sections when spraying a field. The Operational mode provides the operator with status information of the AS7500 controller as it is working in the field.

The display panel of AS7500 in Operational mode will be similar to the picture as shown in Figure 3-6.

Figure 3-6   AS7500 display panel in Operational Mode

The individual areas of the Operational mode display are described below.

Component	Description
Boom	A representation of the configured boom, showing sections.
MCS Status	Shows whether the MCS is active or inactive. If the Boom is a solid white block the MCS is On, if the box is hollow (as shown) the MCS is Off.
Overrides	Shows which sections have been selected to be overridden.
Text Display	The selected text information is displayed in this area.
On / Off	A bar representing whether the boom section is deemed to be ON or OFF.
GPS Status Icon	Displays the status of the GPS data currently being received.

Further to the above the display panel provides additional status information relating to the boom sections and the manual override status as shown in Figure 3-7.

Boom Section
Status - On

MCS
Status - On

Boom Section
Status - Off

Area (Ha)

10.1

Figure 3-7   AS7500, MCS & Boom Section Status

Component	Description
Boom Section Status	A triangular icon shows the boom section to be On or a small block shows the boom section to be Off.
MCS Status	The MCS is On as the status is a solid white block.

The Override status icons are shown in Figure 3-8.

Override
Status - On

MCS
Status - Off

Override
Status - Off

Area (Ha)

10.1

Figure 3-8   AS7500, MCS & Override Status

Component	Description
Override Status	A solid block shows the override status to be On or a hollow block shows the override status to be Off.
MCS Status	The MCS is Off as the status is a hollow white block.

☞   *It is not possible for the AS7500 to be configured as above, the Figure is only for explanation of the display panel.*

3.4 Configuring the GPS

The AS7500 will operate with almost any GPS receiver or guidance system which can output a NMEA or NMEA 2000 message. The AS7500 does not require a GPS mapping screen to operate.

In order for the AS7500 to correctly function the GPS requirements are as follows.

NMEA message	GGA (VTG optional)
Update rate	5Hz
Baud rate	19,200 baud (optional settings)

Connect the GPS receiver / guidance system to the correct port on the back panel of the AS7500 as described in Section 2.3. The AS7500 is supplied with data interface cables to suit most popular GPS systems, however it may be necessary to order an additional cable to suit individual systems. See Appendix B for optional cables that are available for the AS7500.

Instructions for configuring popular GPS receivers / guidance systems including the Leica mojoRTK, Trimble EZ-Guide ® Plus, EZ-Guide ® 500 and Outback® GPS Guidance are provided in Appendix J through to Appendix N. For all other GPS receivers / guidance systems refer to the GPS manufacturer's manual.

Configuring the GPS Type

The AS7500 allows the use of GPS receivers providing NMEA or NMEA2000 format messages, using RS232 or CANbus interfaces.

In order to set up the AS7500 to receive the GPS data on the correct port, navigate to the GPS Type option, see Section 6.10 to change the GPS receiver type. For all non-CANbus GPS receivers using the NMEA messages, connect to Port B on the AS7500. For CANbus GPS receivers use the NMEA2000 messages, connect to the CANbus Port on the AS7500.

Configuring the GPS Baud Rate

If necessary the AS7500 can be configured with optional GPS baud rates. This would be done if the GPS receiver cannot be configured to 19,200 baud to match the AS7500.

The GPS Baud Rate has no effect if the NMEA2000 message is used.
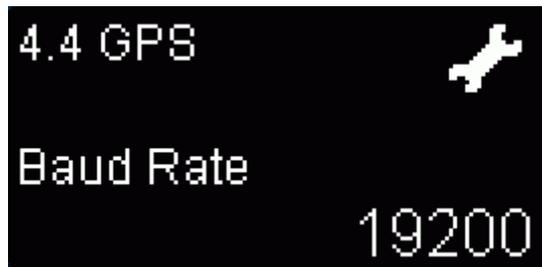
It is essential that the baud rate being transmitted from the GPS and that being received by the AS7500 is exactly the same. Failure to match the baud rates will prevent the AS7500 from correctly receiving the GPS data.

In order to setup the AS7500 to function at a different baud rate navigate to the Baud Rate option, see Section 6.8 to change the baud rate.

☞ *The Baud Rate should not be set below 19200bps unless absolute necessary. A slower Baud Rate may affect the performance of the AS7500.*

If the AS7500 is connected to a SRC that uses 9600 Baud Rate, see Appendix N, it will be necessary to configure to the GPS also to 9600 Baud Rate.

Configuring the DGPS Requirements

The AS7500 can operate with either non-corrected GPS signals or differentially corrected GPS signals (DGPS). It is important to note the use of non-corrected GPS signals is not recommended as this will have a direct impact upon the accuracy of the overall system.

There are several common forms of DGPS correction services which include WAAS, EGNOS, Beacon (Coast Guard), OmniSTAR®, and StarFire®. All of these services provide a more accurate GPS position (DGPS) and are recommended for use with the AS7500. Furthermore RTK signals may also be used with the AS7500 for accurate GPS. It is the user's responsibility to determine the GPS accuracy for use with the AS7500.

It is however possible to configure the AS7500 to operate on GPS data only. In order to setup the AS7500 to function in this manner navigate to the Diff Required page, see Section 6.8 in the GPS menu, and toggle the setting from Yes to No. The AS7500 will now

4.3 GPS

Diff Required

Yes
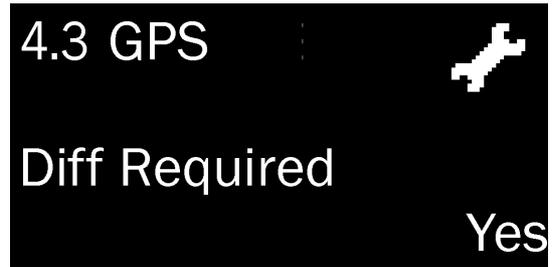
function with either DGPS or GPS only data. If the Diff Required menu is set to No, the AS7500 will operate with either DGPS or GPS signals. The GPS health message, as shown in Table 3-1 describes whether the received GPS message is differentially corrected.

Configuring the Velocity Filter

If the AS7500 is operated with non-corrected GPS signals the heading of the spray rig may be erratic which may cause irregular behaviour of boom sections shutting On and Off, particularly on the outside sections.

To minimize this effect the VTG (heading) message may be disabled at the GPS receiver / guidance system and the AS7500 can smooth the vehicle's heading using a Velocity Filter. The filter may be increased in magnitude to further dampen the erratic behaviour of the non-corrected GPS signals.

RINEX recommend that the AS7500 always be used with a DGPS to provide optimal accuracy with the overall system. It is the operator's responsibility to determine the accuracy of the GPS.

4.5 GPS

Velocity Filter

0
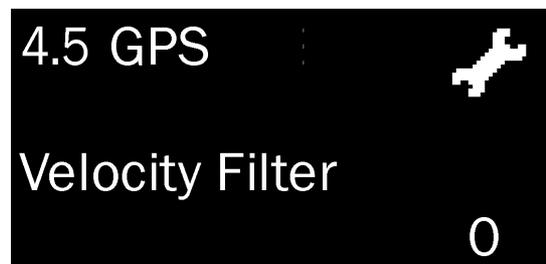
☞ *Velocity Filter has no effect when the $VTG string is being received.*

GPS Alarms

The AS7500, when in the OPERATIONAL mode, with the MCS in the On state, will provide an audible alarm in the following situations.

- **DGPS Required Yes**

  Whenever GPS Health reports other than "Good GPS"

- **DGPS Required No**

  Whenever GPS Health reports other than "Good GPS", except for "No DGPS"

The cause of the alarm should be investigated, and rectified, before continuing to use the AS7500.

☞   *The Sound option in Section 6.5 General Menu must be set to Yes for the alarm to be active.*

Configuring the GPS Antenna Offsets

When using GPS the actual position is computed at the GPS antenna. However this is not the physical location where the sections are located such as the boom spray or the planter boxes. Hence it is necessary to measure the distances or offsets, from the GPS antenna to the physical section.

Most GPS antennae are located along the centreline of the vehicle and or spray rig. However if for some reason the antenna is offset from the centreline then it will be necessary to enter a Cross Track value. When standing at the rear of the vehicle looking forward, if the antenna is located on the left hand side of the vehicle the offset is entered as a negative value, if the antenna is located on the right hand side of the vehicle the offset is entered as a positive value.

```
4.1 GPS              🔧

Cross Track (m)
                  0.00
```
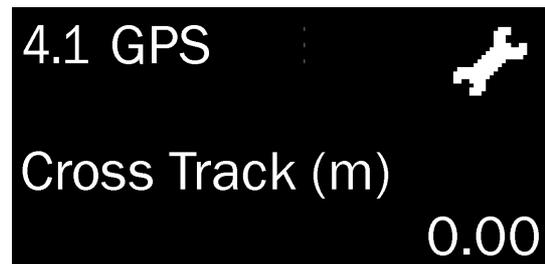
The distance between the GPS antenna and the boom sections is not measured directly between the points. The AS7500 provides accurately modelling of the boom by measuring points along the length of the spray rig to compute the orientation of the boom relative to the vehicle. See Section 3.9 for the necessary measurements.

GPS Status

The number of satellites used by the GPS receiver / guidance system is reported in the GPS status message on the display panel. It is necessary to have four or more satellites for a valid GPS position.

GPS Health

Further to the GPS Status, the GPS Health is a summary of several parameters related to the GPS data. The meaning of GPS Health values are given in the following table.

Message	Description
Good GPS	Good DGPS data is being received (GGA message only).
Good GPS (V)	Good DGPS data is being received (GGA & VTG messages).
No DGPS	Good GPS data is being received but no differential correction signal is received.
Poor GPS	Poor DGPS data is received, less than four satellites or a PDOP greater than 10. The AS7500 will not function.
No Pos	Correct data type & baud rate, no GPS position given in the data.
No NMEA	Invalid data being received.
No Data	There is no data being received through the GPS port.

Table 3-1   GPS Health Messages

3.4.1 Testing the GPS connection to the AS7500

Once the AS7500 has been correctly configured for the GPS, it should be tested for correct operation as described in the following steps.

Step	Instruction	Screen
1	Start the AS7500 using the On/Off button.	
2	The AS7500 will start into the Operational mode after about 15 seconds and the display panel will appear as shown until a valid GPS signal is received.	Area (Ha) dⵁG 0.0
3	Once the AS7500 is receiving valid DGPS information on the correct port, the display will show a moving satellite symbol as shown.	Area (Ha) 🛰 0.0
4	Scroll to the GPS health messages using the ⌃ or ⌄ buttons. If no GPS data is being received the display will be as shown.	GPS Health dⵁG No Data
5	Once GPS data is received the message will be changed to show the status of the GPS data being received. See Table 3-1 for a description of the GPS health messages.	GPS Health 🛰 Good GPS

If the test procedure fails, confirm that the GPS receiver / guidance system is correctly configured and that the data cable is connected to the correct Port on the AS7500 controller.

3.5 Configuring the Spray Rate Controller

The AS7500 can be connected to a wide range of SRC. The type of SRC will determine to which port the SRC cable is connected. Individual SRC cable kits are supplied with installation instructions.

The AS7500 will control automatic boom section switching via one of two methods for individual SRC. Voltage switching cables are connected to the Section Controller port on the rear of the AS7500. Data interface cables are connected to either Port A or the CANBus port on the rear of the AS7500.

Selecting the SRC

The AS7500 can be configured to work with different types of spray rate controllers. Navigate to the Controller Type option, see Section 6.10 to select the required Controller from the list.

3.5.1 Configuring the AS7500 for voltage switch installations

There are no additional steps required to set up the AS7500 for voltage switch installations. The SRC cable will be connected to the Controller port on the rear of the AS7500.

The next step is to check the Master Control Switch, see Section 3.6 for further details. In some rare cases the order of the boom section switches may need to be changed to allow for fence nozzle switches that appear as boom section switches. See Section 6.6 for further details.

3.5.2 Configuring the AS7500 for data interface installations

SRC data interface cables can be connected to either Port A, for RS232 interfaces, or the CANbus port. Consult the SRC documentation and connect the supplied cable to the correct port for the SRC interface.

Selection of the Controller Type in the option above will automatically configure communication parameters for the AS7500. Appendix N lists common SRC and their respective communication parameters.

SRC communication alarm

If the communication between the AS7500 and the SRC is broken, the AS7500 will show a warning on the display panel and trigger an audible alarm for approximately two seconds.

AS7500 alarm message when communication to the SRC is broken.
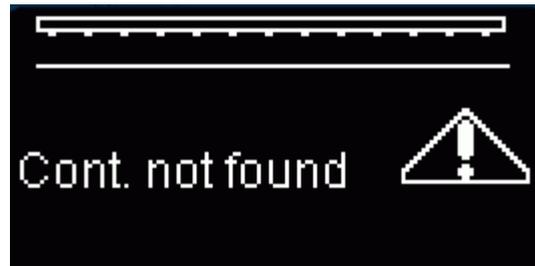
☞ *This feature is not available for controllers connected to the Section Controller port.*

3.5.3 Testing the SRC connection to the AS7500

To test Spray Rate Controller cable, follow the steps below.

Step	Instruction	Screen
1	Start the AS7500 using the On/Off button.	
2	The AS7500 will start into the Operational mode after about 15 seconds and the display panel will appear as shown.	
3	Switch the SRC Master switch ON. If the vehicle is stationary the display will not change.	

Step	Instruction	Screen
4	If the vehicle is moving, with GPS connected. The MCS status will be On, and the Section status will be On as shown, assuming three boom sections.	Area (Ha) 0.1
5	If number of boom sections is more than 13, the displayed will be as shown.	Area (Ha) 0.1
5	Switch the SRC Master switch OFF.	Area (Ha) 0.0
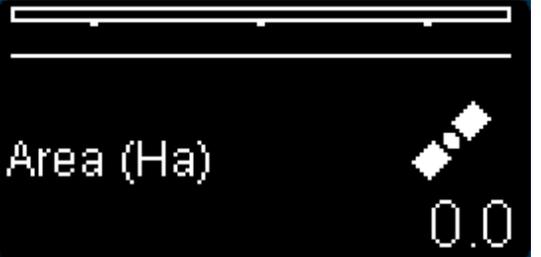
A delay may occur between the switching of the Master Section switch and when the Master Status is displayed on the AS7500. This delay is due to the type of electrical circuit switching used within the SRC.

If the display panel status value does not change, check that the cable has been installed correctly.

3.6 Configuring the Master Control Switch

The Master Control Switch (MCS) is the switch (source) which is used to control both the AS7500 controller and the SRC.

The vast majority of SRC have a master switch which is used to switch all sections On and Off as required. Ideally this will be setup as the MCS. The SRC Cable kit will indicate if the SRC master switch can be set as the MCS. However in some cases it is not possible, or practical to use this as the MCS. In these cases the front keypad of the AS7500 may be used as the MCS.
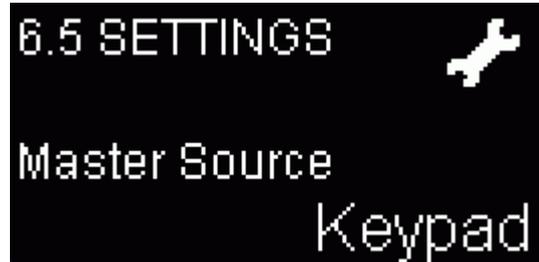
Prior to use of the AS7500 it is necessary to setup the MCS. Navigate to the MCS setting, Master Source option. See Section 6.10 to select the required option from the list. The MCS (Master Source) may be configured from the following settings.

Control Setting	Device Used
Keypad	The ✔ button on the front panel of the AS7500 controller (default setting).
External	Typically this will be the Master switch on the SRC. The AS7500 requires a constant 12Vdc signal on pin 11 of the Section Controller Port.
Bipole	Typically this will also be the Master switch on the SRC. It is observes a 12Vdc pulse on one wire (pole) to open the valve and then a 12Vdc pulse on the opposite wire (pole) of the valve to close it. The AS7500 requires 12vDC pulse on pins 11 and 16 of the Section Controller Port.

☞ *With Bipole selected as the MCS, only 12 boom sections can be used on the Section Controller port. Bipole must be set as the MCS before the cable is connected to the Section Controller port. Damage may occur to either the AS7500 the SRC, or both units.*

3.7 Self Test the AS7500

Prior to using the AS7500 for the first time, the AS7500 Self Test should be completed to ensure that all components are correctly installed and operational.

The Self Test is used to check that the AS7500 is communicating correctly with the SRC. It starts with a sound test and then turns each section On for three seconds. To start the test, set the Self Test option to "Yes". The left most boom section (when looking from behind the boom in a forward direction) will come on first. When the section test is finished it tests the MCS for general switching On and Off.
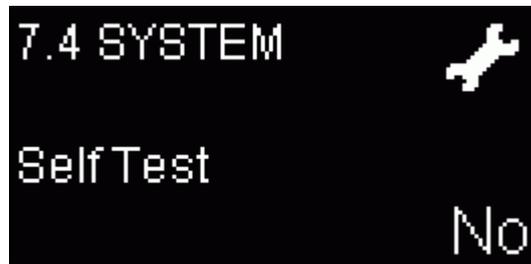
☞ *To If the MCS is set to External, it should be turned On prior to starting the Self Test.*

3.8 Configuring the Vehicle and Boom

When setting up the AS7500 for the first time or for use in a new vehicle, there are various settings that must be configured for AS7500 to function correctly and accurately.

The AS7500 models the movement of the entire spray rig, whether it is a self propelled boom spray or a pull behind (trailer) boom spray. This allows the true position of the spray boom and its orientation to be accurately computed for precise control when switching the boom sections On and Off.

The measurements as described in the following sections and depicted in Figure 3-10 through to **Error! Reference source not found.** are to be accurately measured for the relevant spray rig and recorded in the tables provided for future reference.

GPS Offset (Cross track)

The distance between the centreline of the vehicle and the GPS antenna must be entered as the Cross track value. Measure the distance and enter a positive value if the antenna is to the right of the centreline of the vehicle as viewed from the rear of the tractor facing forwards. Enter a negative value if the antenna is to the left of the centreline of the vehicle as viewed from the rear of the tractor facing forwards. The Cross track value can be edited in the GPS Menu.
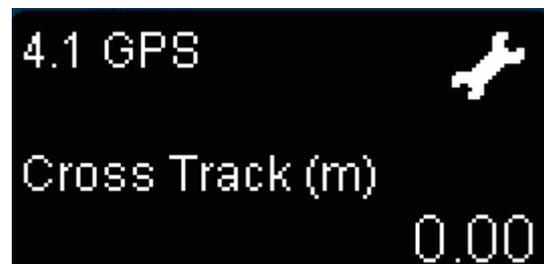
GPS Offset (Long track)

The Long track is the distance from the GPS antenna to the centreline of the front axle on the spray vehicle. If the GPS antenna is located forward of the front axle, the distance is entered as a negative value. If the spray vehicle is equipped with a front mounted boom, the Long track measurement is to the flow point of the boom and not the front axle.
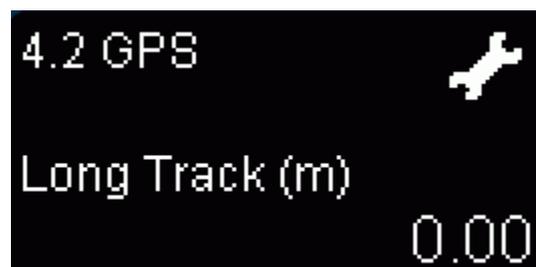
Boom Settings

The Boom Settings determine the overall width of the spray boom being used. Enter the number of boom sections and the width of each section in the Boom Width Menu.
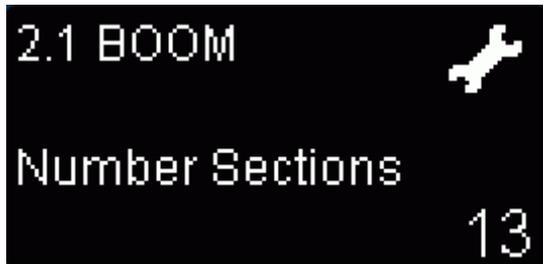
Front Boom

The Front Boom option is used when the physical boom is located at the front of the vehicle. The location of boom will be modelled correctly when this option is selected as Yes. See Appendix Q for a sample configuration.

