

Service Manual Supplement

Evinrude E-TEC G2
150, 175, 200, HP, 66°V6 (2.7 L)
200, 225, 250, 300 HP, 74°V6 (3.4 L)

EVINRUDE®
E-TEC®



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Use this **Service Manual Supplement** in addition to the current ***Evinrude E-TEC G2 Service Manual*** and the ***iDock Installation Guide***.

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Safety Notice

Before working on any part of the outboard, read the SAFETY section at the end of this manual.

This publication is written for qualified, factory-trained technicians who are already familiar with the use of *Evinrude* Special Tools. The included information is not a substitute for work experience. It is an organized guide for reference, repair, and/or maintenance.

The following symbols and/or signal words may be used in this document:

DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate personal injury.

NOTICE

Indicates an instruction which, if not followed, could severely damage engine components or other property.

These safety alert signal words mean:

ATTENTION!
BECOME ALERT!
YOUR SAFETY IS INVOLVED!

IMPORTANT: Identifies information that controls correct assembly and operation of the product.

ENVIRONMENTAL NOTE:

A note which provides tips and behaviors related to protecting the environment.

DO NOT perform any work until you have read and understood these instructions completely.

Torque wrench tightening specifications must strictly be adhered to.

Should removal of any locking fastener (lock tabs, locknuts, or patch screws) be required, always replace with a new one.

When replacement parts are required, use *Evinrude Genuine Parts* or parts with equivalent characteristics, including type, strength and material. Use of substandard parts could result in injury or product malfunction.

Always wear EYE PROTECTION AND APPROPRIATE GLOVES when using power tools.

Unless otherwise specified, engine must be OFF when performing this work.

Always be aware of parts that can move, such as flywheels, propellers, etc.

Some components may be HOT. Always wait for engine to cool down before performing work.

If you use procedures or service tools that are not recommended in this manual, YOU ALONE must decide if your actions might injure people or damage the outboard.

This document may be translated into other languages. In the event of any discrepancy, the English version shall prevail.

⚠ DANGER

Contact with a rotating propeller is likely to result in serious injury or death. Assure the engine and prop area is clear of people and objects before starting engine or operating boat. Do not allow anyone near a propeller, even when the engine is off. Blades can be sharp and the propeller can continue to turn even after the engine is off. Remove propeller before servicing and when running the outboard on a flushing device.

DO NOT run the engine indoors or without adequate ventilation or permit exhaust fumes to accumulate in confined areas. Engine exhaust contains carbon monoxide which, if inhaled, can cause serious brain damage or death.

⚠ WARNING

Wear safety glasses to avoid personal injury, and set compressed air to less than 25 psi (172 kPa).

The motor cover and flywheel cover are machinery guards. Use caution when conducting tests on running outboards. DO NOT wear jewelry or loose clothing. Keep hair, hands, and clothing away from rotating parts.

During service, the outboard may drop unexpectedly. Avoid personal injury; always support the outboard's weight with a suitable hoist or the tilt support bracket during service.

To prevent accidental starting while servicing, disconnect the battery cables at the battery. Twist and remove all spark plug leads.

The electrical system presents a serious shock hazard. DO NOT handle primary or secondary ignition components while outboard is running or flywheel is turning.

Gasoline is extremely flammable and highly explosive under certain conditions. Use caution when working on any part of the fuel system.

Protect against hazardous fuel spray. Before starting any fuel system service, carefully relieve fuel system pressure.

Do not smoke, or allow open flames or sparks, or use electrical devices such as cellular phones in the vicinity of a fuel leak or while fueling.

Keep all electrical connections clean, tight, and insulated to prevent shorting or arcing and causing an explosion.

Always work in a well ventilated area.

Replace any locking fastener (locknut or patch screw) if its locking feature becomes weak. Definite resistance to tightening must be felt when reusing a locking fastener. If replacement is indicated, use only authorized replacement or equivalent.

Reference Information

Abbreviations Used In This Manual

Abbreviations Used In This Manual

Units of Measurement

A	Amperes
amp-hr	Ampere hour
fl. oz.	fluid ounce
ft. lbs.	foot pounds
HP	horsepower
in.	inch
in. Hg	inches of mercury
in. lbs.	inch pounds
kPa	kilopascals
ml	milliliter
mm	millimeter
N·m	Newton meter
P/N	part number
psi	pounds per square inch
RPM	revolutions per minute
°C	degrees Celsius
°F	degrees Fahrenheit
ms	milliseconds
μs	microseconds
Ω	Ohms
V	Volts
VAC	Volts Alternating Current
VDC	Volts Direct Current

List of Abbreviations

ABYC	American Boat & Yacht Council
ATDC	After Top Dead Center
AT	Air Temperature Sensor
BPS	Barometric Pressure Sensor
BTDC	Before Top Dead Center
CAN	Controller Area Network
CCA	Cold Cranking Amps
CFR	Code of Federal Regulations
CPS	Crankshaft Position Sensor

DPS	Dynamic Power Steering
ETB	Electronic Throttle Body
ETC	Electronic Throttle Controller
EGT	Exhaust Gas Temperature
EMM	Engine Management Module
EPA	Environmental Protection Agency
ESC	Electronic Shift Controller
FNR	Forward, Neutral, Reverse
FWD	Forward
HPS	Helm Pressure Sensor
ICOMIA	International Council of Marine Industry Associations
ID	Inside Dimension
LED	Light Emitting Diode
MCA	Marine Cranking Amps
MWS	Modular Wiring System
NMEA	National Marine Electronics Assoc.
OOC	Out Of Correlation
PBLC	Public (<i>NMEA 2000</i>) Network
PPS	Pump Pressure Sensor
PRVT	Private (Remote Control) Network
PTPS	Port Steering Pressure Sensor
REV	Reverse
ROM	Read Only Memory
S.A.F.E.	Speed Adjusting Failsafe Electronics
SAC	Start Assist Circuit
SAE	Society Of Automotive Engineers
SPS	Shift Position Sensor
STPS	Starboard Steering Pressure Sensor
STS	Steering Position Sensor
SYNC	Synchronization
TDC	Top Dead Center
TPS	Throttle Position Sensor
USCG	United States Coast Guard
WOT	Wide Open Throttle
WTS	Water Temperature Sensor

Standard Torque Specifications

Size	In. Lbs.	Ft. Lbs.	N·m
No. 6	7–10	0.58–0.83	0.8–1.1
No. 8	15–22	1.25–1.83	1.7–2.5
No. 10	24–36	2–3	2.7–4.0
No. 12	36–48	3–4	4.0–5.4
1/4 in.	60–84	5–7	7–9.5
5/16 in.	120–144	10–12	13.5–16.5
3/8 in.	216–240	18–20	24.5–27
7/16 in.	336–384	28–32	38–43.5
M3	15–22	1.25–1.83	1.7–2.5
M4	24–35	2–2.9	2.7–4.0
M5	35–60	2.9–5	4.0–6.8
M6	84–106	7–8.8	9.5–12
M8	177–204	14.7–17	20–23
M10	310–336	25.8–28	35–38

IMPORTANT: These values apply only when a specific torque for a specific fastener is not listed in the appropriate section. When tightening two or more screws on the same part, DO NOT tighten screws completely, one at a time.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to. Replace any locking fastener (locknut or patch screw) if its locking feature becomes weak. Definite resistance to turning must be felt when reusing a locking fastener.

If replacement is specified or required because the locking fastener has become weak, use only authorized *Evinrude Genuine Parts*.

Product Reference and Illustrations

1

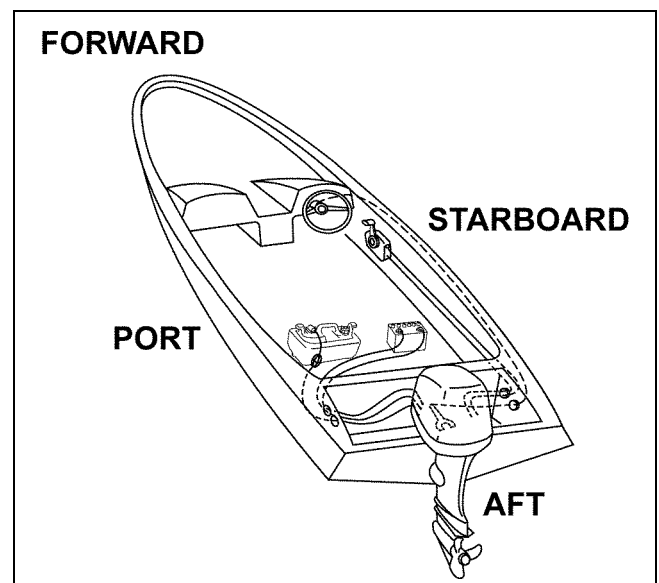
BRP US Inc. reserves the right to make changes at any time, without notice, in specifications and models and also to discontinue models. The right is also reserved to change any specifications or parts, at any time, without incurring any obligation to equip same on models manufactured prior to date of such change. Specifications used are based on the latest product information available at the time of publication.

The continuing accuracy of this manual cannot be guaranteed.

All photographs and illustrations used in this manual may not depict actual models or equipment, but are intended as representative views for reference only.

Certain features or systems discussed in this manual might not be found on all models in all marketing areas.

All service technicians must be familiar with nautical orientation. This manual often identifies parts and procedures using these terms.



Nautical Orientation

006411

Emission-Related Installation Instructions

Failing to follow these instructions when installing a certified engine in a vessel violates federal law (40 CFR 1068.105 (b)), subject to fines or other penalties as described in the Clean Air Act.

A repair shop or person of the owner's choosing may maintain, replace, or repair emission control devices and systems. These instructions do not require components or service by BRP or authorized Evinrude dealers. Although an authorized Evinrude dealer has the in-depth technical knowledge and tools to service Evinrude outboard engines, the emission-related warranty is not conditioned on the use of an authorized Evinrude dealer or any other establishment with which BRP has a commercial relationship.

For emission-related warranty claims, BRP is limiting the diagnosis and repair of emission-related parts to authorized Evinrude dealers. For more information, please refer to the US EPA EMISSION-RELATED WARRANTY contained in the ***Operator's Guide***. Proper maintenance is the owner's responsibility. A warranty claim may be denied if, among other things, the owner or operator caused the problem through improper maintenance or use.

You must follow the instructions for fuel requirements in the FUEL REQUIREMENTS section of this manual. Even if gasoline containing greater than ten volume percent ethanol is readily available, the US EPA has issued a prohibition against the use of gasoline containing greater than 10 vol% ethanol that applies to this engine. The use of gasoline containing greater than 10 vol% ethanol with this engine may harm the emission control system.

Manufacturer's Responsibility

Beginning with 1999 model year outboards, manufacturers of marine outboards must determine the exhaust emission levels for each outboard horsepower family and certify these outboards with the United States of America Environmental Protection Agency (EPA). An emissions control information label, showing emission levels and outboard specifications, must be placed on each outboard at the time of manufacture.

Dealer's Responsibility

When performing service on all 1999 and more recent *Evinrude* outboards that carry an emissions control information label, adjustments must be kept within published factory specifications.

Replacement or repair of any emission related component must be executed in a manner that maintains emission levels within the prescribed certification standards.

Dealers are not to modify the outboard in any manner that would alter the horsepower or allow emission levels to exceed their predetermined factory specifications.

Exceptions include manufacturer's prescribed changes, such as altitude adjustments, for example.

Owner's Responsibility

The owner/operator is required to have outboard maintenance performed to maintain emission levels within prescribed certification standards.

The owner/operator is not to, and should not allow anyone to, modify the outboard in any manner that would alter the horsepower or allow emissions levels to exceed their predetermined factory specifications.

Tampering with the fuel system to change horsepower or modify emission levels beyond factory settings or specifications will void the product warranty.

EPA Emission Regulations

All new 1999 and more recent *Evinrude* outboards are certified to the EPA as conforming to the requirements of the regulations for the control of air pollution from new watercraft marine spark ignition outboards. This certification is contingent on certain adjustments being set to factory standards. For this reason, the factory procedure for servicing the product must be strictly followed and, whenever practical, returned to the original intent of the design. The responsibilities listed above are general and in no way a complete listing of the rules and regulations pertaining to the EPA requirements on exhaust emissions for marine products. For more detailed information on this subject, you may contact the following locations:

U.S. Environmental Protection Agency
Office of Transportation and Air Quality
Certification Division
Gasoline Engine Compliance Center
2000 Traverwood Drive
Ann Arbor, MI 48105

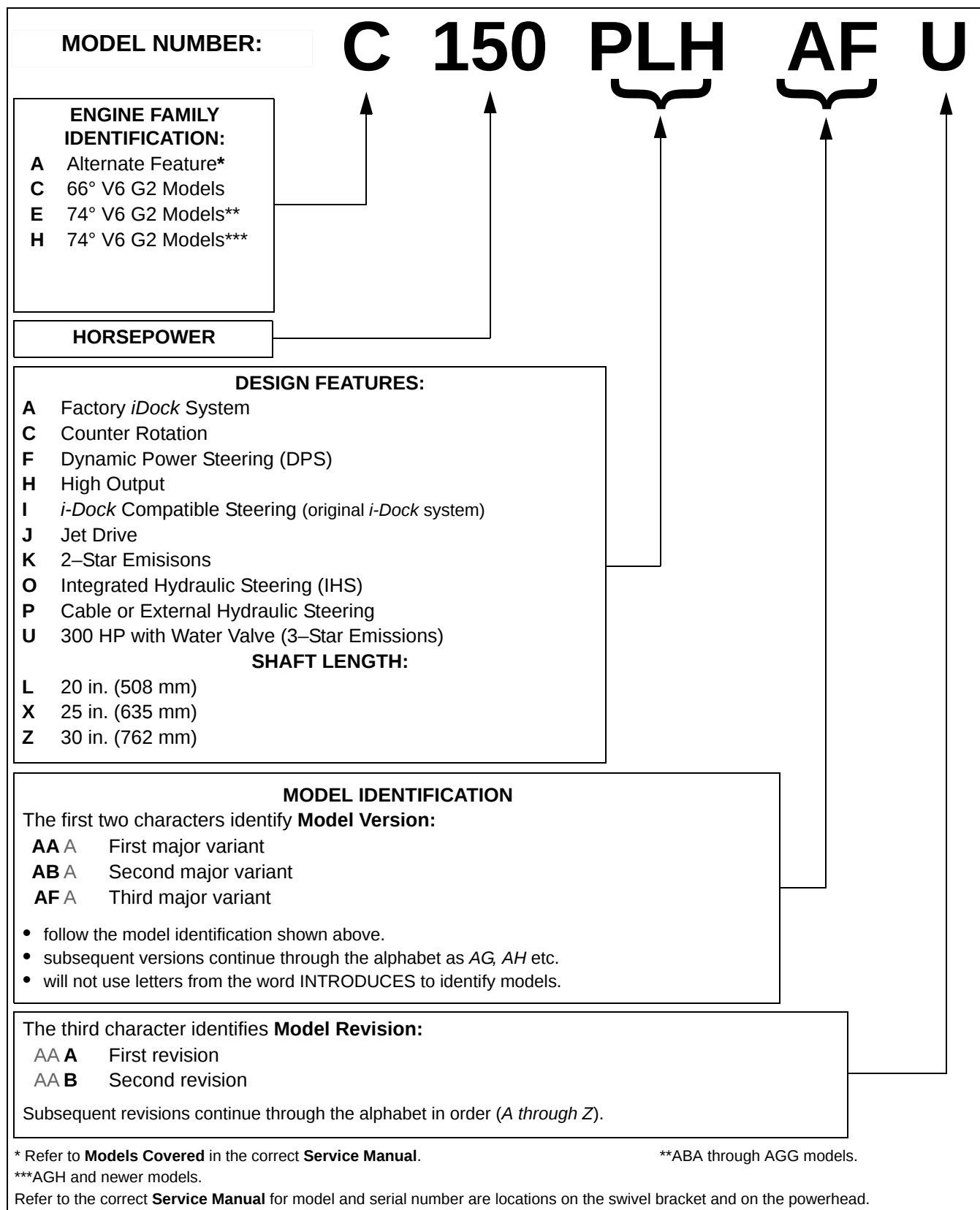
EPA Internet Web Site:

www.epa.gov/otaq

Reference Information

Model Designation

Model Designation



Models Covered

Use this **Service Manual Supplement** in addition to the correct **Service Manual** to service the Fuel System or *iDock* System on the following, or newer, *Evinrude E-TEC G2*, models:

Engine Type: 66° V6 Displacement: 167 cu. in. (2.74 L)
Gearcase: SLX-Type, Gear Ratio: 12:26 (0.46) (2.16:1)

Charging System: 50 Amp

HP	Model Number	Software Version	Shaft Length	Steering	Graphics	Standard Features	Special Features
150	C150PLAAEE	3030567	20 in.	TRAC+ ¹	G2 Standard	Digital EST ⁴	
	C150PXAAE	3030567	25 in.	TRAC+ ¹	G2 Standard	Digital EST ⁴	
	C150PXCAAE	3030567	25 in.	TRAC+ ¹	G2 Standard	Digital EST ⁴ , CR ⁵	
150 H.O.	C150PLHAAE	3030558	20 in.	TRAC+ ¹	G2 H.O.	Digital EST ⁴	H.O.
	C150PXHAAE	3030558	25 in.	TRAC+ ¹	G2 H.O.	Digital EST ⁴	H.O.
	C150FLHAAE	3030558	20 in.	DPS ²	G2 H.O.	Digital EST ⁴	H.O.
	C150FXHAAE	3030558	25 in.	DPS ²	G2 H.O.	Digital EST ⁴	H.O.
	C150XHCAAE	3030558	25 in.	IHS ³	G2 H.O.	Digital EST ⁴ , CR ⁵	H.O.
	C150XHOAAE	3030558	25 in.	IHS ³	G2 H.O.	Digital EST ⁴	H.O.
	C150AXHAAE	3030558	25 in.	<i>iDock</i> ⁶	G2 H.O.	Digital EST ⁴	H.O.
	C150AXCAAE	3030558	25 in.	<i>iDock</i> ⁶	G2 H.O.	Digital EST ⁴ , CR ⁵	H.O.
175	C175PLAAE	3030568	20 in.	TRAC+ ¹	G2 Standard	Digital EST ⁴	
	C175PXAAE	3030568	25 in.	TRAC+ ¹	G2 Standard	Digital EST ⁴	
	C175PXCAAE	3030568	25 in.	TRAC+ ¹	G2 Standard	Digital EST ⁴ , CR ⁵	
	C175FLAAE	3030568	20 in.	DPS ²	G2 Standard	Digital EST ⁴	
	C175FXAAE	3030568	25 in.	DPS ²	G2 Standard	Digital EST ⁴	
	C175XCAAE	3030568	25 in.	IHS ³	G2 Standard	Digital EST ⁴ , CR ⁵	
200	C200PLAAE	3030570	20 in.	TRAC+ ¹	G2 Standard	Digital EST ⁴	
	C200PXAAE	3030570	25 in.	TRAC+ ¹	G2 Standard	Digital EST ⁴	
	C200PXCAAE	3030570	25 in.	TRAC+ ¹	G2 Standard	Digital EST ⁴ , CR ⁵	
	C200FLAAE	3030570	20 in.	DPS ²	G2 Standard	Digital EST ⁴	
	C200FXAAE	3030570	25 in.	DPS ²	G2 Standard	Digital EST ⁴	
	C200XCAAE	3030570	25 in.	IHS ³	G2 Standard	Digital EST ⁴ , CR ⁵	
	C200XOAAE	3030570	25 in.	IHS ³	G2 Standard	Digital EST ⁴	
	C200AXAAE	3030570	25 in.	<i>iDock</i> ⁶	G2 Standard	Digital EST ⁴	
	C200AXCAAE	3030570	25 in.	<i>iDock</i> ⁶	G2 Standard	Digital EST ⁴ , CR ⁵	

DPS Control Module	3030559
<i>iDock</i> Control Module	3030591
Pressure Sensor Module	3030590
EMM Co-Processor	3030479

1. Alternate feature
2. Dynamic power Steering
3. Integrated Hydraulic Steering

4. Digital Electronic Shift and Throttle
5. Counter-Rotation Gearcase
6. Factory installed *Evinrude iDock* System

Reference Information

Models Covered

Engine: 74° V6 3.4 L, 210.1 cu. in Charging System: 50 Amp

Gearcase: SLX-Type, Gear Ratio: 13:24 (0.542) (1.85:1)

HP	Model Number	Software Version	Shaft Length	Steering	Graphics	Standard Features	Special Features
200	E200LHAGG	3030560	20 in.	DPS ²	G2 H.O.	Digital EST ⁴	H.O.
	E200LHOAGG	3030560	20 in.	IHS ³	G2 H.O.	Digital EST ⁴	H.O.
	E200XHAGG	3030560	25 in.	DPS ²	G2 H.O.	Digital EST ⁴	H.O.
	E200XHCAGG	3030560	25 in.	IHS ³	G2 H.O.	Digital EST ⁴ , CR ⁵	H.O.
	A200XHCAGG ¹	3030560	25 in.	DPS ²	G2 H.O.	Digital EST ⁴ , CR ⁵	H.O.
	A200XHAGG ¹	3030560	25 in.	IHS ³	G2 H.O.	Digital EST ⁴	H.O.
	E200AXHAGG	3030560	25 in.	iDock ⁶	G2 H.O.	Digital EST ⁴	H.O.
	E200AXCAGG	3030560	25 in.	iDock ⁶	G2 H.O.	Digital EST ⁴ , CR ⁵	H.O.
225	E225XAGG	3030561	25 in.	DPS ²	G2 Standard	Digital EST ⁴	
	E225XCAGG	3030561	25 in.	IHS ³	G2 Standard	Digital EST ⁴ , CR ⁵	
225 H.O.	E225LHAGG	3030562	20 in.	DPS ²	G2 H.O.	Digital EST ⁴	H.O.
	E225XHAGG	3030562	25 in.	DPS ²	G2 H.O.	Digital EST ⁴	H.O.
	E225LHOAGG	3030562	20 in.	IHS ³	G2 H.O.	Digital EST ⁴	H.O.
	E225XCHAGG	3030562	25 in.	IHS ³	G2 H.O.	Digital EST ⁴ , CR ⁵	
250	E250XAGG	3030563	25 in.	DPS ²	G2 Standard	Digital EST ⁴	
	E250XCAGG	3030563	25 in.	IHS ³	G2 Standard	Digital EST ⁴ , CR ⁵	
	E250ZAGG	3030563	30 in.	DPS ²	G2 Standard	Digital EST ⁴	
	E250ZCAGG	3030563	30 in.	IHS ³	G2 Standard	Digital EST ⁴ , CR ⁵	
	A250XCAGG ¹	3030563	25 in.	DPS ²	G2 Standard	Digital EST ⁴ , CR ⁵	
	A250ZCAGG ¹	3030563	30 in.	DPS ²	G2 Standard	Digital EST ⁴ , CR ⁵	
	A250XAGG ¹	3030563	25 in.	IHS ³	G2 Standard	Digital EST ⁴	
	A250ZAGG ¹	3030563	30 in.	IHS ³	G2 Standard	Digital EST ⁴	
	E250AZAGG	3030563	25 in.	iDock ⁶	G2 Standard	Digital EST ⁴	
	E250AZCAGG	3030563	30 in.	iDock ⁶	G2 Standard	Digital EST ⁴ , CR ⁵	
250 H.O.	E250LHAGG	3030564	20 in.	DPS ²	G2 H.O.	Digital EST ⁴	H.O.
	E250LHOAGG	3030564	20 in.	IHS ³	G2 H.O.	Digital EST ⁴	H.O.
	E250XHAGG	3030564	25 in.	DPS ²	G2 H.O.	Digital EST ⁴	H.O.
	E250XCHAGG	3030564	25 in.	DPS ²	G2 H.O.	Digital EST ⁴ , CR ⁵	H.O.
	E250ALHAGG	3030564	20 in.	iDock ⁶	G2 H.O.	Digital EST ⁴	H.O.
	E250ALCAGG	3030564	20 in.	iDock ⁶	G2 H.O.	Digital EST ⁴ , CR ⁵	H.O.
	E250AXHAGG	3030564	25 in.	iDock ⁶	G2 H.O.	Digital EST ⁴	H.O.
	E250AXCAGG	3030564	25 in.	iDock ⁶	G2 H.O.	Digital EST ⁴ , CR ⁵	H.O.

HP	Model Number	Software Version	Shaft Length	Steering	Graphics	Standard Features	Special Features
300	E300LUAGG	3030565	20 in.	DPS ²	G2 Standard	Digital EST ⁴	
	E300XUAGG	3030565	25 in.	DPS ²	G2 Standard	Digital EST ⁴	
	E300XCUAGG	3030565	25 in.	IHS ³	G2 Standard	Digital EST ⁴ , CR ⁵	
	E300ZUAGG	3030565	30 in.	DPS ²	G2 Standard	Digital EST ⁴	
	E300ZCUAGG	3030565	30 in.	IHS ³	G2 Standard	Digital EST ⁴ , CR ⁵	
	A300XCUAGG ¹	3030565	25 in.	DPS ²	G2 Standard	Digital EST ⁴ , CR ⁵	
	A300ZCUAGG ¹	3030565	30 in.	DPS ²	G2 Standard	Digital EST ⁴ , CR ⁵	
	A300XUAGG ¹	3030565	25 in.	DPS ²	G2 Standard	Digital EST ⁴	
	A300ZUAGG ¹	3030565	30 in.	IHS ³	G2 Standard	Digital EST ⁴	
	E300AXUAGG	3030565	25 in.	iDock ⁶	G2 Standard	Digital EST ⁴	
	E300AXCAGG	3030565	25 in.	iDock ⁶	G2 Standard	Digital EST ⁴ , CR ⁵	
	E300AZUAGG	3030565	30 in.	iDock ⁶	G2 Standard	Digital EST ⁴	
	E300AZCAGG	3030565	30 in.	iDock ⁶	G2 Standard	Digital EST ⁴ , CR ⁵	

DPS Control Module	3030559
iDock Control Module	3030591
Pressure Sensor Module	3030590
EMM Co-Processor	3030479

1. Alternate feature
2. Dynamic power Steering
3. Integrated Hydraulic Steering

4. Digital Electronic Shift and Throttle
5. Counter-Rotation Gearcase
6. Factory installed Evinrude iDock System

Reference Information

Service Specifications

Service Specifications

66° V6 Models

Note: A bar to the left side of the table indicates updated information.

HP	150	150 H.O.	175	200
Engine				
Full Throttle Operating Range	5400-6000 RPM	5400-6000 RPM	5000-6000 RPM	5000-6000 RPM
Power	150 HP (110.32 kw) @ 5750 RPM	150 HP (110.32 kw) @ 5750 RPM	175 HP (128.71 kw) @ 5750 RPM	200 HP (147.1) @ 5750 RPM
Idle RPM in NEUTRAL	400 ± 50 RPM			
Idle RPM in Gear	500 ± 50 RPM			
Weight (may vary depending on model)	TRAC+ 20 in. (L) Models 487 lbs. (221 kg) TRAC+ 25 in. (X) Models 507 lbs. (229 kg) Full Featured 20 in. (L) Models TBD lbs. (530 kg) Full Featured 25 in. (X) Models 532 lbs. (241 kg)			
Engine Type	66° V 6-Cylinder Loop-Charged			
Displacement	167 cu. in. (2.7 L, 2743 cm ³)			
Bore	3.386 in. (86 mm)			
Stroke	3.100 in. (78.74 mm)			
Standard Bore	3.3853 to 3.3868 in. (85.987 to 86.025 mm) To bore oversize, add piston oversize dimension to standard bore			
Top Crankshaft Journal	1.6199 to 1.6204 in. (41.15 to 41.16 mm)			
Center Crankshaft Journals	2.1870 to 2.1875 in. (55.55 to 55.56 mm)			
Bottom Crankshaft Journal	1.5747 to 1.5752 in. (40.0 to 40.01 mm)			
Rod Crankpin	1.4995 to 1.5000 in. (38.09 to 38.106 mm)			
Piston Ring End Gap, Both	0.020 to 0.026 in. (0.55 to 0.66 mm)			
Cooling System				
Thermostat	143°F (62°C)			
Maximum Temperature	203°F (95°C)			
Water pressure – Idle – @ 5000 to 6000 RPM	5 to 8 psi (34 to 55 kPa) 24 to 40 psi (165 to 276 kPa)			
Pressure Relief Valve (open)	28 to 30 psi (193 to 206 kPa) (approximate)			

HP	150	150 H.O.	175	200
Fuel / Oil System				
Fuel/Oil Ratio	EMM Controlled			
Starting Enrichment	EMM Controlled			
Preferred Fuel	Regular unleaded gasoline			
Acceptable Fuel	Use unleaded regular gasoline. The use of unleaded gasoline containing alcohol above the percentage specified by government regulations is not recommended. Do NOT use Fuel labeled "E85." Use of fuel labeled E15 is prohibited by U.S. EPA Regulations.			
Minimum Octane	87 AKI (R+M)/2 or 90 RON			
Fuel Pressure (minimum) – Lift Pump – High Pressure Pump	7 psi (48 kPa) @ idle 30 to 42 psi (207 to 289 kPa)			
Maximum Fuel Inlet Vacuum	4 in. Hg. (13.5 kPa)			
Fuel Filters – Inline – Water Separating	P/N 360941 P/N 5009676			
Fuel Additives	2+4 Fuel Conditioner, Fuel System Cleaner. Use of other additives may result in engine damage.			
Lubricant – Preferred Lubricant – Acceptable Lubricant	Evinrude XD100, Evinrude XD50 Synthetic TC-W3 NMMA-certified oil			
Capacity – On-Engine Tank Only – With Remote Oil Tank	2.8 gallons (10.6 liters) 2.0 gallons (7.5 liters)			
Electrical System				
Minimum Battery Requirements	675 CCA (845 MCA); or 750 CCA (940 MCA) below 32°F (0°C) (Use a 107 amp-hr battery for extreme applications.)			
Alternator	Dual Voltage 50 Amp with Voltage Regulator and Battery Isolation. Refer to Predelivery and Installation Guide for multiple battery applications.			
Analog Tachometer Setting	6 pulse (12 pole)			
Charging Isolator	Integral, Terminal on Engine Harness			
Engine Fuses	3 Amp MINIFUSE, P/N 3011805, 5 Amp MINIFUSE, P/N 514764, 10 Amp MINIFUSE, P/N 514766, 30 Amp MINIFUSE, P/N 3011729			
Engine Relays – Starter – B+ to 55 V System	12V 35A SPDT, P/N 3011790 12V 35A SPDT, P/N 3011790			
Ignition System				
Type	Inductive Discharge			
Firing Order	1-2-3-4-5-6			
Ignition Features	EMM Controlled			
RPM Limit (in gear)	6250 RPM			
Crankshaft Position Sensor Air Gap	Fixed			
Spark Plug	Champion [†] QC10WEPI @ 0.028 ± 0.003 in. (0.71 mm)			

Reference Information

Service Specifications

HP	150	150 H.O.	175	200
Gearcase				
Gear Ratio	“SLX” Type Gearcase: 12:26 (0.46) (2.16:1)			
Lubricant	HPF Pro Gearcase Lubricant			
Capacity	Gearcase only – 37.3 fl. oz. (1103 ml) Gearcase, vent hose and oil reservoir 43 fl. oz. (1273 ml) Gearcase only – 39 fl. oz. (1154 ml) Gearcase, vent hose and oil reservoir 44.7 fl. oz. (1324 ml)			
Shift Rod Height	Refer to Shift Rod Adjustment on p. 420			
Trim & Tilt System (Full Featured)				
Lubrication	Power Trim/Tilt Fluid, P/N767969			
Fluid Capacity	24 fl. oz. (710 ml)			
Trim Range	0° to 21° (-6° to 15°)			
Tilt Range	22° to 81° (16° to 75°)			
Trim & Tilt System (TRAC +)				
Lubrication	Power Trim/Tilt Fluid, P/N767969			
Fluid Capacity	21 fl. oz. (621 ml)			
Trim Range	0° to 21° (-6° to 15°)			
Tilt Range	22° to 75° (16° to 69°)			
Steering System (Full Featured)				
Hydraulic Steering Fluid	SeaStar Hydraulic fluid, P/N 770891 or Hydraulic fluid meeting MIL SPEC: Mil-H-5606			
Fluid Capacity (NOT including helm or hydraulic hoses)	10 oz. (300 ml) (approximate)			
Steering Range (lock to lock)	–32° to +32°, 64° Total (see engine Profile Drawing)			
Steering System (TRAC +)				
Hydraulic Steering Fluid	Refer to steering system manufacturer recommendation			
Steering Range (lock to lock)	–33° to +33°, 66° Total (see engine Profile Drawing)			
NMEA 2000 Support				
Load Equivalency Number (LEN)	1			
Receive PGNs	127488, 129026			
Transmit PGNs	127488, 127489, 127493, 127505, 127508, 130310			
	Also supports the mandatory PGNs included in NMEA 2000 Library Version 3.101			

Service Specifications

74° V6 Models

Note: A bar to the left side of the table indicates updated information.

HP	200	225	250	250 H.O.	300
Engine					
Full Throttle Operating Range	5400-6000 RPM	5400-6000 RPM	5400-6000 RPM	5400-6000 RPM	5400-6000 RPM
Power	200 HP (147.1 kw) @ 5500 RPM	225 HP (165.49 kw) @ 5500 RPM	250 HP (183.87 kw) @ 5500 RPM	250 HP (183.87 kw) @ 5750 RPM	300 HP (220.65 kw) @ 5750 RPM
Idle RPM in NEUTRAL	500 ± 50 RPM				
Idle RPM in Gear	500 ± 50 RPM				
Weight (may vary depending on model)	20 in. (L) Models 537 lbs. (244 kg) 25 in. (X) Models 558 lbs. (253 kg) 30 in. (Z) Models 570 lbs. (259 kg)				
Lubricant – Preferred Lubricant – Acceptable Lubricant	Evinrude XD100, Evinrude XD50 Synthetic TC-W3 NMMA-certified oil				
Capacity	2.0 gallons (7.5 liters)				
Engine Type	74° V 6-Cylinder Loop-Charged				
Displacement	210 cu. in. (3.4 L, 3441 cm ³)				
Bore	3.854 in. (97.89 mm)				
Stroke	3.000 in. (76 mm)				
Standard Bore	3.8535 to 3.8550 in. (97.87 to 97.90 mm) To bore oversize, add piston oversize dimension to standard bore				
Top Crankshaft Journal	1.6199 to 1.6204 in. (41.15 to 41.16 mm)				
Center Crankshaft Journals	2.1870 to 2.1875 in. (55.55 to 55.56 mm)				
Bottom Crankshaft Journal	1.5747 to 1.5752 in. (40.0 to 40.01 mm)				
Rod Crankpin	1.4995 to 1.5000 in. (38.09 to 38.106 mm)				
Piston Ring End Gap, Both	0.022 to 0.028 in. (0.57 to 0.72 mm)				

Reference Information

Service Specifications

HP	200	225	250	250 H.O.	300
Fuel / Oil System					
Fuel/Oil Ratio	EMM Controlled				
Starting Enrichment	EMM Controlled				
Preferred Fuel	Regular unleaded gasoline				
Acceptable Fuel	Use unleaded regular gasoline. The use of unleaded gasoline containing alcohol above the percentage specified by government regulations is not recommended. Do NOT use Fuel labeled "E85." Use of fuel labeled E15 is prohibited by U.S. EPA Regulations.				
Minimum Octane	87 AKI (R+M)/2 or 90 RON				
Fuel Pressure (minimum) – Lift Pump –High Pressure Pump	7 psi (48 kPa) @ idle 30 to 42 psi (207 to 289 kPa)				
Maximum Fuel Inlet Vacuum	4 in. Hg. (13.5 kPa)				
Fuel Filters – Inline – Water Separating	P/N 360941 P/N 5009676				
Fuel Additives	2+4 Fuel Conditioner, Fuel System Cleaner. Use of other additives may result in engine damage.				
Electrical System					
Minimum Battery Requirements	675 CCA (845 MCA); or 750 CCA (940 MCA) below 32°F (0°C) (Use a 107 amp-hr battery for extreme applications.)				
Alternator	Dual Voltage 50 Amp with Voltage Regulator and Battery Isolation. Refer to Predelivery and Installation Guide for multiple battery applications.				
Analog Tachometer Setting	6 pulse (12 pole)				
Charging Isolator	Integral, Terminal on Engine Harness				
Engine Fuses	3 Amp MINIFUSE, P/N 3011805, 5 Amp MINIFUSE, P/N 514764, 10 Amp MINIFUSE, P/N 514766, 30 Amp MINIFUSE, P/N 3011729				
Engine Relays – Starter – B+ to 55 V System	12V 35A SPDT, P/N 3011790 12V 35A SPDT, P/N 3011790				
Cooling System					
Thermostat	143°F (62°C)				
Maximum Temperature	203°F (95°C)				
Water pressure –Minimum @ Idle – @ 5500 RPM	4 psi (27.6 kPa) > 25 psi (>172 kPa)				
Pressure Relief Valve (open)	28 psi (193 kPa) (approximate)				

HP	200	225	250	250 H.O.	300
Ignition System					
Type	Inductive Discharge				
Firing Order	1-2-3-4-5-6				
Ignition Features	EMM Controlled				
RPM Limit (in gear)	6250 RPM				
Crankshaft Position Sensor Air Gap	Fixed				
Spark Plug	Champion [†] QC8WEPI @ 0.028 ± 0.003 in. (0.71 mm)				
Gearcase					
Gear Ratio	“SLX” Type Gearcase: 13:24 (.542) (1.85:1)				
Lubricant	HPF Pro Gearcase Lubricant				
Capacity	Gearcase only – 37.3 fl. oz. (1103 ml) Gearcase, vent hose and oil reservoir 43 fl. oz. (1273 ml)				
– Standard Rotation	Gearcase only – 39 fl. oz. (1154 ml) Gearcase, vent hose and oil reservoir 44.7 fl. oz. (1324 ml)				
– Counter Rotation					
Shift Rod Height	N/A				
Trim & Tilt System					
Lubrication	Power Trim/Tilt Fluid, P/N767969				
Fluid Capacity	24 fl. oz. (710 ml)				
Trim Range	0° to 21° (-6° to 15°)				
Tilt Range	22° to 81° (16° to 75°)				
Steering System					
Hydraulic Steering Fluid	SeaStar Hydraulic fluid, P/N 770891				
Fluid Capacity (NOT including helm or hydraulic hoses)	10 oz. (300 ml) (approximate)				
Steering Range (lock to lock)	–32° to +32°, 64° Total (see engine Profile Drawing)				
NMEA 2000 Support					
Load Equivalency Number (LEN)	1				
Receive PGNs	127488, 129026				
Transmit PGNs	127488, 127489, 127493, 127505, 127508, 130310				
	Also supports the mandatory PGNs included in NMEA 2000 Library Version 3.101				

Technician's Notes

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Fuel System Supplement

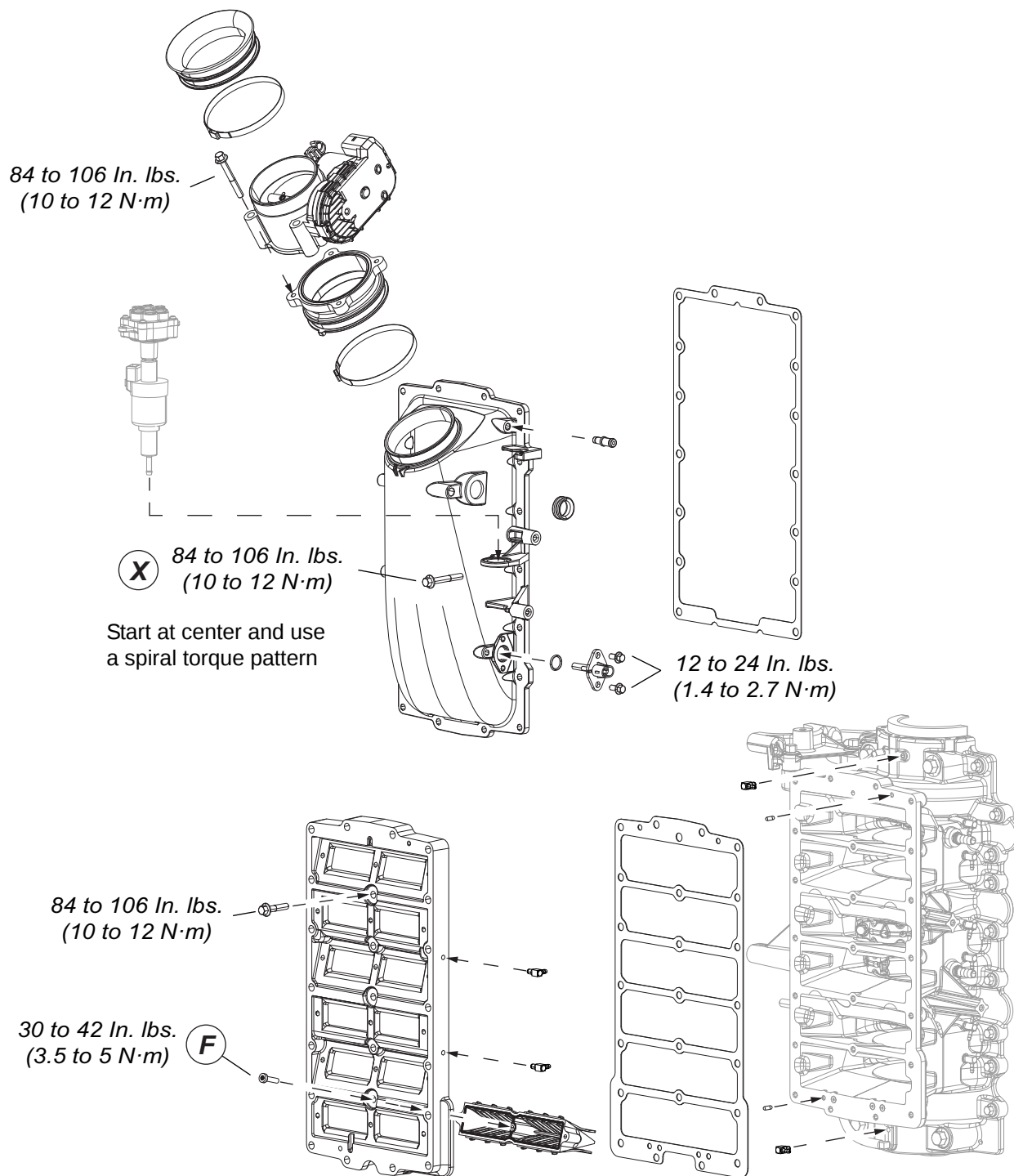
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Service Charts

