BERTRAM 540

OWNER'S MANUAL



BERTRAM

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RINA S.p.A. (Registro Italiano Navale) assigned the classification of Your BERTRAM yacht with Certificate, following its supervision of hull lamination, reinforcement structures, propulsion and auxiliary power generating machinery, onboard systems.

NOTICES

The EC Certificate of product check stating that this pleasure boat has been approved in accordance with the 94/25/EC Directive, amended by the 2003/44/EC Directive, and that it conforms to the safety requirements applicable, is not included inside of the current Owner's manual, but it will be delivered separately by BERTRAM and will have to be stored with this manual.

Specifications

Manufacturer Name **BERTRAM**
Hull No. **04**
Number of People Capacity **max. 14**
Propulsion type: engine **(nr. 2)**
Maximum Rated Engine Power **1676 mhp/1232 kW**

Dimensions

- Length overall with fore pulpit	**57 ft 1 in - 17.40 m**
- Length hull (standard ISO 8666)	**54 ft 2 in - 18.04 yd**
- Length waterline, yacht fully laden	**47 ft 8 in - 15.90 yd**
- Fore rail extension pulpit	**2 ft 11 in - 0.98 yd**
- Maximum Beam	**16 ft 11 in - 5.64 yd**
- Draft under propellers (yacht fully laden)	**5 ft - 5 in - 1.65 m**
- Max. height (from the keel to the console)	**19 ft 4 in - 5.9 m**
- Cockpit surface	**170 ft² - 17.28 yd²**

Displacements

- Displacement, unladen	**64,375 lb - 29.2 ton**
- Displacement fully laden	**82,853 lb - 37.58 ton**

Tank capacities

- Standard fuel tank capacity	**1400 US gals - 5300 lt ***
- Water tank capacity	**225 US gals - 850 lt ***
- Black water tank capacity	**101 US gals - 382 lt ***
- Grey water tank capacity	**37 US gals - 140 lt ***

* The usable volume of tanks will vary according to the trim and load.

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LIMITED WARRANTY
BERTRAM YACHT, INC. (U.S.A.)

Bertram Yacht, Inc. (Bertram) warrants, subject to **the limitations herein**, to the first retail purchaser of this yacht (first owner) provided the First Owner completes, signs and returns the Bertram Warranty Registration Card to Bertram at the address below by certified mail, return receipt requested, within (10) days of the First Owner's purchase of the yacht, and any properly registered subsequent owners, that it will repair or replace defects in (a) items manufactured by Bertram for one (1) year and (b) the yacht's hull and its fiberglass structural components for five (5) years. These warranties run from the date of Delivery. "Delivery" means the date of the actual delivery of the yacht to the First Owner. Unless prohibited by applicable state law, an action hereunder shall be barred unless it is commenced with in (1) year from the date the cause of action accrues, regardless of the time remaining in the applicable period above.

Bertram's Obligation. Bertram's obligation is limited to repairing or replacing, at its option, any covered items found to be defective at a facility designated by Bertram. Repaired or replaced items shall be warranted as provided herein for the remainder of the applicable warranty period. Defective parts or components that are replaced shall thereupon become the property of Bertram.

Procedures. Notice of defects occurring under this Limited Warranty must be given to Bertram within a reasonable time, not to exceed thirty (30) days after discovery, or the time such defect should reasonably have been discovered, in writing, at the address below, by certified mail, return receipt requested. All notices must include the owner's name, address, phone number, the hull number, the nature of the defect, the date it was discovered, the date of purchase, and the name and address of the party from whom the yacht was purchased. A copy must also be sent to the dealer from whom the yacht must was purchased.
The owner must thereafter provide all information necessary to allow Bertram to verify compliance with these requirements. The dealer must obtain Bertram's written approval before repairing the yacht and must follow all applicable Bertram procedures. As to items not covered by this Limited Warranty, the owner may contact the appropriate manufacturer representative, to which the dealer will direct the owner on request.

Future Improvements. Bertram reserves the right to improve its design or materials without any obligation, or incorporate any changes into any previously manufactured yachts.

Exclusions. This Limited Warranty is **NOT** applicable to:

a. Damage to a yacht part or component, caused by any alteration, modification, or repair, or which has been removed from the yacht, unless specifically authorized in writing by Bertram.

b. Paints; varnishes; gelcoats; anti-fouling products; chrome plated, anodized, aluminum, or other plated finishes; the color fastness of materials or finishes; external wood paneling, siding, and trimming; stainless steel, fabrics and canvas - all of which are subject to the effects of different climates and use (including cracking and crazing); osmosis blistering if the original gelcoat surface has been altered in any way - including repair, application of any coating other than marine antifouling bottom paint, improper surface preparation for paint, or excessive sanding or sandblasting.

c. Engines, engine parts, controls, accessories, air conditioning systems, transmissions, electronics (including the installation thereof unless installed by Bertram), batteries, appliances, propellers, generators, and any equipment not manufactured by Bertram. Some of these items are warranted by their manufacturers as stated in the applicable warranties as supplied by their manufacturers. The owner shall look exclusively to these manufacturers for any and all such warranty claims.

d. Yachts which have been used for or subjected to: commercial or charter service; careless operation, grounding, collision, hurricane conditions or other extreme forces of nature; military or paramilitary operations; racing, towing, improper storage, service or maintenance; negligent operation; lack of maintenance; improper use; use in violation of instructions provided by Bertram; or use in of Federal, State, or other governmental laws, regulations, or rules.

e. Any published or announced catalog speeds; fuel consumption; weight; draft and performance characteristics; since these are estimated or obtained from test runs.

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f. Electrolysis, galvanic or crevice corrosion, or any deterioration of underwater items or items requiring repairs or replacement as a result of lack of maintenance or improper use.

g. Any damage or failure that occurs from either increasing the horsepower of the original engines installed by Bertram.

h. Compliance with the laws, regulations, or rules of any governmental or regulatory body or agency other than the U.S.A.

i. Direct, incidental, or consequential damages, costs or expenses, including but not limited to, loss of time, inconvenience, rental charges, travel expenses, loss of use, dockage fees, towing and storage charges, and the costs of transportation to the repair facility designated by Bertram, incurred as a result of any defects, or as a result of any steps the owner must take to become entitled to repair or replacement, and injury or damage to persons or property resulting from information provided by the dealer if erroneous or not approved in advance and in writing by Bertram. SOME STATES DO NOT ALLOW THE EXCLUSION OF LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES SO SUCH LIMITATION MAY NOT APPLY TO YOU.

DISCLAIMER; LIMITATION OF DURATION OF IMPLIED WARRANTIES. EXCEPT FOR THE REPAIR OR REPLACEMENT BY BERTRAM OF ITEMS COVERED BY THE LIMITED WARRANTY, BERTRAM MAKES NO OTHER WARRANTIES EXCEPT FOR THE IMPLIED WARRANTIES THAT CANNOT BE DISCLAIMED, ALL OF WHICH ARE LIMITED IN DURATION TO THE APPLICABLE PERIOD PROVIDED IN THE LIMITED WARRANTY. SOME STATES DO NOT ALLOW TIME LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THIS LIMITATION MAY NOT APPLY TO YOU.

Modifications, Subsequent Owners. This limited warranty may only be modified in writing by an authorized Bertram officer. No dealer or other party may modify the Limited Warranty. Subsequent owners to the First Owner may register to qualify for the benefits of this Limited Warranty by following the procedures specified after contacting Bertram at the address and phone set forth below.

Venue. To the extent permitted by law, venue for any dispute shall lie in Miami-Dade County, Florida, unless an alternative venue is elected by Bertram.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

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1



FOREWORD

FOREWORD

USE OF THE MANUAL

DESCRIPTION OF THE YACHT

NAVIGATION

AUXILIARY EQUIPMENT ON BOARD

CONTROL STATION

ON THE MAIN DECK

THRUST SYSTEMS

HYDRAULIC SYSTEMS

ELECTRIC SYSTEM

DETAILED INFORMATION ON THE INTERIORS

SAFETY DEVICES AND EQUIPMENT

YACHT HAULAGE AND LAY-UP PERIOD

MAINTENANCE

TROUBLESHOOTING

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1.1 WELCOME

Before taking the helm, you should have a working knowledge of the operational characteristics of your yacht, sufficient marine experience to take charge of its operation, and the skill to navigate the waters in which you intend to cruise. You must become familiar with the yacht's systems and their operation. Your personal safety and that of your guests, as well as that of your yacht, are your responsibility.

No single book can cover all the aspects of pleasure boating and seamanship, but your BERTRAM Owner's Manual is a key resource for learning about your yacht and its equipment, and for acquiring an understanding of its operational characteristics and maintenance requirements.

Additional information pertaining to the equipment installed on your boat is provided by the manufacturers of the equipment and is located in the owner's information case, which was placed aboard before delivery. It is very important that you study these manuals and understand the operation of all of the systems.

By providing you with the information you need to maintain the yacht and to operate it safely, the manual will enhance your enjoyment of your yacht. It contains details about the yacht and its systems and equipment, as well as information about practical use and maintenance. To become acquainted with your yacht before going to sea for the first time, we recommend that you read this manual carefully and consult it frequently in the future.

CAUTION

This manual presents basic guidelines, but it cannot describe every possible risk you may encounter. You are strongly urged to:
- *regularly review safety requirements;*
- *maintain your yacht and its onboard systems regularly;*
- *have your yacht inspected at least (bi-annually) by authorized BERTRAM personnel.*

CAUTION

Please, keep this manual carefully in a safe, dry and easily accessible place for an easy consultation. When you decide to change yacht, deliver this manual to the new owner in its integrity.

CAUTION

Do not attempt to operate your yacht until you are thoroughly familiar with the contents of this manual and all of your yacht's onboard systems.

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NOTICES

This manual is not intended to replace years of boating experience or the excellent classes on boating safety offered by the United States Coast Guard Auxiliary and the United States Power Squadron. We have included material that covers some of the aspects of safe boating, but we urge you to attend a safe boating course and stay current on navigation and safe boating practices.

This manual contains the following chapters:

- FOREWORD
- HOW TO USE THIS MANUAL
- DESCRIPTION OF THE YACHT
- GETTING UNDERWAY
- INSTRUMENTATION & EQUIPMENT
- HELM STATION
- ON DECK
- PROPULSION SYSTEMS
- HYDRAULIC SYSTEMS
- ELECTRICAL SYSTEM
- INTERIOR DETAILS
- SAFETY DEVICES AND EQUIPMENT
- YACHT HAULAGE AND LAY-UP PERIOD
- MAINTENANCE
- TROUBLESHOOTING

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1.2 CUSTOMER SUPPORT

BERTRAM
3663 N.W. 21st Street
Miami, Florida 33142
(305) 633-8011
Fax (305) 635-1388
www.bertram.com

To ensure a readily available supply of spare parts and the capability of providing prompt and reliable service, BERTRAM selects all your yacht's original equipment and accessories among the most reliable marine supply sources available.

The equipment is covered under specific warranties provided by the individual manufacturers.
Any repair to be performed under warranty must be carried out solely by BERTRAM authorized personnel, to avoid compromising the provisions of the warranty, as well as to ensure the quality of the workmanship and to prevent further damage.
The BERTRAM Service network is happy to provide any information regarding issues not addressed by the manuals. Yacht owners, captains, and crew members may contact dealers, sales offices, service centers, or BERTRAM directly.

CAUTION

Sanctions are provided if the yacht is not supplied with the "Owner's Manual".

CAUTION

In case you lose or damage the manual, BERTRAM will always be able to supply you with a new copy.

CAUTION

For all legal aspects related to the yacht warranty, refer only to the Purchase Proposal and to the Limited Warranty, which specify all warranty clauses applicable to the purchased product.

CAUTION

BERTRAM declines all responsibility for the installation and operation of electric, electronic or mechanical equipment, improperly installed by third parties, in a way not authorised by the Shipyard.

CAUTION

Any modification or change to the Yacht's original design or specifications should not be done without first consulting BERTRAM for approval, in order to avoid compromising the Yacht's safety and the provisions of the warranty.

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WARNING

BERTRAM declines all responsibility concerning tampering carried out by third parties on equipment installed in the Yard. Such tampering or unauthorized installations will void the warranty, and even cause damages to the yacht and the people on board.

CAUTION

BERTRAM declines all responsibility for damage due to improper preservation and poor maintenance.

CAUTION

The maintenance operations described in the manual are simple, but should be performed by authorized and qualified technical staff only, according to the standard procedures delivered by the devices manufacturers and in compliance with national and international regulations. We suggest contacting the BERTRAM Service Department.

WARNING

Equipment and accessories: The engine, the windlass, the ventilators and other accessories are guaranteed by their manufacturers who will support you directly by means of their structures. If necessary, the BERTRAM After-Sales Service will support your requests in order to obtain fast service and the respect of the applicable rules. At purchasing, the owner should mail the Warranty Registration Card to activate the Limited Warranty. BERTRAM is not responsible for warranty coverage if the Owner fails to mail in the Warranty Registration Card.

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1.3 HULL IDENTIFICATION

BERTRAM has focused on building high quality yachts for the international yachting market since 1961. Safety is a high priority, and all BERTRAM yachts undergo certification to the requirements of the applicable registries to obtain a Classification Certificate.

RINA S.p.A. (Registro Italiano Navale) assigned the classification of Your BERTRAM yacht with Certificate, following its supervision of hull lamination, reinforcement structures, propulsion and auxiliary power generating machinery, onboard systems.

You will find the hull identification numbers affixed to your yacht in two places.
One is integral to the hull laminate, and the other is engraved on the transom. The hull identification number is matched to that which appears on the Classification Certificate.

CAUTION

Always keep the plates readable. If deteriorated or altered, request new plates from BERTRAM.



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2



HOW TO USE THIS MANUAL

FOREWORD

USE OF THE MANUAL

DESCRIPTION OF THE YACHT

NAVIGATION

AUXILIARY EQUIPMENT ON BOARD

CONTROL STATION

ON THE MAIN DECK

THRUST SYSTEMS

HYDRAULIC SYSTEMS

ELECTRIC SYSTEM

DETAILED INFORMATION ON THE INTERIORS

SAFETY DEVICES AND EQUIPMENT

YACHT HAULAGE AND LAY-UP PERIOD

MAINTENANCE

TROUBLESHOOTING

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2.1 READ THIS MANUAL CAREFULLY

We recommend that you read the individual manufacturer's engine and equipment manuals provided with the yacht to gain a deeper understanding of the yacht and its systems.

This Yacht comes with the BERTRAM Limited Warranty, which describes the terms and conditions under which defects in your yacht will be repaired. Familiarize yourself with the warranty and follow instructions regarding proper operation and maintenance. Lack of attention to instructions can void the warranty.

Before operating equipment associated with your yacht, particularly the engine, read the manufacturer's manual concerning the equipment to be used.

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2.2 STAY ALERT

Throughout this manual, we present critical information, messages, requirements, and safety alerts in a label format to draw your special attention to the information offered.
These messages begin with a signal word, e.g. “danger”, “caution”, etc. as follows. The signal word is the indicator of the level of the hazard being addressed in the message. See the following for hazard signal word definitions.

DANGER

Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. The use of this hazard signal word is limited to the most extreme conditions.

CAUTION

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

WARNING

Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury or property damage. This signal word may also be used to alert against unsafe practices.

ENVIRONMENT NOTICE

Draws the attention to risks associated with toxic substances and environmental pollution.

NOTICES

Draws the attention to important information and reminders.

MAINTENANCE

Shows the time necessary for the maintenance to be carried out on the different devices on board.

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2.3 SPECIFIC SAFETY WARNINGS

Fire risk:
It indicates a fire risk.



DANGER

The cause of the fire is described here.

Electrocution risk:
It indicates an electrocution risk.



DANGER

The cause of the electrocution is described here.

Burn risk:
It indicates a burn risk.



DANGER

The cause of the burn is described here.

Forbidden areas:
It forbids the access, the transit or the stop in a dangerous area.



DANGER

The forbidden area is described here: it is forbidden to gain access to dangerous areas or to approach moving mechanical parts.

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2.4 KNOW YOUR RESPONSIBILITIES AS A YACHT OWNER/OPERATOR

If your Bertram is to be operated in the waters regulated by the United States Coast Guard, there are certain requirements that must be met. These requirements are discussed in the Coast Guard Publication Federal Requirements for Recreational Boats.

As a yacht owner, you are responsible for being informed about a variety of laws (state and Federal, in the U.S.) and regulations that apply to the navigation, operation and equipping of your yacht.

In the United States, the Federal government, through the U.S. Coast Guard, specifies the requirements for PFD's (personal flotation devices, a.k.a., "life jackets") and other required safety equipment that must be carried aboard recreational yachts.
PFD's and the other safety equipment must be approved by the Coast Guard and/or other safety standards organizations. If approved, there will be a label indicating this on the equipment. States may impose additional requirements. Know the regulations for your areas of operation.

The yacht's owner and/or operator, is responsible for knowing the navigation and safety rules and good seamanship practices. Take the time to learn the Nautical Rules of Navigation (COLREGS) that are found in the Coast Guard publication "Navigation Rules - International and Inland". CG-169 that is required to be carried on all yachts over 39.4 feet (12 m) in length. Study navigation techniques and the safe practices for operating Your yacht and its equipment.

You are also the key person ensuring the safety of your passengers, crew, and of the yacht. Please take time to study the chapter on SAFETY in this manual for important information about safety procedures.

Every yacht owner and operator must be knowledgeable about the yacht and its systems. Because you are responsible for the operation of your yacht, we provide you with information on those topics. For each system on board, we have provided a detailed description, including schematics where appropriate, as well as information on maintenance and troubleshooting.

There is a variety of instructional books, courses and videos available to help you improve your knowledge of the Rules of Navigation, navigation, yacht operation, operation of marine electronics, maintenance, etc. Consult the resources listed in the appendix.

NOTICES

United States Coast Guard Regulations state that it is the responsibility of the vessel owner to be certain that all required equipment is onboard and in proper working order.
Bertram has supplied you with a copy of Navigation Rules, International – Inland.
Regardless of how much experience you have, it is important to refresh your memory by studying the Navigation Rules on a regular basis.

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NOTES:

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BERTRAM

3



DESCRIPTION OF THE YACHT

FOREWORD

USE OF THE MANUAL

DESCRIPTION OF THE YACHT

NAVIGATION

AUXILIARY EQUIPMENT ON BOARD

CONTROL STATION

ON THE MAIN DECK

THRUST SYSTEMS

HYDRAULIC SYSTEMS

ELECTRIC SYSTEM

DETAILED INFORMATION ON THE INTERIORS

SAFETY DEVICES AND EQUIPMENT

YACHT HAULAGE AND LAY-UP PERIOD

MAINTENANCE

TROUBLESHOOTING

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3.1 MAIN DIMENSIONS AND WEIGHT DATA



- (Loa) Length overall with fore pulpit **57 ft 1 in - 19.03 yd**
- (Lh) Length hull (standard ISO 8666) **54 ft 2 in - 18.04 yd**
- (Lwl) Length waterline, yacht fully laden **47 ft 8 in - 15.90 yd**
- Fore rail extension pulpit **2 ft 11 in - 0.98 yd**
- Maximum Beam **16 ft 11 in - 5.64 yd**
- Draft under propellers (yacht fully laden) **5 ft - 5 in - 1.65 m**
- Hmax = Building height from keel to console **1 ft 4 in - 5.9 m**
- Displacement, unladen **64,375 lb - 29.2 ton**
- Displacement fully laden **82.853 lb - 37.58 ton**

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3.2 MAIN TECHNICAL DATA

Main Propulsion Engines

Model	CATERPILLAR C32
Power	1676 mhp/1232 kW at 2300 rpm
Max fuel consumption per engine	327 l/h - 86.4 US gal

Fuel tank capacity
1400 US gal - 5300 l

Water tank capacity
225 US gal - 850 l

Black water (sewage) tank capacity
101 US gal - 380 l

Gray water (sewage) tank capacity
37 US gal - 130 l

Electrical power

AC Volts:	230
DC Volts:	24
Hz:	50
kW:	22+13 (optional)

Batteries
Six batteries for engines
Six for service
One battery for each generator

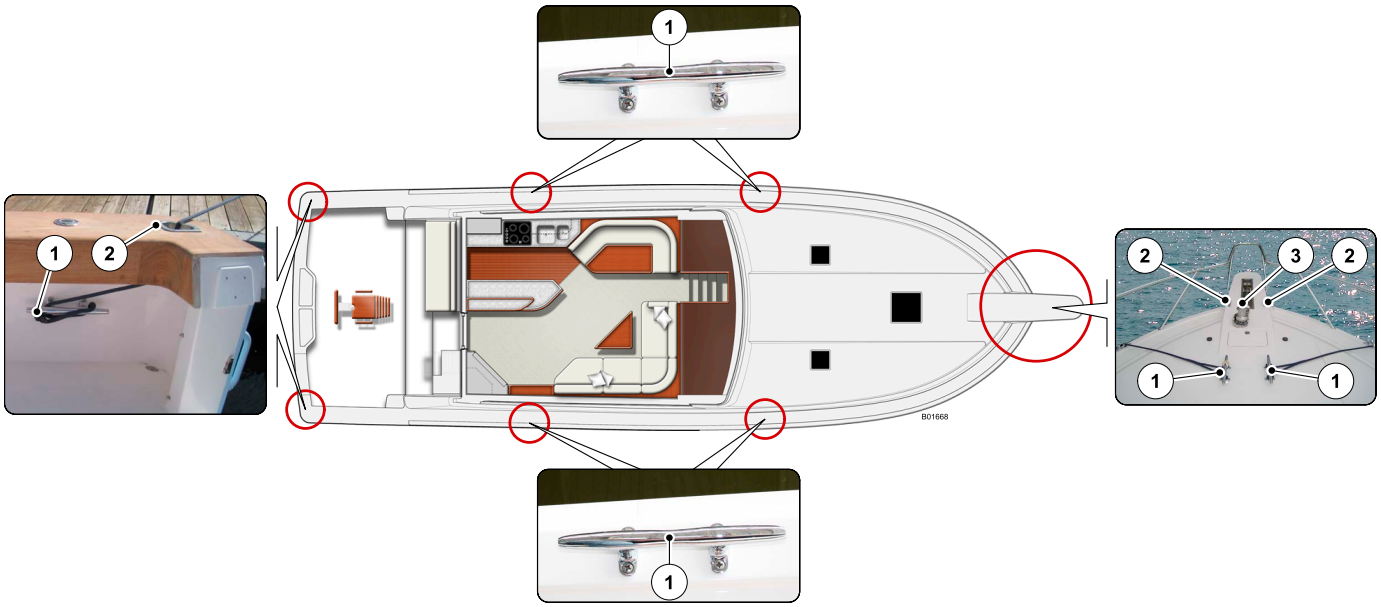
Bilge pumps
Two pumps in the helm gear compartment
Two bilge pumps in the engineroom
Two pumps in fore stateroom area

CAUTION

BERTRAM yachts are designed to obtain a correct transversal trim with full-optional equipment, and with spare propellers and shafts.
If the yacht is not equipped with full optional, spare propellers and shafts, some weights might have been installed to correct the transversal trim.
The above-mentioned weights can be removed or displaced as soon as the yacht is provided with new equipment.

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3.3 MOORING EQUIPMENT



1. Cleats
2. Chocks
3. Anchor winch

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3.4 WARNING AND SAFETY LABELS

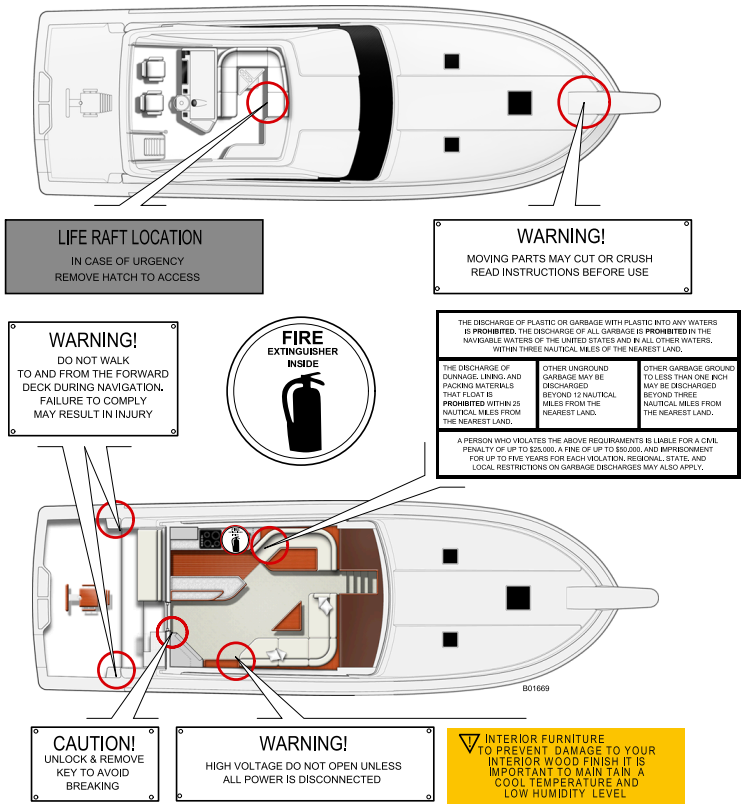
The warning and safety labels applied as decals on the yacht are used to point out special features, systems or operational risks.
The labels identify the level of the hazard by the signal word, e.g. danger, caution or warning, followed by a notice on the nature of the hazard, followed by the consequences that can result if the instructions to avoid the hazard are ignored and, finally, instructions on how to avoid the hazard.

Before working with or on an area of the yacht or equipment bearing such a warning or safety label, be sure that you have read the safety warning and that you understand the nature of the hazard and that you act in accordance with the instructions to avoid illness, injury, death, or property damage.

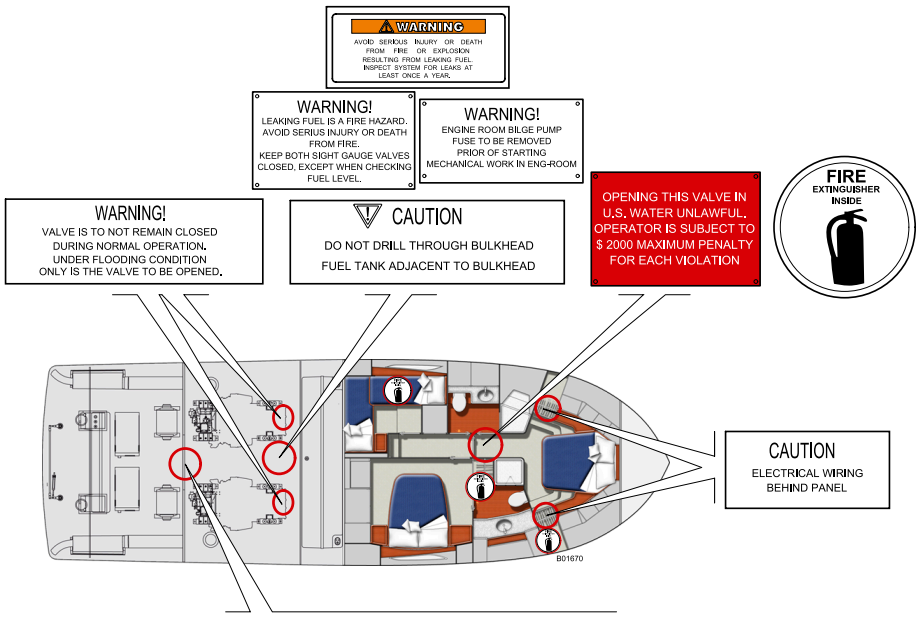
Keep all the labels clean and legible. Replace them if they are lost or damaged.

The extinguisher plate (**A**) is located near each fire extinguisher.

This section shows the locations of the warning notice labels with their application points.



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BERTRAM

4



GETTING UNDERWAY

FOREWORD

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MAINTENANCE

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4.1 YOUR KEYS

The yacht is delivered with original keys to all the yacht's locks.
Each original is supplied with copies. Each key has a code number printed on it. The other locks on the yacht are universal. The same key opens all the locks. The universal key opens a door even if it is locked from inside. Specific task keys are described as follows. Engine keys are provided with differently colored BERTRAM floating key holders.
Two (2) copies are included for each engine.
Keys for the sliding door at the salon entry (3 copies)
Keys for stateroom access (3 copies)

NOTICES

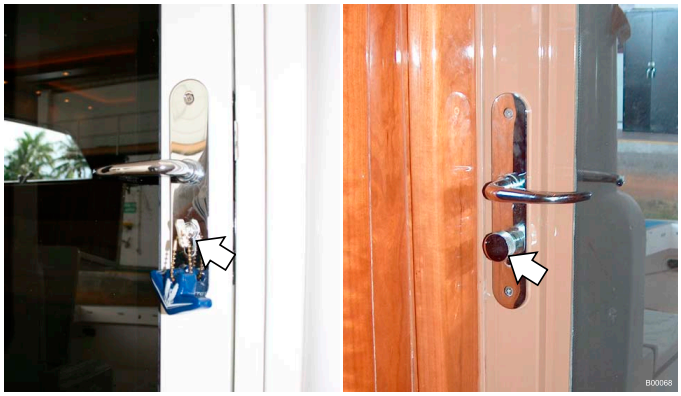
The yacht's helmsman should have a complete set of keys in his/her possession at all times so that he/she can operate every lock on the yacht. Another complete set of keys should be stored in a readily accessible location on the yacht to be available at all times.

Contact BERTRAM for guidance on deteriorated or altered locks.

NOTICES

Very general and limited information for first startup and initial operation of your yacht is included in this manual. For specific directions about the use of the individual systems and equipment, consult the manuals provided by the individual equipment manufacturers or contact the BERTRAM Customer Support.

Before operating the yacht, you must understand the operation of all controls, instruments, and warning systems. Read the chapters **AT THE HELM** & **INSTRUMENTATION AND EQUIPMENT**.





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4.2 PREPARING TO GET UNDERWAY

4.2.1 Preliminary checklist

Accurate preliminary checks carried out with time, are fundamental for a safe navigation. Before leaving harbour, perform the following procedures. Details for some of the procedures in this list are found elsewhere in this manual. Check the INDEX.

- Gather information on weather forecast and warnings.
- Consult the pilot's book for the condition of waters in your area of operation.
- Consult the navigation charts, in particular the distances, routes, dangerous sea bottoms, shallow waters, and other hazards.
- Consider the cruise duration.
- Calculate the quantity of fuel required. Check the fuel onboard.
- Check the bilge flooding lights on the control station panel, indicating the presence of water in the bilge.
- If the lights are lit, switch ON the bilge pump.
- If the pumps do not run, the batteries should be changed.
- If the pumps run, but do not discharge any water, the float switches may be jammed or defective.
- If the pumps run, but do not discharge any water, the suction line may be clogged.
- Check if seawater filters of both engines intake seacocks, of generator cooling system and of A/C system, are clean. If the filter elements are dirty, CLOSE the thru-hull fitting by moving the valve lever perpendicularly to the thru-hull fitting body. Remove and clean the filter baskets, reassemble the filters and then OPEN the thru-hull valves.

NOTICES

After reopening the intake seacock, check if seawater filter shows leaks.

CAUTION

Storeroom stowage can alter yacht balance, especially transversal trim. Try to arrange load equally and securely, in order to avoid sudden displacements.

- Check the engines and generator belt tension. Adjust as needed. Check the engine oil, gearbox oil, and generator oil levels. Replenish as indicated. V-drive oil inlet is via the dipstick opening.
- Check the propulsion engine and generator cooling water level. Replenish as indicated as per manufacturer's manual.
- Check that the diesel fuel filter/water separator elements are clean. Drain any water in the filters by operating the drain valve.
- Check hydraulic oils levels of the control units for gangway, trim tabs and steering system. Replenish as indicated.
- Check the levels in fuel and fresh water tanks.
- Check that all items (provisions, navigation charts, yacht documents, flares, first aid kit, basic tool kit, etc.) required for a safe and comfortable voyage are onboard.

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- Ensure that the individual and collective personal safety and rescue equipment is available and in good condition.
- Check that all loose materials are properly fixed.
- Check that the loads are distributed evenly and the yacht floats on its lines without excessive list and in proper fore-and-aft trim.
- Check that all portlights and hatches are properly closed and secured.

WARNING

Equipment, and supplies loaded onboard may alter the yacht's attitude afloat, affecting the trim and list. Distribute loads evenly so the yacht floats on its lines. Secure all loose items, to avoid sudden, dangerous load movement.

CAUTION

Open hatches can be hazardous when the yacht is navigating. Before sailing, make sure that all deck hatches, portlights and engine room hatches are secured in closed position, in order to prevent injury to persons onboard or even death and/or water penetration when the yacht is navigating.

WARNING

Before starting the engines disconnect the battery charger.

NOTICES

BERTRAM furnishes the equipment required by the international regulations.
The Owner is responsible for providing any equipment or safety device required by national regulations in force for the waters in which the yacht is navigating.

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4.2.2 Safety equipment check

- Ensure that the life raft is easily accessible and properly stowed, and that its attachment lines and safety lines are in good condition, properly coiled and showing no wear and tear.
- Ensure that the throwable PFD's, e.g., ring buoy, horseshoe buoy, Lifesling® are in their correct locations on deck and that the safety line is in good condition.
- Check extinguishers charge status. The extinguisher is charged when the pressure gauge indicator is in the green sector.
- Ensure that individual PFD's (lifejackets) meet the criteria for use in the waters of operation and are approved by the authorities. Check that they are in good condition, that the inflating device (if any) is operational, and that the PFD's are readily accessible in the proper location.

See **General Safety Considerations** that follow in this chapter.

NOTICES

Check the safety equipment prior to leaving harbor, ensuring that all items required are in good condition. Record the locations of this equipment and be familiar with its correct use.

The designated helmsman must ensure that all passengers are properly informed of safety equipment locations and of equipment proper use (fire extinguishers, life raft, throwable PFD's, personal PFD's, etc.).

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4.3 GENERAL SAFETY CONSIDERATIONS

Do not deploy emergency signals (visual or radio) unless there is a need for emergency service.

Every person aboard the yacht must

- know the storage location of the PFD's (life jackets)
- know the location of their personal PFD
- know the location of the throwable PFD's (e.g. ring buoy, horseshoe buoy Lifesling)
- know the location of the life raft
- know how to properly put on and wear a PFD
- know how to release the personal PFD's for use
- know how to launch a PFD
- know how to launch the life raft
- be aware of the risks posed by a fire
- know what to do in case of fire
- know the location of and be trained in the use of the fixed firefighting systems and the portable, hand-held fire extinguishers.

People can fall overboard at any time.
Do not hesitate to ask people to wear the individual flotation devices. PFD's may be worn in any weather, underway, at the shore, or at anchor.

- People who cannot swim and children must always wear an individual flotation device.
- People working on deck should wear a PFD.
- PFD's should be worn on deck when underway in cold waters (water temperatures below 20 °C/68 °F).
- In any emergency, passengers should put on their PFD's immediately.

Inflatable PFD's (USCG Approved Type V) are comfortable to wear, and some types will inflate automatically if the wearer falls overboard. These PFD's are mandatory safety devices to have for yourself and your guests. Make sure that all PFD's are approved by the appropriate national or international regulatory agencies.

Read the **SAFETY** chapter in this manual.

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4.3.1 Final pre-departure checklist

- Check rudder operation by putting the rudder hard over to port and starboard, and then back to the center.
- Check trim tabs operation. Operate both tabs.
  When not in use, trim tabs should be kept in the UP position.
- Check navigation lights and horn operation.
- Check the efficiency of the anchor winch and chain stopper.
- Check VHF radiotelephone operation.
- Check documents and nautical charts.
- Check proper closing of portlights and hatches and that all loose items are secured on main deck and belowdeck.
- Check operation of bilge pumps and related indicators.
- Make sure that the engineroom ventilation system is operating.
- Check that no flammable or other hazardous materials are stowed in the engineroom.
- Check that seawater intake valves for engine and generator cooling and for air-conditioning system are open.
- Check that the engines and generator fuel systems' valves are open.
- Switch on engine and user batteries.
- Switch on all 24 V circuits from the switch panel board. Check the proper operation of each system and then switch off the systems not to be used.
- Check the battery charge level (Volts) on the switch panel board. Recharge the battery if indicated.
- Start the generator if you are to use it. Allow the generator to warm up before adding electrical loads to it from the switch panel board.
- Disconnect the shore connections for fresh water and electric power, cables and telephone.
- Check the fixed firefighting systems and the portable (hand-held) fire extinguishers.
- Check fuel system for no leaks or fumes.

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4.4 STARTING THE ENGINES

Refer to the **AT THE HELM** and **INSTRUMENTATION AND EQUIPMENT** chapters for the location of all engine controls and gauges.

NOTICES

Before starting the engine, check fuel level, coolant level and engine oil level. In case of need, fill with fuel, coolant and oil mix.

Carry out the necessary daily maintenance before starting the engines. Check the engine room. This check can avoid following remarkable repairs. For further information refer to the Use and Instruction Manual delivered by the engine Manufacturer.

- The engines can have a longer life if you carry out a complete inspection before start-up. Check following items: oil leaks, coolant leaks, dirt build-ups. Remove dirt build-ups and repair if necessary.
- Check if cooling system hoses are cracked or show loose clamps.
- Check if alternator drive belts are cracked, broken or damaged.
- Check for the presence of loose wire connections, or worn out wires.
- Check the fuel quantity. Drain water from separator. Open the fuel supply valve.

CAUTION

Open all valves in the fuel supply line before starting the engine, in order to prevent fuel high pressure. This pressure can damage the filter housing or cause other kinds of damage.

Oil level check

Check engine oil level only after the engine has cooled down.

- Pull out dipstick and wipe it with a clean, lint free rag.
- Place it back up to retainer.
- Pull out dipstick again.

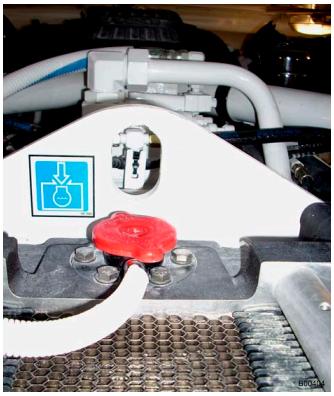
The oil level should be between the two notches “ADD” and “FULL” of the dipstick and must never drop below the lower notch. Add oil as necessary.



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Coolant check

- Check the coolant level. Check the level inside of recovery tank.
- Keep the coolant level flush with notch “FULL” of the tank.



Engine air filter indicator check

- Check the air filter clogging indicator.
- Clean the air filter when yellow diaphragm reaches the red range, or when red piston locks in visible position.



Engine sea cocks

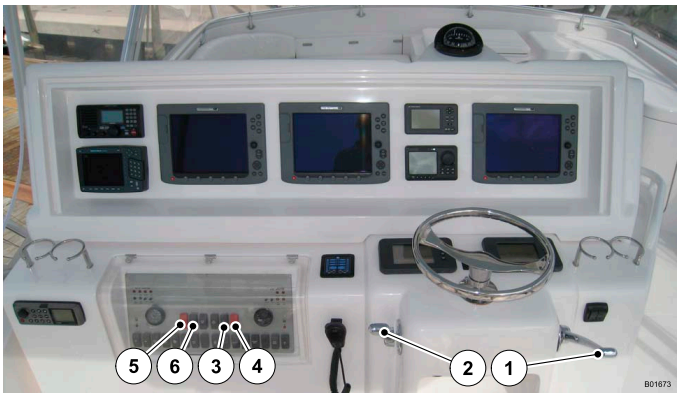
- Open the sea water valves inside of the engine heat exchangers.



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After performing the final pre-departure checklist, **start the engines one at a time**.

- Set control heads (**1**) and (**2**) to central idle position.
- Press the “STBD ENGINE IGNITION” button (**3**) to enable start-up.
- Press the starboard engine “STBD ENGINE STARTER” button (**4**).
- Check if oil pressure reaches the normal value within 10 seconds.
- Check if cooling water circulation is correct.
- Once the first engine is running and only when its operation has proved to be regular, start the second engine too.
- Start the port engine in the same way as described for the starboard one.
- Press the “PORT ENGINE IGNITION” button (**6**) to enable start-up.
- Press the port engine “PORT ENGINE STARTER” button (**5**).
  Do not press or hold the throttle lever while the engine is running.
  The system will supply automatically the fuel quantity necessary to start the engine.
- If the engine does not start within 30 seconds, release the start button. Before trying to restart the engine, wait two minutes and let the starter cool down.
- Let the engine run with no load for about 3 minutes, until the water temperature gauge raises. Check all devices during the pre-heating time.



NOTICES

Check that the self-test of the monitoring system is complete, before starting the engine under load.

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- Run the engines idle and with no load for five minutes. During pre-heating carry out the following checks:
  - check for liquid and air leaks;
  - check all devices.

  Check the devices and record the data while the engines are operating. The data comparison will help with time to determine the standard values of each device. This will help beside to detect a possible wrong operation. Verify possible remarkable reading variations.
- After the engines have run with no load for five minutes and when all checks have been performed, increase the engine speed up to 1/2 of rated speed.

CAUTION

To avoid overheating and possible damages to the engines, make sure that water drain is visible from sea water outlet and/or that water flow is not hindered. If the water flow is hindered and/or the water drain is not visible from sea water outlet, follow the recommended procedure.

- Verify the water drain at sea water outlet. If the water drain is not visible, or if the water flow is not hindered, carry out following procedure:
  - stop the engine immediately;
  - check that the inlet filter or the sea water strainer are not clogged, remove clogging;
  - check for leaks in the cooling system and in the auxiliary water pumps.
- Check for liquid and air leaks.
- Carry out all necessary repairs before starting the engines.
- When all checks have been performed, set the throttle lever to idle and start the operation.
- Check for abnormal noises or excessive smoke. Otherwise stop engines and call the customer support.
- Check that the alternators are recharging the batteries.
- Verify the efficiency of the instruments, from the plotter to the radar, VHF, compass, etc.

DANGER

Make sure that no crew stands in front of gas exhausts and near the mooring ropes.

CAUTION

Should a "magneto-thermal switch" trip, do not try repeatedly to reset it but check the relevant electric system condition.

CAUTION

We suggest avoiding slow running for periods longer than 5 minutes. The slow run implies major wear of the engine mechanical parts and is the most harmful of the poisonous exhausts.

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As soon as each engine starts

- First check that water is discharged from the (by-pass) exhausts. Lack of water flow indicates a malfunction. Stop the engine immediately. Do not operate engines without correcting this problem. Track the source of the malfunction and service or repair as indicated. Request CATERPILLAR service assistance if necessary.
- For each engine, check the operation of:
  a. Ammeters and voltage meters. Check that the alternators are recharging the batteries. If the warning lights are OFF, the charging system is operating correctly;
  b. Engine oil pressure gauges;
  c. Engine water temperature gauges;
  d. Gearbox oil pressure.
- Run the engines at 1000 rpm maximum until the normal operating temperature is reached.
- Check for abnormal noises or excessive smoke. In case of abnormal noise or smoke, stop the engine(s) immediately and request service assistance.

DANGER

It is absolutely forbidden to perform reverse run with one of the two engines stopped. This operation is allowed only in case of life danger for the persons on board and for the safety of the yacht itself, however when the engine is running it should not run higher than 1000 rpm.

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4.5 STOPPING THE ENGINES

4.5.1 Procedure

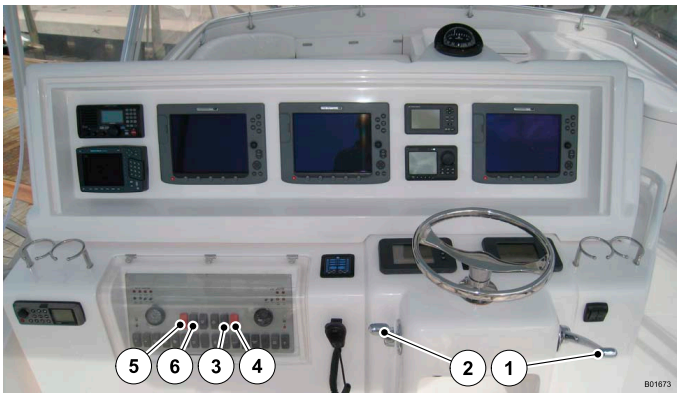
Do not stop immediately the engines after an high load operation, but let them run low (for approx. 5 minutes) to balance the temperature differences.

From the helm station

- Reposition the control heads, levers (**1**) and (**2**) into the central position of gearbox idle run.
- Press STOP push-buttons (**4**) and (**5**).
- Press “ON/OFF” push-buttons (**3**) and (**6**) to stop the engines.
- Disconnect the circuit breakers concerning the start-up systems of both engines.

DANGER

Make sure that the engines cannot be started by unauthorized staff.



CAUTION

With engines stopped carry out following:

- *disconnect all unnecessary electric users and check the general status of the switchboard as well as the voltmeters and ammeters indications;*
- *check the switches of the bilge pumps and their regular operation;*
- *check for possible leaks from the shaft lines seals;*
- *rinse the yacht with fresh water;*
- *connect dock electric power supply;*
- *keep air extractors in the engine room running for about 30 minutes for ventilation and air cooling.*

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4.6 ENGINES EMERGENCY STOP PROCEDURE

Due to a mechanical or electric fault, the normal procedures of engines stop could not work; it is therefore necessary to stop the engines by means of EMERGENCY PROCEDURES.

- **From engineroom**
  Press the red push-button located on the control panel of each engine (aside each engine).
  During normal operation the emergency stop button must not be inserted. When pressed it locks in low position and prevents the engine start.
  To reset the system to normal operation, it is necessary to turn the button clockwise until it unlocks and returns to original position.

NOTICES

The emergency stop generates a high stress in the engines with consequent hazard of components damage. Use only in case of real need.

DANGER

Before starting the engines after an emergency stop, make sure that you have found out and cleared the faulty reason.



WARNING

The emergency stop controls of propulsion engines must be used only in case of real emergency.
Do not activate these systems during normal engines stop procedure.

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4.7 NAVIGATION WITH ONLY ONE ENGINE

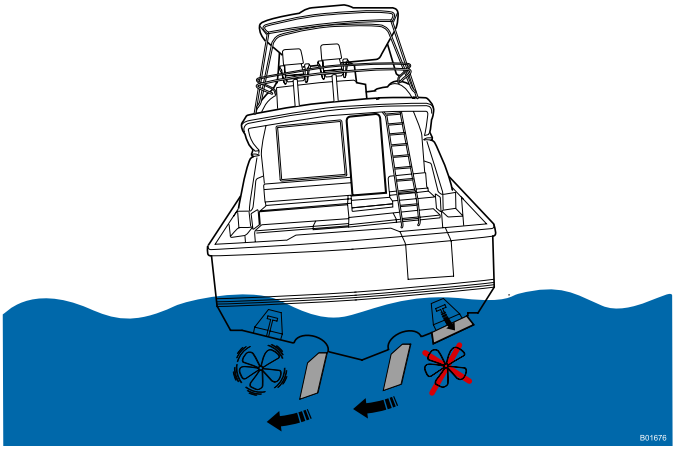
The yacht is driven by two powerful thrust systems designed to operate together and at the same time.

In case of failure of one of the thrust systems, you may navigate with only one engine.

Therefore, we suggest you to:
- shut off the failed thrust engine;
- set the position of the steering wheels in the opposite direction of the failed thrust system; in case the steering wheels cannot contrast the asymmetric push of the operating system, lower the trim tab on the side of the failed system, or reduce the speed;
- head to the nearest landing at a reduced speed;
- keep the yacht at a speed that allows the best manoeuvrability.

In case one engine stops due to a failure and the gear box is in idle position, during navigation keep constantly an eye on the oil temperature of the gear box connected with the failed system.

The propeller shaft is kept rotating thanks to the water flow through the propeller, under these conditions also some parts of the gear box are kept rotating.
Should the temperature increase excessively over 80°C/176°F, lock the propeller shaft by engaging the gearbox: in this way the resistance will be higher, because the gear box is jammed, but oil will not overheat.



WARNING

The yacht has been designed to navigate driven by two engines; please remember that it is possible to navigate with one engine only in case of emergency and for a very short time.

DANGER

It is absolutely forbidden to perform reverse run with one of the two engines stopped. This operation is allowed only in case of life danger for the persons on board and for the safety of the yacht itself, however when the engine is running it should not run higher than 1000 rpm.

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4.8 MOORING & DOCKING

CAUTION

Before the mooring or unmooring maneuver, ensure that engines, gearboxes, rudders and bow thruster (if installed) are in working order. During such maneuvers, the helmsman should prevent any unpleasant noise, and/or wake. Before unmooring, make sure that all doors, hatches, port-holes, etc. are closed.

WARNING

Before starting the maneuver, make sure that people on board, especially children, do not obstruct operations or that they stay in suitable places.

The yacht is equipped with very powerful engines, with high performance rudders and with a very efficient thruster.
The bow thruster should be used at very low speed for maneuvering, without making headway; at higher speeds, engine control levers should be in off-set use.
The ability to exploit such qualities depends on the “familiarity” the helmsman has with his yacht. Practice is the only way to acquire confidence, and finally you will be able to safely perform mooring and unmooring maneuvers even in very difficult or crowded areas.
A basic rule to keep in mind is to maneuver the yacht at low speed, in order to have enough time to react and for evaluating the situation; then, in case of accidental contact with other vessels, you will not cause any serious damage.

4.8.1 Before leaving the shore

Do not cast off mooring lines or weigh anchor if swimmers or other vessels are nearby.

- Ease the mooring lines and check that everything is ready for casting off lines, all lines are clear; nothing on the yacht is entangled with another yacht or the shore structure.
- Check the proper operation of all navigation instruments: VHF radio, compass, radar, plotter, horn, etc.
- Unplug the shore service connection cables of TV/Telephone, shore power electric supply, water supply, and cablemaster if connected.
- Plan maneuvers ahead of time.
- If there is more than one way to approach a berth or depart the shore, use the most conservative maneuver.

4.8.2 Departing from the shore

- When you are ready to depart the shore, remove mooring lines. Check for mooring lines overboard or objects that may become entangled in the propellers. Do not engage the engine gears until you are certain nothing can become caught in the propellers.
- Have a crew member ready with fenders to protect the yacht in the event of wind or sea conditions that overcome your ability to control the yacht.

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If the yacht is moored aft to the shore (Mediterranean-mooring style with the anchor off the foredeck and the aftdeck tied to the shore):
- release the aft lines,
- haul in the anchor rope until you are sufficiently clear of the mooring area

If the yacht is side-moored,
- release the aft lines,
- haul in the shoreside foreline while pushing the aftdeck away from the shore and back away from the shore.

Another way to do this maneuver is to set up a spring line on which to drive the yacht forward (toward) the shore in such a way as to force the aftdeck outwards, and then back away from the shore. This is a highly recommended technique to master for close-quarters yacht handling.

CAUTION

Mooring operations on a large yacht can be hazardous for the crew. To avoid serious personal injury or death, use only the appropriate equipment, e.g., fenders or boathook, to push the yacht away from a fixed or floating structure. Never allow any person onboard to attempt pushing the yacht away from a fixed structure or another vessel by using arms or legs.

4.8.3 Before entering the harbor, be sure you

- check that bilges and gray/black water tanks are empty.
- check that the mooring lines are ready and coiled to run free.
- check that the mooring berth and the berthing route are free from incoming, departing or other moored vessels
- switch on all equipment necessary for entering the harbor from the switch panel board (anchor windlass, aft mooring windlasses, bow thruster, etc.).
- switch off all equipment not required for harbor operation.
- raise the trim tabs.
- stop in uncongested waters and check the operation of reverse gear.
- check the operation of the horn.
- have the yacht's boathook and fenders ready.
- check the operation of the searchlight and have a working flashlight ready on deck when mooring at night.
- check that mooring lines and fenders are positioned correctly.
- make sure that persons onboard not involved with the mooring operations do not interfere with the activity and, if participating, they are properly instructed and competent to perform as directed.

If the yacht is to be moored aft to the shore (Mediterranean mooring style), have the anchor ready to deploy. Prepare the aft lines. When the anchor is set, haul in the aft lines and adjust the anchor rode until the yacht is close to the shore.

If the yacht is to be side moored, haul on fore and aft lines until yacht is close and parallel to the shore. Adjust the fenders for best protection of the yacht's hull.

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4.8.4 When the yacht is safely secured to the shore

- Stop engines.
- check that all lamps on the synoptic panel are switched off and remove the ignition keys.
- turn OFF all unnecessary electrical equipment and check all switch positions on the electric panels.
- check the readings on the voltmeters and ammeters.
- connect the shore power supply, and any other shore connections, such as shore water supply.
- start the battery charger when connected to shore power or when the generator is operating.
- check the position of the bilge pump switches and confirm the operation of the pumps.
- check that the bilges are dry.
- check for possible leaks from the shaft seals (stuffing boxes).
- raise the trim tabs to the fully UP position.
- wash the yacht with fresh water.

4.8.5 Before leaving the yacht, be sure you

- Check that the below deck lights are OFF.
- check that the navigation lights, searchlights and other external lights are OFF.
- check that the switches for all unnecessary equipment (plotter, radio, anchor windlass, etc.) are OFF.
- check that all necessary equipment switches are ON (automatic bilge pumps, battery charger, etc.).
- check that the shore power cable is properly connected, has enough slack and will not fall into the water.
- turn off the battery switch.
- check that all deck equipment is stowed correctly.
- check that no flammable liquid bottles and containers are open or loose.
- check that there is no debris that can clog the deck scuppers and prevent proper water drainage.
- check that the gangway is in the right position and properly secured.
- check that the yacht is moored in a manner to protect it under all normally expected wind and sea conditions. Check that the mooring lines keep the yacht well clear of other yachts and that the fenders are properly positioned and secured in place.
- check the belowdeck compartment closures.
- check that all compartments, portlights, skylights and bilges are secured and watertight.

4.8.6 Leaving the yacht unattended

If the yacht is left unattended,

- CLOSE the seawater intakes and the other thru-hull fittings below the waterline.
  Ensure that the bilge pump discharge is open.
- check the electrical panels and switch OFF all unnecessary equipment.
- switch off the pressurization systems of water.
- check that all compartments, portlights, skylights and bilges are secured and watertight.
- check that the yacht is securely moored.
- press the button OFF to disconnect the battery charger, located in the engineroom.

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CAUTION

Overboard outlets and drainpipes should be checked regularly, in order to ensure good drainage. The electric system should be checked regularly, in order to prevent fire risks on board.

NOTICES

Excessive cranking of propulsion engines can damage the starters. Do not run the engine starter for more than 10 seconds. Allow the starter to cool for about one minute before attempting to start the engine again.

WARNING

Do not run the engines at idle longer than necessary. Excessive idling time can damage the engines and pollute the environment.

WARNING

Never deactivate the battery disconnectors with the engines running or you may damage the engine alternators.

WARNING

Hot and moving parts in the engine space are hazardous to personnel. To avoid serious injury or death from contact with hot and/or moving parts when working inside engine space, wear appropriate safety attire, including but not limited to safety glasses and gloves. Be extremely cautious in proximity of hot and moving parts. Wear hearing protection if the engines are running.

WARNING

When preparing to get underway, ensure that no persons are near the engine exhaust discharges. Ensure that only the line handlers are on deck when casting off shore lines.

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NOTICES

Use the engine/users battery parallel switch only if absolutely necessary, to provide additional battery power for starting the engines. If your are compelled to use the "battery parallel connection", turn off all electric devices so as not to jeopardize their correct operation. Disconnect them as soon as possible.

WARNING

Starting the engines in gear or at a higher-than-idle speed can cause sudden motion of the yacht. To avoid serious injury or death to persons onboard, always ensure that the gears are in neutral and the throttles at idle before starting the engines.

WARNING

Open hatches can be hazardous when the yacht is navigating. To avoid injury or death to persons onboard and/or flooding when the yacht is underway, ensure that all deck hatches, portlights, engineroom hatches are secured in the CLOSED position before getting underway.

NOTICES

If a circuit breaker trips, check the related circuit for any short circuits or overload before switching on again.

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4.9 YACHT OPERATION DURING NAVIGATION

NOTICES

Persons operating your yacht must never be under the influence of alcohol or drugs. The yacht's pilot should be experienced in the use of all instruments and controls, and know the handling characteristics of the yacht at all speeds and sea conditions.
You should be certain that persons intending to operate your yacht are completely knowledgeable about its proper operation. If you are not certain about an individual's qualifications or competence, the person must be supervised by a qualified operator.

The yacht is very efficient and is equipped with very responsive rudders; nevertheless, because of its size and performance capability, only persons experienced, competent, responsible, prudent and with necessary qualifications should operate the yacht.

The yacht is manoeuvred by means of the steering wheel in the control station. The steering wheel operates the rudders via a hydraulic system. The steering gear operation is independent from the engine operation. Never leave the steering wheel unattended when the yacht is navigating.

Keep in mind that the rudder effect is proportional to the propeller rpm and the yacht's speed, especially when moving forward. As a consequence, the rudder efficiency is high at high rpm and speed. On the contrary, when the engines are idling and the yacht's speed is low, the yacht's reaction to the tiller angle is almost negligible.

If necessary, or when in restricted waters, you can steer the yacht with the engines by varying and/or reversing the engine speeds and alternating power from port and starboard engines.
At low rpm's, operating on a single engine, alternating port and starboard engines and using the "back and fill" method for turning the yacht is the recommended practice. Learn and practice the skills for handling the yacht at low speed and engine rpm.

When the yacht's speed increases, the transition of the hull from displacement mode to planing mode is a critical phase. The transition to the planing mode should be done as quickly as practical to achieve fuel efficiency and provide a comfortable motion.

The minimum planing speed depends on yacht's displacement, the load distribution; trim tab position and sea conditions.

Adjust speed and trim tab positions according to the sea conditions and the loading of the yacht to ensure a comfortable yacht motion and avoid stresses to the yacht structure from the affects of sea conditions.

NOTICES

At high speed, the use of the autopilot is dangerous and not recommended. Anyway, be always very careful during navigation also when the autopilot is in use.

The high quality engines allow running the yacht safely at cruising speed for extended periods of time.

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4.9.1 Operating in shallow water

CAUTION

COLLISION HAZARD - Use extra caution in shallow water or where underwater/floating objects may be present. Hitting an object at high speed or at an acute angle can seriously injure people and damage the yacht.

NOTICES

The best compromise in speed, to accommodate comfort and minimize fuel consumption, is to operate the engines at 150/200 rpm under the maximum rated rpm (also known as WOT [wide open throttle]).

NOTICES

During navigation, keep the stern tilting window closed, to prevent engine exhaust fumes and splash water from entering the interior. As the closure is not watertight, do not aim water directly onto the window when washing down the yacht.

Observing the following guidelines will improve comfort, minimize noise inside the yacht, avoid damage and assist in the proper operation of the yacht.

- Do not run the engines at idle longer than necessary.
- Avoid sudden accelerations and decelerations, which create stress on engine turbochargers.
- Run at idle for a few minutes before shutting down the engines, to allow a gradual cool-down.
- Once the yacht is at cruising speed, the engine instrumentation readings should remain steady. However, if, during normal operating conditions, the engine gauges show abnormal or contradicting values, investigate for possible systems and/or equipment problems or failures (stop the engines).
- Monitor the control panel gauges and system condition alerts frequently.
- Check the switch panel to see if any circuit breaker has tripped due to an electrical system fault.
- Once in open waters and well clear of other vessels, increase the engine rpm gradually, until the desired speed is reached. Adjust the trim tab positions for the best performance. For information on trim tab adjustment, refer to “Trim Tabs” in the AT THE HELM chapter.
- Adjust the speed to accommodate sea conditions.

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- Check the engine exhausts. In particular,
  - very black smoke generally means dirty filters or unburned fuel due to improper calibration of injection pumps or injectors.
  - very white smoke may mean presence of water in the fuel.
  - bluish smoke may mean abnormal oil combustion.
- In case of abnormal vibration, reduce speed and run at slow rpm until the cause of the vibration is determined. If the vibration is severe, take the engines out of gear. It may be necessary to check the propeller condition. It may also be necessary to have a specialist check the propeller shaft alignment.
- Perform a visual inspection of the bilges periodically.

Be aware of the fuel supply in relation to the distance you plan to cover.

NOTICES

While the yacht is underway, all persons on board must be seated in the designated seating areas in order to prevent injury due to falls caused by sudden yacht movements in active wake areas or in the event of sudden changes in yacht speed or during manoeuvring. No one should be seated on the spoiler or forward decks when the yacht is navigating.

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4.10 PRECAUTIONS DURING NAVIGATION

- Maintain a safe speed for the sea conditions, visibility, and when near other yachts.
- Do not exceed speed limits in harbour and confined waters.
- Follow all navigation rules applicable to the waters in which you are operating.
- During navigation do not unlock the anchor chain stopper because you can seriously damage the yacht foredeck.
- Provide laminated plastic reference cards for the Rules of Navigation and have them available for quick reference at each control station.
- Consult charts for information on locations of reefs, rocks, shoals, or other hazards to make sure that the yacht is not at risk of grounding or collision with fixed or floating structures.
- Frequently check that your route ahead and around the yacht is unobstructed (no yachts or objects in the expected route or approaching your yacht).
- Frequently confirm the yacht's position as you cruise, using all available aids, such as charts, visual observations and bearings, depth soundings, GPS, radar, etc.
- If the yacht is controlled by the autopilot, be especially careful to keep a good visual watch. The autopilot cannot see.
- Before night navigation, make sure that navigation lights and search lights are operational. Ensure that the correct navigation lights are turned on for operation at night. Do not keep the anchor riding light on while the yacht is navigating.
- Use navigation lights in all conditions of reduced visibility, such as fog and rain and at all times between sunset and sunrise.

NOTICES

When navigating at night, visual sharpness is crucial for a safe passage. To avoid collisions, reduce speed at night to compensate for limitations of visibility. Avoid switching on inner lights that may affect the pilot's night vision.

- Know the characteristics of the sea bottom prior to anchoring. Keep well clear of other anchored yachts.
- During anchoring, pay special attention to avoiding rotating parts of the winch and take precautions when handling the anchor chain as it comes off the winch. Caution is needed to avoid injury to hands and fingers. Also, take care to avoid entangling feet and legs in the anchor rode.
- While the yacht is underway, all persons on board must be seated in the designated seating areas in order to prevent injury due to falls caused by yacht movements with rough sea and in active wake areas or in the event of sudden changes in yacht speed or during manoeuvring. No one should be seated on the spoiler or forward decks when the yacht is navigating.

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WARNING

Persons entering the engine room when the yacht is navigating should be aware of the hazards of the yacht's motion and their potential exposure to high ambient temperatures, hot equipment components and operating machinery within the engine room.
Prior to entering the engine room, set the yacht on the most comfortable heading for sea and wind conditions. Persons in the engine room should maintain communication with the pilot.

CAUTION

To avoid heavy injuries or even death caused by hazards in the engine room, avoid the contact with hot and/or moving parts, while you are working in this area, wear proper safety clothing and also safety goggles and safety gloves. Be extremely cautious in proximity of hot and moving parts. Wear hearing protection if the engine is running.

DANGER

It is absolutely forbidden to perform reverse run with one of the two engines stopped. This operation is allowed only in case of life danger for the persons on board and for the safety of the yacht itself, however when the engine is running it should not run higher than 1000 rpm.

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4.11 NAVIGATION IN BAD WEATHER CONDITIONS

It is the yacht captain's responsibility to ensure the safe conduct of the yacht. The yacht's captain must consider the sea state and weather conditions (at present and as forecast) in determining whether it is safe to navigate.
In consideration of these conditions, it may be necessary to reduce speed, change the heading or seek shelter to protect the yacht from damage and to keep all persons onboard safe.

WARNING

BERTRAM declines any responsibility for the improper use of the yacht, in relation to the wave height conditions.

WARNING

Before setting off, it is necessary to be aware of the sea and weather conditions you will find along the transfer route and in the area you want to reach.

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4.11.1 Weather

Learn to understand weather patterns and signs of change. Bad weather and sea conditions can cause an uncomfortable and unsafe situation. Here are a few basic weather-related rules:

- check the forecast and sea conditions before leaving and while underway;
- a sudden change in wind direction or speed, or an increase in wave height indicates deteriorating weather;
- if a storm approaches, immediately seek a safe harbour;
- if a storm hits, head the foredeck of your yacht into the wind;
- if you encounter fog, determine your position, set a safe course, slow down and alert other boats of your presence with a sound signal.

ACCIDENT REPORT:
The U.S. Coast Guard and state agencies require a report to be filed by the helmsman of a boat involved in an accident involving loss of life, disappearance, injury requiring treatment beyond first aid, loss of boat or property damage exceeding $500. Contact the state boating agency where the accident occurs for a copy of the state's accident report form. In the absence of a state enforcement agency, contact the U.S. Coast Guard office nearest the accident site. Other countries have other reporting requirements. Consult your nation's boating law enforcement agency.

HOTLINES:
The U.S. Coast Guard offers many pamphlets on safety and other information not covered in this Manual. Contact your local Coast Guard unit or call the toll-free U.S. Coast Guard hotline at: 1-800-368-5647.
NOTE THAT THIS NUMBER IS NOT INTENDED FOR BOATING EMERGENCIES.

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4.12 ANCHORING

To know the anchor windlass operation (if installed) read the chapter **Anchor Windlass** in the section **ON DECK**.

Your choice of anchor depends on the size and type of your yacht and the weather and anchoring conditions you generally expect to encounter. When selecting anchors for your yacht, bigger is better and there's safety in numbers. No anchor can be all things to all bottoms so have aboard at least two anchors of different designs to handle varying conditions.

- Check that the engines battery breaker is on;
- turn the switchboard "windlass" breaker on, on the main electric panel;
- when the windlass hand-held remote control is not used, disconnect it and stow it away, in order to prevent contacts oxidation;
- before operating the winch, check that the wildcat clutch is properly engaged and remove the chain stopper;
- let the yacht move backward slowly; if necessary, use the engines;
- lower the anchor until just below the waterline, and hold;
- lower the anchor until it reaches the sea bottom;
- once the anchor is engaged, leave the chain stopper on.

WARNING

Operate the anchor windlass with the engines running, in order to provide the high voltage required and reduce the stress by slowly moving the yacht toward the anchor without passing the chain.

4.12.1 Setting the anchor

For a secure set, follow these basic guidelines

- Choose the spot to ride the anchor carefully, considering the shelter it offers, the proximity of other boats, and whether it's a good-holding bottom. Remember that boats of different sizes may swing to a different amount of anchor rode (scope) than your yacht, so give other boats as wide a berth as possible.

- Determine the scope (length) and type of anchor rode needed for the water depth. (See **DETERMINING SCOPE** in this section). If the anchor rode is line (rope), you should have the predetermined amount of line ready on deck. If the rode is chain, you will have to watch the markings on the chain, as the chain is let out, to know how much chain has been deployed.

- Approach the spot where you plan to drop the anchor. Move slowly and put the yacht in slow/idle reverse when you're over the desired location. As the yacht begins to move slowly at the aftdeck, lower the anchor to the bottom, gradually paying out the rode to almost the full amount of scope that you have predetermined.

- Secure the chain on the windlass, or, if the rode is line, around a cleat. This will make the anchor "bite". Take the engines OUT OF GEAR (put engine controls in NEUTRAL). Let out the anchor rode to the proper scope and secure the end of the line around the mooring cleats at the foredeck. If a chain rode is used, lock the chain with the chain stopper. Don't let the windlass carry the load of anchor chain or line.

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- Confirm that the anchor is set well. One of the methods of doing this is to choose two stationary objects on shore that are abeam of the yacht and that line up to form a range. When the objects are in line with each other (looking at them from the same position on your yacht, for example the main helm position) your anchor is probably set.

- Visually check your position periodically in relation to the shore objects. Any change in the way they line up means your anchor may be dragging and you'd better try again. **Always check the anchor if the wind increases or the yacht swings in another direction.** Learn how to use the radar and GPS to assist checking your anchored position. Read the manuals supplied with the equipment for this information.

4.12.2 Determining scope

The amount of anchor rode (scope) to pay out depends on:
- the type of rode you're using;
- the weather (now and in the future);
- the bottom conditions (mud, sand, weed, grass, gravel, etc.);
- the range of the tide.

A chart of the anchorage will show the type of sea bottom and the tide range in the area. Avoid trying to anchor on rocky bottoms. The anchor may not be able to hold or it may get caught under a rock.

The key is to keep the angle of pull on the anchor as close to horizontal as possible. Heavy weather or difficult anchoring conditions demand more scope. Always keep in mind the extent of the arc or circle in which you'll swing in relation to other yachts in the anchorage.

In an area with a substantial tide range, you should consider the tide range in determining scope; at high tide you may not have enough rode out for the proper scope.

Rode: the rode is the line connecting the anchor to the yacht.
Rode length = (Foredeck Height + Water Depth) x Scope.
Scope: the scope is technically defined as the ratio of the rode length to the vertical distance from the foredeck to the sea floor.
Scope = Rode Length / (Foredeck Height + Water Depth)
Minimum scope is 5:1 for calm conditions; norm is 7:1; severe conditions may require 10:1.

4.12.3 Retrieving the anchor

To avoid overstressing the electric windlass, break out your anchor by powering up to it slowly, taking in the chain or rope as you go. When the foredeck is over the anchor, the windlass should be able to lift it vertically. If the anchor is still stuck, stop the windlass and snub the rode around the cleat/bitt or windlass (chain). Then power the yacht forward slowly over the anchor until it breaks free. When the anchor is free, remove the rode from the cleat/bitt and try the windlass again. You know the anchor is free when the windlass is able to pull the rode and raise the anchor. Be careful not to damage your yacht's hull during this operation or ride over the anchor and foul the yacht's propellers with the rode. Do everything slowly and gently.
A muddy or weedy bottom condition may leave the anchor and chain very dirty. Use the seawater washdown provided on deck to clean the ground tackle while retrieving it.
Read **ANCHORING PRECAUTIONS** on the next paragraph.

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4.12.4 Anchoring precautions

CAUTION

The last ring of the anchor chain is fastened by a polyester rope, fixed to the anchor peak. In case you must leave the mooring suddenly or you cannot refloat the anchor, you can cut the line.

WARNING

Danger: when the winch is operating, be extremely cautious of rotating parts; keep your feet, hands and the remote control cable at safe distance.

