

BOOMPILOT[®]

INSTALLATION MANUAL


Automatic Boom Section Control Installation Manual for
Kit Number 90-02671

For use with Willmar w/ Mid-Tech Controls (Air-Ride,
Eagle 8100/8500 or Rangers)



BoomPilot[®]

TeeJet[®]
TECHNOLOGIES

A Subsidiary of  Spraying Systems Co.[®]

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Safety Information

TeeJet Technologies is not responsible for damage or physical harm caused by failure to adhere to the following safety requirements.

As the operator of the vehicle, you are responsible for its safe operation.

The BoomPilot is not designed to replace the vehicle's operator.








Do not leave a vehicle while the BoomPilot is engaged.




Be sure that the area around the vehicle is clear of people and obstacles before and during engagement.

The BoomPilot is designed to support and improve efficiency while working in the field. The driver has full responsibility for the quality and work related results.

Disengage BoomPilot before operating on public roads or when not in use to prevent loss of vehicle control.

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KIT CONTENTS

Unpack the installation kit and identify the required parts.

Item	Part Number	Description	Quantity
A	45-05626	Power/CAN/Data Cable	1
B	45-05740	BoomPilot Harness, Air-Ride w/ MT Controller	1
C	78-05077	BoomPilot Section Driver Module (SDM).....	1
D	45-05868	Cable, Extension to Foot Switch	1
E	98-05275	Installation Manual, Willmar w/ Mid-Tech Controls	1

Item	Part #	Description	Illustration
A	45-05626	Power/CAN/Data Cable	
B	45-05740	BoomPilot Harness, Air-Ride w/ MT Controller	
C	78-05077	BoomPilot Section Driver Module (SDM)	
D	45-05868	Cable, Extension to Foot Switch	
E	98-05275	Installation Manual, Willmar w/ Mid-Tech Controls	

Figure 1-1: System Diagram for Air-Ride

Matrix
BoomPilot
Optional Accessory

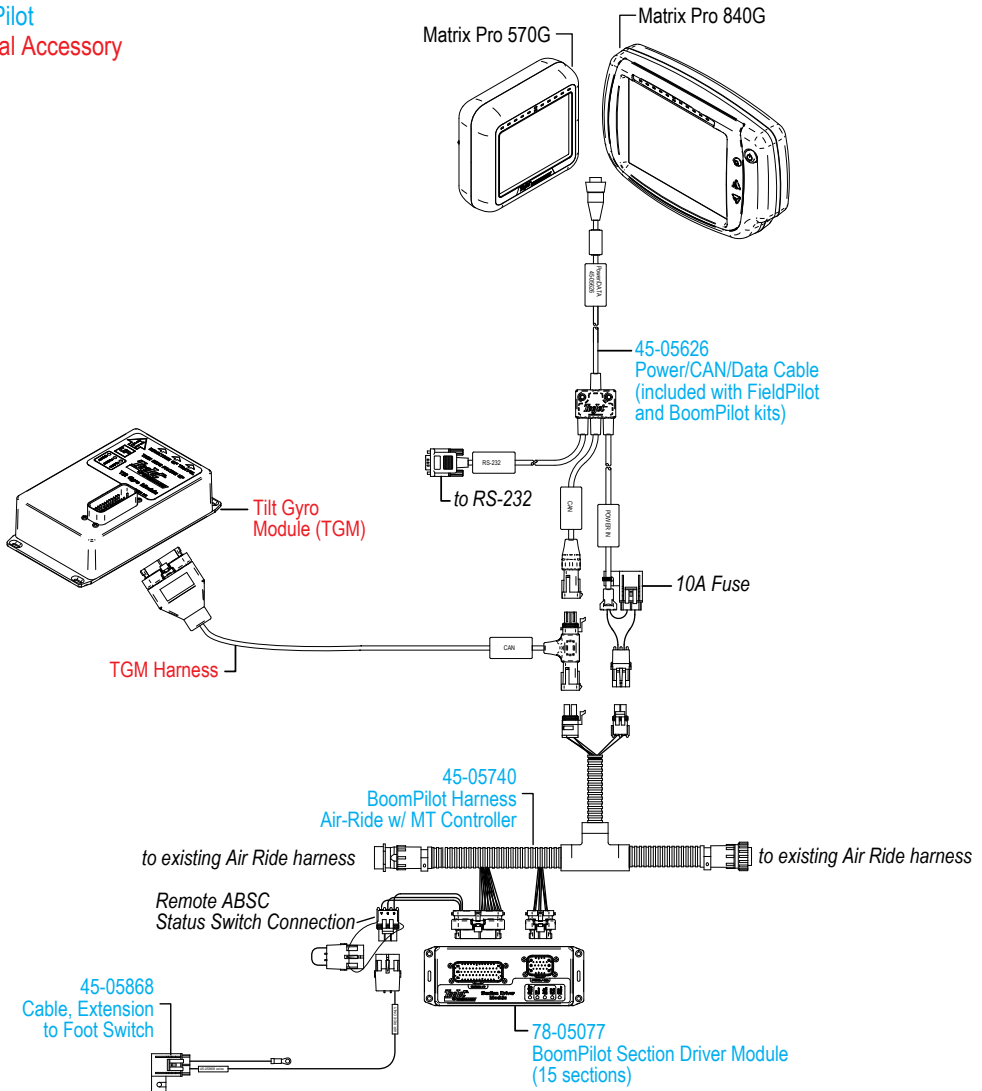
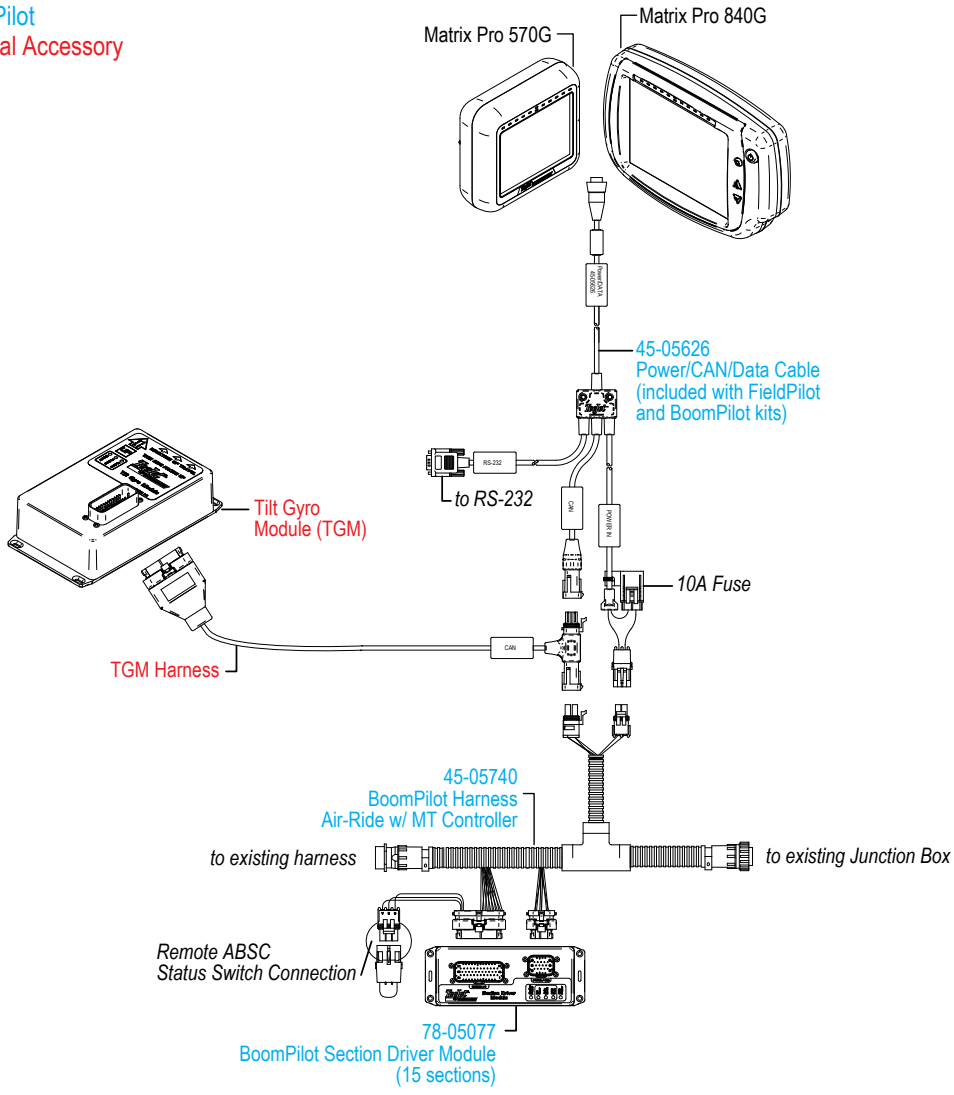