Reed Plate Assembly and Throttle Body

66° V6 Models AAE & Newer Models



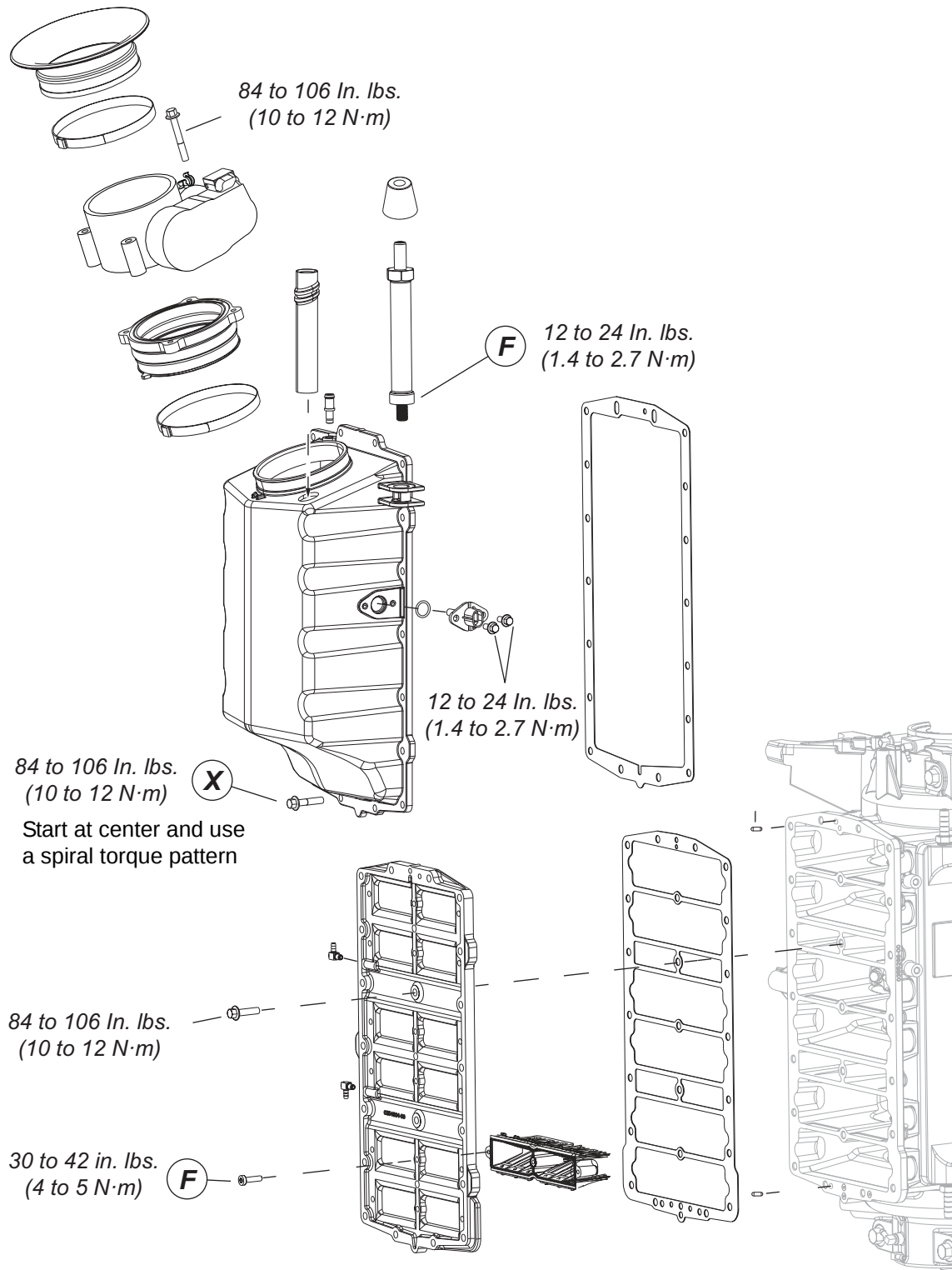
E Red Ultra Lock

F Blue Nut Lock

X See Service Procedure

Reed Plate Assembly and Throttle Body

74° V6 Models AGG & Newer Models



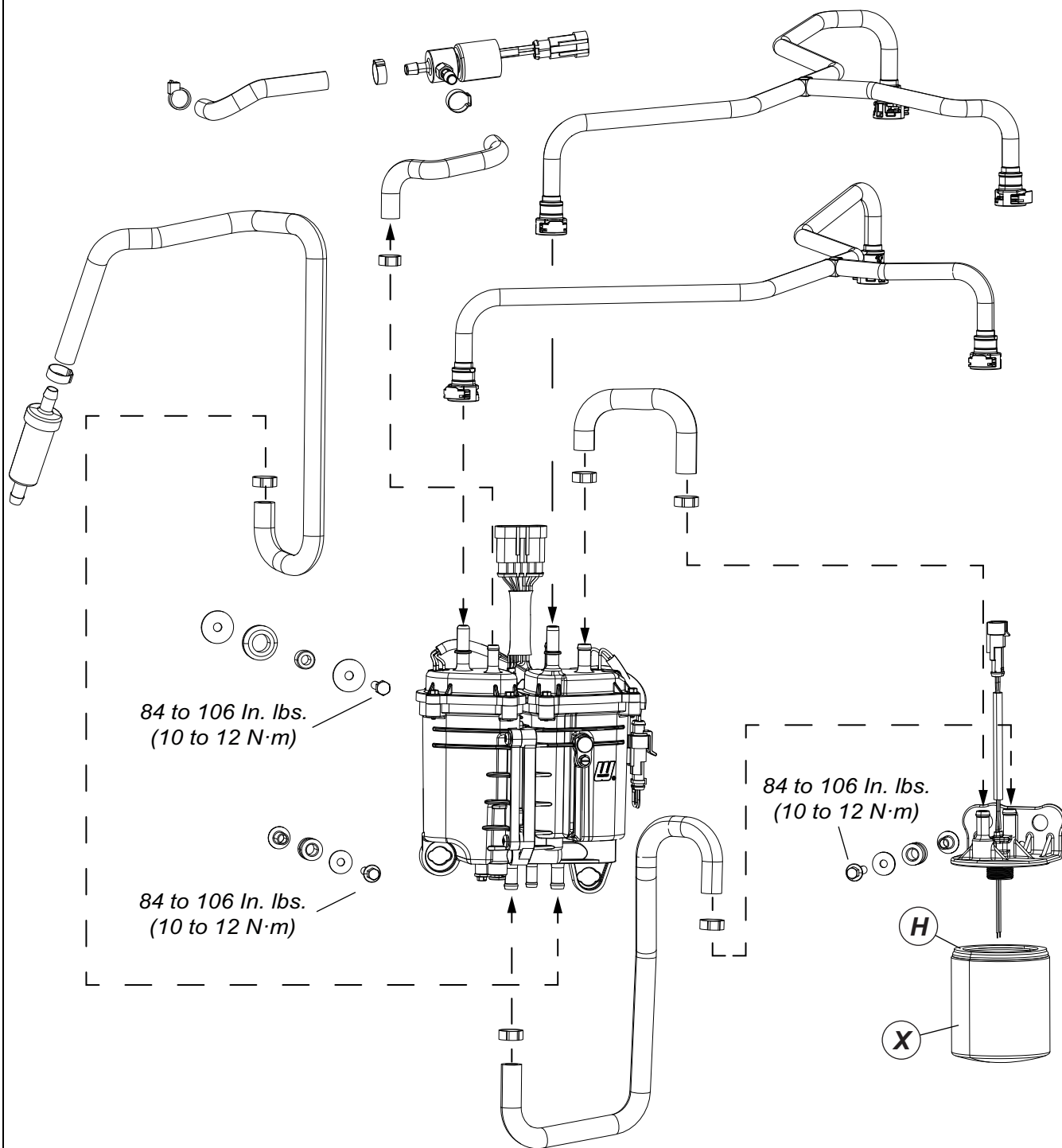
E Red Ultra Lock

F Blue Nut Lock

X See Service Procedure

Fuel Pump and Vapor Separator, Fuel Filter and Fuel Rails

66° V6 Models AAE & Newer Models



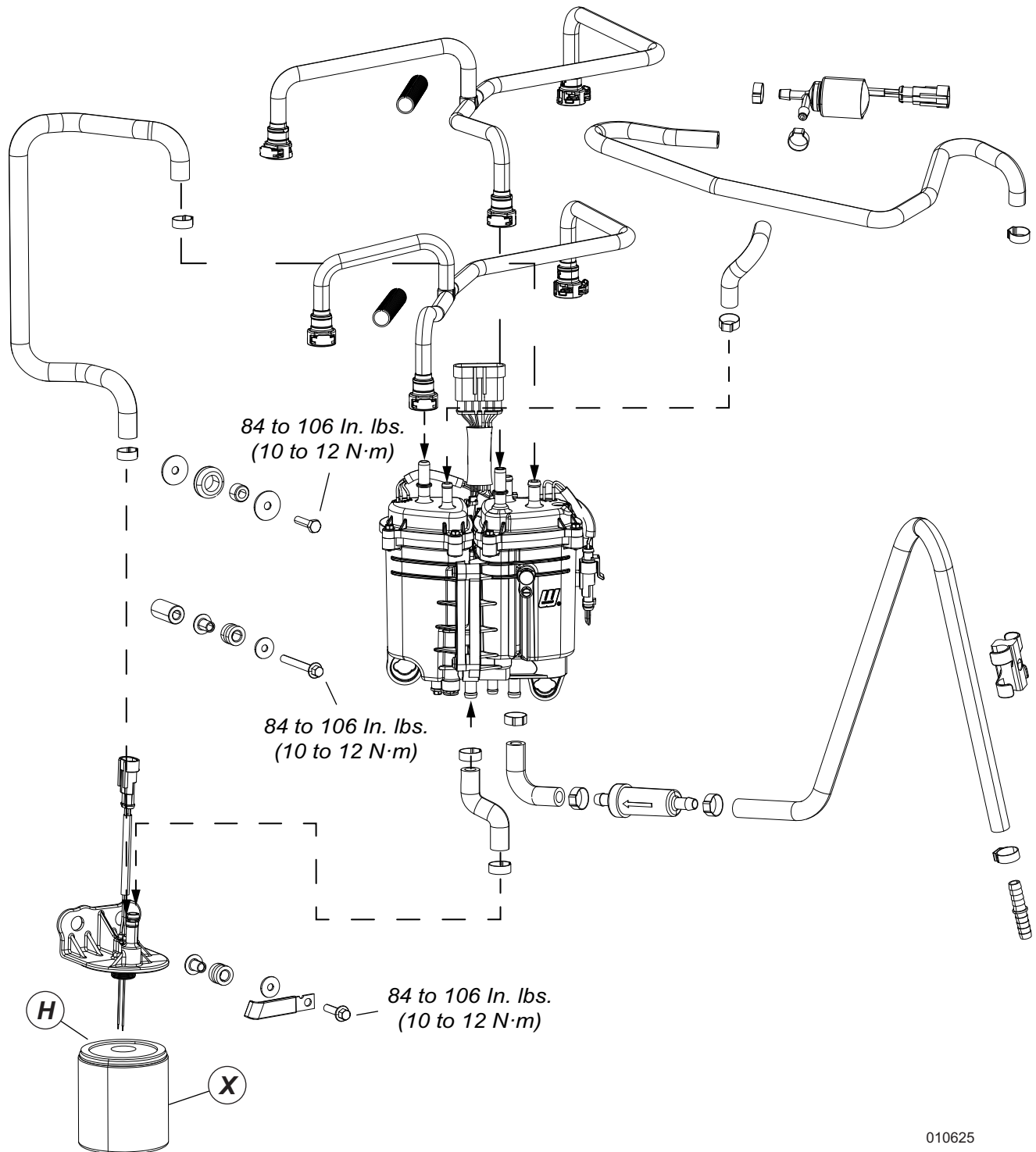
010626

H Outboard Lubricant

X See Service Procedure

Fuel Pump and Vapor Separator, Fuel Filter and Fuel Rails

74° V6 Models AGG & Newer Models

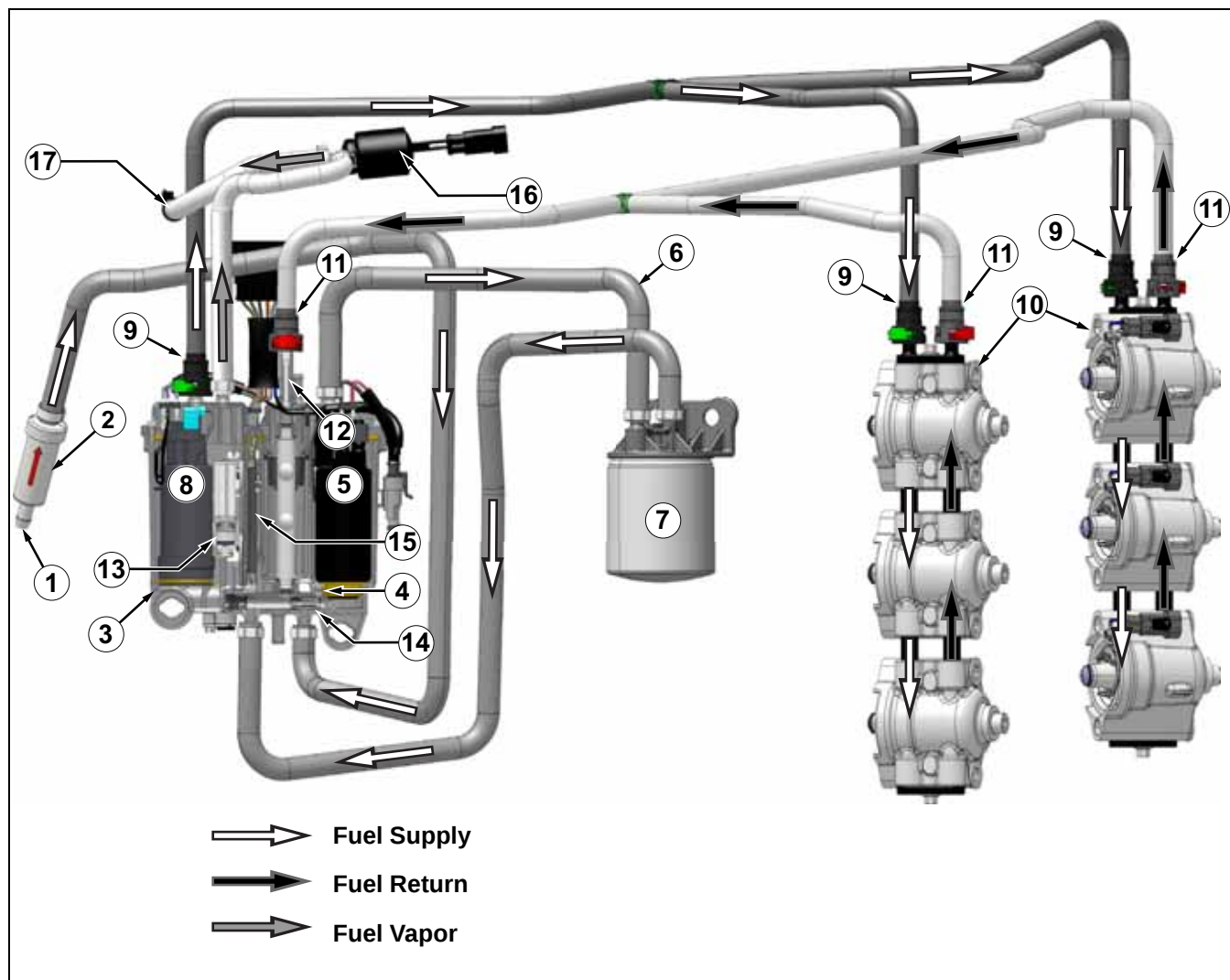


H Outboard Lubricant

X See Service Procedure

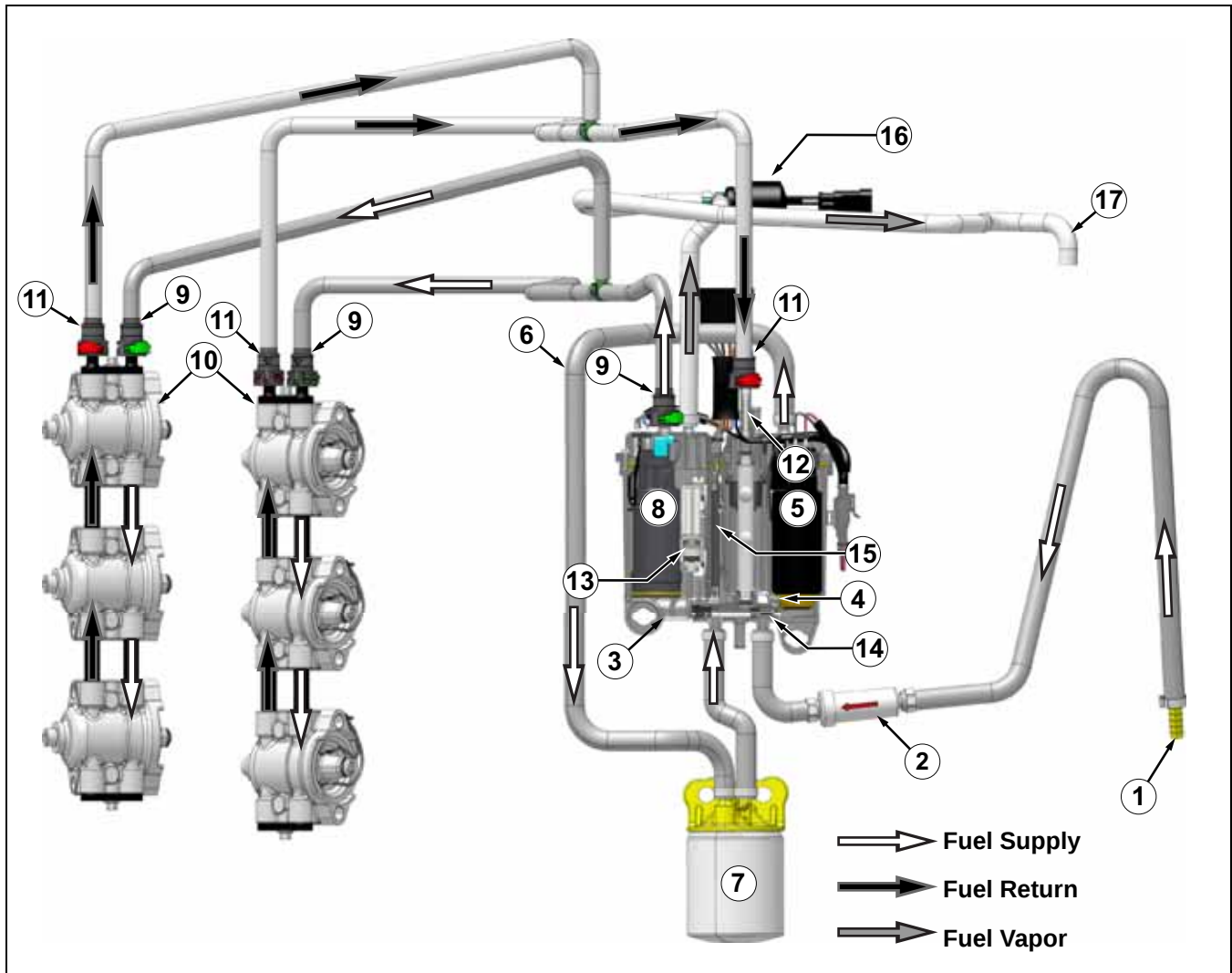
Fuel System Flow Diagrams

66° V6, AAE & Newer



- | | |
|---|--|
| 1. Fuel inlet /supply from boat fuel system | 10. Fuel injector(s) |
| 2. Inline fuel filter (65 micron) | 11. Fuel return rail (red connector) |
| 3. Fuel pump/vapor separator assembly | 12. Fuel return filter |
| 4. Over-pressure relief valve | 13. Pressure regulator (high pressure) |
| 5. Electric fuel lift pump | 14. Pressure regulator (low pressure) |
| 6. Fuel supply hose to water separating fuel filter | 15. Fuel level sensor |
| 7. Water separating fuel filter (10 micron) | 16. Fuel vapor vent solenoid |
| 8. Electric fuel circulation pump | 17. Fuel vapor vent hose to plenum |
| 9. Fuel supply rail (green connector) | |

74° V6, AGG & Newer

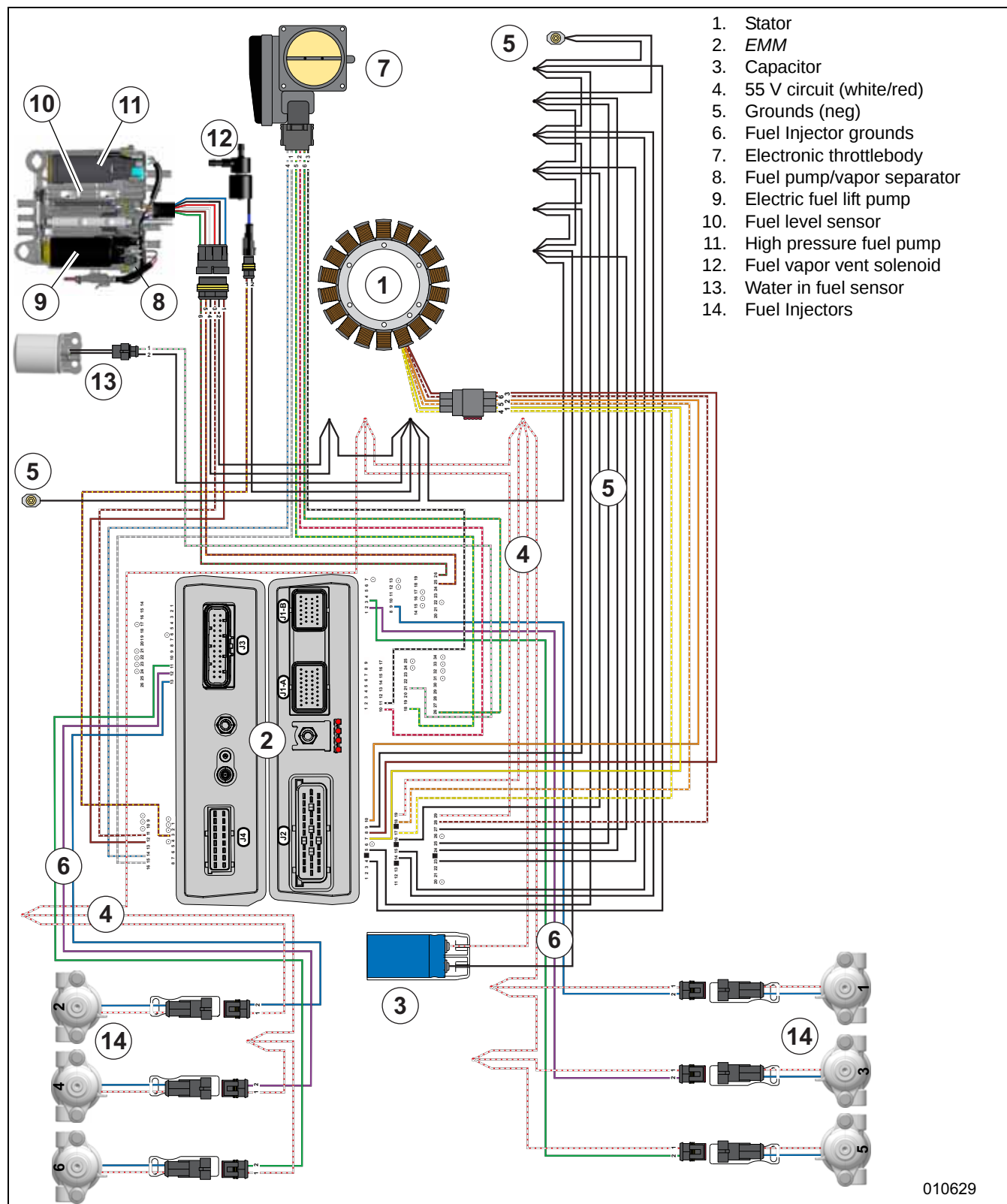


1. Fuel inlet /supply from boat fuel system
2. Inline fuel filter (65 micron)
3. Fuel pump/vapor separator assembly
4. Over-pressure relief valve
5. Electric fuel lift pump
6. Fuel supply hose to water separating fuel filter
7. Water separating fuel filter (10 micron)
8. Electric fuel circulation pump
9. Fuel supply rail (green connector)

10. Fuel injector(s)
11. Fuel return rail (red connector)
12. Fuel return filter
13. Pressure regulator (high pressure)
14. Pressure regulator (low pressure)
15. Fuel level sensor
16. Fuel vapor vent solenoid
17. Fuel vapor vent hose to plenum

Fuel System Circuit Diagrams

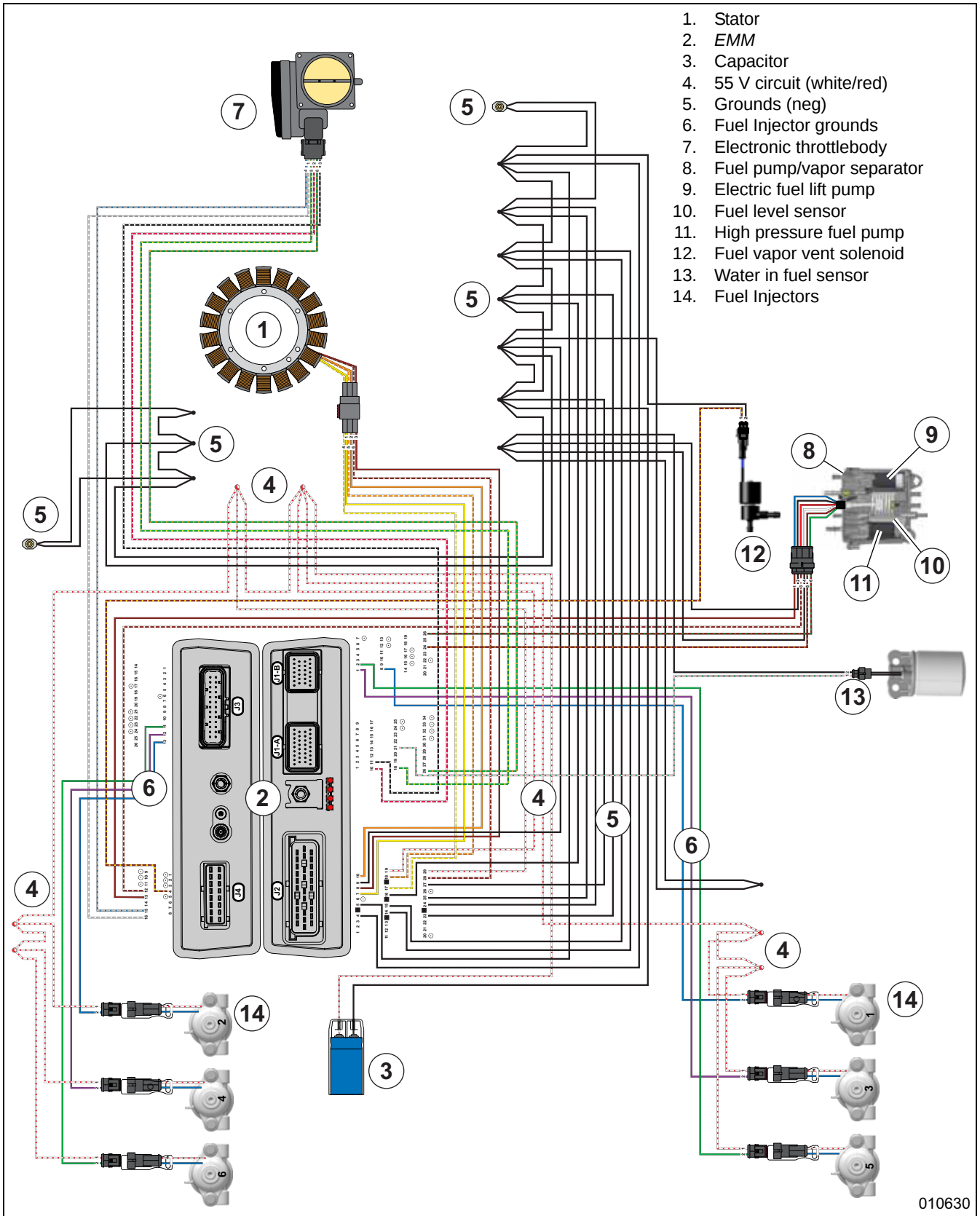
66° V6, AAE & Newer



010629

74° V6, AGG & Newer

2



Fuel System Requirements

Regulations and Guidelines

Vessel manufacturer, and/or installer of an EPA certified outboard, must meet minimum specifications for boat fuel systems established by:

- U.S. Environmental Protection Agency (EPA)
 - 40 CFR 1045.112
 - 40 CFR 1060
- U.S. Coast Guard (USCG)
 - 33 CFR 183
- American Boat & Yacht Council (ABYC)
 - Standard H-24
 - Standard H-25.

Permanent Fuel Tanks

Permanent fuel tanks must be properly vented outside of the hull.

Remote fuel tank gas fills must be grounded.

Fuel tank pickups should include an anti-siphon valve to prevent fuel flow if a leak occurs in the fuel distribution system.

Portable Fuel Tanks

NOTICE

Do not use portable fuel tanks for outboards larger than 115 HP. Inadequate fuel flow to high horsepower outboards can result in serious powerhead damage.

Fuel Flow Requirements

	200 – 300 HP
Fuel tank pickup tube; minimum I.D.	3/8 in. (9.5 mm)
Fuel fittings; minimum I.D.	9/32 in. (7.1 mm)
Fuel supply hoses; minimum I.D.	3/8 in. (9.5 mm)
Fuel tank pickup screen	100 mesh, 304 grade stainless steel wire, 0.0045 in. wire diameter, 1 in. (25 mm) long
Antisiphon valve	2.5 in. (63.5 mm) Hg maximum pressure drop at 30 gph (114 l/hr) flow
Remote fuel filter	0.4 in. Hg maximum pressure drop at 20 gph (76 l/hr) flow, 150 in. ² (1290 cm ²) of filter area
Maximum fuel pump lift height	Fuel pump should not be located more than 30 in. (76.2 cm) above bottom of fuel tank

Fuel Requirements

⚠ WARNING

Gasoline is extremely flammable and highly explosive under certain conditions. Improper handling of fuel could result in property damage, serious injury or death.

Always turn off the outboard before fueling.

Never permit anyone other than an adult to refill the fuel tank.

Do not fill the fuel tank all the way to the top or fuel may overflow when it expands due to heating by the sun.

Remove portable fuel tanks from the boat before fueling.

Always wipe off any spilled fuel.

Do not smoke, allow open flames or sparks, or use electrical devices such as cellular phones in the vicinity of a fuel leak or while fueling.

Recommended Fuel

Use unleaded gasoline with an AKI (R+M)/2 octane rating of 87, or an RON octane rating of 90.

Fuel blending varies by country and region. Your outboard has been designed to operate using the recommended fuels; however, be aware of the following:

- The boat's fuel system may have different requirements regarding the use of alcohol fuels. Refer to the boat's owner guide.
- Alcohol blended fuels attract and hold moisture which may lead to fuel phase separation and can result in engine performance problems or engine damage.
- Use of fuel containing alcohol above the percentage specified by government regulation can result in the following problems in outboard engines and fuel system components:
 - Vapor lock or fuel starvation
 - Starting and operating difficulties
 - Deterioration of rubber or plastic parts
 - Corrosion of metal parts
 - Damage to internal engine parts
- Inspect for fuel leaks or other fuel system abnormalities if you suspect the presence of

alcohol in gasoline exceeds the current government regulation limits.

Biobutanol (Bu16) Fuel

Biobutanol is a four-carbon alcohol produced from renewable, plant-derived energy sources in a fermentation process similar to beer and wine production. Biobutanol delivers more renewable energy content than ethanol while remaining compatible with current vehicles, boats, and infrastructure. Biobutanol does not phase separate in the presence of water like ethanol and is less corrosive to fuel system components such as fuel tanks, fuel fittings and fuel hoses.

Biobutanol blended fuel (either isobutanol or n-butanol) may be used in all *Evinrude* outboards. Use of biobutanol blended fuel will NOT void the warranty of *Evinrude* outboards.

Biobutanol blended fuel (Bu16 - up to 16.1% by volume) has been approved for use by the *National Marine Manufacturers Association (NMMA)*.

Use in North America

NOTICE

Do NOT use fuel from fuel pumps labeled E85. Never experiment with other fuels.

The use of unleaded gasoline containing alcohol above the percentage specified by government regulations is not recommended.

Use of fuel labeled E15 is prohibited by U.S. EPA Regulations.

Use of a boat mounted water separating fuel filter, such as Fuel Filter Kit P/N 174176, is strongly recommended.

Use Outside North America

The use of unleaded gasoline containing alcohol above the percentage specified by local government regulations is not recommended.

Use of a boat mounted water separating fuel filter, such as Fuel Filter Kit P/N 174176, is strongly recommended.

Fuel System Supplement

Fuel System Requirements

Additives

IMPORTANT: The only fuel additives approved for use in *Evinrude* outboards are 2+4® fuel conditioner and *Evinrude* Fuel System Cleaner. **Use of other fuel additives can result in poor performance or engine damage.**

***Evinrude* 2+4 Fuel Conditioner** will help prevent gum and varnish deposits from forming in fuel system components and will remove moisture from the fuel system. It can be used continuously and should be used during any period when the outboard is not being operated on a regular basis. Its use will reduce spark plug fouling, fuel system icing, and fuel system component deterioration.

***Evinrude* Fuel System Cleaner** will help keep fuel injectors in optimal operating condition.

Components

The fuel system includes the following components:

- Fuel Pump & Vapor Separator Assembly
- Water Separating Fuel Filter
- Fuel Supply Rails
- Fuel Injectors
- Fuel Return Rails
- Fuel Vapor Vent Solenoid

Fuel Pump & Vapor Separator Assembly

The fuel pump and vapor separator assembly houses the following fuel system components in one package:

- Electric fuel lift pump
 - gerotor pump
 - (runs with Pulse Width Modulation (PWM))
 - functions as the fuel lift pump
 - functions to raise fuel pressure
- Vapor separator assembly
 - water-cooled fuel reservoir to accumulate incoming fuel and from the fuel return rail
 - micro switches control venting of fuel vapors
 - Low pressure regulator
 - High pressure regulator
- Electric fuel circulation pump
 - turbine impeller pump
 - runs 100% duty cycle
- Filter (fuel return rail fitting)



66° V6 Models (Port Side)

010675

1. Fuel pump & vapor separator assembly



74° V6 Models (Starboard Side)

010674

1. Fuel pump & vapor separator assembly

Electric Fuel Lift Pump

The electric fuel lift pump utilizes a gerotor for maximum lifting performance.

Fuel Supply

The pump is mounted inside the vapor separator and draws fuel from the boat fuel tank through an inline 65 micron filter.

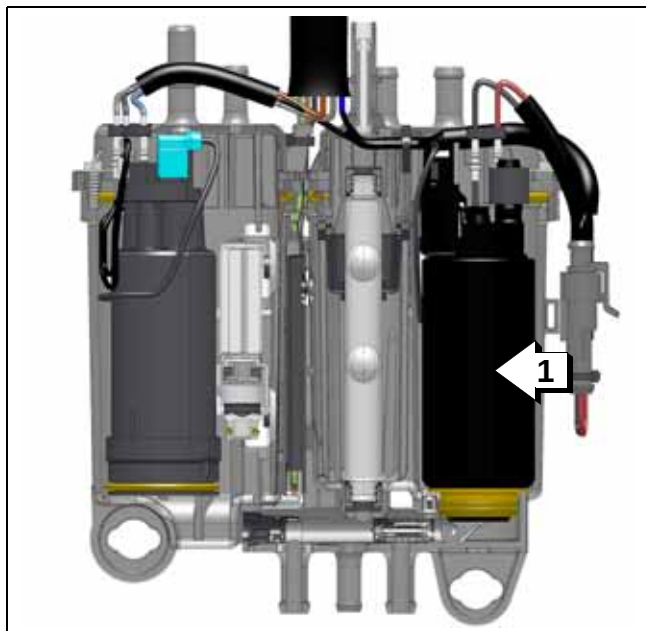
All Models

Fuel is pressurized to 7 to 17 psi (48 to 117 kPa) and flows through a hose to a 10 micron water separating fuel filter and into the fuel reservoir.

Fuel System Supplement Components

Electrical Circuit

The electric fuel lift pump is controlled by the *EMM* and operates on the 12 V circuit. The pump activates for 10 seconds when the *EMM* powers up (assumes the fuel system is primed, see **Fuel System Priming** on p. 40). The fuel pump runs continuously during engine operation.



1. Fuel lift pump

010684

The *EMM* monitors the fuel pump electrical circuit.

- If the pump is disconnected (open circuit), the *EMM*:

Stores fault code 157

Engine Monitor CHECK ENGINE display: ON

- If the circuit current is beyond the specified range (short circuit), the *EMM*:

Stores fault code 158

Engine Monitor CHECK ENGINE display: ON

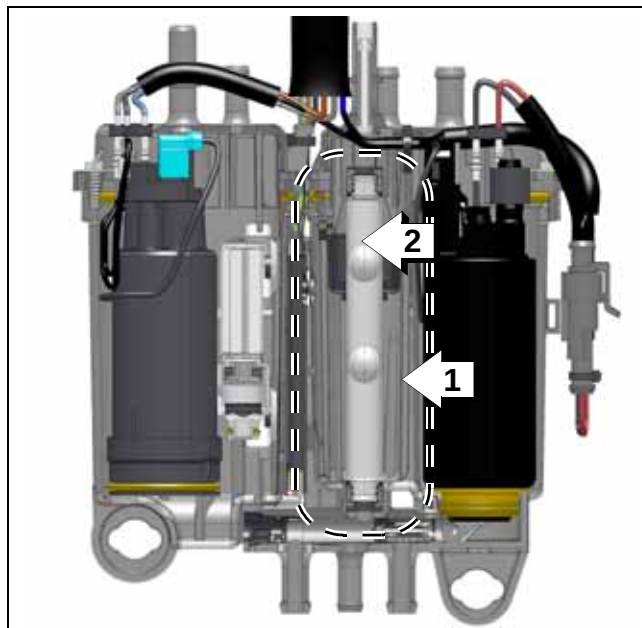
Fuel Reservoir

The vapor separator accumulates fuel in an internal fuel reservoir and supplies fuel to the electric circulation pump. It is water-cooled to enhance vapor separating capabilities.

Cooling

Water is used to cool the fuel as it flows through the vapor separator. The cooling passage of the

separator self-drains when the outboard is stored vertically.

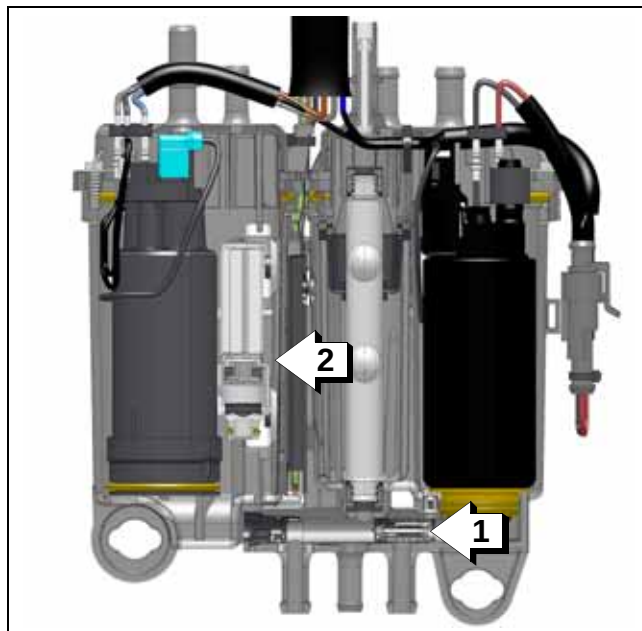


1. Fuel reservoir
2. Cooling passage

010684

Pressure Regulators

Fuel pressure regulators help maintain consistent fuel pressure in the fuel system. See the **Fuel System Flow Diagrams** on p. 26.



Fuel Pressure Regulators
1. Low pressure regulator
2. High Pressure regulator

010684

Low Pressure Regulator

A low pressure regulator maintains approximately 12 to 17 psi (83 to 117 kPa) of fuel pressure in the low pressure side of the fuel system.

When the fuel pressure in the reservoir exceeds the pressure regulator setting the regulator opens. Fuel then flows through the regulator and an internal passage to the fuel lift pump. Fuel is cycled by the lift pump until pressure is restored to normal levels.

High Pressure Regulator

Fuel returning from the injectors enters the fuel reservoir of the vapor separator through a pressure regulator. The pressure regulator maintains approximately 30 to 42 psi (207 to 289 kPa) of fuel pressure to the fuel injectors in the high pressure side of the fuel system.

Fuel Circulation Pump

The fuel circulation pump is an electric high pressure fuel pump.

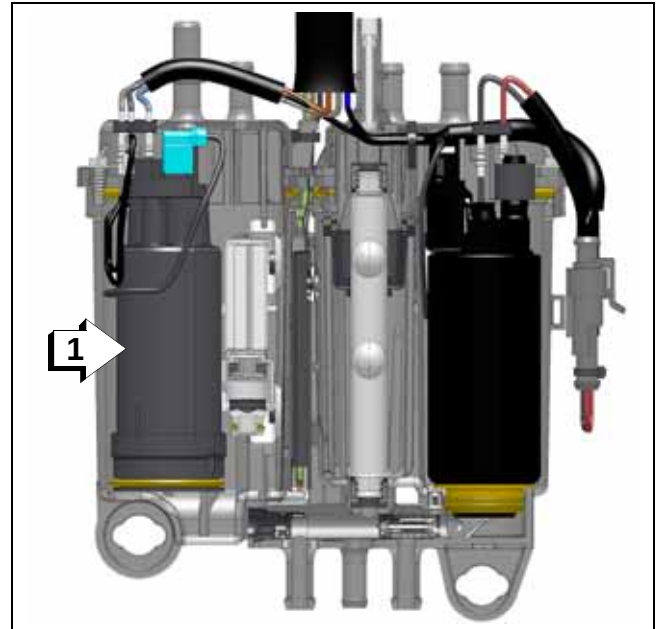
Fuel Supply

The pump is mounted inside the vapor separator and draws fuel from the fuel chamber. It pumps pressurized fuel through a fuel supply rail connected to the fuel injectors.

Electrical Circuit

The circulation pump is controlled by the *EMM* and operates on the 12 V circuit. The circulation pump is activated for 10 seconds when the *EMM*

powers up. The fuel circulation pump runs continuously during engine operation.



1. Fuel circulation pump

010684

The *EMM* monitors the fuel circulation pump electrical circuit.

- If the circulation pump is disconnected (open circuit), the *EMM*:

Stores fault code 91

Engine Monitor CHECK ENGINE display: ON

- If the circuit current is beyond the specified range (short circuit), the *EMM*:

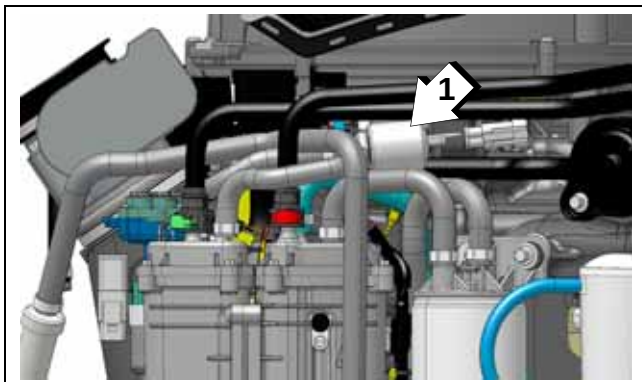
Stores fault code 92

Engine Monitor CHECK ENGINE display: ON

Fuel System Supplement Components

Fuel Vapor Venting

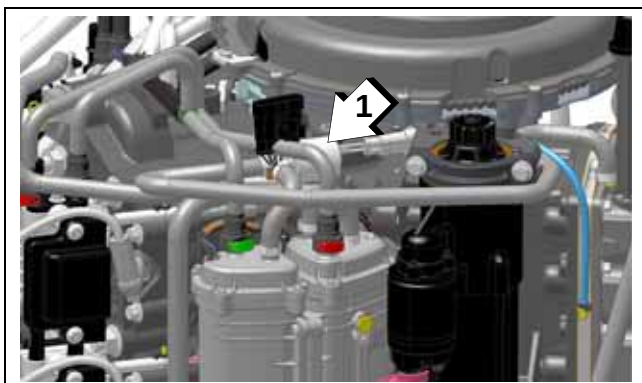
The fuel vapor vent solenoid regulates fuel level in the reservoir.



66° V6 Models

1. Vapor vent solenoid

010681



74° V6 Models

1. Vapor vent solenoid

010682

The *EMM* controls fuel vapor vent solenoid operation based on inputs from the fuel level micro switches.

Electrical Circuit

The *EMM* monitors the fuel vapor vent solenoid electrical circuit.

- If the vent solenoid is disconnected (open circuit), the *EMM*:

Stores fault code 159

Engine Monitor CHECK ENGINE display: ON

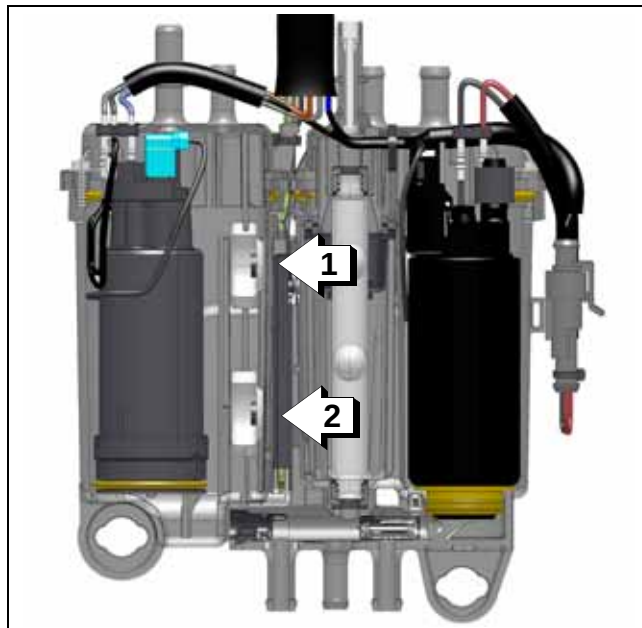
- If the circuit current is beyond the specified range (short circuit), the *EMM*:

Stores fault code 160

Engine Monitor CHECK ENGINE display: ON

Fuel Level

The fuel level in the reservoir is regulated by the fuel vapor vent solenoid.



1. Upper fuel level micro switch (approximate location)
2. Lower fuel level micro switch (approximate location)

010683

Electrical Circuit

The *EMM* monitors the fuel level micro switches.

The upper micro switch is **CLOSED** when the vapor separator is full and **OPEN** when it is not full.

The lower micro switch is **OPEN** when the vapor separator is full and **CLOSED** when it is not full.

When the upper micro switch closes, the *EMM* closes the fuel vapor vent solenoid, preventing vapor and fuel from escaping.

When the lower micro switch closes, the *EMM* opens the fuel vapor vent solenoid, allowing vapor to escape, and the fuel lift pump goes to 100% duty cycle to add fuel to the reservoir.

The *EMM* controls the vapor vent solenoid operation by Pulse Width Modulation (PWM). PWM is a method of powering an analog device (the vapor vent solenoid) using a digital source (the *EMM*). PWM is often expressed as a duty cycle which describes the amount of time the signal is ON. An 80% duty cycle (higher) is ON more than a 30% (lower) duty cycle.

Use *Evinrude Diagnostics* software, v 6.3 or higher to observe the micro switch and vapor vent solenoid operation.



Monitor Screen
1. Upper fuel micro switch
2. Lower fuel micro switch

009242

Modes of Operation

Initial Key ON / Engine OFF

Upper micro switch: OPEN
Lower micro switch: CLOSED

- Lift pump and circulation pump run 10 seconds
- Lift pump runs for an additional 50 seconds
- Vapor vent solenoid OPEN - PWM in prime mode (higher duty cycle) and allows the vapor separator to fill quickly

Upper micro switch: OPEN

Lower micro switch: OPEN

- Vapor separator not completely full
- Lift pump continues to run
- Vapor vent solenoid OPEN - PWM in purge mode (lower duty cycle) allowing the vapor separator to continue to fill

Upper micro switch: CLOSED

Lower micro switch: OPEN

- Vapor separator full
- Lift pump OFF
- Vapor vent solenoid CLOSED

Key ON / Engine Running

Upper micro switch: OPEN

Lower micro switch: CLOSED

- Vapor separator close to empty
- Vapor vent solenoid OPEN - PWM in prime mode (higher duty cycle) and allows the vapor separator to fill quickly.

Upper micro switch: OPEN

Lower micro switch: OPEN

- Vapor separator not completely full
- Lift pump continues to run
- Vapor vent solenoid OPEN - PWM in purge mode (lower duty cycle) allowing the vapor separator to continue to fill

Upper micro switch: CLOSED

Lower micro switch: OPEN

- Vapor separator full
- Lift pump OFF
- Vapor vent solenoid CLOSED

Fault Codes

If the upper micro switch circuit voltage is disconnected (open circuit), the *EMM*:

Activates S.A.F.E.
Stores fault code 132
Engine Monitor CHECK ENGINE display: ON

If the lower micro switch circuit voltage is disconnected (open circuit), the *EMM*:

Stores fault code 133
Engine Monitor CHECK ENGINE display: ON

If the lower micro switch remains closed beyond the specified range (5 seconds) {assumes the fuel system is primed}, the *EMM*:

Activates S.A.F.E.
Stores fault code 137
Engine Monitor CHECK ENGINE display: ON

Fuel Filters

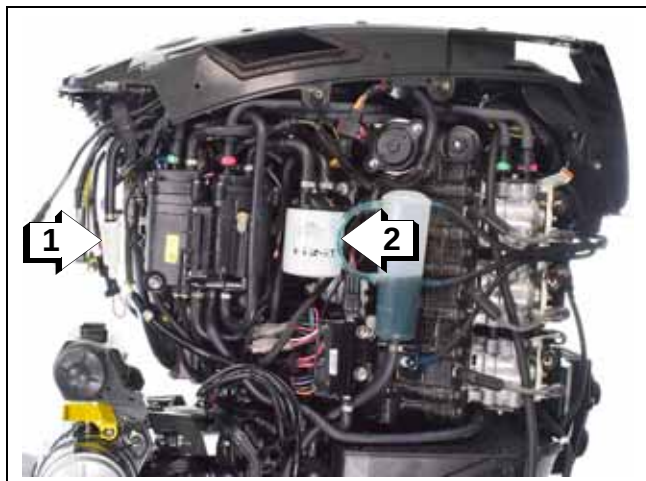
Fuel filters protect the fuel lift pump, vapor separator and the high-pressure components of the fuel system from contaminants.

A 65 micron inline filter and a 10 micron water separating fuel filter are installed. A water in fuel

Fuel System Supplement Components

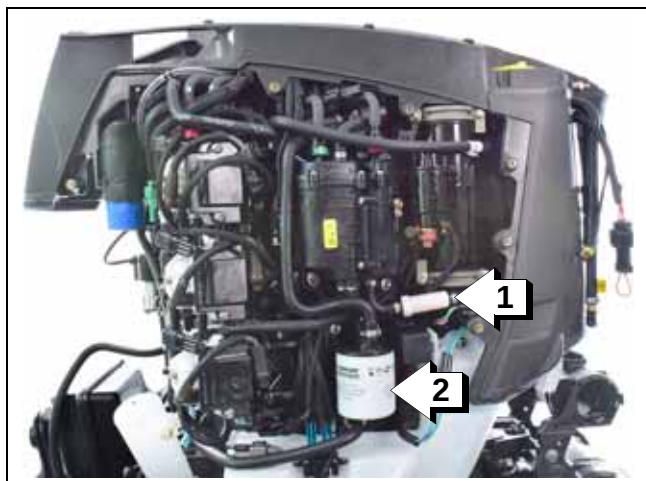
sensor is mounted in the housing of the water separating fuel filter.

Refer to **Inspection and Maintenance Schedule** in the correct **Service Manual** for service frequency.



66° V6 Models
1. Inline fuel filter
2. Water separating fuel filter

010675



66° V6 Models
1. Inline fuel filter
2. Water separating fuel filter

010675

Electrical Circuit

The *EMM* monitors the water in fuel electrical circuit. If the circuit is activated, the *EMM*:

Stores fault code 37

Engine Monitor CHECK ENGINE display: ON

Fuel Rails

The fuel supply and return rails route fuel through the high pressure side of the fuel system.

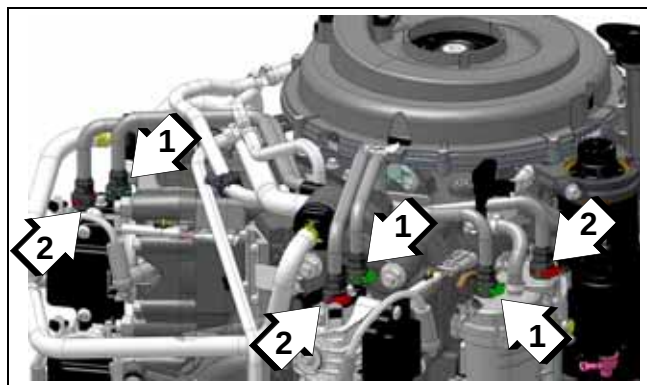
Fuel Supply Rail

The fuel supply rail supplies pressurized fuel to the inlet port of each fuel injector. The fuel supply rails can be identified by the green locking device on each connector fitting.

