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THE PRINCESS 385

MOTOR CRUISER

HANDBOOK

Prepared for  
Marine Projects (Plymouth) Limited

by

Data & Decisions

## ACKNOWLEDGEMENTS

The Authors would like to take this opportunity to thank all the Equipment Manufacturers and Suppliers for their patience and co-operation in supplying information about the use and maintenance of their Equipment.

Our particular thanks and gratitude is extended to the dedicated team of craftsmen who design and build the Princess Motor Cruisers at Marine Projects (Plymouth) Limited, whose enthusiasm and support have made this Handbook possible.

## INTRODUCTION

It is the earnest wish of Marine Projects (Plymouth) Ltd. that you should have the maximum amount of enjoyment from your Princess 385 Motor Cruiser. With this in mind, this Handbook has been prepared to assist you to gain familiarity with the location and use of the equipment that is installed on the craft. The Handbook is therefore intended to augment the literature that is provided by the manufacturers of the equipment installed on your Princess 385 Motor Cruiser.

In preparing the Handbook it is assumed that the Owner and others using the Handbook have already gained experience and are familiar with motor cruisers.

A number of Check Lists have been included in the Handbook. Naturally the climatic conditions and circumstances in which the craft is operating will vary considerably. Thus the Check Lists are not intended to be comprehensive and as always, common sense and experience will always be the best guide.

Where further information is required of a more detailed nature, then you should contact the distributor who supplied the craft. The distributor has direct access to the Factory Service Department of Marine Projects (Plymouth) Ltd. should such assistance be required.

The Company has continuously seeking ways of improving the Princess 385 Motor Cruiser, thus although every endeavour has been made to ensure the accuracy of the information contained in this Handbook, neither Marine Projects (Plymouth) Ltd., their distributors nor the publishers of the Handbook can be held liable for any inaccuracies or omissions that may occur. It should also be remembered that when additional optional equipment is installed in a craft, this may in turn affect the layout of the standard equipment.

