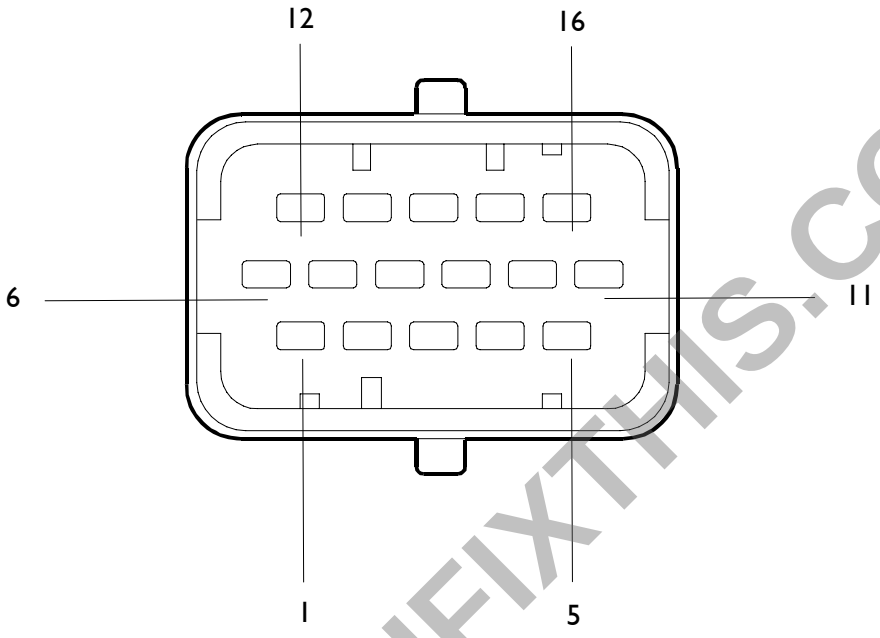
EDC control unit PIN-OUT

Electric injector connector "A"

Figure 7



Colour legend

B	black
R	red
U	blue
W	white
P	purple
G	green
N	brown
Y	yellow
O	orange
E	grey
K	pink

ECU Pin	Colour legend	Function
1	Black	Solenoid valve for electronic cylinder 5 injection
2	Black	Solenoid valve for electronic cylinder 6 injection
3	Black	Solenoid valve for electronic cylinder 4 injection
4	White	Solenoid valve for electronic cylinder 1 injection
5	Green	Solenoid valve for electronic cylinder 3 injection
6	Red	Solenoid valve for electronic cylinder 2 injection
7	-	Free
8	-	Free
9	-	Free
10	-	Free
11	Yellow	Solenoid valve for electronic cylinder 2 injection
12	Red	Solenoid valve for electronic cylinder 3 injection
13	Red	Solenoid valve for electronic cylinder 1 injection
14	Bleu	Solenoid valve for electronic cylinder 4 injection
15	Green	Solenoid valve for electronic cylinder 6 injection
16	Purple	Solenoid valve for electronic cylinder 5 injection

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TIGHTENING TORQUE

PART		TORQUE Nm	TORQUE kgm
Capscrews, undercrankcase to crankcase ♦			
M12x1.75 outer screws	Stage 1: pretightening	30	(3)
M 17x2 inner screws	Stage 2: pretightening	120	(12)
Inner screws	Stage 3: angle	60°	
Inner screws	Stage 4: angle	55°	
Outer screws	Stage 5: angle	60°	
Piston cooling nozzle union ♦		35 ± 2	(3.5 ± 0.2)
Capscrews, heat exchanger to crankcase ♦			
pretightening		11.5 ± 3.5	(1.15 ± 0.35)
tightening		19 ± ≤	(1.9 ± 0.3)
Piston cooling nozzle union ♦		24,5 ± 2,5	(2.4 ± 0.25)
Spacer and oil sump capscrews ♦			
pretightening		38	(3.8)
tightening		45	(4.5)
M 12x1.75 screws, gear case to crankcase ♦		63 ± 7	(6.3 ± 0.7)
M 12x1.75 screws, gear case to crankcase ♦		24 ± 2,5	(2.4 ± 0.25)
Cylinder head capscrews ♦			
Stage 1:	pretightening	60	(6)
Stage 2	pretightening	120	(12)
Stage 3:	angle	90°	
Stage 4:	angle	65°	
Rocker shaft capscrew ♦			
Stage 1:	pretightening	100	(10)
Stage 2:	angle	60°	
Locknut, rocker adjusting screw ♦		39 ± 5	(3.9 ± 0.5)
Capscrews, injector securing brackets ♦		26	(2.6)
Capscrews, injector securing brackets ♦		8,5 ± 1,5	(0.8 ± 0.15)
Capscrews, thrust plates to head ♦		19 ± 3	(1.9 ± 0.3)
Screw fastening the engine supporting bracket to the cylinder head			
Stage 1:	pretightening	120	(12)
Stage 2:	angle	45°	

