BERTRAM

MODEL 375

OPERATOR'S MANUAL

P/N 18A9201 A

BOAT DATA SHEET

MODEL 375

BOAT NAME

OWNER'S NAME

OWNER'S ADDRESS

HAILING PORT

HULL NUMBER

REGISTRATION NUMBER

37 Feet, 9 Inches	13 Feet, 3-3/8 Inches	3 feet, 9 inches
LENGTH OVERALL	BEAM	DRAFT

245 U.S. Gal. Usable Aft
220 U.S. Gal. Usable Fwd

FUEL CAPACITY

100 U.S. Gallons

WATER CAPACITY

DOOR KEY NUMBER

MEASUREMENT TONNAGE

* GROSS 23.19

* NET 18.55

* = Volume Measurement

WEIGHT

LIGHT 30,750

HEAVY 32,500

REVISION AND EFFECTIVITY PAGE		
REVISION	EFFECTIVITY HULL NUMBER	CHANGES
0	501 AND SUBSEQUENT	ORIGINAL ISSUE
0	1001 AND SUBSEQUENT	ORIGINAL ISSUE
A	559 AND SUBSEQUENT	GENERAL REVISION AND
A	1033 AND SUBSEQUENT	REPRINT

QUALITY CONTROL CERTIFICATE

I Certify that Hull Number _____ has been manufactured and equipped in accordance with all applicable specifications and that all work has been completed in accordance with good building practice and workmanship.

_____ INSPECTOR

_____ QUALITY CONTROL MANAGER

_____ DATE

A FEW WORDS OF WELCOME

We are pleased that you have selected a Bertram for your yacht. We know that with its unique design and the care we take in its manufacture, your Bertram will give you outstanding performance and many years of boating pleasure.

Your Bertram is designed by skilled engineers, built of the finest, modern materials, and hand crafted to Bertram's demanding quality standards. You take delivery of a Bertram that is a factory tested and thoroughly inspected boat.

As durable as its construction is, your Bertram will benefit by reasonable care. A yacht is not a simple mechanism and as is always true with complex mechanisms, preventative and corrective maintenance, minor adjustments, and repairs will be needed from time to time. Therefore, we have furnished you with this operators manual to help explain the operation and the required maintenance of the many electric, electro-mechanical, and mechanical systems on your new yacht.

The better you understand your Bertram, obviously, the more pleasure you will get from using its many outstanding features. Therefore, we recommend that you read this manual thoroughly and keep it on board for a reference. If any points arise that are not made clear, your Bertram dealer will be glad to assist you.

While this manual is not intended to replace years of boating experience or even one of the several excellent classes on safe boating taught by the U. S. Coast Guard Auxiliary and the U.

S. Power Squadron, we have included some material relative to some of the various facets of safe boating of which you, as a careful boat operator, should be aware.

Also included in this manual is a section of mechanical and systems drawings such as the gasoline and Diesel fuel systems, the fresh water system, and the steering system. These drawings are for reference and are to be found at the end of the manual.

In addition to this manual, you will find the following two packets of information:

1. The 12 V.d.c. and 120 V.a.c. systems wiring diagrams and the docking plan.

2. The users manuals and operating instructions supplied by the manufacturers of the major mechanical, electrical, and comfort equipment components.

These drawings and manuals will not only help you to get a better understanding of the systems on your Bertram and how they operate, but they will be invaluable to the technicians that service your Bertram.

When your Bertram does require service, we recommend that you first contact your Bertram dealer. He is trained and equipped to help you and our factory service representatives are available to assist him if needed.

WARNINGS, CAUTIONS, AND NOTES

Throughout this manual you will find special information in the form of warnings, cautions, and notes that are intended to alert you to possible dangers to yourself, your crew or passengers, and/or to your vessel. Read these special information items carefully. Please be aware that the mere existence of a warning or a caution note within a box of asterisks will not by itself eliminate the danger(s). Your close attention to these warnings and your knowledge of the "Rules-of-the-Road" are the major accident prevention measures.

Many of these warnings relate to the universally known dangers involved in storing and/or using gasoline. However, the U. S. Coast Guard, in complying with the "Federal Boating Safety Act of 1971; 33 CFR Section 183" as well as the technical committees of the American Boating and Yacht Council (ABYC) have worked hard to set standards to make gasoline powered pleasure craft safer.

Starting in 1977, federal standards have increased the level of component and systems safety testing as related to the fuel and electrical systems for gasoline powered vessels. This has resulted in increased safety through improved fuel and electrical systems and components. Bertram is a member and sits on the ABYC technical committees and be assured that your Bertram exceeds all Federal requirements for testing fuel systems, fuel tanks, electrical systems, and power and natural ventilation, for gasoline powered vessels. All of this is done to ensure you the safest boat available.

Note the sample warning and caution on this page. Each is designed to alert you to a potential problem or hazard.

WARNING:

FAILURE TO HEED A WARNING MAY RESULT IN DEATH OR SERIOUS INJURY.

CAUTION

Failure to heed a CAUTION may result in injury and/or damage to the vessel.

NOTE:

Notes are included in the text when and as necessary to call your attention to important piece(s) of information.

In closing, we wish you many years of safe, pleasurable yachting on your new Bertram.

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TECHNICAL DATA - GASOLINE ENGINE

HULL NUMBER: _____

ENGINES

Manufacturer: Mercruiser

Model Number: 340

Fuel filter

Manufacturer: Mercruiser

Element Number: 35-60494A5

Lube Oil Filter

Manufacturer: Mercruiser

Element Number: 54111

Gear Manufacturer: Borg Warner

Gear Model Number: 72C

Gear Ratio: 2.5:1

PORT ENGINE

Serial Number:

Gear Serial Number:

STARBOARD ENGINE

Serial Number:

Gear Serial Number:

ENGINE BATTERIES

Manufacturer: Surrette

Voltage: 12 Volts

Model Number: T-12-135

Capacity: 120 Ampere hours

PROPELLERS

Manufacturer: Federal

Diameter:

Number of Blades: 3

Port Rotation: Left Hand

Style: Equi-poise

Pitch:

Material: Magnesium Bronze

Starboard Rotation: Right Hand

Bertram Propeller Part Number

PORT:

STARBOARD:

PROPELLER SHAFTS

Material: Stainless steel

Bertram Part Number: 08D5616-13

TECHNICAL DATA

Hull No.

GASOLINE GENERATOR

Manufacturer: ONAN

Model: 6.5 MCCK

Serial No.:

Capacity: 6.5 KW

Voltage: 120

Phase: Single

Frequency: 60 HZ

Fuel Filters:

DSL/WTR Separators: Racor 149-1445

Lube Oil Filter: 123-1417

GENERATOR BATTERIES

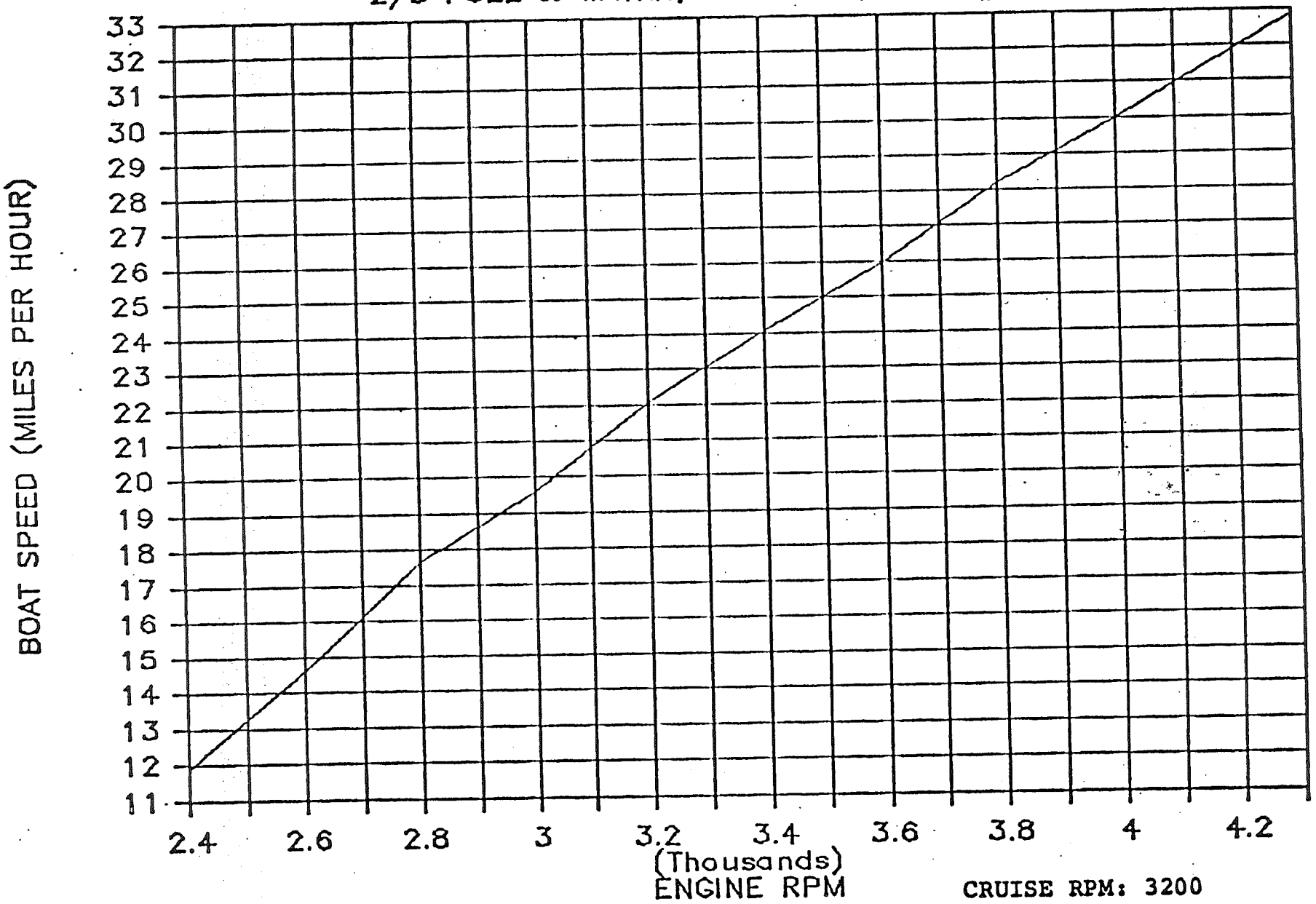
Uses starboard main engine batteries

PERFORMANCE CHARTS

The following three charts (Boat Speed [in statute miles per hour], Range [in stature miles], and Fuel [in gallons of fuel per hour]) are furnished to assist you in planning for safer, more pleasant boating trips. Using these charts will allow you to more closely estimate the answers to speed times distance times fuel onboard problems for your vessel.

BERTRAM 37 CONV. 320 BHP MERCRUISER

2/3 FUEL & WATER, 6 PEOPLE, 1000 # GEAR

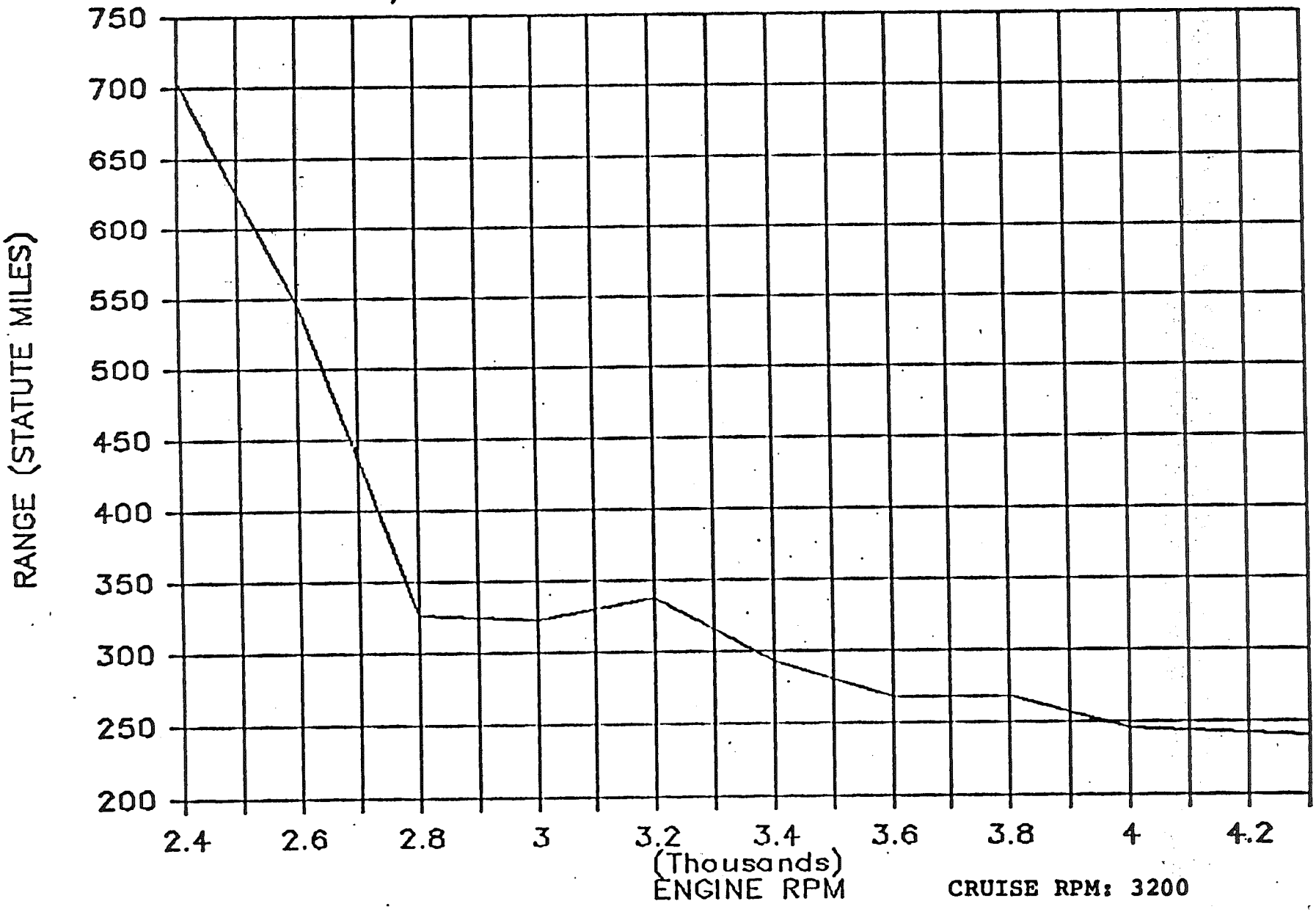


CRUISE RPM: 3200

Performance Data Obtained Under Ideal Conditions
With Clean Boat Bottom in 10 to 12 Foot Water Depth.

BERTRAM 37 CONV. 320 BHP MERCRUISER

2/3 FUEL & WATER, 6 PEOPLE, 1000 # GEAR



CRUISE RPM: 3200

Performance Data Obtained Under Ideal Conditions
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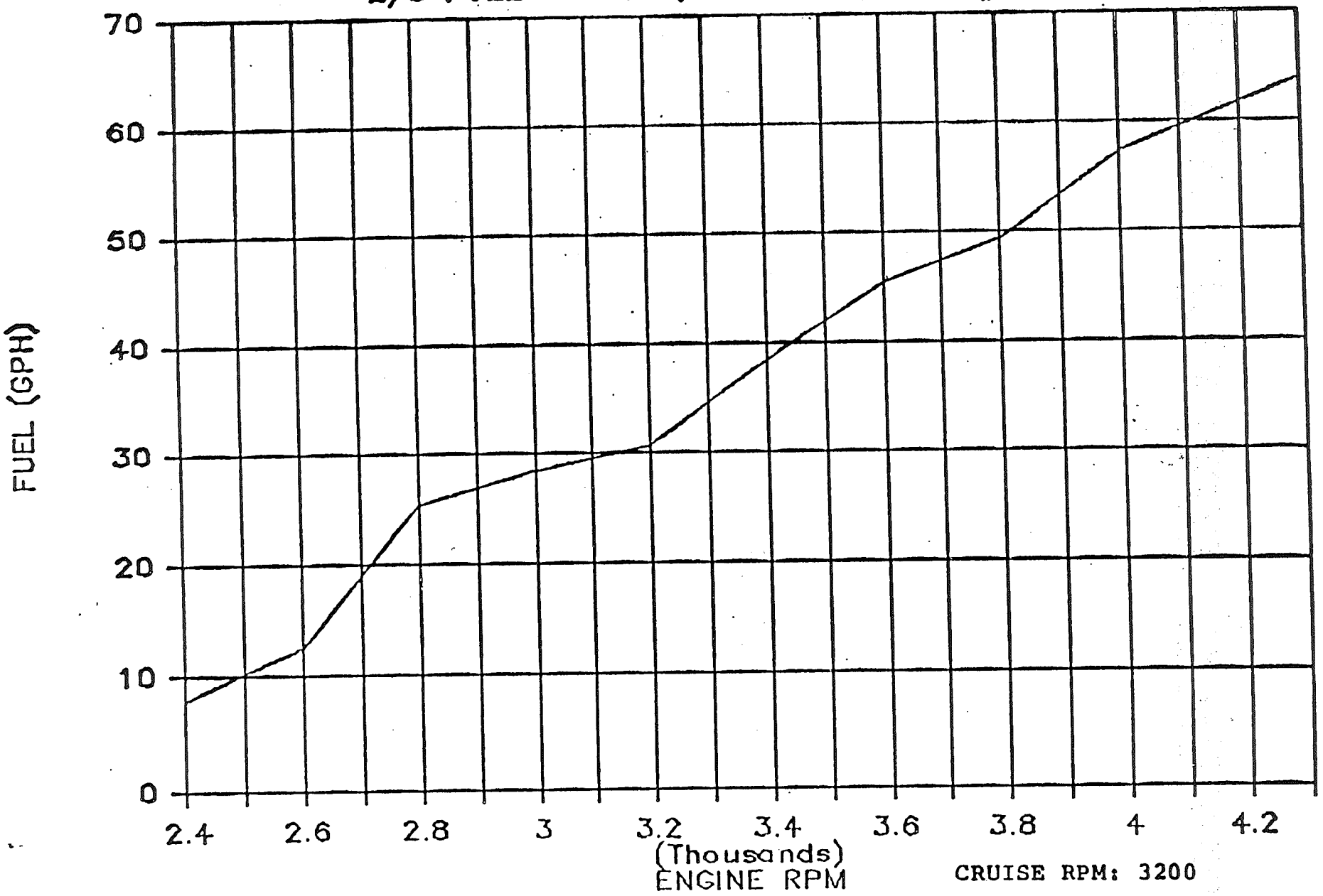
BERTRAM 37 CONV. 320 BHP MERCRUISER

2/3 FUEL & WATER, 6 PEOPLE, 1000 # GEAR



CRUISE RPM: 3200

Performance Data Obtained Under Ideal Conditions
With Clean Boat Bottom in 10 to 12 Foot Water Depth.

TECHNICAL DATA - DIESEL ENGINE

HULL NUMBER:_____

ENGINES

Manufacturer: Caterpillar

Model Number: 3208 STA

Fuel filter

Primary: Dahl 200M

Element Number: Dahl 201

Secondary: Caterpillar

Lube Oil Filter

Manufacturer: Caterpillar

Element Number: 9L9200

Gear Manufacturer: Twin Disc

Gear Model Number: MG 507

Gear Ratio: 1.5:1

PORT ENGINE

Serial Number:

Gear Serial Number:

STARBOARD ENGINE

Serial Number:

Gear Serial Number:

ENGINE BATTERIES

Manufacturer: Surrette

Voltage: 12 Volts

Model Number: T-12-135

Capacity: 120 Ampere hours

PROPELLERS

Manufacturer: Michigan

Diameter:

Number of Blades: 3

Port Rotation: Left Hand

Style: 3-Blade (Equipoise)

Pitch:

Material: Nibral

Starboard Rotation: Right Hand

Bertram Propeller Part Number

PORT:

STARBOARD:

PROPELLER SHAFTS

Material: Stainless steel

Bertram Part Number: 08D4362-27

TECHNICAL DATA

Hull No.

DIESEL GENERATOR

Manufacturer: ONAN

Model: 8.0 MDKD-3CR

Serial No.:

Capacity: 8.0 KW

Voltage: 120

Phase: Single

Frequency: 60 HZ

Fuel Filters:

DSL/WTR Separators: Racor 149-1914-04

Lube Oil Filter: 185-2123

GENERATOR BATTERIES

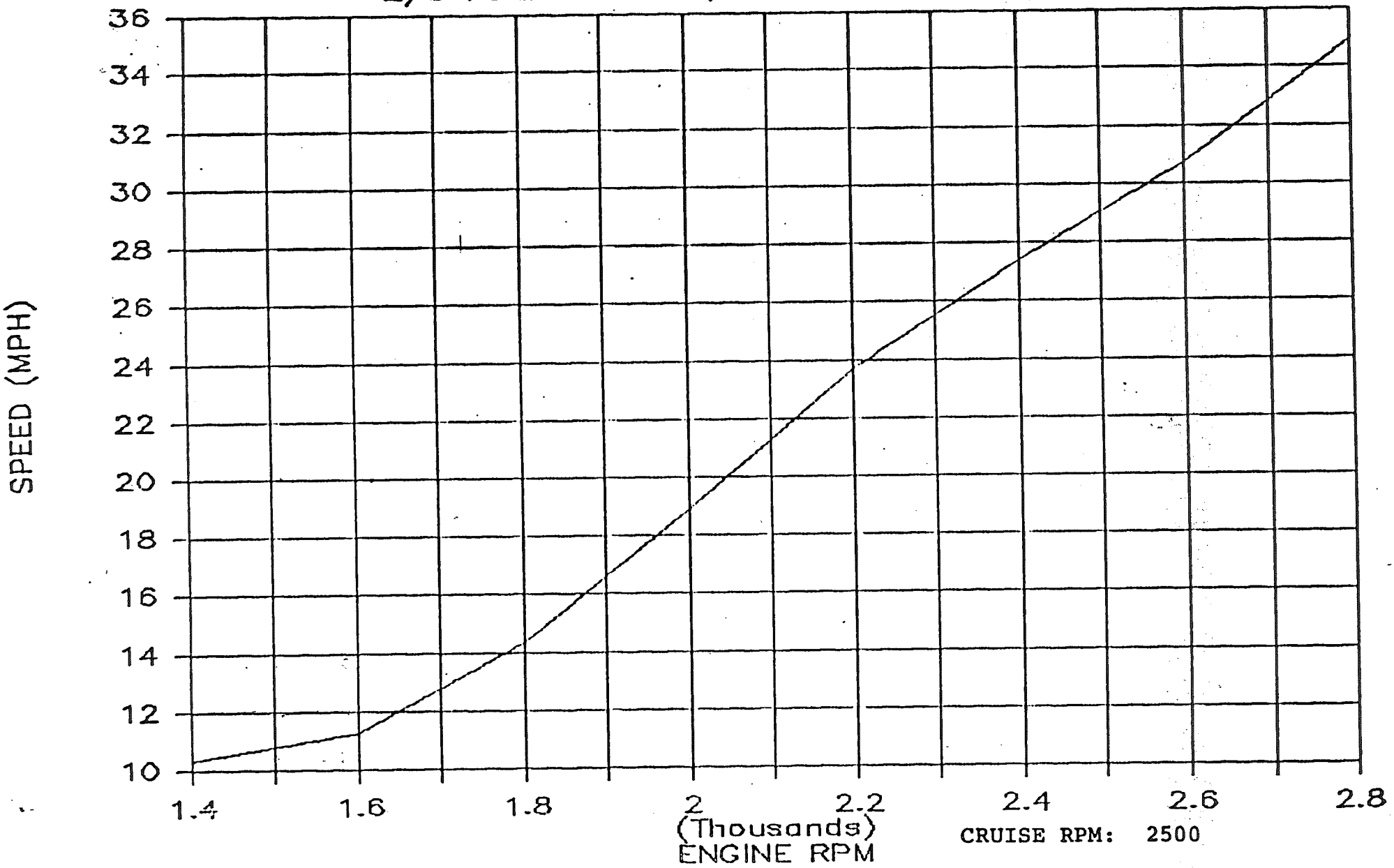
Uses starboard main engine batteries

PERFORMANCE CHARTS

The following three charts (Boat Speed [in statute miles per hour], Range [in stature miles], and Fuel [in gallons of fuel per hour]) are furnished to assist you in planning for safer, more pleasant boating trips. Using these charts will allow you to more closely estimate the answers to speed times distance times fuel onboard problems for your vessel.

BERTRAM 37 CONV. 375 BHP CAT 3208

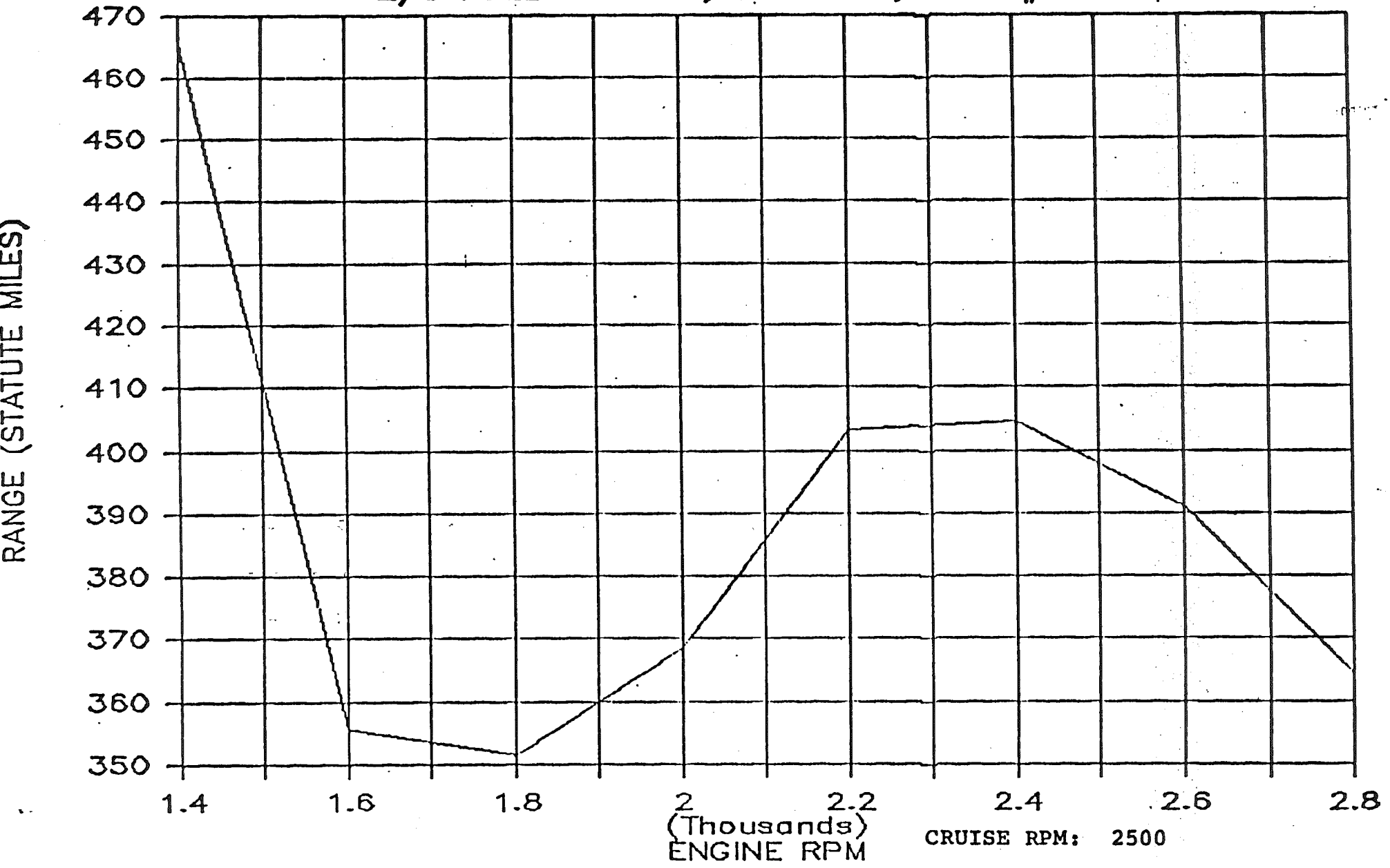
2/3 FUEL & WATER, 6 PEOPLE, 1000 # GEAR



Performance Data Obtained Under Ideal Conditions
With Clean Boat Bottom in 10 to 12 Foot Water Depth.

BERTRAM 37 CONV. 375 BHP CAT 3208

2/3 FUEL & WATER, 6 PEOPLE, 1000 # GEAR

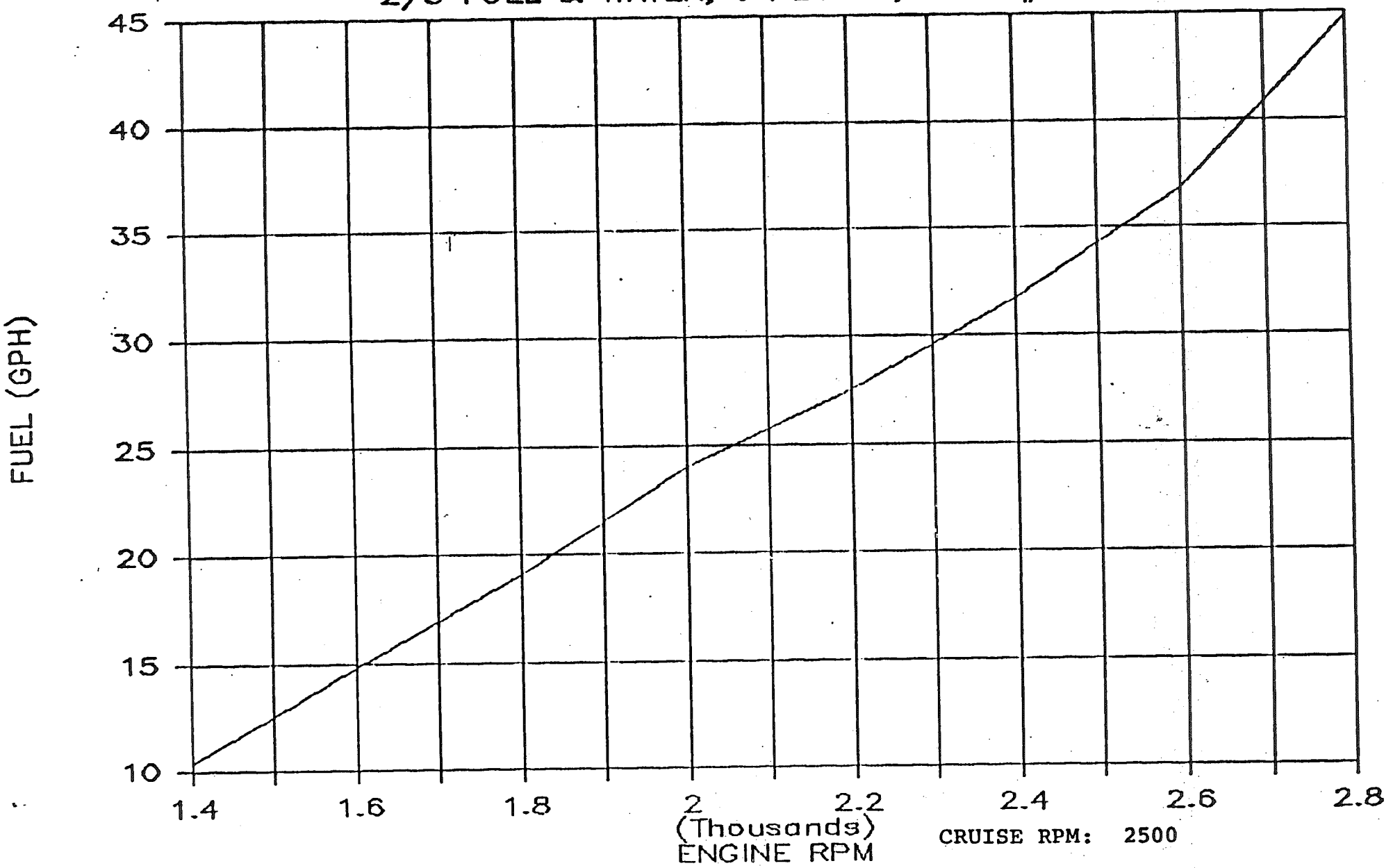


CRUISE RPM: 2500

Performance Data Obtained Under Ideal Conditions
With Clean Boat Bottom in 10 to 12 Foot Water Depth.

BERTRAM 37 CONV. 375 BHP CAT 3208

2/3 FUEL & WATER, 6 PEOPLE, 1000 # GEAR



Performance Data Obtained Under Ideal Conditions
With Clean Boat Bottom in 10 to 12 Foot Water Depth.

TECHNICAL DATA - DIESEL ENGINE

HULL NUMBER:_____

ENGINES

Manufacturer: General Motors (D.D.A.)

Model Number: 6V92TA

Fuel filter

Primary: Dahl 200M

Element Number: Dahl 201

Secondary: AC TP540X

Lube Oil Filter

Manufacturer: AC

Element Number: PF-132

Gear Manufacturer: Twin Disc

Gear Model Number: MG507-2

Gear Ratio: 1.5:1

PORT ENGINE	STARBOARD ENGINE
Serial Number:	Serial Number:
Gear Serial Number:	Gear Serial Number:

ENGINE BATTERIES

Manufacturer: Surrette

Model Number: T-12-135

Voltage: 12 Volts

Capacity: 120 Ampere hours

PROPELLERS

Manufacturer: Michigan

Style: 3-Blade (Equipoise)

Diameter: 25-inches

Pitch: 28 Cupped

Number of Blades: 3

Material: Nibral

Port Rotation: Left Hand

Starboard Rotation: Right Hand

Bertram Propeller Part Number

PORT: 08S30149-31

STARBOARD: 08S30149-32

PROPELLER SHAFTS

Material: Stainless steel

Bertram Part Number: 08D4362-29

TECHNICAL DATA

Hull No.

DIESEL GENERATOR

Manufacturer: ONAN

Model: 8.0 MDKD-3CR

Serial No.:

Capacity: 8.0 KW

Voltage: 120

Phase: Single

Frequency: 60 HZ

Fuel Filters:

DSL/WTR Separators: Racor 149-1914-04

Lube Oil Filter: 185-2123

GENERATOR BATTERIES

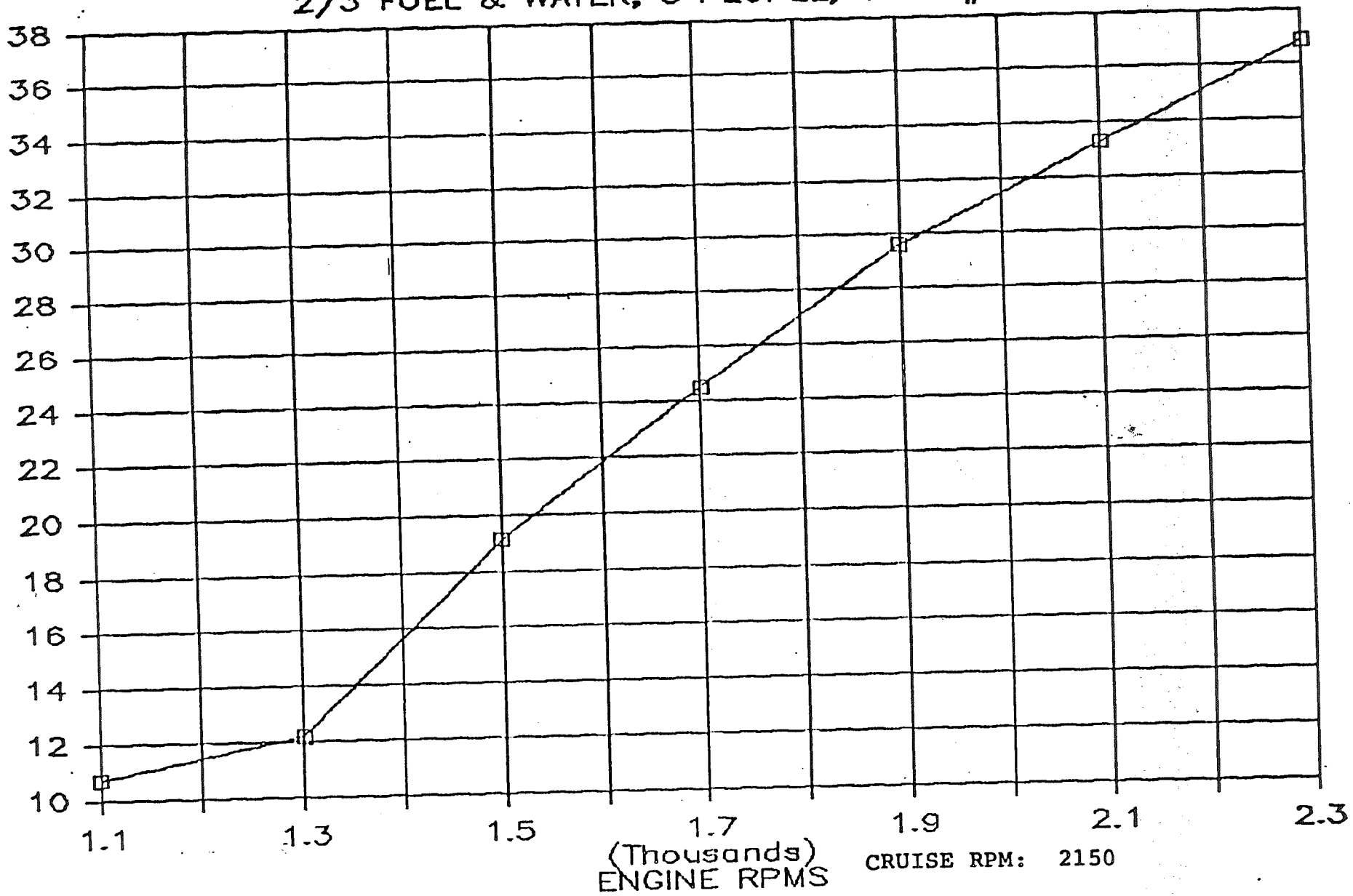
Uses starboard main engine batteries

PERFORMANCE CHARTS

The following three charts (Boat Speed [in statute miles per hour], Range [in stature miles], and Fuel [in gallons of fuel per hour]) are furnished to assist you in planning for safer, more pleasant boating trips. Using these charts will allow you to more closely estimate the answers to speed times distance times fuel onboard problems for your vessel.

