

IMPORTANT INFORMATION

Section 1C - Troubleshooting

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Table of Contents

Troubleshooting	1C-3	Power Trim Electrical System	1C-13
Sterndrive Unit Will Not		Power Trim Pump Motor Will	
Slide Into Bell Housing	1C-3	Not Operate In The OUT/UP	
Sterndrive Unit Does Not Shift		Or IN/DOWN Direction - Solenoids	
Into Gear; Remote Control		Do Not Click	1C-13
Shift Handle Moves	1C-3	Power Trim Pump Motor Will	
Sterndrive Unit Does Not Shift		Not Operate In The OUT/UP	
Into Gear; Remote Control Shift		Or IN/DOWN Direction	
Handle Does Not Move	1C-4	- Both Solenoids Click	1C-14
Sterndrive Unit Shifts Hard	1C-4	Power Trim Pump Motor Operates	
Sterndrive Unit In Gear,		In The OUT/UP Direction,	
Will Not Shift Out Of Gear	1C-4	But Not In The IN/DOWN Direction	
Gear Housing Noise	1C-5	- IN/DOWN Solenoid Does Not Click .	1C-14
Drive Shaft Housing Noise	1C-5	Power Trim Pump Motor Operates	
Power Shift	1C-8	In The OUT/UP Direction,	
System Does Not React	1C-8	But Not In The IN/DOWN Direction	
System Binds	1C-8	- IN/DOWN Solenoid Clicks	1C-15
Performance Troubleshooting	1C-9	Power Trim Pump Motor Operates	
Low WOT Engine RPM	1C-9	In The IN/DOWN Direction, But Not	
High WOT Engine RPM	1C-9	In The OUT/UP Direction	
Propeller Ventilating/Cavitating	1C-9	- Both Trim And Trailer Switches	
Poor Boat Performance		Inoperative - OUT/UP Solenoid	
And/Or Poor Maneuverability		Does Not Click	1C-15
- Bow Too Low	1C-10	Power Trim Pump Motor Operates	
Poor Boat Performance		In The IN/DOWN Direction, But Not	
And/Or Poor Maneuverability		In The OUT/UP Direction - Both Trim	
- Bow Too High	1C-10	And Trailer Switches Inoperative	
Power Steering	1C-11	- OUT/UP Solenoid Clicks	1C-15
Hard Steering - Helm And Cable	1C-11	Trim Control OUT/UP	
Hard Steering (Engine Running)		Trim Switch Inoperative	
- Power Steering System	1C-11	- Trailer Switch Operates	1C-16
Power Steering System External		Trim Control Trailer Switch Inoperative	
Fluid Leaks	1C-11	- Trim OUT/UP Switch Functions	1C-16
Compact Hydraulic Steering	1C-12	Trim System Functions	
Important Information	1C-12	While Unattended	1C-16
Helm Becomes Jammed		Power Trim System Wiring Diagram ..	1C-17
During Filling	1C-12		
System Difficult To Fill	1C-12		
Steering Hard To Turn	1C-12		
Helm Unit Bumpy - Requires			
Too Many Turns	1C-13		

Table of Contents (continued)

Power Trim Hydraulic System	1C-18	Power Trim Hydraulic Schematic	1C-21
Sterndrive Unit Cannot Be		Corrosion Protection	1C-22
Trimmed OUT/UP, Trims Slowly		Corrosion On Underwater Parts,	
Or With Jerky Movements	1C-18	Without MerCathode Or	
Sterndrive Unit Will Not Stay		Impressed Current Protection	1C-22
In Trimmed OUT/UP Position	1C-18	Corrosion On Underwater Parts,	
Sterndrive Unit Trails OUT/UP On		With MerCathode Or Impressed	
Deceleration Or When Shifting		Current Protection - Sterndrive	
Into Reverse - Unit Thumps		Unit Corroding	1C-23
When Shifting	1C-18	Corrosion On Underwater Parts,	
Oil Foams Out Of Pump		With MerCathode Or Impressed	
Fill/Vent Screw	1C-19	Current Protection - Sterndrive	
Sterndrive Unit Cannot Be Lowered		Unit Over-protected	1C-25
From UP Position Or Lowers		Sterndrive Over-Protected	1C-25
With Jerky Movements	1C-19	Testing Procedure for	
Sterndrive Unit Will Not Stay		Corrosion Protection	1C-26
In Full UP Position For		Corrosion Symptoms	1C-26
Extended Periods	1C-19	MerCathode Controller	1C-27
Sterndrive Will Not Stay In The			
Trimmed OUT/UP Position			
When Underway	1C-20		
Sterndrive Unit Trails OUT/UP On			
Deceleration Or When Shifting			
Into Reverse - Unit Thumps			
When Shifting	1C-20		
Trim Motor Operates But Does			
Not Pump Oil	1C-20		
Trim Pump Operates			
Slowly In Both Directions	1C-20		
Trim Pump Operates Slowly			
With A Laboring Sound	1C-20		

Troubleshooting

This section is a guide for performance and product troubleshooting. Referrals to specific sections of this manual are made where special tests or repair procedure are to be performed.

Because of the relationship between power package components (engine and sterndrive), it will be necessary in some cases to simultaneously refer to the appropriate Mercury MerCruiser Engine Service Manual for further troubleshooting information.

Effective troubleshooting is best enhanced by:

- Personal product knowledge and experience of the trained mechanic/technician
- Allowing adequate time for testing and analysis
- Utilizing these charts as a guide, a starting point

Sterndrive Unit Will Not Slide Into Bell Housing

Cause	Special Instructions
U-joint shaft splines not aligned with engine coupler splines.	Rotate propeller shaft COUNTERCLOCKWISE to align splines.
Engine not aligned.	Check engine alignment.
Gimbal bearing not properly installed.	Check engine alignment to determine if gimbal bearing is angled or improperly installed in gimbal housing.
Damaged U-joint shaft splines and/or engine coupler splines.	Inspect and replace if necessary.

Sterndrive Unit Does Not Shift Into Gear; Remote Control Shift Handle Moves

NOTE: For additional information on troubleshooting, refer to **Section 2A - Troubleshooting Shift Problems**.