CAUTION

Anchoring operations involve working with heavy equipment such as anchors and chains. These operations can cause hazards to personal safety. To avoid serious injury or death from improper handling or accidents, ensure that persons working with the winch, anchors and chains and lines are careful to keep a good footing on deck and that everyone is wearing shoes. Make certain that the anchor load is secured after unlocking the anchor prior to lowering it, and that the winch wildcat tension is correctly adjusted. Persons involved with anchoring operations must take care to protect hands and fingers from the winch gears and to avoid feet or legs being caught.

CAUTION

The entire anchoring area must be free, in case of sudden variations of wind and/or current direction, especially in case of night anchoring. At night, before dropping the anchor, check that the white anchor light works. Before dropping the anchor, check the nautical charts: anchoring is prohibited in certain areas; in coral covered sea bottom, anchoring is unsafe and harmful to the environment; on rocky sea bottom, the anchor may get fouled or lost. Anchor the yacht with the engines running, both for safety reasons and to compensate the electrical consumption of the winch.
Check the anchoring point frequently.
The distance from obstacles or from other yachts must be greater than the length of the chain lowered and the all round length of the yacht.
During anchor riding it is advisable to leave the winch powered. Do not reverse the winch rotation suddenly.

NOTICES

Before using the anchor, remove the chain stopper, check that the wildcat clutch is engaged properly and momentarily activate the anchor winch from the main control station to check that it will operate when needed.

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4.13 FUELING THE YACHT

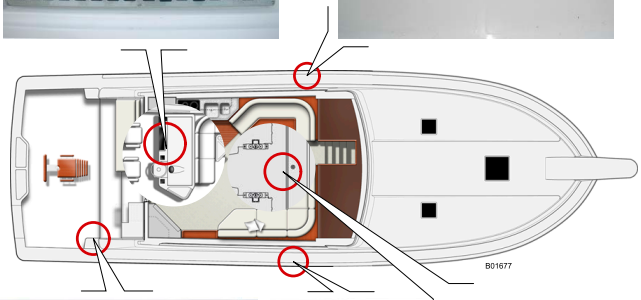
- Check that the yacht is securely moored and shut down all engines, including the generator.
- Extinguish any open flames and do not smoke when handling fuel or oils.
- The fuel tank fill fittings are located on the walk-arounds.
- During refuelling, check for the correct operation of the electric level gauge.
- Remove the fuel tank fill fitting cap; check that the fuel dispensing nozzle fits. First place the filling nozzle as deep as possible into the filling pipe through the rubber of the anti-splash sleeve of the flow switch. Fill the tank. Hold the nozzle steady while pumping. Never leave the filling operation unattended.
- Fuel is harmful to the environment. Prevent any spilling of fuel. Have absorbent materials within reach and promptly clean up any spills.
- Do not overfill the tank. Overfilling the tank will result in illegal, polluting fuel spillage from the tank vent. To avoid tank overfilling, the stern cockpit is equipped with a panel carrying a switch and a buzzer. At switch activation, the buzzer starts sounding when the tank is nearly full. By setting the switch to OFF, the buzzer stops.

Level gauge



Port fuel inlet







Fuel fill monitor



Starboard fuel inlet



Visual level in the engineroom

Studio ti 03312 540-04usa

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- Reinstall the fuel tank fill cap carefully to ensure a tight seal that will keep out rainwater and spray.
- Do not dispose of fuel, oil or other petroleum products into the environment. Use only approved shoreside disposal facilities.
- If you are in doubt about the fuel quality at the fueling facility, see the engine manual for the specifications for diesel fuel quality.
- At least once a month check for the correct operation of the level gauge.

During inlet, the fuel flow produces a lot of foam; if it comes out, you might think the tank is full. Therefore, it is good to wait for a few minutes and then top up, in order to be sure that the tank has been filled correctly. The special geometric shape of the tank allows also the decantation of the impurities or of water contained in the fuel.

NOTICES

For the type of fuel to be used, follow the Manufacturer's recommendations. Diesel engines require very clean fuel. Keep filters clean.

CAUTION

EXPLOSION/FIRE DANGER
- *Stow flammable material in a safety-approved container. Never stow flammable material in non-vented areas.*
- *Check bilge and engine room for fumes.*
- *Keep the ventilation system free of obstructions. Never modify the ventilation system.*
- *Inspect the fuel system for leaks.*

CAUTION

Refuelling should be performed at the end of navigation, in order to allow fuel cooling down, without condense. Drain the tanks, every 2 or 3 refuelling. Before refueling, wash the teak (if installed) with fresh water, in order to prevent the formation of fuel stains.

DANGER

Do not smoke during refuelling.
Do not leave the yacht unattended during refuelling.
Do not leave the engines running during refuelling.

ENVIRONMENT

Do not scatter fuel in the environment: it causes pollution.

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CAUTION

EXPLOSION/FIRE/POLLUTION DANGER
Fuel system connections that are too loose or too tight can leak, resulting in fuel spillage, environmental pollution and explosion/fire hazard.

CAUTION

Carbon Monoxide poisoning hazard - Ensure that the engine exhaust system operates correctly. Carbon monoxide is extremely toxic.
- *The exhaust system removes the combustion gas created by the engine and allows the correct ventilation of the stern.*
- *Inspect the system tightness on a frequent basis. Leaks may permit carbon monoxide exposure.*

Before & During Fueling - Checklist
- fire extinguisher - close at hand
- mooring - yacht tied securely to fueling pier
- crew - at least one knowledgeable person present
- passengers - unnecessary people off boat
- engines - stopped
- electrical equipment - power off
- windows, doors, hatches - closed
- smoking material - extinguished
- trim - fuel weight distributed equally if more than one tank

After Fueling - Checklist
- windows, doors, hatches - open
- fuel tank - secure fuel tank fill fitting cap
- spills - wipe spillage

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4.14 PREVENTIVE MAINTENANCE

The yacht is fitted with a high number of sophisticated equipment and systems that require periodic inspections and maintenance in order to operate safely and reliably. One of the factors that can cause failures is the intermittent use of the yacht and its equipment. Experience shows that the regular use of equipment helps maintain the good operation of all machinery and equipment. Your yacht and its systems will thrive on regular use.

Daily checks and periodic routine and preventive maintenance are important for maintaining the efficiency and effectiveness of your yacht's equipment. Failure to perform these routine periodic maintenance schedules can result in the deterioration of the equipment's performance and lead to premature failures. Neglecting maintenance can lead to unexpected problems and unsafe conditions that will reduce your enjoyment of your yacht.

NOTICES

General information about ordinary maintenance tasks and maintenance scheduling is provided in this manual. For further information, refer to the specific equipment manufacturer's manuals.

The maintenance schedule is based on time or running hour intervals, rather than a specific calendar. For example, if a maintenance task is scheduled every 100 hours or 3 months; such task must be repeated after 200 hours or after 6 months, after 300 hours or after 9 months and so on.

In case of a long inactivity period, e.g. winter, it is advisable to decommission the yacht. See the **Long-Term Lay-up** section in the **MAINTENANCE** chapter of this manual.

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4.15 WARNINGS FOR MAINTENANCE IN HARSH CLIMATES

Periodically check that all equipment and machinery containing water is protected with the correct proportion of non-toxic antifreeze. If the outside temperature goes below 0 °C/32 °F, all fresh and seawater systems are at risk of freezing. Piping and hoses may break from freezing and this could lead to sinking the yacht.

Systems subject to risk of freezing include but are not limited to the engine and generator seawater and freshwater cooling systems, watermaker system, freshwater system (cold and hot water piping, pumps and tanks), windshield washing system, toilets and waste systems (piping, pumps and black water tanks), air-conditioning pumps and piping, all seawater pumps and piping, icemakers and refrigerators, etc.

For more information on the maintenance and service requirements of your yacht and its equipment, and for special information about maintenance with cold weather, see the sections in this manual that make reference to the single components, devices and equipment, but especially consult the User Manuals provided by the Manufacturers for specific information.

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NOTES:

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5



INSTRUMENTATION & EQUIPMENT

FOREWORD

USE OF THE MANUAL

DESCRIPTION OF THE YACHT

NAVIGATION

AUXILIARY EQUIPMENT ON BOARD

CONTROL STATION

ON THE MAIN DECK

THRUST SYSTEMS

HYDRAULIC SYSTEMS

ELECTRIC SYSTEM

DETAILED INFORMATION ON THE INTERIORS

SAFETY DEVICES AND EQUIPMENT

YACHT HAULAGE AND LAY-UP PERIOD

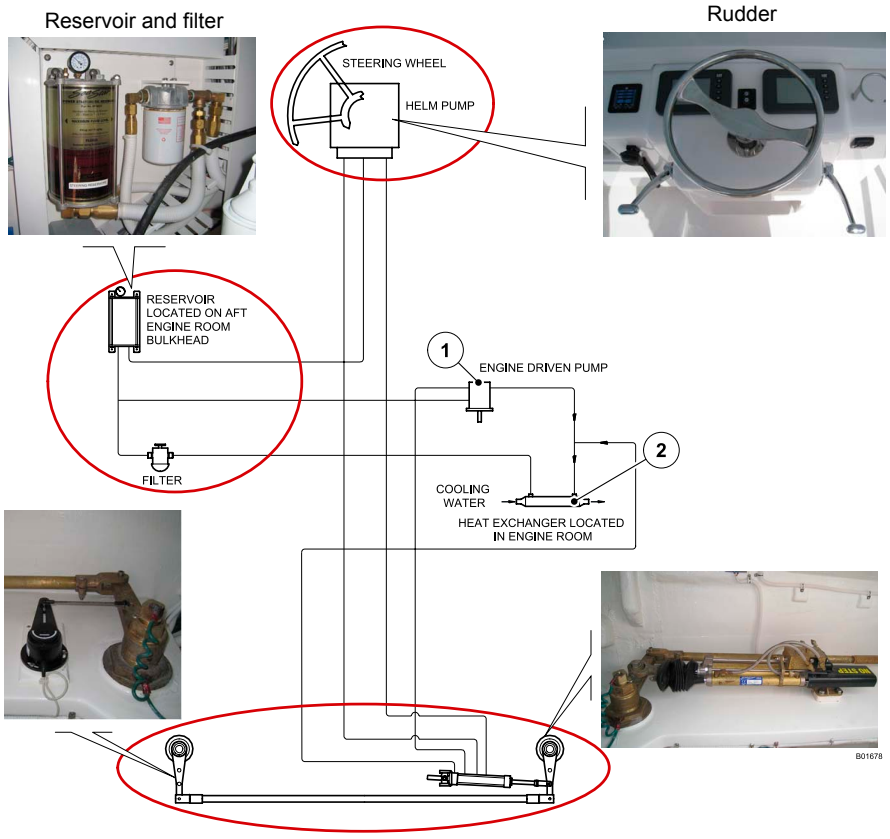
MAINTENANCE

TROUBLESHOOTING

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5.1 HELM SYSTEM

The hydraulic power-steered helm system has been provided to make driving easier when underway, and to improve the safety and reliability of the system.
Hydraulic power steering uses the ship's engines to provide the "power" for the steering system, via an engine or electric motor driven hydraulic pump (**1**). In the engine room there is the heat exchanger (**2**) for system cooling. A manual hydraulic steering system, consisting of a standard helm and a hydraulic steering cylinder, (fitted with an integral servo cylinder and a power steering valve) supplies the "control" portion of the steering system.
Under normal conditions, with engines running, a hydraulic oil supply is in a stand-by mode, ready to be directed to the steering cylinder as dictated by the steering wheel, servo cylinder and power steering valve.
Turning the steering wheel left or right makes the system go from stand-by into operating mode and move the steering cylinder accordingly.
In the event of a power source failure, hydraulic oil, from the steering helm, is automatically diverted directly into the servo and steering cylinder, providing the helmsman with manual back-up steering.
An engine room mounted oil reservoir allows easy system fill and assists the in-line oil cooler in cooling the hydraulic oil. An in-line oil filter helps to protect the steering system components against contaminants.



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The system operates in three modes for cruising: MANUAL, POWER STEERING and AUTOPILOT. Switching from one mode to another is a simple operation.

Manual control of steering always overrides the autopilot.

This is a safety feature and it simplifies steering control. Taking manual control when the autopilot is on will not damage the system. Turning the wheel to avoid an unexpected obstacle is a natural reaction. When the steering wheel is released from manual control, the autopilot will return to the heading it was steering without any additional intervention.

NOTICES

At high speed, the use of the autopilot is dangerous and not recommended. Anyway, be always very careful during navigation also when the autopilot is in use.

CAUTION

CONTROL HAZARD

Inspect and service the driving system regularly. An improperly serviced driving system may get damaged, causing the sudden loss of control, resulting in personal injury and property damage.

- *Follow instructions in owner's information packet for hydraulic driving system operation, for filling and bleeding procedures, for alternative means of operation, for service procedures, troubleshooting, fluid specifications, systems plans and replacement parts list.*
- *Follow instructions in owner's information packet for mechanic driving system inspection and lubrication.*
- *In a hydraulic system, the drive wheel movement pump hydraulic fluid into the lines until they reach a cylinder which transfers the movement to the rudder, aft drive; a tank holds the exceeding fluid; a valve protects against overexposure.*
- *The operator must inspect the driving system frequently for a smooth, free and full range operation.*

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The helm gear assy is located inside of the helm gear compartment and is accessible from the stern cockpit, while the helm gear power unit is located in the engineroom.

NOTICES

Do not enter the helm gear compartment when the yacht is underway.



Near to the port rudder arm is installed the autopilot sensor, allowing assisted navigation by means of the autopilot.
The power unit of the autopilot is installed on the aft bulwark of the engineroom; it consists of electric motor with permanent magnets, of a valve block with reversible pump, of non-return valves and intake on ports.
The pump is reversible because the engine changes its revolution direction according to the signals received from the autopilot sensor. Therefore, the pump delivers hydraulic oil to the cylinder chambers, according to autopilot indication.

NOTICES

Do not remove the safety guards on the rudder coupling system.

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5.2 RUDDERS STROKE (TRAVEL) CHECK

- Turn on the helm system electrical power and activate the hydraulic power unit.
- Bring the rudders to the center. Observe the tiller angle indicator.
- Turn the drive wheel all the way to one side, counting the number of turns to the end of the stroke (travel). Observe the angle between the rudders and the centerline (keel line) of the yacht as shown on the tiller angle indicator.
- Turn the drive wheel all the way to the other side, counting the turns to the end of the stroke (travel). Observe the angle indicated on the tiller angle indicator.
- The number of wheel turns must be about the same in both directions. The angle between rudders and keel line should also be equal on each side.
- When the check is completed, bring the rudders to the center.

WARNING

Should you find remarkable inaccuracy or anomaly when testing rudder stroke, please contact the BERTRAM Service Department.

WARNING

The hydraulic power unit to operate must be electrically powered by the circuit breaker located on the main electric panel.

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5.3 DRIVING SYSTEM MAINTENANCE

Ordinary service

Steering maintenance requirements will vary, depending on usage of the yacht and climate.
Bi-annual inspection by a qualified marine mechanic is required.

- Remove, clean and grease the tilt tube annually with quality marine grease. Lubricate cylinder support rod, support bracket holes and all moving parts.
- Check the steering fluid level in the helm, it should be maintained at no less than 1/2" below the bottom of the filler cap threads.
- Replace any hoses showing signs of wear and remove the cause or re-route hoses. Check fittings and seal locations for leaks or damage and service as necessary.
- If you have installed a jack plate make sure that there isn't any interference between the jack plate and your steering cylinder. If there is interference, it may occur during full tilt.
  Lift restrictors or a Tilt Stop Switch - should be installed. Please consult engine manufacturer.

Failure to comply with maintenance checks may result in loss of steering, causing property damage and/or personal injury.

Oil level & system check

Helm mounted with wheel shaft completely horizontal must be filled to bottom of filler hole at all times.

Do not allow oil level to drop more than 1/4" (6.3 mm). Helms mounted on a 20-degree angle or with the wheel shaft vertical should have an oil level within 1/2" (12.7 mm) of hole.
Check oil level periodically. At this time the steering system should be checked for proper connections of hose, tube and fittings, possible leaks, and the need for air removal from the system.
To do so, turn steering wheel (any one on a multisteering station) and pressurize very hard to port.
Apply enough force to the wheel to exceed pressure relief valve pressure. You will not harm the helm or the system. While pressure is maintained on steering wheel, check all port (left) fittings and line connections. Repeat procedure by turning wheel to starboard. Watch the oil level in the helm pump when pressurizing the steering wheel in either hard over positions.
If there is no obvious drop in oil level, air was removed.
If there is an obvious drop in oil level, you are compressing air and further filling and purging is required.
Follow steps 1 through 5 as shown on the next page.
If no leaks are obvious, your steering system is ready for use.

CAUTION

If leaks are found, correct before using. Failure to correct a leak can lower the oil level in system, resulting in loss of steering.

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Fill & purge procedure

NOTICES

This procedure requires two people. One person may not be able to remove all the air from the system, which will mean spongy, unresponsive steering.

CAUTION

During the entire filling procedure, oil must be visible in the filler tube. Do not allow the oil level to disappear into the helm - this may introduce air into the system and increase your filling time.

NOTICES

HYDRAULIC OIL REQUIREMENTS: two quart bottles for single station and single cylinder systems.
One additional bottle for each additional helm, cylinder, or auto pilot.

NOTE: these instructions will result in hydraulic oil flushed in and out of the system. Oil can be reused if filtered through a fine mesh screen such as the kind used for gasoline. If unable to filter oil, an additional bottle of oil is required.
"Bleeder" may refer to cylinders with either bleed tee fittings or bleed screws.
If fitted with bleed tee fitting, open bleeder by unscrewing bleed nipple nut two turns.
If cylinder is fitted with bleed screws, open bleeder by removing bleed screw completely. Just loosening bleed screw will not cause sufficient oil flow to purge system. (Helm filling can be done faster if oil is poured into the helm prior to connecting filler tube and oil bottle.)

Cleanliness is important when handling hydraulic oil. Prevent contaminants from getting into the oil.

- **Step 1**
  Screw the threaded end of the filler tube into the helm filler hole. Remove the cap from the oil bottle and holding upright, screw into the filler tube bottle cap. Turn bottle upside down and poke hole in the bottom of the bottle. Fill the helm pump full of oil (oil should always be visible in the filler tube). Use the next bottle at any time throughout the procedure when the oil level drops in the filler tube.
  Do not proceed with Step 2 until helm is full of oil.
- **Step 2**
  Turn the steering wheel clockwise until cylinder rod is fully extended on the left side of the cylinder. Open left side bleeder.
- **Step 3**
  Holding the cylinder rod (to prevent it from moving back into the cylinder), turn the steering wheel counterclockwise until a steady stream of airfree oil comes out of the bleeder (drain out about 1/2 bottle of oil as required).

CAUTION

Use only your hands to restrain the cylinder rod. Do not use vise grips, pliers or other metal tools to stop cylinder rod from moving - these tools can damage the cylinder rod, causing leakage to occur. Ordinary hand strength is sufficient to hold the rod.

While continuing to turn the wheel, close the left side bleeder and let go of the cylinder rod.

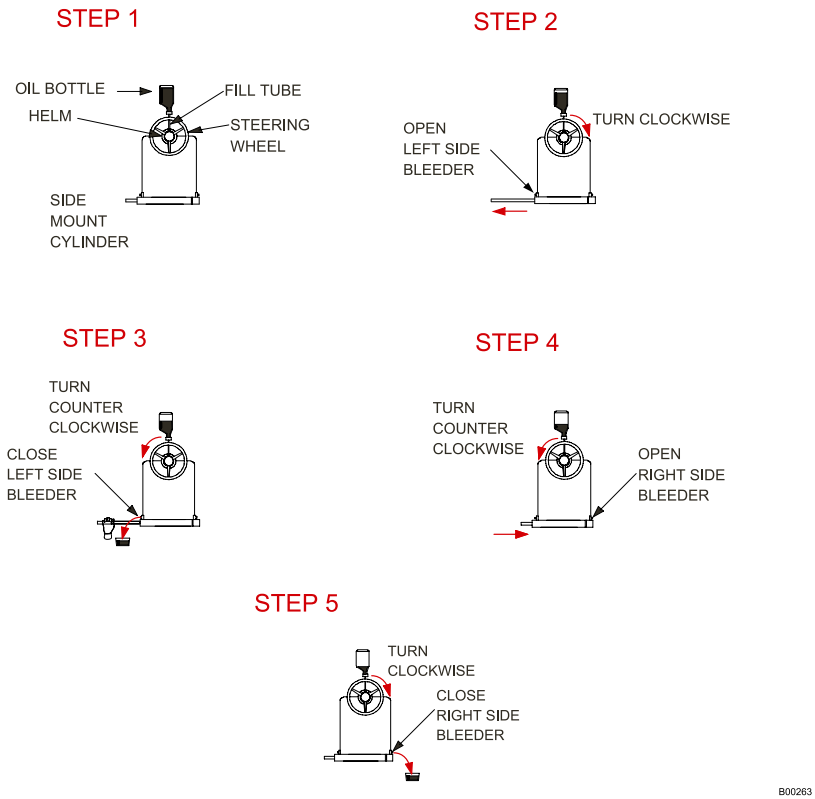
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- **Step 4**
  Continue turning the steering wheel counterclockwise until the cylinder rod is fully extended to the right. (Steering wheel will come to a stop). Open the right bleeder.
- **Step 5**
  Holding the cylinder rod to prevent it from moving back into the cylinder, turn the steering wheel clockwise until a steady stream of air-free oil comes out of bleeder. Use only your hands to restrain the cylinder rod. While continuing to turn the wheel, close the right side bleeder and let go of the cylinder rod. Fill and purge is now complete.

For more information, consult the manufacturer's manual.

ENVIRONMENT

Hydraulic oil is toxic. Dispose of old oil and oily waste materials only in an approved toxic materials disposal facility.



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5.4 TRIM TABS

5.4.1 Trim tabs operation

The yacht is equipped with hydraulic trim tabs, that can be controlled from the helm station. Each trim tab is driven by an hydraulic piston. They allow you to adjust both fore-and-aft and athwartship trim of the yacht during cruising.

The circuit is extremely simple. The electric signal coming from the control switches in the helm station, reaches the electric pump, located in the helm gear compartment.

5.4.2 Trim tabs general information

It is important to become sensitive to the use of the trim tabs. With practice, you will learn how their position affects the performance of the yacht and makes a difference in your comfort.

When you lower the trim tabs, you lower the bow toward the water. When you raise them, you raise the bow. Adjusting the trim tabs is done primarily to adjust the fore-and-aft and/or athwartships trim of the yacht.

5.4.3 Trim tabs basics

When the yacht is underway, adjust the tab positions to the angle that gives the best performance and comfort.

- When the loads aboard the yacht (fuel, supplies, passengers, etc.) are evenly distributed and the yacht sits level on its lines, you will use the trim tabs in a “normal” manner.
- When weight aboard the yacht is unevenly distributed, you may have to adjust the trim tabs individually to compensate for the uneven weight distribution.
- The optimum trim tab position, in calm sea conditions, provides maximum speed with minimum friction, because the trim tabs counteract the natural tendencies of the yacht as it moves through the water. You will learn the best positions for the tabs through experience.
- With average speed, pay close attention to the trim tabs.
- RAISE the trim tabs when going astern.
- At the end of cruising, or when you stop the yacht, push UP both selectors and wait for about 30 seconds to raise the trim tabs and retract the cylinder rods.

NOTICES

The trim tabs are used to improve both passenger comfort and the yacht’s performance.

NOTICES

RAISE the trim tabs when going astern to avoid damage to the tabs.

CAUTION

The trim tabs, like the rudder, can result in sudden direction changes, if actuated too fast. It is therefore necessary to test how they respond very carefully and in open sea.

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WARNING

Pay particular attention when using the trim tabs during fishing operations.

CAUTION

A good practice when navigating is that of making sure that all passengers are sitting down, before carrying out any maneuver when operating the trim tabs, particularly when navigating at high speed.

5.4.4 Trim tabs oil level check

Prior to getting underway, check the oil level visually inside of the power unit tank.

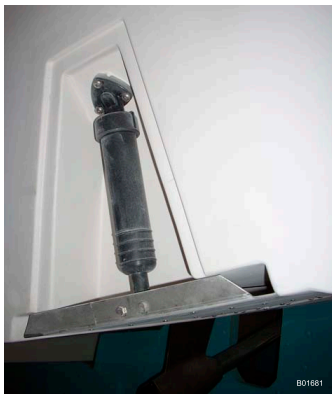


5.4.5 Trim tab oil change

To replace the oil is necessary remove cover. Remove the fitting plug, top up with oil as suggested by Manufacturer and lubricate the rubber gasket.

5.4.6 Hydraulic Cylinder

To prevent the cylinder rods from acquiring barnacles that may damage the gaskets, keep the trim tabs control button on UP when not using the trim tabs. Periodically check the scraping ring on the rods for cracks and oil leaks.



ENVIRONMENT

Collect and dispose of waste oil according to safe environmental practices. Use an approved toxic material disposal facility.

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NOTICES

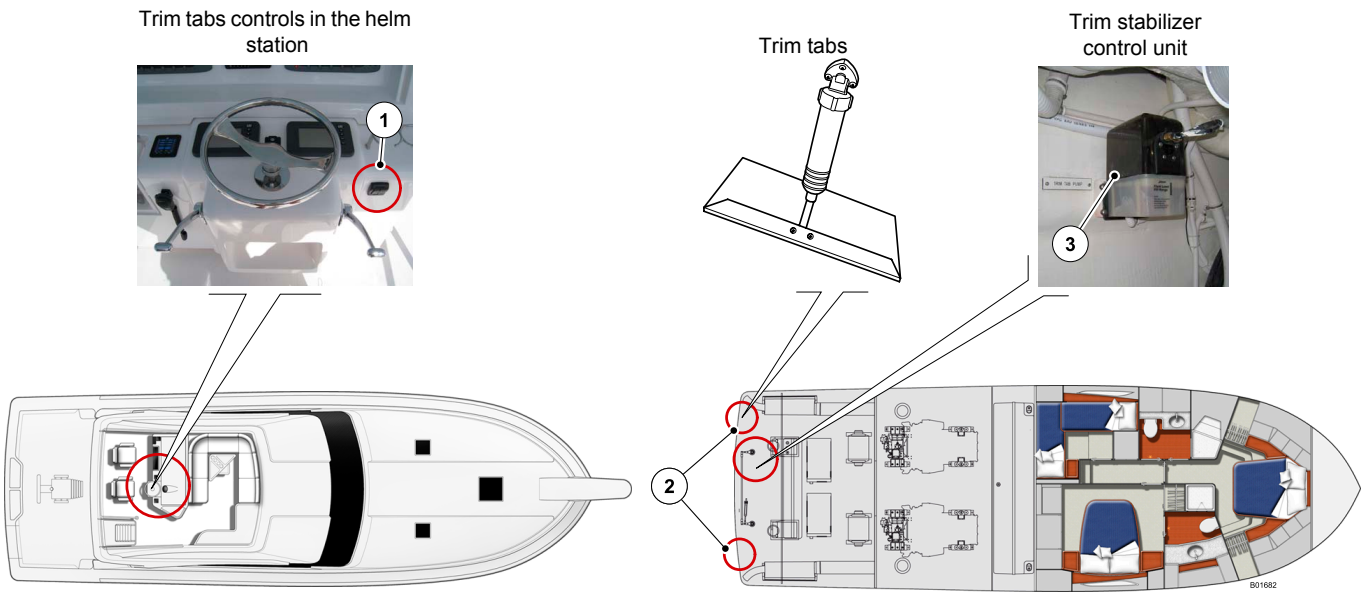
Clean the cylinders periodically to remove possible spots of corrosion that can impair their efficiency. To reduce the risk of corrosion, retract the cylinder rods each time you leave or moor the yacht, and when the yacht is on land.

Item
Trim tab system

Maintenance
Check oil level before navigation
Oil change
Hydraulic cylinders

Notes and precautions
Top up, when necessary, the tank of the gear case with suitable oil.
Should frequent oil topping up be necessary, check all fittings and tubes to find and remove the leak.

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1. Trim tabs controls in the helm station
2. Trim tabs
3. Trim stabilizer control unit

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5.5 BOW THRUSTER (OPTIONAL)

The (double) bow thruster is operated by an electric motor and is activated from the helm station.
The bow thruster system is powered by a battery bank, recharged by a dedicated battery charger equipped with its relevant activation switch.
A joystick operates the bow thruster controls that direct the lateral movement of the bow during docking and close-quarters maneuvering. The joystick movement corresponds to the required heading.
For detailed information refer to Manufacturer's manual.

CAUTION

For the continuous operation of the bow thruster, refer to the handbook delivered by the manufacturer.

DANGER

When the bow thruster is not used, always disconnect the control unit.

WARNING

Remember to disconnect power supply to the system when maneuvers are ended or during normal navigation.

DANGER

Always stop the bow thruster before undertaking inspection or maintenance tasks by disconnecting the switches and possibly also the battery terminals.

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5.6 ANTI ROLLING GYRO (OPTIONAL)

An innovative system consisting of an anti rolling gyro has been installed to reduce the irritating effect of the rolling due to the waves; this system is able to generate a rotation equal and opposite to the waves motion. The ARGs system combines a sensible reduction of the rolling both with yacht idle and in navigation, with low energy consumption, and does not involve the life quality onboard leaving performance unchanged. Thanks to these very important features, the device can remain active also overnight, to maintain the best comfort on board, by almost completely damping the annoying rolling.
The ARGs operation principle is based on a well known physical principle: a gyro tends to maintain its own vertical rotation axis parallel to gravitational acceleration.
When its position changes due to external reason, like the rolling generated by waves, it reacts with a rotation on a perpendicular axis against its own axis of rotation and against the listing cause.
With AR, this generated movement (rolling) is softened by the presence of a damper, calibrated expressly in compliance with the specifications of each yacht.
The system consists of two power units and of two anti rolling gyros placed in the generator room.
For further information on their use and maintenance see the manufacturer manuals.

CAUTION

The ARG is not watertight. If submerged by seawater it could get damaged.

CAUTION

Have the PERIODIC ARG INSPECTION carried out by specialized personnel every two years. Contact the CUSTOMER SERVICE for further information.

DANGER

During operation the ARG components roll freely inside of their housing; therefore to open this housing would cause injuries or even death. In case of a fault, if it is necessary to open the housing for checking, have this operation performed by a skilled technician.

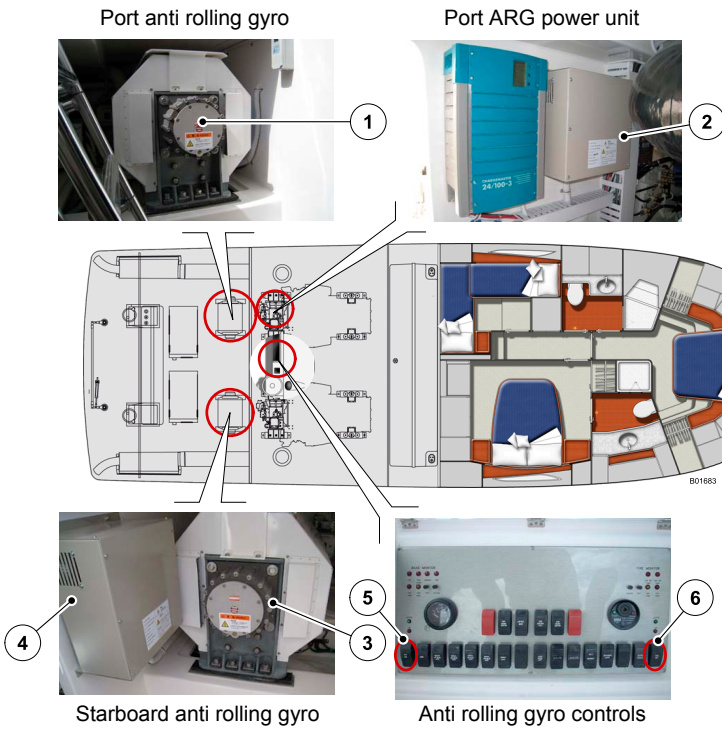
WARNING

During operation the ARG, the dampers and the housing overheat. Therefore, to avoid burns, do not touch the ARG during operation.

DANGER

The ARG housing is not solid. Do not lay objects on the ARG or sit on it.

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1. Port anti rolling gyro
2. Power unit for port anti rolling gyro
3. Starboard anti rolling gyro
4. Power unit of starboard anti rolling gyro
5. Port stabilizer controls in the helm station
6. Starboard stabilizer controls in the helm station

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6



CONTROL STATION

FOREWORD

USE OF THE MANUAL

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6.1 CONTROL STATION

Your yacht is equipped with one helm station with drive wheel and several navigation instruments in the flybridge area.

NOTICES

Very general and limited information for first startup and initial operation of your yacht is included in this manual. For specific directions about the use of the individual systems and equipment, consult the manuals provided by the individual equipment manufacturers or contact the BERTRAM Customer Support.

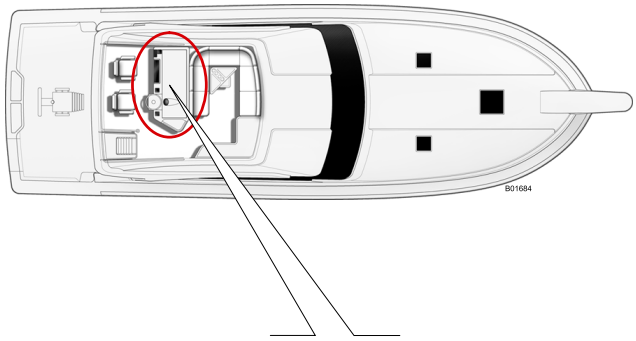
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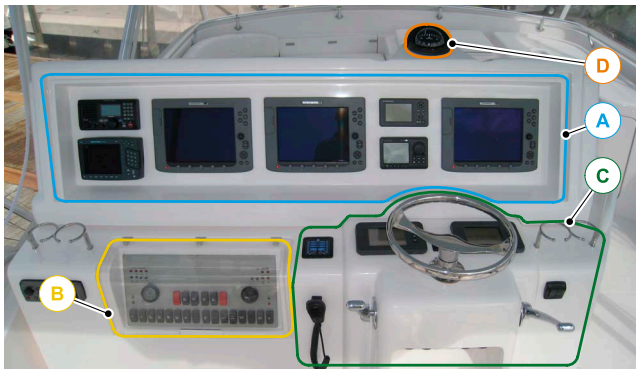
6.2 FLYBRIDGE HELM STATION

To understand the control devices on the flybridge helm station, review the following main sections:

A. Navigation instruments
B. Port helm station console
C. Maneuver control levers
D. Magnetic compass

The console containing the navigation instruments (**A**) is closed. To access these instruments, activate the console opening/closing switch (**12**) section (**B**).





WARNING

It is a good rule to keep the screens clean by washing them with wet and clean rags, avoiding to use chemical or abrasive products.

WARNING

During the yacht cleaning and washing take care not to throw water on the electrical components.

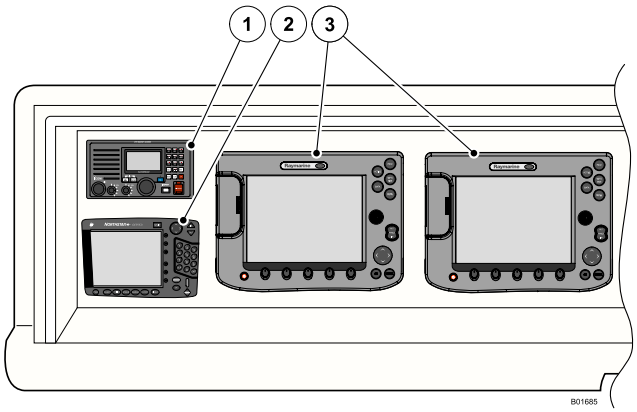
NOTICES

The images and drawings of the helm station are referred to the US-version of the yacht.

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6.2.1 SECTION A - Navigation instruments

1. **Radar display/Chartplotter/Fishfinder**
   It allows displaying in a clear and quick way what is happening around the yacht, so as to facilitate navigation.
2. **VHF-DSC Radiotelephone**
   This device allows to communicate with boats and vessels. It is possible to carry out long distance connections with shore stations for emergency calls and to get in touch with the research and rescue teams. This instrument allows to carry out calls in DSC mode (Digital Selective Call).
3. **Radar display/Chartplotter/Fishfinder**
   They allow to display in a clear and quick way what is happening around the yacht, so as to facilitate navigation.



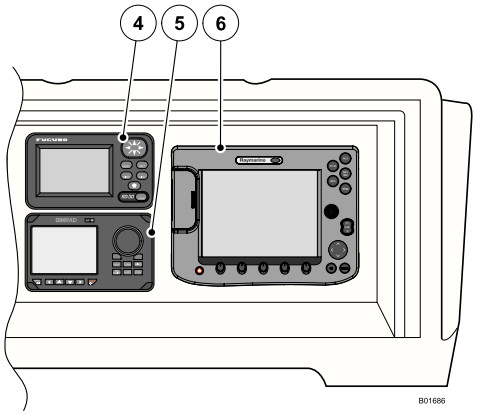
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4. **Multifunctional display**
   This screen allows to display the information received from GPS, chartplotter, radar or various water temperature sensors, wind data, etc.
5. **Automatic pilot (autopilot)**
   This device allows holding a certain pre-set course, without having to manually operate on the helm system.

CAUTION

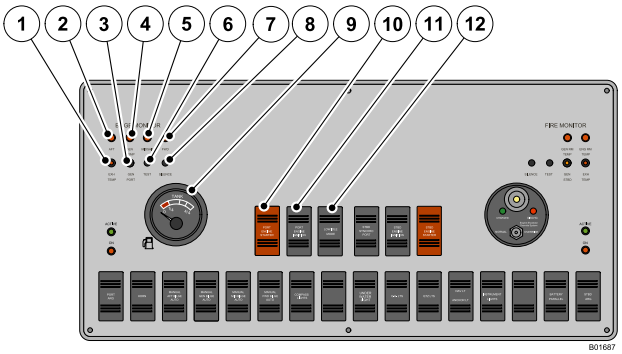
If the yacht bow is facing a sudden obstacle, this can be avoided by turning with force the steering wheel. This operation allows to steer the yacht only if the steering wheel is held firmly. As soon as the steering wheel is released, the autopilot resumes immediately the yacht's track. If the obstacle is not too close, the best thing is to set the device in stand-by, so as to take over control of the yacht definitively. Once by-passed the obstacle the device can be switched on by setting the track again.

6. **Radar display/Chartplotter/Fishfinder**
   It allows displaying in a clear and quick way what is happening around the yacht, so as to facilitate navigation.



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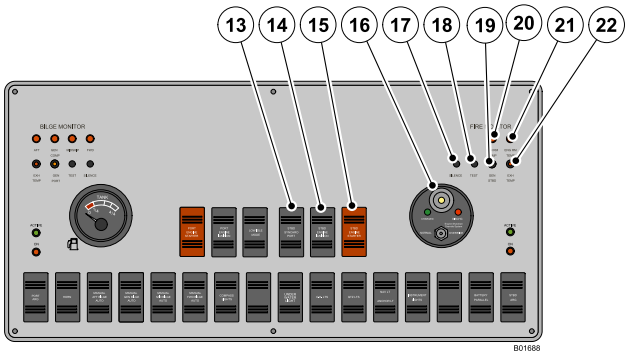
6.2.2 SECTION B - Port helm station console



1. **Port engine exhaust warning lamp**
   This light indicates high temperature inside of port engine exhaust ducts.
2. **Stern bilge flooding alarm lamp**
   This light indicates the flood of the aft bilge.
3. **Port generator light**
   This light indicates that the port generator is running.
4. **Generator room bilge flood signal light**
   This light indicates the flood of the bilge in the generator room.
5. **Engine room bilge alarm lamp**
   This lamp indicates the flooding of bilge in the engine room.
6. **Test button to bilge flood signal**
   The test button is used to verify the correct operation of each signal light of the panel. When using the test button, all LEDs must be ON and buzzer must sound to indicate the correct operation of the bilge signal system. When releasing the button all LEDs must go out and the buzzer must clear off.
7. **Bow bilge alarm lamp**
   This lamp indicates the flooding of the bow bilge.
8. **Squelch button of bilge flood signal**
   This selector allows the deactivation of the bilge alarm.
9. **Fuel level gauge**
   This gauge shows the fuel level in the tank.
10. **Port engine STOP/START switch**
    This switch enables the start/stop of port engine.
11. **Port ENGINE IGNITION switch**
    This switch allows to enable the start/stop of the port engine.
12. **Low idle switch**
    This switch allows to decrease the yacht speed until this becomes lower than the idle speed.

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13. **Engine synchronizer switch**
    This switch allows to activate the synchronization of both engines and to use a one lever operation mode to control the engines.
14. **Starboard ENGINE IGNITION switch**
    This switch allows to enable the start/stop of the starboard engine.
15. **Starboard engine STOP/START switch**
    This switch enables to start/stop the starboard engine.
16. **Fire-fighting alarm panel**
    This panel visualizes the warning lamps connected to the fire-fighting system located in the engine room and it includes the OVERRIDE/ NORMAL switch.
17. **Squelch button for firefighting alarm signal**
    This switch allows to disconnect the fire hazard signal buzzer.
18. **Test button for high temperature signal**
    The test button is used to verify the correct operation of each signal light of the panel. When using the test button, all LEDs must be ON and the buzzer must sound to confirm the correct operation of the signal system. When releasing the button all LEDs must go out and the buzzer must clear off.
19. **Starboard generator light**
    This light indicates that the starboard generator is running.
20. **Generator room high temperature signal light**
    This light indicates that the temperature in the generator room is too high.
21. **Engineroom high temperature signal light**
    This light indicates that the temperature in the engineroom is too high.
22. **Starboard engine exhaust warning lamp**
    This light indicates high temperature inside of starboard engine exhaust ducts.



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23. Port ARG Anti-Rolling-Gyro switch (optional)
This switch allows to activate the port ARG Anti-Rolling-Gyro.
- ON: indicates that the ARG is powered by the relevant circuit breaker.
- ACTIVE: indicates that the ARG stabilizer has reached its operation speed.

24. Horn switch
This switch enables the operation of the horn.

25. Stern bilge pump switch
This switch allows the manual activation of the stern bilge pump.

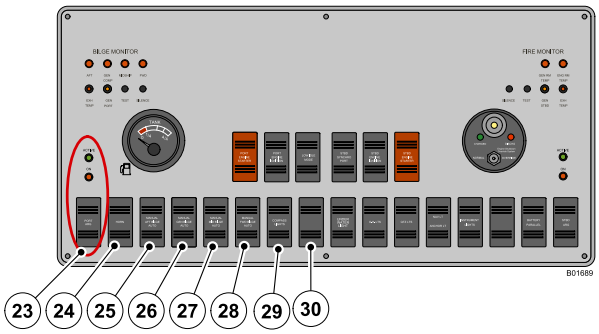
26. Generator room bilge pump switch
This switch allows the manual activation of the bilge pump in the generator room.

27. Engineroom bilge pump switch
This switch allows the manual activation of the bilge pump in the engineroom.

28. Bow bilge pump switch
This switch allows the manual activation of the bow bilge pump.

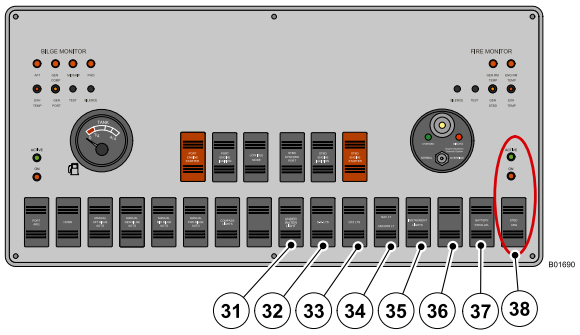
29. Switch for magnetic compass backlighting
Allows the backlighting of magnetic compass.

30. Available
Push-button available for auxiliary system.



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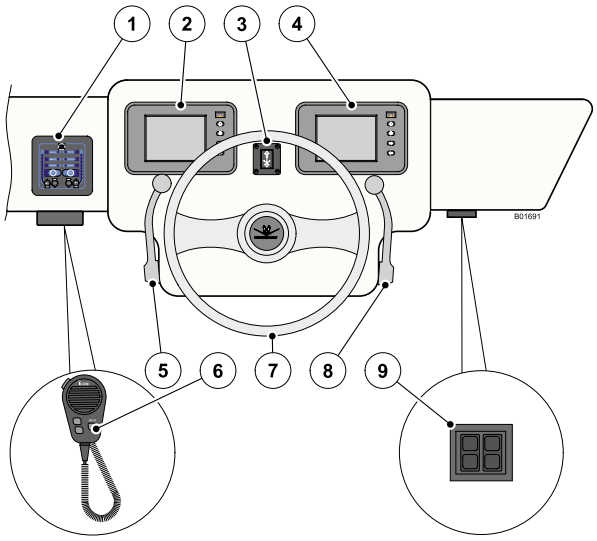
31. **Underwater lights**
    This switch allows the activation of the underwater lights.
32. **OVERHEAD lights**
    This switch allows the activation of the OVERHEAD lights.
33. **Quartz light switch**
    This switch allows the activation of the quartz lights.
34. **Anchor riding and navigation switch**
    This switch turns on the anchor riding or the navigation lights.
35. **Instrument light switch**
    This switch turns on the instruments backlighting.
36. **Available**
    Push-button available for auxiliary system.
37. **Batteries parallel connection switch**
    This switch allows the parallel connection of the users/engines batteries, in order to ensure more power at engines start. This switch may be used only if the batteries are not sufficiently charged.
38. **Starboard ARG Anti-Rolling-Gyro switch (optional)**
    This switch allows to activate the starboard ARG Anti-Rolling-Gyro.
    - ON: indicates that the ARG is powered by the relevant circuit breaker.
    - ACTIVE: indicates that the ARG stabilizer has reached its operation speed.



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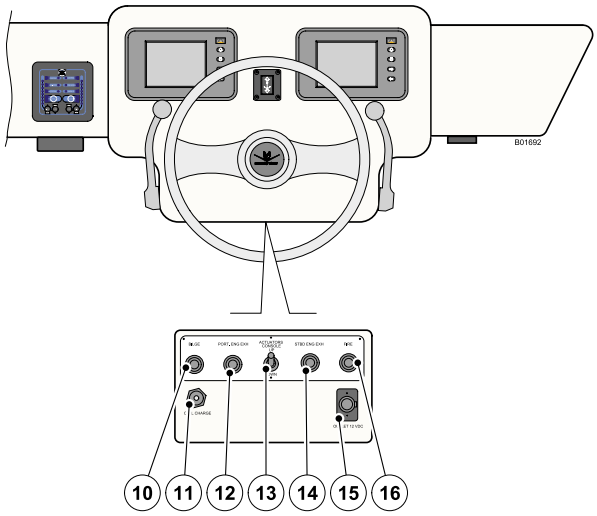
6.2.3 SECTION C - Control and maneuver heads

1. **Control panel of gearboxes**
   This block monitors, by means of electric signals, the revolutions of the propulsion engines and the speeds of the gearboxes.
2. **Port engine control panel**
   This panel allows monitoring all operating parameters of the port engine.
3. **Anchor windlass switch**
   This switch allows the operation in both directions of the bow anchor windlass.
4. **Starboard engine control panel**
   This panel allows monitoring all operating parameters of the starboard engine.
5. **Starboard head (optional)**
   This head drives by means of an electric signal the revolutions of the starboard engine and the gears of the starboard gearbox.
6. **VHF-DSC microphone**
   VHF microphone with remote control function on channels and output power.
7. **Steering wheel**
   By turning the drive wheel you actuate an hydraulic pump that operates the piston located in the helm gear compartment, this in turn is connected to the rudder and allows to drive the yacht.
8. **Port head (optional)**
   This head drives by means of an electric signal the port propulsion engine revolutions and the port gearbox speeds.
9. **Trim tabs control panel**
   This panel carries the switches for trim tabs activation.



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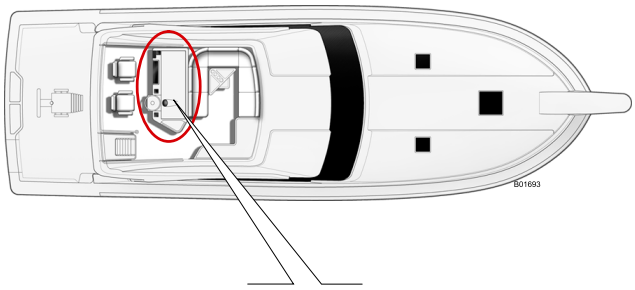
10. **Bilge flood alarm signal**
    This signal activates to indicate a bilge flood hazard.
11. **Cell-phone charge**
    It allows to charge the cell-phone.
12. **Port exhaust signal buzzer**
    This buzzer activates to indicate an excessive temperature of exhaust gases in the port engine.
13. **Console switch**
    This switch allows the opening/closing of the console.
14. **Starboard exhaust signal buzzer**
    This buzzer activates to indicate an excessive temperature of exhaust gases in the starboard engine.
15. **12 V electric outlet**
    12 V DC socket
16. **Fire hazard signal buzzer**
    This signal activates to indicate a fire hazard.



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6.2.4 SECTION D - Magnetic compass

A magnetic compass fitted on the dashboard of a yacht is inevitably close to the magnetic fields produced by the electric and electronic systems on board. This condition is called “variation”. Only a skilled technician should set the compass to correct the variation and supply an accurate deviation schedule. This procedure is called “compass compensation” or “compass setting”.
Compensate the compass after the yacht launch or when replacing it, in order to eliminate possible mistakes due to the compass position.
Do not approach the compass to steel or iron objects or objects made of other ferrous materials (e.g. tools, wrenches, batteries, etc.). The ferrous materials close to the compass alter the readings and make them unreliable. Remove any unnecessary object near the compass.





NOTICES

The compass delivered with the yacht is not compensated for change or deviation. Any electrical or metallic item located in its proximity may influence the compass. The yacht’s owner is responsible for the compass compensation. Compensation should be carried out after installing additional electronic equipment or once a year after a prolonged period of mooring or ground lay-up. Compensation should be carried out only by authorized and qualified personnel.
As a compass can rarely be set to zero variation on all courses, the technician in charge of its compensation should give you a card containing the corrections to be applied to navigation calculations. Always keep this card available on the main control station.

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Compass compensation

Read carefully the manual delivered by the manufacturer.

NOTICES

*Never unscrew for any reason screws and filling caps (**1**). The only screws that may be turned are the adjusting screws (**2**) by means of the non-magnetic screwdriver provided. When the adjuster's screw slot (**2**) is horizontal, the compensation is neutral. When the slot is vertical, the compensation is at its maximum. This operation must be carried out only by a trained compass adjuster.*

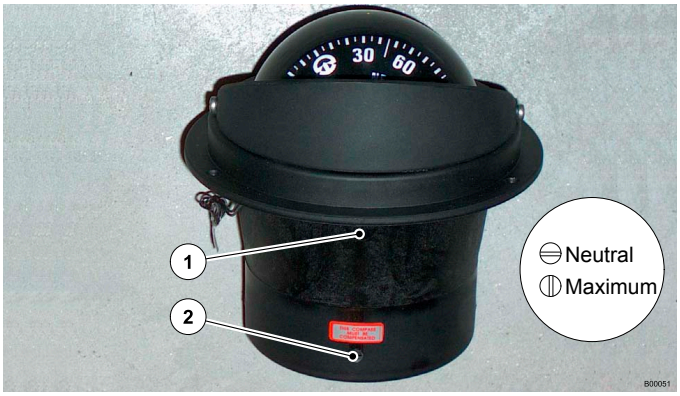
NOTICES

At least once a month check the operation and the deviations. If necessary, have a new compensation of the compass turns carried out.

Objects in the immediate vicinity influence every compass. Deviation is the angular difference between the reading your compass provides as installed and the reading it would provide if the objects were not there.

Deviation is expressed in degrees East or West of true North. It varies with the heading of your vessel because, as your vessel turns, the position of the objects that affect the compass change relative to the magnetic North.

You must record deviation of the compass on a compass deviation card and place it near the compass. You must record the deviation for each individual compass that you use, because the position of each compass relative to the materials around it determines the deviation.



You compass is fitted with a set of compensation, or adjustment, screws to minimize these errors. It is seldom possible to compensate for all compass deviation errors, since this type of error varies as the heading of your vessel varies. However, the error should remain the same for any given heading, as long as no changes are made to instruments and electronic fixtures near the instrument panel.

There is a vertical mark on the compass called a "lubber line". This line was oriented when your compass was installed, so an imaginary line drawn from the compass pivot point to the lubber line will be parallel to the longitudinal axis of your vessel. Thus, your vessel's course is the compass card reading below the lubber line.

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6.3 HANDLE BLOCK

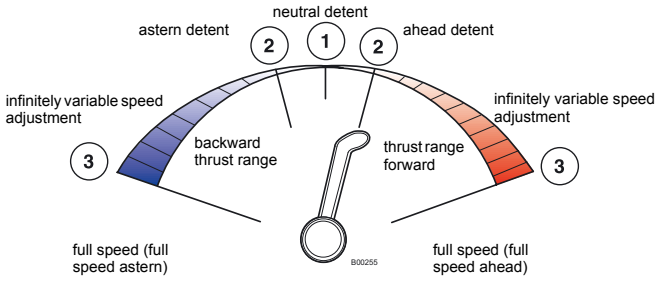
The heads block is a system designed to control through electric signal the revolutions of the engines and the gearbox speeds. The system may consist of a single block carrying the heads and the selector switches or of two separate heads, each one installed at the side of the drive wheel, and of a separate panel.
In both cases the heads can be moved to three detents:

1. **Neutral:** in this position, the gearbox is disengaged and the propulsion engines turn at idle speed (visual signal "**N**" lit);
2. **Ahead/astern:** in this position the gearbox is engaged to "ahead" or "astern" gear and the engines turn at idle speed (visual lights "**F**" or "**R**" lit);
3. **Maximum revs:** indicates the maximum speed detent for ahead and astern gear.

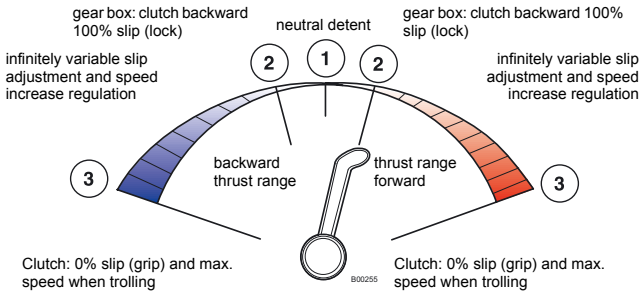
The system between the positions (**2**) and (**3**) changes the engine revolutions continuously.
The operation principle is different for the two modes: standard and trolling.

> ***CAUTION***
>
> *In "trolling" mode (optional) the function of the heads block changes with respect to the standard mode.*

Standard mode diagram



Trolling mode diagram (optional)



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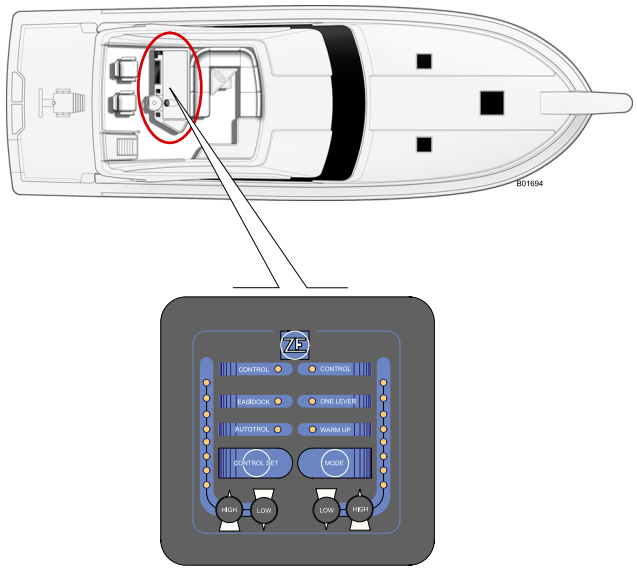
Taking control phases

- Set the control heads to the central idle position. The station cannot take over the control with heads in different positions. You hear the acoustic sequence of initialization.
- Press **CONTROL/SET**. The **CONTROL** LEDs light up green steadily, to indicate that the station has taken over the control and that the operator is engaging the idle control.

WARNING

The next shifting of the handle will engage the speed.

- Start the engine while you send the idle run control. If the levers of the handles block are not placed on idle run, the interlocking start switch will prevent the engines start.
- Shift the levers on the forward or backward retainer. The gearbox starts and the **CONTROL** LEDs light up steady red to indicate that the operator is engaging either the ahead or the astern gear. For further information, see the Manufacturer's Manual.



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Advanced control modes
SmarCommand provides different advanced control modes:

- **EASIDOCK:** mode giving the answer for a safe action of the gear box and ensuring a easy and accurate manoeuvrability during mooring phases with limited room.
- **AUTOTROLL:** mode keeping the propeller revs per minute constant when a complete range of shaft speed controls is available.
- **WARM UP:** heating mode increasing the engine rpm when the transmission is stalling on idle.
- **ONE LEVER**: one head mode allowing to activate several propellers with gear change and acceleration complete control by means of a single head.

High and low buttons allow you to control the shaft rotation (engine RPM) through the use of SmartCommand Trolling System.
In the Cruise Mode, the up and down push buttons allow to move to at least five percent of Trottle Command. By pressing the buttons (high or low), the command can be incremented or decremented up to twenty (20) percent.
The Autotroll Mode allows for slipping the clutches to go between 30 and 70 percent of idle speed. It allows fine-tune movement of the yacht by pressing the panel HIGH or LOW buttons.

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6.4 ENGINE ALARM DEVICES

The engine monitoring alarms alert the yacht operator that important engine operating values are outside the permitted tolerance range.
The engine operating parameters shown on the display are monitored. Gearbox parameters are to be monitored if the corresponding sensors have been fitted in it.
For a detailed description consult the specific manual.

NOTICES

To protect the engine, power is automatically reduced in case of certain main alarms.

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6.5 EMERGENCY CONTROL DEVICES

6.5.1 Engine stop control

Due to a mechanical or electric fault, the normal procedures of engines stop could not work; it is therefore necessary to stop the engines by means of stop button (**1**) located on the control panel of each engine.
During normal operation the emergency stop button must not be inserted.
When pressed it locks in low position and prevents the engine start.
To reset the system to normal operation, it is necessary to turn the button clockwise until it unlocks and returns to original position.

CAUTION

Before starting the engines after an emergency stop, make sure that you have found and cleared the faulty reason. For more information, consult the CATERPILLAR manual.

CAUTION

The emergency stop controls of propulsion engines must be used only in case of real emergency.
Do not activate this control during normal engines stop procedure.



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CAUTION

Persons entering the engine room when the yacht is navigating should be aware of the hazards of the yacht's motion and their potential exposure to high ambient temperatures, hot equipment components and operating machinery within the engine room.

CAUTION

To avoid heavy injuries or even death caused by hazards in the engine room, avoid the contact with hot and/or moving parts, while you are working in this area, wear proper safety clothing and also safety goggles and safety gloves. Be extremely cautious in proximity of hot and moving parts. Wear hearing protection if the engine is running.

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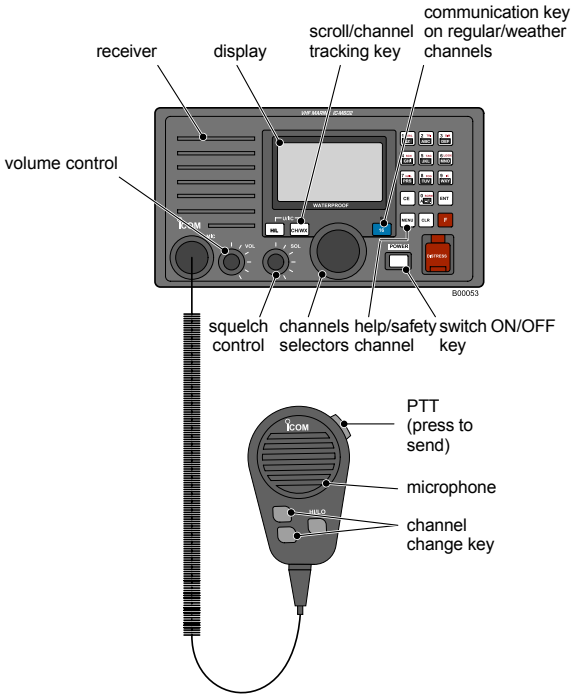
6.6 INSTRUMENTATION

6.6.1 VHF-DSC Radiotelephone

Operate the radiotelephone according to the following instructions:
- Power the device through the switch located on the 12 V users electric panel of flybridge.
- Push POWER switch to switch on and off the radiotelephone.
- Set the audio and squelch levels by means of knobs VOL and SQL.
- Select channels with knob CHANNEL.
- To transmit, use the microphone by holding key **PTT** pushed.

The handset display shows always the information concerning the channel selection, the operation mode and the output power.
The **HI/LO** key, allows to select the output power (high -25 W, low -1 W).
The **16-9** key, selects the help and safety channel; it is used to establish an initial contact with another station and for emergency calls.
This key also allows to memorize the call channels more frequently used in order to recall them quickly.
The **DISTRESS** key, if pressed for 5 seconds, transmits the rescue calls.
- **Urgency - "PAN-PAN, PAN-PAN, PAN-PAN"** (pronounced PAHNPAHN). Used when a person or vessel is in some jeopardy less than indicated by a Mayday call.

The **DSC/ENT** key selects the DSC menu for Digital Selective Calls.
For the activation of transceiver's particular functions, see the specific manual delivered by the Manufacturer.



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Manual distress call
- select the rescue channel by pressing key 16 (156.800 MHz) or on the SSB radio frequency 2182 KHz
- press PTT-transmission key on the handset
- transmit with a calm voice the following message, loud and clear:

MAYDAY - MAYDAY - MAYDAY
THIS IS (repeat the yacht name THREE TIMES)
MAYDAY THIS IS (repeat the yacht name)
AT POSITION (specify the position)
FAILURE (specify the distress causes)

- release the PTT-key
- wait for the reply for a few seconds; if you do not receive any reply, repeat the message at regular intervals, until receiving a reply.

For further information refer to the specific manual of use.

WARNING

The DSC (Digital Selective Calling) system is a protocol applied all over the world that uses channel 70 (156.525 MHz) to send and receive digital messages. The communications take place between VHF radios equipped with DSC system and are programmed for emergency calls, individual or collective. The users of VHF DSC radio can contact other ships equipped with DSC system, avoiding unnecessary radio traffic and improving the communications from ship to ship.

WARNING

For channel selection or special function instructions, please refer to the radiotelephone Manufacturer's manual.

CAUTION

The DSC-call should only be performed if the yacht is in a real distress situation. Otherwise, to send a DSC-call with no need is considered as an infringement.

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6.6.2 Radar display/Chartplotter/Fishfinder

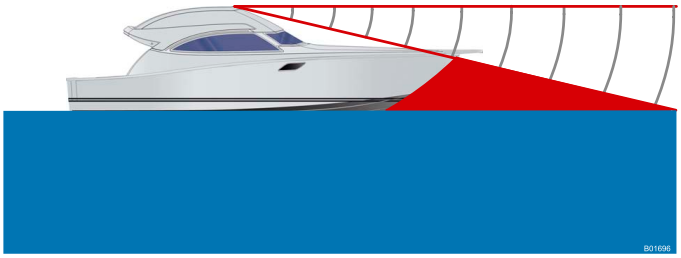
The display can show four different types of color screens.
Chartplotter, radar, sounder and video can be visualized inside of small windows or overlapped on the multifunctional display with a simple press of a key. By means of SPLIT key you can subdivide the screen or modify the selected windows.
You can select which and how many screens to use and what functions to combine on each display.
For a detailed description consult the specific manual.

DANGER

Radiation danger.
The radar antenna emits radiations, which can damage the human body, especially the eyes. When the radar is operating, never look straight at the transmission aerial from a distance shorter than 40 in.
During the radar operation it is necessary to keep out of the aerial transmission flow; therefore steer the yacht exclusively from the inner main control station. Switch off the radar if not expressly necessary to navigation.

WARNING

Pay the outmost attention during navigation, because in proximity of the R.I.B. a shadow cone is formed, which is not covered from the radar waves.



6.6.3 Radar display/Chartplotter/Fishfinder

This instrument offers all features of a radar, of a digital Fishfinder and of a Chartplotter. The new high speed network protocol allows to transfer radar, Chartplotter, Fishfinder on any point of hsb2 net, generating a multifunctional system.
The overlapping of the radar image and of the Chartplotter combined with data windows defined by the user, transform the device into a true and real integrated navigation system.
From whatever display you are able to access to all operations and controls of the various devices ensuring a safe navigation.
For a detailed description consult the specific manual.

CAUTION

The electronic chart is a help to navigation, meant to facilitate the use of official charts, but not to replace them. Only official nautical charts and warnings to sailors contain all necessary information for the safety during navigation, and as always, the Captain is responsible for their use.

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6.6.4 Autopilot

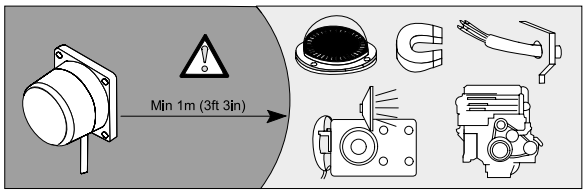
This device includes an LCD-screen for information display.
The keys indicating the intuitive menus are completed by simple basic graphic representation, making the instrument performance the best. It can be used as a single unit or as a second control unit.
It offers a variety of functions included in the system; the compass rate (mini gyro); the user control and reaction; the direct interface with a wind sensor.
The information lay-outs are easy accessible by means of a single pressure of the corresponding mode key.
The autopilot sensor is located in the bilge under the Master stateroom.
For a detailed description consult the specific manual.

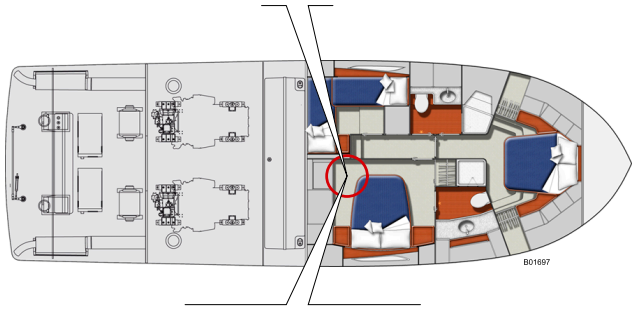
CAUTION

Never place electric and/or magnetic sources of any kind closer than 1 meter from the autopilot compass (particularly in presence of loudspeakers, transceivers, tool boxes, etc,) which could jeopardize the operation and reliability of the autopilot.

DANGER

The autopilot has been designed to offer the maximum accuracy and reliability. The autopilot's performance can be influenced by many factors. For this reason we recommend its use only as an help to navigation.
A careful and continuous monitoring has always to be kept also under the best navigation and sea conditions.









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CAUTION

If the yacht bow is facing a sudden obstacle, this can be avoided by turning with force the steering wheel. This operation allows to steer the yacht only if the steering wheel is held firmly. As soon as the steering wheel is released, the autopilot resumes immediately the yacht's track. If the obstacle is not too close, the best thing is to set the device in stand-by, so as to take over control of the yacht definitively. Once by-passed the obstacle the device can be switched on by setting the track again.

6.6.5 Multifunctional display

This multifunctional screen allows to select the information received from GPS, videoplotter, radar and depth sounder or from different sensors of water temperature, wind data, etc.
Five display modes are available, including speedometer, highway and text. The text mode gives up to four informations at the same time between the data available. The display layout can be customized according to requirements.
For a detailed description consult the specific manual.

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6.6.6 Engine control panel

This panel allows to monitor electronically the engine, it supplies the same engine and delivers the operating data.
The displays can be customized to visualize the engine parameters, using different formats and instrument types. Each type of engine requires a dedicated display up to a maximum of five.
The keys are multifunctional according to the displays visualized. The primary functions of the keys for measuring displays are:

1. Signal reception (recalls active diagnostics) and signals audible for all displays on DATA Link.
2. Visualization display:
   - Normal (black digits on white background) Day Mode;
   - Reverse (white digits on black background) Night Mode.
3. Next screen.
4. Previous screen.



Information on configuration system of the keys

At initial start, scroll through the visualizations up to “System Information”. This display allows to record following parameters: User Name, Unit Location, Unit Display and Yacht Speed Unit. A menu is shown in the upper right screen corner. Press (**1**) to visualize the keys functions (scroll through parameters selection, exit, shift the cursor upward, shift the cursor downward).
Use (**3**) or (**4**) to shift the cursor upward or downward for paragraph selection. The parameter name will appear on the upper right corner of the screen.

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Press (1) to scroll through selections:

- User Name;
- Unit Location;
- Unit Displays
  ENGLISH, METRIC;
- Vessel speed unit
  KNOTS, NM/H, KM/H.

The parameters selections will be outlined on the display in white digits on black background. When all correct parameters have been selected, press (**2**) to exit the configuration mode. Then press (**3**) or (**4**) to return to measuring displays.

Measuring displays

The measuring displays can be configured with three different types of measures. The measuring instruments Analogical, Graphic, Bars and Digital can be programmed according to the requirement of each customer for the available engine parameters. Refer to display manufacturer software for screen options.

Diagnostics

All engine diagnostics messages are supported by a visual indicator sending an acoustic signal. If the diagnostics codes are not actuated, no DIAGNOSTIC indicator will appear on measuring screens. When a fault is detected, the DIAGNOSTIC indicator appears on the upper left corner of the screen, as well as a window of diagnostics code description in the center of the screen and the acoustic signal activates. Press the signal reception button (**1**) to clear the alarm.

Press again the alarm reception key (**1**) to scroll to description window of diagnostics code or clear it.
The DIAGNOSTIC code indicator remains on the screen until the fault is removed.

Display modes

- Daily Mode - Normal display is on white background with digits and black meters. To increase or decrease the backlighting press and hold (**2**) to visualize the backlighting bar. Adjust the backlighting with arrows.

- Night Mode - Press (**2**) to shift the display on night mode, with black background and digits and red meters. To increase or decrease the backlighting press and hold (**2**) to visualize the backlighting bar. Adjust the backlighting with arrows. To increase or decrease the backlighting, with back light lit, press again (**2**) to visualize the backlighting bar. Adjust the backlighting with arrows. Press (**2**) to exit from backlighting bar. Press (**2**) to return to Day Mode.

