

EVINRUDE®

E-TEC®



IMPORTANT
Technicians must complete
2009 Update Exam at
<http://exams.evinrude.com>.
(North American dealers
must complete exam by
April 30, 2009)



2009 Product Service Update

Product Service Update

BRP US Inc.
Technical Publications
300 Sea Horse Drive
Waukegan, Illinois 60085 United States

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AFTER SALES SUPPORT TEAM	5
WHO'S WHO	6
TECHNICAL PUBLICATIONS	10
DEALERPORT	12
NOTES – TECHNICAL SUPPORT	14
NEW MODELS FOR 2009	15
25 – 30 HP INLINE MODELS	16
115 H.O. – 200 HP 60° V4 / V6 MODELS	18
200 H.O. – 250 HP 90° V6 (3.3 L) MODELS	20
250 H.O. – 300 HP 90° V6 (3.4 L) MODELS	22
NOTES – NEW PRODUCT INFORMATION	24
SERVICE INFORMATION	
RIGGING	26
KEY SWITCH INFORMATION	26
OUTBOARD INSTALLATION INFORMATION	27
2009 RPM QUICK REFERENCE CHART	29
RIGGING ISSUES	30
NOTES – RIGGING	34
I-COMMAND	35
I-COMMAND INFORMATION	36
SERVICE ISSUES	41
NOTES – I-COMMAND	44
EVINRUDE DIAGNOSTICS SOFTWARE	45
TECHNICAL SKILLS	46
PC SPECIFICATIONS	46
USB TO SERIAL ADAPTERS	47
NEW SOFTWARE VERSION 3.0	48
IMPROVEMENTS AND CHANGES	48
NOTES – EVINRUDE DIAGNOSTICS SOFTWARE	54
ENGINE MANAGEMENT SOFTWARE	55
SOFTWARE VERSIONS & REVISIONS	56
NOTES – ENGINE MANAGEMENT SOFTWARE	60

ENGINE MANAGEMENT MODULE (EMM)	61
2009 EMM CHANGES	62
EMM SERVICE CHART	63
NOTES – EMM	64
SERVICE CODES	65
SERVICE CODES INFORMATION	66
NOTES – SERVICE CODES	70
IGNITION AND ELECTRICAL	71
IMPROVEMENTS	72
SPARK PLUGS	76
STARTER MOTORS	77
SERVICE ISSUES	78
NOTES – IGNITION AND ELECTRICAL	86
FUEL SYSTEM	87
FUEL QUALITY ISSUES	88
IMPROVEMENTS AND CHANGES	91
SERVICE ISSUES	93
NOTES – FUEL SYSTEM	96
OILING SYSTEM	97
OIL INFORMATION	98
SERVICE ISSUES	101
OIL RECIRCULATION SYSTEM CHANGES	104
NOTES – OILING SYSTEM	106
COOLING SYSTEMS	107
WATER PRESSURE	108
EXTERNAL WATER SCREENS AND APPLICATIONS	110
IMPROVEMENTS	111
SERVICE ISSUES	112
NOTES – COOLING SYSTEMS	116



POWERHEAD 117

POWERHEAD IDENTIFICATION	118
REPLACEMENT POWERHEADS	120
INSTALLATION	121
RETURNING OUTBOARD TO SERVICE	122
NOTES – POWERHEAD 124	

MIDSECTION 125

IMPROVEMENTS AND CHANGES	126
TRIM AND TILT SYSTEMS	130
NOTES – MIDSECTION / TILT AND TRIM SYSTEMS	132

GEARCASES 133

2009 GEARCASE APPLICATION CHART	134
GEARCASE IDENTIFICATION	136
GEARCASE IMPROVEMENTS	140
SERVICE ISSUES	142
GEARCASE TOOLS	144
NOTES – GEARCASES	146

PARTS AND ACCESSORIES 147

P&A INFORMATION	148
ACCESSORY KITS	150
SERVICE ISSUES	152
NOTES – SERVICE PARTS AND ACCESSORIES	154



AFTER SALES SUPPORT TEAM



WHO'S WHO

Evinrude/Johnson North American Call Center:

Dealer only number: **1-800-888-4662**

Customers may call **1-847-689-7090**

Administration:

Dawn Johnson, Director After Sales Support and Warranty

Jeff Cooper, Technical Product Manager

Susan Filer, After Sales Support Staff Assistant

Dealer Technical Support:

Jeff Berg, Technical Team Leader, 2-Cyl, 3-Cyl, and 4-Stroke Products

Keith Moody, Technical Team Leader, 60° V4 / V6 Products

Mike Bomberry, Technical Team Leader, 90° V6 Products

Dealer Warranty Support:

Grant Tipton, Warranty Team Leader

Consumer Support:

Bill Guelzo, Customer Support Team Leader



***Evinrude/Johnson* Field Service and Training – North America**

Administration:

Lynn Gibson, North American Field Service and Training Supervisor

Technical Service/Sales Representatives (TSR) – North America

United States:

Justin Antolini: MN, ND, SD, IA, WI.

Dave Belus: NY, NJ, ME, NH, VT, MA, RI, CT.

Bob Brown: VA, DE, MD, PA, WV.

Dick Davis: LA, MS, AL.

Pat Eves: South FL.

Bob Galley: OK, AR, CO, KS, NE.

Terry Jeffreys: TN, KY, MO.

Norm Luck: North FL, South GA.

Gary McAlister: OR, WA, ID, MT, WY, NV, CA, UT, AZ, AK, HI.

Pat Merier: North GA, SC, NC.

Robert Patteson: TX, NM.

Dan Stalf: IN, MI, OH, IL.

Canada:

Pierre Ouellette: QC, NL, NB, NS, PE, BC, AB.

Al Sturch: ON, SK, MB.

Technical assistance visits by TSR's are limited.

IMPORTANT: Coordinate all efforts to resolve service issues through Dealer Technical Support. Dealer only number:1-800-888-4662.

Training Group – North America

You may schedule technicians for training online (www.DealerPort.com), or by calling 1-847-689-7500.

Denis Dubois, Technical Training Supervisor

Jenn Lowry, Technical Training Scheduling Coordinator

Ron Dean, Technical Instructor (Waukegan, IL)

Roy Degler, Technical Instructor (Morrow, GA)

Dan Mauck, Technical Instructor (Morrow, GA)



International Distributor – After Sales Support

Robert Gariup, International Service Manager

Brian Hanover, International Service Coordinator

BRP AUSTRALIA, Riley Tolmay, Service Manager

BRPED DISTRIBUTORS EUROPE, MIDDLE EAST AND AFRICA,
Valentin Radelescu, Technical Representative

BRP BRAZIL, CARIBBEAN AND LATIN AMERICA,
Ednilson Beneli, Service Manager

BRP JAPAN, Makoto Numajiri, Service Manager

BRP BENELUX, Gerhard Bressers, Technical Representative

BRP FRANCE, Rémi Campestrin, Service Manager

BRP SPAIN, Manuela Gomez, Service Manager

BRP GERMANY, Andreas Klopffleisch, Service Manager

BRP UK AND IRELAND, Lou Price, Service Manager,
Lloyd Stevens, Technical Representative



BRP Australia



BRP Training, Bankstown NSW Australia

Before You Call the Service Department

The *Evinrude/Johnson* After Sales Support Group values your call. Your input is essential. Remember, quick problem resolution requires accurate information. In order to provide you with the best service possible, observe the following guidelines:

Confirm the customer complaint.

If you are calling for assistance, you **MUST** be able to describe the problem accurately and provide accurate information. Make sure the outboard exhibits the problem the customer describes. If you cannot duplicate the problem, schedule time with your customer to go for a test ride. Have the customer show you his concern. This is a proven method of identifying a customer's complaint.

Review service material.

Check your service publications. Service manuals, bulletins, catalogs or newsletters may contain information related to a problem you are trying to resolve.

Check DealerPort*.

Service bulletins and safety campaigns, installation guides, newsletter, instruction sheets, special tool catalogs, and engine management software updates are available online. Check the warranty status and unit history for the engine. Is the engine still in warranty or has it expired? Does the customer have an extended service contract?

* Locations outside of North America may subscribe to *BossWeb*.

Be prepared.

Have your dealer number, the engine model and serial number, engine hours, and an engine history report in hand. This will help speed up the process for everyone.

Before ending the call, be sure to take down the name of the representative you have spoken. Note all troubleshooting you've been asked to perform. If a warranty claim is being processed, note the claim number.





TECHNICAL PUBLICATIONS

Published service information includes:

Installation Guides

Operator's Guides

Parts Catalogs—Printed and Electronic Parts Catalogs (EPC) which is accessed through *DealerPort* and *PartSmart*

Service Bulletins

Service Manuals

Special Tool Catalogs

Instruction Sheets

User Guides

Warranty Procedures Manuals and Flat Rate Guides

Consumer and Dealer letters

Service publications should be organized and accessible to all technicians. Technicians should familiarize themselves with all publications. Refer to publication for all detailed service information and specific information related to proper outboard servicing.

Some service information may be available in electronic format. Technicians should access *DealerPort* and familiarize themselves with information available online.

Bulletins

There are five categories of bulletins:

Administrative (A)

- Includes general policy notifications or changes.
- Announcements.
- Items which do not clearly fall into one of the other four categories.

Predelivery (D)

- Includes predelivery check lists.
- Notification of any issues which may effect the rigging or delivery of an outboard to the customer.

Parts & Accessories (P)

- Includes parts-related general policy notifications or changes.
- Announcements of new parts or kits.
- Service issues with parts or accessories.

Service (S)

- Includes service-related policy notifications or changes.
- Communicates technical information for service and repair-related issues.

Warranty (W)

- Includes Warranty-related repairs.
- Includes Safety Campaigns and Product Recalls.
- Warranty-related policy notices, changes or announcements.



DEALERPORT

* Locations outside of North America may subscribe to *BossWeb*.

What's on *DealerPort*?

Features: Besides the ability to order parts, register sold engines and submit warranty claims online, there is a gold mine of information available on the *DealerPort* website. Technical information includes:

- Bulletins
- Installation Guides and Instruction Sheets
- *EMM* information and engine management software
- Performance Reports
- Diagnostics software information and updates
- Warranty information
- Newsletters and other technical information
- Parts catalogs

Why YOU Should Care

How technology helps

You are on a customers boat at the marina for a service call. Preliminary testing is complete. Using *Evinrude Diagnostic* software, a data log is recorded and an engine report is saved. Reviewing this information you recognize the engine is running cold.

You are fortunate to have a wireless network to access the internet and log onto *DealerPort*. Reviewing the Engine Software page you find the engine management software in this outboard needs to be updated and you download the software.

A quick search through the *Hey Ole, What's New?* index lists two articles concerning cold running engines, you download both. You install the software and then review the newsletters. One of them supplies the information for the exact problem you are dealing with.

The problem is fixed right away. You close the work order and move on to the next job, leaving a happy customer impressed with complete, prompt and efficient service.

This technology is available today, the first step is to check with your internet service provider for availability.

Why Technicians Need Access to *DealerPort*

Benefits: Valuable time is not wasted with multiple trips to the marina or on the phone waiting on hold. The results are; technicians increase their productivity and billable hours. Customer satisfaction is enhanced. Profits are maximized and you grow your business.

Navigating the *DealerPort* Website

Most technical information is accessible from one page.

- Click on Engines link (top)
- Click on the *Evinrude* (or *Johnson*) link (left)
- Links to document families (Bulletins, Performance Reports and other) is on the right side of the page

Spend some time exploring *DealerPort*.

For problems with *DealerPort* service, call toll free, 1-800-888-4662, option 5.



Click on "ENGINES" link (top)



Click on Evinrude Link (left)

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NEW MODELS FOR 2009



25 – 30 HP INLINE MODELS

All Models

- Displacement: 35.3 cu in (576 cc / 0.578 L)
- Blue, 15 and 20 inch models
- Weight: 152 lbs (DR) – 190 lbs (DTL) depending on length and options
- Alternator: 15 amps
- Gearcase: H -Type gearcase .465 (2.15:1) ratio

Models	E25DR, E25DRL, E30DR E30DRL	E25DTE, E25DTEL E30DTEL	E25DTL E30DTL	E25DEL E30DEL	E25DPL E30DPL
Features					
Rope Start	yes	yes	yes	yes	yes
Electric Start	optional *	yes	yes	yes	yes
Battery Charging	optional *	yes	yes	yes	yes
Troll Control	yes	yes	yes	not available	not available
Tiller Steer	yes	yes	yes	optional *	optional *
Remote Steer	optional *	optional	optional *	yes	yes
Manual Tilt	yes	yes	~	yes	~
Power Tilt	not available	not available	yes	not available	yes
Remote Conversion	optional *	optional *	optional *	~	~
Note * Optional dealer-installed kit available					



Features

Tiller Handle

- Forward mount shifter
- Touch Troll electronic idle speed adjustment

Engine Management

- New *EMM* supports inductive ignition and BIP injectors
- Clear case with easy to see LEDs

Electrical and Ignition

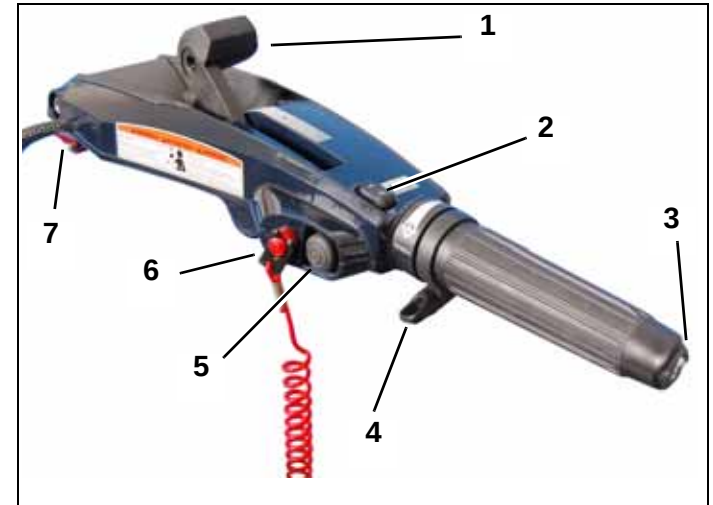
- Inductive ignition system
- Engine wiring harness to support *I-Command*

Fuel Injection

- Ball In Plunger (BIP) fuel injectors refine fuel delivery

Oil Management

- Multi-point oiling supplies oil directly to each cylinder



1. Forward mounted shifter
2. Touch-Troll button
3. Trim switch (Power TNT models)
4. Throttle Friction
5. Start button (Electric start models)
6. Stop button
7. Tilt release



1. LEDs



115 H.O. – 200 HP 60° V4 / V6 MODELS

E115DHL, E115HSL and E115DHX

- Displacement: 105 cu in (1727 cc 1.7 L)
- White, 20 and 25 inch models with new H.O. styling
- Weight: 390 / 405 lbs (177 / 184 kg)
- Alternator: 50 amps
- Gearcase: S2-Type gearcase .50 (2:1) ratio

E130DPL, E130DSL, E130DPX and E130DCX

- Displacement: 105 cu in (1727 cc 1.7 L)
- White, 20 and 25 inch models
- Weight: 390 / 405 lbs (177 / 184 kg)
- Alternator: 50 amps
- Gearcase: S2-Type gearcase .50 (2:1) ratio (20 inch models), O-Type gearcase with .44 (2.25:1) ratio 25 inch models

E150HSL

- Displacement: 158 cu in (2592 cc 2.6L)
- White, 20 inch model with new H.O. styling
- Weight: 418 lbs (190 kg)
- Alternator: 50 amps
- Gearcase: L2-Type gearcase .54 (1.86:1) ratio

E150HGX (Ranger Boats)

- Displacement: 158 cu in (2592 cc 2.6L)
- Graphite, 25 inch model with Ranger Boats Anniversary styling
- only available with a Ranger boat package
- Weight: 433 lbs (196 kg)
- Alternator: 50 amps
- Gearcase: L2-Type gearcase .54 (1.86:1) ratio



Features and Improvements

Decals

- New H.O. graphics (115 H.O. models only)
- New saltwater decal, located on stern bracket

Engine Management

- New *EMM* with more powerful processor and increased memory — supports TPS Calibration and BIP injectors

Electrical and Ignition

- New inductive ignition system improves run quality

Fuel System

- Ball In Plunger (BIP) fuel injectors

Oil Management

- Multi-point oiling supplies oil directly to each cylinder

Exhaust adapter

- One piece adapter / inner exhaust housing
- Increased water flow

Gearcases

- S2-Type Gearcase
- O-Type Standard and Counter Rotation (25 inch models)
- L2-Type .54 (1.86:1) ratio (150 H.O. models only)



APPROVED FOR
SALTWATER



200 H.O. – 250 HP 90° V6 (3.3 L) MODELS

E200HVL

- Displacement: 200 cu in (3279 cc 3.3 L)
- White, 20 inch model with new H.O. styling
- Weight: 518 lbs (235 kg)
- Alternator: 50 amps
- Gearcase: L2-Type gearcase gearcase with .54 (1.86:1) ratio

E225HSL

- Displacement: 200 cu in (3279 cc 3.3 L)
- White, 20 inch model with new H.O. styling
- Weight: 503 lbs (228kg)
- Alternator: 50 amps
- Gearcases L-Type gearcase gearcase with .58 (1.71:1) ratio



Features and Improvements

Decals

- New H.O. graphics (200 H.O. and 225 H.O. models only)
- New saltwater decal, located on stern bracket

Engine Management

- New *EMM* with more powerful processor and increased memory—now supports TPS Calibration and new injectors

Electrical and Ignition

- New inductive ignition system improves run quality



APPROVED FOR
SALTWATER



250 H.O. – 300 HP 90° V6 (3.4 L) MODELS

E300DSL

- Displacement 210 cu. in. (3441cc, 3.4 L)
- White 20 inch model added
- Weight: 522 lbs (237 kg)
- Alternator: 50 amps
- Gearcases M2-Type gearcase with .54 (1.85:1) ratio
- Sound Level db(A) Idle – 57.0 Cruise – 82.4 WOT – 94.7

E250HSL

- Displacement 210 cu. in. (3441cc, 3.4 L)
- White 20 inch model added with new H.O. styling
- Weight: 507 lbs (230 kg)
- Alternator: 50 amps
- Gearcase: L2-Type Gearcase with .58 (1.71:1) ratio
- Sound Level db(A) Idle – 57.0 Cruise – 82.4 WOT – 94.7

E250HGL and E250HGX (Ranger Boats)

- Displacement 210 cu. in. (3441cc, 3.4 L)
- Graphite, 20 and 25 inch models, with Ranger Boats Anniversary styling
- only available with a Ranger boat package
- Weight: 507 / 515 lbs (230 / 234 kg)
- Alternator: 50 amps
- Gearcase: L2-Type Gearcase with .58 (1.71:1) ratio
- Sound Level db(A) Idle – 57.0 Cruise – 82.4 WOT – 94.7



Features and Improvements

Decals

- New H.O. graphics (250 H.O. models only)
- New saltwater decal, located on stern bracket

Engine Management

- New *EMM* with more powerful processor and increased memory – supports TPS Calibration and BIP injectors

Electrical and Ignition

- New inductive ignition system improves run quality
- New knock sensors added to “F” suffix models

Fuel System

- Two fuel lift pumps
- Ball In Plunger (BIP) fuel injectors

Oil Management

- Multi-point oiling supplies oil directly to each cylinder

Cooling

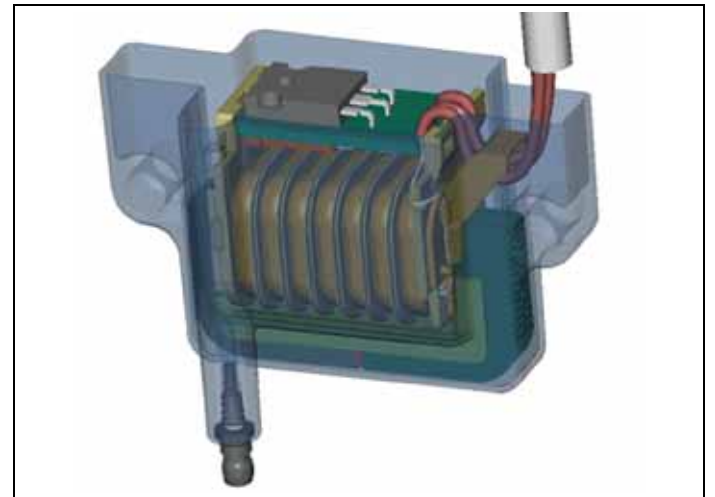
- New water pump – increased water flow

Exhaust adapter

- One piece adapter / inner exhaust housing
- Increased water flow

Gearcases

- M2-Type Gearcase with low water pickup
- M2-Type Counter Rotation with low water pickup
- L2-Type .58 (1:71:1) ratio (250 H.O. models only)



Inductive ignition coil

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



SERVICE INFORMATION



KEY SWITCH INFORMATION

Key Switch Accessory Circuit

What: Current draw on the accessory circuit (purple wire, on terminal A) must be limited to 5 amps. Use a separate inline fuse (up to 5 amps).

Why: Key switches are designed to carry the electrical load of an outboard's start circuit and primer / choke circuit, plus gauges and dash lighting. Powering high current devices (such as trim tab controls or other accessories) from the accessory circuit can blow the outboard's main power fuse, possibly leaving the customer stranded.



*Accessories circuit **MUST** be limited to 5 amps.*

Key Switch Orientation

What: A water drain is designed into the body of key switches. Follow all installation instructions provided with the key switch. Key switch drain hole must be down to allow for proper drainage.

Why: Improper mounting may allow water to collect inside the switch, causing the key switch to fail.

IMPORTANT: Water collecting in key switches may create short circuits, causing fire, battery drain, or an unattended outboard to start.



1. Drain hole

OUTBOARD INSTALLATION INFORMATION

25 – 30 HP Inline Models

Reference: Predelivery Bulletin 2008-02(D)

Service Bulletin 2008-02(D) contains the requirements for installing 2009 *Evinrude E-TEC* 25 – 30 HP models. Review this information before installing one of these outboards.

Additional information about Boat Rigging, Outboard Installation and Predelivery Checks has not changed for these models and can be found in the Predelivery and Installation Guide, P/N 5007085.



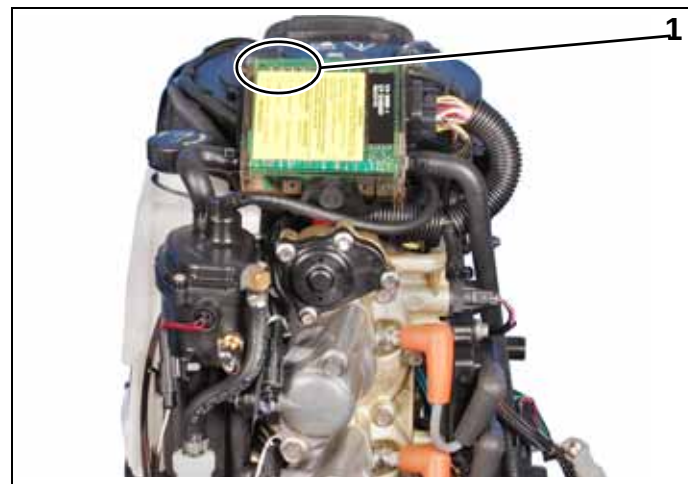
Warning System 25 – 30 HP Inline Models

This outboard is equipped with Speed Adjusting Failsafe Electronics (S.A.F.E.).

S.A.F.E. is an engine warning system controlled by the Engine Management Module (EMM). The EMM monitors engine sensors. If conditions which could cause permanent engine damage exist, the EMM limits engine speed to 1200 rpm.

If engine is in S.A.F.E. mode, the outboard will shake noticeably when accelerated above 1200 rpm. For additional protection during severe operating conditions the EMM will shut OFF the engine.

The EMM has four LED indicators located on the top corner of the circuit board. The LEDs provide quick reference to the status of several outboard systems and can be used to identify specific warning functions of S.A.F.E. mode activation. LED 1 is closest to the center of the EMM. To view the LEDs the engine cover must be removed.



1. LED indicators



Integrated Flywheel Cover 115 – 200 HP 60° V4 / V6 Models

Beginning with 2009 production, the flywheel cover and air baffle have been combined, eliminating cover baffle brackets from the upper injectors.



Engine Mounting Screws

Reference: Parts and Accessories Bulletin 2008-05(P)

Evinrude outboards are shipped with “heavy duty”, plated, stainless steel 1/2 in X 4.75 in. screws (P/N 336676). If different length screws are required for a specific installation, be sure to use screws with equal or greater strength.

Always use high strength stainless steel screws with a known proof load to attach outboard engines to transoms and brackets.

The chart lists the screws recommended for outboard installation.

Hex Head Cap Screws 1/2 in. / Stainless Steel / Plated			
Part Number	Length (INCHES)	Thread Size	Proof Load Minimum (LBS.)
327053	3	1/2-13	18,520
318573	3.5	1/2-13	12,771
336676	4.75	1/2-13	12,771
331578	5	1/2-13	18,520
354101	6	1/2-13	18,520
354102	7	1/2-13	18,520
354103	8	1/2-13	18,520
354104	9	1/2-13	18,520

Proof load chart

2009 RPM QUICK REFERENCE CHART

Model	Recommended Operating Range	Optimum RPM Range
25 HP	5000 – 6000	5400 – 5800
30 HP	5000 – 6000	5400 – 5800
40 HP	5000 – 6000	5400 – 5600
50 HP	5500 – 6000	5600 – 5750
60 HP	5500 – 6000	5600 – 5750
65 HP Commercial	5500 – 6000	5600 – 5750
75 HP	4500 – 5500	5000 – 5200
90 HP	4500 – 5500	5000 – 5200
115 HP (60° V4)	5500 – 6000	5600 – 5700
115 H.O. (60° V4)	5500 – 6000	5500 – 5650
130 HP (60° V4)	5500 – 6000	5500 – 5650
150 HP (60° V6)	4850 – 5850	5500 – 5600
150 H.O. (60° V6)	4850 – 5850	5500 – 5600
175 HP (60° V6)	4850 – 5850	5500 – 5600
200 HP (60° V6)	4850 – 5850	5600 – 5850
200 H.O. (3.3 L 90° V6)	4500 – 5800	5500 – 5700
225 HP (3.3 L 90° V6)	4500 – 5800	5500 – 5700
225 H.O. (3.3 L 90° V6)	4500 – 5800	5500 – 5700
250 HP (3.3 L 90° V6)	4500 – 5800	5500 – 5700
250 H.O. (3.4 L 90° V6)	4500 – 6000	5500 – 5700
300 HP (3.4 L 90° V6)	5000 – 6000	5500 – 5700

How to Use the RPM Quick Reference Chart

When selecting a propeller for an outboard and boat application, refer to the recommended wide open throttle operating range for the outboard model.

When determining propeller selection, choose a propeller that will best suit the customers needs. For example:

- choose a higher pitch propeller for low-to-mid rpm for light load cruising.
- choose a lower pitch propeller to attain top rpm for water skiing or other high high load applications.

For best overall performance choose a propeller that allows the outboard to run in the optimum rpm range, which is usually the point of peak horsepower.

Remember, only a thorough water test will determine which propeller works best for a particular application.

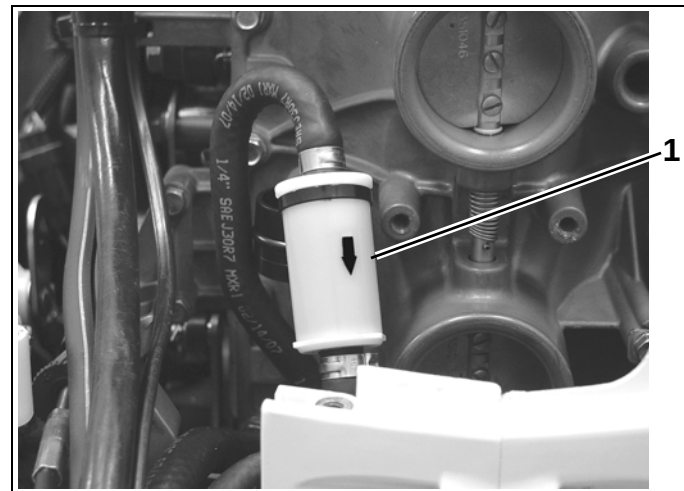


RIGGING ISSUES

Oil Filter, 115 – 200 HP 60° V4 / V6 Models

What you need to know: The arrow on the oil filter used on these models must point toward the oil tank.

Why this is important: The filter assembly may trap air if installed incorrectly.



1. Correct oil filter installation

No Oil Light 40 – 90 HP Inline Models

The Problem: During Predelivery Inspection (PDI) the NO OIL warning stays on even after adding oil to the oil tank.

The Cause: If the *EMM* is powered up before oil is added to the tank, the *EMM* will activate the NO OIL warning.

Reset: The *EMM* must count three oil pulses to reset. To reset, turn the key switch off. Add oil to the tank. Start the engine and use the Prime Oil function of *Evinrude Diagnostics* software to reset the warning system.



Propeller Selection – .54 versus .58 Ratio Gearcases

When repowering an older boat, or rigging a new boat and outboard with an L2-Type gearcase installed, it is important to consider which gear ratio is used when selecting a propeller.

Typically, the .58 ratio gearcase requires a propeller with two inches less pitch than the .54 ratio gearcase.

This is important when repowering from an older outboard with the .54 ratio to a new outboard with the .58 ratio. If reused, the old propeller may not perform as expected. Remember, only a thorough water test will determine which propeller works best for a particular application.



Hydrus Propeller

Reference: Parts and Accessories Bulletin 2005-01(P)

This bulletin discusses the use of Exhaust Ring, P/N 5006512, which ships with *Hydrus* propellers.

Certain applications can benefit by not installing the exhaust ring. Only a thorough water test will determine whether or not the exhaust ring works best for a particular application.





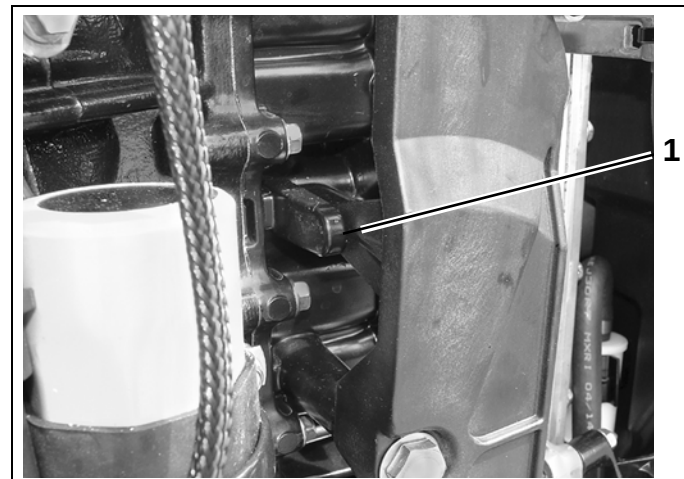
Throttle Cable Adjustment

Reference: Appropriate Service Manual – Installation section.