Cause	Special Instructions
Shift cables improperly adjusted.	Adjust shift cables.
Shift cables not connected.	Install and adjust shift cables.
Inner core wire broken or loose.	Reconnect or replace inner core wire.

Sterndrive Unit Does Not Shift Into Gear; Remote Control Shift Handle Does Not Move

NOTE: For additional information on troubleshooting, refer to **Section 2A - Troubleshooting Shift Problems**.

Cause	Special Instructions
Control box not properly assembled.	Properly reassemble control box.
Broken or damaged linkage in control box.	Repair linkage.
Controls improperly adjusted, cable end guide hitting brass barrel.	Adjust shift cables.

Sterndrive Unit Shifts Hard

NOTE: For additional information on troubleshooting, refer to **Section 2A - Troubleshooting Shift Problems**.

Cause	Special Instructions
Shift cables improperly adjusted.	Adjust shift cables.
Damaged remote control or sterndrive unit shift cable.	Replace cables and adjust.
Shift cable too short (sharp bends) or too long (loops and long bends).	Select and install proper length cable.
Corroded shift cables.	Replace, adjust and check for water leakage.
Internal wear in remote control box.	Repair as needed.
Shift cable attaching nuts too tight (end cannot pivot).	Properly install nuts.
Shift cable pivot ends are corroded or not lubricated.	Clean and lubricate.

Sterndrive Unit In Gear, Will Not Shift Out Of Gear

NOTE: For additional information on troubleshooting, refer to **Section 2A - Troubleshooting Shift Problems**.

Cause	Special Instructions
Shift cable broken.	Replace cable and adjust.
Cable end not connected in sterndrive unit.	Remove and reinstall sterndrive unit.
Remote control damaged.	Repair or replace remote control.
Internal shift mechanism damage.	Repair or replace as necessary.

Gear Housing Noise

Cause	Special Instructions
Metal particles in sterndrive unit lubricant.	Disassemble, clean and inspect and replace necessary components. (Refer to Section 3B, 3C, or 3D)
Propeller incorrectly installed.	Inspect mounting hardware. Install propeller correctly.
Propeller with untrue or out-of-balance blades.	Repair or replace, as required.
Propeller shaft bent.	Inspect and replace if necessary. (Refer to Section 3B, 3C, or 3D)
Incorrect gear shimming.	Check gear housing backlash and pinion gear height. (Refer to Section 3B, 3C, or 3D)
Worn or damaged gears and/or bearings caused by impact, overheating or improper shimming.	Disassemble, inspect and replace. (Refer to Section 3B, 3C, or 3D)

Drive Shaft Housing Noise

Cause	Special Instructions
Engine flywheel housing contacting inner transom plate or exhaust pipe.	Determine cause for interference (loose engine mounts, transom too thin, etc.) and correct as necessary.
Abnormal sterndrive operation.	Instruct operator on proper operating technique.
U-joint cross and bearing assembly retaining rings improperly installed or of incorrect size.	Ensure that proper thickness retaining rings are used and that rings are fully seated in U-joint bearing cap grooves. (Refer to Section 3A)
Excessive side-to-side play in U-joint cross and bearing assemblies.	Replace cross and bearing assembly.
U-joint bearing caps contacting U-joint bellows retention sleeve.	Ensure that proper cross and bearing assemblies are used. If interference is severe, replace cross and bearing assembly and / or sleeve assembly.
U-joint cross and bearings rough.	Replace assemblies. Signs of scoring, galling, or roughness are the result of lack of lubricant. (Refer to Section 3A)
O-rings missing or flattened out on U-joint shaft causing shaft to rattle against ID of gimbal bearing.	Install new O-rings. (Refer to Section 3A)

Drive Shaft Housing Noise (continued)

Cause	Special Instructions
Worn U-joint shaft splines and/or engine coupler splines.	Remove U-joint coupling end yoke and insert into gimbal bearing and engine coupling. Rotate shaft back and forth. If play is excessive, replace U-joint coupling end yoke and/or engine coupler, as necessary.
Engine alignment incorrect or engine coupler crooked.	Adjust alignment. Ensure that alignment tool moves in and out of coupler freely. After proper alignment has been obtained, check for a crooked coupler by rotating engine coupler 1/2 turn and rechecking alignment. If proper alignment is no longer observed, coupler is crooked and must be replaced. (Refer to Section 2)
Gimbal bearing rough.	Replace gimbal bearing. (Refer to Section 4) IMPORTANT: Gimbal bearing and carrier MUST BE replaced as an assembly because they are a matched set. Failure to do this may result in a loose bearing fit in carrier.
Loose gimbal bearing.	Reinstall bearing assembly using a new tolerance ring if carrier is loose in gimbal housing. If bearing is loose in carrier, bearing assembly must be replaced. (Refer to Section 4)
Gimbal bearing not fully seated in gimbal housing.	Sterndrive bearing assembly into place.
Excessive clearance between gimbal ring and gimbal housing. This could cause misalignment between bell housing and gimbal housing and also may allow gimbal ring to vibrate up and down.	Check and adjust clearance. (Refer to Section 4)
Improperly installed or failed rear engine mounts. This will affect engine alignment, but usually is not detectable with engine alignment tool.	Check for uneven mount height, or loose or soft mounts. Make sure there is clearance between flywheel housing and fiber washer. If no clearance exists, mounts have probably sagged. Install mounts correctly or replace, as necessary.

Drive Shaft Housing Noise (continued)

Cause	Special Instructions
Boat transom too thin. Thickness: 51 mm (2 in.) minimum, 57 mm (2-1/4 in.) maximum.	Add thickness to transom.
Boat transom thickness uneven. This could affect engine to transom assembly alignment and is usually not detectable with alignment tool. Variation: 3 mm (1/8 in.) maximum.	Repair boat as necessary.
Bell housing contacting gimbal ring. This would cause knocking in the fully trimmed IN position only.	Check for soft or split trim cylinder bushings and loose or worn hinge pin bushings. (Refer to Section 5B)
Stringer height uneven or transom assembly installed angled on boat transom. This will affect engine alignment, but is usually not detectable with alignment tool.	Measure the distance between the engine flywheel housing and the inner transom plate on both sides. If distances are uneven, the problem may be due to uneven stringer height or a cocked transom assembly. Adjust the stringer height or relocate the transom cutout as required.
Weak boat transom or boat bottom that flexes under power and causes engine misalignment - this condition will usually cause engine coupler failure.	This condition can sometimes be detected by having someone apply force to the top of the sterndrive unit while watching the inner transom plate. If movement can be observed, the transom is weak and must be repaired.
Rear engine mount attaching hardware improperly installed or missing.	Reinstall hardware correctly.
Engine mounting holes drilled off-center in inner transom plate engine supports or engine flywheel housing	Ensure that the holes are equally spaced fore and aft and are equal distance from the centerline.
Misalignment between bell housing, gimbal housing and engine coupler.	Contact your service center and arrange to have a technical service representative check the unit using a special gauge.

