GARMIN®

FORCE® TROLLING MOTOR
TRANSDUCER REPLACEMENT INSTRUCTIONS

Getting Started

⚠ WARNING

Always disconnect the motor from the battery before handling or working with the propeller, propeller drive motor, electrical connections, or electronics enclosures to avoid serious injury or death.

⚠ CAUTION

For the best possible performance and to avoid potential injury, damage to the device, or damage to your vessel, installation by a qualified marine installer is recommended.

When stowing or deploying the motor, be aware of the risk of entrapment or pinching from moving parts, which can result in personal injury.

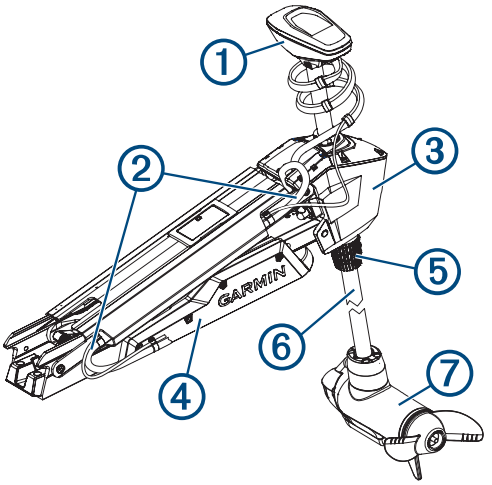
You should read these instructions completely before beginning this service, and make sure that you have the tools and skill set needed to complete it. If necessary, you should use a qualified marine installer to ensure proper service.

Tools Needed

- #2 and #3 Phillips screwdrivers
- 3 and 4 mm hex bits or drivers
- 4 mm ball-head hex bit or driver

  NOTE: A ball-head bit is highly recommended due to the angle of some screws.
- Torque wrench
- Medium-strength thread-locking compound, such as LOCTITE® 243™
- Canned compressed air or an air compressor

Device Overview



1	Shaft cap
2	Power and transducer cables
3	Steering system
4	Mount
5	Depth-adjustment collar
6	Shaft
7	Propeller drive motor

Preparing the Motor for Transducer Replacement

Before you can replace the transducer, you must perform these actions to prepare the motor.

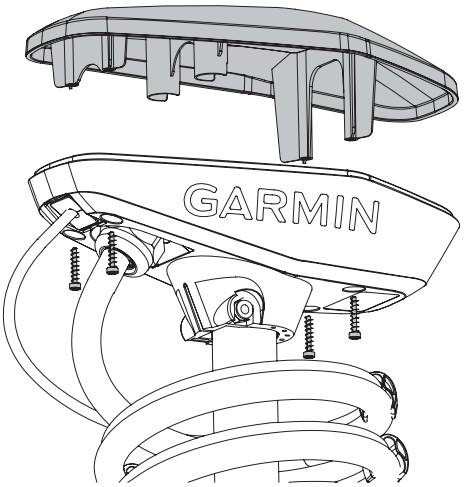
1. Disconnect the motor from the power source.
2. Open the shaft cap (*Opening the Shaft Cap*, page 3).
3. Disconnect the cables in the shaft cap (*Disconnecting the Cables in the Shaft Cap*, page 3).
4. Remove the transducer cable from the shaft cap (*Removing the Transducer Cable*, page 4).
5. Remove the shaft cap (*Removing the Shaft Cap*, page 5).
6. Remove the shaft from the steering system (*Removing the Shaft from the Steering Servo*, page 6).

Opening the Shaft Cap

⚠ WARNING

Before you open the shaft cap, you must disconnect the motor from the power source. Failure to disconnect the power source can lead to electrical shock or damage to the motor.

1 Using a #2 Phillips screwdriver, remove the four screws that secure the lid of the shaft cap.



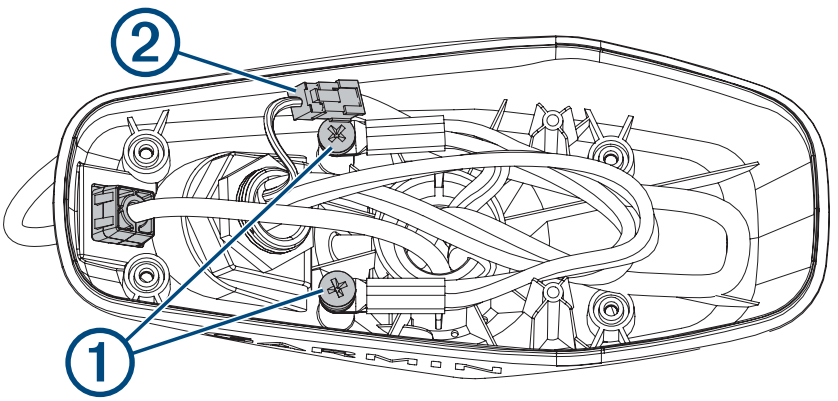
You should place these screws in a safe place, because you must use them to close the shaft cap.

2 Lift up to remove the lid of the shaft cap.

Disconnecting the Cables in the Shaft Cap

Before you can disconnect the cables in the shaft cap, you must open the shaft cap (*Opening the Shaft Cap*, page 3).

1 Using a #3 Phillips screwdriver, remove the two screws ① that secure the power cables in the shaft cap.



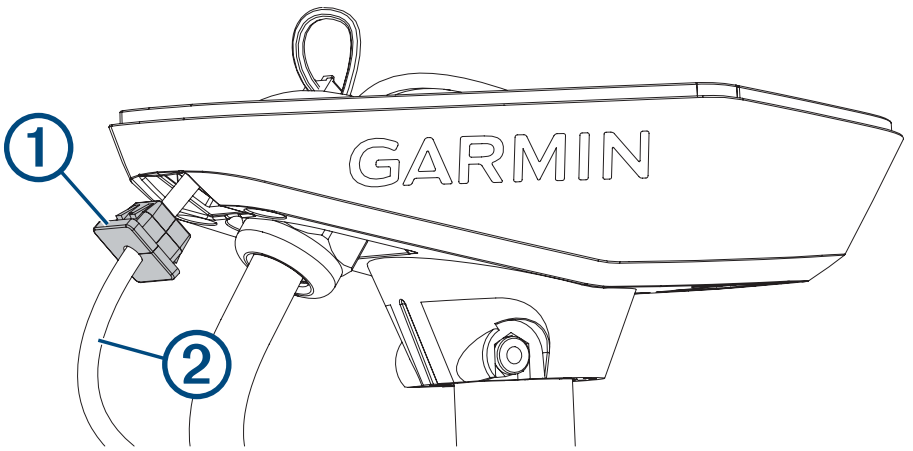
You should keep these screws in a safe place, because you must use them when reconnecting the cables.

