MARINE DIESEL SPECIALISTS, INC
SURVEY REPORT

February 24, 2026

Owen Perry / Regency Marine Ventures
6870 Bermuda Rd
Las Vegas, NV 89119

MAIN ENGINES M/Y EL MIRAR II 110' HORIZON V107-316

CAT C32 ACERT - 1800 HP at 2300 RPM
Port Engine Number : RNC 02568 Hours: 6580
Stbd. Engine Number : RNC 02570 Hours : 6575
Marine Gear: ZF 3060 A Port: 5001 9401 Stbd: 5001 9402 Reduction: 2.520 : 1

DESCRIPTION

The CAT C32 is a twelve-cylinder 65-degree V configuration engine. The cylinder bore diameter is 145 mm (5.7 ") with a stroke of 162 mm (6.4"). The engine is of a four-cycle design with Acert Electronic Unit Injection, closed circuit liquid cooling, charge air cooling and exhaust turbochargers. Single cylinder heads with two exhaust valves and two intake valves per cylinder are some of the design features of this engine. Charge air cooling is accomplished through the large cooler that is mounted in the valley of the engine. Charge air cooling serves to make the combustion air more dense, which enables the engine to efficiently burn more fuel and therefore increasing the horsepower output when combined with exhaust gas driven turbochargers. The turbochargers are mounted at the end of each exhaust manifold, and they pressurize and deliver combustion air to the engine. Both the exhaust manifolds and the turbochargers are jacket water cooled. The cooling system consists of a titanium plate type heat exchanger which is supplied seawater by an engine mounted, gear driven raw water pump. The fuel injection system is electronically controlled, and fuel is delivered via high pressure through the injectors and into the combustion chamber. This serves to reduce smoke and noise commonly associated with other direct injection engines. Engine starting is accomplished through a 24-volt MT 50 starter and batteries are charged by an engine driven 24-volt Leese Neville alternator. This engine application is typical for yachts and fast patrol boats. Typical operation ranges from 250-1000 hours a year, and the vessel may be operated at full load up to 8% of this time or a ½ hour for every six hours of use. Cruise speed should be approximately 1800 RPM or 80% load according to Caterpillar.

M/Y "EL MIRAR II"

MAIN ENGINE PERFORMANCE

A sea trial was performed, and the engines were slowly brought up to 1500 RPM in order to allow pressures and temperatures to stabilize. All temperatures and pressures were within normal parameters for this engine application at that speed. The engines were next brought up to 2000 RPM, again all temperatures and pressures were within manufacturers specifications. The engines were then brought up to maximum RPM of 2180 on the port and 2153 on the starboard with all readings being normal. Maximum full load RPM should be 2300. It is necessary to bring the engines to maximum RPM on occasion in order to check performance and to check for problems that otherwise may not be evident at lower engine speeds. The engines are not reaching full load RPM. The engines are overloaded at this time. NOTE: It was reported that both the vessel bottom and the props were dirty at time of haul out.

AIR FILTRATION

The combustion air is supplied to the engines through CAT Airsep cleanable element air filters mounted directly to the air inlet elbow of the turbocharger. This application utilizes engine room air supply. The filters were in need of service/cleaning at time of survey.

TURBOCHARGERS

The compressor wheels of the turbochargers were inspected and there was damage to the compressor wheels of both turbochargers on the starboard engine. The port compressor wheels were normal and all four spin freely with normal radial and axial play.

FUEL SYSTEM

Fuel is supplied to the engines from the tanks through triple Racor model 1000 primary filter assemblies that act as primary filters and water separators. The fuel is routed from the primary filters to the engine supply pump then through engine mounted double spin-on type secondary fuel filters and on to the high-pressure pump. The lower Racor bowls are solid, therefore fuel condition could not be seen.

COOLING SYSTEM

The engine cooling system consists of a titanium plate-type heat exchanger mounted at the front of the engine. Seawater is supplied to the heat exchanger through a rubber impeller gear driven pump mounted at the front of the engine. The after cooler is raw water cooled. Zinc anodes are used in the CAT cooling system. Periodic inspection of sea strainers, water pump impellers, zinc anodes, and heat exchangers are recommended. The cooling systems are due for service at this time.

M/Y "EL MIRAR II"

MARINE TRANSMISSION Zahnradfabrik Friedrichshafen (ZF) 3060A

The marine transmissions are manufactured in Germany. The housing is a light alloy, and the internal parts include an input shaft, output shaft, gears, and forward and reverse clutch packs. The gear is hydraulically operated and is a reduction and a reversing unit. The selector valve serves to direct oil flow to provide neutral, forward or reverse. The transmissions operated normally during sea trials and there was no slippage noted during operation. The transmissions are equipped with a ratcheting type oil filter assembly and a seawater cooled oil cooler both of which should be removed and cleaned periodically. The transmissions are flanged on to the engines set up in a conventional propulsion configuration. The reduction ratio is 2.520 : 1.

EXHAUST SYSTEM

The vessel is equipped with a marine exhaust system that consists of dual risers per engine. The hot sections of the risers are shielded with a soft fiberglass wrap. The exhaust stream exits the hull through the vessel bottom after meeting a steel collector and spray ring for cooling. The exhaust bypass exits the hull at the port and starboard transom waterline. This is designed to prevent back pressure. All associated hoses and clamps are in good condition at this time. Steam was noted from both engine bypass exhausts at high RPM. The exhaust system should be removed and inspected for condition. Note: Both exhaust risers have rust pitting at the spray ring area.

MOUNTS

The engines and transmissions are resiliently mounted on standard mounts. The mounts appear to be in good condition as there was no movement noted during sea trials or backing down.

ELECTRONICS

The vessel's helm is equipped with the standard six-page CAT LCD displays. The bridge has CAT displays and single lever controls. The engines come with the standard CAT monitoring system. All displays and electronics functioned properly during sea trial except for the upper helm display.

PREHEATERS

Both port and starboard engines are equipped with Kim Hotstart coolant preheat assemblies. They are designed to prevent cold start up and to prolong engine life. The preheat assemblies are 240-volt AC. Both port and starboard are functioning properly at this time.

CONTROLS

The vessel is equipped with three fly-by-wire electronic controls. The controls are ZF Clear Command. The vessel is equipped with a main helm station, upper station and an aft docking station which has a ZF remote control. The control heads feature push button functions for synchronization and command. The control stations are functioning properly at this time.

M/Y "EL MIRAR II"

OIL SAMPLES

Oil samples were taken from the main engines, transmissions, and generators. **Results indicate that all samples have abnormal to severe levels of contamination.** It is recommended to change the oil in all equipment and resample after 10 hours of operation.

MANUFACTURER'S RECOMMENDATION

CAT recommends that the engines be serviced at 250-hour intervals changing engine oil and filters. In addition, a maintenance service that includes additional items should be performed at 500 and 1000 hour intervals.

DISCREPANCIES

PORT

1. Oil leak at crankcase breather a valve cover.
2. Air filters require cleaning.
3. Exhaust riser has rust pitting near raw water connecting pipe.
4. Alternator belt needs adjustment. (loose)
5. White smoke out exhaust noted when leaving dock for sea trial.
6. Rust pitting noted at transmission oil cooler fitting.
7. Oil leak at inboard turbo from center section.
8. Vibration noted during sea trail. Suggest check alignment.
9. Abnormal levels of silicone and aluminum. Severe level of tin in M.E. oil sample.
10. Abnormal levels of chromium and potassium. Severe levels of silicone in transmission.

STARBOARD

1. Both turbo compressor wheels have damage to blades.
2. Oil level was noted too high on dipstick.
3. Outboard coolant hose to turbo deteriorated.
4. Transmission oil cooler hoses deteriorated.
5. Rust pitting noted on exhaust riser.
6. Air filters require cleaning.
7. Alternator belt is loose.
8. Corrosion on transmission oil cooler fittings.
9. Vibration noted on sea trial, suggest check alignment.
10. Abnormal levels of silicone in M.E. oil sample.
11. Severe levels of silicone in transmission.

M/Y "EL MIRAR II"

GENERAL COMMENTS

The main engines and gears were found to be in fair condition at this time. An external visual inspection was performed the outward appearance of the main engines and marine gears is satisfactory however, both port and starboard engines are in need of maintenance service at this time. The above discrepancies should be remedied as soon as possible.