Figure 1-2: System Diagram for Eagle 8100/8500 or Rangers

Matrix
BoomPilot
Optional Accessory



INSTALLATION



If there are questions concerning the installation of the BoomPilot system on this vehicle, or due to the changes in component specifications the parts supplied in the kit are not exactly as presented in this document, please contact your dealer or TeeJet Customer service representative for clarification before installation. TeeJet Technologies is not responsible for misuse or incorrect installation of the system.

NOTE: All references to left and right are stated as if the user is seated in the driver's seat.

NOTE: BE VERY CAREFUL TO ABSOLUTELY SECURE ALL CABLES AND HOSES SO THAT THEY DON'T INTERFERE WITH THE MANY MOVING PARTS OF THE MACHINE!

1. LOCATE THE CONNECTION POINT FOR THE SDM HARNESS

Locate the existing system's harness connection between the harness to the rate controller and the harness to the valves.

Air-Ride

The connection point is in the cab between harness 405-0073 and harness 405-0068 (in some vehicle configurations, the Air-Ride harnesses have been replaced by 78-00045 switchbox & 45-05763 harness). These two harnesses most likely connect behind the seat.

Figure 1-3: Locate the Connection Point – Air-Ride



Eagle 8100/8500 or Rangers

The connection point is at the Junction Box (smaller rectangular box) under the floor to the right of the operator seat in front of the electrical compartment in the cab. Remove the Interior Finish Panel to access the electrical compartment.

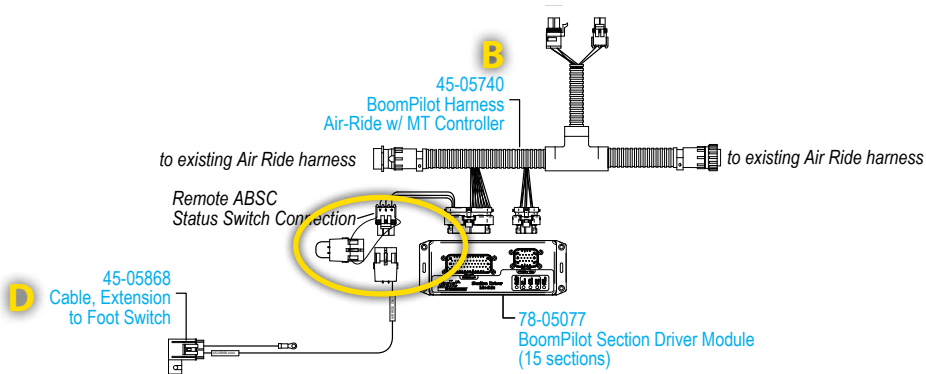
Figure 1-4: Locate the Connection Point – Eagle 8100/8500 or Rangers



2. CONNECT FOOT SWITCH EXTENSION – AIR-RIDE ONLY

Disconnect cap from the Remote ABSC Status Switch connection on the BoomPilot harness (B). Connect the Foot Switch Extension Cable (D) to the Remote ABSC Status Switch connection. The foot switch is used as a spray boom master on/off switch.

