Torque

F4DE9484, F4HE9484, F4DE9684, F4DE9687, F4HE9684

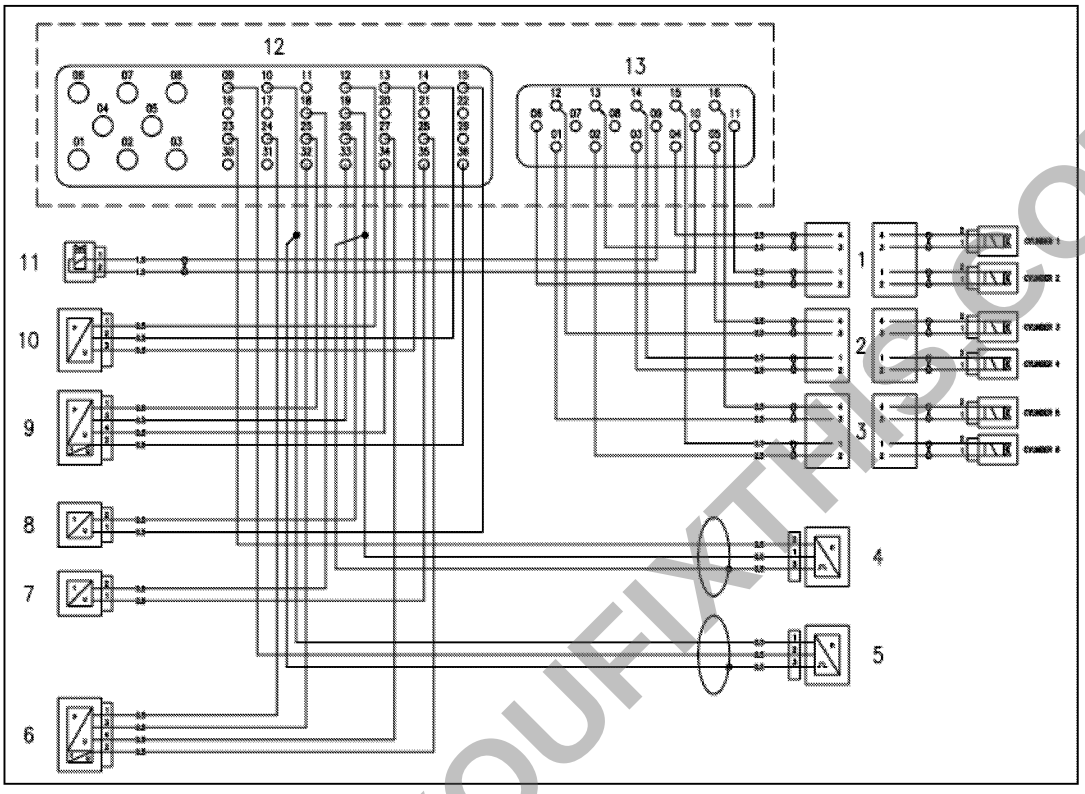
Component	Size	Specification
Cylinder Head and Components		
Plug	¼"	**10 - 14 Nm (7.4 - 10.3 lb ft)**
	½"	**20 - 28 Nm (14.8 - 20.7 lb ft)**
	¾"	**31 - 41 Nm (22.9 - 30.2 lb ft)**
Grid Heater	M6 Nut	**6 - 10 Nm (4.4 - 7.4 lb ft)**
Intake Manifold	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Engine Lifting Bracket		
Rear	M12	**65 - 89 Nm (47.9 - 65.6 lb ft)**
Front	M8	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Cylinder Head	**M12x1.75x130 mm**	
First Phase		**30 - 40 Nm (22.1 - 29.5 lb ft)**
Second Phase		**85 - 95 °**
Third Phase		**85 - 95 °**
Cylinder Head	**M12x1.75x150 mm**	
First Phase		**50 - 60 Nm (36.9 - 44.3 lb ft)**
Second Phase		**85 - 95 °**
Third Phase		**85 - 95 °**
Rocker Bracket		**31 - 41 Nm (22.9 - 30.2 lb ft)**
Rocker Arm Jam Nuts		**20 - 28 Nm (14.8 - 20.7 lb ft)**
Exhaust Manifold		**48 - 58 Nm (35.4 - 42.8 lb ft)**
Valve Cover	M8 Nut	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Turbocharger		
6 Cylinder	M8 Screw	**6 - 8 Nm (4.4 - 5.9 lb ft)**
	M8 Nut	**37 - 49 Nm (27.3 - 36.1 lb ft)**
4 Cylinder	M8 Screw	**6 - 8 Nm (4.4 - 5.9 lb ft)**
	M8 Nut	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Front Case		
Front Cover	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Rear Case		
Gear Case	M12 Screw	**65 - 89 Nm (47.9 - 65.6 lb ft)**
	M10 Screw	**42 - 52 Nm (31.0 - 38.4 lb ft)**
	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Flywheel Housing	M10	**75 - 95 Nm (55.3 - 70.1 lb ft)**
	M12	**44 - 54 Nm (32.5 - 39.8 lb ft)**
Cylinder Block and Crankshaft Components		