GENERATORS KOHLER 65 KW

PORT		**STARBOARD**	
Model:	65EOZD	Model:	65EOZD
Serial:	N/A	Serial:	2121357
Hours:	12219	Hours:	10662
Volts:	120/240	Volts:	120/240
Freq:	60 HZ	Freq:	60 HZ.
Oil press:	57 PSI	Oil press:	N/A
Temp:	192 F	Temp:	N/A
Batt. V:	24	Batt. V:	24

The port generator performed well and carried the vessels electronic load. The starboard shuts down with high coolant temp alarm.

GENERATOR DISCREPANCIES

PORT

1. Coolant pipe to thermostat housing rust pitted.
2. Raw water pressure switch leaking and wiring is off.
3. Air intake hose mispositioned and taking air from inside enclosure.
4. Air filter dirty and missing duckbill.
5. Corrosion under heat exchanger near turbo.
6. Sound shield insulation needs replacement.
7. Rust noted on electrical end switch covers.
8. Oil leak top left front cover.
9. Raw water pump leaking at seal.
10. Riser pitted.
11. Coolant leak at turbo.
12. Abnormal levels of copper and potassium. Severe levels of silicone in oil sample.

M/Y "EL MIIRAR II"

STARBOARD

1. Corrosion at zinc anode back of heat exchanger.
2. Air filter is dirty and housing missing duckbill flapper.
3. Sound shield insulation deteriorated.
4. Raw water pipe from raw water pump has been repaired with an epoxy. (replace)
5. Raw water pump not pumping water.
6. High coolant temp alarm.
7. Electrical fault alarm.
8. Abnormal levels of sodium and potassium. Severe levels of aluminum and silicone in oil sample.

NOTE: The comments as stated in this report are based on engine inspections that were performed to the best of our ability and with as much attention to detail as possible. The results are believed to be an accurate evaluation as to the general condition of the engines at this time.

However, Marine Diesel Specialists, Inc. offers no warranty either express or implied on the engines of **M/Y "EL MIRAR II"**. Survey results are intended to represent the physical condition of the vessel only on the day of the survey, based on the facts presented and discovered, in the opinion of the surveyor. This report will not specify or imply any type of warranty of the vessel or the vessel's machinery.

This report is issued subject to the condition that it is understood and agreed that neither this office, nor any surveyor or employee thereof is under any circumstances whatsoever to be held responsible in any way for any error in judgment, default or negligence, nor for any inaccuracy, omission, misrepresentation or misstatement in this report, and that the use of this report shall be construed to be an acceptance of the foregoing conditions.

This report is issued without prejudice to the rights of whom it may concern.

Thank you for the opportunity to be of service and if you have any questions, please call.

Sincerely,

Peter Angel
President

Cat Electronic Technician 2023C v1.0

Top Engine Speed Data Summary

2/20/2026 2:59 PM

Captured Parameters	990 RPM	1206 RPM	1423 RPM	1611 RPM	1817 RPM	1993 RPM	2142 RPM
Engine Speed [rpm]							
Port (RNC02568)	986	1210	1421	1610	1814	1998	2171
Starboard (RNC02570)	985	1205	1414	1607	1811	1995	2141
Active Codes Present During Capture							
Port (RNC02568)	No	No	No	No	No	No	No
Starboard (RNC02570)	No	No	No	No	No	No	No
Engine Speed within +/- 20 RPM							
Port (RNC02568)	Yes	Yes	Yes	Yes	Yes	Yes	No
Starboard (RNC02570)	Yes	Yes	Yes	Yes	Yes	Yes	No
Fuel Pressure [psi]							
Port (RNC02568)	90	94	96	98	99	98	96
Starboard (RNC02570)	93	96	99	100	100	99	96
Boost Pressure [psi]							
Port (RNC02568)	1	2	5	9	15	24	32
Starboard (RNC02570)	1	2	4	9	15	25	31
Engine Oil Pressure [psi]							
Port (RNC02568)	42	49	50	51	51	50	48
Starboard (RNC02570)	45	46	46	47	46	45	43
Engine Coolant Temperature [Deg F]							
Port (RNC02568)	181	180	180	178	178	181	194
Starboard (RNC02570)	180	178	178	178	178	181	190
Fuel Temperature [Deg F]							
Port (RNC02568)	87	87	88	88	89	90	91
Starboard (RNC02570)	86	87	87	87	88	89	90
Engine Load Factor [%]							
Port (RNC02568)	32	32	40	46	60	66	100
Starboard (RNC02570)	25	33	39	46	60	69	100
Right Exhaust Temperature [Deg F]							
Port (RNC02568)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Starboard (RNC02570)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Left Exhaust Temperature [Deg F]							
Port (RNC02568)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Starboard (RNC02570)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Fuel Consumption Rate [gal/h]							
Port (RNC02568)	9.3	14.6	22.4	34.5	48.6	58.1	94.2
Starboard (RNC02570)	8.1	14.5	22.4	34.6	49.1	59.4	94.2
Engine Oil Temperature [Deg F]							
Port (RNC02568)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Starboard (RNC02570)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Transmission Oil Temperature [Deg F]							
Port (RNC02568)	99	104	109	113	118	126	132
Starboard (RNC02570)	100	102	108	111	115	120	126
Transmission Oil Pressure [psi]							
Port (RNC02568)	322	325	328	331	334	336	339
Starboard (RNC02570)	317	320	324	326	330	332	335
Inlet Air Temperature [Deg F]							
Port (RNC02568)	92	91	91	92	94	103	113

Captured Parameters	990 RPM	1206 RPM	1423 RPM	1611 RPM	1817 RPM	1993 RPM	2142 RPM
Starboard (RNC02570)	92	91	91	92	93	102	112
901 JW Outlet Temperature (Before Reg) [Deg F]							
Port (RNC02568)	181	180	180	178	178	181	194
Starboard (RNC02570)	180	178	178	178	178	181	190
902 Jacket Water Engine Inlet Temperature [Deg F]							
Port (RNC02568)							
Starboard (RNC02570)							
903 Aftercooler Water Inlet Temperature to Engine [Deg F]							
Port (RNC02568)							
Starboard (RNC02570)							
903A Aftercooler Water Outlet Temperature from Engine [Deg F]							
Port (RNC02568)							
Starboard (RNC02570)							
906 Intake Air Manifold Temperature [Deg F]							
Port (RNC02568)	92	91	91	92	94	103	113
Starboard (RNC02570)	92	91	91	92	93	102	112
907 Air Cleaner Inlet Restriction (Single or RH) [" H2O]							
Port (RNC02568)							
Starboard (RNC02570)							
907A Air Cleaner Inlet Restriction (LH) [" H2O]							
Port (RNC02568)							
Starboard (RNC02570)							
908 Exhaust Engine Outlet Stack Pressure [psi]							
Port (RNC02568)							
Starboard (RNC02570)							
910 Engine Speed [rpm]							
Port (RNC02568)	986	1210	1421	1610	1814	1998	2171
Starboard (RNC02570)	985	1205	1414	1607	1811	1995	2141
911 Intake Air Manifold Pressure [psi]							
Port (RNC02568)	1	2	5	9	15	24	32
Starboard (RNC02570)	1	2	4	9	15	25	31
912 Exhaust Engine Outlet Stack Temperature [Deg F]							
Port (RNC02568)							
Starboard (RNC02570)							
912B Exhaust Manifold Right Rear Turbo Temp [Deg F]							
Port (RNC02568)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Starboard (RNC02570)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
912D Exhaust Manifold Left Rear Turbo Temp (or Low Pressure Turbo) [Deg F]							
Port (RNC02568)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Starboard (RNC02570)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
913 Engine Oil to Bearings Temperature [Deg F]							
Port (RNC02568)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
Starboard (RNC02570)	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable	Unavailable
914 Engine Oil to Bearings Pressure [psi]							
Port (RNC02568)	42	49	50	51	51	50	48
Starboard (RNC02570)	45	46	46	47	46	45	43
917 Engine Fuel Pressure (After Filters) [psi]							
Port (RNC02568)	90	94	96	98	99	98	96
Starboard (RNC02570)	93	96	99	100	100	99	96
922 Jacket Water Temperature From Hex Outlet [Deg F]							
Port (RNC02568)							
Starboard (RNC02570)							
923 Aftercooler Core Water Inlet Pressure [psi]							
Port (RNC02568)							
Starboard (RNC02570)							
924 Aftercooler Core Water Outlet Pressure [psi]							
Port (RNC02568)							
Starboard (RNC02570)							