Figure 1-5: Connect Foot Switch Extension – Air-Ride Only



3. DISCONNECT & RECONNECT HARNESSSES & CABLES

The BoomPilot SDM harness (**C**) tees into the existing system's connection between the rate controller harness and the valve harness.

1. Disconnect the existing connection between harnesses (AirRide) or junction box & harness (Eagle/Ranger) located in step 1.
2. Connect BoomPilot harness (**B**) to valve harness or junction box.
3. Connect BoomPilot harness (**B**) to controller harness.
4. Air-Ride Only – Connect BoomPilot Harness extension wire from step 2 to the cold/switch side (12v ON / 0v OFF) of the Foot Switch in combination with the existing connection in that location.

Figure 1-6: Disconnect Existing Combination

Air-Ride



Eagle 8100/8500 or Rangers

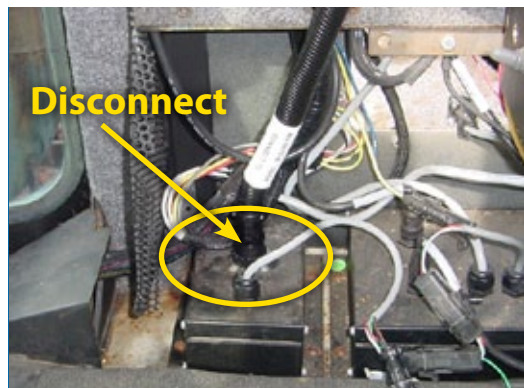


Figure 1-7: BoomPilot Harness to Valve Harness or Junction Box

Air-Ride



Eagle 8100/8500 or Rangers

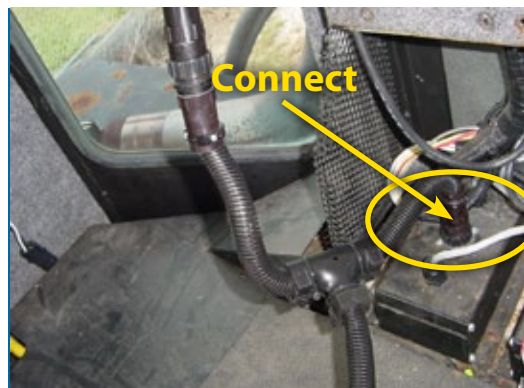
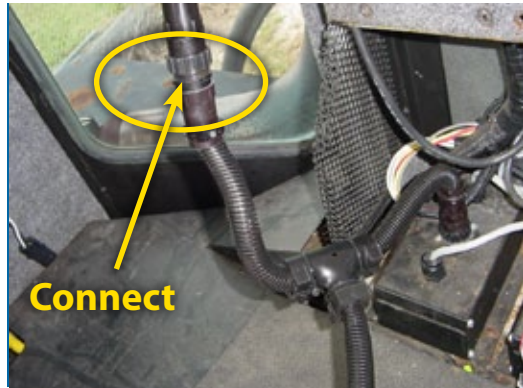


Figure 1-8: BoomPilot Harness to Controller Harness

Air-Ride

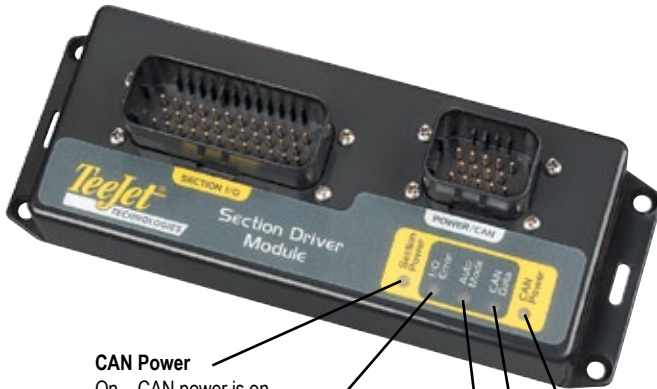
Eagle 8100/8500 or Rangers



4. MOUNT & CONNECT SDM

1. Mount SDM (C) to the operator's preference where LED's can be seen for troubleshooting.
2. Connect SDM (C) to BoomPilot Harness (B).

Figure 1-9: LED Description



CAN Power

On – CAN power is on
Off – CAN power is off

CAN Data

Blinking – receiving console CAN messages
Off – CAN messages stop for > 3 seconds

