REMOVAL AND INSTALLATION

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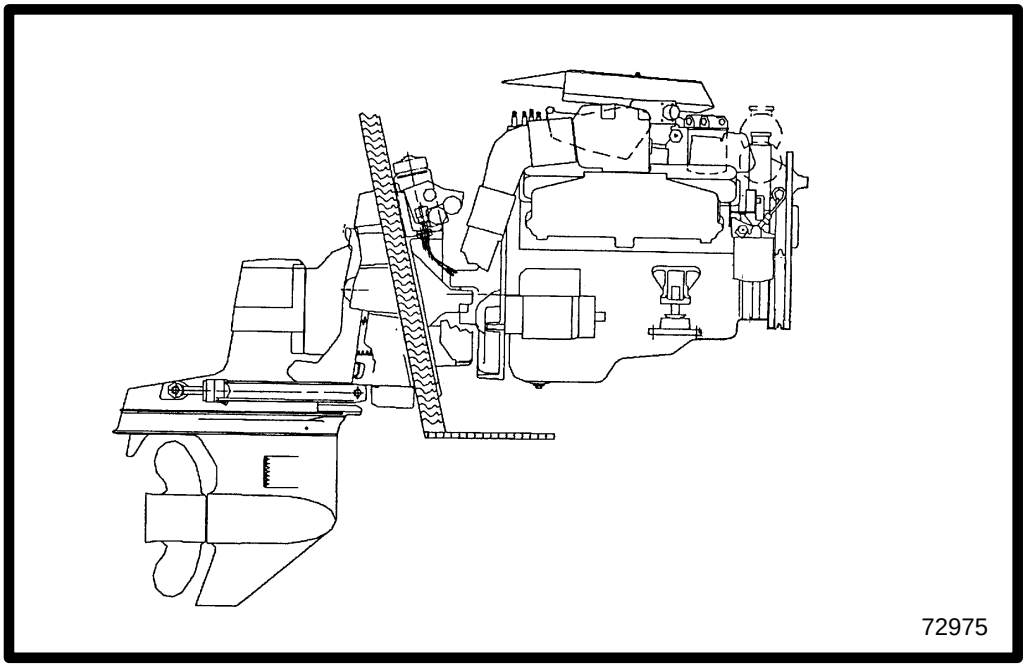
A



MCM MODELS - ALPHA ONE DRIVES

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Table of Contents

Torque Specification

Fastener Location		Lb. In.	Lb. Ft.	N·m
Drive Unit Shift Cable	Cable Barrel	Spread Cotter Key		
	Cable End Guide	See Note		
Hose Clamps		Securely		
Rear Engine Mounts			35-40	47-54
Power Steering Fluid Hose Fitting				
Earlier Style Large			23	31
Small		100		11
Later Style			23	31
Rear Engine Mounts			35-40	47-54
Remote Control Shift Cables	Cable Barrel	Securely		
	Cable End Guide	See Note		
Remote Control Throttle Cable	Cable Barrel	Securely		
	Cable End Guide	See Note		

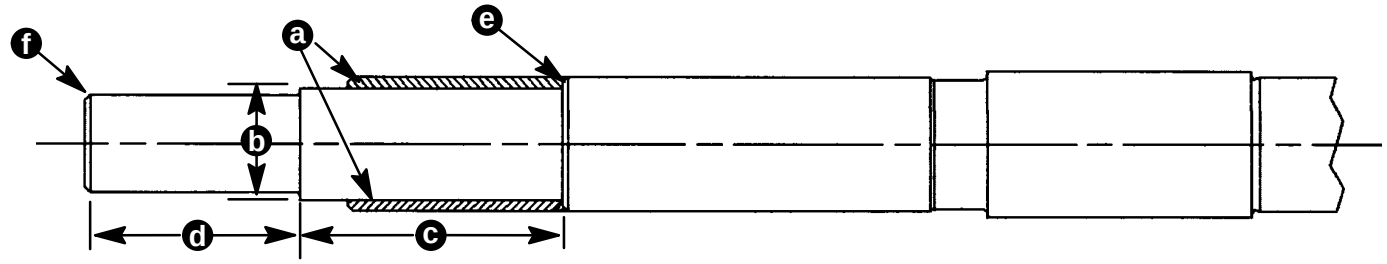
NOTE: *Tighten, then back nut off one half turn*

Tools/Lubricants/Adhesives/Sealants

Part Number	Description
91-805475 A1	Quicksilver Engine Alignment Tool
91-816391 A4	Quicksilver Engine Coupler Spline Grease
92-25711--2	Quicksilver Liquid Neoprene
Obtain Locally	Loctite Pipe Sealant with Teflon

