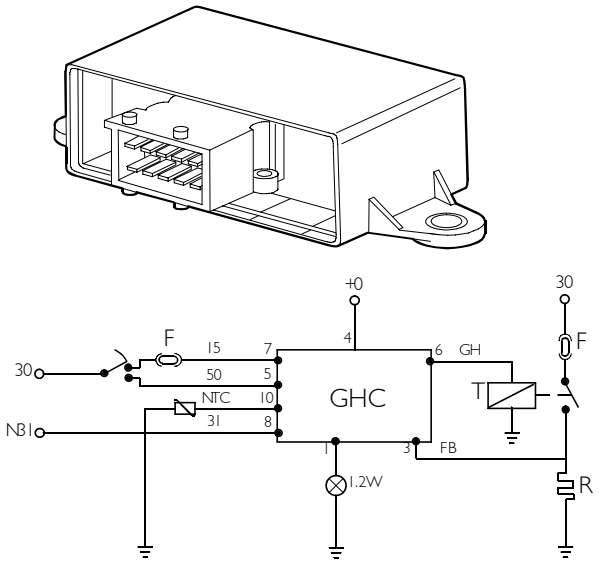
Pre-post heating unit

Figure 101



88153

Legend

F =	Fuse
R =	Pre-post heating resistance
T =	Remote control switch
GHC =	Pre-post heating unit

Electrical diagram pin out

PIN	Description
1	Output for "cold start" warning light
2	Not connected
3	Feedback signal input from pre-post heating resistance (FB)
4	Started engine signal input (D)
5	Start-up signal input (50)
6	Pre-post heating resistance supply remote control switch output (GH)
7	Supply positive (15)
8	Supply negative (31)
9	Not connected
10	Temperature analogue signal input (NTC)

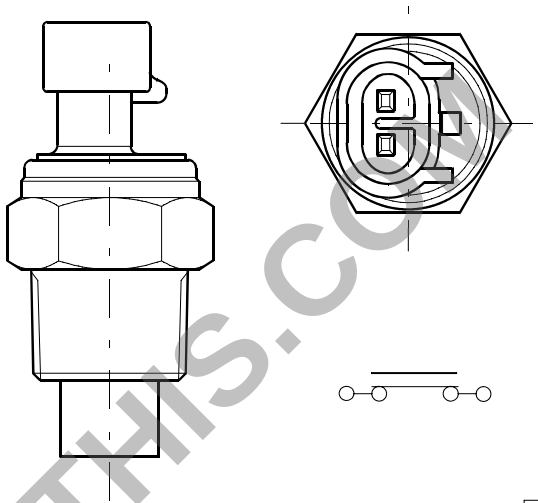
This unit operates, by means of the remote control switch, the pre-post heating resistance according to the engine coolant temperature.

Features:

Working tensions:	12 V
Operating voltage:	7 V ÷ 16V
Operating temperature:	-40°C ÷ 85°C
Maximum current in the GH line:	0.3A

KSB Water temperature sensor

Figure 102



75719

It is assembled to the cylinder head on the engine left hand side.

Specifications:

Working tensions:	12 ÷ 24 V
Electrical Power load:	2.5 A (induction) 5.0 A (resistance)
Setting:	63±3°C Contact opening upon increasing temperature 53±3 °C Contact closure upon decreasing temperature

