EVINRUDE® E-TEC®

Service Manual

200, 225, 250 HP

90° V6 (3.3L)

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INTRODUCTION

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SAFETY INFORMATION

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

This manual is written for qualified, factory-trained technicians who are already familiar with the use of *Evinrude*®/*Johnson*® Special Tools. This manual is not a substitute for work experience. It is an organized guide for reference, repair, and maintenance of the outboard(s).

This manual uses the following signal words identifying important safety messages.

⚠ DANGER ⚠

Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

⚠ WARNING ⚠

Indicates a potentially hazardous situation which, if not avoided, CAN result in severe injury or death.

⚠ CAUTION ⚠

Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate personal injury or property damage. It also may be used to alert against unsafe practices.

IMPORTANT: Identifies information that will help prevent damage to machinery and appears next to information that controls correct assembly and operation of the product.

These safety notices mean:

ATTENTION!
BECOME ALERT!
YOUR SAFETY IS INVOLVED!

Always follow common shop safety practices. If you have not had training related to common shop safety practices, you should do so to protect yourself, as well as the people around you.

It is understood that this manual may be translated into other languages. In the event of any discrepancy, the English version shall prevail.

To reduce the risk of personal injury, safety warnings are provided at appropriate times throughout the manual.

DO NOT make any repairs until you have read the instructions and checked the pictures relating to the repairs.

Be careful, and never rush or guess a service procedure. Human error is caused by many factors: carelessness, fatigue, overload, preoccupation, unfamiliarity with the product, and drugs and alcohol use, to name a few. Damage to a boat and outboard can be fixed in a short period of time, but injury or death has a lasting effect.

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

Torque wrench tightening specifications must be strictly followed. Replace any locking fastener (locknut or patch screw) if its locking feature becomes weak. Definite resistance to turning must be felt when reusing a locking fastener. If replacement is specified or required because the locking fastener has become weak, use only authorized *Evinrude/Johnson Genuine Parts.*

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

⚠ DANGER ⚠

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

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

⚠ WARNING ⚠

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

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

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

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

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

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

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

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

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

Always work in a well ventilated area.

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

ABBREVIATIONS USED IN THIS MANUAL

Units of Measurement

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

List of Abbreviations

ABYC	American Boat & Yacht Council
ATDC	after top dead center
AT	air temperature sensor
BPS	barometric pressure sensor
BTDC	before top dead center
CCA	cold cranking amps
CPS	crankshaft position sensor
EMM	Engine Management Module
ICOMIA	International Council of Marine Industry Associations
MCA	marine cranking amps
MWS	modular wiring system
NMEA	National Marine Electronics Assoc.
NTC	negative temperature coefficient
PTC	positive temperature coefficient
ROM	read only memory
S.A.F.E.™	speed adjusting failsafe electronics
SAC	start assist circuit
SAE	Society of Automotive Engineers
SYNC	synchronization
TDC	top dead center
TPS	throttle position sensor
WOT	wide open throttle
WTS	water temperature sensor

ENGINE EMISSIONS INFORMATION

Maintenance, replacement, or repair of the emission control devices and systems may be performed by any marine SI (spark ignition) engine repair establishment or individual.

Manufacturer's Responsibility

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

Dealer's Responsibility

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

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

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

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

Owner's Responsibility

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

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

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

EPA Emission Regulations

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

VIA U.S. POSTAL SERVICE:

Office of Mobile Sources
Engine Programs and Compliance Division
Engine Compliance Programs Group (6403J)
401 M St. NW
Washington, DC 20460

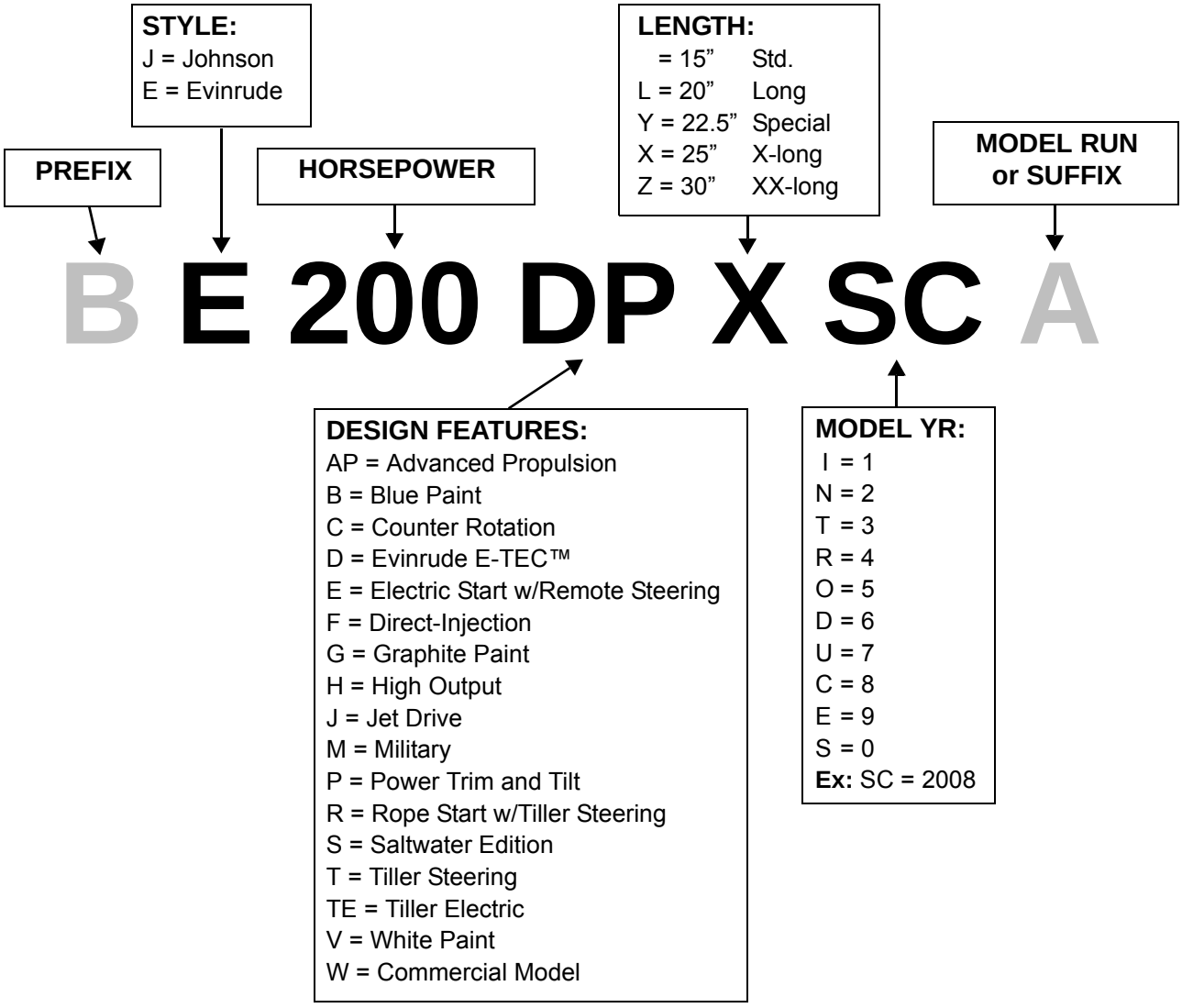
VIA EXPRESS or COURIER MAIL:

Office of Mobile Sources
Engine Programs and Compliance Division
Engine Compliance Programs Group (6403J)
501 3rd St. NW
Washington, DC 20001

EPA INTERNET WEB SITE:

www.epa.gov

MODEL DESIGNATION



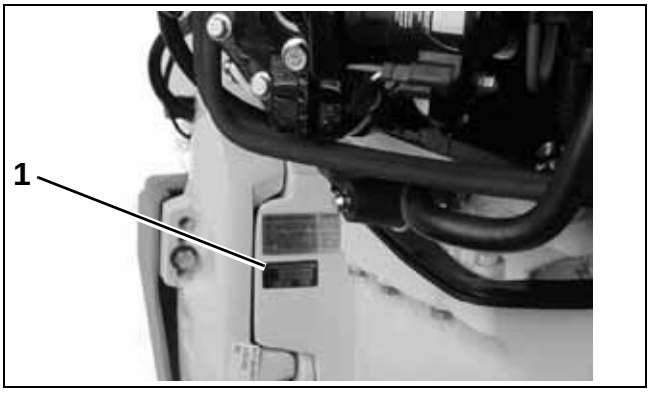
MODELS COVERED IN THIS MANUAL

This manual covers service information on all 200.1 cubic inch, 90° V *Evinrude E-TEC*® models.