2 Release the latch ② and pull the connectors apart to disconnect the data cable.

Removing the Transducer Cable

1. Using a #2 Phillips screwdriver and a 3 mm hex bit or wrench, remove the three cable clamps that secure the power cable and the transducer cable to the trolling motor mount.
2. If necessary, pull the transducer cable out of the channel in the trolling motor mount.
3. Remove the plastic cable clamps that secure the transducer cable to the coiled power cable.

   You should keep these cable clamps in a safe place, because you must reinstall them later.
4. Push from the inside out to remove the square grommet ① that holds the transducer cable ② in the shaft cap.



5. Remove the grommet from the transducer cable.

   The grommet is split on one side to make it easy to remove from the cable.

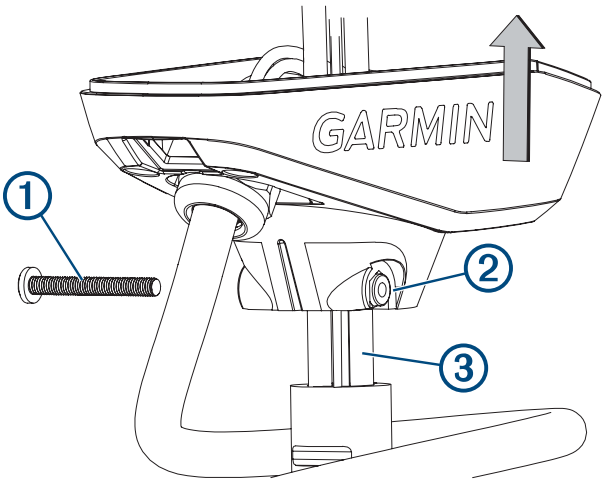
   You should keep the grommet in a safe place, because you must reinstall it later.
6. Feed the transducer cable through the shaft cap from the outside in until it is no longer routed through the square hole.

Removing the Shaft Cap

Before you can remove the shaft cap, you must remove the transducer cable from the shaft cap (*Removing the Transducer Cable*, page 4) and disconnect the cables in the shaft cap (*Disconnecting the Cables in the Shaft Cap*, page 3).

1. Count and write down the number of coils in the coil cable that wraps around the shaft.

   When re-assembling the shaft and shaft cap, it is beneficial to use the same number of coils around the shaft.
2. Using a 4 mm hex bit or wrench, remove the $^{1}/_{4}$-20 bolt ① and nut ② that secure the shaft cap to the shaft.



   You should keep this bolt and nut in a safe place, because you must use them when reinstalling the shaft cap.
3. Lift up on the shaft cap to disconnect it from the shaft.
4. Pull the cables ③ from the shaft completely through the shaft cap, taking care to avoid damaging the data cable connector when you pull it through.

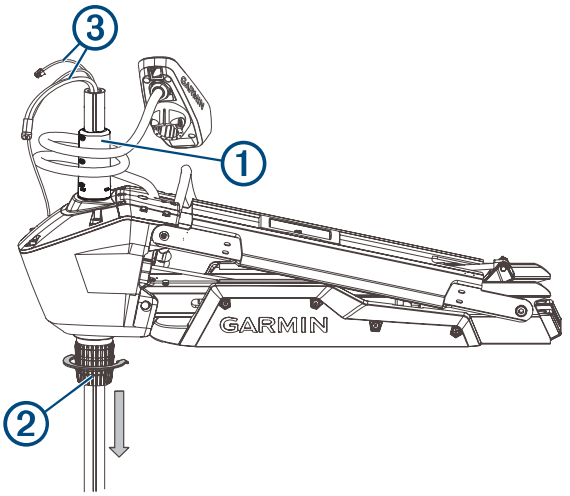
Removing the Shaft from the Steering Servo

Before you can remove the shaft from the steering servo, you must remove the shaft cap (*Removing the Shaft from the Steering Servo*, page 6).

This procedure is best performed with two people.

1 Loosen the depth limiter screws and remove the depth limiter ①.

2 Loosen the depth adjustment collar on the base of the steering servo ②.



3 Slide the shaft down and out of the steering servo, taking care not to damage the skeg and transducer or snag the cables or connectors ③ as you pull it through.

TIP: Depending on the height of your trailer, you may find it easier to remove the shaft if you transition the mount halfway between the deployed and stowed positions.

Removing the Existing Transducer

After you prepare the motor by removing the shaft from the steering system, perform these actions to remove the existing transducer.

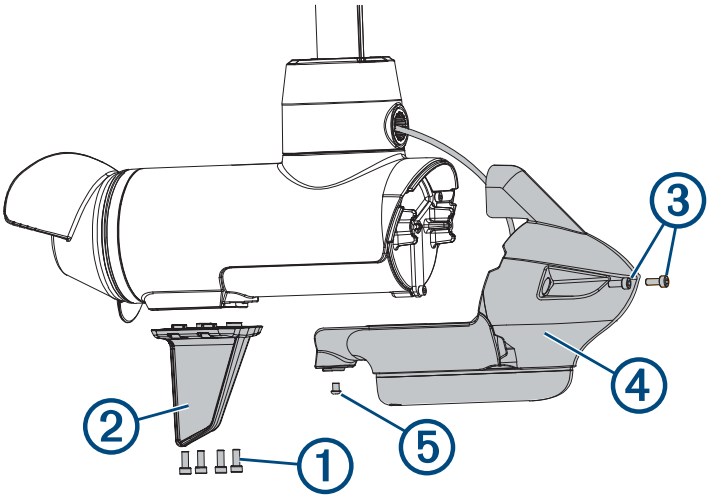
1 Remove the skeg and nose cone from the propeller drive motor (*Removing the Skeg and Nose Cone*, page 7).

