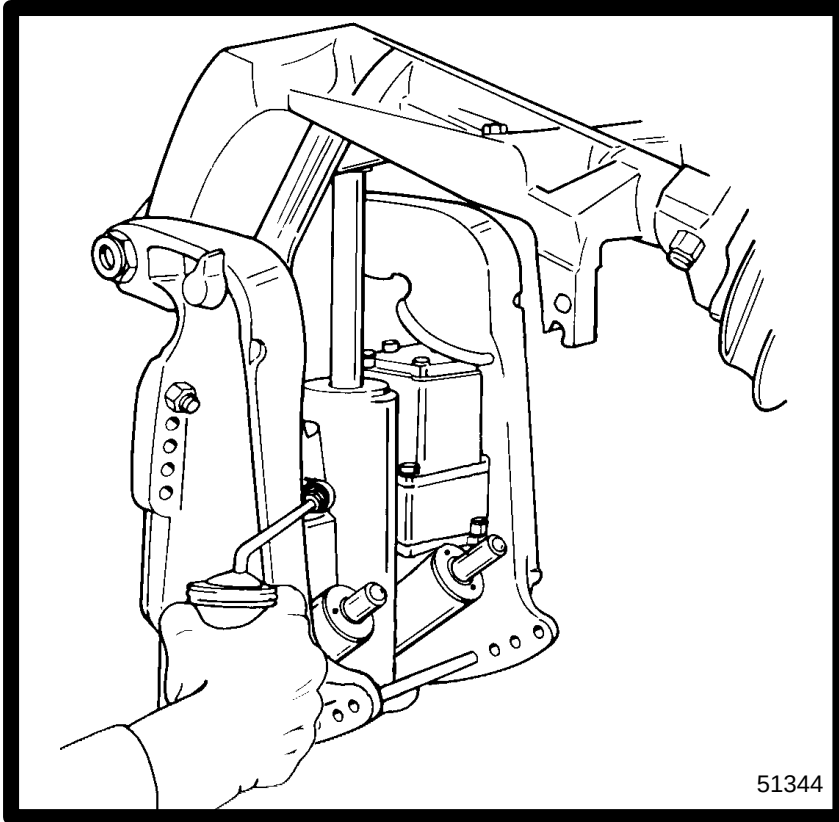




POWER TRIM



**DESIGN II
(AFT FILL RESERVOIR)**

6

B



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Power Trim System

Specifications

Test	Readings
Trim "UP"	1300 PSI (91 kg/cm ²) Maximum Pressure
Trim "DOWN"	500 PSI (35 kg/cm ²) Minimum Pressure

Special Tools

Part No.	Description
91-11230	Alignment Tool
91-44486A1	Trim Rod Removal Tool
91-44487A1	Trim Rod Guide Removal Tool
91-52915A3	Power Trim Test Gauge Kit
91-11243	Adaptor Fitting
91-74951	Spanner Wrench
91-99750	Multi-Meter DVA Tester

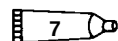
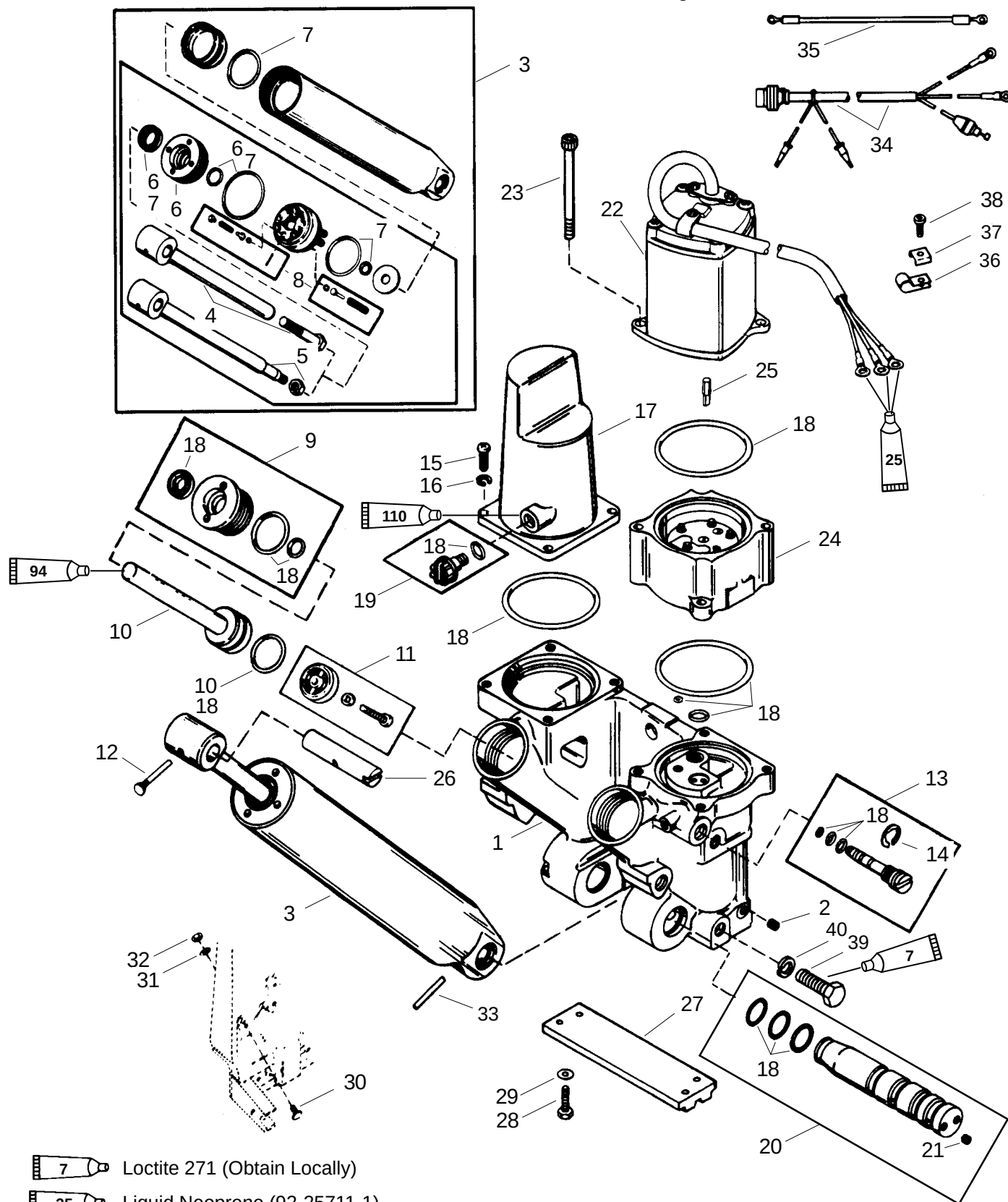
Quicksilver Lubricants and Service Aids

Part No.	Description
91-90100A12	Power Trim and Steering Fluid
Obtain Locally	Loctite 271
91-25711-1	Liquid Neoprene
91-78376A6	Anti-Corrosion Grease

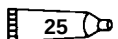


Power Trim Components

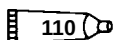
NOTE: All O-rings - Lubricate with Power Trim and Steering Fluid.



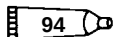
Loctite 271 (Obtain Locally)



Liquid Neoprene (92-25711-1)



Power Trim and Steering Fluid (92-90100A12)



Anti-Corrosion Grease (92-19007A24)



Power Trim Components (Continued)

REF. NO.	QUAN.	DESCRIPTION	TORQUE		
			lb. in.	lb. ft.	N·m
1	1	Manifold			
2	9	Pipe Plug			
3	1	Tilt Cylinder Assembly			
4	1	Piston Rod (Bolt Type) Design 1			
5	1	Piston Rod (Nut Type) Design 2			
6	1	Guide Kit			
7	1	O-ring Repair Kit (811607A1)			
8	1	Check Valve Kit			
9	1	Guide Assembly			
10	1	Piston and Rod Assembly (Port)			
10	1	Piston and Rod Assembly (Starboard)			
11	1	Trim Filter Assembly			
12	1	Groove Pin			
13	1	Valve Assembly			
14	1	E-ring			
15	4	Screw			
16	4	Washer			
17	1	Cover			
18	1	O-ring Kit (811612A1)			
19	1	Plug Assembly			
20	1	Shaft Assembly			
21	2	Plug Pipe			
22	1	Trim Motor			
23	2	Screw (Long)	70		7.9
23	2	Screw (Short)	70		7.9
24	1	Pump			
25	1	Driveshaft			
26	1	Shaft			
27	1	Anode Assembly			
28	2	Screw	60		6.8
29	2	Washer			
30	2	Striker Plate			
31	2	Lockwasher			
32	2	Nut	80		9.0
33	1	Groove Pin			
34	1	Control Harness, Power Trim			
35	1	Cable (6-3/8" – Red)			
35	1	Cable (24" – Red)			
35	1	Cable (2-3/4" – Red)			
36	2	Clip, Pump Wire			
37	2	C-Washer, Clip Screw			
38	2	Screw, Clip to Transom Bracket			
39	6	Screw, Manifold		30	40.7
40	6	Flatwasher, Manifold Screw			



Power Trim - General Information

Description

The Power Trim System consists of an electric motor, pressurized fluid reservoir, pump, tilt cylinder, and two trim rams.

The remote control (or trim panel) has switches that trim the outboard “Up” or “Down” and tilt the engine for “Trailing”. The outboard can be trimmed and tilted under power or when the outboard is not running.

Trimming Characteristics

NOTE: Because hull designs react differently in varying water conditions, varying the trim position will often improve the ride and boat handling. When trimming from a mid-trim position (with outboard trim tab in a straight fore and aft position), expect the following:

TRIMMING OUTBOARD “UP” (OUT):

WARNING

Excessive Trim “Out” may reduce the stability of some high speed hulls. To correct instability, reduce the power gradually and trim the outboard “In” slightly before resuming high speed operation. A rapid reduction in power will result in a sudden change of steering torque and may cause additional boat instability.

Will lift boat bow, increasing top speed.

Transfers steering torque harder to port (left) on installations above 23 in. transom height.

Increases gearcase clearance over submerged objects.

Excess trim can cause “porpoising” and/or ventilation.

WARNING

Excessive outboard trim angle will result in insufficient water supply causing water pump and/or powerhead overheating damage. Insure water level is above water intake holes whenever outboard is running.

The “Up” circuit actuates the “up” solenoid (under outboard cowl) and closes the motor circuit. The electric motor drives the pump, forcing fluid thru passageways into the “up” side of the trim cylinders.

The trim cylinders position the outboard at the desired trim angle in the 20 degree maximum trim range. The system will not allow the outboard to be trimmed above the 20 degree trim range as long as the engine RPM is above approximately 2000 RPM.

The outboard can be trimmed above the 20 degree maximum trim angle (for shallow water operation, etc.), by keeping the engine RPM below 2000. If the RPM increases over 2000, propeller thrust (if propeller is deep enough) will result in the trim system to return the outboard to the 20 degree maximum trim position.

TRIMMING OUTBOARD “DOWN” (IN):

WARNING

Excessive speed at minimum trim “In” may result in undesirable and/or unsafe steering conditions. Test for handling characteristics after any adjustment is made to the trim angle (and tilt pin location).

Aids planing, particularly with heavy loads.

Improves ride in choppy water conditions.

Excess trim “In” can cause “bow steer” (boat veers to left or right).

Transfers steering torque to starboard (right).

Improves acceleration to planing speed.

The “Down” circuit actuates the “down” solenoid (under engine cowl) and closes the motor circuit. The electric motor drives the pump in the opposite direction as the “up” circuit, forcing fluid thru passageways into the “down” side of the tilt ram. The tilt ram moves the engine down to the desired position.

Trailing Outboard

The “Up” circuit first moves the trim cylinders; when the trim cylinders extend fully, the tilt ram extends to tilt the outboard to the full “Up” position for trailing.



Before the boat is trailered, the operator should check for clearance between the outboard skeg and pavement to prevent damage to skeg from striking pavement.

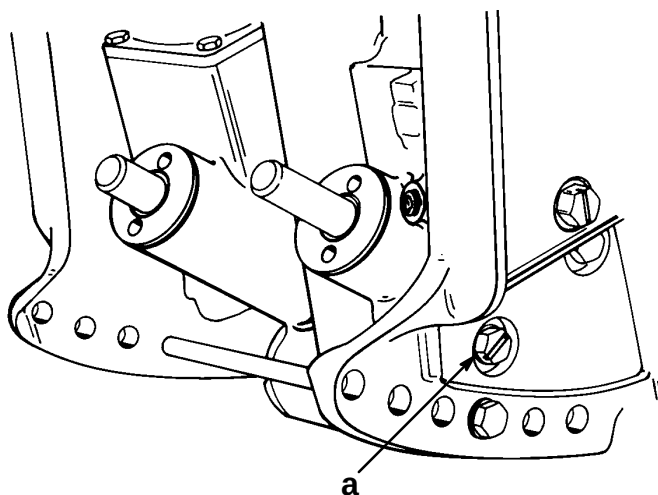
If the outboard must be tilted for clearance between skeg and pavement, a device such as a "Transom Saver" should be installed to prevent stress to boat transom from outboard weight while the boat/outboard are being trailered.

Tilting Outboard Manually

⚠ WARNING

Before opening the manual release valve knob, insure all persons are clear of outboard as outboard will drop to full "Down" when valve is opened.

The outboard can be raised or lowered manually by opening the manual release valve 3 to 4 turns counterclockwise. Close manual release valve to hold outboard at the desired tilt position.



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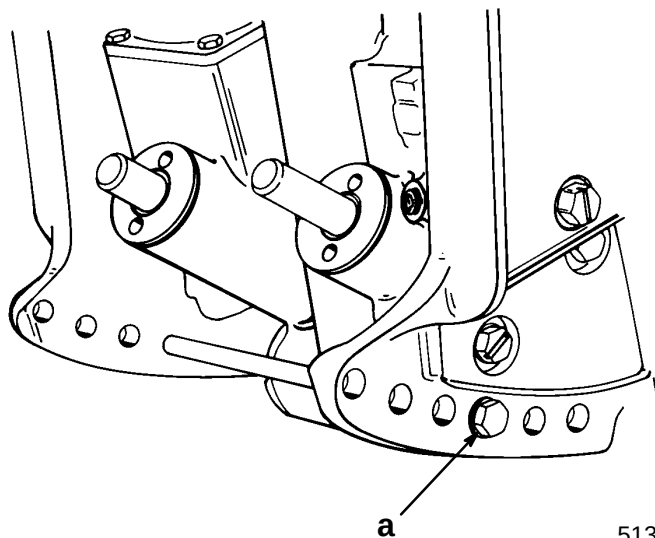
a - Manual Release Valve

Trim "In" Angle Adjustment

⚠ WARNING

Boat operation with outboard trimmed to the full "In" trim angle [not using the trim angle adjustment bolt (a)] at planing speed may result in undesirable and/or unsafe steering conditions. A water test for handling/steering conditions is required after any trim angle adjustments.

IMPORTANT: Some boat/motor combinations not using the trim angle adjustment pin (a) and trimmed to the full "In" trim angle position may not exhibit any undesirable and/or unsafe handling and/or steering characteristics at planing speed. If so, not using the trim angle adjustment bolt (a) may be advantageous to acceleration and planing. A water test is required to determine if these characteristics apply to a particular boat/motor combination.