CAUTION ⚠

DO NOT use an alignment tool from another manufacturer. Alignment tools other than Quicksilver Alignment Tools (91-805475A1 or a properly modified 91-57797A3) may cause improper alignment and damage to gimbal bearing and/or engine coupler.



a - Material To Be Removed (Shaded Area)
b - Measurement - 1.150 in. (29.21 mm)
c - Measurement - 2.750 in. (69.85 mm)
d - Measurement - 2.200 in. (55.88 mm)
e - Radius - .060 (1.5 mm)
f - Chamfer - .060 in. (1.5 mm) x 45 degree

Quicksilver Engine Alignment Tool (91-57797A3) Modification

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Removal

IMPORTANT: Stern drive unit must be removed prior to engine removal. Refer to Stern Drive Service Manual.

Engine Removal

1. Disconnect battery cables from battery.
2. Remove instrument harness connector plug from engine harness receptacle after loosening clamp.

⚠WARNING

Be careful when working on fuel system. Gasoline is extremely flammable and highly explosive under certain conditions. Do not smoke or allow spark or open flame in area. Wipe up any spilled fuel immediately.

3. Disconnect and suitably plug fuel line to prevent fuel in tank from leaking into bilge.
4. Disconnect throttle cable from carburetor and retain locknuts and hardware.
5. Disconnect bullet connectors of trim sender wires (coming from transom assembly) from engine harness.

NOTE: *After wires are disconnected be sure to loosen them from clamps or Sta-Straps retaining them to engine or hoses.*

6. Slide sleeves back on BLACK and WHITE/GREEN (or gray) wires and disconnect engine harness wires from shift cut-out switch harness.
7. Disconnect MerCathode wires from MerCathode controller if so equipped.
8. Disconnect seawater inlet hose from gimbal housing.
9. Disconnect exhaust elbow hoses (bellows).
10. Remove both shift cables from shift plate. Retain locknuts and hardware.
11. Disconnect any grounding wires and accessories that are connected to engine.
12. Disconnect (and suitably plug) fluid hoses from power steering control valve on transom.

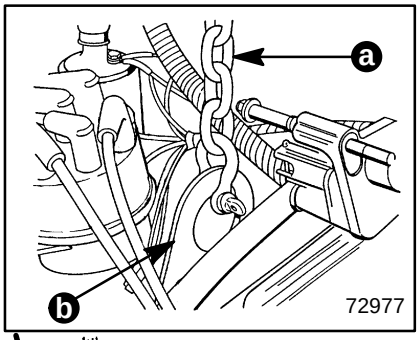
⚠CAUTION

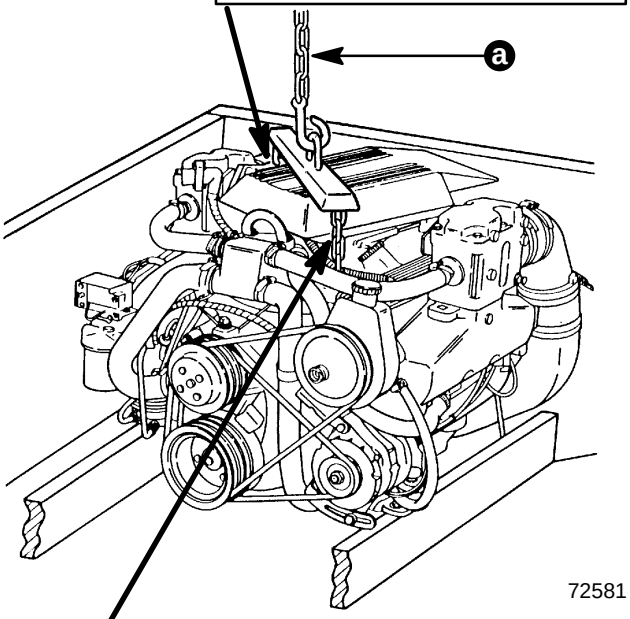
Center lifting eye (located on top of thermostat housing) is used for engine alignment only. DO NOT use to lift entire engine.

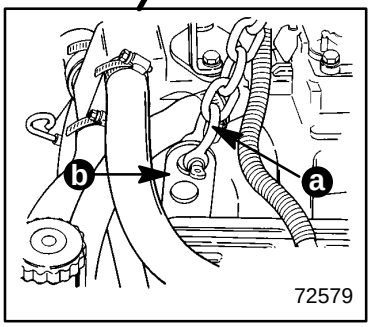
⚠CAUTION

DO NOT allow lifting sling to hook or compress engine components or damage will occur.