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TIGHTENING TORQUE

COMPONENT		TORQUE	
		Nm	kgm
Cooling Nozzles (M8x1.25x10)		15 ± 3	1.5 ± 0.3
Main bearing cap	1st stage	50 ± 6	5.0 ± 0.6
	2nd stage	80 ± 6	8.0 ± 0.6
	3rd stage	90° ± 5°	
Rear gear housing assembly			
(M8x1.25x40)		24 ± 4	2.4 ± 0.4
(M8x1.25x25)		24 ± 4	2.4 ± 0.4
(M10x1.5)		49 ± 5	4.9 ± 0.5
Front cover assembly - Oil pump			
(M8x1.25x45)		24 ± 4	2.4 ± 0.4
(M8x1.25x30)		24 ± 4	2.4 ± 0.4
Connecting rod bolts(M11x1.25)	1st stage	30 ± 3	3.0 ± 0.3
	2nd stage	60 ± 5	6.0 ± 0.5
	3rd stage	60° ± 5°	
Ladder frame assembly (M10x1.25x25)		43 ± 5	4.3 ± 0.5
Oil rifle plugs			
(M10x1)		6 ± 1	0.6 ± 0.1
(M14x1.5)		11 ± 2	1.1 ± 0.2
Assemble oil suction tube (M8x1.25x20)		24 ± 4	2.4 ± 0.4
Oil pan assembly			
(M8x1.25x25)		24 ± 4	2.4 ± 0.4
(M18x1.50)		60 ± 9	6.0 ± 0.9
Set timing pin		5 ± 1	0.5 ± 0.1
Fuel pump assembly			
M8 screw		24 ± 4	2.4 ± 0.4
M6 screw		10 ± 1	1.0 ± 0.1
M6 nut		10 ± 1	1.0 ± 0.1
M10x1.5 flange head nuts	pre-torque	10 - 15	1.0 - 1.5
	Final torque	50 - 55	5.0 - 5.5
Fuel pump gear (drive gear nut)	Snug torque	15 - 20	1.5 - 2.0
	Final torque	85 - 90	8.5 - 9.0
Timing pin cap of fuel pump		30 - 35	3.0 - 3.5
Equalizer fastening to cylinder head (M8)		24 ± 4	2.4 ± 0.4
Cylinder head bolts			
(M12x70)		50 + 90°	5.0 + 90°
(M12x140)		40 + 180°	4.0 + 180°
(M12x180)		70 + 180°	7.0 + 180°
Assy rocker covers (M8x1.25x25)		24 ± 4	2.4 ± 0.4
Intake manifold (M8x1.25)		24 ± 4	2.4 ± 0.4
Assy air intake connection (M8x1.25)		24 ± 4	2.4 ± 0.4
Oil bypass valve into lube filter head (M22x1.5x10)		80 ± 8	8.0 ± 0.8
Plug (M12x1.5x12)		10 ± 1	2.4 ± 0.4
Exhaust manifold (M10x1.5x65)		43 ± 6	4.3 ± 0.6
Water pump (M8x1.25x25)		24 ± 4	2.4 ± 0.4
Water outlet connection			
(M8x1.25x35)		24 ± 4	2.4 ± 0.4
(M8x1.25x70)		24 ± 4	2.4 ± 0.4
Fan support (M10x1.5x20)		33 ± 5	3.3 ± 0.5
Fan pulley			
(M6)		10 ± 2	1.0 ± 0.2
(M10)		43 ± 6	4.3 ± 0.6

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OVERHAUL OF THE ENGINE PROVIDED WITH MECHANICAL ROTARY PUMP

Preface

Part of the operations illustrated within this section can be partially executed while the engine is assembled on the vehicle, depending on the room available for access to the engine and on the equipment application as well.

NOTE With regard to the engine disassembly operations, please apply for information consulting the specific manual. All operations of engine disassembly operations as well as overhaul operations must be executed by qualified engineers provided with the specific tooling and equipment required.

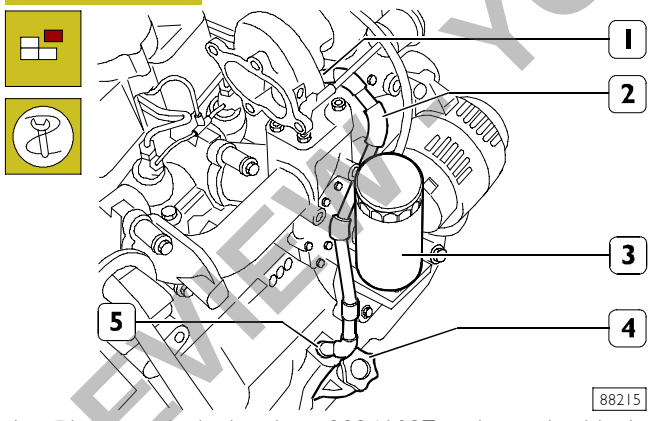
The following information relate to the engine overhaul operations only for what concerns the different components customising the engine, according to its specific duties.

NOTE For specific application exigencies, some units can be assembled to the engine in different positions.

Within "General overhaul" section, all the operations of engine block overhaul have been contemplated. Therefore the above mentioned section is to be considered as following the part hereby described.

