



MID-SECTION

Section 5C – Power Trim - Design II (Oildyne)

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Power Trim Specifications

POWER TRIM	Design II (Oildyne) Trim “UP” Trim “DOWN”	2000 PSI (91kg/cm ²) Maximum Pressure 600 PSI (35kg/cm ²) Minimum Pressure
	Leak Down Design I & II	Maximum Acceptable Amount of Leak Down in 24 hours is 1 in. (25.4 mm)



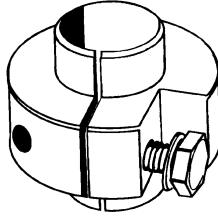
Special Tools

1. Alignment Tool 91-11230



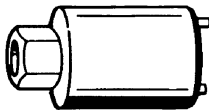
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2. Trim Rod Removal Tool 91-44486A1



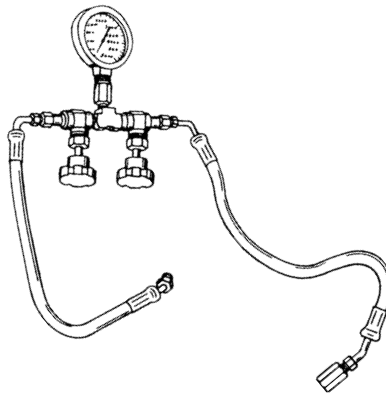
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3. Trim Rod Guide Removal Tool 91-44487A1



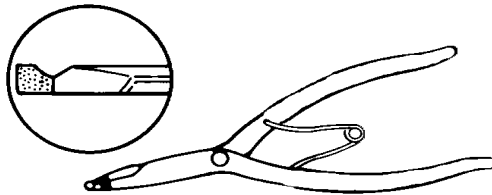
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4. Power Trim Test Gauge Kit 91-52915A6



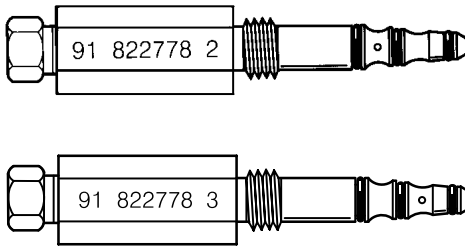
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5. Lock-Ring Pliers P/N SRP-4 (Snap-On)



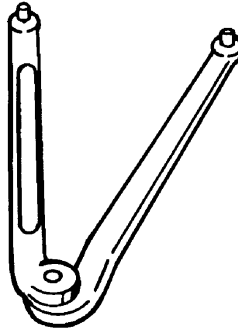


6. Adaptor Fitting 91-82278A2 and 91-82278A3



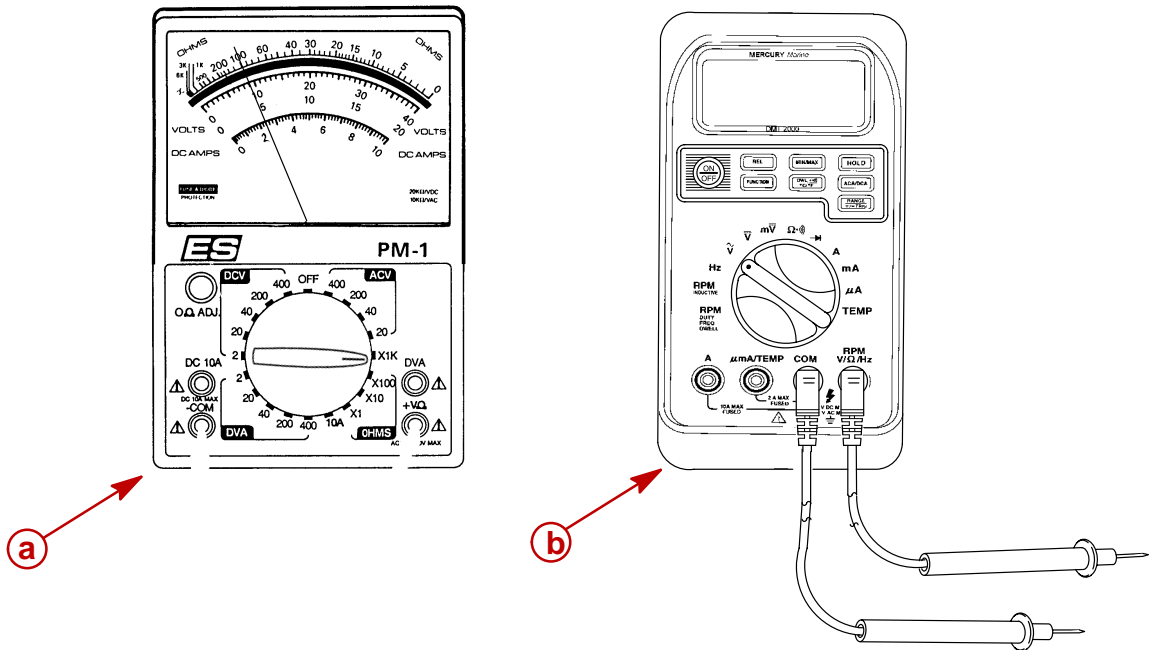
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7. Spanner Wrench 91-74951



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8. Multi-Meter DVA Tester 91-99750A1 or DMT 2000 Digital Tachometer Multi-meter 91-854009A1

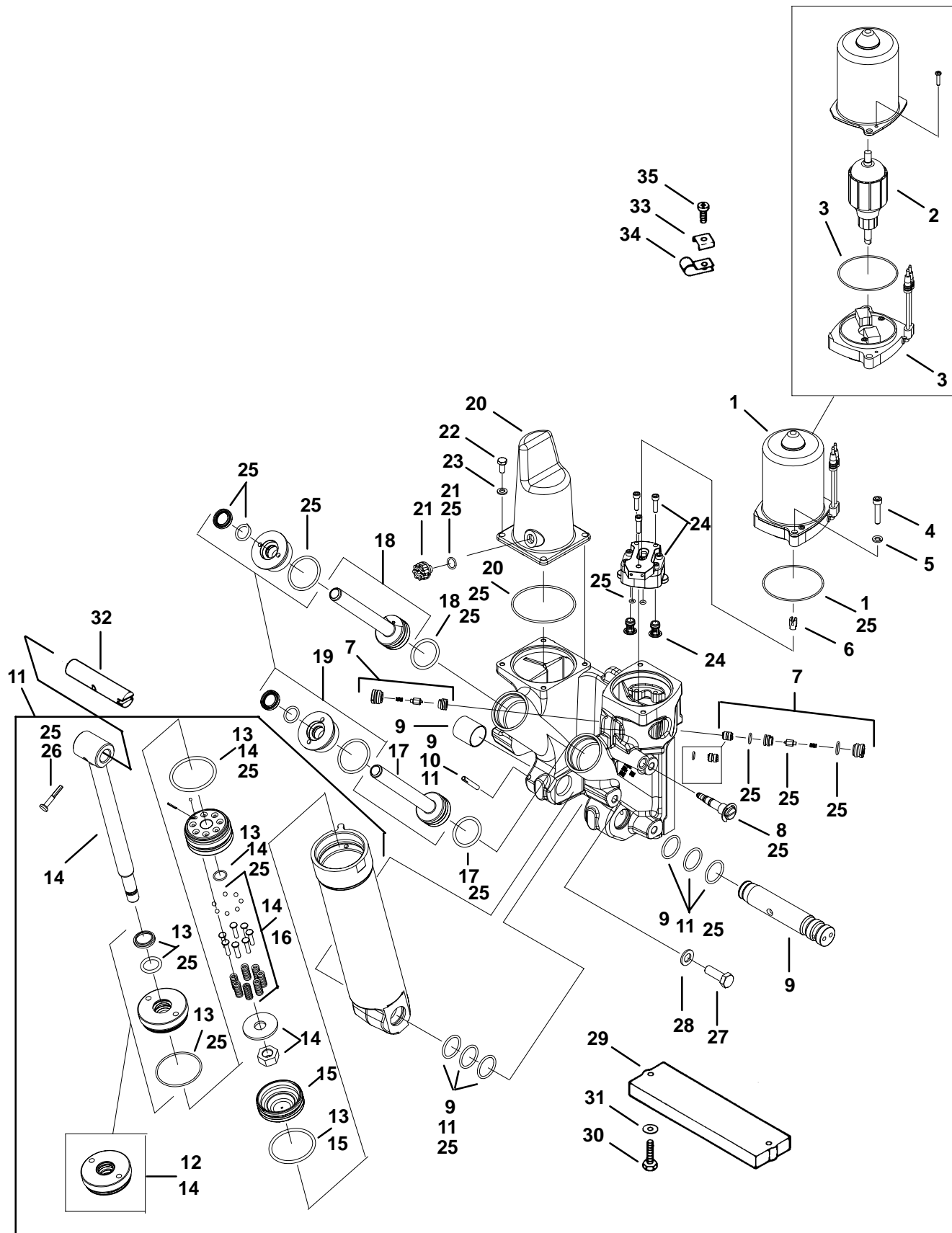


a - Multi-Meter DVA Tester 91-99750A1

b - DMT 2000 Digital Tachometer Multi-meter 91-854009A1



Power Trim Components





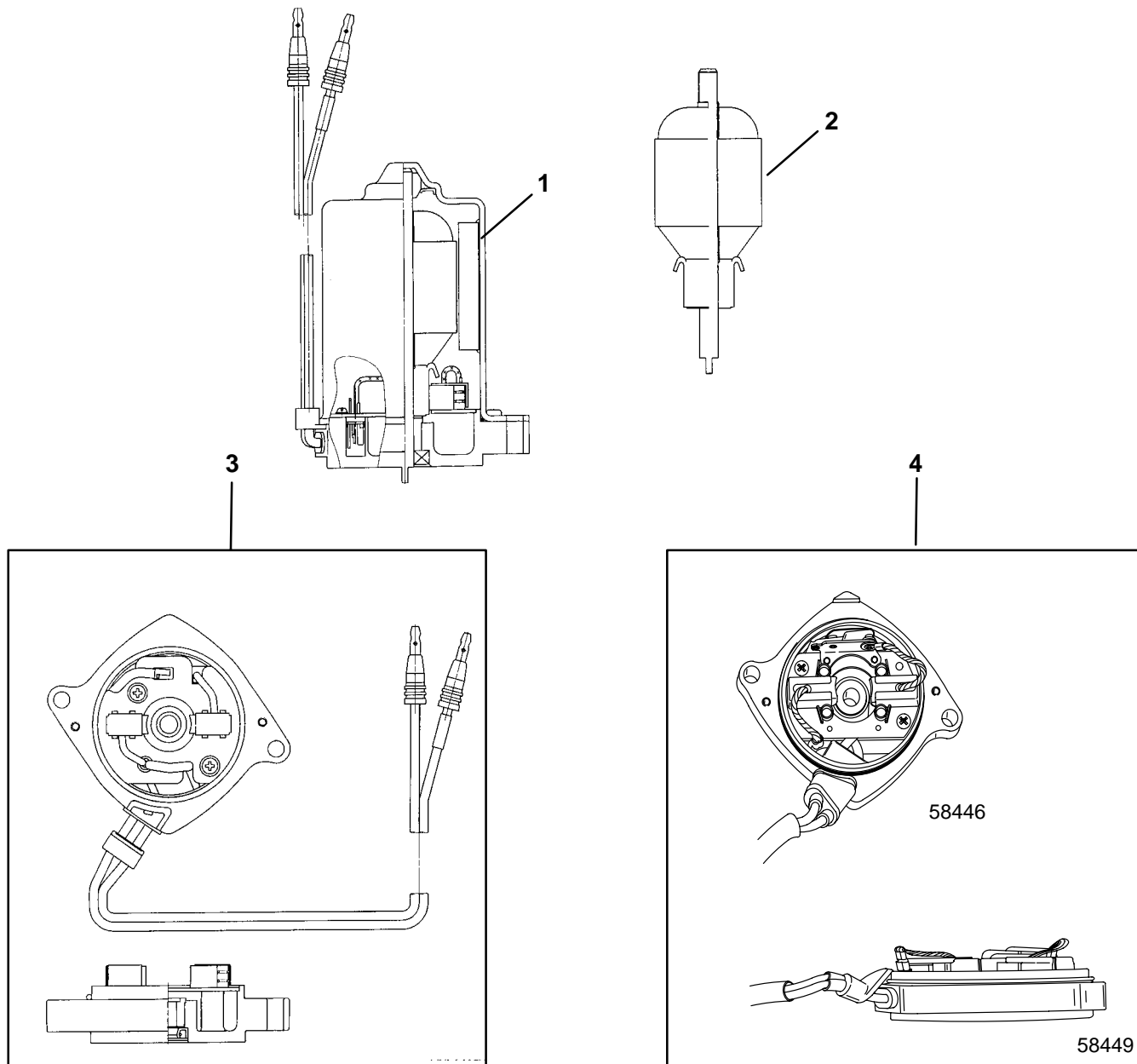
Power Trim Components

REF. NO.	QTY.	DESCRIPTION	TORQUE		
			lb-in	lb-ft	Nm.
-	1	POWER TRIM ASSEMBLY-Complete			
1	1	TRIM MOTOR			
2	1	ARMATURE			
3	1	END FRAME			
4	2	SCREW (M6 x 30)	80		9
5	2	LOCKWASHER			
6	1	DRIVE SHAFT			
7	1	CHECK VALVE KIT	120		13.5
8	1	RELIEF VALVE ASSEMBLY	22		2.5
9	1	SHAFT KIT (Includes. Ref. #26)			
10	1	GROOVE PIN			
11	1	TILT CYLINDER ASSEMBLY			
12	1	END CAP (Includes. Ref. #26)		45	61
13	1	O RING KIT (Includes. Ref. #26)			
14	1	SHOCK ROD KIT		95	129
15	1	MEMORY PISTON			
16	1	CHECK VALVE REPAIR KIT (Includes. Ref. #26)			
17	1	STARBOARD TRIM ROD			
18	1	PORT TRIM ROD			
19	2	END CAP TRIM ROD		70	95
20	1	RESERVOIR KIT			
21	1	PLUG KIT	22		2.5
22	4	SCREW (M6 x 14)	60		7
23	4	WASHER			
24	1	PUMP KIT			
25	1	POWER TRIM REPAIR KIT			
26	1	GROOVE PIN			
27	6	SCREW (M10 x 30)		45	61
28	6	WASHER			
29	1	ANODE			
30	2	SCREW (M6 x 25)	70		8
31	2	WASHER			
32	1	SHAFT			
33	1	C WASHER			
34	2	CLIP			
35	2	SCREW (10-16 x 5/8)			Drive Tight

NOTE: Lubricate all o-rings with ATF Dexron III or Power Trim and Steering Fluid.



Power Trim Motor



REF. NO.	QTY.	DESCRIPTION	TORQUE		
			lb.in.	lb.ft.	N-m
-	1	POWER TRIM MOTOR			
1	1	BRUSH AND SEAL KIT			
2	1	ARMATURE KIT			
3	1	END FRAME (Complete)(MODEL YEAR 2000)			
4	1	END FRAME (Complete)(MODEL YEAR 2001)			



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 below 23 in. (584.2 mm) 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 relay (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 cause 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 relay (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.

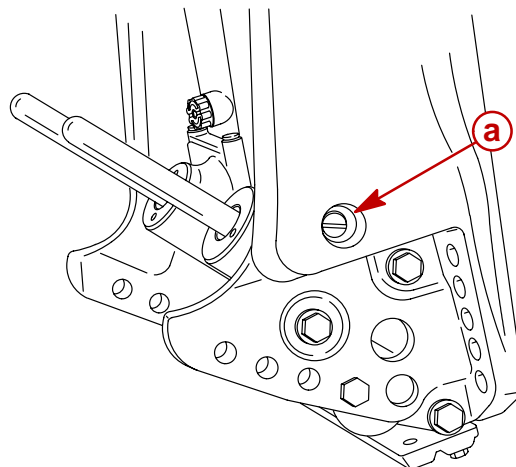
If the outboard must be tilted for clearance between skeg and pavement, a device such as a “Transom Saver” should be installed to prevent stress to boat transom from outboard weight while the boat/outboard are being trailered.

Tilting Outboard Manually

⚠ WARNING

Before opening the manual release valve, 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.



a - Manual Release Valve

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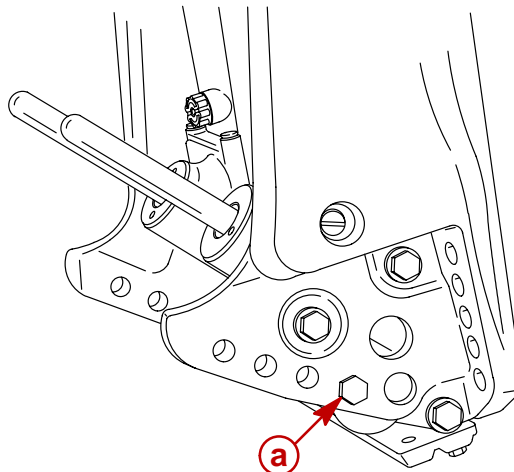


Trim “In” Angle Adjustment

⚠ 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 may be advantageous to acceleration and planing. A water test is required to determine if these characteristics apply to a particular boat/motor combination.

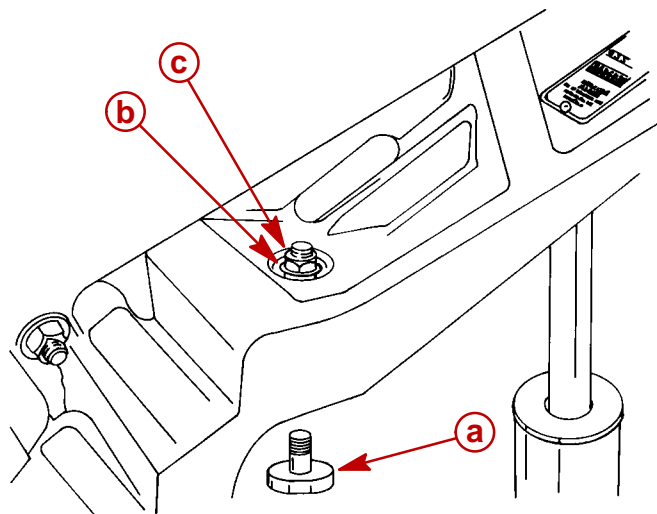


a - Trim Angle Adjustment Bolt

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Striker Plate Replacement

Visually inspect striker plates and replace if worn excessively.



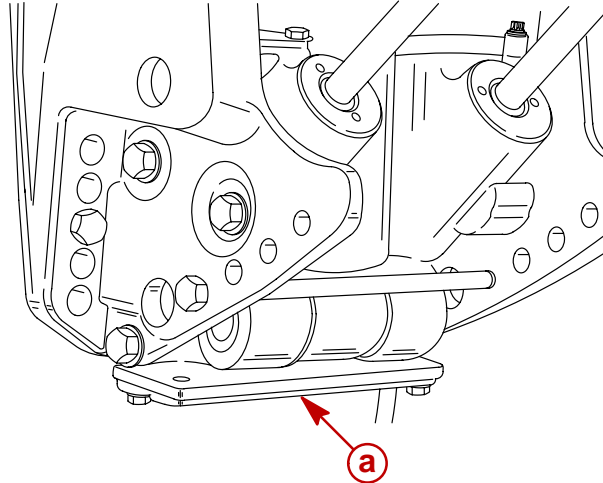
- a** - Striker Plate (2)
- b** - Lockwasher
- c** - Locknut. Torque to 80 lb. in. (9 Nm)

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Anode Plate

Anode plate 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.



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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).

Check, Fill and Purge - Power Trim System

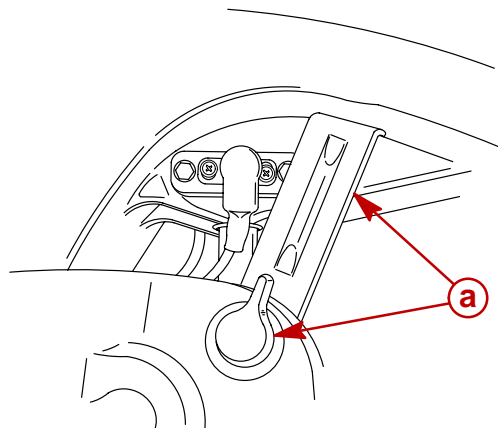
TO CHECK:

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.

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

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

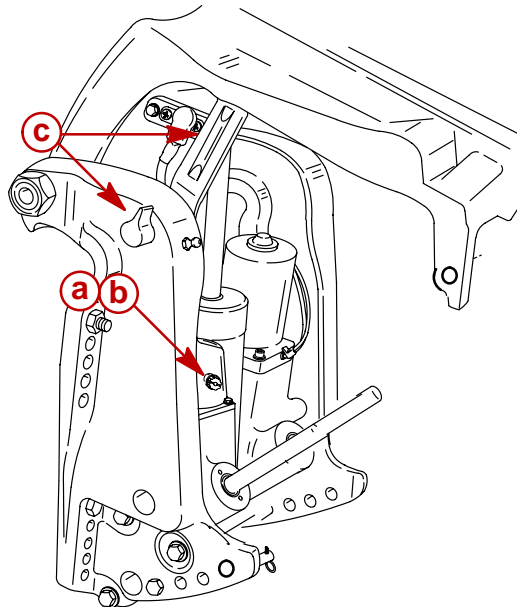


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a - Tilt Lock Lever

**TO FILL:**

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.



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- a** - Fill Plug and O-ring (remove to fill system, tighten securely)
- b** - Fill system with Quicksilver Power Trim and Steering Fluid
- c** - Tilt Lock Lever (engage to support engine in “Up” position)

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.