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Wiring harness - Electrical schema

F4HE9484, F4HE9684



ELECSCHEMH 1

(1) Injectors for cylinders 1 and 2

(2) Injectors for cylinders 3 and 4

(3) Injectors for cylinders 5 and 6

(4) Engine RPM sensor

(5) Timing sensor

(6) Engine oil pressure/temperature sensor

(7) Fuel temperature sensor

(8) Coolant temperature sensor

(9) Air pressure/temperature sensor

(10) Fuel pressure sensor

(11) Pressure regulator

(12) Connector C to the EDC control unit (sensors)

(13) Connector A to the EDC control unit (injectors)

Injectors Connector (A)	
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	-
8	-
9	Pressure Regulator
10	Pressure Regulator
11	Cylinder 2 injector
12	Cylinder 3 injector
13	Cylinder 1 injector
14	Cylinder 4 injector

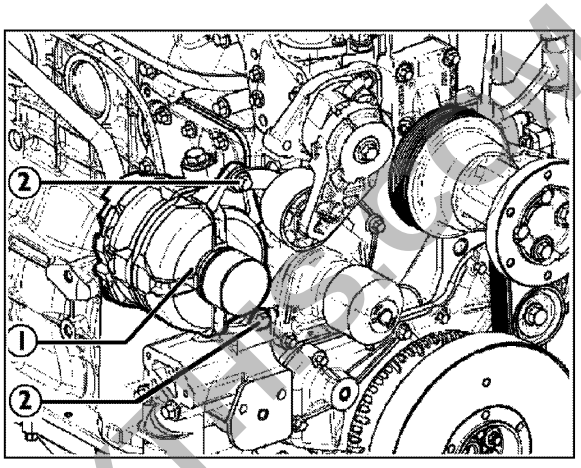
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Alternator - Remove

F4DE9484, F4HE9484, F4DE9684, F4DE9687, F4HE9684

Prior operation:
Fan and drive Belt - Remove (B.50.A)

1. Remove the cables from the back of the alternator **(1)**.
2. Remove the retaining bolts **(2)** securing the alternator **(1)** to the support.
3. Remove the alternator **(1)**.



ALTERNATOR 1

Next operation:
Alternator - Install (A.30.A)

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Component	Size	Specification
Camshaft Retaining Plate	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Camshaft Gear	M8 Screw	**32 - 40 Nm (23.6 - 29.5 lb ft)**
Crankcase Plate	M10 Screw	**38 - 48 Nm (28.0 - 35.4 lb ft)**
Vibration Damper and Adapter	M12	
First Phase		**45 - 55 Nm (33.2 - 40.6 lb ft)**
Second Phase		**90 °**
Drive Pulley	M10	**61 - 75 Nm (45.0 - 55.3 lb ft)**
Engine Flywheel	M12	
First Phase		**26 - 34 Nm (19.2 - 25.1 lb ft)**
Second Phase		**55 - 65 °**
Main Caps	M12	
First Phase		**44 - 56 Nm (32.5 - 41.3 lb ft)**
Second Phase		**74 - 86 Nm (54.6 - 63.4 lb ft)**
Third Phase		**85 - 95 °**
Connecting Rod Caps		
First Phase		**55 - 65 Nm (40.6 - 47.9 lb ft)**
Second Phase		**55 - 65 °**
Lubrication System and Components		
Oil Pump		
First Phase	M8	**7 - 9 Nm (5.2 - 6.6 lb ft)**
Second Phase	M8	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Oil Pressure Relief Valve	M22	**72 - 88 Nm (53.1 - 64.9 lb ft)**
Oil Cooler and Oil Filter Base	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Oil Filter		Contact + ¾ Turn
Connection on Filter Base for Turbo Oil Supply	1 ⅛"	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Turbo Lubrication Pipe	M12 Nut	**8 - 12 Nm (5.9 - 8.9 lb ft)**
Turbo Lubrication Pipe Adapter	M12	**30 - 40 Nm (22.1 - 29.5 lb ft)**
Oil Pan		**20 - 28 Nm (14.8 - 20.7 lb ft)**
Piston Spray Nozzles	M8	**12 - 18 Nm (8.9 - 13.3 lb ft)**
Electrical Components		
Camshaft Sensor	M6 Studs	**6 - 10 Nm (4.4 - 7.4 lb ft)**
	M6 Nut	**8 - 12 Nm (5.9 - 8.9 lb ft)**
	M6 Screw	**6 - 10 Nm (4.4 - 7.4 lb ft)**
Wiring Bulkhead	M6 Screw	**8 - 12 Nm (5.9 - 8.9 lb ft)**
Support Bracket for Injector Wiring	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Injector Wiring		**1.25 - 1.75 Nm (0.92 - 1.29 lb ft)**
ECU Cooling Plate	M6 Screw	**8 - 12 Nm (5.9 - 8.9 lb ft)**
	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Fuel Outlet	M12	**10 - 14 Nm (7.4 - 10.3 lb ft)**
Fuel Inlet	M12	**10 - 14 Nm (7.4 - 10.3 lb ft)**
Crankshaft Speed Sensor	M6 Screw	**6 - 10 Nm (4.4 - 7.4 lb ft)**
Coolant Temperature Sensor	M14 Screw	**17 - 23 Nm (12.5 - 17.0 lb ft)**
Oil Pressure / Temperature Sensor	M5 Screw	**5 - 7 Nm (3.7 - 5.2 lb ft)**
Fuel Pressure Sensor		**30 - 40 Nm (22.1 - 29.5 lb ft)**
Fuel Temperature Sensor	M14	**17 - 23 Nm (12.5 - 17.0 lb ft)**
Air Pressure / Temperature Sensor		**5 - 7 Nm (3.7 - 5.2 lb ft)**
Engine Oil Level Sensor	M12	**10 - 14 Nm (7.4 - 10.3 lb ft)**
Alternator Support Bracket	M10 Screw	**37 - 49 Nm (27.3 - 36.1 lb ft)**
Alternator Tension Bracket	M10 Screw	**37 - 49 Nm (27.3 - 36.1 lb ft)**
Starter		**37 - 49 Nm (27.3 - 36.1 lb ft)**

