

Eye On the Hog

EYE ON THE HOG MANUAL

**HOG-LINE-VIOLATION-DETECTION
SYSTEM**

Revision 5-A-071013



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TABLE OF CONTENTS

	PAGE
1. General	1
2. Operation	1
3. Installation	1
3.1 Hog-Line Magnet.....	1
3.1.1 Magnet Installation During Ice Making	1
3.1.2 Magnet Installation in Finished Ice	1
3.2 Handle and Battery Pack	2
4. Verification Tests	3
4.1 Mounted-Handle Test (Using Test Magnet).....	3
4.2 Mounted-Handle Test (Using Hog-Line Magnet).....	3
4.3 Unmounted-Handle Test	3
5. Shipping and Long-Term Storage	3
6. Replacing the Battery Pack	4
7. Curler's Instructions	5
8. Technical Specifications	6
8.1 Handle	6
8.2 Battery Pack.....	6
8.3 Hog-Line Magnets	6
9. Ordering Information	6
10. Warranty	6
Appendix A R101-H Revision History	7

DISCLAIMER

Specifications are subject to change without notice. Littelfuse Startco is not liable for contingent or consequential damages, or for expenses sustained as a result of incorrect application, incorrect adjustment, or a malfunction.

LIST OF FIGURES

	PAGE
1. Hog-Line Magnet.....	1
2. Hog-Line-Magnet Placement	1
3. Connecting Battery Pack	2
4. Installing Handle	2
5. Disconnecting Battery pack.....	3
6. Improvised Tweezers.....	3
7. Replacing Battery Pack	4

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1. GENERAL

Eye On the Hog is a system that provides impartial hog-line judging for the sport of curling. It uses innovative technology to detect a magnetic strip frozen into the ice at the hog line and a bare hand touching the handle. Circuitry in the handle turns on green lights after a valid release or flashes red lights if a violation has occurred.

2. OPERATION

Eye On the Hog electronics activate and the red LED's flash when the rock is tilted with a bare hand touching the coated handle grip. When the rock is returned to the playing position and the grip is released, the green LED's flash quickly for ten seconds and then slowly for two minutes. If the grip is not touched, the electronics will turn off after the slow flashing stops. If the grip is touched, the LED's turn off to prevent distracting the curler during delivery. When the grip is released before the hog line, the green LED's flash until the centre of the rock crosses the centre of the hog-line magnet; then, the green LED's turn on for five seconds to indicate a valid delivery. If the grip is not released before the centre of the rock crosses the centre of the hog-line magnet, a violation is indicated for 25 seconds by flashing red LED's. The touch sensor remains on for a short interval after the hog line is crossed. If the grip is touched in this interval, indication will switch from valid to violation.

A low battery is indicated by alternating red and green LED's.

CAUTION: The coated handle grip and the LED's can be damaged by brushes and shoes. Do not push on the handles with brushes or shoes.

3. INSTALLATION

3.1 HOG-LINE MAGNET

The hog-line magnet (Fig. 1) must be parallel to the hog line and less than 25 mm (1") below the ice surface. Magnets are usually installed when the curling ice is being made, but magnets can also be installed in finished ice.



FIGURE 1. Hog-Line Magnet.

3.1.1 MAGNET INSTALLATION DURING ICE MAKING

Chill the non-magnetic magnet-positioning guide and the hog-line magnets. Centre the guide on the sheet and place it one rock radius plus 13 mm (0.5") on the house side of the hog line as shown in Fig. 2. This places the magnet centre line one rock radius from the leading edge of the hog line. Holes in the positioning guide can be used to fasten the guide to the ice. With the labelled side of the magnet facing down, place the magnet edge against the guide. Spray the magnet with water and allow it to freeze in place. Remove the guide.

To simplify rock measurement and magnet placement, use an R101-MLJ Magnet Locating Jig. Follow the instructions supplied with the jig.