Engine setting operations for the assembly on turning stand

Figure 2



88215

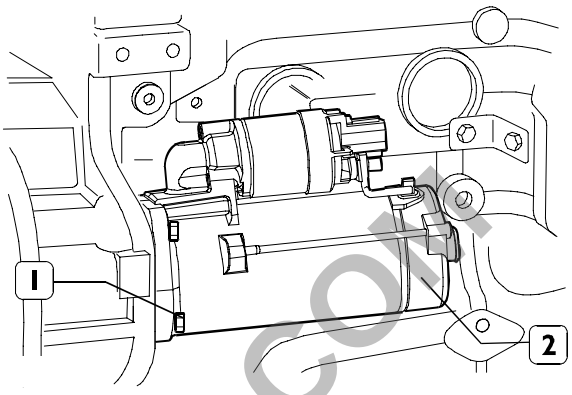
In order to apply the brackets 99361037 to the engine block to fix it on to the stand 99322205 for the overhaul, it is necessary to perform the following operations:

On the right hand side:

- ❑ disassemble lubrication oil exhaust pipe (2) from the turbo-blower:
  Underneath the turbo-blower loosen the screws (1);; finally loosen and remove the union (5) from the block; plug the pipe ends and the exhaust of the turbo-blower.
- ❑ oil level rod (4);
- ❑ oil filter (3).

Provide for oil recovery and disposal in compliance with the law and regulations in force.

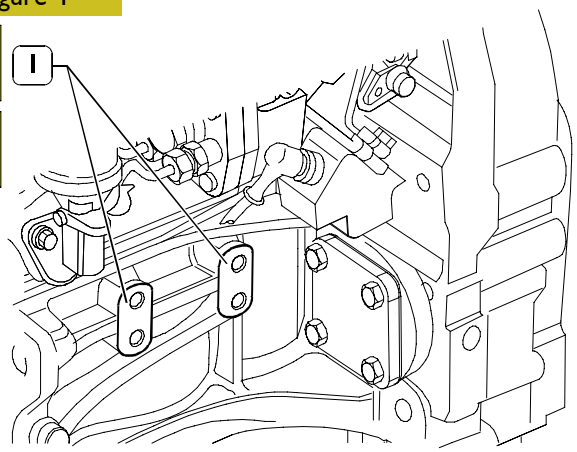
Figure 3



87712

- ❑ Disassemble the starter;
  Properly hold the starter (2) and loosen the two fixing screws (1);
  assemble the supporting bracket 99361037 using the threaded ports on the basement.

Figure 4



88216

On the left hand side:

- ❑ assemble the second bracket 99361037 throughout the screw-threaded ports (1).
- ❑ Lift the engine using the rocker arm 99360595 and put it on the turning stand 99322205.
- ❑ Drain the oil through the cap underneath the plug.

Warning: avoid contact of engine oil with the skin: in case of skin contamination, rinse in running water.

Engine oil is highly pollutant: provide for disposal in compliance with the law and regulations in force.

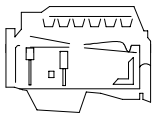
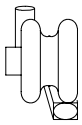
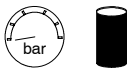
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ANOMALY	POSSIBLE CAUSE	REMEDY	NOTE
The engine does not start	Battery flat or faulty.	Check and recharge battery. Replace battery if necessary.	
	Connections to battery terminals corroded or loose.	Clean, examine and tighten the nuts on the battery terminals. Replace the cable terminals and the nuts if excessively corroded.	
	Incorrect timing of injection pump.	Check and correctly time the injection pump.	See your Iveco dealer.
	Deposits or water in the fuel tank.	Disconnect the hoses and clean them using a jet of compressed air. Dismantle and clean the injection pump. Remove water from tank and refuel.	Drain feed system.
	No fuel in tank.	Refuel.	
	No power supply.	Overhaul or replace the fuel or transfer pump.	
	Air bubbles in the fuel lines or injection pump.	Check the hoses to ensure that air is in fact present and also check the fuel pump. Eliminate the air from the injection pump by unscrewing the cap and working the fuel pump by hand.	
	Faulty starter motor.	Repair or replace the starter motor.	