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Injectors Connector (A)	
ECU PIN	**FUNCTION**
15	Cylinder 6 injector
16	Cylinder 5 injector

Sensors connector (C)	
ECU PIN	**FUNCTION**
1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	-
9	Timing sensor
10	Timing sensor
11	-
12	Negative for rail temperature and pressure sensor
13	Positive for rail temperature and pressure sensor
14	Signal from rail temperature and pressure sensor
15	Coolant temperature sensor
16	-
17	-
18	signal from fuel temperature sensor
19	Engine RPM sensor
20	-
21	-
22	-
23	Engine RPM sensor
24	Negative for engine oil pressure and temperature sensor
25	Negative for air temperature and pressure sensor
26	Coolant temperature sensor
27	Signal from engine oil pressure sensor
28	Signal from engine oil temperature
29	-
30	-
31	-
32	Positive for engine oil pressure and temperature sensor
33	Positive for air temperature and pressure sensor
34	Signal from air pressure sensor
35	Negative for fuel temperature sensor
36	Signal from air temperature sensor

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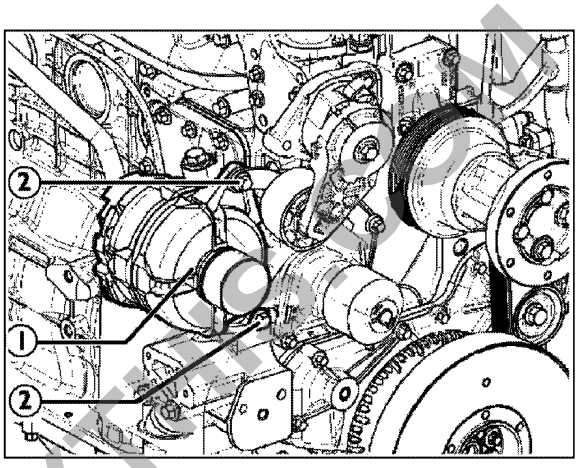
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Alternator - Install

F4DE9484, F4HE9484, F4DE9684, F4DE9687, F4HE9684

Prior operation:
Alternator - Remove (A.30.A)

1. Install the alternator **(1)** and tighten the bolts **(2)** to the specified torque.
2. Connect the positive and negative cables onto the back of the alternator.