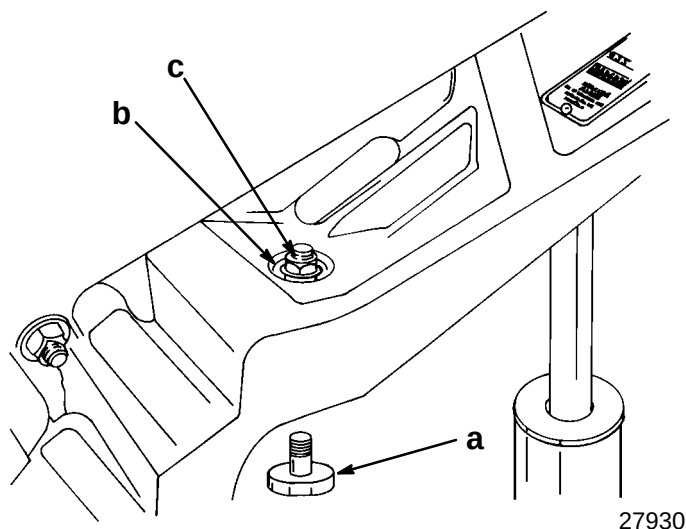
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a - Trim Angle Adjustment Bolt



Striker Plate Replacement

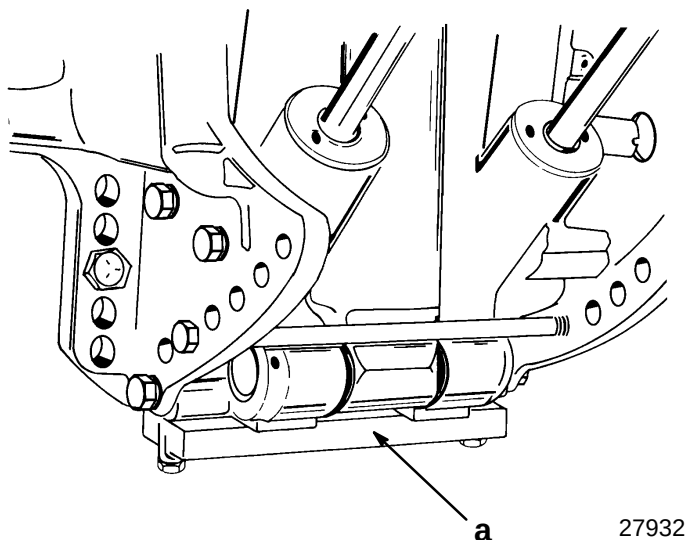
Visually inspect striker plates (a) and replace if worn excessively.



- a - Striker Plate (2)
- b - Lockwasher
- c - Locknut - Torque to 80 lb. in. (9.0 N·m)

Anode Plate

Anode plate (a) is a self-sacrificing alloy plate that is consumed gradually by corrosion while providing protection to the midsection and power trim from galvanic corrosion. Replace anode plate when it is 50% consumed.



- a - Anode Plate

IMPORTANT: Do not paint or place protective coating on anode plate, or corrosion protection function will be lost.

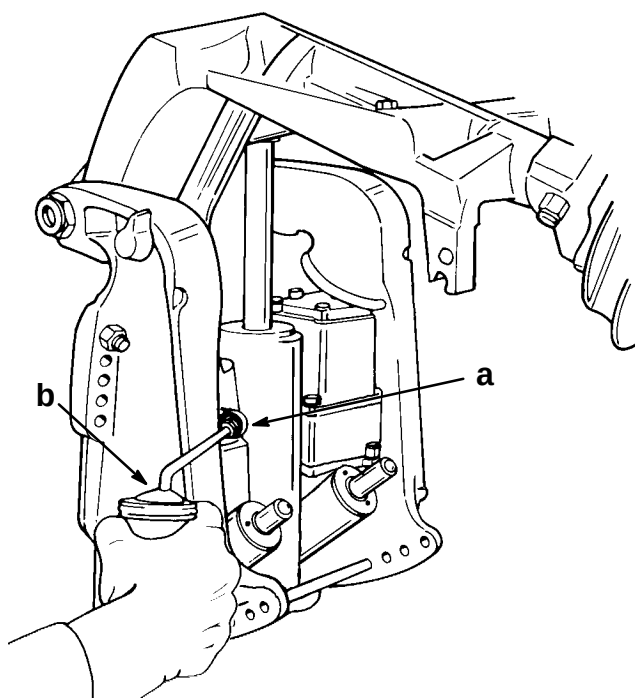
Trim Indicator Gauge

A Quicksilver Trim Indicator Gauge accessory kit is available for the power trim sender (if not previously installed).

Fill, Check, and Purge - Power Trim System

IMPORTANT: This trim system is pressurized. Remove “Fill” plug only when outboard is tilted to the full “Up” position or the trim/tilt rams are fully extended. Retighten “Fill” plug before tilting outboard down or retracting tilt/trim rams.

Remove “Fill” plug and O-ring. System is full when oil level is present at fill hole. Tighten “Fill” plug securely.



- a - Fill Plug and O-ring (remove to fill system, tighten securely)
- b - Oil Can (fill system with Quicksilver Power Trim and Steering Fluid)

NOTE: Automatic Transmission Fluid (ATF) Type F, FA, or Dexron II may be used.



TO PURGE:

IMPORTANT: Fill plug and O-ring must be tightened securely before purging system.

IMPORTANT: Run Trim System in short “jogs” until pump is primed and trim system moves. If trim motor is run without priming pump, driveshaft failure could result.

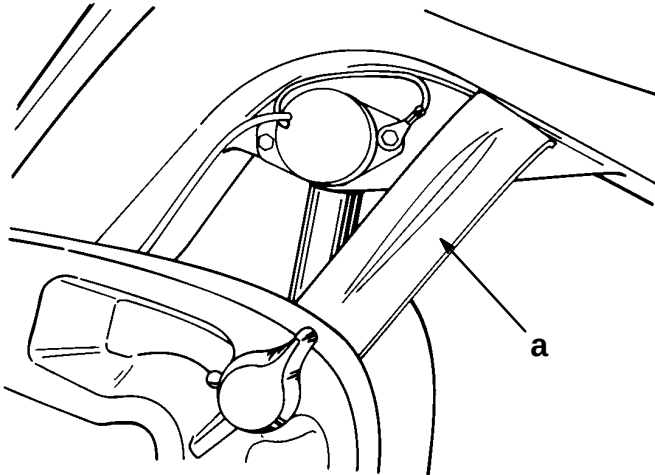
Cycle outboard through entire trim/tilt range 4 times. Check fluid level after purging system.

Push down on outboard when trim rams are slightly extended. If rams retract more than 1/8 in. (3.2 mm), air is present in system. Cycle system again and check fluid level.

TO CHECK:

CAUTION

Tilt outboard to full “Up” position and engage tilt lock lever before checking fluid level. System is pressurized. Extend trim and tilt rams fully to depressurize system.



51368

a - Tilt Lock Lever (engage to support engine in “Up” position)

Remove fill plug and O-ring. System is full when oil level is present at filler hole. Tighten fill plug securely.

Hydraulic System Troubleshooting

IMPORTANT: Operate Power Trim System after each check to see if problem is corrected. If problem has not been corrected, proceed to next check.

1. Check that Manual Release Valve knob is tightened to full right (clockwise) position.
2. Check trim pump fluid level and fill if necessary. (Refer to “**Fill, Check, and Purge - Power Trim System**”) preceding.
3. Check for external leaks in the system. Replace defective parts if leak is found.
4. Check for air in the system and purge if necessary. (Refer to “**Fill, Check, and Purge - Power Trim System**”) preceding.

NOTE: When troubleshooting the hydraulic system, cleanliness, and inspection of sealing surfaces, seals, O-rings, and moving parts is important. The internal pressures required for proper operation of the Power Trim System require these parts to be in excellent condition. Replace any parts that may be suspect of failure.



Troubleshooting

IMPORTANT: Determine if Electrical or Hydraulic problem exists.

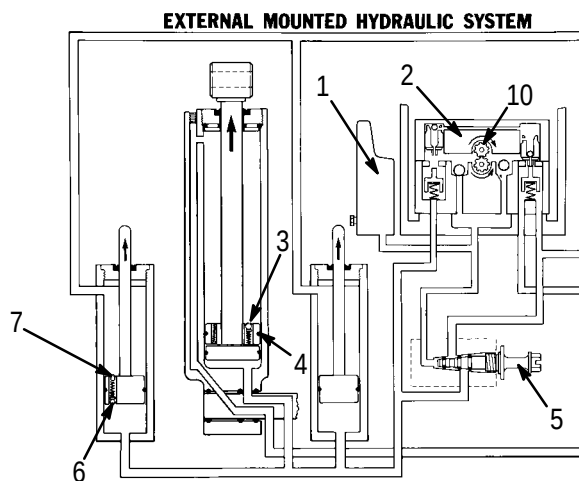
HYDRAULIC SYSTEM TROUBLESHOOTING

IMPORTANT: Make one correction at a time. Check operation of trim system before proceeding to the next check.

CONDITION OF TRIM SYSTEM	PROBLEM
A. Trim motor runs; trim system does not move up or down.	1, 2, 5, 10
B. Does not trim full down. Up trim OK.	2, 3, 4
C. Does not trim full up. Down trim OK.	1, 6
D. Partial or "Jerky" down/up.	1
E. "Thump" noise when shifting.	2, 3, 6, 7
F. Does not trim under load.	8, 9
G. Does not hold trim position under load.	2, 5, 6
H. Trail out when backing off from high speed.	3, 4
I. Leaks down and does not hold trim.	2, 5, 7
J. Trim motor working hard and trims slow up and down.	8, 9
K. Trims up very slow.	1, 2, 8, 9
L. Starts to trim up from full down position when "IN" trim button is depressed.	3, 4
M. Trim position will not hold in reverse.	3, 4

PROBLEM

1. Low oil Level.
2. Pump Assembly faulty.
3. Tilt ram piston ball not seated (displaced, dirt, nickel seat).
4. Tilt ram piston O-ring leaking or cut.
5. Manual release valve leaking (check condition of O-rings) (Valve not fully closed.)
6. Lower check valve not seating in port side trim ram.
7. Upper check valve not seating in port side trim ram.
8. Check condition of battery.
9. Replace motor assembly.
10. Broken motor/pump driveshaft.



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ELECTRICAL SYSTEM TROUBLESHOOTING

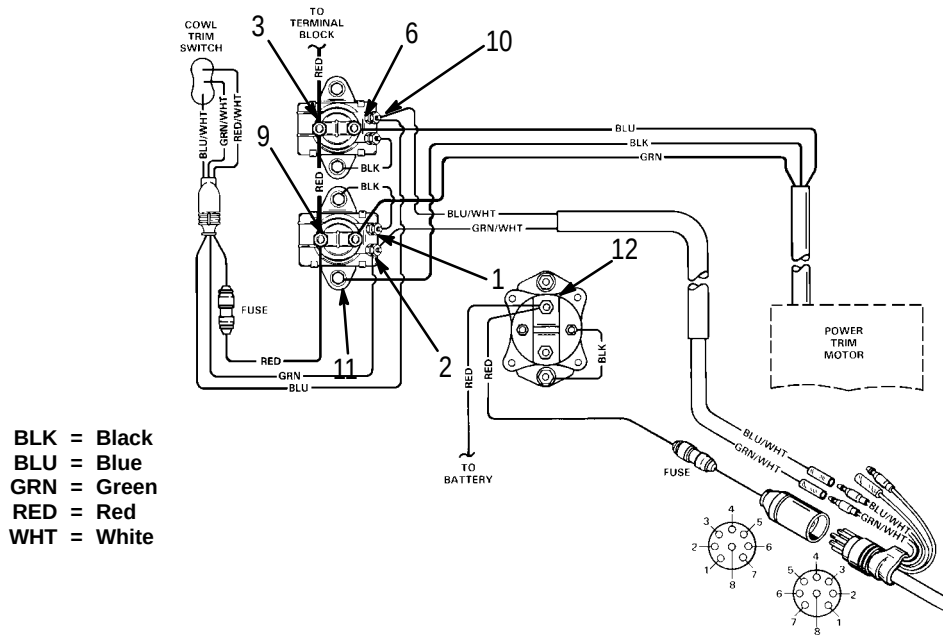
CONDITION OF TRIM SYSTEM	PROBLEM
A. Trim motor does not run when trim button is depressed.	1, 2, 4, 5, 6, 7
B. Trim system trims opposite of buttons.	3
C. Cowl mounted trim buttons do not activate trim system.	2, 4, 5, 6

PROBLEM

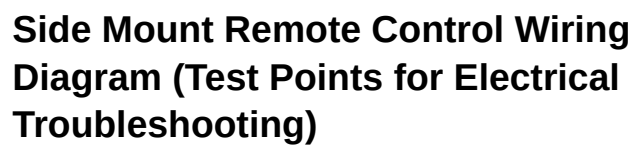
1. Battery low or discharged.
2. Open circuit in trim wiring.
3. Wiring reversed in remote control.
4. Wire harness corroded through.
5. Internal motor problem (brushed, shorted armature).
6. Blown fuse(s).
7. Trim Solenoids Failed

NOTE: Refer to following pages to troubleshoot Power Trim Electrical System.

POWER TRIM SYSTEM WIRING DIAGRAM



51306





Electrical System Troubleshooting

GENERAL CHECKS

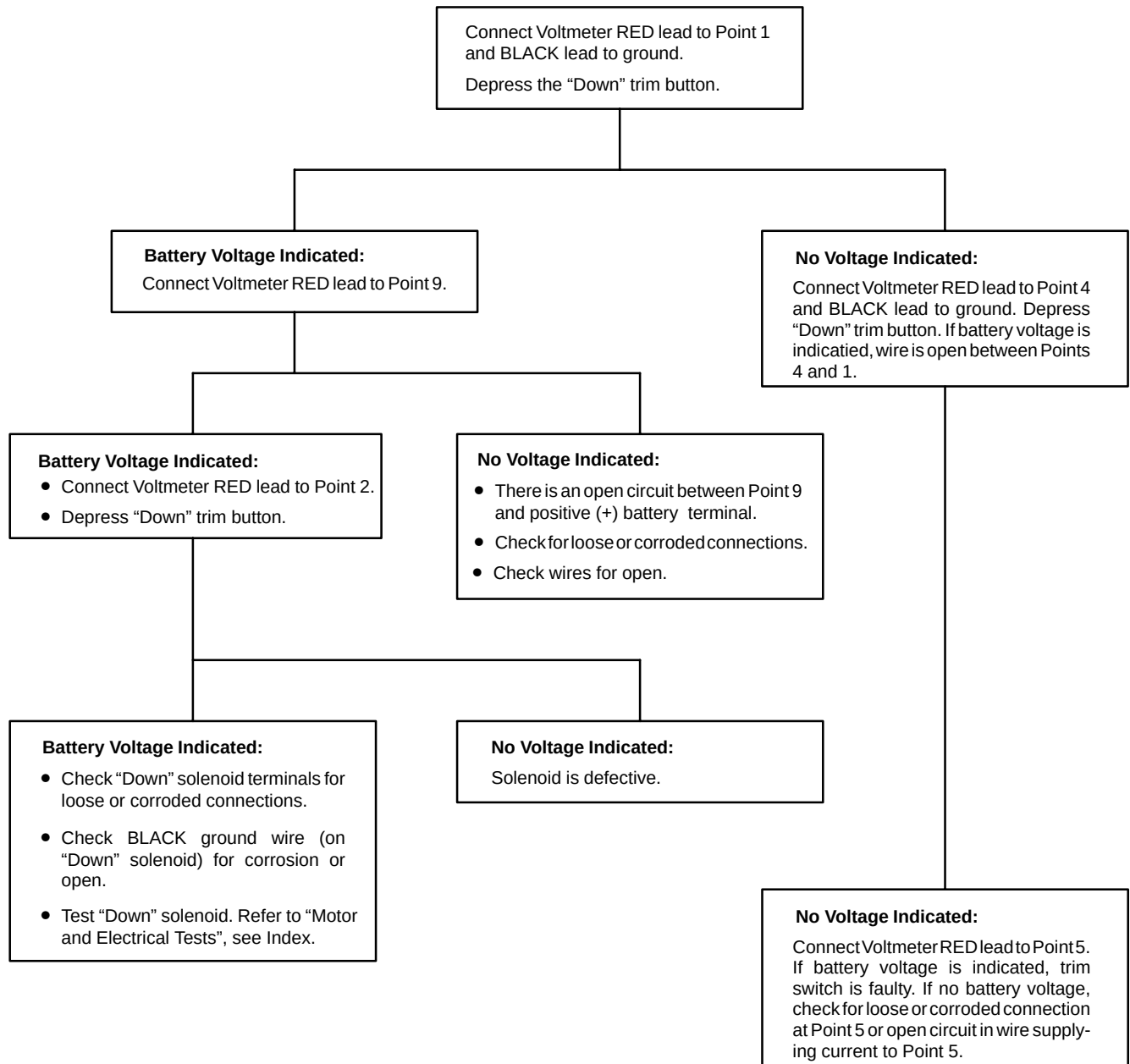
Before troubleshooting the Power Trim electrical system, check the following:

1. Check for disconnected wires.

2. Make certain all conditions are tight and corrosion free.
3. Check that plug-in connectors are fully engaged.
4. Make certain battery is fully charged.

