ENGINE SURVEY

Vessel Name: TA-BOO

Boat Type: 54' RYBOVICH

Model Year: 1970

Report For: DALE MATTESON

Captain: DALE MATTESON

Seller: DALE MATTESON

Hull Surveyor: CLINT YATES

Hull ID: NONE

Location: DELRAY BEACH, FL

Survey Date: 6/20/2025 & 6/27/2025

Report Date: 6/28/2025

Listing Broker: PAUL DENTON

Number of Persons Aboard: 4

Survey Type: Pre-purchase (in water)

The vessel is powered by twin MAN D2848LE403, 14.6 Liter engines.

Port Engine:

Engine Serial Number: 4239586122A301

Cylinder Configuration: V-8

Job Number: 544256

Manufacture Date: 2000

Rated at 788-HP at 2,300 RPM's

Engine Hours: 4,152.3 hours

Starboard Engine:

Engine Serial Number: 4239586243A301

Cylinder Configuration: V-8

Job Number: 544256

Manufacture Date: 2000

Rated at 788-HP at 2,300 RPM's

Engine Hours: 5,262.9 hours

The transmissions for the main engines are manufactured by ZF.

Port Transmission:

Model: ZF850

Serial Number: 20014085

Parts List Number: 3015002022

Ratio: 1.5 to 1.00

Clutch Oil Pressure: 333.6 psi

Oil Capacity: 3.96 gallons

Oil Type: SAE 30

Starboard Transmission:

Model: ZF850

Serial Number: 20014089

Parts List Number: 3215002022

Ratio: 1.5 to 1.00

Clutch Oil Pressure: 333.6 psi

Oil Capacity: 3.96 gallons

Oil Type: SAE 30

There is one Northern Lights generator aboard the vessel.

Generator:

Model: 844-16N

Serial Number: 8442-13650

Engine Hours:

- **At the generator: 5,359.0 hours**
- **At the salon start panel: 5,071.8 hours**

DC System: 12 volts

Genset output is 16.0 kilowatts (133.0/66.7 amps at 120.0/240.0 volts) @ 60.0 Hz

Visual Inspection of the Main Engines and Transmissions

Port Engine and Transmission:

- **There is algae growth and debris in the Racor sight glass fuel bowls.**
- **There is light engine oil at the base of the bell housing.**
- **Many of the engine's blue fuel hoses are lightly cracked on their outer sheathing, or the steel reinforcing wire is printing through with light corrosion.**

- **There are oil weeps at the inboard valve covers.**
- **There is transmission oil at the inboard transmission oil cooler oil line fittings and hose connection.**
- **There is corrosion present on the transmission oil cooler's outboard side and endcap.**
- **There is corrosion present on the transmission's oil pump out fitting assembly.**
- **There is corrosion and engine oil present at the raw water pump's shaft seal housing weephole area.**
- **The raw water sea valve was not operational when tested.**
- **There Is corrosion present on the crimped-on hose end to the transmission's high pressure oil pump line, to the transmission oil cooler.**
- **The mechanical throttle system (cable, pulley and chain) does not actuate the throttle in reverse equal to the throttle in forward. There is much less throttle in reverse.**
- **There are fuel leaks at the secondary fuel filters.**
- **There is corrosion present on the hose clamp at the blue silicon exhaust hose connection to the muffler's discharge.**
- **The muffler's drain plug is heavily corroded.**
- **The short raw water hose to the raw water splitter pipe is cracked and deteriorating.**
- **The raw water hose between the outboard stainless steel exhaust riser showerhead and the raw water splitter is heavily cracked.**
- **There is corrosion and salt residue present at the inboard stainless steel exhaust riser's showerhead, coming from under the exhaust hardcoat, indicating a possible raw water weep/leak.**
- **The inboard exhaust riser is making contact with the ceiling's wooden support.**
- **There is no protective boot on the starter's positive terminal.**
- **The inboard exhaust riser's blue silicon hump hose's lower hose connection to the muffler is missing a hose clamp.**
- **The vessel's fire suppression system discharge gas horn is laying in between the two exhaust risers at the ceiling and chafing the exhaust hardcoat.**
- **The raw water supply hose to the raw water pump is loose on the sea strainer's discharge nipple.**
- **The engine block heater and thermostat cords are laying in the bilge and not secured.**