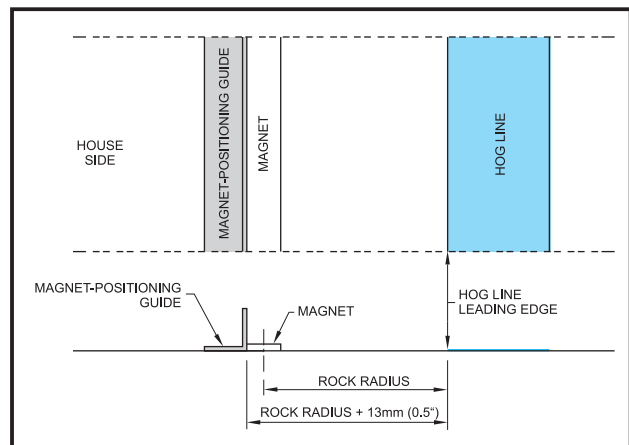


FIGURE 2. Hog-Line-Magnet Placement.

3.1.2 MAGNET INSTALLATION IN FINISHED ICE

Use a router and a straight edge to cut a 32 mm (1.25") wide, 19 mm (0.75") deep, 1550 mm (61") long channel in the ice on the house side of the hog line. The channel edge furthest from the hog line must be one rock radius plus 13 mm (0.5") from the edge of the line. It is critical that this reference edge be straight and accurately located. With the labelled side of the magnet facing down, centre the magnet on the sheet and place the magnet edge against the reference edge of the channel. Spray the magnet with water and allow it to freeze in place.

CAUTION: The distance from the top of the magnet to the ice surface must not exceed 25 mm (1").

3.2 HANDLE AND BATTERY PACK

A battery pack is usually supplied mounted to the handle, but to prevent battery discharge it is not connected. The battery pack has a flexible carrier which allows it to conform to the stone profile. To allow the carrier to flex without breakage, ensure that the handles and battery packs have been at 20°C / 68°F (room temperature) for at least four hours prior to installation. Immediately before handle installation, connect the battery pack as shown in Fig. 3. Be sure that the battery connector is oriented with the red wire towards the centre of the handle and that the connector latches have both engaged. Gently pull on the battery-pack wires to confirm that the connector is latched. If the connector releases, bend the latches inward slightly and retest.

With the stone resting on its striking surface, install the handle and fasten it with the mounting screw as shown in Fig. 4. Do not rotate the handle. A screw engagement of three to seven turns is required to secure the handle to the stone. A short screw, a long screw and two washers are factory supplied. Try the shorter screw first. The longer screw is required if three turns of engagement cannot be attained. Use the washers to keep the number of turns to below seven. Tighten the screws to a maximum torque of 9.5 N·m (84 in·lb).

To prevent battery drain, place the rock on its running surface as soon as the handle is mounted.

NOTE: The metalized handle undersurface and the battery carrier provide more insulation than a metalized insulator. Do not install a metalized insulator or plastic anti-rotation disc.

CAUTION: A screw engagement of at least three turns is required to secure the handle to the stone. More than seven turns will cause damage.

CAUTION: Do not invert the stone and handle on the ice. Ice contact can damage the handle-grip coating. Tighten the screw with the stone resting on its striking surface.

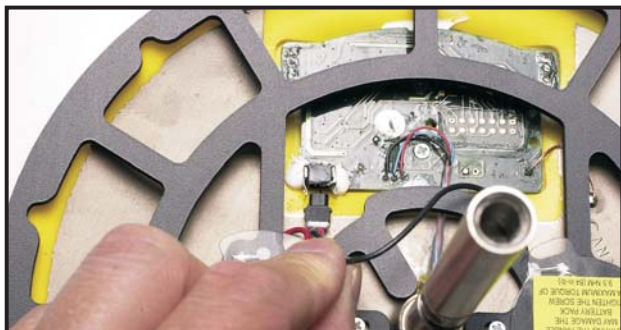


FIGURE 3. Connecting Battery Pack.