Mid Offset

The Mid Offset option is used when the physical boom is split along the longitudinal axis of the vehicle. Typically this will be on a self propelled sprayer with mid mounted boom and the central part of the boom at the rear of the vehicle. The

mid offset for the boom is for one central section of the boom only and must be one complete section for the boom section switches, see Appendix Q for a sample configuration.
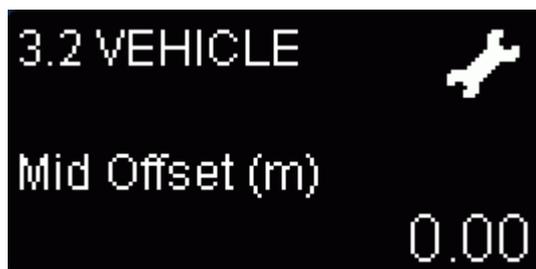
Boom Section Translation

The Translation option is used when the boom sections do not map "one-to-one" to the outputs of the Section Controller port. Using this option, the AS7500 outputs can be mapped to different boom sections. To use translation, edit the character in each boom section position and change it to the position that it is to be mapped to.

As an example if a five section boom had two additional switches placed for further control of the two outer most sections as shown in Figure 3-9 then it would be necessary to translate which sections would be activated by the AS7500. In this example it would be necessary to have the translation as shown in the sequence beneath the boom in Figure 3-9.
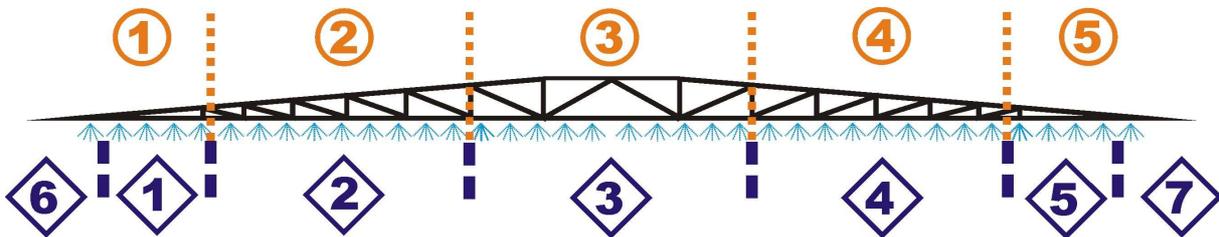
Figure 3-9   Boom Section Translation

☞ *There can be no duplication of section values in the translation table.*

☞ *In the example given it would be necessary to reconfigure the AS7500 to seven sections.*

Link and Axle Distances

The Link and Axle distances are used when determining the path of the spray rig as it moves around the field. First, enter the number of links for the spray rig. Then enter the distances for each link. The Link and Axle distances should be measured as follows:
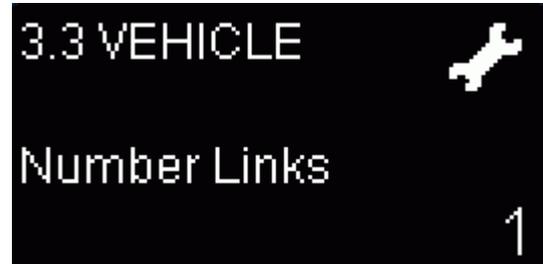
Link Setting	Measurement
Link 1	Link 1 is measured from the front axle centreline to the vehicle hitch point.
Axle 1	Axle 1 is measured from the rear axle of Link 1 to the hitch point of Link 1.
Link 2	Link 2 is measured from the hitch point of Link 1 to the hitch point or the flow point if it is the last link.
Axle 2	Axle 2 is measured from the rear axle of Link 2 to the pivot point of Link 2.
Link 3	Link 3 is measured from the hitch point of Link 2 to the flow point.
Axle 3	Axle 3 is measured from the rear axle of Link 3 to the flow point.

See Figure 3-10 for an illustration of the Link settings.

The number of Links and the Link and axle distances can be edited in the Vehicle Menu.
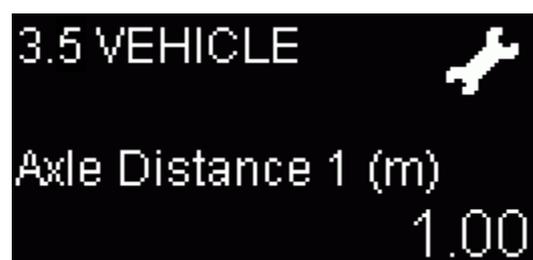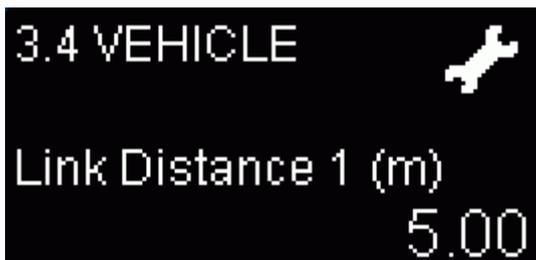
3.9 Measuring Vehicle & Boom offsets

For precise control of the AS7500 it is necessary that all measurements are accurately recorded and entered into the system. Some of the measurements required will be unique to the vehicle configuration, a self-propelled sprayer or tow behind, and the various equipment diagrams indicate the measurements required.

The typical measurements required, for a tractor and trailer configuration is shown in Figure 3-10. A more comprehensive list of spray vehicles and a table to record their respective measurements is provided in Appendix Q.

Tractor with pull behind boom spray
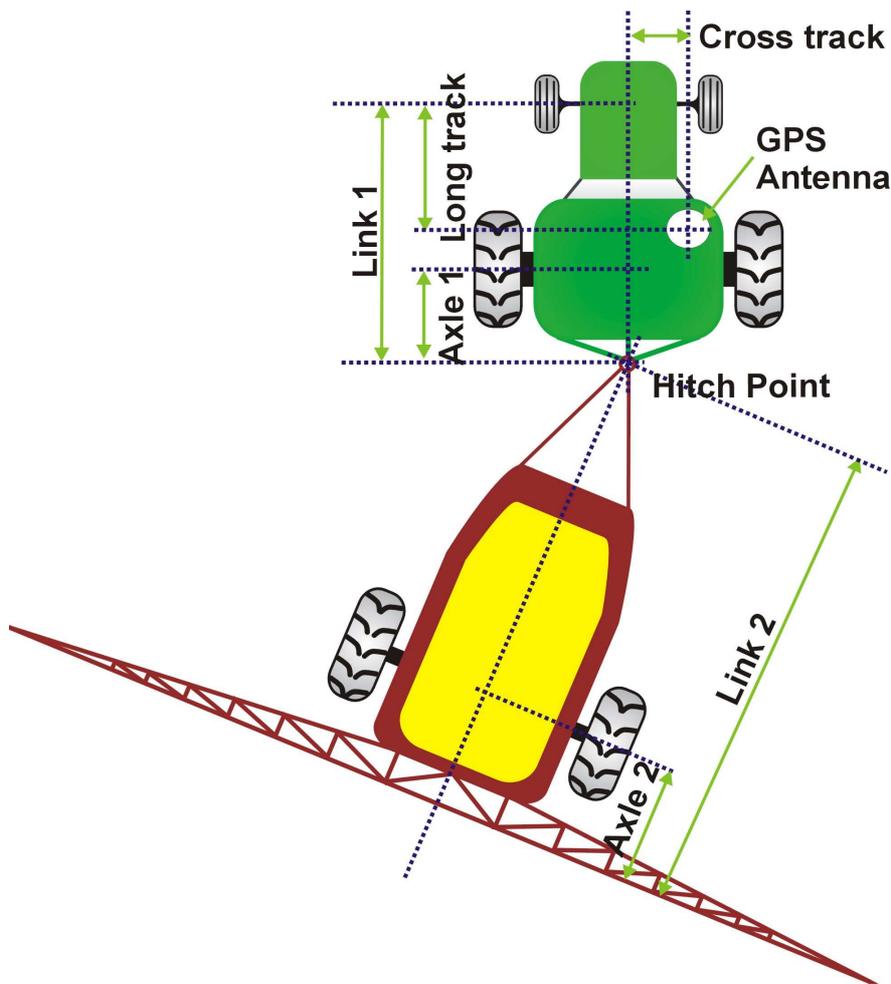
Figure 3-10 Tractor with pull behind boom spray

3.10 Configuring the Boom Spray Parameters

The following parameters are used when determining when to turn the boom sections On or Off. To optimize the usage of AS7500 it is important that these settings are configured correctly.

Tolerance

The Tolerance or Overlap is used to decide when to turn boom sections On or Off. When set to its default of 1%, the system will turn the sections On whenever any part of the sensed area has not been sprayed. It is effectively the percent of miss that the system will tolerate. If the value is increased, the system will not turn the sections On when traversing over a small missed area such as a line between two spray swaths.
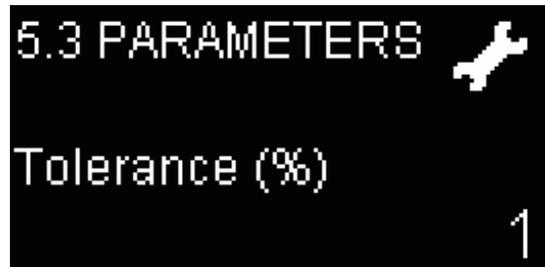
The Tolerance value can be edited in the Parameters Menu.

Min Delay

This value defines the minimum amount of time that should elapse before a section that has been switched Off can be again turned On, and vice-versa. The feature is designed to prevent problems due to fast switching of solenoid valves.

The entered value is a percentage of the sum of the Latency On and Latency Off values.

The Min. Delay value can be edited in the Parameters Menu.

> NOTE: *This is an advanced tuning parameter and should only be changed from its default value under instruction from authorised support personnel.*

Latency On

Latency On is used to compensate for any time delay between the time the system requests the valves to open and the actual time that this takes place. For example, if it takes one second for a valve to open, a Latency On of one second should be entered.

In this case the signal to open the valve will be sent to the valve a second before the valve needs to open. This is illustrated in Figure 3-11.
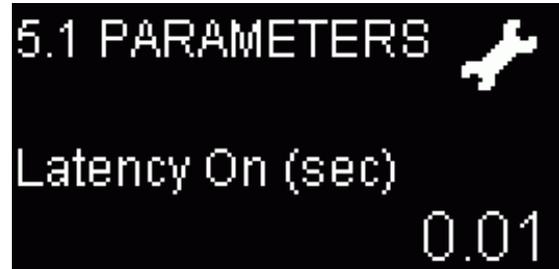
Latency Off

Latency Off is opposite to Latency On and is used to compensate for any time delay between the time the system requests the valves to close.
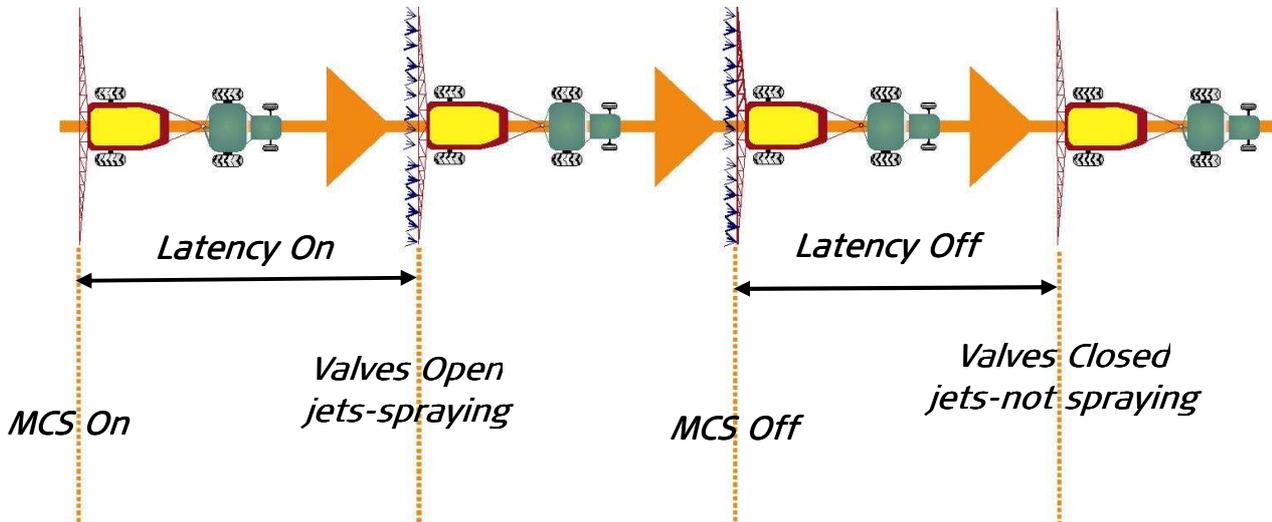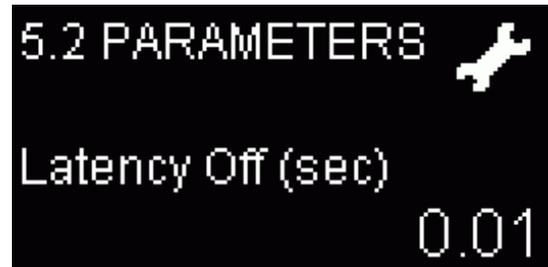
Figure 3-11 AS7500 Latency values

3.11 Measuring Latency Values

The following parameters are used when determining when to turn the boom sections On or Off. To optimize the usage of AS7500 it is important that these settings are configured correctly.

The quickest way to estimate the latency of the sprayer is to use a stop watch, turn a spray section On and time the delay between this action and when spray is coming out the nozzle onto the crop. The same steps would be taken to measure the latency value when switching a section Off.

These observations require precise timing and would need to be repeated many times to confirm that the times were accurate. The times would need to be measured to less than 0.01 of a second for precise control.

A more accurate and convenient way to measure latency is with the following procedure.

Step	Instruction	Diagram
1	Drive slowly in a straight line down the field for 200m with the sprayer on. The tank should have water only for the purpose of this exercise. Have another person mark the left end nozzle of the boom with two pegs and a rope half way along the spray run.	
2	At right angles to the previous spray run, spray at a constant speed of 20km/h across the spray mark with one end of the boom crossing over the rope. Ensure that you have allowed enough distance before crossing over the line for the boom trailer to straighten up behind the tractor. Have someone measure the distance from the rope to where the sprayer actually turned on the sections.	

Step	Instruction	Diagram
3	**Calculations - Metric** If Speed(km/h) = The speed of the vehicle in kilometres per hour Distance (m) = The distance from the rope to where the sprayer turned on the sections in metres. Calculate the Latency On using this formula: **Latency On(s) = Distance(m) ÷ Speed(km/h) x 3.6** For example Assuming the operator was travelling at 20km/hr and the distance from the rope to where the sprayer turned on the sections is 5 metres: Latency(s) = 5(m) ÷ 20(km/h) x 3.6 = 0.9 seconds. **Calculations - Imperial** If Speed(mph) = The speed of the vehicle in miles per hour Distance (in) = The distance from the rope to where the sprayer turned on the sections in inches. Calculate the Latency On using this formula: **Latency On(s) = Distance(in) ÷ Speed(mph) x 0.056** For example Assuming the operator was travelling at 10mph and the distance from the rope to where the sprayer turned on the sections is 150 inches: Latency(s) = 150(in) ÷ 10(mph) x 0.056 = 0.8 seconds.	
4	Repeat steps 1 to 3, altering the Latency On figure by plus or minus 0.1 seconds, until the optimum result is achieved.	

To calculate the Latency Off value the same procedure is followed, except that the measurements are observed where the sections are switched Off crossing into the sprayed area.

The following examples show possible scenarios and how to resolve the latency settings for optimum control of the AS7500.
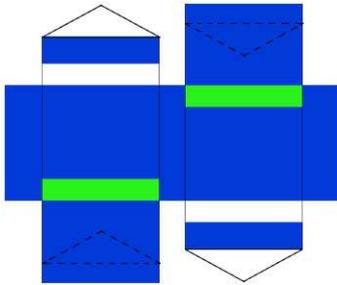
Both Latencies set too <u>low</u>
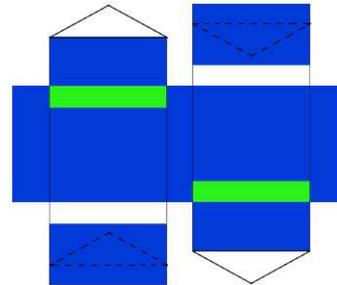
Both Latencies set too <u>high</u>
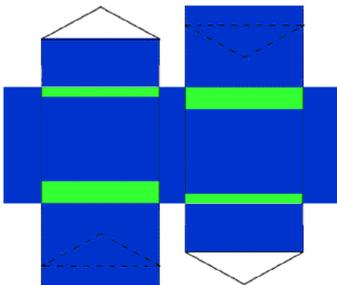
Latency ON is normal

Latency OFF set too <u>low</u>
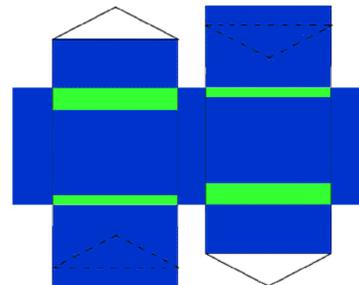
Latency ON set too <u>high</u>

Latency OFF is normal
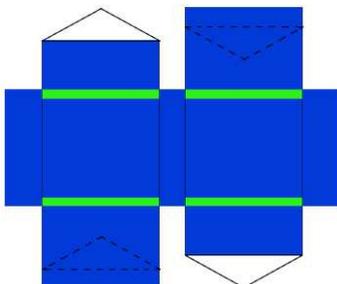
Optimum Latency setup
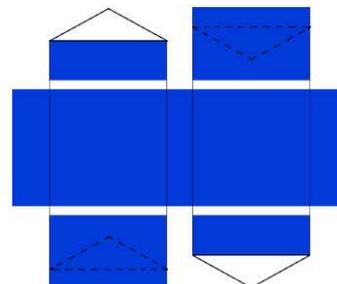
Abnormal situation
Check link and axle measurements,
reset latency values to 0.0s and
repeat test

3.12   Saving & Restoring Configuration Settings

All the settings for the unit configured for a particular vehicle can be backed up and restored to a USB-stick (USB thumb drive) if required. Hence when moving the device to a different vehicle or installation, a restore from a USB-stick is all that is required to get started. This makes changing the unit between vehicles simpler.

To save the system settings

1. Place a blank USB-stick in the USB Port prior to turning on the AS7500.

2. Go to menu 7.3 Upgrade Software menu and toggle the No option to Backup.

3. The system will display "Complete" when the backup is successful.
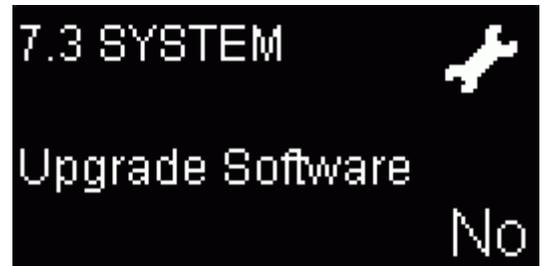
To restore the system settings

1. Place the USB-stick, which contains the Backup settings for the rig which is to be configured, into the USB-Port prior to turning on the AS7500.