Starboard Engine and Transmission:

- **There is algae growth and debris in the Racor sight glass fuel bowls.**
- **There is light engine oil at the base of the bell housing.**
- **Many of the engine's blue fuel hoses are lightly cracked on their outer sheathing, or the steel reinforcing wire is printing through with light corrosion.**
- **There are oil weeps at the inboard valve covers.**
- **There is corrosion present on the crimped-on hose end to the transmission's high pressure oil pump line, to the transmission oil cooler.**
- **The mechanical throttle system (cable, pulley and chain) does not actuate the throttle in reverse equal to the throttle in forward. There is much less throttle in reverse.**
- **There is corrosion and salt residue present at the inboard stainless steel exhaust riser's showerhead, coming from under the exhaust hardcoat, indicating a possible raw water weep/leak.**
- **There is no protective boot on the starter's positive terminal.**
- **There is corrosion present at the raw water pump's shaft seal housing and raw water inlet flange. There is engine oil at the raw water pump's mounting flange to the engine.**
- **The transmission oil cooler is loose in its mounting blocks.**
- **The outboard exhaust system housing's exhaust flange (between the turbo and the exhaust riser) is cracked, and there is exhaust soot at the upper portion of the flange.**
- **There is engine oil around the oil pan mounting rails and mounting bolts.**
- **There is surface corrosion present on the Racor filter housing's hard line fittings.**
- **The engine block heater and thermostat cords are laying in the bilge and not secured.**
- **There are fuel leaks at the secondary fuel filters.**
- **There is a raw water leak and corrosion present at the outboard intercooler end cap mounting bolt. The leak has caused corrosion below on the #2 outboard cylinder's fuel injector and steel fuel hard line.**
- **There are oil leaks at the outboard valve cover.**
- **There is dried coolant and corrosion at the forward outboard block heater element's mounting flange.**

Visual Inspection of the Generator

Generator:

- **There is algae growth and debris in the Racor sight glass fuel bowls.**
- **The engine mount isolators are collapsed.**
- **There is an oil leak at the raw water pump's shaft seal housing.**
- **There is no belt guard present on the front of the engine.**
- **There is an oil leak at the crankshaft's front oil seal.**
- **There are oil leaks at the valve cover and rocker fence.**
- **The engine oil pump out fitting assemblies is corroded. The oil pump out hose is hard and cracked.**
- **There is engine oil in the drip pan.**
- **There is heavy corrosion present on the exhaust elbow from a raw water leak at the raw water inlet hose connection.**
- **The exhaust hose mounting clamp is broken at the forward engine room bulkhead.**
- **The sound shield insulation is falling onto the engine and stator.**

Trial Run Data

- **The port main engine turned 2,017 RPM's at 100% throttle.**
- **The starboard main engine turned RPM's at 100% throttle.**
- **The engines are NOT properly loaded. The engines should turn 2,300 RPM's, at a minimum, with the boat fully loaded and a clean bottom and propellers.**
- **The port engine alternator was NOT charging properly at 24.5 volts.**
- **The starboard engine alternator was charging properly at 28.1 volts.**
- **The block heaters were tested and the starboard main engine block heater was found to be operating properly, but the port main engine block heater was found to NOT be operating properly.**

Ta-Boo Trial Run Data

Engine RPM's	1200	1400	1600	1800	2000	2200	2300 (WOT)
Engine Speed (RPM's) P	1171	1417	1622	1819	2017	-------	-------
Engine Speed (RPM's) S	1176	1423	1621	1810	1983	-------	-------
Oil Pressure (psi) P	35	42	45	48	53	-------	-------
Oil Pressure (psi) S	40	41	43	47	52	-------	-------
Boost Pressure (psi) P	4.1	9.0	14.2	20.7	26.0	-------	-------
Boost Pressure (psi) S	3.3	7.2	11.5	16.5	22.1	-------	-------
Air Intake Temp (Deg F) P	100	100	100	104	109	-------	-------
Air Intake Temp (Deg F) S	102	101	101	102	107	-------	-------
Coolant Temp (Deg F) P	168	169	168	170	172	-------	-------
Coolant Temp (Deg F) S	180	180	185	187	188	-------	-------
Transmission Pressure (psi) P	350	347	348	350	350	-------	-------
Transmission Pressure (psi) S	335	338	340	337	335	-------	-------
Transmission Temp (Deg F) P	123	123	126	127	129	-------	-------
Transmission Temp (Deg F) S	131	131	132	135	135	-------	-------
Fuel Temp (Deg F) P	98	99	101	103	105	-------	-------
Fuel Temp (Deg F) S	95	97	99	102	105	-------	-------