BERTRAM 37 CONV. 450 BHP GM 6V92TA

2/3 FUEL & WATER, 6 PEOPLE, 1000 # GEAR

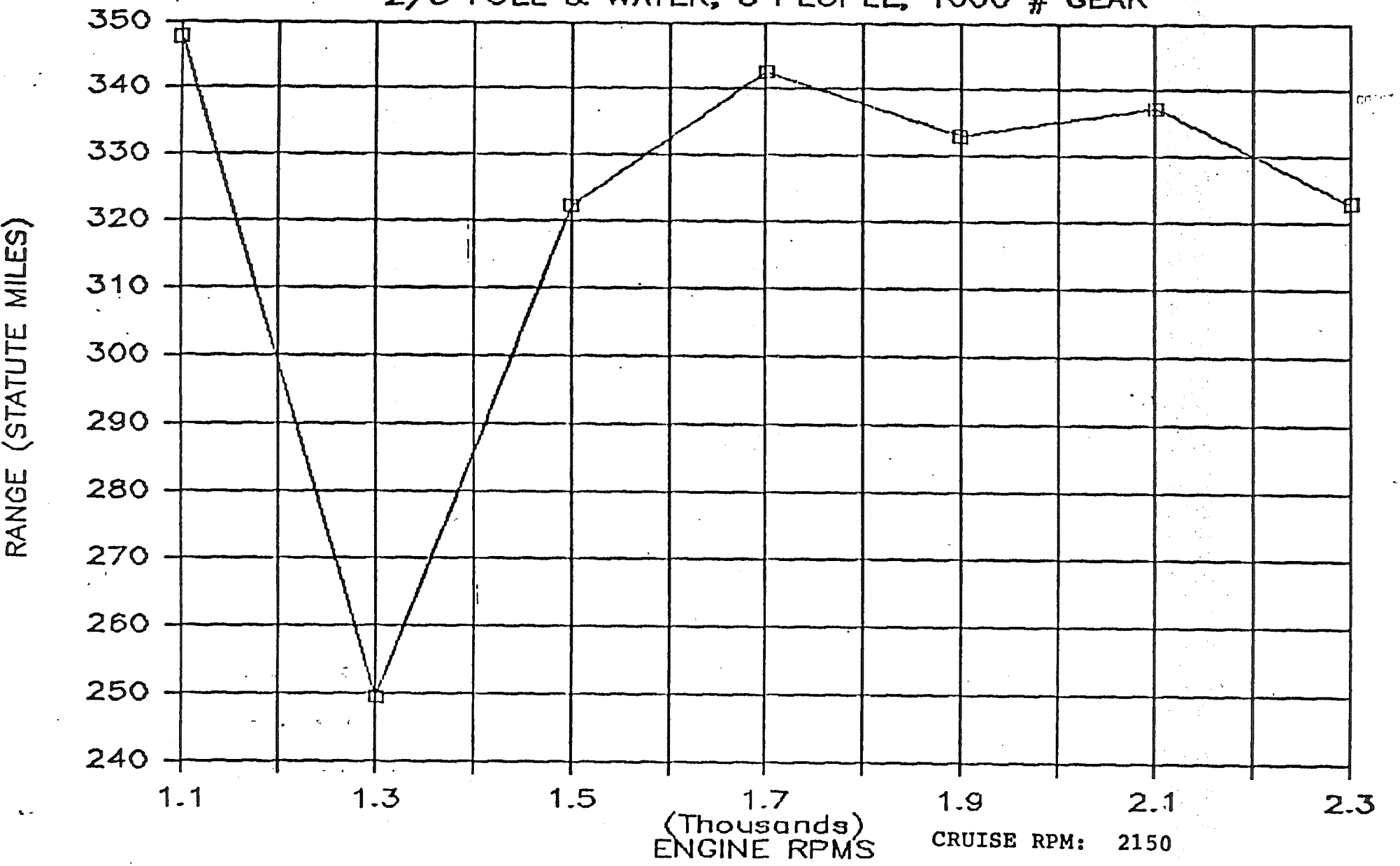


CRUISE RPM: 2150

Performance Data Obtained Under Ideal Conditions
With Clean Boat Bottom in 10 to 12 Foot Water Depth.

BERTRAM 37 CONV. 450 BHP GM 6V92TA

2/3 FUEL & WATER, 6 PEOPLE, 1000 # GEAR

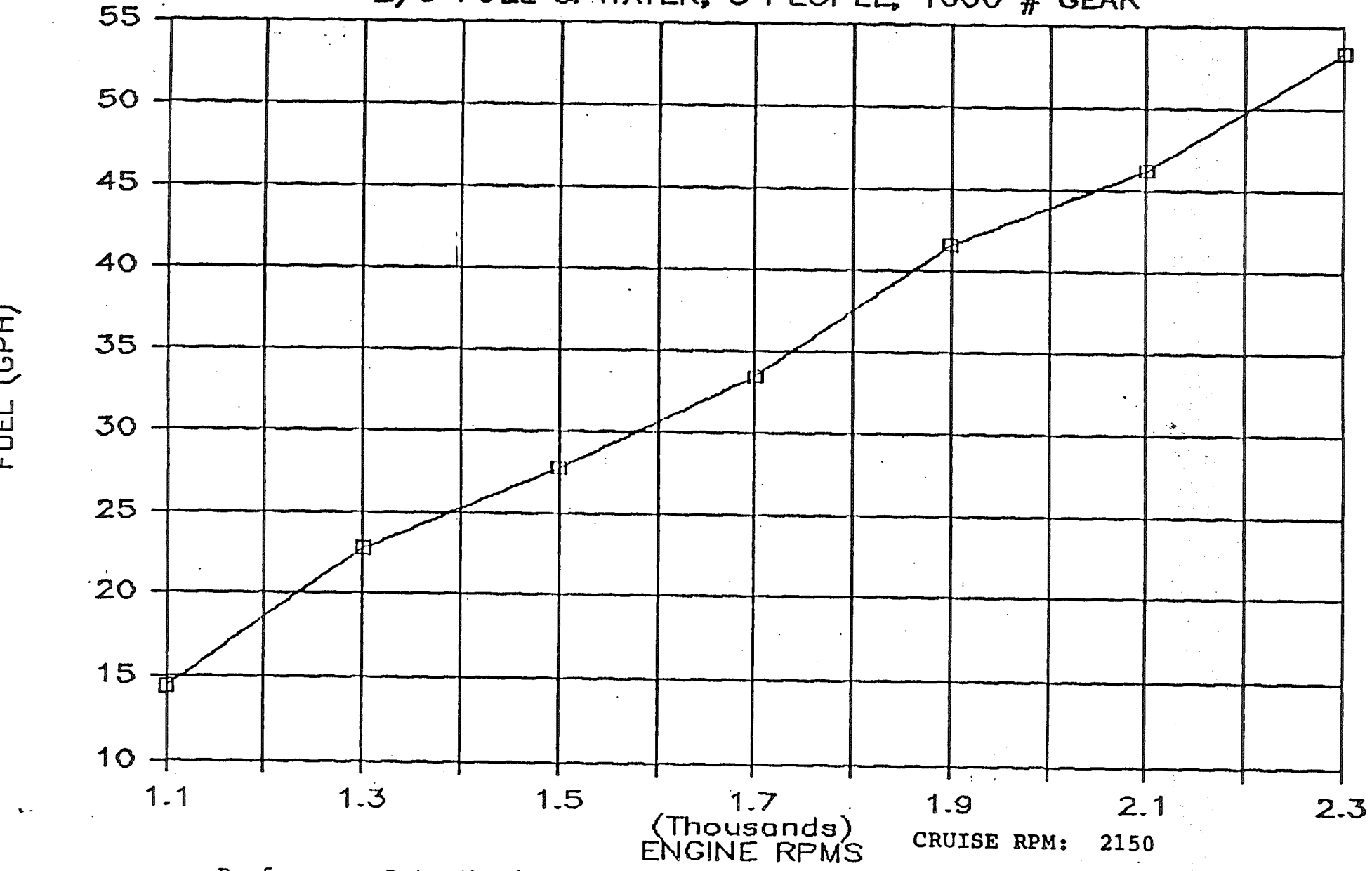


CRUISE RPM: 2150

Performance Data Obtained Under Ideal Conditions
With Clean Boat Bottom in 10 to 12 Foot Water Depth.

BERTRAM 37 CONV. 450 BHP GM 6V92TA

2/3 FUEL & WATER, 6 PEOPLE, 1000 # GEAR



CRUISE RPM: 2150

Performance Data Obtained Under Ideal Conditions
With Clean Boat Bottom in 10 to 12 Foot Water Depth.

II. CONTROLS AND INSTRUMENTS SECTION

A. Control Stations

1. General.

NOTE:

Do NOT attempt to operate this vessel until you are thoroughly familiar with the contents of this manual and all of your vessel's onboard systems. Included in this manual are the appropriate warnings, cautions, operating and maintenance information for each of your Bertram's onboard systems.

Section II is intended to give you a basic understanding of the controls and instruments on your Bertram, where on your vessel these controls and indicators can be found, and what you can expect from them. A physical and functional description of each onboard system, including what it does and how, can be found in the section of this manual pertaining to that particular system.

2. The Bridge Deck (Flybridge) Station. The flybridge is the standard control station or helm for your Bertram. There are two other possible control stations available for your Bertram; one is the optional Cockpit Engine Control Station (see Subsection 3 in this Section) and the other is the Fishing Tower Station (see Subsection 4 in this Section).

The standard control station is located on the bridge deck or flybridge and this control station is complete with the following controls, indicator gauges, and alarms:

a. the engine and steering controls

b. the engine performance instruments;

c. the accessory switches;

d. the alarm system indicators; and,

e. the applicable optional features ordered for this boat.

****

CAUTION

The Cockpit Engine Control Station has

1. Little or NO Forward Visibility and

2. NO Steering Wheel

THEREFORE

Use the Engine Control Station **ONLY**:

1. When a lookout is on the Flybridge;

2. when the Vessel is in SAFE OPEN Waters; and,

3. when only limited engine maneuvering is needed to aid in boating a large fish.

****

3. **The Cockpit Engine Control Station (Optional)**. An additional optional control station located in the cockpit is available. This is an engine control only station (if supplied) and as such it is NOT equipped with either a steering wheel nor is it equipped with a set of engine alarm monitors. The Cockpit Engine Control Station is equipped with the clutch and throttle controls, engine start, blowers, ON-STOP, and the battery parallel switches. As stated in the above caution, this control station is intended to be used only under the following conditions:

a. a qualified lookout is on duty on the flybridge who is prepared to take over the control of the vessel if necessary;

b. the vessel is operating in open seas well clear of obstructions or dangers; and,

c. limited, low speed maneuvers are being performed to assist in the boating of a large fish.

4. The Fishing Tower Station. If you have had your Bertram equipped with a fishing tower, this tower will probably also have installed on it an additional complete set of engine controls plus the hydraulic steering.

B. SWITCHES

1. The "ON/STOP" Switches. One of these two-position, toggle switches is provided for each engine (port and starboard). The "ON/STOP" switches are on the flybridge control station. Each of these switches must be placed in the "ON" position before attempting to start its respective engine and kept in the "ON" position while the engine is running. Conversely, placing either of these switches in the "STOP" position will shut down that engine.

2. The "START" Switches. The flybridge control station has one momentary contact switches "START" for each engine. If the "ON/STOP" switch is in the "ON" position, depressing this switch into the "START" position engages the starter for that engine.

3. The "BATTERY PARALLELING" Switch. This is a single switch on the flybridge control station instrument panel. When this switch is placed and held in the "PARALLEL" position, both battery banks are connected in parallel. When starting Diesel engines, Bertram recommends that the "BATTERY/PARALLEL" switch be set and held in the "PARALLEL" position each time a Diesel engine is started. If you have gasoline engines that are hard to start due to weak batteries, you can also use the "BATTERY/PARALLEL" switch to parallel both battery banks by holding this switch in the "PARALLEL" position while using the START switch.

4. The Accessory Switches. Also located at the flybridge or helm station are the switches for: (a) the horn; (b) the instrument lights; (c) the blowers; (d) the three bilge pumps; and, (e) the navigation/anchor lights.

5. The Bilge Pump Switches. The forward bilge pump (FWD. BILGE PUMP) switch controls the bilge pump that is located under the forward cabin sole. The midships bilge pump (MID BILGE PUMP) controls the pump in the engine room. The aft bilge pump (AFT BILGE PUMP) switch controls the pump in the stern.

Bilge pump switches have no "OFF" position and are set to operate either manually (operating continuously regardless of the bilge water level), or automatically. In "AUTO" (automatic) position, pumps operate bilge when water reaches a preset level and shuts down when the water is lowered below another preset level. Normally, bilge pump switches are kept in the AUTO position.

NOTE:

All bilge pump systems are connected directly to the 12 volt batteries (NOT cut off from power when the MAIN BATTERY switches are set in the "OFF" position) and are protected by fuses located on the DC panel.

6. The Trim Tab Controls.

****
*
* WARNING *
*
* BEFORE RUNNING AN INLET OR IF BEFORE A FOL- *
*
* LOWING SEA, MOVE TRIM TABS TO FULL UP TO LES-*
*
* SEN THE RISK OF BROACHING OR PITCHPOLING. *
*
****

NOTE:

Do NOT depress one switch "BOW DOWN" and the other "BOW UP" or hold either switch in "BOW UP" or "BOW DOWN" for an extended period as this will trip the circuit breaker which must be manually reset to "ON" to reactivate the trim tab system.

Each trim tab is operated by a rocker-type switch set in a panel located on the starboard side of the control helm console, below the throttles. If used properly, the trim tabs will enable you to trim your Bertram in a fore and aft position, providing an overall smoother ride and a more efficient use of fuel. The trim tabs are also used to level your vessel port to starboard to correct for lists caused by improper loading or cross winds.

The trim rocker switches are marked "BOW DOWN" at the top of each switch. When you depress the "BOW UP" side of this switch,

the trim tabs are moved to their upper or "normal position". This should be best for most cruising speeds.

When you push the "BOW DOWN" half of either trim tab control switch, its associated trim tab will be hydraulically lowered to a down position. Your Bertram is designed to ride best at a bow-up angle of about 5 degrees. Therefore, under certain sea and/or running conditions you will find that some degree of bow-down trim tabs will improve the ride and/or the trim. You will learn to judge the running attitude of your vessel by comparing the bow's relation to the horizon.

C. Instruments

1. The Importance of Instruments. Your Bertram is factory equipped with a set of engine operating condition instruments (gauges) as well as gauges to show the condition of the other electrical and non-electrical systems on board. The engine and other gauges are as follows: (1) Oil Pressure; (2) Tachometer; (3) Voltmeter; (4) Water Temperature; (5) Hour Meter; (6) Fuel Gauge; (7) Battery Condition Meter; (8) Fresh Water Tank Gauge; (9) A.C. Ammeter; and, (10) A.C. Voltmeter.

These instruments or gauges are intended to assist you, the vessel operator, in the operation and maintenance of your Bertram and to make you aware of the engine and transmission operating conditions, to help you avoid mechanical damage to the vessel propulsion system. Therefore, you, the operator, should:

1) become familiar with the function of each of your Bertram's instruments;

2) make it a habit to check your instruments frequently when under way;

3) particularly check your instruments when first starting the engines; and,

4) note what constitutes the "normal" readings or operational ranges of the instruments.

5) Be aware that except for the a.c. voltmeter and ammeter that measure 120 V.a.c., all onboard instruments operate on this vessel's 12V system through the ignition circuit and that all engine instruments do not return to any particular position when the ignition is off.

2. The Instrument Arrangement. Except for the two tachometers, which are mounted one on each side of the Fire and Bilge Flood alarm lights below the row of engine instruments, the twin sets of port and starboard engine operating instruments are positioned in a row across the top of the flybridge instrument control panel with the single, switchable, fuel gauge in the center above the Fire and Bilge Flood alarm lights. The forward/aft fuel tank selector switch for the fuel gauge is mounted below the alarm lights. The two Hour Meters (which are the least important meters from an operational standpoint) are mounted farthest out. The remaining two sets of three instruments each: 1) the Oil Pressure Gauge; 2) the Water (Coolant) Temperature Gauge; and, 3) the DC Voltmeter are mounted between the Fuel Gauge and the Hour Meters.

The compass is mounted in the center of the instrument panel at the forward edge.

The Battery Condition Meter and the Fresh Water Tank Gauge are mounted on the 12V.D.C. Distribution Panel located in the salon.

The a.c. ammeter and voltmeters are mounted on the 120V.A.C Distribution Panel. This panel is also mounted in the salon.

NOTES:

1) During operation, there may be some slight fluctuations in the gauge readings. This is normal and due to the nature of the lubricating oil and temperature variation.

2) When an engine is first started, the oil pressure gauge will have a higher than normal reading but this reading will decrease in pressure as the engine warms to a normal operating temperature.

3) In addition to the Oil Pressure Gauge for each engine, your Bertram yacht has a warning alarm system that will sound and illuminate should the oil pressure become dangerously low.

3. The Engine Lube Oil Pressure Gauges. Almost all serious engine trouble will be quickly reflected on its corresponding oil pressure gauge. Therefore, if any radical change in the oil pressure reading should occur, shut down that engine immediately.

4. The Engine Coolant Temperature Gauges. The two engine water temperature gauges indicate the temperature of the coolant circulating through each engine. In addition, both engines are equipped with an audible and visible alarm system to warn you of engine overheating and a thermostat that controls the coolant flow through the engine. The coolant flow, in turn, determines the engine operating temperature.

NOTES:

1) As ENGINE TEMPERATURE RISES, OIL PRESSURE DROPS. Therefore, the engine coolant temperature and oil pressure gauges should be observed as sets since most engine malfunctions will be reflected in both gauges.

2) Consult the engine manufacturer's operating manual for the proper operating temperature ranges for your engines.

3) The alarm system should warn you if engine temperature becomes excessive.

5. The Tachometers. Each of the twin digital tachometers registers the revolutions per minute (RPM) of one engine. Therefore, any substantial increase or decrease in your vessel's maximum RPMs is a good indication that something could be wrong and a check should be made of the boat's engines and/or running gear.

While a series of timed test runs back and forth over a measured course at different rpm readings can provide a good tool for speed estimation, there is no direct correlation of RPM's to the speed of the boat across the bottom due to:

1) Slippage of the propeller;

2) the effect of wind on the vessels superstructure;

3) the effect of tides or currents;

4) the condition of the vessels bottom; and,

5) variations in the load.

6. The Hour Meters. Each of these two instruments registers the total number of hours that its respective engine has been operating. The engine running time is accumulated regardless of engine speed (RPM). The engine hour meters are energized by the ignition switch.

7. The Battery Condition Meter. This instrument is mounted on the upper right side of the 12 VDC distribution panel which is located in the salon.

8. The Fuel Gauges and Tanks. Due to the fuel tank configurations, the fuel gauge indications for both tanks, which appear on the two fuel gauges (forward and aft) on the instrument panel, can only indicate the approximate amount of usable fuel remaining in these tanks (see Table II - 1). The configuration of the fuel tanks was built to follow the shape of your vessels hull. In order to make the most of the unsymmetrical available space in your vessel's hull, your Bertram is equipped with tanks that are necessarily larger at the top portion than at the bottom. Therefore there is actually space for more gallons of fuel in the upper half of the tanks than in the lower half. For this reason, the fuel gauge does not register gallonage accurately. This fact should be considered when planning for or during long range trips

to avoid running too low on fuel or the possibility of running out of fuel at sea.

TABLE II - 1. FUEL GAUGE READINGS Vs TANK GALLONAGE

Gauge Reading	Forward Tank	After Tank
Full	220 gallons	245 gallons
3/4	165 gallons	180 gallons
1/2	70 gallons	95 gallons
1/4	25 gallons	25 gallons
Empty	0 gallons	0 gallons

9. The Water Tank Gauge and Tank. The FRESH WATER TANK gauge is mounted on the 12V.D.C. distribution panel in the salon. This gauge reads in the usual quarters of a tank full. The FRESH WATER TANK gauge is activated by an "ON/OFF" switch mounted below the gauge. There are two (2) fresh water tanks on your Bertram connected together by an equalizer line. These tanks are located one on each side of the generator.

10. The Battery Voltmeters. The charge level in each bank of batteries is indicated by its respective voltmeter.

a. A reading of 12.8 volts is normal for a fully charged battery when the ignition switch is moved to the "ON" position.

b. When the engine is running, a reading of 13 to 15 volts indicates a normal charging rate.

c. When either voltmeter reads below 11 volts. There is little chance that the engine will start unless the operator holds the BATTERY/PARALLEL switch into its battery paralleling position.

11. The A.C. Voltmeter and Ammeter. These two gauges are mounted in the 120V.A.C. Power Selector Panel. These gauges measure the voltage level and current draw of the 120V.A.C. on your yacht either from the shipboard generator or from a dockside connection.

12. The Compass.

NOTE:

As installed, NO compensation is made on this compass for either deviation or variation.

Your Bertram is delivered to you equipped with a non-gimballed, flush-mounted, marine compass mounted on the top of the instrument panel. This is a magnetic compass and all magnetic compasses are susceptible to:

1) nearby ferrous metal (iron and steel) objects including tools, some beverage cans, and firearms.

2) the magnetic fields generated by nearby electronic equipment and gauges including other compasses; and,

3) the variations in the earth's magnetic field.

****
*
* CAUTION *
*
* Any time any electronic devise, gauge, or *
*
* instrument is added, removed, or replaced *
*
* on the instrument panel or in its immediate *
*
* area, the Compass Deviation Card should be *
*
* redone by a competent compass technician *
*
****

a. Compass Deviation. The first of the two compass errors mentioned at the beginning of this subsection is referred to as the compass deviation error. This error is due to the existance of magnetic metal objects and electronic devices that produce local magnetic fields. The degree of this error to the east or west of magnetic north changes with the heading of your vessel. Additionally, the amount of compass deviation error will change whenever any electronic or electrical equipment is added to or changed on the instrument panel or in the immediate area of the instrument panel, if a steel or iron object, or another compass is temporarily placed close to your vessel's compass.

Your vessel's compass is fitted with compensating screw adjustments. However, it is not possible to compensate for all deviation errors since this error varies as the heading of your vessel varies. This error will remain constant for the same heading as long as no changes are made to the instruments and electronics on or near the instrument panel.

Therefore, good seamanship requires that a Compass Deviation Card be generated for your vessel by a competent compass technician. Copies of this card should be kept at the helm and where the courses are plotted.

b. Compass Variation. The other compass error is variation and it changes depending on the location of the compass user on the face of the earth. Official sea charts or land maps used to navigate always show the local compass variation in degrees east or west off of true north. The variation in the worlds magnetic field varies slightly each year and the amount of change and its direction are also shown on navigation charts and maps along with the date. This allows the user of an out-of-date chart to calculate the variation.

D. The Throttle, Clutch, and Reverse Controls

1. General. All of your Bertram's engine maneuvering controls, which include the throttle, the clutch, and the reverse controls for both engines, are located on the flybridge control station. (See Drawing 18A 9201, Sheet 1.)

2. The Throttle Controls.

****
*
* CAUTION
*
* To avoid transmission damage while maneuver-
*
* ing, do NOT shift until engine speeds have
*
* dropped to idle - below 1,000 RPM's.
*
****

The two throttle controls (one throttle for each engine) are installed on instrument console to the starboard of the steering wheel. These twin lever controls have red knobs and are directly connected to the engine throttles by push-pull cables thus providing positive and instantaneous control from the steering station to the engines. Engine speed is increased by pushing the levers forward and decreased by pulling the levers back.

3. The Transmission (Clutch and Reverse Controls). Both clutch and reverse controls are mounted to the port of the steering wheel on the instrument console, and have black knobs. The clutches have detent positions which allow you, the operator, to "feel" the neutral position. Pushing one or both of these levers forward from neutral will place that engine(s) in forward. Pulling back from neutral will place that engine(s) in reverse

It is advisable to allow the engines to come to idle and pause in the neutral position before shifting gears to the opposite direction. This pause allows the hydraulic pressure within the marine gears to decrease and helps facilitate shifting.

E. The Steering Control

Your Bertram is equipped with a marine hydraulic steering system that turns two balanced rudders. The basic system is composed of three working parts:

1) the steering station pump;

2) the slave or steering cylinder; and,

3) the reservoir.

When you turn the steering wheel, hydraulic fluid is pumped to the steering cylinder attached to the rudder arms. The hydraulic fluid reservoir contains two (2) quarts of fluid under thirty (30) Pounds per Square Inch (psi) of air pressure. The system is designed to prevent outside air from entering into the reservoir.

The reservoir has a sight glass that shows the fluid level. If necessary, the system air pressure can be recharged by using an ordinary bicycle pump attached to the valve on top of the reservoir. The reservoir is located in the lazarette on the starboard side.

F. The Emergency Engine Stop (G.M. Diesel Engines Only)

****
*
* CAUTION
*
* Do NOT use the emergency stop system to shut *
* down the engines except in emergencies since *
* shutting off the air supply to the engines *
* could damage them. READ THE MANUFACTURER'S *
* MANUAL ON THE USE OF THIS SYSTEM. *
*
****

For vessels equipped with Diesel engines manufactured by General Motors (G.M.), Bertram has an Emergency Stop System. (See Drawing 18A 9201, Sheet 2.). As far as the operator is concerned, this system's visible parts consists of two heavy duty cables (one per engine). The working end of each cable is attached to a SHUT DOWN lever on the engine and the other end is fitted with a "T" handle. The Emergency Stop handles are located on the flybridge on the primary Halon fire extinguisher system nameplate.

It may be necessary at some time to use the Emergency Shut DOWN System. Bertram suggests that you become familiar with this procedure under other than emergency conditions. The suggested familiarization procedure is as follows:

1) With the engines SHUT DOWN, you should check for the "feel" of the unlocked position of these emergency stop "T" handles. The "T" handles should be unlocked in the vertical position, however, this may vary slightly from vessel to vessel.

2. You should then pull each emergency Stop "T" handle out as far as it will go and

3. then you should lock each of the two "T" handles by rotating it one-quarter (1/4) turn to the right (clockwise) or to the left (counter-clockwise).

4. You should then release the two "T" handles by returning both of them to the vertical position and

5. you should push the "T" handles back down as far as they will go. When you have returned the "T" handles to their original positions, DO <u>NOT</u> TURN them and LOCK them in place.

III. ALARMS

****
*
* CAUTION
*
* If the **ENGINE ALARM** sounds and **ANY** engine
*
* alarm light illuminates indicating an engine
*
* or a transmission problem, **IMMEDIATELY**:
*
* 1. Throttle the engine back to IDLE speed
*
* 2. Shift the engine into neutral
*
* 3. Shut down the engine
*
****

A. General

In addition to the gauges and indicators described in the previous section on controls and instruments, your Bertram is delivered equipped with the following three (3) separate alarm systems for your protection on board and to help you prevent damage to your vessel:

1) One alarm system is designed to alert you if either engine reaches a critical level in its operating condition.

2) A second system monitors for excess water in the bilges and for fire in the engine-room.

3) There is a third independent system that will alert you if the Halon fire extinguishing primary system automatically discharges due to a fire sensed in the engine-room.

B. The Engine Alarms

Each engine is equipped with an alarm system that warns the operator if either: 1) the lube oil pressure (OIL PRES) in that

engine is too low or 2) if any one or more of the following three engine operating parameters (conditions) are too high:

1. coolant temperature (WATER TEMP);
2. transmission temperature (GEAR TEMP); and/or,
3. engine exhaust temperature (EXHAUST TEMP).

NOTE:

The transmission gear oil temperature and the exhaust temperature are not monitored by gauges.

Each engine has alarms systems that consist of an audible alarm to alert you, the operator, to a problem and a set of four alarm indicator lights that are mounted on the instrument panel. The set of four alarm lights will indicate to you which engine has the problem and to some extent, what that problem is.

C. Trouble Shooting

1. Low Oil Pressure. If the alarm sounds and either engine OIL PRES light illuminates to indicate a low oil pressure condition; check the following:

   a. The oil pressure gauge.
   b. Low lube oil in the crankcase.
   c. A leak in the oil system.
   d. A. defective alarm switch

2. Engine Coolant Temperature. If the alarm sounds and either engine WATER TEMP alarm light illuminates indicating an engine over heat problem, check the following:

a. Check the engine temperature gauge.

b. Low coolant in the (optional) heat exchanger.

c. Loose or worn belts.

d. A restricted seawater strainer.

e. A closed or partially closed seacock.

f. A defective water pump.

g. A defective thermostat.

h. A defective alarm switch.

i. A collapsed water suction hose (check with the engine running but after the engine has cooled down).

3. Gear Temperature. If the alarm sounds and the GEAR TEMP alarm light illuminates indicating a gear box over heat problem, check the following:

a. Low transmission fluid

b. Clutch slipping (check control cable adjustment)

c. Transmission Cooling System

d. Defective alarm switch

4. Exhaust Temperature. If the alarm sounds and the EXHAUST TEMP light illuminates indicating an exhaust system over heat problem, check the following:

a. Flow of water from exhaust outlet at transom

b. Restricted seawater strainer

c. Closed or partially closed seacock

d. Defective sea water pump

e. Collapsed water suction hose

f. Defective sea water flow switch (located in the engine sea water discharge system)

D. **The Fire/Bilge Flood Alarm**

There are two bilge alarm switch sensors, one in the forward bilge and one in the engine compartment bilge. The Bilge alarm switch sensors are installed several inches above the bottom of the boat and closely resemble the bilge pump switches. Do NOT confuse the two. The bilge pump switches are the same type, but located down in the bilge.

It is recommended that you test the bilge alarm switch sensors every 100 operating hours or every 60 days. Each switch has a cover with a red test button. When the test button is pressed:

1. the float is raised;
2. the alarm bell should ring; and,
3. the "bilge" lamp on alarm panel should illuminate.

E. **The Fire Alarm Detection System**

The fire detection system is located on the engine-room and generator compartment overhead. The detector part of this system consists of two (2) wires individually encased in red heat sensitive material and two (2) 200^{o} thermal switches. At the critical temperature (155^{o}F.), the two wires make contact, and the alarm system is activated. Each thermal heat switches is located outboard of an engine near the exhaust.

IMPORTANT

1. **The heat sensitive wire system <u>CANNOT</u> be reset. The wire <u>must</u> be replaced.**

2. **The fire/bilge alarm can be disabled by removing the panel fuse.**

3. Do NOT attempt to test detection system by heating wire.

4. The 200^{o} thermal switches will reset automatically after the temperature drops below their critical point.

This fire detection system is limited solely to the engine and generator spaces.

F. The Halon Fire Extinguisher System Discharged Horn

The automatic Halon fire extinguishing system has an alarm horn built into it that is sounded when the system is discharged. This horn alerts the operator that the Halon system sensors discovered a fire in the engine-room and discharged the gas in the primary system. Unless there is an emergency requiring maneuvering power, the operator should immediately shut down both engines.

G. The Fire and Bilge Alarm Lights (Test)

The Fire and Bilge (flooding) Alarm Lights on the flybridge instrument panel can be tested by depressing the test switch that is mounted just below them on the instrument panel.

IV. VESSEL OPERATION

A. Fueling Instructions

NOTE:

Starting in 1977, federal standards have steadily increased the level of component and systems safety as related to the fuel and electrical systems for gasoline powered vessels. These tightened standards have resulted in increased boating safety.

WARNING:

THE FIRST TIME ANY TANK IS FILLED, MAKE A CAREFUL CHECK TO ENSURE THAT FUEL DOES OVER-FLOW THROUGH THE VENT. IF NOT, DO NOT START THE ENGINES. INSTEAD, IMMEDIATELY NOTIFY DEALER AND THE BERTRAM SERVICE DEPARTMENT.

CAUTION

To avoid engine stoppage, fuel line contamination, and the need to reprime your engines, Do NOT let your fuel tanks run dry in use.

Gasoline vapor is both heavier than air and **HIGHLY EXPLOSIVE**. For maximum safety when fueling **GASOLINE** powered vessels, the following steps should be followed, in the order given, each time your Bertram is fueled.

1. Before Fueling:

a. Close all hatches, doors, windows, and closeable vents.

b. Extinguish all open flames and smoking material.

c. Turn OFF all spark causing equipment, such as, but not necessarily limited to, the following: engines, stove, pumps, bilge blowers, electronic gear, and/or the generator.

d. Drain off any static electric charge that may have built up or that may be building up in the fuel filling hose. Do this by making sure that the filling hose nozzle is touching the deck fill plate before any fuel is pumped and the nozzle continues touching the deck fill plate all the time that fuel is being pumped.

e. Add fuel (top the tank) until the fuel is sighted at the vent fitting on hull side below the fuel fill.

2. After Fueling:

****
*
* WARNING
*
* BOATS EQUIPPED WITH GASOLINE ENGINES
*
* GASOLINE VAPORS EXPLODE. OPERATE ENGINE-ROOM
* BLOWERS FOR FOUR (4) MINUTES THEN CHECK THE
* ENGINE-ROOM BILGE FOR GASOLINE VAPORS BEFORE
* STARTING THE ENGINES OR THE GENERATOR.
*
****

a. Open all hatches, doors, windows, and vents.

b. Then, visually and by smell, check for fuel leaks or fuel fumes.

c. Operate bilge blower for at least four (4) minutes and leave running until engines are started.

d. Hatches and vents may be closed after engines have run for a while.

NOTE:

On gasoline powered vessels, it is recommended that the engine-room blowers be kept running during any low speed operation.

****
*
* **CAUTION** *
*
* Do NOT store fuel for long periods in your *
*
* vessel's fuel tanks. Stored fuel will spoil *
*
* and spoiled fuel can damage your engines. *
*
****

3. **Fuel Tank Usage**. While keeping in mind the above caution that fuel stored for long periods of time in your vessel's fuel tanks will deteriorate and that spoiled fuel can damage your engines, Bertram suggests that on long trips where both tanks will be used, that you use the forward tank first. Using the forward tank's fuel first will make it easier to trim your vessel to the slightly bow up attitude (about 5 degrees) at which your Bertram is designed to operate best.

4. The Fuel Tanks. Your Bertram's fuel tanks are made of molded fiberglass and fire retardant resin and are constructed in accordance with current Federal regulations and accepted standards. On vessels with gasoline engines, (see Drawing 18A 9201, Sheet 3) there are sealed anti-siphon valves in each supply line to the main engine and generator. On diesel engine vessels, (see Drawing 18A 9201, Sheet 4) a manual shut-off valve is used on each supply line.

a. The Aft Tank. A small cockpit hatch provides you with access to the aft tank engine fuel supply fittings and fuel gauge sender, which incorporates a sight gauge. You can inspect the tank fill and vent plate assembly from the engine room.

b. The Forward Tank. The forward fuel tank fittings and gauge sender, which also incorporates a sight gauge, are inspected from the engine room.

c. The Tank Selector Valves. Located in the compartment below the step from the cockpit to the salon, are two 3-way fuel tank selector valves, one for each main engine. The valves permit the operator to select which engine shall draw fuel from which tank. These valves are connected directly to the hexagon shaped suction tube head which extends to the bottom of each tank. The lower end of this tube is fitted with a strainer. The fuel return lines are also connected to these valves and they automatically return the unused fuel to the

tank from which it was drawn. Fuel for the onboard generator is drawn from and returned to the aft tank.

B. Starting Engines

WARNING:

INTERNAL COMBUSTION RECIPROCATING ENGINES BURN PETROLEUM FUEL AND EMIT CARBON MONOXIDE GAS. THIS GAS IS COLORLESS, ODORLESS AND IS DEADLY IF BREATHED IN SUFFICIENT QUANTITIES. THE FOLLOWING LIST OF PRECAUTIONS ARE MANDATORY FOR SAFE AND PLEASENT POWER BOATING.

1) When underway, do NOT operate your vessel with all the forward hatches and vents closed, the side windows and/or vents CLOSED, and the cabin door to the cockpit OPEN. This will create a MOST hazardous condition. The same rule applies to the fly-bridge if a "Bimini" top is installed, the front and side curtains are closed, and only the rear curtain is left open.

2) When underway, keep the cabin door to the cockpit closed and either open the side windows and slightly open at least one forward hatch or vent to pressurize the cabin. The same rule applies to a closed-in fly-bridge.

3) When at anchor, ensure sufficient open windows, hatches, and vents for adequate ventilation even with the air conditioner operating. This is MOST important when operating the a.c. generator.

4) When tied up perpendicular to the dock and/or immediately along side of other vessels, pay particular attention to the generator exhaust emissions from the nearby vessels as a LETHAL concentration of carbon monoxide could be drawn into your vessel by its ventilation system.

5) If you smell excessive exhaust odor or you think that you or anyone on your vessel might be experiencing one or more of the classic symptoms of carbon monoxide poisoning; IMMEDIATELY:

a) Move everyone on board out on deck in the fresh air;

b) open all hatches, windows, and vents to air out your vessel;

c) shutdown engines and/or generator until you find the carbon monoxide source if it is on your vessel; and,

d) make the necessary corrections before getting underway again.

e) you should also be aware that it is possible for you to be getting the exhaust fumes of vessels tied up along side of your vessel or even docked in the next slip, if they are using their generator.

WARNING

BEFORE STARTING DIESEL ENGINES, BE SURE THE CLUTCH CONTROLS ARE SET IN THE NEUTRAL POSITION TO PREVENT ACCIDENTAL VESSEL MOVEMENT.

CAUTION

If engine fails to start within 30 seconds: Release "START" switch, wait 3 minutes, try again. Excessive cranking results in unnecessary starter motor wear and battery drain.

NOTE:

The four switches discussed below are on the 12 V.D.C. DISTRIBUTION Panel which is inside the salon. The salon can be locked to prevent unauthorized use of your vessel.

1) Check to see that both MAIN BATTERY SWITCHES are set to "ON". (These switches feed battery power to the 12 Volt Distribution Panel.)

2) Set the PORT and STARBOARD ENGINE circuit switches to "ON".

3) Set the HORN and BLOWER switches to "ON" plus any others that may be needed for vessel operation.

4) Place clutch controls in the "NEUTRAL" position.

5) Advance throttle levers to slightly forward of the idle position.

6) Set the switch marked "ON-STOP" to "ON".
(The ENGINE ALARM bell should ring and the alarm lights for OIL PRES and EXHAUST TEMP should illuminate.)

7) Activate the Start switch.

(The ENGINE ALARM bell should continue to ring and the alarm lights for OIL PRES, WATER TEMP, GEAR TEMP, and EXHAUST TEMP should illuminate.)

8) Hold START switch until engine starts or 30 seconds, whichever comes first.

9) Release START switch.

(ENGINE ALARM bell should stop ringing and all alarm lights should extinguish.) With a gasoline engine, it may help to pump throttle while cranking the engine.

C. The Battery Paralleling Switch

In the event that starting is difficult because of weak batteries, the BATTERY/PARALLEL switch can be held in the "PARALLEL" position while using the Start switch. When starting Diesel engines, Bertram recommends that the BATTERY/PARALLEL switch be held in a "PARALLEL" position each time an engine is started.

D. After the Engine Starts

Visually check the flow of water from the exhaust outlet on transom. This will indicate if the seawater cooling system is operating properly.

E. Stopping the Engines

1) Move "ON/STOP" switch to the "STOP" position.

2) Hold the "ON/STOP" switch in the "STOP" position until the engine is fully stopped.

3) Release the "ON/STOP" switch.

NOTE:

Because Diesel engines are self-igniting (Diesels do not require an ignition system) they will continue to operate as long as they have fuel and air and they may prove difficult to shut down. If your Diesel engines are made by General Motors (G.M.), Bertram has provided an emergency shut down system that is intended to be used with the "Fireboy" Halon 1301 fire extinguishing system. However, this system will shut down G.M. Diesels at other times if necessary.

