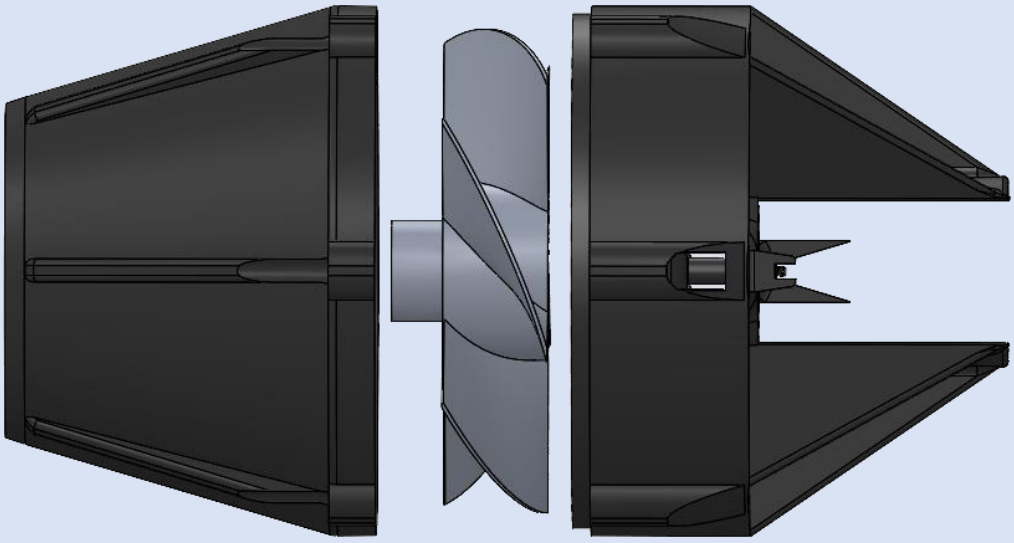
RAIDER Outboards

# SAFETY JET MODEL 50

# R504500

# OWNER'S MANUAL



RAIDER OUTBOARDS, INC

1885 ARMSTRONG DRIVE,
TITUSVILLE, FL 32780

(321) 383-9585

**MULTI-FUEL SUBMERSIBLE ELECTRIC START OUTBOARD ENGINES**

The Raider Outboards series of submersible outboard motors are dedicated to the United States Marine Raiders. Established by the United States Marine Corps during WWII, the Raiders are considered to be the first United States Special Operations Force. Handpicked from the elite, these men were given specialized training and the best equipment. The Raiders operated behind enemy lines in direct support of combat operations in the Central Pacific and Solomon Islands, and distinguished themselves during the conduct of clandestine amphibious landings utilizing small, inflatable boats. Although the Raiders were disbanded at the close of WWII, the need for specially trained warfighters and the requirement for specialized equipment did not. Today's Special Operations Forces under the United States Special Operations Command (USSOCOM) are expected to conduct similar and far more demanding missions. With those warfighters in mind, the Raider Outboards line of Submersible Outboard Motors and accessories are specifically developed for Special Operations Forces operating within the unforgiving, demanding, dynamic maritime environment.

## ABOUT RAIDER

Raider Outboards, Inc. is a US-owned and operated company located in the Space Port Commerce Park, near Kennedy Space Center in Central Florida. Raider designs and produces a line of submersible outboard motors and associated parts, including the Raider Safety Jet.

## OUR MISSION

Raider Outboards strives to provide the most reliable, premium products alongside hands on training and technical support of the highest quality. We strive to serve as the world leader in submersible outboard motors, while honoring those who protect, defend, and support our communities, our country, and our partners around the world.

Chris Woodruff
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## INTRODUCTION TO THE SAFETY JET

The Raider Outboards Safety Jet Model 50 is a specially manufactured outboard motor jet pump for use on Tohatsu and Mercury 50 horsepower two-stroke outboard motors.

