



WORLD CLASS CATAMARANS

2002

Owner's Manual 2002

226SF / 246DC / 246SF / 266SF / 266SC / 266LC / 266TE

Hull # EPY _____

WORLD CAT™
OWNERS MANUAL – 2002 MODELS
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APPENDICES:

- A. PANEL, SWITCH & INSTRUMENT WIRING DIAGRAMS

FOR FURTHER INFORMATION, CONTACT YOUR WORLD CAT™ DEALER, OR:

WCC GROUP, INC. ATTN: CUSTOMER SERVICE
801 STATON RD., GREENVILLE, NC 27834
Tel: (252) 754-1948 Fax: (252) 754-1949
e-mail fmunden@worldclasscatamarans.com

“TOPS”

World Class Catamaran’s Program for Total Owner Product Satisfaction

Total Owner Product Satisfaction is a critical part of World Class Catamaran’s business mission, and every member of the World Class Team is dedicated to making your ownership of our products a satisfying and rewarding experience. From the individuals in our production departments that hand-craft every aspect of your boat, through to our local Dealer’s personnel, each is dedicated to this mission and the TOPS program has been developed to assure your complete satisfaction.

It is important to all of us that any problems that may arise are dealt with in a timely and professional manner. All warranty and service matters regarding your World Class Catamaran boat are handled through our authorized dealers. If for any reason you are not satisfied with any aspect of your Dealer’s performance, please contact the owner of the dealership where you made your purchase, fully explain the problem, and ask for assistance in resolving the situation. The owner is usually in the best position to help you, and is concerned with both your overall satisfaction and your future business.

If you do not receive satisfaction after working with your dealer, and you believe that you require further assistance, please WRITE to us at the address below. Please be certain to include the model, identification number, date of purchase, type of power, hours of use and installed accessories. Also provide a dated sequence of events, including actions taken by both you and the dealer. Please include copies of related receipts, photographs, and any other pertinent information including names and positions of dealership personnel with whom you have been working.

Upon receipt of your WRITTEN correspondence, we will contact both you and the dealership to review, and then resolve the situation.

In order to provide a permanent record for all parties, all service and warranty resolutions will take place ONLY through WRITTEN correspondence.

Our mailing address: WCC Group, Inc.
Customer Service
801 Staton Road
Greenville, NC 27834

Or Fax to (252) 754-1949

Or you may e-mail your comments to jhill@worldclasscatamarans.com or visit our website at www.worldclasscatamarans.com

WCC GROUP INC. / WORLD CLASS CATAMARANS LIMITED WARRANTY - 2002 MODELS

WARRANTY COVERAGE

Subject to the limitations of coverage described herein, WCC Group, Inc. (hereinafter referred to as the Manufacturer) warrants that each new World Class Catamaran manufactured is free from defects in material and workmanship under normal care, use and conditions for a period of twelve months initiated by registration of the original owner or subsequent owner unless excepted. It is further warranted to the original owner or subsequent owner that the hull only shall remain free from defects in materials and workmanship for an additional nine (9) years from the date of original purchase for a total of ten (10) years, the hull being defined as the single fiberglass casting which rests on the water. Products that are proven to be defective with the applicable warranty period, when used and maintained according to the Manufacturer's instructions, will be repaired or replaced by the Manufacturer, or one of its dealers, at the option of the Manufacturer, and only after prior authorization by the Manufacturer. All warranty claims in excess of \$200 will require substantiation and photos prior to authorization, at the option of the Manufacturer. Only during the first five (5) years after the original purchase, by following the procedure explained in the Owner's Manual, the original owner may transfer one time, ownership and this warranty to a subsequent owner.

WARRANTY VOIDING

This warranty is voided in its entirety if the boat is powered with outboard engines of a higher horsepower rating than is recommended by the Manufacturer as evidenced on the Coast Guard Certification Plate attached to the boat and/or hull modification in any way.

LIMITATIONS

Warranty coverage for Parts & Accessories does not extend to any Purchaser other than the original purchaser from the Manufacturer's authorized dealer for more than the first twelve months. Some vendors however will cover warranty parts for longer periods of time directly to the Manufacturer's authorized dealer or owner. It may be the elective of the vendor to not cover labor and then it will become the responsibility of the owner.

WARRANTY COVERAGE DOES NOT INCLUDE:

1. Outboard motors, propellers, batteries, adjustment of mechanical steering or engine toe alignment, chrome, windshield breakage and/or leakage, instruments, gauges, electronics, pumps, anti-fouling paint or any component or accessory not manufactured by the Manufacturer and expressly warranted by the manufacturer thereof. Refer to the Owner's Manual for specific warranty details on components and accessories, and vendors who cover their own warranty.
2. Cosmetic issues such as: Gel-coat cracking, crazing, voids after one year, fading or discoloration and graphics.
3. Fiberglass blistering attributable to water penetration of the fiberglass (osmosis) is specifically EXCLUDED from the warranty.
4. Damage caused by misuse, abuse, customer negligence, collision, racing, accidents, grounding, improper wiring, theft, normal deterioration, Acts of God, damage and deterioration resulting from environmental conditions, improper cleaning, maintenance, handling, trailering, lifting, or storage as determined by WCC Group, Inc.
5. UV deterioration, any vinyl or upholstery after 30 days and/or improper cleaning of upholstery or vinyl causing direct damage.
6. Any repairs, adjustments or modifications to the boat and/or any of its components made by anyone other than an authorized dealer, or a pre-approved facility by the manufacturer. Damage or deterioration of the boat and/or its components due to the attachment of hardware, equipment, electronics, other components and/or the installation of said items that are not previously approved and authorized by the manufacturer.
7. Damage which has occurred as a result of the boat being operated as a demonstrator, displayed for sale and/or if the boat is a part of a rental fleet.
8. Fuel contamination of any kind is specifically EXCLUDED from this warranty.
9. Boats used for COMMERCIAL activity including charter and/or tournament or for profit are EXCLUDED from coverage in this warranty.

Repair or replacement, at the option of the Manufacturer, is the exclusive remedy under this warranty. In no event shall the Manufacturer be liable for any consequential or incidental damages, including, but not limited to, personal loss of time, inconvenience, telephone, food, lodging, loss to personal property, loss of revenue and profits, loss of use, storage bills, charges for transportation, service calls and/or charges for hauling (in or out of the water), in order to effect warranty repair, unless provided for under local statute, in which case these exclusions may not be applicable. TO THE EXTENT ALLOWED BY LAW, AND ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND ANY APPLICABLE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED TO THE DURATION THIS WARRANTY, UNLESS PRESCRIBED BY LOCAL STATUE. The rights and obligations of the Purchaser and the Manufacturer under this written warranty may not be varied or modified. WCC Group, Inc. is not responsible for any litigation fees incurred and all litigation is subject to being held in Pitt County, NC.

RESPONSIBILITY OF THE PURCHASER

1. The original purchaser or approved subsequent purchaser must give WRITTEN NOTICE of the claimed defect to an authorized dealer within ten (10) days after first detecting the claimed defect. It must appear to the Manufacturer's reasonable satisfaction that the claimed defect is covered by warranty. The purchaser must give WRITTEN NOTICE to WCC Group, Inc. of any failure by an authorized dealer to respond to a claimed defect within ten (10) days after first notification to the authorized dealer.
2. The boat, including any claimed defective part MUST BE RETURNED TO AN AUTHORIZED DEALER, or elsewhere, as directed by the Manufacturer, or to the Manufacturer with the warranty period for inspection and warranty service. SERVICE CALLS ARE THE SOLE RESPONSIBILITY of the owner. ALL EXPENSES incurred in returning the boat to the authorized dealer and returning the boat to the owner are to be paid by the OWNER. It is highly recommended that you have a trailer for transporting your boat if permissible over state highways to and from your authorized dealer for warranty service.

THIS WARRANTY WILL BE DEEMED NULL AND VOID IF THIS SIGNED WARRANTY, ALONG WITH THE ATTACHED WARRANTY CARD AND DELIVERY CHECK OFF SHEET, CONTAINING THE NECESSARY INFORMATION REQUIRED, ARE NOT RETURNED WITH TEN (10) DAYS OF THE PURCHASE TO FACILITATE THE HANDLING OF ANY CLAIM THAT MAY ARISE UNDER THE TERMS OF THE LIMITED WARRANTY AND TO COMPLY WITH THE FEDERAL BOATING SAFETY ACT OF 1971 BY THE ORIGINAL PURCHASER OR APPROVED SUBSEQUENT PURCHASER.

OWNER'S SIGNATURE (Required)

DEALER'S SIGNATURE (Required)

WCC GROUP, INC. / WORLD CLASS CATAMARANS LIMITED WARRANTY – 2002 MODELS

WARRANTY TRANSFER PROCEDURE

For a transfer fee, WCC Group, Inc. will extend warranty coverage one time to the subsequent owner of 2002 models within the first five years of the warranty period. Notification of a change of ownership, including: hull identification number, names, current addresses and telephone numbers of both the former and new owner, a dated and notarized bill of sale and the appropriate fee (fees may be subject to change/see current schedule below) must be sent to WCC Group, Inc., Warranty Registration, 801 Staton Rd., Greenville, NC 27834 within ten (10) days of purchase by the new owner who will be notified in writing that the transfer has been approved by WCC Group. The subsequent owner and a WCC dealer will need to complete a new warranty card along with a new-signed warranty. The subsequent owner will be responsible for a \$100 deductible, per occurrence for claims filed in accordance with the WCC Group, Inc./World Class Catamarans Limited Warranty. There is no transfer of warranty on a commercial, tournament or for profit boat. WCC Group, Inc. reserves the right to deny transfer of warranty to a subsequent owner.

Within the first year	\$500.00
Within the 2 nd year	\$400.00
Within the 3 rd year	\$300.00
Within the 4 th year	\$200.00
Within the 5 th year	\$100.00
After the 5 th year	-Not Transferable

WCC Group, Inc. reserves the right to modify its products through changes in design and/or material, in prices, or to make changes in colors, specifications, equipment, options, and/or discontinue models or equipment and options without prior notice and without notice or obligation to incorporate changes on models or prior manufacture, at any time throughout the year.

THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

WARRANTY REGISTRATION

Hull Identification No. EPY _____ State and Registration No. _____

Date on the Bill of Sale _____ Actual Delivery Date _____

Engine Information: MFG _____ Model _____ HP _____

Serial # (Port) _____ Serial # (Stbd) _____

Purchaser _____ Date of Birth _____

Address _____

City _____ State _____ Zip _____

E-Mail Address _____

Home Phone _____ Cell Phone _____ Work Phone _____

Selling Dealer _____ Date Received at WCC _____

WORLD CAT TM Component Suppliers

<u>SUPPLIER</u>	<u>PRODUCT(S)</u>	<u>WARRANTY</u>	<u>TELEPHONE#</u>
Bomar	Cabin & Console Portlights	1 yr.	(603) 826-5791
Clarion Marine Audio	Stereo System	1 yr.	(800) 754-9876
Custom Marine Fabrication	Cabin & Console Tops	3 yrs.	(252) 638-2920
Diesel Equip. Co.	Windshield Wiper Assembly	2 yrs.	(800) 222-7159
Dura-Cast	Fresh Water tank	1 yr.	(800) 683-4116
Faria Gauges	Gauges	1 yr.	(800) 473-2742
FloJet	Washdown/Freshwater Pumps	1 yr.	(800) 235-6538
FloScan	TwinScan	1 yr.	(206) 524-6625
Galley Maid	Marine Head	1yr.	(561) 848-8696
Inca	Fuel Tanks	1yr.	(615) 350-7290
ITT Jabsco	Washdown/Freshwater Pumps	1 yr.	(949) 609-5106
Lewmar Marine	Cabin Hatch	3 yrs.	(203) 458-6200
Perko	Bow / Stern Lights	5 yrs.	(305) 621-7525
Phaze II	Electrical Panels	1 yr.	(757) 853-5122
Rule Industries	Bilge Pumps	5 yrs. pro-rated	(978) 281-0573
Rule Industries (div.)	Danforth Compass	3 yrs.	(978) 281-0573
Scandvik	Washdown Faucet & Shower	1 yr.	(800) 535-6009
ShurFlo	Livewell Pumps	1 yr.	(800) 854-3218
Simpson Lawrence	Windlass	1 yr.	(800) 946-3527
SS Marine	T-top (226SF only)	3 yr.	(757) 588-1950
SS Marine	Aluminum Helm Seating	1 yr.	(757) 588-1950
Tampco	Bow Rail	1 yr.	(336) 835-8091
Teleflex	Hydraulic Steering	2 yrs.	(904) 389-4536
Thetford	Porta-Potti	1 yr.	(800) 354-4135
Water Bonnet	246DC & Cabin Windshield	1 yr.	Contact WCC
Windline	Transom Ladder	1 yr.	(310) 516-9812

Note: Contact the listed vendor for component replacement and warranty. Most parts will have the manufacturer's name located on the part. Please attempt to be certain that the vendor that you contact is the supplier of the part required, or see your dealer.

LEISURE CATTM COMPONENT SUPPLIERS

<u>SUPPLIER</u>	<u>PRODUCT(S)</u>	<u>WARRANTY</u>	<u>TELEPHONE#</u>
Ameritex	Bimini Top and Mooring Cover	1 yr.	(941) 751-6131
Clarion Marine Audio	Stereo System	1 yr.	(800) 754-9876
Crane Interiors	All Upholstery	2 yrs.	Contact WCC
Dura-Cast	Fresh Water tank	1 yr.	(800) 683-4116
Faria Gauges	Gauges	1 yr.	(800) 473-2742
FloJet	Water Pumps & Faucets	1 yr.	(800) 235-6538
FloScan	TwinScan	1 yr.	(206) 524-6625
HRO	Windshield	3 yrs.	(219) 854-2772
Inca	Fuel Tanks	1yr.	(615) 350-7290
ITS	Shower Assembly	1 yr.	(616) 396-1355
ITT Jabsco	Washdown/Freshwater Pumps	1 yr.	(949) 609-5106
Moeller	Fuel Tanks	1 yr.	(800)-432-8344
Perko	Bow / Stern Lights	5 yrs.	(305) 621-7525
Phaze II Products	Electrical Panels	1 yr.	(757) 853-5122
Rule Industries	Bilge Pumps	5 yrs. pro-rated	(978) 281-0573
Rule Industries (div.)	Danforth Compass	3 yrs.	(978) 281-0573
Sierra	Fuel Filters	1 yr.	(217) 324-9445
Teleflex	Hydraulic Steering	2 yrs.	(904) 389-4536
Thetford	Porta-Potti	1 yr.	(800) 354-4135
Windline	Hand Rails & Ladders	1 yr.	(310) 516-9812

Note: Contact the listed vendor for component replacement. Most parts will have the manufacturer's name located somewhere on the part. Please attempt to be certain that the vendor that you contact is the supplier of the part required, or see your dealer.

World Class Catamarans
ADVISORY LABELS – 2002 World Cat

WARNING

AVOID SERIOUS OR FATAL INJURY.
DO NOT OCCUPY FORWARD SEATS
WHILE UNDERWAY.

Model 266SC Only
Bow Area Seating

CAUTION

TORQUE ENGINE MOUNTING BOLTS TO
40 FT. LBS. (4.56Kgm) ONLY.
RETORQUE PERIODICALLY,
BUT AT LEAST ANNUALLY.

ALL MODELS
Transom Area
(2 Installed)

DANGER

STOP ENGINES BEFORE USE
OF BOARDING LADDER.

ALL MODELS
Center Transom Area

WARNING

DO NOT LEAVE BATTERY SWITCH
IN "ON" POSITION WHEN BOTH
ENGINES ARE RUNNING

ALL MODELS
Starboard Battery
Compartment

WARNING

LEAKING FUEL IS A FIRE & EXPLOSION HAZARD.
INSPECT FUEL SYSTEM REGULARLY FOR LEAKS
& CORROSION, BUT AT LEAST ANNUALLY.

ALL MODELS
Battery Compartments,
Fuel Vents, Fill Hoses,
Access Ports

World Class Catamarans

ADVISORY LABELS – World Cat 246DC

Your Model 246DC World Cat boat is equipped with a three-piece safety glass windshield. The center portion is a hatch (door) that allows access to the bow area of the boat. This hatch must be kept in the closed position at all times when the boat is being operated. There is extreme danger to the passengers should the door be left open during operation as the wind flow could cause it to suddenly close and severely hurt anyone standing between the two consoles.

Please caution all passengers as to this danger. The following warning label is installed on the door to remind you of this potential hazard.



CARE, CLEANING & GENERAL INFORMATION

Some simple maintenance tasks performed on a regular basis will keep your WORLD CAT in top condition. Even if you are a seasoned skipper, we suggest that you spend a few minutes reviewing the following information. If you have further questions, talk with your dealer for specific recommendations.

GENERAL CARE

The gelcoat surface of your boat is the best available, and is formulated to resist UV degradation for many years. However, accumulated dirt and mineral deposits will cause the finish to lose that "showroom" look more rapidly. Regular washdowns with fresh water and the use of a mild detergent, such as Ivory liquid, will extend that new boat look. In addition, an occasional coat of marine paste wax will further protect all surfaces. Use of harsh chemical or abrasive cleaners is NOT recommended.

STAINLESS STEEL

Contrary to popular belief, stainless steel is not "stainless." Without proper care, it can rust and discolor gelcoat surfaces (bleeding). Regular washdowns with fresh water and detergent will lessen that possibility. Occasional waxing or wiping down with a product such as Corrosion-Bloc will protect the stainless steel components. NEVER USE STEEL WOOL on rusted areas. It will scratch the protective surface, causing irreparable damage. Avoid the use of any product not specifically designed for use on stainless steel, and check to make certain that other nearby surfaces will not be damaged through such use. For further information, refer to the care pamphlet included with this Manual.

SUNBRELLA

Sunbrella should be cleaned regularly before dirt and mineral deposits become embedded in the fabric. Lightly soiled Sunbrella can be cleaned without removal from the installation. Brush off loose dirt, etc., wet down with fresh water and clean with a mild solution of Ivory liquid and lukewarm water.

For heavily soiled fabric, removal from the frame is necessary. Soak in a solution Ivory liquid and lukewarm water. Allow the fabric to soak brush out stains with a soft bristle kitchen scrub brush. Rinse the fabric repeatedly in cold water to remove soap residue. Allow the fabric to AIR DRY completely before re-installing.

NEVER store any Sunbrella while wet or dirty, or in a moist unventilated area. ALWAYS roll the fabric instead of folding, particularly on side curtains with clear plastic windows. To prevent cracking, curtains with plastic windows should be stored inside when not in use and not stored in cold temperatures. Roll Bimini tops carefully around the collapsed bows and cover with the storage boot.

ZIPPER & SNAPS

Occasional light lubrication with Corrosion-Bloc will keep these parts operating smoothly. Avoid spraying lubricant on adjacent fabric or acrylic surfaces.

CLEAR ACRYLIC, VINYL WINDOWS & PORTS

Clean with a mild solution of Ivory liquid soap and lukewarm water, using a soft cloth. Use of Pledge furniture polish (NOT lemon-scented) will extend the life of flexible clear vinyl and prevent shrinkage. If scratched, use a product made for clear acrylic scratch removal. Use of automotive products such as Armorall may permanently cloud the surface. Always roll the canvas and clear acrylic, vinyl windows when storing. DO NOT FOLD AND CREASE.

INTERIOR CUSHIONS (Cabin Model Only)

Brush and/or vacuum to remove loose dirt. In case of spill and/or stain, remove excess with a damp cloth. Clean with a 1:1 mix of Whisk liquid house cleaner and lukewarm water, applying the foam only with a soft brush. Do NOT saturate. Rinse with clean water and dry. Use straight applications of concentrated cleaners such as 409 or Fantastic spray cleaner, if needed. If absolutely necessary, use a 1:1 mix of ammonia and water to remove the most stubborn stains. Pre-test a small, inconspicuous area before proceeding. Always allow thorough AIR DRYING before placing cushions back in the cabin.

VINYL CUSHIONS

Regular washing with a solution of water and Ivory liquid as part of general boat care is recommended. Exterior cushions are closed-cell foam. Use a protective product specifically formulated for marine vinyl to provide UV protection. Use of automotive products such as Armorall may deteriorate surfaces and shorten fabric life. Warranty is for UV protection and thread deterioration only.

FRESH WATER TANK

Cleaning or deodorizing the fresh water tank may be accomplished by filling the tank with a 5% solution of household bleach and water after draining the contents of the tank. Add approximately 10 gal. Water, then add 1 gal. Bleach -- fill the remainder of the tank with water. Let stand for several hours. Drain the tank, refill and drain repeatedly until all chlorine odors are removed.

WINTERIZATION/LAY-UP

Refer to the motor manufacturer's manual for storage instructions. Drain all fresh and raw water tanks. Remove batteries and store in a dry cool area (not on a cement surface); maintain charge levels with a trickle-charger. Drain fuel tanks, or fill completely as per local practice or regulation. If full tanks are stored for more than 30 days, it is recommended that a fuel stabilizer be added to prevent degradation. Remove all personal items and portable electronics. Wash the boat thoroughly with a solution of fresh water and Ivory liquid and apply a coat of marine paste wax. If covering, provide some means of ventilation to prevent moisture and/or heat damage. All pumps should be drained and prepped for winterization to keep pumps from freezing and cracking.

BOTTOM PAINTING

If your WORLD CAT is to be left in the water for extended periods, it is strongly recommended that an application of high-quality bottom paint be applied to protect against marine growth and deteriorated performance. It is strongly recommended that you apply an epoxy barrier coat before applying bottom paint to your New World Cat for the first time to help ensure longer protection. Bottom painting is NOT an absolute protection against gelcoat blistering and it is NOT warranted. Follow all manufacturer precautions regarding the use of personal protective equipment, etc. Hint: To establish the waterline for masking, put the boat in the water for a few days to establish a "scum line" and mask off accordingly.

EPOXY BARRIER COATING

For the prevention of osmosis on new hulls an epoxy barrier coating is the first step. Multiple coats are required (usually 2 to 4) until a dry film thickness of 12 to 15 mils. (Fifteen thousandths of an inch) is reached. Each coat may be applied in succession after the preceding coat has cured to a tacky stage. After the final coat has reached the tacky stage, the antifouling paint may be applied. Following this procedure will eliminate the need for sanding between coats, greatly reducing time and labor.

LEACHING ANTIFOULING BOTTOM PAINTS

Leaching antifoulings can have either soft, semi-hard, or hard finishes. In general, the harder finishes are used by the stronger, longer lasting paints and the softer finishes are used in more economical paints for cooler, low-fouling waters. All these paints function by the slow dissolution of water soluble portions of the paint film, releasing (leaching) the cuprous oxide into the water. Eventually, as the paint dissolves and leaches copper into the water, the water insoluble portion of the film is left behind on the surface, which prevents further leaching of the paint. The depleted paint film must be sanded off before the boat is repainted.