4. If it becomes necessary to bring General Motors (G.M.) made Diesel engine(s) to an emergency stop and placing and holding the ON/STOP switch down into the "STOP" position has failed to shut down the engine(s); you should use the two (2) Emergency Stop "T" handles that are located below the manual fire extinguisher discharge "T" handle on the control console (see Drawing 18A 9201, Sheet 2). This emergency stop method requires that you, the operator, pull the appropriate Emergency Stop "T" handle(s) out as far as it/they will go and then lock the "T" handle(s) by rotating it one-quarter (1/4) turn to the right (counter-clockwise) or to the left (clockwise). If one or both of these "T" handles prove hard to pull, check to see that they are unlocked, which should be a vertical or nearly vertical position.

F. vessel Speed

When operating in rough water, your Bertram's deep "V" hull cushions pounding by slicing through the waves rather than slapping against them. However, even a Bertram will eventually encounter extreme conditions that require the restraints of sensible

seamanship. Your speed should be reduced under adverse sea conditions in the interest of your comfort, and to reduce any needless strain on the engines and vessel structure.

1. Hull Efficiency. Your Bertram has a built-in ability to carry comparatively heavy loads without appreciably reducing its performance; however, for the best performance results, maintain your vessel's original trim. This is with a slight (about 5 degrees) bow up attitude. You should spend a few minutes to become familiar with this trim and the feel of your vessel especial ly the relationship of the bow to the horizon when your Bertram is first launched, and before any extra equipment is placed on board. Of course, all gear and equipment should be properly stored while cruising.

2. Atmospheric Conditions. There are some additional operational considerations for you to keep in mind while operating your Bertram. Engine performance will be affected to a slight degree by atmospheric conditions. You will find that your engines develop less power in warm air temperatures. Similarly, dry air reduces power, as will high altitudes. If you are cruising regularly in waters well above sea level, you will want to have a certified mechanic make the engine adjustments necessary to get the correct air/fuel mixture.

3. Marine Growth. In order to obtain maximum hull efficiency, which directly translates into speed, your Bertram'S bottom must be kept free of marine growth, including grass. Any bottom growth will cause an increase in your vessel's water resistance

as it moves through the water, thus decreasing the speed.

4. Water In the Bilge. The bilges must be kept pumped dry to minimize excess weight. The added weight of any water in the bilges causes your vessel to ride lower, which increases your vessel's water resistance, and this will reduce vessel speed.

5. Damaged Underwater Equipment

****
*
* CAUTION
*
* Only under EMERGENCY CONDITIONS should your
* Bertram be operated at cruising speed with
* a vibration caused by damaged propellers or
* running gear. Seek a tow, or, if necessary,
* proceed with EXTREME CAUTION at IDLE SPEED.
*
****

A marked loss of speed plus excessive vibration can be due to damaged propellers, shafts, struts, and/or misaligned rudders and engines (see Drawing 18A 9201, Sheet 5). The rudders on your Bertram always should be kept parallel, NEVER "toed" in NOR out. The propeller shaft alignment should be checked periodically.

6. Propeller Size. Your Bertram is fitted with the propellers that the Bertram Engineering Department determined by exhaustive tests to be the most efficient for your vessel size, the engines, and optional equipment selected. If it becomes necessary to replace damaged propellers, Bertram recommends that you use the same make, style, and size as the originals.

7. Changing Propellers. If in the future, for any reason (such as the later addition of a fishing tower), or if there is a significant change in your vessel's primary use) you feel that a different size or style of propeller would improve your vessel's performance, give Bertram's Service Department a full report on that performance, including measured speeds at various and the maximum engine RPMs. The Service Department will check with Bertram engineers to see if any change in propellers is indicated.

8. Fresh Water Operation. All vessels have more displacement in fresh water than in salt water. The added drag can reduce the speed of your vessel as much as 2 percent.

9. Fuel Quality

WARNING:

NEVER ADD COMMERCIALLY MARKETED DIESOHOL OR GASOHOL TO DIESEL FUEL. MIXING THESE BLENDS WITH DIESEL FUEL CREATES BOTH AN EXPLOSION AND A FIRE HAZARD.

CAUTION:

NEVER use Galvanized steel pipes or fittings in any Diesel fuel system. Diesel fuel oil reacts chemically with the zinc coating to form a powdery, flaking compound that will clog filters and damage engines.

a. Gasoline. Use only leaded gasoline with a minimum rating of 89 octane.

b. Diesel. Use only the type(s) of high quality fuel specified by the engine manufacturer. Fuel oil should be clean and free of contamination. Fuel tanks and stored fuel should be inspected regularly for dirt, water, and/or water-emulsion sludge.

c. Alcohol In Diesel or Gasoline Fuels. Very small amounts of isopropyl alcohol (isopropanol) may be used to prevent fuel line freeze-up in winter months. No more than ONE PINT of isopropyl alcohol should or need be added to each 125 GALLONS of Diesel fuel for adequate protection.

10. Draft. To avoid going aground or damaging your underwater gear when maneuvering in shallow waters, it is most important that you know the amount of water your vessel draws, which is known as its draft. The draft of any vessel will vary depending on the load it is carrying. In the case of a pleasure vessel, Bertram suggests that you determine your draft after she is fully equipped and at or near the maximum load you expect to be carrying. Remember, any vessel will draw slightly less in salt water than it will equally loaded in fresh water. To determine the minimum amount of water you need under your vessel:

a. Measure the freeboard (the hull height above the waterline) from the top of the covering board to the waterline at the center of the transom.

b. Subtract this number from the dimension given for the distance from the top of the covering board, at the center of the transom to the propeller bottom. Refer to the docking plan (Drawing 33D 9036) supplied herein to get your vessel's maximum draft at the transom.

c. Record this figure where it is readily available, for instance on your compass deviation card.

11. **Height**. If you are ever going to cruise in waterways that are crossed by bridges and other overhead obstructions, in addition to knowing your vessel's draft, it is also necessary to know its height including the optional fishing tower and/or the optional electronic equipment antennae. This distance is obtained by measurement and should be made when your vessel has a light load of fuel, passengers, and equipment.

12. **Drainage Systems**. Your Bertram yacht has both cockpit and deck drains provided to allow sea water to flow overboard. Hatch drains flow into the bilge and the water is automatically pumped overboard by the engine room sump pump. The bilge is kept dry by three bilge pumps, equipped with switches (see Drawing 18A 9201, Sheet 6). The galley and lavatory sinks have their own drains and the shower has a sump which is equipped with a pump.

13. **Trip Preparation**. To get the maximum pleasure from your vessel, Bertram suggests that you have a written check-off list to review each time you use your vessel. The following items should be included:

a) Pump bilges as required (check operation of bilge pumps).

b) Check engine (and generator) lube oil levels.

c) Check engine (and generator) coolant levels (if fresh water cooled).

d) Check fuel, water, and oil systems for leaks.

e) Check sea water strainers, clean if necessary.

f) Check to ensure that all sea valves are open.

g) Check fuel and water tank levels.

h) Check gasoline fuel strainers or Diesel fuel/water separators.

14. Maneuvering. Your Bertram has twin propellers that contra-rotate (rotate in opposite directions) in order to balance the torque and twin rudders (see Drawing 18A-9201, Sheet 1). If you engage one engine in forward gear, and the other in reverse gear and if the rudder is placed in the center position, your vessel will turn completely around in its own length. You can, of course, make such a turn in either direction. Port engine forward and starboard engine in reverse spins you clockwise. Starboard engine forward and port engine in reverse spins you counter-clockwise. You can increase the spin by applying rudder in the spin's direction.

When docking parallel to a dock or pier, approach at a slow speed, at a 30^{o} angle, and if possible, against either tide flow or wind, whichever is greater. When your bow is about five (5) feet from the dock, put the dockside engine in neutral and the far side engine in reverse. This will reduce your forward move ment and bring your stern alongside the dock. With some practice, docking can usually be accomplished with the clutches alone. No steering or use of the throttle will usually be required.

All of your Bertram's mechanical controls (see Drawing 18A 9201, Sheet 1), including the two (2) throttles, the transmission (the clutch and reverse controls) for both engines, and the hydraulic steering system are on the flybridge control station.

a. The Throttle Controls. Twin lever controls provide a positive control. Engine speed is increased by pushing the levers forward and decreased by pulling the levers back.

b. The Transmission (Clutch and Reverse Controls). The clutches have detents which let you "feel" the neutral position. Pushing one or both of these levers forward from the neutral will place that transmission(s) in forward. Pulling back from neutral puts that transmission(s) in reverse.

c. Pause in Idle. It is advisable to allow the two engines to come to an idle and to pause in the neutral position before shifting the gears to the opposite direction. This pause allows the hydraulic pressure within the marine gears to decrease and helps facilitate shifting.

d. Steering Control. Your Bertram has a hydraulic steering system with twin rudders. Since these rudders are at the stern, the bow pivots around when you turn the steering wheel. The effect is somewhat different than steering a car where the steering action takes place up front.

15. Single Engine Running. There may be a time when it becomes necessary to operate your Bertram with a single engine. Before such a situation occurs it would be prudent to practice with first one engine and then the other to learn how your vessel handles. You will see that your vessel must be moving fairly fast after a dead stop before the rudders will make the correction to the desired course. You will also notice that with only one engine, steering while in reverse is very poor.

16. Cruising Speeds. You will find that your Bertram handles easily and creates little wake at slow speeds. However, as you begin to increase speed, she will initially increase her angle-of-trim. That is, the bow will rise. As her speed increases further, she will then start to level off, and then she will assume a planing attitude. This is the most efficient angle-of-trim and will be about 5 degrees of bow up. For the most fuel efficient operation, do not hold your vessel at its maximum angle-of-trim any longer than necessary.

When you first start operating your Bertram, take note of your engine RPM's at the maximum trim angle. Then plan to cruise either under that speed or over it. As a rule, your top gasoline engine cruising speed RPM should be 20% to 30% less than the top

RPM. For diesel engines, maximum cruising RPM should be about 10% less than the wide open RPM.

17. Personal Equipment and Accessories. All the personal equipment and accessories placed on board your vessel will tend to decrease its speed, just as adding passengers will. The effect of this added weight should be taken into consideration in calculating the performance of the vessel.

G. The Use of Trim Tabs

****
*
* WARNING:
*
* BWFORE RUNNING AN INLET OR IF BEFORE A FOL-
*
* LOWING SEA, MOVE TRIM TABS TO FULL UP TO RE-
*
* DUCE THE RISK OF BROACHING OR PITCHPOLING.
*
****

NOTE:

Do NOT depress one switch "BOW DOWN" and the other "BOW UP" or hold either switch in "BOW UP" or "BOW DOWN" for and extended period as this will trip the 12V.d.c. panel circuit breaker which will have to be manually reset to the "ON" to reactivate the trim tab system.

1. The Trim Tab System. The trim tab system on your Bertram is electo-hydraulic in operation and is powered from the 12V.d.c. distribution panel. The two (2) trim tabs (one on each side of the hull at the stern) are used to regulate the attitude of your Bertram while underway in much the same way that flaps aid an airplane to maintain the proper flight attitude.. The

trim tabs can also be used to adjust the vessel's running angle when in adverse seas or with unusual load conditions.

2. Trim Tab Operation. The trim tabs are operated by a rocker-type switch panel that is located on the starboard side of the control helm below the throttles. If used properly, the trim tabs will aid in trimming the vessel in a fore and aft position, allowing an overall smoother ride. The trim rocker switch is marked "BOW UP" at the top of the switch.

a. When you depress the "BOW UP" side of the rocker switch, the trim tabs are moved to their upper position. This the is "normal" operating position and should be the best for most cruising speeds.

b. Conversely, when you press the other side of the rocker switch, the trim tabs are moved to their down position. Under certain conditions you will need some "BOW DOWN" tab. You will learn to judge the running attitude of your vessel by the bow's relationship to the horizon.

c. After starting your engines, before casting off, depress the "Bow UP" side of both trim tab switches. This will assure you that the tabs are in the full "up" position. After getting underway, when you are clear of the harbor or when conditions permit sufficient speed to get your Bertram up on plane, depress the "BOW DOWN" side of the two trim tab switches lightly to bring the bow down slightly. Your vessel's speed, its load, and the choppiness of the water will determine the extent to which you lower the trim tabs.

Note:

Usually, the faster you go, the less trim tab is required. Additionally, too much "BOW DOWN" at any speed will reduce your vesel's speed and may degrade her handling characteristics.

d. While under way, if your vessel lists to one side, due to the improper loading of gear or passengers, or to a beam wind, the vessel can be leveled by adjusting the tabs. For instance:

If your vessel lists to port:

1) Depress the Starboard BOW UP switch momentarily

2). then depress Port BOW DOWN switch momentarily.

If this does not completely correct the list, repeat operations 1) and 2). For a starboard list reverse the procedure.

e. The following three subsections are Bertram's suggestions for the proper use of the trim tabs on your vessel:

1) Never go into reverse "back down" above idle speed, while the trim tabs are in the down position. The force of the water on the trim tabs in reverse could possibly damage both the trim tab hydraulic cylinders and/or the cylinder's internal seals.

2) Always return the trim tabs to the full up or the "BOW UP" position prior to docking. Following this procedure will prevent marine growth from

developing on the hydraulic rams.

3) Always return the trim tabs to the full up or the "BOW UP" position prior to trolling in anticipation of "backing down" on a fish.

V. EMERGENCY SITUATIONS

CAUTION

If aground, do NOT attempt to drive this vessel off. Trying to refloat this vessel under its own power could result in damage to the propellers; propeller shafts; struts; and/or, the transmissions (clutch and reverse gears)

CAUTION

Do NOT run engines while aground; sand, dirt, and other foreign matter could be drawn into the cooling system and damage your engines

A. Running Aground

In the event that you, the operator, inadvertently run aground you MUST immediately do the following in the order given below.

1) Pull both throttles back to reduce the engine speed to less than 1000 RPM.

2) Then shift both clutches into neutral.

3) Stop both engines.

Recommendations for refloating boat:

1) Set a "kedge" anchor off of your stern to prevent being driven further aground.

2) The kedge should be set as far behind your vessel as practical with an offset to port or starboard to compensate for the wind or current, whichever is stronger.

3) Keep tension on the kedge line and wait for high tide.

B. Flotsam (Floating Debris)

If you, the operator observe flotsam while at cruising speed, you should immediately throttle back to idle speed. At idle you should then shift into reverse or forward depending on the situation and proceed cautiously until out of the area.

C. Vibrations

CAUTION

Only under EMERGENC CONDITIONS should your Bertram be operated at cruising speed with a vibration caused by damaged propellers or running gear. Seek a tow, or, if necessary, proceed with EXTREME CAUTION at idle speed.

After either running aground or striking flotsam, proceed at a reduced speed and check to see if there is noticeable vibration which might indicate damage to your vessel's underwater gear before resuming cruising speed. If a vibration is noticed. proceed to dockside at the reduced speed. Depending on the damage done, it might be necessary to shut down one engine.

D. TOWING

****
*
* WARNING
*
* DO NOT SECURE TOW LINES TO DECK CLEATS, WHICH
*
* ARE ONLY FOR MOORING. CLEATS ARE NOT FASTENED
*
* TO YOUR VESSEL FOR TOWING. RATHER, USE A LONG
*
* LINE TO RIG A TOWING BRIDLE AROUND HER HULL.
*
****

****
*
* CAUTION
*
* Take extra care if towing or being towed with
*
* "Nylon" lines. These lines stretch and if a
*
* a fitting fails or the line parts, the ends
*
* can snap back with enough force to injure.
*
****

1. General. Although a common courtesy between pleasure vessel skippers, towing is NOT recommended since it can be dangerous to the occupants of the towing and towed vessels and is best left to professional salvors or those trained to minimize the risks. The U.S. Coast Guard Auxiliary manual CG-484 "Auxiliary Towing Guide" dated 1977 states that most marine accidents occurring during towing fall into one of the following three categories:

a. Most recreational type boats do not have suitable deck fittings to tow and many do not have suitable deck fittings to be towed;

b. the boating public in general has both a limited knowledge and practice of good seamanship; and,

c. boating personnel have sometimes failed to use or conform to the practices of good seamanship through inexperience and/or expediency.

2. Personnel Safety. In all towing operations the primary objective is to ensure the safety of the personnel on both vessels. Thus the primary objective always is to save lives and to avoid inflicting personal injury. The saving of property is only of secondary importance and must NEVER take precedence over assuring personal safety.

E. Fire Extinguishing Systems

Bertram has installed a Halon 1301, two-bottle, fixed fire-extinguishing system in your yacht. This automatic (primary system only) system and manual (secondary system) is intended only to protect the engine room space from fire. For other shipboard fires, Bertram has also supplied three B-1, dry-chemical, hand-held, fire extinguishers, U.S.C.G. approved Type BC-1

F. Using the Portable Fire Extinguishers

1. Class "A" Fires - Class "A" fires are those fueled by paper, wood, fabrics, rubber, and some plastics. Water is the best means of extinguishing a Class A fire and should be applied as soon as possible. Drench the fire, open up the material to expose all burning embers and drench them again, or throw the smoldering embers overboard.

2. Class "B" Fires - Class "B" fires are those fueled by flammable liquids such as gasoline, oils, paint, and cooking fats. Carbon dioxide, dry chemical, and Halon are suitable for

Class "B" fires. In general the extinguishing agent should be directed at the base of the fire working in a horizontal sweeping motion from the front to the back of the fire.

3. Class "C" Fires - Class "C" fires are caused by energized electrical equipment. Extinguishing Class "C" fires may be best accomplished with carbon dioxide, dry chemical, and/or Halon. Water based extinguishing agents should NOT be used because of the potential danger of electrical shock to the fire fighter and the possibility of short circuiting the electrical circuits.

G. Using the Fixed Fire Extinguisher Systems

These instructions contain important information on engine-room fire management in general and on the operation of the two fixed Halon 1301 fire extinguishing systems installed on this vessel in particular. In the event of a shipboard fire emergency, a thorough understanding of these subjects could provide you with an additional margin of safety.

1. Fixed Fire Extinguisher System Description

****
*
* WARNING *
*
* HALON 1301 IS SAFE TO BREATH, BUT ITS COMBUS- *
*
* TION PRODUCTS ARE TOXIC. WAIT FOR THE BLOWER/ *
*
* VENTILATION TO COMPLETELY CLEAR THE ENGINE *
*
* COMPARTMENT BEFORE ENTERING. *
*
****

WARNINGS

1. THE FIXED HALON SYSTEM FIGHTS ENGINE COMPARTMENT FIRES. FIRE OUTSIDE THIS COMPARTMENT OR OTHER FIRES ARE FOUGHT WITH HAND-HELD FIRE EXTINGUISHERS. 2. BURNED HALON CAN BE TOXIC

DO NOT BREATH THESE FUMES, SMOKE, OR EXHAUST.

CAUTION

Most fire fighting agents stop engines by oxygen depletion. Halon 1301 MAY NOT. If you do NOT quickly stop your Diesels, the Halon gas concentration will be rapidly lowered and may be eliminated as an effective fire fighter.

The two fixed fire extinguishing systems on this vessel are located in and both systems discharge into the engine room.

2. **System Redundancy**. The two fixed fire extinguishing systems provide you with a second effort or backup if reignition should occur or if the primary system fails to completely extinguish the fire. The redundant systems also provides you with a second effort or backup if you feel, because of an eminent danger from another source requiring maneuvering power, that it is necessary to not shut down your engines or that you must restart the engines immediately after the primary system discharges.

3. The Primary System. The primary fire extinguishing system has both an automatic and a manual discharge capability. This system's status indicators and controls are on the flybridge.

a. The Systems'Status Indicator. This indicator is above its placard. Normal operating condition has its green "CHARGED" lamp illuminated if either or both engine(s) "ON/STOP" switch(s) is/are in the "ON" position. This means that the primary fire extinguishing system is pressurized. The red "DISCHARGED" lamp illuminates when the primary system discharges. After a discharge, when you deem it safe or necessary to purge the engine compartment and restart the engines and the generator, use the "OVER-RIDE" switch to override the generator and forced air ventilation system automatic shutdown.

b. The Automatic Discharge Device. The heat sensor for this device is mounted in the engine-room. When the engine-room temperature exceeds 175 ^{o} F. the following events happen almost simultaneously:

1) The primary system bottle is automatically discharged;

2) the "System Discharged" horn is sounded;

3) the generator and forced ventilation systems are both automatically shut down;

4) the system "CHARGED" green lamp is turned off; and,

5) the system "DISCHARGED" red lamp is illuminated.

c. Manual Discharge Device. This device, a "T" handle secured in position by a readily removable safety pin, discharges the primary Halon gas bottle at any time. The manual discharge "T" handle is located just below the information placard (item D). If the primary fire extinguishing system is discharged manually, the effects are the same as if it were discharged automatically by the engine-room heat sensor. That is, the generator and forced ventilation are shut down and the system discharged indicators (horn and lamp) are activated.

d. The Information Placard. The primary fire extinguishing system information placard is located on the flybridge just below the systems status indicator and above the manual discharge "T" handle. The important information on the primary fire extinguishing system operation is summarized on this placard.

e. and f. The Gasoline and Diesel Engine Stop Switches. are located on the flybridge instrument panel bottom edge, port side. There is a"ON/STOP" switch for each engine. The primary method of stopping either a gasoline or a Diesel engine is to move its associated "ON/STOP" switch down into the STOP position.

g. An Emergency Diesel Shut-down. If an emergency shut-down is necessary on General Motors (G.M.) Diesel engines and placing and holding the ON/STOP switch in the STOP position has failed to shut down the engine,

your Bertram has an emergency shutdown system. There are two (2) Emergency Stop "T" handles located below the manual discharge "T" handle on the control console. This emergency stop method requires that:

1) The operator pull each Emergency Stop "T" handle out as far as it will go and

2) then lock each of the two "T" handles by rotating it one-quarter (1/4) turn to the right (clockwise) or to the left (counter-clockwise).

NOTE:

If either or both "T" handles proves difficult to pull out, try rotating it/them slightly from clockwise to counter-clockwise and back. These handles are intended to be "unlocked" when in the vertical position; however, some may not unlock when exactly in the vertical. Once the unlocked position has been established, the "T" handles should be left in this unlocked position in case they are needed.

4. The Secondary System. The secondary fire extinguishing system is designed as a backup to the primary system and is a manual discharge system only. The only indicator is a system "CHARGED" indicator light. The secondary system is NOT equipped with automatic shutoff switches for the generator or the blower motors. If the engines, generator, and/or the blowers are running when you deem it necessary to discharge the secondary fire extinguishing system, this equipment MUST BE MANUALLY SHUT DOWN BEFORE discharging the Halon for maximum effectiveness.

The manual control and the "CHARGED" indicator lamp for the secondary fire extinguishing system are located under the step between the cockpit and the cabin. This equipment is adjacent to the two (2) fuel selector valves.

a. The Secondary Systems "CHARGED" Indicator. When the secondary system's green indicator lamp is illuminated, this shows that the secondary fire extinguishing system is pressurized. This indicator lamp circuit is energized when either engine ON /STOP switch is in the "ON" position.

b. The Manual /Discharge Device You may use the Manual Discharge Device at any time to discharge the secondary Halon gas bottle. This device consists of a "T" handle, secured by a removable safety pin and is located just below the information placard (see paragraph G.4.c. in this section). The secondary fire extinguishing system has NO automatic discharge system as such. However, to prevent the Halon gas bottle from exploding, the secondary fire extinguisher system has an overpressure device which will automatically discharge the bottle when the engine temperature reaches 268^{O} F.

NOTE:

When the secondary fire extinguishing system is discharged, the generator and the forced ventilation systems are NOT automatically shut down. This MUST be done manually by the operator BEFORE discharging the secondary system.

c. The Information Placard. The secondary fire extinguishing system information placard is located beneath the steps to the main cabin and above the manual discharge "T" handle. The important information on the secondary fire extinguishing system operation is summarized on this placard.

5. After the Discharge of Either Fire Extinguisher System.

****
*
* WARNING *
*
* DO NOT OPEN THE ENGINE-ROOM HATCH OR TRY TO EN- *
*
* TER THE ENGINE-ROOM FOR AT LEAST FIFTEEN (15) *
*
* MINUTES AFTER HALON DISCHARGE. TO LET OXYGEN IN *
*
* TO ENGINE-ROOM BEFORE HOT METALS AND/OR FUELS *
*
* HAVE COOLED MAY CAUSE REIGNITION OR FLASH BACK. *
*
****

a. Turn off all the nonessential electrical equipment (i.e., everything except the bilge pumps, the emergency radio, and your navigation lights if it is after dark).

b. Extinguish all open flames (galley stoves or charcoal grills) and smoking materials.

6. Inspection and Restarting Boat Systems.

a. WAIT at least fifteen (15) minutes to allow any hot metals and/or fuels to cool before either cautiously opening the engine-room hatch or switching on engine-room blowers to ensure that the fire is totally out.

b. MOVE the primary fire extinguisher "OVERRIDE/NORMAL" switch located on the primary fire extinguisher control panel to the OVERRIDE position to permit the operator to restart the engine-room forced air blowers.

c. Restart engine-room forced air ventilation blowers.

d. Have the proper type of U. S. C. G. approved hand held fire extinguishers ready.

e. Examine the engine room for the cause of the fire.

f. Make the necessary emergency repairs.

g. Only for Bertram yachts equipped with G. M. Diesel engines:

1) reset the Emergency Stop "T" handles, if activated;

2) rotate each handle one-quarter (1/4) turn to either direction; and,

3) push the "T" handles to return them to their original position.

7. Restart engines.

NOTE:

Engines may be difficult to start due to residual Halon 1301 gas in the engine room.

8. Electrical Circuits. Activate only those electrical circuits necessary to safely maneuver the vessel.

9. Return to dockside.

10. Fire Extinguisher Service. Have the Halon fixed fire extinguisher system(s) and any hand held fire extinguishers that were used checked and serviced as soon as possible.

11. Systems Test. Test the fire alarm and repair if necessary.

H. The Fire Fighting Plan

1. A well thought out and well rehearsed vessel fire fighting plan is probably the single most important step toward organizing the fire fighting efforts of a vessel operator and crew members. Such organization can be vital since a quick reaction time is essential to extinguishing a shipboard fire.

2. The vessel operator as well as other designated persons should be thoroughly familiar with:

a. The automatic operation of the primary fixed Halon 1301 fire extinguishing system;

b. the location of the switches to shut down the engines, the generator, and the forced air ventilation blower system;

c. the location of the controls for and the manual operation of the primary fixed fire extinguisher system;

d. the location of the controls for and the manual operation of the secondary fixed fire extinguisher system; and,

e. the location and operation of every hand held fire extinguisher on board as well as what type of fire(s) it should or should not be used on.

3. Rehearsals or dry runs should be a regular event to maintain operator and crew efficiency levels. Dry runs should stop short of actually discharging fire extinguishers.

I. The Fire or Emergency Evacuation Plan

As an important part of the fire emergency preparedness plan, the operator along with the crew should develop and practice an emergency evacuation plan (Abandon Ship Drill). This plan should include:

1. The location of the life vests and how to don them;

2. the location and operation of any other emergency flotation equipment such as a life raft;

3. How to quickly summon help by:

   a. Using the hailing and emergency channel for the on board VHF (in coastal waters) or single sideband radio (past the continental limits);

   b. When and how to use flares and/or daylight visual distress signals;

   c. the use of the orange distress flag; and,

4. the Emergency Position Indicating Radio Beacon (EPIRB).

VI. SAFETY PRECAUTIONS

A. Fishing Tower

****
*
* WARNING *
*
* NO ONE SHOULD OCCUPY THE FISHING TOWER UNDER *
*
* ADVERSE SEA AND/OR WIND CONDITIONS. *
****

If you have had a fishing tower (also known as a tuna tower or a marlin tower) added to your vessel, it is important that you keep in mind that its height and weight plus the weight of any occupants will increase the vertical center of gravity of your vessel. This may result in excessive heeling and slower recovery to an upright condition. Therefore, under adverse sea and/or weather conditions the tower should NOT be occupied.

B. Swim Platform

****
*
* WARNING *
*
* TO REDUCE THE RISK OF SERIOUS INJURY, DO NOT *
*
* ENTER OR LEAVE THE WATER FROM YOUR VESSEL *
*
* WHILE THE ENGINES ARE RUNNING. *
****

If your vessel has a swim platform, to lessen the chances of a possible serious injury from the propeller blades, be sure that engines are turned off and the propellers have stopped rotating before allowing anyone to:

1) go out on the swim platform;

2) enter or leave the water via the swim platform; or,

3) board or leave your vessel by climbing out of or down to a dinghy via the swim platform.

Also, keep in mind that the propellers have very sharp edges that are capable of inflicting a serious injury on any swimmer who is pushed against one by a wave or the current, even when the propeller is not turning.

C. When Underway

****
*
* **WARNING** *
*
* WHEN UNDERWAY, TO REDUCE THE CHANCES OF SOME- *
* ONE FALLING OVERBOARD, DO NOT LET ANYONE: *
* 1. MOVE TO OR FROM THE FOREDECK ALONG THE *
* OUTSIDE OF THE CABIN; *
* 2. LEAVE THE TRANSOM DOOR OPEN; OR, *
* 3. MOVE ABOUT TOPSIDE WITHOUT THE PROPER *
* NON-SLIP "BOATER" FOOTWARE. *
*
****

1. Preparations For Rough Weather.

One of the reasons that your bought a Bertram is its exceptional seaworthiness. However, you should never lose sight of the fact that there is no vessel, regardless of its size and strength, that is totally immune to the dangers of heavy weather. Therefore, in anticipation of high winds and/or rough seas, there are certain precautions and preparations that you, as a prudent skipper, will want to take. You will undoubtedly add your own items to the following basic check list:

HEAVY WEATHER CHECK LIST

[_] 1) Close and secure all hatches, doors, ports, and windows, and in particular, DOUBLE CHECK that the "dog house" door from the cockpit to the engine-compartment companionway is tightly shut and latched.

[_] 2) Use the **MAN** (manual) bilge pump switch positions to ensure that all bilges are pumped dry. This should be repeated as often as seems necessary. Since "free" water sloshing in your bilges degrades your vessel's performance.

[_] 3) Secure all loose gear. Stow all the smaller items and securely lash down all the larger ones.

[_] 4) Break out the Personnel Flotation Devices (P.F.D.s) (life jackets) and have everyone don and properly adjust one before the weather turns this chore into a real problem.

[_] 5) Get the best fix possible on your current position and track and update the plot on your chart.

[_] 6) Break out and keep handy what ever emergency gear you feel may be needed, such as flash lights, the first aid kit, a sea anchor, distress flares, etc.

[_] 7) Plot (prepare) course changes to the nearest protected harbor or sheltered waters in case the storm worsens.

[_] 8) Stay current with local marine weather reports, if possible, have one person assigned to monitor the marine weather channel(s).

[_] 9) Any time there is reduced visibility, post at least one lookout whose sole responsibility it is to watch for other vessels or possible dangers.

[_] 10) If at all possible, it is better to have all hands busy rather than sitting and worrying, therefore inform your crew and passengers of the following:

a) what you are doing;

b) what you want each of them to do or NOT to do;

In case of fog or other limited visibility, slow down to a "moderate speed" in accordance with the Inland Rules and a "safe speed" in accordance with the International Rules. Admiralty courts have generally held that a "moderate speed" is a speed at which a vessel can come to a complete stop in one-half (1/2) the existing visibility.

D. OVERHEAD ROD LOCKER

****
*
* CAUTION *
*
* Do NOT mount equipment on top of door. Addi-*
*
* tional weight may cause inadvertant opening *
*
* of door. *
*
****

Do NOT mount rods nor any other equipment on the top of the overhead rod locker doors. Neither the hinges nor the latches are designed to take additional weight. If these doors are loaded with gear and the latches fail, the doors could swing down unexpectedly and could cause injury.

VII. SAFETY EQUIPMENT

A. Life Preservers

By federal regulation, this vessel is required to have one (1) U.S. Coast Guard approved Personal Flotation Device (P.F.D.) of suitable size readily available for each adult and each child on board. If this vessel is not used commercially, PFD's may be Type I, II, or III. If this vessel is used commercially and is carrying 6 or fewer passengers for hire, the PFD's must be Type I.

B. Ring Buoy

In addition, and also by federal regulations, at least one (1) U.S. Coast Guard approved throwable Type IV device (ring bouy or seat cushion) must be onboard mounted where it is IMMEDIATELY AVAILABLE to those on deck. Bertram supplies an approved 20-inch diameter ring buoy and 3 ring buoy brackets so the operator can mount the ring bouy in a suitable location. It is recommended that about 60-feet of light line be attached to the ring buoy.

C. Portable Fire Extinguishers

In addition to the (2) two fixed Halon 1301 fire extinguishing systems on board, Bertram has furnished your yacht with three (3) 3/4-pound, dry-chemical, U.S.C.G. approved Type BC-1, fire extinguishers with mounting brackets. The total of this fire fighting equipment exceeds the Federal requirements for vessels of this size. Type BC extinguishers are effective on the following types of fires:

Class B Fire - Flammable liquids, such as gasoline, oils, paints, and cooking fat.

Class C Fire - Energized electrical equipment, such as motors, appliances, and switches.

D. The Fixed Fire Extinguishing Systems

Bertram has installed a Fireboy Halon 1301, two-cylinder, fixed fire-extinguishing system in your yacht. This system is only intended to protect the engine-compartment space. For a complete working description of the Halon fixed fire extinguishing systems, see Section V, subsection G.

1. System Description. Each of the two fixed fire extinguishing systems installed on this vessel consists of a single Halon 1301 gas cylinder with its associated controls and indicators. One Halon cylinder is used for the primary system and the other is for the secondary or backup system. Both cylinders are located in the engine-compartment and both cylinders discharge into the engine-compartment. The size of each of the fixed fire extinguishing systems installed in this vessel were determined by calculating the engine-compartment volume to ensure adequate gas concentration to put out an engine-compartment fire.

2. System Redundancy

The reasons for the two fixed fire extinguishing systems are as follows:

a. To provide you with a second effort or backup if reignition should occur or there is a failure to completely extinguish the fire upon primary system discharge.

b. To provide you with a second effort or backup if, because of an eminent danger from another source requiring

maneuvering power, you feel that it is necessary to not shut down the engines or that you must restart them immediately after the primary system discharges.

3. The Primary System. The primary fire extinguishing system has both an automatic and a manual discharge capability. The system's charged and discharged indicator lights and the manual discharge control for the primary system are located on the flybridge.

4. The Secondary System. As explained in Section 2, System Redundancy, the secondary fire fixed extinguishing system is installed as a backup to the primary system and has a manual discharge mode only. When it is illuminated, the only indicator that this system has shows that this system is "CHARGED". The secondary system does NOT have an automatic shutoff for either the generator or for the forced ventilation blower motors. If the engines, the generator, and/or the blowers are running when you deem it necessary to discharge the secondary system, this equipment MUST BE MANUALLY SHUT DOWN BEFORE discharging the Halon for maximum effectiveness.

The manual control and the "CHARGED" indicator lamp for the secondary fire extinguishing system are located under the step between the cockpit and the cabin. This equipment is adjacent to the fuel selector valves.

E. Visual Distress Signals

A Federal regulation became effective January 1, 1981, requiring that Coast Guard approved visual day and night distress signals, that have not exceeded the expiration date, be carried on board when operating in most U.S. waters and on the high seas.

Bertram does not supply such equipment. The operator should study the latest issue of the Coast Guard pamphlet "Visual Distress Signals for Recreational Boats" which has been placed aboard and then purchase such equipment as may be required and/or desired.

F. Courtesy Marine Examination

Specially trained members of the U. S. Coast Guard Auxiliary are authorized by the Coast Guard to conduct free annual Courtesy Marine Examinations (C.M.E.s) of recreational boats upon the consent of the owners or operators. This C.M.E. is a complete check of the existence and the validity of all of a boat's required onboard safety equipment. A C.M.E. covers both the federal and state legal requirements and the additional safety criteria adopted by the Auxiliary. Boats meeting these criteria are awarded the respected Auxiliary C.M.E. decal "Seal of Safety" for that year. If a boat does not pass the examination, the owner/operator is the only one advised of the deficiencies and NO report is made to any law enforcement official or agency.

IX. ELECTRICAL SYSTEMS

NOTE:

The Wiring Diagrams for the 12 Volt d.c. and 120 Volt a.c. Systems are in a separate package.

A. General

Your Bertram yacht has two separate electrical systems:

1. A 12 Volt d.c. system which operates on power from the two (2) marine, wet-cell, batteries and

2. a 120 Volt a.c. system that is powered from either the shore connection or the on board a.c. generator.

The a.c. and d.c. electrical system control and distribution center is located in the aft port corner of the salon. A separate 12 V.d.c. electronics panel is located on the flybridge. There is a main circuit breaker located adjacent to each a.c. shore inlet and a main a.c. circuit breaker located on the Diesel powered a.c. generator. The gasoline powered a.c. generator does not require a main circuit breaker.

Some electrical components have additional fusing as indicated in the wiring diagram.

B. Ground and Bonding System

Your Bertram yacht is equipped with a bonding system designed to minimize stray current corrosion. The main strap runs fore and aft through the bilge area. This main strap is connected by jumpers to all of the under water fittings and hardware as well as the negative terminals of the two batteries. The on board a.c.

equipment is also connected with a grounding conductor to this system.

C. The 12 Volt D.C. System

1. Batteries. There are two lead-acid, wet-cell, marine-type, battery banks in your Bertram's generator compartment. If your Bertram is gasoline powered, each battery bank has a single battery. However, if your Bertram is Diesel powered, each battery bank has two (2) batteries. In either case, one battery bank is used to start the starboard engine and the other is for the port engine. The batteries are charged by the engine alternators or by an a.c. converter. These battery banks are always independent of each other and the momentary paralleling of both battery banks is for assistance in starting only.

The starboard engine battery is also used for starting the a.c. generator. A generator main battery disconnect switch is provided to permit disconnecting all d.c. power to the generator.

2. Battery Switches. To activate your vessel's 12 V.d.c. system, the main battery disconnect switches must be in the "ON" position. These switches should be left in the "OFF" position whenever your vessel is left unattended, especially if it is to be left unattended for long periods of time. The battery switches do NOT control power to the alarm system or bilge pumps. These circuits are continually energized for the protection of the boat.

The battery disconnect switches also do NOT control the output from the 120 V.a.c. to the 12 V.d.c. converter. Provided that the 120 V.a.c. shoreline is plugged in and operating, this converter is normally used to keep the batteries charged when the engines are not running or when the boat is unattended.

The main engine battery switches are extra heavy-duty and rated at 600 Amperes continuous and 1,000 Amperes momentary. The generator battery switch is rated at 175 Amperes continuous and 800 Amperes momentary.

****
*
* CAUTION
*
* Battery switches are designed for use under *
*
* normal operating conditions. If this switch *
*
* opens the d.c. circuit **WHILE THE ENGINE IS** *
*
* **BEING CRANKED, the SWITCH SHOULD BE REPLACED** *
*
* as-soon-as you can to avoid future failure. *
*
****

3. Fuses. A number of the d.c. circuit fuses are located behind the hinged d.c. distribution panel. A listing of the fused circuits is located on the fuse panel below the alarm fuse.

