BERTRAM 510

OWNER'S MANUAL

BERTRAM

BERTRAM Spa

Legal seat:
Via Irma Bandiera, 62
47841 Cattolica – Rimini – Italy
Tel. +39.0541.839611
Fax +39.0541.839625

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

studio ti technology partner
www.studio-ti.it

Studio ti S.r.l.
40026 Imola (BO) - Italy
Via Ercolani, 5c
Tel. +39 (0542) 643513 - 643321
Fax +39 (0542) 643514
studioti@studio-ti.it

www.tuv.com TÜVRheinland ID:0910080273
Organizzazione con Sistema di Gestione certificato
Company with Management System certified
ISO 9001:2000
SINCERT

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.

NOTICE

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. **85**
Number of People Capacity **max. 15**
Propulsion type: engine **(nr. 2)**
Maximum Rated Engine Power **1342 HP/1000 kW**

Dimensions

- Length overall with bow pulpit	**54 ft 10 in - 16.73 m**
- Length hull (standard ISO 8666)	**51 ft 5 in - 15.68 m**
- Length waterline, yacht fully laden	**44 ft 8 in - 13.65 m**
- Bow rail extension pulpit	**3 ft 5½ in - 1.05 m**
- Maximum Beam	**15 ft 6 in - 4.8 m**
- Depth under propellers (yacht fully laden)	**5 ft - 1.52 m**
- Height above waterline, maximum	**15 ft 6 in - 4.8 m**
- Cockpit surface	**142 sq ft - 13.2 m^2**

Displacements

- Displacement, unladen	**51597 lb - 23.4 ton**
- Displacement fully laden	**66812 lb - 30.3 ton**

Tank capacities

- Standard fuel tank capacity	**1057 US gals - 4000 lt ***
- Water tank capacity	**229 US gals - 865.5 lt ***
- Black water tank capacity	**55 US gals - 208 lt ***

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

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

The limited warranty. 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, generator, 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.

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.

NOTES:

BERTRAM

INDEX

NOTES:

BERTRAM

1

INTRODUCTION

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.

WARNING

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.*

WARNING

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 entirety.

WARNING

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.

NOTICE

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:

- INTRODUCTION
- 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 & EQUIPMENT
- YACHT LIFTING & ONSHORE HANDING
- MAINTENANCE
- TROUBLESHOOTING

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 to provide 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.

WARNING

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

WARNING

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

WARNING

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.

WARNING

BERTRAM declines all responsibilities for the installation and operation of electrical, electronic and mechanical equipment improperly installed by third parties in a fashion not authorised by the yacht's builder.

WARNING

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

CAUTION

BERTRAM declines all responsibilities if third parties tampered with equipment installed by the yacht's builder. Such tampering or unauthorized installations will void the warranty, and even cause damages to the yacht and the people on board.

WARNING

BERTRAM declines all responsibilities for damages due to improper preservation and poor maintenance.

WARNING

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 to contact BERTRAM Customer Support.

CAUTION

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, BERTRAM After-Sales Service will support your requests in order to obtain fast services 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.

1.3 HULL IDENTIFICATION

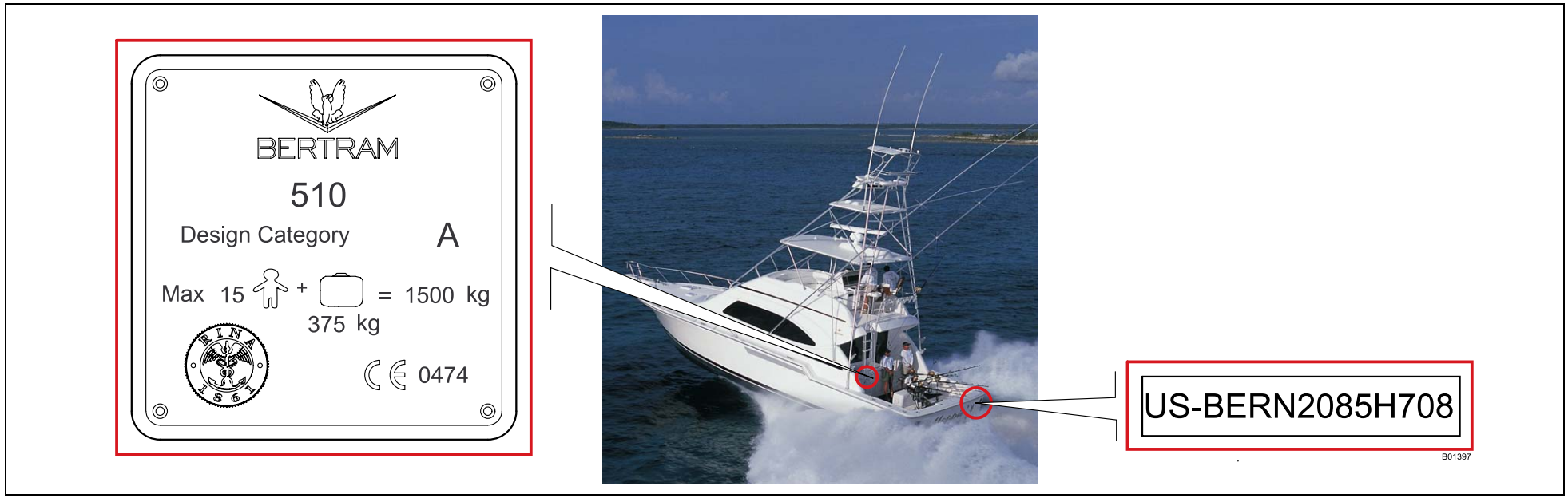
BERTRAM has focused on building high quality yachts for the international yachting market since 1961. Safety is a high priority, and all BERTRAM yachts undergo certification to the requirements of the applicable registries to obtain a Classification Certificate.

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.

WARNING

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



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BERTRAM

2

HOW TO USE THIS MANUAL

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.

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”, “warning”, 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.

WARNING

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

CAUTION

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.

NOTICE

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.

2.3 SPECIAL 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 access dangerous areas or to approach moving mechanical parts.

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 the 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 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 the Navigation, navigation, yacht operation, the operation of marine electronics, maintenance, etc. Consult the resources listed in the appendix.

NOTICE

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.

NOTES:

BERTRAM

3

DESCRIPTION OF THE YACHT

3.1 MAIN DIMENSIONS AND WEIGHT DATA

– (Loa) Length overall with bow pulpit	**54 ft 10 in - 16.73 m**
– (Lh) Length hull (standard ISO 8666)	**51 ft 5 in - 15.68 m**
– (Lwl) Length waterline, yacht fully laden	**44 ft 8 in - 13.65 m**
– P= Bow rail extension pulpit	**3 ft 5½ in - 1.05 m**
– Maximum Beam	**16 ft 2 in - 4.93 m**
– Draft under propellers (yacht fully laden)	**5 ft - 1.52 m**
– Hmax = Height above waterline, maximum	**15 ft 6 in - 4.8 m**
– Displacement, unladen	**51597 lb - 23.4 ton**
– Displacement fully laden	**66812 lb - 30.3 ton**

3.2 MAIN TECHNICAL DATA

Main Propulsion Engines

Model	MAN V12-1360 CRM
Power	1342 HP/1000 kW at 2300 rpm
Maximum speed (with 3/4 of load)	39.7 knots approximately
Maximum speed (with 3/4 of load)	36 knots approximately
Range (at maximum speed)	313 NM, approximately
Range (at cruise speed)	413 NM, approximately

Fuel tank capacity
1057 US gallons

Water tank capacity
229 US gallons

Black waters (sewage) tank capacity
55 US gallons

Electrical power

AC Volts:	120/240
DC Volts:	24
Hz:	60
kW:	15.5 + 15.5 (optional)

Batteries
Two batteries for engines
Two batteries for users
One battery for the generator

Bilge pumps
One bilge pump in the helm gear compartment
One pump in the engineroom
One pump forward staterooms area

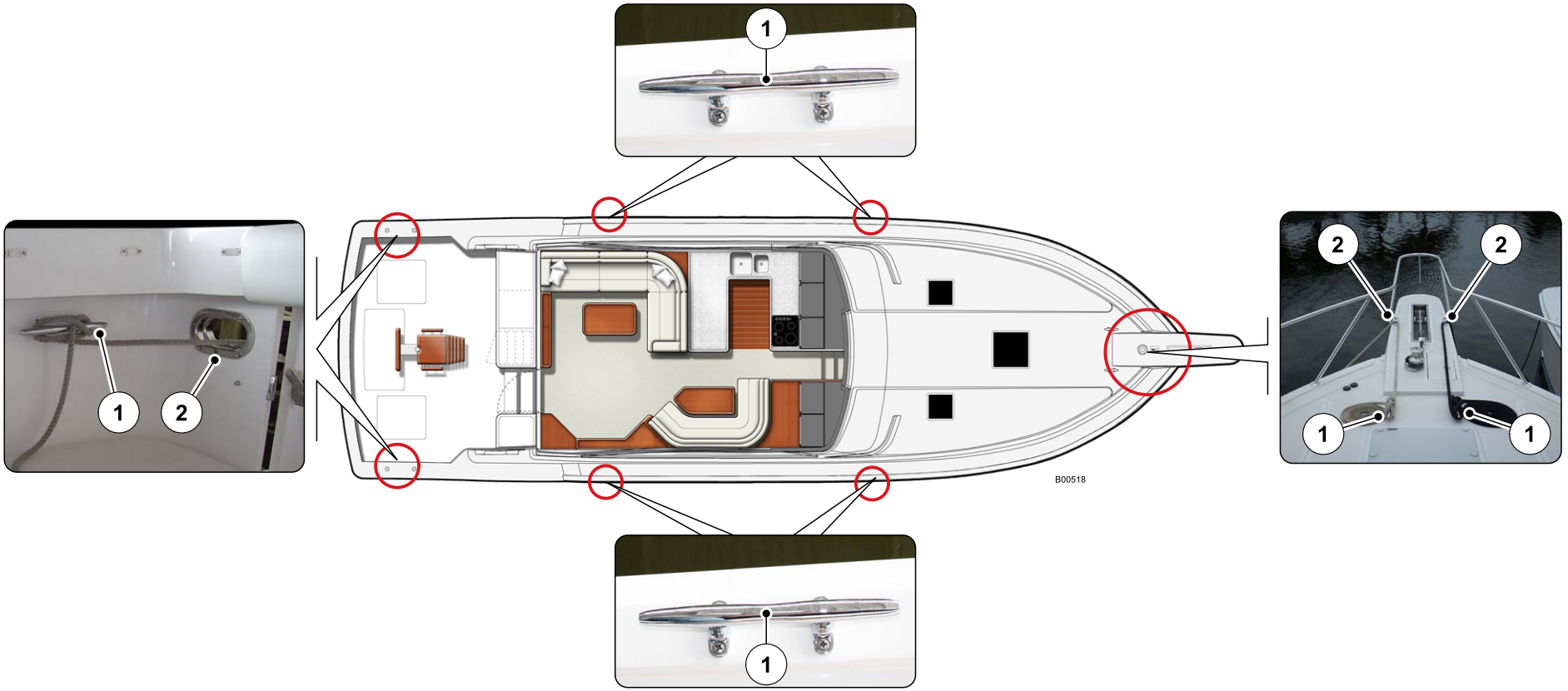
NOTE

Performance measured during sea trials was taken in accordance with ISO 8666. The performance data are established at 62021 lbs and reference the standard version of the yacht with a clean hull bottom, with full fuel and water tanks and with six persons onboard while operating the yacht at in an ambient atmospheric temperature of 25°C/ 77°F in good weather conditions. If the yacht load is increased by 2205 lbs, the maximum speed decreases by 1 knot.

WARNING

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.

3.3 MOORING EQUIPMENT



1. Cleats
2. Chocks

3.4 WARNING AND SAFETY LABELS

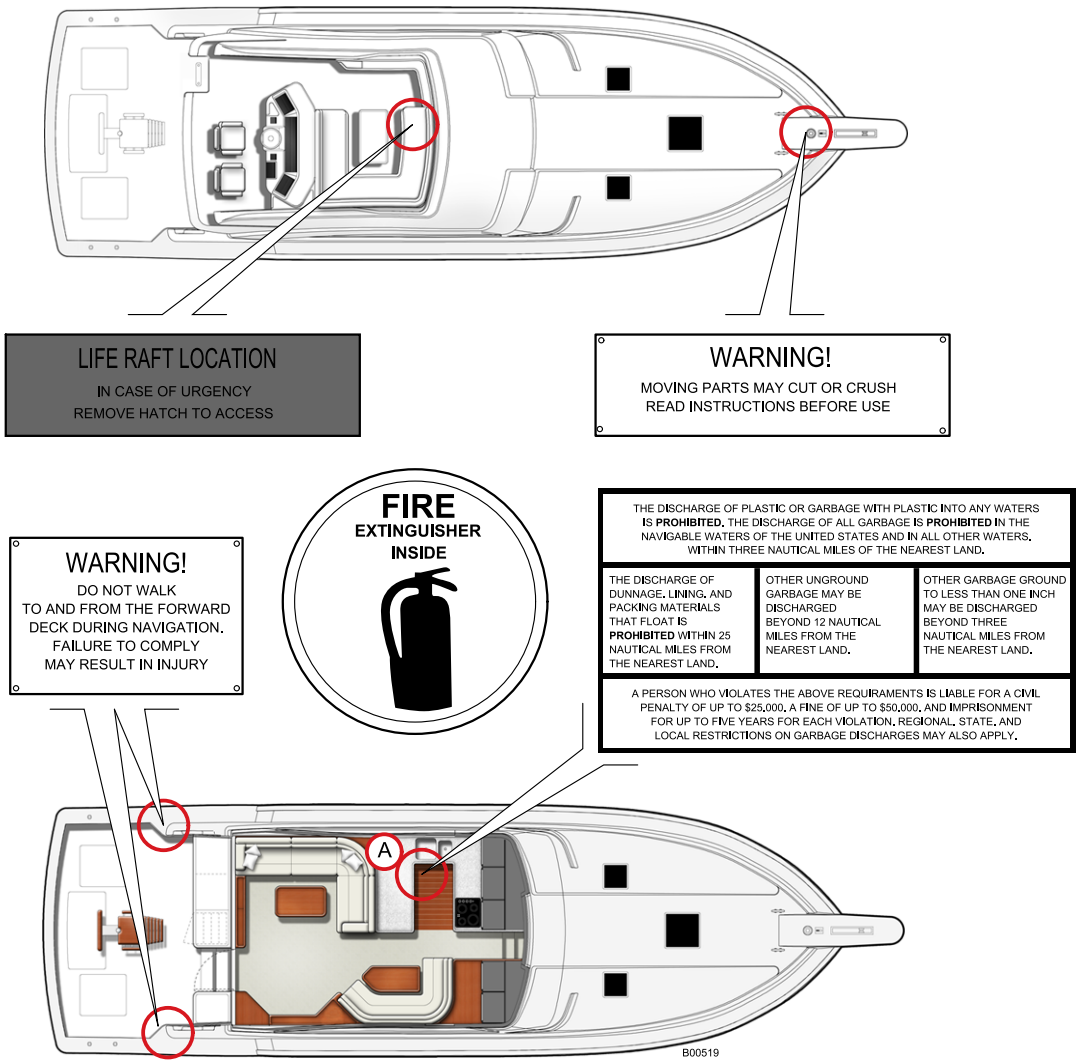
The warning and safety labels applied as decals on the yacht are used to point out special features, systems or operational risks.
The labels identify the level of the hazard by the signal word, e.g., danger, warning or caution, followed by a notice of the nature of the hazard, followed by the consequences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

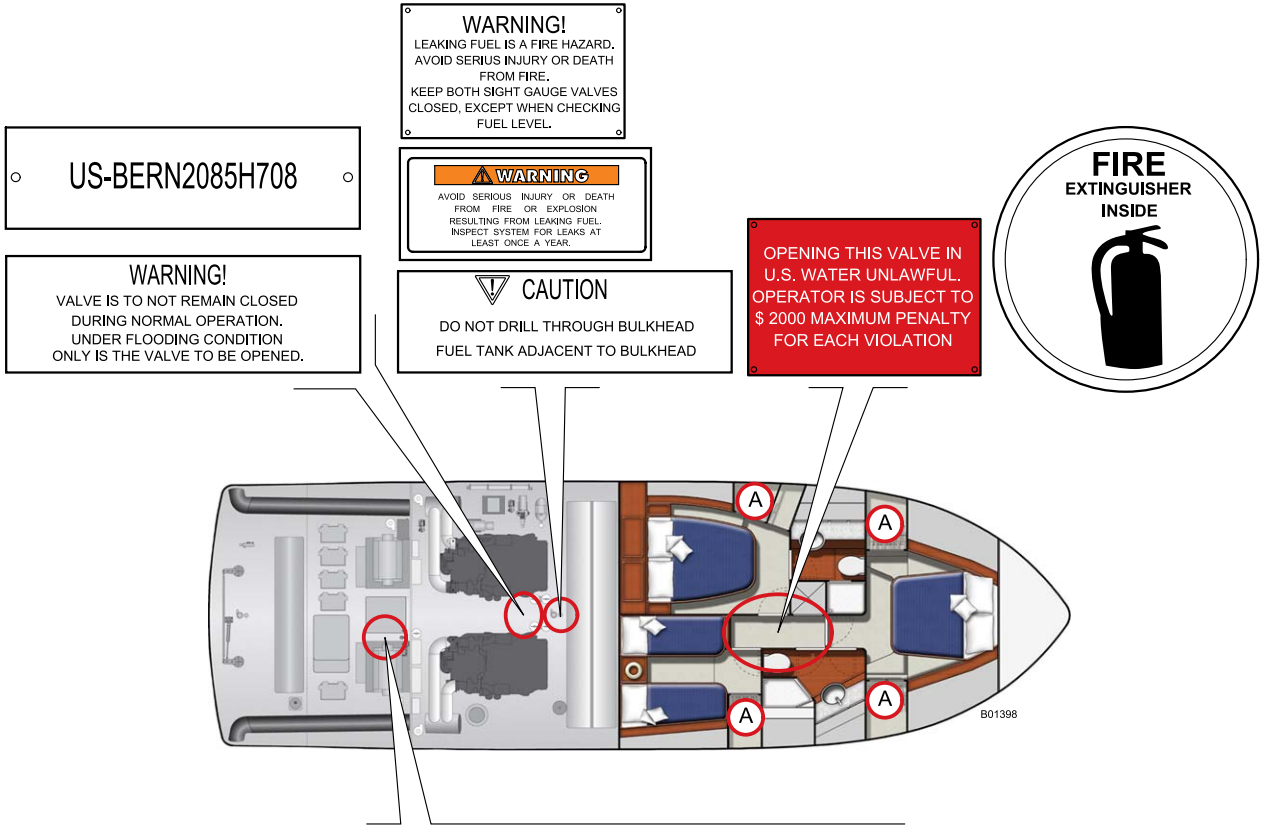
Before working with or on an area of the yacht or equipment bearing such a warning or safety label, be sure that you have read the safety warning and that you understand the nature of the hazard and that you act in accordance with the instructions to avoid illness, injury, death, or property damage.

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.




WARNING!
LEAKING FUEL IS A FIRE HAZARD.
AVOID SERIUS INJURY OR DEATH FROM FIRE.
KEEP BOTH SIGHT GAUGE VALVES CLOSED, EXCEPT WHEN CHECKING FUEL LEVEL.
US-BERN2085H708
WARNING
AVOID SERIOUS INJURY OR DEATH FROM FIRE OR EXPLOSION RESULTING FROM LEAKING FUEL. INSPECT SYSTEM FOR LEAKS AT LEAST ONCE A YEAR.
FIRE
EXTINGUISHER
INSIDE
WARNING!
VALVE IS TO NOT REMAIN CLOSED DURING NORMAL OPERATION.
UNDER FLOODING CONDITION ONLY IS THE VALVE TO BE OPENED.
CAUTION
DO NOT DRILL THROUGH BULKHEAD
FUEL TANK ADJACENT TO BULKHEAD
OPENING THIS VALVE IN U.S. WATER UNLAWFUL. OPERATOR IS SUBJECT TO $ 2000 MAXIMUM PENALTY FOR EACH VIOLATION
A
A
A
A
B01398
DISCHARGE OF OIL PROHIBITED
THE FEDERAL WATER POLLUTION CONTROL ACT PROHIBITS THE DISCHARGE OF OIL OR OILY WASTE INTO OR UPON THE NAVIGABLE WATERS AND CONTIGUOUS ZONE OF THE UNITED STATES IF SUCH DISCHARGE CAUSES A FILM OR SHEEN UPON. OR DISCOLORATION OF. THE SURFACE OF THE WATER. OR CAUSES A SLUDGE OR EMULSION BENEATH THE SURFACE OF THE WATER.
VIOLATORS ARE SUBJECT TO A PENALTY OF $5.000.00
CAUTION
DO NOT MOUNT EQUIPMENT ON TOP OF DOOR ADDITIONAL WEIGHT MAY CAUSE INADVERTENT OPENING OF DOOR
WARNING
COMING IN CONTACT WITH MOVING MACHINERY CAN RESULT IN SERIOUS INJURY
CAUTION
KEEP DECK HATCHES DOGGED AND ENGINE ROOM ENTRANCE DOOR AND HATCH SECURED WHILE UNDERWAY TO PREVENT ENGINE ROOM AND LAZARETTE FLOODING

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NOTES:

BERTRAM

4

GETTING UNDERWAY

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. The engine keys are provided with different 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 staterooms access (3 copies)

NOTICE

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.

NOTICE

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**.

4.2 PREPARING TO GET UNDERWAY

4.2.1 Preliminary checklist

Accurate and careful preliminary checks are fundamental for a safe outing. Before leaving harbor, 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 forecasts 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 helm station panel bilge water indicators that signal the presence of possible water in the bilge.
- If the indicators 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 generators 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 perpendicular to thru-hull fitting body. Remove and clean the filter baskets, reassemble the filters and then OPEN the thru-hull valves.

NOTICE

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

WARNING

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 generators belt tension. Adjust as needed. Check the engine oil, gearbox oil, and generators oil levels. Replenish as indicated. V-drive oil inlet is via the dipstick opening.
- Check the propulsion engine and generators 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 gangway, trim tabs and steering system control units hydraulic oil levels. 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.

- 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.

CAUTION

Equipment, stores 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.

WARNING

Open hatches can be hazards when the yacht is underway. To avoid injury or death to persons onboard and/or water penetration when the yacht is underway, ensure that all deck hatches, portlights, engineroom hatches, etc. are secured in the closed position before getting underway.

CAUTION

Before starting the engines disconnect the battery charger.

NOTICE

BERTRAM furnishes the equipment required by the international regulations.
The owner is responsible for providing any equipment or safety devices required by national regulations in force for the waters in which the yacht is underway.

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 fire extinguisher charge levels. 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.

NOTICE

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

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

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 off the yacht at any time.
Do not hesitate to require that persons wear PFD's (life jackets). PFD's may be worn in any weather, underway, at the shore, or at anchor.

- Non-swimmers and children should wear a PFD at all times.
- 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.

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 trim tabs.
  When not in use, trim tabs should be kept in the UP position.
- Check navigation lights and horn operation.
- Check anchor windlass and chain stopper operation.
- Check VHF radiotelephone operation.
- Check yacht documents and navigation 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 generators cooling and for air-conditioning system are open.
- Check that the engines and generators 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 potable water and electric power, cable and telephone.
- Check the fixed firefighting systems and the portable (hand-held) fire extinguishers.
- Check fuel system for no leaks or fumes.

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.

NOTICE

Before starting the engine, check fuel level, coolant level and engine oil level. If necessary, refill with fuel, coolant and oil.

Before starting the engines, carry out the necessary daily maintenance. Check the engineroom. This check may avoid further remarkable repairs. For further information refer to the Use and Instruction Manual delivered by the engine Manufacturer.

- In order to ensure a longer engine life, carry out a complete inspection before starting. Check for the following faults: 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 relevant separator. Open the fuel supply valve.

WARNING

Open all valves in the refuelling line, before starting the engine, to avoid high fuel pressure. This pressure may cause damages to the fuel housing or other damages.

Oil level check

Check engine oil level only approximately 20 minutes after the engine has been switched off.

- Pull out dipstick (**1**) for oil level check.
- Wipe it with a clean, dry and lintfree cloth.
- Place it back up to detent.
- Pull out dipstick again.

The oil level should be between the two notches in the dipstick and must never drop below the lower notch. Top up oil as necessary.

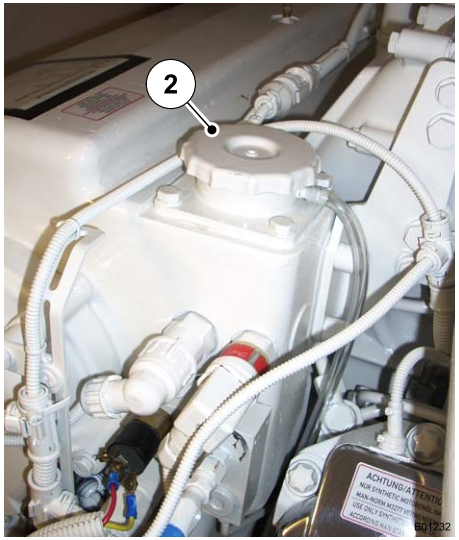
Cooling liquid

Fill the cooling system of the engine with a mixture of fresh drink water and of antifreeze or anti-corrosion agent.

For this purpose see “Fuels, Lubricants and Coolants for MAN Diesel Engines”.

– Pour in coolant slowly in the expansion tank through proper fill fitting (**2**).
– Make sure that the ratio between water mixture and antifreeze is always correct.

For coolant filling quantity, see “Technical data” on the handbooks delivered by MAN.

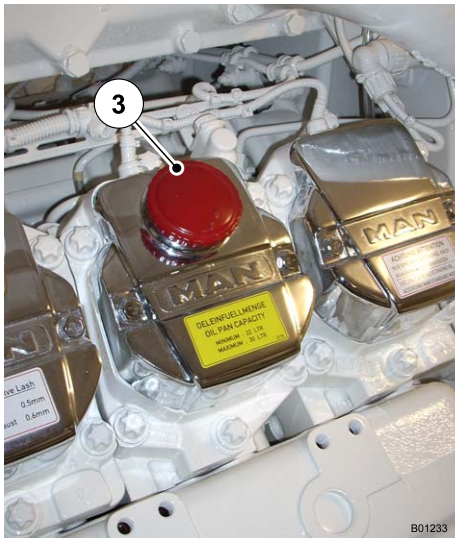


Engine oil

WARNING

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

– Pour lubricating oil into engine by means of proper fill fitting (**3**). For the refilling quantity see “Technical Data” on the handbooks delivered by MAN.



Engine intake seacocks

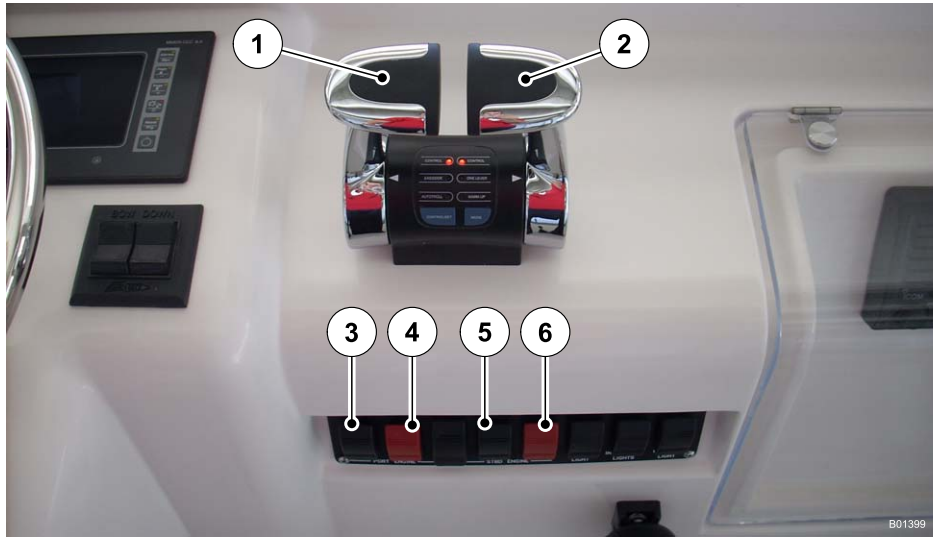
– Open the sea water valves inside of the engine heat exchangers.

WARNING

Do not let seawater pump run dry! Make sure that all valves of the engines seawater circuit are open. Drain the pump in case of freezing danger.

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

- Set control levers (**1**) and (**2**) to central idle position.
- Press “ON/OFF” button (**3**) to enable start-up.
- Press starboard engine “START” button (**4**).
- Verify that the oil pressure sets on normal value within 10 seconds.
- Verify the correct cooling water circulation.
- After starting the first engine and, only after checking that it operates correctly, start also the second engine.
- Start the port engine as described for the starboard one.
- Press “ON/OFF” button (**5**) to enable start-up.
- Press port engine “START” button (**6**).
  Do not press or hold the throttle lever when 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.



– 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.

WARNING

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 that there is no abnormal noise 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.

WARNING

Should a “circuit breaker switch” trip, do not try repeatedly to reset it but check the relevant electric system condition.

WARNING

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

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 MAN 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 that there is no abnormal noise 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 onboard and for the safety of the yacht itself, however when the engine is running it should not run higher than 1000 rpm.

4.5 STOPPING THE ENGINES

4.5.1 Procedure

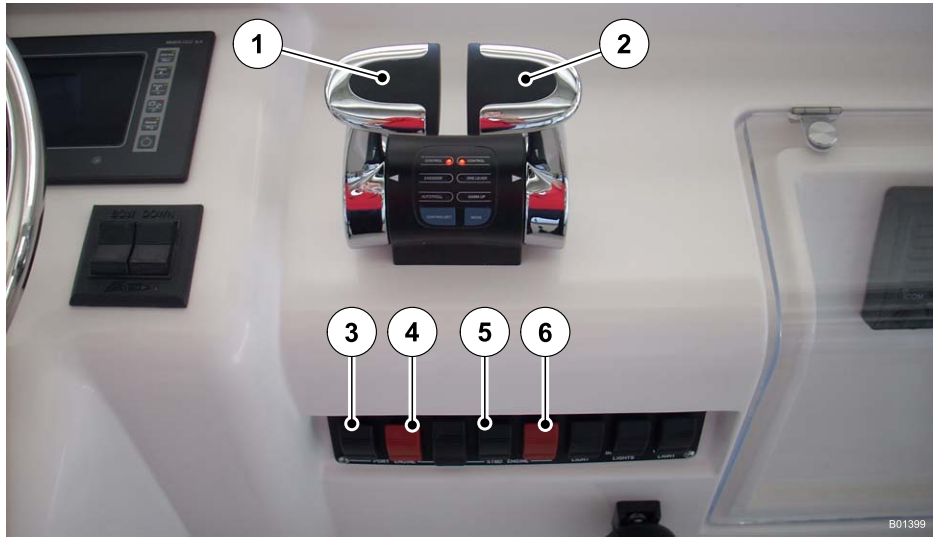
Do not stop the engines immediately after a high power operation, but let them run idle (for approx. 5 minutes) to balance the temperature differences.

From helm station

- Set levers (**1**) and (**2**) to central idle position of gearbox.
- Press STOP push-buttons (**4**) and (**6**).
- Press “ON/OFF” push-buttons (**3**) and (**5**) 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 non authorized personnel.



WARNING

With engines stopped carry out following:

- *cut out not-in-use electrical equipment and check the general condition of the electrical panel and the indication of voltmeters and ammeters;*
- *check for the condition of the bilge pump switches and their regular operation;*
- *check for possible leaks from the shaft seals;*
- *rinse the yacht with fresh water;*
- *connect electrical power supply from shore;*
- *keep air extractors in the engineroom running for about 30 minutes for ventilation and air cooling.*

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 PROCEDURE.

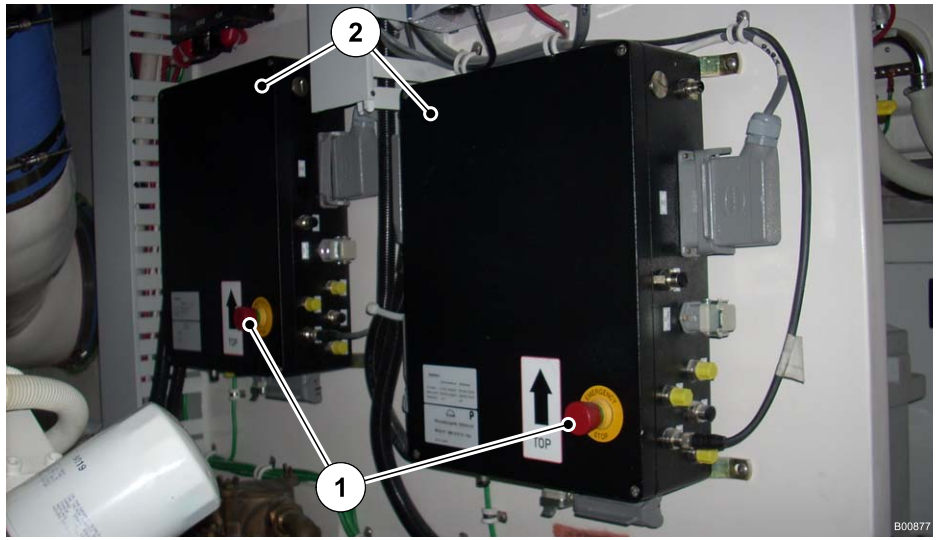
- **From engineroom**
  If the propulsion engines cannot get stopped with usual controls, the push-button (**1**) on the engine power unit (**2**) enables the engines stop. MAN engines are equipped with electronic-diagnostic and monitoring systems, whose operation is to check vital operation parameters for the engines and to alert the Captain in case these values run out of allowed tolerance.

CAUTION

When stopping the engines with the EMERGENCY STOP buttons, after 5 attempts the engine electronics will stall and needs to be reprogrammed. To reprogram the electronics, contact the MAN customer service. These buttons are to be used only with real need.

CAUTION

*Emergency control (**1**) stops the engine. Only 5 emergency stops are allowed, after which an attachment will start, limiting the maximum engine speed at 1600 rpm. Have the engine memory re-programmed at the MAN Service Centers.*



CAUTION

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.

4.7 NAVIGATION WITH ONLY ONE ENGINE

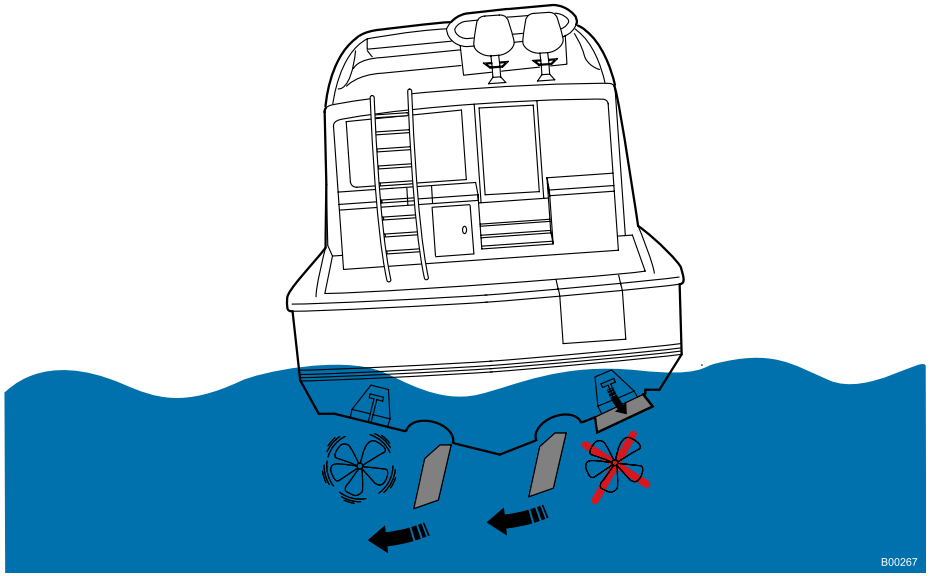
The yacht is driven by two powerful propulsion systems, designed to operate together and at the same time.

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

Therefore we suggest you to:
- shut off the failed propulsion engine;
- set the position of the helm in the opposite direction of the failed propulsion system; in case the helm 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 speed for the best maneuverability.

In case one engine stops due to a failure and the gearbox is set to neutral position, keep constantly an eye during navigation, on the gearbox oil temperature of the faulty system.

The propeller shaft is kept rotating thanks to the water flow through the propeller; in this way also some parts of the gearbox 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 but, with gearbox jammed, the oil will not overheat.



CAUTION

The yacht has been designed to navigate thrust by two engines; please remember that, in case of emergency, it is possible to navigate with a single engine, but 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 onboard and for the safety of the yacht itself, however when the engine is running it should not run higher than 1000 rpm.

4.8 MOORING & DOCKING

WARNING

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 starting maneuvers, make sure that doors, hatches, etc. are closed.

CAUTION

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 dock

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 dock 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 a dock, use the most conservative maneuver.

4.8.2 Departing from the dock

- When you are ready to depart the dock, 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 crewmember ready with fenders to protect the yacht in the event of wind or sea conditions that overcome your ability to control the yacht.

If the yacht is moored stern to the dock (Mediterranean- mooring style with the anchor off the bow and the stern tied to the dock):

- release the stern lines,
- haul in the anchor rope until you are sufficiently clear of the mooring area

If the yacht is side-moored,

- release the stern lines,
- haul in the dockside bowline while pushing the stern away from the dock and back away from the dock.

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

WARNING

Mooring operations on a large yacht can be hazardous to personnel. To avoid serious personal injury or death, use only the appropriate equipment, e.g., fenders, boathook, to push the yacht away from a fixed or floating structure. Never permit 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, stern 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 stern to a dock (Mediterranean mooring style), have the anchor ready to deploy. Prepare the stern lines. When the anchor is set, haul in the stern lines and adjust the anchor rode until the yacht is close to the dock.

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

4.8.4 When the yacht is safely secured to the dock

- Stop the engines.
- check that all indicator lights on the panel are 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 vessels and that the fenders are properly positioned and secured in place.
- check the belowdeck compartment closures.
- check that all compartments, portholes, 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, portholes, 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.

WARNING

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.

CAUTION

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

CAUTION

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 when near hot and moving parts. Wear hearing protection if the engines are running.

CAUTION

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 dock lines.

NOTICE

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.

CAUTION

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

NOTICE

Use the engine/users battery parallel switch only if absolutely necessary, to provide additional battery power for starting the engines. To prevent damage, turn off all electrical equipment prior to operating the battery parallel system. Disconnect it as soon as possible.

CAUTION

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.

CAUTION

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

NOTICE

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

4.9 OPERATING THE YACHT UNDERWAY

NOTICE

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 steered by using the drive wheel from the helm station. The steering wheel operates the rudders via a hydraulic system. The steering gear operation is independent from the engine operation. Never leave the drive wheel unattended when the yacht is underway.

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, 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.

NOTICE

At high speed, the use of the autopilot is dangerous and not recommended. Anyway pay always attention during navigation and use of the above mentioned device.

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

4.9.1 Operating in shallow water

WARNING

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

NOTICE

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]).

NOTICE

When underway, keep the aft tilting window closed to prevent engine exhaust fumes and splash water from entering the interior. Because 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.
- Monitor the control panel gauges and system condition alerts frequently.
- Check the switch panelboards to see if any circuit breakers have 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.

- 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.

NOTICE

While the yacht is underway all persons onboard must be seated in designated seating areas in order to avoid injury from falls from sudden yacht motion in active wake areas or in the event of sudden changes in yacht speed or during maneuvering. No one should be seated on the spoiler or forward decks when the yacht is underway.

4.10 PRECAUTIONS WHILE UNDERWAY

- Maintain a safe speed for the sea conditions, visibility, and when near other yachts.
- Observe speed limits in the harbor and other 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 bow.
- Provide laminated plastic reference cards for the Rules of Navigation and have them available for quick reference at each helm 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 searchlight are operational. Ensure that the correct navigation lights are turned on for operation at night. Do not have the anchor light on while the yacht is underway.
- Use navigation lights in all conditions of reduced visibility, such as fog and rain and at all times between sunset and sunrise.

NOTICE

When underway 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 helmsperson'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 windlass and take precautions when handling the anchor chain as it comes off the windlass. 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 onboard must be seated in designated seating areas in order to avoid injury from falls from yacht motion in the rough seas and wake areas, in the event of sudden changes in yacht speed or during maneuvering. No one should be seated on the spoiler or forward decks when the yacht is underway.

CAUTION

Persons entering the engineroom when the yacht is underway 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 engineroom.
Prior to entering the engineroom, set the yacht on the most comfortable heading for sea and wind conditions. Persons in the engineroom should maintain communication with the helmsman.

WARNING

To avoid serious illness, injury or death from engineroom hazards, avoid contact with hot and/or moving parts when working within the space, wear appropriate safety attire, including, but not limited to, safety glasses and gloves. Be extremely cautious when near 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 onboard and for the safety of the yacht itself, however when the engine is running it should not run higher than 1000 rpm.

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.

CAUTION

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

CAUTION

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.

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 harbor;
- if a storm hits, head the bow of your boat 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.

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 on battery disconnector panel the engines battery disconnector 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 windlass, check that the wildcat clutch is properly engaged and remove the chain stopper;
- let the yacht move backward slowly; if necessary, use the engines;
- deploy the anchor until just below the waterline, and hold;
- deploy the anchor until reaching the sea bottom;
- once the anchor is engaged, leave the chain stopper on.

CAUTION

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) of anchor rode needed for the water depth and type of rode. (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 astern, 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 bow. 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.

- 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 anchor ranges/bearings 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 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 = (Bow Height + Water Depth) x Scope.
Scope: the scope is technically defined as the ratio of the rode length to the vertical distance from the bow to the sea floor.
Scope = Rode Length / (Bow 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 bow 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 (if 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.

4.12.4 Anchoring precautions

WARNING

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 rope.

CAUTION

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

WARNING

Anchoring operations involve working with heavy equipment such as anchors and chains. These operations can pose hazards to personal safety. To avoid serious injury or death from improper handling or accidents, ensure that persons working with the windlass, anchors and chains and ropes 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 deploying it, and that the windlass wildcat tension is correctly adjusted. Persons involved with anchoring operations must take care to protect hands and fingers from the windlass gears and to avoid feet or legs being caught.

WARNING

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 guarantee electrical power to the windlass.
Check the anchoring point frequently.
The distance from obstacles or from other yachts must be greater than the length of the chain deployed (all round). At anchoring, leave the windlass electrical power on. Do not reverse the windlass rotation suddenly.

NOTICE

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

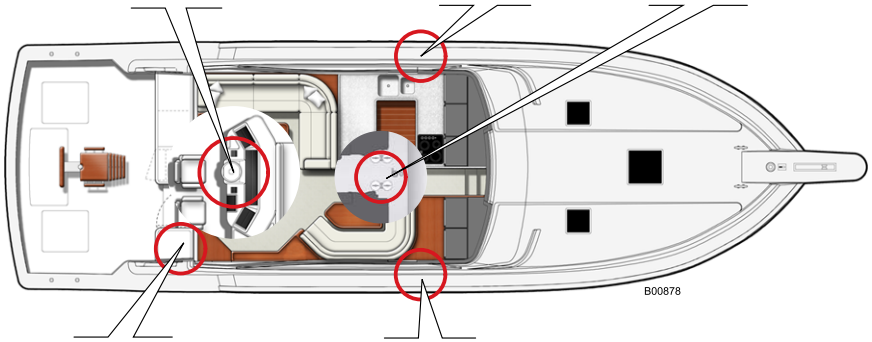
4.13 FUELING THE YACHT

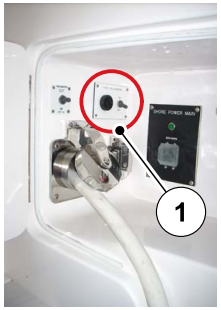
- Check that the yacht is securely moored and shut down all engines, including the generators.
- Extinguish any open flames and do not smoke when handling fuel or oils.
- The fuel tank fill fittings are located on the walk-arounds.
- During refueling, verify the correct operation of the electric level indicator.
- Remove the fuel tank fill fitting cap; check that the fuel dispensing nozzle fits. Place the filling nozzle as far as possible into the filling pipe, through the rubber anti-splash sleeve on the flow cut-off. Fill the tank. Hold the nozzle steady while pumping. Never leave the filling operation unattended.
- Fuel is toxic 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 the tank overfilling, the stern cockpit is equipped with a panel (**1**) 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.

Helm station fuel level

Port fuel inlet

Engineroom fuel level





Fueling screen

Starboard fuel inlet

- 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 dockside 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.
- Check for the correct operation of the visual level indicator at least once a month.

During filling, the fuel flow produces foam that may cause a fuel overflow, giving the appearance of a full tank. Therefore, it is good to wait for a few minutes and then fill, in order to be sure the tank has been filled correctly. The special geometric configuration of the tank allows also the decantation of the impurities or of water in the fuel.

NOTICE

Follow the engine manufacturer's recommendation on fuel type. Diesel engines require very clean fuel. Keep filters clean.

WARNING

EXPLOSION/FIRE HAZARD
- *Store flammable material in a safety-approved container. Never store flammable material in a non-vented space.*
- *Check bilge and engineroom for fumes.*
- *Keep ventilation system free of obstructions. Never modify the ventilation system.*
- *Inspect fuel system regularly for leaks.*

WARNING

We suggest refueling upon return to the harbor, in order to allow fuel to cool down without condensate. Drain the tank, every 2 or 3 refueling. Before refueling, wash the teak (if installed) with fresh water, in order to prevent the formation of fuel stains.

DANGER

Do not smoke during refueling.
During refueling, do not leave the yacht unattended.
During refueling, do not leave the engines running.

ENVIRONMENT

Dispose of fuel carefully: it is highly polluting.

WARNING

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

WARNING

Carbon Monoxide Hazard - Ensure engine exhaust system is working properly. Carbon monoxide poison is extremely toxic.
- *Exhaust system removes gases created by the engine and vents them aft.*
- *Inspect entire system for 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

4.14 PREVENTIVE MAINTENANCE

The yacht is fitted with sophisticated equipment and a number of 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 utility and function 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.

NOTICE

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 at 200 hours or after 6 months, at 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.

4.15 COLD WEATHER MAINTENANCE CAUTIONS

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 rupture 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 generators seawater and freshwater cooling systems, water-maker 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 needs of your yacht and its equipment, see the sections in this manual that reference the specific components, machinery and equipment manufacturer's manuals for information about special attention during freezing weather.

NOTES:

BERTRAM

5

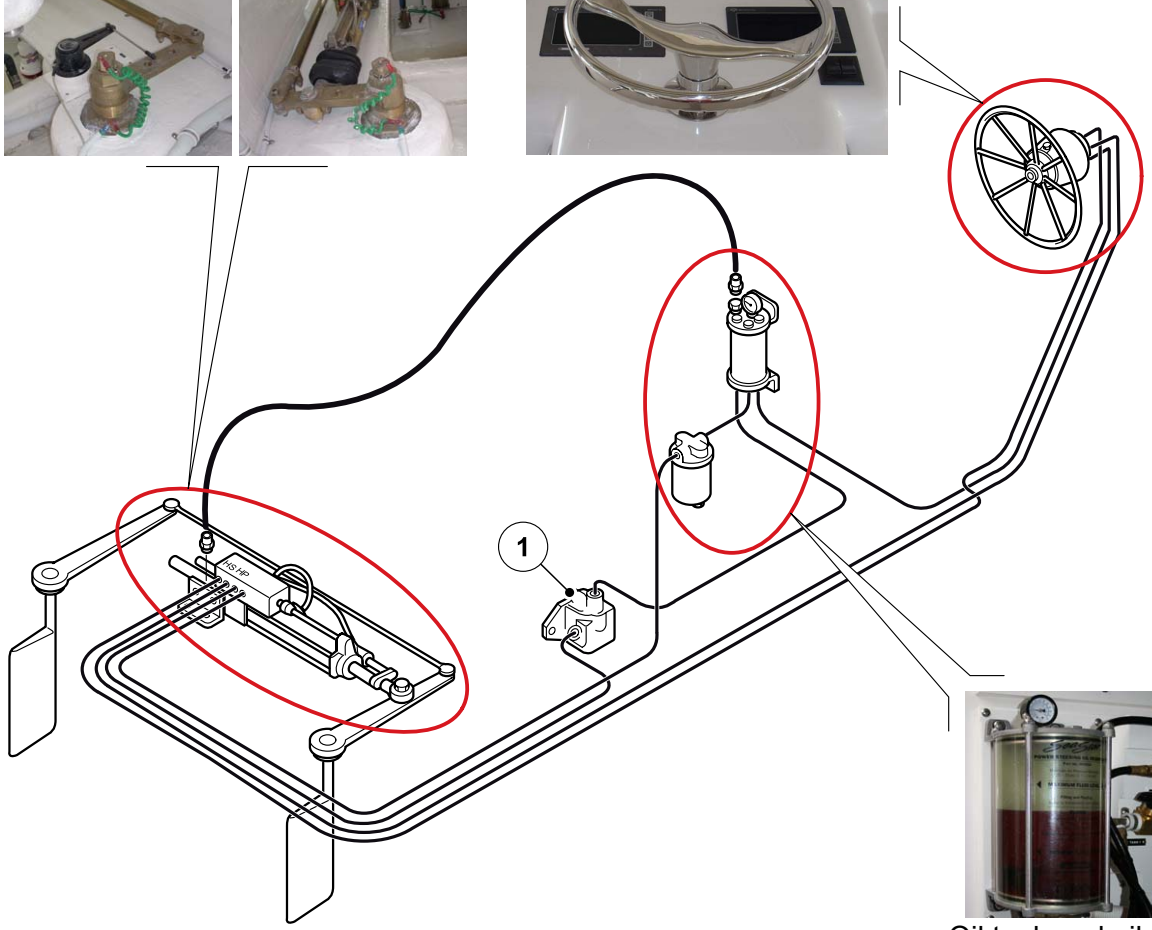
INSTRUMENTATION & EQUIPMENT

5.1 STEERING SYSTEM

The hydraulic power steering system has been provided to make steering easier during cruising, 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**). 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.

Cylinder, coupling rod and tiller angle indicator

Drive wheel



Oil tank and oil filter

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.

NOTICE

At high speed, the use of the autopilot is dangerous and not recommended. Anyway pay always attention during navigation and use of the above mentioned device.

WARNING

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, steering wheel movement pumps hydraulic fluid through lines to a cylinder which transfers movement to the rudder, stern drive; a tank holds extra fluid; a valve protects against overexposure.*
- *The operator must inspect the driving system frequently for a smooth, free and full range operation.*

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

NOTICE

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.

NOTICE

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

5.2 RUDDERS STROKE (TRAVEL) CHECK

- Turn on the steering 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.

CAUTION

In case of a remarkable imprecision or failure when checking the rudder stroke, contact the BERTRAM Customer Support.

CAUTION

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

5.3 DRIVING SYSTEM MAINTENANCE

Ordinary maintenance

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.

WARNING

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

Fill & purge procedure

NOTICE

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.

WARNING

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.

NOTICE

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

NOTES: 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).

WARNING

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.

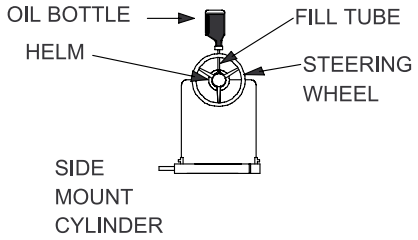
- **Step 4**
  Continue turning the steering wheel counterclockwise until the cylinder rod is fully extended to the right. (Steering wheel will come to a stop). Open the right bleeder.
- **Step 5**
  Holding the cylinder rod to prevent it from moving back into the cylinder, turn the steering wheel clockwise 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.

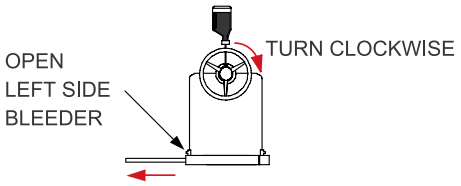
ENVIRONMENT

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

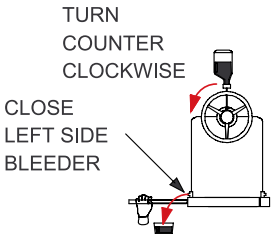
STEP 1



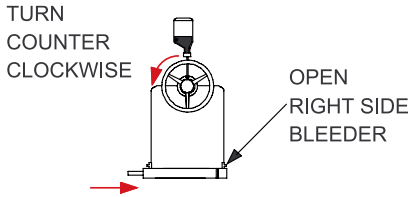
STEP 2



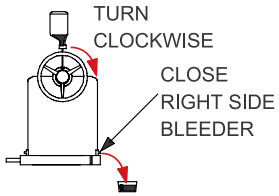
STEP 3



STEP 4



STEP 5



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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.

NOTICE

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

NOTICE

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

WARNING

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.

CAUTION

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

WARNING

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.

NOTICE

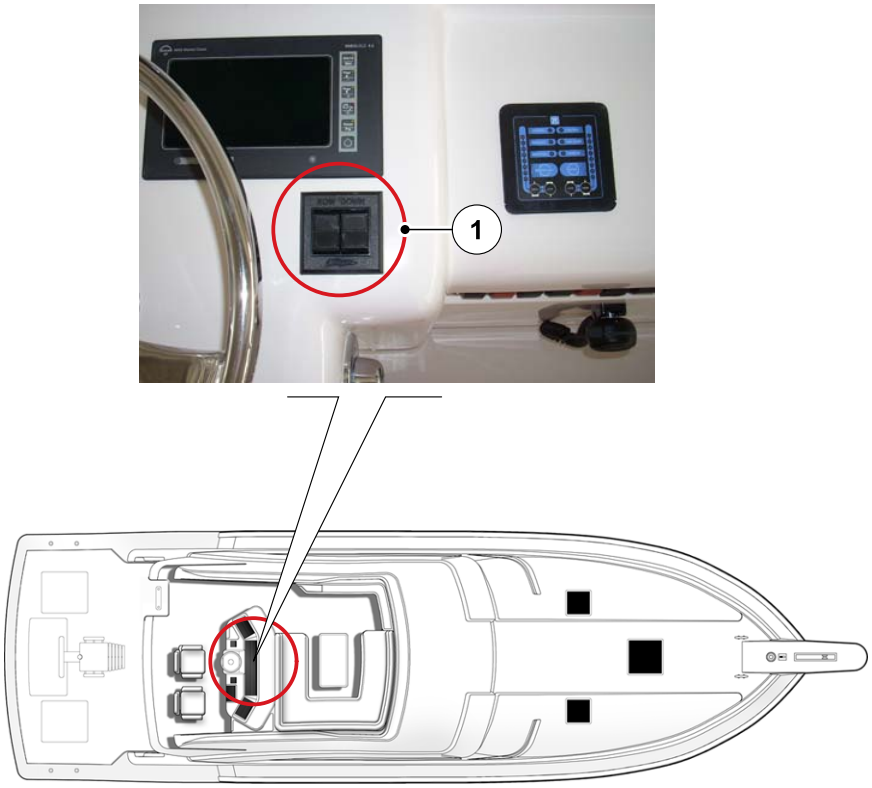
Clean the cylinders periodically to remove possible spots of corrosion that can impair their efficiency. To reduce the risk of corrosion, retract the cylinder rods each time you leave or moor the yacht, and when the yacht is on land.

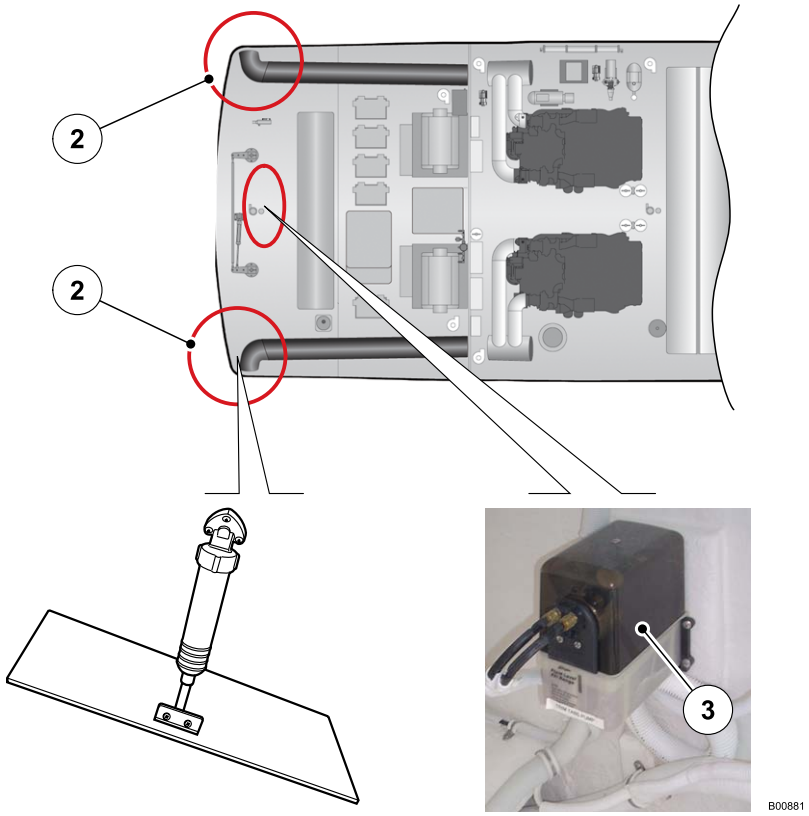
Item
Trim tabs system

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.

Trim tabs controls in the helm station





Trim tabs

Trim tabs control unit

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

5.5 BOW THRUSTER (OPTIONAL)

The bow thruster (double) (**5**) is driven by electric motor (**1**) and is activated from the helm station.
The bow thruster system is powered by a battery bank (**2**), recharged by a dedicated battery charger (**3**) equipped with proper activation switch (**4**).
A joystick (**6**) 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 desired direction of the bow.
For detailed information refer to manufacturer's manual.

WARNING

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

DANGER

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

1. Bow thruster electric motor
2. Battery bank
3. Battery charger
4. Battery charger switch
5. Bow thruster
6. Joystick and power switch

CAUTION

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.

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 overnight to maintain the best comfort on board, by damping nearly completely the irritating 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 ARG, 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 generators room.
For further information on their use and maintenance see the manufacturer manuals.

DANGER

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

WARNING

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

DANGER

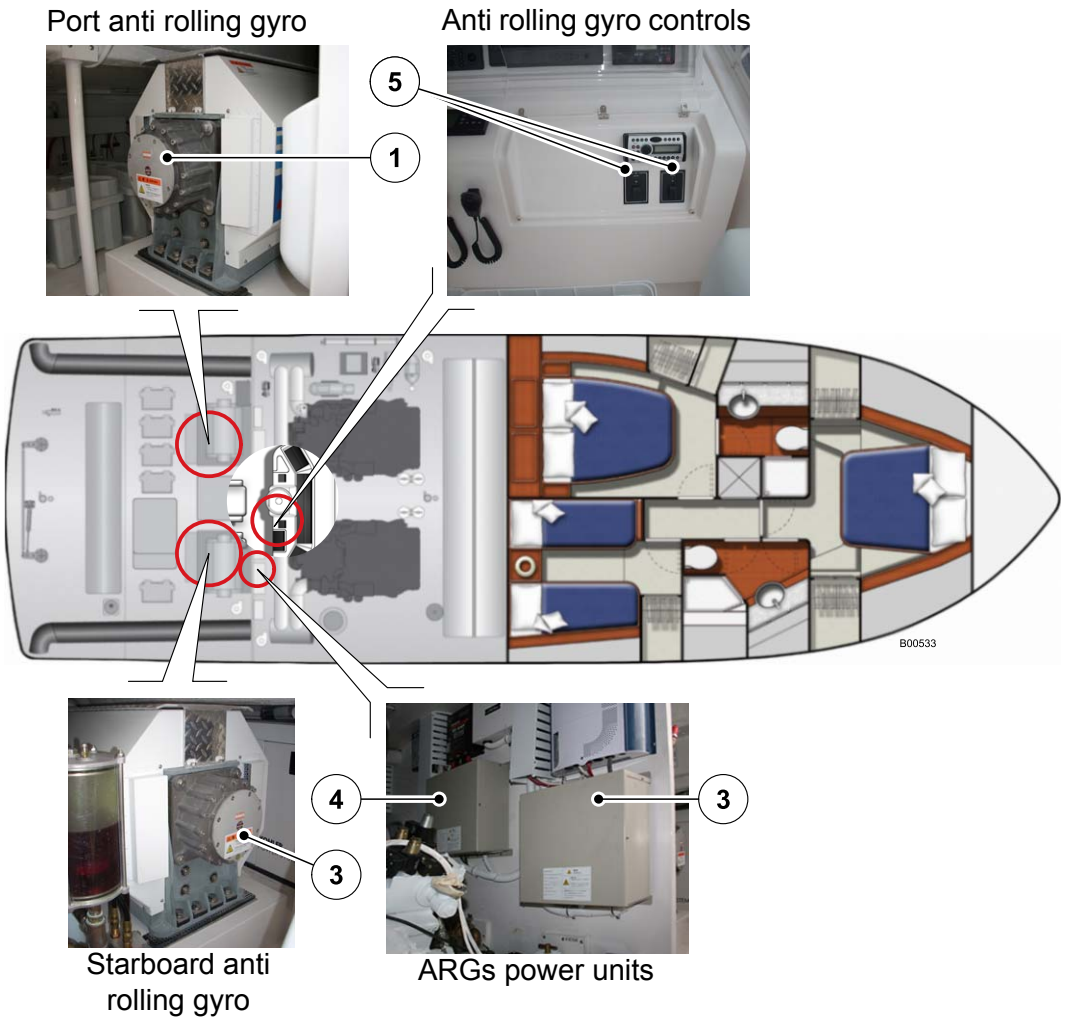
During operation the ARG components roll freely inside of their housing; therefore to open this housing would cause injuries or even death. In case of a fault, if it is necessary to open the housing for checking, have this operation performed by a skilled technician.

CAUTION

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

WARNING

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



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. Helm station anti rolling gyro controls

NOTES:

NOTES:

BERTRAM

6

HELM STATION

6.1 HELM STATION

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

NOTICE

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.

6.2 FLYBRIDGE HELM STATION

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

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

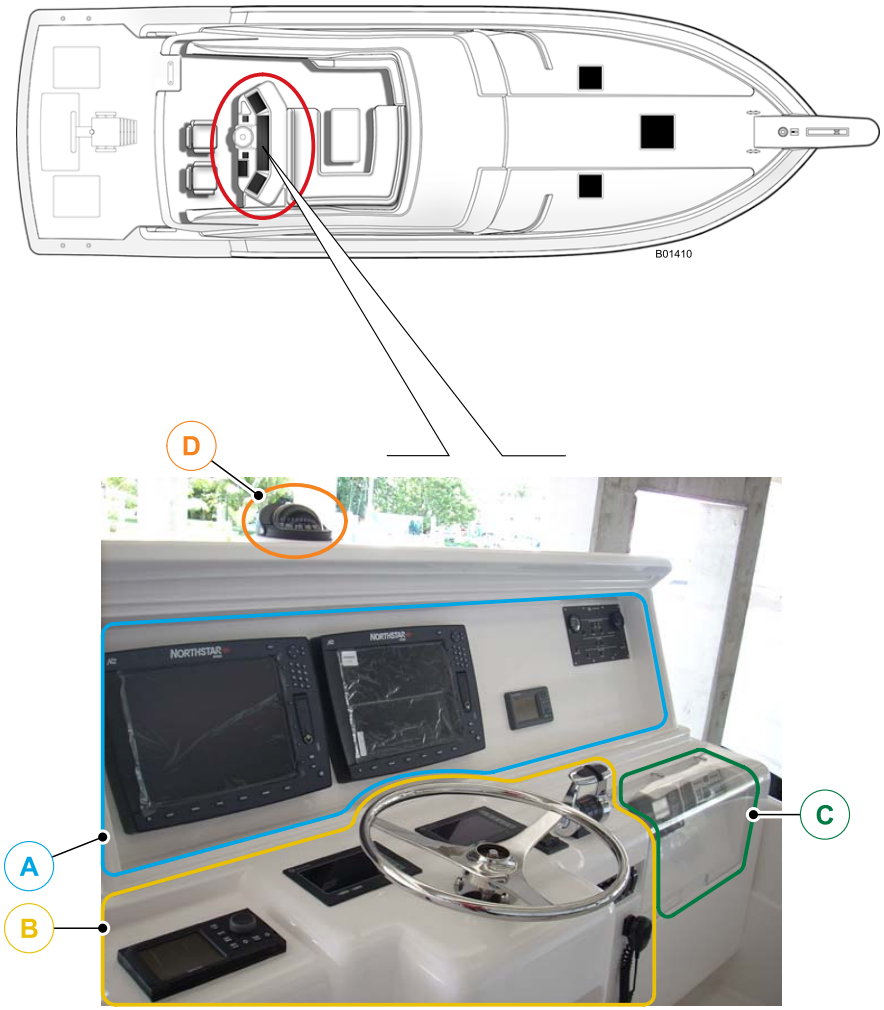
The console containing the navigation instruments (**A**) is closed. To access these instruments, activate the console opening/closing switch (**10**) section (**B**).

