GARMIN®

# GMR™ xHD3

# Field Service Manual

## Important Safety Information

**⚠ WARNING**

See the *Important Safety and Product Information* guide in the product box for product warnings and other important information.

The high voltage capacitors in this product can hold a charge well after disconnecting power. While servicing the unit, take all necessary precautions against high voltage. High voltage electrocution can result in serious personal injury or death.

The magnetron in this product generates a strong magnetic field and may pose a danger to persons with implanted medical devices. If you have an implanted medical device, you should not perform service on this device, to avoid the risk of malfunction or failure of your medical device.

This product generates and transmits non-ionizing radiation. Exposure to electromagnetic radiation can result in serious health hazards. Before performing any bench test procedure, remove the antenna and install the antenna terminator (*Installing the Antenna Terminator*, page 6).

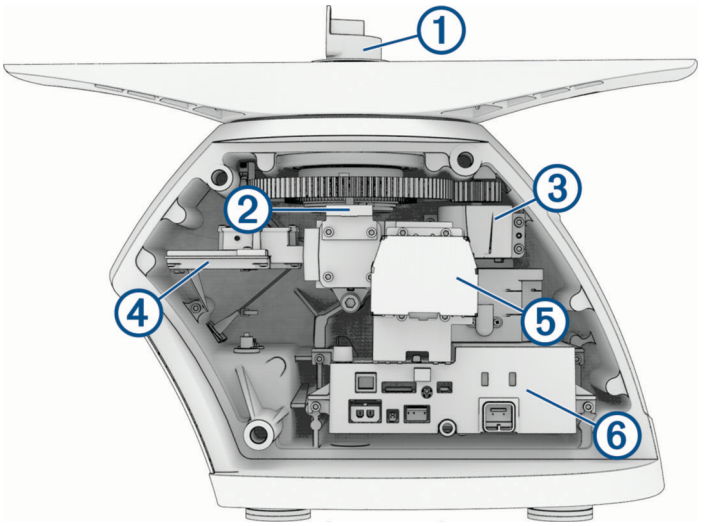
Repairing and performing maintenance on Garmin® electronics is complex work that can result in serious personal injury or product damage if not done correctly.

***NOTICE***

Garmin is not responsible for, and does not warrant, the work that you or a non-authorized repair provider perform on your product.

Use care when working near a magnetron with ferrous instruments. The strong magnetic force of the magnetron will attract ferrous instruments, risking damage to the magnetron. Use instruments made from non-ferrous materials such as stainless steel or titanium, or use cardboard or a similar material to shield the magnetron from potential damage.

# Overview



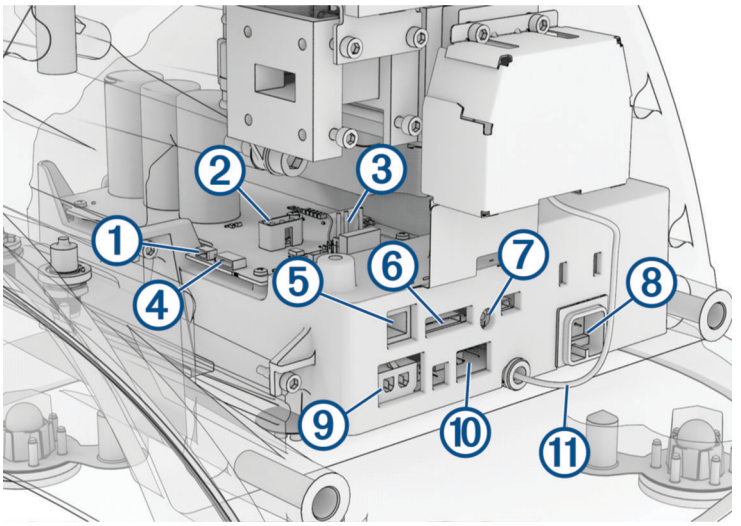

| Item | Description | Related Instructions |
|---|---|---|
| 1 | Antenna rotary joint | *Removing the Antenna Rotary Joint*, page 16 |
| 2 | Antenna position sensor board | *Replacing the Antenna Position Sensor Board*, page 13 |
| 3 | Motor/gearbox assembly | *Replacing the Motor*, page 15 |
| 4 | Low-noise converter (LNC) | *Replacing the LNC*, page 14 |
| 5 | Magnetron[1] | *Replacing the Magnetron and the Electronics Box*, page 9 |
| 6 | Electronics box | *Replacing the Magnetron and the Electronics Box*, page 9 |

[1] The magnetron may look different, depending on radar model.