The wiring diagrams show the amperage of each fuse.

4. 12 V.d.c. Distribution Panel. Located at the top of this panel are the Port and Starboard main breakers. Below the main breakers on the same panel are all the branch breakers. Bertram recommends that these main breakers be "OFF" when the boat is unattended.

5. Circuit Breakers.

****
*
* CAUTION *
*
* Do NOT replace existing circuit breakers with *
*
* circuit breakers having a higher trip value. *
*
* This modification is DANGEROUS and can cause *
*
* equipment/circuit failures and/or FIRES. *
*
****

6. Automatic Converter. The function of the a.c. to d.c. converter is to charge the main engine batteries when the engines are not running. The converter operates on 120 V.a.c. When the batteries are fully charged the converter maintains a "trickle charge" condition.

Bertram recommends that the converter always be left on, with either shore power or the generator supplying the power.

7. Battery Condition Panel. The panel just to the right of the 12 V.d.c. distribution panel is equipped with a meter that can check the voltage in either bank of batteries. The bank of batteries to be measured is selected by the "PORT" or "STBD" position of the BATTERY CONDITION switch mounted below the voltmeter.

The FRESH WATER TANK Level Gauge is on this same panel, below the BATTERY CONDITION voltmeter. This gauge has a momentary contact switch that permits you to take a reading of the amount of fresh water in the tanks.

NOTE:

The F.W. Pump breaker #47 must be on to take this reading.

Mounted below the FRESH WATER TANK switch are the switch and pilot light for the Engine Compartment Lights. This switch and pilot light get their electrical power from Stbd. Cabin Light circuit breaker #46.

NOTE:

STBD Cabin Light Circuit Breaker #46 must be "ON" to activate this switch and its pilot light.

The HOLDING TANK DISCHARGE PUMP Alarm Light (optional) and the Holding Tank Pump Switch (Optional) are mounted at the bottom of the BATTERY CONDITION Panel.

NOTE:

The holding tank alarm system and the optional holding tank discharge pump are powered by circuit breakers #50.

8. Electronics Panel. This panel gets its power from the load side of the Starboard Battery Main Switch through a 60 Ampere fuse. The panel is provided with a 60 Ampere Main circuit breaker and has provision for 10 optional/spare branch breakers (not supplied).

9. Second Converter (Optional). If the optional second converter is installed in your vessel, it is only used to charge the port battery bank. The standard converter then charges only the starboard bank.

D. 120 VOLT A.C. System

WARNING

TO MINIMIZE SHOCK HAZARD: 1) PLUG CORD INTO VESSEL FIRST. 2) UNPLUG SHORE-POWER END FIRST. 3) CLOSE SHORE-POWER INLET COVER TIGHTLY. 4) DO NOT ALTER SHORE-POWER CABLE CONNECTIONS.

WARNINGS:

DO NOT CUT OR DISCONNECT THE GREEN GROUNDING CONDUCTOR IN THE SHORE CORD AT THE DOCK OUTLET OR THE BOAT INLET. THIS CONDUCTOR IS NECESSARY TO PROVIDE THE SAME GROUND POTENTIAL BETWEEN SHORE GROUND AND YOUR VESSEL'S GROUND AND MINIMIZES THE SHOCK HAZARD TO PERSONS ON YOUR VESSEL OR IN THE WATER.

CAUTION

Before CONNECTING or DISCONNECTING the shore cords, ensure that all of the MAIN CIRCUIT BREAKERS are "OFF" or that the Power Selector Switches are "OFF". This will help to prevent connector arcing and fitting damage.

CAUTION

The shore cord has a twist-to-lock fitting on each end. **ENSURE** these are properly locked in place **BEFORE** switching the shore power circuit breakers to "**ON**". This will help to prevent connector arcing fitting damage.

CAUTIONS

1. The Voltmeter and Ammeter on the 120V.a.c. POWER DISTRIBUTION Panel monitor the power source in use. A voltage drop below 110V.a.c. may damage any a.c. motor in use.

2. The shore inlet is rated at 50 Amperes. To protect your inlet fittings from damage and keep the inlet breaker from tripping, do NOT exceed 50 Amperes current draw.

3. When using the generator do NOT exceed a 70 Ampere current draw.

CAUTION

Before you switch from shore power to generator power or vice versa, REMOVE the distribution load to avoid Selector Switch damage.

1. Shore Power Inlets. There are two 120 V.a.c. power inlets, one on each side of the cockpit. Each inlet and its associated circuit breaker is rated 50 amps. Since only one inlet can be used at any time, a single shore cord is provided. The standard cord is rated at 50 amps. and is 50 feet long.

2. Polarity Lights.

****
*
* CAUTION
*
* Check the polarity lights for the shore cir-
*
* cuit in use. If the AMBER light is illumin-
*
* ated, the polarity is CORRECT and you may
*
* turn on the panel circuit breakers.
*
* If the RED light is lit, the polarity is
*
* REVERSED and a correction must be made on
*
* the dock before turning ON the CIRCUIT
*
* BREAKERS. DISCONNECT shore power until the
*
* problem is fixed.
*
****

The Bertram shore lines are wired in accordance with current industry standards; however, you may occasionally find some dock outlets that are improperly wired. For your protection, lights are mounted on the 120 V.a.c. Power Selector Panel to indicate if the shore wiring has either normal or reversed polarity.

****
*
* WARNING:
*
* IF BOTH "NORMAL" AND "REVERSE" POLARITY
* LIGHTS ARE LIT, IT SHOWS A HAZARDOUS CONDI-
* TION WHERE THE HOT (BLACK) WIRE AND GROUND
* (GREEN) WIRE ARE REVERSED. IMMEDIATELY DIS-
* CONNECT THE SHORE CORD AT THE DOCK AND CHECK
* THE DOCK A.C. CONNECTIONS AND IF NECESSARY,
* ALL A.C. CONNECTIONS ON THE BOAT. DO NOT USE
* UNTIL THIS FAULT HAS BEEN CORRECTED.
*
****

3. 120 V.a.c. Power Selector Switch. This four-position selector switch is located above the 120 V.a.c. branch circuit breakers and is used to select either port or starboard shore power or the onboard generator power.

****
*
* WARNING:
*
* BEFORE OPENING 120 V.A.C. DISTRIBUTION PANEL
* OR SERVICING ANY 120 V.A.C. EQUIPMENT:
* 1. DISCONNECT SHORE POWER CORD AND
* 2. STOP THE GENERATOR.
*
****

E. A.C. Circuit Protection

1. A.C. Circuit Breakers. All a.c. circuit breakers on your Bertram are of the two pole common trip type that disconnect the current carrying conductors (black wire and white wire). The white (ground potential) wires are isolated from the boat ground.

NOTES:

1) IT IS RECOMMENDED THAT ANY FUTURE A.C. EQUIPMENT BE INSTALLED IN THE SAME MANNER USING PROPER SIZED CIRCUIT BREAKERS AND WIRE.

2) If your vessel has the optional 120 V.a.c. power windlass, keep its breaker (circuit breaker nr. 113 in the "OFF"position except when it is actually in use. Other branch breakers may be on or off depending on your needs.

2. Ground Fault Circuit Interrupters.

a. Description. Circuit breakers and fuses protect the on-board equipment against high-current overloads and short circuits. However, circuit breakers and fuses do not protect people from electric shock. The amount of electric current necessary to severely injure or kill someone can be less than 200 milliamperes. The most common type of current responsible for electric shock accidents is referred to as the ground fault, which is a leaking of current to the ground, often through the body of a person in contact with ground, who then provides the electrical path to ground.

Your Bertram has two (2) Ground Fault Circuit Interrupters (GFCIs), one in the galley and one in the toilet (head). Due to their likelihood of wet decks these are the two most likely places for this type of accident. Except that GFCIs have a red "RESET" push-button and a black "TEST" pushbutton between the two receptacles, the GFCI receptacles appear similar to the common every day, double 120 V.a.c. receptacles.

b. Operation. For all practical purposes, each GFCI functions as a standard double 120 V.a.c. outlet except that if it senses 6 or more milliamperes of ground fault current it will then act as a circuit breaker and open the circuit. At that time, the reset push button will extend out of the receptacle plate. To reset a tripped GFCI, merely depress the red "RESET" push button until it locks in place. If the push button will not reset, there is a problem with that part of your 120 V.a.c. circuitry that requires the attention of a competent electrician.

c. Testing. Testing a GFCI receptacle requires only that you depress the black "TEST" pushbutton switch. The red "RESET" pushbutton switch should pop out. If it does, depress the "RESET" pushbutton until it is locked in place. If the "RESET" pushbutton does not pop out when tested, have that GFCI receptacle checked by a competent electrician.

F. D.C. Equipment

Like the shipboard a.c. equipment, each item requiring d.c. power is protected by its own circuit breaker. Provision is made on the d.c. distribution panel for additional d.c. equipment that you may wish to add to your Bertram.

G. A.C. & D.C. Circuit Breakers

A tripped breaker may indicate a problem in the circuit or in the equipment being controlled by that breaker. If any circuit breaker trips repeatedly, the cause of the problem must be found and corrected to avoid further inconvenience. Under NO

circumstance should ANY circuit breaker be replaced with one having a higher trip value than those in any of your vessel's standard circuits.

H. European Shore Power (Optional)

Bertram yachts that are equipped with the optional 240/120 V.a.c. European Shore Power have no polarity indicator lights. This system uses transformers to correctly polarize the a.c. system.

1. If this vessel is to be operated from foreign ports that have 220 to 250 V.a.c. and 50 Hz. shore power instead of 120 V.a.c. 60 Hz., the European system must be installed on your vessel.

2. The system transformers built into this vessel will provide you with 120 V.a.c. power when you are using either Shore Inlet connected to a 220 V.a.c. to 250 V.a.c., shore power source. The frequency of the a.c. (50 or 60 Hz) depends on the frequency of the shore power.

3. The vessel's generator remains unchanged. Its output is 120 V.a.c. at 60 Hz.. The standard a.c. equipment also remains unchanged as it was selected to be able to work on either 50 or 60 Hz. current. Motor driven equipment will be only slightly less efficient on 50 Hz.

4. The Wiring Diagrams include a plan that shows how these transformers are included.

5. When using a vessel equipped with the optional European system in American or similar ports where 125 V.a.c./250 V.a.c., 60 Hz. shore outlets are available, it will be necessary for you to remove the 125 V.a.c. male connector on the shore end of the shore cord and replace with 125 V.a.c./250 V.a.c. twist lock male connector. The black and white wires of the shore cord must be connected to the "x" and "y" 250 V.a.c. terminals (either way is acceptable) and the green wire to the green terminal. No neutral wire to the "w" terminal is required. If the outlet on the dock is a 125 V.a.c./250 V.a.c., 50 Ampere "crowfoot type", the a.c. adapter will be required in addition to the new plug on the shore end of the cord.

6. When your vessel is in foreign ports, it will be necessary to make special adapters or to replace the shore end fittings with suitable connectors. In either case, the white wire should be connected to the neutral source, and the black wire should be connected to the "hot" wire. The green wire is connected to earth ground.

7. The operation of the European System is identical to that described for use with the standard system.

VIII. NAVIGATION LIGHTS

A. General

Your Bertram yacht is delivered to you with navigation/running lights installed that fully comply with the International Regulations for Preventing Collisions At Sea, 1972 (72 COLREGS). All vessels may use the 72 COLREGS in the navigable waters of the U.S. The running lights shall be used if your vessel is operated between sunset and sunrise. The navigation lights consists of red (for port) and green (for starboard) sidelights, white masthead and stern lights, and a white anchor light.

B. The Side Lights

The visibility of the red and green side lights is nominally one mile. The law requires that they can each be seen in an uninterrupted arc which extends from dead ahead of your Bertram aft for 112.5 degrees (10 points) on each side; or from dead ahead to 22.5 degrees (two points) aft of amidships.

C. The Masthead Light

The 225 degree (20 point) uninterrupted-arc, white, masthead-light (facing forward) has a nominal visibility of two miles. The law requires that the masthead light can each be seen in an uninterrupted arc which extends from dead ahead of your Bertram aft for 112.5 degrees (10 points) on each side; or from dead ahead to (22.5 degrees (two points) aft of amidships.)

D. The Stern Light

The 135 degree (12 point) uninterrupted-arc, white, stern light, has a nominal visibility of two miles and is permanently

located on the center of the transom.

E. The Anchor Light

The 360 degree (32 point) uninterrupted-arc, white, anchor light should be located as high as possible on your vessel. This light should have a nominal visibility of two miles. The law requires that whenever your vessel is riding at anchor, after sundown, anyplace except within the limits of a recognized, charted, anchorage, this light should be ON.

NOTES:

1) If your Bertram has a transom door, this door must be kept closed while underway for the safety of the persons onboard and to avoid obscuring the transom light.

2) All of the navigation lights furnished on your Bertram meet the current 72 COLREGS requirements. However, it remains the legal responsibility of the vessel's owner to:

a) Ensure that in the event of modification(s) to your vessel's superstructure (i.e., the addition of a fishing tower, radar, and/or other electronic equipment), that the required areas of visibility for these lights is not obstructed.

b) Ensure that his vessel complies with any future changes to the existing 72 COLREGS.

F. Light Bulb Replacement

To comply with the U.S. Coast Guard's regulations and with the international rules, it is important that the correct bulbs

be used when replacing burned out bulbs in your navigation lights. Table VIII-1. lists the replacement navigation light bulbs required for your Bertram.

TABLE VIII-1. REPLACEMENT NAVIGATION LIGHT BULBS

LIGHT(S)	REPLACEMENT BULBS
SIDE	12V, 25W, Aqua-Signal Part Nr. 904-00002 Bertram Part Nr. 141661
BOW	12V, 8C.P., Bertram Part Nr. 141616
STERN	12V. 12C.P., Perko Part Nr. 70-1 (211-2) Bertram Part Nr. 141617
ANCHOR	12V, 6C.P., Bertram Part Nr. 14034

X. MECHANICAL SYSTEMS

A. General Description

The mechanical or electro-mechanical systems on your Bertram are each fully described in other sections of this manual. These systems and the sections they are described in are shown in Table X-1. - Mechanical Systems.

TABLE X-1. - MECHANICAL SYSTEMS

MECHANICAL SYSTEM	REFERENCED SECTION(S)
The steering system.....	.II.E and IV.F.14.d
The seawater intake and exhaust systems.....	.XVII.B and C
The forced air ventilation system...	.XIX
The trim tab system.....	.II.B.6 and IV.G
The fresh water system.....	.XIV
The gasoline or Diesel engines including their fuel systems.....	.I, II.C and D, III. B and C, XI, and XVII
The gasoline or Diesel generator engine including its fuel system..	.I, XVI and XI
The Halon fixed fire extinguishing system.....	.V.G and VII.D
The propulsion system including the transmission.....	.II.G and XII
The bilge pump system.....	.IV.F and XVIII
The optional seawater washdown system.....	.XXI

B. Mechanical Systems Drawings

Where applicable, the mechanical systems drawings or schematics are included in a drawing package as a part of this manual to help you to better understand these various systems and to assist you in their maintenance.

C. The Docking Plan and Sling Locations

A drawing showing the critical dimensions of your Bertram and the correct places to put the supports for dry docking is included in the drawing package. This drawing also has the correct locations to place the sling straps for lifting your Bertram into and out of the water.

XI. FUEL SYSTEM

WARNING:

WHEN FUELING WITH GASOLINE, ALWAYS

1) STOP ENGINES;

2) EXTINGUISH SMOKING MATERIALS; AND,

3) DO NOT ALLOW OPEN FLAMES IN AREA WHEN FUEL FITTINGS ARE OPEN AND TAKE EXTRA CARE WHEN OPENING FUEL FILTER OR ANY OTHER FUEL FITTING. GASOLINE IS EXTREMELY FLAMMABLE AND HIGHLY EXPLOSIVE UNDER SOME CONDITIONS.

A. Description

The fuel tanks are molded fiberglass, made of fire retardant resin and constructed in accordance with Federal regulations and accepted standards.

A small cockpit hatch provides access to the aft tank engine fuel supply fittings and fuel gauge sender with sight gauge. The tank fill and vent plate assembly can be inspected from the engine-compartment. The forward fuel tank fittings and the forward fuel tank gauge sender are inspected from the engine-compartment.

On vessels powered by gasoline engines (see Drawing 18A 9201, sheet 3), there are sealed anti-siphon valves in each supply line to the main engine and generator. On vessels powered by diesel engines (see Drawing 18A 9201, Sheet 4), a manual shut-off valve is used on each supply line.

B. Tank Selector Valves

Located on the aft engine-compartment bulkhead are two 3-way valves that are controlled from a compartment under the step between the cockpit and the salon. There is one fuel tank selector valve for each main engine. These selector valves permit either engine to draw fuel from either tank. The fuel return lines are also connected to these valves and automatically return unused fuel to the tank from which it was drawn. Fuel for the generator is drawn from and returned to only the aft tank. Both type of valves are connected directly to the hexagon shaped head of the suction tube which extends to the bottom of the tank. The lower end of this tube is fitted with a strainer.

C. Fuel Supply Lines - Gasoline

The gasoline fuel hose leads from the fuel tank to each engine and a manual fuel shut-off valve is provided at each main engine for servicing.

D. Fuel Filter - Gasoline

An inline fuel filter is mounted on the starboard side of each main engine. These filters require regular maintenance and printed on these filters is an important label which specifies the maintenance required. However, the location and position of the filter can make this label very difficult to read. The label states as follows:

"WARNING NOTICE

The regular inspection of the fuel filter canister every 25 hours of operation or twice per season is mandatory to remove all sediment and water which may be within. Close inspection of the canister for possible deterioration due to corrosion or otherwise is required and replacement of canister is required if such signs are evident.

"Complete inspection of entire engine fuel system for any possible leaks or damage should be performed at the same time."

E. Fuel - Gasoline

Use only leaded gasoline with a minimum octane rating of 89.

F. Fuel Supply Lines - Diesel

The Diesel fuel supply hoses lead directly from the tanks to the fuel filters which are also fuel/water separators. The Diesel fuel manual Shut-off valves are located at the top of the fuel tanks.

G. Return Lines - Diesel

Since Diesel engines do not use all of the fuel drawn into them, a return line is used to take any surplus Diesel fuel back to the tank from which it was pumped. The return lines have no shut-off valves.

H. Fuel Filters - Diesel

Each main Diesel engine and the Diesel generator supply line has a fuel/Water Separator. This fuel/water separator assembly has a drain plug at the bottom that allows removal of water. Visual inspection should be made periodically and the water removed if required. The make and element numbers for main engines and generator filters are listed on the the Technical Data page in Section I. of this manual as well as in the manufacturers manuals.

I. Diesel Fuel

WARNING:

NEVER ADD COMMERCIALLY MARKETED DIESOHOL OR GASOHOL TO DIESEL FUEL. MIXING THESE BLENDS WITH DIESEL FUEL CREATES BOTH AN EXPLOSION AND A FIRE HAZARD.

Use only high quality Diesel fuel that meets the specifications of the engine manufacturer. See their manual for details.

XII. PROPULSION SYSTEM

A. Engines

All of the necessary technical data and operating information about the engines in your Bertram yacht are contained in the manufacturer's Engine Manual, which is supplied as a part of this vessel's documentation package. Therefore, this information is not repeated in this manual.

B. Engine Care

Just a reminder, despite the quality of the materials used and the ruggedness of the design, ultimately, the life and performance of your vessel's engines are dependent on the way they are cared for. Therefore, follow the manufacturer's instructions as to your selection of lubricants, scheduled preventative maintenance, and operating conditions, and watch your instruments carefully. For instance, be sure to check the engine oil level and the coolant level each time the engines are to be run.

C. Marine Gears

The reverse gear on your Bertram is hydraulically operated. Information and maintenance procedures will be found in the manufacturer's Engine Manual. Check gear fluid level frequently.

D. Propeller Shafts

Information as to diameter, length, and material of the propeller shafts is shown on the "Technical Data" page(s) at the front of this manual.

E. Propeller Shaft Alignment

Bertram performs the following two separate propeller shaft alignment procedures that are necessary to establish that your vessel's propulsion system was aligned correctly when it was installed at the factory.

1. Parallel or Bore Misalignment. The first procedure is the parallel or bore alignment. In this case, a misalignment occurs when the centerline of the transmissions and the centerline of the mating propeller shafts ARE parallel but ARE NOT coaxial. The allowed misalignment should be less than 0.005 inches. Since the slip fit of the pilot surfaces of these two shafts holds the shafts in alignment, it is most unlikely that this alignment will change unless you replace an engine, move an engine, or seriously damage the underwater gear. To do a parallel or bore alignment procedure requires precision measuring equipment and a competent technician.

2. Angular or Face Misalignment. This misalignment occurs when the centerlines of the marine transmission and the mating propeller shaft are NOT parallel and therefore the mating faces of the marine transmission and the mating propeller shaft can NOT be parallel. In the case of angular or face misalignment, the formula to determine allowed amount of misalignment is 0.0005 inches per inch of the propeller shaft companion flange outside diameter, measured at the mating surface of the flanges.

3. Allowable Angular or Face Misalignment. Using the formula from the preceding Section with a 5.0 inch outside diameter companion flange, the allowable amcunt of misalignment is 0.0025 of an inch. The angular or face misalignment must be checked periodically to ensure proper alignment and therefore optimum performance. The initial alignment check is considered a part of the predelivery preparation. Upon delivery, alignment becomes an owner maintenance responsibility. Bertram recommends that you:

1) Open the two couplings before haulout.

2) To check the alignment after launching:

   a) Let your vessel settle in the water for a day or two before making the final alignment adjustments.

   b) Remove all of the bolts in the coupling flanges at the end of the marine gear.

   c) Slide the shaft aft until the flanges are about 1/4 of an inch apart.

   d) Press the flanges together by hand with a .010 of an inch or larger feeler gauge between them.

NOTE:

At this point the gauge thickness is not important. What is important is that as the flange faces are brought gradually closer together, that the differences between the opposite side gaps stay within the allowed tolerance. This difference is derived by subtracting the thickness of the thinner feeler gauge from that of the thicker feeler gauge.

e) Insert the feeler gauge at 90° intervals around the flange to assure equal clearance at all faces.

f) If the alignment is correct, the .010 of an inch or larger feeler gauge will be tightly gripped at all four of the points around the coupling edges.

g) Repeat steps d, e, and f, gradually moving the two flanges closer together until they touch. Using the formula given in Subsection E.2., for a 5-inch diameter flange, when the faces touch at one point, they should be not more than .0025 of an inch apart at any other point.

3) Engine alignment is best accomplished by an experienced mechanic working with the proper tools. Keep this in mind before attempting to move a marine engine on its mountings.

F. Propellers

The combination of propeller diameter and pitch was selected to give maximum efficiency based on engine power, at its rated RPM, hull design, and the weight of the vessel. The propeller is one part of a balanced propulsion system. Any changes in its size or pitch could reduce engine life or performance and place undue stress on other components of the running gear. When you find it necessary to replace a propeller, it is important to use the same type, diameter, and pitch as the original.

G. Propeller Installation

The installation of the propellers completes your vessel's propulsion system. With the amount of power being transmitted at

this point, it is important that the fitting of the shaft to the propeller be done properly in order to provide maximum shaft and propeller life. If it is necessary to replace either the propeller or the shaft, follow these guidelines:

1) Inspect the keyway in the shaft and the key for the proper radii (see Figure 1 on the sketch at the end of this Section).

2) Check the fit of the key into the shaft keyway. With the retaining pin in key tight against the recess in the shaft (see Figure 2 on the sketch at the end of this Section); the aft end of the key should not extend up onto the ramp of the shaft keyway (see Figure 3 on the sketch at the end of this Section).

3) Check the fit of the key in propeller keyway.

4) If required, dress the propeller keyway carefully. The file should cut evenly along the entire keyway.

5) Place the propeller on the shaft (without the key) and seat on the shaft taper. The fit should be tight with no wobble and no space between the shaft and forward and aft ends of the propeller hub.

6) Mark the shaft at forward end of the hub with a sharp pencil.

7) Remove the propeller, insert the key into the shaft keyway and reinstall the propeller.

8) Ensure that the propeller is fully seated with the hub's forward end touching the previously marked line on the shaft.

9) Check the clearance between the key top and the propeller hub keyway bottom with a feeler gauge. This clearance should be between 0.006 of an inch and 0.010 of an inch.

10) Remove the propeller and coat the bore with any nongraphite, waterproof grease. Reinstall the propeller.

11) Depending on the type of propeller shafts on your Bertram, use method 11.a or 11.b.

a) Position the locating pin extending down from the bottom of the key into its matching locating hole in the shaft key way, then push the key into place. (see Figure 2.a on the sketch at the end of this Section).

b) Install the plain (full) nut, allowing the nut to push the key into position. (see Figure 2.b on the sketch at the end of this Section)

12) Torque the nut with a wrench to seat the propeller.

13) Remove the full nut and install a jam (half) nut.

14) Tighten the jam nut slightly more than finger tight.

15) Install full nut.

16) Lock both nuts together by holding the jam nut while tightning the full nut.

17) Install a cotter pin and bend the legs.

The sequence and method of nut installation, as described in Subsection G of this Section, is in accordance with S.A.E. Speci-

fications #J-755.

H. Shaft Log and Stuffing Box

1. The Shaft Log. The shaft log recess is the tunnel in which each propeller shaft turns. In your Bertram, the shaft logs are part of and are constructed of the same material as the hull. As shown on Drawing 18A 9201, Sheet 5, inside your vessel, each stuffing box is attached to its shaft log recess by a flexible hose held in place by hose clamps. The flexible hose serves to absorb any normal shaft vibration.

2. The Stuffing Boxes. The stuffing boxes prevent water from leaking in around the shaft and into the boat. The key components of the stuffing boxes are the braided flax packing and the packing gland. Keeping the packing gland tight keeps the stuffing box from leaking. It is normal to have a slight drip from the stuffing box as this serves as a lubricant, but if the leaking is excessive, the packing gland should be retightened. Be careful not to tighten too much as this will glaze the packing and score the shaft. If packing is to tight, the gland will get too hot to hold with your hand. When running at full speed, the gland should feel warm, not hot to the touch.

3. Repacking a Stuffing Box. If it becomes necessary to repack the stuffing box:

1) Remove the boat from the water;

2) remove the sprayshield;

3) unbolt and slide the packing gland forward on its shaft;

4) remove the old packing and install 1/4 inch by 1/4 inch rings of new packing to within 1/4 inch of the end of the stuffing box (always use tallow flax packing, do not spiral the flax packing around the shaft, each ring must be separate);

5) slide the packing gland aft and tighten the packing gland to the point where the shaft will not turn;

6) this will seat the packing;

7) relaunch the boat;

8) back the gland off until shaft is free and there is a slight drip, remembering that a slight water drip is necessary for proper lubrication;

9) run the shaft for a while, reset if necessary; and,

10) replace the sprayshield.

I. Shaft Log Sprayshield

A rubber hose sprayshield is installed over each stuffing box to prevent any dripping water from being sprayed around the engine compartment.

J. Rudder Stuffing Boxes

The rudder stuffing boxes are packed in the same manner and with the same material as are the propeller stuffing boxes, except that it is not necessary to have the rudder stuffing boxes drip. Just be sure the rudders turn freely.

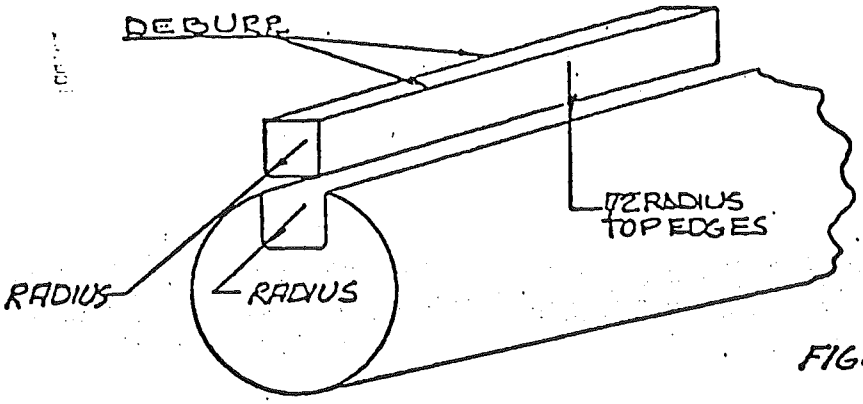


FIGURE #1

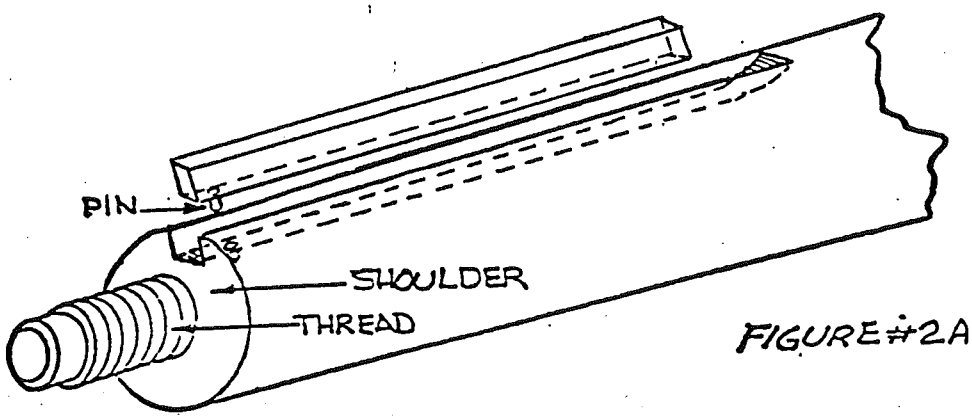


FIGURE #2A

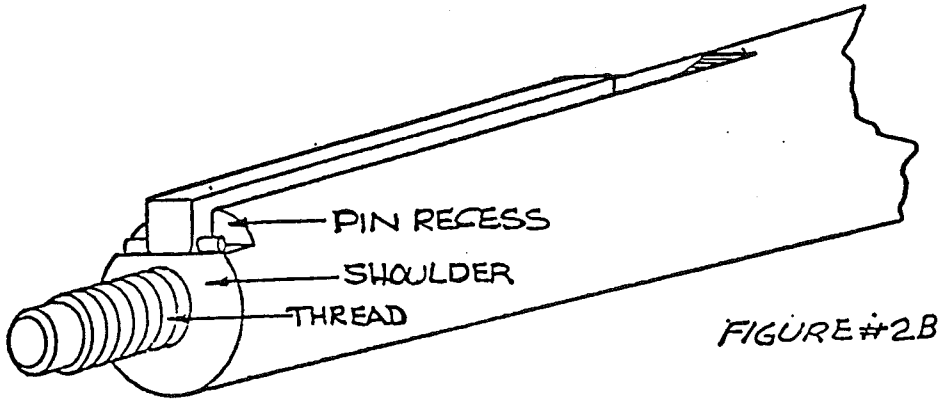


FIGURE #2B

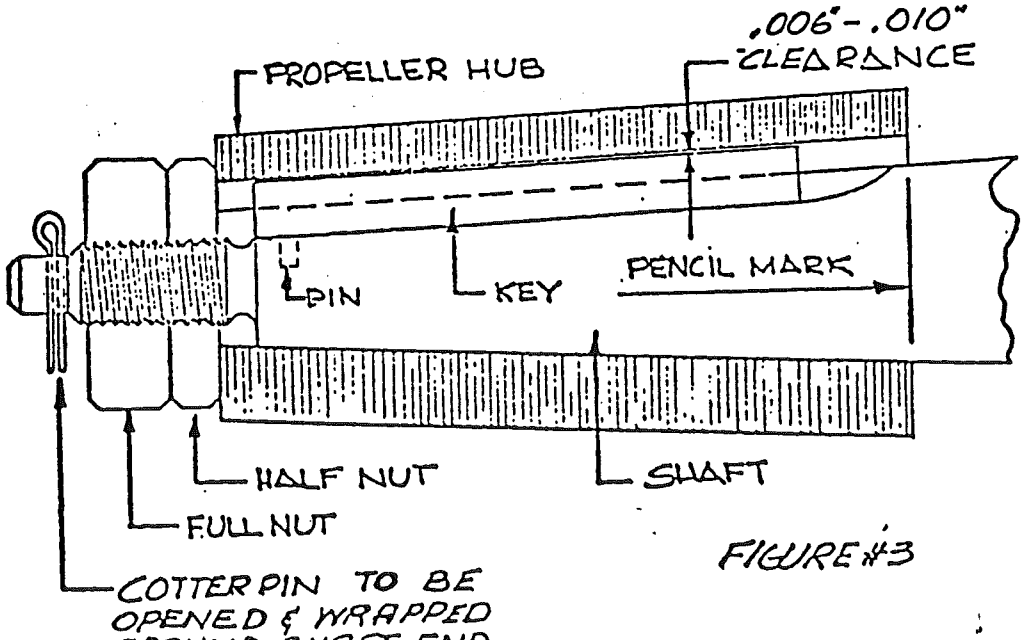


FIGURE #3

XIII. AIR CONDITIONING SYSTEM

A. Equipment Description

The air conditioning equipment on your Bertram yacht is a system designed and built especially for marine use. The components are called the "Cruisair" system and they are built by The Marine Development Corporation. This is a bi-directional heat pump system operating off of a single seawater-cooled, reverse-cycle, condenser and your system will either heat or cool as required for your comfort. The condensate from the air conditioning unit drains into the shower sump and is pumped overboard.

There are two identical one-ton, compressor/evaporators, one "Cruisair Twin Blower" unit for the galley and the salon area and another for the main cabin area.

NOTE:

The air conditioning cooling water seacock must be turned to "OPEN" before any air-conditioning system is switched "ON". Failure to do this or to keep the seawater strainer and the filter clean will result in a thermal overload and system shut-down.

1. The Seawater Cooling System. The seawater supply system (as shown in Drawing 18A 9201, Sheet 7) consists of a seacock, a strainer, and a pump. The seawater is brought through the thru-hull fitting and then drawn through to a sea water strainer. The outlet of the strainer goes directly to the pump and is then pumped through the air conditioning condenser and back over board as shown. The seawater pump is automatically switched "ON" whenever the air conditioning is switched to "START" or "RUN".

NOTE:

When starting the air conditioning system, always check that there is a sea water discharge from the hullside fitting to ensure that the seawater pump is operating properly.

Each time the air-conditioning system is started, you should check the hullside discharge streams to ensure that the sea-water pump is operating properly.

2. The Air Conditioning Controls. Both the unit located in the salon and the unit in the main cabin are equipped with a thermostat, a temperature regulating control, and a fan speed adjustment control.

B. The Initial Control Check (Normally done by the dealer.)

This procedure must be done on both units, one at-a-time.

1. The three circuit breakers (number 115 A/C PUMP, number 112 SALON A/C, and number 116 FWD A/C) should be set to "OFF".

2. The "START-RUN" switch on the unit being checked, either the unit in the salon or the one in the main cabin should be set to "OFF".

3. Rotate the thermostat control knob from right-to-left (counter-clockwise) and listen very closely to the control by placing your ear as near to it as possible while you rotate the knob. While you are rotating the knob, you should hear two (2) distinct clicks about halfway through the knob's rotation. If you hear these clicks, this indicates that the thermostat's bellows has NOT been ruptured and you may proceed to the next step. If

you do NOT hear the clicks, contact your nearest "Cruisair" dealer.

Do NOT attempt to place your air conditioner in service.

C. Initial Start-Up

NOTE:

Check that the air conditioning fans are operating BEFORE switching the START-RUN control to "RUN" or the evaporator may freeze.

1. Starting with the three circuit breakers on the 120 V.a.c. POWER DISTRIBUTION Panel (numbers 112, 115, and 116) in the "OFF" position, move these circuit breakers to the "ON" position.

2. Move either the salon or the main cabin START-RUN air conditioner control switch to "START".

3. Check that there is a steady seawater discharge stream about 1/2 inch in diameter from the overboard discharge outlet to ensure that the seawater pump is circulating the sea water through the condenser/compressor unit.

4. Set the fan speed at midpoint (medium speed) and check the air flow from the discharge grill. Adjust the grill louvers if necessary to get the maximum flow.

5. Repeat steps 2 and 4 with the other air conditioner.

6. Select the desired fan speed.

NOTES:

1) The starboard cabin has only a fan speed control. The temperature for that cabin is controlled by the thermostat in the main cabin.

2) When operating on the heat cycle, allow the unit to run on low fan for 5 to 15 minutes until the system begins to heat well. Then, increase fan speed to the medium setting and run the system in this position for most efficient output.

3) On the cooling cycle, use any fan speed desired. Keep in mind, however, that the lower the fan speed, the less capacity the system has.

D. Initial Operation After Initial Start-Up

To check the cooling and heating functions of your air conditioning system, set either unit "START-RUN" control to "START" and set the fan control at midpoint.

****
*
* CAUTION
*
* To avoid damaging your air conditioning unit *
*
* NEVER make quick changes from COOL to HEAT *
*
* or from HEAT to COOL. *
*
****

1. To check that the system is cooling properly, turn the thermostat knob right (clockwise) as far as it will go .

2. Move the unit's "START-RUN" control to "RUN". The unit's compressor will start to cool.

3. Start checking the temperature of the air from the discharge grill. In 3 to 5 minutes, the unit should be discharging cold air.

4. Move the unit's "START-RUN" control to "OFF" and wait for 10 to 15 minutes.

5. To check the heating, turn the thermostat knob as far left (counter-clockwise) as it will go .

6. Move the unit's "START-RUN" control to "RUN".

7. Start checking the temperature of the air from the discharge grill. In 3 to 5 minutes, the unit should be discharging heated air.

E. Temperature Adjustment

1. The Thermostat. The system thermostat serves to cycle the compressor on and off. The thermostat on your cooling and heating system provides an automatic change-over from cooling to heating with a 3-1/2°F differential. Rotating the thermostat to the left after it has been set for cooling will cause the unit to heat. If you rotate the thermostat to the right, the unit will cool. If the thermostat is left stationary after being set, the unit will cycle from neutral to cooling if cooling is needed, or it will cycle from neutral to heating if heating is needed.

2. Setting the Thermostat. To set the thermostat, allow sufficient time for the unit to cool or heat the salon to the desired temperature. When the salon temperature is comfortable, turn the thermostat knob slowly toward the center position until

it "clicks" once. The thermostat is now set to hold a constant temperature. After the unit has been operating for about one hour, turn the thermostat knob, warmer or cooler, a little at a time, until the desired temperature is reached. The unit should now automatically hold the set temperature, cooling or heating as needed.

F. Power Interruption

1. If for any reason, the 120 V.a.c. power is turned off even for an instant, the "START-RUN" switches on both units should be set to "OFF" for a period of 10 minutes minimum.

2. After the first 10 minutes, the "START-RUN" switches may be moved to the "START" position for a period of 5 minutes to allow the water in the system to circulate fully.

3. After the 5 minute period in "START", the switches may be moved to "RUN".

G. How To Stop the Units

NOTE:

NEVER leave the air conditioner control on RUN and switch it off from the 120 V.A.C. DISTRIBUTION PANEL. ALWAYS use the unit control to shut down the air conditioners.

