

# 2200 PATROL BOAT



## TECHNICAL SPECIFICATION

# SUMMARY

<b>1</b>	<b>MAIN CHARACTERISTICS .....</b>	<b>5</b>
<b>2</b>	<b>STRUCTURE .....</b>	<b>6</b>
2.1	HULL .....	6
2.2	DECK / WHEELHOUSE .....	6
2.3	WATERTIGHT BULKHEAD .....	7
2.4	PAINTING.....	7
<b>3</b>	<b>SYSTEM .....</b>	<b>8</b>
3.1	FUEL SYSTEM .....	8
3.2	FRESH WATER SYSTEM .....	8
3.3	GREY WATER SYSTEM .....	9
3.4	BLACK WATER SYSTEM .....	10
3.5	FIRE DETECTION SYSTEM.....	11
3.6	FIRE FIGHTING SYSTEM.....	11
3.7	BILGE SYSTEM .....	13
3.8	AIR CONDITIONING SYSTEM.....	14
3.9	ENGINE ROOM VENTILATION .....	15
3.10	AFT PEAK VENTILATION .....	15
3.11	ENGINE ROOM INSULATION.....	15
3.12	ALARM SYSTEM.....	16
<b>4</b>	<b>ELECTRICITY .....</b>	<b>17</b>
4.1	OVERVIEW .....	17
4.2	DIESEL GENERATOR .....	22
4.3	D. C. BATTERIES .....	22
4.4	CHARGING.....	22
4.5	SHORE SUPPLY.....	22
4.6	ELECTRIC SWITCHBOARD .....	23
4.7	LIGHT .....	23
4.8	CATHODIC PROTECTION.....	24
4.9	EARTHING .....	24
<b>5</b>	<b>MECANICAL.....</b>	<b>25</b>
5.1	MOTORIZATION .....	25
5.2	EXHAUST SYSTEM .....	26
5.3	PROPULSION.....	26
5.4	STEERING SYSTEM .....	26
<b>6</b>	<b>DECK FITTING.....</b>	<b>27</b>
6.1	WINDOWS.....	27
6.2	WINDSHIELD .....	27
6.3	WIPERS.....	27
6.4	PORTHOLES .....	27
6.5	WATERTIGHT DOOR.....	27
6.6	MOORING AND TOWING .....	27
6.7	ANCHORING .....	28
6.8	FENDER .....	28
6.9	RAILING – HAND RAILS .....	28
6.10	MAST.....	29
6.11	RIB AND DAVIT .....	29
6.12	LADDER .....	29

---

<b>7</b>	<b>INTERNAL LAYOUT .....</b>	<b>30</b>
7.1	CHAIN LOCKER .....	30
7.2	FORE PEAK .....	30
7.3	WHEELHOUSE.....	30
7.4	LOWER DECK ACCOMMODATIONS .....	31
7.5	ENGINE ROOM .....	33
7.6	AFT PEAK .....	33
7.7	FLY BRIDGE .....	34
<b>8</b>	<b>ARMAMENT.....</b>	<b>34</b>
8.1	GUN MOUNTINGS.....	34
8.2	ARMAMENT LOCKER .....	34
8.3	AMMUNITION LOCKER.....	34
<b>9</b>	<b>SAFETY EQUIPMENT .....</b>	<b>35</b>
9.1	LIFE RAFTS .....	35
9.2	LIFE JACKETS .....	35
9.3	LIFE RINGS .....	35
9.4	DISTRESS EQUIPMENT.....	35
<b>10</b>	<b>ELECTRONICS.....</b>	<b>36</b>
10.1	NAVIGATION EQUIPMENT .....	36
10.2	COMMUNICATION EQUIPMENT .....	36
<b>11</b>	<b>INSCRIPTION .....</b>	<b>37</b>
11.1	BOAT NAME .....	37
11.2	DRAFT MARK .....	37
11.3	NAME PLATE.....	37
<b>12</b>	<b>DOCUMENTATION .....</b>	<b>37</b>
12.1	DRAWING .....	37
12.2	INSTRUCTION BOOKS .....	37
<b>13</b>	<b>SURVEY .....</b>	<b>38</b>
13.1	CLASSIFICATION .....	38
<b>14</b>	<b>WARRANTY .....</b>	<b>38</b>
<b>15</b>	<b>PRODUCT SUPPORT.....</b>	<b>38</b>

---

## OVERVIEW

<b>Vessel Type</b>	Fast patrol boat High speed, hard chine, with increased stability and reduced rolling motions
<b>Mission</b>	General offshore patrol duty in coastal waters Anti-terrorist protection of the critical coastal infrastructures Anti-smuggling, anti-piracy and anti-drug trafficking operations Control of emigration / immigration Search & rescue and salvage operations Fishery protection Control of marine pollution Disaster relief operations
<b>Environmental conditions</b>	Maximum air temperature 45° C Maximum sea water temperature 35° C Humidity up to 90 % The vessel is designed to be capable of: <ul style="list-style-type: none"> <li>- achieving tasks at sea state 5</li> <li>- manoeuvring at sea when the wind is no less than 6 Beau fort</li> </ul>
<b>Construction</b>	Hull in Glass / Aramid Fibber – Resin Polyester – Kevlar & Carbon reinforcement Wheelhouse and deck in F.R.P. composite solid / Sandwich laminate.
<b>Design</b>	Semi displacement hull Hull form mono V-shaped Superstructure as General Arrangement
<b>Classification</b>	Supervision society: BUREAU VÉRITAS I ✘ Hull ● Mach Fast patrol Vessel
<b>Endurance</b>	Vessel could stay at sea at 15 knots (service speed) with maximum range of 600 Nautical Miles.

The vessel is built in accordance with the final specification and to the satisfaction of the owner administration.

The shipyard is flexible in doing minor modifications from the offer specifications, provided if it does not affect the production delays nor does it carry additional high cost to the shipyard.

All equipment, machinery, material are marine heavy duty.

Items which are not mentioned in the specifications but are functionally are also supplied and installed.

The vessels has a service life of 10 years, without need for major repairs except on account of normal wear and tear, allowing for 1000 running hours of average annual usage, following engine maker requirements.