Section Power

On – boom section power is on
Off – boom section power is off

In/Out Error

Off – boom output is high or on
Blinking – boom output is low or off

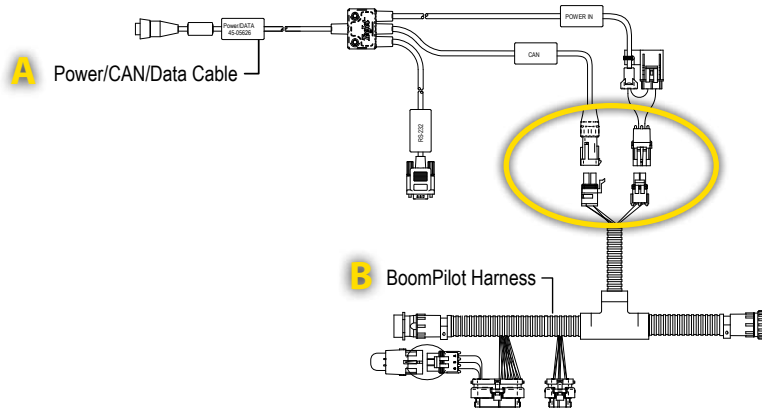
Auto Mode

On – auto mode is active
Off – manual mode is active

5. CONNECT POWER/CAN/DATA CABLE TO BOOMPILOT HARNESS

Connect Power/CAN/Data Cable (A) to BoomPilot Harness (B)

Figure 1-10: Connect Power/CAN/Data Cable to BoomPilot Harness



6. REPLACE INTERIOR FINISH PANEL – EAGLE 8100/8500 OR RANGERS ONLY

Replace Interior Finish Panel removed in Step 1.

Figure 1-11: Replace Electrical Compartment Panel



7. COMPLETE ELECTRONIC INSTALLATION



Refer to the “Configuration Using your Matrix® Pro” and “Operation Using your Matrix® Pro” sections of this manual for further instructions on setting up and using your Matrix Pro for ABSC.



If not using a Matrix Pro, please refer to the owner’s manual supplied with the guidance system to complete the electronic installation and setup.

Operation Review and Tips

Off/Manual & Automatic

To switch BoomPilot between off/manual  and automatic :

1. Turn the controller master switch to the “On” position. The individual boom section switches should remain in the “Off” position.
2. Press NAVIGATION AND GUIDANCE OPTIONS icon  to display navigation options.
3. Press BOOMPILOT icon .

- ◀ Off/Manual – Status Bar Icon will change to red 
- ◀ Automatic – Status Bar Icon will change to green 

In areas where application is not desired, manually turn “off” the rate controller master switch to shut off the booms. Turn the master switch “on” to resume application.

All Booms On Mode

To turn all booms on :






1. Press NAVIGATION AND GUIDANCE OPTIONS icon  to display navigation options.
2. Press and hold BOOMPILOT icon .
 - ◀ All On – Status Bar Icon will change to yellow 

Figure 1-12: Automatic to All Booms On Mode



Matrix Pro BoomPilot Switch Configuration

BoomPilot (ABSC) System	Controller Master Switch or Original Master Switch	Controller Boom Switches or Original Boom Switches	Matrix Pro Spray Icon
Automatic Mode	On	Off	
Manual Mode	On	On	

- System will still operate normally using existing section switches if BoomPilot is in manual
- Boom master will always override BoomPilot auto condition and turn sections off
- BoomPilot auto mode does not require a boundary
- If typical application is a first lap around the field, make this lap with BoomPilot in manual mode to avoid improper on/off boom action during reversing movements of vehicle if BoomPilot is in auto.

CONFIGURATION USING YOUR MATRIX® PRO

The Matrix Pro is used to configure the vehicle and its implements including ABSC.

To access BoomPilot configuration options:



1. Press UNIT SETUP bottom tab .
2. Press CONFIGURATION side tab .
3. Select from:
 - ▶ Vehicle – used to establish vehicle type, antenna height, direction to boom and distance to boom
 - ▶ Implement – used to establish number of boom sections, guidance width, spray width, overlap percentage, implement delay on time and implement delay off time
 - ▶ Lightbar – used to establish LED brightness, LED mode and LED spacing

Figure 1-13: Configuration Options

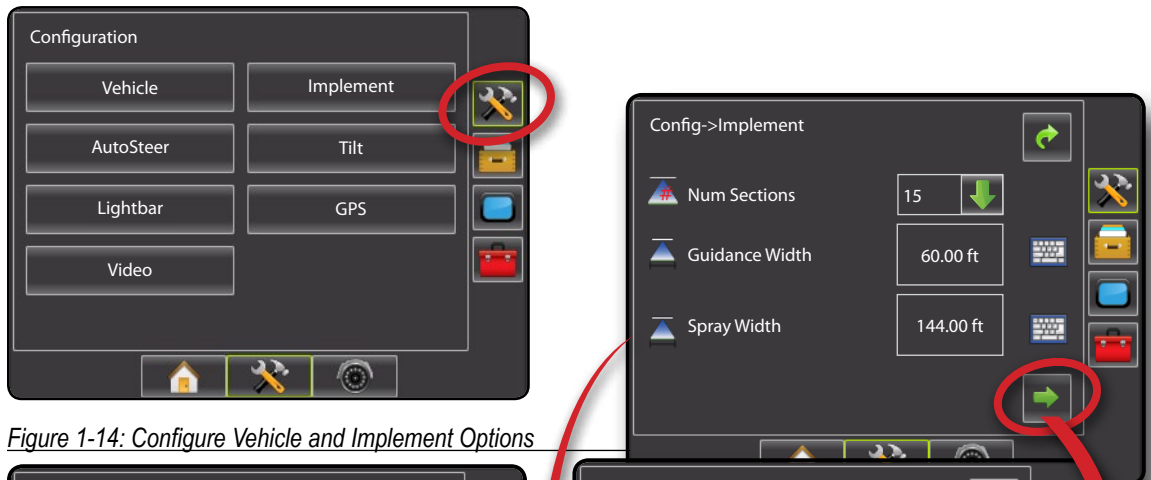
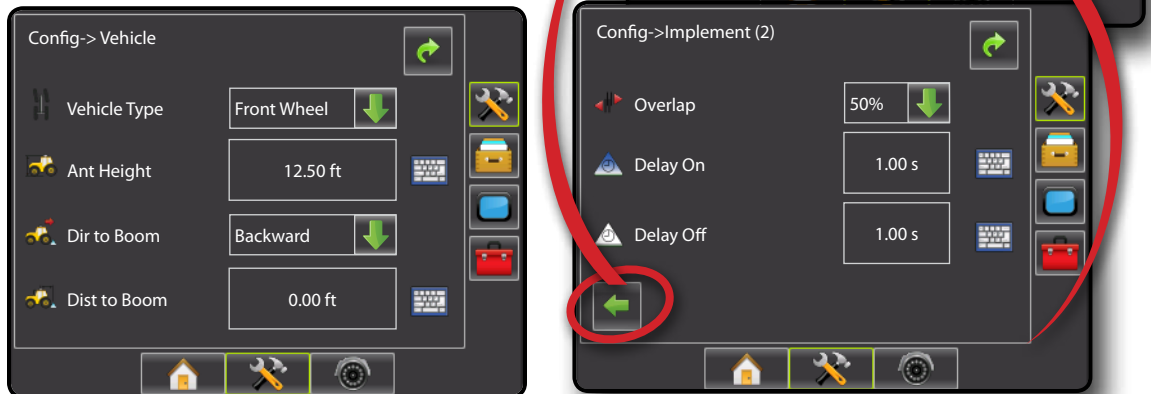