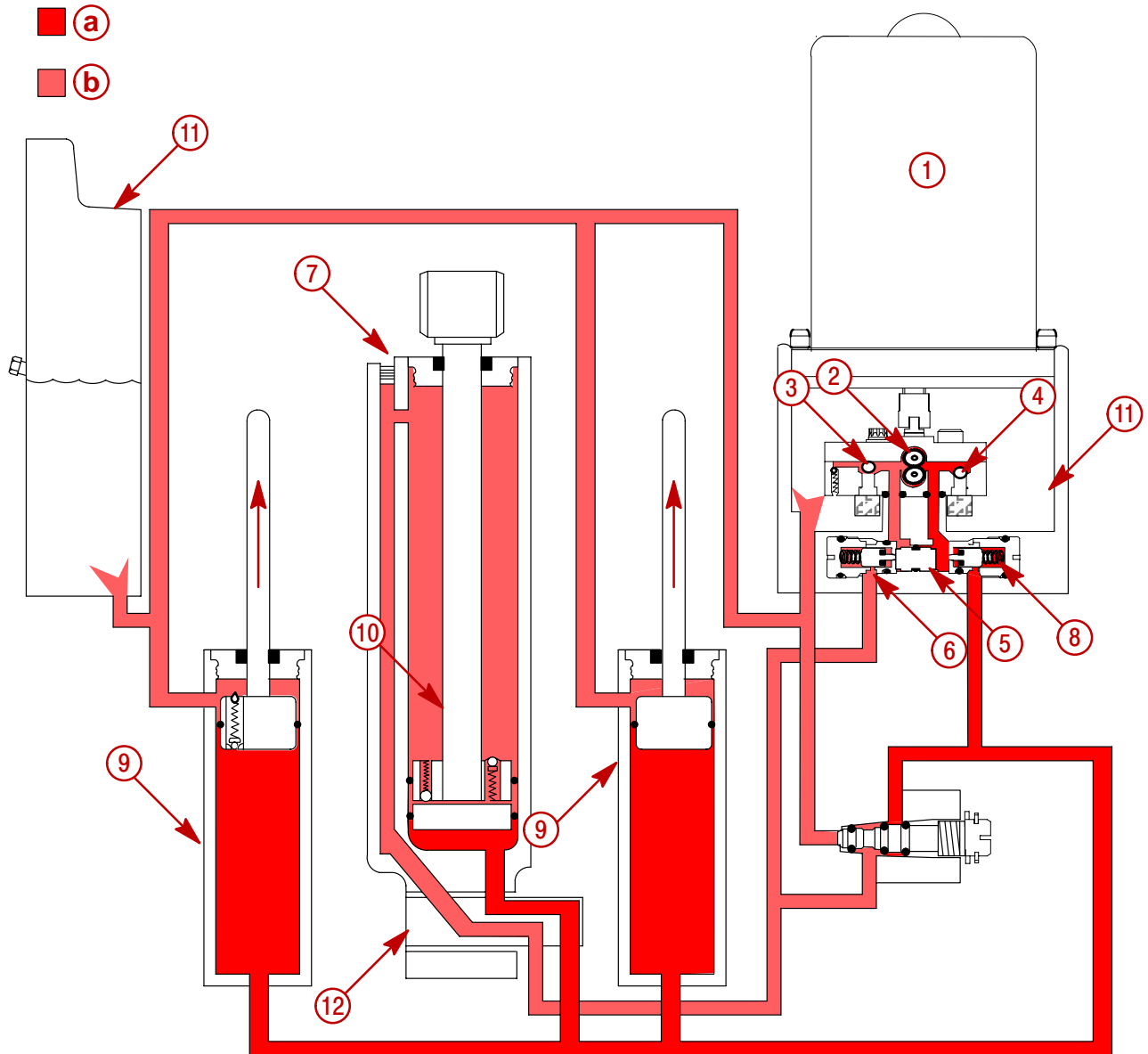
Trim Circuit

When the up button is activated the electric motor (1) will rotate the oil pump gears (2). As the oil pump gears begin to rotate, oil is drawn through the up circuit suction check valve (3) and into the pump, supplying flow for the up circuit. Oil under pressure opens the up circuit pressure operated valve (8), allowing oil enter the up pressure passages inside the manifold casting. The oil continues on through the up passages into the bottom of the cylinders below the pistons, pushing the trim (9) and tilt (10) rams up and out. Oil, from the pump, is blocked from returning into the reservoir by the closed down suction check valve (4). Oil, under pressure slides the shuttle spool (5) to the left, against the down circuit pressure operated valve (6). The shuttle spool will mechanically open the down pressure operated valve, allowing oil to return into the pump from top of the tilt cylinder (7). Oil returning from the top side of the tilt cylinder piston flows through an interconnecting passage on the side of the tilt cylinder, through the lower pivot pin (12), past the open down pressure operated valve, and into the pump, supplying some of the oil required for the up circuit. Oil returns into the reservoir (11), from the trim rams, through passages cast inside of the manifold.

Up pressure varies from 850 psi to 1150 psi unloaded to approximately 3000 psi against full engine thrust.



Trim Circuit



- a** - High Pressure
- b** - Low Pressure
- 1** - Electric Motor
- 2** - Oil Pump/Gears
- 3** - Up Circuit Suction Check Valve
- 4** - Down Circuit Suction Check Valve
- 5** - Shuttle Spool
- 6** - Down Circuit Pressure Operated Valve
- 7** - Tilt Cylinder
- 8** - Up Circuit Pressure Operated Valve
- 9** - Trim Cylinders
- 10** - Tilt Cylinder Piston
- 11** - Reservoir
- 12** - Lower Pivot Pin



Tilt Circuit

In the up mode, as the trim rams (1) reach the limit of their travel, the mechanical check valve (2) of the trim relief valve, in the port trim ram piston (3), contacts the cylinder cap. The “pin” contact with the cover mechanically opens the shut off valve, allowing the trim relief valve to bypass oil and perform the following functions.

- Trim Limit

While the engine is running under thrust (at high engine RPM), the high pressure develops below the pistons. The high pressure will open the check ball on the bottom of the trim relief valve (850-1150 psi), allowing oil to flow through the port trim ram piston. If the operator continues to depress the “up” button, the up pressure will not be sufficient to overcome the propeller thrust, so the trim range is limited to the length of the trim rams. When the engine thrust falls (low engine rpms), the check ball in the trim relief valve closes, allowing oil flow to extend the tilt cylinder ram into the tilt range.

- Over Trim At High Thrust

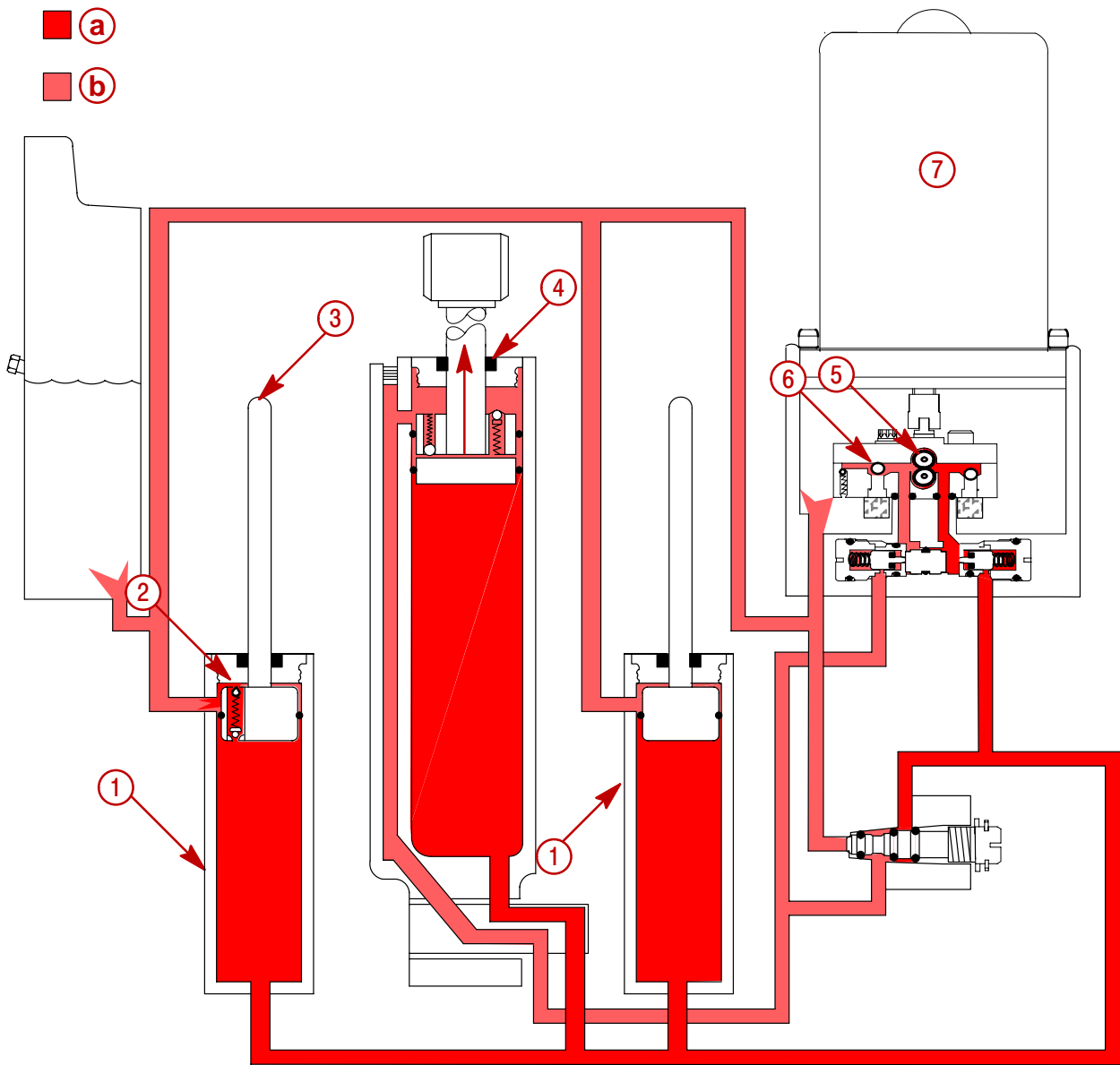
As the operator increases the engine rpms when the engine is raised beyond the trim range, the pressure below the pistons begin to rise. When the pressure is sufficient, the high pressure will open the check ball on the bottom of the trim relief valve (850-1150 psi), allowing oil to flow through the port trim ram piston. Oil will continue to flow through the valve until either the engine contacts the trim rams and the mechanical shut off valve closes or the engine rpm's are reduced.

- Maximum Up Pressure Reduction

As the tilt ram extends to its limit, the up pressure below the pistons will increase and open the trim relief check valve to relief the up pressure. If the up button is not released, the up flow will continue to dump over relief causing the electric motor to heat up. The thermal overload switch inside the motor will open, stopping the motor.



Tilt Circuit



- a** - High Pressure
- b** - Low Pressure
- 1** - Trim Cylinders
- 2** - Trim Relief Valve
- 3** - Port Trim ram
- 4** - Tilt Cylinder
- 5** - Pump/Gears
- 6** - Up Circuit Suction Check Valve
- 7** - Electric Motor

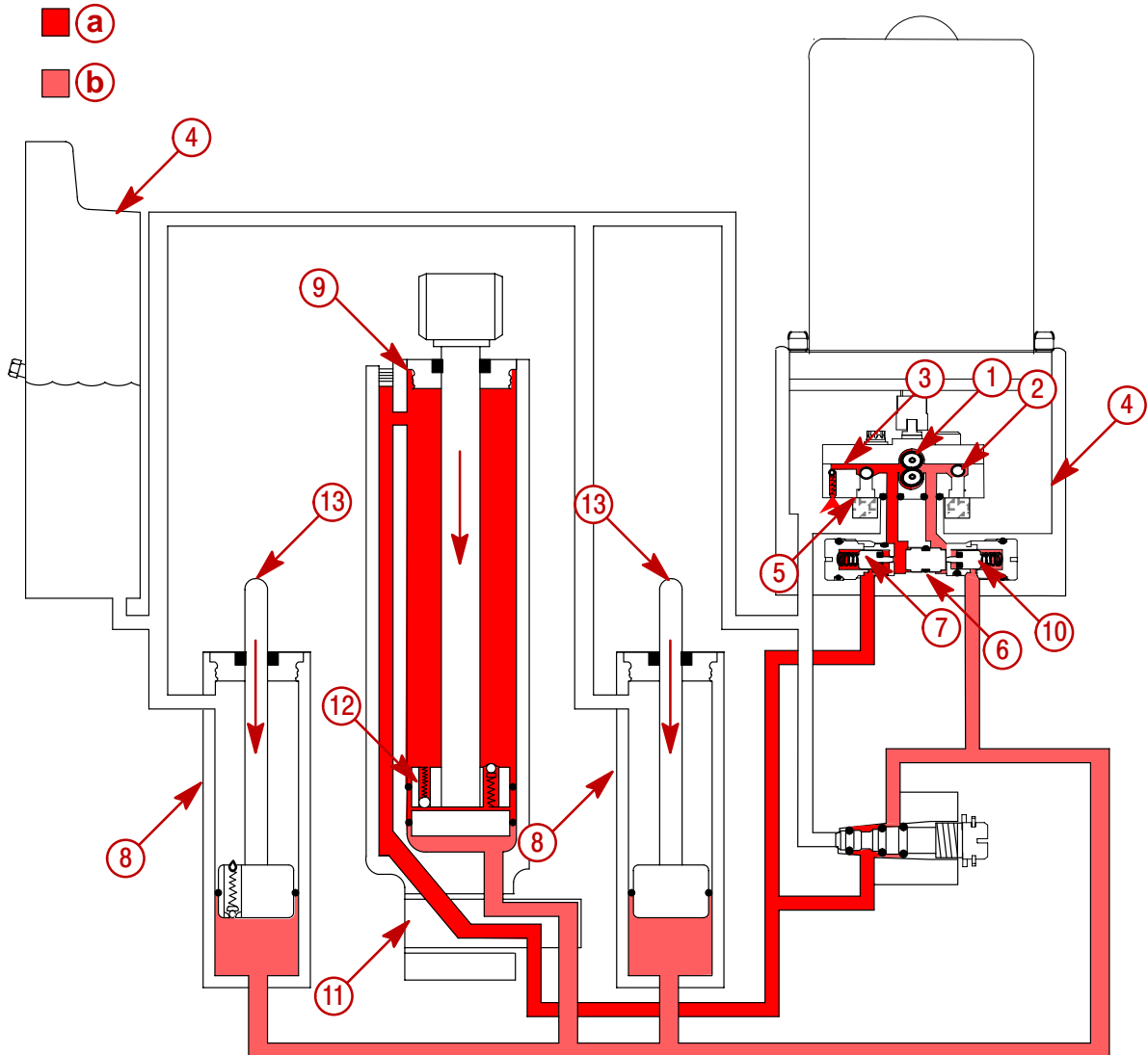


Down Circuit

When you depress the down button, the power trim pump (1) is activated in the opposite direction. As the oil pump gears begin to rotate, oil is drawn through the down circuit suction check valve (2) and into the pump, supplying flow for the down circuit. Down circuit oil pressure is lowered by the down pressure regulating valve (3) (640 psi to 1050 psi) allowing excess oil to return into the reservoir (4). Oil is blocked from returning into the reservoir by the closed up circuit suction check valve (5). Oil under pressure then moves the shuttle spool (6) to the right, mechanically opening the “up” pressure operated valve (7), allowing oil from the bottom of the trim (8) and tilt cylinders (9) to supply oil to the trim pump for the down circuit. At this same time, oil under pressure opens the down circuit pressure operated valve (10) allowing oil to exit through the down pressure port. The oil then continues through the down pressure passage, through the pivot pin (11), and into the interconnecting passage of the tilt cylinder leading to the cavity above the shock piston (12), and pushes the piston and ram assembly in (down). As the outboard engine contacts the extended trim rams (13), the weight of the motor, propeller thrust and pump down pressure will force the trim rams to retract.



Down Circuit



- a** - High Pressure
- b** - Low Pressure
- 1** - Pump/Gears
- 2** - Down Circuit Suction Check Valve
- 3** - Down Pressure Regulating valve
- 4** - Reservoir
- 5** - Up Circuit Suction Check Valve
- 6** - Shuttle Spool
- 7** - Up Circuit Pressure Operated Valve
- 8** - Trim Cylinders
- 9** - Tilt Cylinder
- 10** - Down Circuit Pressure Operated Valve
- 11** - Pivot Pin
- 12** - Shock Piston
- 13** - Trim Ram



Trail Over System

Should the outboard motor strike a submerged object with light steady pressure, while in forward motion, oil will build up sufficient pressure in the top of the tilt cylinder (4) to open the piston trail over relief valve (7) (600 psi). Oil on the bottom side of the cylinder is locked in by the up circuit pressure operated valve (1) and manual tilt valve (3). Therefore, the piston trail over relief valve allows the oil from the down side cavity of the trim cylinder to pass through the piston trail over relief valve, into the area between the tilt ram piston (5) and the memory piston (6). The return valve (8) allows the oil to return through the piston, back to the down side cavity as the outboard returns to its normal running position. Propeller thrust and the weight of the outboard provides the return motion for the engine.

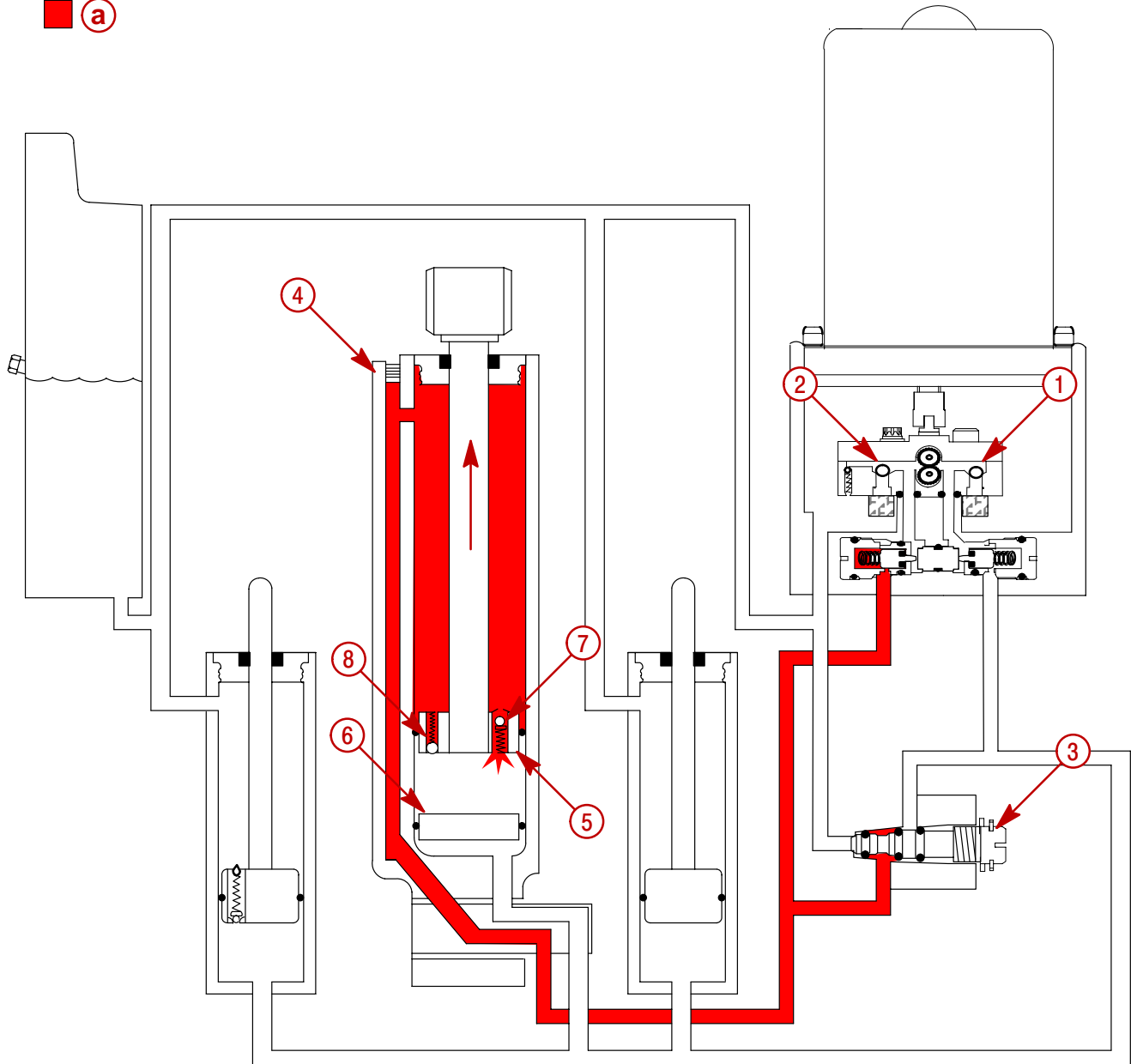
Shock System

When a submerged object is hit with great force, oil will build up sufficient pressure in the top of the tilt cylinder (4) to open both the trail over valve and the piston impact relief valves (7) (3200 psi). Oil on the bottom side of the cylinder is locked in by the up circuit pressure operated valve (1) and manual tilt valve (3). Therefore, the piston impact relief valve allows the oil from the down side cavity of the trim cylinder to pass through the piston impact relief valve, into the area between the tilt ram piston (5) and the memory piston (6). The return valve (8) allows the oil to return through the piston, back to the down side cavity as the outboard returns to its normal running position. Propeller thrust and the weight of the outboard provides the return motion for the engine.



Trail Over and Shock Absorber

a



- a** - High Pressure
- 1** - Up Circuit Pressure Operated Valve
- 2** - Down Circuit Pressure Operated Valve
- 3** - Manual Tilt Valve
- 4** - Tilt Cylinder
- 5** - Shock Piston
- 6** - Memory Piston
- 7** - Impact Relief & Trail over Valves
- 8** - Return Valve



Manual Tilt System

If the outboard motor is to be raised or lowered manually, turn the manual release (tilt) valve (1) counterclockwise approximately 3 turns to the full out position. When in the full (out) position, oil in the tilt cylinder (2) can flow freely from the up side to the down side or from the down side to the up side. The oil return line into the reservoir (3) is also open, allowing free oil flow to either side of the tilt cylinder to accommodate the differential oil capacities between the tilt cylinder up side and down side cavities.

When trimming the outboard in either the up or down position, with the manual tilt valve open or leaking, little or no movement will occur. Oil pressure from the pump (4) will move to both, the up cavity and through the manual tilt valve into the down cavity, each cavity would have equal pressure resulting in little or no movement.

