

A WORD OF WELCOME

We are pleased that you have chosen a Bertram, and know that her unique design will give you outstanding performance and many years of boating pleasure.

Your Bertram is built of the finest, most modern materials and is manufactured under rigid quality controls. Her hull is of high-impact, multi-laminate fiberglass. High pressure laminates and vinyl throughout further reduce maintenance. She comes to you as the most thoroughly tested and trouble-free boat on the market today.

As durable as her construction is, your Bertram will benefit by reasonable care; and, as is always true with things mechanical, maintenance, adjustments or repairs may be required from time to time for certain components. Thus, this Owner's Manual, containing a wealth of detailed information, has been specially prepared for your particular model to guide you in keeping her in yacht condition.

To fully enjoy your Bertram, you should understand her completely. To this end, we suggest that you read this manual thoroughly. If any points arise that you do not completely understand, your Bertram dealer will be glad to assist you.

Included are warranties, ours plus those of manufacturers of engines and accessories.

When your boat requires service, contact your Bertram dealer. He is anxious to help you.

We wish you many years of pleasurable yachting on your new Bertram.

"Sandy Point" OFF # 544646

TECHNICAL DATA

HULL NUMBER 312-1235

E N G I N E S

Manufacturer MERCUISER

Gear Manufacturer WARNER

Model 325 HP

Gear Model AS 12-72C

Type Fuel Filter:

Gear Ratio 1.52:1

- 1. _____
- 2. _____
- 3. _____

Type Oil Filter _____

Type Spark Plugs _____

PORT ENGINE

STARBOARD ENGINE

Serial No. 3213226

Serial No. 3213206

Gear Serial No. 10093

Gear Serial No. 10131

B A T T E R I E S

Manufacturer DEKA

Type 135 AMP.

P R O P E L L E R S H A F T S

Material STAINLESS

Diameter 1 3/8"

Length 82"

P R O P E L L E R S

Manufacturer FEDERAL

Style _____

Diameter 17"

Pitch 20"

No. of Blades 3

Material BRONZE

DATA SHEET

NAME OF BOAT

OWNER'S NAME & ADDRESS

HAILING PORT

312-16-1235

HULL NUMBER

REGISTRATION NUMBER

6'02"

HEIGHT ABOVE
WATERLINE

11'2"

BEAM

2 34"

DRAFT

30'07"

LENGTH
OVER ALL

231 GALS.

FUEL CAPACITY

18 Gals.

WATER CAPACITY

BGM 119

DOOR KEY NUMBER

TABLE OF CONTENTS

	<u>PAGE</u>
Welcome	
Data Sheet	
Technical Data	
INITIAL CHECKLIST	1
Master Switches	1
Circuit Breakers	1
Distribution Panel	2
Optional D. C. Systems	2
Shore Power	2
CONTROLS AND INSTRUMENTS	4
The Importance of Instruments	4
Ignition and Starter Switch	4
Gas	4
Diesel	4
Accessory Switches	5
Battery Paralleling Switch	5
Gauges	6
Lube Oil Pressure Gauge	6
Gear Oil Pressure (Diesel)	6
Tachometer	7
Ammeter	7
Water Temperature Gauge	7

<u>TABLE OF CONTENTS (CONT'D)</u>	PAGE
Fuel Gauge	8
CONTROLS	8
Bridge Control	8
Engine and Marine Gear Controls	8
Steering System	9
POWER PLANT AND TRANSMISSION OF POWER	11
Engines	11
Marine Gears	11
Propeller Shafts	11
Shaft Alignment	11
Shaft-Log and Stuffing Box	12
Propellers	13
Installation of Propellers	13
CLOSED COOLING SYSTEM	15
Water Circuit	15
Break Down of Parts	15
Maintenance	16
Trouble Shooting	16
BOAT SPEED	18
Engine Efficiency	18
Atmospheric Conditions	18
Personal Equipment & Accessories	18
Marine Growth	19
Water in the Bilge	19

<u>TABLE OF CONTENTS (CONT'D)</u>	<u>PAGE</u>
Damaged Underwater Equipment	19
ELECTRICAL	20
General	20
Batteries	20
Shore Power (Optional)	20
Circuit Breakers	21
D. C. Distribution	21
Converter (Optional)	21
Ground and Bonding Systems	21
FUEL AND WATER	27
Fuel System	27
Fuel	27
Fueling Instructions	27
Fresh Water System	31
Galley Water Pump	31
ELECTRICAL ACCESSORIES	34
Engine Compartment Blower	34
Electric Bilge Pumps	34
Electric Horn	34
COMMANDING YOUR BERTRAM	35
Pre-Starting Instructions	35
Starting Instructions	35
Maneuvering	36
Stopping Engines	36

<u>TABLE OF CONTENTS (CONT'D)</u>	PAGE
Cruising Speeds	37
Cruising	38
Calling at Ports Away From Home	39
Leaving Your Bertram	40
MAINTENANCE	41
Periodic Maintenance	41
Daily	41
Every 100 Hours or 60 Days	42
Exterior	42
Interior	42
Galley	43
Engine Compartment	43
Bridge	45
As Required	45
STORING YOUR BERTRAM	46
Dry Storage	46
Pre-Launch	47
After Launch	47
Electrical System Check	47
Engine Check	48
Controls Check	48
MAINTAINING YOUR BERTRAM	
Care of Fiberglass Construction	50
Seasonal Care	50
Loss of Gloss	50

TABLE OF CONTENTS (CONT'D)

PAGE

Stains	51
Scratches and Abrasions	51
Painting Fiberglass Surfaces	52

ILLUSTRATIONS

PAGE

CONTROLS AND INSTRUMENTATION

Steering System 10

POWER PLANT AND TRANSMISSION OF POWER

Propulsion System 14

ELECTRICAL

Bonding & Grounding System 23

Wiring Diagram Part I - Distribution 24

Wiring Diagram Part II - Gasoline Engine
Circuits 25

Wiring Diagram Part IID - Diesel Engine
Circuits 26

FUEL AND WATER

Fuel System - Gas Engines 29

Fuel System - Diesel Engines 30

Fresh Water System 32

Drainage System 33

MAINTENANCE

Docking Plan 54

INITIAL CHECKLIST

LOCATION AND FUNCTION OF ALL 12 VOLT ELECTRICAL SWITCHES, FUSES AND CIRCUIT BREAKERS

I. Location of Circuit Breaker Panel (12 Volt System)

- (1). All Fly Bridge models, starboard side forward in hanging locker.
- (2). Hardtop, in hanging locker forward on starboard side.
- (3). Bahia Mar models have the circuit breaker panel located under the console with access through a hinged door on the aft bulkhead in the head compartment. The Express model has the circuit breakers mounted on the inboard bulkhead in the head compartment.

a). Circuit Breakers

The function of these breakers is to protect the boat's circuits from overload and to protect the wiring between the batteries and instruments. The only 12 Volt circuit not included in this system is the bilge pump circuit which is protected by a fuse mounted on the aft side of the forward bulkhead in the port engine compartment. When these are in the "off" position, the 12 Volt D.C. system of your boat is completely "dead" with the exception of the bilge pump circuit. The master switches should be placed in the No. "1" position for normal operation.

- b). Distribution Panel - D.C. circuit breakers control and protect the electrical components such as lights, pumps and electrically operated instruments. The port and starboard breakers supplant the ignition keys for locking the starting circuits.
- c). Optional D.C. systems, such as radio or automatic pilot, are protected by labeled fuses. The radio fuse is located in the starboard engine compartment aft side of forward bulkhead near bilge pump fuses on all models except Bahia Mar and Express. On Bahia Mar models, the radio fuse and auto pilot fuse is mounted under the deck in the water tank compartment and on the Express, the radio fuse is mounted on the port side in the engine compartment and the auto pilot fuse is mounted on the starboard side in the engine compartment.

II. Location and function of 115 Volt Electrical Switches and Fuses (Optional)

(1). Shore Power (110 Volt A.C.)

The circuit breaker box is located on the port side of the port engine compartment and aft side of forward bulkhead.

III. Location, description and operation of mechanical systems such as valves, seacocks, fuel system, etc., are described in the sections that follow and are accompanied by diagrams of each operation.

CONTROLS AND INSTRUMENTS

THE IMPORTANCE OF INSTRUMENTS

To avoid mechanical damage, become accustomed to checking your instruments frequently when running and particularly when starting an engine.

IGNITION AND STARTER SWITCH

Gasoline

After the corresponding engine circuit breaker is turned on, the engines are started by first putting the "on-stop" switch to the "on" position. This energizes the engine electrical system. Press engine starter switch until engine starts then release starter switch. This starter should not be operated for a prolonged period. If the engine fails to start after a reasonable time, it should be checked before attempting to re-start. Continued use of starter will drain the battery or overheat the starter motor or solenoid.

Diesel

Boats powered with diesel engines use the "on-stop" switch to energize the starter circuit. This switch also energizes the electrical system of the instruments and should be left in the "on" position while the engine is running. Press engine start switch to start engine. If an engine fails to start after two or three

tries, have the engine checked before using the starter again. Continued use of starter, for long periods, can seriously damage it. To stop diesel engines, the "on-stop" switch should be pushed to the "stop" position and held in this position until the engine has stopped. This shutdown cuts off the fuel supply to the engine. Diesel engines may also be equipped with an emergency air shutdown which closes the engine air intake. This shutdown should only be used when as its name implies, the "on-stop" method fails. If you do use the emergency air shutdown, the air shut-off valve located on the air silencer case must be manually reset before attempting to restart engine. (See Engine Operating Manual).

ACCESSORY SWITCHES

Each of these toggle switches operates either a light or an electrical accessory; these switches usually operate off the engine battery. Consequently, it is imperative that before leaving the boat they be checked to see that they are all in the "off" position. This does not apply to the bilge pump switch. This switch should be left in the "auto" position when boat is not in use.

BATTERY PARALLELING SWITCH

(Standard on Diesel, Optional on Gasoline)

In the event that engine starting is difficult due to a weak battery, the battery paralleling switch may be used to assist

in starting. For example, if the Port Battery is low, hold the Paralleling Switch to the starboard position and operate starter switch of the port engine at the same time. By paralleling both port and starboard batteries, sufficient current should be available to start the engine. With Diesel engines it is recommended that the Paralleling Switch be used whenever an engine is started.

GAUGES

Your Bertram is equipped with the following gauges:

Lube Oil Pressure, Gear Oil Pressure (Diesel), Tachometer, Ammeter, Engine Cooling Water Temperature and Fuel Gauges. All gauges should be observed while cruising. Consult Engine Manual for gauge read outs.

Lube Oil Pressure Gauge

Almost all indications of serious engine trouble will be reflected on the oil pressure gauge. This gauge and the water temperature gauge are the two gauges that should be checked at frequent intervals during the running period of the engine. If any radical change in pressure is noted, the engine should be shut down immediately. During normal operation, a slight fluctuation is normal due to nature of the lubricating oil and its temperature. Consult your engine manual for their recommended operating pressures.

Gear Oil Pressure Gauge (Diesel Only)

This gauge records only transmission oil pressure. Consult your engine manual for proper operating pressures.

Tachometer

This instrument records the number of revolutions per minute that your engine is turning and is used to help synchronize engines. There is no direct correlation of RPM to speed of the boat due to reduction gear and propeller slippage. The tachometer can be used to assist in making a speed table when running a known distance course.

Ammeter

This gauge is an indicator which measures the rate of electrical charge going into the battery when the engine is operating. The amount of charge from the alternator to the battery is governed by the amount of amperage being drawn from the battery and condition of the battery. If the battery is fully charged and accessory demand is low, the ammeter will show very little charge while running.

Water Temperature Gauge

The temperature gauge records the water temperature circulating through the engine. All engines are equipped with thermostats and these should be checked periodically to see that they work properly. Never run your engine without the proper thermostat installed. Consult your engine manual for further information.

Fuel Gauge

The electrical fuel gauge is standard equipment and is located on the instrument console.

CONTROLS

Bridge Control

The bridge control panel contains all controls, gauges and switches necessary to operate the boat from this station. The bridge console contains the following instruments and switches: Bilge Blower, On-Off Engine Switches, Starter Switches, Navigation Light Switches, Compass Light, Horn, Bilge Pump Switches, Tachometers, Ammeters, Lube Oil Pressure, Marine Gear Oil Pressure (Diesel), Engine Cooling Water Temperature and Throttle and Marine Gear Controls.