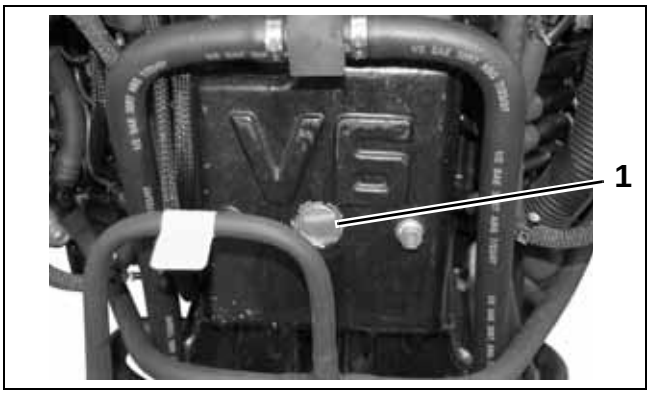
Model Number	Shaft	Color	Gearcase
E200DHLSCM	20”	BL	“L”
E200DHLSCF	20”	BL	“L”
E200DHLSCG	20”	BL	“L2”
E200HSLSCR	20”	WH	“L”
E200HSLSCF	20”	WH	“L”
E200HSLSCG	20”	WH	“L2”
E200HVLSCS	20”	WH	“M”
E200HVLSCF	20”	WH	“M”
E200HVLSCG	20”	WH	“M2”
E200DHXSCR	25”	WH	“M”
E200DHXSCF	25”	WH	“M”
E200DHXSCG	25”	WH	“M2”
E200HCXSCR	25”	WH	“M” CR
E200HCXSCF	25”	WH	“M” CR
E200HCXSCG	25”	WH	“M2” CR
E225DPLSCM	20”	BL	“M”
E225DPLSCF	20”	BL	“M”
E225DPLSCG	20”	BL	“M2”
E225DHLSCM	20”	BL	“L”
E225DHLSCF	20”	BL	“L”
E225DHLSCG	20”	BL	“L2”
E225HSLSCS	20”	WH	“L”
E225HSLSCF	20”	WH	“L”
E225HSLSCG	20”	WH	“L2”
E225DHXSCA	25”	BL	“L”
E225DHXSCF	25”	BL	“L”
E225DHXSCG	25”	BL	“L2”
E225DPXSCM	25”	WH	“M”
E225DPXSCF	25”	WH	“M”
E225DPXSCG	25”	WH	“M2”
E225DCXSCM	25”	WH	“M” CR
E225DCXSCF	25”	WH	“M” CR
E225DCXSCG	25”	WH	“M2” CR
E225DPZSCM	30”	WH	“M”
E225DPZSCF	30”	WH	“M”
E225DPZSCG	30”	WH	“M2”
E225DCZSCM	30”	WH	“M” CR
E225DCZSCF	30”	WH	“M” CR
E225DCZSCG	30”	WH	“M2” CR
E250DPLSCM	20”	BL	“M”
E250DPLSCF	20”	BL	“M”
E250DPLSCG	20”	BL	“M2”
E250DPXSCM	25”	WH	“M”
E250DPXSCF	25”	WH	“M”
E250DPXSCG	25”	WH	“M2”
E250DCXSCM	25”	WH	“M” CR
E250DCXSCF	25”	WH	“M” CR
E250DCXSCG	25”	WH	“M2” CR
E250DPZSCM	30”	WH	“M”
E250DPZSCF	30”	WH	“M”
E250DPZSCG	30”	WH	“M2”
E250DCZSCM	30”	WH	“M” CR
E250DCZSCF	30”	WH	“M” CR
E250DCZSCG	30”	WH	“M2” CR

Identifying Model and Serial Numbers

Outboard model and serial numbers are located on the swivel bracket and on the powerhead.



1. Model and serial number 000449



1. Serial number 006828

SERVICE SPECIFICATIONS

	HP	200	225	250	200 H	225 H
ENGINE	Full Throttle Operating Range	4500–5800 RPM				
	Power	200 HP (149 kw) @ 5150 RPM	225 HP (168 kw) @ 5150 RPM	250 HP (187 kw) @ 5150 RPM	Factory Tuned for High Performance	
	Idle RPM in Gear	500 ± 50				
	Test Propeller	**Standard Rotation Models:** P/N 436080 or P/N 396277 **Counter Rotation Models:** P/N 436081 or P/N 398674				
	Weight (may vary depending on model)	**20 in. (L) Models:** 516 lbs. (234 kg) **25 in. (X) Models:** 524 lbs. (238 kg) **30 in. (Z) Models:** 530 lbs. (240 kg)				
	Lubrication	*Evinrude/Johnson XD100* Oil Refer to **Oil Requirements** on p. 65				
	Engine Type	90° V 6-Cylinder Loop-Charged				
	Displacement	200.1 cu. in. (3279 cm^3)				
	Bore	3.854 in (97.89 mm)				
	Stroke	2.858 in. (72.60 mm)				
	Standard Bore	3.8535 to 3.8545 in. (97.87 to 97.90 mm) To bore oversize, add piston oversize dimension to standard bore				
	Top Crankshaft Journal	1.6199 to 1.6204 in. (41.15 to 41.16 mm)				
	Center Crankshaft Journals	2.1870 to 2.1875 in. (55.55 to 55.56 mm)				
	Bottom Crankshaft Journal	1.5747 to 1.5752 in. (40.0 to 40.01 mm)				
	Rod Crankpin	1.4995 to 1.5000 in. (38.09 to 38.106 mm)				
	Piston Ring End Gap, Both	0.022 to 0.028 in. (0.57 to 0.72 mm)				
FUEL	Fuel/Oil Ratio	*EMM* Controlled				
	Starting Enrichment	*EMM* Controlled				
	Preferred Fuel	Regular unleaded gasoline				
	Acceptable Fuel	See **Fuel Requirements** on p. 64 for additional information.				
	Minimum (High) Fuel Pressure @ IDLE RPM – 500 ± 50	22 to 28 psi (152 to 193 kPa)				
	Minimum Fuel Lift Pump Pressure @ IDLE RPM – 500 ± 50	3 psi (21 kPa)				
	Maximum Fuel Inlet Vacuum	4 in. Hg. (13.5 kPa)				
	Minimum Octane	87 AKI (R+M)/2 or 90 RON				
	Additives	*2+4 ® Fuel Conditioner*, *Fuel System Cleaner* Use of other additives may result in engine damage. See **Fuel Requirements** on p. 64 for additional information.				

	HP	200	225	250	200 H	225 H
ELECTRICAL	Minimum Battery Requirements	675 CCA (845 MCA); or 750 CCA (940 MCA) below 32°F (0°C) (Use a 107 amp-hr battery for extreme applications.)				
	Alternator	Dual Voltage 50 Amp with Voltage Regulator and Battery Isolation				
	Tachometer Setting	6 pulse (12 pole)				
	Charging Isolator	Integral, Terminal on Engine Harness				
	Engine Fuses	P/N 967545 – 10 A				
COOLING	Thermostat	143°F (62°C)				
	Maximum Temperature	190°F (88°C)				
	Water pressure	11 psi minimum @ 5000 RPM				
IGNITION	Type	Capacitor Discharge				
	Firing Order	1-2-3-4-5-6				
	Ignition Features	*EMM* Controlled				
	RPM Limit	6050				
	Crankshaft Position Sensor Air Gap	Fixed				
	Spark Plug	Refer to Emission Control Information Label				
		Champion† QC10WEP @ 0.028 ± 0.003 in. (0.71 mm)				
GEARCASE	Gear Ratio	**"M" Type Gearcase**: 13:24 (.542) (1.85:1) **"L" Type Gearcase**: 14:26 (.538) (1.86:1) **"L2" Type Gearcase – 200 HP**: 14:26 (.538) (1.86:1) **"L2" Type Gearcase – 225 HP**: 14:24 (.583) (1.71:1) Refer to **GEARCASE TYPES** on p. 283				
	Lubricant	*HPF XR* Gearcase Lubricant				
	Capacity	**"M" Type Gearcase**: 44.0 fl. oz. (1300 ml) **"M2" Type Gearcase**: 38.9 fl. oz. (1150 ml) **"M" Type – Counter Rotation**: 41 fl. oz. (1220 ml) **"L" Type Gearcase:** 33.1 fl. oz. (980 ml) Refer to **GEARCASE TYPES** on p. 283				
	Shift Rod Height	**20 in. (L) Models:** 21 29/32 (556.25 mm) ± one-half turn **25 in. (X) Models:** 26 29/32 (683.25 mm) ± one-half turn **30 in. (Z) Models:** 31 29/32 (810.25 mm) ± one-half turn				
	Shift Cable Stroke	1.125 to 1.330 in. (28.6 to 33.8 mm) measured between NEUTRAL and FORWARD				
POWER TRIM/TILT	Lubrication	*Power Trim/Tilt & Power Steering Fluid* or GM Dexron† II Automatic Transmission Fluid				
	Fluid Capacity	21 fl. oz. (622 ml)				
	Trim Range	0° to 21°				
	Tilt Range	22° to 75°				
	Tilt UP Stall Pressure	1500 psi (10342 kPa)				
	Tilt IN Stall Pressure	800 psi (5516 kPa)				

STANDARD TORQUE SPECIFICATIONS

Size	In. Lbs.	Ft. Lbs.	N·m
No. 6	7–10	0.58–0.83	0.8–1.1
No. 8	15–22	1.25–1.83	1.7–2.5
No. 10	24–36	2–3	2.7–4.0
No. 12	36–48	3–4	4.0–5.4
1/4 in.	60–84	5–7	7-9.5
5/16 in.	120–144	10–12	13.5–16.5
3/8 in.	216–240	18–20	24.5–27
7/16 in.	336–384	28–32	38–43.5

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

⚠ WARNING ⚠

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

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

PRODUCT REFERENCE AND ILLUSTRATIONS

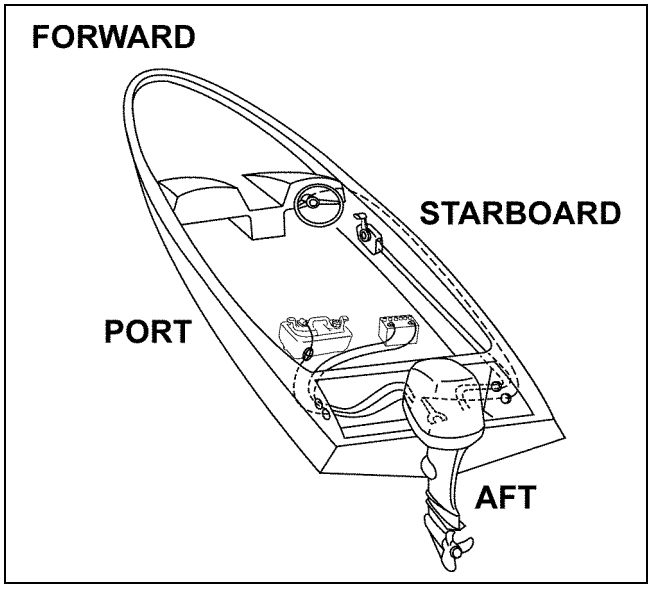
BRP US Inc. reserves the right to make changes at any time, without notice, in specifications and models and also to discontinue models. The right is also reserved to change any specifications or parts, at any time, without incurring any obligation to equip same on models manufactured prior to date of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

The continuing accuracy of this manual cannot be guaranteed.