Reverse Operation

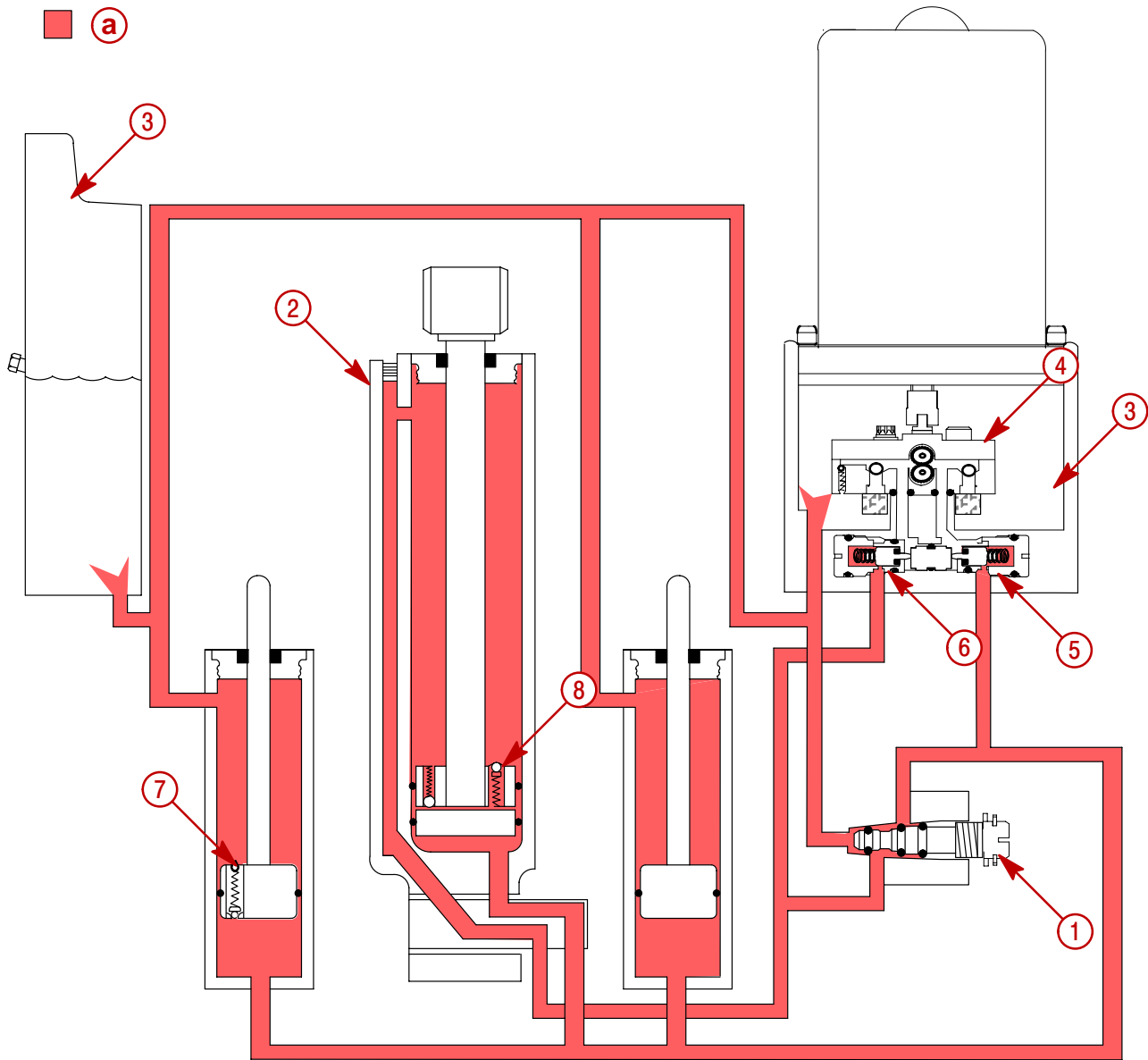
To prevent the outboard from coming up or trailing out, when shifted into reverse and/or throttling back rapidly, oil in the trim system must be locked in a static position. This is accomplished by closing the:

- up (5) pressure operated valve
- down (6) pressure operated valves
- trim relief valve (7)
- trail over valve (8)
- impact relief valves (8)
- manual release valve (1)

Thus, not allowing oil in the system to move in either direction.



Manual Tilt



- a** - Low Pressure
- 1** - Manual Release Valve
- 2** - Tilt Cylinder
- 3** - Reservoir
- 4** - Pump
- 5** - Up Pressure Operated Valve
- 6** - Down Pressure Operated Valve
- 7** - Trim Relief Valve
- 8** - Impact Relief Valves



Troubleshooting

IMPORTANT: Determine if Electrical or Hydraulic problem exists.

IMPORTANT: Acceptable power trim leak down should not exceed 1 in. (25.4 mm) (when measured at the tilt ram) in a 24 hour period.

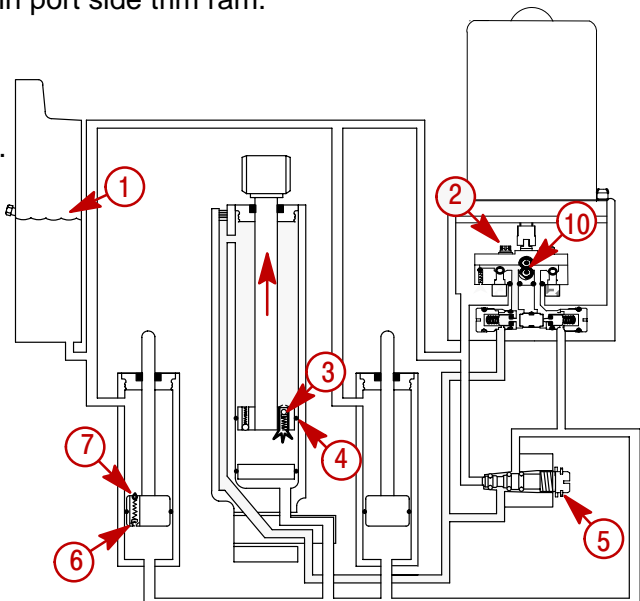
HYDRAULIC SYSTEM TROUBLESHOOTING

CONDITION OF TRIM SYSTEM	PROBLEM
A. Trim motor runs; trim system does not move up or down.	1, 5, 10, 11
B. Does not trim full down. Up trim OK.	3, 4, 5
C. Does not trim full up. Down trim OK.	1, 5
D. Partial or "Jerky" down/up.	1, 3
E. "Thump" noise when shifting.	3
F. Does not trim under load.	5, 8, 9
G. Does not hold trim position under load.	5, 6, 7
H. Trail out when backing off from high speed.	3, 4
I. Leaks down and does not hold trim.	5, 6, 7
J. Trim motor working hard and trims slow up and down.	8, 9
K. Trims up very slow.	1, 2, 5, 6, 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).
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 drive shaft.
11. Air pocket under pump.

External Mounted Hydraulic System





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, 8
B. Trim system trims opposite of buttons.	3
C. Cowl mounted trim buttons do not activate trim system.	2, 4, 5, 6, 7

PROBLEM

1. Battery low or discharged.
2. Open circuit in trim wiring.
3. Wiring reversed in remote control, cowl switch or trim leads.
4. Wire harness corroded through.
5. Internal motor problem (brushes, shorted armature).
6. Blown fuse(s).
7. Trim switch failure.
8. Verify relays are functioning correctly.

POWER TRIM RELAY TEST PROCEDURE

The trim motor relay system used on permanent magnet trim systems connect each of the two wires from the trim motor to either ground or positive in order to allow the motor to run in both directions.

If the motor will not run in the UP direction, it could be either the UP relay is not making contact to 12 volts **OR** the DOWN relay is not making contact to ground. The opposite is true if the system will not run DOWN. When the system is not energized, both relays should connect the heavy motor leads to ground.

To test which relay is faulty if the trim system does not operate in one direction:

1. Disconnect the heavy gauge pump wires from the trim control relay.
2. Check for continuity between the heavy leads from the trim relays to ground.

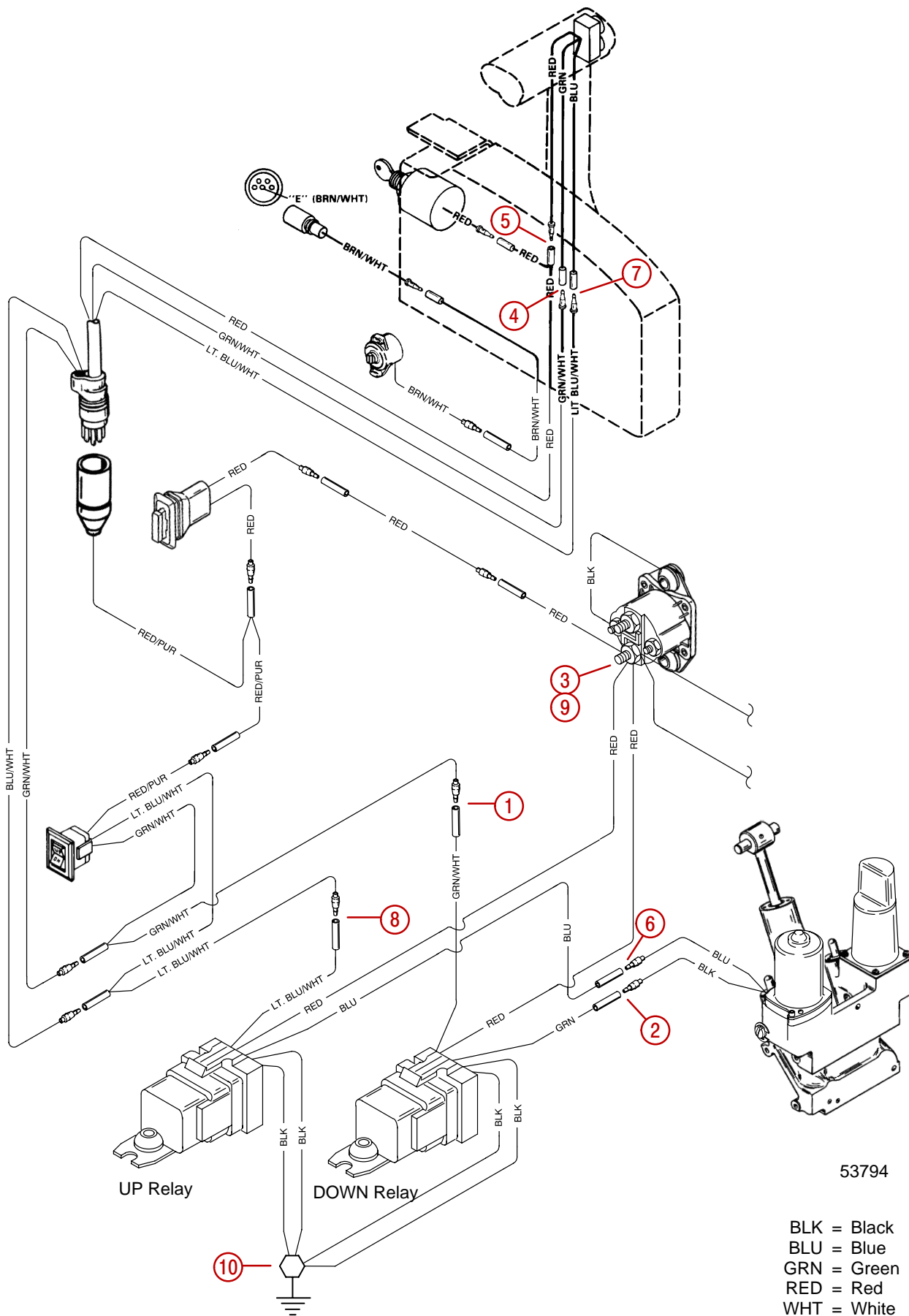
Ohmmeter Leads Between	Resistance (Ohms)	Scale Reading* (x _____)
GREEN and Ground	0	Full Continuity (Rx1)
BLUE and Ground	0	Full Continuity (Rx1)

Replace the relay that does not have continuity.

3. Connect a voltmeter to the heavy BLUE lead and to ground. You should have 12 volts on the BLUE lead when the UP switch is pushed. You should also have 12 volts on the GREEN lead when the DOWN switch is pushed. Replace the relay that does not switch the lead to positive.



Power Trim System with Relays and 2 Wire Trim Motor



53794



Electrical System Troubleshooting

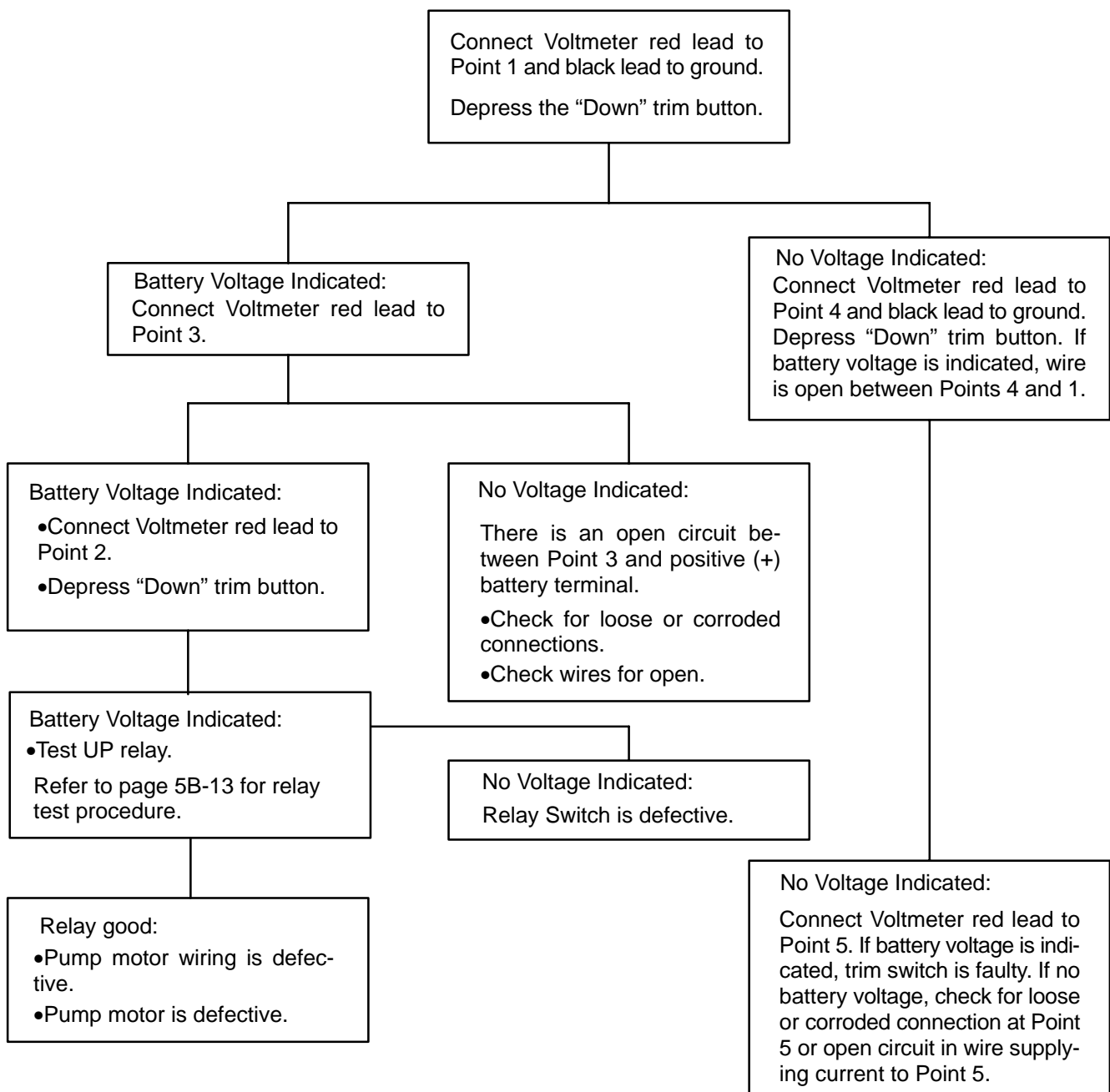
General Checks

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

1. Check for disconnected wires.
2. Make certain all connections are tight and corrosion free.
3. Check that plug-in connectors are fully engaged.
4. Make certain battery is fully charged.

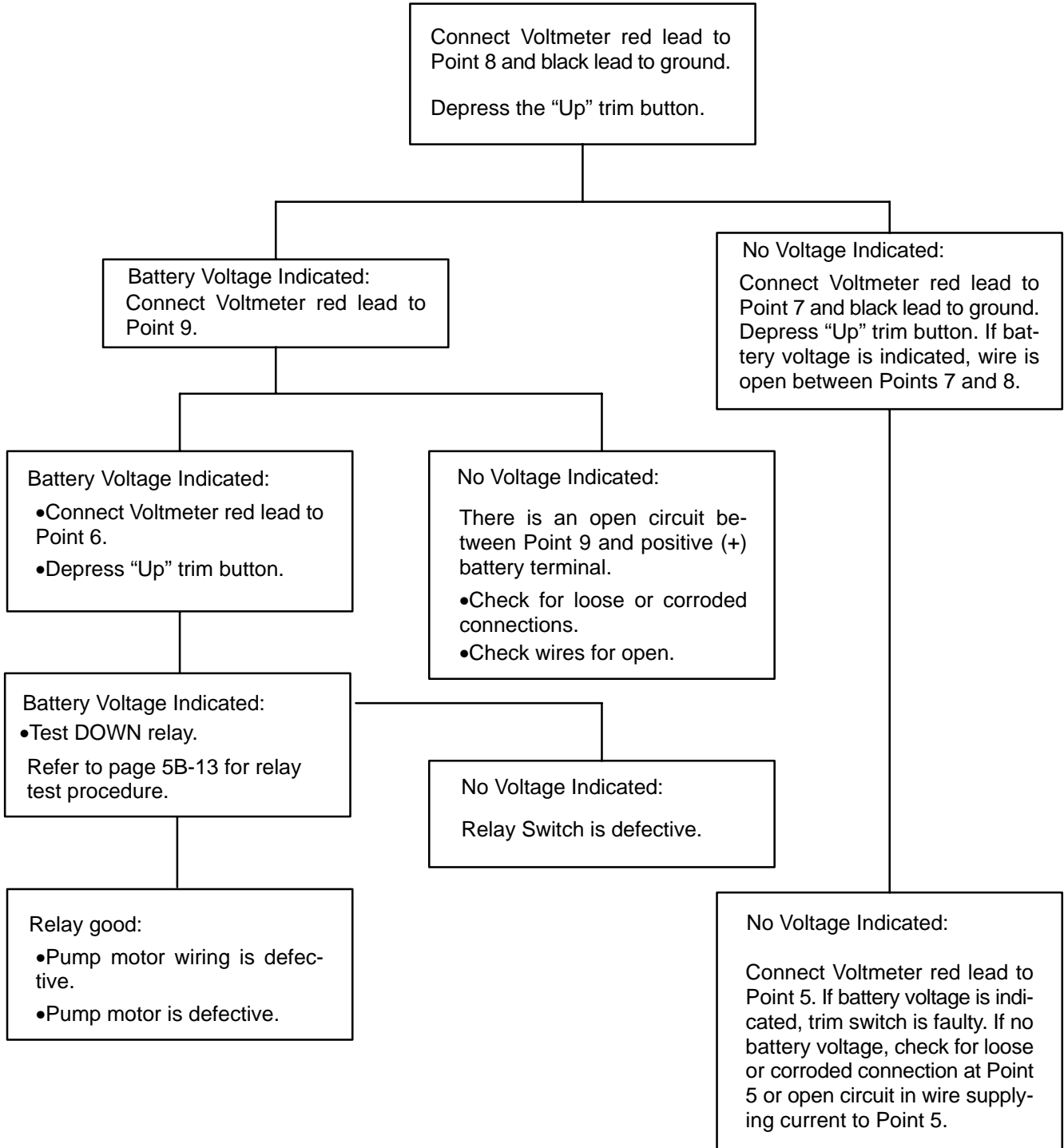
Refer to the preceding four wiring diagrams for connection points when troubleshooting the electrical systems (Connection points are specified by number.)

Troubleshooting the “Down Circuit”



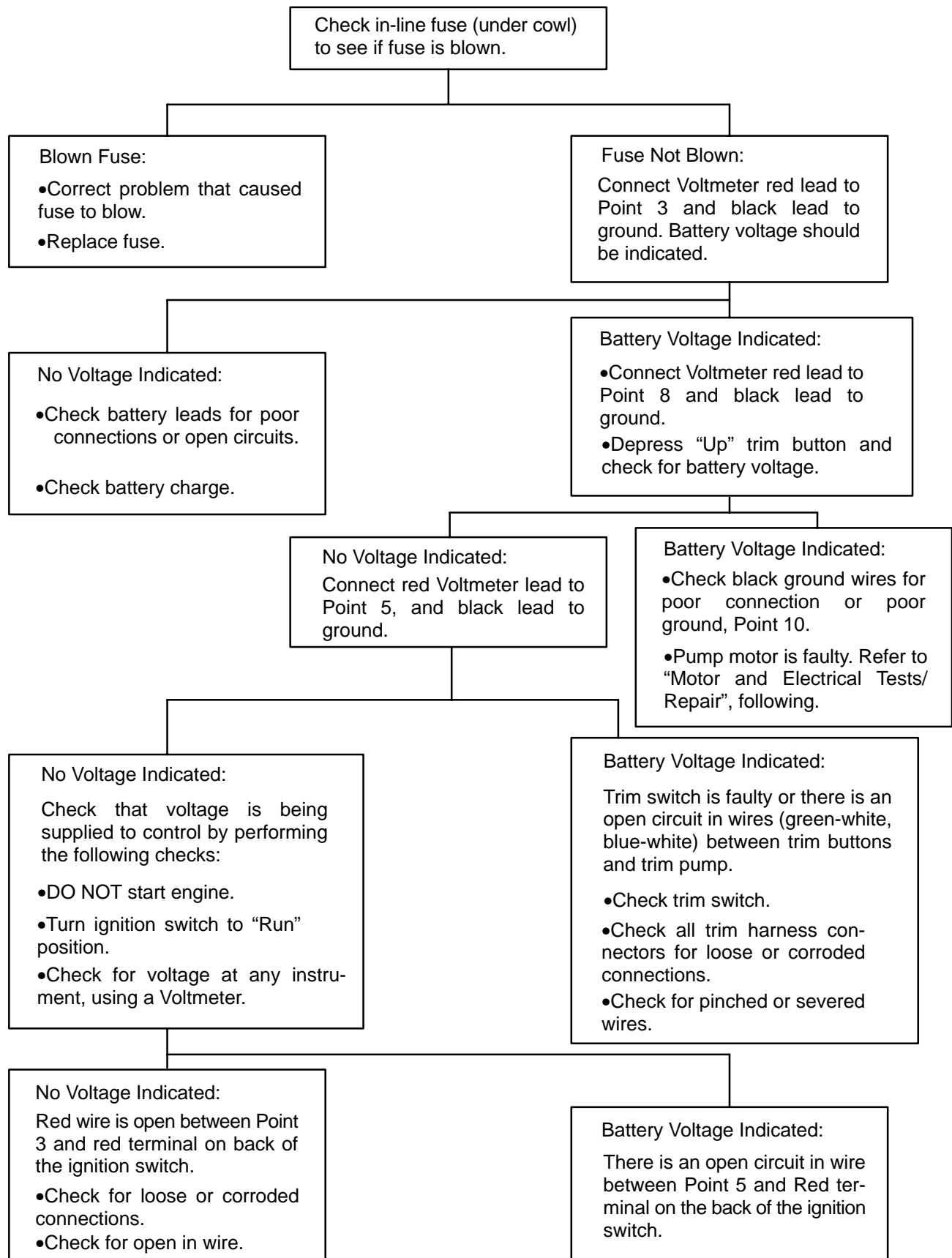


Troubleshooting the “Up” Circuit





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

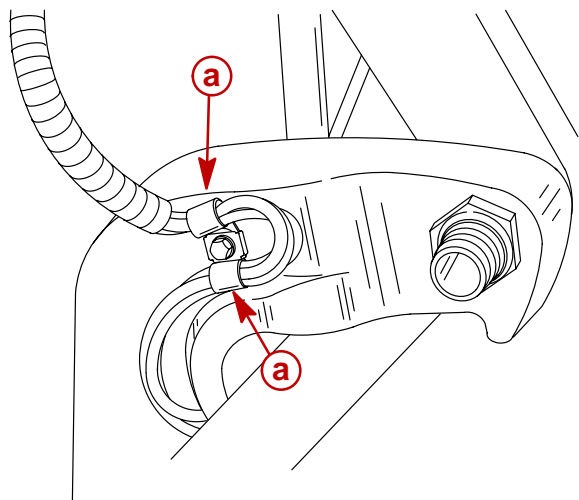




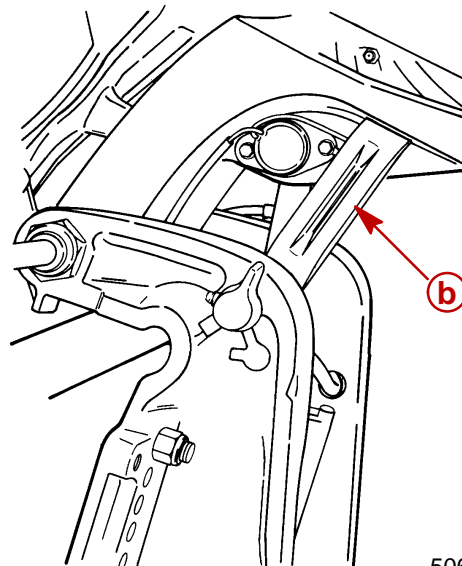
Power Trim Assembly Removal and Installation

Removal

1. Remove clamps on transom bracket to free power trim wiring.
2. Raise outboard to full "Up" position and engage tilt lock lever.
3. Remove trim indicator.



