

Parameter	Directions	Potential Causes	Recommended Action	Suggested Checklist	Further Root Cause Checklist
Air Cooler Cooling Water Inlet Temperature	High	1. Reduced cooling water flow rate	1. Inspect and clean cooling water strainers	1. Monitor cooling water flow rate	1. Check for cooling water pump performance and impeller condition
Air Cooler Cooling Water Inlet Temperature	High	2. Scaling or fouling of the heat exchanger	2. Perform chemical cleaning of the heat exchanger surfaces	2. Inspect for leaks in the heat exchanger	2. Check for proper heat exchanger maintenance
Air Cooler Cooling Water Inlet Temperature	High	3. Faulty thermostat	3. Replace the thermostat	3. Confirm proper thermostat operation	3. Inspect and test the thermostat
Air Cooler Cooling Water Inlet Temperature	Low	1. Overcooling due to excessive flow	1. Adjust or control the cooling water flow rate	1. Monitor cooling water flow rate	1. Inspect and calibrate cooling water flow control system
Air Cooler Cooling Water Inlet Temperature	Low	2. Air pockets in the cooling system	2. Bleed air from the cooling system	2. Verify absence of air pockets in the system	2. Check for cooling system leaks and integrity
Air Cooler Cooling Water Inlet Temperature	Low	3. Malfunctioning temperature sensor	3. Calibrate or replace the temperature sensor	3. Confirm instrument readings match actual values	3. Check and calibrate temperature sensors
Air Cooler Cooling Water Outlet Temperature	High	1. Reduced cooling water flow rate	1. Inspect and clean cooling water strainers	1. Monitor cooling water flow rate	1. Check for cooling water pump performance and impeller condition
Air Cooler Cooling Water Outlet Temperature	High	2. Scaling or fouling of the heat exchanger	2. Perform chemical cleaning of the heat exchanger surfaces	2. Inspect for leaks in the heat exchanger	2. Check for proper heat exchanger maintenance
Air Cooler Cooling Water Outlet Temperature	High	3. Faulty thermostat	3. Replace the thermostat	3. Confirm proper thermostat operation	3. Inspect and test the thermostat
Air Cooler Cooling Water Outlet Temperature	Low	1. Overcooling due to excessive flow	1. Adjust or control the cooling water flow rate	1. Monitor cooling water flow rate	1. Inspect and calibrate cooling water flow control system
Air Cooler Cooling Water Outlet Temperature	Low	2. Air pockets in the cooling system	2. Bleed air from the cooling system	2. Verify absence of air pockets in the system	2. Check for cooling system leaks and integrity
Air Cooler Cooling Water Outlet Temperature	Low	3. Malfunctioning temperature sensor	3. Calibrate or replace the temperature sensor	3. Confirm instrument readings match actual values	3. Check and calibrate temperature sensors
Air Cooler Inlet Fuel Temperature	High	1. Insufficient cooling water flow	1. Check and clean cooling water passages	1. Verify cooling water pump functionality	1. Inspect cooling water pump impeller and replace if needed
Air Cooler Inlet Fuel Temperature	High	2. Cooling water pump malfunction	2. Inspect and repair/replace the cooling water pump	2. Monitor cooling water pump pressure	2. Conduct flow test on cooling water pump
Air Cooler Inlet Fuel Temperature	High	3. Fouling of the air cooler	3. Clean the air cooler surfaces and passages	3. Check for leaks in the air cooler	3. Perform a thorough inspection of the air cooler surfaces
Air Cooler Inlet Fuel Temperature	Low	1. Air cooler bypass open	1. Adjust or close the air cooler bypass as necessary	1. Verify air cooler bypass position	1. Check for air cooler bypass valve functionality
Air Cooler Inlet Fuel Temperature	Low	2. Insufficient fuel flow	2. Check and clean fuel lines and filters	2. Monitor fuel pressure	2. Conduct a flow test on the fuel system
Air Cooler Inlet Fuel Temperature	Low	3. Malfunctioning temperature sensor	3. Calibrate or replace the temperature sensor	3. Confirm instrument readings match actual values	3. Check and calibrate temperature sensors
Air Cooler Outlet Fuel Temperature	High	1. Insufficient cooling water flow	1. Check and clean cooling water passages	1. Verify cooling water pump functionality	1. Inspect cooling water pump impeller and replace if needed
Air Cooler Outlet Fuel Temperature	High	2. Cooling water pump malfunction	2. Inspect and repair/replace the cooling water pump	2. Monitor cooling water pump pressure	2. Conduct flow test on cooling water pump
