



Ultra Sonic Boom™ Kit

Multi-Pro® 5800 Turf Sprayer

Model No. 41615—Serial No. 311000001 and Up

Form No. 3368-972 Rev D

Installation Instructions

This attachment maintains consistent distances from the boom nozzles to the ground when spraying over uneven surfaces and is intended to be used by professional, hired operators in commercial applications. It is primarily designed for spraying golf course applications, parks, sports fields, and on commercial grounds. It is designed to only be used in conjunction with machines designated by the manufacturer.

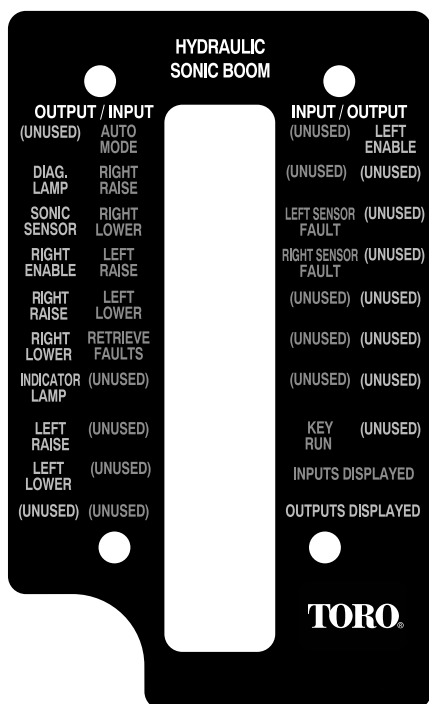
This product complies with all relevant European directives. For details, please see the separate product specific Declaration of Conformity (DOC) sheet.

Safety

Safety and Instructional Decals



Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or lost.



119-9432

Installation

Loose Parts

Use the chart below to verify that all parts have been shipped.

Procedure	Description	Qty.	Use
1	No parts required	–	Prepare the machine.
2	Hinge Angled strap (for an uncovered boom) Angled strap (for a covered boom) Top or bottom strap Compression spring Bushing Hex-head bolt (5/16 x 3-1/4 inch) Flat washer Locknut (5/16 inch)	2 2 2 2 4 8 4 12 4	Assemble the sensor mounting hardware.
3	Hydraulic manifold block Hydraulic fitting	1 4	Prepare the booms.
4	Boom cradle arm	2	Replace the boom cradle arms.
5	Sonic boom sensor Bracket Programming plug Sensor cover Lower sensor housing Cap tube Sensor guard bracket Sensor cable (4 m) Large nut U-bolt Locknut (1/4 inch) Bolt (5/16 x 3/4 inch) Bolt (5/16 x 1-1/4 inch) Locknut (5/16 inch) Cable tie	2 2 2 2 2 2 2 2 4 6 8 8 4 12 12	Install the sonic boom sensors.
6	Electronic controller Mounting bracket Bolt (1/4 x 1-1/8 inch) Locknut (1/4 inch)	1 1 4 4	Mount the electronic controls.
7	Wire harness Rocker switch Indicator light Cable tie	1 1 1 12	Install the controls.
8	No parts required	–	Calibrate the sonic booms.

Note: Decal 119-9432 is used with a hand-held diagnostic tool and therefore is not installed on the machine.

Note: Determine the left and right sides of the machine from the normal operating position.

1

Preparing the Machine

No Parts Required

Procedure

Position the machine on a level surface, stop the engine, remove the ignition key, and engage the parking brake.

⚠ CAUTION

If you leave the key in the ignition switch, someone could accidentally start the engine and seriously injure you or other bystanders.

Remove the key from the ignition switch before you install the kit.

2

Assembling the Sensor Mounting Hardware

Parts needed for this procedure:

2	Hinge
2	Angled strap (for an uncovered boom)
2	Angled strap (for a covered boom)
2	Top or bottom strap
4	Compression spring
8	Bushing
4	Hex-head bolt (5/16 x 3-1/4 inch)
12	Flat washer
4	Locknut (5/16 inch)

Procedure

Note: How you assemble the sensor mounting hardware depends upon whether the Covered Boom Kit (model 41602) is installed.

1. Lay out the hinges and straps as shown in Figure 1 (for an uncovered boom) or Figure 2 (for a covered boom).

Note: There are 2 sets of 2 angled straps in loose parts. One set is for an uncovered boom and the

other set is for a covered boom. You will have one set of 2 angled straps (either for the covered boom or for the uncovered boom) that you will not use on the machine.

Note: The top straps for the uncovered booms also serve as the bottom straps for the covered booms.

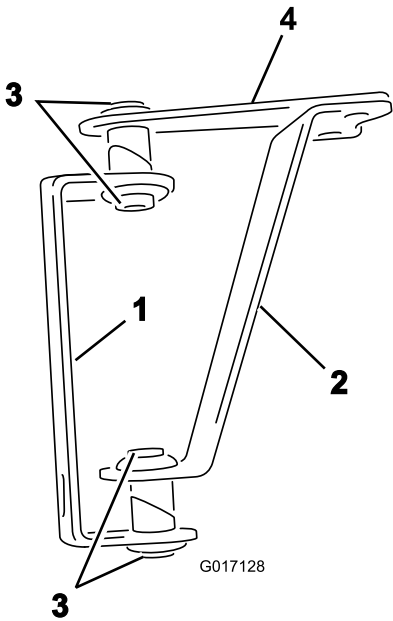


Figure 1
For uncovered booms only

- | | |
|---------------------|-----------------|
| 1. Hinge (2) | 3. Bushings (8) |
| 2. Angled strap (2) | 4. Top strap |