58448

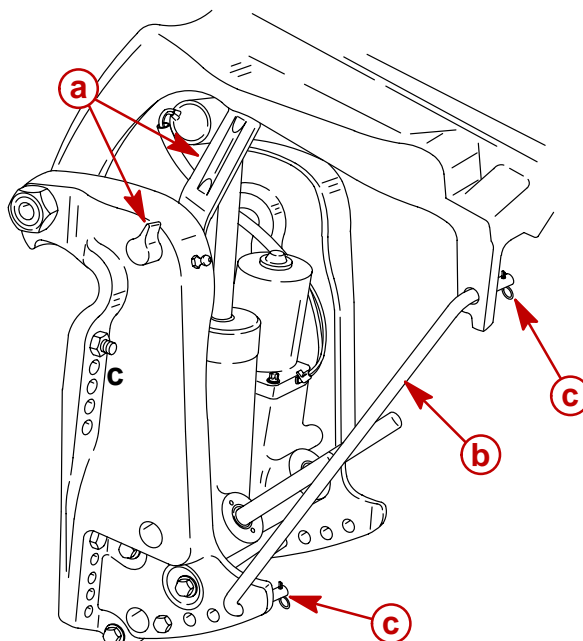


50605

- a** - Clamps
- b** - Tilt Lock Lever

⚠ WARNING

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



58447

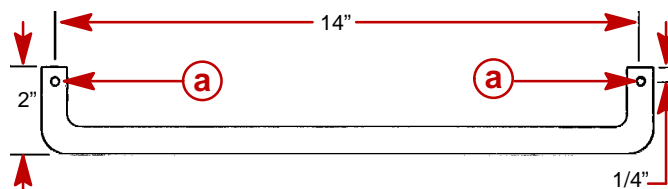
- a** - Tilt Lock Lever
- b** - Support Tool
- c** - Retaining Clips



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. = 50.8 mm

3/8 in. = 9.5 mm.

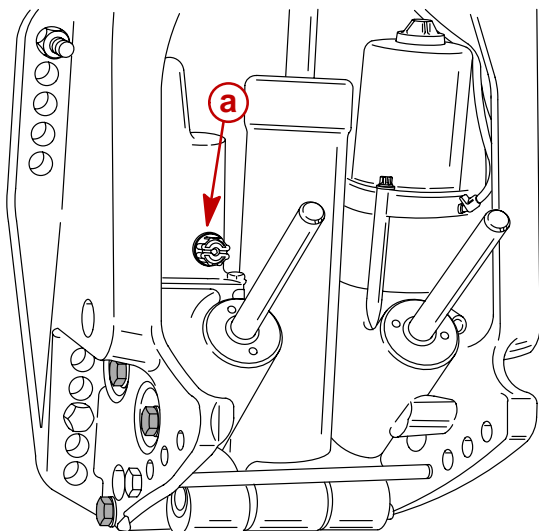
1/4 in. = 6.35 mm.

⚠ CAUTION

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

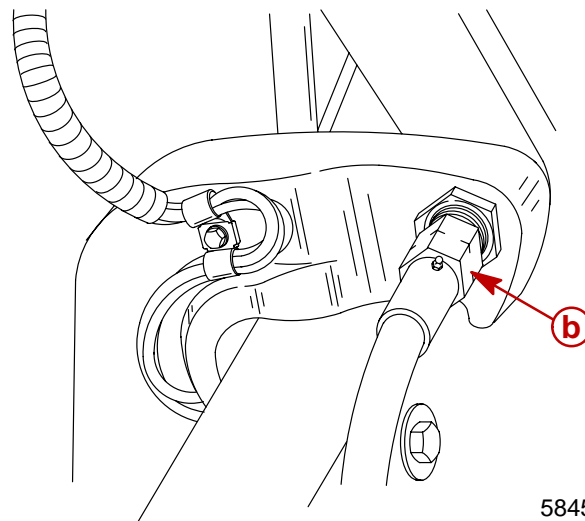
4. Disconnect (BLUE and GREEN) bullet connector harness.
5. Open filler cap and release any remaining pressure in the system.

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.



58444

a - Filler Cap
b - Retaining Nut



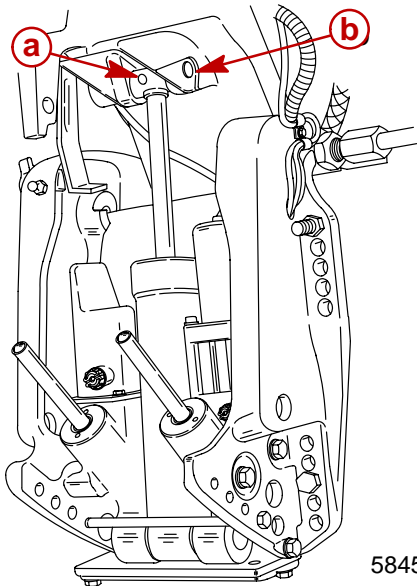
58454



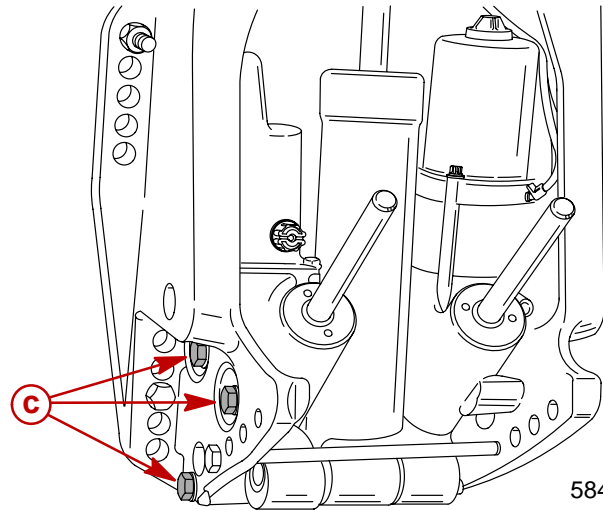
IMPORTANT: Cross pin (a) should not be reused. Replace with new cross pin.

NOTE: 6 trim mounting bolts should not be reused. Replace with new patch lock bolts.

6. Drive out cross pin, push out upper swivel pin, and remove 3 bolts and washers in port clamp bracket.

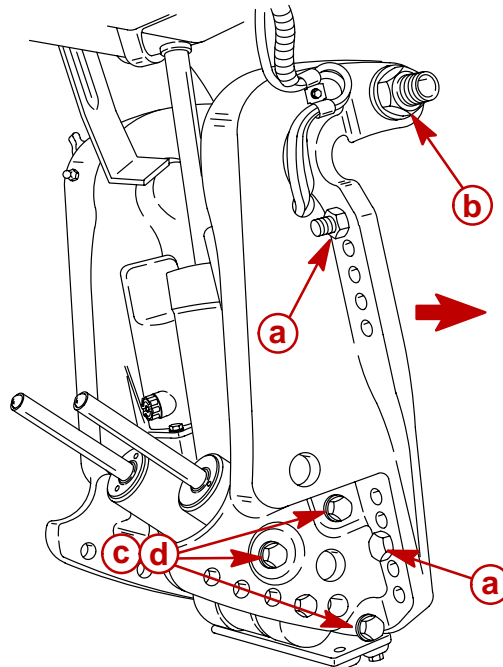


a - Cross Pin
b - Upper Swivel Pin



c - Port Transom Bracket Bolts and Washers (3). Remove to Release Trim System from Outboard.

7. Remove 3 bolts and washers and in starboard transom bracket.



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

c - Screws (3)
d - Washers (3)

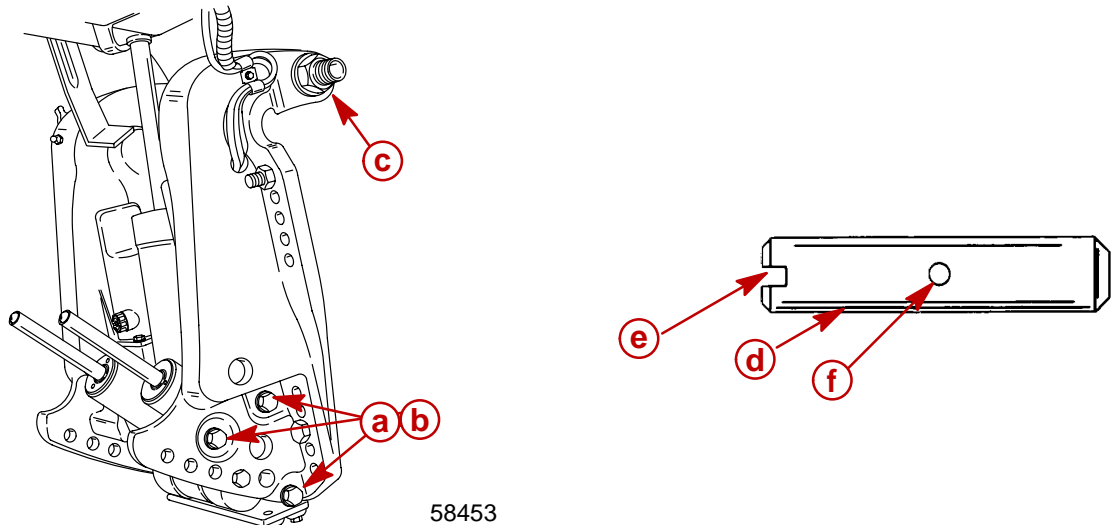
8. Remove outboard transom mounting bolts and loosen tilt tube nut until nut is flush with end of tilt tube thread. Remove system from outboard.



Installation

NOTE: Upper swivel pin bushings in swivel bracket should be inspected for wear and replaced as required. The trim rod shoes in the swivel bracket should also be replaced.

1. Paint any exposed metal surfaces to prevent corrosion.
2. Install trim system, starboard transom bracket, and 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 (+), GREEN wire to NEGATIVE (-)]. If ram extends too far, retract ram by connecting GREEN wire to POSITIVE (+) and BLUE wire to NEGATIVE (-).
4. Install Upper Swivel Pin with slotted end to left (port) side of engine.

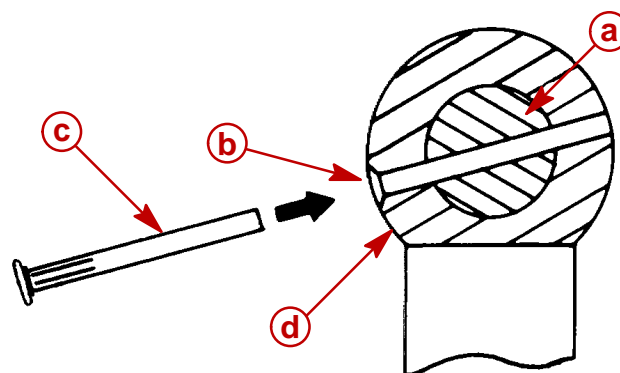


- a** - Screw (6) Torque to 45 lb. ft. (61.0 N-m)
b - Flat washer (6) Install one per screw
c - Tilt Tube Nut

- d** - Upper Swivel Pin
e - Slotted end
f - Cross hole (in line with slotted end)

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

5. 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.

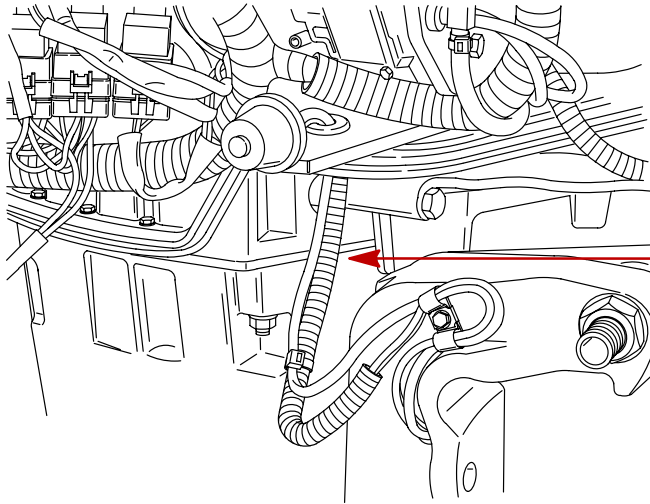


- a** - Upper Swivel Shaft (Slot is in line with cross hole)
b - Chamfered End of Hole (Faces away from transom)
c - Retaining Pin
d - Tilt Ram End

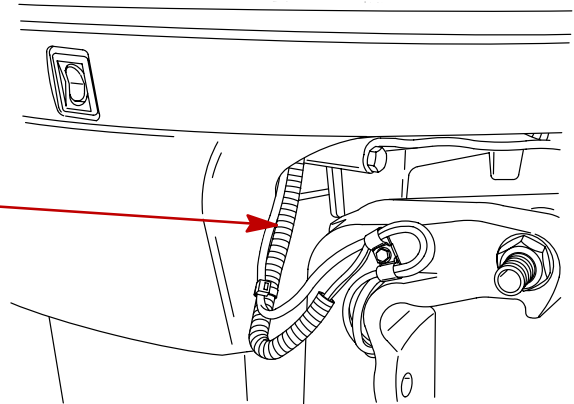
6. Connect trim motor wires to relays. Refer to Wiring Diagrams in this manual. Route trim wires as specified in this manual.



NOTE: The 2 power leads going to the trim motor should be encapsulated with conduit tubing.



56921



56922

a - Conduit Tubing

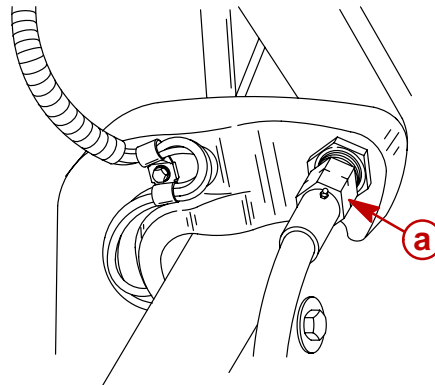
7. Apply marine sealer to shanks of mount bolts and install transom mount bolts.

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.

8. Tighten tilt tube nut securely.

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



58454

a - Steering Cable Retaining Nut

⚠ WARNING

Electrical wires passing through cowl openings must be protected from chafing or being cut. Follow the recommended procedures outlined in Section 1D 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 (91-52915A6)

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.



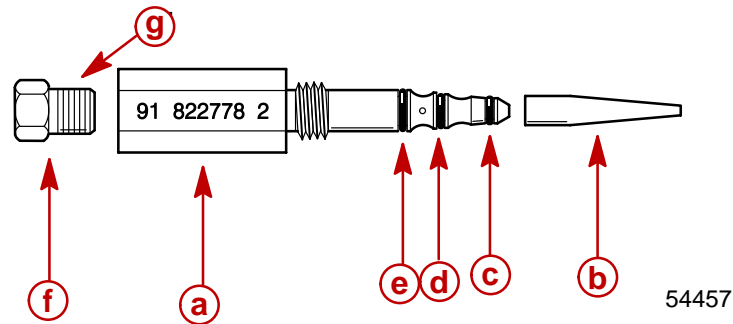
“UP” Pressure Check

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. Remove circlip securing manual release valve and unscrew release valve from trim assembly.

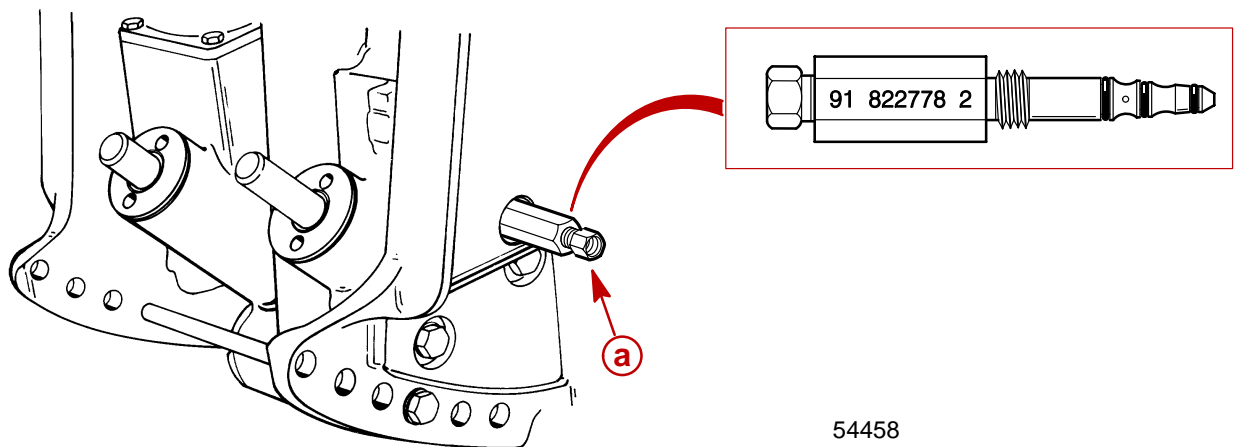
NOTE: A small amount of trim fluid may drip from manual release valve hole. Place a suitable container under trim assembly to collect any leakage.

NOTE: Assemble test adaptor by using O-ring installation tool to position small O-ring onto adaptor 1st, then install medium O-ring and lastly large O-ring. Thread brass fitting into test adaptor securely using teflon tape on threads.



- a - Test Adaptor (91-822778A2)
- b - O-ring Installation Tool
- c - Small O-ring (Install 1st)
- d - Medium O-ring (Install 2nd)
- e - Large O-ring (Install Last)
- f - Brass Fitting
- g - Apply Teflon Tape

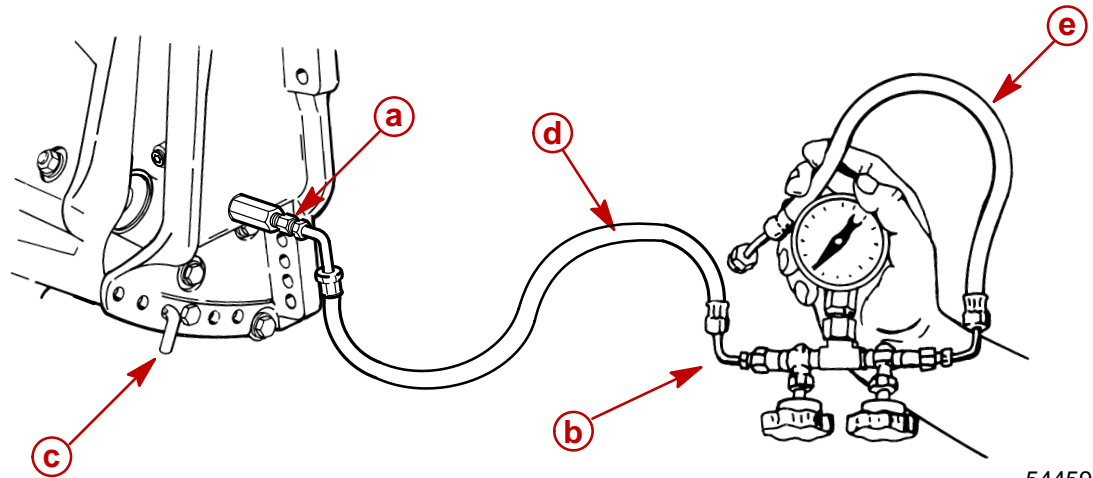
4. Install test adaptor 91-822778A2 into manual release valve hole.



- a - Test Adaptor (91-822778A2)



5. Thread hose from Test Gauge Kit (91-52915A6) into brass fitting on adaptor.



54459

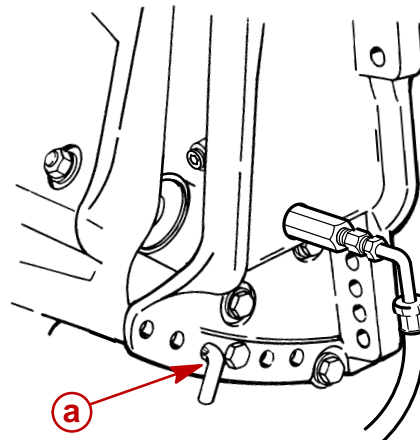
- a** - Brass Fitting
- b** - Test Gauge Assembly
- c** - Tilt Pin (Position in Hole Shown)
- d** - Hose
- e** - Hose (Not Used)

6. Reinstall fill plug.
7. Run trim "UP".
8. 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.

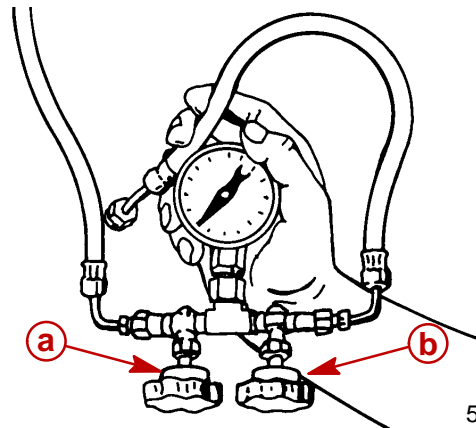
9. Move outboard "IN" until hole in swivel bracket "ear" aligns with the 3rd tilt hole in transom bracket. Lock engine in trim range by installing a 3/8 in. (9.5 mm) diameter tilt pin or two 3/8 in. (9.5 mm) hardened bolts and nuts thru the transom brackets and swivel bracket in the hole shown.



54460

a - Tilt Pin Hole (Install Spare Tilt Pin or Hardened Bolts and Nuts)

10. Open valve (a) and close valve (b).



51374

11. Run trim "UP". The minimum pressure should be 2000 P.S.I. (140.6 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. Remove test gauge hose and adapter.
16. Reinstall Manual Release Valve and secure valve with circlip.
17. Retighten "Fill" plug.

NOTE: If pressure is less than 2000 PSI (140.6 kg/cm²), troubleshoot system per instructions on page 5B-16.



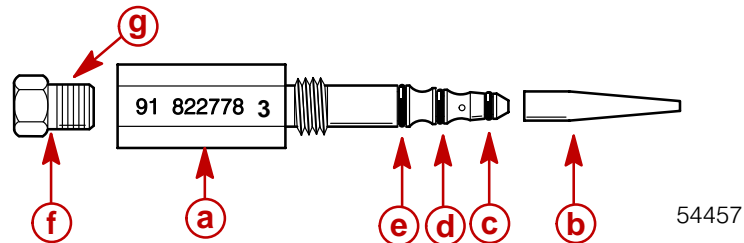
“DOWN” Pressure Check

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. Remove circlip securing manual release valve and unscrew release valve from trim assembly.

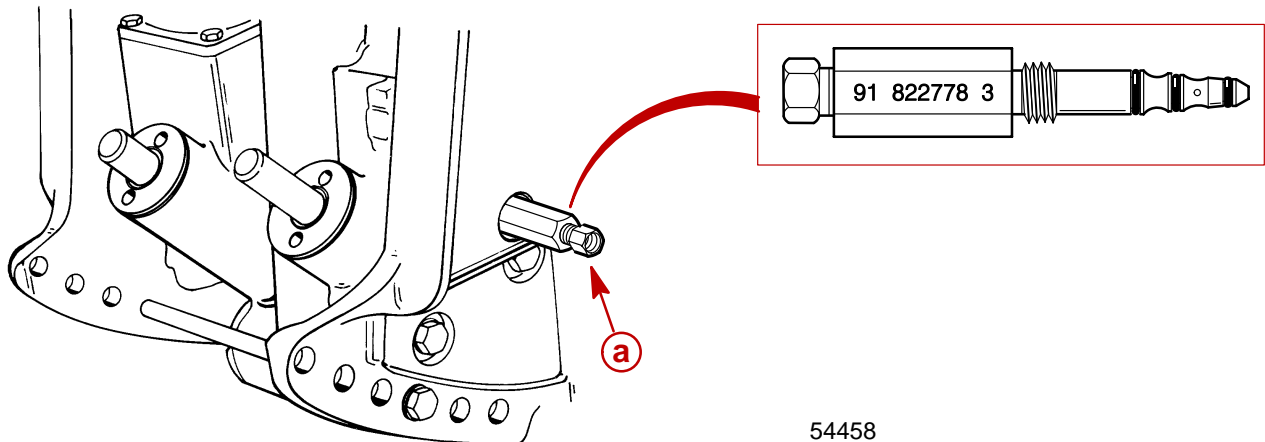
NOTE: A small amount of trim fluid may drip from manual release valve hole. Place a suitable container under trim assembly to collect any leakage.

NOTE: Assemble test adaptor by using O-ring installation tool to position small O-ring onto adaptor 1st, then install medium O-ring and lastly large O-ring. Thread brass fitting into test adaptor securely using teflon tape on threads.



- a** - Test Adaptor (91-822778A3)
- b** - O-ring Installation Tool
- c** - Small O-ring (Install 1st)
- d** - Medium O-ring (Install 2nd)
- e** - Large O-ring (Install Last)
- f** - Brass Fitting
- g** - Apply Teflon Tape

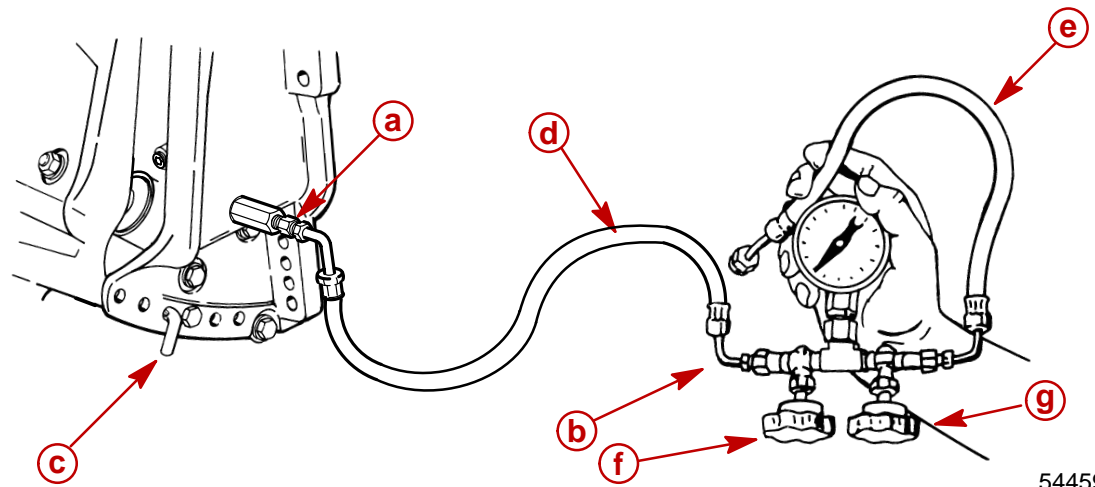
4. Install test adaptor 91-822778A3 into manual release valve hole.



- a** - Test Adaptor (91-822778A3)



5. Thread hose from Test Gauge Kit (91-52915A6) into brass fitting on adaptor.



- a - Brass Fitting
- b - Test Gauge Assembly
- c - Tilt Pin (Position in Hole Shown)
- d - Hose
- e - Hose (Not Used)
- f - OPEN Valve
- g - CLOSE Valve

6. Reinstall fill plug.
7. Run trim "UP".
8. Disengage tilt lock lever.
9. Open valve (f) and close valve (g).
10. Run trim "DOWN". Minimum pressure should be 600 P.S.I. (42 kg/cm²).
11. Tilt outboard full "UP" and engage tilt lock lever.
12. Slowly remove "Fill" plug to bleed pressure.
13. Remove test gauge hose and adaptor.
14. Reinstall manual release valve and secure valve with circlip.
15. Retighten "Fill" plug.

NOTE: If pressure is less than 600 PSI (42 kg/cm²), troubleshoot system per instructions on Page 5B-15.



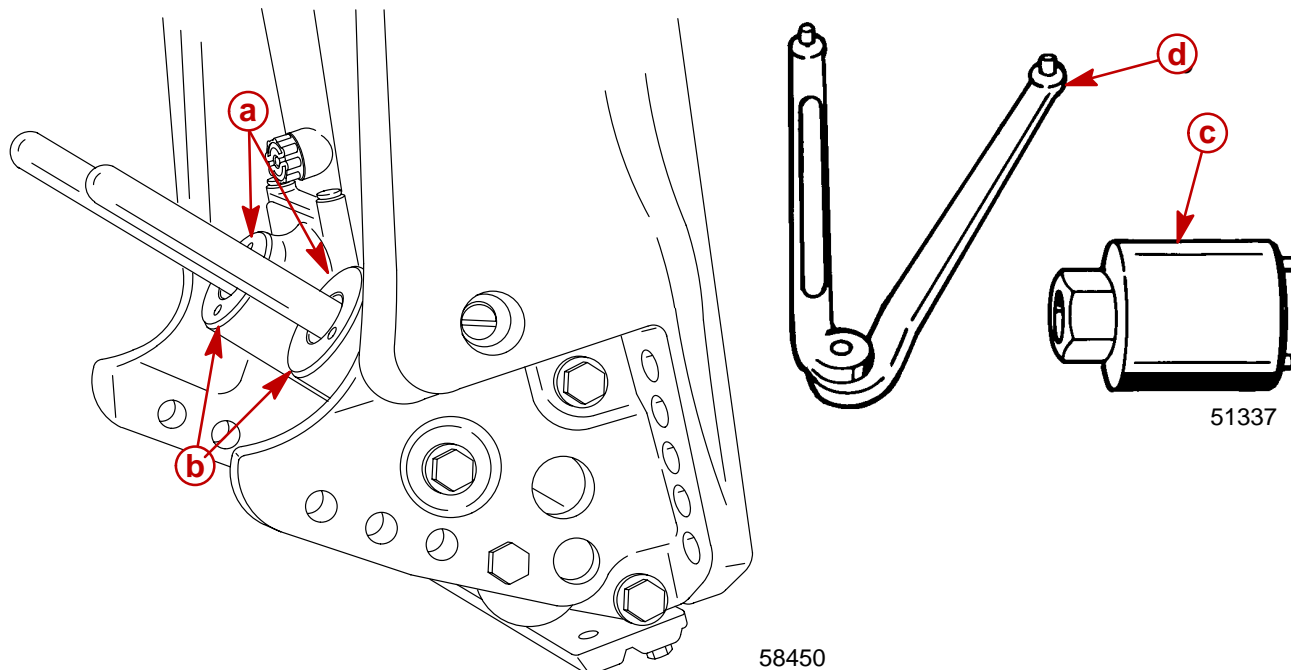
Hydraulic Repair

TRIM ROD REMOVAL AND REPAIR

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

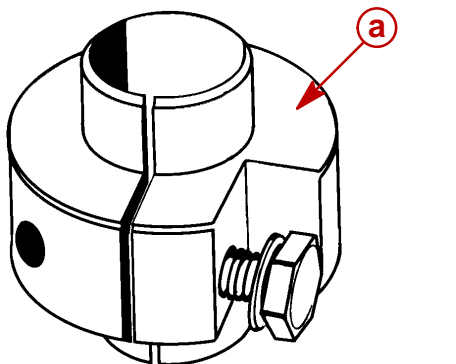
1. Tilt outboard to full "UP" position and engage tilt lock lever.
2. Slowly remove "Fill" plug to bleed reservoir pressure.
3. Turn Manual Release Valve 3 to 4 turns (counterclockwise) to bleed remaining pressure.
4. Remove trim rod cylinder caps.

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



- a** - Trim Rod Cylinder Cap
- b** - Turn Counterclockwise to Remove
- c** - Removal Tool (91-44487A1)
- d** - Spanner Wrench (91-74951)

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



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



CLEANING AND INSPECTION - TRIM RODS AND CAPS

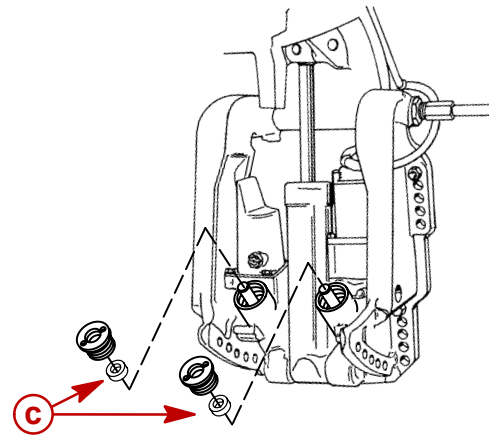
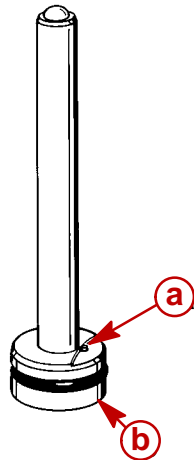
CAUTION

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.

NOTE: Certain models may have trim limit reducers installed on the trim rod to limit trim out angle. Each reducer limits the amount of total trim by 2°. A maximum of 5 reducers may be installed on each trim rod.

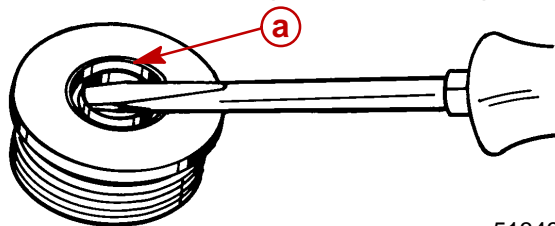
1. Inspect check valve and check valve screen for debris; if debris cannot be removed, replace trim rod assembly. Clean trim rod with parts cleaner and dry with compressed air.



- a - Check Valve
- b - Check Valve Screen
- c - Trim Limit Reducers

Trim Rod End Cap Seal

1. Inspect trim cap end seal and replace if damaged or if seal does not keep trim rod clean.
2. Inspect trim cap internal o-ring and replace if damaged or worn.
3. Inspect inner surface of the cap and if worn, replace trim cap.



- a - Seal (remove as shown)

4. Install new seal with seal lip up.

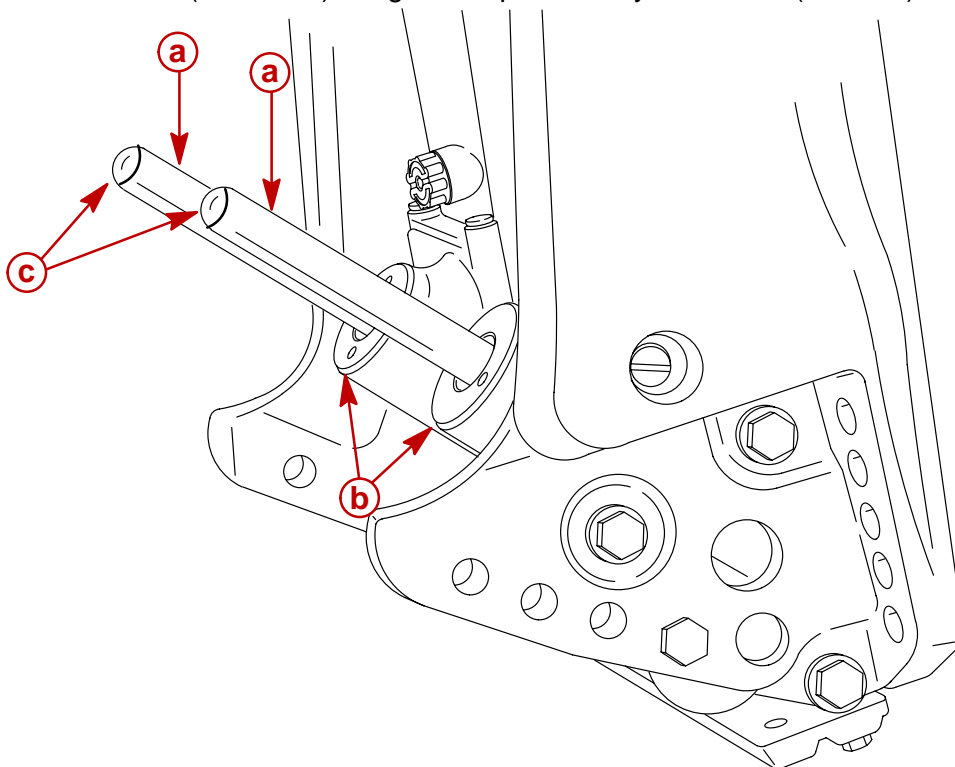


TRIM ROD INSTALLATION

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 ATF Dexron III or 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 – 70 lb. ft. (95 N m).



58450

- a** - Trim Rods
- b** - Cylinder End Caps
- c** - Rod End Rollers (lubricate with Quicksilver Anti-Corrosion Grease or Special Lubricant 101)

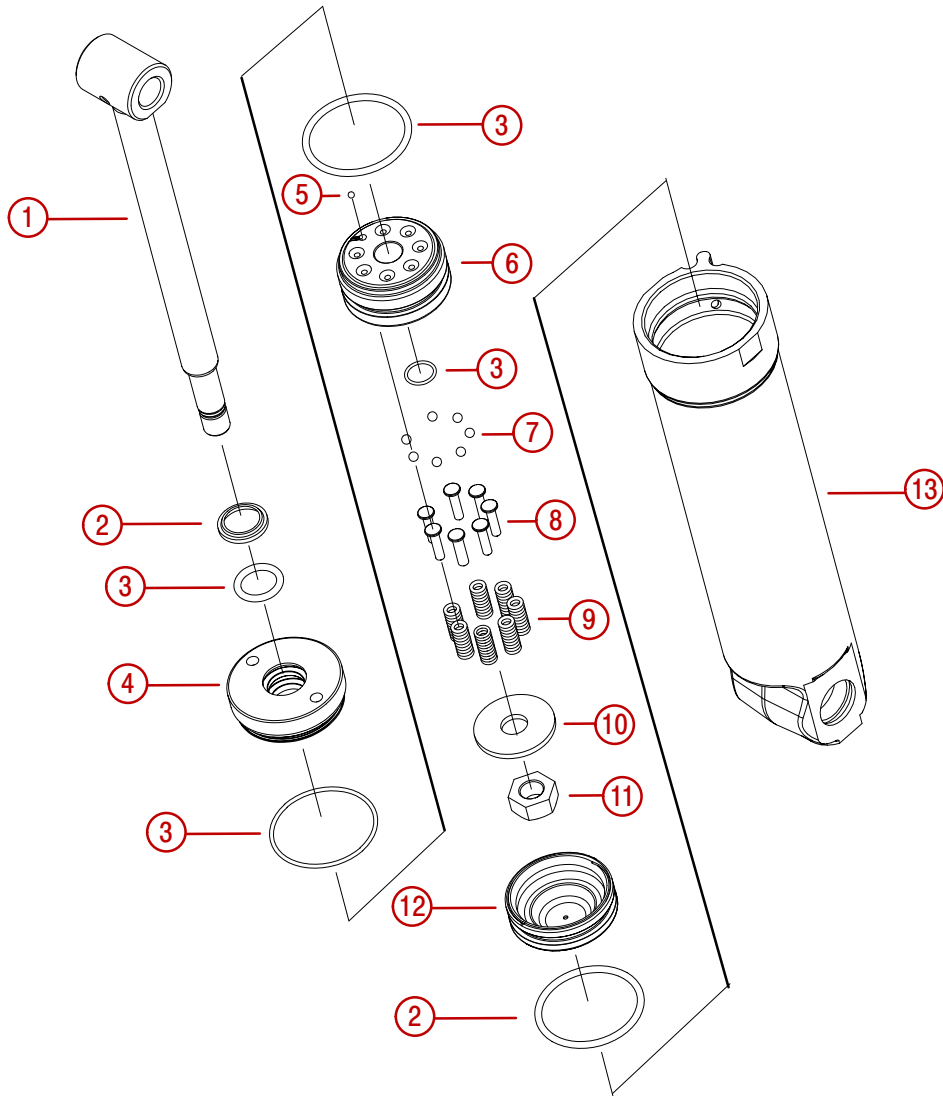


Tilt Ram

REMOVAL - TILT ROD ASSEMBLY ONLY

NOTE: Tilt Rod Assembly can be removed from cylinder without removing entire power trim system from outboard.

TILT RAM COMPONENTS



- 1 - Tilt Cylinder Rod
- 2 - Scraper Seal
- 3 - O-ring*
- 4 - Cylinder Cap
- 5 - Return Ball
- 6 - Shock Piston
- 7 - Shock Balls
- 8 - Spring Keepers – (1 is RED)

- 9 - Shock Springs – (1 is RED for low speed trail over)
- 10 - Washer
- 11 - Nut
- 12 - Memory Piston
- 13 - Housing

*O-ring Repair Kit Available, P.N. 811607A1 (Includes item 2, Scraper Seal)

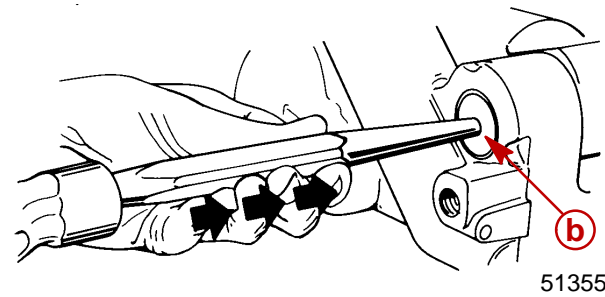
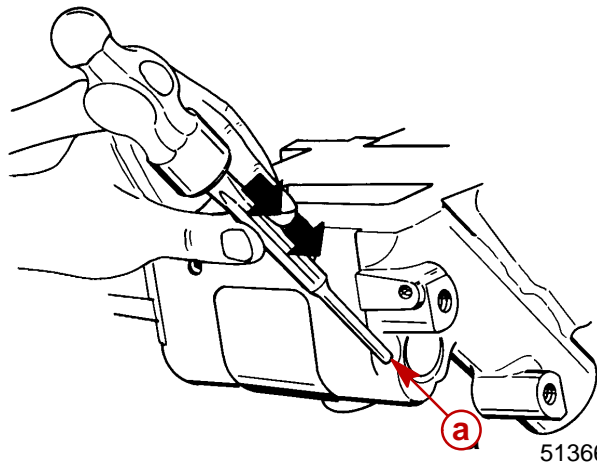


TILT RAM REMOVAL - POWER TRIM SYSTEM REMOVED FROM OUTBOARD

⚠ CAUTION

Insure trim system is depressurized prior to tilt ram removal.

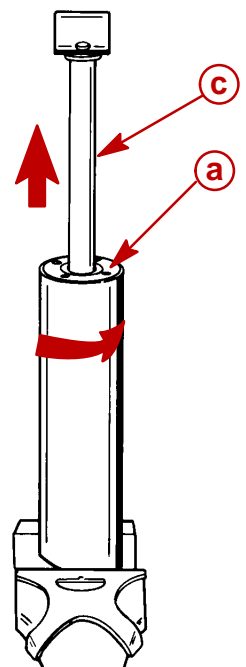
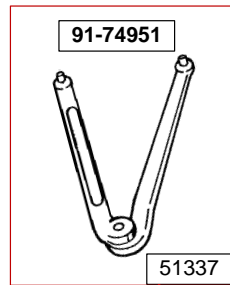
1. Remove cross pin.
2. Remove lower swivel pin.



- a** - Cross Pin (Remove as shown)
- b** - Lower Swivel Pin (Remove as shown)

Disassembly

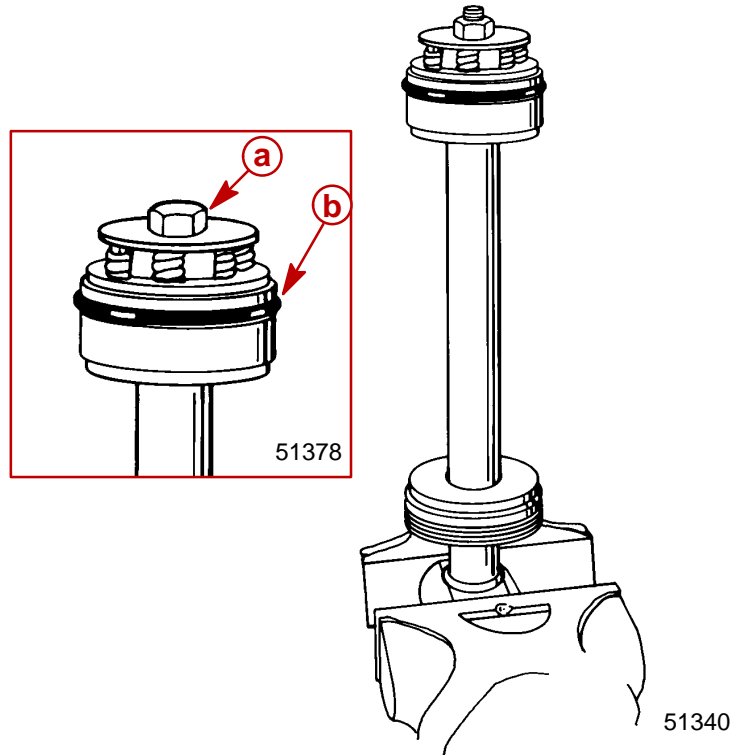
1. Secure tilt ram in a soft jawed vise. Remove tilt rod and cap.



- 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.



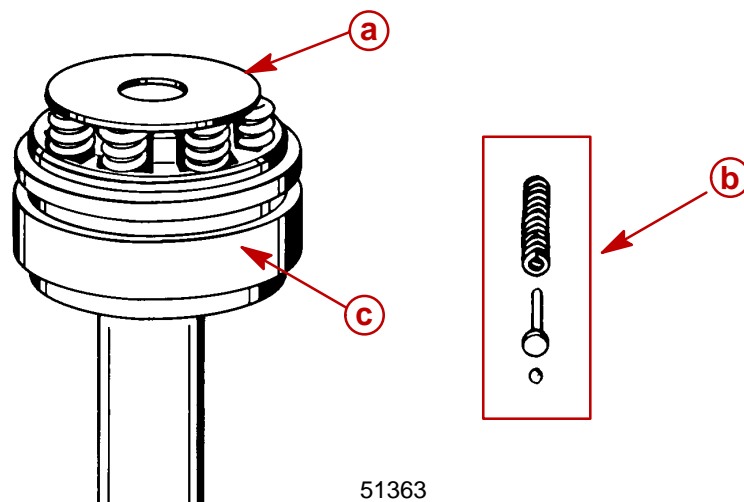
- a - Stud/Nut
- b - O-Ring

IMPORTANT: Design 1 tilt rod assembly can be used to replace a Design 2 tilt rod assembly. Design 1 or Design 2 cylinder assemblies (complete) can be used as replacements.

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.

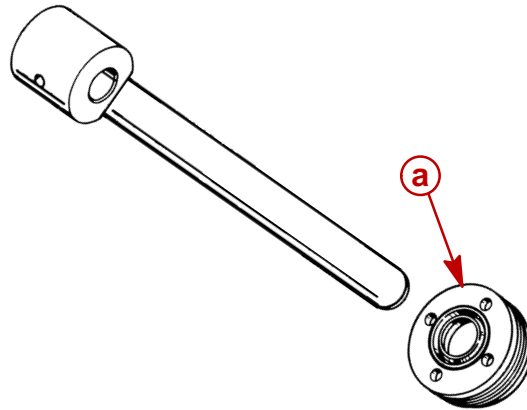
NOTE: Check valve held in by roll pin can be cleaned but not removed.



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



- Remove end cap from tilt rod.

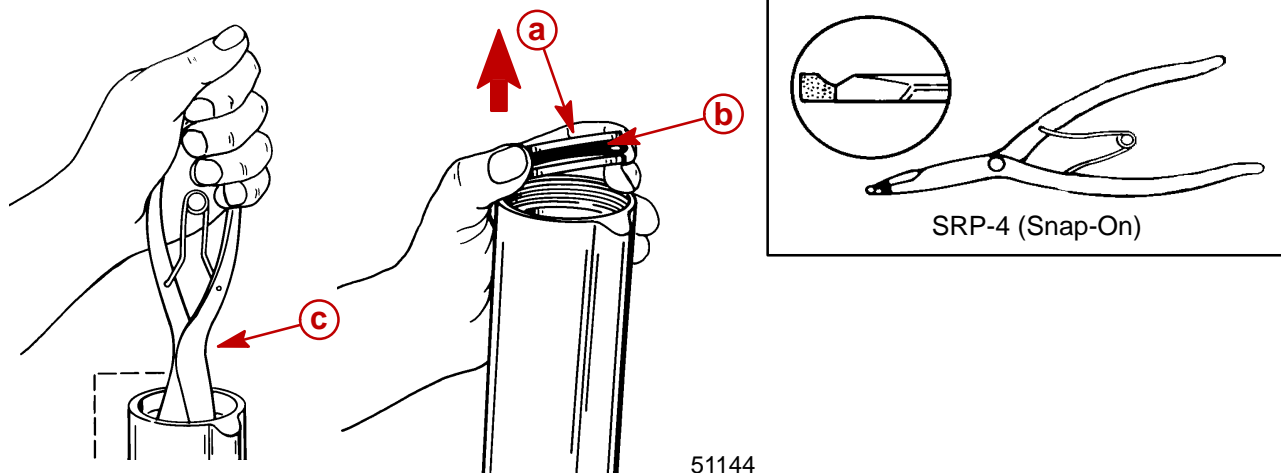


a - End Cap

51376

Memory Piston Removal

- Remove memory piston from cylinder using Snap-On lock ring pliers SRP-4 or similar tool.
- Remove o-ring from memory piston.



a - Memory Piston
b - O-Ring
c - Snap-On Pliers SRP-4

51144



Cleaning/Inspection/Repair

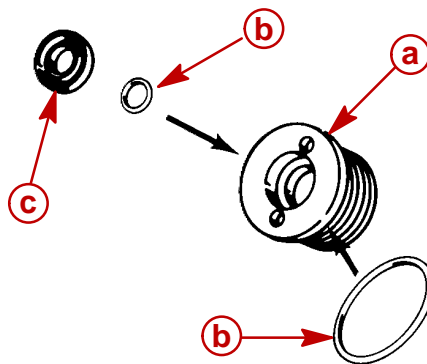
1. Inspect all internal parts for damage or wear. Clean and replace parts as necessary.
2. Inspect tilt rod for scratches. Replace scraper seal in rod end cap if tilt rod is scratched or worn.
3. Slight scratches or tool marks less than 0.005 in. (0.1 mm) deep in cylinder are acceptable.

IMPORTANT: Components must be dirt and lint free. Slightest amount of debris in Power Trim system could cause system to malfunction.

4. Clean shock rod and components with parts cleaner and dry with compressed air.
5. It is recommended that all O-rings in trim system be replaced.
6. Lubricate all o-rings with Quicksilver Power Trim Fluid (92-90100A12). If not available, use automotive (ATF) automatic transmission fluid.

Scraper Seal Replacement

1. Remove components from end cap.



- a - Cap
- b - O-ring (2)
- c - Scraper Seal

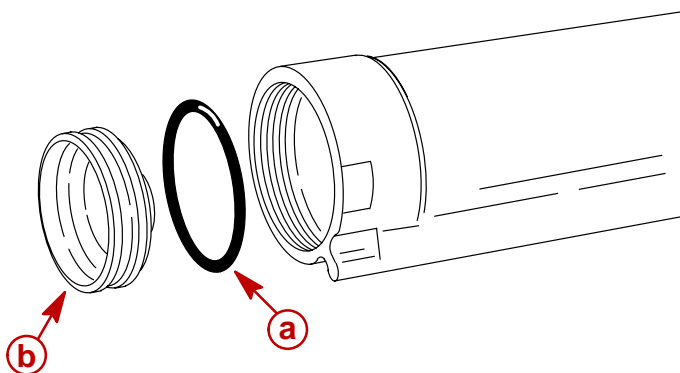


REASSEMBLY

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.

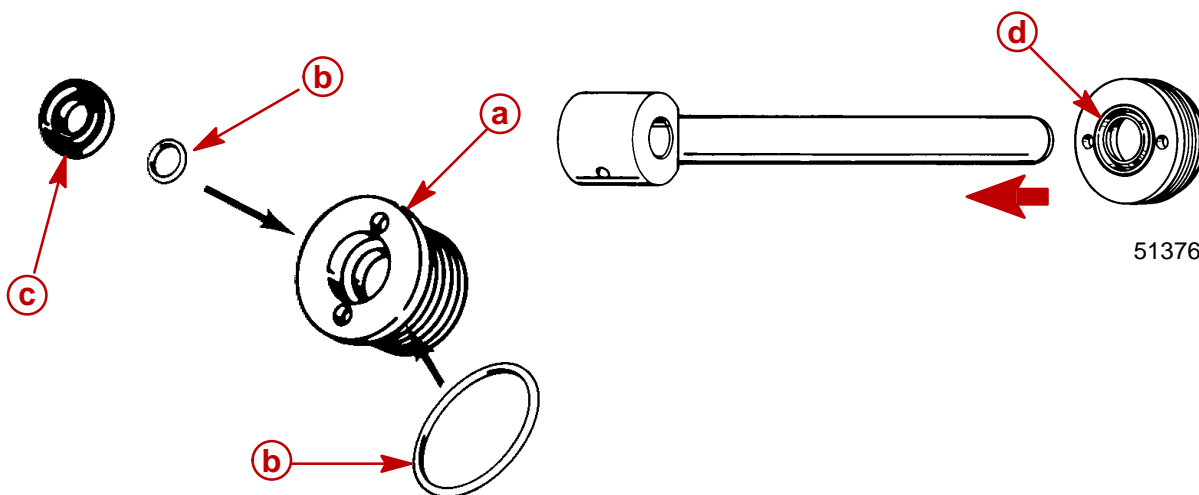
1. Apply ATF Dexron III or Quicksilver Power Trim and Steering Fluid on O-rings prior to reassembly.
2. Install O-ring on Memory Piston Cup and install in cylinder.
3. Inspect and replace as required 3 o-rings in the bottom of the tilt cylinder.
4. Inspect and replace as required 3 pivot pin o-rings in the manifold.



- a** - O-ring
- b** - Memory Piston Cup

58462

5. Assemble end cap.
6. Install end cap.

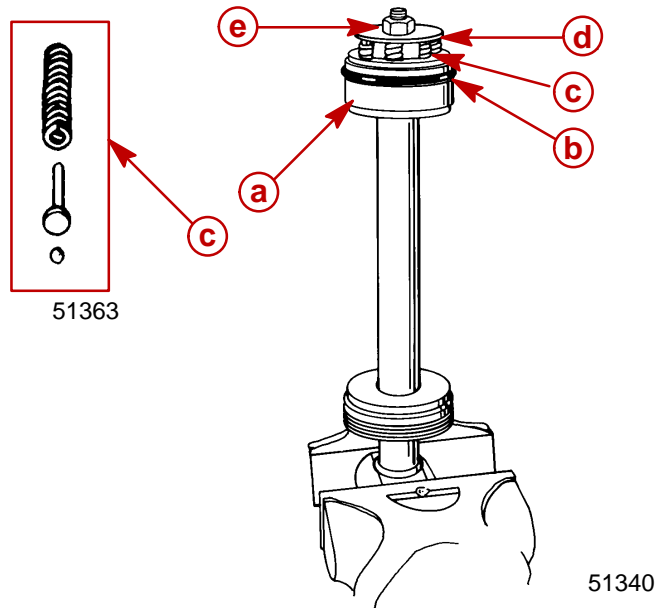


- a** - End Cap
- b** - O-ring (2)
- c** - Scraper seal
- d** - End Cap

51376

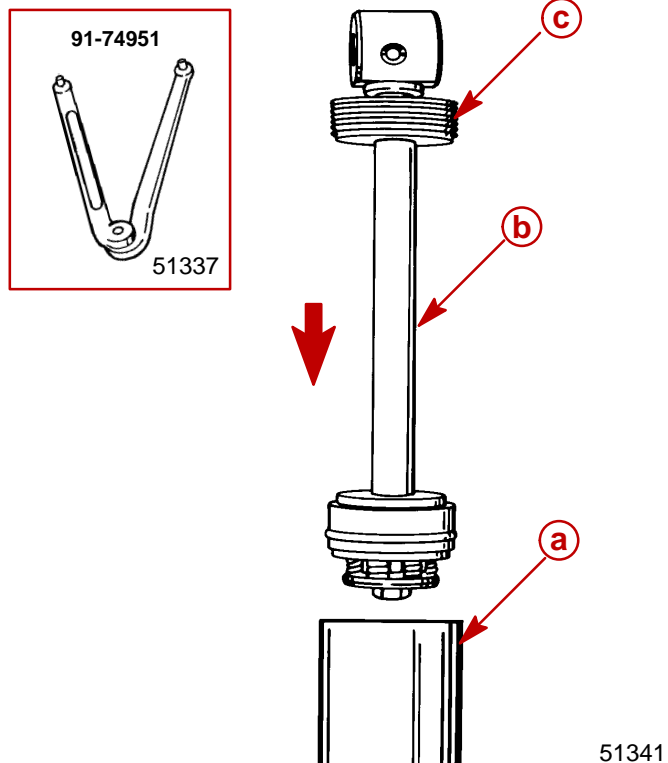


7. Install components on rod.



- a** - Piston
- b** - O-ring
- c** - Check Valve Assembly (7)
- d** - Washer
- e** - Locknut [Torque to 95 lb. ft. (129 N m)]

8. Clamp cylinder in a soft jawed vise and install tilt rod assembly. Use spanner wrench and tighten end cap securely. Torque end cap to 45 lb. ft. (61 N m).

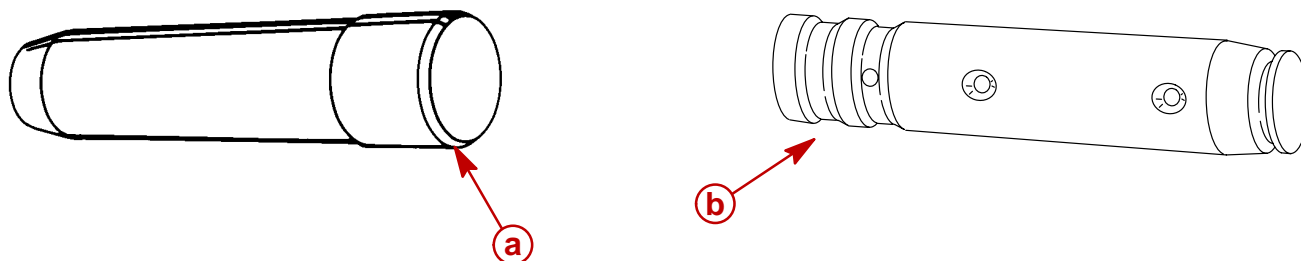


- a** - Cylinder
- b** - Tilt Rod Assembly
- c** - End Cap (Tighten Securely.) Use Spanner Wrench.



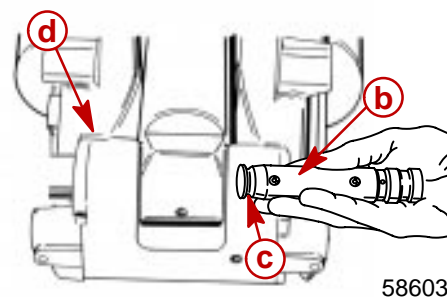
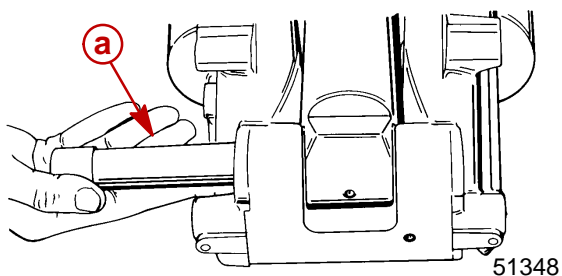
TILT RAM ASSEMBLY INSTALLATION

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



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

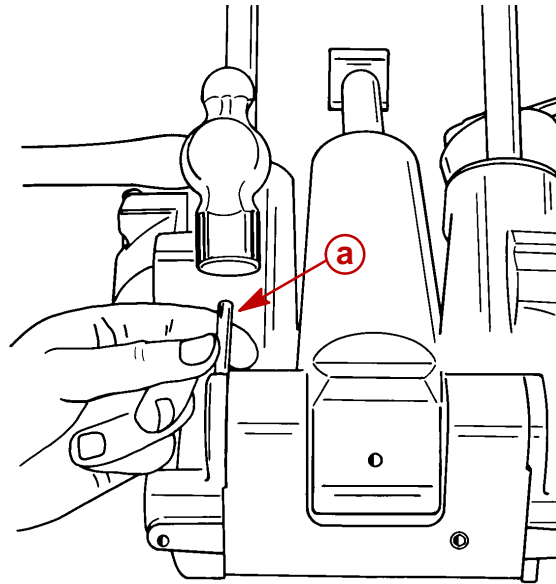
2. Align tilt ram and housing using alignment tool.
3. Install shaft.



- a** - Alignment Tool (91-11230)
- b** - Shaft
- c** - Groove
- d** - Hole [Groove (c) will Align with this Hole]



4. Drive pin in until flush.



51356

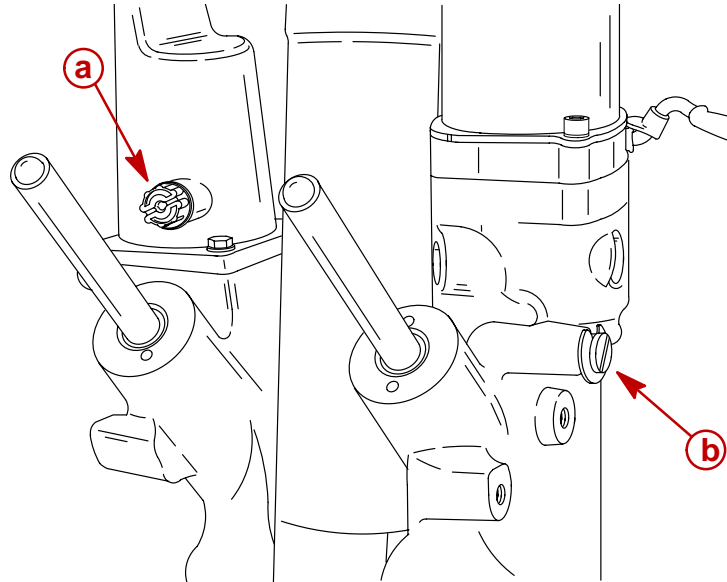
a - Pin (Drive Against Knurled End)



Power Trim Disassembly

IMPORTANT: Power trim is pressurized. Trim rams must be in the full up position (fully extended) prior to fill/drain plug or manual release valve removal.

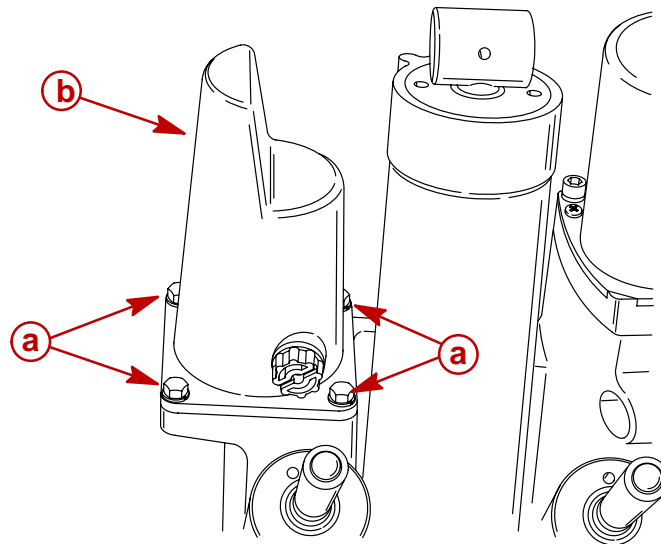
1. Remove reservoir cap to drain oil.
2. Remove manual release valve to drain any remaining oil.



58604

- a** - Reservoir Cap
- b** - Manual Release Valve

3. Remove 4 screws securing reservoir cover and remove cover.

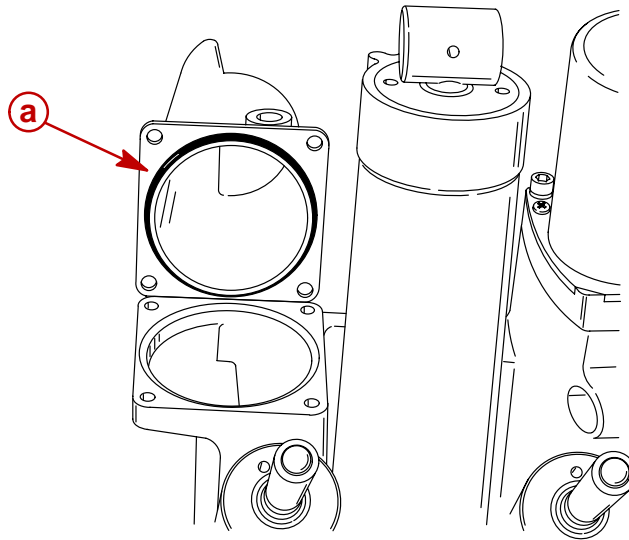


58606

- a** - Screws (4)
- b** - Reservoir Cover



4. Inspect reservoir cover o-ring for cuts or abrasions. Replace o-ring as required.

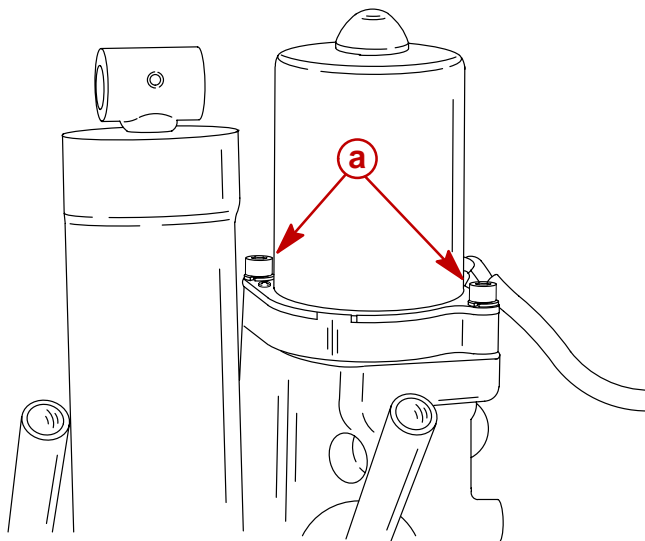


58605

a - O-Ring

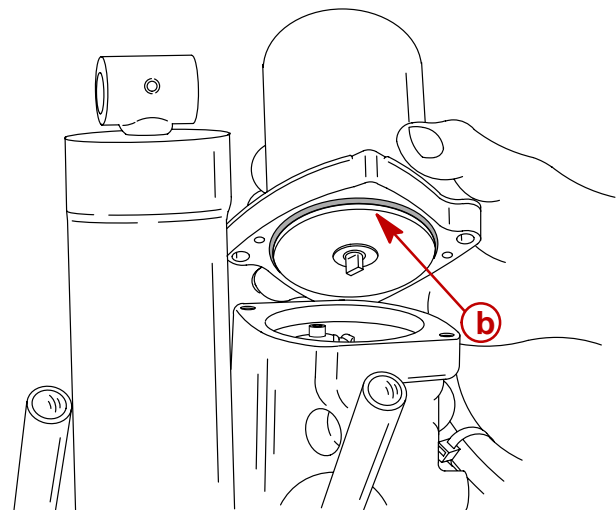
Trim Motor Removal

1. Secure power trim assembly in a soft jaw vise.
2. Remove 2 screws securing motor and remove motor. Remove motor o-ring (yellow) and coupler.
3. Inspect o-ring for cuts and abrasions. Replace o-ring as required.



58611

a - Screws and Washers
b - O-Ring (YELLOW)



58610

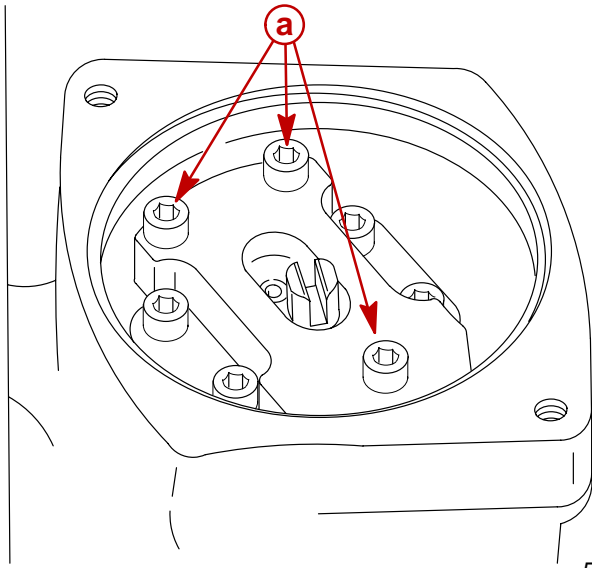


Pump and Component Removal

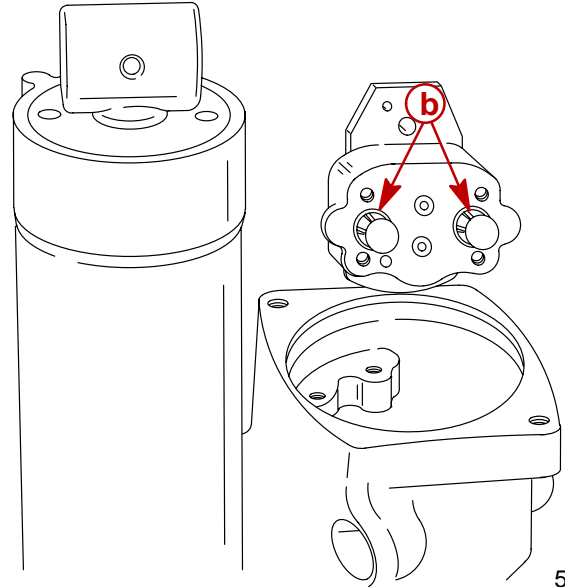
1. Remove 3 screws securing oil pump.

NOTE: There are no serviceable parts within the oil pump. Failure of or damage to internal components of the pump requires pump assembly replacement.

2. Inspect filter/o-ring assemblies on bottom of oil pump. Replace as required.



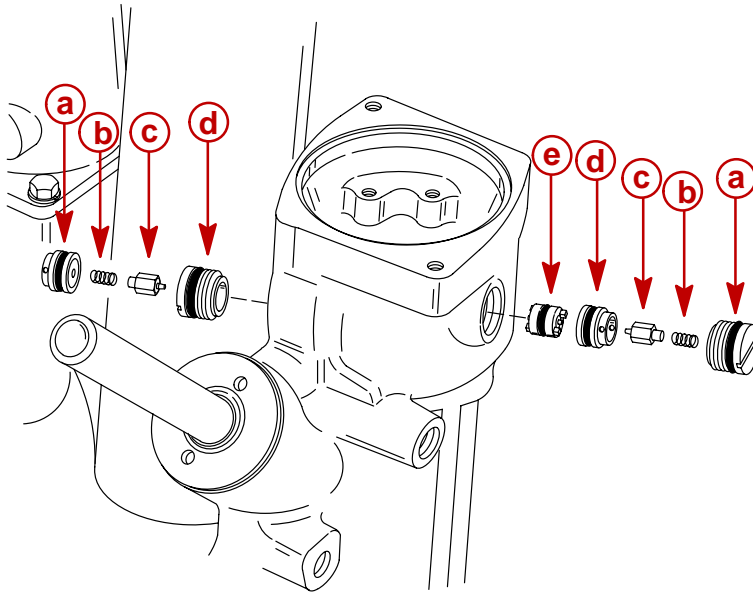
58609



58608

- a** - Screws
- b** - Filter/O-ring Assemblies

3. Remove both plugs in manifold. Remove springs, poppet/check valves and seats from both sides. Remove spool.

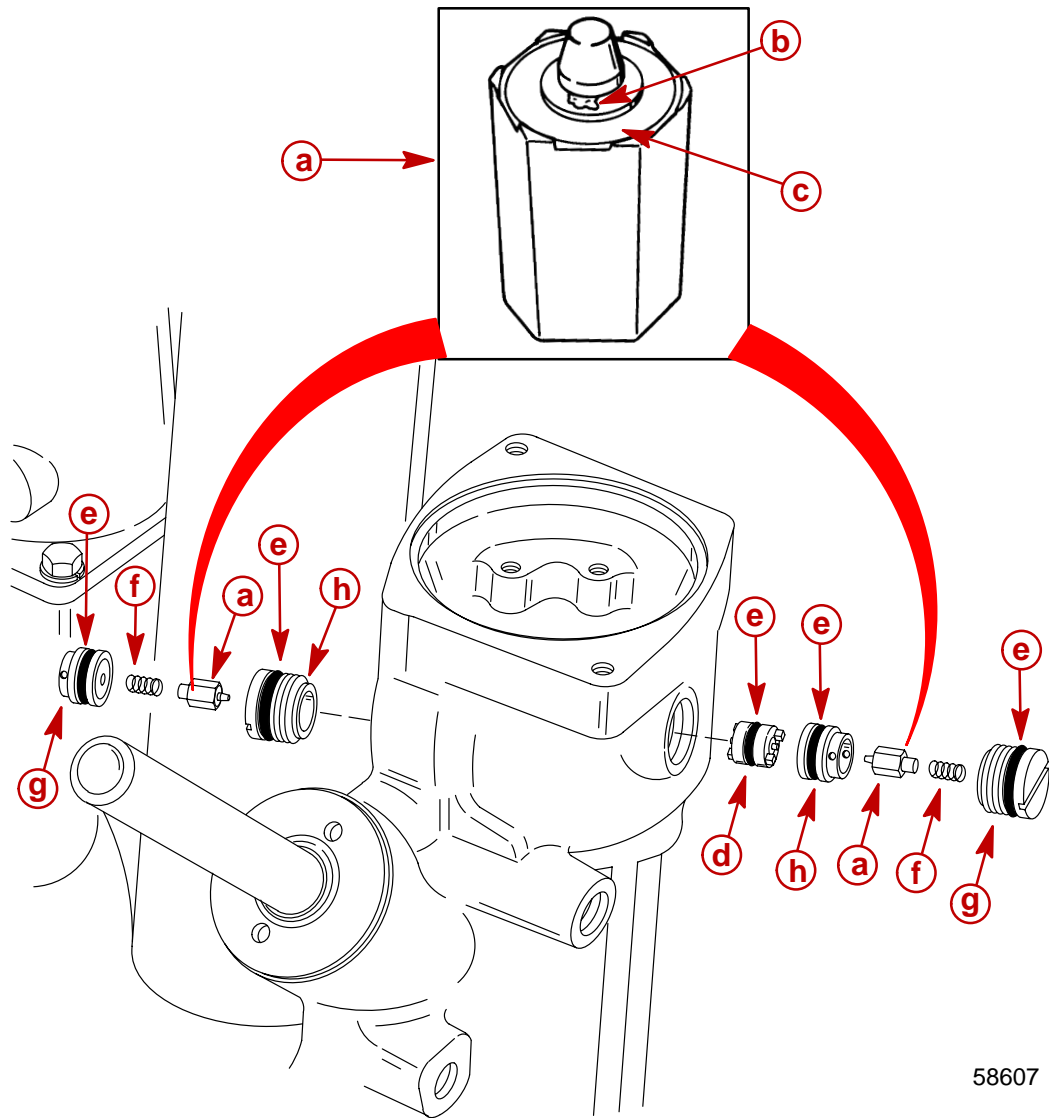


58607

- a** - Plugs
- b** - Springs (2)
- c** - Poppet/Check Valves (2)
- d** - Seats (2)
- e** - Spool



IMPORTANT: Inspect poppet assembly for debris in the area shown. If debris is found on poppet, replace poppet. Inspect o-rings on both seats and spool for cuts or abrasions. Replace o-rings as required.



58607

- a** - Poppet Assembly
- b** - Debris on Rubber Seat
- c** - Neoprene Seat
- d** - Spool
- e** - O-Rings
- f** - Spring
- g** - Cap
- h** - Seat



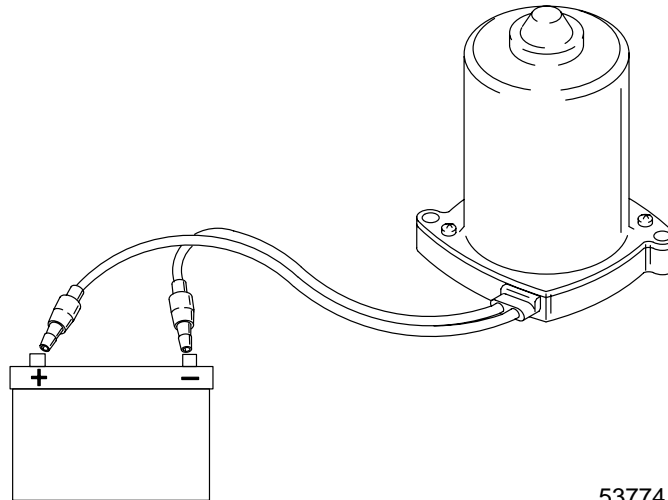
Motor and Electrical Tests/Repair

Trim Pump Motor Test

⚠ WARNING

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

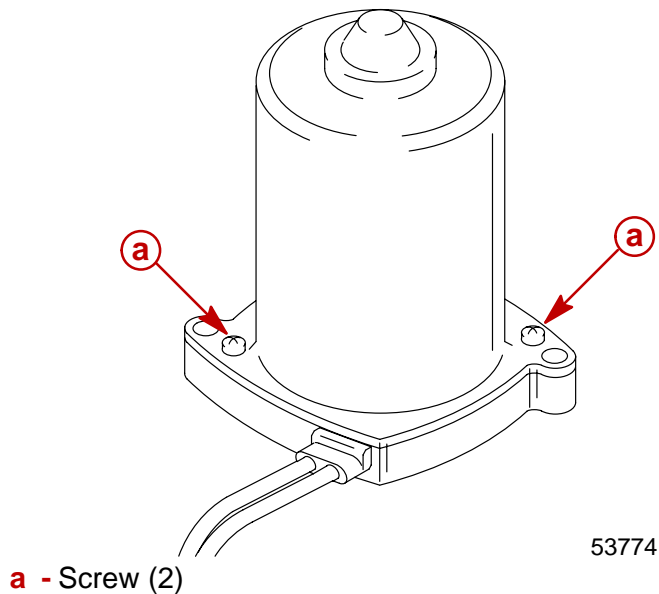
1. Connect a 12 volt power supply to motor wires; one motor lead to POSITIVE (+) battery terminal and the other motor lead to the NEGATIVE (-) battery terminal. Motor should run. Reverse motor leads between battery terminals. Motor should run.



2. If motor does not run, disassemble and check components.

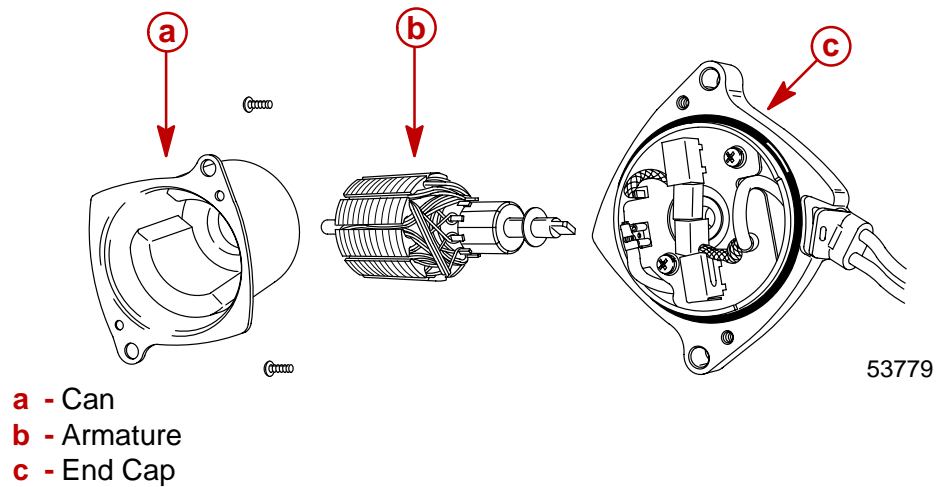
Motor Disassembly

1. Remove 2 screws.





2. Remove frame and armature from end cap. Use care not to drop armature.



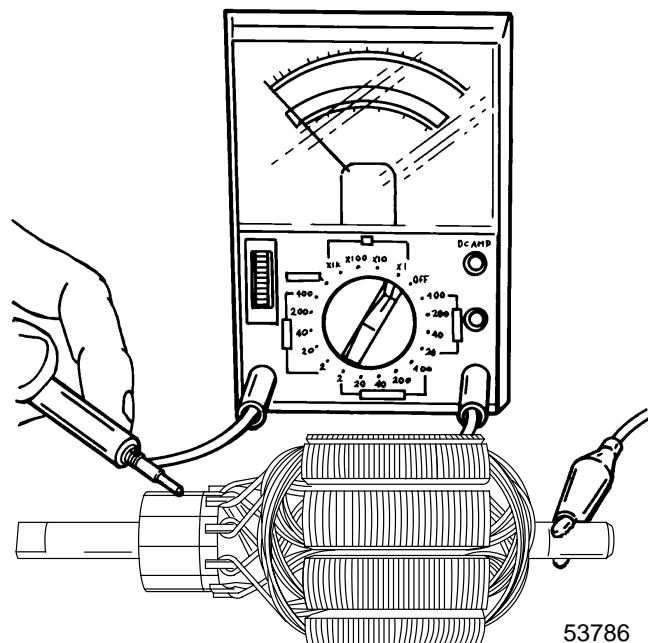
Armature Tests

TEST FOR SHORTS

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

TEST FOR GROUND

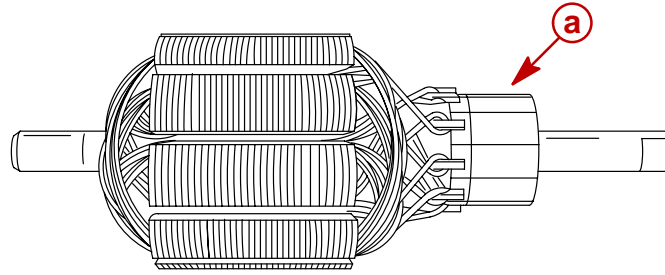
1. Use an Ohmmeter (Rx1 scale). Connect one lead on armature shaft and other lead on commutator. If continuity is indicated, armature is grounded. Replace armature.





CHECKING AND CLEANING COMMUTATOR

1. If commutator is worn, replace armature.



53775

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 _____)
BLUE and GREEN Motor Wires	0	(Rx1)
GREEN Motor Wire, and Frame (Motor Housing)	No Continuity	(Rx1)
BLUE Motor Wire and Frame	No Continuity	(Rx1)

*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

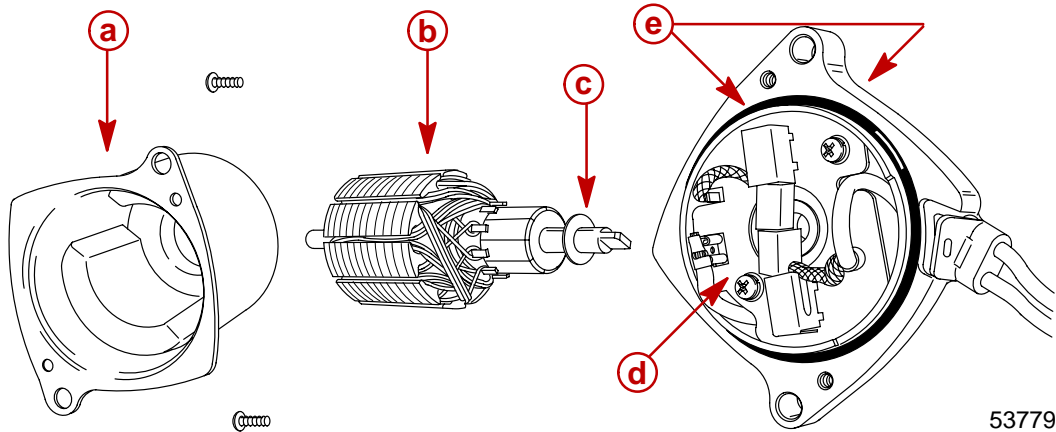
Trim outboard to the full "UP" position and engage tilt lock lever. Open reservoir plug to relieve pressure, then retighten. Use a SNAP ON [5 mm (FABLM5)] ball end allen bolt driver to remove the 2 motor mounting bolts.

Refer to "**Motor Disassembly**" on page 5B-39 to disassemble motor from pump.



CLEANING AND INSPECTION

Inspect O-rings and replace if necessary. Carefully inspect power cord for cuts or tears which will allow water to enter motor. If cord is cut or torn, replace motor and power cord as an assembly. Clean, inspect, and test motor components. Refer to “**Brush Replacement**”, “**Armature Test**”, and “**Field Tests**” for inspection and test procedures.

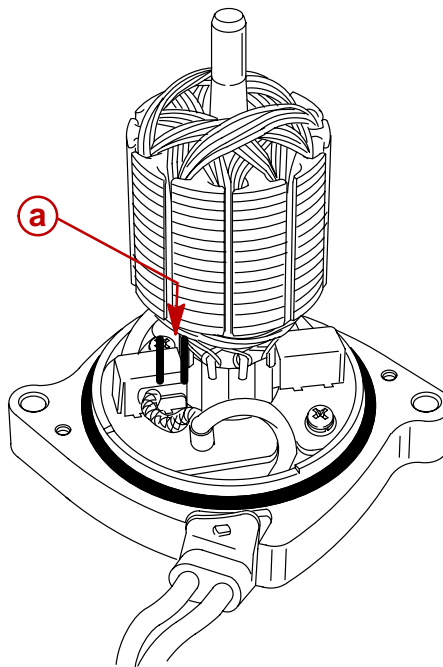


- a** - Can
- b** - Armature
- c** - Shim
- d** - Motor End Frame Assembly
- e** - O-rings

53779

BRUSH REPLACEMENT

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, complete motor end must be replaced (brushes are not available separately). Check brush distance with armature installed.



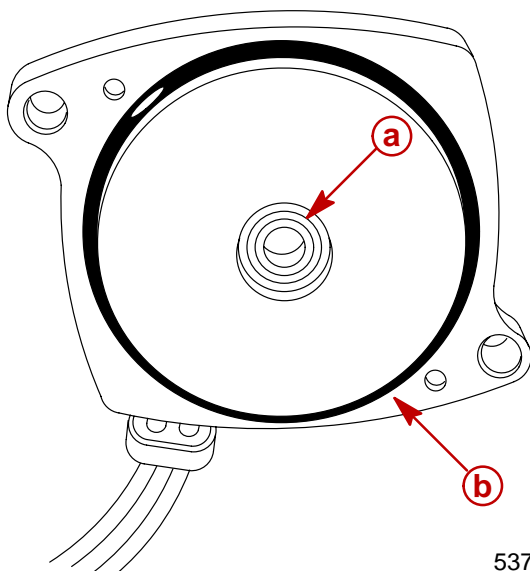
- a** - 1/16 in.

53784

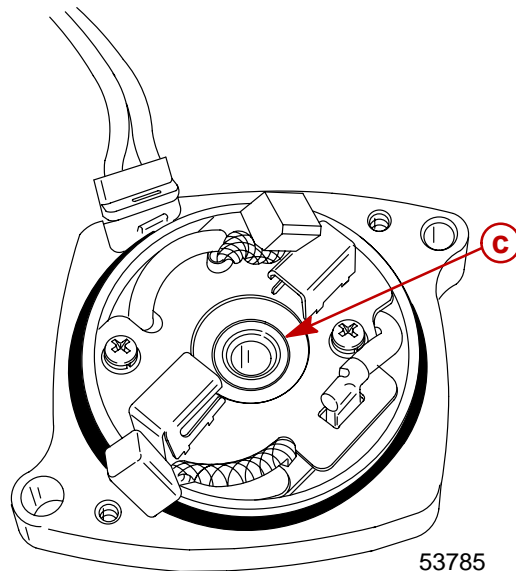


END CAP INSPECTION

1. Inspect seal and O-ring for cuts and abraisions.
2. Inspect bushing for wear. If bushing appears to be excessively worn – grooves, scratches, etc. – install END FRAME ASSEMBLY (COMPLETE).



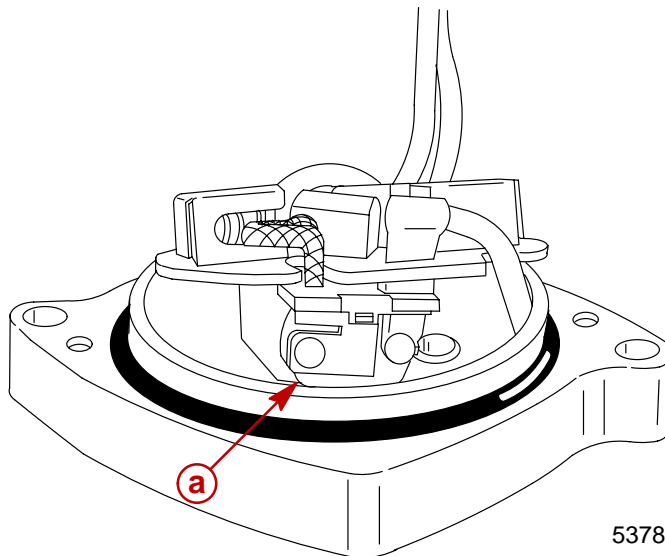
53783



53785

- a** - Seal (Apply 2-4-C w/Teflon to seal lips)
- b** - O-ring
- c** - Bushing

3. If trim motor is overheated, a thermoswitch located on the brush card will open. Normally, this switch will reset itself within 1 minute.