CAUTION

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

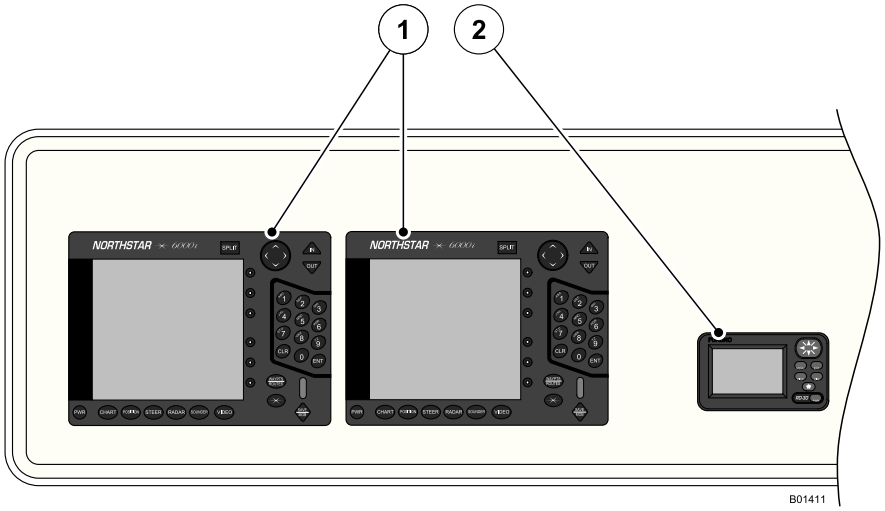
CAUTION

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

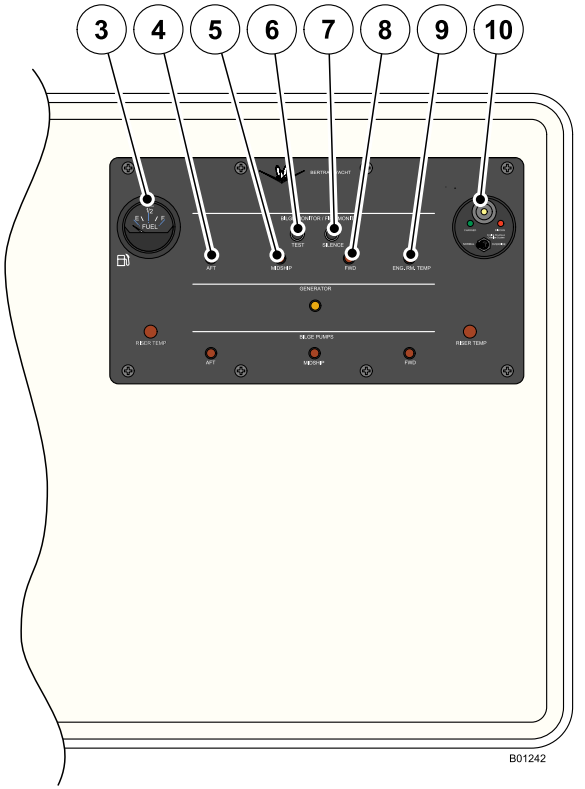


6.2.1 SECTION A - Navigation instruments

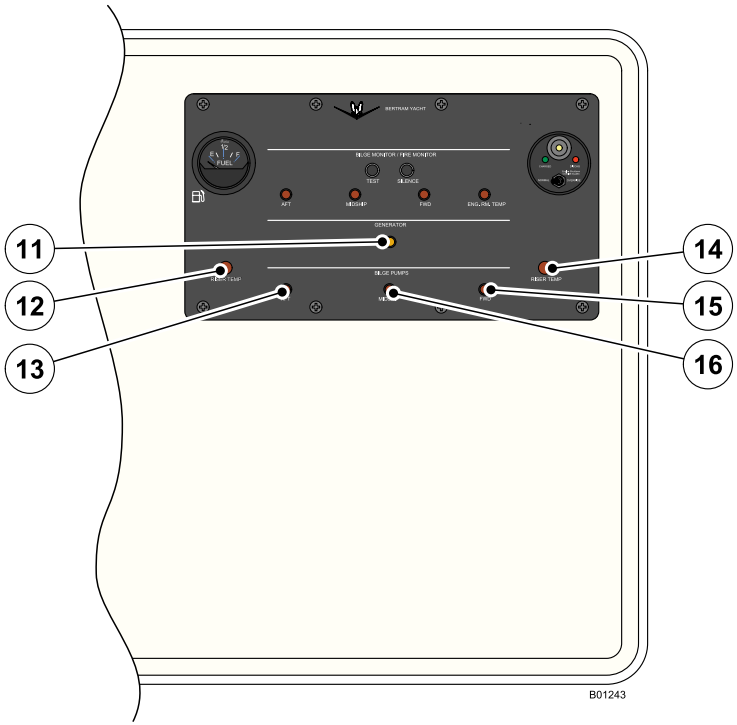
1. **Radar/Chartplotter/Fishfinder**
   Enables to display on the screen in a clear and quick way what is happening around the yacht, so as to facilitate navigation.
2. **Multifunctional screen**
   This screen allows to display the information received from GPS, chartplotter, radar or various water temperature sensors, wind data, etc.



3. **Fuel level gauge**
   This gauge shows the fuel level in the tank.
4. **Aft bilge flood signal light**
   This light indicates the flood of the aft bilge.
5. **Mid yacht bilge flood signal light**
   This light indicates the activation of the mid yacht flood signal.
6. **Test button for bilge flood and high temperature in the engine room**
   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 indicate the correct operation of the bilge signal system and engineroom high temperature signal system. When releasing the button all LEDs must go out and the buzzer must clear off.
7. **Squelch button for bilge flood and high temperature in the engine room**
   This button allows to clear the bilge flood signal and the high temperature in the engineroom signal.
8. **Fore bilge flood signal light**
   This light indicates the flood of the fore bilge.
9. **Engineroom high temperature signal light**
   This light indicates that the temperature in the engineroom is too high.
10. **Firefighting signal panel**
    Displays the warning lights connected to the firefighting system in the engineroom and includes the NORM/OVERRIDE switch.



11. **Generator LED**
    This light indicates that the generator is running.
12. **Port engine exhaust signal light**
    This light indicates high temperature inside of port engine exhaust ducts.
13. **Aft bilge pump signal light**
    This light indicates the activation of the aft bilge pump.
14. **Starboard engine exhaust temperature signal light**
    This light indicates high temperature inside of starboard engine exhaust ducts.
15. **Fore bilge pump signal light**
    This light indicates the activation of the fore bilge pump.
16. **Mid yacht bilge flood signal light**
    This light indicates the activation of the mid yacht bilge pump.



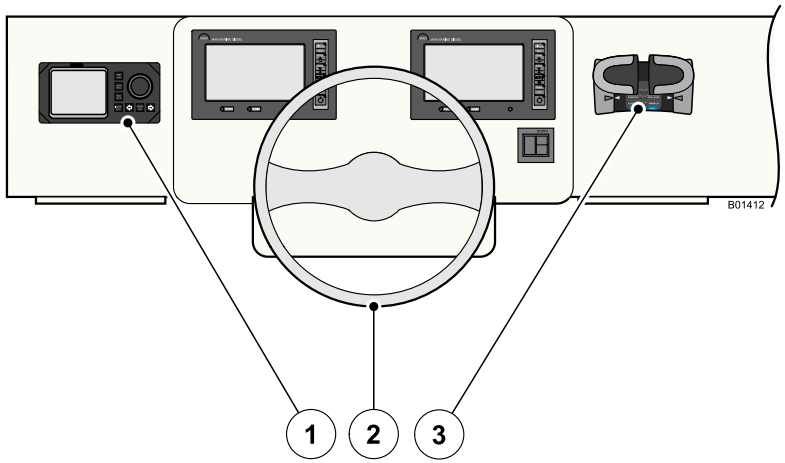
6.2.2 SECTION B - Control and maneuver levers

1. **Autopilot**
   The autopilot functions are controlled by simply pressing the keys. Each mode key is identified with the primary function indicated in large text and the secondary function in smaller text. For more information, consult the manufacturer's manual.

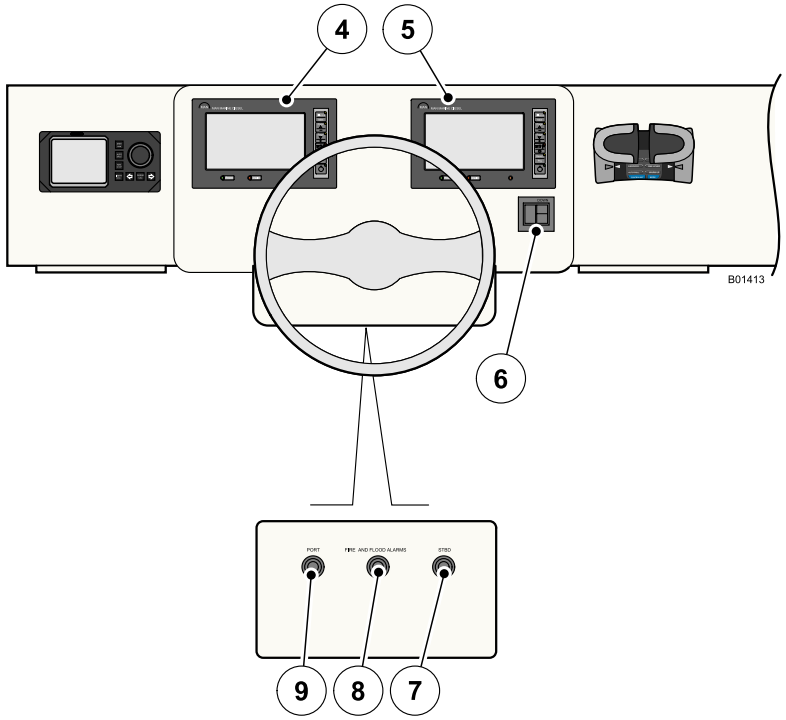
WARNING

If the yacht foredeck is facing a sudden obstacle, this can be avoided by turning with force the drive wheel. This operation allows to drive the yacht only until the drive wheel is firmly held. As soon as the drive wheel is released, the autopilot resumes immediately the yacht's course. 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 the hindrance has been bypassed, the device can be switched on again by resetting the course.

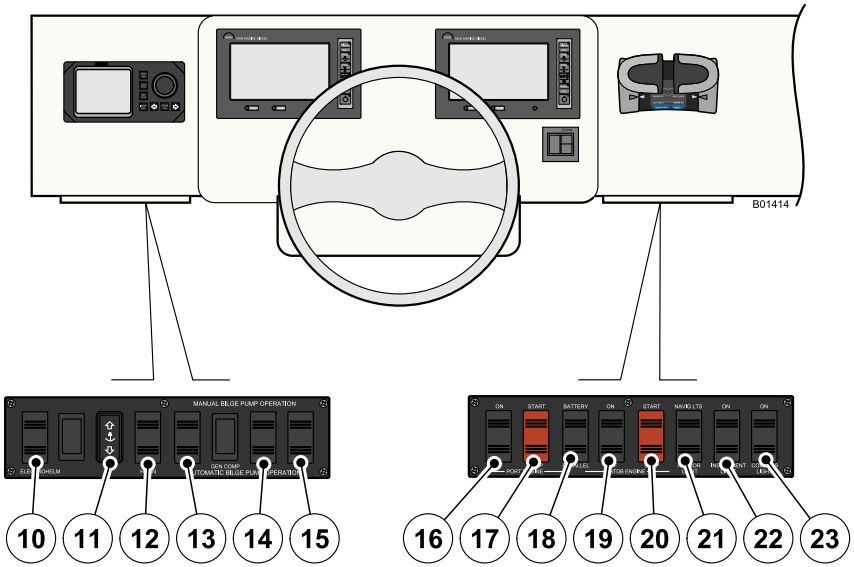
2. **Heads block (levers)**
   This block monitors, by means of electric signals, the propulsion engine revolutions and the gearbox speeds.
3. **Drive wheel**
   By turning the drive wheel you actuate an hydraulic pump that operates the piston located in the helm gear compartment, this in turn is connected to the rudder and allows to drive the yacht.



4. **Port engine control panel**
   This panel allows to monitor all operating data of the port engine.
5. **Starboard engine control panel**
   This panel allows to monitor all operating data of the starboard engine.
6. **Trim tabs control panel**
   This panel carries the switches for trim tabs activation.
7. **Starboard ventilator signal buzzer**
   This buzzer activates to indicate a fault of the starboard engineroom ventilator.
8. **Bilge flood/fire signal buzzer**
   This signal activates to indicate a bilge flood/fire hazard.
9. **Port ventilator signal buzzer**
   This buzzer activates to indicate a fault of the port engineroom ventilator.

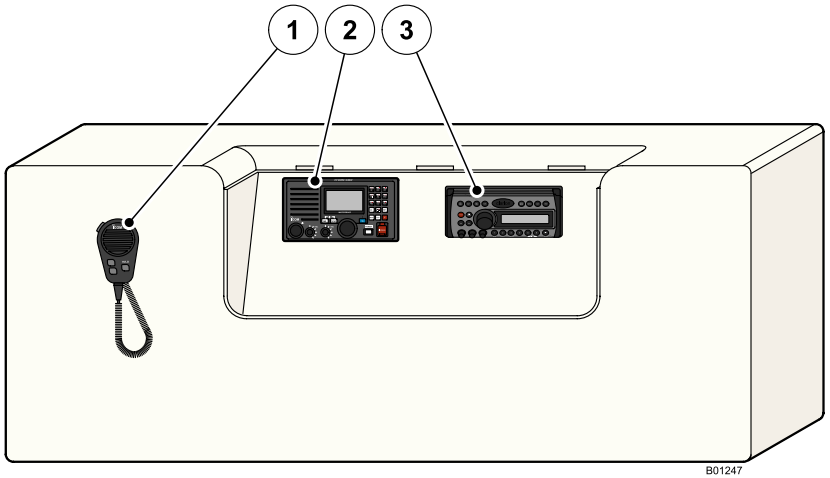


10. **Console switch**
    This switch allows the opening/closing of the console.
11. **Anchor windlass switch (optional)**
    This switch allows the operation in both directions of the bow anchor windlass.
12. **Horn switch**
    This switch allows the activation of the horn.
13. **Aft bilge pump switch**
    This switch allows the manual activation of the aft bilge pump. If the light is on, this means that the pump is operating.
14. **Mid yacht bilge pump signal light**
    This switch allows the manual activation of the mid yacht bilge pump. If the light is on, this means that the pump is operating.
15. **Fore bilge pump switch**
    This switch allows the manual activation of the fore bilge pump. If the light is on, this means that the pump is operating.
16. **Port engine ON/OFF switch**
    This switch enables the start/stop of the port engine.
17. **Port engine STOP/START switch**
    This switch enables the start/stop of port engine.
18. **Parallel switch**
    This switch allows parallel connection of the user/engine batteries to supply additional power for starting the engines. This happens only if the batteries are not sufficiently charged.
19. **Starboard engine ON/OFF switch**
    This switch enables the activation/deactivation of the starboard engine.
20. **Starboard engine STOP/START switch**
    This switch enables the start/stop of starboard engine.
21. **Anchor riding and navigation switch**
    This switch turns on the anchor riding or the navigation lights.
22. **Instruments backlight switch**
    This switch turns on the instruments backlighting.
23. **Switch for magnetic compass backlighting**
    Allows the backlighting of magnetic compass.



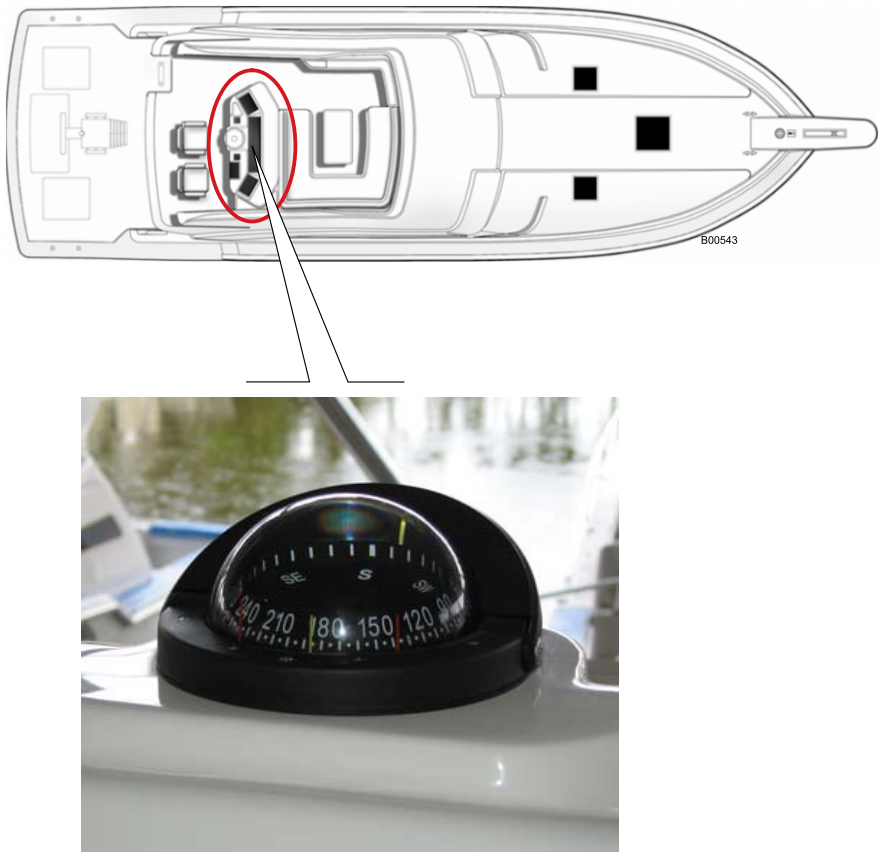
6.2.3 SECTION C - Starboard helm station control console

1. **VHF-DSC microphone**
   VHF microphone with remote control function on channels and output power.
2. **VHF-DSC Radiotelephone**
   This device allows to communicate with other vessels and ships. 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. **HI-FI stereo system**
   CD reader and radio stereo-system.



6.2.4 SECTION D - Magnetic compass

A magnetic compass installed on the console of a yacht is unavoidably close to the magnetic fields produced by the electric and electronic systems on board. This condition is called “variation”. You must have an expert technician to adjust the variation of the compass and to provide a detailed deviation schedule. This process is called “compass compensation” or “compass adjustment”.
To eliminate the compass errors due to its position, carry out the compensation after the yacht launch or when the compass is replaced.
Never approach steel, iron, or other ferrous metals to the compass (e.g. tools, keys, batteries, etc.). Ferrous metals near the compass will affect its readings, making it unreliable. Keep the area around the compass clear of unnecessary items.



NOTICE

The compass delivered with the yacht is not compensated for variation or deviation. Any electrical or metallic items located near the compass may influence the accuracy of the compass. The compass compensation is the yacht owner’s responsibility. It should also be performed after any installation of any additional electronic equipment or after a prolonged period of mooring or storage ashore. Compensation should be performed only by an authorized and qualified compass adjuster.
Since a compass seldom can be corrected to zero deviation on all headings, the technician who compensates your compass should give you a deviation card showing the correction to be applied in navigational calculations. Keep this card at the helm station at all times.

Compass compensation

Read carefully the manual delivered by the manufacturer.

NOTICE

*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.*

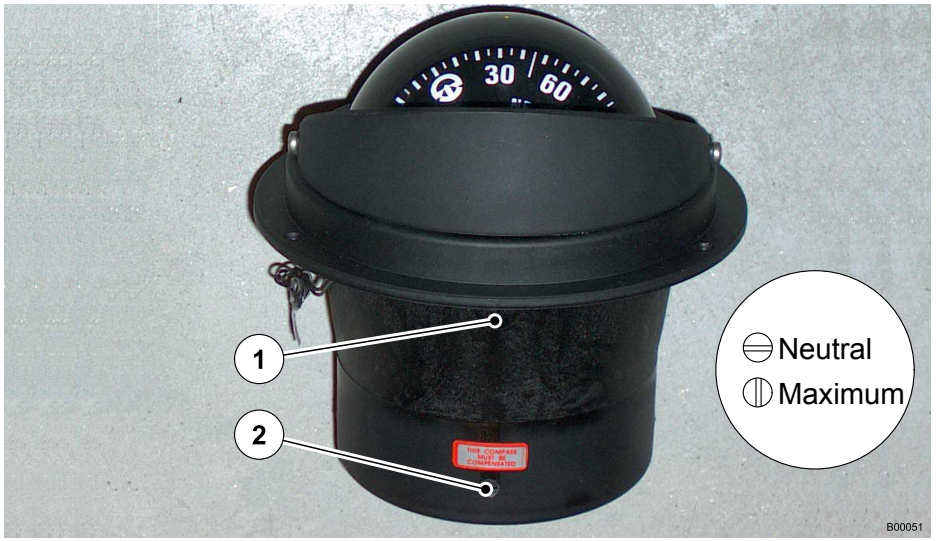
NOTICE

Verify the operation and the deviations at least once a month. 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 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.

6.3 HEADS BLOCK

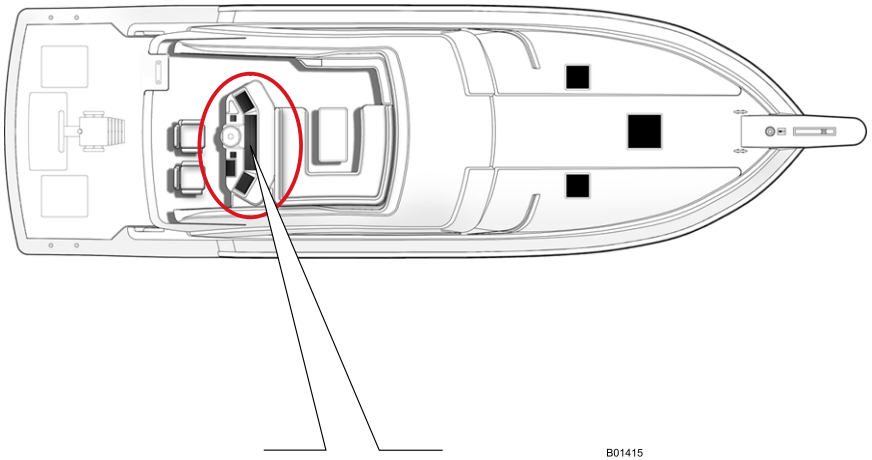
6.3.1 Head block

The the heads block is a system designed to control the revolutions of the engines and the gearboxes speeds by means of electric signals. SmartCommand owns following performance features and functions.

- Sequence setting of gearbox and engine speed.
- Start interlocking.
- Low/high idle run.
- Engines synchronization for several propellers.
- Trolling electrovalves control.
- Emergency control against back run.
- Gearbox oil pressure interlocking (optional).

These features and operations facilitate the use of the control heads.

- Helm station indicator.
- Six bi-colored LEDs indicating the status and operation mode of the driving system.
- Acoustic transducer for indication of system status.



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Advanced control modes

SmarCommand is equipped with several advanced control modes:

- **EASIDOCK:** mode giving the answer for a safe action of the gearbox and ensuring a maneuverability easy and accurate during the mooring in confined space.
- **AUTOTROLL:** mode keeping the propeller rpm constant, when a complete range of shaft speed controls is available.
- **WARM UP:** mode increasing the engine rpm when the transmission is stalling on idle.
- **ONE LEVER:** mode allowing to activate several propellers with full gear change and acceleration control by means of a one lever control.

Steps for taking over the control

- Place the control heads to idle position. The station cannot take over the control with heads in different positions. The acoustic start sequence is released.
- Press **CONTROL/SET** at current helm station. The **CONTROL** LEDs light up green to indicate that the station has taken over the control and that the operator is engaging the idle control. The acoustic signal clears at all stations.

CAUTION

The next shifting of the control head will engage the gear.

- Start the engine while engaging the idle control. If the control heads are not set to idle, the start interlock switch will prevent the engines from starting.
- Shift the heads to ahead and astern detent. The gearbox starts and the **CONTROL** LEDs light up red to indicate that the station has taken over the control and that the operator is engaging either the ahead or the astern gear.

WARNING

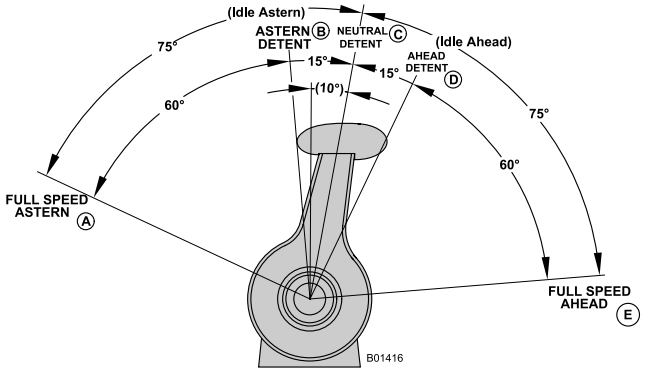
Only a single helm station can be operative at each time.

Basic operation

The control heads block has three detents: astern, idle and ahead.
With heads positioned to idle detent, the system sends the idle control and low rpm.
By shifting the control heads ahead or astern of 15 ° the clutch is engaged either ahead or astern. The engine holds the low rpm. By shifting the head further, the engine rpm increases proportionally to the head shifting.

Control heads detents

Reference	Head position
A	Full speed astern
B	Detent astern (idle astern)
C	Idle detent
D	Detent ahead (idle ahead)
E	Full speed ahead



WARNING

The idle detent (central position of control head shifting) is 10° to ahead direction. The shifting degrees are measured starting from this position not from the vertical one.

For further information, refer to manufacturer manual.

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. If gearbox parameters are to be monitored, this depends whether the corresponding sensors have been fitted in the gearbox.
For a more detailed description refer to the specific handbook.

NOTICE

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

6.5 INSTRUMENTATION

6.5.1 VHF-DSC Radiotelephone

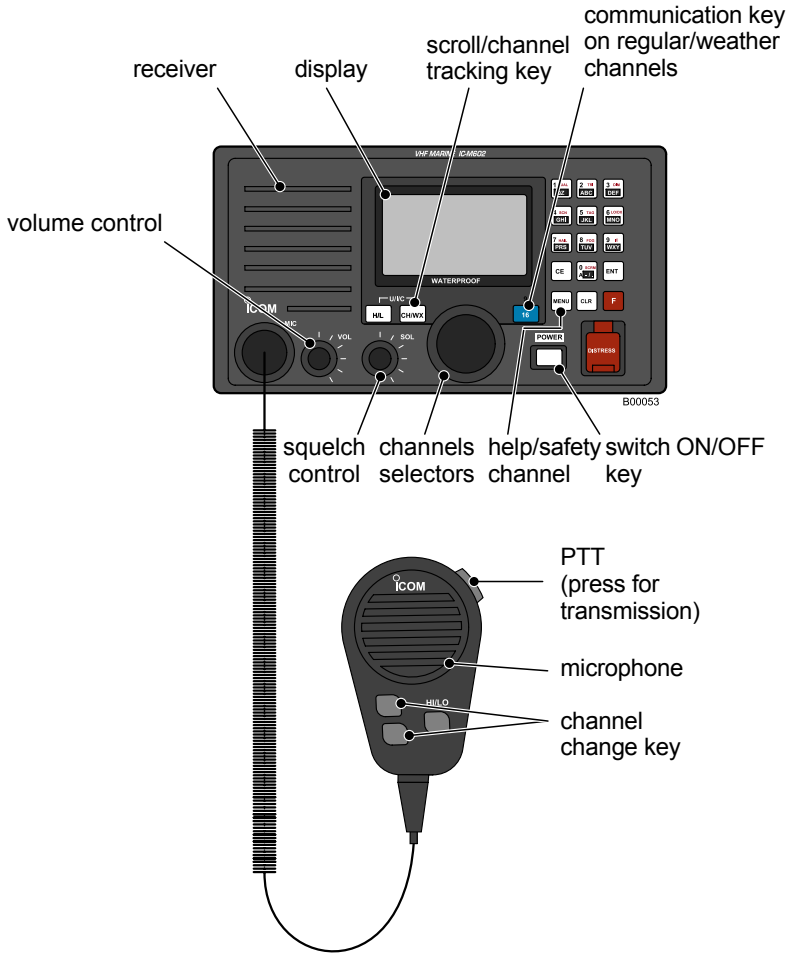
Operate the radiotelephone according to the following instructions:

- 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.



Manual distress call
- select the rescue channel with key 16 (156.800 MHz) or through SSB radio frequency 2182 KHz.
- press PTT pushbutton 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 pushbutton
- 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.

CAUTION

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.

CAUTION

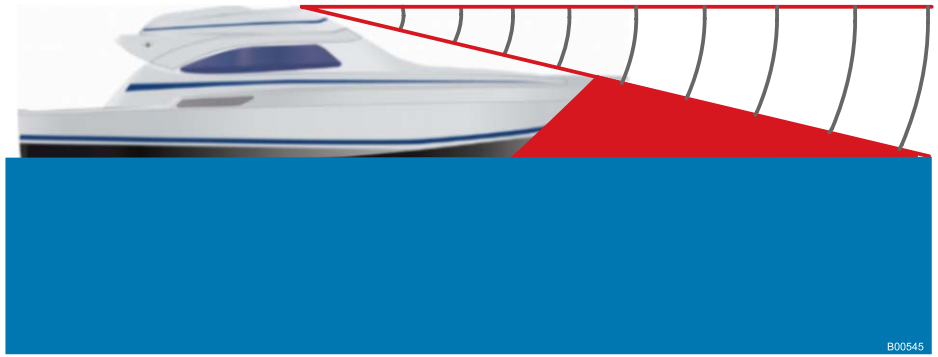
For channel selection or special function instructions, please refer to the radiotelephone manufacturer manual.

WARNING

Perform DSC-call only in case of a real danger. Otherwise, sending a DSC-call is considered a law infringement.

6.5.2 Radar/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 more detailed description refer to the specific handbook.



DANGER

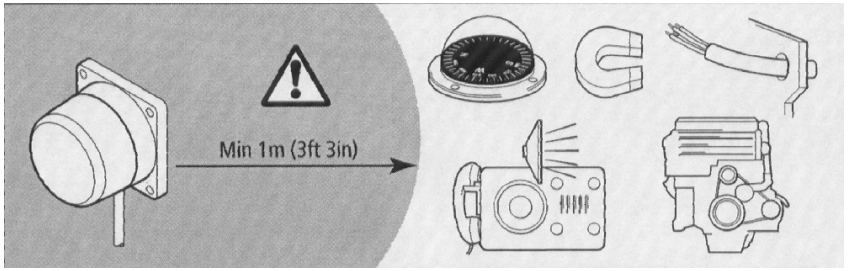
Radiations danger.
The radar antenna emits radiations, which can damage the human body, especially the eyes. When the radar is operating, never look straight at the transmission antenna at a distance lower than 40 in.
During the radar operation it is necessary to keep out of the antenna transmission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

CAUTION

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

6.5.3 Autopilot

This unit includes a LCD display to visualize the information.
The dedicated keys and the intuitive menus are completed by a simple basic graphic presentation, which facilitates the best performance of your instrument. It can be used as a single or additional controller.
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 plans are easily accessible with a single press on the correspondent key mode.
The autopilot sensor is located in the bilge under the passageway of the stateroom area.
For a more detailed description refer to the specific handbook.



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WARNING

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 a help to navigation.
A careful and continuous monitoring must always be kept under the best navigation and sea conditions.

WARNING

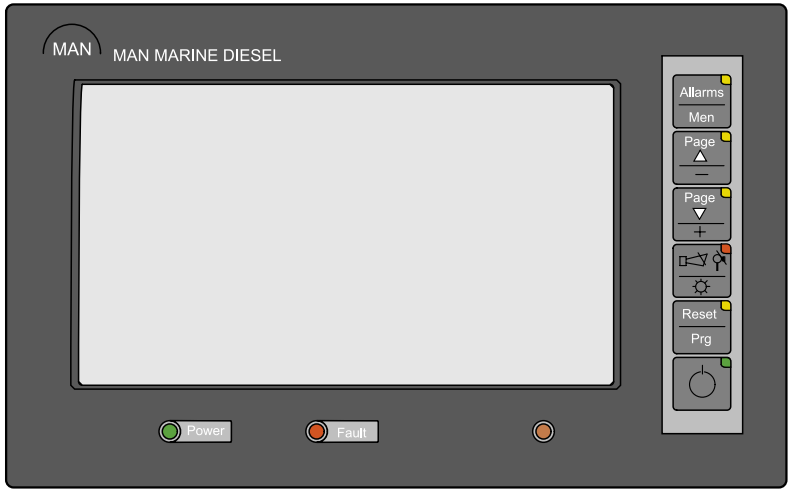
If the yacht foredeck is facing a sudden obstacle, this can be avoided by turning with force the drive wheel. This operation allows to drive the yacht only until the drive wheel is firmly held. As soon as the drive wheel is released, the autopilot resumes immediately the yacht's course. If the obstacle 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 the hindrance has been bypassed, the device can be switched on again by resetting the course.

6.5.4 Multifunctional screen

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 more detailed description refer to the specific handbook.

6.5.5 Engine control panel

This panel allows the visualization of the engine's data and to monitor it. The engine and gear data visualization is carried out graphically on a display with digital indication of the values obtained. The led as the visualization listing all incoming alarms with detailed information, indicate the alarms status.
For a more detailed description refer to the specific handbook.



NOTES:

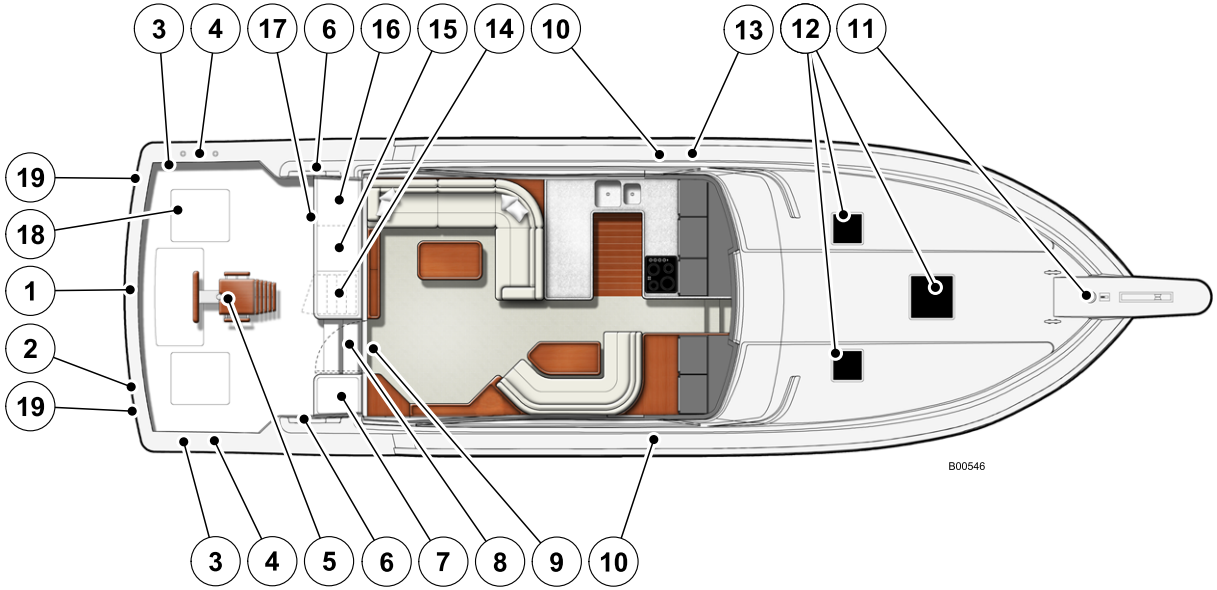
BERTRAM

7

ON DECK

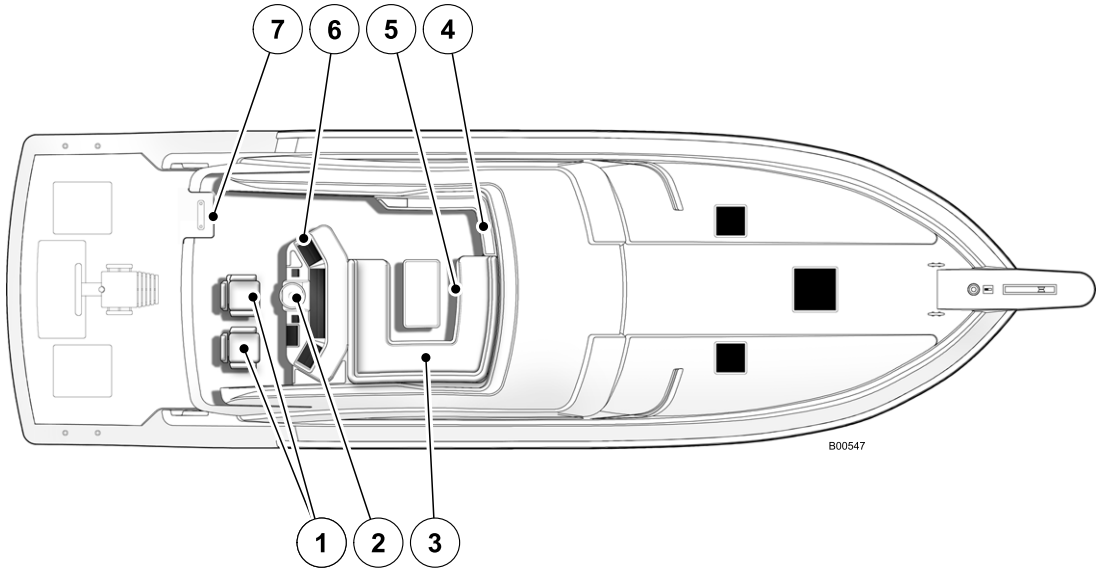
7.1 MAIN DECK EXTERIOR

1. Transom fish box
2. Aft transom door and liftable gate
3. Aft moorings, chocks and cleats
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 box
8. Salon access steps
9. Salon access door
10. Fuel fill fittings
11. Anchor locker with washdown faucet
    - anchor windlass (available only with optional pulpit)
12. Staterooms skylights
13. WASTE black water drain fitting
14. Engineroom access door, with lockable access stair
15. Sink
16. Cooled container
17. Flybridge access staircase
18. Removable containers for caught fish and access to helm gear compartment
19. Underwater lights



7.2 FLYING BRIDGE

1. Helm and companion pedestal seats
2. Helm station
3. Sofa with peaks
4. Peak for optional fridge
5. Life raft location
6. 24 V DC and 12 V DC electric panels location
7. Flybridge access stair



CAUTION

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

WARNING

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.

CAUTION

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.

CAUTION

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.

CAUTION

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.

WARNING

Check the light operation before any navigation to avoid any inconvenience when using them by night.

WARNING

Replace the bulbs with the same visual fields.

7.3 ANCHOR

The vessel at bow is equipped with an anchor locker 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.

WARNING

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.

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. **Barrel**
   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.

WARNING

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 guarantee electrical power to the windlass.
Check the anchoring point frequently.
The distance from obstacles or from other yachts must be greater than the length of the chain deployed (all round).
At anchoring, leave the windlass electrical power on.
Do not reverse the windlass rotation suddenly.

WARNING

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 breakers 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;
- deploy the anchor until just below the waterline, and hold;
- deploy the anchor until reaching the sea bottom;
- once the anchor is engaged, leave stopper and brake on.

CAUTION

Operate the anchor windlass with the engines running, because of the high electric absorption and to reduce the effort by slowly moving the yacht toward the anchor.

NOTICE

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.

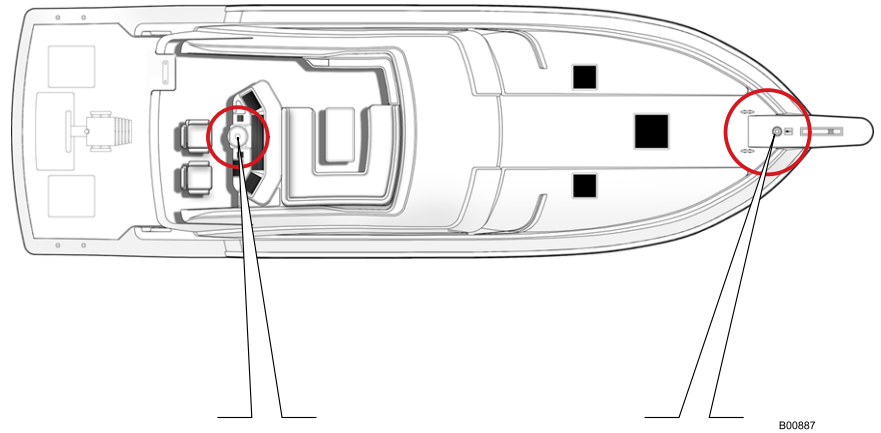
7.4.1 Anchor windlass activation controls

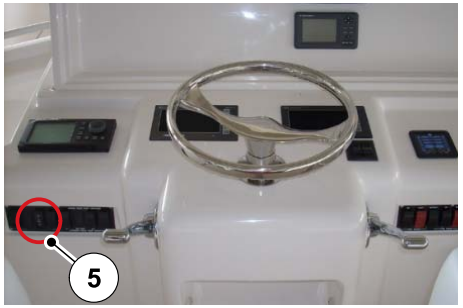
The anchor windlass is located at bow and can be activated by means of switch located on helm station console and the foot buttons.

5. **Anchor windlass control on flybridge**
   This button allows to operate the anchor windlass from the fly.
6. **Foot buttons**
   They allow retrieving or deploying the anchor chain.

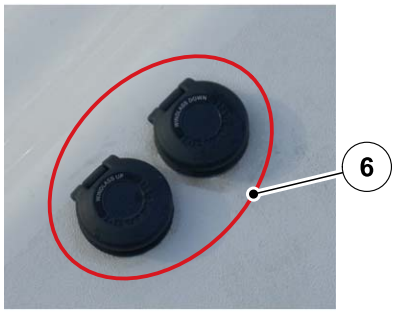
> ***WARNING***
>
> *If you are to use the anchor, remove the wildcat lock and the safety cable.*

> ***WARNING***
>
> *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

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).

Anchor retrieving
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 those 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 bow.
Pay utmost attention: do not approach too much to the moving parts to avoid dangers and damages to the people.

WARNING

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

WARNING

Do not activate the anchor windlass electrically with the lever engaged in the barrel or in the wildcat cover.

DANGER

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

DANGER

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

NOTICE

Lock the chain with the stopper before cruising.

Deploy and retrieve the anchor always by using the electrical control, after engaging wildcat and barrel.
This latter can be disengaged, both for casting the anchor off in case of need and for operating the barrel 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 above, in reverse order.
In windy or strong current conditions, start the engines and keep the bow toward the anchor position to avoid the breakage of the hawse.
Once the anchor is retrieved, fasten the chain stopper, before resuming navigation.

7.5 WINDLASS CLEANING AND MAINTENANCE

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 norm, before any season, to carry out maintenance by disassembling the wildcat and the drum to remove oxidation in the rubbing and gliding points and to carry out a correct restoration of the lubrication grease in the needed points.

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.

NOTICE

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.

NOTES:

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BERTRAM

8

PROPULSION SYSTEMS

8.1 ENGINE ROOM ACCESS

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

CAUTION

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.

WARNING

Do not put material in the engineroom that can freely move with cruising lists.

CAUTION

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

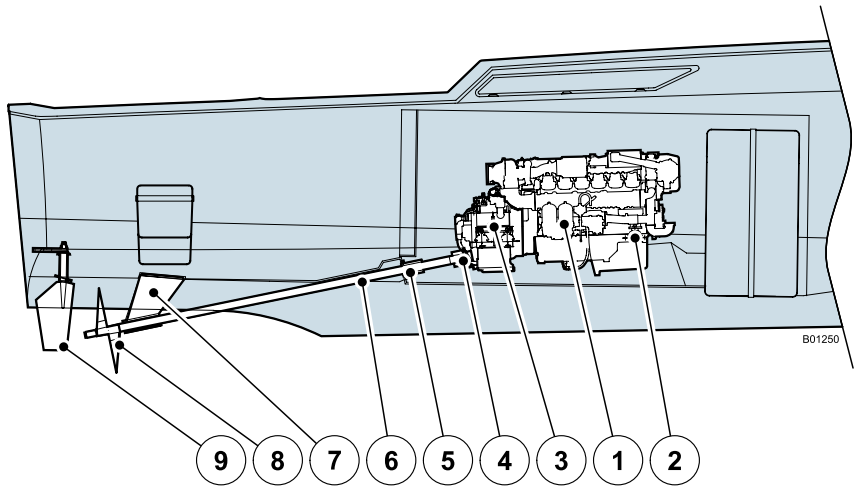
8.2 PROPULSION SYSTEMS

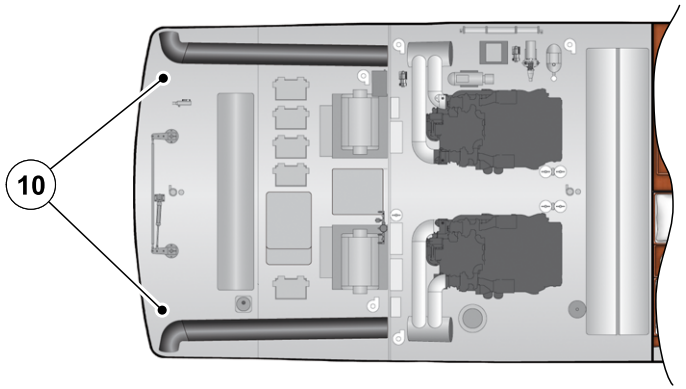
The propulsion system consists of two equal units. Each one includes the following:

1. MAN motor, model V12-1360 CRM
2. Flexible supports for engine
3. ZF gearbox
4. Flange coupling
5. Shaft seal
6. Propeller shaft in stainless steel “Aquamet” 17; diameter 3 in/76.2 mm; length 140.75 in/3575 mm
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 onboard and for the safety of the yacht itself, however when the engine is running it should not run higher than 1000 rpm.





8.3 ENGINES

They have the following specifications:

– Model		V12-1360 CRM
– Make		MAN
– Cylinders No.		12
– Pattern		90 a V
– Injection systen		COMMON RAIL
– Effective output	kW/HP	1000/1342
– Rated speed	rev/min	2300
– Dry weight	lb (kg)	4400 (2000)

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

WARNING

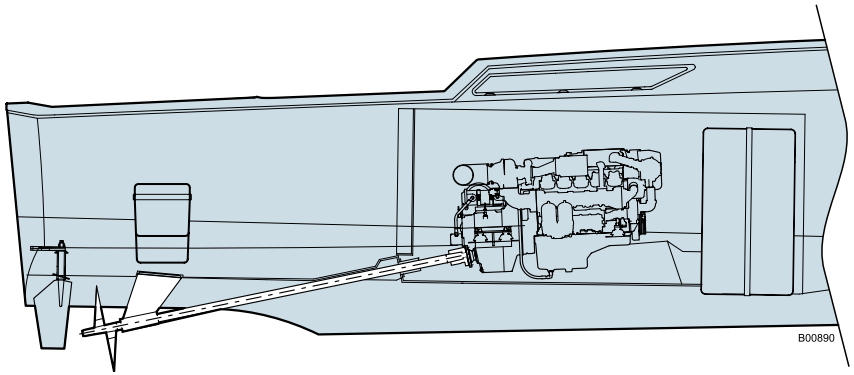
We suggest you to read the MAN instruction manual carefully and in detail.

8.4 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.

WARNING

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.

CAUTION

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 steering 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.

WARNING

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 a new equipment.

WARNING

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.

8.4.1 Propellers maintenance

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 dock 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.

8.4.2 Periodic checks on propellers

DANGER

While carrying out cleaning and checks with the yacht in water: disable the engines and generators start.

It is advisable to carry out this operation with yacht in dry dock 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.

WARNING

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.

NOTICE

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.

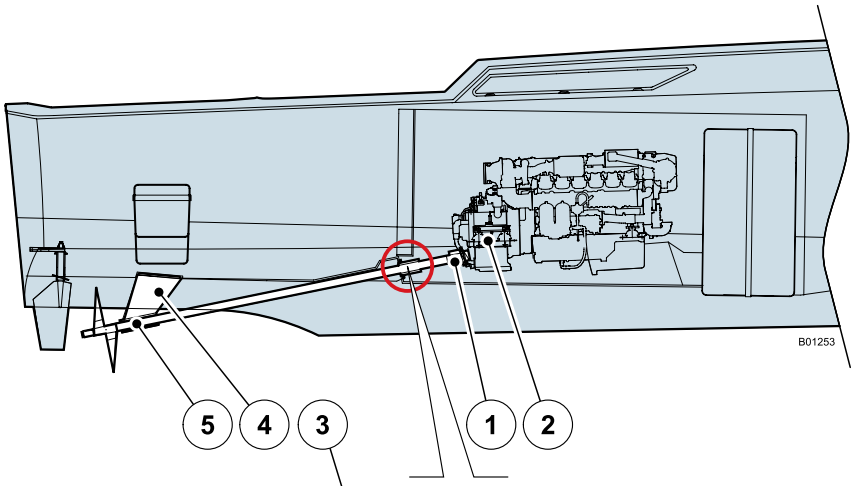
8.5 PROPELLER SHAFT, STUFFING BOX CASE AND SHAFT SUPPORT

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 seal stuffing box (**3**) and a shaft support (**4**). The stuffing box includes one part affixed to the hull and one part, which is movable and adjustable. This last is pushed against the fixed part, so as to compress the seal inside the stuffing box. 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 sea water 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.

WARNING

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

8.5.1 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 dock 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 dock 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.

NOTICE

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

CAUTION

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

8.6 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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8.6.1 Gearbox maintenance

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.

8.6.2 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 notches 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.

WARNING

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

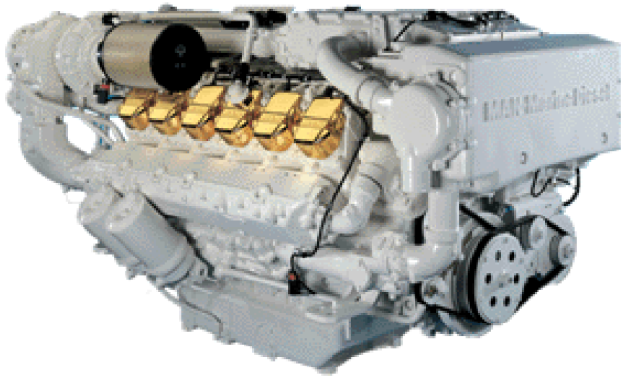
Service the gearbox only if engine and propeller are stopped and the thermal switch is OFF. Before starting the gearbox, carry out the filling and the consequent check of the oil level. The use of the gearbox with a low quantity of oil, may damage the gears. An excess of oil might cause leaks to the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

8.7 FUEL AND LUBRICATION SYSTEMS

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

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

See the engine instruction manual.



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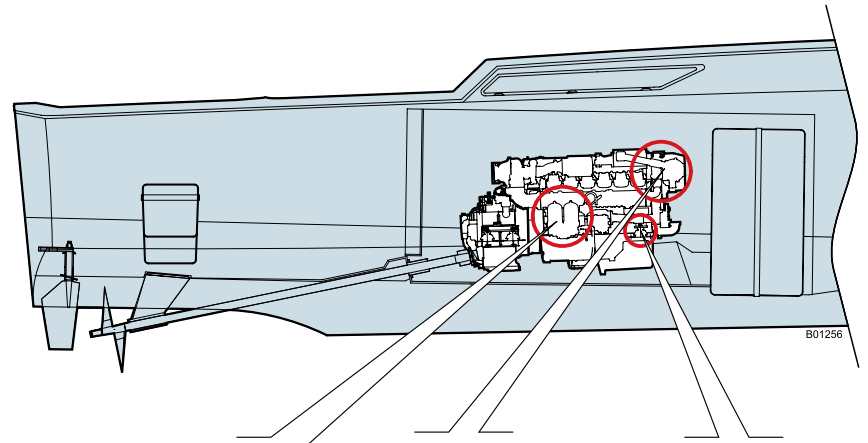
NOTICE

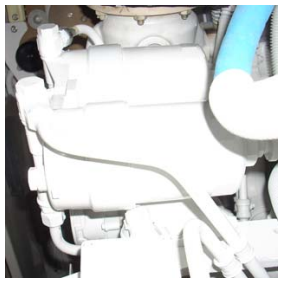
The engine data cards are very important when repairs are necessary. Keep them together and store them with your warranty in a secure, readily available location.

NOTICE

Read the engine operating instruction manual carefully.



Fuel filters



Oil twin filters

Elastic strut

8.8 PROPULSION ENGINES MAINTENANCE

Item	Maintenance	Notes and precautions
Lubrication system	Oil level check	Check the oil level by means of level gauge to make sure that it is placed between proper range (MIN - MAX). Do not start engines if oil level is not within reference notches, as indicated by the Manufacturer's Manual.
	Oil and oil filter replacement	Replace engines oil according to time intervals and oil type suggested by the Manufacturer.
Fuel System	Fuel prefilter cleaning	Clean fuel prefilter with clean diesel oil and dry it with a compressed air jet.
	Fuel filter condensate drain	Each time the engine oil is replaced, remove draining plugs and let condensate discharge until only mere fuel comes out.
	Replacement of fuel filter	Replace fuel filter according to the time intervals suggested by the Manufacturer.
Cooling system	Drain cooling system	Drain the cooling liquid only with cool engine following the procedure suggested by the Manufacturer.
	Filling and bleeding	Fill with a mixture of fresh tap water and antifreeze on ethylene glycol basis or anti-corrosion agent. Refer to table "Fuels, Lubricants and Coolants for MAN Diesel Engines" supplied by the Manufacturer.
V-belts	Check the V-belts condition	Make sure the V-belts do not show cracks, oil traces, overheating and wear, otherwise replace them.
	Check the V-belts tension	Use the tester supplied by Manufacturer to measure the V-belts tension.
	Replacement of V-belts	Replace V-belts according to the time intervals suggested by the Manufacturer.

Item	Maintenance	Notes and precautions
Injection System	Cleaning	The components of modern injections systems contain high accuracy component highly stressed. Because of this high accuracy standard of technology, observe the outmost cleanliness while servicing the injection system. Even particles thicker than 0.2 mm can damage the components.

For more information, consult the Manufacturer's manual.

WARNING

Use only approved technical fuels (see brochure "Fuels, Lubricants and Coolants for MAN Diesel Engines") otherwise the Manufacturer's warranty will expire.

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!

DANGER

Due to high temperature in engineroom, oil or fuel leaks can evaporate and create a serious risk of fire break. Periodically check the integrity of Your installation.

WARNING

With FERRETTI YACHTS it is absolutely necessary to view the various components documentation delivered by the Manufacturer; for any problem relevant to the use or maintenance, you can refer directly to the Service Centers, listed in the documentation delivered by the Manufacturer. Anyway, in case of need, some little interventions, can be carried out by the staff on board, after consulting the use manual.

WARNING

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

DANGER

Do not approach the hands to the V-belts or to the pulleys of a running engine.

WARNING

Filling of the cooling system only by cooled down engine.

CAUTION

The turbochargers must not be bled while the cooling system is being topped off.

DANGER

Compressed air at high pressure may create the risk of injuries. Do not direct compressed-air jets at persons. Wear protective goggles, safety masks and ear protectors.

WARNING

Do not open the cooling circuit when the engine is at operating temperature.This causes a pressure loss in the circuit. If the cooling system has been opened when the engine is at operating temperature, this can lead to the activation of the alarm “pressure in the expansion tank” and to a reduction in the engine output. Coolant pressure in the expansion tank builds up automatically when the engine has cooled down. The cooling system must therefore only be filled up when the engine is cold.

DANGER

If exceptionally the coolant level has to be checked when the engine is at operating temperature, turn first cautiously the closure cap up to the first stop, let the pressure release and then open it carefully.

DANGER

Injuries hazard!

While the engine is running, the pipes under high pressure of the injection system contain fuel under pressure up to 1600 bar.

Before loosing the connectors, wait at least one minute from the engine shut off, until the pressure in the injection manifold has discharged.

WARNING

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

WARNING

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

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

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.

CAUTION

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.

WARNING

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.

CAUTION

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.

8.9 FUEL SYSTEM

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

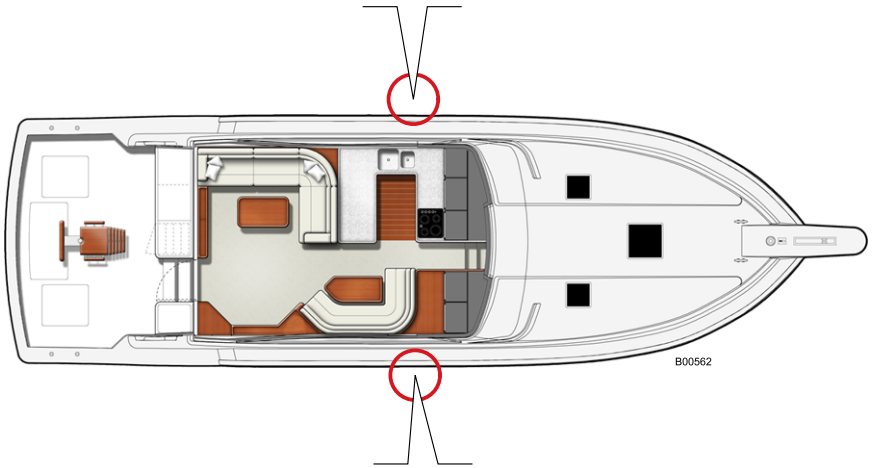
Fuel Quality

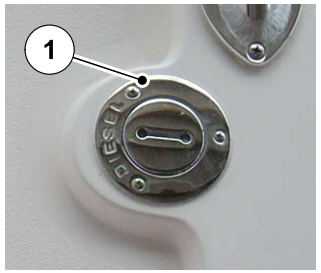
Quality of fuel is crucial for efficient performance of the engines installed on your BERTRAM 510 yacht. Purchase fuel only from reliable high-volume filling stations. This will help ensure the quality of the fuel itself, as well as the probability that the fuel has not been stored for a long period inside the shore tank.
For fuels suitable to supply MAN engines, read the MAN manual.
If none of the above types of fuel specified is available in some countries, follow the rules suggested in the engines manual.

> ***CAUTION***
>
> *Stop all engines when refueling.*

1. Refueling fill fitting

Port fill fitting





Starboard fill fitting

8.9.1 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.

CAUTION

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 water & fuel separator filters regularly. Do not use additives to improve fuel flow properties in winter.

During filling, the fuel flow produces foam that may cause a fuel overflow, giving the appearance of a full tank. To be sure the tank is filled completely; wait for the foam to dissipate before adding more fuel.

NOTICE

Place the filling nozzle as far as possible into the filling pipe, through the rubber anti-splash sleeve on the flow cut-off. Use the nozzle to fill the tank.

WARNING

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 toxic 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 directly on the tank by means of a visual check, applied directly on the tank and activable by means of 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.

WARNING

Stop all engines when refueling.

8.9.2 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 generators.
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 sent to the manifold supplying the engines and generators. The fuel before reaching the users, is led through the water/fuel separator filters, to hold impurities and to separate possible water.

CAUTION

The bilge of the engineroom must always be clean, in this way fuel leaks or bleedings or oil leaks from engines or generators, 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.

The fuel once flown through the separator prefilters is still dirty, for this reason, an "ALGAESEP" water separator has been installed in the engineroom, able to filter the fuel contained in the tank.
The separator allows to filter the fuel without starting the engines. Press the switch located on the control panel to activate the water/ fuel separator. Two LEDs indicate the activation and a high water level in the separator.

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.

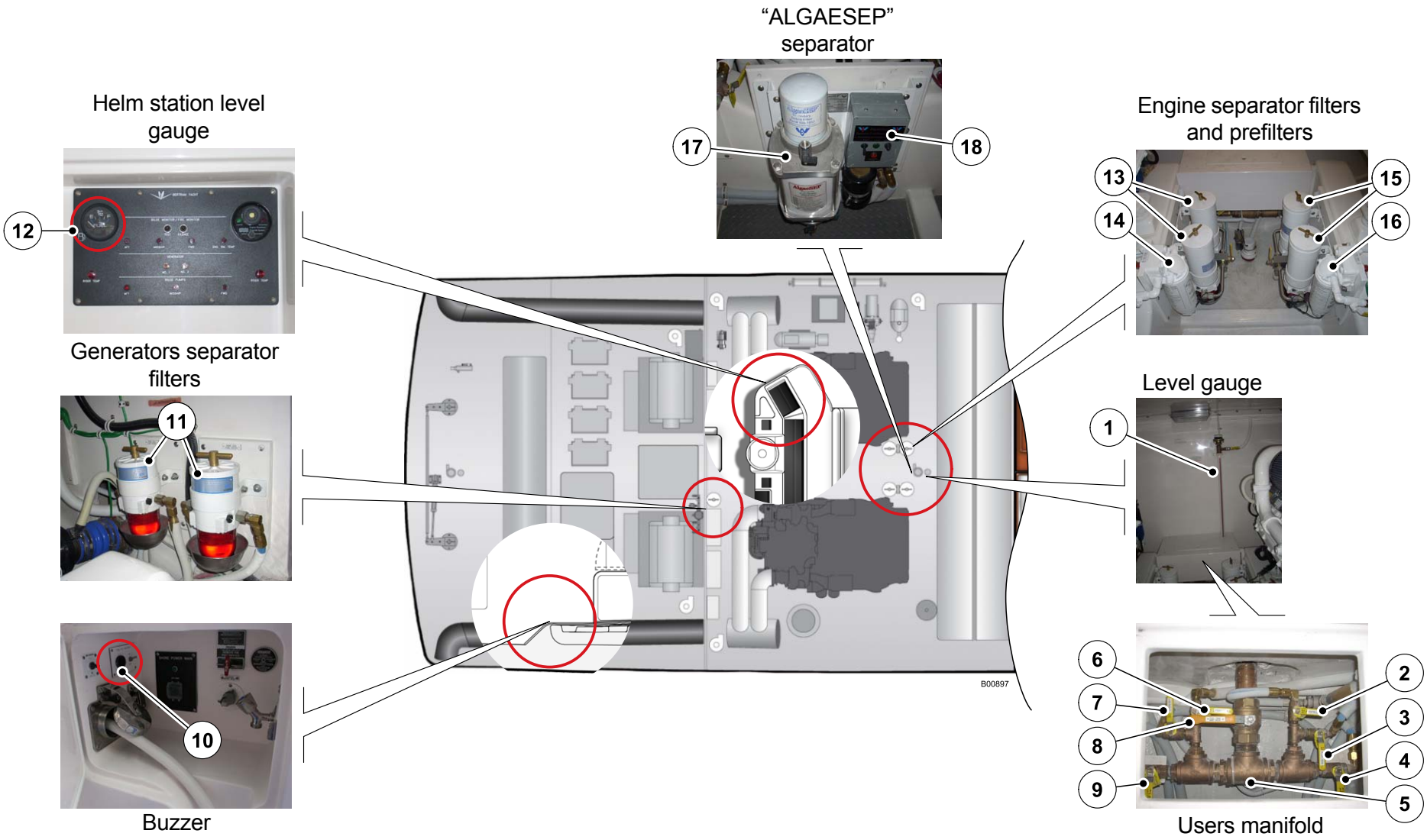
DANGER

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. Fuel level suction valve
3. Starboard generator fuel delivery valve
4. Starboard engine fuel delivery valve
5. Users manifold
6. Port generator fuel delivery valve
7. Fuel delivery valve for “ALGAESEP” separator.
8. Main fuel delivery valve
9. Port engine fuel delivery valve
10. Full tank buzzer
11. Generators “RACOR” separator filters
12. Helm station level gauge
13. Port engine “RACOR” separator pre-filters
14. Fuel filter with condensate separator for port engine
15. “RACOR” separator pre-filters for starboard engine
16. Fuel filter with condensate separator for starboard engine
17. “ALGAESEP” water/fuel separator
18. “ALGAESEP” control panel


"ALGAESEP" separator
17
18
Helm station level gauge
12
Engine separator filters and prefilters
13
14
15
16
Generators separator filters
11
Level gauge
1
B00897
10
Buzzer
6
7
8
9
2
3
4
5
Users manifold

8.9.3 Water & fuel separator filters for the engines

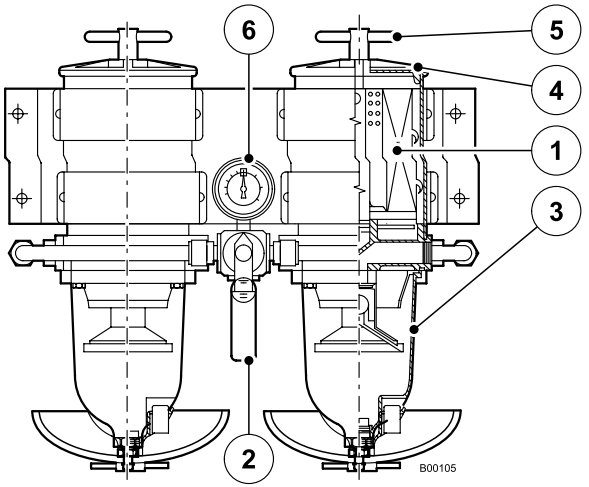
Maintenance and check

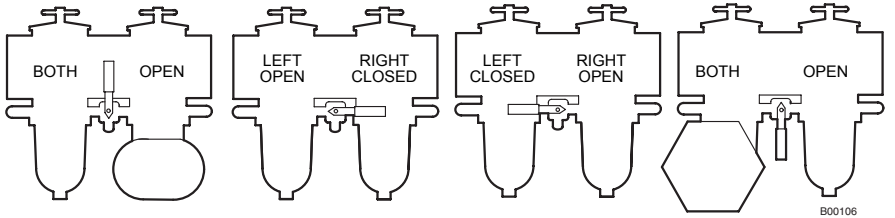
The frequency of water drainage or of filtering element (**1**) replacement is determined by fuel contamination level.
The selector valve (**2**) (or handle indicator) allows the operator to isolate one filter at a time, in order to carry out maintenance even with engine running.

Water drainage from collecting tank

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

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

WARNING

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

CAUTION

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.

8.9.4 Fuel filters with condensate separator for engines

Condensate drain

– Open the drain cap (**1**) and discharge the condensate.
– Retighten the drain cap (**1**).

Filter cartridge replacement

CAUTION

Carry out this operation only with engine shut off.

– Unscrew the cups (**2**) and the filter cartridge (**3**).
– Moisten the seal of the new filter with fuel.
– Tighten the cups (**2**) and the filter cartridge (**3**) by hand.
– Vent fuel system.
– Check filter tightness.

WARNING

Handle used fuel filters as special waste!

The condensate discharge frequency or the replacement of the filtering element are determined by the contamination level of the fuel. For further information, refer to manufacturer manual.

NOTICE

Verify the operation at least once a month. At least once a week and in any case, prior to each refueling check the presence of water in the fuel. When necessary, drain the water collected. When necessary, but at least once a year, replace the filter cartridge.

CAUTION

During winter, strictly observe following precautions:

Danger of damages caused by dirt inside of the system!

– *If the system has been open downhill of the fuel filter, no compressed air jet can be used for cleaning.*
– *Remove possible dirt particles by means of a suitable vacuum cleaner (industrial cleaner).*
– *Use exclusively lint-free rags.*
– *Before starting the disassembly of the components, wash your hands and wear a clean overall.*

8.9.5 Generators water & fuel separators filters

Water drainage from collecting tank

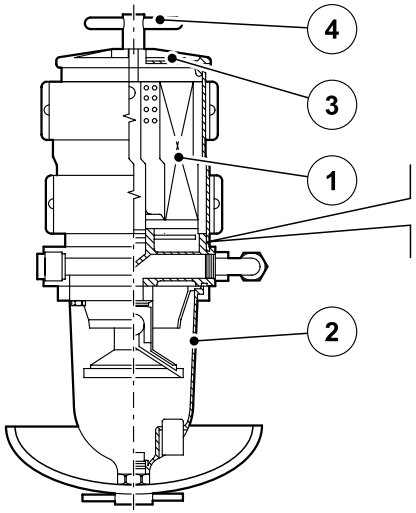
The frequency of water drainage or of filtering element (**1**) replacement is determined by fuel contamination level.
Check or drain the water collecting tank (**2**) daily.
The collecting tank must be drained before polluting elements reach the turbine end.

- In order to eliminate the polluting elements place a big recovery tank there below.
- Remove cover (**3**) and fill it 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.



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- 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.

WARNING

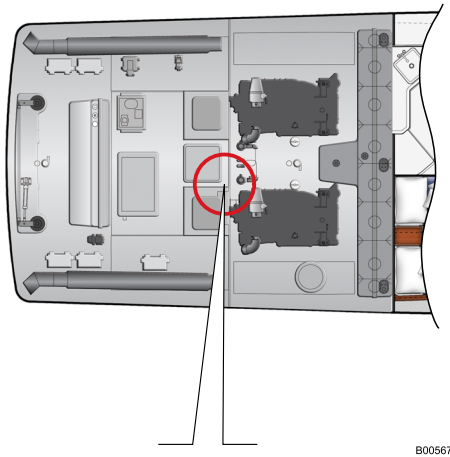
The separators have to be checked at regular intervals as suggested by manufacturer, so as not to impair the generators operation.