With remote control lever in NEUTRAL, pull firmly on throttle cable casing to remove slack.

With throttle lever idle stop against the crankcase or stop, place the cable trunnion into the upper anchor pocket and adjust the trunnion nut so the casing fits onto the throttle lever pin.

IMPORTANT: Remember, throttle lever **MUST** be against the stop. There should be a gap between the throttle cam and roller.



1. Throttle lever against idle stop (60° V-model shown)

Oetiker Clamp Selection

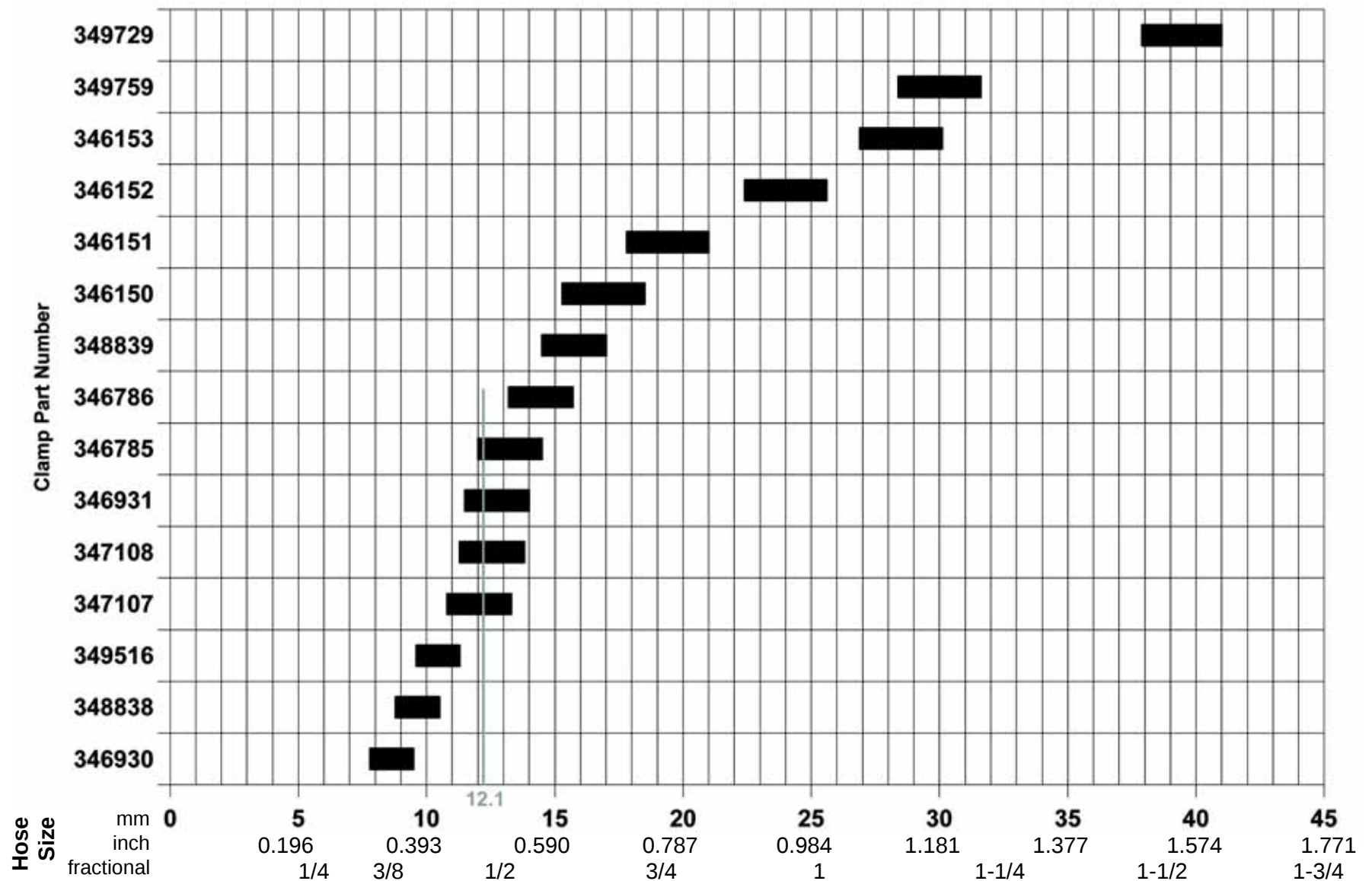
To select the correct size Oetiker clamp, measure the outside diameter of the hose when installed on the fitting. Place a line on the **Oetiker Clamp Selection Chart** on p. 33 at that size. Select the smallest clamp size that covers the range.

For example, hose size 12.1 mm – The chart shows three size clamps that cover 12.1 mm. Select the smallest size clamp to ensure the best clamp range – for this example, P/N 347107.



Oetiker clamps

Oetiker Clamp Selection Chart





34



I-COMMAND



I-COMMAND INFORMATION

I-Command Digital Product Selection Guide, P/N 764677

The *I-Command* Digital Product Selection Guide, P/N 764677, (or the current *I-Command* Installation Guides, P/N 354044, or P/N 353571), are the only printed reference materials that should be used to order *I-Command* components.

Any other documents should be considered obsolete.

This document is available on *DealerPort*.



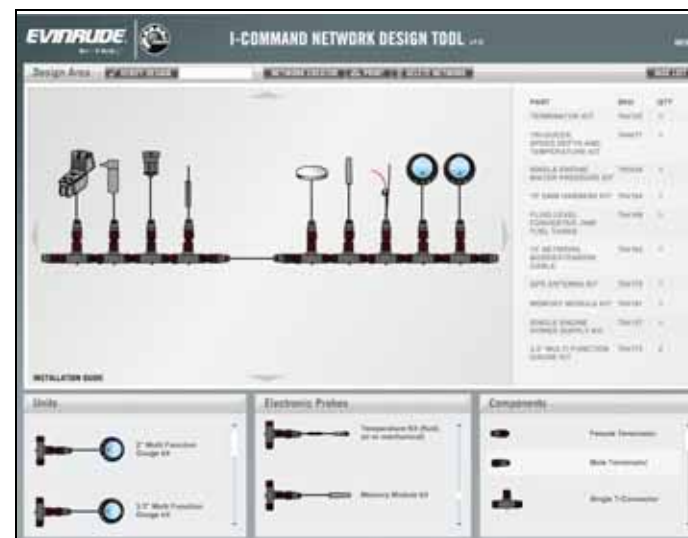
I-Command Network Design and Gauge Simulator Tool

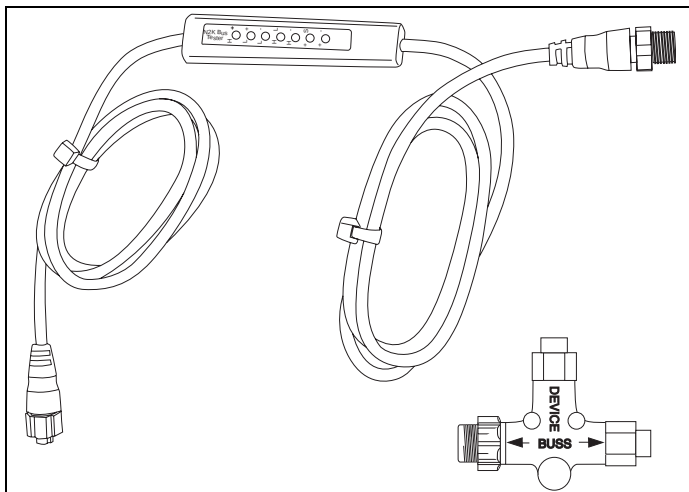
The *I-Command* Network Design and Gauge Simulator Tool was developed to help customize an *I-Command* network for specific needs and boat configurations. By providing a few pieces of key information, the network designer builds an image of the network and the required parts list, which can be printed for easy reference and ordering.

Also available is the *I-Command* Gauge Simulator. The simulator allows users to learn about different functions and features of the *I-Command* gauge system without the frustration of trial and error while on the water.

The *I-Command* Network Designer and Gauge Simulator Tool is available to authorized *Evinrude* dealers, OEM customers and consumers.

These tools are available on *DealerPort*. Click on Engines, then *Evinrude*. Click on the *I-Command* link.





Network tester kit, P/N 765023

Network Tester Kit, P/N 765023

This service tool has been developed to troubleshooting open, shorted and grounded circuits on *I-Command* networks.

The kit contains a Network Tester, P/N 764591, a Single Tee, P/N 764151, and instructions.

The tester uses a seven-light display to monitor network voltage and communication, and can help identify a failed backbone cable, connector, sensor or gauge.

An instruction sheet for this kit is available on *DealerPort*.



NMEA 2000 test kit, P/N 764592

GPS Head Unit Kit, P/N 764592

The following accessory kit has been developed for checking and updating the software of *NMEA 2000* devices in the field.

The kit contains:

- A 5" monochrome GPS head unit with blue *NMEA 2000* connector
- Head unit bag with mounting base and hardware kit
- 12v rechargeable battery with battery charger
- Power cable set
- 15' blue *NMEA 2000* power adapter
- Male blue to male *NMEA 2000* style connector adapter
- SD card reader/writer and blank SD card



DeviceNet-Style Connectors

Reference: Parts and Accessories Bulletin 2008-01(P)

Available Connectors

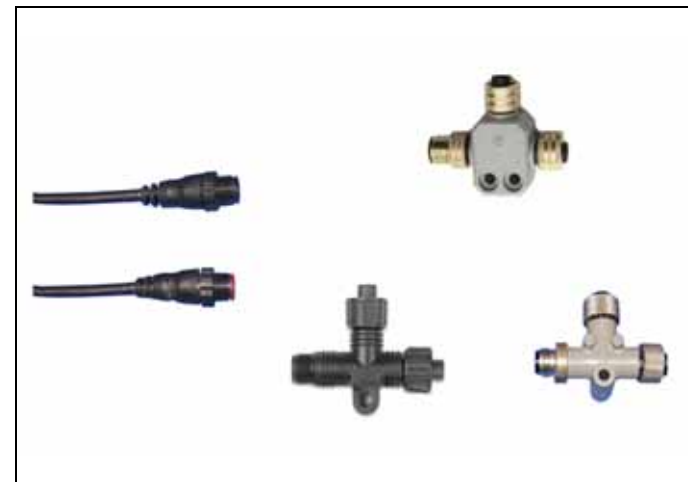
This bulletin contains information about the differences in *I-Command* compatible DeviceNet-style connectors.

Installation Information

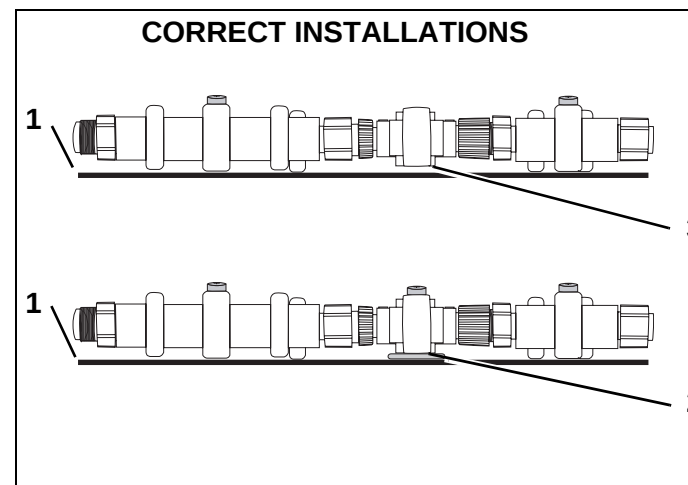
Additional installation information is also contained in this bulletin. Special attention must be given to tee connector mounting when mixing connector styles because of different mounting boss dimensions.

When mixing tee connectors, a spacer can be used to ensure that each tee connector is against a flat surface. Otherwise tee connectors can bend, possibly causing communication issues on the network.

See Parts and Accessories Bulletin 2008-01(P) for complete details.



DeviceNet Micro-C Style Connectors



1. Flat mounting surface
2. Spacer
3. No spacer



Water pressure sensor kit, P/N 5006214

Water Pressure Sensors

Water Pressure Sensor Kit, P/N 5006214

This sensor requires the installer to use *Evinrude Diagnostics* software to activate the water pressure function within the *EMM*.

Water Pressure Sensor Kit, P/N 764195

Reference: *I-Command* User's Guide, P/N 765025 (2-inch gauge) or P/N 765026 (3.5-inch gauge).

This is a DeviceNet-style sensor which can be configured to read water pressure, fuel pressure, or pitot speed. The default setting of the device is water pressure. If installing multiple pressure sensors, connect and configure one device at a time. See the *I-Command* User's Guide for set up information.

New Water Pressure Sensor Kits

Reference: Parts and Accessories Bulletin 2008-03(P)

New Water Pressure Sensor Kits are available for *I-Command* Digital gauge systems. Each kit includes all the needed components for single, dual or triple engine set ups and makes ordering, installation and configuration easier.

Each water pressure sensor is pre-programmed as an Engine Water Pressure device and configured individually as Engine 1 (Instance 0), Engine 2 (Instance 1) or Engine 3 (Instance 2).

Pre-programming allows these devices to immediately display information for the specific engine.



Water pressure sensor, P/N 765038

Kit P/N	Kit	Kit Contents
765038	Single Engine Water Pressure	1 Water Pressure Sensor and 1 Tee, P/N 764151
765045	Dual Engine Water Pressure	2 Water Pressure Sensors and 2 Tees, P/N 764151
765046	Triple Engine Water Pressure	3 Water Pressure Sensors and 3 Tees, P/N 764151



Fuel Level Sensor Kits

Fluid Level Converter Kit, P/N 764166

Reference: *I-Command* User's Guide, P/N 765025 (2-inch gauge) or P/N 765026 (3.5-inch gauge).

This is an unconfigured Device Net-style converter which **MUST** be configured during installation. If installing multiple fluid level converters, connect and configure one device at a time. See *I-Command* User's Guide for set up information.

New Fuel Level Converter Kits

Reference: Parts and Accessories Bulletin 2008-04(P)

New Fuel Level Converter Kits are now available for *I-Command* Digital gauge systems. Each kit includes all the needed components for single, dual or triple engine set ups and makes ordering, installation and configuration easier.

Each fuel tank level converter is pre-programmed as Main Fuel Tank (Instance 0), Aux Fuel Tank (Instance 1) or Aux Fuel Tank (Instance2).

Pre-programming allows these devices to immediately display information for the specific engine or fuel tank.

Kit P/N	Kit	Kit Contents
764168	Single Engine Fuel Level Converter	1 Fuel Level Converter and 1 Tee, P/N 764151
765047	Dual Engine Fuel Level Converter	2 Fuel Level Converters and 2 Tees, P/N 764151
765051	Triple Engine Fuel Level Converter	3 Fuel Level Converters and 3 Tees, P/N 764151



Fuel level sensor kit, P/N 164166 (unconfigured)



Fuel level sensor kit, P/N 765047 (configured)

SERVICE ISSUES

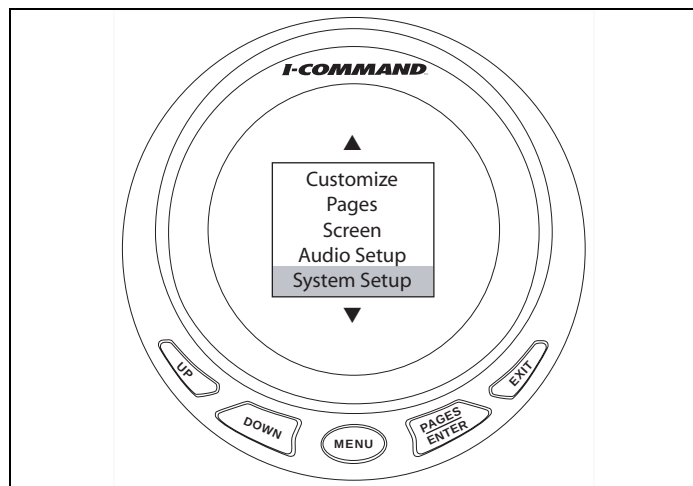
Gauge Reset

If gauge settings are modified and the results are unsatisfactory, the gauge can be reset to its factory default settings using the Reset Values command.

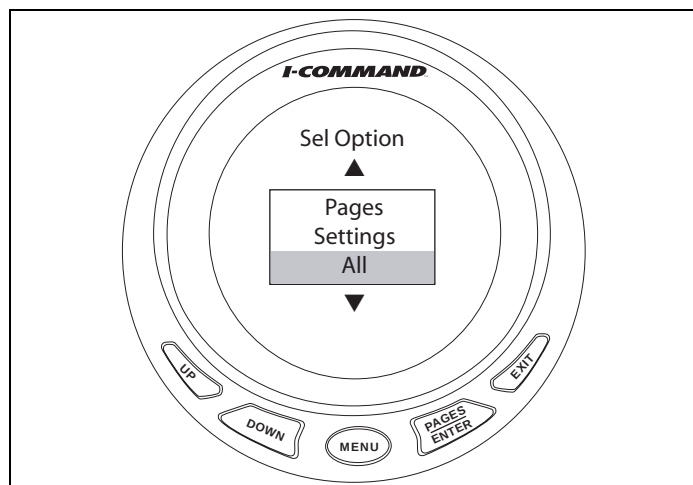
To reset gauge values

- Press MENU. Using the UP / DOWN buttons, select SYSTEM SETUP. Press ENTER.
- Using the UP / DOWN buttons, select RESET VALUES then PRESS ENTER. Choose PAGES, SETTINGS, or ALL.
- Select PAGES to reset the factory default pages. They are: RPM, Ground-Speed, Fuel Level, Engine Trim, Battery Voltage, Engine Temperature and Fuel Manager.
- Select SETTINGS to reset Fuel Remaining Source, Fuel Economy Speed Source, Keypad Sounds, Sleep Mode, Fluid Level Warnings and Sonar Alarms.
- Select ALL to reset both PAGES and SETTINGS. Press ENTER. Press ENTER again to reset the values.

Resetting values resets the gauge only, and will not clear engine/tank configuration or the settings of EP sensors previously calibrated or configured.



Select System Setup, then Reset Values



Choose Pages, Settings or All



Fuel Management

Reference: *I-Command* User's Guide, P/N 765025 (2-inch gauge) or P/N 765026 (3.5-inch gauge).

Some Fuel Management functions require installation of a Memory Module Kit, P/N 764181, and a GPS antenna, P/N 764179. If fuel management needs to remember anything when the key switch is turned off (i.e. how much fuel has been used this week or season), then a memory module is needed. Fuel economy (i.e. miles per gallon) works with or without the module. Calculations based on remaining fuel, such as range, do not need a memory module.

The memory module:

- Saves all Fuel Used data
- Saves and synchronizes Engine / Tank Configuration
- Tracks Tank Fuel Used, Trip Fuel Used, and Seasonal Fuel used (up to 3 engines)
- Accumulates fuel used data by monitoring Fuel Flow messages *Evinrude E-TEC* outboards
- Provides Tank Fuel Used and Tank Fuel Remaining data, which is more accurate than a fluid level sensor

Features that use the memory module and how to access them:

Tank Fuel Used can be modified by "Filling Tank," and by "Adding Fuel." Press MENU, select System Setup, select Fuel Setup.

Trip and Season Fuel Used can be reset independently. Press MENU, select System Setup, select Fuel Setup.

A Low Fuel Level Alarm can be set to notify the operator when fuel is low. Press MENU, select System Setup, select Bus Devices, select memory module.

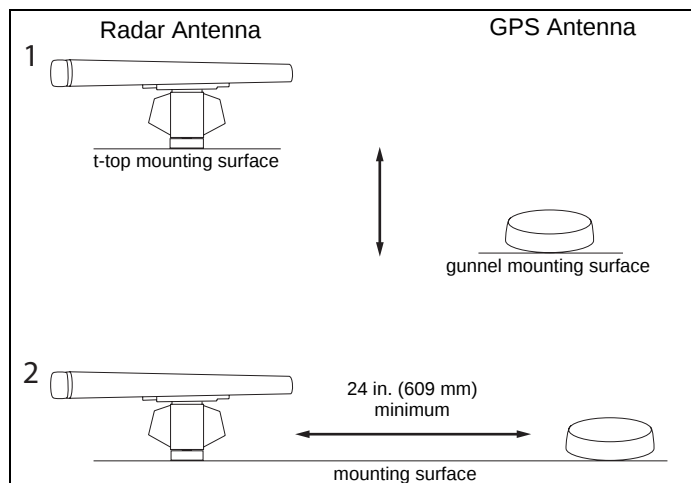
To view Tank Fuel Used and Tank Fuel Remaining data, the Fuel Remaining Source must be set to "Engine Fuel Flow." Press MENU, select System Setup, select Fuel Setup, then select Fuel Remaining Source.



Memory module kit, P/N 764181



GPS Antenna Kit, P/N 764179



1. Preferred mounting
2. Optional mounting (AVOID)



Use 1-1/2 in (38 mm) hole saw to enlarge tank for oil level converter

I-Command Installation and Set Up Tips

- Gauge installation requires the following size dashboard holes:
 - 2 inch – 2-1/8 inch (54 mm)
 - 3.5 inch – 3-3/8 inch (85.7 mm)
- When installing a GPS module, the PREFERRED installation is to locate the GPS module in a lower position than the radar antenna. For example, mount the radar array on a t-top and install the GPS on the gunnel. Because the high power of a radar beam can disrupt the GPS signal, AVOID installing the module in a location which places it in the direct path of a radar beam.
- When setting up a boat with a GPS module installed, it can take up to ten minutes for the GPS module to acquire a signal and obtain a position fix. Remember, GPS modules require an unobstructed “view” of the sky.
- In-tank fuel level senders can have different resistance standards.
 - In North America they are 33 to 240 ohms.
 - In Europe they are 0 to 180 ohms.

For this reason, in order to obtain the most accurate reading from a fuel level converter, perform a five point calibration. (See the *I-Command* User's Guides, P/N 765025 for 2 inch gauge, or P/N 765026 for 3.5 inch gauge.)

- When installing an oil level converter kit, the tank opening must be enlarged for the float to fit into the remote tank.
 - Remove the oil return fitting.
 - Reinstall the oil return fitting retainer to serve as a guide.
 - Use a 1-1/2 inch (38 mm) hole saw to enlarge the opening.
 - Clean ALL debris from oil tank after enlarging hole.
- When configuring fuel level converter devices on a network, be sure battery voltage is at least 13.2 VDC. If voltage falls below this level, the configuration settings may not be saved. Start and run the engine. A battery charger may cause electronic interference and disrupt the display.

[illegible]



EVINRUDE DIAGNOSTICS SOFTWARE



TECHNICAL SKILLS

The laptop computer (PC) is the best diagnostics tool for servicing *Evinrude / Johnson* products.

Technical skills must include knowledge of:

- Engine Management systems
- Computers, operating systems, file systems, and file names
- Diagnostics software

PC SPECIFICATIONS

Reference: Service Bulletin 2008-05(S)

The computer system requirements for *Evinrude Diagnostics* software has changed.

Listed are the minimum computer system requirements for *Evinrude Diagnostics* software version 3.0 or higher.

- Any PC must be an IBM-compatible type.
- A battery powered laptop is strongly recommended to avoid electric shock hazards.
- Operating system - *Microsoft Windows 2000†, XP, Vista* or higher. Version 3.0 is NOT compatible with Windows 95 or 98.
- Processor - *Pentium† 133Mhz.*
- Memory - 64MB.
- Hard drive free space - 20MB.
- Display resolution - 800 x 600 pixels.
- Media drives - Both a CD-ROM drive and a 3 ½ inch floppy drive are required. An external 3 ½ inch floppy drive with USB plug-in is acceptable.
- Communication cable - Serial interface which requires an RS-232 (9-pin) serial port or the use of a USB to Serial Converter.



Technicians must understand computers, operating systems, and file systems



Use a battery powered laptop

USB TO SERIAL ADAPTERS

Many new computers do not have a 9-pin serial port. A USB to serial adapter is used to provide a connection to interface cable, P/N 437955.

Installing a USB to serial port adapter can be a detailed procedure. Always refer to the manufacturer's instructions when installing an adapter.

A USB to serial adapter requires software "drivers." Drivers allow the computer to recognize this accessory and properly communicate with it. A quality USB adapter will allow changing Com Ports assignment, a needed option if working on 4-stroke outboards.

Recommended USB to serial adapters include:

- *Radio Shack* brand adaptor, P/N 26-183, for *Windows XP* operating system.
- *Radio Shack* brand adaptor, P/N 26-949, for *Windows Vista* operating system.
- *Parallax* brand adaptor, P/N 28030, and cable, P/N 805-00006, for *Windows XP* or *Vista* operating systems. Drivers for the *Parallax* adapter must be downloaded (www.parallax.com) from the internet.
- *USB Gear* brand adaptor, P/N USBG-232Mini, for for *Windows XP* or *Vista* operating systems. Drivers are supplied on CD for this device. Order from www.usbgear.com.
- *Cables Unlimited* brand adaptor, P/N USB-2920, for for *Windows XP* or *Vista* operating systems. Drivers are supplied on CD for this device. Order from www.cablesunlimited.com.



USB Gear, P/N USBG-232Mini



Cables Unlimited, P/N USB-2920



NEW SOFTWARE VERSION 3.0

Reference: Service Bulletin 2008-05(S)

Evinrude Diagnostics software is a Windows based diagnostic tool developed for *Evinrude E-TEC* outboards. The latest version will communicate with DI engines back to 1997.

Model year changes require the release of new software versions. Version 3.0 is required for model year 2009 and older. Version 2.0 software was required to communicate with 2008 and older models.

New diagnostics software (Version 3.0, P/N 765011) automatically shipped to all authorized U.S. and Canadian service dealers as part of the North American Essential Tools and Software Program. Existing dealers are charged a reduced price for this software as an annual software license renewal and update.



Evinrude Diagnostics (version 3.0)

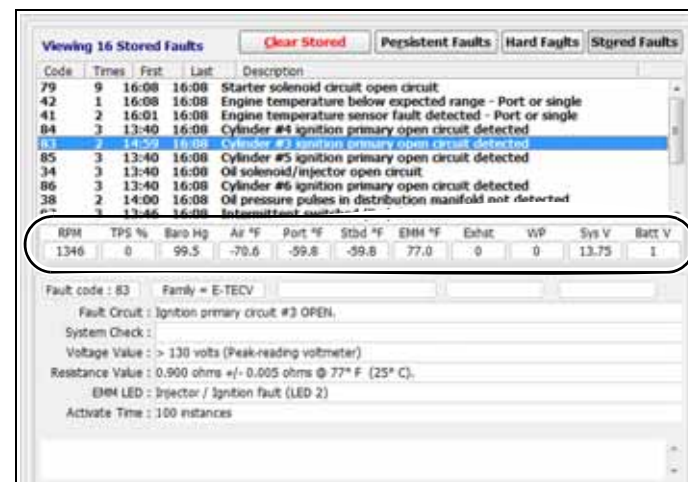
IMPROVEMENTS AND CHANGES

Stored Service Codes - “Freeze-Frame Data” Feature

A new feature has been added to the STORED CODES screen of *Evinrude Diagnostics* software version 3.3.

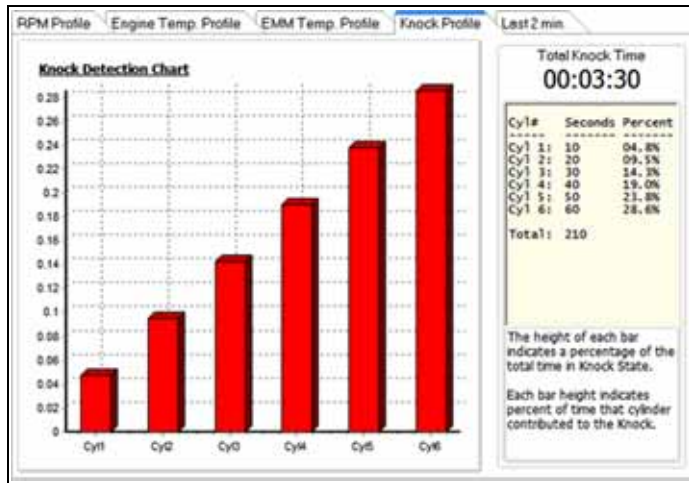
When a code is stored, critical engine information is now saved from the time the code was set. To display the Freeze-Frame data, click on the code.

Note: Freeze-Frame Data only appears on select 2009 and newer outboards.



Stored codes screen with Freeze-Frame Data (version 3.3)

EVINRUDE DIAGNOSTICS SOFTWARE



Knock profile screen (version 3.3)

Profile Screens

Beginning with *Evinrude Diagnostics* software version 3.3 the profile screens have been placed on their individual tabs. This provides a clear view of all the profile screens.

Additionally, a knock profile screen has been added. The knock profile will only display when connected to an outboard model that uses knock sensors.

Two (2) Minute History

Time	RPM	TPS	Temp	Volts	Knock	MP
0	2800	100%	100°C	30V	000000	1
-1	2800	100%	100°C	30V	000000	1
-2	2800	100%	100°C	30V	000000	1
-3	2800	100%	100°C	30V	000000	1
-4	2800	100%	100°C	30V	000000	1
-5	2800	100%	100°C	30V	000000	1

Portion of "Two Minutes History" report

"Two Minute History" Report

Beginning with *Evinrude Diagnostics* software version 3.3, a new feature has been added to the Profiles. This feature saves engine run-time values during the last two minutes of engine operation above 1500 rpm. The values are:

- RPM
- TPS %
- Engine Temperature
- Cylinder Knock State (models with knock sensors only)
- Missed Oil Pulses

Information is collected once per second. The newest record is first on the list. When each new record is added, the oldest record is removed, so that the most current 120 records are stored.

Note: This feature only appears on select *Evinrude E-TEC* V6 models and can be useful in troubleshooting engine issues.