♦ Before assembly, lubricate with UTDM oil
• Before assembly, lubricate with graphitized oil

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FAULT CODE

DTC	Faulty component
	Vehicle 1 (Sensors/Plausibility checks)
1.1.9	PLAUSIBILITY +15
1.1.A	PLAUSIBILITY +50
	Vehicle 2 (Warning lights/Relays/Actuators)
1.2.5	MAIN RELAY
1.2.6	BATTERY VOLTAGE
1.2.8	MAIN RELAY - SHORT CIRCUIT TO BATTERY
1.2.9	CONDITIONER COMPRESSOR RELAY
1.2.B	THERMO STARTER RELAY 1 (HEATER)
1.2.E	PRE/POST-HEATER CONTROL SYSTEM (ACTIVE)
2.2.5	INTERRUPTED AFTER-RUN
2.2.8	MAIN RELAY - SHORT CIRCUIT TO EARTH
	Engine 1 (temperature and pressure sensors)
1.3.1	COOLANT TEMPERATURE SENSOR
1.3.2	COOLANT TEMPERATURE SENSOR (TEST)
1.3.3	TURBOCHARGER AIR TEMPERATURE SENSOR
1.3.4	SUPERCHARGER AIR PRESSURE SENSOR
1.3.5	FUEL TEMPERATURE
1.3.8	OIL PRESSURE SENSOR
1.3.A	OIL TEMPERATURE SENSOR
2.3.2	COOLANT TEMPERATURE SENSOR ABSOLUTE TEST
2.3.8	LOW OIL PRESSURE
2.3.A	HIGH OIL TEMPERATURE
	Engine 2 (speed sensors/actuators)
1.4.1	CRANKSHAFT SPEED SENSOR
1.4.2	ENGINE OPERATION WITH CAMSHAFT SENSOR ONLY
1.4.3	CAMSHAFT SENSOR
1.4.4	PLAUSIBILITY BETWEEN FLYWHEEL SENSOR AND CAMSHAFT
	Damage information
1.4.D	ENGINE OVERSPEED
3.9.E	TURBO PROTECTION TORQUE LIMITER
4.9.E	ENGINE PROTECTION TORQUE LIMITER
6.9.E	TORQUE LIMITER DUE TO LIMITED INJECTED QUANTITY
	Fuel metering
1.5.1	INJECTOR CYLINDER 1
1.5.2	INJECTOR CYLINDER 2
1.5.3	INJECTOR CYLINDER 3
1.5.4	INJECTOR CYLINDER 4
1.5.5	INJECTOR CYLINDER 5
1.5.6	INJECTOR CYLINDER 6

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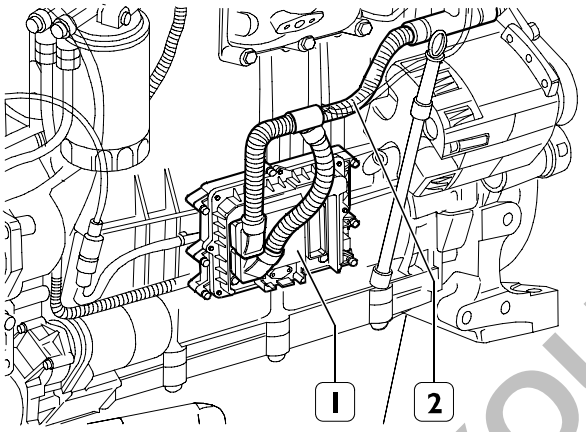
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ENGINE OVERHAUL PROCEDURE
Disassembling

Handle all parts with great care. Never put your hands or fingers between one part and another. Wear suitable personal protective equipment such as a visor, gloves and safety shoes.

Cover all electrical components before washing with high-pressure water jets.