2. Go to menu 7.3 Upgrade Software menu and toggle the No option to Restore.

3. The system will say "Complete" when the restore is successful.
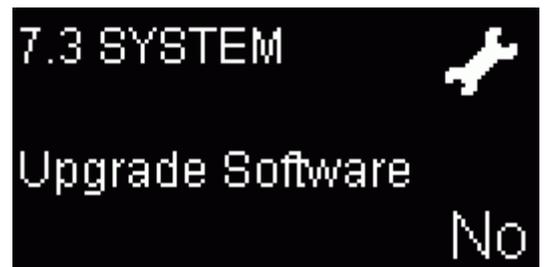
4

Using the

AS7500
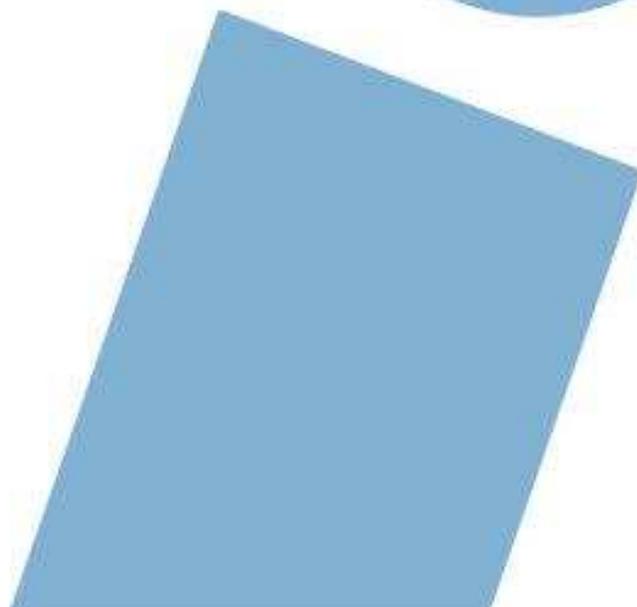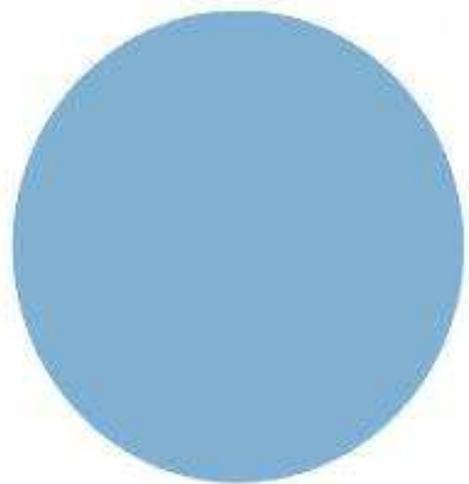
Once the AS7500 has been setup and calibrated it is a very simple system to use and requires only one button to start and stop operations in the field.

This section provides the user with a step by step guide to using the AS7500 on a daily basis in the field. Should it be necessary to suspend or pause operations in the field, this section also describes the necessary steps.

While the AS7500 does not require user intervention during normal operation, the method of overriding the AS7500 is also described in this section.

4.1 Starting a Field

Prior to starting in a new field it is essential that the AS7500 has been setup and all relevant dimensions of the spray rig have been measured and recorded as shown in Section 3.9. It is also necessary that the system has been calibrated in accordance with Section 3.11.

Once these steps have been completed then the system is ready for use to start work in a field. Prior to starting any field it is recommended that the system be cleared of all previous information.

The first step is to start the vehicle and any necessary pumps or ancillary equipment in preparation for the field activities. The next step is to power up the AS7500 and the SRC installed in the vehicle. The field data can then be cleared using one of two methods.

4.1.1   Clearing a Field from Operational Mode

 This Method is the quickest method to clearing all treatment data from the AS7500 in preparation to commence a new field.

While in Operational mode, hold down the ⊗ button on the display panel for a few seconds until the screen displays "Clearing…". The message "Treatment Clear" will be displayed when the field has been successfully cleared. Any boundaries that exist will also be cleared. These steps are shown in Figure 4-1.

Figure 4-1   Clearing Treatment data

☞   *All previous treatment data will be lost when the field is cleared.*

4.1.2 Clearing a Field from Setup Mode

 The field can be reset in the Setup Mode by navigating to the menu 1.1 GENERAL-Field Reset and then toggling the option to Yes. This will clear all treatment data from the AS7500 in preparation to commence a new field.

From the Operational Mode, with the MCS Off, press the ⊗ button to enter Setup Mode. The Setup menu 1.1 GENERAL-Field Reset is the first menu when entering the Setup Mode. Press the ✓ button to enter EDIT mode, and press the ⌃ or ⌄ buttons to change the NO to a YES. Press the ✓ button to exit EDIT mode. The field will be cleared, as shown in Figure 4-1.

4.2 Using the AS7500 to Spray a Field

The following is a step by step guide to using the AS7500 to spraying or a field with the AS7500 using automatic boom section control.

Step	Instruction
1	If not already done so, start the vehicle and any necessary pumps or motors to operate the boom spray. Start the SRC and the AS7500
2	Wait until the display panel is operational, this may take approximately 15 seconds. Confirm that the GPS status icon on the display panel shows the scrolling satellite. If the GPS is not ready wait until the system is ready to proceed.
3	Confirm that the Area value reports 0.0Ha for a new field. If the field has not been cleared see Section 4.1.1.
4	Position the vehicle ready to commence spraying operations with the boom spray in position ready to drive forward to spray the field.
5	Turn all boom section switches to the Off position.
6	If the Master Switch of the SRC is not set as the MCS, then turn to the On position, otherwise proceed to the next step.
7	Turn the MCS to the On position. Note that MCS status will become a solid block at the top of the display panel.
8	Start to move the vehicle forward and observe that the boom sections will automatically switch On. The physical spray nozzles will start spraying the field.
9	Drive around the field in the normal method at the desired speed. As the vehicle moves over any area that has been sprayed the AS7500 will switch Off boom sections as necessary to minimise over-spray in the field.
10	As the field is being treated, status information can be viewed on the display panel.
11	When the field has been completed, turn the MCS Off.

Step	Instruction
12	Turn the Master Switch on the SRC to the Off position, if not already done so.

☞ *Boom sections will switch Off if the vehicle is stationary with the MCS On.*

Once the field has been completed the size of the field is displayed in the Operational Mode. The area is computed using GPS co-ordinates, hence it may not agree exactly with the SRC as it will typically use a relatively coarse calculation based upon the distance travelled.

The above steps can be repeated to spray a new field commencing from Step 3 of clearing the treatment from the AS7500.

4.3 Suspending & Resuming Spraying Operations in the Field

If it is necessary to suspend the spraying operations, such as filling the spray tank before the field has been completed the MCS should be turned Off. The spray rig may then travel to where ever it is necessary to fill the tank. Once the spray rig returns to the field to re-commence spraying operations, proceed from Step 4 in Section 4.2.

If necessary the AS7500 may be switched off entirely between suspending and resuming spraying operations in the field. This may be necessary if environmental conditions in the field prevent the spraying operations to be terminated for the day.

Spraying operations can be resumed in the field after any period of time, assuming that the treatment has not been cleared from the AS7500. However it should be noted that the accuracy of the shut-off will be related to any drift in GPS accuracy over this time.

☞ *To continue tank agitation on the spray rig without auto section control, place the AS7500 in Setup Mode and turn the MCS On.*

4.4 Starting a New Field

After a field has finished being sprayed, it is a simple step to start a new field. As stated in Section 4.1 it is important that the field is cleared, or reset to begin spraying a new field.

Clearing information from the AS7500 ensures that the internal memory is not overloaded with old data from completed fields. The AS7500 has a capacity to work in fields up to 800Ha (2,000ac) in capacity before it is necessary to reset the field. However it is a good practice to clear the field prior to commencing a new field.

See Section 4.1 to clear the field and commence spraying in a new field.

4.5 Override Function

The Override Function is used to override the status of the system so that selected sections are temporarily fixed to On or Off and are not controlled by the AS7500.

Any individual section can be over ridden to either On or Off and ignore the automatic operation of section control. This allows the AS7500 to leave "tram-lines" when used with a planter or similar such operations.

```
5.4 PARAMETERS  🔧

Override

           Disabled
```
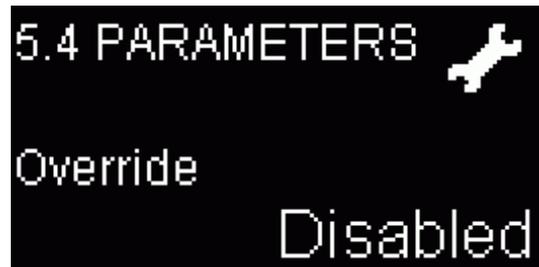
In addition to this the override function can be incremented from one section to the next, starting from either side, similar to the operation in some spray controllers. This permits a quick an easy method for manual override of sprayer "wing-tips" when used around waterways or fence lines and other related activities.

In order to use the override function it must first be enabled in the Setup mode and configured to the format that is required. The Override function is configured using the PARAMETERS menu in Setup mode.

Override Status	Action
Disabled	Used to switch the Override Function off. In this state the Override is not active and the user is not able to manually control the section switches. ☞*This is the default state.*
Off	Allows the user to increment sections from either side to manually switch boom sections to Off and ignore the AS7500 status.
On	Allows the user to increment sections from either side to manually switch boom sections to On and ignore the AS7500 status.
Manual	Allows the user to select individual sections and toggle these to either, Override Off and Override On and ignore the AS7500 status.

4.5.1   Wing-tip Increment Override

In order to use the wing-tip incremental override the operator must first select whether the override function is to be set to On or Off. The operator must set the function in the Setup Mode as previously described.

To use the wing-tip increment override function while spraying, press the ⊙ or ⊙ button while in Operational mode, to select and increment sections to override.

Pressing ⊙ will select and deselect sections starting from the left wing-tip of the boom, working to the right with each subsequent press.

Pressing ⊙ will select and deselect sections starting from the right wing-tip of the boom, working to the left with each subsequent press.

☞ *Override Function is accessible only after turning the MCS On.*

As an example assume that it is necessary to spray around an obstacle and one side of the boom will pass across to an adjoining field which is not to be sprayed as shown in Figure 4-2.
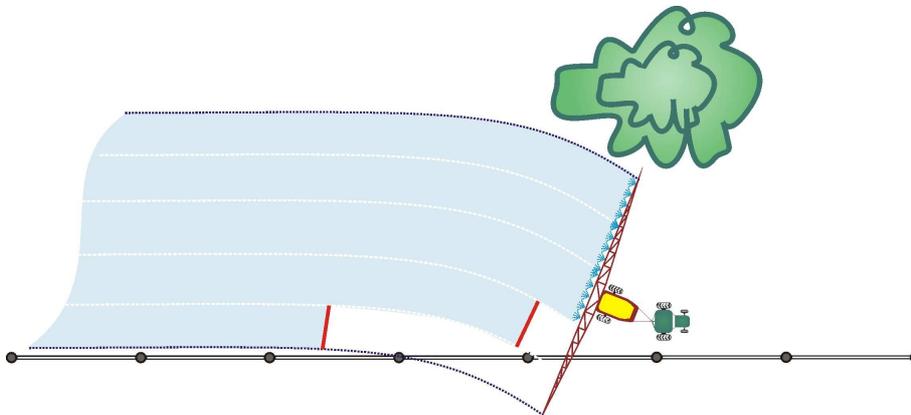
Figure 4-2   Override function set to Off, stop spraying over a fence line

Using the wing-tip increment override allows the user to manually switch sections Off on outer side of the boom as it hangs over the boundary that is not required to be sprayed. This is shown in the following steps;

STEP	AS7500 Screen	Boom Spray
Normal mode	Area (Ha) 10.1	All boom sections are On and the Override function is not activated
Press ◁	Area (Ha) 10.1	The outermost right hand boom section is Off, the manual override indicator status is shown below the section switched Off.
Press ◁ again	Area (Ha) 10.1	The two outermost right hand boom sections are Off, the manual override indicator status is shown below the two sections switched Off.

The above actions can be reversed by pressing the ▷ as required or pressing the ✓ will clear all override settings and the AS7500 will function as normal. However if the MCS is set as the Keypad then it is not possible to clear all settings.

The Override to On has the same functionality as that described above. However the Override status indicator is different as shown here.

Area (Ha) 10.1
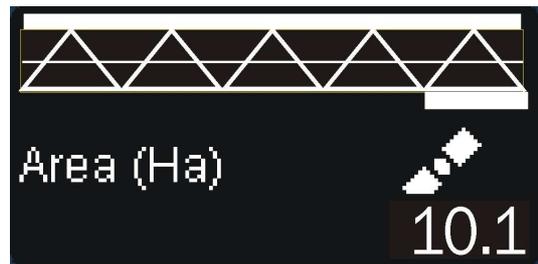
4.5.2   Individual Section Override

To select individual sections that are to be manually set to either the On or Off position, and to ignore the AS7500 status, it is necessary to firstly set the Override function to Manual in the Setup Mode as previously described.

In Operational mode the user steps to the individual section and then selects to set the override status to either On or Off as required for the operation. Typically this will be done before commencing spraying or planting activities.

Pushing the ⌃ button toggles the selected section between Automatic, Override Off and Override On. The section status is displayed with an indicator as shown in the following steps;

STEP	AS7500 Screen	Description
Operational mode with Manual Override	Area (Ha) 12.3	Flashing box indicates the section which can be toggled between Automatic, Override Off and Override On.
Press ⟩ to move to section	Area (Ha) 12.3	Flashing box indicates the section which is be configured.
Press ⌃ to toggle Override Off	Area (Ha) 12.3	Section Status (2) is indicated as Override Off with a hollow box at the Section status position.

STEP	AS7500 Screen	Description
Press ⟩ to move to section	Area (Ha) 12.3	Flashing box indicates the section which is be configured. Section (2) has been manually set with Override Off.
Press ⌃ twice to toggle Override On	Area (Ha) 12.3	Section Status (3) is indicated as Override On with a solid box at the Section status position. Section (2) has been manually set with Override Off.
Press ⟩ to move to section	Area (Ha) 12.3	Flashing box indicates the section which is be configured. Section (2) has been manually set with Override Off. Section (3) has been manually set with Override On.
Press ⌃ to toggle Override On	Area (Ha) 12.3	Section Status (4) is indicated as Override Off with a hollow box at the Section status position. Section (2) has been manually set with Override Off. Section (3) has been manually set with Override On.
Start spraying or planting	Area (Ha) 12.3	Sections (1) and (5) in Automatic mode; Sections(2) and (4) in Override Off and Section (3) in Override On.

Note that if the Master switch is set to external, then pressing the

✓button will toggle all sections between Automatic, Override Off and Override On.

4.6 Forced Start (Section Control)

The Section Control function is used when it is necessary for boom sections to remain On, even when the vehicle is stationary or operating at extremely low speeds.

When the AS7500 is used in a spraying application the Section Control function is used to forced the sections to remain open, even if the vehicle is moving extremely slow or even stationary. This is useful when a spray rig is backed into a position and then moves forward to commence spraying activities and the operator wants instant application of product. This will still be determined by the SRC functionality which is governed by the pressure and rig speed. However all Sections will be forced On for an immediate start and the Latency value will be ignored.

When used with a planter it is designed to prevent any gaps with seed placement as the rig starts and stops planting in a field. Under normal operating conditions all sections will be Shut Off when the speed of the vehicle drops below the minimum operating speed (0.5kmh / 0.8mph).

The operator is required to select the desired mode in the Setup mode menu 1.4 GENERAL-Section Control ‹0 / 1›. The Section Control function is configured via the following settings;

(0) All sections will transition to Off whenever the speed of the vehicle goes below 0.5km or 0.8mph.

(1) The sections will be forced On even when the vehicle is stationary.

4.7 Backup and Restore

The AS7500 can Backup all the setup / parameter information entered into the controller to USB stick. This information can then be Restored to the controller at a later point in time. This function is useful if the AS7500 is swapped between vehicles and/or rigs, such as a planter and a sprayer, without the need to manually re-enter all setup information into the AS7500.

The following is a step by step guide to creating a Backup USB stick for the AS7500.

Step	Instruction
1	Place a blank USB stick in the USB port of the AS7500 while it is switched Off.
2	Start the AS7500 and toggle to the Setup Mode, menu 7.3 SYSTEM –Upgrade Software.
3	Toggle the option from ‹No› to ‹Backup›, the Backup procedure will start automatically and display Complete when finished.
4	The USB stick can then be removed and should be labelled accordingly so that it can be used to restore the AS7500 at a later point in time.

In order to restore the AS7500 to a previously saved configuration the following step by step guide is followed.

Step	Instruction
1	Place the USB stick with the Backup vehicle configuration in the USB port of the AS7500 while it is switched Off.
2	Start the AS7500 and toggle to the Setup Mode, menu 7.3 SYSTEM –Upgrade Software.
3	Toggle the option from ‹No› to ‹Restore›, the Restore procedure will start automatically and display Complete when finished.
4	The USB stick can th be removed.

4.8 Record Boundary Inclusion / Exclusion

The AS7500 is able to record two types of boundaries

Inclusion: The inclusion boundary is the boundary of an area in which sections can be turned on and treatment can be recorded.

Exclusion: Exclusion boundaries are areas inside and/or outside the inclusion boundary where sections cannot be turned on and treatment will not be recorded.

The diagram below shows two examples of Boundaries. Both examples have an Inclusion boundary created with a right boundary record point. Both examples also have an Exclusion boundary and show that one exclusion boundary record point is on the left and one is on the right. The exclusion boundary may be for vegetation, boggy area, water course or some other obstacle.

Inclusion Boundary

Exclusion Boundary

Treatment permitted inside of Inclusion Boundary

No treatment outside of Inclusion Boundary

No treatment within exclusion boundary
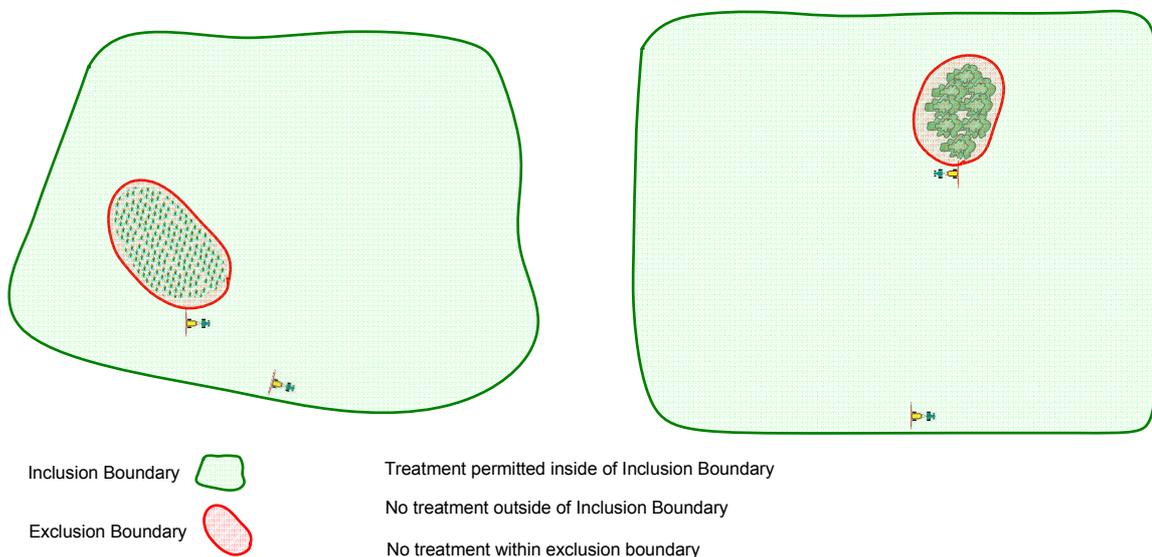
Figure 4-8-1 Inclusion and Exclusion Boundaries

4.8.1   Boundary Operations

The following boundary operations exist:

Press ⊗ enter the menu structure then press ⌃ or ⌄ to advance to the menu section Boundary.

Press ❯ or ❮ to change to sub menu selections, press ✓ to enable the selection.

Press ⌃ or ⌄ to change item selection, press ✓ to set selection.