Signal loss on display

The signal loss on the display is shown on a DIAGNOSTICS with description “no data link signal”.

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NOTES:

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NOTES:

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BERTRAM

7



ON DECK

FOREWORD

USE OF THE MANUAL

DESCRIPTION OF THE YACHT

NAVIGATION

AUXILIARY EQUIPMENT ON BOARD

CONTROL STATION

ON THE MAIN DECK

THRUST SYSTEMS

HYDRAULIC SYSTEMS

ELECTRIC SYSTEM

DETAILED INFORMATION ON THE INTERIORS

SAFETY DEVICES AND EQUIPMENT

YACHT HAULAGE AND LAY-UP PERIOD

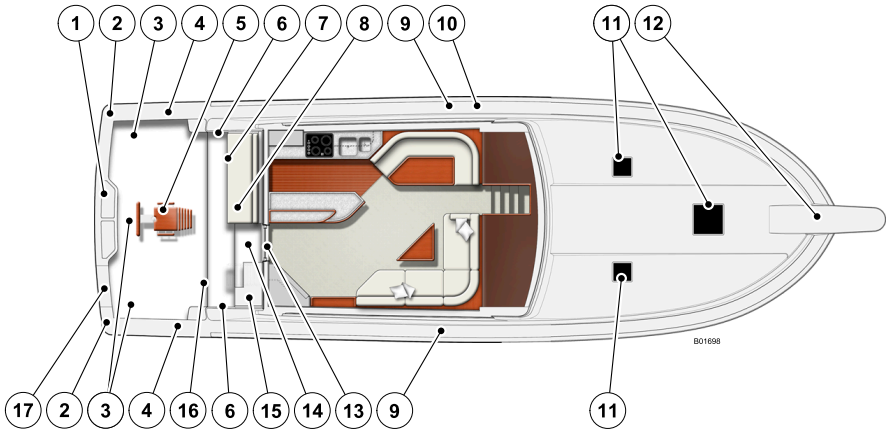
MAINTENANCE

TROUBLESHOOTING

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7.1 MAIN DECK - EXTERIOR

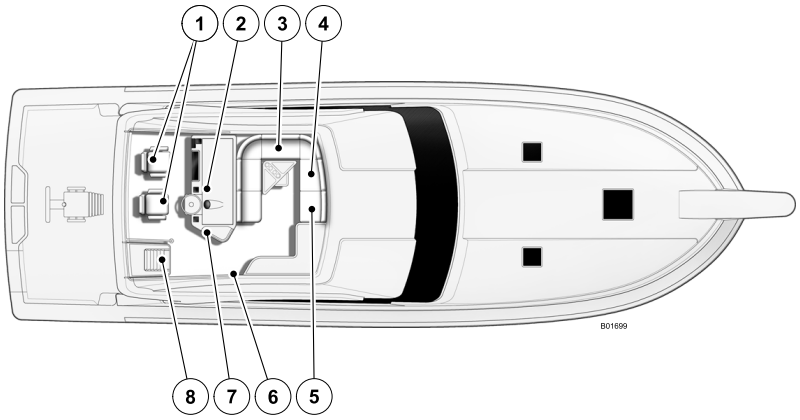
1. Transom fish box
2. Aft moorings, chocks and cleats
3. Removable containers for caught fish and access to helm gear compartment
4. Rods holder, boat hook and gaff storage under gunnel
5. Mounting plate for fighting chair or table
6. User peaks
   - shore electric power outlets
   - dockside water inlets
   - firefighting system controls
   - cockpit washdown faucets
   - switches
7. Fish boxes
8. Engineroom access door, with lockable access stair
9. Fuel fill fittings
10. WASTE black water drain fitting
11. Staterooms skylights
12. Anchor locker with washdown faucet
    - Anchor winch
13. Salon access door
14. Salon access steps
15. Baitwell
16. Flybridge access stair
17. Aft transom door and liftable gate



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7.2 FLYBRIDGE

1. Helm seat and first meat seat with pedestal
2. Control station
3. Sofa with peaks
4. Life raft location
5. Peak for optional fridge
6. Wash down pump valve
7. 24 V DC and 12 V DC electric panels location
8. Flybridge access stair



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WARNING

Never use alcohol or acetone to clean Plexiglas; this may cause the treated part to get cracks inside.

CAUTION

When the yacht is underway it is unadvisable to move, a listing of the yacht could affect a passenger's movement, causing his accidental fall or his impact against a piece of furniture.

WARNING

To prevent circumstances that could lead to property damage, injury or death from the improper use of the helm and its controls, the yacht's owner/operator must ensure that inexperienced or unauthorized persons are never permitted to be at the helm station.

7.2.1 Navigation lights

The yacht is delivered to you with a complete set of navigation lights. These lights fully comply with the requirements of the International Regulations for Preventing Collisions At Sea (72 COLREGS). All vessels may use the 72 COLREGS as the controlling document when in international waters. In U.S. navigable waters, reference must be made to the Great Lakes and Western River Rules.

The 72 COLREGS require that the navigation lights shall be switched on if your vessel is being operated between sunset and sunrise, or in times of reduced visibility. For this kind of yacht, the required navigation lights consists of a red (port) and green (starboard) sidelight, a white masthead light, and a white stern light; or if you are not docked or anchored in a recognized anchorage, a white masthead light.

WARNING

All of the navigation lights furnished with your vessel meet the current 72 COLREGS requirements. However, it is the legal responsibility of the vessel's owner to ensure that in the event of modifications to the vessel superstructure, the required areas of visibility for each of these lights are not obscured.

WARNING

Your transom door must be kept closed while underway at night to avoid obscuring the stern light. This door should remain closed at all times when underway to minimize the possibility of someone falling overboard.

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CAUTION

Before each navigation, check the light operation at regular intervals, to avoid any inconvenient when using them by night.

CAUTION

Replace the bulbs with the same visual fields.

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7.3 ANCHOR

The anchor locker is located at foredeck and is equipped with hatch. Inside of the locker is located the anchor with relevant chain and recovery line.
The anchor is located on proper saddles fastening it during navigation.
Before using the anchor, release the relevant stoppers.

CAUTION

Always maneuver the anchor with the utmost care, to avoid to damage the vessel and the people onboard.

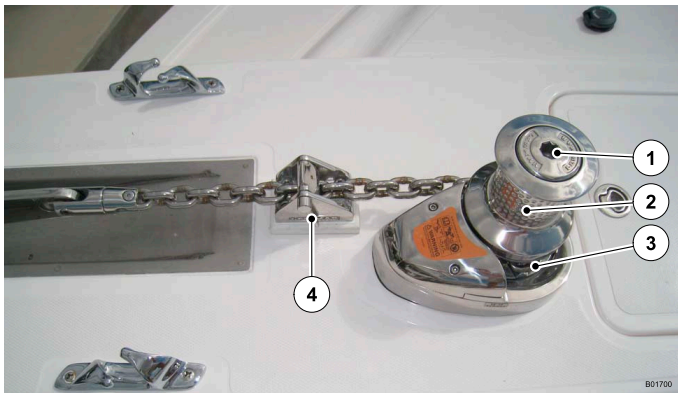
When you place back the anchor into its saddle, re-lock it with relevant stoppers.
The locker houses inside also a faucet for the anchor and relevant chain washdown.

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7.4 ANCHOR WINDLASS (available only with optional pulpit)

The on board anchor windlass allows to face each anchoring condition, even the most critical one with a certain margin of safety.
The anchor windlass is used to weigh and lower the anchor. It may also be used as warping windlass for pulling a line.
The chain to which the anchor is linked, glides inside of the yacht through the chain guide and reaches the anchor windlass, it then turns around the wildcat and glides into the chain pit. Each anchor windlass is equipped with a control to handle the chain in both directions and with manual brake to lock the chain position during the moorings.

1. **Lever connecting bushing**
   It allows the lever connection.
2. **Capstan**
   It allows to pull a line.
3. **Wildcat**
   It allows to retrieve and to deploy the anchor.
4. **Safety hook**
   It allows to lock the anchor chain.





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CAUTION

The anchoring area is a circle with the center at the anchoring point and a radius equal to the chain length plus the yacht length.
The entire anchoring area must be free, in case of sudden variations of wind and/or current direction, especially in case of night anchoring.
At night, before dropping the anchor, check that the white anchor light works.
Before dropping the anchor, check the nautical charts: anchoring is prohibited in certain areas; in algae-covered sea bottom, anchoring is unsafe and harmful to the environment; on rocky sea bottom, the anchor may get fouled or lost.
Anchor the yacht with the engines running, both for safety reasons and to compensate the electrical consumption of the winch.
Check the anchoring point frequently.
The distance from obstacles or from other yachts must be greater than the length of the chain lowered and the all round length of the yacht.
During anchor riding it is advisable to leave the winch powered.
Do not reverse the winch rotation suddenly.

CAUTION

The anchor chain is fastened to the yacht by means of a line and a hook system. If it is not possible to remove the anchor from the sea bed this system will make it possible to resume navigation.

Anchoring operation

- check that on the battery disconnector panel the engines batteries breaker is on;
- turn on the switchboard windlass breaker on 24 V flybridge user panel;
- before operating the windlass with the electric control, check that the wildcat clutch is properly engaged;
- let the yacht move backward slowly; if necessary, use the engines;
- lower the anchor until just below the waterline, and hold;
- lower the anchor until it reaches the sea bottom;
- once the anchor is engaged, leave the stopper and the brake on.

WARNING

Operate the anchor winch with the engines running, in order to provide the high current required and reduce the stress by slowly moving the vessel toward the anchor.

NOTICES

To use the anchor, remove the stopper from the chain. Attach the stopper to the chain when the anchor is set (if using a chain rode). Attach the stopper to the chain after the anchor is on deck.

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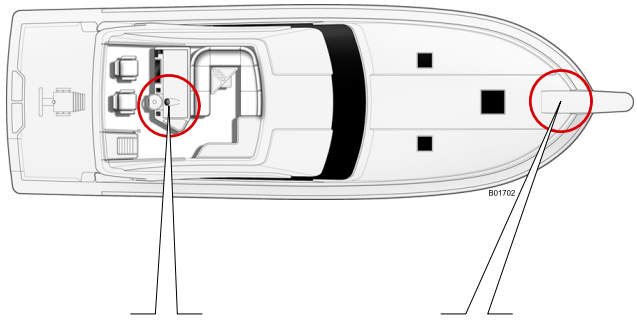
7.4.1 Anchor windlass activation controls

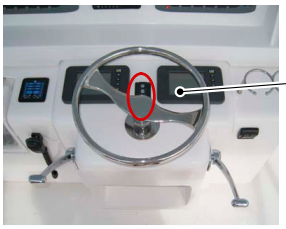
The anchor windlass is located at bow and can either be activated by the switch located on the helm station console or by the foot buttons.

1. **Anchor windlass control on flybridge**
   This button allows to operate the anchor windlass from the fly.
2. **Foot button "UP"**
   This button allows to retrieve the anchor chain.
3. **Foot button "DOWN"**
   This button allows to deploy the anchor chain.

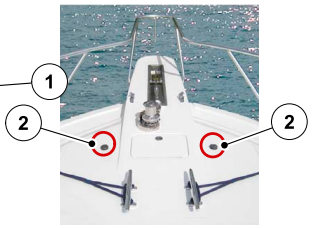
> ***CAUTION***
>
> *If you are to use the anchor, remove the wildcat lock and the safety cable.*

> ***CAUTION***
>
> *Do not approach your body or objects to gliding chains, to lines or wildcats. Make sure that the electric motor is not supplied when the anchor windlass is operated manually (even when the lever to release the clutch is moved), as persons in possession of the anchor windlass remote control may accidentally activate it.*





Helm station windlass



Foot buttons

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Use of the clutch
The wildcat is connected with the main shaft by means of the clutch.
The clutch releases (disengages) through the lever that, once inserted in the barrel, will have to turn counterclockwise. When rotating clockwise, the clutch will be applied (engaged).

Anchoring

The wind and the sea conditions have an impact on an anchored yacht. Make sure the anchor is firm in any situation. It is necessary to understand the principles of the chain length and its effect on the performance of the anchor.
The radius is technically defined as the ratio between the length of the chain and the vertical distance from the foredeck to the bottom of the sea. The chain length depends on the type of anchor, on the sea bottom, on the tides, on the wind and on the sea conditions.
The minimum chain length is 5 times the depth with calm sea; under normal conditions 7:1 and under critical conditions up to 10:1.

$$\text{Radius} = \frac{\text{Chain length}}{\text{Foredeck height + water depth}}$$

As it is necessary to know the length of the chain to be used for mooring.
Chain length =
(foredeck height + water depth) x radius

Anchor retrieval
Start the yacht engines. Make sure the clutch is engaged and pull the lever. Press the relative control button and start retrieving the anchor. If the anchor windlass stops without any reason, the anchor might be stuck and therefore the anchor windlass protections will activate, due to the effect of the effort.
In this case, if after several attempts the anchor windlass remains stuck, we suggest to maneuver the yacht, to refloat the anchor.
Check the raise of the last meters/feet in order to avoid bow damage.

Anchor deploying
Deploy the anchor by means of electric controls or manually. To carry out this operation manually, open the clutch and leave the wildcat free to rotate on its shaft.
Let the chain fall into the water. Turn the lever clockwise to slow down the anchor fall.
For the electric anchor deploying, press the relative control button. In this case the deploying is perfectly controllable and the unrolling of the chain or of the line is regular.
Once anchored, lock the chain with the proper cable.
The anchor and the chain may cause damages to the yacht hull if the anchor windlass is not operated carefully.
We suggest to carry out the operation by means of the remote control located near the anchor windlass; this will allow to check the lifting and lowering speed of the chain and the entry and exit of the anchor shaft into the anchor roller. Namely during these operations, an excessive gliding of the chain or a wrong entry or exit of the anchor shaft from the anchor roller may cause damages to the yacht foredeck.
Pay utmost attention: do not approach too much to the moving parts to avoid dangers and injuries to the people.

CAUTION

Lock the chain with proper wildcat locking before setting up navigation.

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CAUTION

Do not operate the anchor windlass electrically with the lever in the capstan housing or in the wildcat cover.

DANGER

Do not approach to moving parts to avoid dangers and injuries to people.

DANGER

Danger: when the winch is operating, be extremely cautious of rotating parts; keep your feet, hands and the remote control cable at safe distance.

NOTICES

Lock the chain with the stopper before cruising.

Deploy and retrieve the anchor always by using the electrical control, after engaging wildcat and capstan.
This latter can be disengaged, both for casting the anchor off in case of need and for operating the capstan as a warping windlass. This is simply performed by undoing the clutch located on the barrel, by means of the lever.

Anchor retrieving

To retrieve the anchor, perform the same operations previously described in reverse order.
In windy or strong current conditions, start the engines and keep the foredeck towards the anchor position to avoid the breakage of the hawse.
Once the anchor is retrieved, fasten the chain stopper before resuming navigation.

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7.5 WINDLASS CLEANING AND SERVICE

Item	Maintenance	Notes and precautions
Gearmotor	Check and cleaning (before any navigation) Check and topping up	Sailing the chain, after an anchor mooring in muddy or seaweed seabed, we suggest to wash the chain using the provided system. The outer part of the windlass demands frequent washes with fresh water because very much exposed to sea salt during navigation, especially with choppy sea. It is a good rule, before any season begin, to carry out service by disassembling the wildcat and the drum, to remove oxidation from the rubbing and gliding points and to restore correctly the lubrication grease in the points requiring it.

7.5.1 Gearmotor

Frequent rinsing of the windlass with freshwater from a hose will help prevent corrosion.

Routinely remove the layer of salt that forms on the outer surfaces of the windlass. Corrosion may occur that could jeopardize its operation or safety. Wash with fresh water and flush all the surfaces clean, taking special care to remove salt trapped in inaccessible areas.

NOTICES

Before carrying out any maintenance operation on the anchor windlass, turn off the electric power connected to it and carefully remove the chain from the wildcat. The accidental application of power to the windlass could injure the person servicing the equipment. Secure the chain with the chain stopper and remove the chain from the wildcat.

Routinely disassemble the exposed parts of the windlass, clean and check all parts, removing any corrosion. Grease the threads of the shaft with salt-resistant grease. If the windlass has not been used for a period of time, turn the motor slowly for several minutes in both directions. If the motor turns with difficulty, clean or replace the motor brushes.
Routinely lift the windlass from the deck to remove salt deposits that form at the base.

If oil leaks from the windlass, it will be necessary to disassemble the gear to replace the seals. A complete kit of spare parts is available from the windlass manufacturer.

Periodically check the condition of the electric motor terminals and the control box. Remove any corrosion and coat terminals with corrosion inhibitor.

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BERTRAM

8



PROPULSION SYSTEMS

FOREWORD

USE OF THE MANUAL

DESCRIPTION OF THE YACHT

NAVIGATION

AUXILIARY EQUIPMENT ON BOARD

CONTROL STATION

ON THE MAIN DECK

THRUST SYSTEMS

HYDRAULIC SYSTEMS

ELECTRIC SYSTEM

DETAILED INFORMATION ON THE INTERIORS

SAFETY DEVICES AND EQUIPMENT

YACHT HAULAGE AND LAY-UP PERIOD

MAINTENANCE

TROUBLESHOOTING

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8.1 ENGINE ROOM ACCESS

The access to the engineroom is possible through a hatchway located in the aft cockpit, next to the salon access door.

DANGER

You are not allowed to enter the engineroom when underway.

The engineroom, accessible through a ladder, is illuminated by several fixed overhead lights supplied by switch (**1**) located at engineroom entry. If you have to carry out extra maintenance to the engines, it is possible to gain access to the engineroom also from the salon, by lifting the dunnages of the salon floor.

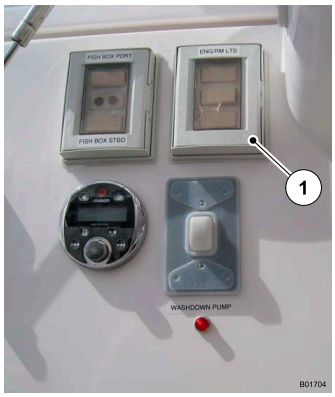
DANGER

In the engineroom, thermal engines create highly radiated areas which keep temperature high for a long time. Protect yourself and wait until they are cool before entering the engineroom.

WARNING

The maintenance and adjustment operations have to be carried out only by expert and authorized personnel equipped with proper tools. BERTRAM declines all responsibility for proposed corrective action carried out by unskilled personnel not properly equipped.





CAUTION

Do not stow in the engineroom any material that can freely move due to the navigation lists.

WARNING

The engines maintenance is a special operation that has to be carried out by specialized personnel. Contact BERTRAM Customer Support to receive suitable help.

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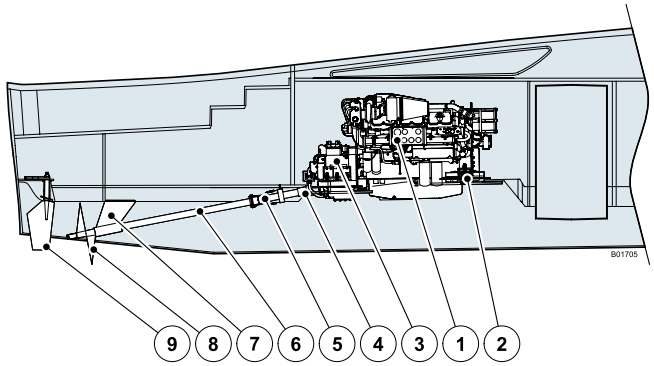
8.2 PROPULSION SYSTEMS

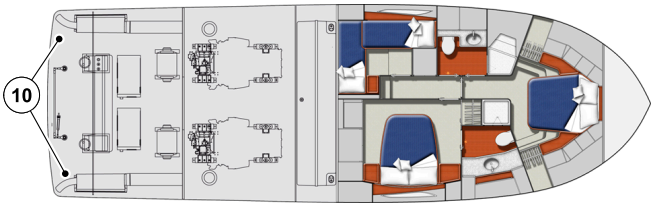
The propulsion system consists of two equal units. Each one includes the following:

1. CATERPILLAR engine, model C32
2. Flexible struts for engine
3. ZF2555A gearbox
4. Flange coupling
5. Shaft seal
6. Propeller shaft in stainless steel “Aquamet” 17; diameter 3 in/3.00 in; length 140.75 in/145.75 in
7. Propeller shaft support with neoprene bearing
8. Propeller
9. Rudder
10. Trim tabs

DANGER

It is absolutely forbidden to perform reverse run with one of the two engines stopped. This operation is allowed only in case of life danger for the persons on board and for the safety of the yacht itself, however when the engine is running it should not run higher than 1000 rpm.





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8.3 ENGINES

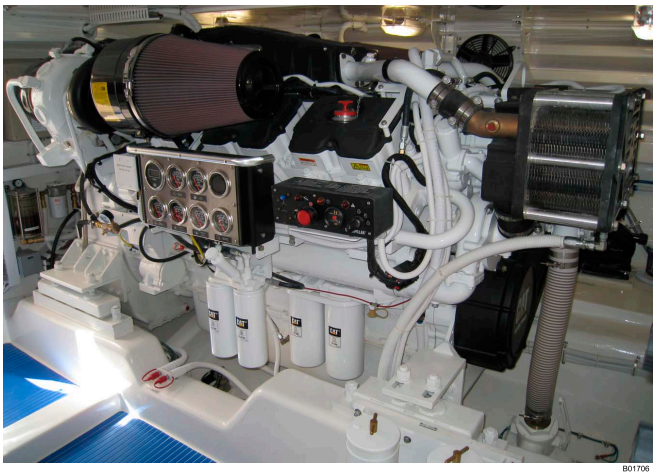
They have the following specifications:

– Model		C32
– Make		CATERPILLAR
– Cylinders No.		12
– V-pattern		90°
– Effective output	kW/mhp	1232/1676
– Max fuel consumption per engine	US gal/h (l/h)	86.4 (327)
– Rated speed	rev/min	2300
– Dry weight	lb (kg)	5617 (2548)

For any problem concerning the use or the maintenance of the engines, refer to devices manuals or directly to the CATERPILLAR Customer Service.

CAUTION

We suggest you to read the CATERPILLAR instruction manual carefully and in detail.

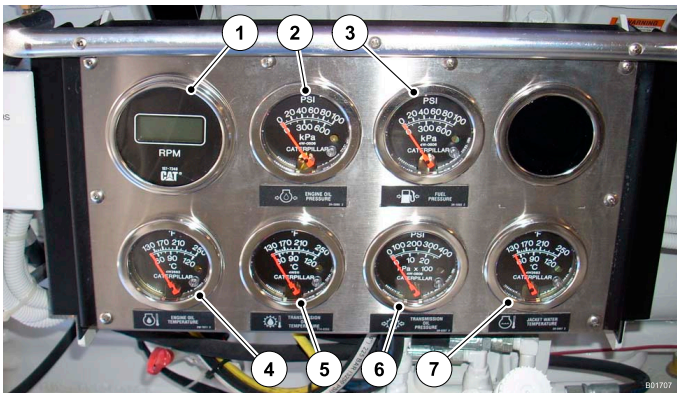


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8.4 ENGINE CONTROL PANEL

The engine control panel is located in the engineroom at each engine side.



Monitoring system

The monitoring system check following parameters:

- coolant temperature
- coolant level (if installed)
- oil pressure
- oil temperature
- high air pressure overfeeding temperature (if installed)
- fuel pressure
- fuel temperature

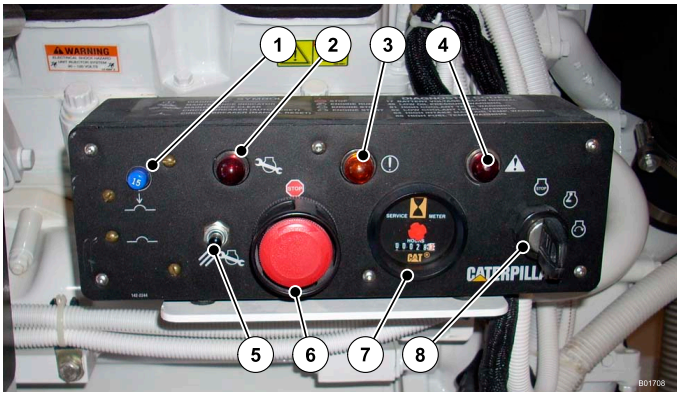
Engine monitoring panel

1. Engine rpm digital gauge
2. Engine oil pressure gauge
3. Fuel pressure gauge
4. Engine oil temperature gauge
5. Gearbox oil temperature gauge
6. Gearbox oil pressure gauge
7. Engine coolant temperature gauge

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Control panel

1. **Circuit switch reset**
   Three resets for the circuit switch are available on the control panel: two automatic resets (15 A) and a manual one (15 A). Check for complete lack of electric power supply of the engine.
2. **Maintenance LED**
   This LED blinks when programmed maintenance has to be carried out.
3. **Diagnostics LED**
   This LED blinks when a diagnostic code has been generated by the ECM. The active diagnostic code will blink.
4. **Signal lamp**
   This LED blinks because of critical situation, for instance oil pressure insufficient or temperature of coolant is too high.
5. **Maintenance clearing button**
   When the engine has been serviced, press this button to switch off the maintenance lamp.
6. **Emergency stop button**
   The OUT position is for normal engine operation. Press this button to stop the engine for an emergency. The start button does not actuate the circuit breaker of the starter while the emergency button is pressed. Reset this button before starting the engine. Turn the button clockwise to release it and allow the start.
7. **Hours counter**
   The hours counter checks the engine service hours. It actuates only with running engine.
8. **Starter switch**
   The starter switch has three detents: OFF, RUN & START. When turning the switch clockwise to RUN, the LEDs flash for five seconds during the system test, then switch off. In RUN position, the ECM and the electronic systems are powered.
   When you turn the switch to START, the circuit breaker of the starter actuates. The electric starter switches on. The starter carries on turning while the starter switch stays in START position. The starter switch is spring loaded, so as to return to RUN when the switch is released. The engine can be shut off by positioning the starter switch to OFF. This kind of disconnection cuts off the power to the ECM.



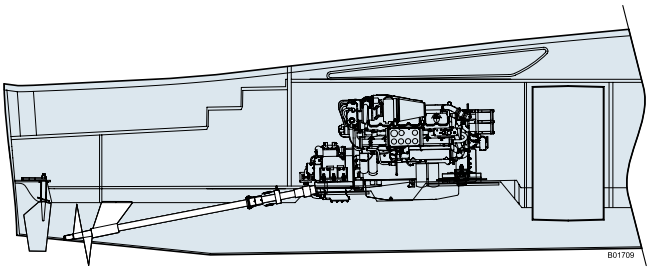
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8.5 PROPELLERS

The propellers have been designed in order to result lightly “unloaded” with new yacht, hull clean and without displacement overloads: in this way the engines will develop all their power in average normal operating conditions, with hulls and propellers not perfectly clean and some overloads on board.
Periodically check (at least once every six months) that the propellers are not too “dirty”, as this leads to a fast performance decrease and to a vibration increase.

CAUTION

Dirty propellers can lead to cavitation.
The propellers check must be carried out according to the yacht stationary waters.



In case of impact with the depth or submerged/semi-submerged bodies, check propellers and shafts immediately; in case of considerable vibrations, reduce the revolutions to the minimum and steer toward the harbor for repair, as a vibration increase might damage the propelling devices and the yacht structure.
If items such as a fishing tower, tender, davit, or anything else that changes the displacement or trim of the vessel are added to your boat, it may be necessary to adjust the propeller specifications. Bertram Yacht is not responsible for any changes that may become necessary. Please contact a propeller specialist for recommendations based on the modifications that were made. Keep in mind that anything that adds weight to your boat, or affects its aerodynamics or hydrodynamics, will affect its performance.
See **Maintenance** in this chapter.

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WARNING

An increase in vibration that develops while the engines are in gear could damage the propulsion system and the yacht structure. To reduce the chance of damage, decrease the engine rpm to the slowest speed that allows drive control and proceed slowly to the nearest harbor for repair.
If the vibration is very severe, you may have to stop the yacht as soon as possible, anchor, and call for professional assistance.

CAUTION

BERTRAM yachts are designed to obtain a correct transversal trim with full-optional equipment, and with spare propellers and shafts.
If the yacht is not equipped with full optional, spare propellers and shafts, some weights might have been installed to correct the transversal trim.
The above mentioned weights can be removed or shifted as soon as the yacht is provided with a new equipment.

CAUTION

To reduce the risk of serious injury or death, do not enter the water from your vessel, or board your vessel from the water, while the engines are running.

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8.5.1 Propellers service

Item	Maintenance	Notes and precautions
Propellers	Periodical checks	The propellers check must be carried out according to the stationary waters. Checking and eventual cleaning may be carried out with the yacht in a dry shore or with the help of a diver. Check that the propeller paddles do not show notches or breaks, scales or barnacles, which may have a negative influence on the yacht output while sailing. If you find traces of corrosion you must check the condition of the anodes and, for heavy irregularities, replace the propeller.
	Assembly/disassembly	The propellers, the starboard and port one, are not interchangeable between them and with others, as they have been projected according to specific features of Your yacht. Replace only with genuine spare parts supplied by BERTRAM Customer Support.

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8.5.2 Periodic checks on propellers

DANGER

To clean and check the yacht in water: disable the engine and generator start.

It is advisable to carry out this operation with yacht in a dry shore because maintenance is in this way eased. Check that the propeller paddles do not show notches or breaks, scales or barnacles, which may have a negative influence on the yacht output while sailing. If you find traces of corrosion, you must check the condition of the anodes and with heavy irregularities replace the propeller.

CAUTION

Ensure that the engines cannot be started before you carry out any propeller or shaft cleaning or checks with the yacht in the water. Remove the keys from the ignition. If an engine is started when a diver is underwater, serious injury or death could result.

NOTICES

Propellers are not interchangeable with each other. Each yacht model has its own propellers. Check to ensure that replacement propellers meet the specifications of your yacht. Do not replace the propellers of your yacht with others of unknown or doubtful origin. Contact the BERTRAM Customer Support for more details.

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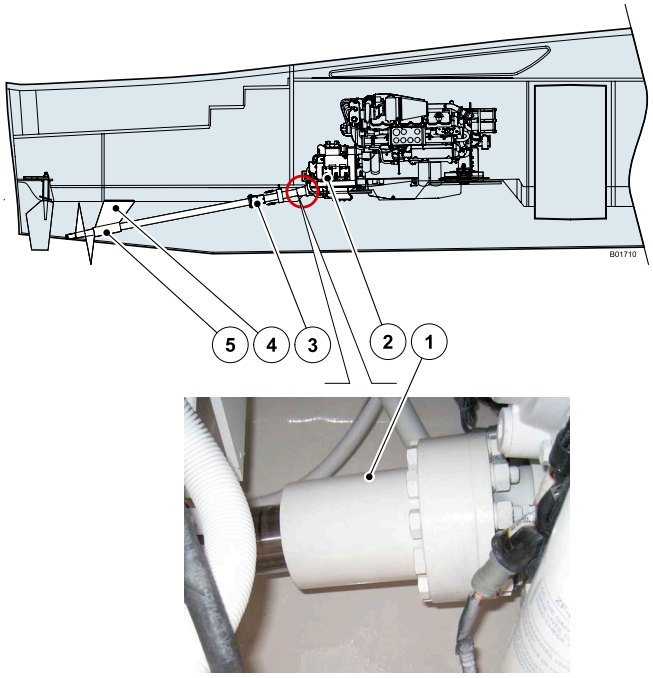
8.6 PROPELLER SHAFT, STUFFING BOX CASE AND SHAFT SUPPORT

The propeller shaft is fastened to the gearbox by means of a flange coupling (**1**) and is aligned on the three points represented by the gearbox (**2**), a water-lubricated propeller shaft seal (**3**) and a shaft support (**4**). The propeller shaft seal includes a fixed piece fastened to the hull and a movable piece, which is adjustable. This latter is pushed against the fixed piece, so as to compress the seal inside of the case. It is very important that the seal is compressed evenly, because if it doesn't, irregular pressure may occur on the seat housing and this could impair the life and performance of the seal. The outer shaft support includes a neoprene bushing (**5**), which uses the seawater as a lubricant. Check it every season, as it might get worn quickly during navigation, especially in sandy waters. The bushing wear causes a vibration increase. When the yacht is on a sandbank, a good technician can easily evaluate, by moving the shaft, if the wear demands the replacement of the bushing.

CAUTION

Remember to check the shaft seal clamps after a period of inactivity of the yacht before turning the shafts again, otherwise you might damage them.

1. Flange coupling
2. Gearbox
3. Shaft seal
4. Shaft support
5. Neoprene bushing



Propeller shaft seal

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8.6.1 Shafts line, stuffing box seal and shafts supports bushings maintenance

Item	Maintenance	Notes and precautions
Shaft lines	Periodical checks Assembly/disassembly	It is essential to keep the propellers shafts always clean; the formation of barnacles or the presence of cloths or plastic bags lead to propulsion power reduction, to propellers cavitation with consequent surface damage, and to vibrations causing damages to the staffing box seals and to the bushings of the shaft supports. Checking and eventual cleaning may be carried out with the yacht in a dry shore or with the help of a diver.
Bushings of shaft supports	Checks & maintenance Shaft support bearing replacement	The Neoprene bushing of the shaft support, when sailing in waters with sandy suspensions, may wear rapidly. The bushing wear causes a vibration increase. With the yacht in a dry shore a good technician can evaluate easily, by moving the shaft, if the wear is so bad to require the bushing replacement.
Propeller shaft seal	Checks & maintenance	The shaft seals prevent water from leaking around the shaft and into the boat. The seals installed in your BERTRAM are of the dripless type and do not require adjustment as in a traditional stuffing box. Special nitrile lip seals endure a watertight fit around the shaft. A constant supply of water is necessary for cooling and lubricating the shaft and seal. This water supply is provided by hose connections from the seals to the engine heat exchanger discharge. Water must be supplied to the seals anytime the shafts are rotating. A lack of cooling water may cause distortion of the seal resulting in leakage around the shaft.

NOTICES

Proper alignment of the shaft is very important for the life of the seals.

WARNING

The seal should never operate without cooling water, so as not to impair its lifetime.

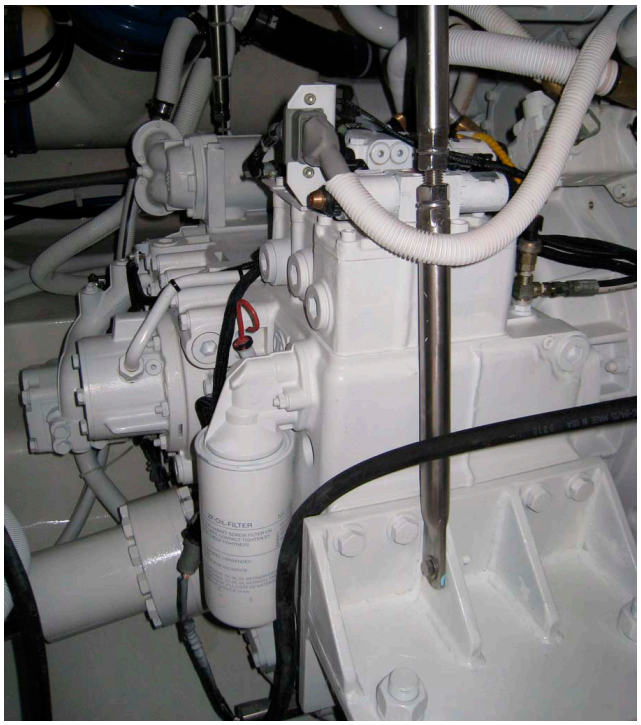
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8.7 GEARBOX (TRANSMISSION)

The main functions of a marine gearbox are the following:

- couple the engine with the propeller shaft and reduce the number of the propeller revolutions;
- to reverse the propeller direction;
- stop the propeller shaft motion (idle).

Read the gearbox operating instruction manual carefully and in detail.



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8.7.1 Gearbox service

Item	Maintenance	Notes and precautions
Gearbox	Oil level check	For correct procedures about maintenance and check, refer to the manual provided by the Manufacturer.
	Oil change	Refer to gearbox plate, to determine the oil type and viscosity grade recommended by the manufacturer.
	Suction filter check	Remove the suction filter cap uphill the sump, positioned near the gearbox connection/ propeller shaft area. Remove filter and gasket. Carry out check according to the time intervals suggested by the manufacturer.
	Oil filter replacement	Have the expected maintenance carried out at correct time intervals and by authorized and qualified personnel only, to keep the gearboxes perfectly efficient.

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8.7.2 Gearbox check

Oil level check
Carry out oil level check after the engine has stopped.
The right oil level is set between upper and lower notch of dipstick.
After first filling or repair or oil filter cleaning, run the gearbox for the time suggested by the Manufacturer.
Later on you have to carry out the oil level check again after the engine has stopped.

CAUTION

Before checking the oil level, check that the oil temperature of the gearbox is as per normal operation specifications.

ENVIRONMENT

Recover waste oil, according to the laws in force relevant to special waste disposal.

DANGER

Service the gearbox only if engine and propeller are stopped and the circuit breaker switch is OFF. Before starting the gearbox, carry out the filling and the consequent check of the oil level. The use of the gearbox with a low quantity of oil, may damage the gears. An excess of oil might cause leaks to the seals and to the vent and increase remarkably the operation temperature.

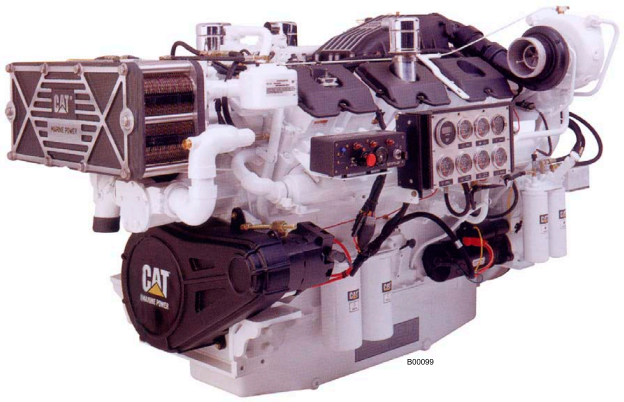
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8.8 FUEL AND LUBRICATION SYSTEMS

Among the many routine maintenance tasks required for the engines, the following are the most common.

- Replace the elements of the water/fuel separator prefilters and filters.
- Checking the oil level in the engines and generator.
- Replace the filters of the engine condensate separators.

See the engine instruction manual.



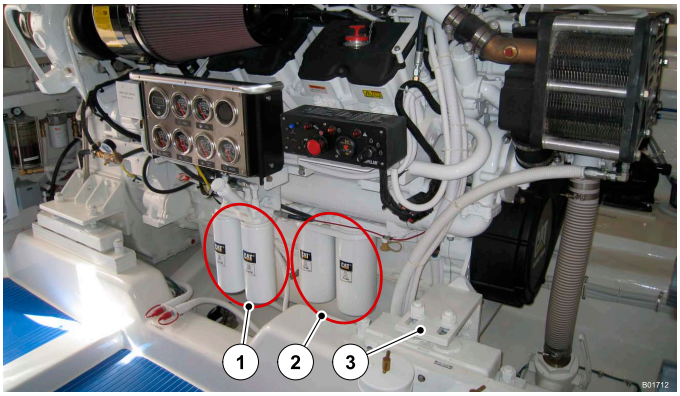
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NOTICES

The engine data cards are very important when repairs are necessary. Keep them together and store them with your warranty in a secure, readily available location.

NOTICES

Read the engine operating instruction manual carefully.



1. Fuel twin filters
2. Oil twin filters
3. Flexible strut

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8.9 PROPULSION ENGINES MAINTENANCE

Item	Maintenance	Notes and precautions
Alternator	Check	Check that alternator and battery charger work correctly. If the batteries are charged correctly, the ammeter value must be very close to the 0. All batteries must be kept charged.
Alternator belt	Inspection Adjustment Replacement	To optimize the engine performance, check if the belt is worn out or cracked. Check the belt tension. Adjust the tension of the belt to reduce slipping. A possible slipping shortens the belt life. Read carefully the service manual supplied by the manufacturer.
Cooling liquid	Draining Washdown Filling Check Addition Additional additive (SCA)	Clean the cooling system and wash it before the service interval recommended. Stop the engine and let it cool down. Unlock the filling plug slowly to release the pressure, then remove it. Open the drain valve (if installed). If the cooling system is not equipped with this valve, remove the drain plugs and drain the coolant. Fill the cooling system with long life coolant (ELC). For further details about cooling system specifications, see the instruction manual. Unlock the plug of recovery tank slowly to release the pressure, then remove it. Pour the long life coolant (ELC) into the proper recovery tank up to flush reference “COLD FULL”. DO NOT fill the tank beyond above mentioned level. Clean the recovery tank plug and fit it. Start the engine. Check for leaks in the cooling system and if the operating temperature is correct.
Coolant temperature controller	Replacement	Replace the water temperature controller before it fails. This is a suggested preventive maintenance practice. The controller replacement avoids possible unforeseen down-times. A water temperature controller that fails into partial open position, can cause overheating or excessive cooling of the engine.

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Item	Maintenance	Notes and precautions
Engine air filter	Cleaning/Replacement	Remove the vacuum limiter and the air filter element. Cover the orifice of the air inlet with a clean rag, or seal it with some tape to avoid the penetration of dirt and dust into the engine. Tap slightly the element to remove the dirt particles. Clean the element with a brush with soft bristles. Spray a cleaning solution on the element. Let the element rest. Rinse the element with water at low pressure.
Paper air filter	Check	Check that the element is clean and dry. Use a 60 Watt blue light into a darkroom or similar. Position the blue light inside of the element and turn it. Check if the element shows breaks and/or holes. Check if light rays penetrate through the filter paper.
Engine air filter indicator	Check Indicator test	The engines are equipped with differential pressure meter of inlet air. This indicates the pressure difference measured before and after the air filter element. As the air filter element gets dirty easily, the pressure difference increases. If the engine is equipped with a different indicator, keep to the manufacturer suggestions for its maintenance.
Engine crankcase vent	Cleaning	For further information, see the Manufacturer's Manual.

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Item	Maintenance	Notes and precautions
Paper air filter	Replacement Cleaning Pressurized water Pressurized air Vacuum cleaning Washing with nonsuding detergent Dry the paper filter	Remove the cover. Remove the element. Cover the orifice of the air inlet with a clean rag, or seal it with some tape to avoid the penetration of dirt and dust into the engine. Clean the inside of the cover and of the air filter housing with a clean and dry rag. Clean the element and check it. Replace it as needed. Remove the seal of the air inlet. Assemble a new or clean element. An element can be reused if it has been properly cleaned and checked. After the cleaning, check for the presence of breaks or tears in the filter material. The replacement must be carried out independently from the cleanings already performed. The pressurized air can be used to clean the elements that have not been cleaned more than twice. Pressurized air does not remove carbon and oil build-ups. Vacuum cleaning is a good method for paper air filters cleaning, requiring a daily cleaning because of the dry and dusty environment they work into. Before vacuum cleaning, we recommend to carry out the cleaning with pressurized air. Pressurized air does not remove carbon and oil build-ups. The washdown with nonsuding detergent is effective for the cleaning of carbon and oil build-ups. Use a specific product to clean this kind of element. Before washdown with nonsuding detergent, we recommend cleaning with pressurized water, pressurized air or under vacuum.
Engine oil level	Check Draining	Keep oil level between references “ADD” (Y) and “FULL” (X) on level gauge. Do not fill the crankcase beyond “FULL” (X) reference. Remove oil-filling plug and top up if necessary. Clean the plug and install it. Stop the engine after running at normal operating temperature to drain the oil from the crankcase. Turn the knob of the drain valve counterclockwise and start the hand pump (the same used to drain oil from the gearbox). Once the draining is completed, turn the knob clockwise to close the valve.

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Item	Maintenance	Notes and precautions
Oil filter	Replacement	Remove the oil filter case with proper wrench. Open the oil filter with a proper cutter. Separate the fins and check for the presence of metal slags in the filter. An excessive quantity of slags inside oil filter may lead to premature wear of the filter or to a failure. Clean the seal surface of the filter mounting seat. Make sure to remove the old seal completely. Apply clean oil to new seal. Fit the oil filter and tighten until the seal comes in contact with the seat. Tighten the filter by hand according to the instruction on the same. Do not overtighten the oil filter.
Fuel filter	Replacement	Remove old fuel filter. Clean the sealing surface of the seal at fuel filter seat. Make sure that all old seals have been removed. Apply clean fuel to new seal. Fit the new fuel filter. Turn the oil filter on its seat until the seal comes in contact with the seat. Refer to rotation scales on the filters as a reference for a correct tightening. Tighten the filter further 3/4 of turn by hand. Do not overtighten.

For further information, see the Manufacturer's Manual.

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WARNING

When the cooling system is clean, use only clean water for flushing, when draining, or replacing the coolant.

WARNING

Once the liquid has been drained from the cooling system, check the water pump and water temperature controller. This is a good chance, if necessary, to replace the water pump, the water temperature controller and the hoses.

ENVIRONMENT NOTICE

Dispose of engine cooling liquid according to environment regulation or recycle it. Different measures have been suggested for the recovery of the old cooling liquid and the recycling of the same: the procedure of complete distillation is the only method accepted by Manufacturer. For more information about disposal and recycle of old cooling liquid, refer to your authorized dealer or to Manufacturer Engineering Service.

CAUTION

Collect the coolant and dispose of it according to regulations in force.

CAUTION

Pressurized system: coolant is hot and could generate serious burns. To open the filling plug of cooling system, stop the engine first and wait until system components have cooled down. Unlock the plug slowly to release the pressure.

CAUTION

Dot not exceed the suggested percentage of additive in the coolant. A thick mixture may originate deposits on the cooling system surfaces under higher temperature, and decrease the warmth exchange feature of the engine. A reduced heat exchange may cause possible cracks on the cylinder head or on other components under high temperature. If the additive is too dense the radiator tubes could get clogged and the seal of the water pump could overheat or prematurely wear.

WARNING

During normal engine operation the coolant expands when heated. The additional volume will be forced into the tank during engine operation. When the engine is shut down and cooled, the coolant flows-back to the engine.

CAUTION

Check the cooling system only with engine shut down and cool.

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WARNING

If the temperature controllers are not replaced regularly, the engines can experience serious damage. Do not start the engines if the temperature controllers are not installed. If a temperature controller is not fit correctly, the engine can overheat, damaging the cylinder heads. Make sure that the new temperature controller is fit into original position. For replacement procedure of temperature controller, refer to service manual or address to your dealer.

WARNING

If only the temperature controllers are replaced, drain the coolant from the system until the level of the liquid drained is below the controller housing. Once the controllers have been installed, fill the engine with coolant up to proper level. Make sure to fill with proper coolant. Keep coolant to proper concentration.

WARNING

The engine should not run without air filter. Do not run the engine if the air filter is damaged. Do not use elements with fins, gaskets or seals damaged. Dirt penetrating inside of the engine may cause premature wear or damage the components. The filter elements prevent the penetration of air particles through the air inlet.

WARNING

Do not service air filter when engine is running: dirt may penetrate inside of engine.

WARNING

Do not use transmission liquid, engine oil, diesel fuel or other lubes to lubricate the air filter element. If improper lubricant is used, the element could not operate correctly. Do not start the engine if the air filter element is dry. Without oil the filter element could fail.

WARNING

Do not use compressed air, open flames or warm air to clean the air filter element. Excessive heat restricts the cotton fiber and compressed air can pierce the material. Let the element dry to the air.

WARNING

Do not use gasoline, steam or lye-based dissolvers, detergents or solvents for the cleaning. Do not use compressed water or air to clean the air filter element. Anyone of these liquids or methods could damage the element.

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WARNING

If the engine is started when the oil level exceeds the reference "FULL", this can cause the immersion of the drive shaft in the oil. The air bubbles generated reduce the oil lubrication features and cause consequently a loss of power.

WARNING

At each engine oil change, replace the oil filter too.

WARNING

The oil filters are produced according to manufacturer's requirements. The use of a filter not recommended by manufacturer could damage the engine seriously as well as its bearings and drive shaft etc. This is because particles of slag penetrate inside of the engine lubrication system. Use oil filters exclusively recommended by the manufacturer.

CAUTION

The fuel spilled on hot surfaces or electric components may cause a fire. To avoid possible injuries, disconnect the starter switch when fuel filters or water/fuel separator elements are replaced. Clean fuel leaks immediately.

WARNING

No dirt should penetrate into the fuel system. Clean the area around the component of the fuel system to be disassembled, accurately. Cover all disassembled components of the fuel system properly.

WARNING

Collect the fuel spilled into a suitable container. Clean fuel leaks immediately.

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8.10 FUEL SYSTEM

Fuel quality

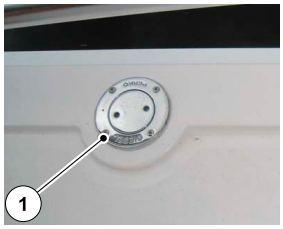
Quality of fuel is crucial for efficient performance of the engines installed on your BERTRAM 540 yacht. Purchase fuel only from reliable high-volume filling stations. This will help ensure the quality of the fuel itself, as well as the probability that the fuel has not been stored for a long period inside the shore tank.
For fuels suitable to supply CATERPILLAR engines, read the CATERPILLAR manual.
If none the above types of fuel specified is available in some countries, follow the rules suggested in the engines manual.

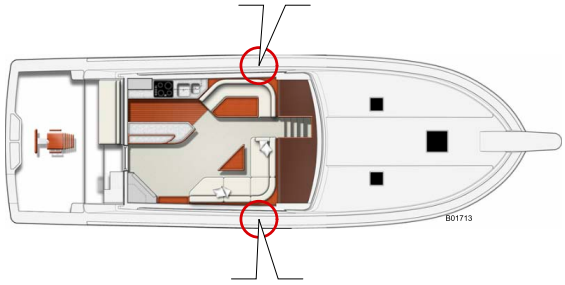
WARNING

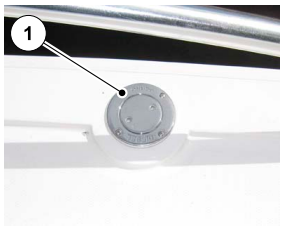
Stop all engines when refueling.

1. Refueling fill fitting

Port fill fitting







Starboard fill fitting

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8.10.1 Fuel tank filling

The fuel tank is filled by means of two fill fittings positioned along the lateral corridors of the yacht, they are equipped with vent and flame-trap screen.

WARNING

If fuel containing water is drawn by the engines, the injection system may get damaged. To avoid this, drain water from the fuel tank and service the fuel filter/water separators regularly. Do not use additives to improve fuel flow properties in winter.

During inlet, the fuel flow produces a lot of foam; if it comes out, you might think the tank is full. To be sure the tank is filled completely; wait for the foam to dissipate before adding more fuel.

NOTICES

First place the filling nozzle as deep as possible into the filling pipe through the rubber of the anti-splash sleeve of the flow switch. Use the nozzle to fill the tank.

CAUTION

When refueling open both fill fittings of the yacht.

In the aft cockpit starboard, inside of a proper peak is installed a buzzer indicating when the fuel tank is full. The buzzer actuates only if the switch placed aside of the same is set to “ON”.
To clear the buzzer, set the switch to “OFF”.

ENVIRONMENT NOTICE

Fuel is harmful to the environment. Prevent spillage by observing proper refueling procedures. As a precaution, always keep oil-absorbent materials within reach when fueling the yacht. Dispose of oily materials as toxic waste.

An analog gauge on the console of helm station shows the fuel tank level. This control is connected to an electronic fuel level sending unit inside the tank.

The other level is visible by means of a visual check, installed directly on the tank and can be activated by a ball valve. Check it from time to time to determine the real fuel level inside the tank. Unless the valve is operated each time the level is checked, the level indicated refers to the last check.

CAUTION

Stop all engines when refueling.

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8.10.2 Fuel System

The fuel system allows for the supply to both the propellers' engines and to the generators. It consists of following:
from refueling fill fittings, located along the lateral passageways, the fuel falls into the tank and, by means of cut-off valves on the suction, is sent to the engines and generator.
The engine and generator fuel suctions can be remotely cut-off by means of some levers (to actuate only in emergency case), located at foredeck in the engineroom, close to the fuel tank.
Fuel is sucked directly from the tank and delivered to the manifold supplying the engines and the generator.
The fuel before reaching the users, is led through the water/fuel separator filters, to hold impurities and to separate possible water.



The fuel once flown through the separator pre-filters is still dirty, for this reason the engine is equipped with water separators, able to hold the remaining particles of dirt.
When using fuel containing water, serious damages can impair the injection system.



WARNING

The bilge of the engineroom must always be clean, in this way fuel leaks or bleedings or oil leaks from engines or generator, can easily be noticed. If this happens, stop the engines and let them cool down, then if possible repair the leak. Finally clean the bilge.

ENVIRONMENT

Handle and drain the water mixed with fuel and dispose of it according to the rules in force. Use only authorized disposal procedures; in case of doubt, refer to the Port Authorities.

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ENVIRONMENT

Every marina has toxic waste disposal dedicated areas. It is recommended to dispose polluting waste (such as used oil, fuel, oily liquids, batteries, etc.) according to the environment protecting laws.
Prior to performing any job in the engineroom, disconnect the bilge pumps switches, in order to prevent that accidental fuel, lubricant or other liquid leakages pollute the surrounding waters.

DANGER

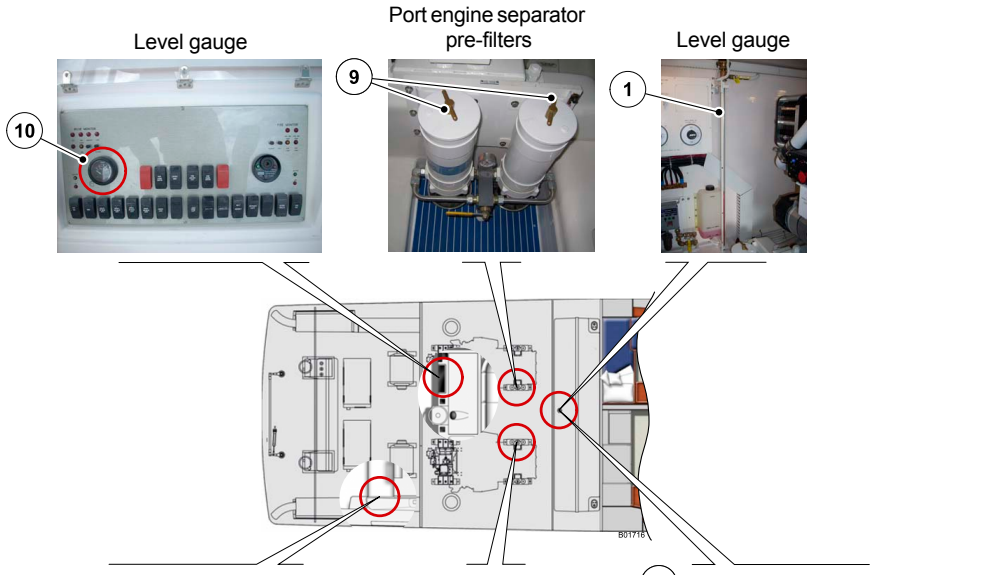
Due to high temperature in engineroom, oil or fuel leaks can evaporate and create a serious risk of fire break.

DANGER

Fuel leak can be the cause of fire. Periodically check the integrity of Your installation.

1. Level gauge in the engineroom
2. Main fuel delivery valve
3. Port engine fuel delivery valve
4. Starboard engine fuel delivery valve
5. Generator fuel delivery valve
6. Fuel level delivery valve
7. “RACOR” separator filter for generators
8. “RACOR” separator pre-filters for starboard engine
9. “RACOR” separator pre-filters for port engine
10. Helm station level gauge
11. Full tank buzzer

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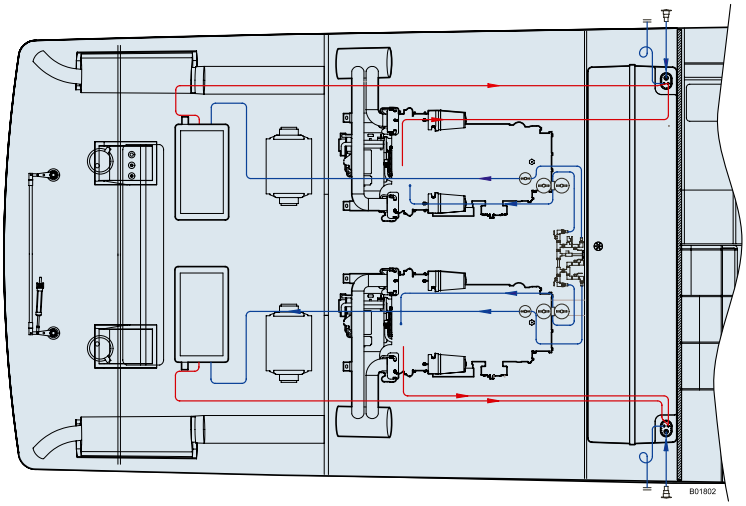


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8.10.3 Diagram of fuel system



“RACOR” water/fuel separator pre-filters for engines	Tank vent
RACOR filter for generator	Users manifold
Fuel inlet	

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8.10.4 Water/fuel separator prefilters for engines

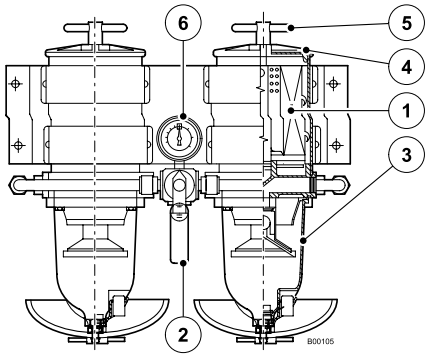
Maintenance and check

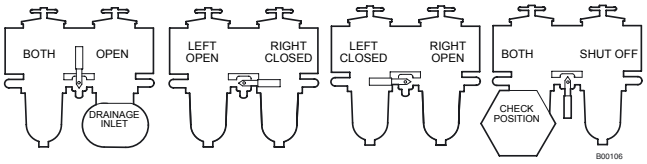
The frequency of water drainage or of filtering element (**1**) replacement is determined by fuel contamination level.
The selector valve (**2**) (or handle indicator) allows the operator to isolate one filter at a time, in order to carry out service even with engine running.

Water drainage from collecting tank

Check or drain the water collecting tank (**3**) daily. The collecting cup must be drained before polluting elements reach the engine.

- In order to eliminate the polluting elements place a big recovery tank there below.
- Remove the cover (**4**) and fill the device with clean fuel.
- Close the cover and tighten T-handle (**5**) firmly by hand.





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Replacement of the filtering element

Replace the element according to the intervals suggested by manufacturer or in case of power losses; a power loss indicates that the element is restricted.
As a rule, when the pressure gauge (**6**) shows 6-10 inches of mercury (inch Hg), it should be time for maintenance.
The current values varies in the different fuel systems. Also other extra elements, such as a full tank or excessively contaminated fuel may obstruct the filter.

- Close the valve.
- Remove the cover.
- Remove the element by holding the handle and pulling lightly forward with a twist movement.
- Replace the cover seal with the seal pertaining to the new element. Apply a layer of clean fuel or engine oil on the seal before reinstallation, fit the new element with a slow twist movement downwards.
- Fill the device with clean fuel, then replace the cover. Tighten T-handle by hand and reopen by hand.
- Start the engine and check for leaks. If necessary, remedy with the engine off.

Troubleshooting procedure

The main cause of a weak start or of a power loss is the result of an obstructed filter or an air loss in the fuel system. If the device does not start or does not hold the low idle, check first of all the cover and vent it, if it hadn't been properly closed. Then check all the pipe connections and make sure no fuel pipe is obstructed by contaminants. If the fuel tank is equipped with a built-in filter, check if it is obstructed. If the problem continues and the filtering element is new, contact your dealer.

CAUTION

The separators have to be checked at regular intervals as suggested by manufacturer, so as not to impair the engines operation.

WARNING

If the engine must be running, select the filter which has to remain in-line and carry out maintenance on the filter not in-line. This operation is a good procedure also when the engine is off.

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8.10.5 Generator water & fuel separator filter

Water drainage from collecting tank

The frequency of water drainage or of filtering element (**1**) replacement is determined by fuel contamination level.
Check or drain the water collecting tank (**2**) daily.
The collecting cup must be drained before polluting elements reach the engine.

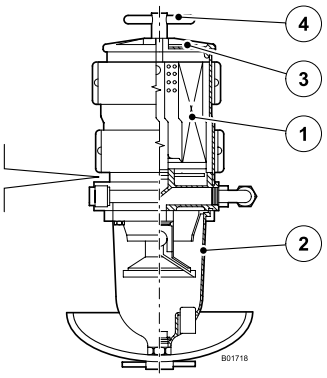
- In order to eliminate the polluting elements place a big recovery tank there below.
- Remove the cover (**3**) and fill the device with clean fuel.
- Close the cover and tighten T-handle (**4**) firmly by hand.

Replacement of the filtering element

Replace the element according to the intervals suggested by manufacturer or in case of power losses; a power loss indicates that the element is restricted. Also other extra elements, such as a full tank or excessively contaminated fuel may obstruct the filter.

- Close the valve.
- Remove the cover.
- Remove the element by holding the handle and pulling lightly forward with a twist movement.





- Replace the cover seal with the seal pertaining to the new element. Apply a layer of clean fuel or engine oil on the seal before reinstallation, fit the new element with a slow twist movement downwards.
- Fill the device with clean fuel, then replace the cover.
- Tighten T-handle by hand and reopen by hand.
- Start the engine and check for leaks. If necessary, remedy with the engine off.

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Troubleshooting procedure

The main cause of a weak start or of a power loss is the result of an obstructed filter or an air loss in the fuel system.
If the device does not start or does not hold the low idle, check first of all the cover and vent it, if it hadn't been properly closed. Then check all the pipe connections and make sure no fuel pipe is obstructed by contaminants. If the fuel tank is equipped with a built-in filter, check if it is obstructed. If the problem continues and the filtering element is new, contact your dealer.

CAUTION

The separators have to be checked at regular intervals as suggested by manufacturer, so as not to impair the generator operation.

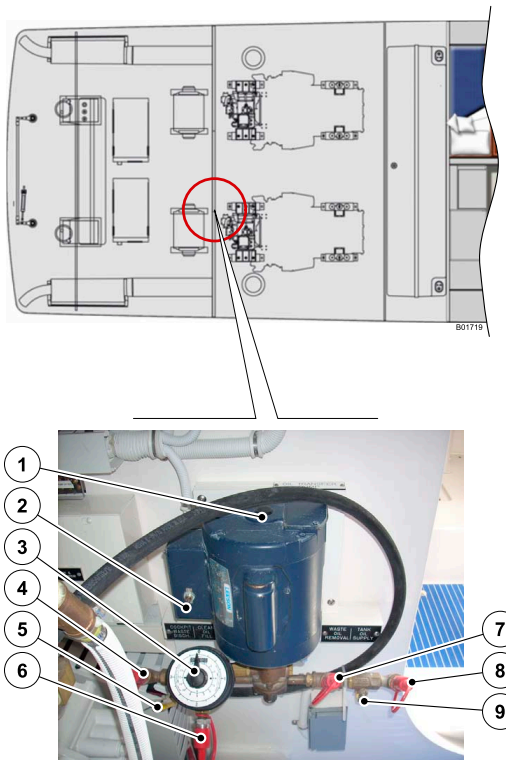
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8.11 LUBE OIL SYSTEM

8.11.1 Oil filling/draining system from engines, gearboxes and generator

The system consists of a pump (**1**) duly connected to engines, gearboxes and generator, by which it is possible to perform the shoreside lube oil filling/draining operation, without having to carry onboard clean oil and waste oil barrels.
For correct maintenance procedures, refer to the Manufacturer's manual.

1. Pump
2. Oil pump activation/deactivation circuit breaker
3. Oil level gauge
4. Cockpit waste discharge connection
5. Oil filling/draining lever
6. Clean oil fill connection
7. Waste oil removal connection
8. Tank oil supply connection
9. Oil filling/draining lever



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WARNING

Close the valves if not in use.

DANGER

Take care that oil does not hit the skin. During maintenance operation wear gloves and safety glasses. If you come in contact with lube oil wash the hit part immediately and accurately with water and soap.

DANGER

Any maintenance intervention on the engines ad on the inverters is to be carried out with engines shut off, after they have sufficiently cooled down and after preventing their switching on by disconnecting the circuit breakers.

CAUTION

*Do not remove the **tank filling plug** when the engine activated, because the hydraulic installation under pressure may cause injuries. Before releasing pressure, stop the engine.*

DANGER

*The spilling of hydraulic oil under **pressure** may cause injuries: before disconnecting or connecting the hoses, stop the engine and operate the controls to release the residual pressure. Prevent the engines from starting when the pipes are disconnected.*

DANGER

The use of the gearboxes and engines with a low quantity of oil, may damage them.

An excessive quantity of oil may cause seals and vents to leak and can remarkably increase the operation temperature.

DANGER

No open flames, no electric sparks. Do not smoke. Avoid ignition sources. Risk of fires and explosions!

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CAUTION

Make sure to drain the oil contained inside of the engine or gearbox completely, before performing new oil top-up.

ENVIRONMENT

Never discharge old oil at sea, but dispose of it instead into proper containers. Respect rules in force concerning the disposal of special waste.

CAUTION

*If damaged, the **hydraulic hoses** may cause death, carry out appropriate periodical checks to verify the presence of:*

- *damaged fittings;*
- *wear of outer coatings as consequence of rubbing;*
- *swelling of outer coatings.*

CAUTION

Filling of the cooling system only by cooled down engine.

WARNING

For more information about the lubrication of engines and gearboxes, refer to use and maintenance manuals.

CAUTION

Use only technical fuels approved by the manufacturer otherwise warranty will become null and void.

DANGER

Because of the high temperature in the engine room, oil or fuel leaks can evaporate and create a serious risk of fire breaking. Periodically check the entirety of your system.

CAUTION

Do not refill oil over the notch MAX of the dipstick. Overfilling may damage the engine!

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DANGER

The oil is hot, risk of scalding! Do not touch the oil drain plug with bare hands. Engines oils are polluting liquids; treat them and handle them with care!

WARNING

The Federal Water Pollution Control Act prohibits the discharge of any oily waste into, or upon, the navigable water and contiguous zone of the United States. If such discharge causes a film, or sheen upon, or a discoloration of the surface of the water, or causes a sludge or emulsion beneath the surface of the water, it is considered a violation of the regulation.

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8.12 ENGINE COOLING SYSTEM

8.12.1 Operation

The engines and generator are cooled by seawater that is circulated through the engines by internal pumps. After the suction, the water filtered is sent to the gearboxes, to the heat exchangers and then discharged at sea.

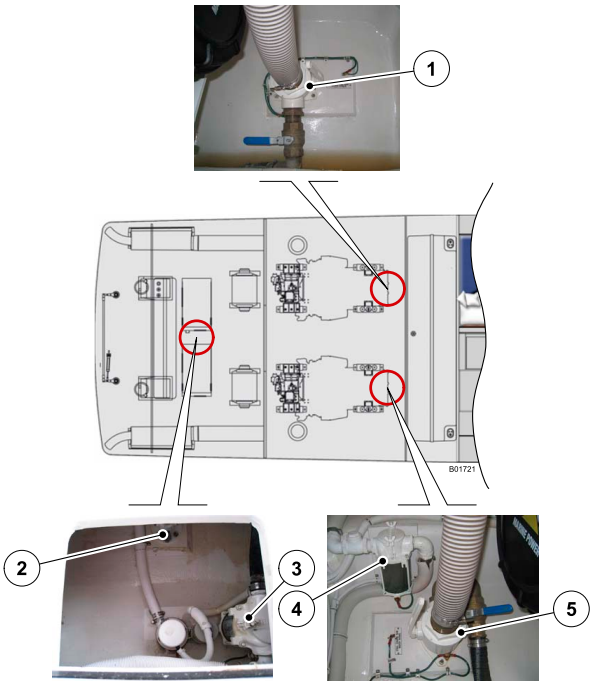
CAUTION

Before opening the intake seacock filter for cleaning, remember to close the hull cut-off valve.
If the yacht is left unattended, close as a precaution, all intake seacock cut-off valves; when they have to be used again, remember to re-open them.



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Port engine sea cock valve



Generator intake seacock valve and filter

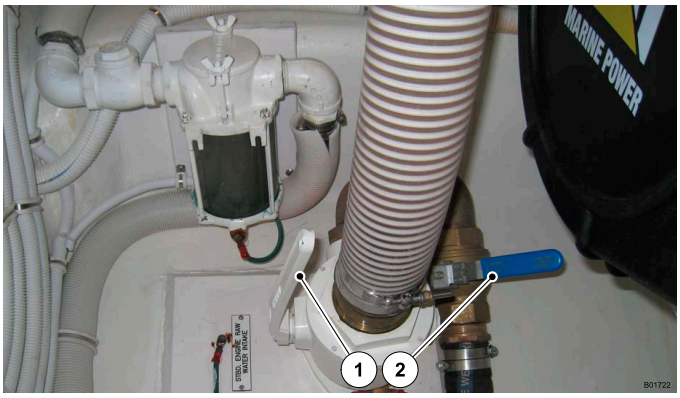
Starboard engine filter and sea cock valve

1. Port engine sea cock valve
2. Generator intake seacock valve
3. Generator intake seacock filter
4. Starboard engine intake seacock filter
5. Starboard engine sea cock valve

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8.13 BILGE SUCTION OF THE ENGINES IN EMERGENCY

In engineroom is located the bilge emergency draining system, which operates with diverters, allowing to use the seawater pumps, driven by the propulsion engines, as draining pumps.
The diverters are valves, which in normal position ensure the seawater suction, through the intake seacock filters, for engine cooling. In case of emergency, handle on levers (**1**) and (**2**) of both valves, by setting them to emergency position: the pumps suction, driven by the engines, is then diverted directly to the bilge.
If it is necessary to use this draining system, check the bilge level continuously, because in case of complete draining, the engines cooling should not fail.



CAUTION

Be very careful when resetting the valves to the outboard suction position when the bilge is dry, in order not to compromise the engine parts.

CAUTION

In case of emergency it is possible to pump the water from the bilge through the seawater pumps of each engine.