Figure 1-14: Configure Vehicle and Implement Options



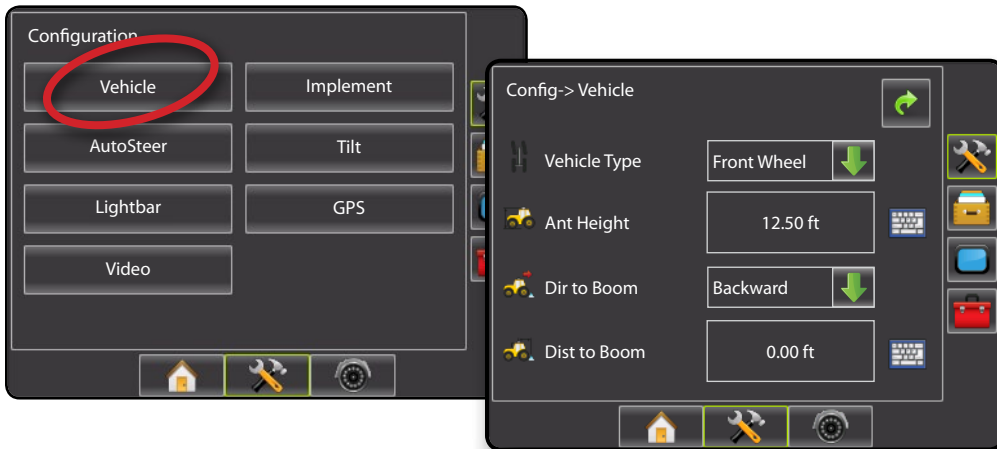
Vehicle Setup

Vehicle Setup is used to configure Vehicle Type, Antenna Height, Direction to Boom and Distance to Boom.

1. Press CONFIGURATION side tab .
2. Press **Vehicle**.
3. Select from:
 - ▶ Vehicle Type  – used to select the type of vehicle steering that most closely represents your vehicle
 - ▶ Antenna Height  – used to enter the height of the antenna from the ground
 - ▶ Direction to Boom  – used to select whether the boom is located behind or in front of the GPS antenna
 - ▶ Distance to Boom  – used to enter the distance from the GPS antenna to the boom
4. Press RETURN arrow  or CONFIGURATION side tab  to return to the main Configuration screen

NOTE: All settings under Vehicle Setup are required for autosteer and tilt sensor operation, as well as proper implement operation.

Figure 1-15: Vehicle Setup Options



Vehicle Type

Vehicle Type selects the type of vehicle steering that most closely represents your vehicle.


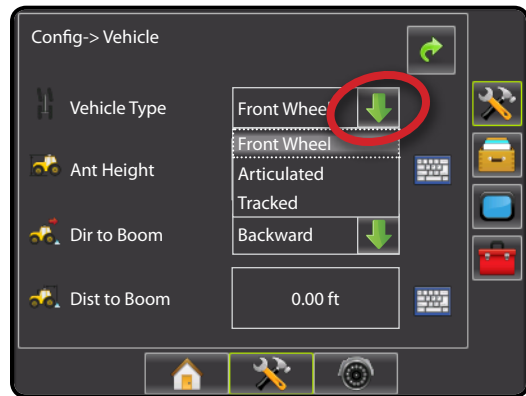
1. Press DOWN arrow  to access the list of options.
2. Select:
 - ▶ Front wheel (also used for combines)
 - ▶ Articulated
 - ▶ Tracked

Figure 1-16: Vehicle Type



Antenna Height

Antenna Height sets the height of the antenna from the ground. Range is 0.0 - 32.8 feet / 0.0 - 10.0 meters.

NOTE: This setting is required for auto steering and tilt sensor operation.


1. Press the KEYPAD icon .
2. Use the entry screen to establish the antenna height.

Figure 1-17: Antenna Height



Direction to Boom

Direction to Boom sets whether the boom is located behind or in front of the GPS antenna as the vehicle moves in a forward direction.