Air Cooler Outlet Fuel Temperature	High	3. Fouling of the air cooler	3. Clean the air cooler surfaces and passages	3. Check for leaks in the air cooler	3. Perform a thorough inspection of the air cooler surfaces
Air Cooler Outlet Fuel Temperature	Low	1. Air cooler bypass open	1. Adjust or close the air cooler bypass as necessary	1. Verify air cooler bypass position	1. Check for air cooler bypass valve functionality
Air Cooler Outlet Fuel Temperature	Low	2. Insufficient fuel flow	2. Check and clean fuel lines and filters	2. Monitor fuel pressure	2. Conduct a flow test on the fuel system
Air Cooler Outlet Fuel Temperature	Low	3. Malfunctioning temperature sensor	3. Calibrate or replace the temperature sensor	3. Confirm instrument readings match actual values	3. Check and calibrate temperature sensors
Compression Pressure	High	1. Cylinder Sealing Issues	1. Inspect and replace worn piston rings or valves	1. Conduct a compression test, identify and replace faulty components	1. Inspect and measure cylinder components for wear and tear
Compression Pressure	High	2. Carbon Deposits	2. Perform decarbonization procedures	2. Regularly use fuel additives, inspect and clean combustion chambers	3. Inspect and clean injectors for proper fuel atomization and distribution
Compression Pressure	High	3. Valve Timing Issues	3. Check and adjust valve timing as per specifications	3. Inspect and adjust valve timing components	4. Validate timing with specialized equipment and assess timing components
Compression Pressure	High	4. Fuel Quality Issues	4. Use high-quality fuel and additives to prevent carbon buildup	4. Monitor fuel quality, inspect and clean fuel filters, assess fuel delivery system	5. Investigate fuel system for irregularities, such as pressure or flow issues
Compression Pressure	Low	1. Leakage in Cylinder or Valves	1. Identify and repair any leaks in cylinders or valves	1. Conduct a leak-down test, inspect and repair leaks	1. Inspect gaskets, seals, and components for any signs of leakage
Compression Pressure	Low	2. Inadequate Lubrication	2. Ensure proper lubrication of piston rings and valves	2. Monitor oil levels and quality, perform regular oil changes	2. Inspect lubrication system components for malfunctions and wear
Compression Pressure	Low	3. Incorrect Valve Clearance	3. Adjust valve clearance to specifications	3. Periodically check and adjust valve clearance	3. Investigate valve train components for wear or damage
Compression Pressure	Low	4. Exhaust Restriction	4. Inspect and remove any restrictions in the exhaust system	4. Check exhaust pipes, mufflers, and catalytic converters	4. Assess exhaust components for damage or blockages
Compression Pressure	High	1. Carbon deposits on piston rings and cylinder walls	1. Perform decarbonization and clean piston rings and cylinder walls	1. Include decarbonization in routine maintenance	1. Investigate factors leading to carbon deposits
Compression Pressure	High	2. Malfunctioning valves	2. Inspect and adjust valves for proper seating and operation	2. Include valve inspection and adjustment in routine maintenance	2. Investigate factors causing valve malfunctions
Compression Pressure	High	3. Worn or damaged piston rings	3. Inspect and replace worn or damaged piston rings	3. Include piston ring inspection and replacement in routine maintenance	3. Investigate factors causing accelerated wear of piston rings
Compression Pressure	Low	1. Leakage in the cylinder or piston rings	1. Perform leak-down test to identify and fix leaks	1. Include leak-down test in routine maintenance	1. Investigate factors causing cylinder or piston ring leakage
Compression Pressure	Low	2. Inadequate compression due to valve clearance	2. Inspect and adjust valve clearance as per specifications	2. Include valve clearance inspection and adjustment in routine maintenance	2. Investigate factors affecting valve clearance
Compression Pressure	Low	3. Incorrect cylinder pressure measurement	3. Calibrate and verify accuracy of compression pressure measurement instruments	3. Regularly calibrate compression pressure measurement instruments	3. Investigate factors leading to inaccurate pressure measurements
