



A MESSAGE FROM RANGER FOUNDER, FORREST WOOD

**Forrest L. Wood
Founder**

Congratulations! You and your new Ranger are part of a celebrated legacy of leadership spanning over four decades. From the first six boats built in 1968, Ranger has grown into an internationally known household name. Today, it's the boat of choice for the world's most accomplished anglers as well as Chevrolet, NASCAR, Cabela's, the Wal-Mart FLW Tour and countless other leading organizations around the globe. Most importantly, though, it's your boat of choice and we're truly honored to be a part of your family and the dreams and memories you'll share with others. As the owner of a new Ranger boat, you're eligible for even more benefits from the Ranger Owner's Group. Drop us a line or visit our website at rangerboats.com for more details. It's just one more way we'd like to say 'thank you'.

This manual is intended to help you better understand your boat while also helping make basic care and maintenance even easier. Additionally, it provides important information essential for safe and pleasant boat operation. Please take the time to study this manual along with your engine and equipment manuals before operating your boat. Should you have questions, visit with your Ranger dealer or contact us at... Ranger Boats • P.O. Box 179 • Flippin, AR 72634 • 870-453-2222 • rangerboats.com

We encourage you to make safety and courteous boating practices an integral part of your outdoor activities. "Boat Smart From The Start." Take a boating education course and get a vessel safety check for your boat. For more information on these important services, contact the United States Coast Guard Auxiliary at 1-800-368-5647, www.cgaux.org, or the United States Power Squadrons at 888-FOR-USPS, www.usps.org. Remember that common sense and sound judgment are two of the most important elements to carry with you on every outing.

If we can be of additional help, feel free to give us a call, visit us on the internet, contact your local dealer, or just drop us a line through the mail. Thank you, again, for being a part of the legendary "Ranger Family!"

Sincerely,

GETTING TO KNOW AND HANDLE YOUR RANGER BOAT...

Your Ranger dealer should see that you have selected the proper horsepower engine for the rating range of the boat model you have chosen. The proper engine mounting height has been selected for optimum performance and the correct propeller has been chosen.

Since most boats spend more time on the trailer than in the water, a RangerTrail® trailer can extend the useful life of your new boat. The load **MUST** be evenly distributed on the properly fitting “bunks” or “pads” of the trailer. The boat should not rest on the loading rollers, but should properly cradle on the bunks.

Always park your rig so that the trailer tongue is higher than the stern of the boat, so that any water can drain from the hull when the drain plug is removed. All livewell valves should be placed in the “empty” position to properly drain your livewell plumbing.

A properly fitted boat cover will protect your investment from the damaging effects of the ultraviolet rays of sunlight, as well as from road film, rain and dirt abrasion while trailering. The cover also protects your accessory equipment and fishing tackle from “prying eyes” and helps to guard against pilferage.

Familiarize yourself with the instruments and indicators used with all installed equipment. Factory equipment manuals are included to assist you to properly operate your trolling motor; depth finders; engine tachometer; speedometer; and any additional accessories that you have installed. Naturally this Ranger manual is only complete when you have completely studied your engine operating manual and are familiar with engine operation.

Now you are ready for a ride in your new boat! This will be an exciting, fun experience if you exercise the proper caution and observe all safety rules and regulations.

Before launching your boat... stop on the ramp short of the water. Stop your vehicle’s engine and set the parking brake. At the rear of the boat, install your transom drain plug and remove the trailering tie-downs, trailering arms, motor supports and/or support brackets. Slowly back the



NOTICE

Failure to store/park your rig with the bow elevated could allow rain water to accumulate in the storage boxes.

boat and trailer into the water and unhook the winch strap hook. When in the driver's seat, put on and secure your life vest and attach the engine emergency stop switch lanyard to your person. Start engine and back your boat off the trailer. You should experience no problem if the water is adequately deep for proper launching.

While you are easing along within the "No Wake" zone you should trim your engine all the way down to its lowest position (in). Turn the steering right and left to insure that there is no undue slack and inspect the steering system. Look for any loose connections at the engine and beneath the driver's console (see pp. 28-32). Inspection of this crucial linkage system can be visually made at home or at the lake, but should be done at regular intervals. Before applying power and "opening it up", insure that all passengers are properly seated and are wearing an approved Personal Flotation Device (PFD or Life vest). Check to see that there are no obstructions in your path. We recommend that the front pedestal seat be removed from the front deck base and positioned in the special base provided in the front floor of the boat. If your boat has non-adjustable pedestals, remove the extension pipe from the seat base and install the seat base directly into the front deck receptacle. If your boat has an optional deck extension and power pedestals, remove the lid in the deck extension and secure the pedestal in the receptacle provided in the floor. If the optional deck extension does not have a removable lid, store your seat securely in the floor of the boat. This will provide for an unobstructed view while driving. The power pedestal should be pushed down into the lowest position. Should there be no base provided in the floor, the seat should be removed and securely placed in the floor of the boat.

When you have cleared the "No Wake" zone it is time to accelerate and get your new boat "on plane". Before applying power, insure that all passengers are properly and securely seated in appropriate locations. Abruptly move the throttle lever into the full open position (full forward). The bow of the boat will rise into the air for a moment... this is normal operation when a boat is "coming out of the hole" and is no cause for alarm. The bow will quickly come back down into a level running position. When the boat begins to accelerate rapidly, the throttle should be pulled back to obtain a comfortable running speed. Always increase your speed a little at a time until you are running at a speed at which you feel safe and are in complete control...**NEVER FASTER THAN YOUR EXPERIENCE DICTATES!** At this moderate speed you should begin to trim your engine into a higher position (out). Please refer to your engine owner's manual for more information on power trim use and operations.

Your speed will increase and the bow will lift. The boat will begin to run with the back rear portion of the hull in contact with the water and steering will become easier. Over-trimming will result in excessively high RPM (note your tachometer) and the steering can develop “torque” or a “pull” toward the right. Trim back down slightly for best operation. A different trim setting (see your trim indicator) will be required for different throttle settings. You will soon develop an instinctive feel for these settings. Your ear will become attuned to the sound of the proper engine RPM. Again,



WARNING

Improper use of power trim may lead to excessive bow steer or steering torque (pull) and could lead to accidental injury or death.

over trimming is to be avoided as excessive RPM can cause engine damage and can also cause your prop to “blow out” (lose its grip on the water because it is too near the surface). If the bow of your boat should begin to bob up and down (called porpoising) you will probably have over trimmed. Bump the trim button down a little until the motion stops.

If your boat should continue to “porpoise”, a slight increase in throttle and speed will generally correct the condition. Proper distribution of the load in your boat will make a great difference in its operation. Moving tackle boxes or ice chests rearward or toward the front can greatly effect boat performance and handling.

When beginning a turn with the engine trimmed in the higher positions, the trim switch should be pressed to LOWER the engine further into the water just prior to and during the turning of the steering wheel. Practice and experience will determine just how far down you will need to trim for safely handling a turn at various speeds and water conditions. Just remember to **MAKE SAFETY YOUR GUIDE** when attempting any new or unfamiliar maneuver. Proceed **ONLY AT SPEEDS AT WHICH YOU FEEL SAFE AND IN CONTROL!**

Naturally, it is impossible to describe here all the different situations that you may encounter. Just remember that **COMMON SENSE** is your best safety precaution. Your new boat is built to safely carry you in **NORMAL OPERATION**, but it is up to you to stay alert and to avoid dangerous situations. Safe boating is in the hands of the operator.

Even the pleasant experience of the “first ride in your new boat” must sometime come to an end. Hopefully you have purchased a “drive on” trailer with your boat. The key to simple and effortless loading of your boat is having the trailer in the proper position. This “right” position is determined by the steepness of the ramp. Here, you will have to

experiment with the proper depth to have your trailer in. The most common mistake is having the trailer too deep, so a little time spent experimenting with different depth positions can ultimately save you much time and embarrassment. To load at slow speed, position your boat to head directly between the guide bunks or guide rollers and use the thrust of your outboard engine to drive the boat forward until the bow contacts the roller on the bow stand block. Shut down your outboard and fasten the winch strap hook to the bow eye. Tighten the winch strap and lock winch before pulling the boat from the water. Your engine should be trimmed up into a higher position before the trailer is pulled up the ramp to prevent damage to the lower unit or propeller. Pull the rig up the ramp and park well out of the way of other boaters. Stop your vehicle engine and set parking brake. Remove the drain plug, open and drain the livewell systems, and stow all loose equipment. We recommend that you install a transom saver, or engine support brace, between the trailer frame and the lower unit of your engine to prevent damage to your transom while the boat is in transit.

For the most possible boating and fishing enjoyment familiarize yourself completely with your boat and with the instruction manuals for all additional equipment. If you are a novice, there are publications on good seamanship recommended to make your boating safe and enjoyable. We also recommend that you enroll and attend any of the excellent safe boating courses offered and conducted by your area Power Squadron or the U.S. Coast Guard Auxiliary.



WARNING

The operator (driver) is responsible for the correct and safe operation of the boat, the equipment aboard and the safety of all occupants aboard. We strongly recommend that the operator read this manual and thoroughly understand the operational instructions for the engine and all related accessories before the boat is used.

BE RESPONSIBLE FOR SAFER BOATING

- **ALCOHOL and DRUGS** - The debilitating effects of alcohol and other drugs reduces reaction time and detracts from judgment. The combined effect of the outdoor environment... sun, heat, wind, rough water, and noise can be more fatiguing than one would imagine and, combined with drugs or alcohol, can be very dangerous.
- **GAME PLAN** - Tell a friend, neighbor or another family member where you will be boating and when you plan to return. Be certain that this individual has a good description of your boat and any other identifying information that could be needed to help find you should an emergency arise.
- **TOOLS and SPARE PARTS** - Many people have been stranded by minor breakdowns that they could have repaired themselves. It is a good idea to carry a few tools and common spare parts and to be familiar with simple repairs that you can easily accomplish.
- **GASOLINE RESERVES** - Never push your boating range to the limit of your gas tank capacity... one-third of the fuel to go, one-third to come back and one-third to reserve.
- **GOOD BOAT KEEPING** - A clean boat is a safer boat. Take care to see that rods, lures, nets, gaffs and other potentially harmful gear are properly stowed so that it cannot blow or move around while the boat is underway. Perform all maintenance and safety checks regularly. Secure all icebox or cooler lids and place any trash or debris safely under cover until the trip is over.
- **SPEED and SKILL** - The fast and powerful boat can require the operator to exercise a high level of skill and attention to driving. Only go as fast as your skill and good judgment dictates is safe. You are in charge of the well being of your passengers and yourself. Be alert for any hazards in the water and operate your boat only in such a manner as would be appropriate for the water conditions. Be a good boating “neighbor” and do not create a hazard or annoyance to others. The best safety equipment is your own good judgment.
- **SKIERS and SWIMMERS** - Do not allow operation of the engine when anyone is in the water near the stern of the boat. Never back up to a down skier or anyone in the water. Never drive your boat directly behind a skier.

CARBON MONOXIDE

Carbon monoxide is a deadly gas that is odorless, tasteless and colorless. It is present in the exhaust of internal combustion engines. Inhaling sufficient concentrations of carbon monoxide can be fatal within minutes. Early signs of carbon monoxide poisoning may include headache, nausea, fatigue, drowsiness, confusion and vomiting. **DO NOT MISTAKE THESE SYMPTOMS FOR SEASICKNESS.** If any of these symptoms occur to you or any of your passengers, ventilate the boat by opening the side curtains or forward hatch to remove the fumes and immediately seek medical attention.

Carbon monoxide can be drawn into the cockpit area over the stern of the boat. When operating the engine, ventilate the cockpit area by removing side curtains or opening forward hatches to allow fresh air to flow through. Do not operate the engine if your boat is moored in a confined area.



WARNING

Exhaust from a running engine can cause an accumulation of carbon monoxide gas in the cockpit area when the canvas top and side curtains are installed. Provide adequate ventilation when these coverings are installed in their closed positions.

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SPECIAL INFORMATION

The following special information is intended to alert you to possible dangers and to information important to the safe operation of your boat and other equipment. Observe them carefully. However, simply being aware of the “WARNING”, “CAUTION” AND “NOTICE” notations in this manual will not eliminate the dangers that they signal if you do not implement the information. These warnings, plus common sense operation will insure you a safe and fun boating or fishing outing.

Please take special note when you see one of the following signs:



WARNING

Failure to follow the advice of a “WARNING” may result in bodily injury or death.



CAUTION

Non-compliance with “CAUTION” instructions could result in failure of, or damage to, the product and/or equipment.



NOTICE

Draws special attention to installation, operation, or other important maintenance information.

ALL information or instructions in this manual could be necessary for proper operation and/or maintenance. If you do not understand any portion of this manual, please contact your Ranger dealer or our Customer Service Department for any additional information.

IMPORTANT: Your Ranger Dealer’s Responsibilities...

Generally, it is the dealer’s responsibility to the customer to make sure that the boat has been equipped as ordered with a properly installed and functioning engine that is within the horsepower rating specified for that model boat. The dealer should see that the engine is outfitted with the proper propeller for that boat model and for the load that the boat is normally expected to carry.

The dealer should help to familiarize the customer with the onboard equipment and explain operation of this equipment; the engine operation; and the proper functioning and operation of the boat itself.

Prior to delivery, the dealer should make certain that the product and equipment is completely operational; the proper propeller is installed; and that all oil, fuel system and lubrication systems are understood. The dealer should explain the operation of all instrumentation equipment, and the boat electrical and livewell systems.

The dealer should check for correct carburetor adjustment, throttle and steering functioning, and instrumentation accuracy. Engine cooling water should be properly circulating.

The dealer should test for maximum engine RPM as specified in the engine manufacturer's specification sheet(s) and/or engine owner's manual for proper operation of all equipment and for proper adjustment of steering effort and direction. All necessary adjustments for maximum efficiency should be made.

Owner/Operator's Responsibilities...

It is the owner/operator's responsibility to perform all safety checks and to ensure that all lubrication and maintenance instructions are complied with for maximum safety and proper operation.

It is also the owner/operator's responsibility to return the unit to the Ranger dealer for a periodic checkup.

The owner/operator is responsible for the correct operation of the boat and for the safety of its occupants. Be sure that all operators read this manual before attempting to operate the boat. Your passengers should be shown the location and use of all emergency equipment and one passenger should be instructed how to handle the boat in case of emergency. U.S. Coast Guard requirements for PFDs (Personal Flotation Devices, or Life vests) can vary, depending on the type of boat. Be sure to comply with the U.S. Coast Guard regulations that apply to your boat. The owner/operator should, however, make certain that all passengers in the boat are in possession of, and are securely wearing a PFD whenever the boat is in operation. We strongly recommend that an engine emergency stop switch be securely connected to the boat operator any time that the engine is in operation!

Learn the waterway rules of the locality in which you intend to operate your boat. Navigable waterways are controlled by Federal regulations while inland lakes and Canadian waters are controlled by local jurisdictions. Obey all regulations to protect yourself, your passengers, and fellow boating enthusiasts.

Before boating, obtain the weather forecast for your area. Familiarize yourself with the weather bureau warning system signal(s) and waterway traffic sign/marking information.

Contact your local U.S. Coast Guard Auxiliary and take advantage of their excellent boating and safety classes and seasonal boat inspections.



WARNING

Operating a boat with an engine of horsepower in excess of that specified on the boat's capacity plate can result in loss of control over the boat's operation and could lead to an accident resulting in injury or death of the boat's occupants.



WARNING

Imprudent operation of the boat, with or without the use of PFDs and an approved engine emergency stop switch, can lead to property damage, injury or death of the boat operator or passenger(s), or other, whether within the boat or outside the boat.



WARNING

The boat operator should insure that the lanyard connection to the emergency stop switch is of ample length to insure that the inadvertent activation of the switch is not likely. Accidental triggering of the emergency stop switch could result in loss of engine power at inopportune times, such as while docking or in heavy seas, strong currents or high winds and could lead to an accident resulting in injury or death.




WARNING


Do not exceed the maximum weight and persons capacity found on the U.S. Coast Guard capacity information plate located on your boat. Overloading severely affects the stability and handling of your boat and could lead to an accident causing injury or death.

HAZARD LABELING


The hazard warning decals shown on the following pages may be found in various locations on your boat and trailer (photos are not necessarily to scale). Some labels are not appropriate for every boat/trailer model so your rig may not have them all. Check with your Ranger dealer to find out what labels your boat and trailer should have and ask them to order any necessary replacements.



Rotating propeller can cause serious injury or death. Never approach or use ladder when motor is running.



Rotating propeller can cause serious injury or death. Shut off motor when near persons in water.




Fuel vapors are a fire and explosion hazard. To avoid injury or death, do not store fuel or flammable liquids here.



SUDDEN TURNS ABOVE 30 MPH MAY CAUSE LOSS OF BOAT CONTROL. AVOID SERIOUS INJURY OR DEATH. REDUCE SPEED BEFORE ATTEMPTING A SUDDEN SHARP TURN. READ OWNERS MANUAL.

**MAXIMUM HORSEPOWER RATINGS
125 HP WITH TILLER STEERING
150 HP WHEN EQUIPPED WITH
ENGINESTEER® HYDRAULIC
TILLER STEERING SYSTEM**


Engine mounting location preset at the factory. Adjustments can result in damage to control system equipment. Control system damage can result in serious injury or death. Regularly inspect control system and clearances at all trim angles.



Install ski pylon securely before use. Insert pin thru receiver and ski tow pylon. Pushing pylon into mounting hole until red line is no longer visible. Install pin thru receiver and pylon to secure position. Failure to secure pylon may result in possible injury or death.

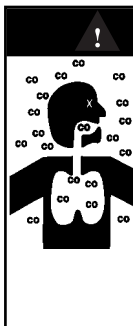



Avoid serious injury or death from fire or explosion, resulting from leaking fuel. Inspect system for leaks at least once a year.