13. Support engine with suitable sling through lifting eyes on engine and remove front and rear engine mounting bolts. Retain hardware.







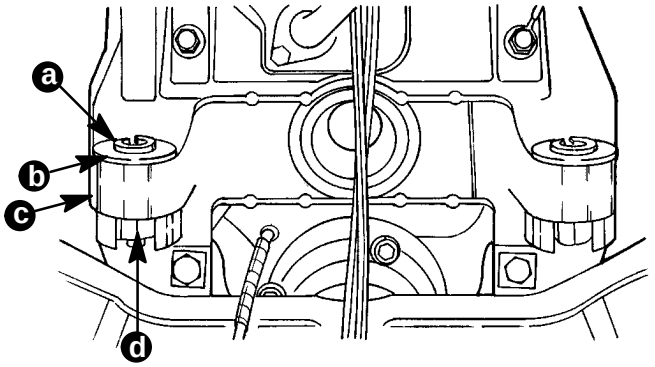
a - Suitable Sling
b - Engine Lifting Eyes

14. Carefully remove engine. DO NOT hit power steering control valve.

Installation

Engine Installation/Alignment

1. Follow instructions “a”-“e”:
   a. Be certain fiber washers (cemented in place) on inner transom plate are present. Inspect fiber washers. Replace if worn or damaged.
   b. Install double wound lockwashers onto inner transom plate inside fiber washer.
   c. Be certain rear engine mount locknuts are in position as shown.
   d. Lubricate exhaust bellows with soap and water to ease installation.
   e. Lubricate engine coupling splines with Quicksilver Engine Coupler Spline Grease.



72023

c - Double Wound Lockwasher
d - Fiber Washer (Cemented in Place)
e - Inner Transom Plate Mount (Engine Support)
f - Locknuts (Engine Mounting Bolts)

⚠CAUTION

Center lifting eye (located on top of thermostat housing) is used for engine alignment only. DO NOT use to lift entire engine.

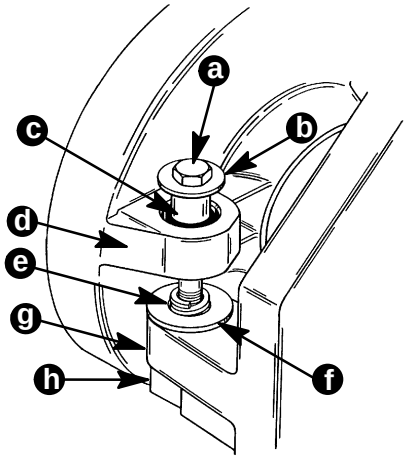
⚠CAUTION

DO NOT allow lifting sling to hook or compress engine components or damage will occur.

2. Attach a suitable sling to lifting eyes on engine and adjust so that engine is level when suspended. **(Refer to “Removal” section for location of lifting eyes.)**
3. Lift engine into position (in boat), using an overhead hoist.
4. Align rear engine mounts with inner transom plate mounts while simultaneously aligning exhaust tubes with exhaust pipe hoses (bellows).

IMPORTANT: Engine attaching hardware must be installed in sequence shown.

5. Install both rear engine mounting bolts and hardware as shown. Torque to 35-40 lb. ft. (47-54 N·m).



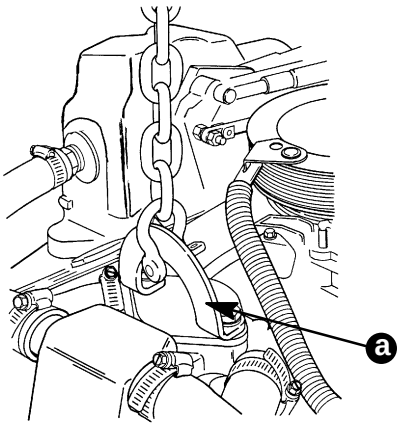
72535

a - Bolt, Rear Engine Mounting
b - Washer, Large Steel
c - Spacer, Metal
d - Rear Engine Mount
e - Double Wound Lockwasher
f - Fiber Washer (Cemented in Place)
g - Inner Transom Plate Mounts
h - Locknuts (Hidden In This View)

⚠CAUTION

When lowering engine into position DO NOT set engine on shift cable. Shift cable outer casing can be crushed causing difficult or improper shifting.

6. Set engine down on stringers and relieve hoist tension. Disconnect sling from engine lifting eyes and switch sling to center lifting eye.