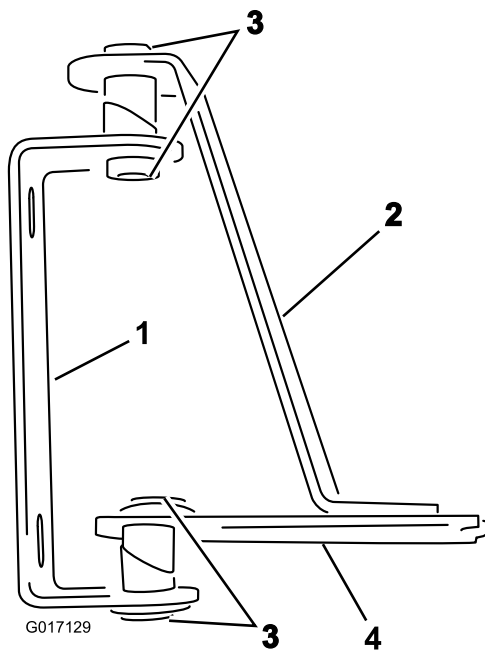


Figure 2

For covered booms only

- | | |
|---------------------|-----------------|
| 1. Hinge (2) | 3. Bushing (8) |
| 2. Angled strap (2) | 4. Bottom strap |

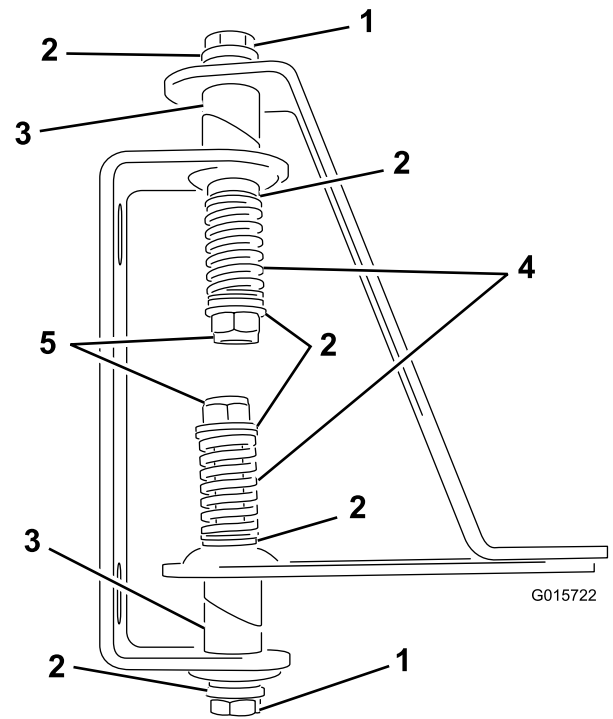


Figure 3

Hardware for a covered boom shown

- | | |
|------------------------|-------------------------|
| 1. Hex-head bolt | 4. Springs |
| 2. Flat washer | 5. Locknuts (5/16 inch) |
| 3. Welded tube opening | |

2. Insert the bushings into the welded tube openings in the hinges and straps as shown in Figure 1 or Figure 2.
3. Install a flat washer on each of the 2 hex-head bolts (3-1/4 inch).
4. Insert the bolts through the hinged welded tube openings, hinges, and straps (Figure 3).

5. Install a flat washer on the exposed end of each of the bolts.
6. Install a spring on the end of each bolt (Figure 3).
7. Install a flat washer and a locknut on the end of each bolt, and tighten the locknuts until there is no slack in the spring.

Note: Check to ensure that the hinges are not so tight that the mounted sensors do not freely pivot on the hinges.

3

Preparing the Booms

Parts needed for this procedure:

1	Hydraulic manifold block
4	Hydraulic fitting

Procedure

The booms are set at the factory to travel downward no farther than the horizontal position. To enable the

ultrasonic boom kit to maintain a consistent distance between the nozzles and the ground when the ground slopes downward from the machine, you must adjust the boom support system to allow the booms to travel below the horizontal position in order to maintain a constant nozzle-to-ground distance.

1. Raise the booms and have them rest in the transport cradle.
2. For each boom, remove the hairpin cotter and pull out the pin from the rod to disconnect the rod from the boom pivot pin housing (Figure 4).

Note: There should be no more than 5/8 inch of exposed thread on the eyelet to prevent the engaged threads from stripping and the rod from pulling away.

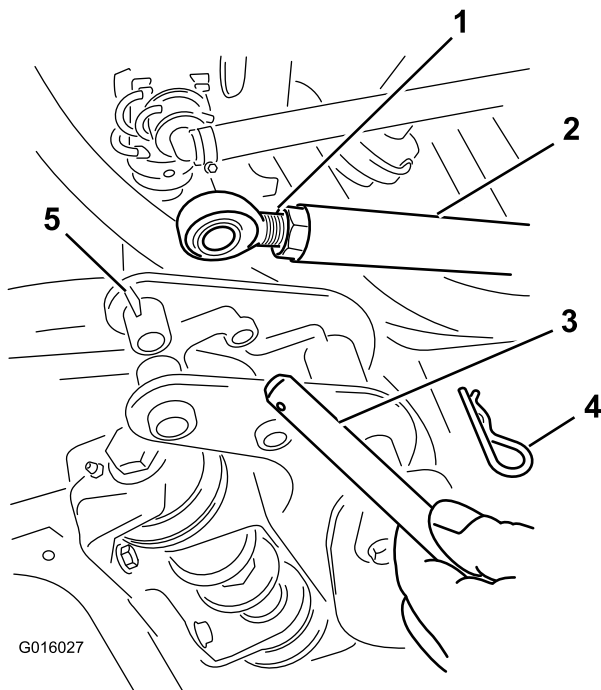


Figure 4

- | | |
|---------------------------------------|---------------------------|
| 1. 5/8 inch or less of thread exposed | 4. Hairpin cotter |
| 2. Rod | 5. Boom pivot pin housing |
| 3. Pin | |

3. Carefully lower the booms onto wooden blocks about 4 inches (10 cm) high (Figure 5).

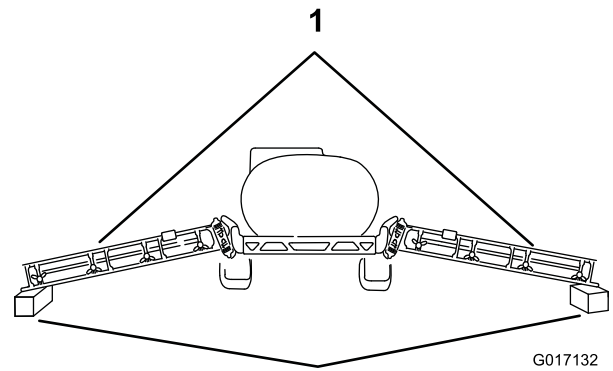


Figure 5

- | | |
|----------|------------------|
| 1. Booms | 2. Wooden blocks |
|----------|------------------|