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

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

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



Nautical Orientation 006411

SPECIAL TOOLS

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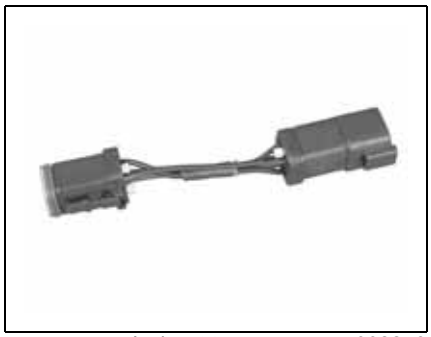
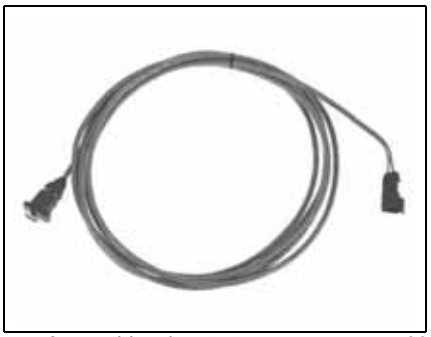
DIAGNOSTIC TOOLS

Diagnostic Software P/N 764642 764642



Bootstrap tool P/N 586551 002276



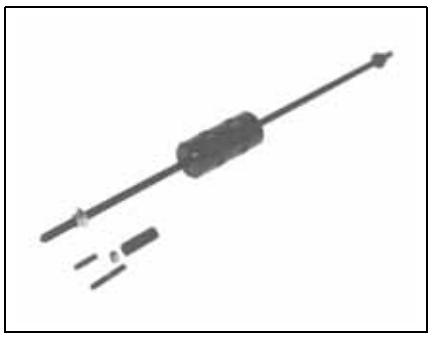
Interface cable P/N 437955 45583

UNIVERSAL TOOLS

Universal Puller Set P/N 378103 32885

Lifting eye P/N 321537 23701

Lifting ring assembly P/N 396748 000669



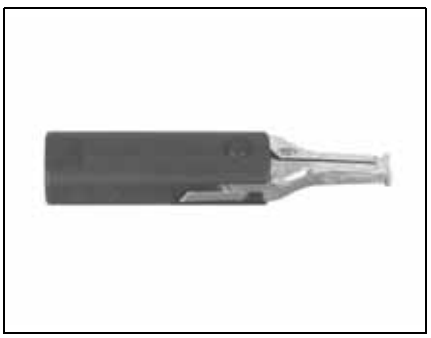
Slide hammer P/N 391008 CO1577

Slide hammer P/N 432128 15345

Flywheel holder P/N 771311 42938

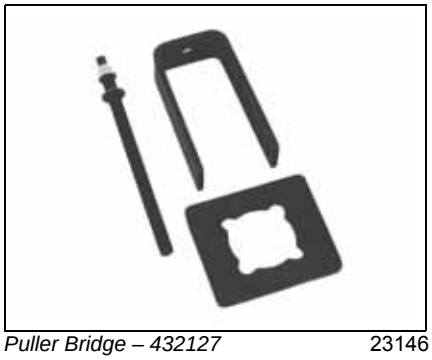
Small puller jaws P/N 432131 23150

Large puller jaws P/N 432129 23148



Bearing puller jaws P/N 432130 23149

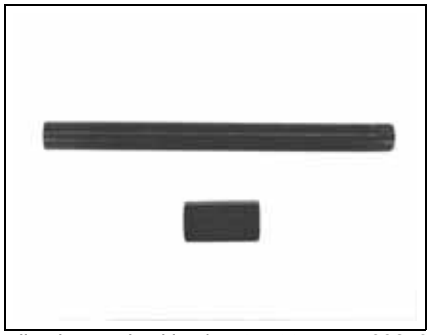
Slide hammer adapter P/N 390898 15356



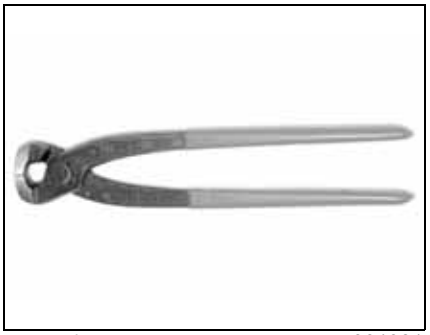
Puller Bridge – 432127 23146

Syringe P/N 346936 50243

Tilt tube nut wrench P/N 342680 46879

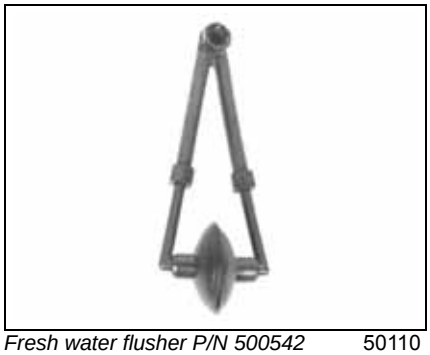


Tilt tube service kit P/N 434523 33249



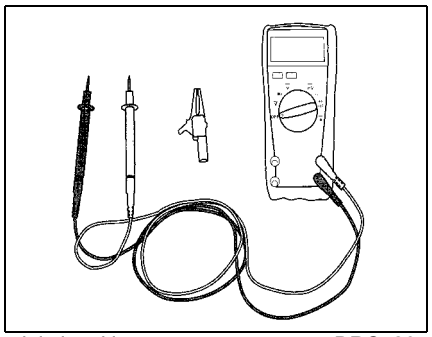
Oetiker† *pincers, P/N 787145* 001081

Temperature gun P/N 772018 45240



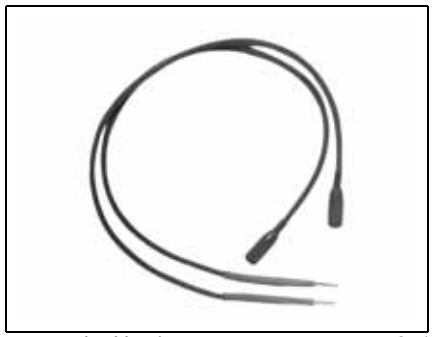
Fresh water flusher P/N 500542 50110

ELECTRICAL / IGNITION TOOLS

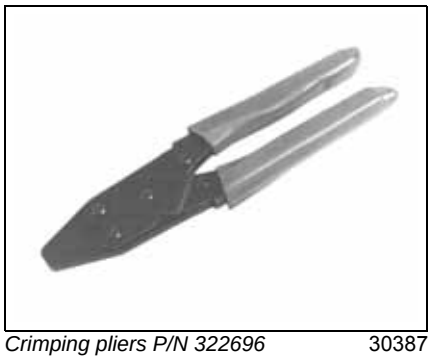


Digital multimeter DRC7265
Ohms resolution 0.01
Purchase through local supplier

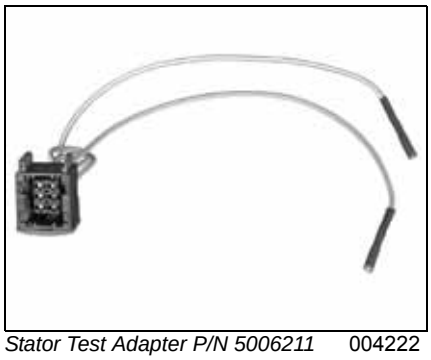
Peak reading voltmeter 49799
P/N 507972



Test probe kit P/N 342677 45241

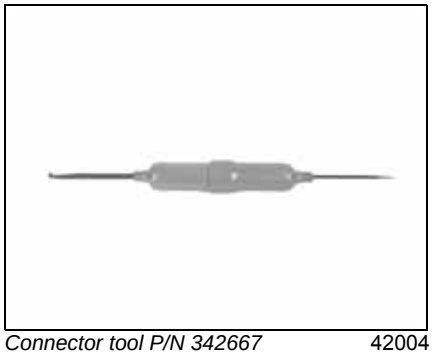


Crimping pliers P/N 322696 30387



Stator Test Adapter P/N 5006211 004222

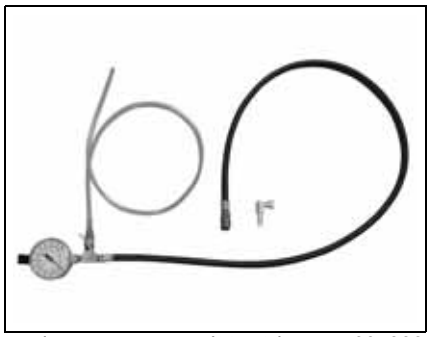
Tachometer/timing light P/N 507980 49789