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8.14 EXHAUST SYSTEM

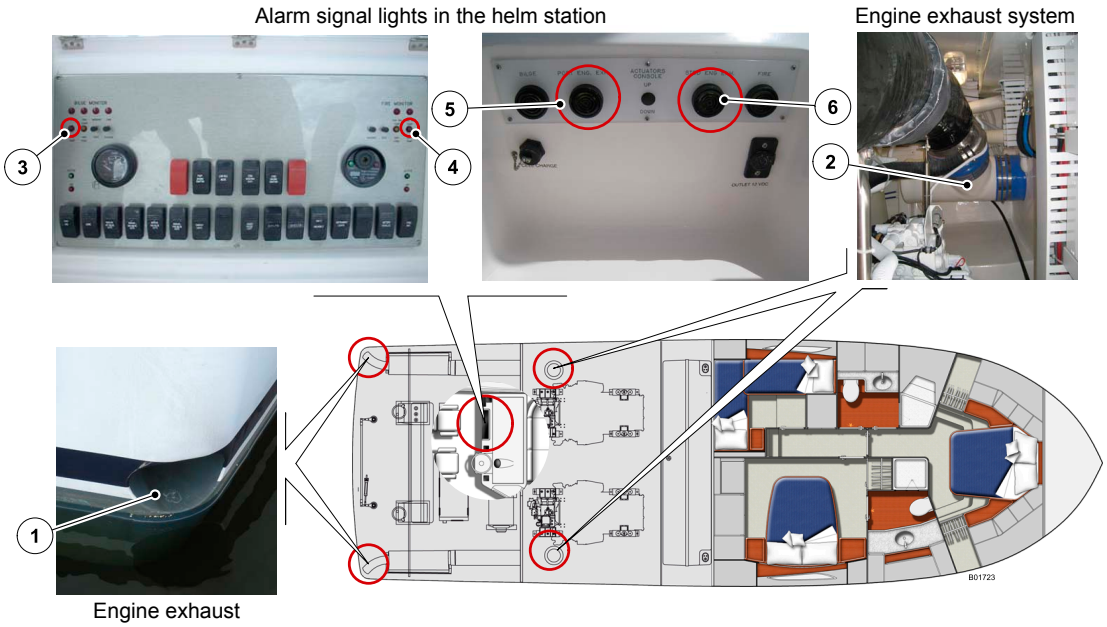
The engine exhaust system is equipped with a double chamber muffler (one on each engine). These mufflers allow to generate a very low counterpressure inside, so that the hazard of water flow-back to cylinders is reduced, otherwise the propulsion system could get seriously damaged.
The exhaust system is conceived so as to eject water and gas together. This reduces remarkably the combustion noise and the noise produced by the same engines.

Check the underwater exhaust terminal cleanliness conditions periodically.

WARNING

When starting the engines, check that the exhaust discharges water; this means that the engines cooling system and exhaust cooling system work correctly. Accelerate if no water comes out.
If the problem carries on, refer to the BERTRAM Customer Support.

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1. Engine exhaust
2. Engine exhaust system
3. Port exhaust alarm signal light
4. Starboard exhaust alarm signal light
5. Port exhaust alarm sound signal
6. Starboard exhaust alarm sound signal

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8.14.1 Engine exhaust system control

For each engine, you should:

- check the components of the exhaust system (exhaust manifold, mixing elbow, exhaust line, hose clamps, muffler, etc.) for cracks, breaks and corrosion.
- check the hoses for softness, cracks, leaks, or dents. Replace them if necessary.
- check for corroded or broken metal parts. Replace them if necessary.
- check for loose, corroded, or missing clamps.
- tighten or replace the hose clamps and/or hangers as needed.
- check that the exhaust outlet is unobstructed.
- visually inspect for exhaust leaks.
- check for carbon or soot residues in the exhaust components. These residuals show the presence of leaks that have to be eliminated.

WARNING

Carbon deposits, marine growth, and fouling may affect engine exhaust operation, causing performance degradation and serious engine damage. Exhaust outlet blockage, even if partial, may compromise proper engine operation.

Ensure that the exhaust outlets are free of deposits, growths, and fouling. Ensure that the parts of the check valves (flappers) move freely and without any obstruction.

NOTICES

A strong smell and a light smoke from exhaust insulation are normal at the first start.

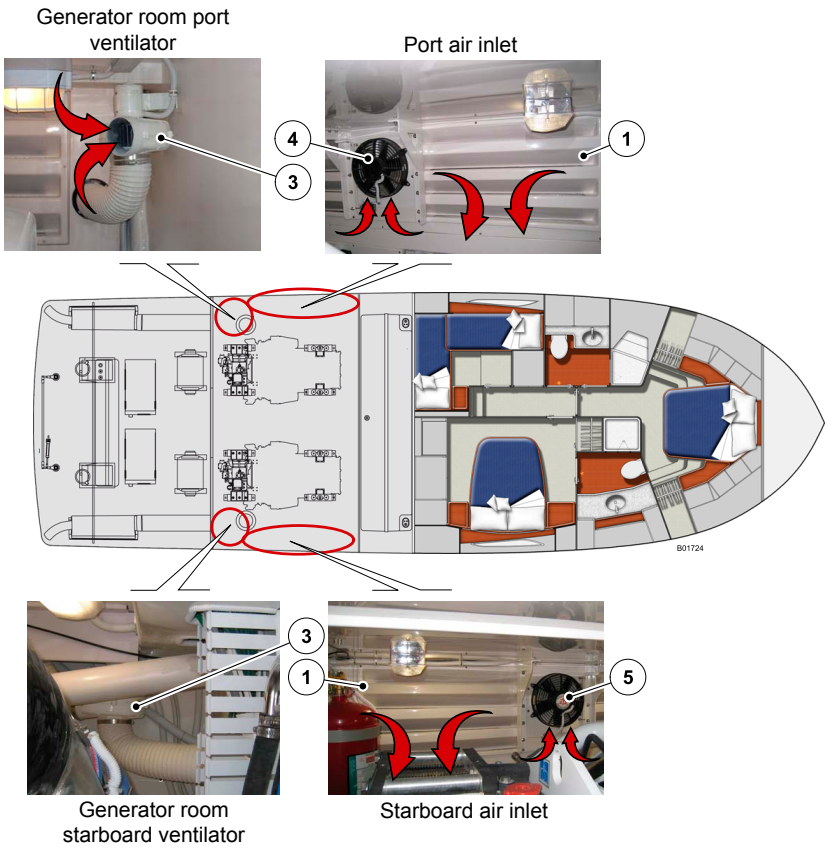
CAUTION

Carbon Monoxide poisoning hazard - Ensure that the engine exhaust system operates correctly. Carbon monoxide is extremely toxic.

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8.15 ENGINEROOM & GENERATOR ROOM VENTILATION SYSTEM

1. Air inlets
2. Engineroom ventilator blowers
3. Generator room ventilator blowers



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Operation

The engineroom ventilation system provides the necessary air exchange for the correct operation of the propulsion systems of your BERTRAM 540 yacht.

The ventilation system consists of four ventilators, two of them are located in the engineroom and the other two in the generator room; they convey outside the air drawn inside, and by two lateral air inlets which provide natural ventilation to the engineroom. The air inlets are equipped with a air separating system from suspended water

To supplement the natural air ventilation, there is also a thermostatically controlled forced air ventilation system.

The electric supply of the ventilators is performed by a switch located on the main electric panel of the salon. When the blowers are in their normal operating mode and the circuit breaker is turned on, the blowers automatically operate when the engineroom temperature rises above 110 °F and turn off below 90 °F. The ventilators have a manual override switch on the thermostat housing, which allows them to operate regardless of engineroom temperature. This is valuable when working in the engineroom.

NOTICES

Do not place tools or clothing on the extractors. Do not allow anything to block the air inlets. Do not block the emergency closing device.

NOTICES

After navigation in particularly rough seas, it may be necessary to rinse the salt residuals from the components near the inlets of the engineroom.

NOTICES

With the engines on, it is recommended to have the ventilators under thermostatic control. It is suggested to keep them on for at least 30 minutes after running the engines, to dissipate the engineroom heat.

DANGER

CARBON MONOXIDE DANGER NOTICE

Carbon monoxide (CO) is a potentially deadly, odorless, colorless vapor present in the exhaust by-products of all fossil fuel burning engine. While there is a substantially reduced CO presence in the exhaust of diesel engines and a corresponding reduced hazard to human beings, as compared to gasoline fueled engines, the hazard, however limited, should be noted.
Keep cockpit, fly and stateroom areas well ventilated when engines and/or generator are running and prevent the exhaust clogging. Do not occupy swim platforms or aft lounging areas when engines and/or generator are running.
Signs of exposure include nausea, dizziness and drowsiness, symptoms similar to those of seasickness.

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NOTES:

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BERTRAM

9



HYDRAULIC SYSTEMS

FOREWORD

USE OF THE MANUAL

DESCRIPTION OF THE YACHT

NAVIGATION

AUXILIARY EQUIPMENT ON BOARD

CONTROL STATION

ON THE MAIN DECK

THRUST SYSTEMS

HYDRAULIC SYSTEMS

ELECTRIC SYSTEM

DETAILED INFORMATION ON THE INTERIORS

SAFETY DEVICES AND EQUIPMENT

YACHT HAULAGE AND LAY-UP PERIOD

MAINTENANCE

TROUBLESHOOTING

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9.1 ELECTRIC PUMPS

9.1.1 Bilge pumps

Automatic bilge pumps controlled by float switches pump the bilge water and discharge it overboard.

The bilge pumps are connected directly to the batteries and can be operated when the battery disconnect switch is positioned to OFF. They provide bilge water drainage at any time (keep the circuit breakers on the electric panel of engineroom connected).

The pump suction intakes are fitted with mesh strainers to prevent foreign materials and debris from entering the intake pipes and clogging the piping and/or jamming the pump.

Bilge pumps can work in automatic mode, thanks to float switches, and in manual mode.
To activate the pumps manually push relevant buttons in the helm station.
To run the bilge pumps you have to activate the relevant circuit breakers placed on the electric panel of the engineroom.
For a better understanding consult the owner's manual "Electrical System".
For more directions about the use of the individual systems and equipment, consult the manuals provided by the individual equipment manufacturers.
Should the bilge automatic suction pumps of the engineroom not be able to drain water from the bilge, you can use an emergency draining system installed in the bilge; this system operates by means of some selector valves at manual operation, allowing to use the sea water pumps of propulsion engines, as draining pumps.

These selector valves ensure, when set to normal position, the seawater suction for engine cooling, through the intake seacocks and filters. In emergency case, operate levers of both valves, by setting the valves to emergency position: the pumps suction, driven by the engines, is then diverted directly to the bilge. The levers are equipped with a spring mechanism, because their operation must absolutely be wanted and not accidental. Should it be necessary to use this draining system, the bilge level must be checked continuously, because in case of complete drainage, the engines will not be cooled down.
For correct procedure see "Engines emergency suction from the bilge".

CAUTION

In emergency the sea water pumps of each engine can be used to drain the engineroom bilge (for the correct procedure see the chapter "Engine cooling system").

CAUTION

SINKING HAZARD - Ensure proper pump operation.

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WARNING

Don't run the electric pumps dry.

CAUTION

Care has to be taken because the intake seacock of the engine is quickly closed after opening the bilge strainer valve.

CAUTION

Be very careful when resetting the valves to the outboard suction position when the bilge is dry, in order not to compromise the engine parts.

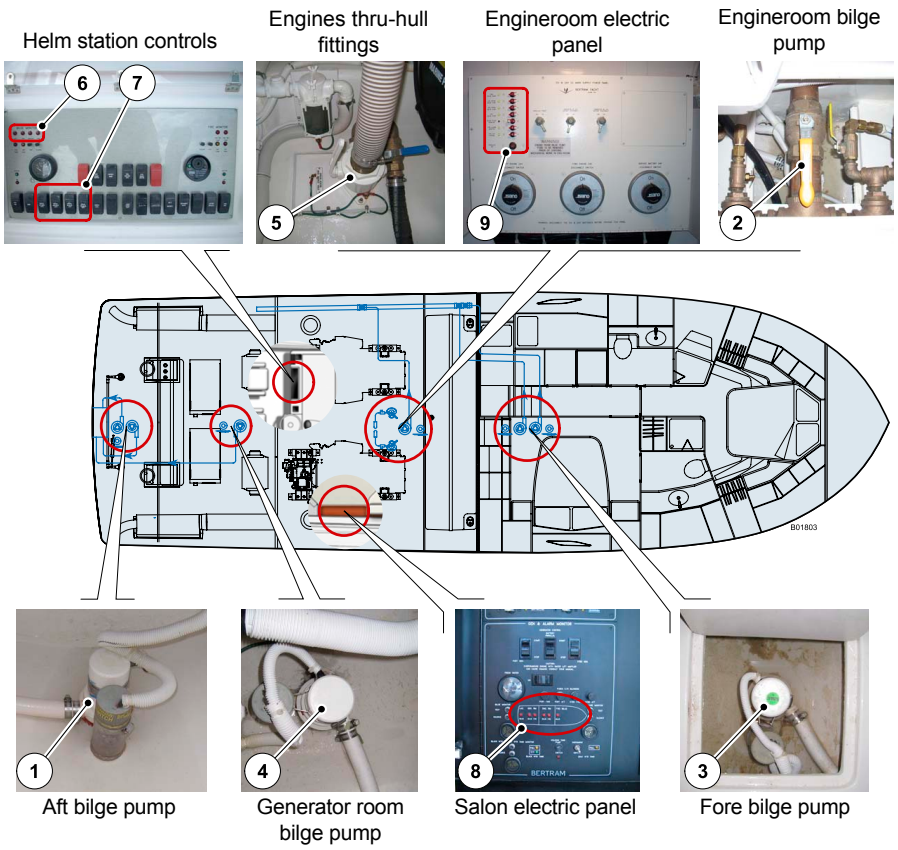
WARNING

The system total capacity has not been designed to drain the unit in case of damage.

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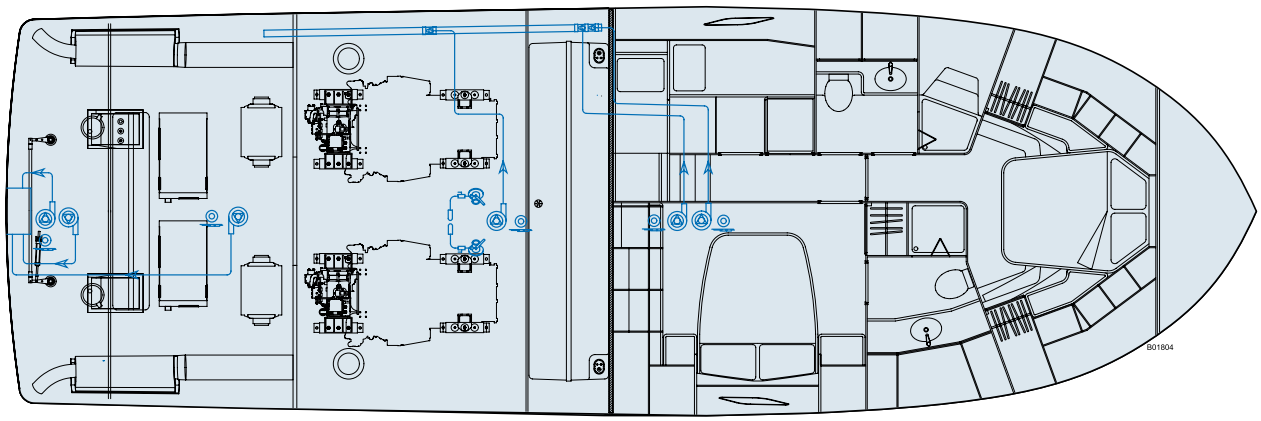
9.1.2 Bilge automatic/manual suction system displacement

1. Aft bilge pumps
2. Engineroom bilge pump
3. Fore bilge pumps
4. Generator area bilge pump
5. Engines thru-hull fittings
6. Helm station bilge pump signal lights
7. Helm station bilge pump controls
8. Bilge pump signal lights on the main electric panel in the salon
9. Circuit breakers on the electric panel of the engineroom



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Bilge automatic/manual suction system



Bilge pump

Level sensor

Engines thru-hull fittings

Drain manifold

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CAUTION

Clean the bilges frequently and meticulously.
Remove any rags or other materials from the bilge, to avoid clogging the intakes and damaging the pumps.

ENVIRONMENT

Possible oil or diesel fuel spilled in the bilge must be collected and stowed.
It is forbidden to discharge bilge water mixed with oil or diesel fuel into the sea, because this is cause of heavy pollution.
During the maintenance operation in the engineroom, it is compulsory to disconnect the circuit breakers for the pumps of the bilge automatic suction system, in this way accidental spills of liquids and consequently water pollution are avoided.

CAUTION

Keep the bilge dry to allow a prompt detection of water presence and to reduce the risk of slipping, besides creating a less aggressive environment for the fixtures.

CAUTION

In case of water presence in some compartments of the belowdeck, before getting alert, verify if the bilge water is fresh or salted. This will be of fundamental help while analyzing its origin.

NOTICES

The bilges should be kept as dry as possible to minimize excess weight. The added weight of bilge water causes the vessel to ride lower in the water, which increases resistance. This increased resistance reduces your vessel's speed and increases fuel consumption. Another consequence of excess bilge water is called the free-water effect. As the bilge water "sloshes" from side to side, it may influence the amount of roll at low speeds, or make it difficult to trim the vessel at higher speeds.

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9.1.3 Bilge pump operation check

– Fill the bilge with enough water to activate the floater switches. Check the operation of each bilge pump, including the hand pump.
Check the overboard drain to see that water is pumped out. When checks are completed, turn the pump switches to AUTO.

Bilge pumps normally do not need routine service.
You can, however, take measures to prolong their useful service life.
Ensure that a pump never runs dry. Running dry can destroy the pump impeller.

– Where the possibility of freezing exists, drain the pump body. Before restarting the pump, refill it with water and follow the priming sequence described in “Priming A Pump”.
– Where a check valve and suction filter are installed, check them periodically for cleanliness and proper operation.
– If the yacht will be inactive for a long period, drain and clean the pump bodies and tanks.

Ensure that a pump never runs dry. Running dry can destroy the pump impeller.

WARNING

The bilge pumps are connected directly to the batteries and can be operated when the battery disconnect switch is positioned to OFF. Starting a pump while it is being serviced could cause personal injury or damage the pump.
Before doing any kind work on the bilge pumps, DISCONNECT the pumps’ electrical power from the battery.



9.1.4 Maintenance of other electric pumps

WARNING

Before doing any kind of work on an electric pump, make sure that the electric power to the pump is switched OFF, and that there is no possibility of accidentally starting the pump. Starting a pump while it is being serviced could cause personal injury or damage the pump.

The electric pumps on your yacht are generally maintenance free, provided some precautions are taken to extend their useful life.

– Ensure that a pump never runs dry. Running dry can destroy the pump impeller.

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- Where the possibility of freezing exists, drain the pump body. Before restarting the pump, refill it with water and follow the priming sequence described in **Priming A Pump**.
- If the yacht will be inactive for a long period, drain and clean the pump bodies and tanks.
- Check that the pump shaft turns freely. Use a suitable tool or a screwdriver at the end of the motor shaft.
- Check to ensure that the rotation direction of the pump shaft is correct, and that the pump motor does not draw more than its rated amperage when operating.
- Check the impeller. If it is obstructed, the electric motor will be seriously damaged. If the impeller is obstructed, remove the obstruction, and clean the impeller and the pump body.
- If the impeller or the mechanical seals need replacement. This requires the services of a skilled technician.
- Check the brushes and brush springs in DC motors at regular intervals.
- To prevent damage to the motor, check that the turning attachment is not blocked.
- Check the pressure inside the pump tank. This must be the same as the connection pressure of the electric pump.

NOTICES

Avoid voiding the manufacturer's warranty. An electric pump should be repaired only by an authorized and qualified technician, using approved spare parts designed for the pump.

9.1.5 Priming a pump

When a pump has been drained or opened for inspection or service, it should be primed before it is used. A newly installed pump also requires priming.

- Fill the pump body with water to allow the pump to prime. This operation is very important and must be carried out at the first start of a new pump and at any time the pump body is drained. Priming the pump helps avoid damaging the pump and the impeller.
- Turn ON the pump with the water inlet CLOSED and the discharge outlet completely OPEN. Then slowly OPEN the water inlet to start the water flow. If water does not flow, refill the pump body and repeat the priming procedure.

MAINTENANCE

Verify the operation of the pumps and of the floating switches at least once a week.
At least once a month:
- *verify the condition of the connections;*
- *carefully clean the pumps and the floating switches;*
- *carefully clean the bilges.*

Verify any sign of obstruction in the pipes at least once every six months.

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9.2 FRESH WATER SYSTEM

Water is taken from the tank and through a pump to relevant distribution manifolds, and then sent to the various users:
- guests staterooms head;
- Master head;
- galley sink;
- engineroom faucet;
- cockpit washdown faucets;
- air conditioning unit;
- washing machine;
- water heater.

The system is kept under pressure by the pump, while the water heater warms water.
The operation of your vessel's fresh water pump is automatic and normally does not need priming, except before its initial use or if the fresh water tank is empty.
The pump holds an average static pressure of 30 PSI. When the pressure drops below approximately 21 PSI, the pump automatically turns on and raises the pressure. If the pressure continues to drop because of an empty tank, the low-pressure cut-out switch will shut off the pump.
The fresh water pump is equipped with an active charcoal filter, improving the quality of water; for more information, consult the relevant use and maintenance manual.

CAUTION

Periodically clean the filter and replace if necessary. Before cleaning the filter, disable system operation.

A second fresh water pump (optional) has been installed on this yacht. One of the two pumps is just a back-up, as the system always operates with only one pump running. Some cut-off valves have been installed in the engineroom for the operation and use of these pumps.
To prime the pump:
- ensure that the tank is at least partially full;
- start the pump by lifting the momentary pump restart switch located in the salon DC distribution panel;
- hold the momentary pump restart switch until the pump continues to run on its own, then release the switch;
- Once the pump has raised the pressure, open a faucet to release any trapped air.

The water heater is located in the bilge underneath the Master stateroom. The thermostat is pre-set by the manufacturer to 140-145 °F.
We recommend that you do not raise the temperature above this setting. Avoid switching on the differential circuit breaker of the water heater when this latter is empty. The water heater operates at 230 V AC either by generator or by shore power supply.

CAUTION

Do not open the water heater thermostat access panel, unless the differential circuit breaker is turned off.

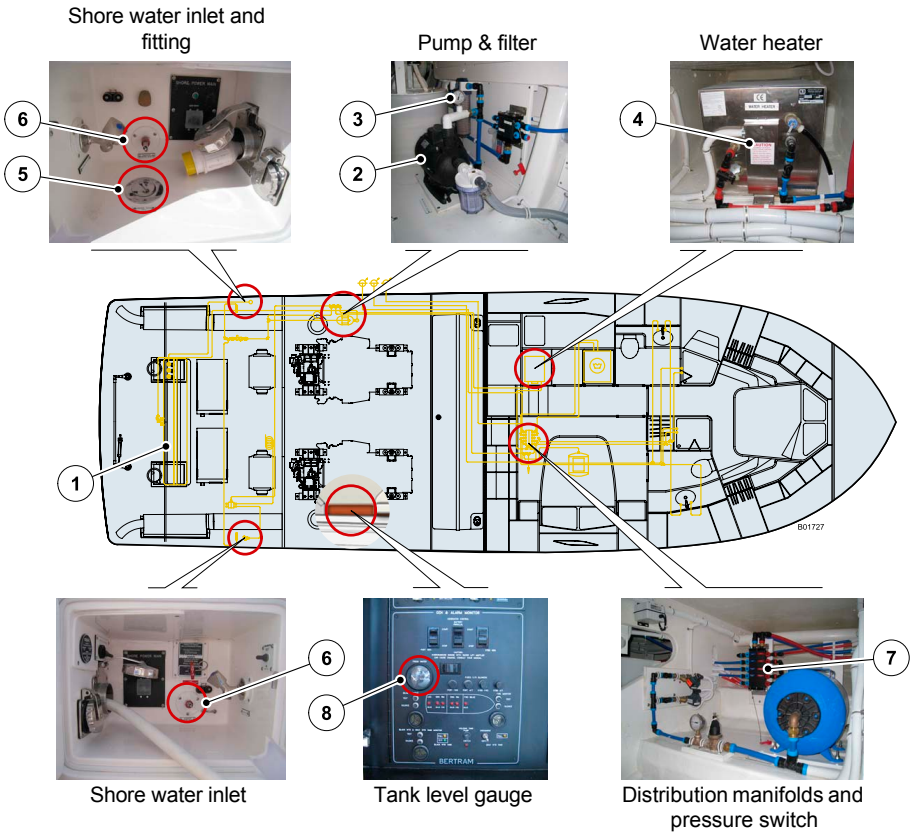
The fresh water system is equipped, beyond normal fresh water inlet, also with two extra dockside inlets. This system is equipped with a pressure relief valve.

NOTICES

The fresh water tank can be filled only through fill fitting. It cannot be filled using the shoreside quick-connect fittings.

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1. Tank
2. Fresh water pump
3. Fresh water pump
4. Water heater
5. Fill fitting
6. Shoreside water inlet with quick-connect fitting
7. Distribution manifolds
8. Tank water level gauge on the main electric panel in the salon



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CAUTION

The fresh water circuit, and particularly the tank, must be cleaned periodically by pouring in the case a specified disinfectant solution. We do not recommend to drink the water supplied by the onboard system.

CAUTION

When the yacht is left unguarded for a long period of time, the pump and water heater must be disconnected by means of the relevant circuit breakers.

CAUTION

In yachts equipped with direct connection to shore fresh water the maximum operation pressure should not exceed 29 PSI/2 bar and the pipes must be disconnected during periods of unattendance for safety reasons. Notwithstanding the presence of a, pressure switch, check the pressure on the pressure gauge installed on the switch.

CAUTION

Periodically carry out inspection of the fresh water circuit and of the bilges to find out the possible presence of leaks.
Repair leaks by releasing the pressure in the system, in order to avoid damages to the furniture and to the electric devices.

CAUTION

The intake plug carries the indication "WATER" to avoid accidental introduction of different liquids.
To avoid damages to the system and tanks, we recommend to replenish by liquid fall and not by pressure.

WARNING

It is a good rule to optimize the use of water, especially if you are during high sea navigation.

WARNING

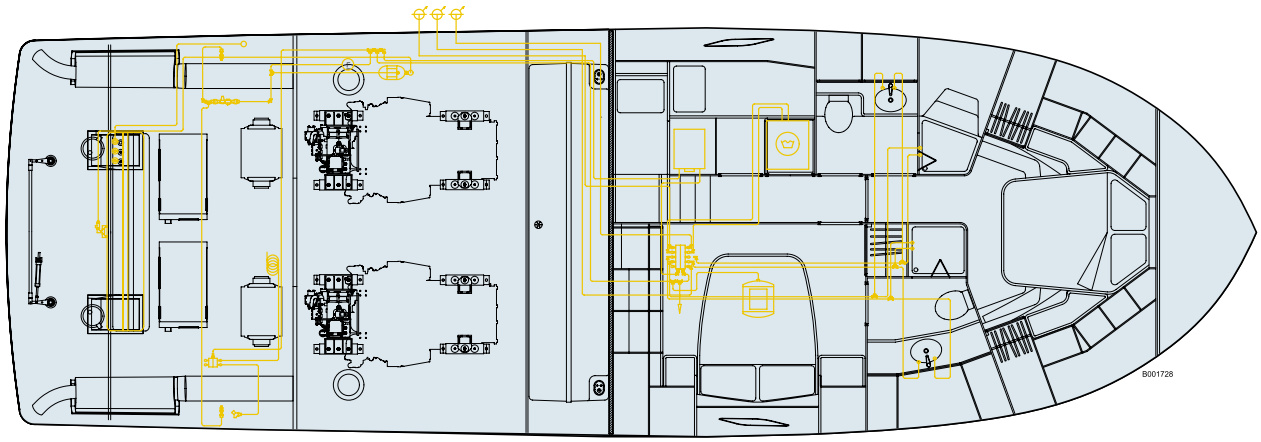
When leaving the vessel unattended, the dockside fresh water supply should be disconnected to prevent flooding the bilges in the event of a broken pipe.

CAUTION

Before refilling the fresh water tank, check that fresh water supplied by the shore system is drinkable.

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Fresh water system



Water heater
Ball valve
Pump
Filter
Non-return valve
Water inlet
Manifolds
Shore water inlet
To deck

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9.3 REFILLING THE WATER TANK

- Ensure that the yacht is properly moored; we suggest to stop the engines and the generator.
- Loosen the fill fitting plug and insert the hose, which must have the correct dimensions. The water fill fitting is inside of the cockpit afterpeak.
- During refilling, check the tank level though the gauge located on the general electric panel. off the salon.
- At the end of filling, remove the hose and tighten filler plug.

NOTICES

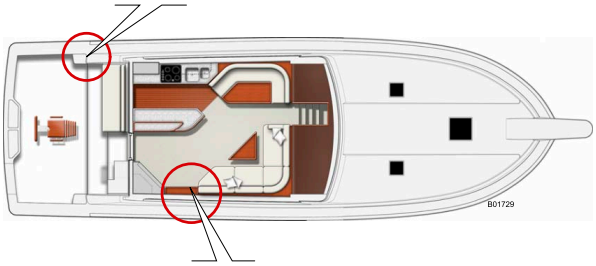
Replace freshwater in the tank frequently, and, if necessary, disinfect the system with suitable products. Never leave the yacht unattended while taking on fresh water. If there is a risk of freezing, do not top off tanks.

CAUTION

During the refilling of fresh water pay attention to the filling hose. Water spillage may cause electrical short-circuits. Do not leave the fresh water hose and fill fitting unattended.

Inlet fitting







Level gauge

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9.4 Fresh water system maintenance

9.4.1 Fresh water tank

The fresh water tank is placed at stern and can be inspected through the helm gear compartment.
Clean the tank inside at least once a year.

NOTICES

Before servicing the fresh water tank, disable the operation of the fresh water system.

Pump check and cleaning

CAUTION

When the yacht is left unguarded for a long period of time, the pump must be disconnected by means of the relevant circuit breaker.

- Check the cleanliness of the pump and of the captive air tank. Wash them with well-diluted detergent, and then dry them.
- Check the fittings for tightness and evidence of corrosion.
- Check the air pressure inside the tank. If it is lower, restore it to a maximum with a bicycle pump or a compressor. For range values refer to the specific equipment manufacturer's handbook.

9.4.2 Water system maintenance

For service purposes, you may isolate parts of the system or individual services without affecting the general system operation. To do this, handle on suitable valves installed on the main manifold. Also, to stop a failure in the hot water system, you can close the valves located at the water heater inlet. Check and clean the fresh water tank at least every three months. Fill the tank with clean water, and then drain it. Repeat the operation two to three times. You may add an appropriate disinfectant or a sanitizing product through the tank fill fitting. Follow the directions on the product label. Fill and drain the tank at least one more time, after draining the water containing disinfectant or sanitizing agent. Verify for possible leaks in the system at least once every six months. Verify the operation of the cocks at least once a month.

CAUTION

When operating in shallow water, care must be taken that debris do not penetrate through the raw water intake seacocks of generator.
Excessive use of the yacht with generator running in shallow water, may damage the raw water pump impellers.

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9.5 SEAWATER SYSTEM

The onboard seawater systems are following:

- **Engines cooling system**, consists of two circuits, one for the starboard engine and the other for the port engine. Seawater is drawn directly by the inner pumps of the engines, by means of a intake seacock equipped with cut-off valve and filter. The water sucked by the engines, flows through the strainers and is then delivered to the heat exchanger of the stabilizers and to the heat exchangers of the engines, and then discharged overboard. Moreover, suitable circuits branches allows the cooling of the seals at shaft output and the cooling of the exhaust manifolds.
- **Generators cooling system**. Sea water is sucked directly by the generator pumps through sea cocks equipped with cut-off valve and strainer. The water sucked by the generators flows through the filters and is then delivered to the heat exchanger of the generators and drained overboard.
- **Sea water system for washdown**, consists of an electric pump that sucks seawater through a intake seacock equipped with cut-off valve and filter and delivers it to the washdown faucets.

WARNING

The seawater faucets are clearly labeled to prevent the accidental use of seawater for drinking or cooking. Do not use this system for fighting electrical fires, because of the potential for shock hazard.

NOTICES

The seawater system should always be switched off when the boat is left unattended.

The seawater washdown system will make the cleaning of fish, fish boxes, and the cockpit area while at sea easier. The system is also an integral part of the live well system.

- **Live Bait Well System (optional)**
  The live well will keep bait alive only when it is operating and aerating the water. When the water in the live well reaches the drain near the top of the tank, the excess water will drain overboard.
  To operate the live well:
  • turn on the seawater washdown pump;
  • open the water supply valve located near the overhead in the machinery room;
  close the live well drain valve located near the supply valve.
  To drain the live well after use:
  • turn off the washdown pump or close the water supply valve;
  • open the drain valve.
- **Cooling system for air conditioning**. Seawater is drawn directly by an electric pump by means of a intake seacock equipped with cut-off valve and filter. The sucked water is sent to the heat exchanger of the air conditioner and then discharged overboard.

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– **Sea water system for water maker (optional)**, consists of an electric pump that sucks sea water through a intake seacock equipped with cut-off valve and filter and delivers it to the watermaker for the production of fresh water. The intake seacock and the filter are the same delivering the firefighting system. The brine left over after the desalination process is drained overboard.

CAUTION

Before carrying out the cleaning of the intake seacock filter, check that the users supplied with seawater are disconnected.

CAUTION

In case of risk that the yacht sinks, if you can and escaping condition allow you this, close all ball valves of the intake seacock.

WARNING

Before carrying out maintenance on the sea water circuit, cut-off its operation and close the intake seacock valve.
Before restarting the system circuit, make sure that the cut-off valve is completely open.

WARNING

During navigation check periodically the cleaning condition of the seawater strainers.
If the yacht is crossing a dirty sea area, check the strainers condition and proceed with their cleaning.
This precaution is very important, to avoid damaging of mechanical parts (like engines, generator, etc.), of the exhausts systems and to prevent endangering the yacht safety.

WARNING

It is advisable, when leaving the yacht in water for a long time, to close all intake seacocks.

CAUTION

When operating in shallow water, care must be taken that debris do not penetrate through the raw water intake seacocks of generator.
Excessive use of the yacht with generator running in shallow water, may damage the raw water pump impellers.

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9.6 THRU-HULL FITTINGS AND INTAKE SEACOCK

The sea valves and the outer intake seacocks of the hull must be free from barnacles, seaweed, corrosion or other obstructions. The intake seacocks and valves must be kept clean, using a brush if necessary. As this operation has to be performed from the outside of the hull, the yacht should be in a dry shore. If necessary, the cleaning may be done underwater by a diver, thus preventing anybody from starting the engines.

9.6.1 Seawater cooling system check

Never leave water in the system when the yacht is out of water.
At least once a month, flush the seawater system with fresh water to remove any scale that could clog the passages of the seawater cooling circuit.

WARNING

During navigation check periodically the cleaning condition of the seawater filters.
If the yacht is crossing a dirty sea area, check the strainers condition and proceed with their cleaning.
This precaution is very important, to avoid damaging of mechanical parts (like engines, generator, etc.), of the exhausts systems and to prevent endangering the yacht safety.

9.6.2 Maintenance of the sea filters

Clean the sea filter at regular intervals, according to the use of the system and the level of pollution (seaweeds, jellyfish, other foreign matter, etc.) in the water in which the yacht is operating.

Moving the valve handles repeatedly and regularly helps prevent sea valves from becoming difficult to open or close.
Clean the intake seacock filters according to the frequency of the system use and to the pollution condition of the sucked waters (seaweeds, mucilages, etc.).

- Close the intake seacock valve concerned.
- Cut-off valves upstream of concerned filter.
- Loosen the filter cover.
- Remove the filter basket and wash away all impurities with fresh water. Replace, if necessary.
- Reinstall the baskets and the cover.
- Open the valves upstream of concerned filter.
- Before restarting the system circuit, ensure that the screws and relevant washers are correctly fastened with the ring and disc on filter's body.
- Re-open the intake seacock valve completely and check for leaks presence from the filter cover.

All intake seacocks must always be fully open or fully closed, as needed. Do not use the intake seacock in a partially open or partially closed position.
If a valve handle is difficult to operate, you may use an extension on the handle to increase leverage. However, the sea valve should be serviced at the next dry-docking of the yacht to correct the problem.

DANGER

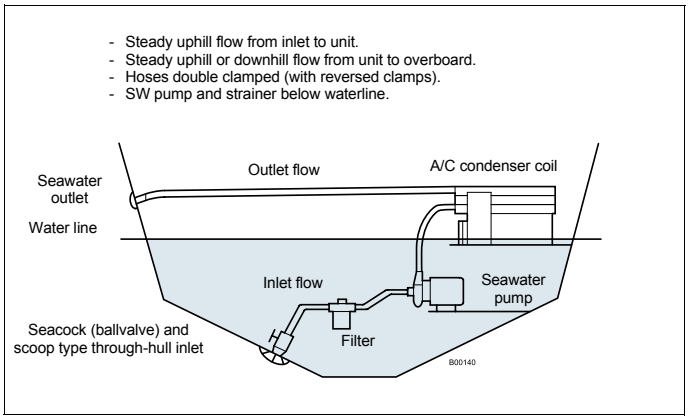
The lack of care during the cleaning of the intake seacock filters can cause heavy damages to the on board devices and in some cases fire, with very serious consequences. Check before setting up for navigation and at regular intervals also during navigation, the condition of the intake seacock filters of the various devices.

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9.7 AIR-CONDITIONING SYSTEM

9.7.1 Air-conditioning system operation

The basic principle of an air conditioner is the movement of heat. In a marine, direct expansion (DX) seawater-cooled air conditioner, heat is transferred from the cabin air to the refrigerant gas, which then releases the heat into the seawater. In reverse cycle heating (heat pump), the refrigerant flow is reversed and heat is extracted from the seawater and discharged into the cabin.
Part of the cooling process, in addition to lowering the air temperature, is the removal of moisture from the air. This lowers the humidity, making the area feel more comfortable and helping to keep the boat dry, reducing mold growth and other moisture related problems.
Seawater System: The seawater cooling system consists of an inlet through-hull fitting, seacock (water valve), strainer, pump, and overboard discharge fitting all connected by hose or piping.
If multiple air conditioning units are served by a single seawater pump, then a pump relay and water manifold are required.
Cruisair recommends a centrifugal seawater pump for efficient, quiet operation and long life. Centrifugal pumps are not self-priming and must be mounted below the water-line. It is important that the seawater plumbing be “self-draining”; this means that, if the yacht is lifted, all water in the piping will drain out. An air conditioning system plumbed this way will have no air locks which could disrupt the flow of seawater.
For shallow-draft boats where it is impossible to mount the pump below the water-line, a self-priming pump must be used.



On this yacht each air-conditioned space has an independent temperature control panel. The air conditioning units are located in the bilge below the galley, while the relevant intake seacocks, strainers and pumps for seawater supply are located in the engineroom.
The components in your air conditioning system are designed and built for saltwater use. Your system operates with seawater cooled, reverse-cycle condensers and either cools or heats as required for your comfort.
The condensate from the forward cooling units drains into the gray water sump tank and is automatically pumped overboard. Important: do not turn off the gray water differential circuit breaker. If the differential circuit breaker is turned off, condensate may overflow the gray water tank. The salon cooling unit drains overboard via the common drain. The machinery room cooling units have a dedicated sump pump to discharge the condensate water.
All air conditioning units are 240 V AC and powered through the differential circuit breakers in the salon AC distribution panel.

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Please see the documentation provided in the owner's information case for detailed information on your system.

WARNING

It is very important that you read and understand the air conditioning operation's manual before you attempt to operate your air conditioning. Please read the air conditioning manufacturer's manual, provided with your owner's information.

WARNING

Before starting the air conditioning system, make sure that the air conditioning seawater seacock is open. After starting the unit(s), confirm that seawater discharge is flowing from the through hull outlet.

WARNING

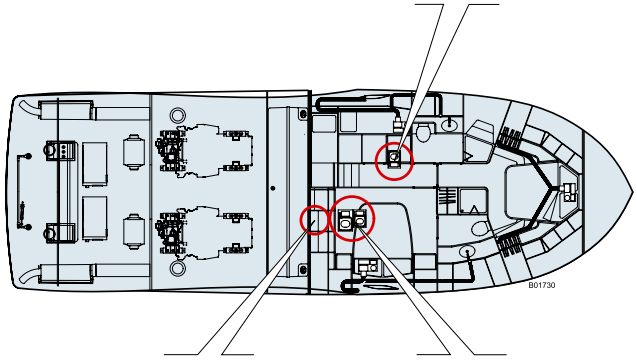
If your boat has been hauled from the water, seawater may have drained from the system. When the boat is returned to the water, air may need to be bled from the seawater strainer before the A/C pump is operated.

NOTICES

It is recommended to always keep a good air circulation inside the yacht; for this purpose it can be helpful to keep the system set to dehumidifier or anyway on.

Port air unit







Intake seacock and filter



Starboard and salon air units

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9.8 CHILLER UNIT CONTROL PANEL

9.8.1 Basic operation

Turning the system on
Press the POWER or MODE keys to turn the system on. In three seconds, the system will start operating in whatever mode it was running prior to the last shut down. Press the MODE key prior to three seconds (while the display is flashing) to change mode before system starts, or any time to change the mode while the system is on. The modes available are: Cool, Heat Auto Switchover (automatically switches from Cool to Heat Mode), or Dehumidification Mode. A solid dot will light up next to the words COOL or HEAT when the compressor is on and running in that mode.

Selecting the setpoint
Press the Up or Down arrow keys to adjust the setpoint (press and hold keys to scroll); wait three seconds after powering up system. The word SET will appear in the display while setpoint is being adjusted. The setpoint range is 55-99 °F (10-40 °C). After selecting the desired setpoint temperature, if no buttons are pressed for three seconds, the display will automatically revert back to showing the inside cabin temperature. Inside cabin temperature is continuously displayed.

Adjusting the fan speed
The Fan key is used to adjust the fan speed while in manual fan Speed mode and to switch from manual to automatic fan speed modes. The fan may be run manually whether the system is on or off. The word MANUAL appears in the display while in that mode. Automatic fan speed mode may be operated only when the system is on. Fan behavior also depends on how the Fan Mode function is programmed: - “C” for continuous or “I” for intermittent running with the compressor (see SMXht keypad/display programming summary table).

Dimming the display
Press the MODE and Up arrow keys simultaneously and repeatedly to select the display brightness setting.

Backlight mode
While in the Sleep Mode (backlight is off, see function #20) press any button to light the display, and then operate as usual.

Important memory function
After changing modes, programming settings, setpoint, etc., wait at least 30 seconds before turning off main power supply in order for new settings to be maintained in memory.

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Programming

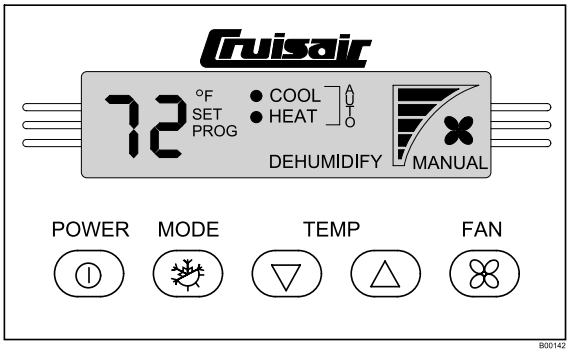
SMXht must be in the Off mode prior to entering Programming Mode; pressing the POWER key turns the display off or on. Once in the Off mode:

1. Simultaneously press and hold the MODE and Down arrow keys for three seconds. The word “PROG” will flash in the display while the buttons are being held. Successful entry into the Programming Mode is indicated when the word “PROG” stops flashing, and a flashing “1” appears in the display.
2. Use the Up or Down arrow keys to scroll until the desired program function number is displayed. See SMXht keypad/display programming summary table.
3. Press the MODE key to enter the desired function. The current value and the word “PROG” will be displayed.
4. Use the Up or Down arrow keys to change the value oft hat program.
5. Press the POWER key to save the new settings, exit the Programming Mode, and return to the Off mode.

Note: If SMXht is programmed for displaying °C (rather than the factory setting °F), then functions 3 & 4 should be adjusted.

For function 3, the factory setting of 12 (or 1.5 °F) should be changed to 7 (7/8 = 33.44 °F). For function 4, the factory setting of 4 (or 0,5 °F) should be changed to 2 (2/8 = 0,3 °C). For these functions °F (or 8) = 0.6 °C (or 5).

For more information, consult the manufacturer’s manual delivered separately.



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9.8.2 Air conditioning system maintenance

Condensate drains
At least once every three months, check the condensate drains for obstructions by pouring a quart of water rapidly into the condensate pan. If it does not drain completely within 30 seconds, check the drain outlets for clogging. Remember that many air conditioning units have two drains and hoses, one at each end of the drain pan.

Air filters
At least once a month, check the lint screen or filter behind the return air grill or on the face of the cooling/heating unit and clean if necessary.

Seawater connections
Verify that all seawater connections are tight, and check for water flow from each unit's overboard discharge.

Seawater pump
If the seawater pump has a plastic pump head, then the impeller is made of either plastic or rubber, and should be inspected after 300 hours of operation. Replace the impeller if it is worn. Whereas, if the pumps head is made of bronze, then the impeller is too, and regular maintenance is not needed as often.

Seawater filter
Check the seawater strainer daily. Remove any debris.

Refrigerant gas
The refrigerant gas used in the air conditioning system is adequate for the life of the system. Routine "seasonal" charging of the system is not typically necessary.

Winterizing the system
Close the seacock and remove the water inlet hose from the air conditioner. Allow all water to drain from the system. Loosen the screws on the pump head to allow the water to drain from the pump. Drain and clean the seawater strainer.

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9.9 BLACK WATER (SEWAGE) SYSTEM

9.9.1 Operating the WCs

The WCs of the heads are ceramic marine-type and are flushed with fresh water. The waste from the WCs is directed to the black water (sewage) holding tank. The WCs have two buttons: BEFORE USE & AFTER USE.

1. Button BEFORE USE
2. Button AFTER USE

Pushing the BEFORE USE button automatically introduces a pre-determined quantity of seawater into the bowl, preventing waste remains from clinging to the ceramic walls.

Pushing the AFTER USE button floods the bowl with fresh water, which breaks up the waste and sends it to the black water (sewage) holding tank.

On the toilets control panel a LED indicates:

3. Green, system activate - red, holding tank full toilet disabled

To change the quantity of water introduced into the WC by the AFTER USE button, and therefore the opening time of the solenoid valve, remove the toilet control panel (**4**) and change the setting of the adjustment regulator.

Regularly pour an appropriate marine disinfectant/treatment liquid into the WCs, following directions on the product label.

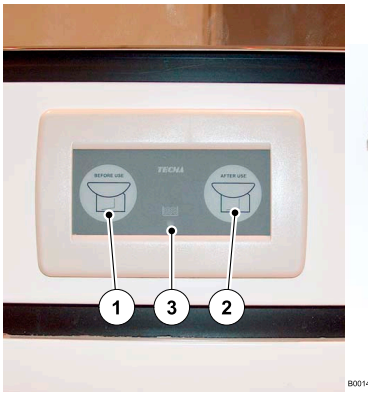
NOTICES

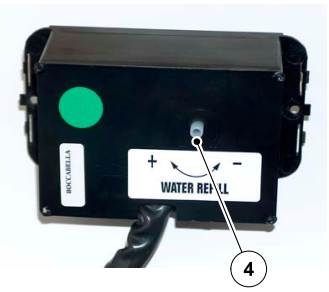
Do not put anything other than human waste and single-ply toilet paper into the WC.

Before entering the harbor, check the black water (sewage) tank and drain it if necessary (beyond land borders) to avoid having to return to the open sea to empty the tank.

ENVIRONMENT NOTICE

Do not discharge black water (sewage) inside harbors or marinas or near beaches. Observe the applicable environmental laws and regulations for overboard discharge.

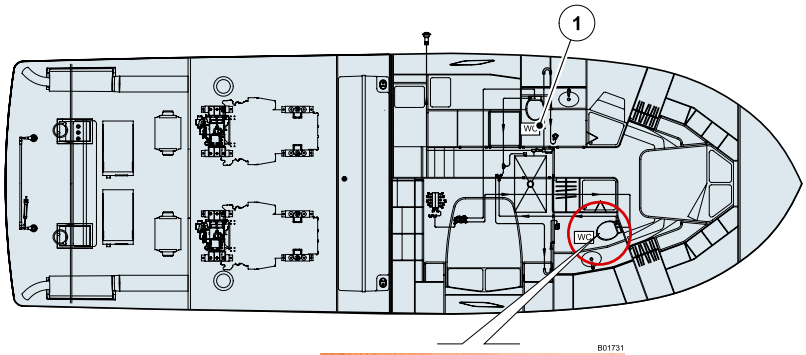




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9.9.2 WC Control Panels



Toilets control panel

1. WC Control Panels

> ***WARNING***
>
> *Close the various safety valves of the WCs drains and intakes, when they are not used.*

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9.9.3 System Operation

NOTICES

It is unlawful to discharge untreated waste within the territorial waters of the United States. Violators are subject to fine of $5,000.00 per incident.

Marine toilets on vessels operating within the territorial water of the United States shall discharge directly into a holding tank, which is to be emptied by a dockside pump-out facility, or at sea beyond the territorial limits. To satisfy U.S. regulations, all intake seacocks on vessels operating within the Territorial waters must be locked shut with a padlock, a non-reusable wire-tie, or have the valve handle removed.
For vessels operating outside of the U.S. Territorial waters, it is generally acceptable to have a toilet system where the waste is either discharged into a holding tank and then pumped overboard, or where the toilet discharges directly overboard through a discharge seacock. However, you, as the owner, must determine and conform to local regulations whenever you operate your vessel.
The system consists essentially of a tank and of a black waters pump, draining overboard. The water used for WCs flushing is taken from the cold water system by means of the distribution manifold. On the manifolds are installed the solenoid valves, each one of them concerns one toilet; they allow the flush of water each time the buttons “Before use” or “After use” are pressed. Each WC has a retting pump conveying black waters into the black water (sewage) tank.
The tank, the macerator pumps and the draining valves are located in the bilge under the passageway of the stateroom area.

WARNING

In case of need, break or pollution of the tanks, they can be replaced. Contact BERTRAM Customer Support.

CAUTION

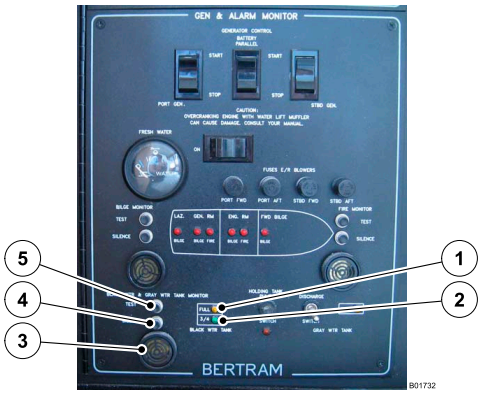
*In case of sinking hazard, if escaping condition allow you this, close the ball valves of the **black water drain**, located in the bilge under the stateroom area*

WARNING

For a proper use, do not let the holding tank overfill.

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The controls of the black water tank are located on the main electric panel in the salon.



1. Full tank alarm warning light. The toilet pumps are disconnected and cannot be used
2. Pre-alarm warning light for black water level. Only a limited number of operations is available
3. Buzzer. Sounds when the tank is full
4. It clears off the buzzer
5. System test

There are two ways to empty the holding tank:
- dockside pump-out using the WASTE drain fitting (within Territorial waters);
- onboard holding tank pump (outside Territorial waters).

To accomplish onboard holding tank pump-out:
- switch on the holding tank pump differential circuit breaker;
- open the intake seacock for overboard drain;
- under the forward companionway sole, you will find the momentary switch for the pump. Depress the momentary switch, and hold it until you hear a change in the sound from the pump, indicating that the tank is empty.

NOTICES

After draining the holding tank overboard, close the sea valve serving the tank discharge thru-hull to prevent seawater from coming back into the tank.

WARNING

For all pleasure yachts it is prohibited to drain at sea the on board toilets inside of harbors, landings and moorings dedicated to craft's anchor riding, and also within the limit of beaches visited by swimmers, as stated in the single decree of the Port Authorities.

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WASTE fitting

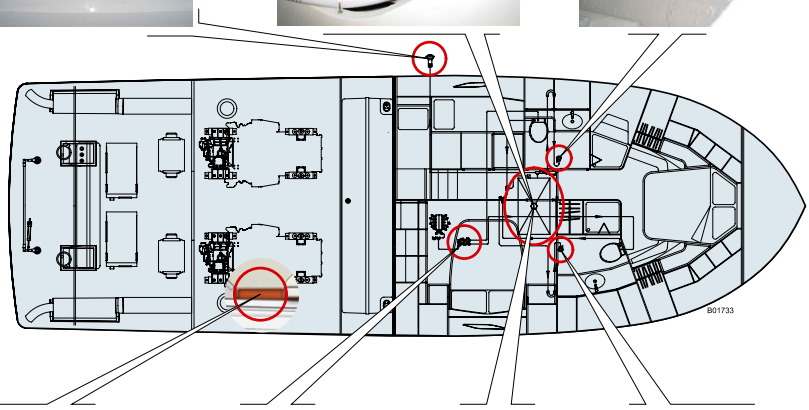


Holding tank and black water pump



WC sea drain







Main electric panel



WC solenoid valves



3-way valve



WC sea drain

Studio ti 03312 540-04usa

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9.9.4 Tank pump-out by shore pump

Observe local regulations that prohibit overboard discharge from holding tanks. You may empty the black water (sewage) tank at the shore into a designated shoreside pump-out station.

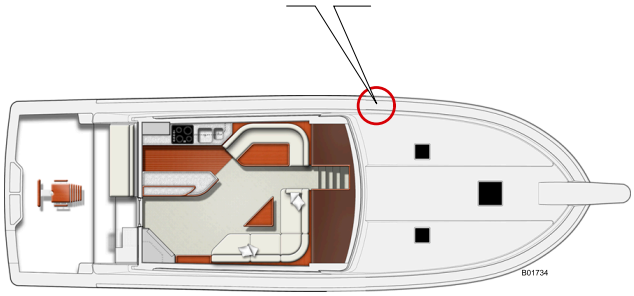
To empty the black water (sewage) tank into a shoreside pump-out station, first make sure the yacht is moored correctly and the engines are shut down.

Connect the shoreside suction hose to the yacht's black water system, using the waste outlet located on the port walk-around. When the line is connected, activate the direct pump-out circuit by opening the suction valve, located near the black water pump, located in the bilge below the stateroom area.

When the draining is complete, remove the hose and firmly tighten the cap of drain fitting.

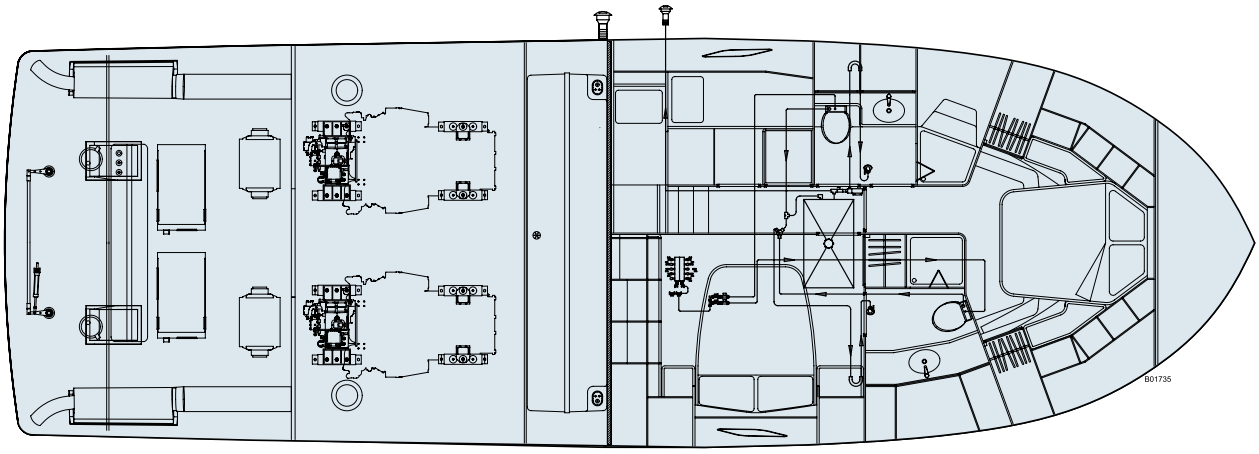
WASTE fitting





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Black water system



Electric pump	WC solenoid valve	Siphon break
Tee connection	Overboard draining	3-way selection valve
Fresh water manifolds	Outlet dockside suction	Tank

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9.9.5 Black water system maintenance

Periodically or by each yacht onshore handing, flush out the black water (sewage) tank with fresh water. Flush it several times until clean. All cleaning water should be drained into the proper shoreside pump-out facility.
Add an appropriate black water (sewage) tank sanitizing product for the final fill and perform a drain cycle, following the product directions. This service procedure will help prevent undesirable odors.
See the **Long-Term Lay-up** section in the **MAINTENANCE** chapter of this manual.

NOTICES

Verify the correct operation at least once a week:
- *of the toilets;*
- *of the black water pump.*

Verify the pipe and connection condition at least once every three months.
Protect with suitable products at least once every six months:
- *the toilet solenoid valves;*
- *the black water pump.*

Carefully clean the black water tank when required but at least once a year.

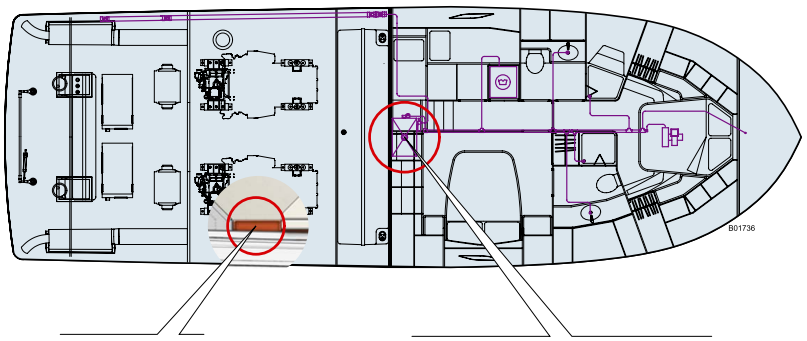
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9.10 GRAY WATER SYSTEM

The water drained by showers, bidets and washbasins is collected into a gray water tank located in the bilge under the stateroom area.
This tank has a pump and automatic float switch. The pump, while operating in automatic mode, discharges the shower and sink water overboard and is powered by the gray water pump differential circuit breaker.

> ***ENVIRONMENT***
>
> *Do not discharge soaped waters drained by washing machines and dishwashers in the harbor, inside marinas or near beaches, because of the large amount of foam produced.*

The galley sink and dishwasher drain directly overboard.
On the electrical panel of the salon you can monitor the status of the gray waters tank.
When the liquid level of the gray water tank reaches a nearly full condition, an indicator light will come on and an alarm will sound. A momentary push button switch is provided to manually override the automatic operating function.




Electric panel


Grey water tank


Grey water pump

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If pressing and holding the switch for a few minutes does not cause the alarm horn to stop sounding and the light to extinguish, briefly press the silence button. The light will remain lit until the problem is fixed, but the alarm horn will stop sounding. Correct the problem as soon as possible to prevent the tank from overflowing.
The monitor system can be disabled permanently by turning off the differential circuit breaker. This monitor also includes the tank level signal system. Turning off the circuit breaker will disable the holding tank warning system as well as the gray water tank system.

9.10.1 Gray water system maintenance

Flush the gray water tank at least every three months. Fill and empty the tank with clean water.
Repeat the operation two to three times.
To prevent the formation of bacteria and the consequent production of bad smells, pour regularly an appropriate disinfectant into the drains of sinks, showers and bidets that discharge into the gray water tank.

NOTICES

At least once every three months:
- *fully clean the tank;*
- *fully clean the pump;*

Verify the pump condition at least once every six months.

NOTICES

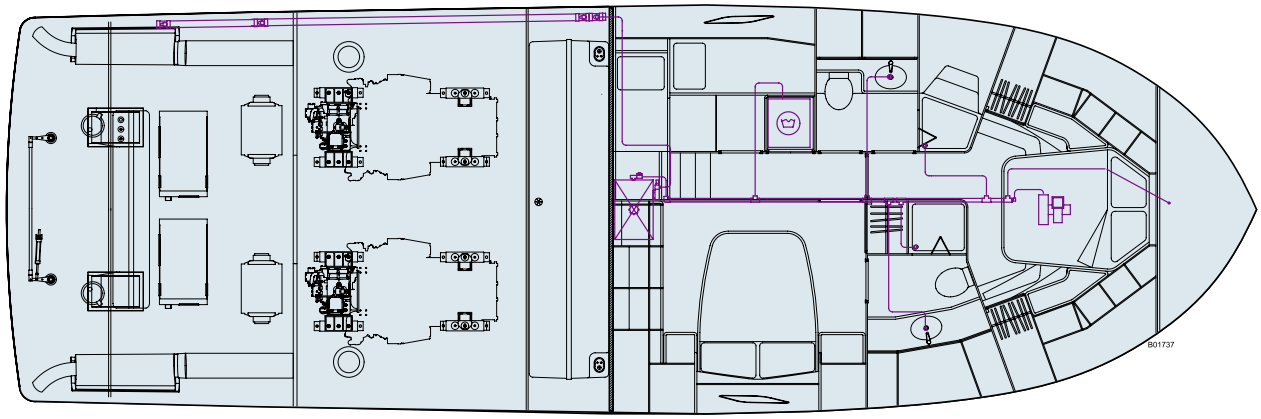
Do not use very aggressive products or lye-based dissolvers for the tank cleaning. For more information contact BERTRAM Customer Support.

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Gray water system



Grey water pump

Tank

Centralized drain

Tee connection

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BERTRAM

10



ELECTRIC SYSTEM

FOREWORD

USE OF THE MANUAL

DESCRIPTION OF THE YACHT

NAVIGATION

AUXILIARY EQUIPMENT ON BOARD

CONTROL STATION

ON THE MAIN DECK

THRUST SYSTEMS

HYDRAULIC SYSTEMS

ELECTRIC SYSTEM

DETAILED INFORMATION ON THE INTERIORS

SAFETY DEVICES AND EQUIPMENT

YACHT HAULAGE AND LAY-UP PERIOD

MAINTENANCE

TROUBLESHOOTING

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10.1 ELECTRICAL SYSTEM DESCRIPTION

CAUTION

ELECTRICAL SYSTEMS AND CIRCUITS
For the plans and the specifications of the electric components, refer to the specific manual.

CAUTION

Before undertaking any navigation, check that the batteries are in good condition and that they supply the correct nominal current.

CAUTION

During navigation both selectors of user and engine batteries, must always be switched to ON. The selector for parallel connection on both batteries banks must normally be disconnected, OFF.

CAUTION

Do not start sailing without having set to ON both switches: engine and user batteries and do not disconnect them during navigation.

CAUTION

If an operation fault on the re-charging alternators occurs when underway, set to "ON" the parallel link selector between the battery banks and let it connected until the fault has been removed.

CAUTION

If during navigation a sensitive and a persistent lowering of the batteries voltage occurs, it is necessary to switch on the current generator and to make sure that the independent electric batteries charger is activated.

CAUTION

The parallel connection system between the batteries sets, driven by a switch located in the main control station, is used to increase the boosting power at engines start, under particularly climate conditions or charge condition, and for a short period of time.
The switch for batteries parallel connection has to be activated only by placing selectors connecting the engines batteries banks and users to ON.
Do not use in case of faults on the batteries recharging circuits, for instance on the engines alternators. We advise to use this system only in emergency cases.

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The electrical system of your yacht has been designed with the utmost attention to all aspects of safety. The system has been manufactured and installed using high-quality materials that meet or exceed industry standards.

This system has been manufactured according to the standards of Registro Italiano Navale (section D - RINA), of UNI EN ISO and of ABYC, which regulate the electrical systems of pleasure yachts.

The yacht electric system consists of three distinct and separated sections:

- Users network supplied at a rated voltage of 24 V DC by six banks of accumulators at 12 V DC each, serially/parallel connected to deliver 24 V.
  The above-mentioned battery bank is re-charged through the 100 A output of the on-board battery charger and by the alternator, driven by the port propulsion engine of the yacht.
- Engine network, supplied at a rated voltage of 24 V DC, by six accumulator banks of 12 V DC each, serially/parallel connected to obtain 24 V. This bank of batteries is recharged by a second output of the onboard battery charger, and by the alternator driven by the starboard engine.
- 230 V - 60 Hz user network supplied from shore, or alternatively, by the power generator installed onboard (standard generator power 23 kW). The power generator is supplied by a 12 V DC accumulator bank, located near the generator and recharged by the generator battery charger and by an alternator, driven by the generator.

All the electric cables have been insulated with PVC N07V-K and further protected by sheaths and/or PVC self-extinguishing raceways.
Each junction is made by terminals with screw tightening housed in self-extinguishing PVC boxes. The protection of the system's single parts is ensured by automatic breakers of different amperage and sized according to the absorption of each single user to be protected, and to the size of the wires used for their supply. All metallic wet pieces are interlocked with equipotential connections and linked on sacrificial anodes of zinc installed on the underwater quick-work.
Regular service and proper use of the system will contribute greatly to its continued safety. Like any other system onboard, the electric system is subject to the stresses and vibrations of the hull. In addition, the electric system is exposed to high levels of corrosive salt humidity. Therefore, you must check the condition of the system and its individual components as part of a scheduled service plan.

NOTE: the **230 V AC** system shows features (and hazards) similar to those of a domestic household system. If the system or components are misused, or poorly maintained, there is a risk of fire or personal injury. Statistically, the electrical system is one of the most frequent causes of fire onboard.
There are two separate electrical systems onboard, each one having own features:

- 24V DC
- 230 V AC (60 Hz)

The DC voltage electrical systems are supplied by three banks of storage batteries: engine bank (24 V), user bank (24 V) and generator battery (12 V).
The AC system can be powered either by the shore power supply or by the onboard generator.

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All electric users are protected by circuit breakers, fuses and residual current switches for a total protection against accidental contacts on the whole 230 V AC system.

WARNING

NEVER:
- *work on the electric system while under voltage.*
- *modify the electric systems of the system or relevant drawings: the installation, the modifications and the maintenance must be carried out only by a skilled marine electrician.*
- *alter or modify the intensity of rated current of protections against overcurrent.*
- *install or replace electric equipment or devices with components exceeding the rated current intensity of the circuit.*
- *leave the yacht unguarded with the electrical system powered, except for the circuits of the bilge automatic suction pumps, of the firefighting protection and of the alarms (driven by batteries).*

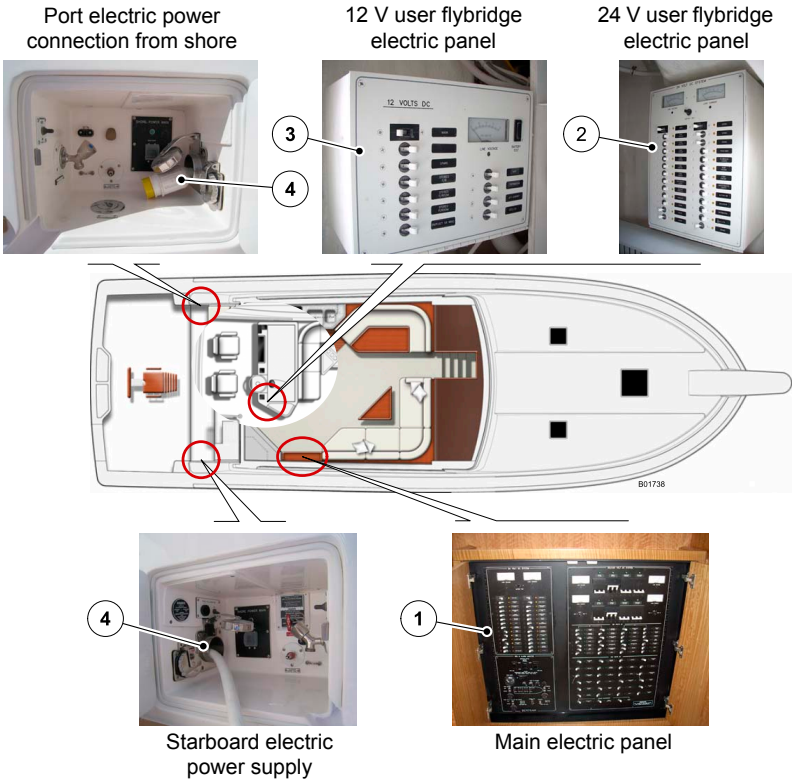
1. Main electric panel
2. 24 V DC user flybridge electric panel
3. 12 V DC user flybridge electric panel
4. Shore electric power supply with electric cablemaster (no. 2)
5. Battery breaker panel
6. 24 V/100 A -3 A battery charger
7. Head block/gearbox power unit (no. 2)
8. 60 A battery equalizer
9. 24 V/40 A -3 A battery charger
10. Generator 12 V battery charger
11. Electric cablemaster
12. Isolation transformers (no. 2)
13. Generator (23 kW - 50 Hz)

NOTICES

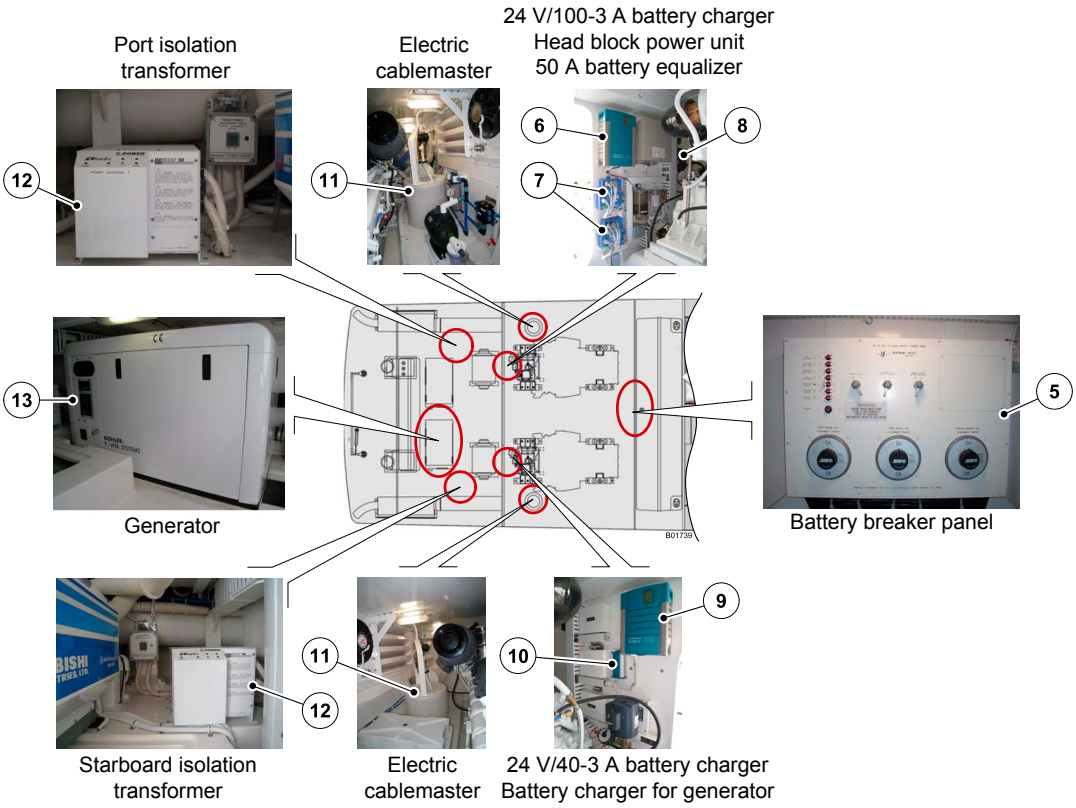
The images and drawings of the electric panels are referred to the US-version of the yacht.