2 Remove the propeller drive motor from the shaft (*Removing the Propeller Drive Motor*, page 8).

3 Remove the transducer from the nose cone (*Removing the Transducer*, page 10).

Removing the Skeg and Nose Cone

1 Using a 4 mm hex bit or wrench, remove the four screws ① that secure the skeg ② to the propeller drive motor.



2 Remove the skeg.

3 Using a 4 mm hex bit or wrench, remove the two screws ③ that secure the front of the nose cone ④ to the propeller drive motor.

4 Using a 3 mm hex bit or wrench, remove the single screw ⑤ that secures the bottom of the nose cone to the propeller drive motor.

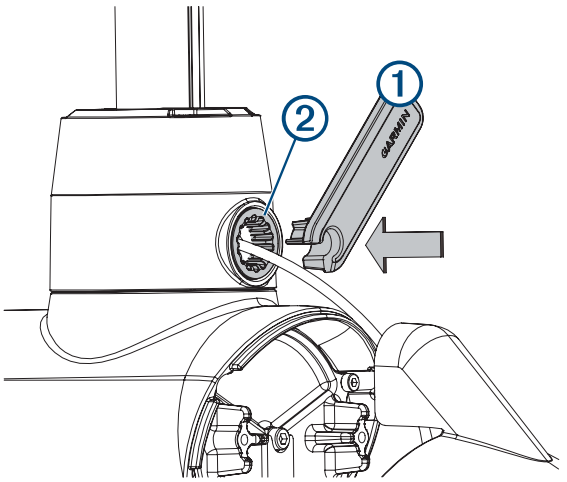
NOTE: You should keep all of these screws and parts in a safe place, because you must reinstall them when reassembling the skeg and nose cone.

Removing the Propeller Drive Motor

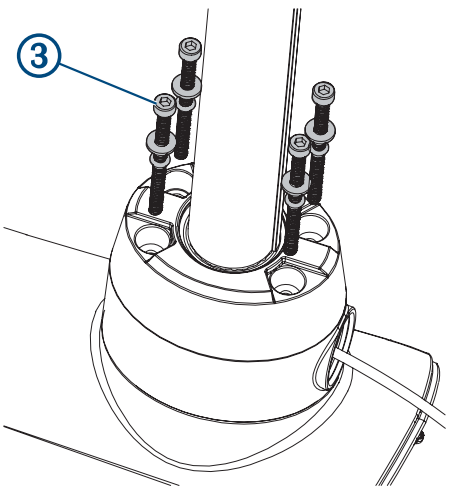
Before you can remove the propeller drive motor, you must remove the shaft from the steering servo (*Removing the Shaft from the Steering Servo*, page 6).

NOTE: When removing the propeller drive motor, using a ball-head hex bit or wrench is highly recommended because of the angle needed to reach the head of the screws.

1 Using the tool ① included in the transducer replacement kit, remove the recessed nut ② that secures the transducer cable to the shaft.

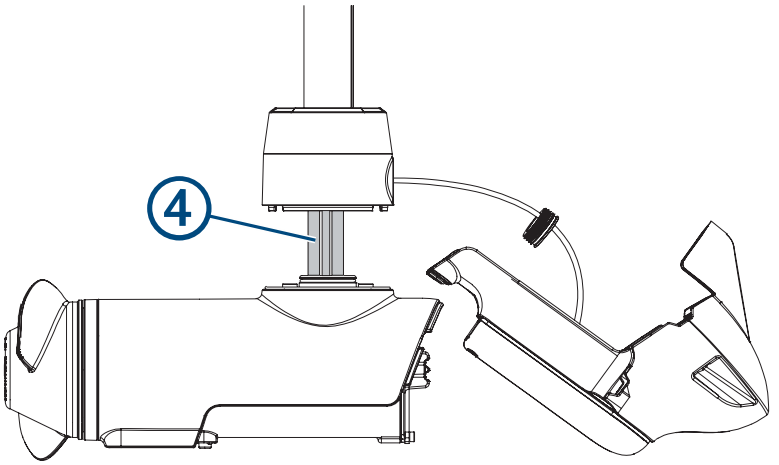


2 Using a ball-head 4 mm hex bit or wrench, remove the four screws ③ that secure the shaft base to the propeller drive motor.



When replacing the transducer, you should dispose of these four screws. New screws, washers, and O-rings are provided in the transducer replacement kit.

3 Straighten the cables at the top of the shaft, and slowly pull the propeller drive motor away from the shaft base until you can see the power and data cables ④ connected to the propeller drive motor.



4 Holding the cables only, slowly pull them through the shaft, taking care that the ring terminals and data cable connector do not get caught on the top of the shaft.

NOTICE

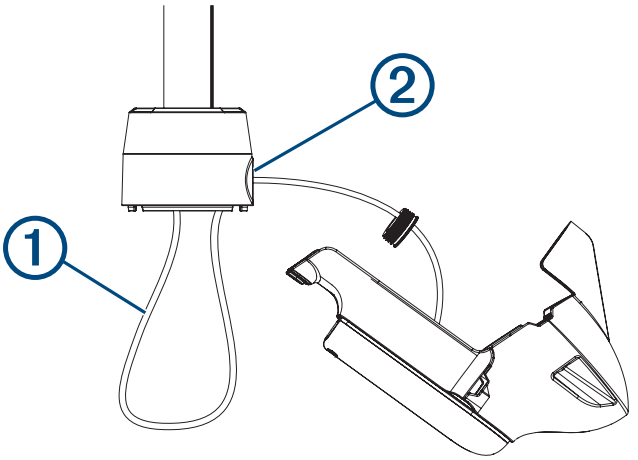
When removing the propeller drive motor from the shaft, you must pull the cables themselves, and not the motor. Pulling on the propeller drive motor may damage the cable connections inside the motor. The motor should not be supported by the cables alone. Supporting the motor only with the cables may damage the motor.

The power and transducer cables should pull through the shaft.

Removing the Transducer

Before you can remove the transducer, you must remove the propeller drive motor (*Removing the Propeller Drive Motor*, page 8).