72024

a - Center Lifting Eye

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⚠CAUTION

DO NOT use an alignment tool from another manufacturer. Alignment tools other than Quicksilver Alignment Tool 91-805475A1, may cause improper alignment and damage to gimbal bearing and/or engine coupler.

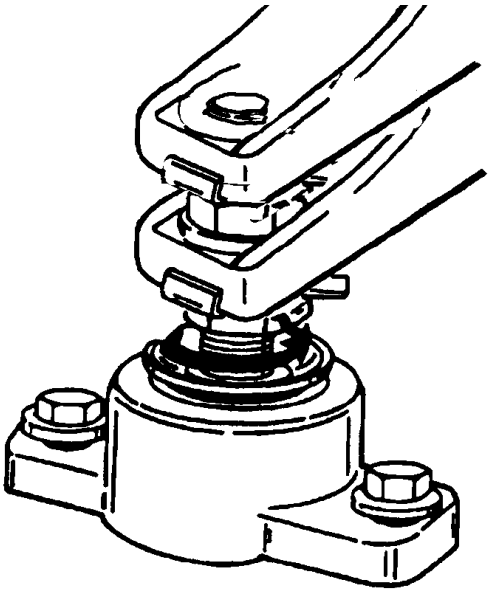
⚠CAUTION

To avoid damage to gimbal bearing, engine coupler, or alignment tool:

- **DO NOT attempt to force alignment tool!**
- **DO NOT raise or lower engine with alignment tool inserted (or partially inserted) in gimbal bearing or engine coupler.**

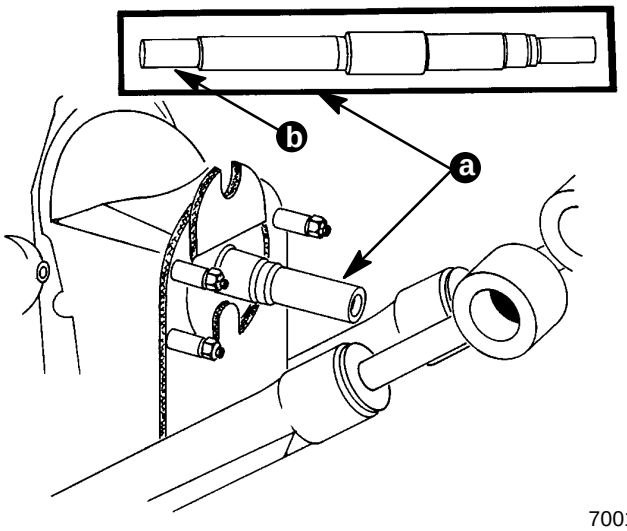
⚠CAUTION

Avoid damage to exhaust system. Engines with single piece manifolds, stress can be placed on the lower exhaust pipe if front of engine is raised too high while performing engine alignment procedure. Ensure that engine is not raised higher than the top of engine mount adjusting stud.



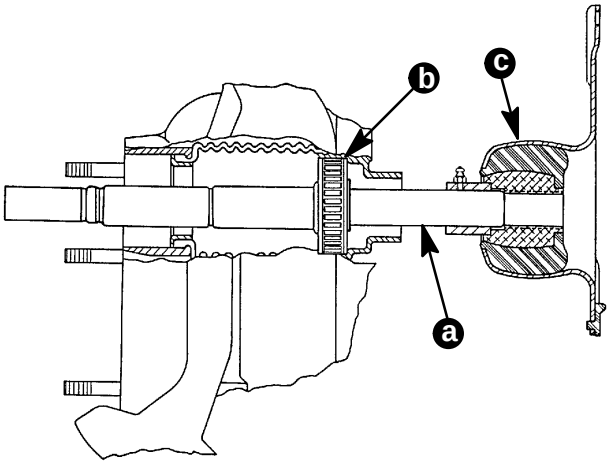
75129

7. Align engine as follows:
   a. Attempt to insert solid end of Quicksilver Alignment Tool through gimbal bearing and into engine coupler splines. If it will not insert easily proceed to following.
   b. While observing the above precautions, CAREFULLY raise and lower front of engine with hoist, as required, until tool will SLIDE FREELY all the way in and out of engine coupler splines.



70013

a - Alignment Tool (Use Only Quicksilver Alignment Tool 91-805475A1, or Properly Modified 91-57797A3)
b - Insert This End of Alignment Tool through Gimbal Housing Assembly



72585

a - Alignment
b - Gimbal Bearing
c - Engine Coupler

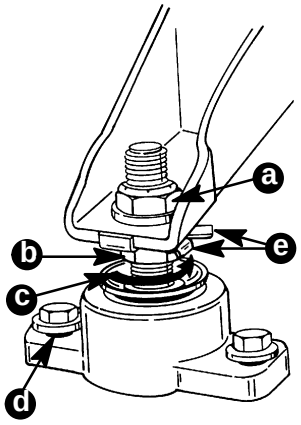
IMPORTANT: Turn both front engine mount adjustment nuts an equal amount in direction required to align engine.

   c. Adjust front engine mounts until they rest on boat stringers.
   d. Relieve hoist tension entirely and fasten both front mounts to boat stringer using appropriate hardware (lag bolts or thru-bolts, etc).

e. Recheck alignment with alignment tool. Tool must enter coupler splines freely. If not, readjust front mounts.

f. When alignment is correct, tighten locknut or nut with lockwasher on each mount securely.

g. Bend tab washer down against flat on adjusting nut.

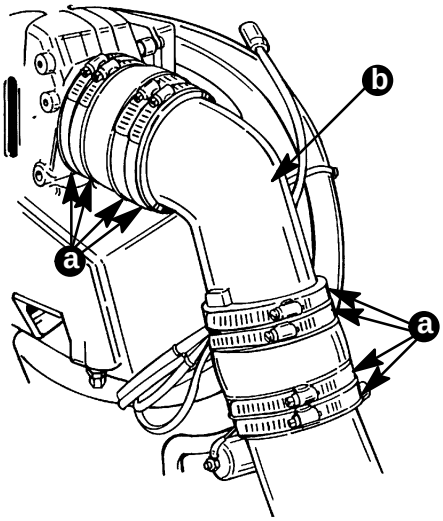


72536

a - Nut and Lockwasher
b - Adjustment Nut
c - Turn Adjustment Nut in This Direction (Counterclockwise)
d - Slotted Hole Toward Front of Engine
e - Tab Washer

h. Remove alignment tool if not already removed.

8. Tighten all exhaust system hose clamps securely as follows (use two hose clamps on each connection):



72537

Typical

a - Hose Clamps - Tighten Securely
b - Exhaust Tube - Long Tube - Port Side; Short Tube - Starboard Side

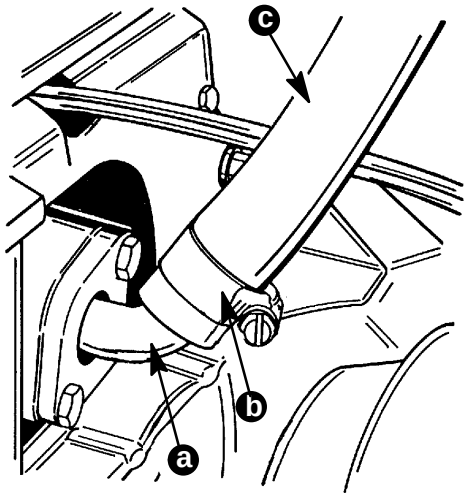
9. Proceed to “Engine Connections” section instructions following.

Engine Connections

IMPORTANT: When routing all wire harnesses and hoses, be sure they are routed and secured to avoid coming in contact with hot spots on engine and avoid contact with moving parts.

1. Connect seawater hose to water tube at gimbal housing with hose clamp. Tighten clamp securely.

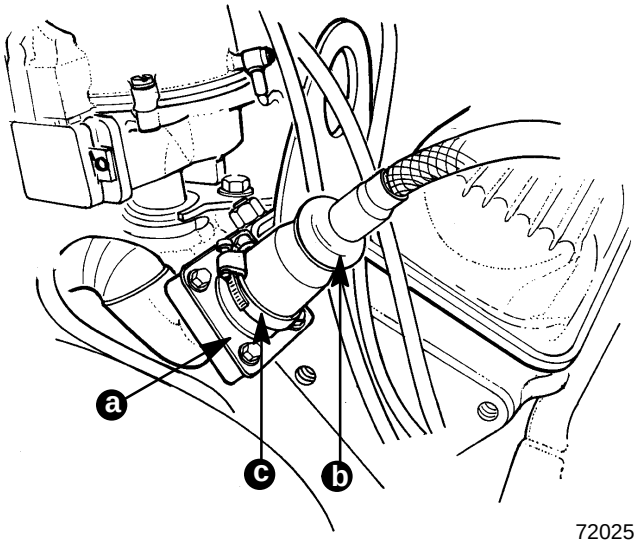
NOTE: *In the following view the engine is not in position, for visual clarity in this step.*



72614

a - Water Inlet Tube
b - Hose Clamp
c - Seawater Inlet

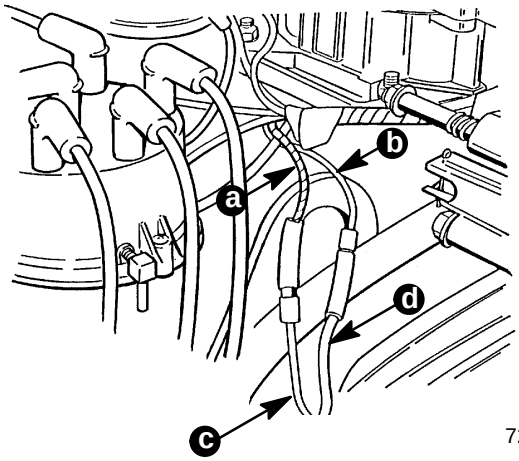
2. Connect instrument harness to engine harness with hose clamp. Tighten clamp securely.



72025

a - Engine Wiring Harness Receptacle Bracket
b - Instrumentation Wiring Harness Plug
c - Hose Clamp

3. Connect trim position sender leads from gimbal housing to leads from engine harness.



72992

a - BROWN/WHITE (From Engine Harness)
b - BLACK (From Engine Harness)
c - BLACK (From Transom Assembly)
d - BLACK (From Transom Assembly)

⚠WARNING

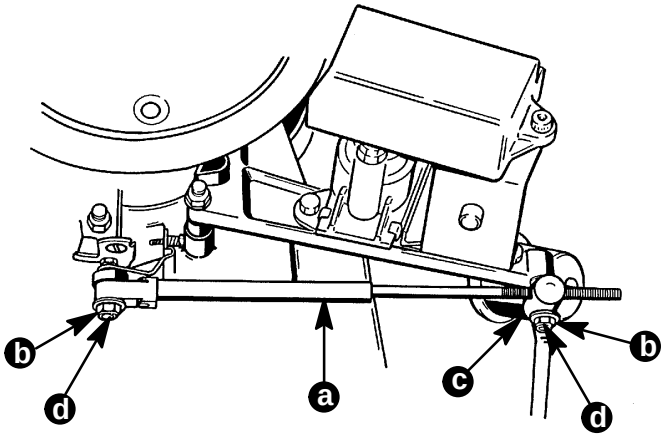
Be careful when working on fuel system. Gasoline is extremely flammable and highly explosive under certain conditions. Do not smoke or allow spark or open flame in area. Wipe up any spilled fuel immediately.

4. Connect fuel line from fuel tank(s) to engine. Make certain connections are secure. Check for leaks.
5. Connect throttle cable using hardware retained and adjust as follows:
   a. Place remote control handle(s) in neutral, idle position.

IMPORTANT: Be sure that cable is routed in such a way as to avoid sharp bends and/or contact with moving parts. DO NOT fasten any items to throttle cable. Outer cable must be free to move when cable is actuated.

   b. Install cable end guide on throttle lever, then push cable barrel lightly toward throttle lever end. (This will place a slight preload on cable to avoid slack in cable when moving remote control lever.) Adjust barrel on throttle cable to align with anchor stud.
   c. Secure throttle cable with hardware (retained) as shown. Tighten cable end guide locknut until it bottoms out and then back off one full turn. Tighten cable barrel securely. DO NOT OVER-TIGHTEN, as cable must pivot freely.