Power Shift

System Does Not React

Cause	Special Instructions
Vacuum leaks.	With engine running, check for vacuum leaks. Squirt oil on fitting and hose connections and on the shift cylinder-to-end plate joint. If oil is sucked in at any point, a vacuum leak exists. Repair leak.
Improper installation.	Reinstall.

System Binds

Cause	Special Instructions
Remote control.	Disconnect input cable at power shift cylinder. Disconnect throttle cable at carburetor or injector pump. Operate remote control. If binding occurs, find cause of binding in either cable or remote control and correct binding. If no binding occurs, check vacuum.
Slow or no shift.	Check vacuum drop-off. If vacuum drops off to "0" psi in less than 5 seconds, install repair kit.
Cable movement.	Check movement of cable from shift plate to sterndrive unit including shifting linkage movement in sterndrive unit for binding. Replace or adjust shift cable following procedures in Section 2A .

Performance Troubleshooting

Low WOT Engine RPM

Cause	Special Instructions
Improper sterndrive unit trim angle.	Properly adjust sterndrive unit trim angle.
Damaged propeller.	Repair or replace.
Improper propeller pitch.	Water test boat using a lower pitch propeller.
Dirty or damaged boat bottom.	Clean and/or resurface boat bottom.
Sterndrive installation too low on transom.	Contact boat manufacturer for installation specifications.
Permanent hook in boat bottom (some boats are built with a slight hook for correct boat performance).	Check for a hook in the boat bottom by placing a straight edge, at least 2 m (6 ft) long, under the bottom edge of the transom. If a hook is found, contact the boat manufacturer.
Power hook or weak boat bottom.	Water test boat. Boat will perform normally until hook develops at high speed, then loss of rpm and speed will occur. Contact boat manufacturer.

High WOT Engine RPM

Cause	Special Instructions
Propeller ventilating.	Determine cause for ventilation.
Improper propeller pitch.	Water test boat using a higher pitch propeller.
Propeller hub slipping.	Replace hub or replace propeller.
Sterndrive installation too high on transom.	Contact boat manufacturer for installation specifications.
Engine coupler hub spun.	Replace coupler.

Propeller Ventilating/Cavitating

Cause	Special Instructions
Sterndrive unit trimmed too high.	Trim sterndrive unit IN/DOWN.
Incorrect propeller.	Install correct propeller.

Poor Boat Performance And/Or Poor Maneuverability - Bow Too Low

Cause	Special Instructions
Improper sterndrive unit trim angle.	Properly adjust sterndrive unit trim angle.
Boat is bow heavy.	Redistribute boat load to stern. If bow overweight is caused by permanently installed fuel tanks, contact the boat manufacturer.
Boat is underpowered.	Check horsepower to weight ratio. Contact the boat manufacturer.
Permanent hook in boat bottom (some boats are built with a slight hook for correct boat performance).	Check for a hook in the boat bottom by placing a straight edge, at least 2 m (6 ft) long, under the bottom edge of the transom. If a hook is found, contact the boat manufacturer.
Power hook or weak boat bottom.	Water test boat. Boat will perform normally until hook develops at high speed, then loss of rpm and speed will occur. Contact boat manufacturer.

Poor Boat Performance And/Or Poor Maneuverability - Bow Too High

Cause	Special Instructions
Improper sterndrive unit trim angle.	Properly adjust sterndrive unit trim angle.
Boat is stern heavy.	Redistribute boat load to bow. If stern overweight is caused by permanently installed fuel tanks, contact the boat manufacturer.
Propeller pitch too high.	Water test the boat using a lower pitch propeller.
Permanent rocker in boat bottom (some boats are built with a slight rocker for correct boat performance).	Check for a rocker in the boat bottom by placing a straight edge, at least 2 m (6 ft) long, under bottom edge of the transom. If a rocker is found, contact the boat manufacturer.
Power hook or weak boat bottom.	Water test boat. Boat will perform normally until hook develops at high speed, then loss of rpm and speed will occur. Contact boat manufacturer.

Power Steering

Hard Steering - Helm And Cable

Cause	Special Instructions
Damaged steering cable.	Replace cable. (Refer to Section 2)
Steering cable too short (sharp bends) or too long (loops and long bends).	Select and install proper length cable. (Refer to Section 2A)
Steering cable corroded or not lubricated.	Lubricate or replace the cable.
Over-lubed cable.	Replace cable.
RideGuide™ rack or rotary head not lubricated.	Disassemble and lubricate.

Hard Steering (Engine Running) - Power Steering System

Cause	Special Instructions
Low power steering pump fluid level.	Check fluid level. (Refer to Section 6A)
Loose power steering pump sterndrive belt.	Adjust belt tension. (Refer to Section 6A)
Air in system.	Cycle to remove air. (Refer to Section 6A)
Fluid leak.	Locate and correct source of leak. (Refer to Section 6A)
If the above 4 steps do not solve the problem, test the power steering system.	Test power steering system. (Refer to Section 6A)

Power Steering System External Fluid Leaks

Cause	Special Instructions
Pump reservoir leaking at fill cap (reservoir too full).	Remove fluid to bring to proper level.
Pump reservoir leaking at fill cap (air or water in fluid).	Locate source of air or water and correct. Air may enter because of low reservoir fluid level or internal pump leak. Test pump. (Refer to Section 6A)
Loose hose connections.	Tighten hose connections.
Damaged hose.	Replace hose.
Bad cylinder piston rod seal.	Replace cylinder.
Damaged or worn control valve seals.	Replace cylinder.
Bad power steering pump seals and O-rings.	Repair pump. (Refer to Section 6A)
Cracked or porous metal parts.	Replace parts.