STEP	AS7500 Screen	Description
Select Record Boundary	8.1 BOUNDARY 🔧 Record Boundary Inclusion	Inclusion – areas within an inclusion boundary may be treated.
	8.1 BOUNDARY 🔧 Record Boundary Exclusion	Exclusion – areas within an exclusion boundary may not be treated even though the exclusion boundary can be within an inclusion boundary
	8.1 BOUNDARY 🔧 Record Boundary No	No – Do not create a boundary.
Press ⊗ to close boundary	Press X to close boundary	Having selected a boundary type, the user drives around the perimeter and presses ⊗ to close the boundary.

STEP	AS7500 Screen	Description
Operational Mode	------------------------------- Boundary (Ha) 2.0	Following the close of the boundary the user is returned to Operational Mode, Boundary (Ha)information is shown.
Select Activate Boundary	8.2 BOUNDARY Activate Boundary Yes	Yes – the boundaries are active and inclusions and exclusions are applied.
	8.2 BOUNDARY Activate Boundary No	No – the boundaries are NOT active and inclusions and exclusions are NOT applied. **Note:** The boundaries still exist and can be reactivated.
Boundary Record Point	8.3 BOUNDARY Boundary Record Point Right	Right – the boundary record point is the right most point of the boom. DEFAULT
	8.3 BOUNDARY Boundary Record Point Left	Left – the boundary record point is the left most point of the boom.
	8.3 BOUNDARY Boundary Record Point Centre	Centre – the boundary record point is the Centre point of the boom

4.8.2 Recording Boundaries

The following is a step by step guide to using the AS7500 to record an inclusion boundary and exclusion boundary.

Step	Instruction
1	Prepare the vehicle and AS7500 for spraying as described in the previous section.
2	Wait until the display panel is operational, this may take approximately 15 seconds. Confirm that the GPS status icon on the display panel shows the scrolling satellite. If the GPS is not ready wait until the system is ready to proceed.
4	Position the vehicle with the left or right point of the boom on the edge of the inclusion boundary with the vehicle prepared to drive the boundary. see figure 4-8-1
5	Select Boundary Record Point item 8.3 and select Left Right or Centre. That is which side of the boom is to record the boundary.
6	Select Record Boundary item 8.1 . Select Inclusion and press ✔ .
7	Drive the boundary of the field or treatment area.
8	At the same time you may enable treatment by pressing ✔ whilst recording the boundary.
9	When you have travelled the perimeter of the boundary but before reaching the start point, press ✖ to close the boundary. **Note:** The boundary can NOT be edited. You can press ✖ at any time and the boundary will be closed by a direct line from the current boundary record point to the start point. If you drive past the start you may be able to circle back to the

Step	Instruction
	correct point.
10	You may now continue to treat inside of the inclusion boundary.
11	You can create an exclusion area by positioning the vehicle adjacent to the area with the boom in a position to mark the exclusion boundary.
12	If necessary select Boundary Record Point item 8.3 and select Left Right or Centre. You should only do this if you wish to use a different side than you used when recording the inclusion boundary. To do this you will need to disable treatment first.
13	Select Record Boundary menu item 8.1 **Alternatively** Use the shortcut of pressing ✓ for 2 seconds to bring up the Record Boundary menu.
15	Select Exclusion and press ✓ .
16	Drive the boundary of the exclusion area. see figure 4-8-1
17	When you have travelled the perimeter of the boundary but before reaching the start point, press ✕ to close the boundary. **Note:** the boundary can NOT be edited. You can press ✕ at any time and the boundary will be closed by a direct line from the current boundary record point to the start point.

4.8.3   Boundary Features

Shortcut to launch the Record Boundary menu.

Hold the tick ✓ button for two seconds
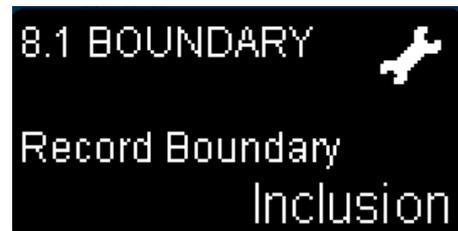
A field reset (press ✕ for 2 seconds) will clear the current treatment along with ALL boundaries.

Boundaries and treatment are saved between sessions. You may power down the AS7500 and power it back up, all boundaries and treatments will still exist.

Having created inclusion and an exclusion boundary, you may wish to treat in some area that is normally excluded by those boundaries. You may do this by selecting menu item 8.2 Activate Boundary and selecting No. To return to using the boundaries select menu item 8.2 Activate Boundary and select Yes.

You may only have one Inclusion zone and one exclusion zone.

Boundaries will automatically close if they are crossed within an implement width of the start position. The boundary will NOT close if the user is travelling parallel to the boundary, the boundary must be crossed, or, the

user must choose to close the boundary by pressing the ✕ button. This requirement is intentional and stops invalid auto close conditions.
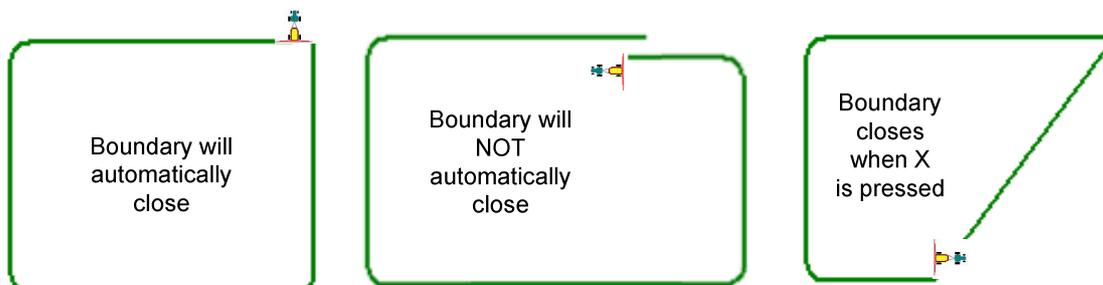
Figure 4-8-2 Boundary Closure

If a loop is created in the boundary it will be automatically removed.

Loops in boundary paths
are automatically removed
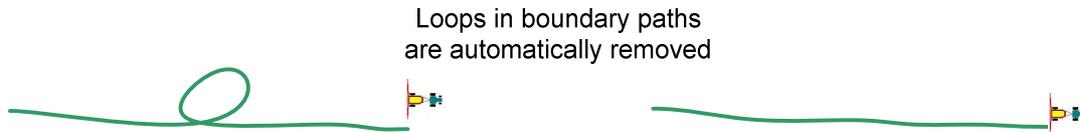
Figure 4-8-3 Boundary Loops Removed

If needed a new Inclusion or Exclusion Boundary can be created, that new boundary will replace the existing boundary. You might do this if you had closed an Exclusion zone too early cutting off part of the exclusion zone or too late creating a triangular shaped protrusion on the exclusion zone.

Pressed X here
(too late)

start

Original

Pressed X here

start

New
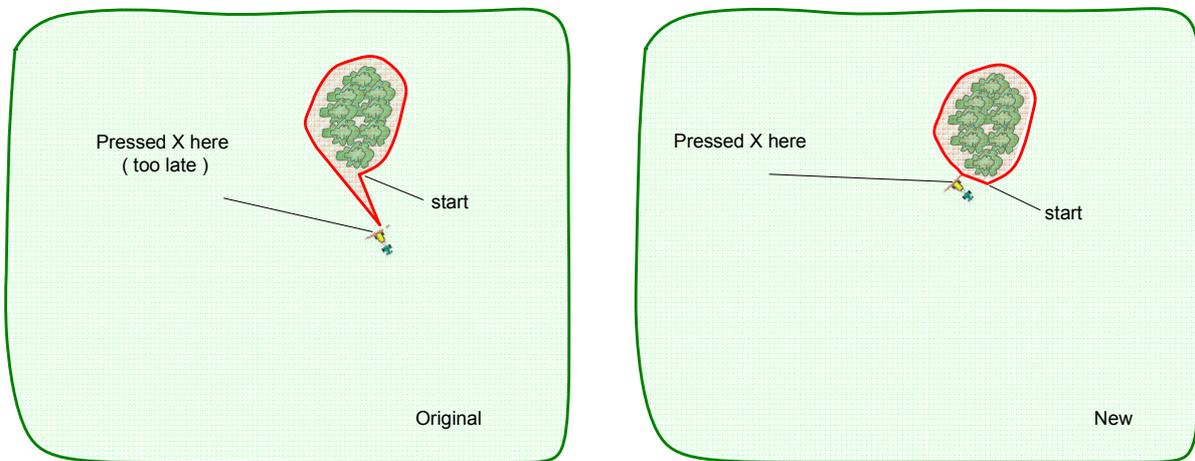
Figure 4-8-4 Fix(too late)Exclusion Boundary

The default Boundary Record Point is Right. Having set the boundary record point for one boundary type it will remain the same for all subsequent boundaries. Once a boundary has been created it may be necessary to stop treatment in order to change from say, a Right boundary for the Inclusion zone to a Left boundary for an Exclusion zone.

5

Safety Directions
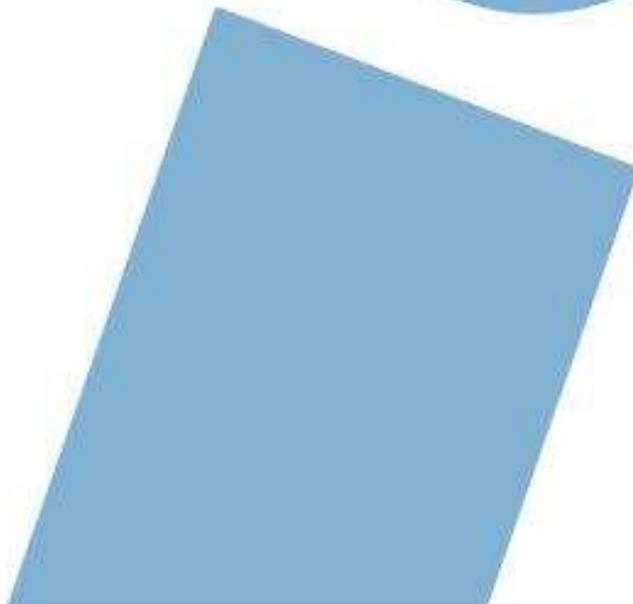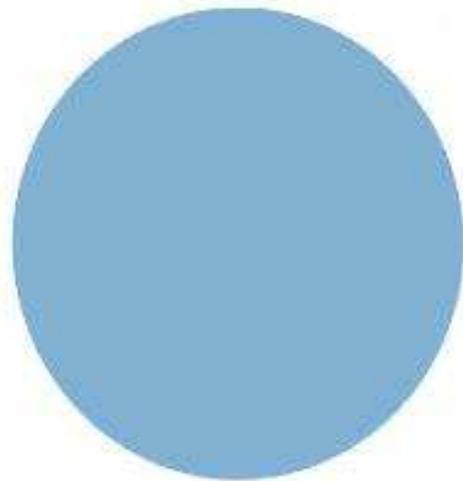
The AS7500 is a safe product and the following directions should enable the person responsible for the product, and the person who actually uses the equipment, to anticipate and avoid operational hazards.

The person responsible for the product must ensure that all users understand these directions and adhere to them.

5.1 Intended Use

Permitted use

- The AS7500 is intended for agricultural and forestry use only.
- The AS7500 is only intended to be fitted to agricultural vehicles. It is not permitted to install this product in any other vehicles.
- Data communication with external appliances.
- Automatic section control with external devices.
- Guidance of approved agricultural equipment.

Adverse use

- Use of the product without instruction.
- Use outside of the intended limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, for example screwdriver, unless this is specifically permitted for certain functions.
- Modification or conversion of the product.
- Use after misappropriation.
- Use of products with obviously recognizable damages or defects.
- Use with accessories from other manufacturers without the prior explicit approval of Leica Geosystems.
- Inadequate safeguards at the working site, for example when using on the intended site.

⚠ Warning

- Adverse use can lead to injury, malfunction and damage.
- It is the task of the person responsible for the equipment to inform the user about hazards and how to counteract them. The product is not to be operated until the user has been instructed on how to work with it.

- Unauthorized modification of agricultural machine by mounting or installing the product may alter the function and safety of the machine.

- **Precautions:**
  Follow the instructions of the machine manufacturer. If no appropriate instruction is available, ask the machine manufacturer for instructions before mounting or installing the product.

5.2 Limits of Use

Environment

Suitable for use in an atmosphere appropriate for permanent human habitation: not suitable for use in aggressive or explosive environments.

Danger

Local safety authorities and safety experts must be contacted before working in hazardous areas, or in close proximity to electrical installations or similar situations by the person in charge of the product.

5.3 Responsibilities

Manufacturer of the product

Leica Geosystems AG, CH-9435 Heerbrugg, hereinafter referred to as Leica Geosystems, is responsible for supplying the product, including the user manual and original accessories, in a completely safe condition.

Manufacturers of non Leica Geosystems accessories

The manufacturers of non Leica Geosystems accessories for the product are responsible for developing, implementing and communicating safety concepts for their products, and are also responsible for the effectiveness of those safety concepts in combination with the Leica Geosystems product.

Person in charge of the product

The person in charge of the product has the following duties:

- To understand the safety instructions on the product and the instructions in the user manual.

- To be familiar with local regulations relating to safety and accident prevention.

- To inform Leica Geosystems immediately if the product and the application becomes unsafe.

- To ensure that the national laws, regulations and conditions for the operation of radio transmitters are respected.

⚠ **Warning**

- The person responsible for the product must ensure that it is used in accordance with the instructions. This person is also accountable for the training and the deployment of personnel who use the product and for the safety of the equipment in use.

5.4 Hazards of Use

⚠ **Warning**

- The absence of instruction, or the inadequate imparting of instruction, can lead to incorrect or adverse use, and can give rise to accidents with far-reaching human, material, financial and environmental consequences.

- **Precautions:**
  All users must follow the safety directions given by the manufacturer and the directions of the person responsible for the product.

- Watch out for erroneous measurement results if the product has been dropped or has been misused, modified, stored for long periods or transported.

- **Precautions:**
  Periodically carry out test measurements and perform the field adjustments indicated in the user manual, particularly after the product has been subjected to abnormal use and before and after important measurements.

- If the product is used with accessories, for example masts, staffs, poles, you may increase the risk of being struck by lightning.

- **Precautions:**
  Do not use the product in a thunderstorm.

- Inadequate securing of the working site can lead to dangerous situations.

- **Precautions:**
  Always ensure that the working site is adequately secured. Adhere to the regulations governing safety and accident prevention and road traffic.

- Only Leica Geosystems authorized service workshops are entitled to repair these products.

Caution

- If the accessories used with the product are not properly secured and the product is subjected to mechanical shock, for example blows or falling, the product may be damaged or people may sustain injury.

- Precautions:
  When setting-up the product, make sure that the accessories are correctly adapted, fitted, secured, and locked in position.

- Avoid subjecting the product to mechanical stress.

Warning

- Incorrect fastening of the AS7500 and cabling to vehicles or transporters poses the risk of the equipment being broken by mechanical influence, vibration. This may result in accident and injury.

- Precautions:
  Attach the controller and cabling professionally. Ensure that the mounting device is correctly mounted and able to safely carry the weight of the controller (>1 kg).

Caution

- Installing near mechanically moving machine components may damage the product.

- Precautions:
  Deflect the mechanically moving machine components as far as possible and define a safe installation zone.

Warning

- High mechanical stress, high ambient temperatures or immersion into fluids can cause leakage, fire or explosions of the controller.

- Precautions:
  Protect the controller from mechanical influences and high

ambient temperatures. Do not drop or immerse controller into fluids.

⚠ Danger

If the product is used with accessories, for example masts, staffs, poles, you may increase the risk of being struck by lightning. Danger from high voltages also exists near power lines. Lightning, voltage peaks, or the touching of power lines can cause damage, injury and death.

- Precautions:
  - Do not use the product in a thunderstorm as you may increase the risk of being struck by lightning.
  - Be sure to remain at a safe distance from electrical installations. Do not use the product directly under or in close proximity to power lines. If it is essential to work in such an environment contact the safety authorities responsible for electrical installations and follow their instructions.
  - To prevent damages due to indirect lightning strikes (voltage spikes) cables, for example, power source or controller should be protected with appropriate protection elements, like a lightning arrester. These installations must be carried out by an authorized specialist.
  - If there is a risk of a thunderstorm, or if the equipment is to remain unused and unattended for a long period, protect your product additionally by unplugging all systems components and disconnecting all connecting cables and supply cables, for example, receiver - antenna.

⚠ Warning

- If the product is improperly disposed of, the following can happen:
  - If polymer parts are burnt, poisonous gases are produced which may impair health.
  - By disposing of the product irresponsibly you may enable unauthorized persons to use it in contravention of the regulations, exposing themselves and third parties to the

risk of severe injury and rendering the environment liable to contamination.

- **Precautions:**
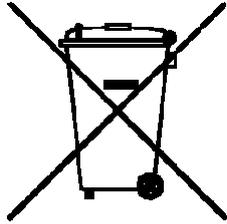
The product must not be disposed with household waste. Dispose of the product appropriately in accordance with the national regulations in force in your country. Always prevent access to the product by unauthorized personnel.

Product specific treatment and waste management information can be downloaded from the Leica Geosystems home page at http://www.leica-geosystems.com/treatment or received from your Leica Geosystems dealer.

5.5 Electromagnetic Compatibility EMC

Description

The term Electromagnetic Compatibility is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.

⚠️ **Warning**

- Electromagnetic radiation can cause disturbances in other equipment.

- Although the product meets the strict regulations and standards which are in force in this respect, Leica Geosystems cannot completely exclude the possibility that other equipment may be disturbed.

⚠️ **Caution**

- There is a risk that disturbances may be caused in other equipment if the product is used in conjunction with accessories from other manufacturers, for example non-standard cables or external devices.

- **Precautions:**
  Use only the equipment and accessories recommended by Leica Geosystems. When combined with the product, they meet the strict requirements stipulated by the guidelines and standards. When using external devices, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

⚠️ **Warning**

- If the product is operated with connecting cables attached at only one of their two ends, for example external supply cables, interface cables, the permitted level of electromagnetic

radiation may be exceeded and the correct functioning of other products may be impaired.

- **Precautions:**
  While the product is in use, connecting cables, for example product to external battery, product to external devices, must be connected at both ends.
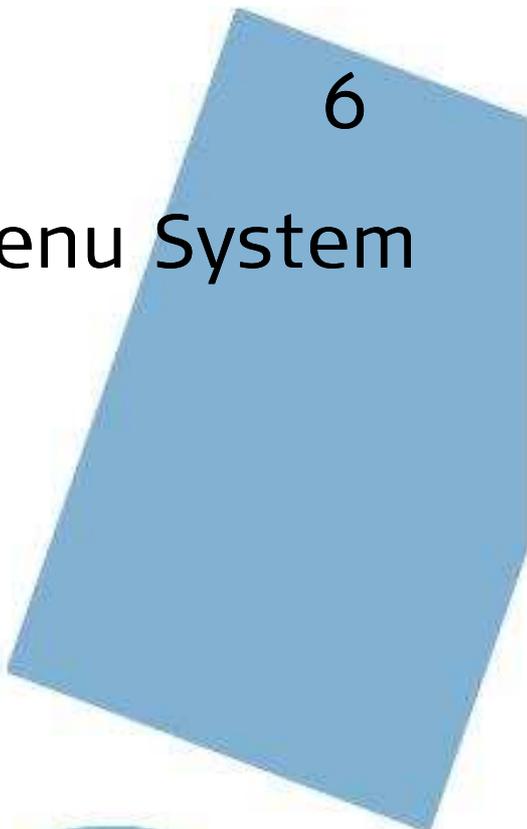
6

The Menu System
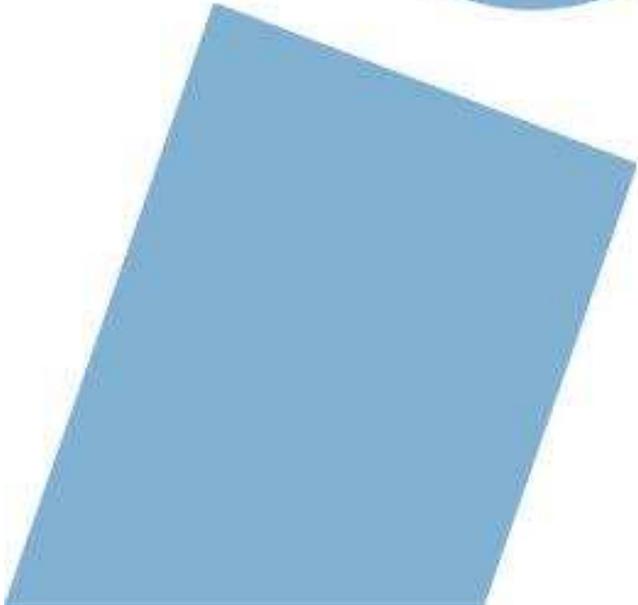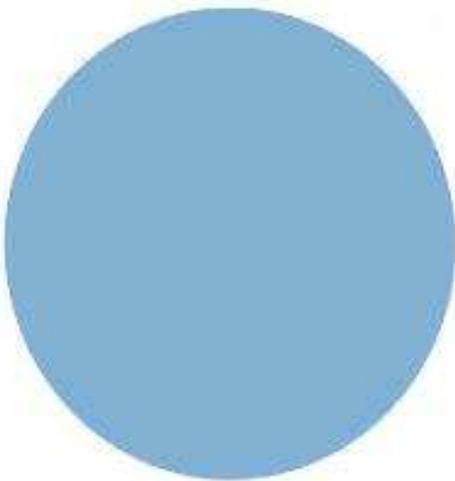
This section describes the individual functions and optional settings for the AS7500. Each function is grouped within menus and these menus are presented to allow easy the user and easy way to scroll to the individual functions.