Exhaust Gas Temperature	High	1. Lean Air-Fuel Mixture	1. Adjust air-fuel ratio to the correct specifications	1. Check and adjust fuel injectors, inspect for clogs or malfunctions	1. Conduct emission tests, inspect oxygen sensors for proper functioning
Exhaust Gas Temperature	High	2. Ignition Timing Issues	2. Adjust ignition timing as per manufacturer's recommendations	2. Use timing lights to check and adjust ignition timing	2. Investigate timing components, such as distributor or sensors, for irregularities
Exhaust Gas Temperature	High	3. Clogged Exhaust System	3. Inspect and clear any obstructions in the exhaust system	3. Check catalytic converters, mufflers, and pipes for blockages	3. Assess exhaust components for damage or wear, inspect for any leaks
Exhaust Gas Temperature	High	4. Malfunctioning EGR System	4. Repair or replace faulty Exhaust Gas Recirculation (EGR) components	4. Perform EGR system tests, inspect for proper valve operation and cleanliness	4. Validate EGR system with specialized equipment, check for clogs or leaks
Exhaust Gas Temperature	Low	1. Rich Air-Fuel Mixture	1. Adjust air-fuel ratio to the correct specifications	1. Inspect and adjust fuel injectors, ensure proper fuel atomization	1. Conduct emission tests, inspect oxygen sensors for proper functioning
Exhaust Gas Temperature	Low	2. Ignition Misfire	2. Repair or replace malfunctioning ignition components	2. Check spark plugs, ignition coils, and wires for wear or damage	2. Investigate ignition system for irregularities or potential failures
Exhaust Gas Temperature	Low	3. Inadequate Fuel Injection	3. Check and calibrate fuel injectors for proper operation	3. Monitor fuel pressure, inspect for clogs or malfunctions in the injection system	3. Assess fuel injection system components for wear, damage, or malfunctions
Exhaust Gas Temperature	Low	4. Exhaust System Leak	4. Identify and repair any leaks in the exhaust system	4. Conduct a smoke test to detect leaks, inspect gaskets and joints	4. Investigate exhaust system for signs of damage or corrosion
Exhaust Gas Temperature	High	1. Overloading	1. Operate the engine within the specified load limits	1. Include load monitoring and compliance checks in routine maintenance	1. Investigate factors causing overloading
Exhaust Gas Temperature	High	2. Lean Fuel Mixture	2. Adjust the air-fuel mixture to the manufacturer's specifications	2. Include air-fuel mixture checks in routine maintenance	2. Investigate factors causing lean fuel mixture
Exhaust Gas Temperature	High	3. Ignition Timing Issues	3. Check and adjust ignition timing to the manufacturer's recommendations	3. Include ignition system checks in routine maintenance	3. Investigate factors affecting ignition timing
Exhaust Gas Temperature	High	4. Combustion Inefficiency	4. Inspect and optimize combustion chamber conditions	4. Include combustion system inspections in routine maintenance	4. Investigate factors affecting combustion efficiency
Exhaust Gas Temperature	Low	1. Reduced Load	1. Operate the engine within the specified load range	1. Include load monitoring and compliance checks in routine maintenance	1. Investigate factors causing reduced load
Exhaust Gas Temperature	Low	2. Rich Fuel Mixture	2. Adjust the air-fuel mixture to the manufacturer's specifications	2. Include air-fuel mixture checks in routine maintenance	2. Investigate factors causing rich fuel mixture
Exhaust Gas Temperature	Low	3. Exhaust System Leaks	3. Inspect and repair exhaust system leaks	3. Include exhaust system inspection for leaks in routine maintenance	3. Investigate factors causing exhaust leaks
Exhaust Gas Turbocharger Inlet Temperature	High	1. Reduced airflow to the turbocharger	1. Inspect and clean air filters	1. Monitor air filter condition	1. Check for air filter restrictions and intake system integrity
Exhaust Gas Turbocharger Inlet Temperature	High	2. Faulty or worn-out turbocharger components	2. Perform a visual inspection of the turbocharger components	2. Inspect turbocharger components for wear and damage	2. Conduct a thorough inspection of the turbocharger components

Exhaust Gas Turbocharger Inlet Temperature	High	3. Combustion issues, such as incomplete combustion or misfiring	3. Check and service fuel injectors	3. Monitor combustion parameters	3. Investigate and diagnose combustion-related issues