## Internal Connections

**NOTICE**

Before proceeding with service, take note of the connections in the electronics box and the cable routing to make sure you can reproduce it correctly when reassembling the radar.




| Item | Connection |
|---|---|
| ① | Status Indicator Light cable |
| ② | Motor power cable |
| ③ | Motor Control Board cable |
| ④ | Antenna Position Sensor Board data cable |
| ⑤ | Internal Network Cable |
| ⑥ | LNC data cable |
| ⑦ | LNC coaxial cable |
| ⑧ | Magnetron power cable |
| ⑨ | Internal power cable |
| ⑩ | Motor Control Board power cable |
| ⑪ | Magnetron ground wire |

## Service Kits

You can order the most common replacement parts and accessories at garmin.com/accessories/gmr_xhd3_open_array_radar.

To order the service kits listed in this manual, you can contact Garmin Support at support.garmin.com.

If you are a Garmin dealer, you should contact your Garmin representative to order service kits.

| Service Kit Number | Description |
| --- | --- |
| S00-02172-00 (GMR 434/436 xHD3)<br>S00-02173-00 (GMR 1234/1236 xHD3)<br>S00-02174-00 (GMR 2534/2536 xHD3) | Electronics box and magnetron |
| S00-00600-04 | Pedestal housing cover[2] |
| S00-00600-05 | Pedestal grounding hardware |
| S00-00600-07 | Antenna rotary joint |
| S11-06002-00 (GMR 434/436 xHD3)<br>S11-06002-04 (all other GMR xHD3 open array models) | Pedestal housing[3] |
| S00-00600-10 (GMR 434/436 xHD3)<br>S00-02542-00 (all other GMR xHD3 open array models) | Internal power cable |
| S00-00600-11 | Hall effect magnet |
| S00-00600-13 (GMR 434/436 xHD3)<br>S00-00600-14 (all other GMR xHD3 open array models) | Circulator/waveguide assembly |
| S00-02050-00 | LNC[4] |
| S00-00490-00 | Status LED cable |
| S00-00382-00 | Access panel |
| S00-02053-00 | Internal network cable |
| S00-02051-00 | Motor/gearbox assembly[5] |
| S00-02052-00 | Pedestal cables[6] |
| S11-01315-50 | Voltage converter |
| 320-01052-00 | 15 m (49.21 ft.) Garmin BlueNet™ Cable |
| S00-01312-00 | Protective cap for the antenna rotary joint waveguide[7] |
| S00-00740-00 | 71 mm M10 threaded rod |
| K00-01414-00 | Installation hardware and manuals[8] |
| S11-03579-50 | Antenna position sensor board |
| T10-00114-00 | Radar service kit[9] |

2 Includes screws and washers.

3 Includes pedestal housing cover, access panel, internal power cable, internal network cable and status LED cable.

4 Includes four 70 mm M4 screws and one 10 mm M4 screw, for mounting. Does not include LNC coaxial cable and data cable. See Pedestal Cables kit (S00-02052-00).

5 Includes the motor control board power cable and four mounting screws.

6 Includes the antenna position sensor cable, the LNC coaxial cable, the LNC data cable, and the motor control board cable.

7 Plastic cover to protect the exposed end of the antenna rotary joint during transport.

8 Includes four 71 mm M10 threaded rods, with washers and nuts, and mounting template.

9 Includes the antenna terminator.

# Service Procedures

Before performing any service procedure, you should update the software (*Software Updates*, page 6).

## Restoring the Radar Settings to Factory Defaults

To restore the radar software to factory defaults, the radar must be powered on and connected to the chartplotter.

1. On the chartplotter, select **Settings** > **System** > **System Information**.
2. Select an option:
   - On a touchscreen chartplotter, touch and hold **Garmin Devices** for 6 seconds.
   - On a keyed chartplotter, select **Garmin Devices**, and press and hold the ENTER key for 6 seconds.
3. Select **Field Diagnostics** > **Radar** > **Factory Defaults**.
4. Select **Yes** to confirm.

## Software Updates

You can go to garmin.com/support/software/marine to find information on the latest software updates for your Garmin marine devices.