Captured Parameters	990 RPM	1206 RPM	1423 RPM	1611 RPM	1817 RPM	1993 RPM	2142 RPM
930 Air Cleaner Outlet Temperature [Deg F]							
Port (RNC02568)							
Starboard (RNC02570)							
932 Crankcase Pressure [" H2O]							
Port (RNC02568)							
Starboard (RNC02570)							
935 Fuel Inlet Temperature [Deg F]							
Port (RNC02568)	87	87	88	88	89	90	91
Starboard (RNC02570)	86	87	87	87	88	89	90
936 Fuel Return Line Restriction (Engine Outlet Pressure) [psi]							
Port (RNC02568)							
Starboard (RNC02570)							
954 Raw/Sea Water Temperature to HEX Inlet (Low Temperature or Parallel) [Deg F]							
Port (RNC02568)							
Starboard (RNC02570)							
957 Raw/Sea Water Temperature from HEX Outlet (High Temperature or Parallel) [Deg F]							
Port (RNC02568)							
Starboard (RNC02570)							
961 Fuel Supply Line Restriction (Engine Inlet Pressure) [psi]							
Port (RNC02568)							
Starboard (RNC02570)							
964 Raw/Sea Water Pressure from HEX Outlet (High Temperature or Parallel) [psi]							
Port (RNC02568)							
Starboard (RNC02570)							
965 Raw/Sea Water Pump Inlet Pressure [psi]							
Port (RNC02568)							
Starboard (RNC02570)							
966 Raw/Sea Water Pump Inlet Temperature [Deg F]							
Port (RNC02568)							
Starboard (RNC02570)							
969 Fuel Consumption from ECM [gal/h]							
Port (RNC02568)	9.3	14.6	22.4	34.5	48.6	58.1	94.2
Starboard (RNC02570)	8.1	14.5	22.4	34.6	49.1	59.4	94.2
991 Engine Load from ECM [%]							
Port (RNC02568)	32	32	40	46	60	66	100
Starboard (RNC02570)	25	33	39	46	60	69	100
992 Fuel Flow Meter Consumption (Manual Entry) [gal/h]							
Port (RNC02568)							
Starboard (RNC02570)							

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Product Status Report

2/20/2026 10:48 AM

Product Status Report

Parameter	Value
Engine Serial Number	RNC02568
Equipment ID	RNC02568
Comments	

Bridge MPD - Port Engine

Parameter	Value
ECM Part Number	307-754100
ECM Serial Number	2337G021MP
Software Group Part Number	275-217400
Software Group Release Date	
Software Group Description	

Configuration - Bridge MPD - Port Engine

Description	Value	Unit
Display Location	Bridge	
Engine Location	Port	

C32 ACERT Starboard (RNC02570)

Parameter	Value
Equipment ID	RNC02570
Engine Serial Number	RNC02570
ECM Serial Number	04966111JW
Software Group Part Number	286966900
Software Group Release Date	NOV05
Software Group Description	C32-MEUI-ACERT-A4

Logged Diagnostic Codes [Diagnostic Clock = 6575 hours] - C32 ACERT Starboard (RNC02570)

Code	Description	Occ.	First	Last
1249- 8	Secondary Throttle Position signal abnormal	16	6507	6575
1249-13	Secondary Throttle Position calibration required	8	6507	6573
91- 8	Throttle Position Sensor : Abnormal Frequency, Pulse Width, or Period	4	6527	6529
91-13	Throttle Position Sensor : Out of Calibration	1	6529	6529

Logged Event Codes [Diagnostic Clock = 6575 hours] - C32 ACERT Starboard (RNC02570)

Code	Description	Occ.	First	Last
E268 (1)	Unexpected Engine Shutdown	127	5420	6574

E057 (2)	Low Engine Coolant Level Derate	2	6518	6525
E059 (1)	Low Engine Coolant Level Warning	2	6518	6525

Active Diagnostic Codes - C32 ACERT Starboard (RNC02570)

Code	Description
No Active Diagnostic Codes	

Active Event Codes - C32 ACERT Starboard (RNC02570)

Code	Description
No Active Events	

Current Totals - C32 ACERT Starboard (RNC02570)

Description	Value	Unit
Total Time	6575	hours
Total Idle Time	1115:12	hours
Total Fuel	121262	gal
Total Idle Fuel	2643	gal
Total Max Fuel	629255	gal
Average Load Factor	18	%
Total Operating Hours	6575	hours
Engine Starts	2111	
Lifetime Total Engine Revolutions	499705848	rev
Percentage Idle Time	16.96	%
Average RPM	1266.68	rpm
Average Fuel Rate	18.44	gal/h
Overall Load Factor	19	%

Configuration - C32 ACERT Starboard (RNC02570)

Description	Value	Unit
Equipment ID	RNC02570	
Engine Serial Number	RNC02570	
ECM Serial Number	04966111JW	
Software Group Part Number	286966900	
Software Group Release Date	NOV05	
Software Group Description	C32-MEUI-ACERT-A4	
Rating Number	1	
Rated Power	1800 hp at 2300 rpm	
Rated Peak Torque	5650 lb-ft at 1600 rpm	
Top Engine Speed Range	2410 - 2410 rpm	
Test Spec	0K5895	
Rated Engine Speed	2300rpm	
Engine Location	Starboard	
Number of Synchronized Engines Configuration	2	
Low Idle Speed	700	rpm

High Idle Speed	2410	rpm
Maximum Trolling Engine Speed	900	rpm
Secondary Throttle Enable Status	Unavailable Parameter	
Tachometer Frequency Configuration	113.0	
System Operating Voltage Configuration	Unavailable	
Cold Cylinder Cutout	Unavailable	
Torque Limit Enable Status	Unavailable	
Maximum Engine Torque Limit	Unavailable	lb-ft
Minimum Engine Torque Limit	Unavailable	lb-ft
Secondary Engine ECM Installation Status	Unavailable	
Cooldown Speed	Unavailable	rpm
Cooldown Duration	Unavailable	min
Engine Pre-Lube Duration	Unavailable	sec
Crank Duration	Unavailable	sec
Maximum Number of Crank Cycles	Unavailable	
Crank Terminate RPM	Unavailable	rpm
Transmission Oil Temperature Sensor	Installed	
Transmission Oil Pressure Sensor	Installed	
Coolant Level Sensor	Installed	
Fuel Level Sensor Installation Status	Not Installed	
Aftercooler Coolant Level Sensor Installation Status	Unavailable	
Engine Oil Temperature Sensor Installation Status	Unavailable	
Left Exhaust Temperature Sensor Installation Status	Unavailable	
Right Exhaust Temperature Sensor Installation Status	Unavailable	
Engine Oil Capacity	22.5	gal
Fuel Correction Factor	0	%
Maintenance Indicator Mode	Off	
PM1 Interval	0	gal
FLS	-16	
FTS	21	
Customer Password #1	**********	
Customer Password #2	**********	
Total Tattletale	2887	

Lifetime: Time vs Engine Coolant Temperature - C32 ACERT Starboard (RNC02570)

Engine Coolant Temperature(Deg F)	hours	%
<122.0	237.50	3.62
122.0-130.0	83.80	1.28
131.0-139.0	99.75	1.52
140.0-148.0	115.60	1.76
149.0-157.0	95.35	1.45
158.0-166.0	96.85	1.48
167.0-175.0	351.50	5.36
176.0-184.0	5471.40	83.43

185.0-193.0	4.50	0.07
194.0-202.0	0.80	0.01
203.0-211.0	0.25	0.00
212.0-220.0	0.40	0.01
221.0-229.0	0.15	0.00
230.0-238.0	0.05	0.00
239.0-247.0	0.00	0.00
>248.0	0.00	0.00

Lifetime: Time vs Inlet Air Temperature - C32 ACERT Starboard (RNC02570)

Inlet Air Temperature(Deg F)	hours	%
<104.0	6519.65	99.42
104.0-112.0	22.95	0.35
113.0-121.0	12.30	0.19
122.0-130.0	2.10	0.03
131.0-139.0	0.55	0.01
140.0-148.0	0.10	0.00
149.0-157.0	0.05	0.00
158.0-166.0	0.05	0.00
167.0-175.0	0.00	0.00
176.0-184.0	0.00	0.00
185.0-193.0	0.05	0.00
194.0-202.0	0.05	0.00
203.0-211.0	0.00	0.00
>212.0	0.00	0.00

Lifetime: Time vs Boost Pressure - C32 ACERT Starboard (RNC02570)

Boost Pressure(psi)	hours	%
<11.6	6382.15	97.32
11.6-12.1	69.80	1.06
13.1-13.5	30.00	0.46
14.5-15.0	18.20	0.28
16.0-16.4	4.75	0.07
17.4-17.9	3.15	0.05
18.9-19.3	6.80	0.10
20.3-20.8	13.00	0.20
21.8-22.2	5.85	0.09
23.2-23.7	1.75	0.03
24.7-25.1	1.00	0.02
26.1-26.6	1.10	0.02
27.6-28.0	7.25	0.11
>29.0	13.10	0.20