Furthermore the method of navigating these menus is presented.

6.1 Navigating the Menus

As detailed in Sections 3.3 and 4.1 the AS7500 has two modes of operation. Navigation in each mode is slightly different, and is explained below.

Operational Mode

Use the ⌃ and ⌄ buttons to view the various information available to the operator while spraying.

Use the ⟩ and ⟨ buttons to select and deselect boom sections for Override, if enabled.

Use the ✕ button to change to Setup mode.

Setup Mode

Use the ⌃ and ⌄ buttons to change menus.

Use the ⟩ and ⟨ buttons to select an option within a menu.

Use the ✓ button to enter and exit Edit mode. Edit mode is used to change the value of a menu item.

While editing the value of items, use the ⌃ and ⌄ buttons to change the highlighted value, and use the ⟩ and ⟨ buttons to select the character under the highlight.

Use the ✕ button to change to Operational mode.

Navigation Example

The following is an example of how to change the number of boom sections, starting from the default Operational mode display.

☞ *Ensure that the MCS is Off.*

Step	Action	Result
1	Press ⊗ to change to Setup mode.	1.1 GENERAL 🔧 Field Reset No
2	Press ⌄ to move to the BOOM menu.	2.1 BOOM 🔧 Number Sections 13
3	Press ✓ button to enter EDIT mode	2.1 BOOM 🔧 Number Sections 1**3**
4	Press ⌄ button to decrease the value.	2.1 BOOM 🔧 Number Sections **7**
5	Press ✓ button to exit EDIT mode and save the new value.	2.1 BOOM 🔧 Number Sections 7

☞ Setup mode *cannot be entered when spraying.*

☞ *To change the digit being edited, press the* ❯ *and* ❮ *buttons until the correct digit is highlighted.*

6.2 The Menu Hierarchy

Operational Mode
View status information relating to the field & GPS status.

Use the ESC button to swap between
Operational and Setup modes.

Setup Mode	
Configure the system settings in the menus listed below.	
GENERAL	Contains frequently-accessed options including Field Reset, Screen brightness and Sound control.
BOOM	Configure the boom sections and their measurements
VEHICLE	Configure spray rig with the number of links and their measurements
GPS	Configure GPS parameters
PARAMETERS	Configure spray parameters, delays and overrides.
SETTINGS	Configure system settings and override function.
SYSTEM	View system status information relating to the AS7500. Self test and software upgrade options.

6.3 The Operational Mode Menu

The Operational Menu contains information related to the field that is being currently worked.

Menu Item	Edit	Description
	☒	The area treated in the current field.
	☒	Displays GPS status information, the number of GPS satellites observed.
	☒	The GPS Health indicator. See Table 3-1 for further details.

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6.4 Setup Mode Menus

1.1 GENERAL		1.2 GENERAL		1.3 GENERAL	
Field Reset	◄►	Brightness	◄►	Sound	◄►

▼▲

2.1 BOOM		2.2 BOOM		2.3 BOOM	
Number Sections	◄►	Translation	◄►	Section1	◄►

▼▲

3.1 VEHICLE		3.2 VEHICLE		3.3 VEHICLE	
Front Boom	◄►	Mid Offset	◄►	Number Links	◄►

▼▲

4.1 GPS		4.2 GPS		4.3 GPS	
Cross Track	◄►	Long Track	◄►	Diff. Required	◄►

▼▲

5.1 PARAMETERS		5.2 PARAMETERS		5.3 PARAMETERS	
Latency On (Sec)	◄►	Latency Off (Sec)	◄►	Tolerance (%)	◄►

▼▲

6.1 SETTINGS		6.2 SETTINGS		6.3 SETTINGS	
Controller Type	◄►	GPS Type	◄►	Language	◄►

▼▲

7.1 SYSTEM		7.2 SYSTEM		7.3 SYSTEM	
Total Area	◄►	Software Version	◄►	Upgrade Software	◄►

▼▲

8.1 BOUNDARY		8.2 BOUNDARY		8.3 BOUNDARY	
Record Type	◄►	Activate Boundary	◄►	Boundary Record Point	

☞ *Menu Items shaded in grey cannot be edited.*

1.4 GENERAL
Section Control

2.4 BOOM	◄►	2.5 BOOM	◄►	*[continues]*
Section 2		Section 3		

3.4 VEHICLE	◄►	3.5 VEHICLE	◄►	*[continues]*
Link Dist 1		Axle Dist 1		

4.4 GPS	◄►	4.5 GPS
GPS Baud		Velocity Filter

5.4 PARAMETERS	◄►	5.5 PARAMETERS
Override		Min. Delay (%)

6.4 SETTINGS	◄►	6.5 SETTINGS
Units		Master Source

7.4 SYSTEM	◄►	7.5 SYSTEM
Self Test		Code

6.5 The General Menu

The General Menu displays frequently used settings and allows them to be edited.

Menu Item	Edit	Description
1.1 GENERAL — Field Reset — No	☑	The Field Reset option. This allows the data collected for the current field to be deleted. *Default* = No *Option* = Yes / No
1.2 GENERAL — Brightness — 9	☑	The brightness of the LCD backlight. *Default* = 9 *Min* = 0 *Max* = 9 Note at the default value of 9, the screen displays as black on white for max brightness. All other settings are white on black
1.3 GENERAL — Sound — Yes	☑	Used to enable or disable the audible alarms (sound). *Default* = Yes *Option* = Yes / No
1.4 GENERAL — Section Control — 1	☑	Used to enable disable checks carried out before turning sections Off. *Default* = 0 *Options* = 0 / 1 0 Off if speed < 0.5m/s (0.8mph) 1 On at all speeds

☞ *Refer to Section 4.4 for an alternative method for clearing the field data.*
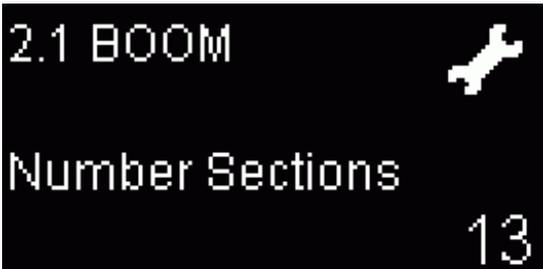
6.6 The Boom Menu

The Boom Menu displays the current boom settings and allows them to be edited.

Menu Item	Edit	Description
2.1 BOOM Number Sections 13	☑	The number of sections contained on the boom. *Default* = 1 *Min* = 1 *Max* = 30
2.2 BOOM Translation 123456789ABCD	☑	Allows for the transposition of the boom section outputs. *Note:* There must be no duplicated digits.
2.3 BOOM Section 1 (m) 3.00	☑	The width of boom section 1. *Default* = 1.00m *Min* = 0.01m *Max* = 100.00m

☞ *The default width for all sections is the current section width of section 1.*

☞ *The maximum total boom width of all sections is 100m.*

☞ *The number of sections widths to be entered is determined by the number of sections entered in BOOM menu 2.1 BOOM-Number Sections.*
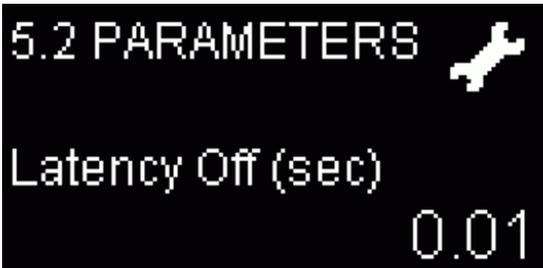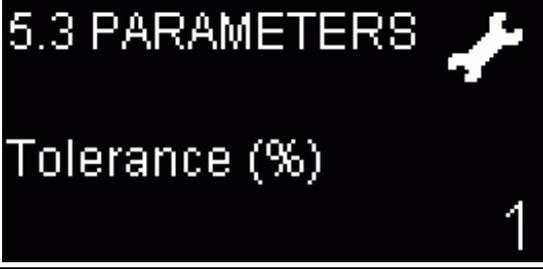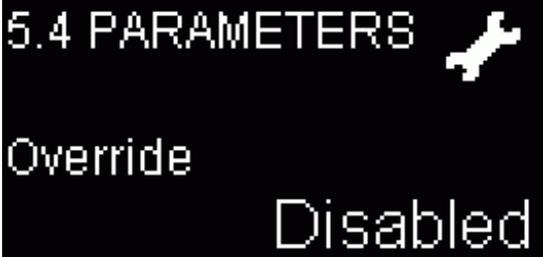
6.7 The Vehicle Menu

The Vehicle Menu displays the current Vehicle settings and allows them to be edited.

Menu Item	Edit	Description
3.1 VEHICLE Front Boom No	☑	Allows configuring for a vehicle with a front-mounted boom. *Default* = No *Option* = Yes / No
3.2 VEHICLE Mid Offset (m) 0.00	☑	Allows configuring for a vehicle with a boom which has the middle section offset to the rest of the boom. *Default* = 0.00m *Min* = -10.00m *Max* = 10.00m
3.3 VEHICLE Number Links 1	☑	The number of links on the vehicle. This determines the number of Link and Axle measurements required for the spray rig in VEHICLE menu 3.4 and 3.5. *Default* = 1 *Min* = 1 *Max* = 3
3.4 VEHICLE Link Distance 1 (m) 5.00	☑	The length of Link 1. See Section 3.9 for link 1 measurement points. **Default** = 5.00m *Min* = 0.01m *Max* = 40.00m
3.5 VEHICLE Axle Distance 1 (m) 1.00	☑	The length of axle 1. See Section3.9 for axle 1 measurement points. **Default** = 1m *Min* = 0.01m *Max* = 40.00m

☞ *The maximum Axle length permissible is the length of Link 1.*

☞ *The number of Links and Axles measurements to be entered is determined by the number of Links entered in menu item 3.3 VEHICLE-Number Links. Only one Link and Axle unit is shown in the Vehicle Menu above.*
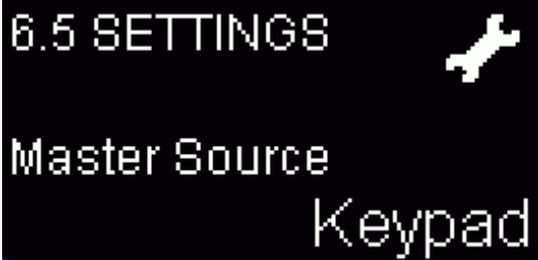
6.8 The GPS Menu

The GPS Menu displays information related to GPS and allows the GPS settings to be edited.

Menu Item	Edit	Description
4.1 GPS Cross Track (m) 0.00	☑	The GPS antenna offset measured from the centreline of the vehicle. *Default* = 0m *Min* = -99.99m *Max* = 100.00m
4.2 GPS Long Track (m) 0.00	☑	The GPS antenna offset measured from the front axle of the vehicle. *Default* = 0m *Min* = -99.99m *Max* = 100.00m
4.3 GPS Diff Required Yes	☑	Determines whether DGPS is required to operate the system. *Default* = Yes *Option* = Yes / No
4.4 GPS Baud Rate 19200		Defines the Baud rate to be used when communicating with the GPS receiver on PORT B. *Default* = 19200 *Option* = 9600 / 19200 / 38400 115200
4.5 GPS Vel Filter 0	☑	Provides smoothing to the positions reported by the GPS receiver. *Default* = 0 *Min* = 0 *Max* = 9

6.9 The Parameters Menu

The Parameters Menu displays settings that effect the operation of AS7500 and allows them to be edited.
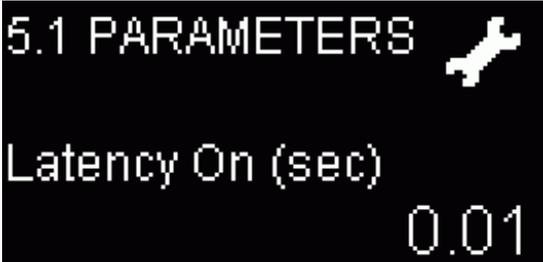
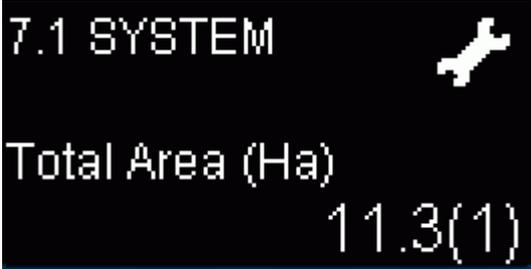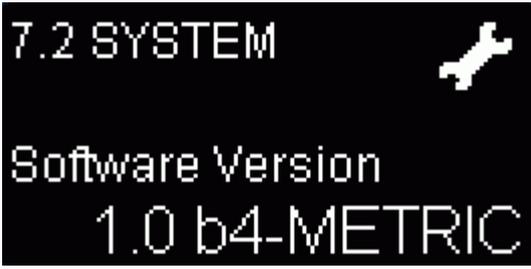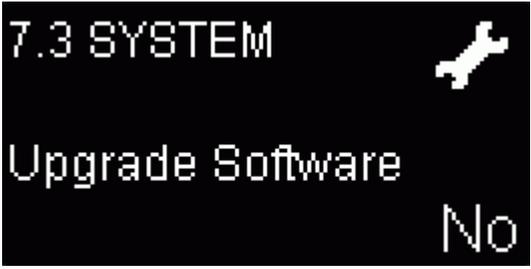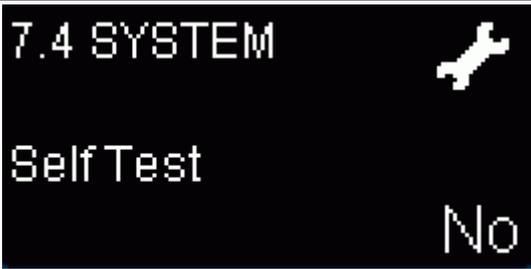| Menu Item	Edit	Description
5.1 PARAMETERS Latency On (sec) 0.01	☑	The difference between electronic and mechanical switching on of boom sections. *Default* = 0.00 seconds *Min* = 0.00s *Max* = 10.00s
5.2 PARAMETERS Latency Off (sec) 0.01	☑	The difference between electronic and mechanical switching Off of boom sections. *Default* = 0.00 seconds *Min* = 0.00s *Max* = 10.00s
5.3 PARAMETERS Tolerance (%) 1	☑	The tolerance used for shutting the sections On or Off. *Default* = 1% *Min* = 1% *Max* = 99%
5.4 PARAMETERS Override Disabled	☑	Enables and configures the section override function. *Default* = Disabled *Option* = Disabled / On / Off / Manual
5.5 PARAMETERS Min Delay (%) 0	☑	Defines minimum period between a section switching On and Off and vice-versa. *Default* = 0% *Min* = 0% *Max* = 100%
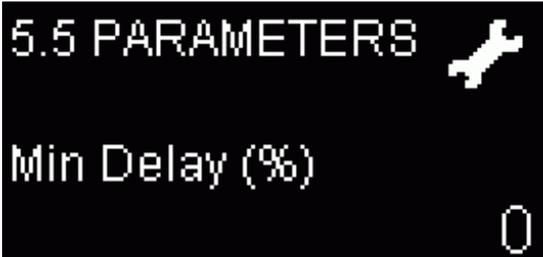
6.10   The Settings Menu

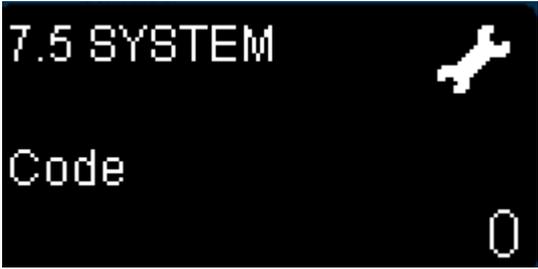The Settings Menu displays various settings and allows them to be edited.

Menu Item	Edit	Description

6.1 SETTINGS
 	
Controller Type
 	
Voltage
	☑	Defines the type of SRC connected to the AS7500.
		Default = Voltage
		Option = Voltage
		       Tru Count
		       Micro-Trak
		       Hardi Mustang
		       BA7000
		       John Deere
		       FlexControl
		       SP655/Pilot
		       Hardi 5500 / 6500
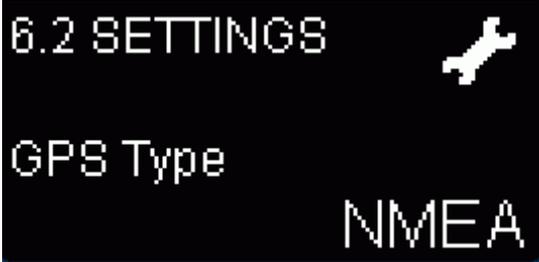
6.2 SETTINGS GPS Type NMEA	☑	Configures for the format of the GPS messages, and the port on which they will be accepted. *Default* = NMEA (Port B-serial) *Option* = NMEA (Port B-serial) NMEA2000 (Port C-CANBus)
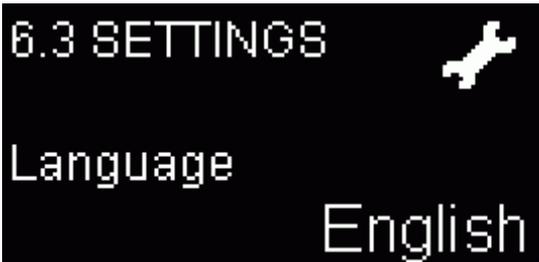
6.3 SETTINGS
 	
Language
 	
English
	☑	Defines the language of the system.
		Default= English
		Option = English / Danish/Dutch
		       Finnish / French
		       German / Hungarian
		       Italian / Portuguese
		       Spanish / Swedish

6.4 SETTINGS Units Metric	☑	Defines the units of the system. *Default* = Metric *Option* = Metric / Imperial

Menu Item	Edit	Description
6.5 SETTINGS 🔧 Master Source Keypad	☑	Defines the method used to control the *MCS* *Default* = Keypad *Option* = Keypad / External / Bipole

6.11   The System Menu

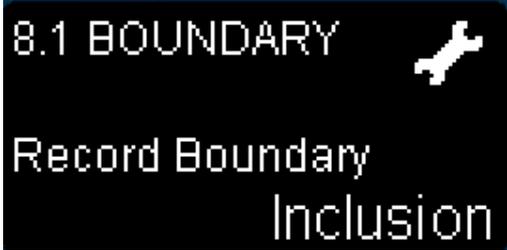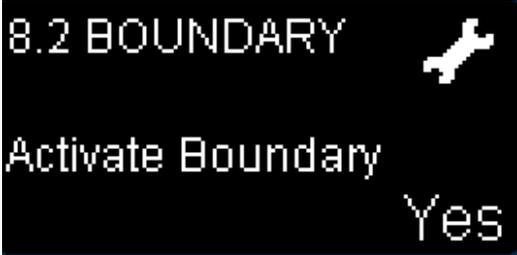The System Menu displays various system settings.