8.10 LUBE OIL SYSTEM

8.10.1 Oil filling/draining system from engines, gearboxes and generators

The system consists of a pump (**1**) duly connected to engines, gearboxes and generators, 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 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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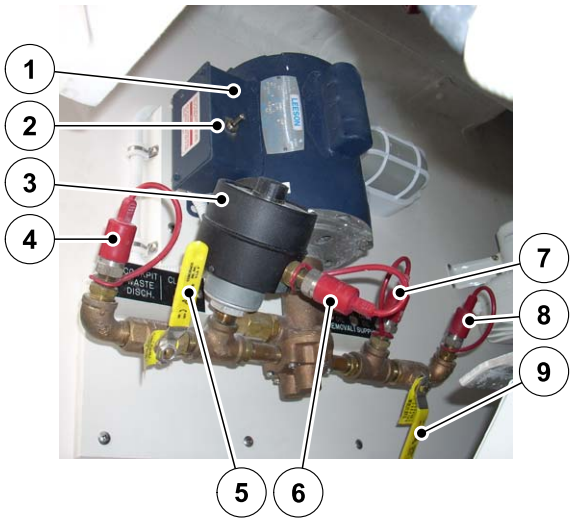


CAUTION

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 is to be carried out with engines shut off, after they have sufficiently cooled down and preventing their switching on with the disconnection of the circuit breakers.

WARNING

*Do not remove the tank **filling plug** when the engine is running, 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 pipes, stop the engines 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!

WARNING

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.

WARNING

*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.*

WARNING

Filling of the cooling system only by cooled down engine.

CAUTION

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

WARNING

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

DANGER

Due to high temperature in engineroom, oil leaks can cause a serious risk of fire break. Periodically check the entirety of your system.

WARNING

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

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!

CAUTION

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.

8.11 ENGINE COOLING SYSTEM

8.11.1 Operation

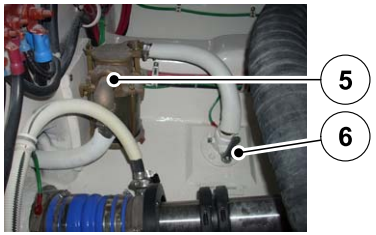
The engines and generators are cooled by seawater that is circulated through the engines by internal pumps. After the suction, the water filtered is sent to the gearboxes and to the heat exchangers, and then discharged at sea.

WARNING

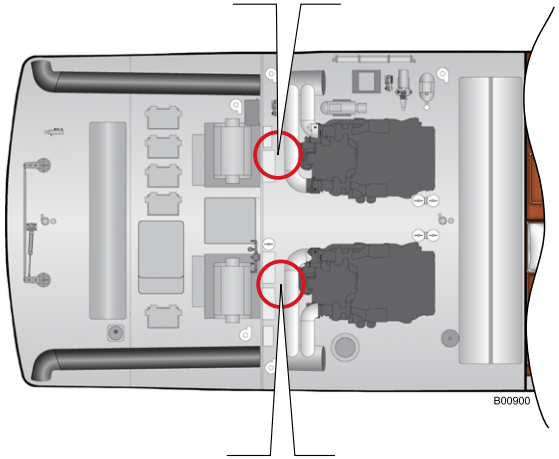
Before opening the intake seacock filter for cleaning, remember to close the hull cut-off valve.
If the yacht is left unattended, close as a precaution, all intake seacock cut-off valves; when they have to be used again, remember to re-open them.

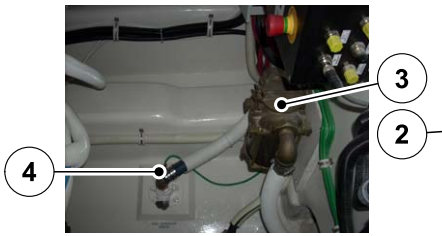
1. Port engine intake seacock valve
2. Starboard generator intake seacock valve
3. Starboard generator intake seacock filter
4. Starboard generator intake seacock valve
5. Port generator intake seacock filter
6. Port generator intake seacock valve

Port generator intake seacock valve and filter



Port engine intake seacock valve





Starboard generator intake seacock valve and filter

Starboard engine intake seacock valve

8.12 BILGE SUCTION OF THE ENGINES IN EMERGENCY

In engineroom is located the bilge emergency draining system, which operates with diverters, allowing to use the sea water pumps, driven by the propulsion engines, as draining pumps.
The diverters are valves, which in normal position ensure the sea water suction, through the intake seacocks filters, for the cooling of engines. In any emergency, operate levers (**1**) and (**2**) of both valves, by setting the valves to emergency position: the pumps suction, driven by the engines, is then diverted directly to the bilge.
Should it be necessary to utilize this draining system, the bilge level must be checked continuously, because in case of full draining the engines will not be cooled down.

WARNING

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

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

8.13 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.

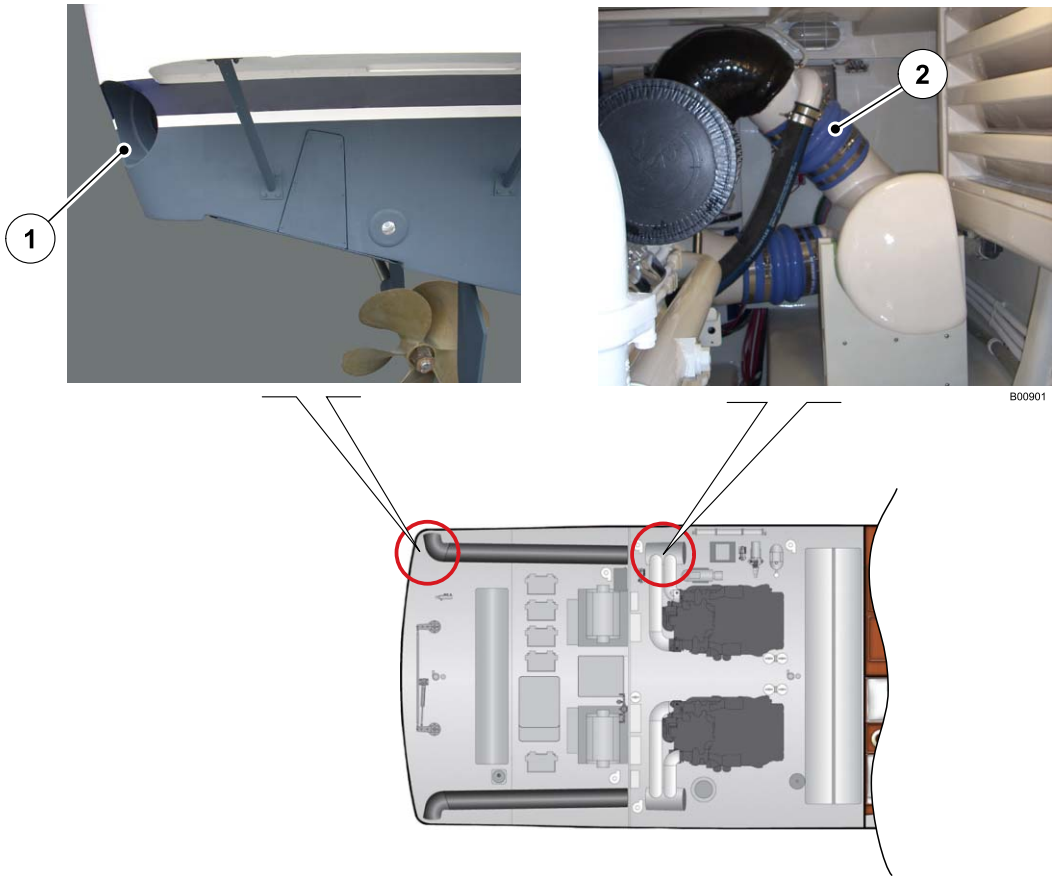
Check the underwater exhaust terminal cleanliness conditions periodically.

CAUTION

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.

Engine exhaust

Engine exhaust system



1. Engine exhaust
2. Engine exhaust system

8.13.1 Engine Exhaust System Inspection

For each engine, you should:

- check the components of the exhaust system (exhaust manifold, mixing elbow, exhaust line, hose clamps, muffler, struts, etc.) for cracks, breaks and corrosion.
- check the hoses for softness, cracks, leaks, or dents. Replace them as needed.
- check for corroded or broken metal parts. Replace them as needed.
- 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 residues indicate exhaust leaks, which must be repaired.

CAUTION

Carbon deposits, marine growth, and fouling may affect engine exhaust operation, causing performance degradation and engines 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.

NOTICE

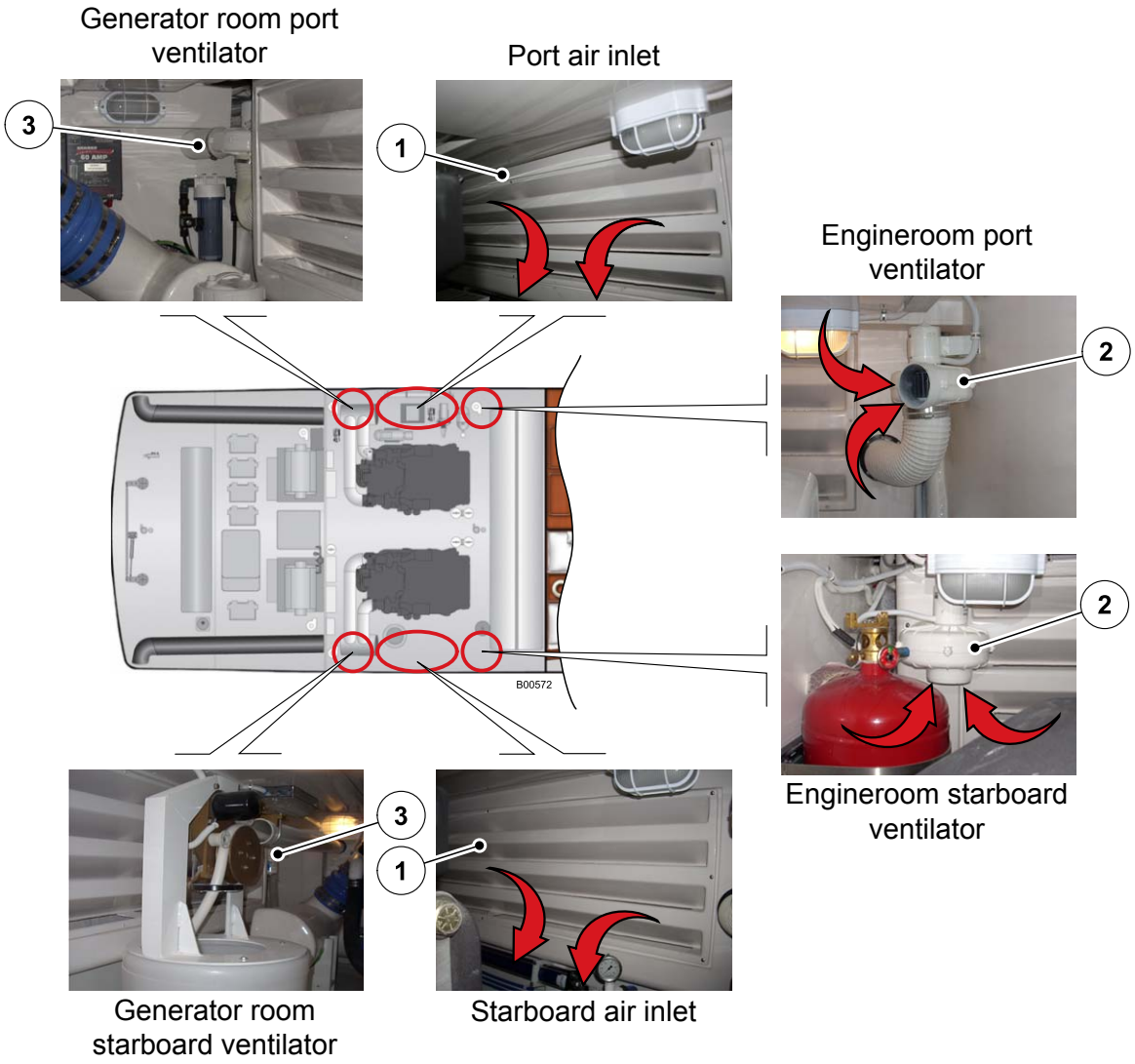
A strong smell and a light smoke from exhaust insulation are normal at the first start.

WARNING

Carbon Monoxide Hazard - Ensure engine exhaust system is working properly. Carbon monoxide poison is extremely toxic.

8.14 ENGINEROOM & GENERATORS ROOM VENTILATION SYSTEM

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



Operation

The engineroom ventilation system provides the necessary air exchange for the correct operation of the propulsion systems of your BERTRAM 510 yacht.

The ventilation system consists of four ventilators, two of them are located in the engineroom and the other two in the generators 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.

NOTICE

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.

NOTICE

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

NOTICE

With the engines on, it is recommended to have the extractor fans 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 engines. 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 generators are running and prevent the clogging of exhausts. Do not occupy swim platforms or aft lounging areas when engines and/or generators are running.

Signs of exposure include nausea, dizziness and drowsiness, symptoms similar to those of seasickness.

NOTES:

BERTRAM

9

HYDRAULIC SYSTEMS

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, in normal position, the sea water suction for engines 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".

WARNING

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").

WARNING

SINKING HAZARD - Ensure proper pump operation.

CAUTION

Don't run the electric pumps dry.

WARNING

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

WARNING

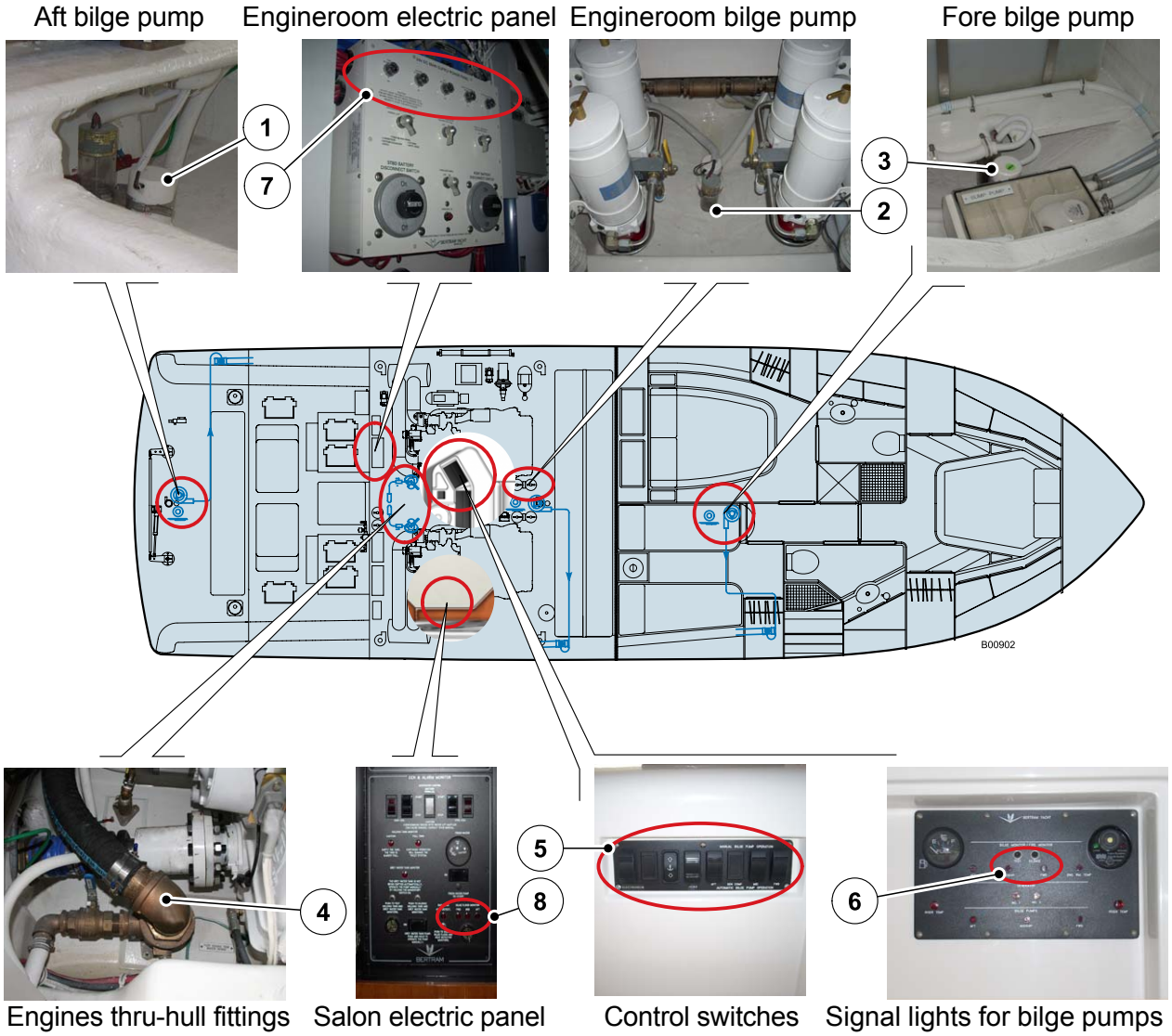
Be very careful when resetting the valves to the outboard suction position when the bilge is dry, in order not to compromise the engine parts.

CAUTION

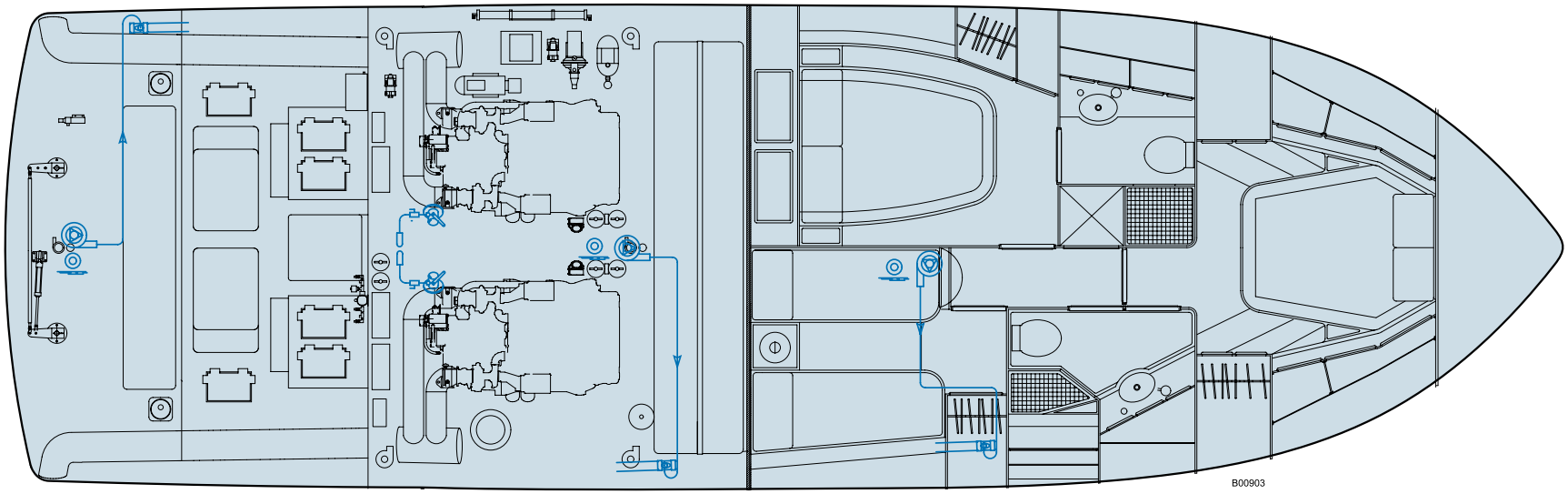
The system total capacity has not been designed to drain the unit in case of damage.

9.1.2 Bilge pump automatic/manual suction system displacement

1. Aft bilge pump
2. Engineroom bilge pump
3. Fore bilge pump
4. Engines thru-hull fittings
5. Helm station controls and bilge pump
6. Signal lights for bilge pumps in the helm station
7. Bilge pump fuses
8. Bilge flood alarm and signal lights



Bilge pump automatic/manual suction system



Bilge pump

Level sensor

Engines thru-hull fittings

Drain manifold

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WARNING

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.

WARNING

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.

WARNING

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.

NOTICE

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.

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 manual 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 maintenance.
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.

CAUTION

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

CAUTION

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.
- 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 output 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.

NOTICE

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 that the pump body was 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.

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;
- cockpit sink;
- engineroom faucet;
- cockpit washdown faucets;
- air-conditioning unit;
- washing machine.

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.

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 galley. The thermostat is pre-set by the manufacturer to 140-145 °F.
We recommend that you do not raise the temperature above this setting. The water heater may get damaged if the differential circuit breaker is switched on when the water heater is empty. The water heater operates at 240 V AC either by generators or by shore power supply.

WARNING

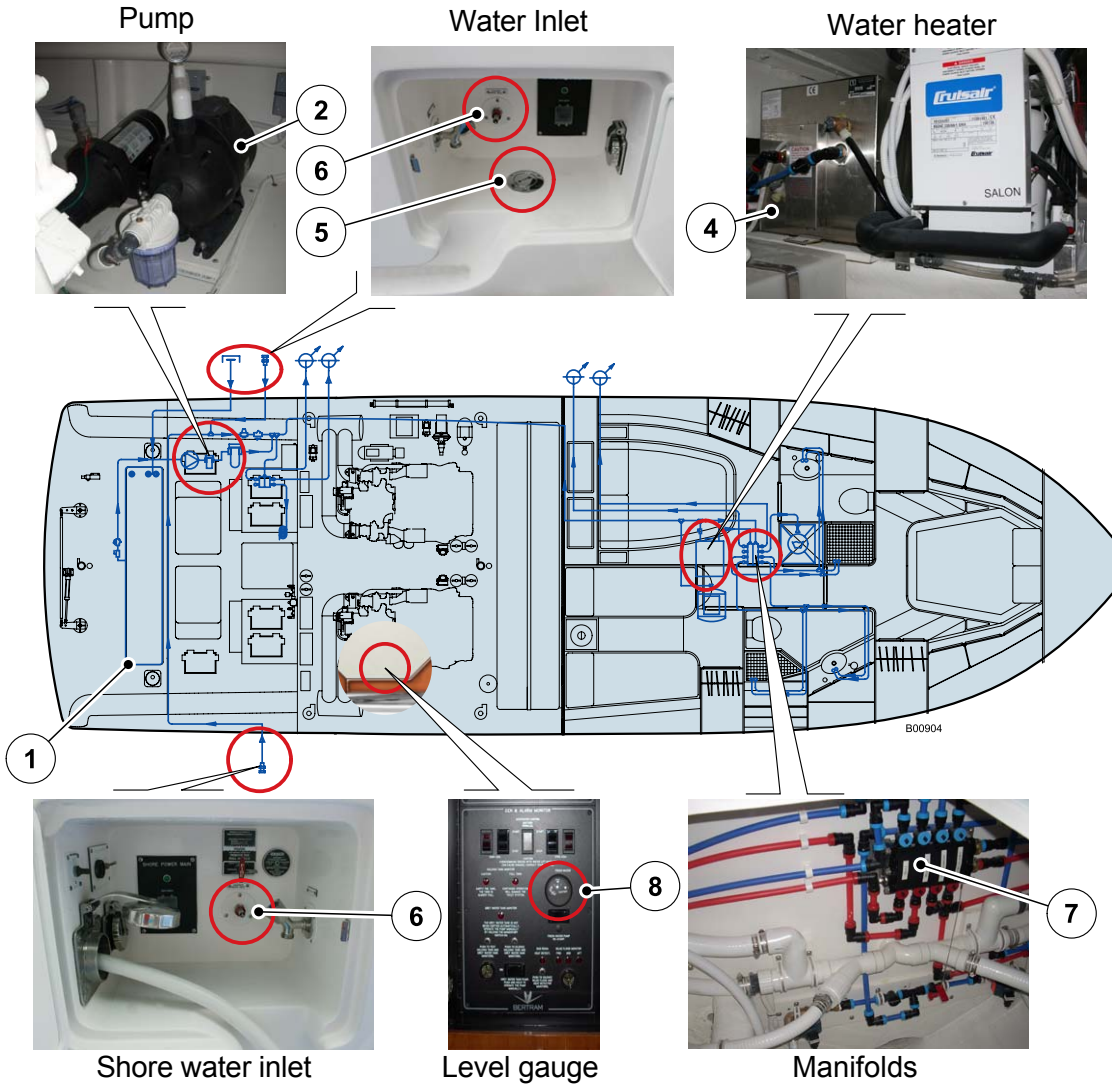
Do not open the water heater thermostat access panel, unless the differential circuit breaker is turned off.

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.

NOTICE

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

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



WARNING

The fresh water circuit, and particularly the tanks, must be cleaned periodically by pouring in the case a specified disinfectant solution.

WARNING

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

WARNING

In yachts disposing of 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 pressure switch check the pressure on the pressure gauge installed on the switch.

WARNING

Periodically carry out inspection of the fresh water circuit and of the bilge 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.

WARNING

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 replenishing by liquid fall and not by pressure.

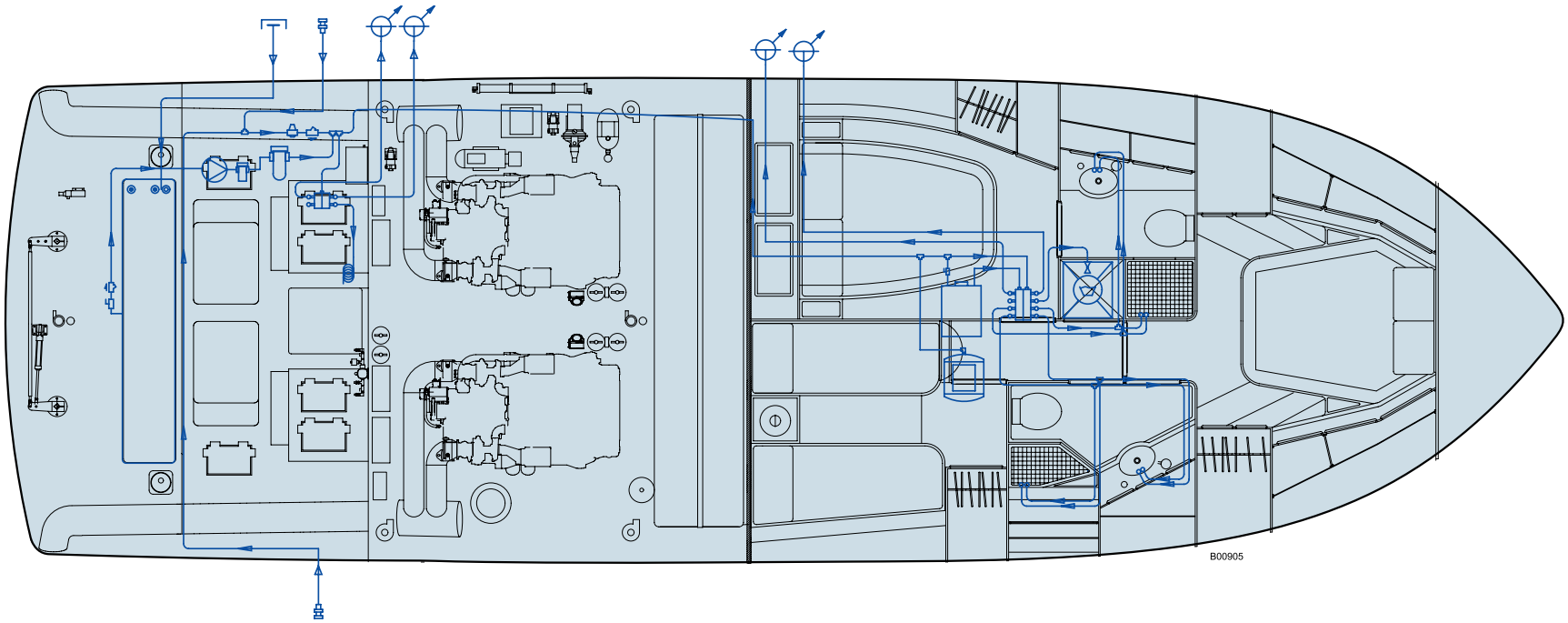
CAUTION

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

CAUTION

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.

Fresh water system



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

Page intentionally white

9.3 REFILLING THE WATER TANK

- Ensure that the yacht is properly moored; we suggest to stop the engines and the generators.
- 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.

NOTICE

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. We advice you anyway not to drink the water supplied by the onboard freshwater system.

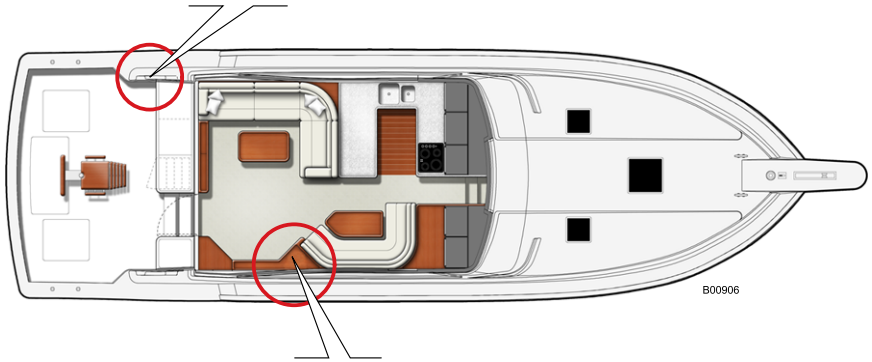
WARNING

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.

NOTICE

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

Water Inlet



Level gauge

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.

NOTICE

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

Pump check and cleaning

WARNING

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

- Check the cleanliness of the pump and expansion 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 manual.

9.4.2 Water system maintenance

For maintenance 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 hot 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 that had a disinfectant or sanitizing agent in it. Verify for possible leaks in the system at least once every six months. Verify the operation of the cocks at least once a month.

WARNING

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

9.5 SEAWATER SYSTEM

The sea water systems on board are:

- **Engines cooling system**, consists of two circuits, one for the starboard engine and the other for the port engine. Sea water is sucked directly from the inner pumps of the engines by means of a intake sea cock 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 shafts output and the cooling of the exhaust manifolds.
- **Generator cooling system**. Sea water is sucked directly by the generators pumps by means of two intake seacocks equipped with cut-off valves and filters. The water sucked by the generators flows through the filters and is then conveyed to the heat exchangers of the generators and discharged 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.

CAUTION

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.

NOTICE

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**. Sea water is sucked 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.

– **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 water maker 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.

WARNING

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

WARNING

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.

CAUTION

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.

CAUTION

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, generators, etc.), of the exhausts systems and to prevent endangering the yacht safety.

CAUTION

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

WARNING

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

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. Because this operation has to be performed from the outside of the hull, the yacht should be in a dry dock. 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.

CAUTION

During navigation check periodically the cleaning condition of the sea water 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, generators, etc.), of the exhausts systems and to prevent endangering the yacht safety.

9.6.2 Maintenance of the sea filters

Clean the sea strainer at routine 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 sea valves must always be fully open or fully closed, as needed. Do not use the sea valve 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.

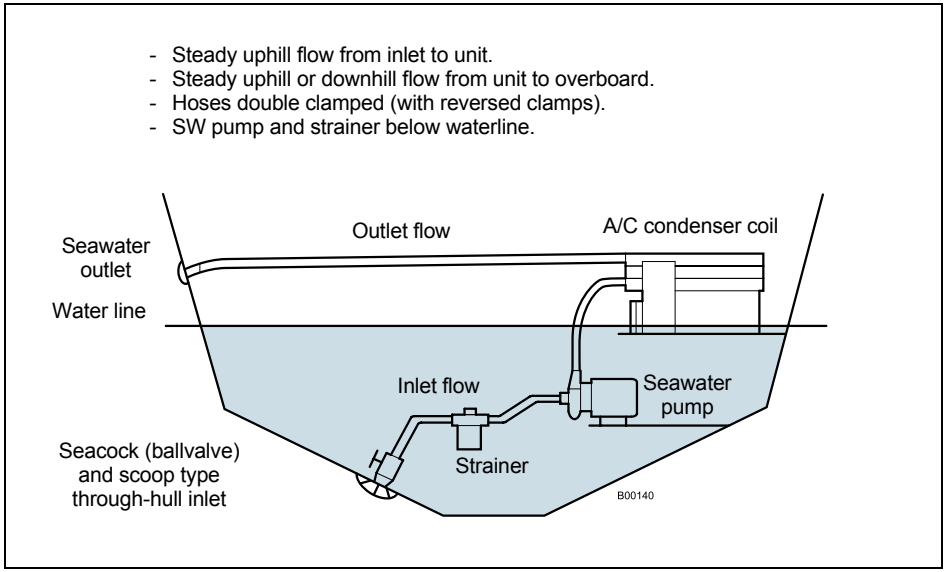
DANGER

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.

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”, meaning that if the boat 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.
Please see the documentation provided in the owner's information case for detailed information on your system.

CAUTION

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.

CAUTION

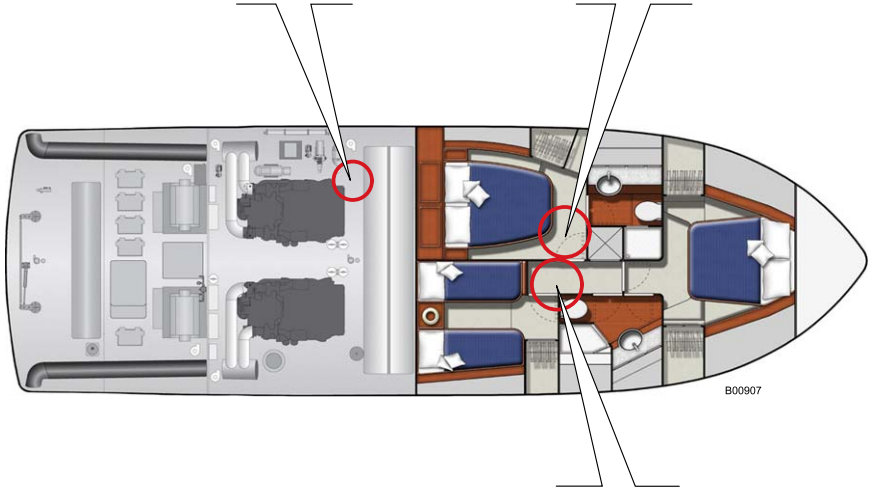
Before starting the air conditioning system, make sure that the air conditioning seawater seacock is open. After starting the unit(s), confirm that seawater discharge is flowing from the through hull outlet.

CAUTION

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.

Intake seacocks, filter and pump

Air-Conditioning units



Sump pump

9.8 AIR-CONDITIONING SYSTEM 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.

Programming

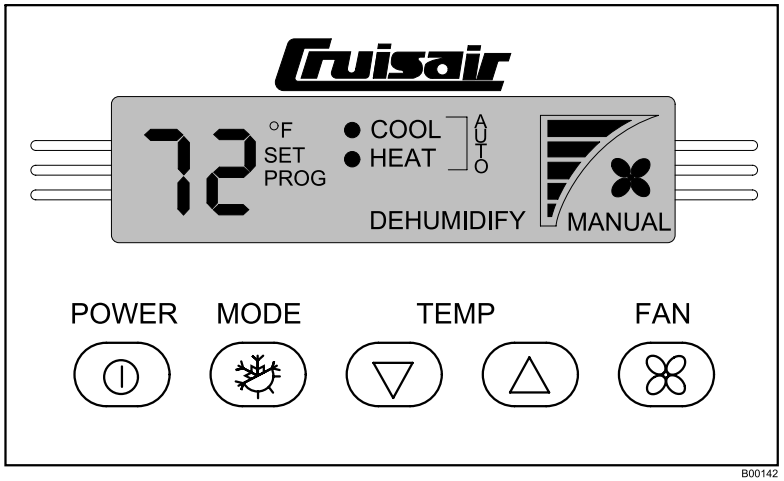
SMXht must be in the Off mode prior to entering Programming Mode; pressing the POWER key turns the display off or on. Once in the Off mode:

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 = 0.8 °C). 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.



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 inlet water 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.

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.

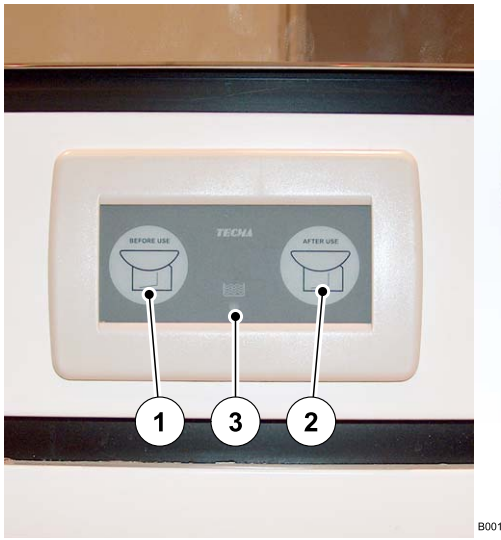
NOTICE

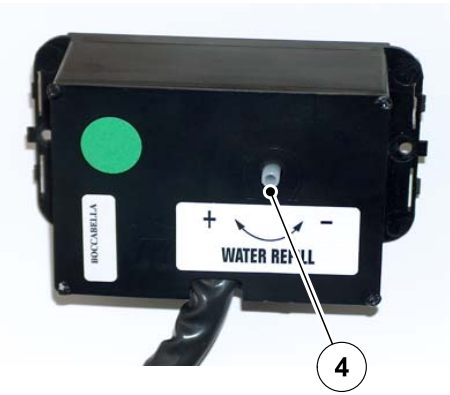
Do not put anything other than human waste and single-ply toilet paper into the WC.

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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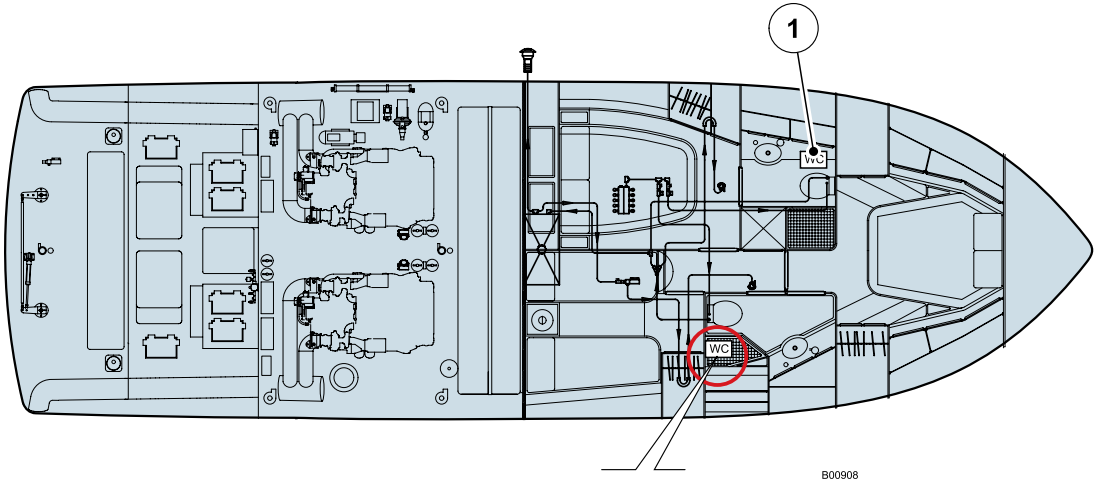
9.9.2 WC Control Panels



Toilets control panel

1. WC Control Panels

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

9.9.3 System Operation

NOTICE

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 have been installed solenoid valves, each one of them refers to a 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 staterooms area.

CAUTION

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

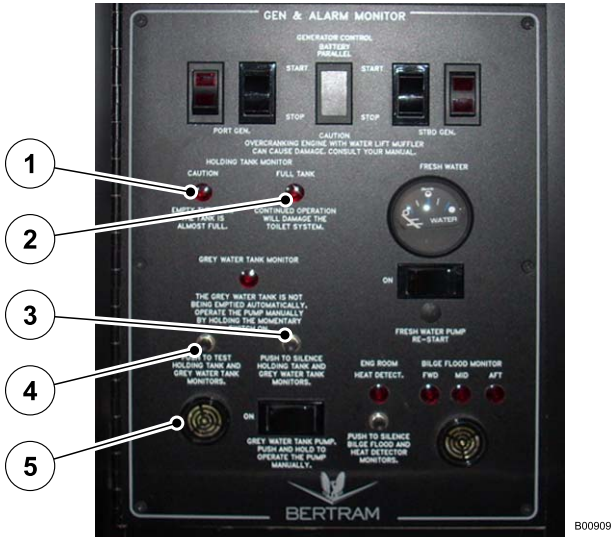
WARNING

*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 staterooms area.*

CAUTION

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

The checks of the black water (sewage) holding tank are located on the electric panel of the salon.



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

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.

NOTICE

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.

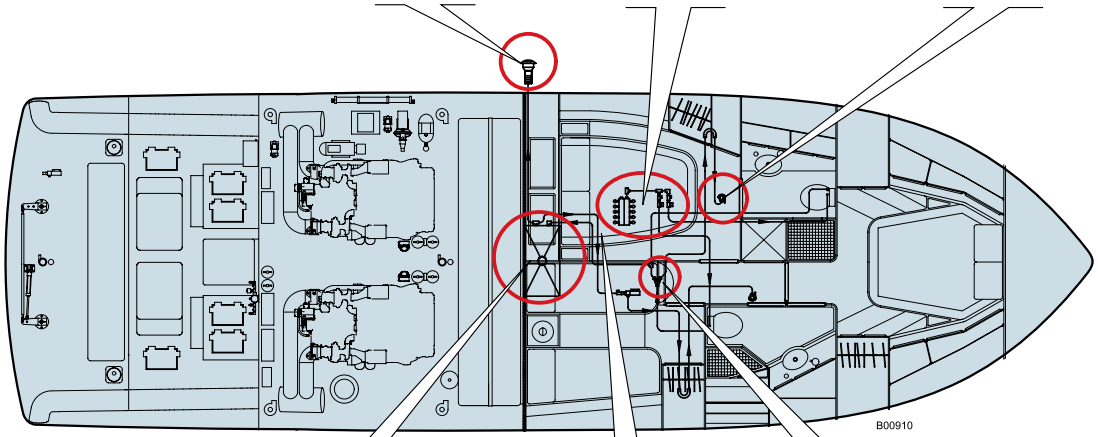
CAUTION

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

WASTE fitting

Solenoid valves in the passageway

Overboard discharge



Black waters (sewage) tank & pump

3-way valve

Overboard discharge

9.9.4 Tank pump-out at the dock

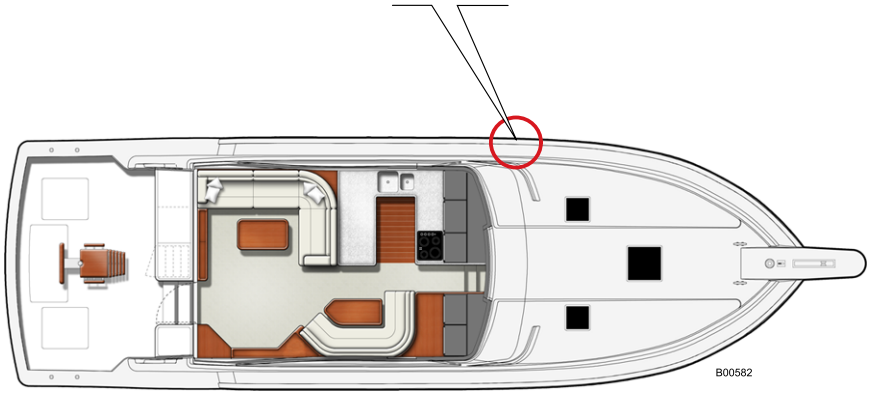
Observe local regulations that prohibit overboard discharge from holding tanks. You may empty the black water (sewage) tank at the dock into a designated shoreside pump-out station.

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.

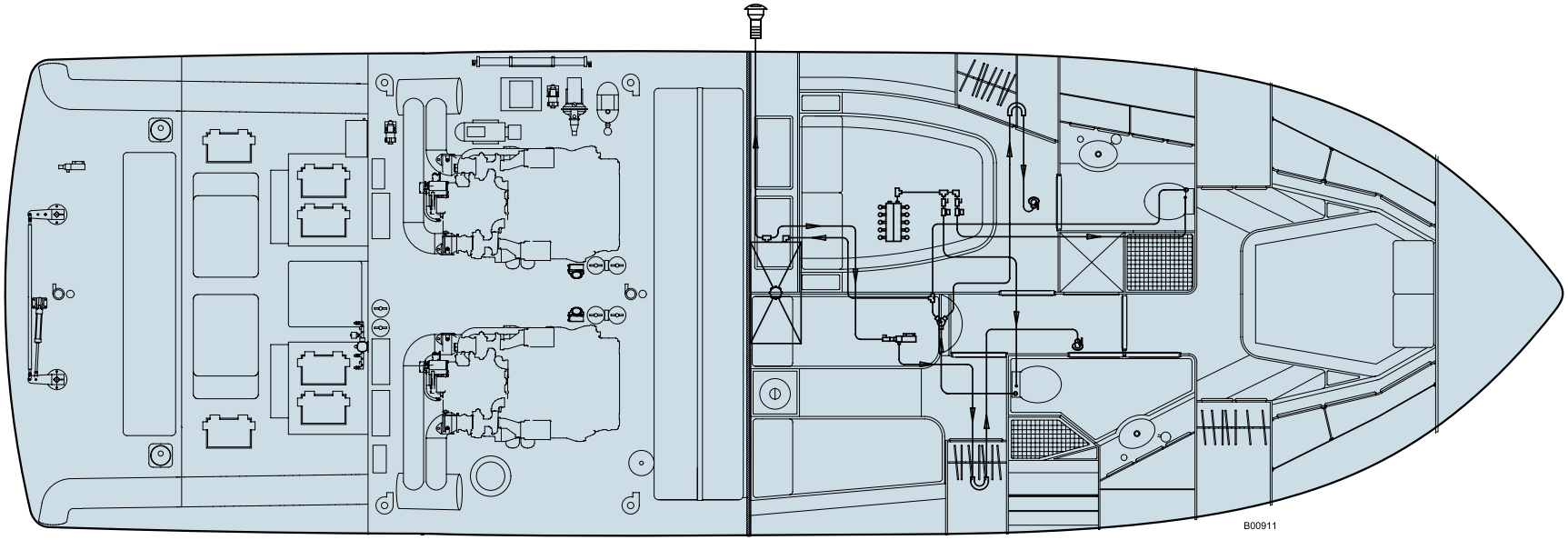
Connect the shoreside suction hose to the yacht's black water system, using the waste outlet located on the port walk-around. When the line is connected, activate the direct pump-out circuit by opening the suction valve, located near the black water pump, located in the bilge below the staterooms area.

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

WASTE fitting



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

NOTICE

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.

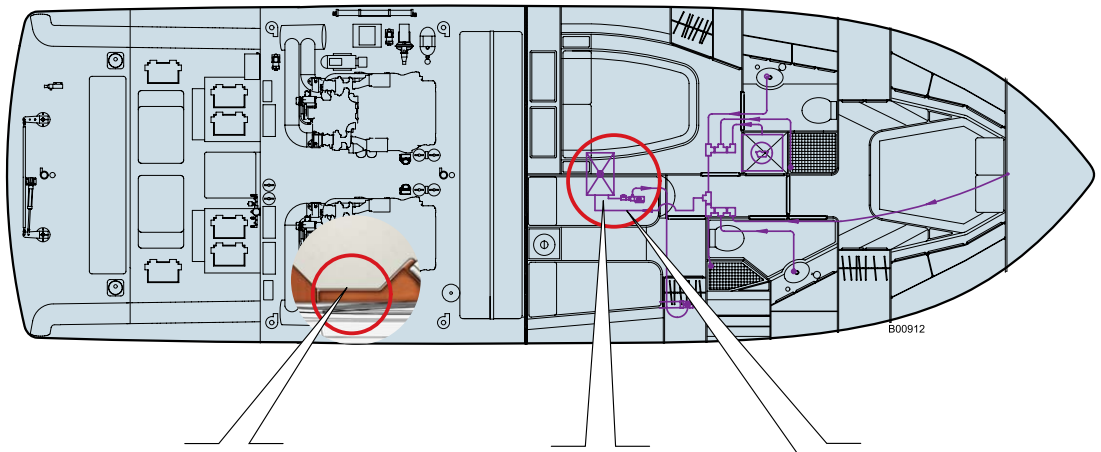
9.10 GRAY WATER SYSTEM

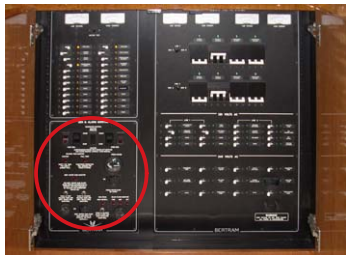
The water drained by showers, bidets and washbasins is collected into a gray water tank located in the bilge under the staterooms area.
This tank has a pump and automatic float switch.
The pump, while operating in automatic mode, discharges the shower and sink water overboard and is powered by the gray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

ENVIRONMENT

Do not discharge soaped waters drained by washing machines and dishwashers in the harbor, inside of 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


Tank


Gray water pump

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.

NOTICE

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

Verify the pump condition at least once every six months.

NOTICE

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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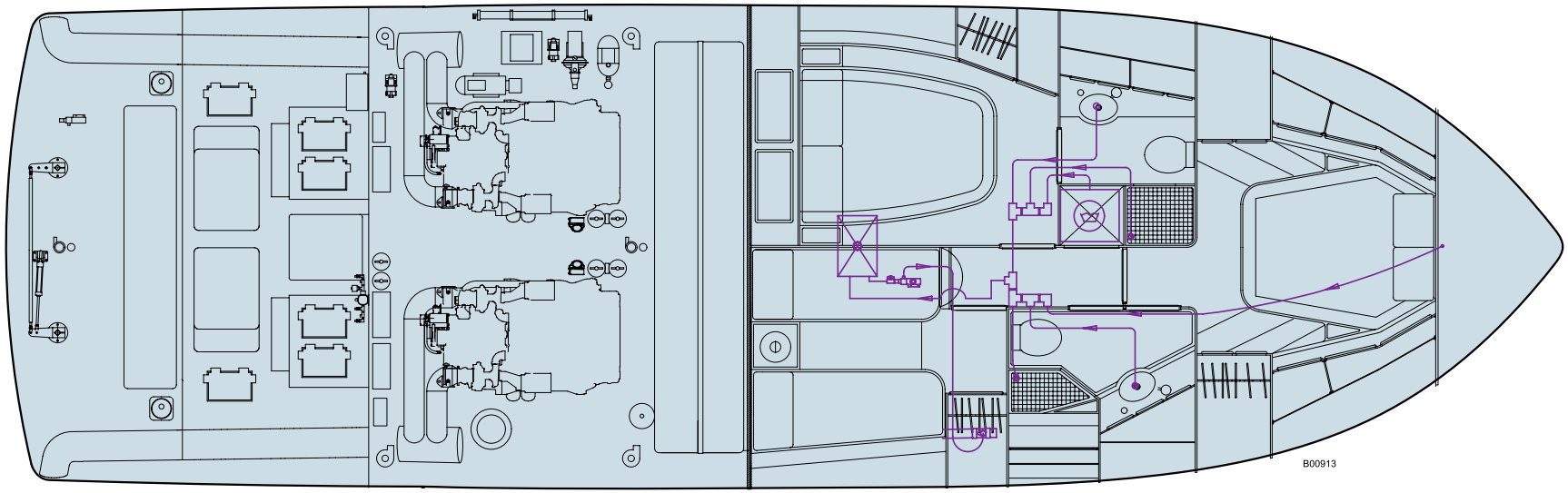
Gray water system



Gray water pump

Centralized drain

Tee connection

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10

ELECTRICAL SYSTEM

10.1 ELECTRICAL SYSTEM DESCRIPTION

WARNING

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

WARNING

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

WARNING

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.

WARNING

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

WARNING

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.

WARNING

If during navigation a considerable and persisting voltage decrease in the batteries is noticed, it is necessary to switch on the power generator and to ensure that the independent electric battery charger is activated.

WARNING

The parallel connection system between the battery banks, controlled by a switch from the helm station, is used to increase the cold cranking amps 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 of the engines alternators. We advise to use this system only in emergency cases.

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 two banks of accumulators at 12 V DC each, series and parallel connected to deliver 24 V.
  The above mentioned battery bank is re-charged by the 50 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 two accumulators banks of 12V DC each, linked 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.
- 120 V / 240 V - 60 Hz user network supplied from shore, or alternatively, by the power generators installed onboard (standard generators power 15.5 kW). Each power generator is supplied by a bank of 12 V DC accumulators, located near the generator and is recharged by an alternator, driven by the same unit.

The system consists of PVC insulated cables (type N07V-K); they are further protected with sheaths and/or PVC self extinguishing ducts, each junction is made by terminals with screw tightening and they are housed inside of 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 the damp metallic parts are interlinked with equipotential connections and connected on sacrifical anodes located on the submerged 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 **120/240 V AC** system has 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:

- 24 V DC
- 120/240 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 batteries (12 V).
The AC system can be powered either by the shore electric network or by the onboard generators.

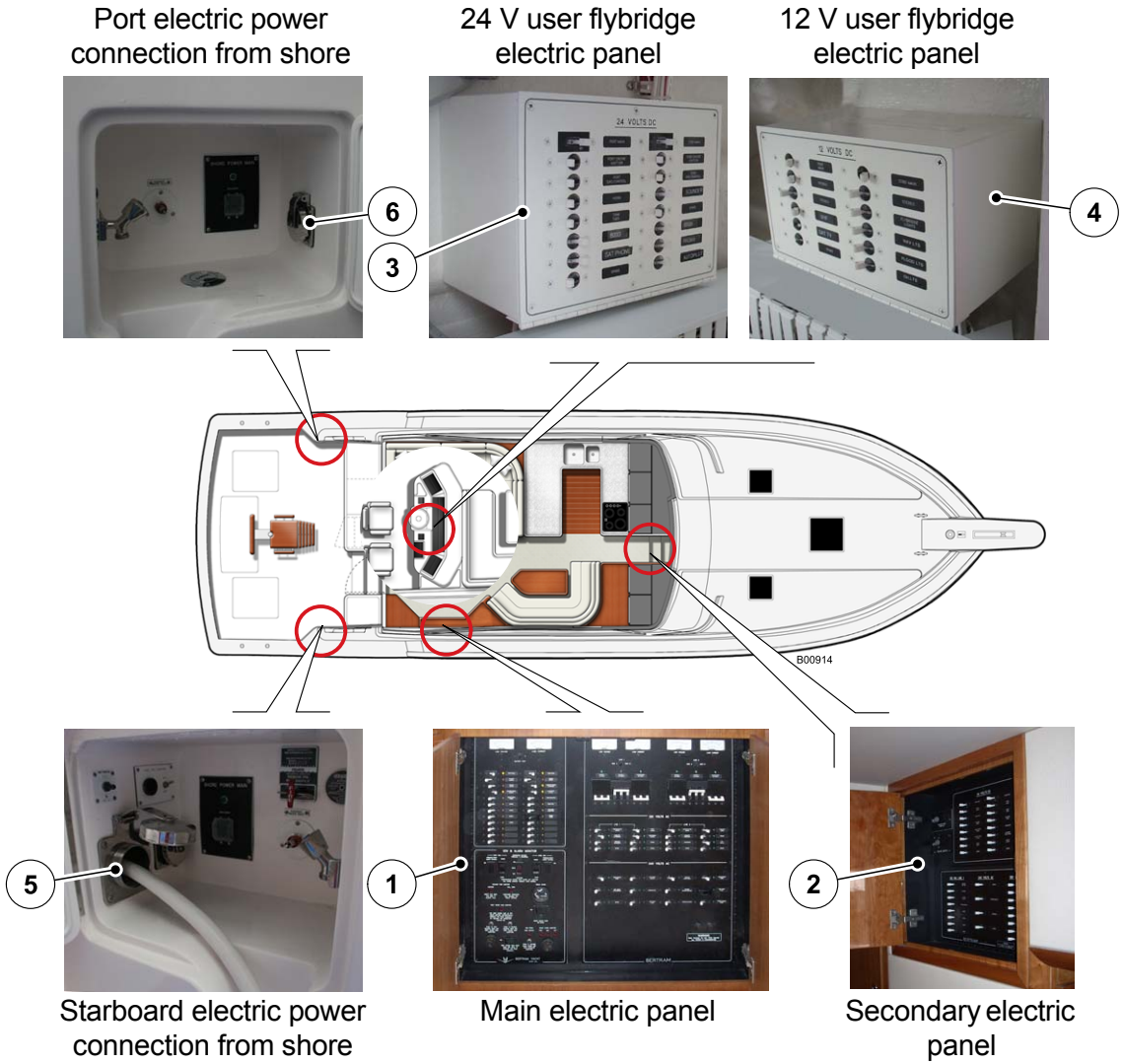
All electrical users are completely protected by circuit breakers, fuses and differential circuit breakers for total protection against accidental contacts on the whole 120 V/240 V AC system.

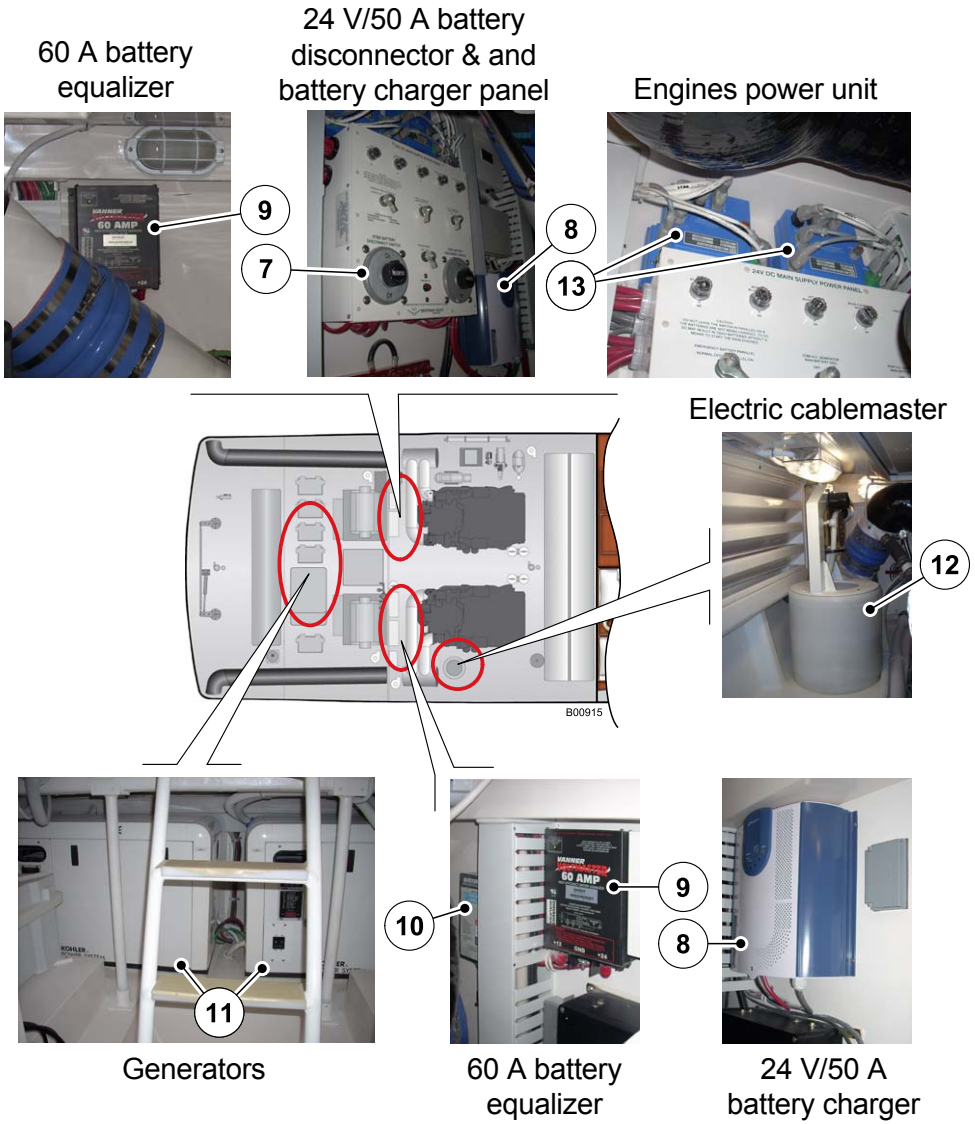
CAUTION

NEVER:
- *work on the electric system while under voltage.*
- *modify the electric systems of a unit or the 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. Secondary electric panel
3. 24 V DC user flybridge electric panel
4. 12 V DC user flybridge electric panel
5. Shore electric power supply with electric cablemaster
6. Power connection from shore
7. 12 V/24 V battery disconnector panel
8. 24 V/50 A battery charger (no. 2)
9. 60 A battery equalizer (no. 2)
10. Galvanic Isolator
11. Generators (2x15.5 kW - 60 Hz)
12. Electric cablemaster
13. Engines power unit

10.1.1 Location of electrical equipment on board




60 A battery equalizer
24 V/50 A battery disconnector & and battery charger panel
Engines power unit
9
7
8
13
Electric cablemaster
12
B00915
11
10
9
8
Generators
60 A battery equalizer
24 V/50 A battery charger

WARNING

Do not modify the electric systems of the unit or the relevant drawings. The installation, the modifications or the service must be performed only by a skilled marine electrician. Inspect the system at least once a year.

WARNING

Disconnect shore power supply when the system is not used.

WARNING

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

WARNING

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

CAUTION

To reduce to the lowest the hazard of electrocution or fire:
- *turn OFF switch for connection to shore supply of the unit, before connecting or disconnecting the shore power supply cord;*
- *disconnect the shore power cable and rewind it by means of the cablemaster;*
- *fasten tightly lid of shore power supply outlet.*

WARNING

Do not modify the connectors of the shore power supply cable, use only compatible connectors.

10.2 ELECTRICAL SYSTEM WARNINGS

DANGER

Electric shock hazard exists in an energized electrical system. To avoid electric shock that can cause serious injury or death, turn OFF power before opening the cover and servicing any internal components of electrical equipment.

WARNING

Operate all electrical equipment and systems (including low voltage systems) with special attention. Avoid overloading to prevent short circuits, dangerous overheating, and potential fire hazards that can lead to serious injury or death.

WARNING

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.

CAUTION

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

CAUTION

Use the switch for engine/user battery parallel connection, only if absolutely necessary, to provide additional battery power for starting the engines. To prevent damage, turn off all electrical equipment prior to operating the battery parallel system. Disconnect the parallel link as soon as possible.

WARNING

Only a qualified marine electrical technician may service the yacht's electrical system.

CAUTION

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.

CAUTION

Have a BERTRAM authorized electrical engineer inspect 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.

WARNING

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

WARNING

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.

WARNING

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 generators;
– deactivate the main battery disconnect switches.

WARNING

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 does not exceed the current carrying capacity of the cables in each branch circuit.

DANGER

Extreme Hazard:
– Never use an open flame in battery storage area.
– Avoid sparks near battery.
– Battery will explode if a flame or a spark ignites the free hydrogen given off during charging.

WARNING

SHOCK/FIRE HAZARD:
– Disconnect the electrical system from its power source before performing any service. Never work on the electrical system while it is energized.
– Electrical fixtures must not exceed the rated amperage of the yacht's circuits.
– Observe the electrical system carefully while it is energized.
The only electrical components which can be left unattended are the automatic bilge pumps, fire protection and alarm circuits.

CAUTION

– *Turn off engine before inspecting or servicing the battery.*
– *Disconnect the battery cables before working on electrical system to prevent arcing or damaging the alternator. Disconnect the negative cable (-) first, then the positive (+) cable.*

WARNING

Explosion/Fire Hazard - Check bilge and generator compartment for fumes.

WARNING

Carbon monoxide poisoning:
– *Operate generator only in a well ventilated area. Carbon monoxide poison, created by the engine internal combustion, is extremely toxic.*

CAUTION

Check polarity of shore power electrical power supply. Reverse polarity may damage equipment.

WARNING

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.

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:

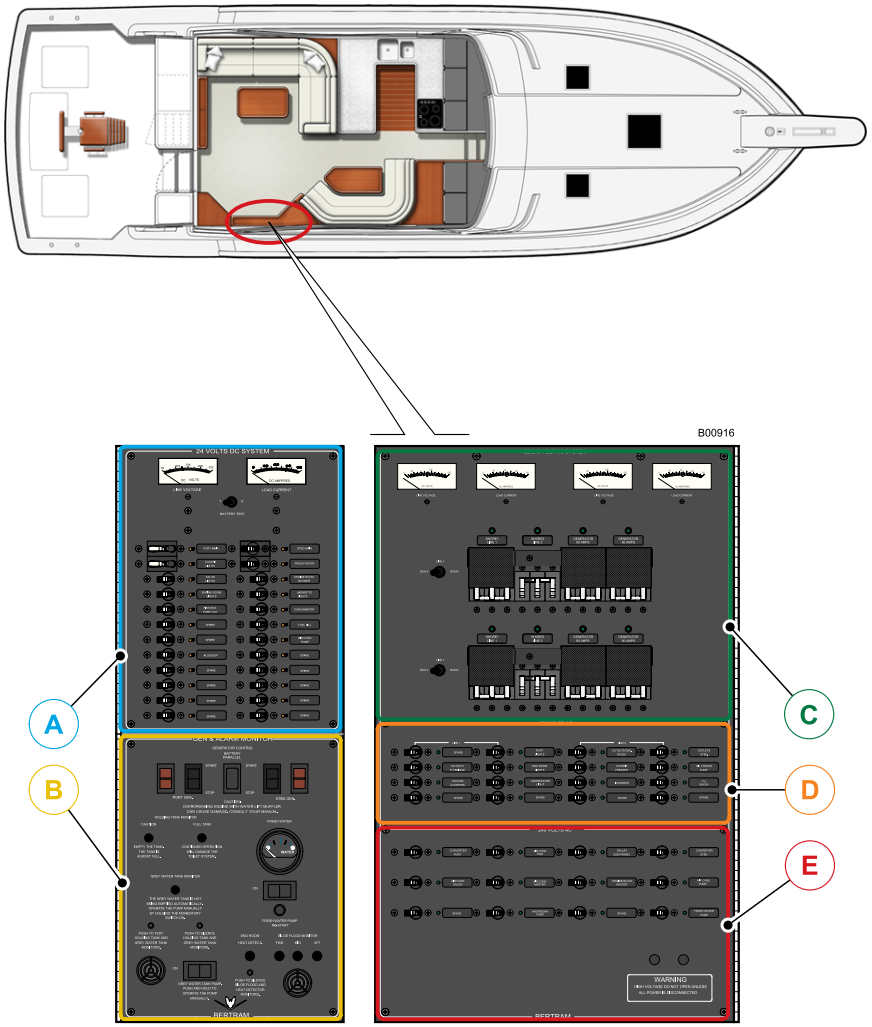
A. Voltmeters, ammeters for 24 V DC and circuit breakers protecting the 24 V DC users
B. Signal and generator control panel
C. Voltmeters, ammeters for 120 V/240 V AC and circuit breakers protecting the 120 V/240 V AC users
D. Circuit breakers protecting the 120 V AC users
E. Circuit breakers protecting the 240 V AC users and lights fuses

WARNING

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

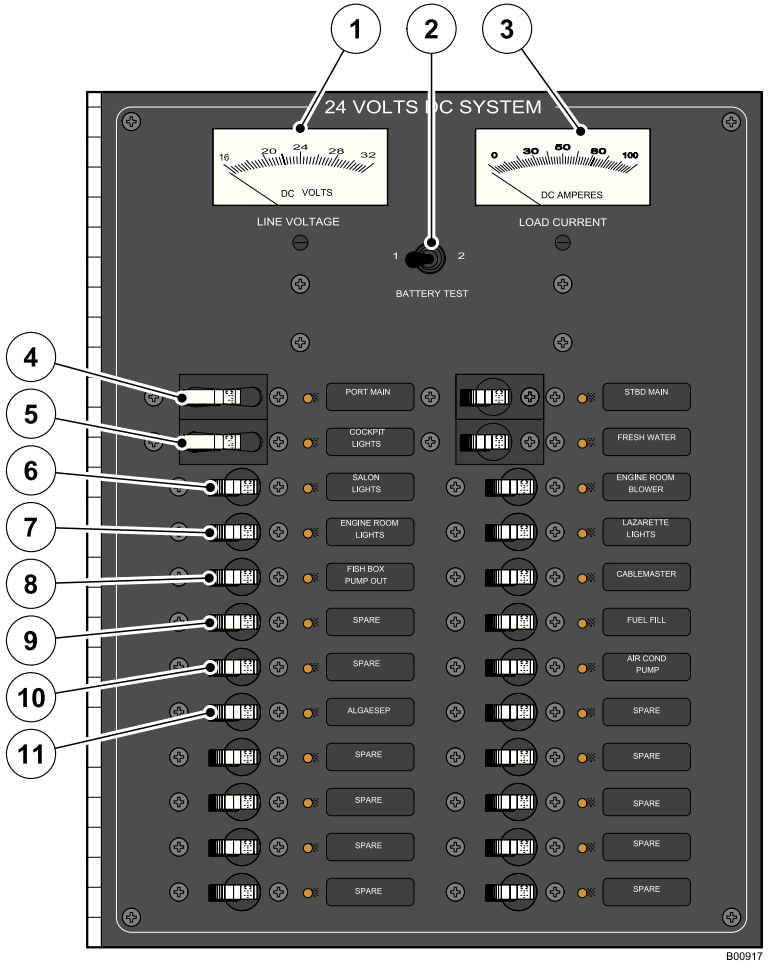
WARNING

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



10.3.1 SECTION A - Voltmeter, ammeter for 24 V and circuit breakers protecting the 24 V DC users

1. **Voltmeter for battery voltage**
   Measures the voltage detected at the terminals of the 24 V DC user/ engine batteries, according to selection by relevant switch (**2**).
2. **Switch for the engine/users batteries**
   Allows to select on voltmeter and ammeter the reading of the voltage and current values at engine, user battery terminals.
3. **Ammeter for battery current absorption**
   It measures the current (amperes) absorbed by the user/engine batteries 24 V DC, according to relevant switch (**2**) selection.
4. **Port Master switch**
   When this switch is disconnected all 24 V yacht port users are disconnected.
5. **Cockpit lights**
   This switch powers the cockpit light system.
6. **Salon lights**
   Powers the light system of the salon.
7. **Engineroom lights**
   Powers the light system of the engineroom.
8. **Fish box pump**
   This switch powers the fish box pump.
9. **Available**
   Switch available for auxiliary system.
10. **Available**
    Switch available for auxiliary system.
11. **ALGAESEP**
    This switch powers the ALGAESEP water/fuel separator prefilter.