Lifetime: Time vs Engine Speed And Engine Load Factor - C32 ACERT Starboard (RNC02570)

rpm	<1100	1100-1299	1300-1499	1500-1699	1700-1899	1900-2099	2100-2299	>2300	Total
%									
<50.0	1836.25	531.30	2488.70	1403.10	161.15	0.15	0.05	0.15	6420.85

50.0-59.9	0.40	0.30	0.20	13.50	65.45	21.50	0.05	0.05	101.45
60.0-69.9	0.20	0.10	0.05	0.05	0.90	12.75	1.00	0.00	15.05
70.0-79.9	0.05	0.05	0.00	0.00	0.00	1.15	3.45	0.00	4.70
80.0-89.9	0.00	0.00	0.00	0.00	0.00	0.10	10.70	0.00	10.80
>90.0	0.00	0.00	0.00	0.00	0.00	0.15	2.60	1.65	4.40
Total	1836.90	531.75	2488.95	1416.65	227.50	35.80	17.85	1.85	6557.25

Lifetime: Total Occurrences vs Engine Speed - C32 ACERT Starboard (RNC02570)

Engine Speed(rpm)	Count	%
<2500.0	0	0.00
2500.0-2599.0	0	0.00
2600.0-2699.0	0	0.00
2700.0-2799.0	0	0.00
2800.0-2899.0	0	0.00
2900.0-2999.0	0	0.00
3000.0-3099.0	0	0.00
3100.0-3199.0	0	0.00
3200.0-3299.0	0	0.00
>3300.0	0	0.00

Lifetime: Time vs Engine Speed - C32 ACERT Starboard (RNC02570)

Engine Speed(rpm)	hours	%
<1100.0	1837.05	28.01
1100.0-1299.0	531.85	8.11
1300.0-1499.0	2489.05	37.95
1500.0-1699.0	1416.75	21.60
1700.0-1899.0	227.60	3.47
1900.0-2099.0	35.90	0.55
2100.0-2299.0	17.90	0.27
>2300.0	1.95	0.03

Lifetime: Time vs Engine Load Factor - C32 ACERT Starboard (RNC02570)

Engine Load Factor(%)	hours	%
<50.0	6421.05	97.91
50.0-59.0	101.60	1.55
60.0-69.0	15.20	0.23
70.0-79.0	4.90	0.07
80.0-89.0	10.90	0.17
>90.0	4.50	0.07

Trip: Time vs Engine Speed - C32 ACERT Starboard (RNC02570)

Engine Speed(rpm)	hours	%
<1100.0	93.90	56.65
1100.0-1299.0	27.00	16.29
1300.0-1499.0	11.20	6.76

1500.0-1699.0	31.10	18.76
1700.0-1899.0	0.15	0.09
1900.0-2099.0	2.35	1.42
2100.0-2299.0	0.05	0.03
>2300.0	0.00	0.00

Trip: Time vs Engine Load Factor - C32 ACERT Starboard (RNC02570)

Engine Load Factor(%)	hours	%
<50.0	163.20	98.49
50.0-59.0	0.10	0.06
60.0-69.0	2.15	1.30
70.0-79.0	0.20	0.12
80.0-89.0	0.00	0.00
>90.0	0.05	0.03

Injector Trim Calibration - C32 ACERT Starboard (RNC02570)

Injector	Serial Number	File Version
Injector1	00000000A5514628449F	0
Injector2	00000000A5514625702D	0
Injector3	00000000A55146285096	0
Injector4	00000000A551463022B4	0
Injector5	00000000A55146285684	0
Injector6	00000000A5514621887D	0
Injector7	00000000A5514628906A	0
Injector8	00000000A55146248085	0
Injector9	00000000A551462626C3	0
Injector10	00000000A55146267682	0
Injector11	00000000A55146267090	0
Injector12	00000000A551462958C5	0

Monitoring System - C32 ACERT Starboard (RNC02570)

Description	State	Trip Point	Delay Time
Engine Overspeed			
Least Severe (1)	Always On	2645 rpm	0 sec
High Engine Coolant Temperature			
Least Severe (1)	Always On	217 Deg F	30 sec
Moderate Severity (2)	On	232 Deg F	30 sec
High Engine Inlet Air Temperature			
Least Severe (1)	Always On	158.0 Deg F	30 sec
Moderate Severity (2)	On	174.2 Deg F	30 sec
High Fuel Pressure			
Least Severe (1)	On	None	2 sec
High Fuel Temperature			
Least Severe (1)	On	158.0 Deg F	30 sec
High Transmission Oil Pressure			
Least Severe (1)	On	410 psi	10 sec

High Transmission Oil Temperature			
Least Severe (1)	On	203 Deg F	10 sec
Low Coolant Level			
Least Severe (1)	On	None	30 sec
Moderate Severity (2)	On	None	30 sec
Low Engine Oil Pressure			
Least Severe (1)	Always On	None	30 sec
Moderate Severity (2)	On	None	30 sec
Low Fuel Level			
Least Severe (1)	Off	13 %	300 sec
Low Fuel Pressure			
Least Severe (1)	On	None	2 sec

Trip Segment - C32 ACERT Starboard (RNC02570)

Description	Value	Unit
Time	166:45	hours
Fuel	1920.0	gal
% Idle Time	35	%
Idle Fuel	122.5	gal

Maintenance Indicator - C32 ACERT Starboard (RNC02570)

Description	Service Status	Value	Unit
PM1	---	Unavailable	
PM2	---	Unavailable	
Coolant Flush/Fill	---	Unavailable	

C32 ACERT Port (RNC02568)

Parameter	Value
Equipment ID	RNC02568
Engine Serial Number	RNC02568
ECM Serial Number	05366091JW
Software Group Part Number	286966900
Software Group Release Date	NOV05
Software Group Description	C32-MEUI-ACERT-A4

Logged Diagnostic Codes [Diagnostic Clock = 6580 hours] - C32 ACERT Port (RNC02568)

Code	Description	Occ.	First	Last
1249- 8	Secondary Throttle Position signal abnormal	19	6532	6580
1249-13	Secondary Throttle Position calibration required	13	6523	6580
91-13	Throttle Position Sensor : Out of Calibration	1	6569	6569
91- 8	Throttle Position Sensor : Abnormal Frequency, Pulse Width, or Period	3	6532	6532

Logged Event Codes [Diagnostic Clock = 6580 hours] - C32 ACERT Port (RNC02568)

Code	Description	Occ.	First	Last
E268 (1)	Unexpected Engine Shutdown	127	5433	6580
E053 (1)	Low Fuel Pressure Warning	1	6536	6536

E017 (1)	High Engine Coolant Temperature Warning	1	6531	6531

Active Diagnostic Codes - C32 ACERT Port (RNC02568)

Code	Description
1249- 8	Secondary Throttle Position signal abnormal

Active Event Codes - C32 ACERT Port (RNC02568)

Code	Description
No Active Events	

Current Totals - C32 ACERT Port (RNC02568)

Description	Value	Unit
Total Time	6580	hours
Total Idle Time	1112:32	hours
Total Fuel	123161	gal
Total Idle Fuel	2763	gal
Total Max Fuel	629769	gal
Average Load Factor	19	%
Total Operating Hours	6581	hours
Engine Starts	2052	
Lifetime Total Engine Revolutions	501551128	rev
Percentage Idle Time	16.90	%
Average RPM	1270.39	rpm
Average Fuel Rate	18.72	gal/h
Overall Load Factor	19	%

Configuration - C32 ACERT Port (RNC02568)

Description	Value	Unit
Equipment ID	RNC02568	
Engine Serial Number	RNC02568	
ECM Serial Number	05366091JW	
Software Group Part Number	286966900	
Software Group Release Date	NOV05	
Software Group Description	C32-MEUI-ACERT-A4	
Rating Number	1	
Rated Power	1800 hp at 2300 rpm	
Rated Peak Torque	5650 lb-ft at 1600 rpm	
Top Engine Speed Range	2410 - 2410 rpm	
Test Spec	0K5895	
Rated Engine Speed	2300rpm	
Engine Location	Port	
Number of Synchronized Engines Configuration	2	
Low Idle Speed	700	rpm
High Idle Speed	2410	rpm
Maximum Trolling Engine Speed	900	rpm
Secondary Throttle Enable Status	Unavailable Parameter	