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10.1.1 Location of electrical equipment on board



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CAUTION

Do not modify the electric systems or relevant drawings. The installation, the modifications or the maintenance must be carried out only by a skilled marine electrical technician. Inspect the system at least once a year.

CAUTION

Disconnect the dock power supply connections when the system is not in use.

CAUTION

Use electric devices with double isolation or earthing (ground).

CAUTION

Do not allow that cable end of dock power supply to floats in the water. This can cause an electric field and following injuries or even the death of the swimmers nearby.

WARNING

To reduce to the lowest the hazard of electrocution or fire:
- *open the switch to connect the dock supply to the unit, before connecting or disconnecting the dock power supply cable;*
- *disconnect the shore power supply cable and rewind it using the cablemaster.*
- *securely fasten the lid of shore power supply outlet.*

CAUTION

Do not modify connectors of dock power supply cable, use only plug compatible connectors.

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10.2 ELECTRICAL SYSTEM WARNINGS

DANGER

Electric shock hazard exists in an energized electrical system. To avoid electric shock, turn off power before opening the cover and servicing any internal components of electrical equipment.

CAUTION

Activate all electrical systems and devices (included those at low voltage) with extreme caution. Avoid overloads which can generate short-circuits, dangerous overheating and risk of fire, having as a result serious injuries or even death.

CAUTION

The 120/240 V AC system is similar to a domestic system as to its features and hazards. If improperly operated or maintained, it can cause a fire or personal injury or death.

WARNING

Never deactivate the battery disconnectors with the engines running or you may damage the engine alternators.

WARNING

Use the switch for engine/user battery parallel connection, only if absolutely necessary, to provide additional battery power to start the engines. If your are compelled to use the "battery parallel connection", turn off all electric devices so as not to jeopardize their correct operation. Disconnect the parallel link as soon as possible.

CAUTION

Only a skilled naval electrician can perform maintenance on the vessel electrical system.

WARNING

Do not replace an existing circuit breaker or fuse with one of a higher rating. Such modification could cause equipment and/or circuit failure and fire.

WARNING

Have a BERTRAM authorized electrical engineer inspect the isolation transformer, the differential circuit breakers, the electric panels and other components of the electrical system, to ensure the correct operation and to detect any overheating signal.

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CAUTION

SHOCK/FIRE HAZARD
Replace automatic breakers or fuses with same amperage. Never alter overcurrent protection.

CAUTION

AC ELECTRICAL SYSTEM: EXTREME HAZARD
Extreme hazard - swimming near a vessel equipped with AC-electrical system operating can lead to severe shock or death. Never swim or allow anyone to swim when the AC-system is powered.

CAUTION

A.C. CIRCUITS CAN DELIVER A LETHAL SHOCK!
Before opening an electrical distribution panel or servicing any electrical equipment:
– disconnect the shore power cord;
– stop the generator;
– deactivate the main battery disconnectors.

CAUTION

Do not replace your vessel's circuit breakers of fuses with breakers or fuses of higher amperage than those installed by BERTRAM. Choose differential circuit breakers and fuses for the spare circuits with ratings that match the load of the equipment, but do not exceed the current carrying capacity of the cables in each branch circuit.

DANGER

Extreme danger:
– Never use open flames in the battery storage area.
– Prevent sparks from reaching the battery.
– The battery can explode if, while charging, a spark or a flame turn on, due to the hydrogen released.

CAUTION

SHOCK/FIRE DANGER:
– Disconnect the electric system from the mains before starting any maintenance work. Never perform any maintenance work on the electric system while under voltage.
– The electric devices should never exceed the rated voltage of the yacht electric circuits.
– Check carefully the electric system while under voltage.
The only electrical components which can be left unattended are the automatic bilge pumps, fire protection and alarm circuits.

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WARNING

– *Stop the engine before inspecting the battery or servicing it.*
– *Disconnect the battery cables before working on the electric system in order to prevent the generation of arcs or damaging the alternator. Disconnect the negative cable (-) first, then the positive cable (+).*

CAUTION

Explosion/fire danger - Check if gas fumes are suspended in the bilge or in the generator area.

CAUTION

Carbon monoxide poisoning:
– *Operate the generator only in a well ventilated area. The carbon monoxide, generated by the inner combustion of engines, is extremely toxic.*

CAUTION

Shock Hazard
Persons with heart problems or other conditions which make them susceptible to electric shock may still be injured by ground faults on circuits protected by GFI (Ground Fault Interrupter) outlets. No safety devices yet designed will protect against all hazards or carelessly handled or misused electrical equipment or wiring.

DANGER

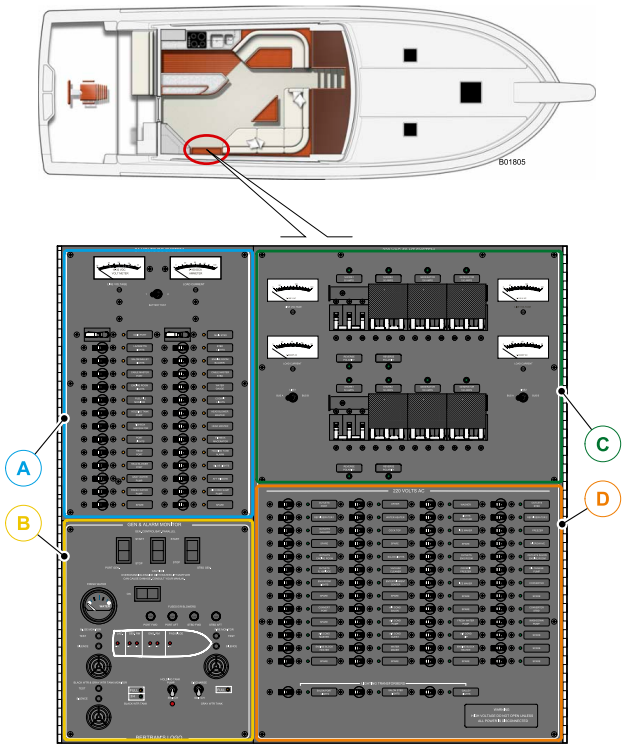
The transformers installed on board separate galvanically the dock electric system from the on board electric system.
During yacht onshore handing (lay-up) for maintenance, if you use one or both shore plugs for the power supply of the on board 120 / 240 V AC electric system, make sure that the yacht earthing is connected to the shore column earthing, taking advantage of expert crew.

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10.3 MAIN ELECTRIC PANEL

The electric system is monitored from the panel located in the salon starboard. The following main sections have been identified, in order to make the descriptions easier:

A. Voltmeters, ammeters for 24 V DC and circuit breakers protecting the 24 V DC users
B. Generator signal and control panel
C. Voltmeters, ammeters for 230 V AC networks, circuit breakers protecting the 230 V AC networks, when these are powered by shore network of by generator
D. Circuit breakers protecting the 230 V AC users



CAUTION

High voltage
Disconnect the electric power supply before opening the door.

CAUTION

Switch off the generator, the inverter and disconnect the shore outlets before opening the panel.

NOTICES

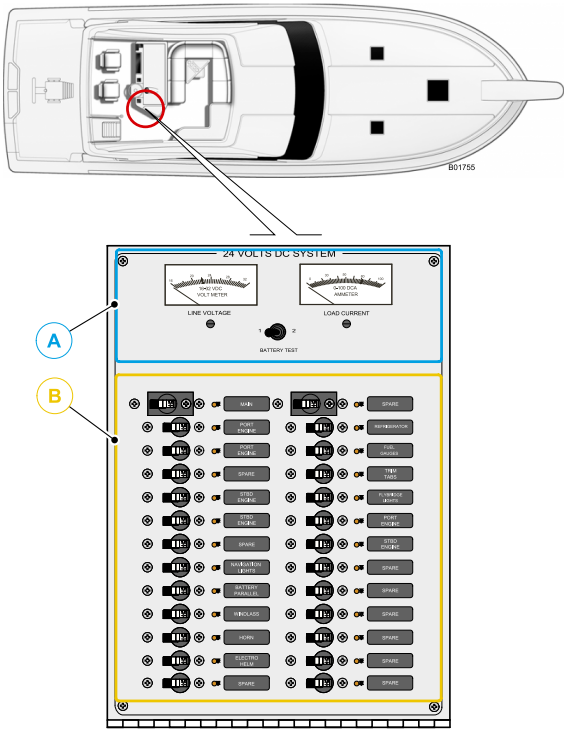
The description of the electric panel is referred to the standard version of the yacht.

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10.4 24 V DC USER FLYBRIDGE ELECTRIC PANEL

On the flybridge is installed an electric panel equipped with circuit breakers protecting the 24 V DC users and the measuring instruments of the system. The following main sections have been identified, in order to make the descriptions easier:

A. Voltmeter and ammeter for 24 V DC batteries
B. Circuit breakers protecting the 24 V DC users



CAUTION

High voltage
Disconnect the electric power supply before opening the door.

CAUTION

Switch off the generator, the inverter and disconnect the shore outlets before opening the panel.

NOTICES

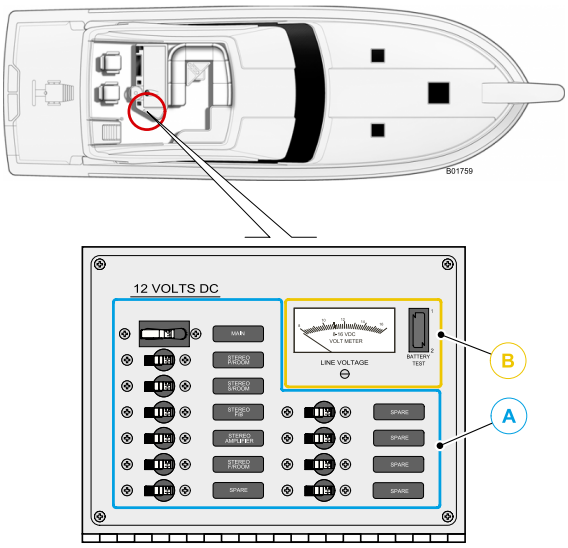
The description of the electric panel is referred to the standard version of the yacht.

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10.5 12 V DC USER FLYBRIDGE ELECTRIC PANEL

On the flybridge in front of the 24 V users electric panel is installed a further electric panel equipped with circuit breakers protecting the 12 V DC users.

A. Circuit breakers protecting the 12 V DC users
B. Voltmeter for 12 V DC batteries



CAUTION

High voltage
Disconnect the electric power supply before opening the door.

CAUTION

Switch off the generator, the inverter and disconnect the shore outlets before opening the panel.

NOTICES

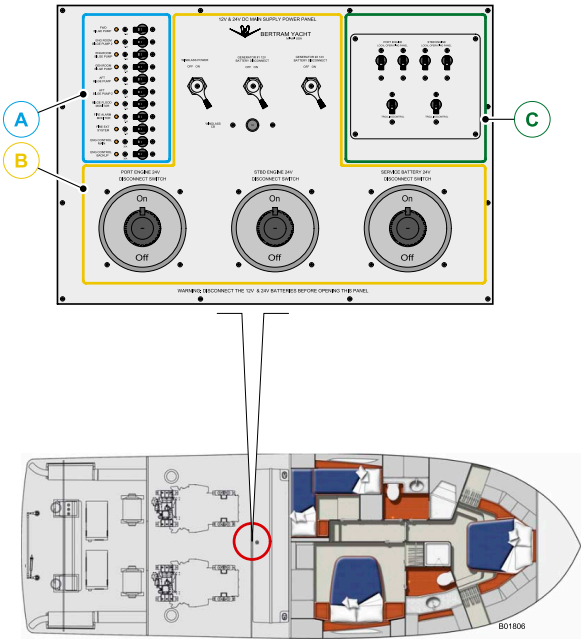
The description of the electric panel is referred to the standard version of the yacht.

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10.6 12 V /24 V DC BATTERY DISCONNECTOR PANEL

In the engineroom is located an electric panel equipped with circuit breakers and battery disconnectors.
The following main sections have been identified, in order to make the descriptions easier:

A. Circuit breakers for bilge pumps and firefighting system
B. 12 V/24 V DC battery disconnectors
C. Circuit breakers for engine control



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CAUTION

Before opening the door disconnect 12 V and 24 V DC batteries

CAUTION

Remove fuse from bilge pump of engineroom, before beginning any mechanical intervention in the engineroom.

WARNING

The battery disconnectors are designed for use under normal operating conditions. If this switch opens the DC circuit while the engine is being started, the switch should be replaced as soon as possible to avoid future failure.

WARNING

Do not disconnect the battery master switches with engines running or you may damage the engine alternators.

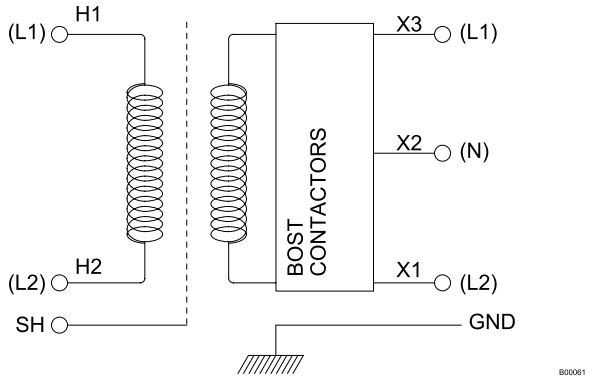
DANGER

The emergency parallel system is intended for emergency use only. If the batteries are paralleled, they will both charge and discharge at the same rate.
Do not use this system on a continual basis because of the possibility of both battery banks going dead and leaving the main engines without a source of starting power.

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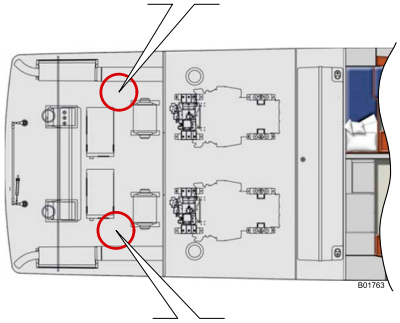
10.7 ISOLATION TRANSFORMER

The yacht is equipped with two isolation transformers ensuring the electric power supply from shore.
The transformer is able to isolate completely the input power from the output power, improving safety and reducing the corrosion caused by galvanic currents. This means that there is no direct electric connection between AC from shore and AC from the yacht. The cable connecting the bonding cord is connected to a screen fit between two coils. This screen ensures the yacht isolation.
When the voltage drops below the preset threshold, due to a shore power supply drop, the transformer increases automatically the yacht voltage. The power supply is transferred from shore to the yacht electric system.



Port insulation transformer and circuit breaker







Starboard insulation transformer and circuit breaker

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CAUTION

Do not store equipment on or next to transformer. This unit is designed to operate hot and must have free air flow to prevent overheating or charring of adjacent materials.

CAUTION

Use appropriate equipment to hoist and rig unit. Care should be taken to ensure safety of individuals.

DANGER

This device is not ignition protected. Avoid serious injury or death from fire or explosion. Do not install in compartment containing gasoline fueled engines or gasoline tanks, or in areas where ignition protected equipment is required.

DANGER

To avoid serious injury or death from high voltage electrical shock, disconnect AC shore power before opening panel.

DANGER

To avoid serious injury or death from high voltage electrical shock, disconnect AC shore power before attempting any maintenance or cleaning.

CAUTION

On board and in-water shock hazard. The transformer must be connected in accordance with manufacturer's installation instructions.

CAUTION

FIRE DANGER
It is normal that the transformer generates and gives out a lot of heat. Pay attention not to cover the transformer with stowing material and keep it free from obstructions, to ensure a proper ventilation. Do not stow flammable material close to the transformer.

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WARNING

Fire Hazard
Periodically make arrangements to have a BERTRAM authorized electrical engineer inspect the transformer for signs of overheating.

DANGER

The transformers installed on board separate galvanically the dock electric system from the on board electric system.
During yacht onshore handing (lay-up) for maintenance, if you use one or both shore plugs for the power supply of the on board 120 / 240 V AC electric system, make sure that the yacht earthing is connected to the shore column earthing, taking advantage of expert crew.

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10.8 POWER GENERATOR

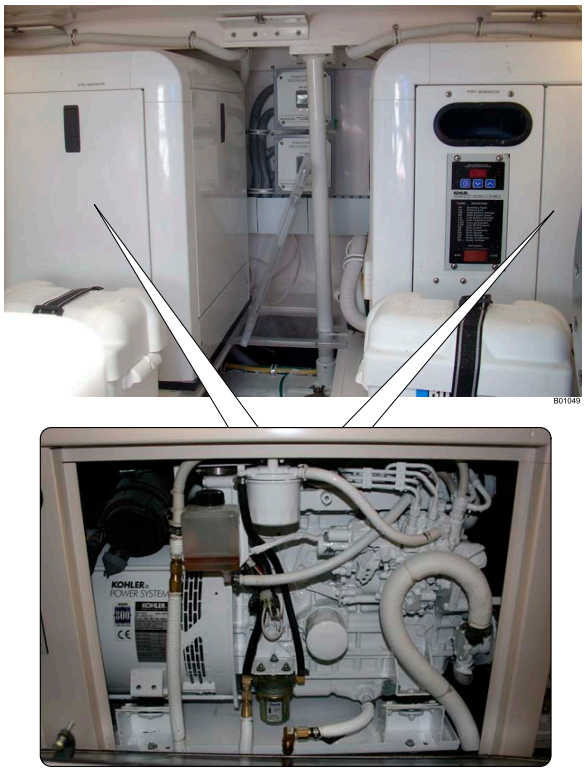
10.8.1 Operation

On board of your BERTRAM 540 yacht are installed two KOHLER generators, located in the generators' room. On the fuel tank, you can easily locate the power generator supply, which can be cut-off by means of two delivery valves, on which you can handle to cut off the fuel lines in case of emergency and to shut off the generators. The connections going from the generators to the tank are for fuel flow-back. The exhaust gases, instead of being discharged directly overboard, are conveyed by means of a silencer, installed on each generator and located in the helm gear compartment and then discharged overboard. These silencers, through the injection of water in the exhaust tubes, allows to cool down the fumes and at the same time, to reduce the noise produced by he water outflow. The intake seacocks of the cooling circuit are installed on the hull with the sea water filters fastened to a surface near to intake seacock valves.
Clean the intake seacock filters according to the frequency of the system use and to the condition of the sucked waters. Before cleaning the strainers, remember to close the hull valves, then proceed with maintenance. When the cleaning is complete, REOPEN the valves feeding the cooling circuit. The generator may be operated either by the remote electric panel or at the generator through the control panel located on the unit in the engineroom. The generator is also equipped with a battery disconnect switch.

WARNING

It is highly recommended to empty the generator muffler after several (three) failed attempts to start the generator.
If this precaution is not observed, water reaches the generator through the exhaust manifold. The exhaust control panel is located at the bottom of the generator muffler.

For detailed information about generators operation and maintenance procedures, see the manufacturer manual.
KOHLER 22 EFOZD (230 V - 50 Hz) and KOHLER 13 EFOZD (230 V - 50 Hz)



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10.8.2 Generator control panel

On the power generator is installed a control panel allowing to carry out the controls and the start/stop operations.

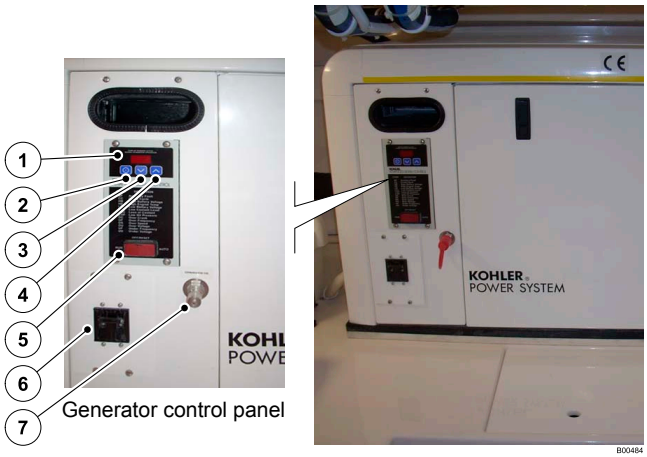
Function keys

1. Display
2. Confirmation key "⊙"
3. Scrolling key "V"
4. Scrolling key "Λ"
5. Start/stop switch
   - RUN/OFF-RESET/AUTO
   To switch on the generator, set to AUTO switch (**5**), placed on the main electric panel of the salon.
6. Main power generator switch
7. Oil intake for generator cooling

For further information, see the Manufacturer's Manual.

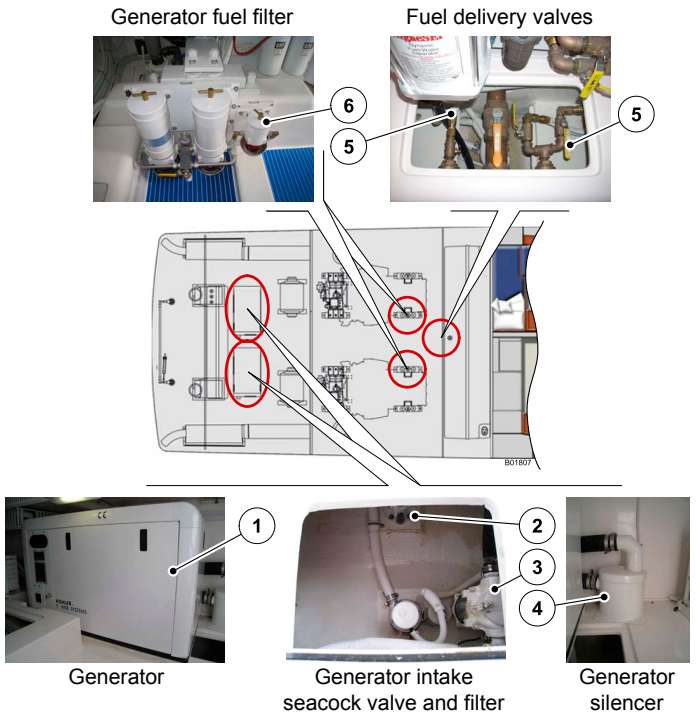
> ⚠ ***CAUTION***
>
> *Carbon monoxide poisoning:*
> – *Operate the generator only in a well ventilated area. The carbon monoxide, generated by the inner combustion of engines, is extremely toxic.*

> ⚠ ***CAUTION***
>
> ***Explosion/fire hazard***
> *Check for the presence of fumes in the generator area.*



Generator control panel

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1. Generators
2. Generator intake seacock valves
3. Intake seacock filters for generators
4. Generators silencers
5. Valves deliverying fuel to generators (close in case of generator leaks or to carry out maintenance)
6. Water/fuel separator filters for generators

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10.9 GENERATOR LUBRICATION SYSTEM

See the **SCHEDULED MAINTENANCE** section of the generator manual for details about oil change and oil filter replacement intervals.

10.9.1 Oil specifications

Refer to the generator manual for oil specifications.

NOTICES

Failure to observe the oil specifications may cause inadequate lubrication/oil pressure and cold-starting difficulties.

10.9.2 Oil check

Check the oil level in the crankcase daily or before each startup to ensure that the level is in the safe range. To check the oil level, remove the dipstick and wipe the end clean, reinsert as far as possible and remove. Maintain the oil level between the Min and Max marks on the dipstick.

NOTICES

Do not operate the generator if the oil level is below the Min or above the Max mark.

10.9.3 Oil change procedure

See manufacturer's manual.

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10.10 GENERATOR COOLING SYSTEM

10.10.1 Closed oil coolant

In the closed cooling system, the seawater circulates through separate chambers within the oil exchanger or manifold to cool the engine coolant. The seawater then mixes with the engine exhaust and exits from the exhaust outlet.

Consult the generator manual for the location of the protective anodes in the cooling system. Check the anodes at the intervals prescribed in the generator manual. The anodes protect the cooling system from corrosion damage; if the anodes are wasted away, corrosion protection will cease. See the **Sacrifical Anodes** section in the **MAINTENANCE** chapter in this manual.

CAUTION

Hot coolant and steams may cause heavy injuries or even death.

Coolant Check and Filling
See manufacturer's manual.

Flushing and Cleaning Procedure
See manufacturer's manual.

Impeller Inspection and Replacement Procedure
See manufacturer's manual.

Sacrificial anodes
The generator has internal zinc anode(s) to help prevent internal corrosion. Consult the generator manual for instructions on checking and replacing the anode(s). Failure to replace the zinc anode at the recommended service intervals will cause internal corrosion of the generator's cooling system.

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10.11 GENERATOR FUEL SYSTEM

Fuel filter cleaning/replacement (optional)

The fuel before reaching the generator, flows through the filter, that holds impurities and separates the possible present water, to prevent that it reaches the engine. Clean the filter if dirty or replace it.

To service the fuel filter see the Manufacturer's manual.

Air inlet filter replacement or service

The air penetrating inside the generator is filtered by the air inlet filter, which helps making the generator operation less noisy.
To clean a dirty filter or replace a damaged filter, see the equipment Manufacturer's manual.

Generator exhaust system inspection

- Check the components of the exhaust system (exhaust manifold, mixing elbow, exhaust line, hose clamps, muffler and outlet flapper) for cracks, breaks and corrosion.
- Check the hoses for cracks, leaks, or dents. Replace them if necessary.
- Check for the presence of metallic pieces corroded or broken. Replace them if necessary.
- Check for lose, corroded or missing clamps.
- If necessary, tighten or replace the hose collars and/or the brackets.
- Check that the exhaust output is not clogged.
- Check visually for leaks from the exhaust.
- Check for carbon or soot residues in the exhaust components. These residuals show the presence of leaks that have to be eliminated.

WARNING

If the generator does not start after several attempts, the muffler could be full of water. In order to prevent seawater from entering the generator engine and causing serious damage, unscrew the muffler drain plug and drain the muffler.
When attempting to start the generator, do not exceed 20 seconds of cranking. Wait 2 to 3 minutes before trying again.

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10.12 BATTERIES

The batteries are normally charged by the alternators during the operation of the engines. Alternatively, you can recharge them with the battery charger by shore power supply or by the generator (selecting the power source).

Description	Cells number	Features
Engine start	3+3	12V 75 Ah
Generator start	2	12V 50 Ah
Users	6	12V 110 Ah

WARNING

If batteries are not recharged over long periods of inactivity, they loose progressively their charge, until they become definitively flat and irreparably damaged.

CAUTION

Always keep the batteries charged and recharge them periodically even if the yacht is left unattended. If the charge level drops to the minimum, the batteries can get irreparably damaged. Check each week the charge status.

DANGER

NEVER clog the air inlets of the cases containing the batteries because the natural ventilation of the batteries must always be ensured so that they do not overheat.

CAUTION

Monitor the voltage of the batteries. During the charging phase 29.1 V can be reached, this is a temporary value, well tolerated, both by the batteries and by the battery charger. This value has to be monitored and if this situation lasts for too long, the magneto-thermal switches of the battery chargers must be disconnected.

CAUTION

A frozen battery may explode if used or charged; do not start a yacht with a frozen battery. To prevent the battery from freezing keep it always completely charged.

DANGER

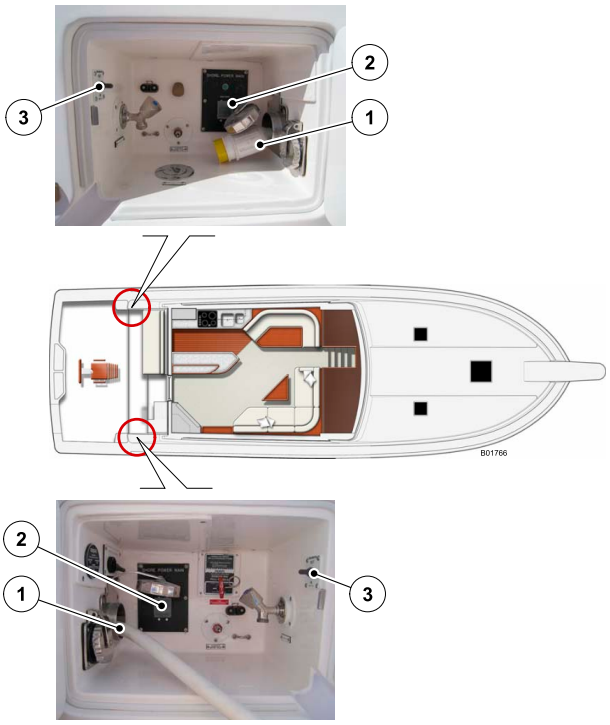
The battery releases explosive gas: do not approach sparkles or a flame nor smoke near it. If the battery is used or charged in a closed area, check for good ventilation. Do not check the battery charge by short-circuiting the terminals with metal tools: use a density gauge or a voltmeter.

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10.13 SHORE ELECTRIC POWER SUPPLY

In order to power the electric system of the yacht, so as to operate the various systems on board, two connections (**1**) for 220 V electric power supply from shore have been arranged, each one equipped with circuit breaker (**2**) protecting against overloads or short-circuits.
The connections are located on each side of the aft cockpit inside of a suitable peak closed with a lid.
It occurs very often to find dock plugs with dimensions not compatible with those on the ship; in this case it is necessary to address to the Port Authority and to get a new plug or an adapter.
Each connection is provided with an electric cablemaster (Glendinning 220 V/50 A) (optional) installed in the engineroom, which allows an easy recovery of the cable; it can be activated through the switch (**3**) near to the cable outlet (see figure).
The cablemaster consists of hawse pipe and power unit. Within the hawse pipe, a neoprene gasket/wiper prevents the entrance of water and helps clean the cable as it is retracted into the boat. When the cable is retracted completely into the boat, the shore cord cover activates the “in-limit” switch, turning off the motor. The “out-limit” switch is located in the guide and roller assembly. The nylon safety collar activates the “out-limit” switch and serves as a mechanical stopping device, should the “out-limit” switch fail.

Cable output and cablemaster control



Cable output and cablemaster control

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The yacht is equipped with two isolation transformers located in the generator room, capable of galvanically isolating the yacht's electrical system from the shore electrical system.
To use the electric power supply from dock:
- Turn OFF the AC shore master power supply breakers on the main electric panel of the salon.
- Set to OFF the switch of the dock column.
- Plug-in the electric cable winder in the dock socket.

CAUTION

Do not modify connectors of dock power supply cable, use only plug compatible connectors. If the yacht power supply cable cannot be plugged into the dock socket, ask the Port Authority for an adapter.

- Turn ON the circuit breaker on the shore column.
- Turn on the general circuit breaker of the relative shore power outlet used and all the breakers located on the main electric panel.

CAUTION

Do not place your hands into the hawse pipe when retrieving the cable.

WARNING

To prevent the cable from becoming tangled in moving machinery, always check to be certain that all of the cable is contained in the drum when completely retrieved.

CAUTION

To interrupt shore electric power supply:
- *turn OFF the main circuit breaker of the shore power outlet used;*
- *turn OFF the protection on the shore column;*
- *disconnect the dock supply cable and rewind it by means of the cable winder;*
- *securely fasten the lid of shore power supply outlet.*

To service the electric power supply from shore:
- In a marine environment, all exposed metallic segments of cables and ducts, must be cleaned periodically with fresh water, while the shore power supply is not in use. Dry and spray with moisture repellent.
- Periodically apply vinyl protector to the cables' plug.

CAUTION

Disconnect the dock power supply connections when the system is not in use.

WARNING

Do not allow that cable end of dock power supply to floats in the water. This can cause an electric field and following injuries or even the death of the swimmers nearby.

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CAUTION

The connection must be performed under safety conditions with not powered connections and by paying attention to carry out a correct grounding.

WARNING

Before connecting or disconnecting the shore power cord, ensure that the main shore power circuit breakers are switched off or that the power selector switch is off. This will help to prevent connector arcing and damage. The shore power cord is a twist-to-lock fitting. Ensure that this fitting is properly locked-in place before switching the main shore power breaker to the on position. This will help to prevent arcing. The shore power outlet is set to 50 A to protect the shore power supply cord fitting. Do not exceed a current absorption of 50 A.

DANGER

Before connecting the dock socket, ensure the type of voltage and the sockets available, their integrity and the absolute absence of moisture on the wire, on the socket and on the plug.
With plug connected check that wire:
– cannot get in traction as a result of tide variations, yacht movements, etc.;
– cannot get crushed, etc.

DANGER

Before carrying out any intervention on the electric system, disconnect all circuits (dock and generator):
– disconnect the dock socket;
– set to OFF the generator circuit breaker.

DANGER

The transformers installed on board separate galvanically the dock electric system from the on board electric system.
During yacht onshore handing (lay-up) for maintenance, if you use one or both shore plugs for the power supply of the on board 120 / 220 V AC electric system, make sure that the yacht earthing is connected to the shore column earthing, taking advantage of expert crew.

CAUTION

To minimize shock hazard, unplug the shore power cord and close the inlet cover tightly. Do not alter the shore power cord connections.
Do not cut or disconnect the green bonding conductor inside of shore cord or at shore outlet. This conductor is needed to provide the same bonding potential between the shore ground and your boat's ground and minimizes the shock hazard to people on the boat or in the water.

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10.14 BATTERY CHARGER

On board of your BERTRAM 540 are located two battery chargers, fully automatic and of high performance (CHARGEMASTER type). The battery charger is equipped with a special charging technique, improved to charge the batteries rapidly and safely, while powering the connected users. Besides the charger is protected from short-circuits, overloads and high temperatures (engine room). On the battery charger three buttons (**1**, **2** and **3**) and one LCD display (**4**) allows to show data and information.



Battery charger buttons

1. **POWER**
   Keep the key (**POWER**) pressed for 3 seconds in order to start the battery charger or set it to the stand-by mode.
   - Green lit = on
   - Orange lit = stand-by
2. **INFO**
   Press key (**INFO**) shortly to display the sequence of the CHARGEMASTER data.
3. **SOURCE**
   Select (**SOURCE**) to choose the battery bank (**1**, **2** or **3**) you wish to check.

WARNING

For further information concerning the battery charger, refer to manufacturer's manual.

CAUTION

The connection between the electric network and the battery charger is not interrupted with the selector switch.

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10.14.1 Battery charger service

Item	Maintenance	Notes and precautions
Battery charger	Check Charge output	Have at least two or three times a year checked by experienced crew that each wire and cable connection is correctly tight and not oxidized. Keep the battery charger dry, clean, and remove any dust, to ensure good heat dissipation. Check periodically the good condition of the cooling fan.

DANGER

Do not work on the battery charger or on the electric system if they are still connected to a current source.

Modification to the electric system must be carried out exclusively by skilled personnel and only after the approval of BERTRAM.

DANGER

Have the inner condition of the battery charger checked at least once a year by skilled crew. Faults like loose connections, burnt wires, etc., with following risk of fire spreading, must be removed immediately.

WARNING

If the engines are on, the alternators are charging the batteries; therefore it is advisable to keep the thermal switch of the batteries charger on OFF, in order to avoid alternator damage.

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10.14.2 Battery charger check



> ***DANGER***
>
> *Before operating on the battery charger, disable the generator start and the shore power supply.*

To make this device operate in a reliable and optimal way, only following operations are necessary:

- have all circuit breakers and outer gauges checked for proper operation, have the wiring checked for possible cracks and for dirty or oxidized components;
- have the casing removed and checked that the circuit boards are free from oxidation. Have it cleaned, If necessary, by a deoxidizing solution;
- have all electric connections protected by a suitable product (DC4);
- have the casing installed after the cleaning;
- check at least once a year the connection of each cable (loose connections, etc.);
- keep the battery charger dry, clean, and remove dust to ensure good heat dissipation.

> ***WARNING***
>
> *All maintenances listed must be executed exclusively by specialized personnel.*

Charge output

To operate properly, your batteries must not be discharged below 30-40% of their capacity; therefore, always re-charge them starting from this charge level.
The battery charger is equipped with temperature sensor installed close to the batteries. According to the temperature value detected, and concurrently with the residual capacity of batteries, the battery charger adjusts automatically the charge voltage, in compliance with the temperature, increasing remarkably the battery life. Moreover, beyond the heat compensation, the battery charger can also compensate the voltage drop, because of the heat dissipation of connecting cables. The battery charger is equipped with built-in signal light, this activates only if special adjustment values are exceeded.

> ***DANGER***
>
> *NEVER clog the air inlets of the cases containing the batteries, because the natural ventilation of the batteries must always be ensured, to prevent their overheating.*

> ***CAUTION***
>
> *Should the battery voltage drop under 18 V, the battery charger will supply a current corresponding to the 25% of the maximum one and the recharge time will consequently increase.*

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10.15 VOLTAGE EQUALIZER



The voltage equalizer is a device that will keep both 12-volt batteries of the same 24-volt bank at an equal state of charge when uneven loads are applied to the individual 12-volt batteries of the 24-volt bank.
This device draws current from the 24-volt battery bank, to recharge one of the 12-volt batteries of the same bank.
The 12-volt battery being charged is the one at the ground (low) end of the 24-volt battery bank.
Never connect a 12-volt load to the high end of the 24-volt battery bank.

A voltage equalizer is used when it is desirable to draw a 12-Volt load from a 24-Volt system, rather than installing a separate 12-Volt battery and charging device. If an equalizer was not used, the battery bank would quickly become unbalanced and cause power and battery failure. A marine converter, when used alone, is not suitable for this type of charging, because it senses the overall voltage of the 24-volt bank, and it is not capable of sensing unbalanced loads within the battery bank.

For further information, see the Manufacturer's Manual.

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BERTRAM

11



INTERIOR DETAILS

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DETAILED INFORMATION ON THE INTERIORS

SAFETY DEVICES AND EQUIPMENT

YACHT HAULAGE AND LAY-UP PERIOD

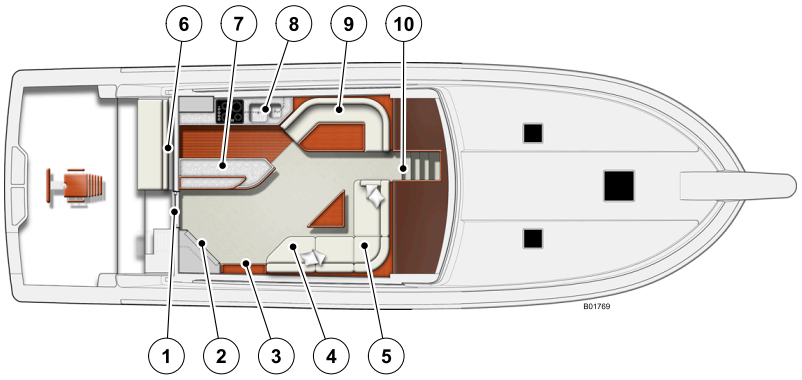
MAINTENANCE

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11.1 INTERIOR DETAILS - MAIN DECK

1. Salon access door
2. Entertainment center
3. Main electric panel
4. Centralized aspirator
5. Salon sofa
6. Salon window
7. Freezer drawers and refrigerators
8. Galley
9. Dinette with table
10. Cabin access stair



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11.1.1 Main deck description - interior

From the cockpit it is possible to access the interior of the deck bridge through a door with frameless glass.

> ***CAUTION***
>
> *While underway, the access door must be closed.*

Starboard of the salon is arranged the entertainment center consisting of an LCD-color-TV, a CD/DVD reader, a stereo receiver and the main electric panel.
Starboard is located also a L-shaped sofa which includes the central vacuum system.
The windows of the salon and of the galley are all equipped with wood blinds.
A curtains set with package opening, is arranged at the salon sides and makes the room brighter and more comfortable.

> ***NOTICES***
>
> *At least once a month vacuum out all A/C filters, by means of the centralized suction system.*





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The galley is located port side and is equipped with cooking top, refrigerator and freezer, working top, sinks and microwave oven.
Various cabinets and drawers stow inside crockery and china plates, glasses and stainless steel cutlery.
Towards the bow there is a dinette with a table and a sofa.



NOTICES

At least once a month carry out accurate cleaning of the dishwasher. At least once every three months check the operation.

NOTICES

Do not leave cooking pans unattended on the cooking top. Do not cook during navigation. Do not put liquid food into the oven.

NOTICES

At least once a month check the correct operation of the oven. After each use carry out an accurate cleaning.

NOTICES

Normal yacht motion in a seaway can cause accidental movement of staterooms doors and other access doors and hatches. Personal injury can result if doors and hatches move suddenly. Before getting the yacht underway, close and secure all access and staterooms doors and hatches.

CAUTION

Children are allowed to use the galley only when they are able to use its items correctly and to understand the dangers specified in the special instruction manuals. The help of an adult is required.

WARNING

When underway, the yacht's normal movement in the water can cause the slipping or falling of persons with the potential hazard of serious injury or even death. Persons should remain seated in secure locations when the yacht is underway.

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WARNING

Use extra caution when moving from one place to another, especially if the change involves using a ladder or stairs. To prevent falls on ladders and stairs, always use handrails when ascending or descending.

Between the dinette and the sofa some steps lead to the belowdeck area, where are arranged the three main staterooms.
Doorways, ladders, stairs, passageways, etc., should be kept dry and free from obstructions.

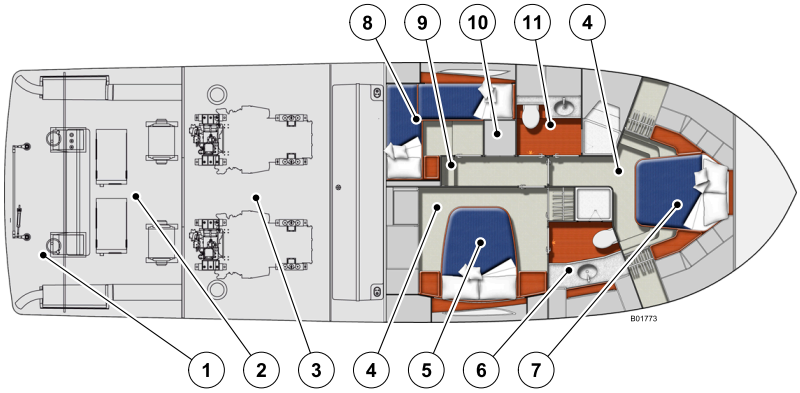
NOTICES

For more directions about the use of the individual systems and equipment, consult the manuals provided by the individual equipment manufacturers.

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11.2 UNDER DECK

1. Steering gear compartment
2. Generator room
3. Engineroom
4. Dunnages for bilge inspection
5. Master stateroom
6. Owner's bathroom
7. VIP cabin
8. Guests' stateroom
9. Main deck access stairs
10. Washer and dryer
11. Guests' head



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11.2.1 Cabins with bathroom: Master's, guests'

You can reach the staterooms by the staircase located between the dinette and the sofa. Downstairs, on the port side there is the guests' stateroom, arranged with two single beds, with a wardrobe underneath.
Starboard is arranged the Master stateroom with relevant head complete with shower box. The WC is provided with bidet shower.
At far foredeck is placed the VIP stateroom, also equipped with head, whose access is also possible from the passageway.
All staterooms are equipped with self-adjusting air conditioning and porthole, that illuminate and ventilate the room.
All portholes are equipped with shading mosquito net.

WARNING

During navigation it is necessary to unlock the safety retainer of the bow skylight.





The dunnages under the carpeting of the Master and VIP staterooms give access to the yacht bilge housing:

- water heater;
- the gray water tank;
- the black water (sewage) tank;
- air-Conditioning units;
- the distribution manifolds;
- bilge pumps;
- the toilet direct discharge;
- grey water tank pump;
- autopilot compass transducer;
- holding tank discharge;
- service battery;
- bow thruster (optional).

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Besides in the passageway, a structure shaped as a closet contains inside a washing machine and a dryer.

WARNING

Empty the content of washing machine and dryer while underway.

CAUTION

Before undertaking any navigation, check the closure of the cabs access doors. You will avoid unpleasant banging and accidental dangers.

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11.3 APPLIANCES

For complete information about galley appliances, refer to the manuals provided by the Manufacturers of the individual appliances.

Cooking top maintenance

See manufacturer's manual indicated.

Oven maintenance

See manufacturer's manual indicated.

Fridge/freezer maintenance

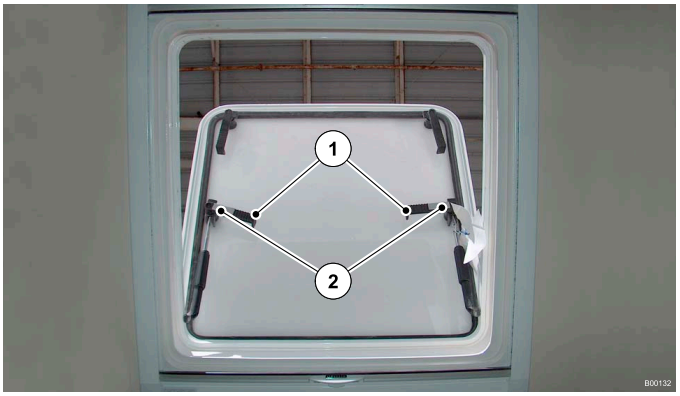
See manufacturer's manual indicated.

11.3.1 Skylights

The skylight can be used as a window or as a passage (in the VIP stateroom). Three skylights are installed onboard.
Their structure is made of transparent unbreakable plastic material.
They are equipped with double handles (**1**) - outside and inside - with side lock (**2**). These skylights are equipped with gas springs adjustable for opening.

MAINTENANCE

At least once a month check the correct operation of the closing system. At least once every three months check the watertight status. Clean seals when required and replace if necessary



WARNING

During navigation it is necessary to unlock the safety retainer of the bow skylight.

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SAFETY DEVICES AND EQUIPMENT

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12.1 GENERAL SAFETY RULES

BERTRAM has designed and built your yacht with your safety and the safety of your guests as its highest priority. Nevertheless, the primary responsibility for the safe operation of your yacht and the safety of all persons onboard is yours. Always operate your yacht with care, courtesy and common sense.

You, as the yacht's owner and/or operator, are responsible for knowing the navigation and safety rules and good seamanship practices. Take the time to learn the Nautical Rules of Navigation (COLREGS), the navigation techniques, and the safe practices for operating and maintaining your yacht and its equipment safe.

You, as the owner of the yacht, and everyone who is responsible for your yacht's operations and maintenance should carefully read and understand the guidelines and instructions contained in this manual and in the manuals of the Manufacturers of the different equipment, as well as the signs and directions installed on the yacht. Pay particular attention to safety notices, warnings and cautions in this manual and elsewhere. This information is essential for the safety of persons aboard and the safety of the yacht.

Safety is also in the hands of everyone aboard.
All persons should be informed about the unique circumstances that are experienced aboard a yacht. They should be instructed about the necessary actions to take in emergency as well as routine situations. Specific safety information follows in this section.

The time you invest in reading this manual about safety will provide you with the knowledge to prevent and/or respond properly to potentially hazardous circumstances.

CAUTION

Persons operating your yacht must never be under the influence of alcohol or drugs. The yacht's pilot should be experienced in the use of all instruments and controls, and know the handling characteristics of the yacht at all speeds and sea conditions.
You should be certain that persons intending to operate your yacht are completely knowledgeable about its proper operation. If you are not certain about an individual's qualifications or competence, the person must be supervised by a qualified operator.

CAUTION

When boarding or leaving the yacht, always use the designated boarding or disembarking routes and equipment. Use the steps, ladders, rails and handholds provided. Wear rubber soled shoes that are clean and dry. Never jump from or onto the yacht. Never use machinery control devices, drive wheels, etc. as handholds. Failure to observe these practices can result in illness, serious injury or death.

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NOTICES

Make sure that the required and approved safety and fire-fighting equipment on board operate correctly. All safety devices must be periodically checked for reliable operation. These devices must be stored, in case of emergency, inside easy visible and accessible places. All persons on board must know how to use the safety equipment correctly.

CAUTION

The safety equipment and systems must be produced in compliance with the local, national and international legislation in force. These devices must be controlled and overhauled periodically by qualified personnel and within the expiry date indicated on the same. Address to local Port Authority and consult the national and international legislation concerning the safety equipment.
Failure to observe such rules may lead to damages of equipment with consequent personal injuries, death and/or fines and/or penalties imposed by the relevant Authorities.

DANGER

It is absolutely forbidden to perform reverse run with one of the two engines stopped. This operation is allowed only in case of life danger for the persons on board and for the safety of the yacht itself, however when the engine is running it should not run higher than 1000 rpm.

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12.2 GENERAL SAFETY CONSIDERATIONS

Never deploy emergency signals or messages (visual or radio) unless there is a need for emergency service responders.

Every person aboard the yacht must:
- know the storage location of PFD's.
- know the location of the throwable PFD's (e.g., ring buoy, horseshoe buoy).
- know the location of the life raft.
- know how to release the personal PFD's for use.
- know how to properly put on and wear a PFD.
- know how to launch a throwable PFD.
- know how to launch the life raft.
- be very aware of the risks posed by a fire.
- know what to do in case of fire.
- know the location of and be trained in the use of the fixed firefighting systems and the portable, hand-held fire extinguishers.

Do not hesitate to ask people to wear the individual flotation devices. PFD's may be worn in any weather. Inflatable PFD's are comfortable to wear, and some types will inflate automatically if the wearer falls overboard. These PFD's are excellent safety gear to have for yourself and your guests.

12.2.1 Yacht stability and safety

Your yacht's stability afloat may be suddenly affected by wave action or a sudden maneuver. Persons onboard should be required to sit in safe seating areas while the yacht is underway. Persons onboard should be aware of the possibility of falling or being thrown into the water, if they are not securely seated while the ship is underway.

Make sure that all objects on board are rigged and stowed properly to prevent movement when the ship is underway. Items that may be needed while cruising should be stowed to enable quick and ready access.
During all underway operation or during any activities onboard, passageways and escape routes must always be kept clear and available for use. Doors shall not be obstructed from opening in case of an emergency.

WARNING

When boarding or leaving the yacht, always use the designated boarding or disembarking routes and equipment. Use the steps, ladders, rails or handholds provided. Wear rubber soled shoes that are clean and dry. Never jump from or onto the yacht. Never use machinery control devices, drive wheels, etc. as handholds. Failure to observe these practices can result in illness, serious injury or death.

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CAUTION

Persons onboard the yacht should be specifically prohibited from riding on parts of the yacht that are not designed for such use, such as the foredeck, swim platform or forward and aft sun bathing cushions.
Persons onboard should be required to sit in safe seating areas while the yacht is underway. Failure to comply with these directions can result in falls overboard and other serious personal injury or death.

WARNING

Never exceed the weight limits for people and load carried.
People and loads onboard should be distributed evenly.
Make sure that safety equipment is perfectly efficient and available to each passenger.

12.2.2 Rules of Navigation

Know and observe the Rules of Navigation and always maintain control of your yacht. Neglecting this is the primary cause for collisions at sea. Provide laminated plastic reference cards for the Rules of Navigation and have them available for quick reference at each control station.

Keep a proper watch ahead of and around the yacht at all times when underway.

12.2.3 Weather

Watch the weather where you are and where you are going. Be especially alert for strong winds and electrical storms. Monitor marine radio weather broadcasts for weather alerts. Storm signals are for your information and safety. Learn their meaning and be guided accordingly.

12.2.4 Fuel

Be certain that there is enough fuel aboard for your anticipated cruising needs and an adequate reserve if you change your plans to accommodate weather conditions or for other reasons.
Know your fuel tank capacities and your engines' hourly fuel consumption rates. Calculate your fuel usage and use this as a backup check on your fuel tank level gauges.

12.2.5 General maintenance safety

Make frequent checks and perform the routine preventive maintenance on the hull, propulsion and auxiliary power generating engines, safety equipment and yacht systems on a regular basis.
Failures of key equipment and systems may result in serious consequences such as property damage or injury or death to persons onboard.

Make sure that the engineroom is properly ventilated when engines and/or generator are running.

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Persons having access to the engineroom must be aware of potential hazards of the following:

- movable mechanical parts;
- high ambient temperature and hot parts or equipment;
- hot, pressurized and/or toxic fluid systems;
- flammable fluids;
- high noise when engines are running;
- risks connected to the unauthorized or accidental operation of valves or switches that are important to the safe conduct of the yacht.

Personnel performing any type of operations, maintenance, repair or other service during the life of your yacht must be technically qualified and have proven abilities and experience acquired and recognized in their specific field.

Failure to follow these instructions and warnings can result in damage to your yacht and compromise the safety and persons onboard.

CAUTION

Tampering with, interrupting, removing or bypassing any safety device installed on your yacht can result in serious damage to your yacht and/or cause personal injury or death to persons onboard.

CAUTION

The captain of a pleasure yacht must know and understand basic fire fighting techniques and how to use the fixed and portable fire extinguishers aboard the yacht. Being unable to use firefighting equipment and techniques effectively could result in injury, death and/or property damage.

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12.3 PFD's - PERSONAL FLOTATION DEVICES AND LIFE-SAVING EQUIPMENT

All personal flotation devices (to be worn or thrown) used on the yacht must be approved by the relevant Authorities. In the U.S., the Federal Government, through the U.S. Coast Guard, specifies the requirements for PFD's and other required safety equipment to be carried aboard recreational vessels (supplied or not).
If the vessel is not used commercially, PFDs may be type I, II, or III.
If the vessel is to be used commercially, and will be carrying six or more passengers for hire, the PFDs must be type I.
Do not hesitate to ask people to wear the individual flotation devices. They can be worn with any weather conditions, during navigation, at dock or during anchor riding.
People can fall overboard at any time.

- People who cannot swim and children must always wear an individual flotation device.
- People working on deck must always wear an individual flotation device.
- PFD's should be worn on deck when underway in cold waters (water temperatures below 20 °C/68 °F).
- In any emergency, persons on board should put on their PFD's.

Inflatable PFD's are comfortable to wear, and some types will inflate automatically if the wearer falls overboard.

These PFD's are excellent safety gear to have for yourself and your guests. Consider providing self-inflating vests or self-inflating "belt pack" vests for yourself and your guests. Make sure that all PFD's are approved by the appropriate national or international regulatory agencies.
Bertram furnishes type II adult size (90 lbs) PFDs. This type of PFD is capable of turning its wearer to vertical or slightly backward position in the water. These PFDs are high visibility orange, comply with all of the USCG requirements for a type II device, and carry the United States Coast Guard approval label. Type II PFDs come in four sizes: adult (90 pounds plus), child large (50 to 90 pounds), child medium (30 to 50 pounds), and child small (less than 30 pounds).
This type of PFD is donned by placing it over the head with the collar behind the neck. The waist strap should then be connected and adjusted to prevent this device from riding up on the wearer.
The technique for donning a PFD should be practiced by everyone, so that they know where to find them and how to properly don one, even in the dark or in the water.
The recommended technique for water entry while wearing a PFD is to wrap both arms as tightly as possible around the wearer's chest and under the chin. This protects the face and keeps the PFD from riding up.

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Always jump into the water feet first, with both feet and knees slightly bent. The head should be tucked down into the pocket made by the folded arms. As soon as a wearer is in the water, he should join others for mutual assistance and warmth.
Please keep in mind that Bertram furnishes only adult sized PFDs and that the USCG requires that everyone onboard have the correct size PFD. Please also keep in mind that if a PFD is stowed wet, mildew will hasten the deterioration of the PFD. If used, they should be rinsed with fresh water and dried out in the sunlight.
The USCG does not consider as “readily available” any PFD left in their original plastic wrappers, since persons under stress may be unable to remove them quickly.
In addition to the PFDs, Federal regulations require at least one (1) United States Coast Guard approved type IV throwable device. This device must be located where it is immediately available to those on deck.
Bertram supplies one type IV device. You should mount this device in a suitable location. We recommend about 60 feet of light line be attached to the device.

The captain must make sure that all persons on board know:
- the stowage place of the throwable PFD’s.
- how and when to launch a throwable device.
- what to do in case of “man overboard”.

All yacht owners and captains should conduct regular “man overboard” drills so that all persons on board are familiar with the procedures for rescuing a person who falls overboard.

At the cry, “**MAN OVERBOARD!**” immediate action is of the utmost importance--every second counts, particularly at night or in heavy weather. It is extremely helpful to indicate which side he went over, such as: “MAN OVERBOARD - PORT!”. This focuses the attention of those who did not see the accident and guides their actions.

Circumstances will dictate the best procedure as to how to approach the person in the water. One good procedure is to stop the boat a short distance up-wind from the victim and allow the boat to drift down. As the boat approaches the person in the water, shut down the engines and prepare to throw your type IV throwable device. Once the person is in range, throw the life ring, and pull him to the boat.

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12.4 YACHT'S AREAS AND ESCAPE ROUTES

In order to cope with the different emergency situations that could determine the abandonment of the yacht (fire, collision with sinking hazard etc.) in the quickest and safest way, the rules in force require an "escape plan" informing about the safest and most secure, as well as the quickest, paths (from any yacht area) for taking shelter and reaching the "collecting points", outdoors, from which it will be easier to leave the yacht.
The diagram below, represents the yacht's general lay-outs, subdivided according to the areas they include:

A. Flybridge
B. Salon, dinette and galley
C. Steering gear compartment
D. Engine room
E. Master, guests', VIP staterooms

CAUTION

You have therefore, according to the nature and position of the danger or fire source, to choose very carefully the most safe and suitable escape route.



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WARNING

During navigation it is necessary to unlock the safety retainer of the bow skylight.

WARNING

Always keep the escape routes, dry, free and accessible.

DANGER

The various yacht's areas have more than one escape route. It is therefore necessary, according to the nature and position of the danger or fire source, to choose very carefully the most safe and suitable escape route.

DANGER

It is forbidden, to stay or to walk on the walk-around and on the bow of the yacht during navigation, as the absence of a bulwark stay could expose people to the risk of falling at sea.

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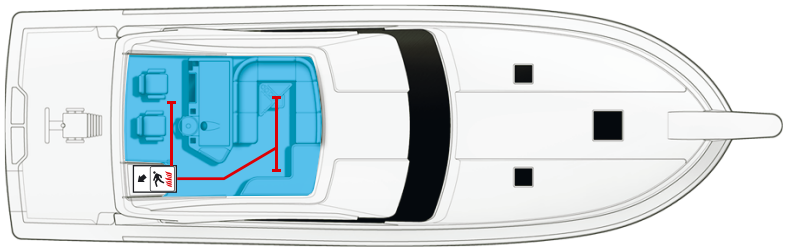
12.4.1 Flybridge Area

The fly bridge area is equipped with a single way out (escape route).
From the fly bridge, by means of a port stair, you can reach the cockpit (**1st Path**).

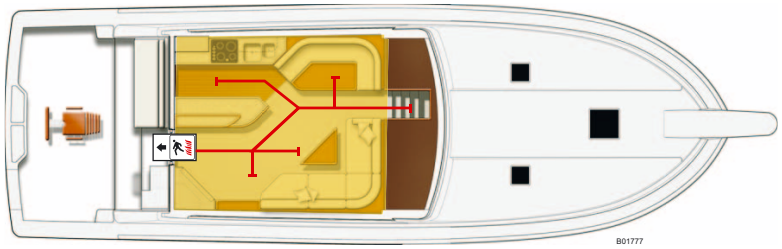
12.4.2 Salon, dinette and galley area

The salon, dinette and galley area shows a single access and exit (escape route).
From salon, dinette and galley area, use the exit path towards the cockpit (**2nd Path**).

1st Path



2nd Path



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12.4.3 Owner's, guests' and VIP stateroom area

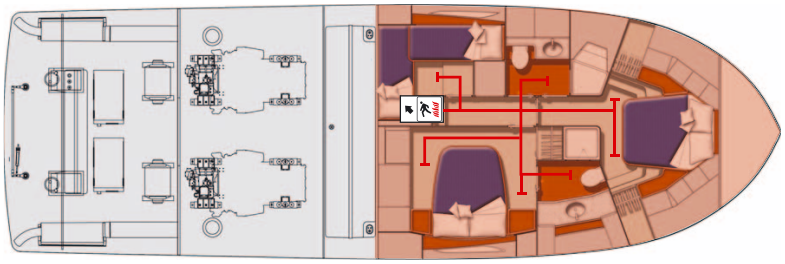
The diagrams shown below indicate the Owner's, guests' and VIP stateroom area, the escape routes and the paths to be used in case of need. Use to this purpose, the stair leading to the salon, dinette and galley (**3rd Path**), or take shelter through the fore skylight (**4th Path**).

DANGER

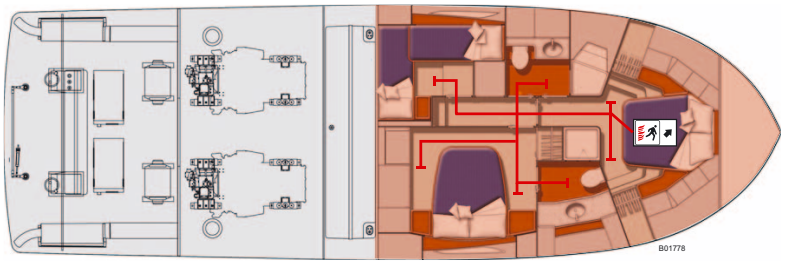
The Owner's, guests' and VIP stateroom area is provided with various escape routes. It is therefore necessary, according to the nature and position of the danger or fire source, to choose very carefully the most safe and suitable escape route.

During navigation it is compulsory to unlock the safety retainer of the bow skylight so as to ensure a safe and quick escape.

3rd Path



4th Path



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12.5 FIRE PREVENTION

The owner/operator/captain of the yacht must be knowledgeable and competent in fire prevention measures and fire fighting techniques.

Your yacht must be equipped with the fire extinguishing equipment required by the law applicable in the waters where the yacht is operated. This includes, but may not be limited to, having an adequate number of portable fire extinguishers.
An automatic engineroom fire-suppression system should also be installed and ready for activation.

The yacht's Owner and the Captain are directly responsible for:

- having the fire extinguishers and firefighting systems inspected and serviced as required by the manufacturer and replaced, when necessary, with equivalent or superior equipment, as provided for by the applicable laws and regulations;
- informing all persons onboard about the location and use of fire extinguishers, firefighting systems and emergency exits and escape routes;
- ensuring that fire extinguishers are available in passenger accommodation spaces and that all persons onboard are trained in their use;
- inspecting the bilges and storage areas frequently and ensuring that they are clean and free of any oily residues and that there are no combustible materials (e.g. oily rags and waste materials) anywhere aboard the yacht.

Never allow crew or persons onboard to:
- to obstruct the access to passageways and escape routes;
- obstruct the access to safety devices, such as fuel valves, electrical switches, etc.;
- obstructing the access to fire extinguishers stowed inside the lockers;
- leave the yacht unattended, when burners or heat generating equipment are on;
- use open flames;
- modify electrical or fuel supply systems, without consulting BERTRAM beforehand;
- smoke close to flammable materials;
- stow highly flammable materials or liquids such as fuels, solvents, etc., near heat sources like engines, cooking appliances, etc.;
- stow any flammable material in the engineroom;
- do not allow fuel leaks to accumulate in the bilge.

CAUTION

Fire prevention is a key to safety onboard of your yacht. Fire onboard a yacht is a life-threatening hazard. To avoid serious personal injury or death and property damage, follow all fire prevention and control measures carefully.

WARNING

Never use water jets to extinguish electrical or electronic equipment fires.

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12.6 FIRE EMERGENCY

In case of fire, the captain of the yacht should immediately:
- stop the yacht and shut down all engines, including the generator;
- switch OFF all battery power;
- locate the fire and activate all available fire extinguishing equipment following standard fire fighting techniques;
- close the air intakes and the ventilators in the engineroom;
- avoid breathing smoke.

- Have everyone aboard don a life jacket and move quickly and safely away from the fire.
- Assign one person to be in charge of your abandon ship bag, which should include a fully charged hand-held VHF radio, emergency flares, dye markers, bottled water, and anything else needed to survive at sea.
- Contact the Coast Guard on VHF channel 16 (156.800 MHz) or SSB radio frequency 2182 kHz. Say, “MAYDAY, MAYDAY, MAYDAY!”. Describe the situation. Describe the vessel. Give your location and the number of people aboard.
- If you have an emergency life raft, prepare it for deployment.
- If you have a tender, launch it immediately, before you lose electrical power.
- Unless other dangers make maneuvering power necessary, immediately shutdown both engines, if the automatic system has not already done so.
- Shut down all electrical power except for the bilge pumps, navigation lights, and VHF or SSB radios.
- Extinguish all open flames.
- Do not open the engineroom access hatches for at least 15 minutes.
- Verify that the fire is totally extinguished by carefully feeling around the hatches and bulkhead to ensure that these surfaces are cool before opening any hatches.
- Stand by with portable hand-held extinguishers, in case the fire spreads past the engineroom or re-ignites.

If the fire is in the engineroom, the automatic firefighting system may have shut down the engines and discharged the firefighting chemical. Read the section on **Engineroom Fixed Firefighting System** that follows, to learn how this system operates in the event of an engineroom fire.

If the fire involved the engines or engine compartment, care should be taken to determine the cause of the fire before restarting the engine(s).

Study the FIRE PREVENTION and FIREFIGHTING SYSTEMS sections in this chapter.

CAUTION

Fire fighting equipment and controls must be accessible at all times. Hindering the access to fire fighting equipment and controls could result in serious injury or death and property damage.

WARNING

Do not open engineroom access hatch, until the fire is completely extinguished.

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12.6.1 Abandonment of the yacht

One situation for which you must be prepared is an uncontrollable fire or other emergency at sea, requiring all hands leave the vessel. As an important part of your fire preparedness plan, the operator, along with the crew and regular guests, should develop and practice an abandon ship drill.
At a minimum, this plan should include:

- Location of the life jackets and how to wear them.
- Location and operation of any other emergency flotation equipment, such as a life raft or throwable devices.
- Speedy operation of the forward emergency egress deck hatch.
- How to summon help quickly by use of the hailing/emergency channels for the onboard radios.
- When and how flares or daylight visual distress signals are used.
- Use of dye markers.
- Use of an Emergency Position Indication Radio Beacon (EPIRB).
- Location of an abandon ship bag and the proper use of each item contained in the bag (The abandon ship bag or container must be one that will float if it is accidentally dropped overboard or must be carried while swimming).

SCALD HAZARD: When you must abandon the yacht, swim against the current or windward. The fuel leaks float in the direction of the current and can catch fire. When you have taken shelter, count the person present on the yacht and help people in need.
- Take advantage of the distress call.
- Keep all people gathered in order to facilitate the rescue operation.

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12.7 FIRE EXTINGUISHING

12.7.1 Disconnect the electrical power

In the event of a fire on board, it is recommended that all energized sources of electrical power be disconnected by switching OFF all master switches.

CAUTION

NEVER

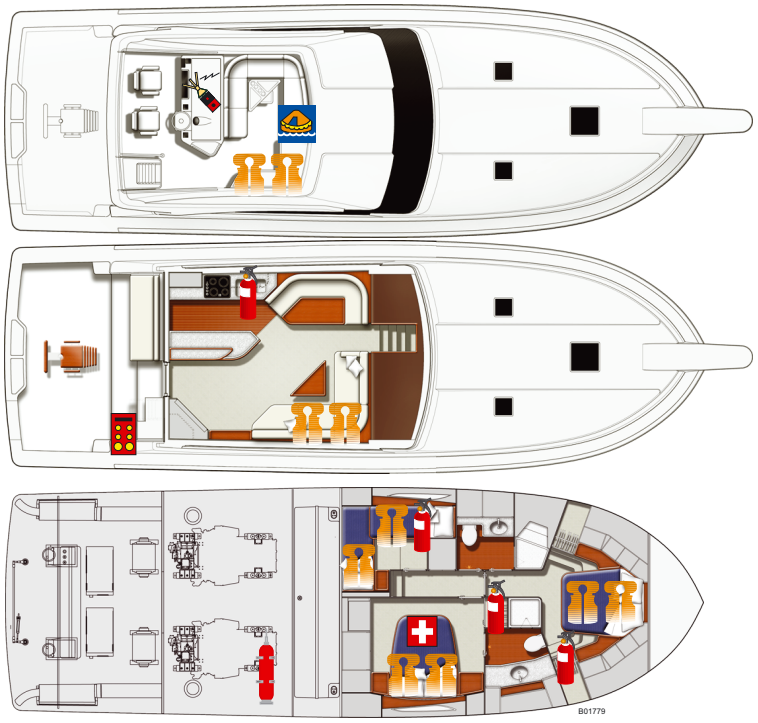
- *obstruct passageways and emergency exits.*
- *obstruct the access to safety devices, such as fuel valves, electrical switches, etc.*
- *obstruct the access to fire extinguishers stowed inside cabinets.*
- *to leave the yacht unattended when burners or heat generating equipment are on.*
- *to use or allow open flames.*
- *modify electrical or fuel supply systems, without consulting BERTRAM beforehand.*
- *smoke near flammable materials or when handling them.*
- *stow highly flammable materials, such as fuel, solvents, etc., near heat sources, like engines, galley appliances, etc.*
- *stow any flammable material in the engineroom. Non-combustible materials may be stowed in the engineroom only if properly protected, isolated and fixed, so they cannot be exposed to engine rotating parts or obstruct access to the engineroom.*

Failure to observe these practices can result in illness, serious injury or death.