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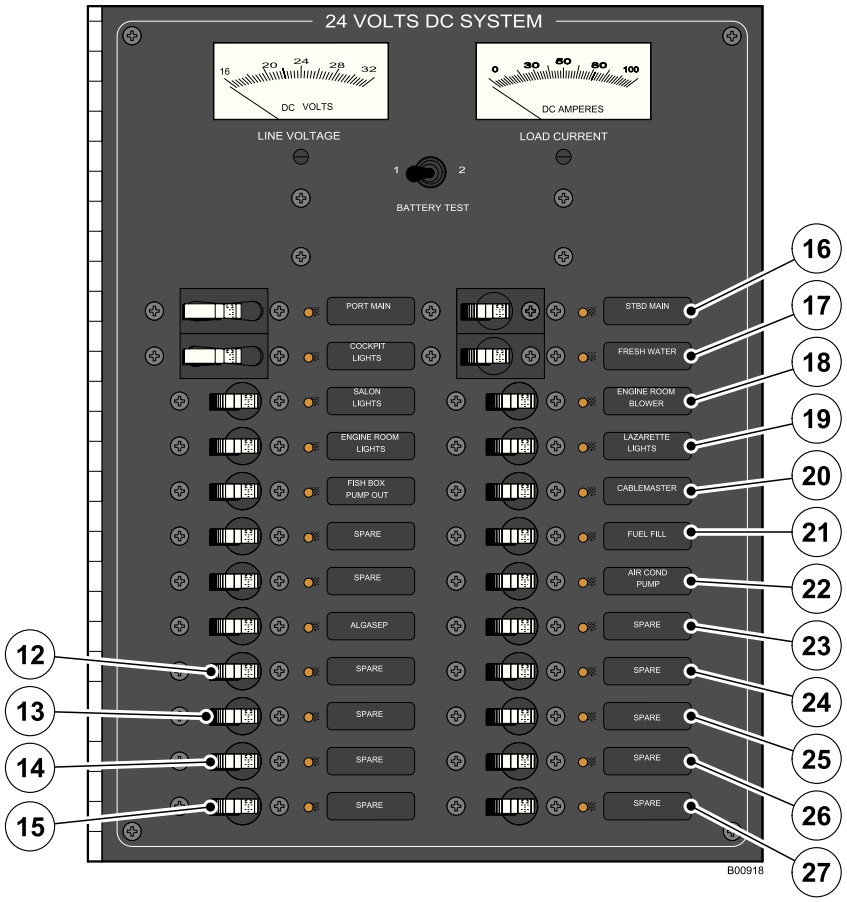
12. **Available**
    Switch available for auxiliary system.
13. **Available**
    Switch available for auxiliary system.
14. **Available**
    Switch available for auxiliary system.
15. **Available**
    Switch available for auxiliary system.
16. **Starboard Master switch**
    When this switch is disconnected all 24 V yacht starboard users are disconnected.
17. **Fresh water level gauge**
    This switch powers the fresh water level gauge.
18. **Engine room ventilation**
    Powers the ventilators of the engineroom.
19. **Helm gear compartment lights**
    Powers the helm gear compartment lights.
20. **Electric cablemaster**
    This switch powers the electric cablemaster.
21. **Fuel level gauge**
    Powers the fuel level gauge.
22. **Air conditioning pump**
    This switch powers the air conditioning unit.
23. **Available**
    Switch available for auxiliary system.
24. **Available**
    Switch available for auxiliary system.
25. **Available**
    Switch available for auxiliary system.
26. **Available**
    Switch available for auxiliary system.
27. **Available**
    Switch available for auxiliary system.

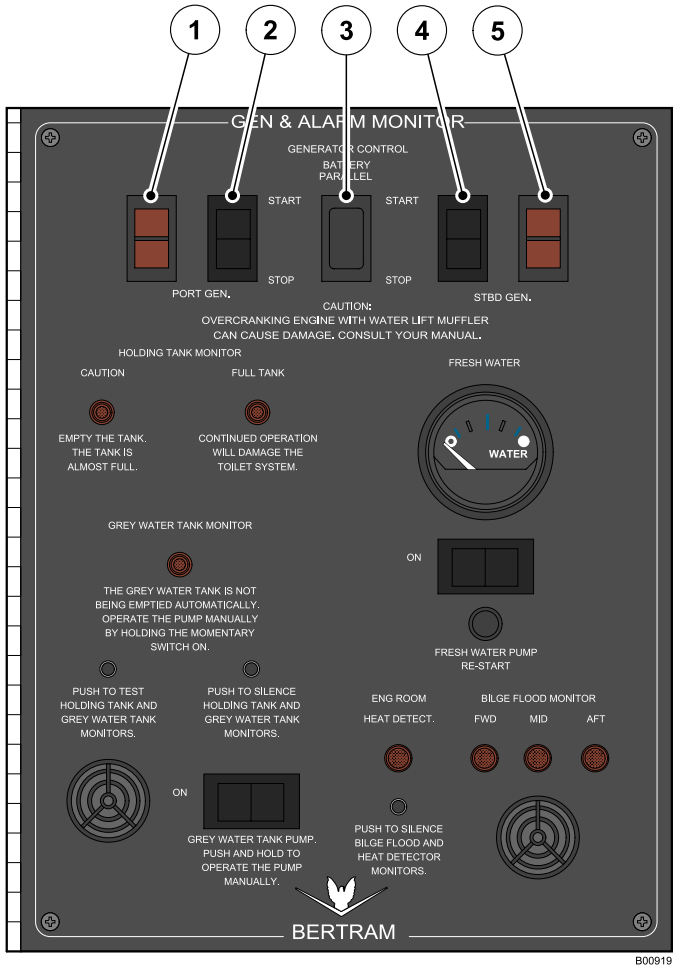


10.3.2 SECTION B - Generator signal and control panel

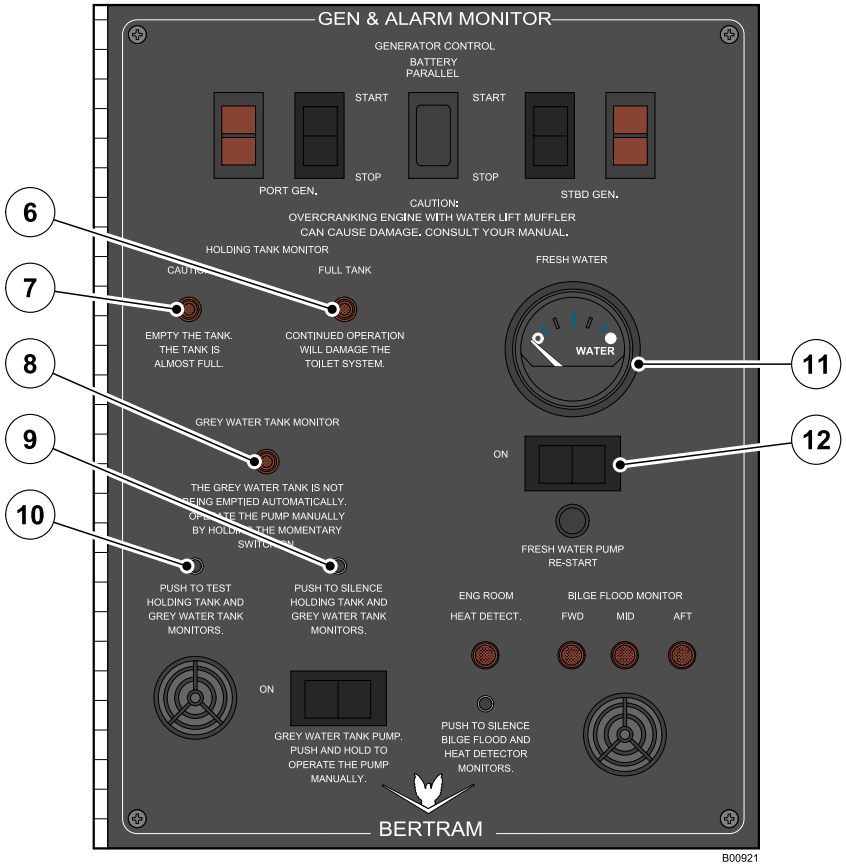
1. **Signal light for port generator**
   Red light indicating the start of the port generator.
2. **Port generator switch**
   Allows to start/stop the port generator.
   - Stop
   - Start
3. **Battery parallel switch**
   Should the engine batteries be flat or not sufficiently loaded to allow the start of propulsion engines, this switch sets the user and engine batteries to parallel connection, and enables the engines start.

> ***WARNING***
>
> *This operation has to be performed only if the engine batteries are not sufficiently charged. The switch for batteries parallel connection can be activated, only if selectors for users batteries banks and engines batteries banks are set to ON.*

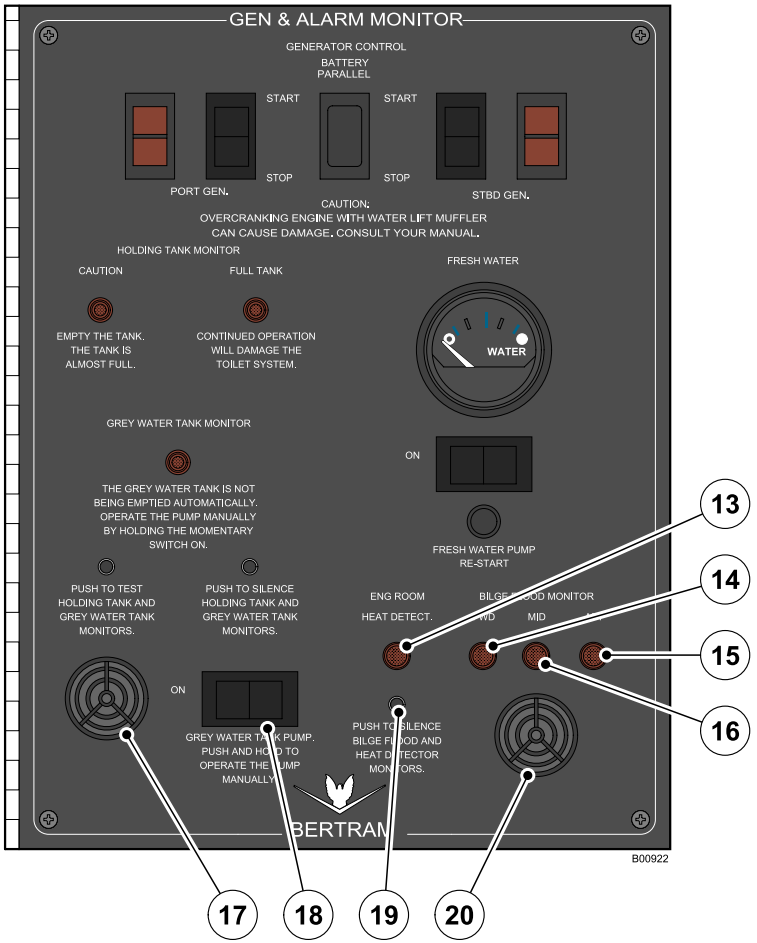
4. **Starboard generator switch**
   Allows to start/stop of the starboard generator.
   - Stop
   - Start
5. **Signal light for starboard generator**
   Red light indicating the start of the starboard generator.



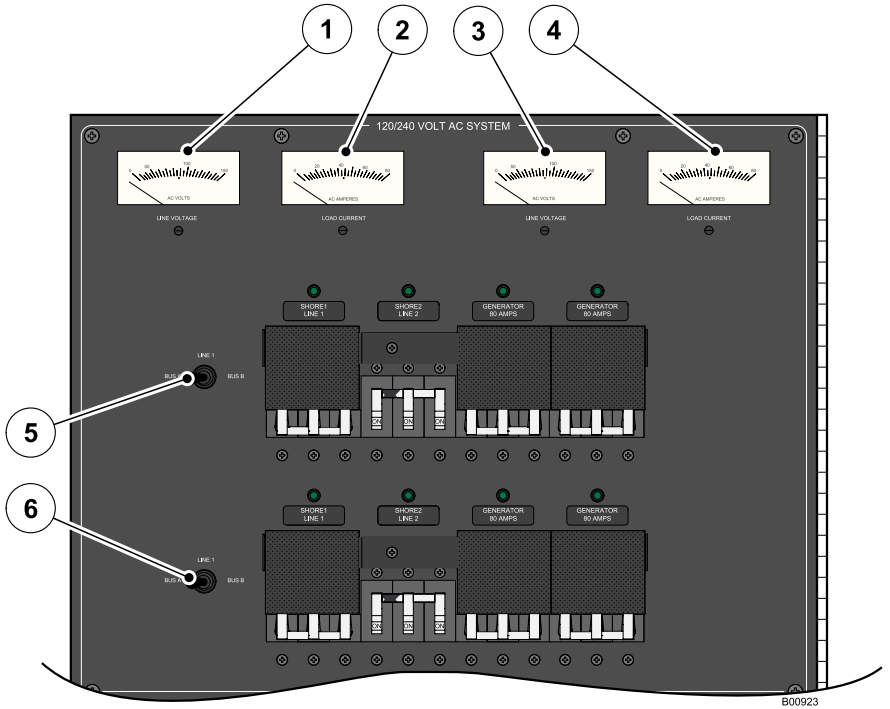
6. **FULL signal light for black waters (sewage) tank**
   Red light, indicating that the black water (sewage) tank is full and that the WCs operation can damage the system.
7. **Signal light indicating that the black waters (sewage) tank is by 3/4 full**
   Red light, indicates that the black water (sewage) tank is almost full and that after a few cycles the onboard WCs cannot be used.
8. **LED of gray water tank**
   Red light, indicates that the gray water tank is full.
9. **Squelch button**
   This button allows to disconnect the buzzer.
10. **Test button**
    The test button is used to verify the correct operation of all LEDs on the synoptic panel. When using the test button, all LEDs must be ON and the buzzer must sound to indicate the correct operation of the gray and black water systems. When releasing the button all LEDs must go out and the buzzer must clear off.
11. **Fresh water level gauge**
    Indicates the fresh water level in the tank.
12. **Fresh water pump switch**
    Allows to start or to stop the fresh water pump.



13. **Signal light for high temperature in the engineroom**
    Red light, indicates that the temperature in the engineroom is too high.
14. **Aft bilge**
    Red light, indicates the aft bilge flood.
15. **Fore bilge**
    Yellow light, indicates the fore bilge flood.
16. **Mid yacht bilge**
    Red light, indicates the mid yacht bilge flood.
17. **Buzzer**
    Activates if a signal is detected from the gray and black waters tanks.
18. **Gray water tank drain switch**
    Allows the drain of the gray water tank. The gray water tank cannot be drained automatically.
19. **Squelch button**
    This button allows to disconnect the buzzer.
20. **Buzzer**
    The buzzer activates if a flood signal or a high temperature signal in the engineroom are detected.



10.3.3 SECTION C - Voltmeters, ammeters for 120 V/240 V AC lines and circuit breakers protecting the 120 V/ 240 V AC users



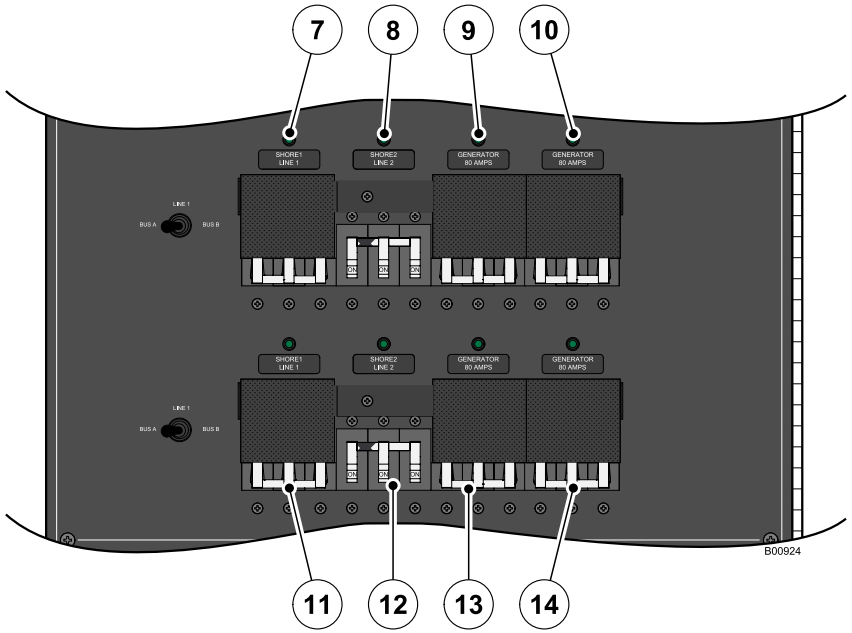
1. **Line 1 voltmeter**
   It measures the voltage at the ends of 1st line according to selection performed by switch (**5**).
2. **Ammeter line 1**
   It measures the current (amperes) absorbed by 1st line according to selection performed by switch (**5**).
3. **Line 2 voltmeter**
   It measures the voltage at the ends of 2nd line according to selection performed by switch (**6**).
4. **Ammeter line 2**
   It measures the current (amperes) absorbed by 2nd line according to selection performed by switch (**6**).
5. **Switch for 1st line**
   Selects on voltmeter (**1**) and ammeter (**2**) the reading of the voltage and current values at 1st line ends.
   - BUS A
   - BUS B
6. **Switch for 2nd line**
   Allows to select on voltmeter (**3**) and ammeter (**4**) the reading of the voltage and current values at 2nd line ends.
   - BUS A
   - BUS B

- **Circuit breakers line 1**

7. **Shore power outlet 1**
   This switch powers shore outlet 1.
8. **Shore power outlet 2**
   This switch powers shore outlet 2.
9. **Generator 80 A**
   Powers the generator.
10. **Generator 80 A**
    Powers the generator.

- **Circuit breakers line 2**

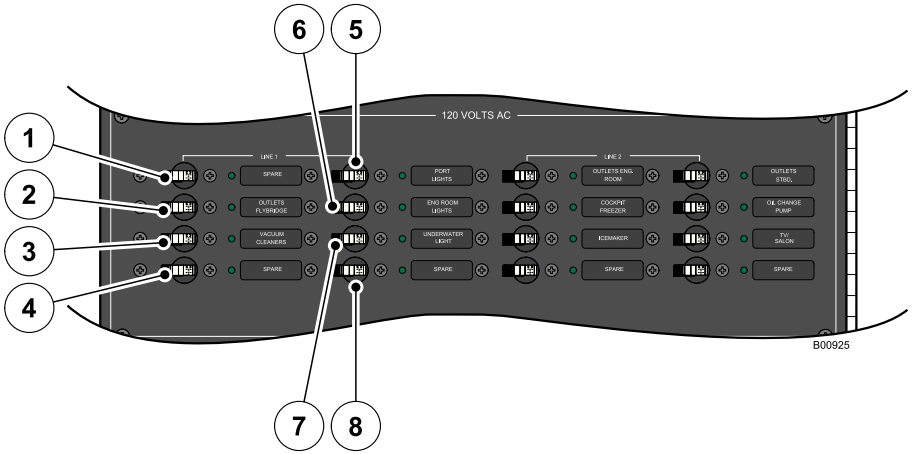
11. **Shore power outlet 1**
    This switch powers shore outlet 1.
12. **Shore power outlet 2**
    This switch powers shore outlet 2.
13. **Generator 80 A**
    Powers the generator.
14. **Generator 80 A**
    Powers the generator.



10.3.4 SECTION D - Circuit breakers protecting the 120 V AC users

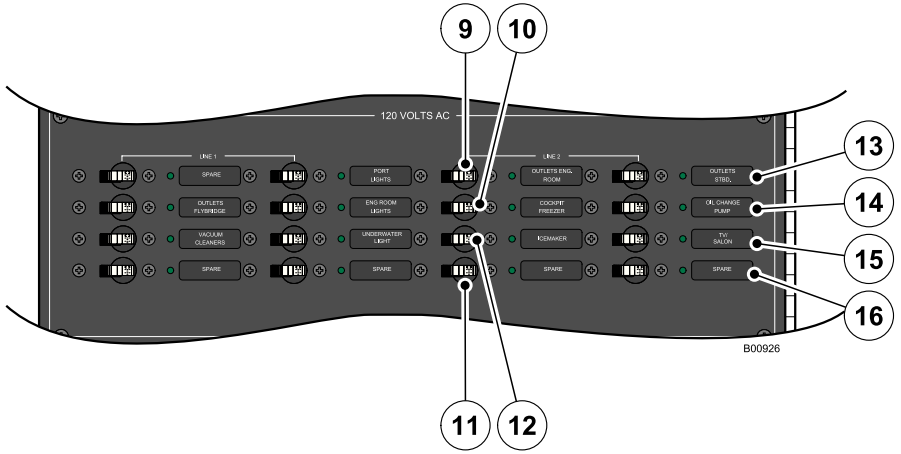
- **Line 1**

1. **Available**
   Switch available for auxiliary systems.
2. **Flybridge electric outlets**
   This switch powers the flybridge electric outlets.
3. **Vacuum cleaner**
   Powers the vacuum cleaner.
4. **Available**
   Switch available for auxiliary systems.
5. **Port lights**
   This switch powers all yacht port lights.
6. **Engineroom lights**
   Powers the light system of the engineroom.
7. **Underwater lights**
   Powers the underwater light system.
8. **Available**
   Switch available for auxiliary systems.



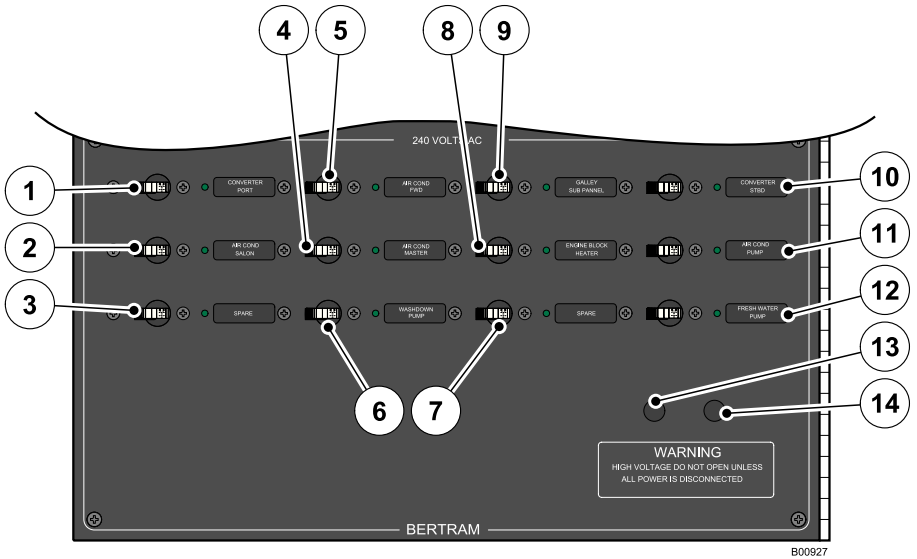
- **Line 2**

9. **Engineroom electric outlets**
   Supplies the electric outlets in the engineroom.
10. **Cockpit freezer**
    Powers the cockpit freezer.
11. **Available**
    Switch available for auxiliary systems.
12. **Icemaker**
    This switch powers the icemaker.
13. **Starboard electric outlets**
    This switch powers the starboard electric power outlets of the yacht.
14. **Oil change pump**
    Powers the oil change pump.
15. **TV-set in the salon**
    Powers the TV-set of the salon.
16. **Available**
    Switch available for auxiliary systems.



10.3.5 SECTION E - Circuit breakers protecting the 240 V AC users

1. **Port engine battery charger**
   Powers the port engine battery charger.
2. **Salon air conditioning**
   Powers the air-conditioning unit in the salon.
3. **Available**
   Switch available for auxiliary systems.
4. **Master stateroom air conditioning**
   Powers the air conditioning unit of the Master stateroom.
5. **Forward air conditioning**
   Powers the fore air conditioning unit.
6. **Washdown pump**
   Powers the pump for fish washing, of the fish box and of the cockpit area.
7. **Available**
   Switch available for auxiliary systems.
8. **Engine heater**
   This switch powers the engine heater.
9. **Galley secondary panel**
   Powers the secondary panel on galley.
10. **Starboard battery charger**
    Powers the starboard engine battery charger.
11. **Air conditioning pump**
    Powers the air conditioning system pump.
12. **Fresh water pump**
    Powers the fresh water pump.
13. **Fuse**
14. **Fuse**



10.4 SECONDARY ELECTRIC PANEL

In the passageway giving access to the belowdeck is installed an electric panel equipped with circuit breakers.
The following main sections have been identified, in order to make the descriptions easier:

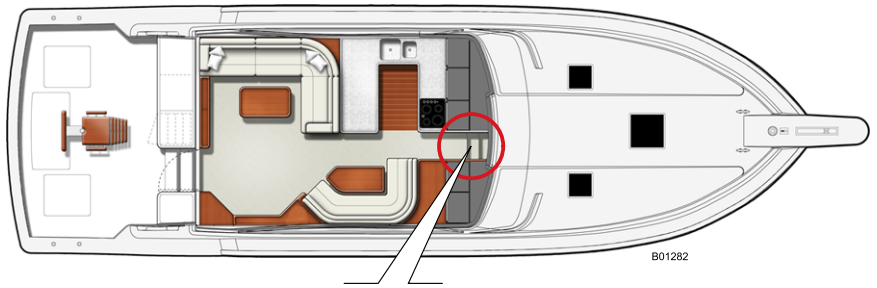
A. Circuit breakers protecting the 24 V DC users, black water pump and flood light controls
B. Circuit breakers protecting the 120 V and 240 V AC users

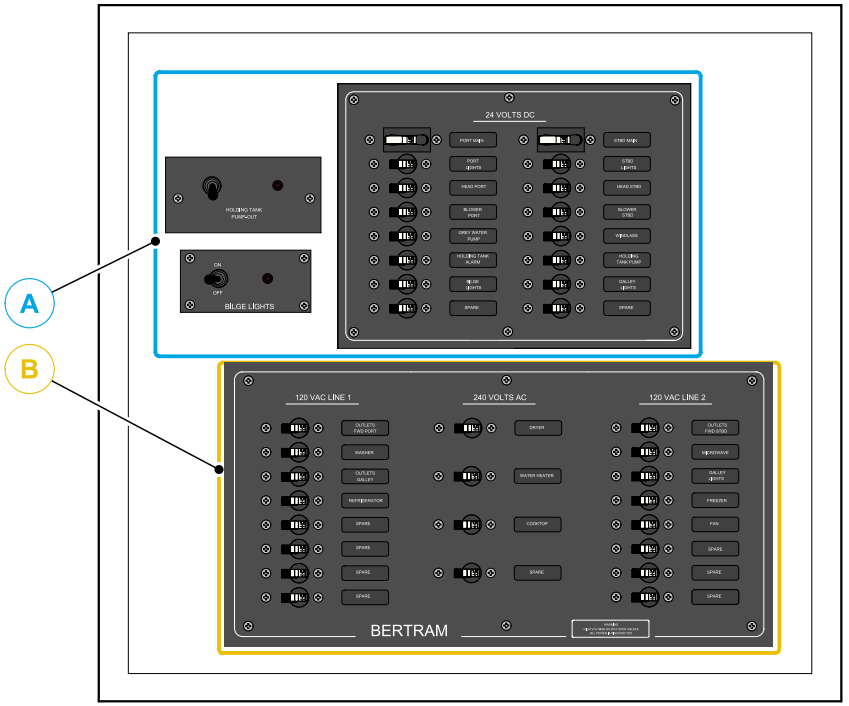
WARNING

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

WARNING

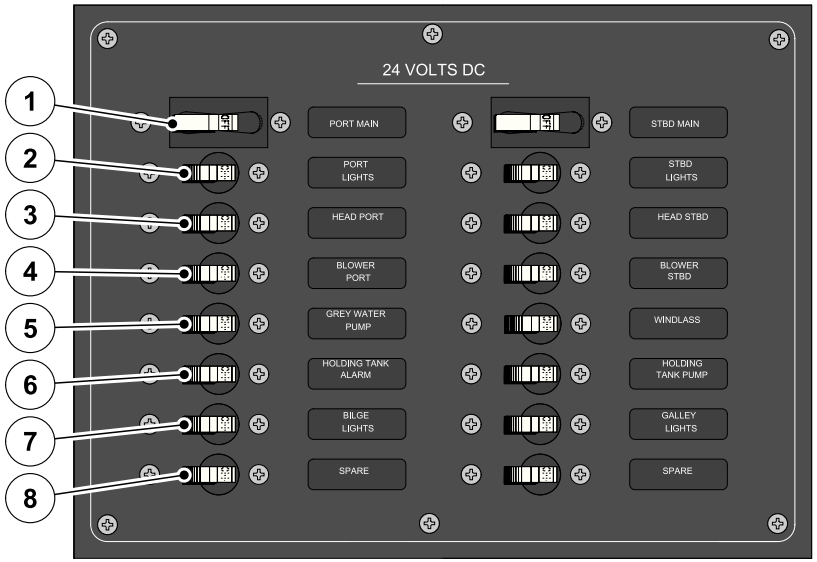
Switch off the generators and disconnect the shore power supply before opening the panel.



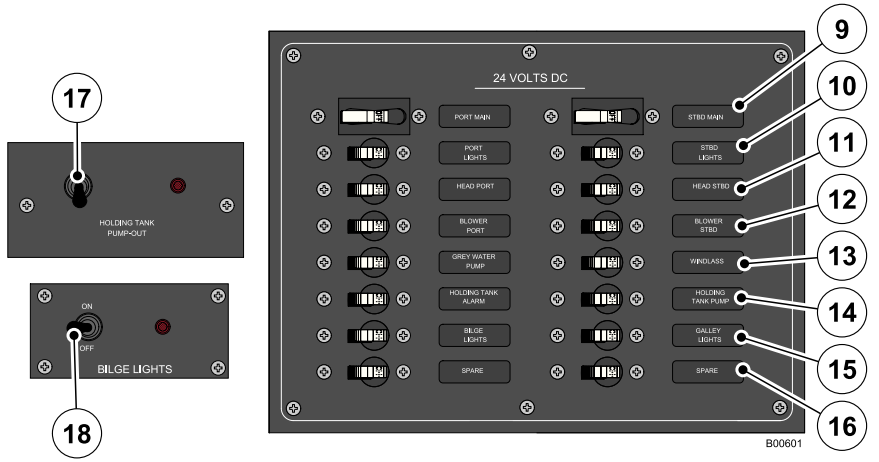


10.4.1 SECTION A - Circuit breakers protecting the 24 V DC users, black water pump and flood light controls

1. **Port Master switch**
   When this switch is disconnected all 24 V yacht port side users are disconnected.
2. **Port lights**
   This switch powers all yacht port lights.
3. **Master stateroom head**
   This switch powers the electric controls of the Master stateroom head.
4. **Master head ventilator**
   This switch powers the ventilator of the Master head.
5. **Gray water pump**
   This switch powers the gray water pump.
6. **Black water (sewage) tank signal**
   Powers the signal system of black waters (sewage) holding tank.
7. **Flood lights**
   This switch powers the flood lights in the bilge.
8. **Available**
   Switch available for auxiliary systems.



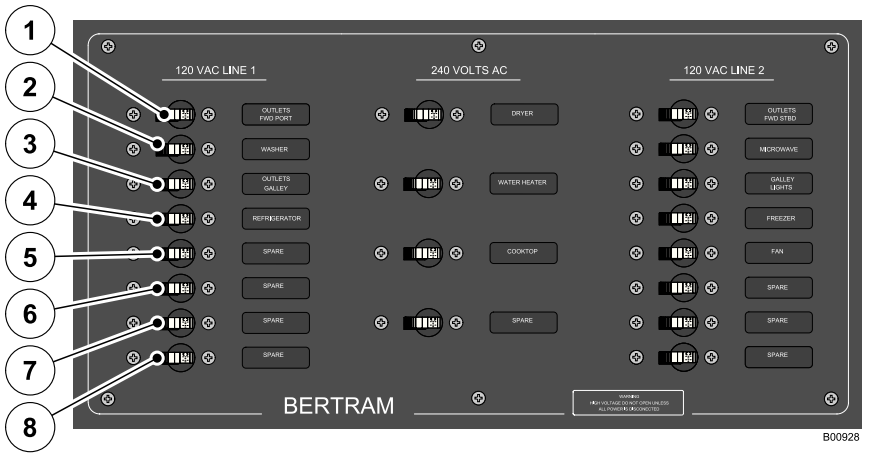
9. **Starboard Master switch**
   When this switch is disconnected all 24 V yacht starboard users are disconnected.
10. **Starboard lights**
    This switch powers all yacht starboard lights.
11. **Starboard head**
    This switch powers the electric controls of the starboard head.
12. **Starboard head ventilator**
    This switch powers the ventilator of the starboard head.
13. **Anchor windlass**
    This switch powers the anchor windlass.
14. **Black water pump**
    This switch powers the black waters pump.
15. **Galley lights**
    Powers the galley light system.
16. **Available**
    Switch available for auxiliary systems.
17. **Black water pump switch**
    Allows to start or stop the black water pump (if relevant LED is lit, the black water pump is powered).
18. **Flood light switch**
    This switch allows to connect or disconnect the flood light system (if relevant signal light is lit, the bilge lights are powered).



10.4.2 SECTION B - Circuit breakers protecting the 120 V and 240 V AC users

- **120 V AC line 1**

1. **Port bow electric outlets**
   This switch powers the bow port electric outlets of the yacht.
2. **Washing machine**
   Switch powering the washing machine.
3. **Galley electric outlets**
   Powers the galley electric outlets.
4. **Refrigerator**
   This switch powers the refrigerator.
5. **Available**
   Switch available for auxiliary systems.
6. **Available**
   Switch available for auxiliary systems.
7. **Available**
   Switch available for auxiliary systems.
8. **Available**
   Switch available for auxiliary systems.

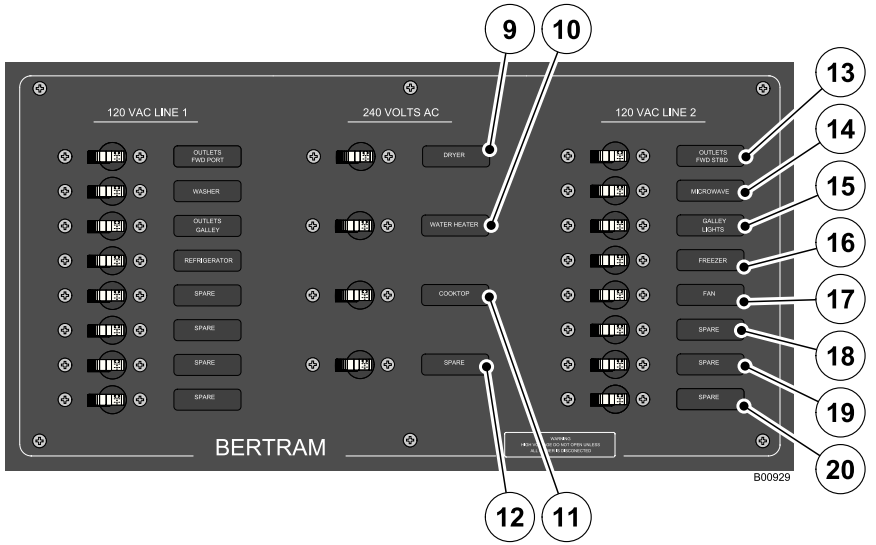


- **240 V AC**

9. **Dryer**
   This switch powers the dryer.
10. **Water heater**
    This switch powers the water heater.
11. **Cooking top**
    This switch powers the cooking top.
12. **Available**
    Switch available for auxiliary systems.

- **120 V AC line 2**

13. **Starboard bow electric outlets**
    This switch powers the starboard bow electric outlets of the yacht.
14. **Microwaves oven**
    This switch powers the microwave oven.
15. **Galley lights**
    Powers the galley light system.
16. **Freezer**
    Powers the freezer.
17. **Ventilation**
    This switch powers the galley ventilator.
18. **Available**
    Switch available for auxiliary systems.
19. **Available**
    Switch available for auxiliary systems.
20. **Available**
    Switch available for auxiliary systems.



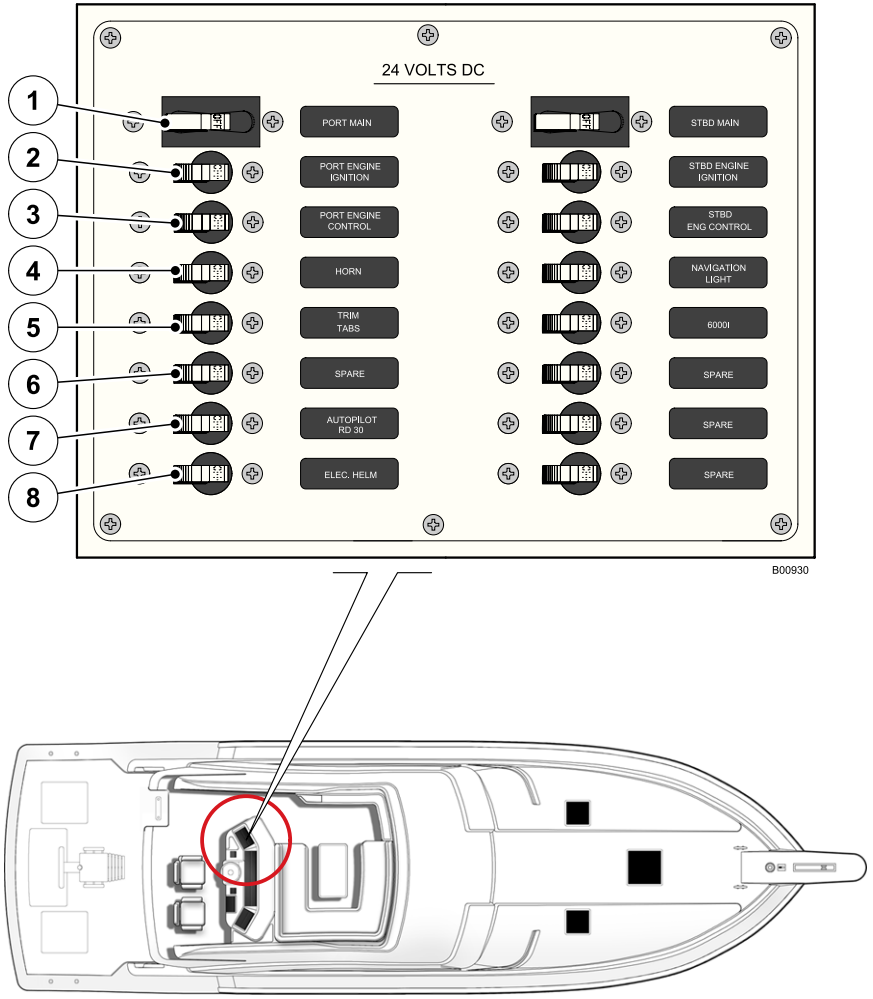
10.5 24 V DC USER FLYBRIDGE ELECTRIC PANEL

On the flybridge is installed a electric panel equipped with circuit breakers protecting the 24 V DC users.

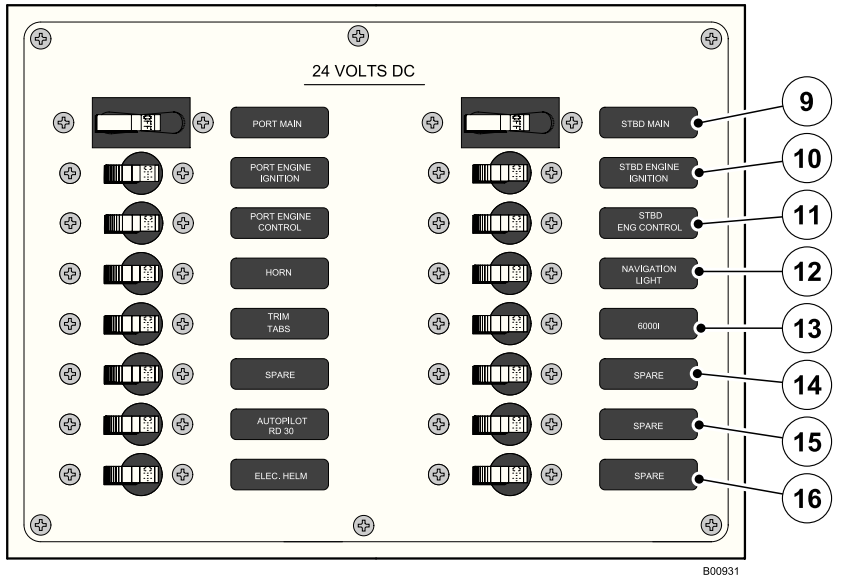
> ***WARNING***
>
> ***High voltage***
> *Disconnect the electric power supply before opening the door.*

> ***WARNING***
>
> *Switch off the generators and disconnect the shore power supply before opening the panel.*

1. **Port Master switch**
   When this switch is disconnected all 24 V yacht port side users are disconnected.
2. **Port engine start system**
   This switch powers the port engine start system.
3. **Port engine controller**
   This switch powers the port engine controller.
4. **Horn**
   This switch powers the air compressor for the operation of the horn.
5. **Trim tabs**
   Powers the electro-hydraulic power unit for trim tab operation.
6. **Available**
   Switch available for auxiliary systems.
7. **Autopilot and RD30**
   This switch powers the autopilot & multifunctional screen electric system.
8. **Electro-hydraulic steering system**
   This switch powers the power unit of the electro-hydraulic helm system.



9. **Starboard Master switch**
   When this switch is disconnected all 24 V yacht starboard users are disconnected.
10. **Starboard engine start system**
    Powers the starboard engine start system.
11. **Starboard engine controller**
    This switch powers the starboard engine controller.
12. **Navigation Lights**
    This switch powers the navigation light system.
13. **6000i**
    Powers the radar/chartplotter/fishfinder.
14. **Available**
    Switch available for auxiliary systems.
15. **Available**
    Switch available for auxiliary systems.
16. **Available**
    Switch available for auxiliary systems.



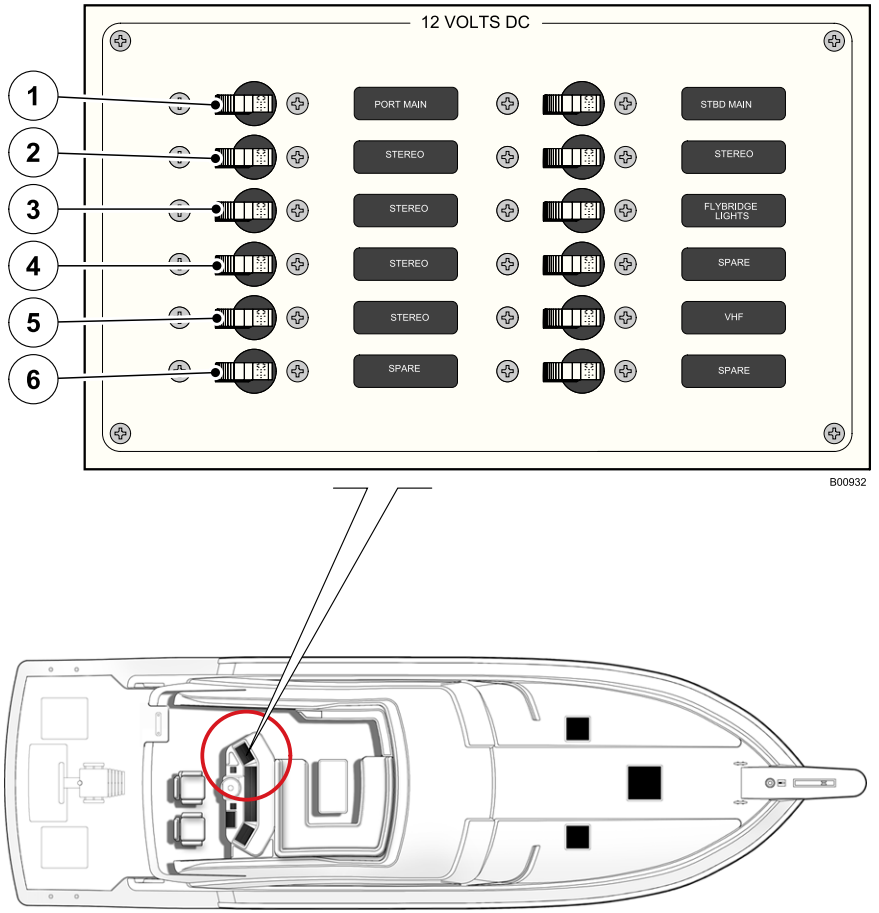
10.6 12 V DC USER FLYBRIDGE ELECTRIC PANEL

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

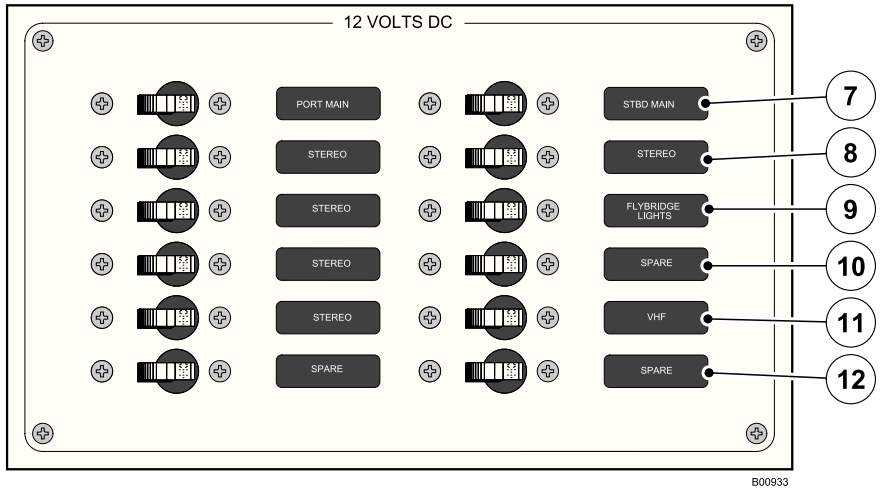
> ***WARNING***
>
> ***High voltage***
> *Disconnect the electric power supply before opening the door.*

> ***WARNING***
>
> *Switch off the generators and disconnect the shore power supply before opening the panel.*

1. **Port Master switch**
   When this switch is disconnected all 12 V yacht port side users are disconnected.
2. **Master stateroom stereo**
   Powers the HI-FI system of the Master stateroom.
3. **Guests stateroom stereo**
   Powers the HI-FI system of the guests stateroom.
4. **Stereo**
   Powers the HI-FI system of the VIP stateroom.
5. **Stereo**
   Powers the HI-FI stereo system.
6. **Available**
   Switch available for auxiliary systems.



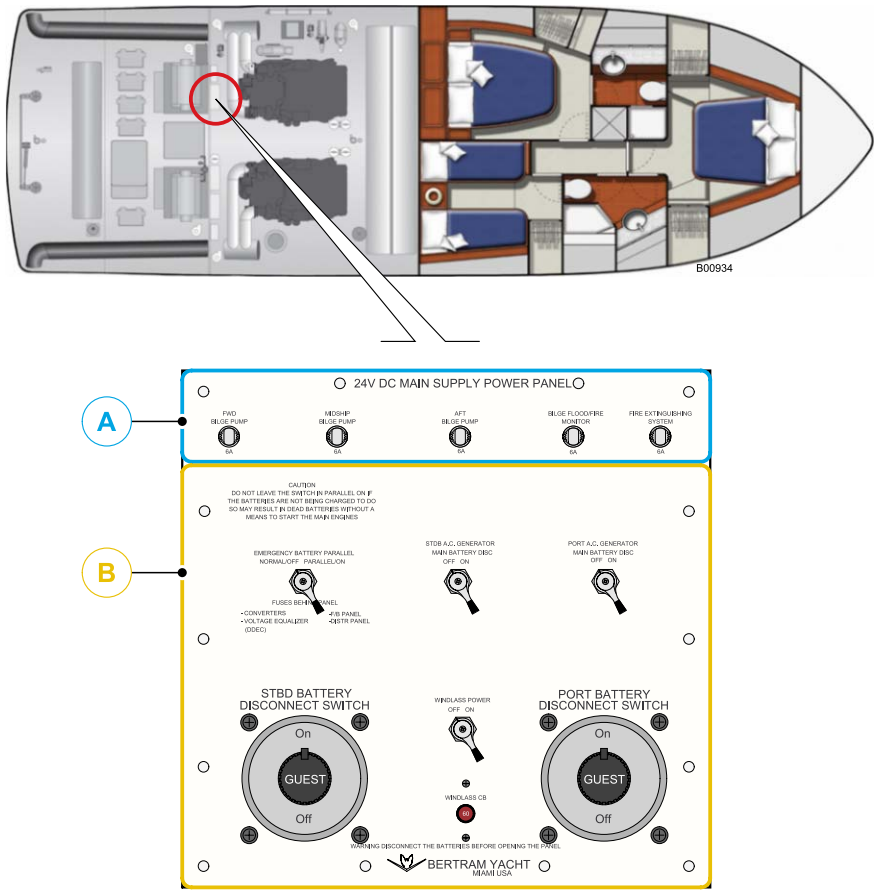
7. **Starboard Master switch**
   When this switch is disconnected all 12 V yacht starboard users are disconnected.
8. **Stereo**
   Powers the stereo system.
9. **Flybridge lights**
   This switch powers the flybridge lights.
10. **Available**
    Switch available for auxiliary systems.
11. **VHF**
    This switch powers the VHF radiotelephone.
12. **Available**
    Switch available for auxiliary systems.



10.7 BATTERY DISCONNECTOR PANEL FOR 24 V DC POWER SUPPLY

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

A. Bilge pump fuses & firefighting system
B. 24 V DC battery disconnectors



WARNING

Before opening the door disconnect the 24 V DC batteries

WARNING

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

CAUTION

The battery disconnect switches 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.

CAUTION

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

DANGER

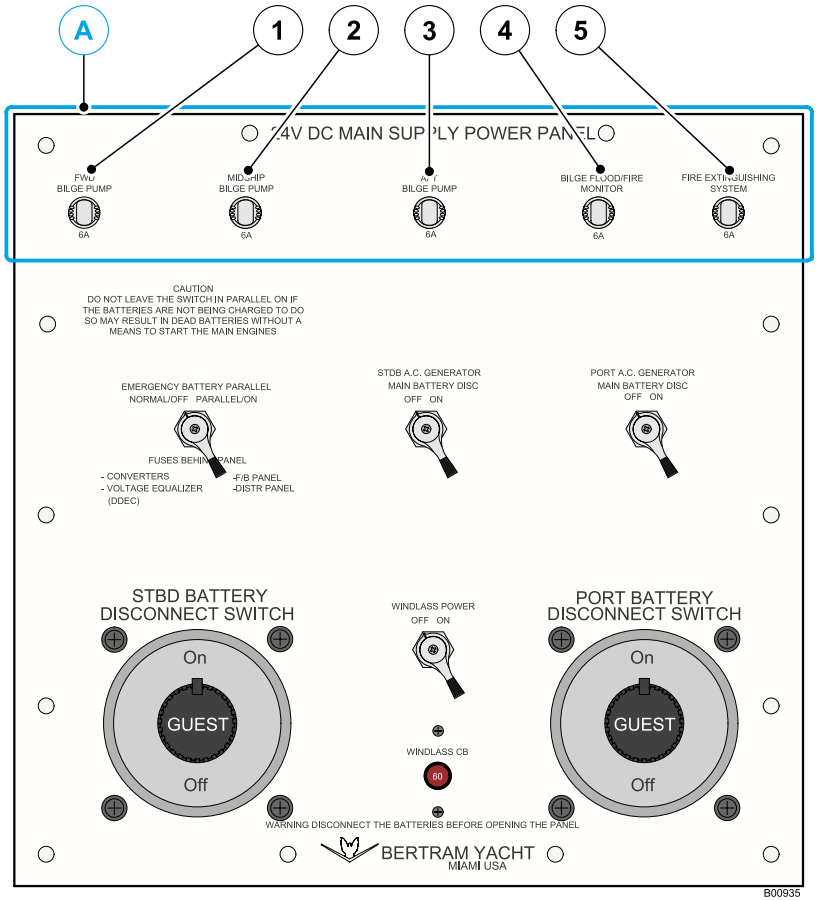
The emergency parallel system is intended for emergency use only. If the batteries are paralleled, they will both charge and discharge at the same rate.
Do not use this system on a continual basis because of the possibility of both battery banks going dead and leaving the main engines without a source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

CAUTION

Do not leave the parallel switch in the “ON” position when batteries are not being charged.
Doing so, may cause battery to lose power without a means to start the engine.

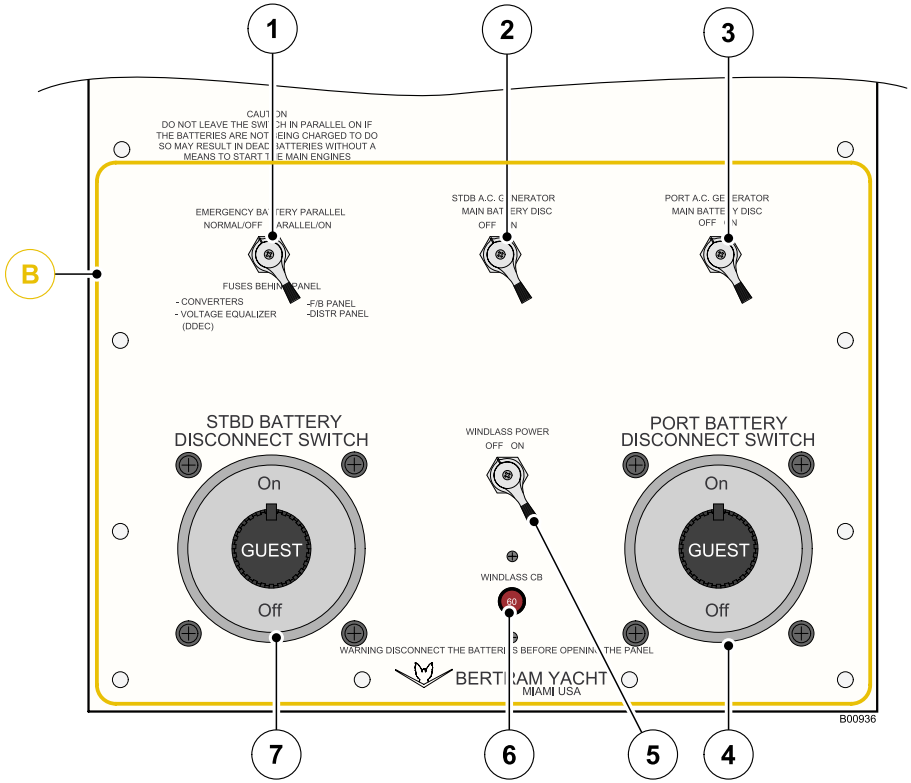
10.7.1 SECTION A - Bilge pump fuses & firefighting system

1. **Fore bilge pump**
   Fuse protecting the fore bilge pump.
2. **Mid yacht bilge pump**
   Fuse protecting the mid yacht bilge pump.
3. **Aft bilge pump**
   Fuse protecting the aft bilge pump.
4. **Bilge flood/firefighting signal panel**
   Fuse protecting the bilge flood/firefighting signal panel
5. **Firefighting system**
   Fuse protecting the firefighting system.



10.7.2 SECTION B - 24 V DC battery disconnectors

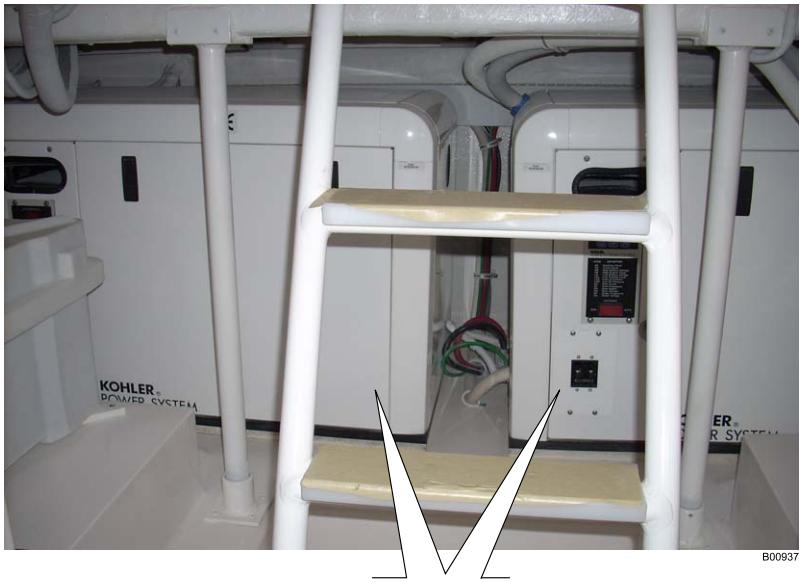
1. **Battery parallel connection emergency**
   Switch allowing to connect or disconnect the battery parallel connection.
2. **Starboard generator battery**
   Allows to connect or to disconnect the battery of the starboard generator.
3. **Battery of port generator**
   Allows to connect or to disconnect the battery of the port generator.
4. **Port engine batteries**
   This switch allows to connect or disconnect the port engine batteries.
5. **Anchor windlass**
   This switch connects or disconnects the anchor windlass.
6. **Anchor windlass fuse**
   Fuse protecting the anchor windlass.
7. **Starboard engine batteries**
   This switch allows to connect or disconnect the starboard engine batteries.



10.8 GENERATORS

10.8.1 Operation

On board of your BERTRAM 510 yacht are installed two KOHLER generators, located in the aft engineroom.
On the fuel tank, you can easily locate the power generator supply, which can be cut-off by means of two suction 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 fuel before reaching the generators, flows through the RACOR separator filters, these hold impurities and separate the possible present water, to prevent them from penetrating into the engines. The exhaust gases, instead of being discharged directly overboard, are conveyed by means of silencers, located in the helm gear compartment and then discharged overboard.
These silencers by means of the water injection in the exhaust tubes, allow to cool down the exhaust gases and at the same time to reduce the noise caused by the water out-flow.
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 filters, remember to close the thru-hull valves and 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.
For detailed information about generators operation and maintenance procedures, see the manufacturer manual.
KOHLER 2 x 15.5 EOZD (120 V/240 V - 60 Hz)



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10.8.2 Generator control panel

On the generator is located a control panel to carry out the start up and stop operations and checks.

Keys function

1. Display
2. Confirmation key “⊙”
3. Scroll key “V”
4. Scroll 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 output at 240 V
7. Oil intake for generator cooling

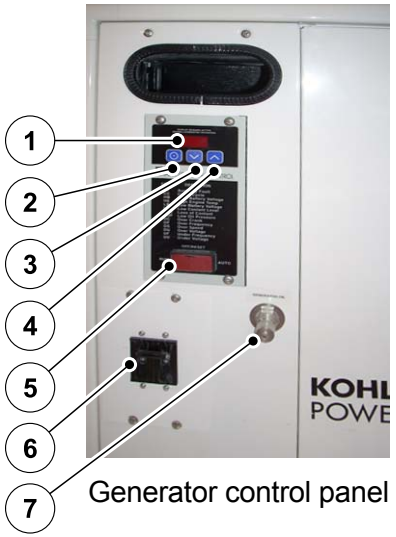
For more information, consult the Manufacturer’s manual.

WARNING

Carbon monoxide poisoning:
– Operate generator only in a well ventilated area. Carbon monoxide poison, created by the engine internal combustion, is extremely toxic.

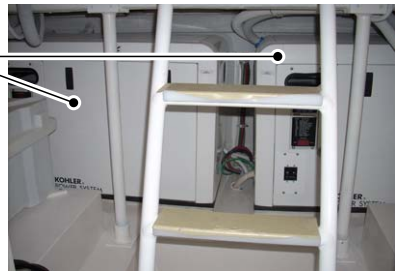
WARNING

Fire/explosion danger
Check generator compartment for fumes.



Generator control panel

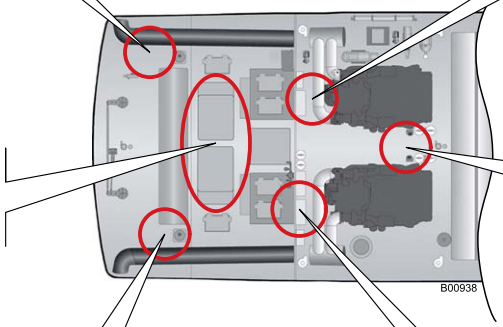
Silencer for port generator



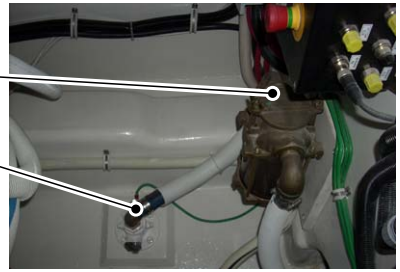
Generators

Port generator intake seacock valve and filter

Fuel delivery valves



Silencer for starboard generator



Starboard generator intake seacock valve and filter

Generator filters

1. Generators
2. Starboard generator intake seacock valve
3. Starboard generator intake seacock filter
4. Port generator intake seacock valve
5. Port generator intake seacock filter
6. Valve of the fuel line to starboard generator (close in case of generator leaks or carry out maintenance)
7. Valve of the fuel line to port generator (close in case of generator leaks or carry out maintenance)
8. RACOR water & fuel separator filter for port generator
9. RACOR water & fuel separator filter for starboard generator
10. Starboard generator silencer
11. Port generator silencer

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 Generator oil specifications

Refer to generator manual for the oil specifications.

NOTICE

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

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.

NOTICE

Do not operate the generators if the oil level is below both reference marks.

10.9.3 Oil change procedure

See manufacturer's manual.

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 coolant 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.

WARNING

Hot coolant and steam in the cooling system of a warm engine may cause severe injury or 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.

Sacrifical 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.

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 and service

The air penetrating inside of 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 as needed.
- Check for corroded or broken metal parts. Replace them as needed.
- 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 residues indicate exhaust leaks, which must be repaired.

CAUTION

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.

10.12 BATTERIES

The batteries are normally charged by the alternators during the engine operation. Alternatively, you can recharge them with the battery charger by shore power supply or by the generator (selecting the power source).

Description	Element number	Features
Engines start	2	12V
Generator start	1	12V
Service	2	12V

CAUTION

If batteries are not recharged over long periods of inactivity, they loose progressively their charge, until they become definitively flat and irreparably damaged.

WARNING

Always keep the batteries charged and recharge them periodically even if the yacht is left unattended. If the charge level drops to the minimum, they can irreparably get damaged. Verify the charge every week.

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

Do not place objects on the battery cases.

WARNING

Check the voltage of the batteries. During the charging phase 29.1 V can be achieved, 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 circuit breaker of the battery charger must be disconnected.

WARNING

A frozen battery may explode if used or charged; do not start a yacht with a frozen battery. To avoid the battery freezing keep it always completely charged.

DANGER

The battery releases explosive gas: do not approach sparkles or flames 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 densimeter or a voltmeter.

WARNING

Check the battery status for spots of electrolytic corrosion on poles and terminals; in case you notice the presence of electrolytic corrosion, address to Customer Support and have the elements showing this kind of faults replaced.

10.13 SHORE ELECTRIC POWER SUPPLY

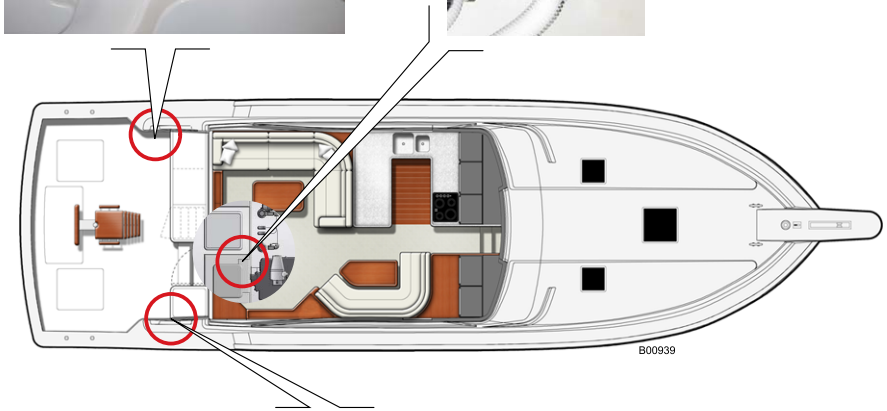
DANGER

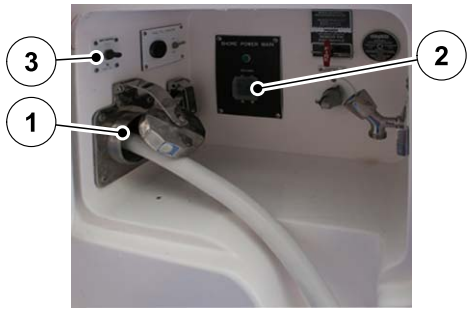
Before connecting the shore power outlet, check the voltage and electric outlets available, check their entirety and the absolute absence of moisture on the wire, on the outlet, and on the plug.
With plug connected check that wire:
– *cannot get in traction as a result of tide variations, yacht movements, etc.;*
– *cannot get crushed, etc.;*
– *is not in contact with water.*

In order to power the electric system of the yacht, so as to operate the various systems on board, two connections (**1**) for 240 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.
The yacht is equipped with an isolation transformer located in the engineroom, able to isolate galvanically the yacht electrical system from the shore electrical plant.
Frequently the shore power outlets are not compatible with the one provided; in this case it is necessary to ask the Port Management for a new plug or adaptor.
One of these outlets is equipped with electric cablemaster (Glendinning 240 V/50 A), placed in the engineroom and allowing an easy recovery of the cable; it can be powered by switch (**3**) located close to the cable outlet (see figure).