Exhaust Gas Turbocharger Inlet Temperature	High	4. Heat exchanger fouling or scaling	4. Perform chemical cleaning of heat exchanger surfaces	4. Inspect for leaks in the heat exchanger	4. Check and maintain heat exchanger components
Exhaust Gas Turbocharger Inlet Temperature	Low	1. Improved combustion efficiency	1. Monitor and maintain optimal fuel-air mixture ratios	1. Monitor combustion parameters	1. Investigate and optimize combustion parameters
Exhaust Gas Turbocharger Inlet Temperature	Low	2. Adequate airflow to the turbocharger	2. Confirm proper functioning of air intake and filtration systems	2. Monitor air filter condition and intake system integrity	2. Check and maintain air intake components
Exhaust Gas Turbocharger Inlet Temperature	Low	3. Malfunctioning temperature sensor	3. Calibrate or replace the temperature sensor	3. Confirm instrument readings match actual values	3. Check and calibrate temperature sensors
Exhaust Gas Turbocharger Outlet Temperature	High	1. Overheating of the turbocharger components	1. Inspect and clean air filters	1. Monitor air filter condition	1. Check for air filter restrictions and intake system integrity
Exhaust Gas Turbocharger Outlet Temperature	High	2. Excessive exhaust gas temperatures	2. Monitor and optimize engine combustion parameters	2. Check for abnormal combustion and misfiring	2. Investigate and diagnose combustion-related issues
Exhaust Gas Turbocharger Outlet Temperature	High	3. Restricted or leaking exhaust system	3. Inspect and rectify any restrictions or leaks in the exhaust system	3. Check for exhaust system leaks and restrictions	3. Conduct a thorough inspection of the exhaust system
Exhaust Gas Turbocharger Outlet Temperature	Low	1. Insufficient engine load	1. Ensure the engine operates within the recommended load range	1. Monitor engine load conditions	1. Investigate and optimize engine load conditions
Exhaust Gas Turbocharger Outlet Temperature	Low	2. Reduced combustion efficiency	2. Check and service fuel injectors	2. Monitor combustion parameters	2. Investigate and optimize combustion parameters
Exhaust Gas Turbocharger Outlet Temperature	Low	3. Faulty or worn-out turbocharger components	3. Perform a visual inspection of the turbocharger components	3. Inspect turbocharger components for wear and damage	3. Conduct a thorough inspection of the turbocharger components
Exhaust Gas Turbocharger Outlet Temperature	Low	4. Heat exchanger fouling or scaling	4. Perform chemical cleaning of heat exchanger surfaces	4. Inspect for leaks in the heat exchanger	4. Check and maintain heat exchanger components
Fuel Pump Index	High	1. Overly rich fuel mixture	1. Check and adjust fuel injection settings	1. Monitor exhaust gas emissions	1. Investigate and optimize fuel injection parameters
Fuel Pump Index	High	2. Faulty fuel pressure regulator	2. Inspect and replace the fuel pressure regulator	2. Check fuel pressure consistency	2. Diagnose and address issues with the pressure regulator
Fuel Pump Index	High	3. Clogged fuel injectors	3. Perform fuel injector cleaning or replacement	3. Monitor fuel injector performance	3. Investigate and address issues with individual injectors
Fuel Pump Index	Low	1. Lean fuel mixture	1. Check and adjust fuel injection settings	1. Monitor exhaust gas emissions	1. Investigate and optimize fuel injection parameters
Fuel Pump Index	Low	2. Reduced fuel pressure	2. Inspect and address fuel system for leaks or issues	2. Check fuel pressure consistency	2. Diagnose and address issues with the fuel delivery system
Main Engine RPM	High	1. Incorrect Fuel-Air Mixture	1. Adjust the fuel injectors for optimal mixture	1. Monitor and adjust the air-fuel ratio	1. Perform combustion analysis, inspect fuel injectors for irregularities
Main Engine RPM	High	2. Throttle Control Issues	2. Inspect and calibrate throttle control system	2. Check throttle linkage, sensors, and control mechanisms	2. Evaluate throttle response, look for anomalies in control signals
Main Engine RPM	High	3. Overloading or High Load Conditions	3. Reduce load or redistribute engine workload	3. Monitor load distribution, avoid prolonged high-load operations	3. Assess engine load during peak RPM, inspect components for stress
