

# Arksen 85



## Sales Specification

Issue 3

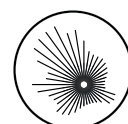


Arksen

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# Arksen

## 1.0 Designed for Explorers, Made for Adventure

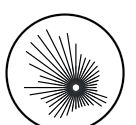
Arksen vessels are all designed and built to allow Owners to explore the globe, with the confidence, comfort, independence and efficiency expected of a serious, modern, long-range cruising yacht.

Robustness, reliability and efficiency are the key elements considered in every aspect of the Arksen 85's journey, from drawing board to handover, with redundancy in all critical systems and care taken to ensure accessibility and serviceability at sea.

The conception of Arksen, its values and the engineering process that has resulted in the Arksen series of vessels, was born from a collaboration of world-renowned yacht designers, boatbuilders, explorers and Tech industry leaders.

Whether on ocean passage, exploring remote coastlines or relaxing self-sufficiently in anchorages, Owners can rest assured that their vessel is designed to allow them to focus purely on the enjoyment of that experience.

Arksen vessels are designed to be able to undertake multiple roles – cruising with families, adventuring with explorers, crewed charter, research, media production, deployment of small submersibles, access to wilderness for adventure sports, etc. The highly capable standard vessel can be customised, optimised for a specific use case or configured for maximum flexibility.



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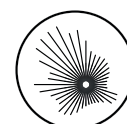
## 2.0 General Particulars

<b>Length overall</b>	27.30 m
<b>Length of hull</b>	26.22 m
<b>Length waterline (DWL)</b>	26.06 m
<b>Loadline length</b>	23.99 m
<b>Beam overall</b>	6.99 m
<b>Depth moulded</b>	2.20 m
<b>Draft to underside of skeg (DWL)</b>	1.55 m
<b>Lightship displacement</b>	66 tonnes
<b>Departure displacement</b>	95 tonnes
<b>Half load displacement (DWL)</b>	82.5 tonnes
<b>Fuel capacity</b>	18,000 litres
<b>Fresh Water capacity</b>	6,000 litres
<b>Main Engines</b>	2 x 246 kW (330hp)
<b>Generators</b>	1 x 35 kW
<b>Maximum Speed</b>	14 knots
<b>Cruising Speed</b>	9 – 12 knots
<b>Berths / Cabins</b>	14 berths max. in up to 6 cabins
<b>Structural Design</b>	Lloyds SSC Rules
<b>Commercial Coding</b>	UK MCA Category 0 (Unrestricted)

## 3.0 Certification

The Arksen 85 is designed, built and equipped to the requirements of the UK MCA Workboat Code, 'unrestricted' Category 0, the most demanding commercial certification under the UK flag.

This verifies that the structure, stability, systems, equipment and safety apparatus of Arksen vessels are, as a minimum, approved to the same rigorous set of requirements as commercial vessels. This allows Arksen vessels to be commercially coded for use as charter and research vessels and ensures every Arksen vessel, commercial or private, meets the highest safety standards.



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The survey regime from the MCA approved Certifying Authority comprises a shipyard quality audit, multiple in-build structural and systems surveys, as well as a series of sea trials and stability tests.

Arksen vessels are registered under a UK flag as standard. Registration to other Flag states can be accommodated.

## 4.0 Quality

The build quality of Arksen vessels is carefully planned and controlled at each stage of production. Initially the quality is driven by the design phase, where all materials, components and equipment are selected from reputable suppliers.

Aluminium work is carried-out by highly skilled, marine-certified welders. Installation of mechanical and electrical systems is undertaken by highly experienced technicians. Interior joinery is built and installed by specialised carpentry teams utilising high-quality marine standard timber, fixings and adhesives, to ensure exceptionally high quality of finish, robustness and longevity.

All areas of production are subject to a rigorous system of in-house production control, testing and sign-off, to ensure Arksen's high standards are always met. Vessels are inspected by an independent surveyor throughout the build process to verify the internal QA processes.

## 5.0 Launch, Trials & Handover

Upon completion of pre-launch commissioning and inspection, the vessel will be launched at the Shipyard and begin an extensive schedule of testing and trials, structured to test and commission every onboard system, under load in real seagoing conditions.

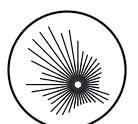
Owner's trials will be held to demonstrate the operation of the vessel and upon sign-off, a comprehensive handover procedure will take place, including crew familiarisation, handover of Owners manuals, documentation, drawings and diagrams.

## 6.0 Design

### 6.1 Operational profile

The Arksen 85 is primarily designed as a long-range explorer vessel, capable of accessing remote areas and operating safely in extreme environments but is equally capable when cruising in more accessible waters. Every aspect of the vessel design and construction is undertaken to enable operation in a wide range of conditions including:

- Summer operation in high latitudes with low sea and air temperatures
- Tropical operation with high temperatures and humidity
- Operation in adverse weather, high winds and rough seas
- Extended periods in remote regions without external support  
Full time, permanent, liveaboard usage



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## 6.2 Stability

The vessel is designed to exceed the MCA criteria for intact and damaged stability required for unlimited worldwide operation. The actual stability characteristics of the vessel are far in excess of the minimum requirement, providing Owners with an exceptionally stable, comfortable and safe vessel, including 180 degrees of positive stability, in all expected operating load conditions.

Every vessel is subject to an inclining experiment to confirm the stability characteristics prior to handover and is supplied with an approved stability booklet.

## 6.3 Design documentation

The vessel is handed over to the Owner with a full set of electronic documentation, including operating manuals, maintenance manuals, equipment manuals, system schematic diagrams, structural drawings and all required certification. Vessel management software is supplied to assist with managing and recording ongoing vessel maintenance.