4. Start the machine and fully extend the actuators.
5. Loosen the jam nut on each rod.
6. Unscrew the eyelet on each rod end until the hole in the eyelet aligns with the holes in the boom pivot pin housing.
7. For each boom, install the pin that you removed in step 2 through the boom pivot pin housing and eyelet on the rod end.
8. Secure the pins with the hairpin cotters that you removed in step 2.
9. Tighten the jam nut on each rod until it is snug.
10. Remove the hydraulic block cover plate.
11. Label all the hoses connected to the hydraulic manifold block (ports C1 through C4), and disconnect them from the block.

Note: Loosen the 2 hydraulic connectors on the right side and the gauge port (Figure 6).

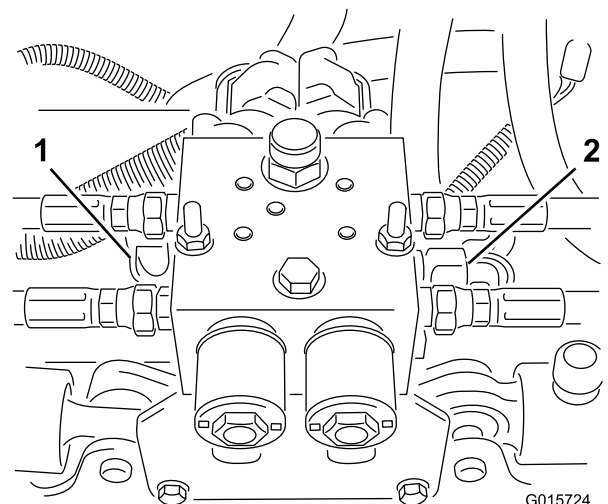


Figure 6

- | | |
|---------------|-------------------------|
| 1. Gauge port | 2. Hydraulic connectors |
|---------------|-------------------------|

12. Remove the hydraulic block from the mounting bracket by removing 2 bolts and 2 locknuts.

Note: Save the hardware.

13. Remove the 2 hydraulic connectors from the ports and the gauge port from the old hydraulic manifold block, and install them on the new hydraulic manifold block.
14. Install the new hydraulic manifold block onto the mounting bracket with the 2 bolts and 2 locknuts that you previously removed.
15. Tighten the gauge port and the 2 hydraulic connectors.
16. Tighten all the fittings on the block.
17. Install all the hoses onto the fittings on the block.

Important: Ensure that you install the hoses correctly. The 3/8-inch hose from the return filter connects to the “T” port, and the other 3/8-inch hose connects to the “P” port. The C1 and C3 ports go to the base end of the cylinders, and the C2 And C4 ports go to the rod end of the cylinders.

18. Purge the hydraulic system. Refer to the *Operator's Manual*.

4

Replacing the Boom Cradle Arms

Parts needed for this procedure:

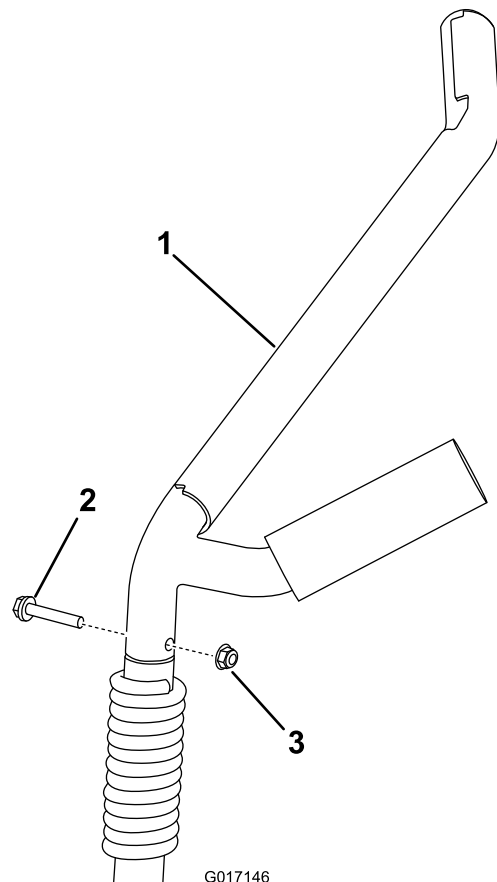
2	Boom cradle arm
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Procedure

The new boom cradle arms allow the booms to fold up without contacting each other, preventing any possible damage to the sensors mounted on the booms.

1. Remove the each of the 2 existing boom cradle arms by removing the bolt and nut (Figure 7).

Note: Save the bolts and nuts to install the new boom cradle arms.



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Figure 7

1. Boom cradle arm (2)
2. Bolt (2)
3. Nut (2)

2. Install each new boom cradle arm and secure it with the bolt and nut that you previously removed.

5

Installing the Sonic Boom Sensors

Parts needed for this procedure:

2	Sonic boom sensor
2	Bracket
2	Programming plug
2	Sensor cover
2	Lower sensor housing
2	Cap tube
2	Sensor guard bracket
2	Sensor cable (4 m)
4	Large nut
6	U-bolt
8	Locknut (1/4 inch)
8	Bolt (5/16 x 3/4 inch)
4	Bolt (5/16 x 1-1/4 inch)
12	Locknut (5/16 inch)
12	Cable tie

Procedure

1. Install a mounting bracket on the front side of each boom near the outermost nozzle with 3 U-bolts and 6 locknuts (1/4 inch) (Figure 8 and Figure 9).