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# Section 1

## WHERE IS IT

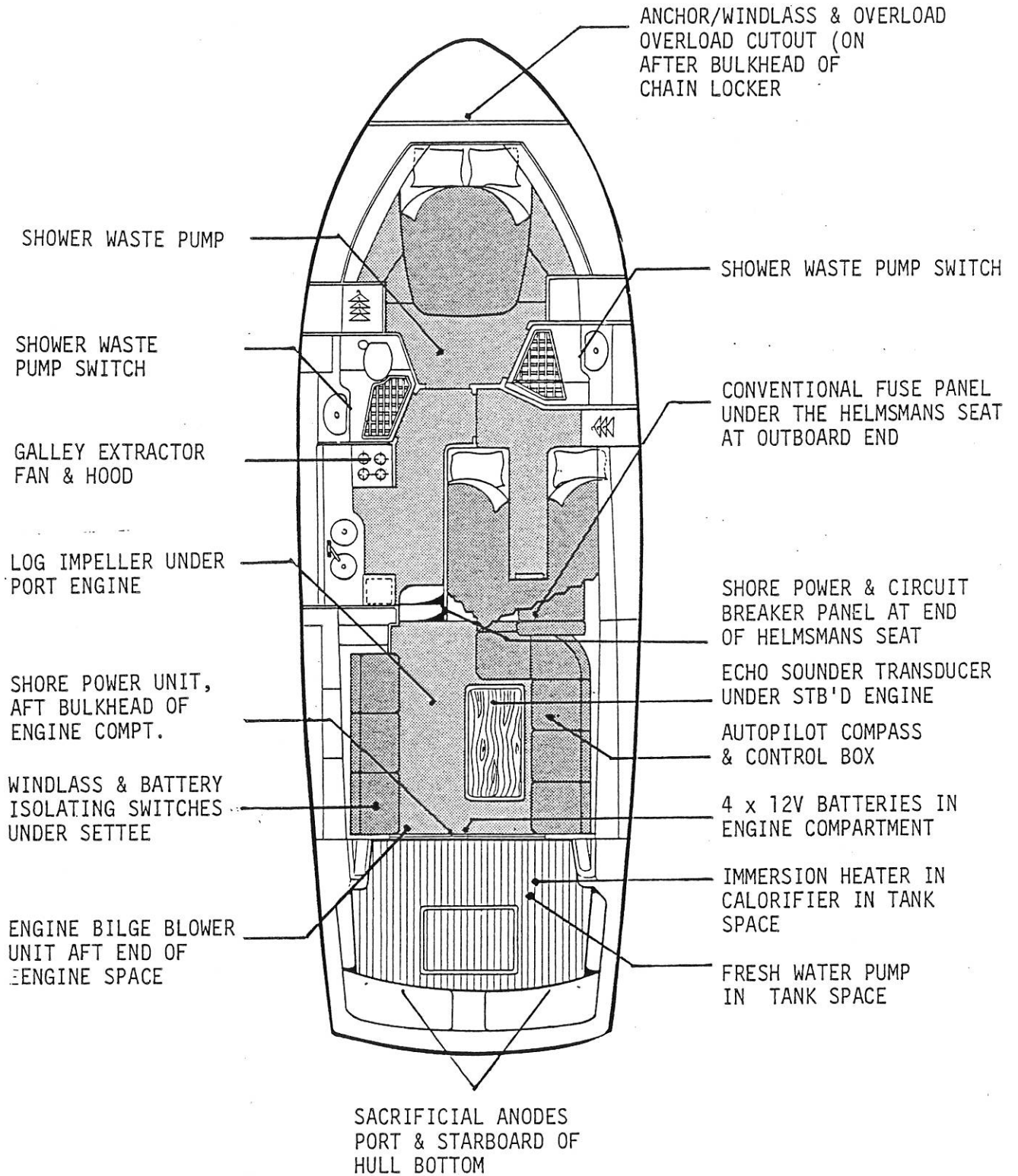
### INTRODUCTION

This Section is intended to illustrate where the most important Controls and Equipment are located. Where additional optional equipment has