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# MIDSECTION

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## CLEANING AND INSPECTION

### General



#### WARNING



To avoid personal injury, wear eye protection and set compressed air pressure to less than 25 psi (172 kPa).

- Clean all parts with cleaning solvent and dry with compressed air.
- All nut and screw threads that are coated with *Screw Lock* or *Nut Lock* must be thoroughly cleaned before assembly. When using a thread locking product, prime the threads with *Locquic Primer*.
- Discard all oil seals, O-rings, and gaskets. Use new components during assembly.
- Check all bushings for wear and proper fit. Replace if necessary.
- Inspect the rubber motor mounts. Replace if deteriorated or damaged.
- Inspect the water tube for obstructions or kinks which may restrict water flow. Replace the grommet if worn or damaged.
- Inspect the tilt assist cylinder (or PTT unit) for cracks and other damage. If replacement is necessary, replace the complete cylinder assembly.
- Inspect the stern brackets, swivel bracket, and steering arm for cracks and other damage.
- Inspect the shift components for wear. Replace if deteriorated or damaged.

### Clamp Screw

Inspect the clamp screw assembly(s). Replace the swivel plate and retainer if they are bent or loose.

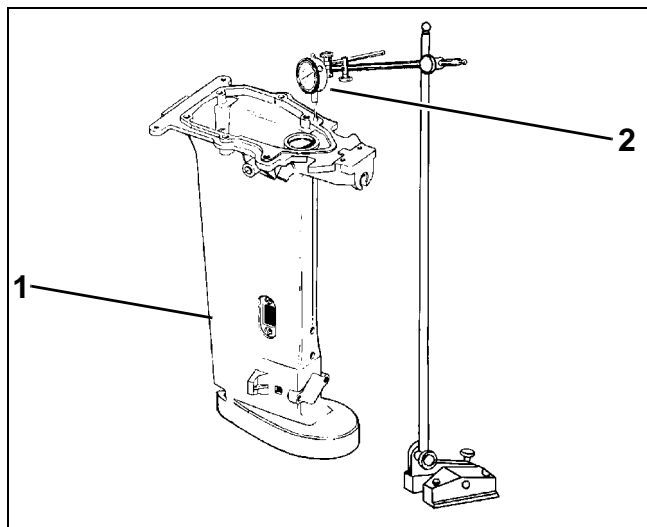
To install a new swivel plate, remove the screw and old plate. Apply *Locquic Primer* to the threads of the screw and allow it to dry for four to five minutes. Then apply *Ultra Lock* to the threads. Install a new swivel plate and tighten the screw securely.

### Exhaust Housing

Before checking the exhaust housing for distortion, thoroughly clean the top and bottom mating surfaces and remove all sealer and corrosion.

Check the exhaust housing for distortion. Place the housing on a surface plate. Use a dial indicator to check the flatness by measuring the run-out on the top edge of the housing. The maximum allowable run-out is 0.009 in. (0.228 mm).

If you do not have access to a dial indicator and a surface plate, seek the services of a machine shop. DO NOT attempt to straighten a distorted housing. Replace it.



TYPICAL  
1. Exhaust housing  
2. Dial indicator

DRC2351

**IMPORTANT:** A bent exhaust housing will cause the upper driveshaft splines to wear excessively and will also damage the crankshaft splines.

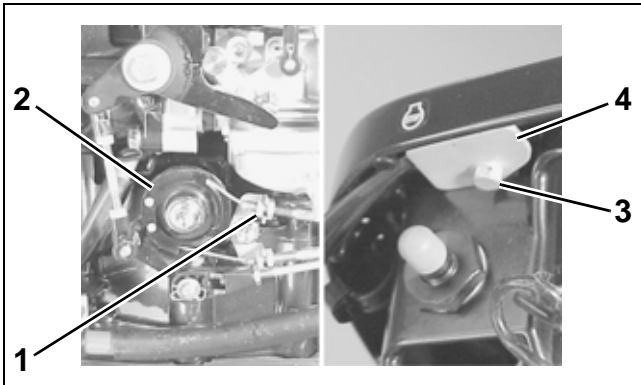
# STEERING HANDLE

## Removal

Remove the starboard side lower cover. Refer to the **MAINTENANCE** section.

Loosen the lock nut and remove the throttle cables from the throttle drum.

Remove the bolt and the plate.

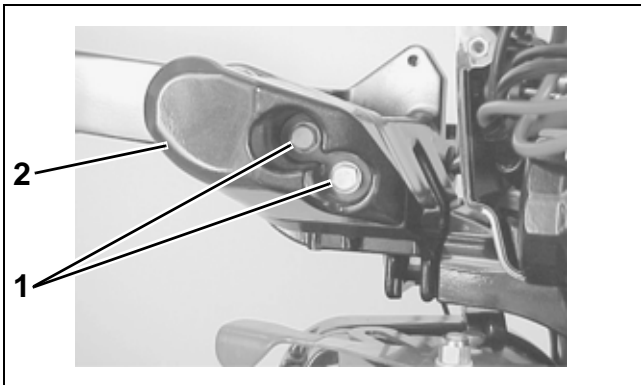


1. Locknut
2. Throttle drum
3. Bolt
4. Plate

001725

Remove two (2) bolts and the tiller handle cover.

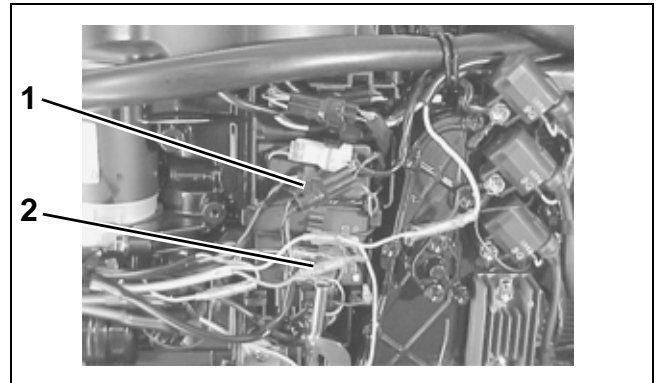
Remove the tiller handle and the throttle cable assembly.



1. Bolts (2)
2. Tiller handle cover

001726

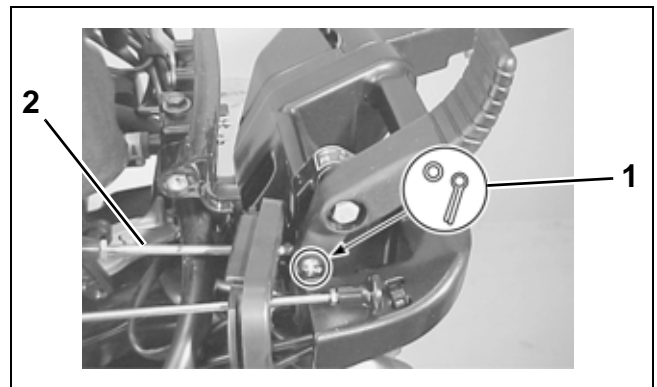
Disconnect the emergency stop switch lead wire and the engine start button lead wire.



1. Engine start button lead wire
2. Emergency stop switch lead wire

001727

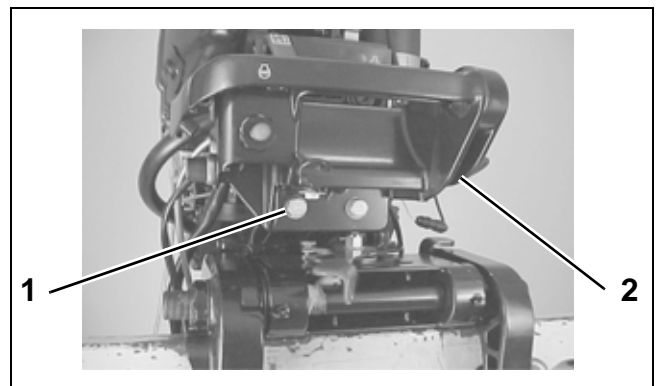
Remove the cotter pin and the washer, then disconnect the shift lever link from the shift handle.



1. Cotter pin and washer
2. Shift lever link

001728

Remove two (2) bolts and the tiller handle bracket.



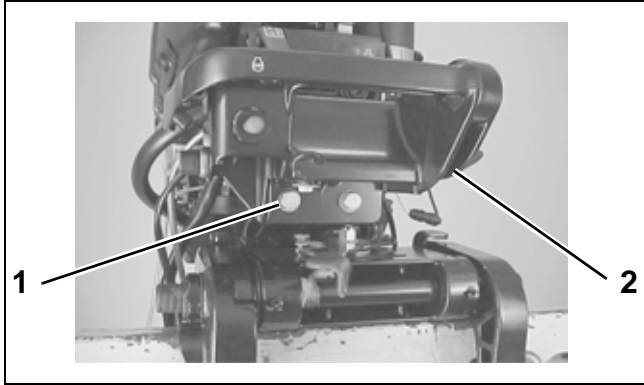
1. Bolts (2)
2. Tiller handle bracket

001729

## MIDSECTION STEERING HANDLE

### Installation

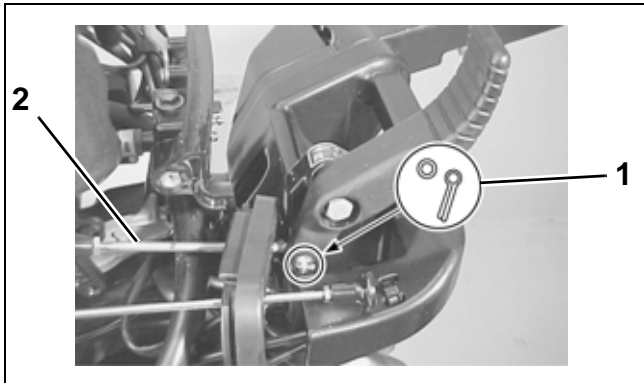
Install the tiller handle bracket. Install and tighten two (2) bolts securely.



1. Bolts (2)
2. Tiller handle bracket

001729

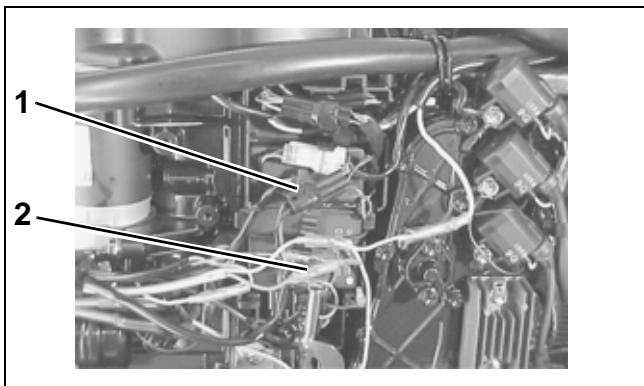
Connect the shift lever link to the shift handle by installing the washer and the cotter pin.



1. Cotter pin and washer
2. Shift lever link

001728

Connect the emergency stop switch lead wire and the engine start button lead wire.