Tachometer Frequency Configuration	113.0	
System Operating Voltage Configuration	Unavailable	
Cold Cylinder Cutout	Unavailable	
Torque Limit Enable Status	Unavailable	
Maximum Engine Torque Limit	Unavailable	lb-ft
Minimum Engine Torque Limit	Unavailable	lb-ft
Secondary Engine ECM Installation Status	Unavailable	
Cooldown Speed	Unavailable	rpm
Cooldown Duration	Unavailable	min
Engine Pre-Lube Duration	Unavailable	sec
Crank Duration	Unavailable	sec
Maximum Number of Crank Cycles	Unavailable	
Crank Terminate RPM	Unavailable	rpm
Transmission Oil Temperature Sensor	Installed	
Transmission Oil Pressure Sensor	Installed	
Coolant Level Sensor	Installed	
Fuel Level Sensor Installation Status	Not Installed	
Aftercooler Coolant Level Sensor Installation Status	Unavailable	
Engine Oil Temperature Sensor Installation Status	Unavailable	
Left Exhaust Temperature Sensor Installation Status	Unavailable	
Right Exhaust Temperature Sensor Installation Status	Unavailable	
Engine Oil Capacity	22.5	gal
Fuel Correction Factor	0	%
Maintenance Indicator Mode	Off	
PM1 Interval	0	gal
FLS	-35	
FTS	43	
Customer Password #1	**********	
Customer Password #2	**********	
Total Tattletale	2834	

Lifetime: Time vs Engine Coolant Temperature - C32 ACERT Port (RNC02568)

Engine Coolant Temperature(Deg F)	hours	%
<122.0	234.00	3.57
122.0-130.0	85.85	1.31
131.0-139.0	98.45	1.50
140.0-148.0	110.60	1.69
149.0-157.0	101.40	1.54
158.0-166.0	106.45	1.62
167.0-175.0	791.85	12.06
176.0-184.0	5032.40	76.67
185.0-193.0	1.10	0.02
194.0-202.0	0.55	0.01
203.0-211.0	0.45	0.01

212.0-220.0	0.40	0.01
221.0-229.0	0.25	0.00
230.0-238.0	0.00	0.00
239.0-247.0	0.00	0.00
>248.0	0.00	0.00

Lifetime: Time vs Inlet Air Temperature - C32 ACERT Port (RNC02568)

Inlet Air Temperature(Deg F)	hours	%
<104.0	6533.10	99.53
104.0-112.0	13.80	0.21
113.0-121.0	16.40	0.25
122.0-130.0	0.55	0.01
131.0-139.0	0.10	0.00
140.0-148.0	0.00	0.00
149.0-157.0	0.00	0.00
158.0-166.0	0.00	0.00
167.0-175.0	0.00	0.00
176.0-184.0	0.00	0.00
185.0-193.0	0.00	0.00
194.0-202.0	0.00	0.00
203.0-211.0	0.00	0.00
>212.0	0.00	0.00

Lifetime: Time vs Boost Pressure - C32 ACERT Port (RNC02568)

Boost Pressure(psi)	hours	%
<11.6	6411.40	97.68
11.6-12.1	64.55	0.98
13.1-13.5	16.00	0.24
14.5-15.0	13.90	0.21
16.0-16.4	8.65	0.13
17.4-17.9	6.25	0.10
18.9-19.3	13.20	0.20
20.3-20.8	4.25	0.06
21.8-22.2	2.20	0.03
23.2-23.7	1.35	0.02
24.7-25.1	5.40	0.08
26.1-26.6	6.80	0.10
27.6-28.0	5.80	0.09
>29.0	3.95	0.06

Lifetime: Time vs Engine Speed And Engine Load Factor - C32 ACERT Port (RNC02568)

rpm	<1100	1100-1299	1300-1499	1500-1699	1700-1899	1900-2099	2100-2299	>2300	Total
%									
<50.0	1825.65	519.05	2433.20	1490.55	188.15	0.00	0.15	0.05	6456.80
50.0-59.9	0.45	0.30	0.25	3.00	44.85	29.50	0.25	0.05	78.65
60.0-69.9	0.20	0.15	0.05	0.05	1.80	5.60	1.70	0.00	9.55

70.0-79.9	0.10	0.05	0.00	0.00	0.00	0.15	3.85	0.05	4.20
80.0-89.9	0.00	0.00	0.00	0.00	0.00	0.05	9.80	0.00	9.85
>90.0	0.00	0.00	0.00	0.00	0.00	0.10	1.75	2.25	4.10
Total	1826.40	519.55	2433.50	1493.60	234.80	35.40	17.50	2.40	6563.15

Lifetime: Total Occurrences vs Engine Speed - C32 ACERT Port (RNC02568)

Engine Speed(rpm)	Count	%
<2500.0	0	0.00
2500.0-2599.0	0	0.00
2600.0-2699.0	0	0.00
2700.0-2799.0	0	0.00
2800.0-2899.0	0	0.00
2900.0-2999.0	0	0.00
3000.0-3099.0	0	0.00
3100.0-3199.0	0	0.00
3200.0-3299.0	0	0.00
>3300.0	0	0.00

Lifetime: Time vs Engine Speed - C32 ACERT Port (RNC02568)

Engine Speed(rpm)	hours	%
<1100.0	1826.50	27.83
1100.0-1299.0	519.65	7.92
1300.0-1499.0	2433.55	37.07
1500.0-1699.0	1493.65	22.76
1700.0-1899.0	234.85	3.58
1900.0-2099.0	35.55	0.54
2100.0-2299.0	17.65	0.27
>2300.0	2.50	0.04

Lifetime: Time vs Engine Load Factor - C32 ACERT Port (RNC02568)

Engine Load Factor(%)	hours	%
<50.0	6456.95	98.37
50.0-59.0	78.80	1.20
60.0-69.0	9.65	0.15
70.0-79.0	4.30	0.07
80.0-89.0	10.00	0.15
>90.0	4.20	0.06

Trip: Time vs Engine Speed - C32 ACERT Port (RNC02568)

Engine Speed(rpm)	hours	%
<1100.0	85.65	55.15
1100.0-1299.0	21.90	14.10
1300.0-1499.0	13.75	8.85
1500.0-1699.0	31.50	20.28
1700.0-1899.0	0.10	0.06
1900.0-2099.0	2.35	1.51
2100.0-2299.0	0.05	0.03

>2300.0	0.00	0.00

Trip: Time vs Engine Load Factor - C32 ACERT Port (RNC02568)

Engine Load Factor(%)	hours	%
<50.0	152.80	98.36
50.0-59.0	1.35	0.87
60.0-69.0	1.15	0.74
70.0-79.0	0.00	0.00
80.0-89.0	0.00	0.00
>90.0	0.05	0.03

Injector Trim Calibration - C32 ACERT Port (RNC02568)

Injector	Serial Number	File Version
Injector1	00000000A551460602D9	0
Injector2	00000000A551460600D7	0
Injector3	00000000A551462838D0	0
Injector4	00000000A55146278424	0
Injector5	00000000A551462968FA	0
Injector6	00000000A55146289476	0
Injector7	00000000A551462972D9	0
Injector8	00000000A551460592D9	0
Injector9	00000000A551462668BD	0
Injector10	00000000A55146288847	0
Injector11	00000000A55146056408	0
Injector12	00000000A55146284083	0

Monitoring System - C32 ACERT Port (RNC02568)

Description	State	Trip Point	Delay Time
Engine Overspeed			
Least Severe (1)	Always On	2645 rpm	0 sec
High Engine Coolant Temperature			
Least Severe (1)	Always On	217 Deg F	30 sec
Moderate Severity (2)	On	232 Deg F	30 sec
High Engine Inlet Air Temperature			
Least Severe (1)	Always On	158.0 Deg F	30 sec
Moderate Severity (2)	Off	174.2 Deg F	30 sec
High Fuel Pressure			
Least Severe (1)	On	None	2 sec
High Fuel Temperature			
Least Severe (1)	On	158.0 Deg F	30 sec
High Transmission Oil Pressure			
Least Severe (1)	On	350 psi	10 sec
High Transmission Oil Temperature			
Least Severe (1)	On	203 Deg F	10 sec
Low Coolant Level			

Least Severe (1)	On	None	30 sec
Moderate Severity (2)	On	None	30 sec
Low Engine Oil Pressure			
Least Severe (1)	Always On	None	30 sec
Moderate Severity (2)	On	None	30 sec
Low Fuel Level			
Least Severe (1)	Off	13 %	300 sec
Low Fuel Pressure			
Least Severe (1)	On	None	2 sec