Successful usage can only be assured on condition that this manual is read through in its entirety and the maintenance routines described in this manual are followed. Should difficulty arise with the Raider Safety Jet, please follow the troubleshooting procedures listed at the end of this manual. For any issues, contact Raider Technical Support via email or Phone**.**

- TechSupport@raideroutboards.com
- 321-567-2306

## LIMITED WARRANTY

a. Unboxing. Visually inspect each component, ensure that all physical aspects of the Raider Safety Jet are free of damage. All parts and part numbers are detailed within this manual to include pictures.

b. Raider Safety Jet is fully guaranteed against defective materials and workmanship for the period from the date of purchase for one year. The limited warranty will not apply to the normal wear and tear of parts, adjustments, tune-ups, maintenance items or damage caused by:

- Damage caused due to collisions, contact with foreign objects, both in and out of water.
- Damage caused due to marine growth on Safety Jet surfaces.
- Damage caused due to operator neglect, lack of or the conduct of improper maintenance procedures.
- Damaged caused due to use of other than Raider Safety Jet authorized parts.
- Damaged caused due to improper Safety Jet installation.

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**GENERAL SAFETY PRECAUTIONS**

a. As the operator of a Safety Jet-equipped vessel, you are responsible for the well-being of those aboard, those in other craft around yours, and swimmers. It is imperative that you possess thorough knowledge of correct operation of the vessel and the Safety Jet. Please read through this manual carefully to learn the correct operation and maintenance of the Safety Jet.

b. Prior to the installation of the Safety Jet, remove the Lock Plate from the Engine Stop Switch and disconnect the Start Battery. This will prevent the motor from starting or turning over in the event of inadvertent contact with the Start Button.

c. Boats are rated and certified in terms of their maximum horsepower and the weight of the outboard motor. The Safety Jet will add weight to the outboard motor. The combined weight of the motor and Safety Jet should not exceed the weight limitation displayed on the vessel's certification plate.

d. Do not operate the Safety Jet-equipped motor until it has been securely mounted to the vessel in accordance with the motor and vessel instructions.

e. Serious injury is likely to occur if a moving vessel or Safety Jet housing makes contact with a person in the water.

f. Use extreme caution when navigating near or picking up swimmers. Swimmers are NOT able to avoid collision with vessels and should be treated as pedestrians.

g. When a swimmer is in the water near a Safety Jet the Operator should place the motor into neutral if possible.

h. Although unlikely to occur during normal usage, it is not impossible to insert hands or fingers into the Safety Jet front or back. This risk is greatest for young children and those with very small hands. Warn children not to stick their hands or fingers into these chambers.

i. Should inadvertent contact with the Safety Jet occur during operation, clench hands into fists and cross arms over your head to minimize impact.

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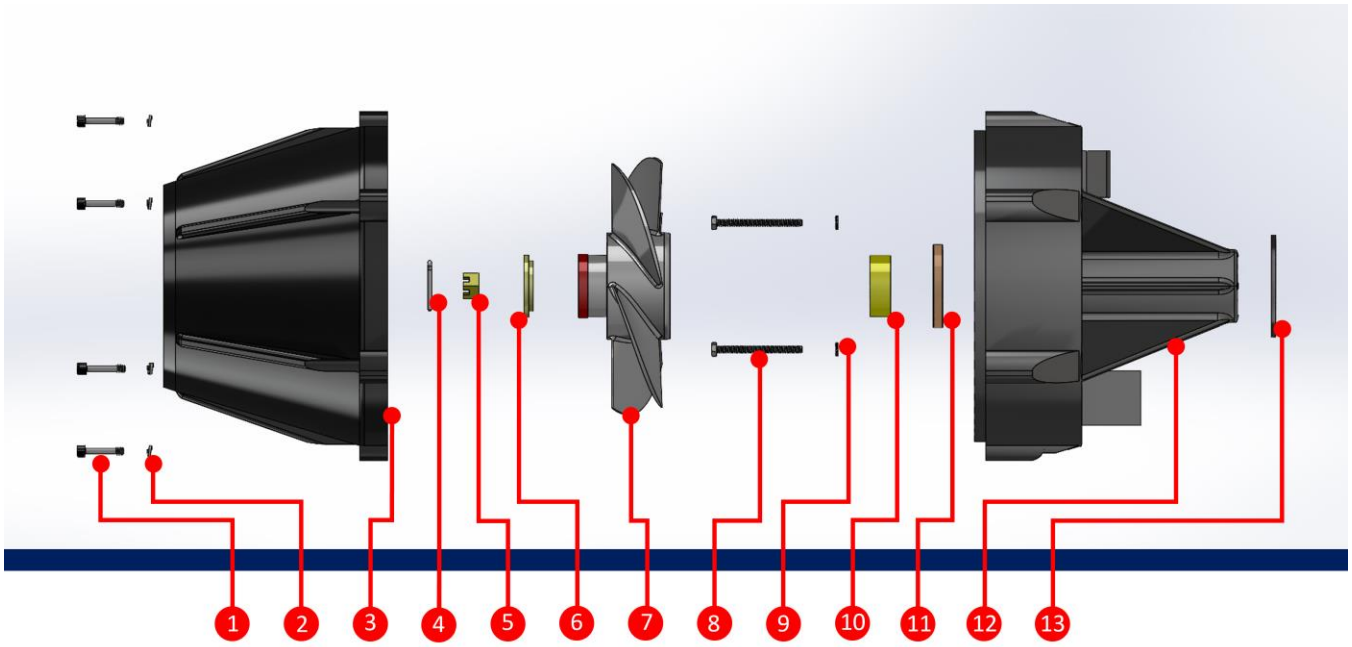
## ASSEMBLY OVERVIEW