To turn the system off, be sure to turn each unit's Mode Switch to "OFF". Do NOT use the 120 V.a.c. Distribution Panel's circuit breaker to shut down either air conditioning system.

XIV. FRESH WATER SYSTEM

A. General.

CAUTION

When filling the water tanks do NOT use full city water pressure which can supply more pressure and volume than the vent line can discharge. This can rupture the fresh water tanks. Bertram suggests you do NOT leave the hose unattended while filling the tanks.

CAUTION

To avoid damage to your vessel, do NOT use lye based clog dissolvers on the fresh water, the toilet, and/or the bilge pump systems.

For you as a user, the fresh water system on your Bertram functions almost the same as the plumbing that you have at home. This system consists of: 1) a low-noise, high-output, water-pump; 2) the fresh-water tanks; and, 3) a pressure sensing device and gauge.

B. The Fresh Water Tanks

Your Bertram has two stainless-steel, 50-gallon, fresh water tanks located port and starboard in the a.c. generator compartment. As shown in Drawing 18A 9201, Sheet 8, these tanks are interconnected so they act as if they were one tank and they are

filled through a portside deck-plate fitting. The water gauge sender is installed in the port side tank.

C. The Water Pump

CAUTION

The fresh water system circuit breaker must be turned "OFF" when the tanks are empty.

D. The Water Heater

CAUTION

To avoid burning out the heater element, do NOT turn "ON" water heater if water level is below the heater element. Open a hot water tap until water stops spurting to bleed air from hot water system, then turn heater "ON".

The automatic heater is located in the engine-compartment forward, port corner. The heater thermostat is factory preset at 140 to 145° F, which Bertram recommends as maximum.

E. Shower

Showers can take a little or a lot of fresh water. To conserve water on a long trip, Bertram suggests a "sailor's shower". After adjusting water temperature, wet yourself thoroughly, turn

the shower off by using the push-button on shower head, soap up and then turn the shower back on to rinse off.

F. Shower Sump Pump

The shower sump is located in the bilge below the cabin sole. This sump has its own submersible pump equipped with an automatic float switch. The pump is connected to the 12 V.D.C. Distribution Panel through the SHOWER SUMP circuit breaker, breaker number 49. This pump will automatically discharge the shower water overboard. The filter screen between pump and float switch should be inspected on a routine basis to ensure that the screen remains clean.

G. Galley Sink and Lavatory Sink

The galley and the lavatory sinks are supplied with cold water directly from the fresh water tank and hot water from the water heater. Both of these sinks drain over-board through hull-side fittings.

H. Dockside Water Supply

CAUTION

When leaving vessel unattended, the dockside fresh water hose should be disconnected.

The dockside fresh water hose connection is located inside the cockpit. This is a convenience feature which allows you to use available fresh water at dockside. A pressure regulator in the supply line reduces the normal city water pressure to within the limits of the on-board system.

NOTE:

This system cannot be used to fill the water tank.

XV. TOILET (HEAD) SYSTEM

A. General

CAUTION

To avoid damage to your vessel, do NOT use lye based clog dissolvers on the fresh water, the toilet, and/or the bilge pump systems.

CAUTION

Do NOT flush toilet when the holding tank is full, as shown by the illuminated red warning "CAUTION: DO NOT FLUSH TOILET SYSTEM. DAMAGE. MAY RESULT" lamp on the "HOLDING TANK MONITOR" panel in each head. Continued flushing with a full tank can damage the toilet system.

TOILET DISCHARGE WARNING

IT IS UNLAWFUL TO DISCHARGE UNTREATED SEWAGE WITHIN THE TERRITORIAL WATERS OF THE UNITED STATES. VIOLATIONS ARE SUBJECT TO A FINE OF $5,000.oo PER INCIDENT.

NOTES:

1) Federal law prohibits the discharge of improperly treated sewage into the territorial waters of the United States.

2) In addition, certain areas may be declared NO-DISCHARGE areas.

3) There may be additional state and local requirements. Check with the local authorities.

4) For vessels operating within the territorial waters of the United States, marine toilets shall discharge directly into a holding tank. The holding tank is emptied by a dockside pump-out facility. To satisfy the U.S. regulation, all outlet seacocks on vessels operating within U.S. territorial waters must be locked shut, with a padlock, or a nonreleasable wire-tie, or have the valve handle removed.

5) For vessels operating outside United States territorial waters, it is acceptable to have a toilet system where the waste is either discharged into a holding tank and is then pumped overboard or where the toilet discharges directly overboard through a discharge seacock.

The toilet (or head) in your Bertram is a complete Marine Sanitation Device (M.S.D.) and complies with the U.S. Coast Guard regulations and standards. The term M.S.D. means that this is a complete marine disposal system and includes as shown in Drawing 18A 9201, Sheet 9:

1) a solid state timer controlling a dual-operation, electric, toilet-pump, which pumps up seawater for flushing and simultaneously removes the waste and either pumps it into the holding tank or overboard, as desired;

2) the toilet and its associated plumbing;

3) the 35 gallon holding tank with a manual pump;

4) the seawater supply seacocks and discharge seacocks;

5) the deck mounted dockside pump-out fitting;

6) a holding tank full alarm; and,

7) an optional electric holding tank overboard discharge pump.

Your toilet system has a "Y" mode control valve. This valve is located below the aft access hatch in the cabin passageway opposite the head. The position of this valve determines if the waste is to be pumped into the holding tank or directly overboard.

B. Operation

****
*
* CAUTION *
*
* Do NOT flush non-soluble items or materials *
*
* such as sanitary napkins, paper towels, or *
*
* cirarette butts, they will clog the system *
*
****

1. For your marine toilet system to function in compliance with the regulation for toilet operation within U. S. Territorial waters, the following conditions must be met:

1) The discharge seacock valve must be **CLOSED** and:

a) the seacock handle removed;

b) the seacock handle must be padlocked in place; or,

c) the seacock handle secured in place with a non-releasable wire-tie.

2) Set the starboard number 50 TOILET SYSTEM circuit breaker on the 12 V.D.C. DISTRIBUTION Panel to "ON".

3) The seawater inlet seacock is located on the starboard side of the engine-compartment, under the forward end of the starboard engine and aft of the web frame (half bulkhead) that separates the engines from the forward fuel tank compartment. This seacock supplies the raw seawater to the manifold and to the pumps. In order for the toilet to function, this seacock must be in the "OPEN" position.

4) For operation in U.S. territorial waters, the "Y" mode control valve must be set to direct the flow of waste materials into the holding tank.

2. For your marine toilet system to pump the waste materials directly overboard, which is legal only outside U. S. Territorial waters, the following conditions must be met:

1) The discharge seacock valve must be "OPEN", the seacock handle may be left in place;

2) Set the starboard number 50 TOILET SYSTEM circuit breaker on the 12 V.D.C. DISTRIBUTION Panel to "ON".

3) The seawater inlet seacock is located on the starboard side of the engine-room, under the forward end of the starboard engine and aft of the web frame (half bulkhead) that separ-

ates the engines from the forward fuel tank compartment. This seacock supplies the raw seawater to the manifold and to the pumps. In order for the toilet to function, this seacock must be in the "OPEN" position.

4) For operation outside U.S. territorial waters, the "Y" mode control valve can be set to direct the flow of waste materials directly overboard.

C. Flushing

1. Controls.

Inside the toilet room (head) is a control panel for flushing the toilet. This control panel has an "ON/OFF" rocker type switch and a push button type switch. The "ON/OFF" switch must be in the "ON" position for your marine toilet to operate.

2. Operation.

With the "ON/OFF" switch in the "ON" position, you simply depress the push button switch. The toilet then functions in an AUTOMATIC mode. A solid state timer operates the flushing pump for a preset period of time that ranges between 10 and 15 seconds. If you are operating outside of U.S. territorial waters, and the "Y" valve and the discharge seacock are properly set, the waste is pumped directly over board. Within U.S. Waters, the "Y" valve and discharge seacock are set so that waste is pumped into the holding tank.

Your marine toilet uses one (1) gallon of water for every ten (10) seconds of operation. It is possible to stop the flushing sequence at any time by switching the "ON/OFF" switch to "OFF". However, Bertram recommends that you only do this if there is danger of the toilet backing up or damage to the pump motor because of a clog.

D. Holding Tank Pump-Out

There are two ways to empty the holding tank on your Bertram:

1) Pumping-out at a dockside facility through a deck-plate on the port side. When removed, this deck-plate allows access to the holding tank.

2) If your Bertram is equipped with the optional electric overboard pump:

   a) Open the discharge seacock;

   b) depress the HOLDING TANK DISCHARGE PUMP pushbutton for a moment to activate this pump. The HOLDING TANK DISCHARGE PUMP pushbutton is located on the BATTERY CONDITION Panel which is to your right of the 12 V.D.C. DISTRIBUTION Panel.

3) If your Bertram does not have the optional electric overboard pump and:

   a) you are within U.S. territorial waters, it is possible to empty the holding tank at a dock side facility using the integral manual pump.

b) if you are outside U.S. territorial waters, it is also possible to empty the holding tank overboard by using the integral manual pump.

E. Prior to storage

Prior to putting your Bertram in storage, or securing it for an extended period of time, be sure to flush the toilet two (2) or three (3) times to clean out the system.

XVI. GENERATOR MECHANICAL SYSTEMS

A. General

For a pictorial representation of the seawater cooling intake systems, exhaust systems, and piping systems for the main engines and the generator, gasoline and Diesel, see Drawing 18A 9201, Sheet 10.

B. Before Starting Generator

1. Check to be sure that the seawater seacock is open.

2. Check that seawater strainer is clean and sealed.

3. Check that the heat exchanger expansion tank on top of generator is full of the proper coolant.

4. Check the lube oil level.

5. Move the generator main battery switch to "ON".

6. Move the generator fuel valve to "OPEN ".

7. Move the generator main breaker to "ON".

C. Starting the Generator

****
*
* **WARNING** *
*
* GASOLINE POWERED VESSELS: GASOLINE VAPORS CAN *
*
* **EXPLODE.** RUN BLOWERS FOR FOUR (4) MINUTES AND *
*
* SMELL ENGINE-COMPARTMENT BILGE FOR GASOLINE *
*
* VAPORS BEFORE STARTING ENGINES OR GENERATOR. *
*
****

CAUTION

When starting your generator, do NOT exceed 30 seconds of WARM-UP or 30 seconds of cranking. Wait 2 or 3 minutes before trying again.

CAUTION

If generator won't start after several tries, the waterlift muffler may fill with water. To keep seawater out of the generator's exhaust manifold, use the drain plug to empty the muffler BEFORE moving your vessel.

1. On the GENERATOR panel, below the POWER DISTRIBUTION Panel, move the blower switch to "ON".

2. For Diesel engines only - hold the **WARM-UP** switch in the "ON" position for 10 to 30 seconds, and release switch. Do NOT exceed 30 seconds.

3. Hold the **ON-STOP** switch in the "ON" position until the generator starts. Do NOT exceed 30 seconds of continuous cranking. If the battery is weak, place the **BATTERY PARALLEL** switch in the "PARALLEL" position.

4. The GEN. RUN lamp will illuminate when the generator is running.

5. After starting the generator, check to be sure that seawater is flowing from the exhaust outlet on the port-side of your vessel's transom.

6. To electrically power your vessel from the generator, turn the 4-position Selector switch located on the 120 V.A.C. POWER SELECTOR Panel to "GEN." and turn "ON" the circuit breakers for the desired appliances and equipment.

D. Stopping the Generator

1. Remove the A.C. Load. Before stopping the generator, turn the 4-position Selector switch located on the 120 V.A.C. POWER SELECTOR Panel to "OFF" to remove the a.c. load.

2. Manual Stop. Hold the "ON-STOP" switch in the "STOP" position until the generator is fully stopped.

3. Automatic Shut-Down. Your generator is provided with an automatic shut-down system that stops the engine for any of the following faults:

a. Low Oil Pressure

b. High Exhaust Temperature

c. High Water Temperature

XVII. MAIN ENGINE SYSTEMS

A. Wet Exhaust Systems

WARNING

COMING INTO CONTACT WITH MOVING MACHINERY CAN RESULT IN SERIOUS INJURY.

CAUTION

All engine exhaust manifolds get VERY HOT during operation. To avoid burns, exercise caution if required to work around engines before they have had a chance to cool down.

1. Wet Exhaust Systems, Gasoline Engines. By definition, wet exhaust systems are exhaust systems where the entire exhaust system or any portion of the system is cooled by water. In your Bertram, the engine exhaust gases are collected in the exhaust manifold and from there go into an exhaust riser. These risers get VERY HOT. To keep the seawater from getting back into the exhaust manifold, the cooling seawater is injected into the exhaust flow at a point several inches below the riser's highest point. The mixture of water and exhaust gases are passed through a silencer (muffler) and then overboard.

a. Standard Cooling. In gasoline engine powered Bertram yachts with standard cooling, as shown in Drawing 18A

9201, Sheet 10, the seawater is drawn up through the slotted strainers, through the seacocks, and piped to the seawater strainers. From the strainers the seawater is circulated through the engine block, cylinder heads, and the exhaust manifolds. As described in Subsection A.1. of this section, after cooling the engine, the seawater is then pumped into the engine exhaust outlet where it is mixed with the exhaust gases and is expelled overboard after passing through the silencers (mufflers).

b. Fresh Water Cooling. Except that the engine block, cylinder heads, and exhaust manifolds are cooled with a pressurized mixture of fresh water and ethylene glycol which is in turn cooled by circulating it through a seawater heat exchanger, the operation of the fresh water cooling is the same as that of the seawater cooling as far as the exhaust systems are concerned.

2. Wet Exhaust Systems, Diesel Engines

CAUTION

Periodically check the insulation that covers the hot sections of Diesel engine riser assemblies to prevent engine-compartment fires and protect people near them when they are hot.

Diesel powered Bertram yachts are always fresh water cooled. The exhaust cooling is essentially the same as that described in Subsections 1.a. and 1.b. of this section. However,

the Diesel exhaust risers get EXTREMELY HOT and they are covered with jackets or blankets to protect anyone working near them and to reduce the chance of an engine-room fire caused by a flammable material coming in contact with the risers.

B. Exhaust System Maintenance

To prevent the leaking and escape of exhaust gases, a periodic inspection should be made of the entire engine and generator exhaust gas system with emphasis on checking for faulty hoses and or loose hose connections.

C. The Seawater Inlet System

As shown on Drawing 18A 9201, Sheet 10, the seawater inlet system consists of the below the waterline intake ports, the seacocks, and the strainers. The seawater taken in through this system first cools a heat exchanger. This heat exchanger is standard equipment for vessels equipped with Diesel engines and optional for gasoline powered vessels. The fluid on the other side of the heat exchanger is the freshwater engine coolant.

To avoid engine overheating, it is important that the seacocks be completely open and that the seawater strainers be kept clean.

D. The Seawater Discharge System

As shown on Drawing 18A 9201, Sheet 10, the seawater that has passed through the engine coolant heat exchanger or, on gasoline powered vessels with seawater cooling, through the engine, is piped directly to the mixing section of the engine exhaust risers (the mixing elbows on Diesel engines).

E. Flow Meter Switches

Your engines are each equipped with a flow meter switch that will activate the engine alarm system described in Section III if the flow of seawater is restricted or cut off.

1. For Diesel engines. This flow switch is installed between the seawater strainer and the heat exchanger.

2. For gasoline engines with standard cooling. The flow switch is installed before the thermostat housing.

3. For gasoline engines equipped with fresh water cooling. The flow switch is installed before the heat exchanger.

XVIII. BILGE PUMPS

A. The Bilge Pump Systems

CAUTION

To avoid damage to your vessel, do NOT use lye based clog dissolvers on the fresh water, the toilet, and/or the bilge pump systems.

OIL DISCHARGE WARNING

The "Federal Water Pollution Control Act" prohibits the discharge of any oil or oily waste into or upon the navigable waters and contiguous zone of the United States, if such a 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.

This applies to any overflow of fuel oil as well as any bilge pump discharge.

Violators are subject to a penalty of $5,000.

As shown in Drawing 18A 9201, Sheet 6, your Bertram yacht has a total of four (4) independent and separate bilge pump systems. These bilge pump systems consist of submersible bilge pumps and their associated automatic bilge switches. The bilge pump systems are installed so that they cannot be switched "OFF". To ensure that the bilge pumps will not inadvertently be switched "OFF", each pump is connected directly to your vessel's battery

bank through a fuse. The operation of the "MAN-AUTO" switches for three of these pumps is described in Section II. "Controls and Instruments". The forth system is the "Engine-Room Sump Pump" and it is always in the automatic mode.

NOTE:

It was intended that NONE of the four bilge pumps be able to be switched "OFF" from either the flybridge control station instrument console or from the 12 V.d.c. panel. The bilge pump control switches can only select either the manual ("MAN", running constantly) or the ("AUTO", controlled by the bilge water level sensor) positions.

1. The Forward Bilge Pump. This pump and its associated water level sensing switch system are located in the bilge under the forward cabin sole.

2. The Midships Bilge Pump. This pump and its associated water level sensing switch system are located in the keel sump between the two main engines.

3. The Aft Bilge Pump. This pump and its associated water level sensing switch are both located near the transom in the aft bilge area.

4. The "Emergency Bilge Pump". This is an entirely separate bilge pump and with its associated water level sensing switch is located in the aft compartment aft of the midships bilge pump.

5. The Automatic Bilge Switches. Each of the four bilge pumps has its associated water level sensing switch mounted slightly above it. This mounting arrangement ensures that there will be a positive shut-down signal to the pump when the bilge is nearly dry.

The proper operation of these switches should be checked periodically. Checking the switch entails depressing the TEST push button on the switch cover.

B. Cleaning the Pumps

Each submersible pump has a strainer on the bottom of its intake that must be kept clean and free of debris. The engine-room sump pump has a strainer in the pump that must also be cleaned periodically.

XIX. VENTILATION SYSTEMS

A. General Description

Your Bertram has both natural air and forced air ventilation systems. The natural air is delivered to and removed from the engine-compartment by a series of hull side vents. These vents are on both sides of the hull and are equipped with built-in water traps.

B. Engine-Compartment Ventilation

1. The Natural Air System. Fresh air taken in through the forward facing vents is ducted into the engine-compartment. Additional air ducting leads from the aft end of the engine-compartment bilge to the aft facing exhaust air vents. When operating at less than cruising speeds for more than a few minutes, Bertram recommends that the engine-compartment blowers be run to ensure adequate ventilation and engine-compartment cooling.

2. The Forced Air Ventilation System. The starboard and the port engine-compartment blowers discharge the heated air from the engine-compartment into the two aft facing hullside exhaust vents. These two blowers are controlled by a single switch on the lower right corner of the flybridge instrument control panel. However, the 12 V.d.c. electric power to operate these blowers is controlled by circuit breaker number 44, "BLOWERS", on the 12 V.D.C. DISTRIBUTION Panel. To run the engine-compartment blowers, this circuit breaker must be set to "ON".

After fueling and before starting the engines, the blowers should be run a minimum of 4 and preferably 5 minutes to allow at least one complete change of air in the engine-compartment to remove any gasoline fumes. When running the blowers before starting the engines, Bertram suggests that you check to be sure that the blowers are operating and that there is air movement in the engine-compartment.

C. Toilet (Head) Ventilation

The head on your Bertram is a combination toilet, lavatory, and shower. To maintain a comfortable climate in the head, there are two separate fan systems. The exhaust fan is intended to keep the humidity level down in this area by drawing off the moist air from the shower out of the head and exhausting it overboard. The circulating fan draws in some of the conditioned air from the cabin.

XX. MAINTENANCE SECTION

A. Periodic Preventative Maintenance

CAUTION

A regular fuel filter canister inspection every 25 hours of operation or at least twice per season is mandatory to remove all the sediment and water which may have collected. Close inspection of this canister at this time for possible deterioration due to corrosion or other reasons is necessary and canister replacement is required if such signs are evident. A complete inspection of the entire engine fuel system for possible leaks or damage should also be performed.

The maintenance required by your Bertram during a boating season depends to a great extent on the conditions under which the boat is used and stored. For instance, adequate ventilation of the cabin during periods of non-use will reduce the interior maintenance and keeping the exterior waxed will minimize the exterior maintenance.

In this section, a suggested preventative maintenance program is set for the boat under "average use" conditions. If this program is used, it should be used in conjunction with the periodic maintenance recommended in the respective operating manuals for the engines and generator.

1. Daily Before Putting To Sea

a. Pump the bilges as required (check the operation of the bilge pumps by switching from "AUTO" to "MAN").

b. Run blowers to ventilate the engine-compartment.

c. Check the engine and generator lubricating oil levels.

d. Check the engine and the generator coolant levels.

e. Check the transmission oil level.

f. Check the fuel, water, and oil systems for leaks.

g. Check the engines for fuel, water, and/or oil leaks.

h. Check that all engine belts are in good condition and have the proper tension.

i. Visually check the seawater strainers for dirt accumulation. Clean as necessary.

j. With the engines running, check the engine circulating seawater by observing engine exhausts. Water should be exhausting at the transom outlet.

k. Check battery water level (see Section XXV. Battery Care).

l. Check for a slow drip at the shaft stuffing boxes.

m. Check the operation of the navigation and anchor lights.

2. Daily After Docking

a. Top off fuel and water tanks.

b. Wash down the boat with fresh water.

B. Every 100 Hours or 60 Days

The following checklist is the breakdown of items to check during the inspection and maintenance associated with the area indicated.

1. Exteriors

a. Exterior fiberglass finish - clean and wax.

b. Clean all hardware and apply protective polish.

c. Tighten any loose fittings.

d. Clean all exterior seat cushions (with a mild soap solution or a mild Clorox solution and rinse any cleaning materials off with fresh water).

2. Interiors

****
*
* CAUTION
*
* Do NOT use a Clorox solution on "Novasuede"
* sides and panels or vinyl furnishings. Clean
* vinyl with "409", "Fantastic", or the equiv-
* alent. Clean "Novasuede" per Table XX-I.
*
****

a. Completely air out the boat.

b. Air out all the life jackets.

c. Use your nose and eyes to check your boat. If any mildew is found:

1) Thoroughly wash down any mildewed areas on painted, stainless steel, or any other hard surfaces with a Clorox solution.

2) Wash mildewed vinyl surfaces with a commercial cleaner such as "409", "Fantastic", or the equivalent.

3) Wash "Novasuede" surfaces as per Table XX-I.

TABLE XX. - 1. CLEANING "NOVASUEDE"

STAIN	CLEANER
Coffee, wine, milk, Coke, ink, and chocolate	Mild detergent or soap and water
Grease and lipstick	Upholstery solvent

d. Operate all drawers and doors. Slight adjustments may be necessary on the doors and drawers due to expansion from moisture. Drawers can be made to slide easier by using a wax or solid lubricant.

e. Check all hand fire extinguishers for full charge.

f. Check operation of bilge alarm float switch.

3. Main Cabin

a. Check the operation of lights.

b. Check that there is power on both sides of the 120 V.a.c. duplex outlet.

c. Check the bow hatch for smooth operation and for a water-tight fit.

d. Check the forward bilge pump and the float switch operation.

4. Guest Cabin

a. Check the operation of lights.

b. Check that there is power on both sides of the 120 V.a.c. duplex outlet.

5. Head

a. Check the operation of the lights.

b. Check that there is power on both sides of the 120 V.a.c. Ground Fault Circuit Interrupter (GFCI) duplex outlet. (A description of the GFCI receptacles, how they work, and how to test them is covered in Section IX. The Electrical Systems).

c. Check the hot and cold water faucets for operation.

d. Check the sink drain for plugging and leaks.

e. Check the operation of the toilet.

f. Check the shower sump pump for operation and clean the pump filter.

6. Galley

a. Check the operation of the lights.

b. Check that there is power on both sides of the 120 V.a.c. Ground Fault Circuit Interrupter (GFCI) duplex outlet. (A description of the GFCI receptacles, how they work, and how to test them is covered in Section IX. The Electrical Systems).

c. Check the hot and cold water faucets for operation.

d. Check the sink drain for plugging and leaks.

e. Clean and check the stove burners for operation.

f. Clean and check the microwave oven for operation.

g. Check refrigerator for operation. Clean the refrigerator with a mild solution of soap and water and a small amount of baking soda.

h. Check the freezer for operation. Clean the freezer with a mild solution of soap and water and a small amount of baking soda. Vacuum dust from grills.

7. Engine Compartment

a. Carefully follow the periodic preventative maintenance for the engines, the generator, and the marine gears as specified in the appropriate manuals.

b. Check the stuffing boxes. A slight drip is desirable, the seawater lubricates the packing. If the stuffing box leaks excessively, tighten the nuts slightly to draw down the gland on the packing.

c. Check the engine and generator exhaust hoses and hose clamps.

d. Check the seawater strainers. The seawater strainers should be free of any foreign matter. If they require cleaning:

1) Close the appropriate seacock;

2) loosen the wing nuts on the top of the strainer body;

3) swing the top to one side and remove the strainer basket for cleaning;

4) replace the basket;

5) secure the top;

6) reopen the seacock; and,

7) check for leaks.

e. Check the engine mounting bolts to see that they are tight. If the bolts are loose, realign the engine. To facilitate a later alignment, lubricate the coupling bolts.

f. Check engine and generator hoses and hose clamps.

g. Check for leaks in fuel lines, flare nut fittings, and valves.

h. Check the control cable brackets for tightness.

i. Check emergency engine shutdown system for proper operation.

j. Lubricate threaded cable ends and check the cotter pins.

k. Check for and clean corroded electrical connections.

l. Check the exhaust blowers for operation.

m. Check the exhaust hoses for leaks.

n. Check the wiring to see that it is not rubbing and that the insulation has not been worn off.

o. Check the gauge senders and alarm system.

p. Check the fresh water system lines and fittings for leaks.

q. Check the fresh water pump for operation and leaks.

r. Check the following items on the air conditioning:

1) Condensing units;

2) hose and hose clamps

3) clean seawater strainer; and,

4) proper pump operation.

s. Check operation of the bilge alarm float switch.

WARNING

THE GASES THAT ESCAPE FROM ANY CHARGING LEAD ACID BATTERY ARE AN EXPLOSIVE MIXTURE OF OXYGEN AND HYDROGEN. THIS MIXTURE WILL EXPLODE WITH GREAT VIOLENCE AND SPRAY BATTERY ACID IF A SPARK OR OPEN FLAME IS ALLOWED TOO CLOSE.

CAUTIONS

1. Do NOT overfill battery cells. Overfilling causes acid leaks during charging which corrodes the battery terminals and cables.
2. **NEVER** add acid to a battery cell

t. Check each battery cell with a hydrometer. The cells should read between 1.250 and 1.265. Add water if necessary.

ALWAYS TURN OFF ALL D.C. POWER AND THE CONVERTERS PRIOR TO CLEANING OR WORKING ON BATTERY TERMINAL CONNECTIONS.

u. Check the battery terminals by doing the following:

1) Remove the battery cable clamps;

2) scrape the terminals and the inside of the cable clamps;

3) coat both the terminal and the clamp with "Vaseline" or a silicone based grease; and,

4) reassemble the battery cable terminal connections making sure that each of the terminal clamps are tight.

v. Follow the periodic preventative maintenance schedule for your vessel's generator as specified in the generator operator's manual.

w. Check the generator mounting bolts for tightness.

x. Check the generator for oil leaks. If leaks are found, have generator manufacturer's service representative inspect and correct.

y. Clean generator seawater strainer if required.

z. Clean out the stringer limber holes.

aa. Remove and clean the screen on the bilge pump.

ab. Check the operation of the four (4) bilge pumps.

ac. Check the bilge sump pump operation.

ad. Inspect all fuel lines, flare nut fittings, and valves for leaks.

8. Lazarette

a. Inspect both rudder ports for leaks. The rudders use a packing gland similar to the propeller shaft stuffing box. The procedure described for the propeller shaft stuffing boxes is followed to stop excessive leaking on the rudder posts.

b. Check the following steering system fittings for tightness and smooth operation:

1) clevis bolts;

2) rudder arms;

3) lock nuts; and,

4) lock bolts.

c. Lubricate the tie rod end fittings.

d. Check the operation of the bilge pump and the pump float switch.

9. Console

a. Check the operation of all switches, gauges, and controls.

b. Check the electrical connections for tightness and freedom from corrosion.

c. Lubricate the control heads.

C. As Required

Haul boat out of the water, scrub bottom if necessary, and repaint with anti-fouling paint.

D. Crevice Corrosion

It is advisable to rotate the shafts about every seven (7) days to prevent a condition called crevice corrosion from occurring to the shafts around the struts and shaft logs. This might occur if shafts remain in the same position over a long period of time when the boat remains in water, as in wet storage.

E. Electrolysis

If your boat will remain idle for extended periods of time, Bertram suggests that you place a zinc "fish" over the side on a heavy wire with a clip attached to an engine or gear at the other end and the zinc in the water. This "fish" will control electrolytic action affecting the components mounted in or on the hull. When the zinc is nearly disintegrated, it should be replaced as it will no longer be effective. Zinc "fish" can be purchased from marine supply stores or they can made up if desired. Remove the zinc from the water before moving the boat under power. Replace standard transom zincs as required.

F. Maintenance of the Portable Fire Extinguishers

1. General. The portable (hand held) fire extinguishers should be examined at least monthly for at least the following:

a. That they are properly secured in their designated places;

b. that they have not suffered corrosion or mechanical damage;

c. that they are fully charged (extinguishers having pressure gauges or pressure indicators should show that the pressure is within the prescribed limits; those without pressure gauges or indicators, those that use Halon, and the CO_2 portable fire extinguishers, should be weighed.);

d. that the tamper proof seal proves that the extinguisher has not been operated; and,

e. that the nozzle orifice is unobstructed and the extinguisher hose is in good condition.

2. Portable Fire Extinguisher Service. Make a full maintenance check on all portable fire extinguishers on at least an annual basis as per the maintenance instructions specified on the extinguisher's nameplate. A tag should be attached to the fire extinguisher showing the date of each such maintenance check.

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

G. Fixed Fire Extinguisher System Maintenance

```
**************************************************
*                                                *
*                    WARNING                     *
*                                                *
* NEVER ATTEMPT TO DISASSEMBLE ANY PART OR POR-  *
*                                                *
* TION OF YOUR FIXED FIRE EXTINGUISHER SYSTEM.   *
*                                                *
* THIS SYSTEM CONTAINS LIQUIFIED GAS AT HIGH     *
*                                                *
* PRESSURE AND SERIOUS INJURY COULD RESULT.      *
*                                                *
**************************************************
```

1. Maintenance Frequency. The "Fireboy" Halon fire extinguisher system maintenance does not require that these systems be emptied and hydrotested at any regular interval. However, according to the manufacturer, it is NECESSARY that each complete unit (less the brackets) be removed and carefully weighed on an accurate (certified) scale at least once each six (6) months. The exact weight for each unit should be noted on the tag provided

for this purpose. If the measured weight falls below that shown on each unit's name plate, that unit must be immediately removed from service.

2. G..M. Diesel Engine Emergency Stop Adjustment. For Bertram's equipped with G.M. made Diesel engines, the recommended procedure for adjusting the Emergency Stop cables is as follows:

a. Each G. M. made Diesel engine must be first tuned per the manufacturer's specifications.

b. Place the SHUT DOWN solenoid in the RUN position.

c. Place the SHUT DOWN cable in its RUN position.

d. Adjust the SHUT DOWN cable at the clevis so there is 0.0625 to 0.125 between the SHUT DOWN lever pin and the clevis end slot.

e. Tighten the lock nut on the SHUT DOWN cable against the clevis to secure this tolerance.

3. To test this adjustment:

a. Actuate the Emergency SHUT DOWN system by pulling and locking the "T" handles as previously described.

b. Check the SHUT DOWN lever for full travel.

c. Return the SHUT DOWN cable to its run or normal operating position.

d. Set clutch controls to neutral.

e. Start one engine at a time.

f. Activate the Emergency SHUT DOWN system at 600 rpm.

g. Restart the engine.

h. Activate the Emergency SHUT DOWN system at 2,300 rpm.

i. Perform tests d. through h. on the other engine.

H. Fuel Tank Replacement

Should it be necessary over the years to replace either or both fuel tanks in your Bertram, the following information is supplied to assist you.

1. The Forward Fuel Tank. Once the forward fuel tank is disconnected and detached from the hull, this tank can be removed from and a new tank replaced into the vessel through the engine-removal hatch without the necessity of cutting away and then replacing any of the vessel's structure.

2. The Aft Fuel Tank. Removing and replacing the Aft fuel tank requires that you cut through, remove, and replace a section of the cockpit sole. Refer to Drawing Number 18A 9201, Sheet 12, and proceed in the following manner:

a. Remove the cockpit side closeout panels;

b. remove the generator;

c. remove the port and starboard water tanks;

d. if installed, remove the flush baitwell;

****

CAUTION

When cutting the cockpit sole, take care NOT to cut any deeper than necessary to avoid damaging equipment that lies just below the cockpit sole (i.e., the mufflers).

****

e. following the lines shown on Drawing Number 18A 9201, Sheet 12, cut through the cockpit sole;

f. remove the screws at hullside in the area of the cockpit sole to be removed;

g. carefully use wedges from the underneath to break the "3M" 5200 adhesive bond between the tops of the bulkheads and the hull side shelves;

h. pry up and remove the portion of the cockpit sole between the cut lines;

i. disconnect the old tank;

j. unfasten the old tank;

k. remove the old tank;

l. install the new tank;

m. clean off any remaining "3M" 5200 adhesive;

n. repair any cracked wood or broken fiberglass;

o. coat the top of the bulkheads and hull side shelves with "3M" 5200 adhesive;

p. reposition the cutout piece of cabin sole ensuring that the replaced cabin sole piece lines up with the cut lines;

q. screw through sole at hull side shelves and weight down sole along bulkheads;

r. bond along cutline from underneath using a 6-inch wide laminate consisting of 1.5-ounce mat, 1.5-ounce mat, 22-ounce woven roving, 1.5-ounce mat, 22-ounce woven roving and isopthalic resin;

s. fill the cutline from the top with isopthalic resin to within 1/8th inch of the sole surface;

t. finish filling the cutline with gelcoat to match the surrounding sole surface; and,

u. reconnect the tank.

XXI. SEAWATER WASHDOWN SYSTEM (OPTIONAL)

****
*
* CAUTION
*
* When installed, SEAWATER FAUCET(S) should
*
* be clearly labeled to prevent the accidental
*
* use of seawater for drinking or cooking.
*
****

A. General

The seawater washdown system is an optional convenience feature designed for the fisherman. This system is intended to make the cleaning of the fish boxes, bait wells, and the cockpit area while at sea both easier and neater.

As shown in Drawing 18A 9201, Sheet 11, this system consists of:

1. A seacock equipped with a slotted strainer to provide the seawater;

2. a seawater pump;

3. a circuit breaker with its associated indicator light on the 120 V.A.C. DISTRIBUTION Panel; and,

4. at least one seawater faucet.

If the preparation center is an option on your Bertram, a second seawater faucet is a part of this unit.

B. Operation

The pump is powered by 120 V.a.c. and it is activated by the SALT WATER PRES SYSTEM circuit breaker which is number 114 located on the 120 V.A.C. DISTRIBUTION Panel in the salon.

Bertram recommends that the seawater pump be switched "OFF" except when in use. However, a relief valve and an overboard discharge through-hull fitting are provided to relieve the pressure on the system when the faucets are closed.

XXII. STORING YOUR BERTRAM

A. Dry Storage

Indoor storage is the generally preferred method for storing your Bertram providing there is good ventilation and the location is otherwise safe and dry. For any special instructions on a covering for outdoor storage, refer to "Docking Plan" drawing.

1. Dry Bilge:

a. Remove the optional bilge drain plug if your vessel is fitted with one;

b. open all valves and/or seacocks;

c. flush toilet two or three times;

d. have holding tank flushed and pumped out;

e. Where possible, drain the water from the following to prevent damage from freezing in cold climates and water stagnation in warm climates:

1) Tanks;

2) water lines;

3) sewage lines; and,

4) pumps.

d. If your local weather requires, add antifreeze to any low position water lines that cannot be drained.

e. If possible, remove the fresh water pump and motor assembly for storage. If the pump must be left on the vessel for the winter, it must be:

1) thoroughly drained and

2) pump inlet and outlet connections removed.

2. Electric and electronic Equipment. The best practice is to remove and store the electrical and electronic equipment in a safe, warm, and dry place over the winter.

3. Ventilating Your Bertram:

a. Open the windows and hatches sufficiently to allow the air to circulate.

b. Leave the locker doors and the drawers open.

c. Wash and thoroughly dry the ice chests and the refrigerator.

d. Mattresses and cushions:

1) If possible clean and store in a dry place.

2) If they must be left aboard, prop up on one end for maximum ventilation.

e. Synthetic material lines need only proper handling and occasional cleaning.

f. Natural fiber lines should be carefully dried and kept in a well ventilated place.

****
*
* CAUTION
*
* When preparing toilet for storage
*
* Do NOT oil any rubber or leather parts.
*
****

g. With any ships toilet, after the holding tank, the water supply, and the discharge lines are flushed and drained, apply a light coat of oil to all metal parts.

h. To protect chrome, stainless steel, or aluminum deck hardware:

1) First remove all salt deposits with water,

2) then clean with a good quality non-abrasive type metal cleaner; and,

3) give items a light coat of grease.

B. Wet Storage

Except, of course, that all seacocks and valves must first be checked for freedom of movement and then placed in the "CLOSED" position and that the vessel's batteries will remain on board with the main battery switches in the "OFF" position, all of the steps required to prepare your vessel for dry storage also apply to wet storage. However, Bertram also recommends that:

1. The zinc "fish" be used as pointed out in the Maintenance Section under "Electrolysis".

2. The bilge pumps should be in automatic mode.

3. The batteries should be kept charged.

C. Fitting Out

To ensure maximum pleasure and enjoyment from your Bertram after an extended lay up, a thorough check of the boat and equipment is necessary with the required maintenance being done as in-

dicated. The following list is intended only to serve as a guide for the more important items to be accomplished (not necessarily in the order to be done.)

NOTE:

Pre-Launch and Post Launch Checks. In all likelihood, your Bertram has been delivered to you in the water with these checks made by your Bertram dealer. However, if your Bertram was hauled for the winter, and you are fitting out for the new season, be sure these check are made.

D. Pre-Launch

1. Check to be certain that:

a. All thru-hull fittings and their associated strainers are clean and secure;

b. both shafts should turn freely;

c. the propeller nuts, jam nuts, and cotter pins are secured per the drawing shown in Section XII, G.

d. the rudders fit well in the rudder port;

e. the set screws holding bearing shells on the struts are in place;

E. Post-Launch

1. Check to be certain that:

a. If moored, the electrical and water supply lines, and the sewage discharge line is secure;

b. all fittings are tight;

c. both propeller shaft stuffing boxes are properly adjusted.

d. the shaft alignment is checked per the procedure outlined in the "Mechanical Systems Section";

e. the rudder packing glands are properly adjusted;

f. the bilge pumps are working; and,

g. the bilge blowers are working.