Figure 7

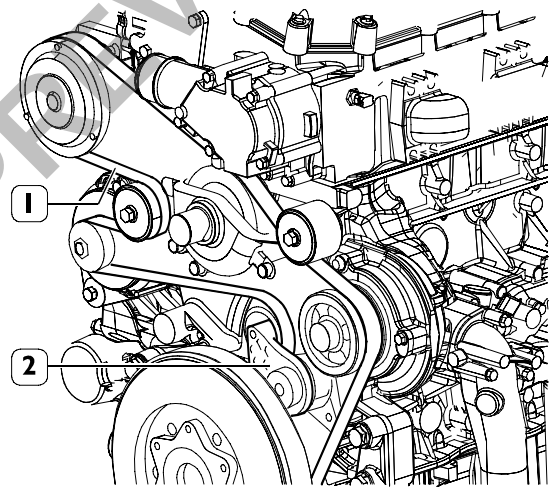


119479

Before securing the engine to the rotary stand, remove: the electrical cable of the engine (2) by unplugging it from the control unit (1) and from all sensors transmitters to which it is connected.

Only for F3CE0684B*E003 engine

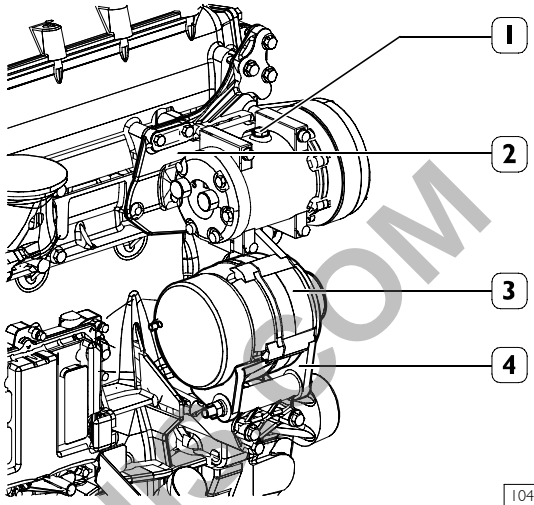
Figure 8



104780

Using an appropriate tool, regulate the belt tightener (2) to release the pressure and remove the belt (1) for controlling various parts.

Figure 9



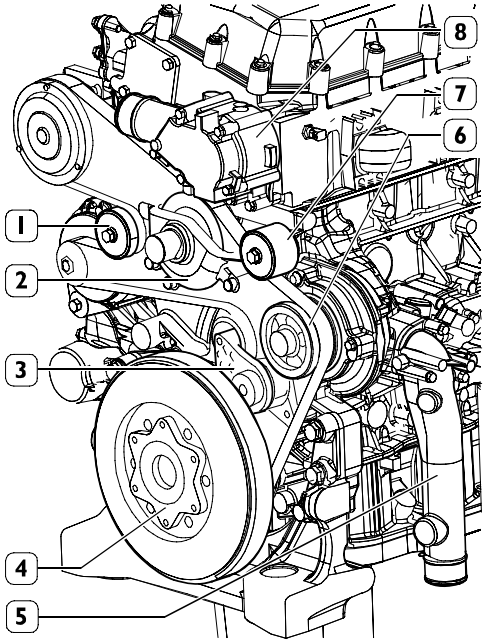
104781

Loosen the locking screws and remove the compressor (1) complete with its support (2) from the engine.

Loosen the locking screws and remove the alternator (3).

Loosen the locking screws and remove the alternator support (4) from the engine.

Figure 10



104782

Remove:

- ❑ the fixed belt tightening roller (1);
- ❑ the support (2);
- ❑ the automatic belt tightener (3);
- ❑ the damping flywheel (4) and the pulley beneath it;
- ❑ all the coolant pipes (5);
- ❑ the water pump (6);
- ❑ the fixed belt tightening roller (7);
- ❑ the thermostat assembly (8).