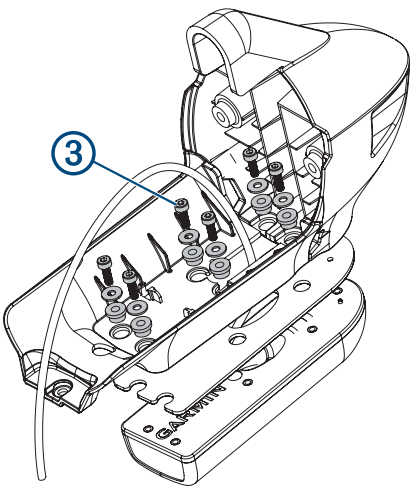
1 Carefully pull the transducer cable ① straight down through the bottom of the shaft until it is completely removed from the shaft.



2 After you pull the transducer cable through the shaft completely, pull it through the hole in the front of the shaft base ②, along with the rubber cable gland and the recessed nut.

When replacing the transducer, you should dispose of the cable gland and recessed nut. A new cable gland and recessed nut are provided in the transducer replacement kit.

3 Using a 3 mm hex bit or driver, remove the six screws ③ that secure the transducer to the nose cone.



When replacing the transducer, you should dispose of the six screws. New screws, washers, and bushings are provided in the transducer replacement kit.

4 Remove the transducer and neoprene pad from the nose cone.

When replacing the transducer, you should dispose of the neoprene pad. A new pad is provided in the transducer replacement kit.

Installing the Replacement Transducer

After you remove the existing transducer, perform these actions to install the replacement transducer.

1. Install the new transducer in the nose cone (*Installing the Transducer*, page 11).
2. Install the propeller drive motor on the shaft (*Installing the Propeller Drive Motor*, page 13).
3. Install the nose cone and skeg on the propeller drive motor (*Installing the Nose Cone and Skeg*, page 15).

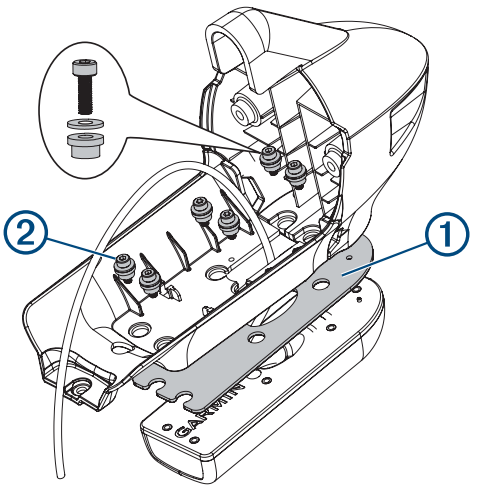
Installing the Transducer

Before you can install the new transducer, you must remove the existing transducer (*Removing the Transducer*, page 10).

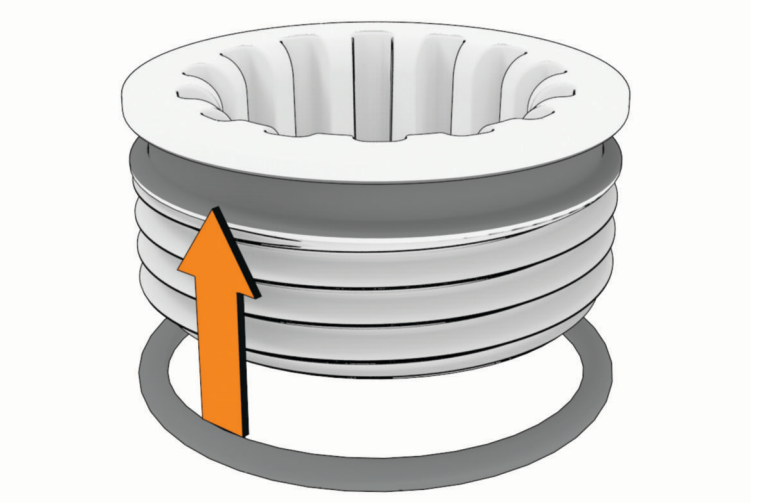
NOTICE

New screws and seals are provided in the transducer replacement kit. You should use the new parts from the kit instead of reusing the screws and seals you removed with the transducer.

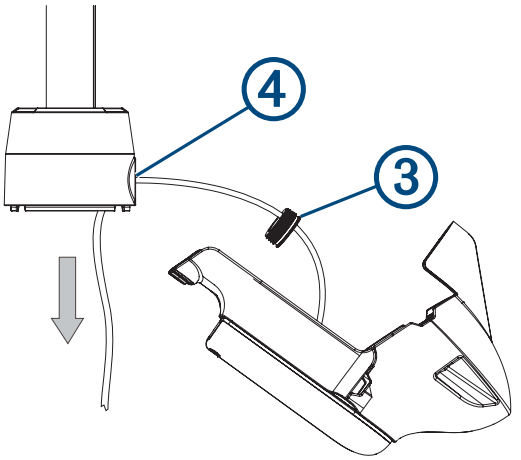
1. Place the new neoprene pad ① from the transducer replacement kit on the replacement transducer.



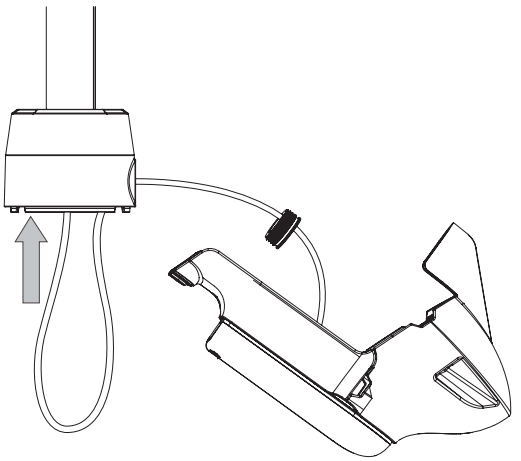
2. Using a 3 mm hex bit or driver and the six new screws and bushings ② from the transducer replacement kit, secure the replacement transducer to the nose cone.
3. Place the 25 mm (1 in.) O-ring on the recessed nut in the transducer replacement kit.



4 With the O-ring facing the transducer, feed the replacement transducer cable through the recessed nut ③ and the hole ④ in the front of the shaft base, but do not feed it up through the shaft.