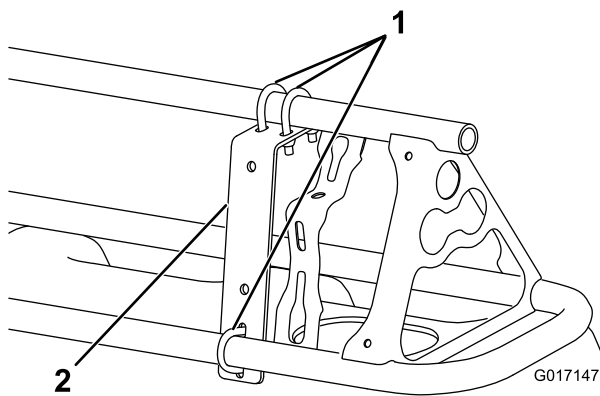


Figure 8
Front view

1. Mounting bracket (2)
2. U-bolt (6)

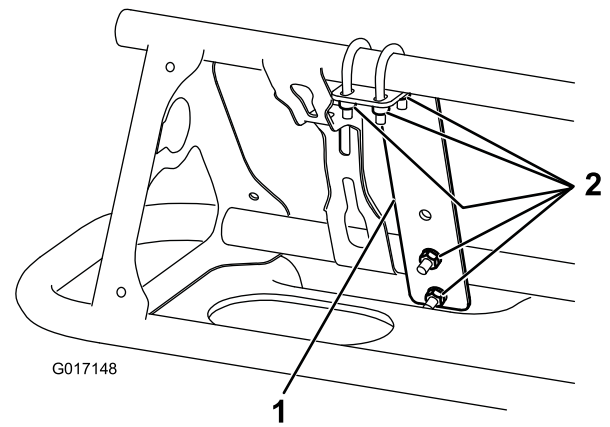


Figure 9
Rear view

1. Mounting bracket (2)
2. Locknuts (1/4 inch) (12)

2. Install the sensor guard bracket onto the mounting bracket with 2 bolts (5/16 x 3/4 inch) and 2 flange nuts (5/16 inch) as shown in Figure 10.

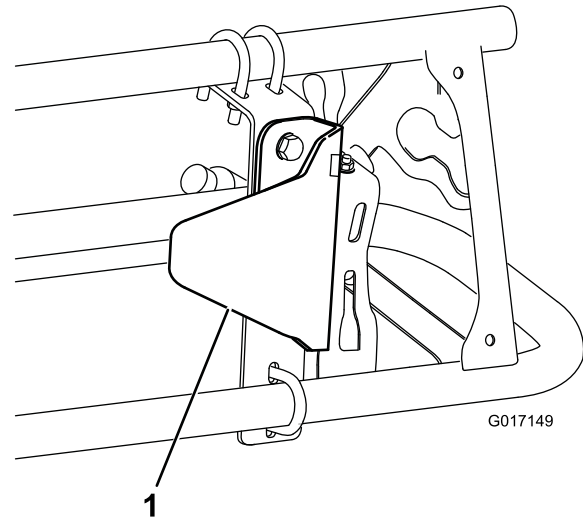


Figure 10

1. Sensor guard bracket
3. Install the sensor mounting hardware onto the sensor guard bracket with 2 bolts (5/16 x 3/4 inch) and 2 locknuts (5/16 inch) as shown in Figure 11 (for a covered boom) or Figure 12 (for an uncovered boom).

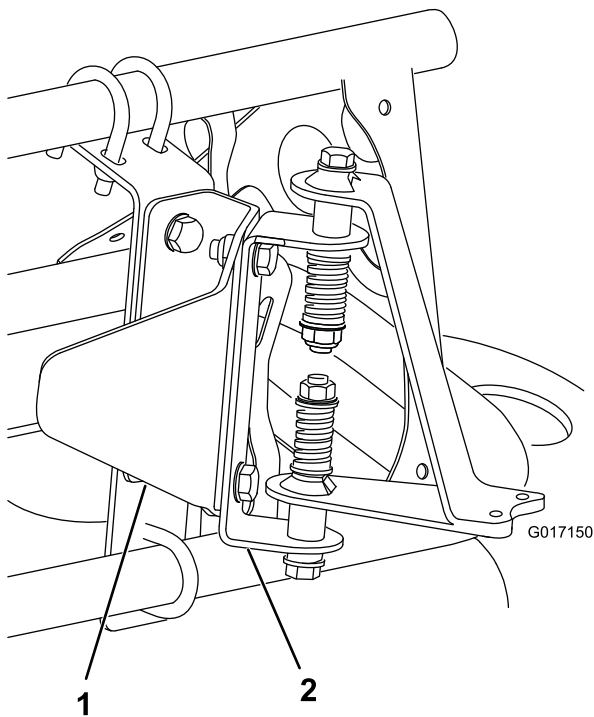


Figure 11

For a covered boom only

- | | |
|-------------------------|--|
| 1. Sensor guard bracket | 2. Hinge (of sensor mounting hardware) |
|-------------------------|--|

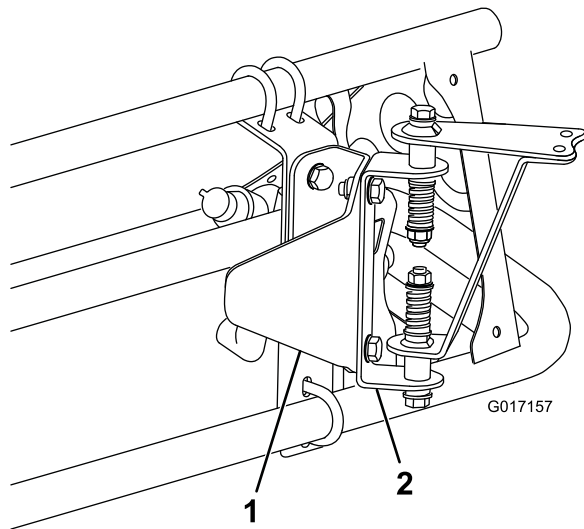


Figure 12

For an uncovered boom only

- | | |
|-------------------------|--|
| 1. Sensor guard bracket | 2. Hinge (of sensor mounting hardware) |
|-------------------------|--|