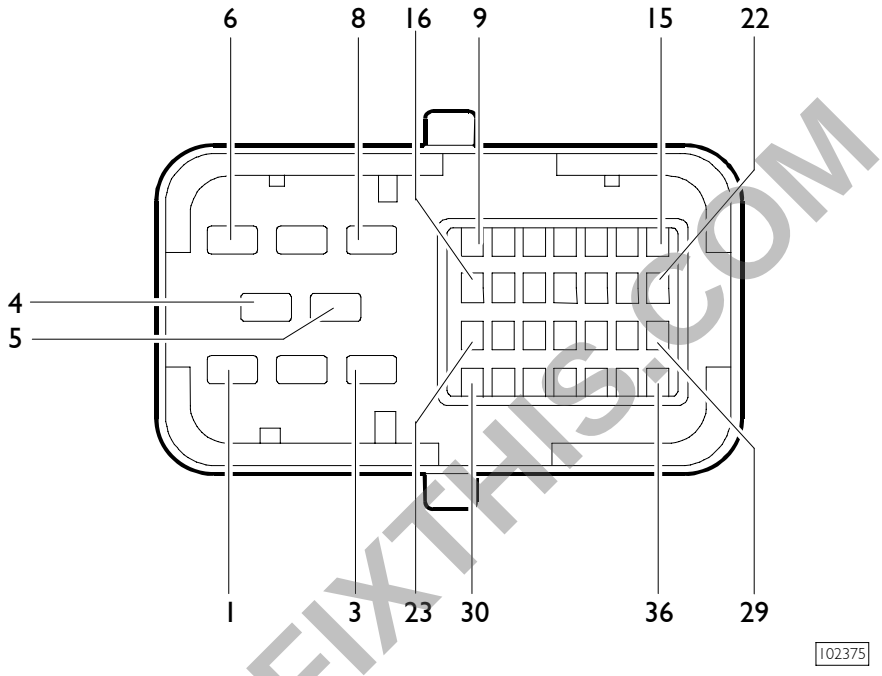
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EDC control unit PIN-OUT

Sensor connector "C"

Figure 8



Colour legend

B	black
R	red
U	blue
W	white
P	purple
G	green
N	brown
Y	yellow
O	orange
E	grey
K	pink

ECU Pin	Cable colour	Function
1÷8	-	Free
9	W	Valve gear camshaft sensor
10	R	Valve gear camshaft sensor
11÷14	-	Free
15	K	Coolant temperature sensor
16 ÷17	-	Free
18	O/B	Fuel temperature sensor
19	B	Flywheel sensor
20÷22	-	Free
23	W	Flywheel sensor
24	N	Pressure sensor mass / Engine oil temperature
25	W	Air temperature/pressure sensor power supply
26	Y	Coolant temperature sensor
27	O/B	Oil temperature signal from the engine oil temperature/pressure sensor
28	U	Oil pressure signal from the engine oil temperature/pressure sensor
29÷31	-	Free
32	O	Engine oil temperature/pressure sensor power supply
33	R	Air temperature/pressure sensor power supply
34	G	Air pressure signal from the air temperature/ pressure sensor
35	W/R	Fuel temperature sensor
36	O	Air temperature signal from the air temperature / pressure sensor

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PART		TORQUE	
		Nm	kgm
Screw fastening the engine supporting bracket to the flywheel case			
Stage 1:	pretightening	100	(10)
Stage 2:	angle	60°	
Camshaft gear capscrews ♦			
Stage 1:	pretightening	60	(6)
Stage 2:	angle	60°	
Screw fixing phonic wheel to timing system gear ♦		8.5 ± 1.5	(0.85 ± 0.15)
Exhaust manifold capscrews •			
pretightening		40 ± 5	(4 ± 0.5)
tightening		70 ± 5	(7 ± 0.5)
Capscrews, connecting rod caps ♦			
Stage 1:	pretightening	60	(6)
Stage 2:	angle	60°	
Engine flywheel capscrews ♦			
Stage 1:	pretightening	120	(12)
Stage 2:	angle	90°	
Screws fixing damper flywheel: ♦			
First phase	pre-tightening	70	(7)
Second phase	closing to angle	50°	
Screws fixing intermediate gear pins: ♦			
First phase	pre-tightening	30	(3)
Second phase	closing to angle	90°	
Screw fixing connecting rod for idle gear		24.5 ± 2.5	(2.45 ± 0.25)
Screws fixing oil pump		24.5 ± 2.5	(2.45 ± 0.25)
Screws fixing crankshaft gasket cover		24.5 ± 2.5	(2.45 ± 0.25)
Screws fixing fuel pump/filter		19	(1.9)
Screw fixing control unit mount to crankcase		19 ± 3	(1.9 ± 0.3)
Screws and nuts fixing turbocharger •			
pre-tightening		35	(3.5
tightening		46	(4.6)
Screws fixing water pump to crankcase		22 ± 2	(2.2 ± 0.2)
Screws fixing water pump to crankcase		25	(2.5)
Screw fixing automatic tensioner to crankcase		26 ± 3	(2.6 ± 0.3)
Screw fixing fixed tensioner to crankcase		50 ± 5	(5 ± 0.5)
Screws fixing fan mount to crankcase		105 ± 5	(10.5 ± 0.5)
Screws fixing starter motor		74 ± 4	(7.4 ± 0.4)
Screws fixing air heater to cylinder head		30 ± 3	(3 ± 0.3)