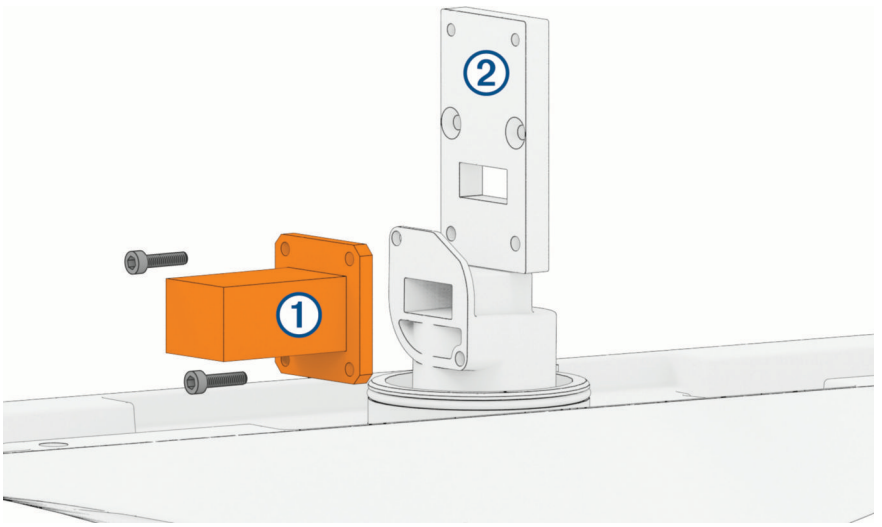
## Installing the Antenna Terminator

**⚠ WARNING**

This product generates and transmits non-ionizing radiation. Exposure to electromagnetic radiation can result in serious health hazards. Before performing any bench test procedure, remove the antenna and install the antenna terminator.

The antenna terminator is included in the radar service kit (*Service Kits*, page 4).

1. Hold the antenna terminator ① against the wave guide on the rotary joint.




**⚠ WARNING**

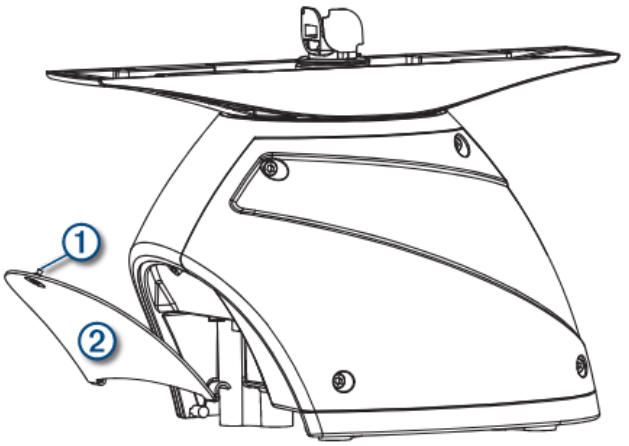
Make sure the orientation of the antenna terminator body matches the shape of the opening on the rotary joint. If the orientation does not match, the antenna terminator may not completely prevent exposure to non-ionizing radiation, leading to serious health hazards.

2. Insert one screw through the top left hole on the antenna terminator and the hole on the rotary joint, and fasten it to the threaded hole in the spacer ② on the other side of the rotary joint.
3. Insert another screw through the bottom right hole in the top of the antenna terminator through the hole in the rotary joint.

   This screw is not fastened to the rotary joint, and acts only as a pin to stop the terminator from rotating.

## Opening the Access Panel

1 Using a flat screwdriver, loosen the captive screw that secures the access panel to the pedestal housing ①.




2 Lift the access panel ② up and away from the pedestal housing.

## Opening the Pedestal Housing

**⚠ WARNING**

The high voltage capacitors in this product can hold a charge well after disconnecting power. While servicing the unit, take all necessary precautions against high voltage. High voltage electrocution can result in serious personal injury or death.

1 Using a 6 mm hex wrench, remove the four screws that secure the housing cover to the pedestal housing.

2 Pry the cover away from the housing.

***NOTICE***

If necessary, you should use a non-marring plastic pry tool to prevent scratching the device. Scratching the device may lead to premature corrosion of the housing.

3 Slide the cover away from the housing and set it aside.

Before proceeding with service, you should familiarize yourself with the internal components of the radar (*Overview*, page 2).