Menu Item	Edit	Description
7.1 SYSTEM 🔧 Total Area (Ha) 11.3(1)	☒	Displays the total area covered by the system since the last hard reset. This value will increase as area is treated and will not be reset when the field is cleared. The figure in brackets is the number of times the system has been shut down incorrectly.
7.2 SYSTEM 🔧 Software Version 1.0 b4-METRIC	☒	The installed software version number.
7.3 SYSTEM 🔧 Upgrade Software No	☑	Allows the software to be upgraded. See Appendix F for further details. Also saves and restores configuration settings. *Default* = No *Option* = No / Yes / Backup / Restore
7.4 SYSTEM 🔧 Self Test No	☑	Allows a Self Test to be run on the system. Individual boom section outputs, system volume and status LED's are exercised.

| Menu Item	Edit	Description
	☑	Allows selection of different algorithms for control. This setting should not be changed unless advised by RINEX. *Default* = 0 *Option* = 0 / 1 / 2 / 3

6.12 The Boundary Menu

The Boundary Menu provides various boundary options:

AS7500 Screen	Edit	Description

8.1 BOUNDARY
 	
Record Boundary
Inclusion
	☒	Allows the selection of the boundary Type:
		
		Option =
		   Inclusion
		   Exclusion
		   No

8.2 BOUNDARY
 	
Activate Boundary
Yes
	☑	Activates or de -Activates boundary actions. Boundaries are NOT deleted.
		
		Option =
		   Yes Boundaries
		     are Active
		   No Boundaries
		     are NOT Active

8.3 BOUNDARY
 	
Boundary Record Point
Right
	☑	Allows selection of which point on the boom is to be used for Boundary Recording
		
		Default = Right
		Option =
		   Right
		   Centre
		   Left

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7

International Limited Warranty, Software Licence Agreement
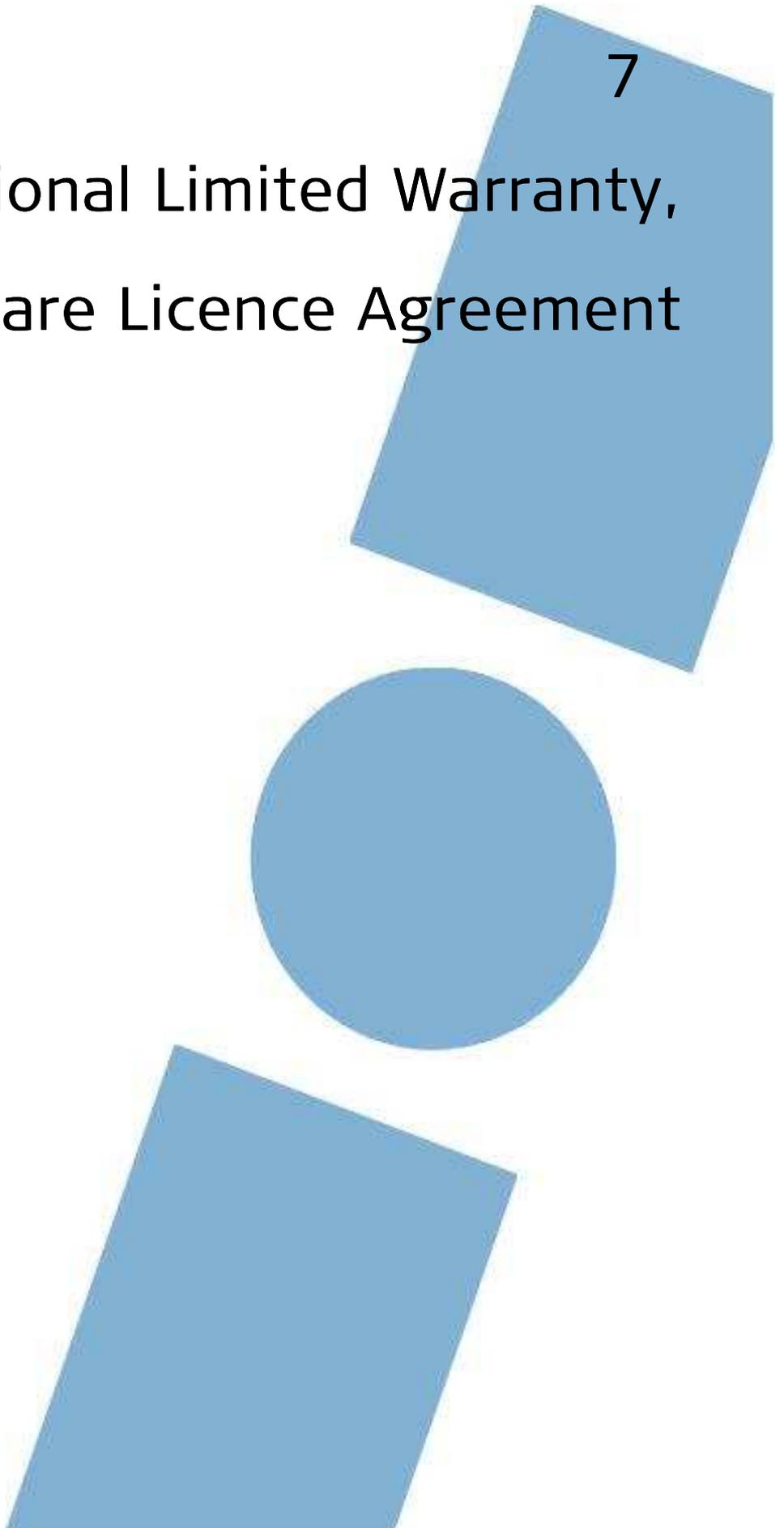
This section describes the applicable warranty and software agreement.

International Limited Warranty

This product is subject to the terms and conditions set out in the International Limited Warranty which you can download from the Leica Geosystems home page at
http://www.leica-geosystems.com/internationalwarranty
or collect from your Leica Geosystems distributor.

The foregoing warranty is exclusive and is in lieu of all other warranties, terms or conditions, express or implied, either in fact or by operation of law, statutory or otherwise, including warranties, terms or conditions of merchantability, fitness for a particular purpose, satisfactory quality and non-infringement, all of which are expressly disclaimed.

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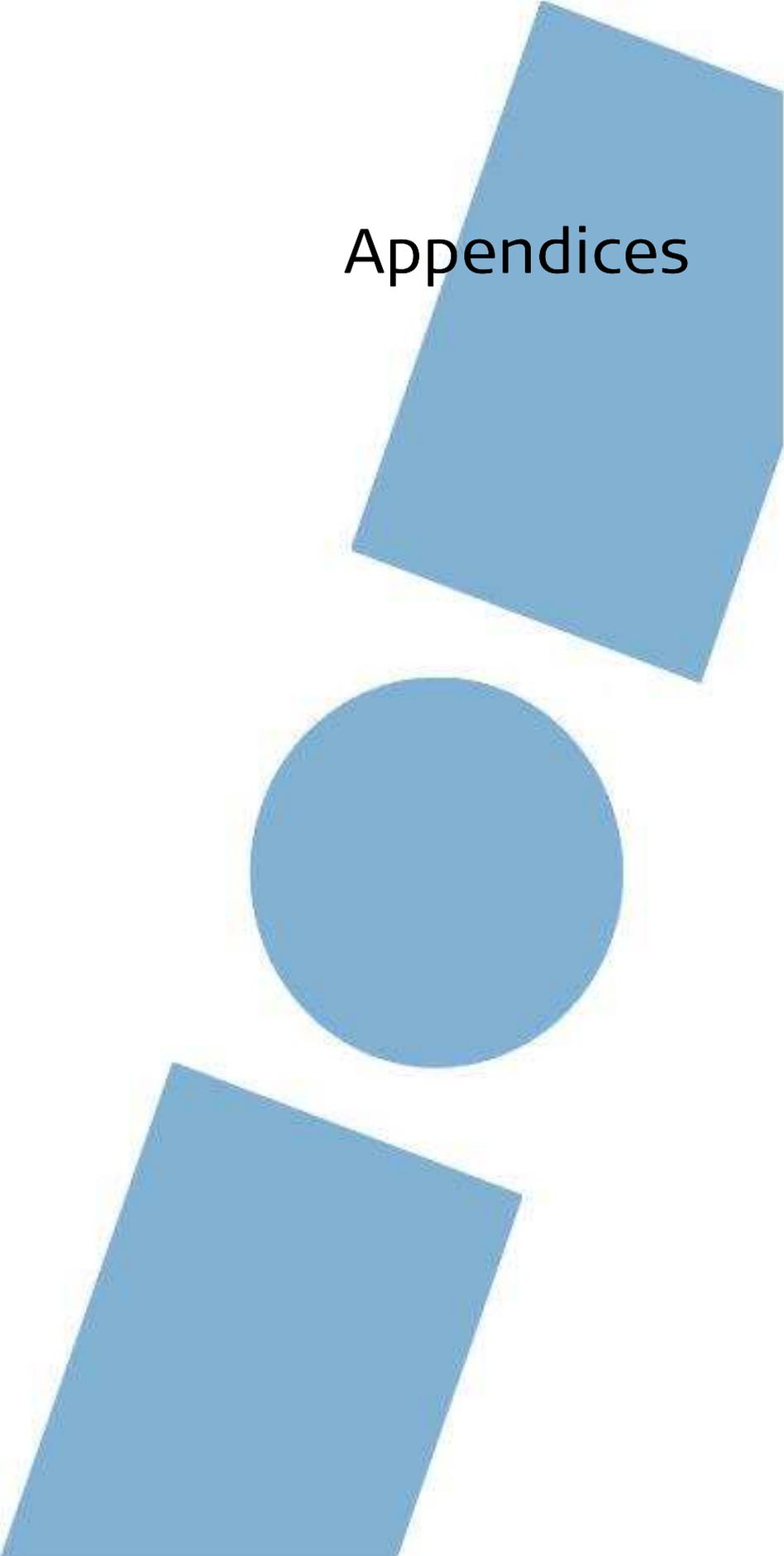
Appendices

Appendix A   Glossary

Phrase	Description
AS7500	Auto Section Control, the HARDI Auto Section Control system.
AutoSPRAY	A system which can automatically control the state of the boom section switches, ie ON or OFF.
Bipole	Typically a valve with two wires which uses 12vDC on one wire (1) to open the valve, the other wire (2) is ground. To close the valve 12vDC is on wire (2) and ground one wire (1).
Boom spray	See also, Spray boom. The physical boom which holds the spray nozzles at their designated spacings along the length of the boom.
Cross track	The distance between the centreline of the vehicle and the GPS antenna.
Latency	The difference in time between electronic switching and the physical activity of that switch. An example of this is with a SRC section switch being turned On until the time that the spray nozzle begins spraying liquid from the nozzle.
Link	The distance measured along the length of the vehicle between Pivot points on the vehicle.
Long track	The distance between the front axle of the vehicle and the GPS antenna.
Master	The switch, regardless of whether it be on the spray rate controller or not, that will control when the physical sections will commence spraying.
MCS	The Master Control Switch, see also Master, regardless of whether it be on the spray rate controller or not, that will control when the physical sections will commence spraying.
Min Delay	The minimum delay between switching a section On or Off from the last time that it was switched in the opposite manner.

Phrase	Description
Override	The ability to take authority of the status of the section switches regardless of the automatic state set by the AS7500.
Spray boom	See also, Boom spray. The physical boom which holds the spray nozzles at their designated spacings along the length of the boom.
Spray rig	The tractor and the pull-behind trailer with boom spray, or a self-propelled sprayer. All the necessary machinery required to spray a field.
SRC	The Spray Rate Controller is the physical controller which controls the flow rate for the spray boom. Typical models include Raven, John Deere, Micro-Trak etc.
Tolerance	The amount of overlap permitted (1-99%) when a section crosses an area which has been previously worked.
Treatment	A treatment is typically defined as a record of an activity across a field. Hence where a field has been sprayed, it is recorded as a treatment, or if the field has been planted this is recorded as a treatment.
Vel Filter	The velocity filter smoothes the direction of the vehicle based upon GPS positions (GGA). This has no effect if the GPS heading (VTG) is supplied to the AS7500.

Appendix B   AS7500 Options

Part Nō.	Description	Usage
1-2406	12Vdc power cable with ignition sense	Automatically starts the AS7500 with vehicle ignition.
1-2408	12Vdc power cable	12Vdc power cable (8A) suits AS7500.
1-2416	JD-12Vdc power cable	12Vdc power cable (ignition sense), connects to JD power strip suits AS7500.
1-2420	Universal 3pin-AMP 12Vdc power cable	12Vdc power cable (ignition sense), connects to Universal 3pin AMP connector suits AS7500.
1-2207	Data cable	D9F – 9M serial cable straight through connections.
1-2208	Data cable	D9F –9F serial cable with cross-over connections.
1-2295	"Y" piece Data cable	D9F – 9M – 9M serial cable used as double adapter for GPS receiver, suits EZ-Guide®.
1-2296	"Y" piece Data cable	D9M – 9F – 9F serial cable used as double adapter for GPS receiver, suits Outback®.
1-2762	JD StarFire cable	Deutsch – D9F serial data cable for JD StarFire.
1-2800	Farmscan 24v1 2400-2405 section switch	Plug compatible cable for SRC to AS7500. Note Farmscan 2405 section switch controller requires modification.
1-2806	Generic (13 section)	Voltage section cable with Master detect.
1-2810	Raven 400 series	Plug compatible cable for SRC to AS7500. Suits Raven 440 / 450 / 460 / 660 controllers.
1-2811	Raven 4400 / 4600	Plug compatible cable for SRC to AS7500. Suits Raven 4440 / 460 controllers.

Part Nō.	Description	Usage
1-2820	TeeJet 844	Plug compatible cable for SRC to AS7500. Suits TeeJet 844 controller.
1-2821	TeeJet 844E	Plug compatible cable for SRC to AS7500. Suits TeeJet 844E controller.
1-2835	Flex Control	Plug compatible cable for SRC to AS7500. Suits Flex Control controller.
1-2851	Micro-Trak MT-3405/II	Plug compatible cable for SRC to AS7500. Suits Micro-Trak MT-3405/II controller.
1-0301	Flexi-Coil SP655 kit	Modification kit to suit Flexi-Coil SP655 controller and cables for AS7500 connection.
1-0302	Spra-Coupe 3000 / 4000 kit	Modification kit to suit Agco SP sprayers Spra-Coupe 3000 & 4000 series and cables for AS7500 connection.
1-0344	Hardi Pilot 3880 kit	Modification kit to suit Hardi Pilot 3880 controller and cables for AS7500 connection.
1-2816	Agco SP sprayer Rogator / Spra-Coupe Cable A	Plug compatible cable for SP sprayer to AS7500. Suits SP sprayers with orange hydro-stat handle
1-2817	Agco SP sprayer Rogator / Spra-Coupe Cable B	Plug compatible cable for SP sprayer to AS7500. Suits SP sprayers with orange hydro-stat handle detects Master and sections greater than section 6.
1-2830	Case IH SP sprayer Patriot models	Plug compatible cable for SP sprayer to AS7500.
1-2840	John Deere SP sprayer All models	Plug compatible cable for John Deere SP sprayers to AS7500.
1-2844	Miller SP sprayer Nitro models	Plug compatible cable for SP sprayer to AS7500.

Part Nō.	Description	Usage
1-2846	SAT SP sprayer Predator models	Plug compatible cable for SP sprayer to AS7500.
1-2848	GVM SP sprayer Prowler models	Plug compatible cable for SP sprayer to AS7500.
1-2842	JD 4700/4710 Master detect	Plug compatible cable for JD SP sprayers 4700 & 4710 (non-CANbus). Detects Master (Bipole) switch.
1-1252	AS7500 User Manual	Installation & user manual to suit AS7500, this manual. English language only.
1-1353	AS7500 Quick Guide	Quick reference guide to suit AS7500, English language only.

☞ *For current information on cables refer to the website www.rinextech.com.*

Appendix C   System Messages

System Messages will display when an event or error occurs.

Please record any message that could assist if support is required.

Message	Meaning
Turn Master Off	The MCS must be turned off before this function can be selected.
Clearing...	The current treatment is being cleared.
Treatment Clear	The current treatment has been successfully cleared.
Upgrading...	The system software is being upgraded.
Upgrade Complete	The system software has been successfully upgraded.
Error: copying	An error occurred copying a file to or from the USB drive.
Error: rename	An error occurred when upgrading the software.
File not found	The file to upgrade was not found on the USB drive.
Please Reboot	Please shut down and restart the system after changing baud rate or upgrading the software.
Width too large	The total width entered for the boom sections exceeds the maximum allowable width (100m)
RINEX	System is initializing
Soft Reset	A soft reset is being performed.
Hard Reset? No Yes	Do you want to perform a hard reset? Press arrow key beneath your choice.
Reset Failed	The reset failed.
Reset Complete	The reset completed successfully.

Message	Meaning
Loading...	The system is loading the current field.
Disk Full	Disk space is full. Clear the field.
Memory Full	All available memory is used. Shut down and restart the AS7500.
Max Cells Reached	The maximum number of cells for storing data has been reached. Clear the field.
Exiting...	The system is preparing to turn off.
Error...Power Outage	The system has detected that the input power has dropped below minimum requirements. Use the IPS to turn Off and restart the AS7500.

Appendix D   Troubleshooting

The AS7500 is a robust system and should provide many years of trouble free service. In the unlikely event that something is not correct please check the following points before contacting your local dealer for service.

Problem	Probable Cause	Action
Boom sections do not switch OFF	Incorrectly wired	Check wiring
	No GPS signal	Check that GPS is being received
	Boom section switches are ON	Turn section switches OFF
	Tolerance set too low	Check settings on Tolerance
	Master Switch incorrectly set	Check settings for Master Switch
Boom sections switches switch at the wrong time	GPS is inaccurate	Check with the GPS supplier
	Latency settings are set incorrectly	Check latency settings with boom sections
NO GPS signal	GPS is not outputting NMEA data	Check that the connected GPS is turned ON and working
	Incorrect GPS settings	Check GPS settings match the GPS receiver
	Incorrect GPS cable	Check that the correct GPS cable is being used.
	GPS connected to wrong port	Check that the GPS cable is connected to the correct port.
Boom sections do not switch ON	Incorrect cabling	Check that the SRC data cable is properly connected to correct port.
	Incorrect Tolerance settings	Check settings for Tolerance

Problem	Probable Cause	Action
	Incorrect MCS settings	Check settings for MCS
AS7500 will not power up	Isolation switch is OFF	Turn the Isolation switch ON
	Incorrect cabling	Check that theAS7500 plug has 12Vdc.
	Incorrect cabling	The AS7500 has not been correctly installed, check if an ignition sense cable is installed.
AS7500 will not save settings after restart	Not shutting down the unit correctly	Switch the AS7500 OFF by turning OFF unit correctly
	Incorrect cabling	The AS7500 has not been correctly installed, check if ignition sense cable is installed
AS7500 is very slow to respond	The last data file may be corrupt	Perform a soft reset as denoted in Appendix E. The hard reset should only be done as directed by an authorised technician
It is difficult to read the display panel	Check that the AS7500 is operational	Turn the system ON by starting the vehicle
	Check that the brightness is fully UP	Turn the brightness Up on the AS7500
The AS7500 alarms are not heard.	The Sound option in the General menu is set to No	Set The Sound option in the General menu to Yes
	Check that the speaker enclosure is not covered	Remove any obstructions from the speaker
Warning message that the Master cannot be switched OFF	The MCS is ON	Turn the MCS OFF
	Incorrect cable in GPS port and settings for the MCS	Check that the GPS cable is the one supplied with the AS7500

Problem	Probable Cause	Action
System constantly beeps	No GPS	Check that the GPS is correctly configured and connected to the AS7500
System beeps randomly	GPS dropping out	Check GPS antenna and cables for corrosion and/or damage. Check reported GPS Health
"File Not Found" message when upgrading software	Insufficient time to recognise upgrade media	Wait 30seconds and then retry the upgrade operation.
System does not respond on Bipole switch.	Setting for MCS is incorrect	Set the MCS option to Bipole
	Bipole switch connection is incorrect	Check that the Bipole switch is connected to Section Controller Port
AS7500 does not respond	Power fluctuation	Restart AS7500 with the Isolation power switch
"Error – Zone Problem" reported	Invalid GPS position in data	Clear existing treatment data by pressing and holding the ⊗ button
Reported Area value too low compared to SRC	Area reported by AS7500 is "Covered Area"	Invalid comparison
	SRC may be reporting distance travelled x swath width, regardless of overlap.	Note that Treated Area reported by AS7500 only counts oversprayed areas once.