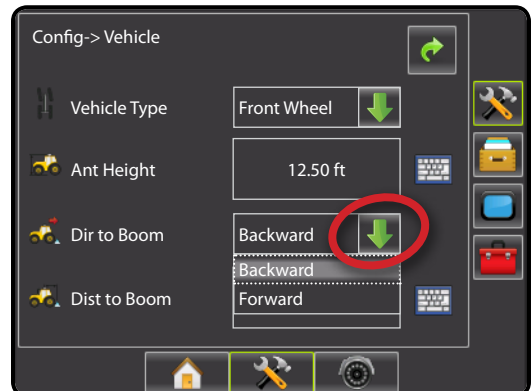
1. Press DOWN arrow  to access the list of options.
2. Select:
 - ▶ Backward – indicates the boom is located behind the GPS antenna
 - ▶ Forward – indicates the boom is located in front of the GPS antenna

Figure 1-18: Direction to Boom



Distance to Boom

Distance to Boom defines the distance from the GPS antenna to the boom. Range is 0.0 - 164.0 feet / 0.0 - 50.0 meters.


1. Press the KEYPAD icon .
2. Use the entry screen to establish the distance from the GPS antenna to the boom.










Figure 1-19: Distance to Boom



Implement - SmartCable or SDM

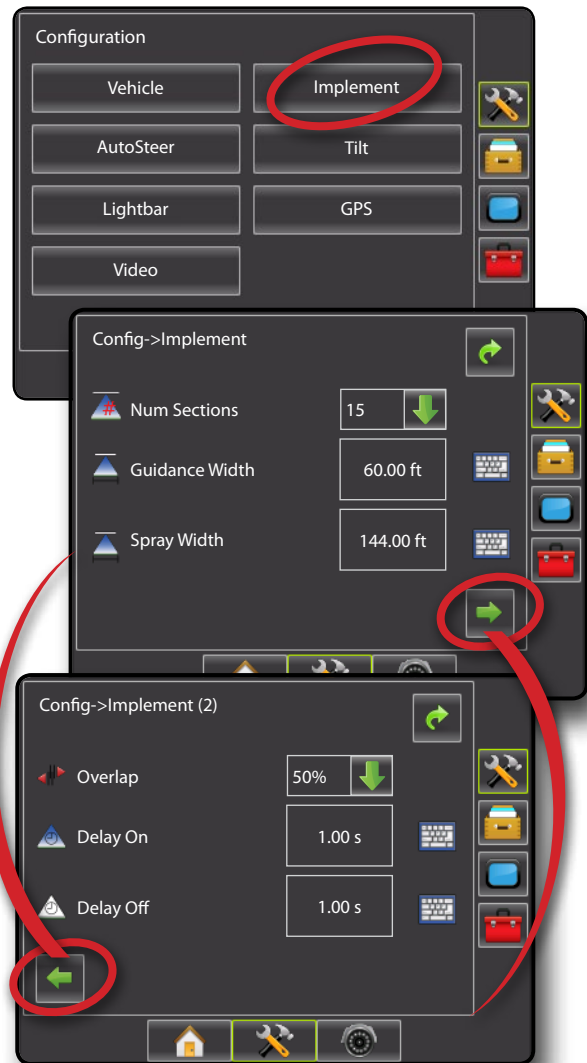
Implement Setup is used to establish number of boom sections, guidance width, spray width, overlap percentage, implement delay on time and implement delay off time.

Note: If a SmartCable or Section Driver Module (SDM) is not present the configurations for Number of Boom Sections, Overlap, Delay On and Delay Off will not be available - only Guidance Width and Spray Width can be entered.

1. Press CONFIGURATION side tab .
2. Press **Implement**.
3. Select from:
 - ▶ Number of Boom Sections  – used to select the number of available boom sections
 - ▶ Guidance Width  – used to enter the width between the guidelines
 - ▶ Spray Width  – used to enter the width of each implement section
 - ▶ Overlap  – used to select the amount of overlap allowed when the boom sections are turned on and off
 - ▶ Delay On  – used to enter the timing for the boom section valves to switch on
 - ▶ Delay Off  – used to enter the timing for the boom section valves to switch off
4. Press RETURN arrow  or CONFIGURATION side tab  to return to the main Configuration screen.

NOTE: Press  or  to switch between Implement setup screens.

Figure 1-20: Implement Setup Options with SmartCable or SDM



Number of Boom Sections

Number of Boom Sections establishes the number of available boom sections. If a SmartCable or Section Driver Module (SDM) is present, 1 to 6 or 1 to 15 section widths can be entered (depending on which SmartCable or Section Driver Module (SDM) is detected).


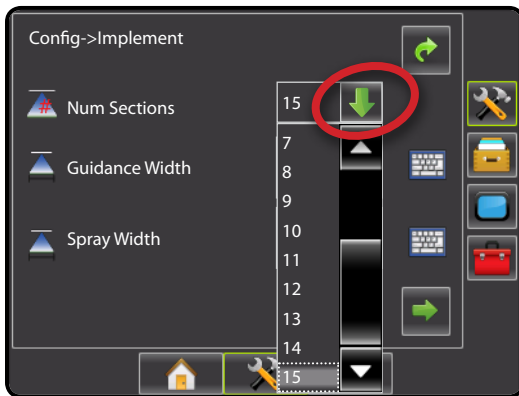
1. Press DOWN arrow  to access the list of options.
2. Select the number of boom sections on the implement:

Figure 1-21: Number of Boom Sections



Guidance Width

Guidance Width establishes the width between the guidelines. Range is 3.28 - 246.1 feet / 1.0 - 75.0 meters.

NOTE: This setting is required for auto steering operation.