Port side electric power supply from shore

Galvanic Isolator





Starboard electric power supply from shore

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.

To use shore electric power supply:

– Turn OFF the AC shore master power supply breakers on the main electric panel of the salon.
– Set to OFF the circuit breaker placed on the shore column.

Without Glendinning

• Connect the shore power supply cable to the intake outlet of the unit, before connecting it to the shore power supply source (shore column).

With Glendinning

• Plug the cablemaster into the shore power electric outlet.

WARNING

Do not modify the connectors of the shore power supply cable, use only compatible connectors. If the yacht power cord cannot be plugged into the shore outlet, ask the port authority for an adapter. Anyway do not use adaptors breaking the connection of neutral cable between the electrical system shore and the unit electrical system.
Using the above mentioned adapters could damage irreparably the 120 V power supplied fixtures.

– Turn ON the circuit breaker on the shore column.
– Turn on the master shoreside circuit breaker, then select the shore power supply on the main electric panel.

WARNING

Do not place your hands into the hawse pipe when retrieving the cable.

CAUTION

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.

To service the electric power supply from shore:

– In a saltwater environment, periodically wipe uncovered metallic parts of cables and fresh water ducts while the shore power supply is not in use. Dry and spray with moisture repellent.
– Periodically apply vinyl protector to the cables’ plug.

CAUTION

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 at 50 A to protect the shore power supply cord fitting. Do not exceed a current absorption of 50 A.

DANGER

Before any operation on the electrical system, cut off all circuits (shore power and generator):
– disconnect the shore power outlet;
– set to OFF the generator circuit breakers.

WARNING

The connection must be performed under safety conditions with no powered connections and by paying attention to carry out a correct grounding.

DANGER

Do not leave electric power from shore connected with no one onboard.

WARNING

Do not modify the electric systems of the unit or the relevant drawings. The installation, the modifications or the service must be performed only by a skilled marine electrician. Inspect the system at least once a year.

WARNING

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 dock 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.

DANGER

Before carrying out any intervention on the electric system, disconnect all circuits and the shore power outlet.

WARNING

Disconnect shore power supply when the system is not used.

WARNING

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

CAUTION

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

CAUTION

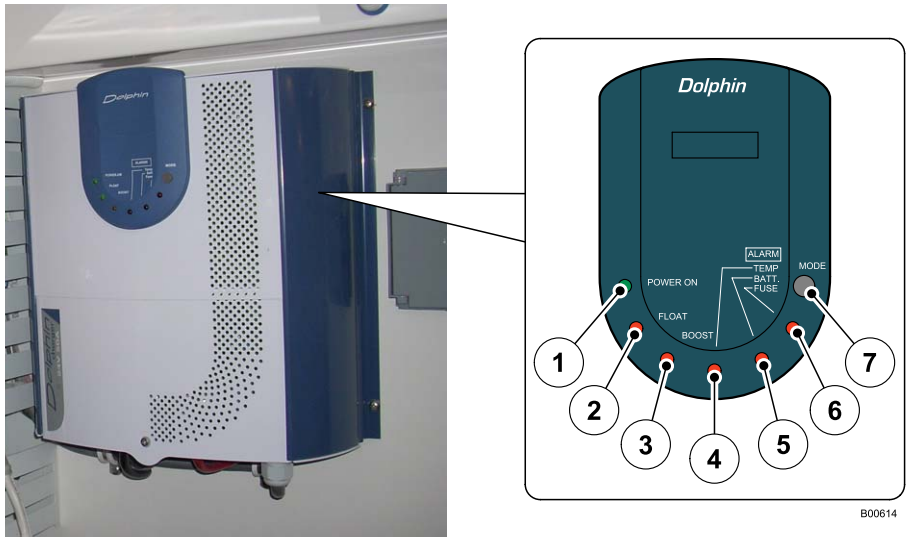
To reduce to the lowest the hazard of electrocution or fire:
- *turn OFF switch for connection to shore supply of the unit, before connecting or disconnecting the shore power supply cord;*
- *disconnect the shore power cable and rewind it by means of the cablemaster;*
- *fasten tightly lid of shore power supply outlet.*

WARNING

Do not modify the connectors of the shore power supply cable, use only compatible connectors.

10.14 BATTERY CHARGER

Your yacht's battery charger is a fully automatic fixture not needing any manual intervention. This battery charger has a special charging technique designed to charge the battery rapidly and safely, while also supplying power to the onboard DC equipment. The battery charger is protected from short-circuits, overloads, and high engineroom temperatures.
The battery charger displays following keys, "MODE" (**7**), five LEDs "FLOAT"(**2**), "BOOST" (**3**), "TEMP" (**4**), "BATT" (**5**), "FUSE" (**6**) and one LED of "POWER ON" (**1**).
This battery charger allows to use up to 10 charging programs, according to the kind of batteries installed on the yacht.



To begin
- All 6 LEDs will blink for 5 seconds
  - CPU initialization
  - Charge position is charging

Absorption phase (maximum 6 hours)
- LED "Power On" is on
- LED "Boost" is on
  - The batteries are in absorption phase

Equalization phase (maximum 4 hours)
- LED "Power On" is on
- LED "Boost" blinks
  - The batteries are in equalization phase

Floating stage
- LED "Power On" is on
- LED "Float" blinks
  - Batteries charged and in floating stage

Communication fault
- LED "Power On" blinks
  - LED "Float" or "Boost" is on
    - Communication network fault
    - Security voltage charge
  - Check the network connection (internal & external)

Internal temperature fault
- LED “Power On” blinks
- LED “Float” or “Boost” is on
- LED “Temp” is on
  - Internal temperature fault on one of the cards
  - The charging current has been reduced by half
  - Return to normal state upon removal of fault
- LED “Power On” blinks
- LED “Temp” is on
- Internal temperature fault
- The charger is on stand-by for 30 seconds and will reboot automatically once the fault is resolved.
- Check the installation and climatic conditions
- Check the internal fan is operational
- Check charger’s confinement

Faulty battery temperature
- LED “Power On” blinks
- LED “Temp” blinks
  - External temperature fault
  - The charger is on stand-by for 30 seconds
    - Check the installation and climatic conditions
    - Check the external sensors

Faulty external sensors
- LED “Power On” blinks
- LED “Temp” blinks
- LED “Bat” blinks
  - Faulty external sensor temperature
  - The charger is on stand-by for 30 seconds
  - Check the external sensors connections

Faulty output load
- LED “Power On” blinks
- LED “Bat” is on
  - Faulty output load
  - The charger is on stand-by for 30 seconds
    - Check external sensor
    - Check the condition of the electronic card

Faulty battery fuse
- LED “Power On” blinks
- LED “Bat” is on
  - Faulty battery fuse
    - Check batteries connections
    - Check the status of the fuses box

Sulphation boost (maximum 1 h)
- LED “Power On” is on
- LED “Boost” blinks
- LED “Temp” blinks
- LED “Bat” blinks
- LED “Fuse” blinks
    - equalization phase to 09 position

Sulphation Float
- LED “Power On” is on
- LED “Float” blinks
- LED “Temp” blinks
- LED “Bat” blinks
- LED “Fuse” blinks
  - floating phase to 09 position

Manual equalization

- LED “Power On” is on
- LED “Boost” blinks
  - Holding down the “mode” button on the front for 2 seconds will begin an extra equalization phase
  - The short anti cycle lasts 24 hrs
  - Please note that holding down the “mode” button will confirm and begin the desulphation programme.

Cycle number	Length of equalization phase
0, 1, 2, 3	2 hours
4, 5, 6	1 hour
7, 8	/
9	begins programme 9

1/2 CHARGE

- LED “Power On” blinks rapidly
- LED “Float” or “Boost” is on
  - A short press of less than 1 second on the mode button will set the charger in 1/2 charge mode: the maximum voltage delivered by device being reduced by half; this is regardless of the cycle of the charger.
  - Another short press allows the charger to revert to its normal operation status.

For further information, refer to manufacturer manual.

DANGER

Before working on the battery charger, disable the generators and the shore power supply line. Risk of electrical shock, which can cause severe injury or death, exists when electric power is present or is turned on by accident.

- This device is suitable for connection to electric single-phase network of 230 V 50 Hz or to 115 V 60 Hz.
- The toggle between 115 V and 230 V is performed automatically.
- For safety reasons, the PE terminal of device must absolutely be connected to the system bonding (yellow/green wire of power supply cord).
- To prevent overheating, carry out cable connection correctly.

NOTE: If reverse battery polarities get connected, the relevant protection fuses will blow.

Start up precautions

In order to prevent all risk of electric shocks at either start up or during the utilization of the system, the protection cap must rest in place and be tightly screwed.

Precautionary maintenance

In order to prevent risk of electric shocks during maintenance, please follow closely all recommendations below before any maintenance begins.

- Disconnect the cable.
- The access to -DC or _BAT must be disconnected in order to avoid transfer of energy.
- Please wait five minutes before accessing the casing as the high-tension condensation will need time to discharge.
- Fuses must be replaced by fuses that have the same characteristics and performance levels.

CAUTION

- *This device is not protected against reverse battery polarity. Irreversible damage may result.*
- *If the mechanical components of the device are not protected by the casing and fall, irreversible damage of the ventilation system and certain electrical components may result.*
- *Modifications made to the casing (and in particular if holes are bored), may result in the deposit of metallic shavings or filings onto the electronic card and consequently may cause the malfunction of or damage to the device.*
- *Interfering with or modifications made to the electronic card may result in unforeseen operations and consequently may cause the malfunction of or damage to the device.*
- *Use of a non-adapted power supply (as a general rule, the input voltage will be too high) may cause the malfunction of or damage to the device.*
- *An accidental electrical surcharge or lightening strike will generally cause the malfunction of or damage to the device.*
- *Replacement of battery fuses with fuses types other than those recommended (same characteristics) may cause the malfunction of or damage to the device.*
- *Obvious connection errors will result in the malfunction of or damage to the device.*
- *Water gaining access to the interior of the device may cause the malfunction of or damage to the device.*

Electrical Lines and Switchboards Check

- Check the inside of the switchboard and clean it if necessary.
- Check the operation of all switches.
- Inspect for any evidence of overheating at terminals or wiring.
- Do not permit metal tools or metal items to bridge across the battery terminals. Cover battery terminals with proper, non-conductive terminal covers.

DANGER

Wear eye protection and liquid-proof gloves when working with or around batteries. Battery acid is a strong corrosive. Contact with acid will damage eyes and skin.

WARNING

These operations should be performed only by qualified personnel.

CAUTION

Charge batteries with extreme caution.
If the battery is located in a closed area, ensure adequate ventilation for the dissipation of battery charging gas. Prevent battery electrolyte from freezing by keeping the batteries fully charged. Never attempt to charge a frozen battery or to use it to start engines. Charging or drawing on a battery with frozen electrolyte may cause an explosion and/or fire.

10.14.1 12 V/24 V DC 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 over-all voltage of the 24-volt bank, and it is not capable of sensing unbalanced loads within the battery bank.

For further information, refer to manufacturer manual.

NOTES:

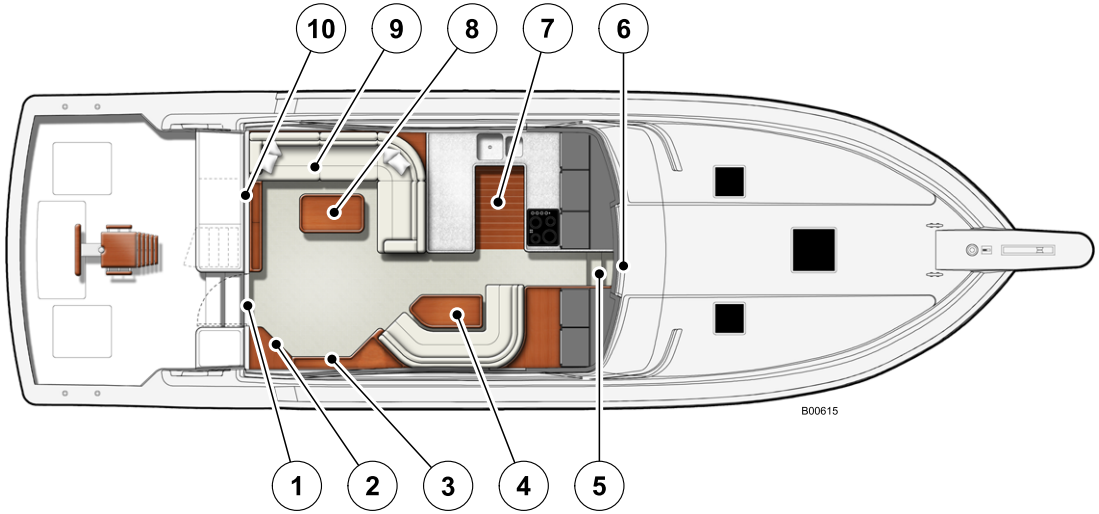
BERTRAM

11

INTERIOR DETAILS

11.1 INTERIOR DETAILS - MAIN DECK

1. Salon access door
2. Entertainment center
3. Main electric panel
4. Forward Upper Dinette With Table
5. Stateroom area access stairs
6. Secondary electric panel
7. Galley
8. Salon table
9. Salon sofa
10. Salon window



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.
The salon is arranged with a table and a comfortable L-shaped settee, lit through a wide window.
The windows of the salon are all equipped with wood blinds.
The room is made comfortable on the sides by a set of curtains with package folding which makes the salon well-lighted.

WARNING

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.

Toward the bow, is arranged a dinette with table and sofa, while port is located the galley, equipped with all necessary appliances.

NOTICE

At least once a month vacuum out all A/C filters, by means of the centralized suction system.

The galley is equipped with a cooking top of three burners, fridge and freezer, countertop, sinks, microwave oven.
Various cabinets and drawers stow inside crockery and china plates, glasses and stainless steel cutlery.

NOTICE

At least once a month perform accurate cleaning of dishwasher. Check for the operation at least once every three months.

NOTICE

Do not leave cooking pans unattended on the cooking top. Do not cook while underway. Do not put liquid food inside the oven.

NOTICE

Verify the operation of the oven at least once a month. Carefully clean each time after use.

NOTICE

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.

WARNING

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 essential.

CAUTION

When underway, the yacht's normal motion at sea can cause persons moving about on the yacht to slip or trip and fall with a potential for causing serious injury or death. Persons should remain seated in secure locations when the yacht is underway.

CAUTION

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.

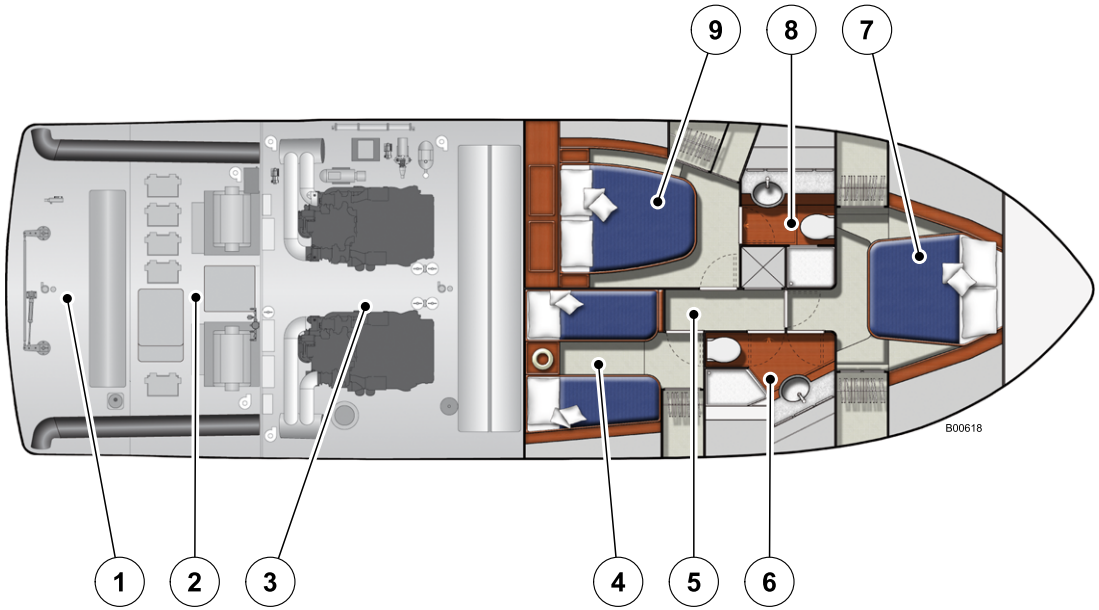
From the galley some steps lead to the belowdeck area, where are arranged the three main staterooms.
Doorways, ladders, stairs, passageways, etc., should be kept dry and free from obstructions.

NOTICE

For more directions about the use of the individual systems and equipment, consult the manuals provided by the individual equipment manufacturers.

11.2 BELOWDECK

1. Helm gear compartment
2. Generators room
3. Engineroom
4. Guests' & VIP stateroom
5. Access stairs
6. Guests head
7. VIP stateroom
8. Master head
9. Master stateroom wardrobe room



11.2.1 Staterooms with head: Master's, guests'

You can reach the staterooms through the stair located at galley foredeck. Down stair, starboard is located the guests stateroom, arranged with two single beds, with drawer underneath.
Starboard is arranged the Master stateroom with relevant head complete with shower box.
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.

CAUTION

During navigation it is necessary to unlock the safety closure of the fore skylight.

The dunnages under the carpeting of the passageway give access to the yacht bilge housing:
- the water heater;
- gray water tank;
- black waters (sewage) tank;
- air-conditioning unit;
- distribution manifolds;
- sump pumps;
- bilge pumps;
- the toilet direct discharge;
- grey water tank pump;
- autopilot compass transducer;
- holding tank discharge.

Besides in the passageway, a structure shaped as a closet contains inside a washing machine and a dryer.

CAUTION

Empty the content of washing machine and dryer while underway.

WARNING

Before sailing, check if the staterooms access doors are closed. You will avoid unpleasant bangings and accidental dangers.

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

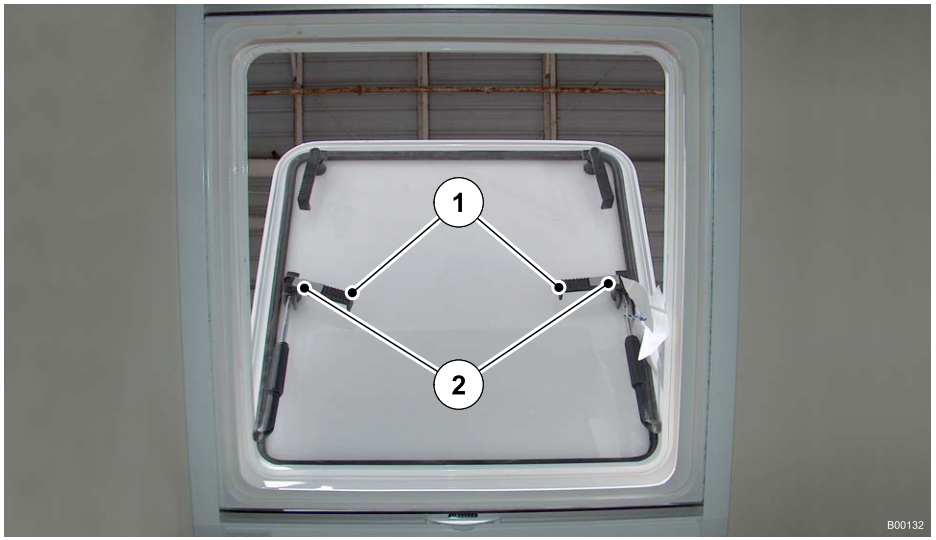
See manufacturer's manual indicated.

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

Verify the correct operation of the closing systems at least once a month. Check for water seal at least once every three months. Clean seals when required and replace if necessary

CAUTION

During navigation it is necessary to unlock the safety closure of the fore skylight.

NOTES:

BERTRAM

12

SAFETY DEVICES AND EQUIPMENT

12.1 GENERAL SAFETY STANDARDS

BERTRAM 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.

WARNING

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.

WARNING

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, steering wheels, etc. as handholds. Failure to observe these practices can result in illness, serious injury or death.

NOTICE

Make sure that required and approved lifesaving and firefighting equipment is on board and in proper working condition. All safety devices should be periodically inspected to ensure their reliable performance when needed. These items should be stored in a visually conspicuous location and be readily and easily accessible in an emergency situation. All persons onboard should be instructed in the proper use of all safety equipment.

WARNING

Safety equipment and systems must comply with the existing local, and national or international regulations. This equipment must be periodically inspected and maintained by qualified technical personnel prior to the expiration date, if any, indicated on the equipment or systems. Refer to the local port authorities, and national or international regulations for information about the requirements for the carriage of safety equipment.
Failure to adhere to these rules could result in equipment failures that lead to personal injury or death and/or fines and/or other punishment imposed by the respective regulatory agencies.

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 onboard and for the safety of the yacht itself, however when the engine is running it should not run higher than 1000 rpm.

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 require that persons wear PFD's (life jackets). 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 yacht is underway.

Make sure that all objects on board are rigged and stowed properly to prevent movement when your yacht 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 on the boat, 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.

CAUTION

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, steering wheels, etc. as handholds. Failure to observe these practices can result in illness, serious injury or death.

WARNING

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.

CAUTION

Never exceed the weight limits for people and load carried.
People and loads should be distributed evenly on the yacht.
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 the 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 helm 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 generators are running.

Persons having access to the engineroom must be aware of potential hazards of the following:

- moving mechanical parts;
- high ambient temperature and hot parts or equipment;
- hot, pressurized and/or toxic fluid systems;
- flammable fluids;
- high noise levels 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.

WARNING

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.

WARNING

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.

12.3 PFD's - PERSONAL FLOTATION DEVICES AND LIFE-SAVING EQUIPMENT

All PFD's (wearable and throwable) used on the yacht must be approved by the applicable regulatory agencies. 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 require that persons wear PFD's (life jackets). PFD's may be worn in any weather, underway, at the dock or at anchor.
People can fall off the yacht at any time.

- Non-swimmers and children should wear a PFD at all times.
- People working on deck should wear a PFD at all times.
- 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.

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.

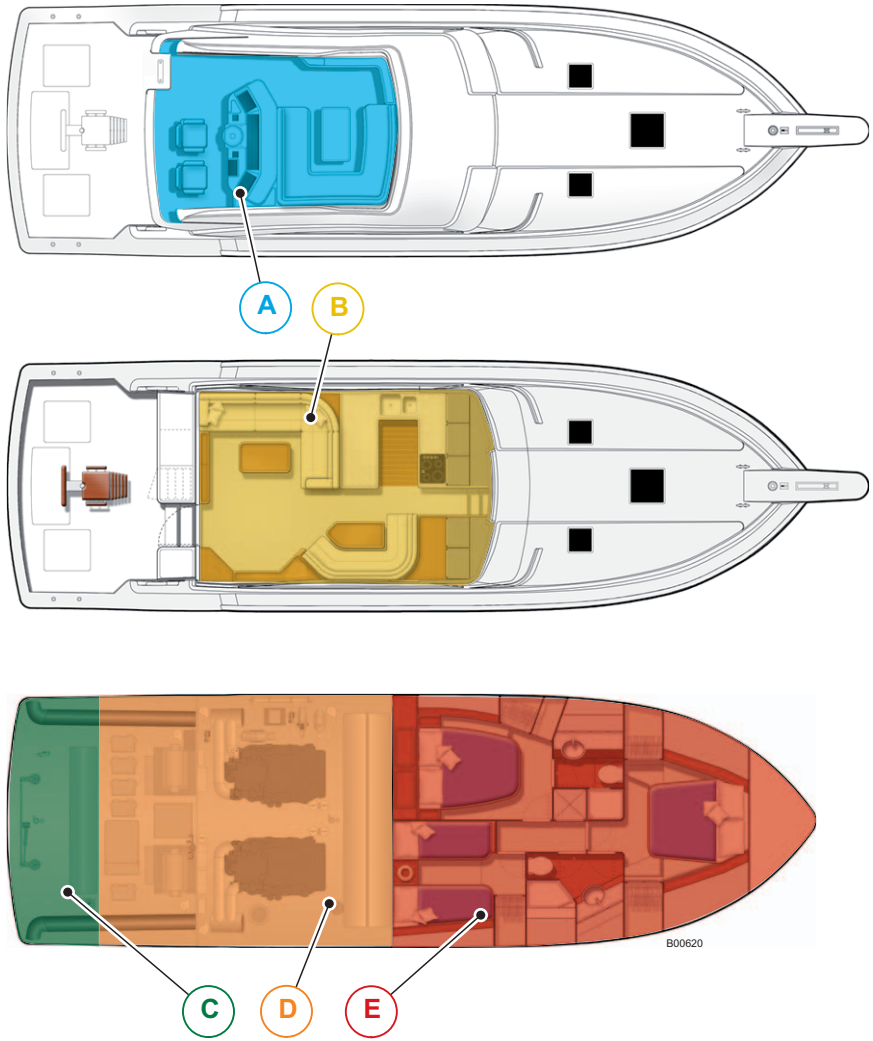
12.4 YACHT'S AREAS & ESCAPE ROUTES

In order to face the various emergencies that could determine the abandonment conditions of the yacht (fire, collision with sinking hazard etc.), in the quickest and safe way, the rules in force require an "escape route" informing about the safest and most protected paths as well as the quickest (from any yacht's area) for taking shelter and reaching the "collecting areas", located in the open, from which it will be easier to leave the yacht.
In the plan shown hereunder, are represented the general decks of the yacht subdivided in areas:

A. Flying bridge
B. Salon, dinette and galley
C. Helm gear compartment
D. Engineroom
E. Master, guests', VIP staterooms

WARNING

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.



CAUTION

During navigation it is necessary to unlock the safety closure of the fore skylight.

CAUTION

Always keep the escape routes, dry, free and accessible.

DANGER

The various yacht's areas have more than one escape route. You have therefore, according to the nature and position of the danger or fire source, choose very carefully the most safe and suitable escape route.

DANGER

It is forbidden to stay or to walk on the corridor and on the side yacht bow, while underway, because no railing prevents the risk of falling at sea.

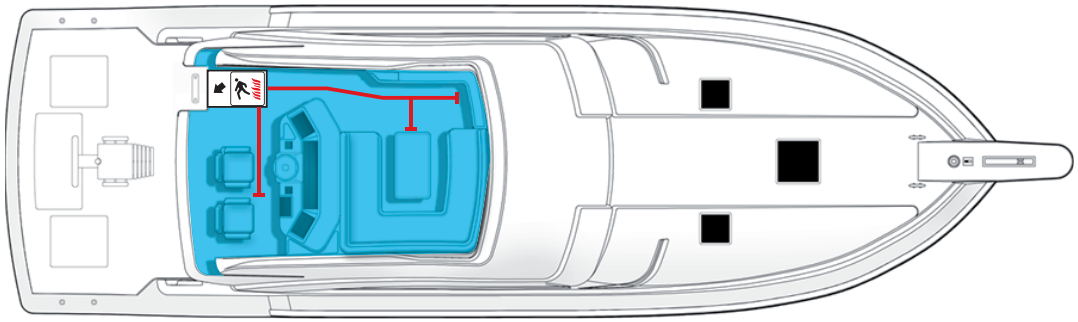
12.4.1 Flybridge Area

The flying bridge area is equipped with only one exit (escape route).
From the flybridge, by means of a port stair you can reach the cockpit (**1st Path**).

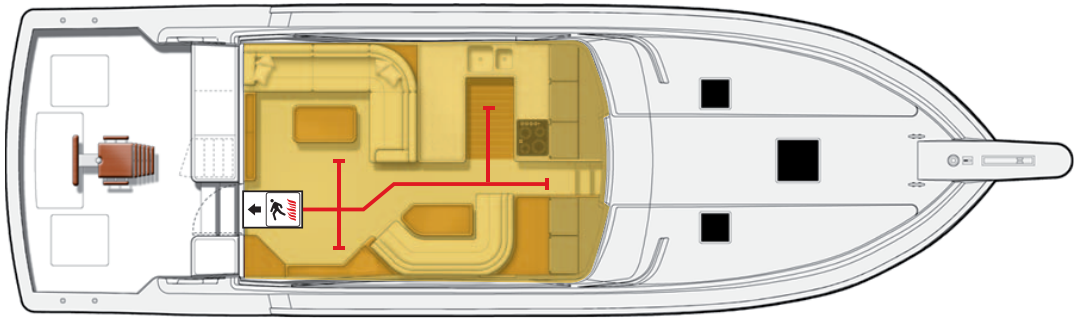
12.4.2 Salon, dinette and galley area

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 Master, guests & VIP staterooms area

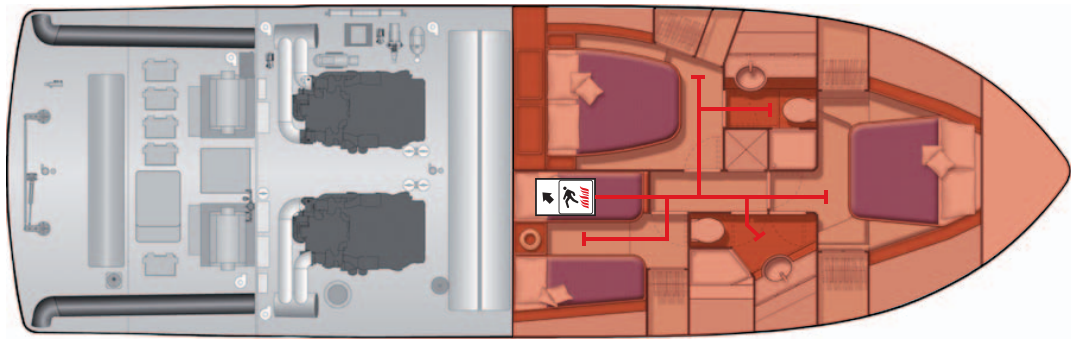
The plans hereunder show the escape routes and the paths to be used in case of need to escape from Master, guests and staterooms area.
Use to this purpose, the stair leading to the salon, dinette and galley (**3rd Path**), or take shelter through the fore skylight (**4th Path**).

DANGER

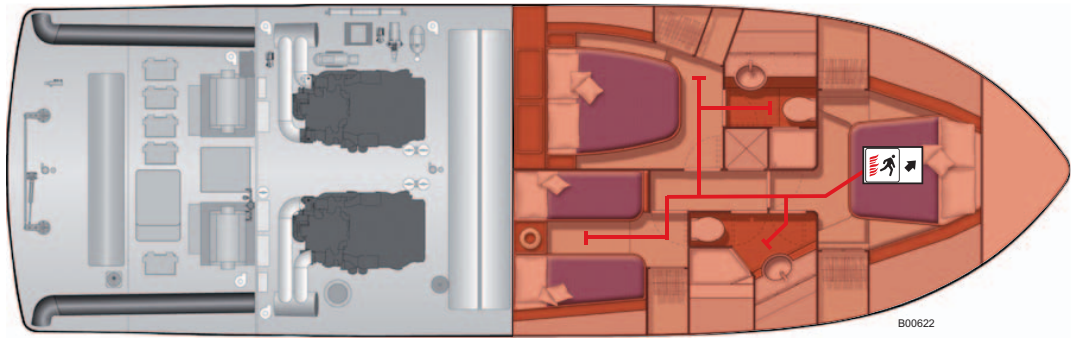
The Master, guests & VIP staterooms area shows more than one single escape route. You have therefore, according to the nature and position of the danger or fire source, choose very carefully the most safe and suitable escape route.

During navigation it is compulsory to unlock the safety closure of the fore skylight, so as to grant a safe and quick escape.

3rd Path



4th Path



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 owner and the captain are directly responsible for:

- having the fire extinguishers and fire fighting 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, fire fighting 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 the yacht to:
- obstruct passageways and escape routes;
- obstruct the access to safety devices, such as fuel valves, electrical switches, etc.;
- obstruct the access to fire extinguishers stowed inside 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.

WARNING

Fire prevention is a key to safety onboard 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.

CAUTION

Do not use water for extinguishing electric or electronic equipment fires.

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 generators;
- 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.

WARNING

Fire fighting equipment and controls must be accessible at all times. Failure to have access to fire fighting equipment and controls could result in serious injury or death and property damage.

CAUTION

Do not open engineroom access hatch, until the fire is completely extinguished.

12.6.1 Leaving 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).

BURN HAZARD: Swim against the current or wind when you leave the yacht. Leaking fuel will float with the current and may ignite. When clear of danger, account for all who were onboard, and help those in need.

- Use distress signal.
- Keep everyone together to make rescue easier.

12.7 FIREFIGHTING

12.7.1 Disconnecting 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.

WARNING

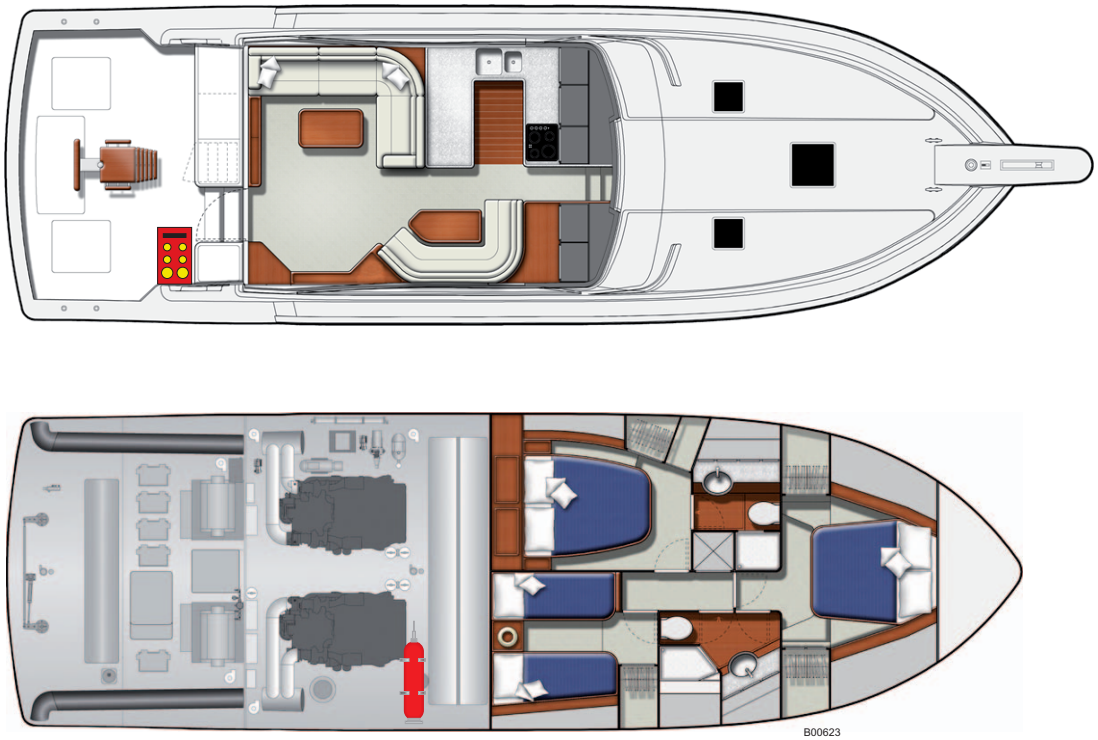
NEVER

- *obstruct passageways and emergency exits.*
- *to obstruct the access to safety devices, such as fuel valves, electrical switches, etc.*
- *to obstruct 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 cooking 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.

12.8 FIREFIGHTING SYSTEMS

12.8.1 Location Of Safety And Firefighting Equipment



Fixed firefighting system emergency control in the engineroom

FE-241 fixed fire extinguisher

12.8.2 Portable fire extinguishers

NOTICE

The person in charge of the yacht must make sure that all persons onboard know the locations of and how to properly operate the portable, hand-held fire extinguishers.

- Check the extinguisher 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 fire involving electrical panels or electrical equipment.
- Direct the discharge nozzle towards base of the fire and open the discharge valve.
- Try to extinguish the flames and cool the equipment.
- After using the extinguisher to fight fire in closed spaces, ventilate the space fully before entering.

Portable fire extinguisher checks and tests

Check the portable extinguisher charge status at least once a month and, in any case, prior to navigation. The pressure gauge needle should be within the green sector of the unit. Service portable extinguishers at an authorized facility and in accordance with the manufacturer's recommendations and applicable regulations.
For further information refer to the extinguisher manual or address to the manufacturer.

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 service technician should attach a tag to each extinguisher showing the date of the maintenance check.

After any use, portable fire extinguishers should be recharged by a qualified fire extinguisher service facility or replaced with a unit of comparable size, rating and extinguishing agent.

All extinguishers should be examined at least monthly to ensure that:
- they are located in their designated places.
- they have not suffered corrosion or mechanical damage.
- they are fully charged. Those extinguishers having pressure gauges or pressure indicators should show that pressure is within the prescribed limits. Those without pressure gauges or indicators and Halon and CO2 portable fire extinguishers should be weighed.
- the tamper seal should be inspected to ascertain that the extinguisher has not been operated.
- the nozzle orifice should be unclogged and the hose in good condition.

For fixed systems, the connections of the distribution piping are secure and the discharge nozzle(s) is (are) unobstructed.
- the fixed system has not been discharged.

NOTICE

Maintain all firefighting equipment and controls according to the Manufacturer's instructions. Have the equipment serviced at regular intervals by a qualified fire extinguisher service technician.

- Verify the charge at least once a month and anyway before navigation.
- Verify the outer condition at least once a month and anyway before navigation.
- Verify fastening at least every six months.

NOTICE

For more directions about the use of the individual systems and equipment, consult the manuals provided by the individual equipment manufacturers.

12.8.4 Engineroom fixed firefighting system

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 by an automatic system, consisting of a glass flask filled with liquid; when the temperature increases in the engineroom, the liquid expands, breaks the flask and activates the extinguisher. The flask is installed 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.

WARNING

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.

WARNING

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 generators. If the engines are not stopped quickly, the fire-fighting agent concentration may be rapidly reduced and eliminated as an effective fire-fighting agent.
In order to give FE-241 a chance to extinguish a fire, the concentration must remain as high as possible. Do not open the engine room access hatch.
The fixed fire extinguisher will fight fires only in the engine room. Fires outside the engine room should be fought with the portable hand-held extinguishers.

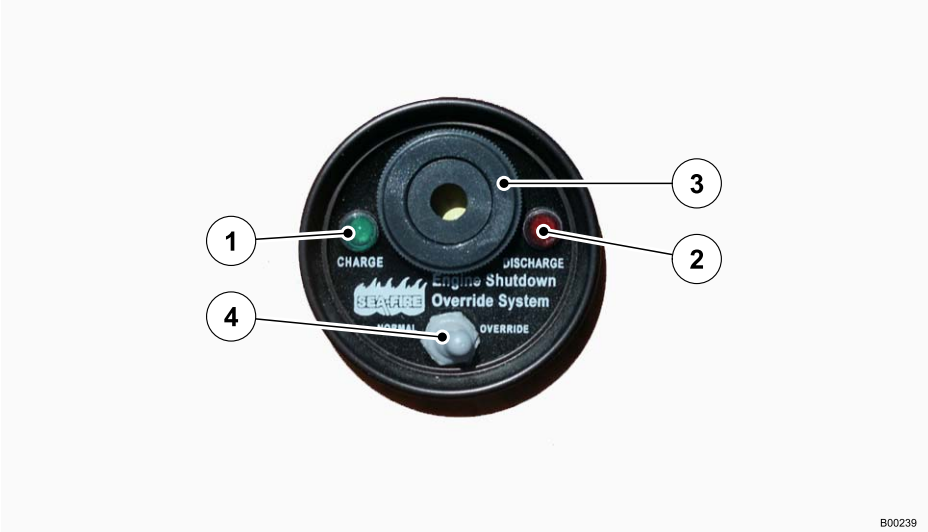
1. **Green light**
   Indicates that the extinguisher is charged.
2. **Red light**
   Indicates that the extinguisher is discharged.
3. **Buzzer**
   Indicates that the system is operating and that the extinguisher is discharging gas.
4. **OVERRIDE/NORMAL switch**
   - When the switch is placed to NORMAL position, the control unit actuates and stops the engines, generators and ventilators, in case of extinguisher discharge.
   - When the switch is placed to OVERRIDE position, the control unit is cut-out.

NOTICE

The switch must always be set to NORMAL. Use OVERRIDE only in case of collision risk because of navigation in confined waters and to restart the engines after system discharge.

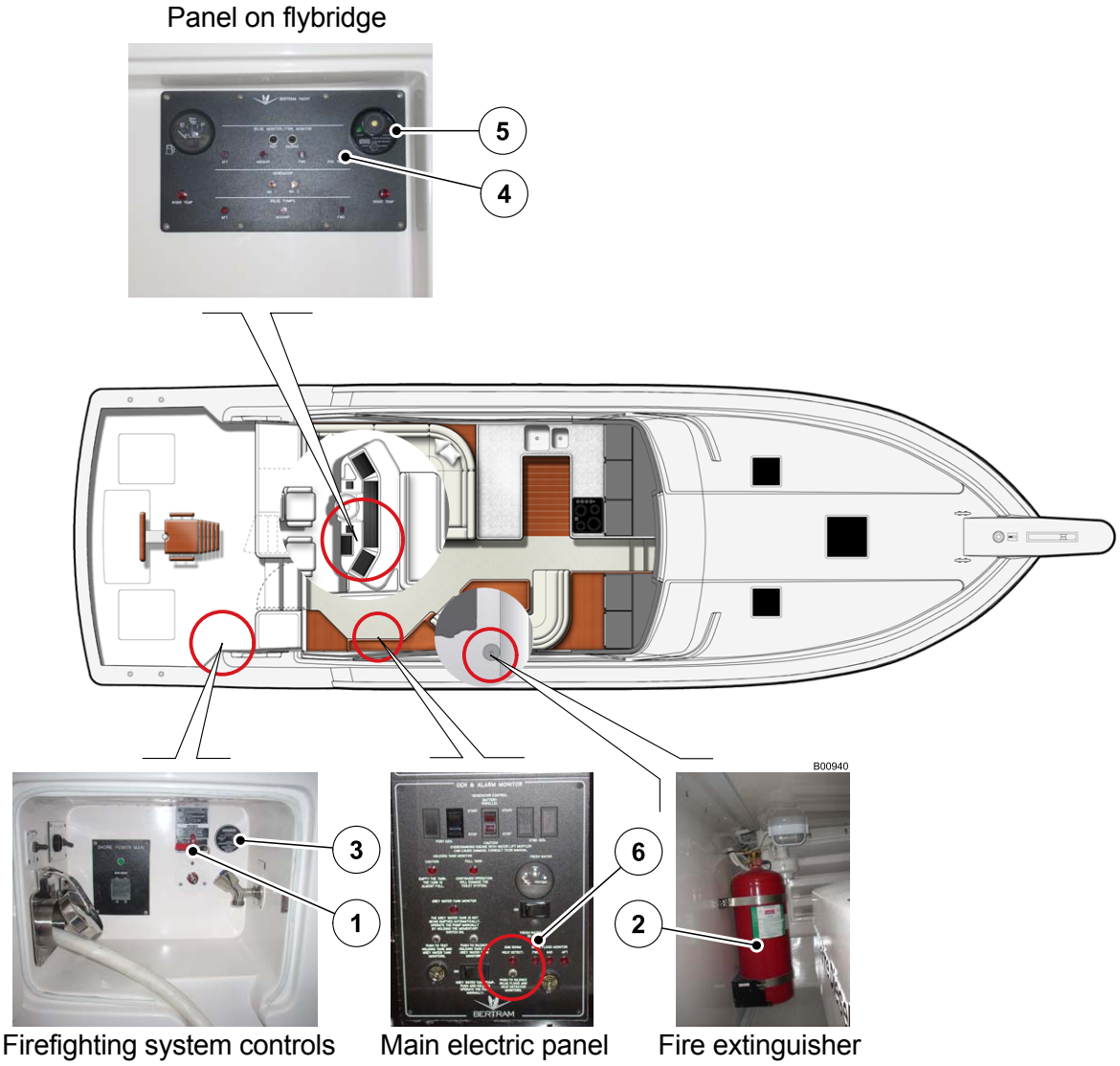
WARNING

OVERRIDE switch has to be used only in case of real emergency.



Plan of fixed firefighting system

1. Extinguisher “T” tie rod
2. Fixed Firefighting System
3. Firefighting system LED
4. Firefighting panel on flybridge
5. Firefighting system control panel
6. Firefighting panel on main electric panel



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 generators 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 engineroom:

- shut down the engines and generators, if they are operating, using the stop buttons on the helm station control panel;
- switch OFF the battery breaker switches and all AC input circuit breaker switches;
- 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, to be on the safe side.

WARNING

Before sailing, open the lock to have the peak and the fire-fighting panel accessible and check that the safety pin of cylinders has been removed.

WARNING

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 engine room 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.

WARNING

Keep the controls of the firefighting system efficient, by servicing them and by checking their operation at regular intervals (according to rules in force). Verify the operation at least once every three months and grease cables and connections at least once a year.

DANGER

The automatic firefighting system, that covers exclusively an area of the engineroom, could under particular fire conditions, fail to activate; for this reason THE SAFETY TIE-ROD MUST COMPULSORY BE ACTIVATED.

NOTICE

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 firefighting system, make sure no one is inside. Before re-entering the engineroom, make sure that the fire is totally extinguished, then ventilate the room by opening the doors, 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, generators, 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 your 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.

CAUTION

Do not open engineroom access door, until the fire is completely extinguished.

WARNING

Do not open the engine room access hatch, or try to enter the engine room, for at least 15 minutes after the fire agent has discharged. This would allow oxygen to enter the engine room before hot metals and/or fuels cool, which might cause re-ignition and flashback.

WARNING

The combustion by-products of FE-241 are toxic. Wait for the natural ventilation to completely exchange the engine room air before entering.

WARNING

Fire extinguishing chemicals and the residues of a system discharge are toxic. To avoid diseases, injuries or death caused by the breathing of the fumes, make sure that nobody stays in the engineroom during the system discharge.

WARNING

Fire re-flash is possible following the discharge of an automatic firefighting system. Fire re-flash is a hazard to persons onboard the yacht. Even the opening of the engineroom 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 engineroom access door until fire has been completely extinguished.

CAUTION

Before entering the engineroom after a fire, be certain that the fire is totally extinguished. Prior to entering, ventilate the compartment by opening the hatches.

Maintenance of fixed firefighting systems

- Check the fixed fire 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).
- A full maintenance check should be made by a qualified firefighting system service facility in accordance with the Manufacturer's maintenance instructions. The technician assigned to the service should apply a tag to the system indicating the date of the control.
- Check the discharge indicator before use, to make sure that the fixed firefighting system has not been discharged.
- Fixed firefighting systems should be examined at least monthly.
  a. for corrosion.
  b. to make sure that the access to the controls is not hindered.
  c. to ensure that cylinders are securely in place.
  d. to ensure that pull cables have not broken, loose or suffered damage or kinking.
  e. to ensure that all connections of the cables are secure
  f. to ensure that connections of the distribution piping are secure, and that the discharge nozzle(s) is(are) unobstructed.
  g. to make sure that the system has not discharged.

WARNING

Accidental release of the fire-extinguishing chemicals during handling or installation may cause serious injuries. Fire extinguishing chemicals and the residues of a system discharge are toxic. Protect eyes and skin during installation or maintenance of the firefighting systems.

WARNING

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.

DANGER

The safety pin inserted prevents the activation of the manual discharge (by means of tie-rod).

WARNING

The fire extinguisher CONTAINS CONCENTRATED AND NOXIOUS CHEMICAL AGENTS AND OTHER PRODUCTS SUITABLE FOR THE FIRE FIGHTING. Avoid vapors inhalation or prolonged exposition to them.
THE ACCIDENTAL DISCHARGE DURING ITS HANDLING OR INSTALLATION MAY CAUSE SERIOUS WOUNDS. Don't let it drop.
Keep away from extreme heat.

WARNING

Read carefully the instruction manual.
Before installation, removal, activation or service on this device.

WARNING

During the service, take utmost care not to break the flask unintentionally, to prevent accidental cylinder discharges.

WARNING

When checking the system pressure, the system or the environment temperature must be determined. The green area of the pressure gauge indicates the system pressure at 70 °F (21.1 °C).
To determine the pressure state of the system, adjust the temperature.

12.9 RECOMMENDED ITEMS TO HAVE ON BOARD

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 - 3/4 in, 65 ft ropes
- 1 - 1 in, 100 ft rope
- 1 66.14 lb spare anchor
- 2 plastic buckets
- 2 synthetic sponges
- 2 empty 5 gals fuel cans
- 2 funnels of different size, complete with 20 in rubber tubes
- 5 gals of engine oil
- 2 gals of reverse gear oil
- 1 gal of hydraulic oil for the rudders
- 1 gal of hydraulic oil for the trim tabs
- 1 gal of anti-freeze coolant liquid
- 35 oz of oil for the bow thruster
- 1 gal of oil for the electro-hydraulic system
- 1 navigation light bulb set
- 10 spare halogen bulbs for spotlights
- 2 spare bulbs for engineroom lights
- insulating tape
- stainless steel hose clamps of various size
- 1 underwater flash light
- 2 pairs of heavy duty rubber gloves
- 5 lbs 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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13

YACHT LIFTING & ONSHORE HANDING

13.1 YACHT LIFTING AND LAUNCHING

WARNING

Do not put the lifting straps in the areas shaded on the drawing.

NOTICE

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.

NOTICE

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.

NOTICE

Lifting sling geometry depends on the type of the lifting equipment, and must be designed for each individual lifting situation.

NOTICE

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.

WARNING

During lifting, launching and blocking activities, no person should be underneath or near the yacht when it is being moved.

WARNING

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.

WARNING

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.

13.1.1 Storing the yacht ashore

When ashore, the yacht must be placed 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.

NOTICE

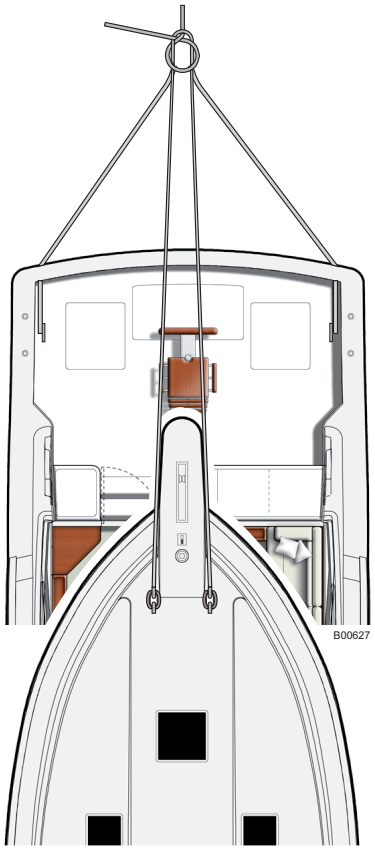
BERTRAM declines any responsibility for the location of the lifting straps, the lowering or lifting of the yacht, and the integrity of the support points placed by other yacht yards.

NOTICE

BERTRAM declines any responsibility for damages to things or persons caused by the wrong performance of hereunder listed operations.

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.



WARNING

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.

NOTICE

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.

WARNING

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.

WARNING

Always tow or have the yacht towed at low speed. Never exceed the speed of the towing yacht while being towed.

WARNING

Ensure a towing rope so as to release it when under load.

WARNING

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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14

MAINTENANCE

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.

Operate always with caution, be alert and understand the applicable safety requirements related to the task you are doing.

Apart from the information here, specific warnings appear throughout the entire manual. This section provides general, limited guidelines for warnings and cautions regarding safe maintenance procedures.

WARNING

This section includes a certain number of information to handle the parts and to maintain them without running any danger. Do not forget that each time you activate the controls you are in fact a driver.
You must read and understand the information given before activating the controls.

WARNING

*The use of **faulty lifting devices** can be the cause of accidents; check therefore their efficiency. Ensure the compliance of the hoists with the local norms and their suitability with the job they have to carry out. Besides check their sturdiness according to the work to carry out.*

WARNING

*The use of unsuitable **clothing** can cause accidents; do not wear fluttering clothes which could be easily caught by the yacht movements. 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.*

WARNING

*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 sparks.*

WARNING

*It is extremely dangerous to operate the yacht controls under the **influence of alcohol or drugs**. Refrain from taking **alcohol or drugs** before and during the work. Do not take medicines causing numbness.*

WARNING

*Be highly alert and **use greatest caution** for the whole time of the work. Pay great attention to avoid possible dangers.*

WARNING

*The **lifted equipment** may fall and hurt you. Do not walk or work under lifted equipment which are not safely supported.*

DANGER

The moving parts of the engine are dangerous; do not open the housings if the yacht is in use.

WARNING

***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 yacht; do not use the yacht controls as handholds; use the rails.*

WARNING

*The **control levers** outside the helm station, if erroneously activated, can cause heavy accidents even death: the controls must be operated exclusively in the correct steering position.*

WARNING

***Metallic chips** hurled during the machining of metallic parts can cause injuries: always wear protective goggles and use a mallet or punch in soft material.*

WARNING

Insufficient information *may cause accidents. If two or more people are working simultaneously on the same yacht, be ensured that each one of them is aware of the operation carried out by the others. Before running the engine, push away the other people from the risky areas (rotary blades and engine belt, tools and movements, yacht inner and rear part). The lack of following these cautions can cause heavy accidents, even death.*

DANGER

Do not smoke while refueling or while working on the engine. Shut down main engines before fueling. The failure to observe these precautions can cause accidents and injuries.

WARNING

A ***frozen*** *battery may explode if used or charged; do not start a yacht with a frozen battery. To avoid the battery 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 densimeter or a voltmeter.*

WARNING

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

WARNING

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

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.*

WARNING

*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.*

WARNING

*The **oil** is poisonous: do not swallow it. The engine oil contains dangerous polluting agents which can generate skin tumors. 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.*

WARNING

__Hydraulic oil__ sprayed at high pressure penetrates the skin: do not check 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.

WARNING

*Clean the **cylinders of the trim tabs** periodically, to remove possible dirt drifts, which can jeopardize their efficiency. If possible, to reduce the corrosion risk, pull back the rods each time you leave or you harbor the yacht.*

WARNING

*The **cleaning** of the metallic parts with unsuitable solvents, may cause corrosion; use detergents and solvents of the prescribed type only.*

WARNING

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. Do not use trichlorethane or solvent near O-rings and seals.*

WARNING

When working in the engineroom, switch bilge automatic pumps off, to prevent that fuel, lubricants and other liquid spilling cause's sea pollution.

CAUTION

BERTRAM declines any responsibility concerning installation and operation of electric, electronic, mechanical equipment carried out by third parties in a manner that is not authorized by the Manufacturer's Yard.
BERTRAM declines all responsibility concerning tampering carried out by third parties on equipment installed in the Yard. Such non authorized tampering, besides causing the immediate lose of warranty rights, can cause damages to the yacht and to 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.

14.2 SACRIFICAL ANODES

The submerged, external metal parts of the yacht and internal parts of the engines and generators are protected from corrosion by means of sacrificial 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 sacrificially 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 that is fifty percent (50%) wasted from its original size should be replaced. The rate of wasting away of sacrificial 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 generators are located in the internal seawater cooling circuits. Check the engine and generators 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 generators 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.

NOTICE

Each time the yacht is dry-docked, check the condition of the propeller, shafts and all underwater metals. Examine the protective anodes, and the fastening system. Replace the anodes, if they have worn off over 50% of their volume.

14.2.1 Periodic Check Of External Anodes

This operation is usually carried out when the yacht is in dry dock. 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.

CAUTION

Before cleaning the bottom or checking the underwater anodes while the yacht is in the water, disconnect engines and generators so they cannot be started accidentally. Serious injury or death to the diver could result. Remove the ignition keys.

NOTICE

Failure to replace the anodes can cause the spreading of corrosion on the other metallic parts.

NOTICE

It is necessary to check the wear (wasting) of the anodes frequently, and to replace them when they are 50% of their original size.

14.2.2 Replacing the external anodes

The sacrificial 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, generators, 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.

14.3 LONG-TERM LAY-UP (DECOMMISSIONING)

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 equipment: 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 Generators 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 sacrificial 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.

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.

Electric hydraulic power units

Protect components and connections with a corrosion-inhibiting product. Check the oil level and top-up as indicated.

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 indicated.

Sacrificial 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

Check seams and buttons at least every six months.
Wash the cushions at least every month.

Aluminum and Steel Fittings

Wash all metallic parts with fresh water and protect them with a corrosion-inhibiting product.

Fresh Water Tanks and System
Sanitize potable 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.

Gray 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) Holding 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.

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 generators Manufacturer's service manuals and follow the Manufacturer's directions for servicing the engines and generators 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 generators.
- 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 the propulsion 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 the engines. Replace fuel filters. Replace oil filters. Top up engine oil if necessary. See the engine manuals for instructions.
- Start the generator engine. Repeat the same sequence as for the propulsion 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 anodes; replace if indicated;
- Check the condition and operational status of:
  - all hoses;
  - all bilge pumps, seawater, potable water, black water and gray water pumps;
  - the steering system connections;
  - trim tab fluid and connections;
  - gangway and swim ladder operation;
  - all controls, system monitoring gauges and meters and instruments used for navigation.

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 dry dock. 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-docked.

CAUTION

While carrying out cleaning and checks with the yacht in water: disable the engines and generators start.

WARNING

Bad maintenance condition (barnacles, etc.) may cause cavitation and damage shafts, rudders, propellers, etc.

WARNING

Small areas of paint may peel off from the propellers even after a short period of operation.

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 warnings on the product labels for the use and disposal of these materials.

CAUTION

Antifouling is poisonous, it should never be burnt, use only authorized elimination procedures and in case of doubts contact the authorities in charge. The sandblasting operations and removal of anti-fouling must be carried out with suitable clothes and protections.

NOTICE

Certain underwater fittings on the yacht must never be painted. Paint will prevent the proper performance of depth sounder and speedometer sensors and anodic (sacrificial 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.

NOTICE

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.

CAUTION

To remove the old antifouling, do not use sandblasting that may damage gel-coat surface and the anti-osmosis applied by the manufacturer. As suggested by the antifouling manufacturer's use paint removers or, as an alternative, wet sanding.

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, the gel-coat may show bubbles, which can break exposing the fibers underneath. The inconvenient occurs generally in vicinity sharp angles, and depends on air bubbles that, during manufacturing, remain entrapped between GRP and gel-coat, although Quality Checks are carried out by specialized 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 Yard Customer Support.

CAUTION

The alteration of color and brightness in correspondence of areas which are greatly exposed is considered as normal. The necessary polishing has to be considered as normal maintenance.

MAINTENANCE

Carefully clean the GRP-parts at least once a month. Verify the GRP condition at least once every six months. Polish all the GRP-parts when required but at least once every two years.

WARNING

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.

WARNING

To remove the old antifouling, do not use sandblasting that may damage gel-coat surface and the anti-osmosis resin and expose fibers. As suggested by the antifouling Manufacturer's use paint removers or, as an alternative, wet sanding.

WARNING

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 small faults do not impair at all the mechanical resistance of the hull. 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 wash down the entire yacht after each navigation, in particular all metal parts, that are 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 yacht's metallic parts.

WARNING

The aft glass wall is not watertight, so do not point the bolt of water towards the window, when washing.

WARNING

Do not use brushes or abrasive rags on metallic fittings, not even on rusty spots, scratches on the surface result in a less shiny appearance.

14.6.4 Sunpad cushions

Remove the sunpad cushions at regular intervals 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 should be flushed with fresh water, do not use jet-cleaners, brushes or abrasive sponges.

MAINTENANCE

Check seams and buttons at least every six months.
Wash the cushions at least every month.

CAUTION

Current use:

- *do not walk nor jump on the cushions;*
- *prevent the cushions from becoming yellowish, do to direct exposure to sun light;*
- *prevent the soaking of water or of moisture, avoiding upholstery exposure to bad weather, particularly during inactivity periods.*

Cleaning:

- *remove ordinary dirt with a solution of warm water and neutral soap: do not use detergents or solvents;*
- *dry with a soft cloth not leaving any residuals.*

Preservation:

- *store the upholstery clean and dry in a cool and ventilated area without moisture;*
- *do not lay heavy objects on the upholstery when stored.*

14.6.5 Instrumentation and navigation lights

Use clean wet rags for cleaning.
After navigation, cover instrumentation and equipment.

MAINTENANCE

Verify the correct operation of the navigation lights at least once a month.
Carefully clean the light glass at least once a week.
Verify any trace of corrosion of the cable connections of the navigation lights at least once every six months.
Tighten the cable connections of the navigation lights at least once every six months.

MAINTENANCE

Verify at least once a week the operation of the fly gauge console and on board instruments.
Clean them at least once a week.
Protect the piston for the fly gauge console opening with suitable products, at least once every six months.

WARNING

Do not use chemical or abrasive products.

14.7 REPLACEMENT

This Section describes the operations for the correct replacement of parts which do not require skilled staff.

CAUTION

Look over the maintenance safety rules contained in this manual in order to act with the maximum safety and follow the indications herebelow.

CAUTION

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.

WARNING

Check the light operation before any navigation to avoid any inconvenience when using them by night.

14.8 BULBS REPLACEMENT

14.8.1 Watertight lights

The watertight lights are located inside the bathrooms 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 grafting the new bulb, proceed in reverse sequence to restore the initial conditions.

14.8.2 Overhead lights

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-holder frame. Force the retaining springs and remove the reflecting and illuminating holder of the light. Then replace the bulb.
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 grafting the new bulb, proceed in reverse sequence to restore the initial conditions.

DANGER

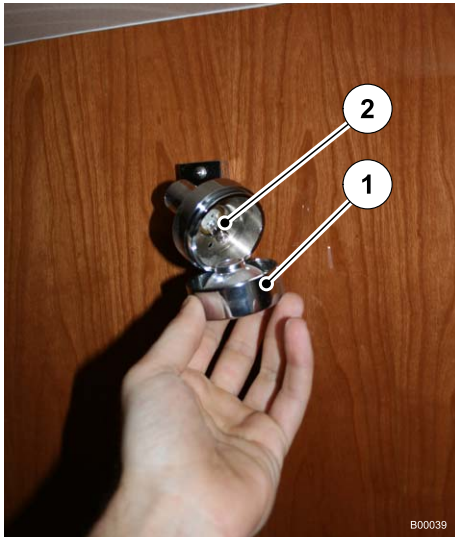
Lights develop heat. Do not approach inflammables.

14.8.3 Reading light

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 lamp off and cold bulb: remove the glass holder frame (**1**) and replace the bulb (**2**). Pay attention during replacement of the bulb, not to touch with your fingers the glass of the new bulb. After grafting the new bulb, proceed in reverse sequence to restore the initial conditions.



14.8.4 Engineroom overhead light

Bulb replacement

Before carrying out the replacement of the bulbs, make sure to disconnect the circuit breaker protecting the area of the ceiling light. Remove the bulb protecting glass by unscrewing fixing screw with a screw driver. Then replace the bulb. The bulb is screw-tightened.

After grafting the new bulb, proceed in reverse sequence to restore the initial conditions.

14.8.5 Closet overhead light

Bulb replacement

Before carrying out the replacement of the bulbs, make sure to disconnect the circuit breakers protecting the area of the bulb to be replaced.

Remove the bulb protecting glass by unscrewing fixing screw (**1**) with a screw driver. Then replace the bulb. The bulb is screw-tightened.

After grafting the new bulb, proceed in reverse sequence to restore the initial conditions.

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BERTRAM

15

TROUBLESHOOTING

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.

CAUTION

BERTRAM declines any responsibility for proposed corrective action carried out by unskilled personnel.

CAUTION

For matters relating to specific equipment and for troubleshooting any equipment, please refer to the Owner's manual of that equipment.

15.2 EQUIPMENT

For further information, please refer to BERTRAM Customer Support.

Problem	Cause	Action
1. Equipment 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

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

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

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	– Carry out proper maintenance
	– Failure in the propulsion system	– Check shafts, mechanical connections, propellers and rudders
2. Water leaks from shaft seals	– Seals are not correctly adjusted	– Check the seals
	– Poor maintenance	– Carry out proper maintenance

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

15.7 BILGE PUMP

For further information, please refer to BERTRAM Customer Support.