| Ref. No. | Part Number | Description |
|---|---|---|
| **1** | R504501 | Captive Screw (6) |
| **2** | R504502 | Washer (6) |
| **3** | R504503 | Stator |
| **4** | R504504 | Cotter Pin |
| **5** | R504505 | Castle Nut |
| **6** | R504506 | Brass Impeller Washer |
| **7** | R504507 | Impeller |
| **8** | R504508 | Stator Carrier Bolt (2) |
| **9** | R504509 | Wedge-Locking Washer (2) |
| **10** | R504510 | Brass Spacer |
| **11** | R504511 | Seal |
| **12** | R504512 | Stator |
| **13** | R504513 | O-ring |

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**INSTALLATION INSTRUCTIONS**

a. This section of the owner's manual provides the instructions for the proper installation and service of the Raider Safety Jet to your outboard motor. Improper installation or servicing of this Raider product could result in damage to the Safety Jet, outboard motor, or personal injury to those installing or operating the product.

b. Installation will not require the use of special OEM mounting hardware when assembling the Safety Jet. Use only hardware provided by Raider or your outboard motor OEM. Anodic rim tab or anodic plate on your existing motor can be left intact. There should not be a clearance issue between the anodic trim plate and Safety Jet.


**Prior to the installation of the Safety Jet remove the Lock Plate from the Engine Stop Switch and disconnect the Start Battery. This will prevent the motor from starting or turning over in the event of contact with the Start Button.**


**Performing service or maintenance without first disconnecting the battery can cause product damage, personal injury, or death due to fire, explosion, electrical shock, or unexpected engine starting. Always disconnect the battery cables from the battery before maintaining, servicing, installing, or removing Safety Jet components.**


**After completing installation, place these instructions, propeller, and bolts in a secure place for future use in the event you want to reinstall to the propeller.**

### 1. Propeller & Anode Removal

a. Begin by using a pair of needle nose pliers or similar to remove the cotter pin from the castle nut.

b. Remove the castle nut using a socket wrench and appropriate socket.

c. Remove the washer and propeller from the prop shaft. The spacer between the propeller and the lower unit should be left on the prop shaft.

d. Remove the zinc anode from the underside of the cavitation plate using a socket wrench and appropriate socket.

e. Remove the carrier bolts from the lower unit using a socket wrench and appropriate socket.

**Img 1a.** Cotter pin removed

**Img 1c.** Spacer remains on prop shaft

**Img 1d.** Remove zinc anode

**Img 1e.** Remove carrier bolts

**2. SAFETY JET INSTALLATION**

a. Install the modified zinc anode provided with the Safety Jet using the hardware removed in step 1d.

b. Install the stator onto the lower unit, with the wider-slotted standoff oriented towards the top, contacting the lower unit above the prop shaft. The narrower-slotted standoff should contact the skeg.

c. Secure the stator using the longer bolts and wedge-lock washers provided with the Safety Jet.

d. Apply a light coat of marine grease to the rubber seal and the prop shaft and install the brass spacer onto the shaft, inserting the spacer into the seal.