Main Engine RPM	Low	1. Fuel Supply Issues	1. Ensure adequate and clean fuel supply	1. Inspect fuel filters, lines, and pump for blockages or contamination	1. Conduct fuel quality analysis, check for impurities or water content
Main Engine RPM	Low	2. Ignition System Problems	2. Check and repair issues with the ignition system	2. Inspect spark plugs, ignition coils, and wiring for faults	2. Perform ignition system diagnostics, evaluate component conditions
Main Engine RPM	Low	3. Throttle Control Malfunction	3. Inspect and repair the throttle control system	3. Check for throttle linkage binding, test sensors and control mechanisms	3. Evaluate system response to throttle commands, look for inconsistencies
Mean Effective Pressure	High	1. Combustion Efficiency	1. Optimize air-fuel mixture for improved combustion efficiency	1. Monitor and adjust air-fuel ratio during operation	1. Analyze combustion characteristics, inspect spark plugs and ignition system
Mean Effective Pressure	High	2. Ignition Timing	2. Ensure proper ignition timing settings	2. Check and adjust ignition timing as per specifications	2. Validate timing with specialized equipment and assess timing components
Mean Effective Pressure	High	3. Cylinder Compression	3. Check and equalize compression across cylinders	3. Conduct a compression test, inspect and adjust as necessary	3. Inspect valves, piston rings, and cylinder condition
Mean Effective Pressure	Low	1. Air Intake Issues	1. Inspect air filters, check for restrictions or blockages	1. Regularly replace air filters, clean intake components	1. Conduct detailed inspection of intake system for any anomalies
Mean Effective Pressure	Low	2. Exhaust Restrictions	2. Check for clogs or restrictions in the exhaust system	2. Inspect and clear any exhaust obstructions	2. Evaluate overall exhaust flow dynamics and address issues
Mean Effective Pressure	Low	3. Fuel Injection Issues	3. Inspect fuel injectors and address any malfunctions	3. Conduct fuel injector tests, ensure proper fuel delivery	3. Analyze injector performance and fuel delivery systems
Mean Effective Pressure	High	1. Advanced injection timing	1. Adjust injection timing to the manufacturer's specifications	1. Include injection timing verification in routine maintenance	1. Investigate factors leading to advanced injection timing
Mean Effective Pressure	High	2. Overfueling	2. Check and calibrate fuel injectors to ensure proper fuel delivery	2. Include fuel injector inspection and calibration in routine maintenance	2. Investigate factors causing overfueling
Mean Effective Pressure	High	3. Improper combustion	3. Optimize air-fuel mixture, check ignition system, and inspect combustion chamber	3. Include combustion system inspection and optimization in routine maintenance	3. Investigate factors affecting combustion quality
Mean Effective Pressure	Low	1. Late injection timing	1. Adjust injection timing to the manufacturer's specifications	1. Include injection timing verification in routine maintenance	1. Investigate factors leading to delayed injection timing
Mean Effective Pressure	Low	2. Restricted air intake or exhaust	2. Inspect and clean air filters, check exhaust system for restrictions	2. Include air intake and exhaust system inspection and cleaning	2. Investigate factors causing air or exhaust restrictions
Mean Effective Pressure	Low	3. Fuel system issues	3. Check and calibrate fuel injectors, inspect fuel system for leaks or blockages	3. Include fuel system inspection and calibration in routine maintenance	3. Investigate factors affecting fuel system performance
Peak Pressure	High	1. Ignition Timing	1. Verify and adjust ignition timing as per specifications	1. Check ignition timing settings	1. Validate timing with specialized equipment
Peak Pressure	High	2. Air-Fuel Mixture	2. Inspect and adjust air-fuel mixture for optimal combustion	2. Monitor air-fuel ratio during operation	2. Perform detailed analysis of fuel system and combustion characteristics
Peak Pressure	High	3. Cylinder Compression	3. Conduct a compression test to identify any issues	3. Check and compare compression across cylinders	3. Inspect valves, piston rings, and cylinder condition
Peak Pressure	Low	1. Fuel Injection Issues	1. Inspect fuel injectors and address any malfunctions	1. Conduct fuel injector tests	1. Analyze injector performance and fuel delivery systems
