1988

- Bravo One introduced on Big Block Magnum and 7.4L models.
- Due to their straight-cut gears, it is a true bi-rotational drive.
- Propshaft rotation changed by changing shift cable output at remote control box and changing propeller.
- Propshaft bearing carrier was shimmed to set propshaft rolling torque.
- No gear lube monitor and no lube passages in driveshaft housing or bell housing.
- Dipstick was in the top cover. Drain plug at front of torpedo. Had to tilt drive unit approximately 45° to allow full drain.
- Fill in vertical position until oil flows out vent plug and verify with dipstick.

1989

- Bravo Two introduced.
- Designed for large, heavy boats with 45 MPH maximum speed.
- Same driveshaft housing as Bravo One, but much larger gear housing.
- Swings a 50.8 cm (20 in.) diameter propeller. Uses TR style prop mounting hardware.
- Load ring on propshaft carrier is used to maintain rolling torque instead of shims.

1990

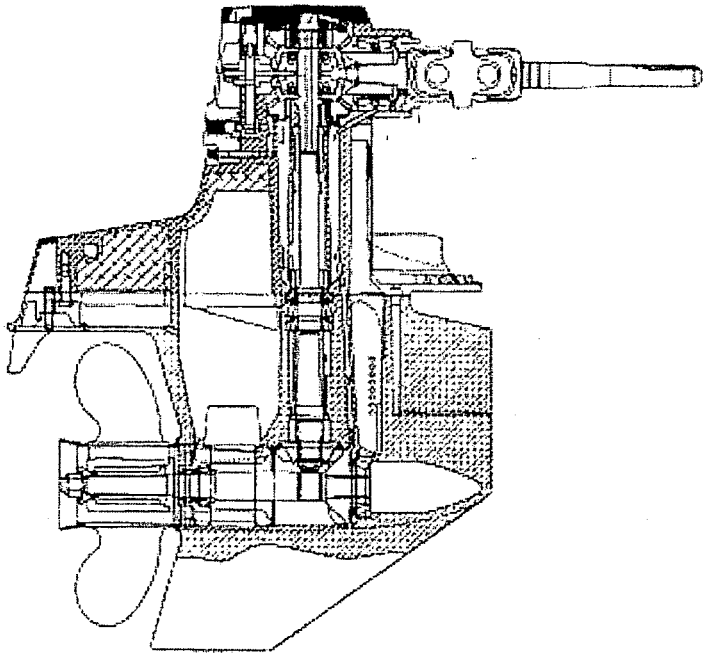
- Bravo One received streamlined gearcase. The strut was moved forward 5 cm (2 in.).
- Bravo One drain plug is now at the rear of the propshaft carrier (C2 carrier).
- Bravo One must trim in fully to drain. Fill in vertical position until oil flows out vent plug.
- Gear lube monitor added to all driveshaft housings and transom assemblies.
- Dipstick removed from top cover.

1991

- Oil recirculation added.
- Lower gearcase pumps lubricant to the U-joint shaft bearings and it returns to the lower gearcase through cast-in passages.
- Required new driveshaft and gear housings. Service Bulletin 91-20.

Bravo Oil Circulation System (1991 and Newer)

Oil movement starts in the gearcase, a high pressure area is created by gear rotation. Using passages cast into the housings this high pressure is directed to the U-joint bearings and seal. Oil; cooled by water flowing past the gearcase, lowers the U-joint bearing and seal temperature. Another passage directs oil from above the U-joint gear to the needle bearing inside the top cover. Oil returns to the gearcase through a passage aft of the driveshaft. Oil enters this return cavity from under the driven gear. A small amount of oil will pass through the bearings under the lower driven gear and around the needle bearing on the upper driveshaft. Oil exits the driveshaft housing and reenters the gearcase through the driveshaft bore.