Problem	Cause	Action
1. The pump does not start	– No voltage	– Check the value of the line voltage
	– Blocked impeller	– Clean the impeller and the pump casing
	– Electric section defective	– Consult BERTRAM Customer Support
2. The pump runs but it does not work	– Dirty valve and filter	– Clean valve and filter
	– Over suction depth	– Install the pump closer to the water static level
	– Air in suction	– 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	– Increase or decrease the capacity
	– Wrong rotation direction	– Vent air from the system
4. The operation of one pump is irregular	– Damaged impeller and diffuser	– Check the internal air pressure in the membrane
	– Pressure required from the system higher than that-one the pump can supply	– Check/Have it cleaned

15.8 COLD 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

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

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

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

15.10 ELECTRO-HYDRAULIC STEERING 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

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

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

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

15.11 TRIM TABS 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

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

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

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

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

Problem	Cause	Action
4. The unit will not operate at all	– Blown fuse or tripped circuit breaker	– Replace fuse with time delay type or reset breaker. Check for correct sizing
	– Low voltage to unit	– Check shore power supply and rating of electrical power cord to boat
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 cabin 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
	– The evaporator coil has iced	– Turn the system to “Fan only” for five minutes, then restart
7. Compressor cycle on and off	– Dirty air filter	– Clean lint screen or air filter
	– Water flow restriction	– Clear restriction.
8. Water dripping inside cabin	– Condensate drain is clogged	– Clean out drain holes
	– Blockage in hose	– Clean hose. Check downhill routing of hose

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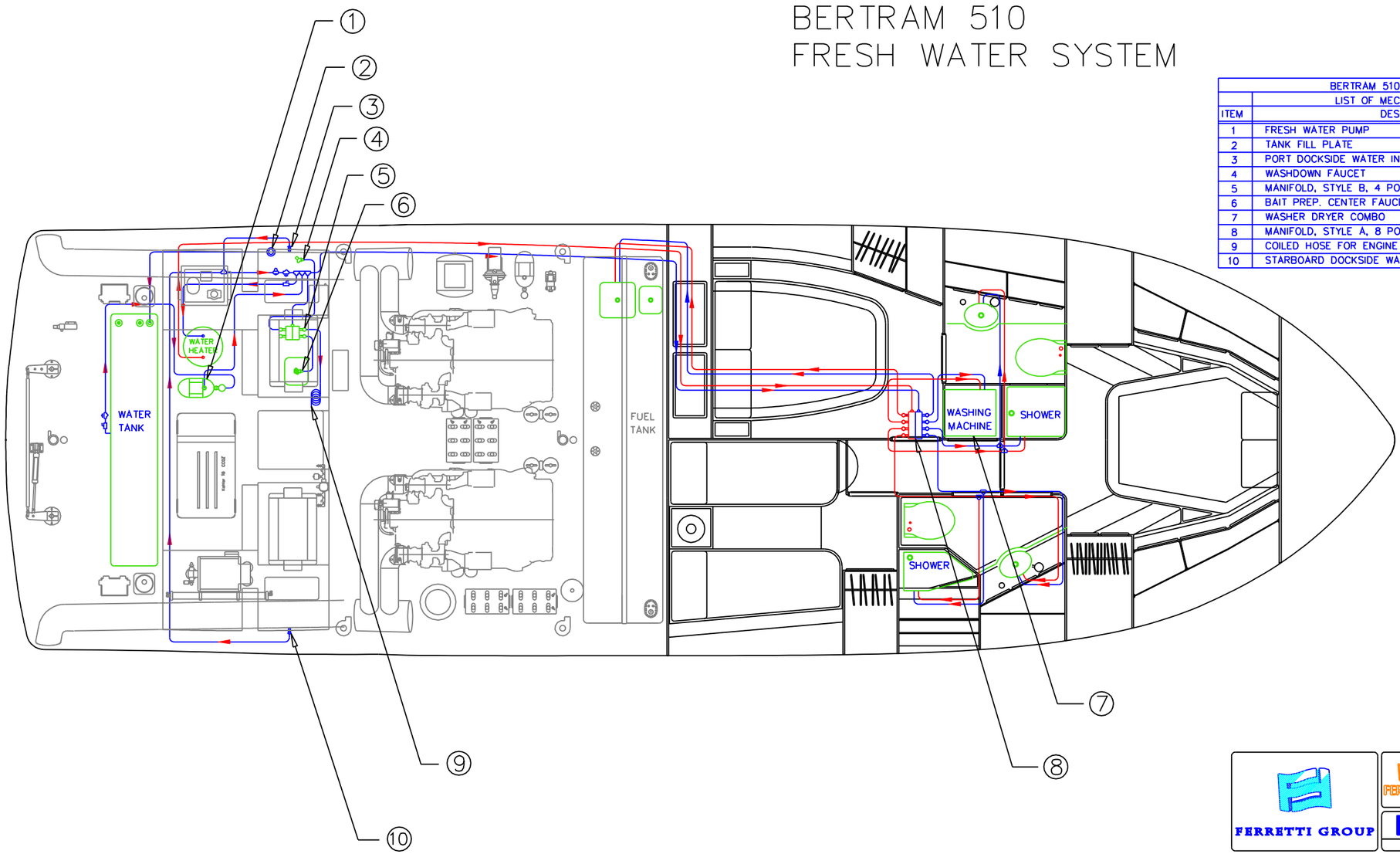
TECHNICAL PLANS

BERTRAM 510
FRESH WATER SYSTEM

BERTRAM 510 FRESH WATER SYSTEM		
	LIST OF MECHANICAL COMPONENTS	
ITEM	DESCRIPTION	BYD #
1	FRESH WATER PUMP	160261
2	TANK FILL PLATE	16017
3	PORT DOCKSIDE WATER INLET	- - - -
4	WASHDOWN FAUCET	16203
5	MANIFOLD, STYLE B, 4 PORTS	211371
6	BAIT PREP. CENTER FAUCET	16203
7	WASHER DRYER COMBO	181991, 181992
8	MANIFOLD, STYLE A, 8 PORTS	211537
9	COILED HOSE FOR ENGINE AND GEN. SERVICE	- - - -
10	STARBOARD DOCKSIDE WATER INLET	- - - -



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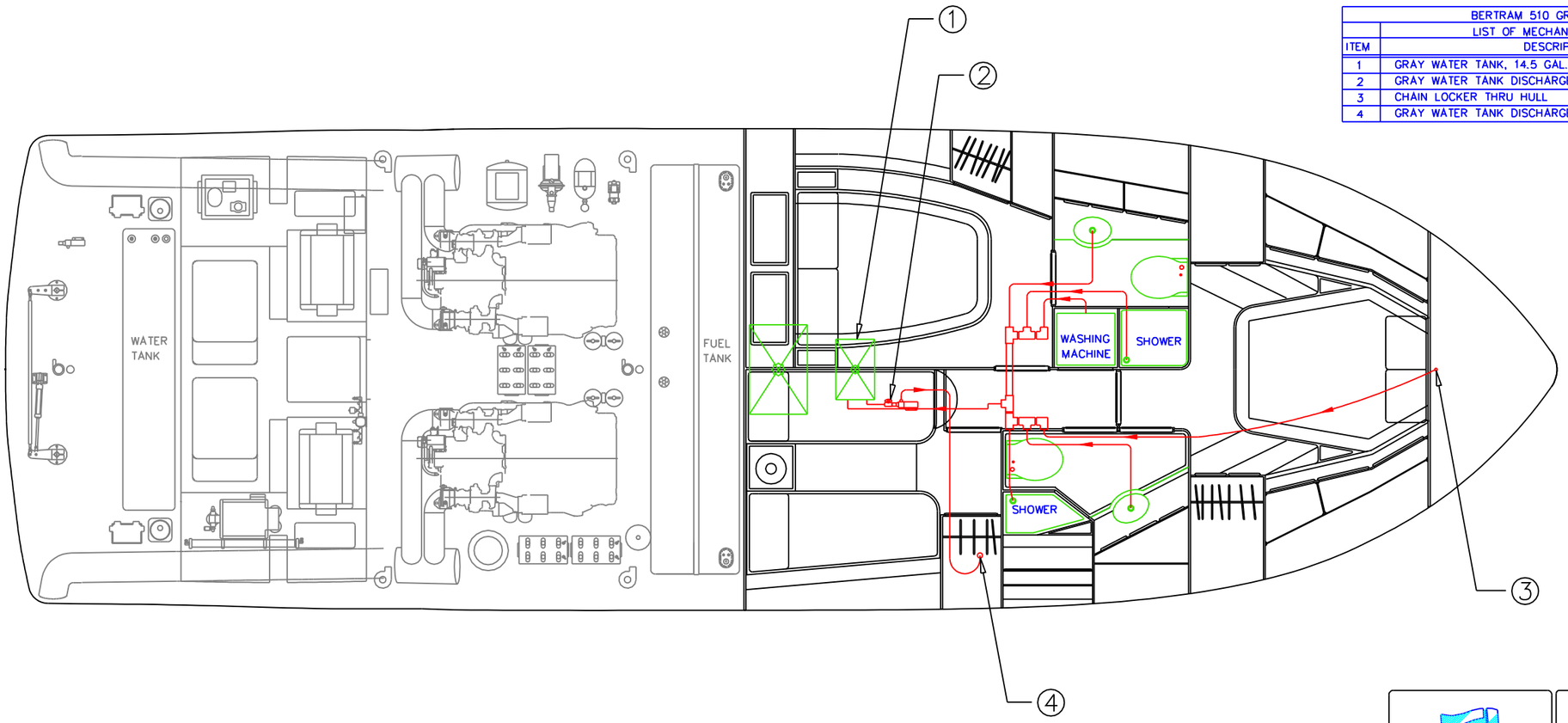
BERTRAM ENGINEERING DEPT.

3663 NW 21 STREET, MIAMI FL. 33142 - USA - tel. (305) 633/8011 - fax (305) 633/7188 - e-mail: info@bertram.com

DRAWING TITLE: FRESH WATER SYSTEM	Project	Job Order #	Group #	Dwg #	Rev.	Layout
	-	-	-	-	-	-
MODEL: B510	FILE: -				TAV	
DRAWING SIZE: B	DATE: 3-27-07					
				SCALE: -		
	APPV.BY:			Dwg # —		
	DESIG.BY: D.D.					

BERTRAM 510
GRAY WATER SYSTEM

BERTRAM 510 GRAY WATER SYSTEM		
	LIST OF MECHANICAL COMPONENTS	
ITEM	DESCRIPTION	BYD #
1	GRAY WATER TANK, 14.5 GAL.	15269
2	GRAY WATER TANK DISCHARGE PUMP	15257
3	CHAIN LOCKER THRU HULL	21305
4	GRAY WATER TANK DISCHARGE THRU HULL	21337



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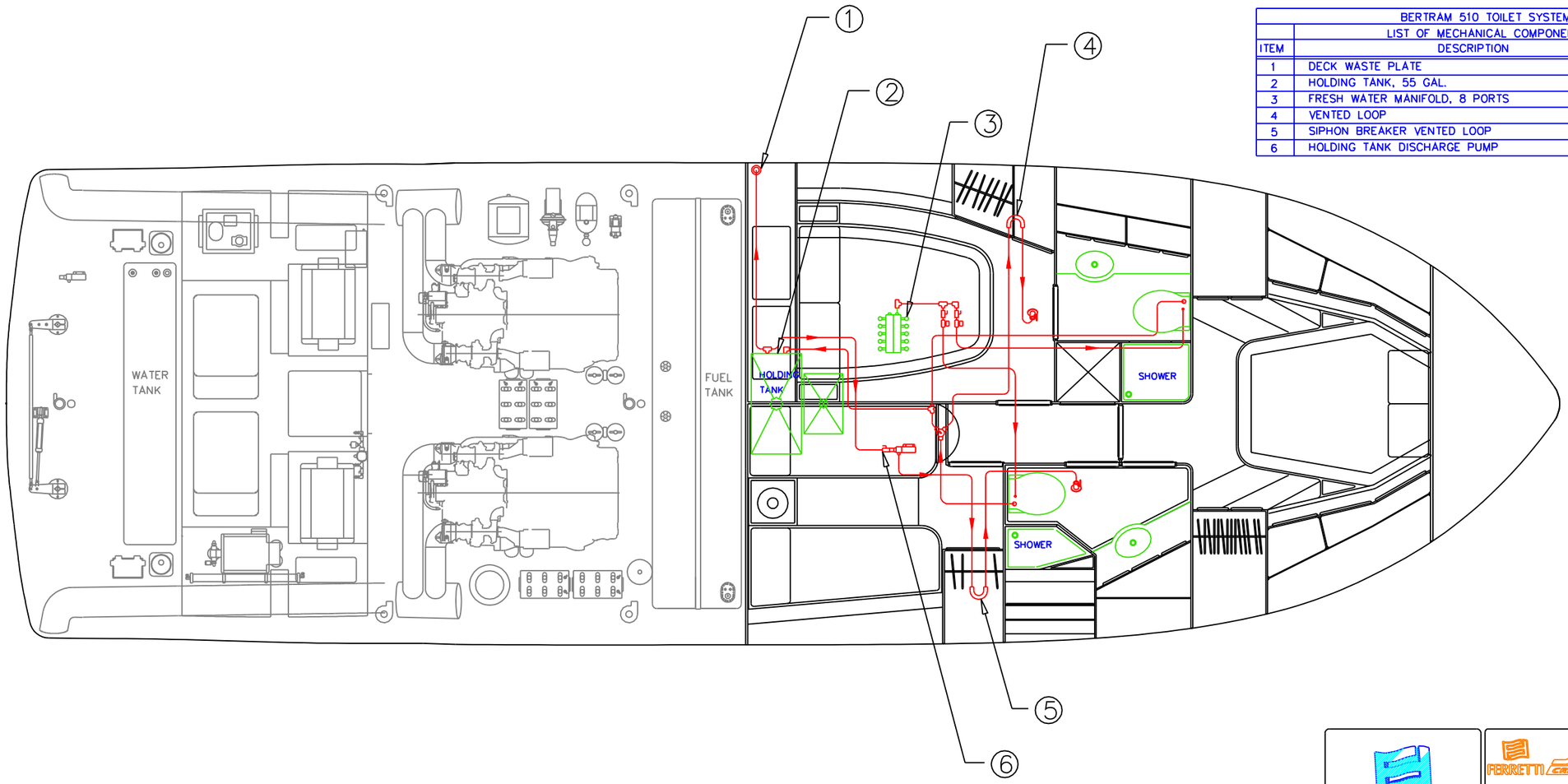
BERTRAM ENGINEERING DEPT.

3663 NW 21 STREET, MIAMI FL, 33142 - USA - tel. (305) 633/8011 - fax (305) 633/7188 - e-mail: info@bertram.com

DRAWING TITLE	Project	Job Order #	Group #	Dwg #	Rev.	Layout
GRAY WATER SYSTEM	–	–	–	–	–	–
MODEL: B510	FILE: –				TAV	
DRAWING SIZE: B	DATE: 3-27-07					
	APPV.BY:		SCALE: –			
	DESIG.BY: D.D.		Dwg # ——			

BERTRAM 510
TOILET SYSTEM

BERTRAM 510 TOILET SYSTEM		
	LIST OF MECHANICAL COMPONENTS	
ITEM	DESCRIPTION	BYD #
1	DECK WASTE PLATE	15060
2	HOLDING TANK, 55 GAL.	15317
3	FRESH WATER MANIFOLD, 8 PORTS	211537
4	VENTED LOOP	21936
5	SIPHON BREAKER VENTED LOOP	211325
6	HOLDING TANK DISCHARGE PUMP	15257



FERRETTI GROUP

FERRETTI CRN PERSHING Riva aprea mare BERTRAM CUSTOM LINE

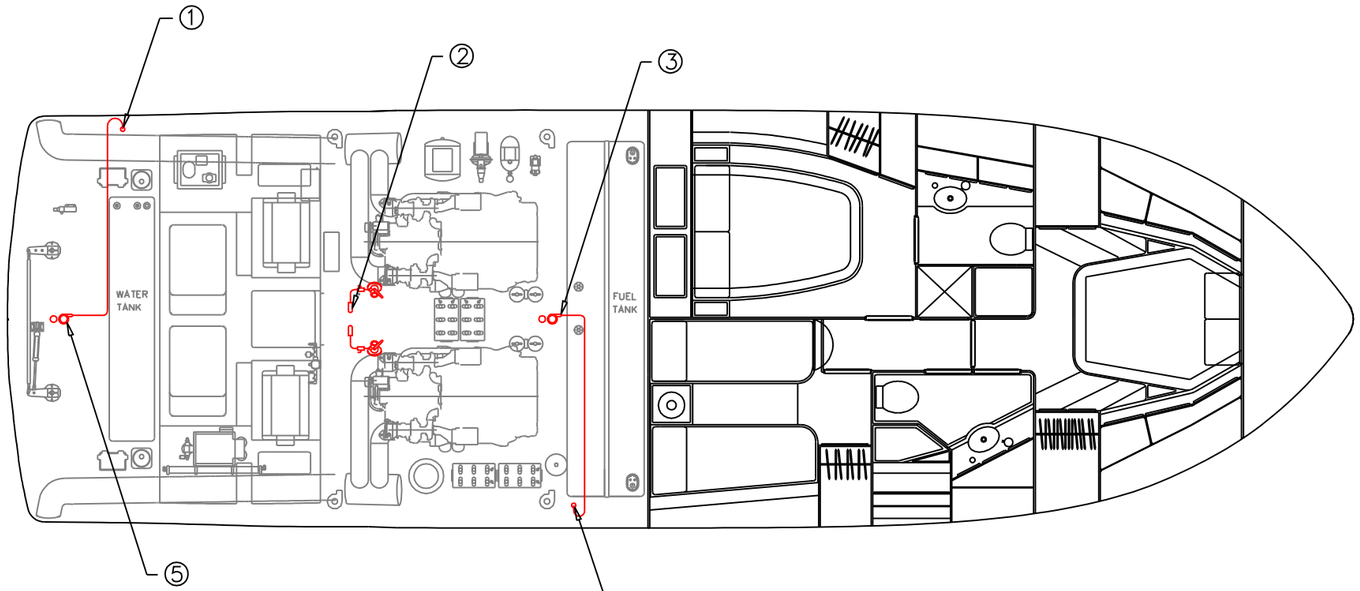
BERTRAM ENGINEERING DEPT.

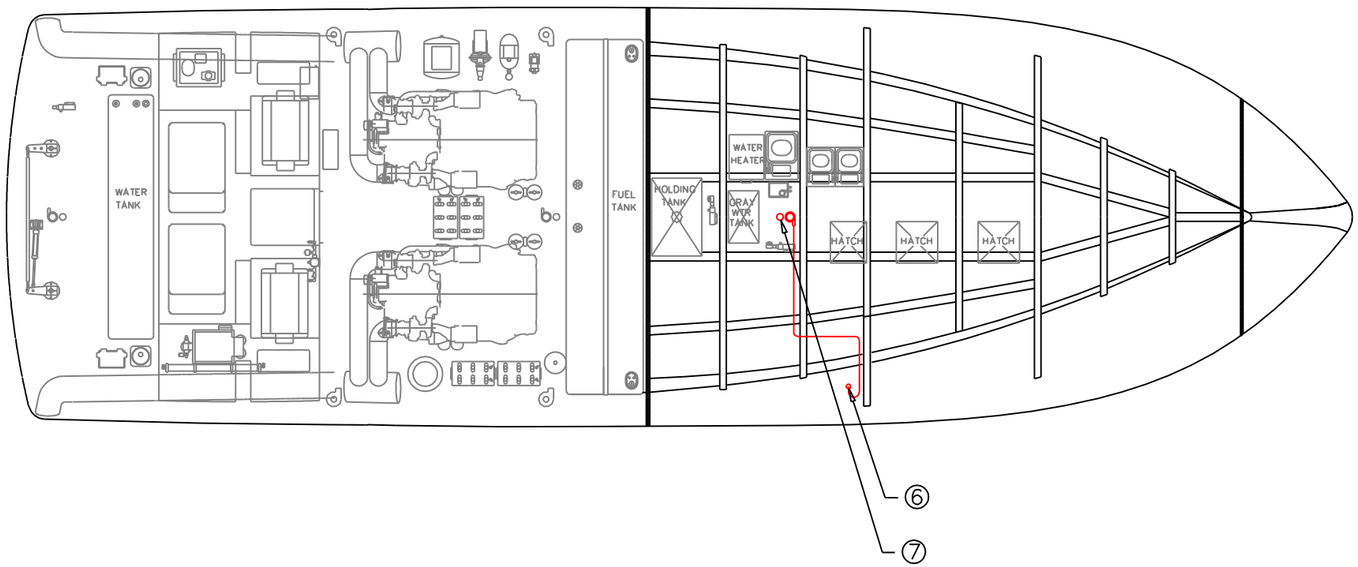
3665 NW 21 STREET, MIAMI FL. 33142 - USA - tel. (305) 633/8011 - fax (305) 633/7188 - e-mail: info@bertram.com

DRAWING TITLE	Project	Job Order #	Group #	Dwg #	Rev.	Layout
TOILET SYSTEM	–	–	–	–	–	–
MODEL: B510	FILE: –				TAV	
DRAWING SIZE: B	DATE: 3-27-07					
	APPV.BY:		SCALE: –			
	DESIG.BY: D.D.		Dwg # ——			

BERTRAM 510
BILGE PUMP SYSTEM – U.S. BOATS

BERTRAM 510 BILGE PUMP SYSTEM – U.S.		
	LIST OF MECHANICAL COMPONENTS	
ITEM	DESCRIPTION	BYD #
1	BILGE PUMP DISCHARGE	– – – –
2	ENGINE DRIVEN EMERGENGY BILGE PUMP, PORT &STBD	– – – –
3	BILGE PUMP AND FLOAT SWITCH	15223, 142178
4	BILGE PUMP DISCHARGE	– – – –
5	BILGE PUMP AND FLOAT SWITCH	15223, 142178
6	BILGE PUMP DISCHARGE	– – – –
7	BILGE PUMP AND FLOAT SWITCH	15223, 142178





FERRETTI GROUP

BERTRAM ENGINEERING DEPT.

3663 NW 21 STREET, MIAMI FL, 33142 – USA – tel. (305) 633/8011 – fax (305) 633/7188 – e-mail: info@bertram.com

DRAWING TITLE
BILGE PUMP SYSTEM
U.S. BOATS

MODEL:
B510

DRAWING SIZE:
B

Project	Job Order #	Group #	Dwg #	Rev.	Layout
–	–	–	–	–	–

FILE: –

TAV

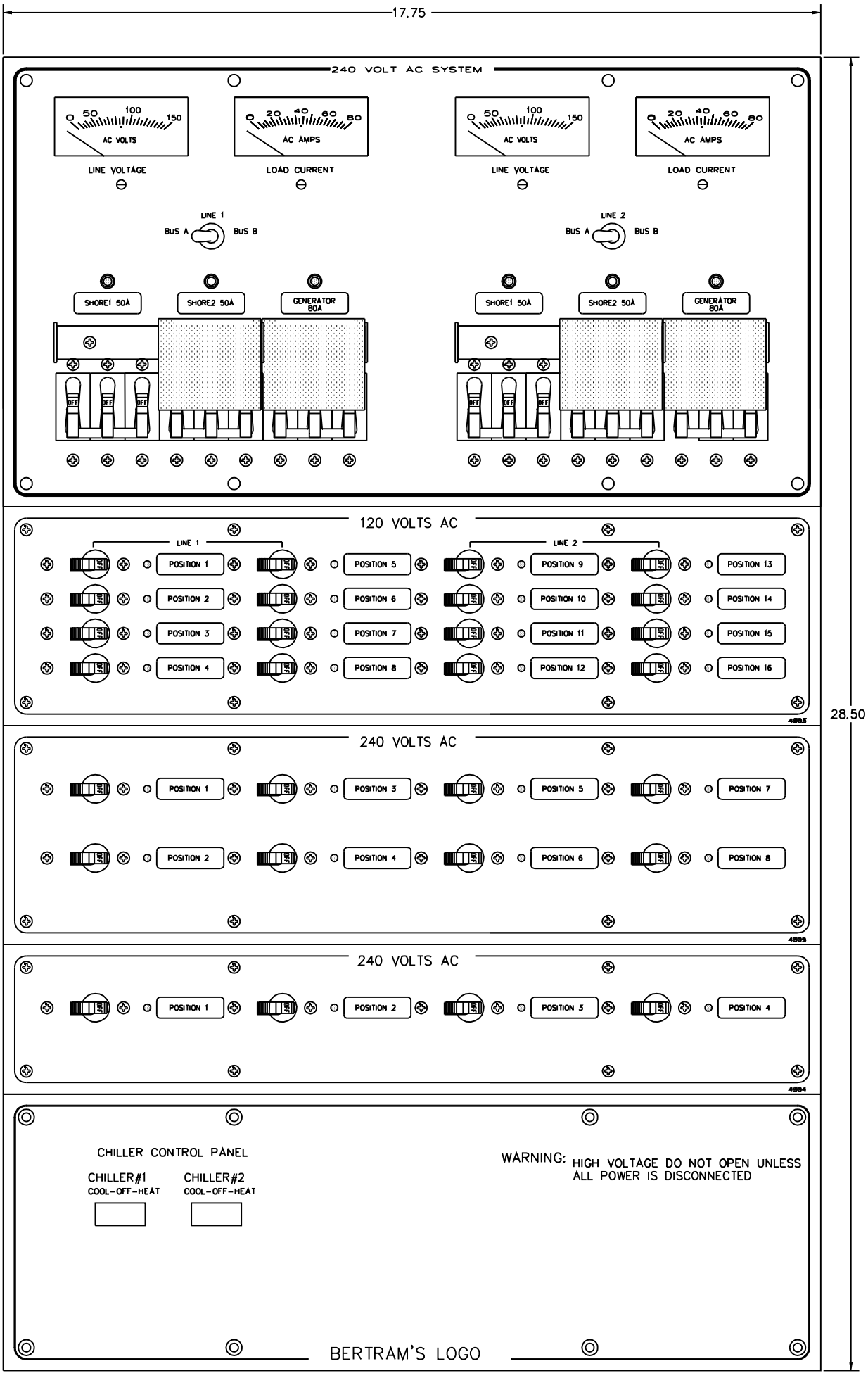
DATE: 3-27-07

SCALE: –

APPV.BY:

DESIG.BY: D.D.

Dwg #


17.75
28.50
240 VOLT AC SYSTEM
AC VOLTS
AC AMPS
LINE VOLTAGE
LOAD CURRENT
LINE 1
LINE 2
BUS A
BUS B
SHORE1 50A
SHORE2 50A
GENERATOR 80A
OFF
120 VOLTS AC
POSITION 1
POSITION 2
POSITION 3
POSITION 4
POSITION 5
POSITION 6
POSITION 7
POSITION 8
POSITION 9
POSITION 10
POSITION 11
POSITION 12
POSITION 13
POSITION 14
POSITION 15
POSITION 16
240 VOLTS AC
CHILLER CONTROL PANEL
CHILLER#1
COOL-OFF-HEAT
CHILLER#2
COOL-OFF-HEAT
WARNING: HIGH VOLTAGE DO NOT OPEN UNLESS ALL POWER IS DISCONNECTED
BERTRAM'S LOGO

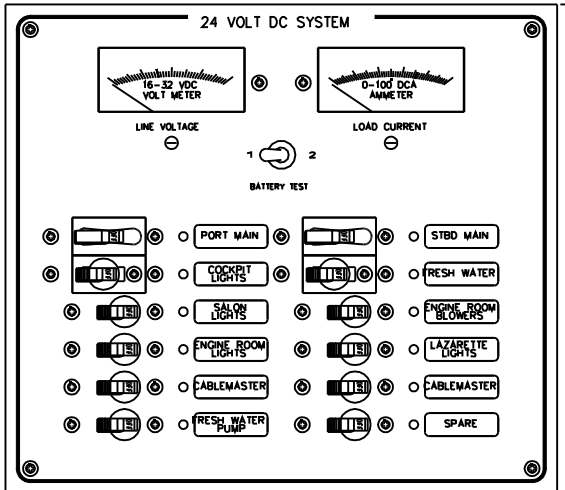
BYD - 143135

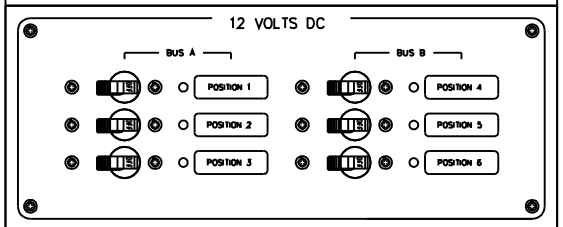
FRONT VIEW

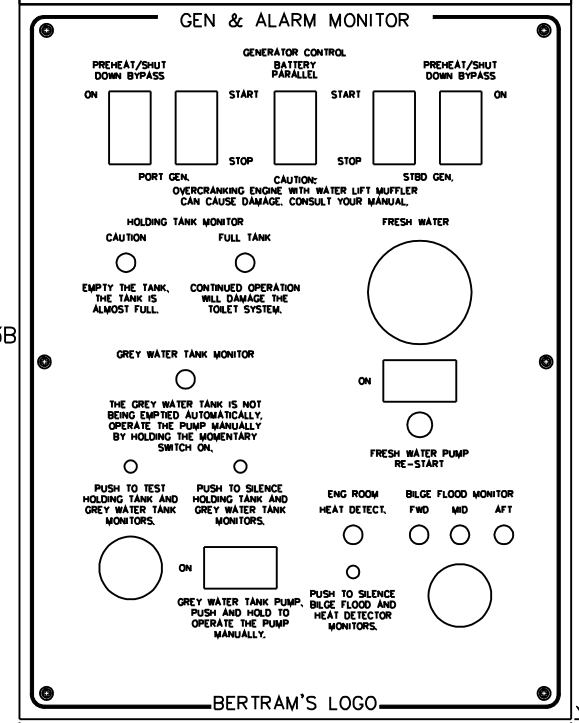
BY-463-006

5204

BY-463-013B



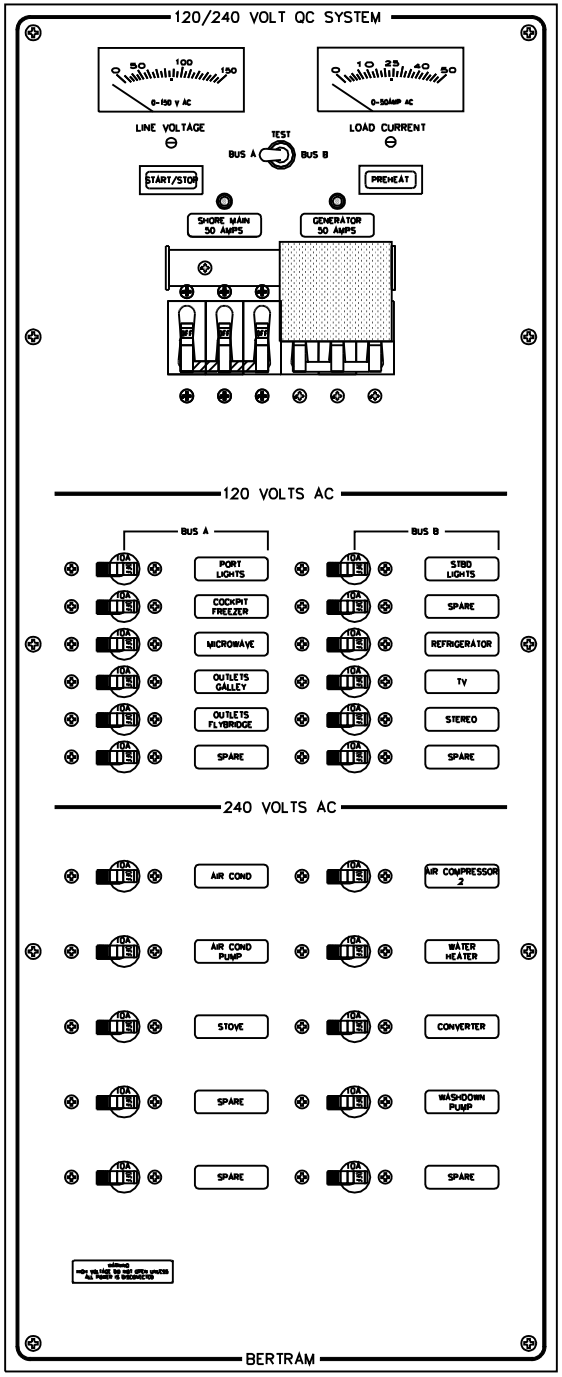


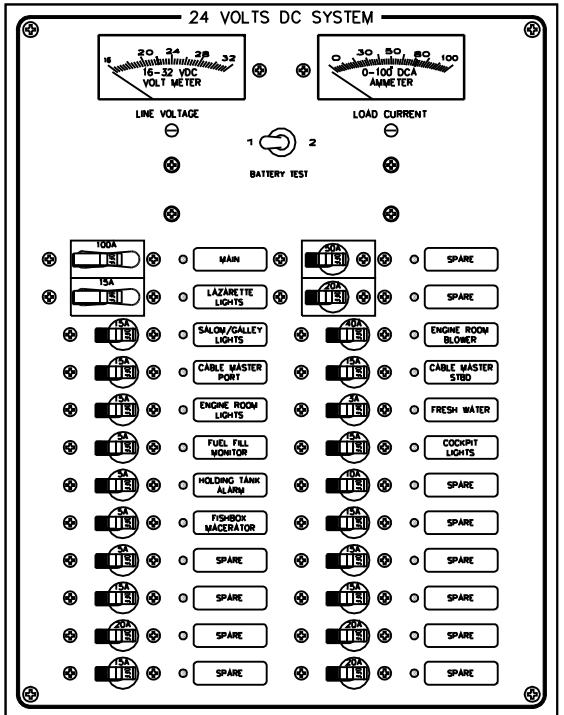


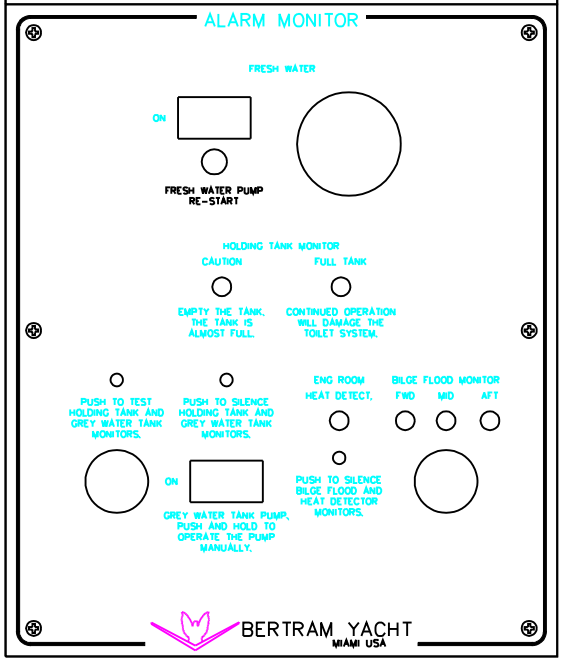
28.50

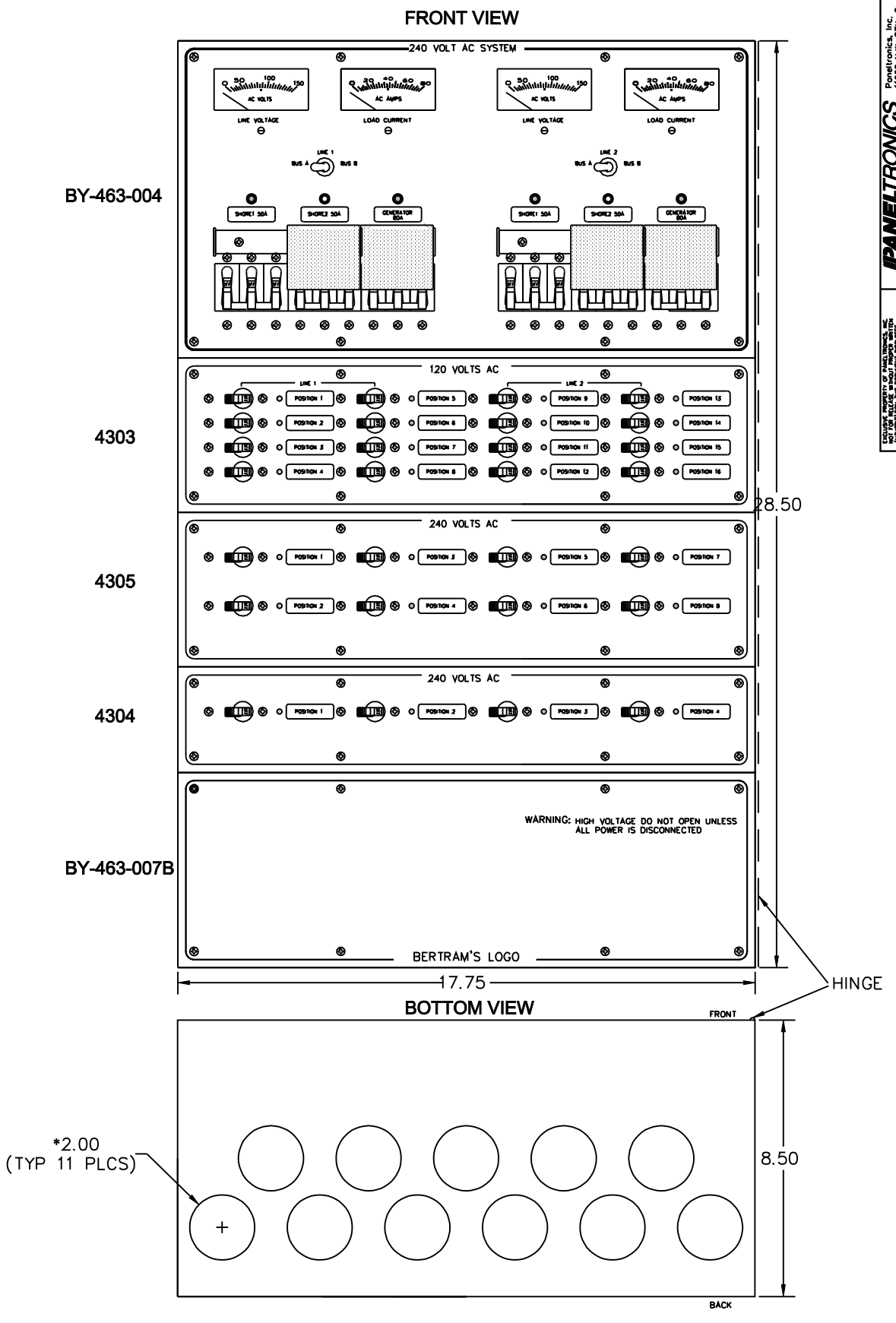
11.00

BYD 143002









PANELTRONICS
Paneltronics, Inc.
11960 N.W. 87th Court
Hialeah Gardens, FL 33018

SINGLE GENERATOR 510
MAIN AC SALON
142974

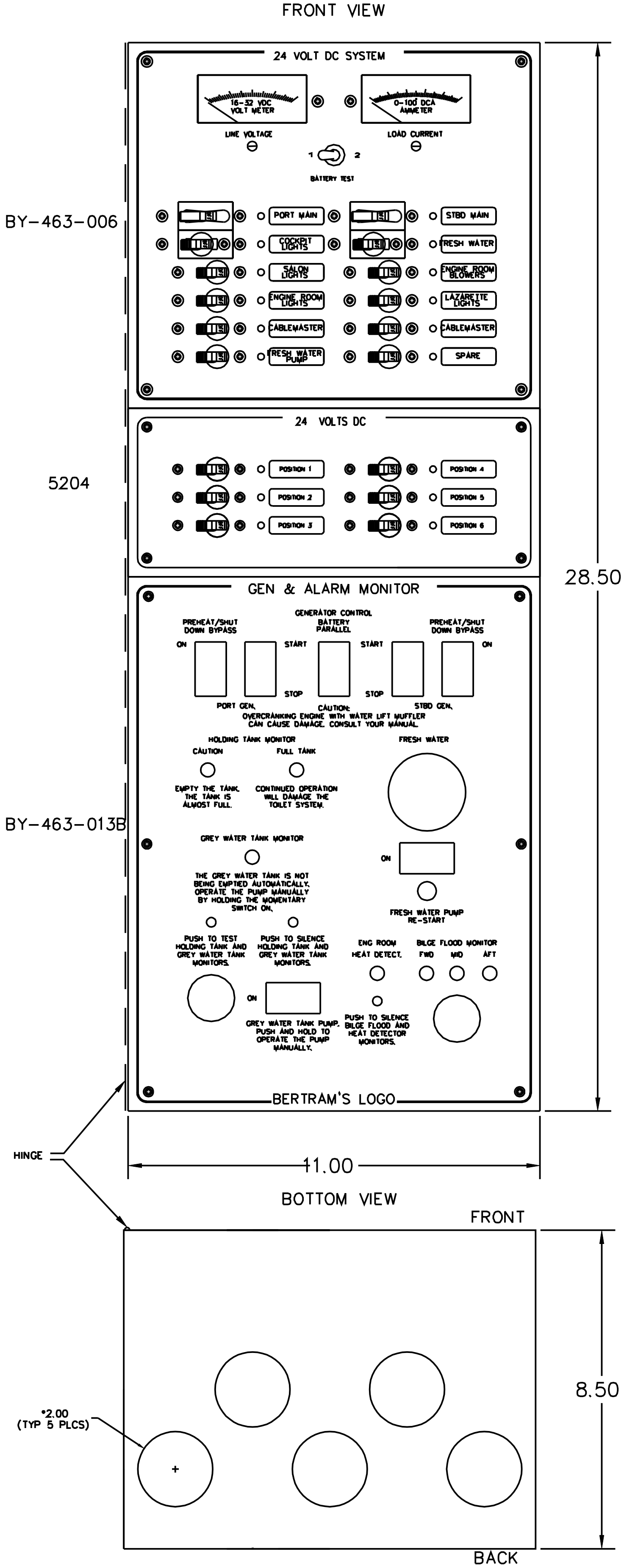
BY-463-51S/0

Sheet: 1 of 6
Scale: 1:5
Size: C
Dwg/Part #:
Rev:

Drawn By: TP Date: 11/16/09
Revised By: MG Date: 11/16/09
Item:
Series/Model: BY

EXCLUSIVE PROPERTY OF PANELTRONICS, INC. ANY REPRODUCTION OR USE WITHOUT AUTHORIZATION FROM PANELTRONICS INCORPORATED IS PROHIBITED. THIS DRAWING CONTAINS INFORMATION WHICH PANELTRONICS INCORPORATED CONSIDERS TRADE SECRETS.

Notes:



PANELTRONICS INCORPORATED

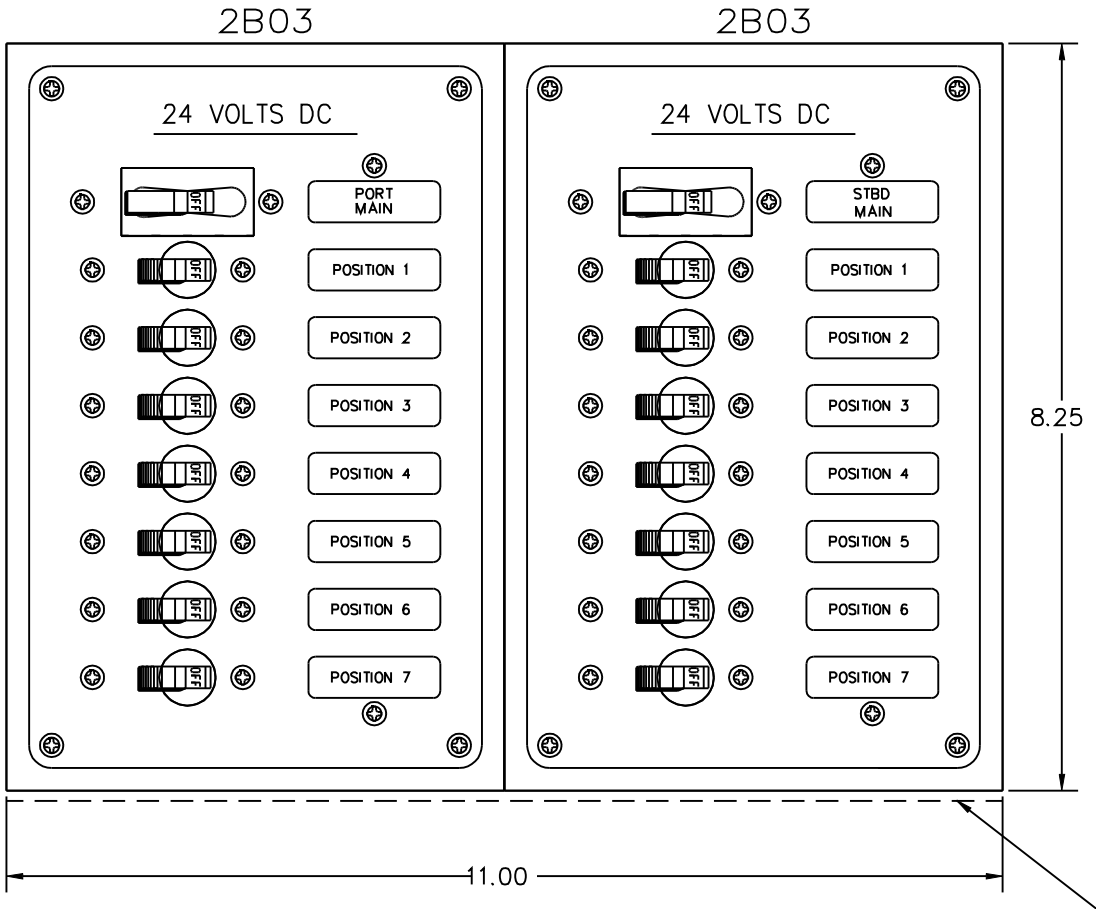
Paneltronics, Inc.
11960 N.W. 87th Court
Hialeah Gardens, FL 33018

SINGLE GENERATOR 510
MAIN DC SALON
142975

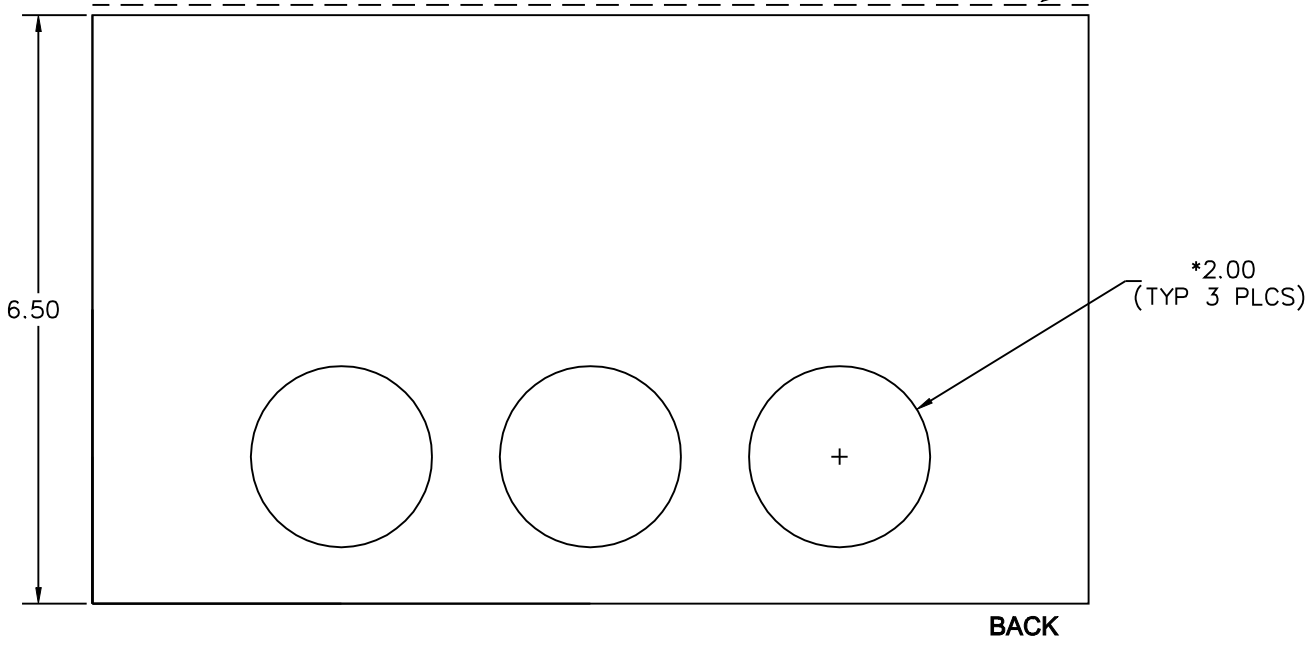
Notes:

Drawn By: TP	Date: 11/17/99	Sheet: 2 of 6	Scale: 1:5
Revised By: MG	Date: 11/17/99	Size: C	DWG/Part #: BY-463-51S/0
Series/Model: BY	Item:	Rev:	

FRONT VIEW



BOTTOM VIEW



Notes:

Drawn By: TP	Date: 11/17/99
Revised By: MG	Date: 11/17/99
Series/Model: BY	Item:

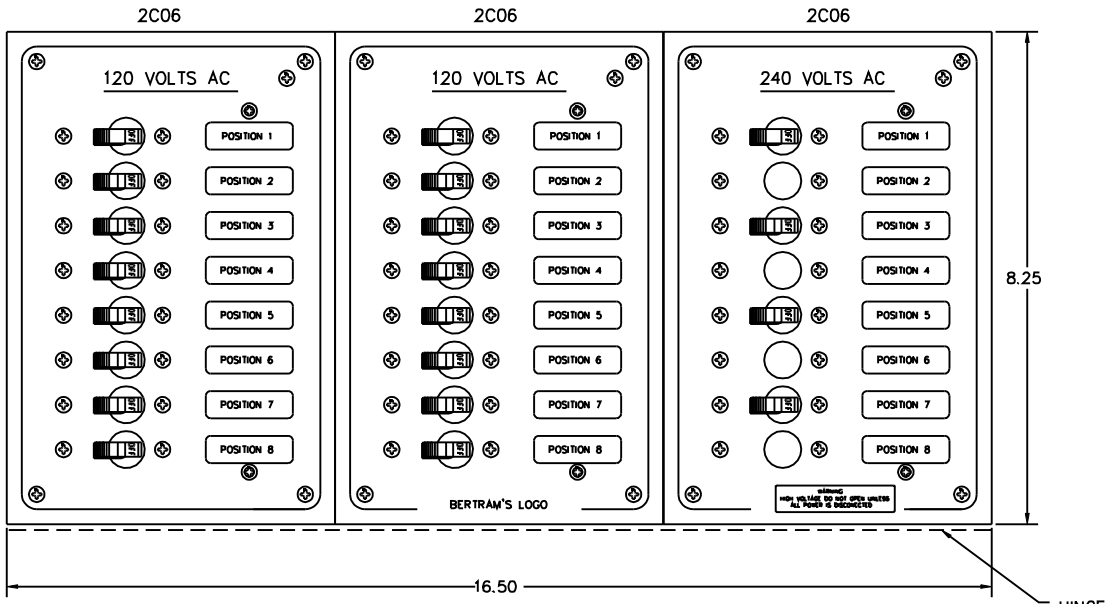
PANELTRONICS INCORPORATED

Paneltronics, Inc.
11960 N.W. 87th Court
Hialeah Gardens, FL 33018

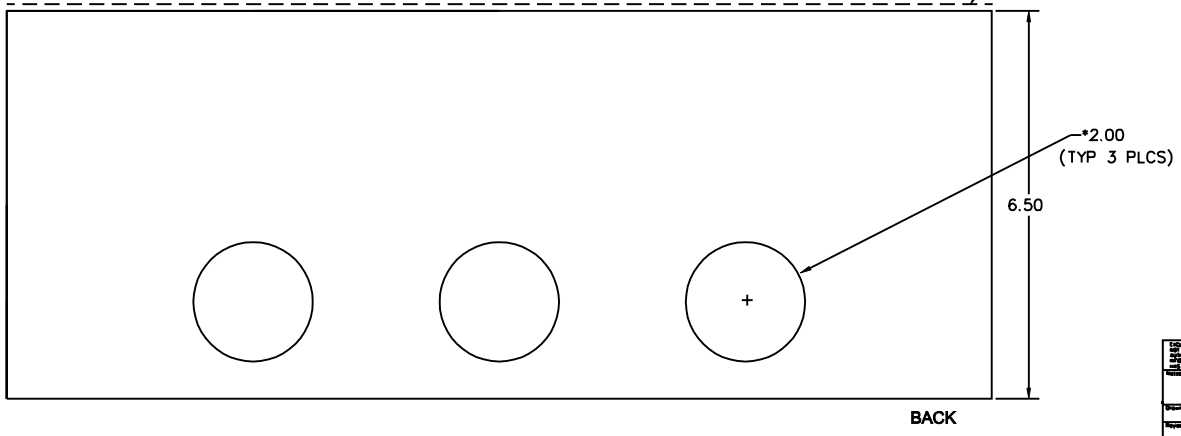
SINGLE GENERATOR 510
GALLEY DC PANEL
142976

Sheet	Scale	Size	DWG/Part #:	Rev:
3 of 6	1:1	C	BY-463-51S/0	

FRONT VIEW



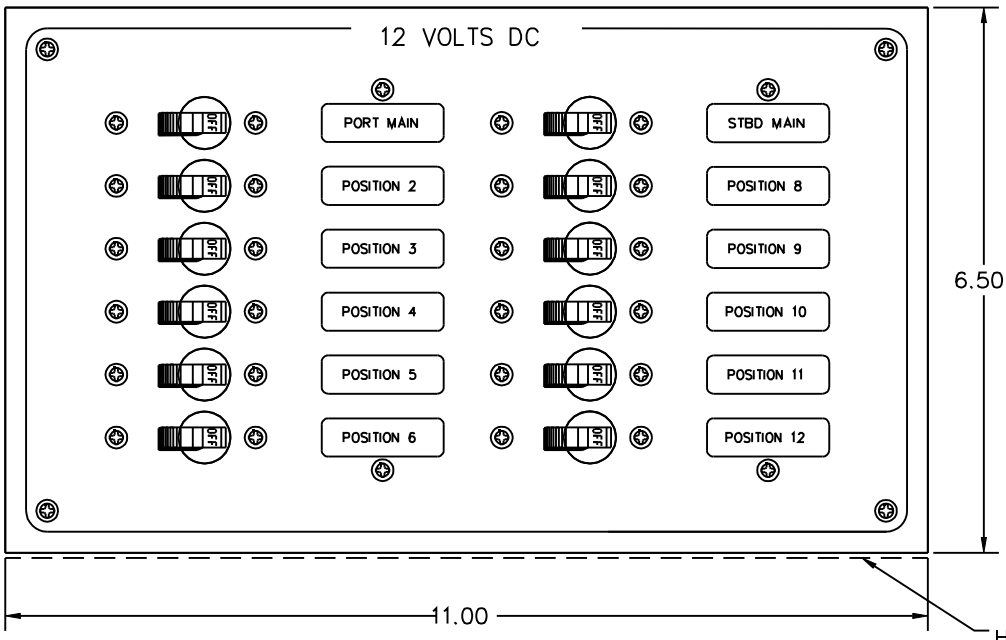
BOTTOM VIEW



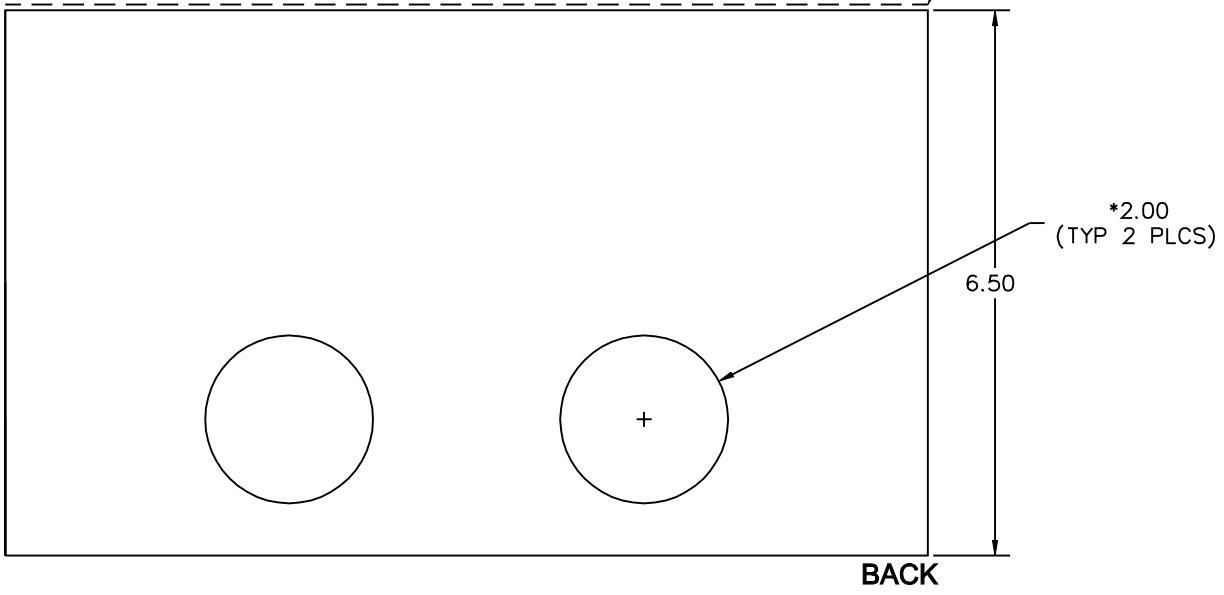
PANELTRONICS Panaltronics, Inc. 11900 N.W. 87th Court Miami Gardens, FL 33018			
			SINGLE GENERATOR 510 GALLEY AC PANEL 142977
Drawn By: TP	Date: 11/17/99		
Reviewed By: MG	Date: 11/17/99		
Series/Version: BY	Name:	Sheet: 4 of 6	Scale: 1:1 | Size: D | DWG/Part #: BY-463-51S/0 | Rev:

5B01

FRONT VIEW



BOTTOM VIEW



NOTE: WHITE PANEL/ WHITE ENCLOSURE

Notes:

Drawn By: TP	Date: 11/17/99
Revised By: MG	Date: 11/17/99
Series/Model: BY	Item:

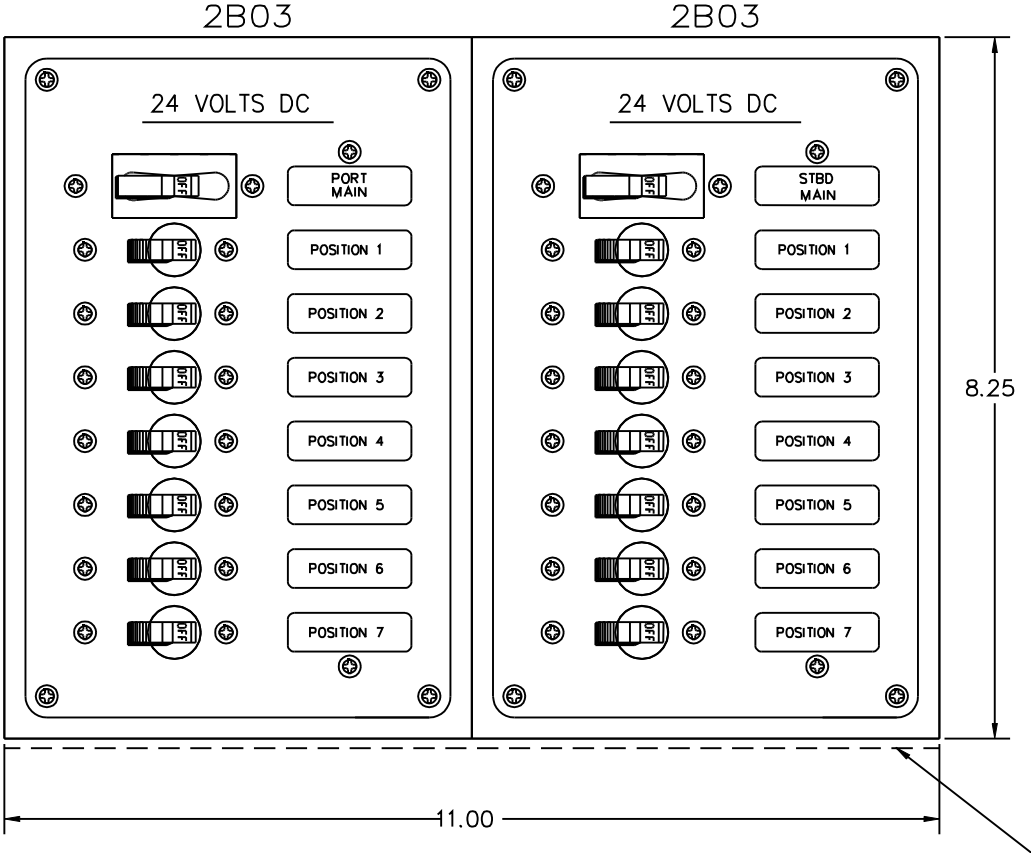
PANELTRONICS INCORPORATED

Paneltronics, Inc.
11960 N.W. 87th Court
Hialeah Gardens, FL 33018

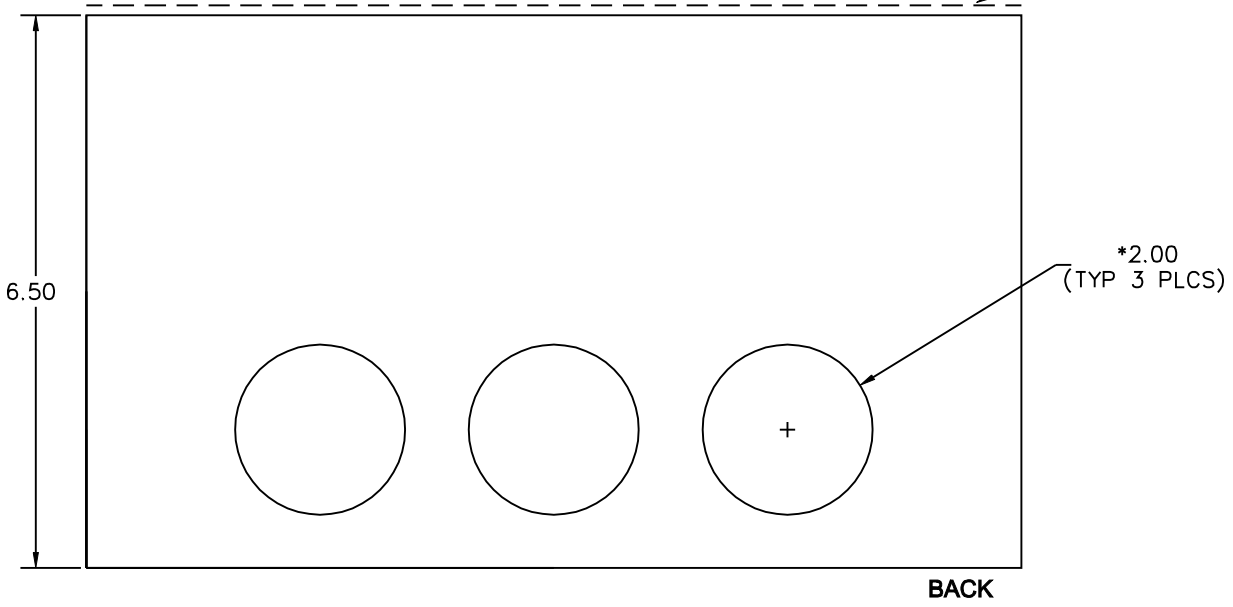
SINGLE GENERATOR 510
FLYBRIDGE 12 VDC
142978

Sheet	Scale	Size	DWG/Part #	Rev
5 of 6	1:1	C	BY-463-51S/0	

FRONT VIEW



BOTTOM VIEW



Notes:

Drawn By: TP	Date: 11/17/99
Revised By: MG	Date: 11/17/99
Series/Model: BY	Item:

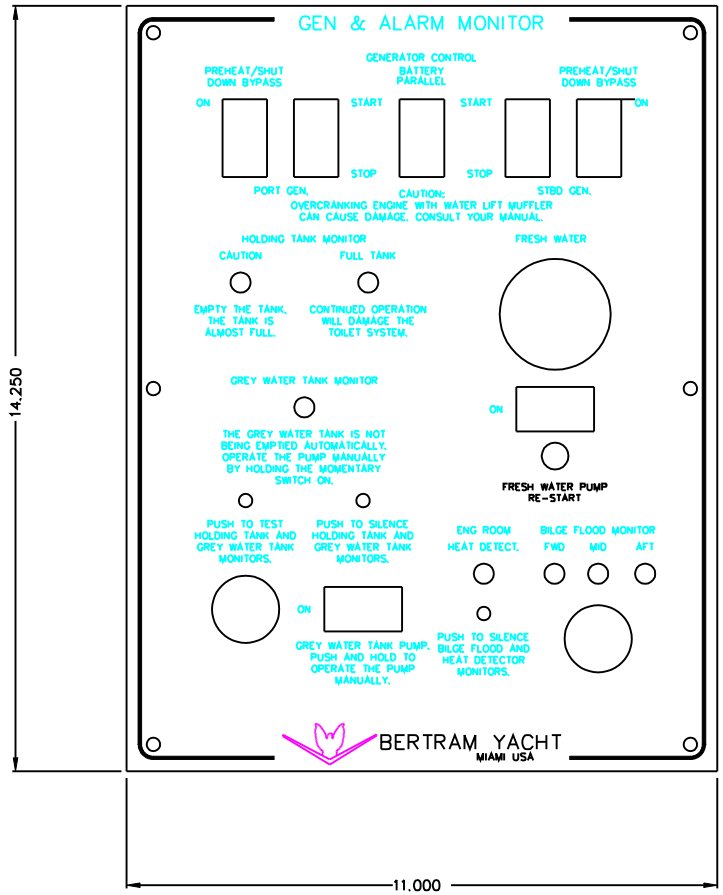
PANELTRONICS INCORPORATED

Paneltronics, Inc.
11960 N.W. 87th Court
Hialeah Gardens, FL 33018

SINGLE GENERATOR 510
FLYBRIDGE 24 VDC
142979

Sheet:	Scale:	Size:	DWG/Part #:	Rev:
6 of 6	1:1	C	BY-463-51S/0	

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 BLACK, LYN–RAND #30–7001–ON.
4. SILKSCREEN LETTERING: A WHITE FONT KNOWN AS "HVLI".