♦ Before assembly, lubricate with UTDM oil
• Before assembly, lubricate with graphitized oil

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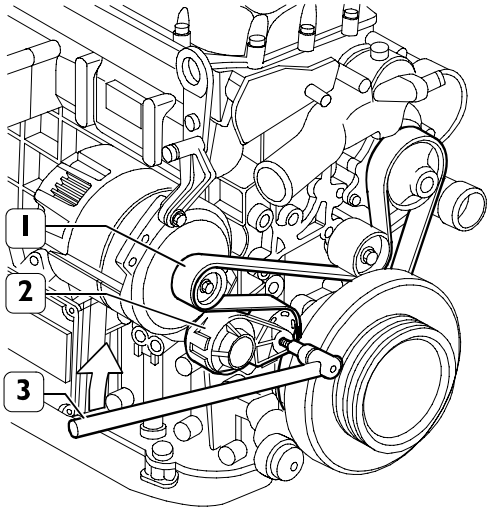
DTC	Faulty component
	Injectors 1
1.6.1	INJECTOR CYLINDER 1 / SHORT CIRCUIT
1.6.2	INJECTOR CYLINDER 2 / SHORT CIRCUIT
1.6.3	INJECTOR CYLINDER 3 / SHORT CIRCUIT
1.6.4	INJECTOR CYLINDER 4 / SHORT CIRCUIT
1.6.5	INJECTOR CYLINDER 5 / SHORT CIRCUIT
1.6.6	INJECTOR CYLINDER 6 / SHORT CIRCUIT
1.6.7	INJECTOR CYLINDER 1 / SHORT CIRCUIT
1.6.8	INJECTOR CYLINDER 2 / SHORT CIRCUIT
1.6.9	INJECTOR CYLINDER 3 / SHORT CIRCUIT
1.6.A	INJECTOR CYLINDER 4 / SHORT CIRCUIT
1.6.B	INJECTOR CYLINDER 5 / SHORT CIRCUIT
1.6.C	INJECTOR CYLINDER 6 / SHORT CIRCUIT
1.6.E	MINIMUM NUMBER OF INJECTIONS NOT REACHED: SWITCHING THE ENGINE OFF
	Injectors 2
1.7.1	ROW 1 SC
1.7.3	ROW 2 SC
1.7.C	ROW 1 INJECTOR CONTROL (IN ECU)
1.7.F	ESTIMATED INJECTED QUANTITY ERROR (NIMA PROGRAM)
2.7.C	ROW 2 INJECTOR CONTROL (IN ECU)
	Turbocharger and turbine speed system
1.9.E	TORQUE LIMITER FOR LIMITING SMOKINESS
	Interfaces 1 (CAN-Bus)
1.B.1	ERROR ON CAN CONTROLLER A
1.B.3	ERROR ON CAN CONTROLLER C
1.B.5	CAN TIMEOUT MESSAGE VM2EDC
2.B.4	CAN TIMEOUT MESSAGE BC2EDC2
	Interfaces 2 (CAN line timeout messages)
1.C.6	CAN MESSAGE ERROR TSC1-PE
1.C.8	CAN MESSAGE ERROR TSC1-VE
2.C.6	CAN MESSAGE ERROR TSC1-VE
3.C.8	CAN MESSAGE ERROR TSC1-VE (passive)
	ECU 1 (internal controls)
1.D.1	ERROR IN ECU
1.D.2	ERROR IN ECU
1.D.3	ERROR IN ECU
1.D.4	ERROR IN ECU
1.D.5	ERROR IN ECU
1.D.6	ERROR IN ECU (TPU)
1.D.7	ERROR IN ECU (VARIANT AREA)
1.D.8	ERROR IN ECU
1.D.9	ERROR IN ECU
2.D.3	ERROR IN ECU
3.D.3	ERROR IN ECU

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Only for F3CE0684A*E001 engine