Appendix E   Resetting the System

Soft Reset

Performing a Soft Reset will clear all treatment data from the system prior to the program starting.

To Soft Reset the system, proceed as follows:

Description	AS7500 Screen
Turn the system ON and press and hold down the ✕ button on the display panel until a beep is heard.	
Release the ✕ button immediately. The display will now be at the Reset menu. Press the ⌄ arrow key to access the Soft Reset menu.	Reset? HARD(UP) SOFT(DOWN) NO(✕)
The AS7500 now requires confirmation to complete the Soft Reset as shown. Press the ✓ key to confirm the request for a Soft Reset, or press the ✕ key to cancel the reset operation.	Soft Reset? NO (✕) YES (✓)
After the Soft Reset has been performed "Reset Complete" will be displayed and the software will continue to start with all treatment data cleared.	Reset Complete ✓

Hard Reset

Performing a Hard Reset will clear all treatment data from the system and reset all settings back to factory defaults.

To Hard Reset the system, proceed as follows:

Description	AS7500 Screen
Turn the system ON and press and hold down the ✕ button on the display panel until a beep is heard.	
Release the ✕ button immediately. The display will now be at the Reset menu. Press the ⌃ arrow key to access the Hard Reset menu.	Reset? HARD(UP) SOFT(DOWN) NO(✕)
The AS7500 now requires confirmation to complete the Hard Reset as shown. Press the ✓ key to confirm the request for a Hard Reset, or press the ✕ key to cancel the reset operation.	Soft Reset? NO (✕) YES (✓)
After the Hard Reset has been performed "Reset Complete" will be displayed and the software will continue to start with all parameters and treatment data cleared.	Reset Complete ✓

Note: It will be necessary to re-enter all setup parameters back into the AS7500.

☞   *Hard/Soft Reset menus are always in English.*

Appendix F   Upgrading Software on the System

The software that controls the AS7500 will be upgraded from time to time as required. Typically the new software will include new features, such as support for new controllers, and/or solutions for earlier versions.

The current software version operating on the AS7500 is found by navigating to the Setup mode menu,
7.2 SYSTEM-Software Version as shown here. The software version number will be displayed in the lower left hand portion of the display.
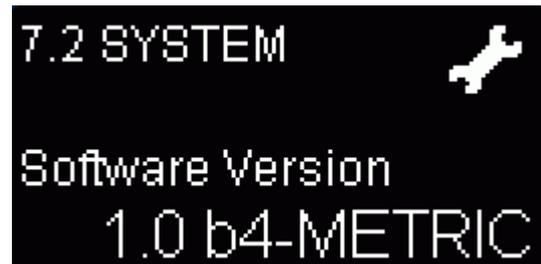
The current software version is available from the world wide web at

www.rinextech.com

if required the current file can be downloaded to upgrade the AS7500 following the instructions on the web page.

To upgrade the AS7500 the software the file should be downloaded to a USB-stick (USB thumb-drive). There should be no other files on the USB-stick.

Place the USB-stick into the USB Port on the rear of the AS7500 and power the system as normal. Next navigate to the Setup mode menu, 7.3 SYSTEM-Upgrade Software as shown here. Toggle the option to Yes and wait for the software to load onto the AS7500.
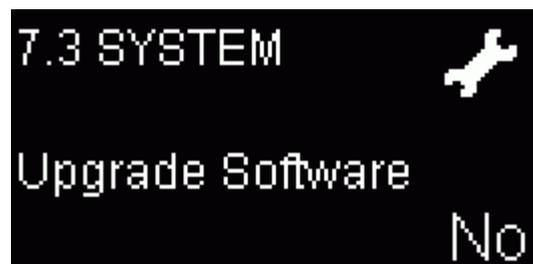
DO NOT cut the power to the AS7500 during the upgrade process and ensure that the AS7500 is power cycled after the upgrade is complete. Check that the physical settings are correct prior to using the AS7500.
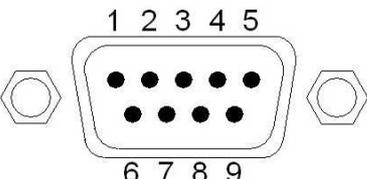
Appendix G   Connector Pin-Outs

Ports A and B Connectors

Port A is a full RS-232C serial port, Port B is a basic RS-232C serial port, the pin functions are shown below.

Connector Pin Locations	Pin	Pt A I/O	Pt B I/O	Signal
	1	x	x	Not Connected
	2	←	←	Receive data (RxD)
	3	→	→	Transmit data (TxD)
	4	→	x	Data terminal ready (DTR)
1 2 3 4 5 / 6 7 8 9	5	—	—	Data ground
	6	←	x	Data set ready (DSR)
	7	→	x	Request to send (RTS)
	8	←	x	Clear to send (CTS)
	9	x	x	Not connected
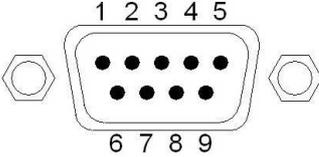
CAN Port connector

Single CAN bus port, whose pin-out conforms to the CIA (Can in Automation) Standard for DB9.

Connector Pin Locations	Pin	Host I/O	Signal
	1	x	Not Connected
	2	↔	CAN Low
	3	—	GND
	4	x	Not Connected
1 2 3 4 5 / 6 7 8 9	5	x	Not Connected
	6	x	Not Connected
	7	↔	CAN High
	8	—	GND
	9	x	Not Connected

Power Input Connector

The AS7500 power input connector is a plastic circular connector that is standard for all RINEX products.
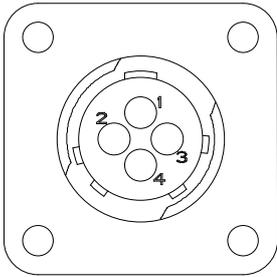
Connector Pin Locations	Pin	HostI/O	Signal
	1	—	Battery Negative
	2	←	Vehicle Ignition sense input
	3	←	Optional battery feed for high current applications
	4	←	Battery Positive

Section Controller Connector

This connector allows the AS7500 to interface with external boom section valves.
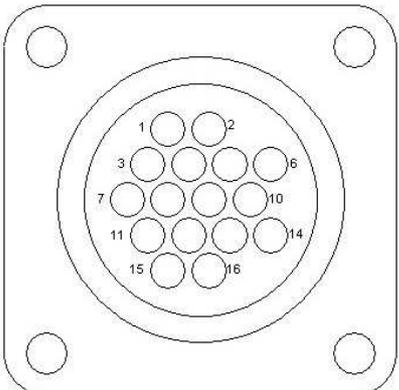
Connector Pin Locations	Pin	Host I/O	Signal
	1	x	Legacy 12 Volt Supply
	2	x	Legacy Power Ground
	3	→	Section one
	4	→	Section two
	5	→	Section three
	6	→	Section four
	7	→	Section five
	8	→	Section six
	9	→	Section seven
	10	→	Section Eight
	11	←	Master (Input)
	12	→	Section Nine
	13	→	Section Ten
	14	→	Section eleven
	15	→	Section twelve
	16	→	Section thirteen

Appendix H   AS7500 Specifications

Physical Characteristics

Weight	▶ 500g	
Size	▶ 183mm x 104mm x 57mm (7.23" x 4.11"x 2.25")	
Environment	▶ Casing, high Density automotive quality plastic, environmentally robust and shock resistant	
	▶ Operational	0°C to 50°C 32°F to 122°F
	▶ Non-operational	-20°C to 60°C -4°F to 140°F
Data I/O	▶ Electrical interface	ASCII serial / CANBus
	▶ Plug types	D-9 Male (serial) x 2 D-9 Male (CANBus) x 1 USB x 1 AMP 4 pin male (12vDC) AMP 16 pin male (ASC voltage)
Power	▶ 12vDC nominal / 8 – 16VDC, 2A max	

Auto Section Control

Control	▶ 30 sections (max. via serial data controllers)
	▶ 13 sections (max. via voltage controller)
Connector	▶ AMP 16 Pin male

Appendix I Ignition Sense Power Cable

The RINEX DC power cable (P/n 1-2406) is a three core power cable which allows the AS7500 controller to be connected directly to the vehicle's battery. The cables are described as follows.

RED Positive wire with in-line fuse connects to the vehicle battery positive terminal (12 Vdc ONLY), fitted with a M12 ring connector.

BLACK Ground wire connects to the vehicle battery negative terminal, fitted with a M12 ring connector.

ORANGE Ignition sense wire connects to the vehicle ignition ON circuit. The wire is connected into the vehicle's ignition circuit such that the AS7500 will detect when the ignition is switched ON and OFF.

The DC power cable should be routed from the operator's cab to the vehicle's batteries through a dedicated cable gland if supplied. If necessary an exit hole will have to be drilled into the vehicle which should be fitted with a rubber grommet to protect the cable from rubbing directly on the vehicle wall. The hole should be sealed with silicone sealant or similar to prevent dust and moisture from entering the cab.

DC Power Cautionary Notes

⚠️ The RINEX DC power cable supplied should only be connected directly to the battery with the supplied fuse in place. It is strongly recommend NOT removing the supplied fuse. If a power wire should short to the vehicle body, a battery can supply a current that will heat the wire to the point where the insulation will catch fire. A fuse mounted inline near the battery connection point and before the cable passes through the vehicle panel will prevent the risk of a vehicle fire.

⚠️ The RINEX DC power cable should not be connected directly to the battery if the vehicle is equipped with a battery isolator switch. In these cases the negative wire (black) should be connected to the vehicle side of the isolator.

Appendix J   Configuring the mojoRTK

The AS7500 will connect directly to the mojoRTK (fitted with a NMEA outcable) using standard cables supplied with the AS7500 kit. The following steps detail how to configure the mojoRTK for NMEA output to the AS7500, the steps can be confirmed directly from the mojoRTK user manual if necessary.

If the mojoRTK is connected to another device and the port is already used it will be necessary to use a splitter "Y" cable (P/n1-2295) which may be ordered separately.

mojoRTK

Front view

NMEA out cable P/n 675559

Step	mojoRTK Instruction
1.	At the main screen push the ⓄⓀ button to access the Menu.
2.	Using the main dial scroll down and select Settings by pressing the ⓄⓀ button, then scroll to Extended Features and select it by pressing the ⓄⓀ button, then scroll to NMEA Settings and select it by pressing the ⓄⓀ button.
3.	Toggle the Output Enabled from No to Yes by pressing the ⓄⓀ button, then scroll to GPGGA and toggle it from No by pressing the ⓄⓀ button, scroll to 5Hz Output Rate and press the ⓄⓀ button to set. Repeat the process for the GPVTG setting and toggle all other NMEA settings to No.
4.	Press the Escape ▷ button four times to return to the main operational screen.

Appendix K   Configuring the EZ-Guide®

The AS7500 will connect directly to the EZ-Guide® using standard cables supplied with the AS7500 kit. The following steps detail how to configure the EZ-Guide® for NMEA output to the AS7500, the steps can be confirmed directly from the EZ-Guide® user manual if necessary.

If the EZ-Guide® is connected to another device and the port is already used it will be necessary to use a splitter "Y" cable (P/n1-2295) which may be ordered separately.

EZ-Guide®

Front view

Data cable

Rear view
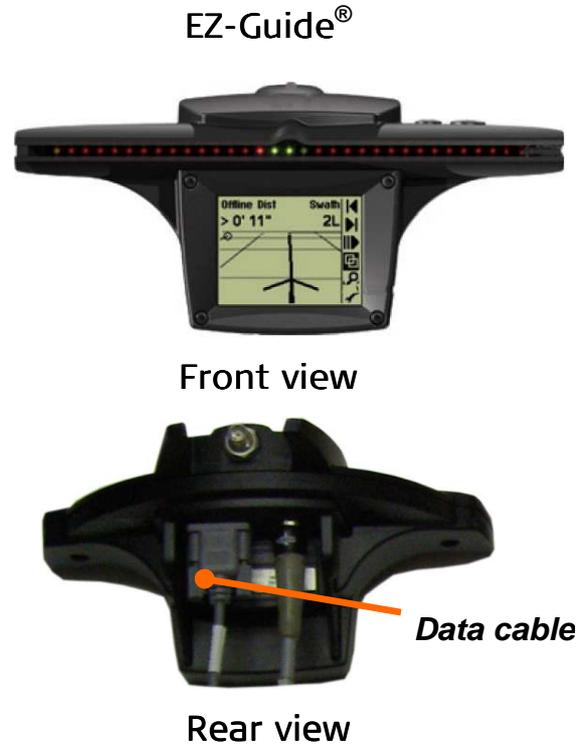
Step	EZ-Guide® Instruction
1	Using the keys on the top of EZ-Guide® step to *Configuration Menu* ⌇ (the bottom menu on the right side). Press ⓞⓚ to select the Lightbar menu.
2	Step to the *Data Port Settings* and change the *Baud Rate* to 19200 and *Output Rate* to 5Hz as shown.
3	Highlight *Exit*, and then press ▼ until *NMEA Output* is displayed. Press ⓞⓚ, set the NMEA messages to output *GGA* and **VTG** as shown.
4	Connect the EZ-Guide® to the AS7500 and confirm that the AS7500 is receiving GPS data in the GPS Status and GPS Health pages in the Display menu.

Appendix L   Configuring the EZ-Guide®.500

The AS7500 will connect directly to the EZ-Guide® 500 using standard cables supplied with the AS7500 kit. The following steps detail how to configure the EZ-Guide® 500 for NMEA output to the AS7500, the steps can be confirmed directly from the EZ-Guide® 500 user manual if necessary.

If the EZ-Guide® 500 is connected to another device and the port is already used it will be necessary to use a splitter "Y" cable (P/n1-2295) which may be ordered separately.

EZ-Guide® 500

Front view

Data port

Rear view

Step	EZ-Guide® 500 Instruction
1	From the main guidance screen select the 🔧 key on the right-hand side of EZ-Guide® 500, then press the OK key to enter the **Configuration** menu. Then select the *System* menu and press the OK key, then select the *GPS* menu and press the OK key, then select the *NMEA Output* menu and press the OK key to enter the **Port Parameters** menu.
2	Configure the *Output Rate* to 5Hz, the *Baud Rate* to 19200bps and *Data Parity* to None. Press the OK key to accept the changes.
3	Set the NMEA messages *GGA* and VTG to On, all other messages are to be set Off. Press the OK key to accept the changes. Then return to the main guidance screen.
4	Connect the EZ-Guide® 500 to the AS7500 and confirm that the AS7500 is receiving GPS data in the GPS Status and GPS Health pages in the Display menu.

Appendix M   Configuring the Outback®

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The AS7500 will connect directly to the Outback® using standard cables. The following steps details how to configure the Outback® and connect to the AS7500. The following steps detail how to configure the Outback®, the steps can be confirmed directly from the Outback® user manual if necessary.

If the Outback® is connected to another device and the port is already used it will be necessary to use a splitter "Y" cable (P/n1-2296) which may be ordered separately.

Outback®

Data cable

Front view
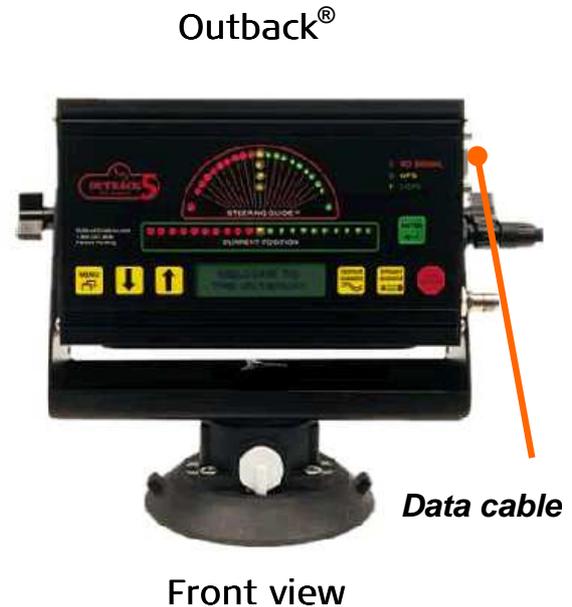
Step	Outback® Instruction	
1	Go to the Setup Menu, then Press ⬇ until the NMEA Port Setup menu is displayed.	Setup Menu >NMEA Port Setup
2	Set the Baud rate to 19200, the press ⏎ (ENTER)	NMEA Port Setup >19200
3	Go to the Setup Menu, then Press ⬇ until the NMEA Port Baud menu is displayed.	NMEA Port Setup >NMEA Port Baud
4	Set the GGA and VTG to On and to output at 5Hz using the ⬇ buttons.	VTG >5 Hz
5	Connect the Outback® to the AS7500 and confirm that the AS7500 is receiving GPS data in the GPS Status and GPS Health pages in the Operational menu.	

Appendix N   Configuring the Envizio

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The Raven Envizio does not have an internal GPS engine and is connected to an external GPS receiver.