Connector tool P/N 342667 42004

AMP† *connector tools* 002277
Primary Lock Tool P/N 777077
Secondary Lock Tool P/N 777078
Release Tool P/N 351413
Lock Installer P/N 777079

FUEL /OIL SYSTEM TOOLS



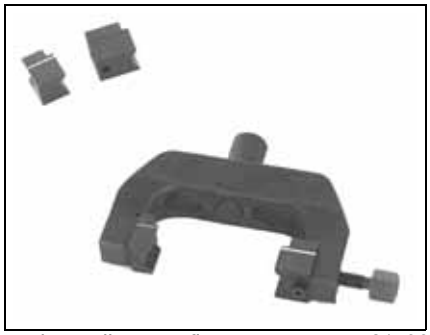
Fuel pressure gauge (60 PSI) 005339
P/N 5007100
90° fitting, P/N 353322

Fuel pressure gauge (15 PSI) 004560
P/N 5006397
90° fitting, P/N 353322

Injector test fitting kit 002465
P/N 5005844

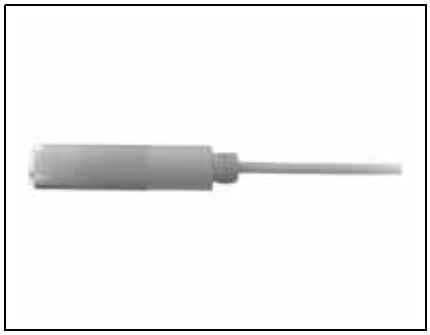
POWERHEAD TOOLS

Cylinder bore gauge P/N 771310 45303

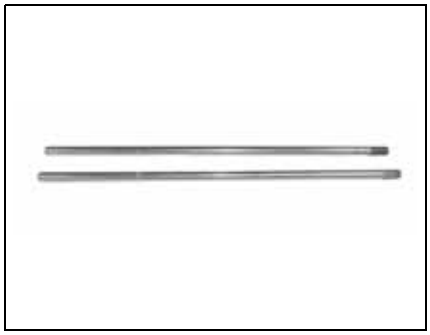


Rod cap alignment fixture 21596
P/N 396749

Torquing socket P/N 346187 50242

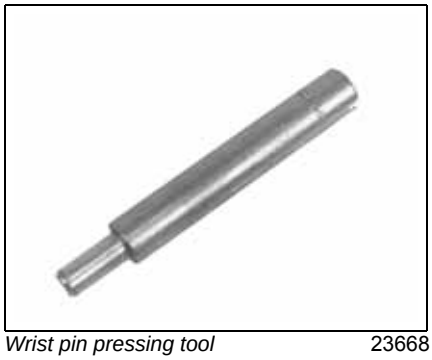


Piston stop tool P/N 342679 46543
Replacement tip P/N 5006098

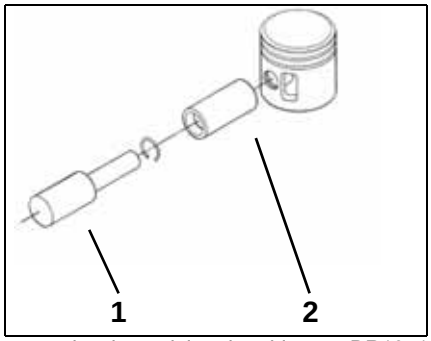


Guide rods 000828
P/N 383175

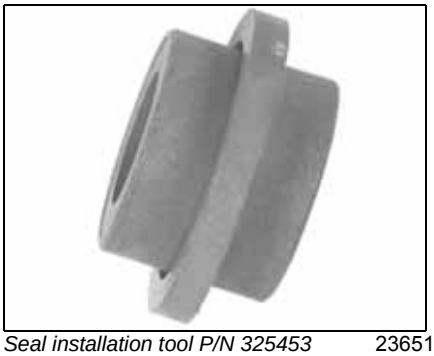
Crankshaft bearing and sleeve 21953C
installer P/N 338649



Wrist pin pressing tool 23668
P/N 396747



1. *Wrist pin retaining ring driver* DR1641
   P/N 396747
2. *Wrist pin cone P/N 331913*



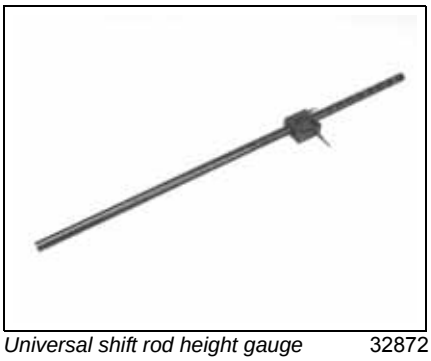
Seal installation tool P/N 325453 23651

GEARCASE TOOLS

Universal Driveshaft Shimming Tool 002601
P/N 5005925

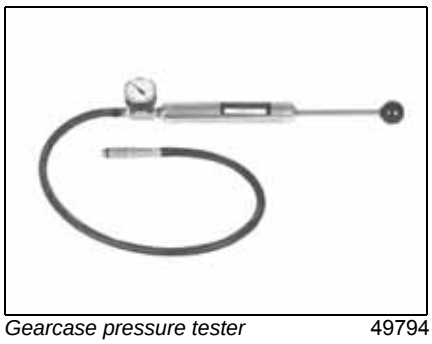
1. *Lower Driveshaft Shimming Bolt (S2 gearcase) P/N352878*

Universal Pinion Bearing Remover and installer kit P/N 5005927 002805

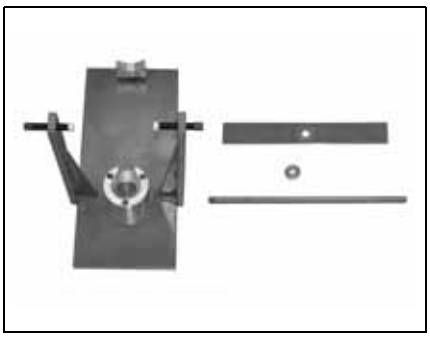


Universal shift rod height gauge P/N 389997 32872

Gearcase filler 49790
P/N 501882

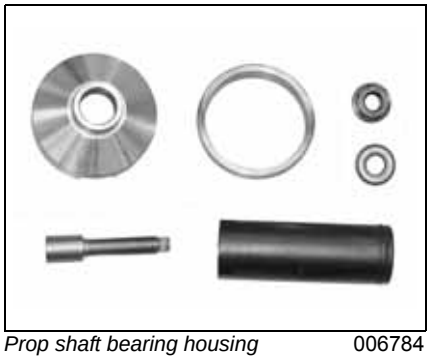


Gearcase pressure tester 49794
P/N 507977 (Stevens P/N S-34)
Gearcase vacuum tester
P/N 507982 (Stevens P/N V-34)



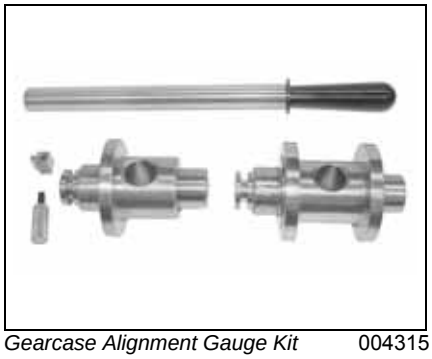
Pressing fixture P/N 354059 006782

Prop shaft bearing housing installers P/N 354058 (L2) P/N 354057 (M2) 006783

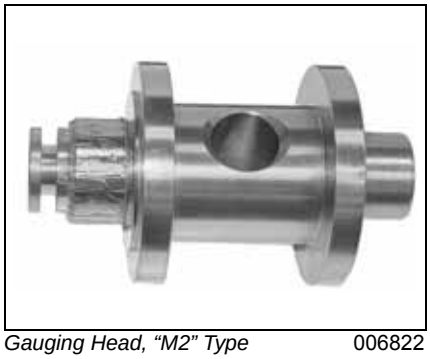


Prop shaft bearing housing remover/puller P/N 354060 006784

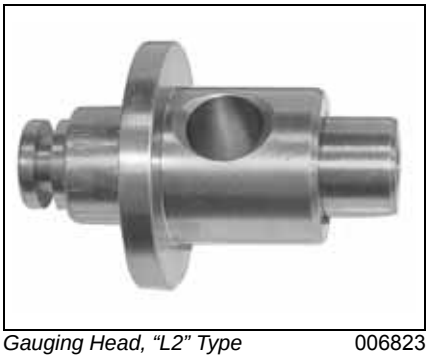
Prop shaft bearing housing alignment pins P/N 354140 006788



Gearcase Alignment Gauge Kit P/N 5006349 004315



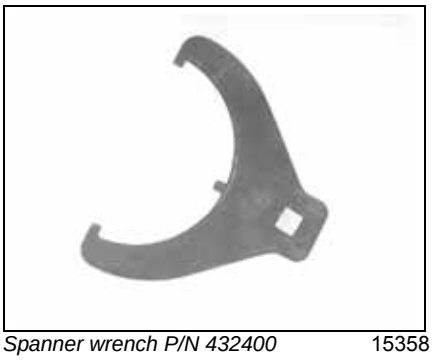
Gauging Head, "M2" Type Gearcases, P/N 5007749 006822