Fuel Control Feature

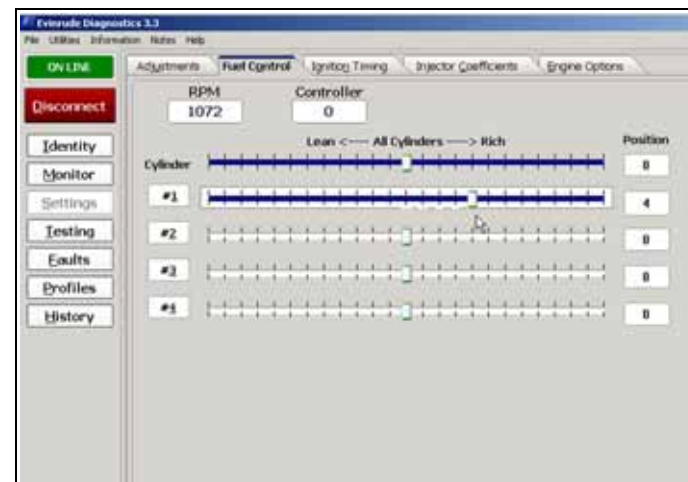
With the release of *Evinrude Diagnostics* software v.3.0, the Fuel Control feature has changed.

For outboards which use BIP injectors, the fuel control feature now adjusts a percentage of fuel flow, up to 12% lean or up to 12% rich.

For outboards which use other injectors, the fuel adjustment feature adjusts the “on-time” of the injector(s) being tested in micro-seconds (μ s).

Notes:

- If unable to make fuel control adjustments, make sure the latest version of *Evinrude Diagnostics* software is installed on the laptop.
- Also be sure the engine management software is up to date.

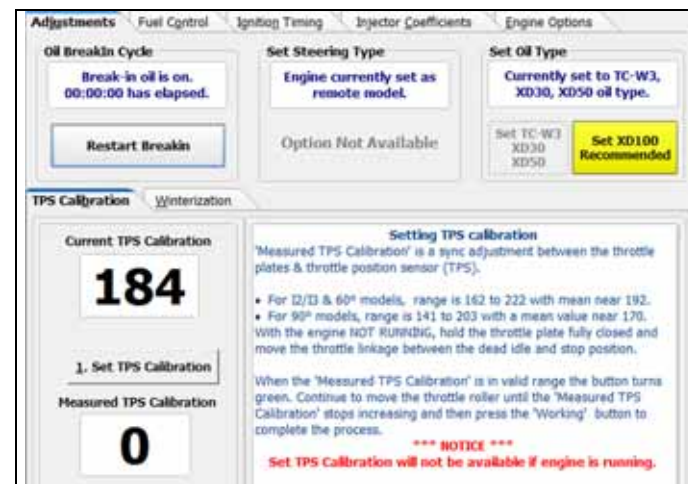


Evinrude Diagnostics version 3.0 fuel adjustment feature

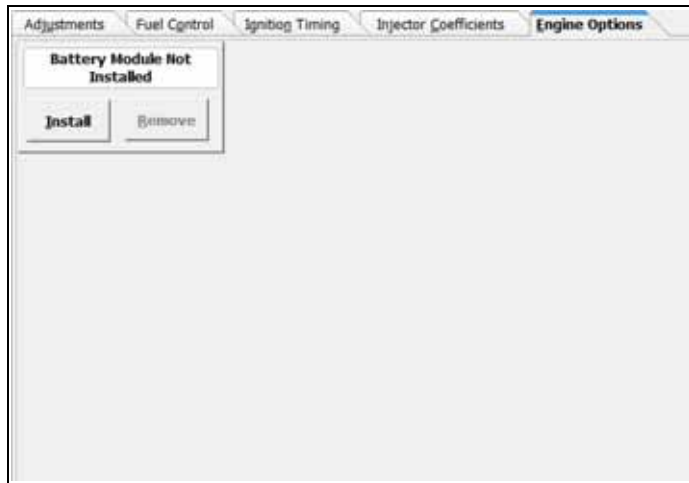
Stop Break-in Removed

The ability to Stop Break-in has been removed from *Evinrude Diagnostics* software v3.0.

Break-in Oil must be restarted whenever a powerhead is rebuilt or replaced.



EVINRUDE DIAGNOSTICS SOFTWARE

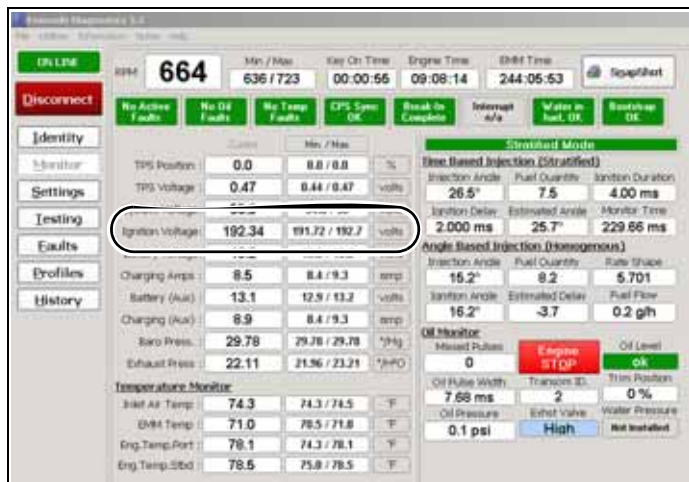


Evinrude Diagnostics engine options screen

Adding Battery Charge Kit to 25 – 30 HP Inline DR Models

When a Battery Charging Kit, P/N 5007741, is added to an *Evinrude E-TEC* 25 – 30 HP rope start model, the battery charge feature **MUST** be turned on.

Use *Evinrude Diagnostics* software “Engine Options” tab. Press the Install button to turn on the charge feature.



Ignition voltage does displays **ONLY** on models without IDI ignition.

Ignition Voltage Display

With the integration of the inductive ignition system onto *Evinrude E-TEC* models, *Evinrude Diagnostics* software will no longer display Ignition Voltage on 2009 and newer model outboards.

Note: 2009 F suffix 115 HP 60° V4 models, and 2008 and older models without inductive ignition will continue to display ignition voltage.



ERROR MESSAGES

Requires Windows NT Version 5.0

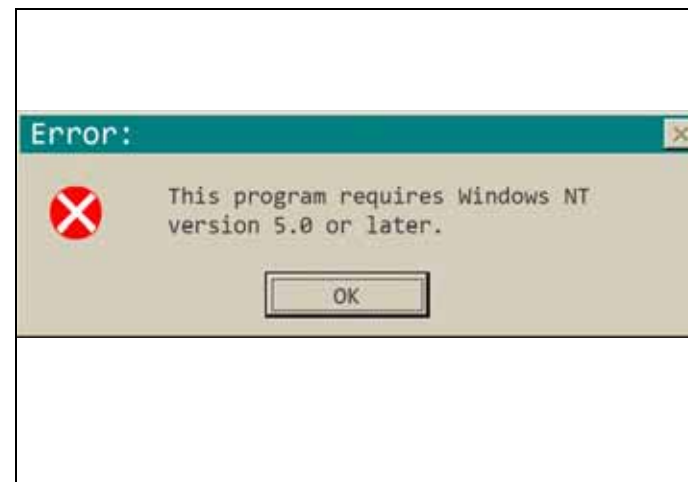
Reference: Service Bulletin 2008-05(S)

If attempting to install *Evinrude Diagnostics* software on a laptop using Microsoft Windows 95 or 98, the following error message will display:

“This program requires Windows NT version 5.0 or later.”

If you see this error message, it means the laptop needs to have the operating system upgraded to Windows 2000, XP or Vista.

Refer to Service Bulletin 2008-05(S) for the minimum computer system requirements for *Evinrude Diagnostics* software version 3.0 and higher.

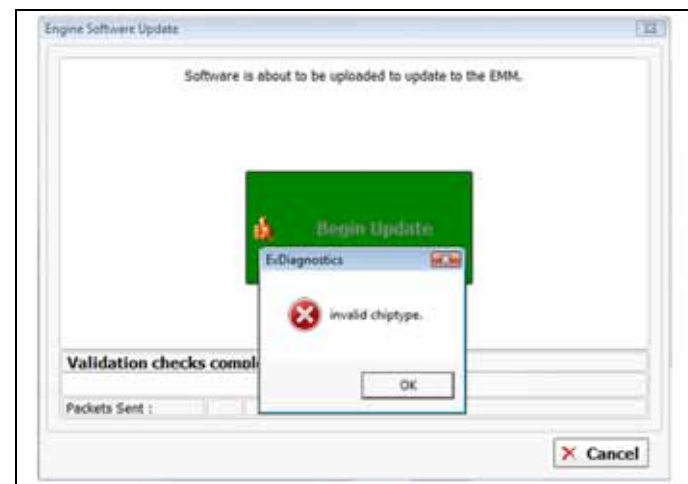


Evinrude Diagnostics version 3.0 error message

Invalid Chiptype

When loading engine software updates, *Evinrude Diagnostics* software checks the *EMM* bootstrap version. This check helps assure the correct software is being uploaded to the *EMM*. The bootstrap version is a permanently stored value and cannot be changed.

If the message “Invalid Chiptype” displays, it means the version of *Evinrude Diagnostics* software being used contains an outdated bootstrap version list. Update your *Evinrude Diagnostics* software to version 3.2 (or higher).



Update Evinrude Diagnostics software if an invalid chipset error message appears

SPECIAL TOOL

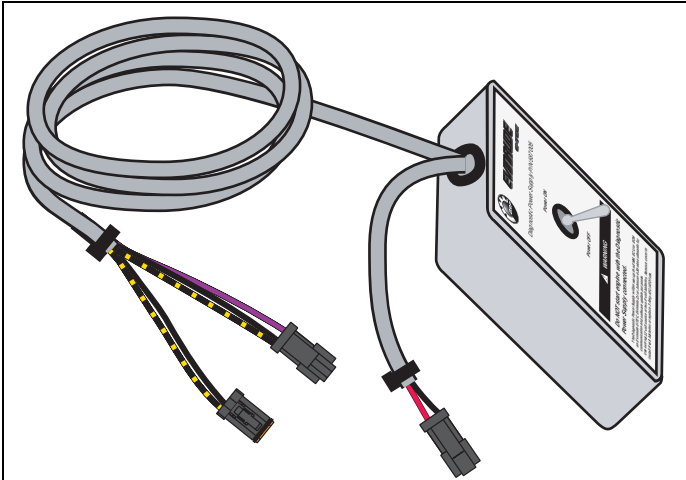
Diagnostic Power Supply, P/N 587005

Unlike *Evinrude E-TEC* 40 HP rope start models, the 25 – 30 HP DR models do not have a starter solenoid installed. For this reason, there is no point to connect a battery to power up the *EMM* and use the diagnostic program.

In order to use the diagnostic program with a non-running engine, the Diagnostic Power Supply, P/N 587005 has been developed.

The diagnostic power supply can also be used to power up any *EMM*, *ECU* or *ECM*-equipped *Evinrude E-TEC*, DI or 4-stroke outboard and communicate with a non-running engine to download diagnostic reports, update engine management software or complete set up options.

IMPORTANT: This tool is not designed for use as a start - stop switch. Do NOT attempt to start or run the engine while this tool is connected to the engine.



Diagnostic power supply tool, P/N 587005

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



ENGINE MANAGEMENT SOFTWARE



SOFTWARE VERSIONS & REVISIONS

Each engine family and horsepower uses Engine Management Software with unique software version and revision numbers.

There are two types of engine management software updates:

- When a typical update is made, a new software revision number is assigned to the software. The version number stays the same.
- Occasionally, updates may change the software version number.

Software Revision Updates

Revisions can be found on *DealerPort*:

- Note version and revision numbers using the *Evinrude Diagnostics* Identity screen.
- Log on to *DealerPort*, find the matching version number for the engine family and horsepower.
- Compare revision number in *EMM* with revision number posted online.
- If posted revision number is different than *EMM* revision number, the engine software may be updated. Refer to **Software Revision Number Changes**.
- Download the update to the laptop. Save the file to a known location.
- The downloaded file will be identified as version_revision.exe (for example 3030340_10516.exe).
- Use *Evinrude Diagnostics* to install the update on the outboard.
- Check the Identity screen to confirm that the correct version and revision numbers are installed.

Software Revision Number Changes

Software revision numbers are changing from five-digit numbers to three-digit numbers. As a result, you may encounter an engine with a software revision number which is higher (i.e. 99954) and now updates to a lower number (i.e. 689).

Authorized Dealer Identification

Dealer No: 120000 Print

Dealership: Vinnie's Marine

Address: 15 1/2 Pershing Drive

City: Waukegan State: IL Zip: 60000

2008 E-TEC V (60')

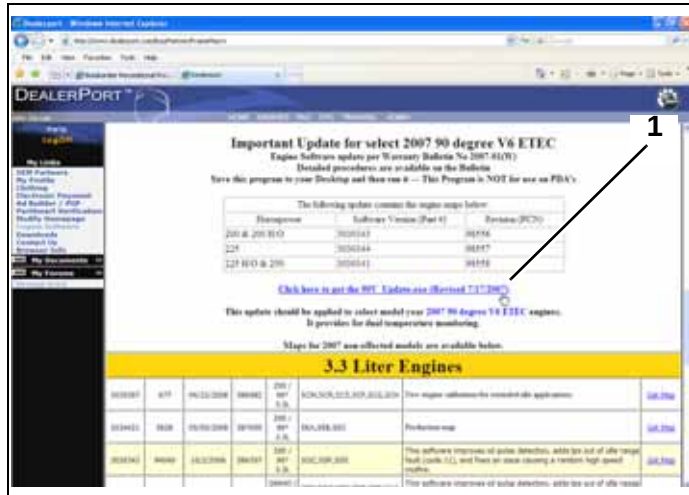
Engine Identification		HorsePower	
Engine Model	E115DPXSCR	HorsePower	115
Engine Serial	5196244	Max Engine RPM	5327
Model Suffix	SCR	Cylinder Count	4
Engine Run Time	09:08:45	Max Temp (Cool)	186.1 F
No Oil Runtime	00:06:33	Max Temp (HOB)	203.6 F
Break-In Clock	Completed	Remots/Tiller	Remote
Starter Cycles	363	In Break-In	No
Oil Ratio	XD100	BoatCamp Version	3.00
EMM Serial	164	Software Version	3030393
EMM Run Time	244:06:24	Software Revision	97475
Max EMM Temp	165.7 F	PDC Version	M8v47148
Diagnostic Version	41122	PDC CheckSum	22157

Identity screen



DealerPort Software Downloads

ENGINE MANAGEMENT SOFTWARE



1. Software version update for 90° V6 Models

Software Version Updates

Software version updates are “stand-alone” programs which are installed with a laptop computer. *Evinrude Diagnostics* software must NOT be running when installing one of these updates.

IMPORTANT: Version updates cannot be used with a PDA.

Software updates can be found on DealerPort:

- Note version and revision numbers using the *Evinrude Diagnostics* Identity screen.
- Log on to *DealerPort*, find the matching version number for the engine family and horsepower.
- Compare revision number in *EMM* with revision number posted online.
- If a version update is required, an update program will be listed at the right of the screen.
- Download the update to the laptop. Save the file to a known location.
- The downloaded file will be identified with a descriptive name (for example InlineUpdate.exe).
- Make sure *Evinrude Diagnostics* is NOT running.
- Double-click Update icon.
- Follow on-screen directions.

IMPORTANT: The error message “COM port in use by another device” will be displayed if *Evinrude Diagnostics* is in use.



Inline Update 2

The Inline Update has been revised to version 1.0.0.2 and includes current software changes to May 16, 2008. If using the previous version (1.0.0.1), delete it and download the revised package from *DealerPort*.

The Inline Update adds a new diagnostics feature (TPS Calibration) and permits the following older outboards to benefit from model year 2007 software features:

- 2006 40 – 60 HP models and
- 2004 – 2006 75 – 90 HP models



Inline Update 2, version 1.0.0.2

I-Command and Engine Management Software

Past engine management software updates contained changes affecting *I-Command* compatibility.

If installing *I-Command* on a non-current V-model outboard, the engine management software should be updated with the most current revision from *DealerPort*.

IMPORTANT: If installing on multiple engines which have different part number EMMs, contact After Sales Support (Technical Service).

3.3 Liter Engines					
000001	017	04/15/2008	000001	000001,000,001,001,001,001	New engine software for extended life applications
000002	0008	05/05/2008	000002	000,000,000	Production stop
000003	00000	10/03/2008	000003	000,000,000	This software improved all power detection, adds get out of idle range fault (code 11), and then no issue causing a random high speed warning
000004	00000	10/03/2008	000004	000,000,000,000,000,000,000	This software improved all power detection, adds get out of idle range fault (code 11), and then no issue causing a random high speed warning
000005	0001	04/15/2008	000005	000,000,000,000,000,000,000	REPLACES THE 000001 UPDATE. THE 000001 UPDATE WAS A PRELIMINARY RELEASE. THE 000005 UPDATE IS THE FINAL RELEASE. THE 000005 UPDATE IS THE FINAL RELEASE. THE 000005 UPDATE IS THE FINAL RELEASE.
000006	00001	10/03/2008	000006	000,000,000,000	This software improved all power detection, adds get out of idle range fault (code 11), and then no issue causing a random high speed warning
000007	00001	05/05/2008	000007	000,000,000,000	Production stop
000008	00000	06/10/2008	000008	000,000,000,000,000,000,000	A few more production (200) of engines were shipped with software that previously contained a software update. The 000008 software will correct the issue and allow current & future software updates to be applied.
000009	00000	06/10/2008	000009	000,000,000,000,000,000,000	REPLACES THE 000008 UPDATE. THE 000008 UPDATE WAS A PRELIMINARY RELEASE. THE 000009 UPDATE IS THE FINAL RELEASE. THE 000009 UPDATE IS THE FINAL RELEASE.

Important Engine Management Software Update, 250 H.O. and 300 HP 90° (3.4L) V6 Models

Reference: Warranty Bulletin 2008-06(W) 250 H.O. and 300 HP models.

[illegible]

Engine Management Software Changes 2008 and Newer 75 – 90 HP Inline Models

A running change was made to engine management software with revision numbers 4066 or newer.

Below 3500 rpm, once engine temperature reaches 212° F (100° C) ± 3° the *EMM* will activate *S.A.F.E.* and sound the warning horn. This will set Code 40; Engine Overheat, Low Speed.

Above 3500 rpm, once engine temperature reaches 194°F (90°C) ± 3° the *EMM* will activate *S.A.F.E.* and sound the warning horn.

[illegible]

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ENGINE MANAGEMENT MODULE (*EMM*)



2009 *EMM* CHANGES

115 H.O. – 300 HP V4 / V6 Models

EMMs for 2009 models have been upgraded with a more powerful processor, increased memory and to support inductive ignition.

Notes:

- All 115 H.O. – 300 HP models model outboards use the same service *EMM*, P/N 587048.
- 2009 and newer *EMMs* are NOT compatible with earlier model outboards.
- *Evinrude Diagnostics* must be updated to version 3.0 or newer to communicate with 2009 and older model outboards.

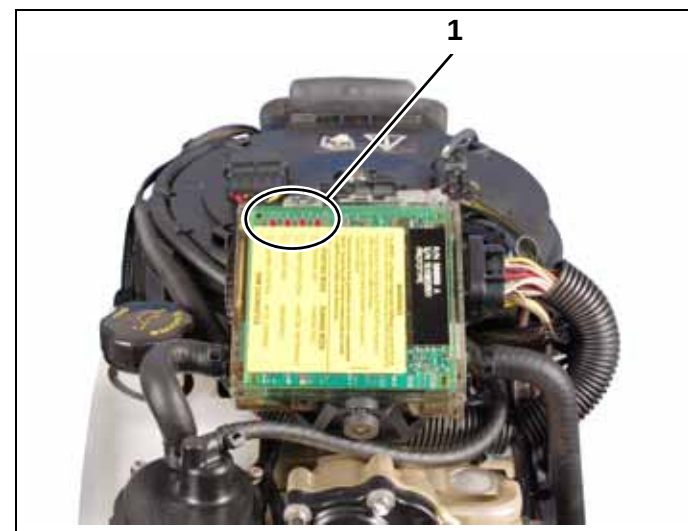
IMPORTANT: 115 HP 60° V4 F suffix models use *EMM* P/N 586982. See **EMM Service Chart** on p. 63.



EMM Light Emitting Diodes (LEDs) 25 – 30 HP Inline Models

A new *EMM* has been developed for these models. This *EMM*, P/N 586869, features a see-through clear case allowing a technician or the operator to view the LED indicators through the top of the case. As with other *Evinrude E-TEC* models, LEDs provide useful information about the status of several outboard systems.

For a detailed description of LED functions, refer to **System Analysis** in the appropriate service manual.



1. LED indicators

EMM SERVICE CHART

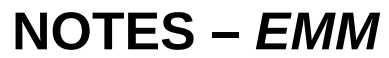
References: Administrative Bulletin 2008-01(A) and Parts and Accessories Bulletin 2008-02(P).

Administrative Bulletin 2008-01(A) outlines the policies and procedures for the Warranty Replacement of *Evinrude E-TEC EMMs*.
Parts and Accessories Bulletin 2008-02(P) the policies and procedures for Service Replacement of *Evinrude E-TEC EMMs*.

Model	2004	2005	2006 - 2007	2008	2009
40 – 50 HP	586759	586759	586759	586968	586968
60 – 65 HP	~	586759	586862	586970	586970
75 – 90 HP	586759	586759	586759	586970	586970
115 HP	~	~	586867	586982	586982*
115 H.O. – 130 HP	~	~	~	~	587048
150 – 200 HP 60° V6	~	~	586707	586982	587048
200 – 300 HP 90° V6	~	586707	586707	586982	587048
* Note: 2009 115 HP F suffix ONLY					

IMPORTANT: Do NOT install an *EMM* from a newer engine on an older engine. Changes in the newer models will result in damage to the *EMM* if installed on an older engine.

Note: *EMMs* cannot be ordered as a regular parts order, since they must be programmed before shipping. Review these two recently released bulletins BEFORE ordering a replacement *EMM*.



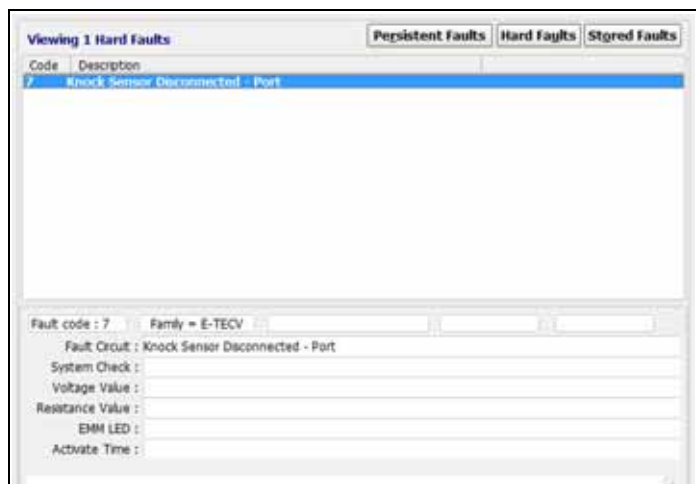
64



SERVICE CODES



Code 1; Excessive knock detected cylinder #1



Code 7; Port knock sensor open circuit detected

SERVICE CODES INFORMATION

Code 1 through 6; Excessive Knock Detected – 250 H.O. and 300 HP 90° V6 (3.4 L) Models

Code 1 through 6 are new service codes starting with 2009 F-suffix production. The code number is also the cylinder number (i.e. code 2 is for cylinder 2).

Symptom: *Evinrude Diagnostics* software reveals one or more Code 1 through 6; Excessive Knock Detected. Customer reports warning system and S.A.F.E. were activated.

What happens: One or more cylinders are knocking above acceptable limits. Also see **Knock Sensors, P/N 587042 – 250 H.O & 300 HP (3.4 L) 90° V6 Models** on p. 75.

Troubleshooting procedure:

- Make sure the sensor is securely fastened to the cylinder head.
- Use the correct service manual to check timing adjustments, and perform fuel and cooling system testing.
- Retest with shop tank of known fresh fuel that meets octane requirements.

Code 7 and 8; Knock Sensor Open Circuit Detected – 250 H.O. and 300 HP 90° V6 (3.4 L) Models

Codes 7 and 8 are new service codes beginning with 2009 F-suffix production. Code 7 is for the port sensor and code 8 is for the starboard sensor.

Symptom: *Evinrude Diagnostics* software reveals Code 7 or 8; Knock Sensor Open Circuit Detected. Customer reports warning system activation.

Troubleshooting procedure:

- Make sure the sensor is securely fastened to the cylinder head.
- No tests exist, swap a known good sensor and run engine above 1500 rpm to check.

Code 40; Engine Overheat, Low Speed (Port or Single) Code 70; Engine Overheat, Low Speed (Starboard)

Code 40 and Code 70 are new codes which support dual-zone temperature monitoring features on some models. Code 40 supports inline models and the port cylinders on V-model outboards. Code 70 supports the starboard cylinders on V-model engines.

Activation limits are:

Model	Temperature Set-Point	RPM Range
75 – 90 HP Inline	212°F (100°C)	below 3500
115 – 200 HP 60° V4 / V6	230°F (110°C)	below 3000
200 – 300 HP 90° V6 (3.3 & 3.4 L)	212°F (100°C)	below 2000

Code 70; Engine overheat, low speed fault

Code 77; Start Assist Circuit (S.A.C.) Over Current Detected – False Setting on 2009 Models

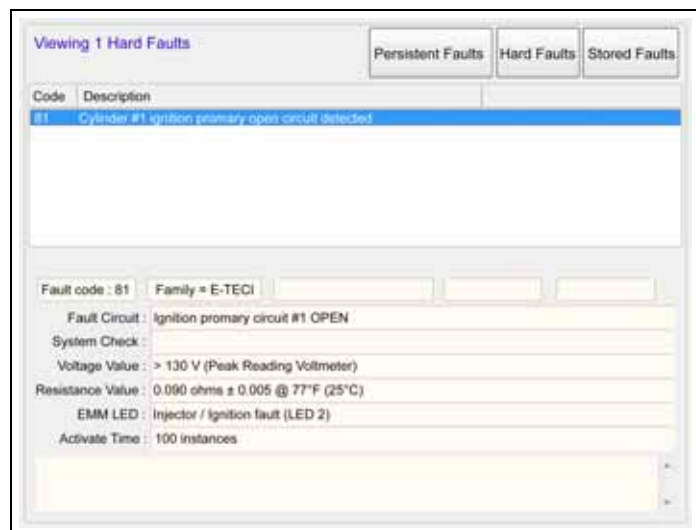
False code 77 issues have been reported on some 2009 models. This issue is currently under investigation. A false code 77 will NOT affect starting while a real code 77 results in a no-start situation for the outboard.

Symptom: Outboard starts. The warning system has NOT activated. *Evinrude Diagnostics* software reveals Code 77; Start Assist Circuit Over Current Detected.

What Happens: A false code 77 has been stored.

Procedure: Contact After-Sales Support.

Code 77; Start assist circuit over current detected



Code 81; Ignition primary open circuit detected

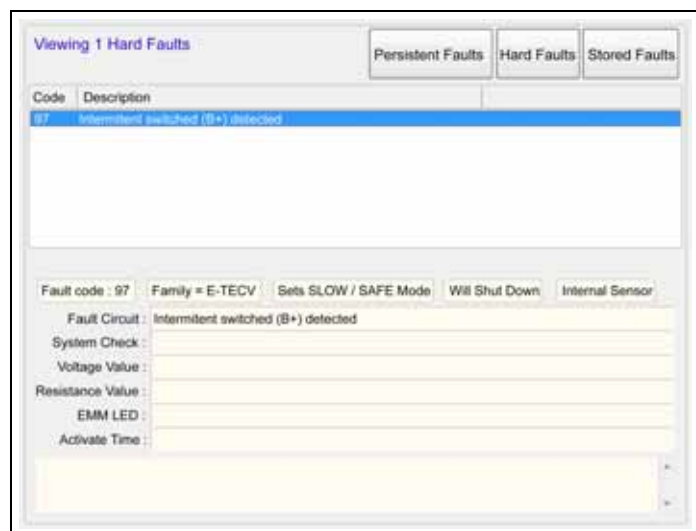
Code 81 thru 86; Ignition Timing Circuit Open Detected

Symptom: Engine not running on all cylinders. *Evinrude Diagnostics* software reveals one or more, Code 81, 82, 83, 84, 85 or 86; Ignition Timing Open Circuit.

Troubleshooting procedure: The *EMM* counts missed ignition events. Check wiring. Swap known good ignition coil.

Symptom: *Evinrude Diagnostics* software reveals Code 84, 85 or 86; Code Not Defined.

Correction Procedure: Update *Evinrude Diagnostics* software to version 3.1 or higher.



Code 97; Intermittent switched (B+) detected

Code 97; Intermittent Switched B+ Detected

Symptom: No notable run quality symptoms. A typical customer complaint may be *SystemCheck* LEDs and warning horn keep running through the self-test. *Evinrude Diagnostics* software reveals multiple Code 97: Intermittent Switched B+ Detected.

Troubleshooting procedure: Inspect all switched B+ connectors and wiring (purple wire). Check for improperly crimped terminals, broken wires or damage. Swap known good key switch and MWS harness.

Note: Typically Code 97 is caused by an electrical fault in the boat. Check engine wiring only after the boat systems have been completely eliminated.

Code 101 thru 106; Ignition Timing Circuit Short Detected – False Setting on 2009 Models

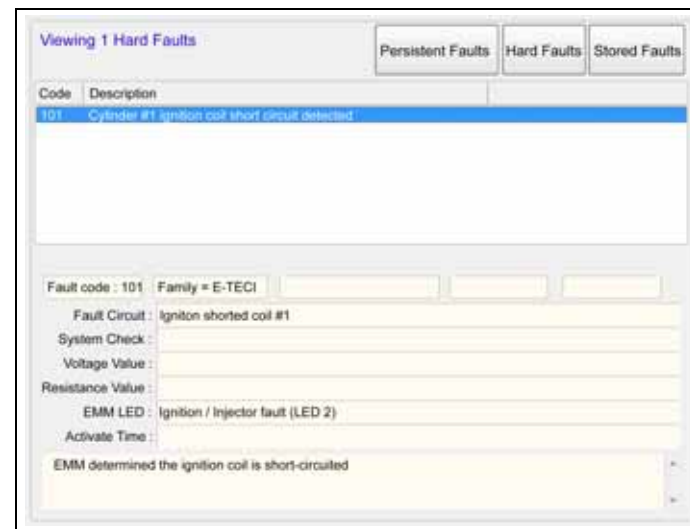
False code 101 through 106 issues have been reported on some models. False faults are most likely to occur during cranking. This issue is currently under investigation. False codes do NOT affect run quality, while a real code will result in a poor running engine.

Symptom: No notable run quality issues. *Evinrude Diagnostics* software reveals Code 101, 102, 103, 104, 105 or 106; Ignition Timing Short Circuit.