ALTERNATOR 1

Next operation:
Fan and drive Belt - Install (B.50.A)

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Component	Size	Specification
Fuel System and Components		
Feed Pump	M8 Studs	**10 - 14 Nm (7.4 - 10.3 lb ft)**
High Pressure Pump Gear	M18 Nut	**100 - 110 Nm (73.8 - 81.1 lb ft)**
Fuel Pump	M8 Nut	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Injector		
First Phase	M6 Screw	**8.15 - 8.85 Nm (6.0 - 6.5 lb ft)**
Second Phase	M6 Screw	**70 - 80 °**
Injector Feed Connector		**45 - 55 Nm (33.2 - 40.6 lb ft)**
Common Rail	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
High Pressure Fuel Line	M14 Fitting	**18 - 22 Nm (13.3 - 16.2 lb ft)**
High Pressure Pipe Connector	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Fuel Filter Bracket	M12 Screw	**71 - 85 Nm (52.4 - 62.7 lb ft)**
Fuel Filter Holder	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Fuel Filter		Contact + ¾ Turn
Cooling System and Components		
Engine Coolant Inlet	M10 Screw	**37 - 49 Nm (27.3 - 36.1 lb ft)**
Fitting on Coolant Inlet	**90 °** Elbow	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Compressor Cooling Pipe		**20 - 24 Nm (14.8 - 17.7 lb ft)**
Engine Coolant Drain Collector	M6 Screw	**8 - 12 Nm (5.9 - 8.9 lb ft)**
Water Pump	M8 Screw	**20 - 28 Nm (14.8 - 20.7 lb ft)**
Belt Tensioner	M10	**37 - 49 Nm (27.3 - 36.1 lb ft)**
Idler Pulleys	M10	**37 - 49 Nm (27.3 - 36.1 lb ft)**

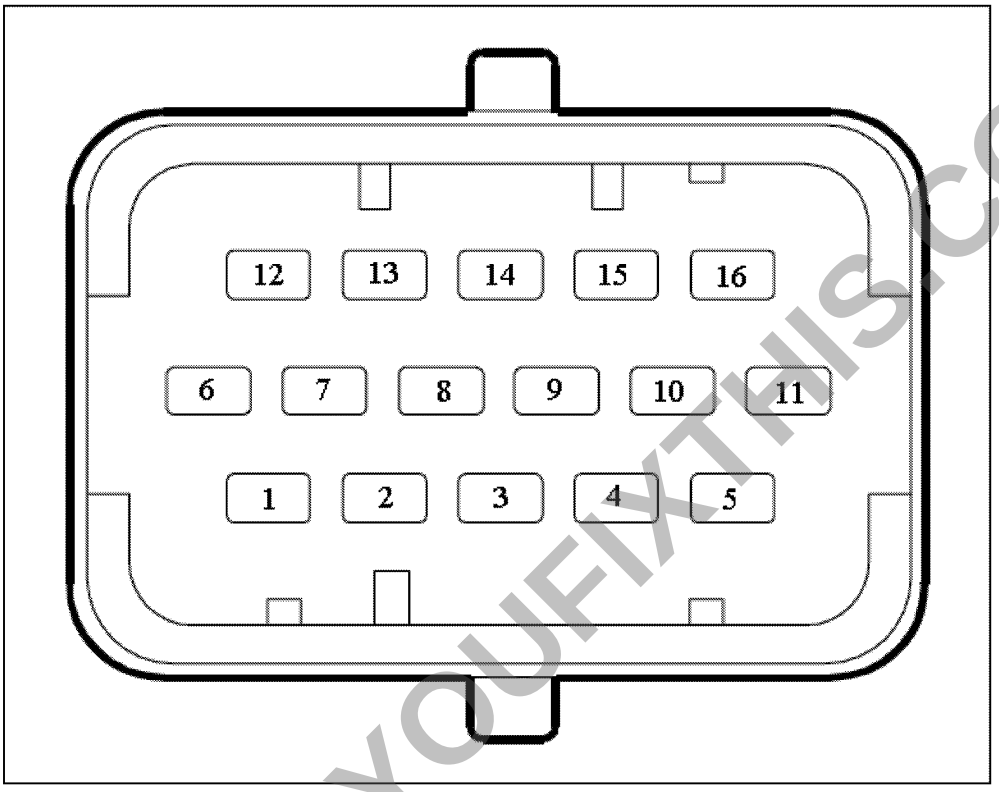
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Wiring harness - Electrical schema

F4DE9484, F4DE9684, F4DE9687

Connector to injectors (A)



CONNECTORA 1

ECU Pin #	Cable Color	Function	
		4 cyl.version	6 cyl. version
1	-	-	-
2	-	-	-
3	MN	-	Injector Cylinder 2
4	MV	Injector Cylinder 4	Injector Cylinder 3
5	VB	-	Injector Cylinder 4
6	HR	-	Injector Cylinder 2
7	-	Earth	Earth
8	-	-	-
9	MB	Injector Cylinder 1	Injector Cylinder 1
10	VN	Injector Cylinder 2	Injector Cylinder 6
11	VG	Injector Cylinder 3	Injector Cylinder 5
12	HN	Injector Cylinder 4	Injector Cylinder 3
13	HG	Injector Cylinder 1	Injector Cylinder 1
14	CN	-	Injector Cylinder 4
15	CB	Injector Cylinder 2	Injector Cylinder 6
16	CL	Injector Cylinder 3	Injector Cylinder 5