Fuel Return Rail

The fuel return rail provides a route for fuel passing through the fuel injectors to flow back to the fuel chamber of the fuel pump & vapor separator assembly.

The fuel return rails can be identified by the red locking device on each connector fitting.



74° V6 Model Shown
1. Fuel supply rail
2. Fuel return rail

010685

Fuel Injectors

Fuel injectors are fuel metering, electric voice coil actuators (55 V) bolted directly to the cylinder head.

Electrical Circuit

The *EMM* controls the activation of each injector by connecting and disconnecting the injector's internal coil to ground.

The *EMM* monitors the fuel injector electrical circuit. If the injector is disconnected (open circuit), the *EMM*:

Stores fault code 51 – 56 (second digit identifies cylinder)

Engine Monitor CHECK ENGINE display: ON

Fuel Flow Compensation

The flow rate of each injector is measured as part of the manufacturing process. This information is recorded and assigned to the injector by serial number.

The *EMM* is programmed to compensate for variations in fuel flow. Each injector and its location on the outboard is identified by the *EMM*. DO NOT install an injector without updating the compensation software.

Each service injector includes its fuel flow information. This software allows the *EMM* to be reprogrammed for this injector's unique fuel flow characteristics.

NOTICE

Fuel injectors MUST NOT be moved from one cylinder to another. *EMM* programming is associated with the cylinder location of each injector. Installing an injector on the wrong cylinder can result in powerhead failure.

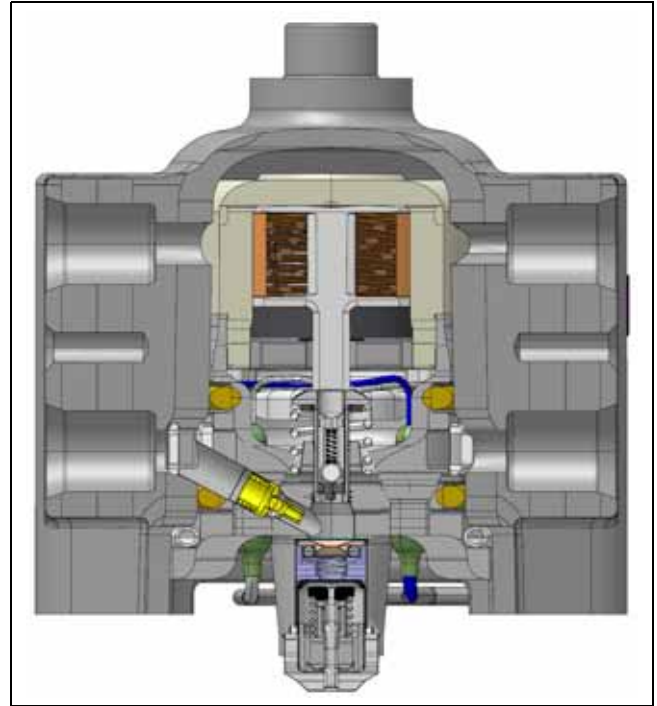
Injector Fuel Supply

Fuel is supplied to the injectors by the fuel circulation pump and the fuel supply rail.

Each injector has internal fuel passages. These passages are designed to:

- Provide fuel to the injector's injection chamber

- Route fuel through the injector housing to cool the injector coil.



009187

Fuel System Priming

Priming the Fuel System

⚠ WARNING

Fuel vapors are highly flammable. Perform the following procedure in a well ventilated area. Extinguish all smoking materials and make certain no ignition sources are present. Failure to check for fuel leaks could allow a leak to go undetected, resulting in fire or explosion and may cause personal injury or property damage.

NOTICE

A fuel primer bulb is NOT required and should NOT be installed on *Evinrude E-TEC G2* models.

Evinrude E-TEC G2 models are equipped with an electric fuel lift pump. The electric fuel lift pump runs continuously up to 1 minute when the vapor separator low fuel switch is active.

Make sure the battery is fully charged and reads a minimum of 12 VDC. Turn the Master Power / Key Switch to the ON position to start the fuel priming process.

The high-pressure fuel circuits and injectors will prime as the outboard is cranked with the starter. Observe all fuel lines, both in the boat and on the outboard. Repair any fuel leaks.

Fuel System Tests

⚠ WARNING

Use caution when working on any pressurized fuel system. Wear safety glasses and work in a well ventilated area. Extinguish all smoking materials and make certain no open flames or ignition sources exist. Before starting any fuel system service, carefully relieve fuel system pressure. Failure to properly relieve fuel system pressure can result in spraying fuel and/or excessive fuel spilling during servicing. Fuel is flammable and can be explosive under certain conditions.

Fuel System Pressure Tests

⚠ WARNING

Protect against hazardous fuel spray. Before starting any fuel system service, carefully relieve fuel system pressure.

Relieve fuel system pressure. See **Relieving Fuel System Pressure** on p. 49.

Check the *Evinrude Diagnostics* software *Occurred Faults* screen for current fault codes before troubleshooting. Correct any problems and clear the codes FIRST.

Inspect all fuel hoses, filters, and connections. Check quality of fuel supply.

Use shop towels to clean up any spilled fuel.

ENVIRONMENTAL NOTE

Dispose of fuel contaminated towels in an environmentally responsible manner, or according to local regulations.

Running Fuel System Tests

Run or crank the outboard.

Use the *Evinrude Diagnostics* software *Monitor* screen to check system voltage. If voltage is low, or drops as RPM increases, refer to **Stator Voltage Output Test** in the correct **Service Manual**.

Use an inductive timing light to monitor the injector control wire (connector pin 2) for each injector.

Make sure the pickup is attached to only one wire. Flashes on the timing light indicate current in the circuit is being switched by the *EMM*. The *Dynamic Tests* screen allows the control signal to be turned off to a particular injector.

IMPORTANT: Some timing lights may not flash consistently at cranking speeds. Always check the orientation of the timing light pickup and the operation of the timing light.

Results:

No light activation on any injector wires (outboard cranks and starter turns flywheel):

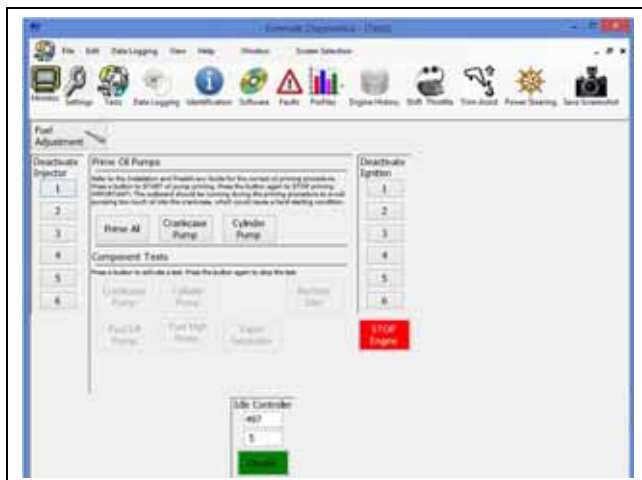
- Check stator input to *EMM*, CPS operation, and all grounds and wiring connections.
- Eliminate all other possibilities to isolate a faulty *EMM*.

Irregular or no light activation on some injector wires:

- Test the resistance of individual injector circuits between the injector connector and injector control wire at the *EMM*.
- Check battery cable connections.
- Make sure all grounds are clean and tight.
- See **Fuel Injector Resistance Test** in the correct **Service Manual**.

Steady light activation on all injector wires and consistent voltage readings, *EMM* injector control function is good:

- Use the diagnostics software *Dynamic Fuel Test* to isolate a faulty cylinder. See **Dynamic Tests** in the correct **Service Manual**.



Dynamic Tests Screen

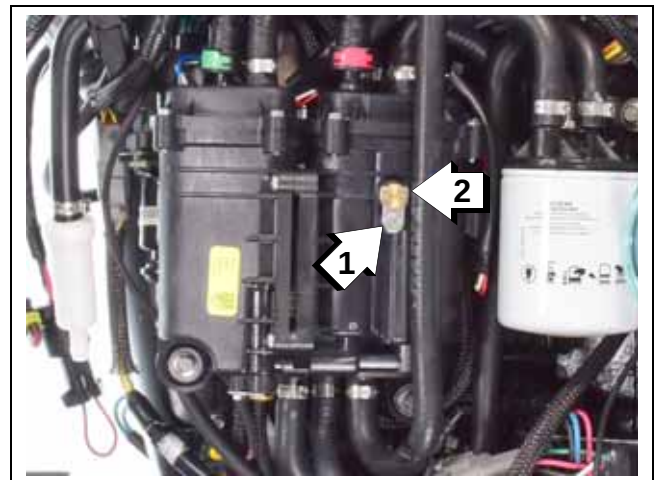
009124

Refer to **Fuel System Pressure Tests** on p. 40.

Install Fuel Pressure Test Fittings

Note: Both 66° and 74° V6 models use the same vapor separator assembly. For the purposes of this **Service Manual Supplement**, 66° models are shown.

Use a 1/4 in. socket or nut driver to remove the screw and retainer from the low pressure plug. Place shop towels to catch any fuel spillage. CAREFULLY remove the plug.



1. Screw and retainer
2. Plug

010686

Remove the screw and retainer from the high pressure plug. Use a suitable container to catch fuel from the vapor separator as the plug is removed. Use a pair of needle nose pliers to CAREFULLY remove the plug.



010686

Fuel System Supplement

Fuel System Tests

Use shop towels to clean up any spilled fuel.

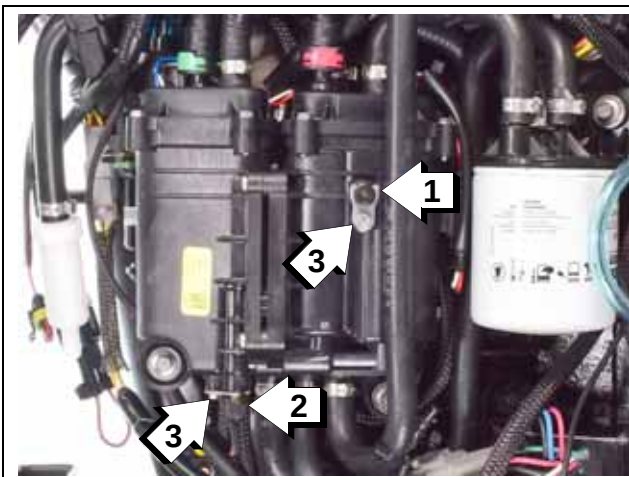
ENVIRONMENTAL NOTE

Dispose of fuel and fuel contaminated towels in an environmentally responsible manner, or according to local regulations.

Install the fuel pressure test fittings from the Fuel Pressure Test Port Kit, P/N 5010756, into the low and high pressure ports. Install a retainer with a screw on each fitting.

IMPORTANT: Turn self-tapping screws counter clockwise to start the threads and clockwise to tighten. Failure to follow this procedure can damage the threads of the vapor separator assembly.

Tighten the screws to a torque of 25 to 35 in. lbs. (2.9 to 3.9 N·m).



1. Low pressure test fitting
2. High pressure test fitting
3. Screws

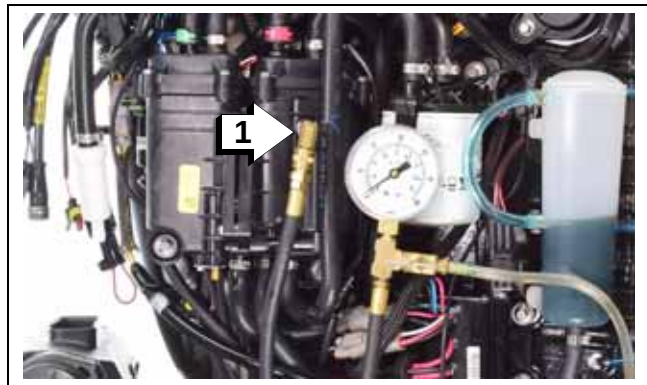
010689

Electric Fuel Pump Pressure Test

Install Fuel Pressure Test Adapter, P/N 353322, on the low pressure test fitting on the vapor separator assembly.

Note: If the outboard is run above idle speed, expect fuel pressure to range from 7 to 17 psi (48 to 117 kPa). Be sure to use a fuel pressure gauge with a range that exceeds 17 psi (117 kPa).

Install a 0 to 60 psi (0 to 415 kPa) Fuel Pressure Gauge, P/N 5007100 or equivalent, onto the adapter.



1. Fuel Pressure Test Adapter, P/N 353322
2. Fuel Pressure Gauge, P/N 5007100

010690

Prime the fuel system and check for leaks. START the outboard and run at idle speed. Monitor the gauge for pressure reading.

Pressure should stabilize and gauge must not indicate less than 6 psi (41 kPa).

Results:

Normal pressure

- Perform the **Fuel Lift Pump Vacuum Test** on p. 44. Make sure no air leaks or restrictions exist in the fuel supply hose or boat fuel system.

Low pressure

- Perform the **Fuel Lift Pump Vacuum Test** on p. 44. Make sure no air leaks or restrictions exist in the fuel supply hose or boat fuel system.

Relieve fuel system pressure before removing fuel pressure gauge. Refer to **Relieving Fuel System Pressure** on p. 49.

Use shop towels to clean up any spilled fuel.

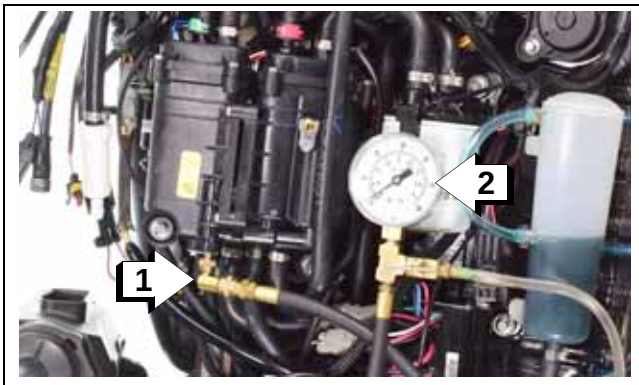
ENVIRONMENTAL NOTE

Dispose of fuel and fuel contaminated towels in an environmentally responsible manner, or according to local regulations.

Fuel Circulation Pump Pressure Test

Install Fuel Pressure Test Adapter, P/N 353322, on the high pressure test fitting on the vapor separator assembly.

Install a 0 to 60 psi (0 to 415 kPa) Fuel Pressure Gauge, P/N 5007100 or equivalent, onto the adapter.



1. Fuel Pressure Test Adapter, P/N 353322
 2. Fuel Pressure Gauge, P/N 5007100
 010686

Running Outboard

START the outboard and check pressure. System pressure should be 36 to 42 psi (248 to 289 kPa) @ idle RPM.

Shut OFF outboard. Monitor pressure gauge.

Non-Running Outboard

If the outboard does not run, turn the key switch to the ON position to prime the fuel system. Crank outboard; check circulation pump operation; check fuel system pressure.

Results:

Normal pressure

- Observe pressure reading after outboard is shut OFF. Pressure should not drop below 20 psi (138 kPa).

Pressure continues to drop below 20 psi (138 kPa) after outboard is shut OFF:

- Check for leaking fuel injector.
- Check for leaking pressure regulator.
- Check for external fuel system leak.

High pressure:

- Check for restricted filter or fuel return fitting of vapor separator, damaged pressure regulator in vapor separator, or restricted fuel return rail.

Low pressure

- Check fuel supply to fuel pump. Refer to **Fuel Lift Pump Vacuum Test** on p. 44. Higher vac-

uum readings indicate restrictions in the fuel supply. Repair or replace as needed.

- Restricted inline fuel filter.
- Restricted fuel filter/water separator assembly.
- If the above tests are good and vapor separator remains full of fuel, check for damaged circulation pump. Replace vapor separator assembly.

No pressure

- Check electrical circuit and ground connections for circulation pump.
- If voltage is present and pump does not run, repair connection or replace vapor separator assembly.

Relieve fuel system pressure before removing fuel pressure gauge. Refer to **Relieving Fuel System Pressure** on p. 49.

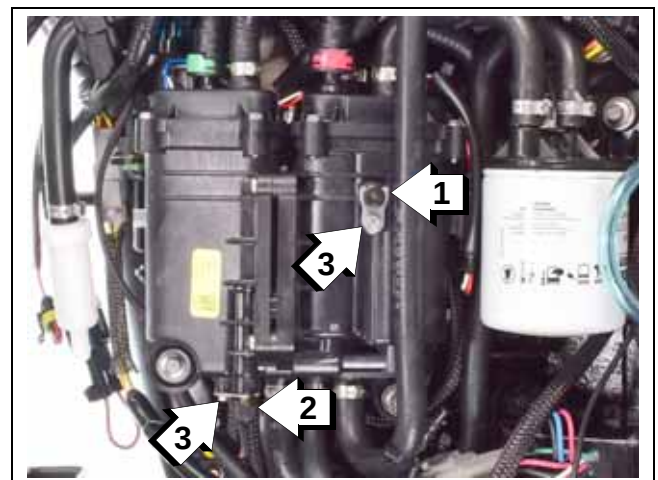
Use shop towels to clean up any spilled fuel.

ENVIRONMENTAL NOTE

Dispose of fuel and fuel contaminated towels in an environmentally responsible manner, or according to local regulations.

Remove Fuel Pressure Test Fittings

Use a 1/4 in. socket or nut driver to remove the screw and retainer from the high pressure test fitting. Place shop towels to catch any fuel spillage. CAREFULLY remove the fitting.



66° V6 Model Shown

1. Low pressure test fitting
 2. High pressure test fitting
 3. Screws and retainers

010689

Remove the screw and retainer from the high pressure test fitting. Use a suitable container to

Fuel System Supplement

Fuel System Tests

catch fuel from the vapor separator as the fitting is removed. Use a pair of needle nose pliers to CAREFULLY remove the fitting.



010686

Use shop towels to clean up any spilled fuel.

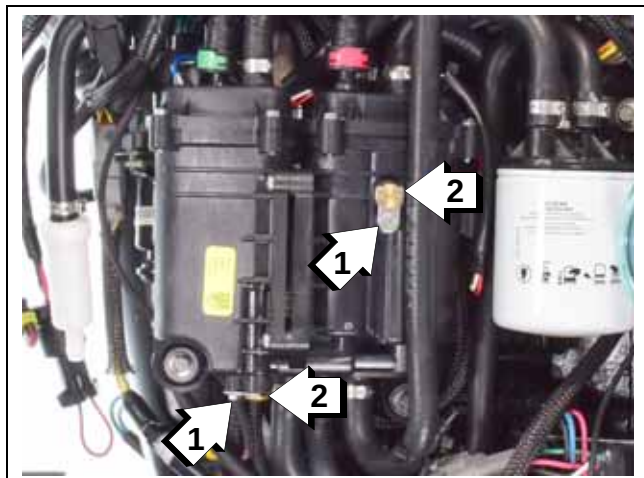
ENVIRONMENTAL NOTE

Dispose of fuel and fuel contaminated towels in an environmentally responsible manner, or according to local regulations.

Install the plugs into the low and high pressure ports. Install a retainer with a screw on each plug.

IMPORTANT: Turn self-tapping screws counter clockwise to start the threads and clockwise to tighten. Failure to follow this procedure can damage the threads of the vapor separator assembly.

Tighten the screws to a torque of 25 to 35 in. lbs. (2.9 to 3.9 N·m).



1. Screw and retainer
2. Plug

010686

Fuel Lift Pump Vacuum Test

Confirm fuel supply to the fuel lift pump.

Temporarily install a vacuum gauge, T-fitting, and 8 in. (20.3 cm) of clear vinyl hose between the fuel supply hose and fuel lift pump (inlet). Secure connections to prevent fuel or air leaks.

NOTICE

Do not use fuel primer bulb, manual fuel primer, or electric fuel pump primer to restart outboard. A positive pressure in the fuel supply could damage some vacuum gauges.



009221

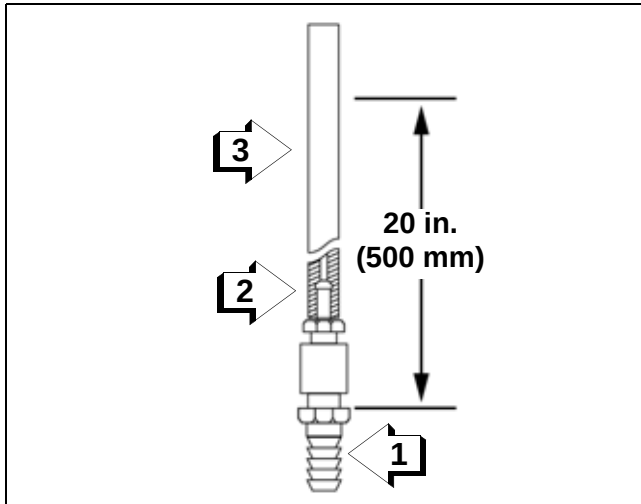
START outboard and run at FULL THROTTLE for at least two minutes. Monitor clear vinyl hose for the presence of air. Air bubbles indicate a faulty hose, connection, or fuel tank pick-up. Repair, if necessary, before proceeding.

There should be no air or vapor bubbles visible in the clear hose. The maximum inlet fuel vacuum should not exceed 4 in. Hg. (13.5 kPa) at the inlet to the fuel lift pump under any operating conditions (IDLE to WOT).

A higher vacuum indicates an excessive restriction in the fuel supply. Repair as needed. Refer to **Fuel System Requirements** on p. 30 for fuel supply component requirements.

Anti-Siphon Valve Test

Remove anti-siphon valve from fuel tank. Install adapter fittings and a 36 in. (91.4 cm) length of clear hose to the inlet side (tank end) of valve.



1. Anti-siphon valve
2. Adapter fitting
3. Clear hose

DR2277

Fill clear hose with water to a height of 20 inches (500 mm). Water must NOT flow through valve. An occasional drip is acceptable. Replace valve if water drips continuously.

Increase height of water to 25 inches (630 mm). Water should flow through valve as water level reaches 25 inches (630 mm). Replace the anti-siphon valve if test results are different.

Fuel System Electrical Tests

NOTICE

Use appropriate test leads or adapters such as Test Probe Kit, P/N 342677, when performing electrical tests.

NEVER pierce the insulation of the engine wiring, or use any piercing-style test probe. Piercing insulation damages the wire and can cause other unintended electrical problems.

Fuel system electrical circuits are dependent on wiring and connections, *EMM* supplied current and component resistance. The supplied current flows through the wiring circuit and component before returning to the *EMM*.

Circuit tests check the integrity of the main engine harness and *EMM* circuits using a diode test. Continuity tests check the integrity of ground circuits and/or the 55V circuit. These tests eliminate the need to disconnect the engine harness from the *EMM*, or remove the *EMM*.

Vapor Vent Solenoid Resistance Test

Disconnect the battery cables at the battery. Remove the electrical connector from the vapor vent solenoid.

Use a digital multimeter with appropriate test probe leads to measure the solenoid coil resistance.

Vapor Vent Solenoid Coil Resistance

17 to 23 Ω @ 72°F (22°C)



010678

Fuel System Supplement

Fuel System Tests

Vapor Vent Solenoid Circuit Test

Remove the electrical connector from the vapor vent solenoid.

Use the diode test function of a digital multimeter with appropriate test probe leads to check the signal circuit.

Connect the negative meter lead to the wire listed in the table, connect the positive meter lead to engine ground.

Vapor Vent Solenoid Circuit Diode Test		
Wire	Pin	Result
BROWN/YELLOW	1	approximately 0.5 VDC

Results:

- No reading (OL or ∞) indicates an open circuit.
- A reading of zero (0) indicates an short circuit.

Isolate the faulty component. Check wiring and connections. Repair or replace faulty wiring.

Use a digital multimeter with appropriate test probe leads to measure the resistance of the vapor vent solenoid ground circuit.

Connect the positive meter lead to the engine harness connector wire listed in the table. Connect the negative meter lead to engine ground.

Vapor Vent Solenoid Ground Circuit Resistance		
Wire	Pin	Result
BLACK	2	< 1 Ω

Results:

- An infinite reading (∞) indicates an open circuit.
- Isolate the faulty component. Check wiring and connections. Repair or replace faulty wiring.

Electric Fuel Lift Pump Resistance Test

Disconnect the battery cables at the battery. Remove the electrical connector from the fuel pump and vapor separator assembly.

Use a digital multimeter with appropriate test probe leads to measure the fuel pump coil resistance.

Connect the black meter lead to the black wire, connect the red meter lead to the red wire.

Fuel Pump Resistance
<10 Ω @ 77°F (25°C)



010679

Electric Fuel Pump Circuit Test

Remove the electrical connector from the fuel pump and vapor separator assembly.

Use the diode test function of a digital multimeter with appropriate test probe leads to check the signal circuit.

Connect the negative meter lead to the wire listed in the table, connect the positive meter lead to engine ground.

Fuel Pump Circuit Diode Test		
Wire	Pin	Result
BROWN/WHITE	3	approximately 0.5 VDC

Results:

- No reading (OL or ∞) indicates an open circuit.
- A reading of zero (0) indicates an short circuit.

Isolate the faulty component. Check wiring and connections. Repair or replace faulty wiring.

Use a digital multimeter to measure the resistance of the fuel pump and vapor separator assembly electrical connector and engine ground.

Fuel Pump Ground Circuit Resistance		
Wire	Pin	Result
BLACK	2	< 1 Ω

Results:

An infinite reading (∞) indicates an open circuit. Isolate the faulty component. Check wiring and connections. Repair or replace faulty wiring.

Fuel Circulation Pump Resistance Test

Disconnect the battery cables at the battery. Remove the electrical connector from the fuel pump and vapor separator assembly.

Use a digital multimeter with appropriate test probe leads to measure the fuel pump coil resistance.

Connect the black meter lead to the black wire, connect the red meter lead to the blue wire.

Fuel Circulation Pump Resistance
<10 Ω @ 77°F (25°C)



010680

Fuel Circulation Pump Circuit Test

Remove the electrical connector from the fuel pump and vapor separator assembly.

Use the diode test function of a digital multimeter with appropriate test probe leads to check the signal circuit.

Connect the negative meter lead to the wire listed in the table, connect the positive meter lead to engine ground.

Fuel Circulation Pump Circuit Diode Test		
Wire	Pin	Result
BROWN	1	approximately 0.5 VDC

Results:

- No reading (OL or ∞) indicates an open circuit.
 - A reading of zero (0) indicates a short circuit.
- Isolate the faulty component. Check wiring and connections. Repair or replace faulty wiring.

Use a digital multimeter with appropriate test probe leads to measure the resistance of the fuel pump and vapor separator ground circuit.

Connect the positive meter lead to the engine harness connector wire listed in the table. Connect the negative meter lead to engine ground.

Fuel Circulation Pump Ground Circuit Resistance		
Wire	Pin	Result
BLACK	2	< 1 Ω

Results: An infinite reading (∞) indicates an open circuit. Isolate the faulty component. Check wiring and connections. Repair or replace faulty wiring.

Fuel Level Switch Circuit Test

Remove the electrical connector from the fuel pump and vapor separator assembly.

Use the diode test function of a digital multimeter with appropriate test probe leads to check the signal circuit.

Connect the negative meter lead to the wire listed in the table, connect the positive meter lead to engine ground.

Fuel Level Switch Circuit Diode Test		
Wire	Pin	Result
BROWN/GREEN	6	1.5 to 3.0 VDC
BROWN/ORANGE	5	

Results:

- No reading (OL or ∞) indicates an open circuit.
- A reading of zero (0) indicates a short circuit.

Fuel System Supplement

Fuel System Tests

Isolate the faulty component. Check wiring and connections. Repair or replace faulty wiring.

Use a digital multimeter with appropriate test probe leads to measure the resistance of the fuel level switch ground circuit.

Connect the positive meter lead to the engine harness connector wire listed in the table. Connect the negative meter lead to engine ground.

Fuel Level Switch Ground Circuit Resistance		
Wire	Pin	Result
BLACK	4	< 1 Ω

Results:

- An infinite reading (∞) indicates an open circuit. Isolate the faulty component. Check wiring and connections. Repair or replace faulty wiring.

Fuel Component Servicing

⚠ WARNING

Gasoline is extremely flammable and highly explosive under certain conditions. Use caution when working on any part of the fuel system.

Protect against hazardous fuel spray. Before starting any fuel system service, carefully relieve fuel system pressure. Refer to Relieving Fuel System Pressure.

Always disconnect the battery cables at the battery before servicing the fuel system unless instructed to do otherwise.

Always work in a well ventilated area and wipe off any spilled fuel.

DO NOT smoke and make certain no open flames or ignition sources exist.

After servicing the fuel system check for leaks. Failure to check for fuel leakage could allow a leak to go undetected, resulting in fire or explosion.

Relieving Fuel System Pressure

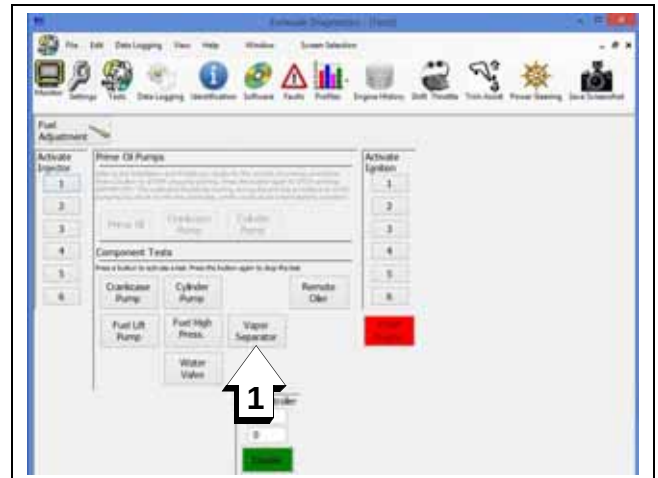
IMPORTANT: Minimize fuel system pressure prior to disassembly.

Remove the propeller from the outboard. Then disconnect the electrical connector of the fuel pump and vapor separator assembly.

Start and run the outboard at IDLE for several seconds and STOP the outboard. If the outboard does NOT run, crank for 10 seconds.

Disconnect the battery cables at the battery.

Use the *Tests* screen of *Evinrude Diagnostic* software v 6.1 or higher. Select the *Vapor Separator* button to activate the fuel vapor vent solenoid.



1. Vapor Separator button

009225

2

Fuel Filter Service

Disconnect the battery cables at the battery.

Remove fuel filters carefully to prevent spilling the filter's contents.

Use shop towels to clean up any spilled fuel.

ENVIRONMENTAL NOTE

Dispose of fuel contaminated towels in an environmentally responsible manner, or according to local regulations.

Inspect fuel filter contents for any presence of water. If water is present, identify the source and correct the problem. Take additional fuel samples and drain fuel tank(s), if necessary.

Water Separating Fuel Filter

IMPORTANT: Replace the water separating fuel filter when replacing a vapor separator.

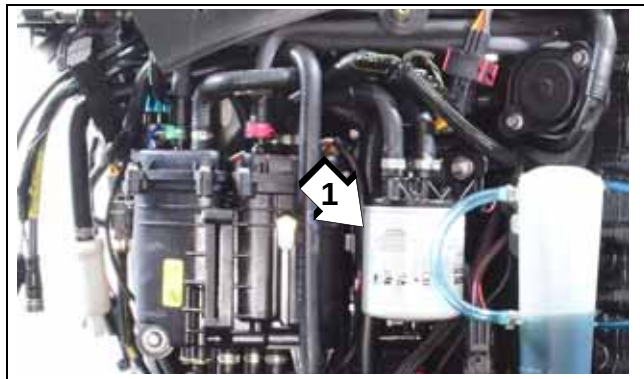
Removal

66° V6 Models: Use an appropriate filter wrench to turn the filter in a counterclockwise direction.

Fuel System Supplement

Fuel Component Servicing

Remove the filter carefully to prevent spilling the filter's contents.



66° V6 Models

1. Water separating fuel filter

010693

74° V6 Models ONLY: Install hose pinching pliers on the short hose between the fuel filter bracket to the vapor separator assembly. This will prevent fuel from draining out of the vapor separator.



1. Hose pinching pliers

010720

Use an appropriate filter wrench to turn the filter in a counterclockwise direction. Remove the filter carefully to prevent spilling the filter's contents.

Place a suitable container under the fuel filter bracket to catch fuel from the vapor separator.

Note: The vapor separator could contain up to 1 quart (0.9 liters) of fuel.

Release the hose pinching pliers from the hose.



010721

All Models: Use shop towels to clean up any spilled fuel.

ENVIRONMENTAL NOTE

Dispose of fuel and fuel contaminated towels in an environmentally responsible manner, or according to local regulations.

Installation

Lubricate filter seal with outboard lubricant and position filter on threaded mounting tube of filter bracket. Take care not to damage water in fuel sensor probe.

Hand tighten until seal contacts filter housing. Then tighten and additional one-half to one turn.

Connect the battery cables at the battery.

Run the outboard and check for fuel leaks.

Inline Fuel Filter

IMPORTANT: 66° V6 AAE and newer and 74° V6 AAG and newer REQUIRE Fuel Filter, P/N 360941, which has a 65 micron rating. Do NOT use other fuel filters which may not have the correct micron rating.

Removal

Remove the *Oetiker* clamps from the fuel supply hoses. Then remove the filter.



66° V6 Models
1. Inline fuel filter

010242



74° V6 Models
1. Inline fuel filter

010694

Installation

Install a new filter in fuel supply hoses. Note arrow indicating direction of fuel flow on filter. Secure filter with new *Oetiker* clamps.

Connect the battery cables at the battery.

Run the outboard and check for fuel leaks.

Vapor Separator Service

IMPORTANT: Replace the water separating fuel filter when replacing a vapor separator.

Remove the water separating fuel filter. Refer to **Fuel Filter Service** on p. 49.

66° V6 Models

Removal

⚠ WARNING

When servicing the fuel system, always shift the outboard to **NEUTRAL** position, turn the key switch **OFF** and remove the key, so the outboard cannot be started accidentally.

Relieve fuel system pressure. Refer to **Relieving Fuel System Pressure** on p. 49.

Disconnect the battery cables at the battery.

Remove the engine top, front and rear covers. Remove the port side panel. Remove the port frame. Remove the front frame. Refer to **Engine Cover and Frame Service** in the correct **Service Manual**.

Disconnect vapor separator and vapor solenoid electrical connectors.

CAREFULLY remove the *Oetiker* clamps from the:

- boat fuel supply hose and inline fuel filter.
- both hoses on the bracket for the water separating fuel filter.

Place shop towels to catch any spilled fuel. Remove the hoses from their fittings.

IMPORTANT: The contents of the vapor separator WILL drain through these hoses. Cap the inline fuel filter and plug each hose to prevent fuel spillage.



1. Inline fuel filter
2. Water separating fuel filter hoses

010692

Fuel System Supplement

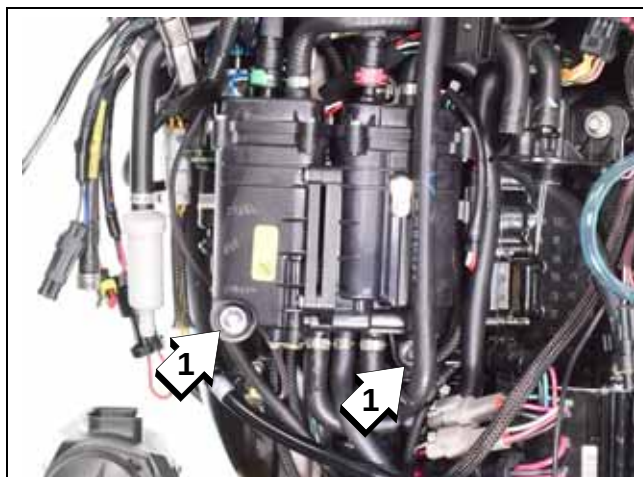
Fuel Component Servicing

CAREFULLY remove the *Oetiker* clamp from the vapor separator vent outlet hose and remove the hose from its fitting.

Place shop towels to catch any spilled fuel. Then disconnect the fuel rails from the vapor separator. Refer to **Quick Connector Locking Fittings** on p. 59

Use shop towels to wipe up any spilled fuel.

Remove the two lower vapor separator mounting screws and washers.

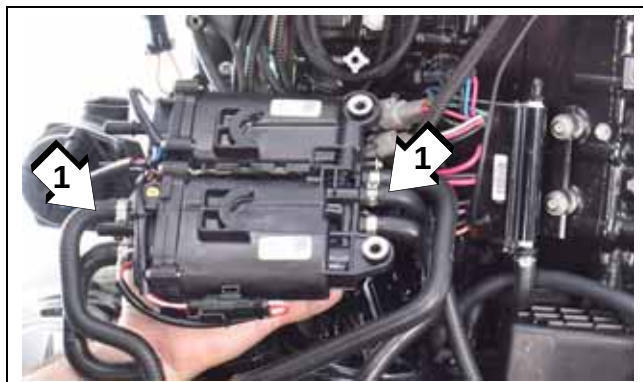


1. Mounting screws and washers

xx010692xx

Lift the vapor separator to remove from the engine.

CAREFULLY remove the *Oetiker* clamps from the upper and lower cooling water hoses. Remove the hoses from their fittings.



1. Hose

010691

Place the assembly in a large tray or other suitable container to catch the fuel from the vapor separator. A full vapor separator assembly can

hold over 32 oz. (1 L) of fuel. Remove the cap and plugs from the inline fuel filter and fuel hoses.

ENVIRONMENTAL NOTE

Dispose of fuel and fuel contaminated towels in an environmentally responsible manner, or according to local regulations.

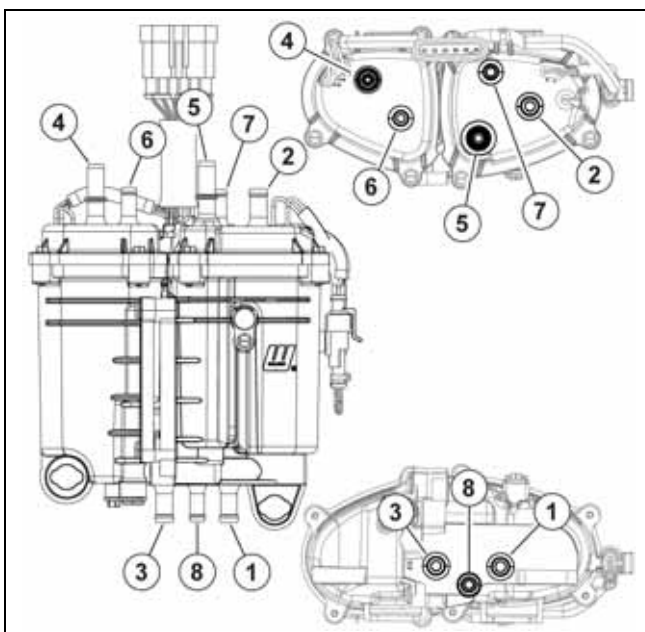
If the vapor separator is being replaced, CAREFULLY remove the remaining clamps and hoses.

Installation

⚠ WARNING

After servicing the fuel system check for leaks. Failure to check for fuel leakage could allow a leak to go undetected, resulting in fire or explosion.

Refer to the diagram below to correctly identify the fittings on the vapor separator.



010645

1. Fuel inlet fitting
2. Low pressure outlet (to fuel filter bracket)
3. Fuel inlet fitting (from fuel filter bracket)
4. Fuel supply rail
5. Fuel return rail
6. Vapor outlet fitting
7. Cooling water fitting (upper)
8. Cooling water fitting (lower)

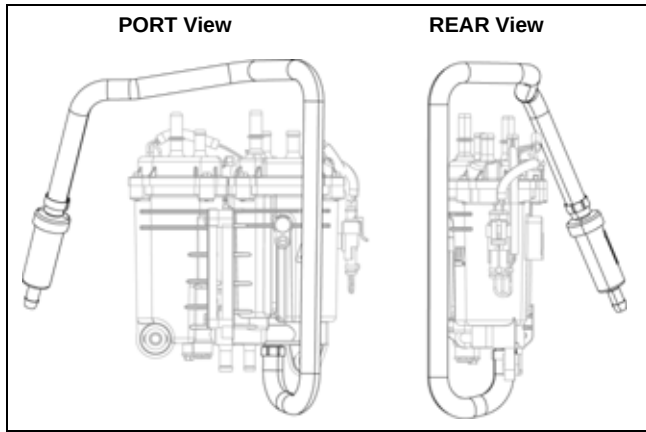
Remove the shipping caps from the vapor separator fittings.

Note: The vapor separator may contain a small amount of testing fluid. Use a small pan or shop

towels to catch any fluid. Reinstall the lower plugs to prevent fluid dripping during handling.

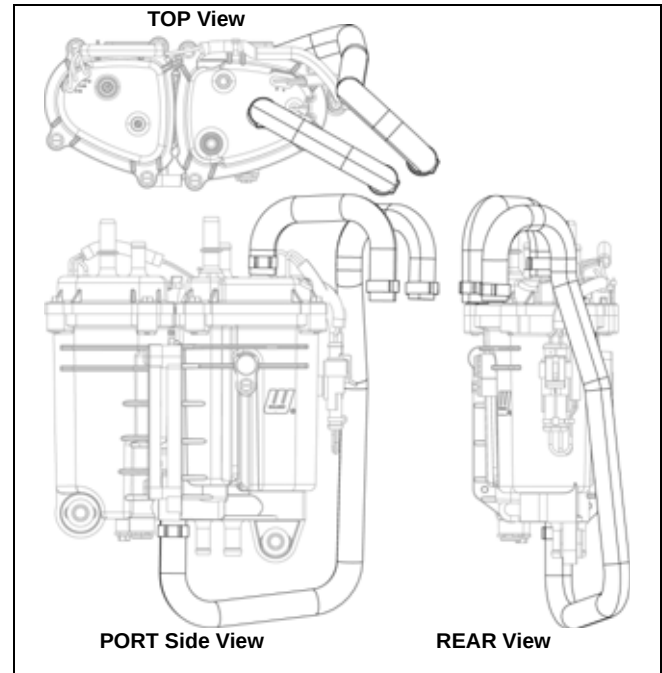
Do **NOT** tighten *Oetiker* clamps until the ear of each clamp is oriented in its correct position. Terms, such as PORT, FORWARD, REAR, etc. refer to direction when the vapor separator is installed on the engine.

Install the fuel inlet hose assembly onto the fuel inlet fitting of the vapor separator with one 17 mm clamp. Orient the hose as shown.



Orient the ear of the clamp towards PORT and secure the clamp.

Install the vapor separator to fuel filter bracket hoses onto the vapor separator with 17 mm clamps. Orient the hoses as shown.



Orient the ear of each clamp towards PORT and secure the clamps.

Install the cooling water hose on the upper vapor separator cooling water fitting with a 15.7 mm clamp. Orient the ear of the clamp toward the REAR and secure the clamp.

Install the cooling water hose on the lower vapor separator cooling water fitting with a 15.7 mm clamp. Orient the ear of the clamp toward the block and secure the clamp.



1. Cooling water hoses

010691

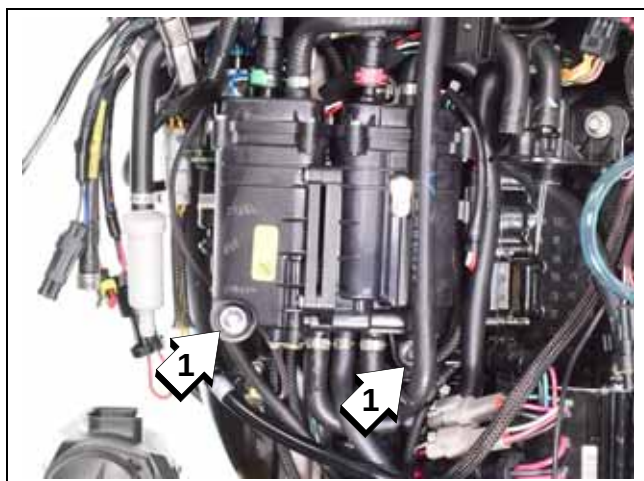
Fuel System Supplement

Fuel Component Servicing

Apply soapy water to the mounting grommets for the vapor separator. Install the vapor separator on the engine.

Install the washers and screws. Tighten screws to a torque of 84 to 106 in. lbs. (10 to 12 N·m).

Install the fuel rails onto the



1. Mounting screws and washers

010692

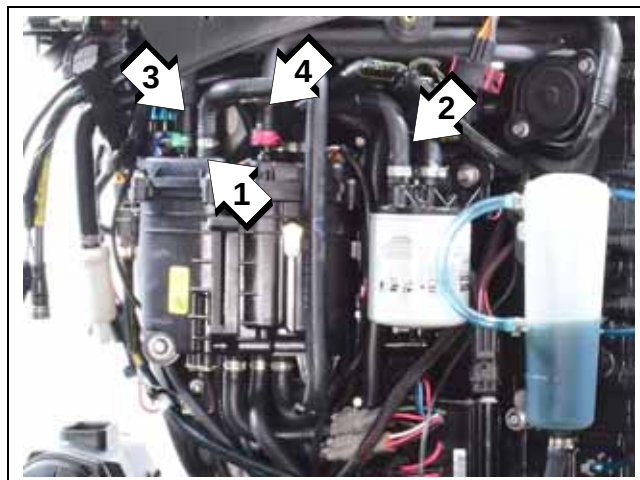
Install the vapor vent solenoid hose onto the vapor separator with a 15.7 mm clamp. Orient the ear of the clamp FORWARD and secure the clamp.

Install the fuel hoses onto the filter bracket with 17.0 mm clamps.

Orient the ears of the 17.0 mm clamps inline with the ribs on the fuel filter bracket and secure the clamps.

Install the fuel supply rail (green lock device) on the FORWARD fuel rail fitting. Install the fuel return rail (red lock device) on the REAR fuel rail fitting.

Refer to **Quick Connector Locking Fittings** on p. 59.



010693

1. Vapor vent solenoid hose
2. Fuel filter bracket hoses
3. Fuel supply rail (GREEN)
4. Fuel Return Rail (RED)

Install a new water separating fuel filter. Refer to **Fuel Filter Service** on p. 49.

Connect the vapor separator and vapor solenoid electrical connectors.

Connect battery cables at the battery.

Prime the fuel system and check for fuel leaks. Repair all leaks.

Supply water to the engine. Start and run the outboard and check for fuel leaks. Repair all leaks before returning the outboard to service.

Install front frame. Install the port frame. Install the engine top, front and rear covers. Install the port side panel. Refer to **Engine Cover and Frame Service** in the correct **Service Manual**.

74° V6 Models

Removal

⚠ WARNING

When servicing the fuel system, always shift the outboard to **NEUTRAL** position, turn the key switch **OFF** and remove the key, so the outboard cannot be started accidentally.

Relieve fuel system pressure. Refer to **Relieving Fuel System Pressure** on p. 49.

Disconnect the battery cables at the battery.

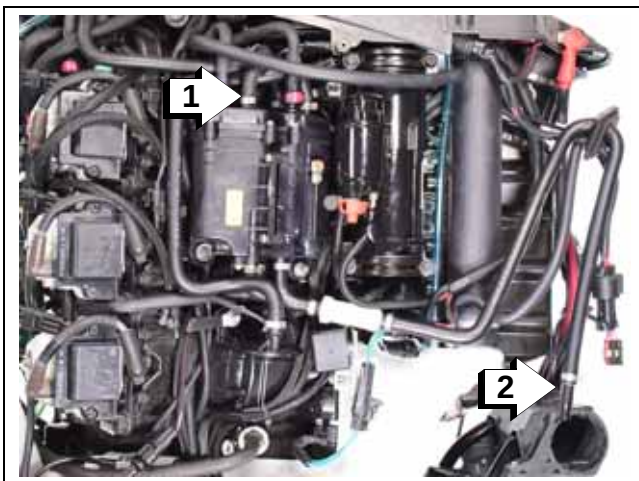
Remove the engine top, front and rear covers. Remove the starboard side panel. Remove the starboard frame. Refer to **Engine Cover and Frame Service** in the correct **Service Manual**.

Disconnect vapor separator electrical connector.

Remove the water separating fuel filter. Refer to **Fuel Filter Service** on p. 49.

Carefully remove the *Oetiker* clamps from the:

- vapor separator vent outlet hose.
- fuel inlet hose at the rigging center.