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Clearance data

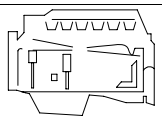
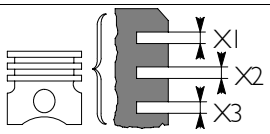
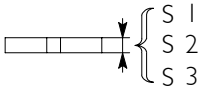
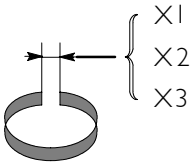
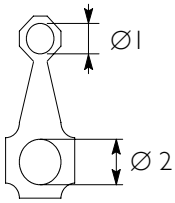
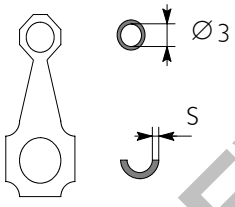
			F4CE9684	
	Type		L*J602.	N*J600
ϱ	Compression ratio		17.5 : 1	
	Max. output	kW (HP) rpm	86 117 2200	126 170 2200
	Max. torque	Nm (kgm) rpm	522 52.2 1250	720 72 1250
	Loadless engine idling	rpm	-	
	Loadless engine peak	rpm	-	
	Bore x stroke Displacement	mm cm^3	104 x 132 6728	
	SUPERCHARGING Turbocharger type		with intercooler HOLSET HX35W	
	LUBRICATION Oil pressure (warm engine) - idling - peak rpm	 bar bar	Forced-circulation by means of lobe pump. Pressure control valve, oil filter 0.8 3.5	
	COOLING Water pump control **Thermostat** - start of opening	 °C	Liquid Through belt 81 ± 2	
 15W40 ACEA E3	FILLING* engine sump engine sump + filter * First filling	 liters liters	 16 17	

NOTE Data, features and performances are valid only if the setter fully complies with all the installation prescriptions provided by Iveco Motors.

Furthermore, the users assembled by the setter shall always be in conformance to couple, power and number of turns based on which the engine has been designed.

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	Type	6 CYLINDERS
CYLINDER UNIT AND CRANKSHAFT COMPONENTS		**mm**
	Split ring slots X 1 X 2 X 3 * measured on 101 mm Ø	X 1* X 2 X 3 2.705 to 2.735* 2.440 to 2.460 4.030 to 4.050
	Split rings S 1 S 2 S 3	2.560 to 2.605 2.350 to 2.380 3.970 to 3.990
	Split rings - slots 1 2 3	0.100 to 0.175 0.060 to 0.110 0.040 to 0.080
	Split rings	0.4
	Split ring end opening in cylinder barrel: X 1 X 2 X 3	 0.30 to 0.40 0.60 to 0.80 0.30 to 0.55
	Small end bush housing Ø 1 Big end bearing housing Ø 2	40.987 to 41.013 72.987 to 73.013
	Small end bush diameter Inside Ø 3 Big end half bearings S	 38.019 to 38.033 1.955 to 1.968
	Piston pin – bush	0.019 to 0.039
	Big end half bearings	0.250 ; 0.500

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MAINTENANCE PLANNING

Recovery

To ensure optimised working conditions, in the following pages we are providing instructions for the overhaul control interventions, checks and setting operations that must be performed on the engine at due planned dates.

The frequency of the maintenance operations is just an indication since the use of the engine is the main characteristic to determine and evaluate replacements and checks.

It is not only allowed but recommended that the staff in charge of the maintenance should also carry out the necessary maintenance and controlling operations even if not being included in the ones listed here below but that may be suggested by common sense and by the specific conditions in which the engine is run.

Planning of controls and periodical intervention

Controls and periodical intervention	Frequency (hours)
Visual check of engine	Daily
Check presence of water in fuel filter or pre-filter	Daily
Check of belt wear status	-
Check and setting of tappet clearance	4000
Replacement of engine's oil and filter	500
Replacement of fuel pre-filter	1000
Replacement of fuel filter	500
Replacement of belt	1500

NOTE The frequency of the maintenance operations is just an indication since the use of the engine is the main characteristic to determine and evaluate replacements and checks.

The maintenance operations are valid only if the setter fully complies with all the installation prescriptions provided by Iveco Motors.

Furthermore, the users assembled by the setter shall always be in conformance to couple, power and number of turns based on which the engine has been designed.