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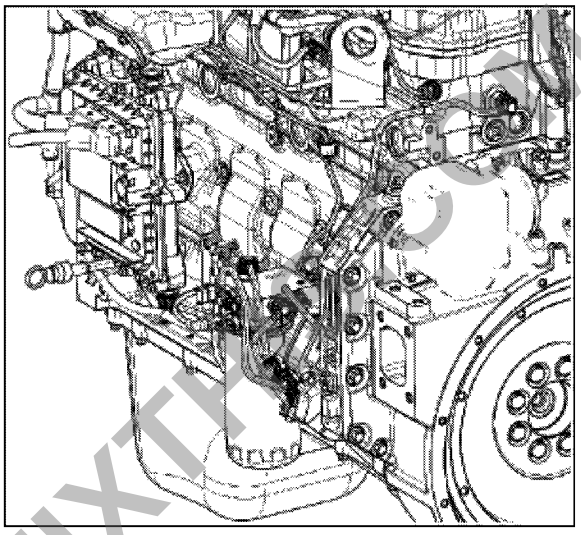
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ENGINE - Place on stand

F4HE9484, F4HE9684

NOTE: *In order to apply the brackets* ***380000661*** *to the engine block, it is necessary to perform the following operations on the left hand side of the engine.*

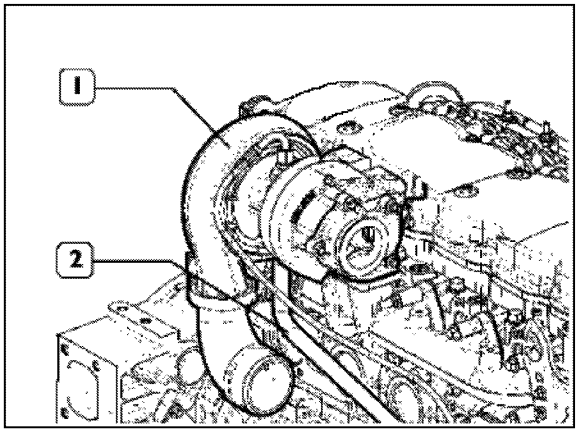
1. Using the tool unscrew the fuel filter and remove it from the support.
2. Disconnect the electrical connection from the support.
3. Disconnect the fuel low pressure pipelines from the support.
4. Disconnect pipeline from the support.
5. Remove the sustaining support bracket from the block.
6. Disconnect the high pressure fuel pipeline from the rail diffuser and from the high pressure pump and disassemble it from the engine block removing the fixing clamps.
7. Disconnect the pipeline feeding the mechanical pump that is combined to the high pressure pump through the exchanger of the engine control module.
8. Disassemble the oil fill tube (if present) by removing the bolts. Remove the O-ring from the tube.



F4HE123456 1

NOTICE: *Because of the high pressure in the pipelines running from the high pressure pump to the rail and from the rail to the electro-injectors, DO NOT, under any circumstances, disconnect or crack pipelines while engine is running or reuse the disassembled pipelines.*

9. Remove the screws holding the turbocharger **(1)** oil drain pipe **(2)** and remove pipe from the engine block.



TURBOLUBEF4HE 2

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AIR INTAKE SYSTEM B.30.A

EXHAUST SYSTEM B.40.A

ENGINE COOLANT SYSTEM B.50.A

LUBRICATION SYSTEM B.60.A

STARTING SYSTEM B.80.A

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Safety rules

Standard safety prescriptions

Particular attention shall be drawn on some precautions that must be followed absolutely in a standard working area and whose non fulfillment will make any other measure useless or not sufficient to ensure safety to the personnel in charge of maintenance.
Be informed and inform personnel as well of the laws in force regulating safety, providing information documentation available for consultation.

- Keep working areas as clean as possible, ensuring adequate aeration.
- Ensure that working areas are provided with emergency boxes, that must be clearly visible and always provided with adequate sanitary equipment.
- Provide for adequate fire extinguishing means, properly indicated and always having free access. Their efficiency must be checked on a regular basis and the personnel must be trained on interventon methods and priorities.
- Organize and identify specific exit points to evacuate the areas in case of an emergency, providing for adequate indications of the emergency indications of the emergency exit lines.
- Smoking in working areas subject to fire danger must be strictly prohibited.
- Provide warnings throughout adequate boards signaling danger, prohibitions and indications to ensure easy comprehension of the instructions even in case of an emergency.

Prevention of injury

- Do not wear unsuitable clothes for work, with fluttering ends, nor jewels such as and chains when working close to engines and equipment in motion.
- Wear safety gloves and goggles when performing the following operations:
- - filling inhibitors or anti-frost
  - lubrication oil topping or replacement
  - utilization of compressed air or liquids under pressure (pressure allowed < **2 bar** (**29 psi**)).
- Wear safety helmet when working close to hanging loads or equipment working at head height level.
- Always wear safety shoes and clothes adhering to the body, better if provided with elastics at the ends.
- Use protection cream for hands.
- Change wet clothes as soon as possible.
- In presence of electrical current exceeding **48 - 60 V** verify efficiency of earth and mass electrical connections. Ensure that hands and feet are dry and execute working operations utilizing isolating foot boards. Do not carry out working operations if not trained for.
- Do not smoke nor light up flames close to batteries and to any fuel material.
- Put the dirty rags with oil, diesel fuel or solvents in anti-fire specially provided containers.
- Do not execute any intervention if not provided with necessary instructions.
- Do not use any tool or equipment for any different operation from the ones they've been designed and provided for. Serious injury may occur.
- In case of test or calibration operations requiring engine running, ensure that the area is sufficiently ventilated or utilize specific vacuum equipment to eliminate exhaust gas. Danger: poisoning or death.

During maintenance

- Never open filler cap of cooling system when the engine is hot. Operating pressure would provoke high temperature with serious danger and risk of burn. Wait until the temperature decreases under **50 °C** (**122 °F**).
- Never top up an overheated engine with cooler and utilize only appropriate liquids.
- Always operate when the engine is tuned off; when particular circumstances require maintenance intervention on running engine, be aware of all risks involved with such operation.
- Be equipped with adequate and safe containers for drainage operation of engine liquids and exhaust oil.

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INTRODUCTION

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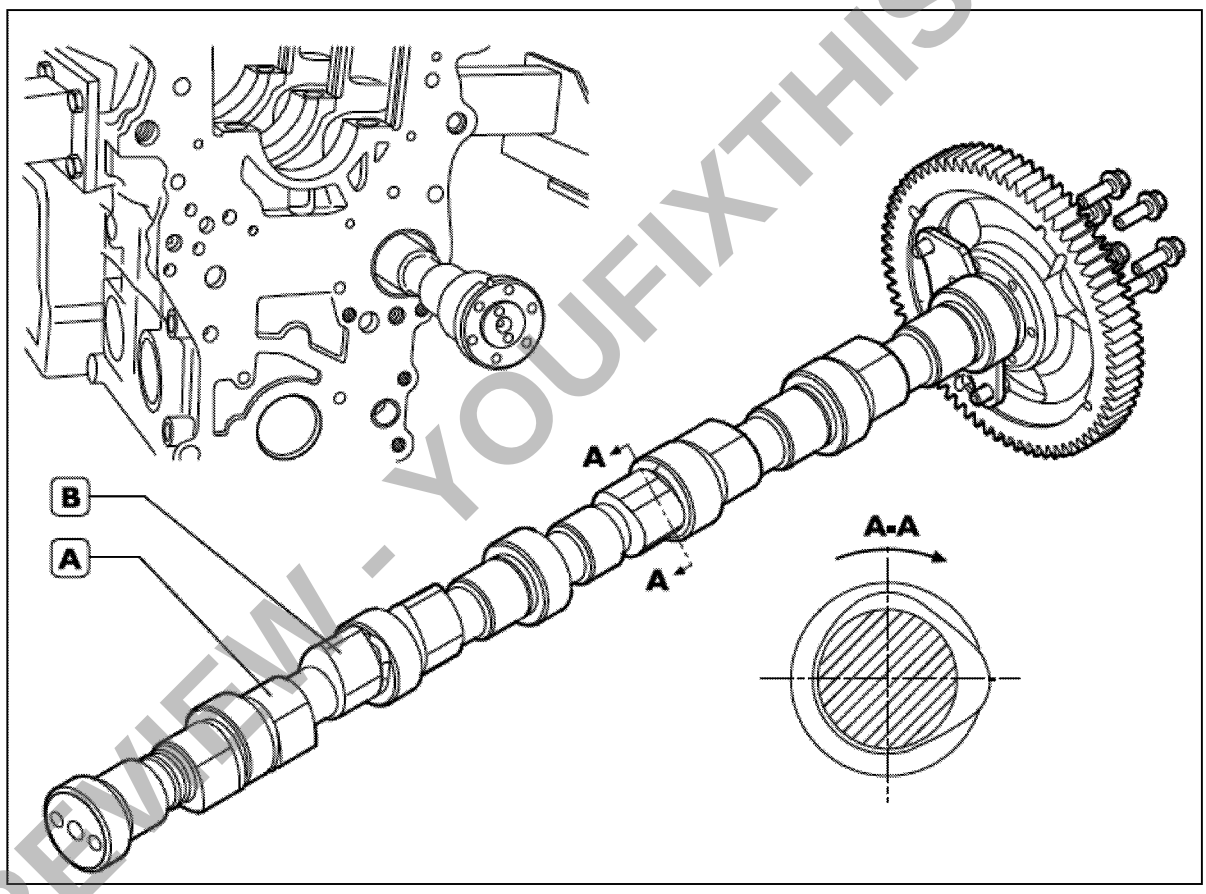
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Valve drive - Overview

F4DE9484, F4HE9484, F4DE9684, F4DE9687, F4HE9684

Exhaust Gas Re-Circulation System (EGR)

In the Tier III version, the profile of the exhaust cam lobe has been modified in order to allow the partial opening of the exhaust valve during the aspiration phase and introduces part of the exhaust gases into the engine cylinders. The exhaust gases can partially be redirected into the cylinders so as to reduce the maximum combustion temperature values responsible for the production of nitrogen oxides (NOx). The EGR system reduces the combustion temperature by means of diminishing the concentration of oxygen in the combustion chamber. This process is an efficient control system of the emission of NOx. The internal EGR system is not equipped with any electronically controlled elements. The system is always active and does not require any additional components such as check valves, piping, or heat exchangers. The exhaust cam has an additional lobe apart from the major lobe. The additional lobe, during the aspiration phase of a cylinder, allows a brief opening of the exhaust valve generating recirculation due the intake of the exhaust gases caused by the suction which is created in the aspiration phase inside the cylinder.



EGRSYSTEM 1

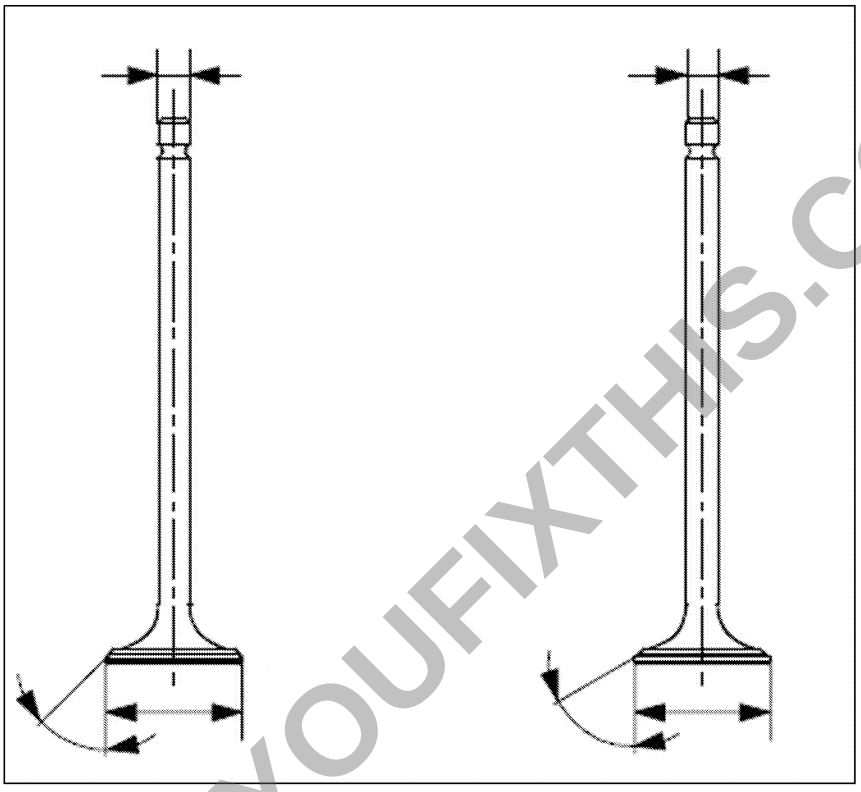
(A) Aspiration valve control - (B) Exhaust valve control

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Valve assembly Valve - Measure

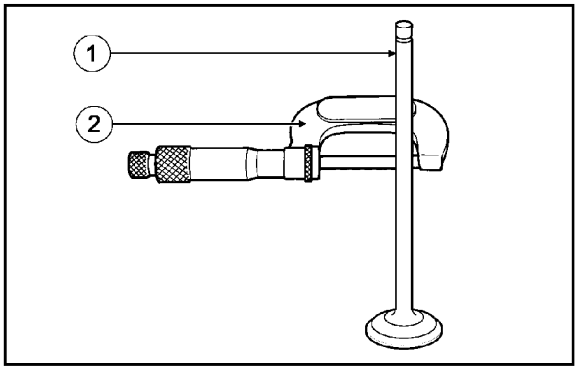
Prior operation:
Valve drive Valve assembly - Cleaning (B.10.A)