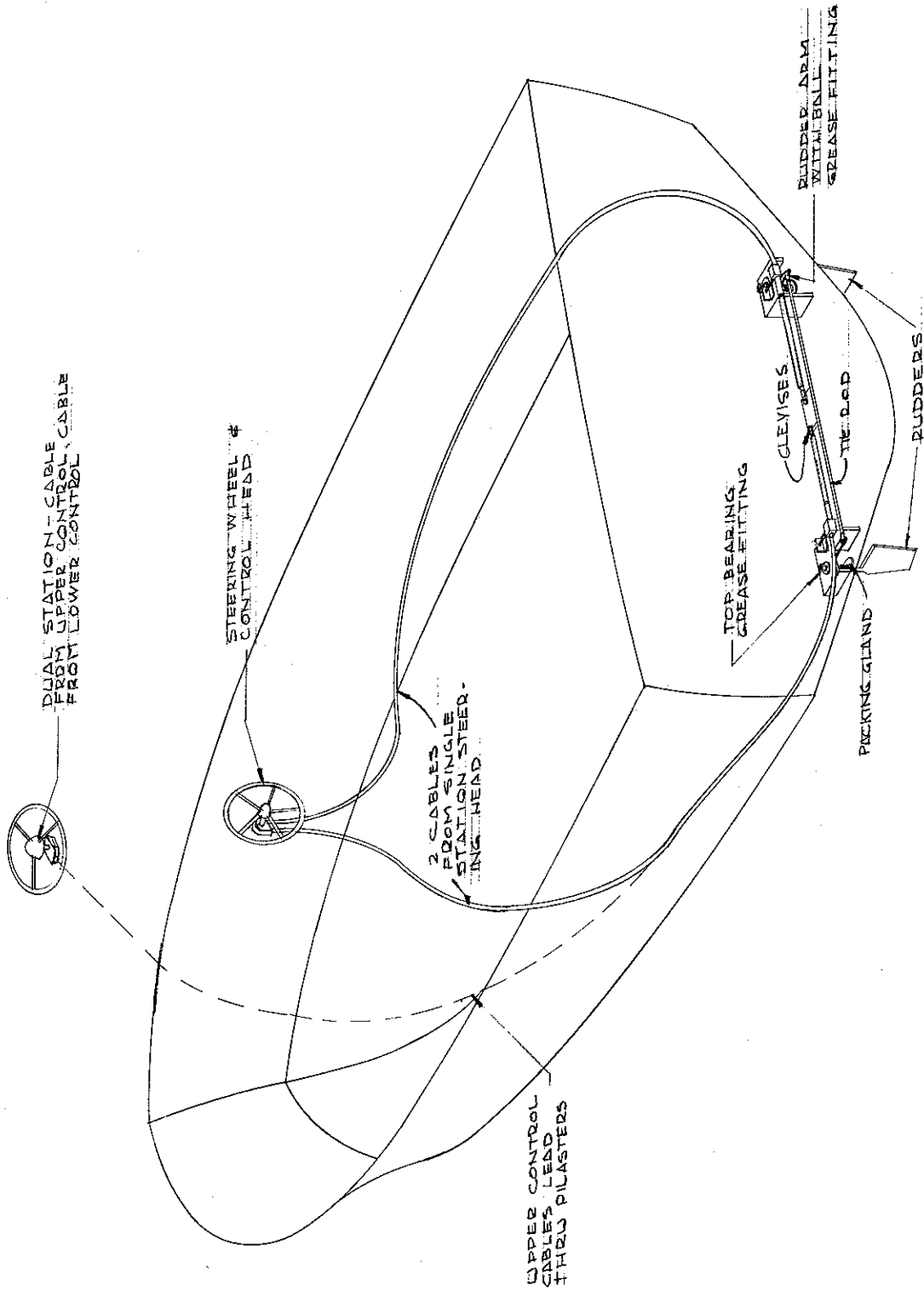
Engine and Marine Gear Controls

Throttle and clutch controls are located on the console within easy reach of the helmsman. There are two types of controls depending on the model and power. These controls are push-pull types directly connected to the throttle and reverse gear. Some boats have a single lever control, that is, one lever controls both throttle and clutch. On this type the lever can be easily disengaged from the gear mechanism to all control of just the throttle to be used in starting and warmup. The other type had an individual lever for the throttle and one for the reverse gear. Both types of

controls are marked for the gear control as follows: Forward, Neutral and Reverse.

STEERING SYSTEM

Steering is controlled by a steering wheel which is directly connected to the rudders by a push-pull type cable which runs in a flexible water-tight conduit. The push-pull cable acts alternately in tension and compression.



BERTRAM / WHITTAKER
31' STEERING SYSTEM
SCALE / NONE BY: HEADERS
DATE: APRIL 25/69 APP'D.
DWG. C-2239 FILE 31

POWER PLANT AND TRANSMISSION OF POWER

ENGINES:

All necessary data and information about the engines are contained in the enclosed engine operator's manual, so they are not repeated here. Just a reminder, the life and performance of the engines are dependent on the way they are cared for so follow the manufacturer's instructions, and watch the instruments carefully to obtain many hours of pleasurable boating.

MARINE GEARS:

A gear unit, affixed to the after end of your engine is a hydraulically operated forward and reverse transmission with reduction gear. Information and maintenance procedure can be found in the Engine Manual.

PROPELLER SHAFTS:

Information as to size, length and material of your Bertram's shafts should be recorded on the Shop's Information page at the front of the book.

SHAFT ALIGNMENT:

Prior to water testing, your propeller shafts were aligned properly; however, they should be checked periodically to insure proper alignment and performance. To check alignment, first remove the bolts in the coupling flanges at the end of marine gear. Using

a .010 feeler gauge, press the flanges together by hand. The feeler gauge should be inserted at 90 degree intervals to assure equal clearance at all faces. If the alignment is correct, the .010 or .013 feeler gauge will be tightly gripped at all points around the edges of the coupling.

SHAFT LOG AND STUFFING BOX:

The shaft log is the tunnel in which the propeller shaft turns. It is of bronze construction. On the inboard end of the shaft log, there is a stuffing box attached by a flexible rubber hose and held in place by hose clamps. This flexible hose allows for a mis-alignment of .010 inch without undue wear of the packing gland itself. The Stuffing Box Packing Gland is packed with braided flax packing and this is kept tight to keep it from leaking by the packing nut. It is normal to have a slight drip of water from the stuffing box as this serves as a lubricant but if the leaking is excessive, the packing gland should be tightened. Be careful not to tighten too much as this will glaze the packing and score the shaft. If necessary to repack the gland, remove boat from water, back off both lock nuts and slide the packing gland forward on the shaft. Be sure that the old packing is removed and tighten to a point where there is a slight drop of water. Tighten so shaft will not move, and then back off

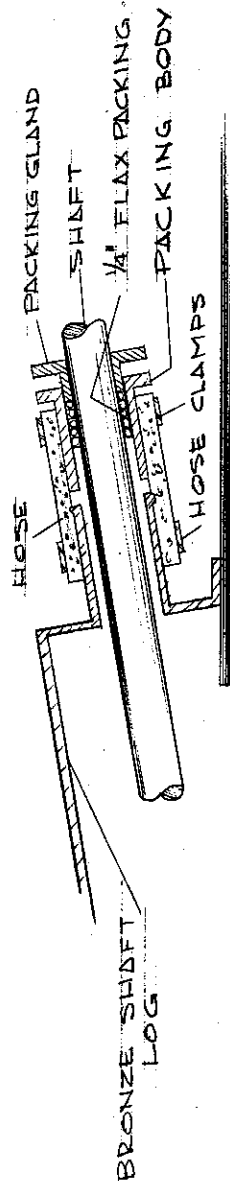
until shaft is free. Run shaft for a while and reset. Always use tallow flax packing. CAUTION: Always tighten packing gland evenly. One turn at a time on each nut will avoid any problems.

PROPELLERS:

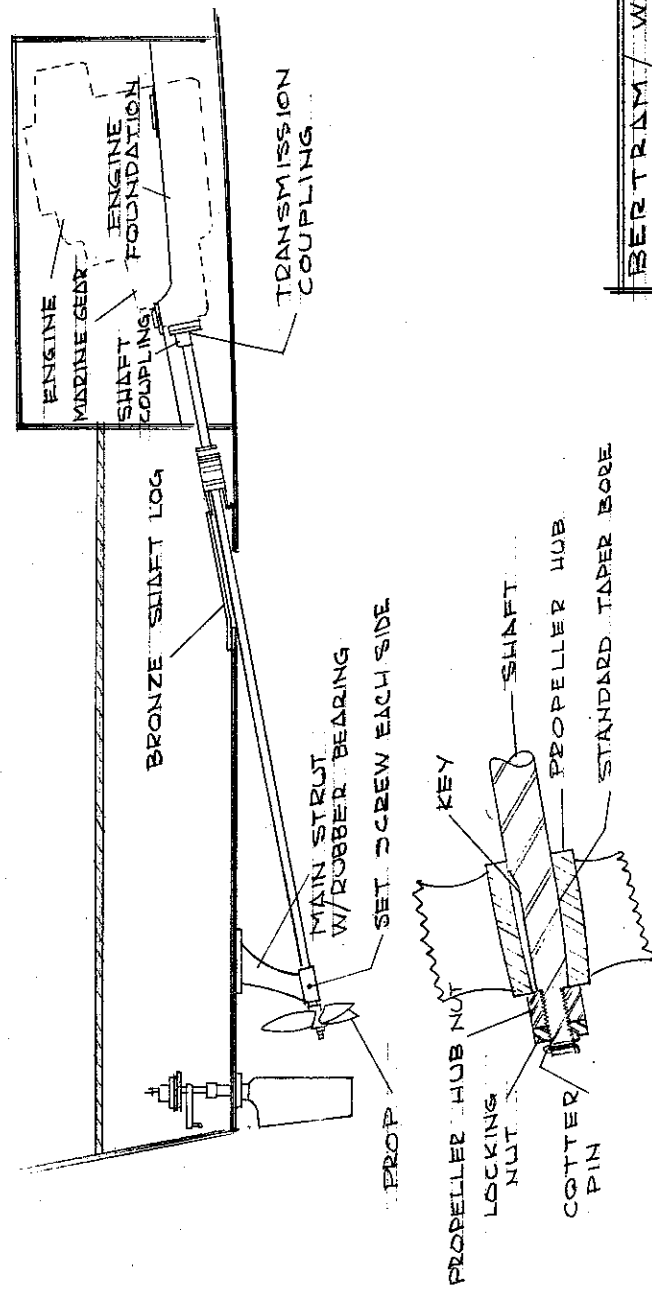
Information on propellers should be recorded on the Ship's Information Page of this book. The propellers recommended are those that your boat was tested with. If weight has been added or the operating characteristics have been changed due to addition of special equipment, it may be necessary to change the pitch to suit existing conditions.

INSTALLATION OF PROPELLERS:

Propeller bore and the end taper of the shaft must be clean and free of any obstructions. In order that the propeller seat securely on the shaft, the keyway of both must be free from burrs and corrosion. Insert the key with its round end forward on the shaft, then place the propeller on the shaft aligning the keyways. The key should fit snugly on each side of the keyway, but clearance at the top is essential so as not to pull the propeller off center and thereby cause vibration. After proper fitting, assemble the propeller nut, locking nut, and cotter pin on the shaft. The key must go on the shaft first.



SHAFT LOG ASSEMBLY



PROPPELLER INSTALLATION

BERTRAM/WHITTAKER	
31' PROPULSION SYSTEM	BY: HEADBERG
SCALE: NONE	DATE: MAY 1/64
DWG: B-2247	APP'D: FILE: 31'

CLOSED COOLING SYSTEM

(Chrysler Only - See Engine Manual for Other Engines)

WATER CIRCUIT:

The closed cooling system employs two separate water circuits. The primary circuit (fresh water) absorbs engine and exhaust manifold heat and, in turn, transfers the heat to the secondary (raw water) circuit, by means of a heat exchanger. Raw water is pumped from a thru hull fitting in the bottom of the boat thru the heat exchanger and over board by way of the exhaust pipes, thus, also, keeping them cool.

BREAK DOWN OF PARTS:

A copper tank is located on the rear of the engine. This is a four pass heat exchanger and under normal conditions this will run about 180 degrees.

Looking at the front of the engine there are two pumps. The one over the oil filter is the raw water pump which cools the oil heat exchangers and also supplies the water to the heat exchanger, this pump should always run cool. On the other side of the engine is the circulating pump which recirculates fresh water from the heat exchanger through the manifolds and block, then back to the heat exchanger. This pump will run hot - about 150 degrees.