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12.8 FIREFIGHTING SYSTEMS

12.8.1 Location of safety & firefighting equipment



Self-inflatable life raft

Life jacket

Fixed firefighting system emergency control in the engineroom

Portable fire extinguisher

FE-241 fixed fire extinguisher

VHF

First aid kit

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12.8.2 Portable fire extinguishers

NOTICES

The person in charge of the yacht must make sure that all passengers know the locations and how to operate correctly the fire extinguishers on board.

- Check the charge status before use.
- Make sure that the discharge nozzle is not directed towards yourself or anybody else in the vicinity.
- Be cautious when using the extinguisher to fight electrical panels or equipment fires.
- Direct the discharge nozzle towards the fire bottom and open the discharge valve.
- Try to extinguish the flames and to cool down the equipment.
- After using the extinguisher to extinguish flames in closed rooms, thoroughly ventilate the room before entering it.

Checks and tests on portable extinguishers

Check the charge status of portable extinguishers at least once a month, and anyway before undertaking any navigation. The pressure gauge indicator must be in the green area of the gauge. Have the portable extinguishers checked at an authorized Service Centre and according to the Manufacturer's recommendations and the applicable rules.
For further information refer to the extinguisher manual or address to the manufacturer.

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12.8.3 Maintenance of portable fire-extinguishers

At least every six months, a full maintenance check should be made by a qualified fire extinguisher service facility in accordance with the maintenance instructions on the nameplate of the extinguisher. The technician who performs maintenance should attach a tag indicating the date of the check to each extinguisher.

After use, have the portable extinguishers recharged at a qualified service centre or have them replaced with extinguishers with the same dimensions, capacity and extinguishing agent.

All extinguishers must be checked at least once a month in order to make sure that:
- they are located in the correct position.
- they do not show signs of corrosion or damage.
- they are fully charged. The pressure gauges or indicators installed on the fire-extinguishers, should show pressure values within the prescribed limits. All fire-extinguishers without pressure gauge or indicator, and portable dry chemical and CO2 fire-extinguishers must be weighed.
- check the seal to make sure that the fire extinguisher has not been activated.
- the hole of the nozzle must not be clogged and the hose must be in good conditions.

The pipe connections of the fixed systems are properly tight and that the discharge nozzles are not clogged.
- the fixed system has not been discharged.

NOTICES

Keep the fire-fighting devices and controls according to Manufacturer's instruction. Have the equipment serviced by a qualified technician at regular intervals.

- At least once a month, and anyway before each navigation, check the charge status.
- At least once a month, and anyway before each navigation, check the external status.
- At least every 6 months check the fastening.

NOTICES

For more directions about the use of the individual systems and equipment, consult the manuals provided by the individual equipment manufacturers.

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12.8.4 Fixed fire-fighting system in the engine room

The engineroom is equipped with an independent firefighting system that can be activated either automatically or manually and uses FE-241 as extinguishing agent. The cylinder is fitted on the forward bulkhead of the engineroom starboard.
The discharge is controlled automatically through a glass flask filled with liquid; when the temperature in the engine room rises, the liquid expands until the flask breaks and the extinguisher discharge activates. The flask is fitted on the same cylinder.
The extinguisher can also be activated manually, the discharge is controlled by the tie rod placed in the aft starboard cockpit inside of a suitable peak closed with a hatch.
In the helm station is placed the control panel for the firefighting system. The red indicator light will illuminate on the helm station panel or on main electric panel and the buzzer sounds, indicating an overheat condition in the engineroom.
Acknowledge the condition by briefly pressing the test button, located in the helm station or on the main electric panel. The alarm horn will stop sounding. The light will remain illuminated until the heat detectors reset themselves.
The system can be tested at any time by pressing the relevant test button. When the button is pressed, the light will illuminate, and the alarm horn will sound.
Releasing the button will cause the light to go out, and the horn will stop sounding. An open circuit in the heat detection system wiring will also cause the monitor to respond as if there is an overheat condition.

CAUTION

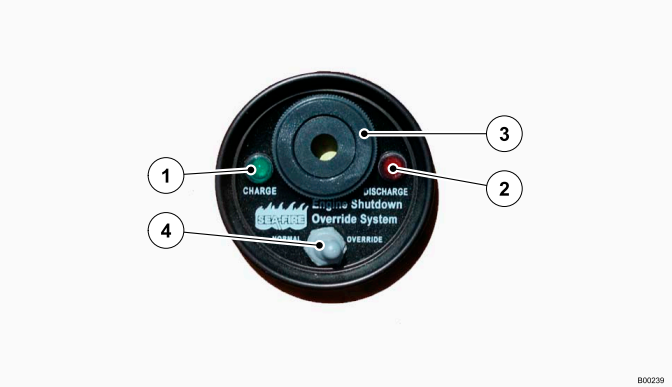
The fire monitor system monitors your vessel for fire (overheat) in the engineroom only. The fire system monitor is separate from the onboard fixed fire extinguishing system.
The fire system monitor will not detect fire outside of the engineroom.
The combination fire and bilge flood monitor is tested and silenced using the same switches and controlled by the same power fuses. It can be disabled completely by removing the fuse in the D.C. main supply panel located in the engineroom.

CAUTION

Toxic by-products are produced when the fire-fighting agent (FE-241) extinguishes the fire. Avoid breathing the fumes.
Inhalation of FE-241 (clorotetrafluoroethane) in high concentrations may cause death without warning. Read the manual provided with the fire extinguishing system for complete information.
Most fire-fighting agents will stop engines by oxygen depletion. Agent FE-241 may not stop your engines or generator. If the engines are not stopped quickly, the extinguishing agent concentration may be rapidly reduced.
In order to give FE-241 a chance to extinguish a fire, the concentration must remain as high as possible. Do not open the engineroom access hatch.
The fixed fire extinguisher will fight fires only in the engineroom. Fires outside the engineroom should be fought with the portable hand-held extinguishers.

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1. **Green light**
   Indicates that the extinguisher is full.
2. **Red light**
   Indicates that the extinguisher is empty.
3. **Acoustic signal**
   Indicates that the system is operating and that the extinguisher is releasing gas.
4. **OVERRIDE/NORMAL switch**
   - When the switch is placed to NORMAL position, the power unit actuates and stops the engines, generator and ventilators, in case of extinguisher discharge.
   - When the switch is placed to OVERRIDE position, the control unit is cut-out.



NOTICES

The switch must always be set to NORMAL position. The OVERRIDE control has to be used only with navigation in confined waters or with a collision hazard and to restart the engines after the system discharge.

CAUTION

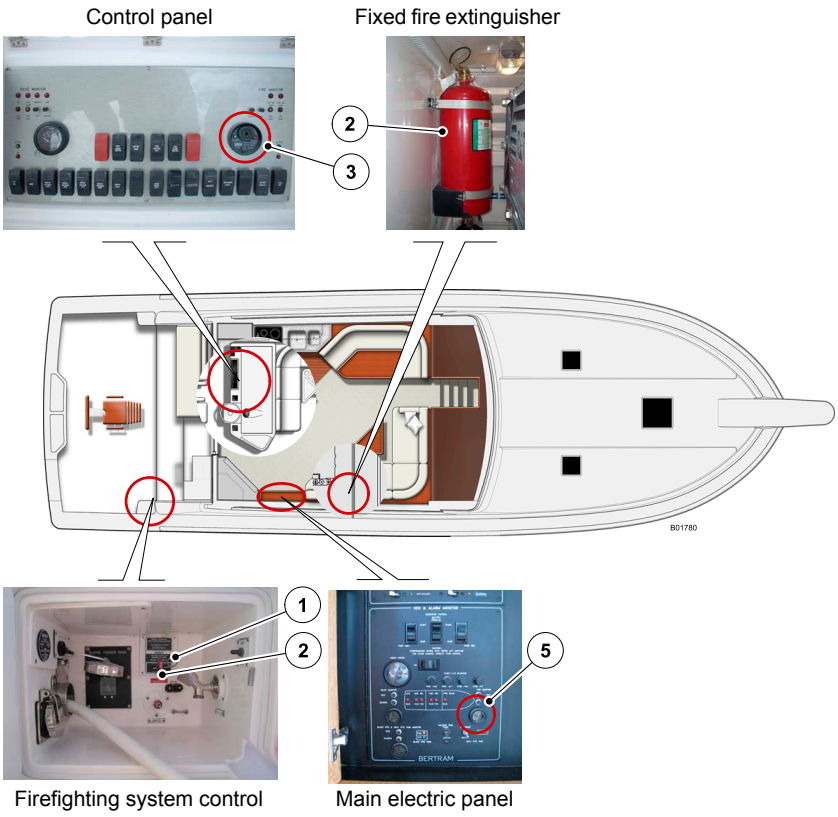
The OVERRIDE switch must be used only in case of real emergency.

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1. “FIRE” rode safety pin
2. “FIRE” extinguisher tie rod
3. Fixed fire extinguisher in the engineroom
4. Firefighting system control panel
5. Firefighting panel on main electric panel

NOTICES

The images are referred to the US-version of the yacht.



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Firefighting system operation

The fixed fire extinguisher operates automatically when the engineroom temperature exceeds 175 °F (79 °C).
In case of fire, an automatic power unit stops the engines immediately, the power generator and the ventilators. In this way the extinguishing agent is not sucked by the engines, causing a loss of performance to the firefighting system.
In case of fire in the engine room, operate as follows:

- shut down the engines and generator, if they are operating, using the stop buttons on the helm station console;
- turn OFF the battery breakers and all magneto-thermal switches for AC inlet;
- remove the pin from the firefighting tie rod located in the aft starboard cockpit by sliding it out and pull the tie rod to discharge the extinguisher. The extinguisher can be automatically discharged, but pull the handle anyway.

CAUTION

Before undertaking the navigation, it is compulsory to open the lock and to allow easy access to the peak, in order to reach the fire-fighting panel, and to check whether the safety pin has been removed from the cylinders.

CAUTION

Everyone aboard must immediately don life jackets (PFDs), move topside, proceed quickly and safely to a location furthest from the fire, and remain there as a group. This should be done before checking the condition of the vessel. Gather all portable hand-held fire extinguishers in the cockpit. If there is an engineroom fire, do not wait for the system to discharge automatically. Discharge the system manually from the cockpit by removing the safety pin and pulling the "T" discharge tie rod.

CAUTION

Keep the controls of the firefighting system efficient, by servicing them and by checking their operation at regular intervals (according to rules in force). Anyway at least every 3 months check the operation and at least once a year grease the cables and linkages.

DANGER

The automatic fire-fighting system, covering exclusively a section of the engine room, under special fire conditions could not activate, for this reason IT IS ALWAYS COMPULSORY TO ACTIVATE THE SAFETY TIE ROD.

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NOTICES

Depending on the rate of rise in temperature, the time between the fire monitor system alarm and the fixed system discharge may be too short to be acted upon as separate events. Automatic discharge of the fire system cannot be defeated. It will always discharge at its designed discharge temperature.

DANGER

Before activating the fire-fighting system, make sure nobody is inside the engine room. Once checked that the fire is totally extinguished, before entering the room, ventilate it for a long time by opening the hatches, and remove any powder deposits carefully.

After The Fire Has Been Extinguished:

- Squelch the fire monitoring system by briefly pressing the squelch button on the flybridge. The light will remain illuminated until the heat detectors reset themselves.
- Use the fire system manual override switch to allow switching on the blowers, generator, and main engines.
- Ventilate the engineroom to remove any unburned FE-241.
- Have the proper type of hand-held fire extinguishers ready before you cautiously open the engineroom access hatches.
- Carefully examine the engineroom for damage and determine the cause of the fire.
- Make the necessary emergency repairs, making certain that none of the seawater cooling intake hoses for the main engines are burned through.
- If your vessel was built to RINA (Registro Italiano Navale) standards, or is over 67 feet long, you must manually reopen the air intake shutters located on the intake plenums outboard of each engine.
- Start the engines.
- Turn on only those electrical circuits necessary to maneuver your vessel safely.
- If you have alerted the Coast Guard, inform them that the fire has been extinguished and you are able to get underway under your own power. Contact them again when you are safely secured at your destination.
- Continue to the nearest port.
- Have the fixed fire extinguisher system and any hand-held fire extinguishers serviced as soon as possible.

WARNING

Do not open the engine room access hatch, until the fire is completely extinguished.

CAUTION

Do not open the engineroom access hatch, or try to enter the engineroom, for at least 15 minutes after the fire agent has discharged. This would allow oxygen to enter the engineroom before hot metals and/or fuels cool, which might cause re-ignition and flashback.

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CAUTION

The combustion by-products of FE-241 are toxic. Wait for the natural ventilation to completely exchange the engineroom air before entering.

CAUTION

The chemical agents for fire extinguishing and the residuals of a discharge system are toxic. To avoid diseases, injuries or death caused by the breathing of the fumes, make sure that nobody stays in the engine room during the system discharge.

CAUTION

An automatic fire-fighting system can cause fire to spread out again. If fire spreads out again the passengers on board are in danger. Even the opening of the engine room access hatch can cause through oxygen a new spreading out of fire. If fire spreads out again, to avoid heavy injuries or even death, do not open the hatch or engine room access door until fire has been completely extinguished.

WARNING

Before ventilating the engine room after a fire, make sure that this has been completely extinguished. Before entering this room ventilate it by opening the hatchways.

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Maintenance of fixed fire-fighting systems

- Check the fixed extinguisher charge status at least once a month, and in any case, prior to navigation (pressure gauge needle within the green sector of the same).
- Have the system overhauled by a qualified service centre according to Manufacturer's instruction. The technician who performs maintenance should attach a tag indicating the date of the check to the system.
- Check the discharge indicator before use, to make sure that the fixed fire-fighting system has not been discharged.
- A fixed fire-fighting system should be checked at least once a month.
  a. for corrosion.
  b. to make sure that the access to the controls is not hindered.
  c. to make sure that the cylinders are firmly sitting.
  d. to make sure that the pulling cables are not broken, loose, damaged or twisted.
  e. to make sure that the cable connections are fastened properly.
  f. to make sure that the distribution pipe connections are firmly fastened and that the discharge nozzles are not clogged.
  g. to make sure that the system has not discharged.

CAUTION

Accidental discharge of the chemical agents for fire extinguishing during handling or installation may cause heavy injuries. The chemical agents for fire extinguishing and the residuals of a discharge system are toxic. Protect eyes and skin during installation or maintenance of the fire-fighting systems.



CAUTION

Never attempt to disable any part of your fixed fire extinguisher system. This system contains liquefied gas at high pressure and serious injury or death could result.

DANGER

The fire-extinguishing cylinder has a safety pin. Check if above mentioned pin has effectively been removed. If this is not the case, should fire spread out, the cylinder would be jammed and would not discharge, with consequent possibility of heavy damages to your yacht up to its sinking.

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DANGER

The safety pin inserted prevents the activation of the manual discharge (by means of tie-rod).

CAUTION

The extinguisher CONTAINS TOXIC CONCENTRATED CHEMICAL AGENTS AND SUBPRODUCTS FOR FIRE FIGHTING. Avoid to inhale fumes or long exposure to them.
THE ACCIDENTAL DRAIN DURING USE OR INSTALLATION CAN CAUSE SERIOUS INJURIES. Never let it drop down. Keep it far from extreme heat.

CAUTION

Read carefully the instruction manual.
Before attempting any installation, removal, activation or maintenance of this device.

CAUTION

During maintenance operations, pay attention not to break the flasks unintentionally, in order to prevent accidental cylinder releases.

CAUTION

When checking the pressure of the system, verify the temperature of the system or the temperature of the environment. The green section of the pressure gauge indicates the system's pressure at 21.1°C/70°F.
In order to determine the pressure level of the system, adjust the temperature.

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12.9 RECOMMENDED ITEMS TO HAVE ONBOARD

In addition to the standard safety and marine equipment required by the existing regulations for pleasure boats, we recommend you also have on board a number of items that can be valuable when your yacht is in use. Some of these items will not be used frequently, but may be essential in emergencies.

- 4 lines - 3/4 in, 65 ft
- 1 line - 1 in, 100 ft
- 1 spare anchor, 66.14 lb
- 2 plastic buckets
- 2 synthetic sponges
- 2 empty 5 gals cans
- 2 funnels of different size, complete with 20 in rubber tube
- 5 gals of engine oil
- 2 gals of gear box oil
- 1 gal of hydraulic oil for steering system
- 1 gal of hydraulic oil for the trim tabs
- 1 gal of anti-freeze
- 35 oz of oil for bow thruster
- 1 gal of oil for the electro-hydraulic system
- 1 set of navigation light bulbs
- 10 spare halogen bulbs for little spot lights
- 2 spare bulbs for engine room lights
- insulating tape
- stainless steel pipe clamps of various size
- 1 underwater lamp
- 2 pairs of heavy duty rubber gloves
- 5 lb of white rags
- 1 CRC spray can
- 1 Vaseline jar
- 1 engine spare parts kit
- 1 water maker spare parts kit
- accumulator for smoke detection unit
- fuses for secondary electric panel
- hearing-protection
- tool kit

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BERTRAM

13



YACHT LIFTING & ONSHORE HANDING

FOREWORD

USE OF THE MANUAL

DESCRIPTION OF THE YACHT

NAVIGATION

AUXILIARY EQUIPMENT ON BOARD

CONTROL STATION

ON THE MAIN DECK

THRUST SYSTEMS

HYDRAULIC SYSTEMS

ELECTRIC SYSTEM

DETAILED INFORMATION ON THE INTERIORS

SAFETY DEVICES AND EQUIPMENT

YACHT HAULAGE AND LAY-UP PERIOD

MAINTENANCE

TROUBLESHOOTING

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13.1 YACHT LIFTING AND LAUNCHING

CAUTION

Do not put the lifting straps in the areas shaded on the drawing.

NOTICES

Yacht lifting and launching operations must be performed by experienced personnel at qualified yards, under their responsibility.

The marine hoist (travel lift) capacity must be greater than the yacht's weight. Lifting equipment must be in good condition; more specifically, the lifting straps must not be worn out, and should be covered with preserving material that will protect the yacht's hull gel-coat and antifouling paint when the yacht is lifted.

NOTICES

Do not put the lifting straps in way of the intakes, sea exhausts or other protrusions.

Because a great difference may exist between different load conditions (e.g., yacht empty and yacht fully-loaded) the lifting straps must be arranged at the time of lifting according to the yacht's load conditions.

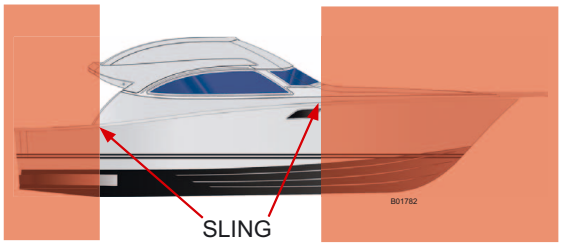
The arrangement of the lifting straps must be carefully evaluated each time, in order to prevent any damage to the yacht. Entrust this determination to qualified, experienced professional personnel.

NOTICES

Lifting sling geometry depends on the type of the lifting equipment, and must be designed for each individual lifting situation.

NOTICES

Prior to lifting and launching, check that there are no unnecessary materials and equipment aboard the yacht. Make sure that all gear, furniture, and loose items are properly stowed and secure. No person should be aboard the yacht when it is lifted or launched.



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CAUTION

During lifting, launching and blocking activities, no person should be underneath or near the yacht when it is being moved.

CAUTION

The use of lifting equipment such as cranes and hoists is a hazardous activity. All lifting equipment, its operation and its maintenance should comply with local and/or national requirements covering its use. Ensure that the equipment is suited to the intended use. Failure to observe these practices can result in illness, serious injury or death.

CAUTION

Do not allow any personnel to walk under or work under items or equipment supported by hoisting equipment. Hoisted items or equipment can fall if not safely supported leading to serious personal injury or death.

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13.1.1 Storing the yacht ashore

When ashore, the yacht must be laid on a cradle with five supports of width and size adequate to distribute the yacht weight evenly. Consult BERTRAM for details.

The hull inclination must be as “natural” as possible, e.g., the yacht’s waterline (not the keel) should be parallel to the ground, so that the level of liquids aboard remains normal and rainwater will drain naturally.
You can obtain a copy of the American Boat & Yacht Council’s technical information report titled TY-28, Boat Lifting And Storage, from ABYC at www.abycinc.org or by calling (in the USA) 1-410-956-1050.

NOTICES

BERTRAM declines any responsibility for the location of the lifting straps, the lowering or lifting of the boat, and for the integrity of the supporting points performed by other Shipyards.

NOTICES

BERTRAM declines all responsibility for damage to property and harm to persons caused by the wrong performance of the hereunder listed operations.

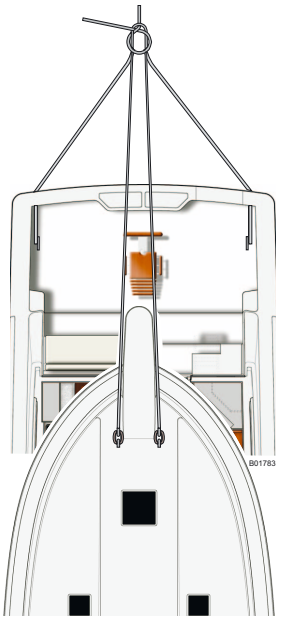
DANGER

The transformers installed on board separate galvanically the dock electric system from the on board electric system. During yacht onshore handing (lay-up) for maintenance, if you use one or both shore outlets for power supply of the on board 230 V AC electric system, make sure that the yacht grounding is connected to the shore column grounding, taking advantage of expert crew.

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13.2 TOWING

Towing should be done only by experienced professionals with the proper equipment. Proper towing of large yachts requires specialized knowledge and equipment. If you need a tow when the water is rough, calling professional assistance is advised because of the dangers to the yacht, the towboat, and personnel, which are created by rough seas. If the yacht is to be towed, fasten the towing lines as shown in the figure, in order to distribute the load evenly.
The towrope length depends upon the sea conditions, and must be adjusted in such a way to control the pulling forces without damaging the yacht's deck fittings.



CAUTION

Do not stand behind or near the ropes during towing operations. Towropes are under a great strain, and if anything breaks, the rope will spring back "whiplash", possibly striking people behind or near the rope. Serious injury or death will result if anyone is struck by a rope that breaks under strain.

NOTICES

If you need to tow another boat, do this only in calm seas and calm wind conditions. Never attempt to tow a vessel that weighs more than 50% of your yacht's weight (displacement). In case of emergency, if towing is not possible, give assistance by taking people from the other vessel on board your yacht. Take on board only as many persons as your yacht can carry safely, and proceed to the nearest harbor. Inform the Coast Guard immediately.

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CAUTION

Do not secure tow lines to deck cleats, which are for mooring only. Cleats are not fastened to your vessel for towing.

Take added care if towing, or being towed, with nylon lines. These lines stretch, and if a fitting fails or the line parts, the end can snap back with sufficient force to cause injury or death.

CAUTION

Always tow or have the yacht towed at low speed. Never exceed the speed of the towing yacht while being towed.

CAUTION

Ensure a towing rope so as to release it when under load.

CAUTION

The tensile strength of ropes/chains should normally not be higher than 80% of the tensile strength of the relevant pull up point.

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BERTRAM

14



MAINTENANCE

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14.1 GENERAL MAINTENANCE SAFETY STANDARDS

Safety standards for yacht maintenance
Do not start any work before being assured that both the operator and the others do not run any risk.

Lack of proper knowledge of the nature, scope and extent of maintenance operations can pose personal injury hazards to personnel involved in the operations. If you are not certain about any aspect of the work to be done, always ask someone with knowledge of the work to clarify the situation. Do not draw any conclusion.
If you are not certain about your knowledge and skills for a specific maintenance operation, entrust it to someone who has the knowledge.

Before carrying out any maintenance or repair operation, the work area must be clear of all unauthorized persons. If others are working in the same area, ensure that there is a clear understanding of the communication signals that will be used to convey messages for action. Manual signals are often used and must be clearly understood when working in high noise areas where verbal instructions may be inadequate.

Always operate with care, pay attention and make sure to understand the applicable safety requirements related to the task you are carrying out.

Further to the warnings below, specific warnings are indicated in the whole manual. This section provides general, limited guidelines for warnings regarding safe maintenance procedures.

CAUTION

This section includes a certain number of information to maintain the components without dangers. Remember that each time you activate the controls you are in fact the pilot.
You must therefore read and understand the information given before activating the controls.

CAUTION

*The use of faulty **lifting attachments** can be the cause of accidents; check therefore their efficiency. Ensure the compliance of hoisting gears with local norms and their suitability for the job they have to carry out. Check besides their soundness according to the work to be carried out.*

CAUTION

*The use of **unsuitable** clothing can cause accidents; do not wear fluttering clothes which could be easily get caught in the yacht's moving parts. Wear protective clothes suitable with the kind of work to carry out (helmets, safety shoes and protective goggles, overalls). Button up the cuffs, do not use ties or scarves and do not leave your long hair loose.*

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CAUTION

*During the restoring operations of metallic or non metallic components, wear **safety goggles**. Move away from the area or protect possible flammable materials, which could catch fire from sparkles.*

CAUTION

*It is extremely dangerous to operate the yacht controls under the **influence of alcohol or drugs**. Keep off from taking **alcohol** or drugs before and during the work. Do not take medicines causing numbness.*

CAUTION

*Take the utmost **care and attention** for the whole duration of your work. Take great care to avoid possible dangers.*

CAUTION

The lifted equipment may fall and hurt you. Do not walk or work under lifted devices not sufficiently and safely supported.

DANGER

The moving parts of the engine are dangerous; do not open the housings if the yacht is in use.

CAUTION

***Yacht entrance**. Always face the yacht to enter or leave it and use the handles and the steps. Make sure that steps, handles and rubber soled shoes are clean and dry. Better to take them off. Do not jump down the vessel, do not use the vessel controls as handholds; use the handles.*

CAUTION

*To activate the **control handles** from outside the control station can cause heavy accidents even mortal ones: controls must exclusively be operated while standing in the correct position in the control station.*

CAUTION

***Metallic chips** whirling during the working of metallic parts can cause injuries: always wear safety goggles and use a mallet or punch of soft material.*

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CAUTION

Insufficient information *may cause accidents. If two or more persons are working simultaneously in the same area, make sure that each one of them is aware of the operation carried out by the others. Before starting the engine, push away the other persons from the risky areas (rotary blades and engine belt, tools and movements, engine inner and rear part). The lack of taking following precautions can cause heavy accidents even death.*

DANGER

Do not smoke during refuelling or while working on the engine. Carry out refuelling with engine shut off. Should the precautions not be taken under due consideration, fires and injuries may occur.

CAUTION

A frozen ***battery*** *may blow up if used or charged; do not start a yacht with frozen battery. To prevent the battery from freezing keep it always completely charged.*

DANGER

The ***battery*** *releases explosive gas: do not approach flames or sparkles nor smoke near it. If the battery is used or charged in a closed area, check for good ventilation. Do not check the battery charge by short-circuiting the terminals with metal tools: use a density gauge or a voltmeter.*

CAUTION

Do not remove the ***tank filling plug*** *when the engine activated, because the hydraulic installation under pressure may cause injuries. Before releasing pressure, stop the engine.*

CAUTION

The spilling of hydraulic oil under ***pressure*** *may cause injuries: before disconnecting or connecting the hoses, stop the engine and operate the controls to release the residual pressure. Prevent the engine start when the hoses are disconnected.*

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DANGER

***Cooling fluid hot**. When the engine temperature is high, the cooling system is under pressure and the hot fluid can spill over when you remove the radiator plug. Therefore, before removing it, wait until the system has cooled down, then turn the plug up to the first notch and release the system's pressure.*

CAUTION

*If damaged, the **hydraulic hoses** may cause death, carry out appropriate periodical checks to verify the presence of:*

- *damaged fittings;*
- *wear of outer coatings as consequence of rubbing;*
- *swelling of outer coatings;*
- *bent or squashed pipes;*
- *fittings not properly located.*

CAUTION

***Oil** is poisonous: do not swallow it. The engine oil contains dangerous polluting agents which can generate skin tumours. Handle oil as less as possible, protect your skin with creams and gloves. Wash accurately with warm water and soap the skin eventually polluted with oil: do not use gasoline, diesel or petroleum and anyway seek expert medical help.*

CAUTION

***Hydraulic oil** sprayed at high pressure penetrates the skin: do not check for possible oil leaks with your fingers, nor approach your face to them. Use a cardboard blank to verify the possible presence of hydraulic oil. If oil penetrates the skin, ask immediately for a doctor for the relevant treatment.*

CAUTION

*Clean the **cylinders of the trim tabs** periodically, to remove possible dirt drifts, which can jeopardize their efficiency. To reduce the corrosion risk, pull back the rods each time you leave or you harbour the yacht.*

CAUTION

*The **cleaning** of the metallic parts with non suitable solvents may cause corrosion; use detergents and solvents of the prescribed type only.*

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CAUTION

Seals and O-rings *fitted in the wrong way, damaged or worn out, may cause leaks or accidents; replace them immediately, except if otherwise prescribed. Never use trichloroethylene or solvent near O-rings and seals.*

CAUTION

When working in the engineroom, switch bilge automatic pumps off, to prevent that fuel, lubricants and other liquid spilling cause's sea pollution.

WARNING

BERTRAM declines all responsibility for the installation and operation of electric, electronic or mechanical equipment, improperly installed by third parties, in a way not authorised by the Shipyard.
BERTRAM declines all responsibility concerning tampering carried out by third parties on equipment installed in the Yard. Such tampering or unauthorized installations will not only immediately void the warranty, but may cause damage to the yacht and injuries to the people on board.
BERTRAM declines all responsibility concerning periodical maintenance activities scheduled by the Yard or by Manufacturers, but not carried out, of equipment/components, for which it is necessary to refer to their own Direction Books.

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14.2 SACRIFICIAL ANODES

The submerged, external metal parts of the yacht and internal parts of the engines and generator are protected from corrosion by means of sacrifical anodes. The anodes waste away to protect the metals on which they are installed. Outside the hull there is a sacrifical anode fixed to the stern.
If the bow thruster is installed also this one must carry a sacrifical anode.

These anodes are intended to waste away sacrifically as a protection for metals that are in contact with seawater. If the anodes waste away completely, other metal components may undergo corrosion.

All anodes should be inspected regularly to monitor their wasting rate. Any anode with a fifty percent (50%) of wear respect to its original size, should be replaced. The rate of wasting away of sacrifical anodes depends on many factors, e.g., internal electrical faults, external electrical faults and the presence of other corrosion accelerators or galvanic activity near your yacht.
The anodes that protect the internal parts of the engines and generator are located in the internal seawater cooling circuits.
Check the engine and generator manuals for the location of these important internal anodes. The internal anodes should be checked at regular intervals, depending upon how many hours the engines or generator is used.
There also may be internal anodes in other equipment that uses seawater as a cooling liquid. Check and replace these anodes according to the maintenance schedule and instructions in the Manufacturer's manuals for the specific equipment.

NOTICES

Each time the yacht is dry-shored, check the condition of the propeller, shafts and all underwater metals. Examine the protective anodes, and the fastening system. Replace the anodes if their wear exceeds the 50% of their size.

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14.2.1 Periodic check of external anodes

This operation is usually carried out when the yacht is in a dry shore. It may be done in water with help of a diver.
If the underwater anodes have not been checked recently and a haul-out is not planned, you should hire a diver to check and replace anodes.

WARNING

Before cleaning the bottom or checking the underwater anodes while the yacht is in the water, disconnect engines and generator so they cannot be started accidentally. Serious injury or even the diver death could result. Remove the ignition keys.

NOTICES

Failure to replace the anodes causes corrosion on other metal parts.

NOTICES

It is necessary to check the wear (waste) of the anodes and to replace them as soon as the wear exceeds the 50% of their original size.

14.2.2 Replacing the external anodes

The sacrifical anodes are fastened to the yacht in several positions on the hull. Before installing a new anode, clean the area under the old anode with a wire brush or fine sandpaper. Remove all residuals left by the anode. Install the new anode and put some silicone on each of the screw ends that fasten the anodes. This will make replacement easier when they are worn out.
Do not fasten anodes with glue or other adhesives that may hinder their removal, and will actually prevent the anodes from doing their job.
Do not paint the anodes.
There are internal anodes in the engines, generator, and other equipment that uses seawater as a cooling liquid. Check and replace these anodes according to the maintenance schedule in the Manufacturer's manuals for the specific equipment.

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14.3 LONG YACHT INACTIVITY

The following section provides a limited, general guide to help you understand the ordinary maintenance that should be carried out when the yacht is decommissioned for any length of time.
Check carefully the instruction manuals of the single devices.
As with all maintenance and service requirements on your yacht, only qualified and/or certified technicians should be employed to carry out these activities.

14.3.1 General Long-term Lay-up Guidelines

- Wash the yacht with fresh water.
- Prior to land storage, the yacht's bottom and all underwater gear should be pressure washed to remove marine growth and fouling.
- Inspect the outer hull and all components: propellers, anodes, shafts and strut supports, rudders, trim tabs, fan-coils, thru-hull fittings and sea valves and bow thruster.
- Check all lights on deck, the flybridge and the radar arch.
- Clean all staterooms and inspect all storage areas; remove all trash and garbage.
- Remove all flammables, e.g., paints, fuels, cleaning products, rags, etc. Dispose of these materials in a toxic waste facility.
- Check all hatches, seals and closures and lubricate.
- Clean all fan-coils with a vacuum cleaner.
- Check all systems and fastenings on the yacht to avoid damages.

Store the yacht in a sheltered place away from wave action and high wind exposure.

If the yacht is stationed outside, cover it with a waterproof sheet placed in such a way that allows ventilation. Otherwise the formation of mould on the yacht surface could be helped.

14.3.2 Engines And Generator Lay-up

For specific directions for service to be performed prior to an extended period of inactivity. Perform all the engine manufacturer's recommendations for engine lay-up in accordance with the engine service manuals. These activities include, but may not be limited to, servicing oil and air filters, pumps, etc.

- Generally, before an extended yacht lay-up period (including winter storage), the seawater-cooled components of all engines should be flushed with fresh water and the closed-system coolant levels should be checked and filled to specification as indicated. If winterizing, the seawater-cooled systems also should be properly protected with a suitable, non-toxic antifreeze.
- Check the condition of the engines' internal sacrifical anodes. Replace if indicated.
- Clean engineroom and bilge. Ensure that contaminated bilge water is not pumped into the marine environment. Use oil absorbent products to trap oil and petroleum byproducts. Dispose them in an approved manner.
- Spray all electrical, mechanical and hydraulic equipment and fittings and engines with a corrosion-inhibiting formula suitable for use on metals, electrical equipment and non-metal items such as rubber and plastics.
- Perform pre-lay-up maintenance for transmissions (gearboxes) in accordance with the recommendations found in the manufacturer's equipment service manual.

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Batteries
- Optimally, batteries should be removed from the yacht and stored in a cool, dry area and periodically charged during the lay-up period. Ensure that battery electrolyte levels are topped up and batteries are fully charged. Protect terminals with a corrosion-inhibiting product.
- Maintenance charging should be via the yacht's marine battery charging system. Never use a portable charger to maintain battery charge levels.

Guidelines for performing some of the following maintenance tasks are found elsewhere in this manual, e.g. water system and tank cleaning, as well as in specific equipment manuals.

Electro-hydraulic control units
Protect components and connections with a corrosion-inhibiting product. Check the oil level and top up as necessary.

Hydraulic steering system
Inspect all connections and lines for leaks. Check operation. Check and top-up oil as indicated.

Bow thruster (optional)
Protect the electrical components with a corrosion-inhibiting product. Check the oil level and top up as necessary.

Sacrifical Anodes (underwater and internal)
Inspect for condition and replace if indicated.

Teak wood deck and trim
Clean teak decks and trim with a cleaning solution recommended for teak. Avoid harsh cleaning products that can strip the wood of its natural oils.

Transducers
Remove the sending unit(s) and replace them with the cap plug provided. This will prevent the sender from becoming fouled with marine growth if the yacht is laid-up afloat. Clean the transducer units according to directions in the equipment manuals.

Diesel fuel tanks
Service diesel fuel system filters. Treat fuel with a diesel-fuel biocide to prevent formation of algae growth and other contaminants. Fill tanks before storage to prevent condensation from forming and contaminating fuel with water. Inspect all lines and fittings for leaks; service as indicated.

Anchor windlass (optional)
Check oil level on the gearbox body, if accessible.
Protect the electrical components with a corrosion-inhibiting product suitable for electrical equipment. Lubricate the clutches and wildcat, according to the instructions in the equipment manuals.

Exterior cushions
Clean and remove all sunpad and other upholstered cushions and store them in a dry place.

MAINTENANCE
At least every 6 months check seams and fasteners.
At least every month carry out the washing of the cushions.

Aluminum and steel fittings
Wash all metallic parts with fresh water and protect them with a corrosion-inhibiting product.

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Fresh water tanks and system
Sanitize fresh water system lines and tanks by flushing with a disinfecting solution. Flush tank and pump dry. To protect the system from freeze damage, disconnect and drain all lines and pumps, or install non-toxic antifreeze in the system. Switch OFF the pressurization systems of water.

Grey water tank
Sanitize the system by pouring a suitable marine type cleaning/ disinfecting solution into the sink drains, showers and bidets.
Flush tank and pump dry. To protect the system from freeze damage, disconnect and drain all lines and pumps, or install non-toxic antifreeze in the system.

Black water (sewage) tank
Empty the tank into a shoreside disposal facility or at sea. Flush system and tank with a suitable cleaner/disinfectant by pumping the solution into the toilets. Flush the system by discharging water in the waste tank. Repeat the process several times to ensure that tank and lines are completely flushed.
To protect the system from freeze damage, disconnect and drain all lines and pumps, or install non-toxic antifreeze in the system.

Clothes Washer And Dishwashers (optional)
Clean interior of machines by running them through a full cycle, including a drying phase for the dishwasher, so as to remove the residuals of washing powder. Leave doors or lids open to enable ventilation. Protect pumps and lines against freezing by draining them.

Refrigerators and icemaker
Remove all foodstuffs/ice, etc. and clean the interiors. Leave doors open to allow ventilation. Clean the exteriors of the units.
Disconnect and drain icemaker supply lines.

Interior Wood and Soft Goods (carpets, upholstery, curtains, etc.)
Cover these materials to avoid direct exposure to light and moisture. Close all window (curtains, blinds) to minimize UV damage to interior woodwork, carpets, furnishings, etc. Clean interior wood trim with a suitable wood cleaner.

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14.4 COMMISSIONING THE YACHT

If the yacht has been winterized, all unused equipment will have to be prepared for service. After commissioning, the activities that follow should be performed.

14.4.1 Preparing the yacht for use after a period of inactivity

The following is a general listing of activities to be performed prior to using the yacht after a period of inactivity, including a lay-up period.
Other specific recommendations will be found in the individual equipment manufacturer's service manuals.

Refer to the engine and generator Manufacturer's service manuals and follow the Manufacturer's directions for servicing the engines and generator before starting them after a period of inactivity.

These activities include, but are not limited to the following:

- Check the engines coolant level. Change oil and filters of engines and generator.
- Check all belt tension and the condition of hoses and connections.
- Check that all hoses are securely clamped and that all thru-hull fittings and sea valves serving the engines are open.

- Check the battery voltage.
- Start thrust engines.
- Warm up the engines by allowing the engine rpm to advance at intervals of several minutes at each speed before bringing them to full speed.
- Stop engines. Replace fuel filters. Replace oil filters. Top up engine oil if necessary. See the engine manuals for instructions.
- Start the engine of the power generator. Repeat the same sequence as for the thrust engines.
- If the yacht has been stored afloat, have the hull, rudders, propellers, shafts and the trim tabs thoroughly cleaned to remove marine growth and fouling.
- Inspect the condition of the antifouling paint on the bottom hull. If necessary, have two layers of suitable antifouling applied by qualified personnel (the yacht will have to be hauled).
- Check propeller and shafts. Inspect for leaks in the shaft seals. Repair as needed;
- Check the condition of underwater zinc anodes; replace if indicated;
- Check the condition and operational status of:
  - all hoses;
  - all bilge pumps, seawater, potable water, black water and grey water pumps;
  - the steering system connections;
  - trim tab fluid and connections;
  - gangway and swim ladder;
  - all controls, system monitoring gauges and meters and instruments used for navigation.

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14.5 BOTTOM MAINTENANCE

14.5.1 Bottom Antifouling Coating

Your yacht's hull bottom was coated with two coats of a high-quality antifouling paint that must be maintained to prevent the formation of marine growth. Uncontrolled marine growth (barnacles, slime, grasses) on the bottom of the yacht and on the propellers and other running gear causes a remarkable reduction in operating efficiency and with time can damage the gel-coat.

Selecting the proper antifouling paint for your yacht is important to maintaining a clean bottom in the waters in which you operate the yacht. There are many antifouling products available, each designed for specific uses. Knowing the performance characteristics of each paint is key to making the right choice of the coating that will best protect your yacht's bottom in your area of operation. If you need assistance to select the right coating for Your yacht, contact the BERTRAM Customer Support.

14.5.2 Bottom inspection

Periodic bottom cleaning and inspections should be performed on a regular schedule when the yacht is in a dry shore. The effectiveness of the antifouling paint primarily depends on local conditions in the waters where the yacht operates.

Marine growth building up on the hull can be removed with the help of a qualified and experienced diver.

A diver can remove marine growth from the hull bottom, rudders, propellers, shafts and trim tabs with a scraper, sponges and/or brushes.

At the same time, the diver can check the paint, the equipment and fittings. He can determine if the antifouling paint is still effective. If a fresh application is needed to retard marine growth, it will be necessary to arrange for the yacht to be dry-shored.

WARNING

To clean and check the yacht in water: disable the engine and generator start.

CAUTION

Bad maintenance condition (barnacles, etc.) may cause cavitation and damage shaft, rudders, propellers, etc.

CAUTION

Small areas of paint may peel off from the propellers even after a short period of operation.

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14.5.3 Renewing antifouling protection

Periodically, it will be necessary to apply a fresh coating of antifouling paint to the yacht's bottom. Before doing so, make sure that the new paint to be applied is compatible with the existing coating.
Antifouling formulas vary, and a new coating will not adhere well if its formula is incompatible with the layer beneath it.

If the existing coating is smooth, adhering well and is not peeling, you can apply a fresh coat directly over the existing layer. If the existing coating is worn, peeling, flaking, cracking, etc. it will have to be removed before repainting.

If you apply a fresh coating over thick, built-up coats of antifouling, the newly applied paint will not adhere well to the bottom and it will peel away. To prevent this condition, prior to applying fresh antifouling paint, it will be necessary to remove all the previously applied layers and to prepare the yacht's bottom in the same way as it was prepared treated before the first application of an antifouling paint.
This will ensure that the antifouling paint will adhere well.

Removing old coatings and applying new coatings is hazardous to your health. Read and follow all warning indications, found on product labels, for the use and disposal of these materials.

WARNING

Antifouling is poisonous and should never be burnt, use only authorized disposal procedures and in case of doubts contact the authorities in charge. The sandblasting operations and removal of antifouling must be carried out with suitable clothes and protections.

NOTICES

Certain underwater fittings on the yacht must never be painted. Paint will prevent the proper performance of depth sounder and speedometer sensors and anodic (sacrifical zinc) protection. To prevent compromising the effectiveness of these fittings, do not paint transducers or anodes.
Shaft and propellers that have been painted may quickly lose their coatings due to the velocity of water action during their normal function.

NOTICES

Removing old antifouling by particle blasting may damage the hull bottom gel-coat and/or the anti-blister barrier coating applied by the yacht's builder.
To avoid damaging the hull bottom gel-coat and/or other prophylactic coating, follow the paint manufacturer's directions for removing antifouling coatings, e.g., with paint removers, by wet sanding, etc.

WARNING

To remove the old antifouling, do not use sandblasting methods, as it may damage gel-coat surface and the anti-osmosis resin applied by the Manufacturer. As suggested by the antifouling manufacturers, use paint removers or, as an alternative, wet sanding.

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14.6 GENERAL MAINTENANCE

14.6.1 Gel-coat cracks

When underway, some structural parts of the yacht are subject to bending, and create tension or compression stresses in fiberglass and on gel-coat.

The differences in the modulus of elasticity of gel-coat and fiberglass can cause small, hairline cracks on the gel-coat surface, in particular in the more heavily loaded spots, e.g., near cleats, handrail stanchion bases and at radius angles in the moldings.

These cracking patterns, however, do not generally compromise the mechanical and structural strength characteristics of the fiberglass moldings.

14.6.2 Gel-coat voids

In some areas of the yacht, bubbles may generate on the gel-coat, which can break exposing the fibres underneath. The drawback occurs generally in vicinity sharp angles, and depends on air bubbles that, during fabrication, remain entrapped between fibreglass and gel-coat, although quality checks are carried out by specialised personnel.
Broken gel-coat bubbles are easy to repair by filling the voids and touching up with gel-coat that can be requested to the Service Department of the Shipyard.

WARNING

The alteration of colour and brightness in correspondence of areas which are highly exposed is considered as normal. The necessary polishing has to be considered as normal maintenance.

MAINTENANCE

At least once a month perform an accurate cleaning of all fibreglass parts. At least once every six months check the status of the fibreglass. When necessary, but at least once every two years, polish all fibreglass parts.

CAUTION

In case of particularly persistent dirt, wash always by using neutral products. Do not use products containing ammonia that turn the surface yellowish; if necessary use powder products dissolved in water.

CAUTION

To remove possible gel-coat, do not use sandblasting methods that may damage the surface of the anti-osmosis resin applied and could expose fibres. As suggested by gel-coat Manufacturers, use suitable products or, as an alternative, wet sand.

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CAUTION

Some hull areas (fastening area of the propeller shafts supports, of submerged exhausts, around the thrust propellers housings, etc.) at which can be carried out further works after the hull molding; in those areas are usually used fillers that, with time, may generate localized faults, as for instance bubbles or small cracks. These little faults do not impair the hull mechanical strength at all. To repair them, it is sufficient to sandpaper the area, by removing possible bubbles and by re-applying fillers suitable for the bottom hull.

14.6.3 Light alloys and stainless steel

It is a good rule to accurately wash the entire yacht after each navigation, in particular all metal parts that may be damaged by salty humidity. Have plenty of fresh water sprayed on handrail, windows, skylights, rub rail, anchors and cleats.
Protect all metal parts with Vaseline oil periodically.

MAINTENANCE

At least once a year check the fastening of all metallic parts of the yacht.

CAUTION

The aft window is not watertight, so do not point the jet of water directly towards the window, when washing.

CAUTION

Never use brushes or abrasive rags on metallic fittings, not even on rusty spots, scratches on the surface result in a less shiny appearance and diminish the mechanical features.

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14.6.4 Sun-deck cushions

Remove the cushions from the seats on a regular interval and let their bottom side and the seat surface dry. When washing or when it is raining, remove the cushions and stow them in a covered place; however, when cushions are wet, remove them from their seats, to prevent that water or humidity remain entrapped between cushions and underneath surface. This could affect the gel-coat and also create osmosis bubbles and deteriorate the cushion cover. The cushions must be washed with running water; do not use jet-cleaners, brushes or abrasive sponges.

MAINTENANCE

At least every 6 months check seams and fasteners.
At least every month carry out the washing of the cushions.

WARNING

Current use:

- *do not walk, nor jump on the cushions;*
- *prevent the cushions from becoming yellowish due to direct exposure to sun rays;*
- *prevent the absorption of water or of moisture by leaving the tapestry exposed to bed weather, particularly during periods of inactivity.*

Cleaning:

- *remove ordinary dirt with a warm water solution and neutral soap: do not use detergents or solvents;*
- *dry with a soft rag, not leaving any residuals.*

Preservation:

- *store tapestries clean and dry into a fresh and ventilated room without moisture;*
- *do not place heavy objects on the tapestries when stored.*

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14.6.5 Instrumentation and navigation lights

Use clean wet rags for cleaning.
After navigation, cover instrumentation and equipment.

MAINTENANCE

At least once a week check the operation of the navigation lights.
At least once a week carry out accurate cleaning of glasses and headlights.
At least once every six months check the presence of corrosion in the connections of the navigation light cables.
At least once every six months, tighten the cable connections of the navigation lights.

MAINTENANCE

At least once a week check the operation of the gauge cluster in the fly and of all instruments on board.
At least once a week carry out cleaning.
At least once every six months protect the piston for fly gauge cluster opening with proper products.

CAUTION

Do not use chemical or abrasive products.

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14.7 REPLACEMENT

This Section describes the operations for the correct replacement of parts which do not require skilled staff.

WARNING

Look over the maintenance safety rules contained in this manual in order to act with the maximum safety and follow the indications herebelow.

WARNING

During the replacements, remove the parts with care and order. In this way the assembly operations are as easy as possible.
Make sure to install genuine spare parts. In this way the system efficiency is not altered.
Sometimes the use of non-genuine spare parts may cause the withdrawal of the Manufacturer's warranty.

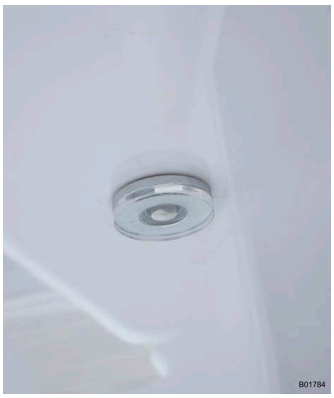
CAUTION

Before each navigation, check the light operation at regular intervals, to avoid any inconvenient when using them by night.

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14.8 BULB REPLACEMENT

14.8.1 Watertight little spotlights



The watertight lights are located inside of heads and on the exterior ceiling of the main deck.
With lights off and cold bulb: periodically remove the salt deposits from the light glass with a cloth moistened with fresh water.

Bulb replacement
Before carrying out the replacement of the bulbs, make sure to disconnect the circuit breaker protecting the area of the built-in spotlight. With lights off and cold bulb: remove the glass of the light, remove the bulb and replace the light. Pay attention during replacement of the bulb, not to touch with your fingers the glass of the new bulb. The bulb graft is of indent-type. After insertion of the new bulb, follow the reverse sequence to recover the previous conditions.

14.8.2 Little spotlights



Light unit replacement
Before carrying out the replacement of the led unit, make sure to disconnect the circuit breaker protecting the area of the built-in spotlight.
With lights off and led unit cold: remove the glass-holder frame. Force the retaining springs and remove the holder of the led unit.
Replace the led unit.
During led unit replacement, do not touch the new leds with your fingers. The led unit graft is of indent-type. After inserting the new unit, follow the sequence in reverse order to restore initial conditions.

DANGER

The lights develop heat. Do not approach inflammables.

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14.8.3 Swinging table lamp

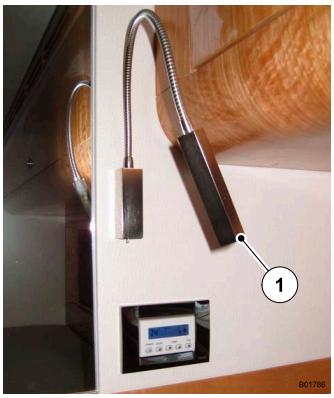
Bulb replacement

Prior to proceed with the bulbs replacement, make sure that the magneto-thermal switch protecting the area in which the bulb to be replaced is located, is disconnected.

With light off and cold bulb: loosen the terminal (**1**) and pull the light unit out.

Pay attention during replacement of the bulb, not to touch with your fingers the glass of the new bulb.

After insertion of the new bulb, follow the reverse sequence to recover the previous conditions.



14.8.4 Engineroom overhead light

Bulb replacement

Prior to proceed with the bulbs replacement, make sure that the magneto-thermal switch protecting the area of the ceiling light is disconnected. Remove the bulb protecting glass by unscrewing fixing screw with a screw driver. Then replace the bulb. The bulb is screw-tightened.

After insertion of the new bulb, follow the reverse sequence to recover the previous conditions.



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14.8.5 Cabinet light

Bulb replacement

Before carrying out the replacement of the bulbs, make sure that the circuit breakers protecting the area concerning the bulb replacement, is disconnected.
Remove the bulb protecting glass by unscrewing fixing screw (**1**) with a screw driver. Then replace the bulb. The bulb is screw-tightened.
After insertion of the new bulb, follow the reverse sequence to recover the previous conditions.



14.8.6 Neon light

Neon replacement

Prior to proceed with the bulbs replacement, make sure that the magneto-thermal switch protecting the area in which the bulb to be replaced is located, is disconnected.
Remove the bulb protecting glass by unscrewing the fixing screws with a screw driver.
Extract the old neon light and replace it with a new one.
After inserting the new neon light, follow the sequence in reverse order to restore initial conditions.



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BERTRAM

15



TROUBLESHOOTING

FOREWORD

USE OF THE MANUAL

DESCRIPTION OF THE YACHT

NAVIGATION

AUXILIARY EQUIPMENT ON BOARD

CONTROL STATION

ON THE MAIN DECK

THRUST SYSTEMS

HYDRAULIC SYSTEMS

ELECTRIC SYSTEM

DETAILED INFORMATION ON THE INTERIORS

SAFETY DEVICES AND EQUIPMENT

YACHT HAULAGE AND LAY-UP PERIOD

MAINTENANCE

TROUBLESHOOTING

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15.1 MAIN NOTES

This section provides some possible causes of defects on the yacht main equipment/machinery.
This section suggests also the corrective action for each failure described; as well as the possible damage suffered if the corrective action is not carried out.
The corrective actions must be performed by specialized personnel.

WARNING

BERTRAM declines any responsibility for proposed corrective action carried out by unskilled personnel.

WARNING

For matters relating to specific equipment and for troubleshooting any equipment, please refer to the Owner's manual of that equipment.

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15.2 EQUIPMENT

For further information, please refer to BERTRAM Customer Support.

Problem	Cause	Action
1. User not powered on	– Power line fuses of users blown	– Check the line and replace the fuses
	– Wiring disconnected	– Check wiring connections
	– Connections oxidized and lack of maintenance	– Check and carry out proper maintenance

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15.3 FUEL SYSTEM

For further information, please refer to BERTRAM Customer Support.

Problem	Cause	Action
1. Irregular fuel supply to engines and generator	– Circuit valves closed or not fully open – Filters clogged	– Check/open – Clean

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15.4 BLACK AND GRAY WATER SYSTEM DRAIN

For further information, please refer to BERTRAM Customer Support.

Problem	Cause	Action
1. Black water (sewage) tank or gray water tank drain irregular	– Circuit valves closed or not fully open – Lack of maintenance – Abnormal pump operation	– Check/open – Carry out maintenance – Check

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15.5 PROPELLERS SHAFTS

For further information, please refer to BERTRAM Customer Support.

Problem	Cause	Action
1. Excessive vibrations and noise	– Too long inactivity period and lack of maintenance – Failure in the propulsion system	– Carry out proper maintenance – Check shafts, mechanical connections, propellers and rudders
2. Water leaks from shaft seals	– Seals are not correctly adjusted – Poor maintenance	– Check the seals – Carry out proper maintenance

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15.6 FRESH WATER SYSTEM

For further information, please refer to BERTRAM Customer Support.

Problem	Cause	Action
1. No water at the outlets	– Circuit valves closed or not fully open – Empty tanks – Pump not powered up	– Check/open – Fill the tanks and bleed the circuit – Check/Supply
2. Fresh water pump starts with no outlet open	– Circuit leaking	– Clear leakages

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15.7 BILGE PUMP

For further information, please refer to BERTRAM Customer Support.

Problem	Cause	Action
1. The pump does not start	– No voltage – Blocked impeller – Electric section defective	– Check the value of the line voltage – Clean the impeller and the pump casing – Consult BERTRAM Customer Support
2. The pump runs but it does not work	– Dirty valve and filter – Over suction depth – Air in suction	– Clean valve and filter – Install the pump closer to the water static level – Check the seal of the suction pipe – Fill the pump casing of liquid – With DC and three-phased motors invert the polarities
3. The pump vibrates and is noisy	– The pump has not been primed at first start – Wrong rotation direction	– Increase or decrease the capacity – Vent air from the system
4. The operation of one pump is irregular	– Damaged impeller and blower – Pressure required from the system higher than that-one the pump can supply	– Check the internal air pressure in the membrane – Check/Have it cleaned

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15.8 FRESH WATER PUMP

For further information, please refer to BERTRAM Customer Support.

Problem	Cause	Action
1. The pump does not start	– No water – Overheating due to high temperature – Voltage too low or too high	– Check the water supply – Add cold water <95 °F (35 °C) – Check the supply voltage
2. The pump operates continuously	– Pipes leaking – One-way inlet valve is jammed or leaking	– Repair leaking – Clean check valve or install a new one. Check the filter
3. Pump stops during operation	– Dry running – Overheating due to high water temperature – Voltage too low or too high	– Check the water supply – Add cold water <95 °F (35 °C) – Supply a proper voltage

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15.9 OIL TRANSFER PUMP

For further information, please refer to BERTRAM Customer Support.

Problem	Cause	Action
1. Water flow restriction	– Closed valves	– Open valves
	– Plugged suction	– Eliminate restriction
	– Air leak at suction	– Locate and repair leak
	– Suction lift too high	– Do not exceed vapor pressure of liquid
	– Incorrectly wired motor	– Check wiring diagram
	– Wrong rotation	– Correct rotation
2. Water flow restriction	– Pump shaft speed incorrect	– Check driver speed, motor wiring, pulley tension
	– Discharge pressure too high	– Decrease downstream pressure
	– Air leak at suction	– Locate and repair leak
	– Worn or damaged pump	– Inspect and repair as required
	– Low viscosity	– Verify original application conditions

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Problem	Cause	Action
3. Gradually loses prime	– Suction lift too high	– Improve suction pressure
	– Air or gas in the fluid	– Eliminate air or gas from fluid
	– Air leak at suction	– Locate and repair leak
	– Worn or damaged pump	– Inspect and repair as required
4. Noise	– Cavitation	– Improve system suction pressure, provide adequate NPDSH
	– Solid particles in fluid	– Install the suction strainer. Clean the suction strainer
	– Air or gas in the fluid	– Eliminate air or gas from fluid
	– Worn or damaged pump	– Inspect and repair as required

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Problem	Cause	Action
5. Motor runs hot or overloads	– Discharge pressure too high	– Reduce downstream pressure. Check relief valve setting. Be sure discharge pressure gages function correctly.
	– Shaft speed too fast	– Reduce speed
	– Fluid viscosity higher than expected	– Change to larger horsepower or higher service factor motor. Thin fluid.
	– Incorrectly wired motor	– Check wiring diagram
	– Binding internal pump parts	– Inspect and correct condition
	– Motor normally feel hot	– Verify if actual motor amperage draw is within range.
6. Seal leaks	– Dry running	– Open valves
	– Solid in fluids	– Add suction strainer
	– Damaged during field replacement	– Inspect and replace damaged components
	– Seal material incompatible with fluid	– Verify original application conditions. Address to Customer Support.

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15.10 ELECTRO-HYDRAULIC HELM SYSTEM

For further information, please refer to BERTRAM Service Department.

Problem	Cause	Action
1. Air bubbles or foam into the system	– The oil level into the tank is too low and doesn't allow suction pipe to be completely plunged. In this way, the pump sucks oil and air contemporarily	– Verify/Check
	– Possible openings and little holes on suction pipes or faulty pump seals, which allow air to enter inside	– Verify/Check
2. Pump doesn't deliver oil	– Wrong rotation direction	– Verify/Check
	– Obstructed conduits or suction filters	– Verify/Check
	– Too low oil level into the tank	– Verify/Check
	– Air in leakages in suction system	– Verify/Check
	– Too viscous oil with some difficulties in passing through	– Verify/Check
	– The shaft or other components of the pump are broken	– Replace

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Problem	Cause	Action
3. Lack of pressure in the system	– Pump doesn't deliver oil	– Verify/Check
	– Relief valve is not calibrated	– Verify/Check
	– Free discharge of oil to the tank somewhere into the system	– Verify/Check
4. System pressure is low or fluctuating	– Possible leaks in the piping or elsewhere in pressurized parts of the system	– Verify/Check
	– Relief valve set at a too low rate	– Verify/Check
	– The relief valve remains open or oscillates in its housing	– Verify/Check
	– Restriction of the pump suction pipes or possible obstruction of the filter	– Verify/Check
	– Air in leakages into the suction pipes or by the pump's seals	– Verify/Check
	– Worn pump	– Verify/Check

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Problem	Cause	Action
5. Too noisy pump	– Wrong pump rotation direction	– Verify/Check
	– Presence of some air in oil	– Bleed
	– Oil viscosity causing obstructions to the suction system	– Verify/Check
	– Irregular inflow of oil to the pump, caused by an insufficient filtering capacity of the filter (the filter could be dirty or not suitable)	– Verify/Check/Clean
	– Big lacks of charge along the suction line	– Verify/Check
	– Worn pump's components	– Verify/Check/Replace
	– Relief valve vibrations	– Verify/Check
	– Mechanical vibration due to a bad anchor action	– Verify/Check

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Problem	Cause	Action
6. Too high temperature rating	– The pump is working at a higher pressure than the allowed one	– Verify/Check
	– Faulty or worn pump causing internal blow-by	– Verify/Check
	– Excessive blow-by through valves and cylinder	– Verify/Check
	– Too viscous oil	– Verify/Check
	– Continuous overloaded operation	– Verify/Check
	– Too high temperature in the room where the pump unit is placed	– Verify/Check
7. Leakages by seals	– Possible abrasive substances entered into the system and circulating with oil, which have damaged pump shaft	– Verify/Check
	– Seals are faulty, broken or mounted in a wrong way	– Verify/Check
	– Too hot oil	– Verify/Check
8. Pump overcharged motor	– Too viscous oil	– Verify/Check
	– Obstructed delivery fine or excessive resistance	– Verify/Check

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15.11 TRIM TAB SYSTEM

For further information, please refer to BERTRAM Customer Support.

Problem	Cause
1. Air bubbles or foam into the system	– The oil level into the tank is too low and doesn't allow suction pipe to be completely plunged. In this way, the pump sucks oil and air contemporarily – Possible openings and little holes on suction pipes or faulty pump seals, which allow air to enter inside
2. Pump doesn't deliver oil	– Wrong rotation direction – Obstructed conduits or suction filters – Too low oil level into the tank – Air in leakages in suction system – Too viscous oil with some difficulties in passing through – The shaft or other components of the pump are broken
3. Lack of pressure in the system	– Action – Pump doesn't deliver oil – Relief valve is not calibrated – Free discharge of oil to the tank somewhere into the system
4. System pressure is low or fluctuating	– Possible leaks in the piping or elsewhere in pressurized parts of the system – Relief valve set at a too low rate – The safety valve remains open or oscillates in its housing – Restriction of pump suction pipes or possible obstruction of filter – Air in leakages into the suction pipes or by the pump's seals – Worn pump

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Problem	Cause
5. Too noisy pump	– Wrong pump rotation direction – Presence of some air in oil – Oil viscosity causing obstructions to the suction system – Irregular inflow of oil to the pump, caused by an insufficient filtering capacity of the filter (the filter could be dirty or not suitable) – Big lacks of charge along the suction line – Worn pump's components – Relief valve vibrations – Mechanical vibrations due to a bad anchor action
6. Too high temperature rating	– The pump is working at a higher pressure than the allowed one – Faulty or worn pump causing internal blow-by – Excessive blow-by through valves and cylinder – Too viscous oil – Continuous overloaded operation – Too high temperature in the room where the pump unit is placed
7. Leakages by seals	– Eventual abrasive substances entered into the system and circulating with oil, which have damaged pump shaft – Seals are faulty, broken or mounted in a wrong way – Too hot oil
8. Pump overcharging the motor	– Action – Too viscous oil – Obstructed delivery fine or excessive resistance

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15.12 GLENDINNING CABLEMASTER

For further information, please refer to BERTRAM Customer Support.

Problem	Cause	Action
1. Non-functional (either no power or unit has power and does not respond)	– Tripped breaker	– Reset breaker
	– Power wire incorrectly connected to relay assembly	– Replace relay assembly
	– Defective motor. Defective relay box	– With power switch on and voltage across motor wires - if no response, replace motor
2. Pays out cable only	– In-limit switch circuit open	– Check in-limit switch
	– Power inputs reversed	– Check polarity on DC input wires
	– Defective relay or diode	– Replace relay assembly
	– Bad power switch	– Check power switch
3. Retracts cable only	– Out-limit switch circuit open	– Check in-limit switch
	– Defective relay	– Replace relay assembly
	– Bad power switch	– Check power switch

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Problem	Cause	Action
4. Tripped DC breaker	– Main pulley too tight	– Adjust pulley
	– Cable jammed and kinking	– Check for adequate storage space and/or cable for undue kinking - see cable adjustment
	– Defective motor	– Disconnect motor wires from relay box. Apply power directly to motor wires, motor should run one direction of other. No response from motor, replace

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15.13 AIR-CONDITIONING UNIT

For further information, please refer to BERTRAM Customer Support.

Problem	Cause	Action
1. Display does not operate	–	– Turn circuit breaker on – Check CX/CXP cable and connections – Replace keypad/display – Replace power logic board
2. Erratic temperature display	–	– Perform a factory memory reset – Check temperature sensor, cable and connection – Ensure the temperature sensor is installed properly – Calibrate temperature – Replace power logic board
3. Erratic system operation	–	– Perform a factory memory reset – Check CX/CXP cable and connections – Check temperature sensor, cable and connection – Replace keypad/display – Replace power logic board
4. The unit will not operate at all	– Blown fuse or tripped circuit breaker – Low voltage to unit	– Replace fuse with time delay type or reset breaker. Check for correct sizing – Check shore power supply and rating of electrical power cord to boat

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Problem	Cause	Action
5. Air from the unit does not feel cool in the "Cool" Mode or warm in the "Heat" Mode	– The selector switch is set for "Fan only"	– Switch the system into the "Cool" or "Heating" mode
	– The thermostat is set incorrectly	– Set the thermostat for a cooler or warmer setting
	– Water flow is restricted	– Clear restriction
6. The unit operates but the stateroom fails to cool normally	– Dirty air filter	– Clean lint screen or air filter
	– The thermostat is set too high	– Reset the thermostat to a cooler setting
7. Compressor cycle on and off	– Dirty air filter	– Clean lint screen or air filter
	– Water flow restriction	– Clear restriction
8. Water leaks in stateroom	– Condensate drain is clogged	– Clean out drain holes
	– Blockage in hose	– Clean hose. Check downhill routing of hose

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TECHNICAL PLANS

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B540 SALON & GALLEY AC COMPONENTS

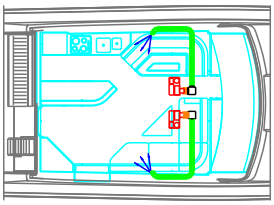
FORWARD SALOON

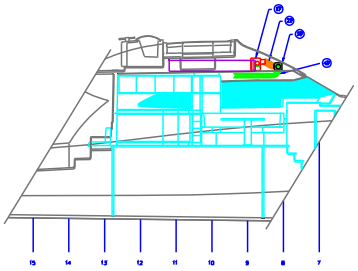
19: EVAPORATOR
MODEL: EDDIC - HE X 3
CAPACITY: 30,000 BTU X 3 = 90,000 BTU
LOCATION: UNDER SEAT BELOW

20: FORWARD SALON DISCHARGE DUCTING
SIZE: 5"

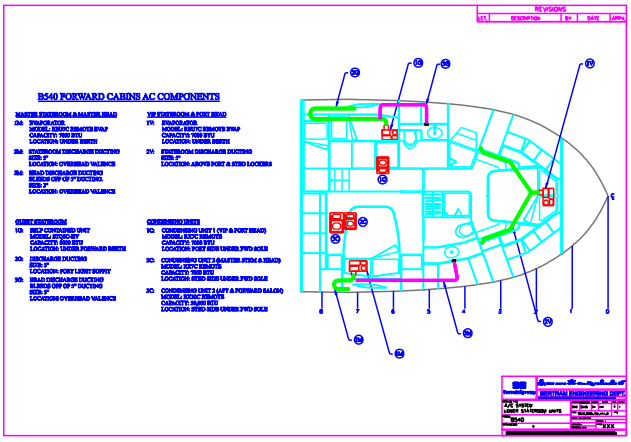
21: DISCHARGE JUNCTION BOX
SIZE: FOR 5" & 3" DUCTING
LOCATION: ENTRANCE WITH EVAPORATOR
RETURNS CENTRE OF SALOON CEILING

47: FORWARD SALOON DISCHARGE DUCTING
SIZE: 3" SPLIT TO FEED PORT & STBD





GALLEY & SALON PLAN VIEW 1



B540 FORWARD CABINS AC COMPONENTS

MASTER STATEROOM & MASTER HEAD

24: EVAPORATOR
MODEL: EDDIC REMOTE SPLIT
CAPACITY: 7000 BTU
LOCATION: UNDER BERTH

25: STATEROOM DISCHARGE DUCTING
SIZE: 3"
LOCATION: OVERHEAD VALENCE

26: HEAD DISCHARGE DUCTING
SIZE: 3" TEE OFF OF 5" DUCTING
SIZE: 3"
LOCATION: OVERHEAD VALENCE

VIP STATEROOM & PORT HEAD

17: EVAPORATOR
MODEL: EDDIC REMOTE SPLIT
CAPACITY: 7000 BTU
LOCATION: UNDER BERTH

27: STATEROOM DISCHARGE DUCTING
SIZE: 3"
LOCATION: ABOVE PORT & STBD LOCKERS

GUEST STATEROOM

18: SELF CONTAINED UNIT
MODEL: EDDIC SU
CAPACITY: 5000 BTU
LOCATION: UNDER FORWARD BERTH

22: DISCHARGE DUCTING
SIZE: 3"
LOCATION: PORT LIGHT SOFFIT

23: HEAD DISCHARGE DUCTING
SIZE: 3" TEE OFF OF 5" DUCTING
SIZE: 3"
LOCATION: OVERHEAD VALENCE

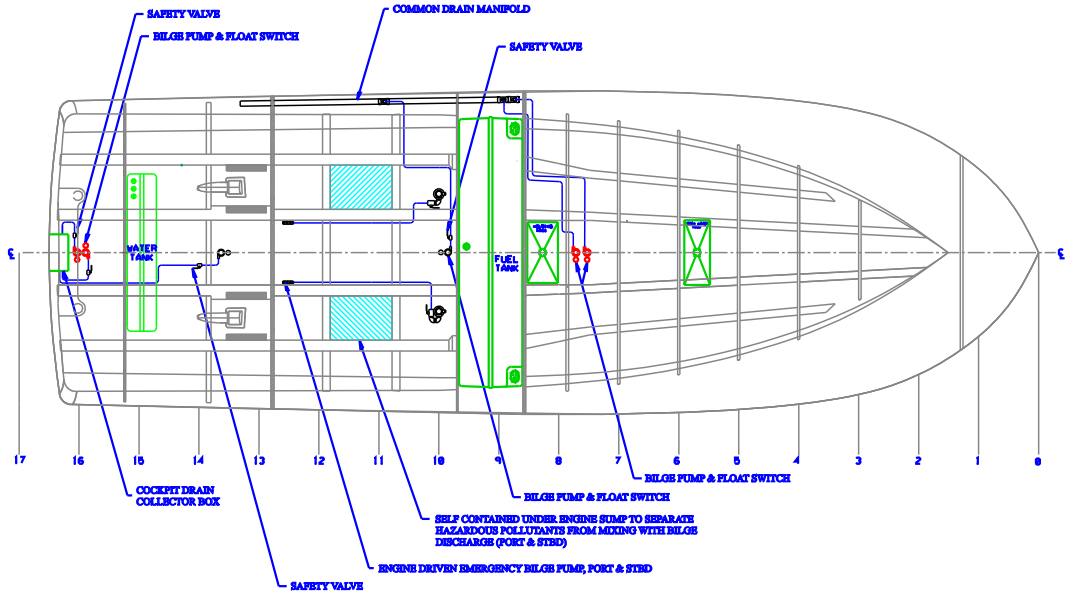
CONDENSING UNITS

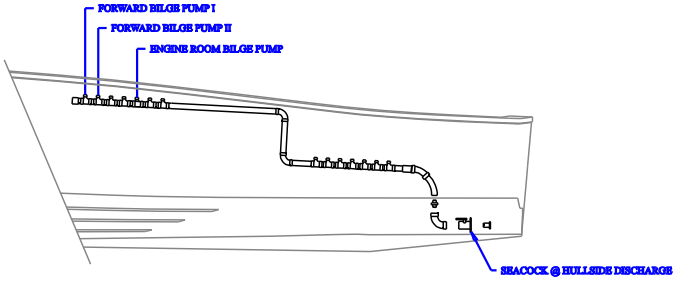
30: CONDENSING UNIT 1 (VIP & PORT HEAD)
MODEL: EDDIC HE/HEATH
CAPACITY: 7000 BTU
LOCATION: PORT SIDE UNDER FWD SOLE

31: CONDENSING UNIT 2 (MASTER, STBD & HEAD)
MODEL: EDDIC HE/HEATH
CAPACITY: 7000 BTU
LOCATION: STBD SIDE UNDER FWD SOLE

32: CONDENSING UNIT 3 (AFT & FORWARD SALOON)
MODEL: EDDIC HE/HEATH
CAPACITY: 30,000 BTU
LOCATION: STBD SIDE UNDER FWD SOLE

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PORT SIDE COMMON DRAIN

RINA NOTES

1. DRAWING IN COMPLIANCE WITH DIPCB32-B-0505, DIP NO. _____ (BILGE PUMPING SYSTEM).
2. SYSTEM IN ACCORDANCE WITH ISO 15083 - BILGE PUMPING SYSTEM.
3. OVERHEAD DISCHARGE IS ABOVE 7° HEEL ANGLE.
4. ELECTRICAL CONNECTIONS ARE IN ACCORDANCE WITH IEC 60529; DEGREES OF PROTECTION PROVIDED BY ENCOLSURES (IP CODE).