Procedure: Contact After-Sales Support.

Symptom: *Evinrude Diagnostics* software reveals Code 104, 105 or 106; Code Not Defined.

Correction Procedure: Update *Evinrude Diagnostics* software to version 3.1 or higher.



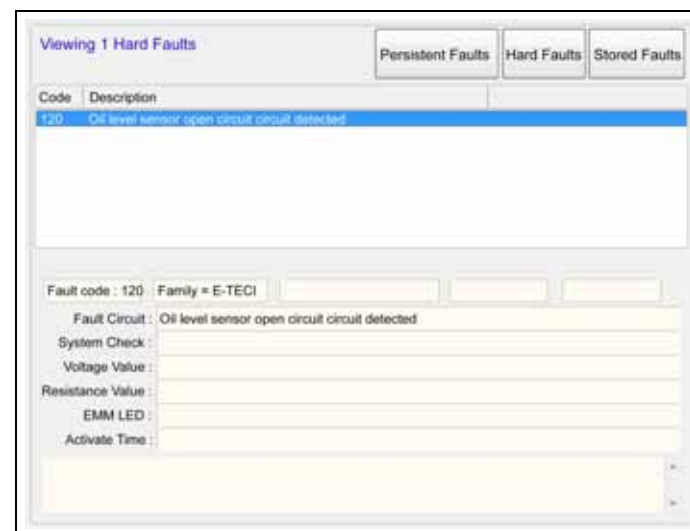
Code 101; Ignition timing circuit short detected

Code 120; Oil Level Switch Open Circuit Detected – 2009 and newer 25 – 30 HP Inline Models

Code 120; Oil Level Switch Open Circuit Detected, is a new service code for 2009 25 – 30 HP models.

Symptom: *Evinrude Diagnostics* software reveals Code 120; Oil Level Switch Open Circuit Detected.

Troubleshooting procedure: Inspect wiring from *EMM* to oil level switch. Swap known good oil level switch.



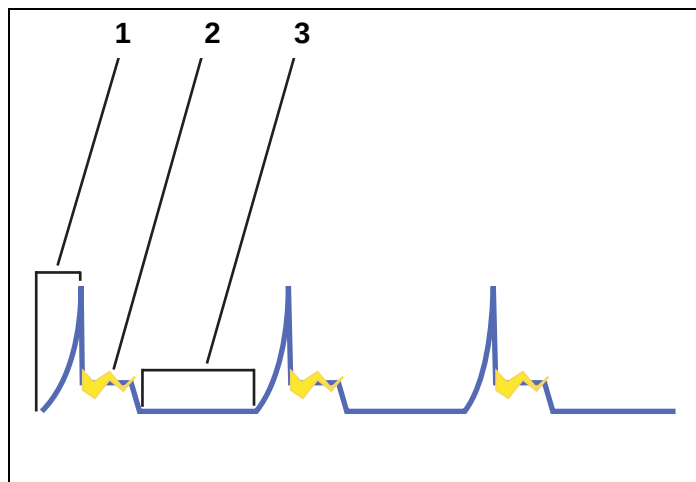
Code 120; Oil level switch open circuit detected



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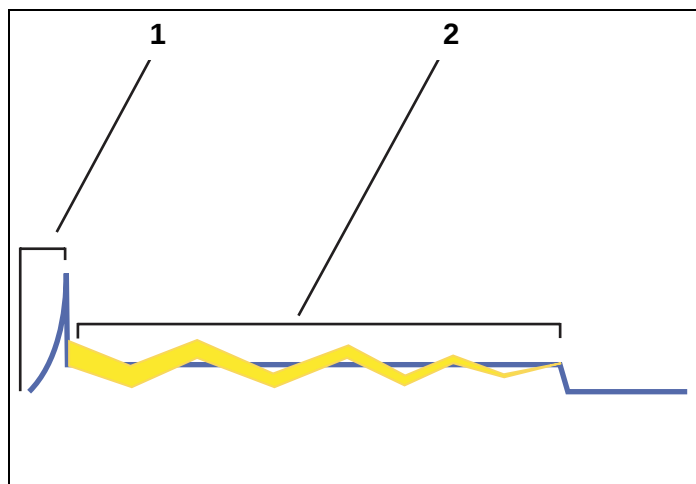


IGNITION AND ELECTRICAL



CDI Multi - Strike Ignition

1. Fast rise time
2. Short spark duration
3. No spark in gap



Evinrude E-TEC IDI

1. Fast rise time
2. Long spark duration

IMPROVEMENTS

Inductive Ignition – New for 2009 115 H.O. – 300 HP V4 / V6 Models

The inductive ignition system is a proven design, used in the automotive industry for years. This design has been adapted to provide ignition spark with a fast rise time like CD ignition, and a long, continuous duration spark, compared to the multi-strike cd ignition used on older models.

Benefit: Smoother running outboards

The inductive ignition uses a new ignition coil. An internal circuit board controls current flow through the primary winding.

How it works:

- **Power:** White/red wire supplies system voltage (55 volts) to the primary winding.
- **Ground:** Black wire provides ground to the circuit board and to the coil primary.
- **Control:** Orange wire from the *EMM* provides a low voltage (approx. 12 V) control signal to the circuit board.

When the circuit board receives the control signal, it momentarily stops current flow through the primary winding. The surrounding magnetic field collapses, creating high voltage in the secondary circuit.

Refer to the appropriate service manual for test procedures.

Ignition Coil Mounting Location, 200 – 300 HP 90° V6 Models

What you need to know: Beginning with 2009 production the ignition coil mounting locations on 90° V6 models has changed. The ignition coil extends below the powerhead mating surface.

Why you need to know: When removing or installing a powerhead with inductive ignition, the ignition coil for number 6 cylinder can be damaged if the powerhead is improperly set down.

IMPORTANT: Properly support complete powerheads to avoid damaging the ignition coil.



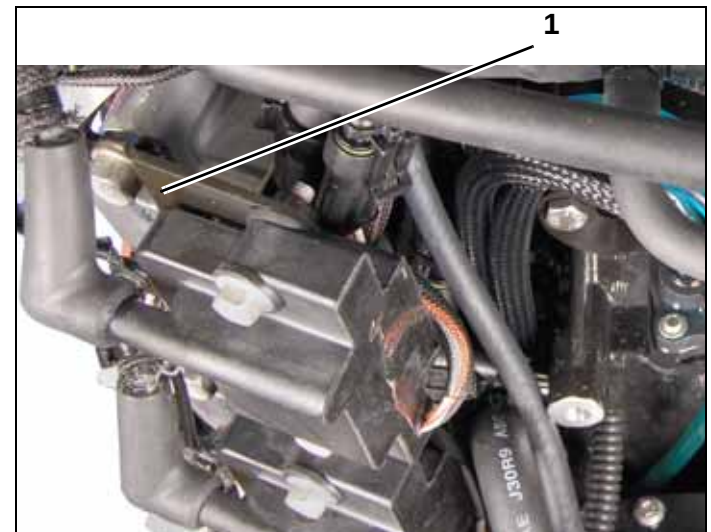
1. Ignition coil mounting, 90° V6 models

Ignition Coil Mounting Bracket, 60° V4/V6 Models

What you need to know: Beginning with 2009 production, the ignition coil mounting locations on 60° V4/V6 models has changed.

Why you need to know: Models with inductive ignition use an ignition coil mounting bracket, which is retained by the injector screws. Refer to the appropriate service manual when servicing fuel injectors or ignition coils on these models.

Note: 115 HP "F" suffix models are not equipped with inductive ignition.



1. Ignition coil mounting bracket, 60° models

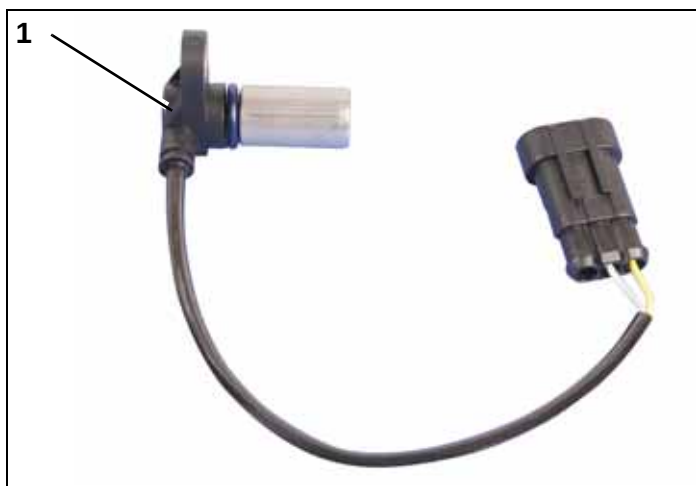


New Engine Harness on 115 H.O. – 300 HP V4 / V6 Models

New engine wiring harnesses are used on all 115 H.O. – 300 HP V4 and V6 models.

Harness changes support the addition of inductive ignition to these models. Harness improvements include:

- better protection from chafing
- rerouting to prevent harness stress
- new anchor points for both the harness and some electrical connectors



Crankshaft position sensor, P/N 587014

1. Gussets

New Crankshaft Position Sensor, P/N 587014

Beginning with 2009 production, a new CPS is used on all *Evinrude E-TEC* 25 – 300 HP models.

The CPS has two wires (white and yellow) compared to the previous CPS which had a third (black) wire. Gussets have also been added to the mounting boss to provide stability to the sensor mounting. This results in more accurate timing.

This sensor is a direct replacement for the three-wire sensor and provides increased reliability.

Oil Pump Wire Harness Routing Revised 40 HP Inline Rope Start Models

A running change has been made to the harness routing for the oil pump. This change prevents harness chafing and eliminates the J-clamp and screw.

The wiring is now routed around the starboard side of the powerhead. Tie straps are added to eliminate slack and keep the wiring in position.

This change may be applied to older engines that experience this issue.



1. Oil pump wire harness
2. Tie straps

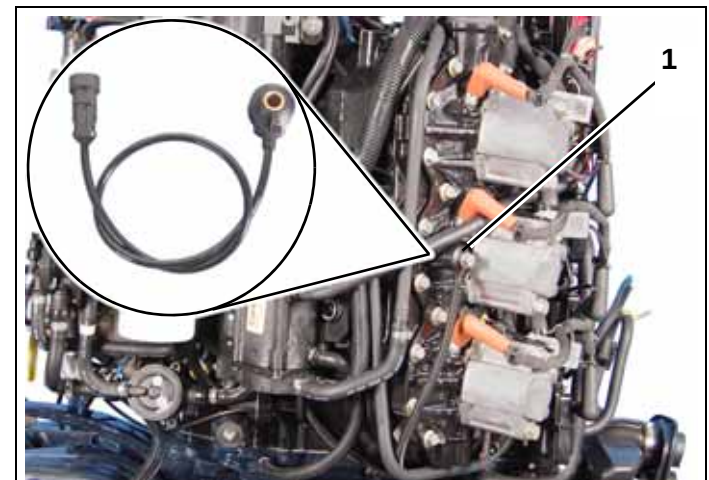
Knock Sensors, P/N 587042 – 250 H.O & 300 HP (3.4 L) 90° V6 Models

Beginning with 2009 F-suffix production, knock sensors have been added to *Evinrude E-TEC* 250 H.O. and 300 HP models.

A knock sensor is installed on each cylinder head to provide up to five levels of protection against powerhead failure.

Each knock sensor is capable of determining which cylinders are knocking, allowing the *EMM* to adjust ignition timing and fuel delivery in increasing degrees of protection for levels one through four.

If excessive knocking continues, the fifth level of protection activates *S.A.F.E.* and the monitor system warns the operator by activating the alarm horn and a **CHECK ENGINE** warning. Service codes are stored identifying which cylinders are knocking. Also see **Code 1 through 6; Excessive Knock Detected – 250 H.O. and 300 HP 90° V6 (3.4 L) Models** on p. 66.



1. Knock sensor, P/N 587042



SPARK PLUGS

Champion QC10WEP spark plugs, introduced in 2007, are now used on all 2009 models, 40 – 200 HP 60° Models. This new spark plug uses iridium pads on the electrodes and offers longer spark plug life.

- Individually wrapped P/N 5007419
- 24-Pack P/N 764643

Champion QC8WEP spark plugs are now used on all 2009 200 – 300 HP 90°V6 (3.3 and 3.4 L) Models.

- Individually wrapped P/N 5007597

Evinrude E-TEC Spark Plug Chart

HP	2004	2005	2006	2007	2008	2009
25 – 30						QC10WEP
40 – 50	QC12PEP†	QC12PEP†	QC12PEPB†	QC12PEPB†	QC10WEP	QC10WEP
60 – 65	QC12PEP†	QC12PEP†	QC12PEPB†	QC12PEPB†	QC10WEP	QC10WEP
75 – 90	QC12PEP†	QC12PEP†	QC12PEPB†	QC12PEPB†	QC10WEP	QC10WEP
115 – 130				QC10PEP†	QC10WEP	QC10WEP
150 – 200 60°V6				QC10PEP†	QC10WEP	QC10WEP
200 – 250		QC10WEP*	QC10WEP*	QC10WEP	QC10WEP**	QC8WEP
250 H.O. – 300					QC8WEP	QC8WEP

† DO NOT substitute spark plugs on these models.

* QC10WEP may be substituted for QC10PEP on 2005/2006 200 - 250 HP 90° V6 models.

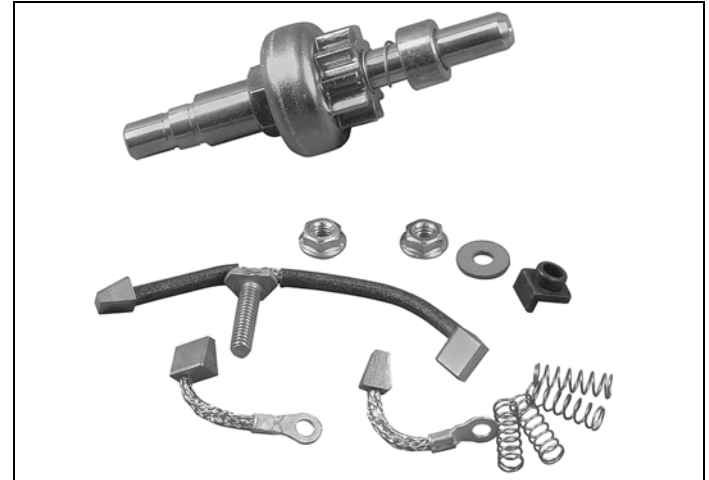
** H suffix models use QC8WEP

STARTER MOTORS

Service Parts

Electric starter motor service parts have changed. Available service parts consist of starter assemblies, drive kits, and brush and spring sets.

Check the Electronic Parts Catalogs (EPC) for the latest parts information.



Refer to the Electronic Parts Catalog for service parts availability

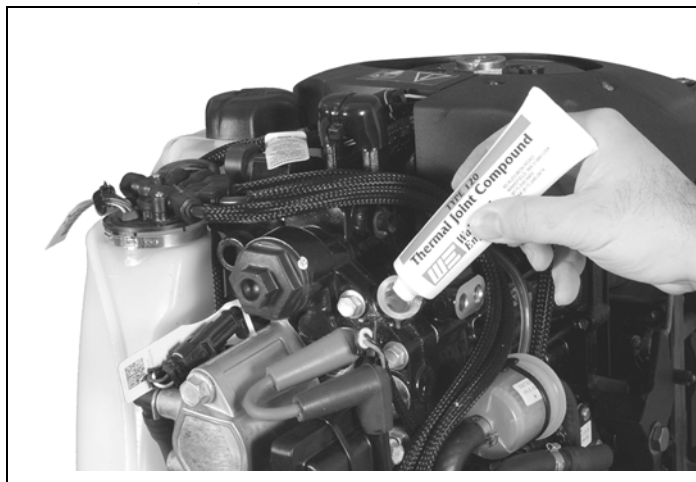
60°V4 and 60°V6/90°V6 Electric Starter Differences

The electric starters for 2007 and newer V4 and V6 models look the same, but they are not. Use the chart below, or the correct parts catalog for service parts.

Model	2005	2006	2007	2008	2009
115 – 130 HP 60° V4	~	~	586957	586957	586957
150 – 200 HP 60° V6	~	~	586890 586957	586957	586957
200 – 300 HP 90° V6	586897	586890	586890	586890	586890



V4 and V6 starter motors are different



SERVICE ISSUES

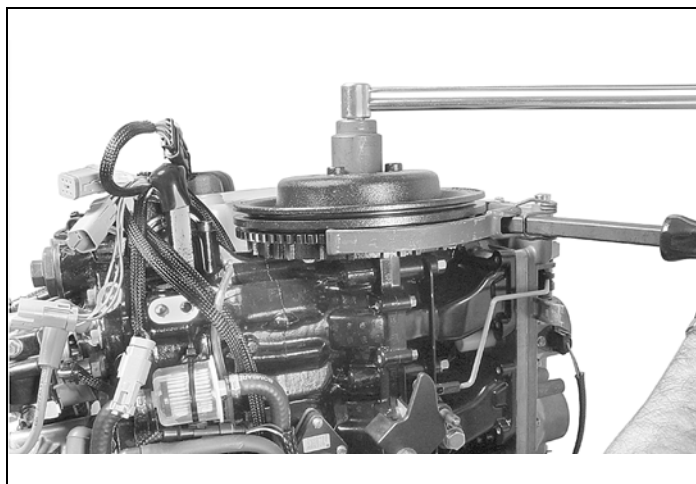
Cylinder Head Temperature Sensor Installation

Reference: Service Bulletin 2008-01(S)

What: A production change which affects 2008 *Evinrude E-TEC* 40 - 300 HP models and increases the amount of heat sink compound in the temperature sensor cavity .

Why: This change improves the reaction time of the engine's overheat warning system (S.A.F.E.).

Note: Refer to Service Bulletin 2008-01(S) when servicing temperature sensor on all *Evinrude E-TEC* models.



Flywheel Servicing 40 – 90 HP Inline Models

What: An engineering change which affects flywheel installation on all *Evinrude E-TEC* 40 - 90 HP models.

This change specifies that *Triple Guard* grease be used on the crankshaft threads, rather than *Gasket Sealing Compound*, and no longer requires the flywheel nut to be replaced when installing a flywheel.

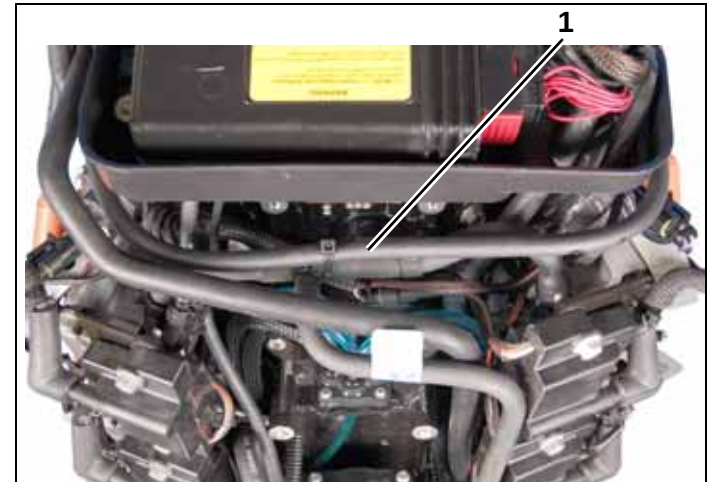
Why: This change improves the torque procedure and clamp load of the flywheel nut, washer and flywheel to the crankshaft.

Starter Cable Service Kit, P/N 5007851 – 2007 / 2008 115 – 200 HP 60° V4 / V6 Models

Beginning with 2009 production, a longer starter cable is used. The longer cable and re-routing help to improve starting by minimizing Radio Frequency Interference (RFI) issues with the Crankshaft Position Sensor.

A Starter Cable Service Kit, P/N 5007851 is available for 2007 – 2008 *Evinrude E-TEC* 115 – 200 HP 60° V4 / V6 models which might be experiencing hard-start issues.

The kit includes a longer starter cable, P/N 587027, and installation instructions.



1. Longer starter cable

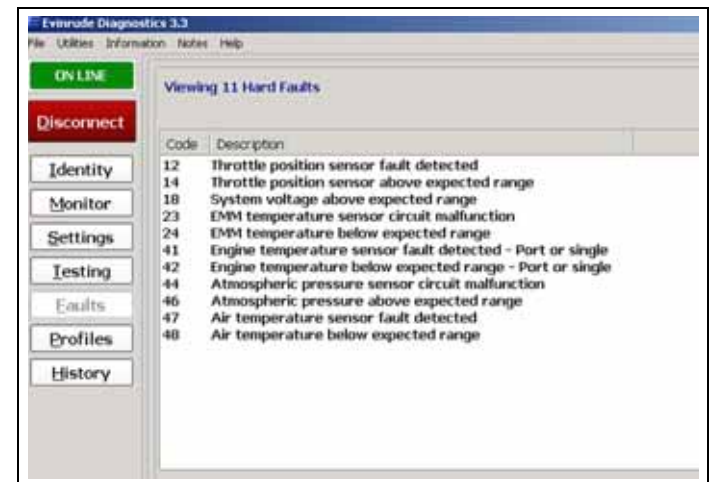
Troubleshooting 5 Volt Sensor Circuit

Symptom: Rough running. Possible hard starting. CHECK ENGINE light and warning horn may activate. Many hard codes, including internal *EMM* codes.

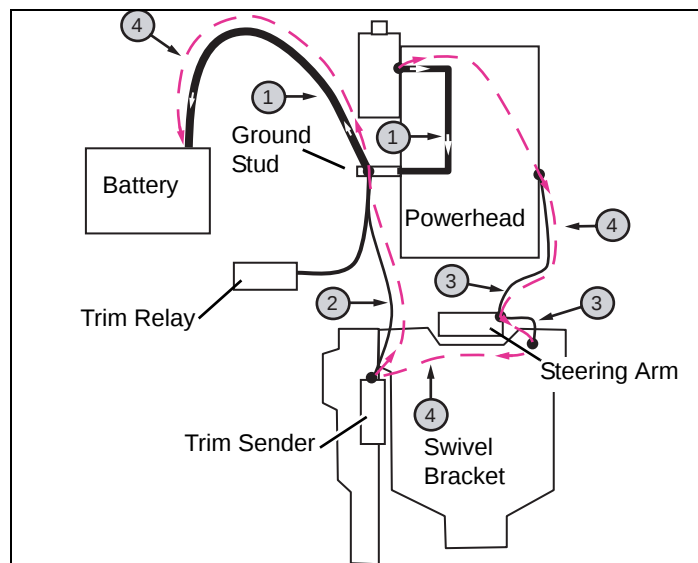
The Cause: The sensors and *I-Command* network operate using the full voltage of the sensor circuit. If an internal sensor failure, or other short, grounds the 5 volt circuit (red wire), it will set a series of sensor hard faults.

Troubleshooting Tips: Check 5 volt sensors, starting with TPS, Oil Pressure Sensor, *I-Command* connector and if equipped, Accessory Water Pressure Sensor, P/N 5006215. Unplug sensors one at a time to eliminate sensors as the cause.

If unplugging sensors does not eliminate the hard sensor faults, inspect the engine wiring harness for chafing, or other damage that may be shorting the 5 volt sensor circuit to ground. See the engine wiring diagram in the appropriate service manual.



1. Hard faults



1. Normal ground path
2. Trim sender leads
3. Bonding leads
4. Improper ground path due to loose battery negative cable

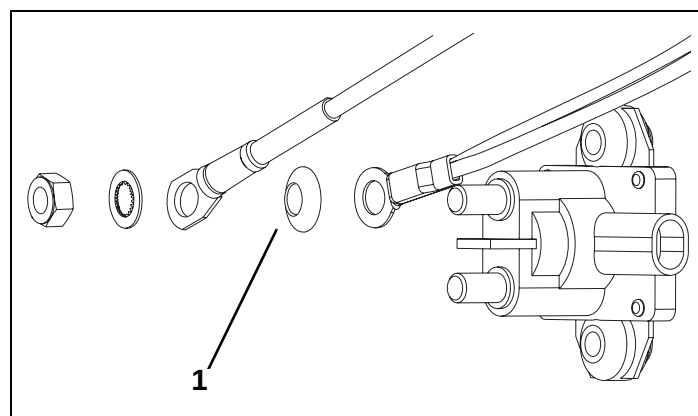
Melted Wiring and Bonding Wires

The Problem: Melted wiring and / or melted bonding wires between the powerhead and midsection. This condition indicates an excessive electrical load through the circuit.

The Cause: This is most commonly caused by a loose ground. The dashed line shows ground path when there is a poor ground connection at the powerhead ground stud. When the operator turns the key switch to the start position, the bonding wires become the return ground path.

Occasionally due to a short, another power source (such as an accessory) energizes the bonding system, or on aluminum boats, the hull. Once the current capacity of the smaller gauge wiring is exceeded, it overheats and melts.

Troubleshooting Tips: Look for loose ground at the battery and the engine. Check power leads and connectors. Check for corroded contacts and wiring. Check the boat for improper wiring or shorted accessory circuits.



1. Retaining washer, P/N 354046

Starter Solenoid Servicing

Reference: Service Bulletin 2008-04(S)

A production change which affects all 2009 *Evinrude E-TEC* models uses a NEW retaining washer, P/N 354046, to secure the engine cable(s) on the starter solenoid terminal during production. This improves positive battery cable installation and affects starter solenoid servicing.

TPS Calibration

TPS Calibration is a function of *Evinrude Diagnostics* software. This function was developed to improve engine performance by synchronizing the TPS with the throttle plates.

The *Evinrude E-TEC* engine management software is calibrated for throttle plate(s) to open from 21.5 to 24% of throttle position. If the throttle plates open too early or too late, the amount of air entering the engine changes, affecting performance.

When to Perform a TPS Calibration

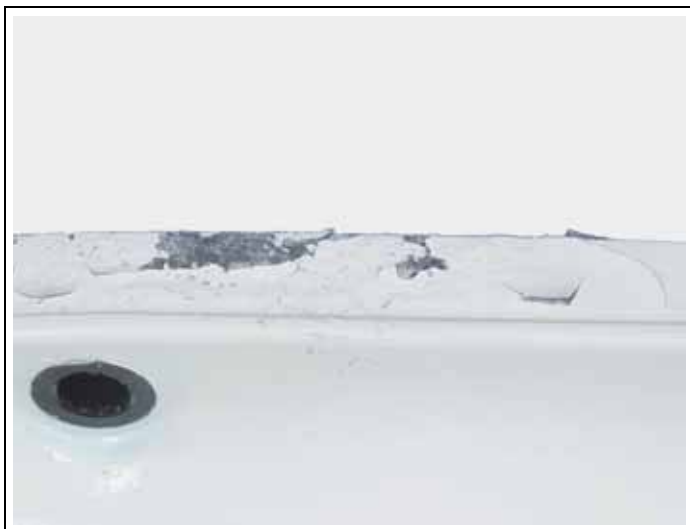
Perform a TPS calibration when a powerhead is replaced or rebuilt, or when any throttle linkage component is replaced.

TPS Calibration should be checked when an engine misses or pops while operating in the low speed to midrange transition. Remember, performing a TPS calibration incorrectly can have a negative effect on the low speed to midrange transition.





Galvanic corrosion



Galvanic corrosion

Corrosion

Definitions

Galvanic Corrosion: Corrosion resulting from an electrochemical reaction, or electric current flow between dissimilar metals that are in contact with the same electrolyte. One of the metals must be more chemically active, or less stable for a reaction to occur.

Stray Current Corrosion: Similar to galvanic corrosion, but is caused by an outside source. Possible sources include the alternating current (AC) or direct current (DC) electrical systems of the boat, other nearby boats on the dock, or the AC electrical system (if present) of the dock.

Electrolysis: A chemical or electrochemical change in a solution due to the passage of electrical current. This term is often used INCORRECTLY when referring to galvanic corrosion or stray current corrosion.

Galvanic Corrosion

Galvanic corrosion of the more chemically active metal occurs whenever two or more dissimilar metals that are "grounded" (i.e. connected by touching each other, or by wire) are immersed in a conductive solution (any liquid that can transfer electricity). Saltwater, freshwater with high mineral content, and polluted freshwater are very conductive.

The first sign of galvanic corrosion is blistered paint on sharp edges below the water line, where a white powdery substance forms on exposed metal areas. As corrosion continues, the exposed metal areas become deeply pitted as metal is eaten away.

Stray Current Corrosion

Stray current corrosion occurs when metal with an electrical current flowing into it is immersed in water that is grounded (i.e. any body of water where customers use their boats). The current leaves the metal and flows through the water to ground. This causes rapid corrosion of the metal at the point where the current leaves the metal.

Stray battery current (DC), in particular, is very destructive. If the metal in question happens to be an aluminum part like a gearcase or midsection, it can be destroyed in a matter of days.

Stray current may come from internal or external sources. Internal sources include short circuits in the boat wiring, such as a poorly insulated wire in the bilge, an improperly wired electrical accessory, or a wire harness with broken insulation or a screw driven through the harness.

External sources are normally related to shore power connections. A boat with internal stray current problems can cause corrosion to other boats plugged into the same shore power line, if the other boats provide better ground. The stray current is transmitted to other boats through the common ground wire.



Stray current corrosion



Stray current corrosion



Keep gearcase in the water when docked



Corrosion protection device

How Shore Power Can Cause Stray Current

Low-voltage galvanic currents (DC) can pass through shore power ground wires and have a disastrous effect for any boat connected to shore power. Normally, alternating current does not create corrosion problems, but because the boat, pier, and shore power wiring are all connected, direct current, if present, has a path to follow.

Safety regulations require three-wire cabling to provide shore power to any boat. One of these leads grounds all electrical and propulsion equipment to shore. This safety procedure not only reduces the danger of shock, but also connects the underwater metal components on the boat with metal on neighboring boats connected to shore power, metal piers, or other metal objects in the water. This allows destructive galvanic currents to flow between them. If these currents continue, serious corrosion occurs in a very short time.

Do's & Don'ts

- Anodes cannot provide corrosion protection if out of the water. Flush with freshwater to remove saltwater and pollutants prior to storage. This can help prevent dried salt deposits from reacting with moisture in the air.
- Keep gearcase in the water when the boat is docked. Due to the mounting location of anodes, they may be out of the water if the outboard is tilted.
- In problem areas, consider installing a corrosion protection device.
- Use zinc anodes in saltwater. Magnesium anodes will provide overprotection and must NOT be used. Over protection may cause a reaction which creates hydrogen on the metal surface, under the paint. This results in paint blisters and paint peeling from the surface of the parts.
- NEVER paint anodes as this will leave them inoperative.