Avoid serious injury or death from fire, explosion or electrical shock.

- Ensure power is turned off before connecting to an AC source.
- Make connection in an open atmosphere free of explosive fumes.
- Make connection in a secure manner that will avoid contact with the water.



Carbon monoxide (CO) can cause brain damage or death.

Engine and generator exhaust contains odorless and colorless carbon monoxide gas.

Signs of carbon monoxide poisoning include nausea, headache, dizziness, drowsiness, and lack of consciousness. Get fresh air if anyone shows signs of carbon monoxide poisoning. See Owner's Manual for information regarding carbon monoxide poisoning.

NW-204-05

! WARNING



Avoid serious or fatal injury.
Do not occupy seat when speed exceeds 5 MPH. Avoid injuries from dislodged seat. Secure unoccupied seat.

B Designed Application Class B **B**



SPRINGFIELD
The Springfield Marine Company
1093 Cynthia St. • PO Box 588 • Nixa, MO 65714

WARNING

50 PSI

TIRE PRESSURE MUST BE MAINTAINED FOR PROPER LOAD CARRYING AND TO AVOID IRREGULAR WEAR!

Always insert Safety Pin Here




! WARNING !

Always insert coupler latch safety pin into coupler latch hole prior to towing!


! CAUTION

Always make your extension cord connection on the charger side before connecting to a nearby 120VAC GFCI protected (Ground Fault Circuit Interrupt) outlet. Failure to use a GFCI outlet may result in electric shock.



! WARNING
Spinning handle could cause serious injury. Hold handle firmly when ratchet is unlocked. Not for moving people or loads over people.

204457B



! CAUTION

CHECK ENGINE CLEARANCE BEFORE TRIMMING

WARNING

Max TrailerGVWR: 7000 lbs.
Max Tongue Load: 700 lbs.
Min Tongue Load: 350 lbs.

READ OWNERS MANUAL BEFORE USING


Always insert coupler latch safety pin into coupler latch holes before towing.
Check brake fluid level each time before towing.

USE ONLY 2" HITCH BALL
MODEL 70LP
SAE CLASS 4

TIE DOWN ENGINEERING
WWW.TIEDOWN.COM
US Patent No. 6,375,211

#15901


! DANGER



Carbon monoxide (CO) can cause brain damage or death. Engine and generator exhaust contains odorless and colorless carbon monoxide gas. Carbon Monoxide will be around the back of the boat when engines or generators are running. Move to fresh air, if you feel nausea, headache, dizziness, or drowsiness.

NW-206-05

! WARNING

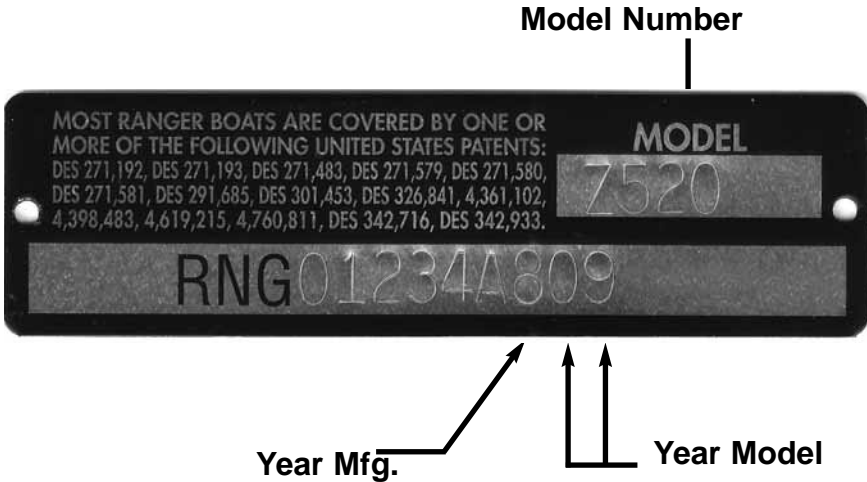


Visibility from the seated position at this helm is limited. Avoid serious injury or death from collisions.

Operation from a standing position may be necessary to maintain a lookout as required by Rules of the Road. Read owners manual.

GM1906501

HULL IDENTIFICATION PLATE



The hull I.D. Plate is located on the outboard side of the starboard transom, above the water line, and contains the following information:

- (1) Boat patent information
- (2) Model Number - This number should be referred to when ordering parts or making other inquiries.
- (3) Hull Identification Number (Serial Number) - Should also be included in any inquiries or when ordering parts. The U.S.C.G. requires the H.I.N. number be permanently affixed and remain on the starboard transom of the boat. Do not alter this plate in any way.

U.S. COAST GUARD CAPACITY INFORMATION PLATE



Familiarize yourself with your boat's maximum capacities. Do not exceed the maximum weight (in pounds) or persons capacity (number) found on the U.S.C.G. capacity information plate attached to your boat. **Know the ratings and load your boat accordingly. It is a must for safe boating.**



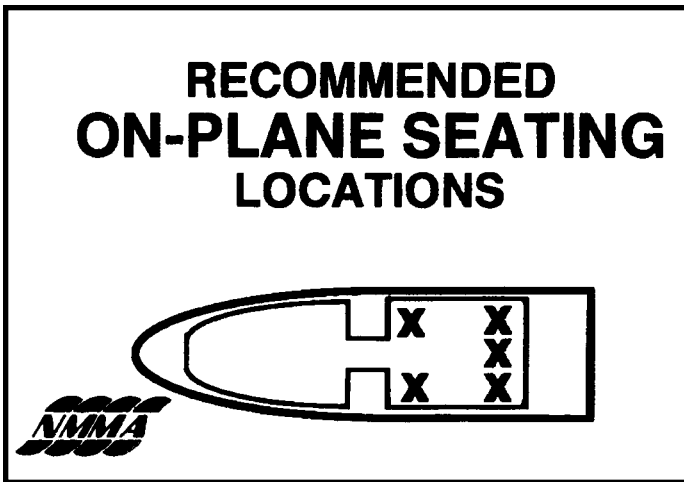
WARNING

Failure to observe maximum weight and horsepower capacities could create conditions favorable to an accident that could result in injury or death to the occupants.

RECOMMENDED ON-PLANE SEATING LOCATIONS

A decal similar to the one in Figure 1 below should be found on your boat in the area of the U.S. Coast Guard Capacity plate. The areas marked by “X’s” are the areas of the boat considered safe and suitable for on-plane seating. The operator of the boat should be familiar with these locations. The boat should not be operated at or above planing speeds with persons on board not seated in the designated areas shown.

FIGURE 1



WARNING

Do not operate the boat on plane with persons located outside the on-plane locations shown on the decal. Failure to do so could cause a person(s) to be thrown overboard resulting in injury or death.

GASOLINE FUEL SYSTEMS

Gasoline fuel systems used in Ranger boats are designed to meet or exceed the requirements of the U.S. Coast Guard, the National Marine Manufacturers Association, and the American Boat and Yacht Council at the time of manufacture.

All gasoline fuel systems have been factory inspected and pressure tested in accordance with regulations in effect at time of manufacture. Additionally, each fuel tank must pass rigid tests and inspections performed by the fuel tank manufacturer.

A. FUEL FILLS

Fuel fill deck plates are located on the port side deck, and are marked “GAS”.



WARNING

DO NOT confuse GAS deck fill plate with WATER or OIL deck fill plates. Deck fill plates are labeled according to the intended use.

The fuel fill fitting allows for venting below the fill cap. While filling the tank, the air displaced by the fuel escapes through the fuel fill/vent. This reduces the amount of fuel spillage. Always open the lid slowly to allow air to escape.

The o-ring seal on the fuel fill cap assists in sealing when closed. A missing or damaged o-ring can allow water on the surrounding surfaces to run into the tank. Periodically inspect the o-ring and the deck fill plate for damage. (Fuel fill deck plate is not waterproof; water can be drawn into fuel tank during vent operation, if fill is submerged).

After fueling, replace the fill cap, and wash the areas around the fuel fill plate. Residual fuel left on the deck and hull sides can be dangerous, and will yellow the fiberglass.

B. FUEL GAUGE

The fuel gauge indicates the amount of fuel in the tank. The fuel level is displayed on the console mounted gauge when the ignition switch is “on”. On models with two tanks, a console mounted switch marked with a fuel pump symbol or just “fuel”, is used to switch the gauge from one tank to the other. Push the fuel pump symbol switch to display the level in tank 1 (starboard) or tank 2 (port). Or, on some models, push the switch to the left to display the port tank fuel level and push to the right to display the starboard tank fuel level. The center position is “off”.

C. FUEL SENDER(S)

Due to the mechanical nature of the fuel sender, variations in readings during various speeds of operation may occur. This system is merely a relative indication of the available fuel supply and not a calibrated instrument. With this type of sending unit a more accurate measurement of fuel level is obtained with the boat in a level position.

D. FUEL VALVE(S)

A fuel hose connects the fuel tank to the engine. On models with more than one tank, a switch valve is installed to switch from tank to tank. This valve, located at the driver seat, on the panel to the right of the driver, is clearly marked and easily operated. Some models have a manual fuel shut-off valve located at the fuel pickup tube on the fuel tank. This is used in case of a break in the fuel hose running to the engine.

Contact your Ranger dealer for information on proper fuel shutoff valve access.



CAUTION

Maintenance or repairs should be performed by your Ranger dealer or other qualified personnel.

E. FUEL FILTER

Fuel filters are installed on each engine. (Yamaha has an additional fuel filter/water separator in the stern of the boat). Filters should be changed frequently to assure an adequate supply of fuel to the engine. Refer to the engine manual for additional information. The engine manual is included in the owner's information packet.



NOTICE

Canister-type filters should be changed annually.

F. FUEL STANDARDS

Be cautious when using gasoline that contains alcohol. Refer to the section on gasoline requirements in your engine manual for additional information. The use of alcohol additives in gasoline has become more widespread. Regulations on public notification of the existence of additives are currently controlled by the Environmental Protection Agency (EPA). Some states do require that gasoline pumps display information on additives (especially alcohol). If alcohol content is not posted, ask and avoid using fuel containing alcohol if possible.

Although alcohol boosts the octane level in gasoline, it also attacks the

rubber fuel distribution lines and even metal fuel system components. Alcohol will permeate most fuel hoses and other components such as fuel pump, gaskets and seals, and can also contribute to fuel system contamination.

The hoses we use in our boats are alcohol-resistant as are the materials used by the engine manufacturers. If only fuel containing alcohol is available, or the presence of alcohol is unknown, you must perform more frequent inspections for leaks and abnormalities. Any sign of leakage or deterioration requires your immediate attention. Refer to the engine manufacturer's recommendations on fuel type and octane ratings.

G. SAFETY AND MAINTENANCE TIPS

The fuel system in your Ranger requires little or no maintenance. However, the periodic inspection outlined below is strongly recommended. Contact your Ranger dealer for proper fuel tank access for your model.

1. Check your fuel tank(s) for leakage, especially around the sending unit and fuel hose connections.
2. Inspect fuel hoses. A deteriorated hose containing alcohol blended fuels will normally be soft and swollen. A deteriorated hose containing no fuel will be hard and brittle. In both cases the hose(s) should be replaced.
3. Inspect the fuel system fittings at the deck fuel fill, fuel tank vent, tank(s), and (if equipped with more than one tank), the fuel switch valve for signs of leaks or corrosion. Visually inspect for deteriorating metal fittings at the fuel hose connections.
4. Check fuel tank hold down brackets, making sure they are secure.



WARNING

Avoid serious injury or death from fire or explosion, resulting from leaking fuel.

Inspect system for leaks at least once a year.

Storage compartments are not designed to store flammable materials, as ventilation may not have been provided.



WARNING

Fuel vapors are a fire and explosion hazard. To avoid injury or death, do not

store fuel or flammable liquids in boat. Ventilation has not been provided.

If areas are found within the fuel system that appear questionable, have your Ranger dealer inspect the system. A thorough fuel system examination should be made by an experienced marine technician at least once a year.

Naturally a leak-free fuel system is a **MUST** for proper operation and on-board safety. Always inspect for fuel leaks prior to connecting wiring to the battery or connecting a battery charger to the batteries or to the AC power.

ALWAYS inspect battery compartments before connecting battery charger to batteries and while battery compartments are ventilated. Battery compartment lids should always be open to ensure no explosive hydrogen gas is trapped in the compartment.



WARNING

Batteries produce hydrogen and oxygen gases when being charged. These explosive gases escape through the vent/fill caps and may form an explosive atmosphere around the battery if the ventilation is poor. This gas may remain around the battery for several hours after charging. Sparks or flame can ignite the gas and cause an explosion.

H. FUELING INSTRUCTIONS

1. Secure boat to dock.
2. Boats on trailers need to be on a level surface to prevent air pockets.
3. Switch off all engine(s), pumps, lights, etc. that could produce a spark.
4. Do not smoke, strike matches, or throw an electrical switch.
5. Make certain all passengers are ashore.
6. Be sure the proper type and grade of fuel as recommended by your engine owner's manual is used.
7. Determine how much fuel is required to avoid overflow.
8. Ensure that a fire extinguisher is readily available.
9. Insert the fuel supply nozzle, keeping it in contact with the fuel fill deck plate to guard against static produced sparks.
10. Stand away from the fuel tank vent/fill during fueling. Splash-back may occur which could cause a fire hazard.
11. Make a habit of inspecting the bilge after pumping 5-10 gallons of fuel for any signs of leakage. If no problems are detected, resume fueling.
12. **DO NOT** top off fuel tank. Allow room for thermal expansion, to prevent fuel from sloshing out the vent.

I. AFTER FUELING

1. Replace all fill caps securely.
2. Wipe up any excess fuel immediately.
3. Determine that there is no odor of gasoline in the bilge, before turning on lights, pumps, or starting engine.



WARNING

Spilled fuel is a fire hazard. **DO NOT** overfill or overflow the tank, or allow fuel spills into the hull or bilge. If spillage occurs, clean up immediately and dispose of soiled rags in a proper container.



WARNING

When fueling, **DO NOT** leave unattended. To help prevent fuel blow back, always fill tank slowly and monitor fuel flow as filling. When tank is almost full the sound's pitch from the vent will become higher indicating the tank is close to being full. Stop pumping fuel into tank. **DO NOT TOP OFF.**



WARNING

A wide variety of components used on this vessel contain or emit chemicals known to cause cancer and birth defects and other reproductive harm. **EXAMPLES INCLUDE:**

- Engine and generator exhaust
- Engine and generator fuel, and other liquids such as coolants and oil, especially used motor oil.
- Cooking fuels
- Cleaners, paints, and substances used for vessel repair
- Waste materials that result from wear of vessel components
- Lead from battery terminals and from other sources such as ballast or fishing sinkers.

TO AVOID HARM:

- Keep away from engine, generator, and cooking fuel exhaust fumes
- Wash areas thoroughly with soap and water after handling the substances above.

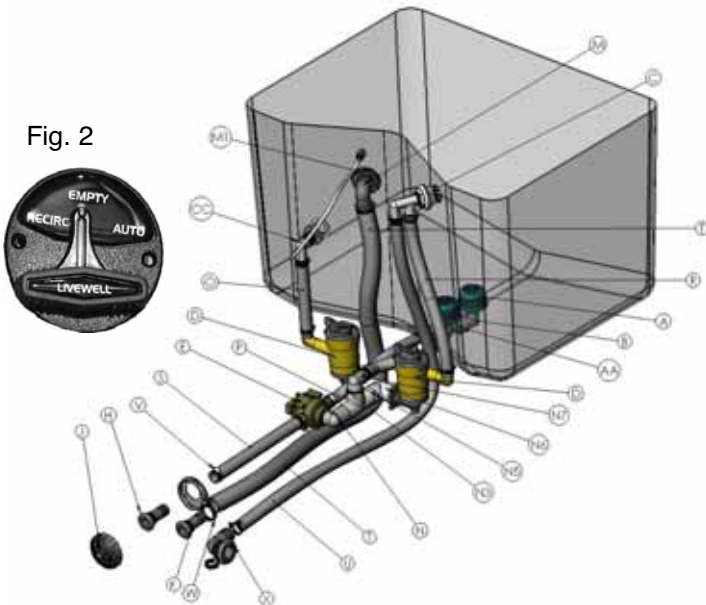
YOUR LIVEWELL AERATION SYSTEM

The livewell aerator system in a Ranger boat is designed to supply the water and oxygen necessary to the survival of your catch. This patented system not only allows fresh water to be pumped in through the aerator supply line(s), but also permits recirculation and aeration at any speed of boat operation.

The recirc position (with aerator running) will only recirculate what water is in the well. It does not bring in any fresh water. This position provides a more positive seal and is good to use if you are going to transport live fish in the well.

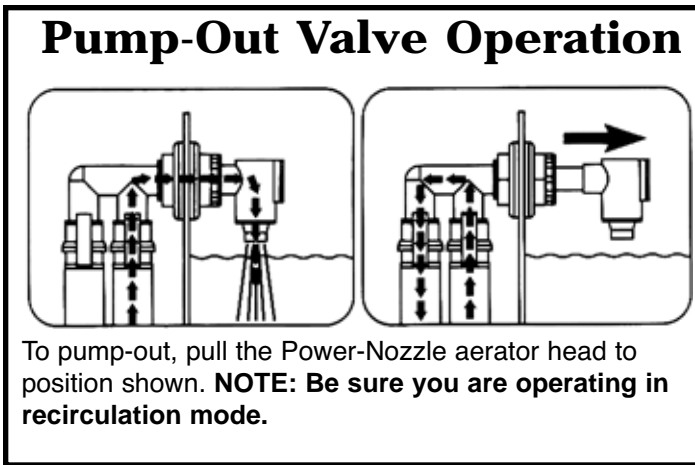
The auto position also holds the water in the well and in conjunction with the aerator will allow a mix of fresh water intake and recirculate existing water. This would be the normal position for a day of fishing. The empty position is just that, to empty the water from the well.

On models without digital switching, the livewell aerator timer located on the driver's console, controls the off time of the aerators when the pump switch is in the automatic position. The timer starts and stops the pump at intervals determined by the setting on the timer. Full counter-clockwise is minimum off time and full clockwise is maximum off time. To have the aerator pumps run continuously, set the pump switch to the manual position.



LIVEWELL PUMP-OUT

Your new Ranger may be equipped with a livewell pump-out system. To use this pump out feature, put the livewell control valve in the recirc position and pull out on the aerator spray head. Turn on the aerator and the water in the well will be emptied. To fill the livewell and resume normal operation, push the aerator spray head in and set the livewell valve to the auto position.

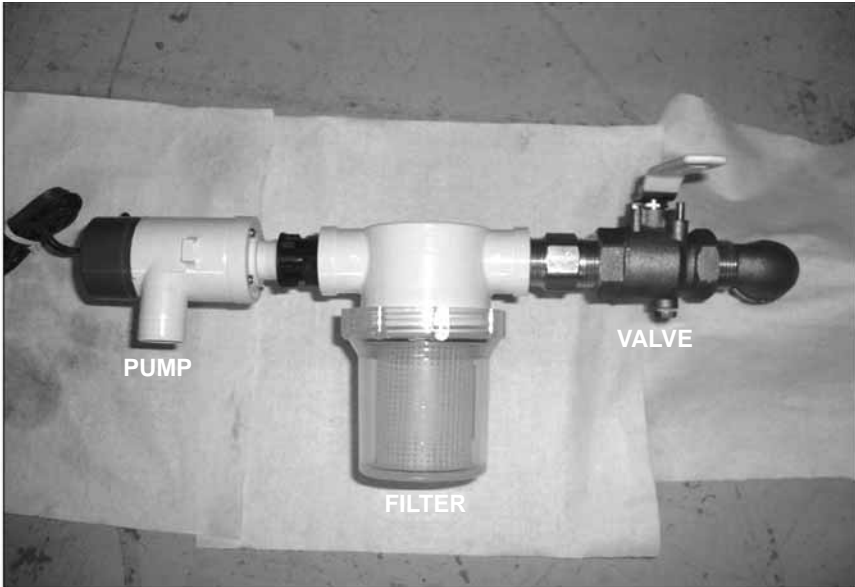


LIVEWELL PLUMBING ASSEMBLY

ITEM NUMBER	PART NUMBER	DESCRIPTION
AA	7415915	3/4" x GHT Swivel Female Insert
X	7100111	90 Deg. Black thru Hull 3/4"
W	7843112	5/8" - 1-1/2" Hose Clamp HF 16SS
V	7843092	Clamp, 1/2-1" Hose, HF 10SS
U	7400262	3/4" blk Spiral Reinf Wtr Hose
T	7400225	1-1/8" ID Blk Bilge Hose
O, P, R, S	7400262	3/4" Blk Spiral Reinf Water Hose
N		PVC ASSEMBLY
M1	7100162	1-1/8" Closed Cell Neop. Gasket
M	7100125	Black 90 Deg 1-1/8" Elbow W/Nut
K	7100110	1-1/8" Black Thru Hull Grommet
J	7100118	Transom Mt L/W Screen (2 pc-sml)
H	7100112	Black 3/4" Thru Hull Straight
	5900006	Actuator (Center Empty) Livewell
E	5903070	Actuator Valve "Center Empty"
D	6000057	Pump, Aerator, 750GPH W/90DG ELB
CC	7415855	Venturi Air Aeration Sys Kit
C	6000050	Pump-Out/Aerator Combo
B	7415816	3/4 Male NPT x Male GHT Elbow
A	7100130	Filter, L/W, Int, Mesh

SALTWATER LIVEWELL PLUMBING SYSTEM

MODELS 168, 169, 173, 183, 191, 223, 2000, 2200, 2300, 2400



Operation Instructions:

Your livewell Aeration System

- 1: Valve (shown in closed position) should be left open
- 2: Close valve when cleaning filter or servicing pump.



- 3: The livewell (all except optional leaning post/bait well) aerator head is adjustable with a valve. The head also is threaded for a hose connection. Recirculate pump does not have valve.
- 4: Install drain plug (1-1/8") or overflow pipe (1-1/2") in livewell to hold water. Pull to drain.

**RECIRCULATION PUMP STANDARD ON STERN LIVEWELL,
OPTIONAL LEANING POST/BAIT WELL
MODELS 173, 183, 168, 169, 191, 223, 2000, 2200, 2300, 2400**



Fish box drain valve on model 2300. Located in battery compartment



MAINTENANCE TIPS FOR AERATOR SYSTEM

- (1) Remove screens only for flushing aerator system.
- (2) Keep screens in place for cleaning and during operation. Replace damaged or broken screens immediately.
- (3) Do not exceed the recommended fuse size on the aerator pumps (a larger fuse WILL NOT make a stronger aerator system!).
- (4) Lubricate pivot on livewell control cable periodically using light weight machine oil.
- (5) Continual operation of pump (especially dry) will damage pump. Be sure aerator switches are “off” when storing, etc.

TROUBLESHOOTING

■ Pump runs, but will not pump water:

- ⇒ Entrapped air pocket around pump impeller has “air locked” pump. With valve in “fill” position, back boat up slowly to expel entrapped water.
- ⇒ On Saltwater models, be sure high speed pickup valve is open (handle in line with valve) and drive boat forward to expel entrapped air.
- ⇒ Grass, sticks, or other debris have clogged the filters or cavity around the pump impeller, restricting water flow to pump. Clean screens, or remove screens and flush system with garden hose using moderate pressure.
- ⇒ On Saltwater models, close the valve, unscrew filter, clean filter element and reinstall. Open valve.

■ Pump will not run (no “hum” is heard):

- ⇒ Make sure switch is in the “Manual” position (in “Automatic” the pump could be working, but in off time).
- ⇒ Check master breaker switch in the rear compartment.
- ⇒ Check fuse, breaker or flashing LED light on digital switching models. Replace or reset as necessary.
- ⇒ Check wire connector at pump.
- ⇒ Replace pump.

■ Livewells will not hold water in “Fill” position.

- ⇒ Flush system to clear debris from livewell valve.
- ⇒ Check cable to valve connection for proper adjustment.
- ⇒ Remove cable, put water in livewell to see if well will hold water with cable removed. If so, adjust cable to match actuator arm.
- ⇒ Remove valve and disassemble. Clean inside of valve with warm soapy water and inspect flappers for nicks, cuts and abrasions. Replace flappers if necessary.

On Saltwater models, be sure drain plug or stand pipe is installed.

STEERING AT CONSOLE



WARNING

The steering in your boat is one of the most important items and should be checked by the driver every time the boat is used. You should school yourself and make it a habit to check the steering methodically. Loose or worn steering could lead to an accident causing injury or death.

Your new Ranger may be equipped with Teleflex hydraulic steering.

This system is designed to help reduce engine torque felt at the wheel (see Fig. 3, page 31), while providing excellent steering response. However, this is not to be interpreted in any way as an “Automatic Pilot”. A firm grip on the wheel is required at all times. Read the steering owner/installation manual for maintenance instructions.



NOTICE

Due to the special valving in the hydraulic helm the steering wheel may not be in the same position each time the steering is returned to center. This is normal operation and should be no cause for alarm.

Other Ranger models may be equipped with no feed back steering. This is mechanical steering that is designed to help reduce engine torque, felt at the wheel, to a minimum. However, a firm grip on the steering wheel is required at all times.

You should familiarize yourself with the feel of the steering at various speeds and trim settings. **NEVER** exceed speeds beyond your comfort level.



WARNING

The driver must always keep a firm grip on the steering wheel. Failure to do so could lead to an accident causing injury or death.

TELEFLEX HYDRAULIC STEERING

Remove, clean and grease the support tube annually with quality marine grease.

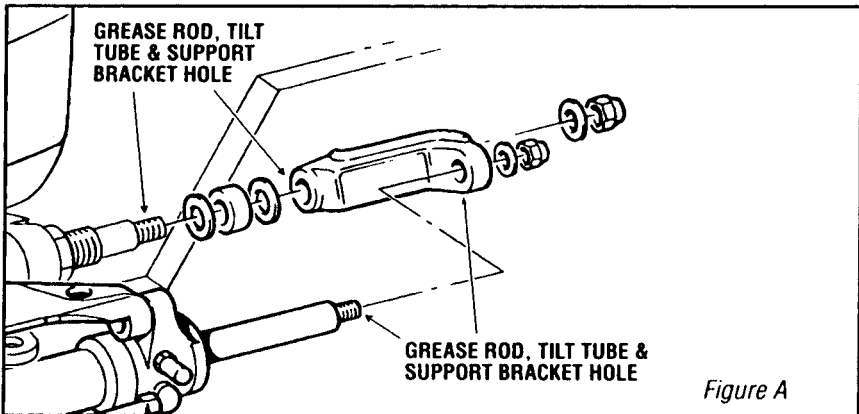
Check the steering fluid level in the helm. It should be maintained at no less than 1/2" and no more than 1/8" below the bottom of the filler cap threads. Be careful not to overfill.

Replace any hoses showing signs of wear and remove the cause or re-route hoses.

Check fittings and seal locations for leaks/damage and service as necessary.

If you have installed a jack plate, make sure that there isn't any interference between the jack plate and your steering cylinder. If there is interference, it may occur during full tilt. Lift restrictors or a Tilt Stop Switch should be installed. Please consult your engine manufacturer.

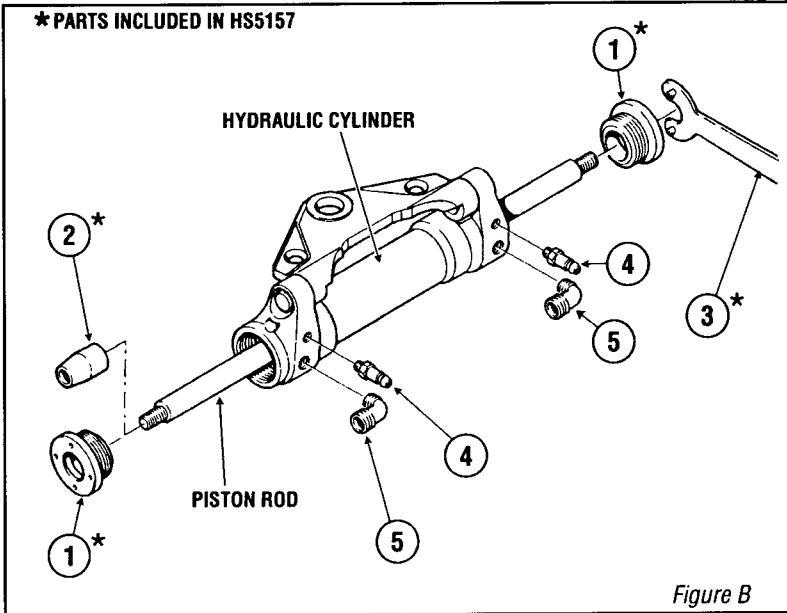
⚠ WARNING Failure to comply with maintenance checks may result in loss of steering, causing property damage and/or personal injury. Maintenance requirements will vary depending on usage and climate. Bi-annual inspection by a qualified marine mechanic is required.



⚠ CAUTION Grease rod, tilt tube and support bracket holes once a year.

⚠ WARNING Engine mounting location preset at the factory. Adjustments can result in damage to control system equipment. Control system damage can result in serious injury or death. Regularly inspect control system and clearances at all trim angles.

For complete installation and troubleshooting information, please refer to your SeaStar installation instructions, Book 1.1 (Part # 296784).



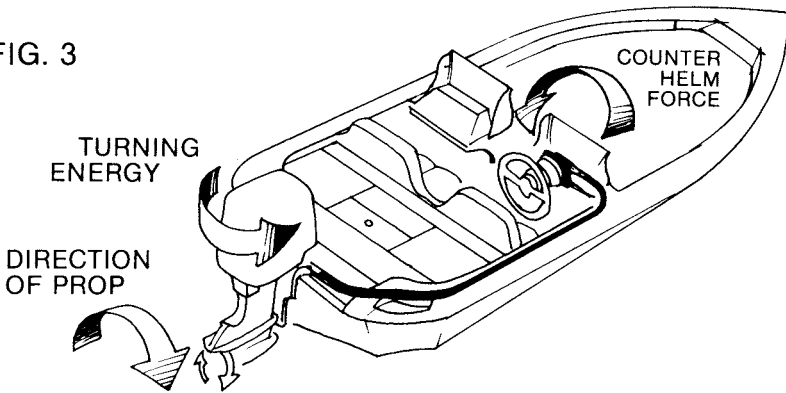
**SEAL REPLACEMENT KIT (PART # HS5157) FOR:
FRONT MOUNT CYLINDER (PART # HC5345)**

<u>Item</u>	<u>Part #</u>	<u>Quantity</u>	<u>Description</u>
1	797021	2	Seal Gland Only
2	745920	1	Seal Gland Assembly Guide Tool
3	745525	1	Pin Wrench Only
4	828980	1	Bleeder Fitting
5	600601	1	Elbow Fitting

SEAL KIT # HS5157

1	797021	2	Seal Gland Only
2	745920	1	Seal Gland Assembly Guide Tool
3	745525	1	Pin Wrench Only

FIG. 3



STEERING CONNECTIONS AT ENGINE

The steering may be connected at the engine by a method similar to the ones shown in Figures 4 & 5 (page 32).

Figures 4 & 5 show maintenance and checkpoints that should be regularly inspected.



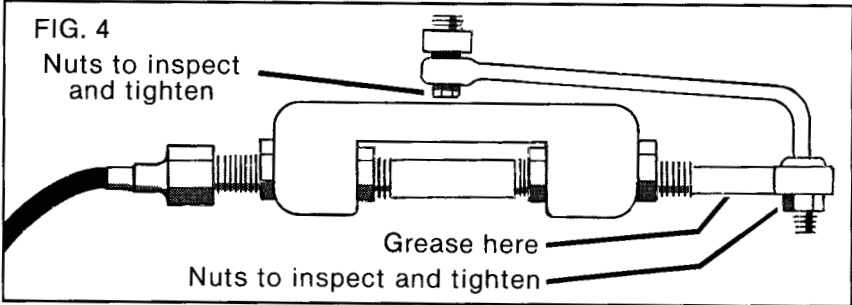
CAUTION

Check all engine to transom mounting bolts and torque to 55 ft lbs after the first 10 hours of use and every 30 hours thereafter. Failure to do so could lead to transom and engine damage.



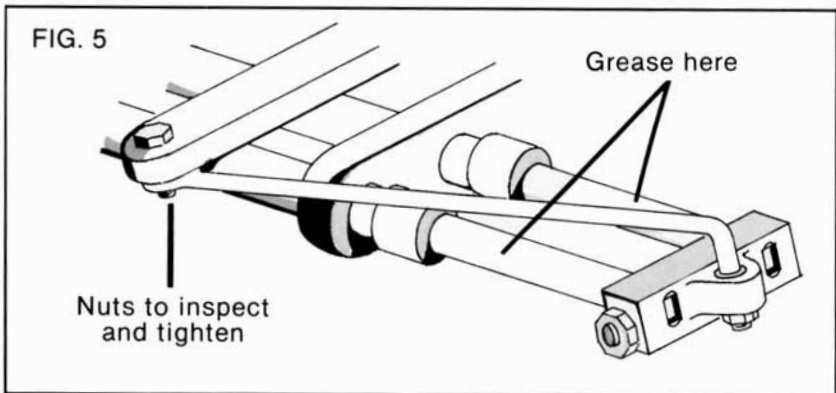
CAUTION

See your authorized marine dealer for specific information concerning maintenance of engine connections.



CAUTION

See engine owner's manual for proper greasing and maintenance of engine link rod and steering kit.



YOUR BOAT'S FINISH... MAINTENANCE AND REPAIR

The gelcoat (color) used on your Ranger® Boat is of the highest quality available today. To keep it looking new and in good condition these tips will prove helpful.

- A light duty rubbing compound (available at most auto parts stores) is recommended for stains such as mold, water lines on the hull, fine scratches on finish or just to bring back that “look new” shine.
- Automotive wax or polish is good for preserving the shine and building an “armor coat” to prevent scratches and will also help protect hull while in wet storage.
- A boat cover (which is available from your Ranger dealer) is also a wise investment to help prevent damage while the boat is at home or on the road.



NOTICE

Do not use acids or other strong chemicals to clean your boat.

Careful as you may be, you will get that scratch from the dock or beach that will need some attention. Most Ranger dealers are equipped to do fiberglass repair, and large jobs are better left to the experts. However, minor scratches, chips, and gouges may be repaired by you. These instructions are to repair solid color gelcoat only, not poliflake:

1. Using masking tape, tape around damaged area slightly larger than actual flaw, keeping area to be repaired as small as possible.
2. Remove any damaged glass or gelcoat. Sand damaged area and all surface inside tape, enough to rough up area and remove shine, using #220 grit dry sand paper.

3. Wash area with a solvent such as acetone and allow to dry.



WARNING

These materials are very flammable. Do not smoke or use electric equipment while using them. Improper handling could result in an explosion resulting in injury or death.

4. Using Ranger touch-up gelcoat or putty only, thoroughly mix 1% catalyst (MEKP) with desired amount of gelcoat or putty.



NOTICE

Gelcoat will not cure by itself. You must use a catalyst.

5. With a putty knife, trowel catalyzed gelcoat in desired area, leaving it slightly higher than the original surface to allow for shrinkage.
6. When patch has dried, remove masking tape and carefully sand back to the original shape using #600 grit WET sandpaper. Then buff with a light duty buffing compound.

NOTE: Area may have to be filled more than once due to shrinkage.

NOTE: Due to different dye lots the color may vary somewhat. However, we take all the steps to keep our color consistent.



NOTICE

Do not hold buffer in one area long enough to burn gelcoat.



NOTICE

Do not sand metalflake surfaces. A different procedure is used to repair these finishes. You should contact your Ranger dealer for more information.

YOUR POWER PEDESTALS

A “power pedestal” is a nitrogen gas filled steel cylinder that is used to raise and lower the fishing seats mounted on the forward and aft casting platforms. This enables you to select the proper seat height for comfort in any fishing situation. Pushing the empty seats all the way down helps to provide an unobstructed viewing area around the boat when underway.

To raise the seat, simply lift your weight slightly off the seat while raising the seat actuating lever simultaneously. To lower the seat, keep your weight on the seat and lift the lever up.

These pedestals are constructed to the highest standard of workmanship and will give years of trouble-free service. A minimum amount of care will insure proper operation. Periodically apply a light weight oil (like household “3 -in-1” oil) to the power unit piston. Take care not to over stress the pedestal by placing excessive strain on the seat and power unit while it is extended into the full up position. Always lower the seat to the full down position when the boat is underway. We recommend that the seat and pedestal be removed from the front casting deck and remounted into the special base mounted in the front of the deck floor when running. Should your boat not have the additional base, the front fishing seat should be removed and securely placed in the floor of the boat.

Your power pedestals are warranted for three years against defects in materials and workmanship. Should a pedestal fail, return the unit to Springfield Marine, Attention: Warranty/Repair, Hwy. 160, P.O. Box 588, Nixa, Missouri 65714, or call 417-725-2667. Repairs not covered by warranty will be charged at their regular rate.



WARNING

Power unit is under pressure. Do not attempt to disassemble it or tamper with it in any way. Improper handling could result in severe injury or death.

If your power pedestal will not remain in position, either up or down, you may need to make a minor adjustment to the air cylinder that causes the pedestal to be raised up and down.

With your chair removed from the pedestal, use a Phillips #0 screwdriver to move the adjustment screw as shown in the accompanying diagram.



WARNING

To avoid serious or fatal injury, do not occupy raised fishing seats when boat speed exceeds 5 MPH.

If your seat will not raise up to the proper height, adjust the screw approximately 1/4 (one-quarter) turn in a counter-clockwise direction and try the pedestal again.

If your seat will not remain in the upright position, move the adjustment screw approximately 1/4 (one-quarter) turn in a clockwise direction.

NOTE: You may need to fine-tune your pedestal by moving the adjustment screw a bit more in one direction or the other.

**NON-ADJUSTABLE
SNAP LOCK SWIVEL**

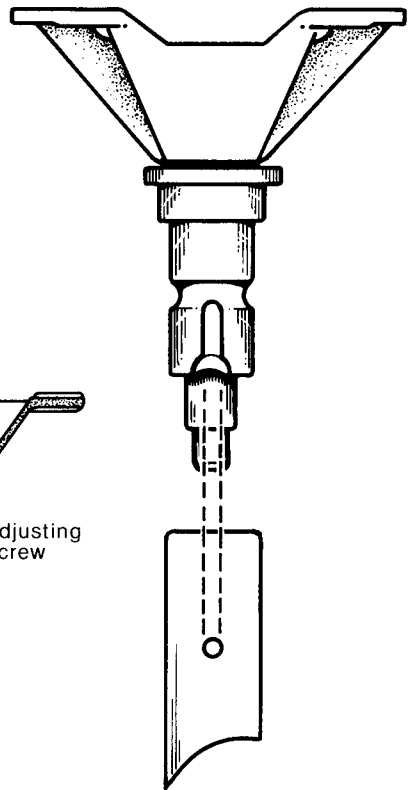
Adjust the screw in
the end of the air
cylinder as needed

Section view
of
swivel

Handle

Adjusting
Screw

**ADJUSTING AIR RIDE HANDLE
Prior To Installing Seat**



* Non-Adjustable pedestals are standard on some models, the same warranty applies.

KEY LOCKS, CARPET AND UPHOLSTERY

Your Ranger® boat has been equipped with top-quality marine grade key locks to secure your storage areas. Should your boat be subjected to use in or near salt water, care should be taken to flush the locks out thoroughly with fresh water to prevent corrosion.



NOTICE

Periodic adjustment of lid latch assemblies may be required to ensure proper lid seal.

The carpet in your boat is the finest grade available. Although the special backing is RESISTANT to oil and gasoline, spills should be removed with soap and water to maintain the good looks and extend the carpet life. A car-wash is suitable for washing and rinsing your carpet as well as cleaning the fiberglass surfaces.



NOTICE

The popular and effective “fish scents” that are commonly sprayed on lures today will cause deterioration of the carpet backing. Use caution to spray these formulas well away from your boat carpet! Any spills should be cleaned up promptly.

Your Ranger upholstery is top-grade marine vinyl. Naturally, the suppleness and color fidelity of the upholstery is best maintained by storing your boat out of direct sunlight. Cleaning and conditioning of your upholstery is best accomplished with an approved, top-quality vinyl cleaner. To loosen stubborn soil or embedded dirt in textured surfaces, use a soft bristle brush, your approved cleanser, followed by wiping with a damp sponge. See specific suggestions for cleaning of marine vinyl on pages 38 and 39.



CAUTION

Do not use acetone, paint remover or other strong solvents on boat's upholstery.

CLEANING MARINE VINYL

For general purpose cleaning, use Vinyl Finish Vinyl Cleaner, Fantastik, or warm water with a mild dish soap such as Dawn or Ivory. Gently scrub with a small soft bristle brush.

For dirt build-up, use Vinyl Finish Vinyl Cleaners. Let soak for approximately 10 minutes, then gently scrub with a soft bristle brush. For specific stain removal, refer to the chart on page 39 or the staining agent's stain removal instructions.



CAUTION

DO NOT use Formula 409 (the bottle states the product should not be used on vinyl.)

DO NOT use kerosene, gasoline, or acetone, as they will remove the protective marine top coat on your vinyl.

DO NOT use any silicone based protectants. They will extract the plasticizers, leaving the vinyl hard and brittle, and eventually cracking will occur.

USE

Vinyl Finish Vinyl Cleaner
Dish Soap (Dawn, Ivory)
Fantastik
303 Protectant

DO NOT USE

Formula 409
Murphy's Oil Soap
Simple Green
DC Plus
ArmorAll
Top Kote Sealant
Son-of-a-Gun
Orange 88 Degreaser
Roll-Off
Bleach/Baking Soda
Turtle Wax Tar Remover
APCO
Harbor Mate

Certain household cleaners, powdered abrasives, steel wool, and industrial cleansers can cause damage and discoloration and are not recommended.

Dry cleaning fluids and lacquer solvents/acetone (for example, nail polish remover) should not be used as they will remove printed pattern and/or gloss.

Waxes should be used with caution as many contain dyes or solvents that can permanently damage the protective coating.

This chart contains methods for removing common stains and soils:

- A. Medium-soft brush, warm soapy water. Rinse. Dry.
- B. Vinyl Finish Cleaner or household cleaner such as Fantastik.
- C. One tablespoon ammonia, one-fourth cup hydrogen peroxide, three-fourths cup water applied with medium soft brush. Rinse. Dry.
- D. Wipe or scrape off excess (chill gum with ice first).
- E. Denatured Alcohol. Rinse. Dry.
- F. Follow instructions of stain agent manufacturer.

	STEP 1	STEP 2	STEP 3
Ballpoint Ink*	E	B	A
Chewing Gum	D	B	A
Coffee, Tea, Chocolate	B		
Crayon	D	B	
Grease	D	B	F
Household Soil	A	B	
Ketchup	A	B	
Make Up (Lipstick, eye shadow etc.)	A	B	
Mildew, Wet Leaves*	C	B	A
Motor Oil	B		
Paint, Dried Oil Base	D	B	A
Paint, Fresh Oil Base	D	A	F
Paint, Latex	A	B	F
Permanent Marker*	E	B	C
Shoe Polish*	D	B	F
Spray Paint	B	F	
Suntan Lotion*	A	B	
Tar/Asphalt	D	B	
Yellow Mustard	A	B	C

* Suntan lotion, tree pollen, wet leaves, and some other products contain dyes that stain permanently.

ADDING ACCESSORIES TO YOUR BOAT...

The bow section of the gunwale is properly reinforced for installing such accessories as trolling motors and depth sounders. We recommend through-bolting all trolling motors, anchor davits and other heavier accessories. Normally 1/4" stainless steel bolts with self locking nuts and 1-1/4" fender will do the job. Lightweight depth sounders or similar equipment and hardware can be installed using #8 or #10 stainless steel screws. Always drill a pilot hole through the fiberglass (just smaller than the screw you're going to use) and use a counter sink to chamfer the pilot hole before attempting to install a screw. This lessens the chance of "stripping" the hold or chipping the gelcoat around the hole.

If additional instruments are desired on the console, holes may be drilled using a hole saw of the proper size.



NOTICE

Use Marine Sealer around all screws installed into transom or floor of boat. When installing screws below water line, be sure sealer used is recommended for such.

When installing additional electric accessories, always use the proper gauge (size) wire recommended for that item. Insure that the proper size breaker or fuse is used. "Splicing" into another accessory's power supply could overload the circuit and should be avoided.



CAUTION

Always disconnect the positive and negative leads from the battery terminals before installing, removing, servicing, or troubleshooting any part of the electrical system.

HOOK UP OF TROLLING MOTOR LEADS:

2 WIRE 36 VOLT SYSTEM	RED to Battery	1 (+)	positive
	BLACK to Battery	3 (-)	negative
	JUMPER 1(black sleeve) to Battery	1 (-)	negative
	JUMPER 1(red sleeve) to Battery	2 (+)	positive
	JUMPER 2 (black sleeve) to Battery	2 (-)	negative
	JUMPER 2 (red sleeve) to Battery	3 (+)	positive
2 WIRE 24 VOLT SYSTEM	RED to Battery	1 (+)	positive
	BLACK to Battery	2 (-)	negative
	WHITE from Battery	1 (-)	negative
	to Battery	2 (+)	positive
2 WIRE 12 VOLT SYSTEM	RED to Battery	1 (+)	positive
	BLACK to Battery	1 (-)	negative



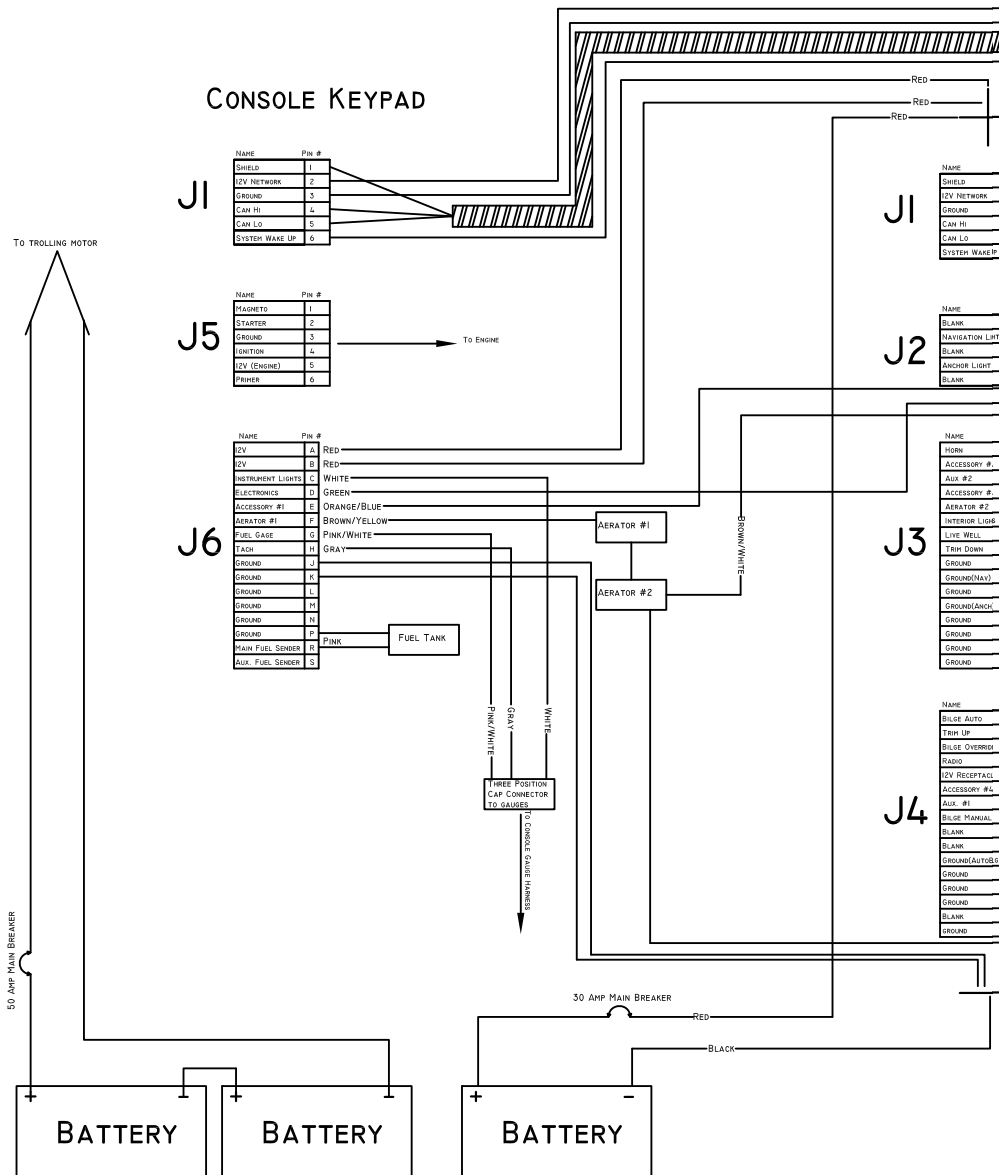
CAUTION

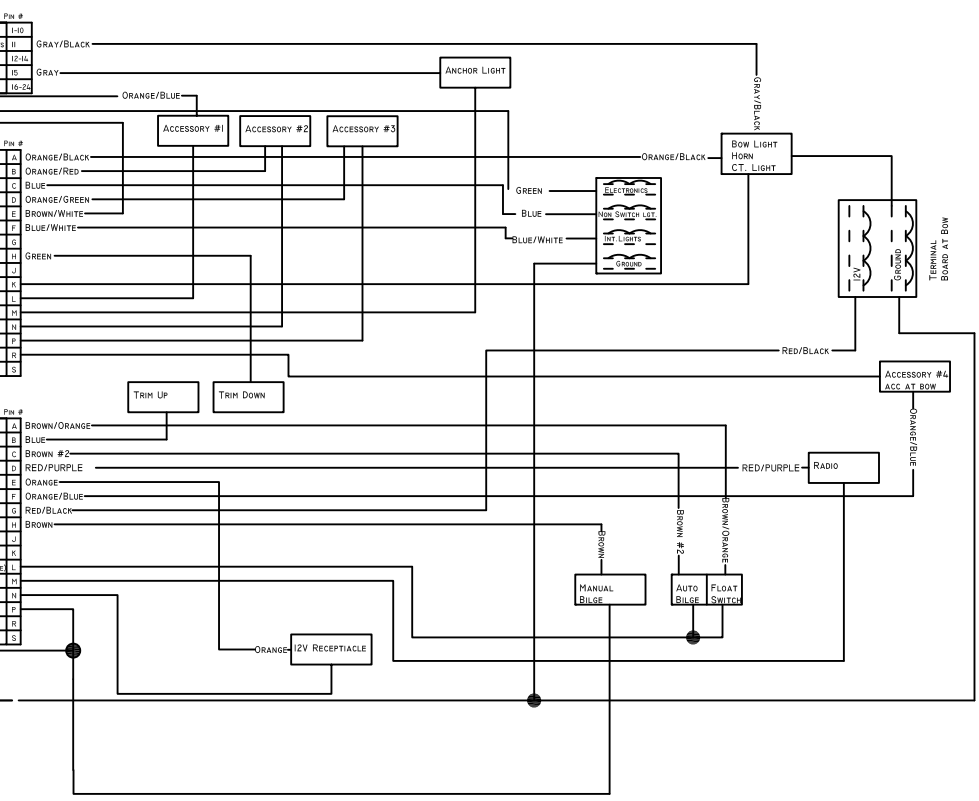
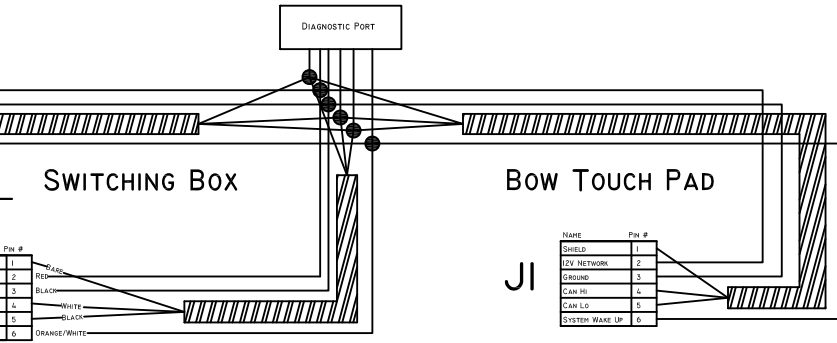
Hooking up leads to trolling motor in any other manner could result in severe damage to both batteries and panel.

Breakers are circuit protection (50 amp 12 volt) for the positive (+) leads in the trolling motor wiring (bow to stern). A problem in the system could result in the breaker(s) being tripped. Should this occur, the breaker(s) can be reset by pushing the switch. If this occurs again, disconnect battery leads and trace immediately, or take it to your Ranger dealer for repair.

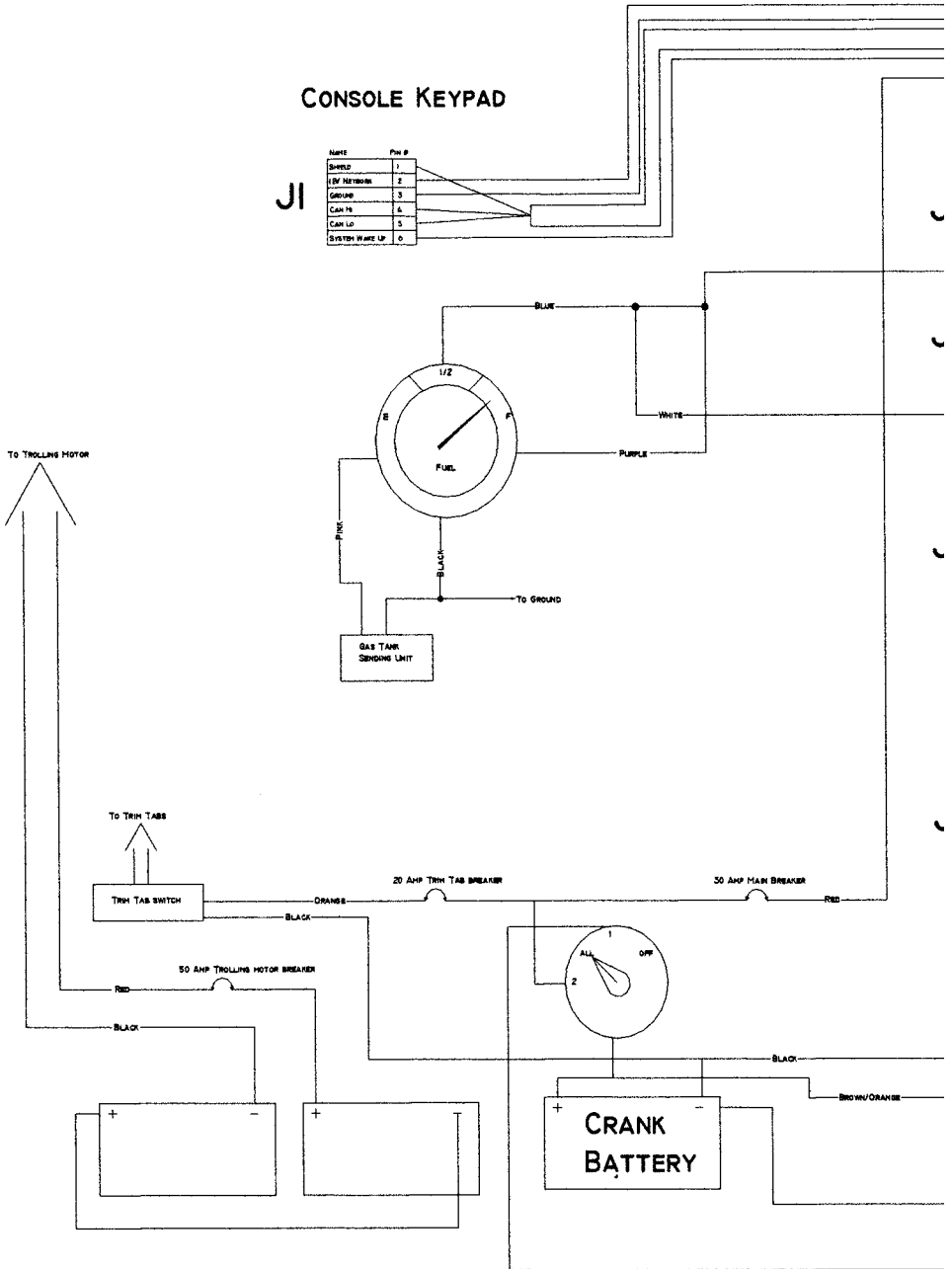
An ignition protected circuit breaker is used for the accessories. Should a breaker trip, simply reset. **This switch should also be in the “off” position when trailering or storing the boat.** It acts as a master switch and turns off all accessories getting their power from the Ranger fuse panel. Remember, engine circuits will not be affected by these breakers/switches, but could have breakers or fuses of their own. Consult your engine owners manual for electrical particulars.

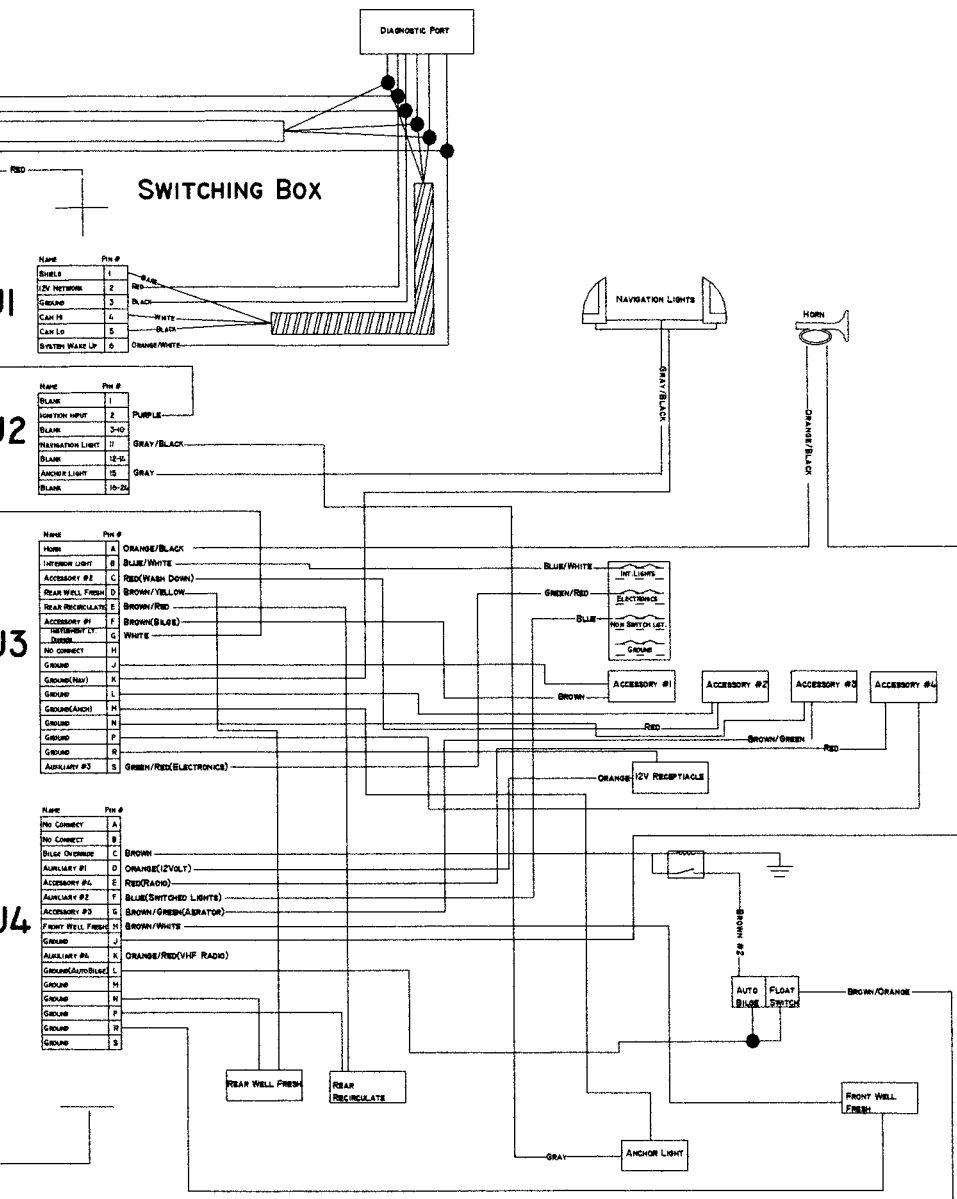
FISHERMAN SERIES





SALTWATER MODELS WITH DIGITAL SWITCHING





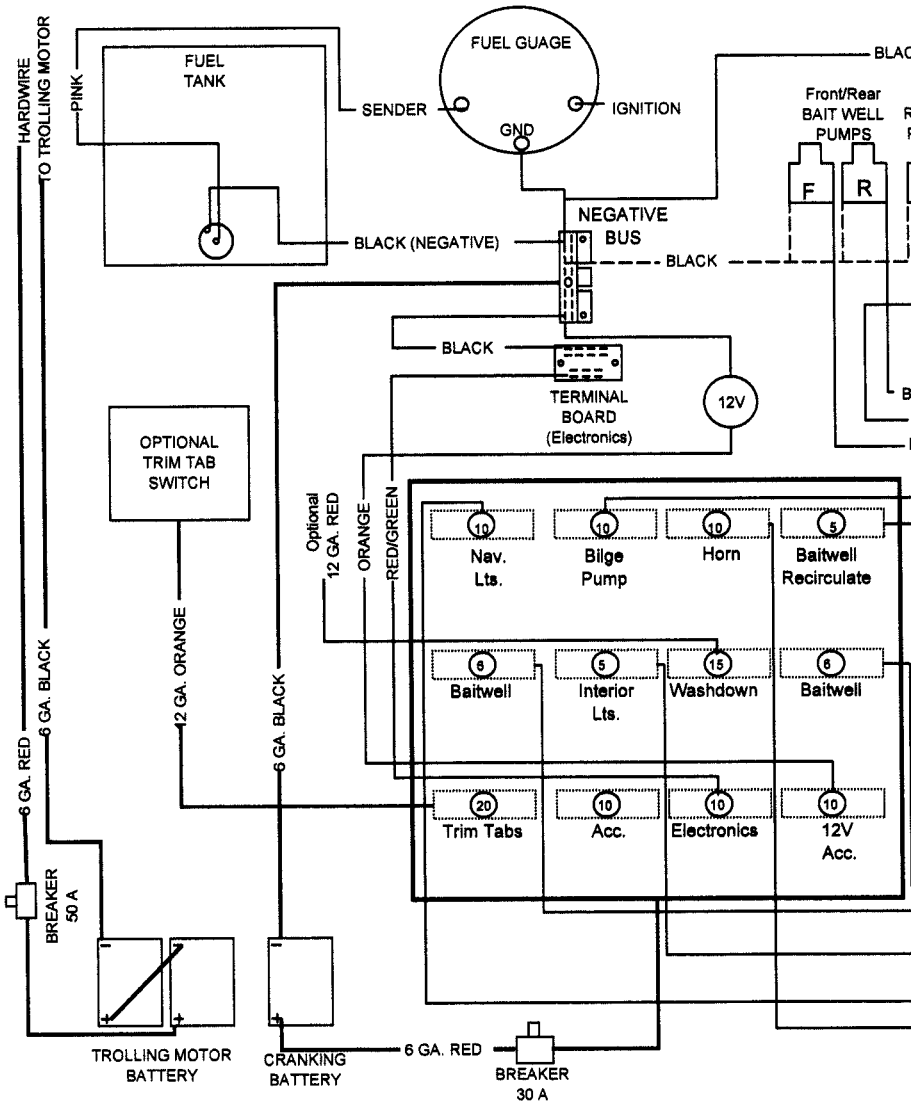
NAME	Pin #
BLANK	1
12V NETWORK	2
GROUND	3
CAN H	4
CAN LO	5
BUSTER WAKE UP	6

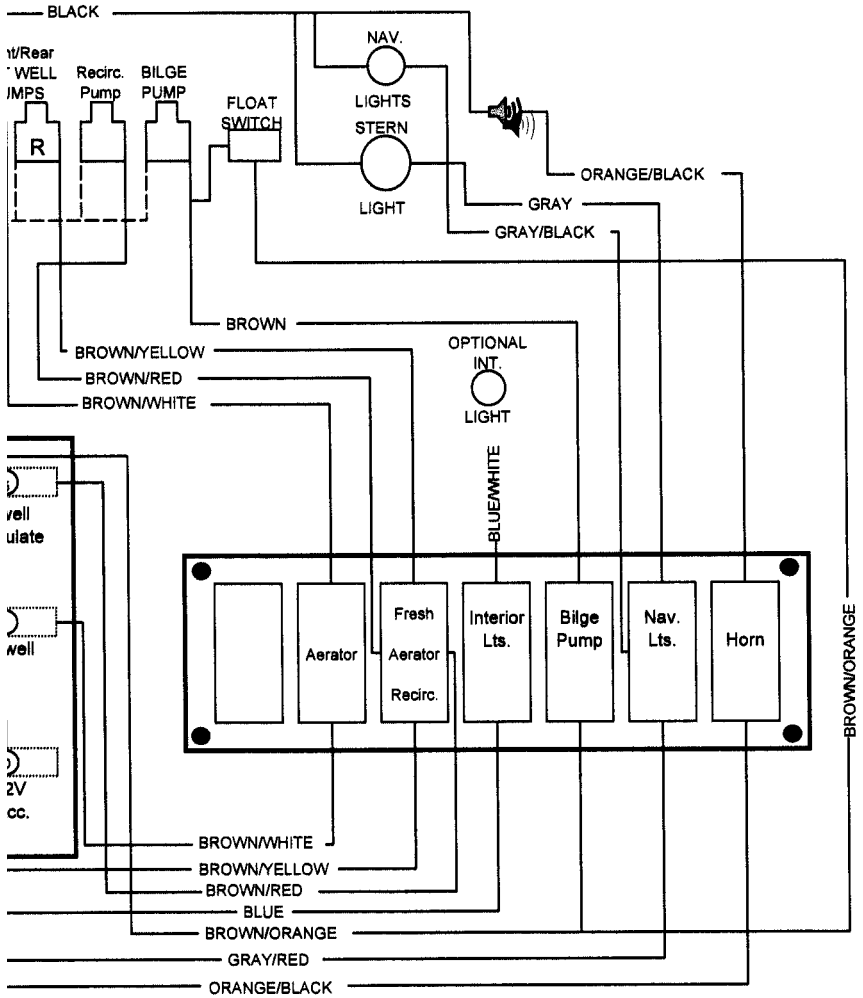
NAME	Pin #
BLANK	1
POSITION INPUT	2
BLANK	3-4
NAVIGATION LIGHT	5
BLANK	12-16
ANCHOR LIGHT	18
BLANK	19-24

NAME	Pin #
HORN	A
TERROR LIGHT	B
ACCESSORY #1	C
REAR WELL FRESH	D
REAR RECIRCULATE	E
ACCESSORY #1	F
TERROR LIGHT	G
NO CONNECT	H
GROUND	J
GROUND(NAV)	K
GROUND	L
GROUND(ANCH)	M
GROUND	N
GROUND	P
GROUND	R
AUXILIARY #3	S

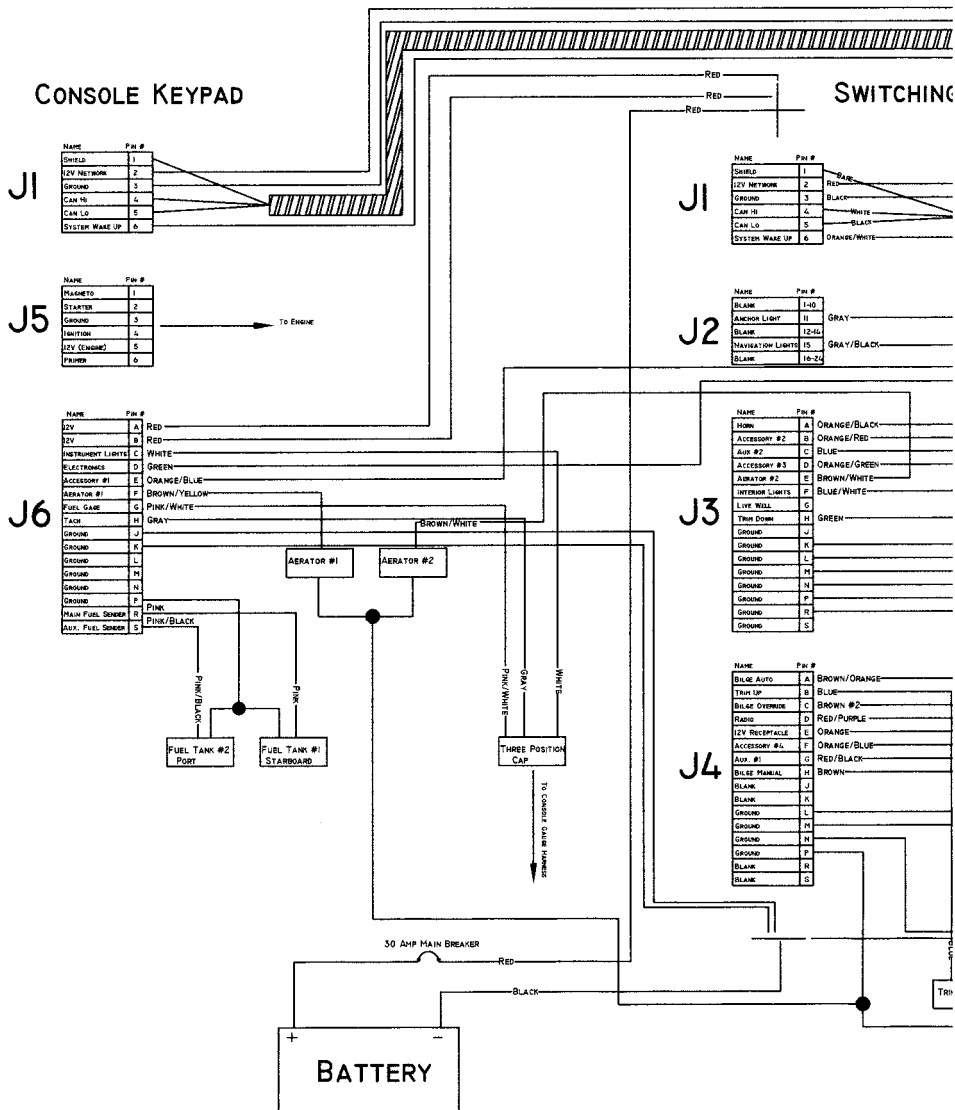
NAME	Pin #
NO CONNECT	A
NO CONNECT	B
BILGE OVERHOLD	C
AUXILIARY #1	D
ACCESSORY #4	E
AUXILIARY #2	F
ACCESSORY #3	G
FRONT WELL FRESH	H
GROUND	J
AUXILIARY #6	K
GROUND(AUTO/BILGE)	L
GROUND	M
GROUND	N
GROUND	P
GROUND	R
GROUND	S

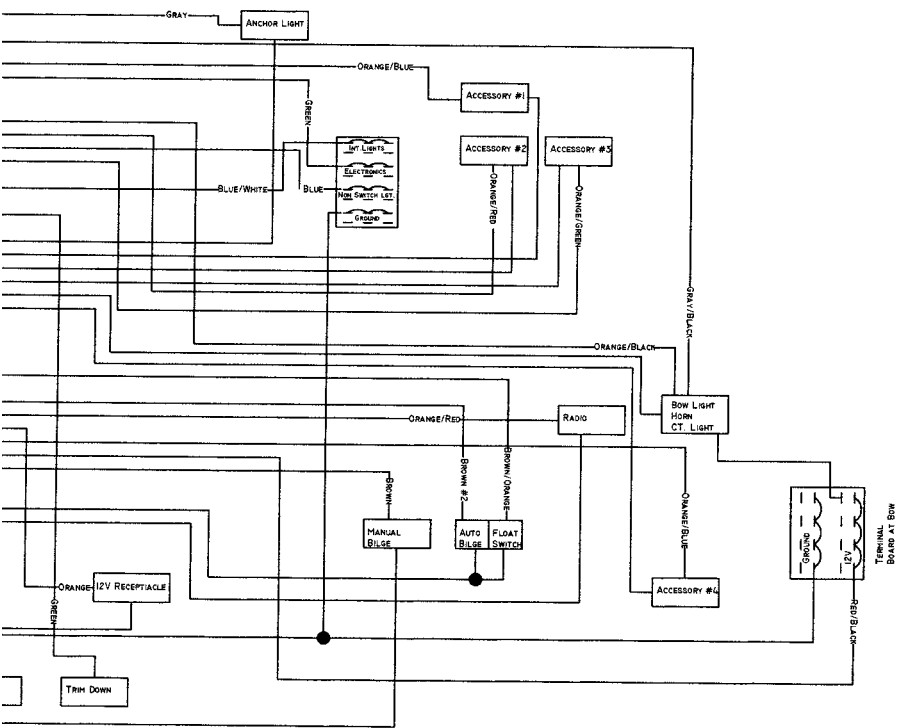
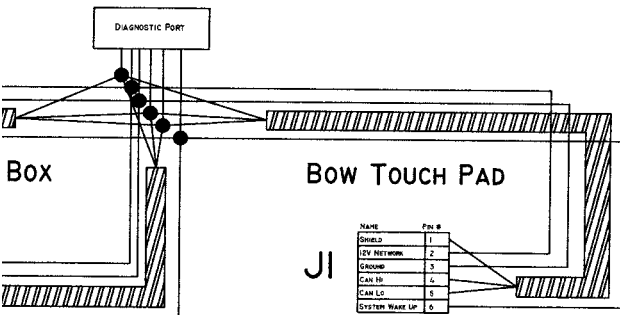
2000 WIRING





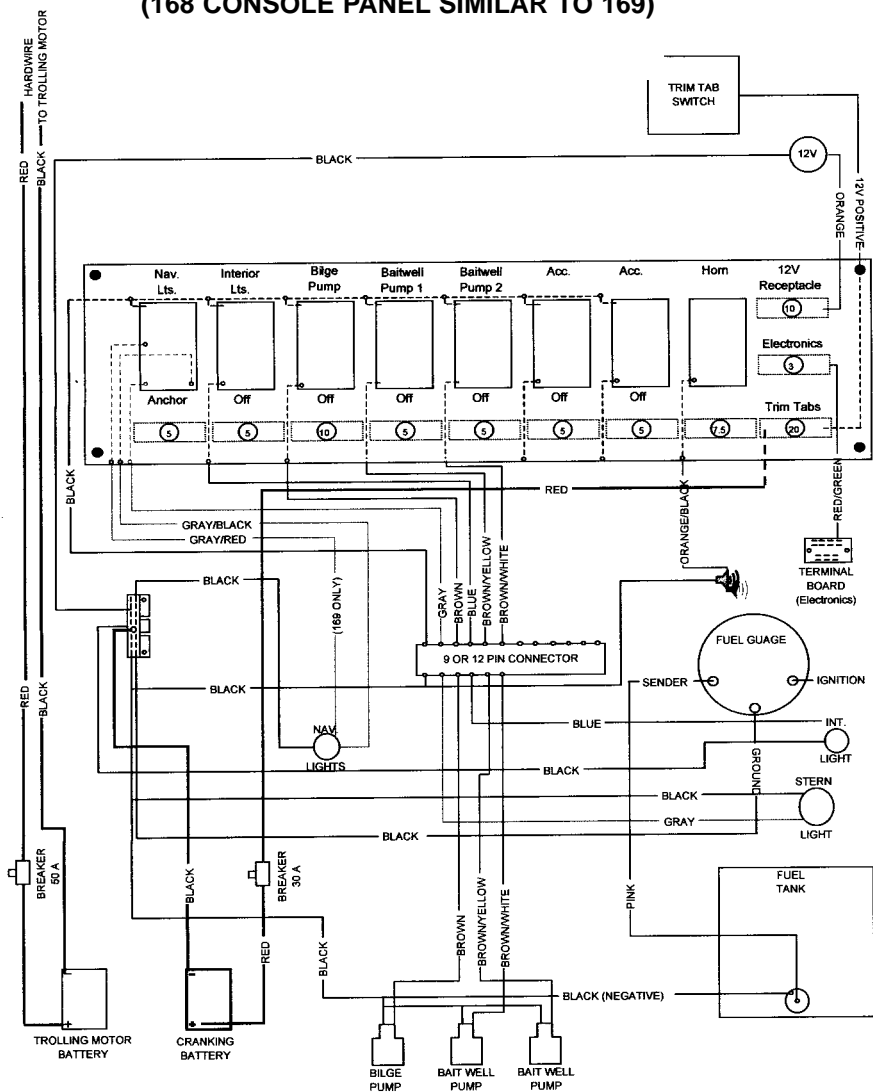
Z COMANCHE



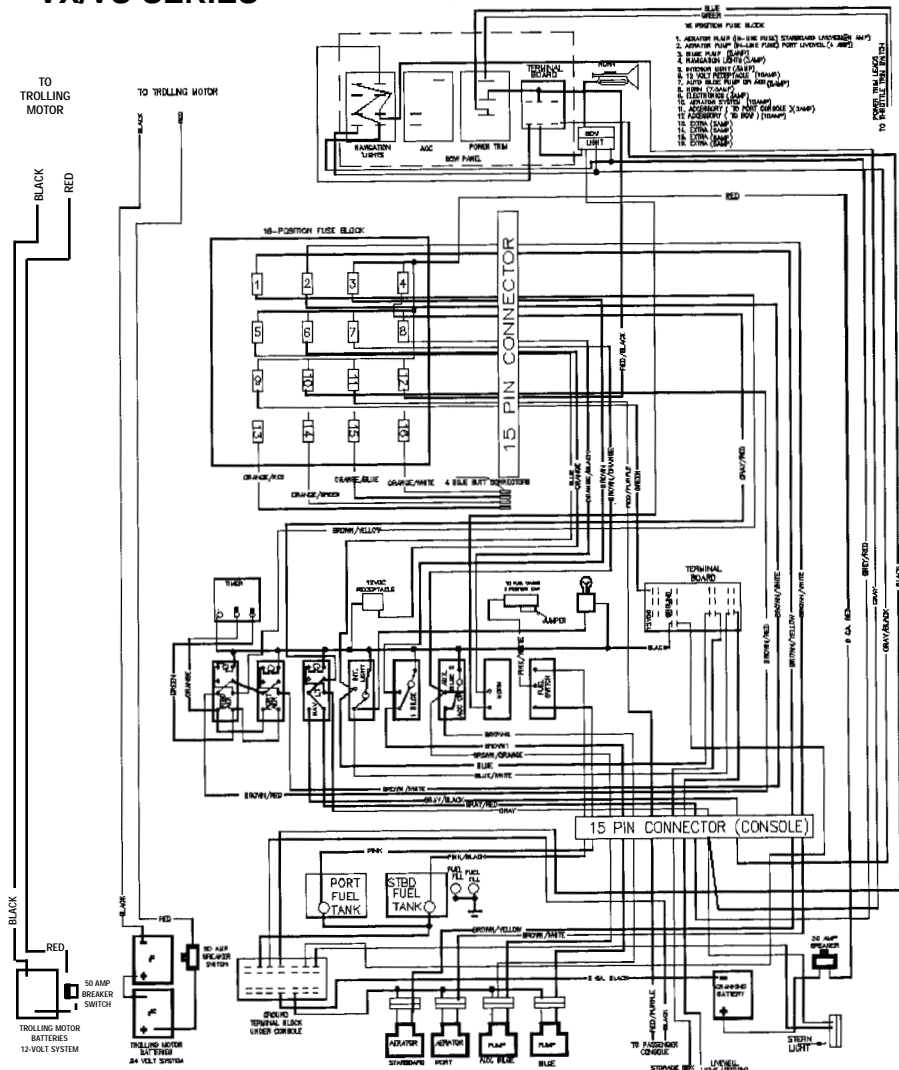


168/169 WIRING DIAGRAM

(168 CONSOLE PANEL SIMILAR TO 169)



VX/VS SERIES



SOME MODELS HAVE ONLY 1 FUEL TANK, IN WHICH CASE THE SENDER WIRE IS PINK AND NO FUEL SWITCH APPEARS ON CONSOLE.

ELECTRICAL SYSTEM

FUSE PANEL INFORMATION

On some models, the fuse panel is located for easy access and features plug-in type ATC fuses. The fuses can be easily inspected and replaced. Z Comanche along with certain Fisherman and Saltwater models have no replaceable fuses. Circuits are reset as outlined in that models Electrical System section. The Panel has a capacity of twelve to sixteen individual circuits. The particular accessory(ies) they operate are shown on the decal on the right side of the fuse panel or back side of the fuse panel cover.



CAUTION

Do not exceed recommended fuse sizes. Always install proper rated fuse when adding accessories to the fuse panel.



CAUTION

Inspect battery compartment(s) before plugging in AC power to charger. Inspect for loose wires, cracked battery, etc.

To improve the performance of the batteries, turn the master breakers to the off position when the boat is not in use. Electronics, stereos and other items that the boat may be equipped with, could have a current draw even when those items are turned off. If you leave your boat in the water, leave the breaker turned on in order for the automatic bilge pump to have power. If conditions are such that the bilge pump is operating frequently, it will be necessary to check the battery for its state of charge and to charge as needed. On Saltwater models equipped with digital switching, you may leave the main breaker and all cut off switches turned to the off position while the boat is not in use. The auto bilge pump on these models is connected directly to the battery and fused independent of the main breaker.

FISHERMAN SERIES

Wake and Sleep Mode

Sleep mode will cause the keypad to reduce power consumption by reducing live circuits. For the keypad to enter the sleep mode it will require the main 30 amp breaker to be on, no switch activity for four hours, all pumps turned off, and the ignition is off. When the keypad is in the sleep mode the accessories will not function. To wake the keypad you must press one of the following functions: Start, Stop, 1, 2, 3, 4, or any button on the bow touch pad with the main breaker set to the on position. After pressing one of the buttons, you can then proceed with your desired operation. While the keypad is in the sleep mode, the float switch to the bilge still has power and if the float switch is triggered, it will wake the keypad. If the bilge pumps, livewell pumps or the ignition is left on, the system will not enter sleep mode.

Keyless Ignition

Starting the engine:

- Turn the main breaker to on.
- Press on the buttons required to wake the system.
- Enter the following user code unless it has not been changed in order “1-2-3-4”.
- Press “Start”. After pressing start the LED by the stop button will light putting the keyless ignition switch in accessory mode.
- Press the “Start” button a second time holding it for two seconds and the engine will crank.
- Once the engine has started, release the “Start” button.
- To stop the engine, press the stop button.
- To lock the system after stopping the engine, enter the user code “1-2-3-4” and then press “Stop”.

To choke a carbureted engine:

Press the “Start” and the “1” key simultaneously while starting the engine.

To change the user code:

Wake the system up by pressing one of the buttons described above. Enter in the current user code followed by pressing the “1” and “4” buttons at the same time. You will have two seconds after entering in the user code to press the “1” and “4” buttons.

“1-2-3-4” buttons → “1” and “4”

Leave the “1” and “4” depressed until the stop LED flashes. If the stop LED does not flash after holding the “1” and “4” down for five seconds, one of the following may have happened: the user code was not entered correctly or “1” and “4” was not depressed at the same time, or

too much time elapsed after entering in the user code before pressing the “1” and “4” . Turn the system off by entering in the code and press stop. After the LED is not lit by the stop button, start at the beginning of this section again.

After the flashing of the stop LED is obtained, enter in the new four digit number followed by the start button, and then re-enter the four digit number followed by the start button.

“X-X-X-X” → “Start” → “X-X-X-X” → “Start”

After pressing the start button the second time, the system will go into accessory mode. If it does not enter accessory mode, type the current user code in and press the stop button then proceed to the beginning of this section.

Navigation Lights

The switch labeled “Nav./Anchor” on the bow and console keypads controls the operation of the navigation lights. On the first key press, the bow navigation and stern anchor lights will turn on. On the second press, the bow lights will turn off and the anchor light will remain on. On the third key press, the anchor light will turn off.

Aerator System

There are two livewell buttons, one labeled “1” and the second labeled “2”. livewell button “1” is for the main well and “2” for the bait well. Pressing the buttons once will turn on the pump and pressing a second time will turn off the pump. While the pumps are running, you can set the livewell timer for a desired run time for the pumps. The timer can be adjusted in three increments, “L, M, and H”. The “L” setting is 1 minute on and two minutes off. “M” is 5 minutes on and 1 minute off. “H” is 15 minutes on and two minutes off.

Fuel System Functioning Indicator

The LED with the fuel pump located next to it is a fuel functioning indicator. This LED will tell you if a short is present between the sending unit and the gauge.

Bilge System

The switch labeled with an image of the water leaving the sump of the boat controls the bilge pumps in the boat. Pressing this button once will activate a manual bilge pump; pressing again will activate the auto bilge and the manual bilge; pressing again will turn off all bilge pumps. The automatic bilge pump float switch always has power. The float switch is located in the sump of the boat.

Interior Lights

Pressing the button with the light bulb activates the interior lights on

the boat. Pressing this key 1 time will activate the lights; pressing the key a second time will turn off the lights. If the lights are left on, they will automatically turn off after five minutes.

Dimming the Instrument Lights and Key Pad Lights

If the boat is equipped with the standard gauges, it is possible to dim the gauge lights and keypad lights for night driving. First turn the keyless ignition to the run position and press the interior light button leaving the button depressed. You will see the gauge lights and keypad lights oscillate from dim to bright. When the desired brightness is obtained, release the interior light button.

Accessories

There are five accessory functions labeled “A, ACC, A1, A2, and A3”. The “A” accessory will drive the oxygenator option. All other accessories buttons will drive any device up to 5 amps. Pressing the button once will turn the accessory on; pressing a second time will turn the accessory off.

Horn

The button with the image of a trumpet is the horn button. Pressing and holding this button will sound the horn; releasing this button will turn the horn off.

Trim

On the bow keypad, the switch with the up arrow controls the trim up and the switch with the down arrow controls the trim down. Pressing and holding the button will allow the trim to function. Releasing the button will cause the trim to stop.

Back Lighting

The back lighting will illuminate the keypad. After waking up the system, it will turn on for 60 seconds or while in the wake mode, it will turn on after any key press for 60 seconds.

Resetting a Breaker

If a circuit causes the breaker to throw, it is indicated by a flashing LED. The LED corresponding to the thrown breaker will flash by its switch along with the stop LED. If the stop LED is the only LED flashing, one of the un-switched outputs (trim, 12V, radio, auto bilge float switch, electronics, or key on engine hot) has thrown a breaker. To reset the breaker, press the switch leaving it held in for five seconds. If the light remains flashing there is a direct short present. If the light stops flashing, the breaker has been reset.

SALTWATER SERIES DIGITAL SWITCHES 191, 223, 2000, 2200, 2300, 2400

Wake-up and Sleep Mode

To reduce power consumption, the keypad and power module can shutdown their supply. In this mode, however, only the float switch of automatic pump is powered. The system is put in wake-up mode when any key of the keypad is pressed, ignition signal is on, or float switch is activated.

When main 30A breaker is open, the keypad and power module are not powered. DC Switching cannot activate its loads.

When the main 30A breaker is closed, the power module and the keypad are powered. After 4 hours of no switch activity, if livewell pumps are not in function and engine ignition is not activated, the power module and the keypad will go in sleep mode.

Navigation and Anchor Lights

The navigation light switches on keypad control the operation of navigation and anchor lights. On the first key press of the switch, both navigation and anchor lights are turned on. On the second key press of the navigation switch, navigation light turn off and anchor light remain on. On the third press of the navigation switch, anchor turns off. The indicator brightness will dim when navigation or anchor lights are on.

Aerator System

The livewell (labeled 1) and livewell timer switch control the rear livewell. Pressing the livewell (1) switch on keypad turns on the rear well fresh pump. Pressing the livewell (1) switch again will close both rear well fresh pump and rear recirculate pump. When either rear pump is on, the livewell timer can be used to start a periodic aeration cycle. Pressing the livewell timer once starts the low aeration cycle of one minute on and two minutes off. On a second key press of the livewell timer, the medium aeration cycle of five minutes on and two minutes off. When a third press of livewell timer, the high aeration cycle of 15 minutes on and two minutes off starts. The fourth key press of livewell timer will turn off the timer function. Rear activated pumps only will follow the cycle time.

Bilge System

The bilge switch on the keypad controls the bilge system. The float switch always has power. Pressing the bilge switch once activates the bilge pump by overriding the float switch. Pressing the switch a second

time deactivates the override output.

Accessories

There are four accessory functions labeled A1 (optional bilge pump), A2 (optional washdown), A3 (optional aerator), and A4 (optional radio). Pressing the corresponding switch will turn on that accessory.

Horn

Pressing and holding the switch activates the horn. Release the switch for stopping the horn.

Interior Light(s)

Pressing the interior light switch will turn on that accessory. Pressing the switch again will turn off the accessory.

Instrument Light(s)

The instrument light output is activated when the ignition input receive a +12V signal. Instrument light, keypad status LED and backlighting LED level can be adjusted by pressing and holding the instrument light switch.

Back Lighting

The back lighting is activated when module is awake and dimmed down when nav. light, anchor light or instrument light is activated.

Function Switch Open Breaker

If function switch breaker is open, corresponding LED will flash. Press and hold switch for five seconds to close breaker. Find fault, if problem arises again.

Unswitched Outputs 1 to 4

These outputs are activated when main breaker is closed and system is awake. Since these outputs do not have associated switches and LEDs, horn LED will indicate failure by flashing. Pressing the horn switch for five seconds will reset the four unswitched breakers.

Z COMANCHE

Wake and Sleep Mode

Sleep mode will cause the keypad to reduce power consumption by reducing live circuits. For the keypad to enter the sleep mode, it will require the main 30 amp breaker to be on and no switch activity for four hours, all pumps turned off and the ignition is off. When the key pad is in the sleep mode, the accessories will not function. To wake the keypad, you must press one of the following functions: Start, Stop, 1, 2, 3, 4 or any button on the bow touch pad with the main breaker set to the on position. After pressing one of the buttons, you can then proceed with your desired operation. While the keypad is in the sleep mode, the float switch to the bilge still has power and if the float switch is triggered, it will wake the keypad. If the bilge pumps, livewell pumps, or ignition is left on, the system will not enter sleep mode.

Keyless Ignition

Starting the engine:

- Turn the main breaker to on.
- Press on the buttons required to wake the system.
- Enter the following user code unless it has not been changed in order "1-2-3-4".
- Press "Start". After pressing start the LED by the stop button will light putting the keyless ignition switch in accessory mode.
- Press the "Start" button a second time holding it for two seconds and the engine will crank.
- Once the engine has started, release the "Start" button.
- To stop the engine, press the stop button.
- To lock the system after stopping the engine, enter the user code "1-2-3-4" and then press "Stop".

To choke a carbureted engine:

Press the "Start" and the "1" key simultaneously while starting the engine.

To change the user code:

Wake the system up by pressing one of the buttons described above. Enter in the current user code followed by pressing the "1" and "4" buttons at the same time. You will have two seconds after entering in the user code to press the "1" and "4" buttons.

"1-2-3-4" buttons → "1" and "4"

Leave the "1" and "4" depressed until the stop LED flashes. If the stop LED does not flash after holding the "1" and "4" down for five seconds, one of the following may have happened: the user code was not

entered correctly or “1” and “4” was not depressed at the same time, or too much time elapsed after entering in the user code before pressing the “1” and “4”. Turn the system off by entering in the code and press stop, after the LED is not lit by the stop button. Start at the beginning of this section again.

After the flashing of the stop LED is obtained, enter in the new four digit number followed by the start button, and then re-enter the four digit number followed by the start button.

“X-X-X-X” → “Start” → “X-X-X-X” → “Start”

After pressing the start button the second time, the system will go into accessory mode. If it does not enter accessory mode, type the current user code in and press the stop button, then proceed to the beginning of this section.

Navigation Lights

The switch labeled “Nav./Anchor” on the bow and console keypads controls the operation of the navigation lights. On the first key press, the bow navigation and stern anchor lights will turn on. On the second press, the bow lights will turn off and the anchor light will remain on. On the third key press, the anchor light will turn off.

Aerator System

Pressing the livewell key will activate two aerator pumps; pressing this button again will turn off the aeration pumps. Pressing the livewell timer button will automatically turn on the aeration pumps and the timer in the “L” setting. The timer can be adjusted in three increments - “L, M, and H”. The “L” setting is one minute on then two minutes off. “M” is five minutes on and one minute off. “H” is 15 minutes on and two minutes off.

Fuel Level

The switch labeled with an image of a fuel pump on the console keypad controls which tanks’ fuel will be displayed by the fuel gauge. When the switch is pressed it will toggle between tank 1 and tank 2. Tank 1 will be on the starboard side and 2 will be on the port side. On models with only 1 fuel tank, the number 2 position will cause the gauge to read empty.

Bilge System

The switch labeled with an image of the water leaving the sump of the boat controls the bilge pumps in the boat. Pressing this button once will activate a manual bilge pump; pressing again will activate the auto bilge and the manual bilge; pressing again will turn off all bilge pumps. The automatic bilge pump float switch always has power. The float switch is located in the sump of the boat.

Interior Lights

Pressing the button with the light bulb activates the interior lights on the boat. Pressing this key one time will activate the lights; pressing the key a second time will turn off the lights. If the lights are left on, they will automatically turn off after five minutes.

Dimming the Instrument Lights and Keypad Lights

If the boat is equipped with the standard gauges it is possible to dim the gauge lights and key pad lights for night driving. First turn the keyless ignition to the run position and turn the Navigation Lights on; then press the interior light button. Leaving the button depressed, you will see the gauge lights and key pad lights dim. To make the lights bright release the interior light button and depress the interior light button. Leaving the button depressed you will see the lights become bright. When the desired brightness is obtained release the interior light button. Once the navigation lights are turned off the gauge lights will become bright.

Accessories

There are five accessory functions labeled “A, ACC, A1, A2 and A3”. The “A” accessory will drive the oxygenator option. All other accessory buttons will drive any device up to 5 amps. Pressing the button once will turn the accessory on; pressing a second time will turn the accessory off.

Horn

The button with the image of a trumpet is the horn button. Pressing and holding this button will sound the horn; releasing this button will turn the horn off.

Trim

On the bow keypad, the switch with the up arrow controls the trim-up and the switch with the down arrow controls the trim down. Pressing and holding the button will allow the trim to function. Releasing the button will cause the trim to stop.

Back Lighting

The back lighting will illuminate the keypad. After waking up the system, it will turn on for 60 seconds or while in the wake mode, it will turn on after any key pressed for 60 seconds.

Resetting a Breaker

If a circuit causes the breaker to throw, it is indicated by a flashing LED. The LED corresponding to the thrown breaker will flash by its switch along with the stop LED. If the stop LED is the only LED flashing, one of the un-switched outputs (trim, 12V, radio, auto bilge float switch, electronics, or key on engine hot) has thrown a breaker. To reset the breaker, press the switch in, leaving it held in for five seconds. If the light remains flashing, there is a direct short present. If the light stops flashing, the breaker has been reset.

SAFETY AND MAINTENANCE TIPS

- Check battery connections periodically to make sure they are corrosion free and TIGHT.
- Alterations of any part of the wiring system should be avoided! Such alterations could cause damage and/or electrical short.
- Inspect wiring connections and terminals periodically for corrosion, etc. and replace as needed. Replacement components should always be of equal or greater rating and quality. We recommend Ranger replacement parts available through your Ranger dealer.
- Always disconnect the positive and negative leads from the battery terminals before installing, removing, servicing, or troubleshooting any part of the electrical system

EQUIPMENT	CLASS A (Under 16' in Length)	CLASS I (16' , but under 26')
Whistle or Horn	Must have means of making an efficient sound signal.	
Visual Distress	None Required During Daytime	All recreational boats, when used on coastal waters, which includes the Great Lakes, the Territorial Seas, and those waters directly connected to the Great Lakes and the Territorial Seas, up to a point where the waters are less than two miles wide, must be equipped with visual distress signals.
Lights	Proper light displays are required to be shown from sunset to sunrise.	
Fire Extinguishers	One B-1 U.S.C.G. or U.L. approved fire extinguisher unless the construction is such that explosive flammable vapors cannot be trapped, there are no closed compartments, no permanently installed fuel tanks on board.	
PFD'S	Type I, II, III, or V for each person aboard.	Type I, II, III, or V for each person aboard and one Type IV.
Numbering	All undocumented vessels equipped with propulsion machinery must be numbered in the state of principle use.	
Certificate of Number	A valid certificate of number showing the numbers issued to a vessel must be on board whenever the vessel is in use.	
Display of Number	Number must be painted or permanently attached to each of the forward halves of the vessel, and no other number may be displayed thereon.	

NOTE: The above information is not conclusive. The owner/operator should check all current Federal, State, and Local Regulations to insure compliance.

Boat operators are required to file a boating accident report with their state boating law enforcement agency when their boat is involved in certain boating accidents as follows:

- 1) There is loss of life or probable loss of life.
- 2) Personal injury requiring medical treatment (other than first aid).
- 3) Damage to property that exceeds \$500.

BOAT DATA

OWNER _____

Address _____

DEALER _____

Address _____

Phone _____

BOAT - MAKE/MODEL _____

Serial No. _____

Key No. _____

ENGINE - MAKE/MODEL _____

Serial No. _____

Drive Unit Serial No. _____

OTHER _____

GENERAL INFORMATION AND MAINTENANCE

- Keep the hubs properly lubricated at all times as described in the hub section of this manual.
- Check all lights before each use of the trailer.
- Check the tires for wear, cuts or other damage before each use and replace as needed. Check tire pressure often. See tire sidewall for maximum pressure and maximum load.
- Check lug nuts for tightness before use. Torque lug nuts to 95-100 ft. lbs.
- Periodically check the winch strap and winch parts for any wear and replace worn parts.
- Remember... a small expense for preventive maintenance is much less expensive now than a road-side breakdown later!

Steps for Determining Correct Load Limit



CAUTION

Trailer tires should be properly inflated and maintained! The load-carrying capacity of your trailer is based on the tire pressure. Inadequate tire pressures can void your tire and trailer warranty and could also lead to an accident damaging to people or equipment!



WARNING

Lug nuts should be properly tightened before each use. Failure to do so could result in loss of a wheel and could lead to an accident causing injury or death.

- (1) Locate the statement “The weight of cargo should never exceed XXX kg or XXX lbs.” on your vehicles placard.
- (2) This figure equals the available amount of cargo and luggage load capacity.
- (3) Determine the combined weight of cargo and gear being loaded on the trailer. That weight may not safely exceed the available cargo and luggage load capacity.

CONTAINED OIL ORBITAL LUBRICATION (COOL) HUBS

2009 model Ranger COOL HUBS have a 3 year “No Touch” warranty. There is no required maintenance for three years from the original date of purchase. If for some unforeseen reason the hub develops an oil leak, it

will be replaced under our limited warranty. Please note that the color of oil will change over time and does not indicate a problem that requires any action.

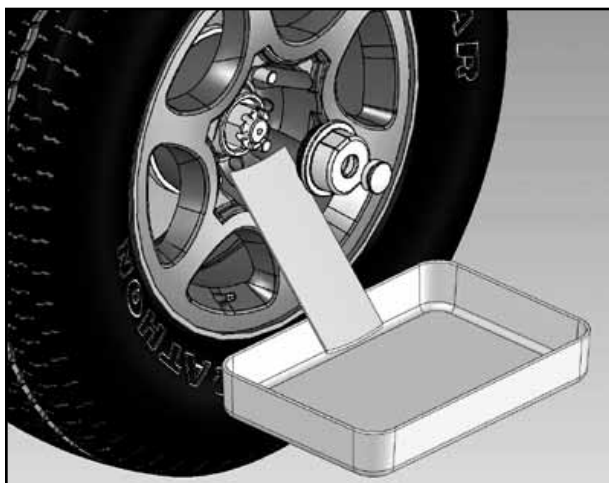
Oil filled hubs can weep out small amounts of oil at the rear seal. When this happens the oil will collect dirt and fall off onto the wheels as black spots. This is not an oil leak. Soap and water will remove this and clean your wheels. An oil leak will leave an oil film on the wheel that you will be able to see.

After three years the hub needs to be serviced by draining and refilling with 50 wt oil.

1. Remove wheel center cap if wheel has one. Do not jack up the trailer or remove tire.
2. Using a piece of cardboard and a catch pan, with the cardboard under the amber center cap, unscrew the center cap and let oil drain on cardboard into catch pan.
3. Once drained and rubber plug removed from amber center cap, re-install the amber center cap till seated on hub. Fill to bottom of fill hole; wait 10 minutes and refill to bottom of hole with oil and install rubber plug. This amount of time is needed for the oil to seep through the bearings so proper level will be shown.
4. Reinstall wheel, tightening lug nuts to 95-100 ft. lbs.

NOTE: It is normal for the oil to change color after a few miles of use.

5. Dispose of oil soaked cardboard and used oil in an appropriate manner.



TRAILER BRAKES

If your trailer is equipped with brakes, follow the safety and maintenance tips listed below for best service.

- Always hook up the brake breakaway cable securely to the tow vehicle (should the trailer come loose, cable will activate the brakes to help slow runaway trailer). Before towing, make sure that the emergency breakaway cable has not been inadvertently set. Reset to normal position by inserting the safety pin in the hole on the clear cover. Pushing down will release the E-stop cable (see Fig. 6, page 68). **Always insert hitch pin after latching coupler to trailer ball.**
- Disc brake trailers are equipped with an electric solenoid valve to prevent the disc brakes from being activated while reversing your trailer. Disc brakes will operate at full capacity in either direction. It is therefore, essential that the wire from the solenoid valve be connected to the reverse light wire of the tow vehicle. When the tow vehicle is put in reverse gear, the solenoid will deactivate the brakes and allow you to back up.

To check proper operation of solenoid valve, place tow vehicle gear shift in reverse (with engine shut off and ignition on). Backup lights should turn on and an audible “click” should be heard at the valve. If lights come on and no “click” is heard, check for an electrical wiring or connection problem. The reverse solenoid is located on the rear of the master cylinder.

- Check cap of master cylinder often for tightness.
- Follow routine maintenance and inspection for disc brakes as outlined in your Disc Brake Manual.



CAUTION

Make sure back up lights **do not** come on when tow vehicle transmission is in any gear other than reverse.

To minimize corrosion, it is necessary for the disc brake calipers and rotors to be rinsed off with fresh water after trailer has been immersed in salt water.



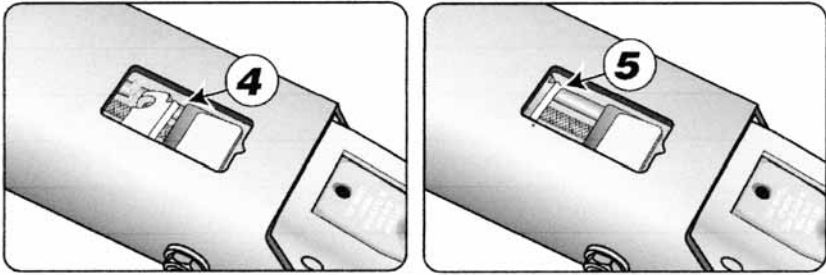
CAUTION

Saltwater model trailers, although designed for the saltwater environment, require specific cleaning and wash-down after each use. Failure to do so will cause excessive corrosion that could lead to trailer damage and part failure, which would not be covered under the limited warranty. Please see your Ranger dealer for proper trailer cleaning procedures.

INSPECTION

To assure continued proper operation of our trailer disc brakes, annual inspection is recommended.

FIG. 6



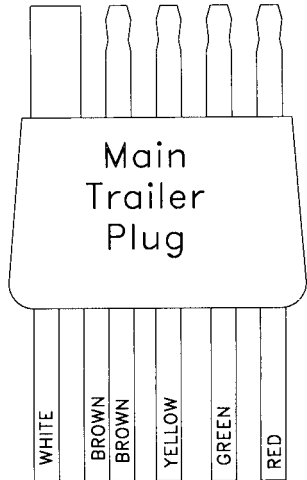
Emergency Brake Disengaged
- Normal Use -

Emergency Brake Engaged
• DO NOT TOW •

RANGERTRAIL WIRING

FIG. 7

- WHITE - Ground
- BROWN - Tail & Clearance lights
- YELLOW - Left stop & turn lights
- GREEN - Right stop & turn lights
- Red - To back-up light wire on vehicle



PADS

Pads must be replaced when 1/16 inch (0.060") of pad friction material is left.



CAUTION

If not familiar with disc brake pad replacement, have work performed by a qualified individual or service shop.

ROTORS

Rotors should be resurfaced by a qualified brake specialist if extreme galling or wear marks are present.



CAUTION

Rotors must be replaced if distance between brake surfaces becomes less than 0.850 inches (21.6 mm) due to wear or machining.

RUST

Check for extreme rust on mounting bolts, flanges and welds, which may weaken the structural integrity of the system. Repair or replace as necessary.

LEAKS



CAUTION

Check for leaks in the brake lines and fittings. Leaks will lead to loss of trailer braking ability. Repair or replace as necessary.

REPLACEMENT PARTS

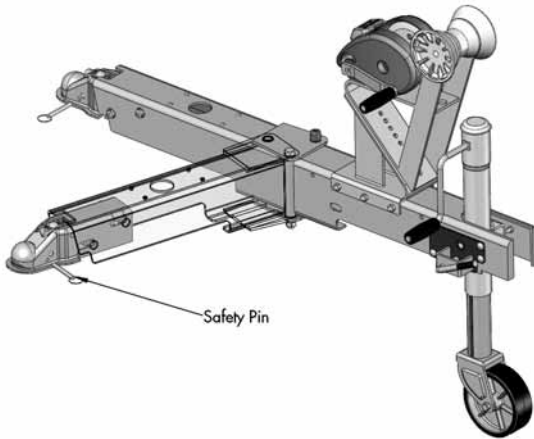
All replacement parts may be purchased from Tie Down Engineering, 5901 Wheaton Drive, Atlanta, GA 30336. If you have any questions or problems with your brake or axle systems, you may contact Tie Down Engineering at 404-344-0000 or visit their website at www.tiedown.com.



WARNING

The braking mechanism on this trailer is designed as an aid in slowing and stopping the trailer. The braking system on the tow vehicle is the primary slowing and stopping system. You will not be able to stop the tow vehicle and the towed trailer as quickly as you could stop the tow vehicle alone.

SWING HITCH



NEVER TOW YOUR TRAILER WITHOUT THE LOCK PIN INSTALLED!

BEFORE TOWING YOUR RANGERTRAIL® TRAILER . . .

Make sure that your tow vehicle is equipped with a **2-inch ball** of machined or forged steel! **Never** use a ball smaller than 1.97 inch diameter or larger than 2.0 inch diameter. Naturally, your tow vehicle should be equipped with a properly rated and substantial towing hitch, well braced and firmly connected to your vehicle. Make sure that your vehicle is properly wired for the trailer light connection.

The height of the towing ball above the ground will greatly influence the tongue weight and the towing characteristics of the trailer. With the trailer attached to the tow vehicle, the base of the ball should be 16" to 17" from the ground loaded.

TOWING YOUR RANGER TRAIL® TRAILER . . .

Back your tow vehicle into position so that the ball is directly under the trailer hitch ball socket. Stop your vehicle's engine and set parking brake. Make sure that the release handle on the trailer hitch is raised and pulled to the rear. This will show that the ball socket is open and ready to receive the tow ball. Then, by turning the tongue jack handle, lower the hitch until it seats fully on the tow ball. Be sure that the tongue jack wheel is slightly clear of the ground. Close the ball socket latch by pushing downward into the recess. The release handle should close smoothly if the ball has been



NOTICE

Aluminum wheels require careful wash down maintenance and are not warranted against surface corrosion.


seated correctly into the socket. If the release handle does not close, **DO NOT TOW THE TRAILER.** Insert safety pin through hole. To make sure that the connection is secure, lower the tongue jack until the ram has lifted the trailer hitch and trailer tongue connection 3 or 4 inches. If the ball does not disengage, you may be reasonably sure that the attachment is secure.

Next, fully retract the jack into the full up position and latch. Connect the safety chains to the connection points on your tow vehicle hitch.

If your trailer is equipped with brakes, hook up the emergency breakaway cable and inspect to see that the breakaway cable button stop is not showing. Please refer to your brake owners manual. If you do not have a brake system manual, please write or call Tie Down Engineering, 5901 Wheaton Drive, Atlanta, GA 30336, 404-344-0000.

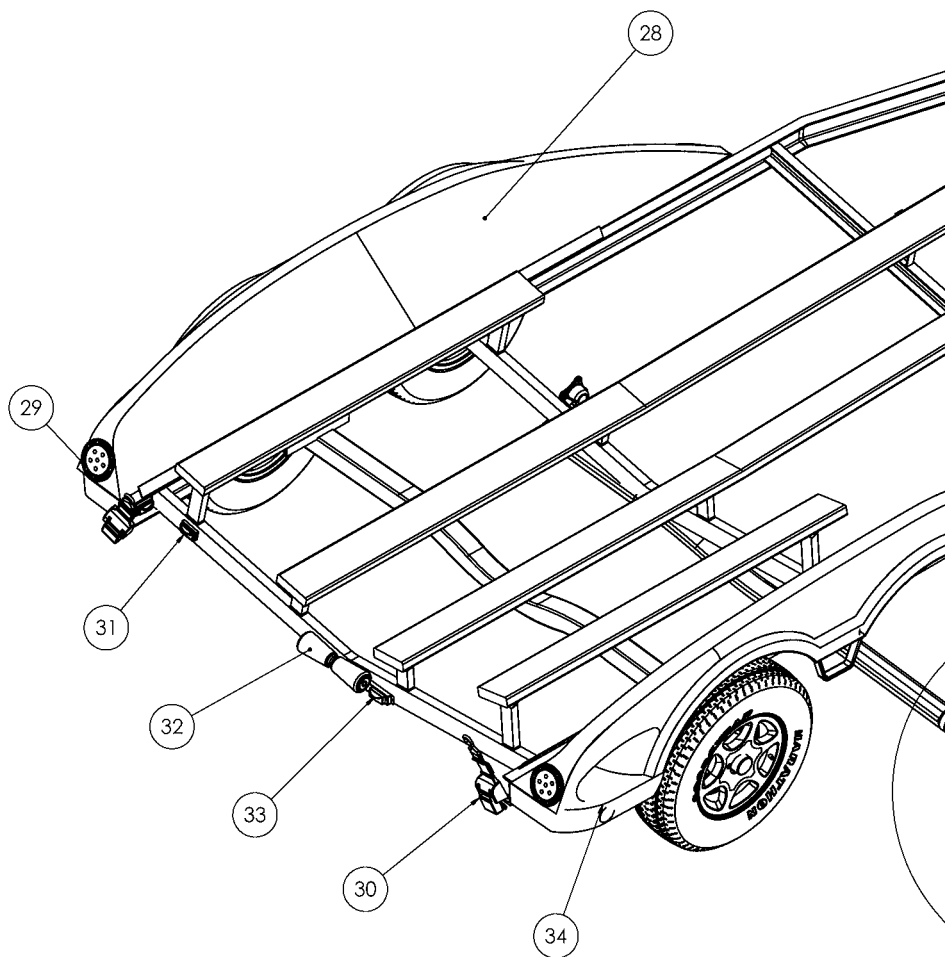
On swing hitch trailers, make sure the hitch is in the forward position and the locking pin is properly installed. Connect your trailer wire harness and test your vehicle lights to make sure that the trailer's brake and turn signals duplicate your vehicles. Remove any trailer wheel chock and carefully pull away.

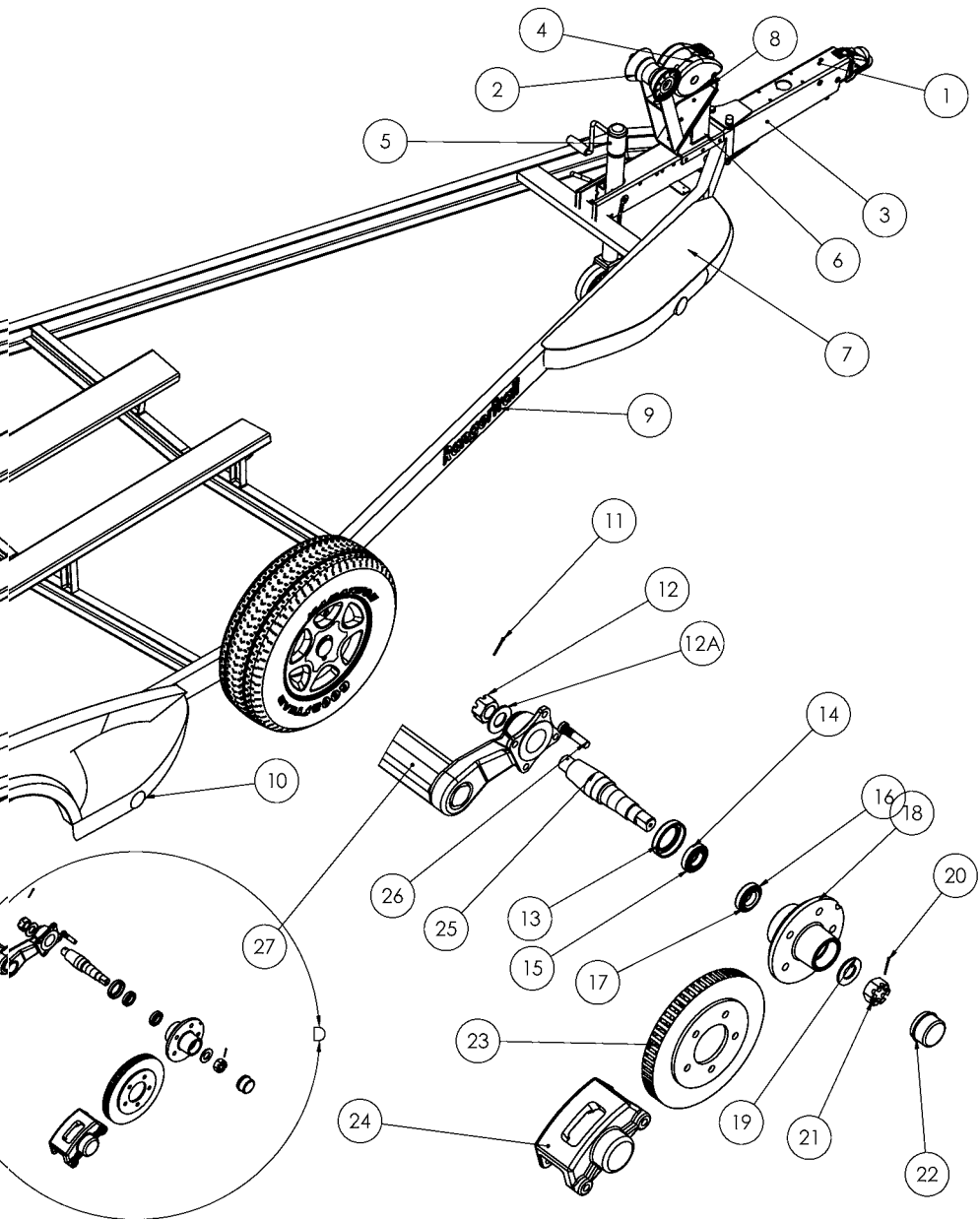
To unhitch your trailer from the tow vehicle, place the trailer on a level and paved surface and chock both trailer wheels to prevent any movement forward or backward. Unhook the safety chains, wiring harness and, if so equipped, the brake break-away cable. Then, using the trailer tongue jack, raise the hitch up and clear the ball. In this position the trailer tongue should be left somewhat bow high so that any water will run out through the drain hole in the stern of the boat.

	CAUTION	Retract jack fully before towing! Replace coupler and ball if worn... do not attempt repair or adjustment.
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HITCH CLASS RATING	MID-SIZE CARS	FULL-SIZE CARS MINI-TRUCKS & VANS	FULL-SIZE TRUCKS, VANS & SUV'S
Class II WC GTW - Up to 3,500 lbs. WC TW - up to 350 lbs.	Medium Duty	Medium Duty	Medium Duty
Class III WC GTW - Up to 5,000 lbs. WC TW - up to 500 lbs.		Heavy Duty	Heavy Duty
Class IV WC GTW - Up to 7,500 lbs. WC TW - up to 750 lbs. WD GTW - Up to 12,000 lbs. WD TW - Up to 1,200 lbs.		Heavy Duty	Heavy Duty

All Ranger Trail trailers that have a GVWR of more than 5000 lbs. must use a Class IV hitch and 6000 lb. 2-inch trailer ball.





RANGERTRAIL® PARTS LIST

#	DESCRIPTION
1.	Brake Hitch
2.	Bow Roller
3.	Lower Winch Stand
4.	Winch
5.	Swing Jack
6.	Upper Winch Stand
7.	Fiberglass Step
8.	Lock Pin
9.	Rangertrail Decal
10.	Side Marker Light Amber
11.	Inside Cotter Pin
12.	Castle Nut
12.a	Washer
13.	Spindle
14.	Inside Bearing
15.	Inside Bearing Race
16.	Outside Bearing Race
17.	Outside Bearing
18.	Hub
19.	Spindle Washer
20.	Spindle Nut Cotter Pin
21.	Spindle Nut
22.	Hub Oil Cap
23.	Disc Brake Rotor
24.	Disc Brake Caliper
25.	Oil Seal
26.	Lug Bolt
27.	Torsion Axle
28.	Carpeted Fender Board
29.	Stop / Turn Light
30.	Ratchet Tie Down
31.	License Plate Light
32.	Keel Roller
33.	Clearance Light Red
34.	Side Marker Red Light

**WOOD MANUFACTURING COMPANY, INC. LIMITED WARRANTY
RANGER® BOATS AND RANGERTRAIL® TRAILERS
LIMITED WARRANTY
2009 MODEL YEAR**

Wood Manufacturing Co., Inc., (“Wood”), warrants to you, the first North American retail purchaser of this 2009 model year boat or trailer, that it will repair or replace defects in materials or workmanship that occur and are reported to Wood or your factory authorized dealer within the applicable warranty periods set forth below, subject to the “What This Warranty Does Not Cover” section below. Warranty coverage is applicable only to products purchased from factory authorized Ranger dealers. Your acceptance of delivery of the warranted Ranger® boat or trailer constitutes your acceptance of the terms of this limited warranty. This warranty gives you legal rights which may vary from state to state.

Defects in structural parts, including the hull, stringers and transom: Warranty Period runs for the duration of the first retail purchaser’s period of ownership. The transferred Warranty Period (see below) to a second purchaser is limited to a maximum of ten (10) years from the original delivery date, regardless of when the warranty is transferred.

Defects in the following factory installed parts and components: Warranty Period runs for three (3) years.

1. Carpet fade
2. Steering helm, cylinder, hoses and cables
3. Aeration pumps and valves
4. Bilge pump
5. Boat electrical system
6. Seat pedestals
7. Fuel tanks
8. Deck hardware such as locks, cleats and fasteners
9. Factory installed battery charger
10. RangerTrail® trailer

Remaining factory installed parts and components: Warranty Period runs for one (1) year.

Defects in the exterior cosmetic gelcoat finish (cracking, crazing or fading): Warranty Period runs for one (1) year.

The applicable Warranty Period runs from the date of delivery to the first retail customer provided that the boat is delivered within twenty four (24) months from the date of manufacture. For boats delivered more than twenty four (24) months after the date of manufacture, coverage will run from the date of manufacture and the first retail purchaser will be entitled to the coverage remaining under the Warranty Periods. All warranties run concurrently.

Coverage remaining under the Warranty Periods may be transferred by an authorized Ranger® dealer to a second purchaser for a \$100 fee (payable to Wood). The transfer must occur within five (5) years of the original retail sale. The transfer fee must be paid within 15 days of purchase of the used boat to transfer the warranty. Proof of purchase date is required. The warranty may only be transferred **once**.

This limited warranty is the sole and exclusive express warranty from Wood. Under the laws of certain states, there may be no implied warranties from Wood covering your boat or trailer, and **all implied warranties (INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE) are excluded and disclaimed where allowed by law.** Any implied warranties arising under applicable law are **LIMITED IN DURATION TO THE APPLICABLE PERIOD OF THIS WRITTEN WARRANTY AND ARE EXPRESSLY DISCLAIMED AFTER THE EXPIRATION OF THE WARRANTY PERIOD. NOTE: SOME**

STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. There are no warranties which extend beyond the description on the face hereof.

What This Warranty Does Not Cover:

1. A boat including its components that has been altered or modified so as to adversely affect its operation, performance or durability.
2. Any damage resulting from an impact with another object.
3. Windshield breakage and leakage around windshields, hatches or other designed openings.
4. Gelcoat finishes including blistering, cracking, crazing, fading, chalking or discoloration (except as noted above).
5. Carpet and upholstery wear, fraying or tearing.
6. A boat which has been overpowered according to the maximum recommended engine horsepower specified on the capacity plate.
7. A boat with an engine setback that is in excess of eight (8) inches, or ten (10) inches on a Z Comanche and Bay Ranger, or twelve (12) inches on a 2410 Bay Ranger.
8. Estimated characteristics such as weight, speed and fuel consumption.
9. Any boat which has been misused, used in a negligent manner, used for racing, used for rental or other commercial purposes, used without normal maintenance, operated contrary to any instruction furnished by Wood, involved in an accident or operated in violation of any Federal, State, Coast Guard or other governmental agency laws, rules or regulations.
10. Loss of time, inconvenience, boat payments, retail charges, travel expense, loss of use, haul out, launch, towing and storage charges, loss of or damage to personal property, or other remedies not specifically allowed.
11. Dealer preparation, cleaning, final adjustments and alignments in preparing the boat for delivery.
12. Trailer tires, paint chipping, rust/corrosion, axle alignment and trailer components manufactured by companies other than Wood.
13. Engines, outdrives, controls, propellers, batteries and other equipment or accessories that are not manufactured by Wood, whether or not warranted by other manufacturers.

Repairs will only be authorized after Wood is satisfied that there is a defect in material or workmanship.

Your **sole and exclusive remedy** under this express warranty or any applicable implied warranty is the repair or replacement, at Wood's sole option, of parts and components covered by this warranty, and **does not include incidental or consequential damages**, which are specifically **DISCLAIMED AND EXCLUDED** from warranty coverage. Note: SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. Any legal action alleging a breach of any applicable warranty coverage must be brought within one (1) year from the date the alleged breach first occurred.

To obtain warranty service, you must return your boat or trailer, including any alleged defective part, to an authorized Ranger® dealer within the applicable warranty period to obtain warranty service. The Ranger® dealer will carry out the warranty procedures on the owner's behalf. All warranty work will be performed at an authorized dealer, at the Wood factory, or at another repair facility that Wood selects. The owner is responsible for the expense associated with transporting the boat to and from the repair facility.

This document contains the entire warranty given by Wood. Wood does not authorize any person or persons, including Ranger® dealers, to change the terms of this express limited warranty, which is Wood's only warranty. Wood reserves the right to change or improve the design or manufacture of Ranger® boats without obligation to modify any boat previously manufactured.

Wood Manufacturing Company, Inc.
Highway 178 North • P.O. Box 179
Flippin, AR 72634
870.453.2222