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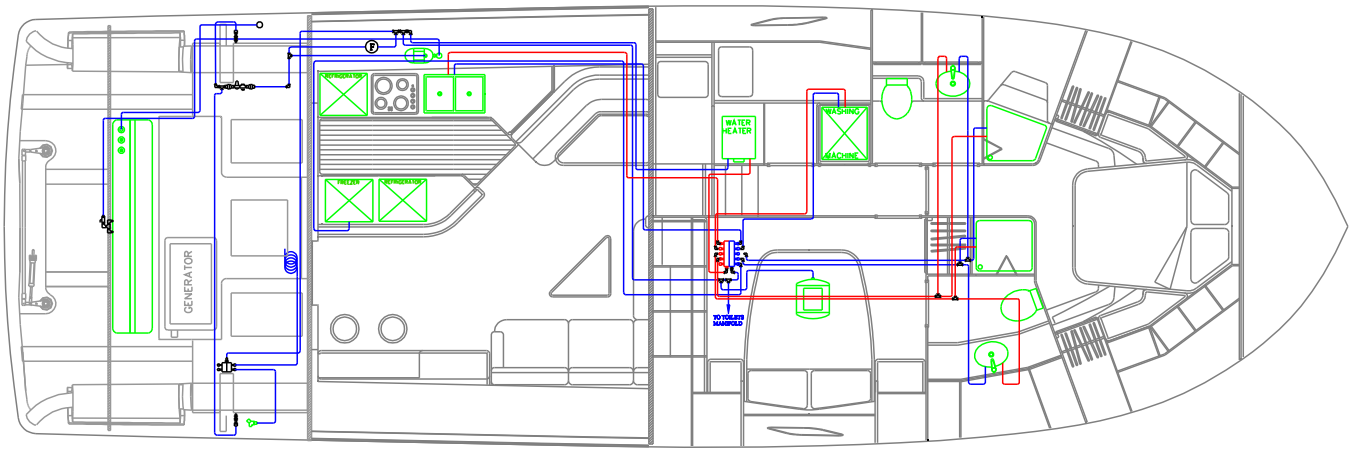
BERTRAM ENGINEERING DEPT.

BILGE PUMP SYSTEM
EURO BOATS

B540

B

XXX



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BERTRAM ENGINEERING DEPT.

DRAWING TITLE
FRESH WATER SYSTEM

MODEL:
B540

DRAWING SIZE:
B

Project	Job Order #	Group	Dwg #	Rev.	Layout
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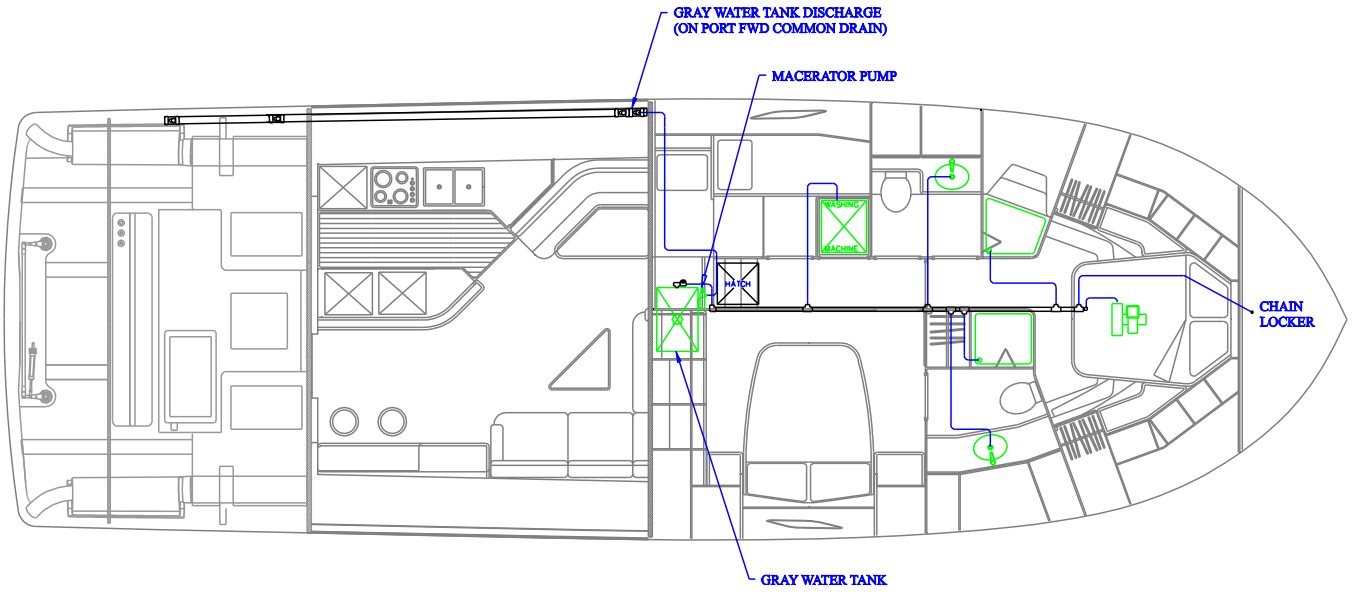
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DATE: 10-7-08

SHEET: No. # XXX

APPROVED:

DESIGN: D.D.



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BERTRAM ENGINEERING DEPT.

DRAWING TITLE: GRAY WATER SYSTEM

MODEL: B540

DRAWING SIZE: B

Project	Jan Order #	Group	Dwg #	Rev.	Layout
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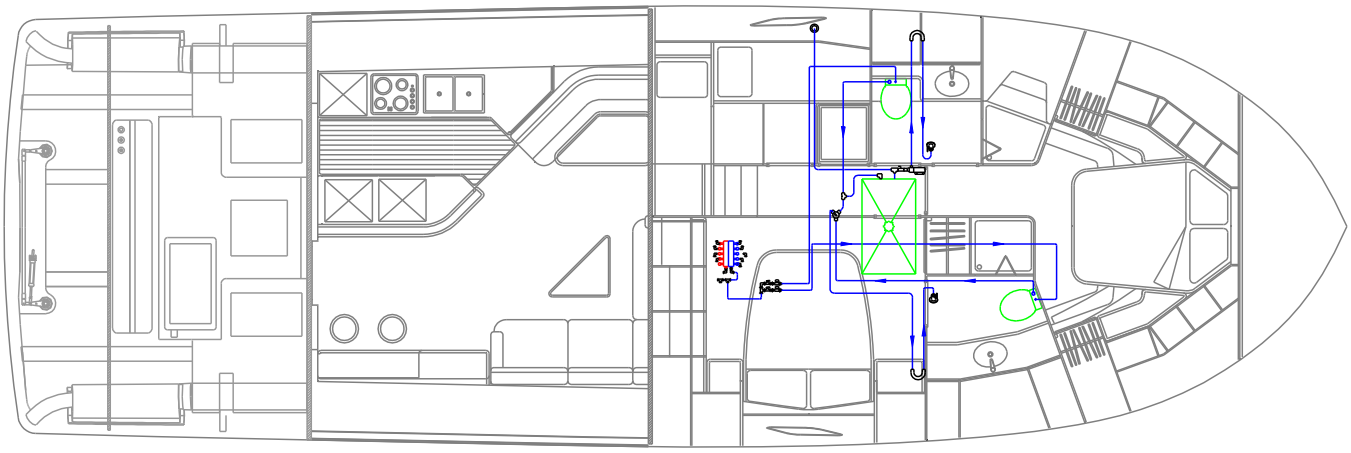
DATE: 10-7-08

SHEET: Dwg # XXX

APPV.BY:

DESG.BY: D.D.

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BERTRAM ENGINEERING DEPT.

DRAWING TITLE: TOILET SYSTEM

MODEL: B540

DRAWING SIZE: B

Project	Jon Order #	Group	Dwg #	Rev.	Layout
B540	00/3U	DM	XXX	0	-

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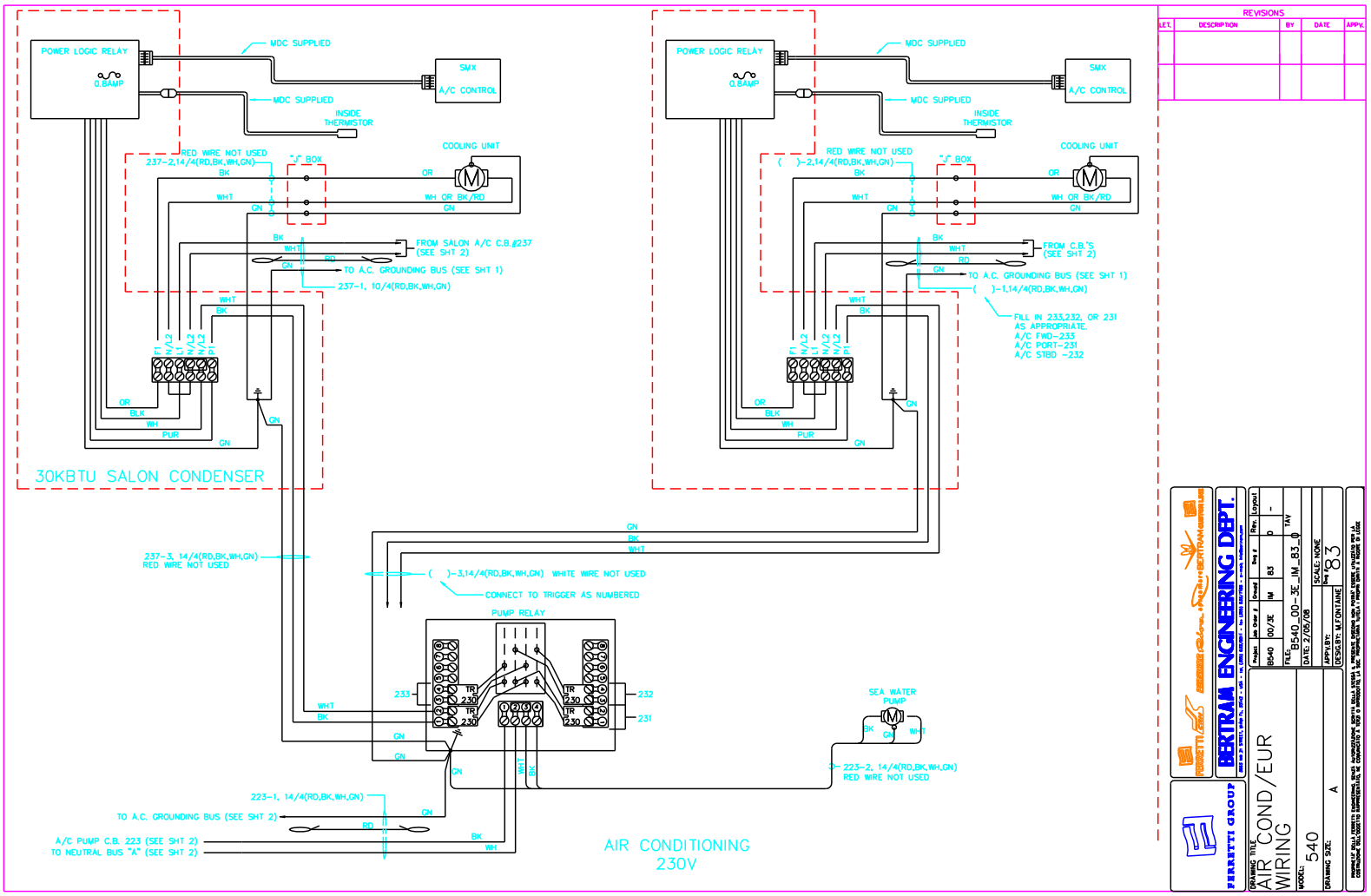
DATE: 10-7-08

SHEET: Dwg # XXX

APPV.BY:

DESG.BY: D.D.

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REVISIONS

LET.	DESCRIPTION	BY	DATE	APPV.

FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

Project	Job Order #	Dwnd	Dwg #	Rev. Layout
B540	00/3E	IM	83	b - TAV

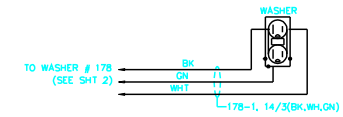
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DATE: 2/05/08
APPV.BY:
DESIGN BY: M.FONTANAE

DRAWING TITLE
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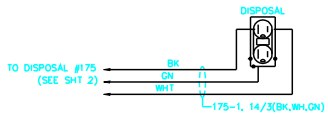
MODEL: 540
DRAWING SIZE: A
SCALE: NONE
Dwg # 83

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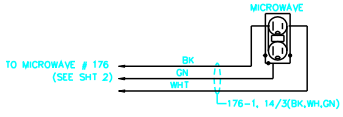
CLOTHES WASHER #178



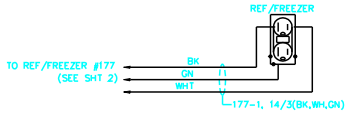
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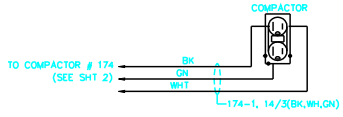
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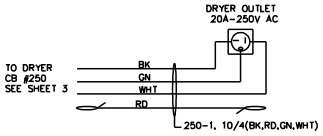
REF/FREEZER #177



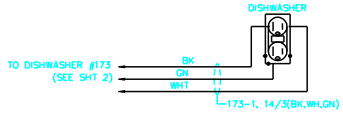
COMPACTOR #174



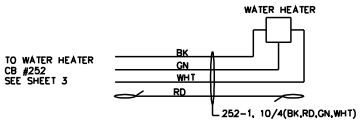
DRYER #250



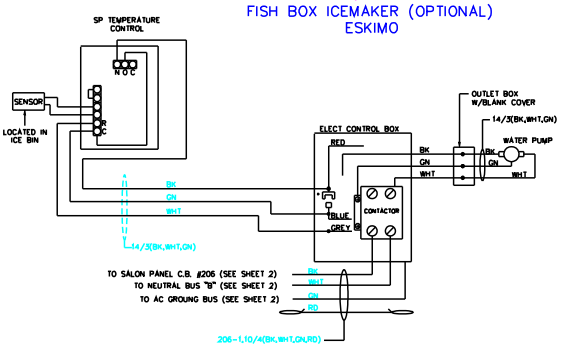
DISHWASHER #173



WATER HEATER #252

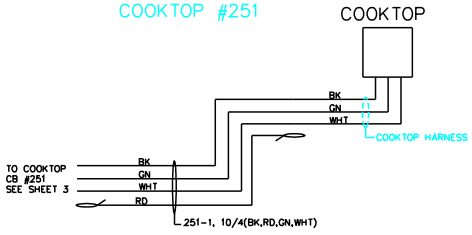


FISH BOX ICEMAKER (OPTIONAL) ESKIMO



*EQUIPMENT PLUG MUST BE DISCONNECTED IF SP TEMPERATURE CONTROL IS USED.

COOKTOP #251



REVISIONS

LET	DESCRIPTION	BY	DATE	APPV.

FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

DRAWING TITLE: APPLIANCES/EURO WIRING(10A)

MODEL: 540

DRAWING SIZE: A

Project	Job Order #	Group	Dwg #	Rev.	Layout
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FILE: B540_00-3E_IM_84_0 TAV

DATE: 02/05/08

SCALE: NONE

APPV.BY:

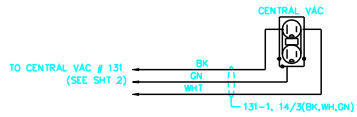
DESIG.BY: M.FONTAINE

Dwg # 84

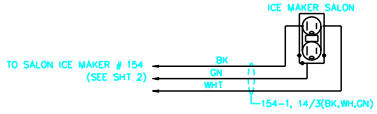
PROPRIETA' DELLA FERRETTI ENGINEERING, SENZA AUTORIZZAZIONE SCRITTA DELLA STESSA IL PRESENTE DISEGNO NON PUO'ESSERE UTILIZZATO PER LA COSTRUZIONE DELL'OGGETTO RAPPRESENTATO, NE COMUNICATO A TERZI O RIPRODOTTO. LA SOC. PROPRIETARIA TUTELA I PROPRI DIRITTI A NORME DI LEGGE

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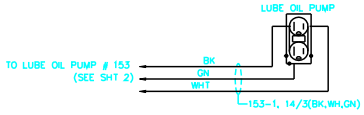
CENTRAL VAC #131



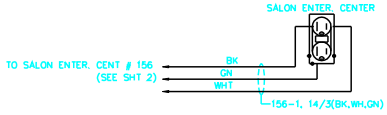
ICE MAKER SALON #154



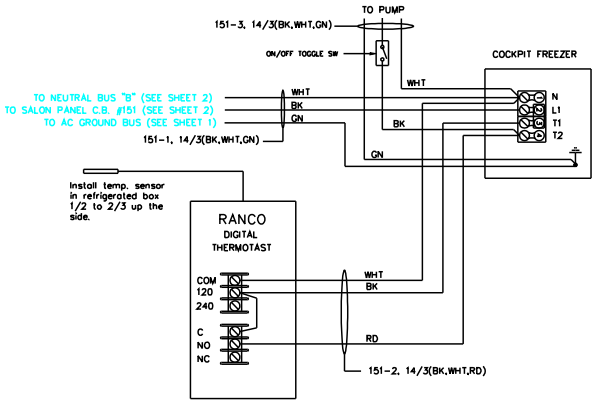
LUBE OIL PUMP #153



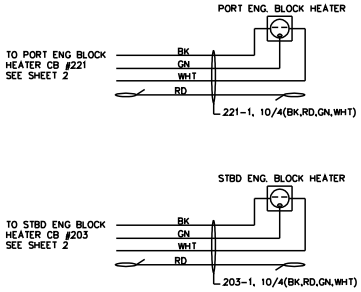
SALON ENTERTAINMENT CENTER #156



COCKPIT FREEZER #151



ENGINES BLOCK HEATERS



REVISIONS

LET	DESCRIPTION	BY	DATE	APPV.

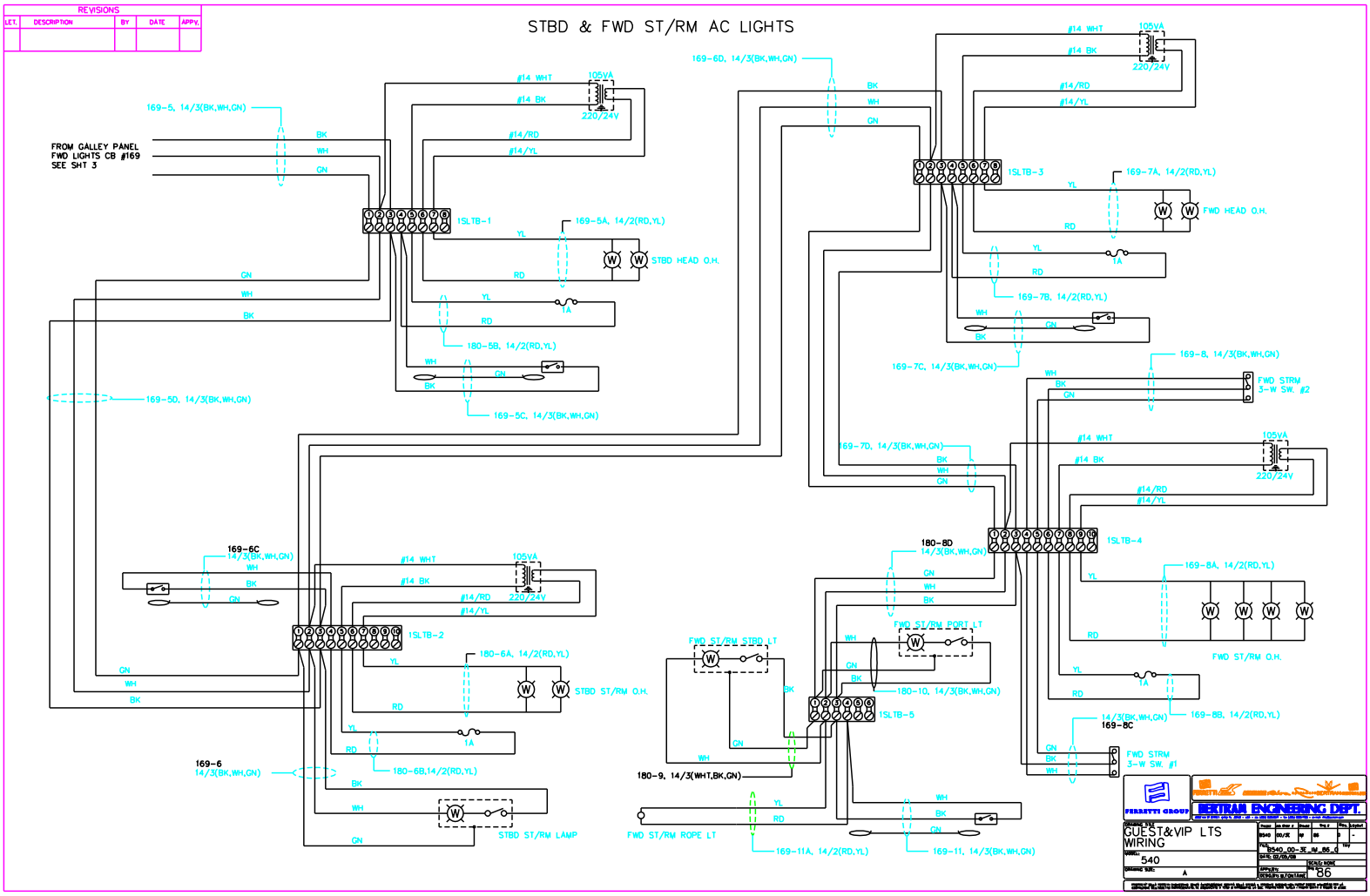
FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

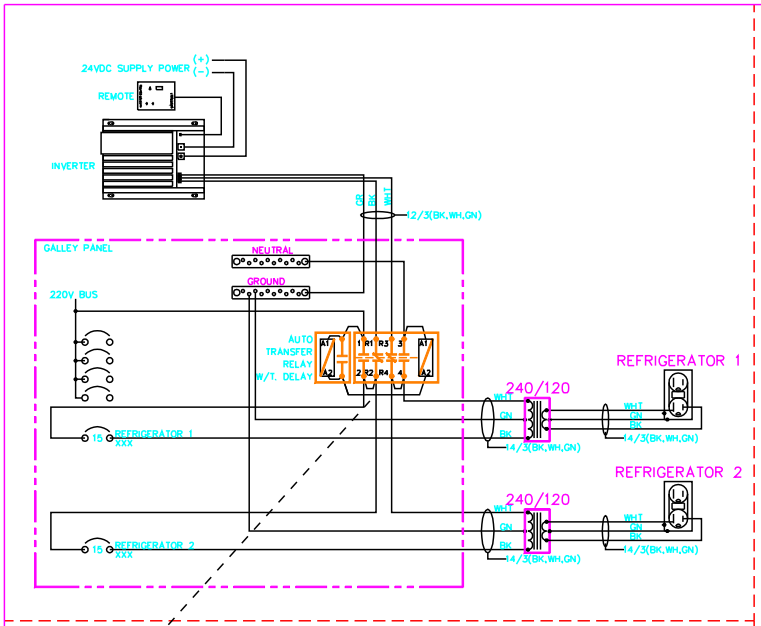
DRAWING TITLE	Project	Job Order #	Group	Dwg #	Rev.	Layout
FREEZER&OUTLETS WIRING	B540	00/3E	IM	90	0	-
MODEL: 540	FILE: B540_00-3E_IM_90_0					TAV
DRAWING SIZE: A	DATE: 02-05-08				SCALE: NONE	
	APPV.BY:			Dwg # 90		
	DESIG.BY: M.FONTAINE					

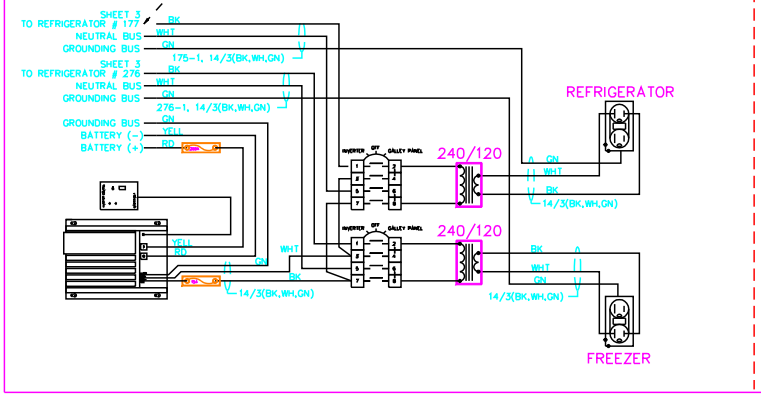
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REVISIONS

LET	DESCRIPTION	BY	DATE	APPV.
A	ADDED REFRIG	JPM	7/11/05	

FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

DRAWING TITLE
INVERTER/EURO
WIRING(10B)

MODEL:
540

DRAWING SIZE:
A

Project	Job Order #	Group	Dwg #	Rev.	Layout
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FILE: B540_00-3E_IM_85_0 TAV

DATE: 02-05-06

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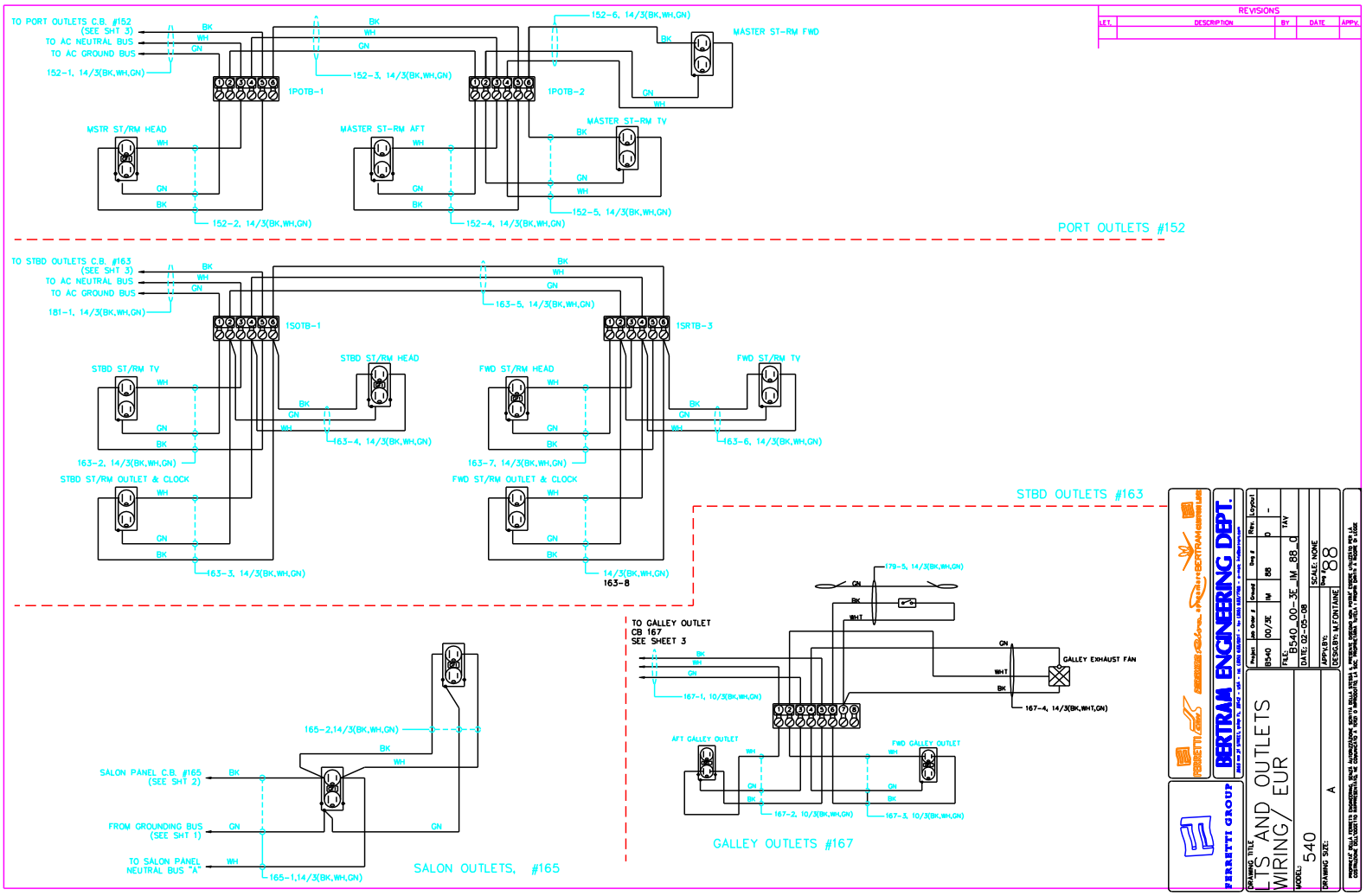
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DESIG.BY: M.FONTAINE

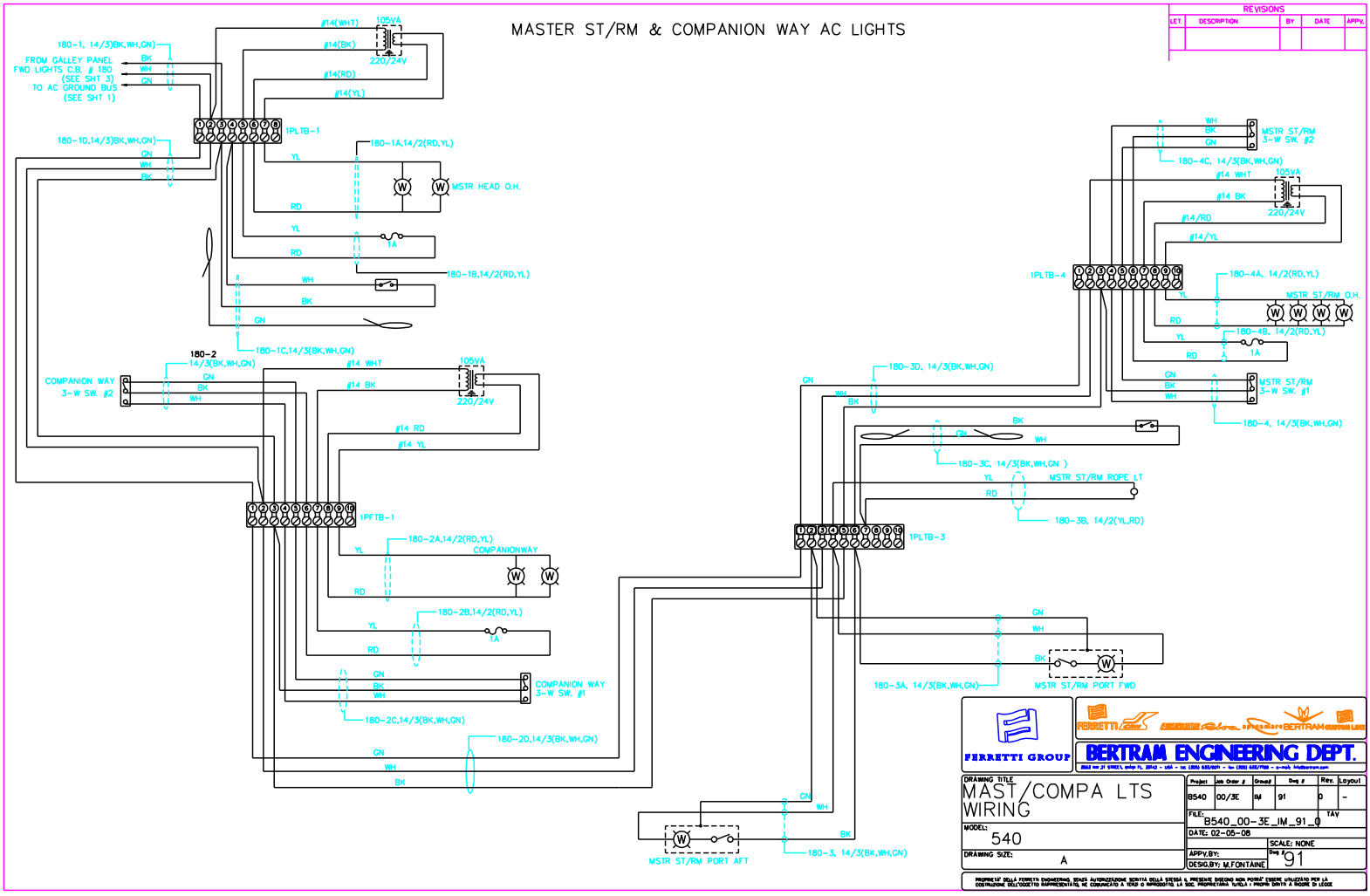
Dwg # 85

PROPRIETA' DELLA FERRETTI ENGINEERING, SENZA AUTORIZZAZIONE SCRITTA DELLA STESSA IL PRESENTE DISEGNO NON POSSA' ESSERE UTILIZZATO PER LA COSTRUZIONE DELL'OGGETTO RAPPRESENTATO, NE COMUNICATO A TERZI O RIPRODOTTO. LA SOC. PROPRIETARIA TUTELA I PROPRI DIRITTI A NORME DI LEGGE

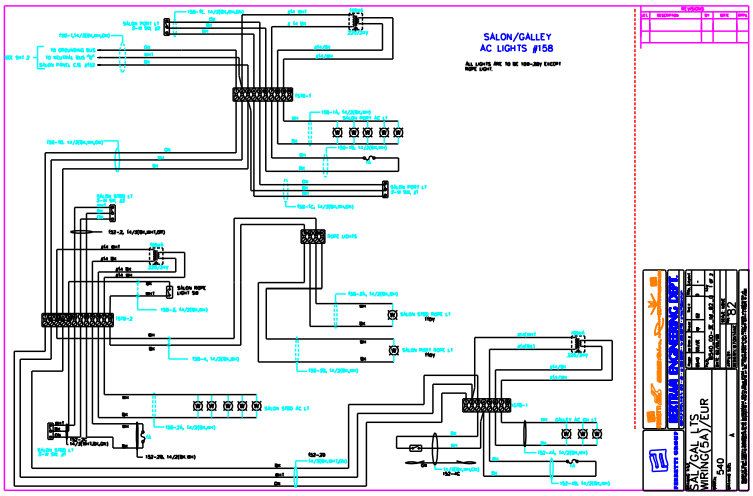
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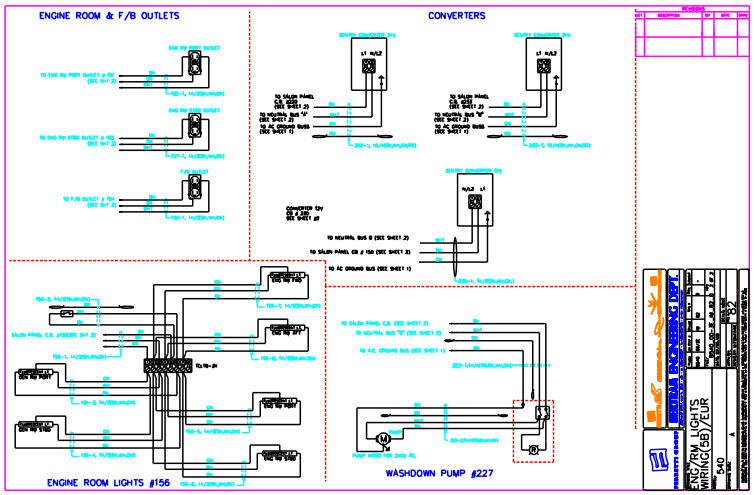


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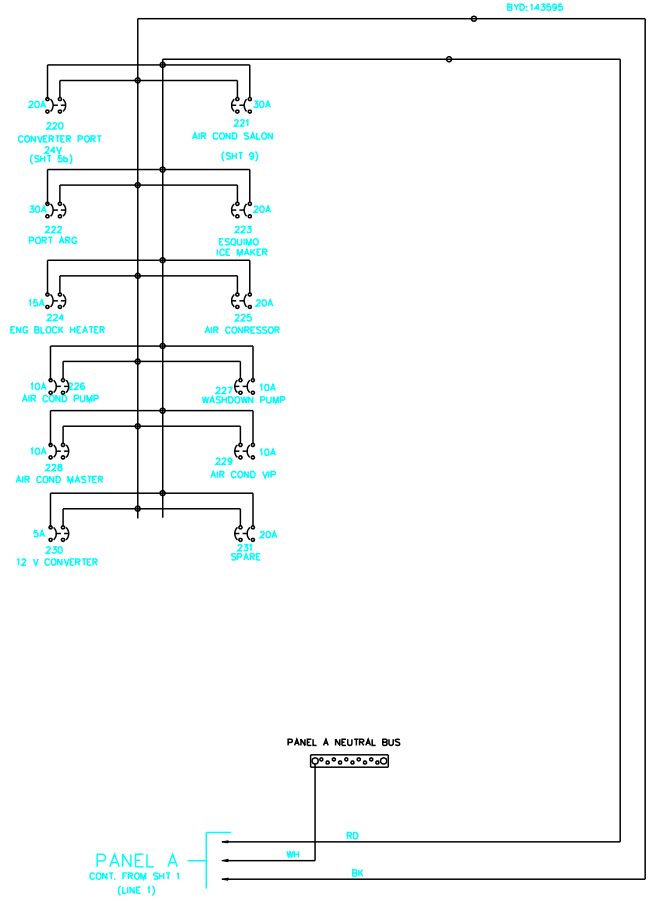


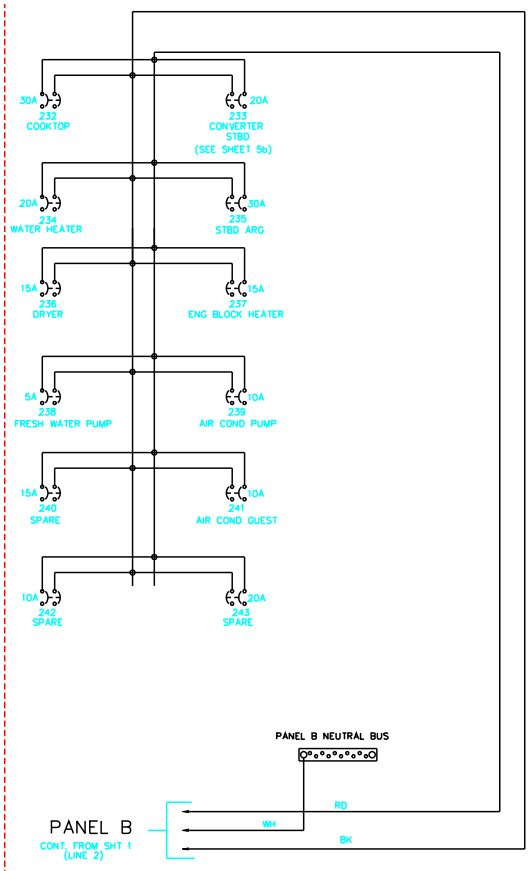
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SALON PANEL BY PANELTRONICS

P/O A.C. PANEL SHEET 1

BYD:143595





NOTES:

1. 120V CIRCUITS.
   BLACK WIRE-HOT(FROM C.B.)
   WHITE WIRE-NEUTRAL(FROM NEUTRAL BUS)
   GREEN WIRE-EQUIPMENT GROUND WIRE (FROM GROUNDING BUS)
2. 240V CIRCUITS.
   BLACK WIRE-HOT(FROM C.B.)
   RED WIRE-HOT(FROM C.B.)
   WHITE WIRE-NEUTRAL(IF USED)
   GREEN WIRE-EQUIPMENT GROUND
3. IF A CIRCUIT IS POWERED FROM PANEL A, THE NEUTRAL MUST CONNECT TO THE PANEL A NEUTRAL BUS. THE SAME SITUATION APPLIES TO THE PANEL B AND GALLEY PANEL CIRCUITS. PANEL B POWER/PANEL B NEUTRAL GALLEY POWER/GALLEY PANEL NEUTRAL.

   CONNECT GREEN GROUNDING CONDUCTORS TO THE AC GROUNDING BUS (SEE SHEET 1)

FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

Project	Job Order #	Sheet	Dwg #	Rev.	Layout
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F.E. B540_00-3E_1M_89_D 1AV

DATE: 02-05-08 SCALE: NONE

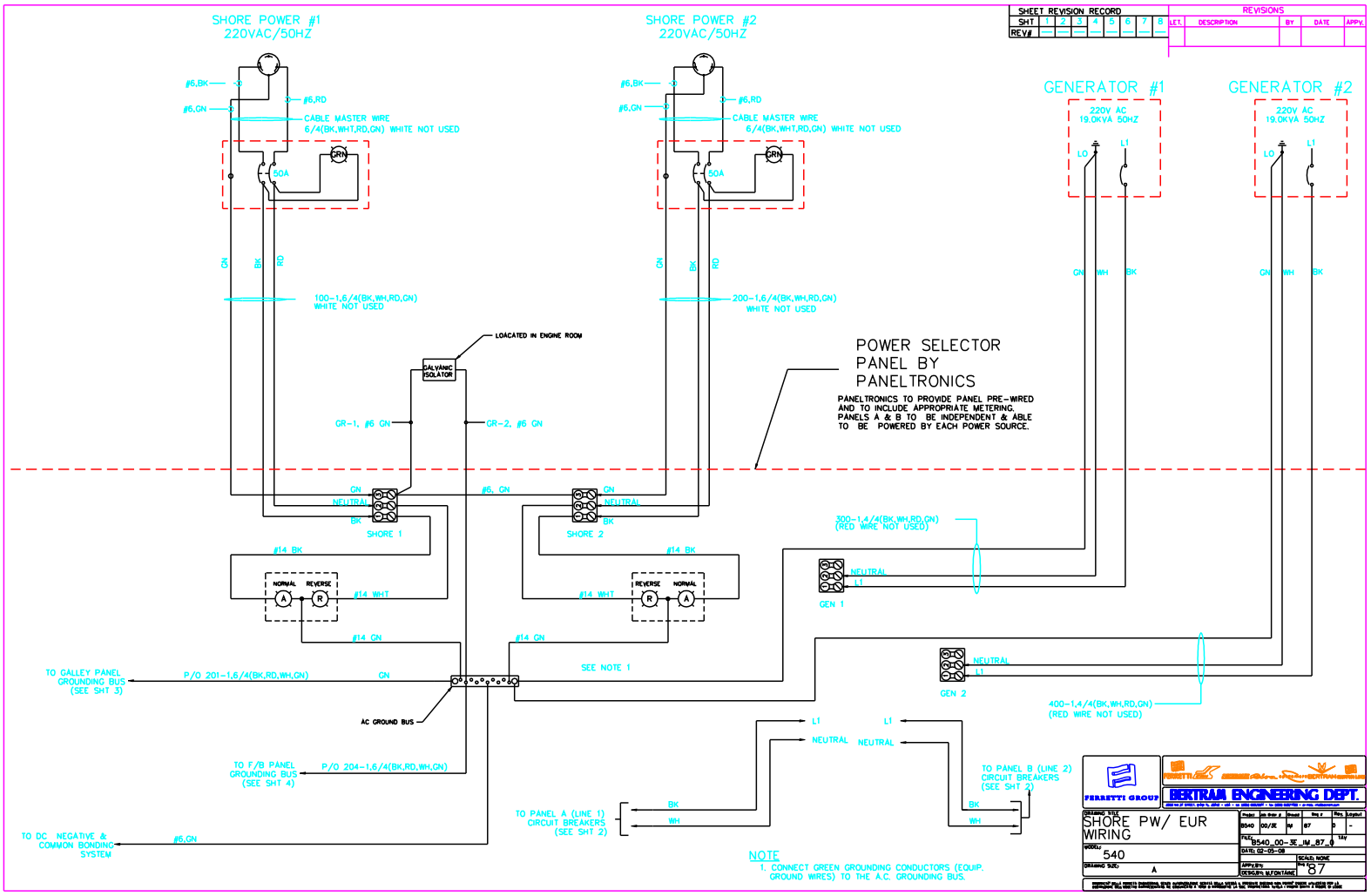
APPV.BY: Dwg # 89

DESIGN BY: M.FONTAINE

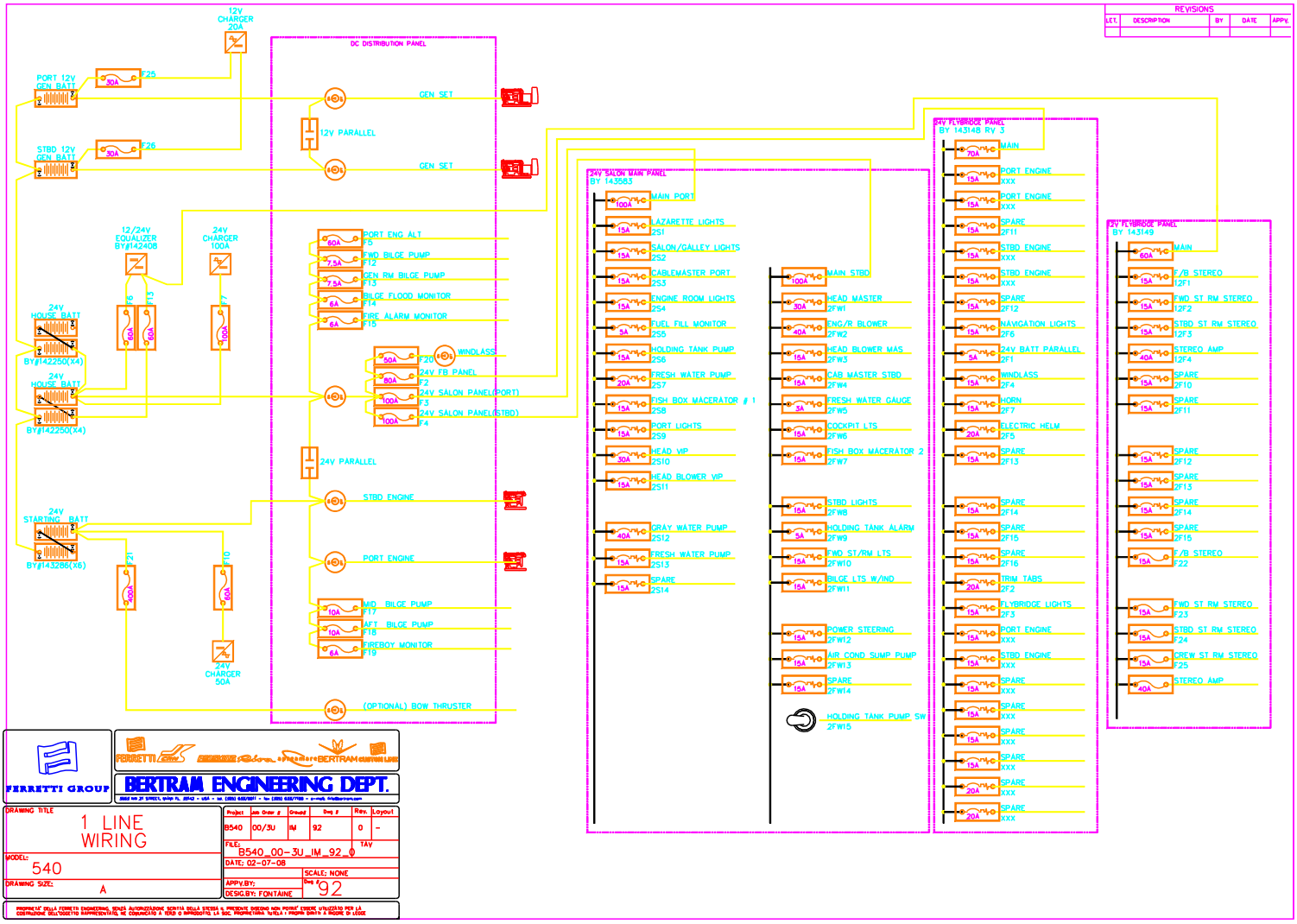
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MODEL: 540 DRAWING SIZE: A

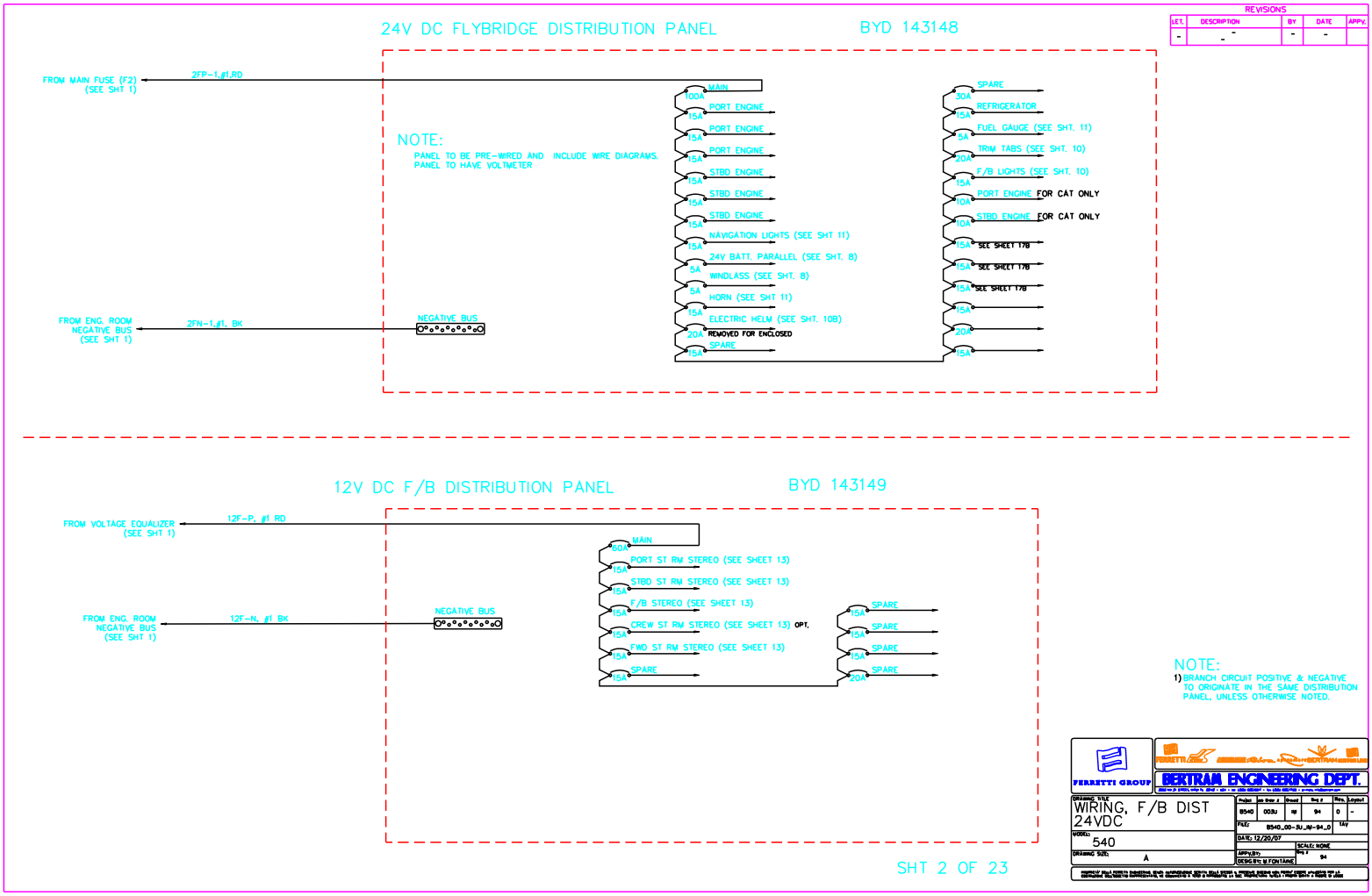
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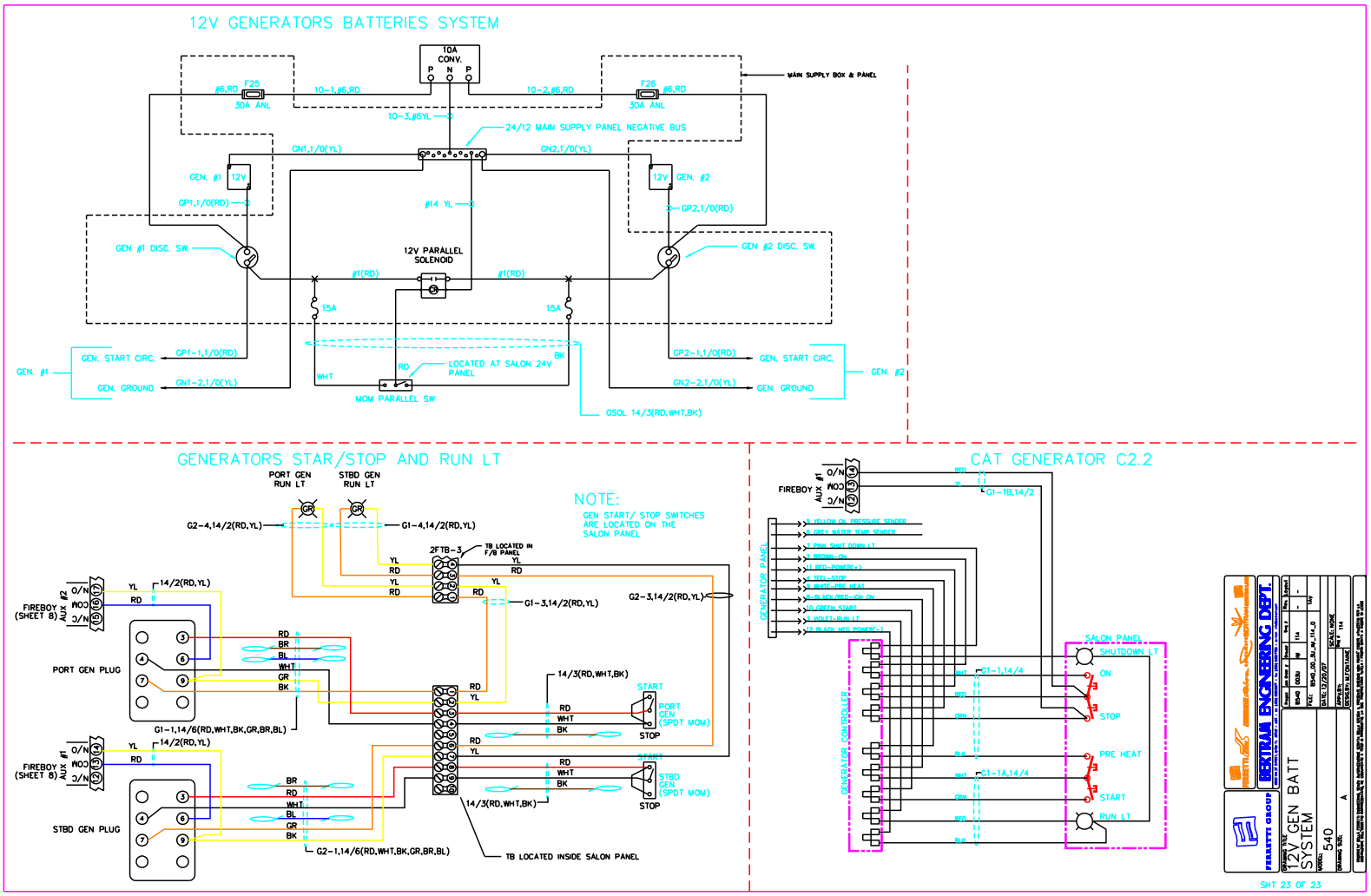
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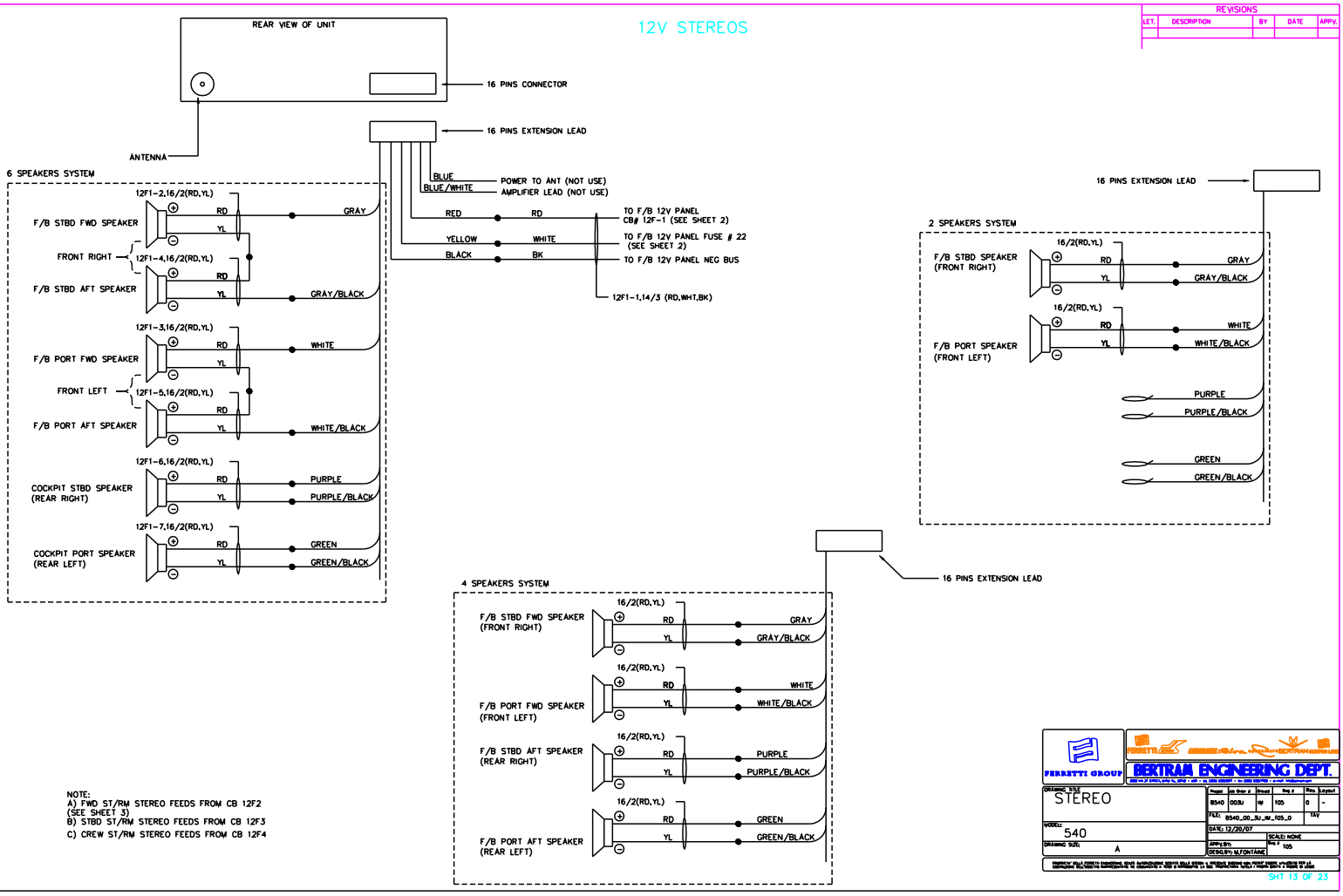


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12V STEREOS



NOTE:
A) FWD ST/RM STEREO FEEDS FROM CB 12F2 (SEE SHEET 3)
B) STBD ST/RM STEREO FEEDS FROM CB 12F3
C) CREW ST/RM STEREO FEEDS FROM CB 12F4

REVISIONS

LET.	DESCRIPTION	BY	DATE	APPV.

FERRETTI GROUP — BERTRAM ENGINEERING DEPT.