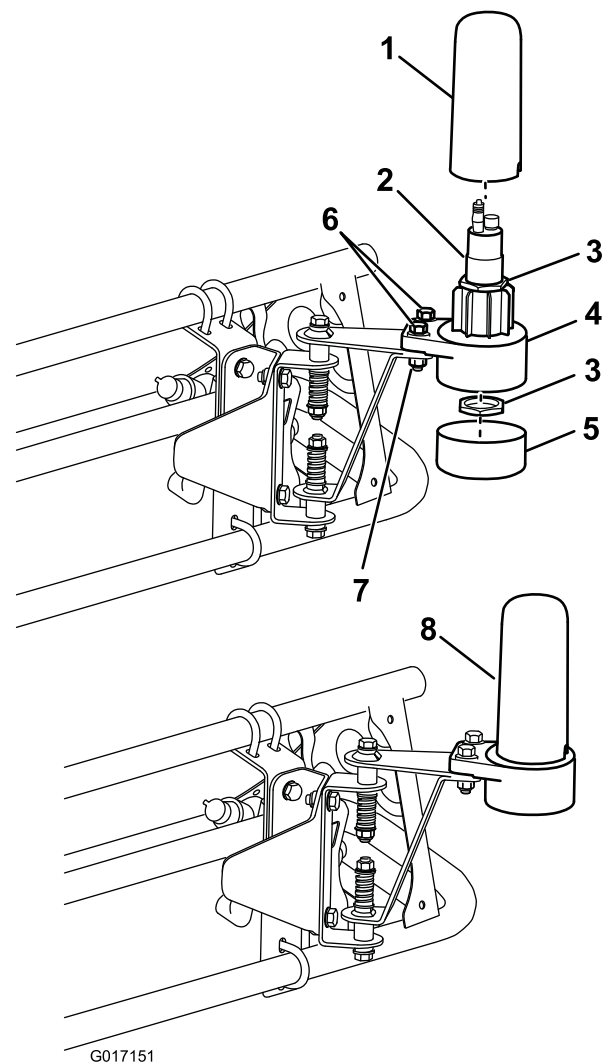


Figure 13

Uncovered boom configuration shown

- | | |
|-------------------------|------------------------------|
| 1. Cover | 5. Cap tube |
| 2. Sensor | 6. Bolts (5/16 x 1-1/4 inch) |
| 3. Large nut | 7. Locknuts (5/16 inch) |
| 4. Lower sensor housing | 8. Finished sensor assembly |

5. Install the programming plug on the sensor (Figure 14).

Important: Ensure that you align the arrow below the sideways “T” with the notch on the top edge of the sensor (Figure 14).

4. Install the lower sensor housing onto the sensor mounting hardware with 2 bolts (5/16 x 1-1/4 inch) and 2 locknuts (5/16 inch) (Figure 13).

6

Mounting the Electronic Control

Parts needed for this procedure:

1	Electronic controller
1	Mounting bracket
4	Bolt (1/4 x 1-1/8 inch)
4	Locknut (1/4 inch)

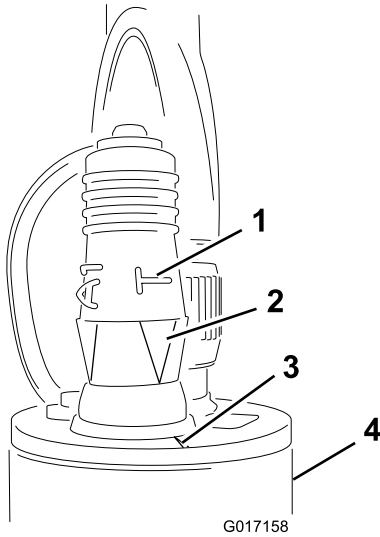


Figure 14

1. Sideways "T"
2. Arrows aligned
3. Notch
4. Sensor

6. Insert the sensor into the lower sensor housing, and secure it with 2 large nuts provided with the sensor (Figure 13).

Note: Discard the lock washers that come with the sensors.

7. Install the cap tube and the cover (Figure 13).

Note: Ensure that the sensor wire is routed through the small opening in the cover before installing the sensor cover.

8. Secure the wire coming from the sensor to the boom with cable ties.

Important: Ensure that you allow enough slack in the wire around the sensor so that the sensor can freely pivot on the hinge without pulling on the wire.

9. Repeat the steps above for the other boom.

Note: For covered booms only: The sensors should not detect the boom cover as this may interfere with the signal. If you experience any difficulties during the calibration process, check the sensors to ensure that their signals do not detect the boom cover.

Procedure

1. Remove the knockout plug (Figure 15).

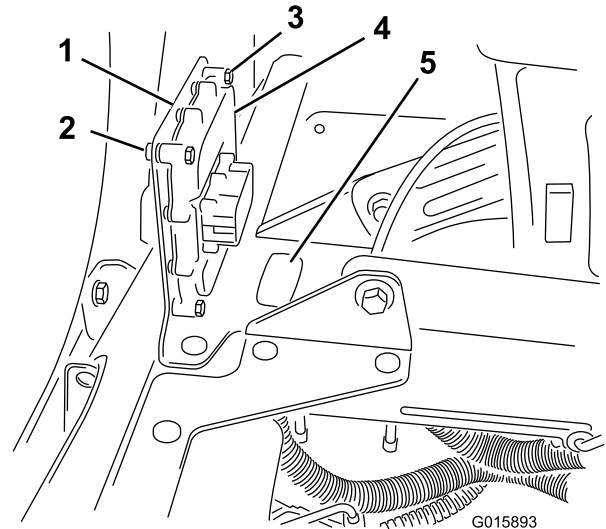


Figure 15

1. Mounting bracket
2. Locknut (1/4 inch) (4)
3. Bolt (1/4 x 1-1/8 inch)
4. Electronic controller
5. Knockout plug

2. Route the electronic control terminal on the wire harness through the knockout hole, but do not connect the terminal to the controller.
3. Install the mounting bracket to the machine seat frame, between and behind the seats with existing hardware (Figure 15).
4. Secure the controller to the mounting bracket with 4 hex head bolts (1/4 x 1-1/8 inch) and 4 locknuts.