Gauging Head, "L2" Type Gearcases, P/N 5007750 006823

Backing plate P/N 325867 23621

Bearing Installation Tool P/N 339778 32519



Spanner wrench P/N 432400 15358

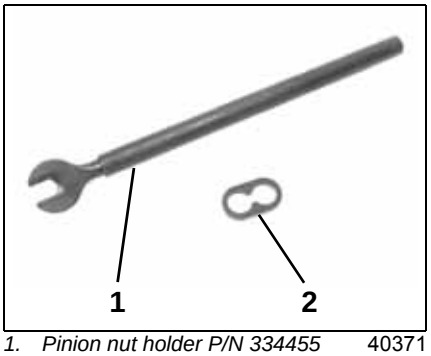
Driveshaft socket P/N 311875 23261

Driveshaft Puller P/N 390706 32884

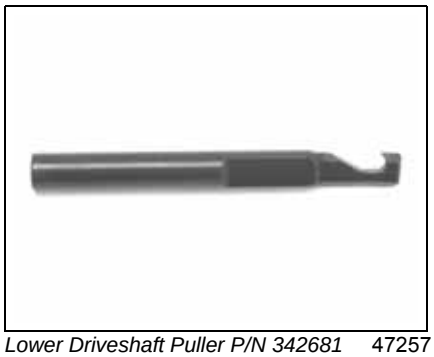
Prop shaft bearing installer P/N 432401 15355

Slide hammer adapter P/N 432398 15356

Driveshaft seal protector P/N 318674 23692



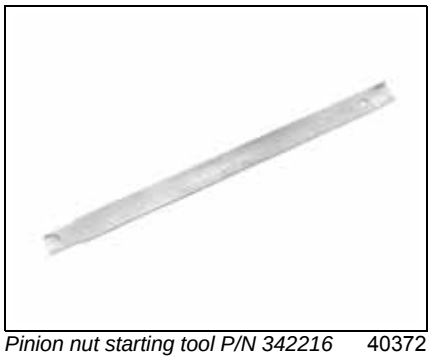
1. Pinion nut holder P/N 334455 40371
2. Wrench retainer P/N 341438



Lower Driveshaft Puller P/N 342681 47257

Prop shaft bearing installer P/N 339750 32880

Seal installation tool P/N 330268 32924



Pinion nut starting tool P/N 342216 40372

Prop shaft housing seal installer P/N 336311 32973

Seal installation tool P/N 354056 006824

TRIM AND TILT TOOLS

Gauge and collar assembly P/N 983975 33023

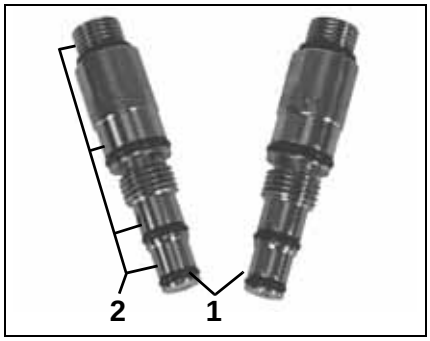
Trim/tilt service kit P/N 390010 33013

Tilt cylinder seal protector P/N 326005 23694

Hydraulic cylinder rod holder P/N 983213 23665

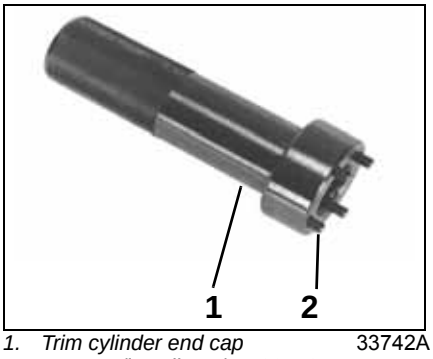
Tilt cylinder end cap remover P/N 352932, for single-piston tilt systems 005340

Spanner wrench P/N 912084 32213



1. *Trim/tilt service kit P/N 434524* 27340
2. *Replacement o-ring kit for adapter tips P/N 434729*

Tilt cylinder end cap remover P/N 326485, for three-piston tilt systems 33741



1. *Trim cylinder end cap remover/installer P/N 436710* 33742A
2. *Replacement tip for 436710*

SHOP AIDS

Cleaning Solvent P/N 771087

D.P.L. Spray P/N 777183

Oil - XD30™ P/N 777219

“6 in 1” Multi-Purpose Lubricant P/N 777192

Oil - XD50™ P/N 777225

HPF XR™ Gear Lube P/N 778755

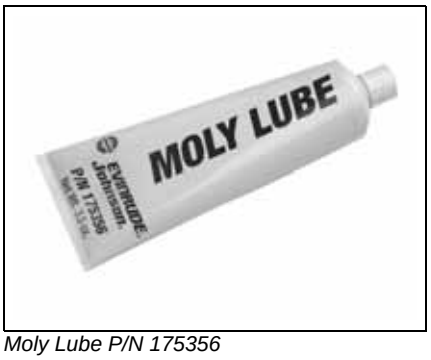
Oil - XD100™ P/N 777118

Anti-Corrosion Spray P/N 777193

HPF PRO Gearcase Lube P/N 778755

Engine Tuner P/N 777185

Silicone spray P/N 775630



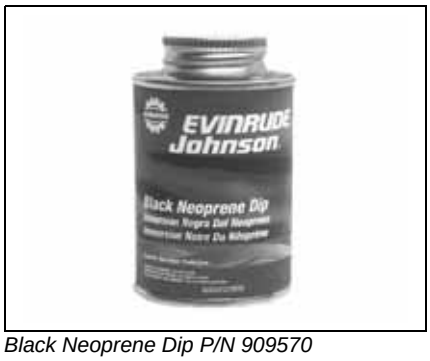
Moly Lube P/N 175356

Storage Fogging Oil
P/N 777186

Power Trim/Tilt and Power Steering Fluid
P/N 775612

Electrical Grease P/N 503243

Lubriplate† 777 P/N 317619



Black Neoprene Dip P/N 909570

2 + 4™ Fuel conditioner P/N 775613

Triple-Guard® Grease P/N 508298

Starter Bendix Lube P/N 337016

Gel-Seal and Gasket Remover P/N 771050

Needle Bearing Grease, P/N 378642

Biodegradeable TNT Fluid
P/N 763439

Permatex† No. 2, P/N 910032

RTV Silicone Sealant P/N 263753

Gasket Sealing Compound P/N 317201

Thermal Joint Compound P/N 322170

Fuel System Cleaner P/N 777184

Pipe Sealant with Teflon P/N 910048

Instant Bonding Adhesive P/N 509955

Gel·Seal II P/N 327361

Locquic Primer P/N 772032

1. *Screw Lock P/N 500417 (Loctite† Purple 222 equivalent*
2. *Nut Lock P/N 500421 (Loctite Blue 242 Equivalent)*
3. *Ultra Lock P/N 500423 (Loctite Red 271 Equivalent)*

Carbon Guard™ P/N 775629

Adhesive 847 P/N 776964

INSTALLATION AND PREDELIVERY

TABLE OF CONTENTS

BOAT RIGGING

Remote Controls

Control Selection

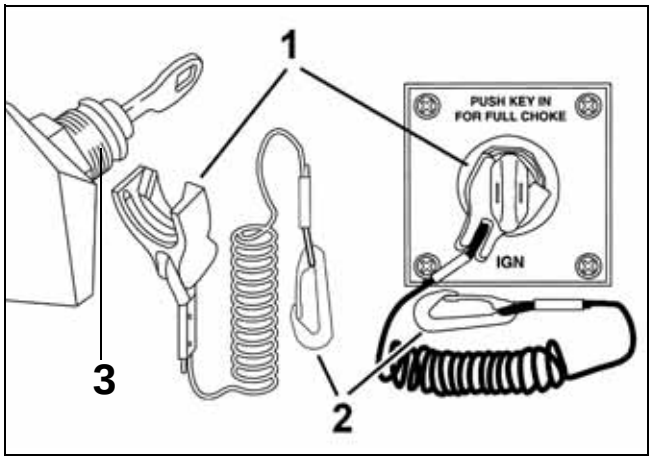
⚠ WARNING ⚠

The remote control used must have start-in-gear prevention. This feature can prevent injuries resulting from unexpected boat movement when the outboard starts.

Remote control styles and applications are described in the *Evinrude/Johnson Genuine Parts and Accessories Catalog.* Plan the installation of all remote controls carefully. Read the outboard's Operator's Guide and the remote control's installation instructions prior to installation.

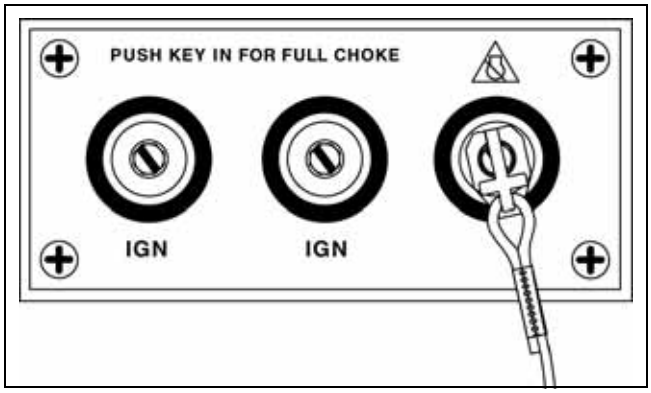
The remote control and wiring harness used must have the following features:

- Start-in-gear prevention
- Emergency stop / key switch
- Shift stroke must measure 1.125 to 1.330 in. (28.6 to 33.8 mm) between NEUTRAL and FORWARD
- Throttle stroke must PUSH for open
- All wiring must be compatible with Modular Wiring System (MWS) components



1. Emergency stop clip 002817
2. Safety lanyard
3. Key switch with emergency stop feature

- Dual-outboard controls require separate key switches with a single emergency stop switch.