been fitted by Marine Projects (Plymouth) Ltd. this may in turn have affected the layout of the standard equipment that is installed in the craft.

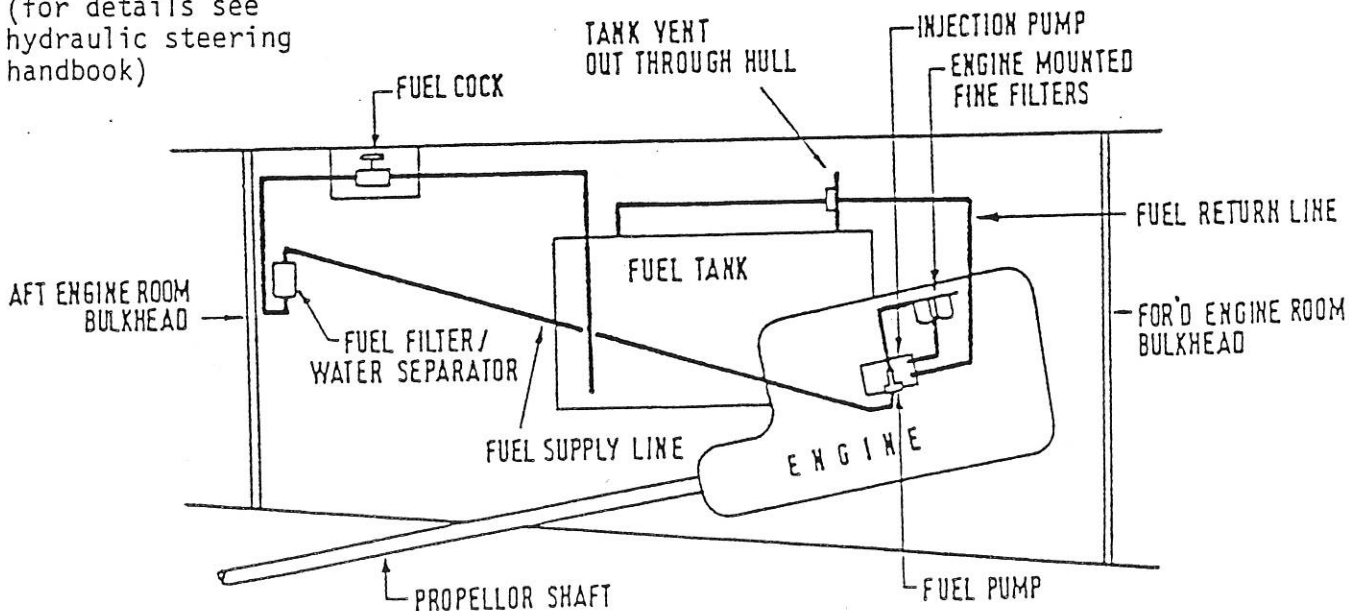
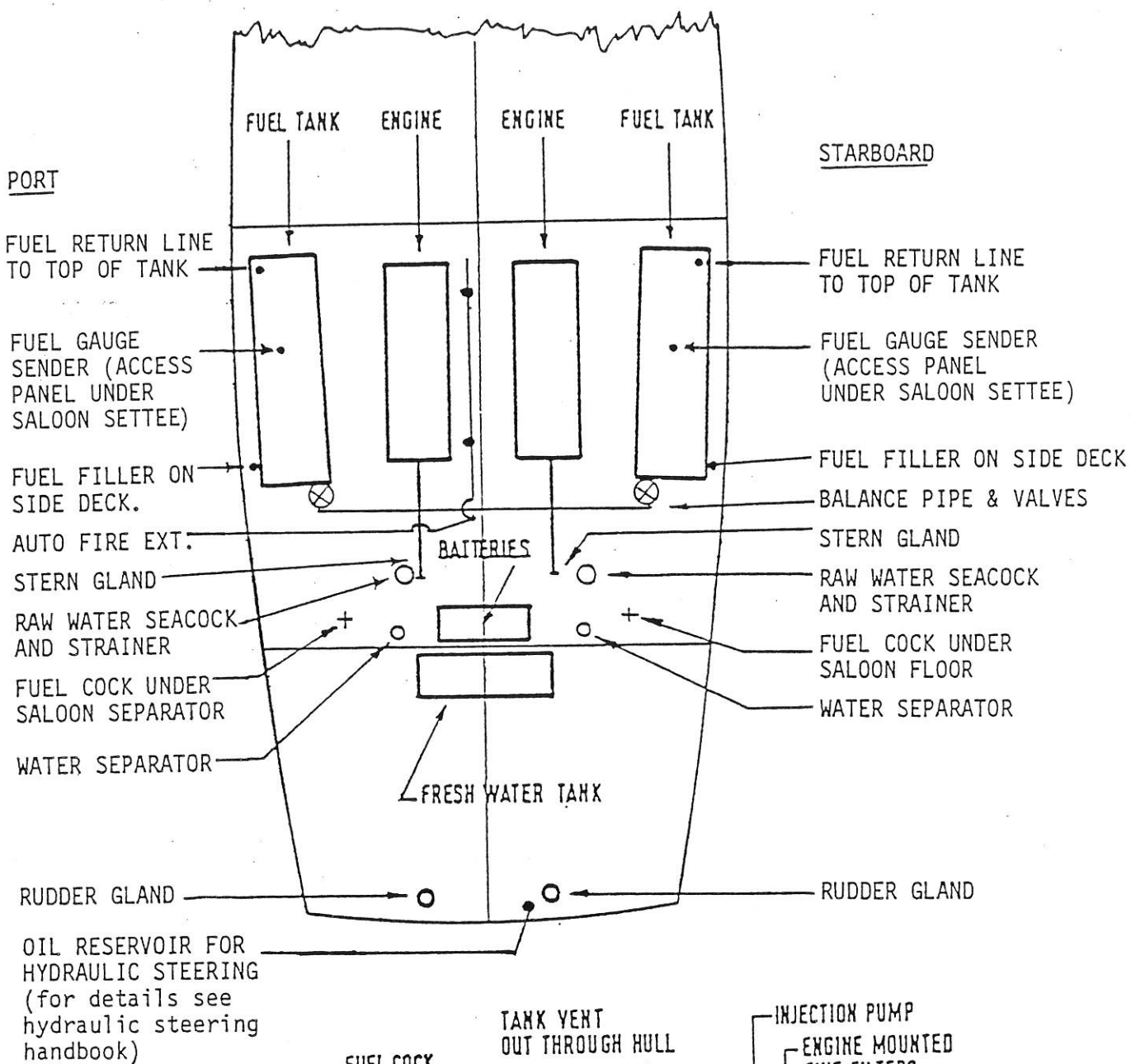
This Section consists of eight Diagrams, namely:

- Fig. E. The Electrical System
- Fig. F. The Engine Room and Fuel System
- Fig. B. The Bilges, Bilge Pumping and Sea Cocks
- Fig. S. Stowage areas
- Fig. W. Domestic Pipework for Fresh Water and Gas.

ELECTRICS



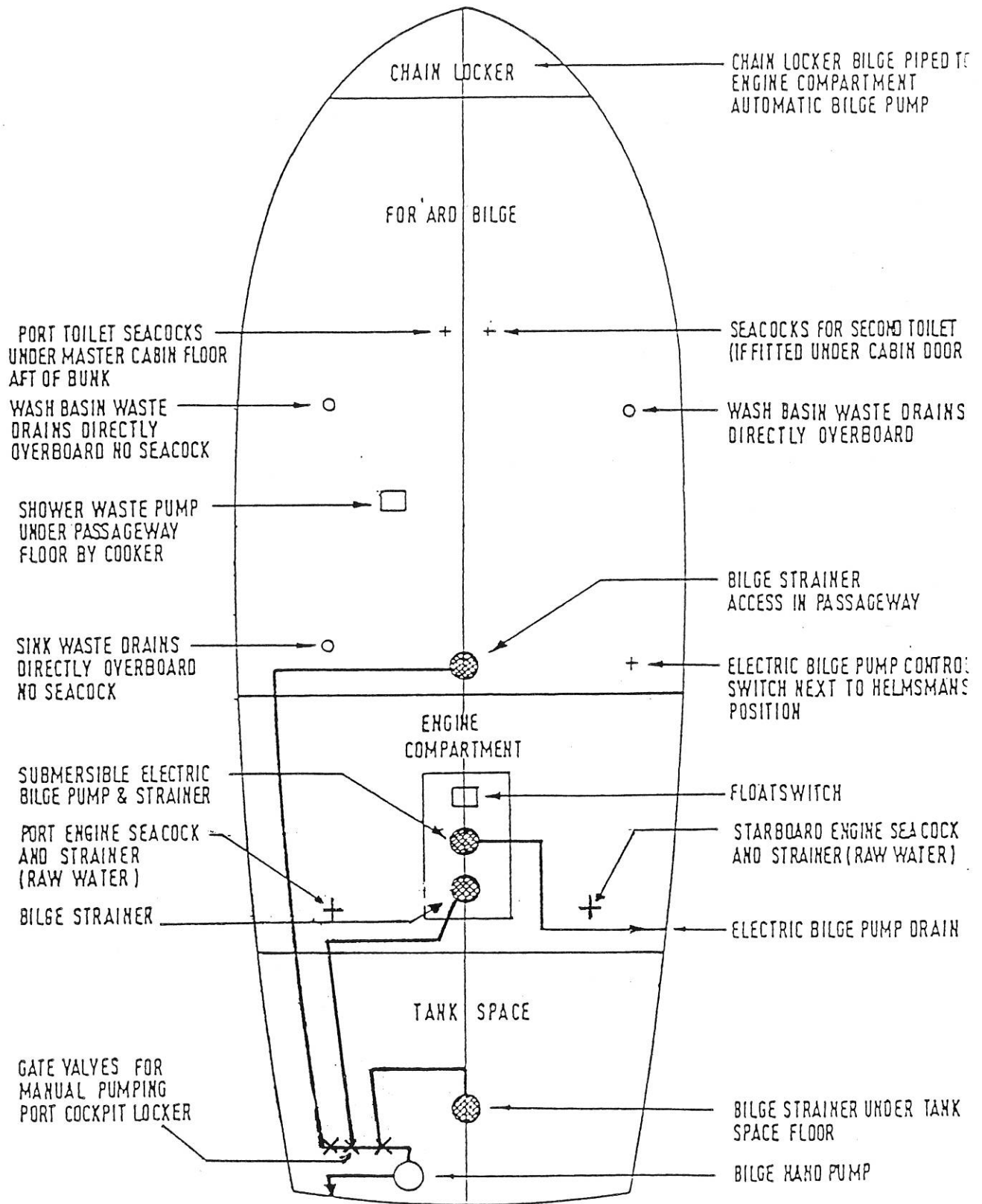