7

Installing the Wire Harness, Indicator Light, and the Switches

Parts needed for this procedure:

1	Wire harness
1	Rocker switch
1	Indicator light
12	Cable tie

Connecting the Wire Harness to the Electronic Controller, Ground Block, Main Power Source, and Battery

1. Connect the terminal on the wire harness into the electronic controller and secure it with an Allen wrench (Figure 16).

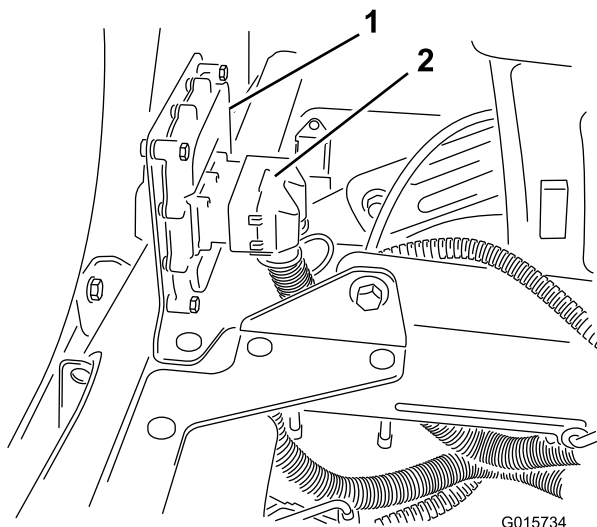


Figure 16

1. Electronic controller
2. Terminal

Note: The controller connection is keyed and can be connected in only one way.

2. Lift the seat to access the fuse block area.
3. Locate the existing fuse blocks on the machine, and install the fuse block connected to the wire harness by securing it to the bottom of the fuse block above it (Figure 17).

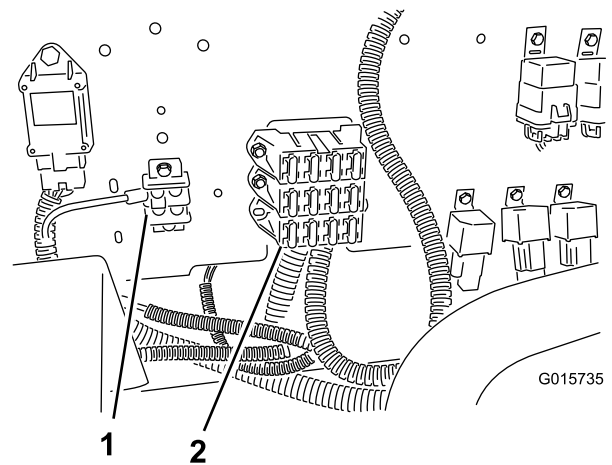


Figure 17

1. Ground terminal block
2. Fuse block

4. Secure the ground terminal on the wire harness to the ground terminal block (Figure 17).
5. Connect the wire harness connector labeled “Main Power” to the main power source connector by the fuse block.
6. Install the battery terminal on the wire harness to the positive (+) terminal of the battery.
7. Lower the driver's seat.

Installing the Sonic Boom Switch

1. Route the end of the wire harness with the sonic boom switch connector under the dashboard.
2. Remove the switch plug on the dashboard in the location shown in Figure 18.

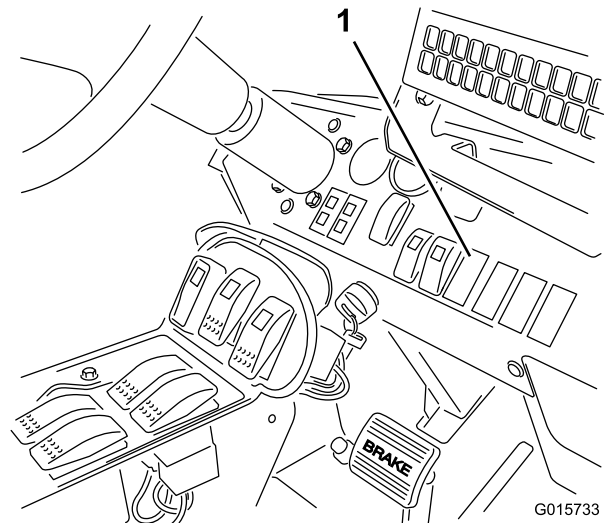


Figure 18

1. Plug on the dashboard

3. Insert the rocker switch in the dashboard opening.
4. Connect the switch connector on the wire harness to the switch.

Installing the Indicator Light and Connecting the Switches

1. Remove the right-hand side cover on the center console by removing 5 bolts and a long screw.
2. Disconnect the connections from the 2 existing boom lift switches that control the left-hand and right-hand booms.

Note: Tuck the connectors from the old wire harness away.

3. Remove the plug and insert the indicator light into the hole in the console.
4. Connect the indicator light to the connector on the wire harness.
5. Connect the 2 boom lift (rocker) switches to the connectors on the wire harness.

Note: The 2 connectors on the wire harness are labelled "Left Boom Raise/Lower" and Right Boom Raise/Lower."

6. Install the right-hand side cover on the center console using the fasteners that you removed in step 1.
7. Route the wire harness to the back of the vehicle along the path of the other wires and hoses.

Note: Use cable ties to secure the wiring harness to the other wiring harnesses away from the exhaust system and any moving parts.

8. Connect the Left Boom/Up; Left Boom/Down connectors on the wire harness to the solenoid valves on the hydraulic block (Figure 19).