VALVE 1

INTAKE AND EXHAUST VALVE MAIN DATA

1. Check the valve stem **(1)** using a micrometer **(2)**, it shall be **6.970 - 6.990 mm** (**0.274 - 0.275 in**).



BAPH04APH152ASA 2

Next operation:
Valve drive Valve assembly - Install (B.10.A)

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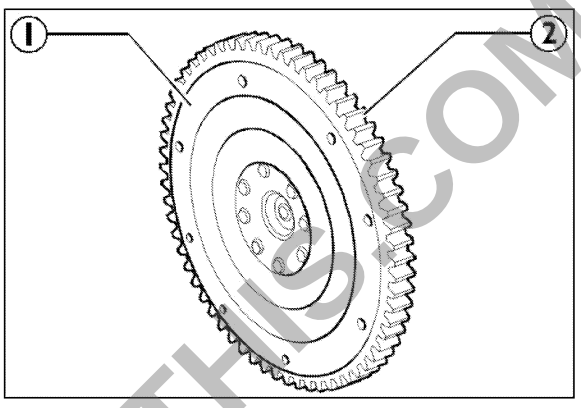
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Flywheel - Check

F4GE9484, F4DE9484, F4GE9684, F4DE9684, F4DE9687

Prior operation:
Flywheel - Remove (B.10.A)

1. Check the supporting surface of the clutch plate **(1)** and if it is scratched, it is necessary to carry out turning.
2. Check ring gear teeth **(2)**, if breakage or excessive wear is found, remove the ring gear from the engine flywheel using a suitable hammer.
3. Heat the ring gear to **150 °C** (**302 °F**)for 15 to 20 minutes.
4. Install the ring gear with the chamfering on the inside diameter facing the flywheel.



FLYWHEELD3 1

Next operation:
Flywheel - Install (B.10.A)

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NEW HOLLAND CONSTRUCTION

POWER PRODUCTION - B

FUEL AND INJECTION SYSTEM - 20.A

F4CE9484 , F4CE9684 , F4DE9484 , F4DE9684 , F4DE9687 , F4GE9484 , F4GE9684 , F4HE9484 , F4HE9684

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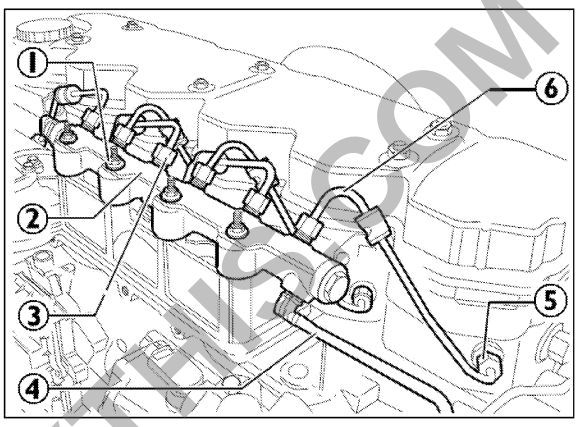
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High pressure common rail Common rail - Install

F4DE9484, F4HE9484, F4DE9684, F4DE9687, F4HE9684

Prior operation:
Fuel line High pressure - Disconnect (B.20.A)

1. Install the high pressure fuel rail **(2)** on the cylinder head.
2. Tighten the mounting screws **(1)** to the specified torque.
3. Connect new fuel pipes **(6)** to the rail **(2)** and to the manifold for electro-injectors **(5)**.
4. Tighten the pipe joints **(3)** to **20 Nm** (**14.8 lb ft**).
5. Install the low pressure fuel line **(4)** to the rail **(2)**. Refer to **Fuel connector - Connect (B.20.A)** for the proper procedure.



RAIL 1

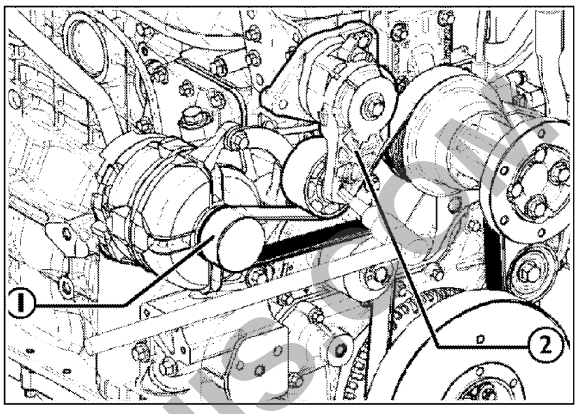
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Fan and drive Belt - Remove

F4CE9484, F4DE9484, F4HE9484, F4CE9684, F4DE9684, F4DE9687, F4HE9684

1. Release tension on the belt **(1)** by pulling back on the belt tensioner **(2)**.
2. Extract the belt **(1)** from all the pulleys.



BELT 1

Next operation:
Fan and drive Belt - Install (B.50.A)

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