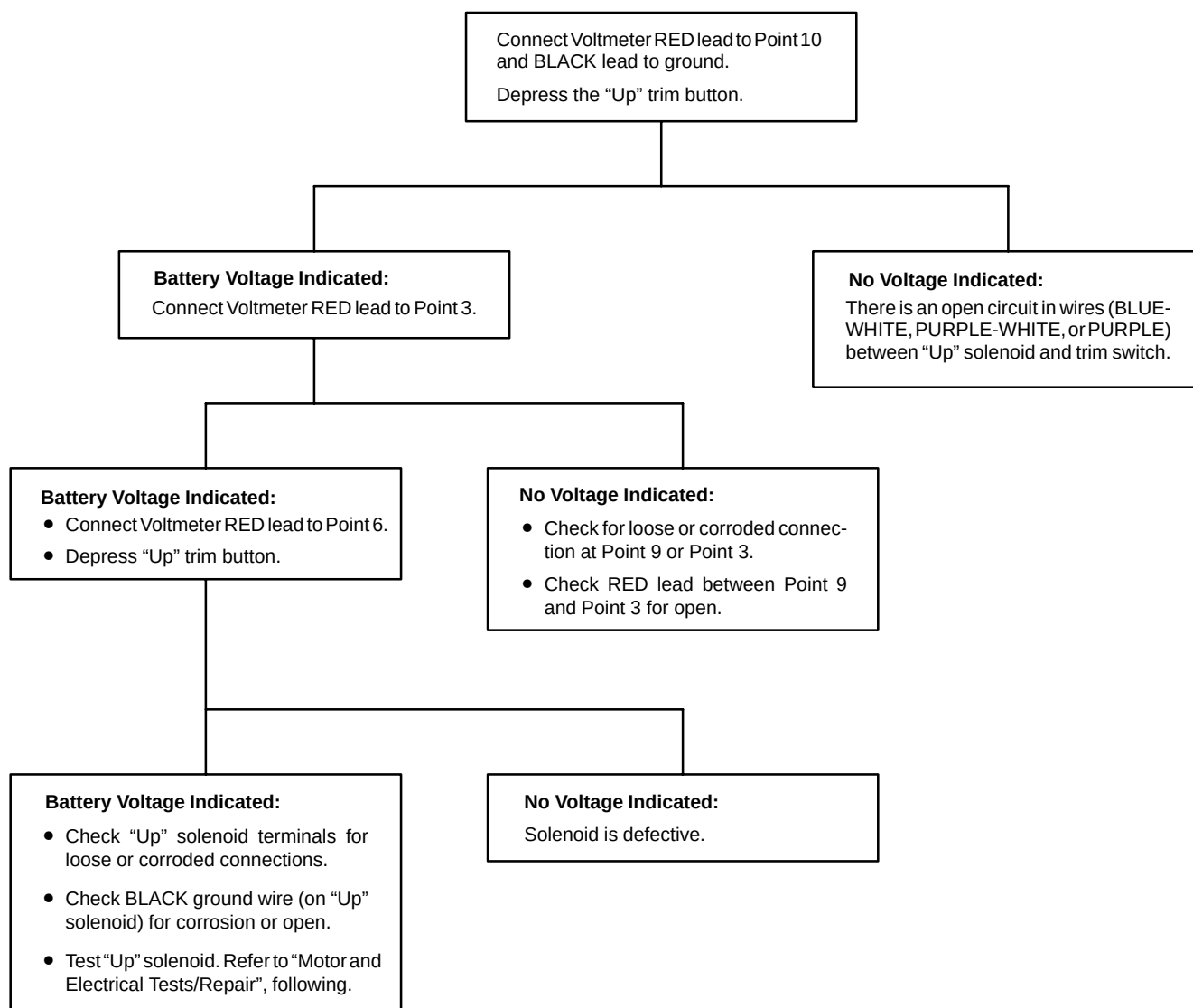
Refer to the preceding four wiring diagrams for connection points when troubleshooting the electrical systems (Connection points are specified by number).

Troubleshooting the “Down” Circuit (When “Up” Circuit is OK)



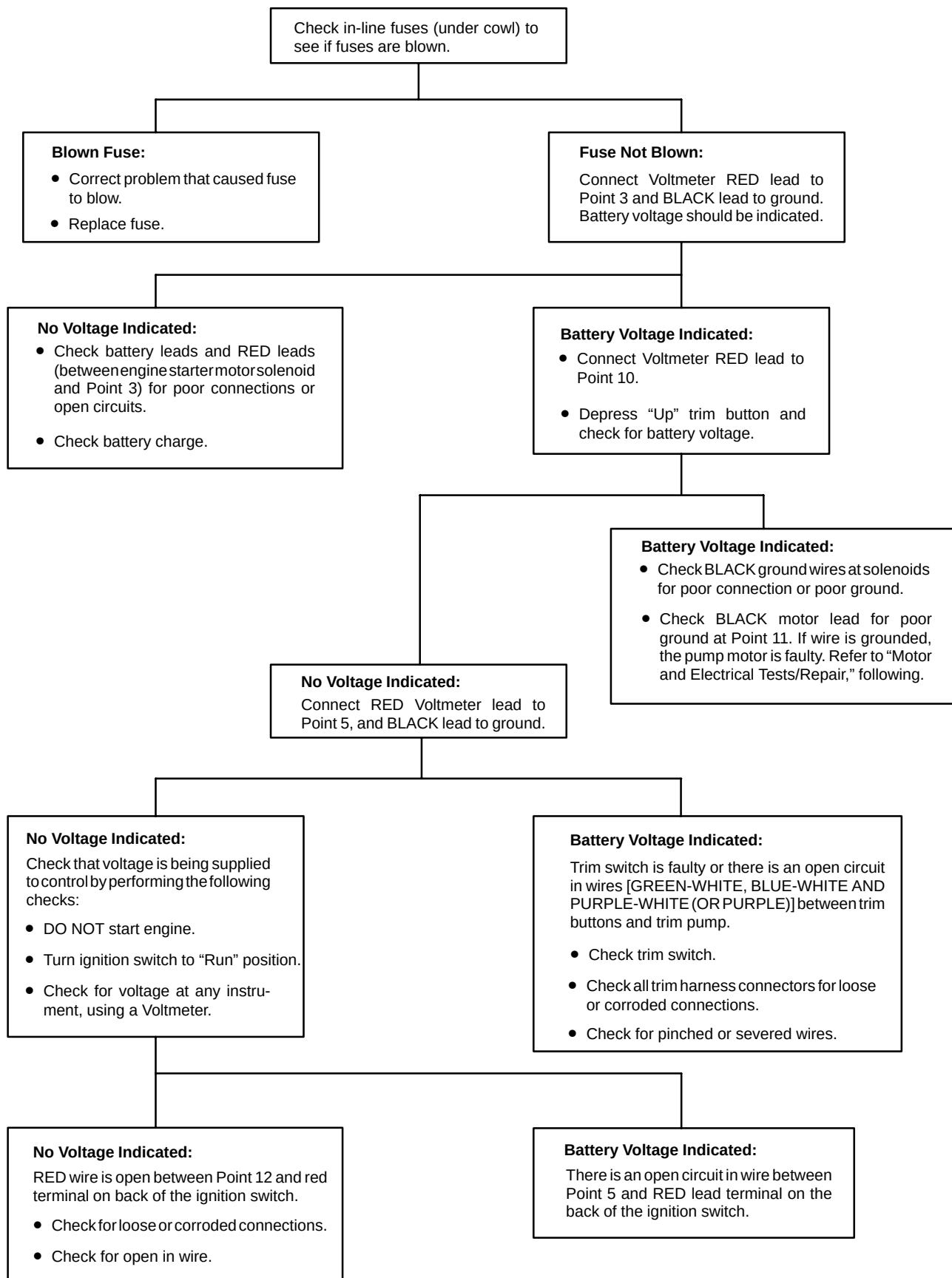


Troubleshooting the “Up” Circuit (When “Down” Circuit is OK)





Troubleshooting the “Down” and “Up” Circuits (All Circuits Inoperative)

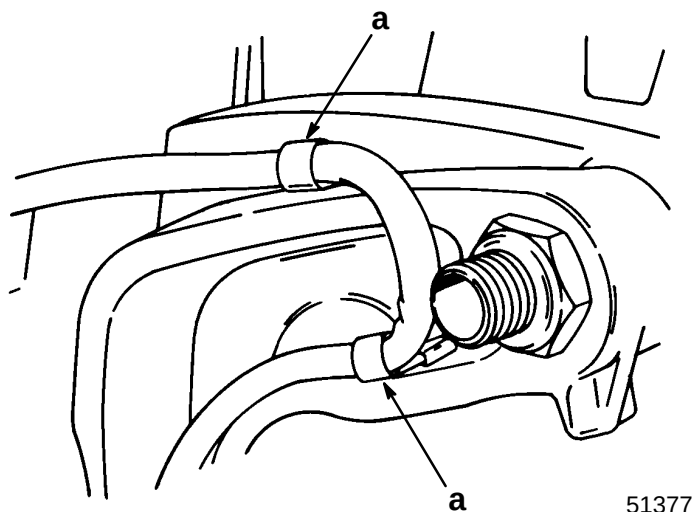




Power Trim Assembly Removal and Installation

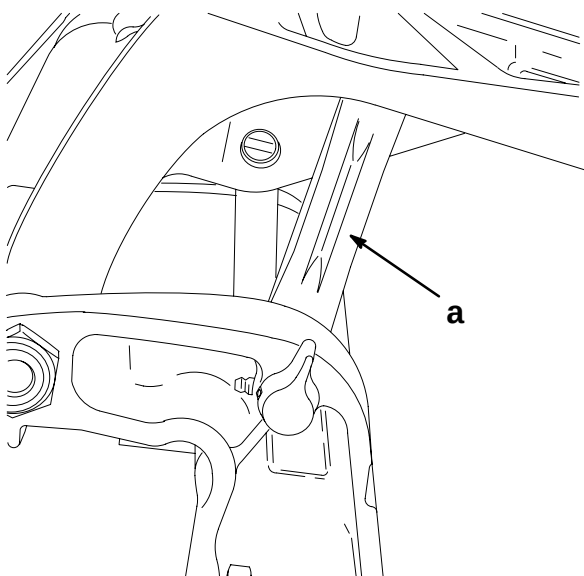
Removal

1. Remove clamps on transom bracket to free power trim wiring.



a - Clamps

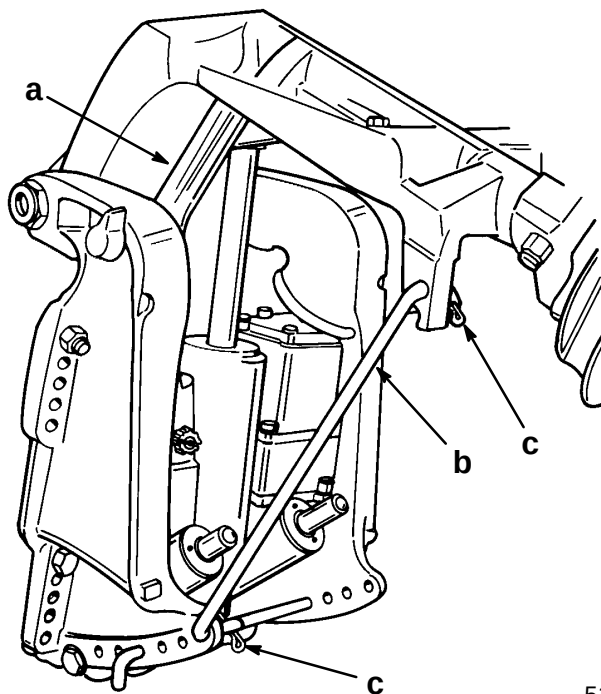
2. Raise outboard to full "Up" position and engage tilt lock lever.



a - Tilt Lock Lever

⚠ WARNING

Failure to support outboard as shown could result in personal injury and/or damage to outboard or boat.



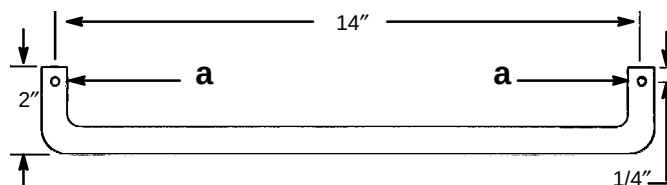
a - Tilt Lock Lever
b - Support Tool
c - Retaining Clips

51346

IMPORTANT: Support outboard as shown above to prevent engine from tipping when power trim retaining pin is removed.

SUPPORT TOOL

3/8 in. diameter metal rod (a used shift shaft works well).



a - Drill Holes for Retaining Clips

METRIC CONVERSION

14 in. = 35.56 cm

2 in. = 50.80 mm

3/8 in. = 9.50 mm

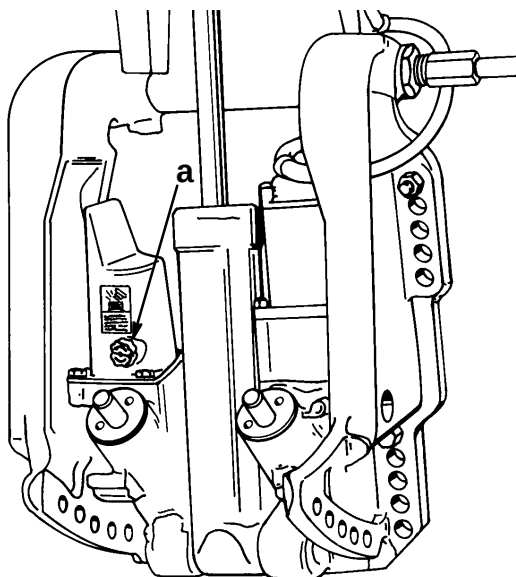
1/4 in. = 6.35 mm



⚠ CAUTION

Disconnect battery cables at battery before removing power trim wires from solenoids.

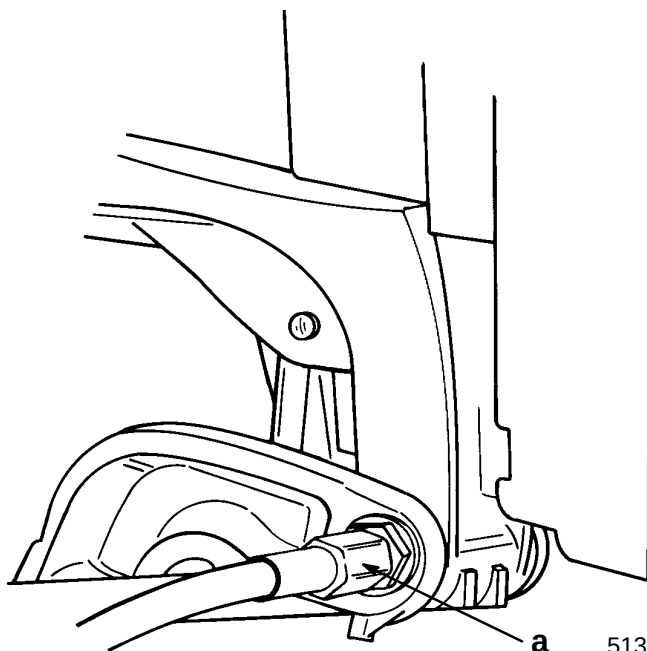
3. Disconnect power trim wires at solenoids (BLUE, GREEN, and BLACK).
4. Open filler cap and release any remaining pressure in the system.



51339

a - Filler Cap

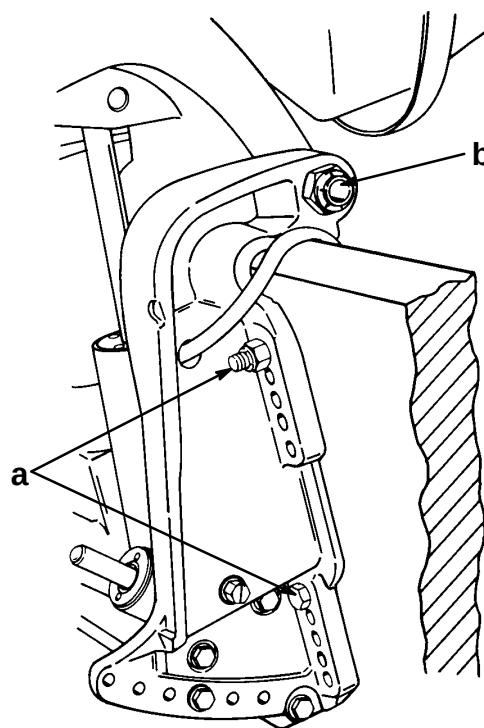
IMPORTANT: Outboards equipped with thru-the-tilt-tube steering - remove steering link arm from end of steering cable and cable retaining nut from tilt tube.