MAINTENANCE:

The closed cooling system requires very little maintenance as far as lubrication, the anti-freeze will take care of this. If sea strainers have been installed, this will eliminate seaweed and trash from clogging up the exchanger. Water should be added when necessary, if all the water is lost, anti-freeze should be reinstalled.

TROUBLE SHOOTING:

- (1) Normal temperature for unit will be 193 degrees with a surge temperature of 220 degrees. This means that after a hard run and then return to idle a rise of temperature will be noted - not over five minutes.
- (2) If a high temperature is noted, or steam comes from the engine room:
 - a. Remove cap from heat exchanger (use rag over cap), check water level, fill if necessary (Note: engine must be running) If unit will not hold water check for blown hose. Before replacing hose make sure nipple and inside of hose are free of paint. If fresh water is not available, salt water may be used; however, system must be flushed removing all salt water from block and manifold by means of drain plugs located in lower side of block and under side of manifold.

- b. Check belts for tightness - described in engine Operating Manuals.
- c. Look inside heat exchanger, check for water flow - this will tell you that the fresh water pump is working.
- d. Next check exhaust overboard discharge for water flow, if no water, impellers in raw water pump are possibly bad.
- e. Could be losing water through cap. Make sure 12# cap is on unit.
- f. Sea strainer could be clogged.
- g. CAUTION: Above all do not try to change water lines or remove thermostat.

BOAT SPEED

Boat speed is dependent on many variable factors, so no catalogue or advertised speed can be guaranteed. A short discussion of some of the more important factors affecting boat speed are presented below:

ENGINE EFFICIENCY:

With normal care and maintenance the engines will maintain peak efficiency; however, if they are neglected, the power will fall off and expensive repairs could become necessary. Take care of the engines!

ATMOSPHERIC CONDITIONS:

Engines will develop more power when the ambient air and water temperatures are cool, in fact the power variations due to temperature can be as much as ten percent. For this reason greater speeds are generally obtained in the spring and fall, rather than in the summer.

PERSONAL EQUIPMENT AND ACCESSORIES:

All personal equipment and accessories added to the boat will tend to decrease the speed, just as adding passengers will. Often the effect of this added weight is not taken into consideration on the performance of the boat.

MARINE GROWTH:

In order to obtain maximum speed, the bottom of the boat must be kept free of marine growth including moss. Any growth on the boat's bottom will increase the resistance of the boat as it moves through the water, thus decreasing speed.

WATER IN THE BILGE:

Since a barrel of water weighs over 400 lbs., the bilges must be kept pumped dry in order to keep excess weight down. As mentioned before, added weight will reduce boat speed.

DAMAGED UNDERWATER EQUIPMENT:

Loss of speed and excessive vibration can result from damaged propellers, shafts, or struts.

ELECTRICAL

GENERAL

Your Bertram 31 Electrical System is 12 Volt, D.C. with power supplied from the installed batteries. The batteries are charged by the engine alternators or the optional 120 Volt A.C. converter. The electrical system is protected by the main switch and fuse and branch circuits are protected by circuit breakers.

BATTERIES

Normal installation calls for two (2) heavy duty batteries. These batteries are for starting the engines and supplying power to all electrical accessories. These batteries can be paralleled by actuating the paralleling switch on the console when deemed necessary. Water in the batteries is to be kept at approximately $\frac{1}{4}$ " above top of plates to insure maximum service.

SHORE POWER (OPTIONAL)

The shore power 115 Volt A.C. waterproof connection box with a polarity light just above it is located on the port side just aft of the engine box. Polarity is reversed when light is "on". The circuit breaker switches are located in the port engine compartment forward.

CIRCUIT BREAKERS

It is the function of the circuit breakers to protect your electrical circuits. The circuit breakers also can be used to turn off power when boat is not in use, thus eliminating any drain on the batteries.

D.C. DISTRIBUTION

All D. C. circuits in your Bertram 31 go through the circuit breaker panel with the exception of the Bilge Pump Circuit. This circuit goes from the battery to an independent fuse located on bulkhead of starboard engine compartment to a switch on the Instrument Console to the Bilge Pump. This circuit is hot regardless of the setting of the circuit breakers and is controlled solely by the bilge pump switch on the console.

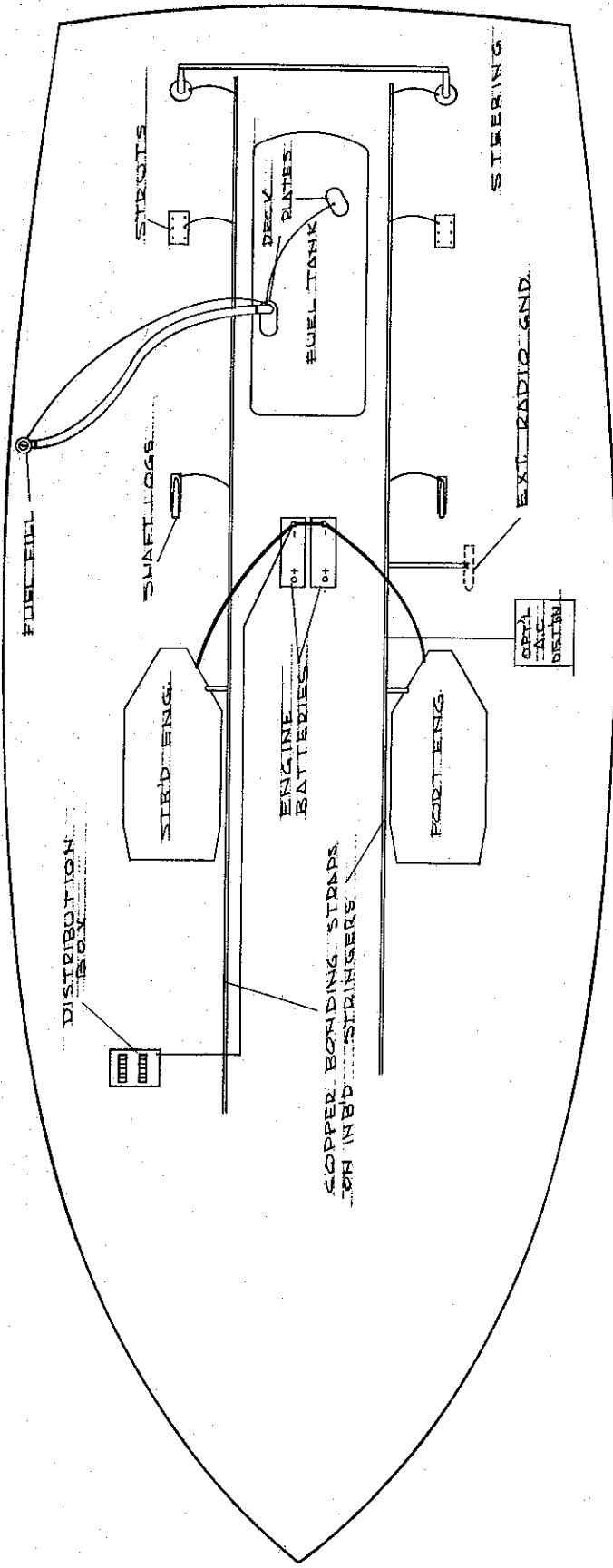
CONVERTER (OPTIONAL)

When a converter is installed it is located on the port side of the boat on the forward bulkhead of the port engine compartment. It is protected by a circuit breaker located on the port side and is completely automatic, shutting off automatically when your batteries are fully charged and when you switch from 110 A.C. to 12 Volt D. C.

GROUND AND BONDING SYSTEM

Your Bertram is fitted with a bonding system to minimize

electrolysis. This system consists of copper strips running fore and aft through the bilge area. All underwater fittings and hardware are connected with wire jumpers to these strips. They are also connected to negative battery terminals and "green" safety wire of all A.C. equipment. This is done to reduce danger of an electrical shock from high voltage equipment.



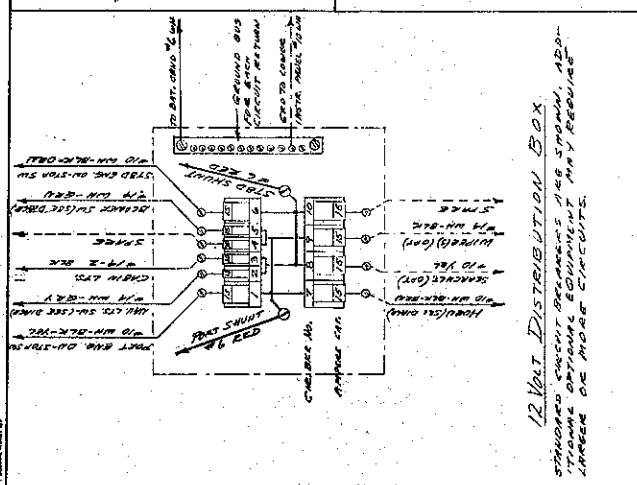
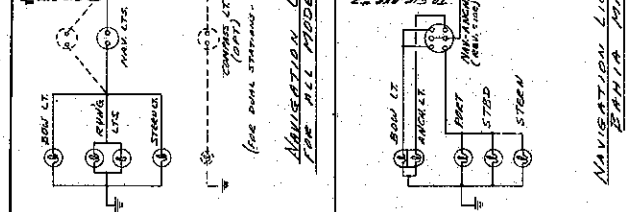
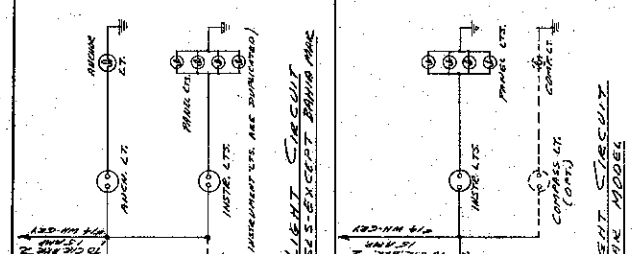
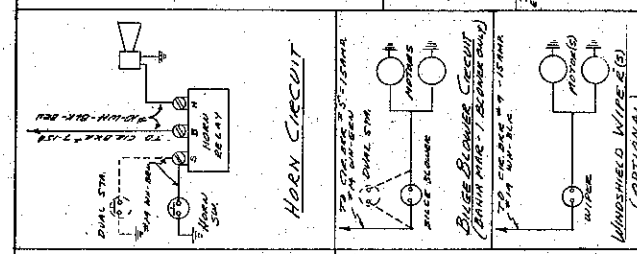
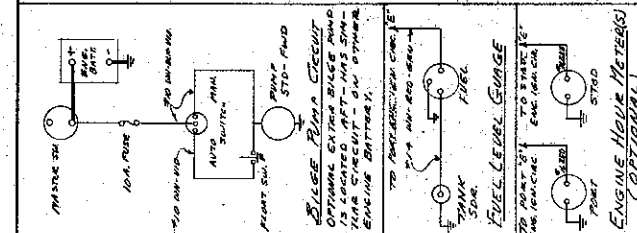
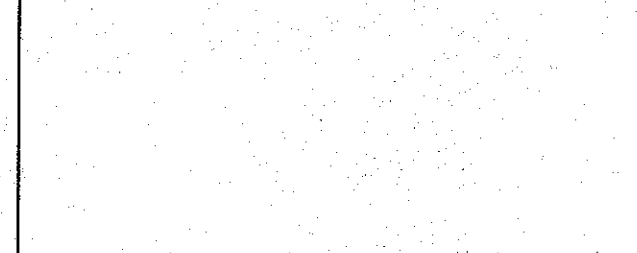
ALL BATTERIES NEG. GROUNDED

JUMPER GROUND WIRES TO:

- TURBOCHARGER FITTINGS
- ELECTRICAL ACCESSORIES
- IN/S & WINDOWS
- FUEL LINES
- UNDER WATER GEAR

DC. GND. WIRE WHITE
AC. BOND WIRE GREEN

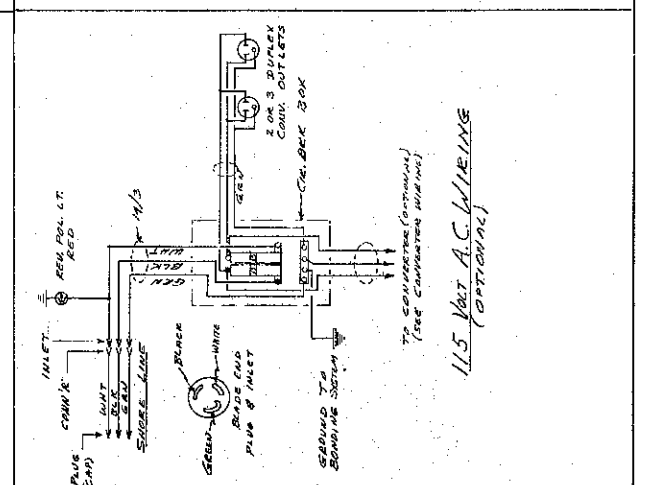
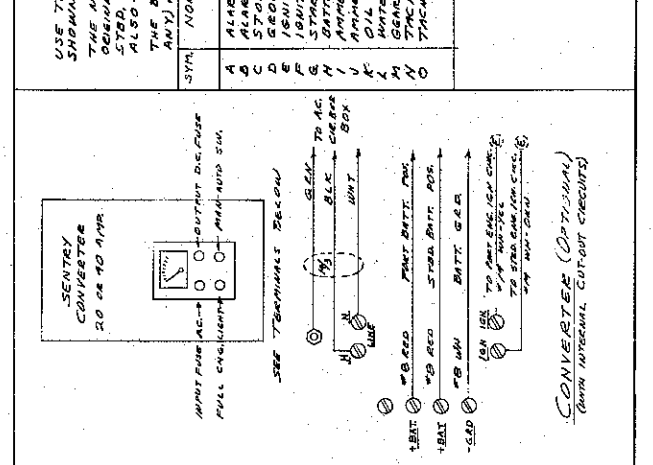
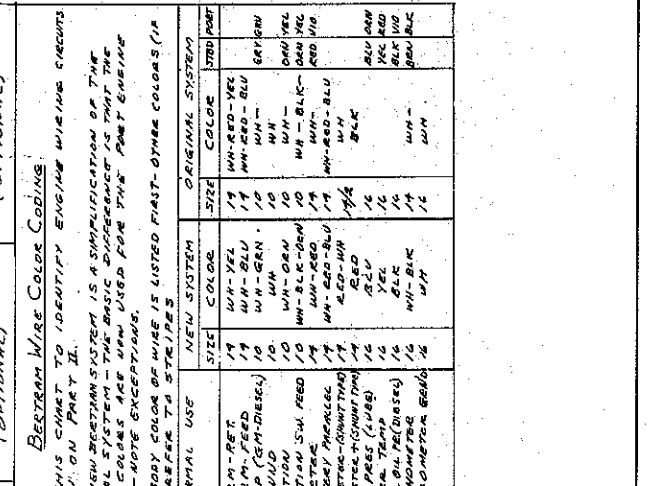
BERTRAM / WHITTAKER
31' BONDING & GROUNDING
SCALE: NONE BY HEADBERG
DATE: APRIL 30/48 APP'D:
ENG. C-2236 FILE 31'



BERTRAM WIRE COLOR CODING

USE THIS CHART TO IDENTIFY ENGINE WIRING CIRCUITS SHOWN ON PART II. THE NEW BERTRAM SYSTEM IS A SIMPLIFICATION OF THE ORIGINAL SYSTEM - THE BASIC DIFFERENCE IS THAT THE STD. COLORS ARE NOW USED FOR THE PAINT ENGINE ALSO - NOTE EXCEPTIONS. THE BODY COLOR OF WIRE IS LISTED FIRST - OTHER COLORS (IF ANY) REFER TO STRIPS

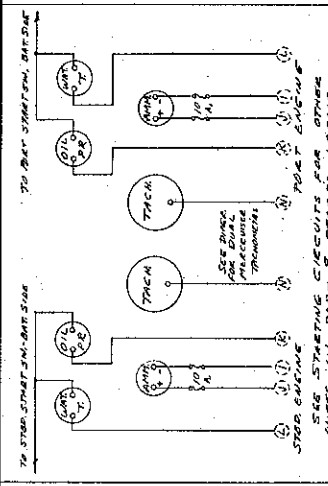
SYM.	NORMAL USE	NEW SYSTEM	ORIGINAL SYSTEM
A	ALARM - RET.	WH-YEL	WH-RED-YEL
B	ALARM - FEED	WH-BLU	WH-RED-BLU
C	STOP (SEM-DIESEL)	WH-GRN	WH-GRN
D	IGNITION	WH-ORN	WH-ORN
E	IGNITION SW. FEED	WH-BLK-ORN	WH-BLK-ORN
F	STARTER	WH-RED	WH-RED
G	BATTERY RECHARGE	WH-RED-BLU	WH-RED-BLU
H	AMMETER (COUNTING)	RED	WH
I	AMMETER (COUNTING)	RED	WH
J	WATER PRESS. (LOW)	YEL	WH
K	WATER PRESS. (HIGH)	YEL	WH
L	GEAR OIL PRESS. (LOW)	BLK	WH
M	GEAR OIL PRESS. (HIGH)	WH-BLK	WH
N	THECHOMETER	WH	WH
O	THECHOMETER REAR	WH	WH



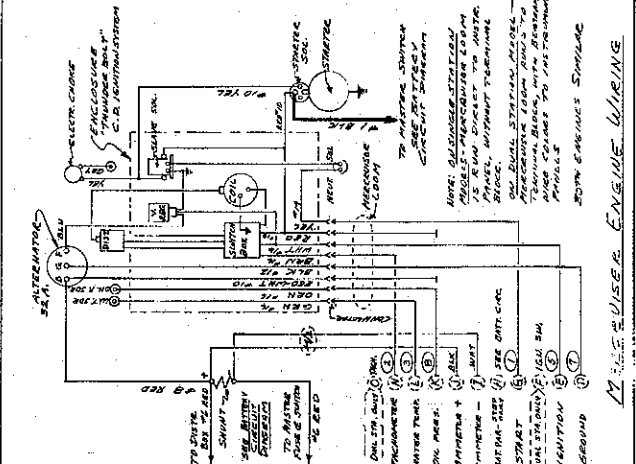
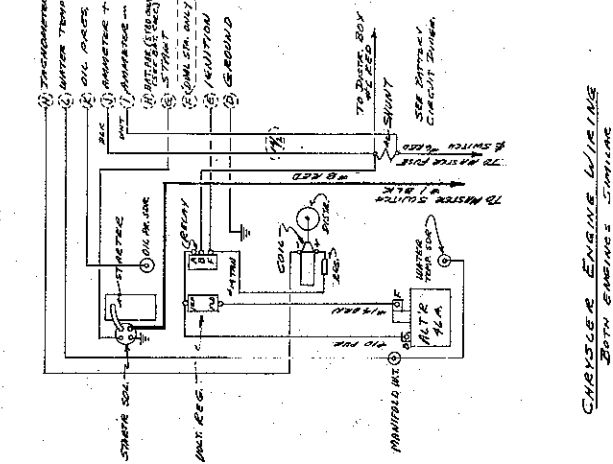
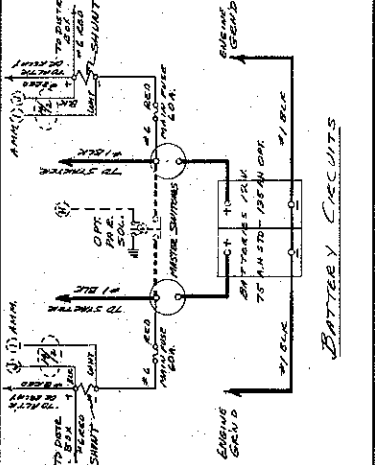
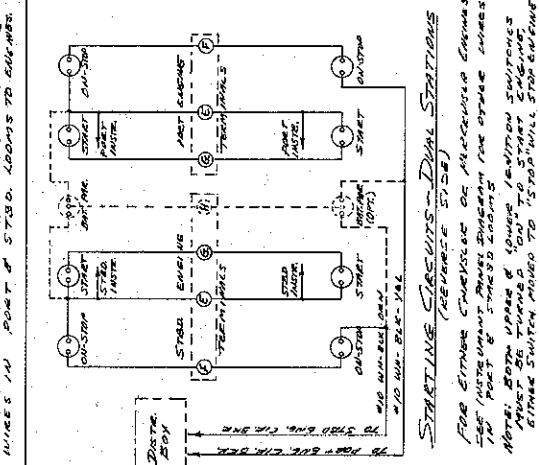
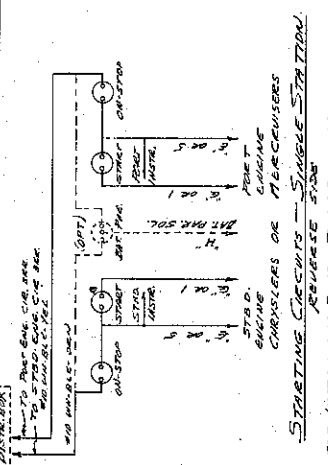
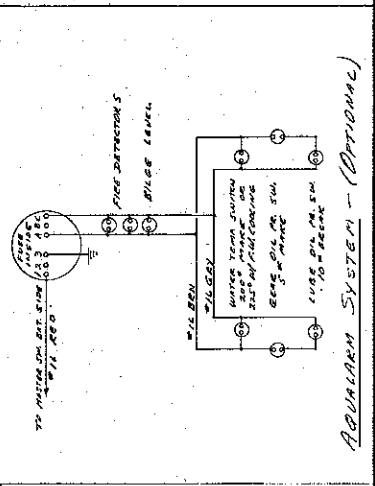
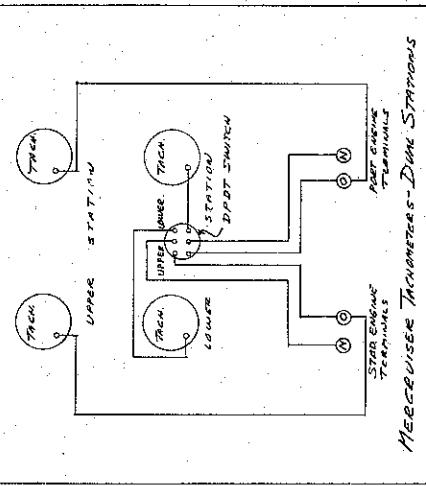
REV.	DESCRIPTION	BY	DATE
1	REVISIONS		
BERTRAM YACHT MIAMI, FLORIDA, U.S.A. A DIVISION OF BERTON CORPORATION 1000 BAYVIEW DRIVE MIAMI BEACH, FLORIDA 33154			
DATE	NO. OF SHEETS	SHEET NO.	TITLE
10/20/51	1	D-2242	WIRING DIAGRAMS - MERCUISER ENGINE CIRCUITS