ABLATIVE ANTIFOULINGS

Ablative antifoulings also function, to a degree, by leaching the toxicant into the water. But more importantly, ablative antifoulings also function by the controlled erosion, or ablation, of the paint film. This is achieved by engineering the solubility of the paint resins so that as the active ingredient is leached into the water, the depleted film left behind is so weakened that it polishes right off as the boat moves through the water. This controlled erosion results in a continuous renewal of antifouling surface, and multiseasonal capability. And, since the paint film polishes away with use, much like a bar of soap, there is no depleted paint film on the surface which must be sanded off before recoating, greatly reducing the sanding required each year.

LIFTING/DRY-STACK STORAGE

The WORLD CAT may be lifted and stored through the use of the (optional) bow lifting eye and the dual transom eyes. Use a spreader bar at the stern to prevent damage to the outboard motors. Slings may also be used for lifting only, taking care to support the stern just aft of the fish box and forward, at least at the front of the console or the cabin windshield. A "cat's cradle" from FLOAT-ON is recommended for long-term dry storage. (Do NOT store your boat on slings for prolonged periods of time. Lifting the boat with a forklift may be accomplished through the use of slings, with a supportive lifting platform (see your dealer) or through the center of the tunnel, if the forks can be collapsed sufficiently. Because of the rounded bottom of the hulls and the narrow chines, it is specifically recommended that your dry stack operator NOT attempt to lift the World Cat from the outside of each hull.

TRANSDUCERS

Transducer mounting is more difficult on a Power Cat due to the narrow hulls requiring a transom mounting point near the outboards; a possible cavitation problem may result. With the advent of higher power transducers, it is possible to mount them inside the bilge at the bottom, just forward of the bilge pumps (not in silicone - refer to the manufacturer's instructions). For tri-ducer installations (depth, temp, speed), it may be best to purchase a separate speed and temp sensor to mount on the outside of the transom.

WCC is now offering a factory-installed 50/200 KHZ 600-watt bronze, low profile, 8-pin transducer installed in the starboard sponson near the transom. If this option is ordered after the boat has been built, it will be necessary to fiberglass a small block for mounting the transducer. This unit is for depth only and extends 5mm (0.19) below the hull of the boat. Before you purchase your electronics, you need to make sure that your electronics will accept our transducer based on KHz and adapter pins. Some electronics are proprietary and their cables and pins will not work. The transducer supplied is AIRMAR's Model B117 and it will work with many quality depth finders and fishfinders. Some manufacturer's models will plug directly into the 8-pin connector, but others will require an adapter that is available through GEM ELECTRONICS Co. They can be reached at (843) 394-3565. When ordering, please provide them with the exact model number and brand name of your depth finder or fishfinder. Also, they can provide extra lengths of cable for the adapter if needed.

GEM ELECTRONICS CO. can also assist you with the selection of a high quality speed / temperature sensor that is suitable for installation on the transom of your World Cat.

For additional information, please contact Ken Comfort at WCC's Technical Support Group.

WORLD CAT™

RIGGING INFORMATION

Note: These are general recommendations for the proper rigging of a World Cat. In all cases, however, the experience of the installation technician regarding safe procedures should prevail.

Motor Mounting Transom height is 25", requiring the use of x-long 25" shaft motors. The installation height will be slightly higher than on a conventional monohull to allow cavitation to occur within reasonable limits to provide the best acceleration. Generally, the cavitation plate height is the best reference to determine which bolt hole to use – the plate should be level with the bottom, or no higher than ¾" above the bottom. Higher installations may cause bow steering conditions, may require the use of low water pickups to prevent overheating and may also result in premature blow-out of the props; therefore, extreme mounting heights are not recommended. Motor mounting bolts should be torqued to 40 ft. lbs. (4.56 Kgm) **ONLY**. Re-torque mounting bolts periodically, but at least annually.

Motor Toe It is recommended that the relationship between the two motors' direction of thrust (toe) be set at **zero** to achieve the lightest steering effort and best performance. To adjust toe, refer to the steering section below.

Steering Adjustment The dual cylinder hydraulic steering system features a "liquid tie-bar" to allow both motors to respond to the helm in unison. (Refer to the diagrams in this manual.) Occasionally, it will be necessary to realign the motors due to normal use. To align the motors, first center the starboard motor by turning the helm. Then, **open** the system ball valve (located beneath the inspection port on the dive platform) by turning it 90 degrees. This will isolate the port motor from the system and allow it to be moved manually. Center the port motor by hand, then **close** the ball valve and replace the inspection cover port. Note: It may become necessary to purge ("bleed") the hydraulic system of air from time to time. Refer to the Teleflex steering system bleeding instructions on the next page. Adjustments to the engines and/or mounting of engines on a prerigged boat are not covered under warranty by World Class Catamarans.

Trim Tabs Setting the trim tabs properly will provide uniform steering effort as the helm is turned to port and starboard. The tabs serve to neutralize the torque effect of the motors on the steering system. For conventional rotation motors, the tab will be set with trailing edge approximately 3/16" to the **right**. (The adjustment is the same for both motors, if both are standard rotation.) If a counter-rotation motor is installed on the port side, that tab will be set with the trailing edge approximately 3/16" to the **left**.

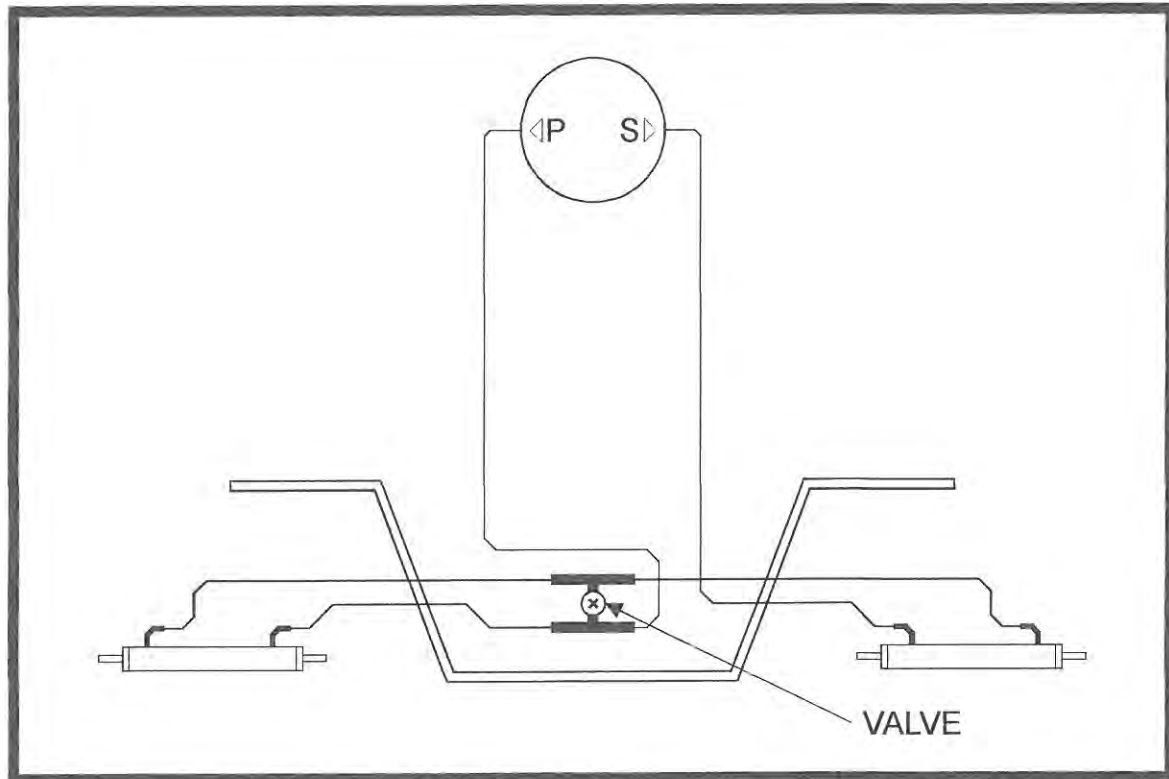
Tilt Angle Install the tilt pin or limiting bolts slightly out to achieve a neutral (straight up & down) position of the motors relative to the hulls. This will reduce any bow steering tendency in the mid-speed range. For Yamaha installations (no tilt pins), it is recommended to trim the motors no further in than 1 bar on the tilt gauges.

Propeller Selection There are a wide variety of OEM and after-market propellers that will provide excellent performance. Your dealer can give customized recommendations based upon your specific requirements. Generally, 3-blade stainless steel props offer better overall performance than aluminum. Propellers with full blade area and cupping (i.e. Mercury Mirage Plus) perform well on power catamarans. Due to different variables, we suggest that you discuss this with your dealer and/or the engine manufacturer.

Steering System - Layout and Components (All Models)

Note: Teleflex requires that all steering system fittings be sealed with Hydraulic Thread Sealant.

AVOID PLACING SEALANT ON THE FIRST (LEADING) THREAD, AS THE SYSTEM CAN BECOME CONTAMINATED LEADING TO STEERING FAILURE. READ INSTRUCTIONS ON TUBE PRIOR TO USE.



Quantity	Description	Part #	Application
1	Helm Pump	1.7 Tilt Helm	All Models
2	O/B Cylinders	HC 5345	All Models
1	20' Hose	HO5120	266SC / 266LC
1	18' Hose	HO5118	246DC / 226SF / 246SF / 266SF / 266TE
3	4' Hoses (pigtail)	HO8304	All Models
1	Whitey Valve	B-43F4	All Models
2	Tube End Filter	600603	All Models
1	Bulkhead Fittings		All Models
1	Valve Bracket		All Models

Steering System - Bleeding Instructions

Refer to the original system owner's manuals purging instructions and read entire text.

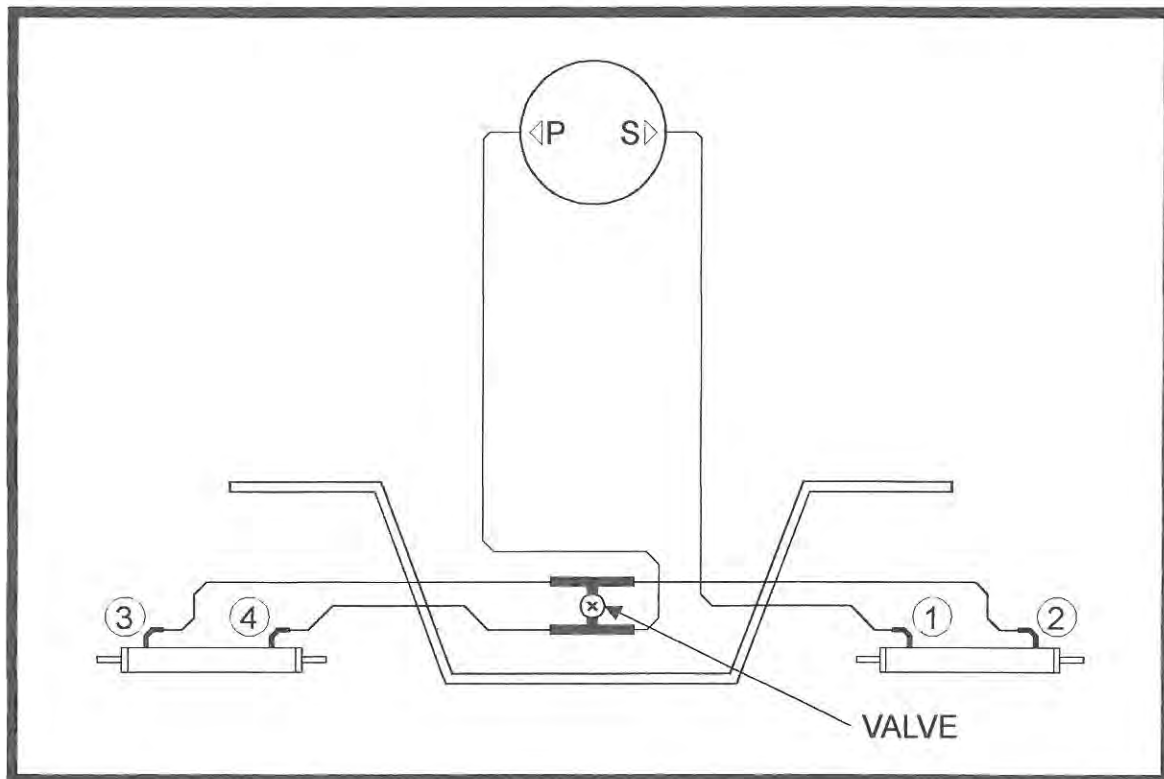
Proceed as follows:

Referencing the cylinder alignment valve installation schematic.

- Fill helm with oil and attach filter device/container to helm (do not overfill)
- Open valve
- Open bleed fitting #1 and pull cylinder shaft all the way on fitting #1 side of cylinder
- Turn steering wheel clockwise until an air-free stream of oil comes forth from bleed fitting #1

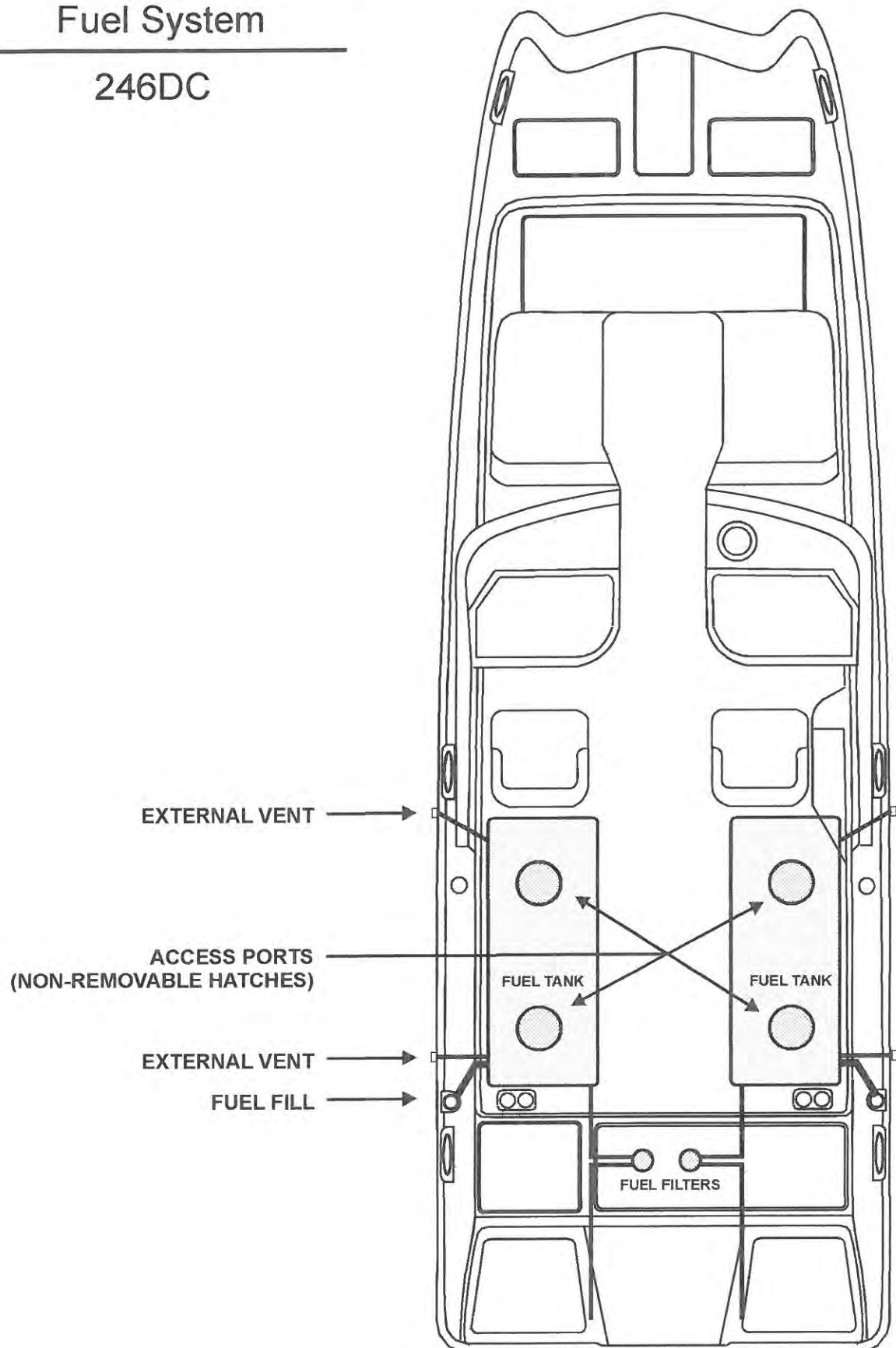
DO NOT ALLOW SHAFT TO MOVE BACK INTO CYLINDER. HOLD WITH HAND TO STOP IT FROM MOVING.

- Close bleed fitting #1
- Open bleed fitting #2 and pull cylinder shaft all the way out on fitting #2 side of cylinder
- Turn wheel counter-clockwise until an air-free stream of oil comes forth from bleed fitting #2, then close bleed fitting #2
- Open bleed fitting #3 and pull cylinder shaft all the way out on fitting #3 side of cylinder
- Turn wheel counter-clockwise until an air-free stream of oil comes forth from bleed fitting #3, then close bleed fitting #3
- Open bleed fitting #4 and pull cylinder shaft all the way out on fitting #4 side of cylinder
- Turn wheel clockwise until an air-free stream of oil comes forth from bleed fitting #4, then close bleed fitting #4
- Turn steering wheel back and forth from hardover to hardover a couple of times. Align cylinders by pulling cylinder rod all the way out on the same side of each cylinder and close valve.