53781

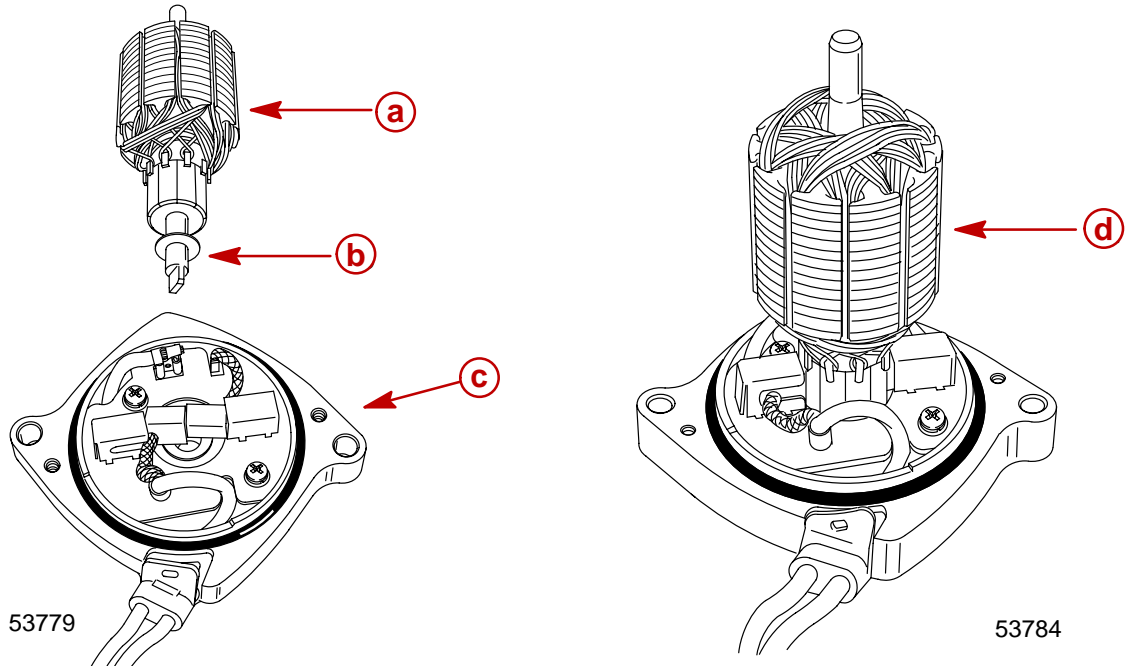
- a** - Thermoswitch



Reassembly

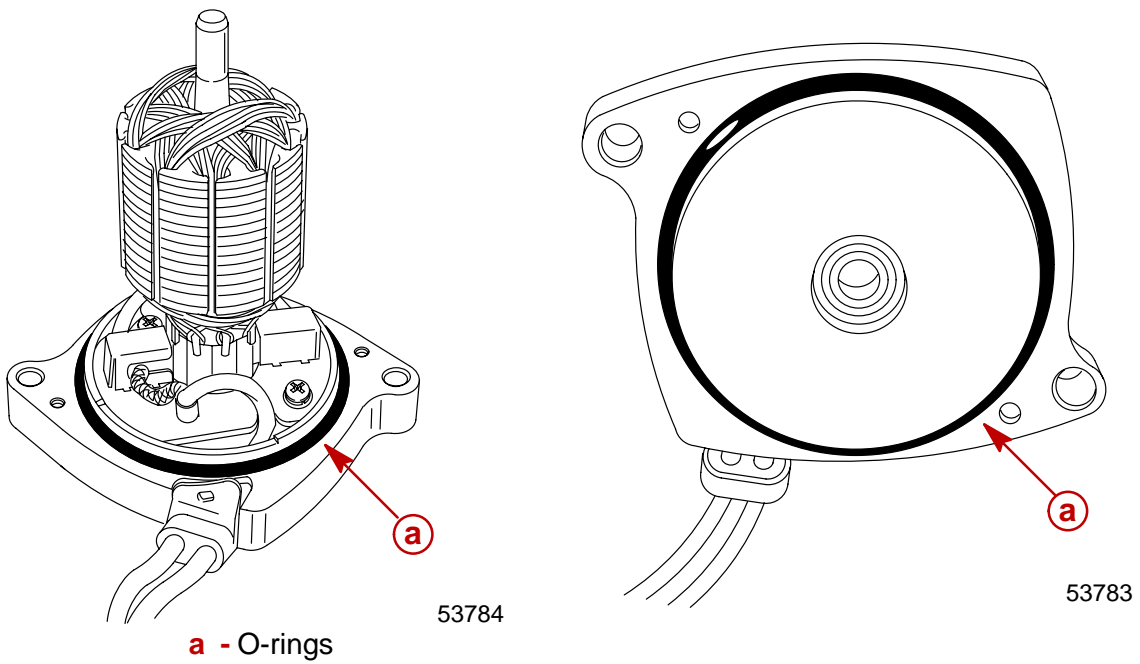
IMPORTANT: Components must be clean. Any debris in power trim system can cause system to malfunction.

1. Install armature into end cap/brush card assembly.



- a** - Armature
- b** - Shim
- c** - End Cap Assembly
- d** - Armature (Spread brushes to install armature into end cap)

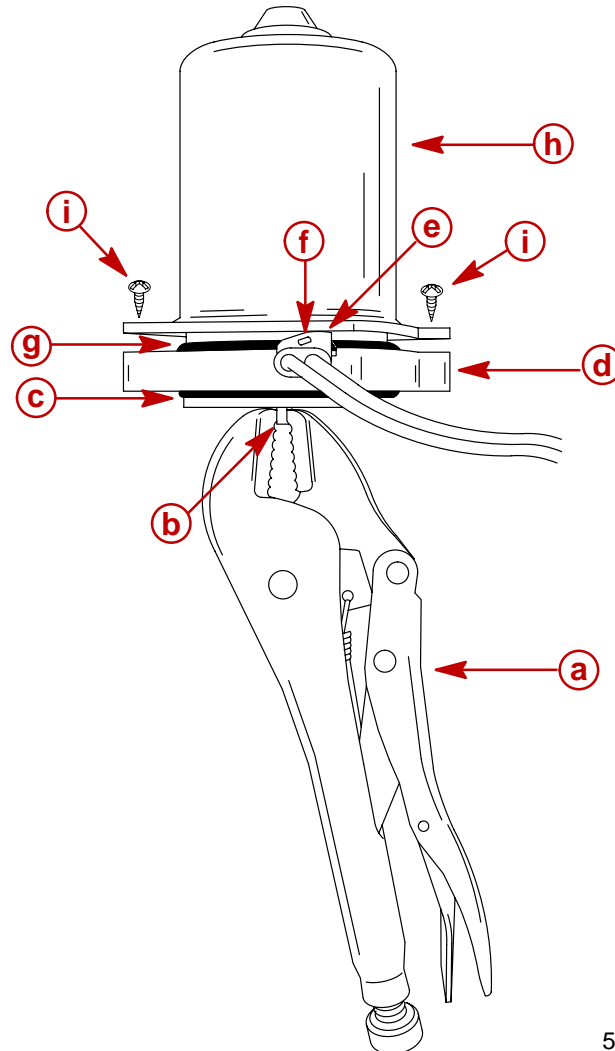
2. Install O-rings in end cap.





IMPORTANT: Attach Vise Grip® pliers to armature shaft before installing frame assembly. The Vise Grip® pliers will prevent the armature from being drawn out of the brush card assembly by the frame magnets while installing the frame assembly.

3. Install Vise Grip® pliers on armature shaft.
4. Carefully install can over armature.
5. Position harness retainer hole over tab in end cap.
6. Secure frame assembly to end cap with 2 screws.



53776

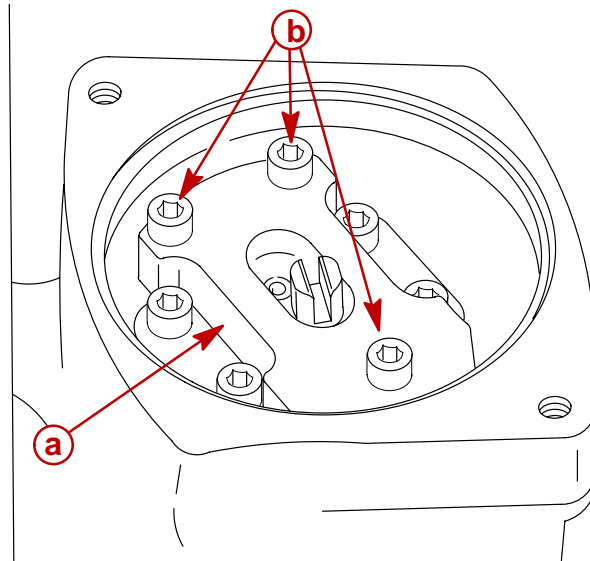
- a** - Vise Grip® Pliers
- b** - Armature Shaft
- c** - O-ring
- d** - End Cap
- e** - Harness Retainer
- f** - Retainer Hole
- g** - O-ring
- h** - Can
- i** - Screws (Drive Tight)



Reassembly - Motor and Pump

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

1. Install pump into power trim manifold. Insure O-rings are in proper locations. Secure with 3 screws. Torque screws to 60 lb. in. (7 N-m).



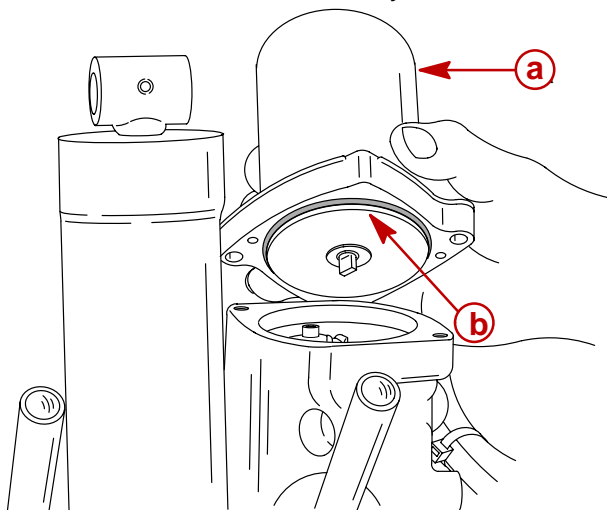
- a** - Oil Pump
b - Screws (3) Torque to 60 lb. in. (7 N m)]

58609

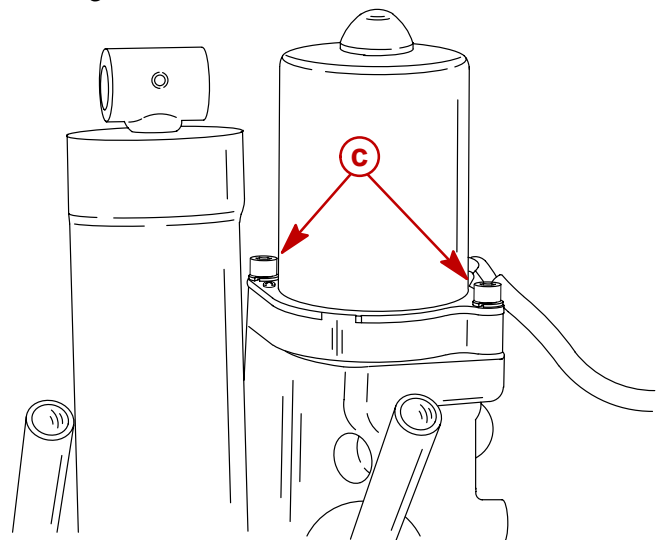
IMPORTANT: Install pump with location flat facing towards starboard transom bracket.

2. Fill pump with ATF Dexron III or Quicksilver Power Trim and Steering Fluid prior to installing motor.
3. Install motor, secure with 2 screws. Torque screw to 80 lb. in. (9 N m). Route wiring; refer to Wiring Diagrams in this service manual.

NOTE: Verify motor and drive shaft are aligned.



58610

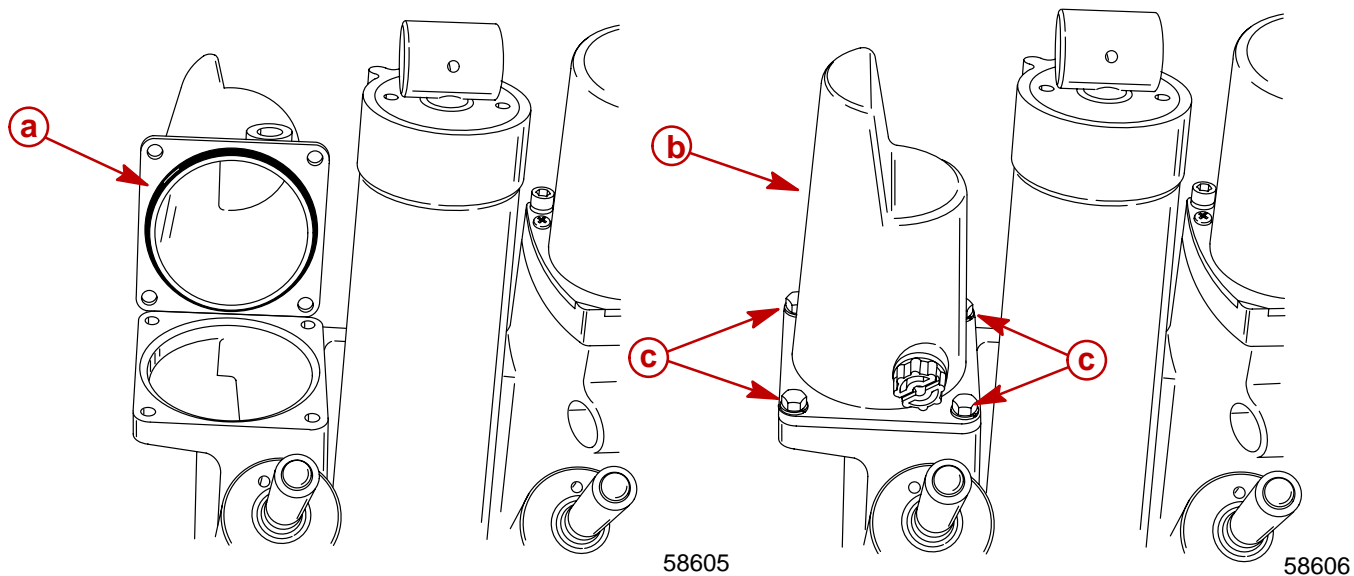


58611

- a** - Motor
b - O-ring
c - Screw (2) Torque to 80 lb. in. (9 N m).



4. Reinstall reservoir cover. Verify cover o-ring is in place and in serviceable condition. Secure cover with 4 screws. Torque screws to 60 lb. in. (7 Nm).



- a** - O-Ring
- b** - Reservoir Cover
- c** - Screws [Torque to 60 lb. in. (7 Nm)]

5. Complete reassembly of Power Trim System as outlined in “**Installation**” on page 5C-31.



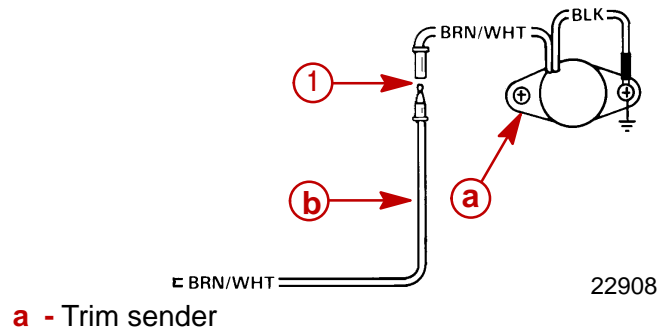
Priming Power Trim System

1. Fill system with Quicksilver Power Trim and Steering Fluid or Automatic Transmission Fluid (ATF) Dexron III. Refer to “**Fill, Check, and Purge**” on page 5B-10.

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

Analog Trim Sender Test

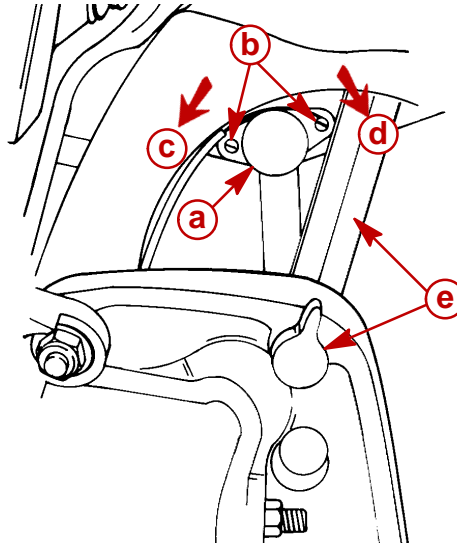
1. Check trim sender black lead for proper ground.
2. Trim outboard to full “DOWN” position.
3. Place ignition switch to “ON” position.
4. Disconnect BRN/WHT trim sender wire from trim sender harness.
5. Connect Ohmmeter (Rx1 scale) leads between outboard ground and Point 1 (trim sender end).
6. Depress “UP” button. Ohmmeter needle should move as the outboard is trimmed up. If needle does not move, trim sender is defective.





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.

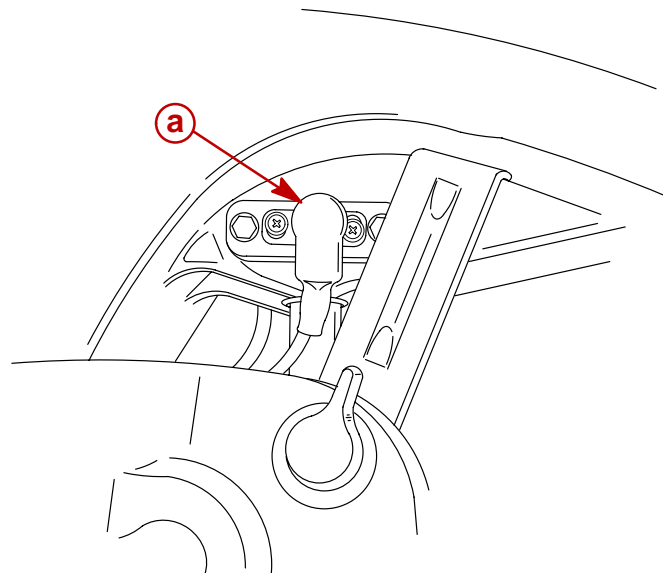


22744

- 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

Digital Trim Sender

Digital trim senders used with Smartcraft gauges are not adjustable.



58451

- a** - Digital Trim Sender



Troubleshooting Digital Trim Sender

Trim sender requires a 5 vdc reference signal from ECU. With the ignition switch in the RUN position and using an appropriate probe (paper clip, etc.) inserted in parallel at the trim sender bullet connectors, this voltage can be checked as follows:

Voltmeter	Sender Harness	Voltage
RED	BLUE	4 – 5 vdc
BLACK	BLACK	

NOTE: 5vdc reference voltage at the ECU can be monitored by the Digital Diagnostic Terminal. Voltage should be $5\text{ vdc} \pm 0.1\text{ v}$. Any other voltage indicates a defective ECU. If ECU reference voltage is correct, but voltage at trim sender is low or not existent, inspect sender wiring and connections.

Voltage at trim sender should rise and fall smoothly as outboard is raised or lowered. Voltage at the full UP position should be $4\text{ vdc} \pm 0.5\text{v}$. Voltage at the full DOWN position should be $1.5\text{ vdc} \pm 0.5\text{ v}$. With the ignition switch in the RUN position and using an appropriate probe (paper clip, etc.) inserted in parallel at the trim sender bullet connectors, this voltage can be checked as follows:

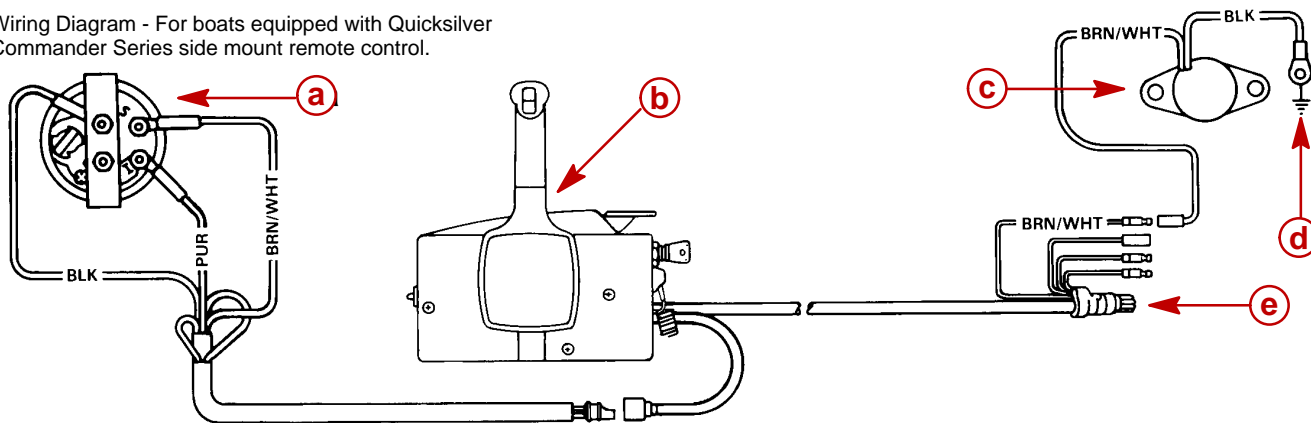
Voltmeter	Sender Harness	FULL UP	FULL DOWN
RED	YELLOW	$4\text{ vdc} \pm 0.5\text{v}$	$1.5\text{ vdc} \pm 0.5\text{v}$
BLACK	BLACK		

If voltage is not as indicated or voltage rise and fall is erratic, trim sender is defective.

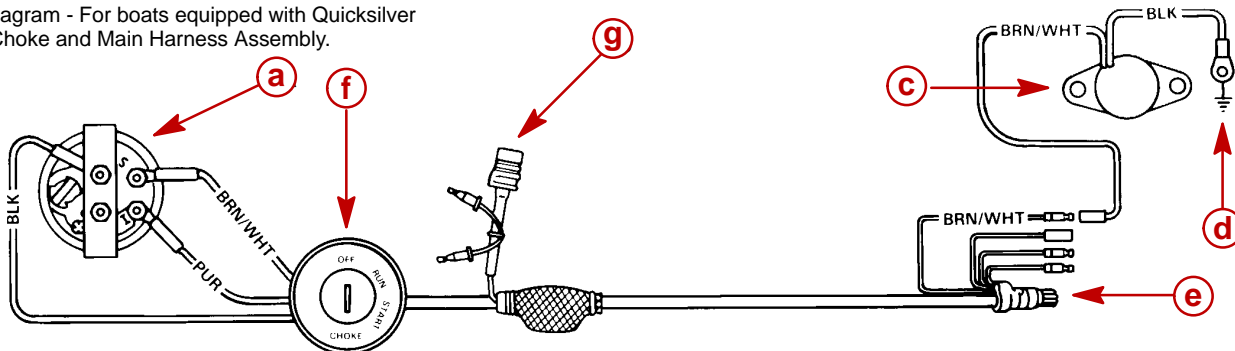


Trim Indicator Wiring Diagrams

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.



22908

- a** - Trim Indicator
- b** - Remote Control
- c** - Trim Sender
- d** - Engine Ground
- e** - To Engine
- f** - Ignition Switch
- g** - Power Trim Harness