Maintenance Schedule

Diesel Engine
20V4000R63
20V4000R63R
Application group 2A

MS50234/04E

A Rolls-Royce solution

Engine model	kW/cyl.	Application group
20V4000R63	150 kW/cyl.	2A, continuous operation, unrestricted
20V4000R63R	135 kW/cyl.	2A, continuous operation, unrestricted

Table 1: Applicability

Rolls-Royce Solutions refers to Rolls-Royce Solutions GmbH or an affiliated company pursuant to §15 AktG (German Stock Corporation Act) or a controlled company (joint venture), and Rolls-Royce Solutions Ruhstorf GmbH.

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Table of contents

1 Maintenance Schedule

1.1 Preface 4
1.2 Maintenance task tolerances 5
1.3 Allocation matrix application group 2A 6
1.4 Noncyclical maintenance tasks 8
1.5 Maintenance Schedule Matrix 36000 HRS 9
1.6 Cyclical maintenance tasks 36000 HRS 15
1.7 Maintenance Schedule Matrix 30000 HRS 18
1.8 Cyclical maintenance tasks 30000 HRS 22
1.9 Maintenance Schedule Matrix 27000 HRS 25
1.10 Cyclical maintenance tasks 27000 HRS 29
1.11 Maintenance Schedule Matrix 24000 HRS 32
1.12 Cyclical maintenance tasks 24000 HRS 36
1.13 Maintenance Schedule Matrix 21000 HRS 39
1.14 Cyclical maintenance tasks 21000 HRS 43

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1 Maintenance Schedule

1.1 Preface

This manual provides instructions for your product from the manufacturer Rolls-Royce Solutions.

Maintenance concept

The maintenance system for Rolls-Royce Solutions products is based on a preventive maintenance concept. Preventive maintenance facilitates advance operational planning and ensures a high level of equipment availability. The maintenance intervals as well as the required scopes of maintenance tasks are based on operational experience and therefore to be considered as recommendations. Additional maintenance work and/or changes to the maintenance intervals may be required in the case of difficult operational and ambient conditions.

Adherence to the specified maintenance intervals is essential to maintain product safety.

The intervals according to which the maintenance tasks have to be carried out are specified as operating hours and time limits. Whichever value is reached first shall apply.

The maintenance intervals are determined and verified by the load profile. Load profiles can be evaluated by the Service Partner of Rolls-Royce Solutions. Reading out load profile data is recommended for the first time after between 500 and 1000 operating hours depending on the application concerned, or after changing the duty profile or operating area.

The individual maintenance intervals are assigned to the qualification levels QL1 to QL4.

QL1: Operational monitoring and maintenance work which does not require disassembly of the product.
QL2: Exchange of components and parts in case of repair (corrective only, not part of the maintenance schedule).
QL3: Maintenance work which requires partial disassembly of the product.
QL4: Maintenance work which requires complete disassembly of the product.

Additional notes on maintenance and preservation:

The relevant component manufacturer's instructions apply with respect to the maintenance of any components which do not appear in this maintenance schedule.

For the change intervals of fluids and lubricants, refer to the corresponding Fluids and Lubricants Specifications.

If the product is to remain out of service for a longer time period, Rolls-Royce Solutions recommends to carry out a monthly test run until engine operating temperature is reached. If the engine is scheduled to remain out of service for > 1 month, carry out engine preservation procedures in accordance with the Preservation and Represervation Specifications

The latest version of the specifications is available at http://www.mtu-solutions.com.

TIM-ID: 0000046281 - 013

1.2 Maintenance task tolerances

Maintenance tasks shall be completed within certain tolerances comprising a percentage and a maximum value, whereby the smaller value shall apply. Taking full advantage of such tolerances does not influence the scheduled timing of the ensuing maintenance task.

Interval (HRS)/limit	Limit in %	Limit max.
Operating hours	± 10%	± 500 hrs
Years	± 10%	± 30 days
Example 1	Task every 1000 hrs	Between 900 hrs and 1100 hrs (10% of 1000 hrs)
Example 2	Task every 30000 hrs	Between 29500 hrs and 30500 hrs (10% of 30000 hrs, but max. 500 hrs)

TIM-ID: 0000097648 - 003

1.3 Allocation matrix application group 2A

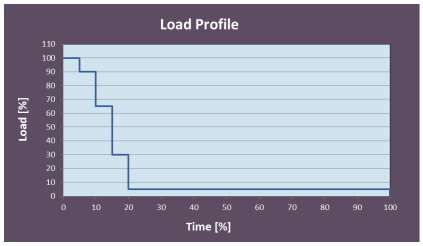
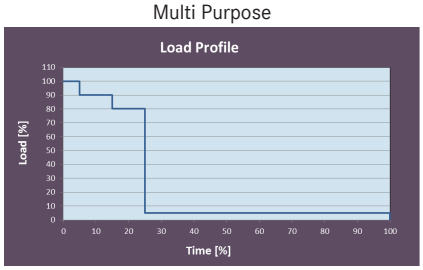
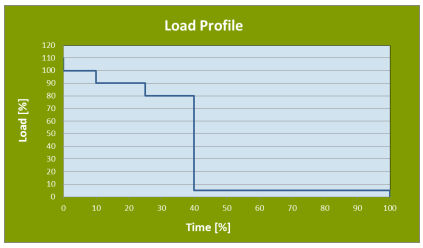
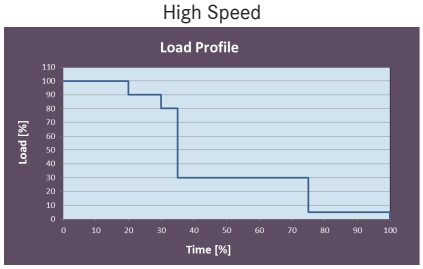
Load profile		Load factor %	Load indicator %	0 to 135 kW/cyl.	136 to 150 kW/cyl.	–	–	
Load %	Time %							
110 (100-110)	–	0 to 18	≤ 7	36,000	36,000	–	–	Switcher 
100 (90-100)	5							
90 (80-90)	5							
80 (65-80)	–							
65 (50-65)	5							
50 (30-50)	–							
30 (5-30)	5							
Idle speed (0-5)	80							
110 (100-110)	–	19 to 26	≤10	36,000	30,000	–	–	Multi Purpose 
100 (90-100)	5							
90 (80-90)	10							
80 (65-80)	10							
65 (50-65)	–							
50 (30-50)	–							
30 (5-30)	–							
Idle speed (0-5)	75							
110 (100-110)	–	27 to 38	≤ 17	30,000	27,000	–	–	Standard 
100 (90-100)	10							
90 (80-90)	15							
80 (65-80)	15							
65 (50-65)	–							
50 (30-50)	–							
30 (5-30)	–							
Idle speed (0-5)	60							
110 (100-110)	–	39 to 46	≤25	30,000	24,000	–	–	High Speed 
100 (90-100)	20							
90 (80-90)	10							
80 (65-80)	5							
65 (50-65)	–							
50 (30-50)	–							
30 (5-30)	40							
Idle speed (0-5)	25							

Table 2: Allocation matrix application group 2A

TIM-ID: 0000072514 - 003

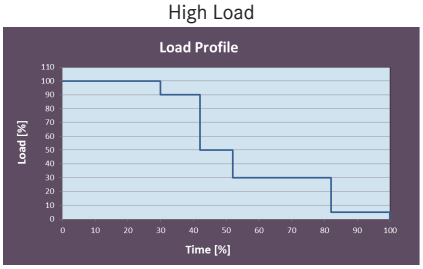
Load profile		Load factor %	Load indicator %	0 to 135 kW/cyl.	136 to 150 kW/cyl.	–	–	
Load %	Time %							
110 (100-110)	–	47 to 56	≤35	27,000	21,000	–	–	High Load 
100 (90-100)	30							
90 (80-90)	12							
80 (65-80)	–							
65 (50-65)	–							
50 (30-50)	10							
30 (5-30)	30							
Idle speed (0-5)	18							
Max. number of load cycles 1				(<10% to >90% spec. value): 2/h				
Max. number of load cycles 2				(<10% to >70..90% spec. value): 4/h				
Max. number of starts				2 per engine operating hour				

Table 3: Allocation matrix application group 2A

TIM-ID: 0000072514 - 003

1.4 Noncyclical maintenance tasks

No.	Qualification	Task	Maintenance tasks	Reference task	Offset	Value	Unit	Option
0001	QL1	WM00094	Check valve clearance, adjust if necessary. ATTENTION! First adjustment after 1,000 operating hours on a new engine and after 1,000 operating hours following each cylinder head overhaul.		0	1000	HRS	
Reference task: Name of the maintenance task the offset refers to Offset: Interval of a maintenance task which depends on another interval Value: Fixed value for binding execution of a maintenance task								

TIM-ID: 0000000000 - 000

1.5 Maintenance Schedule Matrix 36000 HRS

500 to 15000 Operating hours

Task	Limit	Operating hours [HRS]																													
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000
WM00285	1 DAY																														
WM00286	1 DAY																														
WM00287	1 DAY																														
WM00288	1 DAY																														
WM00289	1 DAY																														
WM00290	1 DAY																														
WM00321	1 MON																														
WM00881	1 MON																														
WM00126	1 YR																														
WM00128	1 YR																														
WM00190	1 YR																														
WM00191	1 YR																														
WM00067	2 YR																														
WM00063	2 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00066	9 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00149	1 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00084	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00085	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00086	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00050	1 YR						X						X						X						X						X
WM00136	1 YR						X						X						X						X						X
WM00188	1 YR						X						X						X						X						X
WM00189	1 YR						X						X						X						X						X
WM00076	3 YR						X						X						X						X						X
WM00664	3 YR						X						X						X						X						X
WM00052	18 YR						X						X						X						X						X
WM00094	18 YR		X				X						X						X						X						X
WM00098	18 YR						X						X						X						X						X
WM00106	3 YR																		X												
WM00089	18 YR																		X												
WM00090	18 YR																		X												
WM00110	18 YR																		X												
WM00008	6 YR																														
WM00065	9 YR																														
WM00054	18 YR																														
WM00056	18 YR																														
WM00062	18 YR																														
WM00091	18 YR																														
WM00093	18 YR																														
WM00096	18 YR																														
WM00164	18 YR																														