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"

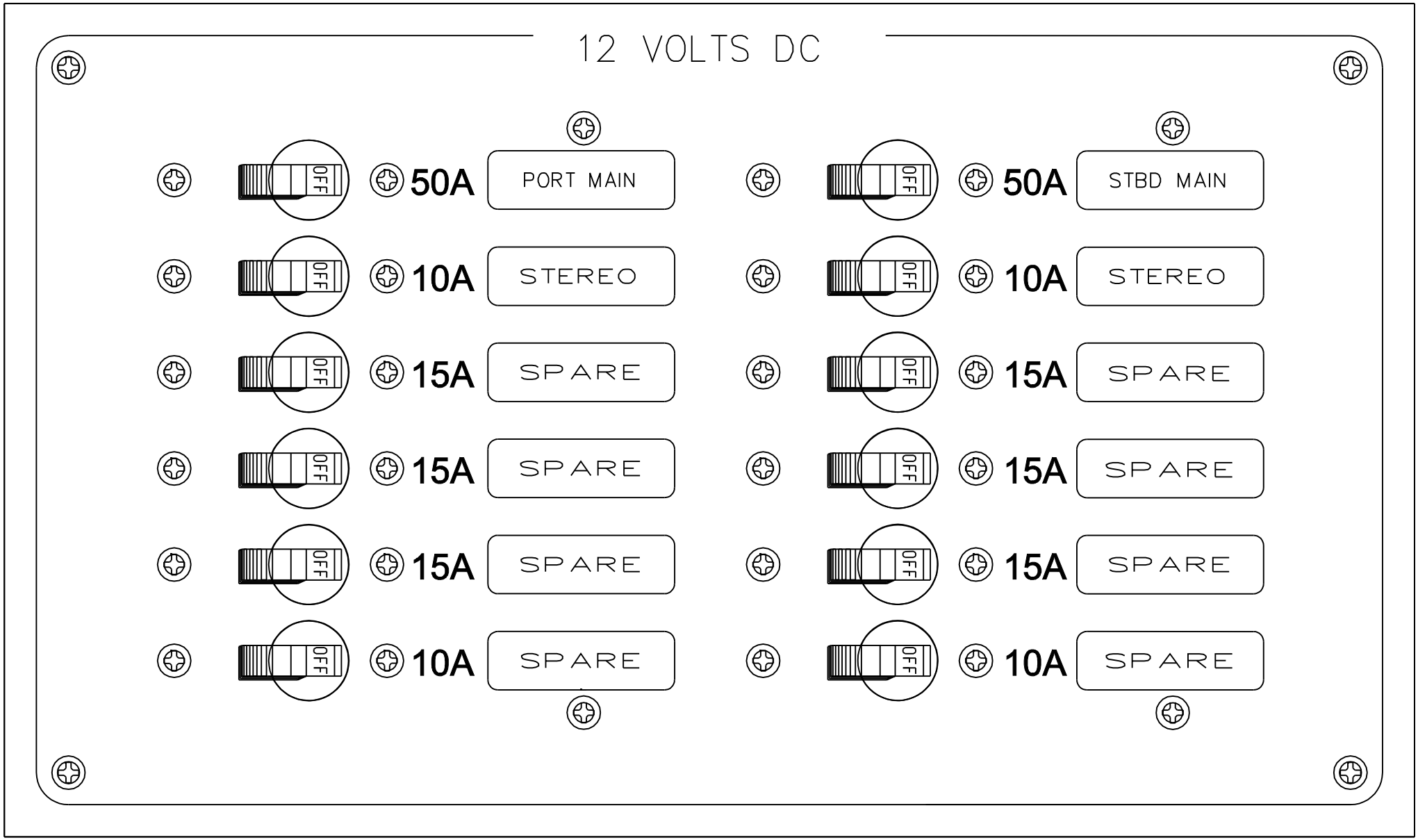
REF			
REF			
CODE	TITLE	DWG NO	REV
	REFERENCE		

NOTES

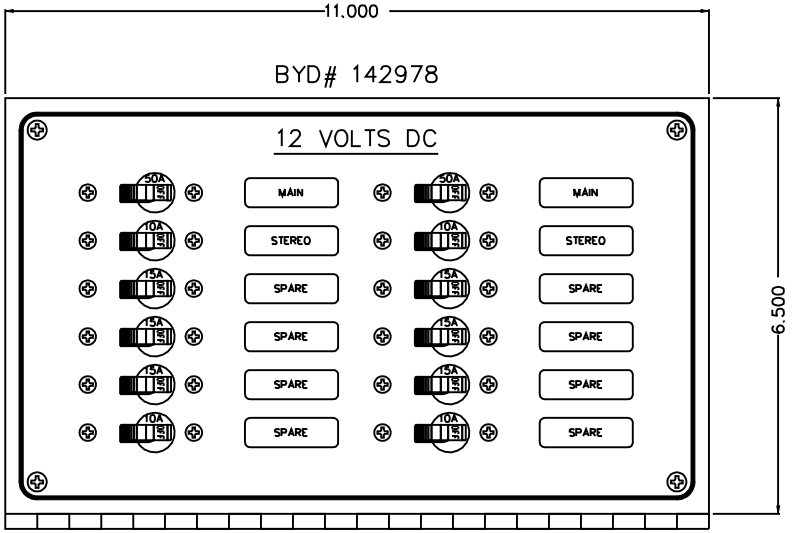
BERTRAM YACHT
MIAMI, FLORIDA, USA

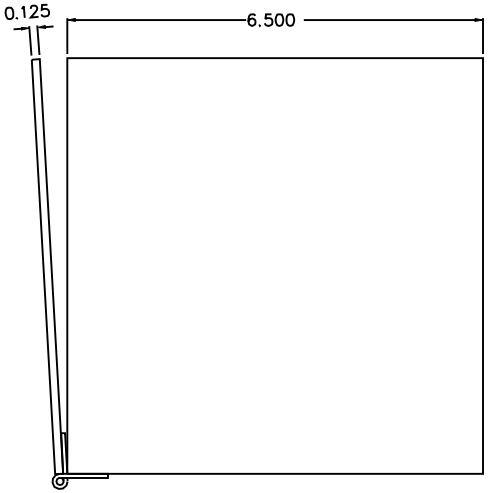
MODEL 510
TITLE GEN. & ALARM MONITOR
SCALE NONE
BY LAMARRE APPV
DATE 6/9/99
D12180 –

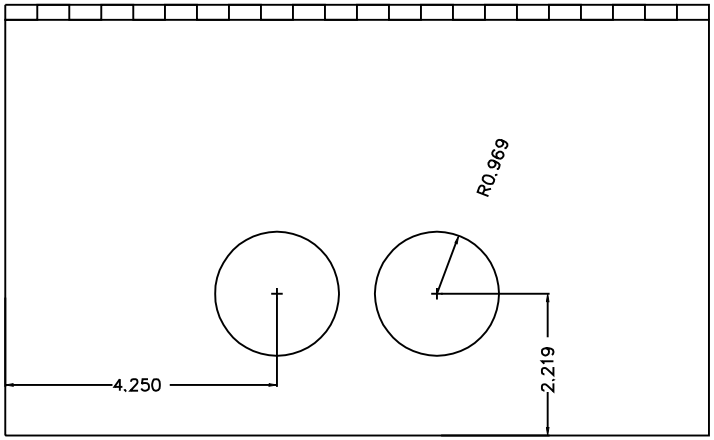
142978


12 VOLTS DC
OFF
50A
PORT MAIN
OFF
50A
STBD MAIN
OFF
10A
STEREO
OFF
10A
STEREO
OFF
15A
SPARE
OFF
15A
SPARE
OFF
15A
SPARE
OFF
15A
SPARE
OFF
15A
SPARE
OFF
15A
SPARE
OFF
10A
SPARE
OFF
10A
SPARE

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.







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"

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 "HVLI".

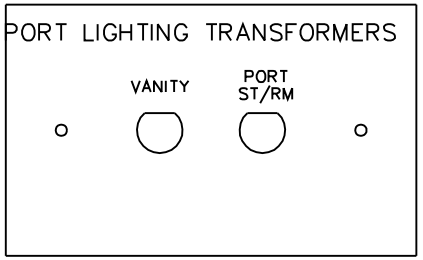
NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

MODEL	510
TITLE	FLYBRIDGE BREAKER PANEL 12V
SCALE	NONE
REV.	
BY	J MESA
APPV	
DATE	9/20/04
DATE	

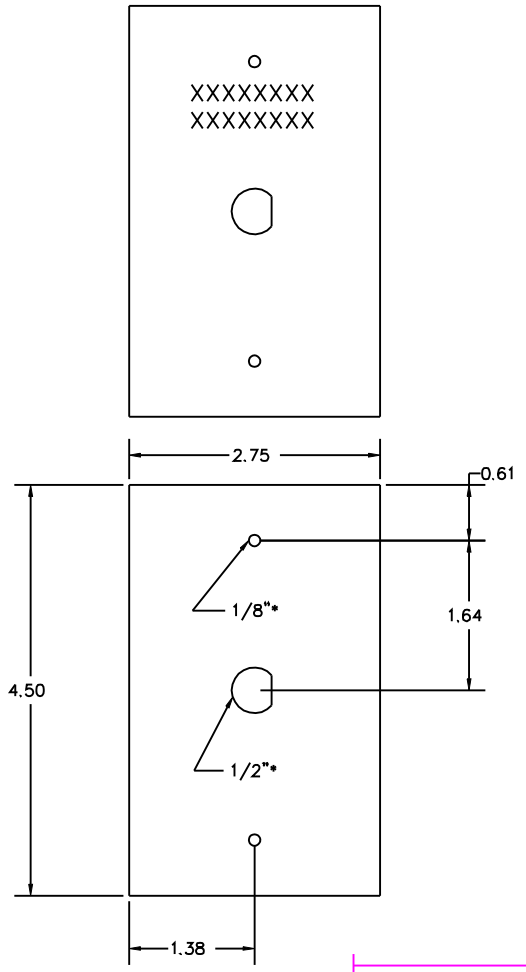
D 142978

BYD# 143XXX
MAT: PHENOLIC WHITE W/ BLACK LETTERS



1 EA REQ'D PER BOAT

BYD# 143XXX
MAT: PHENOLIC WHITE W/ BLACK LETTERS



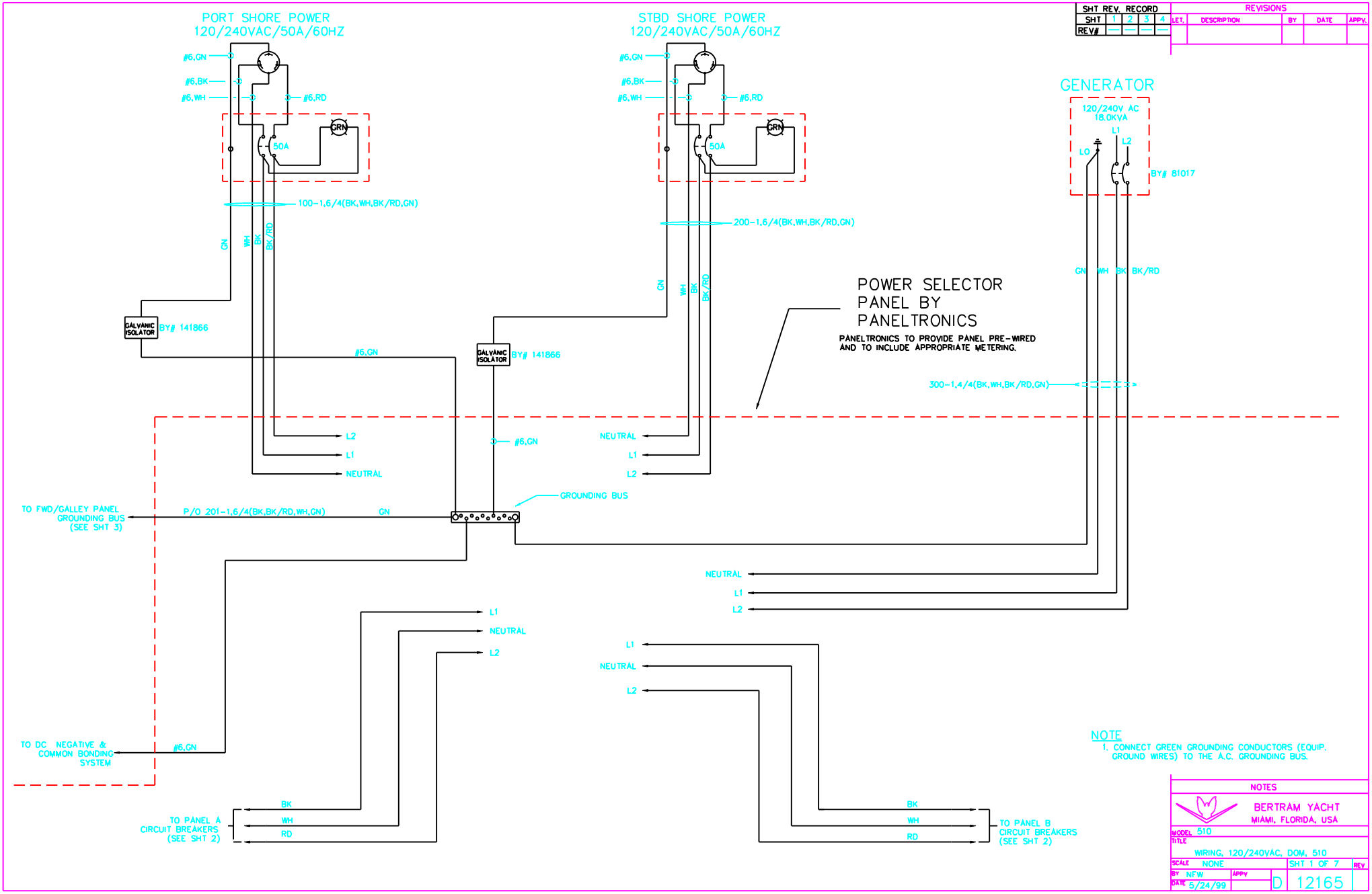
REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

MODEL 510
TITLE NAMEPLATE, ELECTRICAL
SCALE FULL
BY LAMARRE
DATE 4-2-01
APPV
14
REV C
126XX

CODE	TITLE	DWG NO
	REFERENCE	



SHT REV. RECORD				
SHT	1	2	3	4
REV#	—	—	—	—

REVISIONS

LET.	DESCRIPTION	BY	DATE	APPV.

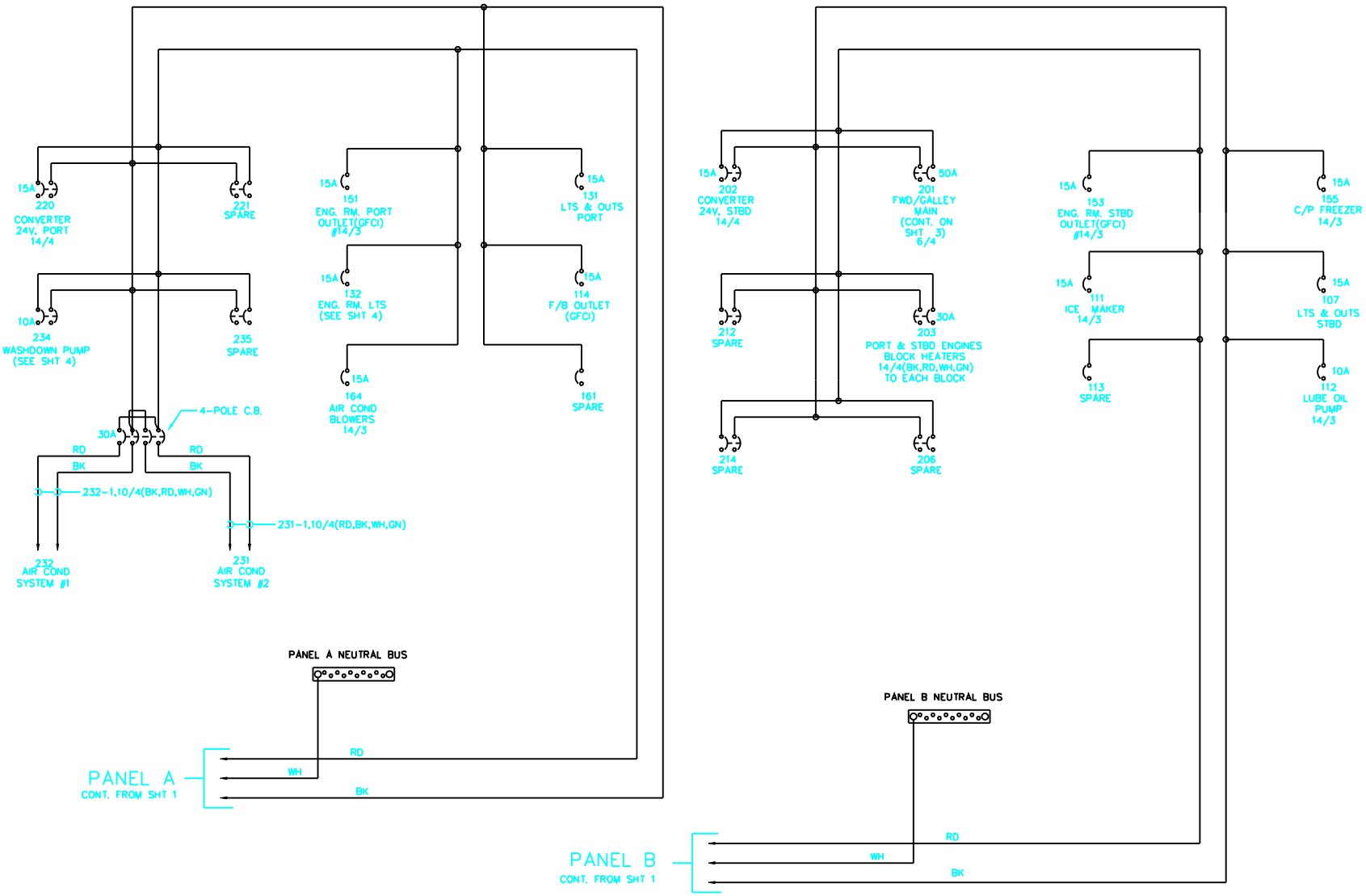
NOTE
1. CONNECT GREEN GROUNDING CONDUCTORS (EQUIP. GROUND WIRES) TO THE A.C. GROUNDING BUS.

NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

MODEL 510
TITLE
WIRING, 120/240VAC, DOM, 510

SCALE	NONE		SHT 1 OF 7	REV
BY	NFW	APPV	D	12165
DATE	5/24/99			



SALON PANEL BY PANELTRONICS

P/O A.C. PANEL SHEET 1

CONNECT GREEN GROUNDING CONDUCTORS TO THE GROUNDING BUS (SEE SHEET 1)

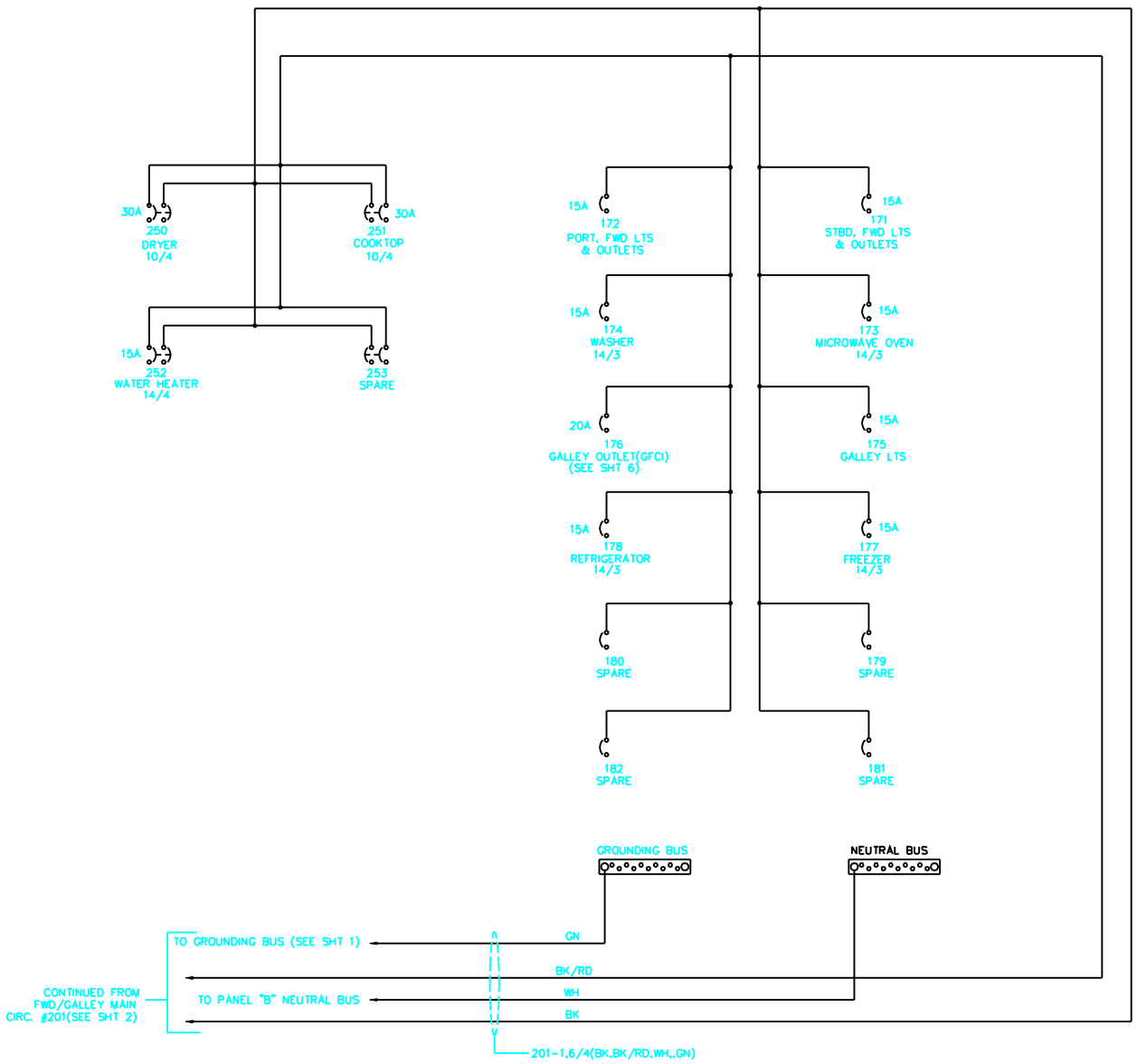
REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

MODEL 510
TITLE WIRING, 120/240VAC, DOM, 510

SCALE NONE | SHT 2 OF 7 | REV.
BY NFW | APPV
DATE 5/24/99 | D 12165



FWD/GALLEY PANEL BY PANELTRONICS

CONNECT GREEN GROUNDING CONDUCTORS TO THE GROUNDING BUS.

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

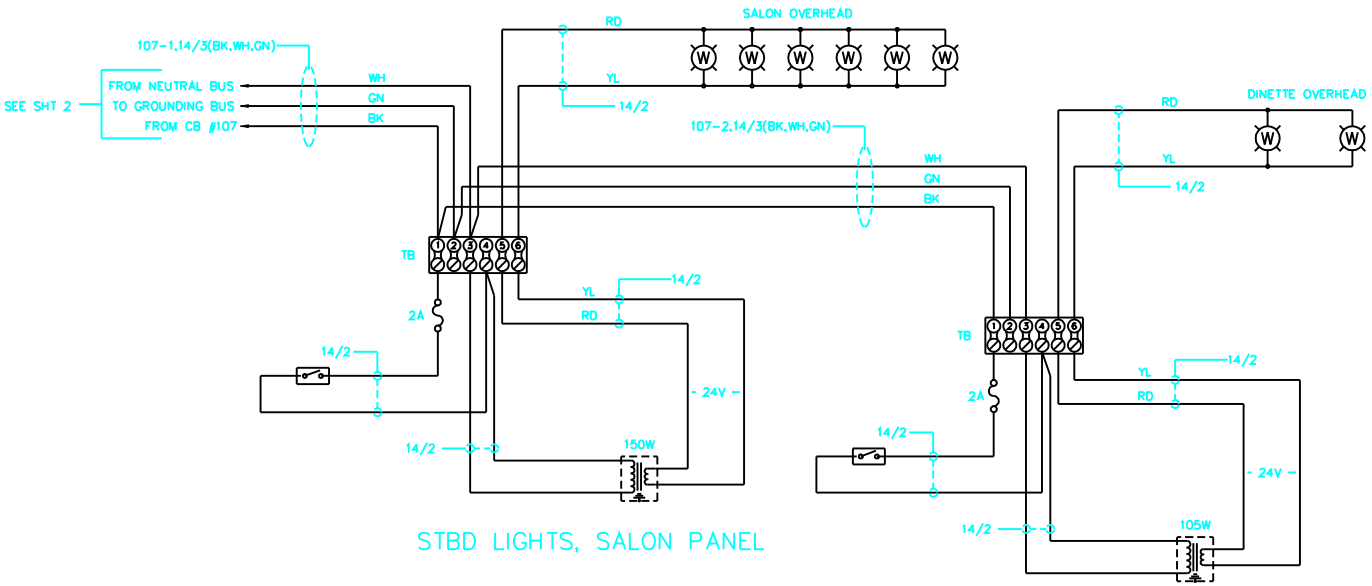
MODEL 510
TITLE WIRING, 120/240VAC, DOM

SCALE NONE | SHT 3 OF 7 | REV

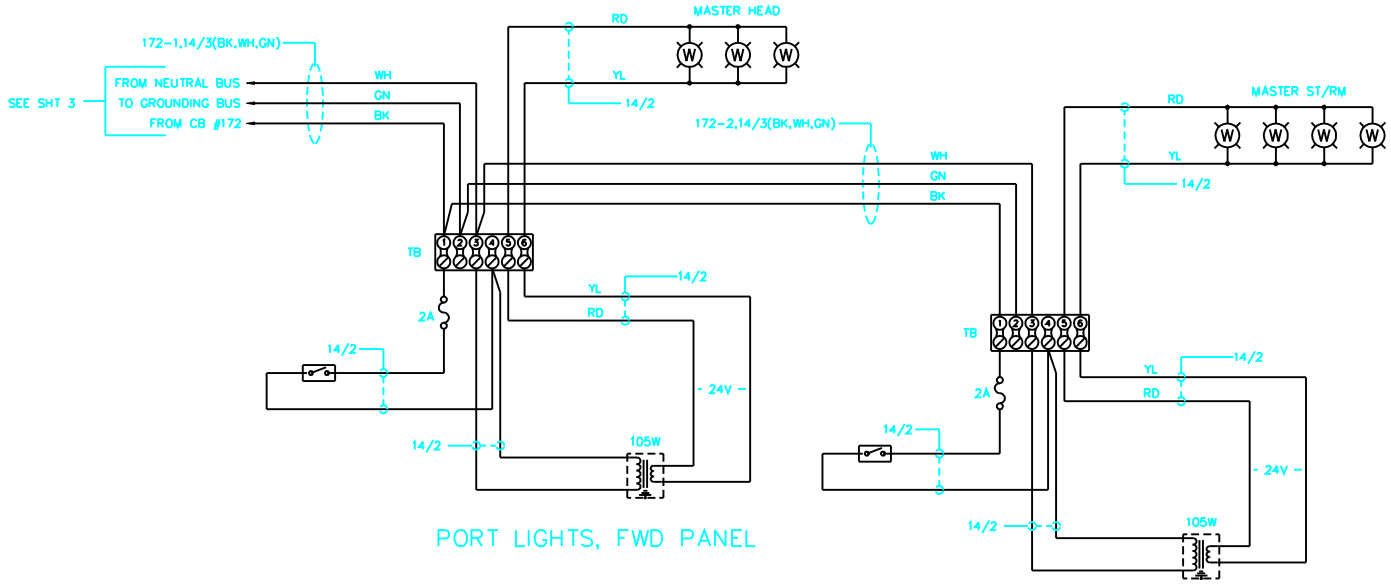
CODE | TITLE | DWG NO | REFERENCE

BY NFW | APPV | DATE 5/24/99

D 12165

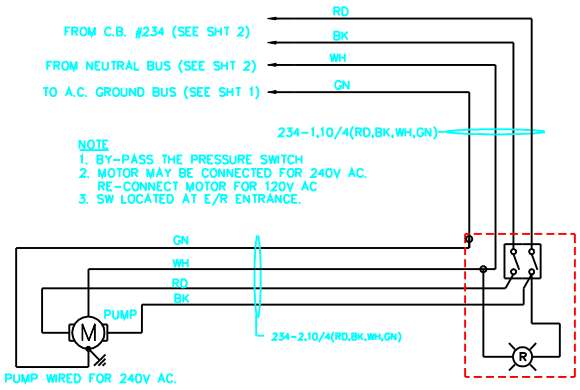


STBD LIGHTS, SALON PANEL

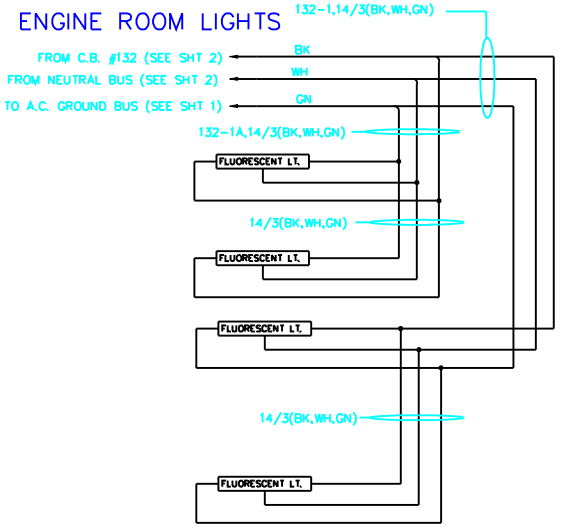


PORT LIGHTS, FWD PANEL

WASHDOWN PUMP



ENGINE ROOM LIGHTS



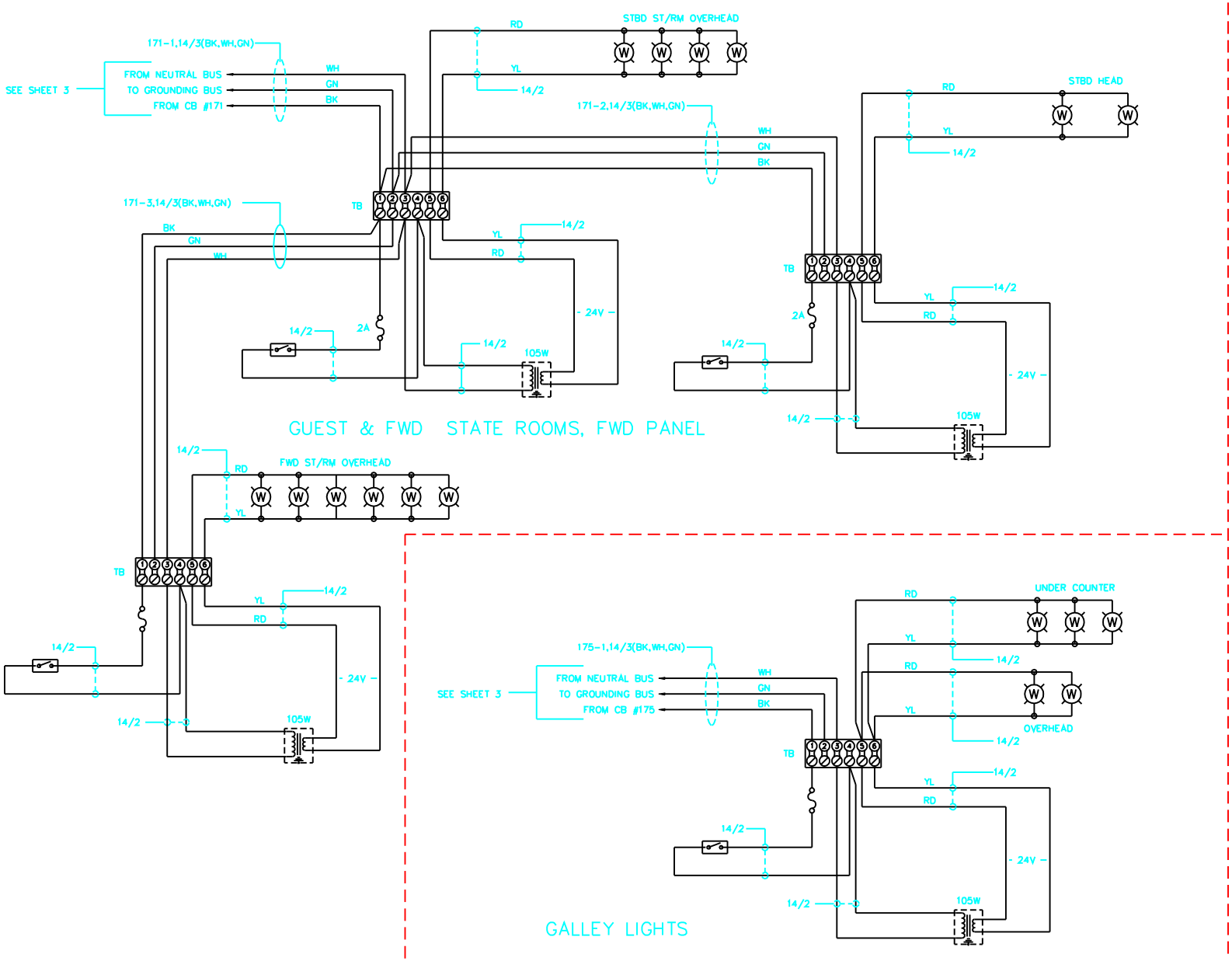
REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

MODEL 510
TITLE WIRING, 120/240VAC, DOM

CODE	TITLE	DWG NO	SCALE NONE	SHT 4 OF 7	REV
	REFERENCE		BY NFW APPV	D 12165	
			DATE 5/24/99		

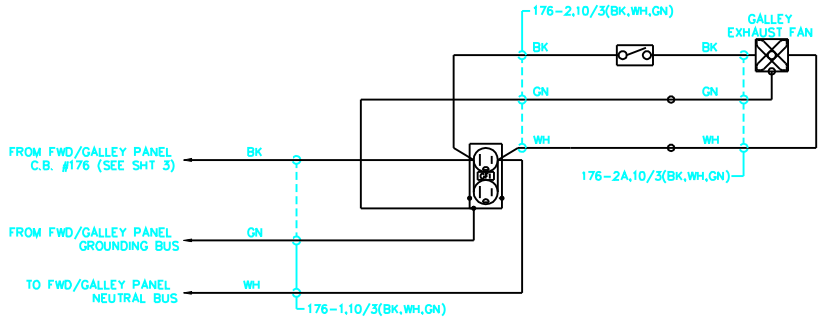


REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

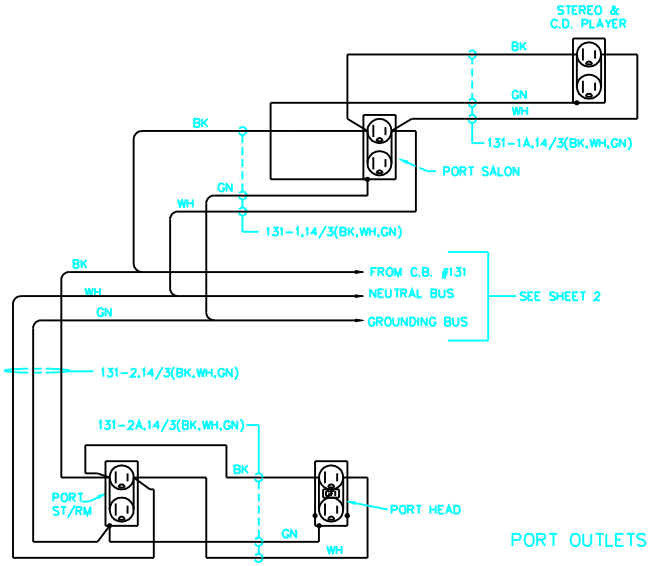
NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

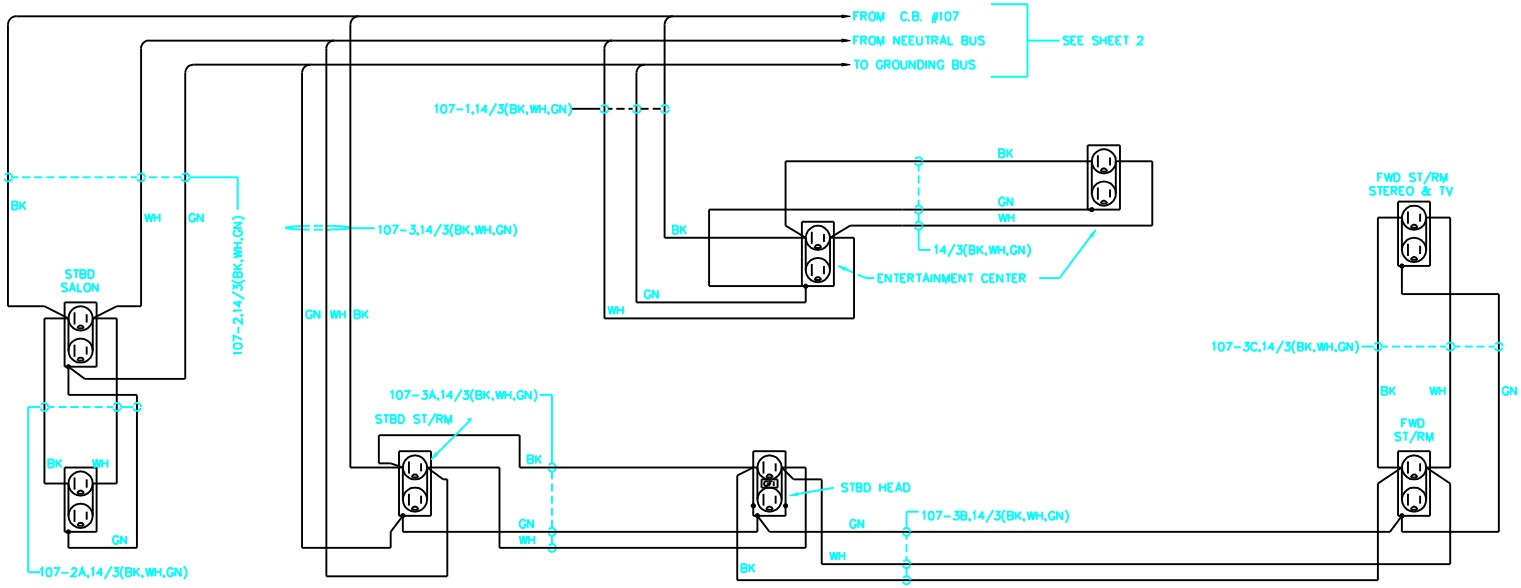
MODEL 510
TITLE WIRING, 120/240VAC, DOM
SCALE NONE
SHT 5 OF 7
REV
BY NFW
APPV
DATE 5/25/99
D12165



GALLEY



PORT OUTLETS



OUTLETS

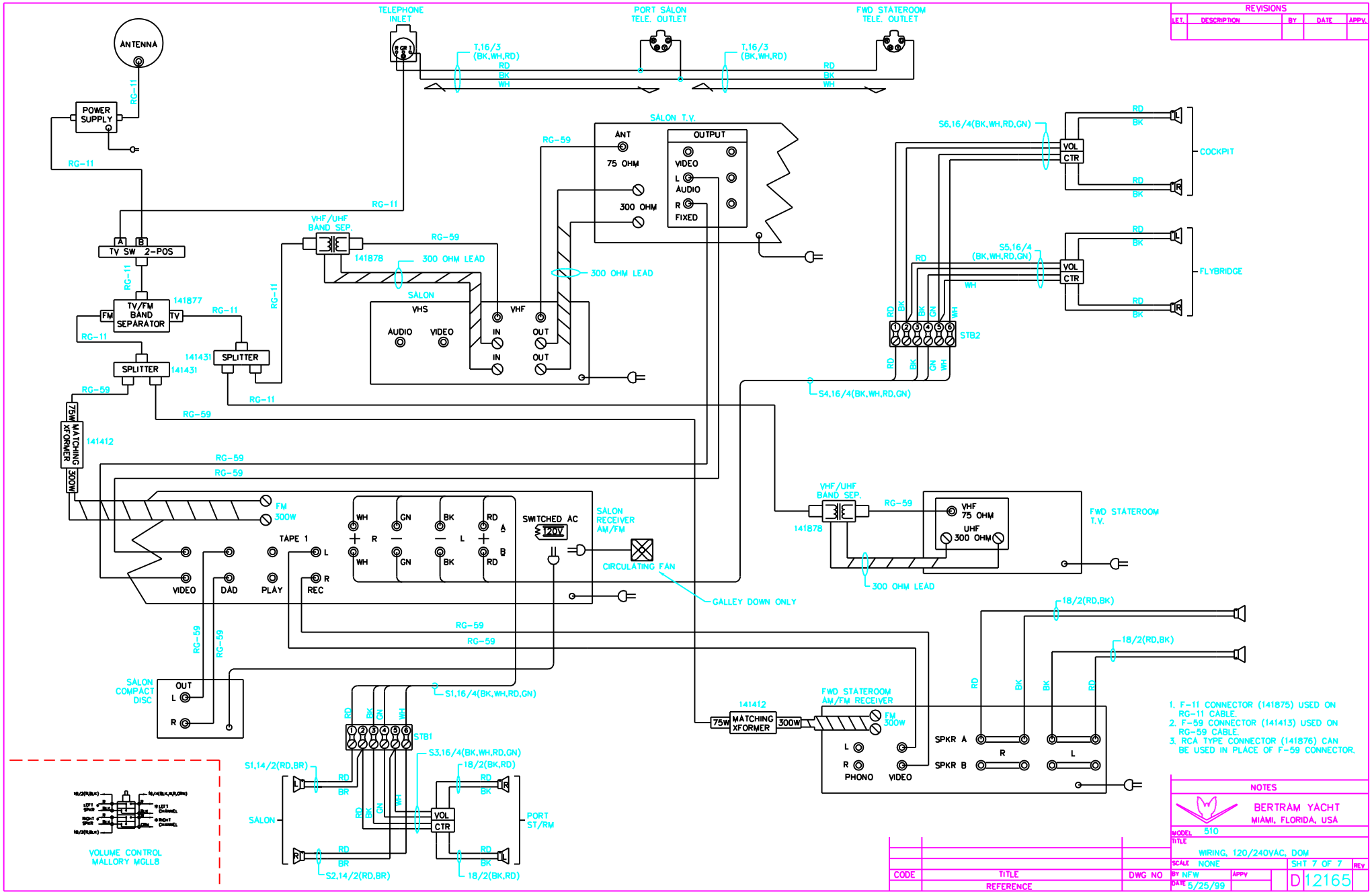
REVISIONS

LET.	DESCRIPTION	BY	DATE	APPV.

NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

MODEL 510
TITLE WIRING, 120/240VAC
SCALE NONE
SHT 6 OF 7
REV
BY NFW
APPV
DATE 5/25/99
D12165



REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

1. F-11 CONNECTOR (141875) USED ON RG-11 CABLE.
2. F-59 CONNECTOR (141413) USED ON RG-59 CABLE.
3. RCA TYPE CONNECTOR (141876) CAN BE USED IN PLACE OF F-59 CONNECTOR.

NOTES

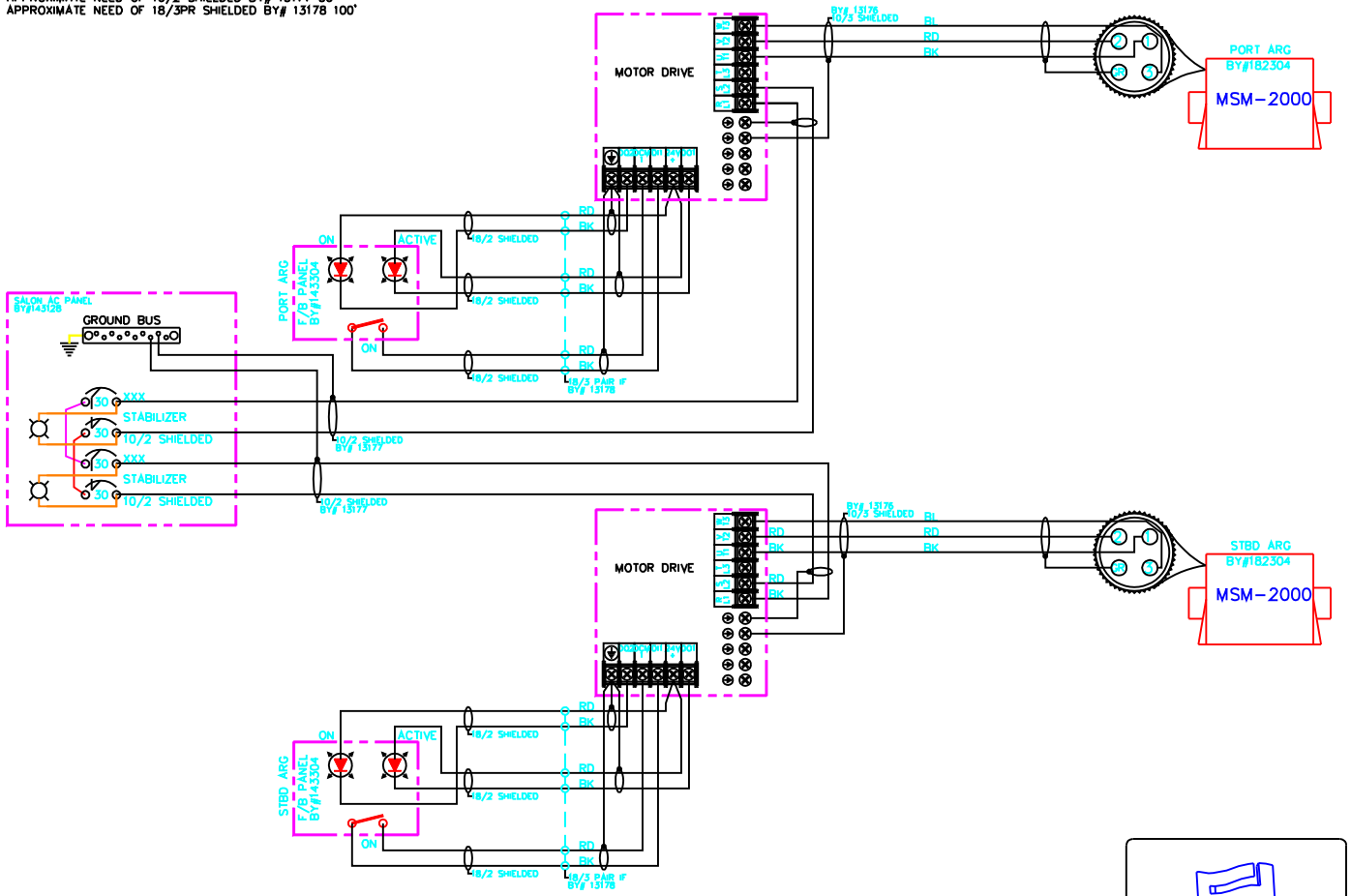
BERTRAM YACHT
MIAMI, FLORIDA, USA

MODEL 510
TITLE WIRING, 120/240VAC, DOM
SCALE NONE
SHT 7 OF 7
REV
BY NFW
APPV
DATE 5/25/99
D12165

CODE | TITLE | DWG NO | REFERENCE

NOTE:
APPROXIMATE NEED OF 10/3 SHIELDED BY# 13176 50'
APPROXIMATE NEED OF 10/2 SHIELDED BY# 13177 50'
APPROXIMATE NEED OF 18/3PR SHIELDED BY# 13178 100'

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.



ANTI-ROLLING GYRO

FERRETTI GROUP

FERRETTI CRN PERSHING Riva apreamare BERTRAM CUSTOM LINE

BERTRAM ENGINEERING DEPT.

3665 NW 21 STREET, MIAMI FL, 33142 - USA - tel. (305) 633/8011 - fax (305) 633/7188 - e-mail: info@bertram.com

DRAWING TITLE
ANTI ROLL GYRO WIRING

MODEL: 510

DRAWING SIZE: A

Project	Job Order #	Group#	Dwg #	Rev.	Layout
B510	83/3U	IM	48	0	-

FILE: B51083_3UIM48 TAV

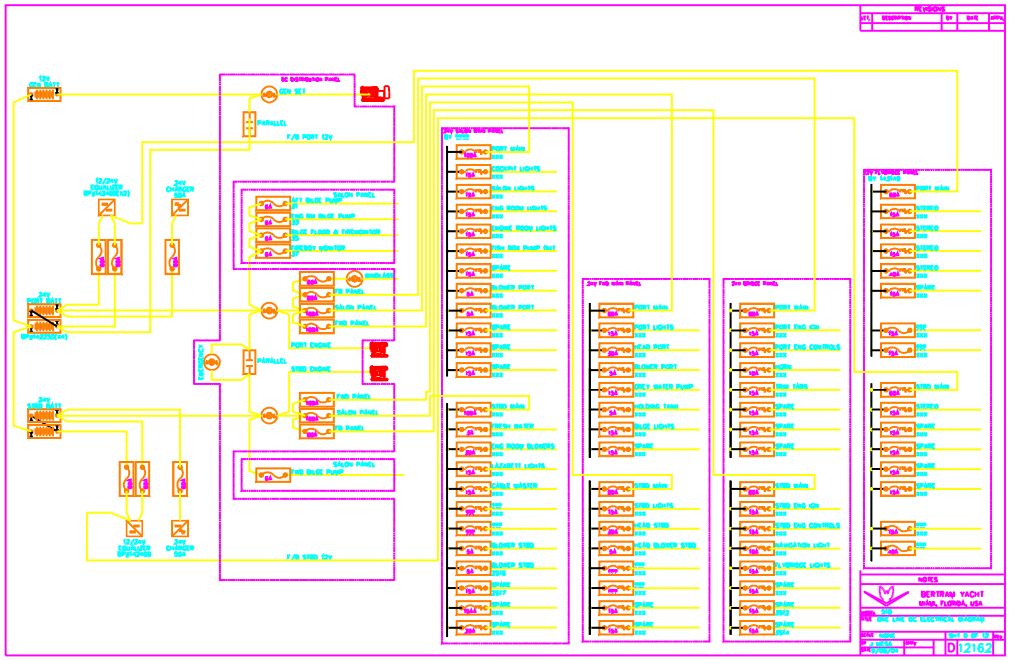
DATE: 05/12/05

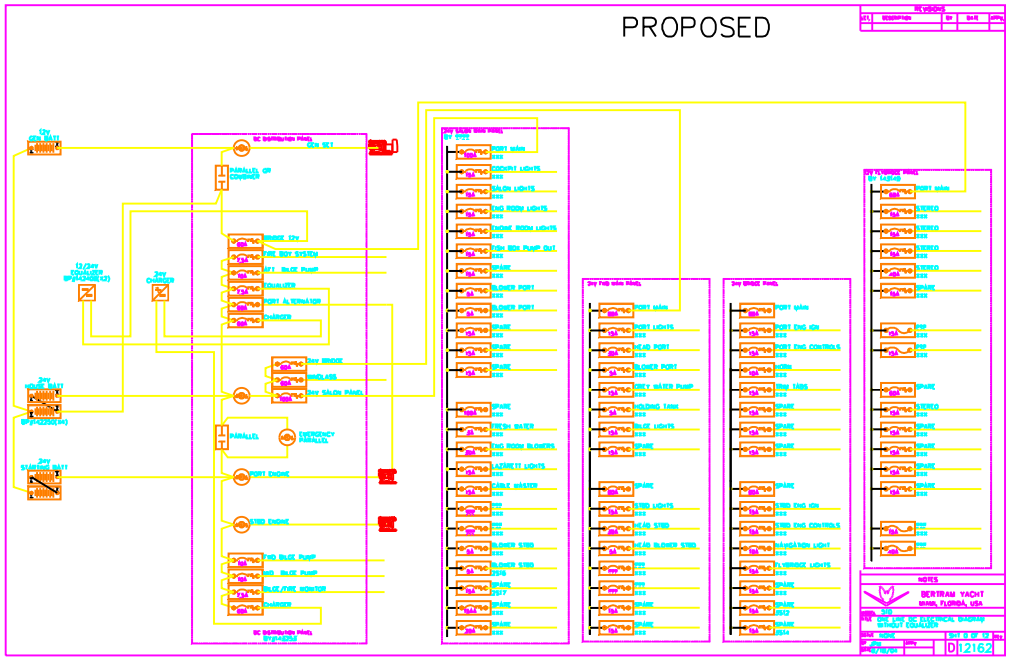
SCALE: NONE

APPV.BY:

DESIG.BY: J MESA

Dwg # 48

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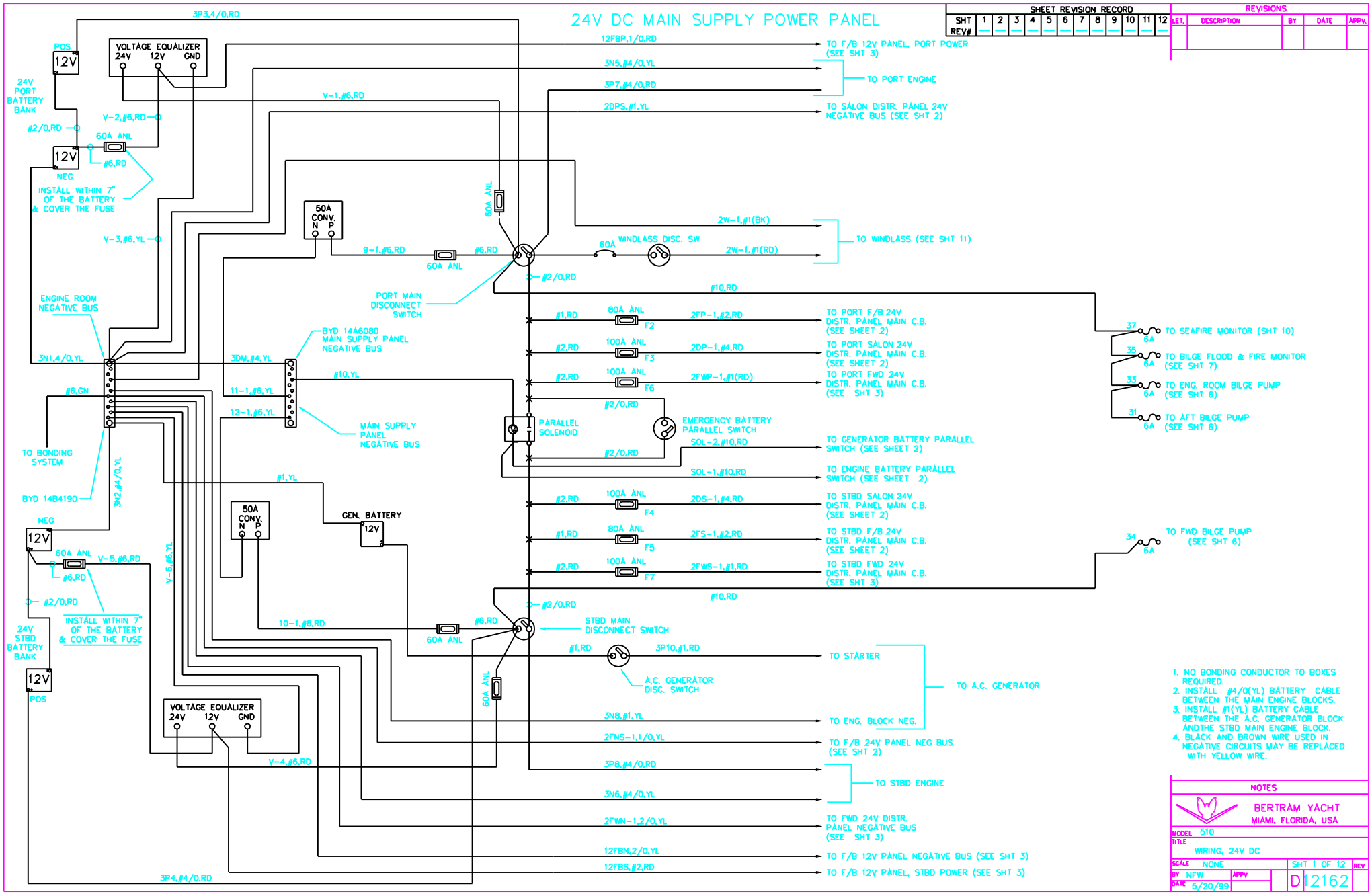
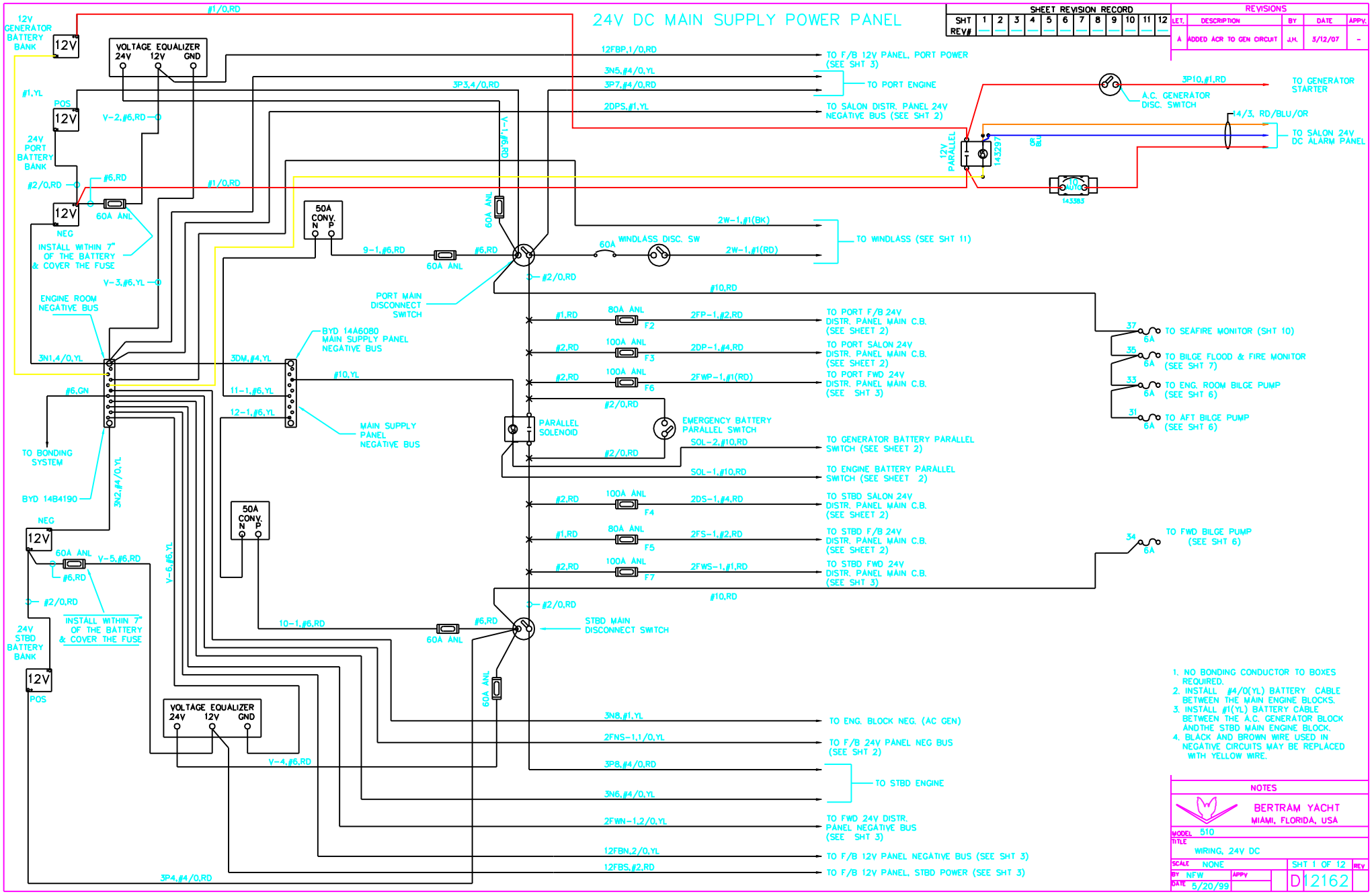
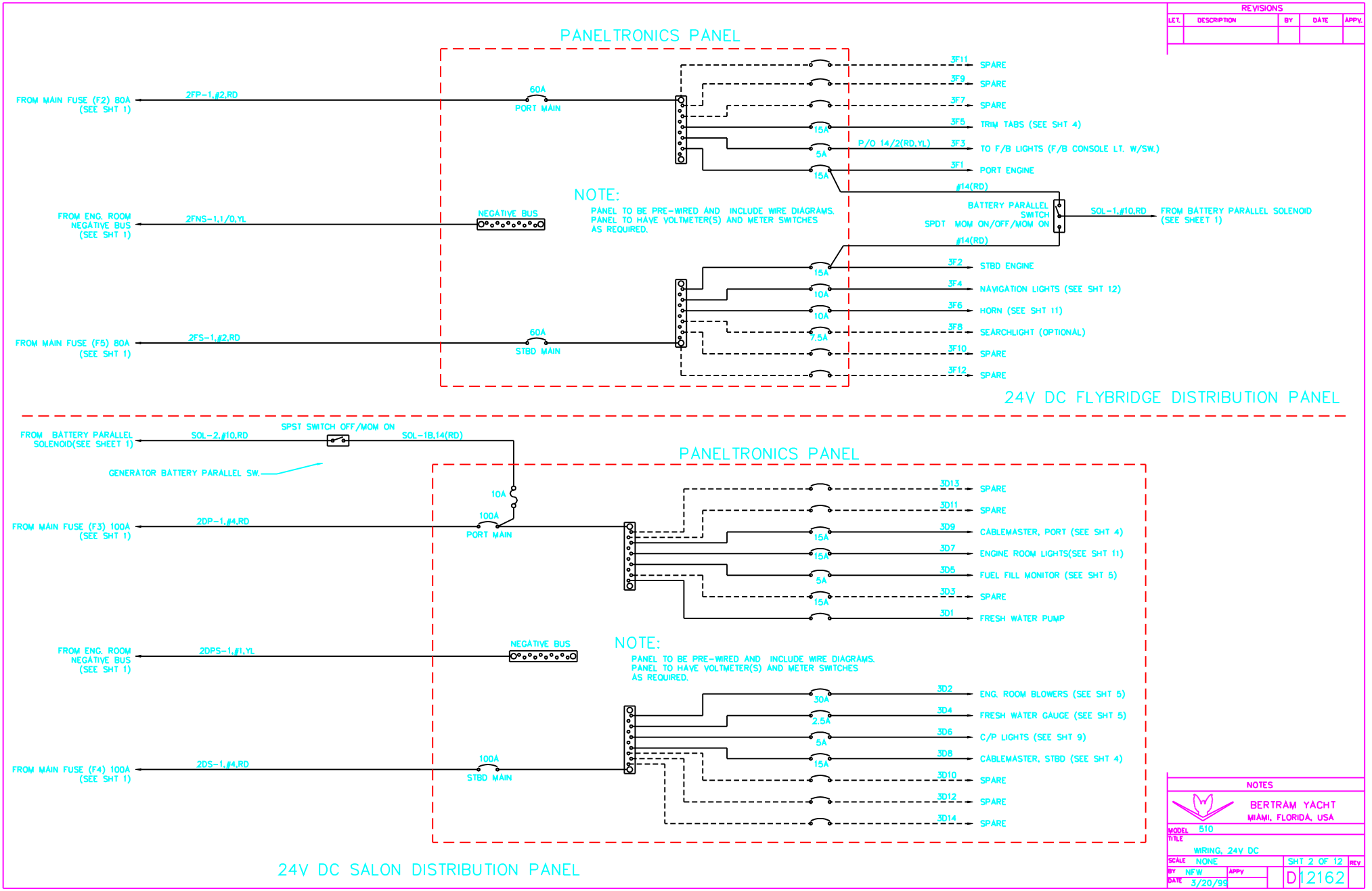
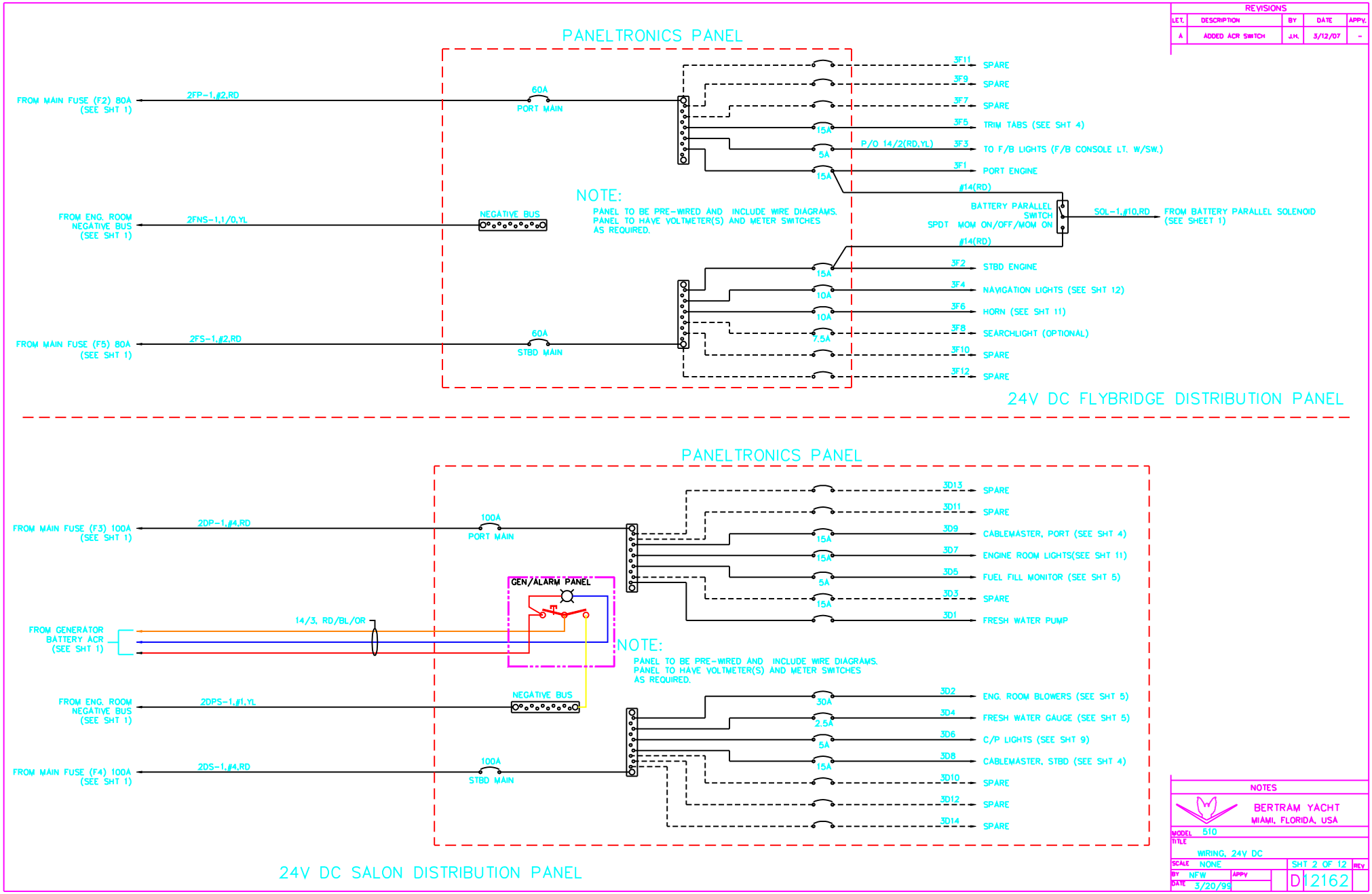

24V DC MAIN SUPPLY POWER PANEL
SHEET REVISION RECORD
SHT REV# 1 2 3 4 5 6 7 8 9 10 11 12
REVISIONS
LET. DESCRIPTION BY DATE APPV.
3P3,4/0,RD
POS
12V
VOLTAGE EQUALIZER
24V 12V GND
24V PORT BATTERY BANK
#2/0,RD
60A ANL
#6,RD
12V
NEG
INSTALL WITHIN 7" OF THE BATTERY & COVER THE FUSE
V-1,#6,RD
V-2,#6,RD
V-3,#6,YL
12FBP,1/0,RD
TO F/B 12V PANEL, PORT POWER (SEE SHT 3)
3N5,#4/0,YL
3P7,#4/0,RD
TO PORT ENGINE
2DPS,#1,YL
TO SALON DISTR. PANEL 24V NEGATIVE BUS (SEE SHT 2)
50A CONV. N P
9-1,#6,RD
#6,RD
60A ANL
60A ANL
60A WINDLASS DISC. SW
2W-1,#1(BK)
2W-1,#1(RD)
TO WINDLASS (SEE SHT 11)
#2/0,RD
#10,RD
PORT MAIN DISCONNECT SWITCH
ENGINE ROOM NEGATIVE BUS
BYD 14A6080 MAIN SUPPLY PANEL NEGATIVE BUS
3N1,4/0,YL
3DM,#4,YL
11-1,#6,YL
12-1,#6,YL
#10,YL
#6,GN
MAIN SUPPLY PANEL NEGATIVE BUS
TO BONDING SYSTEM
BYD 14B4190
3N2,#4/0,YL
#1,RD
80A ANL F2
2FP-1,#2,RD
TO PORT F/B 24V DISTR. PANEL MAIN C.B. (SEE SHEET 2)
#2,RD
100A ANL F3
2DP-1,#4,RD
TO PORT SALON 24V DISTR. PANEL MAIN C.B. (SEE SHEET 2)
#2,RD
100A ANL F6
2FWP-1,#1(RD)
TO PORT FWD 24V DISTR. PANEL MAIN C.B. (SEE SHT 3)
#2/0,RD
PARALLEL SOLENOID
EMERGENCY BATTERY PARALLEL SWITCH
SOL-2,#10,RD
TO GENERATOR BATTERY PARALLEL SWITCH (SEE SHEET 2)
#2/0,RD
SOL-1,#10,RD
TO ENGINE BATTERY PARALLEL SWITCH (SEE SHEET 2)
#2,RD
100A ANL F4
2DS-1,#4,RD
TO STBD SALON 24V DISTR. PANEL MAIN C.B. (SEE SHEET 2)
#1,RD
80A ANL F5
2FS-1,#2,RD
TO STBD F/B 24V DISTR. PANEL MAIN C.B. (SEE SHEET 2)
#2,RD
100A ANL F7
2FWS-1,#1,RD
TO STBD FWD 24V DISTR. PANEL MAIN C.B. (SEE SHT 3)
#10,RD
37 6A TO SEAFIRE MONITOR (SHT 10)
35 6A TO BILGE FLOOD & FIRE MONITOR (SEE SHT 7)
33 6A TO ENG. ROOM BILGE PUMP (SEE SHT 6)
31 6A TO AFT BILGE PUMP (SEE SHT 6)
34 6A TO FWD BILGE PUMP (SEE SHT 6)
#2/0,RD
STBD MAIN DISCONNECT SWITCH
#1,YL
50A CONV. N P
GEN. BATTERY
12V
NEG
12V
60A ANL
V-5,#6,RD
#6,RD
V-6,#6,YL
#2/0,RD
INSTALL WITHIN 7" OF THE BATTERY & COVER THE FUSE
24V STBD BATTERY BANK
12V
POS
10-1,#6,RD
#6,RD
60A ANL
#1,RD
3P10,#1,RD
TO STARTER
A.C. GENERATOR DISC. SWITCH
TO A.C. GENERATOR
60A ANL
3N8,#1,YL
TO ENG. BLOCK NEG.
2FNS-1,1/0,YL
TO F/B 24V PANEL NEG BUS (SEE SHT 2)
3PB,#4/0,RD
3N6,#4/0,YL
TO STBD ENGINE
VOLTAGE EQUALIZER
24V 12V GND
V-4,#6,RD
2FWN-1,2/0,YL
TO FWD 24V DISTR. PANEL NEGATIVE BUS (SEE SHT 3)
12FBN,2/0,YL
TO F/B 12V PANEL NEGATIVE BUS (SEE SHT 3)
12FBS,#2,RD
TO F/B 12V PANEL, STBD POWER (SEE SHT 3)
3P4,#4/0,RD
1. NO BONDING CONDUCTOR TO BOXES REQUIRED.
2. INSTALL #4/0(YL) BATTERY CABLE BETWEEN THE MAIN ENGINE BLOCKS.
3. INSTALL #1(YL) BATTERY CABLE BETWEEN THE A.C. GENERATOR BLOCK AND THE STBD MAIN ENGINE BLOCK.
4. BLACK AND BROWN WIRE USED IN NEGATIVE CIRCUITS MAY BE REPLACED WITH YELLOW WIRE.
NOTES
BERTRAM YACHT
MIAMI, FLORIDA, USA
MODEL 510
TITLE WIRING, 24V DC
SCALE NONE
SHT 1 OF 12
REV
BY NFW
APPV
DATE 5/20/99
D12162