Peak Pressure	Low	2. Intake or Exhaust Restrictions	2. Check for clogs or restrictions in intake and exhaust systems	2. Inspect air filters, check for exhaust obstructions	2. Evaluate overall airflow and exhaust flow dynamics
Peak Pressure	Low	3. Valve Timing	3. Verify and adjust valve timing as per specifications	3. Inspect valve timing settings	3. Validate timing with specialized equipment and check for mechanical issues
Peak Pressure	High	1. Increased load on the engine	1. Optimize vessel speed and power demand based on operational needs	1. Monitor load distribution and adjust throttle accordingly	1. Evaluate vessel load requirements and optimize engine operation
Peak Pressure	High	2. Advanced injection timing	2. Adjust injection timing within specified limits	2. Monitor and adjust injection timing during routine inspections	2. Investigate factors influencing advanced injection timing
Peak Pressure	High	3. Combustion chamber deposits	3. Regularly clean combustion chambers and check for deposits	3. Include combustion chamber inspection in routine maintenance	3. Investigate factors contributing to combustion chamber deposits
Peak Pressure	Low	1. Reduced load on the engine	1. Adjust vessel speed and power demand based on operational needs	1. Monitor load distribution and adjust throttle accordingly	1. Evaluate vessel load requirements and optimize engine operation
Peak Pressure	Low	2. Retarded injection timing	2. Adjust injection timing within specified limits	2. Monitor and adjust injection timing during routine inspections	2. Investigate factors influencing retarded injection timing
Peak Pressure	Low	3. Inadequate air-fuel mixture	3. Ensure proper air-fuel mixture by inspecting and cleaning fuel injectors	3. Include fuel injector inspection and cleaning in routine maintenance	3. Investigate factors affecting air-fuel mixture quality
Scavenge Air Pressure	High	1. Air Leakage in Scavenge System	1. Inspect and seal any air leakage points in the system	1. Check gaskets, joints, and connections for leaks	1. Perform pressure tests, use ultrasonic equipment to detect inaudible leaks
Scavenge Air Pressure	High	2. Clogged Scavenge Air Filters	2. Replace or clean air filters to ensure proper airflow	2. Regularly inspect and replace air filters	2. Investigate filtration system for efficiency, check for contaminants
Scavenge Air Pressure	High	3. Malfunctioning Scavenge Blower	3. Repair or replace faulty scavenge blower components	3. Monitor blower performance, check for unusual noises	3. Inspect blower motor, belts, and bearings for wear or malfunctions
Scavenge Air Pressure	High	4. Combustion Issues Leading to High Cylinder Pressures	4. Address combustion problems, optimize fuel-air mixture	4. Check and adjust fuel injectors, inspect combustion chamber for irregularities	4. Perform cylinder pressure tests, assess piston rings and liners for wear
Scavenge Air Pressure	Low	1. Scavenge Air Leakage	1. Inspect and seal any air leakage points in the system	1. Check gaskets, joints, and connections for leaks	1. Perform pressure tests, use ultrasonic equipment to detect inaudible leaks
Scavenge Air Pressure	Low	2. Scavenge Blower Malfunction	2. Repair or replace faulty scavenge blower components	2. Monitor blower performance, check for unusual noises	2. Inspect blower motor, belts, and bearings for wear or malfunctions
Scavenge Air Pressure	Low	3. Inadequate Scavenge Air Supply	3. Ensure sufficient scavenge air supply, address restrictions	3. Inspect air intake system, check for clogs or blockages	3. Evaluate scavenge air supply components, ensure proper functioning
Scavenge Air Pressure	Low	4. Exhaust System Blockages	4. Inspect and clear any obstructions in the exhaust system	4. Check for blockages in pipes, mufflers, and catalytic converters	4. Investigate exhaust components for damage or wear, inspect for any leaks
Scavenge Air Temperature	High	1. Overheating of Turbocharger	1. Inspect and clean the turbocharger components	1. Monitor turbocharger condition, check for blockages and overheating	1. Conduct thermal imaging of turbocharger, assess component conditions
Scavenge Air Temperature	High	2. Restricted Airflow in Scavenge Air System	2. Inspect and clean scavenge air filters and passages	2. Check for blockages in air filters and ducts, ensure smooth airflow	2. Measure and analyze scavenge air pressure and temperature distribution