## Replacing the Antenna

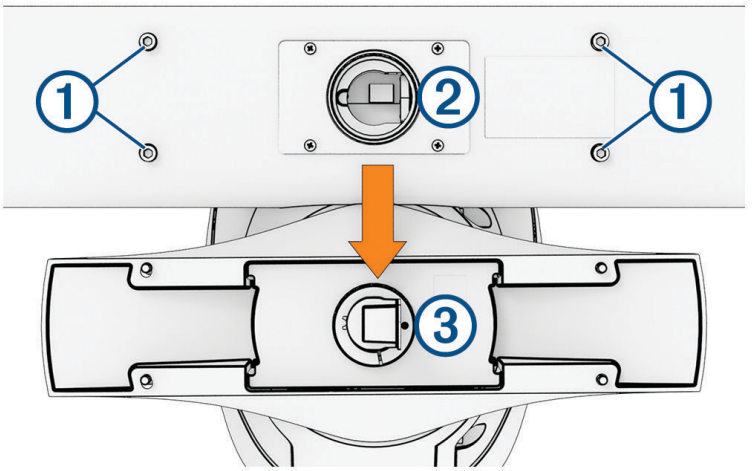
### Removing the Antenna

1 Using a 6 mm hex wrench, remove the four M8 screws and split washers from the underside of the antenna arm.

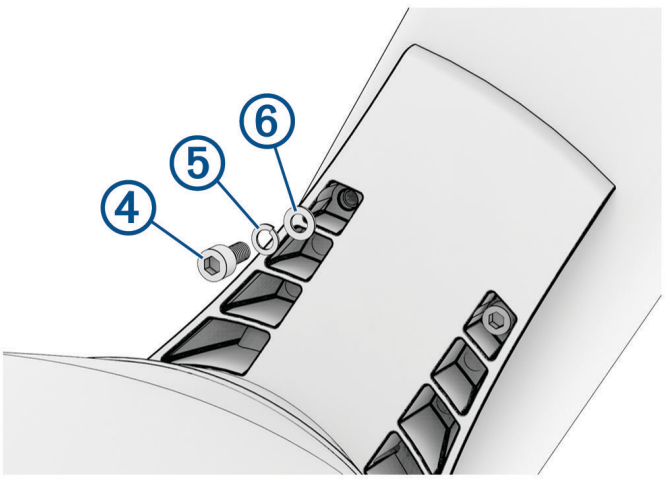
2 Lift the antenna up from both ends to clear the top of the rotary joint.

## Reinstalling the Antenna

1 Remove the mounting hardware from the bottom of the antenna ①.
These screws and washers are used to secure the antenna to the pedestal.




2 Align the waveguide ② on the pedestal with the socket on the bottom of the antenna ③, and slide the antenna onto the pedestal.
3 Secure the antenna to the pedestal using the hex screws ④, spring washers ⑤, and flat washers ⑥ you removed from the antenna.




4 Using a torque wrench, tighten the hex screws to 0.81 kgf-m (70 lbf-in or 5.83 lbf-ft) to fasten the antenna to the pedestal without damaging the antenna or the mounting hardware.

## Replacing the Magnetron and the Electronics Box

***NOTICE***

The components in the electronics box must be tuned at the factory to work with the magnetron in each unit, so both parts are supplied as a pair. Replacing only the magnetron or only the electronics box causes product malfunction.

1. Open the pedestal housing (*Opening the Pedestal Housing*, page 7).
2. Disconnect the magnetron (*Disconnecting the Magnetron*, page 9).
3. Remove the magnetron (*Removing the Magnetron*, page 9).
4. Remove the electronics box (*Removing the Electronics Box*, page 12).
5. Carefully cut the cable tie securing the motor control board power cable to the old electronics box housing.
6. Connect the motor control board power cable to the ports on the front and top of the new electronics box (*Internal Connections*, page 3).
7. Install a new cable tie securing the motor control board power cable to the new electronics box.
8. Install the new electronics box (*Reinstalling the Electronics Box*, page 12).
9. Install the new magnetron (*Reinstalling the Magnetron*, page 13).
10. Reconnect all remaining cables to the electronics box (*Internal Connections*, page 3).
11. Secure the internal network cable, the internal power cable, and the LNC coaxial cable to the boss that supports the left side of the electronics box using a new cable tie.

### Removing the Magnetron

**⚠ WARNING**

The magnetron in this product generates a strong magnetic field and may pose a danger to persons with implanted medical devices. If you have an implanted medical device, you should not perform service on this device, to avoid the risk of malfunction or failure of your medical device.

1. Disconnect the magnetron from the electronics box (*Disconnecting the Magnetron*, page 9).
2. Follow the appropriate instructions depending on the radar model:
   - GMR 2534/2536 xHD3 open array radar models: *Removing a 25 kW Magnetron*, page 12.
   - All other GMR xHD3 open array radar models: *Removing a 4 kW or 12 kW Magnetron*, page 10.

### Disconnecting the Magnetron

1. Identify the magnetron power and ground wire connections from the magnetron to the electronics box (*Internal Connections*, page 3).
2. Carefully cut the cable tie securing the magnetron cable ferrite bead to the electronics box.
3. Pull the magnetron connector away from the electronics box.
4. Select an option:
   - For GMR 1234/1236 xHD3 open array radars built before 2025, use a #1 Phillips screwdriver to loosen the magnetron ground screw.
   - For all other GMR xHD3 open array radars, use a 3 mm hex wrench to loosen the magnetron ground screw.
5. Pull the magnetron ground wire down and away from the magnetron ground screw.