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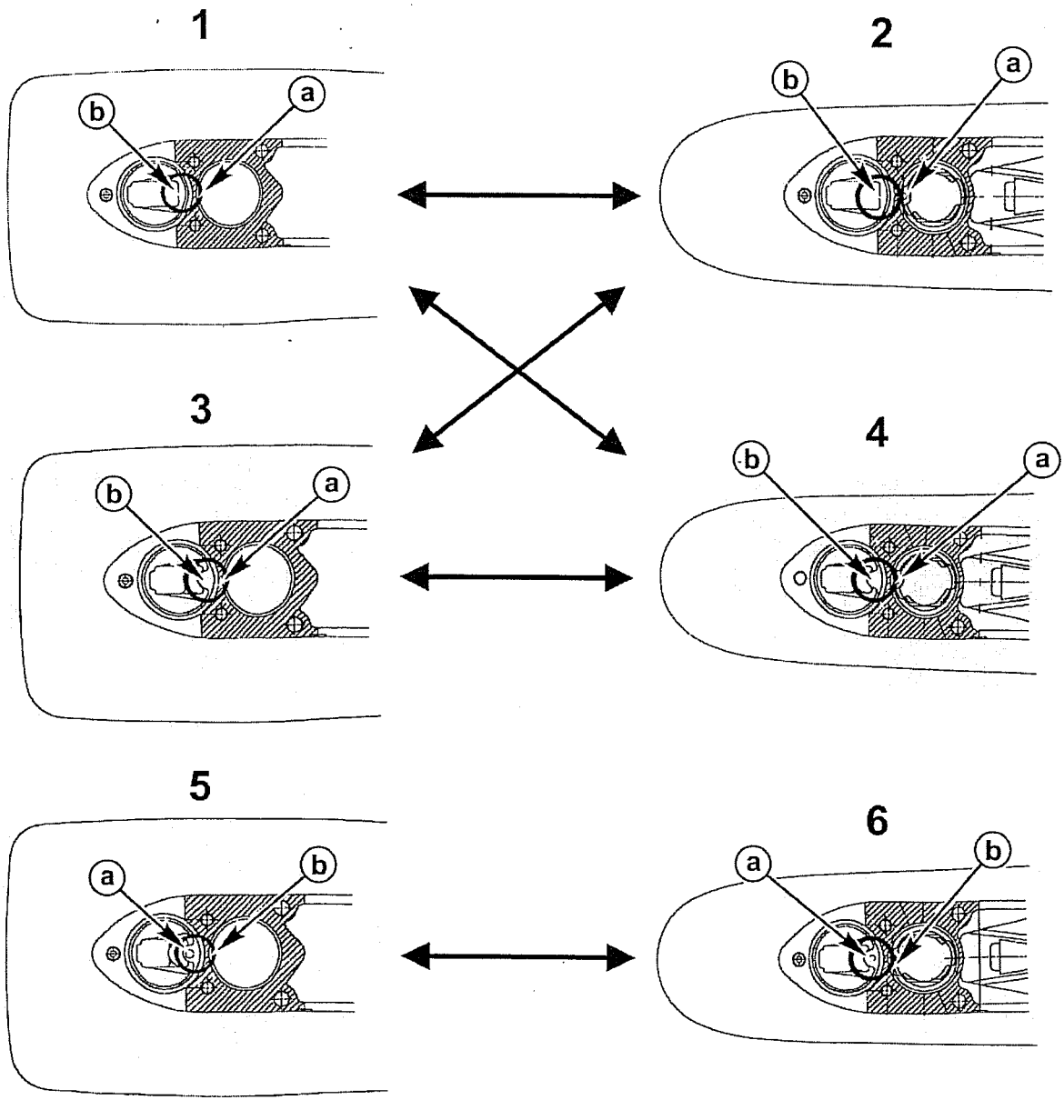
NOTE: Gearcase and driveshaft housings with the oil circulation system will not interchange with housings from older Bravo units without oil circulation. If housings are intermixed, gear oil will drain out of the drive unit, through the interconnecting oil passage. Refer to Service Bulletin 91-20.

Bravo Driveshaft Housing/Gear Housing Compatibility Diagrams

NOTE: All diagrams are of the mating surfaces at the driveshaft bore and forward water cavity areas. Arrows connecting diagrams mean that units are compatible.



a - Oil hole
b - No oil hole

1 - Bravo driveshaft housing - old style
2 - Bravo gear housing - old style
3 - Bravo driveshaft housing - intermediate style
4 - Bravo gear housing - intermediate style
5 - Bravo driveshaft housing - new style
6 - Bravo gear housing - new style

NOTE: Remove and discard any oil passage plugs found in housing mating surface before assembling unit.

1993

- Bravo Three introduced.

- There will be a new driveshaft only in the Bravo One and Three with induction hardened splines on both ends of the shaft. There will be a larger mid-section on the shaft as well. The Bravo One will use the same drive shaft assembly as the Bravo Three. A screw and washer will be used to retain the pinion gear to the shaft, in place of the pinion nut and washer used on older Bravo One product.