74° 3.4L Models
1. Vapor separator vent outlet hose
2. Fuel inlet hose

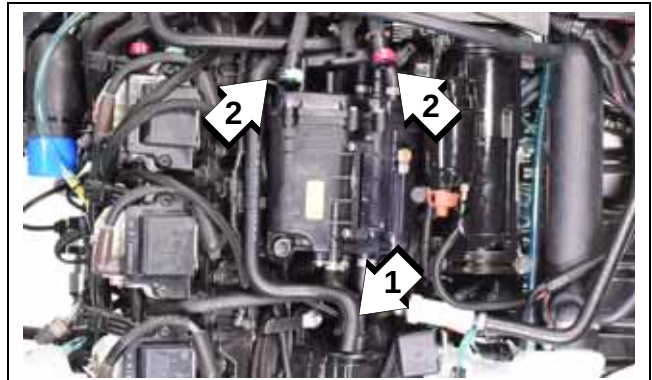
010699

IMPORTANT: The contents of the vapor separator **WILL** drain through the fuel inlet hose. Cap the fitting to prevent fuel spillage.

Place shop towels to catch any spilled fuel. Remove both hoses on the bracket for the water separating fuel filter.

Disconnect the fuel rails from the vapor separator. Refer to **Quick Connector Locking Fittings** on p. 59.

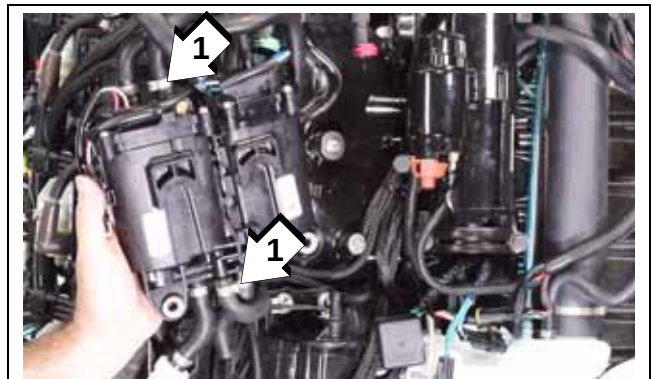
Use shop towels to wipe up any spilled fuel.



1. Fuel filter bracket hoses
2. Fuel rails

010695

Remove the two screws, washers and spacer retaining the vapor separator: Lift the vapor separator from its mounts, then **CAREFULLY** remove the *Oetiker* clamps from the upper and lower cooling water hoses.



1. Oetiker clamps; upper and lower cooling water hoses

010696

The vapor separator **MAY** still contain fuel. Place the assembly in a large tray or other suitable container to catch the fuel and prevent fuel spillage.

ENVIRONMENTAL NOTE

Dispose of fuel and fuel contaminated towels in an environmentally responsible manner, or according to local regulations.

Fuel System Supplement

Fuel Component Servicing

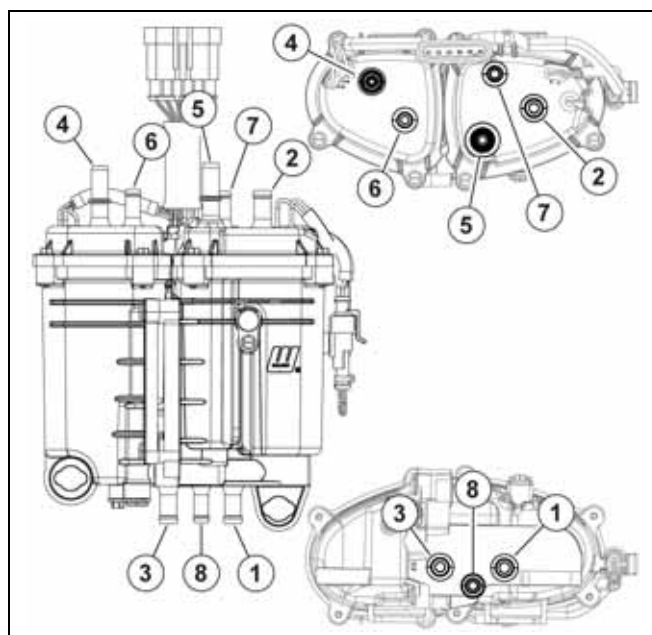
If the vapor separator is being replaced, CAREFULLY remove the remaining clamps and hoses.

Installation

WARNING

After servicing the fuel system check for leaks. Failure to check for fuel leakage could allow a leak to go undetected, resulting in fire or explosion.

Refer to the diagram below to correctly identify the fittings on the vapor separator.



1. Fuel inlet fitting
2. Low pressure outlet (to fuel filter bracket)
3. Fuel inlet fitting (from fuel filter bracket)
4. Fuel supply rail
5. Fuel return rail
6. Vapor outlet fitting
7. Cooling water fitting (upper)
8. Cooling water fitting (lower)

010645

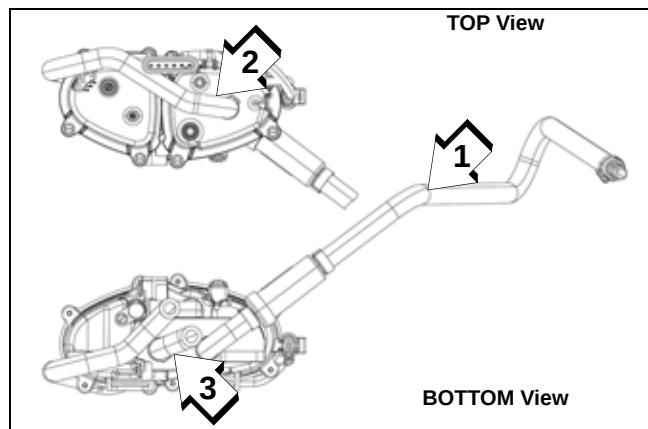
Remove the shipping caps from the vapor separator fittings.

Note: The vapor separator may contain a small amount of testing fluid. Use a small pan or shop towels to catch any fluid. Reinstall the lower plugs to prevent fluid dripping during handling.

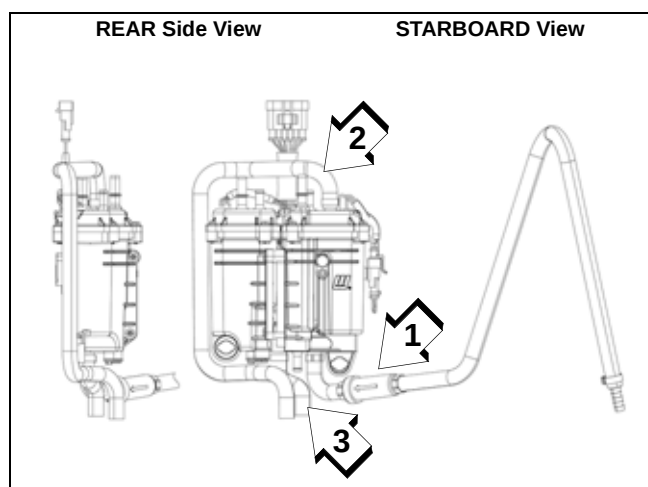
Do **NOT** tighten *Oetiker* clamps until the ear of each clamp is oriented in its correct position. Terms, such as PORT, FORWARD, REAR, etc.

refer to direction when the vapor separator is installed on the engine.

Install the fuel hoses onto the vapor separator with 17 mm clamps. Orient the hoses as shown.



010697



010698

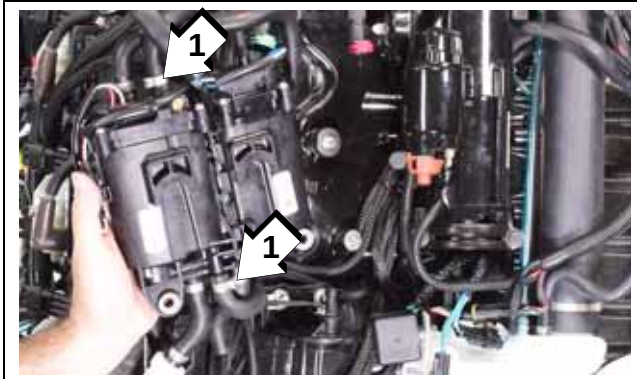
1. Fuel inlet hose assembly
2. Low pressure outlet fuel hose
3. Fuel inlet (short) hose to fuel filter bracket

Orient the ear of each clamp as follows and secure the clamps:

- Fuel inlet hose; towards STARBOARD.
- Low pressure outlet fuel hose; towards engine block.
- Fuel inlet (short) hose to fuel filter bracket; towards engine block.

Install the upper and lower cooling water hoses onto the vapor separator with 15.7 mm clamps.

Orient the ears of the clamps toward the engine block and secure the clamps.



1. Oetiker clamps; upper and lower cooling water hoses 010696

Apply soapy water to the mounting grommets for the vapor separator.

Place a 17 mm clamp on the short fuel hose. Install the vapor separator on the engine and guide the short hose onto the fitting of the fuel filter bracket as the vapor separator is installed.

Install the spacer, washer and M6 x 50 screw in the REAR mounting location. Install the washer and M6 x 25 screw in the FORWARD mounting location.

Tighten screws to a torque of 84 to 106 in. lbs. (10 to 12 N·m).



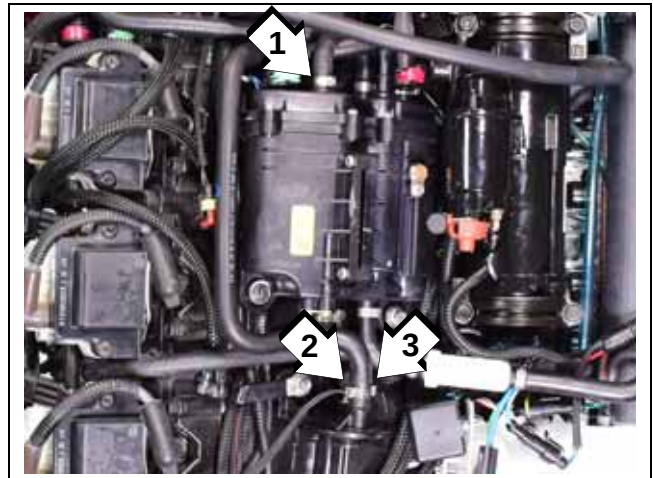
1. Spacer, washer and M6 x 50 screw 0106700
2. Washer and M6 x 25 screw
3. Short fuel hose with 17 mm clamp

Install the vapor separator vent outlet hose onto its fitting with a 15.7 mm clamp. Orient the ear of

the clamp towards STARBOARD and secure the clamp.

Install the fuel hose from the low pressure outlet onto the fuel filter bracket with a 17.0 mm clamp. Orient the ear of the clamp toward the REAR and secure the clamp.

Orient the ear of the clamp for the short fuel hose as far FORWARD as possible and secure the clamp.



1. Vapor separator vent hose 0106701
2. Fuel hose from the low pressure outlet to fuel filter bracket
3. Short fuel hose

Install the fuel supply rail (green lock device) on the REAR fuel rail fitting. Install the fuel return rail (red lock device) on the FORWARD fuel rail fitting.

Refer to **Quick Connector Locking Fittings** on p. 59.



1. Fuel supply rail (GREEN) 010702
2. Fuel Return Rail (RED)

Fuel System Supplement

Fuel Component Servicing

Install a new water separating fuel filter. Refer to **Fuel Filter Service** on p. 49.

Connect the vapor separator and vapor solenoid electrical connectors.

Connect battery cables at the battery.

Prime the fuel system and check for fuel leaks. Repair all leaks.

Supply water to the engine. Start and run the outboard and check for fuel leaks. Repair all leaks before returning the outboard to service.

Install front frame. Install the port frame. Install the engine top, front and rear covers. Install the port side panel. Refer to **Engine Cover and Frame Service** in the correct **Service Manual**.

Fuel Injector Installation

IMPORTANT: Review these instructions completely BEFORE beginning any work. Use the updated information in this **Supplement** along with the correct **Service Manual** to complete the fuel injector installation.

A running change was made to fuel injector screws. Fuel injector kits contain new screws with an *Armorgalv* coating which require higher tightening torque. The *Armorgalv* coating offers increased protection from corrosion.

⚠ WARNING

ALWAYS replace washers, **NEVER** reuse. Washers are treated with *Plus XL* coating. Reuse induces wear of the coating which can result in loosening of the fastener and the retained parts. Loose fuel injectors can leak fuel, resulting in a fire or explosion.

Identify the screws by color. Old screws, P/N 353559, with *Plus XL* coating are black. New

screws, P/N 360349, with *Armorgalv* coating are gray. Both screws use washer, P/N 353741.



1. Screw, P/N 353559, with *Plus XL* Coating and Washer, P/N 353741, with *Plus XL* Coating
2. Screw, P/N 360349, with *Armorgalv* Coating and Washer, P/N 353741, with *Plus XL* Coating

010703

ENSURE the screws in one fuel injector are the same type. Do NOT mix *Armorgalv* and *Plus XL* screws in one fuel injector. Fuel injectors on the same cylinder head MAY use different type screws.

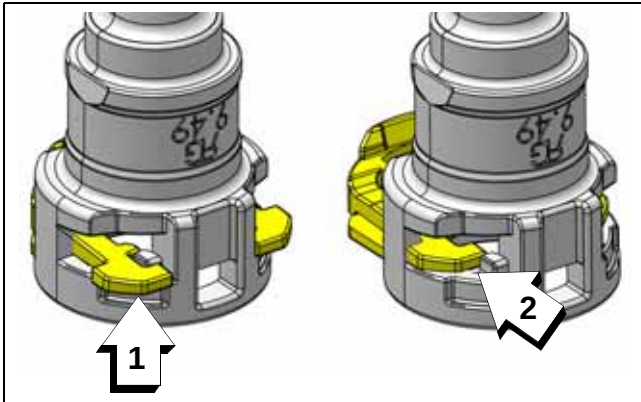
Install screws and washers DRY. Do NOT lubricate *Armorgalv* or *Plus XL* type screws. Otherwise continue the fuel injector installation as directed in the correct **Service Manual**.

Tighten screws in stages, starting with the lower screw. Use the torque specified in the table below, for the type of screw being tightened.

Stage	Screw, P/N 360349 (<i>Armorgalv</i>)	Screw, P/N 353559 (<i>Plus XL</i>)
1	84 to 108 In. lbs. (10 to 12 N·m)	60 to 84 In. lbs. (7 to 10 N·m)
2	144 to 168 In. lbs. (16 to 19 N·m)	120 In. lbs. (14 N·m)
3	32 to 34 Ft. lbs. (43.3 to 46 N·m)	24 to 26 Ft. lbs. (33 to 35 N·m)

Quick Connector Locking Fittings

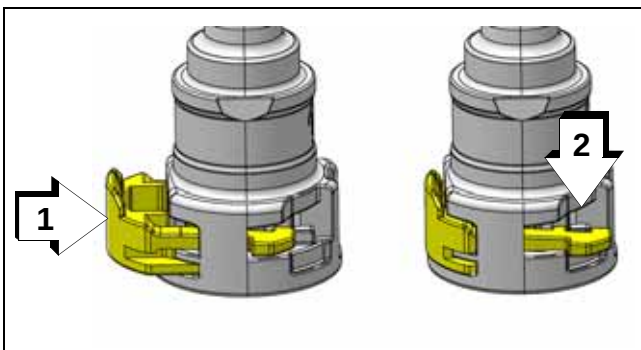
The fuel rails are equipped with quick connector locking fittings. Lift the two tabs of the locking device and push to unlock the quick connector fittings.



1. Lift tabs
2. Push tabs to unlock

009195

Push the locking device to lock the quick connector fittings. Make sure tabs are in the locked position.



1. Push locking device
2. Tab in locked position

009196

Notes

Technician's Notes

[illegible]

Related Documents

[illegible]

iDock Service Supplement

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Service Charts

Stern & Swivel

180 to 204 In. lbs.
(20 to 23 N·m)

X
84 In. lbs.
(10 N·m)

84 to 120 In. lbs.
(10 to 14 N·m)

15 to 23 Ft. lbs.
(20 to 23 N·m)

36 to 60 In. lbs.
(4 to 6 N·m)

348 to 372 In. lbs.
(39 to 42 N·m)

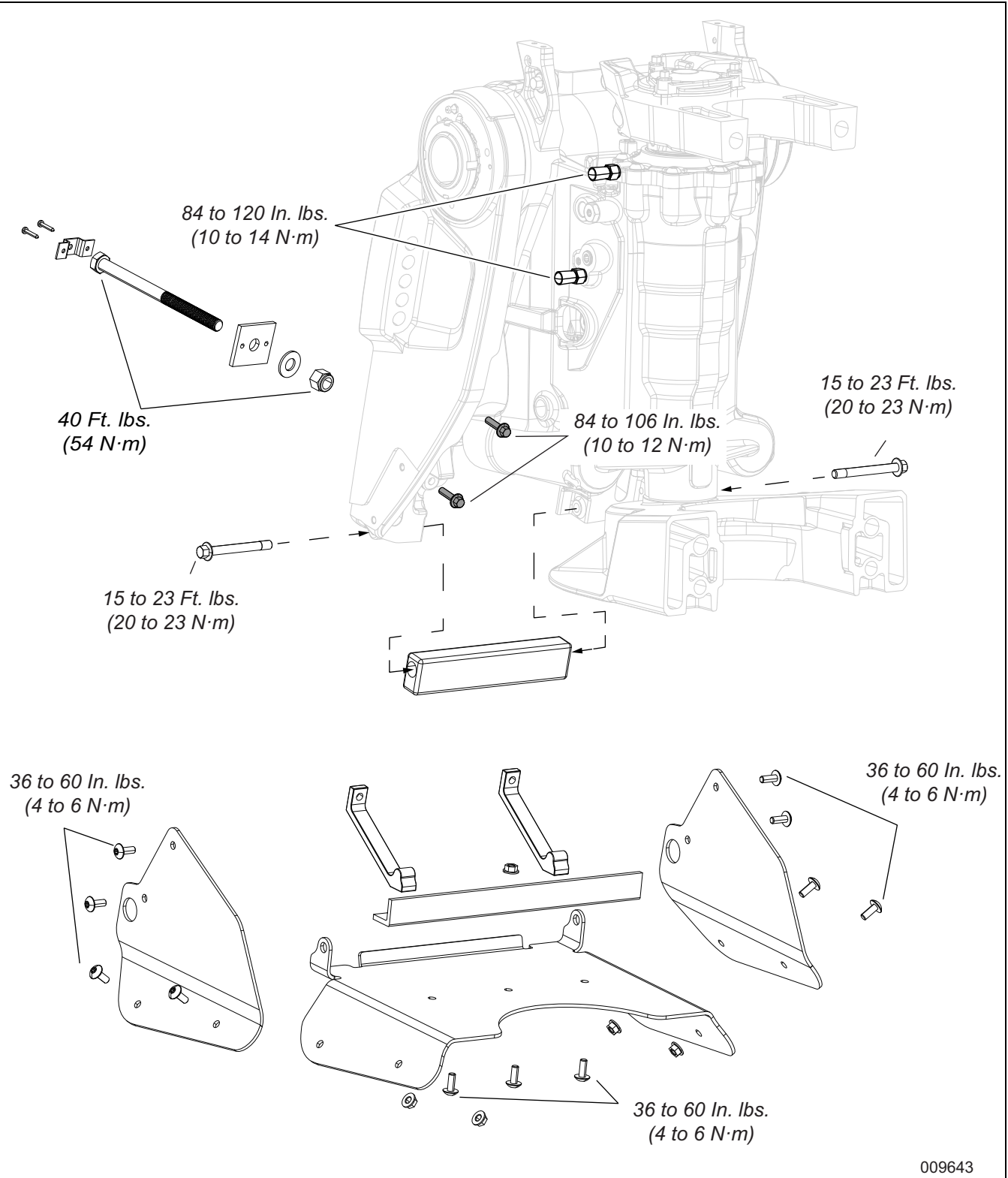
84 to 106 In. lbs.
(10 to 12 N·m)

15 to 23 Ft. lbs.
(20 to 23 N·m)

009640

A	Triple-Guard Grease	X	See Service Manual Procedure
E	Red Ultra Lock	DD	Hydraulic Steering Fluid

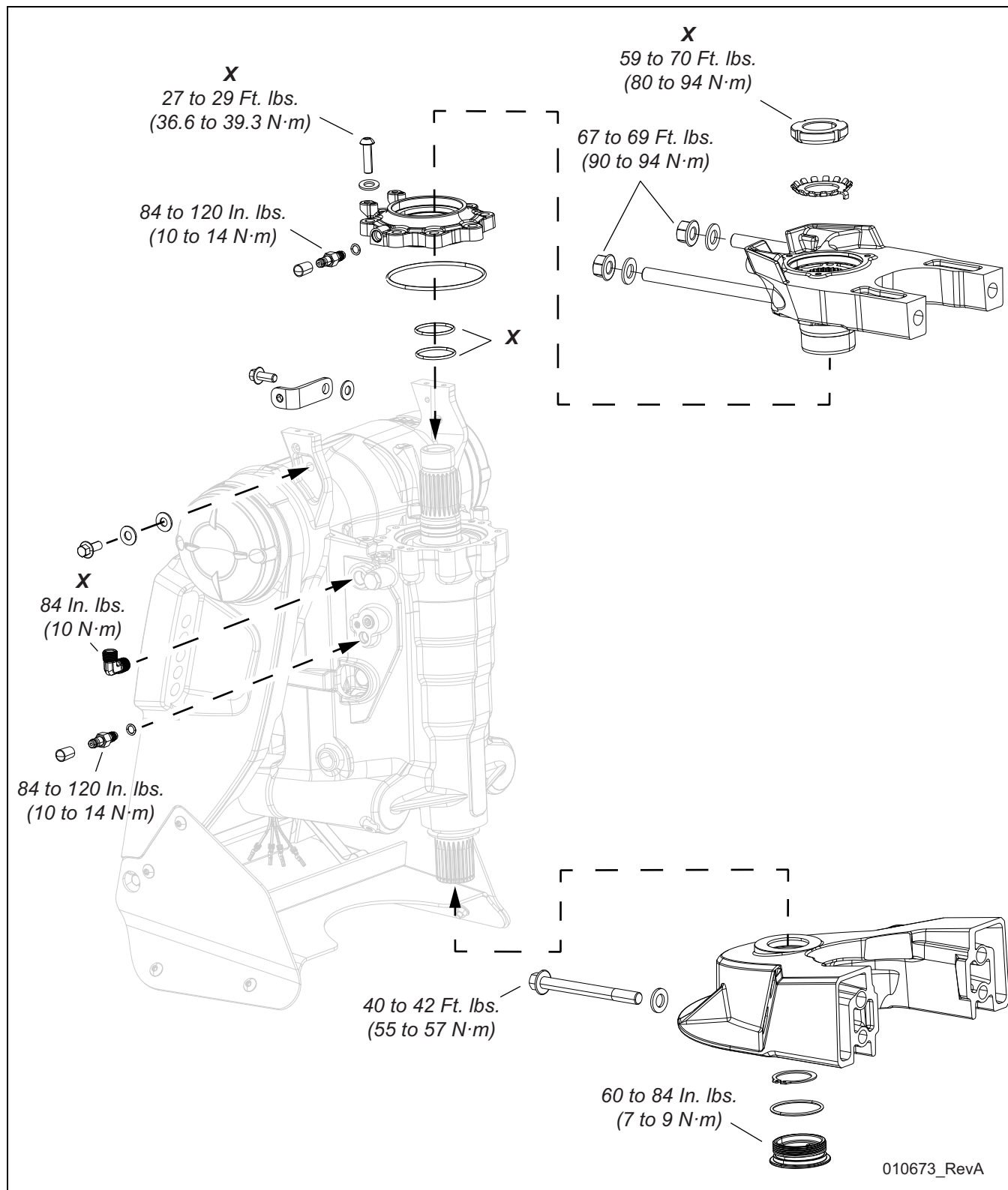
Spray Plate, Covers and Anode



A Triple-Guard Grease
E Red Ultra Lock

X See Service Manual Procedure
DD Hydraulic Steering Fluid

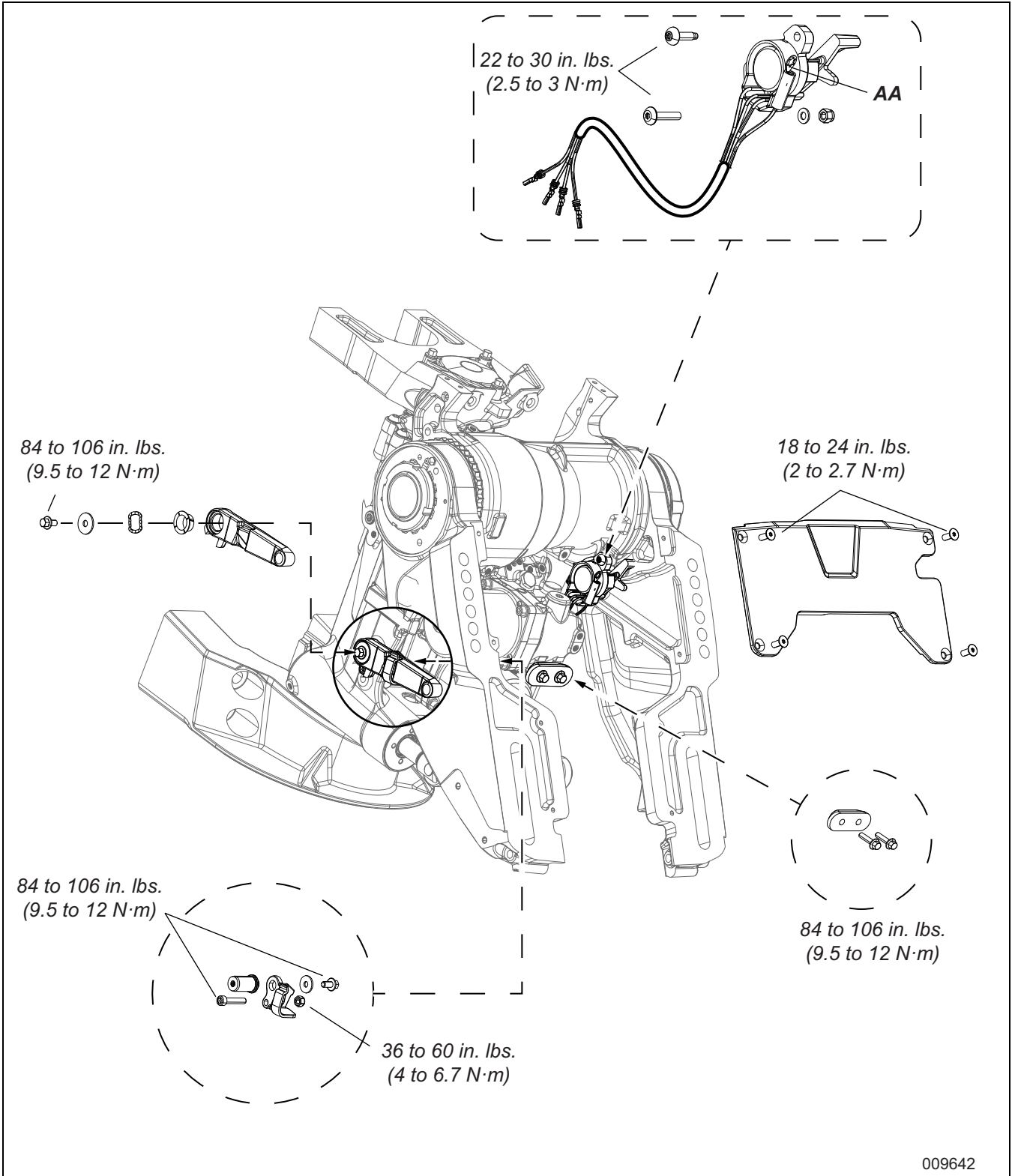
Steering Arm, End Cap and Lower Bracket



A Triple-Guard Grease
E Red Ultra Lock

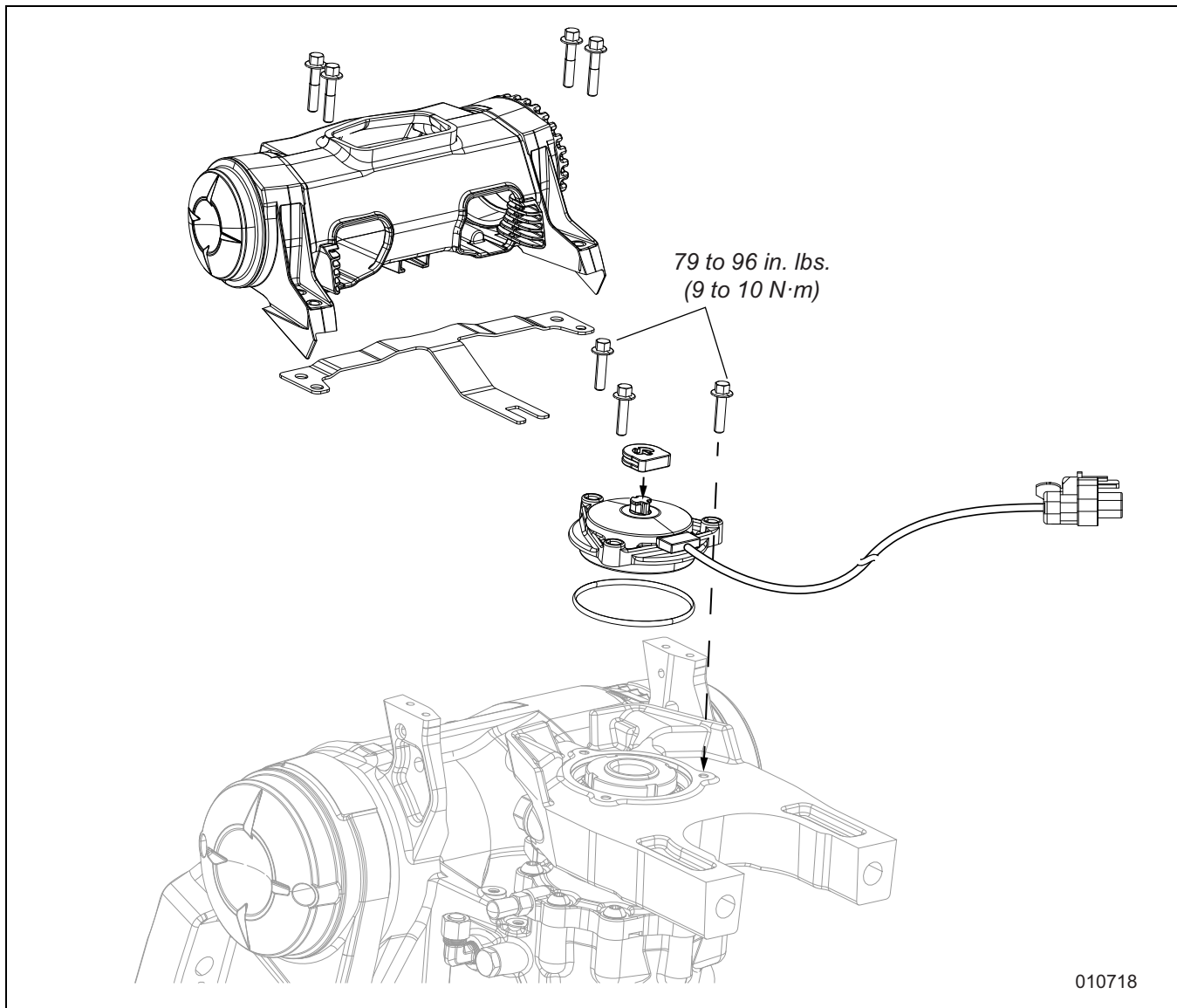
X See Service Manual Procedure
DD Hydraulic Steering Fluid

Stern & Swivel Bracket Attachments

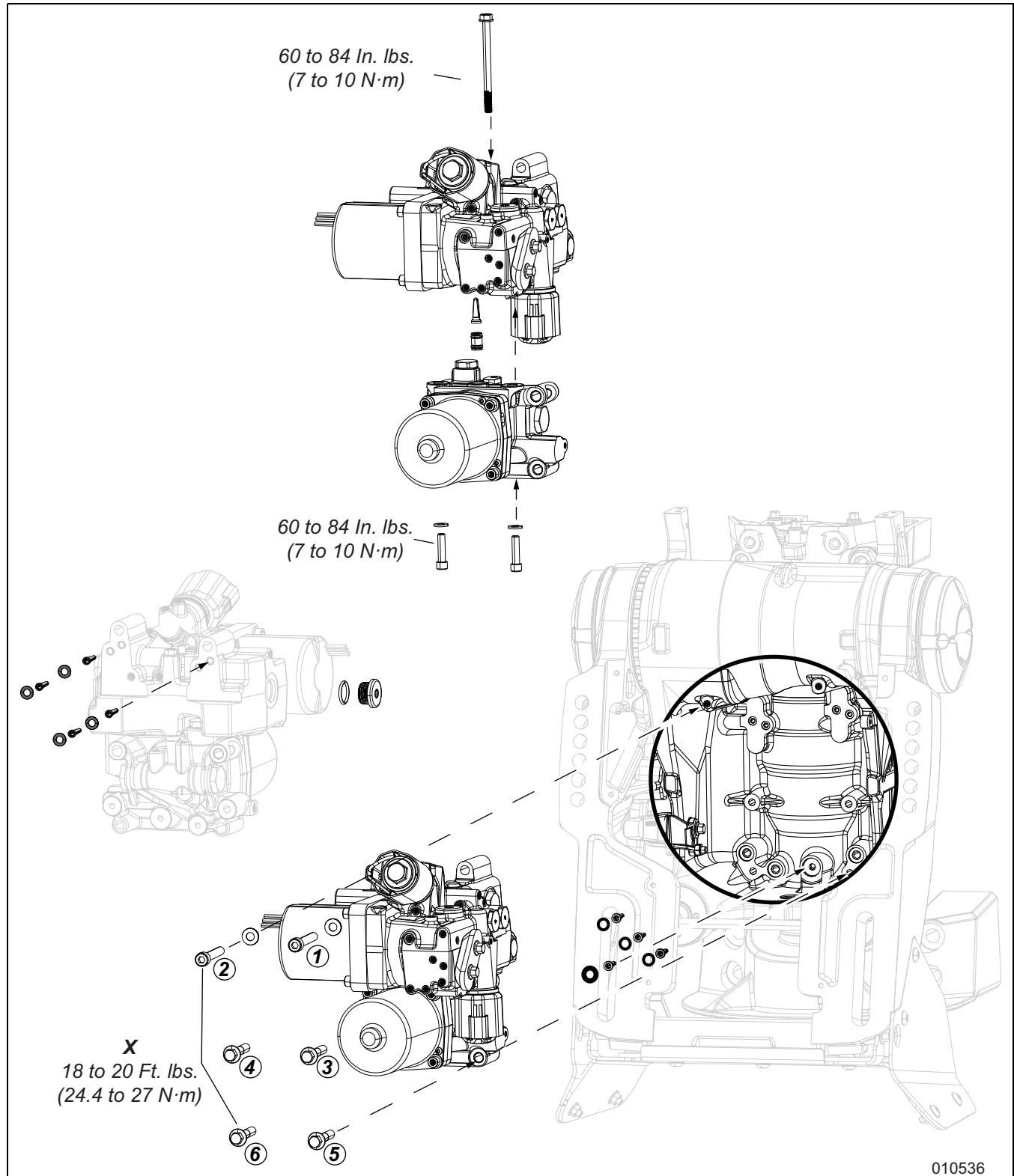


A Triple-Guard Grease	X See Service Manual Procedure
E Red Ultra Lock	AA No-Ox Grease

Steering Position Sensor



iDock Manifold Assembly



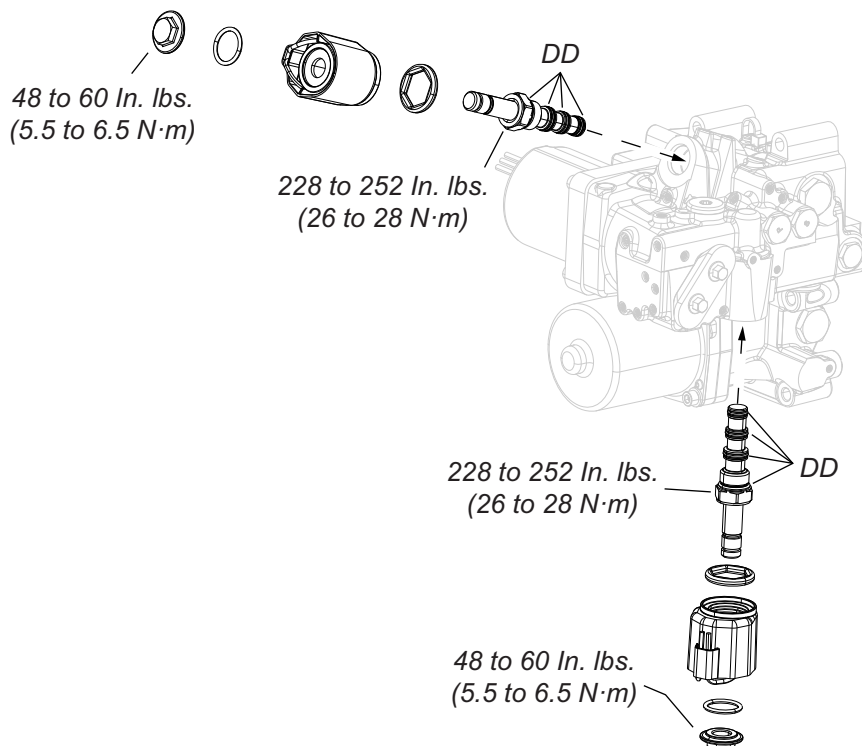
3

A Triple-Guard Grease
E Red Ultra Lock

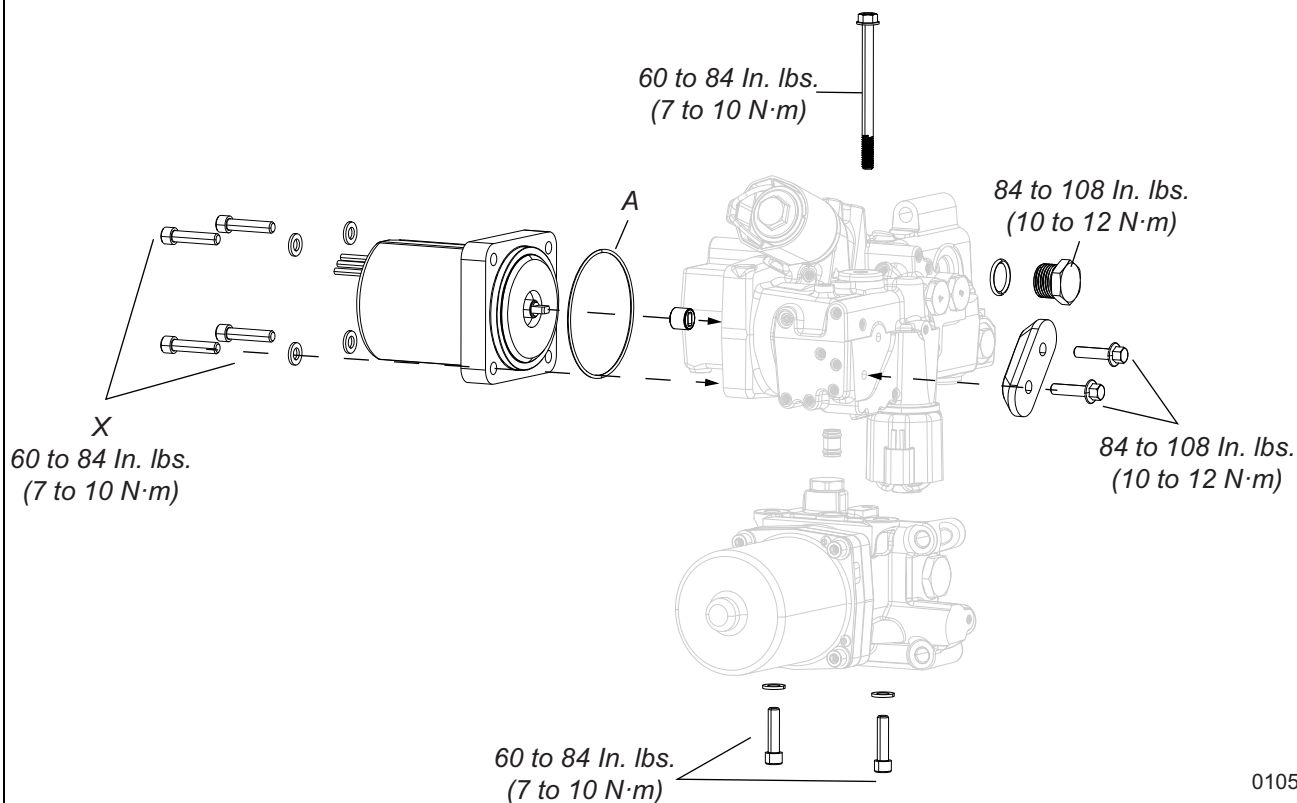
X See Service Manual Procedure
DD Hydraulic Steering Fluid

iDock Motor, Solenoids and Valves

Solenoids and Valves



Manifold & Motor



010537

A Triple-Guard Grease
E Red Ultra Lock

X See Service Manual Procedure
DD Hydraulic Steering Fluid

69



- | | | | |
|---|------------------------------|----|-----------------------------------|
| A | Triple-Guard Grease | AA | No-Ox Grease |
| X | See Service Manual Procedure | BB | Trim & Tilt Fluid (G2) P/N 767969 |

iDock System

The *iDock* system is used only in twin outboard installations.

The *iDock* system consists of boat mounted components which include a hydraulic steering helm, a helm pressure sensor module, hydraulic hoses, hydraulic fluid, a mechanical alignment valve, an electronic joystick directional control, and network wiring.

The helm steering pressure sensor module includes two 1500 psi (10342 kPa) helm pressure sensors and a micro processor. The pressure sensors monitor hydraulic pressure from the helm. The micro processor transmits system pressure information over the network to the control module.

Each outboard includes a control module, a steering position sensor located on the steering shaft and a hydraulic steering manifold assembly.

The helm pressure sensor module and control modules monitor and control the steering system.

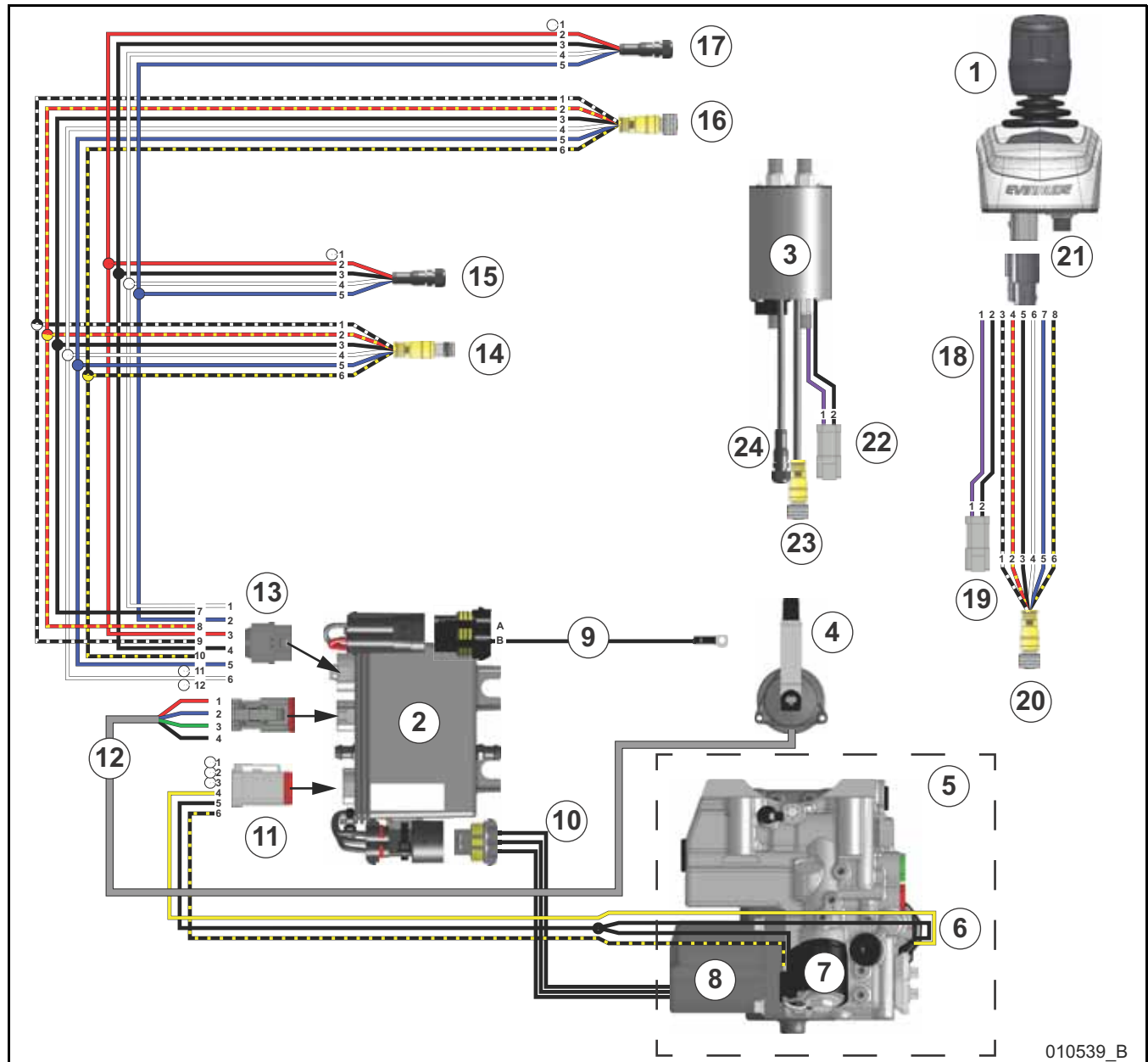
The *EMM* monitors the modules, and activates the engine monitor should a fault code be generated.

Fault Codes

Fault codes generated by the *iDock* Control Module, Joystick controller, or Pressure Sensor Module (PSM) are stored in each device.

Also refer to the **Troubleshooting Tables** and **Fault Code Table** at the end of this manual

iDock Electrical Circuit Diagram



- | | |
|--|--|
| 1. Joystick Direction Control | 13. Network "Y" Adapter harness to Module (Connects engine network cables to control module and boat networks) |
| 2. Control Module | 14. Remote Control (Private) Network Connection to Engine Harness |
| 3. Helm Pressure Sensor | 15. NMEA 2000 (Public) Network Connection to Engine Harness |
| 4. Steering Position Sensor | 16. Remote Control (Private) Network Connection to Boat Network |
| 5. Manifold Assembly | 17. NMEA 2000 (Public) Network Connection to Boat Network |
| 6. Solenoid Assembly (Direction Valve) | 18. Joystick Harness |
| 7. Solenoid Assembly (Mode Valve) | 19. Accessory Power Connection |
| 8. Steering Motor | 20. Remote Control (Private) Network Connection to Boat Network |
| 9. Module Power & Ground Cable (Power from engine harness) | 21. NMEA 2000 (Public) Network Connection to Boat Network |
| 10. Module Output to Steering Motor | 22. Accessory Power Connection |
| 11. Solenoid leads to iDock Module | 23. Remote Control (Private) Network Connection to Boat Network |
| 12. Steering Position Sensor connection to Control Module | 24. NMEA 2000 (Public) Network Connection to Boat Network |

Operation

The *iDock* system has two modes of operation, Normal Mode and Docking Mode.

Normal Mode

In Normal Mode operation, steering control is provided by the hydraulic helm from inputs of the steering wheel made by the operator.

The helm pressure sensor module monitors hydraulic pressure in the steering system. This information is transmitted over the public and private networks to the control modules on each outboard.

The control modules also monitor the steering position sensors on the steering shaft of each outboard.

The following is an example of system operation during a PORT turn. Refer to the diagram on the following page.