24V DC MAIN SUPPLY POWER PANEL
12V GENERATOR BATTERY BANK
VOLTAGE EQUALIZER 24V 12V GND
POS
24V PORT BATTERY BANK
NEG
INSTALL WITHIN 7" OF THE BATTERY & COVER THE FUSE
60A ANL
50A CONV. N P
ENGINE ROOM NEGATIVE BUS
BYD 14A6080 MAIN SUPPLY PANEL NEGATIVE BUS
MAIN SUPPLY PANEL NEGATIVE BUS
TO BONDING SYSTEM
BYD 14B4190
PORT MAIN DISCONNECT SWITCH
STBD MAIN DISCONNECT SWITCH
WINDLASS DISC. SW
PARALLEL SOLENOID
EMERGENCY BATTERY PARALLEL SWITCH
24V STBD BATTERY BANK
12FBP,1/0,RD
TO F/B 12V PANEL, PORT POWER (SEE SHT 3)
3N5,#4/0,YL
3P7,#4/0,RD
TO PORT ENGINE
3P3,4/0,RD
2DPS,#1,YL
TO SALON DISTR. PANEL 24V NEGATIVE BUS (SEE SHT 2)
2W-1,#1(BK)
2W-1,#1(RD)
TO WINDLASS (SEE SHT 11)
2FP-1,#2,RD
TO PORT F/B 24V DISTR. PANEL MAIN C.B. (SEE SHEET 2)
2DP-1,#4,RD
TO PORT SALON 24V DISTR. PANEL MAIN C.B. (SEE SHEET 2)
2FWP-1,#1(RD)
TO PORT FWD 24V DISTR. PANEL MAIN C.B. (SEE SHT 3)
SOL-2,#10,RD
TO GENERATOR BATTERY PARALLEL SWITCH (SEE SHEET 2)
SOL-1,#10,RD
TO ENGINE BATTERY PARALLEL SWITCH (SEE SHEET 2)
2DS-1,#4,RD
TO STBD SALON 24V DISTR. PANEL MAIN C.B. (SEE SHEET 2)
2FS-1,#2,RD
TO STBD F/B 24V DISTR. PANEL MAIN C.B. (SEE SHEET 2)
2FWS-1,#1,RD
TO STBD FWD 24V DISTR. PANEL MAIN C.B. (SEE SHT 3)
3P10,#1,RD
TO GENERATOR STARTER
A.C. GENERATOR DISC. SWITCH
14/3, RD/BLU/OR
TO SALON 24V DC ALARM PANEL
TO SEAFIRE MONITOR (SHT 10)
TO BILGE FLOOD & FIRE MONITOR (SEE SHT 7)
TO ENG. ROOM BILGE PUMP (SEE SHT 6)
TO AFT BILGE PUMP (SEE SHT 6)
TO FWD BILGE PUMP (SEE SHT 6)
3N8,#1,YL
TO ENG. BLOCK NEG. (AC GEN)
2FNS-1,1/0,YL
TO F/B 24V PANEL NEG BUS (SEE SHT 2)
3P8,#4/0,RD
3N6,#4/0,YL
TO STBD ENGINE
2FWN-1,2/0,YL
TO FWD 24V DISTR. PANEL NEGATIVE BUS (SEE SHT 3)
12FBN,2/0,YL
TO F/B 12V PANEL NEGATIVE BUS (SEE SHT 3)
12FBS,#2,RD
TO F/B 12V PANEL, STBD POWER (SEE SHT 3)
3P4,#4/0,RD
1. NO BONDING CONDUCTOR TO BOXES REQUIRED.
2. INSTALL #4/0(YL) BATTERY CABLE BETWEEN THE MAIN ENGINE BLOCKS.
3. INSTALL #1(YL) BATTERY CABLE BETWEEN THE A.C. GENERATOR BLOCK AND THE STBD MAIN ENGINE BLOCK.
4. BLACK AND BROWN WIRE USED IN NEGATIVE CIRCUITS MAY BE REPLACED WITH YELLOW WIRE.
SHEET REVISION RECORD
REVISIONS
LET. DESCRIPTION BY DATE APPV.
A ADDED ACR TO GEN CIRCUIT J.M. 5/12/07 -
NOTES
BERTRAM YACHT
MIAMI, FLORIDA, USA
MODEL 510
TITLE WIRING, 24V DC
SCALE NONE
SHT 1 OF 12
REV
BY NFW
APPV
DATE 5/20/99
D12162


PANELTRONICS PANEL
FROM MAIN FUSE (F2) 80A (SEE SHT 1)
2FP-1,#2,RD
60A
PORT MAIN
FROM ENG. ROOM NEGATIVE BUS (SEE SHT 1)
2FNS-1,1/0,YL
NEGATIVE BUS
FROM MAIN FUSE (F5) 80A (SEE SHT 1)
2FS-1,#2,RD
60A
STBD MAIN
NOTE:
PANEL TO BE PRE-WIRED AND INCLUDE WIRE DIAGRAMS. PANEL TO HAVE VOLTMETER(S) AND METER SWITCHES AS REQUIRED.
3F11 SPARE
3F9 SPARE
3F7 SPARE
3F5 15A TRIM TABS (SEE SHT 4)
P/O 14/2(RD,YL) 3F3 5A TO F/B LIGHTS (F/B CONSOLE LT. W/SW.)
3F1 15A PORT ENGINE
#14(RD)
BATTERY PARALLEL SWITCH SPDT MOM ON/OFF/MOM ON
SOL-1,#10,RD
FROM BATTERY PARALLEL SOLENOID (SEE SHEET 1)
#14(RD)
3F2 15A STBD ENGINE
3F4 10A NAVIGATION LIGHTS (SEE SHT 12)
3F6 10A HORN (SEE SHT 11)
3F8 7.5A SEARCHLIGHT (OPTIONAL)
3F10 SPARE
3F12 SPARE
24V DC FLYBRIDGE DISTRIBUTION PANEL
FROM BATTERY PARALLEL SOLENOID(SEE SHEET 1)
SOL-2,#10,RD
SPST SWITCH OFF/MOM ON
SOL-1B,14(RD)
GENERATOR BATTERY PARALLEL SW.
PANELTRONICS PANEL
10A
FROM MAIN FUSE (F3) 100A (SEE SHT 1)
2DP-1,#4,RD
100A
PORT MAIN
FROM ENG. ROOM NEGATIVE BUS (SEE SHT 1)
2DPS-1,#1,YL
NEGATIVE BUS
FROM MAIN FUSE (F4) 100A (SEE SHT 1)
2DS-1,#4,RD
100A
STBD MAIN
NOTE:
PANEL TO BE PRE-WIRED AND INCLUDE WIRE DIAGRAMS. PANEL TO HAVE VOLTMETER(S) AND METER SWITCHES AS REQUIRED.
3D13 SPARE
3D11 SPARE
3D9 15A CABLEMASTER, PORT (SEE SHT 4)
3D7 15A ENGINE ROOM LIGHTS(SEE SHT 11)
3D5 5A FUEL FILL MONITOR (SEE SHT 5)
3D3 15A SPARE
3D1 FRESH WATER PUMP
3D2 30A ENG. ROOM BLOWERS (SEE SHT 5)
3D4 2.5A FRESH WATER GAUGE (SEE SHT 5)
3D6 5A C/P LIGHTS (SEE SHT 9)
3D8 15A CABLEMASTER, STBD (SEE SHT 4)
3D10 SPARE
3D12 SPARE
3D14 SPARE
24V DC SALON DISTRIBUTION PANEL
REVISIONS
LET. DESCRIPTION BY DATE APPV.
NOTES
BERTRAM YACHT
MIAMI, FLORIDA, USA
MODEL 510
TITLE WIRING, 24V DC
SCALE NONE
SHT 2 OF 12
REV
BY NFW
APPV
DATE 3/20/99
D12162



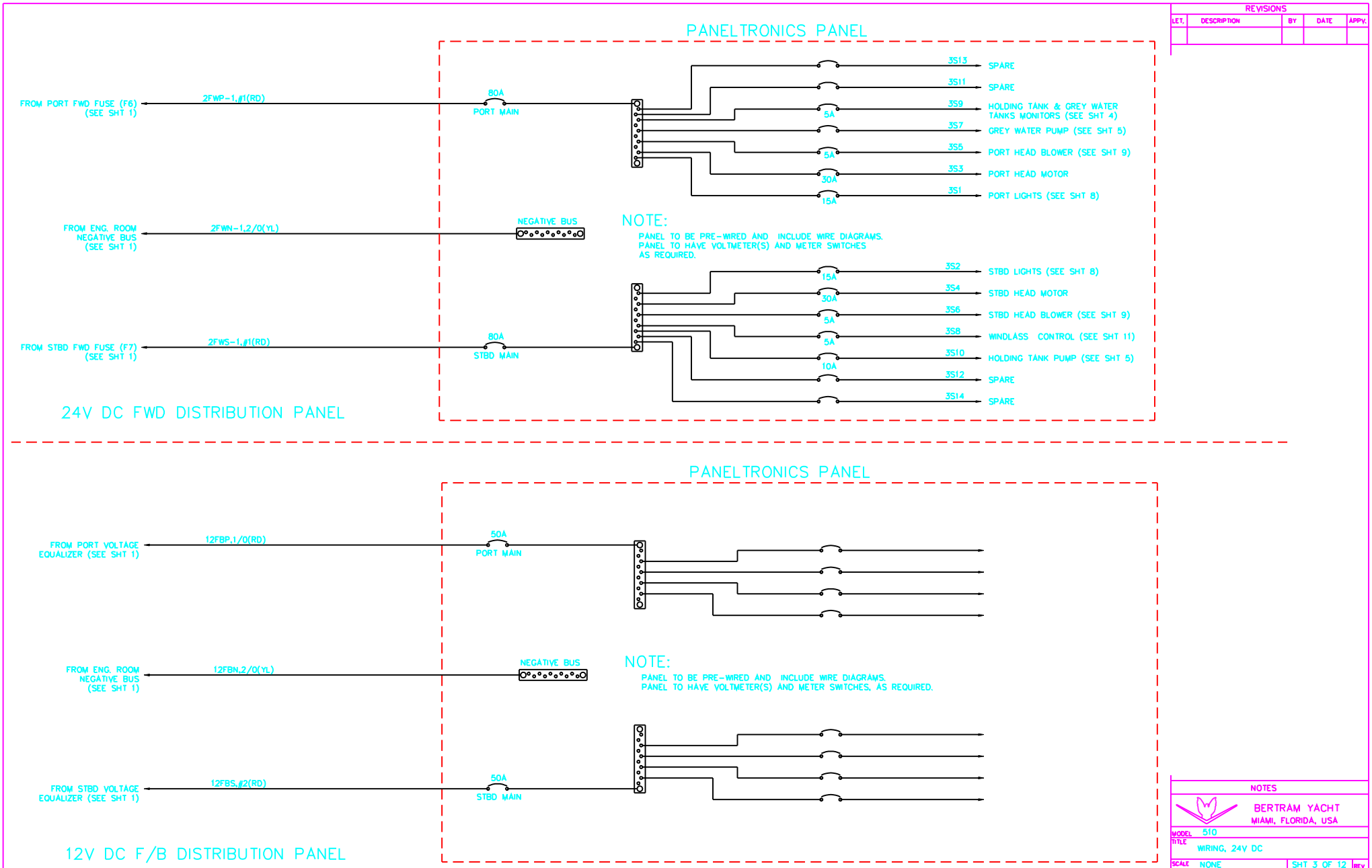
REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.
A	ADDED ACR SWITCH	J.H.	3/12/07	-

NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

MODEL 510
TITLE WIRING, 24V DC

SCALE	NONE	SHT 2 OF 12	REV
BY	NFW	APPV	
DATE	3/20/99	D12162	



REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

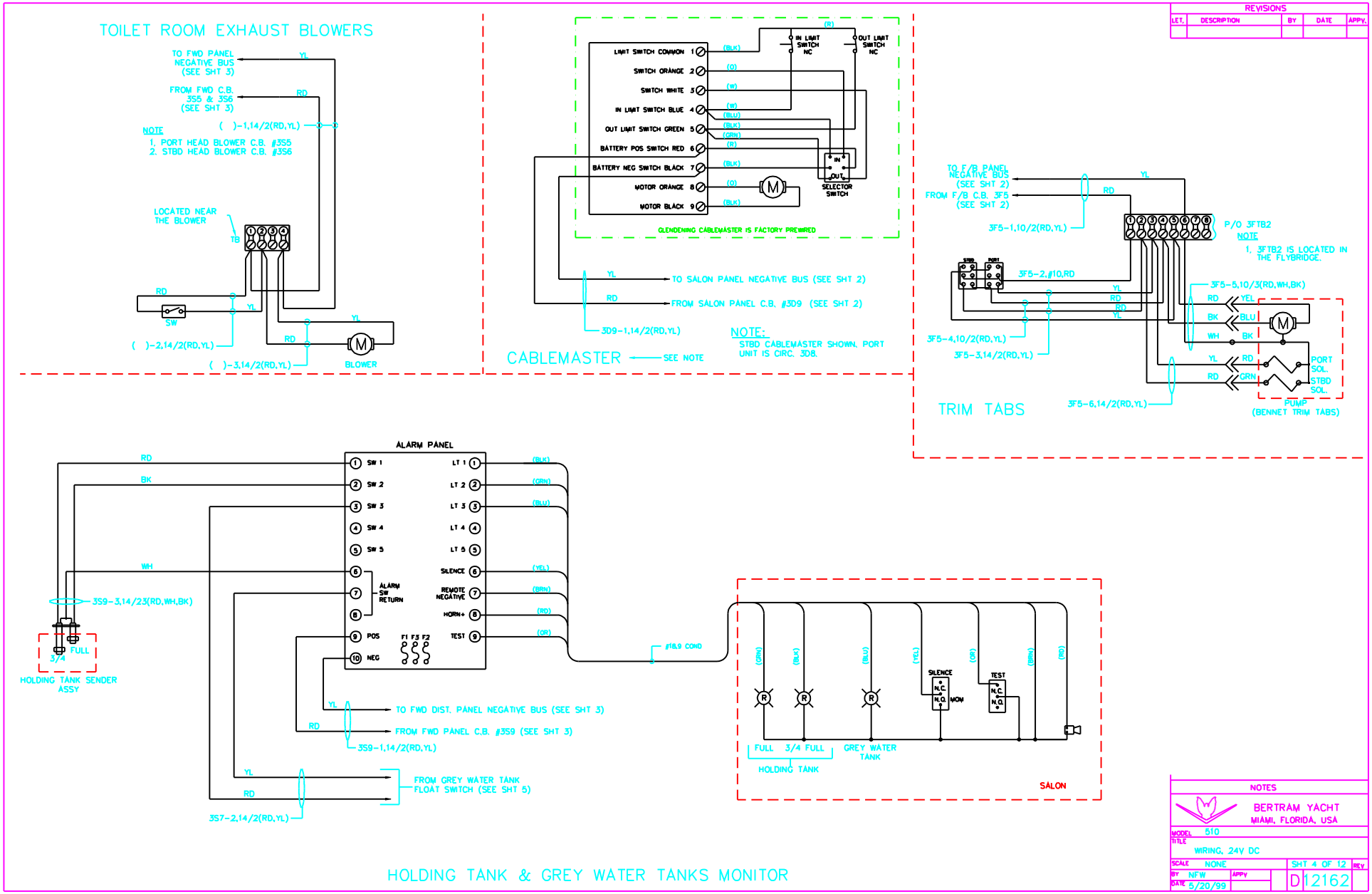
MODEL 510
TITLE WIRING, 24V DC

SCALE NONE | SHT 3 OF 12 | REV

BY NFW | APPV

DATE 3/20/95

D12162


TOILET ROOM EXHAUST BLOWERS
TO FWD PANEL NEGATIVE BUS (SEE SHT 3)
FROM FWD C.B. 3S5 & 3S6 (SEE SHT 3)
NOTE
1. PORT HEAD BLOWER C.B. #3S5
2. STBD HEAD BLOWER C.B. #3S6
( )-1,14/2(RD,YL)
LOCATED NEAR THE BLOWER
TB
SW
( )-2,14/2(RD,YL)
( )-3,14/2(RD,YL)
BLOWER
CABLEMASTER
LIMIT SWITCH COMMON 1
SWITCH ORANGE 2
SWITCH WHITE 3
IN LIMIT SWITCH BLUE 4
OUT LIMIT SWITCH GREEN 5
BATTERY POS SWITCH RED 6
BATTERY NEG SWITCH BLACK 7
MOTOR ORANGE 8
MOTOR BLACK 9
IN LIMIT SWITCH NC
OUT LIMIT SWITCH NC
SELECTOR SWITCH
GLENDENING CABLEMASTER IS FACTORY PREWIRED
TO SALON PANEL NEGATIVE BUS (SEE SHT 2)
FROM SALON PANEL C.B. #3D9 (SEE SHT 2)
3D9-1,14/2(RD,YL)
NOTE:
STBD CABLEMASTER SHOWN, PORT UNIT IS CIRC. 3D8.
SEE NOTE
TO F/B PANEL NEGATIVE BUS (SEE SHT 2)
FROM F/B C.B. 3F5 (SEE SHT 2)
3F5-1,10/2(RD,YL)
P/O 3FTB2
NOTE
1. 3FTB2 IS LOCATED IN THE FLYBRIDGE.
STBD
PORT
3F5-2,#10,RD
3F5-5,10/3(RD,WH,BK)
3F5-4,10/2(RD,YL)
3F5-3,14/2(RD,YL)
3F5-6,14/2(RD,YL)
PORT SOL.
STBD SOL.
PUMP (BENNET TRIM TABS)
TRIM TABS
ALARM PANEL
SW 1
SW 2
SW 3
SW 4
SW 5
ALARM SW RETURN
POS
NEG
F1 F3 F2
LT 1
LT 2
LT 3
LT 4
LT 5
SILENCE
REMOTE NEGATIVE
HORN+
TEST
3S9-3,14/23(RD,WH,BK)
FULL 3/4
HOLDING TANK SENDER ASSY
TO FWD DIST. PANEL NEGATIVE BUS (SEE SHT 3)
FROM FWD PANEL C.B. #3S9 (SEE SHT 3)
3S9-1,14/2(RD,YL)
FROM GREY WATER TANK FLOAT SWITCH (SEE SHT 5)
3S7-2,14/2(RD,YL)
#18,9 COND
SILENCE
TEST
FULL 3/4 FULL
HOLDING TANK
GREY WATER TANK
SALON
HOLDING TANK & GREY WATER TANKS MONITOR
REVISIONS
LET. DESCRIPTION BY DATE APPV.
NOTES
BERTRAM YACHT
MIAMI, FLORIDA, USA
MODEL 510
TITLE WIRING, 24V DC
SCALE NONE
SHT 4 OF 12
REV.
BY NFW
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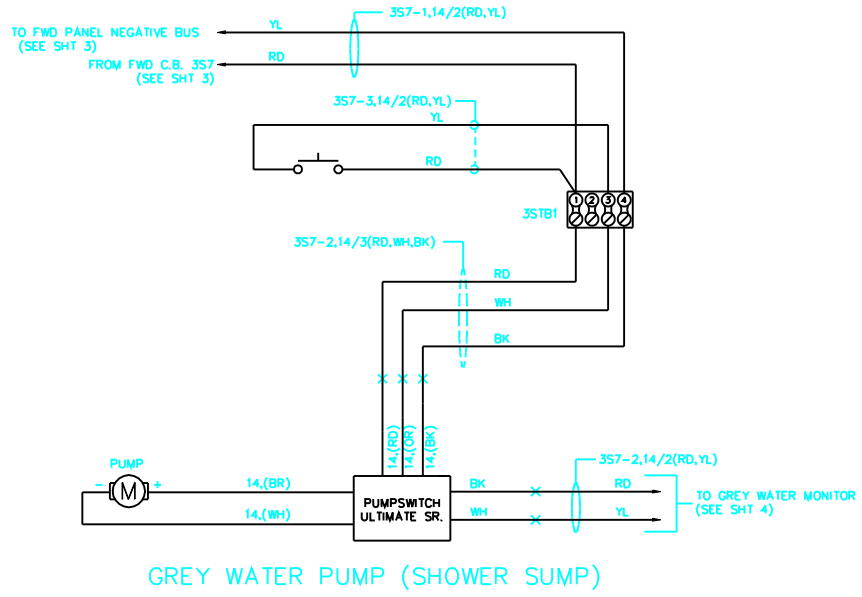
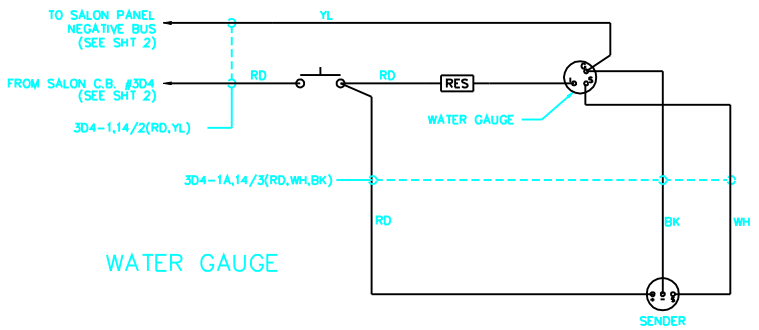
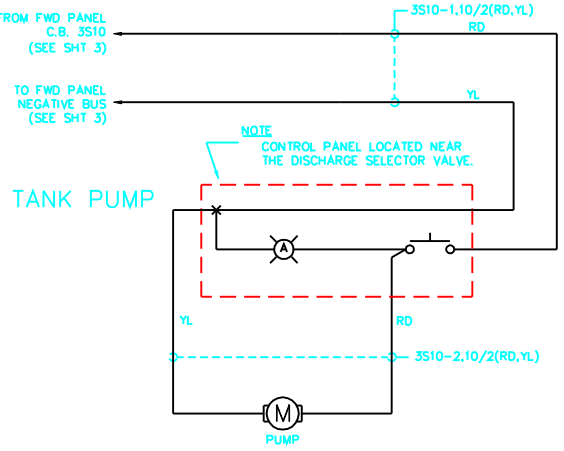
DATE 5/20/99
D12162



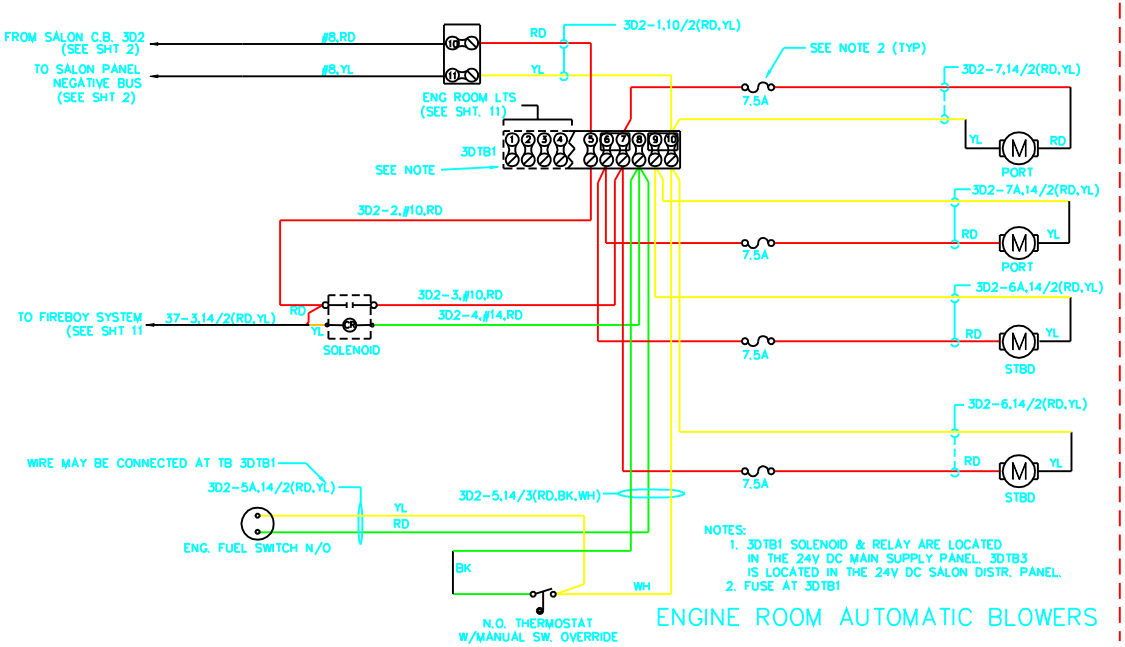
GREY WATER PUMP (SHOWER SUMP)



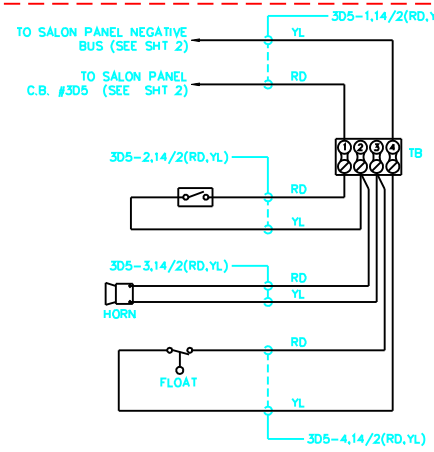
WATER GAUGE



HOLDING TANK PUMP



ENGINE ROOM AUTOMATIC BLOWERS



FUEL FILL MONITOR

REVISIONS

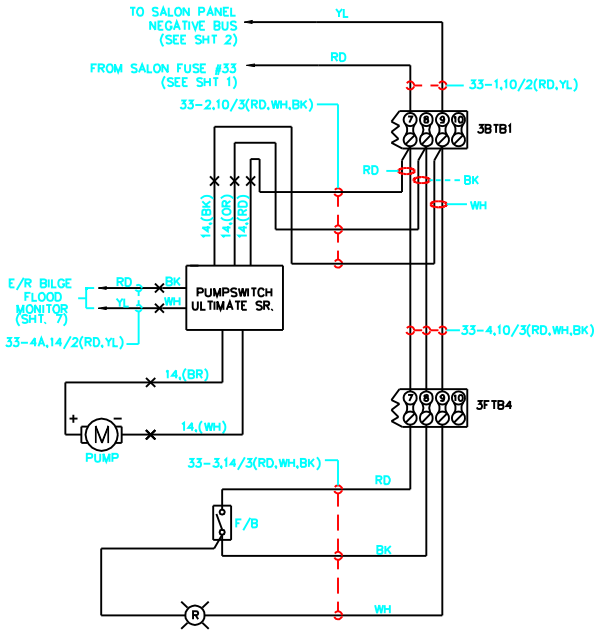
LET.	DESCRIPTION	BY	DATE	APPV.

NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

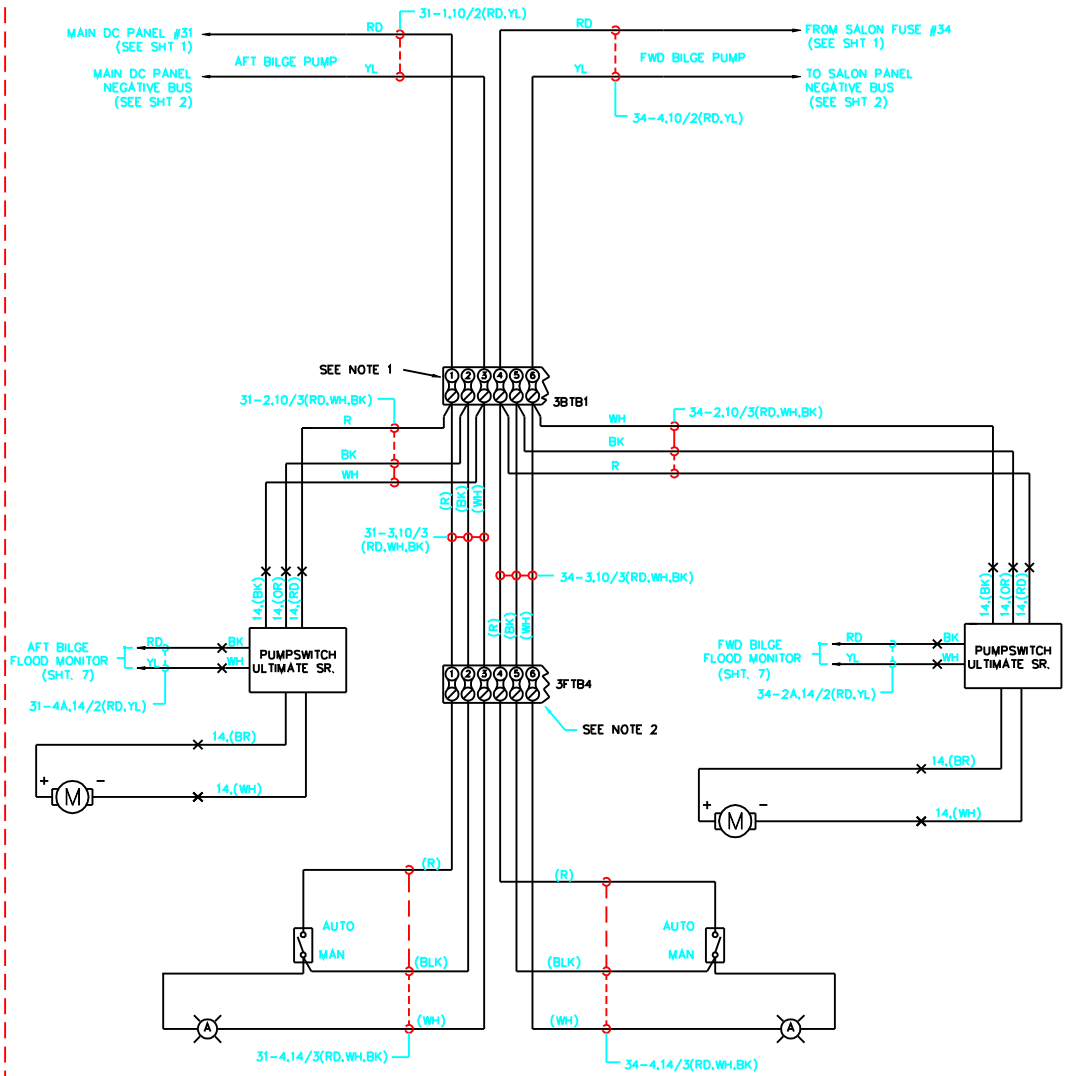
MODEL	510
TITLE	WIRING, 24V DC
SCALE	NONE
SHT	5 OF 12
REV	
BY	NFW
APPV	
DATE	5/20/99
	D12162

ENG. ROOM BILGE PUMP



NOTE:
1. 3BTB1 IS LOCATED IN THE 24V DC MAIN SUPPLY PANEL.
2. 3FTB4 IS LOCATED IN THE F/B

BILGE PUMPS, FWD & AFT



NOTE:
1. 3BTB1 IS LOCATED IN THE 24V DC MAIN SUPPLY PANEL.
2. 3FTB4 IS LOCATED IN THE F/B

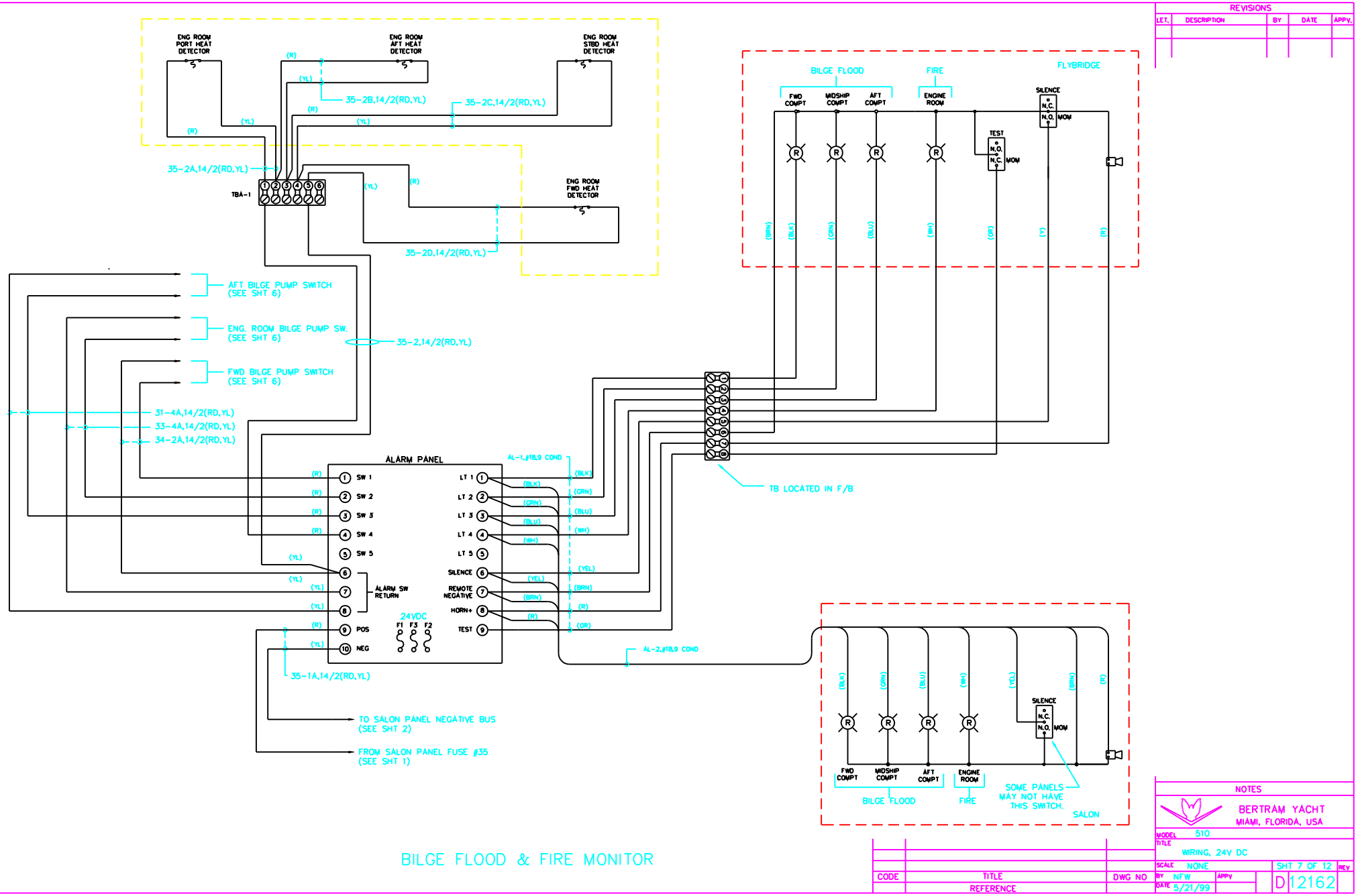
REVISIONS

LET.	DESCRIPTION	BY	DATE	APPV.

NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

MODEL 510
TITLE WIRING, 24V DC
SCALE NONE
SHT 6 OF 12
REV
BY NFW
APPV
DATE 3/21/99
D12162



BILGE FLOOD & FIRE MONITOR

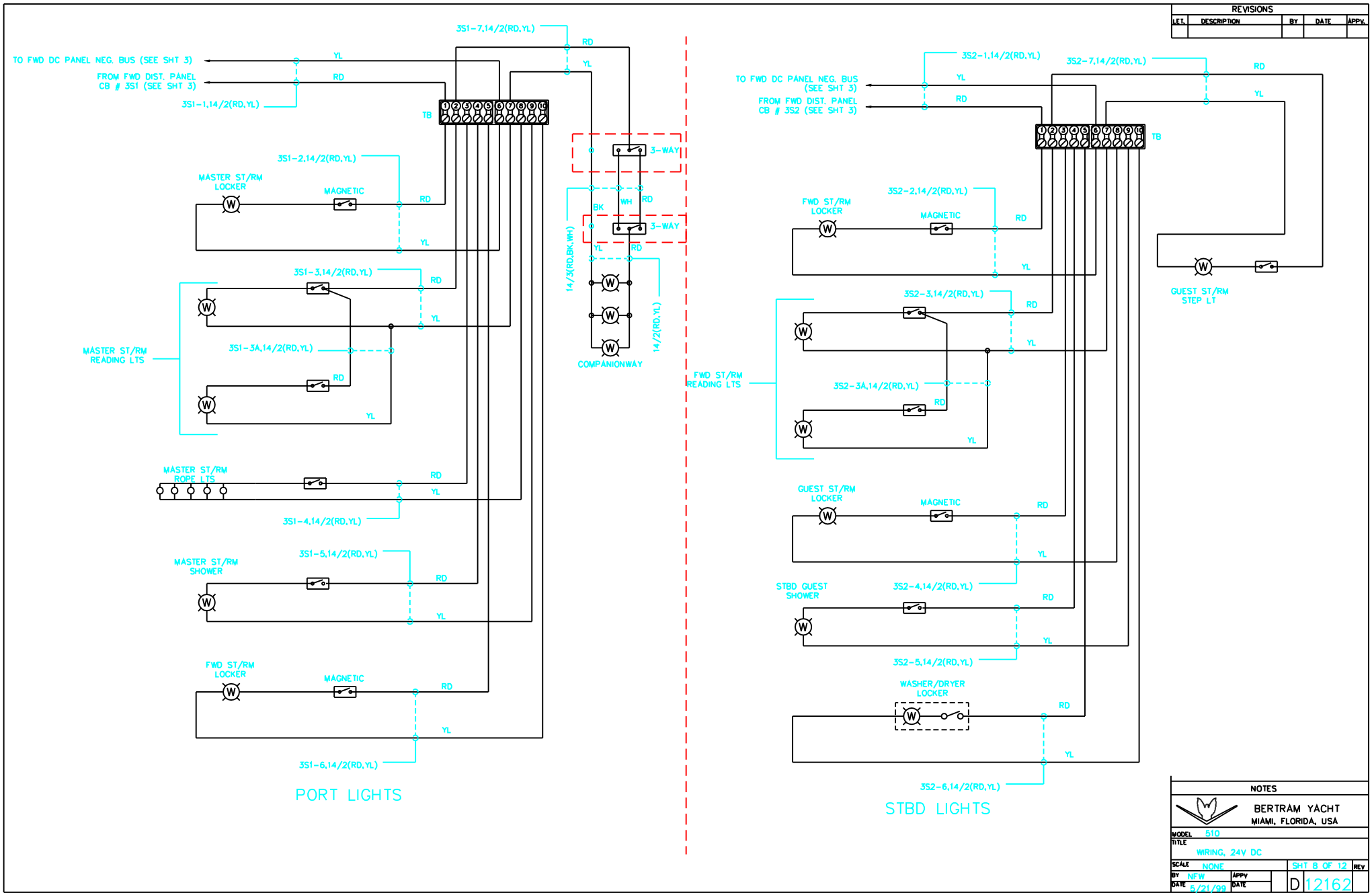
REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

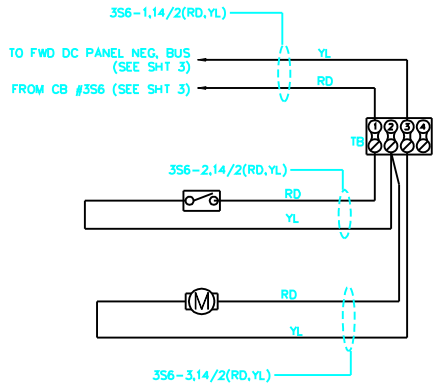
NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

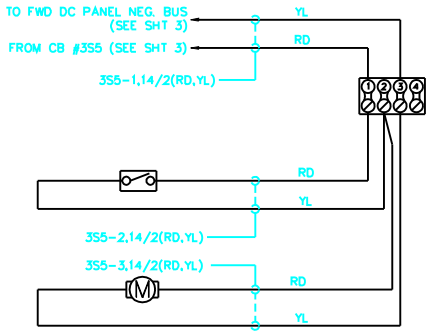
MODEL 510
TITLE WIRING, 24V DC
SCALE NONE
SHT 7 OF 12
REV
BY NFW
APPV
DATE 5/21/99
D12162

CODE	TITLE	DWG NO
	REFERENCE	

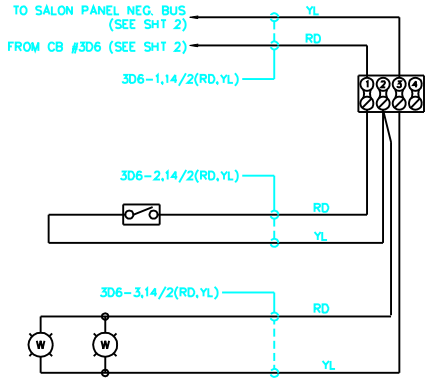

REVISIONS
LET. DESCRIPTION BY DATE APPV.
TO FWD DC PANEL NEG. BUS (SEE SHT 3)
FROM FWD DIST. PANEL CB # 3S1 (SEE SHT 3)
3S1-1,14/2(RD,YL)
3S1-7,14/2(RD,YL)
TB
3-WAY
3S1-2,14/2(RD,YL)
MASTER ST/RM LOCKER
MAGNETIC
3S1-3,14/2(RD,YL)
MASTER ST/RM READING LTS
3S1-3A,14/2(RD,YL)
MASTER ST/RM ROPE LTS
3S1-4,14/2(RD,YL)
MASTER ST/RM SHOWER
3S1-5,14/2(RD,YL)
FWD ST/RM LOCKER
3S1-6,14/2(RD,YL)
14/3(RD,BK,WH)
14/2(RD,YL)
COMPANIONWAY
PORT LIGHTS
TO FWD DC PANEL NEG. BUS (SEE SHT 3)
FROM FWD DIST. PANEL CB # 3S2 (SEE SHT 3)
3S2-1,14/2(RD,YL)
3S2-7,14/2(RD,YL)
3S2-2,14/2(RD,YL)
FWD ST/RM LOCKER
3S2-3,14/2(RD,YL)
FWD ST/RM READING LTS
3S2-3A,14/2(RD,YL)
GUEST ST/RM STEP LT
GUEST ST/RM LOCKER
3S2-4,14/2(RD,YL)
STBD GUEST SHOWER
3S2-5,14/2(RD,YL)
WASHER/DRYER LOCKER
3S2-6,14/2(RD,YL)
STBD LIGHTS
NOTES
BERTRAM YACHT
MIAMI, FLORIDA, USA
MODEL 510
TITLE WIRING, 24V DC
SCALE NONE
SHT 8 OF 12
REV
BY NFW
APPV
DATE 5/21/99
DATE
D12162



STBD HEAD BLOWER



PORT HEAD BLOWER



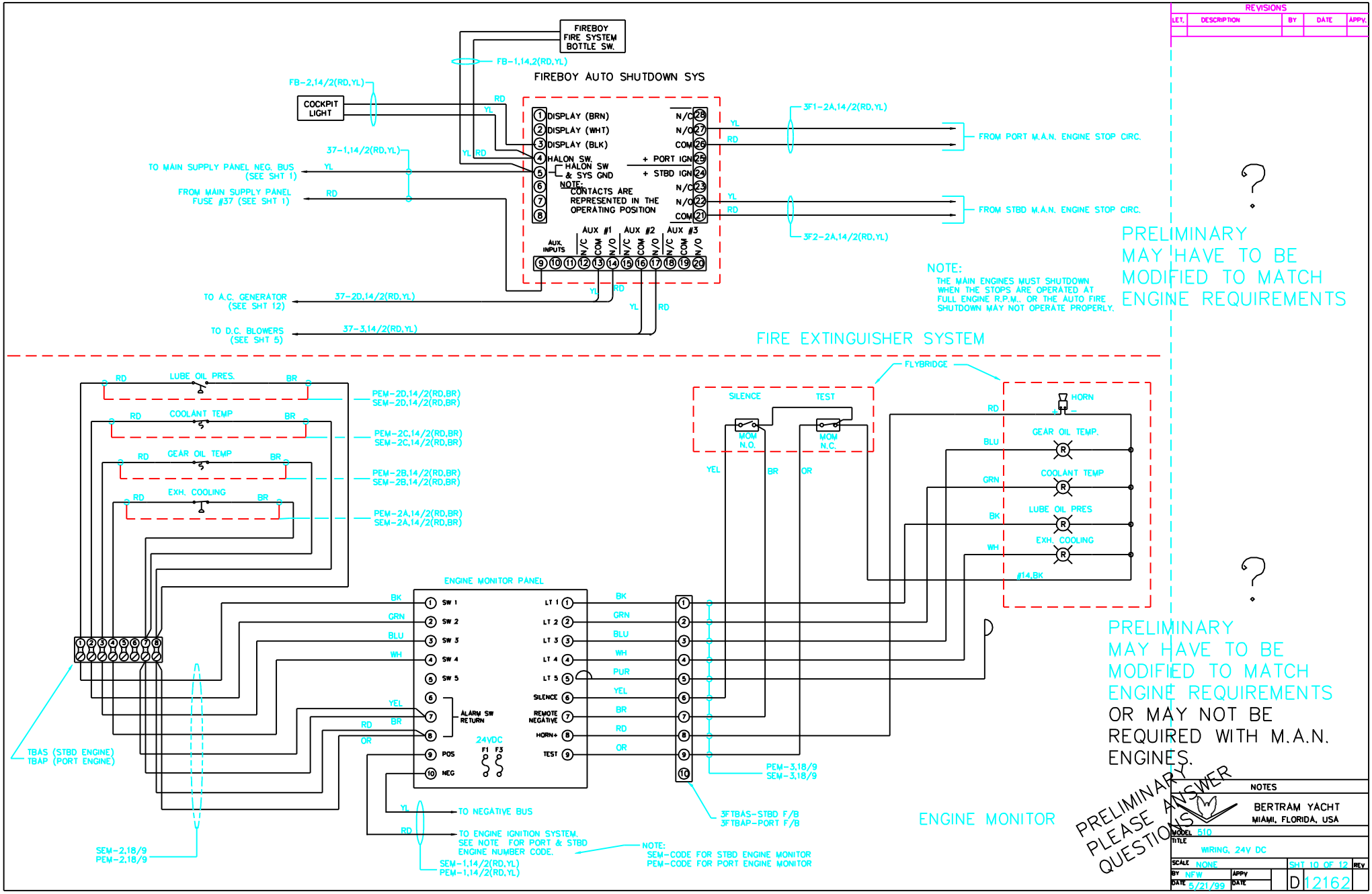
COCKPIT LIGHTS

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.
A	ADDED PORT DC LTS.	JB	02/05/96	

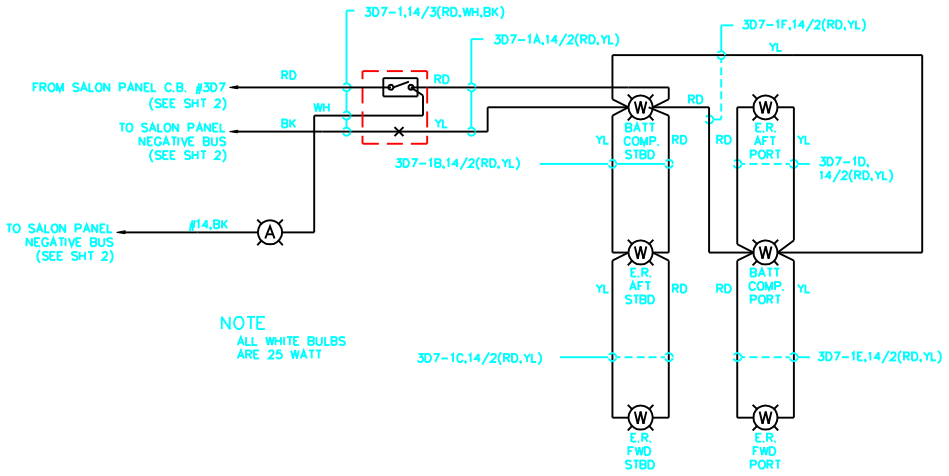
NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

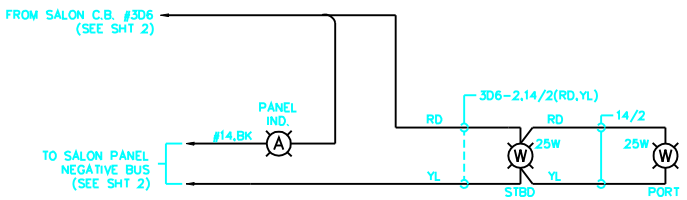
MODEL 510
TITLE WIRING, 24V DC,
SCALE NONE
SHT 9 OF 12
REV
BY NEW
APPV
DATE 5/21/99
D12162


FIREBOY FIRE SYSTEM BOTTLE SW.
FB-1,14,2(RD,YL)
FB-2,14/2(RD,YL)
FIREBOY AUTO SHUTDOWN SYS
COCKPIT LIGHT
RD
YL
37-1,14/2(RD,YL)
TO MAIN SUPPLY PANEL NEG. BUS (SEE SHT 1)
FROM MAIN SUPPLY PANEL FUSE #37 (SEE SHT 1)
1 DISPLAY (BRN)
2 DISPLAY (WHT)
3 DISPLAY (BLK)
4 HALON SW.
5 HALON SW & SYS GND
6
7
8
NOTE: CONTACTS ARE REPRESENTED IN THE OPERATING POSITION
N/C 28
N/C 27
COM 26
+ PORT IGN 25
+ STBD IGN 24
N/C 23
N/C 22
COM 21
3F1-2A,14/2(RD,YL)
3F2-2A,14/2(RD,YL)
FROM PORT M.A.N. ENGINE STOP CIRC.
FROM STBD M.A.N. ENGINE STOP CIRC.
AUX. INPUTS
AUX #1 N/C COM N/O
AUX #2 N/C COM N/O
AUX #3 N/C COM N/O
9 10 11 12 13 14 15 16 17 18 19 20
TO A.C. GENERATOR (SEE SHT 12)
37-2D,14/2(RD,YL)
TO D.C. BLOWERS (SEE SHT 5)
37-3,14/2(RD,YL)
NOTE:
THE MAIN ENGINES MUST SHUTDOWN WHEN THE STOPS ARE OPERATED AT FULL ENGINE R.P.M., OR THE AUTO FIRE SHUTDOWN MAY NOT OPERATE PROPERLY.
PRELIMINARY
MAY HAVE TO BE
MODIFIED TO MATCH
ENGINE REQUIREMENTS
FIRE EXTINGUISHER SYSTEM
LUBE OIL PRES.
COOLANT TEMP.
GEAR OIL TEMP.
EXH. COOLING
PEM-2D,14/2(RD,BR)
SEM-2D,14/2(RD,BR)
PEM-2C,14/2(RD,BR)
SEM-2C,14/2(RD,BR)
PEM-2B,14/2(RD,BR)
SEM-2B,14/2(RD,BR)
PEM-2A,14/2(RD,BR)
SEM-2A,14/2(RD,BR)
FLYBRIDGE
SILENCE
TEST
MOM N.O.
MOM N.C.
YEL
BR
OR
HORN
GEAR OIL TEMP.
COOLANT TEMP
LUBE OIL PRES
EXH. COOLING
#14,BK
ENGINE MONITOR PANEL
SW 1
SW 2
SW 3
SW 4
SW 5
ALARM SW RETURN
POS
NEG
24VDC
F1 F3
LT 1
LT 2
LT 3
LT 4
LT 5
SILENCE
REMOTE NEGATIVE
HORN+
TEST
BK
GRN
BLU
WH
PUR
YEL
BR
RD
OR
PEM-3,18/9
SEM-3,18/9
TBAS (STBD ENGINE)
TBAP (PORT ENGINE)
3FTBAS-STBD F/B
3FTBAP-PORT F/B
SEM-2,18/9
PEM-2,18/9
TO NEGATIVE BUS
TO ENGINE IGNITION SYSTEM. SEE NOTE FOR PORT & STBD ENGINE NUMBER CODE.
SEM-1,14/2(RD,YL)
PEM-1,14/2(RD,YL)
NOTE:
SEM-CODE FOR STBD ENGINE MONITOR
PEM-CODE FOR PORT ENGINE MONITOR
ENGINE MONITOR
PRELIMINARY
MAY HAVE TO BE
MODIFIED TO MATCH
ENGINE REQUIREMENTS
OR MAY NOT BE
REQUIRED WITH M.A.N.
ENGINES.
PRELIMINARY
PLEASE ANSWER
QUESTIONS
REVISIONS
LET. DESCRIPTION BY DATE APPV.
NOTES
BERTRAM YACHT
MIAMI, FLORIDA, USA
MODEL 510
TITLE
WIRING, 24V DC
SCALE NONE
SHT 10 OF 12
REV
BY NFW
APPV
DATE 5/21/99
DATE
D12162

ENGINE ROOM LIGHTS

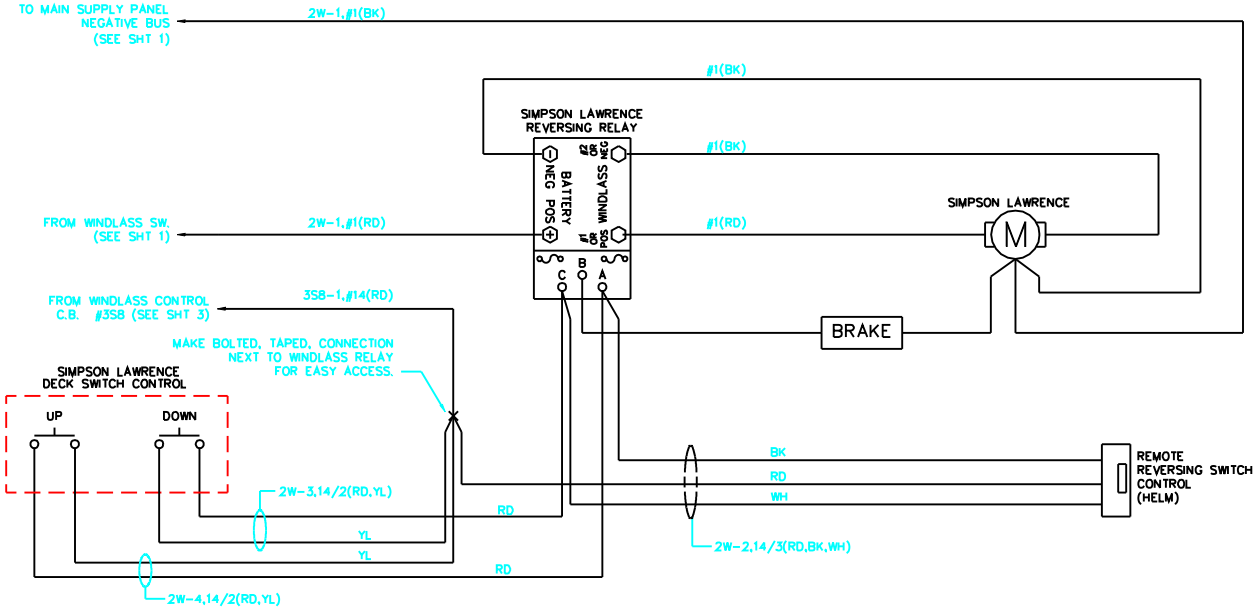


LAZARETTE LIGHTS



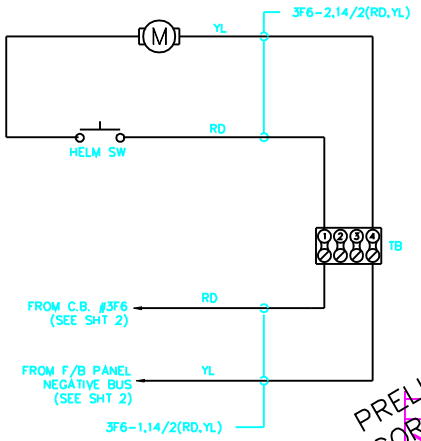
NOTE:
LAZARETTE LIGHTS ARE OPERATED FROM THE SALON PANEL CIRCUIT BREAKER.

ENGINE ROOM LIGHTS



SIMPSON LAWRENCE WINDLASS

ELECTRIC/AIR HORN



PRELIMINARY
CORRECTED 12/99

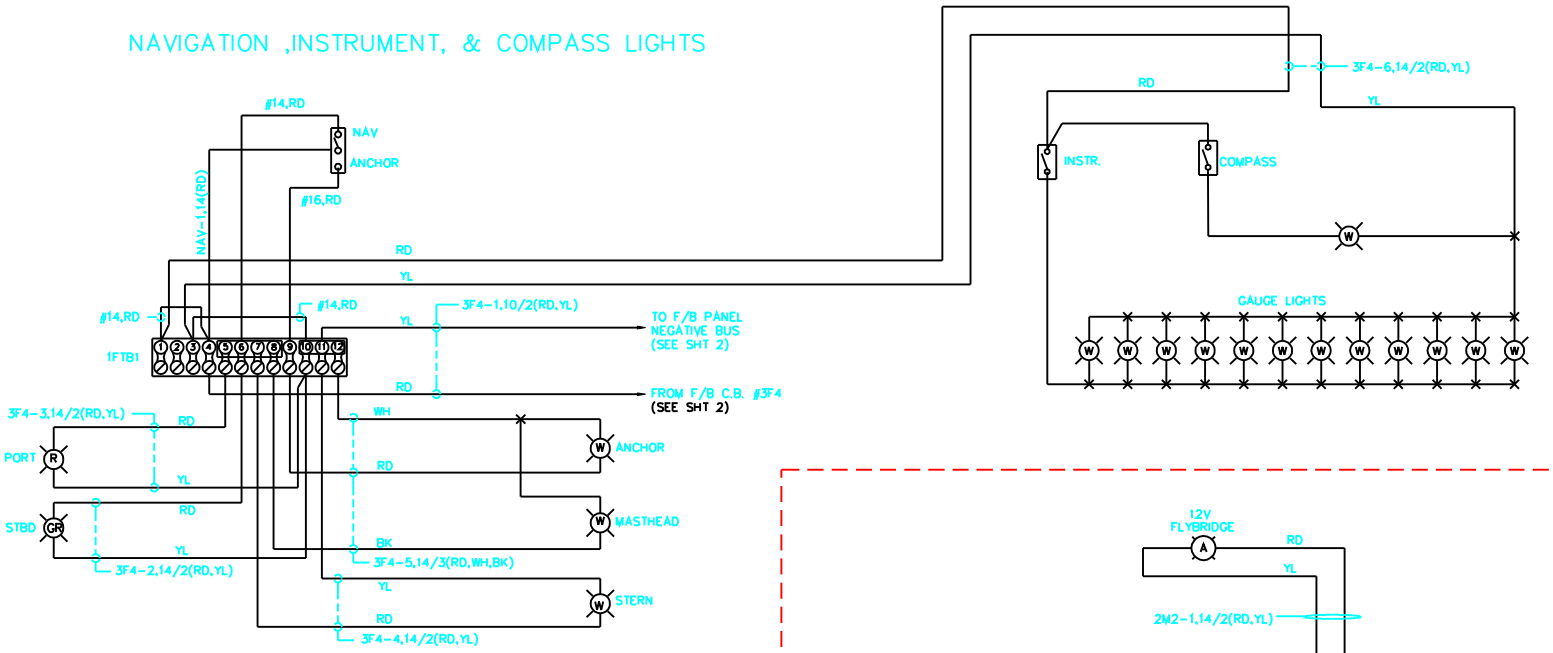
REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

NOTES

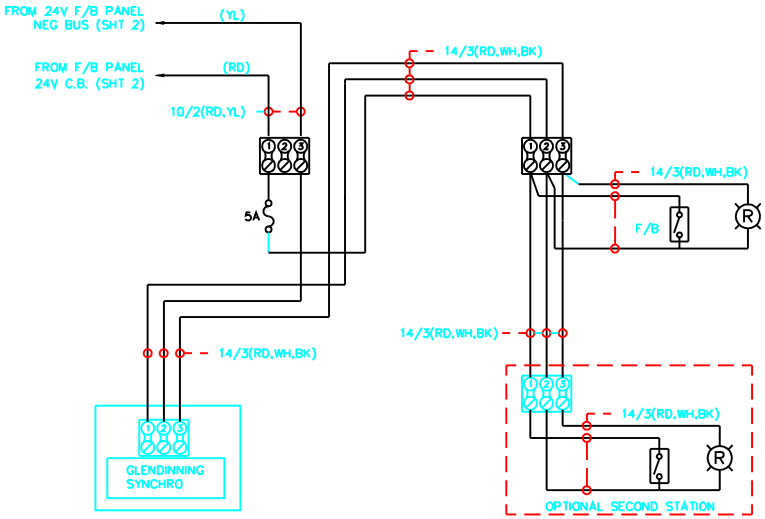
BERTRAM YACHT
MIAMI, FLORIDA, USA

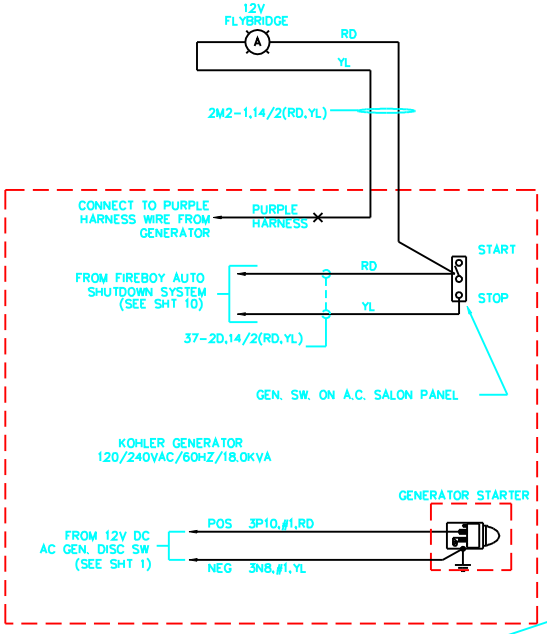
MODEL	510
TITLE	WIRING, 24V DC
SCALE	NONE
SHT	11 OF 12
REV	
BY	NFW
APPV	
DATE	5/21/99
	D12162

NAVIGATION ,INSTRUMENT, & COMPASS LIGHTS



GLENDINNING SYNCHRONIZER





A.C. GENERATORS

? ?

KOHLER GENERATOR MAY REQUIRE EXTENSIVE CHANGES IN THIS CIRC.

PRELIMINARY

PRELIMINARY CORRECTED 12/99 PLEASE ANSWER QUESTIONS

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

MODEL 510

TITLE WIRING, 24V DC

SCALE NONE | SHT 12 OF 12 | REV

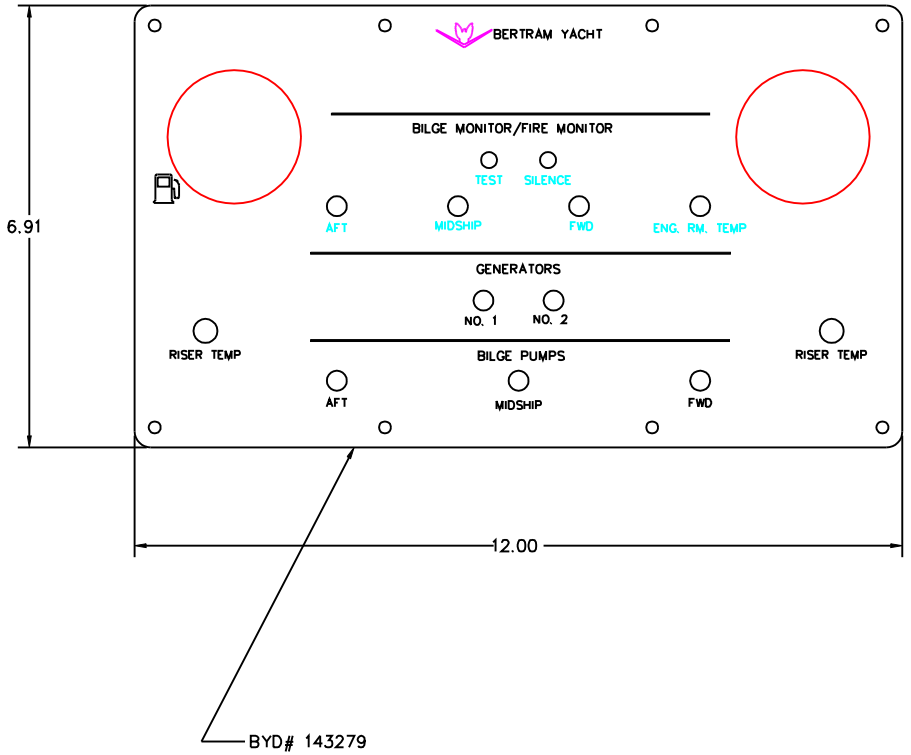
CODE | TITLE | DWG NO

REFERENCE

BY NFW | APPV | DATE 5/21/99

D12162

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 BLACK, LYN-RAND #30-7001-OM.
4. SILKSCREEN LETTERING: A WHITE FONT KNOWN AS "HVLT".
5. 1/32 THICK RUBBER GASKET TO BE PROVIDED WITH EACH PLATE

TOLERANCES UNLESS OTHERWISE SPECIFIED	
ANGULAR:	± 1/2°
DECIMAL :	± .0156"

FERRETTI GROUP

FERRETTI ENGINEERING DEPT.

PANEL INSTR, MAN HELM, PWR ACT, 2 GEN

BERTRAM 510

7/19/2004

SHT 1 OF 1