Trip Segment - C32 ACERT Port (RNC02568)

Description	Value	Unit
Time	156:20	hours
Fuel	1823.5	gal
% Idle Time	36	%
Idle Fuel	122.0	gal

Maintenance Indicator - C32 ACERT Port (RNC02568)

Description	Service Status	Value	Unit
PM1	---	Unavailable	
PM2	---	Unavailable	
Coolant Flush/Fill	---	Unavailable	

PL1000E #2

Parameter	Value
ECM Part Number	2584548-01
ECM Serial Number	1956B031HU
Personality Module Part Number	3150627-00
Personality Module Release Date	AUG07
Personality Module Description	PL1000E Communication ECU

Current Totals - PL1000E #2

Description	Value	Unit
ECM Lifetime Clock	7114	hours

Configuration - PL1000E #2

Description	Value	Unit
CAT Data Link Module Identifier Configuration	PL1000 #2	
CAT Data Link Boost Function Enable Status	Disabled	
Ethernet Media Access Control (MAC) Address	00:0A:75:00:0A:7C	
Internet Protocol Host Name	PL1000E	
Internet Protocol (IPv4) Address	192.168.10.50	
Internet Protocol (IPv4) Network Mask	255.255.255.0	
Network Default Gateway Internet Protocol (IPv4) Address	1.0.0.0	
Web Server Administrator Password	admin	

Dynamic Host Configuration Protocol (DHCP) Enable Status	Disabled	
Modbus #1 Port Selection	Disabled	
ModBus #1 Baud Rate	9600	
ModBus #1 Echo/ No Echo	No Echo	
ModBus #1 Flow Control	None	
ModBus #1 Data Size	8	
ModBus #1 Parity	No Parity	
Modbus #2 Port Selection	Serial Port #4	
ModBus #2 Baud Rate	19200	
ModBus #2 Echo/ No Echo	No Echo	
ModBus #2 Flow Control	None	
ModBus #2 Data Size	8	
ModBus #2 Parity	No Parity	
Modbus #3 Port Selection	Disabled	
ModBus #3 Baud Rate	9600	
ModBus #3 Echo/ No Echo	No Echo	
ModBus #3 Flow Control	None	
ModBus #3 Data Size	8	
ModBus #3 Parity	No Parity	
Modbus TCP Data Link Address	254	

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ECM Summary

2/20/2026 10:40 AM

Description	Value
C32 ACERT Port (RNC02568)	
Equipment ID	RNC02568
Engine Serial Number	RNC02568
ECM Serial Number	05366091JW
Software Group Part Number	286966900
Software Group Release Date	NOV05
Software Group Description	C32-MEUI-ACERT-A4
PL1000E #2	
ECM Part Number	2584548-01
ECM Serial Number	1956B031HU
Personality Module Part Number	3150627-00
Personality Module Release Date	AUG07
Personality Module Description	PL1000E Communication ECU
C32 ACERT Starboard (RNC02570)	
Equipment ID	RNC02570
Engine Serial Number	RNC02570
ECM Serial Number	04966111JW
Software Group Part Number	286966900
Software Group Release Date	NOV05
Software Group Description	C32-MEUI-ACERT-A4
Bridge MPD - Port Engine	
ECM Part Number	307-754100
ECM Serial Number	2337G021MP
Software Group Part Number	275-217400
Software Group Release Date	
Software Group Description	

MARINE DIESEL SPECIALIST **Phone:** **Email:** **Fax:** ___-___-____	**Machine ID:** EL MIRAR **Machine Year :** NA **Component Description:**	**Component ID:** NA100 **Component Make:** KOHLER **Component Model:** 65 EOZD **Component Year:** NA **Component Type :** DIESEL ENGINE **Component Location:** PORT GENERATOR **Sump Capacity:** 5 Gallons	M✓C **MOTORCHECK LAB** **2000 N FLORIDA MANGO RD 104** **WEST PALM BEACH FL 33409** **561-684-7799**

Sample ID	Date Taken	Hours on Component	Hours on Oil	Oil Weight	Oil Brand	Oil Type	Oil Changed	Date Analyzed	User Sample ID
30963	2/24/2026	12219	100	15W40	UNKNOWN	UNKNOWN	No	2/24/2026	
Comments	COPPER LEVEL HIGHER THAN TYPICAL (POSSIBLE OIL ADDITIVE OR LEACHING FROM OIL COOLER). HIGH AMOUNT OF DIRT PRESENT POSSIBLY GAINING ENTRANCE WITH THE COOLANT. POTASSIUM LEVEL HIGHER THAN TYPICAL CHECK FOR SOURCE OF COOLANT LEAK.								

	Wear Metals(ppm)							*Contaminant Metals (ppm)*			*Multi-Source Metals (ppm)*					*Additives (ppm)*				
Sample ID	Iron	Chromium	Aluminum	Copper	Lead	Tin	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Nickel	Manganese	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
30963	98	4	<2	134	93	15	X	35	13	78	X	27	X	X	X	X	X	X	X	X

	Contaminants				*Physical Properties*								
Sample ID	Fuel	Soot	Water	Glycol	Nitration	TBN	Oxidation	V40C	V100C	VIndex	V40C Limit	V100C Limit	Visc Mode
30963	-	<0.1	<0.1	-	3.7	7.3	<2.0	109	14.4	135	92 - 124	12.5 - 16.3	C

ABNORMAL | SEVERE | D = DETECTED | - = NOT DETECTED | X = NOT TESTED / NOT APPLICABLE | NA = NOT AVAILABLE | C = CALCULATED | M = MEASURED

MARINE DIESEL SPECIALIST **Phone:** **Email:** **Fax:** ___-___-____	**Machine ID:** EL MIRAR **Machine Year :** NA **Component Description:**	**Component ID:** 2121357 **Component Make:** KOHLER **Component Model:** 65 EOZD **Component Year:** NA **Component Type :** DIESEL ENGINE **Component Location:** STARBOARD GENERATOR **Sump Capacity:** 5 Gallons	M✓C **MOTORCHECK LAB** **2000 N FLORIDA MANGO RD 104** **WEST PALM BEACH FL 33409** **561-684-7799**

Sample ID	Date Taken	Hours on Component	Hours on Oil	Oil Weight	Oil Brand	Oil Type	Oil Changed	Date Analyzed	User Sample ID
30964	2/24/2026	10662	100	15W40	UNKNOWN	UNKNOWN	No	2/24/2026	
Comments	PISTON WEAR INDICATED. POSSIBLY DUE TO THE PRESENCE OF ABRASIVE DIRT PARTICLES. SODIUM LEVEL HIGHER THAN TYPICAL, CHECK FOR SOURCE OF COOLANT AND/OR SALT WATER LEAK. HIGH AMOUNT OF DIRT PRESENT POSSIBLY GAINING ENTRANCE WITH THE COOLANT. POTASSIUM LEVEL HIGHER THAN TYPICAL CHECK FOR SOURCE OF COOLANT LEAK. CHECK FOR SOURCE OF COOLANT LEAK. CHECK AIR INDUCTION SYSTEM AND ALL DIRT ACCESS POINTS. ADVISE USE OF ADDITIONAL DIAGNOSTIC TOOLS TO DETERMINE COURSE OF CORRECTIVE ACTION.								

	Wear Metals(ppm)							*Contaminant Metals (ppm)*			*Multi-Source Metals (ppm)*					*Additives (ppm)*				
Sample ID	Iron	Chromium	Aluminum	Copper	Lead	Tin	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Nickel	Manganese	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
30964	85	2	191	74	20	17	X	30	119	61	X	23	X	X	X	X	X	X	X	X

	Contaminants				*Physical Properties*								
Sample ID	Fuel	Soot	Water	Glycol	Nitration	TBN	Oxidation	V40C	V100C	VIndex	V40C Limit	V100C Limit	Visc Mode
30964	-	<0.1	<0.1	-	3.8	7.4	<2.0	109	14.4	135	92 - 124	12.5 - 16.3	C

ABNORMAL | SEVERE | D = DETECTED | - = NOT DETECTED | X = NOT TESTED / NOT APPLICABLE | NA = NOT AVAILABLE | C = CALCULATED | M = MEASURED

MARINE DIESEL SPECIALIST **Phone:** **Email:** **Fax:** ___-___-____	**Machine ID:** EL MIRAR **Machine Year :** NA **Component Description:**	**Component ID:** RNC0256 **Component Make:** CATERPILLAR **Component Model:** C32 **Component Year:** NA **Component Type :** DIESEL ENGINE **Component Location:** PORT MAIN **Sump Capacity:** 25 Gallons	M✓C **MOTORCHECK LAB** **2000 N FLORIDA MANGO RD 104** **WEST PALM BEACH FL 33409** **561-684-7799**

Sample ID	Date Taken	Hours on Component	Hours on Oil	Oil Weight	Oil Brand	Oil Type	Oil Changed	Date Analyzed	User Sample ID
30965	2/24/2026	6580	100	15W40	UNKNOWN	UNKNOWN	No	2/24/2026	
Comments	DIRT PRESENT. HOWEVER, SILICON IS ABNORMAL AT 50 PPM FOR ENGINES EQUIPPED WITH AIR SEPS. PISTON WEAR INDICATED. BEARING WEAR INDICATED. POSSIBLY DUE TO THE PRESENCE OF ABRASIVE DIRT PARTICLES. CHECK FOR OIL PRESSURE DROP AND ABNORMAL NOISE. CHECK FILTER AND AIR INDUCTION SYSTEM. ADVISE USE OF ADDITIONAL DIAGNOSTIC TOOLS TO DETERMINE COURSE OF CORRECTIVE ACTION.								