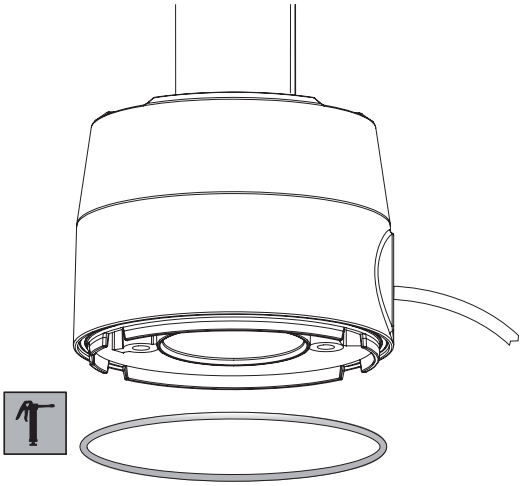
5 After you have fed all but approximately 60 cm (2 ft.) of the transducer cable through the hole in the shaft base, feed the transducer cable up through the shaft.



Installing the Propeller Drive Motor

Before you can install the propeller drive motor, you must install the new transducer and route the transducer cable through the shaft (*Installing the Transducer*, page 11).

1 Remove the large 78 mm (3 in.) O-ring on the shaft base, and discard it.



2 Using the packet included in the transducer replacement kit, apply grease to the new 78 mm (3 in.) O-ring in the transducer replacement kit.

3 Place the new 78 mm (3 in.) O-ring in the groove on the shaft base.

4 Using canned compressed air or an air compressor, blow out any dirt or debris in the four threaded holes on the top of the propeller drive motor.

5 Apply a medium-strength thread-locking compound such as LOCTITE 243 to the threads in the four threaded holes on the top of the propeller drive motor.

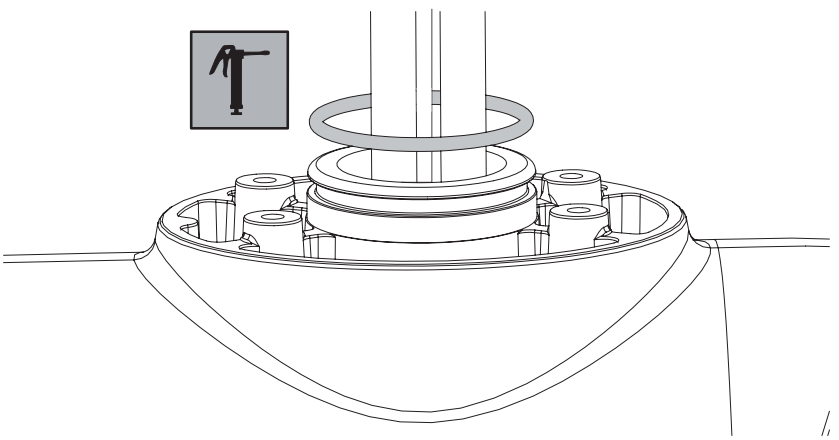
NOTICE

Thread-locking compound is required in these holes to maintain a tight connection between the shaft base and the propeller drive motor. Failure to use thread-locking compound can lead to water ingress and damage to the motor.

6 Remove the 36 mm ($1^{7}/_{16}$ in.) O-ring from the top of the propeller drive motor, and discard it.

7 Thread the cables from the propeller drive motor through the new 36 mm ($1^{7}/_{16}$ in.) O-ring in the transducer replacement kit.

8 Using the packet included in the transducer replacement kit, apply grease to the new 36 mm ($1^{7}/_{16}$ in.) O-ring.

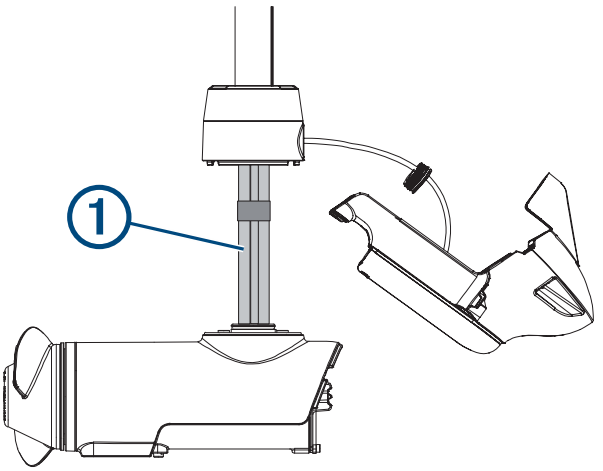


9 Place the new 36 mm ($1^{7}/_{16}$ in.) O-ring in the groove on the top of the propeller drive motor.

10 If the power and data cables from the propeller drive motor are not already aligned and bundled, straighten, align, and bundle them with tape.

If the power and data cables are not straight and aligned, they may not feed through the shaft smoothly.

11 Feed the power and data cables ① from the propeller drive motor up through the shaft until they emerge from the top.

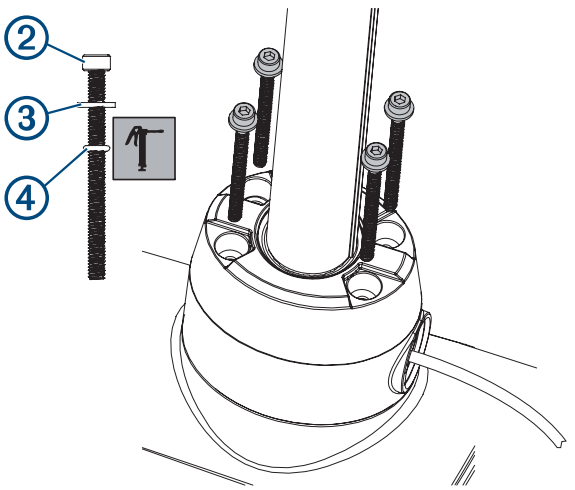


12 Gently pull the ends of the power and data cables as you feed them the rest of the way through the shaft.

NOTICE

When feeding the cables, you must pull on the cable and not on the cable connectors. The data cable connector is fragile and may break if you pull on the connector.

13 Prepare the four bolts ② in the transducer replacement kit by placing a washer ③ and a 4.75 mm ($^{3}/_{16}$ in.) O-ring ④ on each one.