***NOTICE***

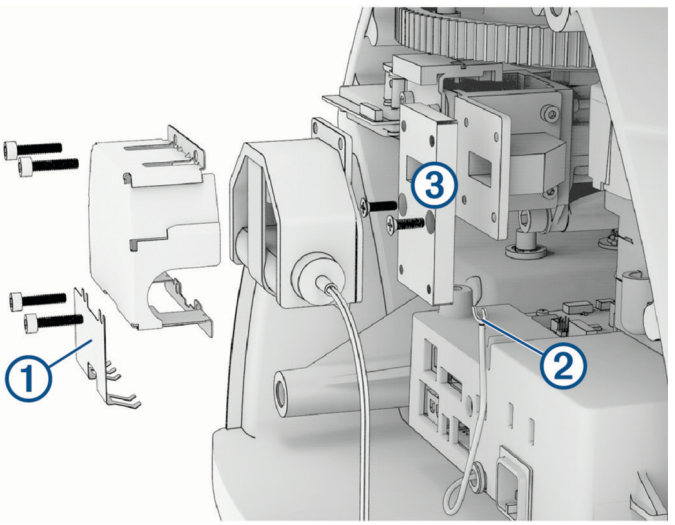
Do not pull the magnetron ground wire away from the electronics box. Pulling on the ground wire may damage the circuit board in the electronics box.

## Removing a 4 kW or 12 kW Magnetron

**NOTE:** GMR 1234/1236 xHD3 open array radars built before 2025 used a different magnetron than the one shown here. Follow the instructions for removing the previous model of 12 kW magnetron (*Removing a Previous Model 12 kW Magnetron*, page 11).

The 4 kW magnetron in the GMR 434/436 xHD3 radar and the 12 kW magnetron in GMR 1234/1236 xHD3 radars built after 2024 are protected behind a non-ferrous metallic cover. The magnetron and the cover are secured by four screws.

The two bottom screws also secure a grounding plate ① that contacts the electronics box housing. The bottom right screw also secures the magnetron ground wire ②. A metal spacer ③ behind the magnetron is secured to the waveguide with two screws.

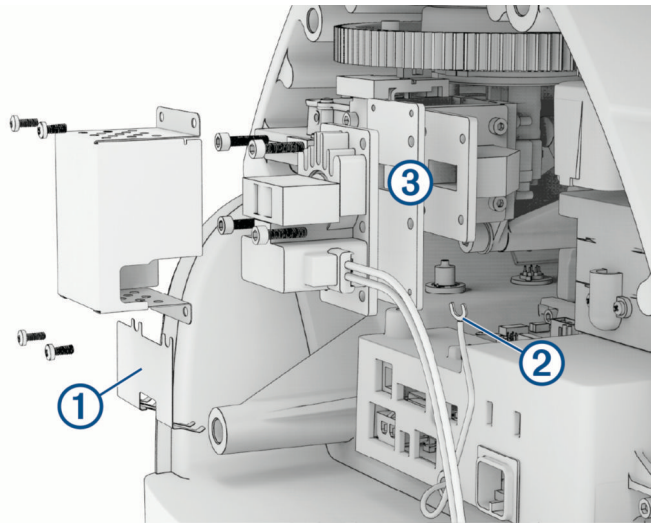



1. Using a 3 mm hex wrench, remove the bottom two screws that secure the grounding plate to the magnetron.
2. Set the grounding plate aside.
3. Remove the remaining two screws, and set the magnetron and the cover aside.
4. Using a #2 Phillips screwdriver, remove the two screws that secure the spacer to the waveguide.

### *Removing a Previous Model 12 kW Magnetron*

**NOTICE**

This magnetron model does not obstruct the circulator mounting screws. If you are not replacing the magnetron, you can skip this step and remove the circulator assembly with the magnetron attached (*Removing the LNC and the Circulator*, page 14).



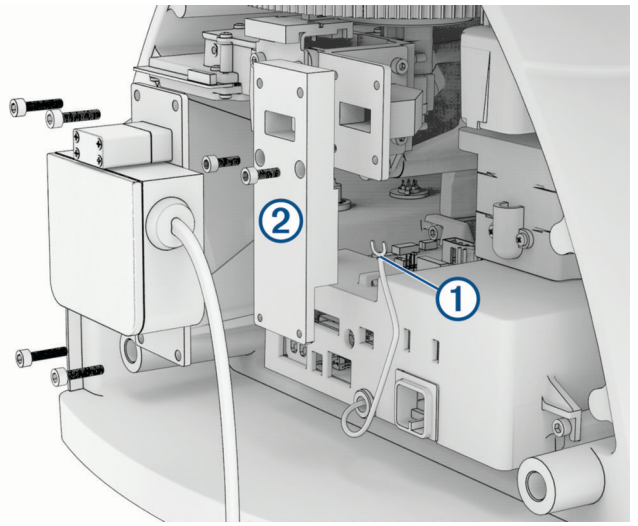

The 12 kW magnetron in GMR 1234/1236 xHD3 radars built before 2025 is protected behind a non-ferrous metallic cover, which is secured to the magnetron by four screws.

The two bottom screws also secure a grounding plate ①, which contacts the electronics box housing to help ground the magnetron. The bottom right screw also secures the magnetron ground wire ②. Under the magnetron cover, the magnetron is secured to the waveguide with four screws. Behind the magnetron, there is a metal spacer ③ separating it from the waveguide.