Battery Voltage (V) P	27.0	27.0	27.0	27.0	27.0	-------	-------
Battery Voltage (V) S	27.5	27.5	27.5	27.5	27.5	-------	-------
Lube Oil Temp (Deg F) P	173	177	186	188	193	-------	-------
Lube Oil Temp (Deg F) S	178	182	186	189	193	-------	-------

Trial Run General Observations and Comments

- **All of the engine mounts appeared to be secure during back down testing.**
- **The start/stop switches for both the port and starboard main engines operated properly at the flybridge helm station.**
- **The start/stop switches for the generator operated properly at the control panel in the salon under the sink and at the generator.**
- **The vessel is equipped with mechanical Morse cable, cable pulley and chain drive controls.**
- **An inspection of the port main engine's turbo chargers revealed that the air inlet impellers are visibly free of damage, spin freely and have minimal side-to-side play.**
- **An inspection of the starboard main engine's turbo chargers revealed that the air inlet impellers are visibly free of damage, spin freely and have minimal side-to-side play.**
- **The generator held a normal vessel load during the entire trial run period. Full load testing output results were as follows:**
    - **64.0 amps, 115.3 volts at 58.7 Hz**
- **Certified service records were supplied the day of the survey from Ace Marine Diesel. Notes:**
    - **A 1,000-hour service was performed on 5/09/2022 at unknown hours for both main engines.**
- **The raw water sea valve for the port main engine was tested and found to NOT be operating properly.**
- **The raw water sea valve for the starboard main engine was tested and found to be operated properly.**

- **The raw water sea valve for the generator was tested and found to be operating properly.**
- **The engine room ventilation blowers are not operational.**
- **There is no vessel HIN (Hull Identification Number), but according to Michael Rybovich's website, the vessel being surveyed is Hull #72.**
- **There was a significant vibration coming from the starboard main engine during the trial run period. After the sea trial, the vessel owner had a diver inspect the propellers and both were found to be damaged due to contact.**
- **The voltage and Hz were decreased during the generator's load test.**
- **The generator's temperature was elevated during operation at 214.8 °F.**
- **There was a light oil or fuel slick exiting the port main engine's exhaust system at stand still, while waiting for the bridge to open in the ICW.**
- **The turbo's boost pressure is decreased for the starboard main engine during the trial run.**
- **The vessel's controls operated properly at the flybridge helm station. At the tower and cockpit stations, the controls operated properly in the forward position but not in reverse. In the reverse position, there is no added throttle available, only "in gear", at the tower and cockpit controls stations.**

General Recommendations

Port Main Engine and Transmission:

- **Disassemble, clean, inspect and reseal the Racor fuel filter housings. Install them with new filters.**
- **Have all of the vessel's remaining fuel polished. Thoroughly clean both fuel tanks and add a biocide treatment to the remaining fuel.**
- **Determine the source of the engine oil at the base of the bell housing and perform repairs as necessary.**
- **Thoroughly inspect all of the blue fuel hoses going to, coming from, on the engine and the vessel's fuel system. Replace any deemed necessary for proper service.**
- **Thoroughly clean all of the engine oil below the valve covers, inspect and reseal the inboard engine's valve covers.**
- **Disassemble, clean, inspect and reseal the transmission oil cooler's inboard oil line fitting assembly.**