Scavenge Air Temperature	High	3. Engine Room Temperature	3. Optimize engine room ventilation, cool the surroundings	3. Ensure proper ventilation, monitor engine room temperature	3. Evaluate engine room cooling system, inspect for insulation issues
Scavenge Air Temperature	Low	1. Insufficient Cooling	1. Improve cooling system efficiency	1. Check cooling system components, inspect for leaks and malfunctions	1. Conduct a thorough inspection of cooling system, evaluate heat exchange
Scavenge Air Temperature	Low	2. Cold Ambient Conditions	2. Utilize preheating systems in cold environments	2. Monitor ambient temperature, consider the use of heating elements	2. Assess effectiveness of preheating systems, inspect for malfunctions
Scavenge Air Temperature	Low	3. Malfunctioning Temperature Sensors	3. Calibrate or replace malfunctioning temperature sensors	3. Check and calibrate temperature sensors, inspect wiring connections	3. Evaluate sensor response, verify accuracy with additional temperature readings
SFOC (Specific Fuel Oil Consumption)	High	1. Increased load on the engine	1. Optimize vessel speed and power demand based on operational needs	1. Monitor load distribution and adjust throttle accordingly	1. Evaluate vessel load requirements and optimize engine operation
SFOC (Specific Fuel Oil Consumption)	High	2. Poor combustion efficiency	2. Inspect fuel injectors, combustion chamber, and ensure proper fuel atomization	2. Regularly check and clean fuel injectors; perform combustion analysis	2. Investigate factors affecting combustion efficiency and address them
SFOC (Specific Fuel Oil Consumption)	High	3. Incorrect fuel injection timing	3. Adjust fuel injection timing to optimize combustion efficiency	3. Check and adjust fuel injection timing based on engine specifications	3. Investigate factors affecting injection timing and optimize settings
SFOC (Specific Fuel Oil Consumption)	High	4. Fuel quality issues	4. Use high-quality fuel and monitor fuel quality regularly	4. Implement a fuel quality monitoring program	4. Investigate factors affecting fuel quality and address them
SFOC (Specific Fuel Oil Consumption)	Low	1. Reduced load on the engine	1. Adjust vessel speed and power demand based on operational needs	1. Monitor load distribution and adjust throttle accordingly	1. Evaluate vessel load requirements and optimize engine operation
SFOC (Specific Fuel Oil Consumption)	Low	2. Improvements in combustion efficiency	2. Regular maintenance of fuel injectors, combustion chamber, and fuel system	2. Implement a regular maintenance schedule for fuel system components	2. Investigate factors affecting combustion efficiency and address them
SFOC (Specific Fuel Oil Consumption)	Low	3. Optimized fuel injection timing	3. Ensure the fuel injection timing is optimized for the engine's performance	3. Regularly check and adjust fuel injection timing based on engine specifications	3. Investigate factors affecting injection timing and optimize settings
SFOC (Specific Fuel Oil Consumption)	Low	4. Use of high-quality fuel	4. Ensure the use of high-quality fuel and monitor fuel quality regularly	4. Implement a fuel quality monitoring program	4. Investigate factors affecting fuel quality and address them
Specific Cylinder Oil Consumption	High	1. Increased load on the engine	1. Optimize vessel speed and power demand based on operational needs	1. Monitor load distribution and adjust throttle accordingly	1. Evaluate vessel load requirements and optimize engine operation
Specific Cylinder Oil Consumption	High	2. Worn or damaged piston rings	2. Regularly inspect and replace worn or damaged piston rings	2. Include piston ring inspection in routine maintenance tasks	2. Investigate factors contributing to piston ring wear and address them
Specific Cylinder Oil Consumption	High	3. Poor-quality cylinder oil	3. Use high-quality cylinder oil and monitor oil condition regularly	3. Implement regular cylinder oil quality checks	3. Investigate factors affecting cylinder oil quality and address them
Specific Cylinder Oil Consumption	Low	1. Reduced load on the engine	1. Adjust vessel speed and power demand based on operational needs	1. Monitor load distribution and adjust throttle accordingly	1. Evaluate vessel load requirements and optimize engine operation
Specific Cylinder Oil Consumption	Low	2. Well-maintained piston rings	2. Regularly inspect and maintain piston rings in good condition	2. Include piston ring inspection in routine maintenance tasks	2. Investigate factors contributing to well-maintained piston rings and optimize
Specific Cylinder Oil Consumption	Low	3. Use of high-quality cylinder oil	3. Ensure the use of high-quality cylinder oil and monitor oil condition regularly	3. Implement regular cylinder oil quality checks	3. Investigate factors affecting cylinder oil quality and address them
Torque Rich Index	High	Heavy weather conditions causing increased resistance	Adjust ship speed to avoid slamming in heavy seas	Be cautious of potential damage to stem and racing of propeller	Check for fouling and consider hull cleaning
Torque Rich Index	High	Potential slamming of the ship leading to propeller damage	Regularly check and clean hull and propeller as needed		
Torque Rich Index	Low	Calm weather conditions with lower resistance	Monitor and maintain normal ship speed in calm weather	Regularly check and clean hull and propeller as needed	Cleaner hull and propeller with lower resistance
Torque Rich Index	Low	Cleaner hull and propeller with lower resistance			
Turbocharger Average RPM	High	1. Increased engine load	1. Ensure the engine operates within the recommended load range	1. Monitor engine load conditions	1. Investigate and optimize engine load conditions
Turbocharger Average RPM	High	2. Excessive exhaust gas temperatures	2. Monitor and optimize engine combustion parameters	2. Check for abnormal combustion and misfiring	2. Investigate and diagnose combustion-related issues
Turbocharger Average RPM	High	3. Restricted air intake	3. Inspect and clean air filters	3. Monitor air filter condition	3. Check for air filter restrictions and intake system integrity
Turbocharger Average RPM	Low	1. Insufficient engine load	1. Ensure the engine operates within the recommended load range	1. Monitor engine load conditions	1. Investigate and optimize engine load conditions
Turbocharger Average RPM	Low	2. Reduced combustion efficiency	2. Check and service fuel injectors	2. Monitor combustion parameters	2. Investigate and optimize combustion parameters
Turbocharger Average RPM	Low	3. Faulty or worn-out turbocharger components	3. Perform a visual inspection of the turbocharger components	3. Inspect turbocharger components for wear and damage	3. Conduct a thorough inspection of the turbocharger components
Turbocharger Average RPM	Low	4. Heat exchanger fouling or scaling	4. Perform chemical cleaning of heat exchanger surfaces	4. Inspect for leaks in the heat exchanger	4. Check and maintain heat exchanger components
Variable Injection Timing	High	1. Advanced injection timing for high load conditions	1. Verify engine load and adjust injection timing accordingly	1. Monitor engine load and adjust timing as needed	1. Optimize injection timing for specific load conditions
Variable Injection Timing	High	2. Faulty VIT control mechanism	2. Inspect and repair or replace VIT control components	2. Check for abnormal sounds during VIT operation	2. Diagnose and address issues with VIT control components
Variable Injection Timing	Low	1. Retarded injection timing for low load conditions	1. Verify engine load and adjust injection timing accordingly	1. Monitor engine load and adjust timing as needed	1. Optimize injection timing for specific load conditions
Variable Injection Timing	Low	2. Faulty VIT control mechanism	2. Inspect and repair or replace VIT control components	2. Check for abnormal sounds during VIT operation	2. Diagnose and address issues with VIT control components
Vessel Speed	High	1. Increased power demand for higher speed	1. Verify navigation requirements and adjust speed	1. Monitor power demand and adjust throttle accordingly	1. Evaluate navigation needs and vessel speed capabilities
Vessel Speed	High	2. Engine propulsion system operating correctly			
Vessel Speed	Low	1. Reduced power demand for lower speed	1. Verify navigation requirements and adjust speed	1. Monitor power demand and adjust throttle accordingly	1. Evaluate navigation needs and vessel speed capabilities
Vessel Speed	Low	2. Engine propulsion system operating correctly			