Corrosion Protection Testing

To determine if corrosion is occurring, measure the hull potential. Corrosion test kits are available commercially, but a more economical option may be a digital multimeter and a commercially available silver / silver chloride reference electrode (also known as a silver – silver chloride half cell).

Search the internet for “silver / silver chloride reference electrode” to find a commercially available electrode.

The boat being tested should be moored for at least eight hours before starting the test. While testing, do not to rock the boat excessively as this will effect the accuracy of readings.

- Be sure the battery is fully charged.
- Submerge the reference electrode into the water about six inches behind the outboard.
- Connect the positive lead of the multimeter to the reference electrode.
- Connect the negative lead of the multimeter to various points in the boat (i.e. battery ground, engine block, bonding system, metal hull fittings, or other metal items in the boat) and observe the meter reading.

Metal Type	Voltage Reading (in mV)		
	Freely Eroding	Protected	Over Protected
Bronze	0 – 499	500 – 700	701 +
Steel	0 – 749	750 – 950	951 +
Aluminum	0 – 799	800 – 1050	1051 +

Note: Because its protected by a new finish and equipped with new anodes, a new boat / outboard package can show higher readings. To obtain accurate results, perform test after the boat has been in use at least one to two weeks. Find and correct the cause of freely eroding or over protected conditions.



Corrosion test meter kit



Silver / silver chloride reference electrode

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



FUEL SYSTEM



FUEL QUALITY ISSUES

Reference: Service Bulletin 2006-06(S)

Unleaded Fuels

Evinrude and *Johnson* outboards are certified to operate on high-quality unleaded automotive gasoline.

Use FRESH fuel. The use of old or poor quality fuel can lead to engine damage.

Minimum Octane

- 87 (R+M)/2 AKI – Inside the U.S.
- 90 RON – Outside the U.S.

Methyl tertiary butyl ether (MTBE) content not to exceed 15% by volume.

Alcohol-Extended Fuels

Use of alcohol-extended fuels is acceptable if alcohol content does NOT exceed:

- 10% ethanol by volume; or
- 5% methanol with 5% cosolvents by volume

E10 is a fuel blend of unleaded gasoline and up to 10% ethanol. In the U.S., fuel may contain up to 10% ethanol by law. It may be called gasoline, reformulated gasoline or gasohol. Note: Ethanol absorbs water.

E85 is a fuel blend of 85% ethanol and unleaded gasoline. DO NOT use **E85** in any outboard.

Phase separation occurs in **E10** fuels when the concentration of water in the fuel exceeds 0.49% by volume. When phase separation occurs two layers of liquid form in a fuel tank. The upper layer is gasoline, the lower layer is an ethanol and water mix. If the engine is run when this occurs, water and ethanol will enter the engine's fuel system.



Deteriorated hose pieces trapped by fuel filter



Damaged fuel primer bulb



Fuel pump – gelled deposit



Fuel hose dissolved from contaminated fuel

Fuel Related Issues Continue to Plague the Marine Industry

Remember, ethanol acts as a solvent, dissolving residues and increasing contaminants in the fuel. These particles are put into suspension and drawn into fuel filters and fuel system components. High concentrations of ethanol can damage rubber hoses and corrode the metal components.

Tar-like substances can form at the bottom of fuel tanks or in the outboard's fuel system. Salt, sand-like, and gelled deposits can occur.

Once phase separation occurs, drain the fuel tank and properly dispose of contaminated fuel. Clean the fuel tank and refill with fresh fuel. Otherwise, fuel pickups collect the ethanol / water mix from the bottom of the fuel tank and the engine will consume contaminated fuel.

Preventive Measures

Recommendations for customers:

- Always add fresh stabilizer to fresh fuel, use the recommended dosage.
- Go Boating! Use the boat frequently during the season so fuel in the tank doesn't go stale.
- For boats with large capacity fuel tanks, consider keeping them full to help limit the formation of condensation in the fuel tank.
- For boats with large capacity fuel tanks, whose operators are NOT using a tank of fuel in a season, consider using smaller capacity portable fuel tanks.
- Always try to buy clean, fresh fuel from name-brand, high-volume retailers.
- Be attentive when fueling trailered boats at a gas station, do NOT use E85.
- Add a water separating fuel filter to provide increased protection.
- Stay with manufacturer recommended additives, such as *Evinrude/Johnson 2+4 Fuel Conditioner* and *Evinrude/Johnson Fuel System Cleaner*.

Note: *Evinrude/Johnson 2+4 Fuel Conditioner* is approved for use with alcohol-extended fuels such as E-10.



Maintenance

Inspect fuel systems often. If you smell fuel, find the source and repair leaks immediately. Check:

- For leaks.
- For deteriorated rubber or plastic components.
- Fuel filters.
- Condition of all fuel connections and hose clamps.

Replace stiff, cracked, or softened hoses

Replace hoses and primer bulbs with signs of permeation (black residue on surfaces, comes off on hands). Replace leaking fuel system gaskets. Replace damaged hose clamps. Replace questionable fuel filters. Test fuel sample for alcohol concentration. Make sure replacement components are compatible with *E10* fuel.

Inspect fuel tanks. Look for:

- Corrosion or leakage on fuel tanks.
- Replace deteriorated tanks.
- Use correct hose diameters, fittings, and hose lengths for all installations.
- DO NOT create fuel system restrictions.

Remember:

- Prevent water accumulation in fuel tanks by keeping them full.
- Stabilize fresh gasoline before storage.
- Carefully monitor for water in fuel with large capacity fuel tanks, or fuel tanks used in unique applications.
- Do not store large quantities of unstabilized fuel for extended periods.
- Never run engines on old or contaminated fuel.



Fuel leak caused by hose damaged from contaminated fuel



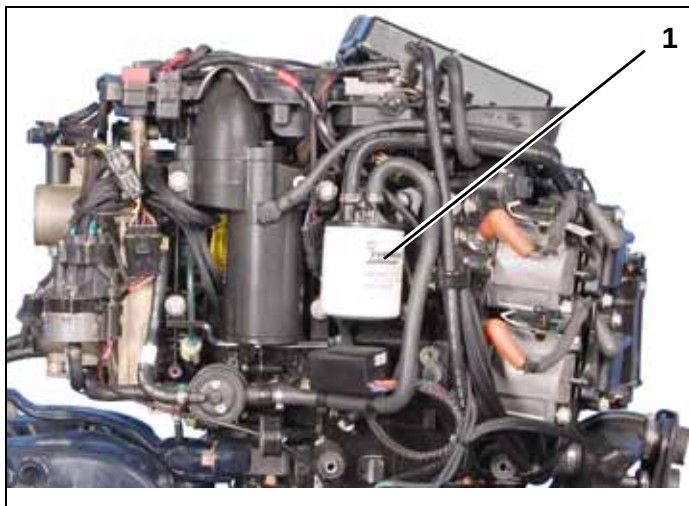
Monitor fuel tanks in unique applications carefully for water in fuel

IMPROVEMENTS AND CHANGES

Spin-on Fuel Filter Standard on 2009 115 – 200 HP 60° V4 / V6 Models

Beginning with 2009 production, the spin-on water separating fuel filter is standard on all 115 – 200 HP 60° V4/V6 models.

Water Separating Fuel Filter Kit, P/N 5007045, is available to retro-fit older models if desired.



1. Water separating fuel filter

Vapor Separator, P/N 5006084

What you need to know: Beginning with 2009 production the vapor separator high pressure test port for 60° V4/V6 models has been modified. This change was required to support mounting the inductive ignition system. The test port has been rotated to prevent contact with the ignition coil.

Why you need to know: Prior vapor separators will not fit 2009 and newer models. Refer to the correct parts catalog when ordering replacement parts. Check existing inventory for correct test port orientation before installation.



1. High pressure test port



Injector Seal Kits

What you need to know: Fuel injector crush rings MUST be replaced if an injector is installed in a different cylinder head or in a different cylinder location.

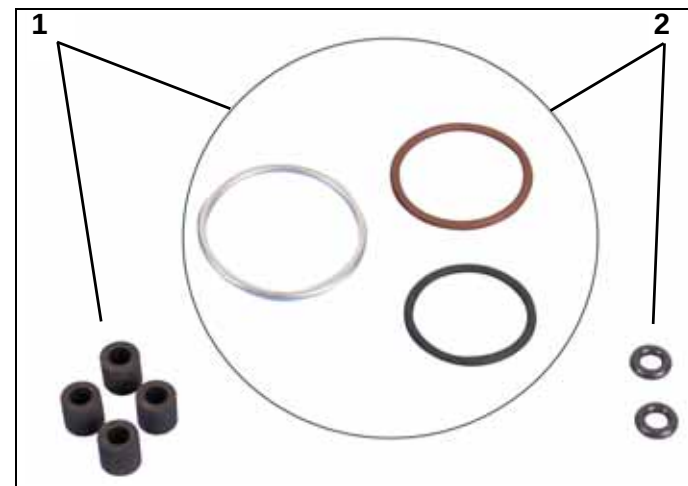
There are now two Injector seal kits;

P/N 5007895 for 25 – 30 HP models

P/N 5007017 for 40 – 300 HP models

The kits contain a crush ring and appropriate o-rings required to service a fuel injector on *Evinrude E-TEC* outboards.

Why you need to know: Crush rings provide the seal between the fuel injector and the cylinder head. Improper installation of injectors or crush rings can result in fuel leaks.



1. Injector Seal Kit, P/N 5007895
2. Injector Seal Kit, P/N 5007017

Vapor Separator Filter, P/N 354190

A replacement filter is now available to service the vapor separator assembly on *Evinrude E-TEC* 40 – 300 HP models.

This filter is located in the return line fitting on vapor separators.



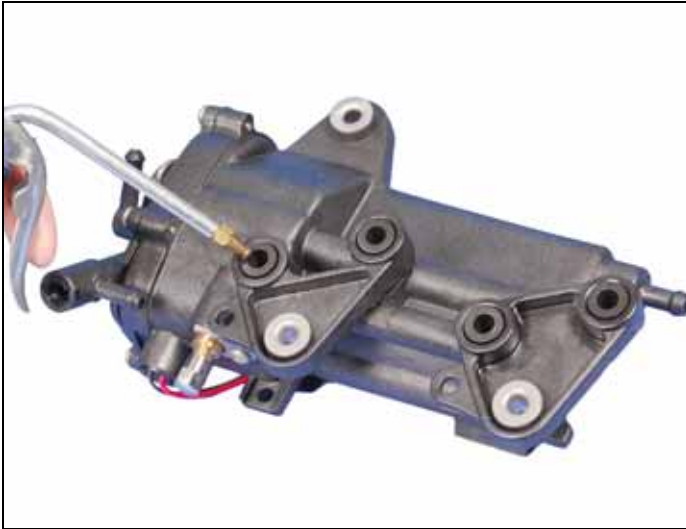
SERVICE ISSUES

Fuel Injector and Vapor Separator Servicing, 25 – 30 HP Inline Models

Reference: Service Bulletin 2008-07(S)

Unlike other *Evinrude E-TEC* models, the 25 – 30HP models do not use fuel supply or return rails. The vapor separator mounts directly to the fuel injectors, which requires special attention to minimize potential fuel leaks.

When servicing the vapor separator or fuel injectors on these models, special attention **MUST** be paid to the assembly sequence. Review completely Service Bulletin 2008-07(S) before attempting to service the vapor separator or fuel injectors on these models.



Lubricating vapor separator seals



Installing vapor separator to fuel injectors



Fuel Pressure and Vacuum Tests

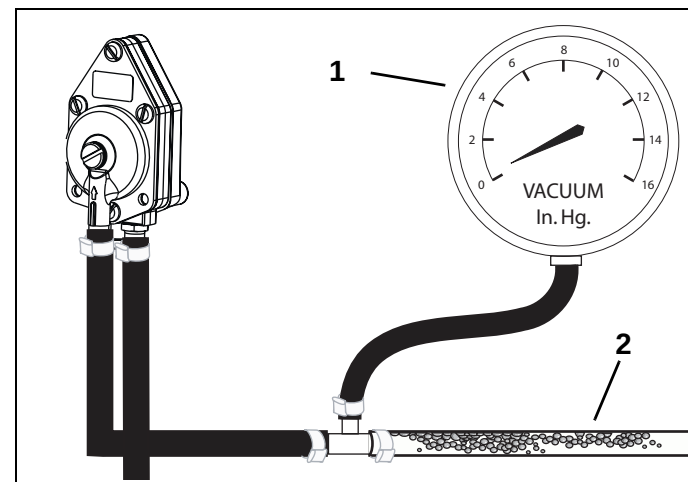
Reference: Service Bulletin 2008-06(S)

What you need to know: Fuel systems must meet minimum specifications to insure the proper delivery of fuel to the outboard. Inadequate fuel flow to outboards can result in serious powerhead damage.

Why: Air leaks or fuel system restrictions (high vacuum) may affect pump performance at higher speeds when outboard is under load. Refer to service manual for testing procedures.

IMPORTANT:

- Use clear hose to check for air bubbles.
- Air bubbles indicate a fuel supply air leak.
- Undetected air leaks lead to inaccurate vacuum tests.
- Fuel system vacuum must not exceed 4 in.Hg.



1. Vacuum must NOT exceed 4 in. Hg.
2. Clear hose

Service Fuel Injectors – 2008 and Newer V4 and V6 Models

Use fuel injector kits, P/N 5007764 and P/N 5007765, to service 2008 and newer 115 – 300 HP V4 and V6 models with BIP fuel injectors.

These service injectors have a two-wire electrical connector, P/N 3011154, (for 2009 engines with inductive ignition) installed. A three-wire electrical connector, P/N 3011156, (for models without inductive ignition) is enclosed in the parts kit.

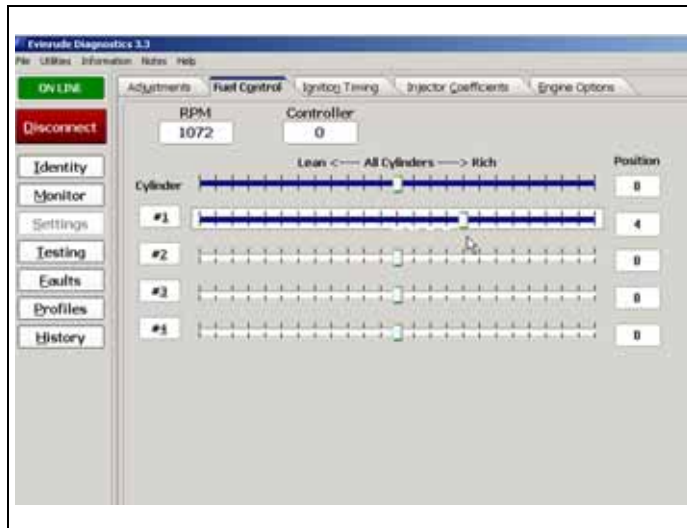
When replacing a fuel injector on an outboard without inductive ignition, the connector will need to be changed. Refer to Connector Servicing in the appropriate service manual.



Fuel Control Adjustment

Fuel control adjustment can be used to temporarily change the flow rate of an injector.

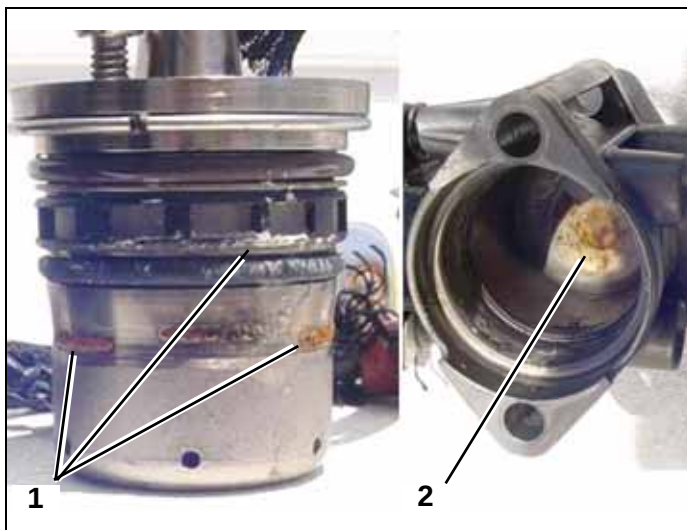
See **Fuel Control Feature** on p. 50



Check Fuel Injectors When Water is Found in Fuel

If water is found when troubleshooting the fuel system, remove fuel injectors from engine. Disassemble injectors and inspect for internal water damage.

Injectors damaged in this manner should be replaced. See **Fuel Related Issues Continue to Plague the Marine Industry** on p. 89 for information on cleaning fuel system.



1. Rust and other deposits clogging fuel injector
2. Rust in bottom of injector housing



NOTES – FUEL SYSTEM

[illegible]



OILING SYSTEM



OIL INFORMATION

Oil Requirements

Evinrude/Johnson XD100, XD50, or XD30 outboard oils are offered for use in Evinrude E-TEC outboards. If these oils are not available, a TC-W3 certified oil must be used.

Evinrude / Johnson XD-100 Outboard Oil

- Is highly recommended for use in Evinrude E-TEC and DI outboards.
- Is a synthetic formula that exceeds the TC-W3 standard, providing uncompromised lubrication and superior performance for all conditions and applications.
- Is strongly recommended for use in all extreme applications.
- Is recommended when operating in conditions under 40°F (4°C).
- MUST be used when operating in conditions under 32°F (0°C).
- May be premixed or used in oil injection systems of carbureted outboards.

Evinrude / Johnson XD-50 Outboard Oil

- Is a performance enhanced oil that meets the demand of direct injection outboards.
- Is a synthetic-blend formula that exceeds the TC-W3 standard.
- XD-50 should be used in high load or performance applications for greater reliability and less maintenance.
- May be premixed or used in oil injection systems of carbureted outboards.

Evinrude / Johnson XD-30 Outboard Oil

- Is a performance blend that provides greater lubrication and higher detergency than the TC-W3 standard.
- XD-30 should be used in general and light load applications for dependability and best value.





HO models MUST use TC-W3 oil type setting

Oil Type Setting

Evinrude Diagnostics software provides an option to change the oil type setting for some outboard models. Use SET OIL TYPE as follows.

Set TC-W3

The TC-W3 oil type setting is the standard setting for all outboards and may be used with XD30, XD50, or XD100 outboard oil. This setting MUST be used on H.O. model outboards.

SET TC-W3 for:

- Operation with all TC-W3 outboard oils including XD30, or XD50 and XD100
- Applications requiring maximum lubrication
- Extreme applications (commercial or harsh operation, racing and other high performance operation)
- Use this setting with XD-100 outboard oil in extreme applications

Set XD-100

The XD100 oil type setting is an optional setting and REQUIRES the exclusive use of XD100 outboard oil. This setting, which offers reduced oil consumption is NOT available on H.O. models and is not recommended for all applications.

SET XD100 for:

- Conventional use (runabouts, cruisers)
- Moderate applications



Set TC-W3, use XD-100 in extreme applications



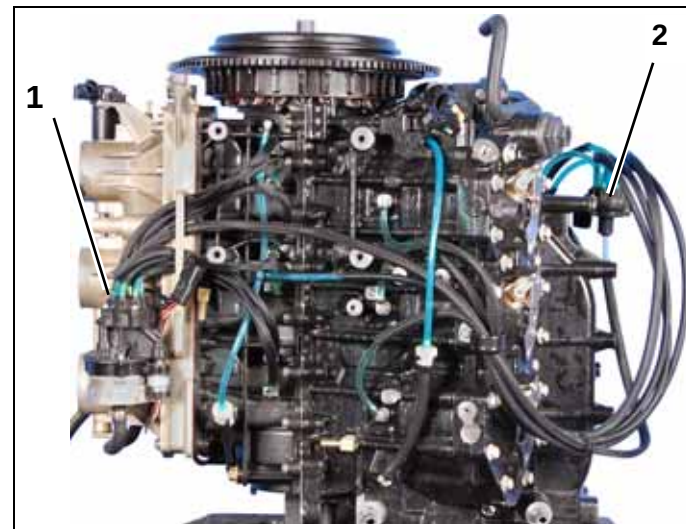
Multi-Point Oiling

V-Models: Use a primary oil distribution manifold to provide crankcase lubrication. The primary oil manifold also supplies oil to an auxiliary, or rear oil manifold which provides cylinder lubrication.

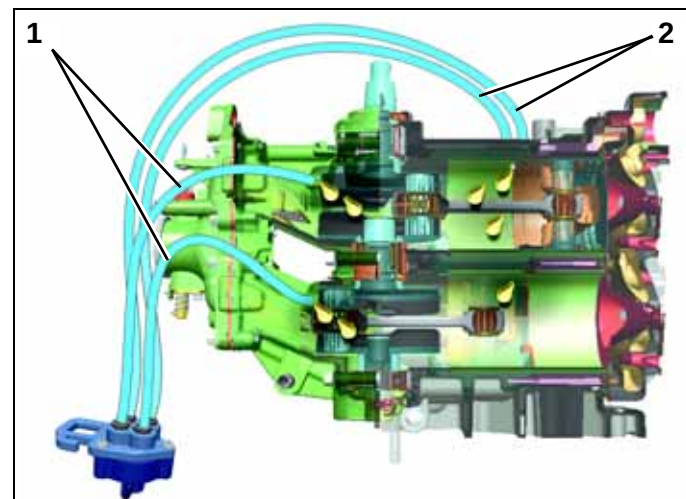
Inline Models: Since inline models have fewer cylinders, only one oil distribution manifold is required to provide both crankcase and cylinder lubrication.

Crankcase Lubrication: Oil flows through oil distribution hoses and pressed-in fittings at the front of the crankcase on the port side. This provides oil to the connecting rod bearings and main bearings.

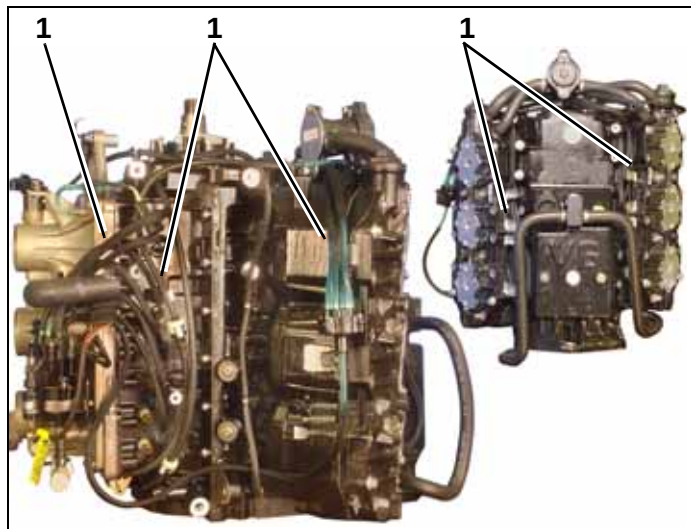
Cylinder Lubrication: Oil flows through oil distribution hoses and pressed-in fittings on the cylinder block. Oil flow continues through a machined passage on the cylinder sleeve, to the piston.



1. Oil manifold
2. Auxiliary oil manifold (V-models only)



1. Oil supply hoses to crankcase
2. Oil supply hoses to cylinder



1. Oil line locations

SERVICE ISSUES

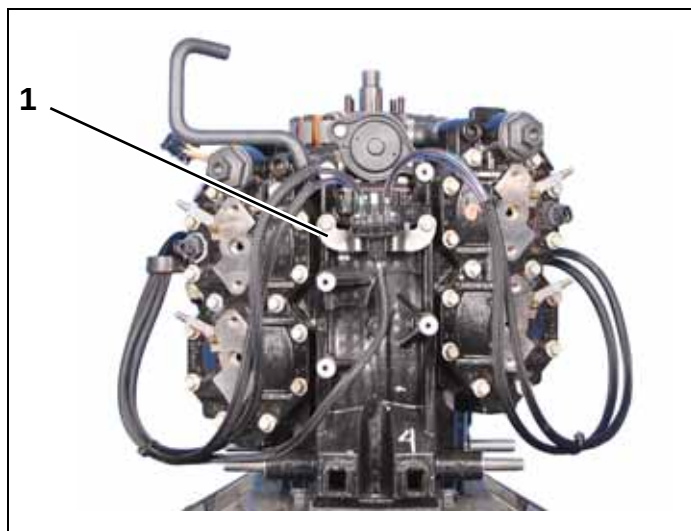
200 – 300 HP 90° V6 Models - Pinched Oil Lines

Be careful to avoid pinching oil hoses when re-installing components on powerheads.

Check the following:

- air silencer
- starter motor
- oil supply hose routing

Refer to the appropriate service manual and installation instruction supplied with service replacement powerheads.



1. Bracket, rear oil manifold

115 – 200 HP 60° V4 / V6 Models - Rear Oil Manifold Mounting Bracket

Beginning with 2009 production, the rear oil manifold on 60° V4/V6 models now uses a mounting bracket.

The bracket provides secure mounting for the oil manifold and helps prevent pinched oil lines.



Air Bubbles in Oil Line, 40 – 90 HP Inline Models

Symptom: Recurring air bubble in oil line closest to oil pump assembly wire harness. No notable run quality symptoms, the NO OIL alarm has NOT sounded, no oil related codes found.

Why: This oil port is physically located higher on the oil manifold than the other oil ports. Normally, champagne-sized bubbles which would be distributed throughout the oil line collect, forming a larger air bubble and rise to the top of this higher-point oil port.

What you need to know: This is considered normal for these models. Do not consider replacing an oil pump assembly unless large air bubbles recur in multiple oil lines.



1. Oil port
2. Oil pump wire harness
3. Air bubbles



Oil port is physically located higher on the oil manifold

Over Oiling Issue 115 HP 60° V4 Models

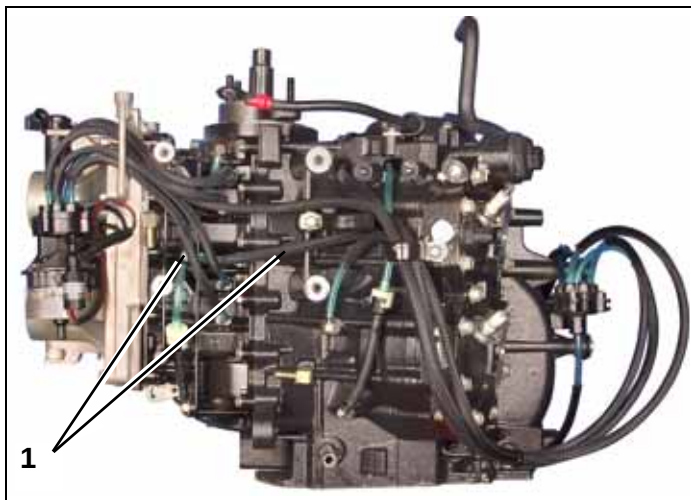
The Symptom: Oil dripping from throttle body when engine is tilted up.

The Cause: Excessive oil puddling in the lower main bearing cavity.

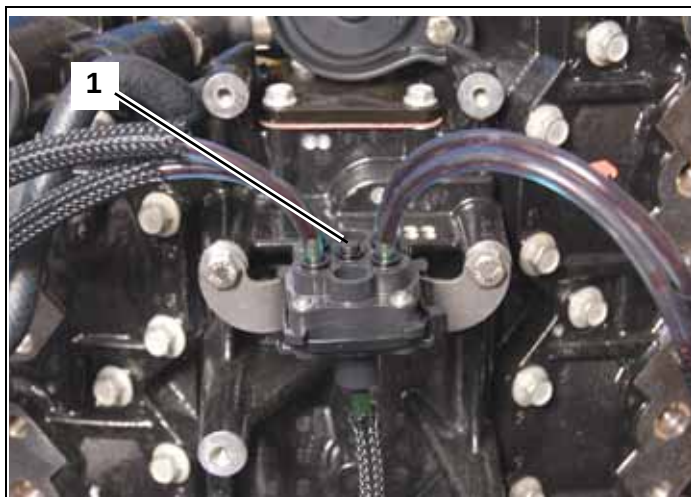
The Fix: A running change was made to 115 – 130 HP 60° V4 models beginning with 2009 production. This change can be applied to earlier V4 models which might experience this issue.

- Remove the oil hose coming from the auxiliary oil manifold to the tee in the main bearing recirculation circuit. Install plug, P/N 353783, in the manifold center port.
- Remove recirculation hose and tee from the check valve to upper main bearing fitting.
- Cut the oil supply line from the auxiliary oil manifold (removed previously) to length and install between the check valve and upper main bearing fitting.

Also see Recirculation System Changes, **60° V4 Models** on p. 105.