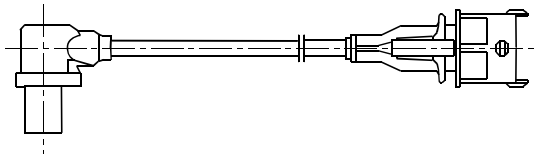
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Speed sensor

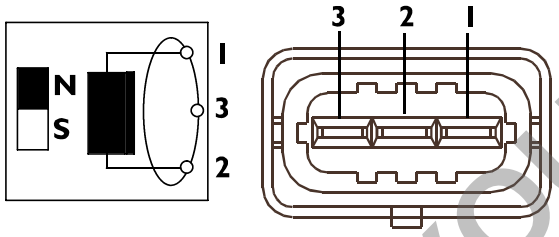
It is an induction type sensor and it is placed on the front part of the engine. It generates signals obtained from magnetic flow lines.

Figure 106



88315

Figure 107



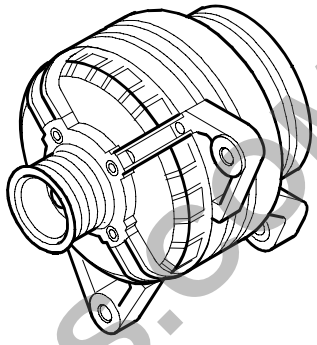
88316

Pin out

PIN	Description
1	Signal
2	Signal
3	Screening

Alternator

Figure 108



75725

It is place front view on the right hand side of the engine, and is driven by tooth belt.

Specifications:

Working tension:	12 V
Current delivered:	90A (at 6000 rpm)
Absorption in stand-by:	≤ 1mA
Sense of rotation:	clockwices

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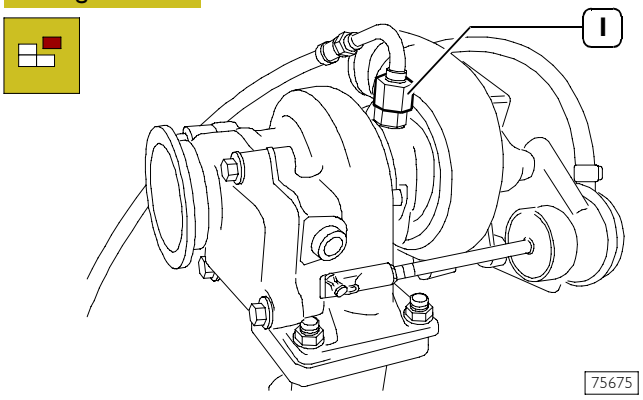
COMPONENT		TORQUE	
		Nm	kgm
Rear lifting bracket (M12x1.75x30)		77 ± 12	7.7 ± 1.2
Crankshaft pulley (M12x1.75x10.9)		110 ± 5	11 ± 0.5
Flywheel housing			
(M12x120)		85 ± 10	8.5 ± 1.0
(M12x80)		85 ± 10	8.5 ± 1.0
(M10x80)		49 ± 5	4.9 ± 0.5
(M10x40)		49 ± 5	4.9 ± 0.5
Flywheel housing (M12x1.25)	1st stage	30 ± 4	3.0 ± 0.4
	2nd stage	60° ± 5°	
Assy rear cover plate to flywheel housing (M8x1.25x16)		24 ± 4	2.4 ± 0.4
Fuel injectors		60 ± 5	60 ± 0.5
Fuel lift pump		24 ± 4	24 ± 0.4
Turbocharger to exhaust manifold (M10)		43 ± 6	4.3 ± 0.6
Oil feed to oil filter head		24 ± 4	2.4 ± 0.4
Oil feed to turbocharger (M12x1.5)		35 ± 5	3.5 ± 0.5
Oil drain (M8x1.25x16)		24 ± 4	2.4 ± 0.4
Alternator to alternator support (M8x1.25x30)		24 ± 4	2.4 ± 0.4
Alternator to water inlet conn. assy (M8x1.25x30)		24 ± 4	2.4 ± 0.4
Lower alternator mounting (M10x1.25x25)		24 ± 4	2.4 ± 0.4
Alternator upper pivot to support (M10)		49 ± 5	4.9 ± 0.5
Alternator mounting hardware (M12x1.75x120)		43 ± 6	4.3 ± 0.6
Alternator wiring (M6x1.0 nut)		10 ± 2	1.0 ± 0.2
Starter motor to gear case (M10)		49 ± 5	4.9 ± 0.5
Screw M12 for fastening output shaft caps	1st stage	50 ± 6	5 ± 0.6
	2nd stage	80 ± 6	8 ± 0.6
	3rd stage	90° ± 5°	
Screw M8 for fastening camshaft longitudinal retaining plate		24 ± 4	2.4 ± 0.4
Screw M8 for fastening camshaft gear		36 ± 4	3.6 ± 0.4
Screw M10 for fastening connecting rod caps	1st stage	60 ± 5	6 ± 0.5
	2nd stage	60° ± 5°	