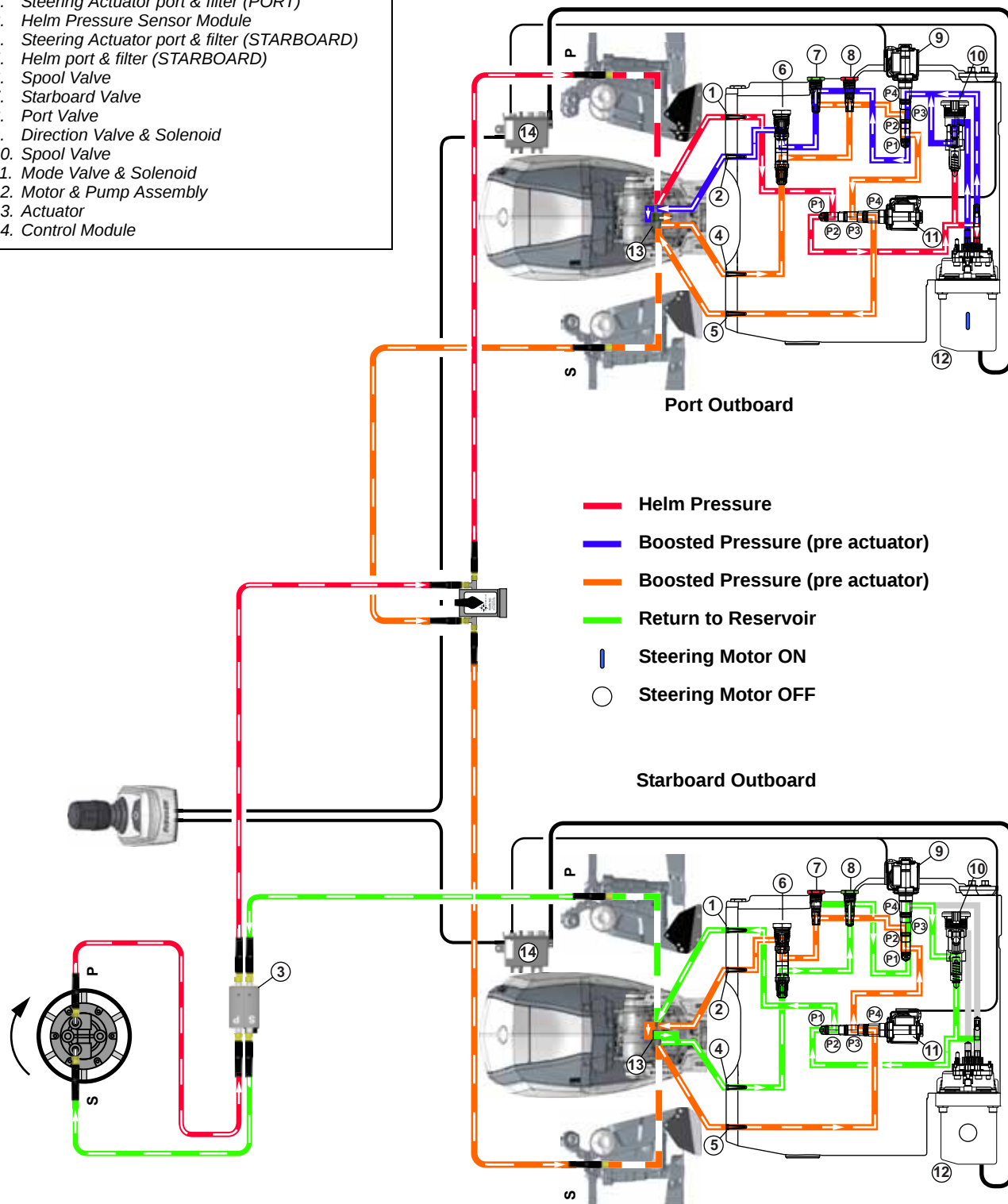
During a PORT turn hydraulic fluid in the helm begins moving through the steering system as the steering wheel is turned.

Several actions happen simultaneously:

- Hydraulic fluid flows from the PORT outlet of the helm, through the hydraulic hoses and helm pressure sensor module, to the PORT hydraulic fitting of the PORT outboard
- "The helm pressure sensor module transmits an increase of hydraulic pressure on the PORT sensor over the networks to the control module of the PORT outboard
 - As hydraulic pressure increases a pressure differential is created between the PORT and STARBOARD pressure sensors
 - The control modules monitor the pressure sensor module information over the networks
 - When a preset pressure differential is detected, the control module of the PORT outboard turns ON the steering pump providing steering assistance
- Hydraulic fluid under helm generated pressure flows through the manifold to the pump
 - Hydraulic fluid pressure is boosted by the pump and directed to the top of the steering actuator, turning the outboard to PORT
- Hydraulic fluid below the actuator is forced out and directed through the manifold and out the STARBOARD hydraulic fitting of the PORT outboard
- Hydraulic fluid passes through the high pressure hoses and alignment valve to the STARBOARD hydraulic fitting of the STARBOARD outboard
- Boosted hydraulic fluid pressure is directed through the manifold to the top of the steering actuator, turning the outboard to PORT
- Hydraulic fluid below the actuator is forced out and directed through the manifold and out the PORT hydraulic fitting of the STARBOARD outboard
- Hydraulic fluid from the hydraulic fitting returns to the reservoir in the helm.
- The control modules monitor the steering position sensors
- As the outboards approach the mechanical steering system stop, the control module turns OFF the steering pump

Diagram

1. Helm port & filter (PORT)
2. Steering Actuator port & filter (PORT)
3. Helm Pressure Sensor Module
4. Steering Actuator port & filter (STARBOARD)
5. Helm port & filter (STARBOARD)
6. Spool Valve
7. Starboard Valve
8. Port Valve
9. Direction Valve & Solenoid
10. Spool Valve
11. Mode Valve & Solenoid
12. Motor & Pump Assembly
13. Actuator
14. Control Module



010571

Re-timing

As the outboards turn during operation, the outboards can get into a state of misalignment. Misalignment can be caused by normal hydraulic fluid leakage through the helm, manifold valves or steering actuator.

Misalignment is defined as the outboards being in a condition of excessive toe in, or excessive toe out.

The control modules monitor the steering position sensors of each outboard for misalignment conditions. If the indicated CENTER positions exceed a difference of 5° the control modules will correct for this condition.

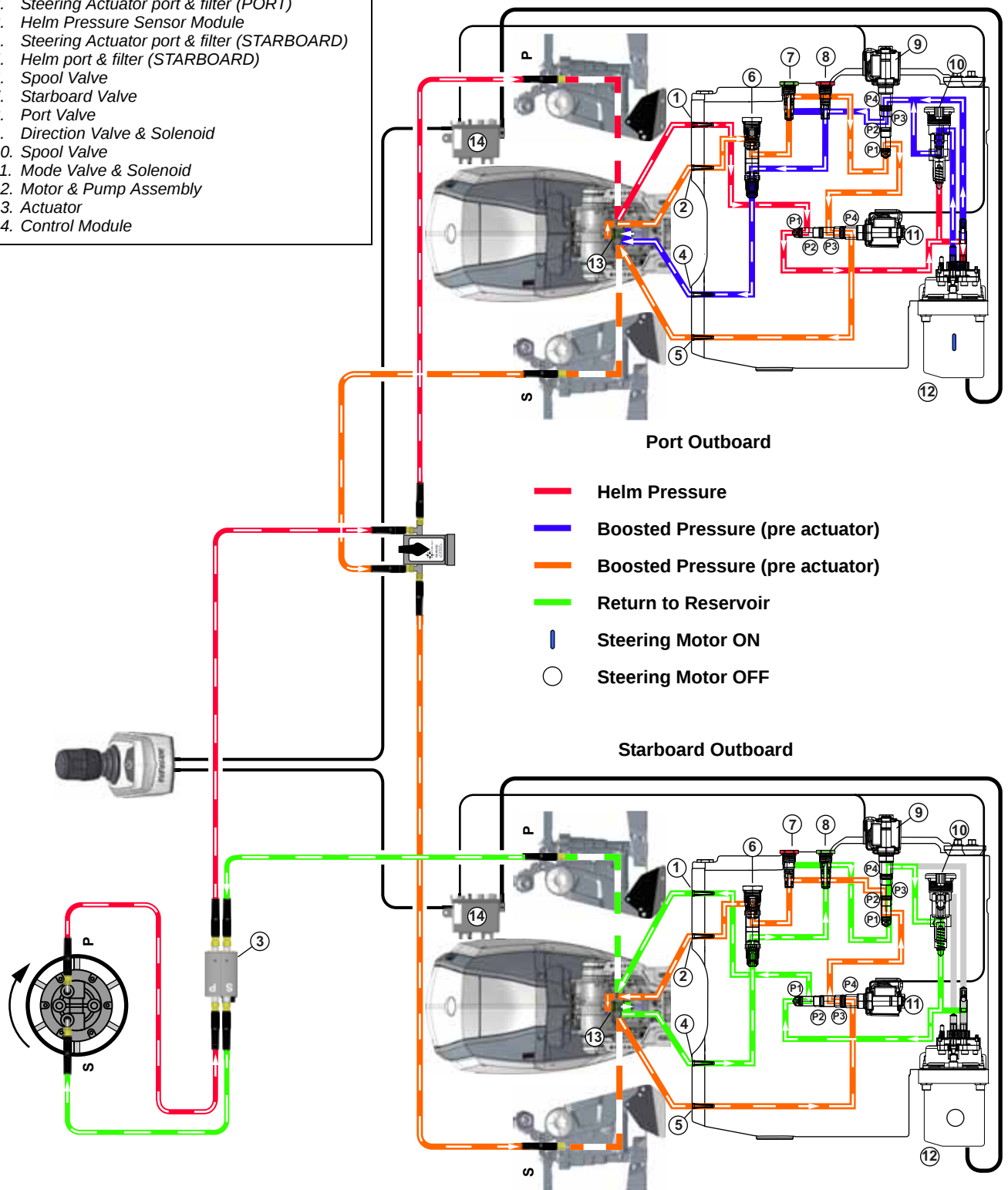
System operation for re-timing is similar to a Normal Mode turn except the control module activates the direction valve of one outboard after the steering pump is turned ON.

The following is an example of system re-timing operation during a PORT turn where excessive toe-in has occurred.

- Hydraulic fluid flows from the PORT outlet of the helm, through the hydraulic hoses and helm pressure sensor module, to the PORT hydraulic fitting of the PORT outboard
- The helm pressure sensor module detects a pressure differential between the outboards
- The control module of the PORT outboard turns ON the steering pump
- Hydraulic fluid under helm generated pressure flows through the manifold and is boosted by the steering pump
- Then the control module:
 - Briefly activates the direction valve of the PORT outboard, redirecting hydraulic fluid flow to the bottom of the steering actuator, turning the PORT outboard to STARBOARD
 - Monitors the steering position sensors, reactivating the direction valve until the sensor readings are within the preset limits
 - When the sensor readings are within their limits, the system returns to normal operation for the direction of the turn
- Hydraulic fluid above the actuator is forced out and directed through the manifold and out the STARBOARD hydraulic fitting of the PORT outboard, flowing to the STARBOARD outboard, allowing it to make a normal turn to PORT.

Diagram

1. Helm port & filter (PORT)
2. Steering Actuator port & filter (PORT)
3. Helm Pressure Sensor Module
4. Steering Actuator port & filter (STARBOARD)
5. Helm port & filter (STARBOARD)
6. Spool Valve
7. Starboard Valve
8. Port Valve
9. Direction Valve & Solenoid
10. Spool Valve
11. Mode Valve & Solenoid
12. Motor & Pump Assembly
13. Actuator
14. Control Module



010579

iDock Service Supplement

iDock System

Docking Mode

Docking Mode is intended for slow speed operation.

The joystick controller provides two levels of throttle settings which are set during system calibration. Engine speed limits are set for the type and size of hull. Moving the joystick in the desired direction activates a "normal" throttle setting, providing thrust for "slow" movement of the vessel.

Continuing joystick movement in the same direction overcomes a detent, activating a "boosted" throttle setting, increasing directional thrust on one or all outboards depending on the joystick position.

To activate Docking Mode:

- Move both remote control levers to the NEUTRAL/IDLE position.
- Press the power button on the joystick controller. The icon on the controller power button will illuminate (blue).

During Docking Mode operation, steering control is provided by the joystick control from inputs made by the operator. Joystick inputs are transmitted over the networks to the control modules of each outboard.

While Docking Mode is active, the mode valve solenoid of each steering manifold shifts position of an internal valve and stops the hydraulic fluid flow to or from the helm. This results in hydraulic fluid flow remaining internal to each manifold assembly.

The control modules control operation of the direction valves of their respective outboard. The direction valves reverse the flow of hydraulic fluid through the steering manifold, depending on joystick inputs, to independently turn the outboards to port or starboard. The control module also determines and commands gear selection for each outboard.

Depending on sensor inputs and joystick position, the outboards can react independently both in direction of turn and gear position.

To de-activate Docking Mode:

- Press the RPM + button on the remote control. The icon on the controller power button will turn OFF.

System Tests

NOTICE

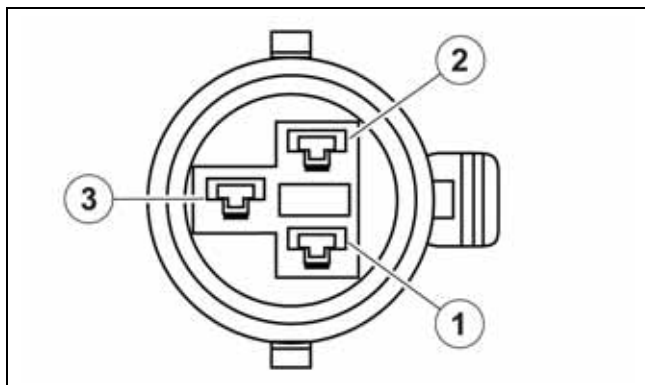
Use appropriate test leads or adapters such as Test Probe Kit, P/N 342677, when performing electrical tests.

NEVER pierce the insulation of the engine wiring, or use any piercing-style test probe. Piercing insulation damages the wire and can cause other unintended electrical problems.

Steering Motor

The *iDock* steering motor is a brushless, 3-phase motor. The *iDock* control module controls motor operation by Pulse Width Modulation (PWM), therefore applying 12 volts to the motor leads will NOT confirm motor operation. Use a quality digital multimeter capable of reading milli-ohms to test the steering motor resistance.

IMPORTANT: Confirm the meter leads are in good condition. Make SURE to calibrate the ohms function of the meter BEFORE testing.



Steering Motor Connector (motor end)

3011918

1. Pin 1
2. Pin 2
3. Pin 3

Connect meter leads as indicated in the table below.

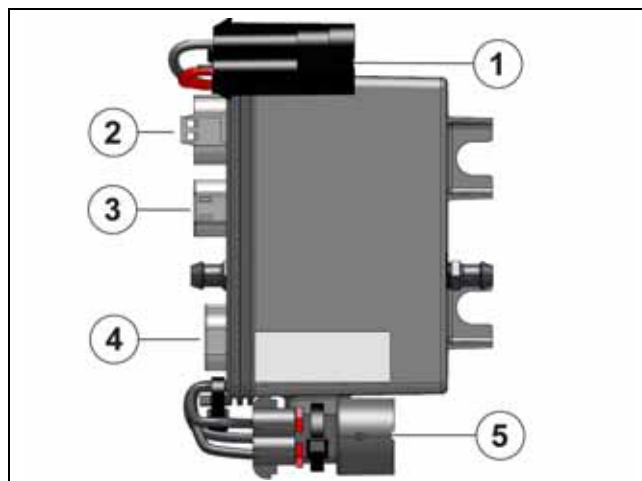
Steering Motor Resistance	
Pin	Result
1 to 2	23 to 26 mΩ
2 to 3	
3 to 1	

Results:

- Readings as listed in table, or a reading less than 1 ohm is acceptable. Make sure the meter is calibrated to read less than 1 ohm.
- No reading (OL or ∞) indicates an open circuit.

Control Module

The control module circuits can be tested on or off the outboard. Disconnect the battery cables at the battery. Disconnect the electrical connectors from the control module.



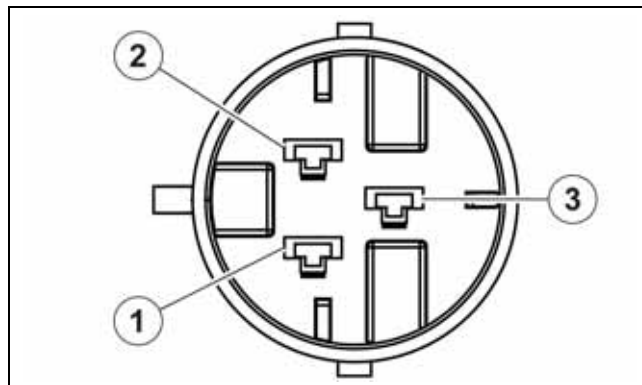
010677

Control Module Connectors

1. Power and Ground Connector
2. NMEA 2000 & Private Network Communication
3. Steering Position Sensor Input
4. Mode and Direction Valve Output
5. Steering Motor Output

Steering Motor Circuits

Use the diode test function of a digital multimeter to check the steering motor circuit.



Steering Motor Connector (control module end)

3011920

1. Pin 1 (green wire)
2. Pin 2 (blue wire)
3. Pin 3 (yellow wire)

IMPORTANT: While performing these tests, voltage readings will start low and rise. Allow time for the multimeter to reach maximum voltage reading. Some multimeters will read Open Load (OL) after attaining the maximum voltage reading. This does NOT indicate a faulty module.

Connect the meter leads as listed in the table below.

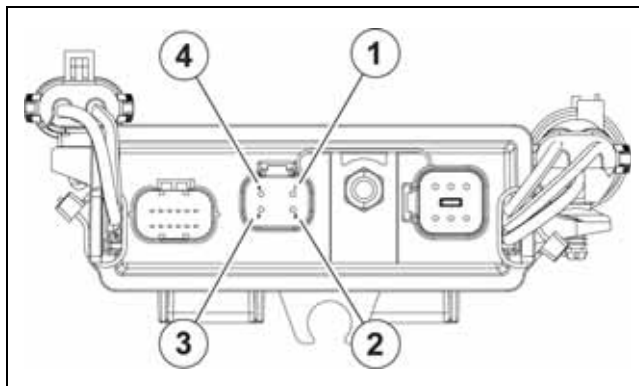
Motor Circuit (Diode Test)		
Meter Lead	Pin	Result
RED (positive) meter lead to:	1	>1.0 VDC
BLACK (negative) meter lead to:	2	
RED (positive) meter lead to:	3	>1.0 VDC
BLACK (negative) meter lead to:	2	
RED (positive) meter lead to:	3	>1.0 VDC
BLACK (negative) meter lead to:	1	
BLACK (negative) meter lead to:	1	approx. 0.5 VDC
RED (positive) meter lead to: module ground lead	—	
BLACK (negative) meter lead to:	2	approx. 0.5 VDC
RED (positive) meter lead to: module ground lead	—	
BLACK (negative) meter lead to:	2	approx. 0.5 VDC
RED (positive) meter lead to: module ground lead	—	

Results:

- Readings as listed in table indicate circuit is good.
- No reading (OL or ∞) indicates an open circuit.
- A reading of zero (0) indicates an short circuit.

Replace faulty module.

Steering Position Sensor Ground Circuit



Steering Position Sensor Connector Pin Locations

010771

Use a digital multimeter with appropriate test probe leads to measure sensor circuit resistance.

Connect the positive meter lead to the control module connector listed in the table.

Connect the negative meter lead to the control module ground lead.

Control Module Ground Circuit		
Connector/ Wire	Pin	Result
Steering Position/ Black	4	<1 Ω

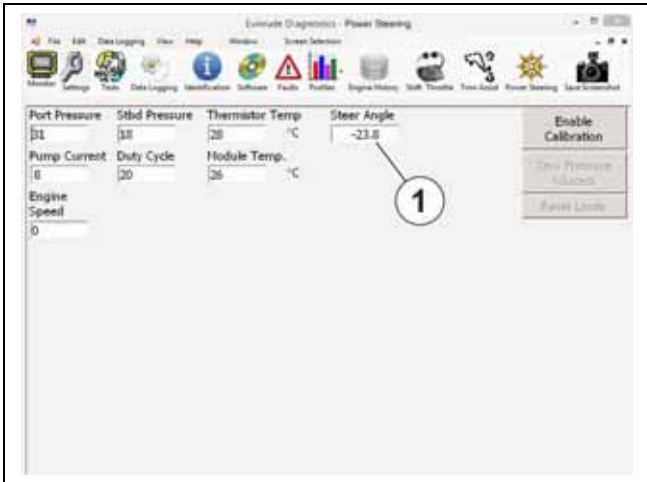
Results:

- Readings as listed in table indicate circuit is good.
- No reading (OL or ∞) indicates an open circuit.
- A reading of zero (0) indicates an short circuit.

Replace faulty module.

Steering Position Sensor Test

Use *Evinrude Diagnostics* software v 6.3 or higher to observe steering angle while turning the steering wheel.



1. Steering Angle 009401

Mode and Direction Solenoid Test

Use a digital multimeter with appropriate test probe leads to measure solenoid resistance.

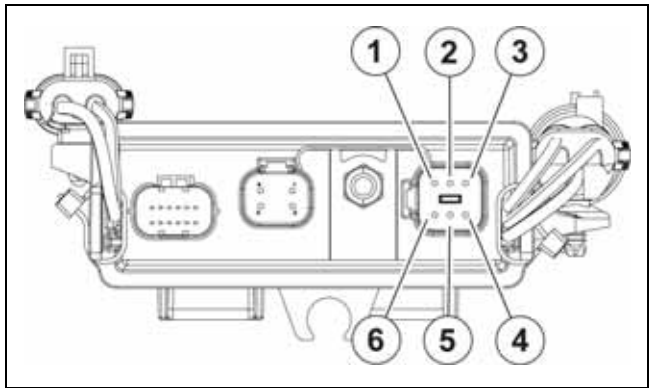
Connect the meter leads as listed in the table below.

Solenoid Resistance		
Meter Lead	Pin	Result
RED (positive) meter lead to:	4	9.8 ±5Ω
BLACK (negative) meter lead to:	5	
RED (positive) meter lead to:	6	9.8 ±5Ω
BLACK (negative) meter lead to:	5	

Results:

- Readings as listed in table indicate solenoid coil is good.
 - No reading (OL or ∞) indicates an open circuit.
 - A reading of zero (0) indicates a short circuit.
- Replace faulty solenoid assembly.

Mode and Direction Solenoid Circuits



Solenoid Connector Pin Locations 010772

Use the diode test function of a digital multimeter to check the signal circuit.

Connect the meter leads as listed in the table below.

Solenoid Circuit (Diode Test)		
Meter Lead	Pin	Result
RED (positive) meter lead to:	5	0.3 ±0.02 VDC
BLACK (negative) meter lead to:	4	
RED (positive) meter lead to:	5	0.3 ±0.02 VDC
BLACK (negative) meter lead to:	6	

Results:

- Readings as listed in table indicate circuit is good.
- No reading (OL or ∞) indicates an open circuit.
- A reading of zero (0) indicates a short circuit.

Replace faulty module.

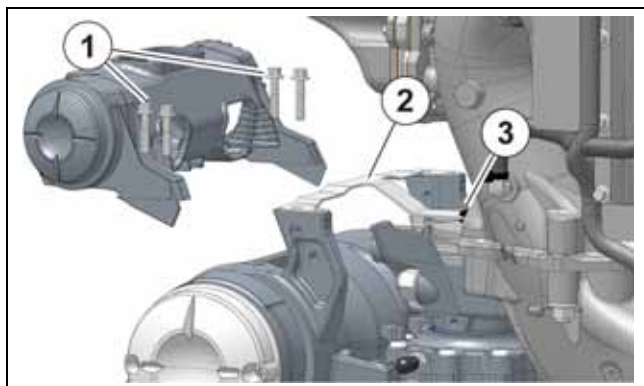
Steering Position Sensor Service

Removal

IMPORTANT: Review this section BEFORE beginning any work. It is NOT necessary to completely de-rig the outboard.

1. Disconnect the battery cables at the battery.
2. Remove the covers, then the starboard and port frames and front frame. Refer to **Engine Cover and Frame Service** in the correct **Service Manual**.
3. Remove the four screws retaining the rigging center.
4. Disconnect the steering position sensor from the control module.
5. Note the routing of *iDock* electrical harnesses. Use a digital camera to take a reference photo, if needed.

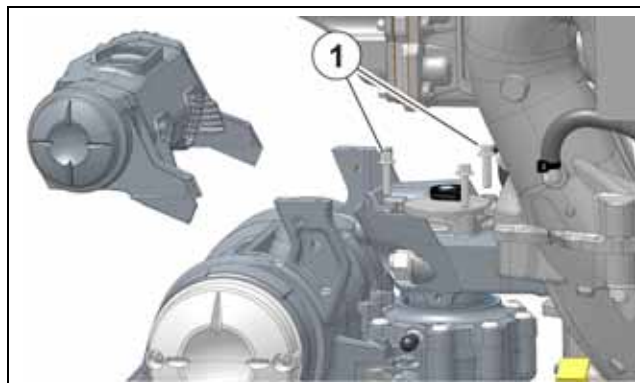
Remove the four screws retaining the rigging housing. Move the rigging housing forward. Slide the bracket forward to remove it from the steering position sensor.



1. Screws
2. Steering position sensor bracket
3. Steering position sensor

010558

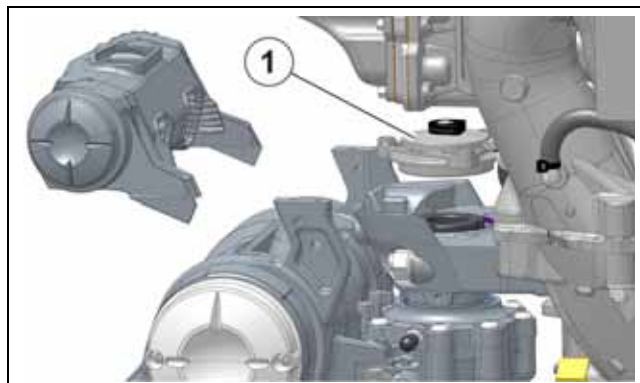
Remove the three screws from the steering position sensor.



1. Screws

010559

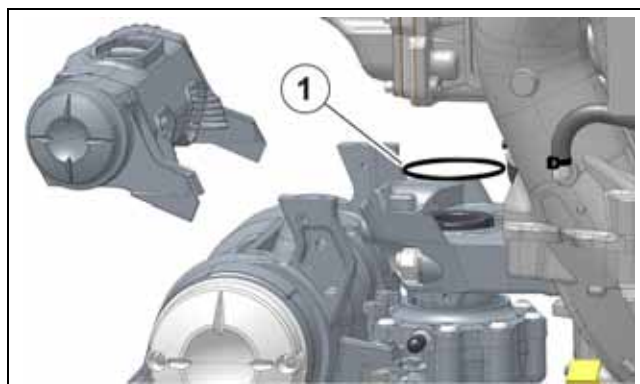
Use an appropriate tool to remove the steering position sensor from the upper steering bracket.



1. Steering position sensor

010560

Remove the o-ring from the upper steering bracket if it didn't come off with the steering position sensor.



1. O-ring

010561

Remove the grommet from the steering position sensor.

Installation

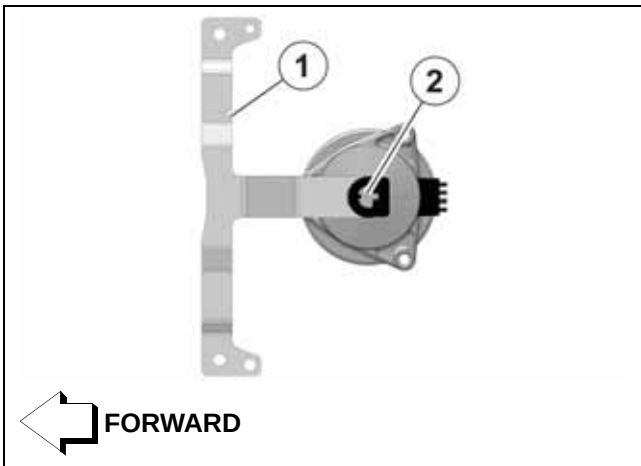
Install the grommet on the shaft of the new steering position sensor.



1. Grommet

010568

Temporarily install the steering position sensor bracket onto the shaft of the steering position sensor. Align the shaft and bracket to face FORWARD as shown.



1. Steering position sensor bracket
2. Shaft

010562

Remove the bracket from the sensor.

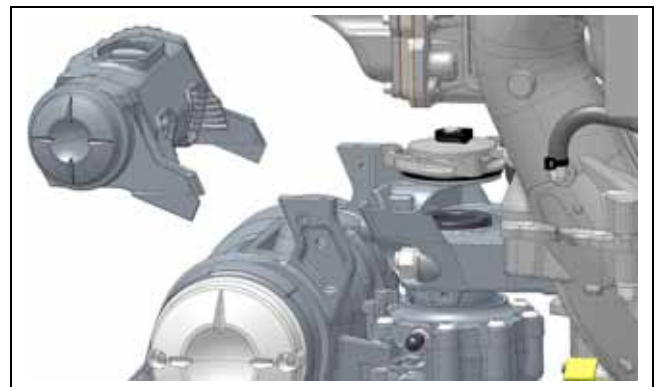
Apply a light coat of *Triple Guard* grease to a new o-ring. Install the o-ring on the steering position sensor.



1. O-ring

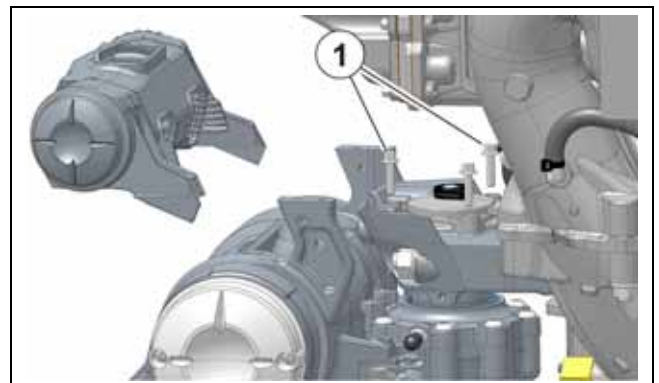
010563

Install the steering position sensor and o-ring into the upper steering bracket.



010565

Install the three screws in the steering position sensor. Tighten the screws to a torque of 79 to 96 in. lbs. (9 to 10 N·m).



1. Screws

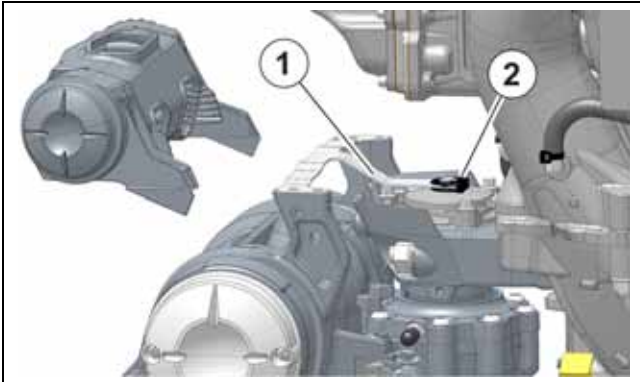
010559

Install the steering position sensor bracket into the grommet on the steering position sensor. Move

iDock Service Supplement

Steering Position Sensor Service

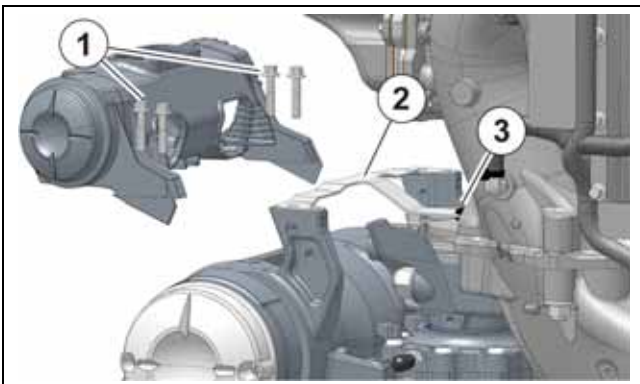
the rigging housing rearward and align the screw holes in the rigging housing with the holes in the steering position sensor bracket.



- 1. *Steering position sensor bracket*
- 2. *Grommet*

010564

Install the four retaining screws into the rigging housing and swivel bracket. Be SURE the steering position sensor bracket stays aligned in the sens grommet. Tighten the screws to a torque of 79 to 96 in. lbs. (9 to 10 N·m).



- 1. *Screws*
- 2. *Steering position sensor bracket*
- 3. *Steering position sensor grommet*

010558

IMPORTANT: Calibrate the appropriate system after installing the steering position sensor. Refer to **iDock Steering Position Sensor Calibration** on p. 86.

Control Module Service

Cover and Frame Removal

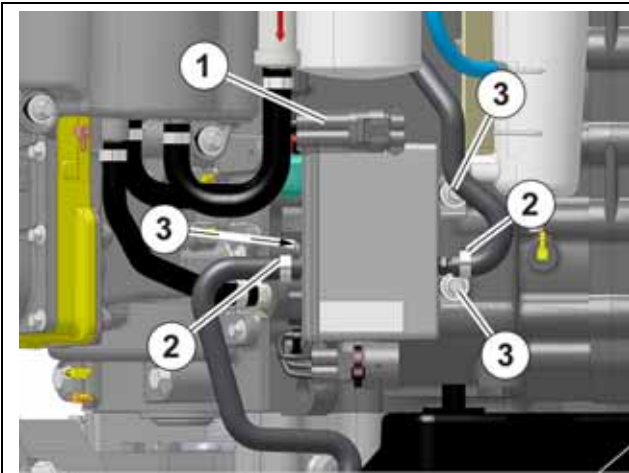
Remove the top, port, front and rear covers. Next remove the port and front frames. Refer to **Engine Cover and Frame Service** in the correct **Service Manual**.

Removal

Disconnect the five electrical connectors from the iDock module.

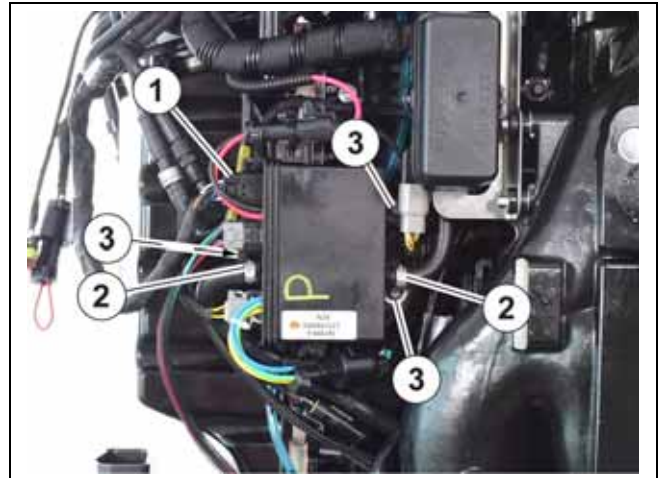
Remove the *Oetiker* clamps from the cooling hoses, then remove the cooling hoses from the module.

Remove one mounting screw and washer at the front and two mounting screws and washers at the back of the module.



66° V6 Models
1. Electrical connectors
2. Oetiker clamps and cooling hoses
3. Mounting screws

010610



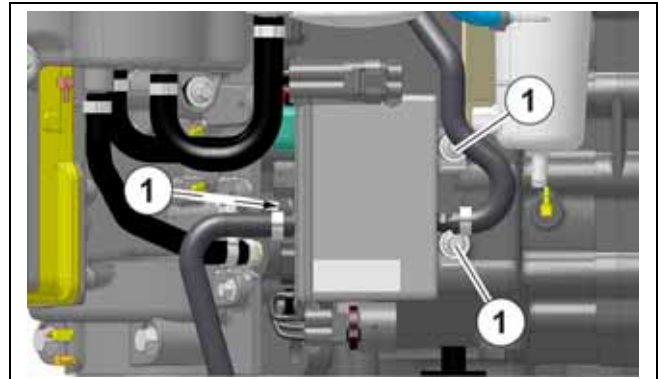
74° V6 Models
1. Electrical connectors
2. Oetiker clamps and cooling hoses
3. Mounting screws

010607

Remove the module from the engine.

Installation

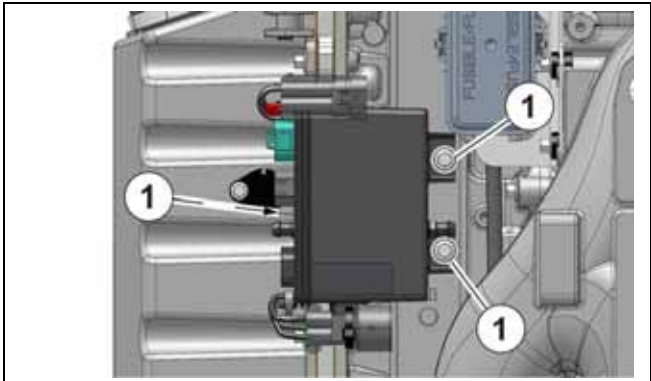
Install the module onto the engine. Install two washers and mounting screws at the back and one washer and mounting screw at the front of the module. Tighten the screws to a torque of 84 to 106 in. lbs. (10 to 12 N·m).



66° V6 Models
1. Washers and mounting screws

010611

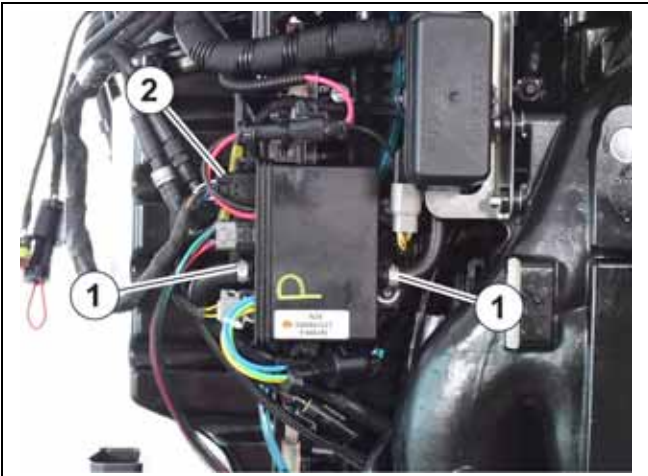
iDock Service Supplement
Control Module Service



74° V6 Models 010608
1. Washers and mounting screws

Install the cooling hoses onto the module. Secure the hoses with new *Oetiker* clamps.

Connect the electrical connectors to the module.



74° V6 Models 010607
1. *Oetiker* clamps and cooling hoses
2. Electrical connectors

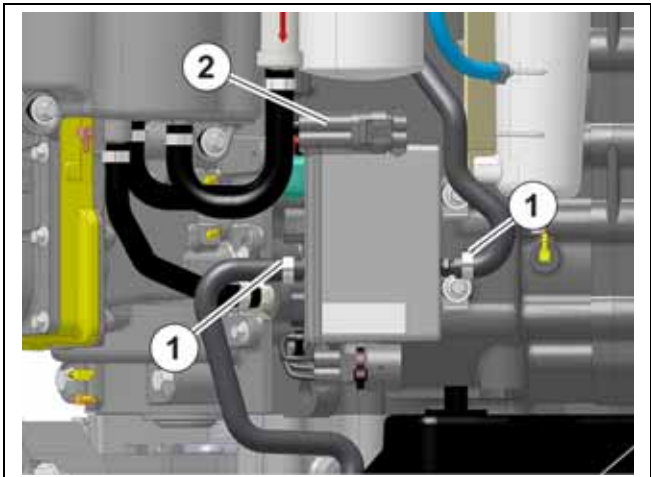
iDock System Software
Installation

Upload the correct software to a replacement *iDock* control module, pressure sensor module or joystick after installing the component. Refer to the table below.

	Version	Revision (or higher)
Control Module	3030591	2025488
Pressure Sensor Module	3030590	2025486
Joystick Control	3030585	2025485

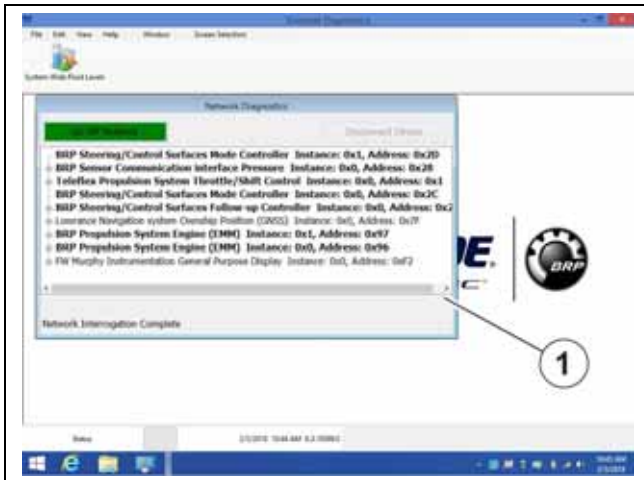
Use *Evinrude Diagnostics* software v 6.3 or higher to upload *iDock* system software.

Connect the MPI-2 and adapter cable to the lap-top and to the *NMEA 2000* network. Turn the key switch to the ON position, then start the diagnostic program. Do NOT start the engine.



66° V6 Models 010610
1. *Oetiker* clamps and cooling hoses
2. Electrical connectors

After the program connects to the network, select correct device from the device list.



1. Device list

010761

When the diagnostic program connects to the device, select the *Software* button, then select the *Load Program* button.



1. Software button

2. Load Steering Firmware button

010762

A *Load Program* pop-up window will appear. Make sure the engine is NOT running, then press the *Ok*

button. When the *Select Program File* pop-up window opens, select the device folder.



1. Load Program pop-up window

2. Ok button

3. Select Program File pop-up window

010763

Select the correct software from the list. Then follow the on-screen prompts to install the software into the device.

After the software is installed, turn the key switch OFF and then ON to complete the process.

iDock Steering Position Sensor Calibration

⚠ WARNING

The iDock system **REQUIRES** calibration when:

- the steering position sensor is replaced or removed and re-installed
- the iDock control module is replaced
- the steering position sensor bracket is replaced or removed and re-installed
- the steering position sensor grommet is replaced or removed and re-installed
- the rigging housing is replaced or removed and re-installed
- the stern and swivel bracket is replaced

Failure to complete the system calibration can cause unexpected steering response, resulting in property damage or personal injury.

Preventing Outboards From Contact

NOTICE

During this procedure observe outboards to ensure they do not contact, especially in applications where outboards are installed on or close to minimum centerline distances.

If during this procedure outboards will contact:

- STOP turning the steering wheel
- If the STARBOARD outboard needs to be moved, OPEN the alignment valve, move the outboard, then CLOSE the alignment valve.
- If the PORT outboard needs to be moved, CLOSE the alignment valve, move the outboard, then OPEN the alignment valve.
- Then continue with the procedure.

Porcedure

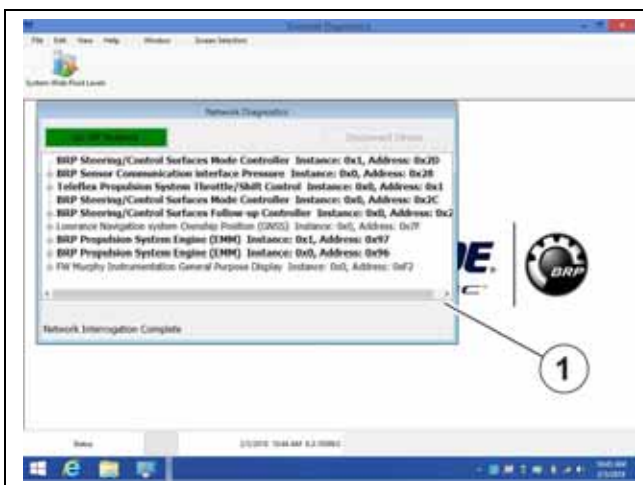
Use *Evinrude Diagnostics* software v 6.3 or higher and the following procedure to calibrate the steering position sensor.

1. Disconnect the Pressure Sensor Module from the remote control (private) network.
2. Connect the MPI-2 and adapter cable to the laptop and to the NMEA 2000 network. Turn

the key switch to the ON position, then start the diagnostic program.

In the next series of steps the PORT outboard will be calibrated

3. After the program connects to the network, select **BRP/Steering Control Surface Mode controller instance: 0x0** from the device list.



1. Device list

010761

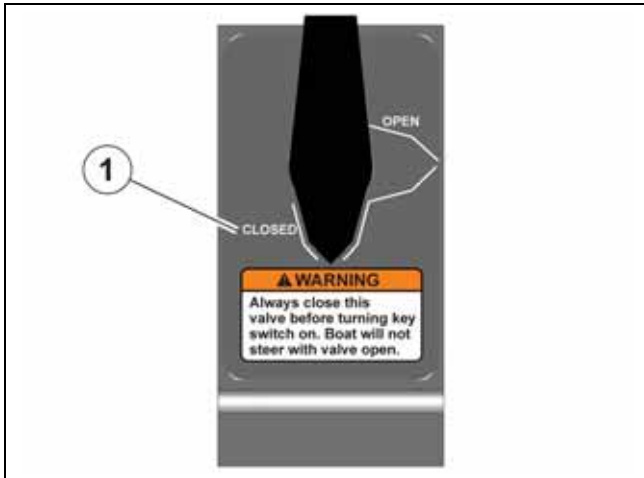
4. Select Configuration from the menu bar.



1. Configuration

010761

5. Make SURE the alignment valve is in the CLOSED position.

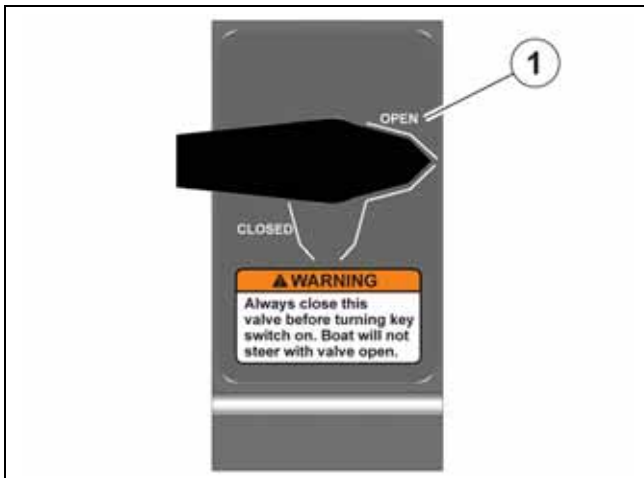


1. Alignment Valve CLOSED position

010765

6. Turn the steering wheel to PORT until it stops.
7. Open the alignment valve, then turn the steering wheel to STARBOARD until it stops.

IMPORTANT: Observe the outboards to ensure they do not contact. If the outboards will contact, the STARBOARD outboard will need to be moved. Refer to **Preventing Outboards From Contact** on p. 86.



1. Alignment Valve OPEN position

010766

8. CLOSE the alignment valve. Then turn the steering wheel to PORT until it stops. Select the *Port Limit* button.



1. PORT Limit button

010767

9. Turn the steering wheel to STARBOARD until it stops.
10. OPEN the alignment valve and turn the steering wheel to PORT until it stops.

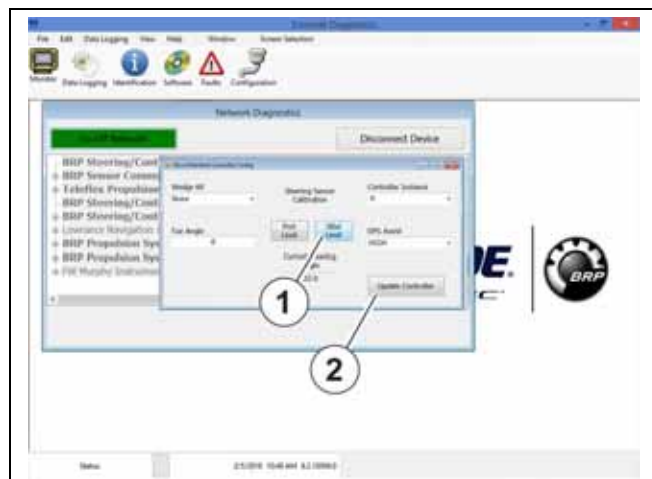
IMPORTANT: Observe the outboards to ensure they do not contact. If the outboards will contact, the STARBOARD outboard will need to be moved. Refer to **Preventing Outboards From Contact** on p. 86.