1. Using a #2 Phillips screwdriver, remove the four screws that secure the magnetron cover and the grounding bracket to the magnetron.
2. Set the magnetron cover and the grounding bracket aside.
3. Using a non-ferrous hex wrench, remove the four screws that secure the magnetron and the spacer.

   **TIP:** If you don't have a non-ferrous wrench, you can wrap the tip of your wrench in a piece of card stock, and use it to guide the wrench into the screw heads without contacting the magnetron.

## Removing a 25 kW Magnetron




The 25 kW magnetron in the GMR 2534/2536 xHD3 open array radar is secured by four screws.

The bottom right screw also secures the magnetron ground wire ①. A metal spacer ② behind the magnetron acts as a grounding plate by contacting the electronics box housing. The spacer is secured to the waveguide with two screws.

1. Using a 3 mm hex wrench, remove the four screws that secure the magnetron.
2. Using a #2 Phillips screwdriver, remove the two screws that secure the spacer to the waveguide.

## Removing the Electronics Box

**⚠ WARNING**

The high voltage capacitors in this product can hold a charge well after disconnecting power. While servicing the unit, take all necessary precautions against high voltage. High voltage electrocution can result in serious personal injury or death.

1. Cut the cable tie that secures the internal network cable, the internal power cable, and the LNC coaxial cable to the boss supporting the left side of the electronics box.
2. Pinch the internal power cable connector to release the latch, and disconnect it from the electronics box.
3. Using a flat screwdriver, lift the retaining latch on the under side of the internal network connector, and disconnect it from the electronics box.

   **NOTE:** The internal network cable connector is a standard water-resistant RJ45 connector.
4. Disconnect all remaining cables on the front of the electronics box by pulling their connectors away from the electronics box.
5. Remove the four screws securing the electronics box to the pedestal housing.
6. Slide the electronics box partly out of the housing.
7. Pull the motor cable connector up with moderate force to disconnect it from the electronics box.
8. Disconnect the status indicator light cable and the antenna position sensor board ribbon cable from the motor control board on top of the electronics box.

## Reinstalling the Electronics Box

1. Place the electronics box in the pedestal housing.
2. Reconnect the motor power cable to the board on the electronics box.
3. Reconnect the status LED light cable to the board on the electronics box.
4. Reconnect the antenna position sensor board data cable to the board on the electronics box.
5. Slide the new electronics box fully into its place and install the four mounting screws to secure it to the housing.

### Reinstalling the Magnetron

1 Follow the steps for removing a magnetron in reverse order (*Removing the Magnetron*, page 9).

**NOTICE**

You must make sure the grounding bracket (models GMR 434/436 xHD3 and GMR 1234/1236 xHD3 radars) or the conductive mesh and foam on the bottom of the magnetron spacer (GMR 2534/2536 xHD3 radars) make direct contact with the electronics box housing. Installing the magnetron without ensuring proper grounding may lead to product damage.

2 Bend a cable tie and carefully insert it into the electronics box slot above the magnetron power cable connector.

3 Feed the end of the cable tie out of the electronics box through the other slot, using a pair of needle nose pliers to pull it out of the electronics box, if necessary.

4 Connect the magnetron ground wire from the electronics box to the magnetron ground screw.

5 Connect the magnetron power cable to the electronics box.

6 Secure the magnetron cable ferrite bead to the electronics box, using the cable tie you inserted into the electronics box.

**NOTICE**

You must secure the ferrite bead tightly with a cable tie to prevent the magnetron power cable working itself loose over time.

## Replacing the Antenna Position Sensor Board

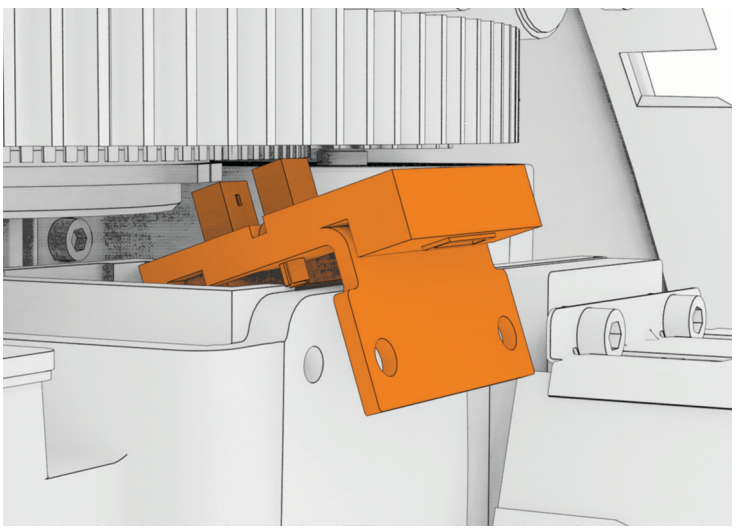
### Removing the Antenna Position Sensor Board

The antenna position sensor board is mounted with two screws that also secure the circulator and the LNC to the rotary joint.