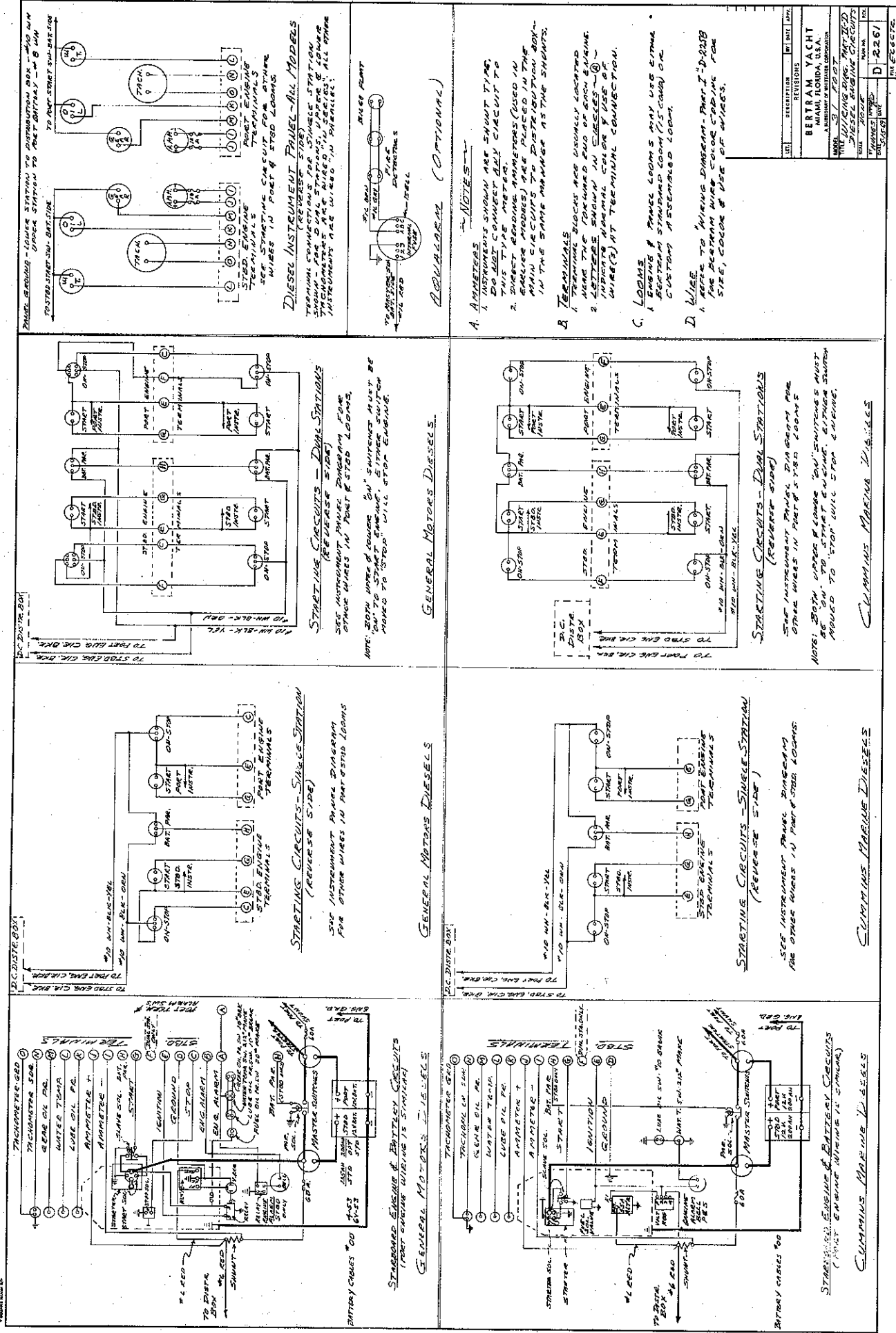
NOTES

- A. AMMETERS**
- INSTRUMENTS SHOWN ARE SHUNT TYPE. DO NOT CONNECT ANY CIRCUIT TO THIS TYPE METER.
 - DIRECT READING AMMETERS (USED IN EARLIER MODELS) ARE PLACED IN THE MAIN CIRCUITS TO DISTRIBUTION BOX IN THE SAME MANNER AS THE SHUNTS.
- B. TERMINALS**
- TERMINAL BLOCKS ARE USED IN DUAL STATION MODEL - ON SINGLE STATION MODELS MOST WIRING RUNS DIRECTLY FROM ENGINE TO INSTRUMENT PANEL. LETTERS IN CIRCLES INDICATE NORMAL COLOR & USE OF WIRES.
- C. LOOMS**
- WITH MERCUISER ENGINES THEIR PLUG-IN LOOMS ARE USED. WITH EARLIER ENGINES OR IN DUAL STATION MODEL CUSTOMER STANDARD LOOM (SECOND) OR CUSTOMER ASSEMBLED LOOMS MAY BE USED.
- D. WIRES**
- REFER TO "WIRING DIAGRAM - PART I" PLAN D-2258 - FOR ENGINE WIRE COLOR CODING FOR SIZE, COLOR & USE OF WIRES.
 - MERCURISER LOOM WIRES DO NOT MATCH BERTRAM COLORS - NUMBERS IN CIRCLES ARE USED TO IDENTIFY SUCH WIRES.



GASOLINE INSTRUMENT PANEL - ALL MODELS
 (REVERSE SIDE)
 SEE STARTING CIRCUITS FOR STARTING WIRES IN PART 8 STARTED LOOMS.
 SEE STARTING CIRCUITS FOR STARTING WIRES IN PART 8 STARTED LOOMS.
 SEE STARTING CIRCUITS FOR STARTING WIRES IN PART 8 STARTED LOOMS.
 SEE STARTING CIRCUITS FOR STARTING WIRES IN PART 8 STARTED LOOMS.



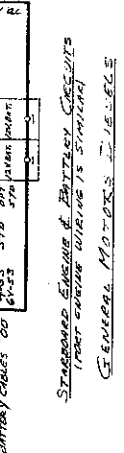
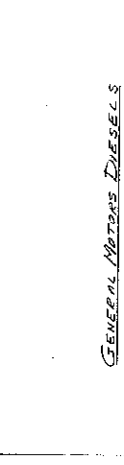
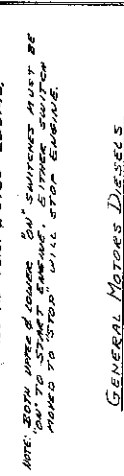
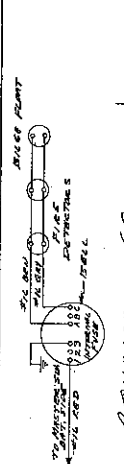
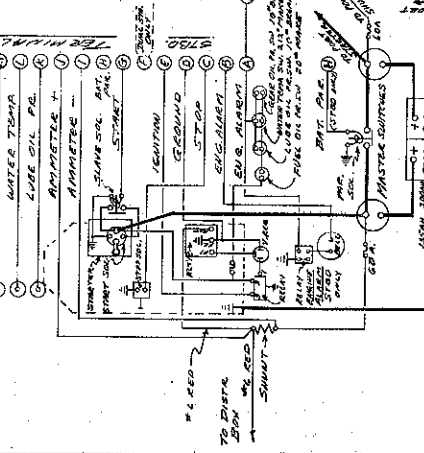
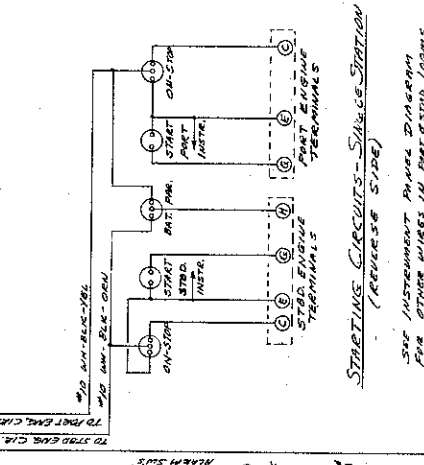
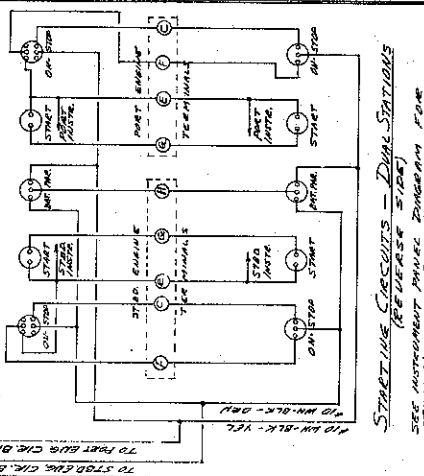
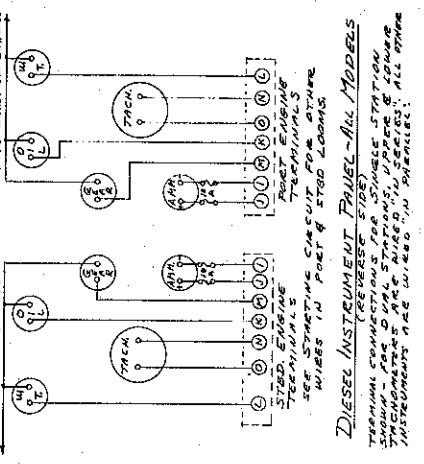


Panel Ground - Lower Station to Distribution Box - 4/0 AWG
 Upper Station to Battery - 4/0 AWG
 TO START SW-START SW

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NOTES

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2. DIRECT READING AMMETERS (USED IN EARLIER MODELS) ARE PLACED IN THE MAIN CIRCUI... (text partially obscured)
3. TERMINALS - TERMINALS ARE USUALLY LOCATED AT THE END OF EACH ENGINE WIRE. TERMINALS ARE USUALLY LOCATED AT THE END OF EACH ENGINE WIRE. (text partially obscured)
4. WIRES - WIRES ARE USUALLY LOCATED AT THE END OF EACH ENGINE WIRE. (text partially obscured)
5. WIRING - WIRING IS USUALLY LOCATED AT THE END OF EACH ENGINE WIRE. (text partially obscured)

GENERAL MOTORS DIESELS

STARTING CIRCUITS - DIESEL STATIONS (REVERSE SIDE)

SEE INSTRUMENT PANEL DIAGRAM FOR OTHER WIRES IN PART 5 STOP LOOPS

NOTE: BOTH 'STOP' WIRES FROM 'ON' SWITCHES MUST BE ON TO START ENGINE. STOP SWITCH SHOULD BE ON TO STOP WILL STOP ENGINE.

GENERAL MOTORS DIESELS

STARTING CIRCUITS - SINGLE STATION (REVERSE SIDE)

SEE INSTRUMENT PANEL DIAGRAM FOR OTHER WIRES IN PART 5 STOP LOOPS

GENERAL MOTORS DIESELS

STARTING CIRCUITS - SINGLE STATION (REVERSE SIDE)

SEE INSTRUMENT PANEL DIAGRAM FOR OTHER WIRES IN PART 5 STOP LOOPS

REV.	DESCRIPTION	BY	DATE
1	ISSUED		
2	REVISIONS		

BERTRAM YACHT
 MIAMI, FLORIDA, U.S.A.

CUMMINGS MARINE DIESELS
 210 NW 15th St., Ft. Lauderdale, Fla.

WIRING DIAGRAM PART 1 D-221B
 FOR BERTRAM WIRE COLOR CODING FOR SIZE, COLOR & USE OF WIRES.

LOOPS
 1. ENGINE STOP LOOPS SHOULD BE ASSEMBLED TO CUSTOMER ASSEMBLED LOOP.

WIRE
 1. REFER TO WIRING DIAGRAM PART 1 D-221B FOR BERTRAM WIRE COLOR CODING FOR SIZE, COLOR & USE OF WIRES.

TERMINALS
 1. TERMINAL BLOCKS ARE USUALLY LOCATED AT THE END OF EACH ENGINE WIRE. TERMINALS ARE USUALLY LOCATED AT THE END OF EACH ENGINE WIRE. (text partially obscured)

AMMETERS
 1. AMMETERS - INSTRUMENTS SHOWN ARE SHUNT TYPE. ALL INSTRUMENTS MUST BE CONNECTED TO THE MAIN CIRCUI... (text partially obscured)

WIRES
 1. WIRES - WIRES ARE USUALLY LOCATED AT THE END OF EACH ENGINE WIRE. (text partially obscured)

WIRING
 1. WIRING IS USUALLY LOCATED AT THE END OF EACH ENGINE WIRE. (text partially obscured)

FUEL SYSTEM

FUEL SYSTEM

The Bertram 31 fuel tank is a molded fiberglass tank with a capacity of 170 U.S. gallons. The tank is located aft of the engine compartment, and runs longitudinally in the boat. There are two fuel lines, one to each engine with a service valve at the fuel filter and another at the tank. This tank is manufactured in accordance with accepted standards and is made of fire retardent resins. The fuel tank is not an integral part of the hull.