# 1 MAIN CHARACTERISTICS

<i>Length overall</i>	<b>22.00 m</b>
Length waterline	<b>21.00 m</b>
Beam overall	<b>5.60 m</b>
Approx. draft	<b>1.40 m</b>
Main engines	<b>MTU 8 V 2000 M 93 , 2 x 1250 HP</b>
Gear box	<b>ZF 665 A ratio 1.971</b>
Propulsion	<b>Shaft line</b>
Speed	
- cruising speed	<b>15 kt</b>
- maximum speed ( full load )	<b>27kt</b>
Displacement:	
- Light (around)	<b>40 Tons</b>
- Full load (around)	<b>48 Tons</b>
Fuel capacity (approx.)	<b>7000 litres</b>
Operational range	<b>600 MN of 15 knots</b>
Fresh water tank (approx.)	<b>2000 litres</b>
Crew	<b>8 + 4</b>
Lifesaving capacity	<b>20 persons</b>

## 2 STRUCTURE

### 2.1 Hull

#### 2.1.1 Hull form

The hull is:

- A semi displacement V-Shaped hull
- Moulded in one piece
- Unsinkable on flooding with water
- Design to achieve horizontal stability for the deck of the boat on sailing at reduced speeds

The hull has:

- High capability to manoeuvre at various speeds without being vulnerable to capsize
- High sea keeping quality, extremely great directional stability and maximum acceleration at shortest possible

Longitudinal and transverse girders on areas free from foam are provided with strainers with diameter not less than 35 mm enforced by plastic pipes fixed on their ends at the girders and enforcements by silicon for preventing water leaking into the layers of these enforcements.

#### 2.1.2 Material scantlings

The hull is:

- Made of highly durable GRP for heavy duties and resisting penetration of solid objects
- Longitudinal and transversely stiffened reinforced construction
- Built to be according to sandwich arrangement resisting absorption of humidity as well as gases, gasoline, fuel ...
- Built with resin and sandwich material grade with full indication of construction, materials covering the chemical composition, mechanical characteristics, construction style and lay up lamination table

Outer skin, inner skin and sandwich must form one bulky unit free of vacant spaces in which gases, vapour, fuel or water ....can be accumulated.

Ambient conditions during the assembling and polymerisation is air temperature not higher than 30° C and hygrometry lower than 80 %.

Thanks to the composite construction there will be no corrosion.

### 2.2 Deck / wheelhouse

Wheelhouse and deck are moulded GRP sandwich.

They are laminated with the hull to form one stiff monobloc piece.

Decks are suitably designed to receive weapons and all specified deck equipment.

#### 2.2.1 Insulation

The insulation is provided by sandwich construction on the top and the sides, to be thermally and sound proof insulated.

#### 2.2.2 Non slip

Outside decks are built in highly non-slip easy to clean type.

#### 2.2.3 Diving platform

One diving platform is fitted at stern.

## 2.3 Watertight bulkhead

The hull is divided into 6 compartments by five watertight bulkheads, from bow to stern as follow:

- Chain locker
- Forepeak
- Fore accommodation area
- Aft accommodation area
- Engine room
- Aft peak

## 2.4 Painting

The hull and superstructures are entirely gelcoated to a thickness 0, 5 mm.

The deck has a non-skid pattern.

All outside surfaces, except the deck are gelcoated without paints, as follows:

- Hull grey
- Superstructure grey
- Antifouling black
- Name and ID black

## 3 SYSTEM

### 3.1 Fuel system

#### 3.1.1 Tank

Two tanks (3500 litres each) in aluminium are localised in the fore engine room and are equipped with:

- Two taps to fill up on the deck (each side of the wheelhouse)
- Two electric gauges in the wheelhouse
- One visual gauge on each tank
- Two pipes for air-release ending outside by a swan-neck
- Two trapdoors for inspection
- Drain-taps
- Emergency stop cocks to close the supply with commands in the abandonment station

Due to the design of the tanks, the fuelling is insured by gravity.

#### 3.1.2 Fuel pre-filter

Engines and generators are fed through a water separator filter:

- Two double RACOR 751000 max for the engines
- Two RACOR RA 230 30 u for the generators

#### 3.1.3 Piping

All pipes are in copper except flexible hoses near to the engines.

The fuel return line will be directly connected on the top of the tanks.

#### 3.1.4 Transfer system

One self-priming electrical transfer pump is fitted in the fore engine room, to allow transfer between tanks.

- Make GIANNESCHI
- Type CP 30, 37 kw 400 V 50 Hz reverse self-priming, 4.5 m<sup>3</sup>/h, 6 m H<sub>2</sub>O

### 3.2 Fresh water system

#### 3.2.1 Tank

Two water tanks in polyethylene (1000 litres each) fitted in the aft peak are equipped with:

- Two water plug holes for filling on the deck
- Two pipes for air-release ending outside by a swan-neck
- One trapdoor for inspection
- One electric gauge on dashboard in the wheelhouse

#### 3.2.2 Shore connection

One shore connection is fitted on the transom to feed the fresh water in the network by the quay without passing by the fresh water pump.

The network is under quay pressure.



### 3.2.3 Electric hydrophore pump

One hydrophore pump is fitted in the aft peak:

- Make GIANNESCHI
- Model Ecoinox 2 CE, 0.37 KW, 2900 tr/mm, 24 V, Q = 55 l/mm, max pres 3.5 b

Fresh water is distributed to:

- The galley sink
- The washbasins
- The showers
- The wiper washers
- Aft peak washing connection
- The deck washing connection
- The AC system

### 3.2.4 Emergency pump

In case of failure of the electric hydrophore pump, one foot pump is fitted in the kitchen to get water on the sink.

### 3.2.5 Filter

Two filters are fitted in the network, after the hydrophore pump.

### 3.2.6 Piping

All pipes will be in PVC.

### 3.2.7 Water heater

Two water heaters are fitted in the aft peak:

- Make RARITAN
- Model 1700 series 12 gal – 45 litres - 220V, 50 Hz, 4.5 Kw

Hot water is supply to:

- The kitchen sink
- The bathroom wash basins
- The showers

## 3.3 Grey water system

One pump lift station is fitted under the floor in the accommodation corridor.

- Make TECMA
- Type Sanisplit automatic, 24 V, IP 55, discharge 11 m, cap 350 l/mm

It discharges over board all effluents coming from:

- Wash basins
- Showers
- Galley sink
- Air conditioning fan coil drains
- Scuppers (toilets and galley floor)

The galley sink can be directly discharge over board through a three way valve fitted under the sink.

## 3.4 Black water system

### 3.4.1 Tank

One tank is fitted under the floor in the accommodation corridor.

- Make VIKING
- Type CANSB SE 4305 capacity 61 liters 24 V

The tank is discharged overboard by operating a breaker.

One electric gauge is fitted on the dashboard in the wheelhouse.

### 3.4.2 Pump

One electric pump is fitted under the floor in the accommodation corridor.

- Make VIKING
- Type Johnson 32 l/mm, 24 V

### 3.4.3 Emergency pump

One manual pump is fitted under the floor in the accommodation corridor.

- Make VIKING
- Type Johnson manual diaphragm bulkhead

### 3.4.4 Event

One pipe for air-release ending outside by a swan-neck equipped with odour filter is fitted (active carbon filter).

### 3.4.5 Piping

All pipes will be in PVC.

### 3.4.6 WC

Three manual toilets are fitted in the accommodations.

They are flushed by sea water with one separate inlet for each toilet.

## 3.5 Fire detection system

### 3.5.1 Fire detection unit

One fire detection central unit is fitted on the radio area in the wheelhouse:

- Make MARINELEC
- Type DI 09 – FR 4 areas, 24 V

The fire detection central has three power sources:

- 24 V by UPS from shore supply or generator
- Emergency battery set
- One 12 volts cell inside the central

The central unit detects the fire and the internal system fault.

### 3.5.2 Detectors

Four areas are covered by the fire detection system.

Accommodation:

- 4 smoke detectors
- 1 heat detector

Wheelhouse:

- 1 smoke detector

Engine room:

- 2 multisensor detectors

Aft peak:

- 1 smoke detector

## 3.6 Firefighting system

Four means to fight the fire are available on board.

- FM 200 system for the engine room
- Sea water firefighting system
- Portable extinguishers
- Portable motor pump

### 3.6.1 FM 200 fire system

The system includes:

- Two FM 200 cylinders (28 liters each) fitted in the engine room
- One visual and sound alarm in the engine room
- Two firebreak flap for the engine room air inlets and outlets
- One abandonment station on the main deck (commands for ER alarm, firebreak flaps, fuel closing valves and FM 200 cylinders opening)
- One control discharge indicator panel in the wheelhouse

The opening of the cylinders is operated manually or electrically from the abandonment station.

The use of the system stops automatically the engine room ventilation.

### 3.6.2 Sea water firefighting system

One electric fire pump is fitted in the aft peak:

- Make GIANNESCHI
- Type BMA 50.5 Kw, 3 Ph 380 V AC 50 Hz self-priming 18 m<sup>3</sup>/h 32 m H<sub>2</sub>O

Four hydrants are fitted:

- One in the engine room
- One in the aft peak
- One on the aft deck
- One on the fore deck

The system includes:

- Four fire hoses 20 m with nozzles
- One discharge valve

In case of failure of the fire pump, the bilge pump could be used as fire pump.

### 3.6.3 Portable fire extinguisher

Fire extinguishers are fitted close to each potential risk area:

Engine room:

- 2 foam extinguishers 9 l

Aft peak:

- 1 foam extinguisher 9 l
- 1 CO<sub>2</sub> extinguisher 5 kg

Accommodation:

- 2 dry extinguishers 6 kg

Galley:

- 1 dry extinguishers 1 kg

Wheelhouse:

- 1 dry extinguisher 6 kg

One fire blanket is fitted in the galley.

### 3.6.4 Portable motor pump

One portable motor pump is stored in the fore peak:

- . Make YANMAR
- Type SMI model YDPSWENM 4.5 HP diesel centrifugal self-priming horizontal

## 3.7 Bilge system

Four means are available on board:

- One electric pump for the fore peak
- One bilge line with one driven pump, suction point and collector for the others compartments
- Use of the fire pump for emergency
- Use of the motor pump for emergency

### 3.7.1 Alarm system

Each watertight compartment is equipped with water level detectors connected to alarm panels in the wheelhouse:

- Fore peak
- Fore accommodation
- Aft accommodation
- Fore engine room
- Aft engine room
- Aft peak

### 3.7.2 Fore peak electric bilge pump

One electric bilge pump is fitted in the fore peak:

- Make GIANNESCHI
- Type maxisub 0.18 Kw 220 V AC 8.4 m<sup>3</sup>/h 4 m H<sub>2</sub>O

The pump is operated from the wheelhouse and the water is directly discharged overboard.

### 3.7.3 Bilge Main Line

Each compartment is equipped with a bilge suction point connected to the collector on the main bilge line arranged to allow the draining of all spaces.

Six points are installed:

- one in the fore accommodation
- one in the aft accommodation
- three in the aft engine room
- one in the aft peak

The collector is fitted in the engine room.

### 3.7.4 Main bilge pump

One driven bilge pump is fitted on the portside engine:

- Make MTU
- Type clutch driven self-priming pump Q= 10 m<sup>3</sup>/h at 1500 tr/mm

The pump is operated from the wheelhouse or directly from the engine room.

### 3.7.5 Emergency bilge pump

In case of failure of the bilge pump, the fire pump and the portable motor pump could be used as bilge pump.

### 3.7.6 Piping

Pipes are in copper, stainless steel and flexible hoses.

## 3.8 Air conditioning system

### 3.8.1 Chiller unit

One chiller unit is fitted in the aft peak.

- Make WEBASTO
- Type ch 84 unit 84000 BTU 2 compressors 380 V AC 6.9 Kw

The unit is with reverse cycle (cold and hot).

The main panel and the expansion tank are fitted in the aft peak.

### 3.8.2 Pumps

The sea water and the circulation pump are fitted with the unit:

- Make WEBASTO
- Type WBCL00187 250 l/mm 380 V AC 1.6 A DN 25

The sea water inlet is at the back of the aft peak.

### 3.8.3 Fan coil

Fan coil are fitted:

- Make WEBASTO
- Type WBCL0074 cap 900/24000 BTU fan coil motor 220 V AC 0.65 A

As following:

Wheelhouse:

- One air handler compact / fan coil 20 000 BTU
- One air handler compact / fan coil 24 000 BTU

Fore crew cabin:

- One cross flow / fan coil 12 000 BTU

Mess area:

- One cross flow / fan coil 6 000 BTU
- One air handler compact / fan coil 12 000 BTU

Aft crew cabin:

- One cross flow / fan coil 6 000 BTU

Officer cabin:

- One cross flow / fan coil 6 000 BTU

### 3.8.4 Digital control display

- Each fan coil is operated by a digital control display fitted in his area.

### 3.8.5 Closed space ventilation

Each closed space is fitted with natural and/or forced ventilation.

## 3.9 Engine room ventilation

### 3.9.1 Air intake

Air is mechanically sucked by one blower through a water separator spray:

- Make ENAG
- Type VA 270-40 FAN 400 V 3 Ph 27 000 m<sup>3</sup>/h

The blower can be controlled from the wheelhouse and the engine room.

It will stop automatically in case of FM 200 use.

### 3.9.2 Air outlet

Air is mechanically discharged by one blower:

- Make ENAG
- Type VA 150-20 FAN 400 V 3 Ph 15 000 m<sup>3</sup>/h

The blower can be controlled from the wheelhouse and the engine room.

It will stop automatically in case of FM 200 use.

### 3.9.3 Firebreak flap

One firebreak flap is fitted under the air inlet blower:

- Make ENAG
- Type CF FDB2 SP 700 x 700

One firebreak flap is fitted under the air outlet blower:

- Make ENAG
- Type CF FDB2 SP 600 x 600

## 3.10 Aft peak ventilation

### 3.10.1 Air intake

Air is naturally sucked through a water separator spray.

A flap to close the air intake is fitted and controlled from the abandonment station.

### 3.10.2 Air outlet

Air is mechanically discharged by one blower through a water separator spray:

- Make ENAG
- Type VA 30-25 FAN 400 V 3 Ph 3000 m<sup>3</sup>/h

The blower can be controlled from the wheelhouse and the engine room.

It will stop automatically in case of FM 200 use.

## 3.11 Engine room insulation

Fire and sound insulation are provided by Firemaster coats A 60 and Agglo insulation covered by metallic grill on the ceiling, bulkhead and sides.

### 3.12 Alarm system

Two alarm panels are fitted on the dashboard in the wheelhouse:

- Make MARINELEC
- Type Altor 16 BV

They indicate the alarm as follow:

Panel 1:

- Engine room watertight door open
- Air conditioning electric box (electrical failure)
- Aft peak bilge level sensor (high level)
- Steering gear oil tank level sensor (low level)
- P 2 switchboard insulation fault
- Overload genset 95 %
- Service UPS supply fail
- Steering gear power 1 fail
- steering gear power 2 fail
- P 1 switchboard insulation fault
- P 4 switchboard insulation fault
- Service UPS change over
- Portside ME exhaust temperature sensor (high temp)
- Starboard ME exhaust temperature sensor (high temp)
- Engine room bilge lever sensor Aft (high level)
- Engine room bilge lever sensor Fwd (high level)

Panel 2:

- Accommodation watertight door open
- Accommodation aft bilge lever sensor (high level)
- Accommodation fwd bilge lever sensor (high level)
- Fore peak bilge lever sensor (high level)
- P 3 switchboard insulation fault



## 4 ELECTRICITY

### 4.1 Overview

There are 3 tensions on board

#### AC 400 Volts

Supplied by

- Generators
- Shore connection

Supply:

- Air conditioning electric box power
- crane
- DO transfer pump
- Engine room fan starter
- Engine extract fan starter
- Fan aft peak
- Fire pump
- Hydraulic unit control rudder 1
- Hydraulic unit control rudder 2
- Transformer TR1 10 kva
- UPS service 24 VDC
- Water pressure system
- windlass

#### AC 230 Volts

Supplied from

- Generators through a transformer
- Shore connection through a transformer

Supply:

- Accommodations outlet
- Air conditioning electric box control
- Accommodations fans
- Cabin officer / crew rear fan coil compressors
- Deck search light
- Electric hood
- Engine room + aft peak + wheelhouse light
- Engine room + generator room outlets
- Fore peak bilge pump
- Fridge (galley)
- Fridge n° 1 (fridge room)
- Fridge n° 2 (fridge room)
- Fridge room evaporator fan
- Galley + mess / 4 crew cabin fan coil compressors
- Grey water pump
- Microwave oven
- Starting charger

- Switchboard 24 VDC P1 (IMD supply)
- Switchboard 24 VDC P3 (IMD supply)
- Transformer TR1 10 kva
- UPS emergency 24 VDC
- Water heaters
- Wheelhouse fan coil compressors
- Wheelhouse outlets
- Windshield washers + wipers

## DC 24 Volts

### Supplied by

- Generators through P2 electric switchboard and a UPS converter
- Batteries

### Supply:

- Accommodation lights
  - AIS
  - Aft deck light
  - Aft peak lights
  - Alarm buzzer + flash light
  - Alarm control unit
  - Alarm luminous column relay box
  - Aldis light
  - anemometer
  - Antenna GP 330 B
  - Automatic pilot
  - Black water pump
  - Bilge pump clutch
  - Cabin reading lamps
  - Cabin galley lights
  - Chart table light
  - Converter 24 VDC / 12 VDC
  - Deck lights
  - Digital compass PG 700
  - Displays 17"
  - Echo sounder
  - Engine room lights
  - External lights
  - F 15002
  - Fire alarm
  - Fire detection control unit
  - Fire detection fire unit
  - FM 200
  - GPS GP 33
  - horn
  - Hub 101
  - Instrument lights
  - Lavatory lights
  - loudhailer
  - MF / HF sailor 6300
  - Navigation lights control unit (control)
  - Navigation lights control unit (power)
  - Navnet 3D + radar
  - Navtex NX 700 B
-

- P 2 control supply
- P 5 supply
- Police light
- Portable search light
- Red lights
- Remote display 4.5" fly bridge
- Repeater RD 33
- spare
- Satellite compass SC 50
- Rudder angle indicator
- Supply 24 VDC from P1
- UHF ICA - 210
- UPS emergency
- VHF sailor 6222
- VHF ICA – M 423
- Wheelhouse control desk commands
- Wheelhouse lights

**Protection**

Electrical wires and equipment protection is insured by:

- Fuses
- Bi-polar type breakers.

The whole installation is at least classification IP 53 (protection against dust and raining water)

**Cabling**

Cabling is made with marine cables MPRX type according to classification rules, shielding where necessary.