1 Disconnect the data cable from the antenna position sensor board.

2 Using a 3 mm hex wrench, remove the two screws that hold the antenna position sensor bracket in place.

3 Tilt the antenna position sensor board down slightly as you remove it, to make sure the sensor clears the encoder ring on the underside of the housing gear.



### Reinstalling the Antenna Position Sensor Board

1 Place the antenna position sensor board on top of the circulator, with the two prongs on top of the antenna position sensor board straddling the encoder ring on the underside of the housing gear.

2 Install the top two screws through the antenna position sensor board bracket, the plate on the right side of the LNC and the circulator, into the rotary joint.

3 Connect the antenna position sensor board data cable to the port on the antenna position sensor board.

## Replacing the LNC

1. Remove the antenna position sensor board (*Removing the Antenna Position Sensor Board*, page 13).
2. Remove the magnetron (*Removing the Magnetron*, page 9).
3. Remove the LNC and the circulator/waveguide assembly (*Removing the LNC and the Circulator*, page 14).
4. Install the new LNC and the circulator/waveguide assembly (*Reinstalling the LNC and the Circulator*, page 14).
5. Reinstall the magnetron (*Reinstalling the Magnetron*, page 13)).
6. Reinstall the antenna position sensor board (*Reinstalling the Antenna Position Sensor Board*, page 13).

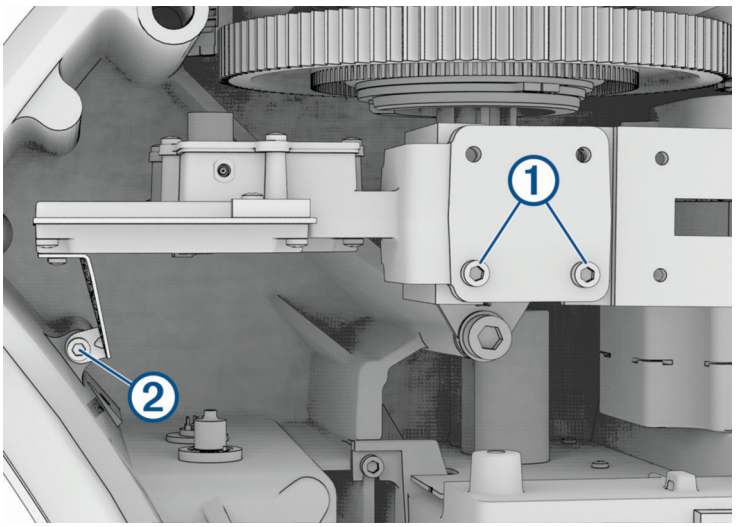
### Removing the LNC and the Circulator

Before removing the LNC and the circulator/waveguide assembly, you must remove the antenna position sensor board (*Removing the Antenna Position Sensor Board*, page 13).

In most cases, you must remove the magnetron in order to access one of the screws that secure the LNC and the circulator/waveguide assembly to the antenna rotary joint (*Removing the Magnetron*, page 9).

The LNC and the circulator/waveguide assembly are secured to the antenna rotary joint by the same set of screws, so you must remove them both at the same time.

1. Remove the adhesive tape securing the LNC coaxial cable and the LED status light cable to the LNC.
2. Disconnect the LNC coaxial cable and the LNC data cable from the LNC.
3. Supporting the circulator/waveguide assembly with your hand, remove the bottom two screws ① securing the circulator and the LNC to the rotary joint.




4. Carefully slide the circulator/waveguide assembly to the right, away from the LNC, and remove it from the housing.

   The LNC will remain supported by one screw on the left side of the housing.
5. Supporting the LNC with your hand, remove the screw on the left-hand side ②, and remove the LNC from the housing.

### Reinstalling the LNC and the Circulator

1. While supporting the LNC with your hand, install the screw on the left-hand side that secures the LNC to the housing, and tighten it enough to support the LNC temporarily while you reinstall the circulator.
2. Carefully place the circulator behind the LNC mounting plate, and install the two bottom screws securing it and the LNC to the antenna rotary joint.
3. Reconnect the LNC coaxial cable and the LNC data cable to the LNC.