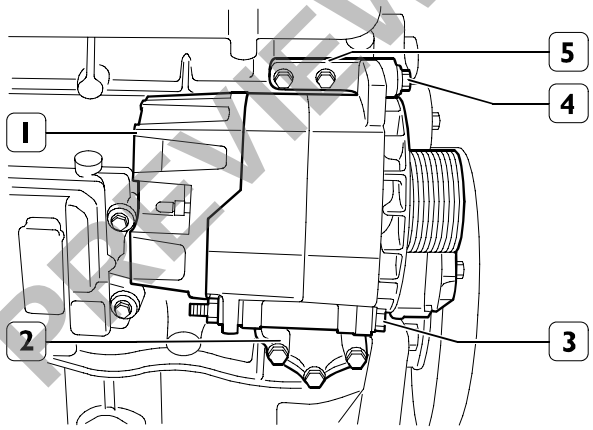
Figure 11



104249

Using a suitable tool (3), work in the direction of the arrow on the tightener (2) and remove the belt (1).

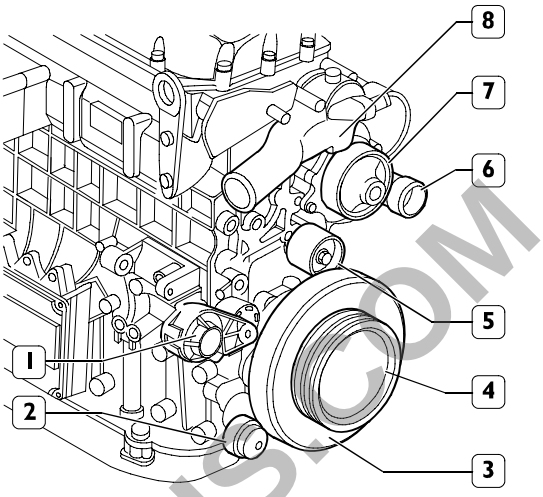
Figure 12



119478

Loosen and remove the screws (3) and (4) fastening the alternator (1) to the supporting brackets (2) and (5).
Remove the supporting brackets (2) and (5) from the crankcase.

Figure 13

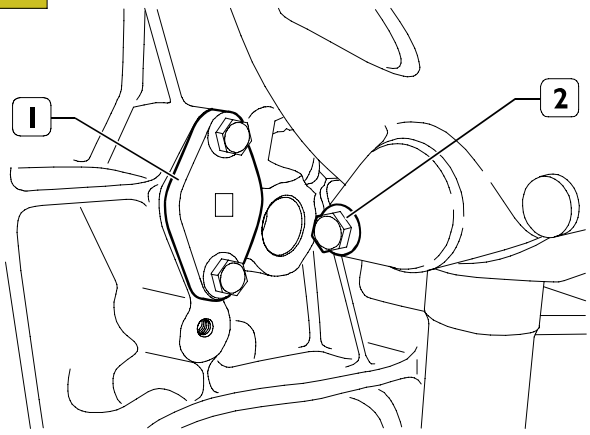


104251

Remove:

- ❑ thermostat assembly (8);
- ❑ pipes complete with coolant (6);
- ❑ pulley (4);
- ❑ water pump (7);
- ❑ automatic tightener support (1);
- ❑ fixed tightener (5);
- ❑ damper flywheel (3) and pulley beneath;
- ❑ automatic tightener (2);

Figure 14



119487

Remove the oil pressure adjustment valve (1).
Loosen and remove the screw (2) fastening the hydraulic coupling to the flywheel casing.

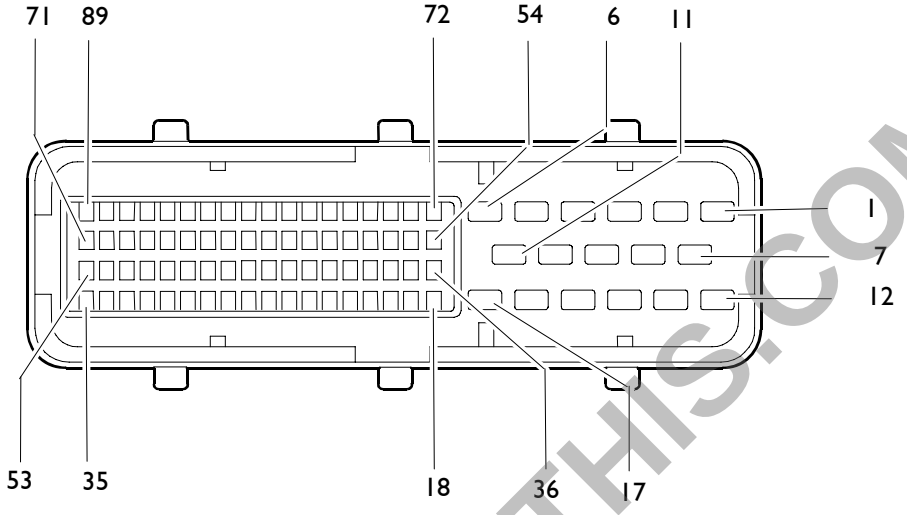
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EDC control unit PIN-OUT

Chassis connector "B"

Figure 9



ECU Pin	Cable	Function
1	-	Free
2	7151	+30 positive
3	7153	+30 positive
4	-	Free
5	0151	Ground
6	0151	Ground
7	-	Free
8	7151	+30 positive
9	7151	+30 positive
10	0151	Ground
11	0151	Ground
12	0094	Preheating actuation enable relay ground
13÷25	-	Free
26	-	Free
27	-	Free
28	-	Free
29	5163	EDC system diagnosis inducing switch power supply (presetting)
30	-	Free
31	-	Free
32	-	Free
33	-	Free
34	Green	CAN - L line (ECB)
35	White	CAN - H line (ECB)
36÷39	-	-
40	-	+15 positive
41	-	Free
42	-	Signal for the sensor of water in the diesel
43÷55	-	Free
56	-	Free
57	-	Free
58÷67	-	Free
68	-	Free
69÷74	-	-
75	9164	Preheating actuation enable relay positive
76÷88	-	Free
89	2298	EDC control unit diagnosis K line

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PART			TORQUE	
			Nm	kgm
Screw fixing alternator	M 10x1,5	l = 35 mm	30 ± 3	(3 ± 0.3)
	M 10x1,5	l = 60 mm	44 ± 4	(4.4 ± 0.4)
Screws fixing air-conditioner compressor to mount			24.5 ± 2.5	(2.5 ± 0.25)
Screws fixing guard			24.5 ± 25	(2.5 ± 0.25)
Filter clogging sensor fastening			55 ± 5	(5.5 ± 0.5)
Water/fuel temperature sensor fastener			35	(3.5)
Thermometric switch/transmitter fastener			25	(2.5)
Air temperature transmitter fastener			35	(3.5)
Pulse transmitter fastener			8 ± 2	(0.8 ± 0.2)
Injector-pump connections fastener			1.36 ± 1.92	(0.13 ± 0.19)
Turbocompound Unit				
Intermediate gear support shaft fixing screws M12x30			115	(11.5)
Intermediate gear fixing screw M12x80			115	(11.5)
Screw that fixes the hydraulic joint to the flywheel box		M10x70	45	(4.5)
		M10x110	45	(4.5)
		M10x150	45	(4.5)
Oil return pipe to block fixing screws M8x70x1.25			23	(2.3)
Oil delivery pipe to hydraulic joint threaded fittings			55	(5.5)
Screws that fix the power turbine to hydraulic joint M10x50			40	(4.0)
Screws that fix the turbine to the exhaust manifold			70	(7.0)
Nuts that fix the turbine to the exhaust manifold			45	(4.5)
Clamps that fix the manifold to the turbines			8.5	(0.85)

♦ Before assembly, lubricate with UTDM oil
• Before assembly, lubricate with graphitized oil

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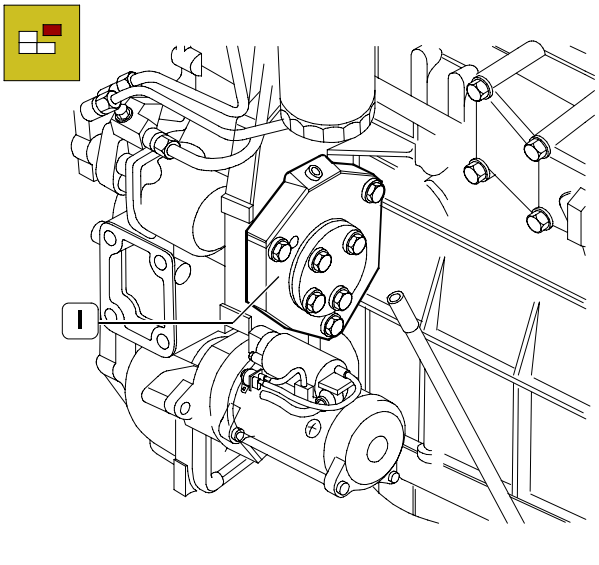
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DTC	Faulty component
ECU 2 (power unit/Immobilizer/overspeed/sensor power)	
1.E.3	MONITORING ERROR IN ECU
1.E.4	MONITORING ERROR IN ECU
1.E.5	SENSOR POWER ERROR (12V)
1.E.6	POWER SUPPLY SENSORS 1
1.E.7	POWER SUPPLY SENSORS 2
1.E.8	POWER SUPPLY SENSORS 3
1.E.9	ERROR IN ECU
1.E.A	ERROR IN ECU
1.E.B	ATMOSPHERIC PRESSURE SENSOR