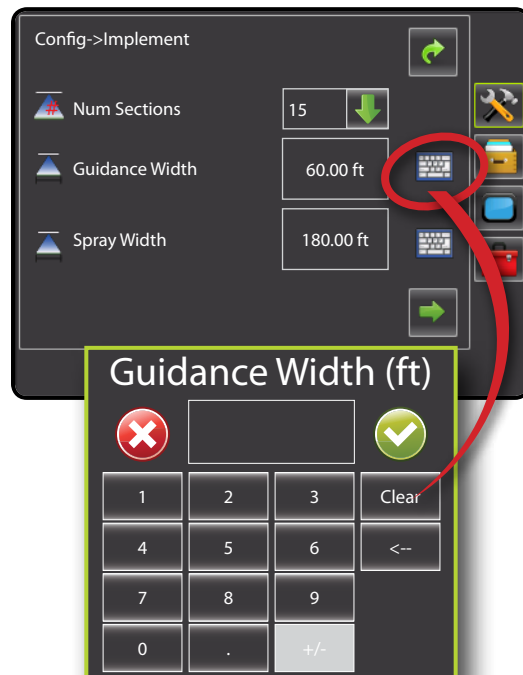
1. Press the KEYPAD icon .
2. Use the entry screen to establish the guidance width.



Figure 1-22: Guidance Width



Spray Width

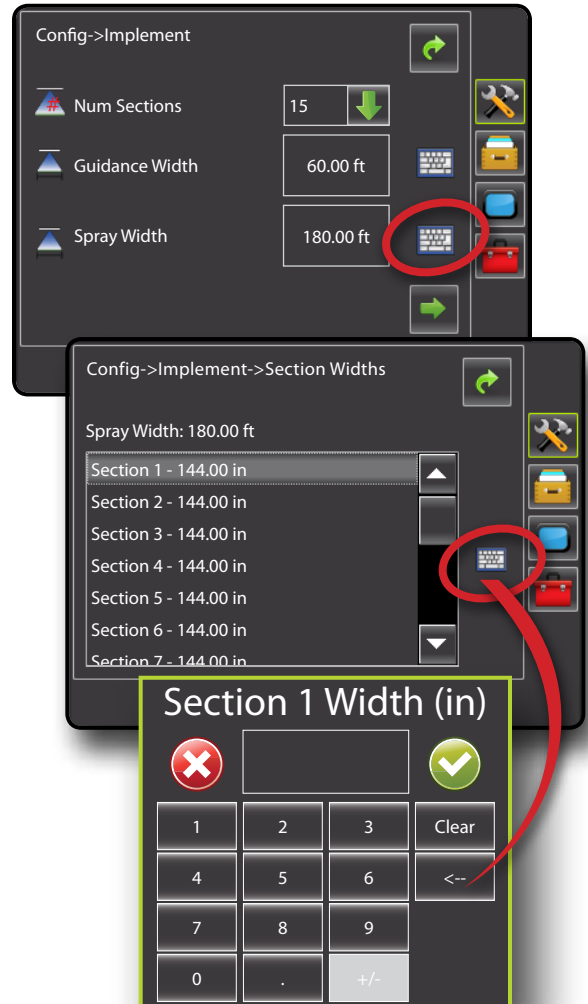
Spray width establishes the width of each implement section. When facing forward, boom sections are ordered from left to right along the boom. Spray width range is 3.28 - 246.1 feet / 1.0 - 75.0 meters. Boom section width range is 0.0 - 2957.8 inches / 0.0 - 75.0 meters.

NOTE: When entering a boom section width, the total of all sections must be greater than 3.28 feet (39.3701 inches) / 1.0 meter.

1. Press the KEYPAD icon .
2. Highlight the section to be established.
3. Press the KEYPAD icon .
4. Use the entry screen to establish the spray width.
5. Repeat steps 2 to 4 until all sections have been established.

NOTE: Individual boom sections can be set to different widths.

Figure 1-23: Spray Width



Overlap

Overlap determines the amount of overlap allowed when each boom section is turned on and off using Automatic Boom Section Control.


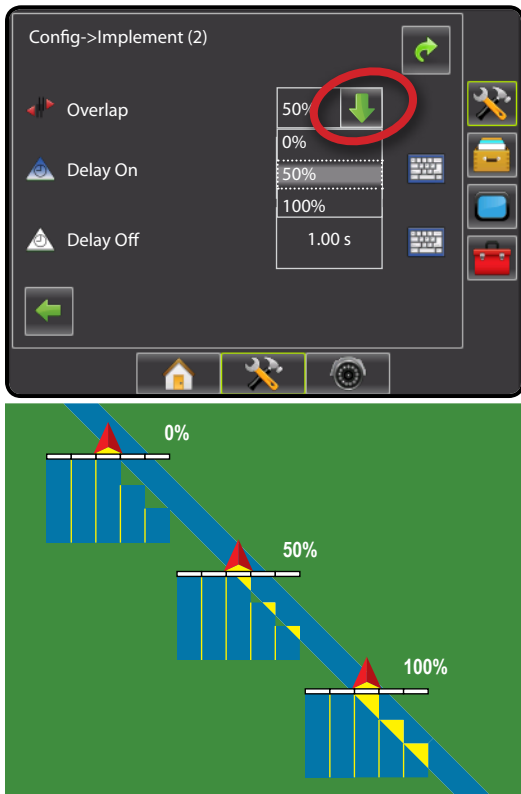
1. Press DOWN arrow  to access the list of options.
2. Select:
 - ▶ 0%
 - ▶ 50%
 - ▶ 100%

Figure 1-24: Overlap



Delay On

Delay On functions as a “look ahead” for establishing the timing for the boom section valves to switch on exactly when entering an area that has not been applied. If the boom turns on too soon when entering a non-applied area, decrease the Delay On setting. If the boom turns on too late when entering a non-applied area, increase the Delay On setting. Range is 0.0 - 10.0 seconds.