14 Using the grease packet included in the transducer replacement kit, apply grease to the 4.75 mm ($^{3}/_{16}$ in.) O-ring on each bolt.

Avoid getting grease on the bolt threads.

REMEMBER: If you did not previously apply thread-locking compound in the four mounting holes for these bolts, you must apply it before installing these bolts.

15 Using a ball-head 4 mm hex bit or wrench, thread all four of the prepared bolts approximately halfway to make sure that the shaft base and the propeller drive motor are properly aligned.

16 With the shaft base and the propeller drive motor properly aligned, lightly tighten all four bolts by hand.

17 Using a torque wrench, tighten all four bolts to 4 N-m (35 lbf-in).

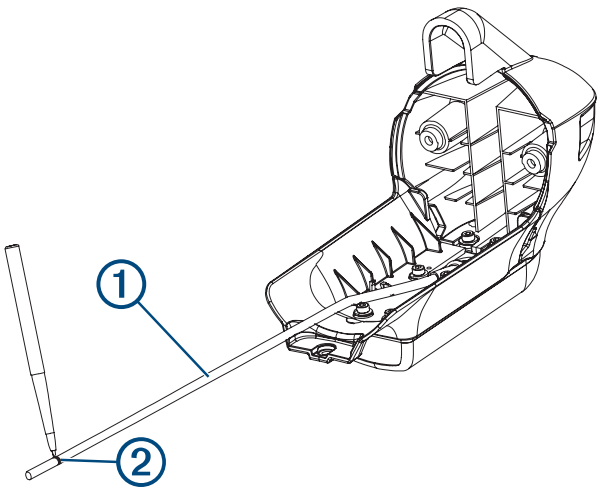
Installing the Nose Cone and Skeg

Before you can install the nose cone and skeg, you must install the propeller drive motor on the shaft base (*Installing the Propeller Drive Motor*, page 13).

1 From the transducer replacement kit, select the cable gland that fits your transducer cable:
   - For a 4-pin transducer, select the cable gland with the smaller hole.
   - For an 8- or 12-pin transducer, select the cable gland with the larger hole.

   NOTE: A cable gland without a hole is provided if you are not installing a transducer or not routing the transducer cable through the shaft.

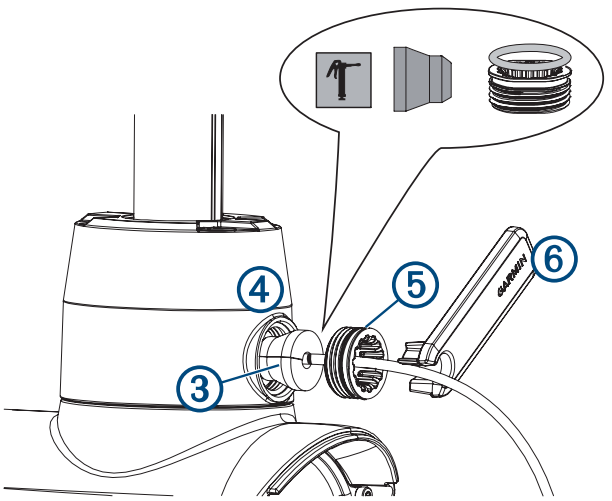
2 Pull the transducer cable ① straight, and measure a 38 cm (15 in.) from the where the cable enters the transducer.



3 Using a permanent marker, mark the measured location on the cable ②.

4 Using the packet included in the transducer replacement kit, apply grease completely to all surfaces of the cable gland you selected to fit your transducer cable.

5 Place the cable gland ③ at the marked location on the transducer cable.



6 While keeping the cable gland aligned with the mark on the transducer cable, gently pull the excess cable through the top of the shaft until the cable gland fits into the hole on the shaft base ④.

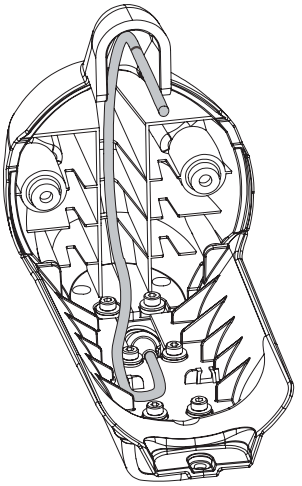
7 Using the packet included in the transducer replacement kit, apply grease to the 25 mm (1 in.) O-ring on the recessed nut ⑤ on the transducer cable.

8 Place the recessed nut into the hole on the shaft base, and tighten it using the included tool ⑥.

9 Tighten the recessed nut until it stops, then loosen it $^{1}/_{14}$ of a turn.

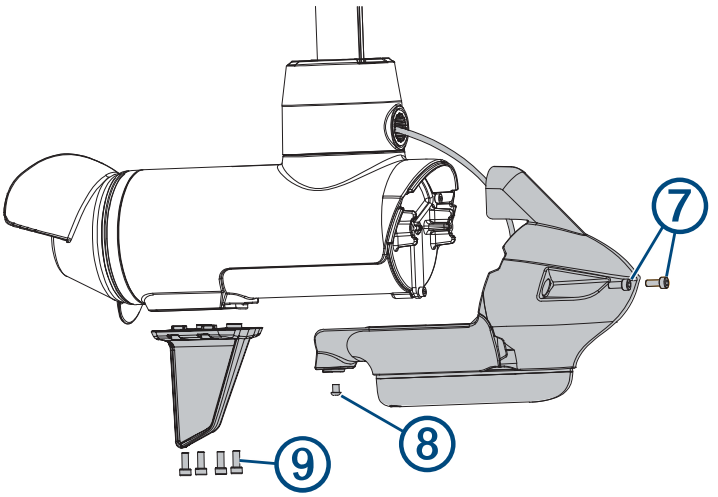
NOTE: For reference, the notches inside the recessed nut are centered $^{1}/_{14}$ of a turn apart.

10 Route the transducer cable through the nose cone so it will fit correctly onto the propeller drive motor.



11 Place the nose cone onto the propeller drive motor.

12 Using a 4 mm hex bit or wrench, secure the front of the nose cone to the propeller drive motor using the existing two screws ⑦.



13 Using a 3 mm hex bit or wrench, secure the bottom of the nose cone to the propeller drive motor using the existing screw ⑧.