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																													
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000
WM00921	18 YR																														
WM00970	18 YR																														
WM00971	18 YR																														
WM00973	18 YR																														
WM00974	18 YR																														
WM00981	18 YR																														
WM00986	18 YR																														
WM00009	15 YR																														
WM00006	6 YR																														
WM00001	18 YR																														
WM00002	18 YR																														
WM00011	18 YR																														
WM00020	18 YR																														
WM00045	18 YR																														
WM00070	18 YR																														
WM00072	18 YR																														
WM00087	18 YR																														
WM00088	18 YR																														
WM00092	18 YR																														
WM00095	18 YR																														
WM00099	18 YR																														
WM00103	18 YR																														
WM00104	18 YR																														
WM00108	18 YR																														
WM00111	18 YR																														
WM00127	18 YR																														
WM00137	18 YR																														
WM00139	18 YR																														
WM00168	18 YR																														
WM00353	18 YR																														
WM00439	18 YR																														
WM00925	18 YR																														
WM00976	18 YR																														
WM00980	18 YR																														

DAY = Days
MON = Months
YR = Years
HRS = Hours

15500 to 30000 Operating hours

Task	Limit	Operating hours [HRS]																													
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000	21500	22000	22500	23000	23500	24000	24500	25000	25500	26000	26500	27000	27500	28000	28500	29000	29500	30000
WM00285	1 DAY																														
WM00286	1 DAY																														

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																													
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000	21500	22000	22500	23000	23500	24000	24500	25000	25500	26000	26500	27000	27500	28000	28500	29000	29500	30000
WM00287	1 DAY																														
WM00288	1 DAY																														
WM00289	1 DAY																														
WM00290	1 DAY																														
WM00321	1 MON																														
WM00881	1 MON																														
WM00126	1 YR																														
WM00128	1 YR																														
WM00190	1 YR																														
WM00191	1 YR																														
WM00067	2 YR																														
WM00063	2 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00066	9 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00149	1 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00084	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00085	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00086	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00050	1 YR						X						X						X						X						X
WM00136	1 YR						X						X						X						X						X
WM00188	1 YR						X						X						X						X						X
WM00189	1 YR						X						X						X						X						X
WM00076	3 YR						X						X						X						X						X
WM00664	3 YR						X						X						X						X						X
WM00052	18 YR						X						X						X						X						X
WM00094	18 YR						X						X						X						X						X
WM00098	18 YR						X						X						X						X						X
WM00106	3 YR						X																		X						
WM00089	18 YR						X																		X						
WM00090	18 YR						X																		X						
WM00110	18 YR						X																		X						
WM00008	6 YR						X																								
WM00065	9 YR						X																								
WM00054	18 YR						X																								
WM00056	18 YR						X																								
WM00062	18 YR						X																								
WM00091	18 YR						X																								
WM00093	18 YR						X																								
WM00096	18 YR						X																								
WM00164	18 YR						X																								
WM00921	18 YR						X																								
WM00970	18 YR						X																								
WM00971	18 YR						X																								
WM00973	18 YR						X																								
WM00974	18 YR						X																								
WM00981	18 YR						X																								

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																													
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000	21500	22000	22500	23000	23500	24000	24500	25000	25500	26000	26500	27000	27500	28000	28500	29000	29500	30000
WM00986	18 YR						X																								
WM00009	15 YR																														
WM00006	6 YR																														
WM00001	18 YR																														
WM00002	18 YR																														
WM00011	18 YR																														
WM00020	18 YR																														
WM00045	18 YR																														
WM00070	18 YR																														
WM00072	18 YR																														
WM00087	18 YR																														
WM00088	18 YR																														
WM00092	18 YR																														
WM00095	18 YR																														
WM00099	18 YR																														
WM00103	18 YR																														
WM00104	18 YR																														
WM00108	18 YR																														
WM00111	18 YR																														
WM00127	18 YR																														
WM00137	18 YR																														
WM00139	18 YR																														
WM00168	18 YR																														
WM00353	18 YR																														
WM00439	18 YR																														
WM00925	18 YR																														
WM00976	18 YR																														
WM00980	18 YR																														

DAY = Days
MON = Months
YR = Years
HRS = Hours

30500 to 36000 Operating hours

Task	Limit	Operating hours [HRS]											
		30500	31000	31500	32000	32500	33000	33500	34000	34500	35000	35500	36000
WM00285	1 DAY												
WM00286	1 DAY												
WM00287	1 DAY												
WM00288	1 DAY												
WM00289	1 DAY												
WM00290	1 DAY												
WM00321	1 MON												
WM00881	1 MON												

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]											
		30500	31000	31500	32000	32500	33000	33500	34000	34500	35000	35500	36000
WM00126	1 YR												
WM00128	1 YR												
WM00190	1 YR												
WM00191	1 YR												
WM00067	2 YR												
WM00063	2 YR	X	X	X	X	X	X	X	X	X	X	X	X
WM00066	9 YR	X	X	X	X	X	X	X	X	X	X	X	X
WM00149	1 YR		X		X		X		X		X		X
WM00084	2 YR		X		X		X		X		X		X
WM00085	2 YR		X		X		X		X		X		X
WM00086	2 YR		X		X		X		X		X		X
WM00050	1 YR						X						X
WM00136	1 YR						X						X
WM00188	1 YR						X						X
WM00189	1 YR						X						X
WM00076	3 YR						X						X
WM00664	3 YR						X						X
WM00052	18 YR						X						X
WM00094	18 YR						X						X
WM00098	18 YR						X						X
WM00106	3 YR												X
WM00089	18 YR												X
WM00090	18 YR												X
WM00110	18 YR												X
WM00008	6 YR												X
WM00065	9 YR												X
WM00054	18 YR												X
WM00056	18 YR												X
WM00062	18 YR												X
WM00091	18 YR												X
WM00093	18 YR												X
WM00096	18 YR												X
WM00164	18 YR												X
WM00921	18 YR												X
WM00970	18 YR												X
WM00971	18 YR												X
WM00973	18 YR												X
WM00974	18 YR												X
WM00981	18 YR												X
WM00986	18 YR												X
WM00009	15 YR												
WM00006	6 YR												X
WM00001	18 YR												X
WM00002	18 YR												X
WM00011	18 YR												X

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]											
		30500	31000	31500	32000	32500	33000	33500	34000	34500	35000	35500	36000
WM00020	18 YR												X
WM00045	18 YR												X
WM00070	18 YR												X
WM00072	18 YR												X
WM00087	18 YR												X
WM00088	18 YR												X
WM00092	18 YR												X
WM00095	18 YR												X
WM00099	18 YR												X
WM00103	18 YR												X
WM00104	18 YR												X
WM00108	18 YR												X
WM00111	18 YR												X
WM00127	18 YR												X
WM00137	18 YR												X
WM00139	18 YR												X
WM00168	18 YR												X
WM00353	18 YR												X
WM00439	18 YR												X
WM00925	18 YR												X
WM00976	18 YR												X
WM00980	18 YR												X

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

1.6 Cyclical maintenance tasks 36000 HRS

Qualification	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
Engine						
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check engine oil level		WM00285
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Visually inspect for leaks and general condition of engine		WM00286
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check maintenance indicator of air filter	X	WM00287
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check relief bore of coolant pump		WM00288
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	When engine is running, check for abnormal running noises, exhaust gas color and vibrations		WM00289
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Drain water and contaminants from fuel prefilter	X	WM00290
QL1	-	1 MON	ENGINE OPERATIONAL MONITORING	Check condensate drain of intercooler		WM00321
QL1	-	1 MON	BENDING / TORS. RESILIENT COUPLING AND STEEL-SPRING COUPLING	Check coupling (visual inspection), replace as necessary	X	WM00881
QL1	-	1 YR	ENGINE MOUNTING	Measure height of rubber element		WM00126
QL1	-	1 YR	ENGINE MOUNTING	Measure buffer play, adjust if necessary		WM00128
QL1	-	1 YR	GENERATOR MOUNTING	Measure height of rubber element of generator mounts	X	WM00190
QL1	-	1 YR	GENERATOR MOUNTING	Measure buffer clearance of generator mounts, adjust if necessary	X	WM00191
QL1	-	2 YR	LUBE OIL SYSTEM	Replace oil filter at every engine oil change, or when the time limit (years) is reached, at the latest	X	WM00067
QL1	500	2 YR	LUBE OIL SYSTEM	Automatic centrifugal oil filter, check layer thickness of oil residue, clean, and replace paper element at every engine oil change at the latest	X	WM00063
QL1	500	9 YR	AUTOMATIC OIL FILTER	Automatic oil filter, check and clean filtering screen	X	WM00066
QL1	1000	1 YR	AIR SUPPLY SYSTEM	Clean air filter, empty dust collector box	X	WM00149
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Fuel prefilter, replace filter	X	WM00084
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Additional filter, replace easy-change fuel filter	X	WM00085
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Replace easy-change fuel filter		WM00086
QL1	3000	1 YR	ENGINE MOUNTING	Check general condition of rubber mounts (visual inspection)		WM00050
QL1	3000	1 YR	ENGINE MOUNTING	Check securing screws for secure seating		WM00136
QL1	3000	1 YR	GENERATOR MOUNTING	Check securing screws of generator mounts for secure seating	X	WM00188
QL1	3000	1 YR	GENERATOR MOUNTING	Check general condition of rubber elements of generator mounts (visual inspection)	X	WM00189
QL1	3000	3 YR	AIR SUPPLY SYSTEM	Replace air filter	X	WM00076
QL1	3000	3 YR	COOLANT SYSTEM	Replace valve cover	X	WM00664
QL1	3000	18 YR	GENERATOR	Check condition of coupling	X	WM00052
QL1	3000	18 YR	VALVE GEAR	Check valve clearance, adjust if necessary. ATTENTION! First adjustment after 1,000 operating hours on a new engine and after 1,000 operating hours following each cylinder head overhaul.		WM00094
QL1	3000	18 YR	CYLINDER HEAD	Measure valve protrusion		WM00098
QL1	9000	3 YR	CRANKCASE VENTILATION	Replace oil separator (impactor)		WM00106
QL1	9000	18 YR	GOVERNOR	Reset drift correction parameters (DC)		WM00089

