

 <p>Rowing Solutions</p>	<p>66 Highfield Park, Wargrave Reading RG10 8LE United Kingdom</p>
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# Owner's Manual



## RS eCAT16

**Please keep this manual in a secure place and hand it over to the new owner when you sell the craft.**

If this is your first craft, or you are changing to a type of craft you are not familiar with, for your own comfort and safety, ensure that you obtain handling and operating experience before assuming command of the craft. Any boat dealer or national sailing federation or yacht club will be pleased to advise you of local sea schools, or competent instructors.

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# 1 WELCOME

Congratulations on becoming the new owner of a: RS eCAT16

This manual has been compiled to help you to operate your craft with safety and pleasure. It contains details of the craft, the equipment supplied or fitted, its systems and information on their operation, set up, maintenance, prevention of risks and management of those risks. Please read carefully and familiarize yourself with the craft before using it.

## 1.1 Boating Experience

This owner's manual is not a course on boating safety or seamanship. If this is your first craft, or if you are changing to a type of craft you are not familiar with, for your own comfort and safety, please ensure that you obtain handling and operating experience before “assuming command” of the craft.

Any boat dealer or national sailing federation or yacht club will be pleased to advise you of local sea schools, or competent instructors.

Even when your boat is categorized for them, the sea and wind conditions corresponding to the design categories A, B and C range from severe gale conditions for category A, to strong conditions for the top of category C, open to the hazards of a freak wave or gust. These are therefore dangerous conditions, where only a competent, fit and trained crew using a well-maintained craft can satisfactorily operate.

This owner's manual is not a detailed maintenance or trouble-shooting guide. In the case of difficulty, refer to the boat builder or boat builder's representative. If a maintenance manual is provided, use it for the craft's maintenance.

## 1.2 Responsibility

Always use trained and competent people for maintenance, repair or modifications. Modifications that may affect the safety characteristics of the craft shall be assessed, executed and documented by competent people. The boat builder cannot be held responsible for modifications that boat builder has not approved.

In some countries, a driving licence or authorization is required, or specific regulations are in force and carriage requirements may be subject to local regulations.

It is the boat owner/operator's responsibility to:

- 1 Know the limitations of your boat;
- 2 Follow the rules of the road;
- 3 Keep a sharp lookout for people and objects in the water;
- 4 Ensure that the anticipated wind and sea conditions will correspond to the design category of your boat and that you and your crew are able to handle the boat in these conditions;
- 5 Never sail when the operator is under the influence of drugs or alcohol;
- 6 Be aware of the crew/passenger's safety at all times;
- 7 Reduce speed when there is limited visibility, rough water, people in the water nearby, boats, or structures;
- 8 Always maintain your craft properly and take into account the deterioration that will occur over time and as a result of heavy use or misuse of the craft.

Any craft, no matter how strong it may be, can be severely damaged if not used properly. Inspect the craft regularly especially after any kind of suspected damage. Always adjust the speed and direction of the craft to sea conditions.

If your craft is fitted with a liferaft, carefully read its operating manual. The craft should have onboard the appropriate safety equipment (lifejackets, harnesses, etc.) according to the type of craft, weather conditions, etc. This equipment is mandatory in some countries. The crew should be familiar with the use of all safety equipment and emergency manoeuvring (man overboard recovery, towing, etc.). Sailing schools and clubs regularly organize training sessions.

All persons should wear a suitable personal floatation device (life jacket/ buoyancy aid) when on deck. Note that, in some countries, it is a legal requirement to wear a personal floatation device that complies with their national regulations.

## 2 ABOUT THIS MANUAL

This manual has been compiled to help you to operate your craft with safety and pleasure. It contains details of the craft; the equipment supplied or fitted its systems and information on their operation. Please read it carefully and familiarise yourself with the craft before using it. Ensure that everyone who will operate the vessel reads this manual before setting out.

This manual complies with the EU Recreational Craft Directive (RCD) and should not be perceived as an exhaustive guide to the vessel. A manual is not a replacement for experience and common sense!

### 2.1 Original Equipment Manufacturer (OEM) Manuals


This manual includes important fundamentals regarding equipment supplied by other manufacturers. More detailed information regarding such equipment can be found in manuals provided by the OEM.




A list of these manuals is given here:

- Engine
- Steering gear
- Batteries
- Instruments






### 2.2 Safety Labels

The craft and this manual show symbols which advise the owner/operator and crew of imperative safety precautions to follow when operating and/or servicing equipment. The following symbols may be found on your craft. They should be respected at all times.

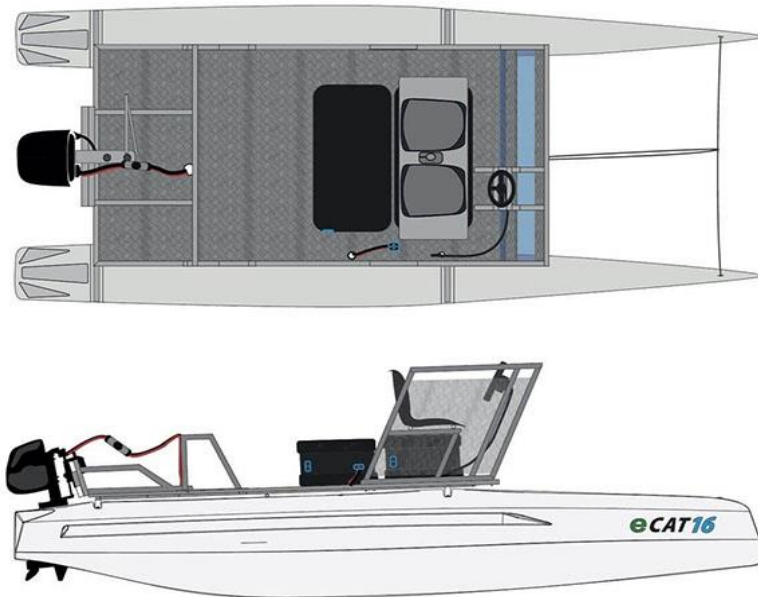
	Hazard - usually followed by text description (see following section)
	Electrical Hazard
	Fire Hazard
	Location of fire extinguisher

	Read the Owners Manual
	Fuel fill point: letter 'D' denotes suitability for 'diesel fuel'
	Sling position for safe lifting of the vessel
<b>FIRE PORT</b>	Dedicated discharge opening for extinguisher

## 2.3 Explanation of Hazard Warnings

 <p>Danger</p>	<p>indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.</p>
 <p>Warning</p>	<p>indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.</p>
 <p>Caution</p>	<p>indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.</p>
 <p>Notice</p>	<p>indicates information considered important, but not hazard-related, for example, relating to property damage.</p>
 <p>Caution</p>	<p>Do not remove or obstruct any safety label. Replace any label which becomes illegible.</p>


# 3 GENERAL ARRANGEMENT



## 3.1 Boat Identification & CE Marking Classification

Type of Boat	RS eCAT16				
Manufacturer's Craft Identification Number	GB-SJlsssssXyZZ				
Name of Boat Manufacturer	RowingSolutions Ltd				
Design Category		A	B	C	D
Maximum recommended number of people	adults				4

<sup>1</sup> For maximum weight limit see: 3.2.3

 <p>Warning</p>	<p>Do not exceed the maximum recommended number of persons. Regardless of the number of persons on board, the total mass of persons and equipment must never exceed the maximum recommended load. Always use the seats/occupancy areas provided.</p>
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### 3.1.1 Design Category Explanation

This vessel carries the UKCA marking (shown here) to indicate that it complies with the UK Recreational Craft Regulations. It has been assigned the Design Category explained below:



This vessel carries the CE marking (shown here) to indicate that it complies with the EU Recreational Craft Directive. It has been assigned the Design Category explained below:

A watercraft given design category D is considered to be designed to operate in typical steady winds of Beaufort force 4 or less and the associated significant waves heights of up to 0,3 m and occasional waves of 0,5 m height. Typically such conditions might be encountered on sheltered inland waters, and in coastal waters in fine weather. Depending on atmospheric conditions, winds can gust to about 12 m/s.

## 3.2 Principal Dimensions

### 3.2.1 Hull Size

Length of Hull	$L_H$	4.670	(m)
Length on waterline	$L_{WL}$	3.970	(m)
Length - max. overall	$L_{MAX}$	4.670	(m)
Beam of hull	$B_H$	2.000	(m)
Beam on waterline	$B_{WL}$	0.340	(m)
Beam - maximum	$B_{MAX}$	2.000	(m)
Freeboard forward	$F_F$	0.350	(m)
Freeboard amidships	$F_M$	0.300	(m)
Freeboard aft	$F_A$	0.250	(m)
Maximum draft	$T$	0.300	(m)
Beam 'tween hull centres	$B_{CB}$	1.650	(m)
Beam of Individual Hull	$B$	0.400	(m)

### 3.2.2 Maximum Recommended Power

Power measurement to EN ISO 8665 Marine propulsion engines and systems - Power measurements and declarations

Horsepower	20	(hp) (metric)
Kilowatts	15	(kW)

### 3.2.3 Weights

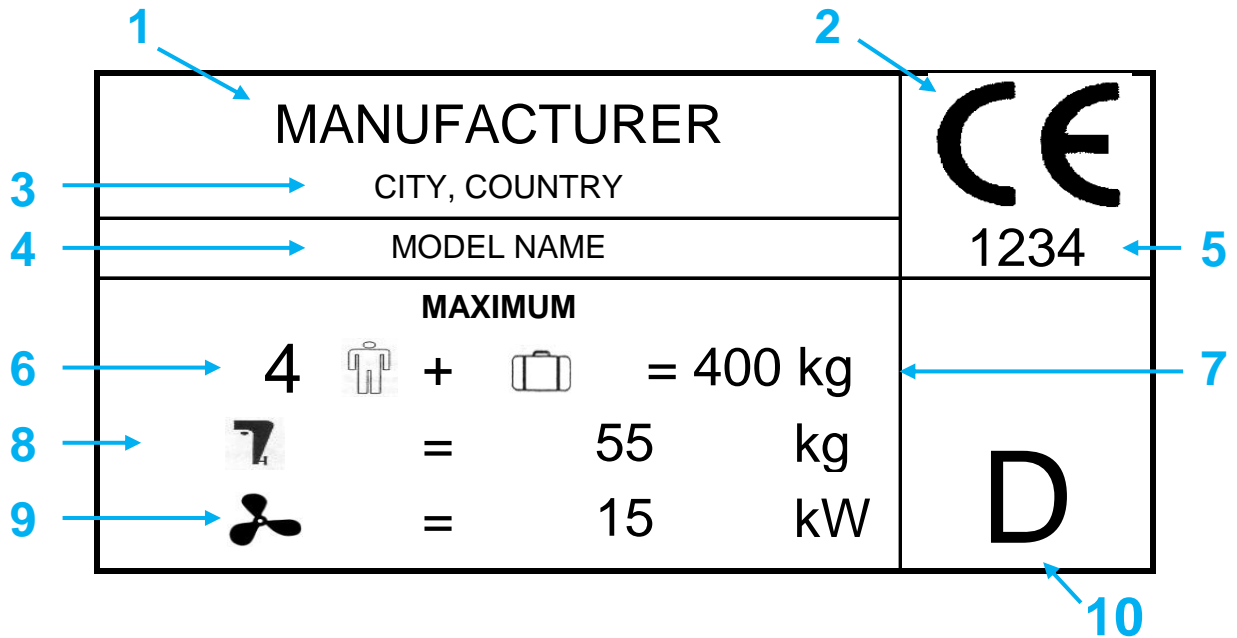
A 'maximum load' has been used for assessing stability and buoyancy, comprising:

All weights in kilograms (kg)	
Essential safety equipment & liferaft	14
Portable fuel tanks	10



Design Category		D
Maximum Number of Persons		300
Baggage & other carry on weights		100
Max Load as on Builder's Plate	$m_{MBP}$	424

Maximum Recommended Load (ISO 14946)	$m_{ML}$	410
The boat in the 'empty craft condition' has a mass of	$m_{EC}$	184
Unladen weight (lightcraft) without engine	$m_{LC}$	214
Weight Fully Laden	$m_{LDC}$	679

Part of the information is given on the builder's plate affixed on the craft. A full explanation of this information is also given in the relevant sections of this manual.




- 1 Manufacturer's name, registered trade name or registered trademark
- 2 CE marking
- 3 Contact address
- 4 Model name
- 5 Notified body's identification number (if applicable)
- 6 Maximum recommended number of people
- 7 Max Load as on Builder's Plate (kg)
- 8 Heaviest allowable outboard motor (kg)
- 9 Maximum Recommended Power (kW)
- 10 Design Category


 <p>Caution</p>	<p>The value of the maximum loaded displacement has a direct influence on loads imposed on the boat's structure: far more so than for monohulls. Overloading, for example, will reduce the clearance between the wet deck and the water. Overloading should be avoided.</p>
 <p>Caution</p>	<p>Rudders should be inspected regularly for damage and to ensure good operation.</p>

# 4 SYSTEMS DESCRIPTIONS

## 4.1 Bilge pumps

	Warning	The combined capacity of the system is not intended to drain the craft in the case of damage.
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**Notice** This boat is not fitted with any bilge pumps.  
It is recommended that a bailer/bucket is carried aboard for emergency bailing purposes. Ensure the bucket is protected against accidental loss.

	Warning	Never use flammable solvents (i.e. kerosene) for bilge cleaning, however oily it becomes.
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## 4.2 Electrical System

ALWAYS.....

- Check battery and charging system condition before going to sea
- Disconnect and remove the battery when the craft is in winter storage (cold weather areas) or long term storage

NEVER.....

- Work on the electrical installation while the system is energised;
- Modify the craft's electrical system or relevant drawings: installation, alterations and maintenance should be performed by a competent marine electrical technician;
- Alter or modify the rated current amperage of overcurrent protective devices;
- Install or replace electrical appliances or devices with components exceeding the rated current amperage of the circuit;
- Leave the craft unattended with the electrical system energised, except automatic bilge-pump, fire protection and alarm circuits.

	Danger	Petrol vapour can explode. Only fit ignition protected, marine parts to replace such items as starters, distributors, alternators, generators, etc.
	Warning	Do not use jump leads in the petrol engine/tank space or carry out any activity that could create sparks.
	Warning	Protective terminal covers, such as rubber boots on electrical connections, must be in place at all times except when servicing equipment.

## 4.2.1 DC System

### Description

The direct current (DC) electrical system derives its power from the series of batteries listed below. The batteries supply the components listed in tables below which show the settings of the overload protection breakers/fuses.

The DC system consists of the following circuits:

Battery Bank	Voltage	Rating	Battery Location	Disconnect Switch
Single Battery	12	38Ah	Below passenger seat	N/A



The battery selector switch is located at: N/A - only one battery

Main DC Panel Board Location: N/A - engine harness only

### Removal of Batteries

To remove the battery cables:


- 1 Turn off all items drawing power from the battery.
- 2 Turn the battery switch to the OFF position
- 3 Remove the negative cable first, then the positive cable. To replace the cables, first replace the positive cable, then the negative.

	Caution	Ensure that the battery space is well ventilated at all times.
	Caution	When charging and (dis)connecting a battery ensure that no water or metal objects can contact the terminals.

### Battery Disconnection

Battery selector switch location: N/A - only one battery  
 Disconnect switch location(s): See table of batteries on previous page.

**Notice** Batteries should be disconnected when not in use and especially while the boat is unattended.  
 Essential service such as electric bilge pumps are wired directly to the batteries and will run even if the battery disconnect switch is open.

	Caution	Do not disconnect all batteries while the engine is running; alternator and wiring damage could occur.
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## Battery Maintenance

1. Check the fluid levels in the cells (if appropriate for the battery type) approximately every 4 weeks, and weekly in summer and hot zones.
2. The fluid level must be between the lower and upper markings.
3. Replenish only with distilled water. Do not use metal funnel.
4. Coat battery terminal clamps with silicone grease.
5. Keep batteries clean and dry.
6. The life of some battery types is shortened if drained to zero charge. It is recommended that a battery not be discharged more than 50 percent. If the battery does become run down, recharge it as soon as possible.
7. Running the engine to recharge the battery may not be effective. The alternator only creates charging power at higher engine speeds, idling for long periods will not generate enough power to recharge the battery.
8. If you need to charge a battery, use only a battery charger designed to charge automotive/marine batteries. Use charger only when batteries are disconnected from the boat's electrical circuit. Follow the charger instructions.
9. If your boat will not be used for several weeks remove the batteries from the boat and connect them to a charger.

### 4.3 Fuel System

The craft has:                      Portable  
                                                       Petrol fuel system







The following components are supplied by the fuel system:

Item	Number	Location
Engine	1	Centreline of aft cross-beam

Refer to manufacturer's instructions for details of the above equipment.

Key fuel system controls and fittings are located as follows:

Item	Location
Shut Off Valve	Disconnect fuel hose

	Warning	Do not smoke or use open flame when filling with fuel, when working on the fuel system and when in the engine room.
	Danger	Never use a flame to check for leaks
	Warning	Inspect fuel lines at least annually. Replace if deterioration or openings are found.
	Caution	All components that burn fuel require an air supply. Ensure all air intakes are clear before fuel burning components are running.
	Danger	Petrol generators and outboard motors can produce dangerously high levels of carbon monoxide, but don't forget, diesel engine exhaust fumes have also been linked to illness and deaths. See section 8.5.1
	Warning	If leakage is detected, close the fuel shut-off valve, and have the system repaired before further use. System repairs should be made by a competent person.




## 4.4 Steering System

Notice The boat's steering system has the following components:

Steering Hardware: Wheel  
 Turning device: Drive unit  
 Mechanism: Direct link/Flexible cable

The craft is fitted with the following steering position(s):

Fwd stbd corner of decking

 Caution	Refer to the system manufacturer's documentation for information pertaining to the steering gear.
 Caution	All components of the steering system must undergo periodic inspection & maintenance to ensure safe operating conditions. Refer to the maintenance section of this manual for further details.
 Warning	Failure of the steering system will cause loss of control of your boat. Any change in steering such as looseness, tightness, binding, etc., must be checked immediately by a qualified person.

## 4.5 Hydraulic System

The craft is fitted with the following hydraulic systems:

Component	Location	Controls	Control Location
Engine trim	Transom	Rocker switch	Throttle lever


The hydraulic system can be powered by the following sources:

Description	Location	Power Source
Engine trim ram	Within drive unit	Supplied off engine harness



# 5 PRE-LAUNCH OBSERVATIONS





## 5.1 Recommended Safety Equipment




	<p>Caution</p>	<p>The sea can be unpredictable. Be prepared by carrying the following equipment, as a minimum, at all times.</p>
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- 1 Life jacket or buoyancy aid for each person
- 2 Appropriate weatherproof clothing
- 3 Compass
- 4 Charts
- 5 Anchor and line
- 6 At least 2 warps - see section 6.4
- 7 First aid kit including compress and thermal blanket
- 8 Bucket
- 9 Distress flares
- 10 VHF radio
- 11 Binoculars
- 12 Knife in protective sheath
- 13 Drinking water


## 5.2 Risk of Loss of Stability

The stability and buoyancy of this boat has been assessed on the basis of the weights specified in section: 3.2.3



	<p>Caution</p>	<p>Any change in the disposition of the masses aboard (for example, the addition of a fishing tower, a radar, a stowing mast, change of engine, etc.) may significantly affect the stability, trim and performance of the craft</p>
	<p>Warning</p>	<p>When loading the craft, never exceed the maximum recommended load. Always load the craft carefully and distribute loads appropriately to maintain design trim (approximately level). Avoid placing heavy weights high up.</p>
	<p>Caution</p>	<p>Stability can also be adversely affected by sloshing fluid. Bilge water should be kept to a minimum</p>
	<p>Warning</p>	<p>Loose equipment can cause damage to the craft and affect stability. Ensure all loose equipment is properly stowed before setting out.</p>

 Caution	The stability of this boat is significantly reduced at speeds above displacement speed.
 Caution	Stability may be reduced when towing or lifting heavy weights using a davit or boom.
 Caution	Breaking waves are a serious stability hazard

### 5.3 Risk of Flooding

 Caution	The following openings are marked "WATERTIGHT OPENING - KEEP SHUT WHEN UNDER WAY" and care should be taken to observe this warning:
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1. Port fwd inspection port
2. Port aft inspection port
3. Stbd fwd inspection port
4. Stbd aft inspection port

 Caution	In rough weather, hatches, lockers and companionway/doorways should be closed to minimise the risk of water ingress.
 Caution	Ensure all limber holes are clear

#### 5.3.1 Through Hull Fittings including Seacocks

The following skin fittings are fitted in the hull of the craft. They provide the frontline defence against flooding and should be regularly inspected for condition. Valves should be frequently operated to ensure free movement.

In addition, it is recommended that all but drains & bilge discharges are closed when the craft is to be left unattended.


Ref.	Description	Location	Means of Closure
1	Stbd hull drain plug	Transom of stbd hull	Plastic screwed plug
2	Port hull drain plug	Transom of port hull	Plastic screwed plug

#### 5.3.2 Strainers


Notice Bilge pump intakes inside the boat, and intakes of water from outside the boat are fitted with protective baskets to avoid blockage by weed, leaves or other debris. Ensure these are kept clear at all times.

## 5.4 Risk of Fire

Notice Always keep the bilges clean and check for fuel regularly

 <p>Caution</p>	<p><b>NEVER</b></p> <ul style="list-style-type: none"> <li>• obstruct portable extinguishers in lockers</li> <li>• obstruct safety controls (shut off valves, switches)</li> <li>• modify craft's systems, especially fuel.</li> <li>• fill any fuel tank whilst machinery is running</li> <li>• smoke while handling fuel or gas</li> <li>• use gas lights in craft</li> </ul>
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### 5.4.1 Fire Fighting Equipment

 <p>Caution</p>	<p>Location and capacity of extinguishers is given below. It is the responsibility of the boat owner/operator to:</p> <ul style="list-style-type: none"> <li>• check equipment at intervals as stated on equipment,</li> <li>• replace any extinguisher, if used, with one of same rating</li> <li>• inform members of the crew about location and operation of all fire fighting devices</li> </ul>
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#### Portable Extinguishers

Location & Description	Medium	Rating/ Capacity
Inside helm seat	Powder	5A/34B

### 5.4.2 General Good Practice

 <p>Caution</p>	Never block ventilation
 <p>Caution</p>	Never store petrol in an area not designed to store petrol
 <p>Warning</p>	Fuel-burning open-flame appliances consume cabin oxygen and release products of combustion into the craft. Ventilation is required when appliances are in use. Open designated vent openings while appliances are in use. Never obstruct ventilation openings and ensure that flued appliances are operating correctly.

## 5.5 Risk of Falling Overboard


**Notice** The working deck is the area of the boat that is safe for use at all times. Areas outside the specified working deck should only be used whilst leaving or arriving at a mooring or whilst the boat is not underway.

On this boat, the working deck area is defined as:


On the aluminium treadplate, amidships

For maximum weight limit see: 3.2.3

For crew area limits, see section: 5.2

 <p>Warning</p>	<p>Most slips and falls occur during boarding and disembarking. Be aware that wet decks can be slippery. Wear slip resistant footwear at all times.</p>
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## 5.6 Grounding - Risks & Actions

 <p>Caution</p>	<p>After any grounding incident, make a visual inspection internally and consider a haul out and external inspection as soon as practical.</p>
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Ensure that any grounding is discussed with an experienced marine professional to determine whether a survey of the area and any repair actions are required.

Ensure that any repairs to the inner hull matrix, keel and hull shell are undertaken by a professional repair yard after consultation with the vessel's manufacturer or designer and a repair specification should be developed by either a surveyor, naval architect, or the original yacht manufacturer.

The easiest way to undertake this is to follow the manufacturer's approved maintenance programme and approved repair facility instructions.

# 6 NAVIGATION & OPERATION

## 6.1 Use of Engines

The craft is fitted with the following motive power:

Engine 4 stroke spark-ignition






Max 15hp four-stroke outboard

Propeller As supplied with motor


Notice

Before starting the engine:






- Check the bilge water level.
- Ensure that ventilation openings and ducts are clear to prevent overheating
- Ensure there is sufficient fuel for the anticipated journey - including a margin for contingencies.

 <p>Warning</p>	<p>After starting the engine, ensure the flow of cooling water</p>
<p>Take care not to damage fuel lines and check regularly that they are in good condition</p>	
 <p>Danger</p>	<p>Avoid placing flammable materials on or near hot parts.</p>
 <p>Danger</p>	<p>If a fuel leak or fumes are detected, do not start the engine. Ensure all crew leave the boat and have a qualified person repair the fault as soon as possible.</p>
 <p>Warning</p>	<p>Controls installed with the motor must have a start-in-gear protection device. It is the owner's responsibility to ensure this is so, should the engine or its controls be repaired/replaced.</p>
 <p>Caution</p>	<p>So as to avoid high-speed moving parts, never run a motor with the cover removed.</p>

## 6.2 Handling Characteristics

	<p>Caution</p>	<p>The owner is responsible for ensuring that normal mode of operation is maintained. This means that the speed of the craft needs to be matched to the prevailing sea state and good seamanship shall be displayed.</p>
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- |        |                       |       |       |
|--------|-----------------------|-------|-------|
| Notice | Maximum engine power: | 15 kW | 20 hp |
|--------|-----------------------|-------|-------|
- |        |                |          |         |
|--------|----------------|----------|---------|
| Notice | Maximum speed: | 16 knots | 30 km/h |
|--------|----------------|----------|---------|
- |        |                                                                                                                                                                     |  |  |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Notice | Periodic inspection of the propeller for excessive wear or damage is recommended in order to maintain peak performance and to maximise the longevity of the engine. |  |  |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
- |        |                                                           |  |  |
|--------|-----------------------------------------------------------|--|--|
| Notice | Ensure all crew are informed about the craft's behaviour. |  |  |
|--------|-----------------------------------------------------------|--|--|

	<p>Warning</p>	<p>Do not operate this craft at negative propulsion unit trim settings (bow down) at high speed: the craft may lean over on its side resulting in instability in turns. Use negative trim to accelerate from displacement to planing speed and reduce speed in choppy water.</p>
	<p>Caution</p>	<p>Seaways are infinitely variable and all craft can meet conditions that will challenge the boats handling characteristics and/or the helmsman's ability. Proceed with a margin for error at all times. Avoid making sharp turns at speed, particularly in a short seaway.</p>
	<p>Caution</p>	<p>It is strongly recommended that helmsmen receive adequate training in boat handling before setting to sea for the first time.</p>
	<p>Caution</p>	<p>Be aware that factors such as altitude, temperature, load, and bottom growth may affect performance.</p>
	<p>Caution</p>	<p>Do not to install engine(s) with power output higher than recommended by the manufacturer as this could cause loss of craft control and result in serious injury or death.</p>

### 6.3 Visibility from the Main Steering Position

Notice Operator vision from the helm can be obstructed by high trim angles of the craft and other factors caused by one or more of the following conditions:




- Propulsion engine trim angles
- Loading and load distribution
- Speed
- Rapid acceleration
- Transition from displacement to planing mode
- Sea conditions
- Rain and spray
- Darkness and fog
- Persons or movable gear in operator's field of vision

The international regulations for preventing collisions at sea (COLREG's) and the rules of the road require that a proper lookout be maintained at all times and observance of right of way. Make certain no other vessels are in the path before proceeding.

### 6.4 Anchoring, Mooring & Towing


Notice It is the owners / operators responsibility to ensure that the mooring lines, towing lines, anchor chains, and anchors are adequate for the vessel's intended use. Owners should also consider what action will be necessary when securing a tow line on board.

Breaking strength of forward strong point: 133.5 kN =13.6 tonnesf = 13609 kg

 <p>Caution</p>	<p>The breaking strength of lines / chains should not exceed 80% of the breaking strength of the strong point to which it is attached.</p>
 <p>Caution</p>	<p>Always tow or be towed at slow speed. Never exceed the hull speed of a displacement craft when towing or being towed.</p>
 <p>Caution</p>	<p>A tow line shall always be made fast in a way that it can be released when under load.</p>

Notice When at anchor, it is damaging to leave the full load of the boat resting on the windlass. It is recommended that the chain be tied onto a local strong point.

## 6.5 Filling With Fuel


	Caution	Never smoke when refuelling, or inspecting or working with the fuel system.
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Notice

For locations of filler caps, see: 3.2.3

Use the following procedure for filling tanks:

- Remove portable tank(s) from the craft for filling ashore.
- Open the filler cap & start filling the tank.
- Check the contents of the tank by monitoring the tank level indicator
- Don't fill the tank to its maximum: allow for expansion
- Close deck fittings tightly, but don't over-tighten since this will damage the rubber o-rings
- (make an entry in ship's log)



	Caution	Fuel is considered chemical waste. Keep an absorbing cloth close by when filling tanks.
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## 7 MAINTENANCE

Regular inspection and maintenance is an essential activity to ensure the boat's longevity and the crew's safety.

This section includes a generic table which details typical inspection and maintenance intervals. This is not specific to your craft and some sections will not apply.

The necessary frequency of service or maintenance depends upon the environment in which the boat operates. The intervals listed in this section should be viewed as maximums.


	Caution	Modifications that may affect the safety characteristics of the craft should be assessed, executed and documented by competent people.
	Caution	Any change in the disposition of the masses aboard may significantly affect the stability, trim and performance of the boat




**KEY: X - Activity required Y - Activity required by qualified individual**


Item	Required Maintenance/Service	INTERVAL				
		Before Every Use	After First 20 Hours	Every 25* Or 50 Hours	Every 50* Or 100 Hours	Every 6 mnth or Annual
<b>Miscellaneous</b>						
Battery	Check water level	X	X	X		
Bilge drain plug	Installed and tight	X				
Zinc anodes	Check and replace	As needed				
Hull	Check for loose, damaged or missing parts	Whenever out of the water and always after striking an object				
<b>Controls</b>						
Steering	Check for proper operation					Y
Throttle	Lubricate. Include all shift linkage and pivot points		X		X	X
<b>Electrical</b>						
Connections	Check for looseness					Y
<b>Engine</b>						
Alarm	Check	X				
Cooling System	Check for leaks with engine running	X				
Crank vent system	Clean		X		X	
Drive belts	Check for wear	X				
Flame Arrestor	Clean		X		X	
Fuel Filter	Replace				X	
Mounts (Fasteners)	Tighten		X			X
Oil and Filter	Replace				X	X
Oil Level	Check	X				
Propeller	Inspect for damage	Always after striking object				
<b>Fuel System</b>						
Connections & Lines	Check for leaks & wear	X	X	X		
Tanks	Check for leaks & tightness of connections	X	X	X		
<b>Exterior</b>						
Non-metallic strong points	Inspect and replace if signs of deterioration, visible surface cracks or permanent deformation.					X
Topside & Fittings	Check for loose, damaged or missing parts					X
Closing appliances	Installed and tight	X				

## 7.1 Maintaining the Electrical System

	Warning	Work on electrical wiring can create shock hazards or sparks.
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Always disconnect power sources and shut off battery switch, breakers and/or pull fuses before checking electrical wiring or connectors.

	Caution	To prevent arcing or damage to the alternator, always disconnect battery cables before doing any work on the engine's electrical system.
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	Caution	Power feeds for accessory equipment must not be taken from the voltmeter terminals.
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Notice	<p>Check all wiring for proper support.</p> <p>Check all wiring insulation for signs of fraying or chafing.</p> <p>Check all terminals for corrosion - corroded terminals and connectors should be replaced or thoroughly cleaned.</p> <p>Tighten all terminals securely and spray them with light marine preservative oil.</p>
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## 7.2 Winter Storage

Your boat and the systems and fittings on board can be damaged if they are not properly prepared for the winter.

You should refer to the advice given in the various handbooks supplied with this manual.

In addition to this you should, for example, consider the following:

- Remove, charge and store the batteries in a warm & dry ventilated place
- Grease the appropriate steering gear components
- Ensure the engine cooling water has the correct proportion of anti-freeze
- Take away any removable delicate on board electrics and electronics
- Check and protect all the systems on the boat
- Remove all water from the craft and protect it from rain
- Ensure deck drains are clear
- Check the sacrificial anodes and replace as necessary


# 8 ENVIRONMENTAL AWARENESS

The previous sections of this manual provide information on how to protect the boat and its crew from the environment. This section gives information on how the environment may be protected from the boat and its crew.

The environment should be understood as including one's neighbours as well as the world of plants and animals.

In many regions of the world, there are strictly enforced regulations regarding environmental protection. It is the responsibility of the owner/operator to be aware of applicable regulations and to ensure compliance with them. (MARPOL)

## 8.1 Leakage of Petrochemicals

	Warning	Any oil must be treated as chemical waste.
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**ALWAYS:** Investigate the source of any oil leaks as soon as possible.

Dispose of recovered spilt oil correctly.


Have oil-absorbing cloths or rolls on board.

**NEVER:** Dispose overboard of any oil, paint or other chemical that is potentially harmful to the environment. Sanctions are in place in most parts of the world for those who disregard this rule!

## 8.2 Black & Grey Water

	Warning	The discharge of effluent into navigable waters is forbidden by law in many areas. If such discharge causes a film or sheen upon or a discoloration of the surface of the water or causes a sludge or emulsion beneath the surface of the water, violators may be subject to a penalty. It is the responsibility of the boat user to ensure that they are aware of local legislation regarding discharge
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## 8.3 Household Waste

	Warning	When at sea for periods longer than space allows onboard storage of waste, only jettison organic waste.
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ALWAYS Retain any household waste until it can be properly disposed of ashore.

## 8.4 Noise

NEVER Make excessive noise. Most people take to the water for relaxation which is ruined by noise.

Run the engine or generator unnecessarily.

## 8.5 Exhaust system


ALWAYS Have the engine & exhaust system inspected & cleaned by a qualified professional at regular intervals.

Inspect the exhaust system to ensure connections are secure.

Check the free flow of exhaust gasses through the silencer (muffler) to ensure that it is unblocked, every time you set out.

Stop if you have any doubts about the exhaust system.

### 8.5.1 Dangers of Carbon Monoxide

	Danger	When carbon-based, appliance and engine fuels, such as gas, LPG, coal, wood, paraffin, oil, petrol and diesel don't burn completely, CO is produced.
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**CO build-up in the cabin can occur with one or a mix of these factors:**






- 1 Faulty, badly maintained or misused appliances
- 2 Exhaust fumes from a boat's engine or generator
- 3 Escaped flue gases from solid fuel stoves
- 4 Blocked ventilation or short supply of air - fuel needs oxygen to burn safely

**Know the danger signs on your boat:**

Routine checking that your boat's fuel-burning appliances and engines are free from signs of problems and in good condition will help keep you safe.


**Any of the following could be signs that CO is filling your boat:**

- 1 Staining, sooty smears, or discolouration on surfaces around an appliance or its flue
- 2 Appliances that are difficult to light, keep lit or burn weakly • Burners with yellow or orange or 'floppy' flames that threaten to go out
- 3 Burners with yellow or orange or 'floppy' flames that threaten to go out
- 4 An unfamiliar or burning smell when an LPG or oil appliance is on
- 5 Smelling or seeing smoke escaping regularly into the cabin when running your wood-burner or coal stove
- 6 Smelling engine exhaust fumes regularly inside the cockpit or cabin

	Caution	Check the boat's exhaust system routinely. Inspect every part for leaks or problems including; manifolds, pipes, joints, hoses, clamps, silencers, and through-hull fittings.
	Warning	Do not install or fix a portable generator inside any accommodation space.
	Caution	Proprietary conversion kits must be used if adapting a portable generator to fixed use.
	Danger	Inefficient petrol engine performance, running the engine cooler than its design temperature or using contaminated or stale fuel, can increase the concentration of CO in exhaust fumes.
	Danger	Whether the boat is moving or moored, under certain running and or wind conditions CO at dangerous levels can be deflected or drawn in from engine exhausts.
	Notice	Be a good neighbour; see if you can avoid running your engine when moored in a crowded marina, particularly when the air is still.

## 8.6 Wash / Waves

**ALWAYS** Adapt your speed to the water in which you are navigating. Consider the comfort and safety of other (particularly small) boats around you.

	Caution	Be aware that in some areas speed restrictions are in place to avoid erosion of banks/coastline.
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