11. CLOSE the alignment valve. Then turn the steering wheel to STARBOARD until it stops.
12. Make SURE the PORT outboard is turned fully to STARBOARD (against the mechanical stop).

iDock Service Supplement

Control Module Service

Select the *Stbd Limit* button, then select *Update Controller*.

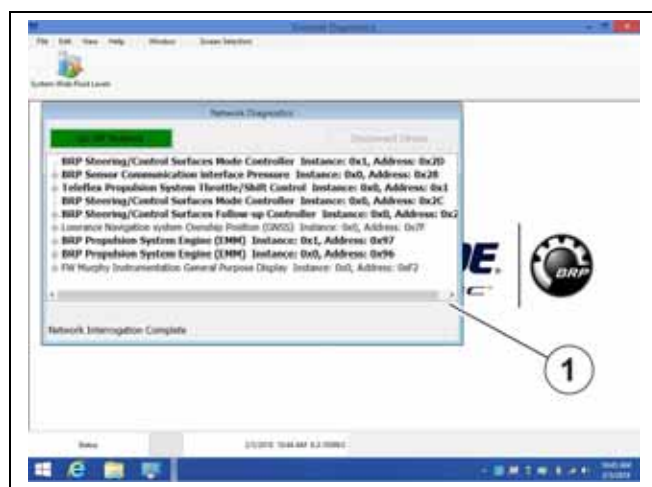


1. *Stbd Limit* button
2. *Update Controller* button

010768

13. Close the *Configuration* window and select *Disconnect Device*.

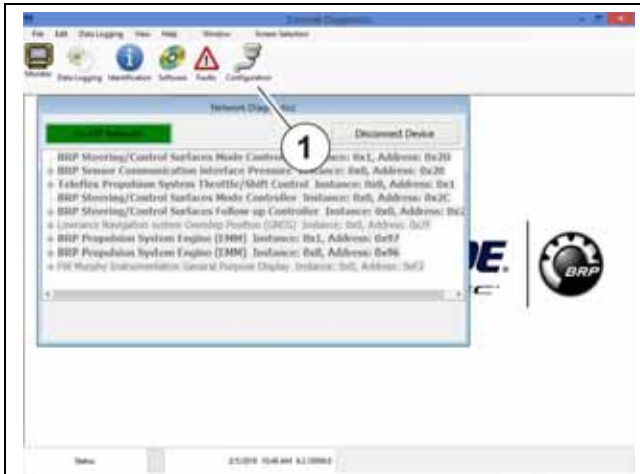
14. Select **BRP/Steering Control Surface Mode controller instance: 0x1** from the device list.



1. *Device list*

010761

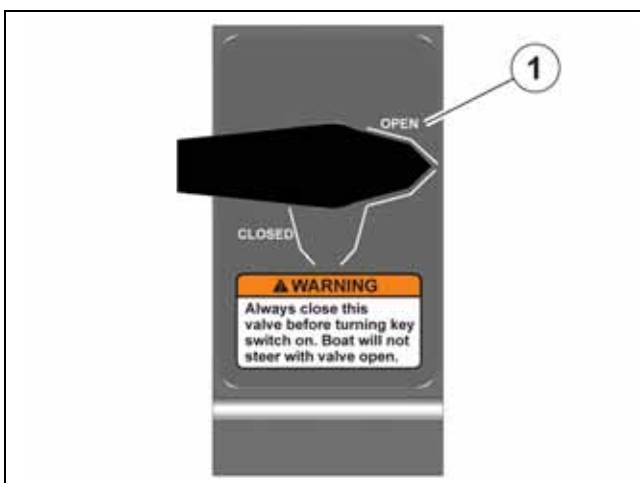
15. Select *Configuration* from the menu bar.



1. *Configuration*

010764

16. Turn the steering wheel fully to PORT. Then OPEN the alignment valve.



1. *Alignment Valve OPEN position*

010766

17. Turn the steering wheel to PORT until it stops.

IMPORTANT: Observe the outboards to ensure they do not contact. If the outboards will contact, the PORT outboard will need to be moved. Refer to **Preventing Outboards From Contact** on p. 86.

When the steering wheel stops, select the *Port Limit* button.



1. PORT Limit button

010769

18. Turn the steering wheel to STARBOARD until it stops. Select the *Stbd Limit* button, then select *Update Controller*.



1. Stbd Limit button

2. Update Controller button

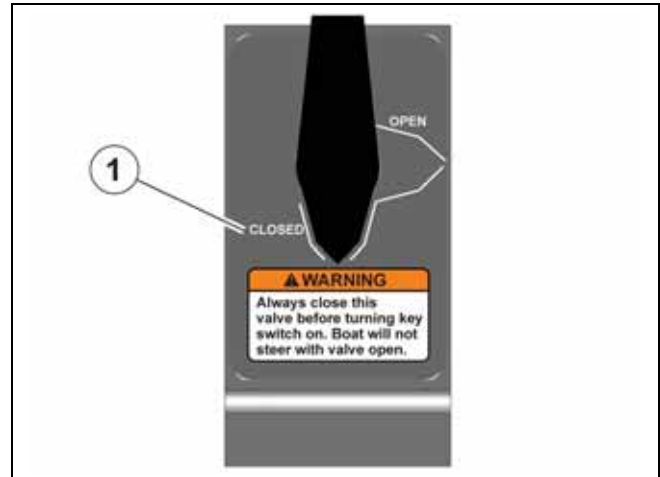
010770

19. Close the *Configuration* window and select *Disconnect Device*.

20. Close the *Evinrude Diagnostics* software program and disconnect the MPI-2 and adapter cable from the laptop and the *NMEA 2000* network.

21. Turn the steering wheel to PORT until the starboard outboard aligns with the port outboard. The turn the key switch to the OFF position,

22. CLOSE the alignment valve.



1. Alignment Valve CLOSED position

010765

23. Connect the Pressure Sensor Module to the remote control (private) network.

Steering Manifold Service

NOTICE

Service procedures of hydraulic manifolds **MUST** occur in a clean, dust-free environment.

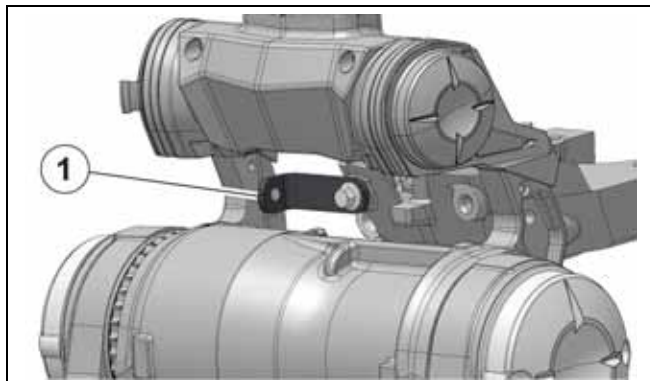
When cleaning components use lint-free shop towels.

Dirt, dust or other contaminants in the hydraulic system can result in malfunctions or failures.

Remove the engine from the stern and swivel bracket. Then remove the stern and swivel bracket from the boat and place it on a suitable work bench. Refer to **Stern & Swivel Bracket Removal** in the correct **Service Manual**.

Removal

Install a shipping bracket with two screws to prevent the engine from turning and spilling additional hydraulic steering fluid.

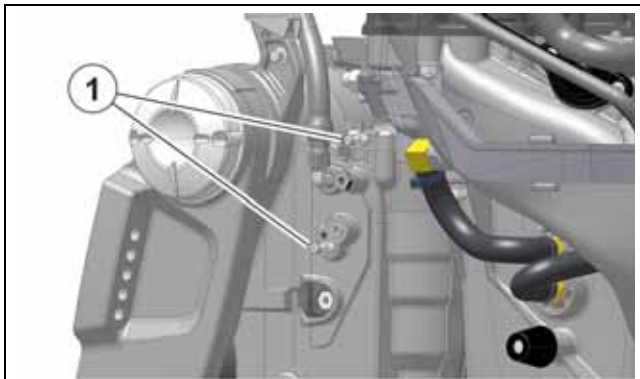


1. Shipping bracket

009439

If the shipping bracket holes do not align with the stern or swivel brackets open the steering system bleed valves one-half turn. This will allow the

swivel bracket to pivot. After the shipping bracket is installed, close the bleed valves



1. Bleed valves

009396

Wipe off any spilled hydraulic fluid.

ENVIRONMENTAL NOTE

Dispose of spilled hydraulic fluid or contaminated shop towels in an environmentally responsible manner, or according to local regulations.

Place the stern and swivel bracket in a clean work area. Place oil absorbent mats or shop towels in a large pan. Place the pan on a work bench and place the stern and swivel bracket in the pan.



1. Large pan
2. Oil absorbent mats

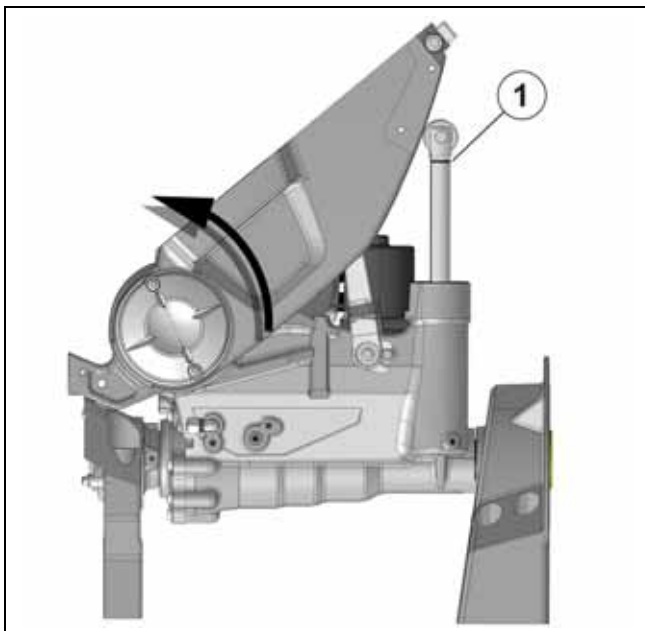
009490

⚠ WARNING

Trim and tilt fluid can be under pressure. Relieve pressure in the trim/tilt hydraulic system.

Wear safety glasses while removing the manifold assembly to avoid personal injury.

Apply 12 VDC to the trim motor leads, positive (+) to the blue lead, negative (-) to the green lead. Run the trim motor until the trim rods are fully extended.



1. Trim rods fully extended

010292

A quantity of hydraulic oil will spill as the manifold assembly is removed from the swivel bracket.

Position electrical wiring to the port side of the stern and swivel bracket for removal. Wiring must

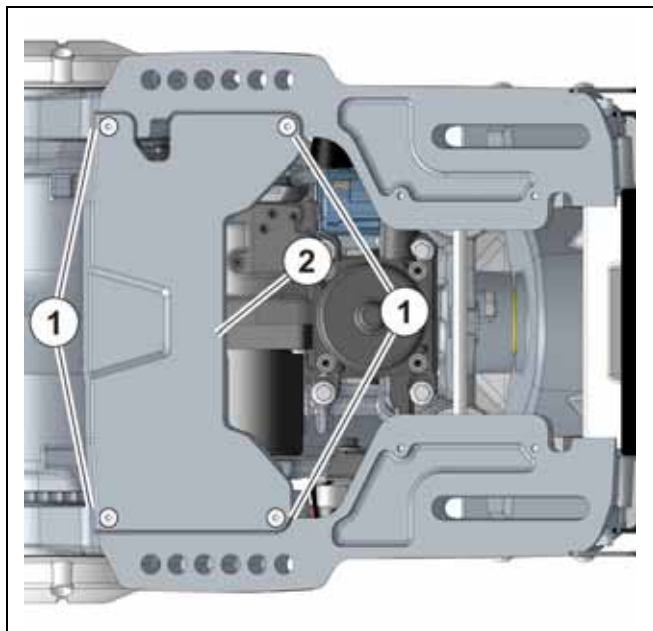
pass through the area shown. Do NOT attempt to remove wiring at this time.



1. Wiring pass-through area

010756

Remove the four screws retaining the plate to the stern brackets. Then remove the plate.



1. Screw
2. Plate

010757

Remove the trim sender from the port stern bracket. Do NOT remove the trim sender wires at this time. Refer to **Trim Sender Service** in the correct **Service Manual**.

⚠ WARNING

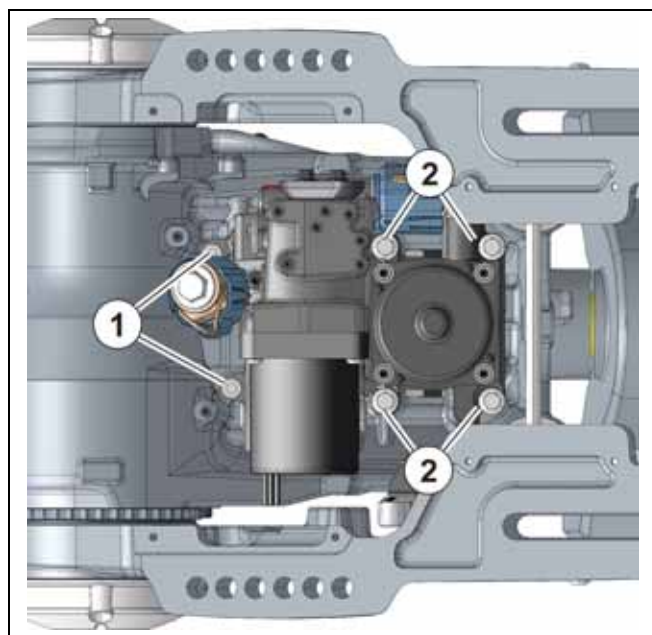
Use care when removing and installing fasteners on the **PORT** side of the manifolds. Use care when removing and installing the manifold.

The direction valve and mode valve solenoids can be damaged if excessive pressure is applied against the solenoids.

Damage to one or both solenoids can result in the loss of steering control while maneuvering in joystick mode.

Remove the two cap screws and washers retaining the steering manifold and the four hex screws retaining the trim manifold.

The manifolds are removed as one assembly.



1. Cap screws
2. Hex screws

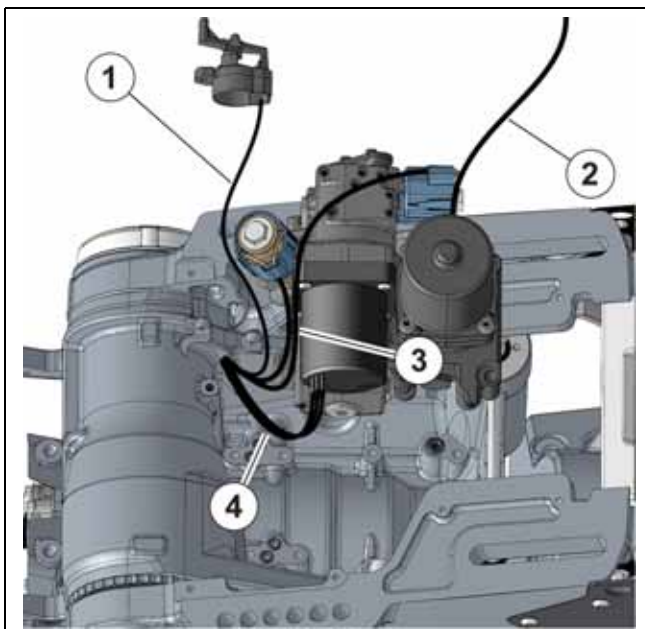
010758

CAREFULLY remove the manifold assembly from the outboard. Use shop towels to wipe up spilled hydraulic oil.

After the manifold is removed, carefully remove leads and cables through the port side of the swivel bracket in this order:

- trim sender lead
- trim motor cable
- solenoid leads

- steering motor cable

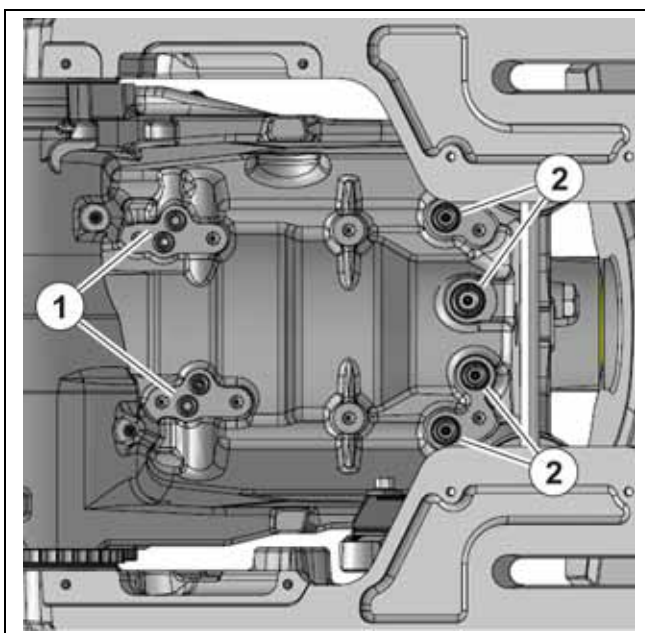


1. Trim sender lead
2. Trim motor cable
3. Solenoid leads
4. Steering motor cable

010759

Remove the four steering manifold o-rings from the swivel bracket.

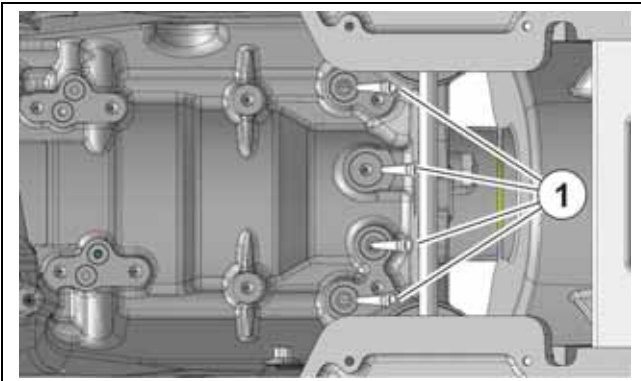
Remove the four trim manifold o-rings from the swivel bracket.



1. Four manifold o-rings
2. Four trim manifold o-rings and filters

009437

Remove the four trim and tilt filters from the swivel bracket.



1. Filters

009441

Installation

NOTICE

Make sure ALL mating surfaces of the steering and trim/tilt manifolds and stern and swivel bracket are COMPLETELY CLEAN AND FREE OF ALL DEBRIS.

Dirt, dust or other contaminants in the hydraulic system can result in malfunctions or failures.

Service replacement manifold assemblies may have filters installed, or included in the packaging.

IMPORTANT: Identify filters and o-rings. Ensure filters and o-rings are installed in their correct locations before installing the manifold assembly.

The **steering manifold** uses:

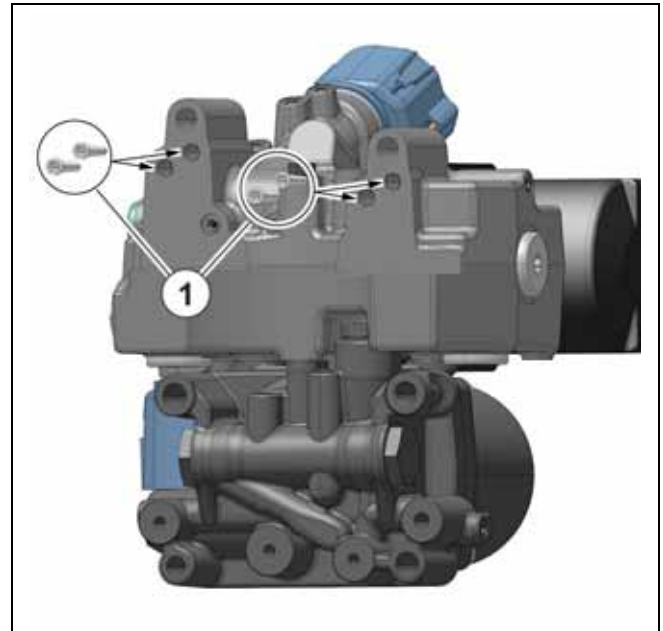
- 4 Filters, P/N 357367, which are 1 in. (25.4 mm) long.
- 4 O-rings, P/N 326956, which are 0.237 in. (6 mm) inside diameter, x 0.103 in (2.6 mm) thick.

The **trim and tilt manifold** uses:

- 4 Filters, P/N 356937, which are 0.875 in. (22.4 mm) long,
- 3 O-rings, P/N 326956, which are 0.299 in. (7.6 mm) inside diameter, x 0.103 in (2.6 mm) thick.
- 1 O-ring P/N 318372, which is 0.306 in (7.8 mm) inside diameter x 0.179 in. (4.5 mm) thick.

IMPORTANT: Install o-rings DRY. Do NOT use grease or adhesives to hold o-rings in position.

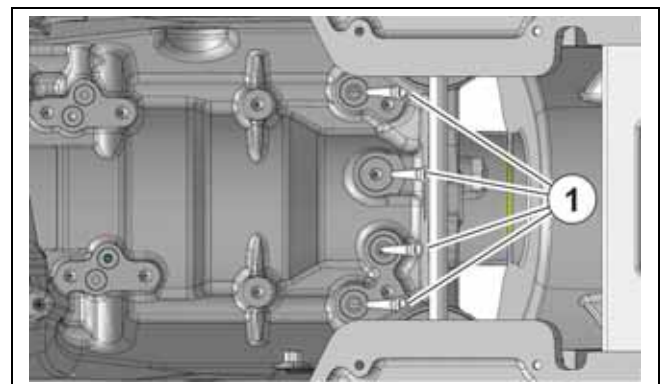
If the filters ARE installed into the manifold, skip this step. If the filters are NOT installed, install four filters into the manifold as shown.



1. Filters

010760

Insert a new filter into the each swivel bracket oil passage for the trim and tilt circuit.



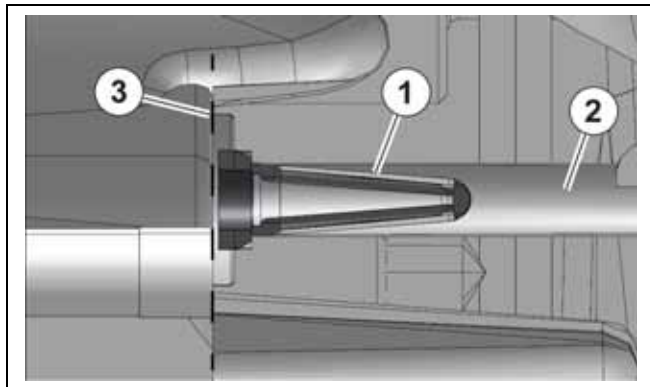
1. Filters

009441

iDock Service Supplement

Steering Manifold Service

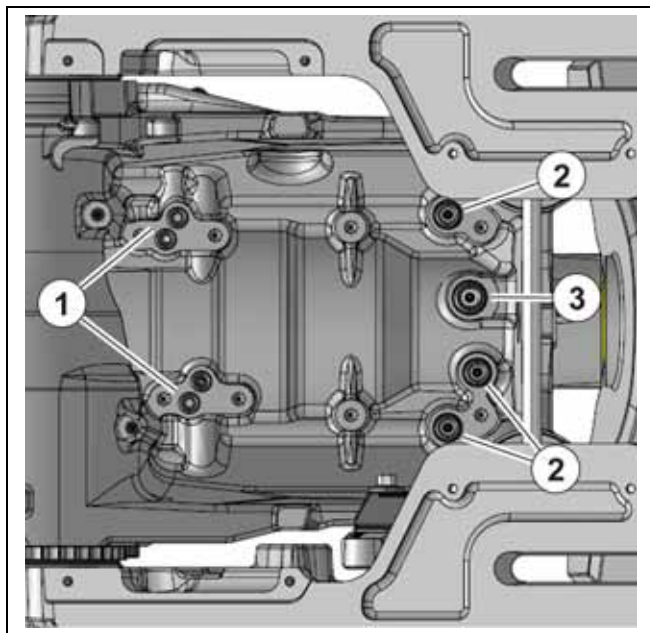
Continue to push the filter into the oil passage until the filter is just below the mating surface.



1. Filter
2. Oil passage (cross-sectioned view)
3. Mating surface

009488

Place the four o-rings on the swivel bracket. Then place the four trim and tilt manifold o-rings on the swivel bracket and over the filters. Install the large diameter o-ring in the position shown.



1. Manifold o-rings
2. Trim and tilt manifold o-rings
3. Large o-ring

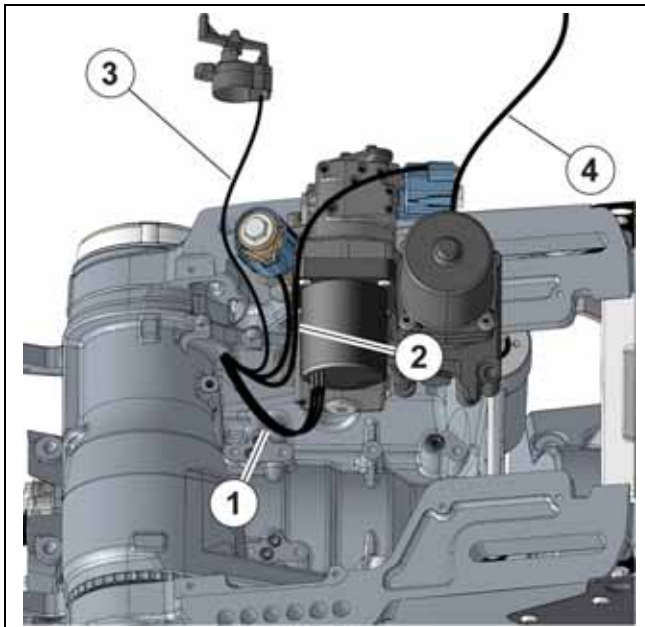
009437.1

Position the manifold assembly close to the swivel bracket.

Carefully install leads and cables through the port side of the swivel bracket in this order:

- steering motor cable
- solenoid leads

- trim sender lead
- trim motor cable



1. Steering motor cable
2. Solenoid leads
3. Trim sender leads
4. Trim motor cable

010759

CAREFULLY place the manifold assembly into position on the swivel bracket. Take care to keep o-rings in position.

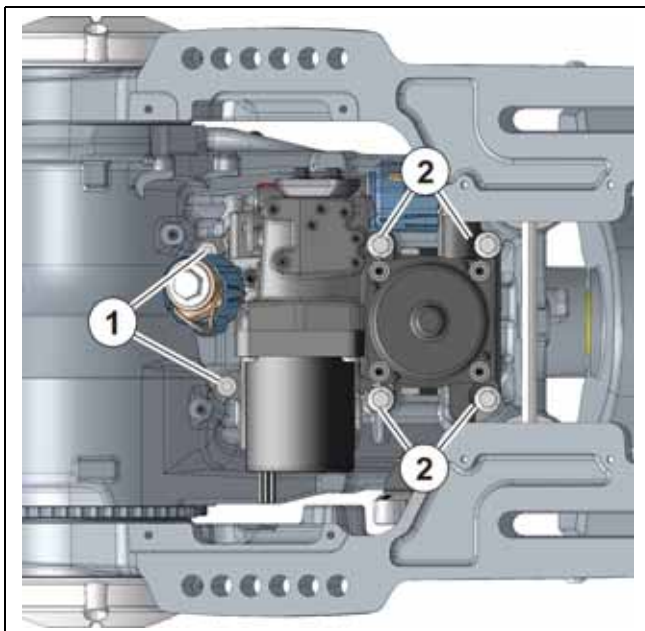
⚠ WARNING

CAREFULLY install and tighten fasteners on the **PORT** side of the manifolds.

The direction valve and mode valve solenoids can be damaged if excessive pressure is applied against the solenoids.

Damage to one or both solenoids can result in the loss of steering control while maneuvering in joystick mode.

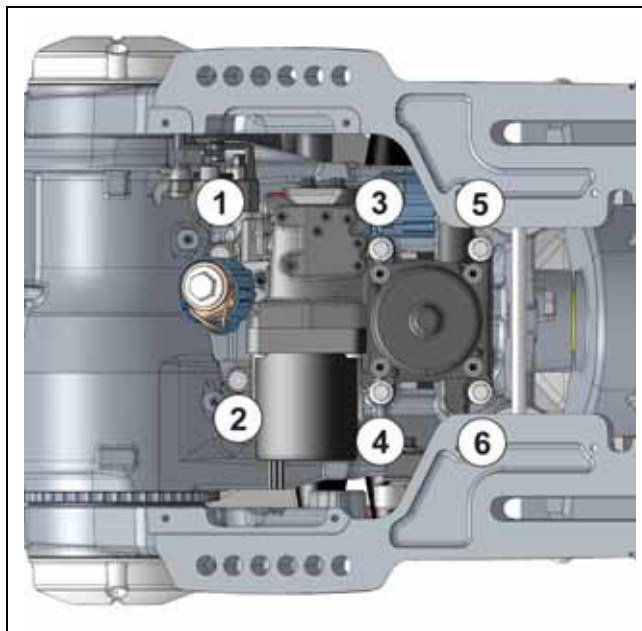
Install the two cap screws and washers into the manifold and the four hex screws into the trim manifold.



1. Two cap screws and washers
2. Four hex screws

010758

Tighten screws in the sequence shown to a torque of 18 to 20 Ft. lbs. (24.4 to 27 N·m).

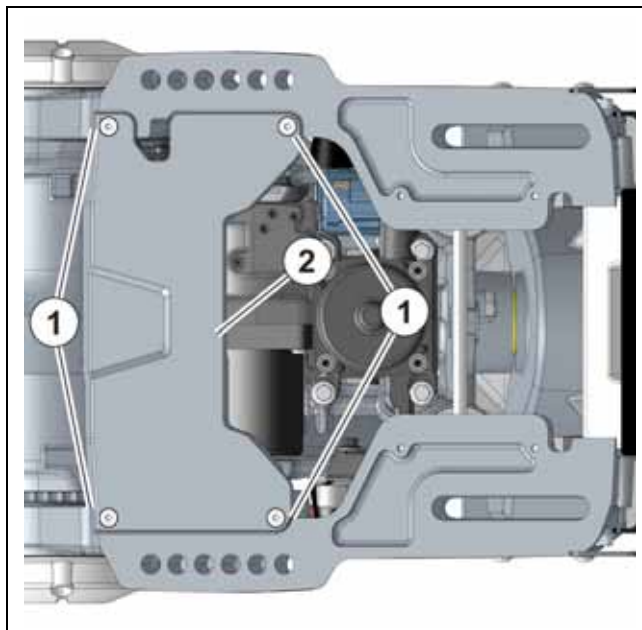


Tightening Sequence

010761

Install the trim sender on the port stern bracket. Refer to **Trim Sender Service** in the correct **Service Manual**.

Install the plate to the stern brackets with four screws. Tighten screws to a torque of 18 to 24 in. lbs. (2 to 2.7 N·m).



1. Screws
2. Plate

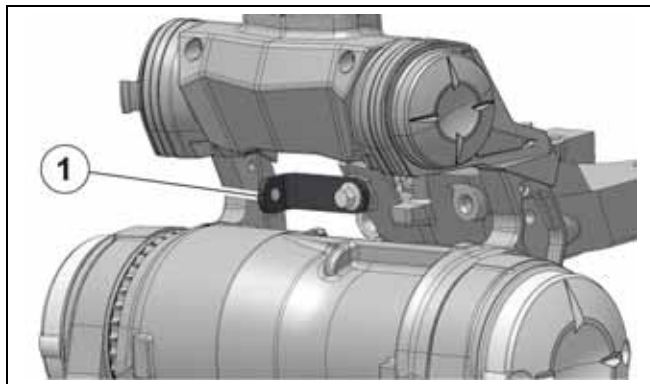
010757

iDock Service Supplement

Steering Manifold Service

Install the stern and swivel bracket on the boat, then install the engine to the stern and swivel bracket. Refer to **Stern & Swivel Bracket Installation** in the correct **Service Manual**.

Then remove the shipping bracket and two screws from the outboard.



1. Shipping bracket

009439

Refer to the correct **Service Manual** for the following:

- Fill and bleed the steering system. Refer to **Filling and Bleeding the Hydraulic Steering System**.
- Fill and bleed the trim and tilt system. Refer to **Filling the Trim and Tilt System**.
- Confirm the trim and tilt fluid level is correct. Refer to **Trim and Tilt Fluid Level**.
- Install the port, starboard and front frames, and engine covers. Refer to **Engine Cover and Frame Service**.

Manifold Disassembly

⚠ WARNING

Use care while servicing the manifold.

The direction valve and mode valve solenoids can be damaged if excessive pressure is applied against the solenoids.

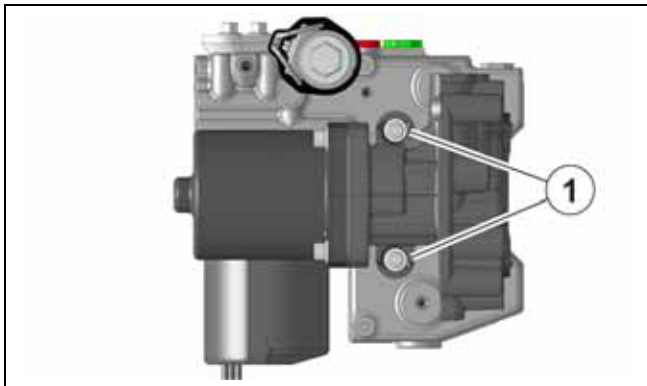
Damage to one or both solenoids can result in the loss of steering control while maneuvering in joystick mode.

Service of the *iDock* manifold requires removal from the outboard. Refer to **Steering Manifold**

Service on p. 90.

If needed, separate the *iDock* steering manifold from the trim manifold:

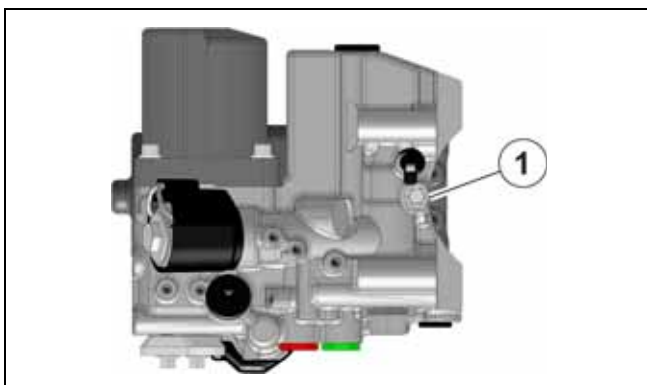
- Remove two screws and washers from the bottom of the trim manifold
- Remove one screw from the top of the manifold



Bottom Of Trim Manifold

1. Two screws and washers

010540

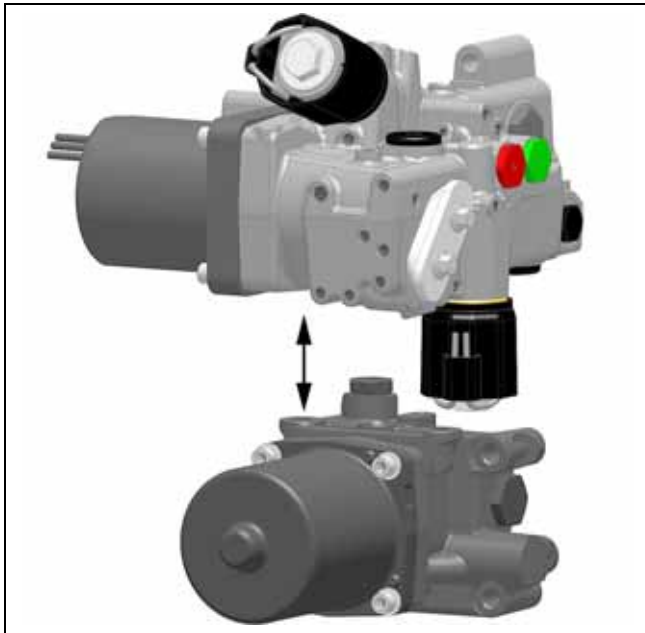


Top of iDock Manifold

1. Screw

010541

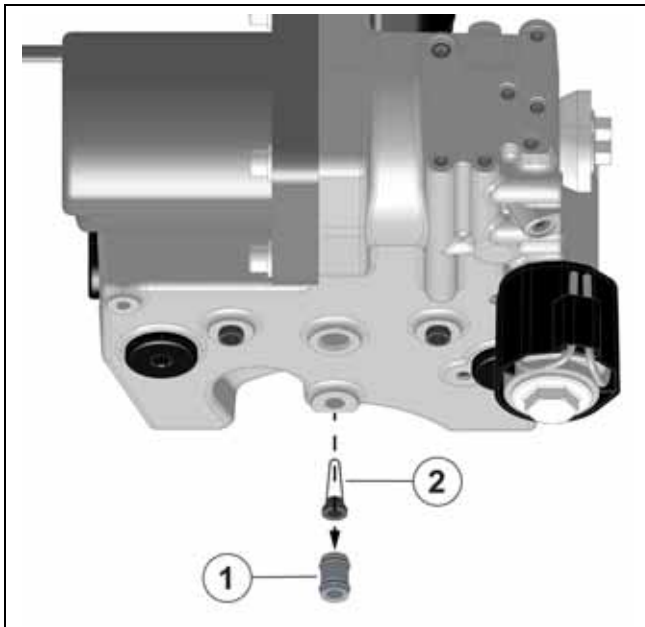
Carefully separate the manifolds.



010542

Remove the tube and o-rings from the bottom of the *iDock* manifold.

Remove the filter.



1. Tube and o-rings
2. Filter

010543

Cleaning and Inspection

NOTICE

Apply cleaning solvent to lint-free shop towels to clean hydraulic oil residue from all surfaces.

Do NOT spray cleaning solvent on the manifolds. Solvent can seep into oil passages resulting in contamination of hydraulic fluids.

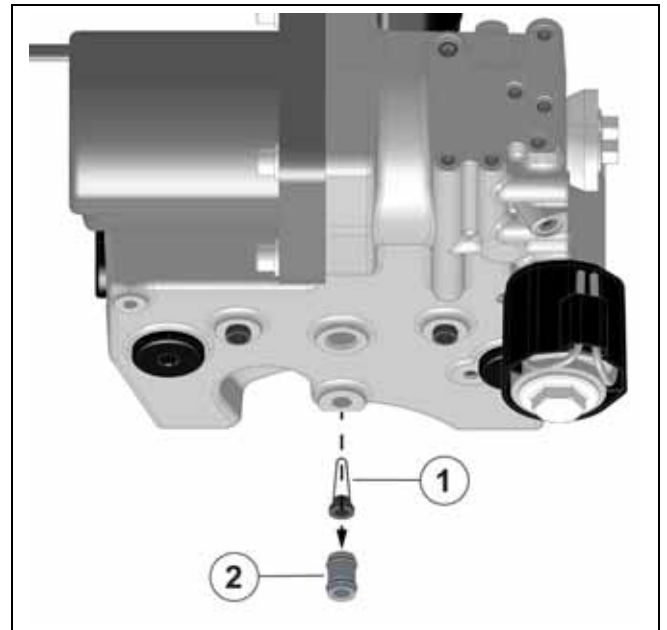
Clean and dry all parts thoroughly. Use lint-free shop towels to wipe up spilled hydraulic fluid.

ENVIRONMENTAL NOTE

Dispose of spilled hydraulic fluid or contaminated shop towels in an environmentally responsible manner, or according to local regulations.

Manifold Assembly

Install a new filter into the manifold. Apply a drop of *Power Trim/Tilt Fluid*, P/N 767969, to the o-rings of a new tube and o-ring assembly. Install the tube and o-rings into the manifold.



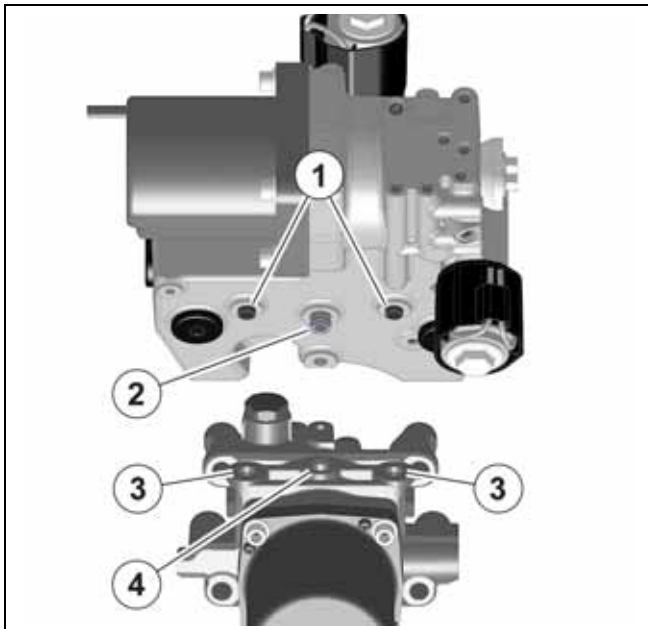
1. Filter
2. Tube and o-rings

010544

iDock Service Supplement

Steering Manifold Service

Align the tube and o-rings and sleeves of the *iDock* manifold with the screw bosses, and fluid passage of the trim manifold.

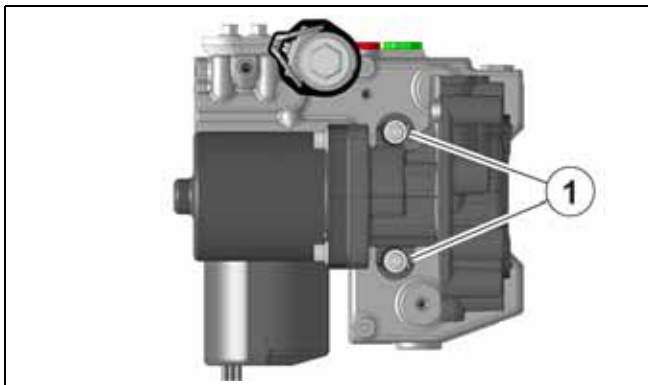


1. Sleeves
2. Tube and o-rings
3. Retaining screw bosses
4. Fluid passage

010545

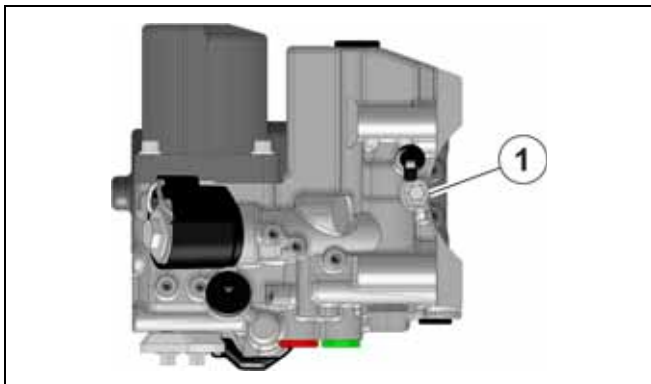
Assemble the manifolds.:

- Install two screws and washers from the bottom of the trim manifold
- Install one screw from the top of the manifold



Bottom Of Trim Manifold
1. Two screws and washers

010540



Top of iDock Manifold
1. Screw

010541

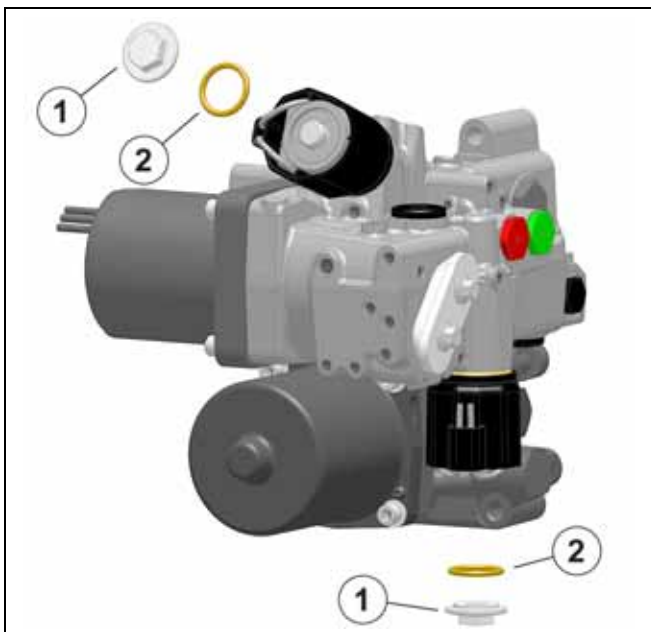
Tighten the screws to a torque of 60 to 84 In. lbs. (7 to 10 N·m).

Steering Solenoids

Solenoids are serviced as a pair.

Removal

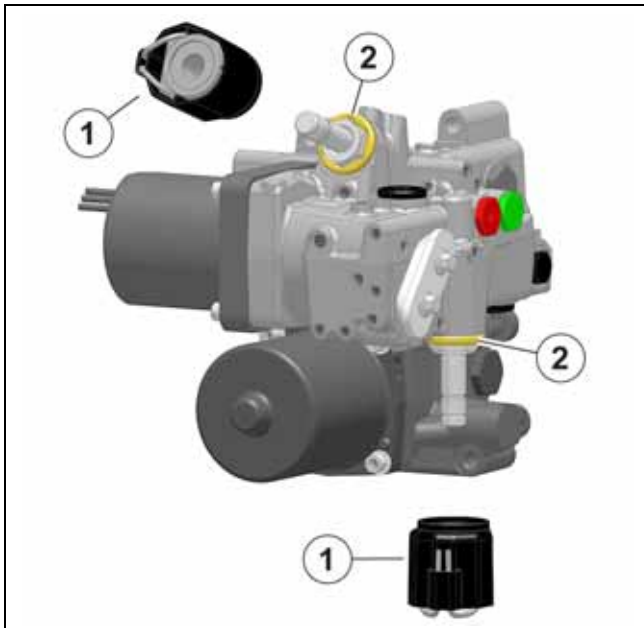
Remove the nut from each solenoid, then remove the o-rings.



1. Nuts
2. O-rings

010547

Remove the solenoids from the valves. Then remove the seals.

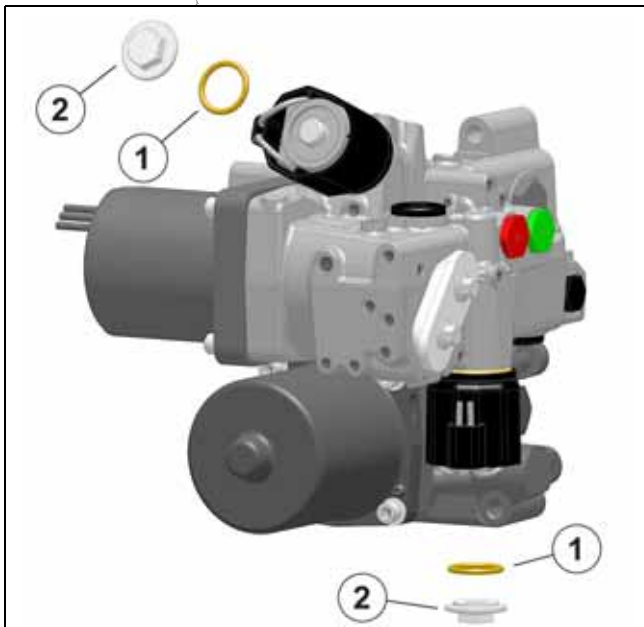


1. Solenoids
2. Seals
010548

Installation

Install new seals over the nut of each valve. Install the solenoids on the valves.

Install a new o-ring on each solenoid. Install the nut on each solenoid, and tighten to a torque of 48 to 60 In. lbs. (5.5 to 6.5 N·m).



1. O-rings
2. Nuts
010547.1

Mode and Direction Valve Service

⚠ WARNING

Use care while servicing the manifold.