Compact Hydraulic Steering

Important Information

Whenever a troubleshooting solution calls for removal from vessel and/or dismantling of steering system components, such work must be carried out by a qualified marine mechanic. The following is offered as a guide only and neither Mercury MerCruiser nor the helm manufacturer are responsible for any consequences resulting from incorrect repairs.

Most faults occur when the installation instructions are not followed and usually show up immediately upon filling the system. The most common faults encountered and their likely cause and solution are provided in the following.

Sometimes when returning the steering wheel from a locked position, a slight resistance may be felt and a clicking noise may be heard. This should not be mistaken as a fault, as it is a completely normal situation caused by the releasing of the lock spool in the system.

WARNING

Avoid serious injury or death due to FIRE or EXPLOSION. Ensure that engine compartment is well-ventilated and that no gasoline vapors are present to prevent the possibility of a FIRE or EXPLOSION.

Helm Becomes Jammed During Filling

Cause	Special Instructions
Blockage in the line between the helms and the cylinders.	Ensure that hoses were not kinked or pinched during installation. If so, the hose must be removed and replaced.

System Difficult To Fill

Cause	Special Instructions
Air in system.	Review filling instructions.

Steering Hard To Turn

Cause	Special Instructions
Steering cylinder pivot bushings are too tight or trunion is bent, causing mechanical binding.	To test, disconnect clevis from steering lever and turn the steering wheel. If it now turns easy, correct cause of mechanical binding. Please note that excessively loose connections to steering cylinder or steering lever can also cause mechanical binding.
Restrictions in hoses.	Find restrictions and correct.
Air in hydraulic fluid.	Refer to filling and purging instructions.
Wrong hydraulic fluid has been used to fill steering system.	Drain system and fill with approved hydraulic fluid.

Helm Unit Bumpy - Requires Too Many Turns

Cause	Special Instructions
Dirt in inlet check of helm pump.	Replace helm unit.

Power Trim Electrical System

NOTE: The numbers in quotation marks, e.g. "3", refer to the Power Trim System Wiring Diagram.

Power Trim Pump Motor Will Not Operate In The OUT/UP Or IN/DOWN Direction - Solenoids Do Not Click

Cause	Special Instructions
Bad electrical connection at the 110 amp fuse or the battery, or the harness came unplugged from the pump	Check all electrical connection points.
20 amp fuse blown.	Determine cause for the blown fuse and correct. Then replace fuse. NOTE: If fuse blows while trimming OUT/UP or raising sterndrive unit, problem may be due to grounded trim limit switch leads. To check for grounded condition, disconnect trim limit switch leads at bullet connector "14," "15," "16," and "17." If sterndrive unit can now be raised (using Trailer switch), trim limit switch or leads are grounded.
Power trim pump battery cables or wiring harness connections corroded or loose.	Clean and/or tighten connections "1," "2," "4," "10," "11," "12" and "18" as necessary.
Trim control wiring harness connector loose or corroded.	Clean and secure connection "13" as necessary.
110 amp fuse blown (does not apply to intermittent problem).	Check for voltage at terminal "4." If no voltage indicated, determine cause of blown fuse.
Open circuit in trim control wiring harness.	Check for battery voltage at terminal "8" while trimming OUT/UP and at terminal "6" while trimming OUT/UP. If no voltage is indicated, check trim control for a loose or corroded connection or a damaged power supply lead in harness.
Thermal circuit breaker in pump motor open.	Replace commutator end plate assembly.

Power Trim Pump Motor Will Not Operate In The OUT/UP Or IN/DOWN Direction - Both Solenoids Click

Cause	Special Instructions
Faulty solenoids or loose or corroded connections.	Check for battery voltage at terminals "5" while trimming OUT/UP. If no voltage is indicated, check connections "2," "3," "4" and "5" and/or replace solenoids.
Pump motor brushes stuck, corroded or worn out.	Clean or replace as required.
Armature commutator dirty.	Clean or replace armature as required.
Armature faulty.	Test for shorted, open or grounded condition and replace if needed.
Field and frame faulty.	Check for open or grounded condition. Replace field and frame assembly if needed.
Water or oil in motor.	Replace motor assembly.
Pump gears frozen.	Replace pump valve body and gear assembly.
Power trim pump harness or trim control harness shorted between OUT/UP and IN/DOWN circuit (pump trying to operate in OUT/UP and IN/DOWN direction simultaneously).	Disconnect BLU/WHI lead from solenoid terminal "8." If pump motor will now operate in the OUT/UP direction, a short in the harness exists. Repair or replace harness as needed.

Power Trim Pump Motor Operates In The OUT/UP Direction, But Not In The IN/DOWN Direction - IN/DOWN Solenoid Does Not Click

Cause	Special Instructions
Loose or dirty solenoid connections.	Check connections "6" and "7" and clean and/or tighten as required.
Open IN/DOWN circuit in trim control or pump wiring harness.	Check for battery voltage at terminal "6" while trimming OUT/UP. If no voltage is indicated, check for a loose or corroded OUT/UP circuit connection, damaged OUT/UP circuit lead or a faulty OUT/UP trim switch. Repair or replace as required.
Solenoid faulty.	Replace solenoid.

Power Trim Pump Motor Operates In The OUT/UP Direction, But Not In The IN/DOWN Direction - IN/DOWN Solenoid Clicks

Cause	Special Instructions
Loose or dirty solenoid connections.	Check connections "4" and "5." Clean and/or tighten as necessary.
Faulty solenoid.	Check for battery voltage at terminal "5" while trimming IN/DOWN. If no voltage is indicated, replace solenoid.
Faulty IN/DOWN field winding.	Replace field and frame assembly.

Power Trim Pump Motor Operates In The IN/DOWN Direction, But Not In The OUT/UP Direction - Both Trim And Trailer Switches Inoperative - OUT/UP Solenoid Does Not Click

Cause	Special Instructions
Loose or dirty solenoid connections.	Check connections "8" and "9." Clean and/or tighten as necessary.
Open OUT/UP circuit trim control or pump wiring harness.	Check for battery voltage at terminal "8" while trimming OUT/UP. If no voltage is indicated, check for a loose or corroded OUT/UP circuit connection, blown fuse (if trim control is equipped), damaged OUT/UP circuit lead or a faulty OUT/UP trim switch. Repair or replace as necessary.
Faulty solenoid.	Replace solenoid.