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Disassembly of application components

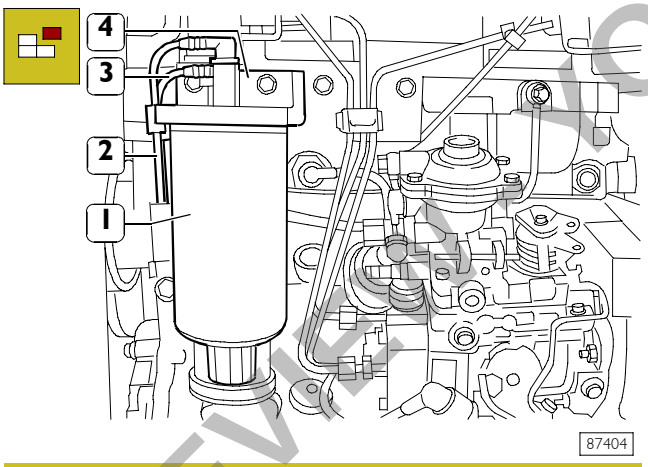
Figure 5



Proceed disassembling the supercharger:

- ❑ loosen the fixing nut (1) and remove the lubrication pipe from the supercharger. Analogously carry out the same operation on the other end of the pipe and remove it from the upper part of the heat exchanger.
- ❑ Loosen the fixing screw (3) and remove the exaust lubrication pipe from the supercharger.
- ❑ Hold up the supercharger and after lifting it remove the gasket.

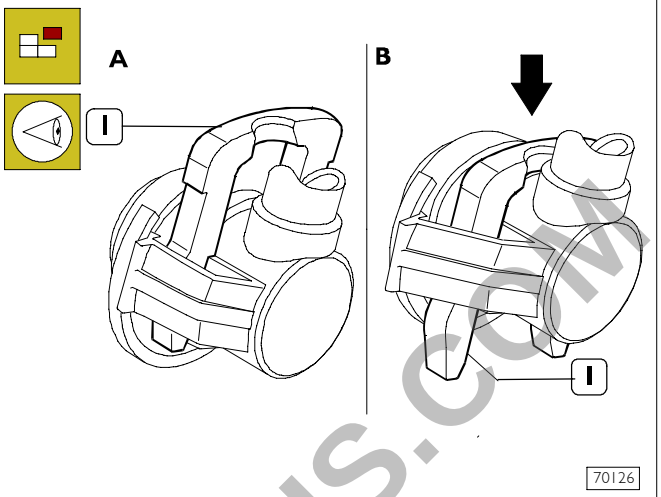
Figure 6



NOTE In some versions, the fuel filter has the sensor detecting water on the basis of the filtering cartridge and/or a heater interposed between filter support and filtering cartridge.
For the versions requiring it, disconnect the electrical connections of such electrical components before removing the fuel filter.

- ❑ Place a container under the fuel filter and screw out the condense drain faucet underneath said filter. Carry out complete drainage of the fuel contained therein.
- ❑ Screw out completely the faucet and, using equipment 99360076 disassemble fuel filter (1).
- ❑ Disconnect fuel pipelines (2 and 3) respectively from priming pump to filter bearing and from this last one to the feed pump.
- ❑ Remove the fuel filter bearing from the bracket fixed to the engine head.