	Wear Metals(ppm)							*Contaminant Metals (ppm)*			*Multi-Source Metals (ppm)*					*Additives (ppm)*				
Sample ID	Iron	Chromium	Aluminum	Copper	Lead	Tin	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Nickel	Manganese	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
30965	70	<2	14	51	10	25	X	24	21	25	X	7	X	X	X	X	X	X	X	X

	Contaminants				*Physical Properties*								
Sample ID	Fuel	Soot	Water	Glycol	Nitration	TBN	Oxidation	V40C	V100C	VIndex	V40C Limit	V100C Limit	Visc Mode
30965	-	<0.1	<0.1	-	3.8	7.4	<2.0	109	14.4	135	92 - 124	12.5 - 16.3	C

ABNORMAL | SEVERE | D = DETECTED | - = NOT DETECTED | X = NOT TESTED / NOT APPLICABLE | NA = NOT AVAILABLE | C = CALCULATED | M = MEASURED

MARINE DIESEL SPECIALIST **Phone:** **Email:** **Fax:** ___-___-____	**Machine ID:** EL MIRAR **Machine Year :** NA **Component Description:**	**Component ID:** RNC02570 **Component Make:** CATERPILLAR **Component Model:** C32 **Component Year:** NA **Component Type :** DIESEL ENGINE **Component Location:** STARBOARD MAIN **Sump Capacity:** 25 Gallons	M✓C **MOTORCHECK LAB** **2000 N FLORIDA MANGO RD 104** **WEST PALM BEACH FL 33409** **561-684-7799**

Sample ID	Date Taken	Hours on Component	Hours on Oil	Oil Weight	Oil Brand	Oil Type	Oil Changed	Date Analyzed	User Sample ID
30967	2/24/2026	6575	100	15W40	UNKNOWN	UNKNOWN	No	2/24/2026	
Comments	ALL ENGINE WEAR RATES NORMAL. SILICON MOST LIKELY FROM SOURCE OTHER THAN DIRT, POSSIBLY ENGINE SEALANT (GASKET MATERIAL) AND/OR OIL ADDITIVE.								

	Wear Metals(ppm)							*Contaminant Metals (ppm)*			*Multi-Source Metals (ppm)*					*Additives (ppm)*				
Sample ID	Iron	Chromium	Aluminum	Copper	Lead	Tin	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Nickel	Manganese	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
30967	16	<2	<2	17	<2	10	X	24	8	<2	X	53	X	X	X	X	X	X	X	X

	Contaminants				*Physical Properties*								
Sample ID	Fuel	Soot	Water	Glycol	Nitration	TBN	Oxidation	V40C	V100C	VIndex	V40C Limit	V100C Limit	Visc Mode
30967	-	<0.1	<0.1	-	3.7	7.5	<2.0	109	14.4	135	92 - 124	12.5 - 16.3	C

ABNORMAL | SEVERE | D = DETECTED | - = NOT DETECTED | X = NOT TESTED / NOT APPLICABLE | NA = NOT AVAILABLE | C = CALCULATED | M = MEASURED

MARINE DIESEL SPECIALIST **Phone:** **Email:** **Fax:** ___-___-____	**Machine ID:** EL MIRAR **Machine Year :** NA **Component Description:**	**Component ID:** 50019001 **Component Make:** ZF **Component Model:** 3060-A **Component Year:** NA **Component Type :** GEARBOX **Component Location:** PORT **Sump Capacity:** 8 Gallons	M✓C **MOTORCHECK LAB** **2000 N FLORIDA MANGO RD 104** **WEST PALM BEACH FL 33409** **561-684-7799**

Sample ID	Date Taken	Hours on Component	Hours on Oil	Oil Weight	Oil Brand	Oil Type	Oil Changed	Date Analyzed	User Sample ID
30968	2/24/2026	6580	100	SAE 40	UNKNOWN	UNKNOWN	No	2/24/2026	
Comments	CHROMIUM LEVEL HIGHER THAN NORMAL. DIRT PRESENT. CHECK ALL DIRT ACCESS POINTS. DIRT HIGH. POTASSIUM LEVEL HIGHER THAN TYPICAL. SUSPECT SALT WATER INTRUSION. CHECK TRANSMISSION COOLER. FLUSH UNIT THOROUGHLY. DRAIN OIL FROM UNIT IF NOT ALREADY DONE.								

	Wear Metals(ppm)							*Contaminant Metals (ppm)*			*Multi-Source Metals (ppm)*					*Additives (ppm)*				
Sample ID	Iron	Chromium	Aluminum	Copper	Lead	Tin	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Nickel	Manganese	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
30968	34	8	<2	27	<2	<2	X	31	13	38	X	46	X	X	X	X	X	X	X	X

	Contaminants				*Physical Properties*								
Sample ID	Fuel	Soot	Water	Glycol	Nitration	TBN	Oxidation	V40C	V100C	VIndex	V40C Limit	V100C Limit	Visc Mode
30968	X	X	<0.1	X	X	X	<2.0	157	14.4	88	133 - 181	12.5 - 16.3	C

ABNORMAL | SEVERE | D = DETECTED | - = NOT DETECTED | X = NOT TESTED / NOT APPLICABLE | NA = NOT AVAILABLE | C = CALCULATED | M = MEASURED

MARINE DIESEL SPECIALIST **Phone:** **Email:** **Fax:** ___-___-____	**Machine ID:** EL MIRAR **Machine Year :** NA **Component Description:**	**Component ID:** 50019402 **Component Make:** ZF **Component Model:** 3060-A **Component Year:** NA **Component Type :** GEARBOX **Component Location:** STARBOARD **Sump Capacity:** 8 Gallons	M✓C **MOTORCHECK LAB** **2000 N FLORIDA MANGO RD 104** **WEST PALM BEACH FL 33409** **561-684-7799**

Sample ID	Date Taken	Hours on Component	Hours on Oil	Oil Weight	Oil Brand	Oil Type	Oil Changed	Date Analyzed	User Sample ID
30969	2/24/2026	6575	100	SAE 40	UNKNOWN	UNKNOWN	No	2/24/2026	
Comments	GEAR UNIT WEAR RATES NORMAL. SILICON LEVEL (DIRT/SEAL MATERIAL) HIGHER THAN NORMAL . DRAIN OIL FROM UNIT IF NOT ALREADY DONE.								