Power Trim Pump Motor Operates In The IN/DOWN Direction, But Not In The OUT/UP Direction - Both Trim And Trailer Switches Inoperative - OUT/UP Solenoid Clicks

Cause	Special Instructions
Loose or dirty solenoid connections.	Check connections "2" and "3." Clean and/or tighten as necessary.
Faulty solenoid.	Check for battery voltage at terminal "3" while trimming OUT/UP. If no voltage is indicated, replace solenoid.
Faulty OUT/UP field winding.	Replace solenoid.

Trim Control OUT/UP Trim Switch Inoperative - Trailer Switch Operates

Cause	Special Instructions
Trim limit switch lead bullet connectors loose or corroded.	Clean and/or tighten connections "14," "15," "16" and "17" as necessary.
Faulty trim limit switch or leads.	Disconnect trim limit switch leads from trim harness. Connect a continuity meter between leads "16" and "17." Continuity should be indicated with sterndrive unit in full IN/DOWN position. If not, check for damaged leads or poor connections. If this is not the cause, replace trim limit switch.
Open trim control OUT/UP circuit.	Check for a loose or corroded OUT/UP circuit connection, damaged OUT/UP circuit lead or faulty OUT/UP trim switch. Repair or replace as necessary.

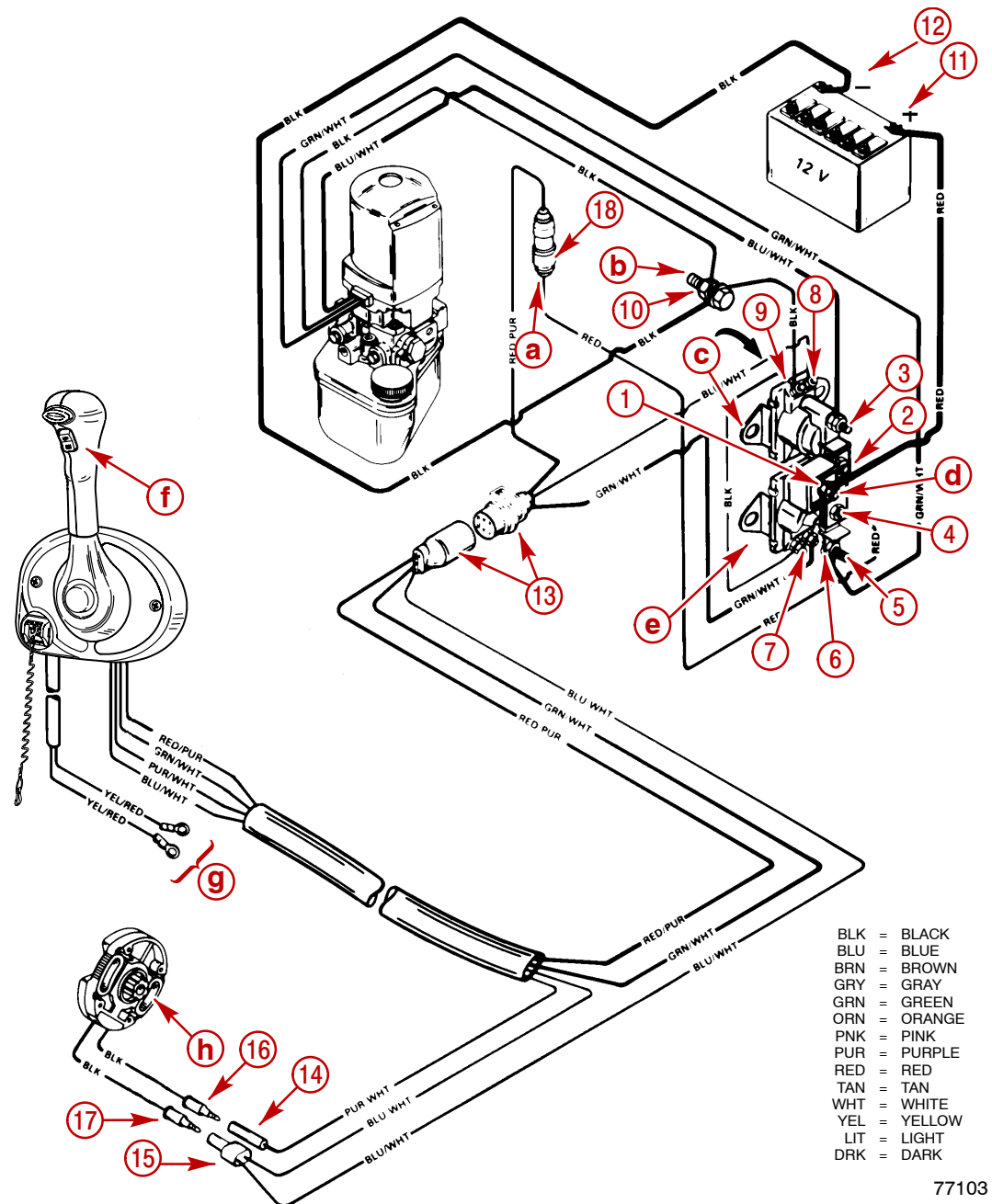
Trim Control Trailer Switch Inoperative - Trim OUT/UP Switch Functions

Cause	Special Instructions
Open trim control trailer circuit.	Check for a faulty trailer switch, loose or corroded connections or damaged trailer circuit lead.

Trim System Functions While Unattended

Cause	Special Instructions
Faulty trim or trailer switch.	Replace switch.
Shorted trim pump harness or trim control harness.	Repair or replace as required.

Power Trim System Wiring Diagram



NOTE: Numbered callouts refer to connections referenced in the Power Trim Electrical System troubleshooting charts.

- a** - 20 amp. fuse
- b** - Ground bolt (floor mount)
- c** - UP solenoid
- d** - 110 amp. fuse
- e** - DOWN solenoid
- f** - Trim/Trailer switch
- g** - Neutral switch to instrument wiring harness
- h** - Trim limit switch

Power Trim Hydraulic System

NOTE: The numbers in quotation marks, e.g. "3," refer to the Power Trim Hydraulic Schematic.