F. Electrical System Check

Before putting to sea for the first time after taking your Bertram out of storage, check to ensure that:

1. The batteries are properly charged at 1.260 sg. If they indicate a reading of less than 1.220 sg. have them charged.

2. The engine wire looms are:
   a. In good repair;
   b. Secure;
   c. away from the exhaust manifolds; and,
   d. all electrical connections are tight.

3. Check each piece of standard and optional electrically operated equipment to make sure each is working properly.

G. Engine Check

Before putting to sea for the first time after taking your Bertram out of storage, check to ensure that:

1. The following are (1) in good repair; (2) secure; and, (3) all fittings are tight:

a. The fuel lines;

b. the cooling lines;

c. the exhaust fittings;

d. the engine mount fastenings; and,

e. the engines and shafts are in the proper alignment per the specifications given in the Propulsion Section;

NOTE:

See engine manual for service instructions.

H. Controls Check

Before putting to sea for the first time after taking your Bertram out of storage, check to ensure that:

1. The clutches are properly adjusted;

2. all clutch fittings are secured;

3. that the shift levers on the transmission have full engagement when control levers on the flybridge are moved to full ahead or full astern;

4. both throttles are properly adjusted;

5. all throttle fittings are secured;

6. the steering is positive;

7. the steering linkage is secure;

8. the steering system hydraulic fluid reservoir has the correct amount of hydraulic fluid;

9. the steering system hydraulic fluid reservoir has the correct amount of air pressure;

10. the rudder moves freely; and,

11. all gauges and indicators are fully operational (check after starting engines).

XXIII. FIBERGLASS CARE

A. General

The fiberglass construction which makes up the entire hull and most of the superstructure of your Bertram yacht consists of several parts. The exterior gelcoat (approximately 0.015 inches in depth) is what gives the fiberglass its glossy finish. This exterior layer or gelcoat consists of a special polyester resin into which coloring pigments were mixed to give a built-in color. Beneath the gelcoat is a series of glass fabric laminations bonded together with polyester resin. During manufacturing, the laminations and the gelcoat are bonded together by a chemical action and the part becomes a one-piece unit. The following recommendations will help you keep this unique material in the same condition it was when it left the factory.

B. Seasonal Care (at fitting out time)

1. Clean the surface with soap and water.

2. Treat with white automotive type polishing compound; use lightly and follow the manufacturer's directions.

3. Wax and polish the surface with a paste type of automobile wax.

NOTES:

1) **Some modern paste wax products provide both rubbing and waxing action in one. These products are acceptable.**

2) **fiberglass repairs more extensive than those described here should be made only with the help and advice of your Bertram dealer.**

1. Loss of Gloss. To restore the glossy appearance of the gelcoat surfaces, a light buffing may be advisable.

a. For hand buffing, use a slightly abrasive rubbing compound similar to DuPont Number 71 or

b. if a power buffer is used, Mirror-Glaze Number 1 or a similar product is recommended.

c. After buffing, the surface should be waxed and polished as described above for "Seasonal Care".

2. Stains. The fiberglass gelcoat surface on your Bertram yacht is highly resistant to stains. Most of the stains which do occur can easily be removed with a household detergent. Crayon, lipstick, or shoe polish can be removed with plain alcohol. Ink spots will come off with Ajax or a similar detergent. While true penetrating stains are very uncommon, some products with unusual chemical contents may go too deep for ordinary removal methods. In such cases, weak solution of acids or alkalis, such as hydrochloric acid or ammonia, can be tried. However, these may produce a slight discoloration in the gelcoat. If none of the above methods are successful, it may be necessary to sand down through the gelcoat to remove the stain. This will require refinishing (see below).

3. Scratches and Abrasions. Those scratches and/or abrasions that do not penetrate the full thickness of the gelcoat can be treated by lightly sanding and buffing the area. Larger scratches that do penetrate the gelcoat but do not go deeply into the fiberglass or weaken the structure can also be repaired as

follows:

a. Clean the damaged area first with mineral spirits or turpentine to remove dirt and wax, then follow with a detergent and rinse, and allow to dry completely.

b. Secure a small amount of pigmented gelcoat resin that matches the color of the area to be repaired. This material is available to you from your Bertram dealer.

c. Add two drops of catalyst per cubic inch of gelcoat and mix thoroughly; the mixture will gel in 15 minutes.

d. Fill the scratch with the mixture before the mixture hardens.

e. Round the patch off to about 1/16 of an inch to 1/8 of an inch above the surrounding surface.

f. Lay a piece of wax paper or cellophane on top of the patch and press lightly to remove all the air. Take off the paper after 20 minutes and allow the patch to cure overnight.

g. Lightly sand the area with 600 grit wet sandpaper.

h. Finish the patch by rubbing and buffing with a regular buffing compound.

C. Painting Fiberglass Surfaces

1. Thoroughly clean all dirt and grease from the fiberglass part to be painted with mineral spirits, turpentine, or other commercial solvents.

2. Wash with detergent and rinse.

3. After the surface is dry, sand it lightly with garnet, fine oxide, wet and dry, or @220 sandpaper. Wipe clean of all dust.

3. Apply two thin coats of primer following the directions of the marine paint manufacturer.

4. Apply the best available marine paint as recommended by the manufacturer.

5. Bottom anti-fouling paint should only be applied per the manufacturer's instructions. Bertram's usual procedure is to apply Pettit Trinidad "75" anti-fouling paint unless an owner specifically requests a different brand. Before repainting a bottom, a check should be made to ensure that the brand and type are fully compatible with the type presently on the bottom.

NOTE:

Some types of bottom paint are <u>NOT</u> compatible with Pettit unless a primer is used first.

6. Before applying anti-fouling paint, make sure the trim tab assemblies are covered (masked off), particularly

the hydraulic cylinder piston rods. Ensure that the lower portion of the cylinder where the ram comes out of the cylinder has been fully protected.

NOTE:

<u>NEVER</u> PAINT ON the depth sounder transducer or zincs,

D. Bottom Blisters.

Regardless of the quality of the materials used and of the care taken in construction, bottom blisters may occur on any fiberglass hull. These blisters are a concern purely from a cosmetic standpoint since they do NOT affect either the strength or the watertight integrity of your vessel.

If you do observe bottom blisters, we suggest that you contact the Bertram Service Department before you attempt any repairs.

XXIV. BATTERY CARE

A. Battery Water

1. Distilled Water. The preferred choice for adding to the electrolyte is distilled water. However, in the event of the non-availability of distilled water, a good grade of drinking water can be used if it is free of minerals, particularly iron. Adding water to a cell will temporarily lower the specific gravity of the electrolyte in that cell. However, this does not mean that the cell has lost any of its charge.

****
*
* CAUTION *
*
* Do NOT overfill battery cells. Overfilling *
*
* causes acid to leak during charging which *
*
* corrodes the battery terminals and cables. *
*
****

2. Filling Procedure.

a. Inspect each cell;

b. fill cells when required (the top of the plate separators should never be exposed) and,

c. fill with water until liquid level is about 3/8 of an inch above the top of the separators.

Do NOT overfill.

(Excessive liquid will cause acid to spill out the vents when the battery is charging which causes corrosion at the terminals and the battery cables.)

B. **Excessive Loss of Liquid**

Under proper operating conditions, batteries should require only a slight amount of water every few weeks. If excessive amounts of water are required, this is usually a sign that the battery is being overcharged and the engine alternators and converter should be checked.

C. **Maximum Charge Voltage**

Use the Battery Condition Meter on the 12vdc distribution panel to check the voltage. The 12vdc system maximum charge rate is 14.1vdc.

D. **Cleaning the Batteries**

1. Be sure that the battery caps are on tight;

2. being careful not to scatter corrosion products; clean the battery top with a stiff (non metallic) brush;

3. wipe off the battery top with a cloth wetted with ammonia or baking soda in water;

4. wipe the battery top off with a cloth dampened with clear water.

5. clean the battery terminals and the cable terminals to a bright metal finish whenever cables are removed; and,

6. coat the contact surfaces with petroleum jelly (Vaseline) before the terminals are reconnected.

E. Battery Gases -EXPLOSIVE

****
*
* WARNING
*
* GASES ESCAPING FROM ANY CHARGING LEAD ACID
*
* BATTERY ARE AN EXPLOSIVE MIXTURE OF HYDROGEN
*
* AND OXYGEN. THIS MIXTURE WILL EXPLODE WITH
*
* GREAT VIOLENCE AND SPRAYING OF BATTERY ACID
*
* IF A SPARK OR OPEN FLAME GETS TOO CLOSE.
*
****

TO AVOID SPARKS

1) Do not disturb the battery connections while charging.

2) When working on battery terminals be sure that:

A) the engines are not running and

B) that the converter has been turned off

F. Spilled Battery Acids

If battery acid is spilled, the following immediate actions are required to check or eliminate its damaging effects.

1. Acid splashed in the eye:

a. should be washed out IMMEDIATELY and CONTINUOUSLY with plenty of cold, fresh water for at least twenty (20) minutes.

b. If cold, fresh water is not available, use milk or any available water based liquid to dilute the acid.

c. always see a doctor.

2. Acid splashed on other parts of the body, the clothing, or parts of your vessel should be:

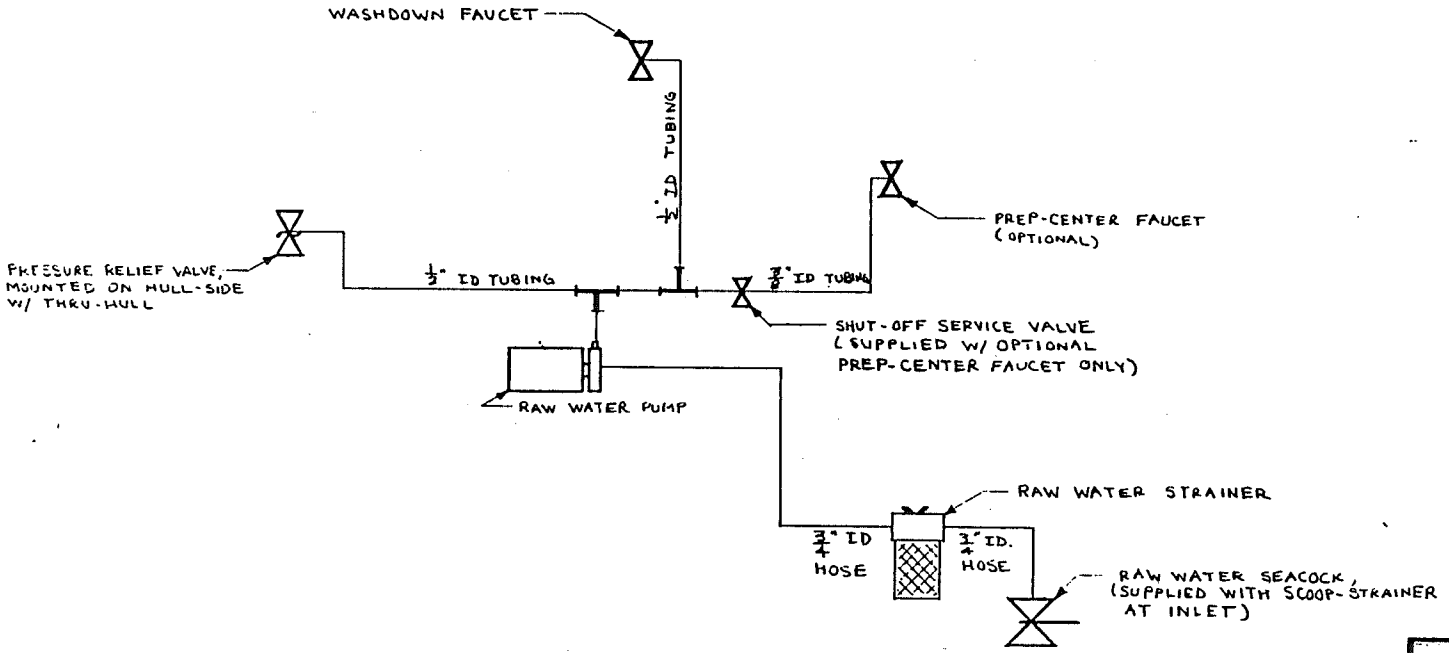
   a. removed immediately by washing thoroughly with cold water and

   b. the area neutralized with a solution of baking soda or household ammonia in water.

3. If a considerable amount of acid is spilled from the battery: The battery should be replaced. This is a job for a battery repairman.

AF 14692A

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.



BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.
A SUBSIDIARY OF WHITTAKER CORPORATION

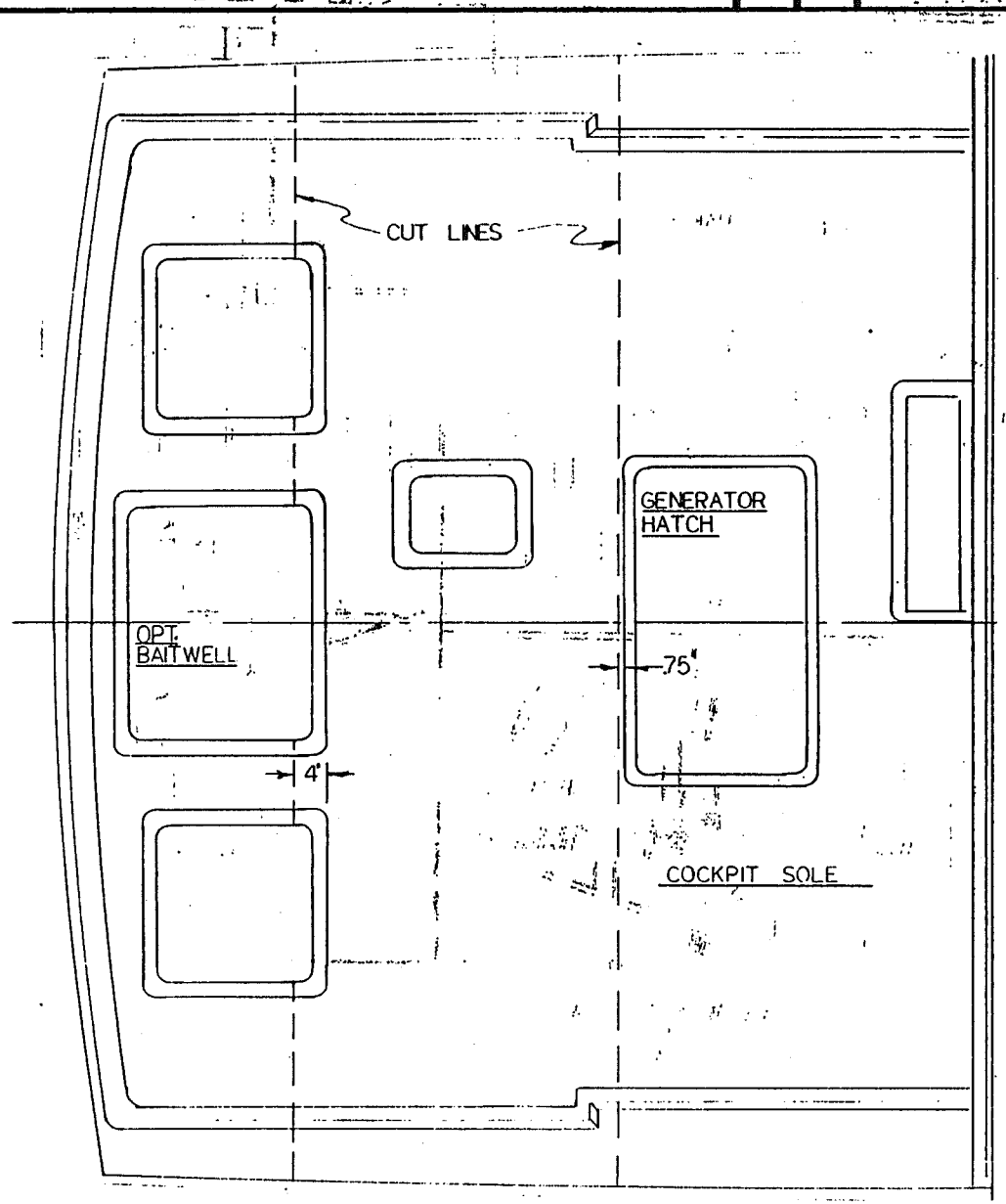
MODEL 375

TITLE SEA WATER WASHDOWN SYSTEM SCHEMATIC (OPTIONAL)

SCALE NONE			PLAN NO.	REV.
BY WW-LAA M.	APPV'D	18	A 9201	
DATE 5/27/86	DATE 6/3/86			

FILE SHT. #11

AF 14692A



REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

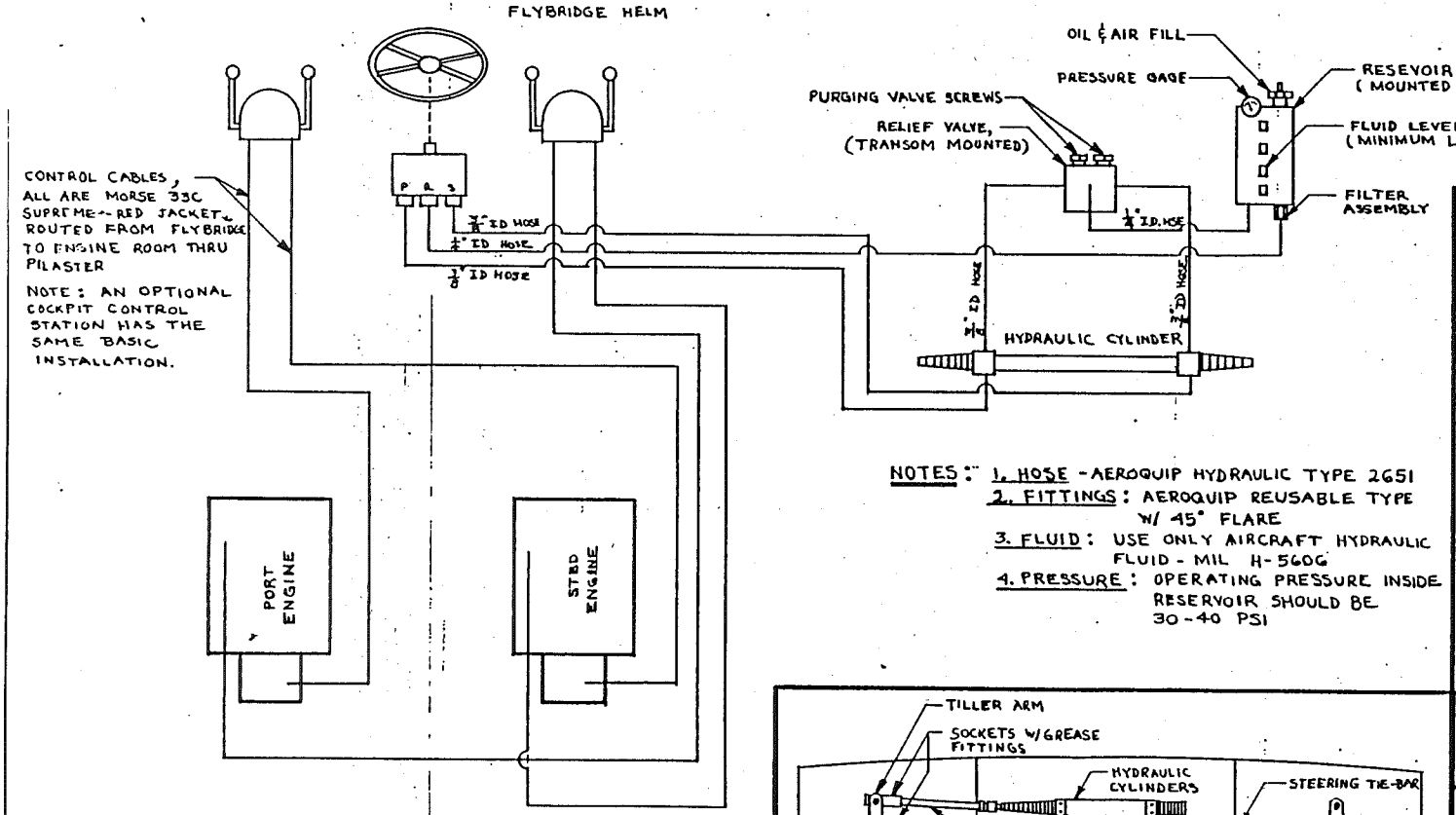
BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.
A SUBSIDIARY OF WHITTAKER CORPORATION

MODEL 37-5
TITLE COCKPIT SOLE CUT LINES FOR AFT FUEL TANK REPAIR

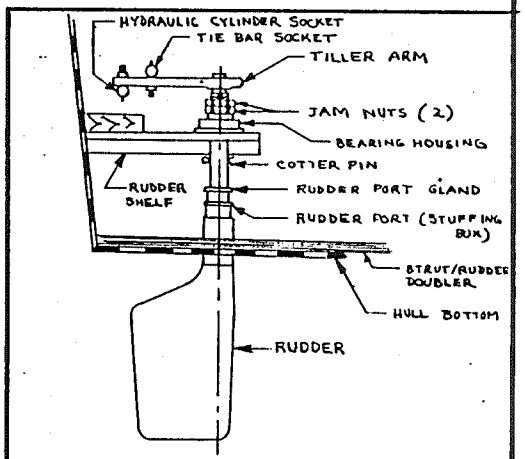
SCALE NONE			PLAN NO.	REV.
BY DFS	APPVD.	18	A 9201	
DATE 4/14/80	DATE			
FILE		SHT # 12		

F 14692A

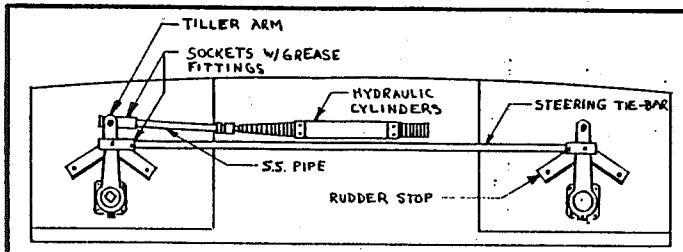
REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.



NOTES:
1. HOSE - AEROQUIP HYDRAULIC TYPE 2651
2. FITTINGS: AEROQUIP REUSABLE TYPE W/ 45° FLARE
3. FLUID: USE ONLY AIRCRAFT HYDRAULIC FLUID - MIL H-560G
4. PRESSURE: OPERATING PRESSURE INSIDE RESERVOIR SHOULD BE 30-40 PSI



RUDDER SECTION DETAIL



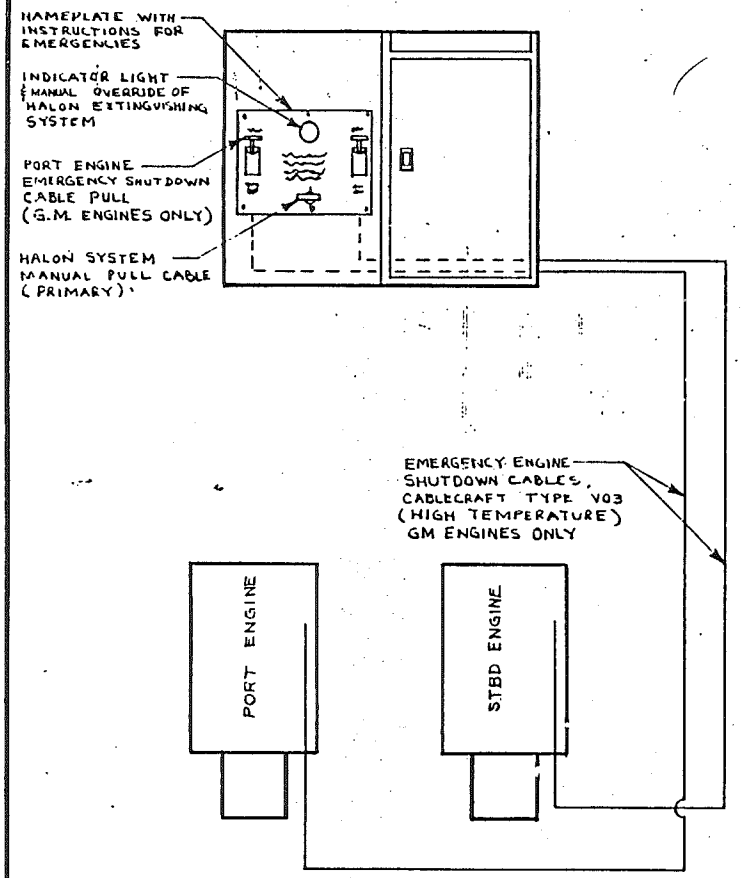
STEERING ASSEMBLY - PLAN VIEW

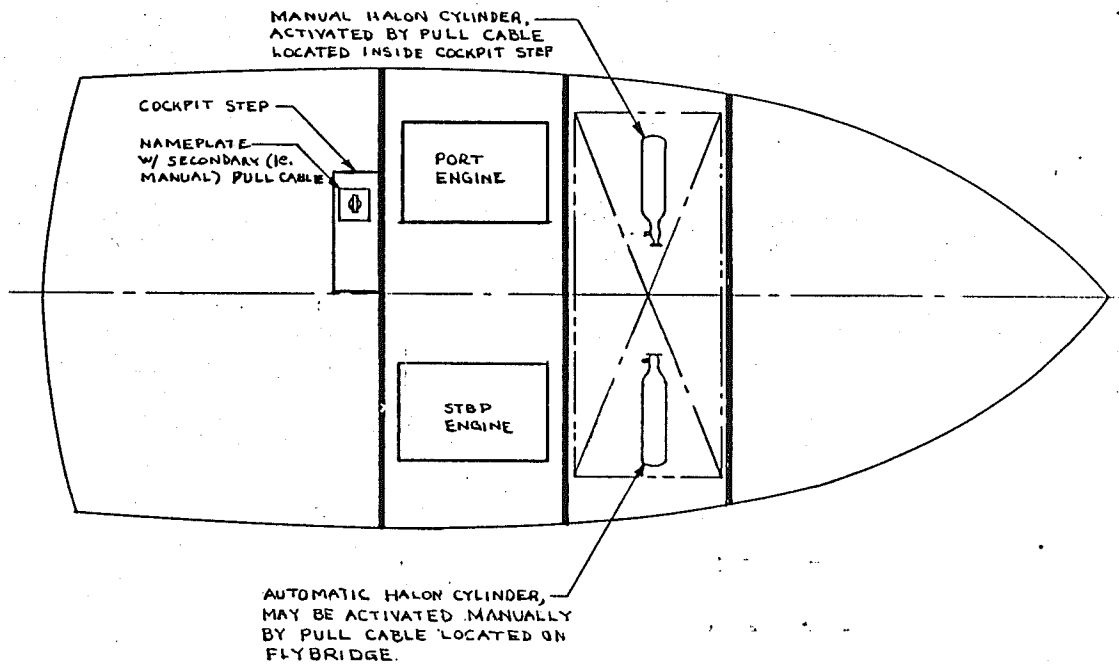
BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.
A SUBSIDIARY OF WHITTAKER CORPORATION

MODEL 375
TITLE ENGINE CONTROLS & STEERING SYSTEM SCHEMATICS

SCALE NONE			PLAN NO.	REV.
BY WALAA M.	APPROVED	18	A 9201	
DATE 5/27/86	DATE 6/3/86			
			FILE SHT # 1	

AF 14692A





REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.
A SUBSIDIARY OF WHITTAKER CORPORATION

MODEL 375

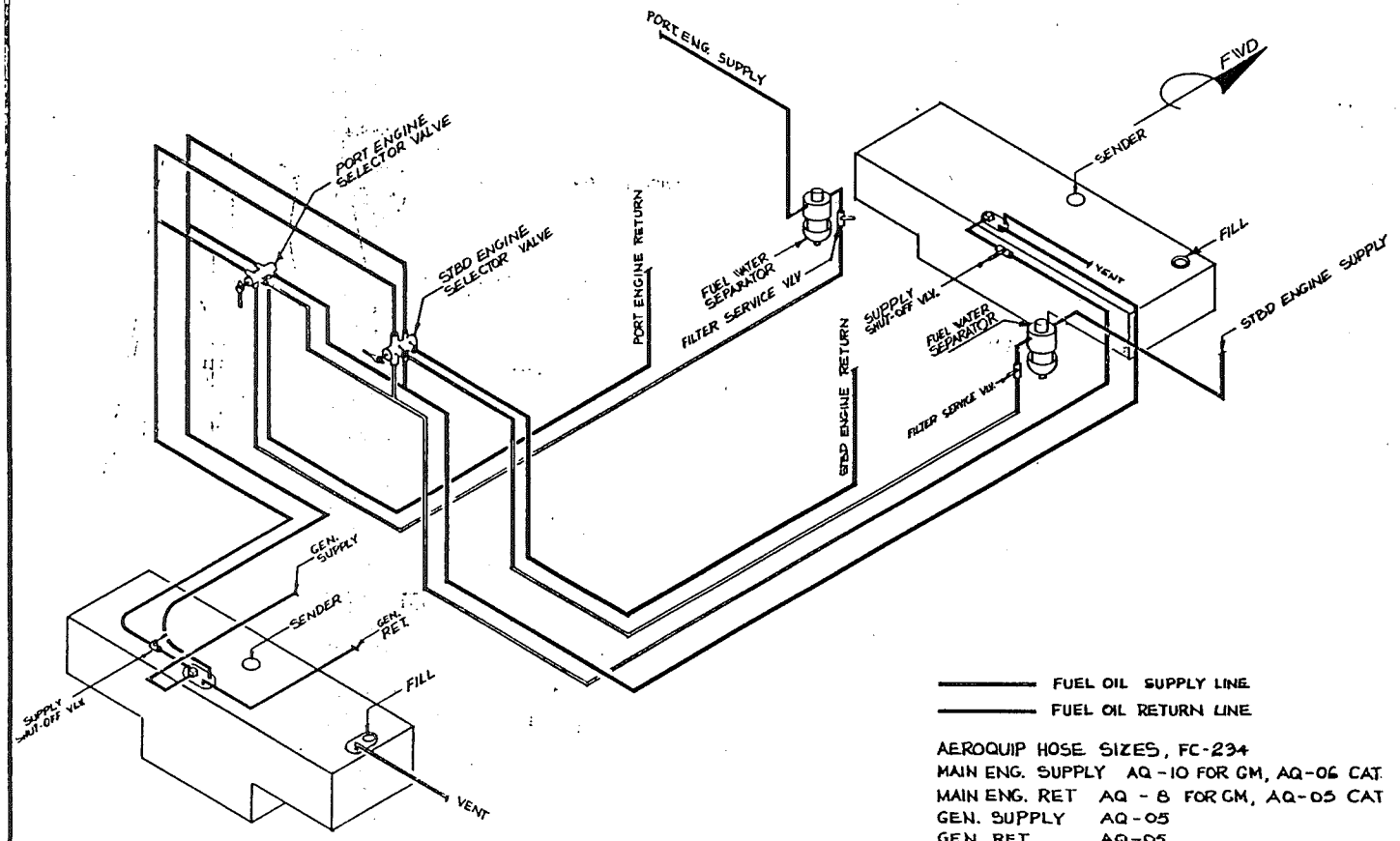
TITLE EMERGENCY CONTROLS & FIRE EXTINGUISHING SYSTEM

SCALE NONE			PLAN NO.	REV.
BY WALAA M.	APPD	18	A 9201	
DATE 5/26/86	DATE 6/3/86			

FILE SHT # 2

AF 38129A

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.



FUEL OIL SUPPLY LINE
FUEL OIL RETURN LINE

AEROQUIP HOSE SIZES, FC-234
MAIN ENG. SUPPLY AQ-10 FOR GM, AQ-06 CAT
MAIN ENG. RET AQ - 8 FOR GM, AQ-05 CAT
GEN. SUPPLY AQ-05
GEN. RET AQ-05

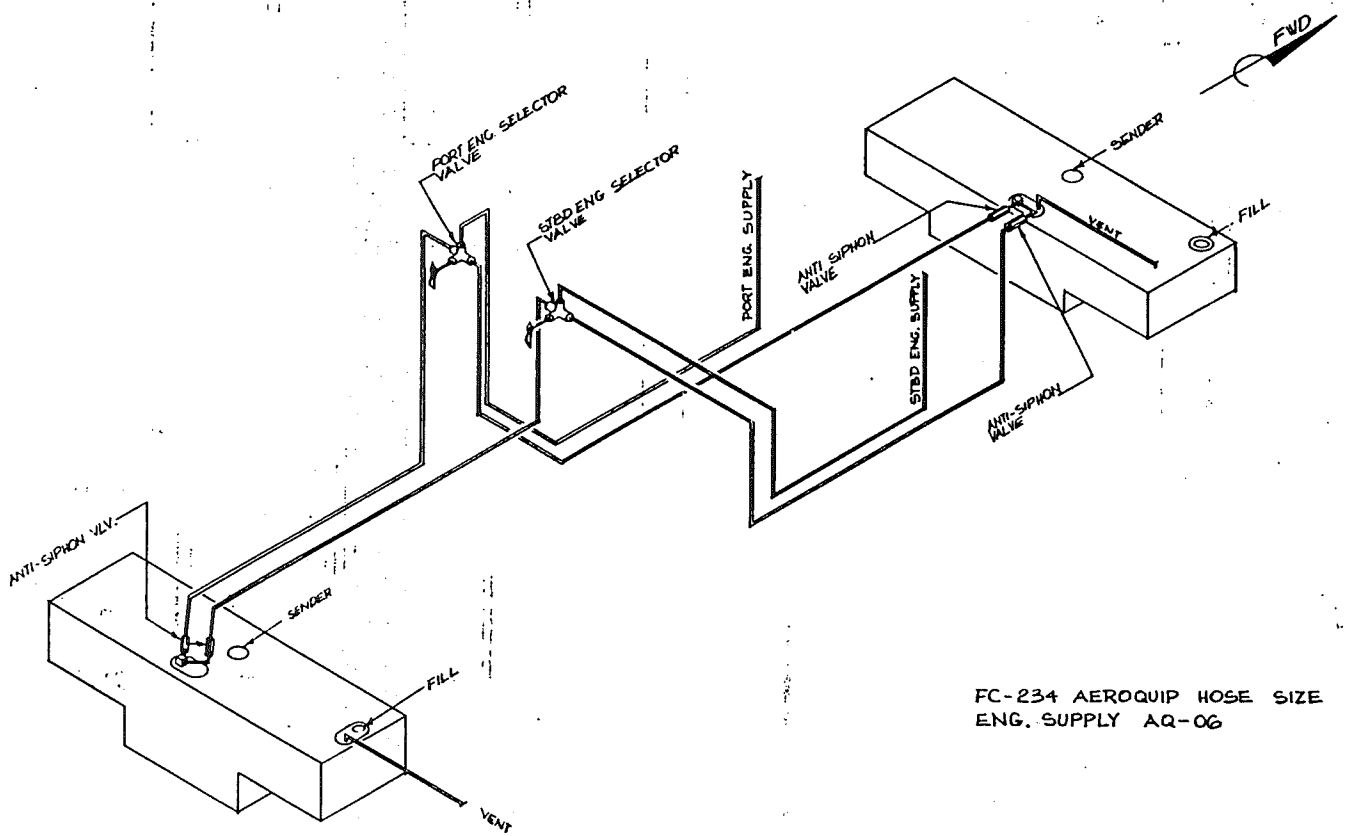
BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.

MODEL 375
TITLE FUEL SYSTEM DSL

SCALE	NONE			PLAN NO.	REV.
BY LAMARRE R	APP'D	18	A	9201	
DATE 5-28-86	DATE 6/3/86				
			FILE	SHT #4	

AF 38129A

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.



FC-234 AEROQUIP HOSE SIZE
ENG. SUPPLY AQ-06

BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.

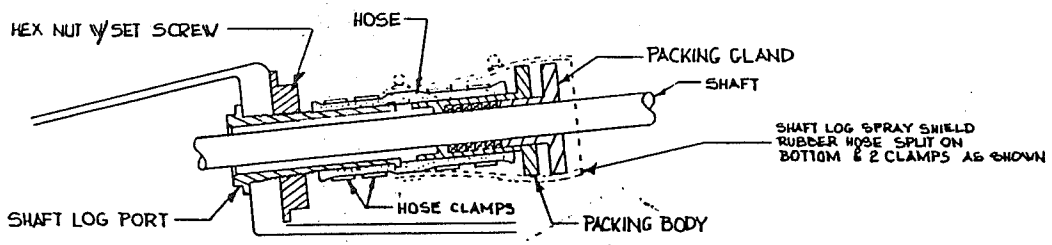
MODEL 375

TITLE FUEL SYSTEM MERC 340

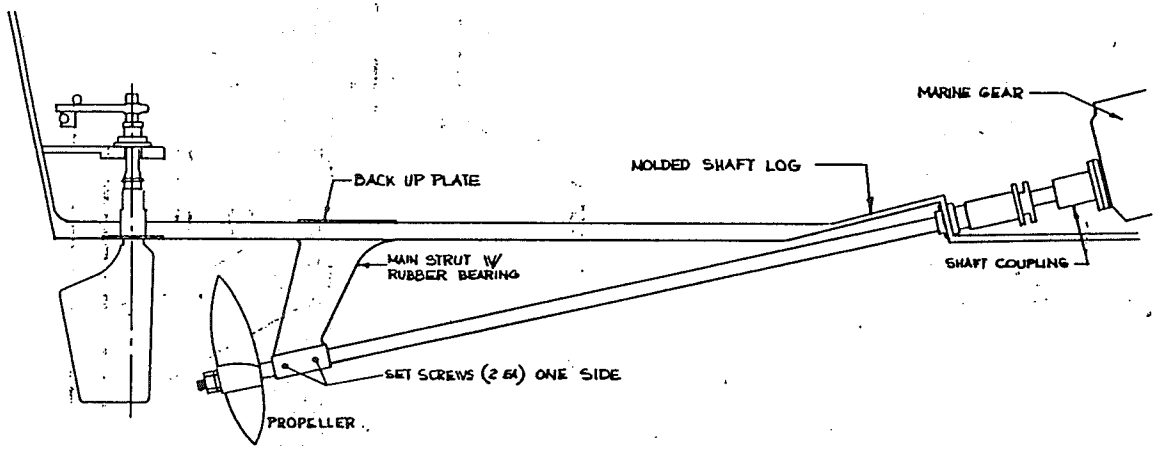
SCALE NONE			PLAN NO.	REV.
BY LAMARRE, R	APPVD	18	A 01	
DATE 5-28-86	DATE 6/3/86			

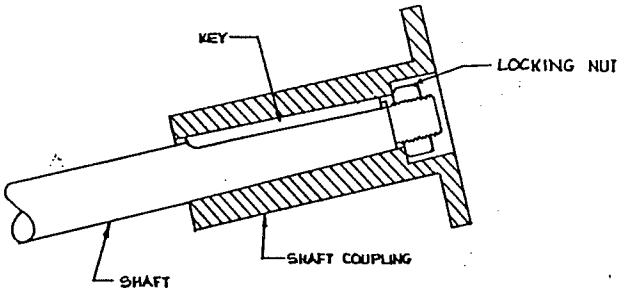
SHT #2

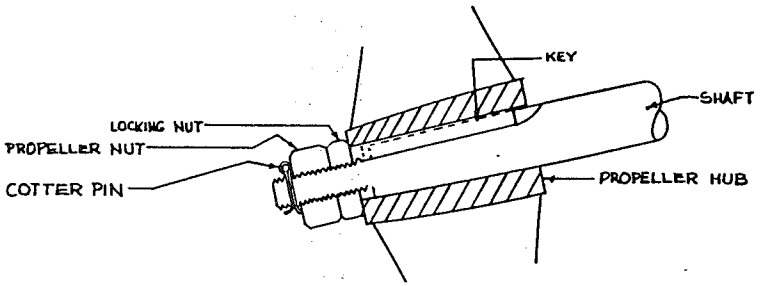
AF 38129A



SHAFT LOG ASSEMBLY







REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.