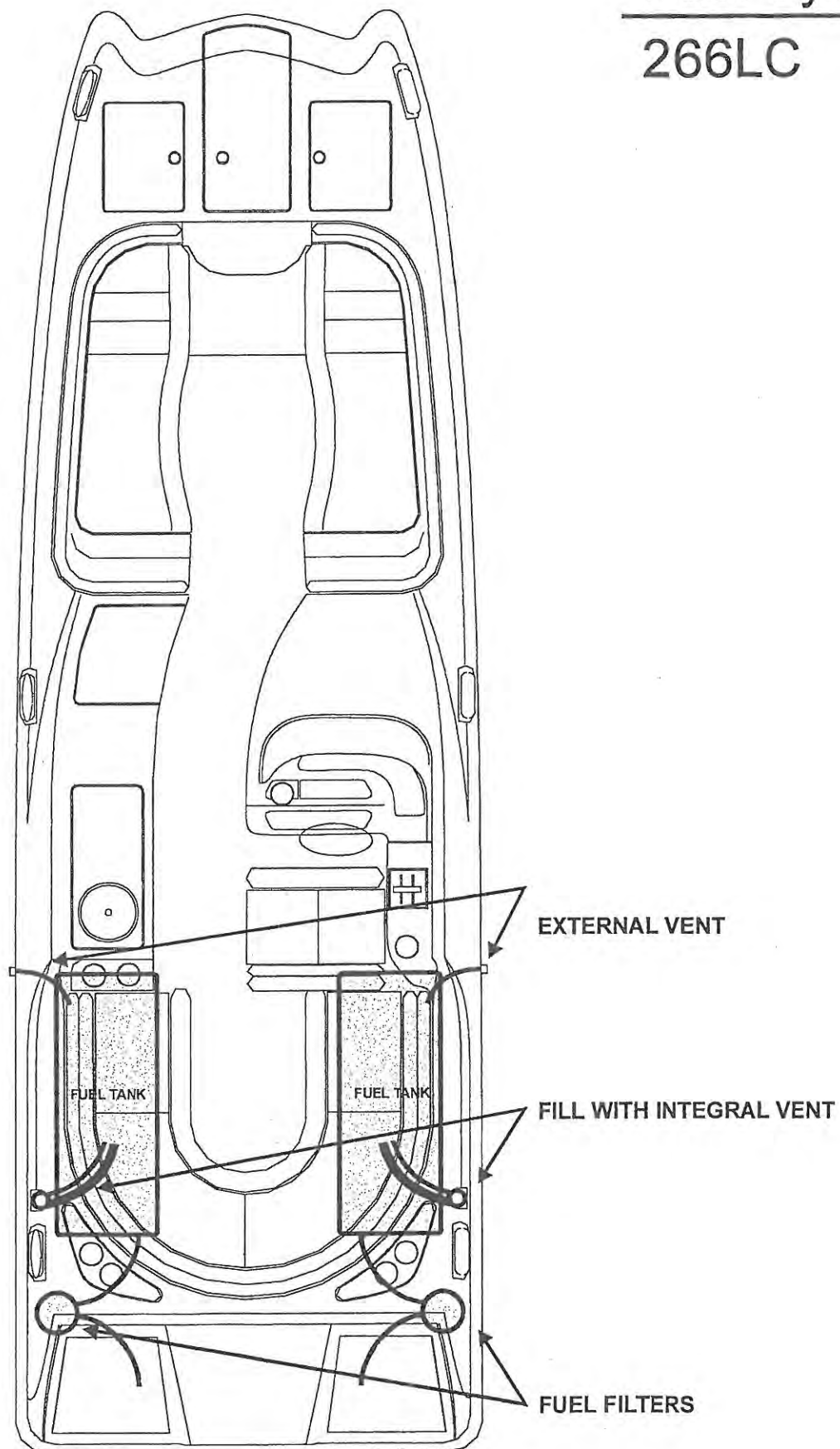
Fuel System

246DC



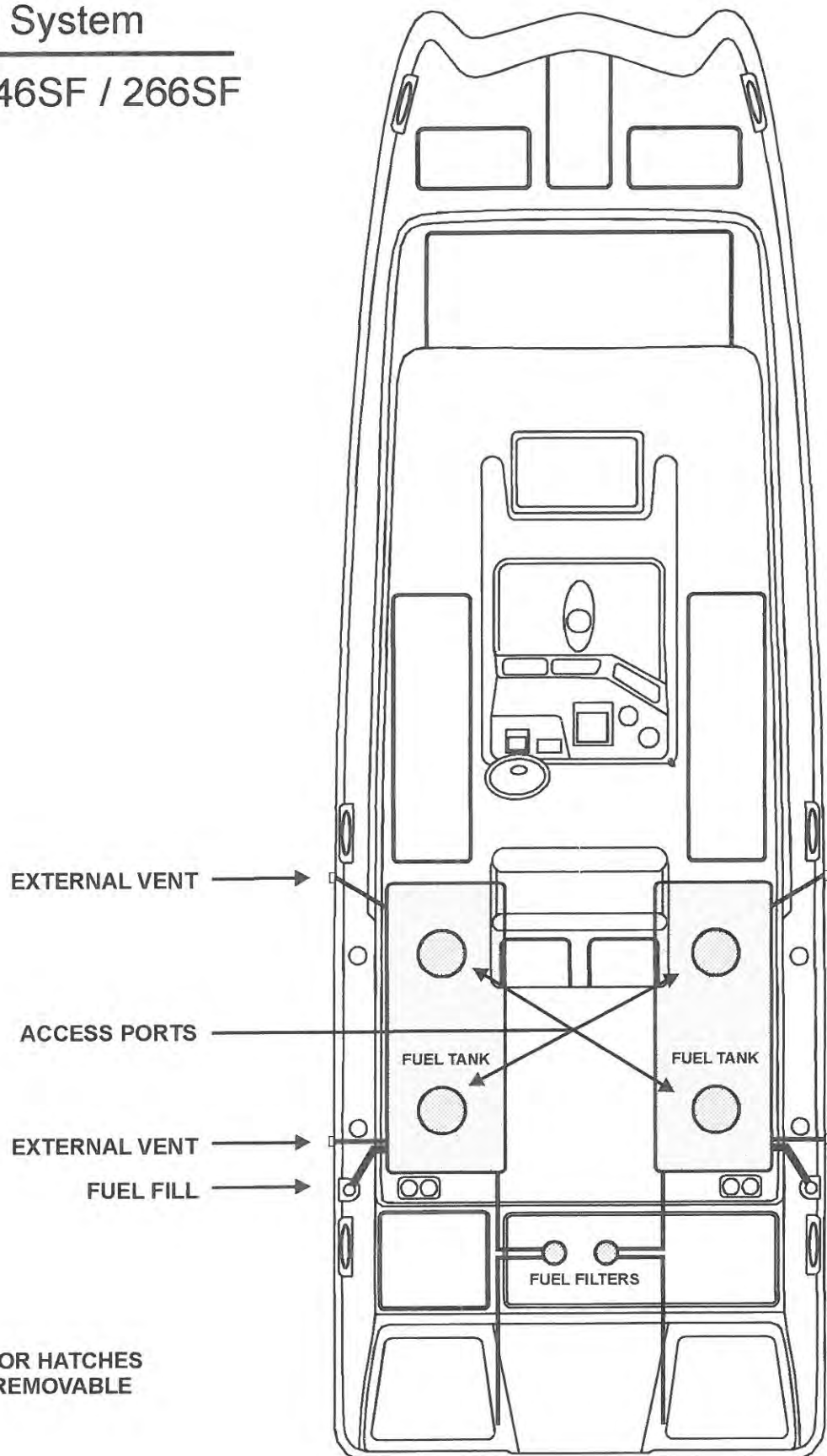
Fuel System

266LC



Fuel System

226SF / 246SF / 266SF

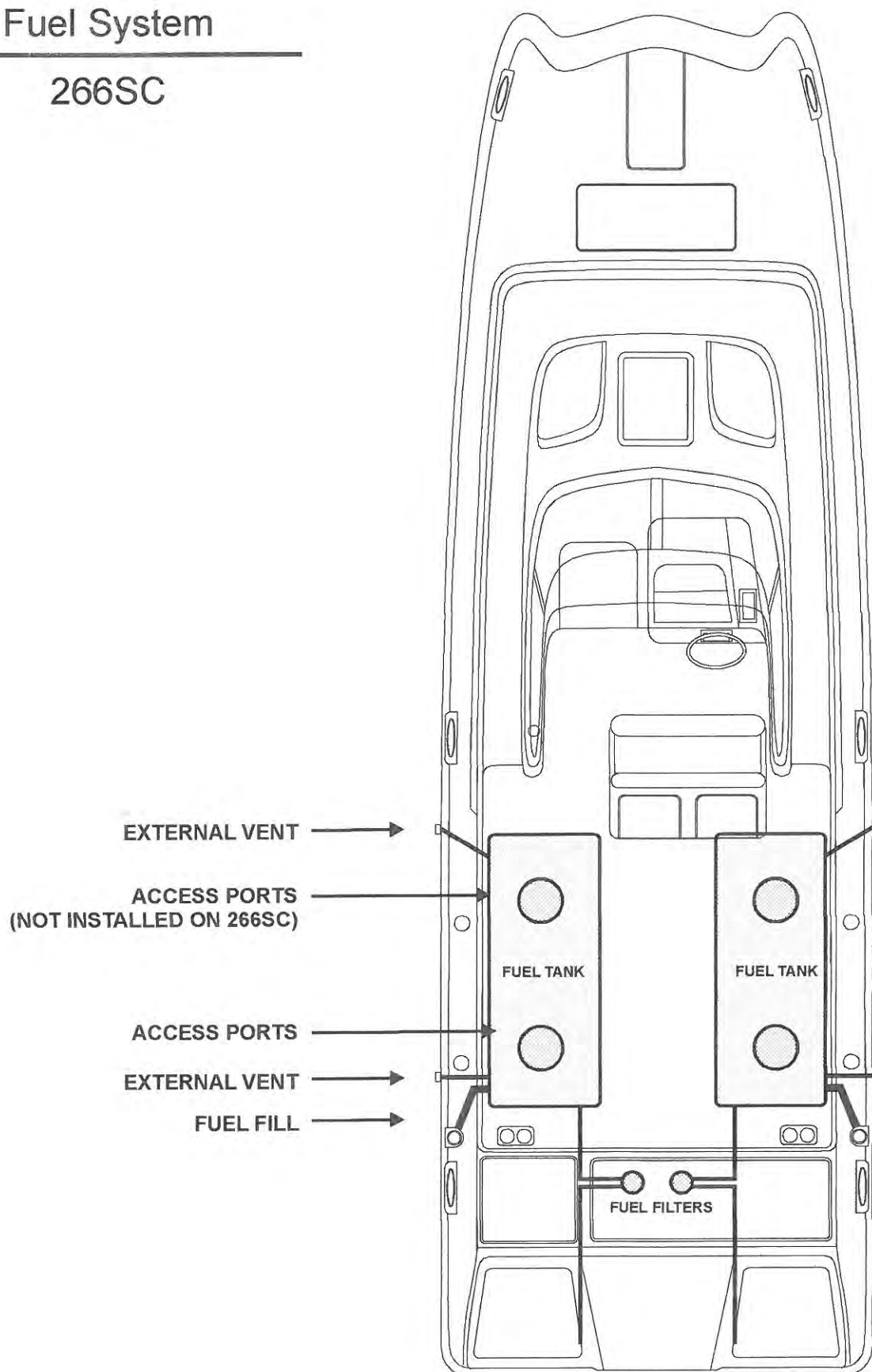


NOTE:

226SF FLOOR HATCHES
ARE NON-REMOVABLE

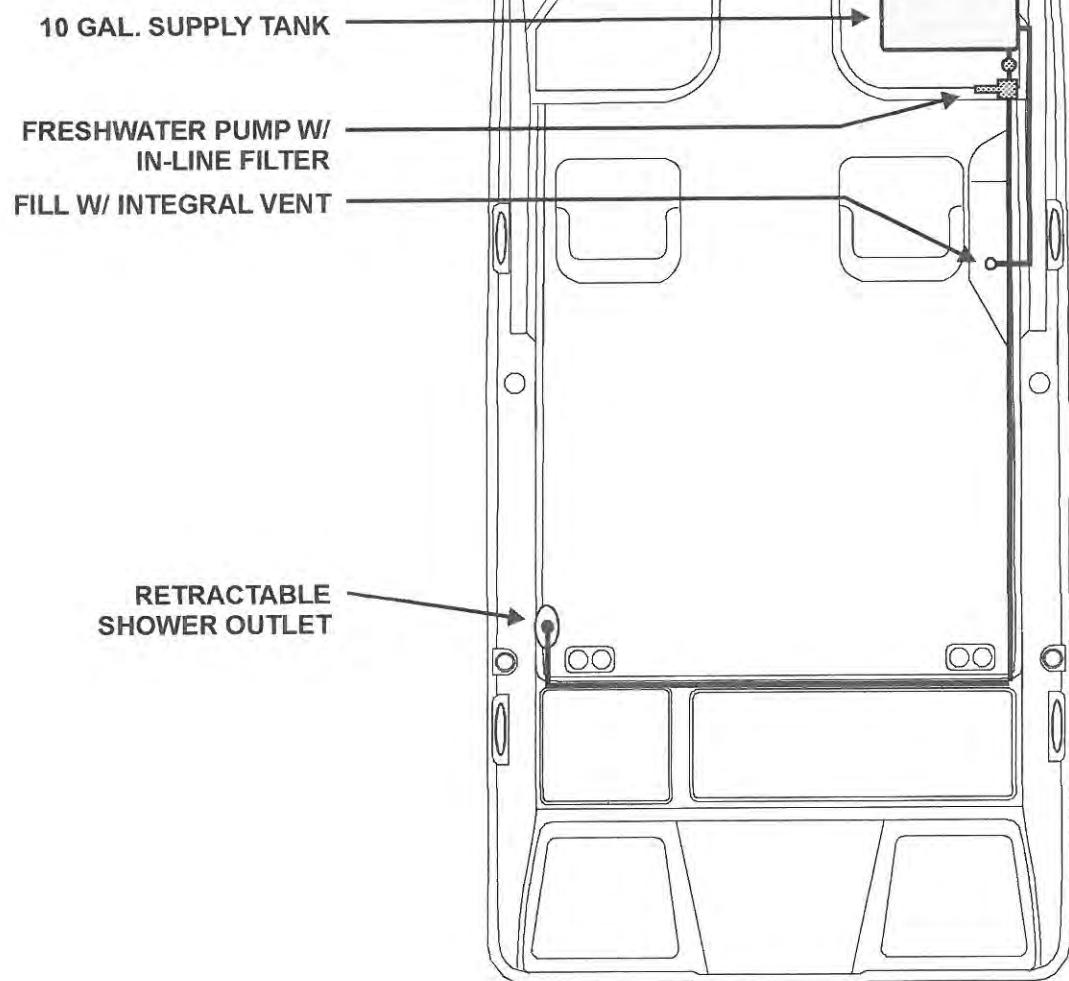
Fuel System

266SC



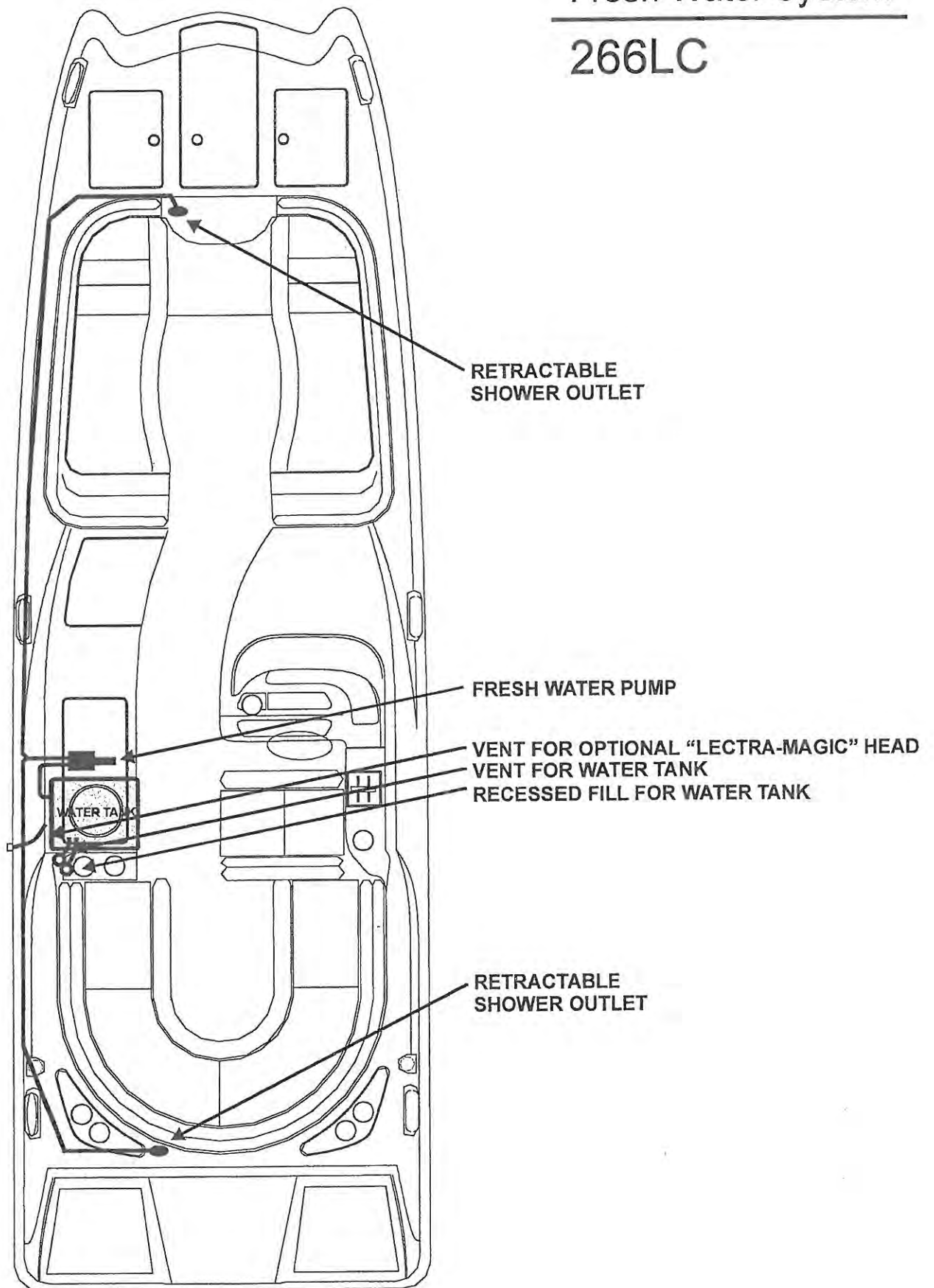
Fresh Water System

246DC



Fresh Water System

266LC



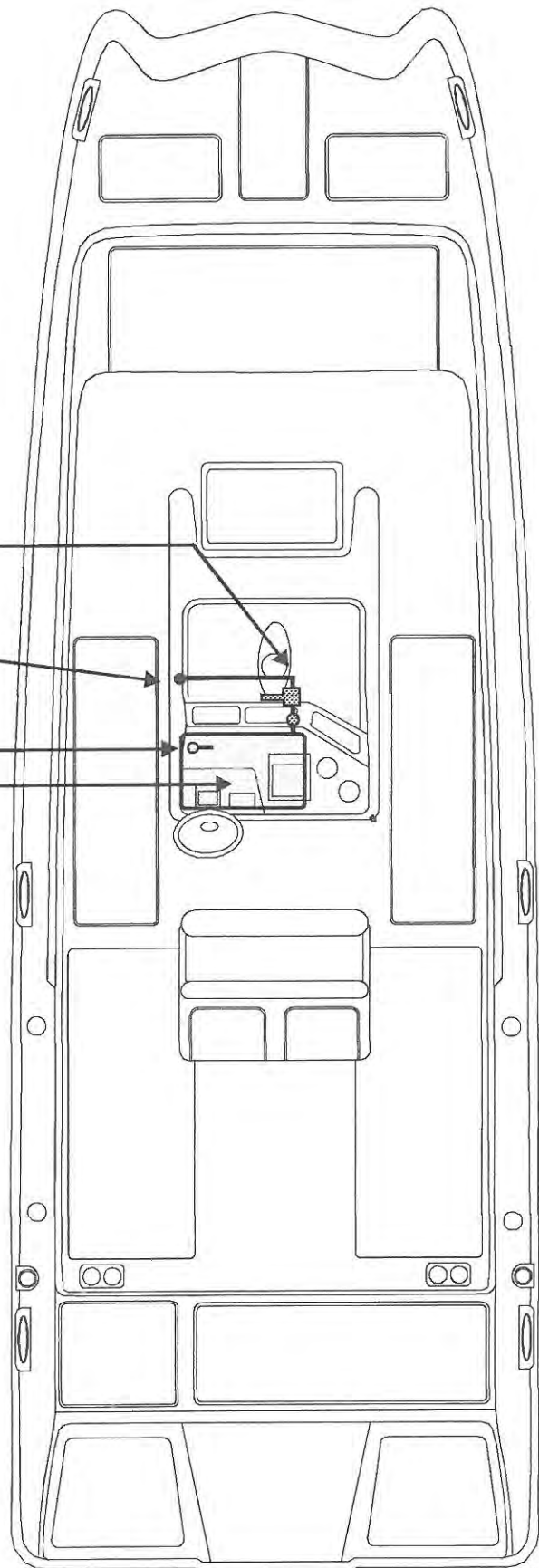
Fresh Water System

226SF / 246SF / 266SF

FRESHWATER PUMP W/
IN-LINE FILTER

RETRACTABLE
SHOWER OUTLET

FILL W/ INTEGRAL VENT
20 GAL. SUPPLY TANK

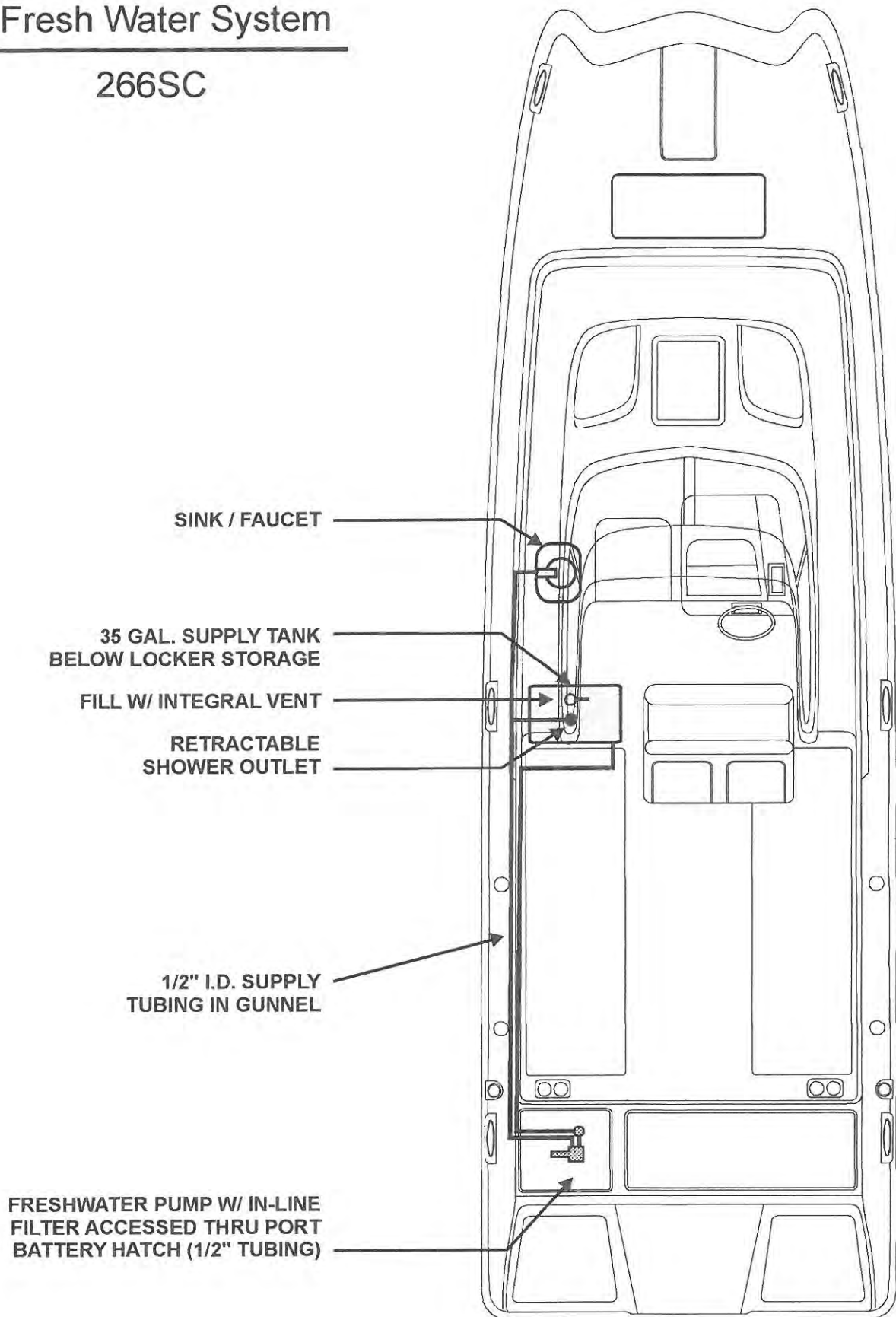


NOTE:

226SF HAS AN 8-GALLON
SUPPLY TANK

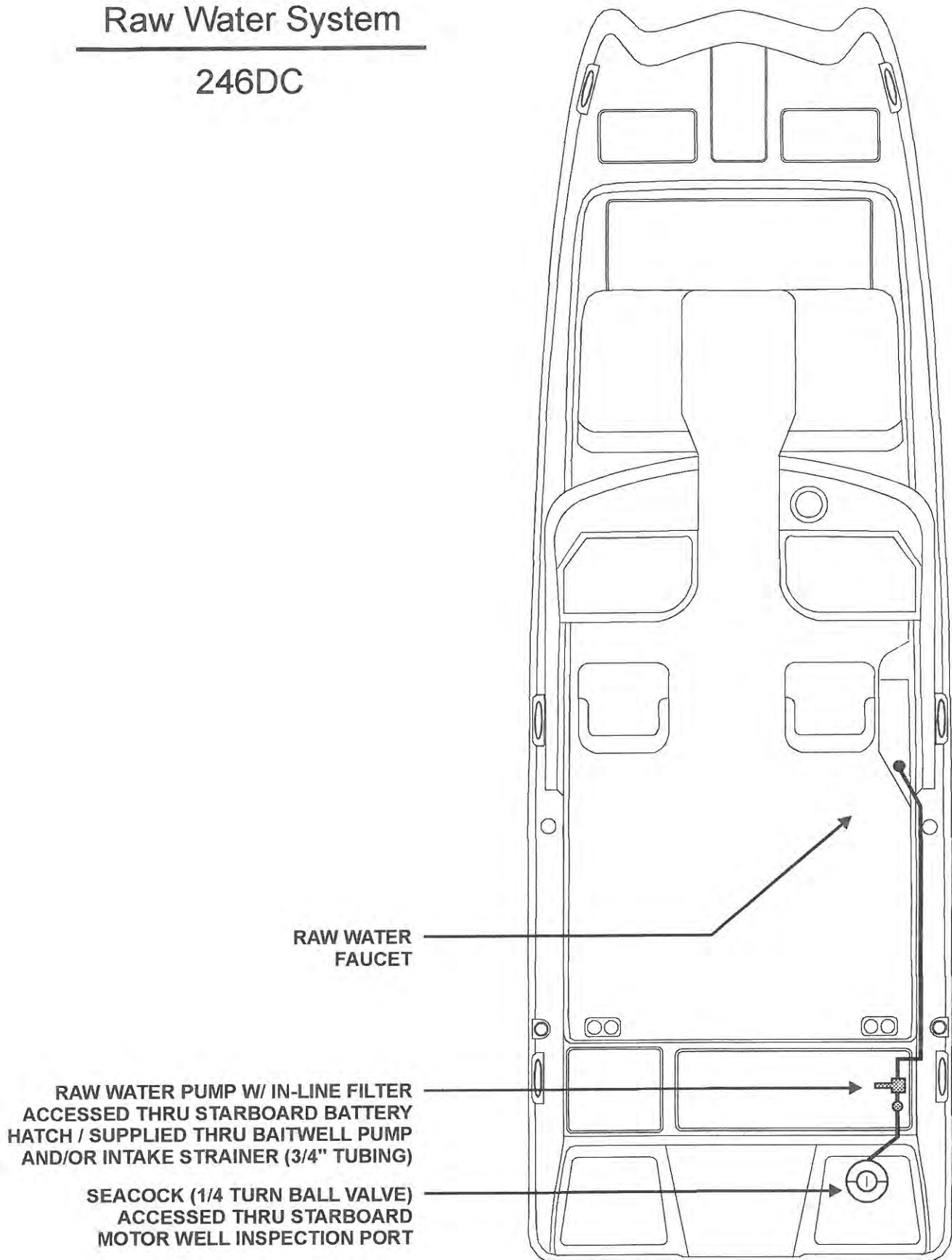
Fresh Water System

266SC



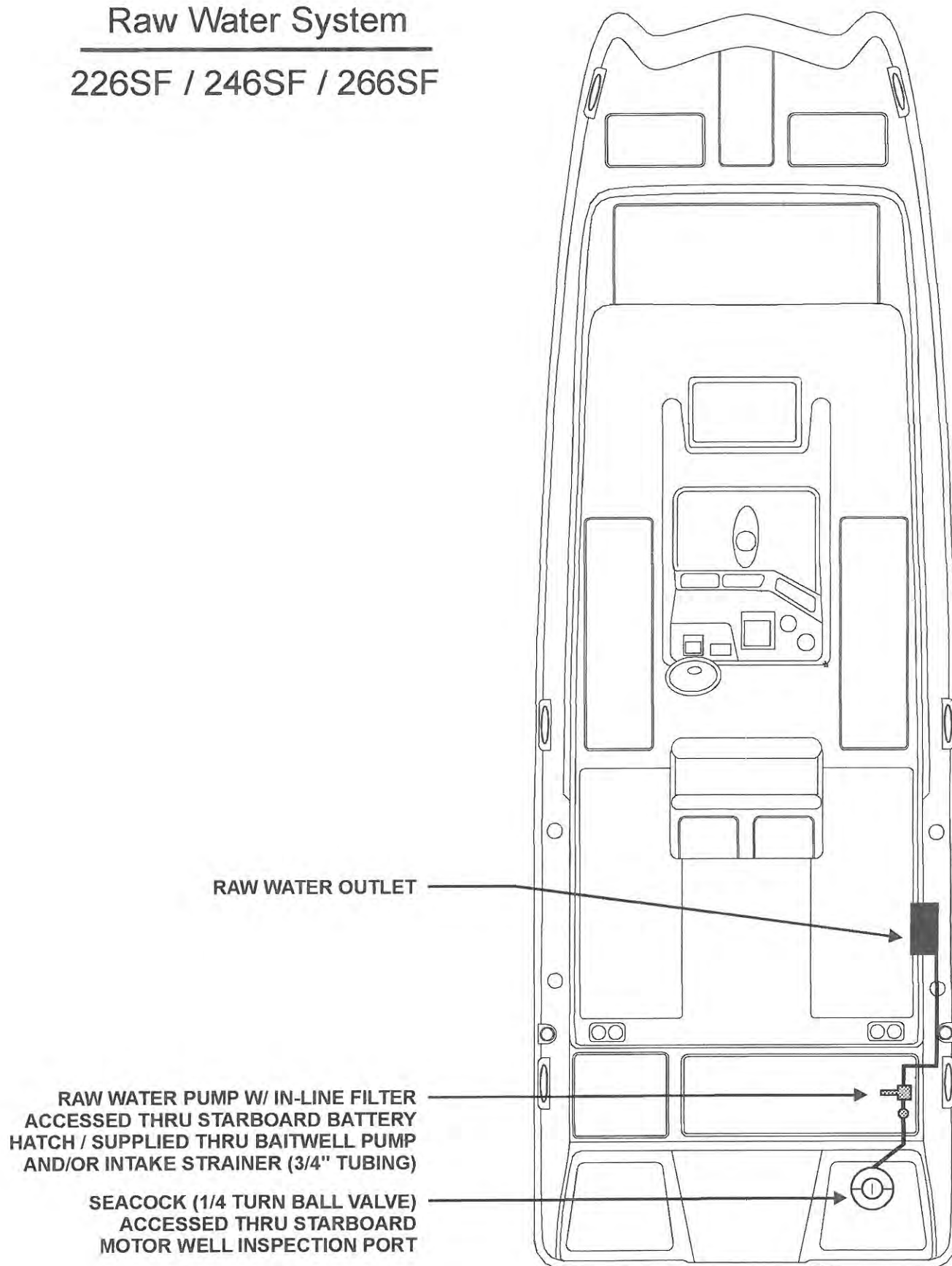
Raw Water System

246DC



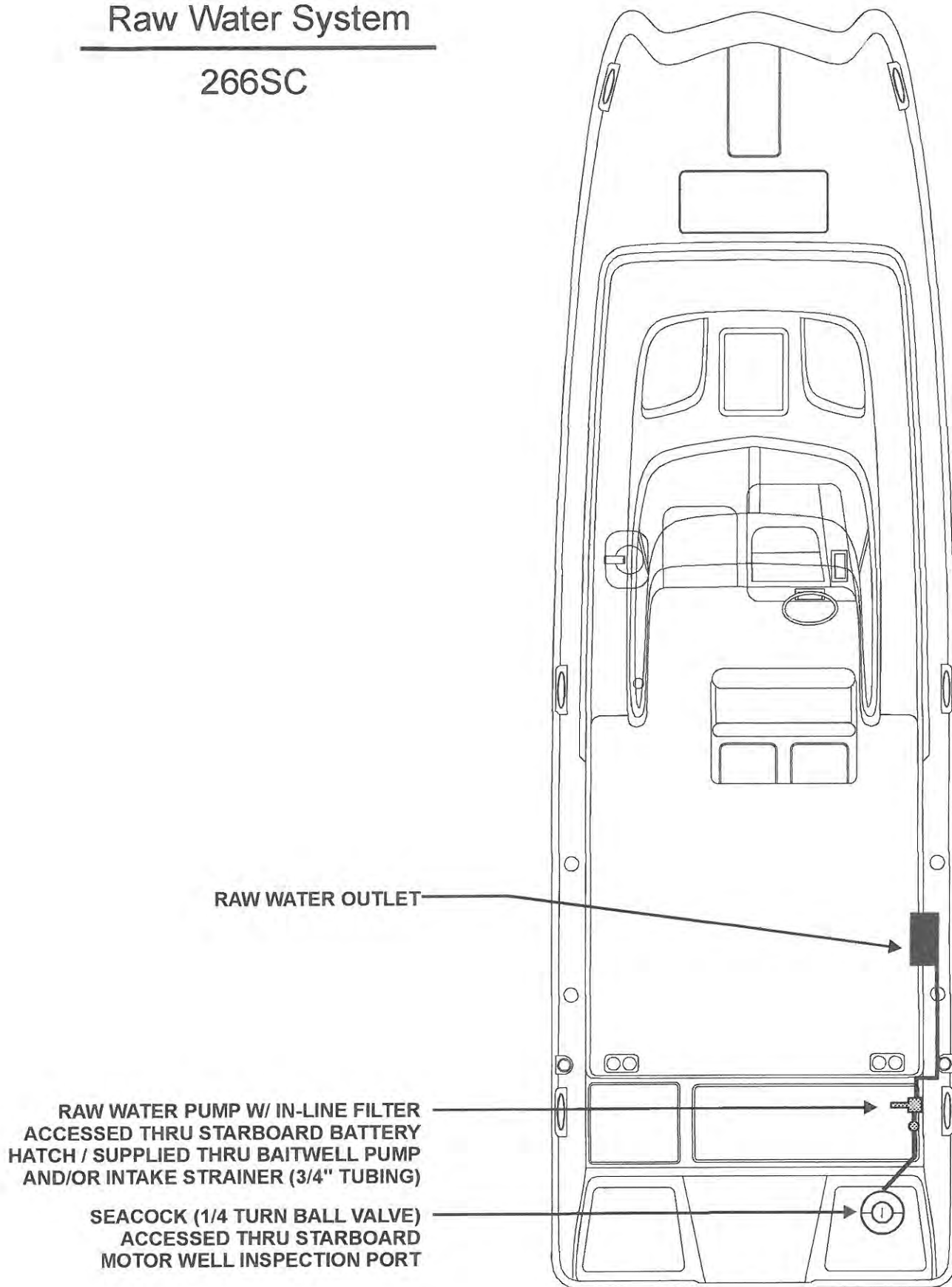
Raw Water System

226SF / 246SF / 266SF



Raw Water System

266SC



266TE Tournament Edition

Fuel / Raw Water / Fresh Water Systems

INTEGRATED BOW STEP

FISH BOX / STORAGE / SEAT
(285 QT INSULATED WITH
OVERBOARD DRAIN)

400 QT INSULATED FISHBOX (BOTH
STBRD AND PORT) OVERBOARD
DISCHARGED W/ REMOVABLE
ROD STORAGE

FRESH WATER TANK - 20 GAL

MACERATOR PUMPS FOR FISHBOXES

BATTERY COMPARTMENTS

EXTERNAL VENTS

FRESH WATER OUTLET

RAW WATER OUTLET

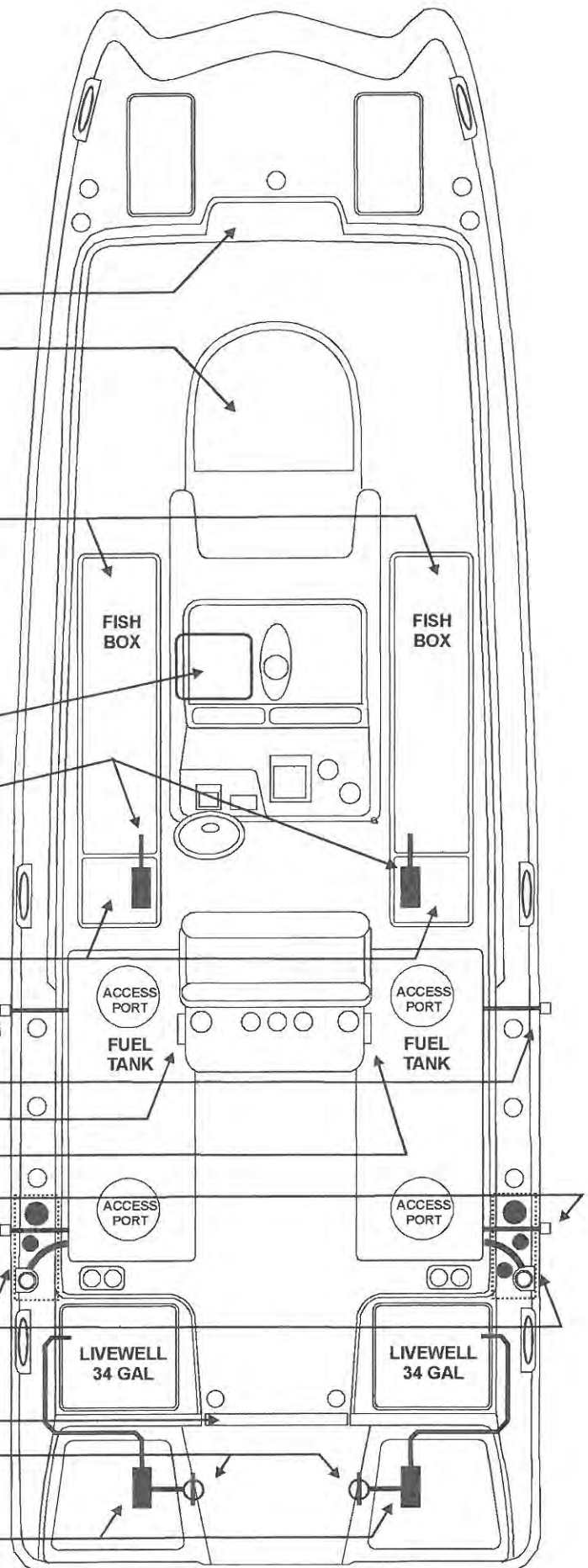
EXTERNAL VENTS

RECESSED BOX INSIDE GUNNEL
CONTAINS FUEL FILTERS AND
PRIMER BULBS (PLUS RAW
WATER PUMP - STARBOARD)

TRANSOM DOOR

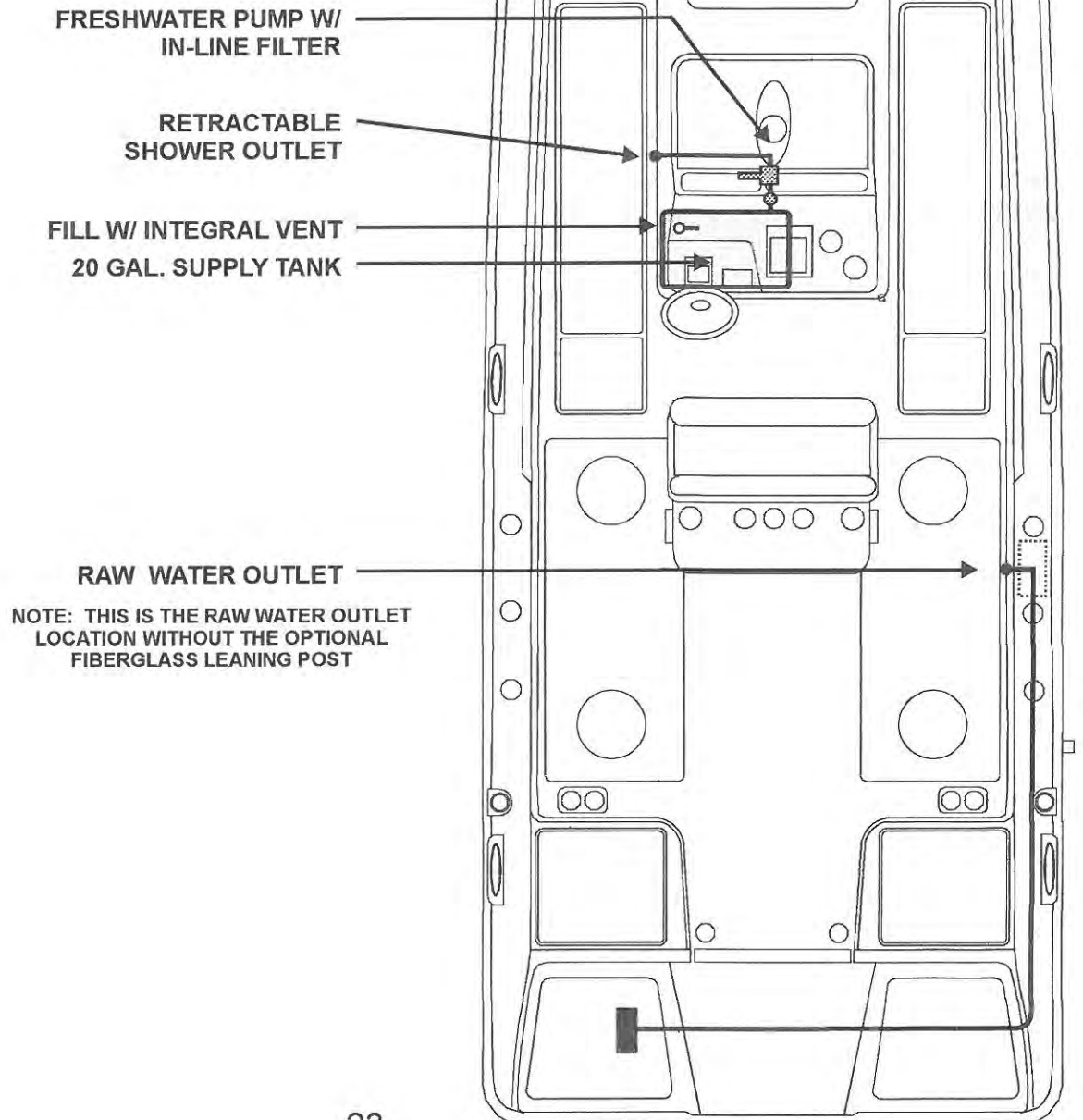
SEACOCK

LIVEWELL PUMPS (ACCESSED THRU
STARBOARD AND PORT ACCESS
HATCHES IN SPLASHWELLS



266TE Tournament Edition

Fresh and Raw Water Systems



LIVEWELL OPERATION

Standard Livewell

The livewell is supplied by a SHURflo MAG-DRIVE BAIT SENTRY (model 800) pump located in the aft section of the starboard hull and accessible through the motor well inspection port. The pump draws from a bronze pick-up on the inside (tunnel side) of the hull. This pick-up also supplies the raw water washdown pump. A seacock is plumbed forward of both pump inlets. It can also be accessed through the same inspection port.

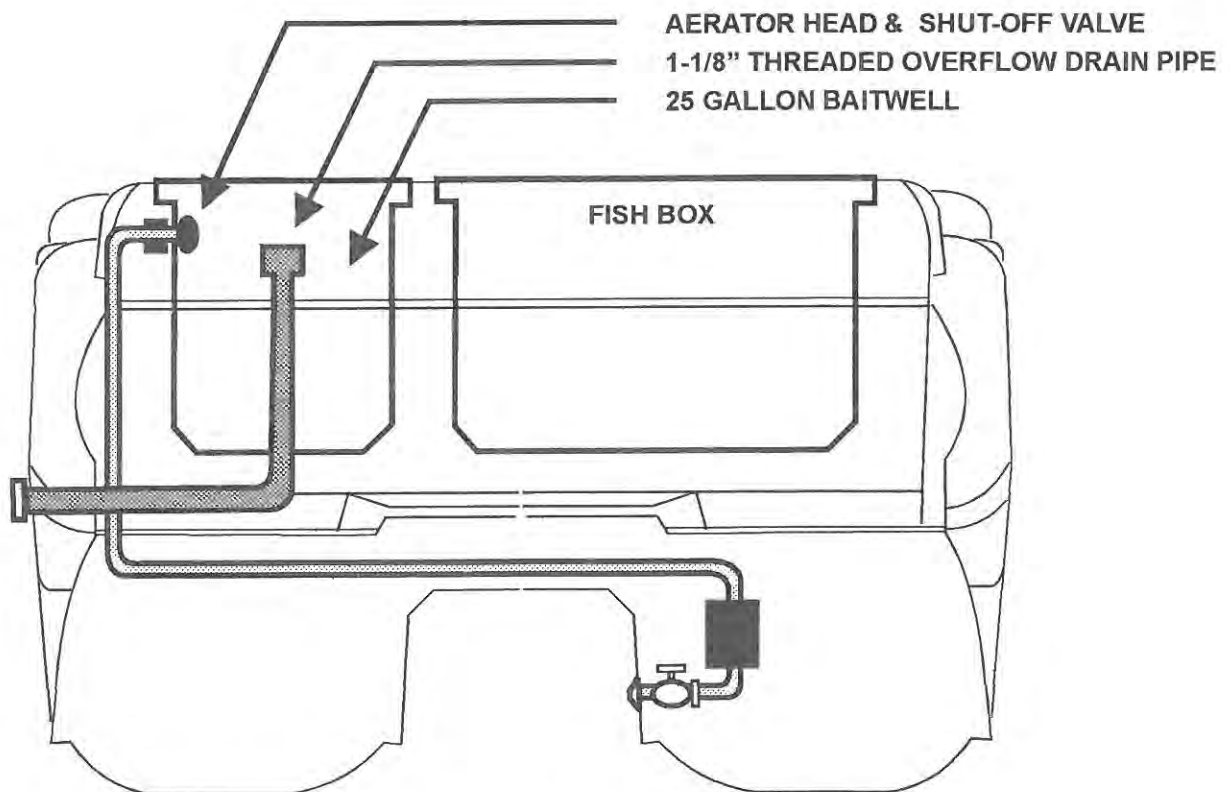
The livewell on all models has a 25 gallon capacity tank with a 1-1/8" over flow drain tube which is threaded into the bottom of the baitwell. When screwed all the way down, all of the water flows over the top of the tube. When partially screwed down, some water goes out through the bottom and helps keep fresh water moving from top to bottom. Care should be taken to ensure that enough water is coming into the tank that water still flows over the top of the drain pipe (water flow into the tank is controlled by the aerator head shut-off valve which is located inside the tank on the port side). To drain the tank, turn the intake water off and completely unscrew the drain pipe. When the baitwell is not being used, keep the aerator head shut-off valve in the OFF position. If left open, water may be forced into the baitwell when the boat is moving at a high rate of speed. Since this tank is insulated, it may be used as a cooler by plugging the drain.

NOTES & CAUTIONS

Ensure that the seacock and the flow adjustment valve are open before turning the pump ON.

When the boat is not in use, CLOSE the seacock.

If replacing the pump, DO NOT use a wrench to tighten the pump to the seacock. Hand-tighten only after application of a sealant to the pipe threads. Double clamp all connections below the water line.



LIVEWELL OPERATION

266TE Tournament Edition

The livewells are supplied by SHURflo MAG-DRIVE BAIT SENTRY (model 800) pumps located in the aft section of the starboard and port hulls and are accessible through the splashwell inspection ports. The pumps draw from bronze pick-ups on the inside (tunnel side) of the hulls. The pick-ups on the starboard side supplies the raw water washdown pump. A seacock is plumbed forward of both pump inlets. They can also be accessed through the same splashwell hatches.

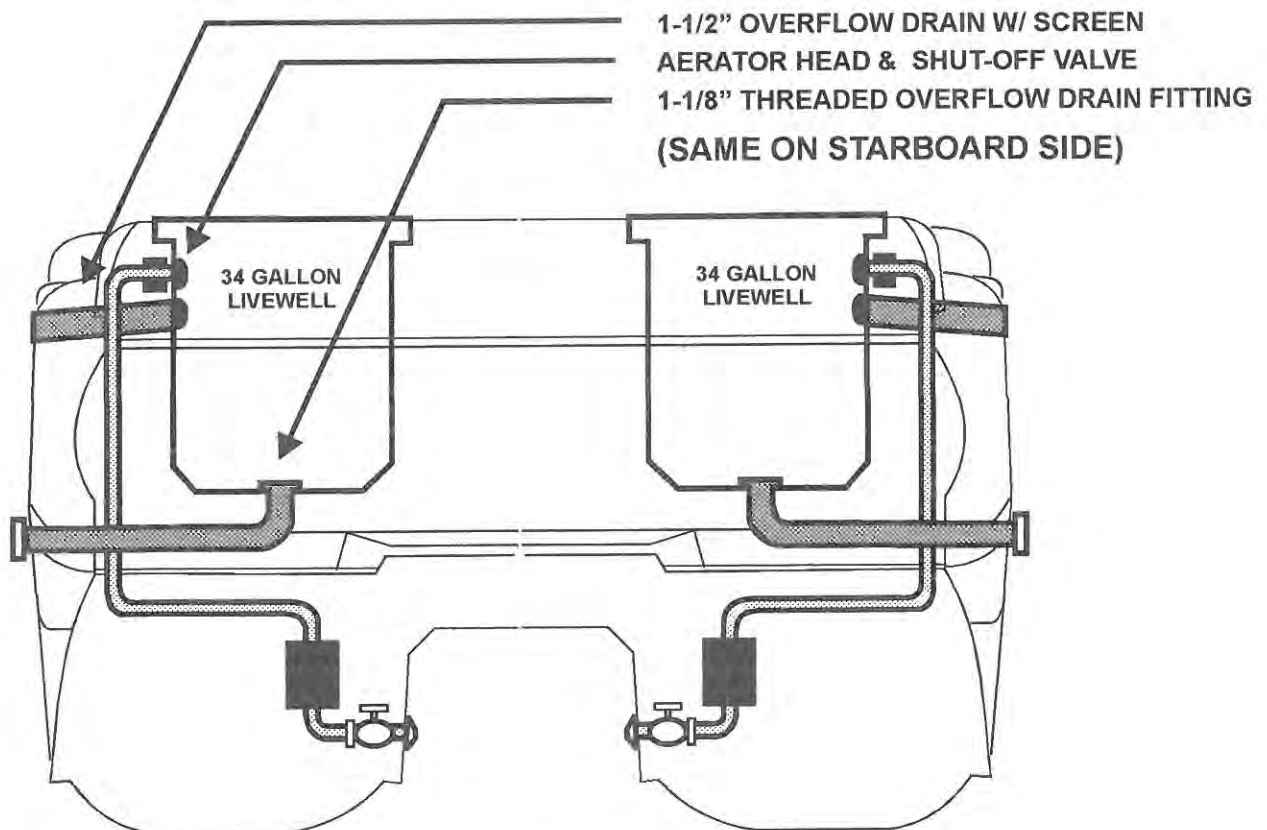
The livewells have a 34 gallon capacity tank with a 1-1/2" over flow drain tube which is located in the upper outboard side of each tank. Care should be taken to ensure that enough water is coming into the tank and that water flows sufficiently to ensure enough oxygen enters the tank. Water flow into the tank is controlled by the aerator head shut-off valves which are located on the outboard sides of tanks. To drain the tank, turn the intake water off and completely unscrew the drain. When the baitwell is not being used, keep the aerator head shut-off valve in the OFF position. If left open, water may be forced into the baitwell when the boat is moving at a high rate of speed.

NOTES & CAUTIONS

Ensure that the seacock and the flow adjustment valve are open before turning the pump ON.

When the boat is not in use, CLOSE the seacock.

If replacing the pump, DO NOT use a wrench to tighten the pump to the seacock. Hand-tighten only after application of a sealant to the pipe threads. Double clamp all connections below the water line.



ELECTRICAL SYSTEM

The electrical system for each engine is isolated, except in emergencies when the battery parallel switch may be used to temporarily connect both sides (see below). Main power forward to the helm is provided by the starboard battery through a #6 ga. feed that is protected with a 50A re-settable circuit breaker in the starboard battery compartment. All accessories are supplied by the starboard battery, including the starboard and port bilge pumps in both manual and automatic modes. **CAUTION:** If additional batteries or battery switching devices are installed, ensure that the automatic side of the bilge pumps (wired independently from the main feed - see Wiring Code) remains directly connected to the battery system.

Battery Jumper Switch

The battery jumper switch is located in the starboard battery compartment. Its purpose is to provide a means of temporarily cross-connecting the port and starboard batteries in parallel to provide starting capability for either engine should the individual dedicated battery become discharged. If it becomes necessary to use the jumper switch, turn it to ON and start the engine on the discharged side. Turn the switch OFF (normal position) and start the other side. Operating both engines with the jumper switch ON may damage sensitive electrical components of one or both engines. **CAUTION:** The computer control systems of many outboard motors continually draw small amounts of current, even when not running. The batteries may therefore discharge completely if the boat is unused over an extended period (approx. 30 days). In such cases, use of a maintenance trickle charger is recommended, or optionally, disconnecting the batteries completely. Disconnection will not harm the control systems.

Battery Connection Warning

Disconnecting and reconnecting the battery while the engine is running by removing the battery cable(s) from the battery post(s) will cause an extremely high voltage variation to be produced on the 12 volt line. This voltage will likely cause immediate failure of instruments and any equipment which is operating at the time and may damage the alternators. Less obvious, yet just as destructive are loose, or bad connections between battery cables and battery posts caused by corrosion and/or frayed cables. Also included in this category are defective, cracked, or corroded battery switches and isolators. The possibility of damage is due to the fact that in almost all battery-started engine applications, the battery acts as a voltage limiter. As a preventative measure, battery terminals and clamps should be cleaned and tightened periodically. Cracked, corroded, or otherwise defective battery switches or isolators should be replaced.

Battery Capacity

Careful consideration should be given to the type of batteries you install in your boat. Many of today's outboard engines require batteries capable of delivering 1000 Marine Cranking Amps (MCA). The type of engines and the amount of electronics should be taken into consideration. Since the starboard battery is the "House" battery, a larger series battery may be recommended by your dealer.

IMPORTANT

266 TE BATTERY SYSTEM

2 Batteries Port
1 Battery Starboard

2 battery switches inside of console:
Starboard switch – run on position 1
Port switch – run on position 1

- To charge house battery, put the port switch to position 2.

In case the batteries being drained or low and the system will not operate/start the motors, turn the switches to the “All Position” and this will allow both batteries to be combined to start motors.

When the motors are running, be sure to put the switches in the #1 position.

Do not operate system in the “On” position. This could result in a system failure.

Any damages incurred by not following procedures will not be covered by WCC Group.

UNDERSTANDING BATTERY RATINGS

* The following is reprinted with the permission of Exide Nautilus Batteries.

Ampere Hour Rating

This is the number of amps which a battery can deliver for a 20 hour period. This test is also referred to as the 20 hour rate. The larger the amp hour rating, the more power a battery can deliver over time.

Marine Cranking Amps (MCA)

This is the number of amps which a battery can deliver at 32 degrees Fahrenheit for 30 seconds and maintain at least a voltage of 1.2 volts per cell. This differs from cold cranking amps which are measured at 0 degrees Fahrenheit.

Reserve Capacity (RC)

This is the time, in minutes, for which a battery will deliver 25 amperes at 80 degrees Fahrenheit. This represents the time which the battery will continue to operate essential accessories in the event of alternator or generator failure.

DETERMINING THE AMPERE HOUR DRAW OF YOUR BOAT

In order to determine the ampere hour draw of your vessel, you need to know what electrical equipment you have and what the 12 volt amp draw is. The following is a listing of typical 12 volt equipment aboard most vessels and their average amp draw per hour. Additionally, the amp draws shown below are for "on time" while the batteries are being used. Remember, a refrigerator, fresh water pump, head macerator, etc. only draws power intermittently.

Simply add up the 12 volt accessories you have, multiply by 20, and that should give you a very good approximation of your boats amp hour battery requirement.

12 volt item	Amp draw
Bilge Pump (500 gph)	2.0
Bilge Pump (1000 gph)	2.9
Bilge Pump (1500 gph)	4.9
Bilge Pump (2000 gph)	8.4
Navigation Lights (3 mile)	1.5
Livewell Pump	7.0
Fresh Water Pump	4.0
Refrigerator (12 v.)	6.0
Icemaker	6.0
Head (Macerator)	9.0
Anchor Windlass (900 lb)	75
12 v. House Lighting	0.15 per 10 watts
Spot Lights (100K cp)	8.0
Spreader Lights (3K cp)	3.0
RADAR (24 mile)	5.0
GPS	0.8
LORAN	0.7
VHF Radio - transmit	6.0
VHF Radio - receive	0.5
Depth Sounder (LCD)	1.0
Depth Sounder (Color)	3.0
SSB - transmit	30

12 volt item	Amp draw
Inverters	
SSB - receive	2.5
Autopilot	5.0
Stereo (50 watt)	0.5
Fan	1.0
Trolling Motors	
24 lb thrust	27
30 lb thrust	30
36 lb thrust	36
42 lb thrust	40
55 lb thrust	55
 * Inverters vary on 12 volt amp draw depending on 115 volts A/C draw. It is generally recommended by inverter manufacturer's that you have 20% of your inverter's wattage capacity in battery amp hour capacity. This should provide 1 hour of full inverter capacity. However, be sure to add additional 12 volt amp draws.	

BATTERY INSTALLATION AND MAINTENANCE

When installing a battery in your boat, it is important to use either a box or a tie down system to keep the battery stationary once underway. This will reduce unnecessary vibration. Make sure all connections to the battery terminals are tight. Loose wires will cause sparking and arcing which can melt wires or cause explosion. Additionally, it is important to coat the terminals and connections with a corrosion inhibitor. The corrosion inhibitor should be re-applied every several months. Failure to do this will result in poor connections and wire corrosion, especially in salt water environments. Corrosion increases the resistance in the wires requiring more amps to be drawn to run electrical equipment. When installing a new battery, be sure to remove any plastic battery terminal protectors before attaching wires. When storing a battery for winter, check and fill with distilled water as needed, recharge the battery fully, and store in a cool place. When preparing battery after winter storage, recharge the battery to its full charge state.

"WORLD CLASS CATAMARANS"

WIRING CODE FOR: 230SF 250SF, 250DC, 270SF, 270SC, 270LC, 270TE

FUNCTION	COLOR	GAUGE	BREAKER/FUSE AMPS	BREAKER/FUSE LOCATION
BATTERY TO BATTERY JUMPER	RED	#4	NONE	N/A
HARNESS MAIN FEED	RED	#6	50A BREAKER	STARBOARD BATTERY COMPARTMENT
WINDLASS POWER WIRE	RED	#6	50A BREAKER	STARBOARD BATTERY COMPARTMENT
WASHDOWN PUMP	BROWN/ORANGE	#14	15A BREAKER	PANEL
BILGE PUMP MANUAL (X2)	BROWN/BLUE- STBD. BROWN- PORT	#14	5A BREAKER (X2)	PANEL
BILGE PUMP AUTO (X2)	BROWN W/ WHITE STRIPE	#14	5A BREAKER (X2)	FUSE BLOCK
COCKPIT INTERIOR LIGHTS	BLUE	#14	5A BREAKER	PANEL
HORN	ORANGE W/ WHITE STRIPE	#14	10A BREAKER	PANEL
WIPER	ORANGE W/ BLACK STRIPE	#14	5A BREAKER	PANEL
WIPER PARK	BLACK W/ WHITE STRIPE	#14	N/A	N/A
NAVIGATION LIGHTING	GREY	#14	5A BREAKER	PANEL
ANCHOR LIGHT	GREY W/ WHITE STRIPE	#14	5A BREAKER	PANEL
BAITWELL PUMP	BROWN W/ YELLOW STRIPE	#14	5A BREAKER	PANEL
BAITWELL LIGHT	BLUE	#14	ATTACHED TO BAITWELL SW.	-----
FRESH WATER PUMP	BROWN W/ RED STRIPE	#14	10A BREAKER	PANEL
ELECTRIC HEAD	WHITE W/ BROWN STRIPE	#14	5A BREAKER	FUSE BLOCK
BOARDING LIGHTS	BLUE W/ WHITE STRIPE	#14	5A BREAKER	SWITCH PANEL
STEREO	WHITE W/ RED STRIPE	#14	5A BREAKER	SWITCH PANEL
STEREO CLOCK	WHITE W/ YELLOW STRIPE	#14	10A BREAKER	FUSE BLOCK
FUEL SYSTEM GROUND	GREEN	#14	N/A	-----
12 VOLT POWER POINT	RED	#14	10A BREAKER	FUSE BLOCK
ALL GROUNDS (EXCEPT FUEL SYSTEM)	BLACK	#4-6-10-14	N/A	-----

INSTRUMENT WIRING

TACHOMETERS	GREY	#16	N/A	N/A
VOLTMETERS	PURPLE (FROM IGNITION)	#16	N/A	N/A
FUEL SENDERS	PINK /WHITE- STBD. PINK - PORT	#14	N/A	N/A
IGNITION	PURPLE	#16	N/A	N/A
INSTRUMENT LIGHTS	BLUE	#16	N/A	N/A

270TE Only

270TE Only

TACHOMETERS	GREY	#16	N/A	N/A
VOLTMETERS	PURPLE (FROM IGNITION)	#16	N/A	N/A
FUEL SENDERS	PINK /WHITE- STBD. PINK - PORT	#14	N/A	N/A
IGNITION	PURPLE	#16	N/A	N/A
INSTRUMENT LIGHTS	BLUE	#16	N/A	N/A

NOTE: All factory wiring is tinned copper and conforms to ABYC Yacht specifications. 2-For the 270SC & 270LC, Fwd bilge pumps have 5A breaker, aft pumps have 10A breaker. 3-Pull string inserted in lieu of wiring for boats ordered w/o windlass.



Model 18590-Series

SELF-PRIMING MACERATOR PUMP FEATURES

- Pump:** Self-Priming Flexible Impeller with Stainless Steel Wearplate
- Impeller:** Jabsco Nitrile compound
- Macerator:** Stainless Steel Cutter reduces particle size to 1/8" (3mm) maximum
- Seal:** Lip Type
- Ports:** Inlet - 1-1/2" (38mm) Hose Barb and 1-1/2" N.P.T. (Male)
Outlet - 1" (19mm) Hose Barb
- Motor:** Permanent Magnet Type, Fully Enclosed, with Stainless Steel Shaft
Complies with USCG Regulation 183.410 and ISO 8846 MARINE for Ignition Protection
- Weight:** 5 lb (2,3 kg) Approx.

VARIATIONS AVAILABLE

MODEL NO.	DESCRIPTION
18590-0000	12 Volt
18590-0090	12 Volt EMC 
18590-0001	24 Volt
18590-0091	24 Volt EMC 

APPLICATION

The JABSCO 18590 series dc macerator pump unit is the ideal solution for emptying marine holding tanks when not in a discharge restricted area. The JABSCO macerator is self-priming to a five foot lift when impeller is wet, four foot when dry, and may be mounted in any convenient point in the waste discharge system. The macerator section grinds waste down to a particle size of 1/8" (3mm) maximum so it can easily be pumped through a 1" (19mm) ID discharge hose. The pump section is self-priming, permitting the unit to be mounted above the tank in a convenient location. (For optimal efficiency, locate pump as close to holding tank as possible.)

The macerator has an approximate flow rate of 12 GPM (45 LPM) and will empty a typical 30 gallon (115 litre) holding tank in less than 3 minutes.

The 18590 series waste pump will macerate and pump all waste and tissue normally found in marine and recreational vehicle waste systems.



Model: 18590-Series

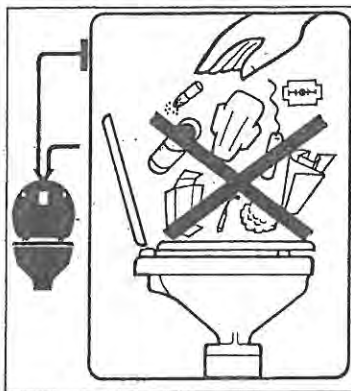
The pumps should be used in accordance with EPA, USCG Marine Sanitation Regulations, and any regional or local ordinances.

Motors meet USCG Electrical Regulation Title 33, Chapter 1, Part 183; Subpart 1 and ISO 8846 MARINE for IGNITION PROTECTION.

OPERATING INSTRUCTIONS

The macerator should be controlled by a momentary switch (push and hold) positioned close enough to the pump so it can be heard while operating. When the tank is empty there will be a change in pump noise (louder, higher frequency) at which time the macerator should immediately be switched off.

The macerator pump unit has been designed to handle waste, toilet tissue, and facial tissue. It will also handle

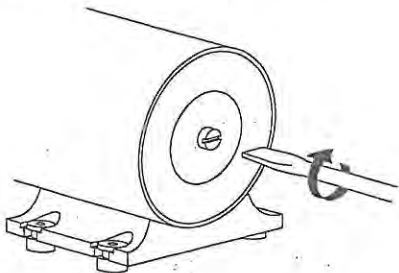


solids such as cigarettes, cigars and chunks of soft fruits or vegetables less than 1" size. It will not pump solid objects like fruit pits, rags, wet strength kitchen towels, tampons or sanitary napkins. The holding tank and pump should be flushed with several gallons of water after each pumpout. Do NOT run pump dry

longer than 30 seconds or impeller and pump damage may result. Make sure the battery is fully charged. The dc motor is suitable only for intermittent duty and should not be run for more than 15 minutes continuously. At maximum flow of 12 GPM (45 LPM) the macerator can empty a 180 gallon (680 litre) holding tank in a single operation.

After long periods of nonuse, the flexible impeller may stick to the pump body preventing the macerator pump from turning freely. If this occurs, the impeller can be broken free by removing the plastic cap on the shaft at the rear end of the motor, inserting a screwdriver in the slot and rotating the shaft clockwise a quarter turn or more. When impeller is broken free, reinstall the plastic cap on the motor shaft.

MOTOR ILLUSTRATION



INSTALLATION INSTRUCTIONS

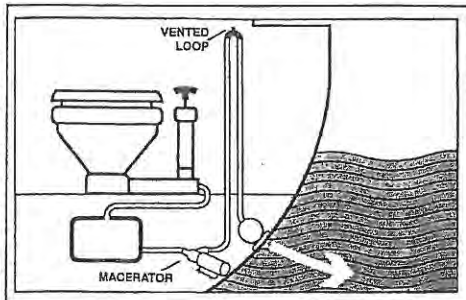
Locating the Pump: The JABSCO macerator is self-priming to a five foot lift when impeller is wet, four foot when dry, and may be mounted in any convenient point in the waste discharge system. It may be mounted in any position or angle without affecting performance. If mounted vertically the motor should be above the pumphead. Use the rubber grommets provided to absorb vibration. Do not overtighten mounting screws. For optimal performance, mount the pump as close to tank as possible.

Plumbing Connections: Use 1-1/2" (38mm) ID noncollapsible waste type suction hose. Slip the hose over the inlet hose barb and secure it with two stainless steel hose clamps.

The macerator may also be screwed directly into a 1-1/2" N.P.T. tank flange or female pipe fitting. If attaching the inlet port to a pipe fitting it may require removing the hose barb portion of the port with a hack-saw. If this is necessary, cut across the hose barb portion of the port about 1/8 inch (3mm) away from the end of the pipe threads. Wrap port threads with a couple wraps of Teflon* tape and screw the pump assembly into the pipe fitting. Tighten hand tight, do not overtighten.

NOTICE: An air leak anywhere in the suction side of the plumbing system can cause extended dry running which may result in damage to the impeller and pump.

All suction connections must be airtight and free of sharp bends or restrictions. If a waste deck fitting is installed (for dockside pump-out), it too must be airtight to



ensure proper priming. Make certain there are no air leaks around the deck plate cap or hose tail. Use minimum 1" (19mm) ID hose for discharge and connect to thru-hull fitting located approximately 4-6 inches above waterline.

NOTICE: The discharge thru-hull may be positioned below the waterline only if the discharge hose has a vented loop fitting installed at least 8" above the waterline at all angles of heel or trim. Consult with a qualified marine plumber.

* Teflon is a registered trademark of E.I. DuPont de Nemours and Company.

WIRING

NOTICE: Correct motor polarity (orange to positive, black to negative) is important. Reverse polarity can damage motor and void warranty.

Full voltage at the motor is required to properly operate the macerator. It must be wired in a circuit independent of all other accessories.

Use stranded copper wire of the correct size (determined from the electrical specifications chart) to connect the macerator to the power source. Undersized wire will cause a reduction of voltage that may cause the pump to seize or damage the motor. An appropriate size fuse or equivalent circuit breaker (determined from electrical specifications chart) must be installed in the positive power lead within seven inches of the power source. Alternatively the macerator may be wired to a properly installed over-current protecting electrical distribution panel. Connect the positive lead to a heavy-duty momentary switch (push and hold) (see required switch amperage rating in electrical specifications chart) positioned close enough to the macerator so the operator can hear the macerator while it is running. Continue the positive lead from the switch to the macerator and connect it to the orange (positive) motor lead. Connect the black (negative) motor lead to the negative side of the battery or grounded buss bar.

ELECTRICAL SPECIFICATIONS

VOLTAGE	AMP DRAW	FUSE SIZE	Switch Rating	WIRE SIZE PER FEET OF RUN*				
				0'-10'	10'-15'	15'-25'	25'-40'	40'-60'
12 Vdc	16	20		#12 (4)	#10 (6)	#10 (6)	#8 (10)	#6 (16)
24 Vdc	8	15		#16 (1.5)	#14 (2.5)	#12 (4)	#10 (6)	#10 (6)

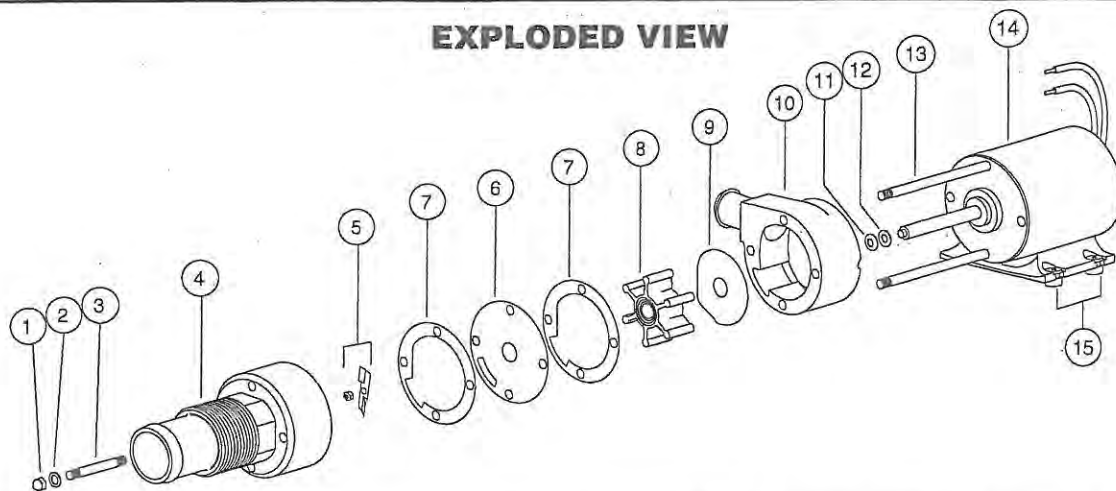
* Length of run is total of the circuit from the power source to product and back to ground.

HEAD CAPACITY TABLE†

Head Ft	GPM	AMPS	
		12 volt	24 volt
Free flow	12.5	14.0	7.6
5	11.5	14.5	7.8
10	10.5	15.0	8.1
15	9.0	16.0	8.6
20	7.5	16.5	8.9

† Flow rates and amperage will vary slightly depending on pump loading (sanitation system design).

EXPLODED VIEW



PARTS LIST

KEY	DESCRIPTION	PART NUMBER	QTY.
1	Acorn Nut	91085-0340	4
2	Fiber Washer*	91613-0140	4
3	Stud*	17288-0010	2
4	Macerator Housing	18594-1000	1
5	Chopper Plate with Locknut	37056-1000	1
6	Wearplate, Large	18597-1000	1
7	Gaskets (2 ea per kit)*	18596-1000	1
8	Impeller*	6303-0003	1
9	Wearplate, Small	12316-1002	1
10	Body*	18593-1000	1
11	Seal*	1040-0000	1
12	Slinger	6342-0000	1
13	Stud	17288-0000	2
14	Motor 12 volt	17246-0000	1
	Motor 12 volt EMC	18753-0638	1
	Motor 24 volt	17246-0001	1
	Motor 24 volt EMC	18753-0634	1
15	Grommets (Set of 4)	92900-0120	1
	Service Kit	18598-1000	1

* These parts are supplied in 18598-1000 Service Kit.

DISASSEMBLY

Notice: Before performing any service, disconnect the electrical power to the macerator and take precaution to ensure that it is not restored until service is complete.

Remove the four acorn nuts (Key 1) and fiber washers (Key 2) from the pump studs (Key 3). Slide the macerator housing (Key 4) off the studs. Insert a thin bladed 9/32" (7 mm) ignition wrench behind the chopper plate (Key 5) and onto the flat of the motor shaft to prevent it from turning. Unscrew (counter-clockwise) the locknut on the end of the motor shaft and remove the stainless steel chopper blade.** On new model macerators the shaft can be prevented from turning by inserting a screwdriver in the slot of the motor shaft extending from the motor's rear end bell. Remove the pump wearplate (Key 6) and two paper gaskets (Key 7). Now slide the pump body (Key 10) with

impeller (Key 8), small wearplate (Key 9), two studs and shaft seal as an assembly off the motor shaft and remaining two mounting studs. Remove the starlock retaining washer on the seal and push the seal out of the seal bore.

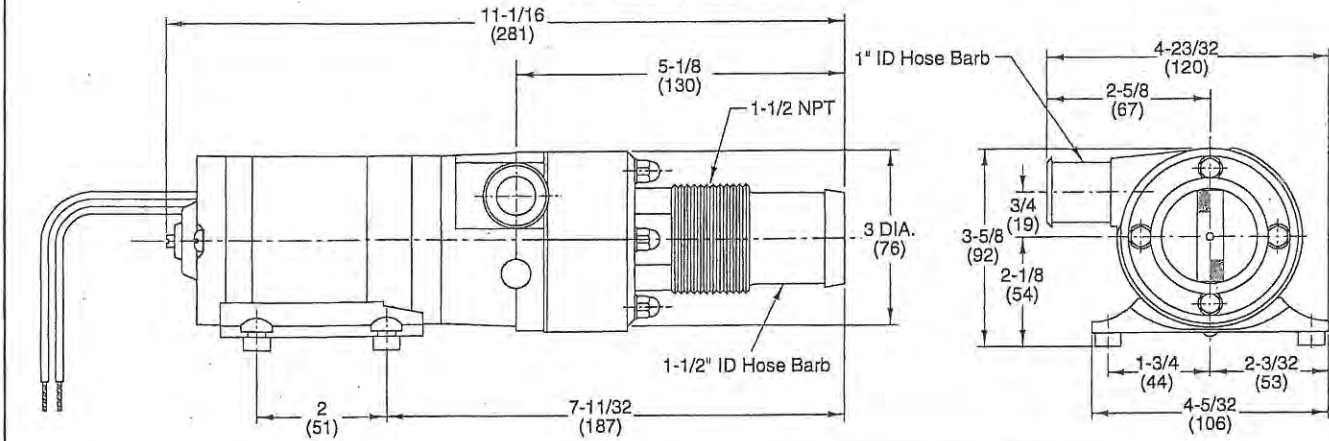
Notice: If reconditioning pump with a service kit (Part No. 18598-1000), it is not necessary to remove the seal because the new seal is pre-installed in the new body. It is also generally not necessary to remove the slinger or brass studs screwed into the motor end bell.

ASSEMBLY

If installing a new seal, push it into the seal bore of the body with the lip pointing toward the impeller bore. Press the starlock washer into the seal bore with the concave side up to secure the seal in the bore. Install the two shorter studs in the two holes with threaded inserts in the new pump body and tighten finger tight. If required, screw two longer studs into the tapped holes in the motor end bell. Slide the new pump body with the shaft seal installed onto the motor shaft and two long mounting studs in the motor. Slide the small wearplate over the motor shaft and position it in the bottom of the impeller bore. Slide the new impeller onto the motor shaft and, with a counter-clockwise motion, push it into the pump impeller bore. Position one new gasket on the studs and against the pump body assuring the cut-out aligns with the inlet groove in the body. Position the large wearplate and second gasket on the studs and against the body again aligning the hole in the wearplate and gasket cut-out with the pump inlet. Position the chopper on the end of the motor shaft with drive tab aligned with flat of shaft and pointing toward the motor. Hold the shaft to prevent it from turning and secure the chopper to the shaft with the locknut. Position the macerator housing on the four studs ensuring the cut-out in the inner wall aligns with pump body inlet port and hole in the wearplate. Position a new fiber washer on each of the studs and secure the macerator housing in place with the four acorn nuts.

** On pumps manufactured prior to April of 1998, position a screwdriver between the prongs of the bronze chopper and unscrew it (counter-clockwise) and remove it and its lock washer from the motor shaft.

DIMENSIONAL DRAWING
INCHES (MILLIMETRES)



Jabsco



ITT Industries
Engineered for life

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Jabsco
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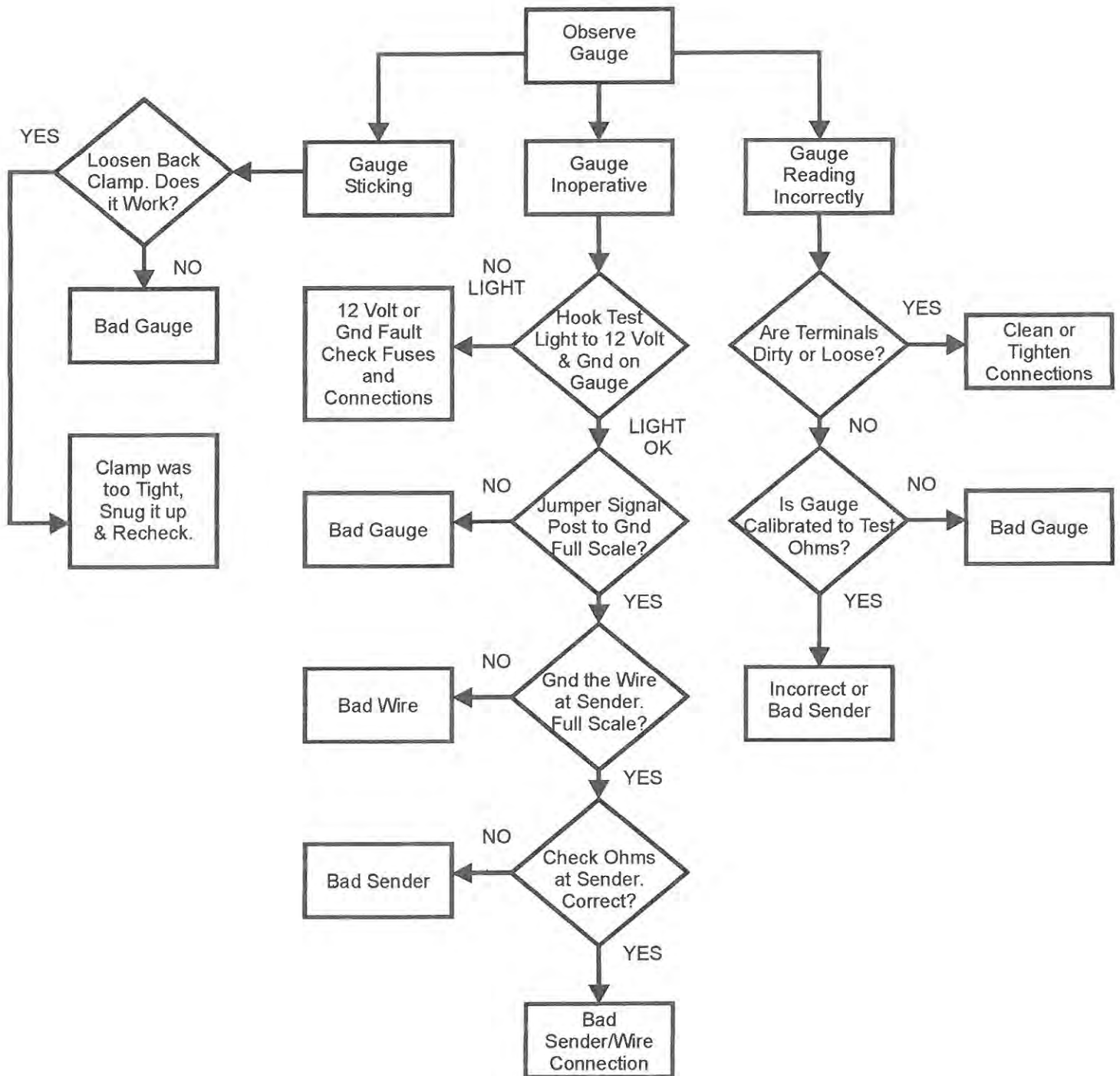


THE PRODUCTS DESCRIBED HEREIN ARE SUBJECT TO THE JABSCO ONE YEAR LIMITED WARRANTY, WHICH IS AVAILABLE FOR YOUR INSPECTION UPON REQUEST.

JAPAN
NHK Jabsco Company Ltd.
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Fax: +49-40-53 53 73 -11

GAUGE TROUBLESHOOTING QUICK REFERENCE GUIDE



MARINE INSTRUMENTATION -- GENERAL FACTS

Meter Movement Stops

Some marine tachometers have no internal meter stops which therefore permits 360 degrees of pointer movement. When the ignition is shut off, the pointer will fall to approximately to the 6 o'clock position. When the ignition is switched back on, the pointer will go to zero and then to the correct RPM when engine is started.

Other models will stop on zero with no power applied, but have the potential for pegging at the maximum RPM's if the switch on the back of the tach is between positions.

To remedy this, the engine is started and revved up to RPM's higher than mid-range. This will allow the tach to re-synchronize itself and operate normally. The tach can also be shut off, and a magnet used on the face of the lens to return the pointer to zero. Either of these methods can be used (with switch on back of the tach in the correct position) to return to normal operation.

Lens Fogging

Most marine instruments have small vents in their cases to allow a way out for moisture that finds its way in. It is possible for moist air to be drawn into vents when the air inside the tachometer or gauge cools down after the instrument is turned off. The morning sun can draw this moisture up against the lens, causing fogging. This same sun will help force the moisture back out of the instrument as well. Running with the instrument lights "on" can also speed up moisture removal. Fogging is not abnormal, nor will it harm your instruments, which are built to withstand a harsh environment.

Radio Transmissions

Some interference (erratic operation) may be noticed on tachometers during radio transmissions. This will neither damage the instrument nor affect its accuracy when not transmitting.

TACHOMETERS

Operation

Electronic tachometers work by counting pulses generated by the ignition system or alternator. The tach is hooked up to + 12VDC, Ground, and one of the signal sources listed above. By selecting the right tach and setting the switch on the back to the correct position, you let the tachometer know how many pulses are being sent per engine revolution. From this information, the tach displays the correct engine speed. Instrument part numbers are located on a label attached to the outside of the case (i.e. TC0000A). Gauges installed on the World Class Catamarans are covered under warranty by their respective manufacturer.

Application

4 cycle engines: The tach signal terminal is connected to the negative terminal on the ignition coil or to a transistorized tach driver circuit connected to the ignition system. This circuit will have a wire (usually gray) for connection to the tach. The correct tachometer will have a white label on the side indicating which switch position is for each engine type. This label will include 4, 6, and 8 cylinder engines for positions 1, 2, and 3.

2 cycle engines: The tach signal terminal is usually connected to the unrectified AC output of the alternator/lighting coil. Sometimes it is hooked directly to the stator output wire (usually yellow) other times a gray tach output lead is provided. The correct tach for this application will have a white label on the side with switch positions for 4, 6, 8, 10, 12, or 20 pole alternators.

Calibration

Set up a calibrated "shop tach" or "strobe tach" to monitor the engine's true **RPM**. Start the engine and (after an appropriate warm-up period and with the shift in neutral) increase it's speed to the boat's normal cruising **RPM** read on the shop tach. Set the coarse adjustment switch to the proper position described on it's label. Remove the stop-plug or paper label corner (at the 8-o'clock position on the rear of the case for most) and insert a 5/16" Allen wrench into the "fine adjustment" trim pot, rotating it **CW** or **CCW** as necessary to indicate the true **RPM**.

Troubleshooting

S ymptom recognition is the first step in effective instrumentation troubleshooting. Tachometers usually exhibit the following symptoms:

A) **Dead** - This is usually caused by: 1) No power applied, 2) No signal supplied, or 3) tach damaged by electrical transients caused by disconnecting the battery with the engine running.

1) Check to see if power is applied to tach by switching the instrument supply switch on and off. As power is applied, the pointer should jump slightly. If it does not, check to see that the wires are installed on the correct terminals and that 12 volts are actually applied to the terminals themselves.

2) If tach indicates that power is applied, check for the presence of a signal on the signal terminal. Measure the signal between the signal and ground terminals. This should read in excess of 2 volts **DC**.

3) If power and signal are present, then it is possible that electrical transients have damaged the tach.

B) **Pegged** - This condition occurs on tachs with internal mechanical pointer stops. It is caused by removing power from the tach while it is running in excess of mid-scale **RPM's** or by the switch on back of the tach being in between positions. When power is re-applied, the tach pointer attempts to go clockwise to zero but cannot because the internal stop is in the way. Read "Marine Instrumentation General Facts" on the previous page for details on how to correct this condition.

C) **Erratic** - This symptom is caused 99% of the time by on intermittent connection between the wire and the ring or spade connector. Often the wire's insulation is pushed into the crimp area and crimped. The center conductor casually touches the connector allowing the tach to work most of the time but causing a nightmare for the technician. Electrical noise also can cause erratic readings. See "Reading High" below for further information.

D) **Reading High** - This is usually caused by the switch on the back of the tach being in the wrong position. If the number of cylinders or alternator poles selected by the switch is too low, the tach will read high. If a variable alternator or magnetic pick-up tach is being used, then further calibration may be necessary, as this calibration is done by the end user. See 'Calibration'. Excessive electrical noise may also cause the tach to read high. These noise spikes are counted by the tach as engine **RPM's**. The wire affected by the noise can be identified by connecting one wire at a time to the tachometer directly from the battery or the signal source on the engine.

FUEL GAUGES

Operation

Gauges operate by sending low amperage current through the gauge's meter to ground via a sending unit with variable resistance. The resistance of the sending units increase or decrease with the changes in volume. As the sender's resistance varies, the amount of current allowed to flow through it to ground changes and the meter deflects. Instrument part numbers are located on a label attached to the outside of the case (i.e. GA0000A). Gauges installed on the World Class Catamarans are covered under warranty by their respective manufacturer.

Troubleshooting

A) Gauge appears to "stick" during operation - Slightly loosen nuts holding back clamp and check operation. If gauge now operates properly and is not loose in panel, gauge now should provide suitable service. If gauge continues to stick during operation -- replace gauge.

B) Gauge is inoperative:

1) To test for voltage to the gauge (use a 12-volt test light or voltmeter for testing):

a) Turn key switch to ON position. Connect the test light or voltmeter lead to the ignition "I" terminal of the gauge and the other lead to the ground "G" or "GND" terminal of the gauge. If test light lights or approximately 12 volts is indicated on the test meter, the ignition and ground connections are good.

b) If test light does not light or there is no reading on the test voltmeter, check the positive 12 volt power source at the key switch of fuse block. If no power is available at those points, correct the lead problem or replace any blown fuses.

c) If test light still does not light or voltmeter still shows no voltage, check ground wire and connections by connecting one lead of test light or voltmeter to a known source of B(+) and the other lead to the ground terminal of the gauge. If lamp lights or voltage is indicated on the voltmeter while touching the ground terminal of the gauge, the ground connection to the gauge is good. If lamp does not light or voltmeter does not show voltage, check ground connection to gauge and connection to ground source.

2) To test gauge operation and sending unit connections:

a) Turn key switch to OFF position. Connect a jumper lead between the "S" terminal and the "G" or "GND" terminal of the gauge. Turn key switch to ON position. If the gauge registers a full scale reading under those conditions, the gauge is good. If less than full scale reading is indicated, the gauge is defective and should be replaced.

b) If no reading is indicated, remove sending unit lead wire from sending unit on the engine. Turn the key switch to the "ON" position. Ground the sending unit lead wire to a good ground and note the gauge reading. If the gauge registers a full scale reading the sending unit may be defective.

c) Remove jumper lead. Remove sending unit lead wire from the sending unit on the fuel tank. Turn key switch to ON position. Ground the sending unit lead wire to a good ground and note the gauge reading. If the gauge now (after grounding the sending unit lead wire) registers a full scale reading, the sending unit is defective and should be replaced. NOTE: Intermittent readings usually indicate loose connections or shorted wiring. Check all connections and wiring if the above checks do not pinpoint a specific defect.

C. Sending Unit is defective - Disconnect sending unit lead from gauge "sender" terminal. Using ohmmeter, test sending unit resistance. If sending unit shows EITHER zero ohms or open circuit, check sending unit or wiring for defects. The sending units supplied with the fuel tanks are covered under warranty by the tank manufacturer. Please note the size of the tank if it's necessary to order new sending units from the tank manufacturer.

VOLTMETERS

Operation

A voltmeter indicates the battery voltage and the general condition of the battery charging system. The meter requires no warm-up and indicates voltage changes instantly. Instrument part numbers are located on a label attached to the outside of the case (i.e. VP0000A). Gauges installed on the World Class Catamarans are covered under warranty by their respective manufacturer.

Troubleshooting

A) Gauge appears to "stick" during operation - Slightly loosen nuts holding back clamp and check operation. If gauge now operates properly and is not loose in panel, gauge now should provide suitable service. If gauge continues to stick during operation, replace gauge.

B) No voltage reading is noted on the voltmeter:

1) If the indications are normal (engine starts, lamps lights, etc.) proceed with this test, otherwise, check battery voltage with a test voltmeter, or a 12 volt test light.

2) Check for voltage at voltmeter by connecting test voltmeter or 12 volt test light to "+" and "-" terminals of voltmeter; turn ignition switch on.

a) If light does not light, or if test voltmeter reads the same as installed voltmeter, the problem is in the battery charging system or wiring. Refer to the outboard motor manufacturer's shop manual for trouble-shooting procedure.

b) If test voltmeter indicates correct voltage; typically 14 volts with engine running and at least 12 volts with no accessories on and engine off (see outboard motor shop manual for details), then replace voltmeter.

WATER PRESSURE GAUGES

Operation

Gauges indicate cooling system pressure and proper operation of water pumps and thermostats. A sudden drop in pressure indicates that a foreign object (plastic bag, seaweed) is obstructing the water intakes. The gauges are directly supplied by tubing connected to each outboard (make sure hose to gauge is secured with tie to prevent water spray) -- No sending unit is utilized. Instrument part numbers are located on a label attached to the outside of the case (i.e. WP0000A). Gauges installed on the World Class Catamarans are covered under warranty by their respective manufacturer.

Troubleshooting

A) Gauge appears to "stick" during operation - Slightly loosen nuts holding back clamp and check operation. If gauge now operates properly and is not loose in panel, gauge now should provide suitable service. If gauge continues to stick during operation -- replace gauge.

B) Gauge is inoperative - Remove tubing from affected gauge. Start outboard and check for water flow at the gauge end of the tubing (This may take a few seconds). If there is no water flow, check for proper water pump and thermostat operation, a loose tubing connection at the outboard or a kink in the tubing line. If all of these are normal -- replace gauge.

Single Switch

Einzelschalter

Interrupteur Unique

Interrupciones Solitarias

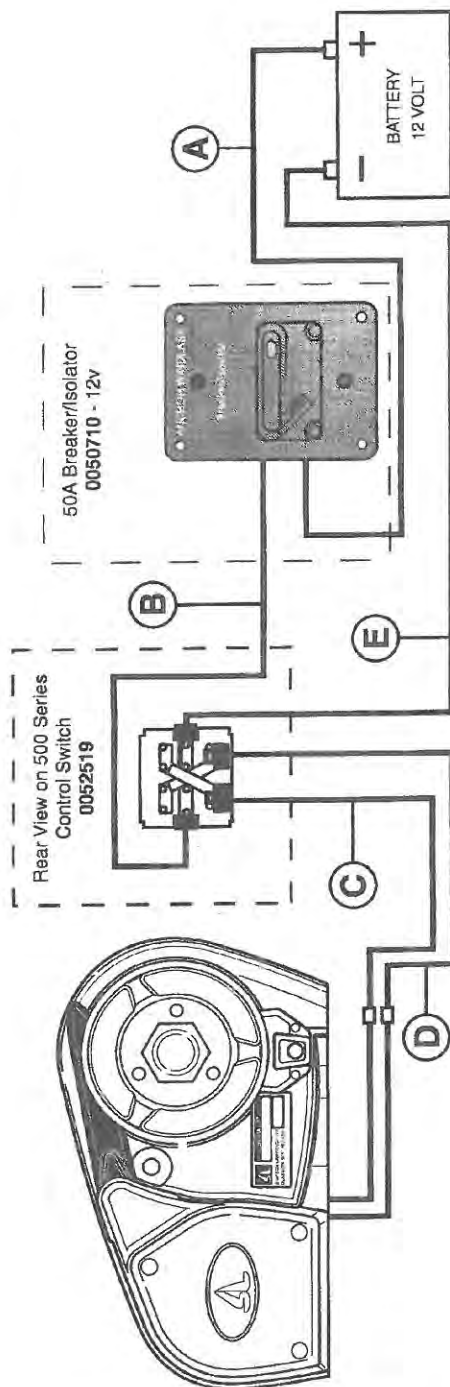
Interruttori Singoli

Enstaka Strömbrytare

Horizon 600

H600-12V

A + B + C + D + E =		
10.7 m (35 ft)	19.8 m (65 ft)	27.4 m (90 ft)
6 mm ² (8 AWG)	10 mm ² (6 AWG)	16 mm ² (4 AWG)



- | | | | | |
|---|--|--|---|--|
| <ul style="list-style-type: none"> ● Wahl des Kabeldurchmessers hängt ab von Gesamtkabelänge;
$A + B + C + D + E =$ ● Von Batterie zur Ankerwinde und von Ankerwinde zur Batterie. | <ul style="list-style-type: none"> ● Le choix d'épaisseur de câble dépend de la longueur totale du câble;
$A + B + C + D + E =$ ● Relevez la batterie au guindeau et le guindeau à la batterie. | <ul style="list-style-type: none"> ● La elección del grosor del cable depende de la longitud total del mismo;
$A + B + C + D + E =$ ● Desde la pila o batería hasta el cabrestante, desde el cabrestante hasta la pila o batería. | <ul style="list-style-type: none"> ● La scelta dello spessore dei cavi dipende dalla lunghezza totale del cavo stesso;
$A + B + C + D + E =$ ● Dalla batteria all'argano, dall'argano alla batteria. | <ul style="list-style-type: none"> ● Val av kabel-tjocklek beror på den totala kabel längden;
$A + B + C + D + E =$ ● Från batteriet till ankarspelet, från ankarspelet till batteriet. |
|---|--|--|---|--|

Simpson Lawrence Horizon 600 Windlass

Operation and Maintenance Guide

The Simpson Lawrence Horizon 600 Windlass installed on your boat is an automatic rope/chain anchor windlass. The unit is operated with a toggle switch located at your helm station. This toggle operates the windlass in both the up and down direction. The following is a brief discussion on the use of the windlass; however, this is an important piece of equipment and the instruction manual should be carefully read.

* Pull string inserted in lieu of wiring for boats ordered without windlass.

Anchoring

- 1- Before anchoring, the retaining clip that is attached to your chain should be released to allow free running of the anchor rode.
- 2- Release the anchor and rode by pressing on the toggle switch. Allow the line to run out to an appropriate length for the depth of water where you are anchoring. Pausing periodically will allow your boat to drift back, both setting the anchor, and allowing the slack to come out of your anchor rode. It is recommended that the up switch be operated briefly to engage the internal clutch mechanism.
- 3- When your anchor is secure, and you have let out the proper amount of scope you should tie off your rode to a cleat. This provides a safe holding point for the boat. Although the windlass may hold the boat, it is always best to tie your rode off for long periods of time, preventing excess strain on the windlass.

Anchor Retrieval

- 1- When you are ready to pull up your anchor, untie your rode, to allow the windlass to retrieve the anchor rode.
- 2- Although the windlass is designed to pull more than the weight of the anchor and rode, it is best to assist it by using your engines. The speed of your boat should be consistent with both wind and current, making sure that you are not driving over the rode as the windlass retrieves it.
- 3- During anchor retrieval, the rode may begin to pile up beneath the windlass motor. Obstructions in the locker can prevent the rode from sliding into the deepest part of the locker. The rode may jam the windlass, and cause the windlass to stop if it piles up high enough. To prevent any complications during the retrieval of your anchor it is recommended that the line be cleared from beneath the windlass approximately every 50 feet.
- 4- When it is time to break the anchor loose from the bottom, you should always use your engines to assist the windlass.
- 5- Care should be taken, when you reach the chain section of your rode, to slow your retrieval down to prevent the anchor from overriding the anchor roller.
- 6- When the anchor is up and safely in the anchor roller, replace the retaining clip to ensure safe operation of your boat.

Other Tips

- 1- To help in anchoring and retrieval, it is good to mark your rode with an oil based paint every 50 feet to allow a visual guide to the amount of rode that is released. It is also beneficial to mark the last few feet of the chain to indicate when the anchor is about to enter the roller.
- 2- If the unit jams, it can be cleared by operating in the opposite direction releasing the kink in the rode or any obstructions. Sometimes it may be necessary to inspect the rope for kinks in order to prevent any jamming of the windlass.

Maintenance

The windlass is designed to operate in the marine environment, however, like any equipment that is exposed to salt water, it should be rinsed with fresh water. Rinsing the unit on a regular basis will prevent salt deposits, which may lead to poor operation of the unit, or corrosion. See your owners manual for more detailed maintenance procedures.

MINIMUM WEIGHT REQUIRED FOR TRAILER BRAKES (As of 1/1/98)

The requirements for trailer brakes are currently controlled by individual state statutes. On tandem trailers, only five states now require brakes on each axle - **Colorado, Pennsylvania, Minnesota and Washington** (and **Arizona** above 6000#). It is recommended that you contact your own state agency to confirm current requirements before purchasing a boat trailer.

State	Weight	State	Weight
Alabama	3,000#	Montana	3,000#
Alaska	5,000#	Nebraska	3,000#
Arizona	3,000#	Nevada	1,500#
Arkansas	3,000#	New Hampshire	1,500#
California	1,500#	New Jersey	3,000#
Colorado	3,000#	New Mexico	3,000#
Connecticut	3,000#	New York	3,000#
Delaware	4,000#	North Carolina	1,000#
Florida	3,000#	North Dakota	ALL
Georgia	2,500#	Ohio	2,000#
Hawaii	1,500#	Oklahoma	3,000#
Idaho	3,000#	Oregon	3,000#
Illinois	3,000#	Pennsylvania	3,000#
Indiana	3,000#	Rhode Island	4,000#
Iowa	3,000#	South Carolina	3,000#
Kansas	NONE	South Dakota	3,000#
Kentucky	NONE	Tennessee	3,000#
Louisiana	3,000#	Texas	4,500#
Maine	3,000#	Utah	2,000#
Maryland	3,000#	Vermont (Ref #1)	3,000#
Massachusetts	10,000#	Virginia	3,000#
Michigan	3,000#	Washington (Ref #2)	3,000#
Minnesota	3,000#	West Virginia	3,000#
Mississippi	2,000#	Wisconsin	ALL
Missouri	NONE	Wyoming	6,000#

Ref #1 If over 7 feet high & 7 feet wide

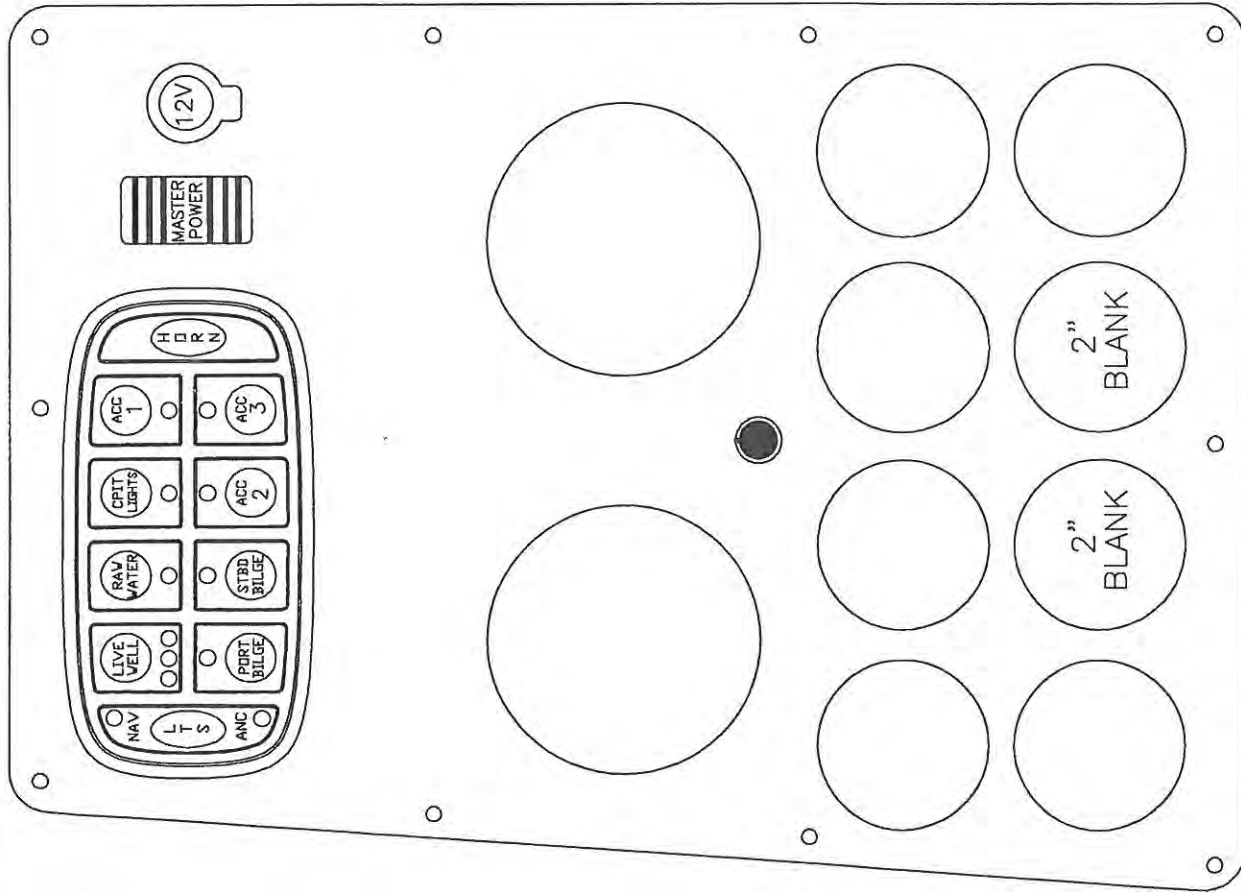
Ref #2 Or, if trailer exceeds 40 percent of tow vehicle weight

* Source: Boating Industry 12/97

**246 SF, 266 SF
CENTER CONSOLE
MODELS**

**PANEL, SWITCH &
INSTRUMENT WIRING
DIAGRAMS**

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ASSEMBLY PARTS:

GRAYHILL DIGITAL SWITCHING SYSTEM

POWER MANAGEMENT ENCLOSURE = 91YY5101-1
SWITCH POD = 91YY5100-1
#10-32 NYLOCK NUTS FOR PODS AND PME BOX (4)
LABEL FOR PME BOX, PRINTED IN HOUSE
SEE SEPERATE DRAWINGS FOR DETAILS

CARLING CONTURA IIL ROCKER BASE AND ACTUATOR

BASE = SPST ON-OFF, LTD, VIDAB60B
ACT = HARD RED, 1 LENS, VVCM500
ACT HAS "MASTER POWER" SCREENED
PANEL, MACHINED, NO SCREENING NAF070
12 VOLT POWER SUPPLY, 12VRC.OEM

ROTARY DIMMER SWITCH, 6400-7055
KNOB FOR DIMMER, KNS501-1/4

BUSS BAR ASSEMBLY, (EXISTING PARTS)
BUSS BAR IS MOUNTED TO SCREENED PLATE

2" BLANKS FOR SMALL GAUGE HOLES, 2403 (2)

ASSEMBLY NOTES:

SEE SEPERATE DRAWINGS FOR CUT SHEETS, AND
WIRING DIAGRAMS FOR GRAYHILL SYSTEM.

1 PME WITH PLUG AND BUSS BAR SHIPS WITH EACH
ASSEMBLY

PME AND SWITCH POD TO BE TESTED PER GRAHILL
SPECS, SEE TEST SHEET AND PROCEDURE.

PHAZE II PRODUCTS, INC.

DRN BY:GMM/XXX

CHK BY:GMM

SHEET 1 OF 1

DATE DRAWN

SCALE

92201

WORLD CLASS CATS CEN CON

HONDA IPA ASSEMBLY

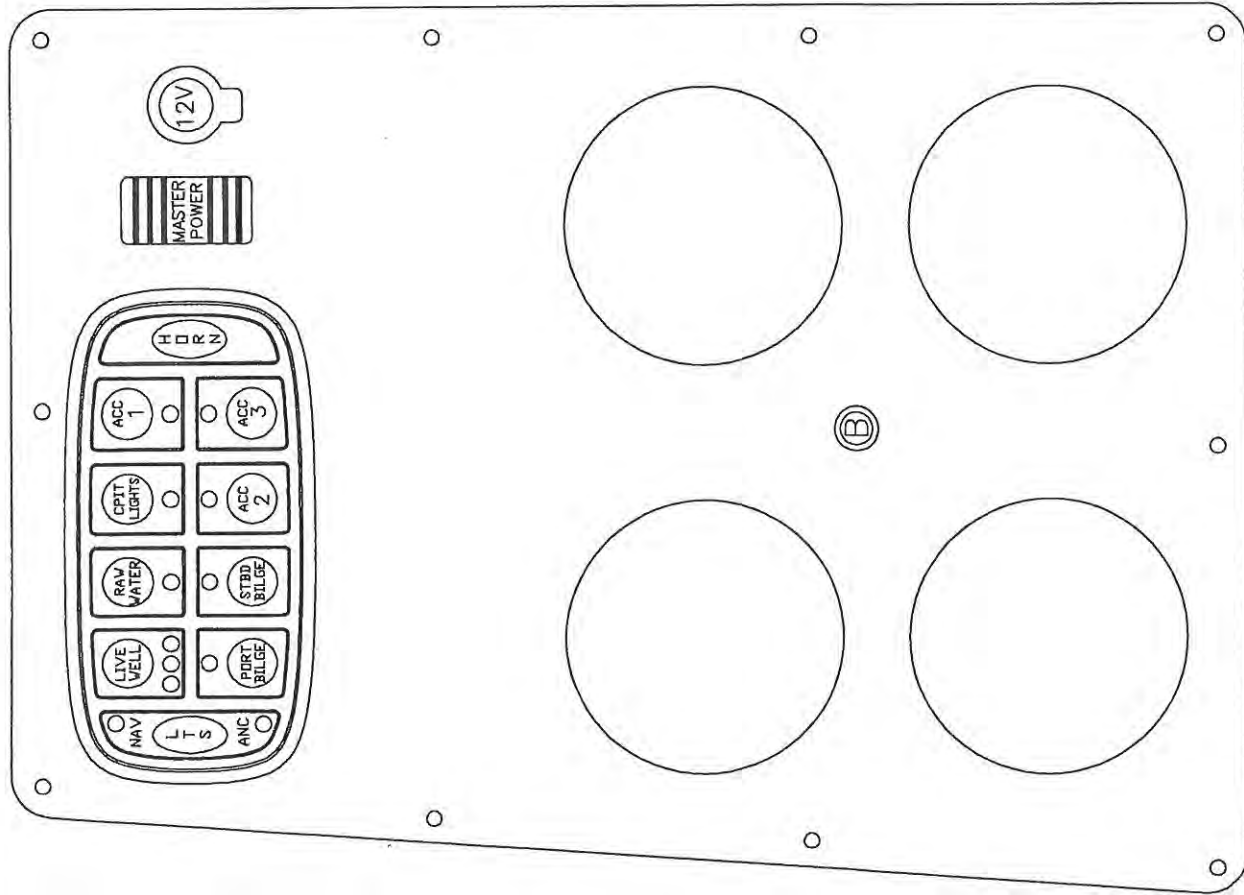
DWG NO.

NTS 09-0056

REVISION

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ASSEMBLY PARTS:

GRAYHILL DIGITAL SWITCHING SYSTEM
POWER MANAGEMENT ENCLOSURE = 91YY5101-1
SWITCH POD = 91YY5100-1
#10-32 NYLOCK NUTS FOR PODS AND PME BOX (4)
LABEL FOR PME BOX, PRINTED IN HOUSE
SEE SEPERATE DRAWINGS FOR DETAILS

CARLING CONTURA III ROCKER BASE AND ACTUATOR
BASE = SPST ON-OFF, LTD, VIDAB60B
ACT = HARD RED, 1 LENS, VCMSSO
ACT HAS "MASTER POWER" SCREENED
PANEL, MACHINED, NO SCREENING NAF069
12 VOLT POWER SUPPLY, 12VRC.OEM
BUSS BAR ASSEMBLY, (EXISTING PARTS)
BUSS BAR IS MOUNTED TO SCREENED PLATE
1/2 HOLE PLUG, 2463

ASSEMBLY NOTES:

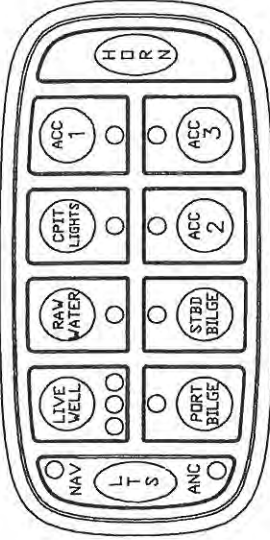
SEE SEPERATE DRAWINGS FOR CUT SHEETS, AND
WIRING DIAGRAMS FOR GRAYHILL SYSTEM.

1 PME WITH PLUG AND BUSS BAR SHIPS WITH EACH
ASSEMBLY

PME AND SWITCH POD TO BE TESTED PER GRAHILL
SPECS, SEE TEST SHEET AND PROCEDURE.

PHAZE II PRODUCTS, INC.			
DRN BY:GMM/KARE	WORLD CLASS CATS CEN CON	REVISION	
CHK BY:GMM	YAMAHA / MERCURY IPA	DWG NO.	
SHEET 1 OF 1	DATE DRAWN	SCALE	
92201	NTS	09-0055	0

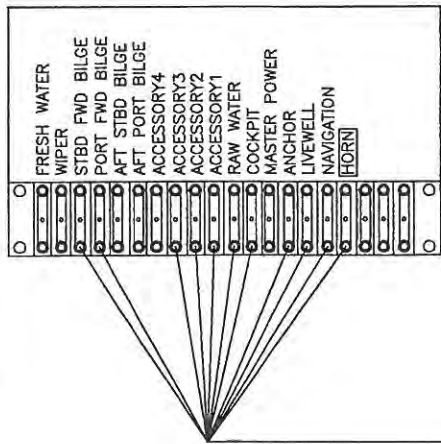
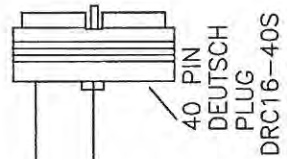
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SEE CABLE DETAIL

MASTER POWER WIRE FROM MASTER SWITCH
CUSTOMER TO HOOK UP WHEN INSTALLING

48"

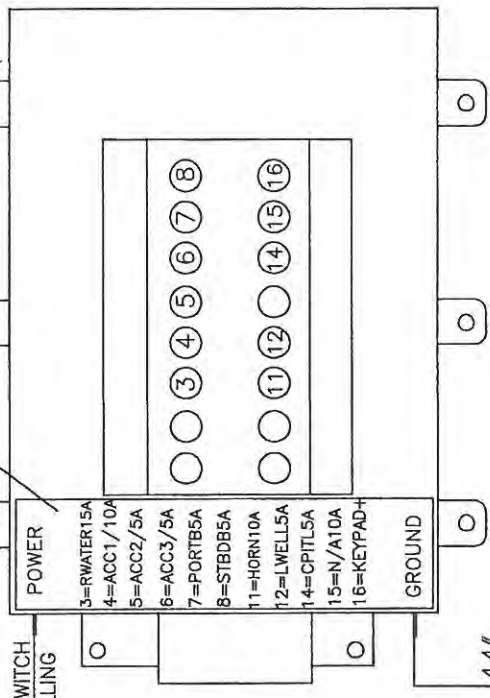


42"

THESE WIRES RUN FROM THE DEUTSCH PLUG TO THE BUSS BAR. TAPE EVERY 6" AND PUT INTO 3/4 SPLIT TUBING FROM 1" PAST PLUG TO BREAK OUT POINT TO BUSS BAR.

ASSEMBLY VIEW OF THE DS GRAYHILL, CEN CON MODELS

PME BOX LABEL
"CENCONPMELB"



MAIN GROUND WIRE IS ATTACHED TO PME
GROUND POST AND COILED AND TIED, THE
CUSTOMER WILL HOOK THE WIRE INTO THE
MAIN GROUND POST IN THE BOAT.

44"

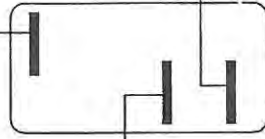
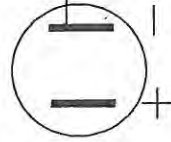
REVISIONS			
ZONE	REV	DESCRIPTION	DATE

DATE		9-20-01	NTS	09-0055/56	0
DRAWN		SCALE	BY	DATE	REVISION
9-20-01					
09-0055/56					
0					

PHAZE II PRODUCTS, INC.
DRN BY:GMM NAME
CHK BY:GMM WCC CENTER CONSOLE DIGITAL
SHEET 1 OF 1 SWITCH ASSEMBLY SHEET
DATE DRAWN SCALE DWG No. REVISION

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UNAUTHORIZED USE OF THIS DOCUMENT WILL RESULT IN LEGAL ACTION AND LITIGATION.

16 GA BLACK, 6", GROUND SWITCH TO 12V



10 RING HS



LABEL
"MAIN"
"POWER"

10 GA RED, 50" TO MAIN POWER

CUSTOMER TO HOOK UP

10 RING HS

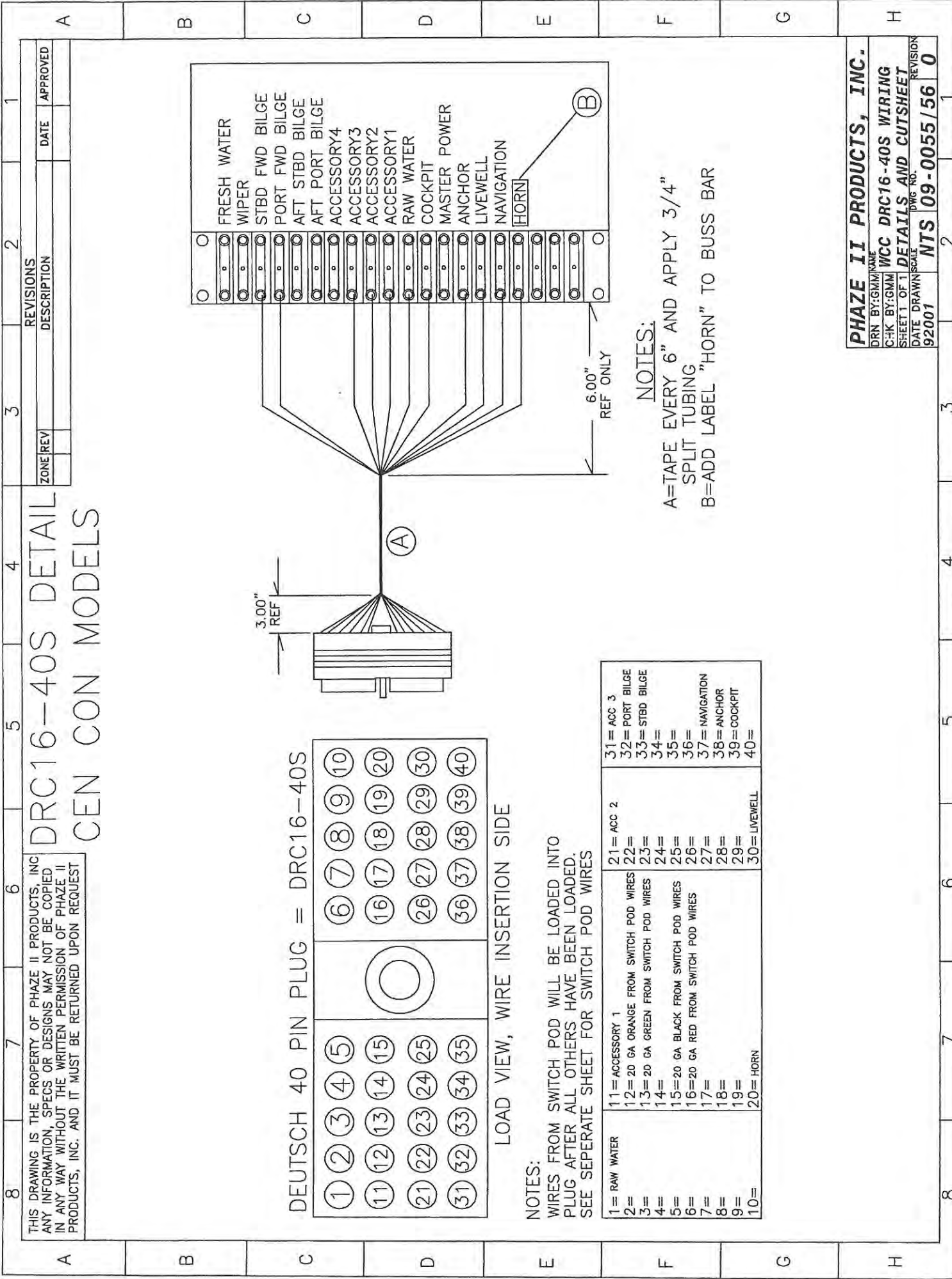


LABEL
"PME"
"POWER"

10 GA RED, 24" TO PME BOX, "POWER"

CUSTOMER TO HOOK UP

PHAZE II PRODUCTS, INC.			
DRN BY:GMM	NAME	WCC CEN CON PNL WIRING	
CHK BY:GMM		SHEET 1 OF 1	DIAGRAM 090055/090056
DATE DRAWN	SCALE	DWG NO.	REVISION
92201	NTS	090055/56	0



DRC16-40S DETAIL
CEN CON MODELS

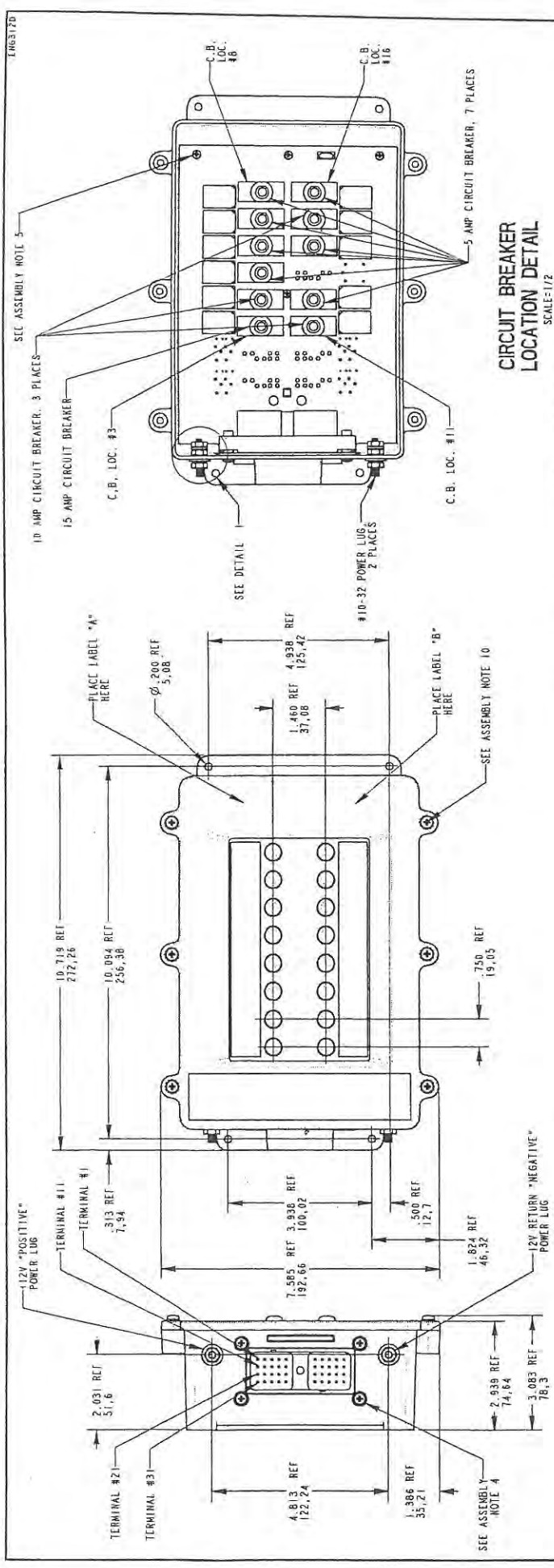
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ZONE REV		REVISIONS	
DATE	APPROVED	DESCRIPTION	

NOTES:
WIRES FROM SWITCH POD WILL BE LOADED INTO PLUG AFTER ALL OTHERS HAVE BEEN LOADED.
SEE SEPARATE SHEET FOR SWITCH POD WIRES

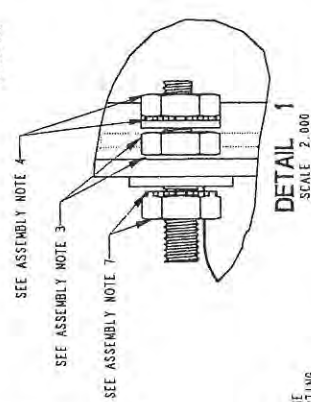
LOAD VIEW, WIRE INSERTION SIDE			
11 = ACCESSORY 1	21 = ACC 2	31 = ACC 3	
1 = RAW WATER	2 = 20 GA ORANGE FROM SWITCH POD WIRES	32 = PORT BILGE	
2 =	3 = 20 GA GREEN FROM SWITCH POD WIRES	33 = STBD BILGE	
3 =	4 =	34 =	
4 =	5 = 20 GA BLACK FROM SWITCH POD WIRES	35 =	
5 =	6 = 20 GA RED FROM SWITCH POD WIRES	36 =	
6 =	7 =	37 = NAVIGATION	
7 =	8 =	38 = ANCHOR	
8 =	9 =	39 = COCKPIT	
9 =	10 = HORN	40 =	

NOTES:
A=TAPE EVERY 6" AND APPLY 3/4" SPLIT TUBING
B=ADD LABEL "HORN" TO BUSS BAR



PLEASE REVIEW, APPROVE AND RETURN
TO GRAYHILL INC., ATTN: LLAKOMY
FAX: 708-482-2245
APPROVED BY: *[Signature]*
DATE APPROVED: 8-23-01

- MATERIALS & FINISHES NOTES:**
1. P.C. BOARD: .093 THICK FR-4.
 2. P.C. BOARD FINISH: 63/37 TIN/LEAD SOLDER, OVER .000200 NICKEL, DOUBLE CLAD WITH 2 OZ. (1.0028) COPPER AFTER PLATING.
 3. COVER: BLACK ABS. CYCLOCAC GRADE 1.
 4. COVER BOOT: TRANSPARENT SILICONE RUBBER, DUROMETER: 50±5, UL94 HB RATED.
 5. CONNECTOR: GRAYHILL 90 POSITION SEALED CONNECTOR, EQUIVALENT TO DEUTSCH DRC13-40PA.
 6. CONNECTOR: BLACK ABS. CYCLOCAC GRADE 1.
 7. POWER LUG: PHOSPHOR BRONZE, ELECTROPLATED BRIGHT TIN, 10-32UNC THREAD.
 8. POWER LUG HARDWARE: SILICONE BRONZE, NUTS AND STAR WASHERS.
 9. POWER LUG STRAPS: PHOSPHOR BRONZE GRADE CDA-510, ELECTROPLATED BRIGHT TIN.
 10. POWER LUG STRAPS: PHOSPHOR BRONZE GRADE CDA-510, ELECTROPLATED BRIGHT TIN.
 11. 5. C-BOARD CONFORMAL COATING: 100% HINDRUM LIGES, P.C. BOARD.
 12. CIRCUIT BREAKERS: ETA MODEL 1536 AND 41-06, VARIOUS VALUES.
 13. RELAY (SINGLE): ARONAT CF2-12V OR EQUIVALENT, IF EQUIPPED.
 14. RELAY (SINGLE): ARONAT JSN1-12V-5 OR EQUIVALENT.
- ASSEMBLY NOTES:**
1. REMOVE RELEASE LINER FROM BOOT AND INSTALL INTO COVER.
 2. COVER RTV SEAL PERIMETER SHALL FORM A BUILT IN GASKET ALLOW 61T TO CURE.
 3. INSTALL (12) POWER LUGS INTO BOX AS SHOWN AND SECURE WITH (1) EACH WASHER AND NUT.
 4. TORQUE TO 15 INCH POUNDS.
 5. INSTALL P.C. BOARD ASSEMBLY. ASSEMBLY TO BE PLACED ON HOUSING BOLTS AND SLID TO THE LEFT SO THAT THE CONNECTOR PROTRUDS THROUGH THE SIDE OF HOUSING. SECURE CONNECTOR WITH (4) #10 SCREWS. TORQUE TO 15 INCH POUNDS. CARE MUST BE OBSERVED WITH ROUTING THE P.C. BOARD ASSURABLY POWER STRAPS OVER THE POWER LUGS.
 6. SECURE P.C. BOARD ASSEMBLY TO HOUSING WITH (4) #4 SCREWS. TORQUE TO 4 INCH POUNDS.
 7. INSTALL POWER STRAPS TO POWER LUG AS SHOWN. INSTALL STAR WASHER & NUT AND TORQUE TO 15 INCH POUNDS. INSTALL POWER WIRE OVER TOP LUG AS SHOWN AND TORQUE TO 25 INCH POUNDS.
 8. INSTALL (11) WASHER AND (11) NUT TO EACH POWER LUG FROM OUTSIDE OF HOUSING AS SHOWN.
 9. DO NOT TORQUE.
 10. TEST UNIT FOR PROPER ELECTRICAL OPERATION. THIS INCLUDES RELAY OPERATION, SERIAL INTERFACE, ETC.
 11. INSTALL COVER AS SHOWN AND SECURE WITH (6) #8 SCREWS AND (6) WASHERS. TORQUE TO 4 INCH POUNDS.
 12. REFERENCE TO 9155113-1 FOR SCHEMATIC OF THIS ASSEMBLY.
 13. PLACE "A" LABEL ON SURFACE INDICATED PER LABEL "A" DETAIL. PLACE LABEL "B" ON SURFACE INDICATED. THIS LABEL SHALL CONTAIN A SERIAL NUMBER AND CUSTOMER PART NUMBER PER LABEL "B" DETAIL.
 14. THIS ASSEMBLY IS SUPPLIED WITHOUT ANY WARNING OR INFORMATION LABELS.



CONNECTOR TRUTH TABLE

CONNECTOR NUMBER	CIRCUIT DESCRIPTION	CIRCUIT BREAKER LOCATION
1	RAW WATER	3
2, 3, 4, 5, 7-10, 40	NO CONNECT (NC)	NONE
6, 16, 17	KEYPAD POWER	16
11	ACC 1	4
12, 14, 22	KEYPAD COMM + (TRX+)	NONE
13, 23, 24	KEYPAD COMM - (TRX-)	NONE
15, 18, 19, 25-29, 34-36	GROUND	NONE
20	HORN	11
21	ACC 2	5
30	LIVELINE	12
31	ACC 3	6
32	PORT BILGE PUMP	7
33	STBD BILGE PUMP	8
37	NAV LIGHT	15
38	ANCHOR LIGHT	10
39	COCKPIT LIGHTS	14

REVISIONS

ISSUE	APP/DATE	DESCRIPTION
A	BHW/ELL 8-23-01	ORIGINAL
B	8-23-01	CHG 336717 LLL 8-21-01

GRAYHILL INC.
14000 N. 140TH AVE.
CHICAGO, IL 60655

UNLESS OTHERWISE SPECIFIED TOLERANCES AND DIMENSIONS ARE IN INCHES
LINEAR ± .031 DIAMETERS ± .015
ANGULAR ± 5° FANG FINISHING
DO NOT SCALE THIS PRINT

CRITICAL CHARACTERISTIC FLAGS
PER GRAYHILL SPEC SOP2338
△ -- CRITICAL CHARACTERISTIC FLAG
○ -- Cpa REQUIRED
B -- S.P.C. FLAG (CONTROL CHART REQUIRED ON FEATURE SPECIFIED)

FINISH
SEE NOTES

APPROVED DATE
8-23-01

NAME
ASM, F, IVAL

DATE
8-23-01

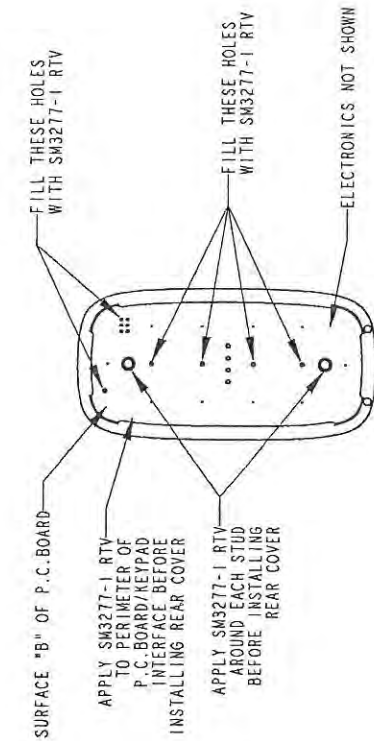
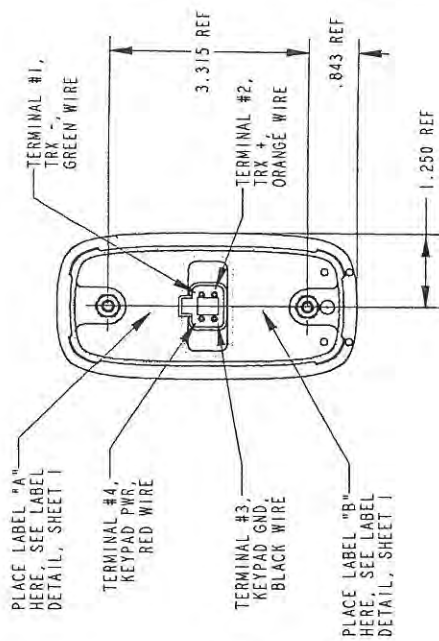
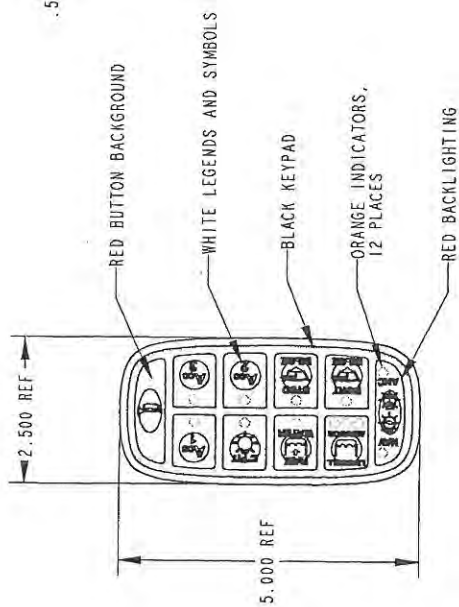
CAGE NO.
81073

ISSUE
91Y5101-1

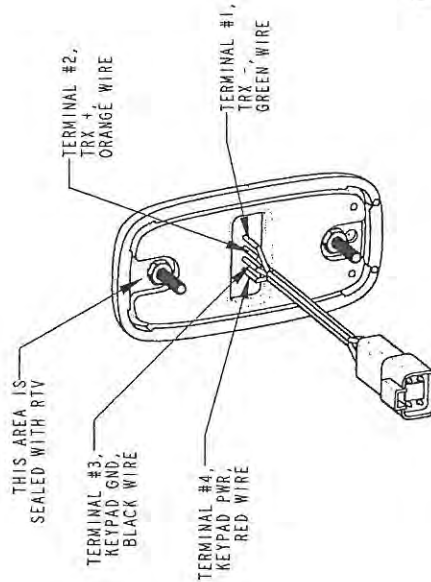
SCALE
0-500

SHEET
1 OF 1

ALL REVISIONS TO THIS DRAWING
MUST BE MADE ON THE PRINT SYSTEM



RTV DETAIL
RTV PLACEMENT DETAIL
CABLE/CONNECTOR NOT SHOWN
SCALE=1/2



ISOMETRIC REAR VIEW
WIRING DETAIL
NOT TO SCALE

		GRAYHILL, INC. 561 HILLBROVE AVE. LA GRANGE, IL 60525 PHONE (708) 354-1040
CAGE NO.	81073	91Y5100-1
DWG. NO.	91Y5100-1	ISSUE
SIZE	B	A
SCALE	0.500	SHEET 2 OF 2

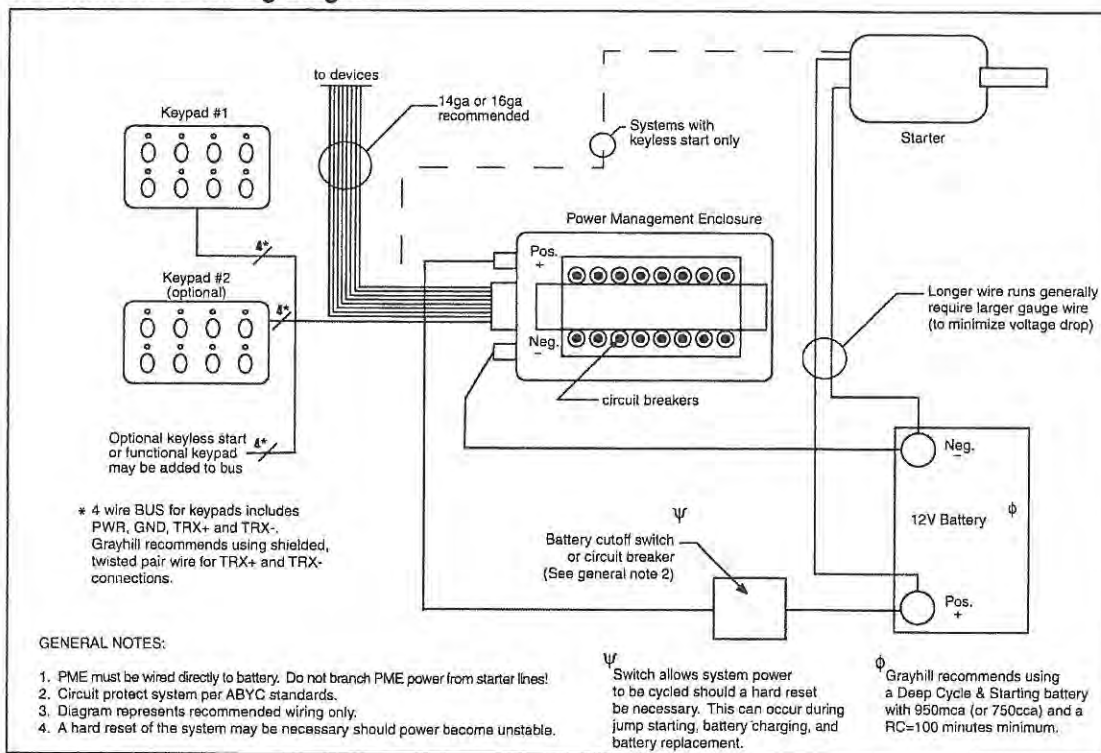
Marine System Wiring and Troubleshooting Guide

The Grayhill standard digital switching system uses low voltage switches, a microprocessor, and serial communication to significantly reduce wire count while adding functionality not possible with traditional power switching systems.

At a minimum, the system consists of a keypad and PME (Power Management Enclosure) powered by a 12V battery. The PME allows for up to 16 different functions to be controlled with two additional functions for motors and systems requiring forward/reverse functionality. Circuit protection is provided through circuit breakers or fuses based on customer's current specifications.

Serial communications is utilized to reduce wiring between the keypad and PME. This system requires only four wires between the keypad and PME, regardless of the number of switches. All switches communicate over two wires, allowing for multiple keypads on the same bus to be placed in different locations.

Recommended Wiring Diagram



SYSTEM SPECIFICATIONS

Electrical	
PC Board:	.093 thick FR-4
Circuit Breaker or Fuse:	ETA model 1658, manual reset, various values available (5A-25A)
Relay (dual or single):	12V, 16 positions @ 15A
Recommended System Voltage:	12 Volts
Minimum System Voltage:	8 Volts
Switch Life (Keypad):	3 million operations per button
PME Current:	65A max, 16 positions @ 15A, 4 positions @ 10A
Standby Current (all functions off):	13mA per device
Transient Protection:	Per SAE J1455 (12V Systems)

Mechanical	
Cover/Housing (PME):	ABS, black
Cover Boot (PME):	Translucent silicone rubber, durometer: 50±5
All Screws:	Stainless steel, AISI 300 passivated finish
Information Labels:	Opaque polyester, white background, black printing

Power Lug:	Phosphor bronze, electroplated bright tin
Power Lug Hardware:	Silicone bronze hex nuts, star washers
Warning Label:	Opaque white mylar, screen-printed, with black printing
PC Board Conformal Coating:	.008 min. thickness, applied to both sides of PC board

Environmental	
Operating Temperature:	0°C to + 70°C
Storage Temperature:	-40°C to + 85°C
Humidity:	0 to 98% (No Condensation)
Salt Spray:	Per ASTM B117
UV Protection:	UV-B 400 Hrs

Connectors (Standard)	
PME:	Deutsch DRC 13-40P, 40 position receptacle or equivalent
Keypad:	Deutsch DT series or equivalent
Optional:	Amp Mate N Lok, Packard

Contact Grayhill for Ignition Protection.

Troubleshooting

For Systems without Keyless Start Only

Problem	Possible Causes		Troubleshooting Steps
No power to keypads. (No functions work and no lights turn on)	-Blown fuse or breaker -PME not wired or connected properly -Low battery power -Improper wiring from PME to keypad -Faulty keypad -Faulty PME box		(1) Check PME for a blown fuse or tripped breaker. (2) Verify PME is wired to the battery properly (refer to wiring diagram). (3) Verify battery is fully charged. (4) Verify keypad is wired correctly to PME. (5) Replace keypad. (6) Replace PME box.
Single function on keypad doesn't work when pressed.	Does the indicator LED light up when button is pressed?	If yes -Improper wiring -Faulty device If no -Blown fuse or tripped breaker -Faulty keypad -Faulty PME	(1) Verify boat device is wired to appropriate pin #. (2) Verify boat device works properly. (1) Check PME for blown fuse or tripped breaker. (2) Replace keypad. (3) Replace PME box.
Function key works but indicator LED doesn't light up.	-Low battery power -Faulty keypad -Faulty PME		(1) Verify system is at recommended voltage. (2) Cycle power to the keypad and watch for LED to light up. Replace keypad if LED still doesn't light up. (3) Replace PME box.



Keypad powers up but no functions work. (Backlight flashes briefly upon power up.)	-Blown fuses or breakers -Improper wiring	(1) Check PME for blown fuses or tripped breaker. (2) Verify communication cables are wired to appropriate pin #'s.
Breaker/fuse is always tripped when button is pressed.	-Fuse or circuit breaker value too low for device -Faulty boat device -Short circuit in wiring harness	(1) Verify circuit breaker/fuse value is sufficient for system. (2) Verify boat device is working properly. (3) Check for short circuit in wiring harness.
Wrong output is activated when button is pressed.	-Improper wiring	(1) Verify device is connected to appropriate pin # on PME box.
Indicator LED's flicker on and off.	-Function has no load -Stray voltage from harness	(1) Apply a load to the function. (2) Shield communication lines.
System locks up.	-Low battery power	(1) Cycle power to the keypad and PME. (2) Verify system is at recommended voltage.

For Systems with Keyless Start Only

Problem	Possible Cause	Troubleshooting Steps
Engine cranks momentarily.	-Low battery power -Improper wiring	(1) Verify battery is fully charged. (2) Refer to wiring diagram for recommended wiring gauge selection, and battery specifications.
Engine will not crank.	-Blown fuse or circuit breaker -Low battery power -Improper wiring	(1) Check for blown fuse or reset circuit breaker on PME. (2) Verify battery is fully charged. (3) Verify engine is connected to PME box properly (refer to wiring diagram).
System locks up.	-Low battery power -PME went into reset	(1) Verify system is at recommended voltage. (2) Cycle power to the keypad and PME. (3) Enter start code sequence once again.