

**NOTES**

1. The non-listed service items may assume the Man/hour working system of similar services on table
2. The Man/Hour system established for all service items including the task needed and the adjustment of the spare parts related.
3. If a performed service includes more than one of the listed items, the total of hours to consider must be the sum of the hours assigned to each task.

**ENGINES**

Code	Subcode	Task	Hour/Man system (H) (4 cylinders)	Hour/Man supplementary system, for each extra cylinder
1. Supplies	1.1	Replace fuel filter (s)	0,5	N/A
	1.2	Replace fuel pre-filter (s)	0,5	N/A
	1.3	Replace separator filter	0,5	N/A
	1.4	Replace oil filter (s)	0,5	N/A
	1.5	Replace water filter (s)	0,5	N/A
	1.6	Replace drive belt (s)	1	N/A
	1.7	Replace lubricating oil	1,5	N/A
	1.8	Replace coolant	1,5	N/A
	1.9	Replace air filter (s)	0,5	N/A
	1.10	Replace/clean centrifugal oil filter (s)	1	N/A
	1.11	Replace/clean crankcase breather filter (s)	0,5	N/A
2. Coolant system	2.1	Replace radiator	4	N/A
	2.2	Replace hoses / coolant pipes	2	N/A
	2.3	Replace thermostats (s)	1,5	N/A
	2.4	Replace fan	2	N/A
	2.5	Replace fan bracket	2,5	N/A
	2.6	Replace water pump	2	N/A
	2.7	Replace block seal plugs	0,5	N/A
	2.8	Replace radiator plug (s)	0,5	N/A
	2.9	Replace radiator shields	1,5	N/A
3. Lubrication System	3.1	Replace oil pump	4	N/A
	3.2	Replace oil pressure regulating valve	1	N/A
	3.3	Replace the crankcase gasket	4	N/A
	3.4	Replace the oil pump strainer	5	N/A
	3.5	Replace oil sump	4	N/A
	3.6	Replace lubrication lines of the turbocharger (s)	1,5	N/A
	3.7	Replace oil cooler (s) and gaskets	4	N/A
	3.8	Replace outer lubrication lines / pipes and gaskets	2	0,5
	3.9	Replace oil filter (s) bracket (s)	2	N/A
4. Charge air and exhaust system	4.1	Replace turbocharger (s) and gaskets	3	N/A
	4.2	Replace Intake manifold and gaskets	2	0,5
	4.3	Replace exhaust manifold and gaskets	2	0,5
	4.4	Replace exhaust compensator	2	N/A
	4.5	Replace intake compensator	2	N/A

	4.6	Replace cartridge (s) of the air filter (s)	2	N/A
	4.7	Replace the charge air cooler (s) and gaskets	4	N/A
	4.8	Replace exhaust pipe	3	N/A
	4.9	Replace EGR valve	3	N/A
	4.10	Replace air charge hoses and gaskets	2	N/A
5. Fuel system	5.1	Replace fuel check valve	0,5	N/A
	5.2	Replace the fuel hoses between the fuel tank and the engine	1	N/A
	5.3	Replace low-pressure engine fuel lines	1,5	N/A
	5.4	Replace manual fuel pump	1	N/A
	5.5	Replace mechanical fuel pump, engine / injection pump driven	3	N/A
	5.6	Replace injection pump	4	N/A
	5.7	Replace Common Rail Low-Pressure Fuel Pump	2	N/A
	5.8	Replace Common Rail High Pressure Fuel Pump	2	N/A
	5.9	Replace high pressure fuel pipes	3	0,5
	5.10	Replace Common Rail system	4	0,5
	5.11	Replace Common Rail Safety Valve	1,5	N/A
	5.12	Replace fuel filter (s) bracket	2	N/A
	5.13	Replace injector	1,5	0,5
6. Electrical system	6.1	Replace the battery (s)	1	N/A
	6.2	Replace the battery cutoff switch	1	N/A
	6.3	Replace the battery cables	1	N/A
	6.4	Replace the starting motor (s)	2,5	N/A
	6.5	Replace the battery charge alternator	3,5	N/A
	6.6	Replace the ECU	3	N/A
	6.7	Replace the Interface Box (FPT engines)	2,5	N/A
	6.8	Replace electrical wiring of the engine	3	N/A
	6.9	Replace the sensor (s)	0,5	N/A
	6.10	Check ECU data	0,5	N/A
	6.11	Replace spark plug (s)	0,5	0,5
	6.12	Replace electro-injectors / pump injectors	1	0,5
	6.13	Replace Stop coil	2	N/A
	6.14	Replace electronic actuator	3	N/A
	6.15	Replace electronic regulator	2	N/A
	6.16	Replace preheating resistance	4	N/A
7. Mechanical system	7.1	Replace the head cover and gasket	1	N/A
	7.2	Replace the cylinder head	8	N/A
	7.3	Replace the cylinder head gasket	8	N/A
	7.4	Replace the inlet and exhaust valve (s)	5	1
	7.5	Replace the intake and exhaust valve springs	4	1
	7.6	Replace the guides and seals of the intake and exhaust valves	6	2
	7.7	Replace the rockers	3	1
	7.8	Replace the rockers shaft	4	0,5
	7.9	Replace camshaft	8	N/A
	7.10	Replace the camshaft bushings	10	N/A
	7.11	Replace the cam (s)	8	N/A

	7.12	Replace the push rod (s)	4	0,5
	7.13	Replace the crankshaft	16	N/A
	7.14	Replace the crankcase seal (s)	4	N/A
	7.15	Replace the crankshaft bearings	20	N/A
	7.16	Replace the piston and the pin	8	1
	7.17	Replace piston rings	10	1
	7.18	Replace cylinder liner and seal (s)	10	2
	7.19	Replace the crankshaft / connecting rod bushings	10	2
	7.20	Replace the connecting rod	10	2
	7.21	Replace distribution system gears	8	N/A
	7.22	Replace the gearbox	12	N/A
	7.23	Replace the flywheel	8	N/A
	7.24	Replace flywheel housing	12	N/A
	7.25	Replace belt tensioner	3	N/A
	7.26	Replace the belt drive pulley (s)	2,5	N/A
	7.27	Replace engine support elements	1,5	N/A
	7.28	Replace vibration damper	4	N/A
8. Gas system	8.1	Replace the components of the gas ignition module	2	N/A
	8.2	Replace the gas ignition coil	1	N/A
	8.3	Replace the spark plug (s) of the gas system	1	0,5
	8.4	Replace the gas filter	0,5	N/A
	8.5	Diagnosing the gas system	0,5	N/A
	8.6	Replace/ clean gas metering valve (FMV)	1	N/A
	8.7	Replace mixer	1	N/A
	8.8	Replace gas pipes	1	N/A
	8.9	Replace gas system gaskets	0,5	N/A

## 9. ALTERNATORS

Code	Task	Hour/Man system (H)
9.1.	Inspect / clean power connections	1,5
9.2.	Replace diodes and varistor	4
9.3.	Replace complete rectifier bridge	4
9.4.	Replace AVR	1
9.5.	Lubricate alternator bearings	0,5
9.6.	Replace PMG	4
9.7.	Replace bearings	4
9.8.	Replace exciter stator	4
9.9.	Replace exciter rotor	6
9.10.	Replace temperature sensors	1
9.11.	Change power connections	2
9.12.	Replace air inlet and outlet protection grilles	1,5
9.13.	Replace engine / alternator coupling bolts	2,5

### 10. CONTROLLER

Code	Task	Hour/Man system (H)
10.1.	Replacement standard controller and programming	1
10.2.	Platinum replacement <= CN 2300	3
10.3.	Platinum replacement > CN 2300 <=4500	5
10.4.	Reprogramming standard controller with existing programming	0,25
10.5.	Standard reprogramming controller without existing programming	0,5
10.6.	Replacement of engine wiring <250kVA	2
10.7.	Replacement of engine wiring >250kVA	3
10.8.	Replacement of alternator wiring - frame < 250kVA	2
10.9.	Replacement of alternator wiring - frame > 250kVA	4,5
10.10.	Replace start / stop relay	0,5
10.11.	Installation coil tripping circuit breaker	1
10.12.	Installation of alarm relays	2
10.13.	Expansion card installation	1,5
10.14.	GSM modem installation and programming	2,5
10.15.	Grupel standard inverter replacement	2
10.16.	Grupel standard inverter plate replacement	0,5

### 11. SEVERAL TASKS

Code	Task	Hour/Man system (H)
11.1.	Alternator replacement from 6kVA to 250kVA	5
11.2.	Alternator replacement from 250kVA to 750kVA	8
11.3.	Alternator replacement above 750kVA	16
11.4.	Full 1600/1950 canopy replacement	8
11.5.	Full 2300/3200 canopy replacement	16
11.6.	Full 3800/4500 canopy replacement	30
11.7.	Replacing one door	1,5
11.8.	Replacing one side	1,5
11.9.	Replacing one of the tops	0,5
11.10.	Replacing the ceiling 1600/1950	1,5
11.11.	Replacing the ceiling 2300 / 3200	3
11.12.	Replacing the ceiling 3800/4500	8
11.13.	Replacing the frame	8
11.14.	Replacing the door lock	0,5
11.15.	Door hinge replacement	1
11.16.	Replacement of fuel float	1
11.17.	Replacement of the tube (PRESAFLEX) from the engine to the silencer	2
11.18.	Replacing the fuel tank 2300/3200	16

11.19.	Replacing the fuel tank 3800/4500	32
11.20.	Installation of external fuel tank	4
11.21.	Fuel tank leak welding	8
11.22.	Replacing the soundproofing of a door	0,08
11.23.	Replacing the insulation of the ceiling	0,5
11.24.	Fuel tank cleaning - plastic	2
11.25.	Fuel tank cleaning - metallic	4
11.26.	Canopy sealing (silicone / mastic)	0,5