51354

a - Retaining Nut

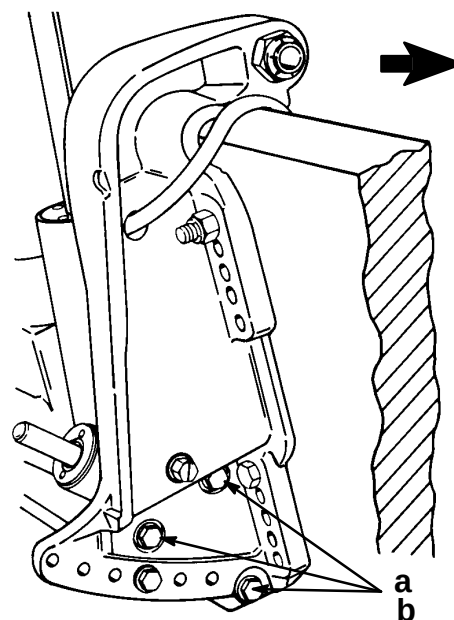
5. Remove outboard transom mounting bolts, and loosen tilt tube nut until nut is flush with end of tilt tube thread.



51375

- a - Transom Mount Bolts (2)
b - Tilt Tube Nut (flush with end of thread)

6. Remove 3 screws and washers and move star-board transom bracket.



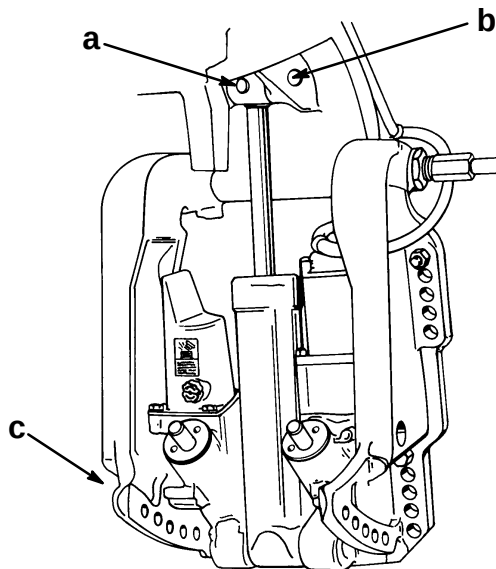
51375

- a - Screws (3)
b - Washers (3)



IMPORTANT: Cross pin (a) should not be reused. Replace with new cross pin.

7. Drive out cross pin, push out upper swivel pin, and remove 3 screws and washers retaining trim system. Remove system from outboard.

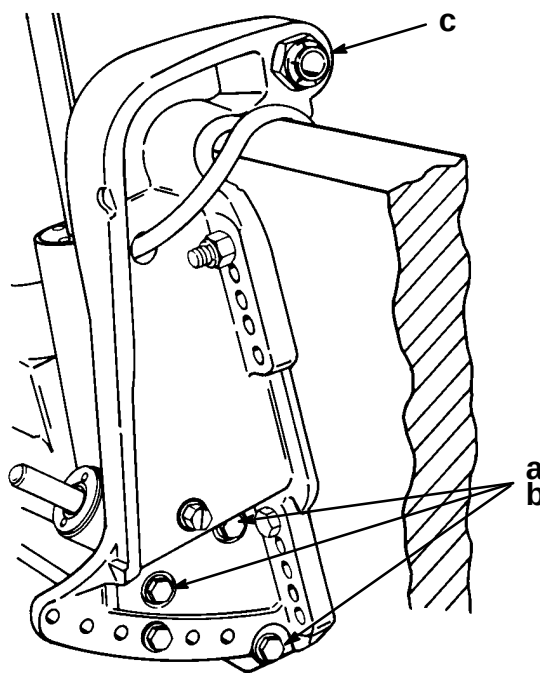


51339

- a - Cross Pin
- b - Upper Swivel Pin
- c - Port Transom Bracket Screws and Washers (3) - Remove to release trim system from outboard.

Installation

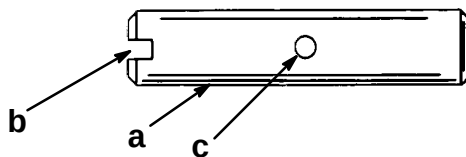
1. Paint any exposed metal surfaces to prevent corrosion.
2. Apply Loctite 271 to screws. Install trim system, starboard transom bracket, and tilt tube nut.



51375

- a - Screw (6) - Torque to 45 lb. ft. (61.0 N·m)
- b - Flatwasher (6) - Install one per screw
- c - Tilt Tube Nut

3. Use a 12 volt power source to extend tilt ram up to align upper swivel shaft hole and end of ram. Connect trim motor wires (BLUE wire to positive (+), BLACK wire to negative (-). If ram extends too far, retract ram by connecting GREEN wire to positive (+).
4. Install Upper Swivel Pin with slotted end to left (port) side of engine.

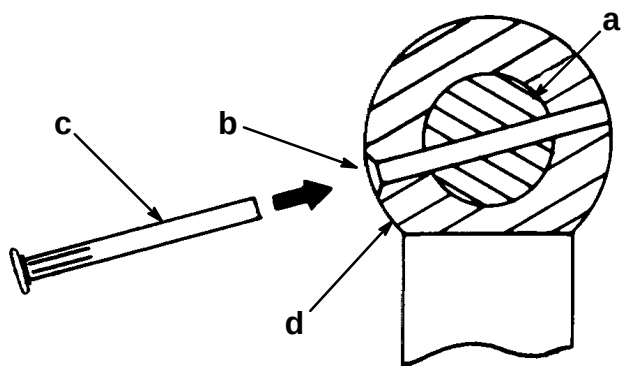


- a - Upper Swivel Pin
- b - Slotted End
- c - Cross Hole (in line with slotted end)

IMPORTANT: Cross pin should not be reused. Install a new pin.



- Position slot on end of swivel shaft in line with hole in tilt ram end. Insert a punch into tilt ram hole to align cross hole in upper swivel shaft. Tap new cross pin in until flush.



- a - Upper Swivel Shaft (Slot is in line with cross hole)
b - Chamfered End of Hole (Faces away from transom)
c - Retaining Pin
d - Tilt Ram End

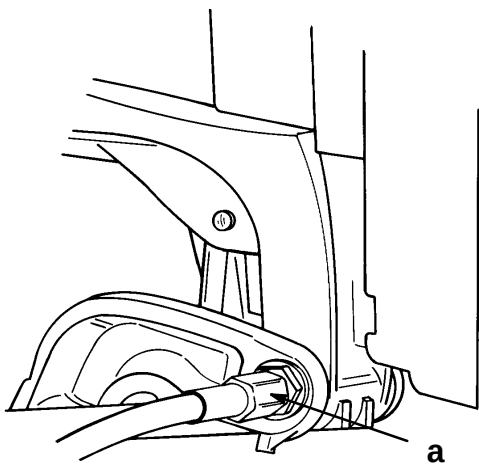
- Connect trim motor wires to solenoids. Refer to Wiring Diagrams in this manual. Route trim wires as specified in this manual.
- Apply marine sealer to shanks of mount bolts and install transom mount bolts.

IMPORTANT: Do not use an impact driver to tighten transom mount bolts.

Apply marine sealer to threads of mount bolts. Secure with flat washers and locknuts. Be sure installation is watertight.

- Tighten tilt tube nut securely.

IMPORTANT: Outboards equipped with thru-the-tilt-tube steering: Tighten steering cable retaining nut securely to tilt tube.



- a - Steering Cable Retaining Nut

- Apply Quicksilver Liquid Neoprene (91-25511--2) on all electrical connections.

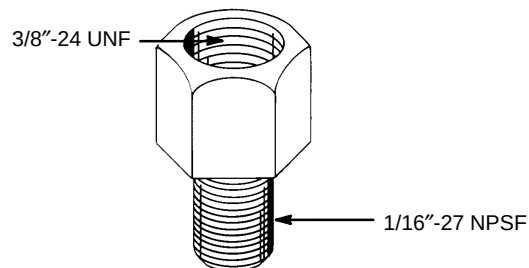
⚠ WARNING

Electrical wires passing through cowl openings must be protected from chafing or being cut. Follow the recommended procedures outlined in Section 1 of this Manual. Failure to protect wires as described could result in electrical system failure and/or injury to occupants of boat.

Testing Power Trim System With Test Gauge Kit (91-52915A3)

IMPORTANT: This test will not locate problems in the trim system. The test will show if the system is correct after a repair. If minimum pressures are not obtainable, the trim system requires additional repair.

Use Adapter Fitting (22-11243) to connect test gauge to trim system.

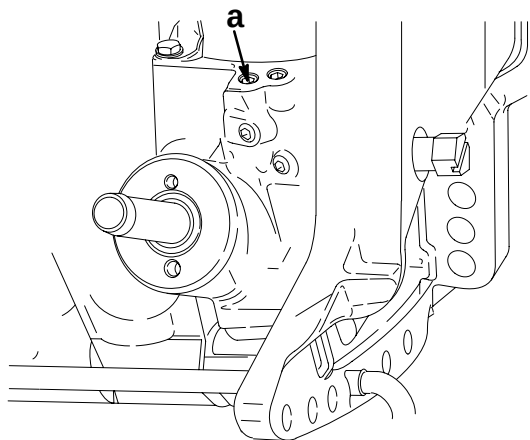




“UP” Pressure Check

IMPORTANT: Insure battery is fully charged before performing tests.

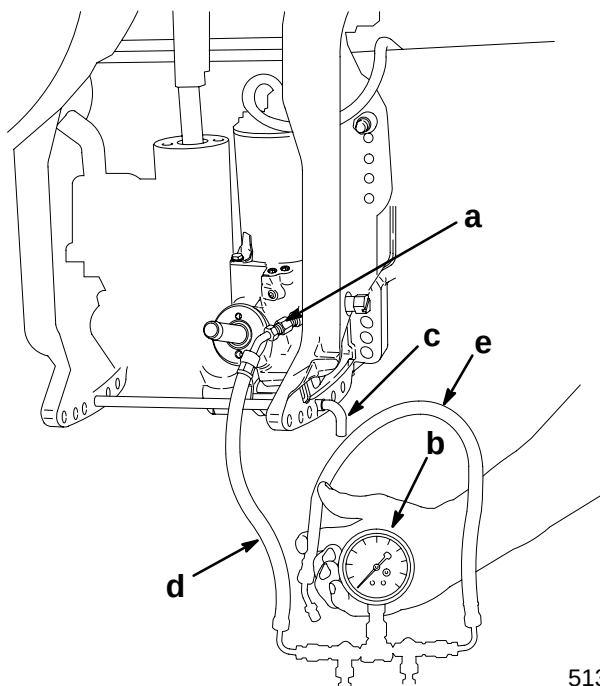
1. Tilt outboard to full “Up” position and engage tilt lock lever.
2. Slowly remove “Fill” plug to bleed pressure from reservoir.
3. Turn Manual Release Valve 3 to 4 turns (counter-clockwise) to bleed any remaining pressure.
4. Remove allen plug.



51353

a - Allen Plug

5. Install components.



51374

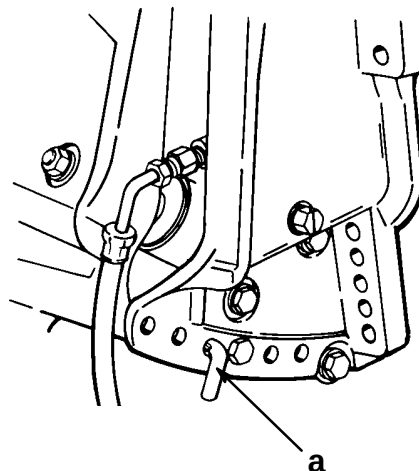
- a - Adapter Fitting (22-11243)
b - Test Gauge Assembly
c - Tilt Pin (Position in hole shown)
d - Hose
e - Hose (not used for this check)

6. Disengage tilt lock lever.

⚠ CAUTION

Failure to install spare tilt pin (or hardened bolts and nuts) in hole shown could result in transom bracket failure and possible injury.

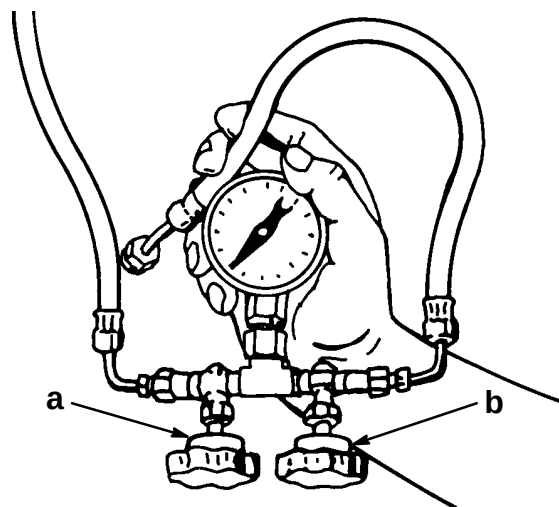
7. Move outboard “In” until hole in swivel bracket “ear” aligns with the third tilt hole in transom bracket. Lock engine in trim range by installing a 3/8 in. (9.5 mm) diameter tilt pin or two 3/8 in. (9.5 mm) hardened bolts and nuts thru the transom brackets and swivel bracket in the hole shown.



51374

a - Tilt Pin Hole (Install spare tilt pin or hardened bolts and nuts.)

8. Install “Fill” plug.
9. Close Manual Release Valve (clockwise).
10. Open valve (a) and close valve (b).



51374

- a - Open valve
b - Close valve

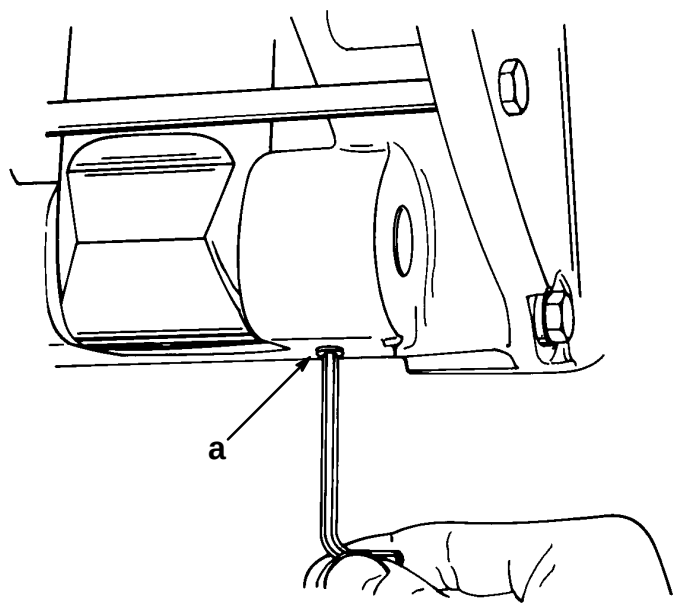


11. Run trim "UP". The minimum pressure should be 1300 P.S.I. (91 kg/cm²).
12. Run trim "DOWN" to release pressure and remove spare tilt pin or bolts and nuts.
13. Tilt outboard full "UP" and engage tilt lock lever.
14. Slowly remove "Fill" plug to bleed pressure.
15. Open Manual Release Valve 3 to 4 turns to bleed any remaining pressure.
16. Remove test gauge hose and adapter, and install allen plug.

NOTE: If pressure is less than 1300 PSI (91 kg/cm²), troubleshoot system per instructions on page 6B-7.

"DOWN" Pressure Check

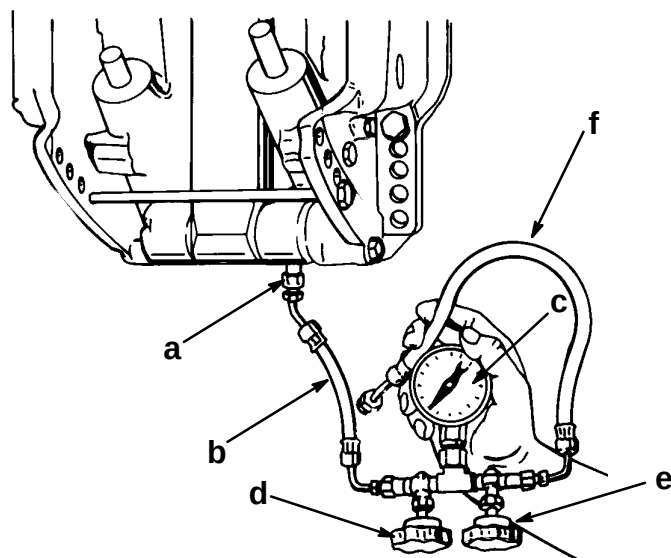
1. Repeat steps 1 through 4 from preceding "UP" pressure check, removing allen plug as shown.