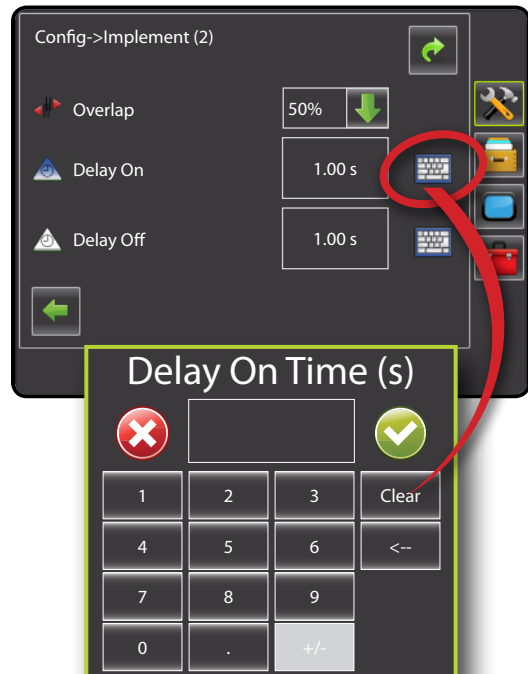
1. Press the KEYPAD icon .
2. Use the entry screen to establish the delay on time.

Figure 1-25: Delay On



Delay Off

Delay Off functions as a “look ahead” for establishing the timing for the boom section valves to switch off exactly when entering an area that has been applied. If the boom turns off too soon when entering an applied area, decrease the Delay Off setting. If the boom turns off too late when entering an applied area, increase the Delay Off setting. Range is 0.0 - 10.0 seconds.


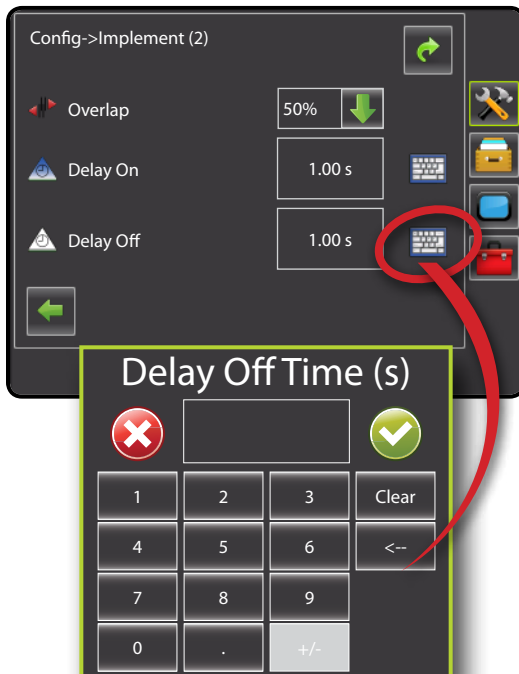


1. Press the KEYPAD icon .
2. Use the entry screen to establish the delay off time.

Figure 1-26: Delay Off



OPERATION USING YOUR MATRIX® PRO

BoomPilot is used to set BoomPilot to Off/Manual , Automatic  or All On .



NOTE: GPS is unavailable when the BOOMPILOT icon is grey . BoomPilot status bar icon will be Off/Manual .

The BOOMPILOT icon  is unavailable if a SmartCable or Section Driver Module (SDM) is not present.

Boom master will always override BoomPilot auto condition and turn sections off.





BoomPilot auto mode does not require a boundary.

Matrix Pro BoomPilot Switch Configuration

BoomPilot (ABSC) System	Controller Master Switch or Original Master Switch	Controller Boom Switches or Original Boom Switches	Matrix Pro Spray Icon
Automatic Mode	On	Off	
Manual Mode	On	On	

Off/Manual & Automatic

To switch BoomPilot between off/manual  and automatic .

1. Turn the controller master switch to the “On” position. The individual boom section switches should remain in the “Off” position.
2. Press NAVIGATION AND GUIDANCE OPTIONS icon  to display navigation options.
3. Press BOOMPILOT icon .
 - ◀ Off/Manual – Status Bar Icon will change to red 
 - ◀ Automatic – Status Bar Icon will change to green 




In areas where application is not desired, manually turn “off” the rate controller master switch to shut off the booms. Turn the master switch “on” to resume application.

Figure 1-27: Automatic to All Booms On Mode



All Booms On Mode

To turn all booms on .

1. Press NAVIGATION AND GUIDANCE OPTIONS icon  to display navigation options.
2. Press and hold BOOMPILOT icon .
 - ◀ All On – Status Bar Icon will change to yellow 

NOTE: This does not apply unless a SmartCable or SDM is installed on the system.

Example

1. While in manual mode on BoomPilot, enter the field to make the first lap around the field as Matrix Pro continues to track area applied. Manual mode is used to avoid rapid boom on/off activity when backing into corners on first lap.
2. Once back to start point:
 - i) turn section switches “Off”
 - ii) activate automatic mode on BoomPilot
 - iii) turn master “On”
 - iv) begin operation for remainder of field performing guidance functions as desired.

BoomPilot Status


BoomPilot Status displays information regarding the current status of the BoomPilot system


1. Press BOOMPILOT STATUS icon    to view the number of sections.

Figure 1-28: BoomPilot Status



BoomPilot Status

 Red = Off/Manual

 Green = Automatic

 Yellow = All On

No icon = Single Boom Section (no SmartCable or SDM installed on system)

BOOMPILOT®


INSTALLATION MANUAL

A series of equipment-specific installation kits have been developed to work in conjunction with your automated boom section control system. This kit contains the necessary components and instructions to install ABSC on a Willmar w/ Mid-Tech Controls (Air-Ride, Eagle 8100/8500 or Rangers). Please review this manual thoroughly before beginning the installation process.

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