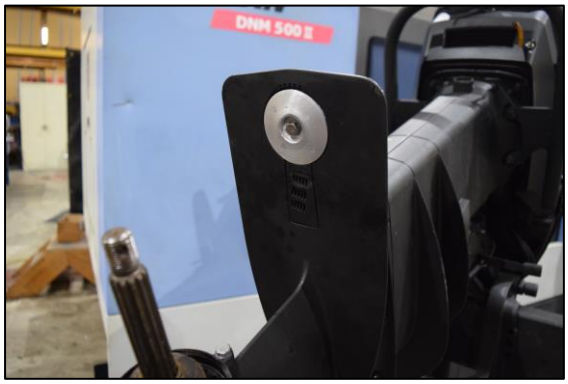
e. Install the impeller onto the prop shaft.

f. Install the brass washer onto the prop shaft.

g. Secure the impeller with the castle nut and cotter pin provided. Do not over-tighten the castle nut.

h. Install the nozzle onto the stator, aligning the captive screws in the nozzle with the threaded holes in the stator.

i. Secure the nozzle by tightening the captive screws using the included T-handle wrench.




**Img 2a.** Install modified anode

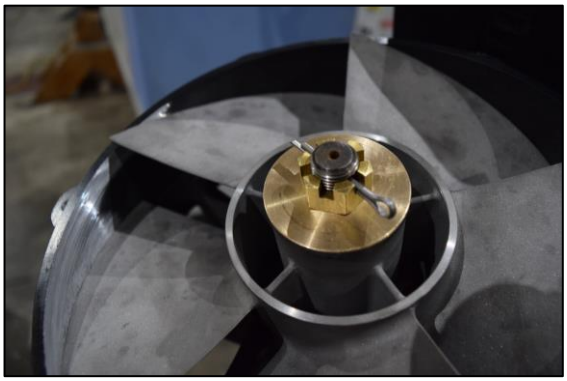
**Img 2b.** Install stator

**Img 2c.** Secure with bolts & washers

**Img 2d.** Install brass spacer into seal

**Img 2e.** Install impeller

**Img 2f.** Install brass impeller washer



**Img 2g.** Secure with castle nut & cotter pin

**Img 2i.** Secure nozzle using captive screws

**PERFORMANCE CONSIDERATIONS**

An outboard motor with Raider Safety Jet installed will perform similarly to an outboard motor with a propeller, however:

- There may be some difference in steering feel dependent upon the vessel to which installed.
- Raider Safety Jet turns at a tighter radius than a propeller.
- The craft will typically plane out quicker.
- Top speed will be reduced by a small amount.
- Performance is heavily influenced by trim angle, proper craft inflation (if applicable), weight distribution, prevailing environmental conditions, and operator experience level. To ensure best performance, all variables should be considered.

**TROUBLESHOOTING**

| Symptom | Corrective Action |
|---|---|
| Craft will not plane | • Change the Trim Angle of the Motor by moving/changing the Thrust Rod position.<br>• Check for proper craft inflation.<br>• Adjust craft load distribution.<br>• Check fuel supply. |
| Noise in Safety Jet | • Remove motor from water.<br>• Inspect pump for foreign objects.<br>• Inspect Captive Screws for tightness.<br>• Remove, Impeller check Stater Bolt Torque Settings. |
| Knock in Lower Unit at idle speeds | • This is normal and caused by the shifter spring movement against Propeller Shaft Assembly. |
| Cavitation | • Reduce Speed and secure motor.<br>• Change the Trim Angle of the Motor by moving/changing the Thrust Rod position.<br>• Tilt the motor up and check for damage to the Safety Jet.<br>• Check for bio matter, or debris caught in the stator. |

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# RO-SJA-50HP
# SAFETY JET

Propeller to Pump Jet