Sterndrive Unit Cannot Be Trimmed OUT/UP, Trims Slowly Or With Jerky Movements

Cause	Special Instructions
Power trim pump oil level low.	Check for cause of low oil level and correct. Add oil and bleed trim system.
Air in trim system.	Check for cause of entry and correct. Add oil to pump and bleed air from system.
O-rings damaged on Manual Release Valve (if equipped) or valve not completely closed.	Replace valve and/or close completely.
Insufficient pump pressure or pump shuttle valve stuck.	Test. If shuttle 1 is stuck, replace pump adapter (Refer to Section 5A). If pressure is low, replace adapter or attempt to repair by replacing the following components: • OUT/UP Pressure Relief Valve • Thermal Relief Valve
Hoses reversed on 1 cylinder only.	Connect hoses 7 and 8 correctly.
Trim cylinders binding.	Check for cause of binding (bent piston rod, scored cylinder). Repair or replace as necessary.
Gimbal housing-to-trim pump hydraulic hose pinched.	Replace hose 7 .
Up pressure relief valve has dirt particles under check ball.	Replace with a new valve kit.

Sterndrive Unit Will Not Stay In Trimmed OUT/UP Position

Cause	Special Instructions
Air in trim system.	Check for cause of entry. Fill and bleed system.
Shuttle valve (poppet valve).	Check for dirt. Install new poppet valve.

Sterndrive Unit Trails OUT/UP On Deceleration Or When Shifting Into Reverse - Unit Thumps When Shifting

Cause	Special Instructions
Trim pump IN/DOWN circuit leaking internally.	Test according to appropriate service manual. Replace adapter or attempt to repair by replacing the pilot check valves or seals. (Install Trim Pump Rebuild Kit)

Oil Foams Out Of Pump Fill/Vent Screw

Cause	Special Instructions
Contaminated oil.	Flush system with clean oil refill pump and bleed trim system.
Oil level low.	Check for cause of low oil level and correct. Add oil to pump and bleed system.

Sterndrive Unit Cannot Be Lowered From UP Position Or Lowers With Jerky Movements

Cause	Special Instructions
Air in trim system.	Check for cause of entry. Fill and bleed trim system.
Low oil level.	Add oil.
Insufficient IN/DOWN pressure or shuttle valve stuck.	Test. If shuttle 1 is stuck, replace pump adapter. (Refer to Section 5A) If pressure is low, replace adapter or attempt to repair by replacing the following items: • IN/DOWN pressure relief valve 1.
Trim cylinders binding.	Check for cause of binding. Repair or replace as necessary.
Gimbal housing-to-trim pump hydraulic hose pinched.	Replace IN/DOWN hose 8 .
Hoses reversed on 1 trim cylinder only.	Reconnect hoses correctly.
Sterndrive unit binding in gimbal ring.	Check for cause of binding and replace.
Down pressure relief valve (6) has dirt particles under check ball.	Replace with a new valve kit.

Sterndrive Unit Will Not Stay In Full UP Position For Extended Periods

Cause	Special Instructions
External leakage.	Check for cause and correct. Add oil to pump and bleed trim system.
Pump OUT/UP circuit leaking internally.	Test. (Refer to Section 5A) Replace adapter 2 or attempt to repair by replacing the following: • Thermal relief valve 4. • Poppet valves seals 9.
Trim cylinder(s) leaking internally and pump DOWN circuit leaking internally (both must be faulty to cause this problem).	Rebuild cylinders 5 Repair or replace adapter 2 as necessary.

Sterndrive Will Not Stay In The Trimmed OUT/UP Position When Underway

Cause	Special Instructions
Air in trim system.	Check for cause of entry. Fill and bleed system.
Leaky poppet valve.	Install repair kit for poppet valve 1 .

Sterndrive Unit Trails OUT/UP On Deceleration Or When Shifting Into Reverse - Unit Thumps When Shifting

Cause	Special Instructions
Trim cylinders leaking internally.	Test. (Refer to Section 5A) Rebuild or replace cylinders as necessary.
Trim pump IN/DOWN circuit leaking internally.	Test. (Refer to Section 5A) Replace adapter or attempt to repair by replacing the following: • Pilot check valves or seals 9. • Install trim pump rebuild kit

Trim Motor Operates But Does Not Pump Oil

Cause	Special Instructions
Broken coupler between the pump and the motor.	Replace the coupler.
Plugged pick-up screens.	Replace pick-up screens.