FUEL

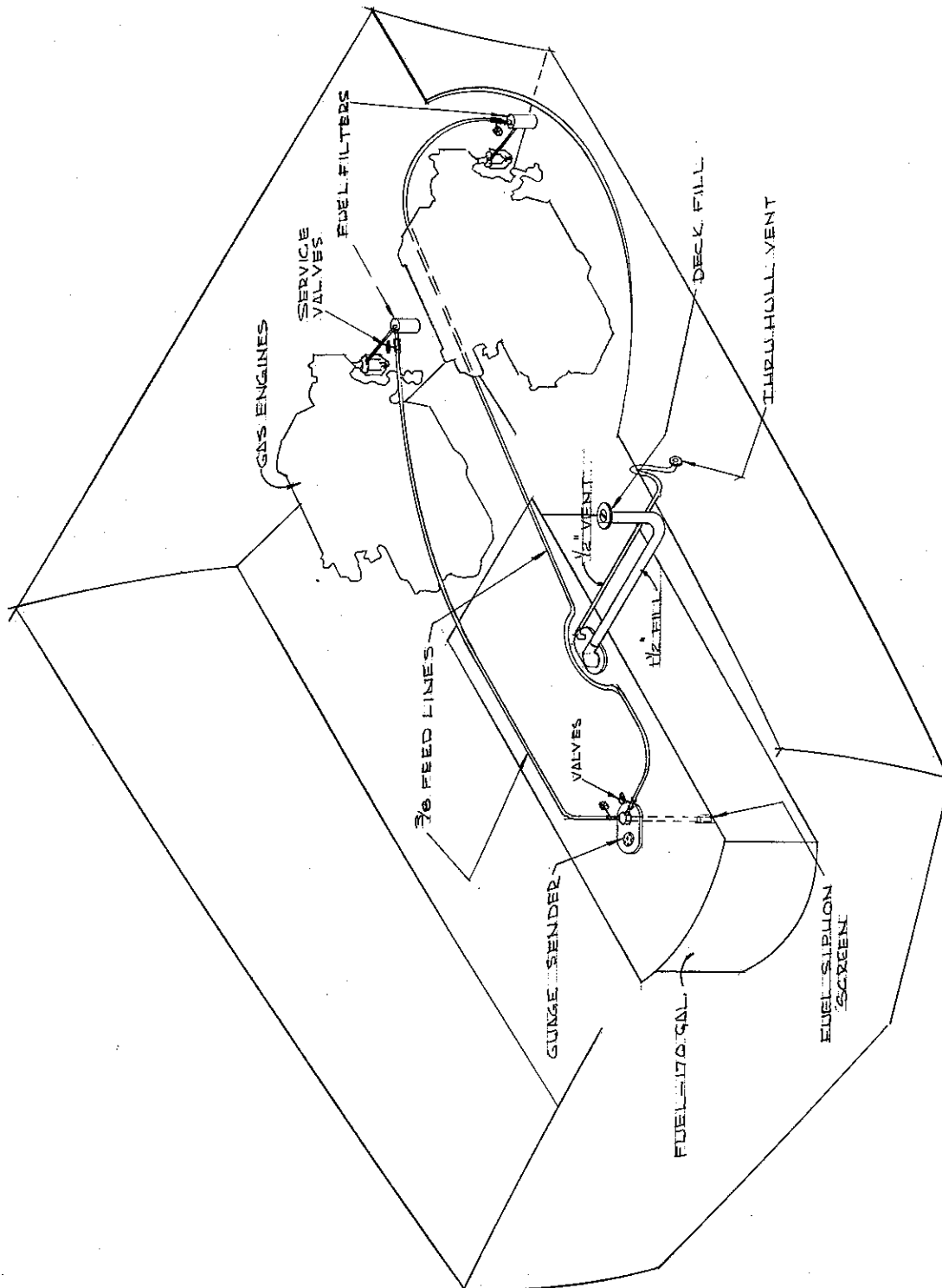
Use only the fuel recommended by the engine manufacturer. Should you be forced to use lower than specified octane-rated gasoline, do not exceed 2700 RPM's under any conditions as severe internal damage to the engines could result at a faster RPM. See the Engine Operator's Manual for more explicit recommendations.

FUELING INSTRUCTIONS

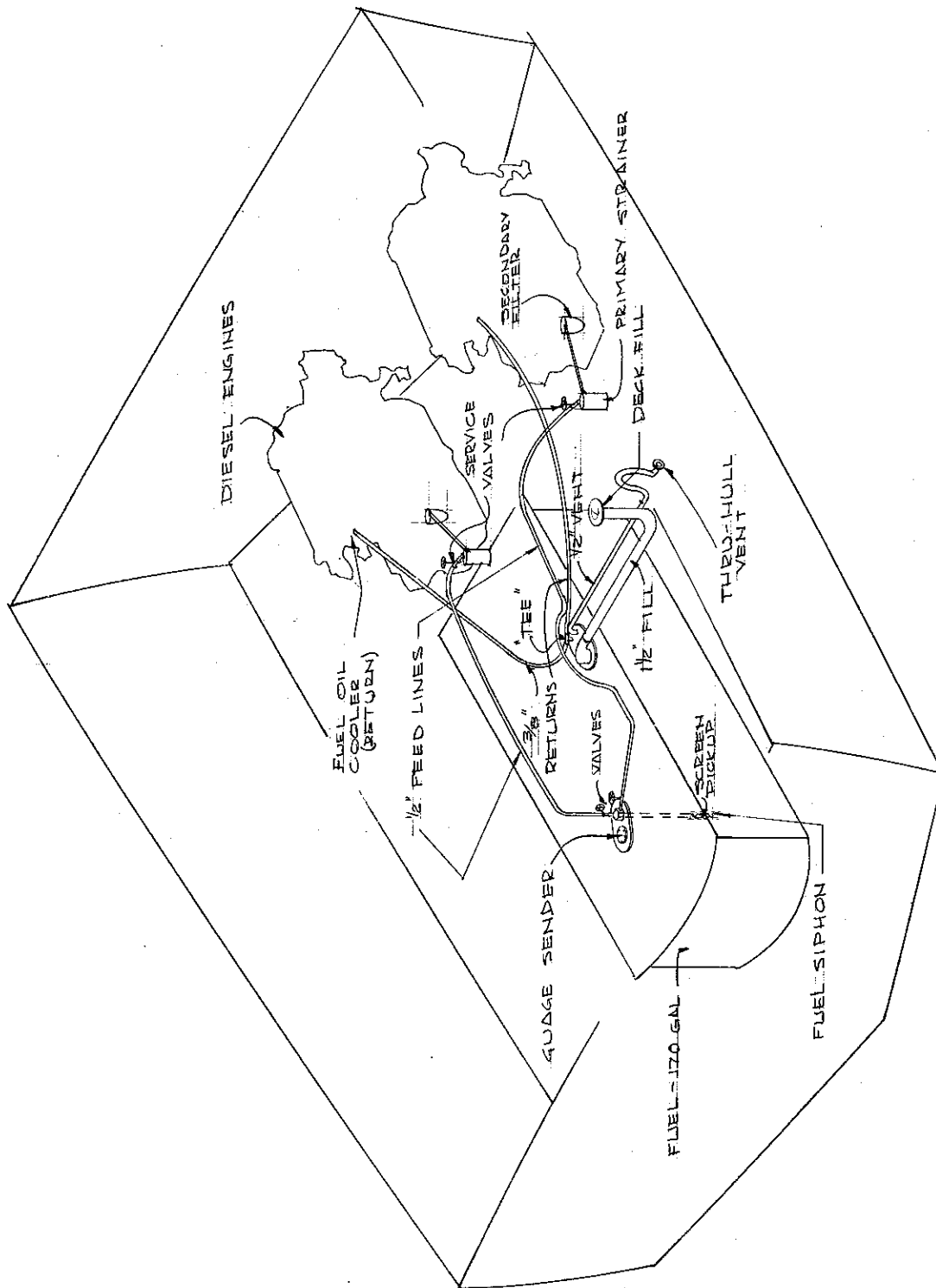
These steps should be followed, in this order, each time you fuel your Bertram.

- 1) Close windows, doors, hatches including engine hatch.
- 2) Shut off all electrical accessories including bilge blower. Do not operate any equipment.

- 3) Be sure hose nozzle is touching the boat's fill pipe before any fuel is pumped.
- 4) Top tank until fuel comes out of tank overflow vent. This vent is located on starboard side of hull in line with fill pipe.
- 5) After cap is replaced in fill pipe, open all windows, hatches and engine hatch. Air boat out and check, both visually and by smell, to see that there are no fuel leaks nor fuel fumes present.
- 6) Operate bilge blower for a minimum of five (5) minutes before restarting engines.
- 7) Close engine hatches after engines are started.



BERTRAM / WHITTAKER	
31' FUEL SYSTEM - GAS	
SCALE: NONE	BY: HEADBERG
DATE: APR 25/61	SPID:
DWG. C-52238	FILE: 31'



BERTRAM / WHITTAKER	
SI FUEL SYSTEM DIESEL	BY HEADBERG
SCALE NONE	DATE APRIL 28/64
APP'D	FILE 31
DWG C-2240	

WATER SYSTEM

FRESH WATER SYSTEM

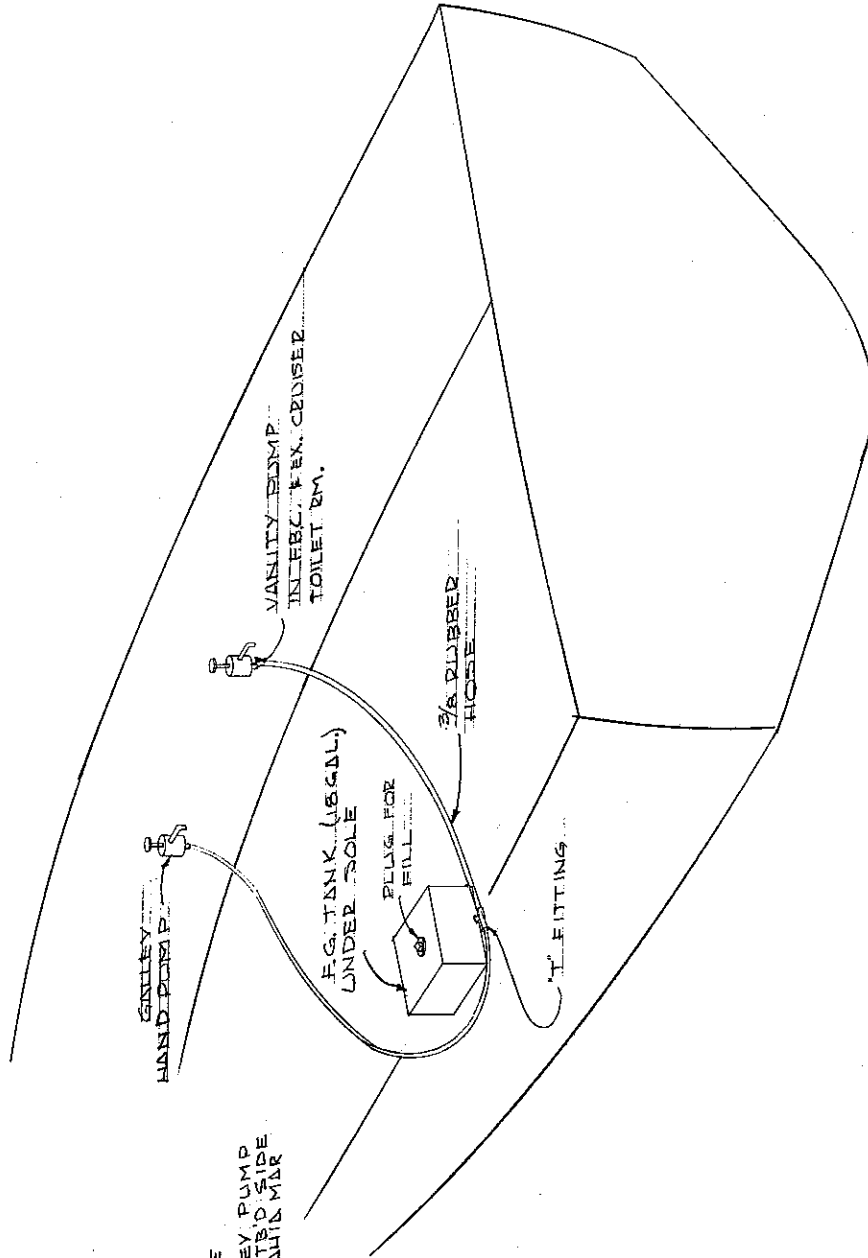
The fresh water tank is made of fiberglass and has an 18 gallon capacity. It is located forward of the engines, below the center deck hatch.

CAUTION

When filling water tank, do not use full city pressure. The tank vent may not be able to carry the discharge and if not, the tank can rupture. When filling tank, it is suggested that you do not leave the hose unattended.