# FUEL SYSTEM AND ENGINE ROOM LAYOUT



FUEL SYSTEM

Fig. B

# BILGES, BILGE PUMPING AND SEACOCKS

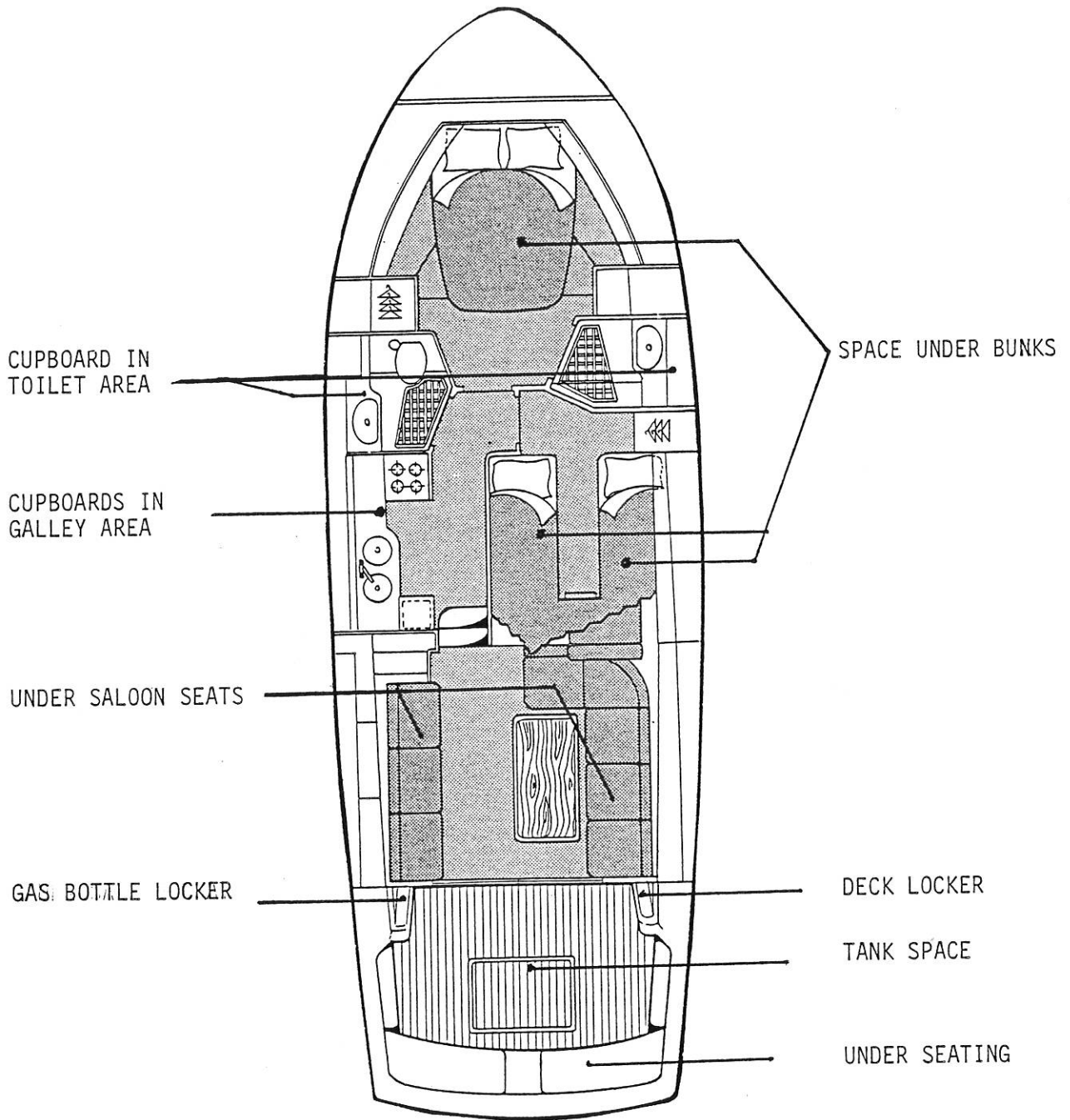




WHERE TO PUT IT

Fig. S.

STOWAGE

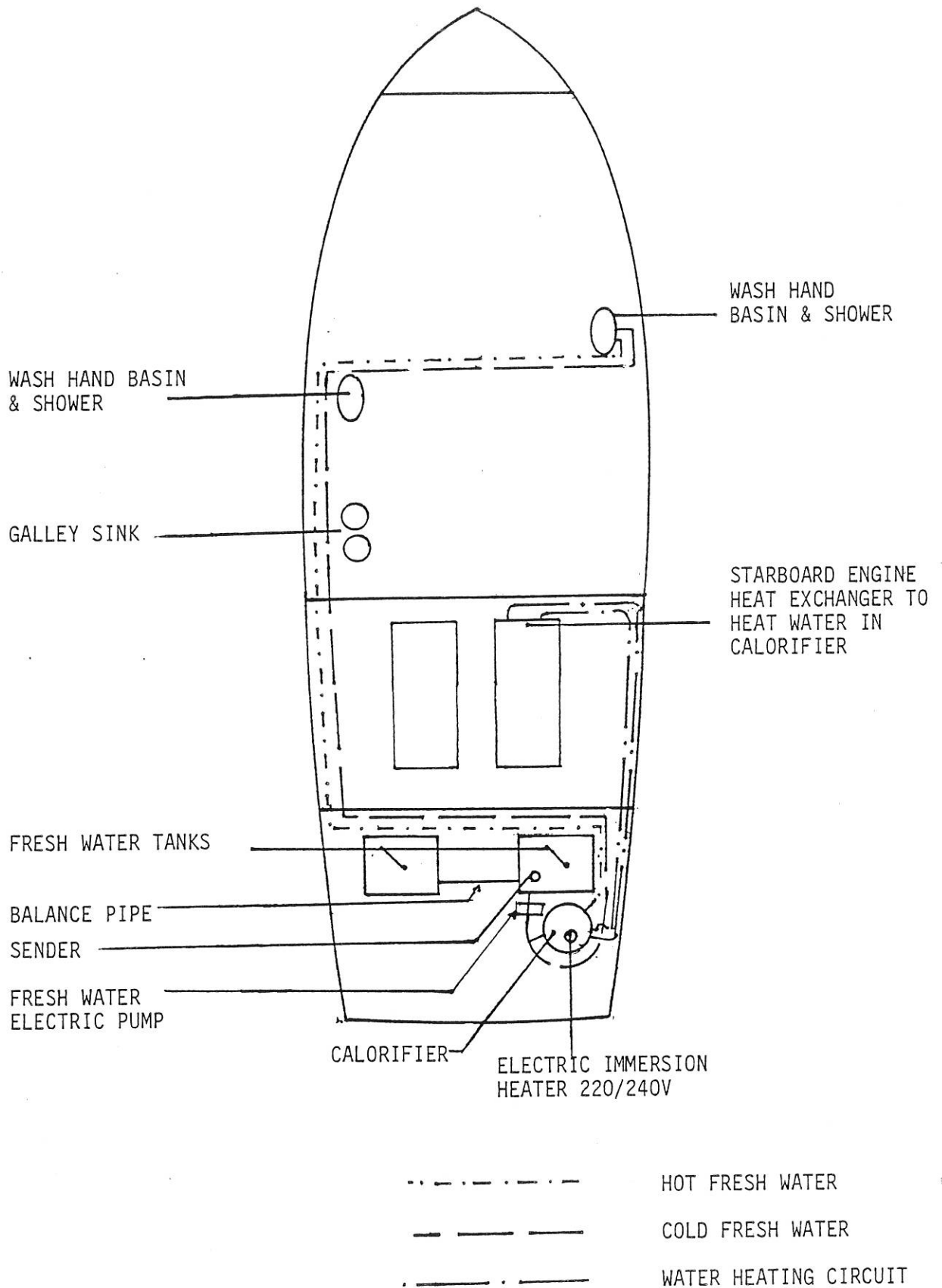


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WHERE IS IT?