51367

a - Allen Plug

2. Install components.



51360

- a - Adapter Fitting (22-11243)
- b - Hose (route hose so it will not be pinched when outboard is trimmed "DOWN")
- c - Test Gauge Assembly
- d - Valve
- e - Valve
- f - Hose (not used for this test)

3. Open valve (d) and close valve (e).
4. Install fill plug.
5. Close Manual Release Valve (clockwise).
6. Run trim "DOWN". Minimum pressure should be 500 P.S.I. (35 kg/cm²).
7. Tilt outboard full "UP" and engage tilt lock lever.
8. Slowly remove "Fill" plug to bleed pressure.
9. Open Manual Release Valve 3 to 4 turns to release any remaining pressure.
10. Remove test gauge hose and adapter fitting. Install allen plug.
11. Fill Power Trim system and purge system; refer to "Fill, Check, and Purge" preceding.

NOTE: If pressure is less than 500 PSI (35 kg/cm²), troubleshoot system per instructions on page 6B-7.



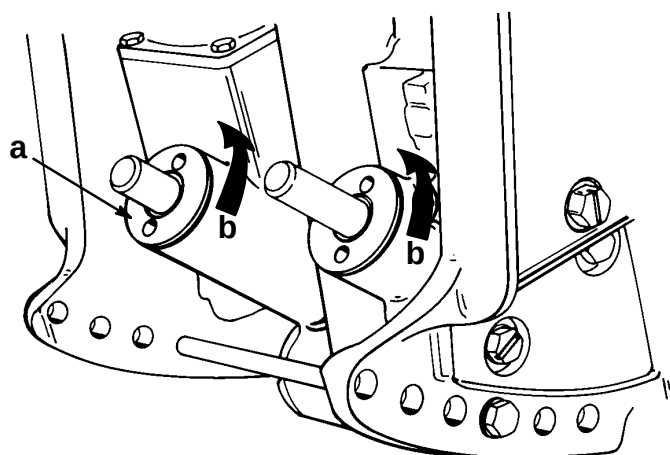
Hydraulic Repair

TRIM ROD REMOVAL AND REPAIR

NOTE: Power Trim does not have to be removed from outboard to remove trim rods.

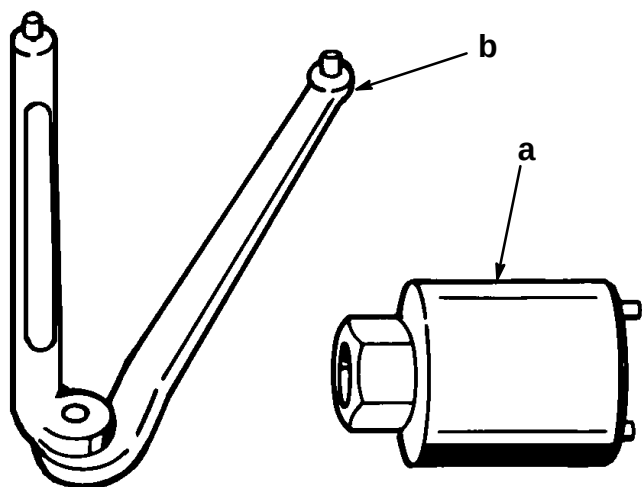
1. Tilt outboard to full "UP" position and engage tilt lock lever.
2. Slowly remove "Fill" plug to bleed reservoir pressure.
3. Turn Manual Release Valve 3 to 4 turns (counterclockwise) to bleed remaining pressure.
4. Remove trim rod cylinder caps.

NOTE: Place a clean pan under trim system to catch fluid.



51353

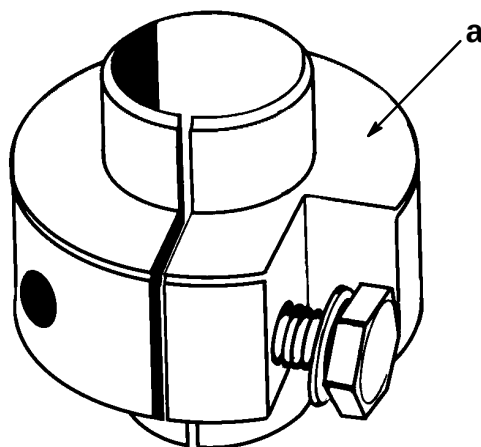
- a - Trim Rod Cylinder Cap
b - Turn Counterclockwise to Remove



51337

- a - Removal Tool (91-44487A1)
b - Spanner Wrench (91-74951)

5. Install trim rod removal tool and pull trim rod from cylinder.



27933

a - Trim Rod Removal Tool (91-44486A1)

CLEANING AND INSPECTION - TRIM RODS AND CAPS

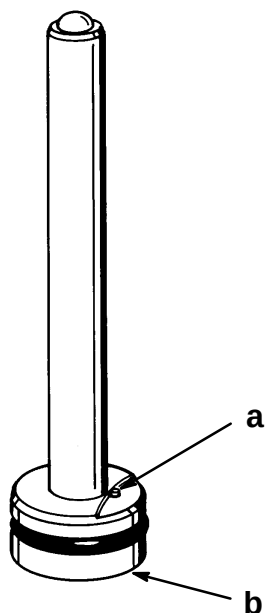
⚠ CAUTION

Do not remove check valve (a). Check valve is preset to operate at a specific pressure. Removal and installation of check valve could result in improper operating pressure and possible system damage.

NOTE: Check valve is in port side trim rod only.



1. Inspect check valve and check valve screen for debris; if debris cannot be removed, replace trim rod assembly. Clean trim rod with parts cleaner and dry with compressed air.

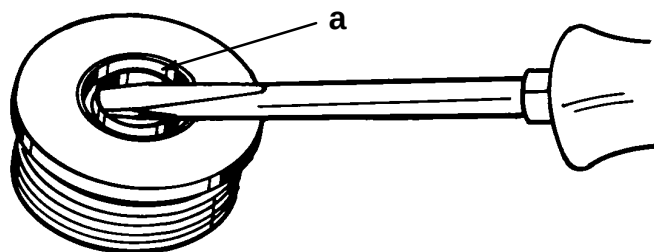


a - Check Valve
b - Check Valve Screen

51352

Trim Rod End Cap Seal

1. Inspect trim cap end seal and replace if damaged or if seal does not keep trim rod clean.



51343

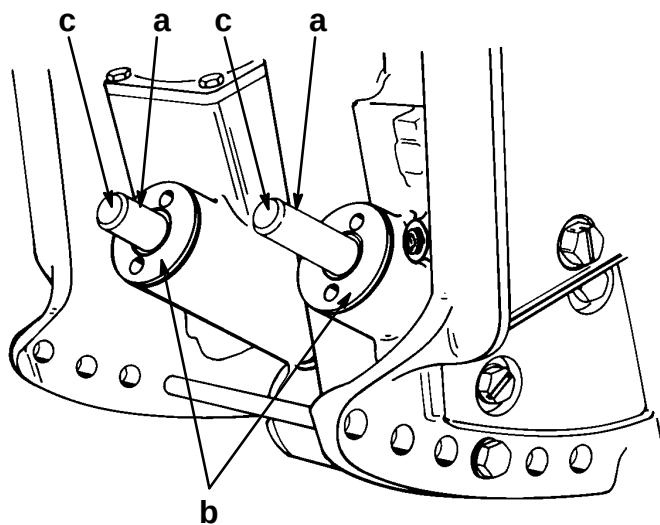
- a - Seal (Remove as shown)
2. Install new seal with seal lip up.

TRIM ROD INSTALLATION

IMPORTANT: Components must be free of dirt and lint. Any debris in the system can cause system to malfunction.

NOTE: Install trim rod with check valve in the port (left) cylinder.

1. Apply Quicksilver Power Trim and Steering Fluid on all O-rings and seals before installation.
2. Install trim rods and caps. Use installation tool (91-44487A1) or spanner wrench (91-74951) to tighten caps securely.



51353

- a - Trim Rods
b - Cylinder End Caps
c - Rod End Rollers (Lubricate with Quicksilver Anti-Corrosion Grease or 2-4-C w/Teflon)



Tilt Ram

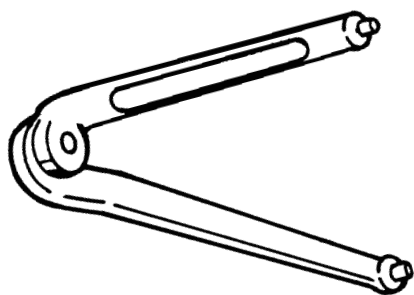
REMOVAL - TILT ROD ASSEMBLY ONLY

NOTE: Tilt Rod Assembly can be removed from cylinder without removing entire power trim system from outboard. Refer to page 6A-13 to remove upper swivel pin.

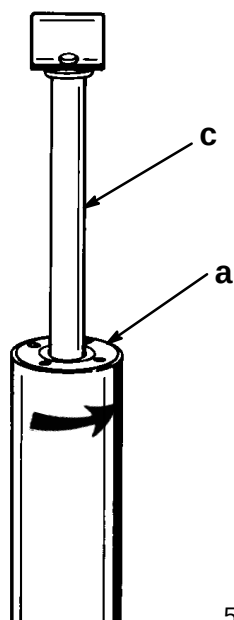
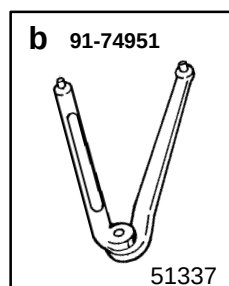
CAUTION

Insure Power Trim System Is Depressurized Prior To Tilt Rod Removal.

1. Use spanner wrench (91-74951) to loosen tilt ram end cap.



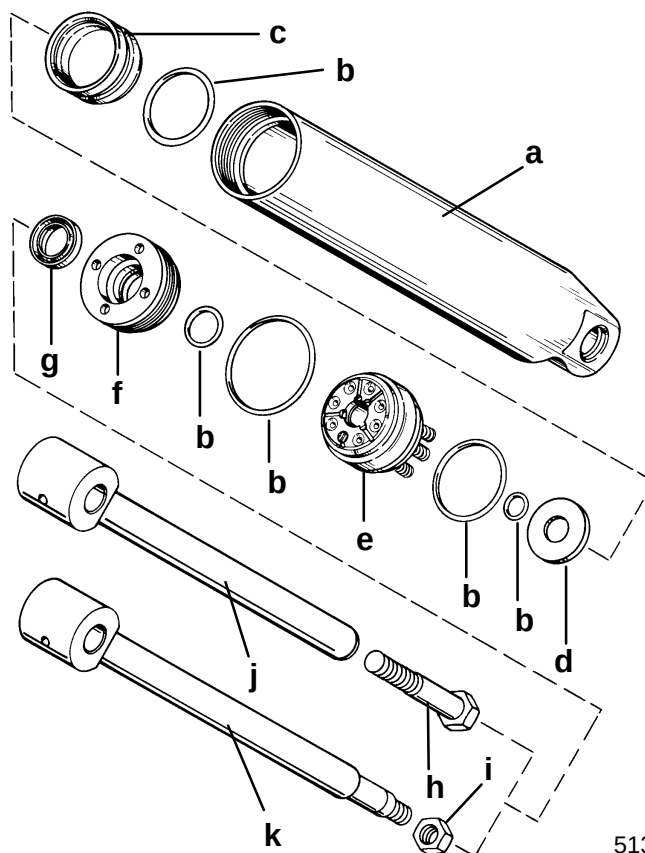
51337



- a - End Cap
b - Spanner Wrench (91-74951) (Turn counterclockwise)
c - Tilt Rod - Pull to remove.

NOTE: Place a clean pan under tilt ram to catch fluid.

TILT RAM COMPONENTS



- a - Housing - Tilt Ram
b - O-ring* (5)
c - Memory Piston**
d - Washer
e - Piston Assembly
f - End Cap
g - Oil Seal
h - Bolt (Design 1)
i - Nut (Design 2)
j - Tilt Rod (Design 1)
k - Tilt Rod (Design 2)

* O-ring Repair Kit Available, P/N 811607A1 (Includes item g, Oil Seal)

** Memory piston (c) for tilt rods (j and k) are different and must be used with correct tilt rod/cylinder assembly. Memory piston for Design 1 tilt rod is flat, Design 2 is dished to clear nut and thread.

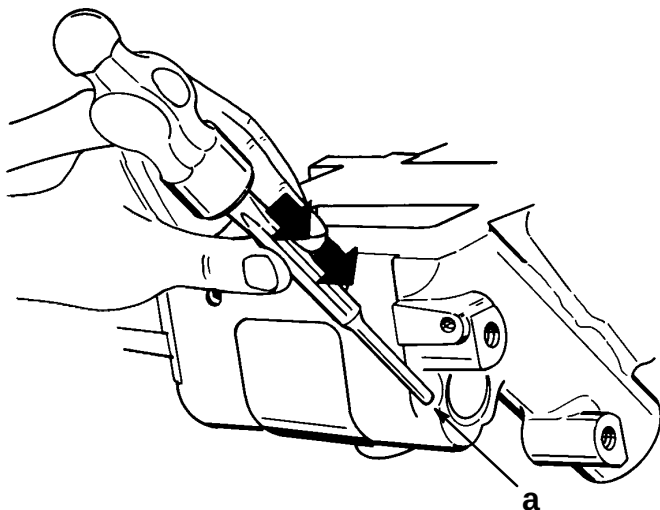


TILT RAM REMOVAL - POWER TRIM SYSTEM REMOVED FROM OUTBOARD

CAUTION

Insure Trim System Is Depressurized Prior To Tilt Ram Removal.

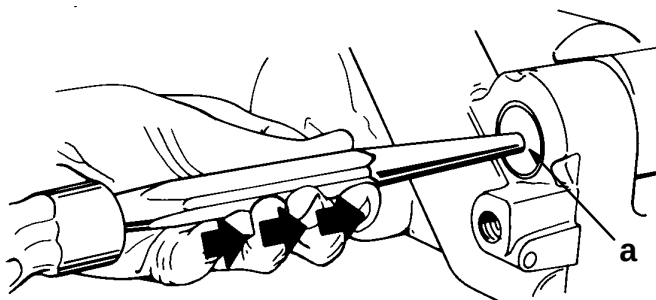
1. Remove cross pin.



51366

a - Cross Pin (Remove as shown)

2. Remove lower swivel pin.

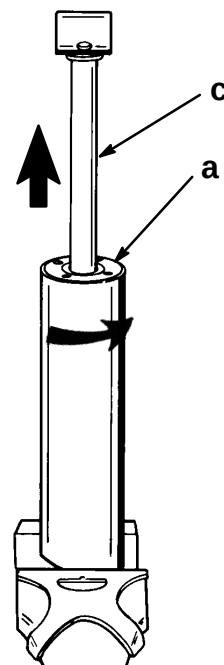
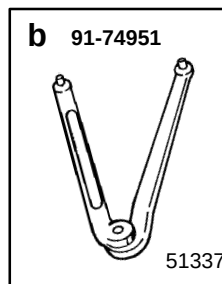


51355

a - Lower Swivel Pin (Remove as shown)

Disassembly

1. Secure tilt ram in a soft jawed vise. Remove tilt rod and cap.



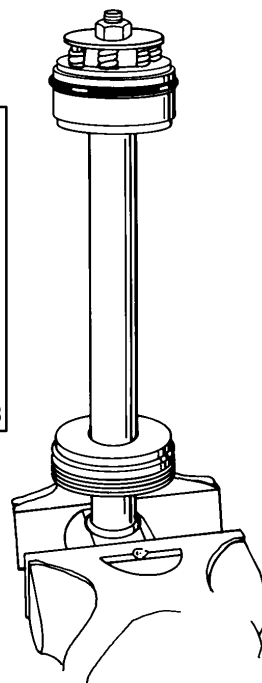
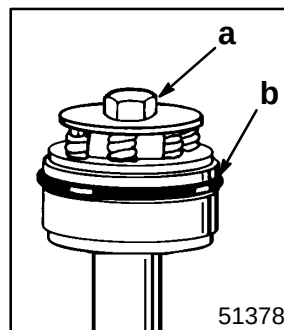
51364

a - Cap (Turn counterclockwise to remove)

b - Spanner Wrench (91-74951)

c - Tilt Rod - Pull to remove

2. Clamp tilt rod in a soft jawed vise. Remove bolt or nut as applicable to disassemble rod assembly. Remove O-ring.



51340

a - Bolt (Design 1) or Stud/Nut (Design 2)

b - O-ring



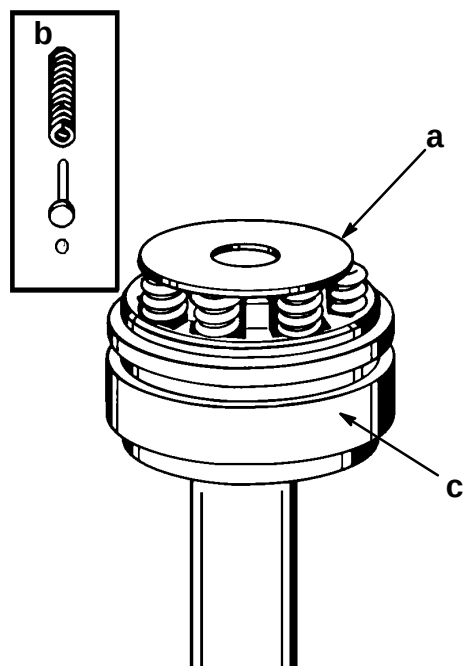
IMPORTANT: Note Design 1 and 2 previous. Design 1 tilt rod assembly replaces either tilt rod assembly Either design will fit as a (replace) cylinder assembly complete.

Design 2 will NOT fit a cylinder originally using a Design 1 tilt rod assembly.

Memory Pistons for Design 1 and 2 differ also and must be used only on the cylinder the piston was removed from.

3. Remove washer, check valve assemblies, and piston.

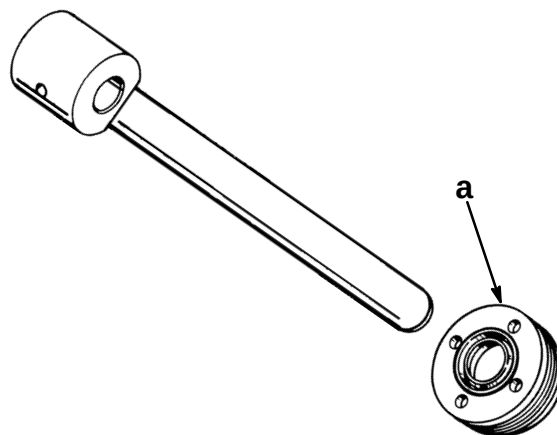
NOTE: Check valve held in by roll pin can be cleaned but not removed.



- a - Washer
b - Check Valve Assembly (7)
c - Piston

51363

4. Remove end cap from tilt rod.

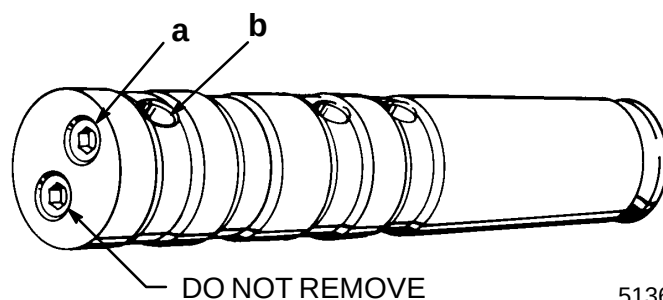


51376

- a - End Cap

5. Remove allen plug.

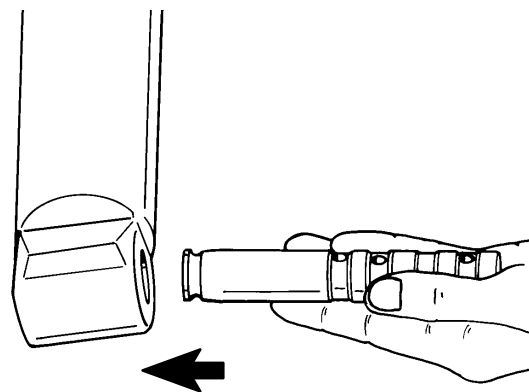
IMPORTANT: Remove plug from same side as holes in shaft.



51361

- a - Allen Plug
b - Hole in Shaft

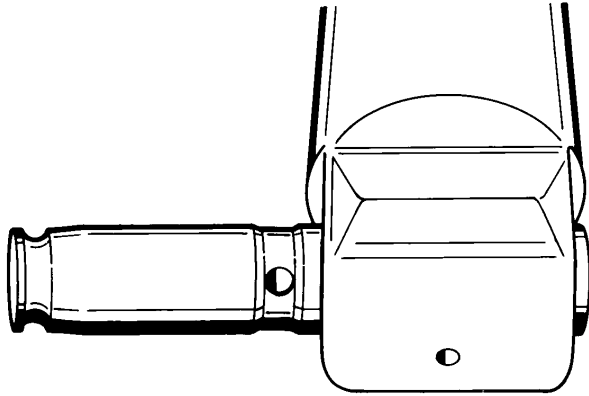
6. Lubricate shaft with Quicksilver Power Trim and Steering Fluid. Insert shaft into cylinder.



51342



7. Tap shaft into cylinder until shaft is positioned as shown.

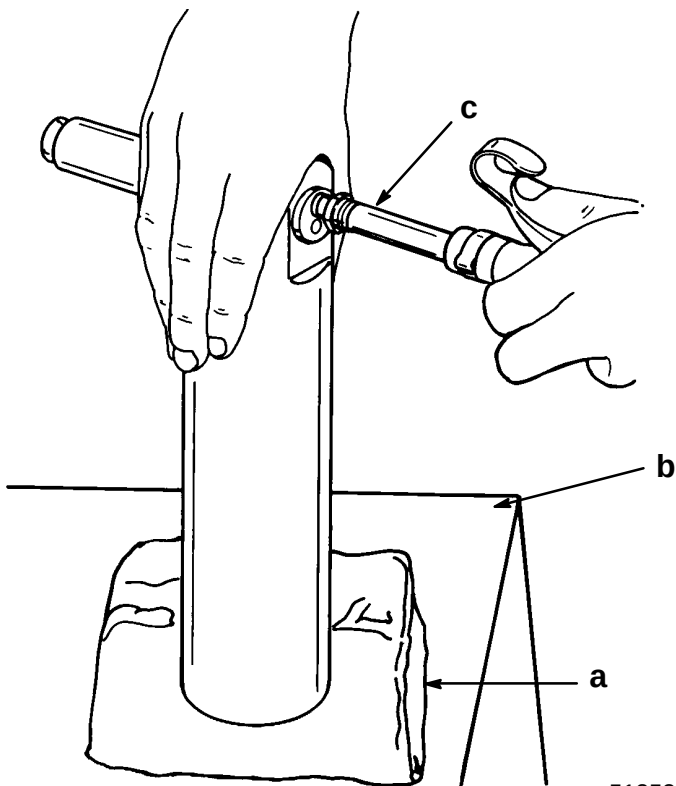


51365

⚠ WARNING

Memory Piston Cup may be expelled at a high velocity when air pressure is applied. Failure to place cylinder as shown below could result in personal injury.

8. Place cylinder as shown. Hold down on cylinder and inject air into shaft opening.



51353

- a - Shop Cloth
- b - Solid Surface
- c - Air Nozzle

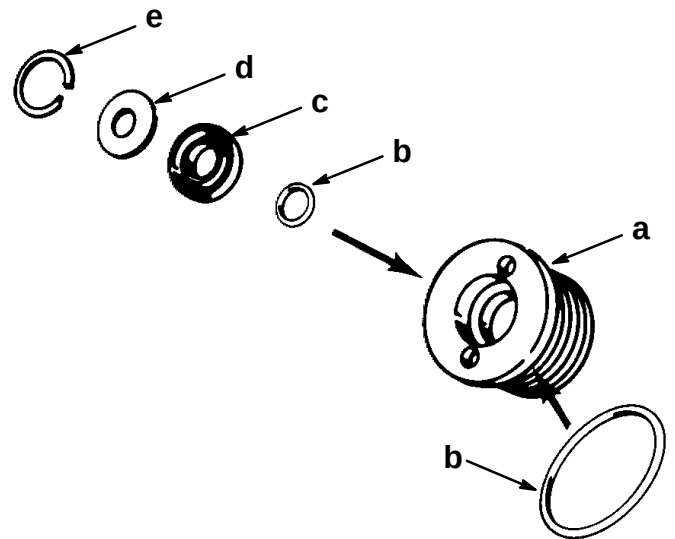
9. Remove shaft after Memory Piston Cup has been expelled. Replace allen plug removed in Step 5 and tighten securely.

CLEANING AND INSPECTION

1. Inspect all internal parts for damage or wear. Clean and replace parts as necessary.
2. Inspect tilt rod for scratches. Replace scraper seal in rod end cap if tilt rod is scratched or worn.
3. Slight scratches or tool marks less than 0.005 in. (0.1 mm) deep in cylinder are acceptable.

Scraper Seal Replacement

1. Remove components from end cap.



- a - Cap
- b - O-ring (2)
- c - Scraper Seal
- d - Washer
- e - Retaining Ring

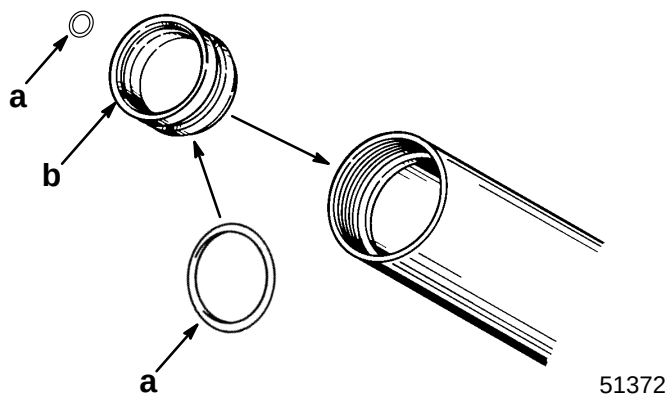


REASSEMBLY

IMPORTANT: Components must be clean for reassembly. Any debris in the system can cause the system to malfunction.

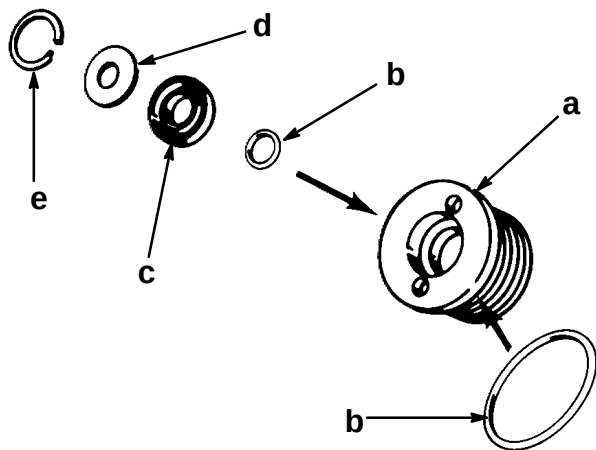
NOTE: Refer to "Tilt Ram Components" for proper O-ring sizes.

1. Apply Quicksilver Power Trim and Steering Fluid on O-rings prior to reassembly.
2. Install O-ring on Memory Piston Cup and install in cylinder.



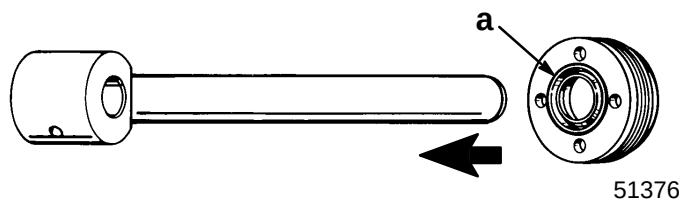
- a - O-ring
b - Memory Piston Cup

3. Assemble end cap.



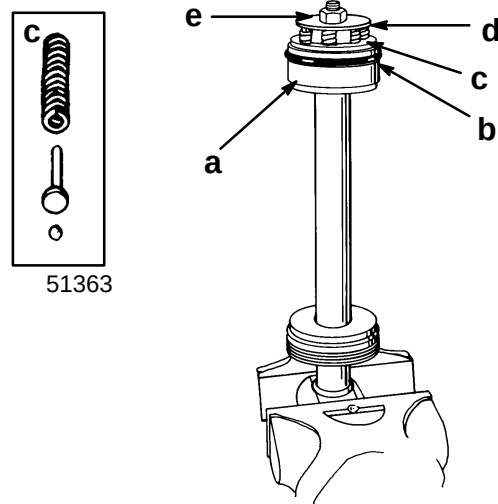
- a - End Cap
b - O-ring (2)
c - Scraper Seal
d - Washer
e - Retaining Ring

4. Install end cap.



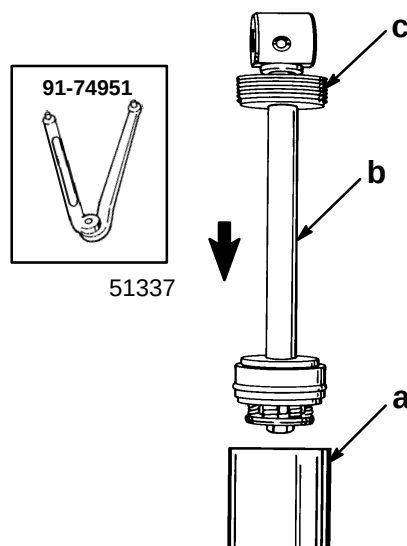
- a - End Cap

5. Install components on rod.



- a - Piston
b - O-ring
c - Check Valve Assembly (7)
d - Washer
e - Bolt or Locknut (Tighten securely)

6. Clamp cylinder in a soft jawed vise and install tilt rod assembly. Use spanner wrench and tighten end cap securely.

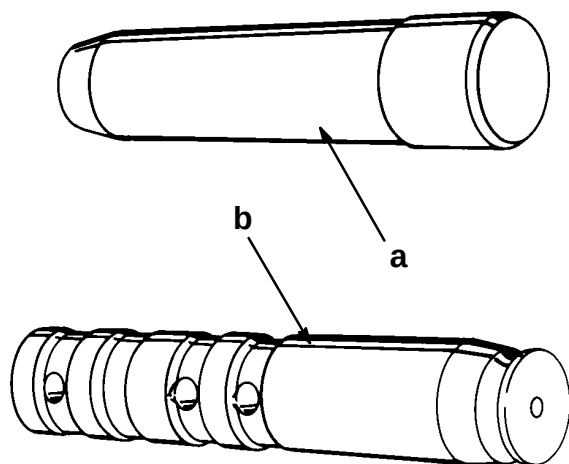


- a - Cylinder
b - Tilt Rod Assembly
c - End Cap (Tighten securely) - Use spanner wrench



TILT RAM ASSEMBLY INSTALLATION

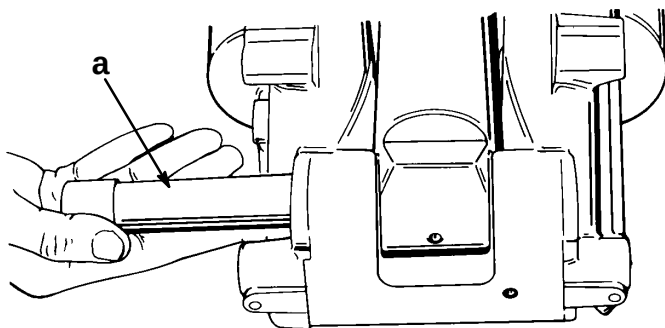
1. Lubricate alignment tool (91-11230) and shaft. Use Quicksilver Power Trim and Steering Fluid.



51369

- a - Alignment Tool (91-11230)
b - Shaft

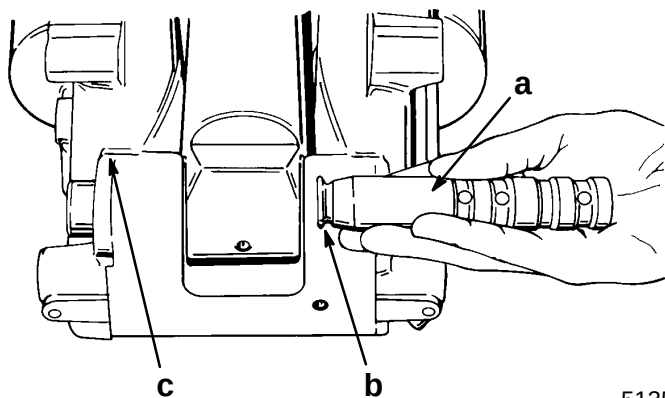
2. Align tilt ram and housing using alignment tool.



51348

- a - Alignment Tool (91-11230)

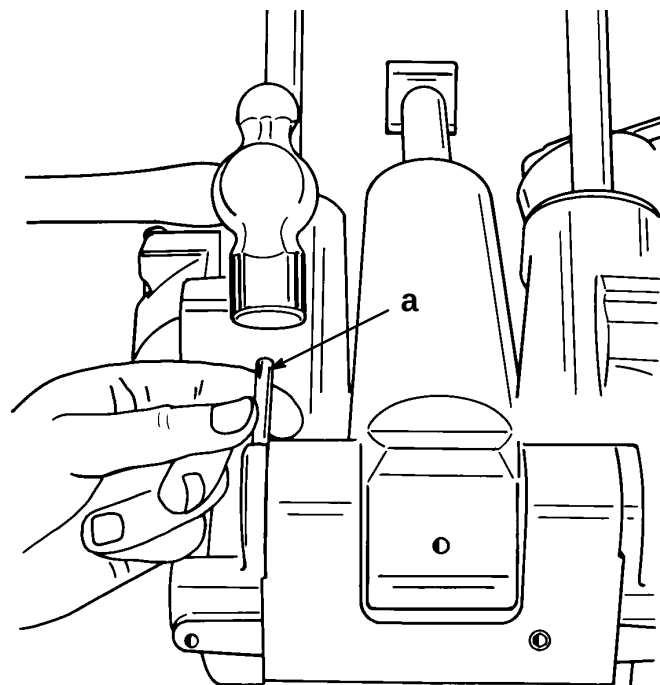
3. Install shaft.



51352

- a - Shaft
b - Groove
c - Hole [groove (b) will align with this hole]

4. Drive pin in until flush.



51356

- a - Pin (Drive against knurled end)

5. Install Power Trim Assembly on outboard. Refer to "Installation" instructions on pages 6B-16 and 6B-17.



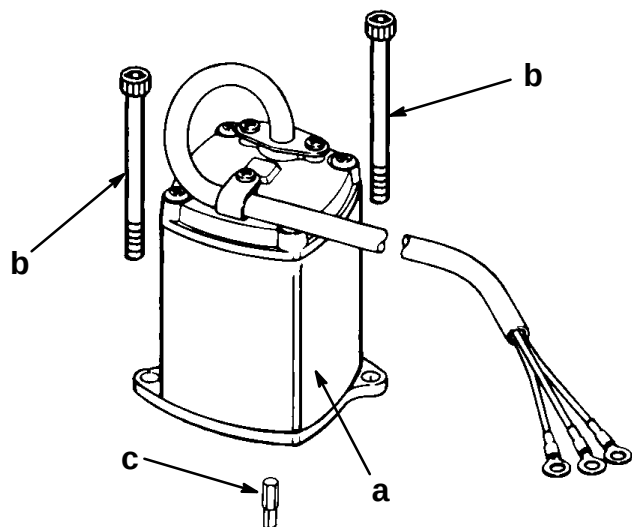
MOTOR AND PUMP REPLACEMENT

IMPORTANT: The pump is not rebuildable. If pump is defective, replace as an assembly.

NOTE: Power Trim System does not have to be removed from outboard to replace pump or motor.

1. Tilt outboard to full "UP" position. Depressurize power trim system, and loosen starboard transom bracket as outlined in "**Removal and Installation**" on page 6B-14.
2. Remove 2 screws to remove motor from system.

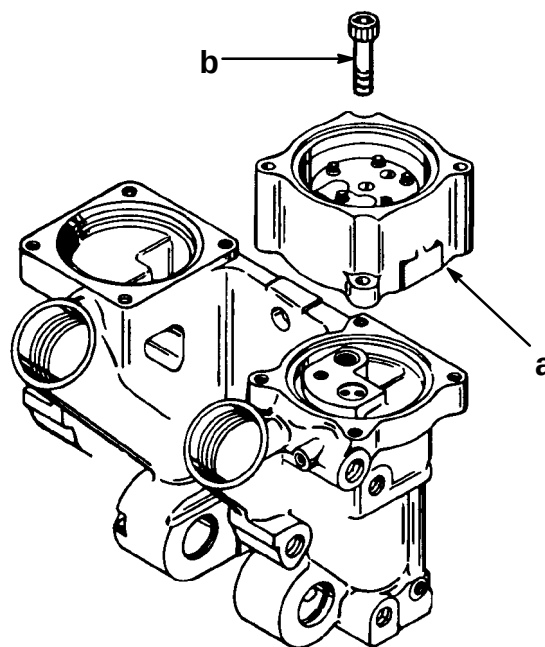
NOTE: Driveshaft is a loose part and may fall out of motor when motor is removed.



- a - Motor
- b - Screw (2)
- c - Driveshaft

51433

3. Remove two screws to remove pump.



- a - Pump
- b - Screw (2)

51433



Motor and Electrical Tests/Repair

Trim Pump Motor Test

⚠ WARNING

Do not perform this test near flammable materials, as a spark may occur while making electrical connections.

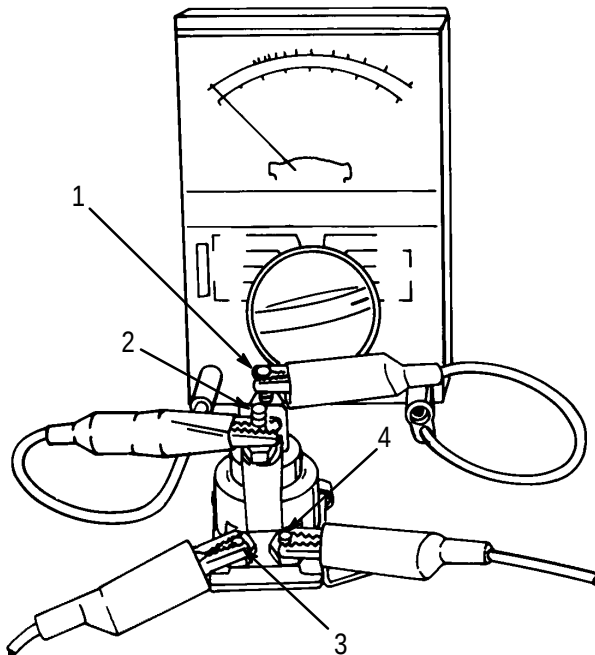
1. Connect a 12 volt power supply to motor wires [positive (+) to blue wire and negative (-) to black wire]. Motor should run. Disconnect blue wire and connect green wire to positive (+) terminal of power supply. Motor should run.
2. If motor does not run, disassemble and check components.

Solenoid Test

⚠ WARNING

Do not perform this test near flammable materials, as a spark may occur while making electrical connections.

1. Disconnect all wires from solenoid terminals.
2. Set an Ohmmeter to Rx1 scale and connect meter leads to solenoid terminals 1 and 2.
3. Connect a 12 volt power supply to terminals 3 and 4. Solenoid should click and meter should read zero (0) ohms (full continuity).

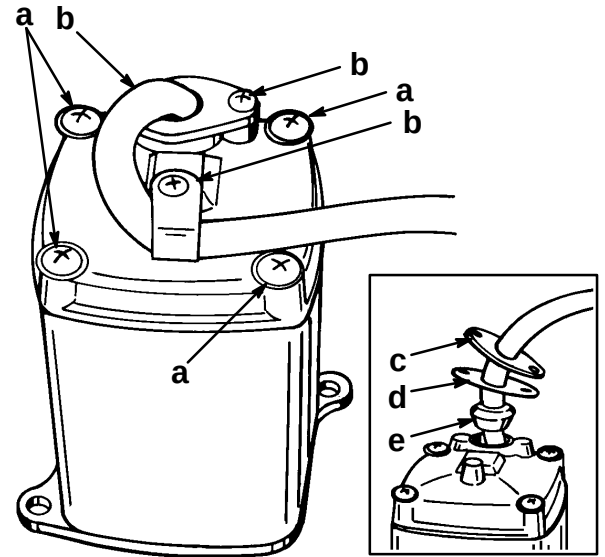


51338

4. If meter does not read zero (0) ohms, replace solenoid.

MOTOR DISASSEMBLY

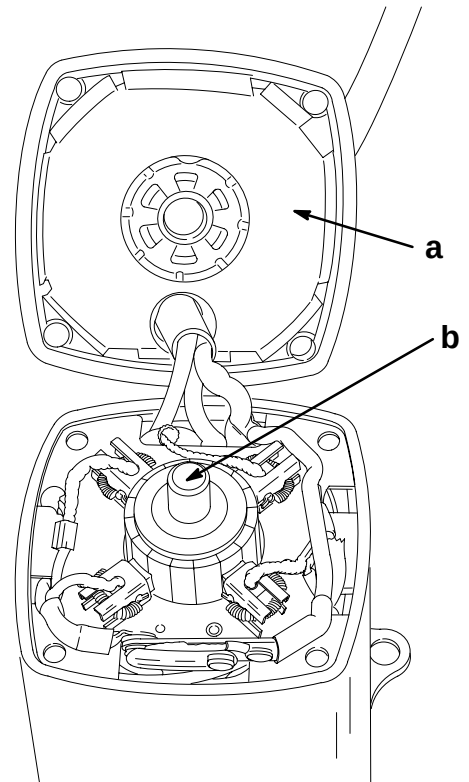
1. Remove screws and clamp.



51345

- a - Screw (4)
- b - Screw (3)
- c - Clamp
- d - Grommet
- e - Gasket

2. Lift motor from end cap. Use care not to drop armature.



18457

- a - End Cap
- b - Armature



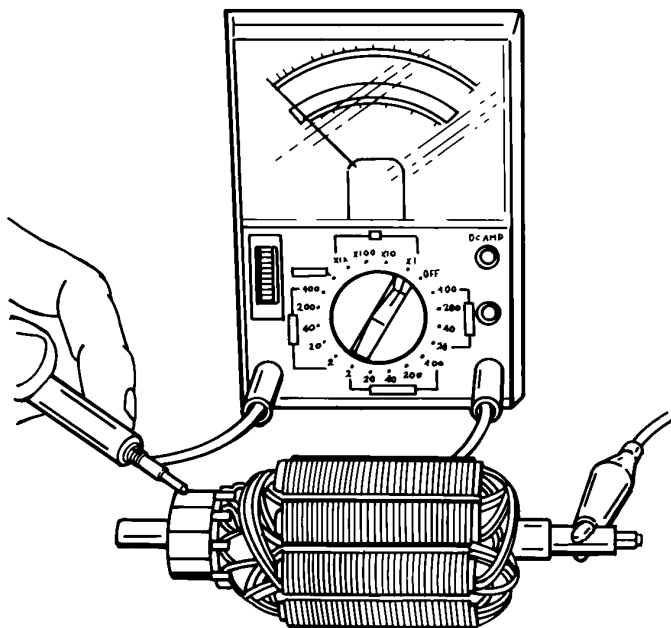
Armature Tests

TEST FOR SHORTS

Check armature on a Growler per the Growler manufacturer's instructions. Replace armature if a short is indicated.

TEST FOR GROUND

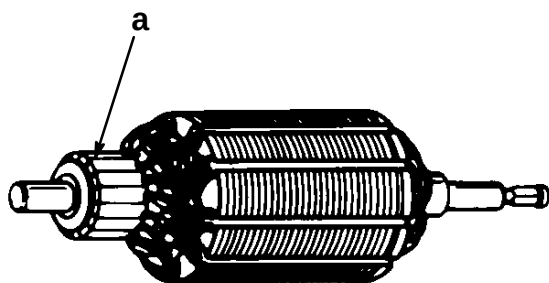
1. Use an Ohmmeter (R x 1 scale). Connect one lead on armature shaft and other lead on commutator. If continuity is indicated, armature is grounded. Replace armature.



51359

CHECKING AND CLEANING COMMUTATOR

1. If commutator is worn it may be turned on an armature conditioner or a lathe.
2. Clean commutator with "00" sandpaper.



a - Commutator

FIELD TESTS

IMPORTANT: Commutator end of armature must be installed in brushes when performing the following tests.

Ohmmeter Leads Between	Resistance (Ohms)	Scale Reading* (x _____)
Green and Blue Motor Wires	0	Full Continuity (R x 1)
Green and Black Motor Wires	0	Full Continuity (R x 1)
Blue and Black Motor Wires	0	Full Continuity (R x 1)
Black Motor Wire, and Frame (Motor Housing)	No Continuity	Full Continuity (R x 1)
Green Motor Wire, and Frame	No Continuity	Full Continuity (R x 1)
Blue Motor Wire, and Frame	No Continuity	Full Continuity (R x 1)

* If specified readings are not obtained, check for:

- defective armature
- dirty or worn brushes
- dirty or worn commutator

If defective components are found, repair or replace component(s) and retest.



Motor Repair

REMOVAL

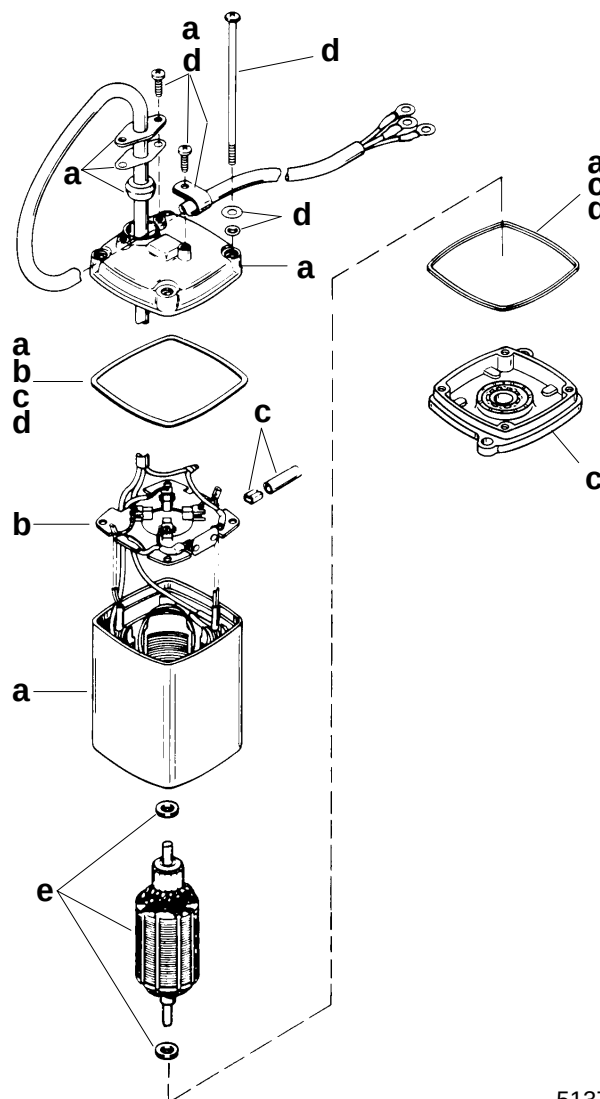
NOTE: Power Trim System does not have to be removed from outboard to repair/replace motor.

DISASSEMBLY

Refer to “**Motor Disassembly**” on page 6B-29 to disassemble motor from pump.

CLEANING AND INSPECTION

Inspect O-rings and replace if necessary. Clean, inspect, and test motor components. Refer to “**Brush Replacement,**” “**Armature Test,**” and “**Field Tests**” for inspection and test procedures.



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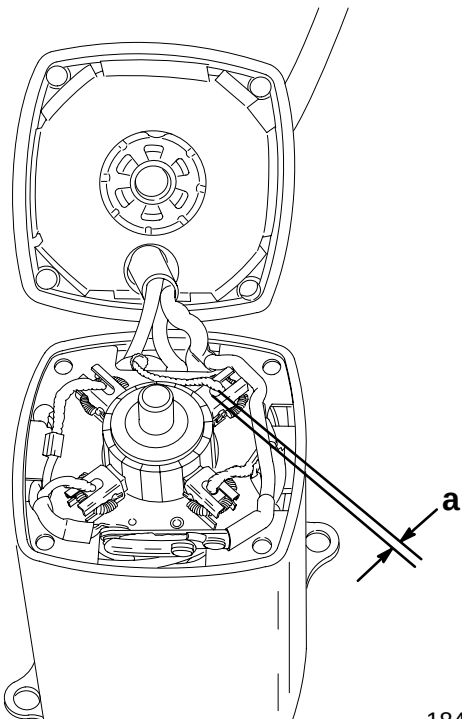
Power Trim Motor

- a - Frame and Field Kit
- b - Brush Card Kit
- c - End Frame Kit
- d - Seal Kit
- e - Armature Kit



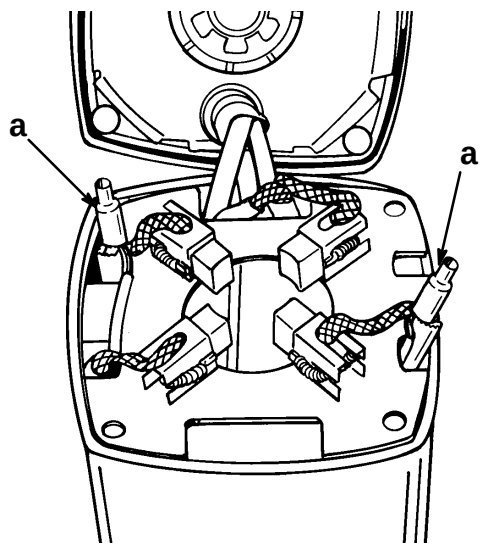
BRUSH REPLACEMENT

1. Brush replacement is required if brushes are pitted, chipped, or if distance (a) between the brush pigtail and end of brush holder slot is 1/16 in. or less. Check distance with armature installed.



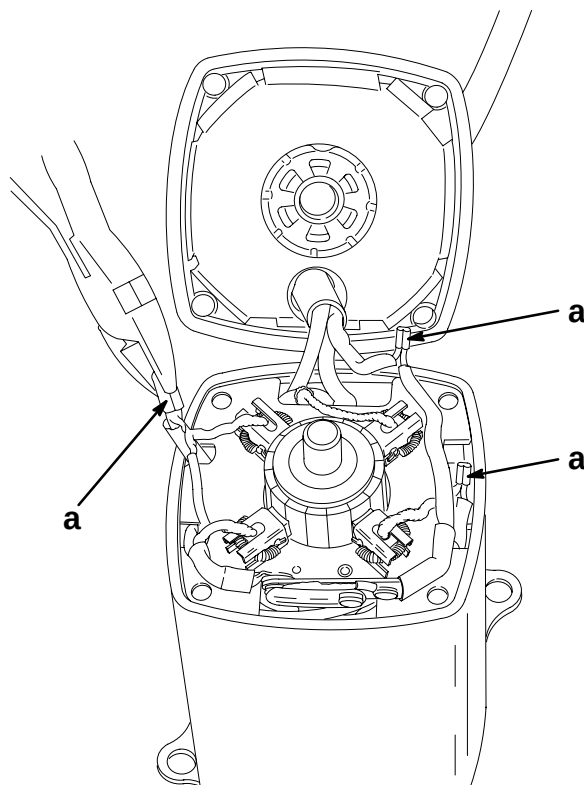
a - 1/16 in.

2. To replace brush card, remove insulators.



a - Insulators

3. Remove metal connectors.



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a - Metal Connectors

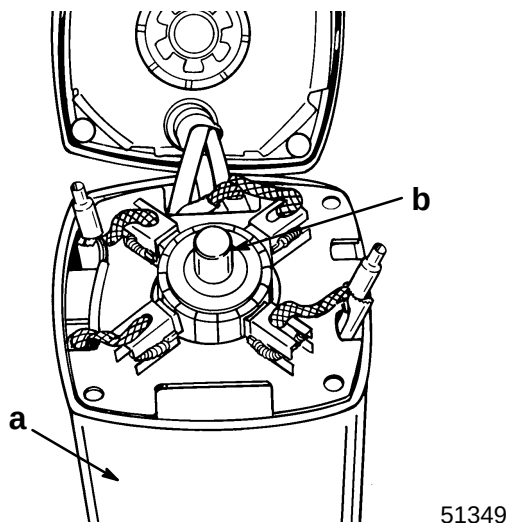
4. Install new brush card.
5. Crimp new metal connectors onto wires.
6. Insulate connections with heat shrink tubing.



Reassembly

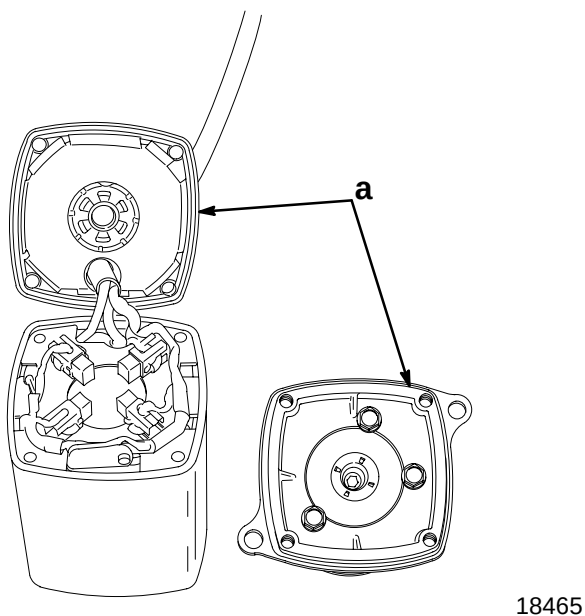
IMPORTANT: Components must be clean. Any debris in power trim system can cause system to malfunction.

1. Install armature in motor housing.



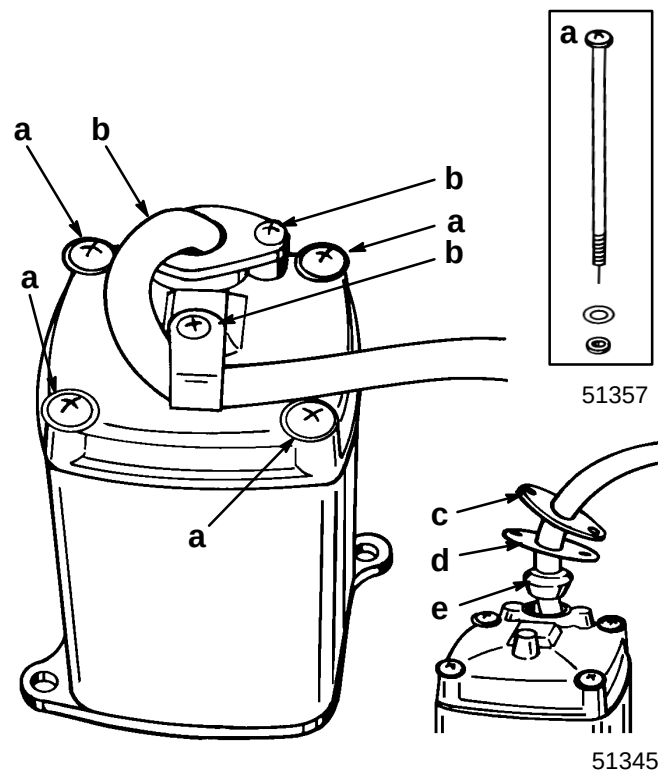
- a - Motor Housing
b - Armature (Spread brushes to insert commutator)

2. Install square-rings in end caps being careful that square ring is not twisted.



- a - Square-rings

3. Install screws and clamp. Tighten screws securely.



- a - Screw (4) - Contains flat washer and O-ring
b - Screw (3)
c - Clamp
d - Gasket
e - Grommet

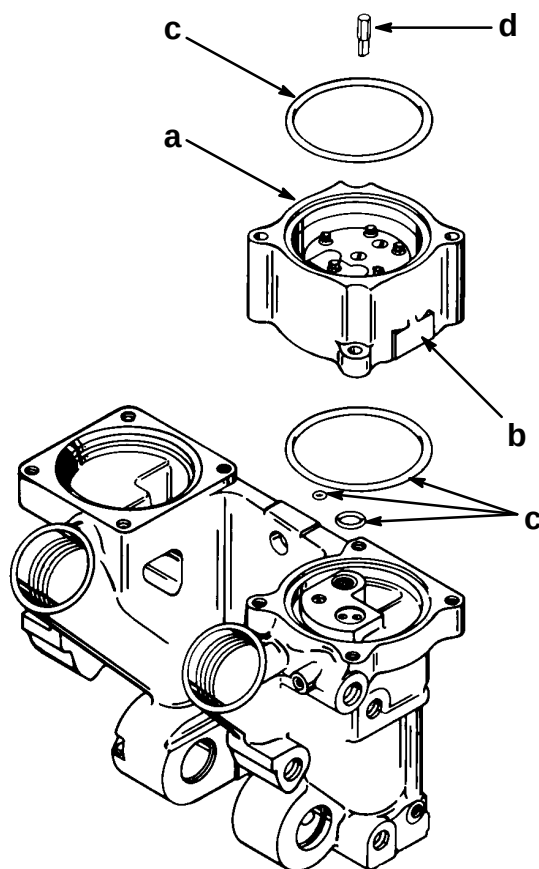


Reassembly - Motor and Pump

NOTE: Driveshaft is a loose part and may fall out of position.

1. Install pump onto power trim manifold. Insure O-rings are in proper locations. Secure with two (2) screws. Torque screws to 70 lb. in. (7.9 N·m).

IMPORTANT: Install pump with location flat facing towards starboard transom bracket.

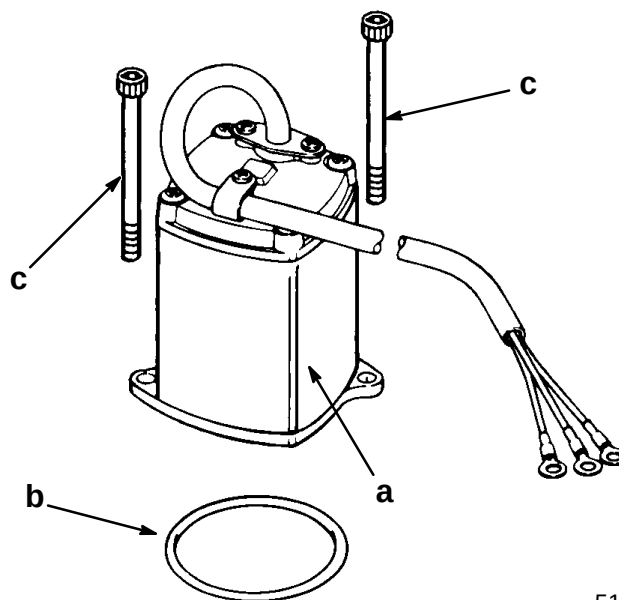


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- a - Pump (Flat towards starboard transom bracket)
- b - Flat (Faces starboard transom bracket)
- c - O-rings (4)
- d - Driveshaft (Install in **center** hole in pump)

2. Fill pump with Quicksilver Power Trim and Steering Fluid prior to installing motor.
3. Install motor, secure with two (2) screws. Route wiring; refer to Wiring Diagrams in this service manual. Torque screws to 70 lb. in. (7.9 N·m).

NOTE: Insure motor and driveshaft are aligned.



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- a - Motor
- b - O-ring
- c - Screw (2) - Torque screws to 70 lb. in. (7.9 N·m)

4. Complete reassembly of Power Trim System as outlined in “**Installation**” on page 6B-15 and 6B-16.

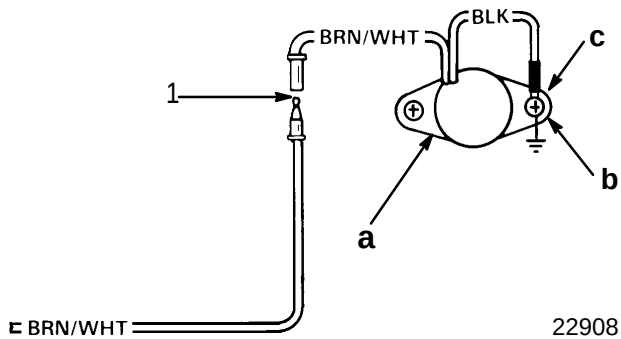
Priming Power Trim System

1. Fill system with Quicksilver Power Trim and Steering Fluid or Automatic Transmission Fluid (ATF) Type F or FA. Refer to “**Fill, Check, and Purge**” on page 6B-5.

IMPORTANT: Run Trim System in short “jogs” until pump motor primes and trim system moves. If trim motor is run without priming pump, driveshaft failure could result.

Trim Sender (Optional Accessory) Test

1. Check trim sender black lead for proper ground.
2. Trim outboard to full “DOWN” position.
3. Place ignition switch to “ON” position.
4. Connect Ohmmeter (R x 1 scale) leads between outboard ground and Point 1.
5. Depress “UP” button. Ohmmeter needle should move as the outboard is trimmed up. If needle does not move, trim sender is defective.

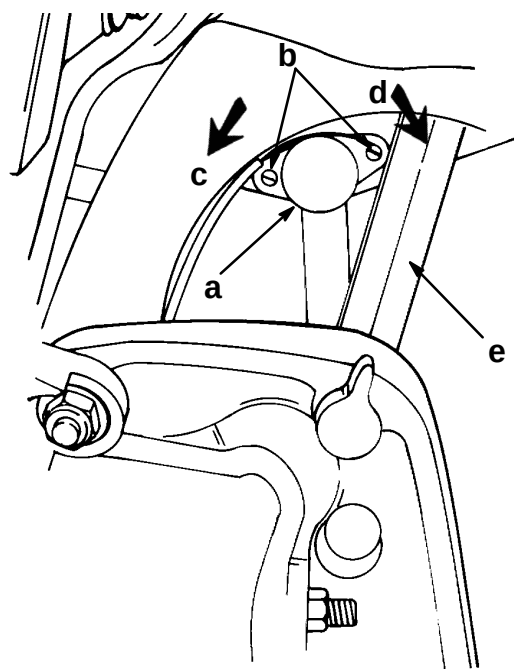


- a - Trim Sender
- b - Connect with screw and hex nut (coat with liquid neoprene).
- c - Rubber Sleeve (Slide over connection)

Trim Indicator Gauge Needle Adjustment

1. Turn ignition key to "RUN" position.
2. Tilt outboard to full "IN" position. Needle of trim indicator gauge should be in full "IN" position.
3. If not, tilt outboard to full "OUT" position to gain access to trim sender and engage tilt lock lever.
4. Loosen trim sender screws and reposition trim sender.

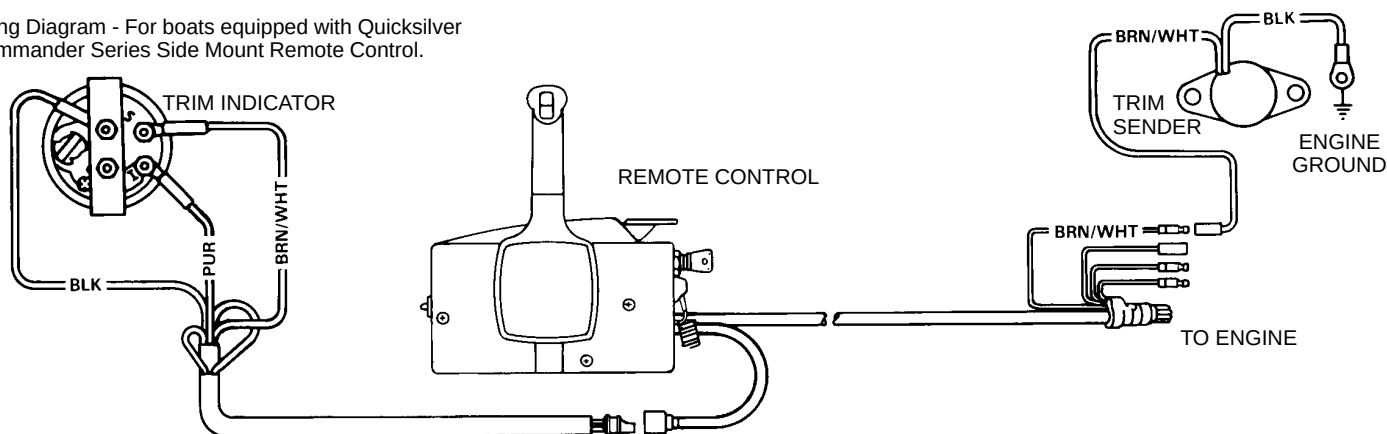
5. Tighten trim sender screws.



- a - Trim Sender
- b - Screws, loosen to rotate sender
- c - Turn sender **counterclockwise** to raise needle reading.
- d - Turn sender **clockwise** to lower needle reading.
- e - Tilt Lock Lever

Trim Indicator Wiring Diagrams

Wiring Diagram - For boats equipped with Quicksilver Commander Series Side Mount Remote Control.



Wiring Diagram - For boats equipped with Quicksilver Ignition/Choke and Main Harness Assembly.