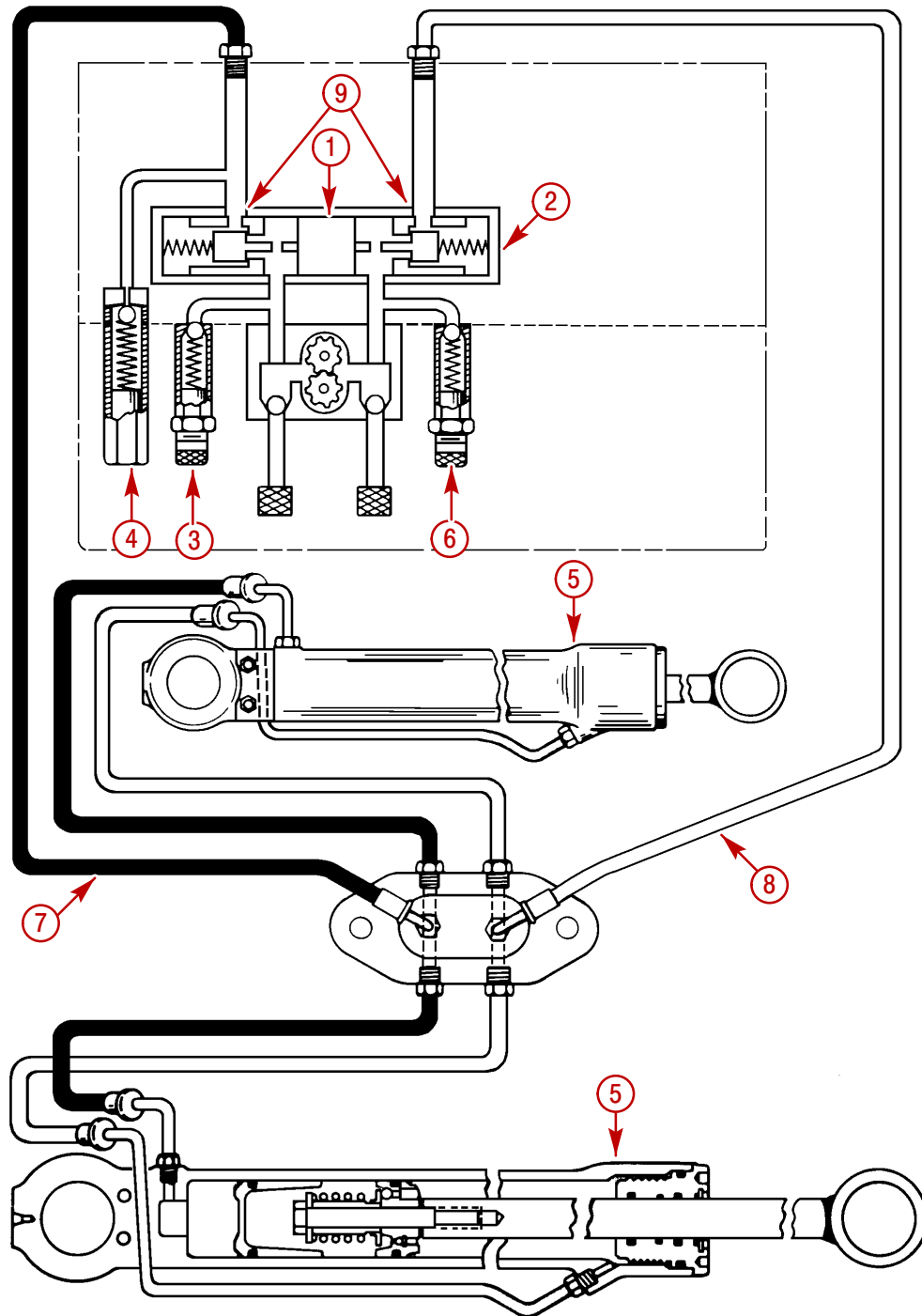
Trim Pump Operates Slowly In Both Directions

Cause	Special Instructions
Check the condition of the oil; it may be contaminated and thick like honey.	Remove the reservoir and clean out the contaminated oil.

Trim Pump Operates Slowly With A Laboring Sound

Cause	Special Instructions
A possible tight adapter pump gear or water or oil in the motor.	Replace the pump assembly in the adapter or replace the electric motor assembly.

Power Trim Hydraulic Schematic



73552

- 1 - Shuttle
- 2 - Pump adapter
- 3 - UP/OUT pressure relief valve
- 4 - Thermal relief valve
- 5 - Trim cylinder

- 6 - IN/DOWN pressure relief valve
- 7 - UP/OUT hose
- 8 - IN/DOWN hose
- 9 - Poppet valves

Corrosion Protection

NOTE: The numbers in quotation marks, e.g. "3," refer to the MerCathode Controller Wiring Diagram.

Corrosion On Underwater Parts, Without MerCathode Or Impressed Current Protection

Cause	Special Instructions
Sacrificial anodes consumed.	Replace anodes when 50% consumed.
Stainless steel propeller installed.	Add MerCathode (impressed current protection) or additional sacrificial anodes.
Sacrificial anodes not grounded to sterndrive.	Remove anodes, clean contact surface, reinstall and check continuity.
Loss of continuity between underwater parts and ground.	Provide good ground connections.
Shore power causing overload of anode(s) and/or MerCathode.	Disconnect shore power or install Quicksilver isolator.
Paint on sterndrive heavily worn (exposing more metal).	Prime and repaint and/or install additional anodes.
Sacrificial anodes painted.	Remove paint or replace anodes.
Sterndrive tilted so far that anodes are out of the water.	Leave sterndrive down, install additional anode (below waterline) or transom mount a MerCathode.
Only power trim cylinders are corroded.	Provide good ground to sterndrive. All parts must be grounded.
Corrosion in area of exhaust outlets. Exhaust deposits can cause corrosion.	Remove deposits with marine or auto wax.
Corrosion occurring after unit removed from saltwater.	Wash exterior and flush interior with fresh water.
Corrosion and/or salt build-up between mating parts.	Exclude moisture from between mating parts with 2-4-C with Teflon.
Stainless Steel parts corroding: Tightly wrapped fishing line or foreign material excludes oxygen, causing corrosion. Iron particles, such as from a wire brush, cause rusting. Propeller pitting can occur if electrical continuity is lost.	Clean parts, remove foreign material, ensure continuity.

Corrosion On Underwater Parts, With MerCathode Or Impressed Current Protection - Sterndrive Unit Corroding

Cause	Special Instructions
Poor connection between reference electrode (BRN) lead or anode (ORN) lead and MerCathode controller.	Clean and/or tighten connection. Repair wiring.
Faulty MerCathode reference electrode.	Disconnect reference electrode lead (BRN) from the controller "R" terminal. Connect the lead to positive (+) terminal of a digital multi-meter (set on 0-2000 millivolt scale). Connect negative (-) meter lead to negative (-) battery terminal. Note meter reading; then repeat the test with a test silver/silver chloride reference electrode held behind the sterndrive. The same reading should be obtained in both cases. If not, replace the reference electrode.
Faulty MerCathode controller.	With anode and reference electrode leads connected to controller, connect a jumper wire between "R" and negative(-) terminals on controller. Connect positive (+) lead of volt meter (set on 0-20 scale) to "A" terminal on controller. Connect the negative (-) meter lead to the negative (-) controller terminal. Reading should be as follows: ● Freshwater Areas = 11.5 volts minimum. ● Seawater Areas = 3.55 volts minimum If the reading is low, replace the controller.
Too much cathode (such as stainless steel).	MerCathode system overpowered by large quantity of stainless steel below the waterline.
Loss of continuity between sterndrive components and ground.	Ensure continuity (check continuity wires and washers).
Sacrificial anodes consumed, painted or inoperative.	Replace anodes.
MerCathode reference electrode or anode painted.	Remove paint or replace anode or MerCathode reference electrode.