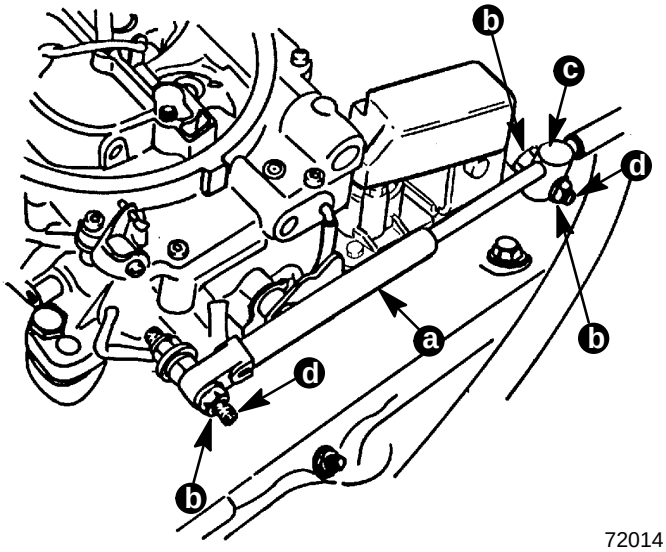
2 BARREL CARBURETOR



72013

a - Cable End Guide
b - Attaching Hardware
c - Cable Barrel
d - Anchor Studs

4 BARREL CARBURETOR

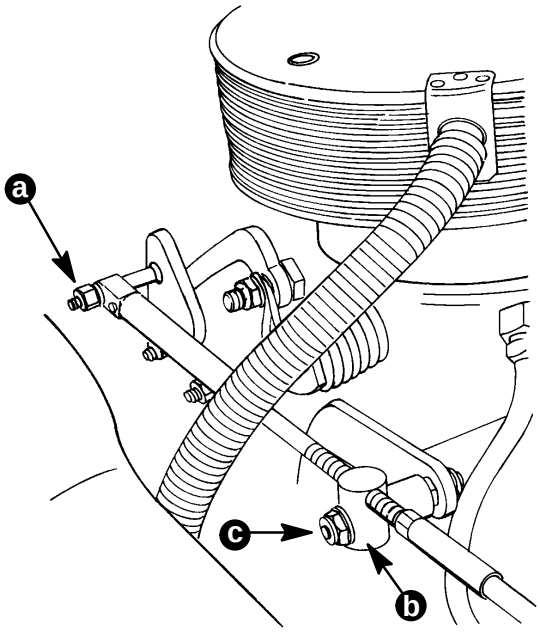


72014

a - Cable End Guide
b - Attaching Hardware
c - Cable Barrel
d - Anchor Studs

d. Place remote control throttle lever in the wide-open-throttle (W.O.T.) position. Check to ensure that throttle shutters (valves) are completely open and throttle shaft lever contacts carburetor body casting.

THROTTLE BODY FUEL INJECTION

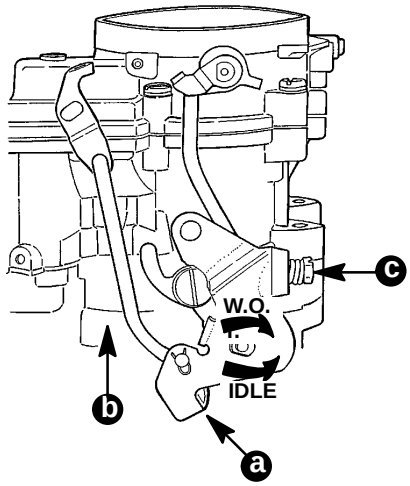


71711

a - Flat Washer and Locknut - Tighten Until Nut Bottoms Out, Then Back Off 1/2 Turn.
b - Cable Barrel
c - Flat Washer And Locknut

e. Return remote control throttle lever to idle position and check to ensure that throttle lever contacts idle speed adjustment screw.

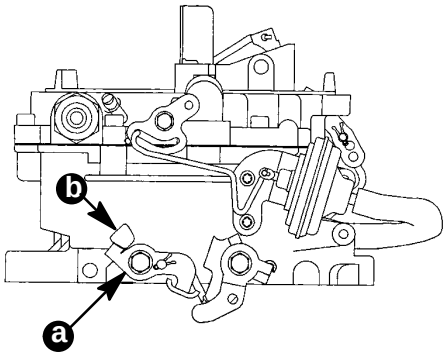
MERCARB 2 BARREL CARBURETOR



72283

a - Throttle Lever Tang
b - Carburetor Body
c - Idle RPM Adjustment Screw

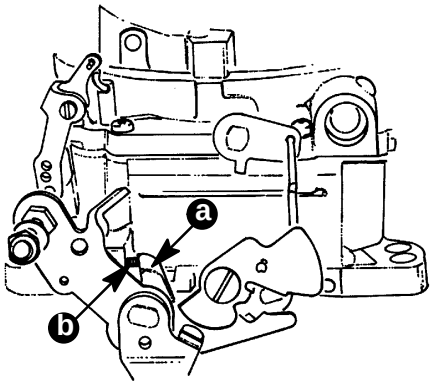
WEBER 4 BARREL CARBURETOR



71159

Wide Open Throttle Position

a - Throttle Shaft Lever [Contacts (b) at W.O.T. Position]
b - Carburetor Body Casting



