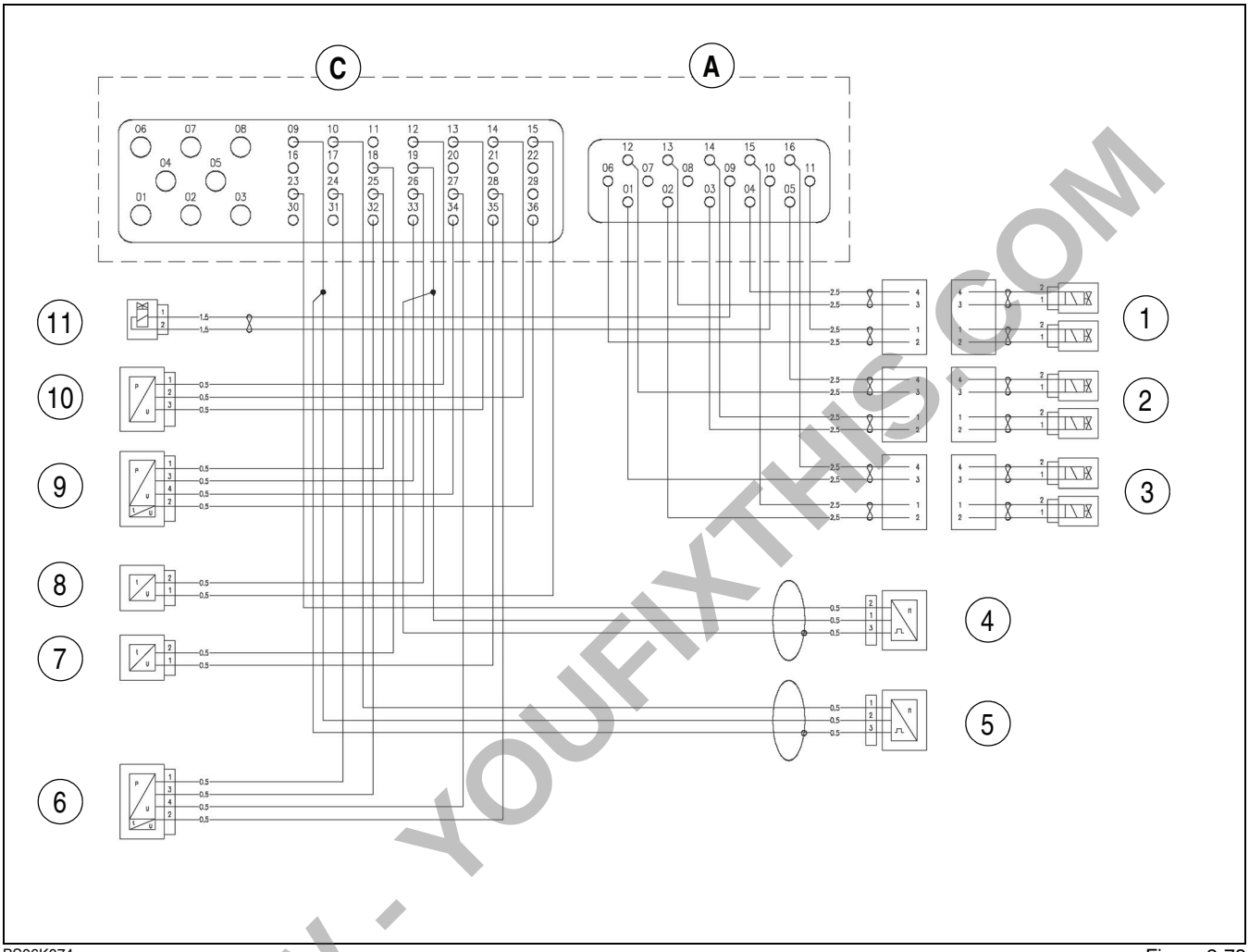
CABLING CONNECTOR PINOUT ON ENGINE



BS06K074

Figure 2-73

CONNECTOR / CABLING DIAGRAM

A. CONNECTOR A (INJECTORS) EDC7UC31 ECU (POWER)
B. CONNECTOR B NOT SHOWN (SEE NOTE BELOW)
C. CONNECTOR C (SENSORS) EDC7UC31 ECU (SIGNAL)
1. INJECTORS FOR CYLINDERS 1-2
2. INJECTORS FOR CYLINDERS 3-4
3. INJECTORS FOR CYLINDERS 5-6
4. CRANKSHAFT SENSOR
5. CAMSHAFT SENSOR
6. OIL PRESSURE AND TEMPERATURE SENSOR
7. FUEL TEMPERATURE
8. COOLANT TEMPERATURE SENSOR
9. BOOST AIR TEMPERATURE AND PRESSURE SENSOR
10. COMMON RAIL PRESSURE SENSOR
11. FUEL HIGH PRESSURE REGULATOR SENSOR

NOTE: *Connector B is not shown because it is specific to the machine application see the particular machine schematic.*

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TORQUE SPECIFICATIONS

PART	TORQUE - Nm (lb.-ft.)
Cylinder head fastening bolt.	
1st phase.	
Bolts M12x1.75x70	45 to 55 Nm (33.2 to 40.6 lb.-ft.)
Bolts M12x1.75x140	35 to 45 Nm (25.8 to 33.2 lb.-ft.)
Bolts M12x1.75x180 (pre lubricate with oil)	65 to 75 Nm (47.9 to 55.3 lb.-ft.)
2nd phase additional rotation	90 degrees
3rd phase (only for bolts 140 and 180 mm long additional rotation)	90 degrees
Main bearing Caps.	
1st phase. (pre lubricate with oil)	44 to 56 Nm (32.5 to 41.3 lb.-ft.)
2nd phase.	74 to 86 Nm (54.6 to 63.4 lb.-ft.)
3rd phase. additional rotation.	90 ±5 degrees
Connecting rod cap fasting bolts.	
1st phase. (pre lubricate with oil.	55 to 65 Nm (40.6 to 47.9 lb.-ft.)
2nd phase. additional rotation	60 ±5 degrees
Engine flywheel fastening bolts.	
1st phase.	26 to 34 Nm (19.2 to 25.1 lb.-ft.)
2nd phase. additional rotation.	60 ± 5 degrees
Nut securing connector for injector supply.	45 to 50 Nm (33.2 to 36.9 lb.-ft.)
Sump (oil pan).	20 to 28Nm (14.8 to 20.7lb.-ft.)
Fuel filter.	Contact + 3/4 turn
Injection pump gear cover fastening bolts.	20 to 30 Nm (14.8 to 22.1 lb.-ft.)
Valve gear cover and case fastening bolts.	20 to 28Nm (14.8 to 20.7 lb.-ft.)
Intake manifold fastening bolts.	20 to 28 Nm (14.8 to 20.7 lb.-ft.)
Fuel pump fastening bolts.	20 to 30 Nm (14.8 to 22.1 lb.-ft.)
Exhaust manifold fastening bolts.	48 to 58 Nm (35.4 to 42.8 lb.-ft.)
Valve cover fastening nuts.	20 to 28 Nm (14.8 to 20.7 lb.-ft.)
Rocker arm support fastening bolts.	31 to 41Nm (22.9 to 30.2 lb.-ft.)
Nut for rocker arm adjusting bolt.	20 to 28 Nm (14.8 to 20.7 lb.-ft.)
Bolts fastening the pulley on the crankshaft.	
1st phase.	45 to 55 Nm (33.2 to 40.6 lb.-ft.)
2nd phase additional rotation.	90 ±5 degrees
Cam shaft shoulder plate fastening bolts.	20 to 28 Nm (14.8 to 20.7 lb.-ft.)
Fan support fastening bolts.	20 to 30 Nm (14.8 to 22.1 lb.-ft.)
Injection pump fastening bolts	7 to 17 Nm (5.2 to 12.5 lb.-ft.)
Fan pulley fastening bolts	37 to 49 Nm (27.3 to 36.1 lb.-ft.)
Turbocharger fastening bolts.	20 to 30 Nm (14.8 to 22.1 lb.-ft.)
Starter motor fastening bolts.	37 to 49 Nm (27.3 to 36.1 lb.-ft.)
Alternator fastening bolts.	37 to 49 Nm (27.3 to 36.1 lb.-ft.)
Water pump fastening bolts.	20 to 28 Nm (14.8 to 20.7 lb.-ft.)
Oil filter.	Contact + 3/4 turn
Belt tensioner fastening bolts.	37 to 49 Nm (27.3 to 36.1 lb.-ft.)
Water Oil cooler (heat exchanger) for EDC7UC31 control unit	
M6 bolt	8 to 12 Nm (5.9 to 8.9 lb.-ft.)
M8 bolt	20 to 28 Nm (14.8 to 20.7 lb.-ft.)
Oil pump and front cover fastening bolts	
1st stage	7 to 9 Nm (5.2 to 6.6 lb.-ft.)
2nd stage	20 to 28 Nm (14.8 to 20.7 lb.-ft.)
Cylinder bore lubrication jets fastening bolt	12 to 18 Nm (8.9 to 13.3 lb.-ft.)
Common Rail fastening bolts	20 to 28 Nm (14.8 to 20.7 lb.-ft.)
Boost temperature/pressure sensor on intake manifold	5 to 7 Nm (3.7 to 5.2 lb.-ft.)
Engine oil level sensor bolt	10 to 14 Nm (7.3 to 10.3 lb.-ft.)
Turbocharger to exhaust manifold fastening bolts	37 to 49 Nm (27.3 to 36.1 lb.-ft.)
Wiring duct securing bolt M6	8 to 12 Nm (5.9 to 8.9 lb.-ft.)
Support for electrical wiring for injector power supply bolt	20 to 28 Nm (14.8 to 20.7 lb.-ft.)

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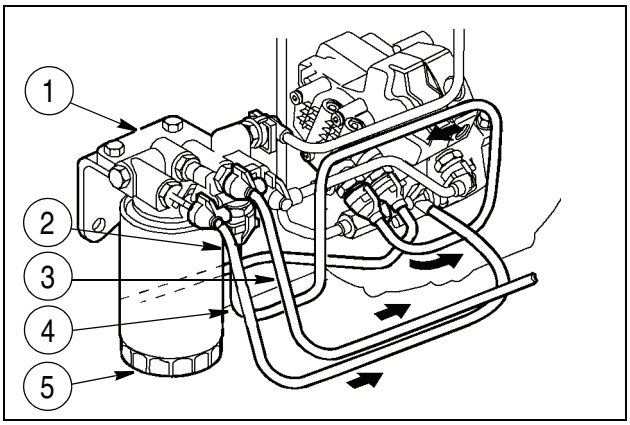
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ENGINE OVERHAUL ON THE BENCH

DISASSEMBLING THE ENGINE

STEP 1
Drain the engine oil by removing the plug from the oil pan (sump).

STEP 2

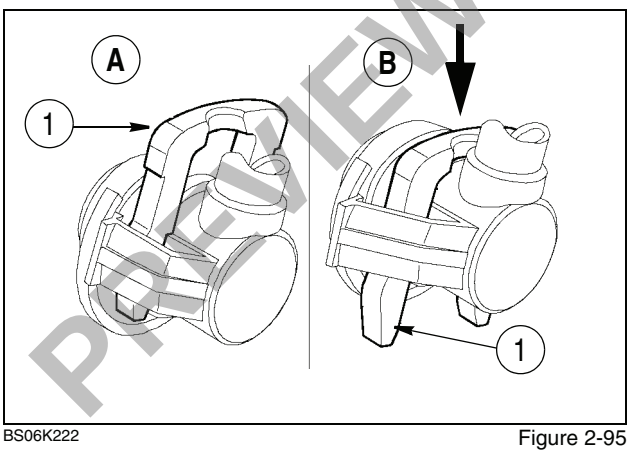


BS06K221 Figure 2-94

Apply the brackets for fastening the engine to the engine stand as follows (working from the left side of the engine.

- Use a suitable tool to remove the fuel filter (5) from the fuel filter bracket (1).
- Disconnect the low pressure lines (2, 3, 4) from the fuel filter bracket (1).
- Remove the fuel filter bracket (1) from the engine block.

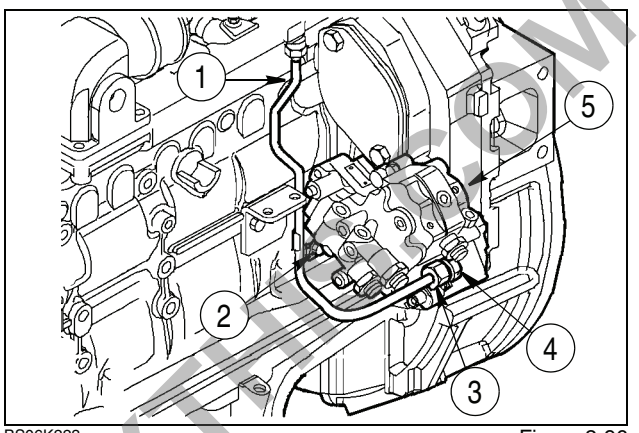
STEP 3



BS06K222 Figure 2-95

IMPORTANT: *Push clamp (1), as shown in figure B to disconnect the low pressure fuel lines (2, 3, 4) from the corresponding connections. After disconnecting the line, reset the clamp (1) in locking position figure A to prevent distortion to the clamp.*

STEP 4

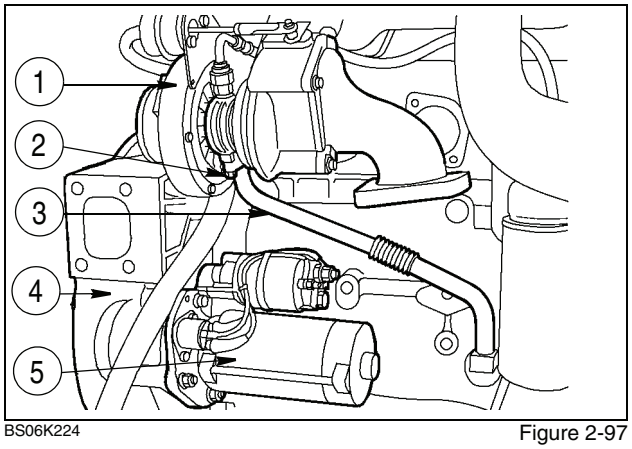


BS06K223 Figure 2-96

Disconnect fuel line (1) from common rail and from high pressure pump (5) and remove it by taking out securing bolts (2).

IMPORTANT: *When loosing fitting (3) of fuel line (1), it is necessary to use a suitable wrench to prevent fitting (4) of high pressure pump (5) from rotating.*

STEP 5
From the Right Side:



BS06K224 Figure 2-97

Remove the mounting bolts (2) and remove the oil line (3) from the Turbo-charger (1) from the engine block.

Remove the starter (5) from the flywheel housing (4)

Secure the engine to a engine stand.

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TROUBLESHOOTING

ENGINE WON'T START

Batteries fully charged.	No →	Perform the checks described in the Electrical section of the Shop manual.
↓ Yes		
Connections to battery terminals are tight and clean.	No →	Inspect, clean, tighten or replace connections.
↓ Yes		
Starter motor working properly.	No →	Perform the checks described in the Electrical section of the Shop manual.
↓ Yes		
Pre-Post heating system working properly.	No →	Check using a multi meter replace or repair.
↓ Yes		
Fuel filters plugged.	Yes →	Replace.
↓ No		
The fuel system or injection pump shows signs of air in system.	Yes →	Check and repair air leaks.
↓ No		
The fuel system shows traces of water.	Yes →	Check and clean the fuel system including the fuel tank.
↓ No		
High pressure pump working properly.	No →	Check using Electronic Service Tool (EST) and repair or replace if necessary.
↓ Yes		
Injectors working properly.	No →	Check using Electronic Service Tool (EST). Check O-ring seal. Replace injectors if defective.
↓ Yes		
Compression good on all cylinders.	No →	Check each cylinder for proper compression, overhaul the engine or make repairs on defective parts (valves, piston rings, etc.).

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CONNECTOR (A) INJECTORS PINOUT DIAGRAM

EDC7UC31 ECU PIN	FUNCTION
1.	Cylinder 5 injector
2.	Cylinder 6 injector
3.	Cylinder 4 injector
4.	Cylinder 1 injector
5.	Cylinder 3 injector
6.	Cylinder 2 injector
7.	not used
8.	not used
9.	High pressure regulator with fuel metering
10.	High pressure regulator with fuel metering
11.	Cylinder 2 injector
12.	Cylinder 3 injector
13.	Cylinder 1 injector
14.	Cylinder 4 injector
15.	Cylinder 6 injector
16.	Cylinder 5 injector

NOTE: *Connector B is not shown because it is specific to the machine application see the particular machine schematic.*

CONNECTOR (C) SENSORS PINOUT DIAGRAM

EDC7UC31 ECU PIN	FUNCTION
1.	Not Used
2.	Not Used
3.	Not Used
4.	Not Used
5.	Not Used
6.	Not Used
7.	Not Used
8.	Not Used
9.	Camshaft speed sensor - Signal
10.	Camshaft speed sensor - Ground
11.	Not Used
12.	Common rail temperature and pressure sensor - Ground
13.	Common rail temperature and pressure sensor - Positive
14.	Common rail temperature and pressure sensor - Signal
15.	Coolant temperature sensor - Signal
16.	Not Used
17.	Not Used
18.	Fuel temperature sensor - Signal
19.	Crankshaft speed sensor - Ground
20.	Not Used
21.	Not Used
22.	Not Used
23.	Crankshaft speed sensor - Signal
24.	Engine oil pressure and temperature sensor - Ground
25.	Boost intake pressure sensor - Ground
26.	Coolant temperature sensor - Ground
27.	Oil pressure sensor - Signal
28.	Oil temperature sensor- Signal
29.	Not Used
30.	Not Used
31.	Not Used
32.	Engine oil pressure and temperature sensor - Positive
33.	Boost intake pressure sensor - Positive
34.	Boost intake pressure sensor - Signal
35.	Fuel temperature sensor - Signal
36.	Boost intake temperature sensor - Signal

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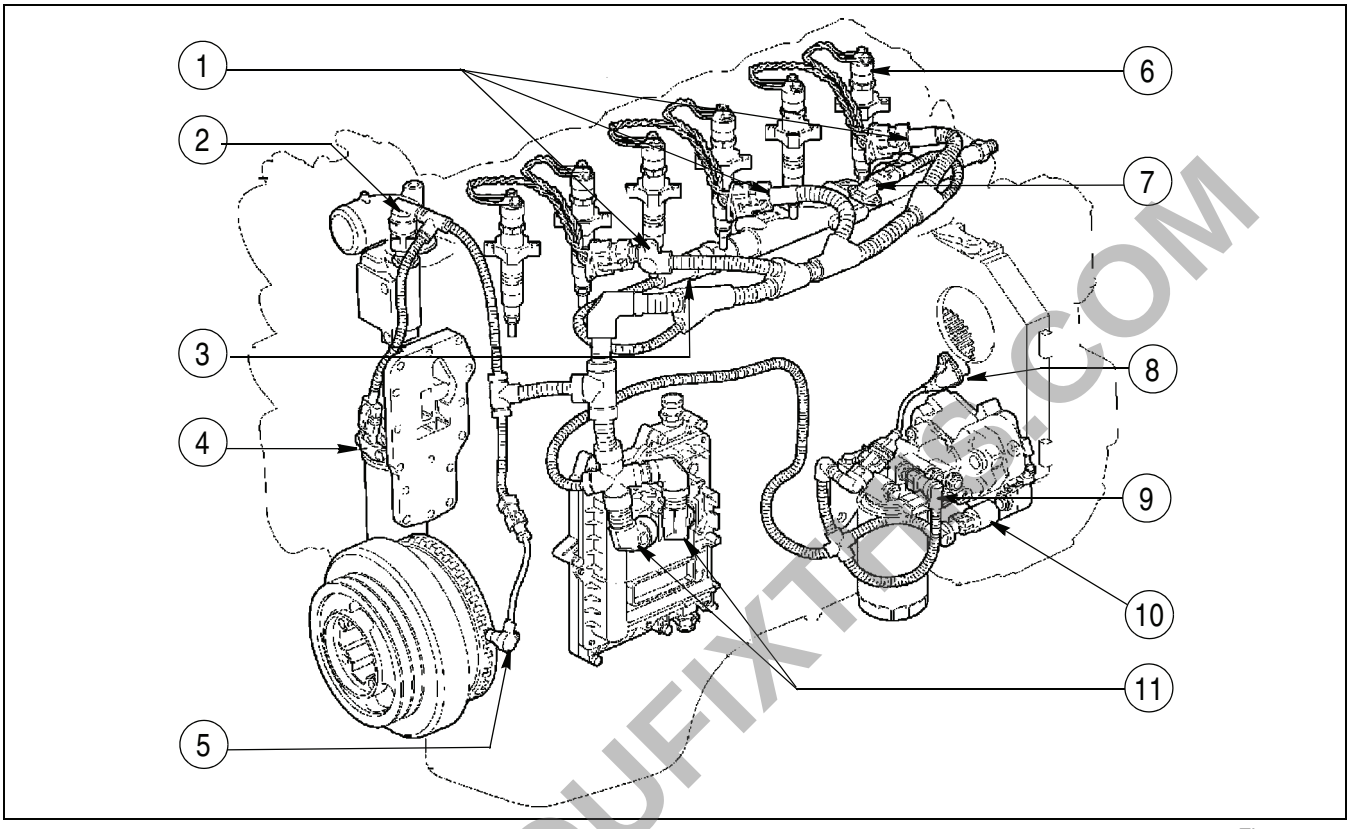
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Fuel filter bracket	
M12 bolt	69 to 85 Nm (50.9 to 62.7 lb.-ft.)
M8 bolt	20 to 28 Nm (14.8 to 20.7 lb.-ft.)
Flywheel casing	
M10 bolt	75 to 95 Nm (55.3 to 70.1 lb.-ft.)
M12 bolt	44 to 55Nm (32.5 to 40.6 lb.-ft.)
Camshaft sensor fastening bolt	6 to 10 Nm (4.4 to 7.4 lb.-ft.)
Crankshaft sensor fastening bolt	6 to 10 Nm (4.4 to 7.4 lb.-ft.)
Engine coolant temperature sensor fastening bolt	17 to 23 Nm (12.5 to 17.0 lb.-ft.)
Oil pressure/temperature sensor fastening bolt	5 to 7 Nm 3.7 to 5.2 lb.-ft.)
Fuel pressure sensor fastening bolt	30 to 40 Nm (22.1 to 29.5 lb.-ft.)
Fuel temperature sensor fastening bolt	17 to 23 Nm (12.5 to 17.0 lb.-ft.)

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STEP 6



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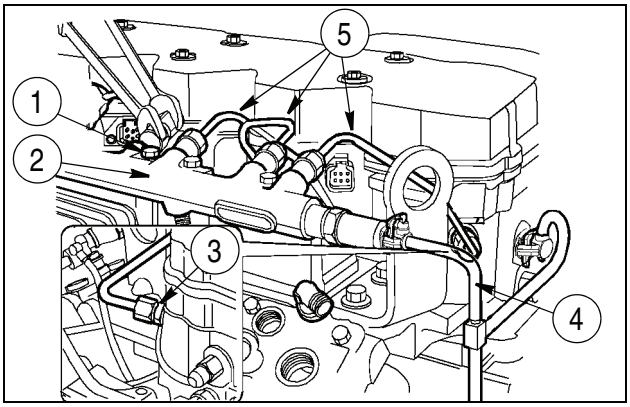
Figure 2-98

1. INJECTOR CONNECTIONS
2. ENGINE COOLANT TEMPERATURE SENSOR
3. COMMON RAIL FUEL PRESSURE SENSOR
4. OIL TEMPERATURE- PRESSURE SENSOR
5. CRANKSHAFT SPEED SENSOR
6. INJECTOR
7. BOOST TEMPERATURE-PRESSURE SENSOR
8. CAMSHAFT SENSOR
9. FUEL HEATER- TEMPERATURE SENSOR
10. HIGH PRESSURE REGULATOR
11. EDC7UC31 CONTROL UNIT

Disconnect the engine cable by disconnecting the following connectors:

- Connectors (1) from injector wiring (6)
- Engine coolant temperature sensor on the thermostat (2)
- Common rail fuel pressure sensor (3)
- Crankshaft speed sensor (5)
- Boost pressure / temperature sensor (7)
- Camshaft sensor (8)
- High pressure regulator (10)
- EDC7UC31 control unit (11)

STEP 7



BS06K226

Figure 2-99

Disconnect from the common rail (2):

- Fuel line (4) according to procedure on step 3 page 2-72
- Fuel lines (5)
- Injector manifolds (3)
- Remove the bolts (1) and disconnect the common rail (2)

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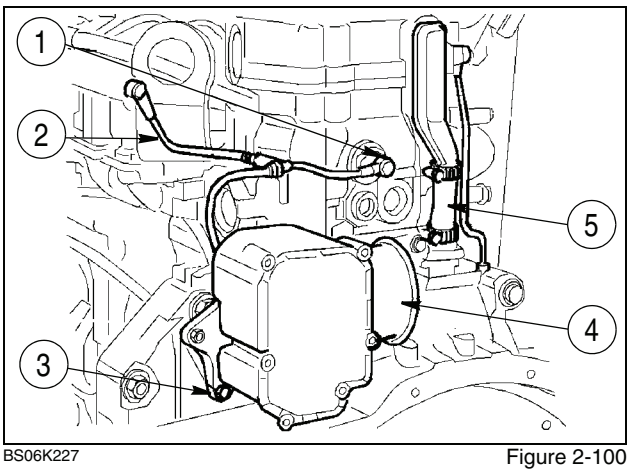
ENGINE OVERHEATS

Coolant level correct.	No →	Check for leaks, repair leaks and refill to proper level.
Yes ↓		
Fan working properly.	No →	Replace.
Yes ↓		
Drive belts in serviceable.	No →	Replace.
Yes ↓		
Water Pump in working properly.	No →	Check for leaks, bad bearing, overhaul or replace.
Yes ↓		
Thermostat working properly.	No →	Replace.
Yes ↓		
Radiator plugged or leaking.	Yes →	Wash down, repair leaks and flush out radiator. If necessary replace radiator.
No ↓		
Oil in radiator fluid.	Yes →	Replace oil cooler.
No ↓		
Air to Air Cooler and hoses leaking.	Yes →	Clean or replace faulty parts.
No ↓		
Openings for coolant flow within the cylinder head and engine block plugged.	Yes →	Clean thoroughly.
No ↓		
Valve clearance correct.	No →	Check and adjust for correct valve clearance.
Yes ↓		
Cylinder head gasket in leaking.	Yes →	Replace.

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STEP 8

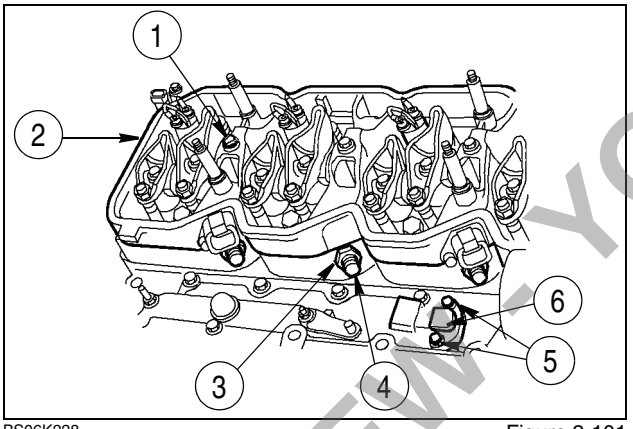


BS06K227 Figure 2-100

Disconnect line (2) from fuel return pressure limiter (1) as shown in step 3 page 2-72.

Remove the nut, loosen the retainer collar and disconnect the oil vapor line (5). Remove bolts (3) and take off the blow-by filter (4).

STEP 9



BS06K228 Figure 2-101

Remove nuts and remove the tappet cover including the gasket.

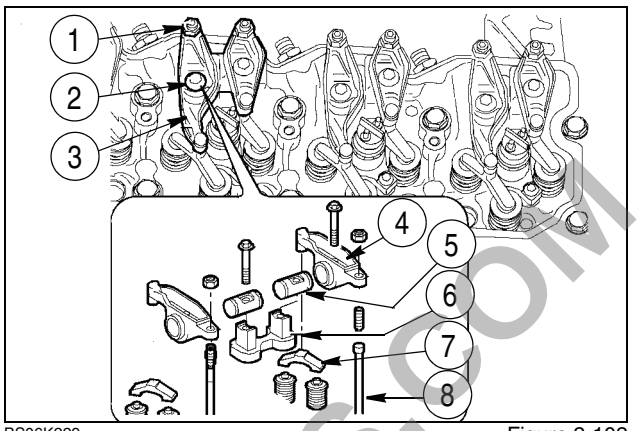
Remove bolts (1) and disconnect the injector wiring housing (2) complete with gasket.

Remove bolts (5) and detach the boost temperature/ pressure sensor (6).

Remove nuts (3) and remove the fuel inlet connectors (4).

IMPORTANT: *Disassembled fuel inlet connectors (4) must not be used again. They must be replaced with new ones.*

STEP 10

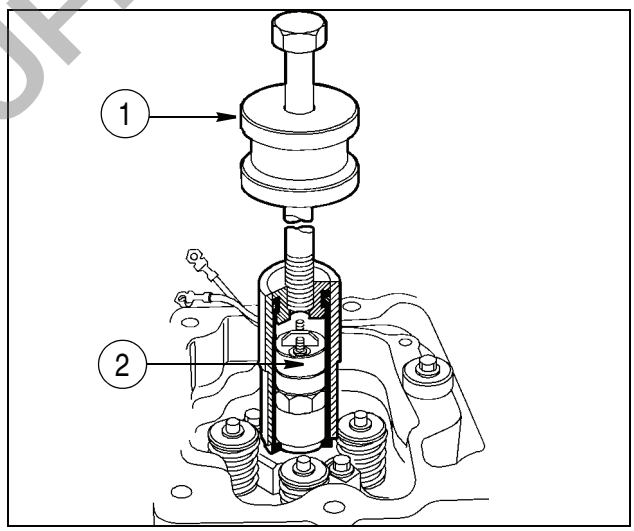


BS06K229 Figure 2-102

Loosen tappet adjusting nuts (1) and unscrew the adjusters.

Remove the bolts (2), remove the rocker assembly (3), consisting of bracket (6), rockers (4), shafts (5) and remove jumpers (7) from valves. Remove rods (8).

STEP 11



BS06K230 Figure 2-103

Remove injector fastening bolts. Use Special Tool 380001099 (1) to remove injectors (2) from the cylinder head.

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ENGINE LACKS POWER AND RUNS ERRATICALLY

Air filter plugged.	No →	Clean the filter and replace if necessary.
Yes ↓		
Fuel filters in plugged.	No →	Replace.
Yes ↓		
Fuel system working properly.	No →	Check and make if necessary repair.
Yes ↓		
The fuel system shows impurities and or traces of water.	Yes →	Take off the hoses and injection pump, clean and dry thoroughly, then if necessary clean and dry the fuel tank.
No ↓		
Thermostat working properly.	No →	Replace.
Yes ↓		
High pressure pump working properly.	No →	Check using the Electronic Service Tool (EST) and repair or replace if necessary.
Yes ↓		
Injectors working properly.	No →	Check using the Electronic Service Tool (EST) and repair or replace if necessary.
Yes ↓		
High pressure fuel side leaking.	Yes →	Check for leaks around O-rings and gaskets.
No ↓		
Turbocharger working properly.	No →	Repair or replace the unit.
Yes ↓		
Correct valve clearance.	No →	Adjust the clearance to proper value.
Yes ↓		
Compression good on all cylinders.	No →	Check each cylinder for proper compression, overhaul the engine or make repairs on defective parts (valves, piston rings, etc.).

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ENGINE REPAIR MANUAL

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Revision History			
Issue	Issue Date	Applicable Machines	Remarks
First Edition	11-2006	667TA/EEG 667TA/EEC 667TA/EBF 667TA/EED 667TA/EBJ 667TA/EDJ	87519804 NA

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