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Qualification	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
QL1	9000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace fuel injection valve/injector		WM00090
QL1	9000	18 YR	RUNNING GEAR	Inspect cylinder liner with endoscope		WM00110
QL3	18000	6 YR	RUBBER SLEEVE	Replace rubber sleeve		WM00008
QL3	18000	9 YR	AUTOMATIC OIL FILTER	Automatic oil filter, remove and clean filter housing, replace filter element and bearing	X	WM00065
QL3	18000	18 YR	COOLANT SYSTEM	Check LT thermostat housing and replace thermal actuator		WM00054
QL3	18000	18 YR	COOLANT SYSTEM	Check HT thermostat housing and replace thermal actuator		WM00056
QL3	18000	18 YR	LUBE OIL SYSTEM	Check centrifugal oil filter for wear		WM00062
QL3	18000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace HP pump		WM00091
QL3	18000	18 YR	VALVE GEAR	Check rocker arm and valve bridge for wear. Visually inspect swing follower with endoscope through pushrod bore.		WM00093
QL3	18000	18 YR	VALVE GEAR	Visually inspect camshaft running surfaces with endoscope through pushrod bore		WM00096
QL3	18000	18 YR	AIR PIPING TO CYLINDERS	Clean air piping		WM00164
QL3	18000	18 YR	COOLANT SYSTEM	Replace sealing material for installation of coolant pump(s) and thermostat(s) (only LT and HT)		WM00921
QL3	18000	18 YR	EXHAUST TURBOCHARGER	Overhaul or replace exhaust turbocharger		WM00970
QL3	18000	18 YR	STARTING SYSTEM	Overhaul or replace starter		WM00971
QL3	18000	18 YR	COOLANT SYSTEM	Overhaul or replace coolant pump in LT circuit		WM00973
QL3	18000	18 YR	COOLANT SYSTEM	Overhaul or replace coolant pump in HT circuit		WM00974
QL3	18000	18 YR	LUBE OIL SYSTEM	Clean oil cooler and check for leaks or replace		WM00981
QL3	18000	18 YR	AIR PIPING TO CYLINDERS	Clean intercooler and check for leaks or replace		WM00986
QL4	-	15 YR	STARTING SYSTEM	Replace CAPOS	X	WM00009
QL4	36000	6 YR	HOSE	Replace hose line		WM00006
QL4	36000	18 YR	ENGINE, GENERAL	Replace elastomeric members and gaskets		WM00001
QL4	36000	18 YR	ENGINE, GENERAL	Disassemble engine completely. Check engine components according to assembly instructions, replace or repair as necessary		WM00002
QL4	36000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace HP fuel sensor		WM00011
QL4	36000	18 YR	GENERATOR MOUNTING	Replace rubber elements of generator mounts	X	WM00020
QL4	36000	18 YR	BENDING / TORS. RESILIENT COUPLING AND STEEL-SPRING COUPLING	Check coupling, replace if necessary	X	WM00045
QL4	36000	18 YR	LUBE OIL SYSTEM	Check pump, replace if necessary		WM00070
QL4	36000	18 YR	EXHAUST SYSTEM	Replace exhaust pipe bellows		WM00072
QL4	36000	18 YR	FUEL SYSTEM (LOW PRESSURE)	Replace pump		WM00087
QL4	36000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace pressure relief valve		WM00088
QL4	36000	18 YR	VALVE GEAR	Replace swing follower and swing follower shaft		WM00092
QL4	36000	18 YR	VALVE GEAR	Replace thrust bearing flange		WM00095
QL4	36000	18 YR	RUNNING GEAR	Replace conrod bearings		WM00099
QL4	36000	18 YR	RUNNING GEAR	Replace crankshaft bearings		WM00103
QL4	36000	18 YR	GEAR TRAIN	Check tooth flanks in gear train for wear (visual inspection), replace bushing		WM00104
QL4	36000	18 YR	RUNNING GEAR	Replace cylinder liners		WM00108
QL4	36000	18 YR	CAMSHAFT	Replace camshaft bearings		WM00111
QL4	36000	18 YR	ENGINE MOUNTING	Replace rubber element of rubber mounts		WM00127

DAY = Days
MON = Months
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HRS = Hours

TIM-ID: 0000000000 - 000

Qualifi-cation	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
QL4	36000	18 YR	SENSOR TECHNOLOGY AND WIRING HARNESS	Replace wiring harness		WM00137
QL4	36000	18 YR	GROUNDING EQUIPMENT	Check flywheel (insulated), overhaul if necessary	X	WM00139
QL4	36000	18 YR	RUNNING GEAR	Replace pistons		WM00168
QL4	36000	18 YR	RUNNING GEAR	Replace conrod		WM00353
QL4	36000	18 YR	RUNNING GEAR	Replace vibration damper		WM00439
QL4	36000	18 YR	BENDING / TORSIONALLY RE-SILIENT COUPLING	Replace coupling or coupling element(s)	X	WM00925
QL4	36000	18 YR	GENERATOR	Overhaul or replace battery-charging generator	X	WM00976
QL4	36000	18 YR	CYLINDER HEAD	Overhaul or replace cylinder head		WM00980

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

1.7 Maintenance Schedule Matrix 30000 HRS

500 to 15000 Operating hours

Task	Limit	Operating hours [HRS]																													
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000
WM00285	1 DAY																														
WM00286	1 DAY																														
WM00287	1 DAY																														
WM00288	1 DAY																														
WM00289	1 DAY																														
WM00290	1 DAY																														
WM00321	1 MON																														
WM00881	1 MON																														
WM00126	1 YR																														
WM00128	1 YR																														
WM00190	1 YR																														
WM00191	1 YR																														
WM00067	2 YR																														
WM00063	2 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00066	9 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00149	1 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00084	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00085	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00086	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00050	1 YR						X						X						X						X						X
WM00136	1 YR						X						X						X						X						X
WM00188	1 YR						X						X						X						X						X
WM00189	1 YR						X						X						X						X						X
WM00076	3 YR						X						X						X						X						X
WM00664	3 YR						X						X						X						X						X
WM00052	18 YR						X						X						X						X						X
WM00094	18 YR		X				X						X						X						X						X
WM00098	18 YR						X						X						X						X						X
WM00106	3 YR																				X										
WM00089	18 YR																				X										
WM00090	18 YR																				X										
WM00110	18 YR																				X										
WM00008	6 YR																														X
WM00065	9 YR																														X
WM00054	18 YR																														X
WM00056	18 YR																														X
WM00062	18 YR																														X
WM00091	18 YR																														X
WM00093	18 YR																														X
WM00096	18 YR																														X
WM00164	18 YR																														X

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																													
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000
WM00921	18 YR																														X
WM00970	18 YR																														X
WM00971	18 YR																														X
WM00973	18 YR																														X
WM00974	18 YR																														X
WM00981	18 YR																														X
WM00986	18 YR																														X
WM00009	15 YR																														
WM00006	6 YR																														
WM00001	18 YR																														
WM00002	18 YR																														
WM00011	18 YR																														
WM00020	18 YR																														
WM00045	18 YR																														
WM00070	18 YR																														
WM00072	18 YR																														
WM00087	18 YR																														
WM00088	18 YR																														
WM00092	18 YR																														
WM00095	18 YR																														
WM00099	18 YR																														
WM00103	18 YR																														
WM00104	18 YR																														
WM00108	18 YR																														
WM00111	18 YR																														
WM00127	18 YR																														
WM00137	18 YR																														
WM00139	18 YR																														
WM00168	18 YR																														
WM00353	18 YR																														
WM00439	18 YR																														
WM00925	18 YR																														
WM00976	18 YR																														
WM00980	18 YR																														

DAY = Days
MON = Months
YR = Years
HRS = Hours

15500 to 30000 Operating hours

Task	Limit	Operating hours [HRS]																													
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000	21500	22000	22500	23000	23500	24000	24500	25000	25500	26000	26500	27000	27500	28000	28500	29000	29500	30000
WM00285	1 DAY																														
WM00286	1 DAY																														

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																													
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000	21500	22000	22500	23000	23500	24000	24500	25000	25500	26000	26500	27000	27500	28000	28500	29000	29500	30000
WM00287	1 DAY																														
WM00288	1 DAY																														
WM00289	1 DAY																														
WM00290	1 DAY																														
WM00321	1 MON																														
WM00881	1 MON																														
WM00126	1 YR																														
WM00128	1 YR																														
WM00190	1 YR																														
WM00191	1 YR																														
WM00067	2 YR																														
WM00063	2 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00066	9 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00149	1 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00084	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00085	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00086	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00050	1 YR						X						X						X						X						X
WM00136	1 YR						X						X						X						X						X
WM00188	1 YR						X						X						X						X						X
WM00189	1 YR						X						X						X						X						X
WM00076	3 YR						X						X						X						X						X
WM00664	3 YR						X						X						X						X						X
WM00052	18 YR						X						X						X						X						X
WM00094	18 YR						X						X						X						X						X
WM00098	18 YR						X						X						X						X						X
WM00106	3 YR										X																				X
WM00089	18 YR										X																				X
WM00090	18 YR										X																				X
WM00110	18 YR										X																				X
WM00008	6 YR																														X
WM00065	9 YR																														X
WM00054	18 YR																														X
WM00056	18 YR																														X
WM00062	18 YR																														X
WM00091	18 YR																														X
WM00093	18 YR																														X
WM00096	18 YR																														X
WM00164	18 YR																														X
WM00921	18 YR																														X
WM00970	18 YR																														X
WM00971	18 YR																														X
WM00973	18 YR																														X
WM00974	18 YR																														X
WM00981	18 YR																														X

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																													
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000	21500	22000	22500	23000	23500	24000	24500	25000	25500	26000	26500	27000	27500	28000	28500	29000	29500	30000
WM00986	18 YR																														X
WM00009	15 YR																														
WM00006	6 YR																														X
WM00001	18 YR																														X
WM00002	18 YR																														X
WM00011	18 YR																														X
WM00020	18 YR																														X
WM00045	18 YR																														X
WM00070	18 YR																														X
WM00072	18 YR																														X
WM00087	18 YR																														X
WM00088	18 YR																														X
WM00092	18 YR																														X
WM00095	18 YR																														X
WM00099	18 YR																														X
WM00103	18 YR																														X
WM00104	18 YR																														X
WM00108	18 YR																														X
WM00111	18 YR																														X
WM00127	18 YR																														X
WM00137	18 YR																														X
WM00139	18 YR																														X
WM00168	18 YR																														X
WM00353	18 YR																														X
WM00439	18 YR																														X
WM00925	18 YR																														X
WM00976	18 YR																														X
WM00980	18 YR																														X