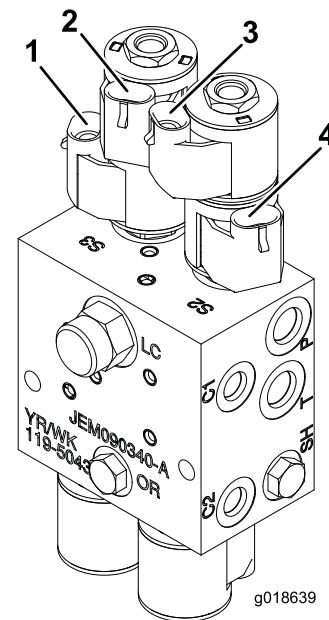


Figure 19

- | | |
|-------------------|--------------------|
| 1. Left Boom/Down | 3. Right Boom/Up |
| 2. Left Boom/Up | 4. Right Boom/Down |

Note: The connectors on the wire harness are labeled Left Boom/Up; Left Boom/Down; Right Boom/Up; and Right Boom/Down.

Note: There should be 2 open connectors that remain; they are for connecting the sensors.

9. Secure the "Right Enable" and "Left Enable" wires with cable ties.
10. Install the mounting plate over the hydraulic block.

Connecting the Sensors

1. Route the wire from each sensor along the boom toward the rear center of the machine.
2. Secure the sensor wires to the boom with cable ties.

Note: Ensure that you allow enough slack in the wire near the sensors so that the sensors can freely pivot on the hinges.

3. Connect the left and right sensor end connectors to the wire harness connectors labeled "Left Sonic Sensor" and "Right Sonic Sensor," respectively.

8

Calibrating the Sonic Booms

No Parts Required

Procedure

In this procedure, you will have 20 seconds to calibrate the sensors on the booms. The distance you set between the sensor on each boom and the ground after the 20-second calibration period is the boom height setting in automatic mode until the next time you calibrate the sensor. After the 20 seconds, a self-calibrating process occurs for up to 2 minutes, during which the controller establishes this distance and then “learns” the flow characteristics of the hydraulic lift cylinder valves.

Note: For uncovered booms: The default height setting is 20 inches (51 cm) from the nozzle to the ground. If, after setting a boom to a height different from that of the factory default setting, you wish to restore the calibration to the factory-default setting, calibrate the boom with the boom in the cradle. **For covered booms:** The default height setting of 20 inches (51 cm) is for uncovered booms only. You must calibrate the sensors on covered booms.

1. Ensure that the turf sprayer is parked and away from any trees, buildings, vehicles, debris, and underground utilities and plumbing.
2. Lower the booms to the horizontal position.
3. Turn off the ignition key.
4. Press the sonic boom switch on the dashboard to the Auto position (Figure 20).

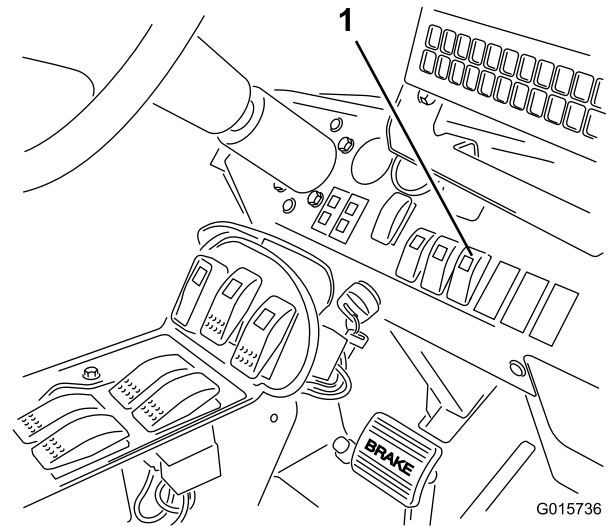


Figure 20

1. Sonic boom switch

5. While pressing and holding both the Left Lower switch and the Right Raise switch, turn the ignition key and start the machine.
6. Release the boom switches.

Note: The green light on the sonic boom switch will flash rapidly, indicating that the sonic boom system is in calibration mode. You now have 20 seconds to use the raise and lower boom switches to set the desired distance from the booms to the ground. After the 20 seconds, the green light will flash slowly.

7. Use the Raise and Lower switches to adjust the height of each boom until you achieve the desired distance from the sensor on the boom to the ground.
8. Allow the self-calibrating process to complete; wait for the slowly flashing green light on the sonic boom switch to stop.

Note: The self-calibrating process may take up to 2 minutes to complete. Do not interrupt the sensor signal during the self-calibration process, such as moving your foot under a sensor.

Operation

Using the Controls

The **Sonic boom switch** is located on the dashboard and has 2 settings: Automatic and Manual.

- **Automatic mode:** This mode enables the automatic movement of the booms, enabling the boom tips to continually remain the desired distance from the ground. To activate the automatic mode, press the Auto mode on the dashboard and tap on the lower boom switch to move the boom to the desired distance from the ground.

Note: You can temporarily override the automatic operation of the booms using the boom switches to raise or lower one or both booms. To lower the boom manually while the system is in automatic mode, hold the lower boom switch until you reach the desired boom height. To raise the boom manually while the system is in automatic mode, simply hold the raise boom switch until you reach the desired boom height. If you adjust only one boom, the other boom will continue to function automatically. To resume the automatic mode, tap the lower boom switch to move the boom to the desired distance from the ground.

- **Manual mode:** This mode turns off the automatic adjustment of the booms, and allows you to control the booms manually.

The **Sonic boom light** is on the sonic boom switch displays the status of the sonic boom system as follows:

- **On continuously:** The sonic boom system is on and operating normally.
- **Flashing quickly:** The system is in calibration mode, which lasts for 20 seconds.
- **Flashing slowly:** There is an error in the system or you have overridden the automatic mode by operating one or both of the booms manually while the system is in automatic mode.

Note: In the event that there is a fault in the sonic boom system (e.g., there is no signal coming from a sensor), the boom will raise for a few seconds and then stop, and the light on the boom switch (located on the dashboard) will flash slowly, indicating that one of the booms has stopped. Also, the indicator light on the armrest will flash, indicating a fault.

The **indicator light** is the small red light located on the arm console and displays the status of the sonic boom system as follows:

- **On momentarily:** The light comes on when you activate the sonic boom system. The light will turn off after a few seconds and remain off as long as the system is operating properly.
- **Flashing:** There is an active fault in the sonic boom system.