1. Remove oil supply hose from auxiliary oil manifold and tee



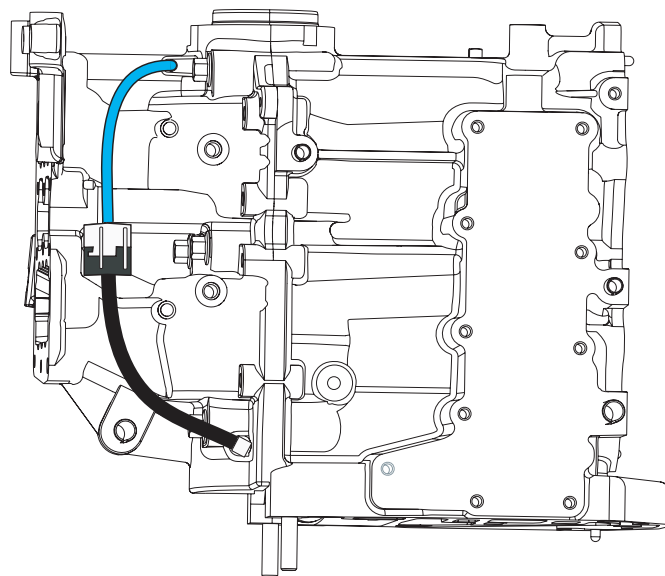
1. Install plug, P/N 353783, in manifold center port



OIL RECIRCULATION SYSTEM CHANGES

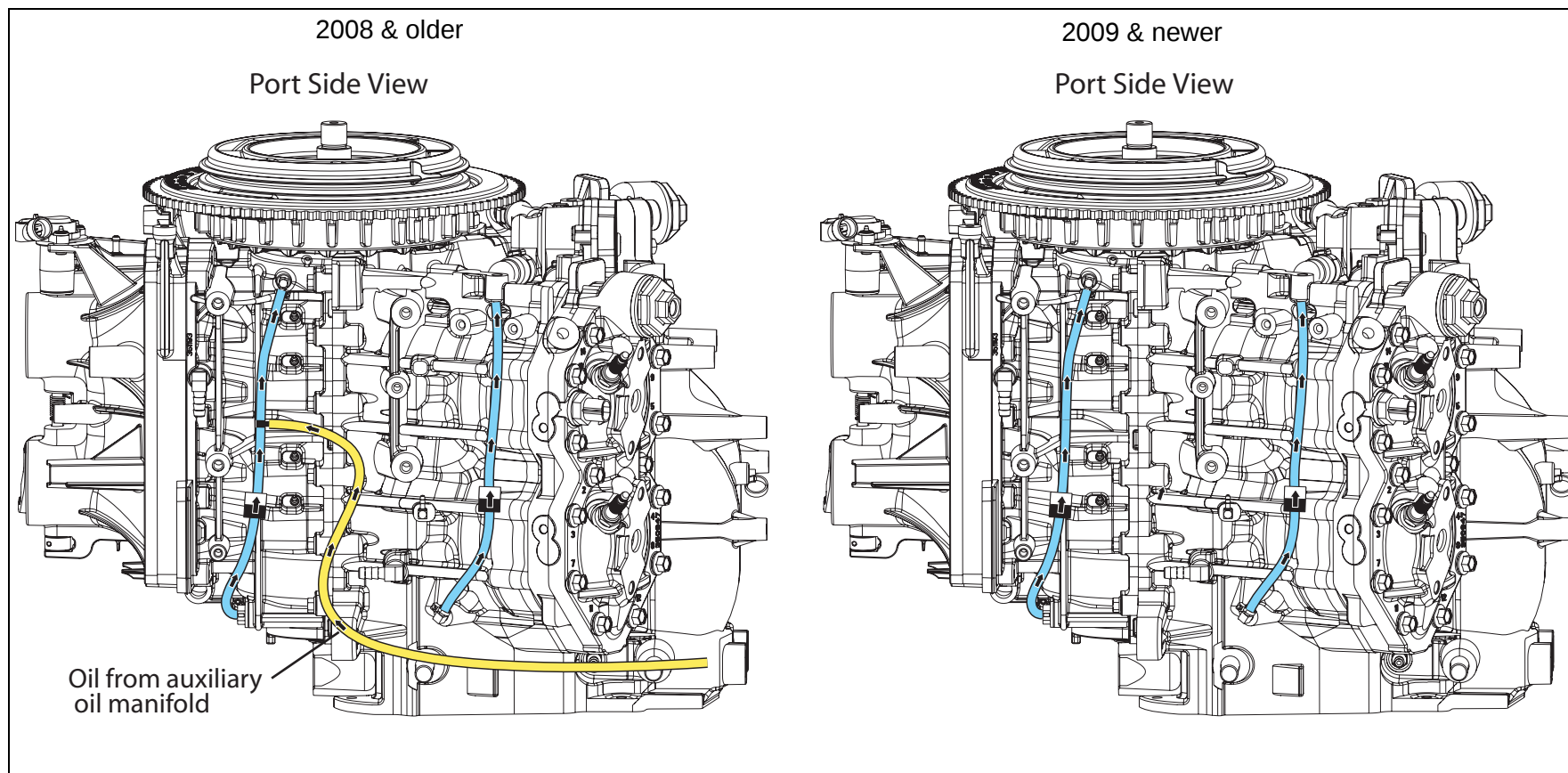
25 – 30 HP Inline Models

25 – 30 HP models use only crankcase recirculation.



60° V4 Models

Recirculation system changes for 2009 and newer, removed oil supply line from auxiliary oil manifold to upper main bearing recirculation line.





106



COOLING SYSTEMS



WATER PRESSURE

Overboard Indicator

All models: DO NOT restrict water flow from overboard indicator. The stream may be re-directed but must NOT be restricted. Restricting of the overboard indicator can result in engine or *EMM* overheating.

40 – 90 HP Inline, and 115 – 200 HP 60° V models use an unrestricted overboard indicator.

200 – 300 HP 90° V6 models use a plug and nozzle. If the engine is run without the nozzle (i.e. it falls out or is not installed), the powerhead will overheat. Restricting water flow on these models may result in a cracked adapter housing.

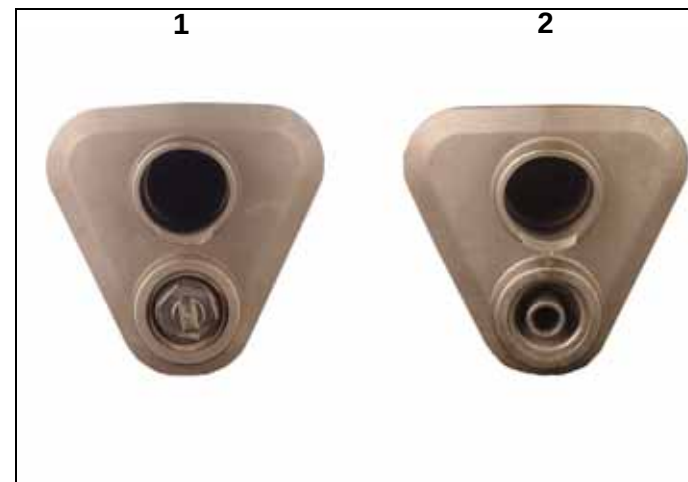
IMPORTANT: When using the flush port, excessive water pressure can cause the overboard indicator hose to come off the fitting inside the grommet. Limit water pressure to 20 to 40 psi (140 to 275 kPa) when using flush port.

Flushing Adapter Issue 200 - 250 HP 90° V6 (3.3 L) Models

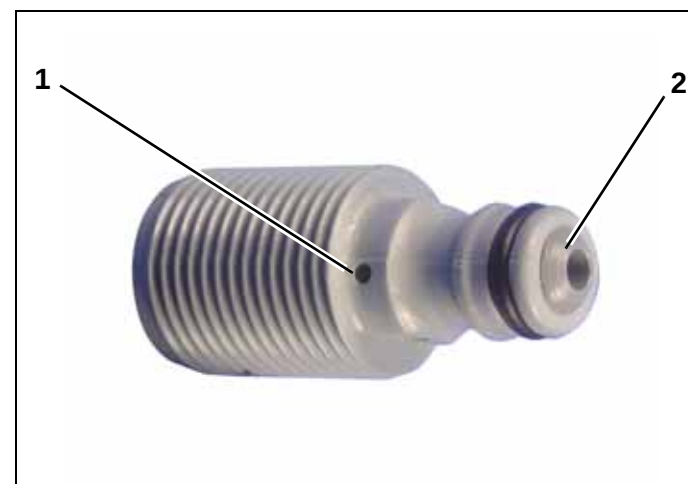
What you need to know: The overboard indicator outlet must be the correct size to properly cool the powerhead and exhaust adapter. The accessory quick-flushing kit, P/N 775385, is designed to be installed in place of the production indicator plug.

Why you need to know: If the overboard indicator is blocked or restricted, it can result in failure of the exhaust adapter. If the production indicator plug or accessory adapter is left out, water flow to the powerhead is reduced resulting in an overheat. If the flushing adapter valve is stuck open or partially open, water flow to the powerhead is reduced resulting in an overheat.

IMPORTANT: For locations with debris-laden waters, use of the flush adapter is not recommended.



1. 90° V models - restricted overboard indicator
2. 2-cyl, 3-cyl, and 60° V models - unrestricted overboard indicator



1. Overboard indicator
2. Flushing valve in open position

2009 Water Pressure Chart

This chart lists typical water pressure readings for 2009 model outboards and is provided as a general guide for use when troubleshooting over-heating or over-cooling issues.

Water pressure readings may vary depending on water inlet screen type, hull design, set up, and operating conditions.

Model	RPM										
	Idle	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500
40 – 60	4-5 (27-34)	5-6 (34-41)	7-9 (48-62)	10-11 (68-75)	14-15 (96-103)	15-17 (103-117)	16-18 (110-124)	16-18 (110-124)	14-16 (96-110)	12-14 (82-96)	10-12 (68-82)
75 – 90	5-6 (34-41)	10-11 (68-75)	12-14 (82-96)	15-17 (103-117)	16-18 (110-124)	16-18 (110-124)	13-15 (89-103)	15-17 (103-117)	16-18 (110-124)	19-21 (131-144)	20-22 (137-151)
115 60° V4 (F-suffix)	4-5 (27-34)	9-11 (62-75)	14-16 (96-110)	17-19 (117-131)	19-21 (131-144)	20-22 (137-151)	20-22 (137-151)	21-23 (144-158)	22-24 (151-165)	23-25 (158-172)	24-26 (165-179)
115 HO – 130 60° V4 (S-suffix)	5-6 (34-41)	9-10 (62-68)	12-14 (82-96)	15-17 (103-117)	18-20 (124-137)	20-21 (137-144)	20-22 (137-151)	21-23 (144-158)	21-23 (144-158)	21-23 (144-158)	21-23 (144-158)
150 – 200 60° V6	4-5 (27-34)	9-11 (62-75)	14-16 (96-110)	17-19 (117-131)	19-21 (131-144)	20-22 (137-151)	20-22 (137-151)	21-23 (144-158)	22-24 (151-165)	23-25 (158-172)	24-26 (165-179)
200 – 250 90° V6	3-5 (27-34)	7-9 (48-62)	8-10 (55-68)	9-11 (62-75)	10-12 (68-82)	11-13 (75-89)	12-14 (82-96)	13-15 (89-103)	14-16 (96-110)	15-17 (103-117)	16-18 (110-124)
250 HO – 300 90° V6 (C, S-suffix)	4-6 (27-41)	7-9 (48-62)	8-10 (55-68)	9-11 (62-75)	10-12 (68-82)	11-13 (75-89)	14-16 (96-110)	15-17 (103-117)	16-18 (110-124)	17-19 (117-131)	18-20 (124-137)
250 HO – 300 90° V6 (F-suffix)	4-6 (27-41)	7-11 (48-75)	9-12 (62-82)	10-14 (68-96)	12-15 (82-103)	14-16 (96-110)	15-18 (103-124)	16-19 (110-131)	18-20 (124-137)	18-25 (124-172)	20-30 (137-207)

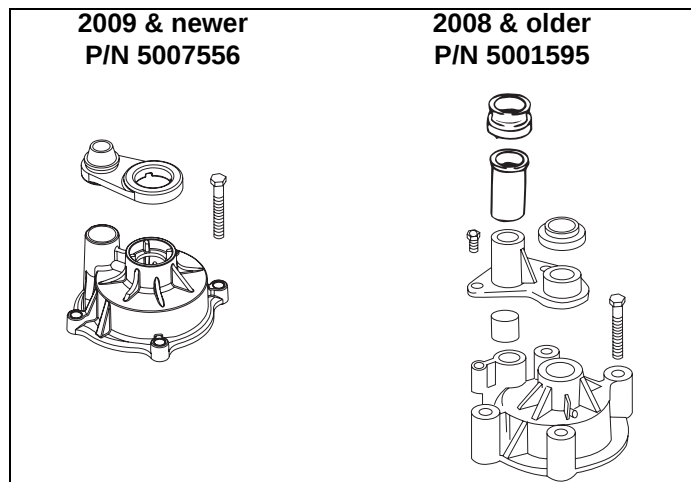
Note: Water pressure listed in psi and in (kPa).



EXTERNAL WATER SCREENS AND APPLICATIONS

This chart lists standard and available optional water screens. For applications which may require additional cooling water, select optional water screens based on the type of application.

M-Type, M2-Type and L2-Type Gearcases				
Water Screen Kit †	Port	Starboard	Height	Application
High Performance, P/N 5005124 (L2 Standard)	348479	348480	Flush	High Speed (over 60 MPH)
High Flow, P/N 5005063	350264	350265	0.060	General
Ultra High Flow, P/N 5006337 (M2 Standard)	350946	350945	0.160	Aerated
Ultra High Flow +1/4, P/N 5007081	350790	350791	0.410	Severely aerated
Screws, P/N 337061				
† Note: Kits include both screens, screws and instruction sheet.				
O-Type Gearcase				
Individual Water Screens ††	Port	Starboard	Height	Application
Standard	337778	337778	0.023	General
Optional	339247	339247	0.055	Aerated
Screws, P/N 337061				
†† Note: Screens are symmetrical, use two per outboard.				
S-Type and S2-Type Gearcases				
Individual Water Screens ††	Port	Starboard	Height	Application
Standard (through 2006)	340495	340495	Flush	General
Standard (2007 and newer)	337778	337778	0.058	Aerated / Weedy
Optional	339247	339247	0.200	Severely aerated
Screws, P/N 340665				
†† Note: Screens are symmetrical, use two per outboard.				



Water pump kits, 60° V4 models

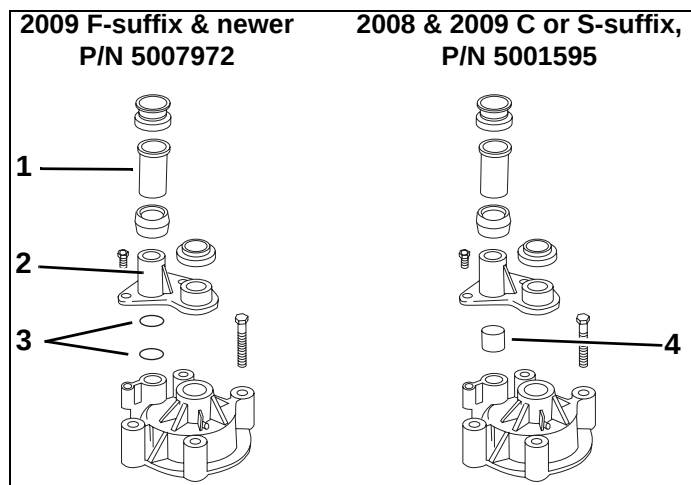
IMPROVEMENTS

New Water Pump Kit, P/N 5007556 and Impeller Housing, P/N 5007554 115 H.O. – 130 HP 60° V4 Models

Beginning with S-suffix 2009 production, the water pump and impeller housing for 115 H.O. and 130 HP models has changed.

This change only affects models which use the new one-piece exhaust housing (see **V4 Exhaust Adapter and Exhaust Valve Improvements** on p. 127) and eliminates several parts, allowing for a common impeller housing across the 60° V4 model line.

Note: 2009 115 HP F-suffix models use Impeller Housing, P/N 435959. Refer to the appropriate parts catalog when servicing water pumps on these models.



1. Sleeve, larger diameter
2. Impeller housing cover, P/N 354578 – larger diameter water tube
3. O-ring sealing
4. Grommet

New Water Pump Kit, P/N 5007972 and Impeller Housing, P/N 5007968 250 H.O. & 300 HP (3.4 L) 90° V6 Models

Beginning with F-suffix 2009 production, the water pump and impeller housing for 250 H.O. and 300 HP models has changed.

Note: 2008 and 2009 250 H.O. and 300 HP C or S-suffix models use Impeller Housing, P/N 435959. Refer to the appropriate parts catalog when servicing water pumps on these models



SERVICE ISSUES

Water Pump Installation

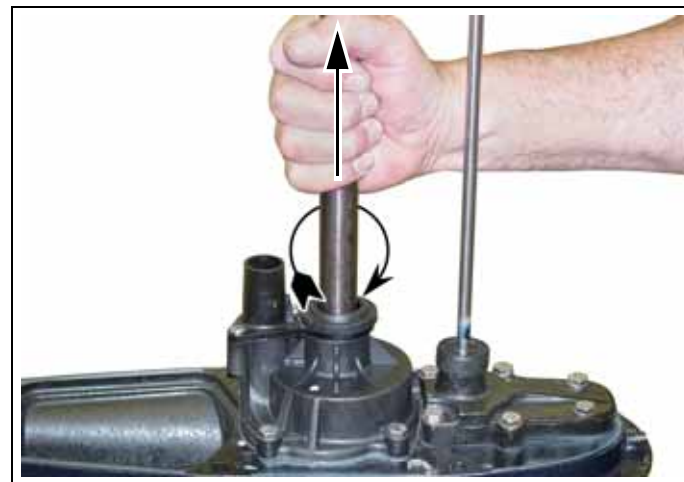
Reference: Warranty Bulletin 2008-04(W)

This bulletin contains information regarding an important *EMM* software update and a required cooling system service procedure.

Two key points **MUST** be observed when installing water pump:

- After water pump is assembled completely, rotate driveshaft counter clock-wise 1/4 turn to unlock and release impeller and key from driveshaft.
- Next, pull up on driveshaft and turn clockwise to lock impeller to shaft.

This process locks the impeller in a slightly lower position on the driveshaft and improves impeller longevity and efficiency.



Pull up on driveshaft and turn clockwise to lock impeller to shaft.

Prop Hub Melting

Outboards may experience prop hub failure for many reasons, such as:

- High jackplate settings.
- High transom mounting heights.
- Aerated water conditions, see **Aerated Cooling Water** on p. 114.
- Restricted exhaust cooling water passages.

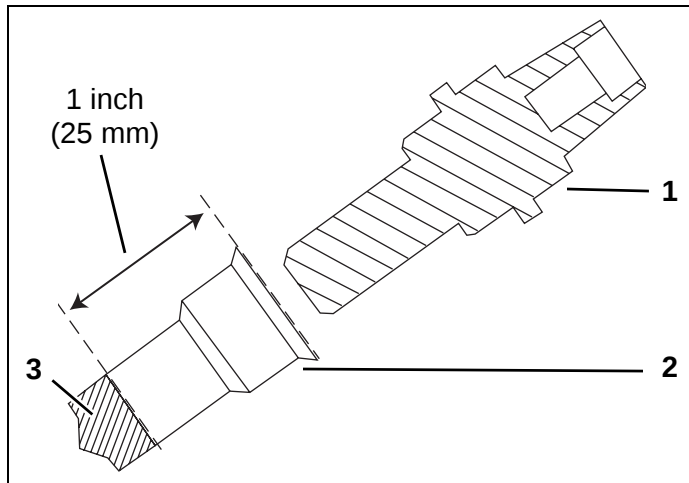
For outboards experiencing propeller hub failures, check.

- Cooling system operation.
- Water pump condition, see **2009 Water Pressure Chart** on p. 109.
- Trim tab and gearcase water passages.

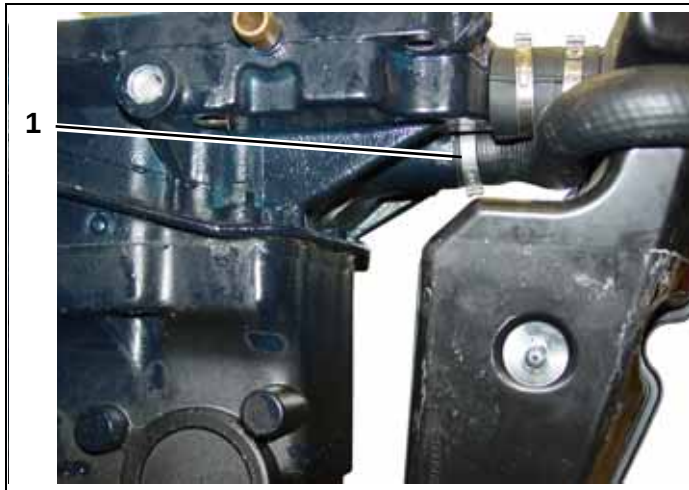
The trim tab passage supplies water to a tapered passage in the gearcase. The gearcase passage provides water to cool the exhaust. If these passages are plugged, high exhaust temperatures can damage propeller hub or hardware.

The tapered passage may be drilled to 5/16 in. (8mm), to increase water flow.





1. Temperature sensor
2. Sensor cavity
3. Heat sink compound



1. Clamp

Temperature Sensor and Clamp Servicing – 250 H.O. – 300HP 90° V6 Models

Reference: Warranty Bulletin 2008-02(W).

This bulletin addresses an important engine update procedure. This procedure corrects a possible cooling system water leak and improves the reaction time of the engine's overheat warning system (S.A.F.E.). Notice of this service update was sent to registered owners of affected outboards.

Key points of service procedure:

- Service temperature sensors on both cylinder heads.
- Remove temperature sensor. Clean threads of sensor, sensor and sensor cavity.
- Fill bottom of sensor cavity with 0.7 cc of heat sink compound. Sensor cavity should be filled to 1 inch (25 mm) below the top edge of the cavity.
- Install sensor. Do NOT use gasket sealing compound on threads. SLOWLY tighten temperature sensor to a torque of 50 to 70 in. lbs. (5.6 to 8.0 N·m).
- When installing hose, clean and dry fitting and inside of hose. Install clamp (31.6 mm), P/N 349759.
- Use P/N 350860 Oetiker pincers to install clamp.
- Connect hose to flushing port and turn on water. Check for leaks. Repair as needed.



Aerated Cooling Water

Symptom: Engine or *EMM* overheat.

Troubleshooting: Check cooling system for blockage. Verify water pressure under all operating conditions, see **2009 Water Pressure Chart** on p. 109 for water pressure guidelines.

Check water flow for aeration:

- Remove water inlet hose from *EMM*
- remove trim switch cover and trim switch from both lower motor covers
- Install appropriate length of 5/16 inch (8mm) i.d. clear hose on water inlet
- Route clear hose out of port lower motor cover, around the front of engine and back in through starboard lower motor cover
- Connect clear hose to *EMM* water inlet
- Run boat in the water at various jack plate heights, trim angles and in turns
Observe the clear hose for aerated water stream

Possible causes:

- Improper impeller installation, see **Water Pump Installation** on p. 112
- Jack plate set too high
- Hull problem, such as an improperly installed keel protector
- Thru-hull transducer installed inline with gearcase water pick ups
- Incorrect powerhead to adapter gasket See **3.3L vs 3.4L Powerhead to Adapter Gaskets** on p. 126

Possible fixes:

- Replace water pump impeller
- Lower jack plate
- Repair hull
- Relocate transducer
- Install larger water inlet screens, see **External Water Screens and Applications** on p. 110



1. Clear hose connected to EMM water inlet hose
2. Clear hose routed through trim switch hole
3. clear hose connected to EMM



1. Observe clear hose for air bubbles



2. Propeller shaft seal pushed out

Melting Propeller Hub / Gearcase Seals Pushing Out 250 H.O. – 300 HP (3.4 L) 90° V6 Models

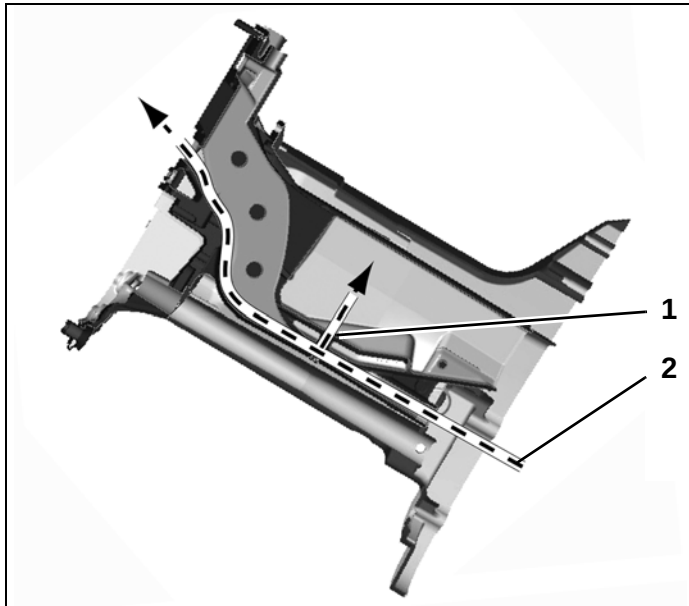
The Problem: Melted propeller hub and / or propeller shaft seal pushed out.

The Cause: Excessive exhaust gas temperatures due to cooling water passage obstruction. Machined cooling water passage is located behind plug on one-piece inner exhaust housing.

The Fix: Check for blockage of cooling water passage.

- Remove gearcase.
- Attach hose to water tube.
- Run water at low volume
- Use flashlight to observe for water stream from cooling water passage.

If no or low water flow, use a long angled pick to clear debris from passage.



1. Cooling water passage
2. Water flow

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POWERHEAD



Powerhead Label, P/N 353759

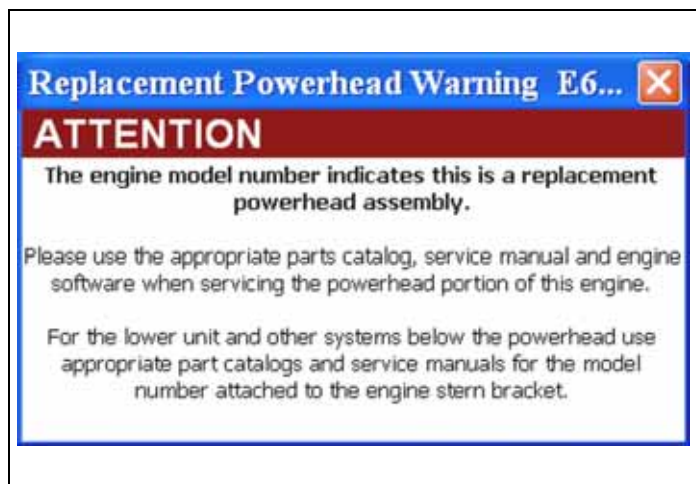
POWERHEAD IDENTIFICATION

What you need to know: Some outboards may have been serviced with a complete (dressed) powerhead.

Why this is important: Service and Parts personnel must properly identify powerheads for service and parts information.

Identification methods:

- Red Powerhead Label attached to the diagnostics connector.
- Replacement powerhead warning when connecting to the outboard with *Evinrude Diagnostics* software.
- Use the *Evinrude Diagnostics* software Identity screen and note the model number stored in the *EMM*.



Evinrude Diagnostics message box.

Compare the model number on the model and serial number tag on the swivel bracket with the model number stored in the *EMM*.

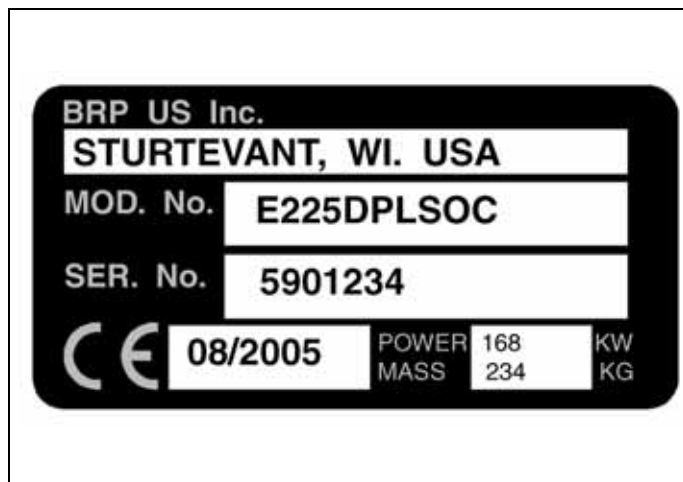
- Use the model number stored in the *EMM* for powerhead servicing.
- Use the model number located on the transom bracket for servicing the remainder of the outboard.

Example: A complete 2009 powerhead is installed on a 2005 model outboard with model number **E225DPLSOC**. The model number stored in the *EMM* will represent the 2009 model replacement powerhead, model number **R225DPLSEB**.

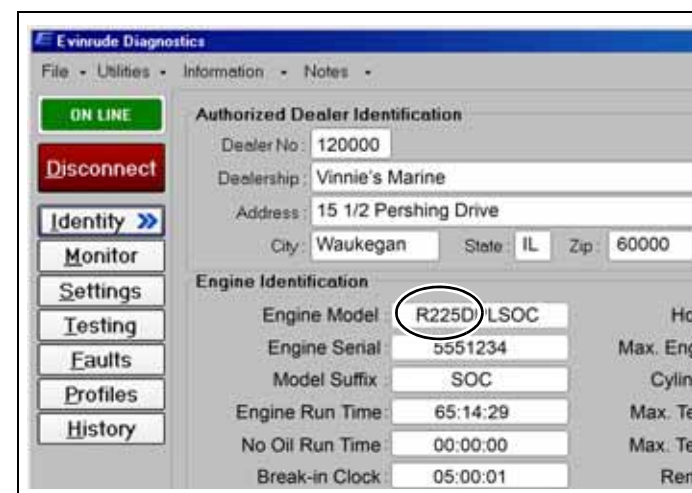
- The **R** in the first position of the model number indicates the original powerhead was replaced with a complete powerhead.
- The model suffix **SEB** indicates the powerhead is a 2009 model replacing the original SOC suffix).

Use the 2009 Parts Catalog and Service Manual to service the **R225DPLSEB** powerhead.

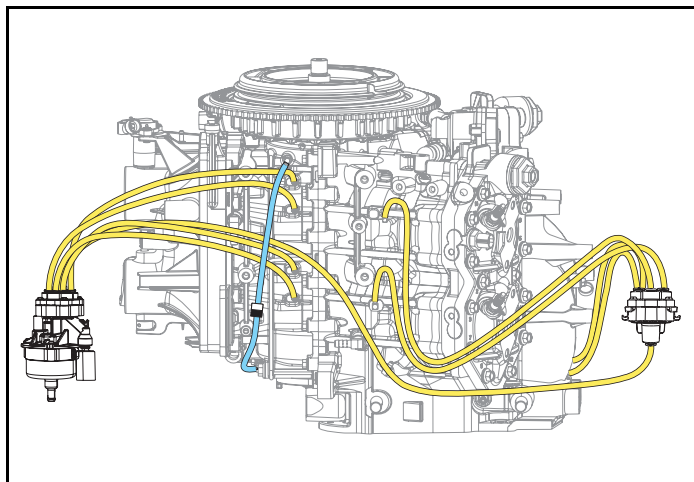
IMPORTANT: Use the model number stored in the *EMM* for engine management software updates.



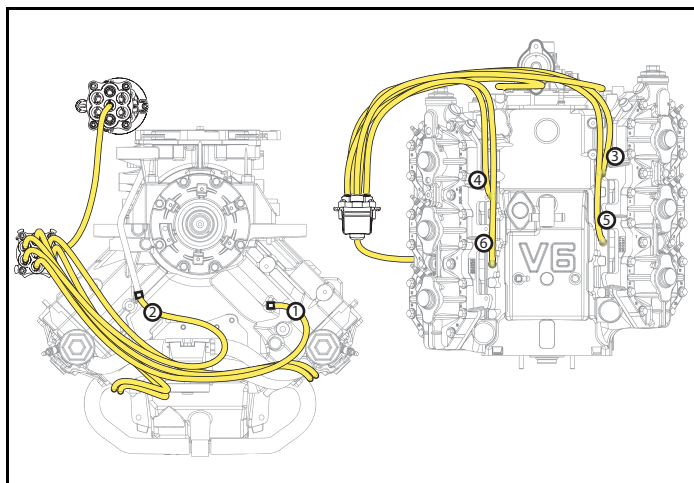
Model and serial number tag



The **R** in the first position of model number indicates the original powerhead was replaced with a complete powerhead



V4 Hose routing



Rear oil manifold, 90° V6 models

REPLACEMENT POWERHEADS

Replacement powerheads may include additional parts to update older products.