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

1.8 Cyclical maintenance tasks 30000 HRS

Qualification	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
Engine						
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check engine oil level		WM00285
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Visually inspect for leaks and general condition of engine		WM00286
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check maintenance indicator of air filter	X	WM00287
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check relief bore of coolant pump		WM00288
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	When engine is running, check for abnormal running noises, exhaust gas color and vibrations		WM00289
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Drain water and contaminants from fuel prefilter	X	WM00290
QL1	-	1 MON	ENGINE OPERATIONAL MONITORING	Check condensate drain of intercooler		WM00321
QL1	-	1 MON	BENDING / TORS. RESILIENT COUPLING AND STEEL-SPRING COUPLING	Check coupling (visual inspection), replace as necessary	X	WM00881
QL1	-	1 YR	ENGINE MOUNTING	Measure height of rubber element		WM00126
QL1	-	1 YR	ENGINE MOUNTING	Measure buffer play, adjust if necessary		WM00128
QL1	-	1 YR	GENERATOR MOUNTING	Measure height of rubber element of generator mounts	X	WM00190
QL1	-	1 YR	GENERATOR MOUNTING	Measure buffer clearance of generator mounts, adjust if necessary	X	WM00191
QL1	-	2 YR	LUBE OIL SYSTEM	Replace oil filter at every engine oil change, or when the time limit (years) is reached, at the latest	X	WM00067
QL1	500	2 YR	LUBE OIL SYSTEM	Automatic centrifugal oil filter, check layer thickness of oil residue, clean, and replace paper element at every engine oil change at the latest	X	WM00063
QL1	500	9 YR	AUTOMATIC OIL FILTER	Automatic oil filter, check and clean filtering screen	X	WM00066
QL1	1000	1 YR	AIR SUPPLY SYSTEM	Clean air filter, empty dust collector box	X	WM00149
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Fuel prefilter, replace filter	X	WM00084
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Additional filter, replace easy-change fuel filter	X	WM00085
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Replace easy-change fuel filter		WM00086
QL1	3000	1 YR	ENGINE MOUNTING	Check general condition of rubber mounts (visual inspection)		WM00050
QL1	3000	1 YR	ENGINE MOUNTING	Check securing screws for secure seating		WM00136
QL1	3000	1 YR	GENERATOR MOUNTING	Check securing screws of generator mounts for secure seating	X	WM00188
QL1	3000	1 YR	GENERATOR MOUNTING	Check general condition of rubber elements of generator mounts (visual inspection)	X	WM00189
QL1	3000	3 YR	AIR SUPPLY SYSTEM	Replace air filter	X	WM00076
QL1	3000	3 YR	COOLANT SYSTEM	Replace valve cover	X	WM00664
QL1	3000	18 YR	GENERATOR	Check condition of coupling	X	WM00052
QL1	3000	18 YR	VALVE GEAR	Check valve clearance, adjust if necessary. ATTENTION! First adjustment after 1,000 operating hours on a new engine and after 1,000 operating hours following each cylinder head overhaul.		WM00094
QL1	3000	18 YR	CYLINDER HEAD	Measure valve protrusion		WM00098
QL1	10000	3 YR	CRANKCASE VENTILATION	Replace oil separator (impactor)		WM00106
QL1	10000	18 YR	GOVERNOR	Reset drift correction parameters (DC)		WM00089

DAY = Days
MON = Months
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HRS = Hours

TIM-ID: 0000000000 - 000

Qualification	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
QL1	10000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace fuel injection valve/injector		WM00090
QL1	10000	18 YR	RUNNING GEAR	Inspect cylinder liner with endoscope		WM00110
QL3	15000	6 YR	RUBBER SLEEVE	Replace rubber sleeve		WM00008
QL3	15000	9 YR	AUTOMATIC OIL FILTER	Automatic oil filter, remove and clean filter housing, replace filter element and bearing	X	WM00065
QL3	15000	18 YR	COOLANT SYSTEM	Check LT thermostat housing and replace thermal actuator		WM00054
QL3	15000	18 YR	COOLANT SYSTEM	Check HT thermostat housing and replace thermal actuator		WM00056
QL3	15000	18 YR	LUBE OIL SYSTEM	Check centrifugal oil filter for wear		WM00062
QL3	15000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace HP pump		WM00091
QL3	15000	18 YR	VALVE GEAR	Check rocker arm and valve bridge for wear. Visually inspect swing follower with endoscope through pushrod bore.		WM00093
QL3	15000	18 YR	VALVE GEAR	Visually inspect camshaft running surfaces with endoscope through pushrod bore		WM00096
QL3	15000	18 YR	AIR PIPING TO CYLINDERS	Clean air piping		WM00164
QL3	15000	18 YR	COOLANT SYSTEM	Replace sealing material for installation of coolant pump(s) and thermostat(s) (only LT and HT)		WM00921
QL3	15000	18 YR	EXHAUST TURBOCHARGER	Overhaul or replace exhaust turbocharger		WM00970
QL3	15000	18 YR	STARTING SYSTEM	Overhaul or replace starter		WM00971
QL3	15000	18 YR	COOLANT SYSTEM	Overhaul or replace coolant pump in LT circuit		WM00973
QL3	15000	18 YR	COOLANT SYSTEM	Overhaul or replace coolant pump in HT circuit		WM00974
QL3	15000	18 YR	LUBE OIL SYSTEM	Clean oil cooler and check for leaks or replace		WM00981
QL3	15000	18 YR	AIR PIPING TO CYLINDERS	Clean intercooler and check for leaks or replace		WM00986
QL4	-	15 YR	STARTING SYSTEM	Replace CAPOS	X	WM00009
QL4	30000	6 YR	HOSE	Replace hose line		WM00006
QL4	30000	18 YR	ENGINE, GENERAL	Replace elastomeric members and gaskets		WM00001
QL4	30000	18 YR	ENGINE, GENERAL	Disassemble engine completely. Check engine components according to assembly instructions, replace or repair as necessary		WM00002
QL4	30000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace HP fuel sensor		WM00011
QL4	30000	18 YR	GENERATOR MOUNTING	Replace rubber elements of generator mounts	X	WM00020
QL4	30000	18 YR	BENDING / TORS. RESILIENT COUPLING AND STEEL-SPRING COUPLING	Check coupling, replace if necessary	X	WM00045
QL4	30000	18 YR	LUBE OIL SYSTEM	Check pump, replace if necessary		WM00070
QL4	30000	18 YR	EXHAUST SYSTEM	Replace exhaust pipe bellows		WM00072
QL4	30000	18 YR	FUEL SYSTEM (LOW PRESSURE)	Replace pump		WM00087
QL4	30000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace pressure relief valve		WM00088
QL4	30000	18 YR	VALVE GEAR	Replace swing follower and swing follower shaft		WM00092
QL4	30000	18 YR	VALVE GEAR	Replace thrust bearing flange		WM00095
QL4	30000	18 YR	RUNNING GEAR	Replace conrod bearings		WM00099
QL4	30000	18 YR	RUNNING GEAR	Replace crankshaft bearings		WM00103
QL4	30000	18 YR	GEAR TRAIN	Check tooth flanks in gear train for wear (visual inspection), replace bushing		WM00104
QL4	30000	18 YR	RUNNING GEAR	Replace cylinder liners		WM00108
QL4	30000	18 YR	CAMSHAFT	Replace camshaft bearings		WM00111
QL4	30000	18 YR	ENGINE MOUNTING	Replace rubber element of rubber mounts		WM00127

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Qualification	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
QL4	30000	18 YR	SENSOR TECHNOLOGY AND WIRING HARNESS	Replace wiring harness		WM00137
QL4	30000	18 YR	GROUNDING EQUIPMENT	Check flywheel (insulated), overhaul if necessary	X	WM00139
QL4	30000	18 YR	RUNNING GEAR	Replace pistons		WM00168
QL4	30000	18 YR	RUNNING GEAR	Replace conrod		WM00353
QL4	30000	18 YR	RUNNING GEAR	Replace vibration damper		WM00439
QL4	30000	18 YR	BENDING / TORSIONALLY RESILIENT COUPLING	Replace coupling or coupling element(s)	X	WM00925
QL4	30000	18 YR	GENERATOR	Overhaul or replace battery-charging generator	X	WM00976
QL4	30000	18 YR	CYLINDER HEAD	Overhaul or replace cylinder head		WM00980

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

1.9 Maintenance Schedule Matrix 27000 HRS

500 to 15000 Operating hours

Task	Limit	Operating hours [HRS]																													
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000
WM00285	1 DAY																														
WM00286	1 DAY																														
WM00287	1 DAY																														
WM00288	1 DAY																														
WM00289	1 DAY																														
WM00290	1 DAY																														
WM00321	1 MON																														
WM00881	1 MON																														
WM00126	1 YR																														
WM00128	1 YR																														
WM00190	1 YR																														
WM00191	1 YR																														
WM00067	2 YR																														
WM00063	2 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00066	9 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00149	1 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00084	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00085	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00086	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00050	1 YR						X						X						X						X						X
WM00136	1 YR						X						X						X						X						X
WM00188	1 YR						X						X						X						X						X
WM00189	1 YR						X						X						X						X						X
WM00076	3 YR						X						X						X						X						X
WM00664	3 YR						X						X						X						X						X
WM00052	18 YR						X						X						X						X						X
WM00094	18 YR		X				X						X						X						X						X
WM00098	18 YR						X						X						X						X						X
WM00106	3 YR																		X												
WM00089	18 YR																		X												
WM00090	18 YR																		X												
WM00110	18 YR																		X												
WM00008	6 YR																											X			
WM00065	9 YR																											X			
WM00054	18 YR																											X			
WM00056	18 YR																											X			
WM00062	18 YR																											X			
WM00091	18 YR																											X			
WM00093	18 YR																											X			
WM00096	18 YR																											X			
WM00164	18 YR																											X			

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																													
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000
WM00921	18 YR																											X			
WM00970	18 YR																											X			
WM00971	18 YR																											X			
WM00973	18 YR																											X			
WM00974	18 YR																											X			
WM00981	18 YR																											X			
WM00986	18 YR																											X			
WM00009	15 YR																														
WM00006	6 YR																														
WM00001	18 YR																														
WM00002	18 YR																														
WM00011	18 YR																														
WM00020	18 YR																														
WM00045	18 YR																														
WM00070	18 YR																														
WM00072	18 YR																														
WM00087	18 YR																														
WM00088	18 YR																														
WM00092	18 YR																														
WM00095	18 YR																														
WM00099	18 YR																														
WM00103	18 YR																														
WM00104	18 YR																														
WM00108	18 YR																														
WM00111	18 YR																														
WM00127	18 YR																														
WM00137	18 YR																														
WM00139	18 YR																														
WM00168	18 YR																														
WM00353	18 YR																														
WM00439	18 YR																														
WM00925	18 YR																														
WM00976	18 YR																														
WM00980	18 YR																														

DAY = Days
MON = Months
YR = Years
HRS = Hours

15500 to 27000 Operating hours

Task	Limit	Operating hours [HRS]																													
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000	21500	22000	22500	23000	23500	24000	24500	25000	25500	26000	26500	27000						
WM00285	1 DAY																														
WM00286	1 DAY																														

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																													
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000	21500	22000	22500	23000	23500	24000	24500	25000	25500	26000	26500	27000						
WM00287	1 DAY																														
WM00288	1 DAY																														
WM00289	1 DAY																														
WM00290	1 DAY																														
WM00321	1 MON																														
WM00881	1 MON																														
WM00126	1 YR																														
WM00128	1 YR																														
WM00190	1 YR																														
WM00191	1 YR																														
WM00067	2 YR																														
WM00063	2 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
WM00066	9 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
WM00149	1 YR		X		X		X		X		X		X		X		X		X		X		X		X						
WM00084	2 YR		X		X		X		X		X		X		X		X		X		X		X		X						
WM00085	2 YR		X		X		X		X		X		X		X		X		X		X		X		X						
WM00086	2 YR		X		X		X		X		X		X		X		X		X		X		X		X						
WM00050	1 YR						X						X						X						X						
WM00136	1 YR						X						X						X						X						
WM00188	1 YR						X						X						X						X						
WM00189	1 YR						X						X						X						X						
WM00076	3 YR						X						X						X						X						
WM00664	3 YR						X						X						X						X						
WM00052	18 YR						X						X						X						X						
WM00094	18 YR						X						X						X						X						
WM00098	18 YR						X						X						X						X						
WM00106	3 YR						X																		X						
WM00089	18 YR						X																		X						
WM00090	18 YR						X																		X						
WM00110	18 YR						X																		X						
WM00008	6 YR																								X						
WM00065	9 YR																								X						
WM00054	18 YR																								X						
WM00056	18 YR																								X						
WM00062	18 YR																								X						
WM00091	18 YR																								X						
WM00093	18 YR																								X						
WM00096	18 YR																								X						
WM00164	18 YR																								X						
WM00921	18 YR																								X						
WM00970	18 YR																								X						
WM00971	18 YR																								X						
WM00973	18 YR																								X						
WM00974	18 YR																								X						
WM00981	18 YR																								X						

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																													
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000	21500	22000	22500	23000	23500	24000	24500	25000	25500	26000	26500	27000						
WM00986	18 YR																								X						
WM00009	15 YR																														
WM00006	6 YR																								X						
WM00001	18 YR																								X						
WM00002	18 YR																								X						
WM00011	18 YR																								X						
WM00020	18 YR																								X						
WM00045	18 YR																								X						
WM00070	18 YR																								X						
WM00072	18 YR																								X						
WM00087	18 YR																								X						
WM00088	18 YR																								X						
WM00092	18 YR																								X						
WM00095	18 YR																								X						
WM00099	18 YR																								X						
WM00103	18 YR																								X						
WM00104	18 YR																								X						
WM00108	18 YR																								X						
WM00111	18 YR																								X						
WM00127	18 YR																								X						
WM00137	18 YR																								X						
WM00139	18 YR																								X						
WM00168	18 YR																								X						
WM00353	18 YR																								X						
WM00439	18 YR																								X						
WM00925	18 YR																								X						
WM00976	18 YR																								X						
WM00980	18 YR																								X						

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

1.10 Cyclical maintenance tasks 27000 HRS

Qualification	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
Engine						
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check engine oil level		WM00285
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Visually inspect for leaks and general condition of engine		WM00286
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check maintenance indicator of air filter	X	WM00287
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check relief bore of coolant pump		WM00288
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	When engine is running, check for abnormal running noises, exhaust gas color and vibrations		WM00289
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Drain water and contaminants from fuel prefilter	X	WM00290
QL1	-	1 MON	ENGINE OPERATIONAL MONITORING	Check condensate drain of intercooler		WM00321
QL1	-	1 MON	BENDING / TORS. RESILIENT COUPLING AND STEEL-SPRING COUPLING	Check coupling (visual inspection), replace as necessary	X	WM00881
QL1	-	1 YR	ENGINE MOUNTING	Measure height of rubber element		WM00126
QL1	-	1 YR	ENGINE MOUNTING	Measure buffer play, adjust if necessary		WM00128
QL1	-	1 YR	GENERATOR MOUNTING	Measure height of rubber element of generator mounts	X	WM00190
QL1	-	1 YR	GENERATOR MOUNTING	Measure buffer clearance of generator mounts, adjust if necessary	X	WM00191
QL1	-	2 YR	LUBE OIL SYSTEM	Replace oil filter at every engine oil change, or when the time limit (years) is reached, at the latest	X	WM00067
QL1	500	2 YR	LUBE OIL SYSTEM	Automatic centrifugal oil filter, check layer thickness of oil residue, clean, and replace paper element at every engine oil change at the latest	X	WM00063
QL1	500	9 YR	AUTOMATIC OIL FILTER	Automatic oil filter, check and clean filtering screen	X	WM00066
QL1	1000	1 YR	AIR SUPPLY SYSTEM	Clean air filter, empty dust collector box	X	WM00149
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Fuel prefilter, replace filter	X	WM00084
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Additional filter, replace easy-change fuel filter	X	WM00085
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Replace easy-change fuel filter		WM00086
QL1	3000	1 YR	ENGINE MOUNTING	Check general condition of rubber mounts (visual inspection)		WM00050
QL1	3000	1 YR	ENGINE MOUNTING	Check securing screws for secure seating		WM00136
QL1	3000	1 YR	GENERATOR MOUNTING	Check securing screws of generator mounts for secure seating	X	WM00188
QL1	3000	1 YR	GENERATOR MOUNTING	Check general condition of rubber elements of generator mounts (visual inspection)	X	WM00189
QL1	3000	3 YR	AIR SUPPLY SYSTEM	Replace air filter	X	WM00076
QL1	3000	3 YR	COOLANT SYSTEM	Replace valve cover	X	WM00664
QL1	3000	18 YR	GENERATOR	Check condition of coupling	X	WM00052
QL1	3000	18 YR	VALVE GEAR	Check valve clearance, adjust if necessary. ATTENTION! First adjustment after 1,000 operating hours on a new engine and after 1,000 operating hours following each cylinder head overhaul.		WM00094
QL1	3000	18 YR	CYLINDER HEAD	Measure valve protrusion		WM00098
QL1	9000	3 YR	CRANKCASE VENTILATION	Replace oil separator (impactor)		WM00106
QL1	9000	18 YR	GOVERNOR	Reset drift correction parameters (DC)		WM00089

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Qualification	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
QL1	9000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace fuel injection valve/injector		WM00090
QL1	9000	18 YR	RUNNING GEAR	Inspect cylinder liner with endoscope		WM00110
QL3	13500	6 YR	RUBBER SLEEVE	Replace rubber sleeve		WM00008
QL3	13500	9 YR	AUTOMATIC OIL FILTER	Automatic oil filter, remove and clean filter housing, replace filter element and bearing	X	WM00065
QL3	13500	18 YR	COOLANT SYSTEM	Check LT thermostat housing and replace thermal actuator		WM00054
QL3	13500	18 YR	COOLANT SYSTEM	Check HT thermostat housing and replace thermal actuator		WM00056
QL3	13500	18 YR	LUBE OIL SYSTEM	Check centrifugal oil filter for wear		WM00062
QL3	13500	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace HP pump		WM00091
QL3	13500	18 YR	VALVE GEAR	Check rocker arm and valve bridge for wear. Visually inspect swing follower with endoscope through pushrod bore.		WM00093
QL3	13500	18 YR	VALVE GEAR	Visually inspect camshaft running surfaces with endoscope through pushrod bore		WM00096
QL3	13500	18 YR	AIR PIPING TO CYLINDERS	Clean air piping		WM00164
QL3	13500	18 YR	COOLANT SYSTEM	Replace sealing material for installation of coolant pump(s) and thermostat(s) (only LT and HT)		WM00921
QL3	13500	18 YR	EXHAUST TURBOCHARGER	Overhaul or replace exhaust turbocharger		WM00970
QL3	13500	18 YR	STARTING SYSTEM	Overhaul or replace starter		WM00971
QL3	13500	18 YR	COOLANT SYSTEM	Overhaul or replace coolant pump in LT circuit		WM00973
QL3	13500	18 YR	COOLANT SYSTEM	Overhaul or replace coolant pump in HT circuit		WM00974
QL3	13500	18 YR	LUBE OIL SYSTEM	Clean oil cooler and check for leaks or replace		WM00981
QL3	13500	18 YR	AIR PIPING TO CYLINDERS	Clean intercooler and check for leaks or replace		WM00986
QL4	-	15 YR	STARTING SYSTEM	Replace CAPOS	X	WM00009
QL4	27000	6 YR	HOSE	Replace hose line		WM00006
QL4	27000	18 YR	ENGINE, GENERAL	Replace elastomeric members and gaskets		WM00001
QL4	27000	18 YR	ENGINE, GENERAL	Disassemble engine completely. Check engine components according to assembly instructions, replace or repair as necessary		WM00002
QL4	27000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace HP fuel sensor		WM00011
QL4	27000	18 YR	GENERATOR MOUNTING	Replace rubber elements of generator mounts	X	WM00020
QL4	27000	18 YR	BENDING / TORS. RESILIENT COUPLING AND STEEL-SPRING COUPLING	Check coupling, replace if necessary	X	WM00045
QL4	27000	18 YR	LUBE OIL SYSTEM	Check pump, replace if necessary		WM00070
QL4	27000	18 YR	EXHAUST SYSTEM	Replace exhaust pipe bellows		WM00072
QL4	27000	18 YR	FUEL SYSTEM (LOW PRESSURE)	Replace pump		WM00087
QL4	27000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace pressure relief valve		WM00088
QL4	27000	18 YR	VALVE GEAR	Replace swing follower and swing follower shaft		WM00092
QL4	27000	18 YR	VALVE GEAR	Replace thrust bearing flange		WM00095
QL4	27000	18 YR	RUNNING GEAR	Replace conrod bearings		WM00099
QL4	27000	18 YR	RUNNING GEAR	Replace crankshaft bearings		WM00103
QL4	27000	18 YR	GEAR TRAIN	Check tooth flanks in gear train for wear (visual inspection), replace bushing		WM00104
QL4	27000	18 YR	RUNNING GEAR	Replace cylinder liners		WM00108
QL4	27000	18 YR	CAMSHAFT	Replace camshaft bearings		WM00111
QL4	27000	18 YR	ENGINE MOUNTING	Replace rubber element of rubber mounts		WM00127

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Qualifi-cation	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
QL4	27000	18 YR	SENSOR TECHNOLOGY AND WIRING HARNESS	Replace wiring harness		WM00137
QL4	27000	18 YR	GROUNDING EQUIPMENT	Check flywheel (insulated), overhaul if necessary	X	WM00139
QL4	27000	18 YR	RUNNING GEAR	Replace pistons		WM00168
QL4	27000	18 YR	RUNNING GEAR	Replace conrod		WM00353
QL4	27000	18 YR	RUNNING GEAR	Replace vibration damper		WM00439
QL4	27000	18 YR	BENDING / TORSIONALLY RE-SILIENT COUPLING	Replace coupling or coupling element(s)	X	WM00925
QL4	27000	18 YR	GENERATOR	Overhaul or replace battery-charging generator	X	WM00976
QL4	27000	18 YR	CYLINDER HEAD	Overhaul or replace cylinder head		WM00980

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

1.11 Maintenance Schedule Matrix 24000 HRS

500 to 15000 Operating hours

Task	Limit	Operating hours [HRS]																													
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000
WM00285	1 DAY																														
WM00286	1 DAY																														
WM00287	1 DAY																														
WM00288	1 DAY																														
WM00289	1 DAY																														
WM00290	1 DAY																														
WM00321	1 MON																														
WM00881	1 MON																														
WM00126	1 YR																														
WM00128	1 YR																														
WM00190	1 YR																														
WM00191	1 YR																														
WM00067	2 YR																														
WM00063	2 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00066	9 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00149	1 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00084	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00085	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00086	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00050	1 YR						X						X						X						X						X
WM00136	1 YR						X						X						X						X						X
WM00188	1 YR						X						X						X						X						X
WM00189	1 YR						X						X						X						X						X
WM00076	3 YR						X						X						X						X						X
WM00664	3 YR						X						X						X						X						X
WM00052	18 YR						X						X						X						X						X
WM00094	18 YR		X				X						X						X						X						X
WM00098	18 YR						X						X						X						X						X
WM00106	3 YR																X														
WM00089	18 YR																X														
WM00090	18 YR																X														
WM00110	18 YR																X														
WM00008	6 YR																								X						
WM00054	18 YR																								X						
WM00056	18 YR																								X						
WM00062	18 YR																								X						
WM00091	18 YR																								X						
WM00093	18 YR																								X						
WM00096	18 YR																								X						
WM00164	18 YR																								X						
WM00921	18 YR																								X						

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																													
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000
WM00970	18 YR																								X						
WM00971	18 YR																								X						
WM00973	18 YR																								X						
WM00974	18 YR																								X						
WM00981	18 YR																								X						
WM00986	18 YR																								X						
WM00065	9 YR																														
WM00009	15 YR																														
WM00006	6 YR																														
WM00001	18 YR																														
WM00002	18 YR																														
WM00011	18 YR																														
WM00020	18 YR																														
WM00045	18 YR																														
WM00070	18 YR																														
WM00072	18 YR																														
WM00087	18 YR																														
WM00088	18 YR																														
WM00092	18 YR																														
WM00095	18 YR																														
WM00099	18 YR																														
WM00103	18 YR																														
WM00104	18 YR																														
WM00108	18 YR																														
WM00111	18 YR																														
WM00127	18 YR																														
WM00137	18 YR																														
WM00139	18 YR																														
WM00168	18 YR																														
WM00353	18 YR																														
WM00439	18 YR																														
WM00925	18 YR																														
WM00976	18 YR																														
WM00980	18 YR																														

DAY = Days
MON = Months
YR = Years
HRS = Hours

15500 to 24000 Operating hours

Task	Limit	Operating hours [HRS]																	
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000	21500	22000	22500	23000	23500	24000
WM00285	1 DAY																		
WM00286	1 DAY																		

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																	
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000	21500	22000	22500	23000	23500	24000
WM00287	1 DAY																		
WM00288	1 DAY																		
WM00289	1 DAY																		
WM00290	1 DAY																		
WM00321	1 MON																		
WM00881	1 MON																		
WM00126	1 YR																		
WM00128	1 YR																		
WM00190	1 YR																		
WM00191	1 YR																		
WM00067	2 YR																		
WM00063	2 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00066	9 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00149	1 YR		X		X		X		X		X		X		X		X		X
WM00084	2 YR		X		X		X		X		X		X		X		X		X
WM00085	2 YR		X		X		X		X		X		X		X		X		X
WM00086	2 YR		X		X		X		X		X		X		X		X		X
WM00050	1 YR						X						X						X
WM00136	1 YR						X						X						X
WM00188	1 YR						X						X						X
WM00189	1 YR						X						X						X
WM00076	3 YR						X						X						X
WM00664	3 YR						X						X						X
WM00052	18 YR						X						X						X
WM00094	18 YR						X						X						X
WM00098	18 YR						X						X						X
WM00106	3 YR		X																X
WM00089	18 YR		X																X
WM00090	18 YR		X																X
WM00110	18 YR		X																X
WM00008	6 YR																		X
WM00054	18 YR																		X
WM00056	18 YR																		X
WM00062	18 YR																		X
WM00091	18 YR																		X
WM00093	18 YR																		X
WM00096	18 YR																		X
WM00164	18 YR																		X
WM00921	18 YR																		X
WM00970	18 YR																		X
WM00971	18 YR																		X
WM00973	18 YR																		X
WM00974	18 YR																		X
WM00981	18 YR																		X
WM00986	18 YR																		X

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																													
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000	21500	22000	22500	23000	23500	24000												
WM00065	9 YR																		X												
WM00009	15 YR																														
WM00006	6 YR																		X												
WM00001	18 YR																		X												
WM00002	18 YR																		X												
WM00011	18 YR																		X												
WM00020	18 YR																		X												
WM00045	18 YR																		X												
WM00070	18 YR																		X												
WM00072	18 YR																		X												
WM00087	18 YR																		X												
WM00088	18 YR																		X												
WM00092	18 YR																		X												
WM00095	18 YR																		X												
WM00099	18 YR																		X												
WM00103	18 YR																		X												
WM00104	18 YR																		X												
WM00108	18 YR																		X												
WM00111	18 YR																		X												
WM00127	18 YR																		X												
WM00137	18 YR																		X												
WM00139	18 YR																		X												
WM00168	18 YR																		X												
WM00353	18 YR																		X												
WM00439	18 YR																		X												
WM00925	18 YR																		X												
WM00976	18 YR																		X												
WM00980	18 YR																		X												

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

1.12 Cyclical maintenance tasks 24000 HRS

Qualification	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
Engine						
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check engine oil level		WM00285
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Visually inspect for leaks and general condition of engine		WM00286
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check maintenance indicator of air filter	X	WM00287
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check relief bore of coolant pump		WM00288
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	When engine is running, check for abnormal running noises, exhaust gas color and vibrations		WM00289
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Drain water and contaminants from fuel prefilter	X	WM00290
QL1	-	1 MON	ENGINE OPERATIONAL MONITORING	Check condensate drain of intercooler		WM00321
QL1	-	1 MON	BENDING / TORS. RESILIENT COUPLING AND STEEL-SPRING COUPLING	Check coupling (visual inspection), replace as necessary	X	WM00881
QL1	-	1 YR	ENGINE MOUNTING	Measure height of rubber element		WM00126
QL1	-	1 YR	ENGINE MOUNTING	Measure buffer play, adjust if necessary		WM00128
QL1	-	1 YR	GENERATOR MOUNTING	Measure height of rubber element of generator mounts	X	WM00190
QL1	-	1 YR	GENERATOR MOUNTING	Measure buffer clearance of generator mounts, adjust if necessary	X	WM00191
QL1	-	2 YR	LUBE OIL SYSTEM	Replace oil filter at every engine oil change, or when the time limit (years) is reached, at the latest	X	WM00067
QL1	500	2 YR	LUBE OIL SYSTEM	Automatic centrifugal oil filter, check layer thickness of oil residue, clean, and replace paper element at every engine oil change at the latest	X	WM00063
QL1	500	9 YR	AUTOMATIC OIL FILTER	Automatic oil filter, check and clean filtering screen	X	WM00066
QL1	1000	1 YR	AIR SUPPLY SYSTEM	Clean air filter, empty dust collector box	X	WM00149
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Fuel prefilter, replace filter	X	WM00084
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Additional filter, replace easy-change fuel filter	X	WM00085
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Replace easy-change fuel filter		WM00086
QL1	3000	1 YR	ENGINE MOUNTING	Check general condition of rubber mounts (visual inspection)		WM00050
QL1	3000	1 YR	ENGINE MOUNTING	Check securing screws for secure seating		WM00136
QL1	3000	1 YR	GENERATOR MOUNTING	Check securing screws of generator mounts for secure seating	X	WM00188
QL1	3000	1 YR	GENERATOR MOUNTING	Check general condition of rubber elements of generator mounts (visual inspection)	X	WM00189
QL1	3000	3 YR	AIR SUPPLY SYSTEM	Replace air filter	X	WM00076
QL1	3000	3 YR	COOLANT SYSTEM	Replace valve cover	X	WM00664
QL1	3000	18 YR	GENERATOR	Check condition of coupling	X	WM00052
QL1	3000	18 YR	VALVE GEAR	Check valve clearance, adjust if necessary. ATTENTION! First adjustment after 1,000 operating hours on a new engine and after 1,000 operating hours following each cylinder head overhaul.		WM00094
QL1	3000	18 YR	CYLINDER HEAD	Measure valve protrusion		WM00098
QL1	8000	3 YR	CRANKCASE VENTILATION	Replace oil separator (impactor)		WM00106
QL1	8000	18 YR	GOVERNOR	Reset drift correction parameters (DC)		WM00089

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Qualification	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
QL1	8000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace fuel injection valve/injector		WM00090
QL1	8000	18 YR	RUNNING GEAR	Inspect cylinder liner with endoscope		WM00110
QL3	12000	6 YR	RUBBER SLEEVE	Replace rubber sleeve		WM00008
QL3	12000	18 YR	COOLANT SYSTEM	Check LT thermostat housing and replace thermal actuator		WM00054
QL3	12000	18 YR	COOLANT SYSTEM	Check HT thermostat housing and replace thermal actuator		WM00056
QL3	12000	18 YR	LUBE OIL SYSTEM	Check centrifugal oil filter for wear		WM00062
QL3	12000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace HP pump		WM00091
QL3	12000	18 YR	VALVE GEAR	Check rocker arm and valve bridge for wear. Visually inspect swing follower with endoscope through pushrod bore.		WM00093
QL3	12000	18 YR	VALVE GEAR	Visually inspect camshaft running surfaces with endoscope through pushrod bore		WM00096
QL3	12000	18 YR	AIR PIPING TO CYLINDERS	Clean air piping		WM00164
QL3	12000	18 YR	COOLANT SYSTEM	Replace sealing material for installation of coolant pump(s) and thermostat(s) (only LT and HT)		WM00921
QL3	12000	18 YR	EXHAUST TURBOCHARGER	Overhaul or replace exhaust turbocharger		WM00970
QL3	12000	18 YR	STARTING SYSTEM	Overhaul or replace starter		WM00971
QL3	12000	18 YR	COOLANT SYSTEM	Overhaul or replace coolant pump in LT circuit		WM00973
QL3	12000	18 YR	COOLANT SYSTEM	Overhaul or replace coolant pump in HT circuit		WM00974
QL3	12000	18 YR	LUBE OIL SYSTEM	Clean oil cooler and check for leaks or replace		WM00981
QL3	12000	18 YR	AIR PIPING TO CYLINDERS	Clean intercooler and check for leaks or replace		WM00986
QL3	24000	9 YR	AUTOMATIC OIL FILTER	Automatic oil filter, remove and clean filter housing, replace filter element and bearing	X	WM00065
QL4	-	15 YR	STARTING SYSTEM	Replace CAPOS	X	WM00009
QL4	24000	6 YR	HOSE	Replace hose line		WM00006
QL4	24000	18 YR	ENGINE, GENERAL	Replace elastomeric members and gaskets		WM00001
QL4	24000	18 YR	ENGINE, GENERAL	Disassemble engine completely. Check engine components according to assembly instructions, replace or repair as necessary		WM00002
QL4	24000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace HP fuel sensor		WM00011
QL4	24000	18 YR	GENERATOR MOUNTING	Replace rubber elements of generator mounts	X	WM00020
QL4	24000	18 YR	BENDING / TORS. RESILIENT COUPLING AND STEEL-SPRING COUPLING	Check coupling, replace if necessary	X	WM00045
QL4	24000	18 YR	LUBE OIL SYSTEM	Check pump, replace if necessary		WM00070
QL4	24000	18 YR	EXHAUST SYSTEM	Replace exhaust pipe bellows		WM00072
QL4	24000	18 YR	FUEL SYSTEM (LOW PRESSURE)	Replace pump		WM00087
QL4	24000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace pressure relief valve		WM00088
QL4	24000	18 YR	VALVE GEAR	Replace swing follower and swing follower shaft		WM00092
QL4	24000	18 YR	VALVE GEAR	Replace thrust bearing flange		WM00095
QL4	24000	18 YR	RUNNING GEAR	Replace conrod bearings		WM00099
QL4	24000	18 YR	RUNNING GEAR	Replace crankshaft bearings		WM00103
QL4	24000	18 YR	GEAR TRAIN	Check tooth flanks in gear train for wear (visual inspection), replace bushing		WM00104
QL4	24000	18 YR	RUNNING GEAR	Replace cylinder liners		WM00108
QL4	24000	18 YR	CAMSHAFT	Replace camshaft bearings		WM00111
QL4	24000	18 YR	ENGINE MOUNTING	Replace rubber element of rubber mounts		WM00127

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Qualification	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
QL4	24000	18 YR	SENSOR TECHNOLOGY AND WIRING HARNESS	Replace wiring harness		WM00137
QL4	24000	18 YR	GROUNDING EQUIPMENT	Check flywheel (insulated), overhaul if necessary	X	WM00139
QL4	24000	18 YR	RUNNING GEAR	Replace pistons		WM00168
QL4	24000	18 YR	RUNNING GEAR	Replace conrod		WM00353
QL4	24000	18 YR	RUNNING GEAR	Replace vibration damper		WM00439
QL4	24000	18 YR	BENDING / TORSIONALLY RESILIENT COUPLING	Replace coupling or coupling element(s)	X	WM00925
QL4	24000	18 YR	GENERATOR	Overhaul or replace battery-charging generator	X	WM00976
QL4	24000	18 YR	CYLINDER HEAD	Overhaul or replace cylinder head		WM00980

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

1.13 Maintenance Schedule Matrix 21000 HRS

500 to 15000 Operating hours

Task	Limit	Operating hours [HRS]																													
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000
WM00285	1 DAY																														
WM00286	1 DAY																														
WM00287	1 DAY																														
WM00288	1 DAY																														
WM00289	1 DAY																														
WM00290	1 DAY																														
WM00321	1 MON																														
WM00881	1 MON																														
WM00126	1 YR																														
WM00128	1 YR																														
WM00190	1 YR																														
WM00191	1 YR																														
WM00067	2 YR																														
WM00063	2 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00066	9 YR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
WM00149	1 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00084	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00085	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00086	2 YR		X		X		X		X		X		X		X		X		X		X		X		X		X		X		X
WM00050	1 YR						X						X						X						X						X
WM00136	1 YR						X						X						X						X						X
WM00188	1 YR						X						X						X						X						X
WM00189	1 YR						X						X						X						X						X
WM00076	3 YR						X						X						X						X						X
WM00664	3 YR						X						X						X						X						X
WM00052	18 YR						X						X						X						X						X
WM00094	18 YR		X				X						X						X						X						X
WM00098	18 YR						X						X						X						X						X
WM00106	3 YR														X														X		
WM00089	18 YR														X														X		
WM00090	18 YR														X														X		
WM00110	18 YR														X														X		
WM00008	6 YR																					X									
WM00054	18 YR																					X									
WM00056	18 YR																					X									
WM00062	18 YR																					X									
WM00091	18 YR																					X									
WM00093	18 YR																					X									
WM00096	18 YR																					X									
WM00164	18 YR																					X									
WM00921	18 YR																					X									

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]																													
		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000	14500	15000
WM00970	18 YR																					X									
WM00971	18 YR																					X									
WM00973	18 YR																					X									
WM00974	18 YR																					X									
WM00981	18 YR																					X									
WM00986	18 YR																					X									
WM00065	9 YR																														
WM00009	15 YR																														
WM00006	6 YR																														
WM00001	18 YR																														
WM00002	18 YR																														
WM00011	18 YR																														
WM00020	18 YR																														
WM00045	18 YR																														
WM00070	18 YR																														
WM00072	18 YR																														
WM00087	18 YR																														
WM00088	18 YR																														
WM00092	18 YR																														
WM00095	18 YR																														
WM00099	18 YR																														
WM00103	18 YR																														
WM00104	18 YR																														
WM00108	18 YR																														
WM00111	18 YR																														
WM00127	18 YR																														
WM00137	18 YR																														
WM00139	18 YR																														
WM00168	18 YR																														
WM00353	18 YR																														
WM00439	18 YR																														
WM00925	18 YR																														
WM00976	18 YR																														
WM00980	18 YR																														

DAY = Days
MON = Months
YR = Years
HRS = Hours

15500 to 21000 Operating hours

Task	Limit	Operating hours [HRS]											
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000
WM00285	1 DAY												
WM00286	1 DAY												

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]											
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000
WM00287	1 DAY												
WM00288	1 DAY												
WM00289	1 DAY												
WM00290	1 DAY												
WM00321	1 MON												
WM00881	1 MON												
WM00126	1 YR												
WM00128	1 YR												
WM00190	1 YR												
WM00191	1 YR												
WM00067	2 YR												
WM00063	2 YR	X	X	X	X	X	X	X	X	X	X	X	X
WM00066	9 YR	X	X	X	X	X	X	X	X	X	X	X	X
WM00149	1 YR		X		X		X		X		X		X
WM00084	2 YR		X		X		X		X		X		X
WM00085	2 YR		X		X		X		X		X		X
WM00086	2 YR		X		X		X		X		X		X
WM00050	1 YR						X						X
WM00136	1 YR						X						X
WM00188	1 YR						X						X
WM00189	1 YR						X						X
WM00076	3 YR						X						X
WM00664	3 YR						X						X
WM00052	18 YR						X						X
WM00094	18 YR						X						X
WM00098	18 YR						X						X
WM00106	3 YR												X
WM00089	18 YR												X
WM00090	18 YR												X
WM00110	18 YR												X
WM00008	6 YR												X
WM00054	18 YR												X
WM00056	18 YR												X
WM00062	18 YR												X
WM00091	18 YR												X
WM00093	18 YR												X
WM00096	18 YR												X
WM00164	18 YR												X
WM00921	18 YR												X
WM00970	18 YR												X
WM00971	18 YR												X
WM00973	18 YR												X
WM00974	18 YR												X
WM00981	18 YR												X
WM00986	18 YR												X

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Task	Limit	Operating hours [HRS]											
		15500	16000	16500	17000	17500	18000	18500	19000	19500	20000	20500	21000
WM00065	9 YR												X
WM00009	15 YR												
WM00006	6 YR												X
WM00001	18 YR												X
WM00002	18 YR												X
WM00011	18 YR												X
WM00020	18 YR												X
WM00045	18 YR												X
WM00070	18 YR												X
WM00072	18 YR												X
WM00087	18 YR												X
WM00088	18 YR												X
WM00092	18 YR												X
WM00095	18 YR												X
WM00099	18 YR												X
WM00103	18 YR												X
WM00104	18 YR												X
WM00108	18 YR												X
WM00111	18 YR												X
WM00127	18 YR												X
WM00137	18 YR												X
WM00139	18 YR												X
WM00168	18 YR												X
WM00353	18 YR												X
WM00439	18 YR												X
WM00925	18 YR												X
WM00976	18 YR												X
WM00980	18 YR												X

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

1.14 Cyclical maintenance tasks 21000 HRS

Qualification	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
Engine						
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check engine oil level		WM00285
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Visually inspect for leaks and general condition of engine		WM00286
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check maintenance indicator of air filter	X	WM00287
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Check relief bore of coolant pump		WM00288
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	When engine is running, check for abnormal running noises, exhaust gas color and vibrations		WM00289
QL1	-	1 DAY	ENGINE OPERATIONAL MONITORING	Drain water and contaminants from fuel prefilter	X	WM00290
QL1	-	1 MON	ENGINE OPERATIONAL MONITORING	Check condensate drain of intercooler		WM00321
QL1	-	1 MON	BENDING / TORS. RESILIENT COUPLING AND STEEL-SPRING COUPLING	Check coupling (visual inspection), replace as necessary	X	WM00881
QL1	-	1 YR	ENGINE MOUNTING	Measure height of rubber element		WM00126
QL1	-	1 YR	ENGINE MOUNTING	Measure buffer play, adjust if necessary		WM00128
QL1	-	1 YR	GENERATOR MOUNTING	Measure height of rubber element of generator mounts	X	WM00190
QL1	-	1 YR	GENERATOR MOUNTING	Measure buffer clearance of generator mounts, adjust if necessary	X	WM00191
QL1	-	2 YR	LUBE OIL SYSTEM	Replace oil filter at every engine oil change, or when the time limit (years) is reached, at the latest	X	WM00067
QL1	500	2 YR	LUBE OIL SYSTEM	Automatic centrifugal oil filter, check layer thickness of oil residue, clean, and replace paper element at every engine oil change at the latest	X	WM00063
QL1	500	9 YR	AUTOMATIC OIL FILTER	Automatic oil filter, check and clean filtering screen	X	WM00066
QL1	1000	1 YR	AIR SUPPLY SYSTEM	Clean air filter, empty dust collector box	X	WM00149
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Fuel prefilter, replace filter	X	WM00084
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Additional filter, replace easy-change fuel filter	X	WM00085
QL1	1000	2 YR	FUEL SYSTEM (LOW PRESSURE)	Replace easy-change fuel filter		WM00086
QL1	3000	1 YR	ENGINE MOUNTING	Check general condition of rubber mounts (visual inspection)		WM00050
QL1	3000	1 YR	ENGINE MOUNTING	Check securing screws for secure seating		WM00136
QL1	3000	1 YR	GENERATOR MOUNTING	Check securing screws of generator mounts for secure seating	X	WM00188
QL1	3000	1 YR	GENERATOR MOUNTING	Check general condition of rubber elements of generator mounts (visual inspection)	X	WM00189
QL1	3000	3 YR	AIR SUPPLY SYSTEM	Replace air filter	X	WM00076
QL1	3000	3 YR	COOLANT SYSTEM	Replace valve cover	X	WM00664
QL1	3000	18 YR	GENERATOR	Check condition of coupling	X	WM00052
QL1	3000	18 YR	VALVE GEAR	Check valve clearance, adjust if necessary. ATTENTION! First adjustment after 1,000 operating hours on a new engine and after 1,000 operating hours following each cylinder head overhaul.		WM00094
QL1	3000	18 YR	CYLINDER HEAD	Measure valve protrusion		WM00098
QL1	7000	3 YR	CRANKCASE VENTILATION	Replace oil separator (impactor)		WM00106
QL1	7000	18 YR	GOVERNOR	Reset drift correction parameters (DC)		WM00089

DAY = Days
MON = Months
YR = Years
HRS = Hours

TIM-ID: 0000000000 - 000

Qualification	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
QL1	7000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace fuel injection valve/injector		WM00090
QL1	7000	18 YR	RUNNING GEAR	Inspect cylinder liner with endoscope		WM00110
QL3	10500	6 YR	RUBBER SLEEVE	Replace rubber sleeve		WM00008
QL3	10500	18 YR	COOLANT SYSTEM	Check LT thermostat housing and replace thermal actuator		WM00054
QL3	10500	18 YR	COOLANT SYSTEM	Check HT thermostat housing and replace thermal actuator		WM00056
QL3	10500	18 YR	LUBE OIL SYSTEM	Check centrifugal oil filter for wear		WM00062
QL3	10500	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace HP pump		WM00091
QL3	10500	18 YR	VALVE GEAR	Check rocker arm and valve bridge for wear. Visually inspect swing follower with endoscope through pushrod bore.		WM00093
QL3	10500	18 YR	VALVE GEAR	Visually inspect camshaft running surfaces with endoscope through pushrod bore		WM00096
QL3	10500	18 YR	AIR PIPING TO CYLINDERS	Clean air piping		WM00164
QL3	10500	18 YR	COOLANT SYSTEM	Replace sealing material for installation of coolant pump(s) and thermostat(s) (only LT and HT)		WM00921
QL3	10500	18 YR	EXHAUST TURBOCHARGER	Overhaul or replace exhaust turbocharger		WM00970
QL3	10500	18 YR	STARTING SYSTEM	Overhaul or replace starter		WM00971
QL3	10500	18 YR	COOLANT SYSTEM	Overhaul or replace coolant pump in LT circuit		WM00973
QL3	10500	18 YR	COOLANT SYSTEM	Overhaul or replace coolant pump in HT circuit		WM00974
QL3	10500	18 YR	LUBE OIL SYSTEM	Clean oil cooler and check for leaks or replace		WM00981
QL3	10500	18 YR	AIR PIPING TO CYLINDERS	Clean intercooler and check for leaks or replace		WM00986
QL3	21000	9 YR	AUTOMATIC OIL FILTER	Automatic oil filter, remove and clean filter housing, replace filter element and bearing	X	WM00065
QL4	-	15 YR	STARTING SYSTEM	Replace CAPOS	X	WM00009
QL4	21000	6 YR	HOSE	Replace hose line		WM00006
QL4	21000	18 YR	ENGINE, GENERAL	Replace elastomeric members and gaskets		WM00001
QL4	21000	18 YR	ENGINE, GENERAL	Disassemble engine completely. Check engine components according to assembly instructions, replace or repair as necessary		WM00002
QL4	21000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace HP fuel sensor		WM00011
QL4	21000	18 YR	GENERATOR MOUNTING	Replace rubber elements of generator mounts	X	WM00020
QL4	21000	18 YR	BENDING / TORS. RESILIENT COUPLING AND STEEL-SPRING COUPLING	Check coupling, replace if necessary	X	WM00045
QL4	21000	18 YR	LUBE OIL SYSTEM	Check pump, replace if necessary		WM00070
QL4	21000	18 YR	EXHAUST SYSTEM	Replace exhaust pipe bellows		WM00072
QL4	21000	18 YR	FUEL SYSTEM (LOW PRESSURE)	Replace pump		WM00087
QL4	21000	18 YR	FUEL SYSTEM (HIGH PRESSURE)	Replace pressure relief valve		WM00088
QL4	21000	18 YR	VALVE GEAR	Replace swing follower and swing follower shaft		WM00092
QL4	21000	18 YR	VALVE GEAR	Replace thrust bearing flange		WM00095
QL4	21000	18 YR	RUNNING GEAR	Replace conrod bearings		WM00099
QL4	21000	18 YR	RUNNING GEAR	Replace crankshaft bearings		WM00103
QL4	21000	18 YR	GEAR TRAIN	Check tooth flanks in gear train for wear (visual inspection), replace bushing		WM00104
QL4	21000	18 YR	RUNNING GEAR	Replace cylinder liners		WM00108
QL4	21000	18 YR	CAMSHAFT	Replace camshaft bearings		WM00111
QL4	21000	18 YR	ENGINE MOUNTING	Replace rubber element of rubber mounts		WM00127

DAY = Days
MON = Months
YR = Years
HRS = Hours

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Qualifi-cation	Interval [HRS]	Limit	Item	Maintenance tasks	Option	Task
QL4	21000	18 YR	SENSOR TECHNOLOGY AND WIRING HARNESS	Replace wiring harness		WM00137
QL4	21000	18 YR	GROUNDING EQUIPMENT	Check flywheel (insulated), overhaul if necessary	X	WM00139
QL4	21000	18 YR	RUNNING GEAR	Replace pistons		WM00168
QL4	21000	18 YR	RUNNING GEAR	Replace conrod		WM00353
QL4	21000	18 YR	RUNNING GEAR	Replace vibration damper		WM00439
QL4	21000	18 YR	BENDING / TORSIONALLY RE-SILIENT COUPLING	Replace coupling or coupling element(s)	X	WM00925
QL4	21000	18 YR	GENERATOR	Overhaul or replace battery-charging generator	X	WM00976
QL4	21000	18 YR	CYLINDER HEAD	Overhaul or replace cylinder head		WM00980
DAY = Days MON = Months YR = Years HRS = Hours						

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