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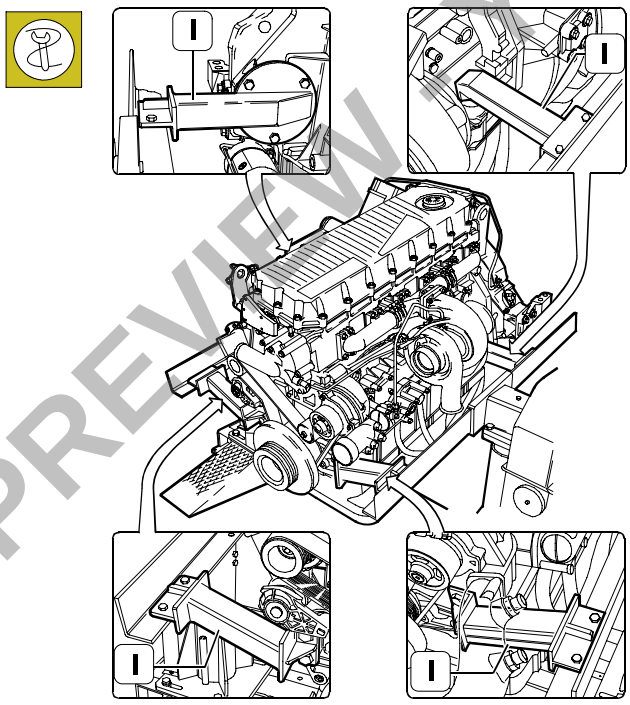
Figure 15



104247

Remove the engine supports;
Remove the drive (1).

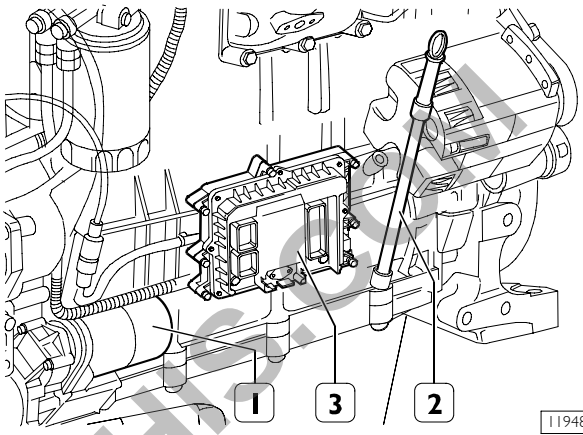
Figure 16



104248

Secure the engine to the rotary stand with the brackets (1).
Drain the lubricating oil from the sump.

Figure 17

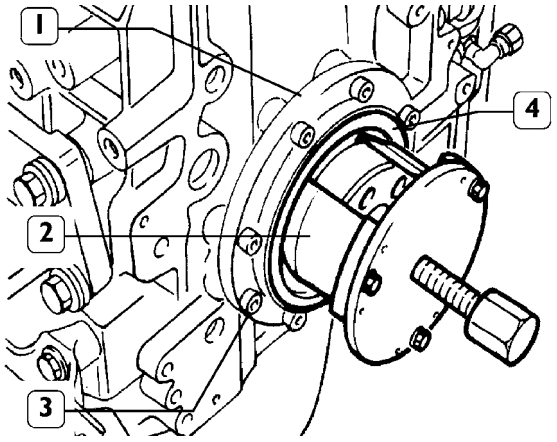


119480

Remove:

- ❑ the starter motor (1);
- ❑ the control unit (2) and its support;
- ❑ the oil dipstick (3) from the crankcase.

Figure 18



99361

With the extractor 99340053 (2) applied as shown in the figure, extract the seal (4). Undo the screws (3) and take off the cover (1).

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