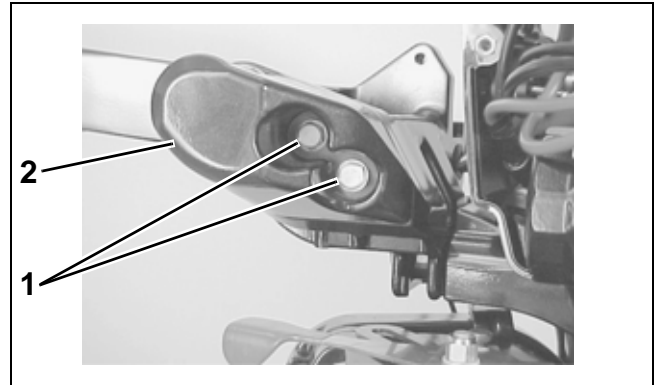


1. Engine start button lead wire
2. Emergency stop switch lead wire

001727

Install the tiller handle and the throttle cable assembly.

Install the tiller handle cover. Apply *Nut Lock* the threads of two (2) bolts. Install and tighten the bolts to a torque of 17 ft. lbs. (23 N·m).

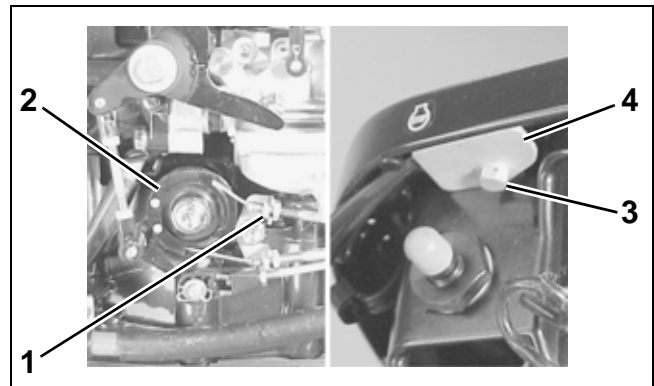


1. Bolts (2)
2. Tiller handle cover

001726

Install the plate and the bolt.

To connect and adjust the throttle cables, refer to the **FUEL SYSTEM** section.



1. Locknut
2. Throttle drum
3. Blot
4. Plate

001725

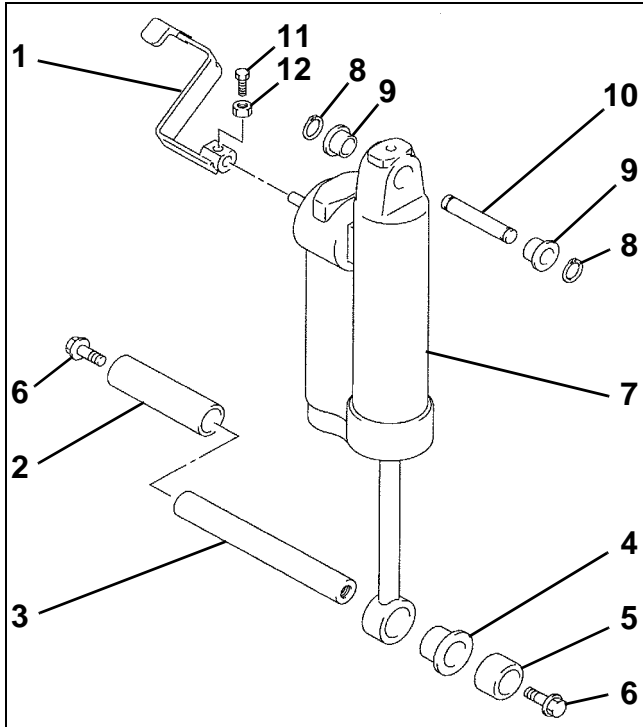
# TILT ASSIST CYLINDER



## WARNING



The tilt assist cylinder contains high pressure gas. To avoid personal injury, it must not be disassembled, punctured, incinerated, or exposed to heat.

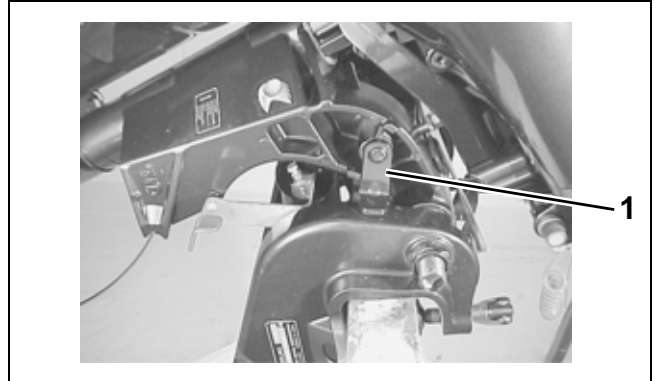


1. Release lever
2. Starboard side tilt shaft spacer
3. Tilt rod lower shaft
4. Tilt rod lower bushing
5. Port side tilt shaft spacer
6. Tilt rod shaft bolt (2)
7. Title assist cylinder
8. Retaining ring
9. Tilt shaft upper bushing
10. Tilt cylinder upper shaft
11. Bolt
12. Nut

001756

## Removal

Raise the engine to the full tilt position and lower the manual tilt lock levers.



1. Manual tilt lock lever (2)

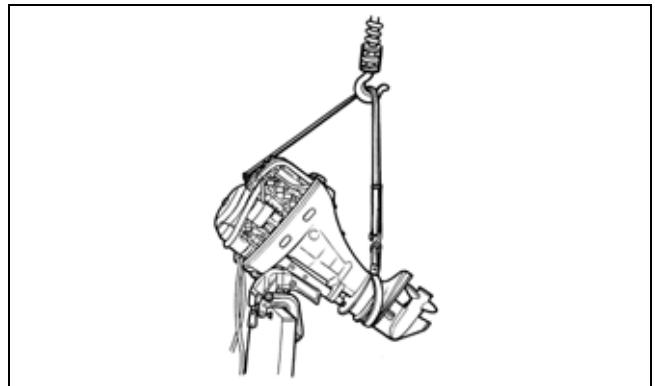
001749



## WARNING



During service, the outboard may drop unexpectedly. To avoid personal injury, always support the outboard's weight with a suitable hoist.



001731

## MIDSECTION

### TILT ASSIST CYLINDER

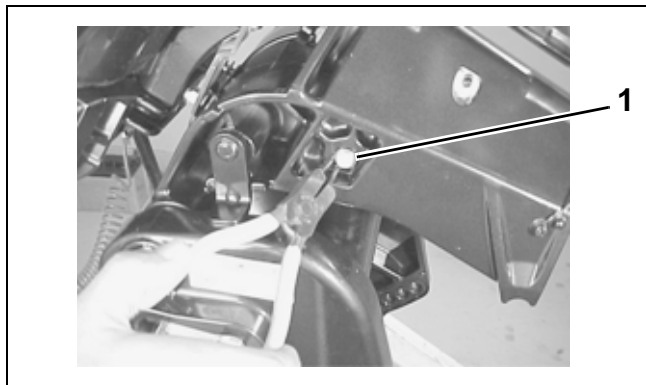


#### WARNING



When removing or installing any type of retaining rings, wear eye protection to avoid personal injury.

Remove the two (2) retaining rings, then push out the tilt cylinder upper shaft and the bushings.



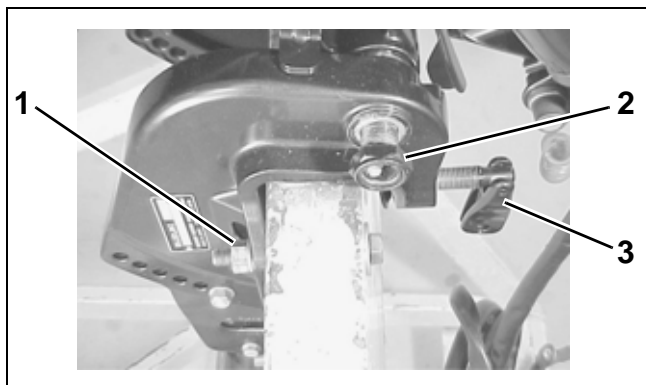
1. Tilt cylinder upper shaft

001750

Remove the two (2) starboard stern bracket nuts and bolts.

Loosen the starboard clamp screw and the tilt tube nut.

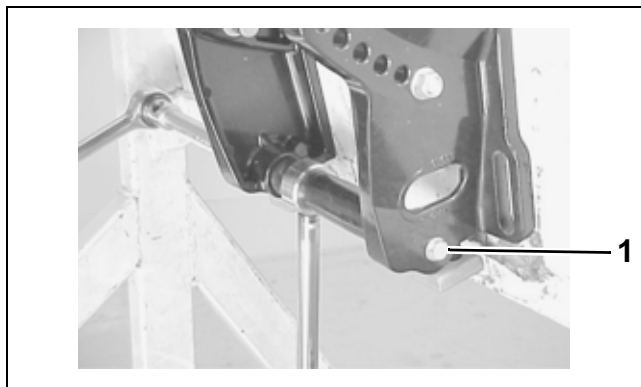
**IMPORTANT:** Complete removal of the tilt tube nut is not required. The nut should only be loosened as far as the end of the shaft threads to facilitate removal of the PTT unit.



1. Stern bracket nut (2)  
2. Starboard clamp screw  
3. Tilt tube nut

001751

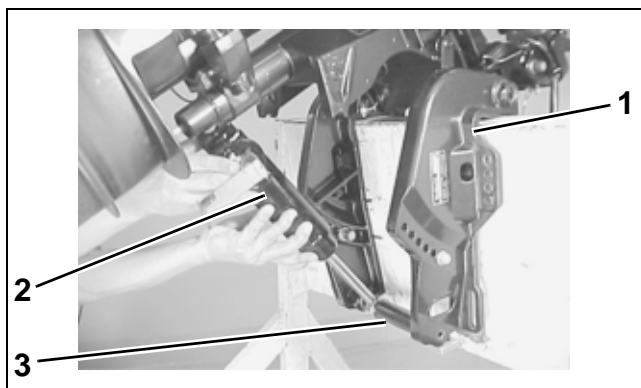
Remove the tilt cylinder lower shaft bolts.



1. Tilt rod lower shaft bolt (2)

001752

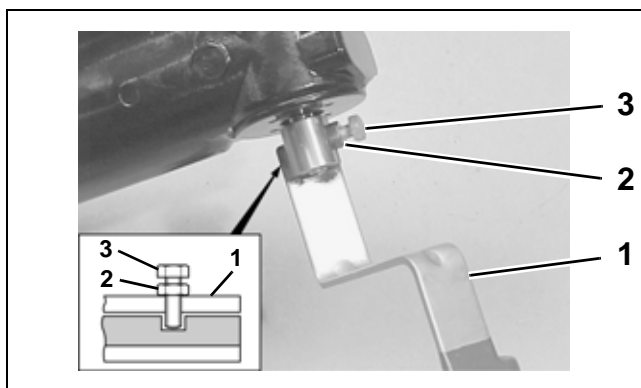
Slide the starboard stern bracket fully outward to the right side. Remove the tilt assist cylinder, the lower shaft, the bushing, and the spacers from between the stern brackets.