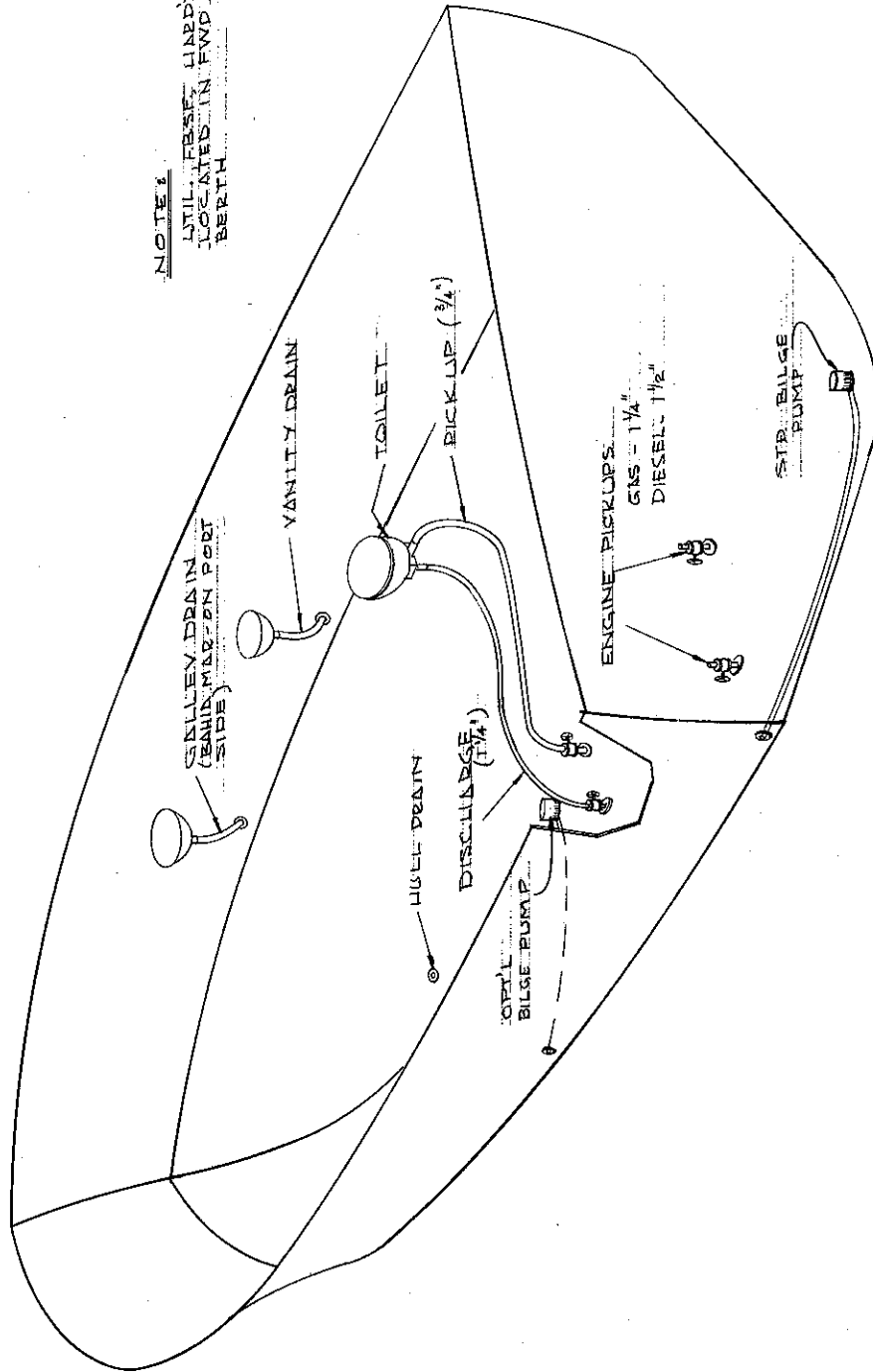
GALLEY WATER PUMP

Manually operated at sink.



NOTE
 GALLEY PUMP
 ON STRID. SIDE
 IN BATHS MAR

BEIRPM / WHITAKED
31 FRESH WATER SYSTEM
SCALE HOSE BY HEADBRED
DATE APRIL 20/81 AND 21/81
DWG. C-2244 FIVE 51



NOTE:
 UTIL. TUBE HARDIP & TOILET
 LOCATED IN FWD COMPT. UNDER
 BERTH.

BERTHAM / WHITTAKER
31 DRAINAGE SYSTEM
SCALE NONE BY HEADBERG
DATE APRIL 30/68 APP'D
DWG C-2245 FILE 31

ELECTRICAL ACCESSORIES

The Bertram 31' is equipped with the finest electrical accessories available.

ENGINE COMPARTMENT BLOWER

The engine compartment blowers are located in each engine compartment with flexible hoses attached to the suction side. These hoses go to the lowest area under the engine and a flexible hose leads from the exhaust side of the blower to the hull side exhaust fitting. These blowers are 12 Volt electric and are wired through the circuit breaker panel. The switch to operate the blowers is located on the console.

ELECTRIC BILGE PUMP

There is an electric bilge pump which works either manually from the switch position or automatically from the same switch put in the "Auto" position. This pump is wired direct from battery to switch thus insuring positive operation regardless of fuse positioning.

ELECTRIC HORN

The horn is located (all Fly Bridge models) on port outboard side of bridge. Bahia Mar model is mounted on starboard side outboard just forward of helmsman position. The horn is controlled by a switch on the console and energized by the 12 Volt system through the circuit breaker panel.

COMMANDING YOUR BERTRAM

PRE-STARTING INSTRUCTIONS

The following are routine procedures that should be followed each time you take your Bertram out.

- (1) Always check fuel supply.
- (2) Never start engines without first running bilge blower and checking the bilge by opening hatch engine and sniffing for gasoline vapor.
- (3) Make sure the seacock or valve for the engine cooling water is open. The rubber impellers in the pump will not last long when run dry.
- (4) Make sure the fuel valves at the tank and at the engines are open.
- (5) Check engine and reverse gear oil. Make sure they are at the proper level.
- (6) Check water level in expansion tank of fresh water cooled engines.

STARTING INSTRUCTIONS:

- (1) Be sure master switch near battery is in number one position.
- (2) Circuit breaker marked "Engine" should be in ON position.
- (3) Check clutch control lever to insure that clutch is NOT engaged.

MANEUVERING:

Your Bertram has twin propellers rotating in opposite directions in order to balance the torque. You can engage one engine in forward gear, and the other in reverse gear. This will turn the boat completely around in its own length if the rudder is left in the center position. 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 accentuate the spin by full rudder in the spin's direction.

In docking, approach at a slow speed, and at a 30 degree angle. When your bow is about 5 feet from the dock, put the dockside engine in neutral, and the far-side engine in reverse. This will reduce your forward movement and bring your stern alongside the dock. Usually docking can be accomplished with the clutches alone. No steering or use of throttle is required.

STOPPING ENGINES:

Simply turn ON-STOP switch to STOP. If G.M. diesel powered, there is, in addition, an emergency shut down system. In case of electric failure or other emergency, simply pull handle marked "Emergency Shut Down". Emergency system should be as a ~~last~~ resort as it is possible to suck the blower seals inside the blower if the engine is operating at high RPM's when emergency stops is pulled. (See Engine Manual)

CRUISING SPEEDS:

As you increase speed, your Bertram will increase her angle of trim. That is, the bow rises. From a maximum angle, she will start to level off, and assume a planing attitude. Do not stay at the maximum angle, or "on the hump" any longer than necessary. Take note of your engine RPM's on the hump. (NOTE: Trim Tabs - Optional. If trim tabs have been installed on your boat it will be possible for you to trim your boat to a 3 degree or 4 degree angle at a lower RPM of the engine or until the hull speed gets to a point where it is "over the hump". The Trim Tabs are actuated by two switches on the console within easy reach of the helmsman. The electrical power actuates a hydraulic pump which in turn operates the Trim Tabs.) Then cruise either under that speed or over it. Best cruising speed also depends on the type of engines your Bertram has. But as a rule, top cruising speed RPM should be 10% to 15% less than the top RPM. Consult your engine manual included in the back.

Top and cruising speed and RPM are included in the enclosed table. These were obtained on actual tests, of boats similar to yours under ideal conditions. The speeds and ranges indicated are not guaranteed. But they will serve as a valuable guide for you. Some additional considerations: engine performance will be affected to a slight degree by atmospheric conditions. You will find 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 change carburetor adjustments to get a better air fuel mixture.

The famous Bertram V-Hull cushions pounding by slicing rather than slapping waves. You'll be able to go out in weather that keeps ordinary boats at their moorings. But even Bertrams can encounter extreme conditions that call for sensible seamanship. While your Bertram will withstand far greater punishment than you will probably ever subject her to, speed should be reduced under severe conditions in the interest of your comfort, and to reduce needless strain on the engines.

CRUISING:

In order to avoid going aground or damaging underwater gear, it is important to know the draft of your Bertram, or the amount of water you must have under you at all times. Draft will vary depending on how many people and how much equipment or personal effects you are carrying. What's more, your draft will be somewhat less in salt water than in fresh water.

You can determine maximum draft by measuring the freeboard from the sheer to the water line at the center of the transom. Subtract this freeboard from the hull depth at the transom (see docking plan in this manual) to get the hull draft at the transom. Add depth of

underwater gear as indicated in Docking Plan, and you have the maximum draft. Record the figure where you can refer to it quickly.

If you plan to travel waterways crossed by bridges, you'll also want to know the height of your Bertram from the waterline. Take your measurement when your Bertram is lightened of its fuel, passengers and equipment. This will give you a small safety factor when boat is loaded.

For the best results try to maintain the original trim of the boat. You can do this by noticing her trim carefully when she is first launched, before extra equipment has gone aboard. Of course, all gear and equipment should be properly stored while cruising.

CALLING AT PORTS AWAY FROM HOME:

You are not likely to have trouble with shore current in the United States. However, you should be careful when using 30 Amp. service with a pigtail adapter. This is a low capacity adapter and should not used when demand exceeds 1700 - 2000 watts. When cruising abroad, check shore power for 115 volt single phase, A.C. 60 cycles. See section on Electrical Systems for specifics on connections for shore current.

Also, when cruising abroad, try to purchase fuel equal to American standards. (See fuel systems section for requirements in your engines). Carry extra fuel filters with you, since replacement may

be necessary.

In some areas, it is advisable to use water purifying tablets of the iodine type. Be sure to take these with you when cruising to places where the water supply is suspect. When living dockside, be sure any water hookup bypasses your own system, unless you have fitted it with a pressure valve. (See section on Water System for your boat).

LEAVING YOUR BERTRAM

The following are procedures to follow when leaving your boat overnight, or for a short period of time:

- (1) Lock all ignition or engine circuits.
- (2) Lock all doors, windows and hatches.
- (3) Make sure mooring lines are well secured with adequate allowance for tide.
- (4) Bumper and spring lines set.

The following steps should be followed when leaving your boat for longer periods of time, such as a week or more:

- (1) Follow all of the above steps.
- (2) Turn master battery switch to OFF position.
- (3) Automatic bilge pump should be left on "auto" position.

If for some reason your boat is taking on water, the batteries should be checked frequently.

- (4) Close all seacocks or valves.
- (5) Turn off all fuel valves.

MAINTENANCE

PERIODIC MAINTENANCE

The maintenance the Bertram 31 requires during the boating season depends to a great extent on the conditions under which the boat is used. Adequate ventilation of the cabin during periods of non-use will reduce the interior maintenance, and keeping the exterior painted (and waxed) will minimize the exterior maintenance.

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

DAILY

- (1) Pump bilges as required.
- (2) Ventilate engine compartment.
- (3) Check engine lubricating oil levels.
- (4) Check engine coolant levels (if fresh water cooled).
- (5) Check fuel, water, and oil systems for leaks.
- (6) Visually check raw water strainers for debris accumulation. Clean as necessary.
- (7) With engines running, check engine circulating water by observing engine exhausts. Water should be

exhausting along with the gases. (Also, the lack of exhaust water may be detected by excessive loud exhaust noise.)

- (8) Top off fuel tanks and water tanks at end of day's operation.
- (9) Wash down boat with fresh water.

EVERY 100 HOURS OR 60 DAYS (Whichever Comes First)

Exterior

- (1) Visually inspect exterior fiberglass finish; clean and wax .
- (2) Inspect all hardware and apply protective polish. Tighten any loose fittings.
- (3) Inspect all exterior seat cushions. If wet, remove covers and air dry in sunlight all polyfoam and covers. Clean covers with mild soap solution or light Clorox solution. Wash any cleaning materials off with fresh water.

Interior

- (1) Completely air out the boat.
- (2) Inspect all life jackets.
- (3) If any mildew is found, thoroughly wash down area with Clorox solution.

- (4) Inspect and operate all drawers and doors. Slight adjustment may be necessary on doors and drawers due to expansion from moisture. Drawers can be made to slide easier by using wax or a lubricant.
- (5) Check all portlights. Lubricate dog threads with Vaseline.
- (6) Check all fire extinguishers for full charge.

Galley

- (1) Inspect sink drain for pluggage and leaks.
- (2) Check lights and duplex plug-ins for operation.
- (3) Clean and check stove for operation (if installed).

Engine Compartment

- (1) Follow periodic preventive maintenance for engines and marine gears as specified in engine manual.
- (2) Inspect stuffing boxes.
- (3) Inspect exhaust hoses and hose clamps.
- (4) Check raw water pick-up gate valves. Lubricate with Vaseline, open and close a couple of times to avoid freezing up.
- (5) Clean raw water strainers. (Optional)
- (6) Check engine mounting bolts to see that they are tight. If bolts are found to be loose, realign engine. If

coupling must be broken loose, lubricate coupling bolts with Vaseline.

- (7) Check all hoses on engines, and hose clamps. Inspect for leaks.
- (8) Check fuel lines, flare nuts, and valves for leaks.
- (9) Check Morse control cable brackets for tightness.
- (10) Check electrical connections and clean if corroded.
- (11) Check exhaust blower for operation and hose for leaks.
- (12) Check all wiring to see that it is not rubbing or insulation worn off.
- (13) Check all gauge senders and alarm system make-break switches.
- (14) Check all fresh water system lines and fittings for leaks.
- (15) Check all nuts and bolts that hold steering in rudder, ports, shelf, anchor support, etc., and lubricate with grease.
- (16) Check fresh water pump for condition and operation.
- (17) Check studs for ground plates.
- (18) Check all battery cells with hydrometer. They should be between 1.250 and 1.265. Water cells as necessary.
- (19) Clean battery terminals, scrape and pack with Vaseline.

- (20) Clean out stringer limber holes.
- (21) Remove and clean screen on bilge pump pick up and check operation of pump.

Bridge

- (1) Check operation of all switches, indicator, and controls.
- (2) Check electrical connections for tightness and corrosion.
- (3) Lubricate control heads and cables with Vaseline.

As Required

- (1) Pull boat out of water, scrub, if necessary.

NOTE: The mold release that is used to lay up the hull at the factory has a certain amount of wax which makes it difficult to get good adherence of the anti-fouling fiberglass bottom paint during the first several months of operation. By then the wax is completely discharged and the paint will adhere.

STORING YOUR BERTRAM

DRY STORAGE

- (1) Indoor storage is generally preferred, if there is good ventilation, and if the location is otherwise safe and dry. However, outdoor storage may be all that is available, or economically practical.
- (2) (For any special instructions for covering Bertram 31 for outdoor storage, refer to Docking Plan).
- (3) To keep bilge dry, remove bilge drain plug and open all valves and/or seacocks.
- (4) Drain all tanks, water lines and pumps of water to prevent damage from freezing. Add antifreeze to any low position lines that can't be drained. In warm climates draining will prevent water stagnation.
- (5) Open windows, portlights, and hatches sufficiently to allow air to circulate. Also leave locker doors and drawers open.
- (6) Dry refrigerators. Doors should remain open.
- (7) If possible, remove cushions, clean and store in a dry place. If they must be left aboard, prop up on one edge for maximum ventilation.

- (8) Synthetic material lines need only proper handling and occasional cleaning. Natural fiber lines should be dried and kept in a well ventilated place.

PRE-LAUNCH:

- (1) Thru-hull strainers clear and secure. Bilge drain plug should be in place and secure.
- (2) Shafts should turn freely.
- (3) Secure propeller nut, jum nut, cotter pin.
- (4) Do rudders fit well in rudder port?
- (5) Are set screws on struts in place?

AFTER LAUNCH:

- (1) Are seacocks or valves free and operable?
- (2) Are supply and discharge lines secure?
- (3) Are fittings tight?
- (4) Make sure stuffing boxes are adjusted and locked.
- (5) Check shaft alignment.
- (6) Make sure packing glands are adjusted and locked.
- (7) Are bilge pumps working?
- (8) Is bilge blower working?

ELECTRICAL SYSTEM CHECK:

- (1) Batteries are properly charged at 1.260 SG. If below 1.220 SG, have charged.

- (2) Engine wire looms secure, away from exhaust manifold, connections tight.
- (3) Check the following standard and optional electrically operated equipment to make sure each is working properly.

Navigation Lights	Radio
Ships Lighting	Auto Pilot
Converter	Depth Finder
Horn	Shore Line and Polarity Light
Wipers	Shore Line Transfer Switch
Toilet	

ENGINE CHECK

- (1) Fuel lines and cooling lines secure and tight fitting.
- (2) Exhaust fittings secure and tight.
- (3) Engine coupling, lock wire, lock washer, key in place.
- (4) Engine mount fastening tight, locked.
- (5) See engine manual for service.

CONTROLS CHECK

- (1) Clutch adjusted, fittings secured.
- (2) Throttle adjusted, fittings secured.
- (3) Emergency shut down, adjusted, fittings secured (diesel only).
- (4) Steering is positive, linkage secure, rudder moves freely.

(5) All gauges, water temperature, oil pressure, tachometer, ammeter, and full operating (after starting engines).

MAINTAINING YOUR BERTRAM

CARE OF FIBERGLASS CONSTRUCTION

The fiberglass construction which makes up the entire hull and most of the superstructure, consists of several parts. The exterior layer gelcoat is a special polyester resin into which coloring pigments have been incorporated to give built-in color. Just beneath the gelcoat is a series of glass fabric laminations bonded together with polyester resin. The complete lamination and gelcoat are bonded together by a chemical action, and the part is a one-piece unit. The exterior gel coat - approximately 0.015 inch depth -- gives the fiberglass part its glossy finish. The following recommendations will help you keep this unique material in the same condition it was in when it left the factory:

SEASONAL CARE (AT FITTING OUT TIME):

- (1) Clean surface with soap and water.
- (2) Treat with an automotive type rubbing compound. Use lightly.
- (3) Wax and polish the surface with an automotive type wax. Some modern products give you rubbing and waxing action in one. These are also acceptable.

LOSS OF GLOSS:

To restore the glossy appearance of the gelcoat surfaces,

a light buffing may be advisable. For hand buffing, use a slightly abrasive rubbing compound similar to DuPont No. 7. If a powder buffer is used, Mirro-Glaze No. 1 or similar product is recommended. After buffing, the surface should be waxed and polished as described above for Seasonal Care.

STAINS:

The fiberglass gelcoat surface is non-porous and therefore highly resistant to stains. Most can be removed easily with 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 penetrating stains are very uncommon, some products with unusual chemical contents may go too deep for ordinary methods of removal. In such cases, weak solutions of acids or alkalies, such as hydrochloric acid or ammonia can be tried. These may, however, 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).

SCRATCHES AND ABRASIONS:

Those that do not penetrate the full thickness of the gelcoat can be treated by lightly sanding and buffing the area. Larger scratches that penetrate the gelcoat, but do not go deeply into the fiberglass or weaken the structure, can also be repaired, as follows:

- (1) Clean damaged area, first with mineral spirits or turpentine to remove dirt and wax. Follow with detergent and rinse. Allow to dry completely.
- (2) Secure a small amount of pigmented gelcoat resin matching the color of the area to be repaired. This is available from your Bertram dealer.
- (3) Add two drops of catalyst per cubic inch of gelcoat and mix thoroughly. The mixture will gel in 15 minutes.
- (4) Fill scratch with the mixture before it hardens, and round off about 1/16" to 1/8" above surrounding surface.
- (5) Lay a piece of wax paper or cellophane on top of the patch and press lightly to remove air. Take off wax paper after 20 minutes, and allow patch to cure overnight.
- (6) Sand down patch with 600 grit wet sandpaper. Finish by rubbing and buffing with regular buffing compound.

Any repairs to fiberglass that are more extensive than those described here should be made only with the help and advice of your Bertram dealer.

PAINTING FIBERGLASS SURFACES:

- (1) Thoroughly clean fiberglass part to be painted, removing any wax with mineral spirits, turpentine or other commercial

solvents. Then wash with detergent and rinse.

- (2) After surface is dry, sand lightly with garnet paper, fine oxide paper or #220 sandpaper. Wipe clean of all dust.
- (3) Apply two thin coats of primer as recommended by marine paint manufacturer.
- (4) Apply regular epoxy paint of good quality as manufacturer directs. While the fiberglass bottom of your Bertram is inherently anti-fouling, you may find your cruising waters make an anti-fouling paint application worthwhile. Follow the above directions (and those of the manufacturer) in applying such a paint to your hull.

REVISIONS		
NO.	DESCRIPTION	BY DATE
1	ADD 1/4" THICK CORRUGATED ALUMINUM SHEETING TO CEILING OF ENGINE ROOM. SEE PLAN FOR LOCATION OF SHEETING.	JK 10-29-44
2	ADD 1/4" THICK CORRUGATED ALUMINUM SHEETING TO CEILING OF ENGINE ROOM. SEE PLAN FOR LOCATION OF SHEETING.	JK 10-29-44

NOTES

1. AVERAGE LIFTING WEIGHT OF 11 TONS CAN VARY 15% DUE TO MOUNTING & LIFTING.

2. DISPLACEMENT PER INCH INFLATION IS 990 LB. PER 2. INCHES & 1160 LB.

3. FWD ALL BUNK BLOCKS & BUNKS AT 100L.

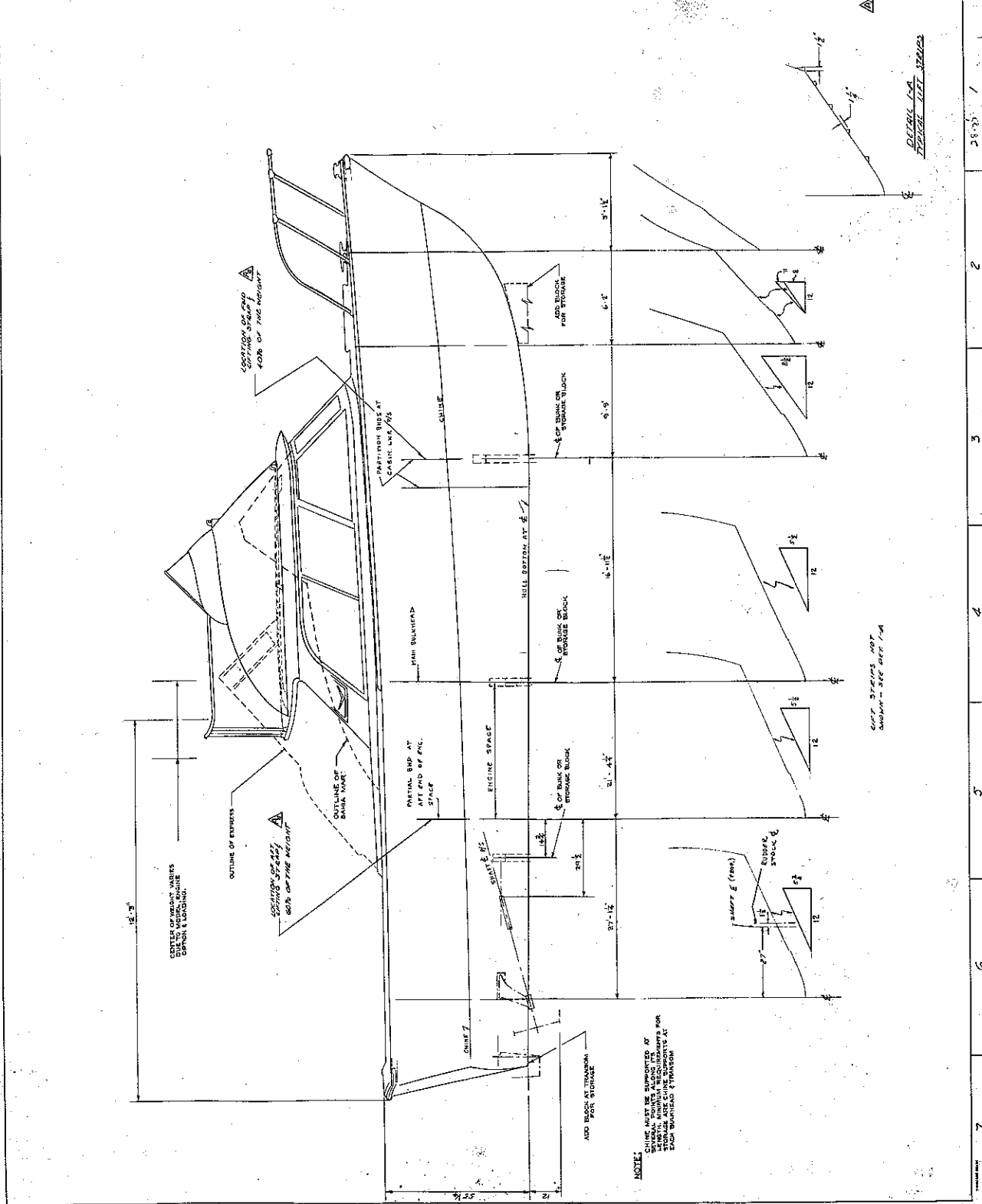
REFERENCES		
NO.	TITLE	DATE

BERTRAM YACHT
DIVISION OF HUBBARD CORP.
MOORE, PA., U.S.A. LICENSED

DESIGNED BY: J.P. SPANG
DRAWN BY: J.P. SPANG
CHECKED BY: J.P. SPANG
DATE: 10-29-44

PLAN NO: 10-21-11
SCALE: 3/8" = 1'-0"

WORKSHEET NO: 10-21-11



NOTE: CHINE MUST BE SUPPORTED BY SEVERAL POINTS ALONG ITS ENTIRE LENGTH. STORAGE ARE CHINE SUPPORTS AT EACH END AND AT 1/3 POINTS.

54