- **Remove, clean, inspect and pressure test the transmission oil cooler.**
- **Thoroughly clean, inspect and paint the transmission's oil pump out fitting assembly to prevent further corrosion.**
- **Remove and replace the raw water pump. Remove and reseal the raw water pump's adapter plate.**
- **Lubricate and exercise or replace the raw water sea valve.**
- **Remove and replace the transmission's high pressure oil hose to the oil cooler from the high pressure pump.**
- **Troubleshoot and diagnose the mechanical throttle system so that full throttle can be achieved in reverse at the tower and cockpit helm stations.**
- **Remove, clean all surfaces thoroughly, inspect and reseal the secondary fuel filters.**
- **Remove and replace the exhaust hose clamps on the blue silicon exhaust hose connection to the muffler's discharge.**
- **Remove and replace the muffler's drain plug.**
- **Remove and replace the short raw water hose to the raw water splitter, that feeds raw water to the exhaust. Install with new hose clamps.**
- **Remove and replace the raw water hose between the outboard stainless steel exhaust riser showerhead and the raw water splitter. Install with new hose clamps.**
- **Thoroughly clean, inspect and monitor the inboard stainless steel exhaust riser showerhead and riser for water leaks.**
- **Relieve the ceiling's support away from the inboard exhaust riser. Inspect the inboard exhaust riser for damage and perform any repairs necessary to the black outer shell hardcoat.**
- **Install a protective boot on the starter's positive terminal to prevent arcing.**
- **Install a second hose clamp on the inboard exhaust riser's blue silicon hump hose lower hose connection.**
- **Move the vessel's fire suppression system discharge gas horn away from the exhaust risers.**
- **Remove, thoroughly clean all surfaces and reinstall the raw water hose on the sea strainer's discharge nipple with new hose clamps.**
- **Properly secure the block heater and thermostat electrical cords out of the bilge.**

Starboard Main Engine and Transmission:

- **Disassemble, clean, inspect and reseal the Racor fuel filter housings. Install them with new filters.**
- **Have all of the vessel's remaining fuel polished. Thoroughly clean both fuel tanks and add a biocide treatment to the remaining fuel.**
- **Determine the source of the engine oil at the base of the bell housing and perform repairs as necessary.**
- **Thoroughly inspect all of the blue fuel hoses going to, coming from, on the engine and the vessel's fuel system. Replace any deemed necessary for proper service.**
- **Thoroughly clean all of the engine oil below the valve covers, inspect and reseal the inboard engine's valve covers.**
- **Remove and replace the transmission's high pressure oil hose to the oil cooler from the high pressure pump.**
- **Troubleshoot and diagnose the mechanical throttle system so that full throttle can be achieved in reverse at the tower and cockpit helm stations.**
- **Thoroughly clan, inspect and monitor the inboard stainless steel exhaust riser showerhead and riser for water leaks.**
- **Install a protective boot on the starter's positive terminal to prevent arcing.**
- **Remove and replace the raw water pump. Remove and reseal the raw water pump's mounting adapter plate seal.**
- **Properly secure the transmission oil cooler in its mounting blocks so that there is no movement.**
- **Remove and replace the outboard exhaust system's housing between the turbo and the exhaust riser.**
- **Retorque all of the engine oil pan mounting bolts and monitor. If oil leaks persist, reseal the engine oil pan to the engine.**
- **Thoroughly clean, inspect and paint the Racor fuel filter housing's hard line fittings.**
- **Properly secure the block heater and thermostat electrical cords out of the bilge.**
- **Thoroughly clean all surfaces, inspect and reseal the secondary fuel filters.**
- **Remove and reseal the outboard endcap mounting bolt on the intercooler and thoroughly clean and inspect the #2 outboard cylinder's fuel injector and hard line. Perform repairs to the fuel injector and steel fuel hard line as necessary.**

- **Thoroughly clean all of the engine oil below the valve covers, inspect and reseal the outboard engine's valve covers.**
- **Disassemble, clean, inspect and reseal the block heater's forward outboard element mounting flange.**

Generator:

- **Disassemble, clean, inspect and reseal the Racor fuel filter housings. Install them with new filters.**
- **Have all of the vessel's remaining fuel polished. Thoroughly clean both fuel tanks and add a biocide treatment to the remaining fuel.**
- **Remove and replace the engine mount isolators.**
- **Remove and replace the raw water pump.**
- **Install a belt guard on the front of the engine.**
- **Remove and replace the front crankshaft oil seal.**
- **Remove and reseal the valve cover and rocker fence.**
- **Remove and replace the engine oil pump out fitting assembly and hose.**
- **Thoroughly clean and monitor the drip pan for oil leaks.**
- **Remove and replace the exhaust elbow. Remove and replace the heat exchanger aft boot and hose clamps.**
- **Remove and replace the exhaust hose mounting clamp at the forward engine room bulkhead.**
- **Remove and replace the sound shield insulation.**