14 Using a 4 mm hex bit or wrench, secure the skeg to the bottom of the propeller drive motor using the existing four screws ⑨.

Completing the Trolling Motor Service

After you replace the transducer, you must perform these actions to complete the trolling motor service.

1 Install the shaft in the steering system (*Reinstalling the Shaft*, page 17).

2 Install the shaft cap on the shaft (*Installing the Shaft Cap*, page 18).

3 Install the transducer cable in the shaft cap (*Installing the Transducer Cable in the Shaft Cap*, page 19).

4 Connect the cables in the shaft cap (*Connecting the Cables in the Shaft Cap*, page 20).

5 Close the shaft cap (*Closing the Shaft Cap*, page 21).

6 Connect the motor to the power source.

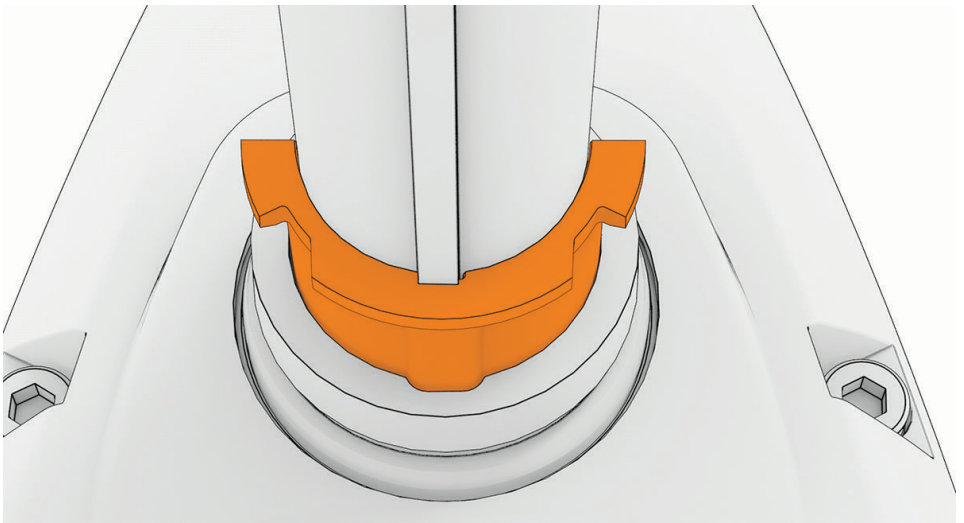
Reinstalling the Shaft

NOTE: We recommend having a second installer available to support the weight of the propeller drive motor while you feed the shaft through the steering servo housing.

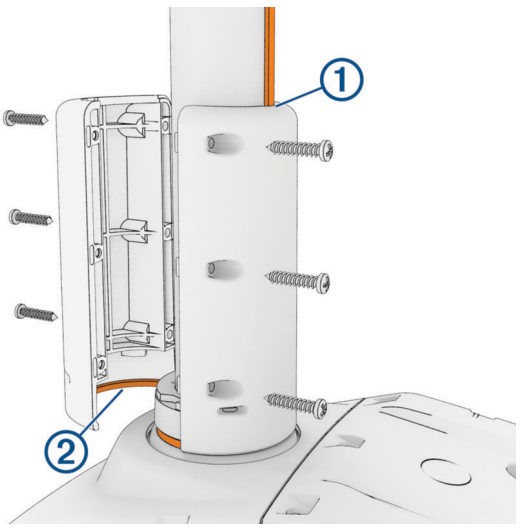
1. Feed the transducer cable up through the steering servo housing.
2. Insert the shaft into the bottom of the steering servo housing, guiding the power and data connectors into the steering servo housing to prevent snagging the cables or connectors.

   NOTE: The shaft fits in the steering servo housing only in a certain orientation. If you encounter any resistance, remove the shaft, rotate it a few degrees, and try again. When it is in the correct orientation, the shaft will slide into the steering servo easily.
3. Push the shaft up the steering servo to a comfortable height for you to access the top of the shaft, and tighten the depth adjustment collar on the base of the steering servo housing.
4. Place the keyed bushing over the keyed side of the shaft, and slide it down until its lip rests on the servo housing.

   NOTE: The keyed bushing fits in the steering servo only in a certain orientation. While someone supports the weight of the propeller drive motor on the bottom of the shaft, you can loosen the depth adjustment collar and rotate the shaft and bushing to match the position of the notch in the steering servo housing.



5. Install the smooth bushing over the other side of the shaft and slide it down until its lip rests on the steering servo housing.
6. Place both halves of the depth limiter around the shaft so that one half fits over the key on the shaft ①, and both halves overlap the top of the steering servo housing ②.



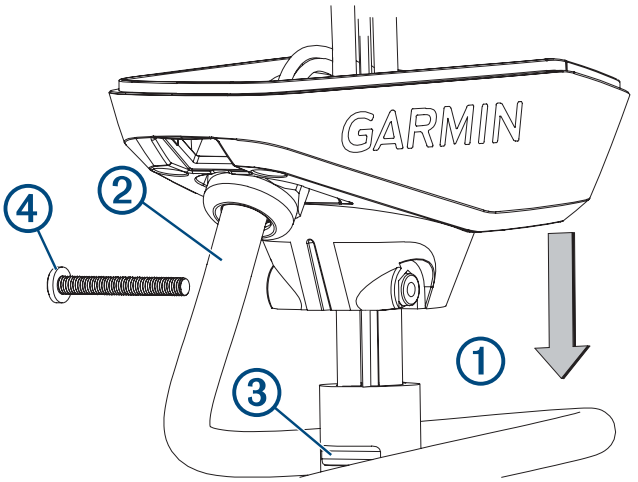
7 Using a #2 Phillips screwdriver, install the 3 mm pan head screws to secure both halves of depth limiter together.

When the depth limiter is installed properly, it rotates with the shaft and cannot slide up the shaft.

8 Reinstall the shaft cap (*Installing the Shaft Cap*, page 18).

Installing the Shaft Cap

1 Pull the cables ① from the shaft completely through the shaft cap.



2 Using the coil count you recorded when you removed the shaft cap, wrap the coil cable around the shaft the appropriate number of times.