## 7.0 Hull & superstructure construction

### 7.1 Hull subdivision

The hull is subdivided by watertight bulkheads into multiple compartments to provide protection against flooding in the event of grounding, system failure or collision with a floating object. Watertight compartments feature watertight bulkhead doors and two means of escape to the weather deck.

Bulkhead penetrations to accommodate pipework and cabling are watertight and, where necessary, fire resistant. A number of empty penetration sleeves are allowed for to facilitate the retrofit of equipment in future.

Additional watertight subdivision is provided by way of integral double-bottom tank tops and watertight service spaces below accommodation sole.

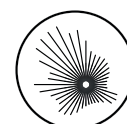
### 7.2 Tank capacities

<b>Fluid</b>	<b>Capacity</b>
Fuel	18,000 litres
Fresh Water	6000 litres
Waste Water	1400 litres
Sludge	530 litres
Lube Oil	580 litres
Waste Oil	580 litres

## 8.0 Hull & superstructure closures

### 8.1 Glazing

Bonded hull portlights are fitted to each cabin. These are manufactured from tinted, toughened, laminated glass with a strength in excess of the hull structure.



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The upper and lower superstructure feature extensive glazing, formed of large, curved, bonded panels. These are manufactured from toughened laminated glass, to withstand the worst conditions the vessel may encounter, including full immersion.

## 8.2 Doors

External doors are high quality, heavy duty weathertight type, with substantial hinges, latches and locks. Doors are fitted with toughened glazing and anodised frames. Doors are either side-hinged or pantograph hinged, depending on position. Doors fitted in watertight bulkheads are of watertight construction, with suitable seals and multiple dogging points operated from a single handle. Watertight doors serving the engine room and battery room are fire rated.

## 8.3 Deck hatches

In addition to internal access provided to all compartments, flush deck hatches are fitted to provide direct access to areas such as the forepeak, laundry and lazarette, as well as providing emergency escape to deck and passive ventilation at anchor. These heavy-duty watertight hatches can be opened from the inside or outside, are lockable and are fitted with the same deck-covering as the surrounding deck, to minimise visual discontinuity and eliminate trip hazards. Hatches are all fitted with gutters, to drain any water that collects around the hatches.

Flush hatches are fitted in the deckhead of the main saloon and upper saloon, to provide even more natural light, as well as passive ventilation at anchor. Hatches have clear tinted finish and are fitted with blinds.

## 8.4 Lazarette door

The large, hinged lazarette door opens to form an extended bathing platform. This platform provides access to the water for swimming, boarding the tender, using toys stowed in the lazarette or deploying scientific equipment.

The door/platform is finished to match the surrounding deck material when open and to match the surrounding hull when closed. The door is hydraulically controlled, with remote-control interface.

The 'deck' surface of the open door is fitted with flush attachment points, which can be used for a variety of purposes, such as swim ladders, railings, tender whips, lashing points for equipment etc.

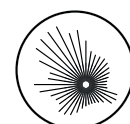
## 8.5 Deck lockers

Ample stowage space is available on deck, in weathertight, drained lockers situated on both the foredeck and afterdeck.

## 9.0 Deck hardware and equipment

### 9.1 Bow anchors

The anchoring arrangement is designed to facilitate easy deployment and recovery and to be robust and reliable. Equipment is specified to allow anchors to be retrieved rapidly, at short





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notice and each windlass is able to lift the entire mass of chain, with anchor and fouling (kelp, mud etc). Both anchors are fitted with substantial chain stoppers for security.

Chain stows in deep lockers designed to allow self-stowing. A saltwater anchor chain wash system is fitted. Controls allow the anchors to be observed from the foredeck during deployment and recovery.

A primary and secondary bow anchor are fitted, with specifications in excess of the requirements for MCA Category 0 coding.

The primary anchor is a galvanised 130kg CQR type with 140m of 14mm galvanised stud link chain.

The secondary anchor is a galvanised 80kg Claw type with 110m of 14mm galvanised stud link chain.

## 9.2 Windlasses

The bow anchors are handled by twin Lewmar V8 vertical stainless windlasses with vertical capstan drums for mooring line handling and independent operation. Remote control and chain counter stations are fitted at each helm console, in addition to local deck switches and wireless handheld remote control with chain counter, for ultimate flexibility.

## 9.3 Stern anchor

A 21kg aluminium Fortress kedge anchor with 12m of 12mm galvanised chain is stowed in the lazarette ready for use as a stern anchor, handled by the aft mooring winches.

## 9.4 Mooring

Mooring bollards and fairleads are of substantial aluminium construction, integrated directly into the hull structure. Bollards are of the double open 'H' type and 12 are positioned around the vessel, for robust and versatile mooring capabilities.

A pair of Lewmar 65EST EVO 2 speed, electric winches are positioned on deck in each aft quarter of the main deck to facilitate mooring line handling.

The vessel is fitted with a long shoreline/kedge warp/towing warp. This line can be controlled with either mooring winch on the aft deck, as a long line ashore, for towing or for a stern anchor warp.

Mooring lines and inflatable fenders of size and quantity suitable for the vessel's size are provided.

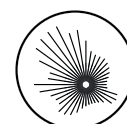
## 9.5 Access/boarding

A manually deployed folding gangway is provided, with mounting/pivot sockets installed on the aft main deck, with support lines from outrigger booms above.

## 9.6 Outriggers

A pair of outrigger booms are fitted, which serve a number of purposes including:

- 'Flopper stopper' stabilisation system
- Tender launch and recovery





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- Lifting stores and equipment
- Support for standard passerelle
- Support for aft deck awnings

The outriggers are designed to be operated from a protected position by two people comfortably or by one person if necessary. There is one control position per boom, on the main deck, aft of the superstructure, beneath the overhanging upper deck. Each control position features a powered back-winding winch and a series of clutches, for the various rigging lines.

As well as use as multi-purpose lifting equipment, each outrigger boom can be slewed 90 degrees outboard and a 'flopper stopper' lowered into the sea from each boom, to provide a passive means of roll stabilisation at anchor.

## 9.7 Tender handling and stowage

The tender can be lifted onto the aft deck and deployed overboard using the outriggers and electric winches. Tender chocks are fitted for the aft deck to suit the Owner's choice of tender.

## 9.8 Deck fastenings

A robust multi-purpose deck fastening system is used around the vessel, to standardise the fitment of loose items and equipment. Aluminium flush sockets are installed around the forward and aft decks, as well as the bathing platform, to accommodate items such as safety line securing points, lashing points, deck furniture, barbeque, tender chocks, swim ladders, awnings etc.

## 9.9 Bow lifting davit

An aluminium folding davit is provided for use at the bow, to lift small tenders/toys/equipment onto the foredeck.

## 9.10 Handrails & guard wires

Aluminium tubular handrails are fitted around the bow, stern and bridge deck. Removable stanchions and guard wires run along sides of the aft deck, connecting the pushpit with the side bulwarks.

## 9.11 Safety equipment stowage

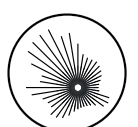
Two 12 man life rafts are stowed in the fairing structure on bridge deck sides.

Stowage is provided for man overboard equipment and EPIRB to allow easy deployment.

## 10.0 Exterior outfitting

### 10.1 Deck coverings

All deck areas are fitted with a nitrile rubber non-slip deck covering. Covering will provide sufficient grip underfoot, in a wide range of conditions, whilst being comfortable to sit or kneel on, or to walk on with bare feet.



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## 10.2 Coatings

The hull below waterline is primed and antifouled. Optionally, the hull below waterline can be finished with epoxy primer and Coppercoat

Propellers and shafts exposed below waterline are coated with Propspeed.

The hull above waterline and the superstructure are bare aluminium. This gives a robust, purposeful look with minimal maintenance requirement.

## 10.3 Signage

The vessel name is fitted on port and starboard bows in vinyl lettering.

The vessel name and port of registry are fitted on the transom door in vinyl lettering.

Signage is fitted as required for compliance with the MCA code.

## 10.4 Deck furniture

Fixed seating is fitted on the foredeck. Fixed seating is also fitted on the bridge deck Portuguese bridge, for two people to sit in comfort with excellent forward views. A fixed table with seating is fitted to starboard on the aft deck in a protected position, which can convert into a sun lounger. Upholstered cushions in hard wearing, UV resistant fabric are provided for the external seating around the front of the saloon and flybridge, as well as the aft deck seating.

Up to 12 people can be comfortably accommodated for dining on the aft deck when clear of the tender. The use of portable, fixable seating allows maximum flexibility of furniture arrangements around the vessel, including dining on the fore or aft deck and comfortable dining for 6 people when at sea.

## 10.5 Awnings

Sun awnings are provided for the foredeck and aft deck.

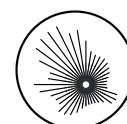
## 11.0 Interior

### 11.1 Interior Design

The Arksen interior is designed in line with the brand's core values of functionality, beauty and sustainability. The honest, built for purpose vessels offer a calming ambience throughout with the interior styling focusing on light and airy spaces. This combined with carefully considered joinery results in an environment perfect to sit back and enjoy after a day of exploring.

Where an eco-friendly approach was at the heart of the interior design process the materials have been selected to enhance the experience on board and minimise damage to environment where possible.

The flooring chosen is made from rubber which has been obtained from trees or from the residue of petrol production. Either manufacturing process does not involve the destruction or consumption of resources nor does it produce highly toxic substances.



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Our teak table top alternative is a soft wood which has been sourced from a sustainable managed plantation, the process in which it is treated ensures a durable product. The galley work tops boast recycled post-industrial plastics and are 100% recyclable. Where laminate has been used it is mainly constructed from layers of paper.

The upholstery showcases fabrics that have either been recycled from the fashion industry or made from rapidly renewable materials such as cotton, hemp, wool, and bamboo. Lastly, the final touch, the scatter cushions have been woven from recycled plastic bottles.

All aspects of interior take into consideration safety at sea and the ease of maintenance and cleaning, (e.g. avoid sharp external and internal corners etc). All fixtures and fittings are of an attractive yet durable standard, suitable for a marine environment.

## 11.2 Accommodation Layout

### 11.2.1 Main Deck

From the aft deck, a watertight door leads into a lobby area, with access to a day head containing shower, sink and head to port. A stairway to the bridge deck is positioned to starboard, with generous stowage space beneath.

A glazed sliding door leads forward into the main saloon. Extensive glazing provides panoramic views.

To starboard is the galley, containing appliances, refrigeration and significant stowage space and counter-top area. Optionally, the galley can be configured to allow separation from the main saloon. To port is further stowage including access to electrical switchboards and communications equipment, and a useful counter with a small sink and boiling water tap, with fridge and ice maker below.

Outboard, a stairway leads down to the lower deck.

Moving forward, to port is a settee with seating for four. To starboard comfortable seating for six surrounds a large table. Removable stools increase comfortable seating capacity to eight. The table can fold out to seat up to 12.

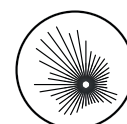
At the forward end of the saloon is a separate seating area with settee and desk. A door provides access to the starboard side deck.

### 11.2.2 Lower Deck – Master Cabin

From bottom of the stairway, a door leads from the lobby aft into the Master cabin. A substantial portlight in the hull side provides plenty of natural light.

A King size bunk is located against the aft bulkhead low level cabinets either side. A desk with adjacent storage is located forward. Lockers and hanging cupboards are located to Port and Starboard.

A door leads aft into the en-suite Master Bathroom, containing large vanity unit and storage, heads and a large shower stall. The shower stall can optionally be specified as a steam room.



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To starboard of the Master cabin, the snug is accessed through a sliding door. A substantial portlight provides natural light. A settee for use in snug mode can be converted into a single bunk, with a pipe cot over.

A door aft leads to the Battery room. A door forward leads to the lobby.

## 11.2.3 Lower deck – Guest Cabins

To port and starboard of the Lobby are two guest cabins. Each cabin is configured with a 'convertible' arrangement, comprising a fixed single bunk outboard and a sliding single bunk inboard, allowing use as a twin or a double cabin.

From each cabin a door leads forward into the en suite bathroom containing vanity unit, heads and shower stall.

Forward of the lobby, a watertight door leads to the utility space to port and a further cabin to starboard. This cabin contains a compact double bunk, writing desk and storage. Optionally, this cabin can be specified with upper and lower twin bunks. A door leads forward to the en-suite heads containing vanity unit, head and shower stall. This cabin is suitable as the crew cabin if crew are carried.

The utility space to port contains washing machine, condenser tumble dryer, and extensive storage space. Forward of the utility space, a watertight door allows access to the forepeak.

## 11.2.4 Bridge Deck

From the main deck entrance lobby, a stairway leads to the bridge deck. The upper saloon has storage to Port, a large comfortable seating area and table to starboard and a further settee to port. A desk/chart table is fitted aft of the settee to port, for admin and chart work, with multi-functional navigation displays and adjacent storage for charts and books.

Forward of the seating area, the navigation bridge contains screens, instruments and controls for the monitoring and operation of the vessel. Two captain's seats at the bridge allow comfortable watch keeping underway. A weathertight door adjacent to the bridge provides direct access to the bridge deck external 'Portuguese bridge'

The aft weathertight door leads to a covered patio area, with a table and bench seating for 4, converting into a large day bed/lounger.

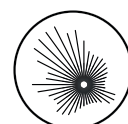
## 11.3 Insulation

The vessel hull and superstructure are thermally insulated in all accommodation areas to a high standard, appropriate for operation in all likely climates. The engine room and battery room are insulated with structural fire protection to A60 standard. Additional acoustic insulation is used around the machinery space, between decks and at cabin boundaries to minimise noise transmission.

## 11.4 Functional spaces

The lazarette is used primarily for stowage of deck equipment, spares and watersports gear and features a small workshop area. The bulkheads and deckheads of this space are bare aluminium finish, with hard-wearing rubber floor tiles glued to the aluminium deck.

Racks and stowage are fitted for stowage of general spares and equipment.



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The forepeak is primarily used for stowage of garbage and deck equipment. The bulkheads and deckheads of this space are bare aluminium finish, with hard-wearing rubber floor tiles glued to the aluminium deck. Storage is provided for garbage and equipment.

## 12.0 Machinery space outfitting

### 12.1 General

The machinery space on the Arksen 85 is fitted-out to a robust and visually attractive standard. The layout and access arrangements of all equipment are carefully considered, to ensure day-to day inspections and maintenance can be carried out at sea, without danger or discomfort to the crew.

### 12.2 Engine room flooring

Engine room walkways are formed of removable lightweight aluminium non-slip panels, with access panels where required for bilge inspection or access to serviceable parts.

### 12.3 Engine room coatings

The engine room is lined throughout with A60 structural fire protection. Locally, painted or powder coated aluminium mountings are provided for the fitment of equipment. Painted and powder coated surfaces are finished in RAL 9010 Pure White. Where possible, all equipment is supplied to match.

Engine room and battery room bilges, up to the bottom of the structural fire protection, are painted with a hard-wearing, easily cleanable, chemical resistant specialist bilge paint.

All pipes, cables, valves and equipment are clearly identified with an ISO standard labelling system.

### 12.4 Battery room

The battery room is outfitted in similar manner to engine room. The battery room houses the service battery bank, inverters and other electrical equipment. To ensure performance and safety of this equipment, the battery room is air conditioned and separately ventilated.

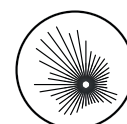
## 13.0 Propulsion systems – Standard twin diesel

### 13.1 Propulsion engines

The vessel is powered by twin Cummins QSL9 six cylinder turbocharged diesel engines, providing 246kW (330bhp) at 1800rpm. These engines are selected for their proven reliability, heavy duty rating and slow speed, allowing optimal pairing of engine, gearbox and large diameter propellers for exceptional overall efficiency. Cummins have an excellent worldwide service and support network.

### 13.2 Transmission

2x ZF550V marine RR remote V-drive gearboxes with a reduction ratio of 2.96:1.



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## 13.3 Shaftline & Propellers

The twin propeller shafts are fitted within substantially constructed stern tubes, within the skegs. The forward end of the inner stern tube is fitted with a shaft seal and bearing, with injection point for lubricating water taken from the main engine cooling system. A thrust bearing is fitted between the gearbox and the propeller shafts, reducing noise and vibration and simplifying installation and maintenance. The aft end of the stern tube is fitted with a cutlass bearing and a rope cutter. Each shaft is fitted with a 5 blade nickel aluminium bronze propeller.

## 13.4 Main engine cooling

Main engines and generator are heat exchanger cooled. Two inter-connected main seawater inlets are fitted; each capable of supplying all machinery, to minimise the chance of blockages disrupting supply. Strainers are easily accessible and fitted with purge valves, for maximum ease of maintenance, bleeding of air and clearance of fouling.

## 13.5 Fuel system

Main machinery fuel supply is from two day-tanks, situated within the engine room. Day tanks can each be isolated or cross-connected, allowing all machinery to be fed from either tank, in the event of a tank becoming contaminated. Day tanks are fed from the bunker tanks via a fuel transfer and high-volume fuel cleaning system, with two electric pumps for redundancy and a manual pump for sampling or ultimate backup. Fuel bunkers are divided into five separate tanks, in the double-bottom tanks forward of the engine room, providing ballasting capability and ability to store winter grade fuel separately from standard fuel. The transfer system ensures that any tank can be transferred to any other tank, being cleaned and warmed in the process and that only cleaned fuel is transferred to the day tanks.

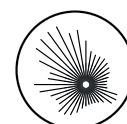
## 13.6 Main machinery exhaust

The main engines and generator are fitted with wet exhaust systems. Seawater water from the engine/gearbox cooling system is injected into the exhaust gas flow at the injection elbow and into a silencer and separator, discharging gas overboard above the waterline and water below the waterline. A bypass is fitted to discharge water above the waterline when operating in extremely cold temperatures.

## 13.7 Main engine electrics

Each main engine is served by a 24V DC start battery bank. The engine start banks and service battery bank cross connected with DVSR and emergency parallel function. Each main engine has two high capacity DC alternators for charging the service battery bank, totalling 400Amp alternator capacity on each main engine.

The main engines have local start/stop control and instrument panels, in addition to control and monitoring from the navigation stations.



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## 14.0 Generator systems – Standard

### 14.1 Generator specification

A Kohler 35EFKOZD AC single phase, 35ekW, 1500rpm, 50Hz generator is installed on the vessel centreline between the two main engines, within an acoustic enclosure. The AC power system is configured to allow AC power to be provided by the generator, inverters, or a combination for peak loads.

### 14.2 Generator control/monitoring

An OEM start/stop/display panel is installed in the sound shield with remote displays at navigation stations. Generator control is integrated with the vessel power management system to provide automatic startup when power demand requires it.

## 15.0 Propulsion Systems – Optional

Replacing the standard engines and generator, a serial hybrid diesel-electric propulsion system supplied by Praxis Automation provides propulsive and electrical power.

This system has multiple advantages over a conventional twin diesel propulsion arrangement.

- Generator engines are always running at optimum efficiency, reducing fuel consumption and emissions.
- Total engine hours are reduced, and hence maintenance requirements.
- Electric motors run almost silently and generators are contained within sound shields and resilient mounted, reducing noise and vibration on board.
- Silent running in electric only mode is possible.
- At anchor, battery recharge times are short and periods of silent operation are long.

Three variable speed generators are fitted within the engine room, each powered by a 3 litre, 200kW turbocharged diesel engine. These generators provide electrical power to the electric propulsion motors and to the batteries.

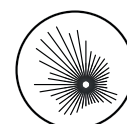
The control of the Hybrid propulsion system is automated, bringing generators online as required to meet the vessel's changing power requirements.

### 15.1 Shaftline & Propellers

The twin propeller shafts are fitted within substantially constructed stern tubes, within the skegs. The forward end of the inner stern tube is fitted with a shaft seal and bearing, with injection point for lubricating water. An electric motor is coupled to each propeller shaft with flexible couplings and a thrust bearing, reducing noise and vibration and simplifying installation and maintenance. The aft end of the stern tube is fitted with a cutlass bearing and a rope cutter. Each shaft is fitted with a 5 blade nickel aluminium bronze propeller.

### 15.2 Engine cooling

Generator engines are heat exchanger cooled. Two inter-connected main seawater inlets are fitted, each capable of supplying all machinery, to minimise the chance of blockages





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disrupting supply. Strainers are easily accessible and fitted with purge valves, for maximum ease of maintenance, bleeding of air and clearance of fouling.

## 15.3 Fuel system

Main machinery fuel supply is from two day-tanks, situated within the engine room. Day tanks can each be isolated or cross-connected, allowing all machinery to be fed from either tank, in the event of a tank becoming contaminated. Day tanks are fed from the bunker tanks via a fuel transfer and high-volume fuel cleaning system, with two electric pumps for redundancy and a manual pump for sampling or ultimate backup. Fuel bunkers are divided into five separate tanks, in the double-bottom tanks forward of the engine room, providing ballasting capability and ability to store winter grade fuel separately from standard fuel. The transfer system ensures that any tank can be transferred to any other tank, being cleaned and warmed in the process and that only cleaned fuel is transferred to the day tanks.

## 15.4 Main machinery exhaust

The generators are fitted with wet exhaust systems. Seawater water from the engine cooling system is injected into the exhaust gas flow at the injection elbow and into a silencer and separator, discharging gas overboard above the waterline and water below the waterline. A bypass is fitted to discharge water above the waterline when operating in extremely cold temperatures.

## 15.5 Main engine electrics

A 24V DC start battery bank is fitted for starting of generator engines. This battery bank is charged by a dedicated AC battery charger and can be linked to the 24V service battery bank as a backup starting option.

## 16.0 Auxiliary systems

### 16.1 Lubrication systems

A 24v lube oil pump is fitted, with a suction hose of suitable length to allow oil removable from all machinery with discharge to a portable storage container.

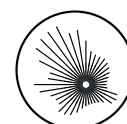
An oil pump is fitted, to provide constant gearbox lubrication when and engine is not running but the shaft is rotating when in single engine operation.

### 16.2 Bilge pumping systems

Two 24V DC heavy duty submersible bilge pumps are fitted in each watertight compartment, each fitted with a two-stage float switch. Engine room bilge pumps are fitted with bilge water filters to remove oil from discharged water. The Fire pump can function as an engine room emergency bilge pump.

### 16.3 Fire main system

An AC fire pump is fitted, feeding deck hydrants and acting as backup engine room bilge pump. Supplied with hoses and branches for each hydrant.



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## 16.4 Wash-down systems

An anchor chain-wash sea water jet is positioned at the bow roller to clean mud and debris from the anchor chains as they are raised.

Deck wash hose fittings are provided fore and aft, with diverter valve to select sea water or fresh water. A hose is provided of sufficient length to reach all deck areas.

## 16.5 Hydraulic systems

The hydraulic systems provide power to the bow thruster and transom door. Hydraulic power to the thruster is provided by a clutched PTO on one main engine. An independent 240v AC driven hydraulic powerpack operates the transom door and other optional hydraulic equipment, without requiring the main engine. This powerpack also provides a redundant backup to the steering system.

## 16.6 Compressed air systems

A small air compressor supplies the horn and sewage treatment plant. Air connection points are provided for purging sea strainers and cleaning at workbenches.

## 16.7 Deck drainage systems

Upper decks and bonnets are fitted with scuppers and discreet gutters, to collect and drain away water.

Water on the main deck drains directly overboard via freeing ports. Limber holes are fitted in bulwark stanchions to allow free passage of water.

Deck hatches are fitted with suitable drainage gutters.

## 17.0 Steering & Docking Systems

### 17.1 Steering

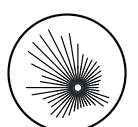
Steering is achieved with a twin flow-aligned rudder arrangement. A single hydraulic cylinder is fitted each side with a mechanical tie bar. The two cylinders provide redundant backup.

An 24V DC HPU is fitted with an integral oil reservoir and AC backup pump. Steering hydraulics are arranged such that either cylinder can easily be bypassed if required. A hand-hydraulic backup helm pump is fitted, concealed in the bridge deck console, with locally stowed emergency steering wheel.

Each control station is fitted with follow-up and non-follow-up steering control, as well as autopilot control heads.

### 17.2 Thruster

The vessel is fitted with a hydraulically powered 36kW (48hp) bow tunnel thruster. Joystick control is fitted at the helm station.



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## 17.3 Remote control

A wireless remote docking system is fitted, to allow easy docking control of the vessel from the most suitable location. This system can control main engines, thrusters, windlasses and horn.

## 18.0 Ride control and stabilisation systems

### 18.1 Interceptors

Active interceptors are fitted across transom, providing trim and ride control and optimising efficiency under way.

### 18.2 Fin stabilisers

Zero speed stabilisers are fitted to provide roll reduction under way and at anchor. These have a composite fin each side with externally flanged actuator/fin connection and are electrically powered.

## 19.0 Domestic systems

### 19.1 Fresh water system

The vessel is fitted with large freshwater tanks, integral to the forward hull structure, fed by a 300 litre/hour watermaker.

The freshwater system is fed by a dual 24V DC pump set, for added redundancy, providing pressurised hot and cold water to all outlets around the vessel. A continuous hot water ring circuit ensures that all outlets have instant hot water on demand, for convenience, whilst conserving water.

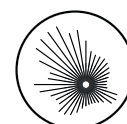
As well as the faucets and showers in the cabins, the galley appliances, the laundry and day head, water is supplied to the transom shower, deck wash hoses and lazarette basin. Water to all potable water outlets is filtered and UV sterilised.

### 19.2 Black water & grey water system

Black water from the onboard WCs and grey water from the basins and showers, is collected in a combined BW & GW tanks, prior to processing by the sewage treatment plant.

The vessel is fitted with 24V DC macerator toilets, with freshwater flush. The day head is fitted with a diverter valve, to allow sea water flushing, to conserve fresh water if necessary. The sewage treatment plant, sized for the maximum system waste output with full complement of guests, ensures that the only overboard discharge is clean water, within MARPOL limits. The remaining processed material is stored onboard in a sludge tank, for discharge ashore.

A 24V DC pumping system is fitted, allowing tanks to be discharged to shore, in the event that suction facilities are not available.



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## 20.0 HVAC & Refrigeration Systems

### 20.1 Engine room ventilation

The engine room and battery room have forced air-in and air-out ventilation. Ventilation trunks are fitted with 24V DC actuated fire flaps and louvred grills, with water mist eliminators on the inlet. This arrangement provides the optimal machinery combustion air and ambient engine room temperature, for all external climates.

### 20.2 Bilge & Void Ventilation

Bilges and void spaces are fitted with forced air extraction, to prevent build-up of any condensation, fumes or stale air.

### 20.3 Accommodation ventilation

A supply of fresh air is essential to provide a comfortable living space, whilst removing any stale air, odours and preventing damp. This is achieved by drawing fresh air in through discreet external inlets at the front of the superstructure and expelling used air at the rear. A system of ultra-quiet intake fans and remotely mounted WC extractor fans ensures that this is achieved unnoticed. A heat transfer system is also used in cold climates, to take waste heat from the expelled air, to pre-heat the inlet air and vice versa in warm climates, thus reducing the load on climate control systems.

The extraction system is supplemented by the galley extractor during meal preparation, to remove any cooking smells and steam.

### 20.4 Air Conditioning

The air conditioning system comprises variable frequency chiller units fitted within the engine room with a tempered water ring main supplying blown air fancoil units within each area of the accommodation.

Utilising multiple variable frequency chillers allows the electrical load to be matched to the demand, avoids system on/off cycling and provides redundancy.

### 20.5 Heating

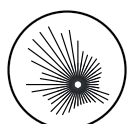
In cold climates, the same tempered water circuit is used to heat the vessel using the blown air fancoil units. In heat mode, the tempered water can be heated using the variable frequency chiller units in reverse cycle mode, when water temperature allows, by waste heat recovery from heat exchangers on main machinery.

Convection radiators are fitted in the forepeak and lazarette to avoid freezing and reduce condensation.

The tempered water heating circuit can also heat water in the domestic fresh water calorifier, reducing electrical loads.

### 20.6 Refrigeration Systems

The vessel is fitted with extensive cold storage, with refrigerators and freezers suitable for long-distance cruising. The generous fridge and freezer capacity in the galley is



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supplemented by additional freezer capacity in the utility space and a fridge on the bridge deck.

## 21.0 Electrical systems – Standard

### 21.1 AC System

#### 21.1.1 General

The electrical systems on the vessel are designed to provide maximum efficiency, redundancy, flexibility and reliability.

This is achieved through the use of multi-function inverter/chargers combined with large engine alternators, a substantial DC battery bank and an AC generator.

AC power can be obtained from the AC generator, the shore power connection, the inverters, or a combination of these.

#### 21.1.2 Inverters and Chargers

A bank of Victron Quattro multiple input/output inverter/chargers can sufficient AC power from the DC battery bank to supply the typical maximum diversified AC loads for the vessel in operation. When the vessel is under way, the high capacity DC alternators continuously charge the DC battery bank, meaning that generator running is not typically required.

When the vessel is at anchor, the inverters can supply AC power while the batteries have charge. When the battery bank runs low, the generator is started and provides ample AC power, with spare capacity being used to recharge the DC battery bank.

When the vessel is in port with access to shore power, the shore power provides AC power. Shore power supplies may not be able to accommodate peak loads, however this arrangement allows the inverters to supplement the shore power when loads are high, and recharge the batteries with spare shore power capacity when loads are low.

In the event of an extreme peak load requirement, the inverters supplement the power provided by the generator.

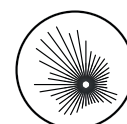
#### 21.1.3 Shore Power

A 63 Amp shore power supply for 230V 50Hz power is connected via the Victron inverter/charger bank, allowing shore power to directly power the systems on board, to charge the batteries, or to be supplemented by the inverters.

A 32 Amp shore power supply for 110V/220V 60Hz power is connected to 3x 100Amp battery chargers for use in areas with 60Hz shore power. Shore power charges the batteries only, with 50Hz AC power provided on board by the inverters.

Two 20m shore power leads are provided, one for 60Hz and one for 50Hz.

This arrangement allows connection to either 50Hz or 60Hz shore power, giving worldwide flexibility.



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## 21.1.4 Generator

A 35kW 1500rpm 50Hz single phase AC generator is fitted in the engine room. Electrical connection to the AC distribution is through the Inverter/Charger bank, allowing generator power to be supplemented for peak loads, and absorbed for battery charging at lower loads.

For generator installation details see section **Error! Reference source not found.**

## 21.1.5 AC Distribution

AC Distribution is 230V 50Hz grounded neutral. Primary distribution equipment is located within the engine room with local distribution boxes containing breakers for equipment and appliances situated in the accommodation.

Power outlets are fitted around the vessel interior and exterior. Outlet types are selected based on suitability for their specific installation location. UK type domestic sockets are fitted as standard in the interior. Alternative region socket types can be specified by the Owner if required.

## 21.2 AC Appliances

The galley is equipped with the following AC appliances. All appliances are quality domestic items by Miele or similar:

- 600mm induction hob mounted on the outboard counter
- Combi microwave/convection oven fitted within the aft bulkhead
- Oven fitted beneath the hob
- Dishwasher fitted under the inboard counter
- Quooker boiling water tap with outlet at sink
- Quooker boiling water tap with outlet at port side counter

### 21.2.1 Laundry Appliances

The utility area is equipped with a Miele washer and Miele condenser dryer.

### 21.2.2 Utility Appliances

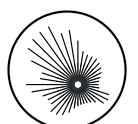
An AC powered portable rapid air pump is supplied for the filling of inflatable fenders.

## 21.3 DC System

### 21.3.1 Service Batteries

At the heart of the DC power system is a large 24V DC service battery bank, comprising 2V deep cycle cells.

Service batteries are charged from the bank of Victron Quattro type charger/inverters, from the secondary shore power battery charger bank, or from the four main engine alternators.



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## 21.3.2 Start Batteries

Each main engine is served by a start battery bank. Engine start batteries are 24V with high cold cranking output. An Auto Charge Relay (ACR) from the service battery bank charges engine start banks.

## 21.3.3 Emergency Batteries

Emergency batteries are 24V AGM type with a dedicated 30 Amp charger, and an ACR from the service battery bank. This bank is of sufficient capacity to supply emergency lighting, navigation lighting, essential navigation and communications equipment for a period of three hours.

## 21.3.4 General

DC Systems are 24V double pole ground isolated.

Monitoring of the status of each battery bank is available at the navigation station.

## 21.3.5 Solar Power

Optionally, solar panels can be fitted to the extensive upper superstructure surfaces, providing charging of the DC battery bank, to reduce the amount of generator power required at anchor. Robust, flexible solar panels are adhered to the superstructure, providing non-slip, non-glare surfaces that can be walked on with deck shoes if necessary. This choice of solar panel and system, provides an extremely efficient contribution to the vessel's power, with an aesthetic that compliments the styling of the vessel.

## 21.4 Lighting

All lighting is LED type for reduced power consumption long life. Lighting is powered from the 24V DC service power supply, with emergency lighting powered by the emergency batteries.

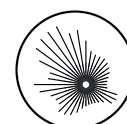
### 21.4.1 Exterior lighting

Exterior lighting is fitted around the vessel, comprising low level and overhead walkway lights, stair tread illumination, fore and aft deck flood lights and a remote-control searchlight. In each area, selected light fittings provide emergency lighting in the event of primary power failure.

### 21.4.2 Interior lighting

Lighting throughout accommodation spaces utilises a combination of direct and indirect lighting, designed to be in-keeping with the interior styling. Light fittings are of good quality and suitable for marine use. Task lighting, reading lights and red lights are fitted where required. In each area, selected light fittings provide emergency lighting in the event of primary power failure.

Lighting circuits are controlled from Vimar type switches at the entrance to each area.





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## 21.4.3 Engine room & utility space lighting

Utility lighting is fitted in the engine room, battery room, forepeak and lazarette, arranged to ensure suitable, even illumination of all areas. Additional light fittings provide emergency lighting capability.

## 21.4.4 Navigation Lights

Navigation lights of LED type are fitted in accordance with the requirements of IRPCS. A dedicated control panel for the navigation lights is fitted.

## 22.0 Electrical Systems – Optional Hybrid Power System

### 22.1.1 General

The Praxis Automation Hybrid system provides power for both hotel and propulsion loads from two 80kWh banks of high voltage DC Lithium Ferro Phosphate batteries. These battery banks are charged by any combination of three variable speed generators through High Power Inverters (HPIs).

A bank of HPIs provides 3-phase AC power to an AC distribution board allowing all AC hotel loads and propulsive power to be provided by battery power alone, or supplemented by generator power.

### 22.1.2 Shore Power

Connections are provided for 50Hz and 60Hz 3-phase shore power supplies.

Two 20m shore power leads are provided, one for 50Hz and one for 60Hz.

This arrangement allows connection to either 50Hz or 60Hz shore power, giving worldwide flexibility.

### 22.1.3 AC Distribution

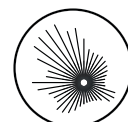
A 400V 3-phase AC supply provides power to high load consumers, with a 230V 50Hz single phase AC supply for domestic equipment and socket outlets. Primary distribution equipment is located within the engine room with local distribution boxes containing breakers for equipment and appliances situated in the accommodation.

## 23.0 Electronics

### 23.1 Navigation

#### 23.1.1 Navigation console – Bridge deck

- 1x Furuno TZT2BB Black Box navigation system
- 2x 24" HD Touchscreens for navigation system use
- 1x 24" HD Touchscreen for systems control and monitoring
- 1x Furuno PSD-003 switch box
- 1x Furuno MCU-005 control unit



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- 3x Furuno FI-70 multi-function display
- 1 x Furuno NP711C Autopilot control head
- 1x GP39 GPS at chart table
- 1x Magnetic compass

## 23.1.2 Main saloon – main deck

- 2x FI-70 multi-function display

## 23.1.3 Installed Equipment

- 1 x Furuno DRS6A-NXT open array radar antenna
- 1 x Furuno GP330B GPS antenna
- 1 x Furuno SC33 GPS compass
- 1 x Furuno PG700 Solid state rate gyroscope fluxgate compass
- 1 x Airmar DST800 Depth/Speed/Temperature transducer
- 1 x Airmar 520-5PSD depth transducer at stern
- 1 x Furuno FA-50 Class B AIS transponder

## 23.2 Communication systems

- 2x Furuno FM4800 VHF/DSC
- 1x Furuno FS-1575 MF/HF
- 1x Furuno Furuno Felcom 19 Sat C terminal
- 1x Furuno NX300 Navtex at chart table
- 1 x Sailor 4300 Iridium Certus
- 1 x Yellowbrick YB3i tracker
- 1 x Pepwave MAX BR1 MK2 4G router
- Onboard Wi-Fi network

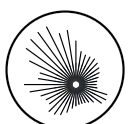
## 23.3 AV Systems

### 23.3.1 Main Saloon

- 1 x Sony 32" 1080p TV with apps and Freeview
- 1 x TV lift system for TV
- Connection to FM antenna
- Connection to vessel network
- 1 x Chromecast
- 1 x Apple TV
- 1 x Sonos Beam
- 2 x Sonos Play 1

### 23.3.2 Bridge deck saloon

- 2 x Sonos Play 1



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## 23.3.3 Master Cabin

2 x Sonos Play 1

## 23.4 CCTV System

2 x exterior cameras at mast (1 x view forward, 1 x view aft)

2 x engine room cameras

## 23.5 Sensor systems

Additional seawater inlet and discharge points are provided to allow connection of sensors for research purposes. Electrical power and data connections to allow sensing equipment to be fitted during research operations and transmit data to a remote computer.

## 24.0 Fire & Safety Equipment

### 24.1 Fire Detection & Fighting Equipment

#### 24.1.1 Engine room fire suppression

The engine room and battery room are protected by separate Stat-X aerosol fire suppression systems, with smoke and heat detectors. Alarm panels are fitted at the main saloon and bridge deck navigation stations.

#### 24.1.2 Smoke detection system

The vessel is fitted with an analogue addressable fire detection system. Smoke detectors and sounders are fitted in all compartments, with heat detectors fitted in the galley, engine room and battery room.

#### 24.1.3 Manual firefighting equipment

Fire extinguishers are fitted throughout the vessel to the requirements of the commercial code. Additional extinguishers are located as required for ready access. Fire hose and branch are located beside each fire main hydrant.

### 24.2 Safety Equipment

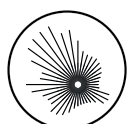
#### 24.2.1 Man-overboard recovery

The preferred method of MOB recovery is through use of the outrigger booms and lifting tackle, with an approved MOB rescue sling.

As a means of MOB self-recovery, a rope ladder is stowed within a tube welded into the transom, reachable from the water.

#### 24.2.2 Liferafts and safety apparatus

The vessel is equipped with two 12-man SOLAS A pack life rafts, as well as all safety apparatus and lifesaving appliances required for Category 0 operation with 12 persons on board.



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Medical stores are provided for Category 2 operation with 12 persons on board.

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