



o.e.m. service bulletin

TO: PURCHASING INSTALLERS
ENGINEERING

No. 94-1

▲ = Revised 1/19/94

A. BRAVO TRIM IN LIMIT SPACER KITS

Models

All Bravo Product

Problem

It has been brought to our attention that some boats (predominantly deep vee heavy boats) will roll up on their side under certain, specific, operating conditions. The roll can be either to port or starboard and may be experienced while moving straight ahead, or while making a turn. The roll occurs most frequently at or near maximum speed, with the drive unit trimmed at or near full in. While the boat will not roll completely over, the roll may be sufficient to unseat the operator or passengers, and thereby create an unsafe situation.

The roll is caused by "stern lift." Stern lift can be created by excessive drive unit trim "in." Under these extreme "stern lift"/"bow down" conditions instability can be created which may cause the boat to roll. Weight distribution to the stern can reduce "Stern lift" and in some circumstances, eliminate the condition. Weight distribution in the bow, port or starboard, may worsen the condition.

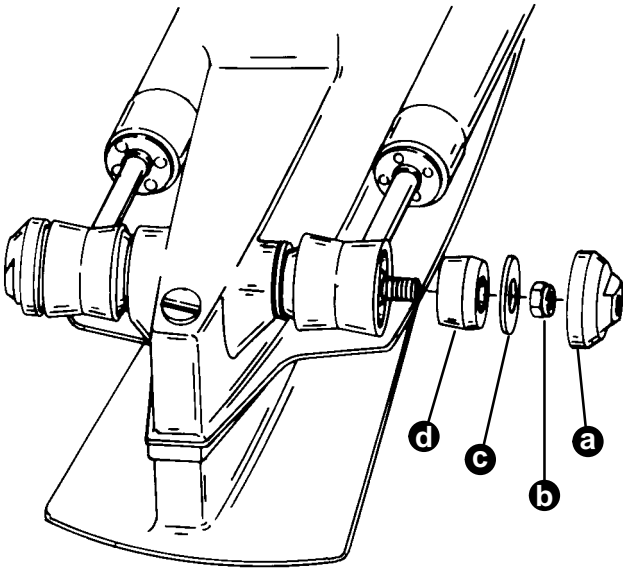
Correction

MerCruiser has a trim in limit kit available through Quicksilver which reduces "stern lift" by preventing the drive unit from reaching the last few degrees of full trim under. While the kit should reduce the rolling tendency, it may not eliminate it entirely. The need for the kit, and the effectiveness of the kit, can only be determined through boat testing and is ultimately the responsibility of the boat manufacturer, or the selling dealer if it is a replacement drive unit.

▲ **NOTE:** Use kit 806692A2 only on Bravo transom assemblies with serial number 0F214600 and above. For Bravo transom assemblies with serial number 0F214599 and below use internal spacer kits listed following: 23-806445A1, A2, A3.

Installation

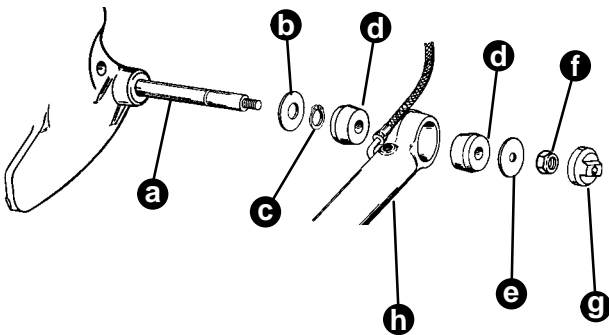
1. Disconnect the aft ends of both trim cylinders from the drive unit.



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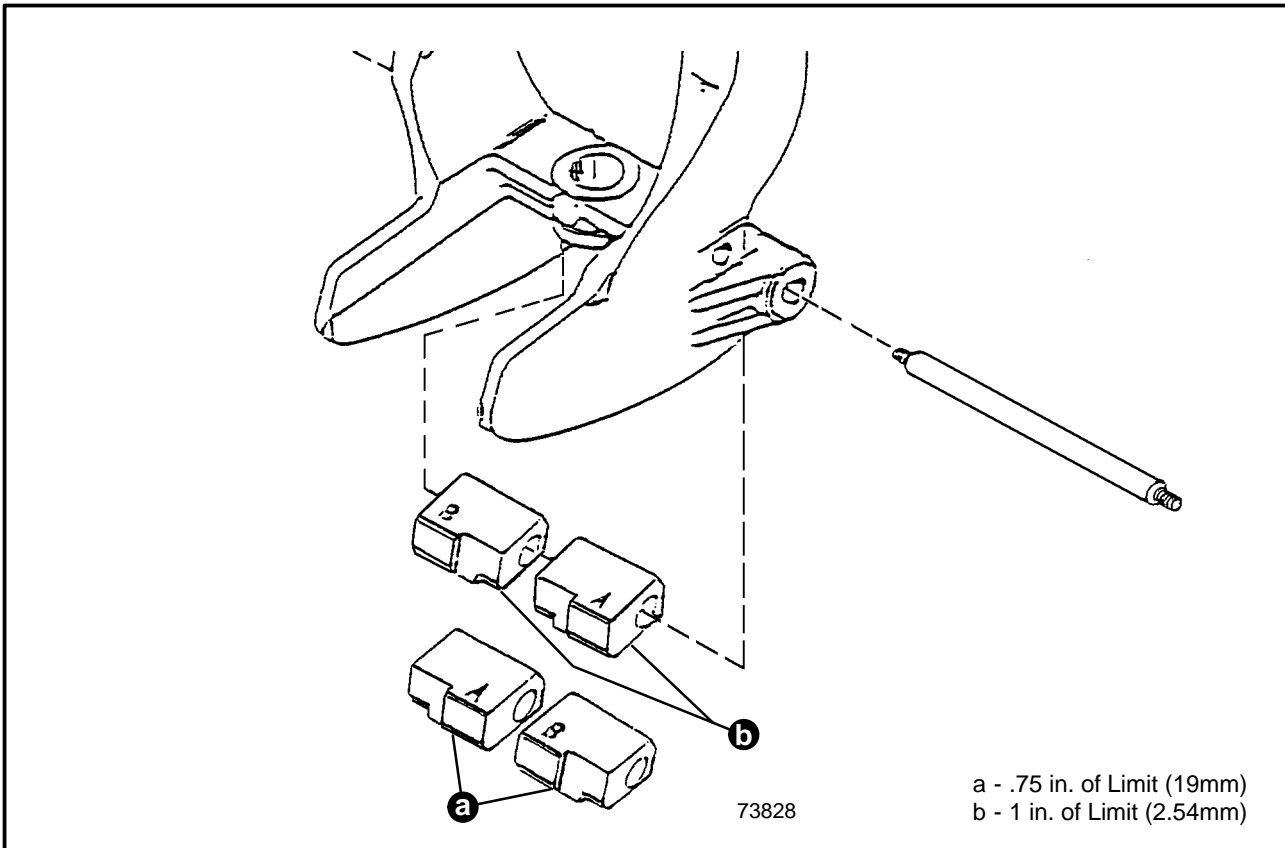
- a - Cap
- b - Nut
- c - Small I.D. Washer
- d - Rubber Bushing

2. Disconnect the forward ends of both trim cylinders and remove the cylinders and their mounting hardware from the anchor pin. DO NOT disconnect the trim hoses.



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- a - Anchor Pin
- b - Flat Washer (Large I.D.)
- c - Snap Rings
- d - Rubber Bushings
- e - Flat Washer (Small I.D.)
- f - Lock nut
- g - Plastic Cap
- h - Trim Cylinder



- Slide the anchor pin out of the gimbal ring far enough to install the limit spacers over the pin. Then, slide the spacers over the end of the anchor pin.

⚠ CAUTION

Avoid transom/drive alignment error or interference, or casting damage. Always install limit blocks with letters facing up.

- Install block “A” on the port side of the anchor pin and block “B” on the starboard side for 3/4”in. (19 mm) of trim “in” limit. For 1 in. (25.4 mm) of trim “in” limit, install block “B” port side and block “A” on the starboard side. Always install the blocks with the letter identifiers facing up (toward the gimbal ring clevis).
- Push the anchor pin back through the gimbal ring.
- Reinstall the trim cylinder and mounting hardware.
- Test the boat to ensure the proper tuck under limit was chosen.

NOTE: If the trim limit blocks do not provide sufficient trim “in” limit, install the trim in limit spacers in kit 23-806445A1, 23-806445A2 or 23-806445A3 for additional trim “in” limit.