60° V4 & V6 Models: The included instruction sheets indicate revised oil hose routings.

Note: 2008 and newer 60° V6 replacement powerheads are NOT interchangeable with older models.

90° V6 200 – 250 HP Models: Two powerhead replacement kits are available.

2005 - 2007: Parts are included to add multi-point oiling. The included instruction sheets indicate revised oil hose routings.

2008 & newer: Multi-point oiling components included. The included instruction sheets indicate revised oil hose routings. Later model outboards may not require all components supplied.

When servicing 2007 or older models, refer to 2008 service manual as needed for additional assembly information.

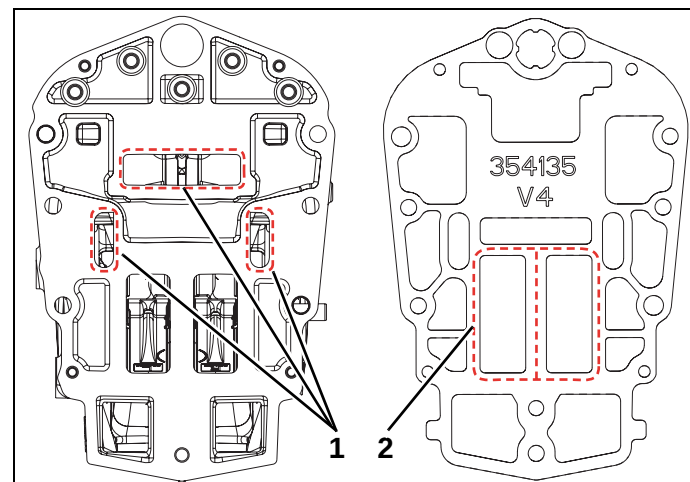
Note: The supply hose to the rear oil manifold should be installed in the center fitting of the oil injection pump. This hose DOES NOT use brass supports. The rear oil distribution hoses can be installed in any of the rear manifold fittings.

INSTALLATION

Powerhead Installation, 115 – 130 HP 60° V4 Models

When installing the powerhead to the exhaust housing on 115 H.O. – 130 HP 60° V4 models, sealer must be applied to the exhaust housing, as well as the powerhead base gasket. This change improves sealing between the powerhead and exhaust housing.

Apply a bead of Permatex # 2 to the exhaust housing and to both sides of the gasket, as indicated.



1. Apply sealant to these areas on exhaust housing
2. Apply sealant to both sides of gasket

Powerhead Alignment

What you need to know: Powerhead alignment pin kit, P/N 5007167, MUST be used when installing powerheads on 60° V6 models. These models DO NOT have locating pins on the exhaust housing.

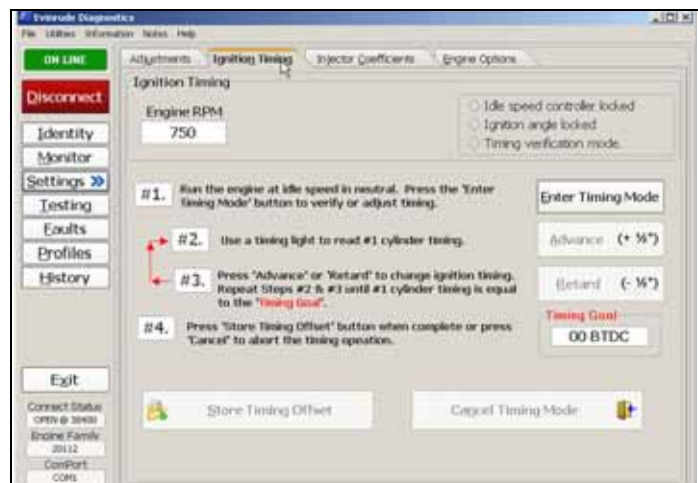
New V4 models with one-piece, cast exhaust housings DO include locating pins.

Be sure to follow the powerhead installation procedure in the service manual.

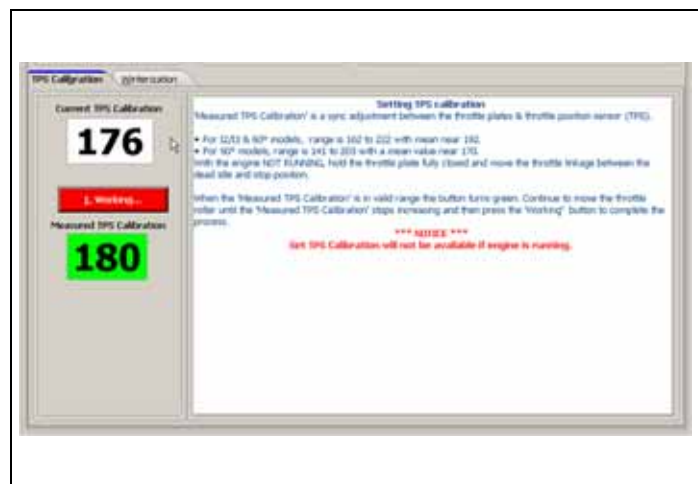
Why you need to know: Failure to properly align powerhead may result in driveshaft damage.



Powerhead alignment pin kit, P/N 5007167



Ignition timing screen



TPS calibration screen

RETURNING OUTBOARD TO SERVICE

What you need to know: Be sure all items are checked and correct before returning outboard to customer. Pay particular attention to the following:

- Set timing pointer.
- Index all spark plugs.
- Use *Evinrude Diagnostics* software to start oil break-in cycle.
- Use *Evinrude Diagnostics* software to set TPS calibration.
- Use *Evinrude Diagnostics* software to confirm engine management software is current. Update engine management software if needed.
- Prime fuel system.
- Prime oiling system.
- Use *Evinrude Diagnostics* software to perform timing verification.
- Use *Evinrude Diagnostics* software to inspect engine operating temperature.

Refer to the appropriate sections of service manual for proper procedures.

Why you need to know: Determining why a powerhead fails and preventing another failure are vital parts of the powerhead rebuild / replacement process.

IMPORTANT: Make sure the boat fuel system is not a contributing factor in a powerhead failure. Test the fuel system per Service Bulletin2008-06(S). See **Fuel Pressure and Vacuum Tests** on p. 94.

Be sure to follow all steps outlined in instruction sheets, service manuals and relevant service bulletins when returning an outboard to service.

Oil Break-In Cycle

Engine management software is used to provide additional oil for new power-head break-in. Use *Evinrude Diagnostics* software to set the oil break-in cycle.

Extra oil is provided only when the engine is run above 2000 rpm. The chart below lists the break-in oil period.

Model / Horsepower	Oil Break-In Period
25 – 30	2 hours
40 – 60	2 hours
75 – 90	2 hours
115 – 130 60° V4	5 hours
150 – 200 60° V6	5 hours
200 – 250 90° V6 (3.3 liter)	2 hours
250 HO – 300 90° V6 (3.4 liter)	2 hours

Note: The break-in clock accumulates run time when engine is run above 2000 RPM.

Oil Break-in Cycle

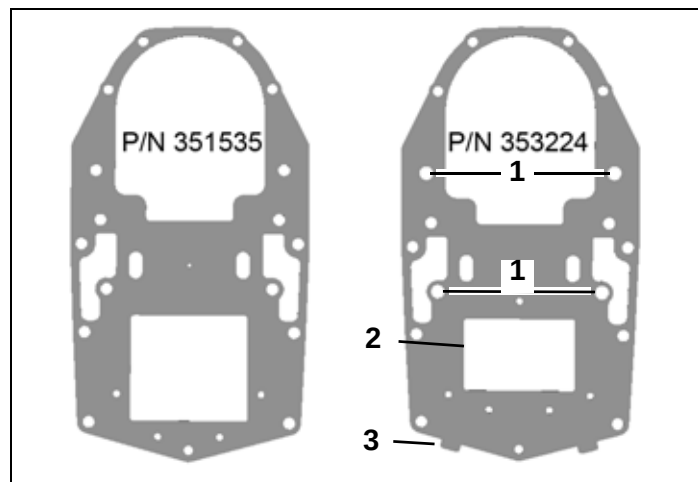
Break-in clock



124



MIDSECTION



1. Larger diameter hole for alignment pins
2. Different exhaust passage
3. Identification tabs

IMPROVEMENTS AND CHANGES

3.3L vs 3.4L Powerhead to Adapter Gaskets

200 H.O. – 250 HP 3.3 L models and 250 H.O. – 300 HP 3.4 L 90° V6 models use different powerhead to adapter gaskets.

3.3 L models require P/N 351535, while 3.4 L models require P/N 353224.

The gasket for 3.4 L models, P/N 353224, has three unique features:

- Four larger diameter holes for alignment pins
- Different exhaust passage
- Externally visible identification tabs

The base gaskets are not interchangeable. If P/N 351535 is used on a 3.4 L model, it will cause the engine to overheat.



Contents of exhaust adapter kit, P/N 5007589

Adapter Kit P/N 5007589

Use Adapter Kit, P/N 5007589, when replacing a powerhead to exhaust adapter on 2005 through 2008 200 – 250 HP 90° V6 models. The kit contains a replacement adapter assembly and the necessary gaskets, seals and hardware (the water tube and water plate are NOT included).

V4 Exhaust Adapter and Exhaust Valve Improvements

Beginning with 2009 production (S-suffix models), 115 H.O. and 130 HP 60° V4 models (20 and 25 inch) now have a one-piece lost foam exhaust housing. The 25 inch models use an extension between the exhaust housing to gearcase.

This change eliminates a significant number of parts, providing improved performance and weight savings.

The exhaust valve mounting location has also changed, but it functions similarly to previous models. The *EMM* activates the exhaust valve to provide the best exhaust tuning for various running conditions. The exhaust valve shaft is now visible (starboard side) and can be used to verify valve operation.

IMPORTANT: Exhaust housings for 20 and 25 inch housings are NOT interchangeable.

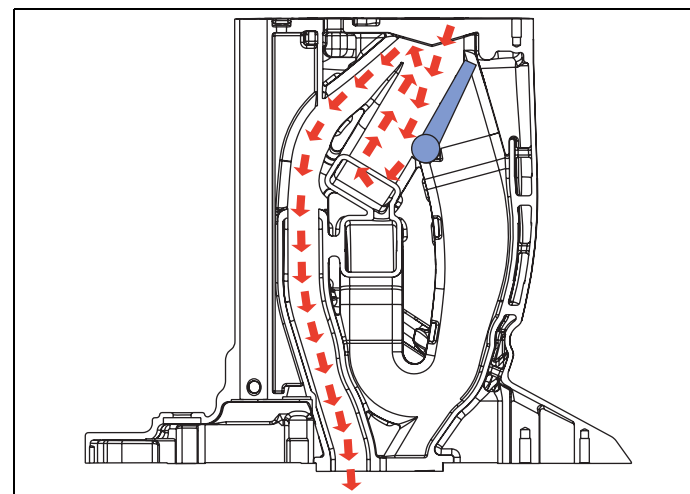
How it works:

At slower speeds and under acceleration, the system opens a longer path, allowing the engine to develop more midrange horsepower. At higher rpm, the path is shortened for maximum high speed performance.

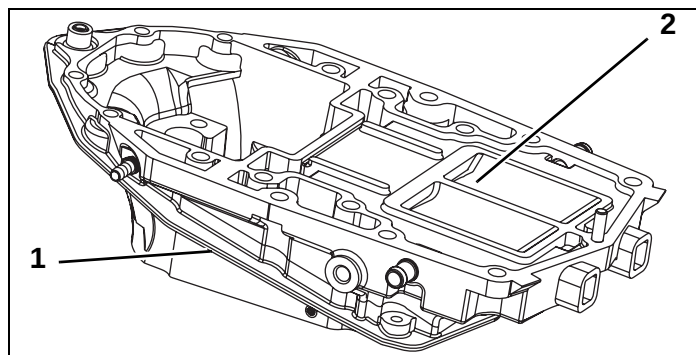
- At key on, the *EMM* cycles the valve from Low Speed Mode to High Speed Mode as a system self-test.
- The valve remains in High Speed Mode when cranking, starting and idling.
- When TPS% exceeds approximately 2% to 5%, the *EMM* moves the valve to Low Speed Mode.
- When speed exceeds approximately 4000 rpm, the *EMM* moves the valve to High Speed Mode.
- The *EMM* controls the timing of the valve based on engine load. Engine load is calculated from sensor inputs.



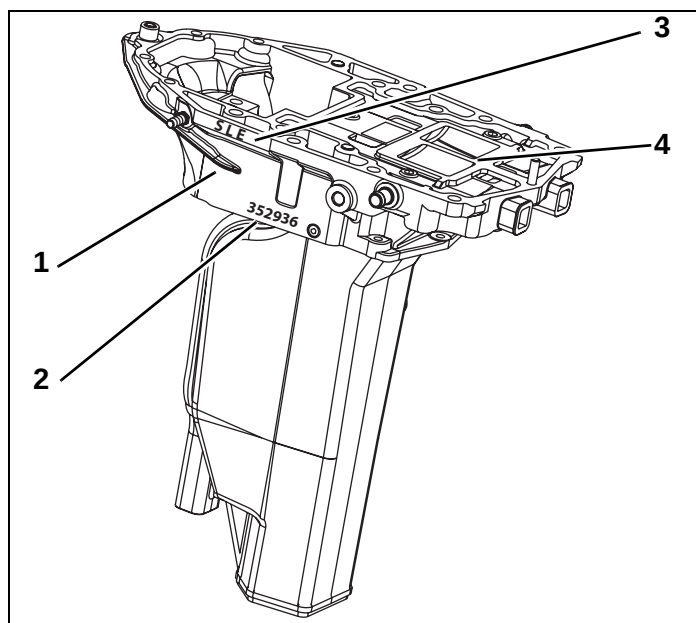
Exhaust valve, low speed position (cut-away view)



Exhaust valve, high speed position (cut-away view)



1. Long rib
2. Symmetrical exhaust ports



1. Short rib
2. Casting number
3. Raised letters - "L" or "SLE"
4. Staggered exhaust port

Identification of 90° V6 Exhaust Adapters, 200 – 250 HP (3.3 L) and 250 H.O. – 300 HP (3.4 L) Models

Multiple exhaust adapters have been used on the 200 – 300 HP models.

Notes:

- The 3.3 L and 3.4 L exhaust adapters are NOT interchangeable.
- Due to water flow differences, early production 3.4 L model exhaust adapters are gearcase specific and are NOT interchangeable.
- Late production 3.4 L exhaust adapter has improved water flow, services all 3.4 L models.

200 – 250 HP 3.3 Liter Exhaust Adapter, P/N 5001496

- Multiple pieces, bolt-on inner exhaust housing
- Long rib
- Symmetrical exhaust ports
- Crankcase to adapter gasket, P/N 351535

250 H.O. & 300 HP 3.4 Liter Exhaust Adapters (Late Production F suffix), P/N 5007973 and Exhaust Adapter Kit, P/N 5007971

- One-piece lost foam casting
- Short rib
- Casting number
- Staggered exhaust ports
- Crankcase to adapter gasket, P/N 353224

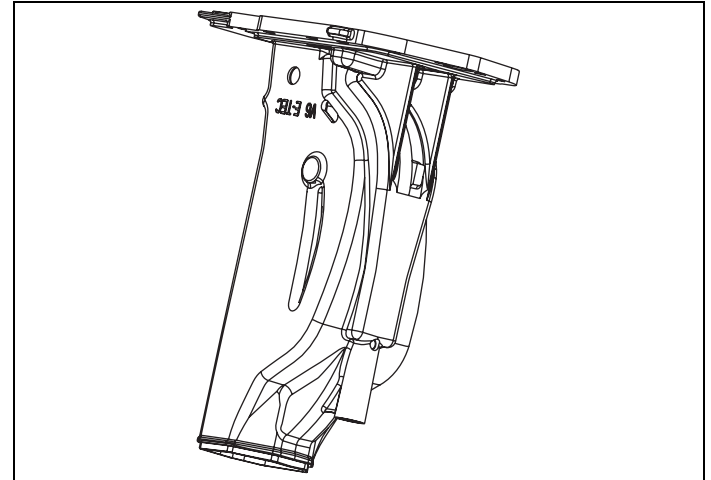
250 H.O. & 300 HP 3.4 Liter (Early Production C or S suffix)

Same features as Late Production plus:

- Was gearcase specific
 - Used with M2-Type gearcase, has raised letters SLE
 - Used with L2-Type gearcase, has raised letter L
- Parts now obsolete, for service use Exhaust Adapter Kit, P/N 5007971 which includes new style water pump and pressure relief valve

New Inner Exhaust Housing, P/N 354148 150 – 200 HP 60° V6 Models

A running change to the inner exhaust housing was made in 2008 production. Inner Exhaust Housing, P/N 354148, allows more water into the exhaust to better cool propeller hub.





Manual release valve, P/N 5007781

TRIM AND TILT SYSTEMS

New Trim and Tilt Assembly 40 – 60 HP Inline Models

Beginning with 2009 production an improved hydraulic unit, P/N 5007774, is used. This unit features new valving to help prevent leak down and a new manual release valve.

The manual release valve, P/N 5007781, is NOT interchangeable with older units.

The hydraulic unit is black anodized, rather than being painted black. This unit will retrofit older models.



New Trim and Tilt Assembly 75 – 90 HP Inline and 115 – 130 HP Models

A running change was made to 2008 production for an improved hydraulic unit, P/N 5007776. This unit features new valving to help prevent leak down and a new manual release valve.

The manual release valve, P/N 5007782, is NOT interchangeable with older units.

The hydraulic unit is black anodized, rather than being painted black. This unit will retrofit older models.

Hydraulic Unit Improvements 2008 and Newer 200 – 300 HP 90° V6 Models

Running changes have been made to the valving of hydraulic unit, P/N 5007662. These changes help improve both forward and reverse thrust hold in high load conditions.

Hydraulic units with these changes can be identified by the letter “F” stamped on the flat area of the lower mounting pin boss.



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GEARCASES



2009 GEARCASE APPLICATION CHART

Type	Assembly Part No.	Color	Model Family	Shaft Length	Gear Ratio	Gear Set	Reverse Gear
H-Type	5006487	Blue	25 – 30 HP	15" / 20"	13:28 (.465) 2.15:1	392475 (F), 351147 (P)	327655
F-Type	5006558	Blue	40 – 60HP	20"	12:32 (.375) 2.67:1	398522 (F,P)	318353
	5007628	White	40 – 60HP	20"	12:32 (.375) 2.67:1	398522 (F,P)	318353
	5006126	Blue	65 Comm	22.5"	12:32 (.375) 2.67:1	398522 (F,P)	318353
S-Type	5006555	Blue	75 – 90 HP	20"	13:26 (.500) 2:1	436746 (F,P)	345992
	5006426	White	75 – 90 HP	20"	13:26 (.500) 2:1	436746 (F,P)	345992
S2-Type	5006326	Blue	60° V4	20"	13:26 (.500) 2:1	5006311 (F,P)	352319
	5006520	White	60° V4	20"	13:26 (.500) 2:1	5006311 (F,P)	352319
O-Type	5007023	White	75 – 90 HP	25"	12:27 (.444) 2.25:1	435123 (F,P)	336574
	5007334	Blue	60° V4	25"	12:27 (.444) 2.25:1	435123 (F,P)	336574
	5007023	White	60° V4	25"	12:27 (.444) 2.25:1	435123 (F,P)	336574
	5006554	Blue	60° V6	20"	14:26 (.538) 1.86:1	5004218 (F,P,R)	336561
	5007134	White	60° V6	20"	14:26 (.538) 1.86:1	5004218 (F,P,R)	336561
CORO	5007594	White	60° V4	25"	12:27 (.444) 2.25:1	435932 (F,P)	431702

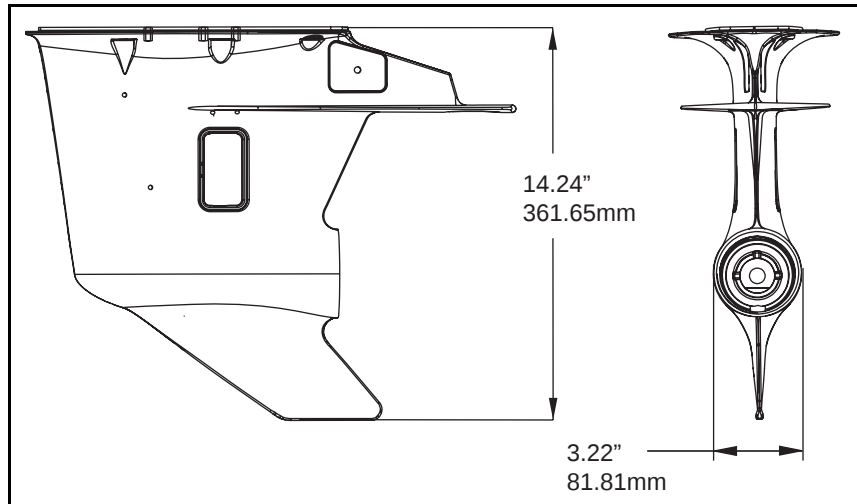
Type	Assembly Part No.	Color	Model Family	Shaft Length	Gear Ratio	Gear Set	Reverse Gear
M2-Type	5007705	Blue	60° V6	25"	13:24 (.542) 1.85:1	5007389 (F,P,R)	N/A
	5007669	White	60° V6	25"	13:24 (.542) 1.85:1	5007389 (F,P,R)	N/A
	5007705	Blue	90° V6 (3.3L)	20"	13:24 (.542) 1.85:1	5007389 (F,P,R)	N/A
	5007669	White	90° V6 (3.3L)	20"/25"/30"	13:24 (.542) 1.85:1	5007389 (F,P,R)	N/A
	5007669	White	90° V6 (3.4L)	25"/30"	13:24 (.542) 1.85:1	5007389 (F,P,R)	N/A
CORO	5007670	White	60° V6	25"	13:24 (.542) 1.85:1	5007388 (F,P,R)	N/A
	5007670	White	90° V6 (3.3L)	25"/30"	13:24 (.542) 1.85:1	5007388 (F,P,R)	N/A
	5007670	White	90° V6 (3.4L)	25"/30"	13:24 (.542) 1.85:1	5007388 (F,P,R)	N/A
L2-Type	5007668	Blue	60° V6	20"	14:26 (.538) 1.86:1	5007663 (F,P)	353544
	5007706	White	60° V6	20"	14:26 (.538) 1.86:1	5007663 (F,P)	353544
	5007668	Blue	200 H.O. 90° V6 (3.3L)	20"/25"	14:26 (.538) 1.86:1	5007663 (F,P)	353544
	5007706	White	200 H.O. 90° V6 (3.3L)	20"	14:26 (.538) 1.86:1	5007663 (F,P)	353544
	5007667	Blue	225 HP 90° V6 (3.3L)	20"/25"	14:24 (.583) 1.71:1	5007631 (F,P)	353480
	5007707	White	225 HP 90° V6 (3.3L)	20"	14:24 (.583) 1.71:1	5007631 (F,P)	353480
	5007667	Blue	250 H.O. 90° V6 (3.4L)	20"/25"	14:24 (.583) 1.71:1	5007631 (F,P)	353480



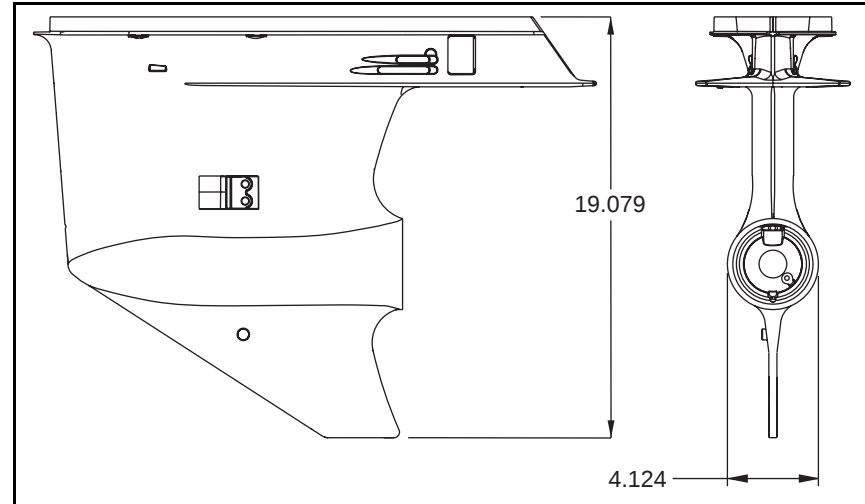
GEARCASES

GEARCASE IDENTIFICATION

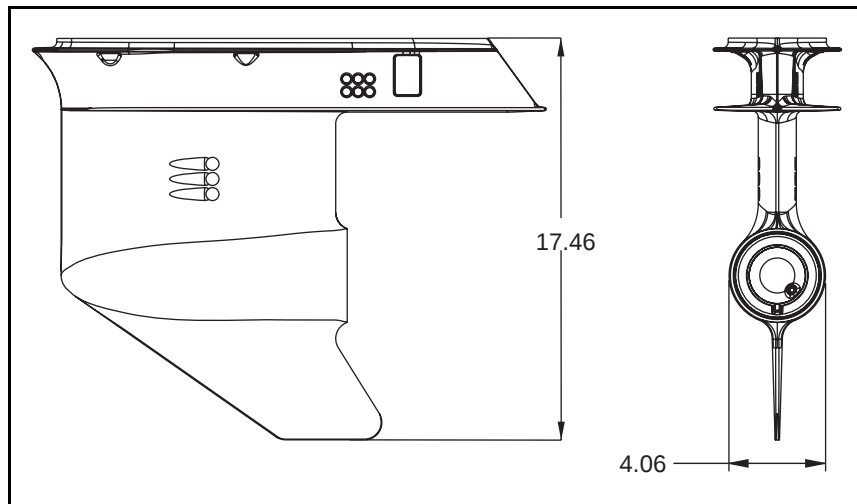
H-Type: I2 25 – 30 HP



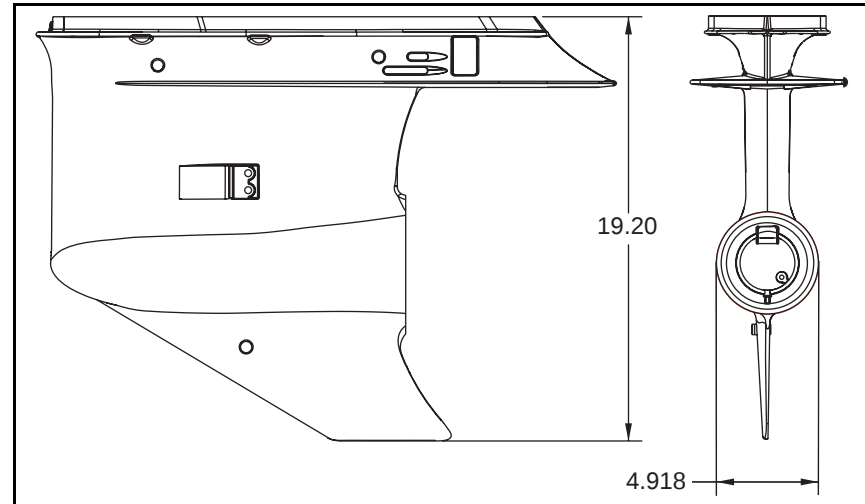
S-Type / S2 Type: I3 75 / 90 HP and V4



F-Type: I2, 40 – 65 HP

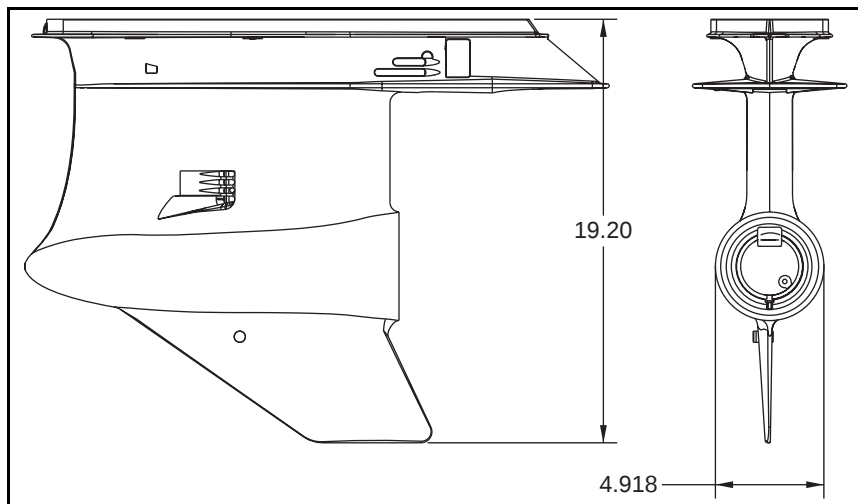


O-Type:

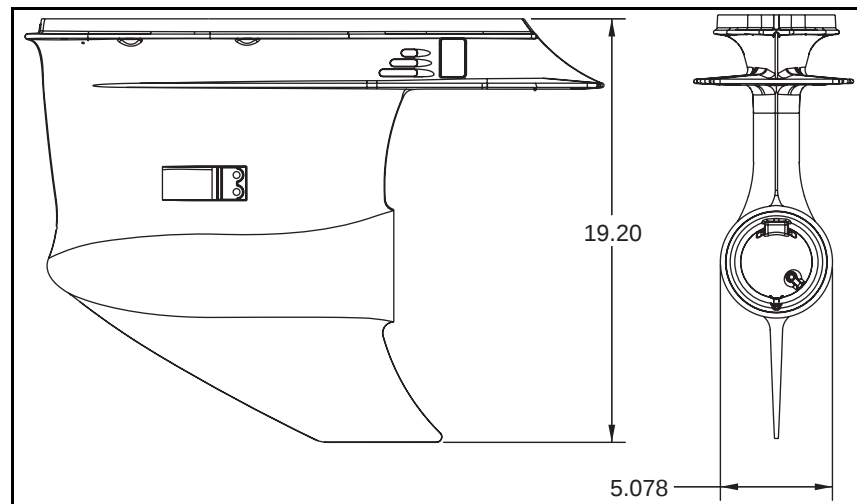




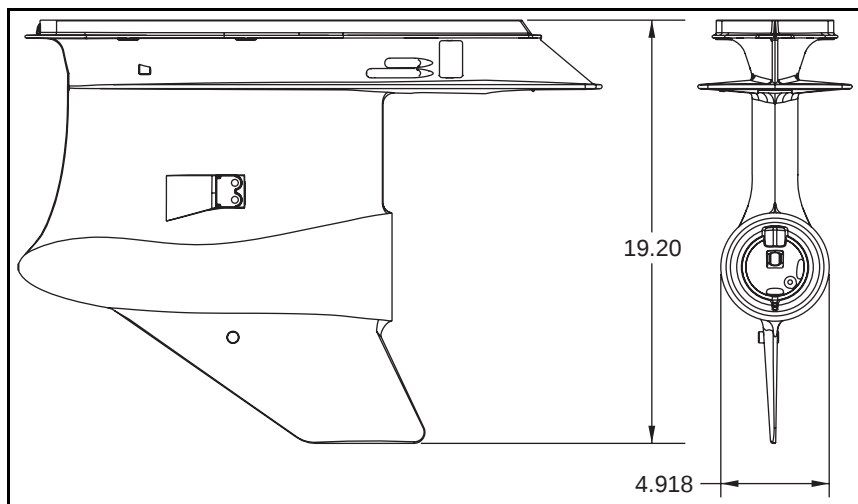
L-Type:



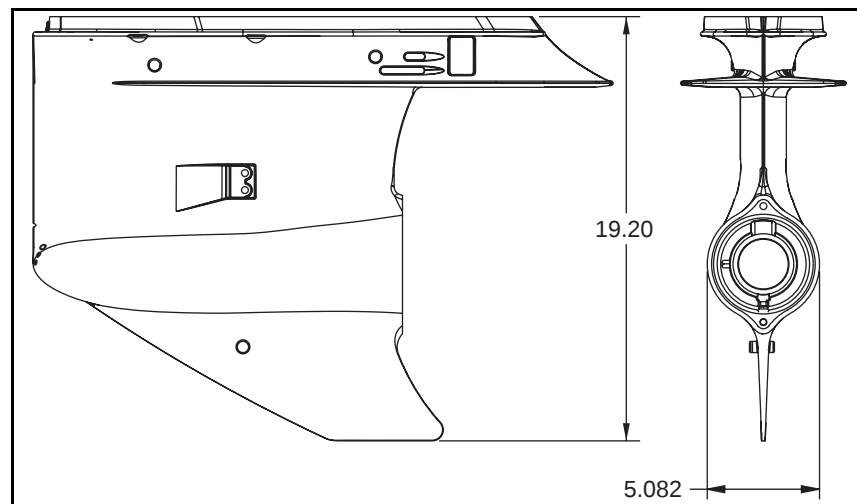
M-Type:



L2-Type:



M2-Type:





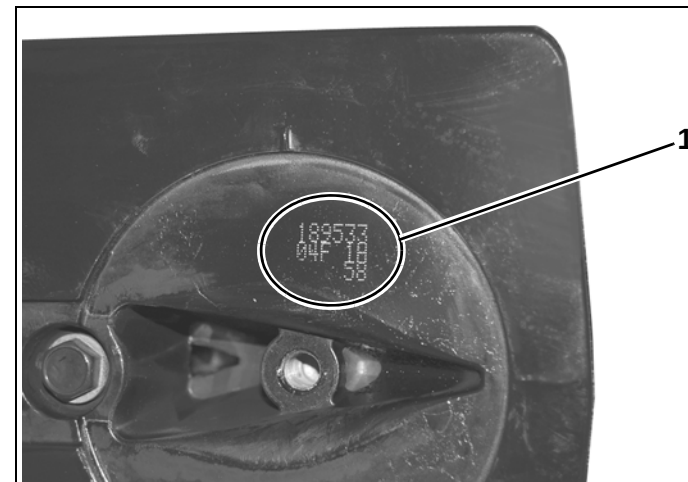
Identifying Gearcases

A running change was made to L2-Type and S-Type / S-2 Type gearcases to ease identification of gearcase and ratio.