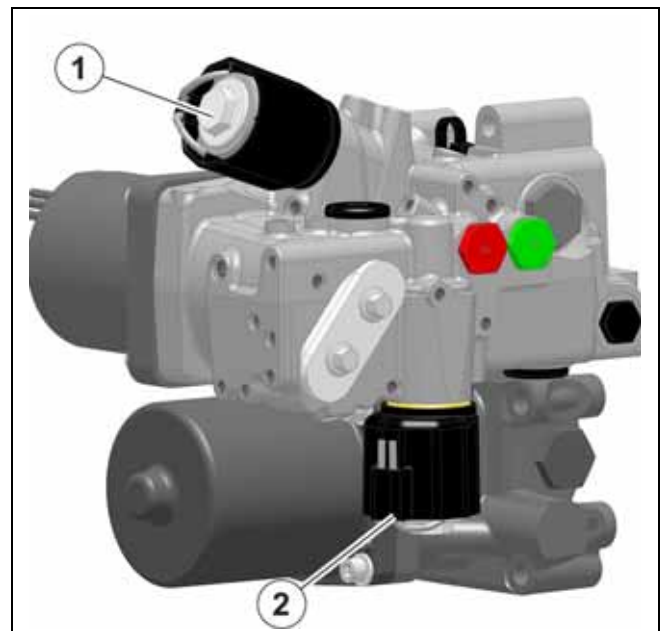
The direction valve and mode valve solenoids can be damaged if excessive pressure is applied against the solenoids.

Damage to one or both solenoids can result in the loss of steering control while maneuvering in joystick mode.

⚠ WARNING

MODE and DIRECTION valves appear similar, but are NOT interchangeable. The internal fluid passages are different.

Installation of valves in the wrong location will cause the outboard to turn opposite of the intended direction. This can result in loss of steering control and damage to the outboards.



1. MODE Valve
2. DIRECTION Valve
010549

Removal

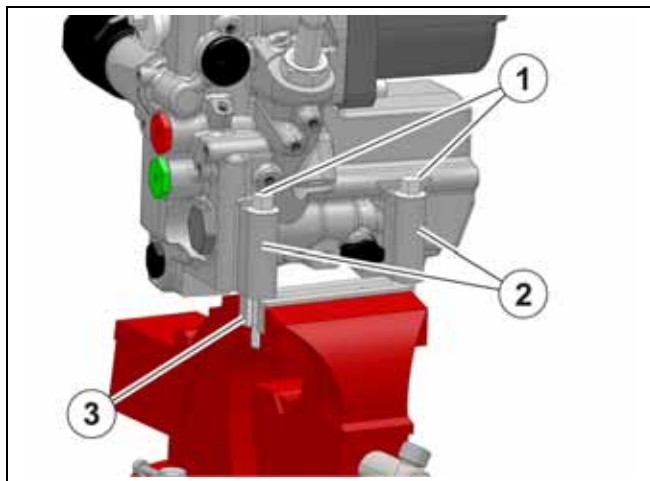
Remove the solenoids as needed. Refer to **Steering Solenoids** on p. 98.

Place two 5/16 in. (8 mm) bolts that are at least 3 in. (75 mm) long, through the upper mounting

iDock Service Supplement

Steering Manifold Service

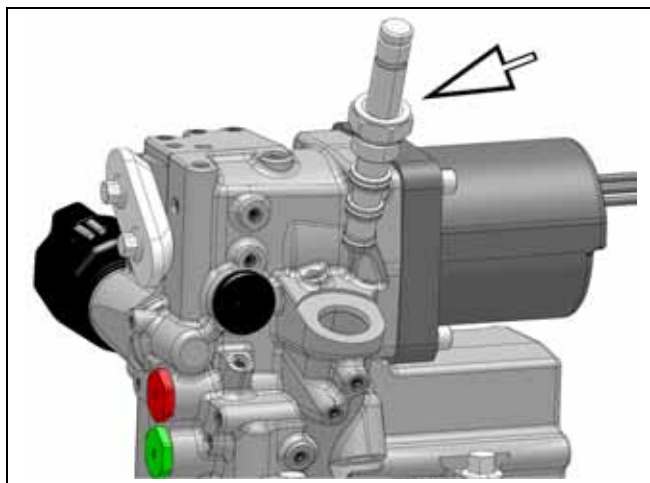
bosses of the manifold assembly. Carefully rest the manifold on top of the vise and tighten the jaws of the vise to hold the screws.



1. Bolts
2. Mounting bosses
3. Jaws

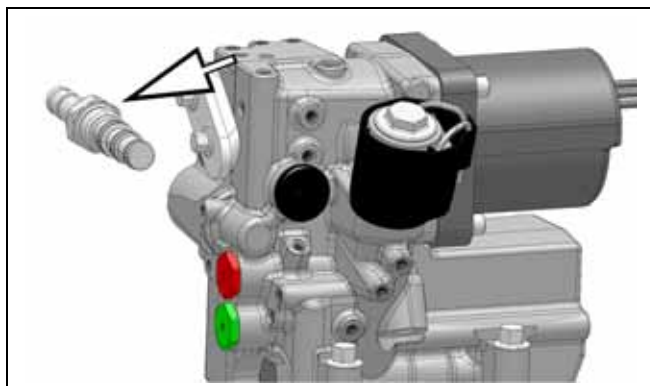
010609

Remove the valves as needed.



MODE Valve

010550



DIRECTION Valve

010551

Cleaning and Inspection

NOTICE

Apply cleaning solvent to lint-free shop towels to clean hydraulic oil residue from all surfaces.

Do NOT spray cleaning solvent on the Manifolds. Solvent can seep into oil passages resulting in contamination of hydraulic fluids.

Clean and dry all parts thoroughly. Use lint-free shop towels to wipe up spilled hydraulic fluid.

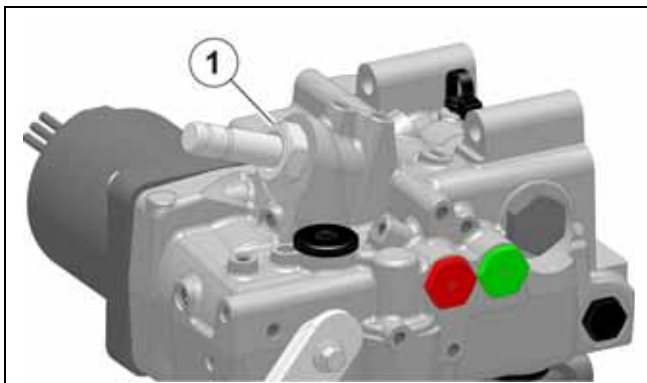
ENVIRONMENTAL NOTE

Dispose of spilled hydraulic fluid or contaminated shop towels in an environmentally responsible manner, or according to local regulations.

Installation

Apply Hydraulic Steering Fluid, P/N 770891, to the o-rings on the valve assembly.

Install the new valve assembly hand tight. Tighten the valve assembly to a torque of 228 to 252 In. lbs. (26 to 28 N·m).



MODE Valve

1. Valve assembly

010552

Install the solenoids as needed. Refer to **Steering Solenoids** on p. 98.

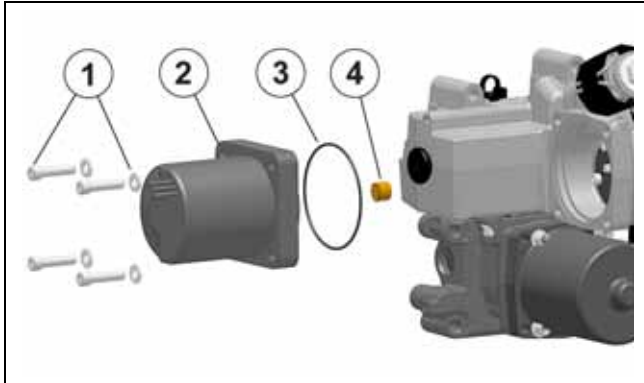
Electric Motor

Make note of the position of the motor wiring in relationship to the manifold. The motor **MUST** be reinstalled in the same position.

Removal

Remove the four screws and washers retaining the electric motor to the manifold housing.

Remove the electric motor, o-ring and coupler from the manifold housing.

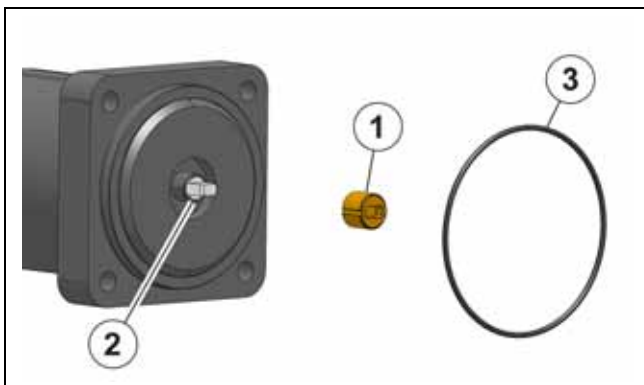


1. Screws and washers
2. Electric motor
3. O-ring
4. Coupler

010553

Installation

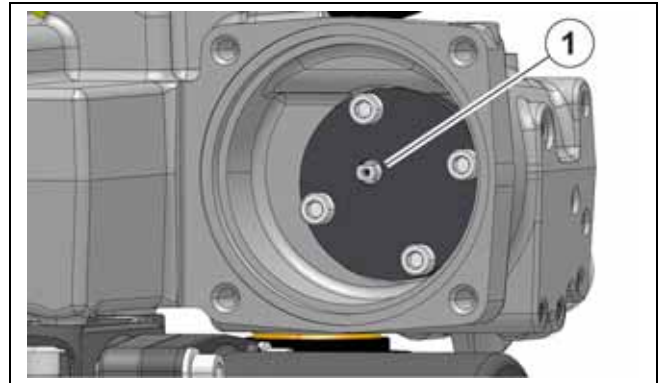
Install the coupler on the motor shaft. Apply a small amount of *Triple Guard* grease to the o-ring and install the o-ring on the motor.



1. Coupler
2. Motor shaft
3. O-ring

010554

Rotate the motor shaft and coupler to align the slot on the coupler with the pump shaft.



1. Pump drive

010555

Install the motor onto the manifold assembly. Install the washers and screws.

Tighten the screws to a torque of 60 to 84 In. lbs. (7 to 10 N·m).

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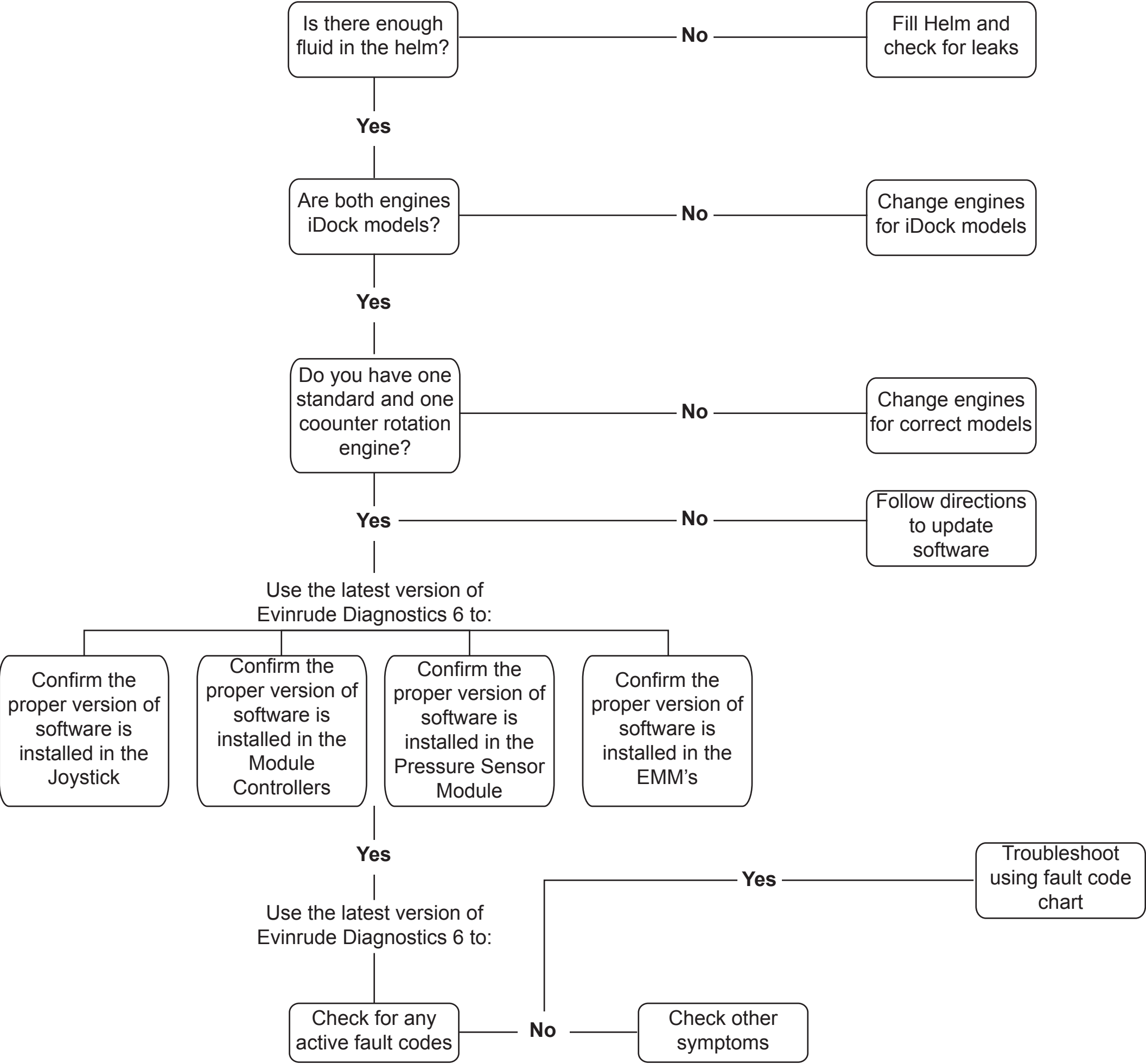
V

Vapor Separator

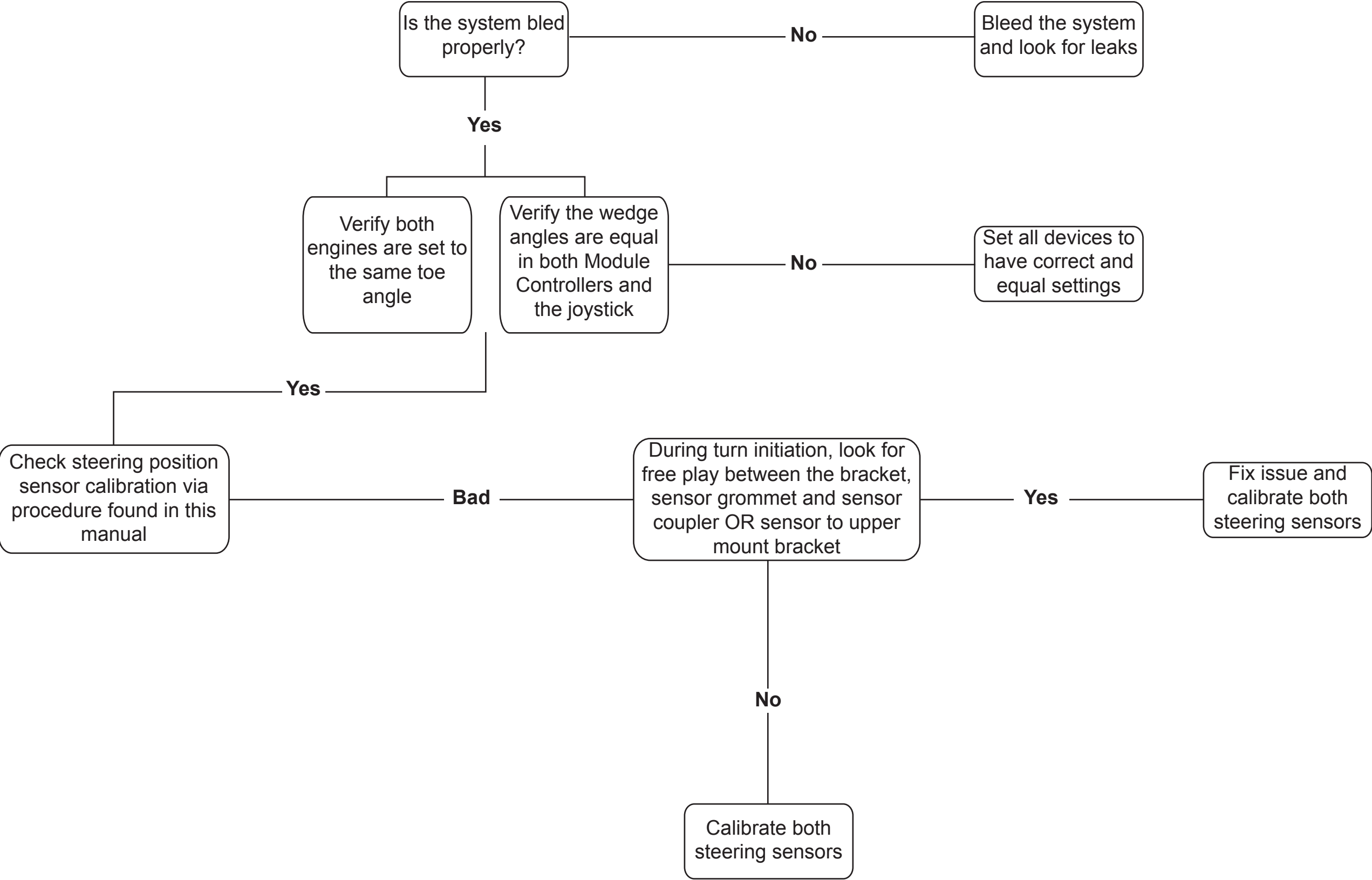
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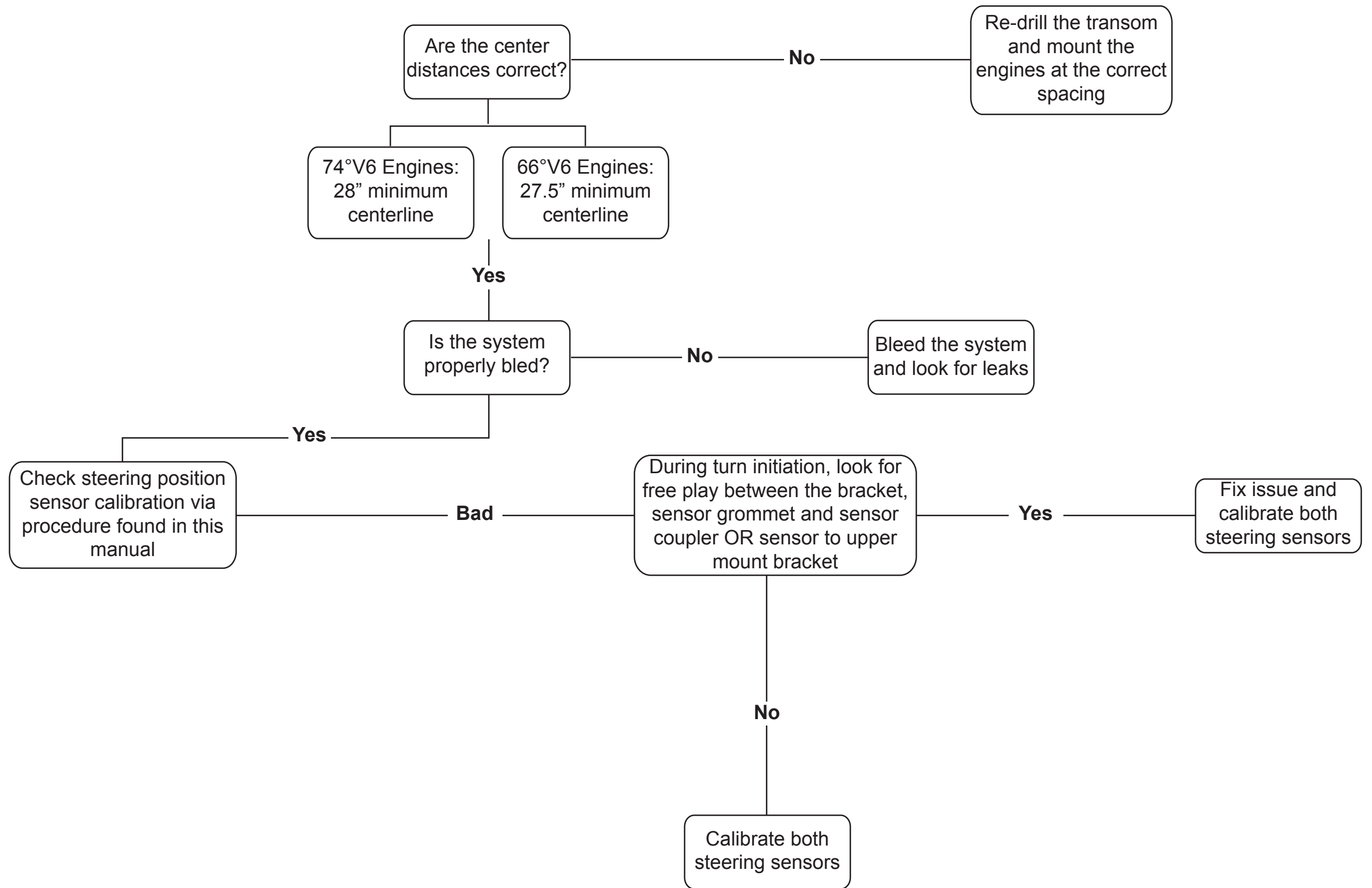
Evinrude iDock Preliminary Checks



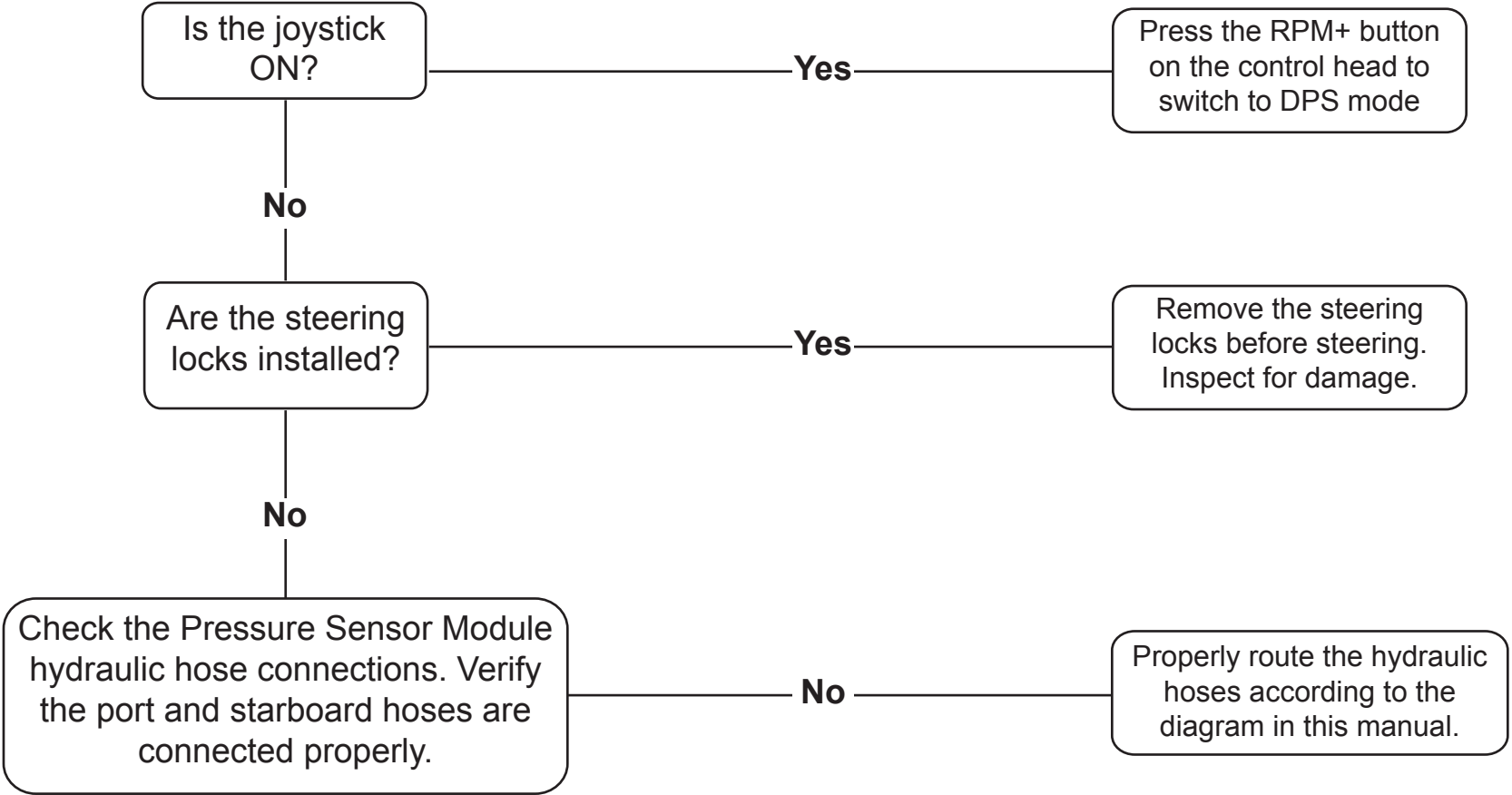
Evinrude iDock
Engines Repeatedly
Retiming



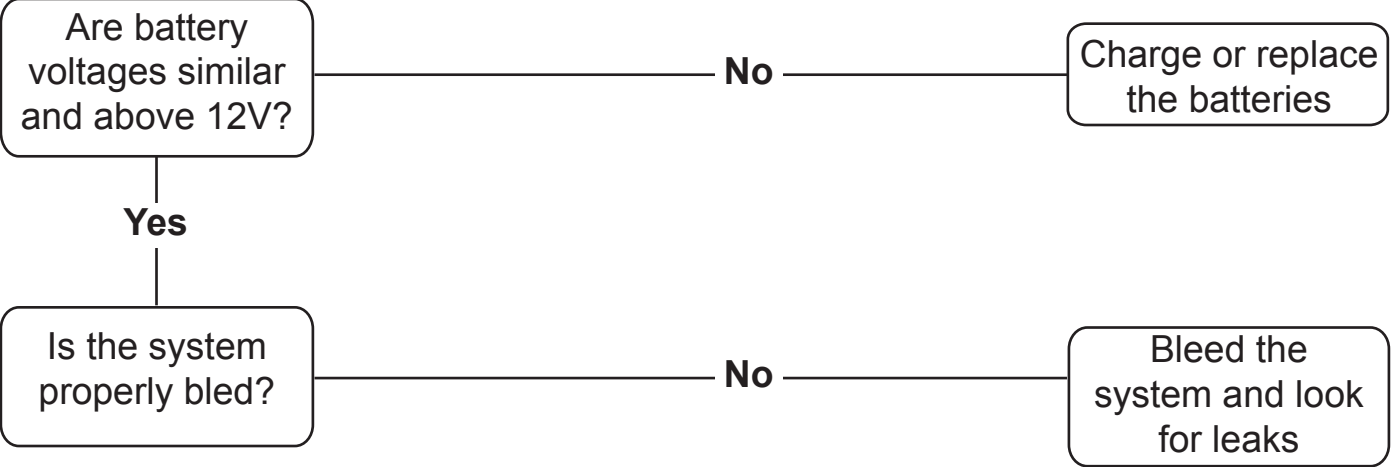
Evinrude iDock Engines Touching



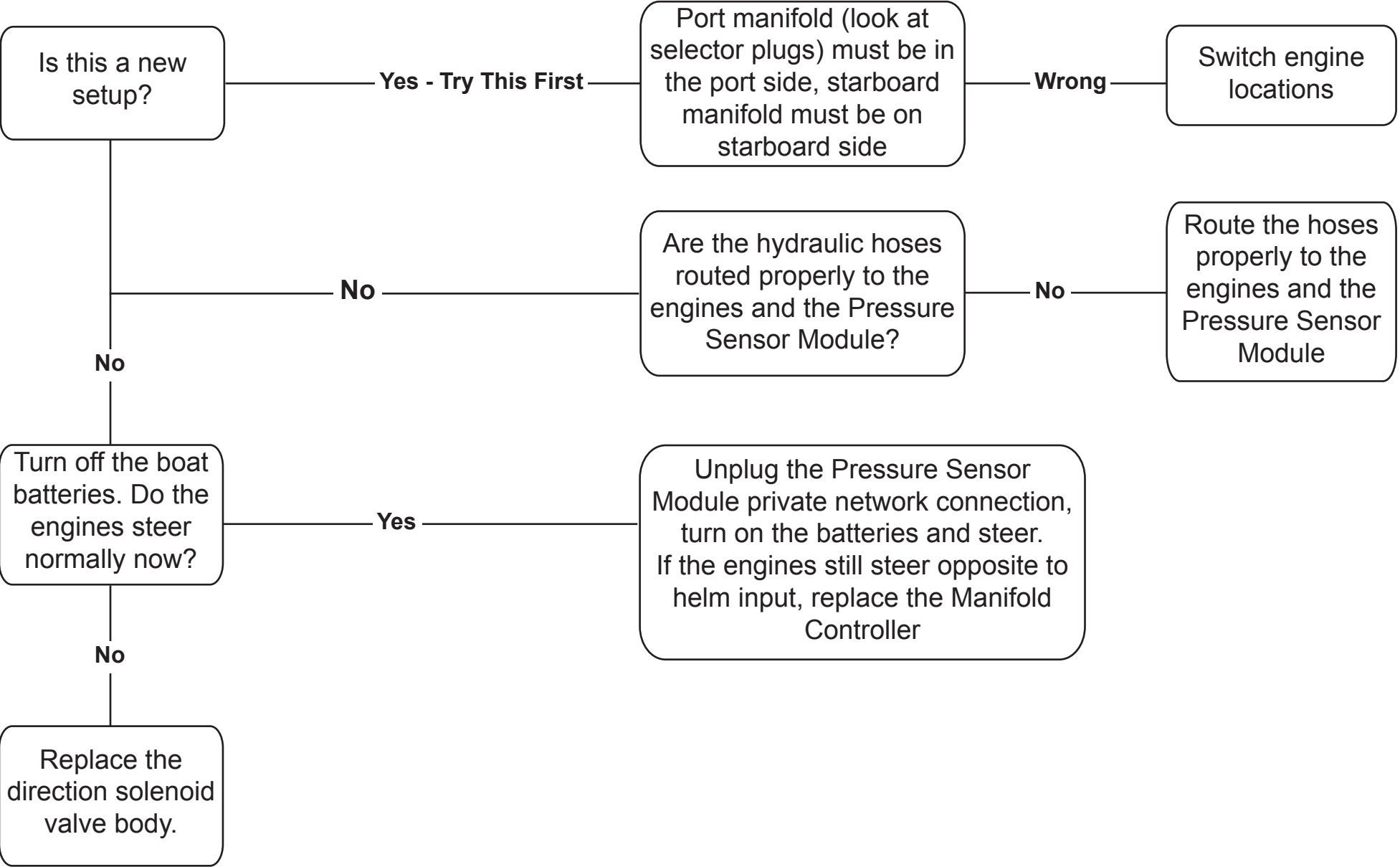
Evinrude iDock Engines Do Not Respond to Steering Input



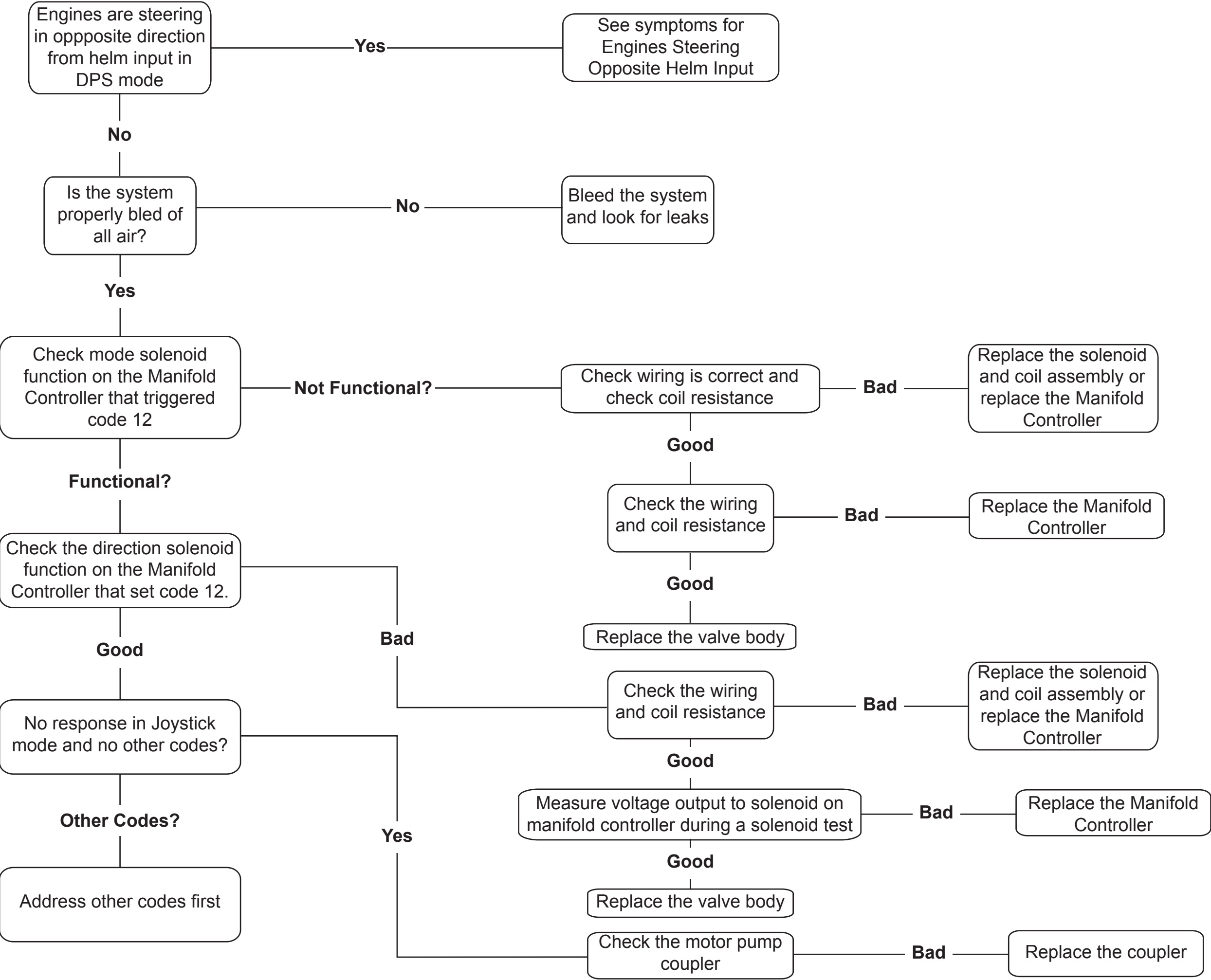
Evinrude iDock
One Engine Steers
Slowly During Docking
Mode



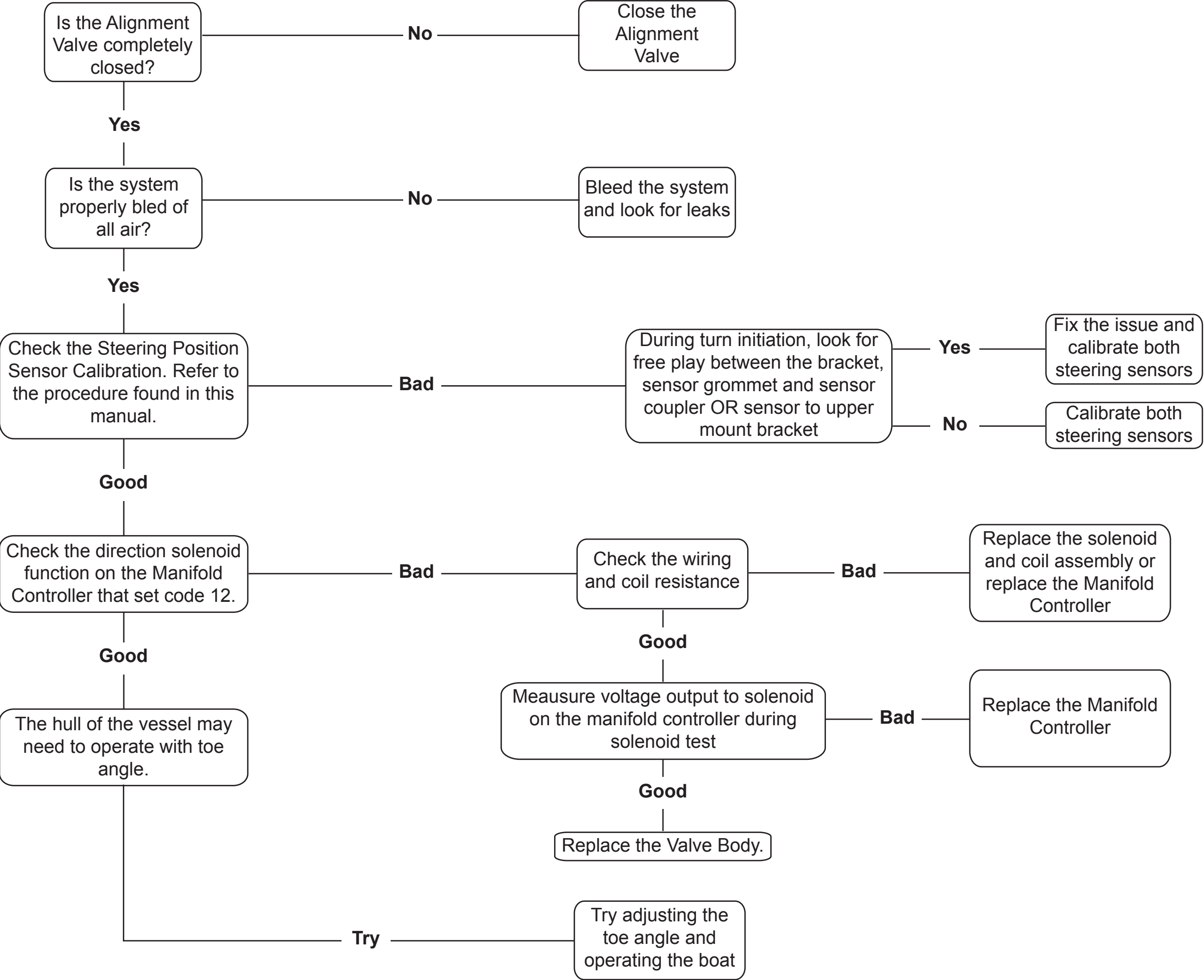
Evinrude iDock
Engines Steering
Opposite of Helm Input



Evinrude iDock
Manifold Controller
Code 12



Evinrude iDock
Manifold Controller
Code 13



Remote Control Fault Codes

Code	Remote Control Circuit/ Sensor	Single	Dual	Critical	Evinrude Digital Touch Screen Display	Audible Alarm*	Indicator LED's	Fault Information/ Corrective Action
1	Port lever sensor 0 OVER range	X	X	X	Code 1 Lever sensor fault			Signal reading out of range. Throttle command allowed, but limited.
2	Port lever sensor 1 OVER range	X	X	X	Code 2 Lever sensor fault			Signal reading out of range. Throttle command allowed, but limited.
3	Port lever sensor mismatch	X	X	X	Code 3 Lever sensor fault	X		Port sensor 0 and sensor 1 readings do not match. Shift and throttle commands NOT available.
4	Port lever failure	X	X	X	Code 4 Lever sensor fault	X		Port sensor 0 and sensor 1 readings not consistent. Shift and throttle commands NOT available.
5	Starboard lever sensor 0 OVER range		X	X	Code 5 Lever sensor fault			Signal reading out of range. Throttle command allowed, but limited.
6	Starboard lever sensor 1 OVER range		X	X	Code 6 Lever sensor fault			Signal reading out of range. Throttle command allowed, but limited.
7	Starboard lever sensor mismatch		X	X	Code 7 Lever sensor fault	X		Starboard sensor 0 and sensor 1 readings do not match. Shift and throttle commands NOT available.
8	Starboard lever failure		X	X	Code 8 Lever sensor fault	X		Starboard sensor 0 and sensor 1 readings not consistent. Shift and throttle commands NOT available.
9	Pedal sensor 0 OVER range	X		X	Code 9 Pedal sensor fault			Signal reading out of range. Throttle command allowed, but limited.
10	Pedal sensor 1 OVER range	X		X	Code 10 Pedal sensor fault			Signal reading out of range. Throttle command allowed, but limited.
11	Pedal sensor mismatch	X		X	Code 11 Pedal sensor fault	X		Pedal sensor 0 and sensor 1 readings do not match. Shift and throttle commands NOT available.
12	Pedal sensor failure	X		X	Code 12 Pedal sensor fault	X		Pedal sensor 0 and sensor 1 readings not consistent. Shift and throttle commands NOT available.
13	Lever calibration error	X	X					Lever calibration not initialized or corrupted. Calibrate control lever(s).
14	Hardware code error	X	X					
15	Calibration signature error	X	X		Code 15 Lever Calibration Error			Calibration memory not initialized or corrupted. Calibrate control lever(s).
16	Part number not supported	X	X					
17	Throttle calibration error	X	X		Code 17 Throttle calibration fault		FNR indicators flash	Throttle calibration not initialized or corrupted. Turn key to OFF position, then to ON position to reset. Calibrate control lever(s).
18	FT CAN transceiver fault	X	X		Code 18 PRVT Network communications fault		FNR indicators flash	Check remote control network connections
19	EMM0 Private bus heart beat lost	X	X		Code 19 PRVT Network communications fault		FNR indicators flash	Check remote control network connections
20	EMM0 NMEA bus heart beat lost	X	X		Code 20 PBLC Network communications fault		FNR indicators flash	Check NMEA 2000 network connections
21	EMM0 communication lost	X	X	X	Code 21 Network communications fault	X		Shift and throttle commands NOT available. Check remote control and NMEA 2000 Network connections.
22	EMM1 Private bus heart beat lost		X		Code 22 PRVT Network communications fault		FNR indicators flash	Check remote control network connections. On new multi-engine installations, verify engine instances are set correctly.
23	EMM1 NMEA bus heart beat lost		X		Code 23 PBLC Network communications fault		FNR indicators flash	Check NMEA 2000 network connections. On new multi-engine installations, verify engine instances are set correctly.
24	EMM1 communication lost		X	X	Code 24 Network communications fault	X	FNR indicators flash	Shift and throttle commands NOT available. Check remote control and NMEA 2000 network connections. On new multi-engine installations, verify engine instances are set correctly.

* Audible alarm function only available if system is equipped with optional accessory warning horn

Remote Control Fault Codes

Code	Remote Control Circuit/ Sensor	Single	Dual	Critical	Evinrude Digital Touch Screen Display	Audible Alarm	Indicator LED's	Fault Information/ Corrective Action
25	EMM2 Private bus heart beat lost		X		Code 25 PRVT Network communications fault		FNR indicators flash	Check remote control network connections. On new multi-engine installations, verify engine instances are set correctly.
26	EMM2 NMEA bus heart beat lost		X		Code 26 PBLC Network communications fault		FNR indicators flash	Check NMEA 2000 network connections. On new multi-engine installations, verify engine instances are set correctly.
27	EMM2 communication lost		X	X	Code 27 Network communications fault	X	FNR indicators flash	Shift and throttle commands NOT available. Check remote control and NMEA 2000 Network connections. On new multi-engine installations, verify engine instances are set correctly.
28	EMM3 Private bus heart beat lost		X		Code 28 PRVT Network communications fault		FNR indicators flash	Check remote control network connections. On new multi-engine installations, verify engine instances are set correctly.
29	EMM3 NMEA bus heart beat lost		X		Code 29 PBLC Network communications fault		FNR indicators flash	Check NMEA 2000 network connections. On new multi-engine installations, verify engine instances are set correctly.
30	EMM3 communication lost		X	X	Code 30 Network communications fault	X	FNR indicators flash	Shift and throttle commands NOT available. Check remote control and NMEA 2000 network connections. On new multi-engine installations, verify engine instances are set correctly.
31	Main power disconnected	X	X		Code 31 Main Power Fault		FNR indicators flash	No voltage detected. Check fuse and power connections from remote control to battery.
32	Accessory power disconnected	X	X		Code 32 Accessory Power Fault		FNR indicators flash	Check fuse and power connections from remote control to battery.
33	Main ground disconnected	X	X		Code 33 Ground Fault		FNR indicators flash	Check fuse and power connections from remote control to battery.
34	Accessory ground disconnected	X	X		Code 34 Accessory Ground Fault		FNR indicators flash	Check ground (negative) connections from remote control to battery.
35	System configuration mismatch	X	X		Code 35 System config fault		FNR indicators flash	– The number of EMM instances detected does not match the current configuration. – OR – – There are two different EMMs configured with the same instance number. Use diagnostic software to correct system configuration.
36	Waiting for Neutral	X	X		Code 36 Waiting for Neutral			System has been powered ON with control lever(s) not in the NEUTRAL position. Move control lever(s) to NEUTRAL position.

* Audible alarm function only available if system is equipped with optional accessory warning horn

UCM Fault Codes

Code	Universal Control Module (UCM) Circuit/ Sensor	Controllable	Critical	Condiiton	System Check Display	Time to Activate	Fault Information/ Corrective Action
1	TPS A malfunction low	X				10 occurrences	TPS A < 0.25 V. TPS A is either open or shorted to ground. Check connectors and wiring. Perform electrical circuit tests.
2	TPS A malfunction high	X				10 occurrences	TPS A > 4.75 V. TPS A is shorted to +5 V, or reference ground is OPEN. Check connectors and wiring. Perform electrical circuit tests.
3	TPS B malfunction low	X				10 occurrences	TPS B < 0.25 V. TPS B is either open or shorted to ground. Check connectors and wiring. Perform electrical circuit tests.
4	TPS B malfunction high	X				10 occurrences	TPS B > 4.75 V.TPS B is shorted to +5 V, or reference ground is OPEN. Check connectors and wiring. Perform electrical circuit tests.
5	SPS A malfunction low	X				10 occurrences	Shift Position Sensor A is either open or shorted to ground. SPS voltage <0.25 V. Actuator will remain in current gear until shifting, then will only remain in neutral.
6	SPS A malfunction high	X				10 occurrences	Shift Position Sensor A is shorted to +5V. SPS voltage > 4.75 V. Actuator will remain in current gear until shifting, then will only remain in neutral.
7	SPS B malfunction low	X				10 occurrences	Shift Position Sensor B is either open or shorted to ground. SPS voltage <0.25 V. Actuator will remain in current gear until shifting, then will only remain in neutral.
8	SPS B malfunction high	X				10 occurrences	Shift Position Sensor B is shorted to +5V. SPS voltage > 4.75 V. Actuator will remain in current gear until shifting, then will only remain in neutral.
9	TPS signal out of correlation		X		Check Engine	20 occurrences	TPS A and TPS B correlated voltage out of range. Engine limited to idle speed. Check connectors and wiring. Perform electrical circuit tests.
10	SPS signal out of correlation		X		Check Engine	20 occurrences	SPS A and SPS B correlated voltage out of range. Enigne limited to NEUTRAL gear position. Check connectors and wiring. Perform electrical circuit tests.
11	TPS/SPS calibration threshold exceeded	X				10 occurrences	The CAM traveled outside the allowable calibration range including hysteresis. Engine limited to NEUTRAL gear position/idle speed.
12	TPS/SPS calibration invalid		X		Check Engine		TPS/SPS ADC > 923, or TPS/SPS ADC < 100, or TPS Total Travel < 500, or SPS Total Travel between each gear < 250. Engine limited to NEUTRAL gear position/idle speed. Check CAM travel at endpoints, minimum travel between FORWARD, NEUTRAL, and REVERSE, and minimum total travel during lever calibration.
13	Waiting for neutral			X			System has been powered ON with control lever(s) not in the NEUTRAL position. Move control lever(s) to NEUTRAL position. Engine limited to NEUTRAL gear position/idle speed.
14	TPS Stability Performance		X		Check Engine	10 occurrences	Both TPS A & B are malfunctioning/failed. Engine limited to idle speed. Replace TPS sensors.
15	SPS Stability Performance		X		Check Engine	10 occurrences	Both SPS A & B are malfunctioning/failed. Engine limited to NEUTRAL gear position. Replace SPS sensors.
17	ROM checksum error		X		Check Engine	15 seconds	ROM "CHECKSUM" failure. Engine limited to NEUTRAL gear position/idle speed. Indicates corrupt EMM program. Re-load/update EMM software.
18	Neutral Start Protect	X					Attempted engine start while in gear. Engine will not start. Move shift lever to NEUTRAL position.
20	Battery voltage below expected range	X			Check Engine	5 seconds	Battery voltage <12 V below 2000 RPM or < 12.5 V above 2000 RPM. Perform stator/charging tests.
21	Battery voltage above expected range	X				5 seconds	Battery voltage > 15.5 V. Check battery connections and wiring.
22	Fused B+ fault		X		Check Engine	5 seconds	Battery voltage <0.25 V. Check fuses
23	Analog 5V supply overload detected		X		Check Engine	1 second	Analog +5 V < 4.75V. Low voltage on analog sensor supply voltage. Check
24	Private CAN Error fault	X				5 seconds	Private CAN network shorted or open, may still function depending upon failure
25	Public CAN communication lost	X			*	3 seconds	Lost communications from EMM on public network. *If communication on private CAN is also lost, Check Engine will flash AND engine limited to NEUTRAL gear position/idle speed.
26	Private CAN communication lost	X			*	3 seconds	Lost communications from EMM on private network. *If communication on public CAN is also lost, Check Engine will flash AND engine limited to NEUTRAL gear position/idle speed.
27	Low Oil Light Open Circuit	X				5 seconds	Low oil light disconnected.
28	No Oil Light Open Circuit	X				5 seconds	No oil light disconnected.
29	Check Engine Light Open Circuit	X				5 seconds	Check engine light disconnected.
30	Overheat Light Open Circuit	X				5 seconds	Overheat light disconnected.