1. Starboard stern bracket  
2. Tilt assist cylinder  
3. Lower shaft

001753

If necessary, loosen the locknut, then remove the bolt and the release lever.

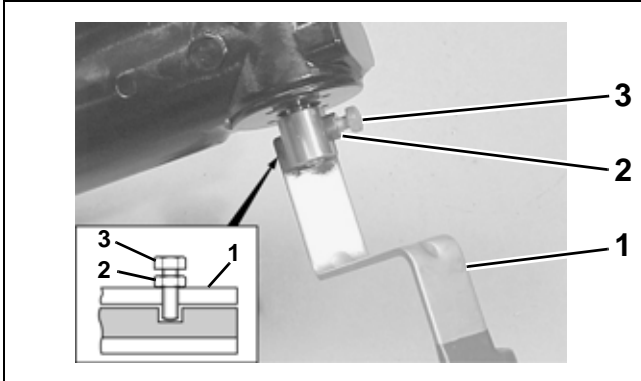


1. Release lever  
2. Locknut  
3. Bolt

001757

## Installation

If removed, install the release lever, the bolt, and the locknut as shown. Tighten the bolt and the locknut securely.

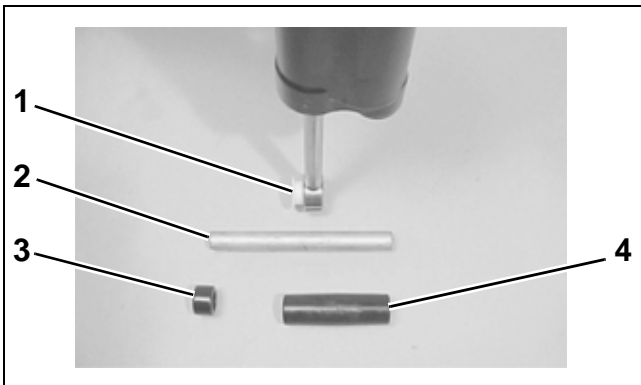


1. Release lever
2. Locknut
3. Bolt

001757

Apply *Triple-Guard* grease to the lower bushing and the tilt cylinder lower shaft.

Install the bushings, the lower shaft, and the spacers to the tilt assist cylinder.



1. Bushing
2. Tilt cylinder lower shaft
3. Port side tilt shaft spacer
4. Starboard side tilt shaft spacer

001758

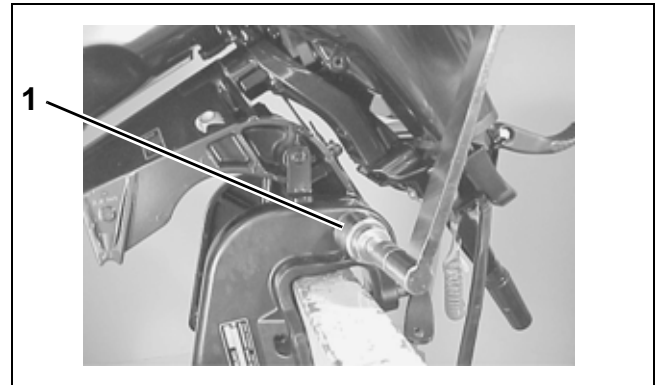
Place the tilt assist cylinder and lower shaft in position between the stern brackets.



1. Starboard stern bracket
2. Tilt assist cylinder
3. Lower shaft

001753

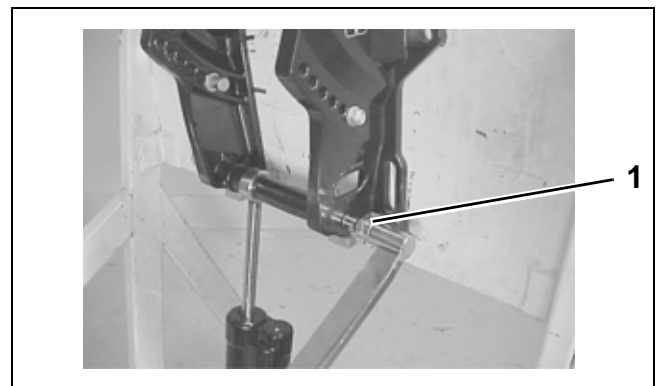
Tighten the tilt tube nut to a torque of 32 ft. lbs. (43 N·m).



1. Clamp bracket shaft nut

001759

Apply *Nut Lock* to the threads of the tilt rod lower shaft bolts. Install and tighten the bolts to a torque of 17 ft. lbs. (23 N·m).



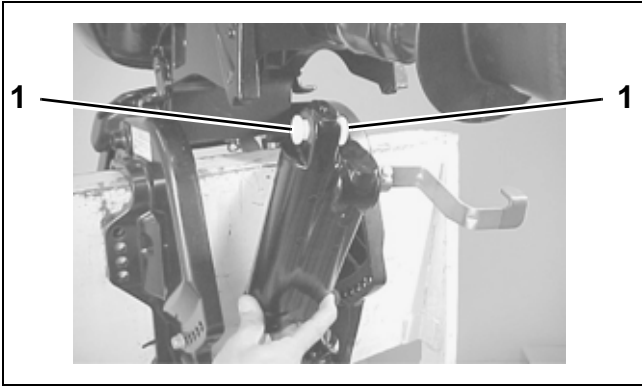
1. Tilt rod lower shaft bolt (2)

001760

## MIDSECTION

### TILT ASSIST CYLINDER

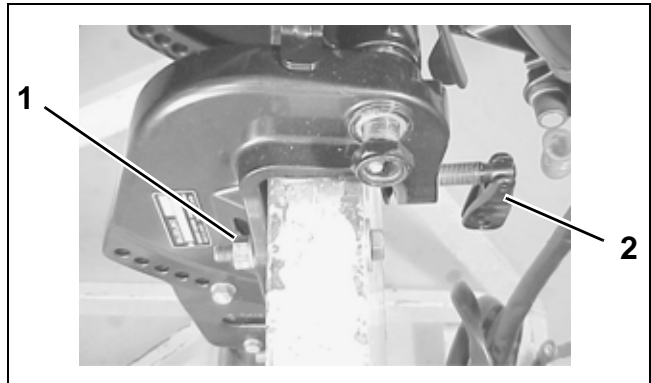
Apply *Triple-Guard* grease to the tilt shaft upper bushings, then install the bushing in the tilt assist cylinder as shown.



1. Tilt shaft upper bushings (2)

001761

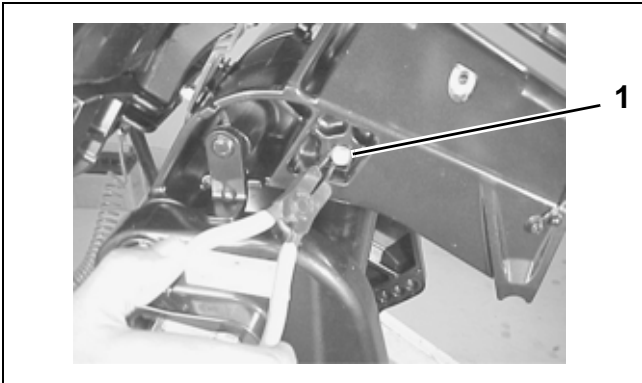
Install the two (2) bolts and the starboard stern bracket nuts. Tighten the starboard clamp screw.



1. Stern bracket nut (2)
2. Starboard clamp screw

001751

Apply *Triple-Guard* grease to tilt cylinder upper shaft. Align the upper eyelet of the tilt assist cylinder with the hole in the swivel bracket, then insert the upper shaft. Secure the upper shaft with two (2) retaining rings.



1. Tilt cylinder upper shaft

001750



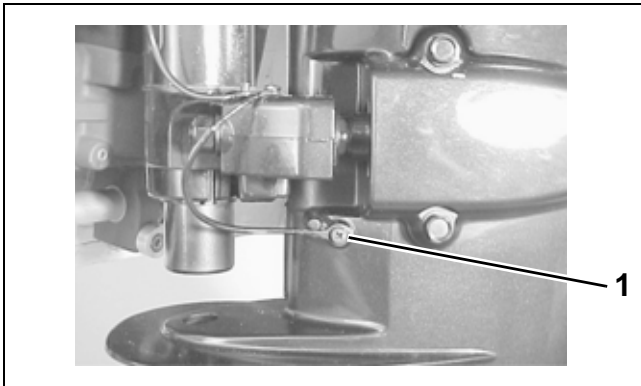
# EXHAUST HOUSING AND OIL PAN

## Removal

Remove the powerhead. Refer to the **POWER-HEAD** section.

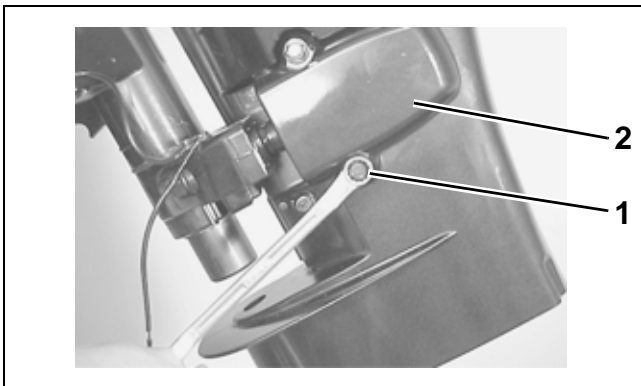
Remove the gearcase. Refer to the **GEARCASE** section.

Remove the screw and the bonding wire from the exhaust housing.



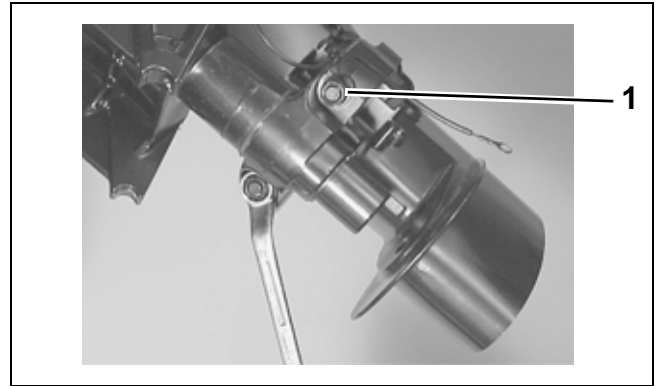
1. Bonding wire 001762

Unscrew the bolts and remove the lower mount covers from the starboard and port sides.



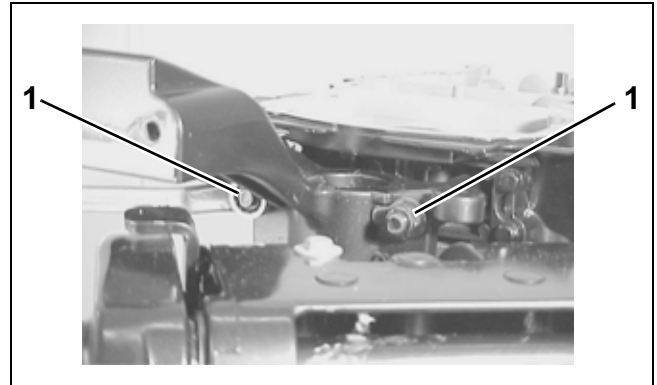
1. Bolts  
2. Lower mount cover (2) 001763

Remove two (2) lower mount nuts and washers.



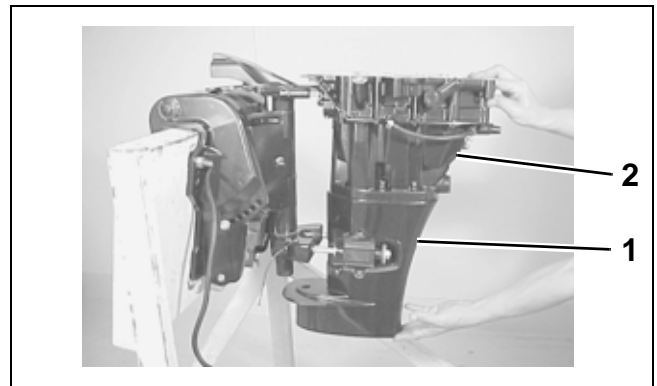
1. Lower mount nuts (2) 001764

Remove two (2) upper mount nuts and washers.



1. Upper mount bolts (2) 001765

Remove the exhaust housing and oil pan from the steering bracket.

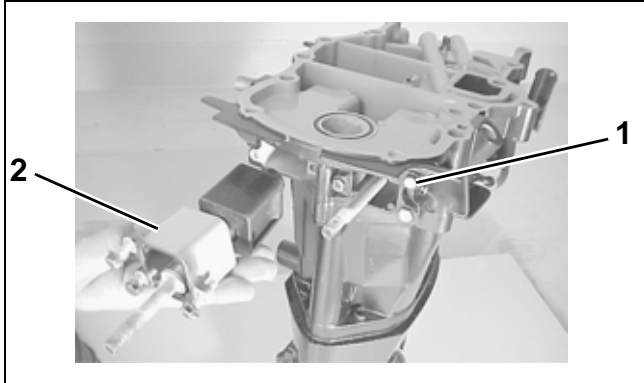


1. Exhaust housing  
2. Oil pan 001766

**MIDSECTION**  
**EXHAUST HOUSING AND OIL PAN**

**Disassembly**

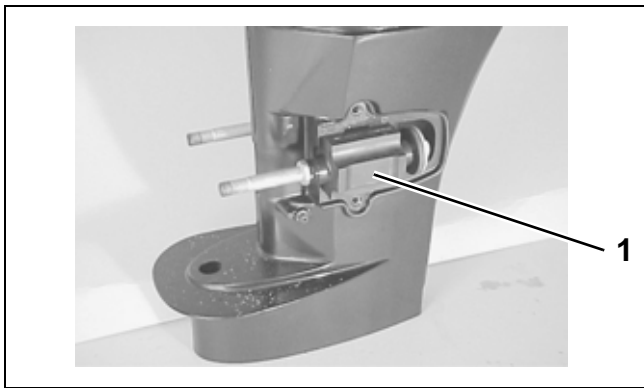
Remove three (3) bolts and the upper mount assembly (starboard and port sides).



- 1. Bolts (3)
- 2. Upper mount assembly

001767

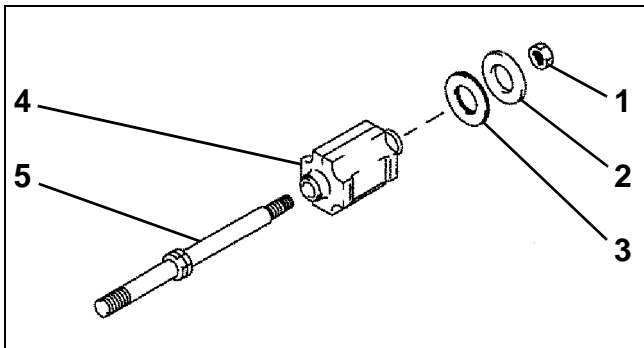
Remove both lower mount assemblies.



- 1. Lower mount assembly (2)

001768

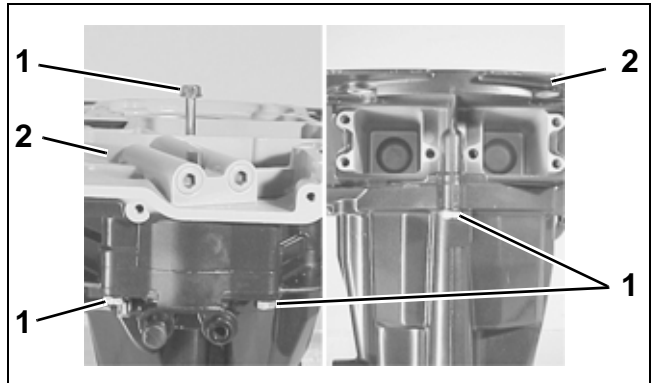
If necessary, disassemble the lower mounts by removing the nut, the washer, the lower mount stop, and the lower mount from the bolt.



- 1. Nut
- 2. Washer
- 3. Lower mount stop
- 4. Lower mount
- 5. Bolt

001778

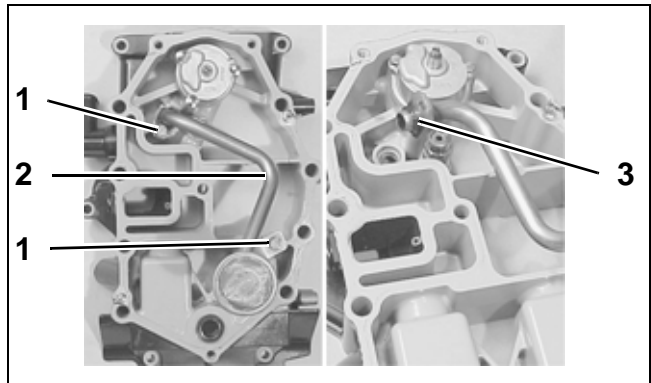
Remove four (4) bolts and the engine holder from the top of the oil pan.



- 1. Bolts (4)
- 2. Engine holder

001769

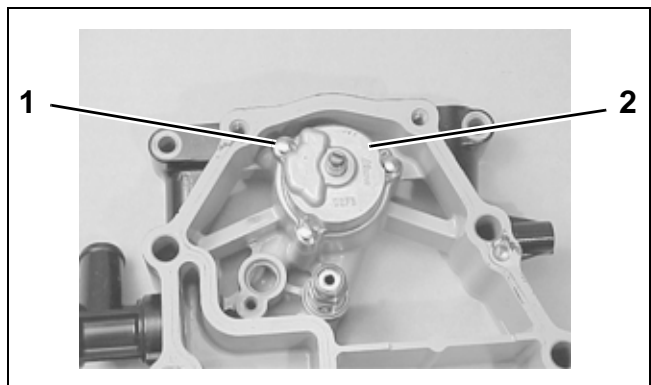
Remove two (2) bolts and the oil strainer. Note the position of the O-ring on the strainer, then remove the O-ring.



- 1. Bolts (2)
- 2. Oil strainer
- 3. O-ring

001770

Remove three (3) bolts and the oil pump assembly.

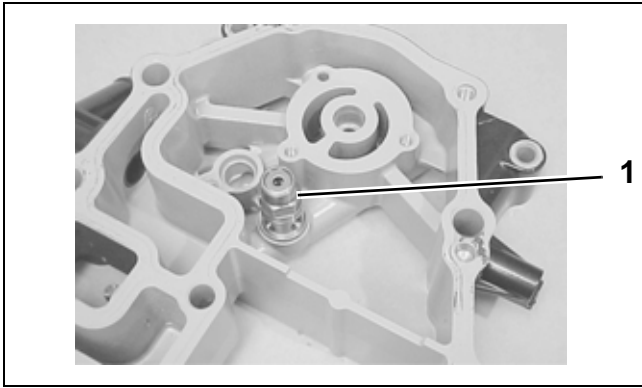


- 1. Bolts (3)
- 2. Oil pump assembly

001771

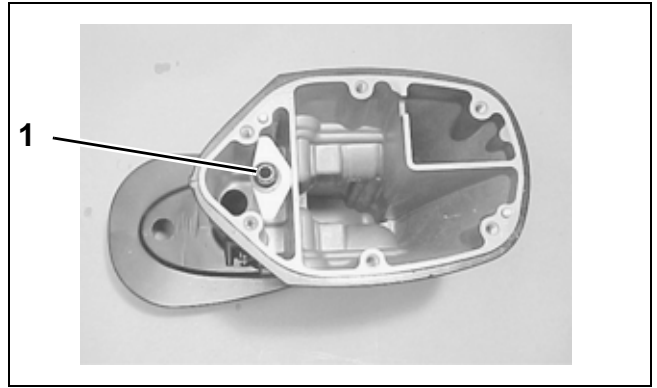
## MIDSECTION EXHAUST HOUSING AND OIL PAN

Remove the oil relief valve.



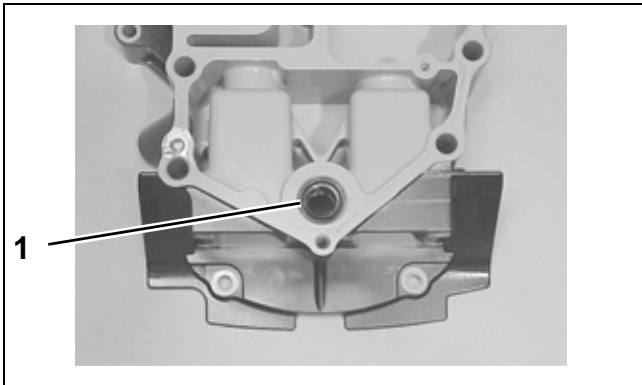
1. Oil relief valve 001772

Remove the water tube from the exhaust housing.



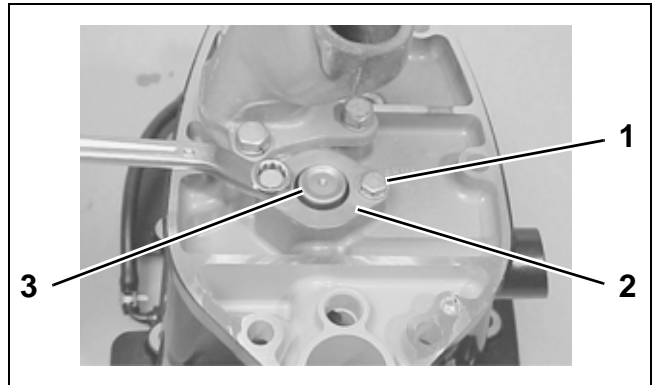
1. Water tube 001774

Use an oil seal remover to remove the driveshaft oil seal from the engine holder.



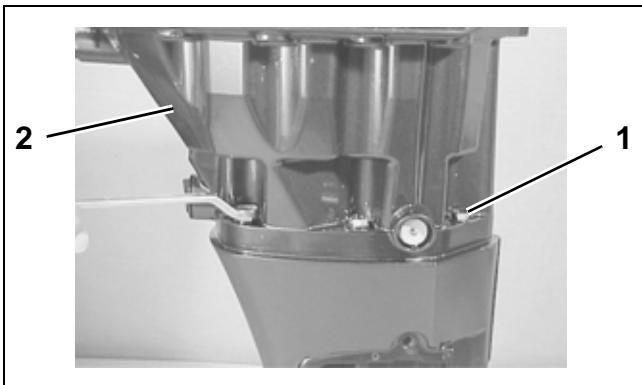
1. Oil seal 001780

Remove two (2) bolts, the valve cover, and the water pressure valve.



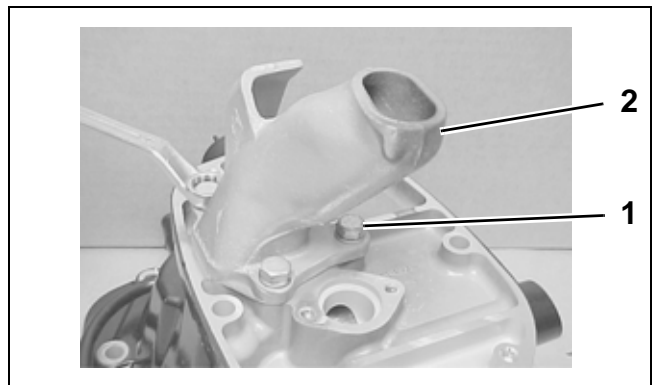
1. Bolts (2)  
2. Valve cover  
3. Water pressure valve 001775

Remove six (6) bolts. Separate the oil pan from the exhaust housing.



1. Bolts (6)  
2. Oil pan 001773

Remove three (3) bolts and the exhaust tube.



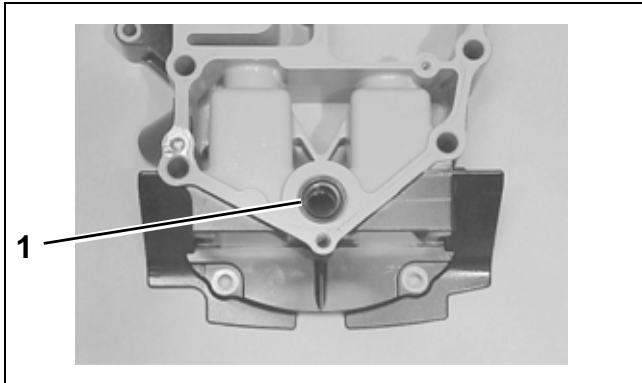
1. Bolts (3)  
2. Exhaust tube 001776

## MIDSECTION EXHAUST HOUSING AND OIL PAN

### Assembly

Use an oil seal installer to install a **new** driveshaft oil seal in the engine holder. Make sure that the lip of the oil seal is facing downward.

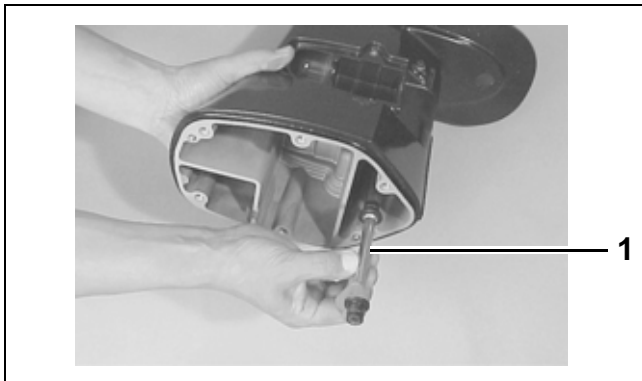
After installation, apply *Triple-Guard* grease to the oil seal lip.



1. Oil seal

001780

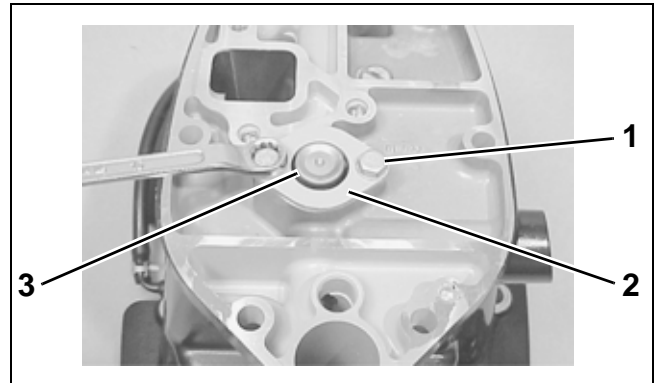
Install the water tube in the exhaust housing.



1. Water tube

001785

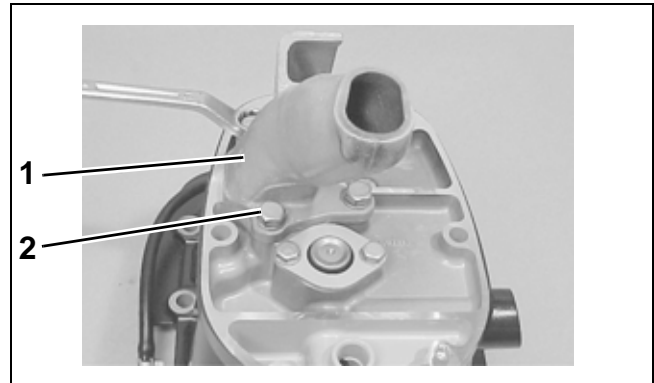
Install the water pressure valve and the valve cover. Install and tighten the bolts securely.



1. Bolts (2)
2. Valve cover
3. Water pressure valve

001775

Install a **new** gasket and the exhaust tube. Install and tighten the bolts securely.



1. Exhaust tube
2. Bolts (3)

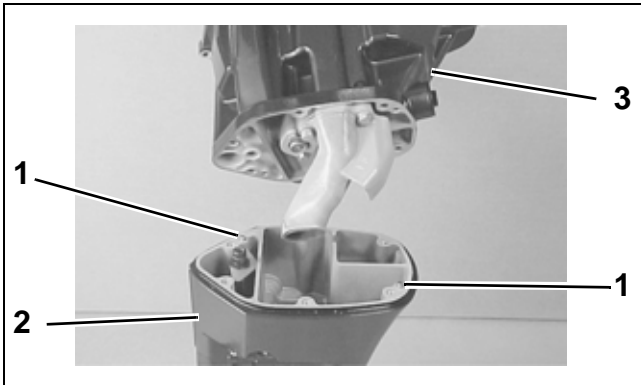
001786

Install two (2) dowel pins to the exhaust housing.

Apply *Gasket Sealing Compound* to the mating surfaces of the exhaust housing and the oil pan.

## MIDSECTION EXHAUST HOUSING AND OIL PAN

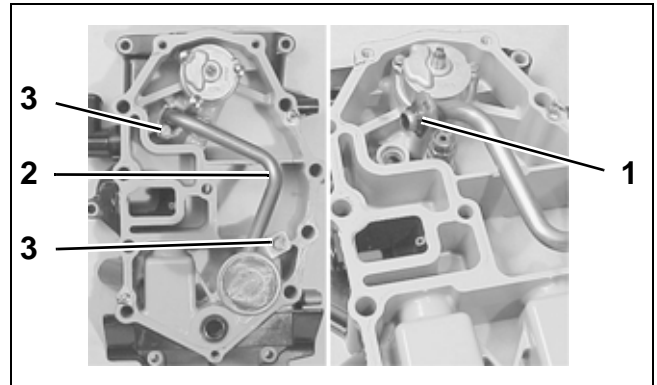
Install the oil pan to the exhaust housing. Install and tighten six (6) bolts securely.



1. Dowel pins (2)
2. Exhaust housing
3. Oil pan

001787

Install the oil strainer to the engine holder. Install and tighten the bolts securely.

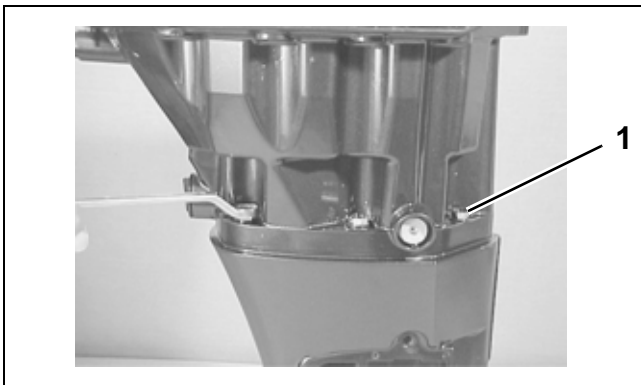


1. O-ring
2. Oil strainer
3. Bolts (2)

001770

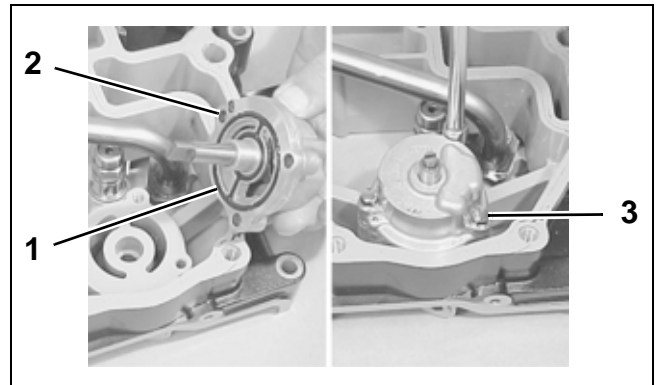
Apply engine oil to a **new** seal, then install the seal on the oil pump.

Install the oil pump to the engine holder. Install and tighten the bolts securely.



1. Bolts (6)

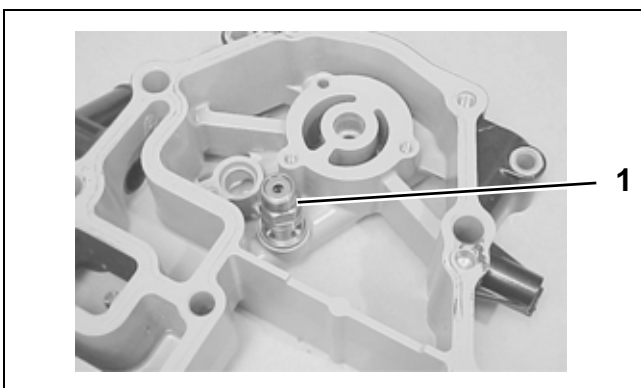
001773



1. Seal
2. Oil pump
3. Bolts (3)

001788

Install a **new** gasket and the oil relief valve to the engine holder. Tighten the relief valve to a torque of 20 ft. lbs. (27 N·m).



1. Oil relief valve

001772

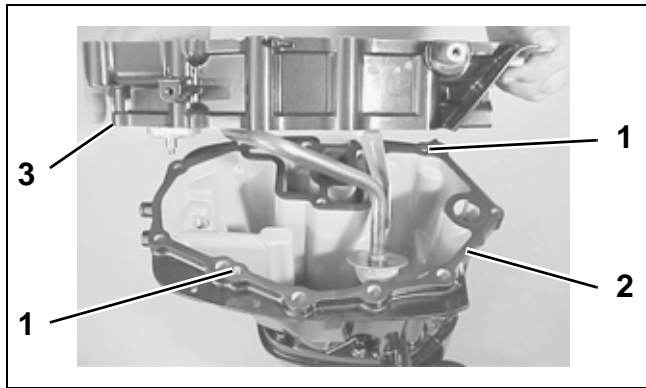
Install two (2) dowel pins and a **new** gasket on the oil pan.

Apply engine oil to a **new** O-ring, then install the O-ring on the oil strainer.

## MIDSECTION

### EXHAUST HOUSING AND OIL PAN

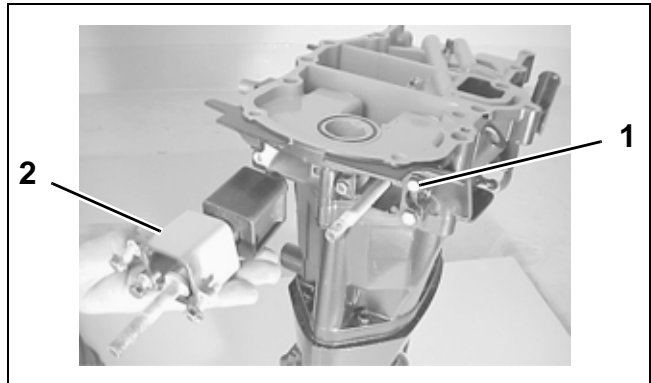
Install the engine holder to the oil pan.



1. Dowel pins (2)
2. Gasket
3. Engine holder

001789

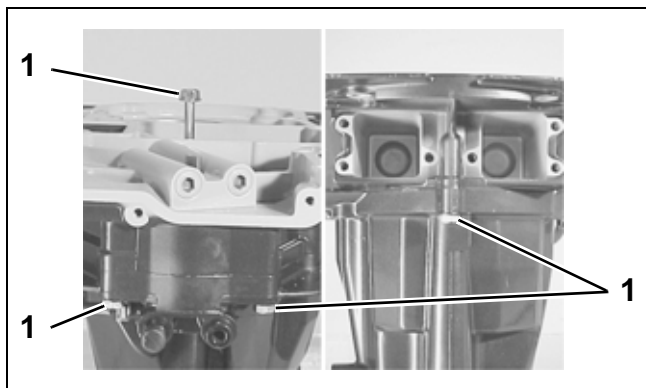
Apply *Nut Lock* to three (3) bolts. Install and tighten the bolts to a torque of 88 in. lbs. (10 N·m).



1. Bolts (3)
2. Upper mount assembly

001767

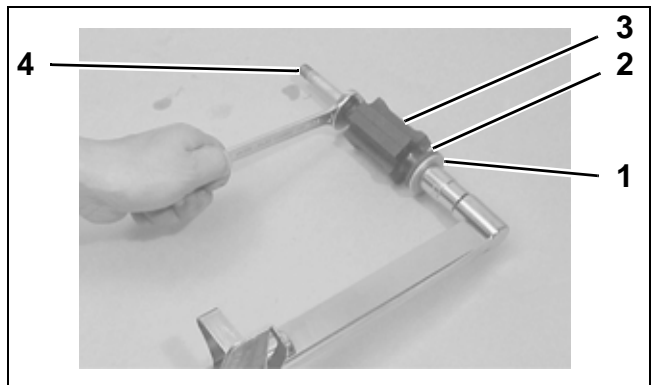
Install and tighten four (4) bolts to a torque of 17 ft. lbs. (23 N·m).



1. Bolts (4)

001769

If the lower mounts are disassembled, place the washer, the damper, and the lower mount on the bolt. Apply *Nut Lock* to the threads of the lower mount rear nut. Install and tighten the nut to a torque of 29 ft. lbs. (40 N·m).



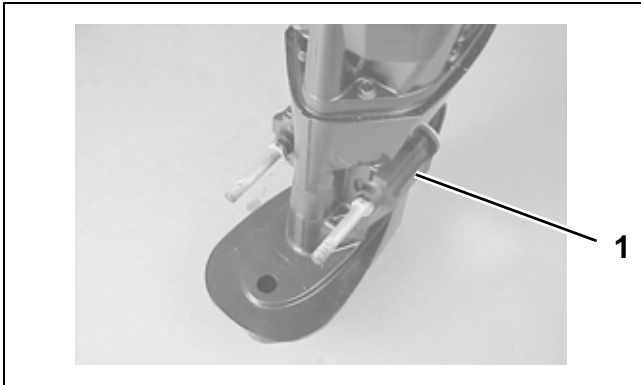
1. Washer
2. Damper
3. Lower mount
4. Lower mount bolt

001790

Install both upper mount assemblies to the engine holder. Make sure that the arrow on the upper mount is pointing upward.

Install the lower mounts and the covers on the exhaust housing. Make sure that the arrow on the lower mount is pointing upward.

At this time, tighten the bolts only finger tight to temporarily hold the covers in place.



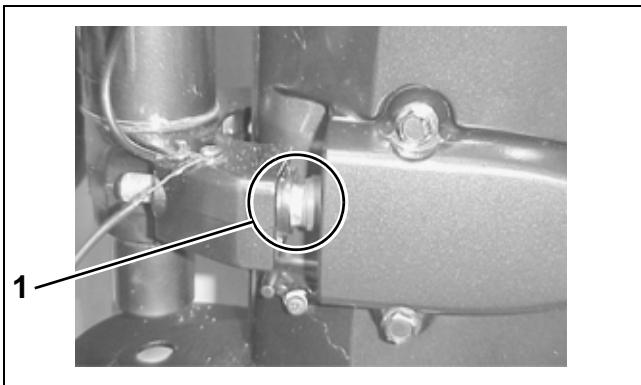
1. Lower mount (2)

001791

### Installation

Install the exhaust housing and oil pan to the steering bracket.

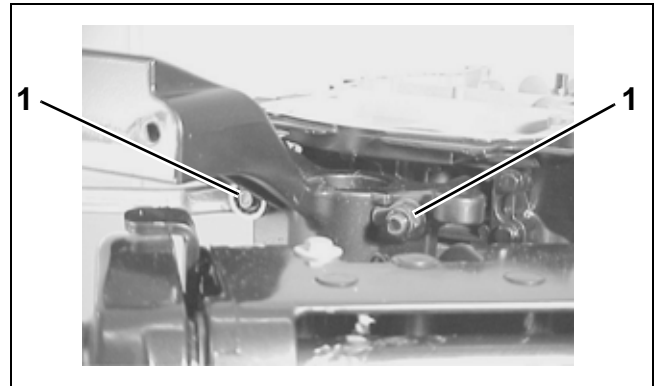
**IMPORTANT:** When installing the exhaust housing / oil pan assembly, be sure lower mount hex head bolt properly fits into the lower mount bracket groove.



1. Hex head bolt in groove

001792

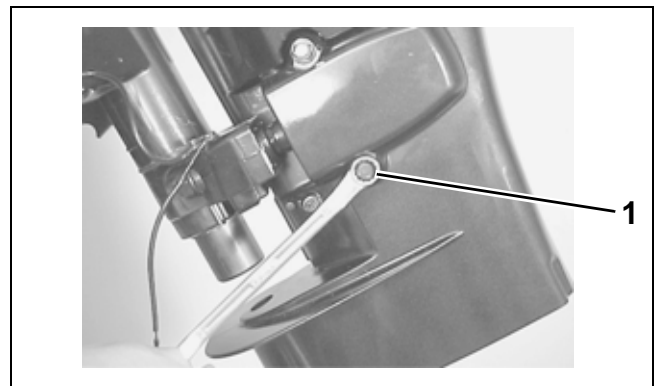
Apply *Nut Lock* to the threads of the upper mount nuts. Install and tighten the upper mount nuts to a torque of 26 ft. lbs. (35 N·m).



1. Upper mount bolts (2)

001765

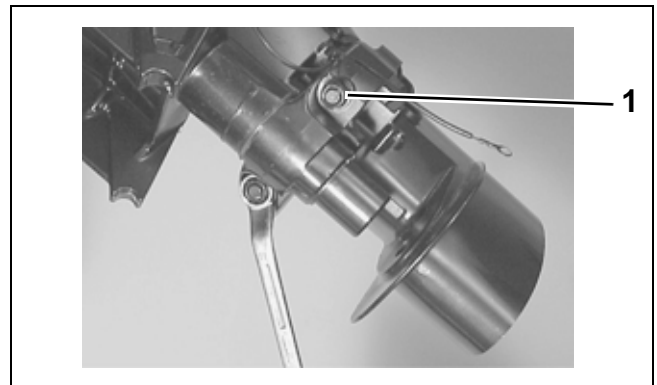
Tighten the bolts for both lower mount covers securely.



1. Bolts (2)

001763

Apply *Nut Lock* to the threads of the lower mount front nuts. Install and tighten the lower mount front nuts to a torque of 44 ft. lbs. (60 N·m).



1. Lower mount nuts (2)

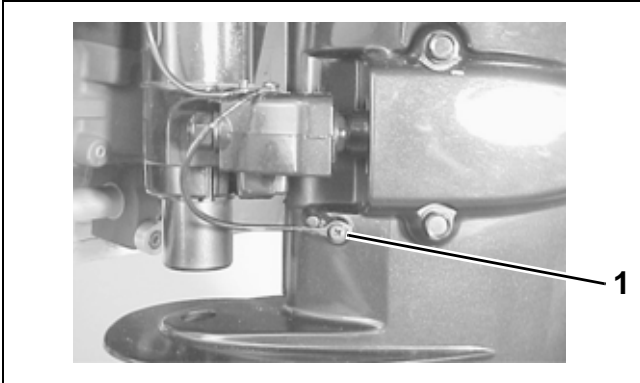
001764

## MIDSECTION

### STERN BRACKETS, STEERING ARM, AND SWIVEL BRACKET

**IMPORTANT:** An insulation washer must be installed between the bonding wire terminal and the exhaust housing.

Attach the bonding wire to the exhaust housing. Tighten the screw securely.



1. Bonding wire

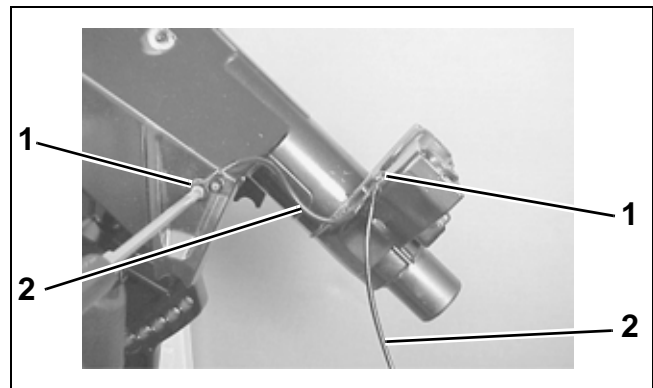
001762

## STERN BRACKETS, STEERING ARM, AND SWIVEL BRACKET

### Removal

Remove the exhaust housing and the oil pan. Refer to "EXHAUST HOUSING AND OIL PAN" on page 181.

Remove the screws and the bonding wires from the stern bracket and the lower mount bracket.



1. Screws  
2. Bonding wires

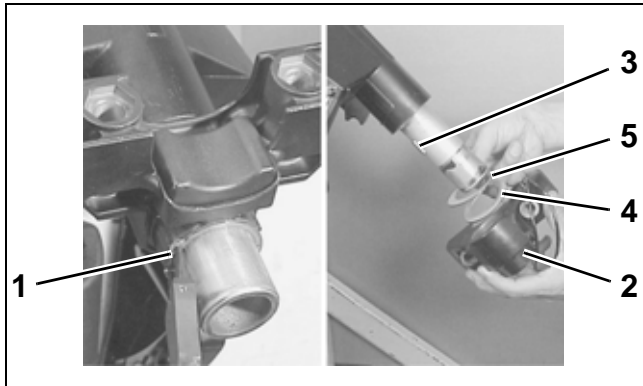
001793

**IMPORTANT:** Before removing the lower mount bracket, use sandpaper to tear the black paint off the lower portion of the pilot shaft for easier removal.



STERN BRACKETS, STEERING ARM, AND SWIVEL BRACKET

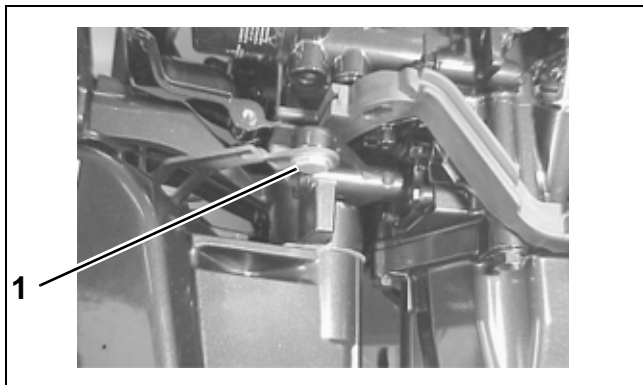
Remove the retaining ring, then slide the lower mount bracket from the steering shaft. Remove the key, the shim, and the washer.



1. Retaining ring
2. Lower mount bracket
3. Key
4. Shim
5. Washer

001794

**Tiller handle models only:** Remove the bolt that secures the steering adjuster plate to the steering bracket.



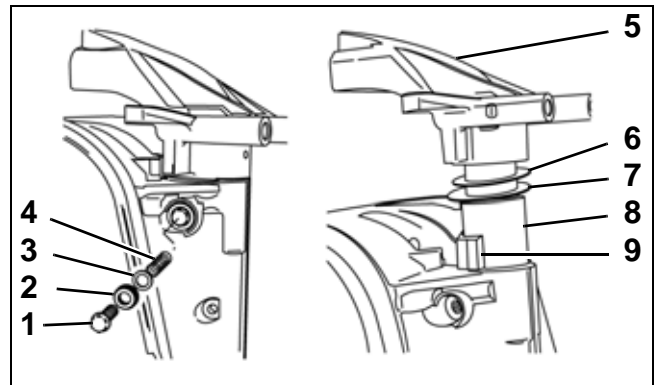
1. Bolt

001795

Remove the steering adjuster bolt, the cover, the washer, and the spring.

Lift the steering arm upward to remove it from the swivel bracket.

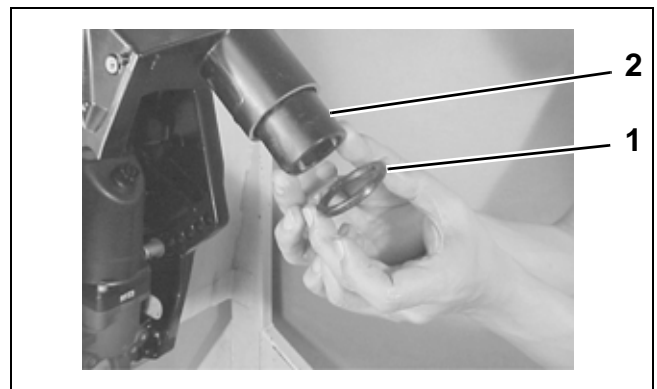
Remove the washer, the plate, the upper bushing, and the steering adjuster from the steering arm.



1. Steering adjuster bolt
2. Cover
3. Washer
4. Spring
5. Steering arm
6. Washer
7. Plate
8. Upper bushing
9. Steering adjuster

001796

Remove the steering arm seal and the lower bushing.



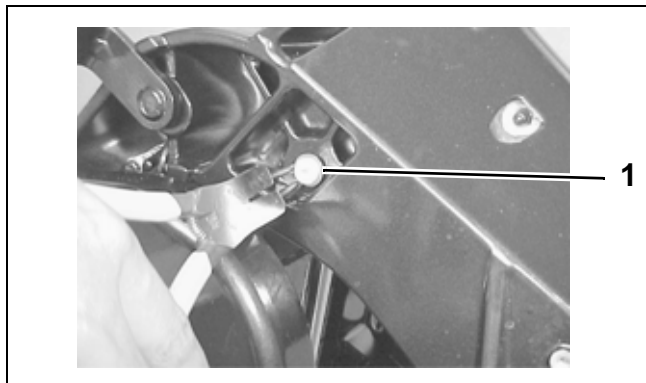
1. Steering arm seal
2. Lower bushing

001797

## MIDSECTION

### STERN BRACKETS, STEERING ARM, AND SWIVEL BRACKET

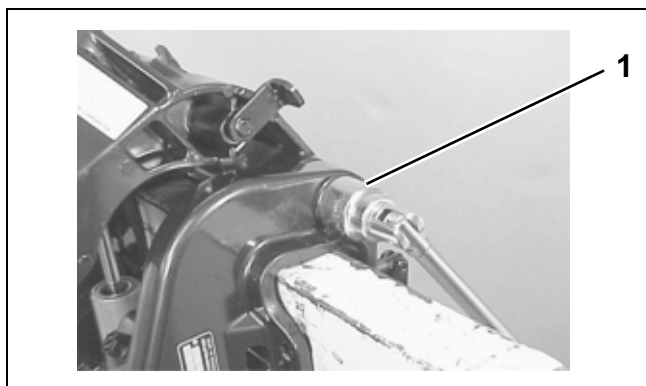
Remove the retaining ring and push out the tilt cylinder upper rod.



1. Tilt cylinder upper rod

001798

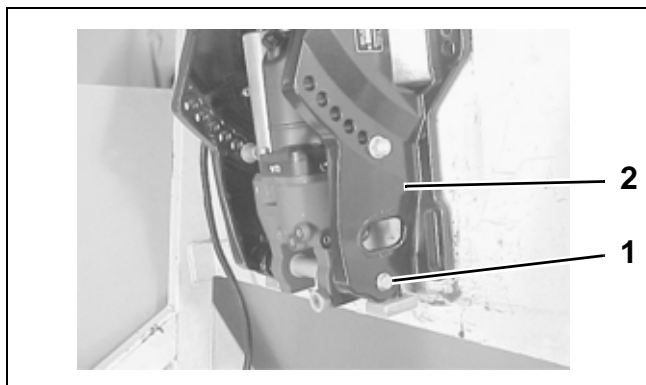
Remove the tilt tube nut from the stern bracket.



1. Tilt tube nut

001799

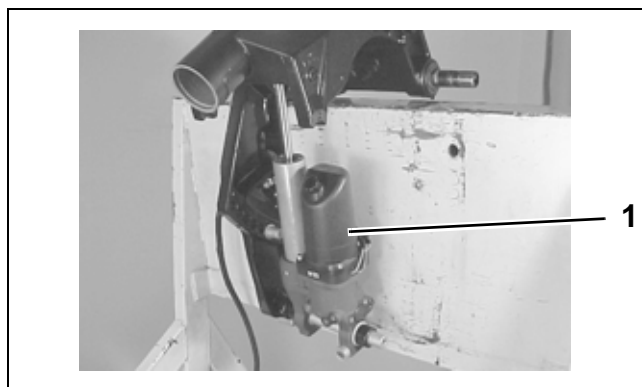
Remove the lower shaft bolts. Slide the stern bracket off the shaft.



1. Lower shaft bolts (2)  
2. Stern bracket

001800

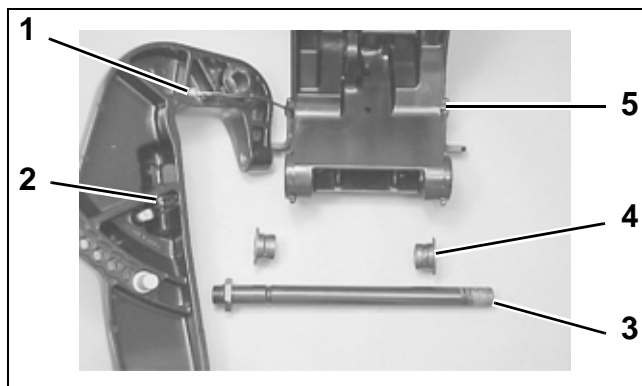
Remove the PTT unit (or tilt assist cylinder).



1. PTT unit (or tilt assist cylinder)

001801

Remove the bonding wire from the port side stern bracket. Pull the stern bracket outward to remove it and the tilt tube from the swivel bracket. Remove the bushings from each side of the swivel bracket.



1. Bonding wire  
2. Stern bracket (port side)  
3. Tilt tube  
4. Bushings (2)  
5. Swivel bracket

001802

## Installation

**IMPORTANT:** An insulation washer must be installed between the bonding wire terminal and the stern bracket.

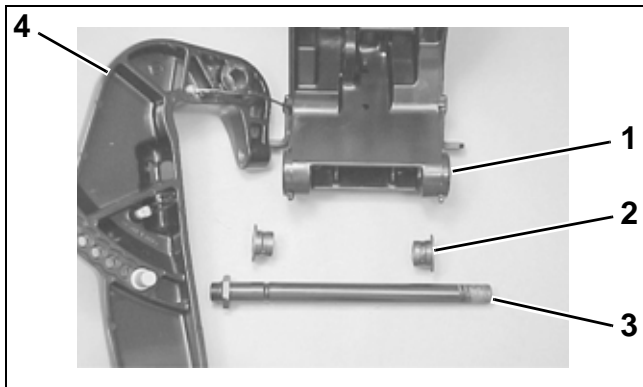
Attach the bonding wire to the port side stern bracket. Tighten the screw securely.

Apply *Triple-Guard* grease to the tilt tube and the bushings. Insert both bushings into the swivel bracket.

Install the stern brackets and the tilt tube to the swivel bracket.

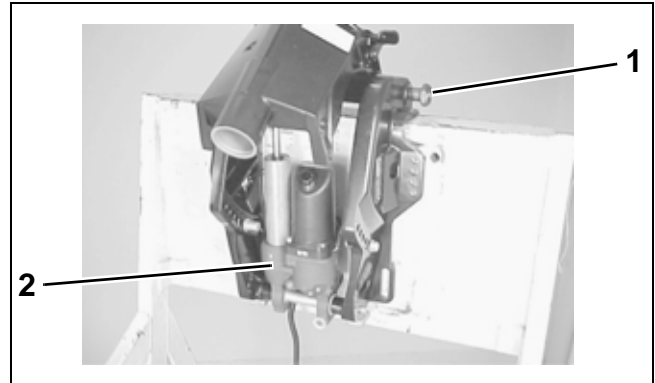
Install the tilt tube nut. Leave the nut loose for easier installation of the PTT unit (or the tilt assist cylinder).

Install the PTT unit (or the tilt assist cylinder) between the stern brackets. Tighten the tilt tube nut to a torque of 32 ft. lbs. (43 N·m).



1. Swivel bracket
2. Bushings (2)
3. Tilt tube
4. Stern bracket

001802

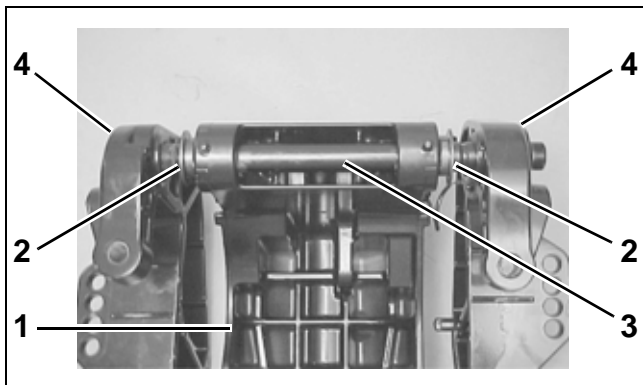


1. Tilt tube nut
2. PTT unit (or tilt assist cylinder)

001811

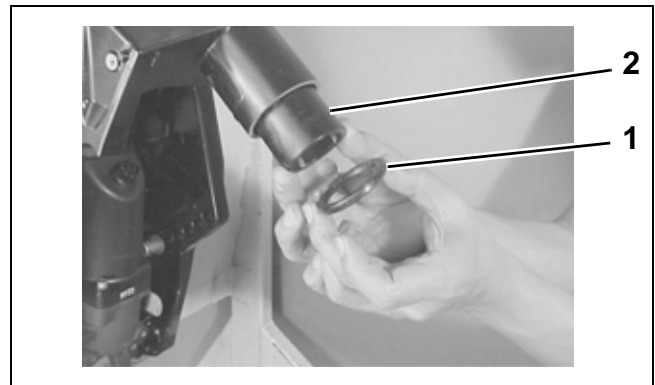
Install the lower bushing (tapered end first) and the steering arm seal in the swivel bracket. Make sure that the lip of the seal is facing outward.

After installation, apply *Triple-Guard* grease to the seal lip.



1. Swivel bracket
2. Bushings (2)
3. Tilt tube
4. Stern bracket

001810



1. Steering arm seal
2. Lower bushing

001797

## MIDSECTION

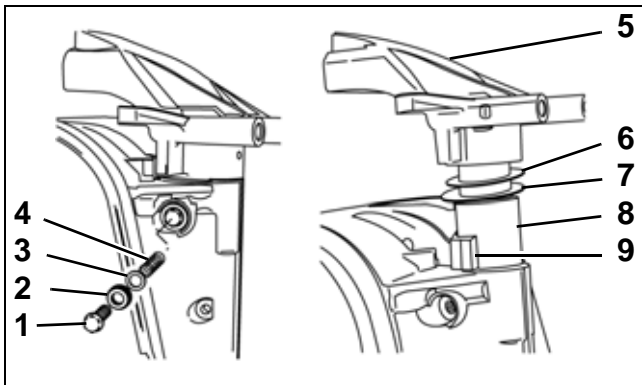
### STERN BRACKETS, STEERING ARM, AND SWIVEL BRACKET

Apply *Triple-Guard* grease to the upper bushing. Install the upper bushing (tapered end first), the steering adjuster, the plate, and the washer in the swivel bracket.

**IMPORTANT:** Make sure the steering adjuster is installed between the upper bushing and the swivel bracket.

Install the spring, the washer, the cover, and the steering adjuster bolt.

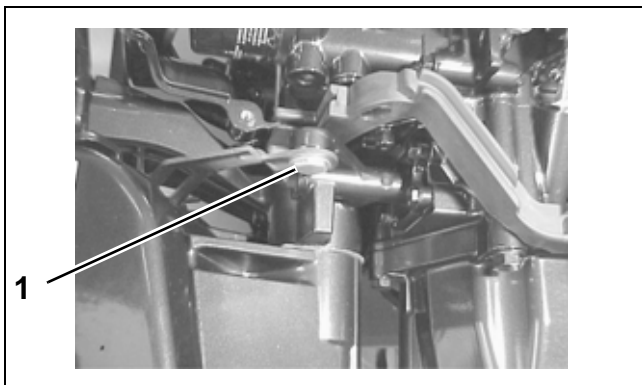
Apply *Triple-Guard* grease to the steering arm shaft. Slide the steering arm into the swivel bracket.



1. Steering adjuster bolt
2. Cover
3. Washer
4. Spring
5. Steering arm
6. Washer
7. Plate
8. Upper bushing
9. Steering adjuster

001796

**Tiller handle models only:** Install the bolt that secures the steering adjuster plate to the steering bracket.

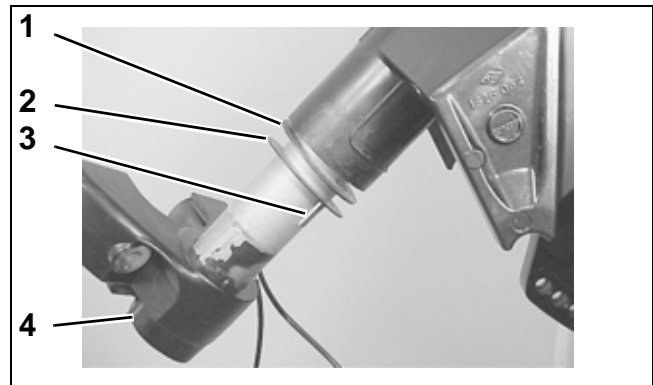


1. Bolt

001795

Install the washer and the shim, then insert the key into the groove on the steering arm shaft.

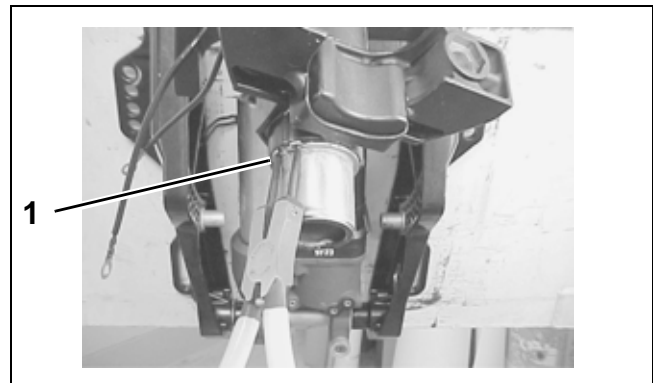
Align the key with the channel in the lower mount bracket, then install the lower mount bracket.



1. Washer
2. Shim
3. Key
4. Lower mount bracket

001813

Install the retaining ring to secure the steering arm to the swivel bracket.



1. Retaining ring

001814

**IMPORTANT:** An insulation washer must be installed between the bonding wire terminals and the brackets.

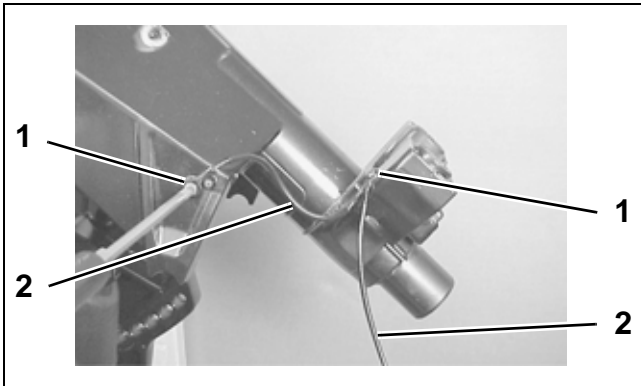
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**MIDSECTION**

**STERN BRACKETS, STEERING ARM, AND SWIVEL BRACKET**

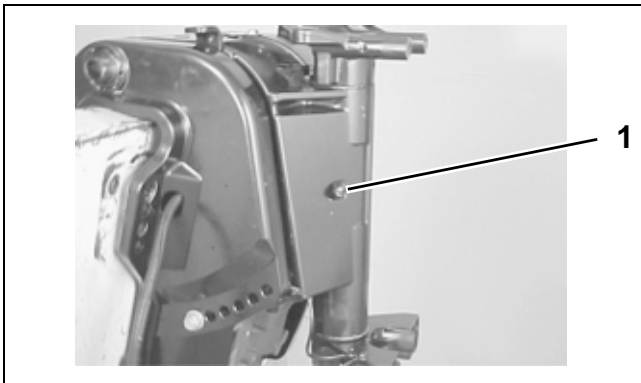
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Attach the bonding wires to the swivel bracket and the lower mount bracket. Tighten the screws securely.

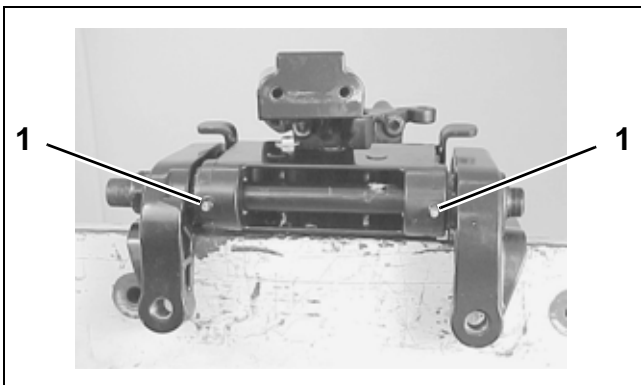


- 1. Screws 001793
- 2. Bonding wires

Apply *Triple-Guard* grease through each grease nipple.



- 1. Grease nipple 001816



- 1. Grease nipple 001817