## Replacing the Motor

1 Disconnect the magnetron (*Disconnecting the Magnetron*, page 9).
2 Remove the magnetron (*Removing the Magnetron*, page 9).
3 Remove the antenna position sensor board (*Removing the Antenna Position Sensor Board*, page 13).
4 Remove the LNC and the circulator/waveguide assembly (*Removing the LNC and the Circulator*, page 14).
5 Remove the four screws securing the electronics box to the housing.
6 Slide the electronics box partly out of the housing, so you can safely disconnect the motor cable from the electronics box.
7 Remove the motor (*Removing the Motor*, page 15).
8 Install the new motor (*Reinstalling the Motor*, page 15).
9 Slide the electronics box back into place, and secure it to the housing using the 4 mounting screws.
10 Reinstall the circulator/waveguide assembly and the LNC (*Reinstalling the LNC and the Circulator*, page 14).
11 If you had to remove the magnetron, reinstall it (*Reinstalling the Magnetron*, page 13).
12 Connect the magnetron ground cable from the new electronics box to the bottom right magnetron cover mounting screw.
13 Connect the magnetron cable to the electronics box.
14 Connect any remaining cables to the electronics box.
15 Install a new cable tie to secure the cables to the boss that supports the left side of the electronics box.

### Removing the Motor

To safely access the motor power cable connection on top of the electronics box, you should remove the LNC and the circulator/waveguide assembly (*Removing the LNC and the Circulator*, page 14) and pull the electronics box partly out of the housing (*Removing the Electronics Box*, page 12) before you disconnect and remove the motor.

The motor is supported entirely by four mounting screws.

The motor power cable is connected to the motor control board on top of the electronics box.

1 Identify the motor power cable connection on the board on top of the electronics box (*Internal Connections*, page 3).
2 Pull the motor cable connector up with moderate force to disconnect it from the electronics box.
3 Remove three of the four mounting screws securing the motor to the housing.
4 Supporting the motor with your hand, remove the last mounting screw.
5 Remove the motor from the housing.

### Reinstalling the Motor

In order to have enough space to safely reconnect the motor power cable to the electronics box, you should first slide the electronics box partly out of the housing.

1 Supporting the motor with your hand, install one of the mounting screws to support it.
2 Install the three remaining mounting screws.
3 Rotate the antenna arms manually to make sure the gears can rotate.
4 Connect the motor power cable to the electronics box.

## Replacing the Internal Network or Power Cable

1. Cut the cable tie that secures the internal network cable, the internal power cable, and the LNC coaxial cable to the boss that supports the left side of the electronics box.
2. Select an option:
   - Remove the internal network cable (*Removing the Internal Network Cable*, page 16).
   - Remove the internal power cable (*Removing the Internal Power Cable*, page 16).
3. Install the new cable (*Reinstalling the Internal Network or Power Cable*, page 16).
4. Secure the internal network cable, the internal power cable, and the LNC coaxial cable to the boss that supports the left side of the electronics box using a new cable tie.

### Removing the Internal Network Cable

1. Using a flat screwdriver or prying tool, lift the retaining latch on the under side of the internal network connector, and disconnect it from the electronics box.

   **NOTE:** The internal network cable connector is a standard water-resistant RJ45 connector.
2. Using a 16 mm ($^{5}/_{8}$ in.) socket wrench, remove the nut that secures the connector on the outside of the pedestal housing.
3. Remove the cable.

### Removing the Internal Power Cable

1. Pinch the internal power cable connector to release the latch, and disconnect it from the electronics box.
2. Using a 21 mm ($^{13}/_{16}$ in.) socket wrench, remove the nut that secures the connector on the outside of the pedestal housing.
3. Remove the cable from the housing.

### Reinstalling the Internal Network or Power Cable

1. Examine the threaded end of the connector, and make sure the o-ring is seated in its groove around the connector.
2. From inside the pedestal housing, insert the threaded connector end of the new cable into its slot.
3. Install and tighten the nut around the connector to lock it in place.
4. Connect the new cable to its port on the electronics box.

## Removing the Antenna Rotary Joint

Before you can remove the antenna rotary joint, you must remove the the magnetron (*Removing the Magnetron*, page 9), the LNC and the circulator/waveguide assembly (*Removing the LNC and the Circulator*, page 14).

1. Using a 6 mm hex wrench, remove the screw and washer securing the antenna rotary joint to the pedestal housing.

***NOTICE***

If you have not removed the electronics box from the housing, take care to avoid dropping the screw or washer on top of the electronics box, which could damage the motor control board.

2. Pull the antenna rotary joint up and out of the housing.

### Reinstalling the Antenna Rotary Joint

1. Insert the new antenna rotary joint into the pedestal housing, rotating the antenna rotary joint as necessary to set it flat against its mounting hole inside the pedestal housing and seat it correctly in the hole at the top of the pedestal.

   The gasket on the antenna rotary joint is keyed to fit in the pedestal housing in a certain orientation relative to the antenna arms.
2. Using a 6 mm hex wrench, install the antenna rotary joint screw and washer.