Fig. W.

THE FRESH WATER SYSTEM



## Section 2

# CHECK LISTS

### INTRODUCTION

To assist Owners, a series of Check Lists have been incorporated in the Handbook for quick reference.

The Check Lists are not intended to be exhaustive and Owners should refer to the appropriate literature provided by the various manufacturers of the proprietary equipment installed on the craft. Naturally, the Check Lists will also need to be modified to accord with local climatic conditions and circumstances. Marina personnel, Harbour Masters and boatyard personnel will undoubtedly be able to give useful advice on any local conditions that may affect the routines outlined in the appropriate Check Lists.

CHECK LIST 2.1

MINIMUM ROUTINE CHECKS

2.11 INTRODUCTION

The frequency of the Checks (particularly the Routine Checks) should be governed by such considerations as the frequency with which the craft is used, its age, the local climatic conditions and circumstances where the craft is generally kept. Owners should also refer to the literature supplied by the individual equipment manufacturers. The references given on the right hand side of the pages refer to cross references in the text regarding the location of the appropriate equipment and notes in later sections of the Handbook relating to the particular Check in question

		References	
		Location	Notes
2.12	REGULAR CHECKS (IN ADDITION TO THOSE APPEARING IN THE APPROPRIATE EQUIPMENT MANUFACTURERS LITERATURE)		
	Clean out limber holes in bilges		4.23
	Clear cockpit drain holes		4.24
	Clear bilge pump strainers		4.23
	Clear engines raw water cooling strainers	B, F	4.54.1
	Check stern glands for leaks	F	3.41
	Check rudder glands for leaks	F	3.42, 4.21
	Check the water level of the batteries and the electrolytic level using a hydrometer	F	4.42.2
	Check fluid level in trim tab pump and windlass (see manufacturers handbook)		
2.13	QUARTERLY/HALF YEARLY CHECKS		
	Check seacocks for operation and any leaks	B, F	
	Check battery terminals	F	4.42.2
	Check anodes	E	3.3
	Check earth binding wire connecting engines/propeller shafts across the flexible coupling		3.3
	Check that the Fresh Water Tank vent/pipe is clear and that the connections at either end are secure. Connections can be accessed below the cockpit deck		4.11
	Check Fire Extinguishers	F	3.5

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References  
Location Notes

MINIMUM ROUTINE CHECKS (continued)

- Check that the gas bottle locker vent/drain pipe is clear and that the connections at either end are secure. Connections can be accessed below the cockpit deck. 4.3
- Lubricate steering linkages and check oil reservoir level and pressure (23-30 p.s.i) 3.42

References  
Location Notes

2.14

ANNUAL CHECKS/RECOMMISSIONING  
(IN ADDITION TO REGULAR AND  
QUARTERLY/HALF YEARLY CHECKS)

- Have manometer test undertaken on the gas system by competent personnel 4.31
- Check/tighten engine mounting bolts
- Check/tighten engine/propeller shaft coupling nuts
- Check fuel system for leaks 4.51.2, 4.53
- Check engine exhaust pipe for leaks
- Check fresh water, bilge water and effluent pipes and connections for leaks
- Flush out fresh water tanks
- Clean cooker flue (see cooker handbook)
- Adjust engine control cables, check fastenings at control positions and at the dual station unit in the engine compartment and at the engine and gear box connections.
- Check for electrical continuity with respect to the cathodic protection system, i.e. all stern gear, seacocks, electric trim tabs when fitted, and the anodes themselves.
- Check all rudder connections.

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CHECK LIST 2.3

LEAVING THE CRAFT FOR MORE THAN A FEW DAYS

	References	
	Location	Notes
LEAVING		
Close all sea cocks (If Engine Cooling Sea Cocks are turned off, leave a note on Instrument Panel)	B, F	4.26, 4.54.1
Turn off all instruments, equipment, lights etc.	E	
If fuel cocks are turned off, leave note on Saloon Instrument Panel		4.51.2
Turn off battery master switches	E	4.42.3
Turn off windlass master switch	E	4.42.3, 4.46
Turn off gas equipment	W	4.31
Turn off gas supply at storage bottle	W	4.31
Pump bilges	B	4.22, 4.23
Set electric bilge pump to AUTO	B	4.22
Switch off battery charger if absent for 7 days or more.	E	
Clean out refrigerator - leave door ajar.		
Pump toilet dry - treat lightly with ammonia based disinfectant.		4.26
Leave locker lids and cupboards open for ventilation.		
Lock all windows.		
Check and secure night covers.		
Check mooring lines and fenders.		
Hose down with fresh water if supply is available.		5.2

4  
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CHECK LIST 2.4

LAYING UP & COLD WEATHER PRECAUTIONS

Introduction:

Regardless of what precautions are taken, it is essential that the craft is visited at regular intervals throughout the winter if the craft is kept afloat to check the moorings and pump the bilges.

References  
Location Notes

2.41 Essential Requirements

GO THROUGH THE "LEAVING SHIP" CHECK LIST

Drain toilets and then turn off all sea cocks, e.g. at the engines and toilets

B, F 4.26

Inhibit the diesel engines (not forgetting the diesel generator if installed) as recommended in the engine manufacturer's handbook

Ensure batteries are topped-up and re-charged.

E 4.42, 4.44

Ensure that there is anti-freeze in the closed circuit fresh water cooling system of the engines, or drain off the water.

F 4.54.2

Drain engine raw water cooling system.

4.54.1

Drain the calorifier

W 4.12.2

Drain the Fresh Water Tank

F

Check all water, oil, diesel fuel hose pipes and clips for security.

Ensure all ventilators are clear and unobstructed.

Open all cupboards, doors and lockers to ensure maximum air movement below decks.

Having thoroughly pumped the bilges open all gate valves and pump air through the manual bilge system to ensure that no water is left in the manual bilge system where frost damage might occur.

B 4.23

At locations where there is a risk of frost damage occurring (check with the local harbour master or marina personnel) drain the electric bilge and disconnect the electric bilge pump from the pipe to allow it to drain.

B 4.22

Ensure there is no water in the fresh water pump and the shower waste pump.

W 4.12

Put battery in trickle charge occasionally

F 4.42.2, 4.44

Ensure underside of cushions and carpets are dry (ideally store soft furnishings at home)

Section 3  
CHECK LISTS  
- SUPPORTING NOTES

3.1 INTRODUCTION

Whilst the Section that follows dealing with the 'Basic Systems' covers various aspects referred to in the Check Lists there are a number of important points that do not fall naturally under any of the headings covered in that Section. These points have therefore been dealt with in these "Supporting Notes" to the 'Check Lists'.

3.2 LAYING UP AND COLD WEATHER PRECAUTIONS

3.2.1 WINTER HEATING OF THE CRAFT

3.2.2 WINTER ENGINE 'WARM UPS'

3.3 CATHODIC PROTECTION

3.4 PROPELLER SHAFTS & STEERING GEAR

3.5 FIRE EXTINGUISHERS



## 3.2

LAYING UP AND  
COLD WEATHER PRECAUTIONS

## 3.21 WINTER HEATING OF THE CRAFT

The recommendations set out above in Section 2.4 assume that the boat will not be used in the winter months and that the boat is located in a region where frosts and dampness are likely to occur. In the event that the boat is not being laid up completely or is located in a warm climate, common sense will be the best guide as to which of the following procedures should be followed.

Many of the problems that are encountered through frost and damp can be overcome by ensuring that all doors, drawers and lockers are opened to ensure the best possible circulation of air.

## 3.22 WINTER ENGINE 'WARM UPS'

There is a common fallacy that diesel engines should be run for 20 minutes or so in neutral whilst the craft is still alongside at about monthly intervals to help safeguard the engines against internal corrosion and to charge the batteries.

RUNNING THE ENGINES IN THIS MANNER, WHEN THEY ARE NOT UNDER LOAD, IS IN FACT GENERALLY INADVISABLE.

When running in neutral, the engine is not under sufficient load to reach its correct operating temperature and the engines are likely to be overfuelled, particularly turbo-charged engines such as often installed in the Princess 38. This results in only partial combustion of the diesel fuel in the cylinders and the cold damp air drawn into the engine condenses out on the cylinder linings.

Thus a series of so called 'warm ups' are likely to do more harm than good, particularly on new engines.

## 3.3

## CATHODIC PROTECTION

It is fundamentally important to ensure that this protective system is operating efficiently as components will otherwise become badly corroded and have to be replaced at considerable cost. There is the additional risk that components that are fundamental to the safety of the boat, such as the sea cocks, could fail at sea or when the boat is unattended.

In order to avoid severe electrolytic corrosion, those parts of the boat that are most likely to be affected are wired, by electrical cable, to Sacrificial Anodes which are fixed below the waterline on the underside of the hull on the port and starboard sides. All through-skin metal fittings are connected, including the propeller shafts.

In general, the propellers are more prone to corrosion due to electrolytic action than any of the other metal skin fittings.

The extent to which electrolytic action causes metal corrosion depends upon a number of factors such as:

1. The metallurgy of the components, such as the propeller.
2. The extent to which the water is salt or brackish.
3. The amount of turbulence at the point where the water and the metal components are in contact.

It is recommended that the following routine checks should be made:

1. Ensure that all the wiring connections are kept in good condition and preferably lightly greased with a petroleum jelly.
2. The sacrificial anodes must be replaced once they have reached a minimum thickness of  $\frac{1}{2}$ " (i.e. 50% of original). As a guide this is going to occur every 6 to 24 months depending upon the salt/brackish nature of the water in which the boat is moored and the frequency with which the boat is used. Make the first check on a new boat after six months to establish the wastage rate for the conditions in which the boat is operating and moored.

The anode however should be inspected fairly regularly and if there is no visible deterioration of the anode itself, careful examination should be made of all exposed metal parts to see if there is any deterioration. It is particularly important to check the propeller as this is most prone to the risk of corrosion. In some cases, if the craft is moored in fresh water, a skin may form over the anodes which will impede their operation and this should also be checked, and scraped off if necessary.

3. Ensure that the studs that secure the anodes on the inside of the hull are not unduly corroded.
4. When the boat is out of the water, check that the studs securing the anodes on the outside of the hull are not corroded. This can often be best accomplished by removing the anodes and cleaning off any rust. In the event of excessive rust the studs will obviously require replacing.

If any signs of pitting or corrosion appear on any of the skin fitted components, a check should be made of the anodes themselves and all the wiring of the anodes. The wiring of the cathodic protection system can be checked using an avometer or similar meter and checking the continuity between the anodes and the propellers.

Clearly this test can only be undertaken if the craft is out of the water. If the vessel is in the water it is possible, as a second best, to check for continuity between the studs securing the anode that are accessible from the inside of the hull and the propeller shafts.

TAKE PARTICULAR CARE THAT THE BRIDGING WIRES BETWEEN EACH ENGINE AND ITS PROPELLER SHAFT ACROSS THE COUPLING IS NOT BROKEN OR LOOSE.

### 3.4 PROPELLER SHAFTS & STEERING GEAR.

#### 3.41 PROPELLER SHAFTS

Each of the contra-rotating stainless steel propeller shafts is mounted on the two separate Cutlass bearings. A cutlass bearing is mounted in the aluminium bronze P brackets (at the stern of the shaft) and another bearing is mounted at the outboard end of the shaft log. Cutlass bearings are water lubricated and there is therefore no need to apply any grease or oil whatsoever. The clear plastic pipe(s) at the shaft log deliver a copious flow of water which is essential for lubrication. When a type of log is fitted that necessitates two pipes, one supplies the lubricating water (from the engine raw water system) and the other is an Air Vent. When an Air Vent is fitted it is most important to check at regular intervals that it is clear and correctly located.

Water is prevented from entering the hull along the propeller shaft by a stern gland. A slight weep of water from the gland is desirable because this assists in lubrication.

The maintenance that is possible while the boat is afloat is confined to adjusting the stern glands, which can be reached from the engine compartment.

If the amount of water entering the hull through the stern gland is judged to be excessive, (only a slight weep is desirable) the graphite impregnated packing around the shaft can be compressed by tightening both nuts on the gland by an equal amount. It is advisable to tighten each of them by about half a turn alternately until seepage has been reduced to an acceptable level.

DO NOT OVERTIGHTEN, ALLOW SOME SEEPAGE OTHERWISE THE PACKING WILL BURN OUT.

The stern glands can only be repacked when the hull is out of the water.

3.42 THE STEERING GEAR

Each rudder post is supported in a bearing which is lubricated with grease forced into the bearing by the hand operated lubricator. Give a half turn at frequent intervals, and especially if the boat has not been used for a while. Water is prevented from entering the hull by an 'O' ring at the top of the bearing.

The rudders are operated from both helm positions hydraulically. Rotation of the steering wheel generates a differential pressure which, through the system, moves the steering cylinder proportionally. This in turn is attached to the rudder posts. The system is pressurised at the oil reservoir mounted inside the starboard transom in the aft compartment. A quarterly check should be made on the reservoir level, the pressure (20-30 p.s.i), the fittings for leaks, and the linkages for security, as outlined in the equipment suppliers' handbook. For further information refer to the hydraulic steering manufacturer's handbook.

### 3.5 FIRE EXTINGUISHERS FITTED ON THE CRAFT

Fire extinguishers are fitted either end of the fore and aft beam in the engine compartment (where there are two) and alongside the central heating unit and generator (if fitted) which are generally located in the tank space. They are automatic in operation. At the head of each fire extinguisher is a heat sensitive switch with twin sensors, either one of which will release the extinguishant on fracture due to heat. They operate when the surrounding temperature reaches 80°C (175°F). Each is also fitted with an indicator. When this is in the red zone, the extinguisher needs servicing.

The manufacturer provides a replacement service by which extinguishers can be recharged at half the current price of a new unit. Check the extinguishers regularly and if in any doubt as to their condition, take advantage of this service.

Hand operated fire extinguishers are provided in the living area and should be kept ready for use at all times. They are of the dry powder type and have a maximum life of 5 - 6 years.

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## Section 4

## THE BASIC SYSTEMS

## INTRODUCTION

This Section first covers the Fresh and Bilge Water Systems, starting with a description of the two systems, followed by hints on the use of the valves, pumps and other important parts of the systems.

This is followed by a brief mention of how the Gas System operates, where the gas cylinders are located and how the system should be used.

The next Section deals with the various Electrical Systems on the craft, including when and how they should be used. Finally comes a few notes on the Engines.