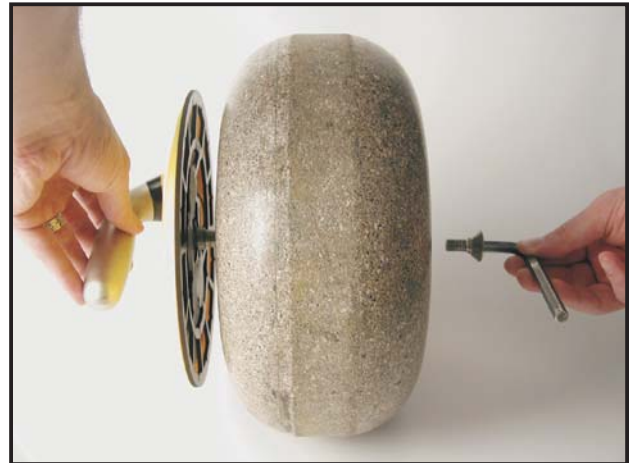


FIGURE 4. Installing Handle.

4. VERIFICATION TESTS

Handle operation should be verified before a competition.

4.1 MOUNTED-HANDLE TEST (USING TEST MAGNET)

- With a bare hand touching the grip, tilt the rock on its striking surface to activate the electronics. The red LED's should flash momentarily.
- Return the rock to its running surface and release the grip. The green LED's should flash rapidly.
- Touch the grip with one finger. The LED's should turn off.
- With a bare hand touching the grip, tilt the rock slightly and quickly move the test magnet across the head of the mounting screw. The red LED's should flash for twenty-five seconds.

4.2 MOUNTED-HANDLE TEST (USING HOG-LINE MAGNET)

- With a bare hand touching the grip, tilt the rock on its striking surface to activate the electronics. The red LED's should flash momentarily.
- Return the rock to its running surface and release the grip. The green LED's should flash rapidly.
- Touch the grip with one finger. The LED's should turn off.
- Without touching the grip, push the rock over the hog-line magnet at a normal curling speed. The green LED's should turn on for five seconds.
- After the green LED's turn off, wait two seconds and then reactivate the electronics. With a bare hand touching the grip, push the rock over the hog-line magnet at a normal curling speed. The red LED's should flash for twenty-five seconds.

4.3 UNMOUNTED-HANDLE TEST

- With a bare hand touching the grip, and the other hand touching the metalized underside of the handle, tilt the handle 90° to activate the electronics. The red LED's should flash momentarily.
- Return the handle to the horizontal position and, while continuing to touch the underside of the handle, release the grip. The green LED's should flash rapidly.
- Touch the grip with one finger. The LED's should turn off.
- Without touching the grip, while continuing to touch the underside of the handle, quickly move a test magnet across the end of the handle-mounting tube. The green LED's should turn on for five seconds.
- After the green LED's turn off, wait two seconds and then reactivate the electronics. With a bare hand touching the grip, and the other hand touching the underside of the handle, quickly move the handle-mounting tube across a test magnet. The red LED's should flash for twenty-five seconds.

5. SHIPPING AND LONG-TERM STORAGE

To avoid damage, do not ship rocks fitted with Eye On the Hog handles. Vibration or angular position can actuate the handle electronics and discharge the battery pack. Battery packs must be disconnected for shipping.

With the stone resting on its striking surface, remove the handle-mounting screw and remove the handle assembly as shown in Fig. 4. Turn the screw, not the handle. To avoid discharging the battery and for shipping purposes, use tweezers to disconnect the battery pack as shown in Fig. 5 immediately after removing a handle.

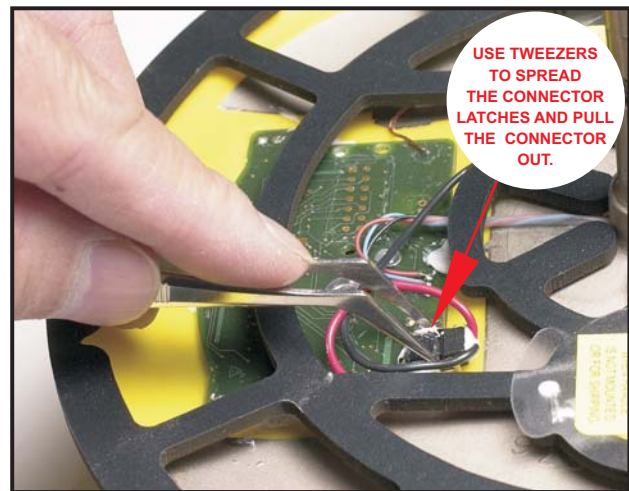


FIGURE 5. Disconnecting Battery Pack.

If tweezers are not available use a paper clip bent as shown in Fig. 6 to spread the connector latches.

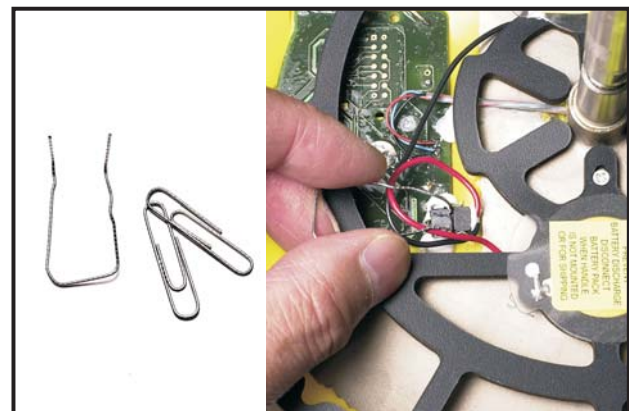


FIGURE 6. Improved Tweezers.

Place handles and mounting screws in an Eye On the Hog R101-HSC Shipping Case for shipping or storage.

6. REPLACING THE BATTERY PACK

A low battery is indicated by alternating red and green LED's. After first indication, there is probably sufficient energy remaining in the battery pack to complete the game. The battery pack should be replaced before the next game. To replace the battery pack, remove the handle from the stone and disconnect the battery pack as outlined in Section 5. Remove the two battery-pack retaining screws shown in Fig. 7 and remove the battery pack. Slip the new battery pack over the handle-mounting tube and loosely install the two battery-pack retaining screws. Press the batteries down into the battery cavities to ensure proper alignment, then tighten the retaining screws. Record the installation date in the location provided on the battery-pack label. Connect the battery pack and install the handle as outlined in Section 3.2.

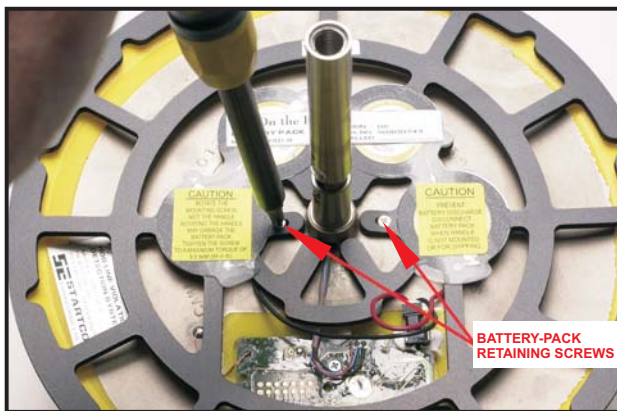


FIGURE 7. Replacing Battery Pack.

CAUTION: Rest the handle on a soft surface to prevent damage to the grip coating.

NOTE: After replacing the battery pack, reset the low-battery indication by performing a valid delivery with the handle activated.

NOTE: An optional R101-BTL battery test load and multimeter can be used to evaluate battery condition.

7. CURLER'S INSTRUCTIONS

Curlers should be familiar with the following guidelines to ensure proper operation of the system.

Prior to delivering a rock, the handle electronics must be activated by tilting the rock with a bare hand touching the grip. After it is activated, if the grip is not touched for two minutes the electronics will turn off and will have to be reactivated.

To verify that the system is working, release the activated handle grip and observe that the green LED's flash. Touch the grip and observe that the green LED's turn off.

Gloves should not be used. The touch sensor in the handle was designed to detect a bare hand. Although the system "works" with most curling gloves, sensitivity of the touch sensor is affected giving an unfair advantage to a gloved hand.

Flashing red LED's indicate a hog-line violation. Solid green LED's indicate a valid release.

Alternating red and green LED's indicate a low battery. Inform the officials.

CAUTION: The coated handle grip and the LED's can be damaged by brushes and shoes. Do not push on the handle with brushes or shoes.

CAUTION: Do not invert the rock on the ice with the grip contacting the ice. The grip coating can be damaged.

CAUTION: If a handle becomes loose, do not attempt to tighten it by rotating the handle. This can damage the battery carrier. Have an official properly torque the mounting screw.

8. TECHNICAL SPECIFICATIONS

8.1 HANDLE

Activation	70° tilt with bare hand touching handle grip
Hog-Line Sensor Accuracy	3 mm at 3.0 m/s (0.12" at 10 ft/s)
Indication:	
Activation	Red LED's on momentarily
Verify On/Ready	Rapid flashing green LED's without hand contact (10 s)
Standby	Green LED's flash every 2 s following Ready, Returns to Ready when grip is touched and released, Turns off if grip is not touched within 120 s
Delivery	No indication with hand touching grip
Release.....	Rapid flashing green LED's until rock crosses hog-line magnet
Valid	Solid green LED's
Violation	Flashing red LED's
Low Battery	Alternating red and green LED's
Mounting Torque.....	9.5 N·m (84 in·lb) maximum

8.2 BATTERY PACK

Type.....	Manganese Dioxide Lithium
Typical Life	150 games (verification tests reduce battery life)
Long-Term Storage	90% residual capacity after 10 years
Battery Disposal	Dispose in the normal municipal-waste stream
Compliance	UN Manual of Tests and Criteria, Part III, Section 38.3, 5 th Revised Edition

8.3 HOG-LINE MAGNETS


Dimensions:	
Height	5 mm (0.2")
Width	25 mm (1")
Length.....	1524 mm (60")

Placement:

Centre-Line
Position..... One rock radius in front of the leading edge of the hog line

Maximum
Depth..... 25 mm (1")

9. ORDERING INFORMATION

R101-H-		R – Red curling rock handle Y – Yellow curling rock handle BK – Black curling rock handle BL – Blue curling rock handle (does not include battery pack)
R101-B.....		Battery Pack (order separately)
R101-BTL.....		Battery Test Load (c/w test instructions, requires multimeter)
R101-M.....		Hog-Line Magnet Two required per sheet Positioning guide included
R101-MLJ.....		Hog-Line Magnet Locating Jig
R101-HSC.....		Shipping Case for 20 handles

10. WARRANTY

The Eye On the Hog R101-H is warranted to be free from defects in material and workmanship for a period of two years from the date of purchase.

Littelfuse Startco will (at Littelfuse Startco's option) repair, replace, or refund the original purchase price of an R101-H that is determined by Littelfuse Startco to be defective if it is returned to the factory, freight prepaid, within the warranty period. This warranty does not apply to repairs required as a result of misuse, negligence, an accident, improper installation, tampering, or insufficient care. Littelfuse Startco does not warrant products repaired or modified by non-Littelfuse Startco personnel.

APPENDIX A
R101-H REVISION HISTORY

MANUAL RELEASE DATE	MANUAL REVISION	PRODUCT REVISION (REVISION NUMBER ON PRODUCT LABEL)
July 10, 2013	5-A-071013	02B

MANUAL REVISION HISTORY

REVISION 5-A-071013

SECTION 8

Added new battery pack type and compliance specification.

APPENDIX A

Revision history added.

PRODUCT REVISION HISTORY

REVISION 02B

No change.

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