Remove the trim tab or trim tab cover to view etching which identifies the following:

- L2-Type, manufacturing part number, date code and gear ratio (.54 or .58)
- S-Type, manufacturing part number, date code and S1 or S2 to determine pinion gear style.

Note: If L2-Type gearcase does not have the etching, see **How to Identify Gearcase Ratios** on p. 138

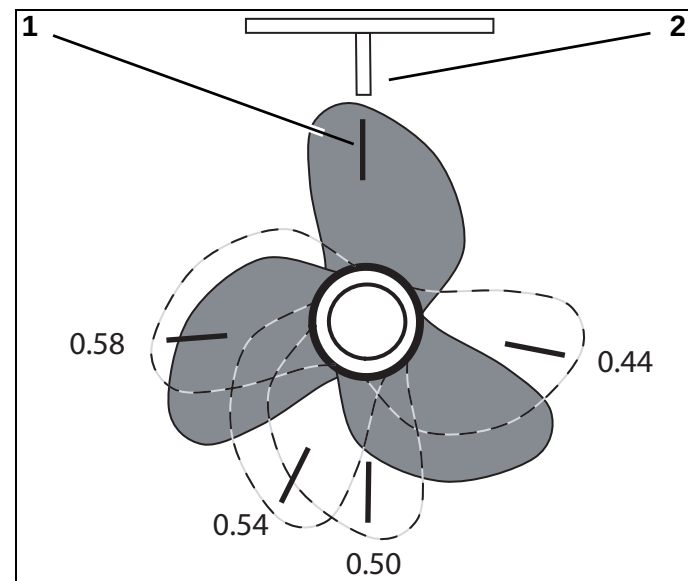


1. Gearcase identification information

How to Identify Gearcase Ratios

To identify gearcase ratio, mark a propeller blade in line with the trim tab. Turn the drive shaft three turns. The propeller shaft turns the number of revolutions indicated in the chart below. The blade should stop in the position indicated in the drawing. Use the chart to identify the gear ratio.

Gearcase Type	Turn Driveshaft	Propeller Shaft Turns	Gear Ratio Is:
S or O	3	1.32	.44 / 2.25:1 / 12:27
O	3	1.5	.50 / 2:1 / 13:26
O or M or L	3	1.62	.54 / 1.85:1 / 13:24
L	3	1.74	.58 / 1.71:1 / 14:24



1. "Start" mark, in line with trim tab
2. Trim tab



Part number stamped on driveshafts

1. S-Type driveshaft, P/N 345880
2. S2-Type driveshaft, P/N 352642

How to Identify an S-Type / S2-Type Gearcase by the Driveshaft

If etched information does not exist under the trim tab, identification requires removing the gearcase.

A part number should be etched on the upper driveshaft.

- S-Type - P/N 345880
- S2-Type - P/N 352642.

If the part number is missing or unreadable, identification will require some disassembly.

Gearcase Assembled:

Remove the water pump and water pump plate. Remove the driveshaft bearing housing.

An S2-Type gearcase uses two spring clips to retain the upper drive shaft to the lower. One of the spring clips is visible just above the lower driveshaft flange.

Gearcase Disassembled:

If the gearcase is disassembled the differences are obvious.

S-Type Driveshaft Features:

- Tapered pinion gear
- Secured to lower driveshaft with nut
- Pin and clip upper driveshaft retention

S2-Type Driveshaft Features:

- Hex-drive pinion gear
- Bolted to lower driveshaft
- Spring clip upper driveshaft retention



Driveshaft - driveshaft bearing housing removed

1. Spring clip



GEARCASE IMPROVEMENTS

New Pinion Bearing, P/N 5007751

A running change was made to 2008 production V6 gearcases. This change increased the taper of the pinion bearing, and improves stability of the bearing / driveshaft loading, resulting in improved gearcase durability.

Models

- All 90° V6 models with the M2-Type gearcase (standard and counter rotation)
- All .58 ratio L2-Type gearcases
- All L2-Type and M2-Type service replacement gearcases

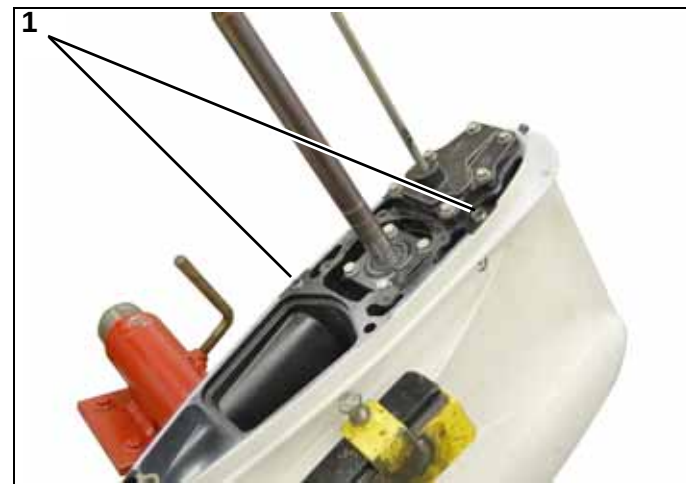


1. Pinion bearing, P/N 5007751 has increased taper

Alignment Pins

A running change was made to 2008 production for the 300 HP 3.4 L 90° V6 models using M2-Type (standard or counter rotation) gearcases. Alignment pins have been added between the exhaust housing and gearcase mounting surfaces. Proper alignment results in increased gearcase durability.

For models without alignment pins, use Gearcase Alignment Pin Kit, P/N 5007231, when installing gearcase to exhaust housing.



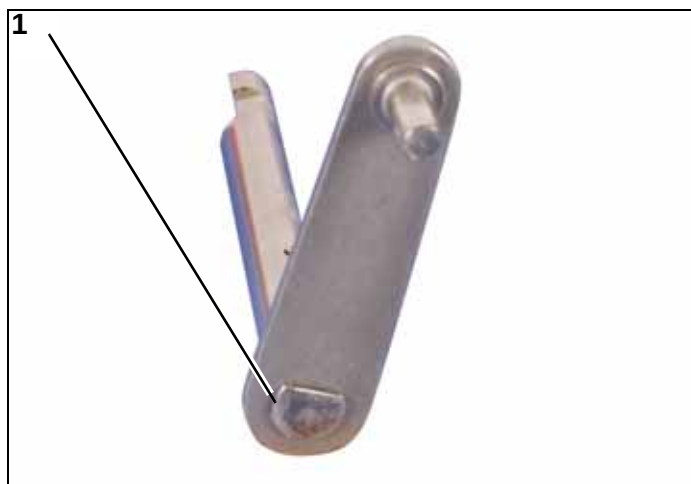
1. Alignment pins



1. O-ring, P/N 314728

Driveshaft Bearing Housing O-Ring 75 – 300 HP Models

A running change was made to 2008 production. The material for the driveshaft bearing housing o-ring, P/N 314728, has changed. This change improves sealing and gearcase durability.



1. Shift lever, P/N 5007292 is now welded

Improved Shift Lever, P/N 5007292 - 115 – 200 HP 60° V4 / V6 Models

The Symptom: Outboard jumps out of gear while running, or won't shift into gear.

Possible Causes: Misadjusted shift cable, wrong shift shaft length or lost motion in shift lever.

The Fix: Check shift shaft length and shift cable adjustment. Check shift lever.

A running change has been made to 2008 production, resulting in an improved shift lever, P/N 5007292. The two pieces of the shift lever are now welded. Previous parts were press-fit and swaged, eliminating lost motion.



SERVICE ISSUES

Fastener Torque

S2-Type Pinion Screw

A running change has been made to the torque specification for the pinion bolt used on the S2-Type gearcase. Torque value has been increased to 47 to 51 ft. lbs (63.7 to 69 N·m).

Mounting Screws, All Models

Be sure to tighten gearcase mounting screws to specified value (refer to appropriate service manual), when installing gearcase to outboard.

IMPORTANT: Check mounting screw torque whenever an outboard experiences an impact. Even minor damage to a propeller can bring about vibration which may cause fasteners to loosen.



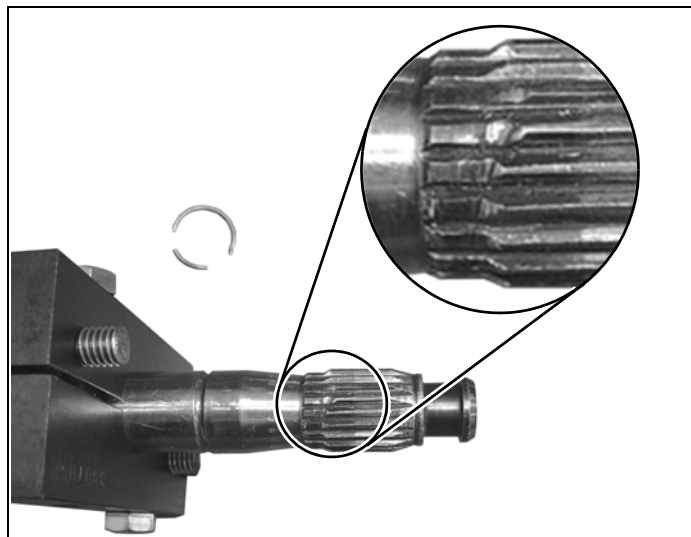
S2-Type gearcase new torque value: 47 to 51 ft. lbs (63.7 to 69 N·m)

Evinrude / Johnson Gear Oil “Stinks”

What: A number of comments have been received regarding the odor of HPF XR and HPF Pro gear lubricants.

Why: As gear oil absorbs condensation or other moisture, the odor will increase - this is a function of the additive package doing its job and the odor is normal.





S2-Type Driveshaft

S2-Type Gearcase; Stuck Driveshaft

The Issue: Upper driveshaft stuck into the lower driveshaft.

The Cause: Assembled with used retainers.

The Fix: To get driveshafts apart use driveshaft puller, P/N 390706, and backing plate, P/N 325867. Due to the length of the splines, it may be necessary to reset the puller and pull the shaft in two segments.

Note damage to the splines of upper driveshaft and that retainer is broken.

IMPORTANT: Use NEW retainers when assembling this style driveshaft!



GEARCASE TOOLS

New Tools for M2-Type and L2-Type Gearcases

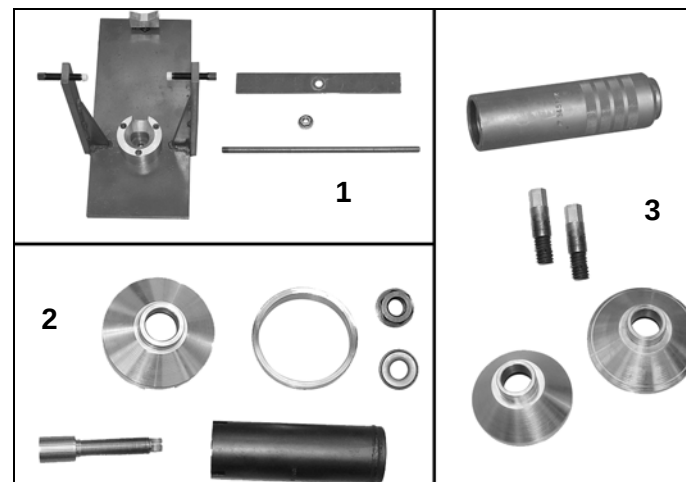
Reference: Service Bulletin 2008-03(S)

New service tools have been developed for 2008 Model Year outboards. The following tools are required for servicing the new “L2” and “M2” gearcase assemblies used on V6 model outboards.

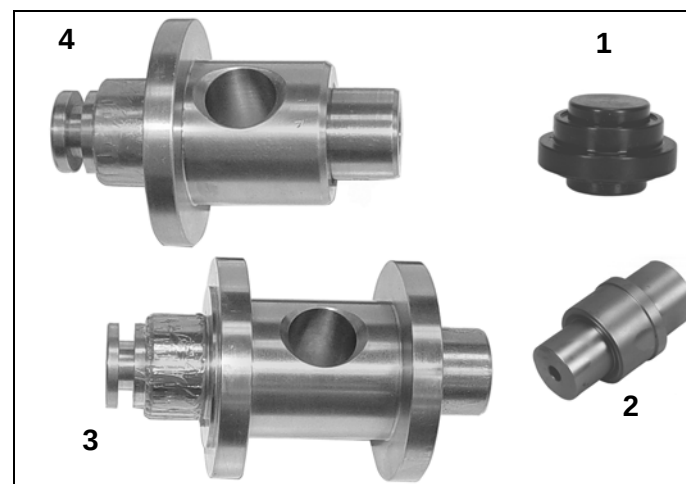
These tools will NOT be shipped automatically as part of the essential tool program and must be ordered as needed.

Refer to the appropriate service manual for gearcase identification and service procedures.

- **354059** Pressing Fixture—“L2” and “M2” type gearcase assemblies with pressed in bearing housings
- **354060** Puller, Propeller Shaft Bearing Housing—“L2” and “M2” type gearcase assemblies with pressed in bearing housings
- **354057** Installer, Propeller Shaft Bearing Housing—(M2)
- **354058** Installer, Propeller Shaft Bearing Housing—(L2)
- **354140** Alignment Pins
- **345822** Handle, Service Tool
- **354056** Installer, Propeller Shaft Seals
- **354139** Installer, Propeller Shaft Rear Bearing
- **5007749** Gearcase Alignment Gauge—(M2)
- **5007750** Gearcase Alignment Gauge—(L2)



1. P/N 354059 Pressing Fixture
2. P/N 354060 Puller, Propeller Shaft Bearing Housing
3. P/N 354057 Installer, Propeller Shaft Bearing Housing, P/N 354058 Installer, Propeller Shaft Bearing Housing, P/N 354140 Alignment Pins, P/N 345822 Handle, Service Tool



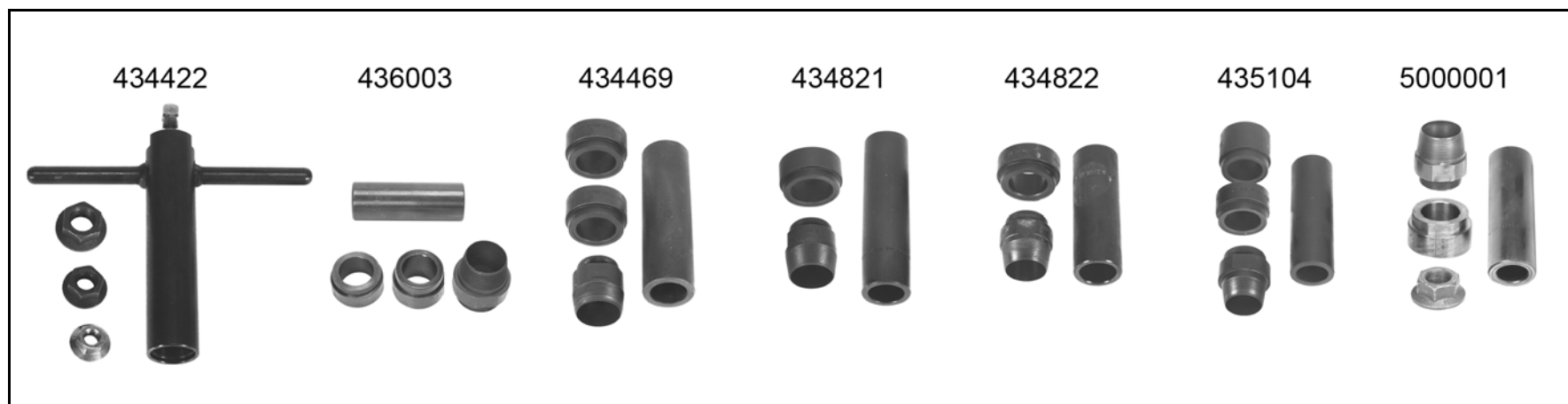
1. 354056 Installer, Propeller Shaft Seals
2. 354139 Installer, Propeller Shaft Rear Bearing
3. 5007749 Gearcase Alignment Gauge (M2)
4. 5007750 Gearcase Alignment Gauge (L2)

Propeller Shaft Seal Tools

Reference: Service Bulletin 2008-02(S)

Use these tools to remove and install propeller shaft seals without removing the propeller shaft bearing housing from the gearcase.

PROPELLER SHAFT SEAL TOOLS					
Outboard Model / Gearcase Type	Handle Kit	Remover Installer Kit	Remover End	Seal Installer	Spacer
20-35 Thru-Hub, 25/30 E-TEC	434422	436003	T19629	T19630	T19631
40/48/50, 75 (15 in.) 3 cyl.		435104	T19626	T19617 T19627	T19628
40/50/60/65C E-TEC		434822	T19613	T19616	T19619
55C, 50-70 3 cyl., V4 (20 in.)		5000001	T19634	T19635	T19619
70 4 stroke		434821	T19612	T19615	T19618
V6 and V8 (1991 and older)		434469	T19623	T19624	T19625
V6 and V8 (1992 and newer)				T19638	
V6 "M2" 2008 and newer ("O", "L", "L2" with extended housing)					





NOTES – GEARCASES

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PARTS AND ACCESSORIES



P&A INFORMATION

Updates To Electronic Parts Catalog

The Electronic Parts Catalogs (EPC) has been updated and offers many new or updated features:

- Easier searching by product, model or part number
- Printer friendly diagram and parts lists
- Inventory - *StockPro* dealers can view inventory and bin locations directly
- Parts Availability - See BRP parts availability immediately
- StockPro Dealer Availability - Search dealer network in one easy step
- Literature - Red highlighted tab when additional literature (i.e. bulletins) apply
- Pick List Ability - keep multiple pick lists by job with the ability to add notes
- Pick List Downloads - Export pick lists to *DealerPort Offline* or compatible Dealer Business Systems without re-keying data

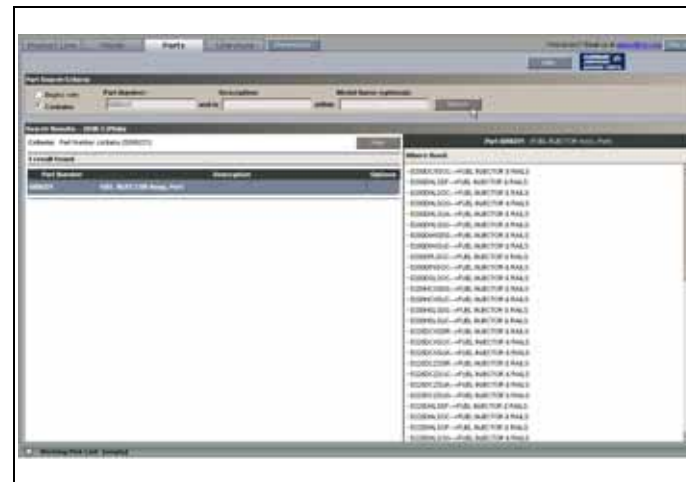
Preliminary catalogs are added to the EPC on *DealerPort* and *Evinrude.com* early in a model year. Any parts changes in the middle of a model year are updated on EPC when they happen. This information is then used to create the *PartSmart* disc.

Report any errors in the EPC by sending an e-mail to ejepc@brp.com. Any required changes are usually posted within a week.

Inquiries About Stern Drive Parts

When calling for parts assistance with *OMC Stern Drive*, *OMC Sea Drive*, *OMC Sail Drive* or *OMC Cobra*, please remember the engine model number is used to identify model year and design features, NOT the numbers on the transom bracket or outdrive.

Consult the Model Year Guide, P/N 5006145, for more information. Without the correct engine model number, we cannot guarantee that the correct information is being provided to you.



SERVICE PARTS AND ACCESSORIES



4-Stroke Outboard Accessory Kits and Service Kits

The Parts and Accessories Catalog includes a 4-Stroke section which contains most of the 4-stroke related kits and service parts for these outboards.

This section provides one convenient location for everything from rigging accessories, such as tiller kits, and other engine add on kits, to filters, sensors, timing belts water pumps and complete gearcases.



Renegade Bass Demo Prop

Demo Prop Program

The *Evinrude* Demo Prop program is reserved exclusively for *Evinrude* Full Line, Package, and Service dealers.

The *Evinrude* Demo Prop program provides a convenient solution to help customers choose the right propeller and is designed to help you market *Evinrude Johnson* props.

The Demo Propeller Program helps drive repeat store traffic, resulting in greater customer satisfaction, improved sales and a better bottom line for your dealership. Some of the benefits are:

- Increase propeller sales.
- Allow customers to experience the benefits of stainless steel over aluminum.
- Gain customer satisfaction by helping them decide which prop is best for their boat.
- Variable discounts, dating, or early pay discounts and free freight.
- Your dealership appears as a Demo Prop Dealer on the dealer locator.
- Receive consumer leads in your area from our *Evinrude* Demo Prop website!



ACCESSORY KITS

New for *Evinrude E-TEC* 25 – 30 HP Inline Models

The following new accessory kit have been developed for the *Evinrude E-TEC* 25 – 30 HP models:

- Tiller Kit, P/N 5007834 – Adds tiller steering to DPL and DEL models. Includes steering friction device
- Electric Start Kit, P/N 5007740 – Adds electric start to DR models. Includes battery charging
- Battery Charging Kit, P/N 5007741 – Adds battery charging to DR models
- Remote Conversion Kit, P/N 5007742 – Converts tiller steering models to remote steering



Tiller kit, P/N 5007834



Electric start kit, P/N 5007740

SERVICE PARTS AND ACCESSORIES



Stars & Stripes Decal Kits

Although no longer offered as a production option, *Evinrude E-TEC* Stars & Stripes Kits are still available:

- White 200 – 250 HP 90° V6 models P/N 763708
- White 150 – 200 HP 60° V6 models P/N 764342
- Blue 200 – 250 HP 90° V6 models P/N 764036
- Blue 150 – 200 HP 60° V6 models P/N 764341

Decal sets include two E-TEC decals, port and starboard flag decals, a squeegee and application instructions.



1. Housing and Plug, P/N 174127
2. Fuel Piston Kit, P/N 436095
3. Motor Piston Kit, P/N 435921

OMS Rebuild Kits

Refer to the appropriate service manual for test procedures before rebuilding an OMS pump. Testing typically involves using the gearcase pressure and vacuum testers to check functionality and verify the air motor check valves are not damaged.

The following kits are available to rebuild an OMS pump:

- Housing and Plug, P/N 174127
- Fuel Piston Kit, P/N 436095
- Motor Piston Kit, P/N 435921

Also see on p. 153 for additional information.



SERVICE ISSUES

After-Market Fuel Filter Issues

The seals on *Evinrude / Johnson Genuine* fuel filters are crimped in place.

Some after-market fuel water separating filters do not crimp the seal in place. In areas where alcohol fuel is a concern, too much alcohol in the fuel may cause the seal to swell, resulting in a fuel leak.



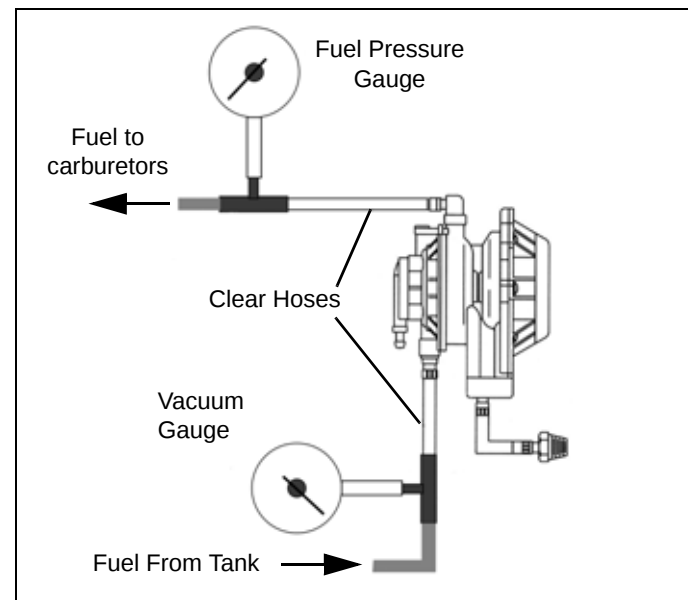
1. The seals on *Evinrude / Johnson Genuine* fuel filters are crimped

OMS Replacement

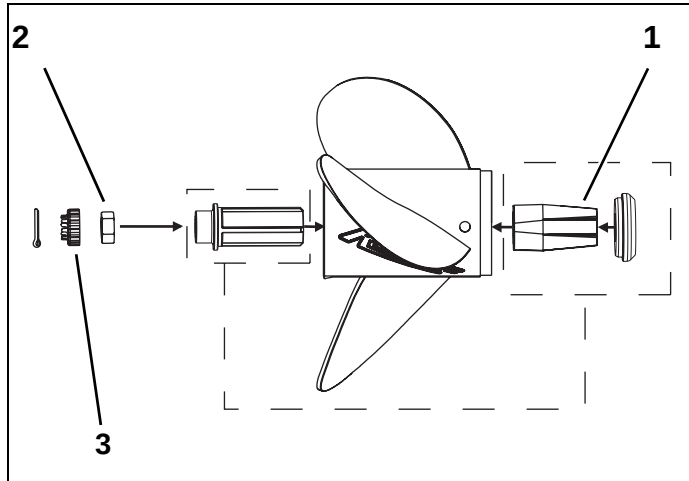
Remember, every time an oil supply line is disconnected, a 50:1 fuel / oil mixture in the fuel tank must be used until oil pump delivery has been verified. Do NOT rely solely on an oil consumption test as the “ok” to run unmixed fuel.

Use the following check list. Refer to the appropriate service manual when replacing an OMS Pump or performing fuel system tests.

- Mark the oil tank for the operator
 - allows for easy visual reference of the oil tank and oil usage
- Check oil system warnings
- Test pump for self-priming
- Test boat fuel system vacuum
 - check for air or vapor bubbles
- Test fuel pump pressure
- Oil consumption test
 - 1500 rpm is needed for driving the sensing unit
 - Run outboard in test tank or in the water when performing this test



SERVICE PARTS AND ACCESSORIES



1. Torsion bushing
2. Propeller nut, tighten to torque specification
3. Keeper - used on V6-style gearcases only

TBX Torsion Bushing Damage

To prevent damage to the torsion bushing, be sure to tighten the propeller nut as specified in installation instructions.

- Without keeper – 120 to 144 in. lbs (13.6 to 16.3 N·m)
- With keeper – 70 to 80 ft. lbs (95 to 109 N·m)

Advise customers who purchase TBX propellers over the counter of the torque specification.



Improved rectifier/regulators do NOT have a purple lead

Rectifier / Regulators

Reference: Parts and Accessories Bulletin 2001-01(P)

Replacement rectifier/regulators have been improved to automatically turn on under normal engine operation.

IMPORTANT: Improved rectifier/regulators DO NOT have a purple lead.

Install the new rectifier/regulator as described by the instruction sheet or *Evinrude/Johnson Service Manual*. Refer to Parts and Accessories Bulletin 2001-01(P) for supplemental installation information for rectifier/regulators that do not have the purple lead.

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