70392

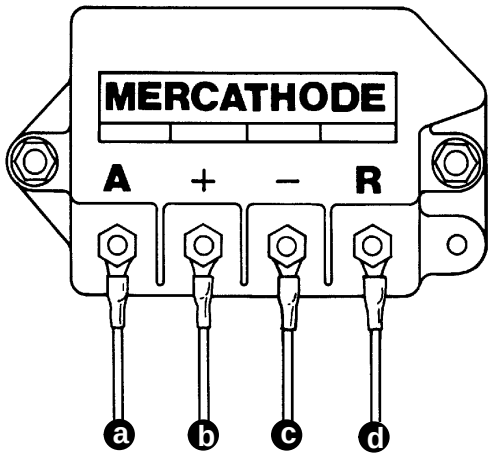
Idle Position

a - Throttle Shaft Lever [Contacts (b) at W.O.T. Position]
b - Idle Speed Adjustment Screw

IMPORTANT: Do not attach any accessory ground (–) wires to transom plate ground point. Accessory ground wires should only be attached to ground stud on engine.

6. Connect any grounding wires or accessories that may have been disconnected.

7. Connect MerCathode wires to MerCathode controller assembly as shown, if so equipped. Apply a thin coat of Quicksilver Liquid Neoprene to all connections.



22232

a - ORANGE Wire - From Electrode on Transom Assembly
b - RED/PURPLE Wire - Connect (Other End) to Positive (+) Battery Terminal
c - BLACK WIRE - From Engine Harness
d - BROWN WIRE - From Electrode on Transom Assembly

IMPORTANT: Adjust shift cables as outlined in appropriate Stern Drive Service Manual.

8. Refer to appropriate Stern Drive Service Manual and install and adjust drive unit and remote control shift cables, using hardware retained.

IMPORTANT: After fluid hose installation in the following, bleed power steering system as outlined in SECTION 1B - "Maintenance" or refer to appropriate Stern Drive Service Manual.

9. Connect power steering fluid hoses to control valve (large fitting first) as shown.

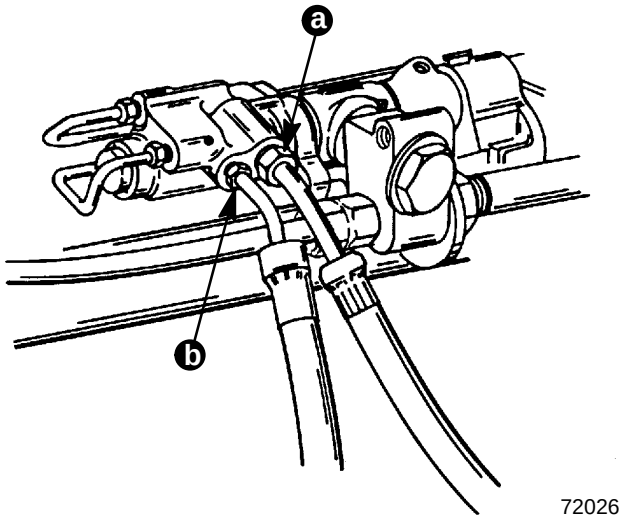
⚠ CAUTION

Route hoses exactly as shown below. This will help avoid stress on the hose fittings and will help avoid kinks in the hose.

IMPORTANT: Make hydraulic connections as quickly as possible to prevent fluid leakage.

IMPORTANT: Be careful not to cross-thread or over tighten fittings.

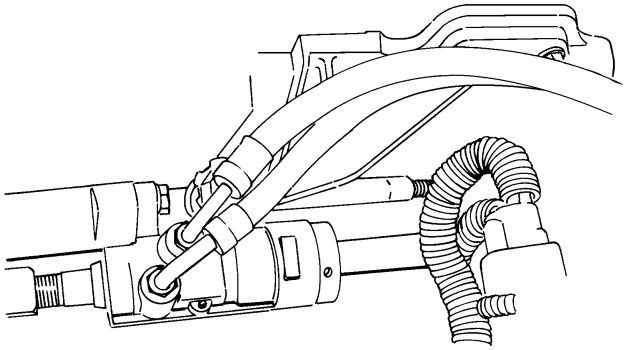
Earlier Style Control Valve: Torque large fitting to 20-25 lb. ft. (27-34 N·m) and small fitting to 96-108 lb. in. (11-12 N·m).



72026

a - Large Fitting
b - Small Fitting

Later Style Control Valve: Torque fittings to 23 lb. ft. (31 N·m)



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10. Connect battery cables to battery by FIRST connecting POSITIVE (+) battery cable (usually red) to POSITIVE (+) battery terminal. Tighten clamp securely. Then, connect NEGATIVE (–) battery cable (usually black) to NEGATIVE (–) battery terminal. Tighten clamp securely.

NOTE: *Spray terminals with a battery connection sealant to help retard corrosion.*