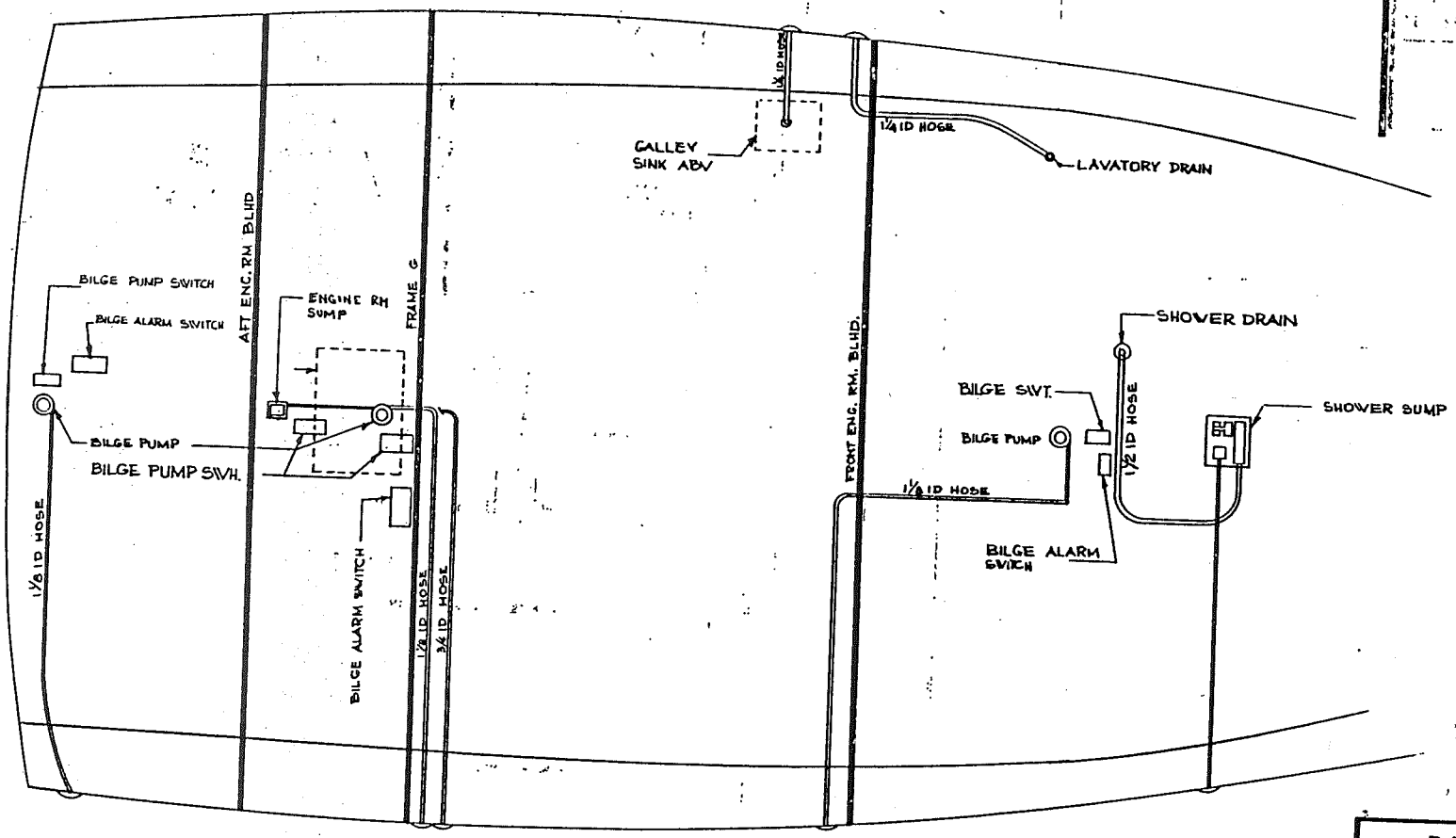
MODEL 375

TITLE PROPULSION SYSTEM

SCALE			PLAN NO.		REV.
NONE					
BY LAMARRE R	APPVD [illegible]	18	A	201	
DATE 5-29-86	DATE 6/3/86				

AF 39129A

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.

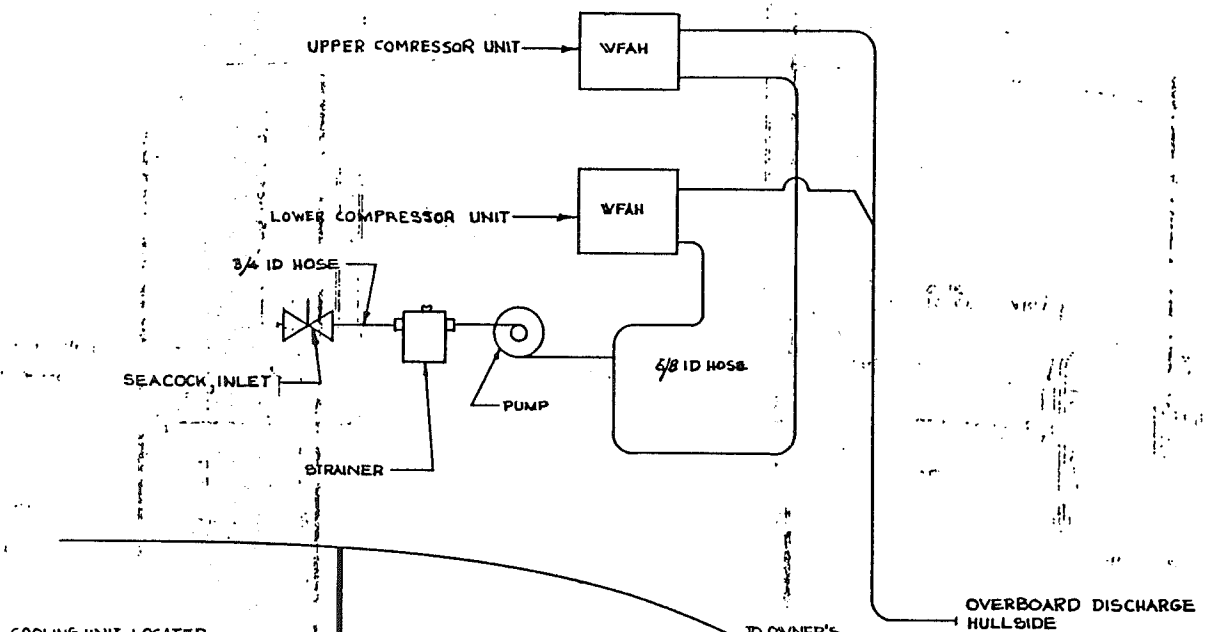


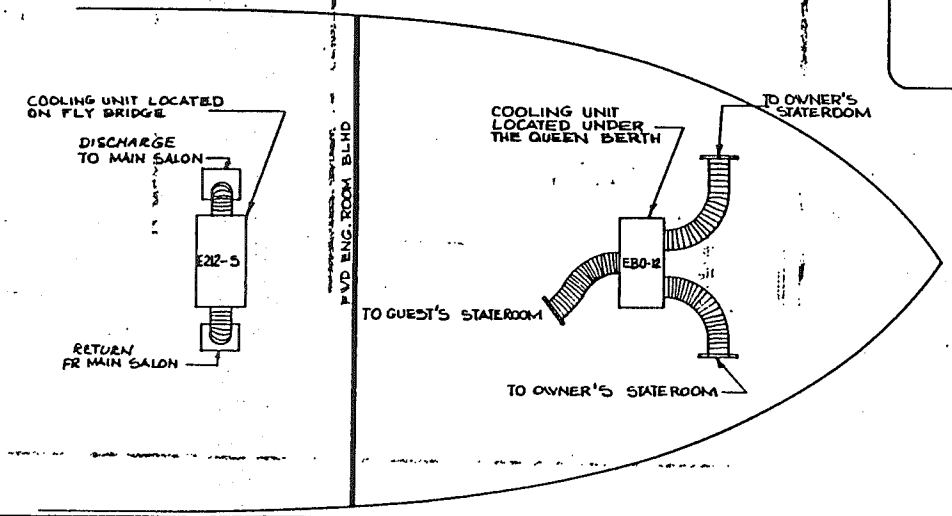
BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.

MODEL 375			
TITLE DRAINAGE SYSTEM			
SCALE NONE		PLAN NO.	REV.
BY LAMARRE R	APPVD	18	A 9201
DATE 5-29-86	DATE 6/3/86		
FILE	SHT # 6		

AF 381298

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.



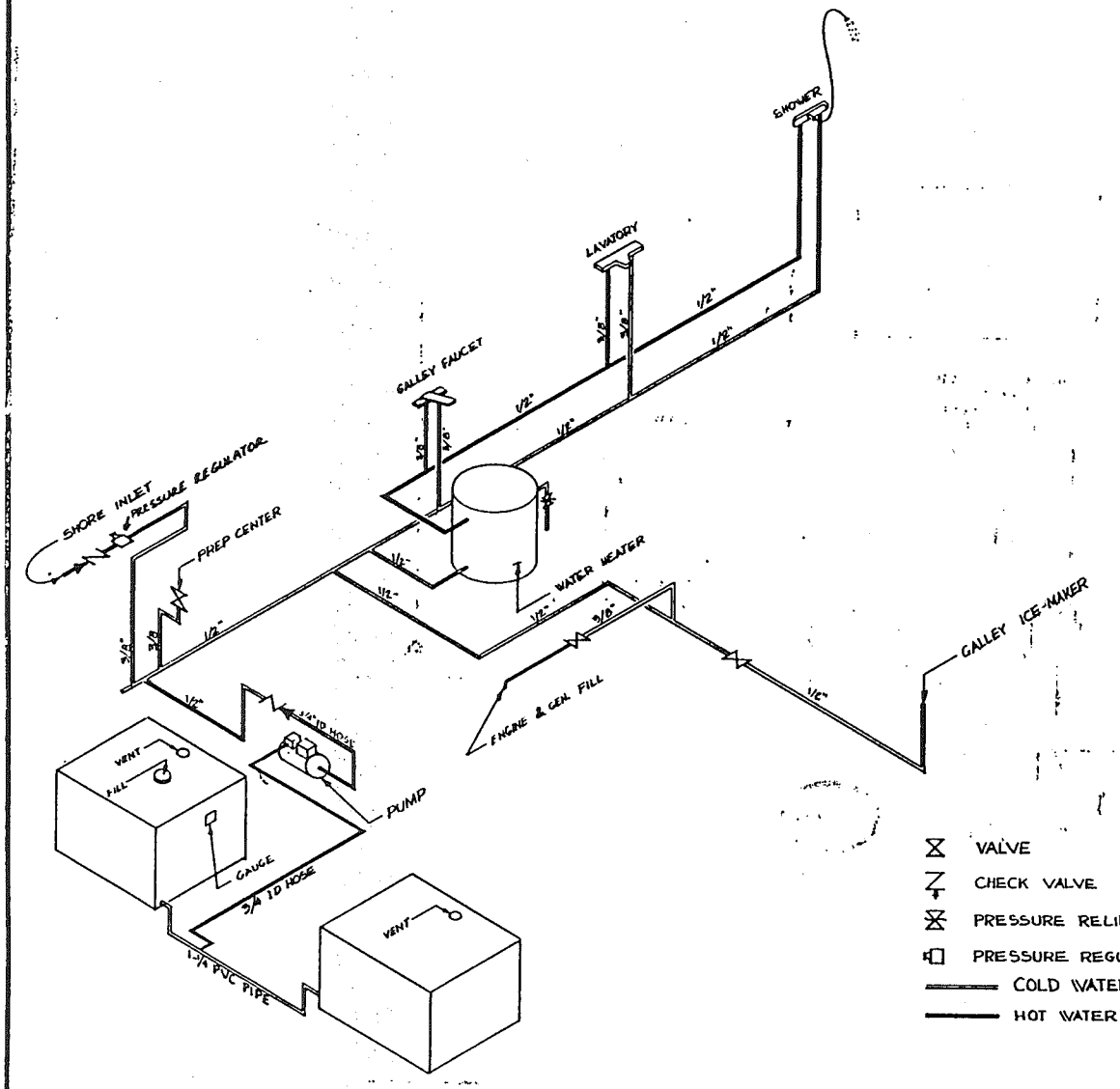


BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.

MODEL 375				
TITLE AIR COND, SEAWATER & DUCT ROUTING				
SCALE NONE			PLAN NO.	REV.
BY LAMARRE, R	APPD	18	A 9201	
DATE 5-29-86	DATE 6/3/86			
			FILE	SHT # 7

AF 39129A

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.



BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.

MODEL 375

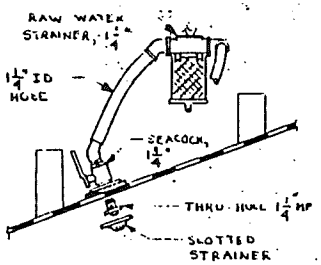
TITLE
FRESH WATER SYSTEM

SCALE NONE			PLAN NO.	REV.
BY LAMARRE, R	APP'D	18	A 9201	
DATE 5-27-86	DATE 6/3/86			

FILE SH # 8

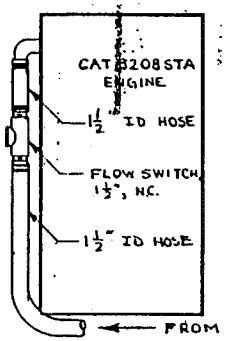
AF 14692A

CAT 3208 & MERC 340 RAW WTR INTAKE



LKG AFT TOWARDS AFT ENGINE RM WEBFRAME

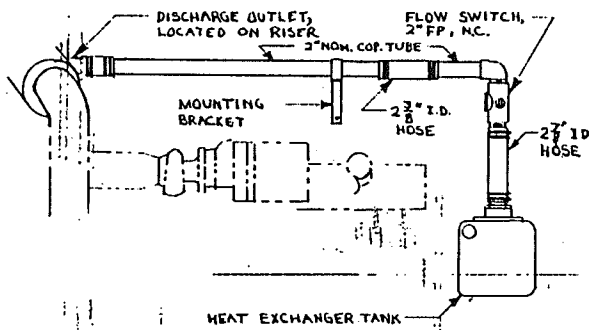
CAT 3208 ENGINE INTAKE



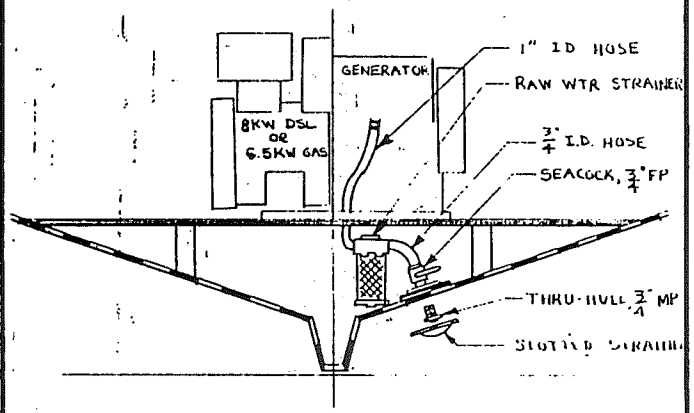
LKG DOWN @ ENGINES

(INTAKE LINES ARE LOCATED ON LEFT SIDE FOR BOTH ENGINES)

GM GV71TA DISCHARGE LINE



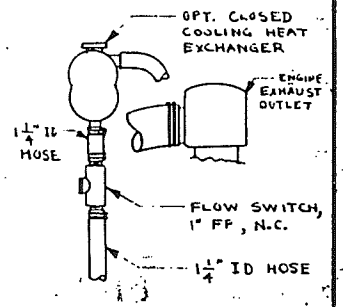
GENERATOR COOLING, INLET & DISCHARGE



NOTES: RAW WATER IS DISCHARGED THROUGH EXHAUST SYSTEM (OUTLET IS @ TRANSOM)

ABOVE SCHEMATIC IS FOR DIESEL GENERATORS ON GAS BOATS, INLETS ARE ON OPPOSITE SIDE

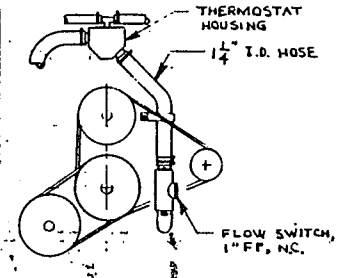
MERC 340 DISCHARGE (W/OPT. CLOSED COOLING)



LKG AT THE RIGHT SIDES OF ENGINES

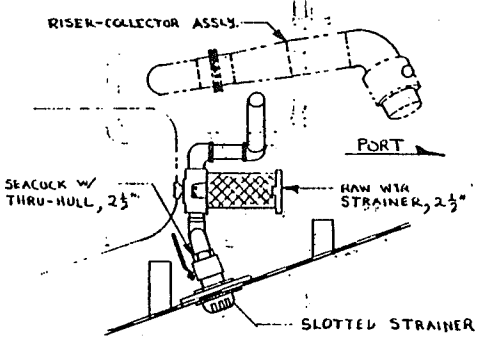
NOTE: RAW WATER IS DISCHARGED THROUGH EXHAUST

MERC 340 DISCHARGE (STANDARD COOLING)



LKG - AFT AT ENGINES

NOTE: RAW WATER IS DISCHARGED THROUGH EXHAUST



NOTE: HOSE SIZE OF RAW WATER INTAKE IS 2⅞" ID

LKG AFT AT AFT ENG. RM. WEBFR.

GM GV71TA INTAKE LINE

REVISIONS

LET.	DESCRIPTION	BY	DATE	APPV.

BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.
A SUBSIDIARY OF WHITTAKER CORPORATION

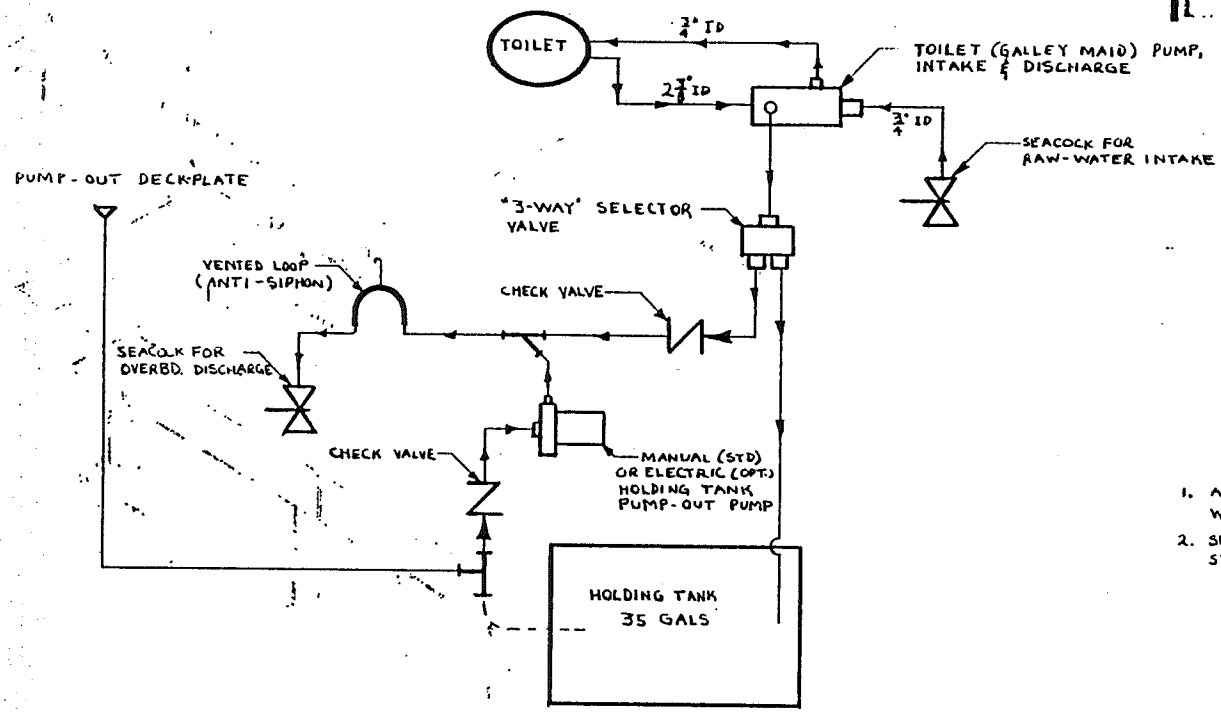
MODEL 375

TITLE ENGINE & GENERATOR COOLING, INTAKE & DISCHARGE

SCALE NONE			PLAN NO.		REV.
BY WALAA M.	APPVD.	18	A	9201	
DATE 5/23/86	DATE 6/3/86				
FILE		SHT # 10			

AF 14692A

REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.



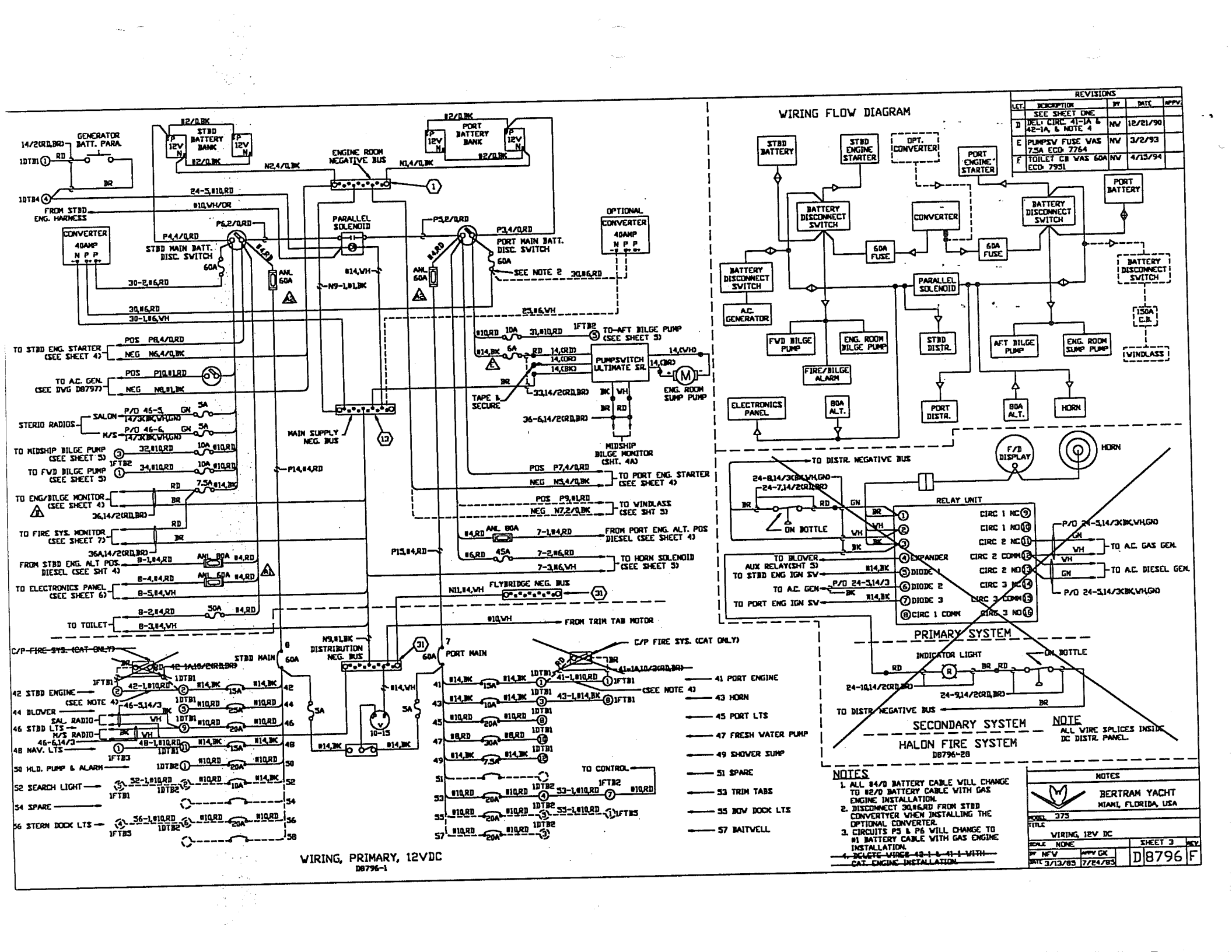
NOTES

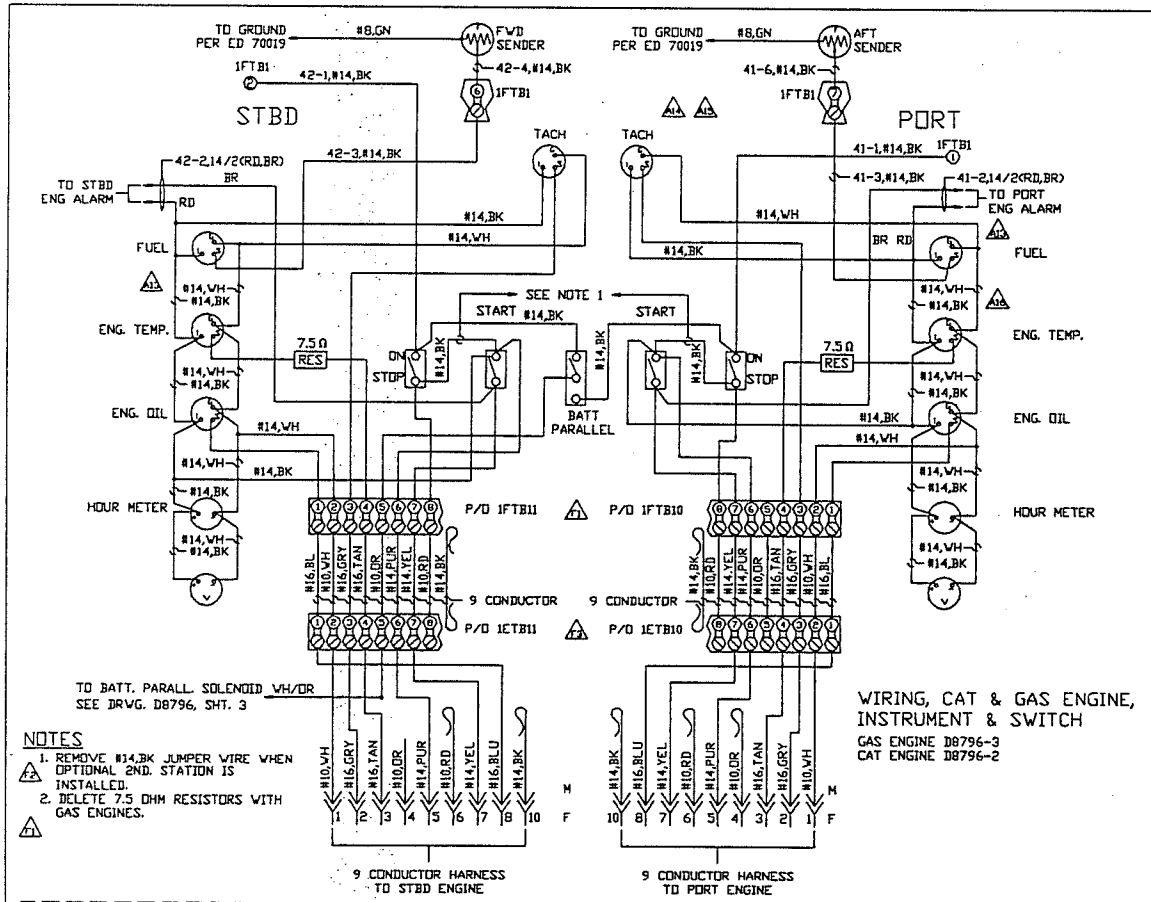
1. ALL HOSE SIZES ARE 1½" I.D. EXCEPT WHERE NOTED
2. SEE OWNERS MANUAL TEXT ON TOILET SYSTEM FOR DETAILS ON OPERATION

BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.
A SUBSIDIARY OF WHITTAKER CORPORATION

MODEL 375					
TITLE TOILET SYSTEM SCHEMATIC, GALLEY MAID					
SCALE NONE			PLAN NO.		REV.
BY WALAA M.	APPVD. CBK	18	A	9201	
DATE 5/27/86	DATE 6/3/86				

SHT # 9


WIRING FLOW DIAGRAM
REVISIONS
LET DESCRIPTION BY DATE APPV
SEE SHEET ONE
D DEL: CIRC 41-1A & 42-1A, & NOTE 4 NV 12/21/90
E PUMPSW FUSE WAS 7.5A ECO 7764 NV 3/2/93
F TOILET CB WAS 60A ECO 7951 NV 4/15/94
STBD BATTERY
STBD ENGINE STARTER
OPT. CONVERTER
PORT ENGINE STARTER
PORT BATTERY
BATTERY DISCONNECT SWITCH
CONVERTER
60A FUSE
PARALLEL SOLENOID
A.C. GENERATOR
FWD BILGE PUMP
ENG. ROOM BILGE PUMP
STBD DISTR.
AFT BILGE PUMP
ENG. ROOM SUMP PUMP
WINDLASS
150A C.B.
FIRE/BILGE ALARM
ELECTRONICS PANEL
80A ALT.
PORT DISTR.
HORN
F/B DISPLAY
RELAY UNIT
ON BOTTLE
EXPANDER
DIODE 1
DIODE 2
DIODE 3
CIRC 1 COMM
CIRC 1 NC
CIRC 1 NO
CIRC 2 NC
CIRC 2 COMM
CIRC 2 NO
CIRC 3 NC
CIRC 3 COMM
CIRC 3 NO
TO BLOWER AUX RELAY(SHT 5)
TO STBD ENG IGN SV
TO A.C. GEN
TO PORT ENG IGN SV
P/O 24-5,14/3
TO A.C. GAS GEN.
TO A.C. DIESEL GEN.
PRIMARY SYSTEM
INDICATOR LIGHT
SECONDARY SYSTEM
HALON FIRE SYSTEM
D8796-28
NOTE
ALL WIRE SPLICES INSIDE DC DISTR. PANEL.
GENERATOR BATT. PARA.
STBD BATTERY BANK
PORT BATTERY BANK
ENGINE ROOM NEGATIVE BUS
FROM STBD ENG. HARNESS
CONVERTER 40AMP
STBD MAIN BATT. DISC. SWITCH
PARALLEL SOLENOID
PORT MAIN BATT. DISC. SWITCH
OPTIONAL CONVERTER 40AMP
SEE NOTE 2
TO STBD ENG. STARTER (SEE SHEET 4)
TO A.C. GEN. (SEE DWG D8797)
STERIO RADIOS
TO MIDSHIP BILGE PUMP (SEE SHEET 5)
TO FWD BILGE PUMP (SEE SHEET 5)
TO ENG/BILGE MONITOR (SEE SHEET 4)
TO FIRE SYS. MONITOR (SEE SHEET 7)
FROM STBD ENG. ALT POS. DIESEL (SEE SHT 4)
TO ELECTRONICS PANEL (SEE SHEET 6)
TO TOILET
MAIN SUPPLY NEG. BUS
TAPE & SECURE
PUMPSWITCH ULTIMATE SR.
ENG. ROOM SUMP PUMP
MIDSHIP BILGE MONITOR (SHT. 4A)
TO STBD ENG. STARTER (SEE SHEET 4)
TO WINDLASS (SEE SHT 3)
TO PORT ENG. STARTER (SEE SHEET 4)
FROM PORT ENG. ALT. POS DIESEL (SEE SHEET 4)
TO HORN SOLENOID (SEE SHEET 3)
FLYBRIDGE NEG. BUS
FROM TRIM TAB MOTOR
TO-AFT BILGE PUMP (SEE SHEET 3)
C/P FIRE SYS. (CAT ONLY)
STBD MAIN
PORT MAIN
DISTRIBUTION NEG. BUS
42 STBD ENGINE (SEE NOTE 4)
44 BLOWER
SAL RADIO
46 STBD LTS
M/S RADIO
48 NAV. LTS
50 HLD. PUMP & ALARM
52 SEARCH LIGHT
54 SPARE
56 STERN DOCK LTS
41 PORT ENGINE
43 HORN
45 PORT LTS
47 FRESH WATER PUMP
49 SHOWER SUMP
51 SPARE
53 TRIM TABS
55 BOV DOCK LTS
57 BAITWELL
TO CONTROL
WIRING, PRIMARY, 12VDC
D8796-1
NOTES
1. ALL #4/0 BATTERY CABLE WILL CHANGE TO #2/0 BATTERY CABLE WITH GAS ENGINE INSTALLATION.
2. DISCONNECT 30,#6,RD FROM STBD CONVERTYER WHEN INSTALLING THE OPTIONAL CONVERTER.
3. CIRCUITS P3 & P6 WILL CHANGE TO #1 BATTERY CABLE WITH GAS ENGINE INSTALLATION.
4. DELETE WIRES 42-1 & 41-1 WITH CAT ENGINE INSTALLATION.
BERTRAM YACHT
MIAMI, FLORIDA, USA
MODEL 375
TITLE WIRING, 12V DC
SCALE NONE
SHEET 3
REV
BY NFV
APPV GK
DATE 3/13/85 7/24/85
D 8796 F

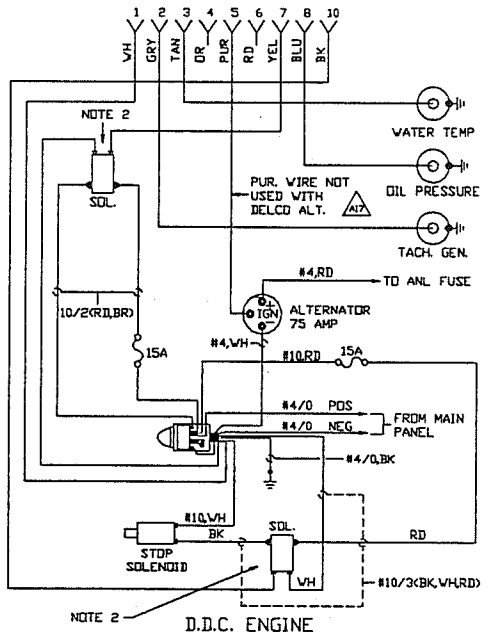


WIRING, CAT & GAS ENGINE, INSTRUMENT & SWITCH

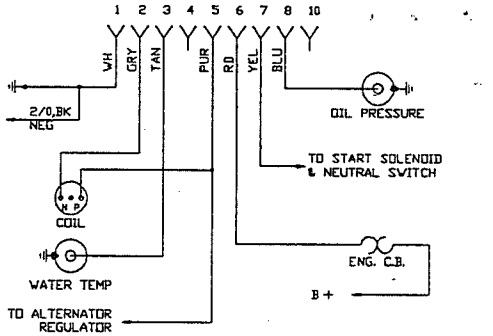
GAS ENGINE D8796-3
CAT ENGINE D8796-2

NOTES

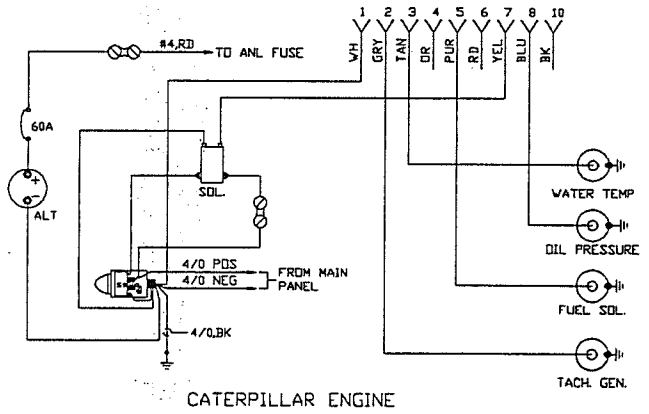
1. REMOVE #14,BK JUMPER WIRE WHEN OPTIONAL 2ND. STATION IS INSTALLED.
2. DELETE 7.5 OHM RESISTORS WITH GAS ENGINES.



D.D.C. ENGINE



PREWIRED GASOLINE ENGINE



CATERPILLAR ENGINE

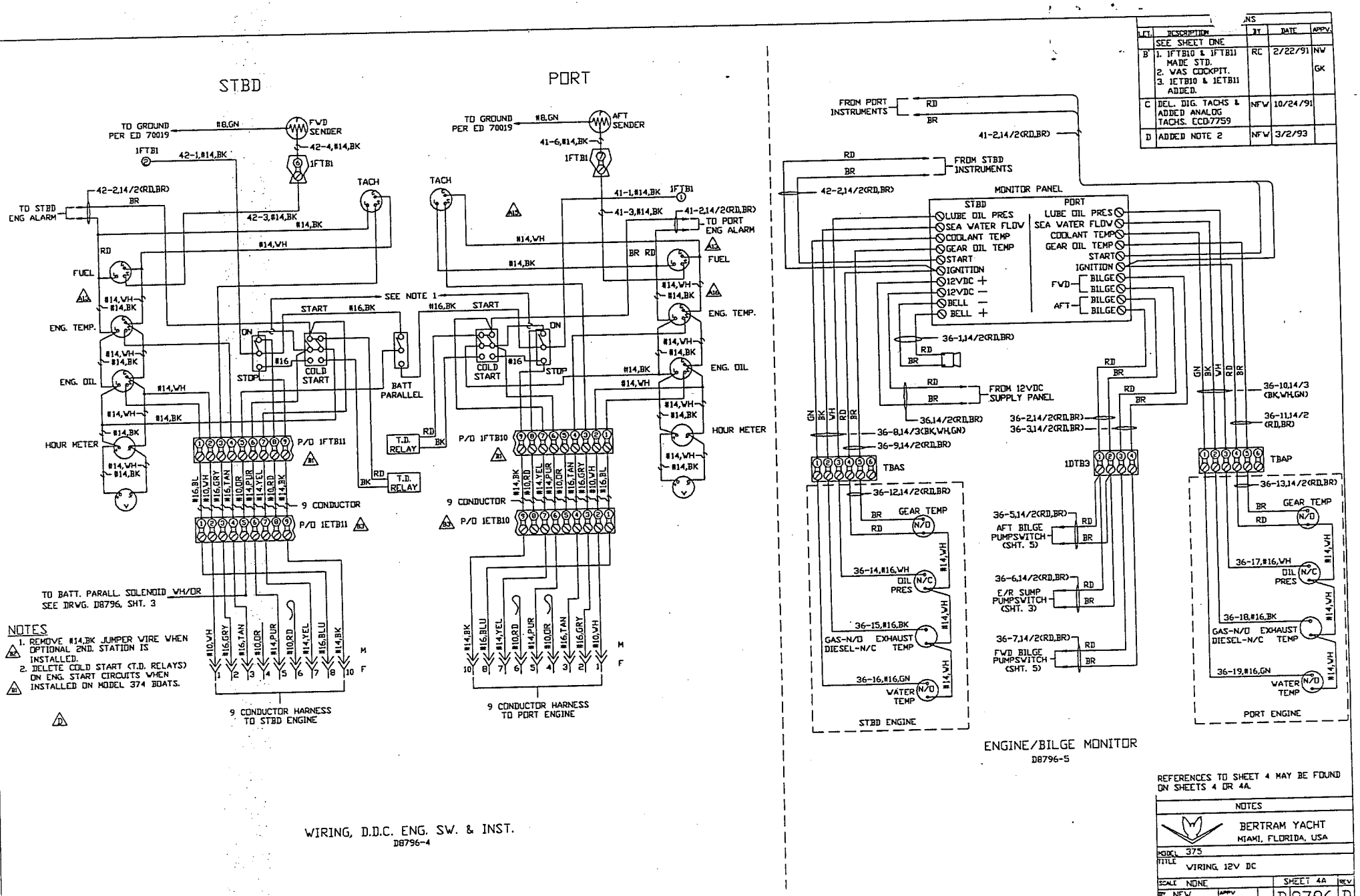
REVISIONS				
LET.	DESCRIPTION	BY	DATE	APPV.
	SEE SHEET ONE			
E	ADDED FUSE TO START SLAVE SOL. ECO: 7714	PAP	12/10/90	N.W. G.K.
F	1. 1FTB10 & 1FTB11 MADE STD. 2. WAS COCKPIT. 3. 1ETB10 & 1ETB11 ADDED.	RC	2/22/91	N.W. G.K.
G	DEL. DIG. TACH & ADDED ANALOG TACHS. ECO: 7759	NFW	10/24/91	

1. REFERENCES TO SHEET 4 MAY BE FOUND ON SHEETS 4 OR 4A.
2. SLAVE START & STOP SOLENOIDS TO BE MOUNTED NEXT TO ENG TERMINAL BLOCKS. PULL WIRE OUT OF CONDUCTOR HARNESS & CONNECT TO SOLENOID.