	Wear Metals(ppm)							*Contaminant Metals (ppm)*			*Multi-Source Metals (ppm)*					*Additives (ppm)*				
Sample ID	Iron	Chromium	Aluminum	Copper	Lead	Tin	Vanadium	Silicon	Sodium	Potassium	Titanium	Molybdenum	Nickel	Manganese	Boron	Magnesium	Calcium	Barium	Phosphorus	Zinc
30969	38	3	11	47	<2	3	X	29	<2	<2	X	28	X	X	X	X	X	X	X	X

	Contaminants				*Physical Properties*								
Sample ID	Fuel	Soot	Water	Glycol	Nitration	TBN	Oxidation	V40C	V100C	VIndex	V40C Limit	V100C Limit	Visc Mode
30969	X	X	<0.1	X	X	X	<2.0	157	14.4	88	133 - 181	12.5 - 16.3	C

ABNORMAL | SEVERE | D = DETECTED | - = NOT DETECTED | X = NOT TESTED / NOT APPLICABLE | NA = NOT AVAILABLE | C = CALCULATED | M = MEASURED

M✓C™ *UNDERSTANDING YOUR REPORT*

	ENGINES	TRANSMISSIONS
ALUMINUM:	PISTONS, BEARINGS, HOUSINGS, THRUST WASHERS, BUSHINGS	TORQUE CONVERTER, THE CASE, THRUST WASHERS, HOUSINGS, GEAR AND VANE PUMPS
CHROMIUM:	COMPRESSION RINGS, LOW FRICTION BEARINGS, LINERS, CHROMATE COOLING SYSTEM	BALL AND ROLLER BEARINGS, ALLOY OF STEEL PARTS
COPPER:	BEARINGS, BUSHINGS, THRUST WASHERS, OIL COOLER, CLUTCHES, AND AN OIL ADDITIVE IN SOME GASOLINE ENGINE OILS.	CLUTCH PLATES, BRONZE BUSHINGS, OIL COOLER OXIDES, BRASS FITTINGS
IRON:	CRANKSHAFT, CYLINDERS, PISTONS, LINERS, BEARINGS, VALVE TRAIN	GEARS, BEARINGS, SHAFTS, SOME CASES, CLUTCH PLATES
LEAD:	BEARINGS, CONTAMINATION FROM LEADED GASOLINE	GEARS
TIN:	PISTON SKIRTS, BEARINGS, AND BUSHINGS.	SOME BEARING CAGES
SILICON:	AIRBORN DIRT, SEAL MATERIAL, GASKETS, USED IN SOME OIL ADDITIVES, SPRAY LUBRICANTS, WHEN FOUND WITH POTASSIUM INDICATES GLYCOL ISSUE	AIRBORN DIRT, SEALERS, GASKETS, USED IN SOME OIL ADDITIVES, SPRAY LUBRICANTS, WHEN FOUND WITH POTASSIUM INDICATES GLYCOL ISSUE, SAND-CASTED PARTS
POTASSIUM:	INDICATION OF GLYCOL OR SALTWATER INTRUSION, ADDITIVE IN SOME OILS	INDICATION OF GLYCOL OR SALTWATER INTRUSION, ADDITIVE IN SOME OILS
SODIUM:	FOUND IN SOME OIL ADDITIVES, GLYCOL, ENVIRONMENTAL COMTAMINANT OR SALT WATER	FOUND IN SOME OIL ADDITIVES, GLYCOL, ENVIRONMENTAL COMTAMINANT OR SALT WATER
WATER:	MEASURED IN % VOLUME, CAN BE INDICATION OF CONDENSATION, COOLING SYSTEM LEAK, OR OUTSIDE CONTAMINATION	
GLYCOL:	MEASURED IN % VOLUME, IN THE FORMULATION OF MOST COMMERCIAL COOLANTS	
OXIDATION:	THIS IS THE RESULTS OF OXYGEN IN THE AIR REACTING WITH THE OIL AT ELEVATED TEMPERATURES. THIS IS A NORMAL PROCESS AS THE OIL AGES. IF AN ENGINE IS OPERATED CONTINUOUSLY AT A HIGH TEMPERATURE FOR EXTENDED PERIODS, OR IF DRAIN INTERVAL IS OVER EXTENDED, OIL CHANGE IS RECOMMENDED.	
NITRATION:	FORMED DURING COMBUSTION PROCESS, LEADS TO ACCELERATED OIL DETERIORATION.	
SOOT:	NORMAL COMBUSTION BY PRODUCT OF DIESEL FUEL AND APPEARS AS CONTAMINANT IN THE OIL CAUSING AN INCREASE IN VISCOSITY. INDICATE AN INPROPER AIR/FUEL RATIO, DEFECTIVE AIR INTAKE, FAULTY INJECTORS, OR BLOW-BY	
VISCOSITY:	CALCULATED MEASUREMENT OF THE OIL'S ABILITY TO FLOW AND LUBRICATE, INDICATES IF OIL IS TOO THICK OR THIN	
TBN:	MEASUREMENT OF OIL'S ALKALINE BASE RESERVE, ADDITIVE IN OIL CAPABLE OF NEUTRALIZING ACIDIC CONTAMINANTS, WHEN TBN IS BELOW 3, IT IS AN INDICATION THE OIL IS NO LONGER SERVICEABLE	
FUEL DILUTION:	MEASURED IN % VOLUME, CAN INDICATE FAULTY COMBUSTION, RICH AIR/FUEL MIXTURE WHEN PRESENT BETWEEN 2%-5%. INJECTOR PROPBLEM OR INTERNAL FUEL LINE LEAK IS TYPICALLY INDICATED WHEN FUEL IS DETECTED AT HIGH LEVELS	

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Ensure that all safety information, warnings, and instructions are read and understood before any operation or any maintenance procedures are performed.

The user is responsible for the performance of maintenance, including all adjustments, the use of proper lubricants, fluids, filters, and the replacement of components due to normal wear and aging. Failure to adhere to proper maintenance intervals and procedures may result in diminished performance of the product and/or accelerated wear of components.

Use mileage, fuel consumption, service hours, or calendar time, WHICH EVER OCCURS FIRST, in order to determine the maintenance intervals. Products that operate in severe operating conditions may require more frequent maintenance.

Note: Before each consecutive interval is performed, all maintenance from the previous interval must be performed.

When Required

Battery - Replace Battery or Battery Cable - Disconnect Engine - Clean Engine Oil Level Gauge - Calibrate Engine Storage Procedure - Check Fuel System - Prime Heat Exchanger - Inspect Maintenance Recommendations Sea Water Strainer - Clean/Inspect Zinc Rods - Inspect/Replace

Daily

Cooling System Coolant Level - Check Engine Air Cleaner Service Indicator - Inspect Engine Oil Level - Check Fuel System Primary Filter/Water Separator - Drain Walk-Around Inspection

Initial 10 Service Hours

Belts - Inspect/Adjust/Replace

Every 50 Service Hours or Weekly

Sea Water Strainer - Clean/Inspect Zinc Rods - Inspect/Replace

Every 22 700 L (6000 US gal) of Fuel or 250 Service Hours or 1 Year

Auxiliary Water Pump (Rubber Impeller) - Inspect/Replace Battery Electrolyte Level - Check Belts - Inspect/Adjust/Replace Cooling System Coolant Sample (Level 1) - Obtain Cooling System Supplemental Coolant Additive (SCA) - Test/Add Engine - Clean Engine Air Cleaner

Element - Clean/Replace Engine Crankcase Breather - Clean Engine Oil Sample - Obtain Engine Oil and Filter - Change Fuel System Primary Filter (Water Separator) Element - Replace Fuel System Secondary Filter - Replace Fuel Tank Water and Sediment - Drain Hoses and Clamps - Inspect/Replace

Initial 500 Hours (for New Systems, Refilled Systems, and Converted Systems)

Cooling System Coolant Sample (Level 2) - Obtain Engine Valve Lash - Inspect/Adjust Engine Valve Rotators - Inspect Fuel Injector - Inspect/Adjust

Every Year

Cooling System Coolant Sample (Level 2) - Obtain

Every 90 850 L (24 000 US gal) of Fuel or 1000 Service Hours

Aftercooler Condensate Drain Valve - Inspect/Clean Closed Crankcase Ventilation (CCV) Fumes Disposal Filter - Replace Turbocharger - Inspect

Every 272 550 L (72 000 US gal) of Fuel or 3000 Service Hours

Auxiliary Water Pump (Bronze Impeller) - Inspect/Replace Cooling System Water Temperature Regulator - Replace Crankshaft Vibration Damper - Inspect Engine Mounts - Inspect Engine Speed/Timing Sensors - Check/Clean/Calibrate Engine Valve Lash - Inspect/Adjust Engine Valve Rotators - Inspect Fuel Injector - Inspect/Adjust Heat Exchanger - Inspect Starting Motor - Inspect

Every 454 250 L (120 000 US gal) of Fuel or 5000 Service Hours

Alternator - Inspect Maintenance Recommendations Oil Cooler Core - Check/Clean/Test Overhaul (Top End) Water Pump - Inspect

Every 757 085 L (200 000 US gal) of Fuel or 8500 Service Hours

Maintenance Recommendations Overhaul (Major)

Every 3000 Service Hours or 2 Years

Aftercooler Core - Clean/Test

Every 3000 Service Hours or 3 Years

Cooling System Coolant (DEAC) - Change

Every 6000 Service Hours or 3 Years

Cooling System Coolant Extender (ELC) - Add

Every 12 000 Service Hours or 6 Years

Cooling System Coolant (ELC) - Change

Every 6 Years

Aftercooler Core - Replace

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