Secondary Recommendations

- **Troubleshoot and diagnose the cause of the engine room ventilation blowers' inoperability and perform repairs as necessary.**
- **Troubleshoot and diagnose the lowered voltage and Hertz output of the generator under load, and perform repairs as necessary.**

Maintenance Recommendations

- **Both the port and starboard main engines are due to receive a cooling system cleaning service, since it has been more than two years since this service was last performed, including the:**
    - **Intercooler**
    - **Transmission oil cooler**
    - **Fuel cooler**
- **Both the port and starboard main engines are due to receive an oil and filter change service since it has been more than two years since this service was last performed.**
- **Both the port and starboard main engines are due to receive a Racor filter change and housing cleaning service since it has been more than two years since this service was last performed.**
- **Both the port and starboard main engines are due to receive a zinc anode replacement service since there are no records of when this service was last performed.**
- **Both the port and starboard main engines are due to receive a raw water impeller change service, since there are no records of when this service was last performed.**
- **Both the port and starboard main engines are due to receive a crankcase breather filter replacement service since there are no records of when this service was last performed.**
- **Both the port and starboard main engines are due to receive an air filter cleaning service since there are no records of when this service was last performed.**
- **Both the port and starboard main engines are due to receive a V-belt replacement service since there are no records of when this service was last performed.**
- **Both the port and starboard transmissions are due to receive an oil and filter change service since it has been more than two years since this service was last performed. ZF recommends changing the oil every 1,000 hours or annually, whichever comes first.**
- **The generator is due to receive a cooling system cleaning service, including the heat exchanger and new coolant, since there are no records of when this service was last performed.**
- **The generator is due to receive an oil and filter change service since it has been more than two years since this service was last performed.**

- **The generator is due to receive a fuel filter change service since it has been more than two years since this service was last performed.**
- **The generator is due to receive a Racor housing cleaning and filter replacement service since there are no records of when this service was last performed.**
- **The generator is due to receive a raw water impeller replacement service since there are no records of when this service was last performed.**
- **The generator is due to receive a zinc anode replacement service since there are no records of when this service was last performed.**
- **The generator is due to receive a V-belt replacement service since there are no records of when this service was last performed.**
- **The generator is due to receive a 1,000-hour service, including a valve lash adjustment service, since there are no records of when this service was last performed.**

I certify that, to the best of my knowledge and belief:

The statements of fact contained in this report are true and correct. The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, unbiased professional analyses, opinions, and conclusions. I have no present or prospective interest in the vessel that is the subject of this report, and I have no personal interest or bias with respect to the parties involved. My compensation is not contingent upon the reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value estimate, the attainment of a stipulated result, or the occurrence of a subsequent event. I have made a personal inspection of the vessel's engines, transmissions and generators and that is the subject of this report.