The AS7500 will connect in line with the Envizio and its GPS receiver. The Envizio data cable, as shown below, has one connector labelled GPS. The optional splitter "Y" cable is to be used in this connector. The supplied cables can then be used to connect the AS7500 controller.
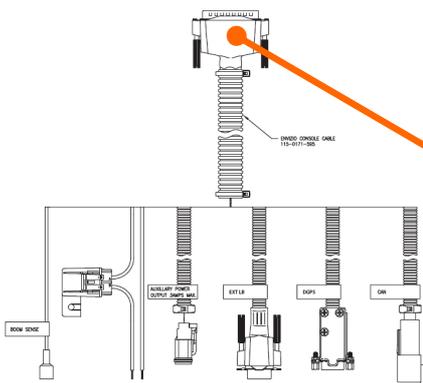
Envizio

Front view

Bottom view

Data cable

Envizio data cable

Once the AS7500 is connected to the Envizio and the GPS receiver it will be necessary to configure the GPS receiver as described in Section 3.4

Appendix O   Configuring the Amazone Amatron+

The AS7500 will connect directly to the Amazone Amatron+ using the Amatron+ AS7500 cable (p/n 790629). Connect this cable to the CAN port on the AS7500. The following steps detail how to configure the Amazone Amatron+ once connected to the AS7500.
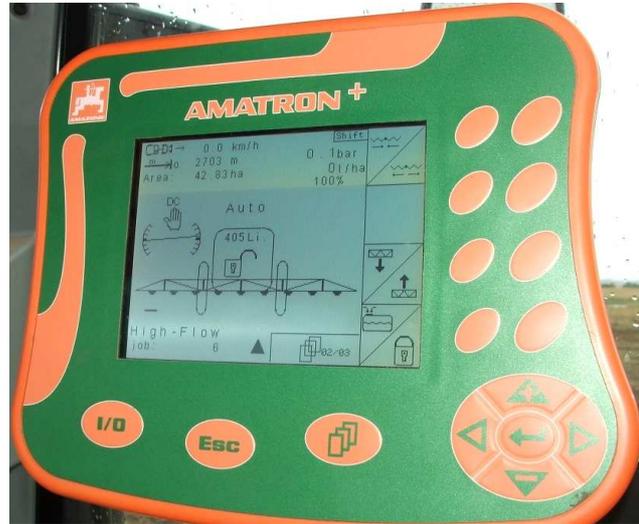
CANbus Port

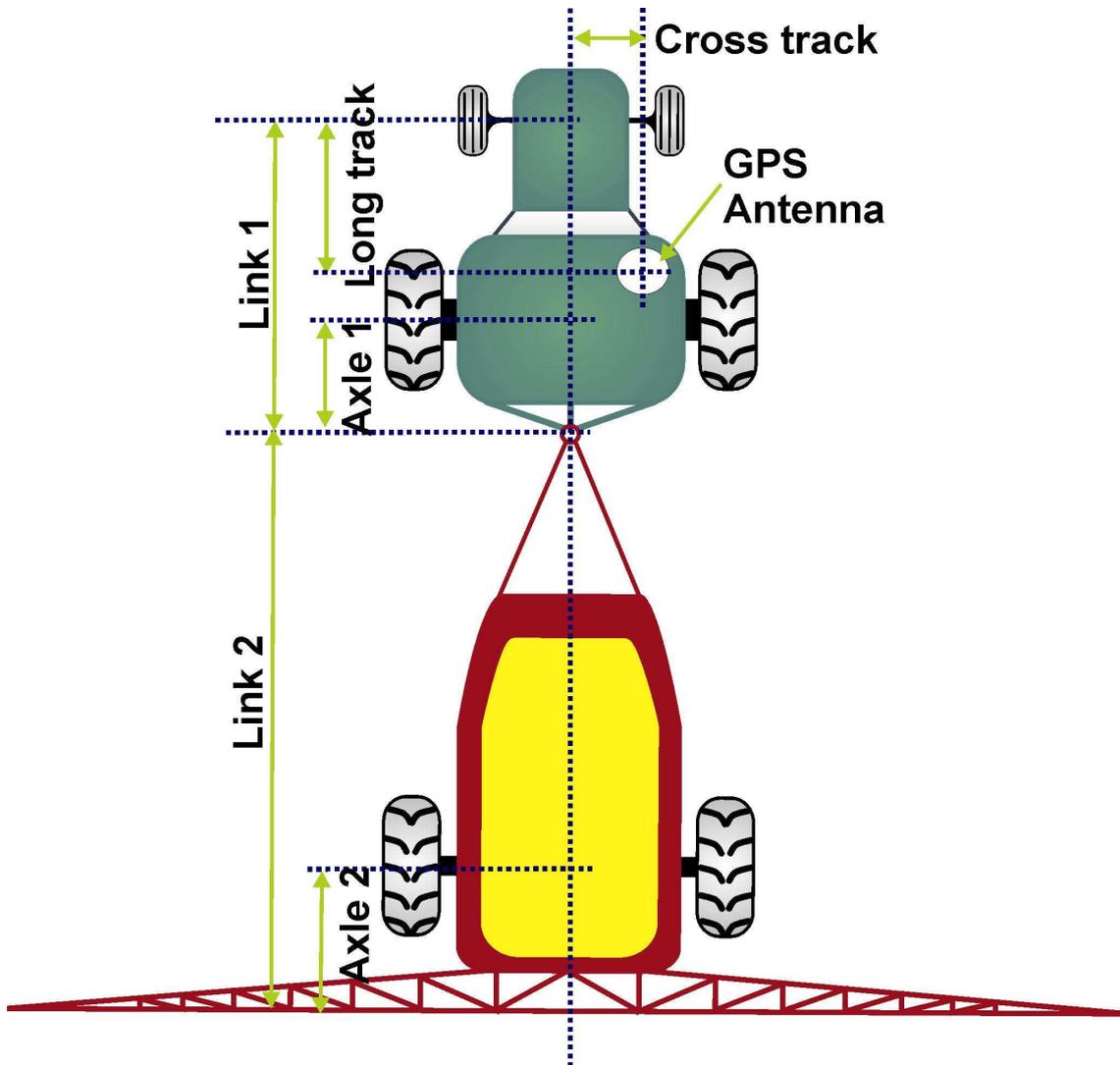| Step	AS7500 Instruction
1.	At the main screen push the ⊗ button to access the Menu Settings.
2.	Using ⌃ and ⌄ buttons, scroll to the menu item **6.1 SETTINGS**.
3.	Press the ✓ button to edit the **Controller Type**.
4.	Using the ⌃ and ⌄ buttons, scroll to **Amazone** and then press the ✓ button.

Step	Amazone Amatron+ Instruction
1.	Press and hold the **I/O** button to switch the power on. Wait until the controller starts with the Menu displayed.
2.	Navigate to the Menu. If you are on the main screen then press **ESC** to get to the Menu.
3.	Press the **Setup** button (bottom row right hand button) and confirm the warning with the **ESC** key.
4.	Select the **Vehicle Setup** button (bottom row right hand button).
5.	Press the **Page** button to move to page 2.
6.	Check that the **Num of Boom Sections** displayed on the Amatron+ matches the number set on the AS7500 in menu item **2.1 BOOM, Number Sections**.
7.	Enter the **Working Width** and press the tick (bottom row right hand button) when complete. Return to the main screen by pressing the **ESC** key.

Appendix P   SRC Communication parameters

SRC	AS7500 Port	Baud Rate
Voltage control models	Section Controller	N/A
John Deere SP models	CANBus	N/A
Flex Control	Section Controller	N/A
SP655/Pilot	Section Controller	N/A
Tru Count	Section Controller	N/A
HARDI 5500/6500	PORT A	9600
Flex Control	PORT A	9600
KEE Eagle / BA7000	PORT A	9600
Hardi Mustang	PORT A	9600
Amazone Amatron+	CANBus	N/A

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Appendix Q   Vehicle & boom measurements

Tractor with pull behind boom spray

Vehicle Measurements

Number of Links	2		
Link 1		Axle 1	
Link 2		Axle 2	
Front Boom	NO	Mid Offset	0
Cross track		Long track	

Boom Details

Number of Sections					
Section 1		Section 2		Section 3	
Section 4		Section 5		Section 6	
Section 7		Section 8		Section 9	
Section 10		Section 11		Section12	
Section 13					

Boom Spray Parameters

Master Source (MCS)			
Latency On		Latency Off	
Tolerance		Min Delay	

Tractor with pull behind boom spray
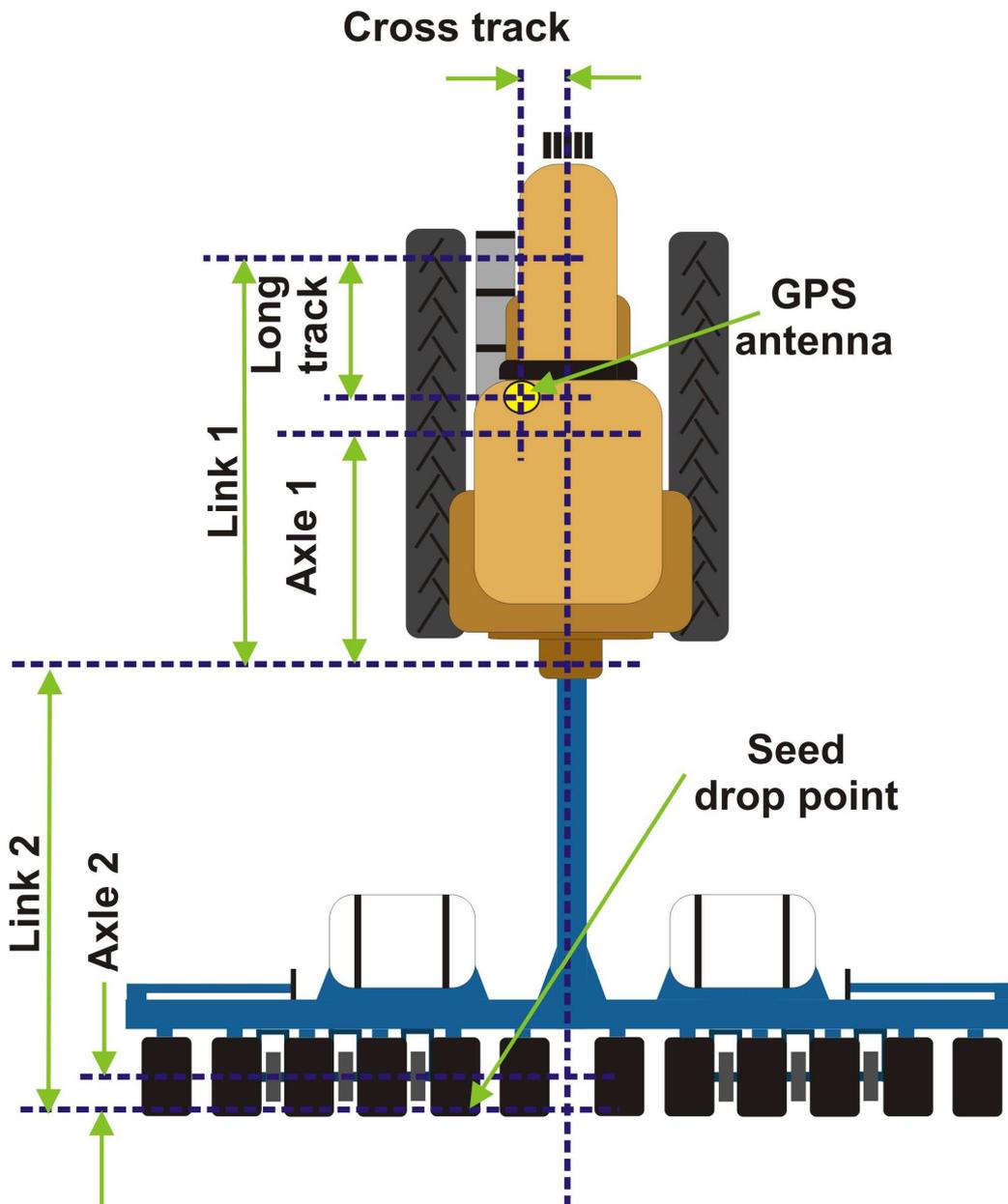
Tracked tractor with pull behind planter

Note:

The axle measurement on a tracked tractor is the mid-point between the front and rear axles.

The measurements on a planter are to the seed drop point of the planter. If the seed drop point is forward of the axle record the axle measurement as 0.00.

Vehicle Measurements

Number of Links	2		
Link 1		Axle 1	
Link 2		Axle 2	
Front Boom	NO	Mid Offset	0
Cross track		Long track	

Boom Details

Number of Sections					
Section 1		Section 2		Section 3	
Section 4		Section 5		Section 6	
Section 7		Section 8		Section 9	
Section 10		Section 11		Section12	
Section 13					

Boom Spray Parameters

Master Source (MCS)			
Latency On		Latency Off	
Tolerance		Min Delay	

Tracked tractor with pull behind planter
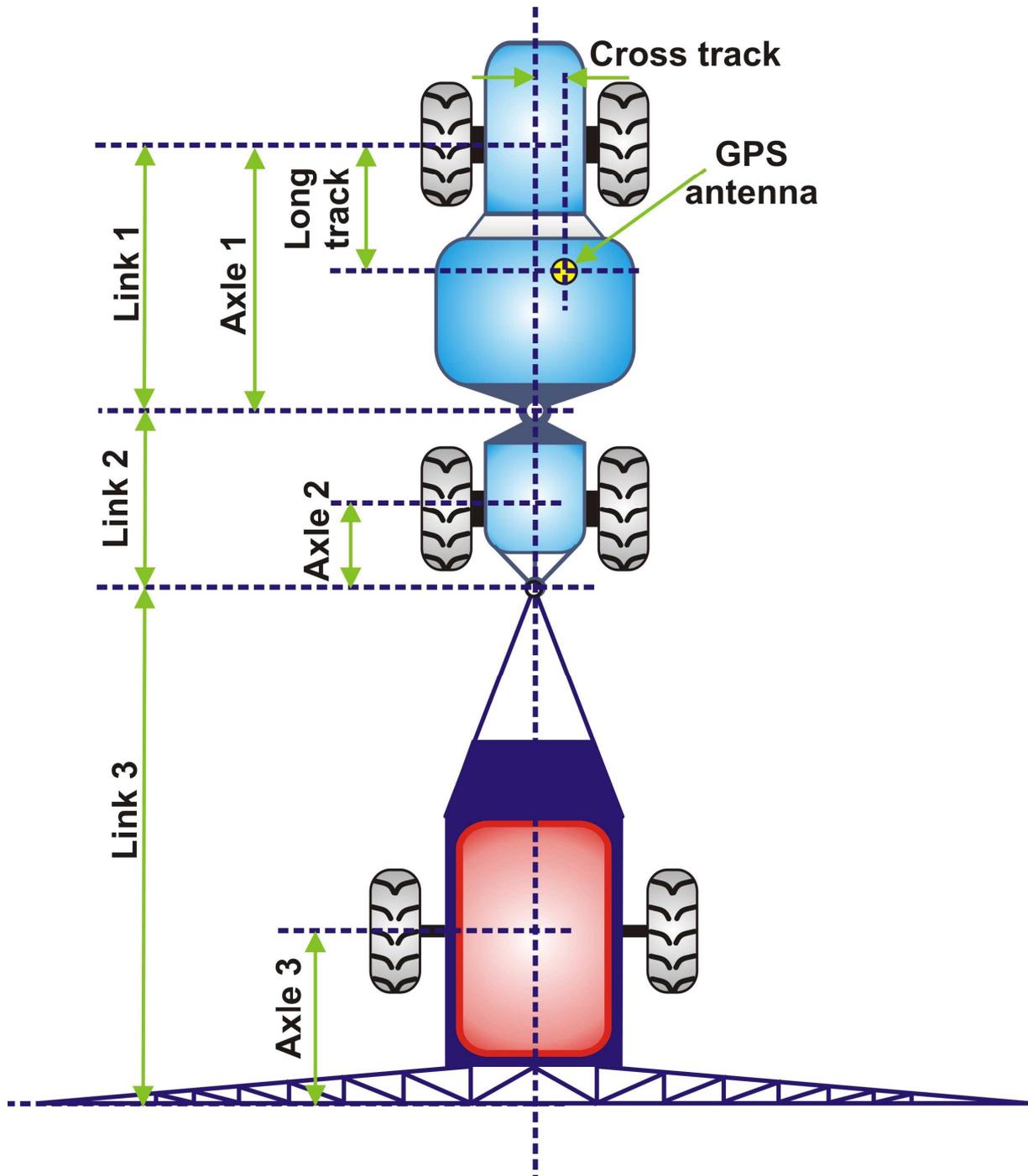
Articulated tractor with pull behind boom spray

Vehicle Measurements

Number of Links	3			
Link 1		Axle 1	
Link 2		Axle 2	
Link 3		Axle 3	
Front Boom	NO	Mid Offset	0
Cross track		Long track	

Boom Details

Number of Sections					
Section 1		Section 2		Section 3	
Section 4		Section 5		Section 6	
Section 7		Section 8		Section 9	
Section 10		Section 11		Section12	
Section 13					

Boom Spray Parameters

Master Source (MCS)			
Latency On		Latency Off	
Tolerance		Min Delay	

Articulated tractor with pull behind boom spray
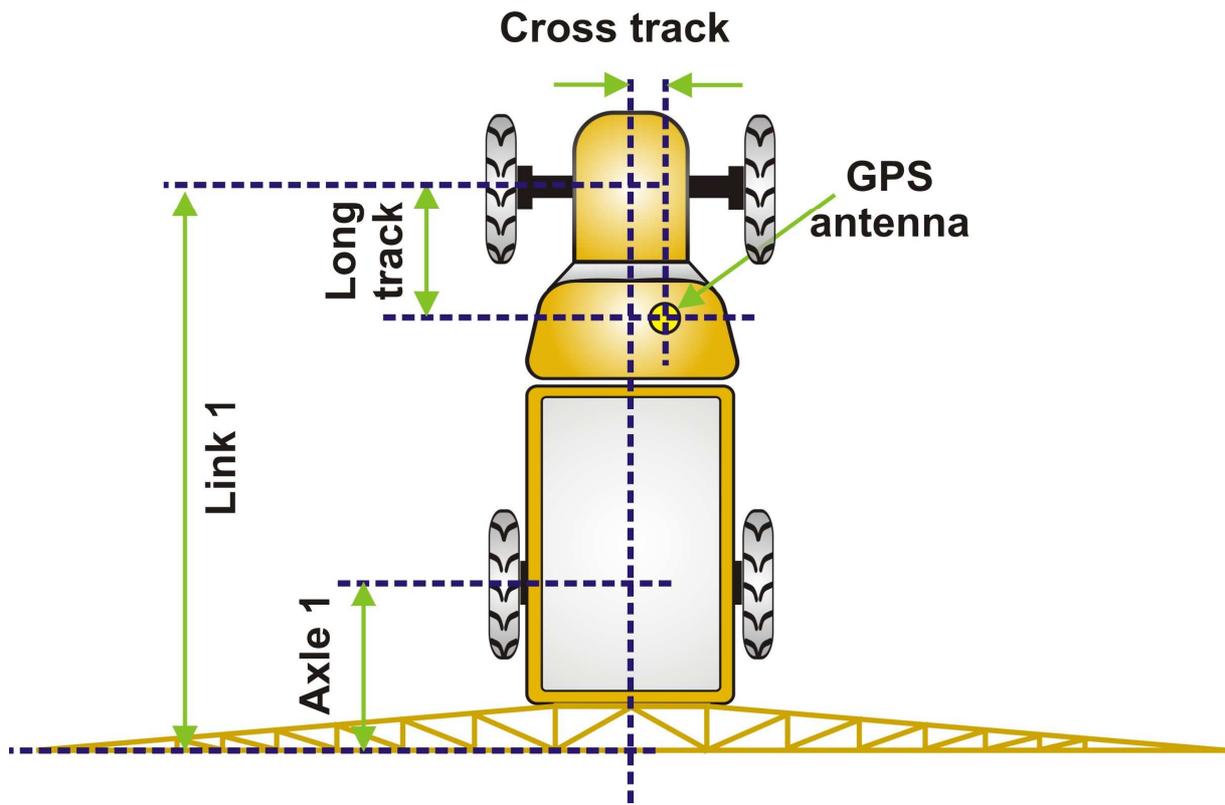
Self-Propelled sprayer – rear mount boom

Vehicle Measurements

Number of Links	1		
Link 1		Axle 1	
Front Boom	NO	Mid Offset	0
Cross track		Long track	

Boom Details

Number of Sections					
Section 1		Section 2		Section 3	
Section 4		Section 5		Section 6	
Section 7		Section 8		Section 9	
Section 10		Section 11		Section12	
Section 13					

Boom Spray Parameters

Master Source (MCS)			
Latency On		Latency Off	
Tolerance		Min Delay	

Self-Propelled sprayer – rear mount boom

Self-Propelled sprayer – front mount boom

Vehicle Measurements

Number of Links	1		
Link 1		Axle 1	0.00
Front Boom	Yes	Mid Offset	0.00
Cross track		Long track	

*NOTE :   **Ensure that the Front Boom is set to YES in the Vehicle Menu.**

Boom Details

Number of Sections					
Section 1		Section 2		Section 3	
Section 4		Section 5		Section 6	
Section 7		Section 8		Section 9	
Section 10		Section 11		Section12	
Section 13					

Boom Spray Parameters

Master Source (MCS)			
Latency On		Latency Off	
Tolerance		Min Delay	

Self-Propelled sprayer – front mount boom

Self-Propelled sprayer mid mount-split boom

Vehicle Measurements

Number of Links		1			
Link 1			Axle 1		
Front Boom		NO	Mid Offset		
Cross track			Long track		

Boom Details

Number of Sections					
Section 1		Section 2		Section 3	
Section 4		Section 5		Section 6	
Section 7		Section 8		Section 9	
Section 10		Section 11		Section12	
Section 13					

Boom Spray Parameters

Master Source (MCS)				
Latency On		Latency Off		
Tolerance		Min Delay		

Self-Propelled sprayer mid mount-split boom

Index