Motordaten	Engine data	Caractéristiques du moteur						
Motortype	Engine Type	Type de moteur	D 9306 TB	D 9306 T / TI	D 9308 T / TI	D 9406 T / TI-EA3	D 9408 T / TI-EA3	D 9406 TI-EA4
Gesamtvolumen cm³	Total displacement (cu.inch) cm³	Cylindrée totale cm³	11 946 (729)		15 928 (972)	12 882 (786)	17 177 (1048)	12 882 (786)
Arbeitsweise	Engine type	Cycle	Viertakt - Diesel		Four stroke diesel		diesel, à 4 temps	
Verbrennungs-verfahren	Combustion system	Principe de combustion	Direkteinspritzung		Direct injection		Injection directe	
Bohrung mm	Bore (inch) mm	Alésage mm	130 (5,1181)			135 (5,3149)		
Hub mm	Stroke (inch) mm	Course mm	150 (5,9055)					
Gewicht der Motoren trocken ohne Kühlein-richtung kg	Weight of engin dry, without radiator (lbs) kg	Poids du moteur à sec, sans système de refroidisse-ment kg	ca. 1095 (approx. 2414) env.		ca. 1330 (approx. 2932) env.	ca. 1095 (approx. 2414) env.	ca. 1330 (approx. 2932) env.	ca. 1095 (approx. 2414) env.
Drehrichtung	Direction of rotation	Sens de rotation	auf Schwungrad gesehen links		counter-clockwise when facing flywheel		Vu sur le volant a gauche	
Nenndrehzahl 1/min	Rated speed (RPM) 1/min	Regime nominal 1/min	1500 / 1800 / 1900 / 2000 /2100					
Niedrigste Leerlaufdrehzahl 1/min	Minimum idle speed (RPM) 1/min	Vitesse min.de ralenti 1/min	600 - 1000					
Verdichtungs-verhältnis	Compression ratio	Taux de compression	17 : 1	15,5 : 1	15,5 : 1	17,2 : 1	17,2 : 1	17,2 : 1

Download full manual at youfixthis.com

PREVIEW - YOUFIXTHIS.COM

Schraubenanzugswerte Torque Specifications Valeurs de serrage des vis / écrous

Motortype	Engine Type	Type de moteur	D 9306 TB	D 9306 T / TI	D 9308 T / TI	D 9406 T / TI - EA3	D 9408 T / TI - EA3	D 9406 TI - EA4
Zylinderkopf-schrauben	Cylinder head bolts	Vis de culasse	vorspannen pretorque préserrage	Nm 30 22 ft - lbs	Nm 90 + ∡°60 + 60 + 60 + 60 = 240 66 ft - lbs			
Zylinderkopf-schrauben nachziehen	Retorque cylinder head bolts	Resserrer les vis de culasse	∡°90					
Schrauben für Kipphebelbock	Screws for rocker arm suppert	Vis de support de culbuteur	M10 x 70 Nm 65 48 ft - lbs				M10 x 120 (ZBS) Nm 75 55 ft - lbs	
Pleuelschrauben	Connecting rod bearing cap bolts	Vis de tête de bielle	vorspannen pretorque préserrage	Nm 50 37 ft - lbs	∡°60 + 60 + 60 = 180			
Hauptlager-schrauben	Main bearing cap mounting bolts	Vis de paliers de ligne d'arbre	Angaben siehe Untergruppe For data, see sub-group 9.15 Pour les donnies, vois le sous-groupe					
Schrauben für Gegengewicht an der Kurbelwelle	Screws for counter-weight to crankshaft	Vis des contrepoids de vilebrequin	vorspannen pretorque préserrage	Nm 30 22 ft - lbs	∡°45 + 35 + 35 = 115			
Schrauben für Zahnrad an der Ausgleichwelle (Massenausgleich)	Screws for gear to balancer shaft (Balancer)	Vis pour roue dentée de arbre de equilibrage (Sys. d'equilibrage)	Nm 70 52 ft - lbs					
Stiftschrauben für Befestig. Massen-ausgleich am Kurbelgehäuse	Stud for fitting of balancer at crankcase	Goujon pour fixat. de systéme d'equi-librage sur boîte de vilbrequin	Nm 40 30 ft - lbs					
Schwungrad-schrauben	Flywheel mounting bolts	Vis de volant	vorspannen pretorque préserrage	Nm 50 37 ft - lbs	∡°50 + 50 = 100 Nm 190 - 320 = 320 140 - 236 = 236 ft - lbs			
Schrauben für lüfterseitiges Kurbelwellen-ende	Screws on fan side end of crankshaft	Vis sur le vilebrequin côté hélice	vorspannen pretorque préserrage	Nm 30 22 ft - lbs	∡°30 + 20 = 50 Nm 90 - 130 = 130 66 - 96 = 96 ft - lbs			

Download full manual at youfixthis.com

PREVIEW - YOUFIXTHIS.COM

	Daily maintenance	every 50 - 100 hrs.	Also every 500 hrs.(at least 1 x annu	Also every 1000 hrs.	Also every 2000 hrs.	Also every 3000 hrs.	Also every 2 years	Work to be carried out	Check	Clean	Replace	Adjust	Interval Hrs. / Years	D 9306 TB	D 9306 / 9308 T, TI	D 9406 / 9408 T / TI - EA3, A4, A5		Fig.	Sub Group No.
MAINTENANCE																			
	○							Check engine oil level	○				daily	○	○	○		1	
	○							Check coolant level	○				daily	○	○	○		2	2.08
	○							Visual inspection (contamination, damage)	○				daily	○	○	○		3	
	○							Air filter - vacuum indicator	○				daily	○	○	○		4	2.05
	○							Water separator on fuel filter	○	○			daily	○	○	○		5,6	
		○						Fuel tank - drain water and sediments (at least 1 x per week)		○			50-100	○	○	○		7	
		○						Dust collector on air filter		○			50-100	○	○	○		8	2.05
			○					Engine break	○				500		○	○		9	8.90
			○					Check oil, coolant, fuel system for leaks, condition	○				500	○	○	○		10,11	
			○					Radiator, pressure relief valve, fan	○	○			500	○	○	○		12	
			○					Water filter (if installed)			○		500	○	○	○		13	
			○					Corrosion inhibitor / antifreeze, DCA 4 (in case of water filter installation)	○				500	○	○	○			2.08
			○					Lube fan drive (V-belt drive)			○		500			○			2.36
			○					Engine oil (first at 500 hrs.) Important: see 2.08			○		500	○	○	○		14,15	2.08
			○					Lube oil filter			○		500	○	○	○		16	
			○					Battery and cable cennections	○				500	○	○	○		17	
				○				Fuel pre-filter - screen (or case of drop in engine performance)	○	○			1000	○	○	○		18,19	
				○				Fuel pre-filter (or in case of drop in engine performance)			○		1000	○	○	○		20,21	
					○			Fuel fine filter (or in case of drop in engine performance)			○		2000	○	○	○		20,21	
				○				Grease gear on flywheel	○		○		1000	○	○	○		22	
				○				Mounting of oil pan and engine brackets	○				1000	○	○	○		23	
			□	○				Check air intake and exhaust system - for leaks, condition (first after 500 hrs.)	○				1000	○	○	○		24,25, 26	
								Air filter main element (according to maintenance indicator / annually)			○			○	○	○			2.05
								Air filter safety element (at every 3rd change of the main element / anually) never clean!			○			○	○	○			2.05
							○	Coolant with corrosion inhibitor / antifreeze			○		2 years	○	○	○		28,29, 30	2.08
CHECK AND ADJUSTMENT																			
			○					Tension + condition of V-belt (alternator)	○		○	○	500	○	○	○			2.35
			○					Tension + condition of V-belt (Fan drive)	○		○	○	500			○			2.36 2.37
			○					Tension + condition of V-belt (air conditioner compressor)	○		○		500			○			2.38
			○					Valve play	○			○	500		○				2.15
			□	○				Valve play (1. Adjustment at 500 hrs.)	○			○	1000	○					2.15
				○				Valve play	○			○	1000			○			2.15
				○				Engine regulation (engine RPM)	○			○	1000	○	○	○		27	
				○				Flame glow plug (at begin of cold season)	○	○			1000	○	○	○			2.28
						○		Injector valve (or in case of drop in engine performance)	○		○	○	3000	○	○	○			2.25
							○	oil separator			○		2 years	○	○	○			2.45

□ First and only maintenance interval ○ Repeat interval

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Troubleshooting

Problem	Cause	Remedy
1) Engine will not start	Fuel tank empty	Add fuel and bleed the fuel system
	Fuel precleaner stopped up	Clean / change filter
	Fuel filter stopped up, in winter due to paraffin deposits	Clean / change fuel filter and bleed fuel system, use fuel designed for cold season
	Fuel lines leak	Check all fuel lines for leaks, tighten fittings / change liners, as necessary
	Starter defective	Remove starter and have it checked in a service center. Have starter repaired, if defective.
	Battery is dead	Check battery, charge or replace battery, as necessary
	Electrical connections on battery, starter or starter switch are loose	Check all electrical wires, tighten, repair, as necessary
	Flame start system is defective (in cold temperatures)	Check solenoid valve and glow plug, replace if necessary
2) Engine starts but then cuts off again	Check all causes in paragraph 1, except electrical test and flame start system	see paragraph 1
	Vent hole in fuel cap stopped up	Clean fuel cap
3) Engine runs irregularly, cuts off or does not reach full power	Check all causes in paragraph 1 and 2, except electrical test and flame start system test	see paragraph 1 and 2
	Air filter contaminated	Clean air filter
	Exhaust flap for engine brake is closed or stuck	Check position of flap
	Overflow valve on injection pump outlet will not hold pressure	Check, replace if necessary
	Valves on fuel pump leak	Check fuel pump in service center, replace if necessary
	Intercooler is dirty	Clean intercooler
	Charge pressure too low	Check turbo charger
	Begin of delivery on injection pump is not correct	Check begin of delivery, readjust if necessary

PREVIEW - YOUFIXTHIS.COM

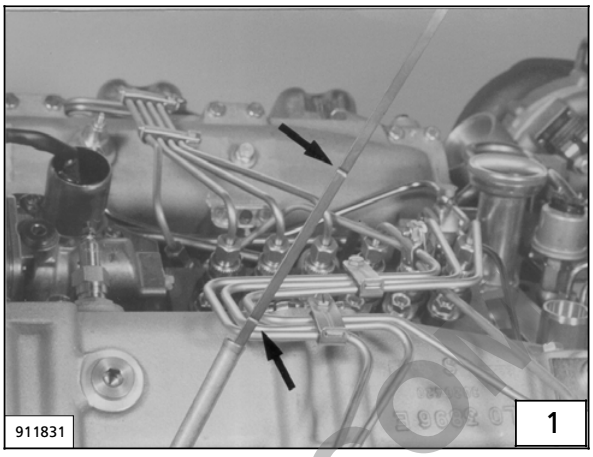
Download full manual at youfixthis.com

Check engine oil level:

The engine must be in a horizontal position.

Turn the engine off, wait 2 - 3 minutes, pull the dipstick, wipe it off and reinsert it. Pull it out again. Add oil, if necessary.

Do not operate the engine with the oil level below the lower mark (Min.) .



Check the coolant level:

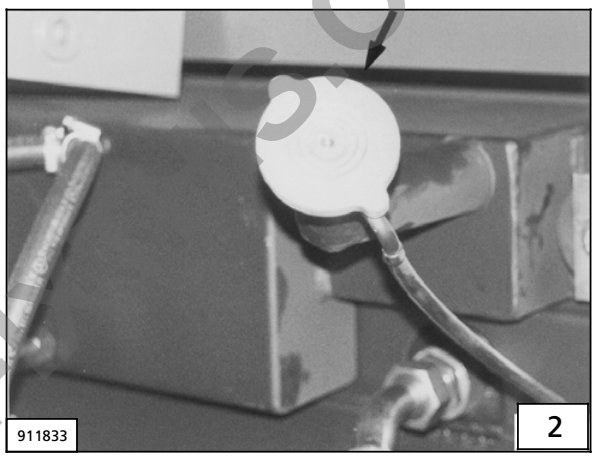
Check the coolant level on the expansion tank or the radiator. Turn the radiator cap to the first notch, wait until any residual pressure is relieved. Continue to rotate the cap to the 2nd notch and remove it.

Add coolant to maximum level.

For coolant specifiations, refer to sub group 2.08.

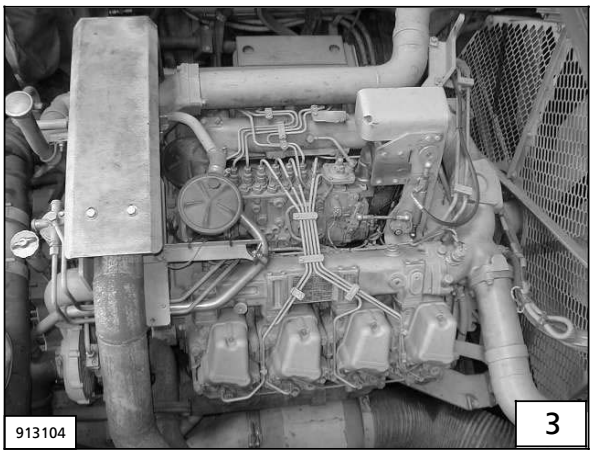
Caution:

Open and remove the radiator cap only at a coolant temperature below 194° F (90°C) .



Visual inspection (contamination, damage):

Check the engine for contamination and damage.

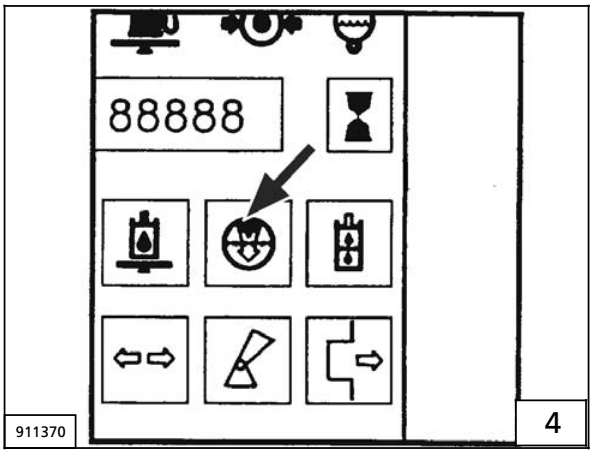


Air filter - vacuum indicator:

Check the vacuum indicator or the vacuum indicator light on the instrument panel in the operator's cab.

When the indicator light lights up, change the filter insert.

For description of the air filter, refer to sub goup 2.05 or the machine's Operation and Maintenance Manual.



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Motordaten	Engine data	Caractéristiques du moteur						
Motortype	Engine Type	Type de moteur	D 9306 TB	D 9306 T / TI	D 9308 T / TI	D 9406 T / TI-EA3	D 9408 T / TI-EA3	D 9406 TI-EA4
Kompressions-druck bar	Compression pressure (PSI) bar	Compression bar	20 - 28 (290 - 406)	18 - 26 (261 - 377)	18 - 26 (261 - 377)	20 - 28 (290 - 406)	20 - 28 (290 - 406)	20 - 28 (290 - 406)
Ventilspiel Einlaß kalt Auslaß kalt mm	Valve clearance Inlet cold Exhaust cold (inch) mm	Jeu des soupapes Admission froid Echappement froid mm	0,25 (0.0098) 0,30 (0.0118)					
Zündfolge	Firing order	Ordre d'allumage	1 - 6 - 3 - 5 - 2 - 4		1-8-4-2-7-3-6-5	1-6-3-5-2-4	1-8-4-2-7-3-6-5	1-6-3-5-2-4
Ventilöffnungs-zeiten	Valve adjustment	Calage de la distribution						
Einlaß öffnet vor OT Grad	Inlet opens before TDC degree	Admission ouverte avant PMH degrés	15 (messen ohne Ventilspiel bei Ventilhub 0,4 mm)		(measured without valve play at valve stroke 0,4 mm) (inch = 0,0157)		(mesure sans jeu de soupape avec une ouverture de soupape de 0,4 mm)	
Einlaß schließt nach UT Grad	Inlet closed after BDC degree	Admission fermée après PMB degrés	45 (messen ohne Ventilspiel bei Ventilhub 0,4 mm)		(measured without valve play at valve stroke 0,4 mm) (inch = 0,0157)		(mesure sans jeu de soupape avec une ouverture de soupape de 0,4 mm)	
Auslaß öffnet vor UT Grad	Exhaust opens before BDC degree	Echappement ouv.avant PMB degrés	54 (messen ohne Ventilspiel bei Ventilhub 0,4 mm)		(measured without valve play at valve stroke 0,4 mm) (inch = 0,0157)		(mesure sans jeu de soupape avec une ouverture de soupape de 0,4 mm)	
Auslaß schließt nach OT Grad	Exhaust closed after TDC degree	Echappement fermée aprés PMH degrés	14 (messen ohne Ventilspiel bei Ventilhub 0,4 mm)		(measured without valve play at valve stroke 0,4 mm) (inch = 0,0157)		(mesure sans jeu de soupape avec une ouverture de soupape de 0,4 mm)	
Abstand des Kolbens vom Zylinderkopf mm	Piston clearance to cylinder head (inch) mm	Espace neutre entre le piston et la culasse mm	1,17 - 1,76 (0,046 - 0,0693)					

PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

Torque specifications
For screws and bolts according to
DIN 912, 931, 933, 960, 961

Allowed tolerance ±10%

Surface condition: screw Mn or Zn phosphated, not lubricated or oiled μ tot. = 0,14
Ft-lbs = Nm x 0.736

normal thread	8.8 Nm	10.9 Nm	12.9 Nm
M6	10	15	18
M8	25	36	43
M10	49	72	84
M12	85	125	145
M14	135	200	235
M16	210	310	365
M18	300	430	500
M20	425	610	710
M22	580	820	960
M24	730	1050	1220

fine-thread	8.8 Nm	10.9 Nm	12.9 Nm
M8x1	27	39	46
M10x1,25	52	76	90
M12x1,25	93	135	160
M12x1,5	89	130	155
M14x1,5	145	215	255
M16x1,5	225	330	390
M18x1,5	340	485	570
M20x1,5	475	680	790
M22x1,5	630	900	1050
M24x2	800	1150	1350

Surface condition: screw galvanized, not lubricated or oiled μ tot. = 0,125

M6	9,6	14	16
M8	23	34	40
M10	46	67	79
M12	79	115	135
M14	125	185	220
M16	195	290	340
M18	280	400	470
M20	395	560	660
M22	540	760	890
M24	680	970	1150

M8x1	25	37	43
M10x1,25	49	71	83
M12x1,25	87	130	150
M12x1,5	83	120	145
M14x1,5	135	200	235
M16x1,5	210	310	360
M18x1,5	315	450	530
M20x1,5	440	630	730
M22x1,5	590	840	980
M24x2	740	1050	1250

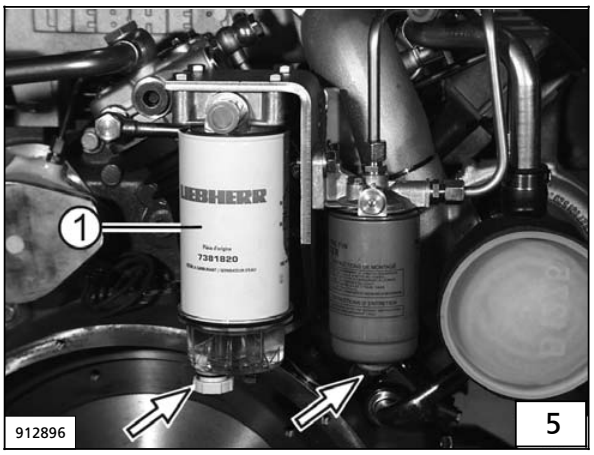
PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Problem	Cause	Remedy
	Injector nozzles do not work properly	Check nozzles, adjust or replace
	Injection pump, flow quantity not adjusted properly, regulating rod does not move freely	Check injection pump in service center
	Throttle linkage is not at full load stop	Check rod and adjust, if necessary
	Engine compression is too low	Check valves, piston and cylinder, check compression, replace if necessary.
4) Exhaust is black	Air filter is dirty	Clean air filter
	Leaks in the air intake system	Check hoses or lines, replace if necessary
	Exhaust flap for engine brake is closed or stuck	Check position of flap
	Injector nozzles are dirty or plugged	Check nozzles, adjust or replace
	Begin of delivery on injection pump is not adjusted properly	Check begin of delivery, adjust if necessary
	Amount of fuel flowing from injection pump is too high	Check injection pump in service center
5) Exhaust is blue	Lube oil level in engine is too high	Correct oil level
	Lube oil enters combustion chamber and burns. Play between valve shaft and valve guides is too large, piston rings are worn, broken or seized. Wear on piston and cylinder liners.	Repair or replace cylinder heads Replace pistons and liners
	Seal in turbocharger is defective	Check turbo charger, replace if necessary
6) Exhaust is white	Cylinder head gasket is defective, allowing coolant into the combustion chamber	Replace cylinder head gasket and/ or cylinder liner seal
	Cylinder head cracked or leaking	Replace cylinder head
7) Engine knocks rapidly	Injector nozzles leak or do not properly spray fuel	Check injector nozzles, adjust or replace if necessary
	Begin of delivery of injection pump is misadjusted.	Check begin of delivery, adjust if necessary

PREVIEW - YOUFIXTHIS.COM

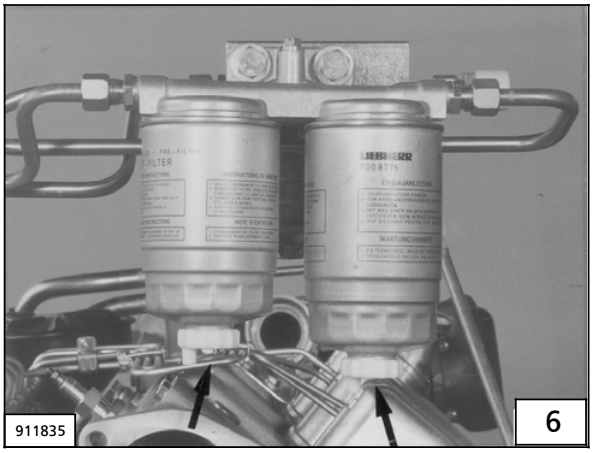
Download full manual at youfixthis.com



Check the water separator on the fuel filter:

On fuel filters 1 with inspection possibilities for water content, check water level. Drain off water, as necessary.

Open the drain plug, drain water until clean fuel emerges, close drain plug.
Catch fuel in a suitable container.

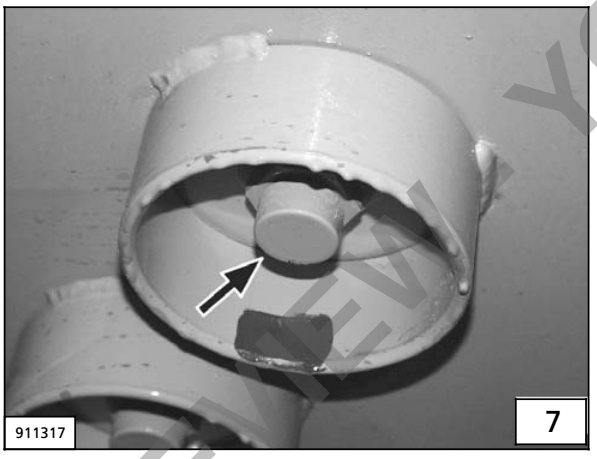


On fuel filters without inspection possibilites for water content:

Open drain plug, drain water until until clean fuel emerges, close drain plug.
Catch fuel in a suitable container.

Note:

If a pre-filter with water separator is installed, check the water level and drain off via the drain valve or drain plug, as necessary (see fig. 19 + 21).



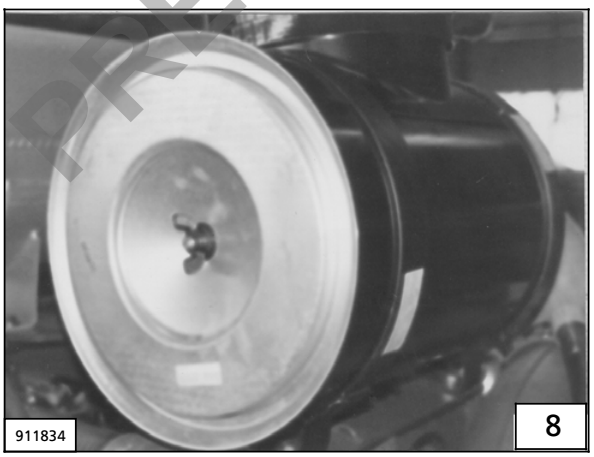
Drain water and sediments from fuel tank:

On the underside of the fuel tank, open the drain plug or drain valve and drain off water and sediments until clean fuel emerges.

Close drain plug or valve.

Catch fuel in a suitable container.

Refer to the machine Operation and Maintenance Manual for details.



Dust collector on air filter:

Remove the dust collector, empty, clean and reinstall.
Make sure the seal ring is seated properly.

For versions with dust ejector valve, push valve open and clean.

On systems with automatic dust ejection, this step is not required.

For air filter description, refer to sub group 2.05.

Refer to machine's Operation and Maintenance Manual for details.

PREVIEW YOUFIXTHIS.COM

Download full manual at youfixthis.com

Einspritzanlage — Fuel injection system — Système d'injection

Motortype / Engine Type / Type de moteur	D 9306 TB	D 9306 T / TI	D 9308 T / TI	D 9406 T / TI-EA3	D 9408 T / TI - EA3	D 9406 TI-EA4
Einspritzpumpe / Fuel injection pump / Pompe d'injection Fabrikat / Make / Marque	Bosch P 3000	Bosch P 3000 P 7800		Bosch P 7800		
Regler / Governor / Régulateur Fabrikat / Make / Marque	Bosch RSV	Bosch RSV, RQV, RSUV	Bosch RSV, RQV	Bosch RSUV, RSV, RQV, RQV - K		Bosch EDC
Einspritzdüse / Injection nozzle / Injecteur Fabrikat / Make / Marque	Bosch DLLA 137 S 1154	Bosch DLLA 134 S 1155		Bosch DLLA 145 P439 DLLA 145 P536	Stanadyne 34166	Bosch DLLA 145 P536 Stanadyne 34166
Einspritzdruck / Injection pressure / Press.d'injection Betriebsdruck / Operating press. / Press.en service bar / (PSI) bar / bar	217^{+8} (3147 - 3263)			217^{+8} (3147 - 3263) $292+8$ (ab 320KW) (4238 - 4354)	217^{+8} (3147 - 3263) $292+8$ (ab 440KW) (4238 - 4354)	217^{+8} (3147 - 3263) $292+8$ (ab 320KW) (4238 - 4354)
Einspritzdruck / Injection pressure / Press.d'injection Neuzustand / in new condition / à létat neuf bar / (PSI) bar / bar	225^{+8} (3263 - 3379)			225^{+8} (3263 -3379) $300+8$ (ab 320KW) (4354 - 4470)	225^{+8} (3263 -3379) $300+8$ (ab 440KW) (4354 - 4470)	225^{+8} (3263 -3379) $300+8$ (ab 320KW) (4354 - 4470)
Förderbeginn vor O.T. in Grad Kurbelwinkel / Fuel delivery begin before TDC in degree / Début d'injec.av. PMH en °d'angle de vilebrequin	20 ± 1	20 ± 1 n(RPM) = 1500 / 1800 1/min 15 ± 1 n(RPM) = 2100 1/min	24 ± 1 D 9308 T n (RPM) = 1800 1/min 20 ± 1 D 9308 TI n (RPM) = 1500 / 1800 1/min 15 ± 1 D 9308 TI n(RPM) = 2100 1/min	16 ± 1 n (RPM) = 1800 / 1900 1/min 14 ± 1 n (RPM) = 2000 / 2100 1/min Angaben siehe Motor-Typenschild Details see Engine Type-plate Pour details voir Plaque signalétique moteur	16 ± 1 n (RPM) = 1800 / 2000 / 2100 1/min Angaben siehe Motor-Typenschild Details see Engine Type-plate Pour details voir Plaque signalétique moteur	Angaben siehe Motor-Typenschild Details see Engine Type-plate Pour details voir Plaque signalétique moteur

Download full manual at youfixthis.com

PREVIEW YOUFIXTHIS.COM

Torque specifications

For screw plugs according to DIN 908, 910, hollow screws according to DIN 7643 with seal rings according to DIN 7603.

Thread	Nm
M 6 x 1	7
M 8 x 1.5	7.5
M 10 x 1	10.4
M 12 x 1.5	20
M 14 x 1.5	27
M 16 x 1.5	37
M 18 x 1.5	40
M 20 x 1.5	47
M 22 x 1.5	57
M 24 x 1.5	68
M 26 x 1.5	75
M 27 x 2	87
M 30 x 1.5	115
M 30 x 2	115

Thread	Nm
M 33 x 2	120
M 36 x 1.5	155
M 36 x 2	155
M 38 x 1.5	171
M 39 x 2	215
M 42 x 1.5	240
M 42 x 2	240
M 45 x 1.5	270
M 45 x 2	270
M 48 x 1.5	300
M 48 x 2	300
M 52 x 1.5	380
M 52 x 2	380
M 56 x 2	430
M 60 x 2	510
M 64 x 2	570
M 65 x 2	620

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Problem	Cause	Remedy
8) Engine knocks	Fuel injector nozzles are damaged or dirty	Check fuel injectors, adjust or replace
	Piston rings are dirty or broken, piston worn	Check piston and cylinder liners and replace, if necessary
	Main bearing or rod bearings are defective	Install new engine bearings or repair complete engine
9) Coolant temperature too high	Not enough coolant in cooling system	Add coolant
	Air in cooling system	Bleed cooling system
	Radiator dirty on the outside	Clean radiator
	Radiator dirty on the inside or clogged up	Clean radiator, degrease and flush
	Thermostats defective	Check thermostats, replace if necessary
	Coolant pump defective	Check coolant pump, repair or replace
	Fan defective	Check fan, replace if necessary
10) Lube oil pressure too low	Oil level in oil pan too low	Add oil to the correct mark
	Lube oil too thin	Drain oil, add oil as specified
	Oil pressure gauge or transmitter is defective	Check oil pressure and replace defective gauge or transmitter
	Lube oil pump is defective	Replace lube oil pump
	Valve on lube oil pump is stuck in open position	Check valve on lube oil pump and replace, if necessary
	Bearing play is too large due to bearing damage or wear	Replace or repair engine bearings
11) Lube oil in cooling system	Oil cooler or oil cooler plate leaking	Remove oil cooler, replace if leaks are found
	Cylinder head gaskets leak	Replace cylinder head gaskets
12) Coolant in lube oil	Cylinder head gaskets leak	Replace cylinder head gaskets
	O-rings on cylinder liners leak	Replace O-rings

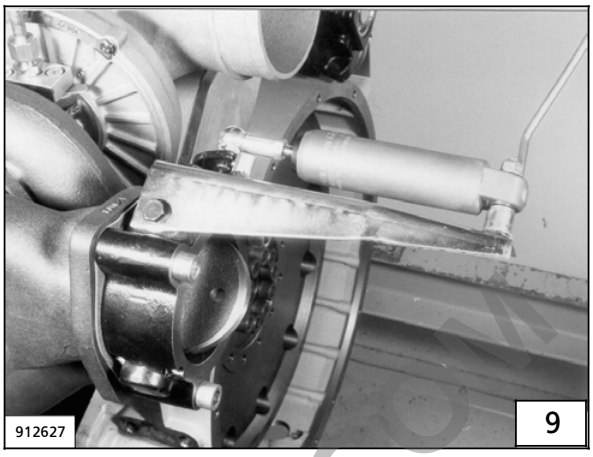
PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Engine brake:

Actuate the engine brake several times to check for proper function.

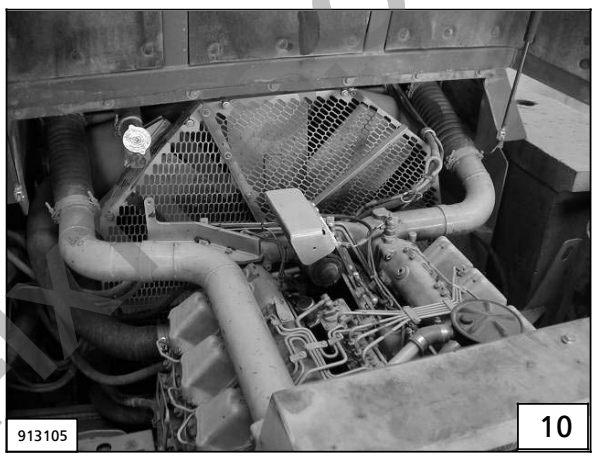
For description of engine brake, refer to sub group 8.90



Oil, coolant and fuel system:

Check connections, hoses, lines for leaks and condition.

Reseal in case of leakage, or replace defective hoses or lines.

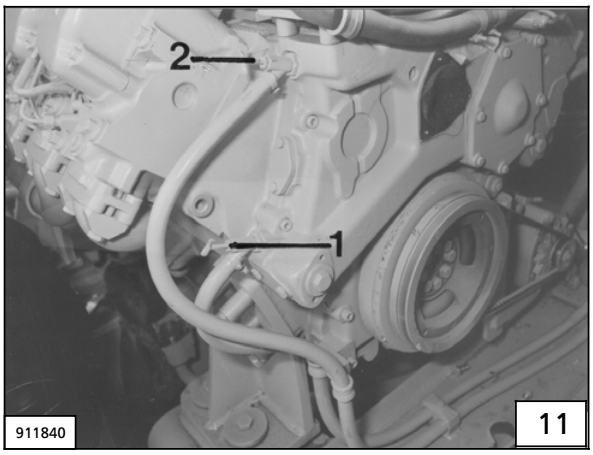


Heater connection: 1 = supply line
2 = return line

Replace brittle or damaged coolant hoses.

Note:

When replacing heater valves or heater connections, coat threads with Omnivisc 1050, or Reinzoplast sealing compound or use Flui-Flex sealing tape or a comparable product.

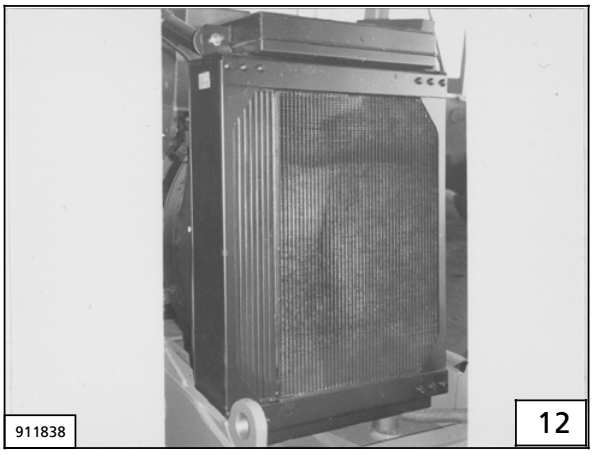


Radiator, pressure relief valve, fan:

Clean the radiator, cooling circuit, as necessary.

Change the radiator cap with relief valve (cooling system) in case of leaks. Replace defective fan.

On machines with intercooler installation, clean cooling circuit, also check fan for cracks, damage and distortion, as necessary.

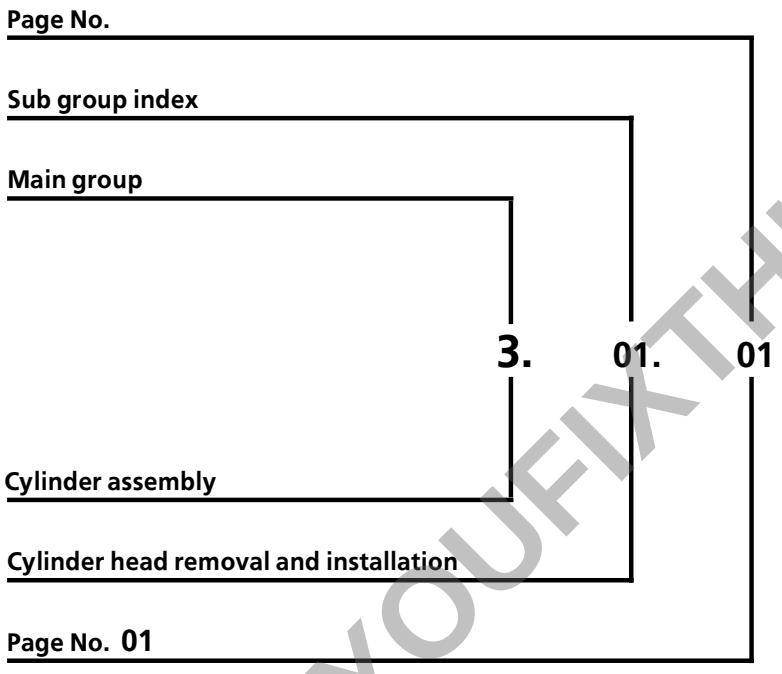


PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Explanation of index

In order to make it easier to find certain information or to remove or add pages, the following system has been established:



The main groups can be found on the index page of this manual.

The sub groups can be found on the sub group index pages in front of every main group.

In case of minor changes, we will issue revised pages with the latest date.

If an already existing sub group is updated completely, a new sub group number will be assigned.

The new group number will list the engine serial number, for which this new or revised information is valid.

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Triebwerk	Crank and Camshaft Drive	Embiellage						
Motortype	**Engine Type**	**Type de moteur**	**D 9408 TI - EA4**	**D 9406 TI - EA5**	**D 9408 TI - EA5**			
Radialspiel mm	Radial clearance (inch) mm	Jeu radial mm		0,05 - 0,121 (0,0019 - 0,0048)				
Grenzwert mm	Limit (inch) mm	Valeur limite mm		0,25 (0,0098)				
Lagerbuchse Innendurchmesser mm	Bushing inside diameter (inch) mm	Coussinet du palier diamètre intérieur mm		$40^{+0,046}$ (1,5748 - 1,5766)				
Lagerzapfen Durchmesser mm	Shaft diameter (inch) mm	Portée Diamétre mm		$40\ ^{-0,050}_{-0,075}$ (1,5719 - 1,5728)				

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Additives for Diesel fuel (Flow improvers)

Commercially available flow improvers can also help to improve the Diesel fuel for cold temperatures. When using these additives, observe the manufacturer's instructions regarding quantities and use.

Approved fuel specifications: DIN EN 590
ASTM D 975 - 89a 1 D and 2

For additional fuel specifications consult the Engine design dept.

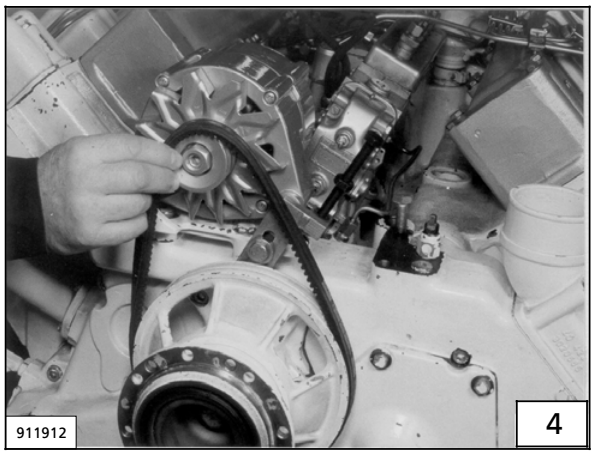
Diesel fuel mixing ratio (Vol.-%)

Ambient temperature °C	Summer Diesel fuel %	Additive %	Winter Diesel fuel %		Additive %	
			- 15°C	- 20°C	- 15°C	- 20°C
0 bis - 10	70	30	100	100	-	-
- 10 bis - 15	50	*50	100	100	-	-
- 15 bis - 20	-	-	70	100	30	-
- 20 bis - 25	-	-	50	70	*50	30

* If more than 50% are necessary, use only kerosene, DO NOT USE regular gasoline .

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

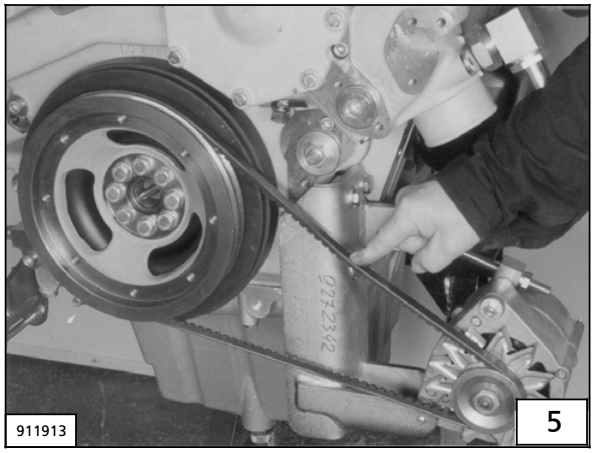


Changing the V-belt

Loosen screws 1, 2, 3 and locknut 4 (see fig. 3). Back out adjustment screw 5, swing the alternator down and remove the V-belt. Install new V-belt, adjust tension and tighten all nuts and screws.

Note:

The fan might have to be removed for V-belt replacement.

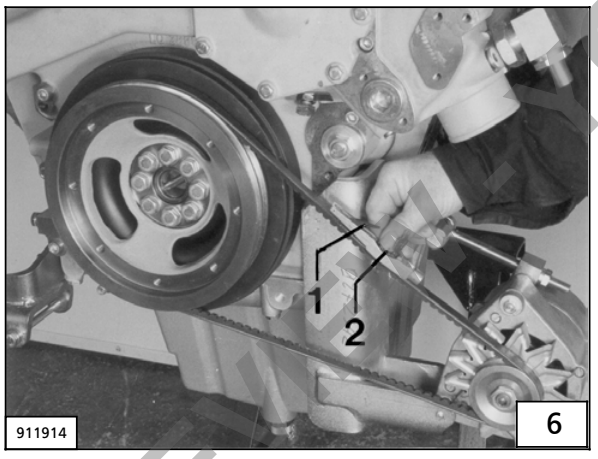


Check alternator V-belt tension, adjust and or replace

Alternator 28V 55A
Driven by crankshaft

To check by hand:

The V-belt tension is correctly adjusted when the V-belts can be pressed down in the center by approx. 10 mm (3/8 ").



Checking the V-belt tension with the "Krikit" tension indicator (Made by Gates):

Push the indicator lever 1 into the tension indicator. Place the indicator on the V-belt in the center between the pulleys. The stop must touch the sides of the V-belt. Push the button 2 evenly at a right angle to the V-belt until the retaining spring releases. Carefully remove the tension indicator and compare the actual V-belt tension on the "KG" scale and on the indicator lever. See chart below.

Belt size mm	New V-belt KG - scale	Used V-belt KG - scale
12.5	40 - 45	30 - 40

PREVIEW ONLY YOUFIXTHIS.COM

Download full manual at youfixthis.com

Install piston rings with piston ring pliers on the piston.

Check the axial play between the piston ring and groove.

For correct dimensions, see Technical Data.

Important:

When installing the piston rings, make sure that the "top" mark on the piston ring points upward to the flat piston surface.

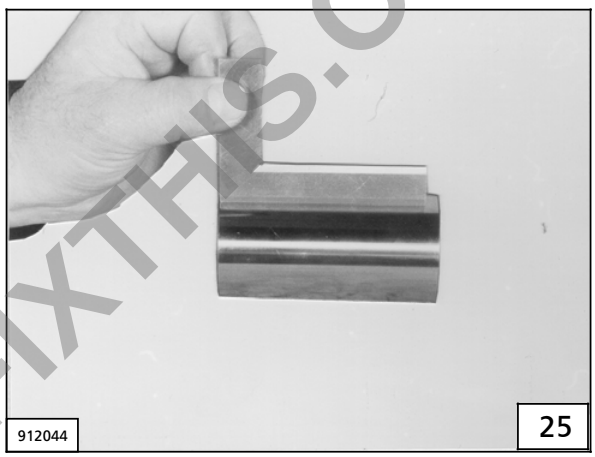


Check piston pin for wear and deformation.

Note:

When replacing the piston or piston rings, replace the cylinder liner as well.

See sub group 3.30.



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

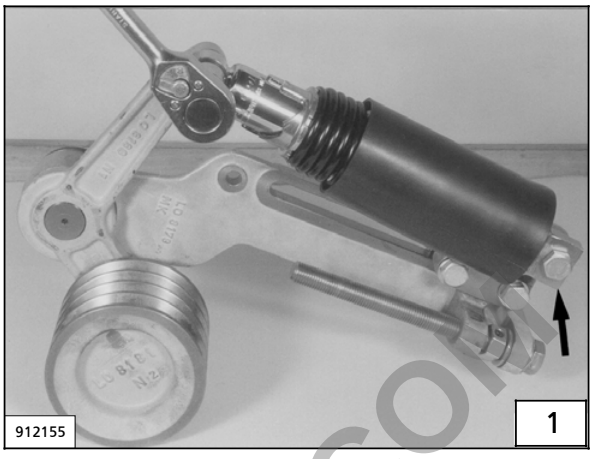
Fan drive disassembly, inspection and assembly (V-belt drive)

The fan drive is removed, see sub group 5.08.

For drawing, see page 5.18.06 (reverse page).

Remove vibration damper :

Vibration damper is released. Remove screws on the positioning lever and on the swing lever. Remove vibration damper.



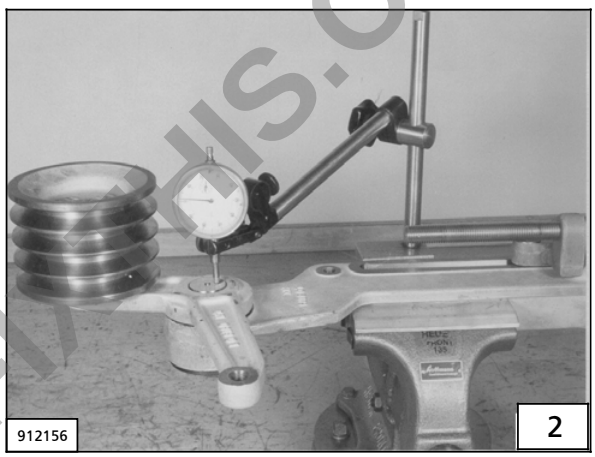
Tensioning device disassembly, inspection and assembly:

Check the axial play between bracket and tensioning device:

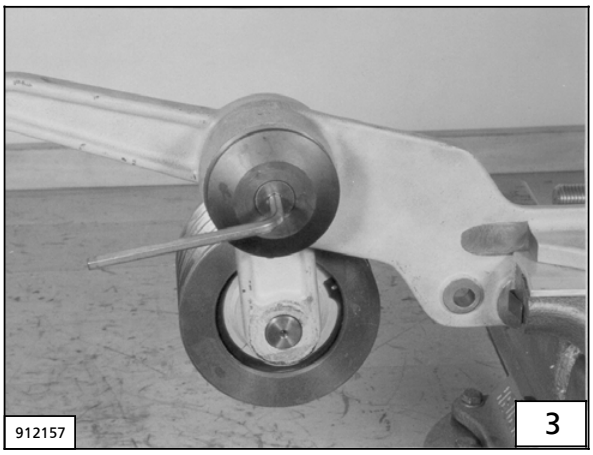
Insert the bracket 1 into a vise with protective sides.

With a commercial magnetic base and dial indicator, check the axial play between bracket 1 and tensioning device.

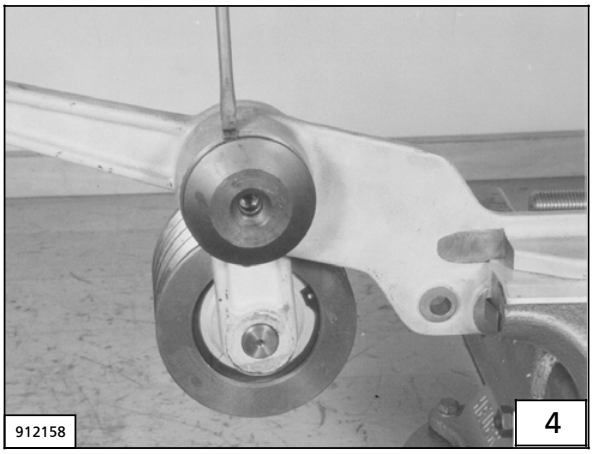
For dimensions, see Technical Data.



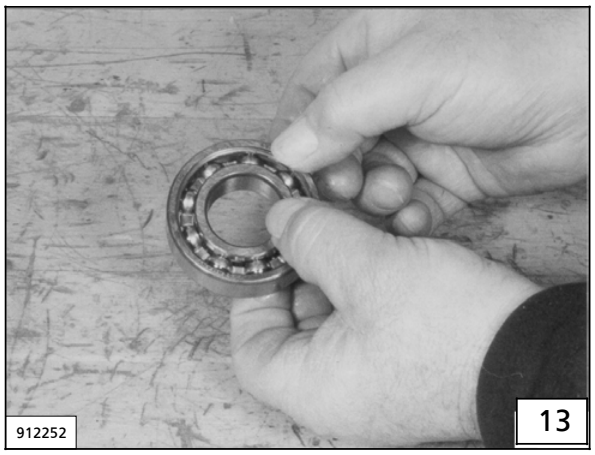
Loosen and remove screw 2 .



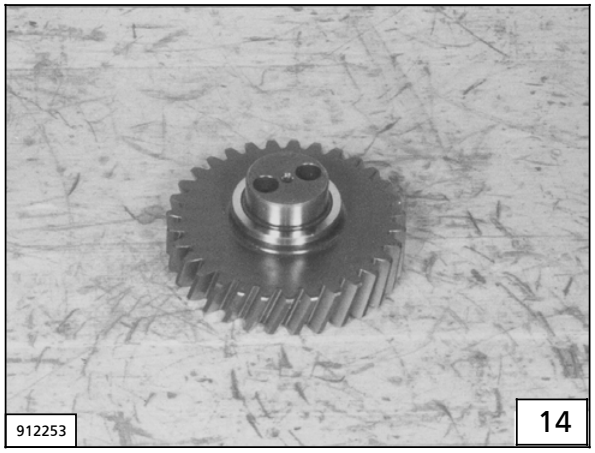
Pry cover 3 from bracket 1.



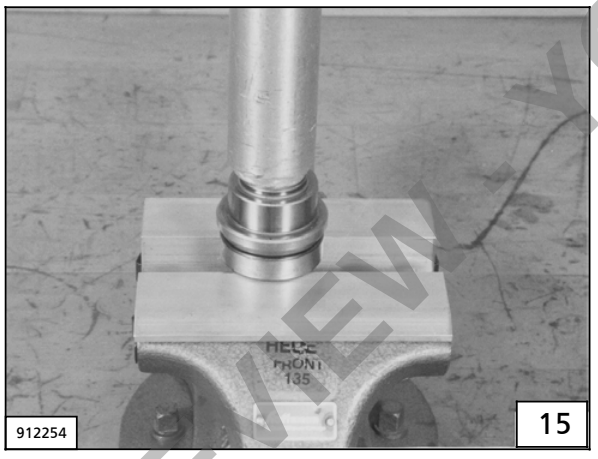
PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com



Visually inspect the ball bearing 11 for excessive play, spin and listen for unusual sound; replace if necessary.



Check the teeth on gear 3 for wear, replace if necessary.



Assembly:

Place the ball bearing 10 onto a vise. Push the shaft 6 through and press the ball bearing onto the shaft.

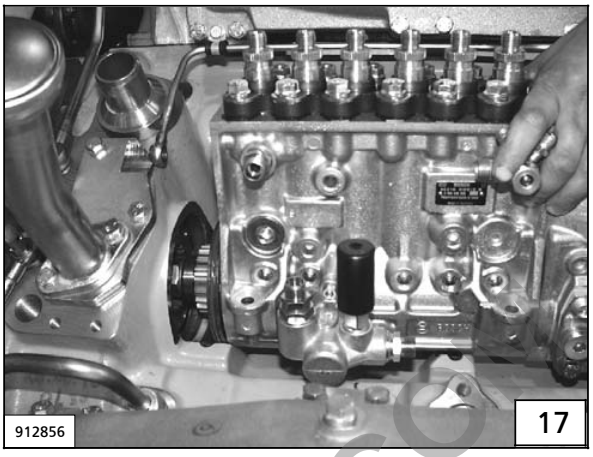


Place the washer 15 onto the ball bearing 10 and insert snap ring 14 .

PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

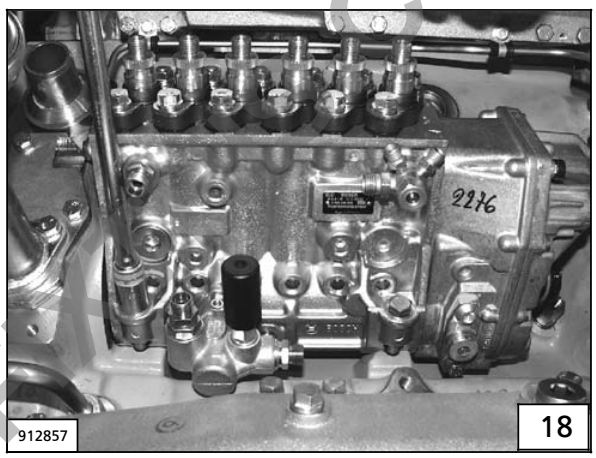
Insert the injection pump with gear shaft into the driving collar in such a way that the gap on the gear shaft (missing tooth) lines up with the matching bore, which is closed with the tension pin in the coupling ring. Push the injection pump into the crankcase.



Screw in and tighten mounting screws.

Notice:
Before tightening the mounting screws it is recommendable to connect the fuel line to the solenoid on the injection pump.

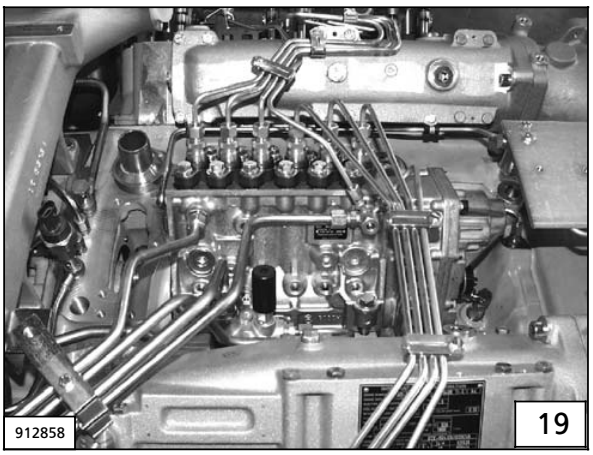
This determines the exact mounting position of the injection pump.



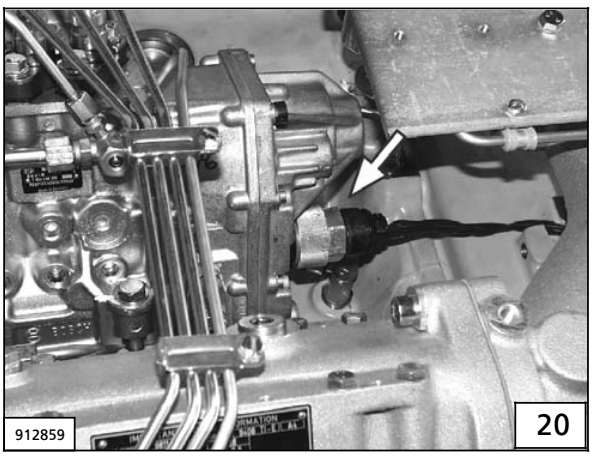
Install fuel line to the solenoid, lubricating oil return and lubricating oil supply line, injection lines, leak oil return line, fuel return line to the tank, fuel line from the fuel filter and fuel line on the lift pump with new gasket rings.

Check and adjust begin of delivery, see subgroup 2.21.

Bleed fuel system, see subgroup 7.30



Install electric plug, fit mounting screw and tighten.



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Hydraulic pump removal and installation

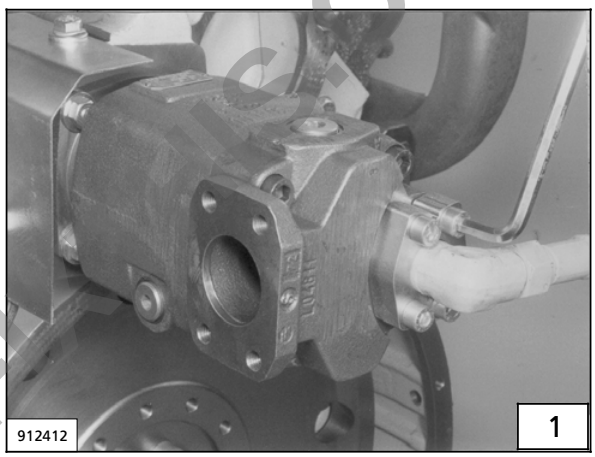
Flange pump, installed on controllable hydraulic pump drive on flywheel housing .

Important:

Before removing the hydraulic pump from the controllable hydraulic pump drive, the connection between drive - hydraulic pump must be turned on, otherwise the clutch ring will fall off the shifting fork during removal.

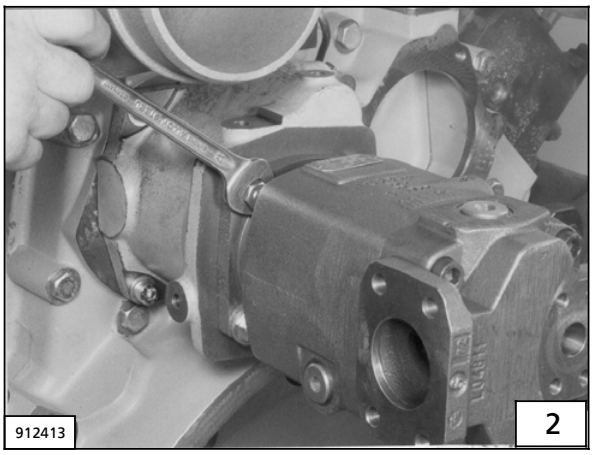
Removal:

Remove hydraulic lines from the pump.



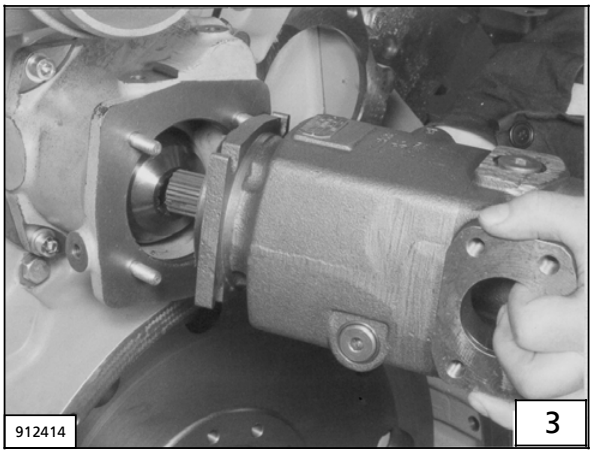
Loosen and remove nuts on flange of hydraulic pump.

Remove washers.



Remove the hydraulic pump from the drive.

Clean flange surfaces on the drive and on the hydraulic pump.



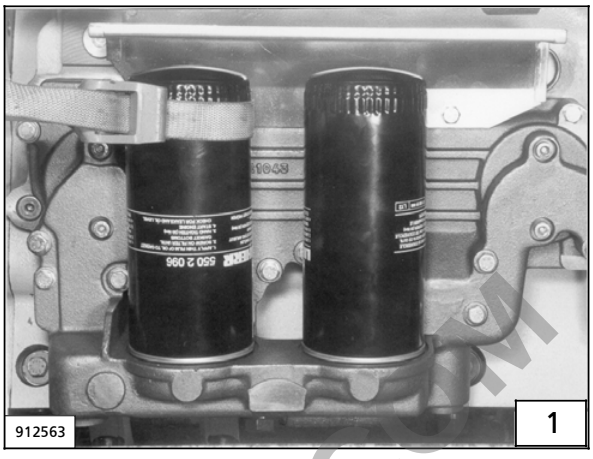
PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

Oil cooler housing, oil cooler and oil filter / oil cooler bypass valve removal and installation (Oil filter installation „upright")

Oil cooler housing removal :

Drain coolant, see sub group 2.01.

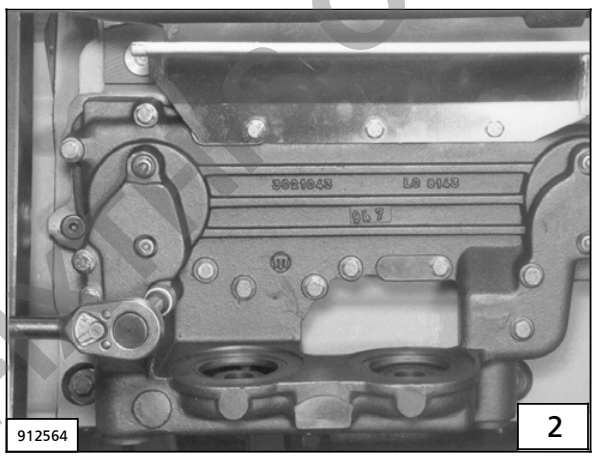
Remove the lube oil filters from the oil cooler housing.



Loosen and remove the screws on the oil cooler housing.

Note:

If a heat shield is installed on the oil cooler housing, remove the shield.

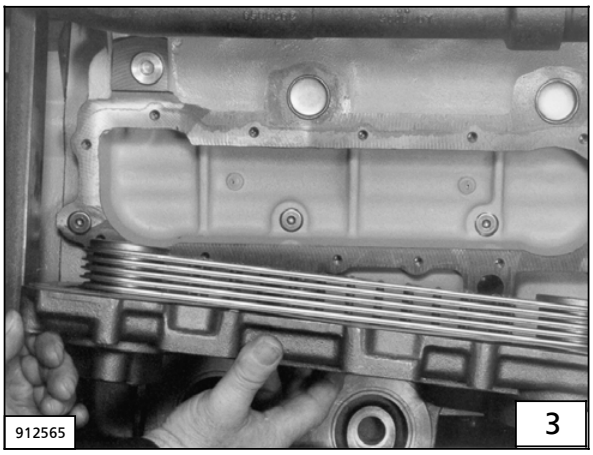


Remove the oil cooler housing with oil cooler from the crankcase.

Clean the sealing surfaces on the crankcase and oil cooler housing.

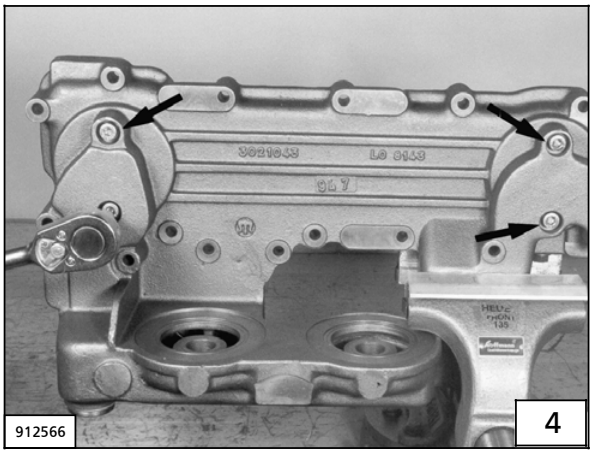
Note:

Depending on the size of the oil cooler, an intermediate flange may be installed between the oil cooler housing and the crankcase. Remove the intermediate flange and clean the sealing surfaces.



Remove the oil cooler :

Loosen and remove the oil cooler mounting screws .



PREVIEW - YOUFIXTHIS.COM
Download full manual at youfixthis.com

Camshaft and cam follower removal and installation

Removal:

Drain engine oil and coolant, see sub group 2.01.

Remove oil pan, see sub group 8.45.

Remove flywheel housing, see sub group 9.10.

Remove timing case, see sub group 9.01.

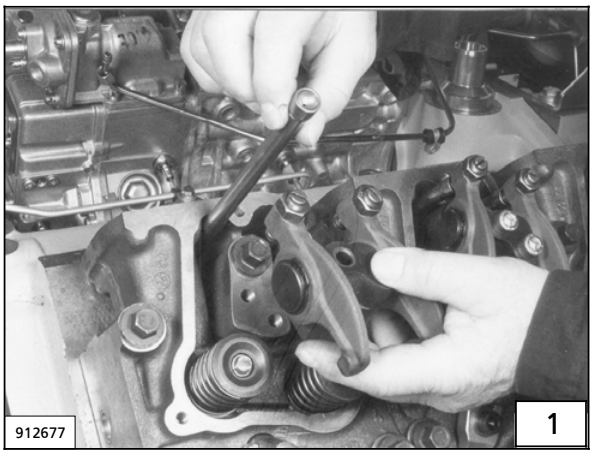
Remove gears for fan and coolant pump drive from camshaft, see sub group 9.05.

Note:

To remove and install the camshaft, the crankshaft does not need to be removed. Fashion two hooks approx. 500 mm long, from 5 to 6 mm diameter material to use as a tool.

Remove cylinder head covers and rocker arm assembly. Remove push rods.

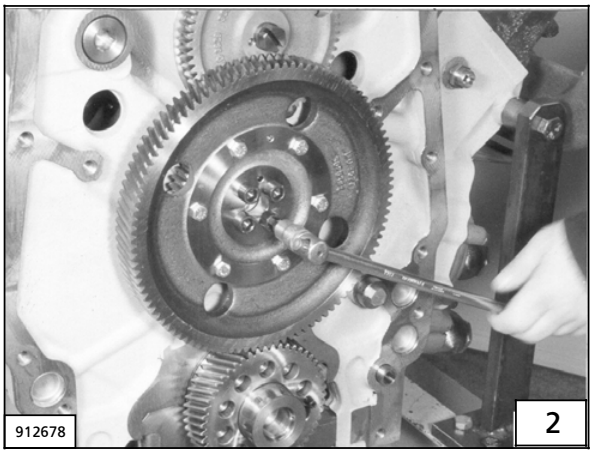
To remove rocker arm assembly and push rods, see sub group 3.01 "Cylinder head removal and installation".



Loosen and remove screws on camshaft gear.

Note:

To loosen and tighten the screws, hold the crankshaft on fan side with special tool No. 41 .



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

Repair instructions

Turbocharger - Made by Schwitzer

To determine the bearing plays:

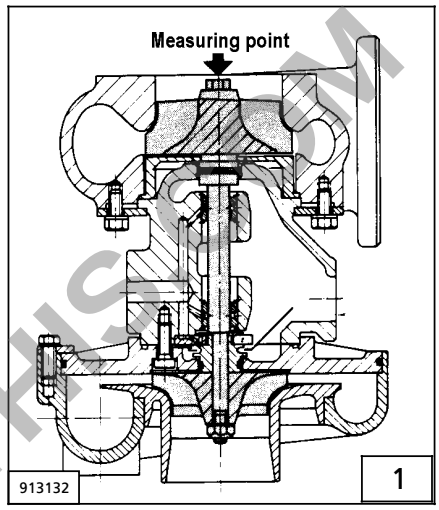
Measure axial play :

Set the needle of the dial gauge on the front onto the turbine wheel hub.

Push the shaft down and set the dial gauge to "0" !

Push the shaft up against the dial gauge and note the deflection of the gauge.

Refer to page 10.26.02 for permissible axial plays .



Measure radial play :

The radial play needs to be checked only on the **compressor side**.

Set the needle of the dial gauge in the center of the hex nut of the compressor wheel.

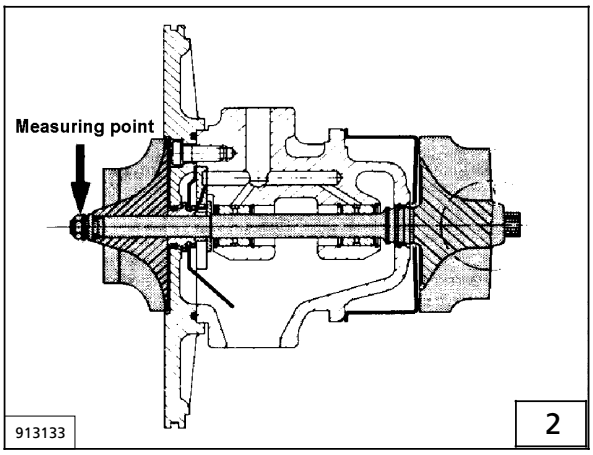
Push the compressor wheel hub downward with a spring scale. Test force : 50 N. Set dial gauge to "0"!

Pull the compressor wheel hub upward with a spring scale. Test force : 50 N.

Note the deflection of the gauge.

Turn the shaft by 90° and repeat this test.

Refer to page 10.26.02 for permissible radial plays .



PREVIEW - YOUFIXTHIS.COM

Download full manual at youfixthis.com

PREVIEW ONLY

You're viewing 25 of 664 pages

The full manual includes:

- All 664 pages, complete
- Searchable PDF (find any keyword)
- No watermarks
- Instant download
- Print-ready quality

GET FULL MANUAL NOW

Liebherr D 9306, D 9308, D 9406, D 9408 Service Manual

Scan or click anywhere
youfixthis.com

Click anywhere on this page to get the full manual