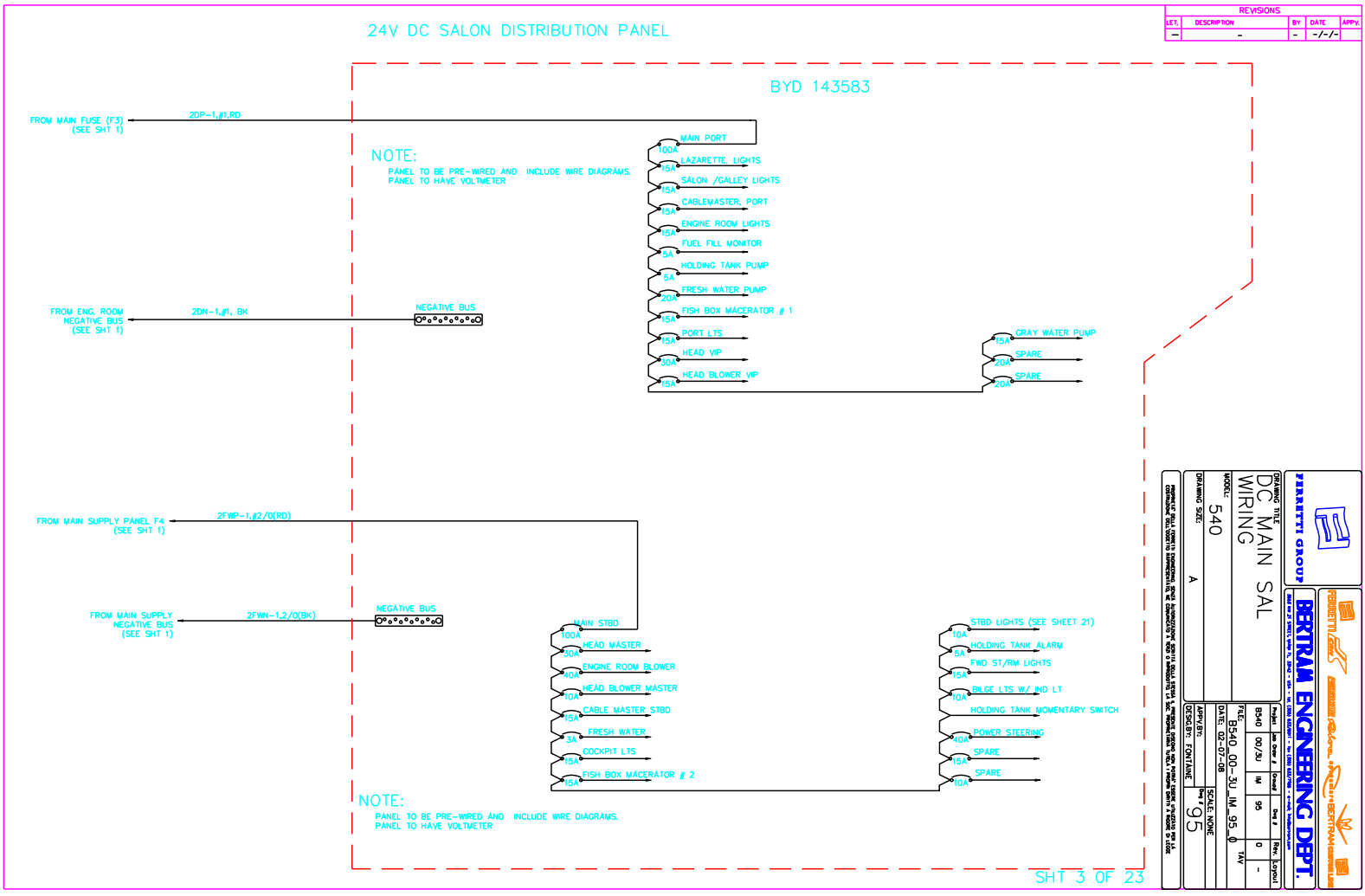
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MODEL: 540
DRAWING SIZE: A

Project	Job Order #	Period	Dwg #	Rev.	Layout
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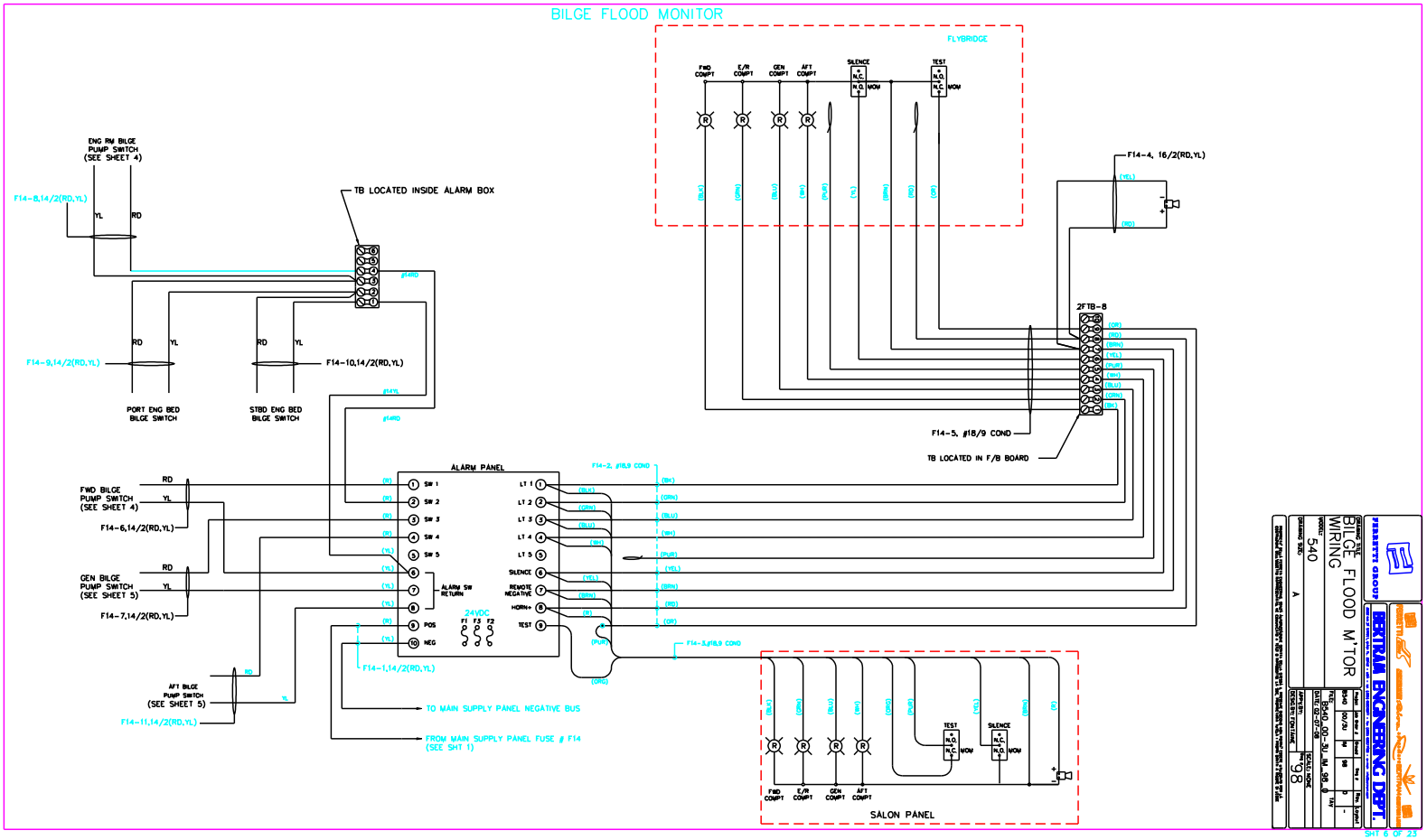
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DATE: 12/20/07
SCALE: NONE
APPV'D BY:
DES'D BY: M.FONTANE
Dwg. # 105

SHT 13 OF 23

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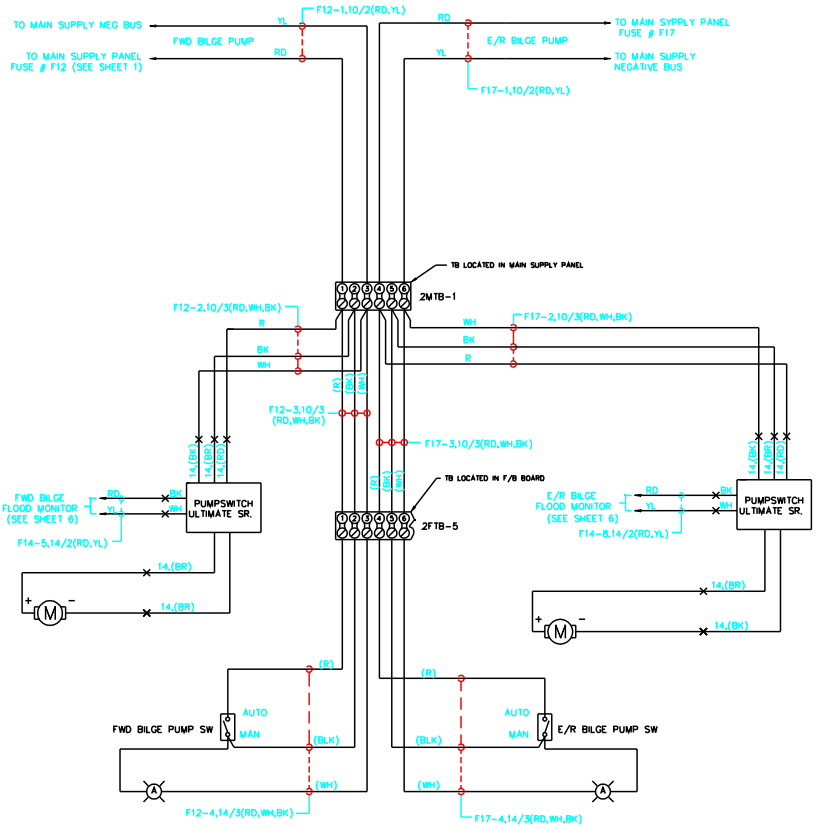
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REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.
A				

BILGE PUMPS, FWD & E/R



NOTE:

1. 2MTB-1 IS LOCATED IN MAIN SUPPLY PANEL
2. 2FTB-5 IS LOCATED IN THE F/B BOARD

FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

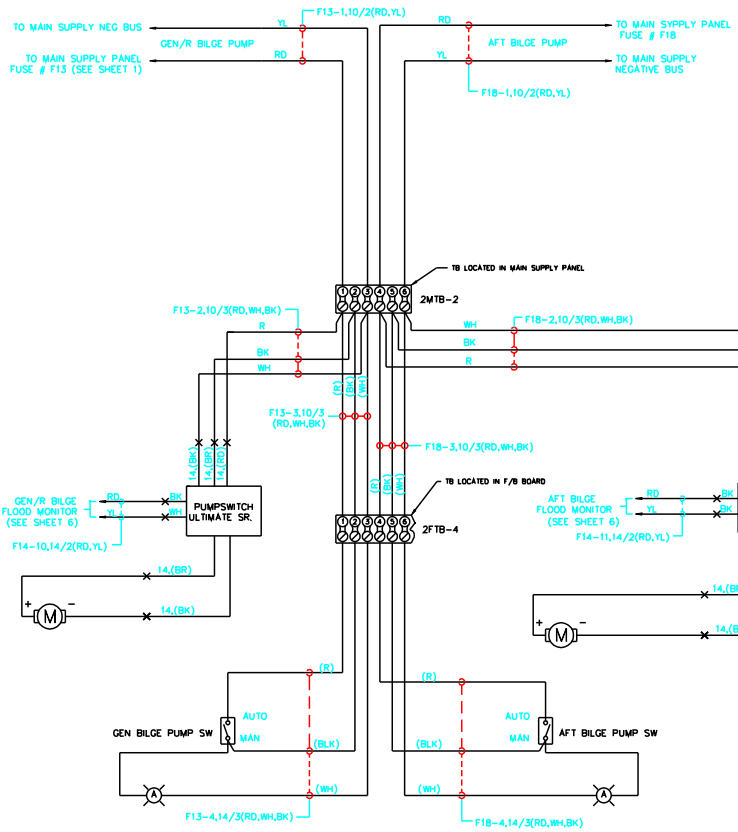
DRAWING TITLE: B'GE FWD & E/R WIRING	Project	Job Order #	Drawing	Dwg #	Rev.	Layout
	0540	00/3U	IM	96	0	-
MODEL: 540	FILE: 0540_00-3U_IM_96_0 TAY					
	DATE: 02-07-08					
DRAWING SIZE: A	APPV.BY:	SCALE: NONE				
	DESIGN: FONTAINE	Dwg No. 96				

SHT 4 OF 23

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REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

BILGE PUMPS, GEN/R & AFT



NOTE:

1. 2MTB-2 IS LOCATED IN MAIN SUPPLY PANEL
2. 2FTB-4 IS LOCATED IN THE F/B BOARD

FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

DRAWING TITLE: BILGE PMP AFT & GEN ROOM

MODEL: 540

DRAWING SIZE: A

FILE: B540_00_3U_IM_97_0

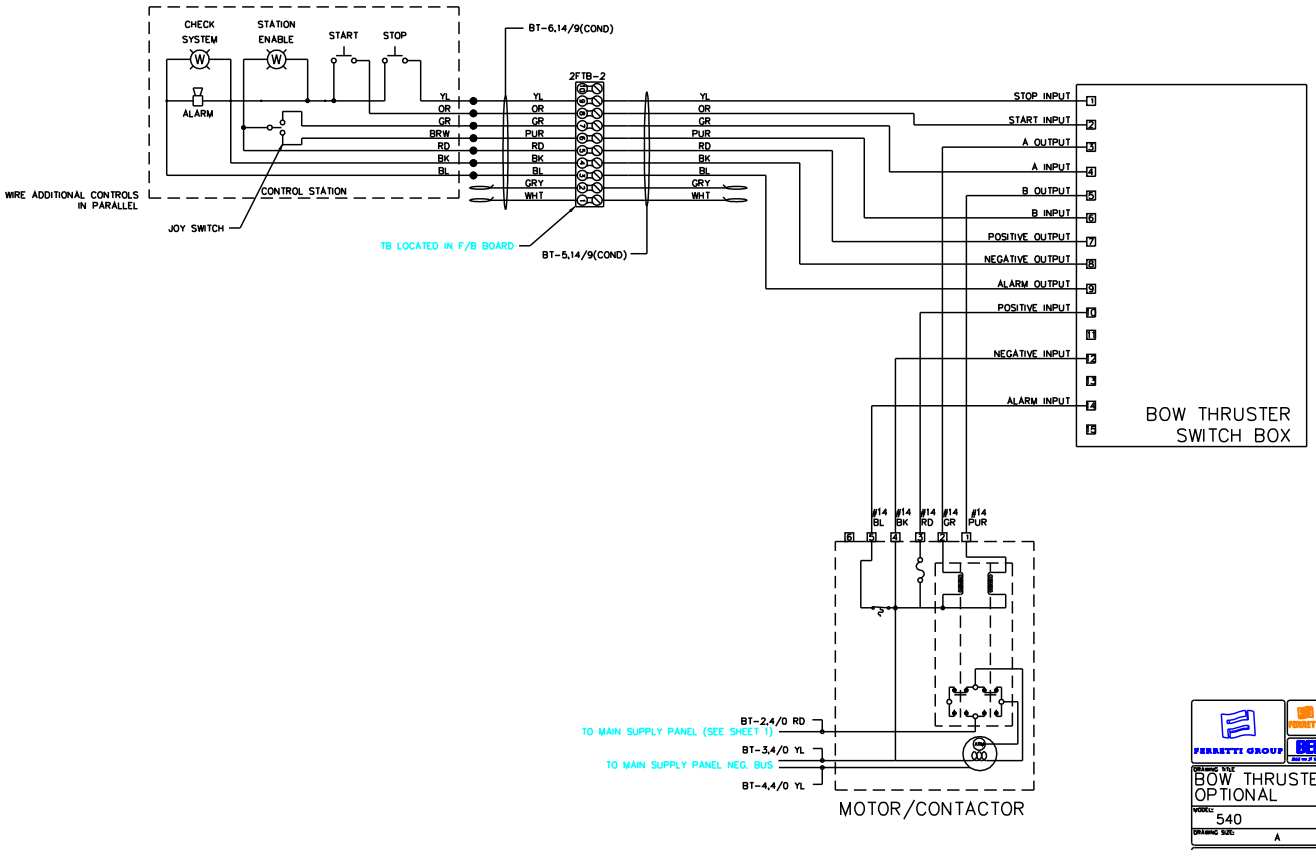
DATE: 12/20/07

SCALE: NONE

DESIGNED BY: M.FONTANE

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BOW THRUSTER
(OPTIONAL)



REVISIONS

LET.	DESCRIPTION	BY	DATE	APPV.

FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

DRAWING TITLE: BOW THRUSTER OPTIONAL

MODEL: 540

DRAWING SIZE: A

Project: 8540 | Job Order #: 003U | Sheet: RE | Dwg #: 101 | Rev.: 0 | Layout: -

FILE: 8540_00_3U_IM_101_0

DATE: 12/20/07

SCALE: NONE

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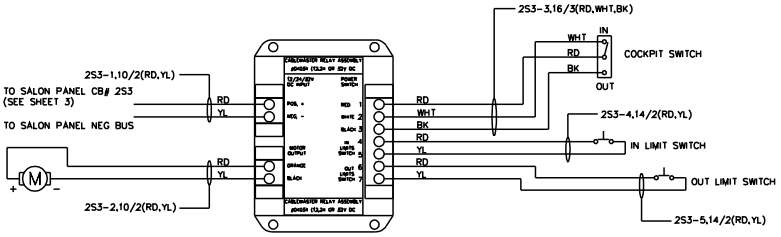
APPV.BY:

DESIGN BY: M.FONTANINI

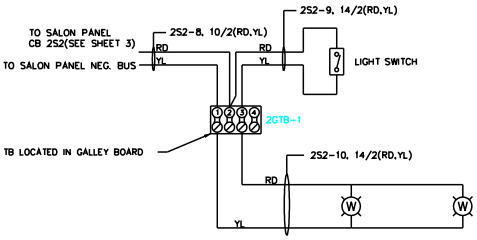
SHT 9 OF 23

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CABLEMASTER — SEE NOTE

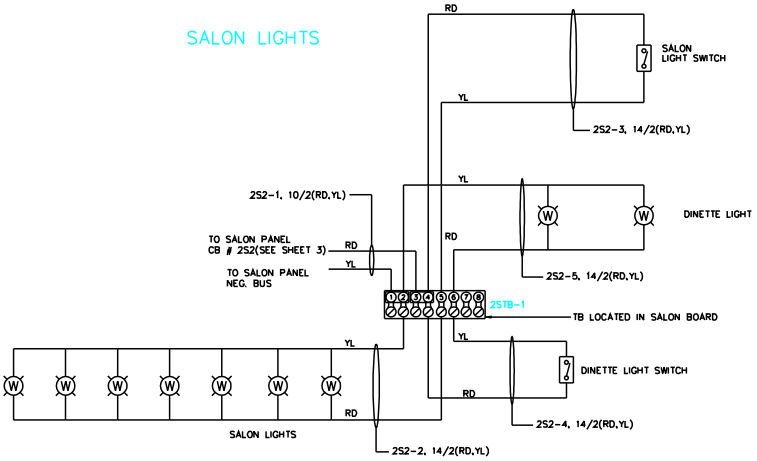


GALLEY LIGHTS

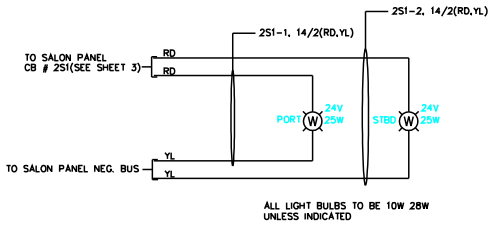


NOTE:
PORT CABLEMASTER SHOWN
STBD IS CB# 2S11

SALON LIGHTS



LAZARETTE LIGHTS



ALL LIGHT BULBS TO BE 10W 28V
UNLESS INDICATED

NOTE:
LAZARETTE LIGHTS ARE OPERATED
FROM SALON PANEL CIRCUIT BREAKER

REVISIONS

LET.	DESCRIPTION	BY	DATE	APPV.

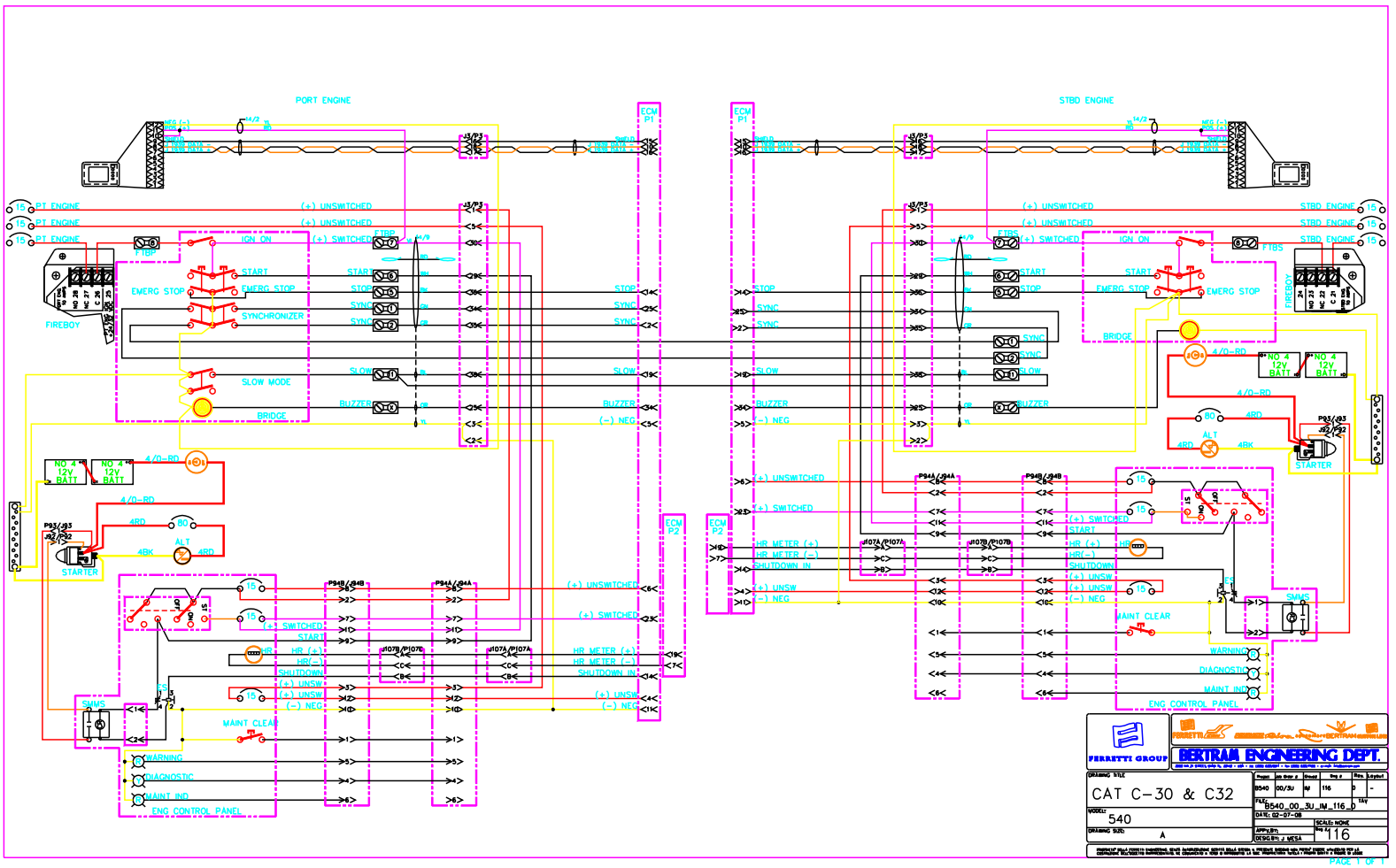
FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

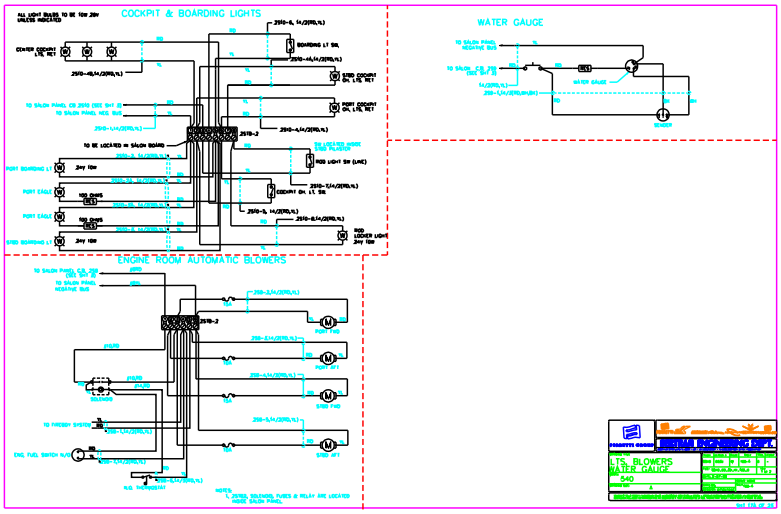
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DRAWING SIZE: A	DATE: 02-07-08					
	APPV.BY:			SCALE: NONE		
	DESIG.BY: FONTAINE			Dwg #: 106		

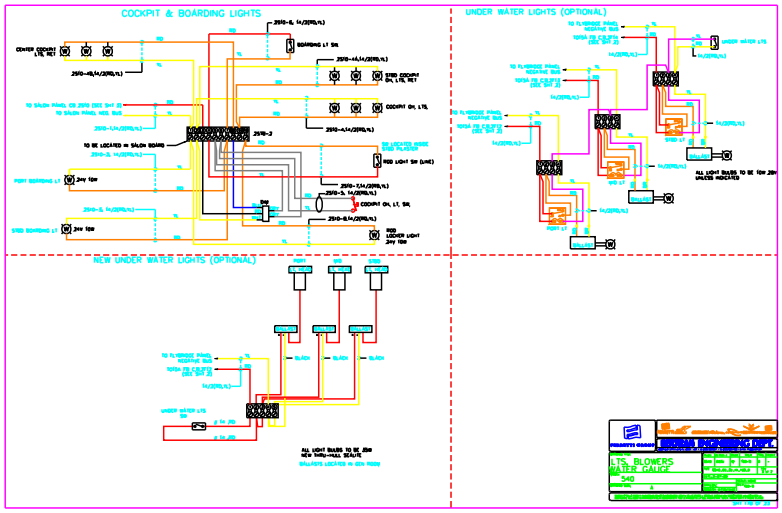
PROPRIETA' DELLA FERRETTI ENGINEERING. SENZA AUTORIZZAZIONE SCRITTA DELLA STESSA IL PRESENTE DISEGNO NON POTRA' ESSERE UTILIZZATO PER LA COSTRUZIONE DELL'OGGETTO RAPPRESENTATO, NE COMUNICATO A TERZI O RIPRODOTTO. LA SOC. PROPRIETARIA TUTELA I PROPRI DIRITTI A RIGORE DI LEGGE

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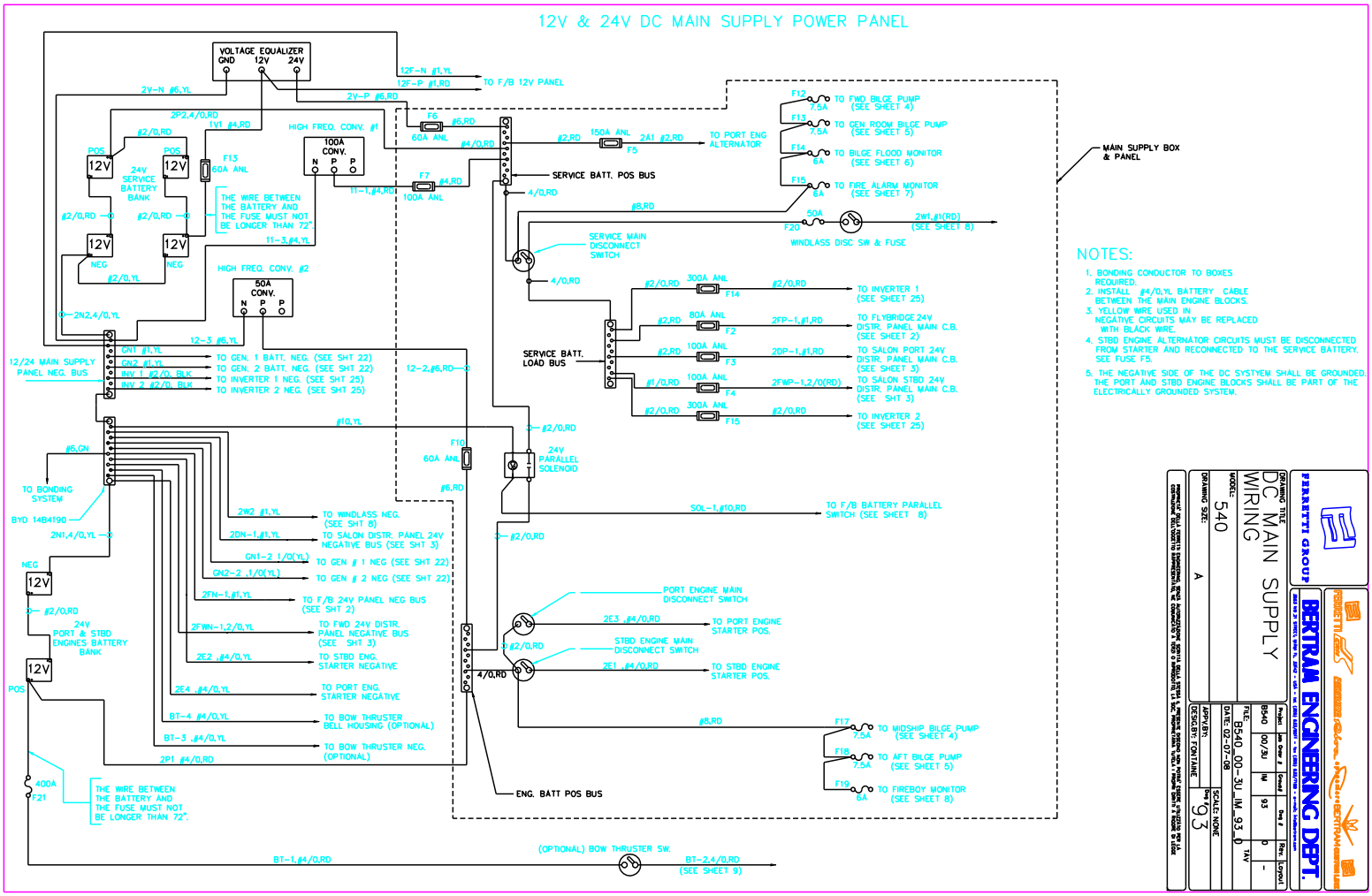
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12V & 24V DC MAIN SUPPLY POWER PANEL



NOTES:

1. BONDING CONDUCTOR TO BOXES REQUIRED.
2. INSTALL #4/0,YL BATTERY CABLE BETWEEN THE MAIN ENGINE BLOCKS.
3. YELLOW WIRE USED IN NEGATIVE CIRCUITS MAY BE REPLACED WITH BLACK WIRE.
4. STBD ENGINE ALTERNATOR CIRCUITS MUST BE DISCONNECTED FROM STARTER AND RECONNECTED TO THE SERVICE BATTERY. SEE FUSE F5.
5. THE NEGATIVE SIDE OF THE DC SYSTYEM SHALL BE GROUNDED. THE PORT AND STBD ENGINE BLOCKS SHALL BE PART OF THE ELECTRICALLY GROUNDED SYSTEM.

PROPRIETARY DRAWING SUBMITTED FOR REVIEW AND APPROVAL. NEITHER THIS DRAWING NOR THE INFORMATION HEREON SHALL BE REPRODUCED, USED OR DISCLOSED EXCEPT AS AUTHORIZED IN WRITING BY FERRETTI S.p.A. BEFORE ANY REPRODUCTION, USE OR DISCLOSURE, VERIFY THAT YOU HAVE THE LATEST REVISION OF THIS DRAWING.

DRAWING SIZE: A

DRAWING TITLE: DC MAIN SUPPLY WIRING

MODEL: 540

DESIGN'R: FONTANE

APPV'R:

DATE: 02-07-08

FILE: B540_00-3U_IM_93_0

SCALE: NONE

Dwg #: 93

	Project	Doc Order #	Group #	Dwg #	Rev.	Layout
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TAV

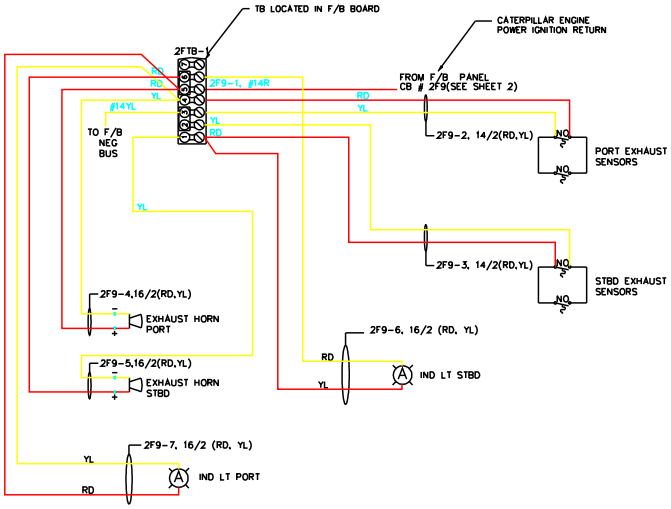
FERRETTI GROUP

FERRETTI

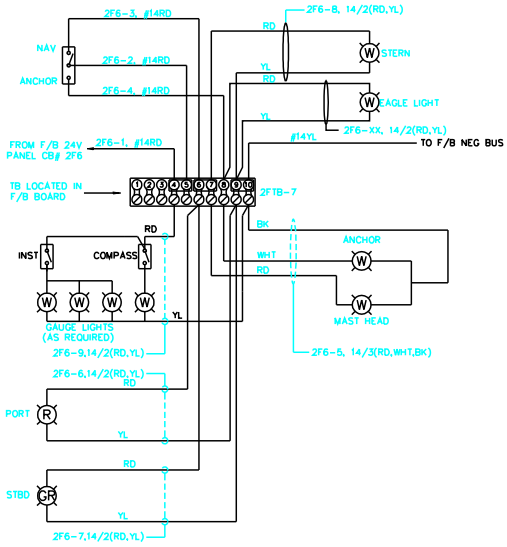
BERTRAM ENGINEERING DEPT.

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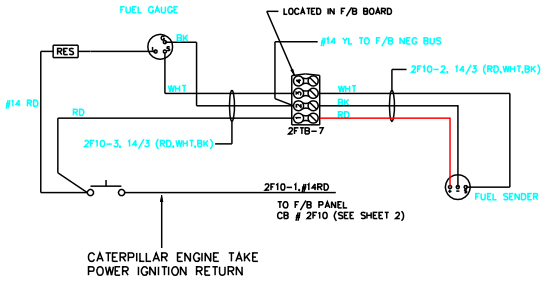
ENGINE EXHAUST SENSORS



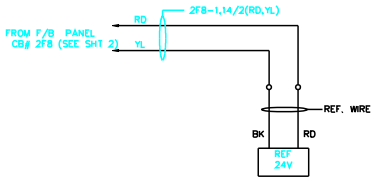
NAVIGATION LIGHTS



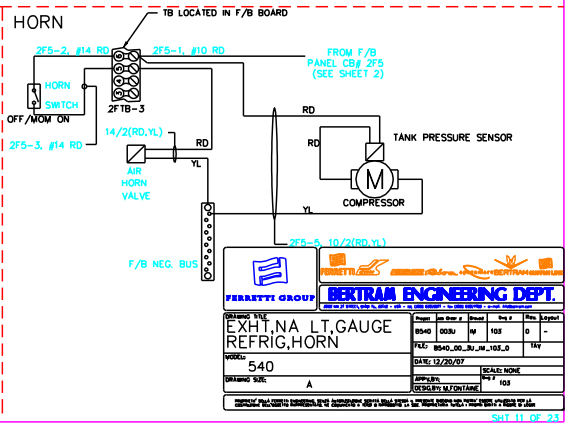
FUEL GAUGE



F/B REFRIGERATOR (ENCLOSED ONLY)



HORN



FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

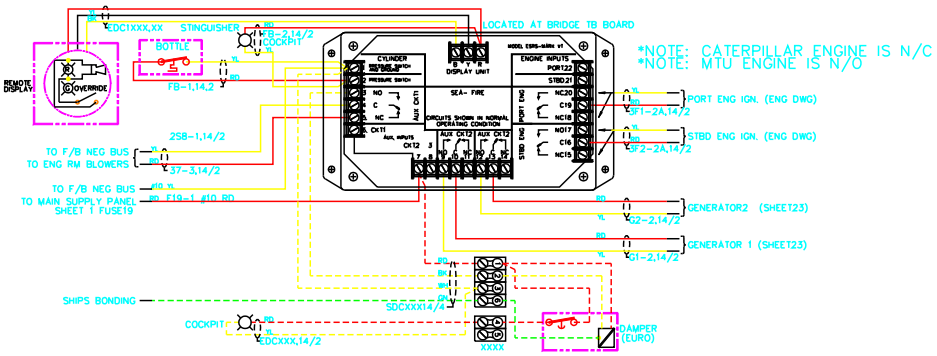
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	FILE: 8540_00_3U_M_103_0					TAY
MODEL: 540	DATE: 12/20/07					
DRAWING SIZE: A	APPR/BY:			SCALE: NONE		
	DESIGN BY: M.FONTAINE			Dwg # 103		

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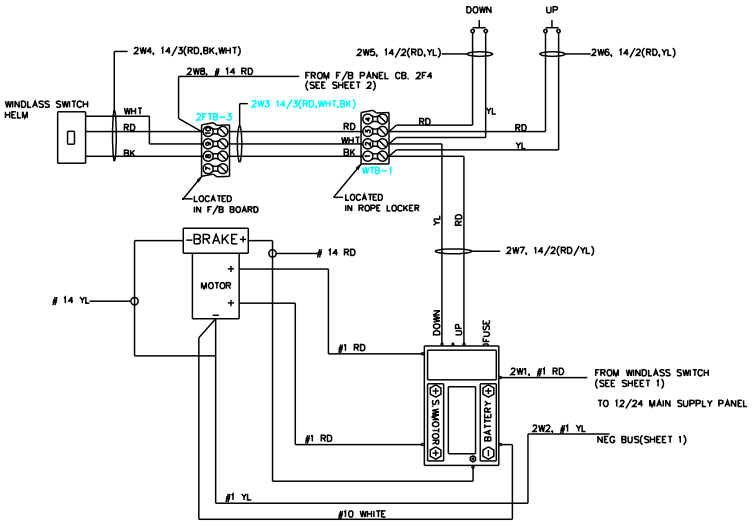
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FIRE EXTINGUISHER SYSTEM

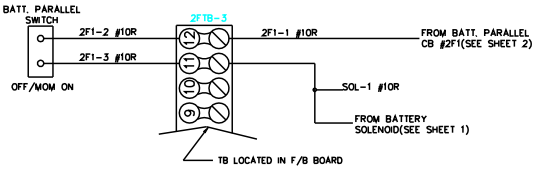
REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.
A				



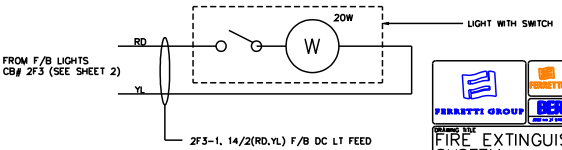
SIMPSON LAWRENCE WINDLASS



BATTERY PARALLEL



F/B LIGHTS



FERRETTI GROUP

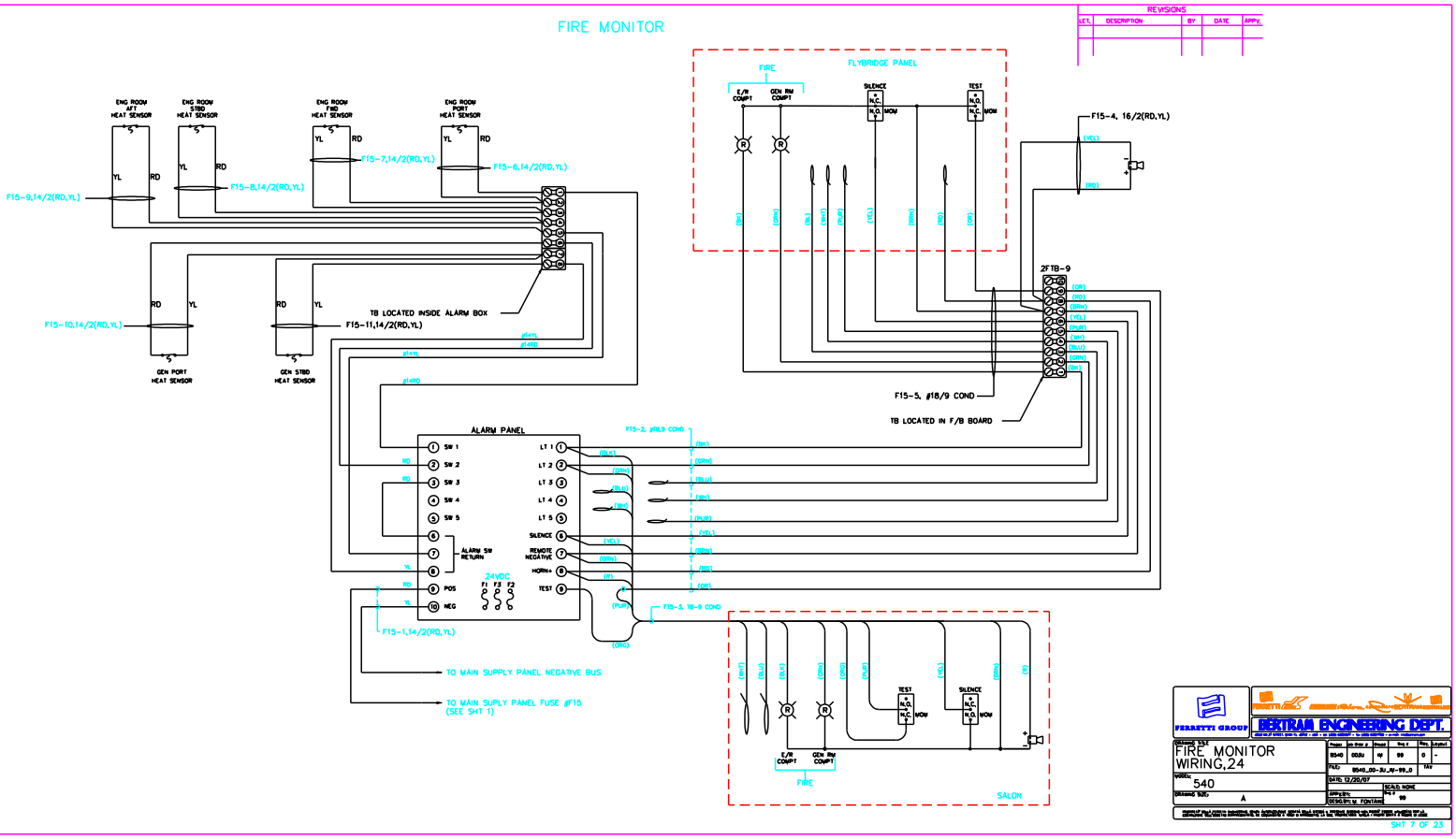
BERTRAM ENGINEERING DEPT.

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MODEL: 540	DATE: 12/20/07				SCALE: NONE	
DRAWING SIZE: A	APP'D BY:				Dwg # 100	
	DESIGNED BY: M.FONTAINE					

SHT 8 OF 23

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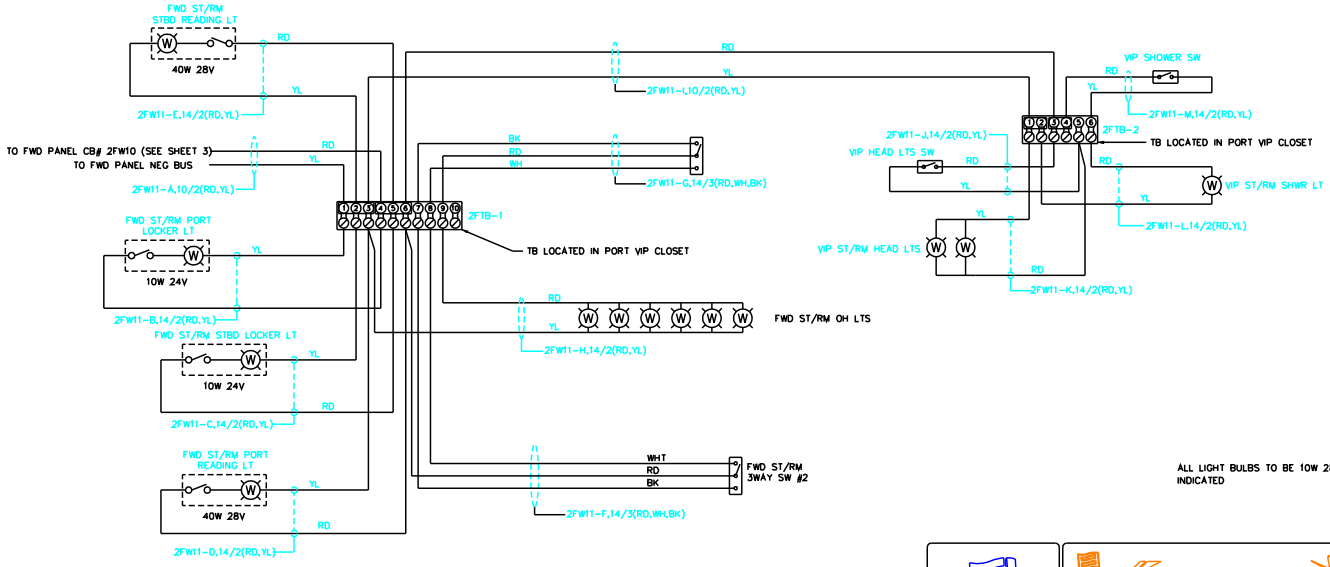
FIRE MONITOR



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VIP ST/RM LIGHTS

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.



ALL LIGHT BULBS TO BE 10W 28V UNLESS INDICATED

FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

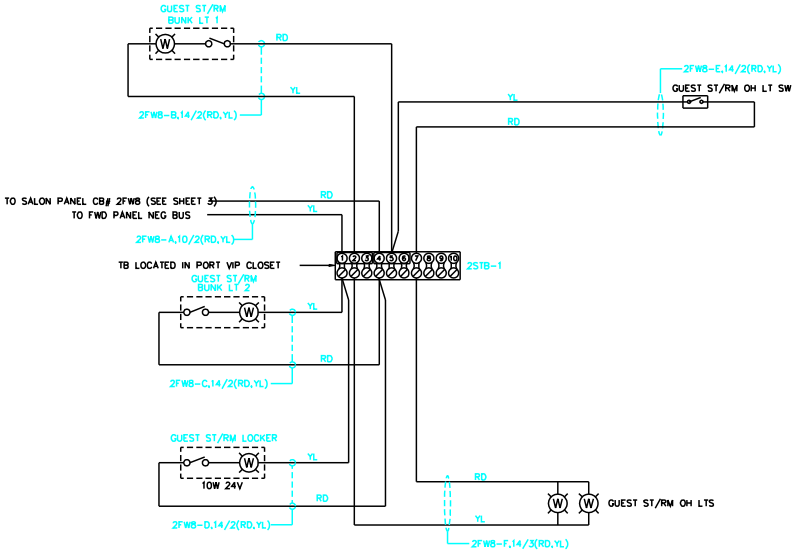
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DRAWING SIZE: A	DATE: 02-07-08					
	SCALE: NONE					
	APPV.BY:			Dwg #: 113		
	DESIG BY: FONTAINE					

PROPRIETA' DELLA FERRETTI ENGINEERING. SENZA AUTORIZZAZIONE SCRITTA DELLA STESSA IL PRESENTE DISEGNO NON POTRA' ESSERE UTILIZZATO PER LA COSTRUZIONE DELL'OGGETTO RAPPRESENTATO, NE COMUNICATO A TERZI O RIPRODOTTO. LA SOC. PROPRIETARIA TUTELA I PROPRI DIRITTI A NORME DI LEGGE

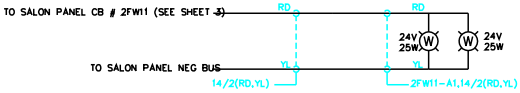
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REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.
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GUEST LIGHTS



FWD BILGE LIGHTS



ALL LIGHT BULBS TO BE 10W 28V UNLESS INDICATED.

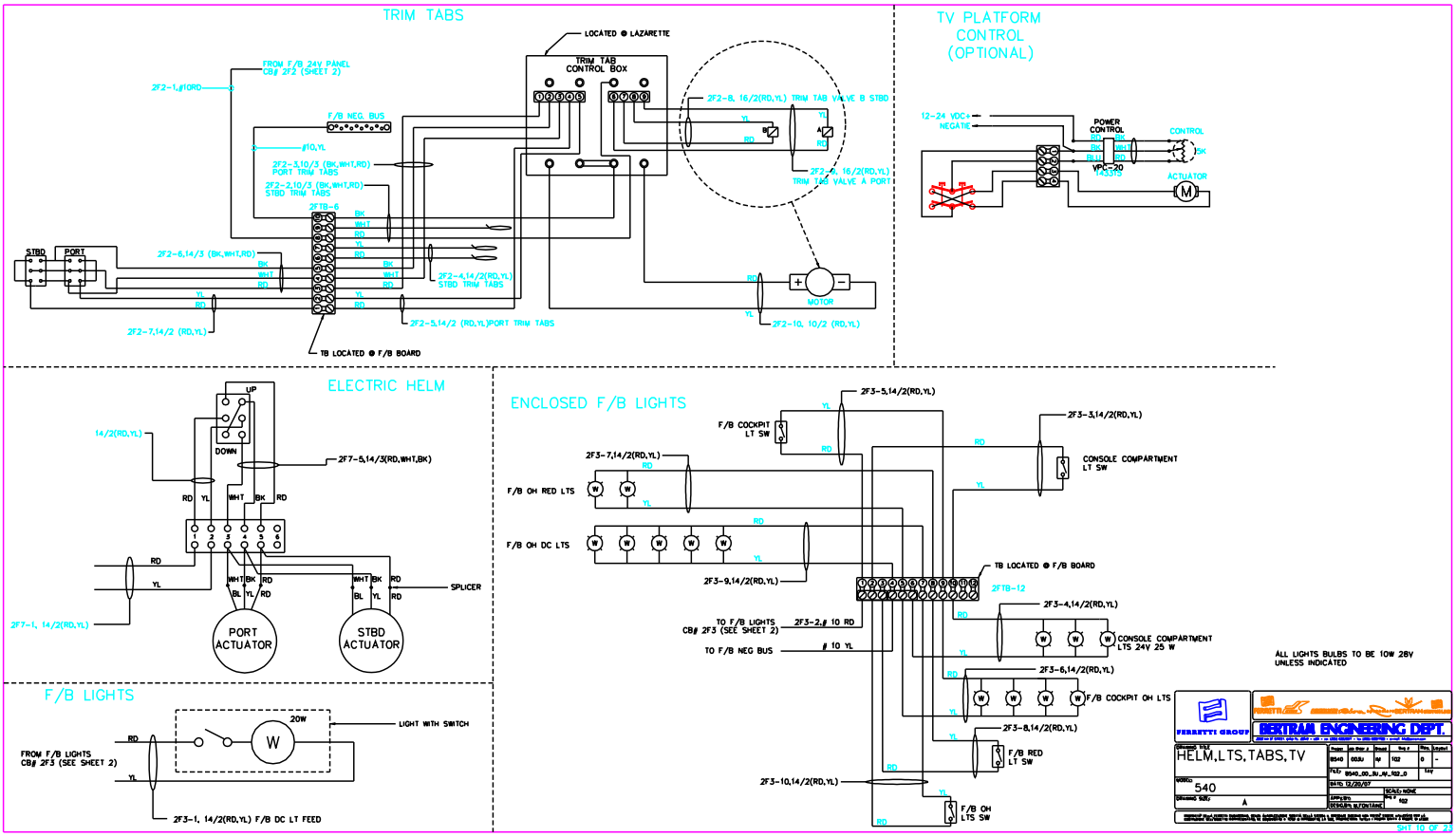
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BERTRAM ENGINEERING DEPT.

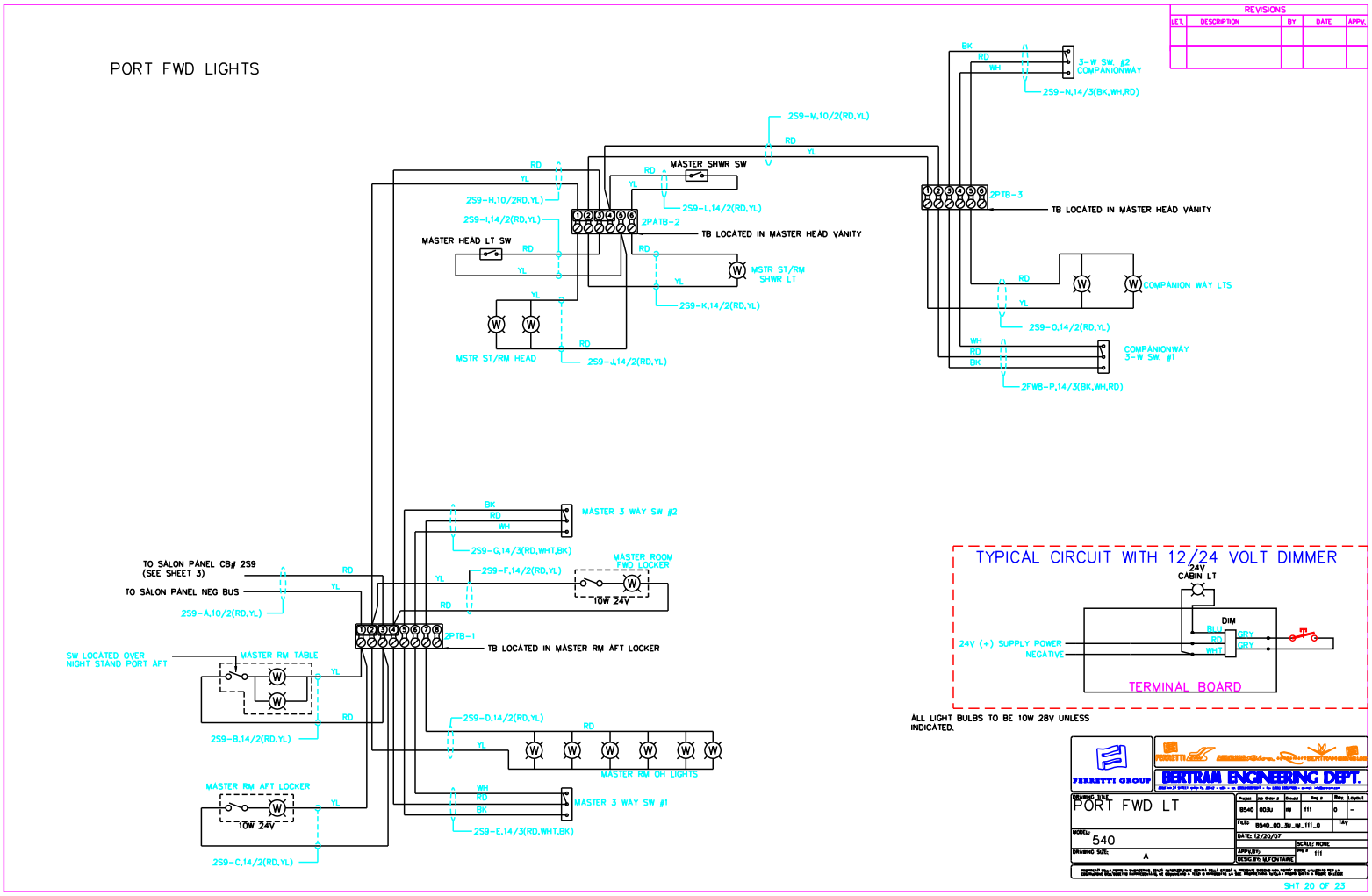
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	FILE: B540_00_SU_AV_112_0					1AV
MODEL: 540	DATE: 12/20/07					
					SCALE: NONE	
DRAWING SIZE: A	APPV. BY:			Dwg #	112	
	DESIG BY: M.FONTAINE					

SHT 21 OF 23

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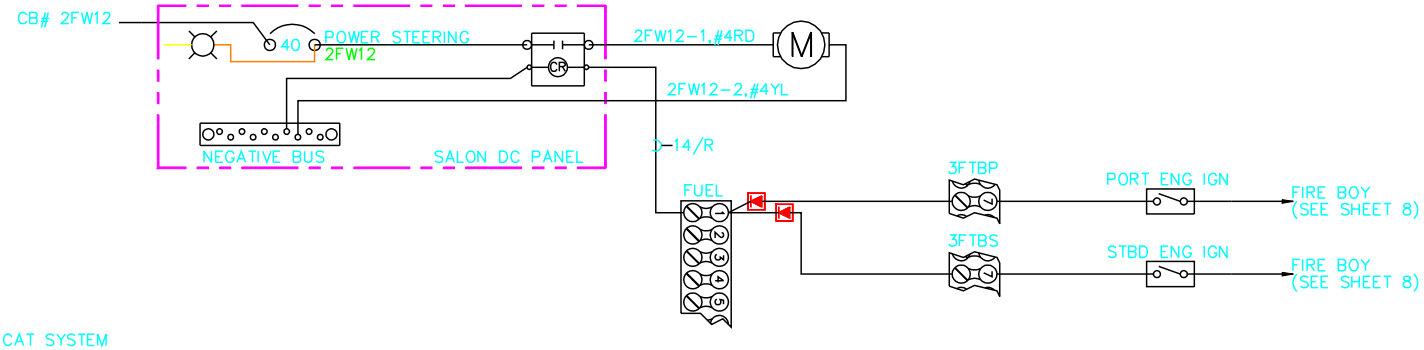


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POWER STEERING SYSTEM



CAT SYSTEM

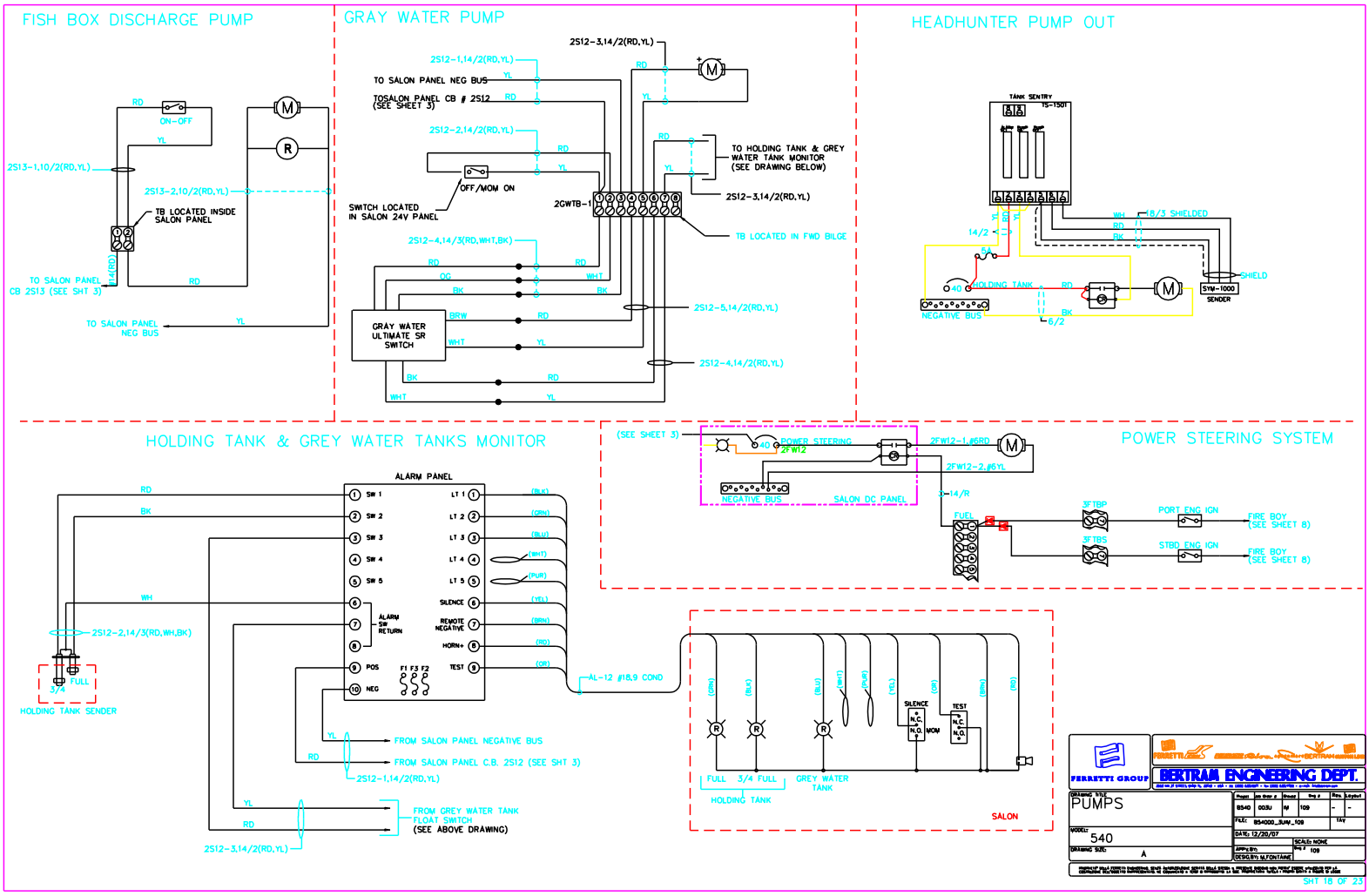
FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

DRAWING TITLE: POWER STEERING PUMP	Project: B540	Job Order #: 003U	Group: IM	Dwg #: 115	Rev.: -	Layout: -
MODEL: 540	FILE: B540_00-3U_IM_115_0				TAV	
DRAWING SIZE: A	DATE: - 2/08/08				SCALE: -	
	APPv.BY:				Dwg # 115	
	DESC.BY: M.FONTANI					

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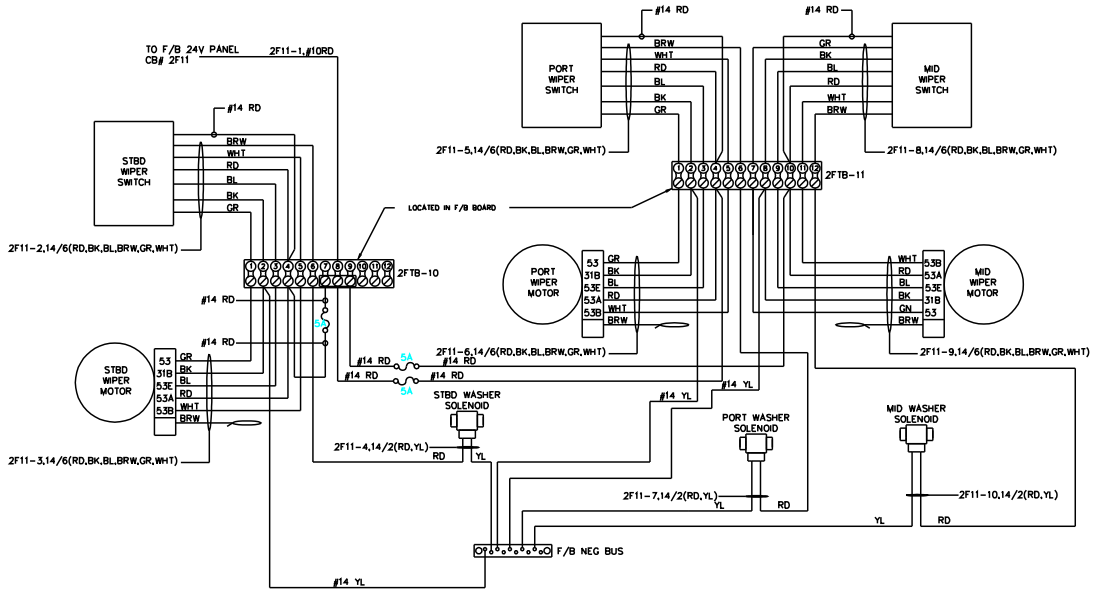


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WIPERS

FOR ENCLOSED F/B ONLY



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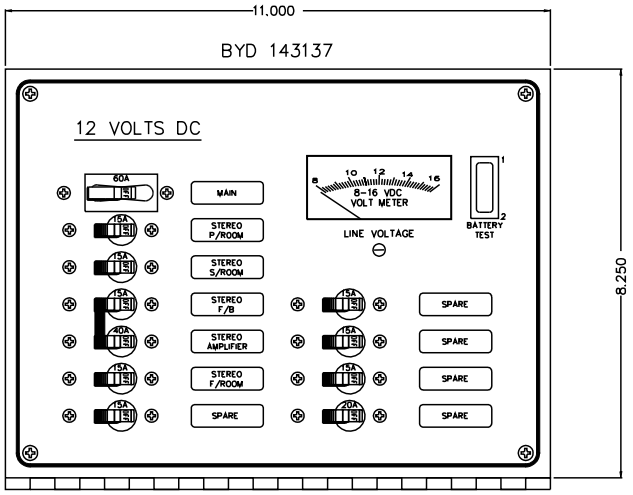
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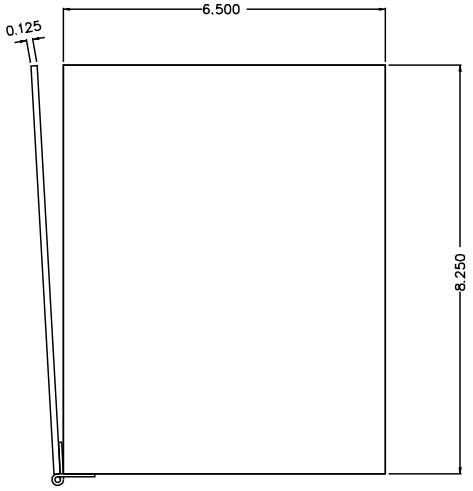
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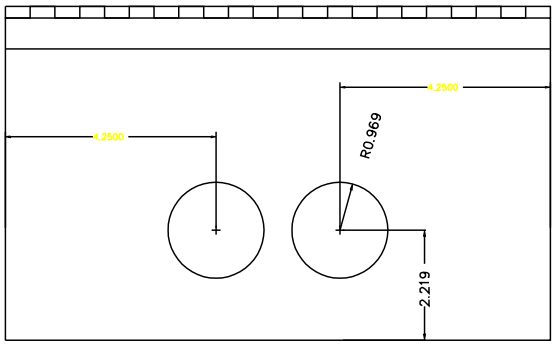
SHT 12 OF 23

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REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.







1. MATERIAL: 5052 ALUM. 0.125" THICK.
2. FINISH: PANEL TO BE FLAT, FACE VERTICAL GRAINED 240 GRIT, EDGE & CORNERS TO BE EASED.
3. PAINTING: PRIME COAT-ALODINE OR IRRIDITE. FINISH COAT-FACE & EDGES BERTRAM YACHT XXXXXX #30-7001-OM
4. SILKSCREEN LETTERING: A BLACK FONT KNOWN AS "HVL1".

DRAWING ON DISK CAN BE PICKED UP AT BERTRAM. DRAWING IS AN AUTOCAD (VERSION 14) EXTENSION (DWG).

TOLERANCES UNLESS OTHERWISE SPECIFIED	
ANGULAR:	± 1/2°
DECIMAL :	± .0156"

FERRETTI GROUP

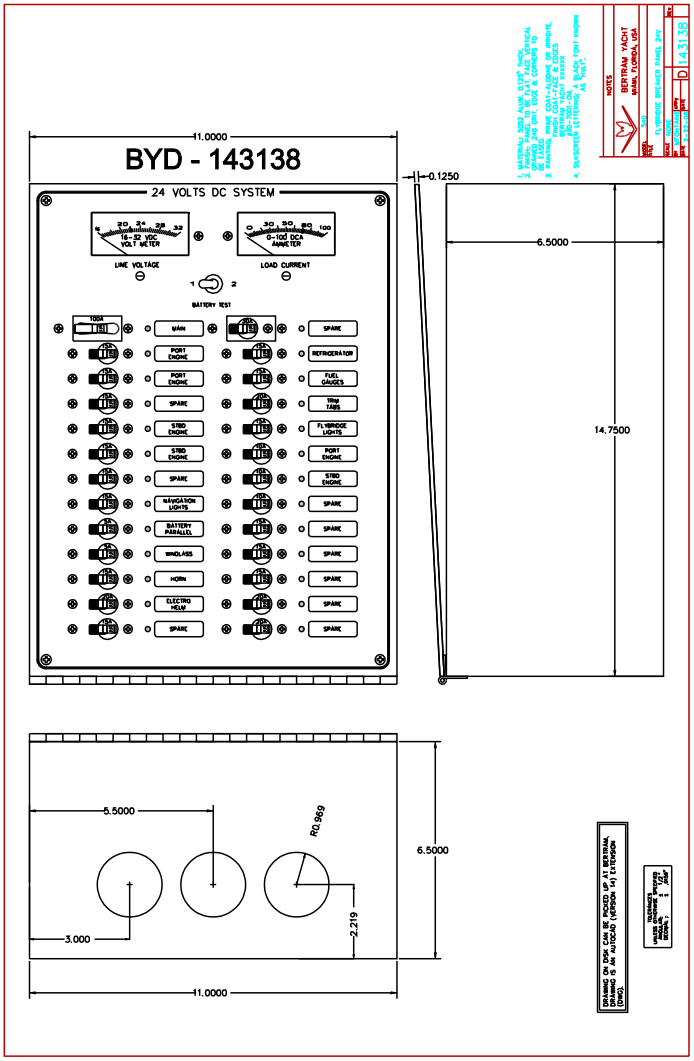
BERTRAM ENGINEERING DEPT.

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DRAWING SIZE: A	DATE: 12/03/07				SCALE: NONE	
	APPV.BY:				Dwg #	
	DESG.BY: M.FONTAINE				–	

PROPRIETA' DELLA FERRETTI ENGINEERING, SENZA AUTORIZZAZIONE SCRITTA DELLA STESSA IL PRESENTE DISEGNO NON POTRA' ESSERE UTILIZZATO PER LA COSTRUZIONE DELL'OGGETTO RAPPRESENTATO, NE COMUNICATO A TERZI O IMPRODOTTO. LA SOC. PROPRIETARIA TUTELA I PROPRI DIRITTI A RIGORE DI LEGGE

1 OF 1

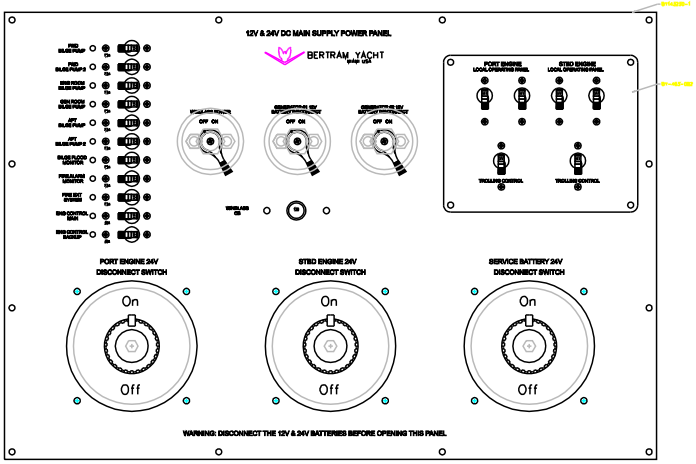
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REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.
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-	-	-	-	

BY143230-1



BOM

IT	PART#	DESCRIPTION	QT
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FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

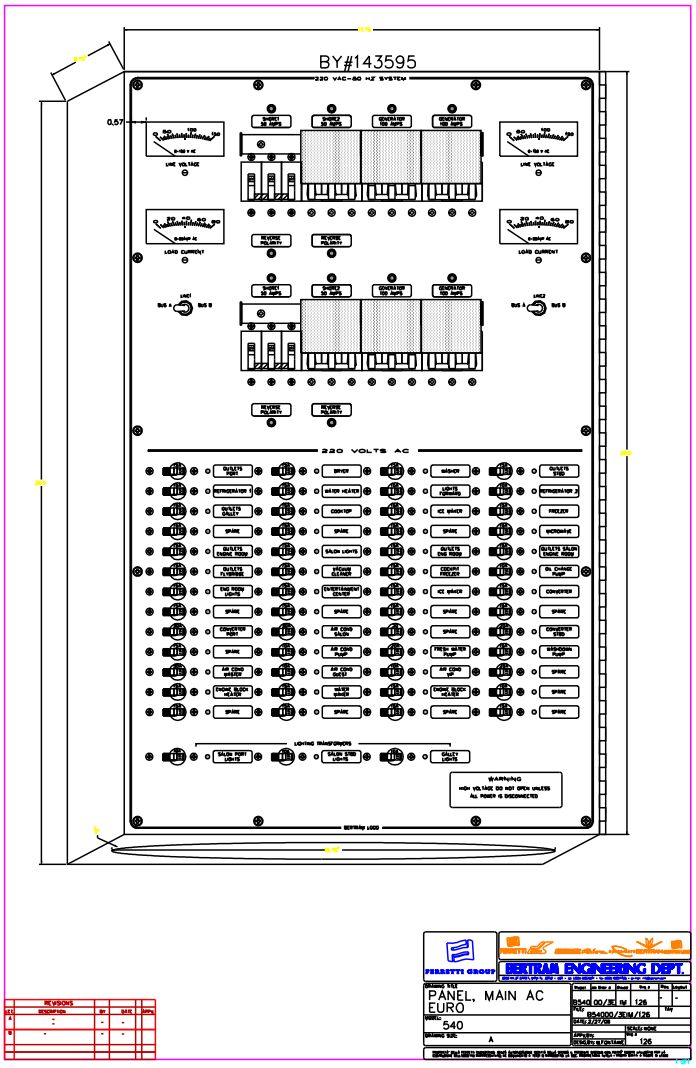
PANEL, MAIN DC BATT DISTRIBUTION

BY143230-1-570-630

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XXX

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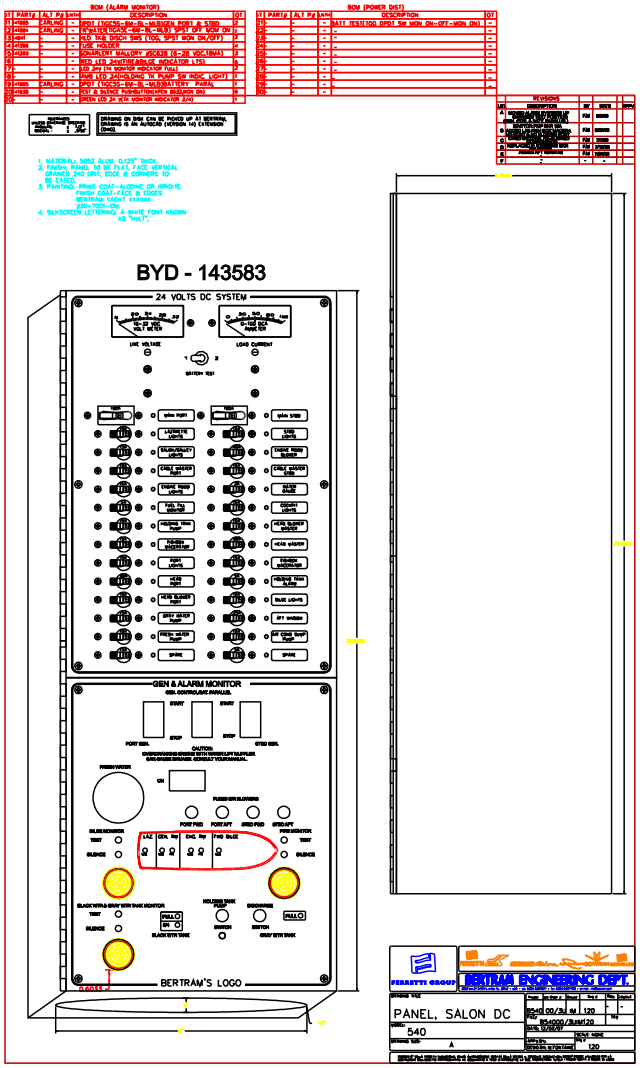
REVISIONS				
REV	DESCRIPTION	BY	DATE	APPD
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B	-	-	-	

FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

DRAWING TITLE	PANEL, MAIN AC EURO
MODEL	540
DRAWING SIZE	A
DRAWN	BS4000/3EM 126
DATE	3/27/08
SCALE	NONE
APPROVED	126

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