NOTES

BERTRAM YACHT
MIAMI, FLORIDA, USA

MODEL 375
TITLE WIRING, 12V DC
SCALE NONE
SHEET 4
REV
BY NFW
APPV GK
DATE 3/15/85 7/24/85
D 8796 G



WIRING, D.D.C. ENG. SW. & INST.
D8796-4

LT.	DESCRIPTION	BY	DATE	APPV.
	SEE SHEET ONE			
B	1. 1FTB10 & 1FTB11 MADE STD. 2. WAS COCKPIT. 3. 1ETB10 & 1ETB11 ADDED.	RC	2/22/91	NW GK
C	DEL. DIG. TACHS & ADDED ANALOG TACHS. ECD7759	NFW	10/24/91	
D	ADDED NOTE 2	NFW	3/2/93	

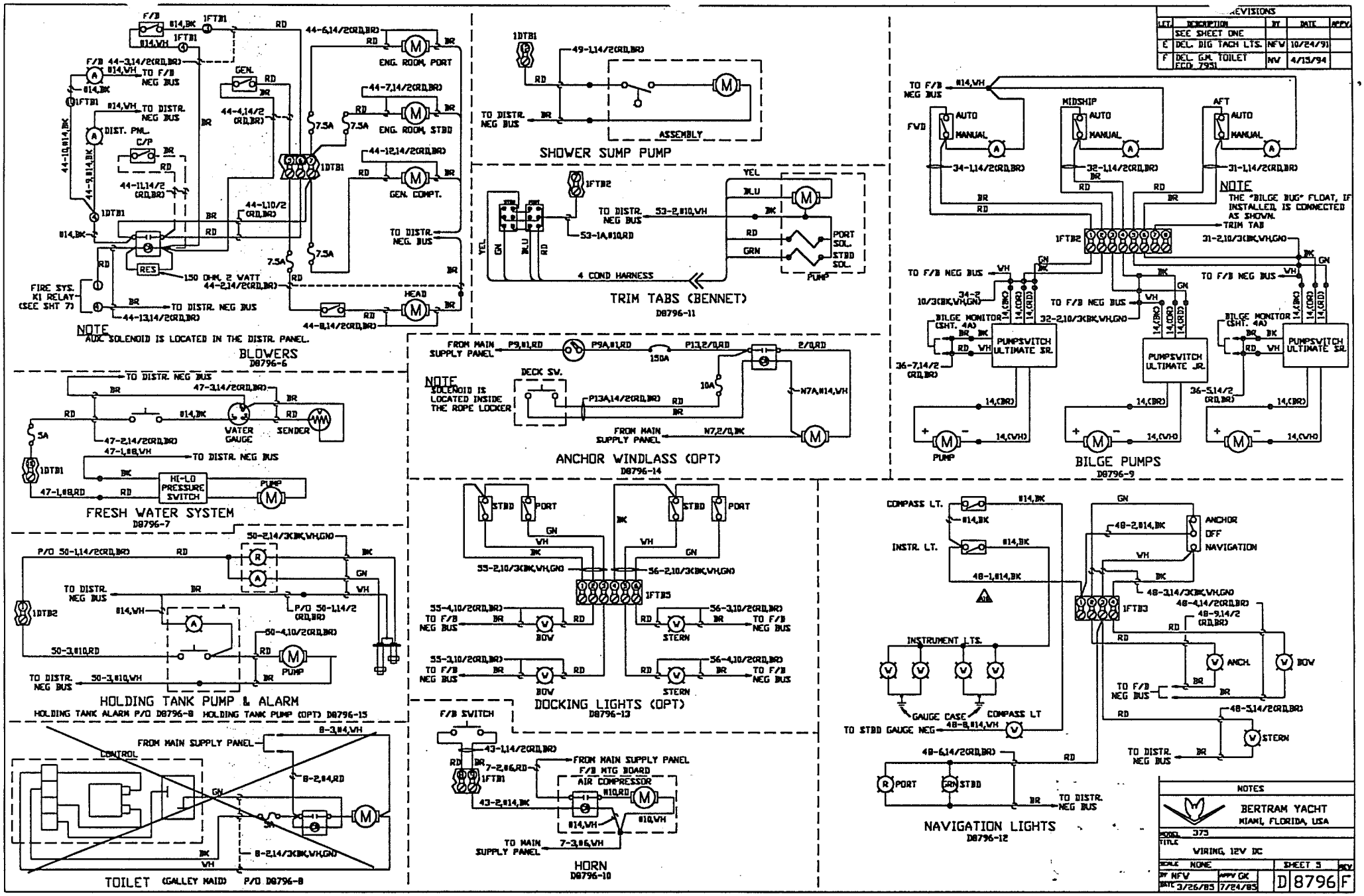
REFERENCES TO SHEET 4 MAY BE FOUND ON SHEETS 4 OR 4A.

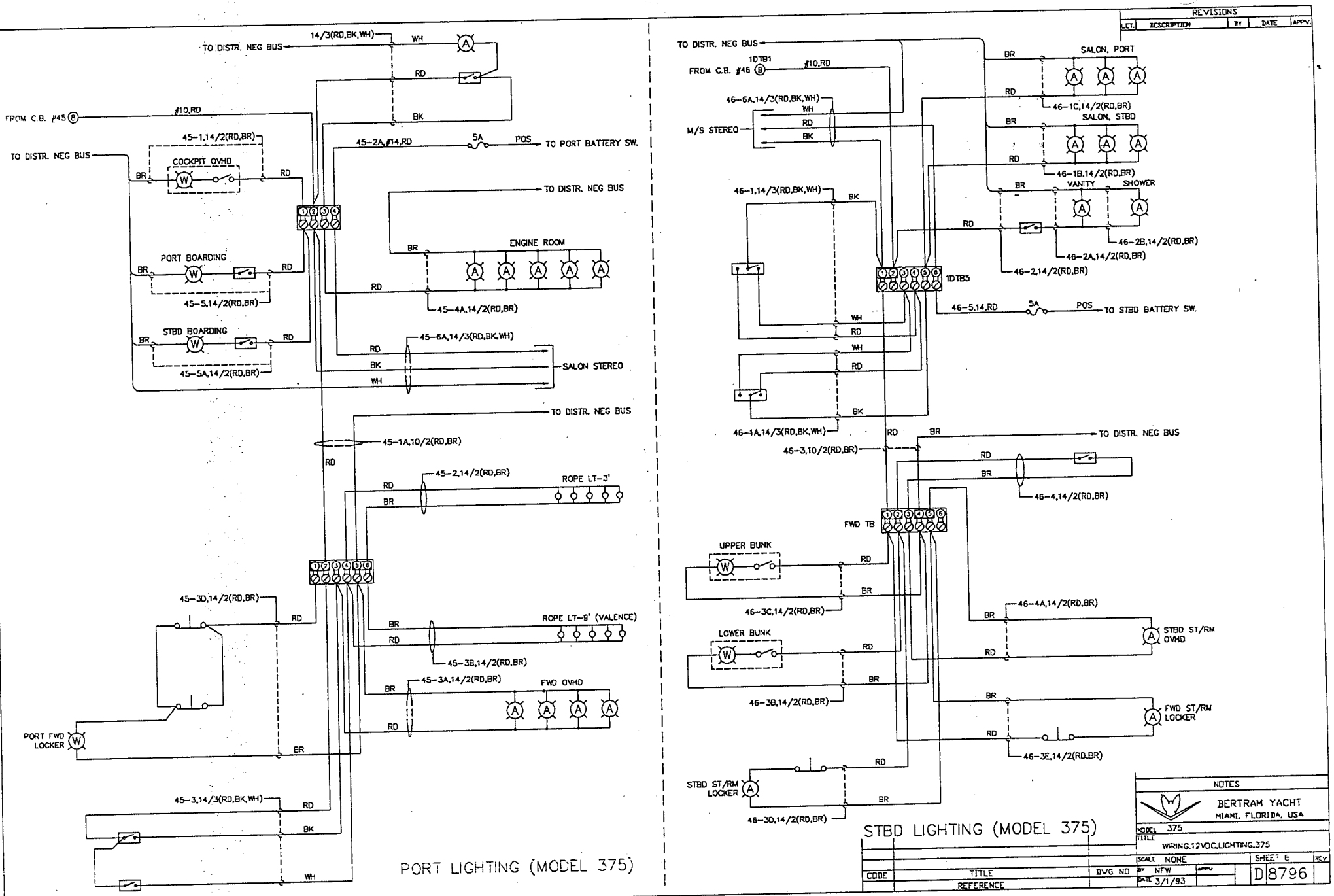
NOTES

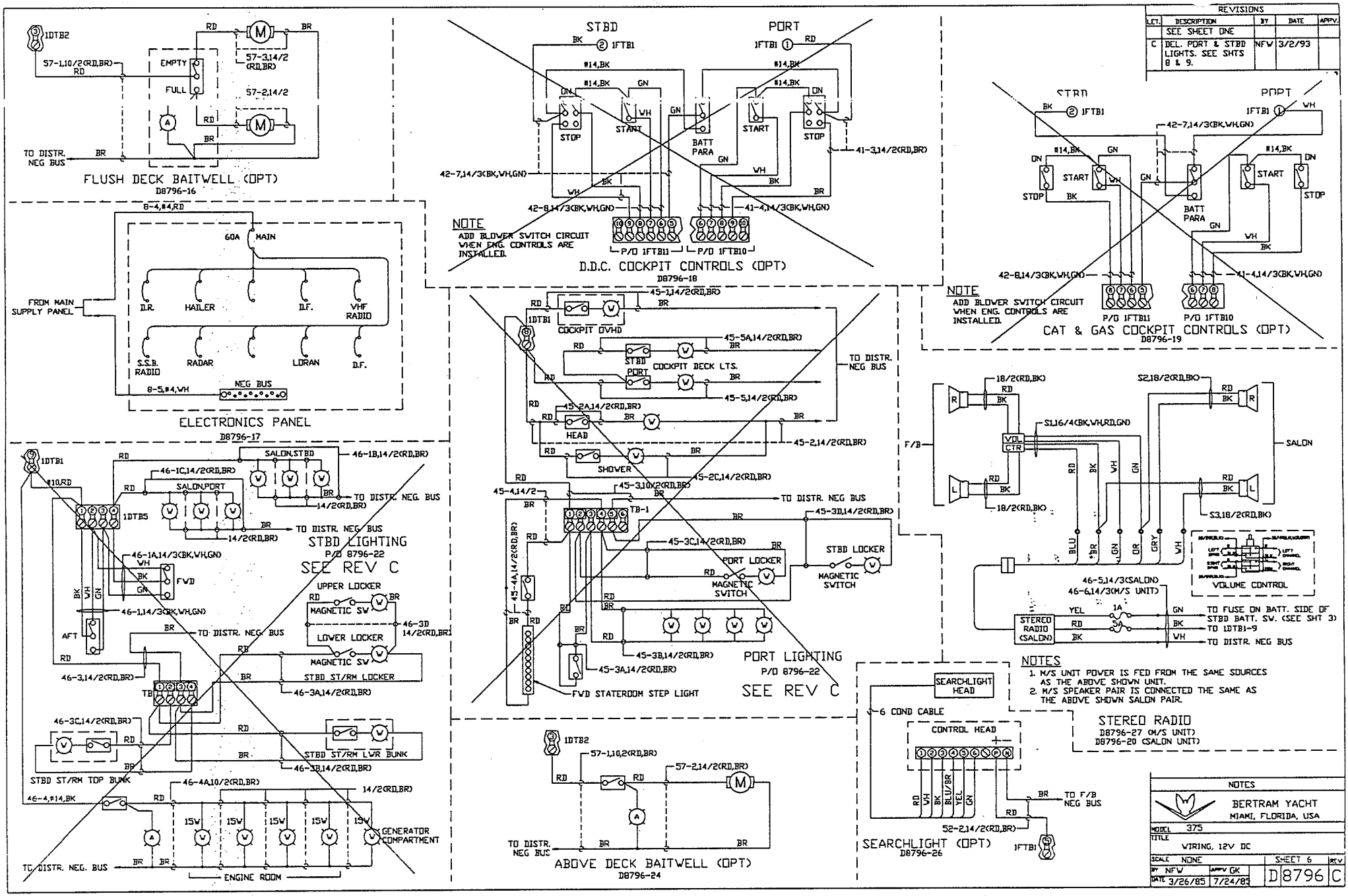
BERTRAM YACHT
MIAMI, FLORIDA, USA

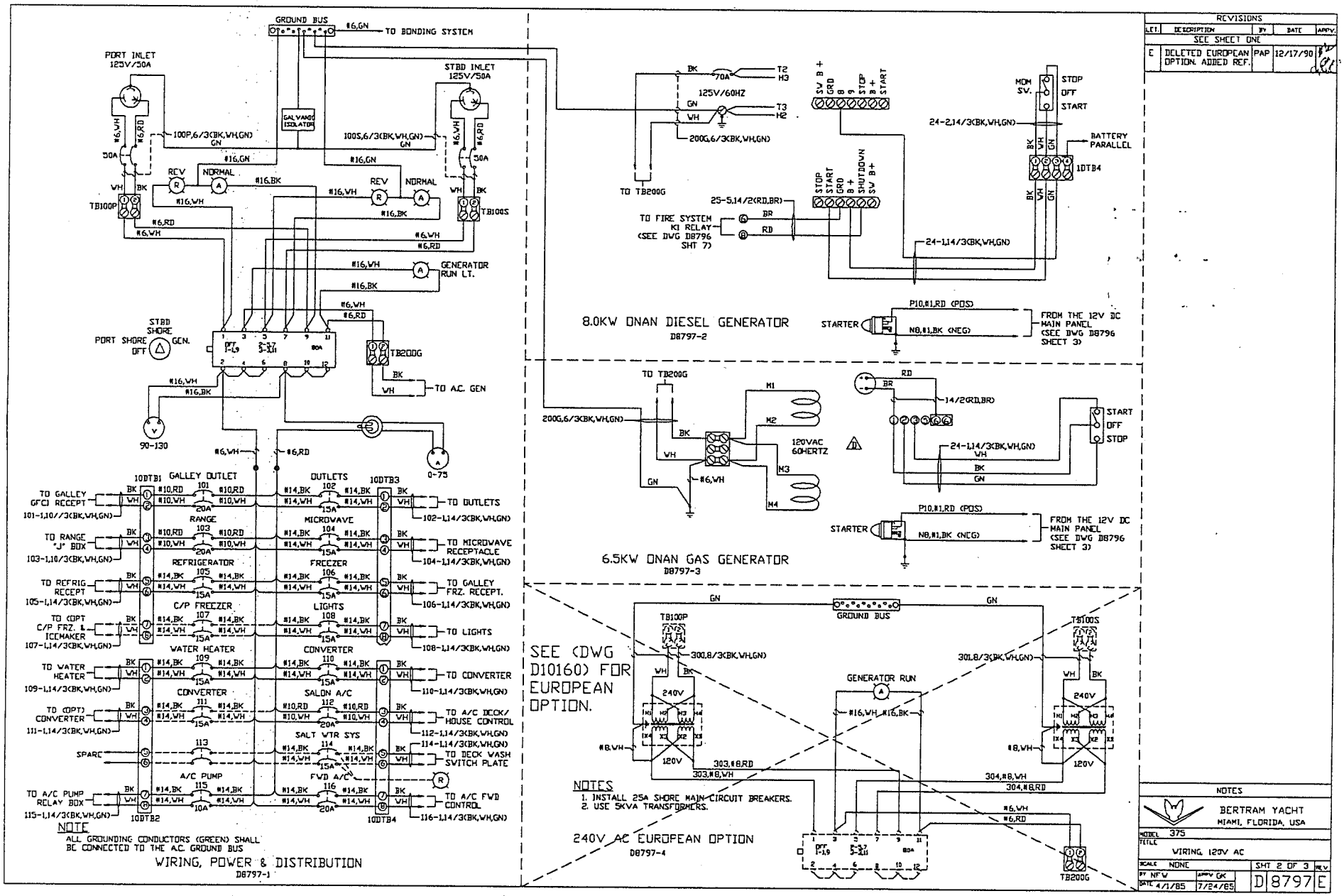
MODEL 375
TITLE WIRING, 12V DC

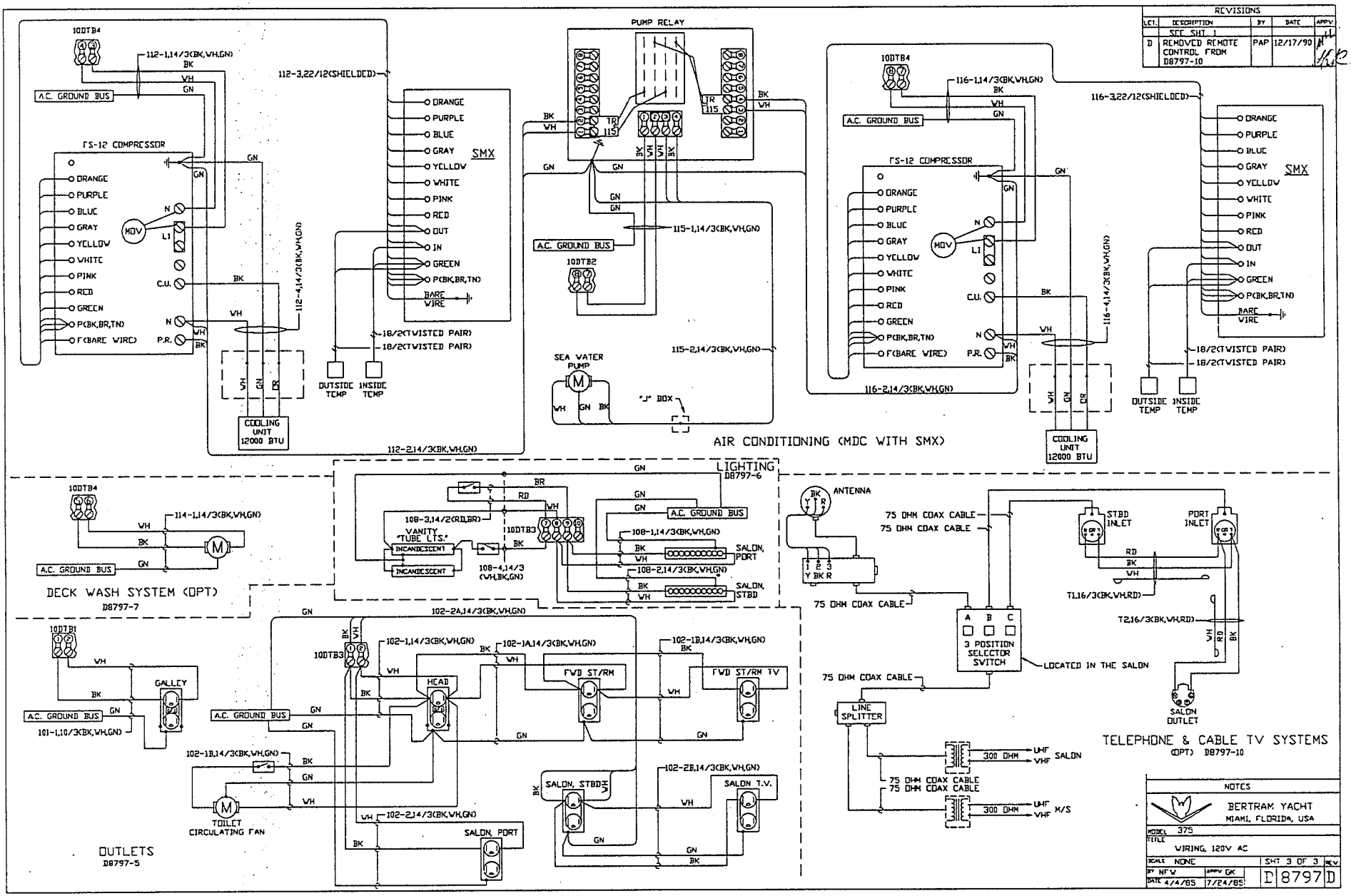
SCALE NONE | SHEET 4A | REV
BY NFW | APPV
DATE 11/27/89 | D8796 | D

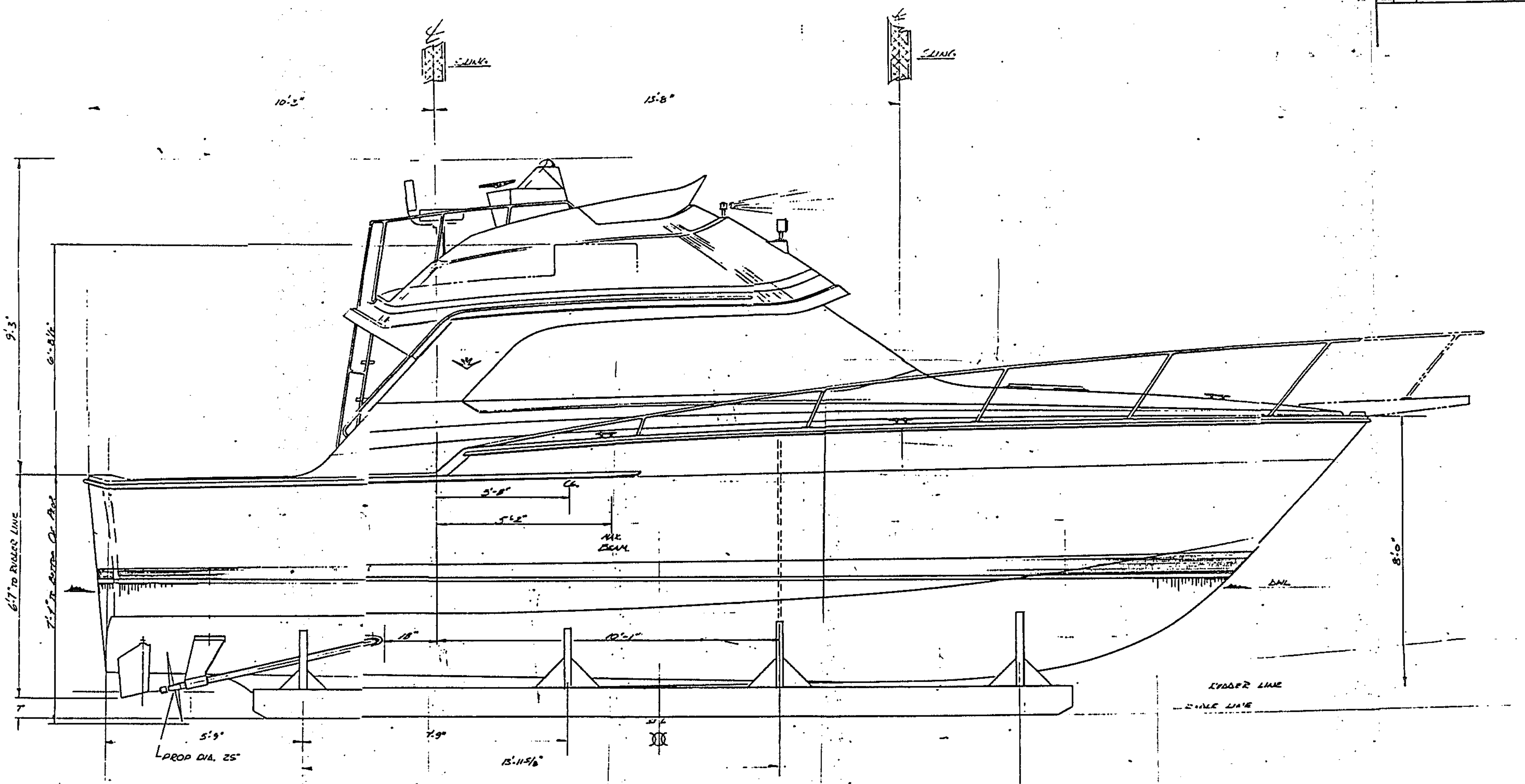

REVISIONS
LET. DESCRIPTION BY DATE APPV
SEE SHEET ONE
E DEL. DIG TACH LTS. NFV 10/24/91
F DEL. G.M. TOILET ECO: 7951 NV 4/15/94
BLOWERS D8796-6
NOTE AUX SOLENOID IS LOCATED IN THE DISTR. PANEL.
SHOWER SUMP PUMP
ASSEMBLY
TRIM TABS (BENNET) D8796-11
4 COND HARNESS
PORT SOL.
STBD SOL.
PUMP
BILGE PUMPS D8796-9
NOTE THE "BILGE BUG" FLOAT, IF INSTALLED, IS CONNECTED AS SHOWN.
TRIM TAB
PUMPSWITCH ULTIMATE SR.
PUMPSWITCH ULTIMATE JR.
FRESH WATER SYSTEM D8796-7
WATER GAUGE
SENDER
HI-LO PRESSURE SWITCH
ANCHOR WINDLASS (OPT) D8796-14
NOTE SOLENOID IS LOCATED INSIDE THE ROPE LOCKER
DECK SW.
HOLDING TANK PUMP & ALARM
HOLDING TANK ALARM P/O D8796-8 HOLDING TANK PUMP (OPT) D8796-15
DOCKING LIGHTS (OPT) D8796-13
BOW
STERN
NAVIGATION LIGHTS D8796-12
COMPASS LT.
INSTR. LT.
INSTRUMENT LTS.
GAUGE CASE
ANCHOR OFF NAVIGATION
TOILET (GALLEY MAID) P/O D8796-8
CONTROL
HORN D8796-10
F/B SWITCH
AIR COMPRESSOR
NOTES
BERTRAM YACHT
MIAMI, FLORIDA, USA
MODEL 375
TITLE WIRING, 12V DC
SCALE NONE
SHEET 3
BY NFV APPV GK
DATE 3/26/85 7/24/85
D 8796 F


REVISIONS
LET. DESCRIPTION BY DATE APPV.
14/3(RD,BK,WH)
TO DISTR. NEG BUS
WH
RD
BK
FROM C.B. #45 (8)
#10,RD
45-1,14/2(RD,BR)
TO DISTR. NEG BUS
COCKPIT OVHD
BR
RD
45-2A,#14,RD
5A
POS
TO PORT BATTERY SW.
TO DISTR. NEG BUS
ENGINE ROOM
PORT BOARDING
45-5,14/2(RD,BR)
45-4A,14/2(RD,BR)
STBD BOARDING
45-5A,14/2(RD,BR)
45-6A,14/3(RD,BK,WH)
SALON STEREO
TO DISTR. NEG BUS
45-1A,10/2(RD,BR)
45-2,14/2(RD,BR)
ROPE LT-3'
45-3D,14/2(RD,BR)
ROPE LT-9' (VALENCE)
45-3B,14/2(RD,BR)
45-3A,14/2(RD,BR)
FWD OVHD
PORT FWD LOCKER
45-3,14/3(RD,BK,WH)
PORT LIGHTING (MODEL 375)
TO DISTR. NEG BUS
1DTB1
FROM C.B. #46 (9)
#10,RD
46-6A,14/3(RD,BK,WH)
M/S STEREO
SALON, PORT
46-1C,14/2(RD,BR)
SALON, STBD
46-1B,14/2(RD,BR)
VANITY
SHOWER
46-2B,14/2(RD,BR)
46-2A,14/2(RD,BR)
46-2,14/2(RD,BR)
46-1,14/3(RD,BK,WH)
1DTB5
46-5,14,RD
5A
POS
TO STBD BATTERY SW.
46-1A,14/3(RD,BK,WH)
46-3,10/2(RD,BR)
TO DISTR. NEG BUS
46-4,14/2(RD,BR)
FWD TB
UPPER BUNK
46-3C,14/2(RD,BR)
46-4A,14/2(RD,BR)
STBD ST/RM OVHD
LOWER BUNK
46-3B,14/2(RD,BR)
FWD ST/RM LOCKER
46-3E,14/2(RD,BR)
STBD ST/RM LOCKER
46-3D,14/2(RD,BR)
STBD LIGHTING (MODEL 375)
NOTES
BERTRAM YACHT
MIAMI, FLORIDA, USA
MODEL 375
TITLE WIRING.12VDC.LIGHTING.375
SCALE NONE
SHEET 6
REV
CODE
TITLE
REFERENCE
DWG NO D8796
BY NFW
APPV
DATE 3/1/93


REVISIONS
LET. DESCRIPTION BY DATE APPV.
SEE SHEET ONE
C DEL. PORT & STBD LIGHTS. SEE SHTS 8 & 9. NFW 3/2/93
FLUSH DECK BAITWELL (OPT)
D8796-16
D.D.C. COCKPIT CONTROLS (OPT)
D8796-18
CAT & GAS COCKPIT CONTROLS (OPT)
D8796-19
ELECTRONICS PANEL
D8796-17
STBD LIGHTING
P/O 8796-22
SEE REV C
PORT LIGHTING
P/O 8796-22
SEE REV C
ABOVE DECK BAITWELL (OPT)
D8796-24
SEARCHLIGHT (OPT)
D8796-26
STEREO RADIO
D8796-27 (M/S UNIT)
D8796-20 (SALON UNIT)
NOTES
1. M/S UNIT POWER IS FED FROM THE SAME SOURCES AS THE ABOVE SHOWN UNIT.
2. M/S SPEAKER PAIR IS CONNECTED THE SAME AS THE ABOVE SHOWN SALON PAIR.
NOTE
ADD BLOWER SWITCH CIRCUIT WHEN ENG. CONTROLS ARE INSTALLED.
BERTRAM YACHT
MIAMI, FLORIDA, USA
MODEL 375
TITLE WIRING, 12V DC
SCALE NONE
SHEET 6
REV
BY NFW
APPV GK
DATE 3/26/85 7/24/85
D 8796 C


GROUND BUS
#6,GN
TO BONDING SYSTEM
PORT INLET
125V/50A
STBD INLET
125V/50A
GALVANIC ISOLATOR
100P,6/3(BK,WH,GN)
GN
100S,6/3(BK,WH,GN)
GN
#16,GN
50A
REV
NORMAL
#16,BK
#16,WH
TB100P
TB100S
#6,RD
#6,WH
GENERATOR RUN LT.
STBD SHORE PORT SHORE OFF GEN.
TB200G
TO A.C. GEN
90-130
0-75
10DTB1 GALLEY OUTLET
OUTLETS
10DTB3
TO GALLEY GFCI RECEPT
101-1,10//3(BK,WH,GN)
RANGE
TO RANGE "J" BOX
103-1,10/3(BK,WH,GN)
REFRIGERATOR
TO REFRIG RECEPT
105-1,14/3(BK,WH,GN)
C/P FREEZER
TO (OPT C/P FRZ. & ICEMAKER
107-1,14/3(BK,WH,GN)
WATER HEATER
TO WATER HEATER
109-1,14/3(BK,WH,GN)
CONVERTER
TO (OPT) CONVERTER
111-1,14/3(BK,WH,GN)
SPARE
A/C PUMP
TO A/C PUMP RELAY BOX
115-1,14/3(BK,WH,GN)
10DTB2
TO OUTLETS
102-1,14/3(BK,WH,GN)
MICROWAVE
TO MICROWAVE RECEPTACLE
104-1,14/3(BK,WH,GN)
FREEZER
TO GALLEY FRZ. RECEPT.
106-1,14/3(BK,WH,GN)
LIGHTS
TO LIGHTS
108-1,14/3(BK,WH,GN)
CONVERTER
TO CONVERTER
110-1,14/3(BK,WH,GN)
SALON A/C
TO A/C DECK/ HOUSE CONTROL
112-1,14/3(BK,WH,GN)
SALT WTR SYS
114-1,14/3(BK,WH,GN)
TO DECK WASH SWITCH PLATE
FWD A/C
TO A/C FWD CONTROL
116-1,14/3(BK,WH,GN)
10DTB4
NOTE
ALL GROUNDING CONDUCTORS (GREEN) SHALL BE CONNECTED TO THE A.C. GROUND BUS
WIRING, POWER & DISTRIBUTION
D8797-1
125V/60HZ
70A
T2
H3
T3
H2
200G,6/3(BK,WH,GN)
TO TB200G
TO FIRE SYSTEM K1 RELAY (SEE DWG D8796 SHT 7)
25-5,14/2(RD,BR)
24-1,14/3(BK,WH,GN)
24-2,14/3(BK,WH,GN)
MOM SV.
STOP
OFF
START
BATTERY PARALLEL
10DTB4
8.0KW DNAN DIESEL GENERATOR
D8797-2
STARTER
P10,#1,RD (POS)
N8,#1,BK (NEG)
FROM THE 12V DC MAIN PANEL (SEE DWG D8796 SHEET 3)
120VAC 60HERTZ
14/2(RD,BR)
6.5KW DNAN GAS GENERATOR
D8797-3
SEE (DWG D10160) FOR EUROPEAN OPTION.
TB100P
TB100S
GROUND BUS
GENERATOR RUN
300,8/3(BK,WH,GN)
301,8/3(BK,WH,GN)
240V
120V
303,#8,RD
303,#8,WH
304,#8,WH
304,#8,RD
NOTES
1. INSTALL 25A SHORE MAIN CIRCUIT BREAKERS.
2. USE 5KVA TRANSFORMERS.
240V AC EUROPEAN OPTION
D8797-4
REVISIONS
LET. DESCRIPTION BY DATE APPV.
SEE SHEET ONE
E DELETED EUROPEAN OPTION. ADDED REF. PAP 12/17/90
NOTES
BERTRAM YACHT
MIAMI, FLORIDA, USA
MODEL 375
TITLE WIRING, 120V AC
SCALE NONE
SHT 2 OF 3
REV
BY NFW
APPV OK
DATE 4/1/85 7/24/85
D 8797 E


REVISIONS
LET. DESCRIPTION BY DATE APPV.
SEE SHT 1
D REMOVED REMOTE CONTROL FROM D8797-10 PAP 12/17/90
10DTB4
112-1,14/3(BK,WH,GN)
A.C. GROUND BUS
112-3,22/12(SHIELDED)
FS-12 COMPRESSOR
ORANGE
PURPLE
BLUE
GRAY
YELLOW
WHITE
PINK
RED
GREEN
P(BK,BR,TN)
F(BARE WIRE)
MOV
C.U.
P.R.
SMX
OUT
IN
BARE WIRE
112-4,14/3(BK,WH,GN)
18/2(TWISTED PAIR)
OUTSIDE TEMP
INSIDE TEMP
COOLING UNIT 12000 BTU
112-2,14/3(BK,WH,GN)
PUMP RELAY
TR
115
115-1,14/3(BK,WH,GN)
10DTB2
115-2,14/3(BK,WH,GN)
SEA WATER PUMP
"J" BOX
116-1,14/3(BK,WH,GN)
116-3,22/12(SHIELDED)
116-4,14/3(BK,WH,GN)
116-2,14/3(BK,WH,GN)
AIR CONDITIONING (MDC WITH SMX)
LIGHTING D8797-6
114-1,14/3(BK,WH,GN)
DECK WASH SYSTEM (OPT)
D8797-7
108-3,14/2(RD,BR)
VANITY "TUBE LTS."
INCANDESCENT
10DTB3
108-4,14/3 (WH,BK,GN)
108-1,14/3(BK,WH,GN)
SALON, PORT
108-2,14/3(BK,WH,GN)
SALON, STBD
10DTB1
GALLEY
101-1,10/3(BK,WH,GN)
102-2A,14/3(BK,WH,GN)
102-1,14/3(BK,WH,GN)
102-1A,14/3(BK,WH,GN)
102-1B,14/3(BK,WH,GN)
HEAD
FWD ST/RM
FWD ST/RM TV
TOILET CIRCULATING FAN
102-2,14/3(BK,WH,GN)
102-2B,14/3(BK,WH,GN)
SALON T.V.
OUTLETS
D8797-5
ANTENNA
75 OHM COAX CABLE
STBD INLET
PORT INLET
T1,16/3(BK,WH,RD)
T2,16/3(BK,WH,RD)
3 POSITION SELECTOR SWITCH
LOCATED IN THE SALON
LINE SPLITTER
SALON OUTLET
300 OHM
UHF
VHF
SALON
H/S
TELEPHONE & CABLE TV SYSTEMS
(OPT) D8797-10
NOTES
BERTRAM YACHT
MIAMI, FLORIDA, USA
MODEL 375
TITLE WIRING, 120V AC
SCALE NONE
SHT 3 OF 3
REV
BY NFW
APPV GK
DATE 4/4/85
7/24/85
D 8797 D



NOTES:
1. DISPLACEMENT & LOCATION OF C.G. MAY VARY WITH BOAT LOADING.
2. WHEN NOT USING CRADLE, BLOCKING & CHOCKING SHOULD BE LOCATED IN SAME LOCATIONS AS CRADLE SUPPORTS.

MEASUREMENTS
L.O.A. (LINED) 37'-5"
MAX. BEAM (LINED) 12'-11 ½"
DISPL. 2/3 FUEL 2/3 WATER 30,750 LBS.

REF	CRADLE, LIFE & SHIPPING	D8968
CODE	TITLE	BYD NO.
	REFERENCE	

BERTRAM YACHT
MIAMI, FLORIDA, U.S.A.
A SUBSIDIARY OF WHITTAKER CORPORATION

MODEL 37-C
TITLE LIFTING PLAN
SCALE ¼" - 1'-0"
PLAN NO. D 9036

A-9036