Corrosion On Underwater Parts, With MerCathode Or Impressed Current Protection - Sterndrive Unit Corroding (continued)

Cause	Special Instructions
No power to MerCathode controller.	Connect positive (+) lead of volt meter (set on 0-20 volt scale) to positive (+) terminal on the controller and negative (-) volt meter lead to negative (-) terminal. Meter should indicate battery voltage. Check for blown fuse (if equipped) on a standard MerCathode system. Clean the connection or repair wiring as required.
MerCathode system not functioning	Check the fuse in the hot lead.
	Check battery.
	Check for loose connections at controller and battery
	Check the grounding wire between the sterndrive and the controller.

Corrosion On Underwater Parts, With MerCathode Or Impressed Current Protection - Sterndrive Unit Over-protected

STERNDRIVE OVER-PROTECTED

Cause	Special Instructions
Faulty MerCathode reference electrode.	Disconnect reference electrode lead (BRN) from "R" terminal on controller. Connect the lead to the positive (+) terminal of a digital multi-meter (set on 0-2000 millivolt scale). Connect the negative (-) meter lead to the negative (-) battery terminal. Note the meter reading; then repeat the test with a test silver/silver chloride reference electrode held behind the sterndrive. The same reading should be obtained in both cases. If not, replace the reference electrode.
Faulty MerCathode controller.	Check controller output. If the hull potential indicates overprotection, remove the reference electrode lead from the controller. If the controller is off (no impressed current called for) the voltage between the negative (BLK) and the anode should be less than 1 volt. Measure amperage; with the reference electrode disconnected, the amperage between the negative on the controller and the anode terminal should be less than 1 milli-amp. Replace the controller if needed.
Stray current corrosion (electrical current leaves a metal conductor and creates a path through the water).	Disconnect electrical components 1 at a time and observe the multi-meter reading until you eliminate the high reading. Correct the source of the stray current.
Poor connection between the MerCathode reference electrode lead (BRN) and the "R" terminal on the controller.	Clean and/or tighten the connection. Repair wiring as needed.
MerCathode system not functioning.	Check the fuse in the hot lead.
	Check the battery.
	Check for loose connections at controller and battery.
	Check the grounding wire between the sterndrive and the controller.

Testing Procedure for Corrosion Protection

1. Unplug shore power (if equipped).
2. Measure hull potential with silver/silver chloride reference electrode and digital volt/ohm meter.
3. The following readings indicate the corrosion protection status of the sterndrive unit.

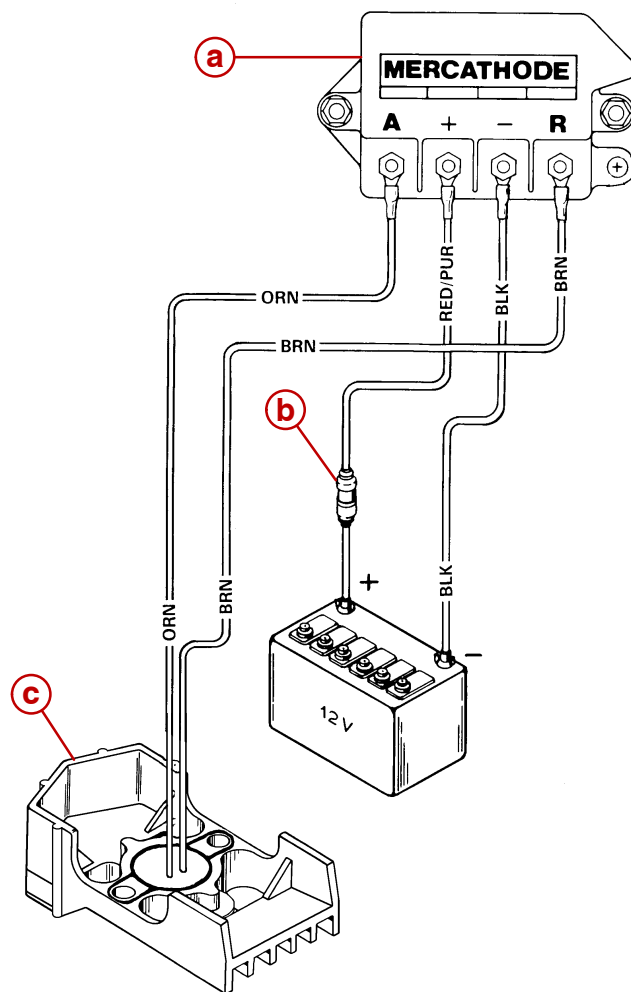
Freshwater	Digital Multi-Meter	Corrosion Protection
	Between 750 - 1050 millivolts	Sterndrive is protected
	Below 750 millivolts	Sterndrive is corroding
	Above 1050 millivolts	Sterndrive is overprotected

Salt, Polluted or Mineral Laden Water	Digital Multi-Meter	Corrosion Protection
	Between 850 - 1100 millivolts	Sterndrive is protected
	Below 850 millivolts	Sterndrive is corroding
	Above 1100 millivolts	Sterndrive is overprotected

CORROSION SYMPTOMS

- Paint blistering (usually on sharp edges)
- Loosely adhering white corrosion products on exposed aluminum surfaces (do not confuse these with tenaciously clinging calcium carbonate deposits)
- Aluminum pitting

MerCathode Controller



BLK = Black
 BLU = Blue
 BRN = Brown
 GRY = Gray
 GRN = Green
 ORN = Orange
 PNK = Pink
 PUR = Purple
 RED = Red
 TAN = Tan
 WHT = White
 YEL = Yellow
 LIT = Light
 DRK = Dark

73596

Standard model shown, quick connect similar

- a** - Controller (Blue)
- b** - 20 amp. fuse
- c** - Electrode

Description	Nm	lb-in.	lb-ft
MerCathode mounting screws	3-4	24-33	

The MerCathode controller assembly is located on the back of the front lifting eye.

1. Connect wires to MerCathode controller assembly and MerCathode quick connect. Apply a thin coat of Liquid Neoprene to all connections.

IMPORTANT: Opposite end of RED/PURPLE wire must be connected directly to battery positive (+) terminal. Do not connect it to a switched positive (+) circuit. MerCathode system must function continuously for proper corrosion protection.

Description	Where Used	Part Number
A Liquid Neoprene	MerCathode connections	92-25711-3

NOTES: