

To: DLRG-Vereinszentrum

Tinsdaler Weg 38, 22880 Wedel, Germany

Date: 4-8-2023

Dear Mister S. Schenk,

We herewith have the pleasure to quote you the Alunautic Windmill 12.00 with the following configuration.



## 000 General description

### 1.1 Main particulars

The **Alunautic Windmill** 12.00 is a modern Vessel of standard design. The Vessel is well suited for the following services (amongst others):

- Transportation of personnel
- Handling
- Coastal control

- Rescue people
- First aid activities

The Vessel has a chined hull with a deep-V bottom. The Vessel is propelled by Twin 370 hp Yanmar inboard engines.

The Alunautic Windmill 12.00 is designed to ensure the following qualities for all aspects of the Vessel and for all the tasks it must perform:

- Efficient and accessible layout
- Excellent performance
- Cost effective to operate.
- Easy to maintain.
- Built to modern and high standards.
- Fitted with new and high standard commercial components.

#### Principal dimensions

Length overall (including appendages)	12.00 m
Beam over all (including appendages)	4.25 m
Aft deck high above waterline (at speed trail condition)	max 0.8 m
Double door to pass stretcher	>1,2m
Depth at side (at half length)	0.90 m
Draught max. (approximately incl engine shaft)	0.95 m

#### Tank capacities

Patrol tank	2x 0,5	m <sup>3</sup>
Water tank	0	m <sup>3</sup>
Seawage tank	0	m <sup>3</sup>

#### Other capacities

Crew	2
(Industrial) personnel	4-6
Gross tonnage / Nett tonnage approx..	7
Dead weight*	Max 8.00 tonnes
* The total maximum deadweight (fuel, persons, cargo, etc)	
Payload 2700 kg	

## 1.5 Layout

The Vessel is divided into the following watertight compartments: checkable, with e.g. ball valves

- Engine room
- Accommodation
- Fore peak-aft deck casco hull.

## 1.6 Propulsion and speed

The Vessel's propulsion system consists of two diesel inboard engines. Full details are given in the Propulsion Selection Diagram. The engines are indirectly seawater cooled and electrically started and can be removed via a large hatch. Speed requirement: at least 38kn with 3 Persons, 100% fuel, 400kg payload.

## 1.7 Definitions

This specification describes the hull, equipment, and machinery of the below mentioned Vessel.

The following words and/or expressions used herein shall have the meaning as defined hereinafter:  
"Vessel"

The Alunautic Windmill 12.00 as described in this specification.

The corporate body or legal person who shall have ownership of the Vessel.  
Euro Offshore bv (or its Licensee)

"Buyer"

The corporate body or legal person who shall have ownership of the Vessel.

"Builder"

EO Workboats bv

"Builder's standards"

Manner of construction and/or outfitting as customary at Builder's yard.

"Standard execution"

Manner of construction and/or outfitting as customary at the execution of the Vessel, built, and equipped with the materials, fittings and items as described in this specification.

"Or" / "Or equivalent"

Substitution of equivalent equipment of different manufacturer may be proposed by builder.

## 1.8 Weather protected assembly.

The assembly of all equipment, the painting and other sensitive activities will take place in a covered working area, protected from weather influences.

## 1.9 Quality policy

By applying a Quality Program (QP) to every facet of our operations the Builder continues to maintain and upgrade the quality of the products and organisation.

### 1.10 Workmanship and quality of materials and fittings

The workmanship on the hull and fittings throughout shall, as a minimum, be completed in accordance with applicable Classification society standards. Care shall be taken to ensure fair lines, smooth surfaces, and neat welding. All materials and equipment installed in, or delivered with the Vessel are new and of a good marine quality. During the outfitting, high standards are kept regarding clean-keeping, safety and environmental protection.

The Builder has a standardisation department for quality control, assurance, and design improvement.

Trade names and names of specific manufacturers mentioned in the specifications are intended to describe the desired quality and/or construction of the equipment and materials. They will not exclude any other makes of similar quality or construction.

All bolts, chains, fittings and other small equipment exposed to seawater are, where possible, of stainless steel, aluminium and at least of galvanised steel. Use of Silicon based materials will be minimized. Where applicable, any silicon-based paint systems will be applied by means of rollers, to prevent Silicon particles becoming air borne.

### 1.11 Delivery

The vessel will be delivered to the Buyer with almost empty tanks, complete with equipment and tools as per purchase order or contract.

### 1.12 Modifications

The Builder has the liberty to modify constructions and/or designs, provided such modifications do not affect the Vessel as described in this specification.

### 1.13 Buyer's supply

In the event the Buyer is supplying components, equipment and/or any other materials to be incorporated in the Vessel, the additional costs for bringing on board and/or for installation on board, is not included in this specification. Also, weight and speed consequences are not included in this specification.

## 30 Classification / Certification

### 31 Classification society

ECB= CE approval B

#### Certificates/statements

The following certificates/statements are supplied to the Buyer at the time of delivery of the Vessel:

- Builder's certificate
- Material certificates (as far as required by client)

## 40 Test / Trials

#### General description

All work and equipment on the Vessel will be tested at Builder's yard for suitability, performance and workmanship for their intended purpose and are in accordance with Builder's standards and the

Classification Society if applicable. A detailed report of all tests and trials will be delivered with the Vessel. The Builder will furnish all consumables necessary for tests and trials.

## 42 Factory tests / Harbour tests

### General

The below mentioned test are indicative only and may change based upon final requirements of the main equipment suppliers and / or Classification Society, if applicable.

### Equipment

The following equipment will be tested:

- Hose test windows, watertight doors and hatches
- Navigation and communication equipment

### Systems

The following systems will be tested:

- Control of the propulsion system
- Bilge system
- General Service system
- Fuel system
- Ventilation systems
- Electrical system
- Lighting system
- Air conditioning-heating system
- Watertight compartments
- Emergency stopping of the patrol supply.

### Inclining test & stability information

An inclining test will be executed for determination of the light ship weight and centre of gravity. A stability booklet will be provided and includes:

- Hydrostatic data
- Stability calculations for various loading conditions
- Tank tables
- General information of the Vessel

ECB will be present at the inclining test for classification society signed stability booklet, will be delivered with the Vessel.

## 43 Seatrials

### General

During the tests and trials listed below, data will be recorded regarding wind speed, wave heights, water depth, air and seawater temperature, draft, trim and weight of the Vessel etc.

A classification society's signed trial report will be delivered with the Vessel together with a certified speed document.

### Speed trials

The Vessel's speed ahead will be measured at maximum throttle on a one mile course, twice in two opposite directions. The distance will be measured by a GPS track at least 38kn average speed.

Loading condition:

Item	Condition	
Fuel oil	100 %	
Fresh water	0 %	
Waste water	0 %	
Crew and effects	2	
(Industrial) personnel and effects	1	
Payload	400 kg	

Weather condition:

Trials are based on the following maximum weather and sea conditions:

- Sea state 3
- Beaufort 4
- Water depth > ½ times the waterline length

Endurance trials

An endurance test at maximum rpm of the main engines will be carried out with the Vessel for a period of 1 ->2 hours . During the test the exhaust gas temperature, cooling water temperature and lubrication oil temperature of the main engines will be recorded. The approximate fuel consumption will be readout from the (engine) management system.

Manoeuvring trials

The following manoeuvring trials will be carried out:

- Measurement of the time and distance needed for a crash stop.
- Measurement of the turning circle diameter.
- Steering gear trials.

Noise measurements

The sound level (dB(A) values will be measured at 50% of the engine power at wheelhouse. No limitation has been agreed on this issue. Manufacturer will create a dB max as possible.

## 70 Design conditions

General requirements

The Alunautic Windmill 12.00 is generally designed for the following environment conditions as appear in Germany:

- Seawater temperature:  
min. 0 °C  
max. 25 °C

- Air temperature outside:  
min. 0 °C -25°C  
max. 32 °C- 40°C
- Relative humidity:  
max. 100 % (Not in combination with max. temp.) The specific design condition of the propulsion installation, air conditioning, heating, etc., see the individual items.

## 71 Manuals / Documentation

### Documents and manuals upon delivery

Upon completion of the Vessel, the Builder will deliver to the Buyer two complete sets documents and manuals in the English language.

The following documents will be delivered:

- General Arrangement Plan
- Docking or hoisting plan
- Engine room arrangement if applicable
- Diagram of all relevant systems
- Electric Power Distribution Diagram
- General Construction Plan
- Dock and sea trial test reports
- Safety plan (Fitted in aluminium frame at suitable location)
- Inventory list
- Manuals of components (as far as available)
- A stability booklet, as indicated in item 042.04
- Safety documents according to Berufsgenossenschaft/Schiffssicherheitszeugnis

## 100 Shipbuilding (hull and coating)

### Aluminium

#### Marine grade light alloy (aluminium) type.

- Plating 4-5 mm type ALMg DIN 1725-ISO H11 seawater resistant
- Extrusions 4-10 mm type ALMg DIN 1725-ISO H11 seawater resistant

### Stainless steel

Stainless steel type 316L or 321 is used unless mentioned otherwise.

### Welding

All welding will be performed in accordance with actual classification requirements.

## 110 Hull

### General description

The single chine hull has a deep V-bottom, spray rails, a transom stern

The hull is manufactured from Marine Aluminium grade alloy, built conform a major classification society.

### Tanks

The tanks are not a part of the construction and are mounted in the construction.

### Sea inlets

Sea inlets will be constructed following general Class approvals.

Each inlet pipe is provided with an aluminium inlet piece, welded into the hull.

The ample size seawater inlets are designed for operation in the environmental conditions.

### Spray rails

A spray rail is integrated in the hull, at the chine, alongside the Vessel and rounding the bow.

## 120 Superstructure

### General description

The Marine Aluminium grade alloy structure is resiliently mounted on the hull construction. The efficient layout offers a clear view in almost all directions.

The wheelhouse has an access door in the aft bulkhead and is provided with the following windows:

- Two windows at the front.
- Four windows at each side. One sliding window each side at pilot and co driver position.
- One windows in the access door.

### Resiliently mounted superstructure

The superstructure is mounted on the hull with a resilient support to minimise vibration and noise.

## 130 Hatches / Doors / Windows

### 131 Hatches

#### General description

All hatch covers are watertight / weathertight by means of gaskets or rubber. All hinges are made from stainless steel or/and aluminium (hinges are adjustable and provided with grease nipples, if applicable). Gas cylinders are fitted for heavy deck hatches.

If necessary for safety, provisions for securing hatch covers with stainless steel/aluminium fittings in open position are provided.

Hatches are positioned generally conform the General Arrangement Plan.



#### Engine removal hatch

The Marine Aluminium grade alloy hatch for the removal of the main engines is fitted on the main deck. The hatch is fitted with rubber seals and is bolted down.

Further more a flush mounted entrance hatch is provided.

#### Ventilation hatches sanitary space

A natural ventilation system will be provided in the cabin with watertide vents.

#### Inspection hatches

Where necessary inspection hatches are provided for tanks, voids, bilges, etc.

#### Closing devices air ducts

The air duct and ventilator openings have the following closing devices:

The engine room inlet and outlet ducts are provided with a watertight aluminium hatch, operated from the main deck.

#### Wheelhouse accommodation hatch

A weathertight synthetic hatch is fitted in the roof of wheelhouse as escape route.

### 132 Manholes

#### General description

All tanks (except expansion tanks) are accessible via manholes. The manholes are closed by watertight plate covers, secured by bolts. In exposed areas the bolts are of stainless steel.

### 133 Watertight and weather tight doors

#### General description

All outside doors are fitted with stainless steel/aluminum / synthetic hinges and toggles and can be secured in an open position. The hinges are adjustable. All outside accommodation doors can be locked from the inside with a knob and from the outside with a key.

Outside doors are positioned generally in accordance with the General Arrangement Plan. Weathertight doors are positioned generally according to the rules of a major Classification Society.

#### Wheelhouse door

The external weathertight wheelhouse door is made of a Marine Aluminium grade alloy construction. The door is provided with one window.

### 135 Windows / Portholes / Blindages

#### General description

All wheelhouse windows are manufactured of toughened glass and are glued/installed to the construction.

Glass thickness:

- 6 mm for the wheelhouse front windows
- 6 mm for the wheelhouse side/aft windows

#### Window wipers

Electrical (12V) pantograph window wipers are fitted on the front wheelhouse window(s).

Switches for each wiper are situated in the dashboard.

#### Fresh water window washing

The windows with window wiper are provided with a fresh water washing system.

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### 140 Stairs / Ladders / Platforms

#### General description

Stairs, ladders, railing and platforms are positioned to generally conform with the General Arrangement Plan. Throughout the Vessel sufficient grab rails are provided for the safety and convenience of the crew. A dismountable-folding ladder will be delivered which will fit on 4 places at the side of Vessel. Position to be agreed with client.

The tanks are provided with climbing steps and handgrips where necessary.

### 141 Stairs / Ladders / Climbing step.

#### Stairways

Stairs with anti-skid steps are fitted in the accommodation.

#### Ladders

A Ladder are made of aluminium. Generally, ladders are fixed with bolts at top and bottom and can be removed when necessary.

### 142 Railings / Handrails / Grips

#### General description

All railings are manufactured from aluminium pipes or aluminium stanchions with plastic coated stainless steel wires. The railing is removable where necessary. See the General Arrangement Plan for the layout.

Handrails and grips will be provided wherever necessary to provide adequate safety.

#### Railing-structure aft deck

A railing-construction is fitted at the aft deck, as indicated on the General Arrangement Plan. Rails on sides of aft deck should be removable/dismountable/openable.

#### Railing wheelhouse sides

A railing is welded to the wheelhouse (to be agreed with client). A Rail for lifeline will be installed on both sides.

#### Railing fore deck

Railings are fitted on the fore deck.

### 143 Platforms / Gratings

#### Swim platform

An extended deck is fitted at the transom

### 150 Additions to ship's construction

### 151 Fenders

#### General description

Special attention is given to the arrangement, materials and fastening of the fenders. Fenders are positioned in general accordance with the General Arrangement Plan.

#### Pu foam fender at main deck level

The Pu foam fender is fitted at the sides at main deck level as indicated on the General Arrangement Plan. The top of the fender is fitted around the shell / deck edge. The fender is glued/bolted to the hull.

### 153 Bollards

#### Cleats

Cleats are positioned to generally conform with the General Arrangement Plan.

The cleats are fitted at the following positions:

- One at the aft deck at each side.
- One at the fore deck at each side.
- 3x Mid of boat at each side
- Bollard, Hook for towing  
For at least 12m sailing yacht.  
Towing force 1500 kg.
- Storage box for towing equipment

### 154 Lifting lugs

#### Lifting arrangement

The vessel can be lifted by slings put through the lifting eyes .

#### Dock cradles (optional)

One set of dock cradles is provided for storage of the vessel at an appropriate location on shore.

#### Lifting lugs on superstructure

The superstructure is provided with removable steel lifting lugs fore and aft.

## 158 Masts

An aluminium mast for navigation lights, flags and aerials is mounted on the top deck.

## 159 Markings hull / superstructure

### Name, port of registry and company emblem

Sticker foil characters will be applied for the name (on both sides) and port of registry (on the stern).  
A company emblem will be fitted on request.

### Hull markings

Permanent hull markings are fitted on the hull indicating the following:

- Positions of the waterline (thin markings)
- Triangular marking for the docking support positions and / or hoisting slings

### Name plates

Identification nameplates and labels are fitted at all relevant pipelines, deck equipment, deck fittings, valves etc. At switchboards and dashboards plastic identification name plates and labels are fitted.

All name plates and labels are provided in the English language.

## 160 Corrosion protection / Deck cover

## 161 Paint system

### General description

Painting is carried out in strict compliance with manufacturer's instructions. According to CD DLRG

The paint system is based on the following:

### Surface preparation aluminum ;

Before painting aluminium surfaces are cleaned, grinded and coated with a primer and 3 layers system.

Anodised aluminium parts will not be painted.

### Colour scheme

Hull outside, below the waterline- aluminium look

Hull outside, above the waterline to deck-aluminium look RAL 3000 / RAL 1016

Superstructure outside-any colour to be agreed RAL 3000 /RAL 1016

Hull below waterline- UC2K HD/transperant

Superstructure inside cabin - Off white or other colour required

External deck/walk away and deck in cabin -antislid paint light grey

The vessel can be delivered with alternative colours

#### Decks

Bollards, railings and deck equipment-aluminium look

(Deck) equipment delivered from vendors, is delivered in their original colour and colour schemes.

### 163 Cathodic protection

#### Anodes

Cathodic anode protection will be provided for the stendrives and hull. The anodes are placed on the sterndrives itself.

#### Bonding system

All major underwater and electrical parts are bonded with a cable according to Builder's standards.

### 164 Active anti-fouling system

#### Impressed current anti-fouling for sea inlet.

An impressed current anti-fouling system, UC2K HD, is installed in the sea-inlet strainers. The copper anode provides anti-fouling for each system connected to the strainer.

## 200 Main machinery

### 210 Propulsion system

#### General description

The design and layout of the propulsion installation is in accordance with Builder's standard and with the relevant rules of the Classification Society and are such that permanent attendance in the engine room is not required.

Each marine engine is coupled to a waterjet propulsion unit which avoid resonance in the working speed range.

All machinery is marine type and the installation is laid out for easy watch keeping, servicing and maintenance.

#### Resiliently mounted engines

Each main engine is resiliently mounted on/via the longitudinal bottom girders. The solid construction of the girders minimises hull vibrations exerted by the engines.

### 211 Propulsion engine system

#### General description

The twin set engines Yanmar 370 HP

#### Bow and Heck thruster

A bow and heck thruster 3 kw electric coupled each to battery pack and remote will be installed.

### 213 Thrust system / Shafts

#### Gearbox

A gearbox will be installed on engine. Model type to be agreed.

#### Waterjet propulsion

Twin set Hamilton jet 292 will be installed on gearbox via a shaft.

### 214 Control system propulsion

#### Remote controls

- The Vessel is provided with remote controls, operated from the helmsman seat in the wheelhouse, second helmstand outside, as indicated on the General Arrangement Plan. The following controls are provided:
- Steering wheel (for manoeuvring and free sailing mode).
- Twin remote-control coupled to waterjet-inboard diesel engine
- Trim button –indicator on remote control
- Remote unit for each truster.

### 220 Steering system

#### Steering gear system

#### Powered hydraulic steering gear

A extra electric steering support pump will be installed as extra on standard hydraulic steering system

### 300 Primary ship systems

#### General description

Installation and quality of the pumps are according to Builder's Standards.

The design and layout of the piping system, the materials, installation, and testing are to Builder's Standards and comply furthermore with the relevant rules of a major Classification Society. Pipes are adequately supported to prevent undue vibration. Where necessary, flexible connections are made. Hoses are double clamped with stainless steel clips. Pivot bolt clamps are preferred on hoses which are pressurised all the time and on clamped fuel hoses.

The relevant piping systems will be pressure tested and cleaned prior to system operation, according to Class requirements.

#### Piping materials

All below listed materials are indicative and may change during final engineering.

Materials of the piping systems:

Item	Material
Bilge / General Service / Internal fi-fi pipes	Aluminium or rubber
Fuel pipes	Aluminium or rubber
Sea water cooling pipes	Rubber
Fresh and waste water pipes	Aluminium or rubber
Filling and de-aeration below deck	Aluminium /Stainless steel/Rubber

Filling and de-aeration above deck	Aluminium/Stainless steel/Rubber
Hydraulic pipes	Stainless steel / hose
Exhaust pipes	Stainless steel / hose

#### Seawater system

The intake to cool the seawater system in the inboard diesel engine will be taken from outside the vessel. The engine will have a separate inter cooling system. We prefer not using keel cooling because, this system cannot control the heat of gearbox and engine oil.

### 310 Bilge / Ballast

#### General description

All watertight compartments are connected with pipes and valves to a bilge system. Foot valves are fitted at different suction points providing an efficient drainage of the watertight compartments. checkable, with e.g. ball valves?

#### Manually operated bilge pump

The engine room is fitted with a manually operated bilge pump with hose with foot valve which can discharge overboard.

#### Manually operated bilge pump fore peak

The forepeak is fitted with a manually operated bilge pump with hose with foot valve which can discharge overboard.

#### Electrically driven bilge pump 2pc

The bilge system is provided with an electrically (12V) driven bilge pump which can be activated from the switchboard.

Capacity approx. 266 l/min at 0.8 bar

### 320 Fuel oil system

#### Fuel type

The fuel system is designed to comply with the fuel type as specified for the main engines by the engine manufacturer.

#### General description

Fuel is supplied to the engines from the fuel oil storage tank via filters and water separators.

#### Fuel tank

Two fuel tanks are fitted. Water can be drained by a manual sounding pipe.

#### Water separator

A static water separator is fitted in the fuel oil supply line to each of the engines. A high-water level alarm is provided which will be displayed on the wheelhouse dashboard.

#### Emergency stopping of the fuel supply

In an emergency, the fuel supply to the engines can be stopped from outside the engine room.

#### Fuel filter

Each main engine is provided with a built-on fuel filter (2 per engine)

### 330 Cooling water systems

#### General description

The main engines are seawater cooled via an inter-cooling system comprising a closed freshwater system and an open seawater system. A heat exchanger is fitted to cool the freshwater system with the seawater system.

#### Fresh water-cooling system

The freshwater cooling system integrated in the engine layout is a closed system with a built-on water cooling pump from engine take from keel cooling unit

Cooling systems are charged with additives and corrosion inhibitor protection, all according to the manufacturer's recommendations.

#### Sea water cooling discharge

The sea cooling water discharges overboard via the exhaust system by water injection piecesfitted in the exhaust system.

### 350 Filling, sounding and de-aeration

#### General description

All tanks are provided with a filling/discharge and a separate de-aeration pipe. The exposed de-aeration pipes are equipped with a (self) closing device. All filling pipes have non-corrosive material caps, secured by chains.

A drip tray is mounted below the fuelfilling point to prevent oil spillage on deck. A main engine crankcase closed loop breather system is provided, including filter.

#### Electric content gauges

Electric content gauges are provided with sensors on the tank and a display in the wheelhouse dashboard. Transmitters are provided at the following tanks:

- Fuel tanks

### 360 Lub-oil / Dirty-oil / Sludge system

#### General description

Each engine has its own lubrication oil system including pump, filters and coolers incorporated in the engine layout.

A lubricant reference chart is provided with the following items:

- Make and type of oil / grease per equipment.
- Content per equipment

### 370 HVAC - Heating system

### 371 Natural and mechanical ventilation system

#### Natural ventilation

Each compartment has natural ventilation through air ducts, ventilation cowls or opening windows.



The inlet air ducts for the engine room are fitted with aluminium water separator ventilation gratings, mounted with stainless steel bolts.

The outlet air ducts for the engine room are fitted with aluminium air gratings. Outlet air ducts for the accommodation are provided with air gratings, goosenecks or caps. (if applicable)

Fresh air for the accommodation is coming from outside via the hatch(s) on top of the coaming.

### 372 Air-conditioning-Heating system

#### General description

An air-cooled air-conditioning system is installed on the wheelhouse. Recirculation grills are installed for air intake directly from the inside of the air-conditioned room.

The air conditioning units are locally controlled.

#### Capacity of the air-conditioning system

The air-conditioning system has the following capacities:

One air cooled units with a capacity of 13.500 BTU/hr each.

- Voltage 230 V
- Frequency 50 Hz

Power for air-conditioning system will be taken from battery pack.

### 373 Heating system

#### General description

A heating system-electric- will be installed. Only in charge with shore power. Position of heating plates (4 pcs) to be agreed

### 380 Exhaust system

#### General description

The exhaust system of each main engine is made up of the following components:

- Exhaust pipes of stainless steel and/or exhaust hose
- Compensator of stainless steel
- Water injection of stainless steel or better.
- Dry exhaust/muffler
- Underwater connection
- Thermal insulation if needed
- Resiliently mounted exhaust system

### 400 Electrical system

#### General description

The design and layout of the electric system IP 65, the materials, installation and testing are to Builders' standards and comply furthermore with the relevant rules of a major Classification Society.

All electric cables and materials are suited for marine application and in accordance with requirements for safe and efficient operation of the vessel. All electric equipment, whose function or application is not evident, shall be provided with notices.

Electrical components are as accessible as possible.

#### Electric network(s)

The following network(s) are installed:

- A bipolar 12 V network, free from earth.
- A single-phase network, nominal voltage 230 V, 50 Hz.

#### Electromagnetic compatibility

The vessel's electrical / electronic installation is such that mutual electromagnetic interference does not prevent any equipment from reaching its specified performance.

#### Lightning protection

A lightning protection system is fitted. This consists of a lightning conductor at the mast top, connected via a large diameter copper cable to a hull earth bonding plate in the engine room. The system is designed according to the rules of major classification society.

### 410 Power-generating systems

#### Alternators (12 V)

Each engine is provided with an engine-driven built-on alternator with sufficient capacity to suit the required electric power (12 V).

#### Battery sets (12 V)

The following battery sets are installed:

- Battery set(s) for starting the engines.
- One battery set for all other electrical consumers / emergency.
- One battery set for radio / communication.
- 2 separate battery packs for heck and bow thruster

Each battery set is placed in a box manufactured from synthetic material.

#### Battery charger

A battery charger is installed. The charger is intended for float charging the batteries with an automatic change-over to trickle charging.

- Voltage: 12V
- Capacity: 1800W

#### Shore connection

A connection for shore power supply is provided. The power supply connection cable is connected to a fuse box on board. A male socket is fitted to the cable on the shore side. An extra female socket is supplied to fit the shore system.

The owner is responsible for a stable power supply on shore.

The shore power supply connection is intended to provide power to all ship consumers.

- Total maximum: 32 A
- Voltage: 230 V  $\pm 10\%$
- Frequency: 50 Hz (max. + 5%)
- Length of cable: 25 m

For sockets inside and outside wheelhouse

- Several 230V to be agreed (max 4 pcs)

## 420 Cables

### Cables

Cables are properly secured on cable trays or cable strips. Cables with stranded conductors are used. For electronic equipment cables with an earth-screen are used. All cables have a number system which can be found in electrical diagram.

Cables used for signalling and communication with a voltage less than 100 V have a minimum cross-section of 0.75 mm<sup>2</sup>. (Cables for control current may be less).

Other cables have a minimum cross-section of at least 1.5 mm<sup>2</sup>.

### 12 V network

The 12 V installation is bi-polar, insulated from earth, and comprises the following networks:

- One network supplying the vessel's consumers.
- One network supplying the diesel engines' starter motors.

### Single phase network

A single phase network is provided, nominal voltage 230 V - 50 Hz, connected between phase and neutral.

### Single phase consumer network

A single phase consumer network is provided, nominal voltage 230 V - 50 Hz, via a converter.

## 430 Switchboards & components

### General description

The installation and the materials used in the switchboards are sufficiently shock-proof, suitable for the environmental conditions and according to the requirements of a major classification society.

### 12 V switchboard

The 12 V switchboard is placed in the wheelhouse and is provided with:

- A battery switch for consumers and engines
- A voltmeter and ammeter of the battery supplying the consumers.
- A voltmeter and ammeter of the battery(ies) supplying the starter motors.
- Combined switches/automatic circuit breakers for outgoing circuits.

### Battery change-over

A battery change over facility ensures the starting of the engines with another battery set.

### 230 V switchboard

A 230 V switchboard is mounted with outgoing circuits for the required consumers.

## 440 Alarm / Monitoring / Control system

#### General description

The alarms of the engines and other equipment are displayed on the wheelhouse dashboard. Each alarm has a signal light. An audible signal is combined for all alarms.

In case of alarm the individual light will light up and the audible signal will be activated until the accept button is pushed.

#### Alarms according to class

The number and type of alarms are according to the Classification Society regulations. In order to prevent serious damage, auto stops are installed on essential parts of the propulsion installation.

#### Alarms wheelhouse

As a minimum, the following alarms are fitted and displayed on the wheelhouse dashboard:

- Cooling water temperature main engines
- Lubricating oil pressure main engines
- Lubricating oil pressure gearbox / clutch

#### The following auto stops are installed:

- Cooling water temperature main engines
- Lubrication oil pressure main engines
- Overspeed main engines

## 450 Lighting

#### General description

The interior of the vessel is adequately illuminated with marine-type lights. All exterior lights are marine-type and water-resistant lights.

#### Interior lighting

The interior lighting of the Vessel is based on 24 V. All locations shall be adequate lit and the following table shall be used as guidance:

Location	Number	Type	Power (W)
Engine room	2	LED ceiling light	2x 18
Wheelhouse	9	LED ceiling light white+red	11
	1	LED instrument lighting red	3

#### Exterior lighting

The exterior lighting of the Vessel is based on 24 V. All locations shall be adequately lit and the following table shall be used as guidance:

Location	Number	Type	Power (W)
Fore deck	2	LED additional walkway red	8

Aft deck	2	LED additional walkway red	8
Each pilot seat	1	Reading light	
Floodlight fore	2	Wide beam light	150

#### Sockets

Free sockets are fitted at the following locations and the following table shall be used as guidance:

Location	Number	Type	Voltage (V)
Wheelhouse	6	Double indoor co-pilot, stretcher/table, cabinet	230
Wheelhouse	2	USB-A at co-pilot	5
Engine room	1	Splash watertight	230
Bow	2	For mobile searchlight	12
Aft	2	For mobile searchlight	12
	2	For portable pump	230

## 500 Deck equipment

### 510 Anchor equipment

#### General description

The anchor equipment is in accordance with Builder's standards and is in conformity with the requirements of a major classification Society.

#### Anchor with line

- Anchor type: Pool TW
- Anchor weight: 10 kg
- Chain length: 10 m
- Chain diameter: 10 mm (short link)
- Length nylon line: > 75 m
- Diameter nylon line: 16 mm
- Number installed: 1pc at bow and aft

The chain and line are stored below the fore deck.

An electric anchor which will be installed at aft and bow deck.

### 520 Mooring system

#### Mooring lines

Mooring lines are provided with the Vessel.

- Number: 3
- Length: 16 m
- Diameter: 18 mm

## 570 Life saving / Fire protection.

### General description

The safety appliances will be according to Builder's Standards. The number and capacities of the life rafts, lifebuoys, life jackets and other life saving equipment can be optionally altered according to the Buyers requirements and/or the classification or national authorities concerned.

The equipment is properly fitted on convenient locations on board of the Vessel.

### Fire extinguishers

The following portable fire-extinguishers are placed:

Location	Number	Type	Content
Wheelhouse	2	Foam	6 L
Engine room	1	Dry powder	9 kg

Spare fillings for the extinguishers are provided according to the requirements of the Classification Society and/or the National Authorities. The exact number and type of extinguishers will be according to the requirements of the Classification Society.

### Lifebuoys

Two lifebuoys are stored in frames and fitted on the Vessel. One lifebuoy is equipped with a line and one with a light/smoke signal. Standard DLRG style

### Rescue quote

2 pcs rescue quotes will be delivered.

### Radar reflector

1 pc reflector will be delivered.

### Phyrotechnics

1 set Solas phyrotechnics will be delivered.

### Rescue net

1 pc rescue net will be delivered.

### Stretcher

1pc stretcher basket type, 1 pc stretcher floating spineboard type, Surgery plank for stretcher, also useable as a table, storing of stretchers.

#### Boat hook-Oars

2 pc combined boathook-oars will be delivered.

#### First aid kit

One first-aid kit is supplied.

#### Emergency notices

Emergency notices are provided in accordance with the Classification regulations and the requirements of the National Authority. Highly visible escape route arrow/markers are situated at appropriate places.

## 600 Secondary ship systems

### 670 Fixed internal fifi system

#### Fixed fire fighting installation engine room

The engine room is provided with a co2 fire-fighting system. The cylinder(s) is placed inside the engine room. The system is activated from a panel outside the engine room.

When activated the system, the engine room fan(s) stops automatically. maintenance interval?  
Firepro system = 15 years

## 700 Joinery / Accommodation

#### General description

The layout of the accommodation and wheelhouse is shown on the relevant General Arrangement Plan.

### 710 Joinery

#### General description

All joinery work is in accordance with Builder's standards. Edges are protected where necessary.

#### Joinery wheelhouse

Item	Description
Floor	anti-slip gel cout

### 715 Insulation

#### General description

The choice and application method of the insulation materials (fire, sound and thermal, as far as applicable) will be applied in accordance with Builder's standards and the regulation of the classification society.

#### Sound insulation

To reduce sound levels, the following measures are taken:

- The wheelhouse is provided with an acoustic ceiling.
- Engines are resiliently mounted.

- Underwater exhausts of the main engines.
- (Acoustic) insulation in the engine room adjacent to the accommodation.
- Resiliently mounted and water-cooled exhausts of the main engines.

#### Fire insulation (if applicable)

The fire insulation types will be in accordance with the Classification requirements.

### 720 Wheelhouse / Crew accommodation

Cabinet in Wheelhouse for mobile radio, dry equipment, personal equipment etc.

### 730 Passenger accommodation

#### Passenger / pilot seats

Passengers / pilot seats with motion-damping are provided as indicated on the General Arrangement Plan. Seats with 14 cm suspension

#### Seat belts

The (industrial) personnel's seats are provided with seat belts.

#### Table / Surgery plank

Surgery plank for stretcher, also useable as a table. To suit basket stretcher: length 2,2m, width 0,65m. This unit will be installed at starboard side aft in cabin.

### 740 Technical spaces

### 741 Arrangement engine room

#### General description

The engine room contains in general all major machinery equipment, necessary for the ships service.

Where necessary, protection railing is fitted and/or protection covers are fitted e.g. for rotating parts.

#### Floors engine room

At centre line, a walking area is kept free from systems for easy access. All major items are accessible for maintenance.

### 752 Rope / Boatswain / Deck stores

#### Cleaning equipment

The Vessel is provided with cleaning equipment.

The following equipment is provided:

- 1 bucket with line
- 1 deck brush
- 1 washing cloth
- 1 sponge
- 1 portable bilge pump, with hose 230V, <2kW, approx. 780l/min, e.g. Mast TP4-1
- all-purpose pump, self-priming, dirt-resistant, same fuel type as main engines, approx. 850 l/min, e.g. Mast NP8
- Suction hoses, pressure hoses, suction cage, etc.



- Storage space for pumping equipment/ropes/fenders/2 kw generator (future planned)

## 756 Engine room workshop / Tools

### Standard tools

Tools are supplied with the main equipment.

The following tools are supplied:

- Standard tool set from engine manufacturer(s)
- 1 grease gun with a set of required heads

## 800 Nautical / Comms / Automation

### 810 Navigation lighting / Signals

#### 811 Navigation lighting

##### Navigation lights

The navigations lights are controlled with combined switches/automatic circuit breakers from the 12V switchboard in the wheelhouse.

The following navigation lights are installed:

- Two (2) side lights, portside is red and starboard side is green
- One (1) stern light, white.
- One (1) masthead light, white.
- One (1) anchor light, white.
- One (1) flashing blue light.

All lights are fitted conform the Colregs requirements. Some lights can be used for more functions.

#### 812 Search light system

##### Searchlight

A searchlight is mounted on the wheelhouse top deck, electrically operated.

- Voltage            12 V
- Capacity           35 W

##### Second manual searchlight

A second manual searchlight will be delivered mounted on wheelhouse top deck, manually operated through ceiling, e.g. Lazerlamps Sentinel Elite

#### 813 Signals / Flags

##### Horn

A horn is fitted on the wheelhouse top deck or in the mast. For operation a push button is situated on the wheelhouse dashboard.

##### Code shapes

One set of code shapes is provided with the Vessel and stored on board.

## 820 Nautical / Bridge system or equal ( to be decided)

Idea of electronics, to be checked by shipyard:

Pilot chart plotter: Raymarine Axiom 2 Pro RVM 9"

Co-Pilot: chart plotter Raymarine Axiom 2 Pro RVM 12" , workspace, USB/230V-socket, flexible reading light

Between Pilots: fixed Radios

Position of mobile radios need to be decided in future.

Radar (Overlay): Raymarine Quantum Q24C

VHF: Raymarine Ray53

Mobile VHF: Icom IC-M25

AIS: Raymarine AIS700 included in VHF?

Sidescan-Sonar: Raymarine RVM-100

Thermal imaging / low light camera: Flir M364C with JCU-2

2x digital radio BOS TETRA (Motorola)

3x mobile digital radio BOS TETRA (Motorola)

2x 2m radio DLRG (Hytera)

2x 2m mobile radio DLRG (Hytera)

Magnetic compass

Search light e.g. Lazerlamps Sentinel Elite mounted on base for manual operation

Megaphone with microphone inside and speaker outside

Storing for 2x binoculars DLRG 2.0 Noblex 7x50 C

Car radio, 2 small speakers

## 822 Radar system

### Radar

A radar system with chart plotter is part of an integrated navigation system.

- Display: 12" colour TFT wide screen
- Radar scanner 18" digital dome, 4 kW
- GPS: SDGPS Raystar 130
- Echo sounder: DSM300
- Chart: Navionics Silver
- Voltage: 24 V
- Make: Raymarine (or equivalent)

- Type radar: C120 series

The chart plotter is provided with basic charts of Europe. C-map charts of other operational areas can be offered upon request.

## 823 Electronic chart system

### Chart plotter

A chart plotter is integrated with a radar system. C-Map charts can be used in overlay with the radar display. The chart plotter is a non-ECDIS type.

## 824 GPS navigation

### GPS navigator

A GPS system is installed and is displayed on the integrated navigation system. The antenna is mounted in the mast or on the wheelhouse top deck.

### Automatic Identification System

An Automatic Identification System (AIS) receiver is installed. The antenna is mounted on the wheelhouse top deck or in the mast. The AIS is displayed on the integrated navigation system.

## 825 Compass

### Magnetic compass

A magnetic compass is mounted on the dashboard. The compass is provided with a small light.

## 828 Echo sounder

### Digital echo sounder

An echo sounder is part of the chart plotter. The transducer is installed at an appropriate place in the hull.

The correct working of the echo sounder depends on undisturbed water underneath the oscillator. Deviations or read-out failure is possible at higher speeds. Sidescan-Sonar

## 850 External communication system

## 851 (GMDSS) Communication system

### VHF radio telephone

A combined VHF radio telephone with all international channels and loudhailer is installed. The antenna is mounted on the wheelhouse top deck or in the mast. A speaker for the loudhailer is placed on the top deck.

- DSC: Class D
- Number: 1

### GMDSS Hand held VHF radio telephone

A hand held VHF radio telephone is installed, complete with battery charger and belt clip. The VHF complies with the GMDSS regulations.

- Number 1

## **Trials:**

Acceptance trials are to be carried out at EOW-Holland shipyard prior to the delivery in the presence of authorised personnel from the owners. The trials will include testing and approval of all function and equipment confirmed by a Certificate of Acceptance.

Fat-Hat- Sat trials will be conducted at shipyard in Holland

Client will attend on own cost.

## **Handover-instruction:**

One service engineer will come to Germany to hand over and start up the vessel. He also give for 1 day instruction when vessel are at the port.

## **Documents:**

Following documents (in English) are to be provided with the boat while delivery:

- Operation guide, performance data, user's manual, and maintenance manual of boat.
- Operation/ Instruction Manual of all equipment
- Maintenance/ repair manual of all equipment
- Necessary drawing and documents as mentioned by manufacturer. List of drawing and documents will be provided.

## **Warranty after delivery from the yard:**

- Warranty: 2 years on aluminium structure.
- For accessories and equipment, we follow the warranty regulations of our OEM suppliers.
- All above is based on normal use.
- Due to client being located abroad, all local warranties support we will charge travelling-lodging-food costs per day per person ex works Vietnam.
- Cost for transporting goods under warranty is for client account.
- For detailed information we refer to our terms and conditions, registered at the chamber of commerce in Brabant, The Netherlands.

Warranty is only applicable when:

- The supplied equipment is operated by skilled / trained persons.
- So when damage of the product is caused because it is operated / used by non-trained operators then warranty will not be applicable
- Equipment is properly used / stored in compliance with the guidelines of the manufacturers. (properly rinsed with fresh water after use on open sea / rinse salt water out of the engines and boats)
- Storage of the boats / engines in a shelter protected from direct sunlight (UV), and protected against wind-sand !
- Equipment is properly maintained as per manufacturers guidelines.

Delivery:

- Delivery time ex works. Building time for this boat is 12 months after approval GA, technical specifications and receiving first payment.
- Delivery time will start after approval specifications, general arrangement and first payment.
- All Alunautic boats will be completed with a user manual.
- Worldwide delivery possible on request.

Alunautic Windmill 1200-twin inboard-waterjet - bow thruster/EO Workboats bv/28-7-2023

Financial conditions:

- Our prices are ex vat.
- Payment conditions: 10% at order for final engineering, 30% after approval Randor and specification, 20% before delivery main engines, 20% ready casco, 10% before testdrive, 10% after testing final acceptance
- 

**Price per unit: 490.000,00 Euro. Ex Works Shipyard Werkendam/Holland**

Validity: till end September 2023

[H. Vroege.](#)

EO Workboats bv, The Netherlands, Steurgat 32, 4251NG Werkendam, The Netherlands