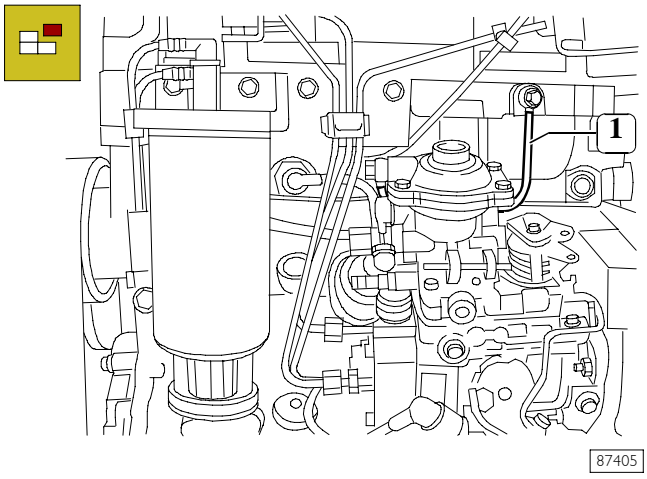
Figure 7



NOTE To disconnect fuel pipelines (2 and 3, Figure 6), in low pressure from the relating pipe fittings, it is Necessary to press the locking fastener (1) as shown in picture **B.**

After having disconnected the pipeline, reset the locking fastener (1) in lock position as shown in. picture **A**, to avoid any possible deformation of the fastener itself.

Figure 8



- ❑ Disconnect the LDA pipe (1) from the head and from the feed pump.
- ❑ Pipe the ends of the pipelines as well as the feed pump and the engine head.

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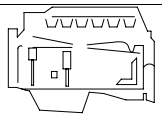
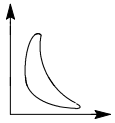
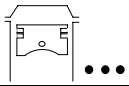
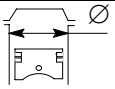
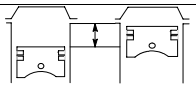
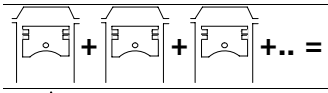
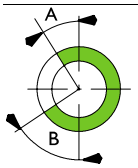
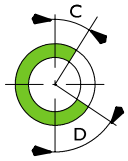
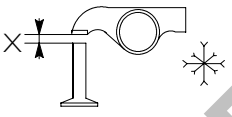
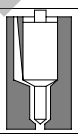
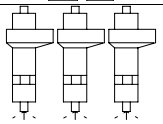
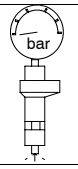
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ANOMALY	POSSIBLE CAUSE	REMEDY	NOTE
The engine does not start at low temperatures	Fuel system clogged with paraffin crystals forming due to the use of unsuitable fuel.	Replace the fuel with fuel suitable for use at low temperatures. Replace the fuel filters.	
	K.S.B. device for cold spark advance control operating incorrectly.	Check or replace the injection pump.	See your Iveco dealer.
The engine cuts out.	Idle rpm too low.	Adjust with adjustment screw.	
	Irregular flow of injection pump.	Adjust flow.	See your Iveco dealer.
	Impurities or water in the fuel lines.	Disconnect the hoses and clean them using a jet of compressed air. Dismantle and clean the injection pump. Remove water from fuel tank and refuel.	Drain feed system.
	Clogged fuel filter.	Dismantle and replace if necessary.	
	Presence of air in the fuel and injection system.	Check that the hoses are not cracked or the unions loose. Replace worn parts, remove the air from the hoses and deaerate the injection pump and fuel filter by unscrewing the caps and working the primer pump by hand.	
	Broken injection pump controls.	Replace the faulty parts.	
	Abnormal clearance between camshaft cams and tappets.	Adjust clearance by replacing shims.	
	Burnt, corroded or chalky valves.	Replace the valves, rectify or replace the cylinder head seatings.	

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GENERAL SPECIFICATIONS

	Type	6 CYLINDERS
	Cycle	Four-stroke diesel engine
	Power	Turbocharged with intercooler
	Injection	Direct
	Number of cylinders	6
	Bore mm	104
	Stroke mm	132
	Total displacement cm^3	6728
   	**TIMING** start before T.D.C. A end after B.D.C. B start before B.D.C. D end after T.D.C. C	 15° 35° 69° 21°
	Checking timing X mm mm	 - -
	Checking operation X mm mm	 0.25 ± 0.05 0.50 ± 0.05
	FUEL FEED Injection Type: Bosch	 VE 6/12F ....
	Nozzle type	DSLA 145 P
	Injection sequence	1 - 5 - 3 - 6 - 2 - 4
	Injection pressure bar	-

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