Dual-outboard key switches with emergency stop switch DRC40118

⚠ WARNING ⚠

Always install and recommend use of an emergency stop/key switch. Doing so will reduce the risk of personal injury or death should the operator fall away from the controls or out of the boat.

Engine Monitoring System

IMPORTANT: Outboards with remote controls must be equipped with an *I-Command* system, a *SystemCheck* gauge, or an equivalent engine monitor. Operating the outboard without an engine monitor will void the warranty for failures related to monitored functions.

Refer to **ENGINE MONITORING SYSTEM** on p. 99.

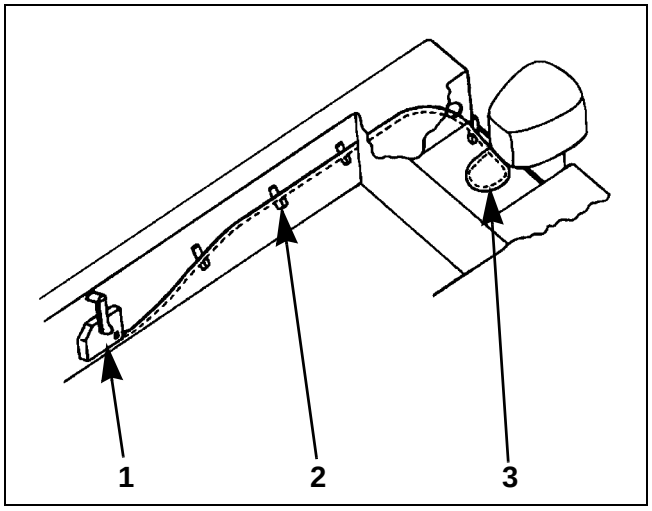
Control Installation

Plan the installation of remote controls carefully, following all instructions provided with the remote control.

Make sure the following items are checked:

- Correct length, type and quality of control cables and wiring harnesses
- Proper routing of cables and harnesses
- Slack in front of the outboard for remote control cables
- Positioning and securing of cables and harnesses along their lengths to prevent movement or damage.

Typical transom-mounted outboard installations require a 12 in. (30 cm) cable loop at the front of the outboard when the cables are routed from the side of the splash well.



1. *Surface side-mount remote control* DR4277
2. *Cable support*
3. *12 in. (30 cm) cable loop at front of outboard*

IMPORTANT: Cables of the proper length, style, and quality that are correctly installed and adjusted will eliminate most control-related operational problems.

Battery Installation

Each outboard requires its own starting battery. Select a battery that meets or exceeds the minimum requirements.

Minimum 12 Volt Battery Recommendations

Outboard Model	Battery Rating
115–250 HP	675 CCA (845 MCA), **or** 750 CCA (940 MCA) below 32°F (0°C) 107 amp-hr in extreme applications

Location and Preparation

Proper installation will prevent battery movement while underway.

- Secure all batteries in protected locations.
- Place battery as close to the outboard as possible.
- Battery location must provide access for periodic maintenance.
- Use battery mounting trays or battery boxes on all battery installations.
- Connections and terminals must be covered with an insulator.
- Battery connections must be clean and free from corrosion.
- Read and understand the safety information supplied with the battery before installation.

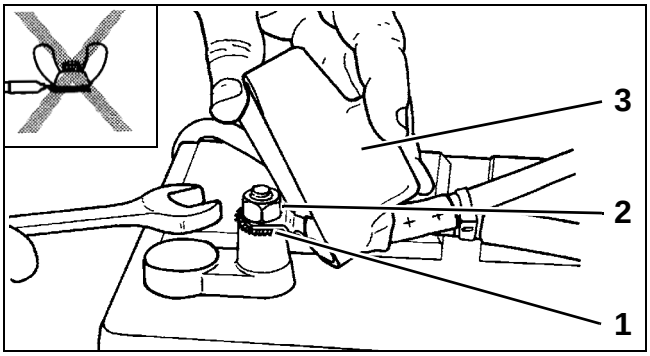
⚠ WARNING ⚠

Keep the battery connections clean, tight, and insulated to prevent their shorting or arcing and causing an explosion. If the battery mounting system does not cover the connections, install protective covers. Check often to see that connections stay clean and tight.

Connections

IMPORTANT: Connect the battery positive (+) cable to the battery positive (+) post FIRST. Connect the battery negative (–) cable to the battery negative (–) post LAST.

Install a starwasher on the threaded battery post. Stack cables from the outboard, then cables from accessories. Finish this connection with a hex nut.



Marine Style Battery Post DR5103
1. *Starwasher*
2. *Hex nut*
3. *Terminal Insulator*

IMPORTANT: Do not use wing nuts to fasten ANY battery cables. Wing nuts can loosen and cause electrical system damage not covered under warranty.

Tighten all connections securely. Apply *Triple-Guard* grease to prevent corrosion.

Battery Cable Requirements

Evinrude outboards are shipped with stranded copper battery cables for typical installations in which the starting battery is positioned close to the transom.

Specialized outboard installations with extended length battery cables require an increased wire size. Refer to the following table.

IMPORTANT: Inadequate battery cables can affect the performance of an outboard's high amperage start circuit and the cranking speed of the outboard. DO NOT use aluminum wire cables. Use ONLY AWG stranded copper wire cables.

	40–250 HP
1 to 10 Ft. (.3 to 3 m)	4 Gauge
11 to 15 Ft. (3.4 to 4.6 m)	2 Gauge
16 to 20 Ft. (4.9 to 6.1 m)	1 Gauge

Battery Switches and Multiple Batteries

A multiple battery setup, including marine battery selector switches, can provide flexibility in single and dual outboard installations.

Refer to **Battery and Switch Wiring Diagrams** on p. 31 for various battery connection options.

The battery selection function can be used for emergency starting if a primary battery becomes discharged.

The OFF position of the battery selector switch can be used to minimize battery discharge during periods of non-use.

Typical battery functions

IMPORTANT: Never connect an external battery isolator to the stator of an *Evinrude E-TEC*.

Primary

- Used as starting battery under normal operating conditions.
- Red (+) cable connected to battery selector switch.
- Primary battery is charged by connection to main red (+) outboard battery cable.

Dual outboard installations can utilize the opposing outboard's primary battery as a secondary battery for emergency starting only.

Secondary

- Used as back-up starting battery under abnormal operating conditions.
- Red (+) cable connected to battery selector switch.
- Secondary battery is charged independently from primary battery.

Accessory

- Not used as starting battery.
- Isolated from outboard start function.
- No red (+) cable connected to battery selector switch.

Secondary and accessory batteries are often charged by an isolated battery charging circuit. Refer to **Auxiliary Battery Charging** on p. 30.

Battery Switch Requirements

Battery switches must meet the following requirements.

- The switch must be approved for marine use.
- The switch should be a “make before break” design to protect the charging system from a no-load condition.
- Switch amperage rating should be adequate for the outboard it will be used on.
- Use one battery switch for each outboard installed.
- Use the appropriate sized wire and terminals for all connections.
- Use AWG stranded copper wire.

Battery Switch Location

- Always locate battery switch as close to the batteries as possible.
- Locate switch so that it cannot be accidently bumped or switched.
- Refer to the battery switch manufacturer’s installation instructions for specific information related to the installation of switch.
- Fasten all battery switches to solid surfaces.
- Route wiring as directly as possible.
- Support the battery switch as needed to prevent abrasion.
- Use appropriate wiring and connectors.
- Seal all connections and terminals with liquid neoprene or electrical sealer to prevent corrosion.

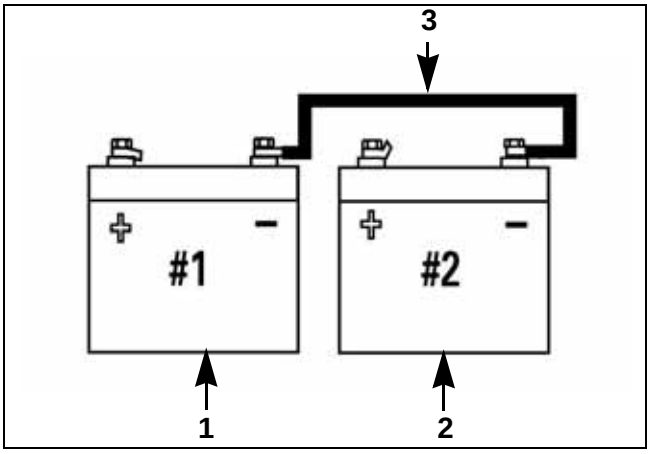
IMPORTANT: Insulate all battery positive (+) terminals to prevent shorting.

Battery Switch Operation

- Select the primary battery for normal operation.
- Secondary batteries should only be selected for emergency starting.
- ALL or BOTH switch position is for emergency starting only.

Provide operator with the documentation supplied by the battery switch manufacturer. Make sure that the operator is informed of proper battery switch operation.

IMPORTANT: The negative (–) terminals of a multiple 12-volt battery installation must be connected together.



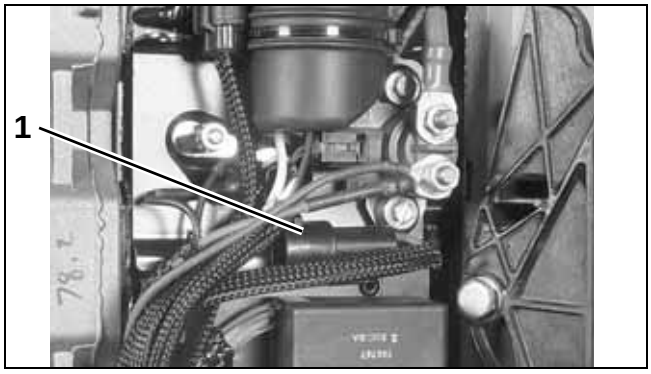
1. *Starting battery (primary)* DRC7284
2. *Accessory battery (secondary)*
3. *Cable connecting negative (–) battery terminals*

Auxiliary Battery Charging

Evinrude E-TEC V4–V6 outboards are equipped with isolated battery charging capability. The isolated charge connection must only be used to charge a single 12-volt battery or two 12-volt batteries wired in parallel.

IMPORTANT: Never connect an external battery isolator to the stator of an *Evinrude E-TEC* outboard.

Accessory Charge Lead Kit, P/N 5006253, is routed from a connector on the outboard's electrical panel to the accessory battery.

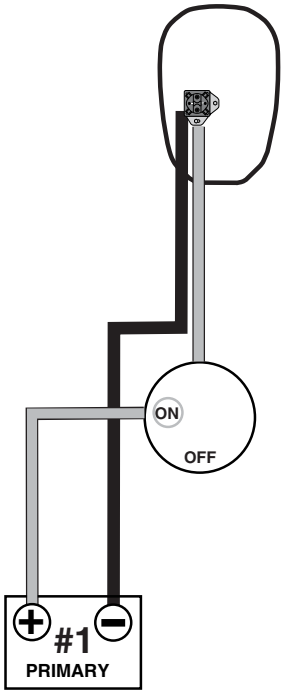


1. *Accessory battery charge connector* 003912

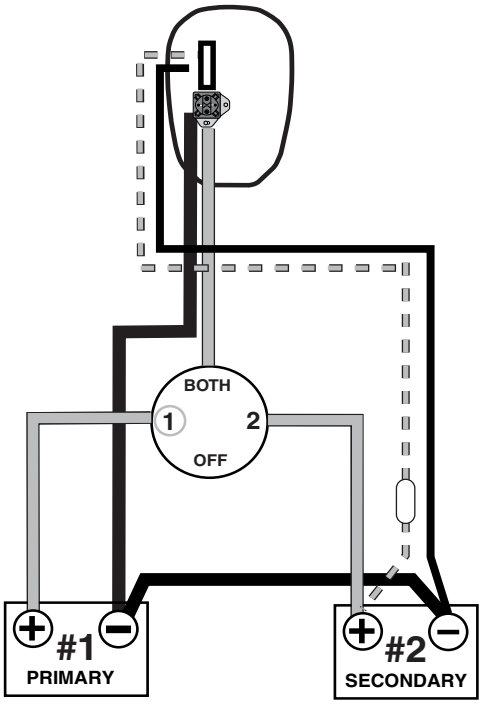
IMPORTANT: The accessory charging kit must never be connected to any battery of a 24-volt electrical system.

Battery and Switch Wiring Diagrams

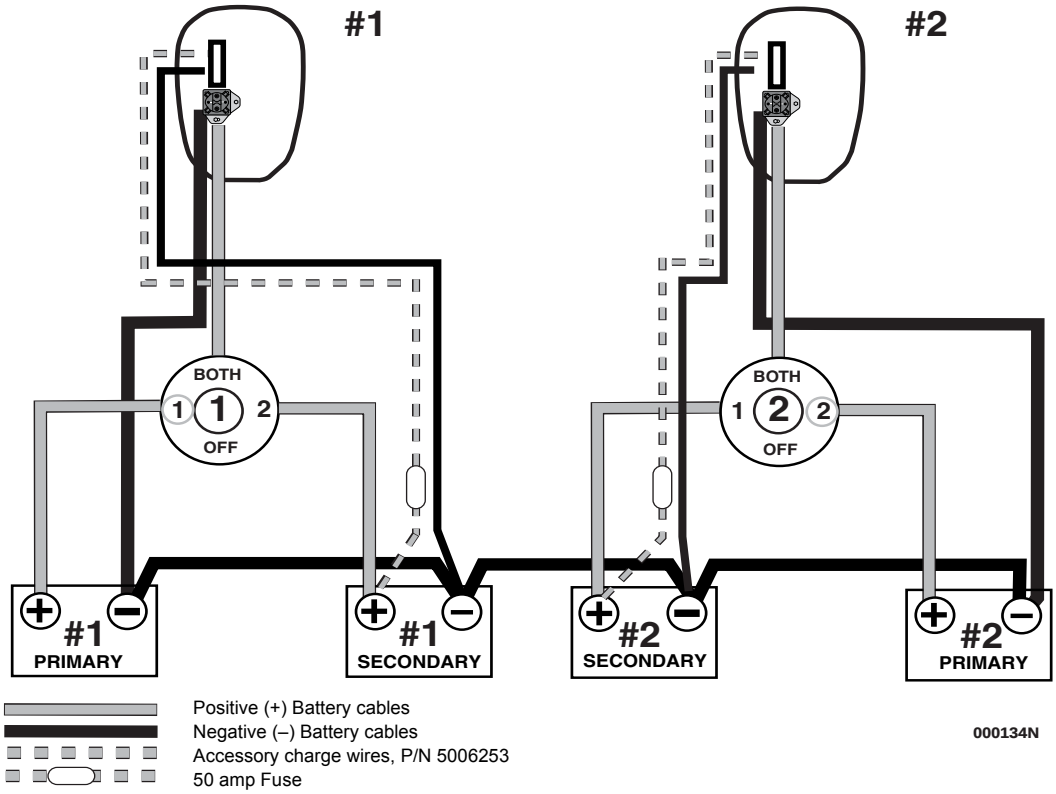
One outboard: Battery disconnect



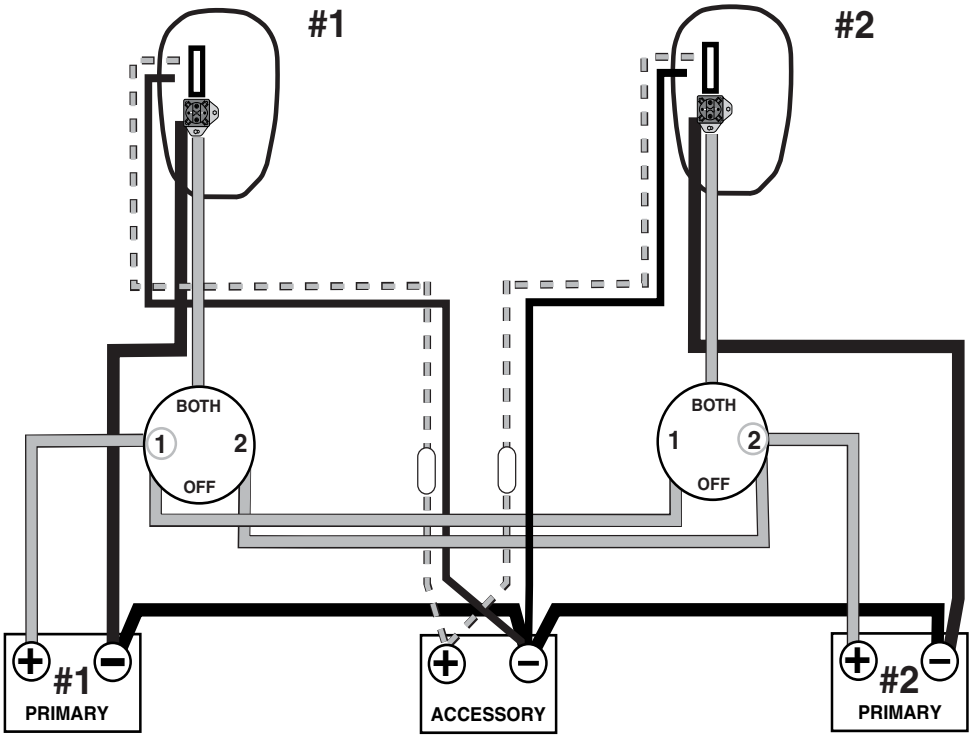
One outboard: One primary starting battery; one secondary battery



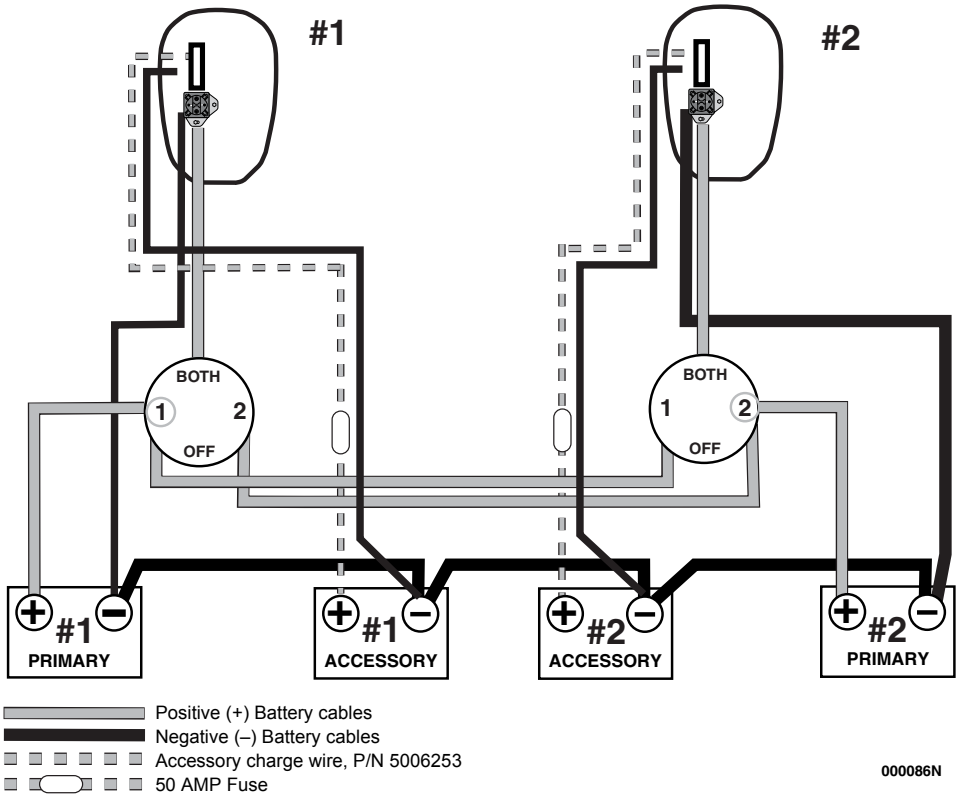
Two outboards: Two starting batteries for each outboard



Two outboards: One primary starting battery for each outboard; one isolated accessory battery



Two outboards: One primary starting battery for each outboard; two isolated accessory batteries



Fuel System Requirements

Overview

Boat fuel systems must meet minimum specifications to insure the proper delivery of fuel to the outboard.

The guidelines established by the ABYC and U.S. Coast Guard should always be followed.

- Permanent fuel tanks must be properly vented outside of the hull.
- Remote fuel tank gas fills must be grounded.
- Permanent fuel tank pickups should have the correct anti-siphon valve installed to prevent fuel flow if a leak occurs in the fuel distribution system. Refer to ABYC Standard H-24.

Fuel Hose

All fuel hoses must be designated as fuel hose and approved for marine use.

- Use only fuel lines (or copper tubing) that meet the outboard minimum I.D. requirement.
- “USCG Type A1” fuel hose must be used between permanent fuel tanks and motor well fittings on inaccessible routings.
- Use “USCG Type B1” for fuel hose routings in motor well areas.
- Permanently installed fuel hoses should be as short and horizontal as possible.
- Use corrosion-resistant metal clamps on permanently installed fuel hoses.
- Multi-outboard applications require separate fuel tank pickups and hoses. (A fuel selector switch may be used for “kicker” motors as long as it has enough flow capacity for the larger outboard.)

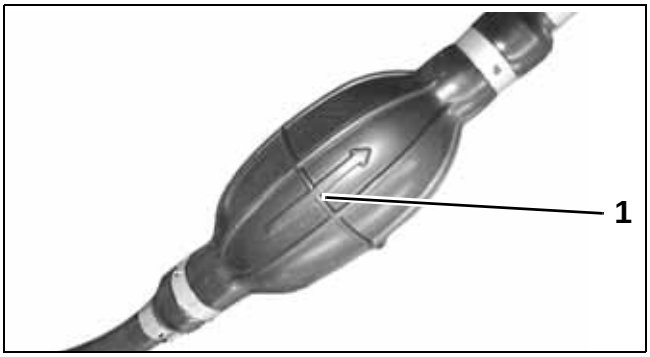
Fuel System Primer

Outboards require a priming system capable of refilling the fuel system after periods of non-use.

Primer bulbs that meet the outboard's minimum inside diameter fuel line requirements are used on most outboards.

Install the primer bulb in the fuel supply hose as follows:

- The primer bulb should be installed in an accessible location.
- The arrow on the primer bulb must point in the direction of fuel flow.
- The fuel primer bulb must be positioned in the fuel supply hose so the primer bulb can be held with the arrow pointing “up” during priming.



1. Arrow indicates direction of fuel flow 000124

An alternative to a primer bulb is a U.S. Coast Guard approved marine primer pump. Electric primer pumps offer the convenience of outboard priming from a dash-mounted momentary switch.

Fuel Filters

Boat-mounted fuel filters and water-separating fuel filter assemblies must meet the required fuel flow and filter specification. The filter must be mounted to a rigid surface above the “full” level of the fuel tank and accessible for servicing.

Fuel Filter Assembly, P/N 174176, meets all requirements for a water-separating fuel filter.

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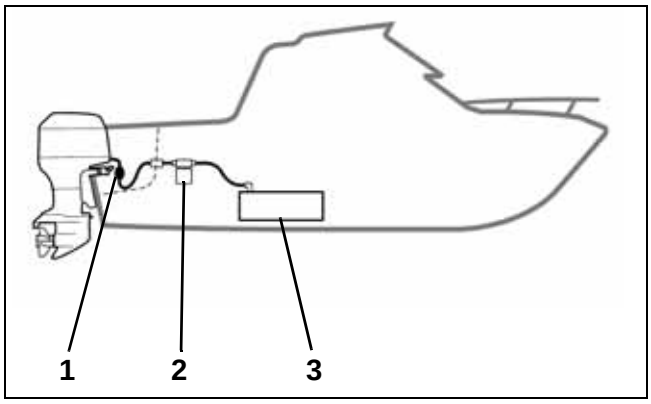

Typical Fuel Supply Configuration DRC6797

1. *Primer bulb*
2. *Water separating fuel filter*
3. *Anti-siphon valve, in fuel pick-up of tank*

IMPORTANT: Avoid using “in-line” fuel filters. The filter area and flow characteristics may not be adequate for high horsepower outboards.

Portable Fuel Tanks

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

Outboard Fuel System Recommendations

Component	25 HP – 130 HP Models	135 HP – 250 HP Models
Fuel tank pickup tube	5/16 in. (7.9 mm) min. I.D.	3/8 in. (9.5 mm) min. I.D.
Fuel fittings	1/4 in. (6.4 mm) min. I.D.	9/32 in. (7.1 mm) min. I.D.
Fuel supply hoses	5/16 in. (7.9 mm) min. I.D.	3/8 in. (9.5 mm) min. I.D.
	ALL MODELS	
Fuel tank pickup screen	100 mesh, 304 grade stainless steel wire, 0.0045 in. wire diameter, 1 in. (25 mm) long	
Antisiphon valve	2.5 in. (63.5 mm) Hg maximum pressure drop at 20 gph (76 l/hr) flow	
Remote fuel filter	0.4 in. Hg maximum pressure drop at 20 gph (76 l/hr) flow, 150 $in.^2$ (1290 cm^2) of filter area	
Maximum fuel pump lift height	Fuel pump should not be located more than 30 in. (76.2 cm) above bottom of fuel tank	

Oiling System Set-Up

Location

IMPORTANT: Consider the installation location of the oil tank carefully. The oil tank is vented to the atmosphere. To avoid serious powerhead damage, be sure the oil tank is installed in a location that does not allow constant exposure to sunlight, rain, bilge water or spray.

Select a mounting location that provides:
- A solid place to mount the tank;
- A dry location that prevents exposure to rain or spraying water;
- Access for adding oil;
- Access to oil-primer bulb; and
- Interference-free hose and wire routing to outboard.

If necessary, the oil tank can be mounted further from the outboard than the supplied hoses and harness allow. The maximum length of oil supply hose that can be fitted to the oil tank is 25 ft. (7.6 m).

IMPORTANT: Do not add hose to an existing oil supply hose.

If the oil tank requires a longer oil supply hose:
- Oil supply hose between the primer bulb and outboard must be replaced with one continuous length of 1/4 in. (6.4 mm) hose.
- Maximum length of hose is 25 ft. (7.6 m).
- Replacement hose must be designated for fuel or oil use and approved for marine use.
- Extend wiring harness with 16 gauge AWG wire.
- Protect connections with heat shrink tube.
- Maintain wire color and polarity when extending harness.

An appropriately sized battery box may be used to conceal and protect the oil tank, if desired.

IMPORTANT: Be sure box includes drain holes so it does not fill with water and contaminate oil.

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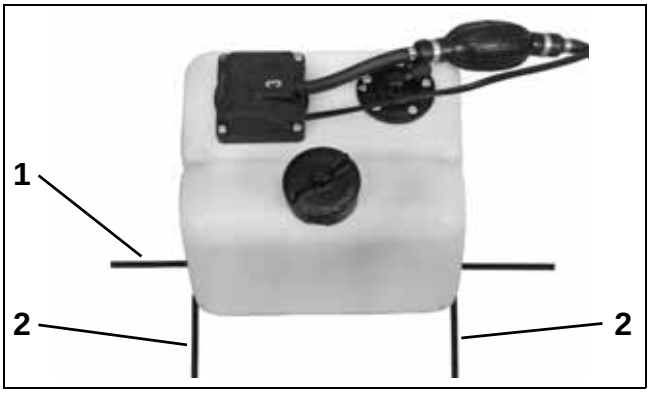
Mounting

Place tank in selected position. Mark one line under groove in tank bottom and lines at each end of tank.



1. Center line of oil tank 44737
2. Ends of tank

Make sure hole locations provide enough clearance for fastening screws. Screws should not contact or penetrate hull.