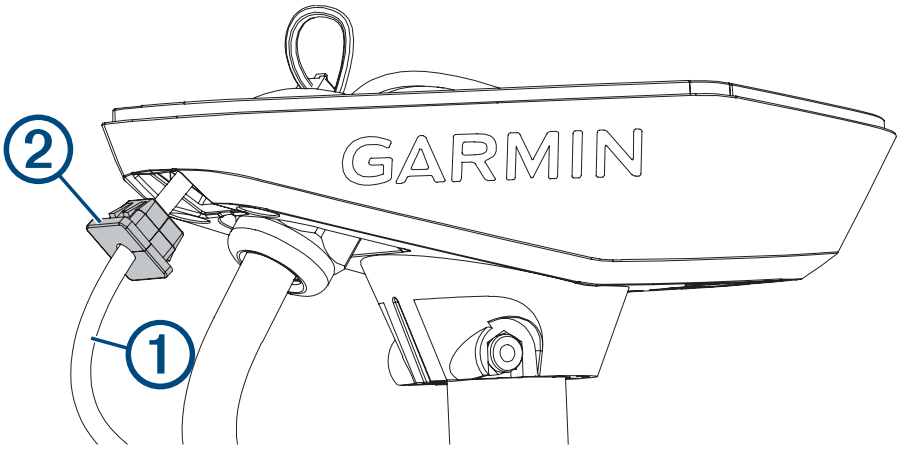
3 Place the shaft cap on the shaft, aligning the coil cable extending from the shaft cap ② with the groove on the shaft ③.

4 Using a 4 mm hex bit or wrench, install the $^{1}/_{4}$-20 bolt ④ and nut to secure the shaft cap to the shaft.

Installing the Transducer Cable in the Shaft Cap

Before you can install the transducer cable in the shaft cap, you must install the shaft cap (*Installing the Shaft Cap*, page 18).

1 If previously removed, feed the transducer cable ① completely through the square hole in the shaft cap.



2 Install the grommet ② on the transducer cable.

The grommet is split on one side to make it easy to install on the cable.

3 Push from the outside to secure the square grommet in the shaft cap.

4 Route the transducer cable alongside the coil cable, using the cable clamps to hold the cables together.

5 Route the transducer cable through the mount base alongside the coil cable, using the cable clamps to secure the cables to the base.

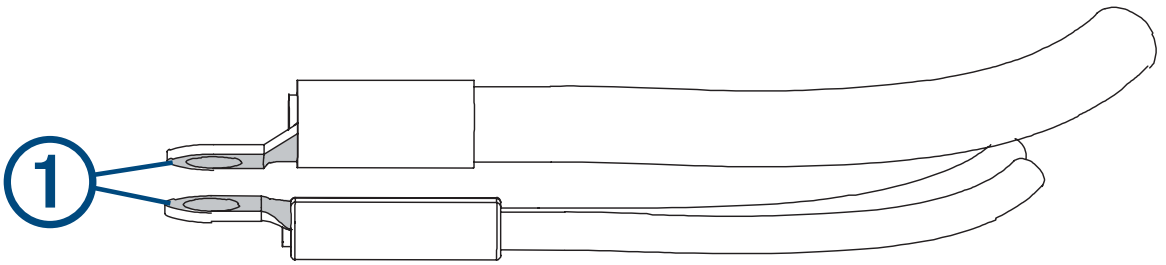
6 Route the transducer cable to the chartplotter and connect it.

Connecting the Cables in the Shaft Cap

Before you can connect the cables in the shaft cap, you must install the shaft cap (*Installing the Shaft Cap*, page 18).

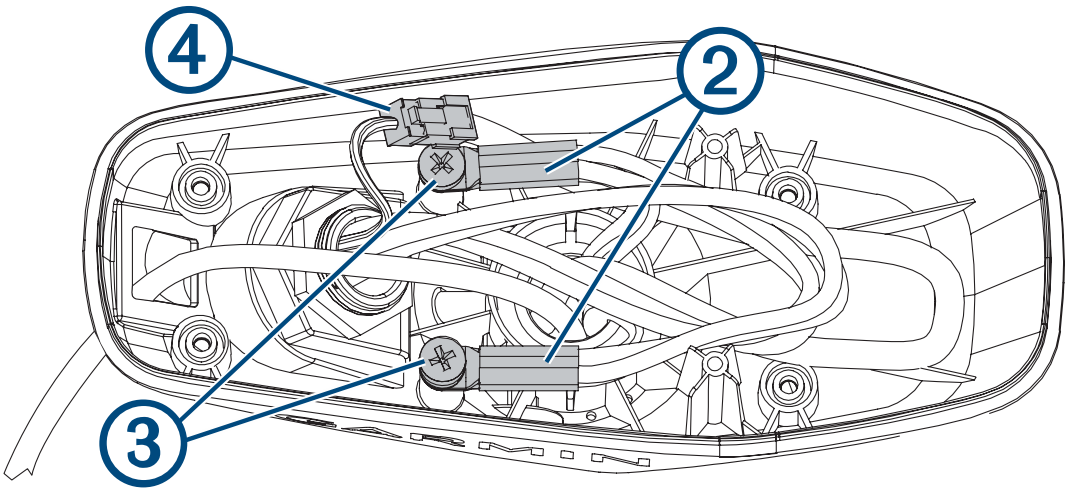
1 Align the rings on the ends of the cables according to color.

You must stack the red cables together and stack the black cables together, aligning the flat sides of the connectors ① on the cables.



NOTE: If the cables are stacked incorrectly, you cannot close the shaft cap cover.

2 Place the stacked cables ② over the stand outs in the shaft cap.



3 Using a #3 Phillips screwdriver, install the two screws and lock washers ③ to secure the power cables onto the stand outs in the shaft cap.

Make sure the power cable terminals are firmly clamped under the screw heads.

NOTICE

You should use only hand tools to prevent stripping the stand outs when reattaching the leads.

4 Align both sections of the data cable connector ④, and push together to connect them.

Closing the Shaft Cap

1 Place the lid on the shaft cap.

NOTICE

Ensure the cables are routed away from pinch points before securing the shaft cap lid to avoid damaging the cables.

2 Using a #2 Phillips bit or screwdriver, install the four screws you removed previously to secure the lid of the shaft cap.