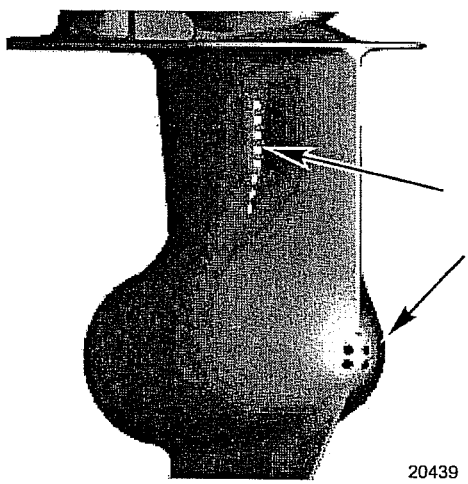
Water Pickups

Bravo standard and X models

- The Bravo One will be offered with the new Dual Water pickup style gearcase. This unit draws water from the side water inlets and from four inlet holes in the front of the torpedo area. The front pickups provide a ram effect and will allow a slightly higher X dimension for the drive unit. If they become plugged from beaching the boat, they will self-clean when under way again.

Bravo XZ, XR models

- The Bravo One will be offered in both the dual water pickup and the Hi-Performance low water pickup style gear housing.



New Bravo One dual water pickup style gear housing

Hi-Performance Propeller Shaft Assembly

Bravo One XZ, XR

- These drives are equipped with the new Hi-Performance propeller shaft assembly. The assembly includes a new heavy-duty bearing carrier, with a larger bearing and piloted gear and a larger diameter propshaft.

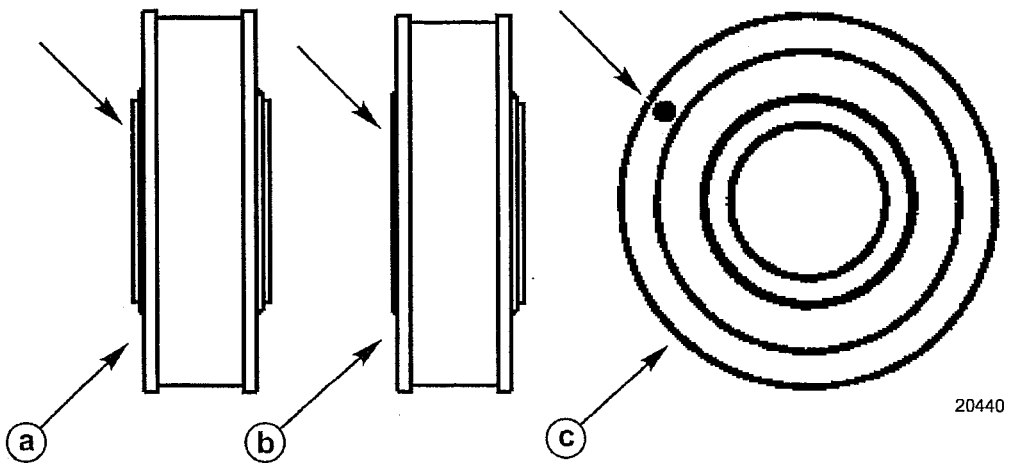
Transom Assembly Changes for Bravo 2000 Models

Intermediate Shift Cable Guide Extension

The Gimbal Housing for both Alpha One and all Bravo product now has a new intermediate shift cable guide extension cast into the housing. There is also a new plastic cable guide insert for the extension in the housing. This extension will help when installing a new intermediate shift cable. It now extends out over the flange of the exhaust pipe. It will help prevent the shift cable from being pushed into the engine coupler area.

New Gimbal Bearing

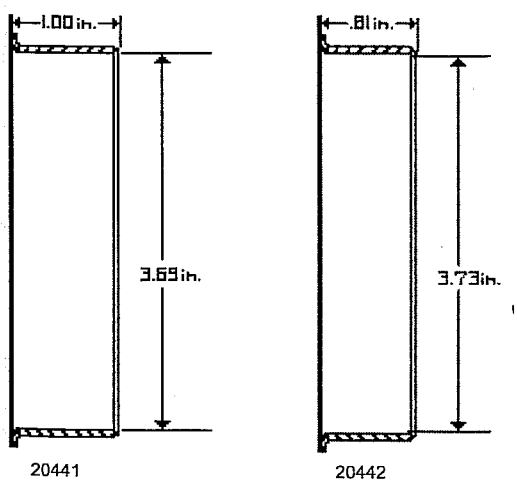
There will be a new gimbal bearing installed in the gimbal housing for Bravo 2000 product only. The new bearing and cartridge will look just like the current gimbal bearing and cartridge. The only difference will be at the center race of the bearing. If you look at the new bearing (from the side), the center race will look like it is offset towards the notched side of the bearing cartridge. The center race has been machined down on one side to provide extra clearance for the L-18 U-joint assembly. The new bearing will also be identified with a **red** paint dot on the aluminum cartridge of the assembly. This new gimbal bearing will be the only gimbal bearing used in all Bravo transom assemblies.



a - Current bearing (30-60794A4) - center race thickness even on both ends
b - New bearing (30-862540A3) - center race machined down on the side that arrow is pointing towards
c - New bearing (30-862540A3) - identifying **red** dot shown on side of aluminum cartridge

New Universal Joint Bellows Aluminum Retention SleevE

There will be a new U-joint bellows aluminum retention sleeve (retainer ring). The retention sleeve will have a larger inside dimension and will be narrower than the current retention sleeve. This change was required to allow clearance for the new larger (L-18) U-joint assembly. The change will be made on all Bravo transom assemblies.