Operating the Sprayer

Important: When operating the machine over especially uneven terrain, reduce the ground speed to prevent the booms from striking the ground.

Maintenance

Cleaning

Clean the sensors periodically with a damp cloth. If a sensor is damaged or excessively dirty, replace it.

Important: Do not spray water at or on the sensors. Water sprayed under even household pressure can damage the sensor. Always cover the sensors completely before washing the sprayer.

Note: When the booms are in the cradle for extended periods of time, the seal around each sensor (which is oriented upward) may become exposed to ultraviolet light and gradually deteriorate. Prevent the bottom of the sensors from being exposed to direct sunlight whenever possible.

Storage

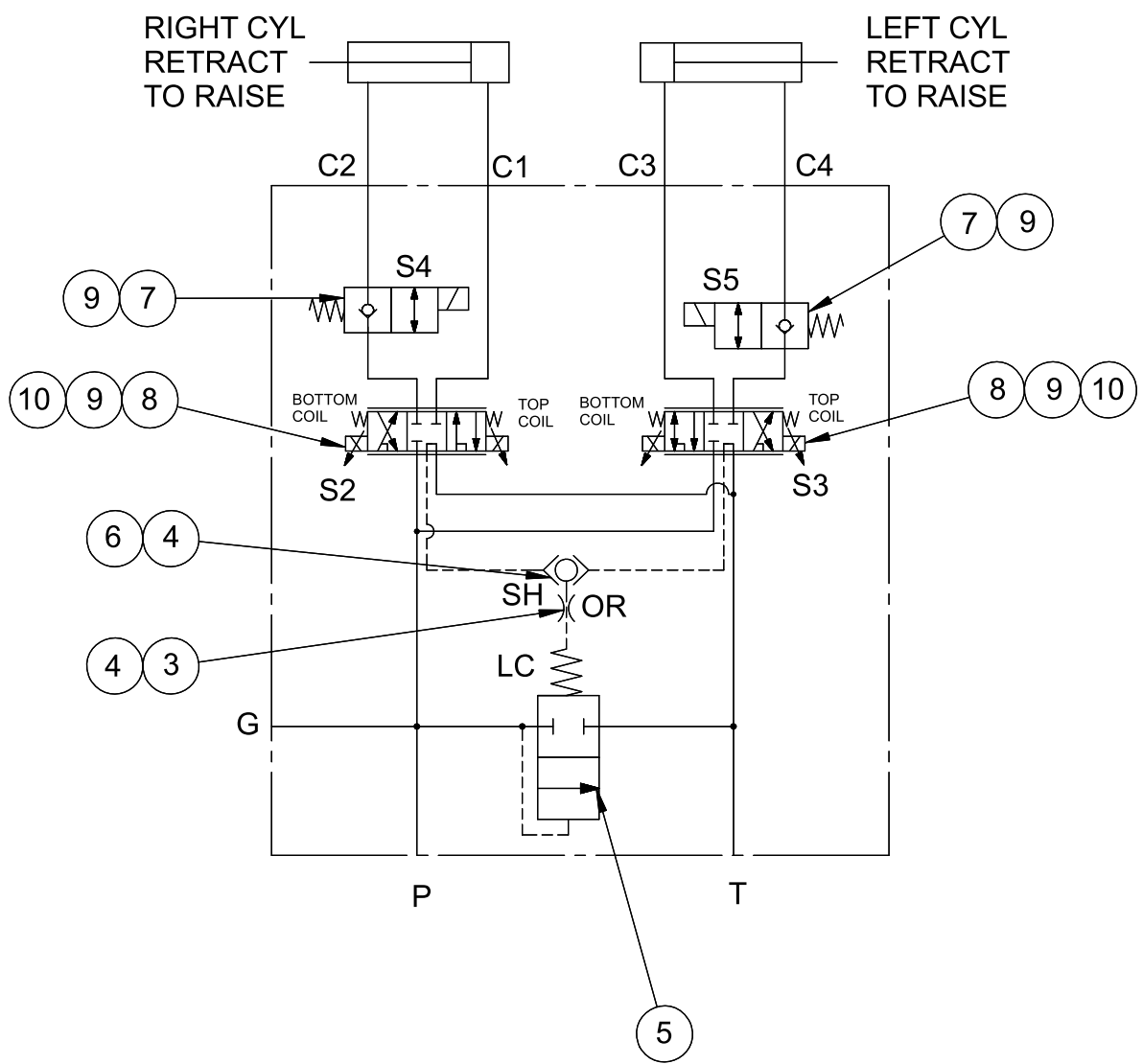
Whenever you are not using the sensors for an extended period of time, put the safety caps on the sensors to protect them from the outdoor elements.

Troubleshooting

Note: Refer to the service manual for additional diagnostic information.

Problem	Possible Cause	Corrective Action
One or both booms malfunction; the sonic boom light is Off.	<ol style="list-style-type: none">1. A fuse is blown.2. The light is burned out.3. The electronic controller or wiring is damaged.	<ol style="list-style-type: none">1. Replace the fuse.2. Replace the light.3. Contact an Authorized Toro Distributor.
One or both booms malfunction; the sonic boom light flashes slowly.	<ol style="list-style-type: none">1. There is a minor system error.2. There is a system error that repeats after clearing the error.3. There is a hydraulic or mechanical failure.	<ol style="list-style-type: none">1. Lower the affected boom(s) using the boom switch(es) to clear the error.2. If the error repeats, contact an Authorized Toro Distributor.3. Repair the hydraulic or mechanical problem.
One or both booms are malfunctioning; the sonic boom light is on.	<ol style="list-style-type: none">1. The sensor covers are blocking or swinging into the sensor path	<ol style="list-style-type: none">1. Install cover to the top side of the sensor.

Schematics



VALVE S2	VALVE S3
S2 (BOTTOM COIL) = C1	S2 (BOTTOM COIL) = C3
S1 (TOP COIL) = C2	S1 (TOP COIL) = C4

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Hydraulics (Rev. A)



17

Notes:

Notes:



Count on it.