Outboard Fault Codes

Code	EMM Circuit/ Sensor	Internal Sensor	S.A.F.E	Shut Down	Evinrude Digital Touch Screen Display	SystemCheck Display	Time To Activate	Sensor: Circuit Voltage / Resistance (Ω) / Information
1-6	Excessive knock detected		X		Engine	Check Engine	Immediate	Code number indicates affected cylinder. 20 knock events in 100 combustion cycles with maximum correction applied. Make sure sensor is securely fastened to the cylinder head. Check timing adjustments. Test fuel and cooling systems. Check fuel quality.
7-8	Knock Sensor circuit OPEN – Port/ Starboard					Check Engine	5 seconds	Sensor output < 0.15 V and RPM > 3000. Check sensor connection.
15	ROM (EMM program)	X	X	X	Engine	Check Engine	15 seconds	ROM “CHECKSUM” failure. Engine shutdown if ESC checksum error. S.A.F.E. activated if ETC checksum error, engine RPM limited to 1000 RPM.
16	Crankshaft Position Sensor (CPS) Intermittent loss of SYNC				Engine		5 losses, RPM<2000 1 loss, RPM >2000	EMM counts losses of synchronization with crankshaft sensor. Check CPS mounting and resistance. Air gap range: 00.036 to 0.110 in. (1 to 2.8 mm), nominal 0.073 in. (1.85 mm). Resistance: 560 Ω ± 10% @ 77°F (25°C).
17	55 V circuit BELOW range	X	X		Engine	Check Engine	10 seconds	55 V alternator output < 45 V at 500 to 1000 RPM, or < 52 V above 1000 RPM. Engine limited to 1200 RPM. Perform stator/charging tests.
18	55 V circuit ABOVE range	X	X		Engine	Check Engine	1 minute	System Voltage > 57 V. Engine limited to 1200 RPM. Perform stator/charging tests. Check for loose connections in 55 V circuit. Check capacitor.
19	Start-in-gear					Check Engine		Attempted engine start while in gear. Engine will not start.
21	Winterization activated					All LEDs Flashing		Engine is speed limited, and stops after 360 oil pulses. Refer to Maintenance or Operator’s Guide.
23	EMM Temperature sensor circuit fault	X					10 seconds	EMM Temperature < -67° F (-55° C), or > 311° F (155° C).
24	EMM Temperature BELOW range	X					10 seconds	EMM Temperature < -22 ° F (-30° C).
25	EMM Temperature ABOVE range	X	X		Temp	Water Temp/Hot	10 seconds	EMM Temperature > 176°F (80°C). Engine limited to 1200 RPM. See Code 29.
26	12 V circuit BELOW range	X			Battery	Check Engine	5 minutes	Battery voltage <12 V below 2000 RPM or < 12.5 V above 2000 RPM. Perform stator/charging tests.
27	12 V circuit ABOVE range				Battery	Check Engine	5 minutes	Battery voltage > 15.5 V. Check battery connections and wiring.
29	EMM Temperature OVER range	X		X	Temp	Water Temp/ Hot (Flashing)	5 seconds	EMM Temperature > 212° F (100° C). Engine SHUTDOWN. Will NOT restart until EMM temperature returns to normal operating range. Check outboard and EMM cooling systems.
31	Engine Temperature OVER range			X	Temp	Water Temp/ Hot (Flashing)	3 seconds	Engine Temperature > 239° F (115° C). Engine SHUTDOWN. Check cooling system. Check temperature sensor resistance—9000 to 11000 Ω @ 77°F (25°C).
33	Critical NO OIL detected	X		X	Oil	No Oil (Flashing)	5 hours	Outboard has run five hours with code 34, 36 or 117. Engine SHUTDOWN. Will restart and run for 1 minute intervals.
34	Crankcase oil pump circuit OPEN		X		Oil	No Oil	4 seconds	Engine limited to 1200 RPM. Perform oil pump electrical tests.
36	Cylinder oil pump circuit OPEN		X		Oil	No Oil	4 seconds	Engine limited to 1200 RPM. Perform oil pump electrical tests.
37	Water in fuel				Engine	Check Engine	10 seconds	Check fuel supply, 5 V circuit, and ground (NEG). Resistance between probes should be infinite (no continuity).
40	Engine Temperature ABOVE range (port cylinder head) – low speed		X		Temp	Water Temp/ Hot	3 seconds	Engine Temperature > 212° F (100° C) below 3500 RPM
41	Engine Temperature Sensor circuit fault (port cylinder head)				Temp	Check Engine	10 seconds	Engine Temperature < -13° F (-25° C), or > 329° F (165° C). Check 5 V circuit and ground (NEG), and sensor resistance—9000 to 11000 Ω @ 77°F (25°C).
42	Engine Temperature BELOW range (port cylinder head)				Temp		10 seconds	Engine Temperature < -4° F (-20° C). Check engine temperature and sensor resistance.
43	Engine Temperature ABOVE range (port cylinder head)				Temp	Water Temp/ Hot	3 seconds	Engine Temperature > 194° ±3°F (90° ±1.6°C) above 3500 RPM activates warning light and horn. Engine Temperature > 203° ±3°F (95° ±1.6°C) activates S.A.F.E., engine limited to 1200 RPM. Check cooling system.
44	Barometric Pressure (BP) Sensor circuit fault	X					10 seconds	Pressure < 3.8 in. Hg (13 kPa), or > 35.1 in. Hg (119.0 kPa). Make sure EMM BP sensor tube is NOT plugged. Check atmospheric condition for comparison. Clear code and retest.
45	Barometric Pressure (BP) Sensor BELOW range	X					10 seconds	Pressure < 20.7 in. Hg (70 kPa).
46	Barometric Pressure (BP) Sensor ABOVE range	X					10 seconds	Pressure > 31 in. Hg (105 kPa).

Outboard Fault Codes

Code	EMM Circuit/ Sensor	Internal Sensor	S.A.F.E	Shut Down	Evinrude Digital Touch Screen Display	SystemCheck Display	Time To Activate	Sensor: Circuit Voltage / Resistance (Ω) / Information
47	Air Temperature (AT) circuit fault				Temp	Check Engine	10 seconds	Air temperature < -67° F (-55° C), or > 212° F (100° C). Check 5 V circuit and ground (NEG), and sensor resistance—9000 to 11000 Ω @ 77°F (25°C).
48	Air Temperature BELOW range				Temp		10 seconds	Air temperature below -22°F (-30°C)
49	Air Temperature ABOVE range				Temp		10 seconds	Air temperature above 169°F (76°C)
51-56	Fuel injector circuit OPEN				Engine	Check Engine	10 seconds	Last digit indicates affected cylinder. Check injector resistance—2 to 3 Ω @ 72°F (22°C). Perform fuel system electrical tests.
57	High RPM with low TPS setting	X		X	Engine	Check Engine (Flashing)	10 seconds	TPS < 5% and RPM > 3000. Engine SHUTDOWN. Will NOT restart until code has been cleared. The problem could be caused by uncontrolled fuel entering the engine. DO NOT attempt to start the outboard until the problem has been found and repaired.
58	Operating temperature not reached (port cylinder head)				Engine		10 minutes	Engine temperature < 104°F (40°C) with engine speed < 1000 RPM. Check thermostat and pressure relief valve.
59	Operating temperature not reached (starboard cylinder head)				Engine		10 minutes	Engine temperature < 104°F (40°C) with engine speed < 1000 RPM. Check thermostat and pressure relief valve.
67	Engine Temperature Sensor circuit fault (starboard cylinder head)				Temp	Check Engine	10 seconds	Engine Temperature < -13° F (-25° C), or > 329° F (165° C). Check 5 V circuit and ground (NEG), and sensor resistance—9000 to 11000 Ω @ 77°F (25°C).
68	Engine Temperature BELOW range (starboard cylinder head)				Temp		10 seconds	Engine Temperature < -4° F (-20° C). Check engine temperature and sensor resistance.
69	Engine Temperature ABOVE range (starboard cylinder head)				Temp	Water Temp/Hot	3 seconds	Engine Temperature > 194° ±3°F (90° ±1.6°C) above 3500 RPM activates warning light and horn. Engine Temperature > 203° ±3°F (95° ±1.6°C) activates S.A.F.E., engine limited to 1200 RPM. Check cooling system.
70	Engine Temperature ABOVE range (starboard cylinder head) – low speed		X		Temp	Water Temp/Hot	3 seconds	Engine Temperature > 212° F (100° C) below 3500 RPM
74	Water Pressure Sensor circuit fault detected						10 seconds	Sensor voltage < 0.15 V or > 4.85 V. EMM water pressure option enabled.
75	Water Pressure BELOW expected range						10 seconds	Sensor voltage < 0.4 V. EMM water pressure option enabled. Confirm engine water pressure. Check sensor circuit.
76	Water Pressure ABOVE expected range							Sensor voltage > 4.6 V. EMM water pressure option enabled. Confirm engine water pressure. Check sensor circuit.
77	S.A.C. over–current fault	X					10 occurrences	SAC current > 2 amps and/or < 20 V. Check for shorted 55 V wiring (injector circuits). Check for pinched or chafed wiring.
78	Sensor supply voltage fault	X			Engine	Check Engine	10 seconds	Sensor voltage < 4.75 V. Check sensors and related wiring. Check for pinched or chafed wiring.
79	Starter relay circuit OPEN				Engine	Check Engine	10 seconds	Check starter relay circuit for continuity (key switch OFF) and for 12 V with key switch ON.
81-86	Ignition coil circuit OPEN				Engine	Check Engine	16 instances	Last digit indicates affected cylinder. EMM counts failed ignition events (crankshaft revolutions). Check ignition electrical circuit.
87	Exhaust Pressure circuit fault	X					10 seconds	< -85 in. water or > 85 in. water. Check for plugged or pinched hose or exhaust fitting.
88	Exhaust Pressure BELOW expected range	X					10 seconds	<-40 in. water
89	Exhaust Pressure ABOVE expected range	X					10 seconds	> 80 in. water
91	Fuel pump circuit OPEN				Engine	Check Engine	10 seconds	Check pump resistance: 2 to 3 Ω @ 77°F (25°C). Check connectors and wiring. Perform electrical circuit tests.
93	Water injection valve OPEN						< 1 second	Check exhaust water valve resistance: 16 to 18 Ω. Perform exhaust water valve circuit tests.
94	Fuel pump circuit SHORTED				Engine	Check Engine	2 seconds	Check pump resistance: 2 to 3 Ω @ 77°F (25°C). Check connectors and wiring. Perform electrical circuit tests.
101-106	Ignition coil circuit SHORTED				Engine	Check Engine	16 events (16 RPM)	Last digit indicates affected cylinder. EMM counts failed ignition events. Check wiring. Test with known good ignition coil.
112	Onboard oil level sensor BELOW expected range						8 seconds	Oil level sensor < 0.22 V.
113	Onboard oil level sensor ABOVE expected range						8 seconds	Oil level sensor > 4.75 V.

Outboard Fault Codes

Code	EMM Circuit/ Sensor	Internal Sensor	S.A.F.E	Shut Down	Evinrude Digital Touch Screen Display	SystemCheck Display	Time To Activate	Sensor: Circuit Voltage / Resistance (Ω) / Information
114	Loss of NMEA 2000 network communication					Check Engine	3 seconds	EMM detects no communication on the NMEA 2000 network. Check NMEA 2000 devices, buss cables, tees and backbone cable.
115	Loss of Remote Control network communication					Check Engine	3 seconds	EMM detects no communication on the Remote Control network. Check remote control connections, buss cables, hubs and backbone cable.
117	Critical LOW OIL detected	X	X		Oil	No Oil	Immediate	EMM counts 20,000 oil pump pulses after LOW OIL switch closes. Engine limited to 1200 RPM. Stop outboard and add oil to tank. Warning resets after three oil pump pulses.
132	Vapor separator upper level switch OPEN circuit		X		Engine	Check Engine	5 seconds	Switch voltage > 4.8 V. Check connectors and wiring. Perform electrical circuit tests.
133	Vapor separator lower level switch OPEN circuit		X		Engine	Check Engine	5 seconds	Switch voltage > 4.8 V. Check connectors and wiring. Perform electrical circuit tests.
134	Exhaust Temperature circuit OPEN fault				Engine	Check Engine	5 seconds	Exhaust temperature ≤ 60°F (20°C). Check connectors and wiring. Check sensor resistance. Perform electrical circuit tests.
136	Exhaust Temperature ABOVE limit		X		Engine	Temperature	1 second	If EGT temperature values exceed these limits, check the cooling system. 150 to 200 HP 2.7 L 66° V6 Models • 124° F (51° C), less than 1500 RPM • 124 to 145° F (51 to 63° C), 1500 to 3500 RPM • 145 to 160° F (63 to 71° C), 3500 to 5000 RPM • 160° F (71° C), greater than 5000 RPM 200 H.O. to 300 HP 3.4 L 74° V6 Models • 131° F (55° C), less than 1500 RPM • 131 to 158° F (55 to 70° C), 1500 to 2500 RPM • 158 to 230° F (70 to 110° C), 2500 to 3750 RPM • 230° F (110° C), greater than 3750 RPM
137	Vapor separator low fuel level detected		X		Engine	Check Engine	5 seconds	Vapor separator lower level fuel switch closed. Engine limited to 1200 RPM. Check for fuel level or fuel system restriction. (Engine running only.)
140	Trim Position sensor output BELOW expected level						10 seconds	Trim sender voltage < 0.22 V. Check connectors and wiring. Perform electrical circuit tests.
141	Trim Position sensor output ABOVE expected level						10 seconds	Trim sender voltage > 4.75 V. Check connectors and wiring for short to ground
153	VRH reference fault	X			Engine	Check Engine	2 seconds	Internal 5 V analog reference is < 4.50 V, or > 5.50 V.
154	Trim UP relay OPEN circuit				Engine		5 seconds	Trim up relay voltage < 4.0 V. Check connectors and wiring. Perform electrical circuit tests.
155	Trim DOWN relay OPEN circuit				Engine		5 seconds	Trim down relay voltage < 4.0 V. Check connectors and wiring. Perform electrical circuit tests.
156	Private CAN error fault						5 seconds	The CANbus transceiver has detected a non-critical fault. A fault on the remote control (private) network has been detected which adversely impacts communication on that network but does not completely disable messaging. The fault conditions which will initiate this code include: CAN Hi signal shorted to ground, CAN Hi signal shorted to B+, CAN Lo signal shorted to ground, CAN Lo signal shorted to B+, CAN Hi signal shorted to CAN Lo, CAN Hi open, CAN Lo open. Check remote control network cables, hub, or the devices. Other devices on the network should also indicate the same fault with the fault code appropriate for the reporting device.
157	Fuel lift pump OPEN circuit				Engine	Check Engine	5 seconds	Fault is detected when key ON, engine OFF. Fuel lift pump voltage < 4.0 V. Check connectors and wiring. Perform electrical circuit tests.
158	Fuel lift pump SHORT circuit				Engine	Check Engine	5 seconds	Fuel lift pump current > 8 amps. Check wiring for shorts to ground.
159	Purge valve OPEN circuit					Check Engine	5 seconds	Fault is detected when output is off. Fuel vent solenoid voltage < 4.0 V. Check connectors and wiring. Perform electrical circuit tests.
160	Purge valve SHORT circuit					Check Engine	5 seconds	Fuel vent solenoid current > 8 amps. Check wiring for shorts to ground.
161	Fused B fault				Engine	Check Engine	5 seconds	Fused B+ voltage < 3.20 V. Check fuses and relays.

Outboard Fault Codes

Code	EMM Circuit/ Sensor	Internal Sensor	S.A.F.E	Shut Down	Evinrude Digital Touch Screen Display	SystemCheck Display	Time To Activate	Sensor: Circuit Voltage / Resistance (Ω) / Information
Electronic Throttle Controller (ETC)								
162	ETC Shut-down		X		Engine	Check Engine	< 1 second	Communication lost for > 250 ms. Engine limited to 1200 RPM. Use diagnostic software to check software program version and revision in EMM. Reload or replace with proper program. Check connectors and wiring. Perform electrical circuit tests.
163	ETC TPS A BELOW expected range						< 1 second	TPS A < 0.17 V. TPS A is either open or shorted to ground. Check connectors and wiring. Perform electrical circuit tests.
164	ETC TPS A ABOVE expected range						< 1 second	TPS A > 4.92 V. TPS A is shorted to +5 V, or reference ground is OPEN. Check connectors and wiring. Perform electrical circuit tests.
165	ETC TPS B BELOW expected range						< 1 second	TPS B < 0.07 V. TPS B is either open or shorted to ground. Check connectors and wiring. Perform electrical circuit tests.
166	ETC TPS B ABOVE expected range						< 1 second	TPS B > 4.82 V.TPS B is shorted to +5 V, or reference ground is OPEN. Check connectors and wiring. Perform electrical circuit tests.
167	ETC TPS signal OOC		X		Engine	Check Engine	< 1 second	TPS A and TPS B correlated voltage out of range. Engine limited to 1200 RPM. Check connectors and wiring. Perform electrical circuit tests.
168	ETC TPS idle window exceeded		X		Engine	Check Engine	< 1 second	Throttle at spring rest position, key ON, TPS A < 0.25 V or > 1.47 V. Or TPS B < 3.53 V or > 4.75. TPS is out of idle range. Engine limited to 1200 RPM. Check for foreign object in throttle body. Check throttle plate movement manually when key is in the OFF position. Check connectors and wiring. Perform electrical circuit tests.
172	ETC lever Position out of range		X		Engine	Check Engine	Immediate	1000 < Lever Position < 65535. Lever position is in an invalid range. Engine limited to 1200 RPM. Check remote control for damaged components. Use diagnostic software to check for remote control fault codes.
173	ETC motor OPEN circuit		X		Engine	Check Engine	< 1 second	Motor current not detected while attempting to move throttle plate. Motor circuit is OPEN. Engine limited to 1200 RPM. Check connectors and wiring. Perform electrical circuit tests.
174	ETC motor excessive current		X		Engine	Check Engine	< 1 second	Motor is drawing > 4.50 Amps when throttle plate position is not moving. Engine limited to 1200 RPM. Check for foreign object in throttle body. Check motor resistance: xx Ω $\pm$ 10% @ 77°F (25°C). Check connectors and wiring. Perform electrical circuit tests.
175	ETC TPS stability performance		X		Engine	Check Engine	Immediate	Faults 163 or 164 and 165 or 166. Both TPS A and TPS B are faulty. Engine limited to 1200 RPM. Check connectors and wiring. Perform electrical circuit tests.
179	ETC running error fault		X		Engine	Check Engine	< 1 second	Throttle plate cannot achieve commanded position. The actual throttle plate position out of limit. Engine limited to 1200 RPM. Check for foreign object in throttle body.
180	ETC running effort fault		X		Engine	Check Engine	< 1 second	The throttle plate requires too much effort to move. Engine limited to 1200 RPM. Check for foreign object in throttle body.
181	ETC drive status fault		X		Engine	Check Engine	Immediate	Driver under voltage < 4.15 V, Driver over temperature > 175°C, or motor over current > 9 A. Engine limited to 1200 RPM. Low battery voltage or battery switch OFF with key switch ON. Check connectors and wiring for short circuit. Perform electrical circuit tests.
182	ETC system critical fault		X		Engine	Check Engine	$\leq$ 4 seconds	Sensor reference voltage fluctuating but sensor fault NOT detected. Engine limited to 1200 RPM. Check for code 78 or code 153. Check connectors and wiring. Perform electrical circuit tests.
183	Controller level monitoring error		X		Engine	Check Engine	< 1 second	Safety message interval > 250 ms or co-processor disable key ON test failure. Safety messages not being received from co-processor or co-processor cannot disable driver. Engine limited to 1200 RPM. Use diagnostic software to check software program version and revision in EMM. Reload or replace with proper program. Check connectors and wiring. Perform electrical circuit tests.
191	ETC step response failure		X		Engine	Check Engine	Immediate	Throttle position $\geq$ 10% during step closed or throttle position $\leq$ 80% during step open. Throttle plate not opening or closing enough. Engine limited to 1200 RPM. Check for foreign object in throttle body.

Outboard Fault Codes

Code	EMM Circuit/ Sensor	Internal Sensor	S.A.F.E	Shut Down	Evinrude Digital Touch Screen Display	SystemCheck Display	Time To Activate	Sensor: Circuit Voltage / Resistance (Ω) / Information
Electronic Shift Controller (ESC)								
195	ESC SPS BELOW expected range		X		Engine	Check Engine	< 1 second	Shift Position Sensor open or shorted to ground. SPS voltage <0.25 V. Actuator will remain in current gear until shifting, then will only remain in neutral. Engine limited to 1200 RPM.
196	ESC SPS ABOVE expected range		X		Engine	Check Engine	< 1 second	Shift Position Sensor shorted to +5 V. SPS voltage > 4.75 V. Actuator will remain in current gear until shifting, then will only remain in neutral. Engine limited to 1200 RPM.
197	ESC NEUTRAL switch BELOW expected range		X		Engine	Check Engine	< 1 second	Neutral switch open or shorted to ground. Neutral switch voltage <0.50 V. Actuator will remain in current gear until shifting, then will only remain in neutral. Engine limited to 1200 RPM.
198	ESC NEITRAL switch ABOVE expected range		X		Engine	Check Engine	< 1 second	Neutral switch shorted to +5 V. Neutral switch voltage > 4.50 V. Actuator will remain in current gear until shifting, then will only remain in neutral. Engine limited to 1200 RPM.
199	SHIFT calibration invalid			X	Engine	Check Engine	Immediate	The forward or reverse calibration exceeds the stored limits. Engine SHUTDOWN. Calibrate shift actuator.
200	ESC driver status flag			X	Engine	Check Engine	Immediate	Shift actuator over current detected, current > 50 Amps. Engine SHUTDOWN. Check connectors and wiring for short circuit. Perform electrical circuit tests.
201	ESC Position Sensors OOC			X	Engine	Check Engine	< 1 second	Shift Position Sensor does not correlate with neutral switch. Check connectors and wiring. Perform electrical circuit tests. Check gearcase for presence of water in shift actuator cavity or damage to the shift actuator.
202	ESC / SPS Stability Performance			X	Engine	Check Engine	Immediate	Both Shift Position Sensor A and Shift Position Sensor B are faulty (Fault codes 206 or 208 AND 209 or 210).
203	ESC Motor OPEN circuit			X	Engine	Check Engine	< 1 second	Motor current not detected when attempting to move the shift actuator. Engine SHUTDOWN. Check motor resistance: 50 Ω ± 10% @ 77°F (25°C). Check connectors and wiring. Perform electrical circuit tests.
204	ESC Cannot achieve desired gear		X	X	Engine	Check Engine	<2 seconds	Actuator cannot achieve commanded gear. Engine limited to 1200 RPM. Engine will SHUTDOWN if NEUTRAL cannot be achieved. Check gearcase for mechanical damage.
205	ESC System Critical Fault			X	Engine	Check Engine	≤ 4 seconds	Actuator movement detected when actuator is in FORWARD, NEUTRAL or REVERSE. Sensor reference voltage fluctuating but sensor fault NOT detected. Engine SHUTDOWN. Check for code 78 or code 153. Check connectors and wiring. Perform electrical circuit tests.
206	ESC Shift position sensor A BELOW range						< 1 second	Shift Position Sensor A is either open or shorted to ground. SPS voltage <0.25 V. Actuator will remain in current gear until shifting, then will only remain in neutral.
207	ESC Motor excessive current			X	Engine	Check Engine	< 1 second	Motor is drawing excessive current (> 8.0 A) when trying to shift to neutral. Engine SHUTDOWN. Check connectors and wiring. Perform electrical circuit tests. Check gearcase for mechanical damage.
208	ESC Shift position sensor A ABOVE range						< 1 second	Shift Position Sensor A is shorted to +5V. SPS voltage > 4.75 V. Actuator will remain in current gear until shifting, then will only remain in neutral.
209	ESC Shift position sensor B BELOW range						< 1 second	Shift Position Sensor B is either open or shorted to ground. SPS voltage <0.25 V. Actuator will remain in current gear until shifting, then will only remain in neutral.
210	ESC Shift position sensor B ABOVE range						< 1 second	Shift Position Sensor B is shorted to +5V. SPS voltage > 4.75 V. Actuator will remain in current gear until shifting, then will only remain in neutral.

Outboard Fault Codes

Code	EMM Circuit/ Sensor	Internal Sensor	S.A.F.E	Shut Down	Evinrude Digital Touch Screen Display	SystemCheck Display	Time To Activate	Sensor: Circuit Voltage / Resistance (Ω) / Information
Dynamic Power Steering (DPS)								
211	DPS motor OPEN circuit				Engine	Check Engine	1 second	Motor current < 0.5 Amps with duty cycle > 25%. Check DPS ground lead to block. Check DPS power lead to back of + battery stud. Perform electrical circuit tests.
212	200 - 300 HP, 76° V6 Engine Models (only ABA models with DPS-1): DPS helm pressure sensor BELOW expected range				Engine	Check Engine	1 second	Helm pressure sensor voltage < 0.12 V. Check DPS module and pressure sensor connectors and wiring. Perform electrical circuit tests.
	All other Engine Models (DPS-2): Port helm pressure sensor BELOW expected range							Port helm pressure sensor voltage < 0.12 V. Check DPS module and pressure sensor connectors and wiring. Perform electrical circuit tests.
213	200 - 300 HP, 76° V6 Engine Models (only ABA models with DPS-1): DPS helm pressure sensor ABOVE expected range				Engine	Check Engine	1 second	Helm pressure sensor voltage > 4.60 V. Check DPS module and pressure sensor connectors and wiring. Perform electrical circuit tests.
	All other Engine Models (DPS-2): Port helm pressure sensor ABOVE expected range							Port helm pressure sensor voltage > 4.60 V. Check DPS module and pressure sensor connectors and wiring. Perform electrical circuit tests. If an <i>i-Dock</i> installation, contact Technical Service for assistance.
214	200 - 300 HP, 76° V6 Engine Models (only ABA models with DPS-1): DPS pump pressure BELOW expected range				Engine	Check Engine	1 second	DPS pump pressure sensor voltage < 0.12 V. Check DPS module and pressure sensor connectors and wiring. Perform electrical circuit tests.
	All other Engine Models (DPS-2): Starboard helm pressure BELOW expected range							Starboard helm pressure sensor voltage < 0.12 V. Check DPS module and pressure sensor connectors and wiring. Perform electrical circuit tests.
215	200 - 300 HP, 76° V6 Engine Models (only ABA models with DPS-1): DPS pump pressure ABOVE expected range				Engine	Check Engine	1 second	DPS pump pressure sensor voltage > 4.60 V. Check DPS module and pressure sensor connectors and wiring. Perform electrical circuit tests.
	All other Engine Models (DPS-2): Starboard helm pressure ABOVE expected range							Starboard helm pressure sensor voltage > 4.60 V. Check DPS module and pressure sensor connectors and wiring. Perform electrical circuit tests. If an <i>i-Dock</i> installation, contact Technical Service for assistance.
216	DPS Motor over current shutdown				Engine	Check Engine	3 occurrences	Excessive current detected. DPS Motor shutdown due to short circuit condition. Check connectors and wiring. Perform electrical circuit tests.
217	DPS supply voltage BELOW expected range				Engine	Check Engine	10 seconds	DPS supply voltage < 5 V. Check DPS module connectors and wiring. Check for battery voltage at DPS module power lead. Perform electrical circuit tests.
218	DPS module temperature ABOVE expected range				Engine	Check Engine	1 second	DPS module temperature > 176° (80°C). Check cooling flow to /through DPS module and cooling system.
219	Power Steering Fault		X		Engine	Check Engine	1 second	Steering fault detected by <i>iDock</i> control module that requires SAFE mode; not an engine or EMM failure. Check for <i>iDock</i> system faults.
220	DPS steering sensor BELOW expected range (DPS-2 only)				Engine	Check Engine	1 second	Steering position sensor voltage < 0.12 V. DPS steering position sensor OPEN circuit. Check DPS module connectors and wiring. Perform electrical circuit tests. If an <i>i-Dock</i> installation, is the <i>i-Dock</i> button selected in EvDiag6?
221	DPS steering sensor ABOVE expected range (DPS-2 only)				Engine	Check Engine	1 second	Steering position sensor voltage > 4.60 V. DPS steering position circuit too high. Check connectors and wiring. Perform electrical circuit tests.

iDock Control Module Fault Codes

Code	iDock Control Module Circuit/Sensor	Controllable	Critical	Audible Alarm*	S.A.F.E	Evinrude Digital Touch Screen Display	Time to Activate	Fault Information/ Corrective Action
1	Sensor 5V Supply Overload Detected		X	X		Code 1 sensor volts	< 1 second	Low voltage on analog sensor supply voltage. +5A output <4.75 V, Joystick Mode not allowed. Check wiring from control module to steering position sensor for chafing and possible short circuit.
2	Mode Solenoid Open Circuit		X	X		Code 2 solenoid fault	< 1 second	Open circuit detected on mode solenoid. Solenoid not connected to ground, Joystick Mode not allowed. Check electrical connections and wiring for possible open circuit from control module to solenoid assembly on manifold. Check continuity of solenoid.
3	Mode Solenoid Short Circuit		X	X		Code 3 solenoid fault	< 1 second	Short circuit detected on mode solenoid. Solenoid current > 5 Amps, Joystick Mode not allowed. Check electrical connections and wiring for chafing and possible short circuit from control module to solenoid assembly on manifold.
4	Direction Solenoid Open Circuit		X	X		Code 4 solenoid fault	< 1 second	Open circuit detected on direction solenoid. Solenoid not connected to ground, Joystick Mode not allowed. Check electrical connections and wiring for chafing and possible open circuit from control module to solenoid assembly on manifold. Check continuity of solenoid with ohmmeter.
5	Direction Solenoid Short Circuit		X	X		Code 5 solenoid fault	< 1 second	Short circuit detected on direction solenoid. Solenoid current > 5 Amps, Joystick Mode not allowed. Check electrical connections and wiring for chafing and possible short circuit from control module to solenoid assembly on manifold.
6	Steering Sensor Signal 1 Failure	X				Code 6 sensor fault	< 1 second	Signal 1 out of range or open circuit. No pwm output detected. Check electrical connections from control module to steering position sensor. Replace steering position sensor.
7	Steering Sensor Signal 2 Failure	X				Code 7 sensor fault	< 1 second	Signal 2 out of range or open circuit. No pwm output detected. Check electrical connections from control module to steering position sensor. Replace steering position sensor.
8	Steering Sensor Out of Correlation		X	X	X	Code 8 sensor fault	< 1 second	Sensor signals do not correlate. Difference between signals > 2.5%, Joystick Mode not allowed. Replace steering position sensor.
9	Steering Sensor Failure		X	X	X	Code 9 sensor fault	< 1 second	Loss of steering angle. Faults 6 and 7, or fault 8, Joystick Mode not allowed. Check electrical connections from control module to steering position sensor. Replace steering position sensor.
10	Steering Motor Failure		X	X	X	Code 10 motor fault	2 seconds	Loss of motor operation. Motor speed < 400 rpm when > 3000 rpm commanded, Joystick Mode not allowed. Check electrical connections from control module to steering motor on manifold. Check for continuity between each motor phase (<100mΩ). Check for similar resistance between each phase (if meter allows). Check for open circuit between each phase and chassis ground (OL).
11	Reserved for future use.							
12	Unexpected Steering Response		X	X	X	Code 12 steering fault	1 second	Steering response to control is unexpected. Change in steering angle opposite of commanded, Joystick Mode not allowed
13	Excessive Steering Drift	X			X	Code 13 steering fault	1 second	Difference in steering angles too high. Difference > 14°, Joystick Mode not allowed. Check all hydraulic steering fittings for hydraulic fluid leakage. Make sure there is no leakage from outboards to alignment valve. Make sure alignment valve is in the CLOSED (operation) position. Make sure there is no air in the steering system, bleed steering system.
14	Main Power Disconnected	X				Code 14 Main Power fault	2 seconds	Main Power from EMM on Remote Control (Private) network disconnected. Main power < 7.0 V. Verify no other modules have similar active fault. If YES, than Remote Control (Private) network cable open circuit, causing signal break between EMM and first device. Possible defective hub, or failed EMM. If NO, then open circuit in Remote Control (Private) network hub or cable from hub to module.
15	Main Ground Disconnected	X				Code 15 Main Ground fault	2 seconds	Main Ground Disconnected. Check electrical connections from control module to battery.
16	Battery Power Disconnected		X	X	X	Code 16 Power fault	2 seconds	Accessory Power Disconnected. Accessory power < 7.0 V, Joystick Mode not allowed. Check electrical connections from control module to battery.
17	Battery Ground Disconnected		X	X	X	Code 17 Power fault	2 seconds	Accessory Ground Disconnected. Joystick Mode not allowed. Check electrical connections from control module to battery.

* Audible alarm function only available if system is equipped with optional accessory warning horn

iDock Control Module Fault Codes

Code	iDock Control Module Circuit/Sensor	Controllable	Critical	Audible Alarm*	S.A.F.E	Evinrude Digital Touch Screen Display	Time to Activate	Fault Information/ Corrective Action
18	ROM Checksum Error		X			Code 18 memory error	3 seconds	Indicates corrupted application program. Checksum of software is incorrect, Joystick Mode not allowed. Reload correct software. If code persists after dsoftware update, replace module.
19	Private CAN Error Fault	X				Code 19 PRVT network communications fault	5 seconds	Check Remote Control (Private) network cables and connections.
20	MC0 Public Communications Lost	X				Code 20 PBLC network communications fault	1 second	MC0 Public Communications Lost. Check NMEA 2000 network connections for Control Modules of all Control Module (other outboard) instances.
21	MC0 Private Communications Lost	X				Code 21 PRVT network communications fault	1 second	MC0 Private Communications Lost. Check Remote Control (Private) network connections for Control Modules of all Control Module (other outboard) instances..
22	MC1 Public Communications Lost	X				Code 22 PBLC network communications fault	1 second	MC1 Public Communications Lost. Check NMEA 2000 network connections for Control Modules of all Control Module (other outboard) instances..
23	MC1 Private Communications Lost	X				Code 23 PRVT network communications fault	1 second	MC1 Private Communications Lost. Check Remote Control (Private) network connections for Control Modules of all Control Module (other outboard) instances..
24	MC2 Public Communications Lost	X				Code 24 PBLC network communications fault	1 second	MC2 Public Communications Lost. Check NMEA 2000 network connections for Control Modules of all Control Module (other outboard) instances..
25	MC2 Private Communications Lost	X				Code 25 PRVT network communications fault	1 second	MC2 Private Communications Lost. Check Remote Control (Private) network connections for Control Modules of all Control Module (other outboard) instances..
26	MC3 Public Communications Lost	X				Code 26 PBLC network communications fault	1 second	MC3 Public Communications Lost. Check NMEA 2000 network connections for Control Module.
27	MC3 Private Communications Lost	X				Code 27 PRVT network communications fault	1 second	MC3 Private Communications Lost. Check Remote Control (Private) network connections for Control Modules of all Control Module (other outboard) instances..
28	JOY0 Public Communications Lost	X				Code 28 PBLC network communications fault	1 second	Joystick 0 Public Communications Lost. Check NMEA 2000 network connections for Joystick at all outboard instances.
29	JOY0 Private Communications Lost	X				Code 29 PRVT network communications fault	1 second	Joystick 0 Private Communications Lost. Check Remote Control (Private) network connections for Joystick at all outboard instances.
30	JOY1 Public Communications Lost	X				Code 30 PBLC network communications fault	1 second	Joystick 1 Public Communications Lost. Check NMEA 2000 network connections for Joystick at all outboard instances.
31	JOY1 Private Communications Lost	X				Code 31 PRVT network communications fault	1 second	Joystick 1 Private Communications Lost. Check Remote Control (Private) network connections for Joystick at all outboard instances.
32	PSM0 Public Communications Lost	X				Code 32 PBLC network communications fault	1 second	PS0 Public Communications Lost. Check NMEA 2000 network connections for Pressure Sensor Module (PSM) at all outboard instances.
33	PSM0 Private Communications Lost	X				Code 33 PRVT network communications fault	1 second	PS0 Private Communications Lost. Check Remote Control (Private) network connections for Pressure Sensor Module (PSM) at all outboard instances.
34	PSM1 Public Communications Lost	X				Code 34 PBLC network communications fault	1 second	PS1 Public Communications Lost. Check NMEA 2000 network connections for Pressure Sensor Module (PSM) at all outboard instances.
35	PSM1 Private Communications Lost	X				Code 35 PRVT network communications fault	1 second	PS1 Private Communications Lost. Check Remote Control (Private) network connections for Pressure Sensor Module (PSM) at all outboard instances.
36	Reserved for future use.							
37	Reserved for future use.							
38	Manifold Controller Overheat	X				Code 38 System Fault	5 seconds	High temperature on MC module detected. Temperature is > 185°F (85°C). Check outboard cooling system and cooling water hoses to Control Module.

* Audible alarm function only available if system is equipped with optional accessory warning horn

iDock Pressure Sensor Module Fault Codes

Code	iDock Control Module Circuit/Sensor	Controllable	Critical	Audible Alarm*	Evinrude Digital Touch Screen Display	Time to Activate	Fault Information/ Corrective Action
1	Port Pressure Sensor Over Range		X	X	Code 1 Port Pressure Sensor Fault	< 1 second	Sensor < 0.4 V or sensor > 4.6 V. Use <i>Evinrude Diagnostics</i> software to check ADC values for sensor, try to reproduce the fault. Replace the PSM if the fault persists.
2	Stbd Pressure Sensor Over Range		X	X	Code 2 Stbd Pressure Sensor Fault	< 1 second	Sensor < 0.4 V or sensor > 4.6 V. Use <i>Evinrude Diagnostics</i> software to check ADC values for sensor, try to reproduce the fault. Replace the PSM if the fault persists.
3	Analog 5V Supply Overload Detected		X	X	Code 3 Sensor Voltage	< 1 second	+5V output < 4.75 V. Use Evinrude Diagnostics software to check Voltage values. Replace the PSM if the fault persists.
4	Main Power Disconnected	X			Code 4 Main Power Fault	2 seconds	Main power < 7.0 V. Check Remote Control (Private) network connections. Check fuse and power connections from remote control to battery.
5	Main Ground Disconnected	X			Code 5 Main Ground Fault	2 seconds	Check Remote Control (Private) network connections. Check fuse and power connections from remote control to battery.
6	Accessory Power Disconnected	X			Code 6 Accessory Power Fault	2 seconds	Accessory power < 7.0 V. Check 2-pin power connector from PSM to adapter(s). Check fuse and power connections from remote control to battery.
7	Accessory Ground Disconnected	X			Code 7 Accessory Ground Fault	2 seconds	Check 2-pin power connector from PSM to adapter(s). Check fuse and power connections from remote control to battery.
8	ROM Checksum Error		X		Code 8 Memory Error	3 seconds	Checksum of software is incorrect, update PSM software to the latest revision.
9	Private CAN Error Fault	X			Code 9 Private Network Communication Fault	5 seconds	Private nework open or short circuit, redundant communication lost. Check and replace Remote Control (Private) network cables as needed.
10	MC0 Public Communications Lost	X			Code 10 MC0 Public Network Communication Fault	1 seconds	Check NMEA 2000 network connections from Control Module
11	MC0 Private Communications Lost	X			Code 11 MC0 Private Network Communication Fault	1 seconds	Check Remote Control (Private) network connections from Control Module
12	MC1 Public Communications Lost	X			Code 12 MC1 Public Network Communication Fault	1 seconds	Missing NMEA 2000 network connections from Control Module
13	MC1 Private Communications Lost	X			Code 13 MC1 Private Network Communication Fault	1 seconds	Check Remote Control (Private) network connections from Control Module
14	MC2 Public Communications Lost	X			Code 14 MC2 Public Network Communication Fault	1 seconds	Missing NMEA 2000 network connections from Control Module
15	MC2 Private Communications Lost	X			Code 15 MC2 Private Network Communication Fault	1 seconds	Check Remote Control (Private) network connections from Control Module
16	MC3 Public Communications Lost	X			Code 16 MC3 Public Network Communication Fault	1 seconds	Missing NMEA 2000 network connections from Control Module
17	MC3 Private Communications Lost	X			Code 17 MC3 Private Network Communication Fault	1 seconds	Check Remote Control (Private) network connections from Control Module

* Audible alarm function only available if system is equipped with optional accessory warning horn

iDock Joystick Fault Codes

Code	iDock Joystick Circuit/Sensor	Controllable	Critical	Audible Alarm*	<i>Evinrude</i> Digital Touch Screen Display	Time to Activate	Fault Information/ Corrective Action
1	Joystick Redundancy Sensor Failure	X			Code 1 Joystick sensor failure	< 1 second	Redundant joystick sensor > 4.65 V or < 0.35 V. Use <i>Evinrude Diagnostics</i> software to check ADC values of each axis to verify or reproduce the fault. Replace the Joystick if the fault persists.
2	Joystick Sensor Failure		X	X	Code 2 Joystick sensor failure	< 1 second	Both joystick sensors > 4.65 V or < 0.35 V, or +5V failure. The Joystick does not function. Use <i>Evinrude Diagnostics</i> software to check ADC values of each axis to verify or reproduce the fault. Replace the Joystick.
3	Orientation Sensor Failure	X			Code 3 Joystick sensor failure	< 1 second	Loss of communications to sensors, sensor calibration not performed, or +2.5V failure. Calibrate Joystick control. Replace the Joystick if calibration does not correct fault.
4	Main Power Disconnected	X			Code 4 Main Power Fault	2 seconds	Main power < 7.0 V. Check power connections from Joystick to battery.
5	Main Ground Disconnected	X			Code 5 Ground Fault	2 seconds	Check ground connections from Joystick to battery.
6	Accessory Power Disconnected	X			Code 6 Accessory Power Fault	2 seconds	Accessory power < 7.0 V. Check power connections from Joystick to battery.
7	Accessory Ground Disconnected	X			Code 7 Accessory Ground Fault	2 seconds	Check ground connections from Joystick to battery.
8	System Calibration Limits Exceeded		X	X	Code 8 Calibration Error		Perform Joystick /boat calibration.
9	ROM Checksum Error		X		Code 9 Memory Error	3 seconds	Checksum of software is incorrect, update Joystick software to the latest revision.
10	Control System Fault, or Engine Stalled	X					The <i>EMM</i> has detected a critical fault, or communications on the NMEA 2000 (public) and remote control (private) networks has been lost. Check <i>EMM</i> communications, cables and connections. Engine speed has fallen below 100 RPM/stalled on at least one engine. Restart the engine(s).
11	Control System Critical Fault		X				System configuration mismatch. The number of joystick stations or number of control head stations doesn't match the number of stations detected/present in the system. Or two Joysticks have the same instance instance number. Use <i>Evinrude Diagnostics</i> software to check the joystick and / or remote control configuration. Set correct instance, set correct number of joysticks and /or remote controls.
12	Private CAN Error Fault	X			Code 12 PRVT Network communications fault	5 seconds	Check Remote Control (Private) network connections.
13	EMM0 Public Communications Lost	X			Code 13 PBLC Network communications fault	3 seconds	Check NMEA 2000 network connections.
14	EMM0 Private Communications Lost	X			Code 14 PRVT Network communications fault	3 seconds	Check Remote Control (Private) network connections.
15	EMM1 Public Communications Lost	X			Code 15 PBLC Network communications fault	3 seconds	Check NMEA 2000 network connections.
16	EMM1 Private Communications Lost	X			Code 16 PRVT Network communications fault	3 seconds	Check Remote Control (Private) network connections.
17	EMM2 Public Communications Lost	X			Code 17 PBLC Network communications fault	3 seconds	Check NMEA 2000 network connections.
18	EMM2 Private Communications Lost	X			Code 18 PRVT Network communications fault	3 seconds	Check Remote Control (Private) network connections.
19	EMM3 Public Communications Lost	X			Code 19 PBLC Network communications fault	3 seconds	Check NMEA 2000 network connections.
20	EMM3 Private Communications Lost	X			Code 20 PRVT Network communications fault	3 seconds	Check Remote Control (Private) network connections.
21	CH0 Public Communications Lost	X			Code 21 PBLC Network communications fault	3 seconds	Check Remote Control NMEA 2000 network connections.
22	CH0 Private Communications Lost	X			Code 22 PRVT Network communications fault	3 seconds	Check Remote Control (Private) network connections.
23	CH1 Public Communications Lost	X			Code 23 PBLC Network communications fault	3 seconds	Check Remote Control NMEA 2000 network connections.
24	CH1 Private Communications Lost	X			Code 24 PRVT Network communications fault	3 seconds	Check Remote Control (Private) network connections.
25	MC0 Public Communications Lost	X			Code 25 PBLC Network communications fault	1 seconds	Check NMEA 2000 network connections for Control Module.
26	MC0 Private Communications Lost	X			Code 26 PRVT Network communications fault	1 seconds	Check Remote Control (Private) network connections for Control Module.
27	MC1 Public Communications Lost	X			Code 27 PBLC Network communications fault	1 seconds	Check NMEA 2000 network connections for Control Module.
28	MC1 Private Communications Lost	X			Code 28 PRVT Network communications fault	1 seconds	Check Remote Control (Private) network connections for Control Module.

* Audible alarm function only available if system is equipped with optional accessory warning horn

iDock Joystick Fault Codes

Code	iDock Joystick Circuit/Sensor	Controllable	Critical	Audible Alarm*	<i>Evinrude</i> Digital Touch Screen Display	Time to Activate	Fault Information/ Corrective Action
29	MC2 Public Communications Lost	X			Code 29 PBLC Network communications fault	1 seconds	Check NMEA 2000 network connections for Control Module.
30	MC2 Private Communications Lost	X			Code 30 PRVT Network communications fault	1 seconds	Check Remote Control (Private) network connections for Control Module.
31	MC3 Public Communications Lost	X			Code 31 PBLC Network communications fault	1 seconds	Check NMEA 2000 network connections for Control Module.
32	MC3 Private Communications Lost	X			Code 32 PRVT Network communications fault	1 seconds	Check Remote Control (Private) network connections for Control Module.
33	JOY0 Public Communications Lost	X			Code 33 PBLC Network communications fault	3 seconds	Check NMEA 2000 network connections for Joystick.
34	JOY0 Private Communications Lost	X			Code 34 PRVT Network communications fault	3 seconds	Check Remote Control (Private) network connections for Joystick.
35	JOY1 Public Communications Lost	X			Code 35 PBLC Network communications fault	3 seconds	Check NMEA 2000 network connections for Joystick.
36	JOY1 Private Communications Lost	X			Code 36 PRVT Network communications fault	3 seconds	Check Remote Control (Private) network connections for Joystick.

* Audible alarm function only available if system is equipped with optional accessory warning horn

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