⚠ CAUTION

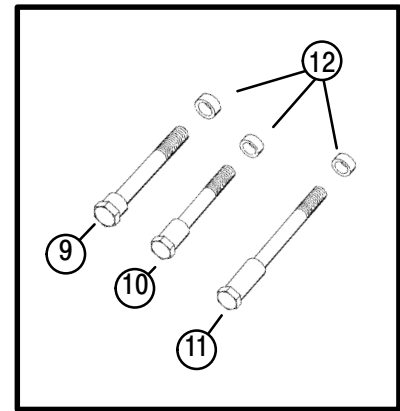
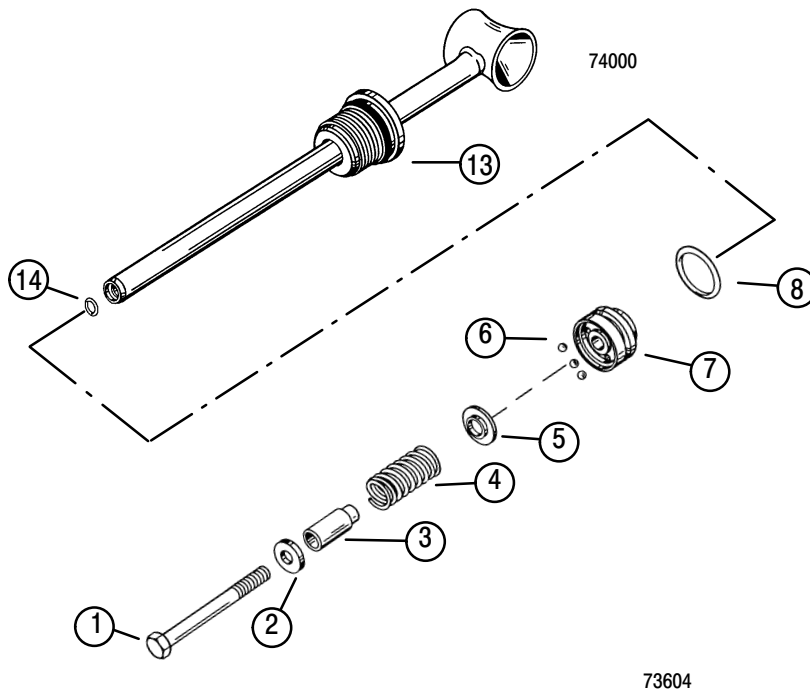
Cylinder parts can be damaged by dirt entering into power trim system. Ensure work area is clean before disassembling power trim cylinders.

⚠ CAUTION

DO NOT clamp center section of power trim cylinder during assembly or disassembly. Clamp cylinder on front mounting flange.

- Ensure that the trim cylinders are disconnected from the stern drive unit.
- Operate the trim pump to extend trim cylinders (half way “Up”/“Out”).
- Loosen the end cap with spanner wrench (P/N 91-821709). Then remove the piston rod assembly from cylinder.

11. Disassemble the piston rod. DO NOT lose the check balls.
12. Replace the bolt with the appropriate spacer bolt (torque to 15-20 lb. ft. (20-27 N•m). Use the optional spacer bushing for an additional 1/4" (6.3 mm) travel reduction if necessary. Torque endcap to 40-50 lb. ft. (55-68 N•m)



- 1 - Bolt
- 2 - Flat Washer
- 3 - Spring Guide
- 4 - Spring
- 5 - Spring Guide Washer
- 6 - Check Balls (3)
- 7 - Shock Piston Assembly
- ▲ 8 - O-ring
- ▲ 9 - Spacer Bolt (1/4", 1/2")(6.3 - 12.7mm)
- ▲ 10- Spacer Bolt (3/4", 1")(19 - 25.4 mm)
- ▲ 11- Spacer Bolt (1-1/4", 1-1/2")(31.7 - 38.1 mm)
- ▲ 12- Spacer Bushing (1/4")(6.3 mm)
- ▲ 13- End Cap
- ▲ 14- O-ring

Kit Number	Travel Reduction
23-806445A1	3/4"-1" (19 - 25.4 mm)
23-806445A2	1-1/4"-1-1/2" (31.7 - 38.1 mm)
23-806445A3	1/4"-1/2" (6.3 - 12.7mm)

IMPORTANT: Before reassembling the trim cylinder, ensure that all cylinder parts are clean.

13. Reassemble the trim cylinders.
14. Use the trim pump to retract and extend the trim cylinders at least 4 times to ensure proper operation and system bleeding.
15. Check trim fluid level and refill if necessary. Use Quicksilver Power Trim & Steering Fluid or SAE 10-W-30 or 10-W-40 motor oil.
16. Reconnect the trim cylinders to the stern drive, if necessary.