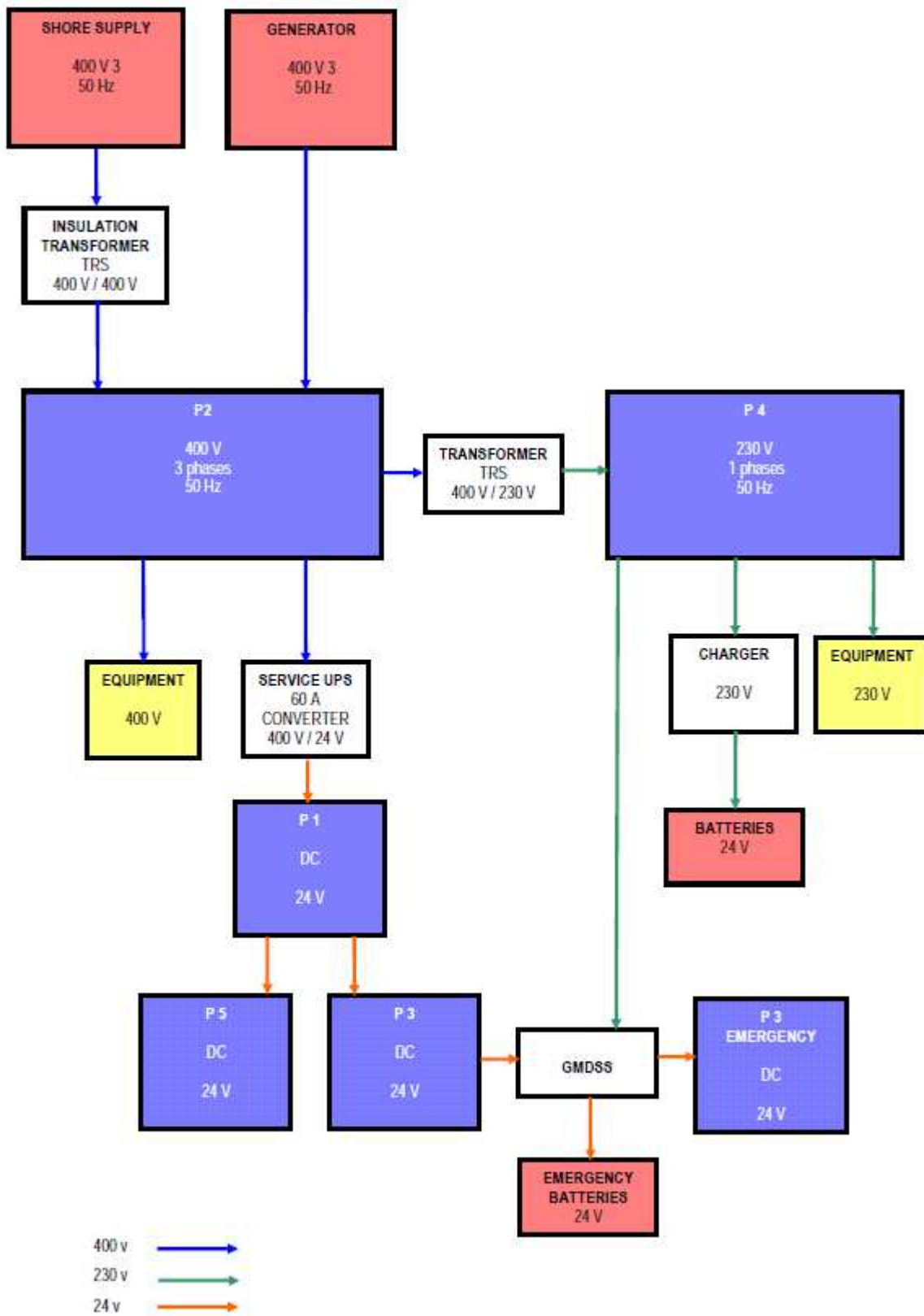
Cables is neatly arranged and properly supported on cable trays to avoid tear and mechanical damage.

Bulkhead passages are watertight and fire insulated where necessary.

**Insulation controller**

This device allows you to control current leakage:

- between phase and ground for AC
- between the plus and the anode mass for DC





## Diesel generator

Two diesel generators are fitted in the aft peak:

- Make KOHLER
- Type 19 MDKBV 19 Kw 380 V 50 Hz with insulated cocoon

They are installed with sea water inlet and exhaust services.

The monitoring is possible on the generator set and in the wheelhouse on the dashboard.

## 4.2 D. C. batteries

24 volts electrical power will be supplied by 12 volts gel batteries distributed like following:

- starting starboard engine: two batteries 240 Ah
- starting portside engine: two batteries 240 Ah
- starboard engine electronic: two batteries 85 Ah
- portside engine electronic: two batteries 85 Ah
- emergency : two batteries 210 Ah

## 4.3 Charging

### 4.3.1 Engine alternator

Batteries will be recharged by engine alternators in navigation (28 volts 55 A).

### 4.3.2 Charger

Two chargers are fitted:

For starting and electronic batteries

- Make ENAG
- Type CDMV 230 V / 24 V 30 A 4 outputs

For emergency batteries

- Make ENAG

The two battery chargers are connected to AC current:

- when generator is running
- when the boat is connected to the quay with the shore power supply

## 4.4 Shore supply

One shore power connection 230 V, 3 PH, 50 HZ 63A sized is fitted on the deck.

Length of shore cable is 35 meters.

A differential circuit breaker and one isolation transformer protect the shore connection.

## 4.5 Electric switchboard

### 4.5.1 AC 400 volts switchboard

One AC 400 volts P 2 is fitted in the engine room

### 4.5.2 AC 230 volts switchboard

One AC 230 volts P 4 is fitted in the engine room

### 4.5.3 DC 24 volts switchboard

Four DC 24 volts are fitted:

- one in the engine room P 1
- one in the wheel house P 3 in front of the fridges
- one in the wheel house P 3 E in front of the fridges
- one in the accommodation corridor P 5

## 4.6 Light

Incandescent and fluorescent lamps realize lighting.

The shocks and vibrations are not reducing the lifetime of bulbs and lamps.

Following the situation, the lamps are of open or watertight type.

### 4.6.1 AC 220 volts light

Lights are fitted for:

- Engine room
- Aft peak
- wheelhouse

### 4.6.2 DC 24 volts light

Lights are fitted:

- accommodation
- engine room emergency
- aft peak emergency
- wheelhouse emergency
- accommodation emergency
- aft deck

### 4.6.3 DC 24 volts emergency light

24 volts lights directly connected to the emergency battery set are fitted for:

- engine room
- aft peak
- wheelhouse
- accommodation

#### 4.6.4 Navigation light

International lights are fitted on the navigation mast

- One Port side red light
- One Starboard green light
- One Masthead white light
- One Stern white light
- One Anchor white light
- Two Non under control red lights
- One towing light
- One police light

Navigation light switchboard in the wheelhouse is equipped with alarm system in case of navigation lights failure.

#### 4.6.5 Search light

One manual search light is fitted in the wheelhouse:

- Make SEIMI
- Type FR 300 1000 W 230 V AC

### 4.7 Cathodic protection

All metallic under water parts (propeller shafts, rudders, brackets etc...) are connected via a network to a sufficient number of marine zinc anodes for at least one year protection.

The anodes support are bolted through the hull, with adequate connection bolts inside the hull.

### 4.8 Earthing

All electric equipment and seawater piping are connected to two underwater ground plates.

No interference will affect the different communication navigation and monitoring installations.



## 5 MECANICAL

### 5.1 Motorization

#### 5.1.1 Engine

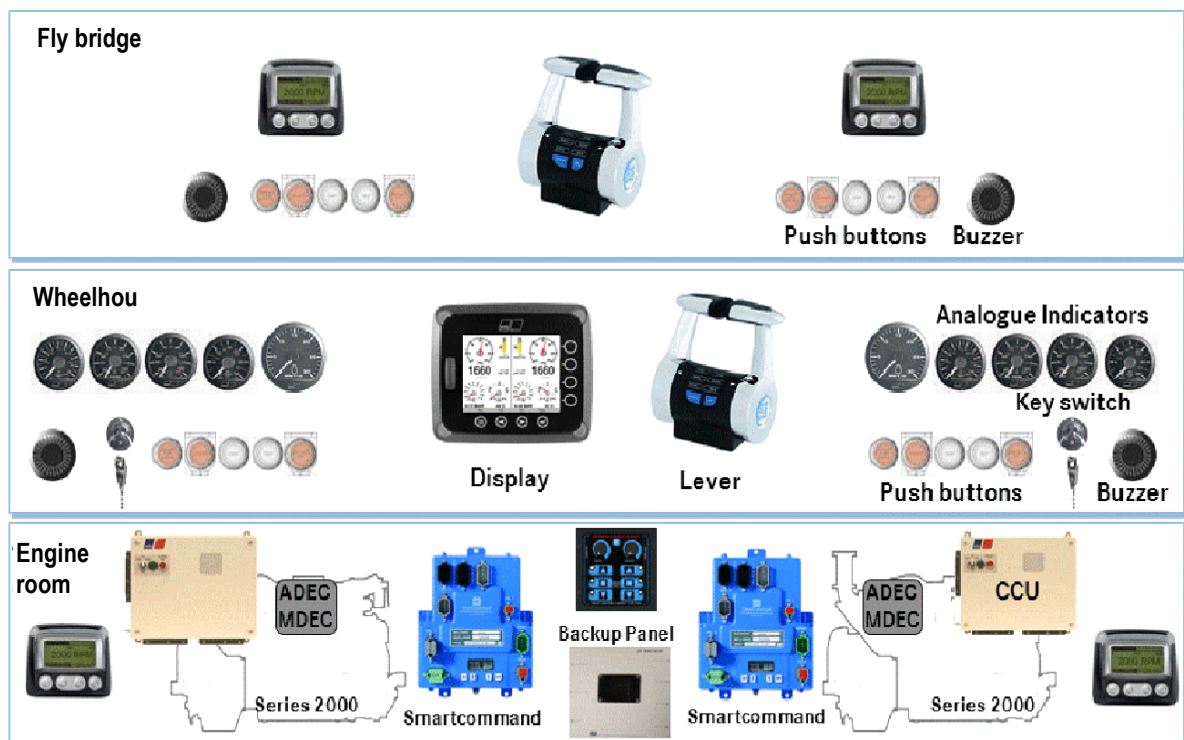
Two diesel engines are fitted in the engine room:

- Make MTU
- Type 8 V 2000 M 93 895 Kw 1200 HP 2450 rpm

Each engine is equipped with a separate enlarged sea water cooling inlet including strainer, flat sea cock, filter ...

The sea cocks are fitted aft to ensure constant immersion at high speed.

Engine instrument panels, as delivered by the manufacturer, are fitted in the wheelhouse, on the fly bridge and in the engine room.



#### 5.1.2 Gear box

Two following gear boxes supplied with engines are fitted:

- make ZF
- Model 665 A
- Reduction Ratio: 1.971
- Alarm and protection systems for low oil pressure and high temperature.

In case of failure of one engine, the reduction gear could accept a back driving for 8 hours.

After this time, the propeller shaft could be blocked.

## 5.2 Exhaust system

The system is completely water cooled by the engine seawater cooling outlet.

Hot parts are be insulated.

The exhaust outlets are situated under the waterline with a by-pass for idling speed.

## 5.3 Propulsion

The propulsion system is by shaft line and included for each line:

- One shaft in stainless steel with his flange
- One stern tube with one seal cooled by seawater
- One main bracket in bronze with seal bearing
- One intermediate bracket in stainless Steel with seal bearing
- One propeller in NIBRAL, 5 blades, Class S, with fixed pitch and outward rotation.

## 5.4 Steering system

### 5.4.1 Main system

It will be included

- One wheel in the wheelhouse
- One wheel in the fly bridge
- Two stainless steel rudders mechanically cross-connected.
- One electric hydraulic pump located in the aft peak

### 5.4.2 Emergency system

One manual emergency tiller is provided.

## 6 DECK FITTING

### 6.1 Windows

The side windows are tinted.

### 6.2 Windshield

Clear windshield is with proper declined surface to prevent the direct effects of the sun rays on the wheelhouse instruments.

### 6.3 Wipers

Variable speed parallel wipers with fresh water washing jets are fitted in the three windshields.

### 6.4 Portholes

Opening porthole is fitted on starboard in the crew mess.

One dead light is delivered for each porthole.

### 6.5 Watertight door

The watertight doors are fitted:

In the wheelhouse:

- One on starboard side, behind Captain seat
- One on portside, behind the navigator seat
- One on stern, for fly bridge access

In the accommodation:

- One between the fore crew cabin and the mess

In the engine room:

- One between the engine room and the aft peak

### 6.6 Mooring and towing

#### 6.6.1 Mooring

Following equipment will be fitted:

- 8 double bits(2 forward, 4 on middle length, 2 aft)
- 4 fairleads
- 4 mooring ropes 25 m each
- 4 mooring ropes 12 m each
- 2 boat hooks length 2 meters

#### 6.6.2 Towing

The two aft bollards will be fitted sized to towing line. Length of the provided towing line is 100 meters, diameter 40 mm

## 6.7 Anchoring

The anchoring system is provided with an anchor roller and includes:

- One electric anchor winch with manual emergency operation  
Make LOFRAN  
Type Titan 2500 W 400 V
- One FOB anchor of 60 kg
- 90 m of galvanised chain diam. 14 mm

On the chain locker, a safety device will be installed for fixing the last link of the anchor chain.

One secondary is provided:

- One FOB anchor of 34 kg
- 10 m of galvanised chain diam. 12 mm
- 50 m of rope diam. 20 mm

## 6.8 Fender

### 6.8.1 Hull protection

Hull protection is ensured:

Main fender all around the hull, at the junction of the hull with the deck, one shaped rubber fender around 150 x 130mm

Eight cylindrical fenders of high energy absorption capability are provided and stored on board.

## 6.9 Railing – Hand rails

### 6.9.1 Railing and candlestick

Stainless steel railings are fitted:

- One U form on the front
- One on each side of the aft deck
- One at the back of aft deck

All the railings are fitted towards the interior on one point on each side on the front deck in order to allow a passage along the hull in full safety for boarding.

Stainless steel candlesticks with stainless steel line are fitted:

- One on each side on the deck
- One at the back of aft deck in order to allow passage at the diving platform

### 6.9.2 Hand rails

Handrails are provided all around the wheelhouse, in the engine room and where ever necessary.

### 6.9.3 Gangway

One gangway is provided and stored on the aft deck.

One fix point to install it is provided on each side of the aft deck.

## 6.10 Mast

### 6.10.1 Navigation mast

One mast is fitted on the fly bridge to allow the fitting of aerials, navigation equipment, flag halyards and navigation lights.

One canvas for sun protection is fitted.

Access for maintenance and repair is by ladder and steps.

## 6.11 RIB and davit

### 6.11.1 RIB

One rib is fitted on aft deck:

- Make ZODIAC
- Model classic mark II alu

It is equipped with on outboard engine:

- Make YAMAHA
- Model fuel injection 40Hp

### 6.11.2 Davit

One crane if fitted at the back of the boat:

- Make PALFINGER
- Model PC 2700 hydraulic system with remote control and manual emergency controls

Maximal load is: 382 Kg.

## 6.12 Ladder

Ladders will be fitted:

- One stainless steel ladder from aft deck to diving platform
- One stainless steel foldable ladder on the diving platform
- One stainless steel ladder for the fly bridge
- One aluminium escape ladder in the fore crew cabin, on the front bulkhead
- One aluminium ladder in the fore peak
- One aluminium ladder for the aft peak access
- One stainless steel ladder for the engine room access from the wheelhouse

## 7 INTERNAL LAYOUT

### 7.1 Chain locker

This compartment will be divided in 2 sections:

The forward section:

- receive the hawsehole
- One trap will be open on the bulkhead from the middle section to get an access.

The middle section:

- receive the chain
- be self-draining
- One trap will be open on the bulkhead from the aft section to get an access.

### 7.2 Fore peak

Access is from the deck through one watertight hatch.

Shelves will be fitted on each side.

### 7.3 Wheelhouse

The wheelhouse is installed as follow from bow to stern:

- Navigator and captain position on the sides
- Coxswain position in the middle
- A Radio position on starboard
- A gun locker in the middle
- A corridor on portside
- Fridge compartment at the back (2 fridges make BOSH 321L)

#### 7.3.1 Access

The accesses in the wheelhouse are:

- From the fly bridge, by a hinged door
- From the two sides, by hinged doors located behind of Captain and navigator seats
- From the engine room by a watertight hatch
- From the accommodation by stairs

#### 7.3.2 Seats

Two adjustable height seats are fitted for Captain and navigator:

- Make NORSAP
- Model skipper 10

One stand / seat is fitted for the coxswain:

- Make MIRIMA DESIGN
- Model ADS / ADS

One rolling chair is provided for the radio.

#### 7.3.3 Hand-rail

High quality stainless steel hand-rails are fitted where necessary.

### 7.3.4 Equipment

The following equipment will be installed:

For the navigation:

- Steering wheel
- Rudder angle indicator
- Switchboard for window wipers, horn, lights, searchlight etc.
- Switch for deck lights
- 1 barometer
- 1 clock
- Navigation and communication equipment
- 1 flag locker with flags
- Magnetic compass

For the engines:

- Monitoring and control panel with all alarm systems
- Monitoring and control panel for the generator sets

For different installations:

- Fire alarm
- Bilge alarm
- Gauges for water and fuel
- Electric switchboard
- Navigation light panel

## 7.4 Lower deck accommodations

The accommodations are installed as follow from bow to stern:

- One fore crew cabin
- Two Sanitary rooms
- A galley on portside
- A crew mess on starboard
- A sanitary room on portside
- One aft crew cabin
- One officer cabin on starboard with sanitary room and toilet

### 7.4.1 Access

The accesses will be:

- From the wheelhouse, by a stairway.
- From the deck, by the escape hatch in the fore crew cabin.

### 7.4.2 Fore crew cabin

It is equipped with:

- Four beds with shelves and chart lights
- Two wardrobe in front

### 7.4.3 Front starboard sanitary room

It is equipped with:

- One washbasin
- One shower with curtain
- One lavatory
- One mirror
- One soap holder

- Two cloth hooks
- One storage
- One electric air extractor

#### **7.4.4 Front portside sanitary room with toilets**

It is equipped with:

- One washbasin
- One shower with curtain
- One lavatory
- One mirror
- One soap holder
- One electric WC
- One brush
- One storage
- One electric air extractor

#### **7.4.5 Galley**

It is equipped with:

- One sink
- One electric ceramic three plates make BOSH 60cm 4.6KW
- One oven make BOSH ecoclean 67L
- One microwave make BOSH 25L 900W
- One refrigerator/freezer make BOSH 274L/63L 2 doors
- One electric air extractor make BOSH 60cm
- Working surface
- Storage for kitchen equipment
- Full cooking equipment

#### **7.4.6 Mess room**

Following equipment are fitted:

- One bench on each side with leatherette cushion and storage under.
- One table
- Bookshelf on each side

#### **7.4.7 Back sanitary room**

It is equipped with:

- One washbasin
- One shower with curtain
- One lavatory
- One mirror
- One soap holder
- One electric WC
- One brush
- One storage
- One electric air extractor

#### **7.4.8 Aft crew cabin**

It is equipped with:

---



- Two beds with shelves and chart lights
- One wardrobe
- One desk with storage and chair

#### **7.4.9 Officer cabin**

It is equipped with:

- Two beds with shelves and chart lights
- One wardrobe
- One desk with storage and chair

One sanitary room with:

- One washbasin
- One shower with curtain
- One lavatory
- One mirror
- One soap holder
- One storage
- One electric air extractor

One WC room with:

- One washbasin
- One shower
- One electric WC
- One brush
- One storage
- One electric air extractor

### **7.5 Engine room**

The accesses are:

- From the wheelhouse, by a stainless steel ladder
- From the aft peak by a watertight door

The floor is made with aluminium alloy tread plate.

All machinery has good service access and have adequate guards and protection plates.

### **7.6 Aft peak**

The accesses are:

- From the engine room, by a watertight door
- From the aft deck, by a watertight hatch

The floor is made with aluminium alloy tread plate.

---

## 7.7 Fly bridge

One fly bridge is provided with access from the wheelhouse and the aft deck.

One coxswain console is fitted with:

- Steering wheel
- Engine controls
- Engine control panel
- Magnetic compass
- Horn, windlass and lights switches
- Rudder angle
- VHF
- Intercom connection
- A Furuno repetitor display
- One seat

# 8 ARMAMENT

## 8.1 Gun mountings

Three gun mountings are provided for shooting:

- One on the fore deck for 12.7 mm weapon
- One on each side of the aft fly bridge for 12.7 mm weapons

## 8.2 Armament locker

One armament locker is provided in the wheelhouse for safe portable armament stowage.

## 8.3 Ammunition locker

One ammunition locker is located in the aft peak.

## 9 SAFETY EQUIPMENT

### 9.1 Life rafts

Two life-rafts are installed on fore deck:

- Make VIKING
- Model 12DK solas capacity of 12 persons

### 9.2 Life jackets

Twenty life jackets are provided:

- Make SEAFARER
- Model 1050 solas

### 9.3 Life rings

4 life buoys with light and buoyant line 30m length each are installed on main deck.

### 9.4 Distress equipment

- Three rocket parachute flares
- One kit of three hand flares
- Two buoyant smoke signals
- Two first aid kit with one survival blanket
- One daylight signalling mirror
- One horn
- One radar reflector
- One fireproof blanket
- One bucket
- One bailer
- Two body harness
- Flag of ensign
- Flag of country 50cmx70cm
- One set of international flag
- One set of semaphore flags
- N and C flags 60cmx50cm
- Four hand lights make MAGLITE ML100 led
- One marine binocular 7x50 autofocus
- One probe line 30m length

## 10 ELECTRONICS

Power supply of the equipment will be by 24 V DC.

The housings will not distort and will be protected against oxidation and corrosion. The equipment and cables will be armoured where necessary to avoid radiation and electromagnetic disturbance.

The equipment will be programmed through MMSI number forwarded by the customer.

Communication and distress systems will be of marine type and capable of operating within the marine field A2 in conformity with solas and GMDSS.

### 10.1 Navigation equipment

The boat is equipped with:

- One radar Furuno NAVNET 3D BB with keyboard connected to a 17" Hatteland screen. The NAVNET 3D will be used to interconnect GPS, echo sounder and compass
- One Furuno GPS GP33 4,5' LCD colour
- One plotter GP 33 B
- One Furuno echo sounder DFF1 Navnet
- One satellite compass Furuno SC 50
- One mini gyro compass PG 700
- One Furuno Autopilot NAVPILOT 700
- One Furuno Repetitor display RD33 on Fly bridge
- One Rowind NMEA 0183
- One SAAB secure AIS R4S (receiver only or with emitter component deactivated if needed), addition layer on screen
- One lighted magnetic compass PLASTIMO 135 in wheelhouse and on Fly bridge

### 10.2 Communication equipment

The boat is equipped with:

- One MF/HF radio Sailor 6300
- One fixed VHF DSC class A Sailor RT6222 in the wheelhouse
- One VHF ASN class D ICOM IC-M423 on the flying bridge
- UHF aero, make Icom model IC-A210E
- One Furuno NAVTEX receiver NX700B
- One intercom / public address and siren system make FURUNO type LH 3000 with 30W external loudhailer
- Four portable VHF Sailor SP 3520C (floating)
- One Rescuer Transponder Sart II, 9GHz
- One Emergency Position Indicating Radio Beacon Kannad auto GPS
- One portable Aldis light make Hella type 8502

## 11 INSCRIPTION

### 11.1 Boat name

The Boat's name is painted on the stern.

### 11.2 Draft mark

Draft marks are marked forward and aft.

### 11.3 Name plate

All systems, equipment, fittings, pipes and valves are provided with fixed instruction plates in English language indicating names and necessary instructions and warnings.

## 12 DOCUMENTATION

### 12.1 Drawing

The shipyard supplies two copies of the complete drawings of the boat amended to show the vessel "as fitted":

- General arrangement
- Safety and fire fighting equipment plan
- Hull construction
- Fuel system
- Steering system
- Exhaust system
- Fresh water system
- Bilge system
- fire system
- Shafting and stern gear arrangement
- Electrical wiring plan
- Machinery arrangement
- Docking and slinging plan
- Fender arrangement / fixing
- Wheelhouse arrangement
- Cathodic protection system

### 12.2 Instruction books

Copies of instruction books, maintenance manuals, manufacturers' drawings and spare parts lists, in English, for all items of machinery and equipment are supplied:

- One on each boat
- Two for the administration

## 13 SURVEY

### 13.1 Classification

The boat including its machinery, equipment and outfitting is built in accordance with the regulations and under survey of Classification Society:

BUREAU VERITAS

I ✘ Hull  
● Mach  
Fast patrol boat

## 14 WARRANTY

The company guarantees the hull of each boat constructed and supplied by it from any defect or fault that may appear due to malfunctions in designs, construction or installation or due to improper selection of materials for one (1) year from the date of final acceptance.

The company guarantees engines, and all systems and equipment installed on the boats for one (1) year from the date of acceptance from any fault or defect that may appear from defects or manufacturing or installations.

## 15 PRODUCT SUPPORT

The shipyard is in position to provide support in terms of maintenance, materials and spare parts for a minimum period of 10 years from the date of delivery of the boat.