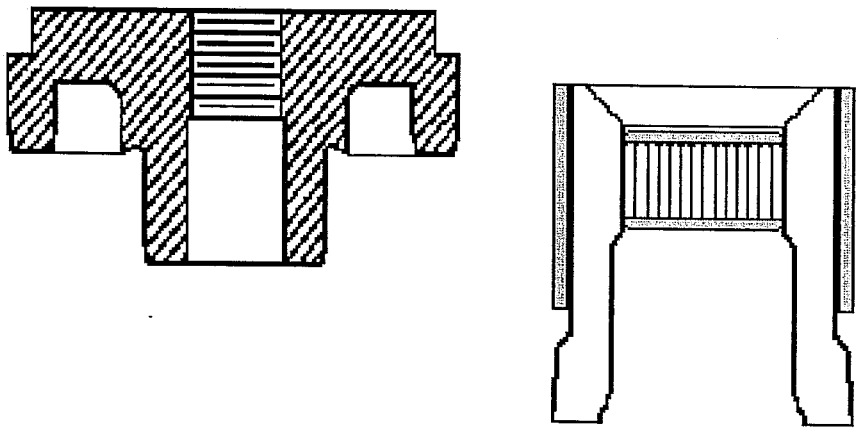


Original U-joint bellows retention sleeve

New U-joint bellows retention sleeve

Bearing Driver And Chimney For Bravo 2000 And Newer Models

A different bearing driver (different from the one used for replacement gear sets used on 1999 and prior units, and the tool used on the original bravo units) is used for installing the sleeve bearing used on all Bravo 2000 series, and later drive units.



20449

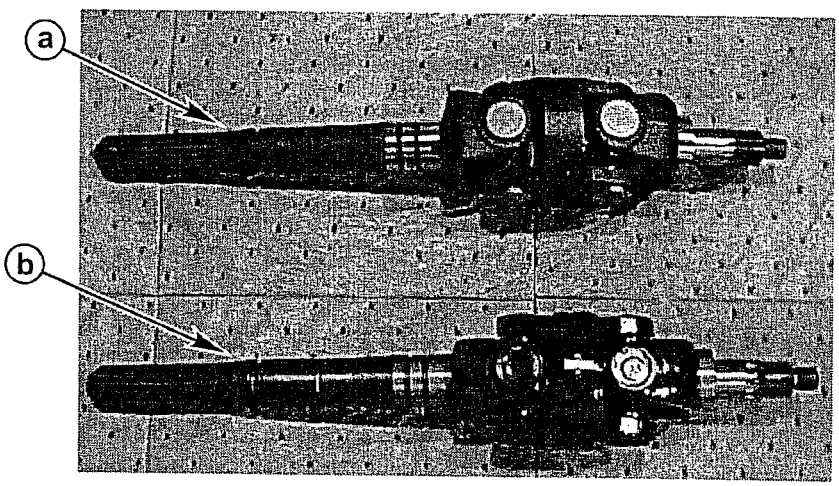
Bearing Driver (91-862530)

NOTE: Information on the new gear sets, new thrust bearing shim races and sleeve bearing drivers can be found in MerCruiser Service Bulletin 2001-17.

2004

U-joint Assembly (Standard and X models)

Rockwell version is No Longer Available (NLA). GKN now makes this assembly for MerCruiser.



20793

a - Rockwell U-joint assembly
b - GKN U-joint assembly

- The Rockwell assembly is **gray** in color, where as the GKN assembly is **black** in color.
- The Rockwell assembly has the cross and bearing end caps retained with clips at the bottom of the cap, inside of the yoke ear.
- The GKN assembly has the cross and bearing end caps retained with the clips above the cap on the outside of the yoke ear, for standard Bravo and Alpha.
- The Rockwell U-joint assembly was a greaseable assembly. The GKN is a permalube style, like the Alpha U-joint assembly and cannot be greased.
- The GKN Bravo X assembly is **black** in color and has the cross and bearing end caps retained with clips at the bottom of the cap, inside of the yoke ear, as did the Rockwell style (Bachman U-joint assembly).