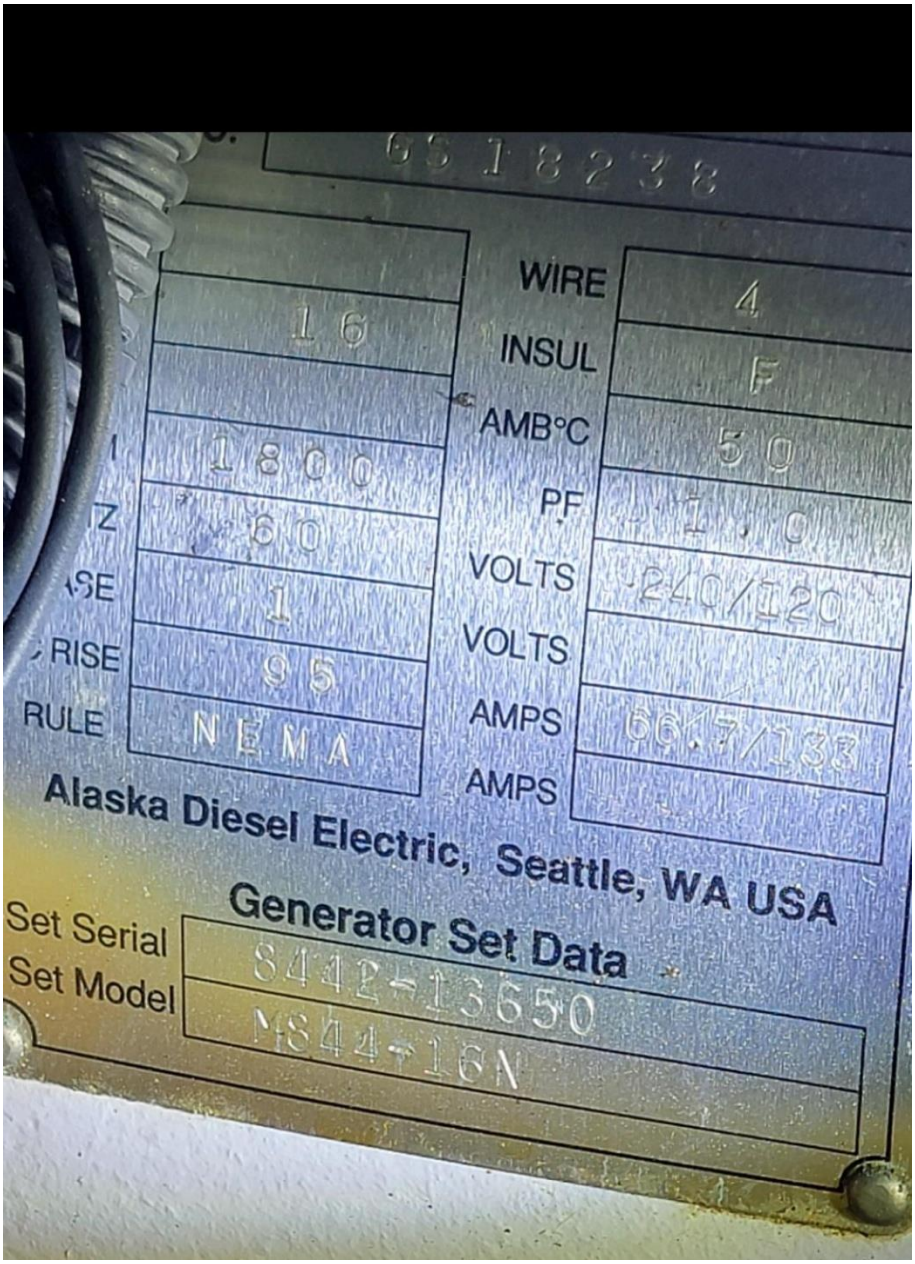
This report should be considered as an entire document. No single section is meant to be used except as part of the whole. This report is submitted without prejudice and for the benefit of whom it may concern. This report does not constitute a warranty, either expressed, or implied, nor does it warrant the future condition of the vessel. It is a statement of the condition of the vessel at the time of survey only.

Kruger Survey & Engineering shall not be held liable for any engine condition related to any issues that were not noted in this report of data.

The purpose of this report is to provide the customer with a general idea of the sea trial data. The customer should under no circumstances presume that all potential engine problems that could occur on the engines reported herein have been identified by this data.

Ryan Kruger **6/28/2025**

Generator:



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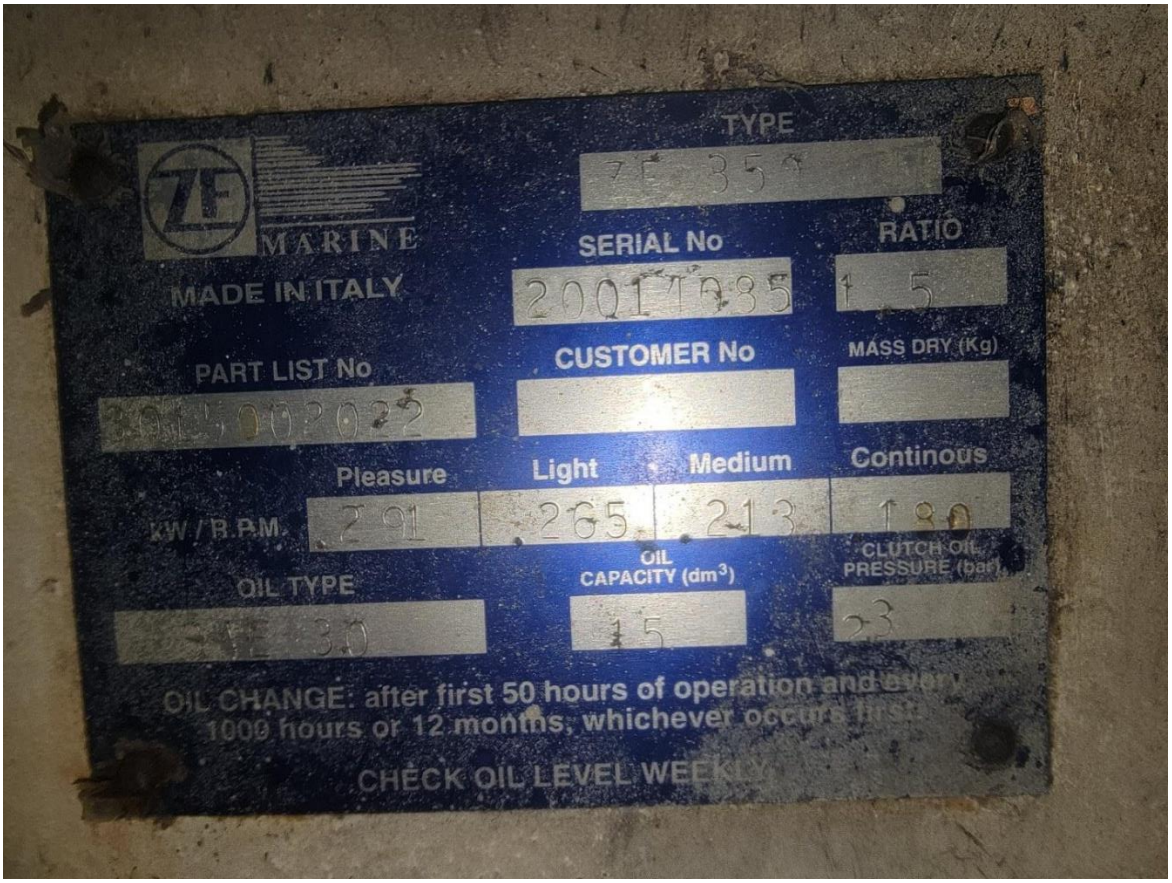
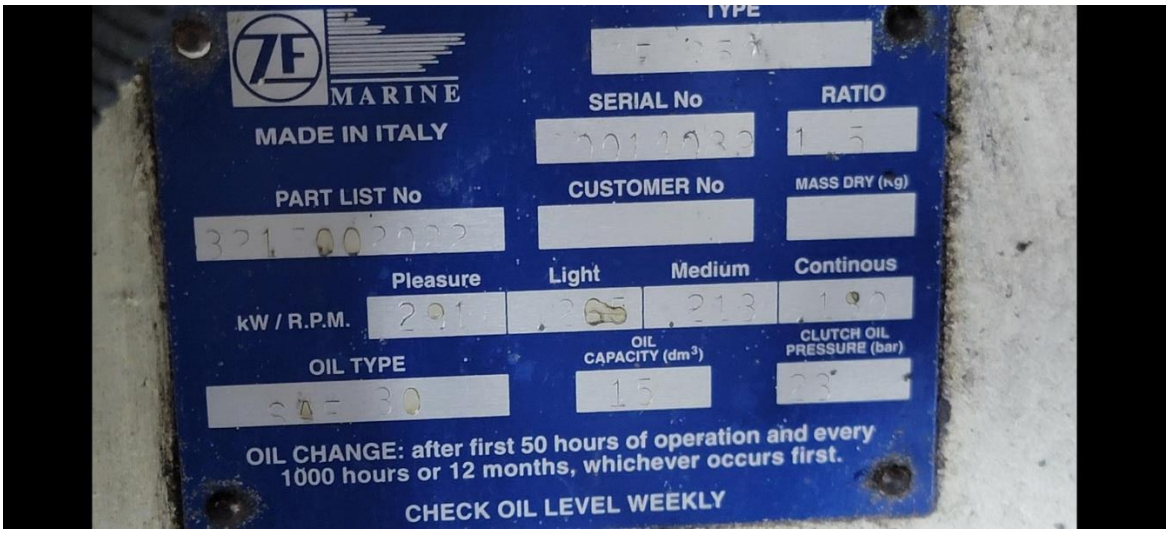


Starboard Gear:



Port Engine:

Starboard Engine: