EURO 4
NEF SERIES

Application to vehicles

N40

N40 ENT C

N60

N60 ENT C

Technical and Repair manual

Part 1
F4A ENGINES

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PREFACE TO USER'S GUIDELINE MANUAL

Section 1 describes the F4A engine illustrating its features and working in general.

Section 2 describes the type of fuel feed.

Section 3 relates to the specific duty and is divided in four separate parts:

1. Mechanical part, related to the engine overhaul, limited to those components with different characteristics based on the relating specific duty.
2. Electrical part, concerning wiring harness, electrical and electronic equipment with different characteristics based on the relating specific duty.
3. Maintenance planning and specific overhaul.
4. Troubleshooting part dedicated to the operators who, being entitled to provide technical assistance, shall have simple and direct instructions to identify the cause of the major inconveniences.

Sections 4 and 5 illustrate the overhaul operations of the engine overhaul on stand and the necessary equipment to execute such operations.

Installation general prescriptions are reported within the appendix.

The appendix reports general safety prescriptions to be followed by all operators whether being in-charge of installation or maintenance, in order to avoid serious injury.

UPDATING

Section	Description	Page	Date of revision

SECTION 1

General specifications

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CORRESPONDENCE BETWEEN TECHNICAL CODE AND COMMERCIAL CODE

Technical Code	Commercial Code
F4AE3481	N40 ENT C
F4AE3681	N60 ENT C
F4AE3682	N60 ENT C

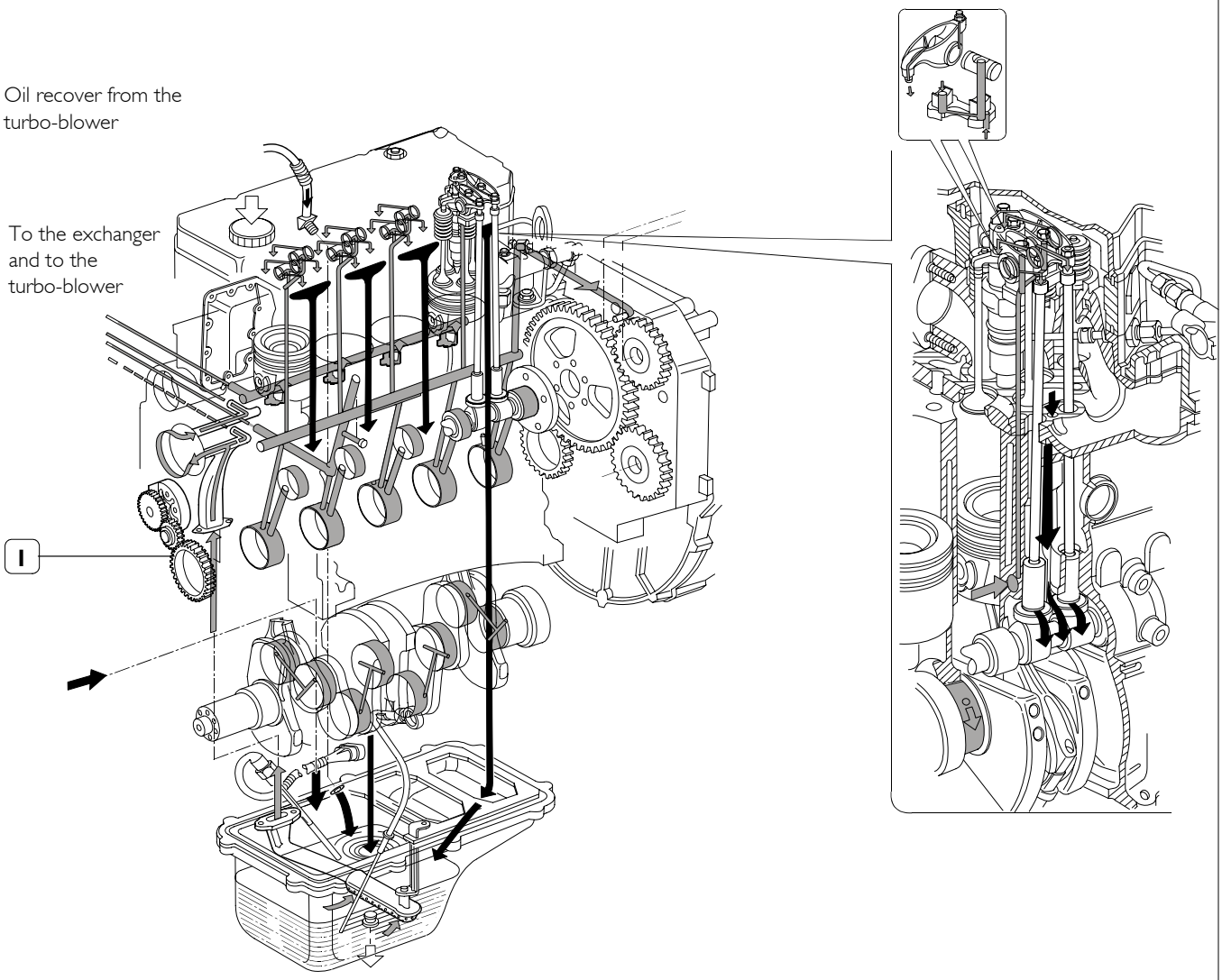
LUBRICATION (4 CYLINDERS)

Lubrication by forced circulation is achieved through oil rotary expansion pump (1), placed in the front part of the basement, driven by the straight-tooth gear splined to the shaft's bar hold.

From the pan, the lubrication oil flows to the driving shaft, to the camshaft and to the valve drive.

Lubrication involves the heat exchanger as well, the turbo-blower and the eventual compressor for any eventual compressed air system. All these components may often vary according to the specific duty and will therefore be examined in the specific section.

Figure 1



Routing of oil under pressure

Routing of oil return by gravity to sump

Introduction of oil

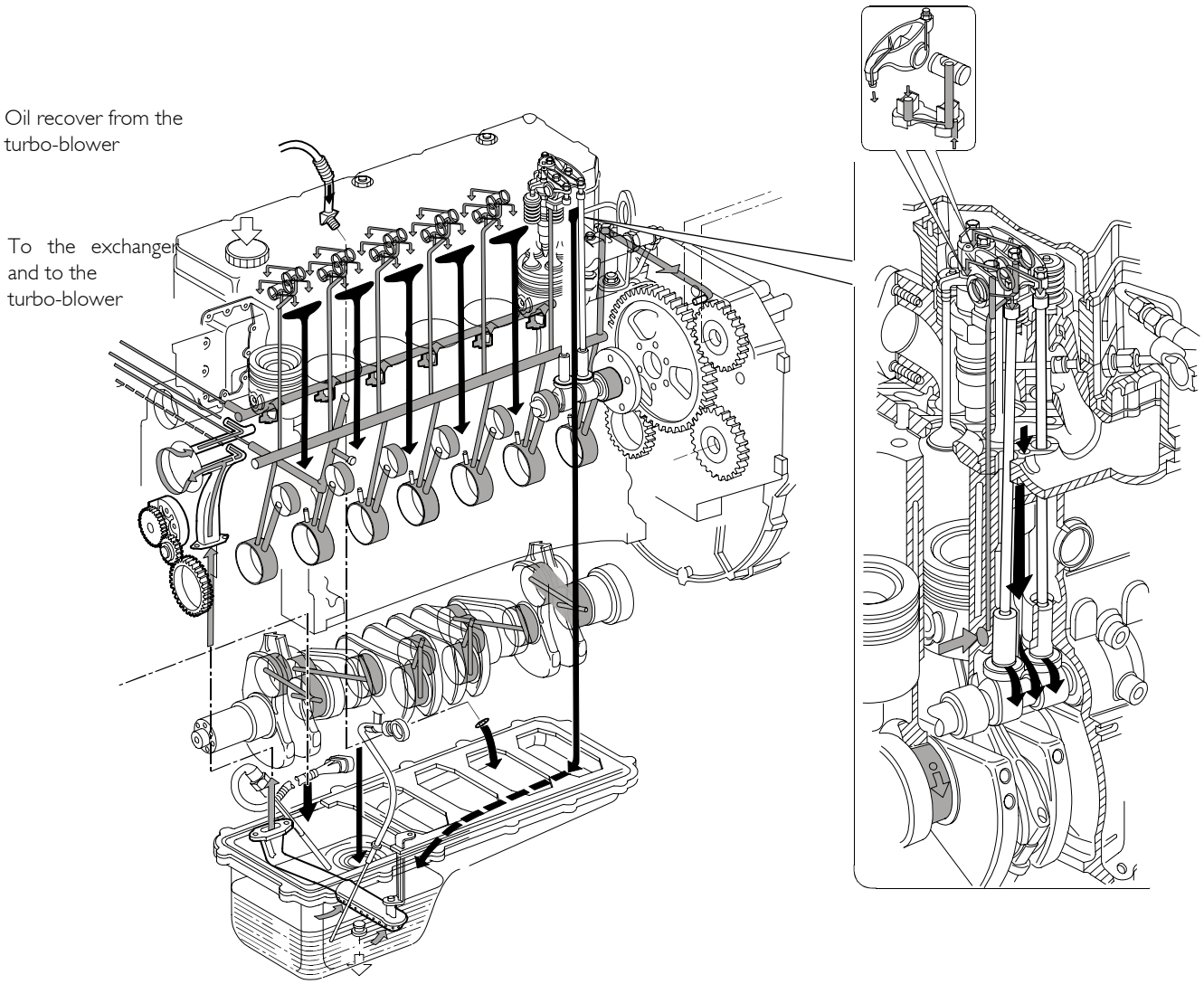
LUBRICATION SYSTEM LAYOUT

LUBRICATION (6 CYLINDERS)

Even for the 6 cylinders version lubrication is obtained by forced circulation and achieved through an oil rotary expansion pump similar to the 4 cylinders' one.

Also in this case, the components such as the oil exchanger, the turbo-blower and the eventual compressor are specifically studied and made out to suit the equipment or the duty for which the engine has been developed.

Figure 2



Routing of oil under pressure

Routing of oil return by gravity to sump

Introduction of oil

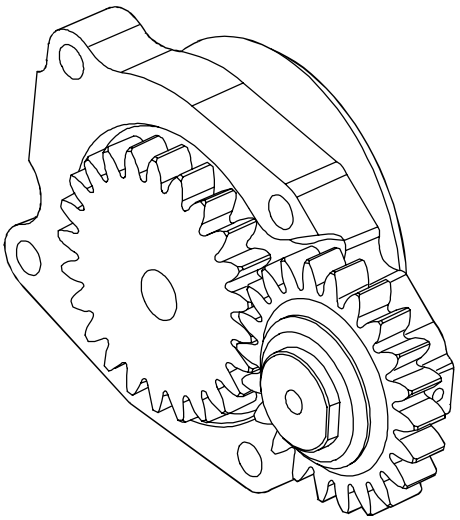
LUBRICATION SYSTEM LAYOUT

OIL PUMP

NOTE Since the oil pump cannot be overhauled, it shall be replaced when damaged.

The oil pump is controlled directly by the drive shaft.

Figure 3



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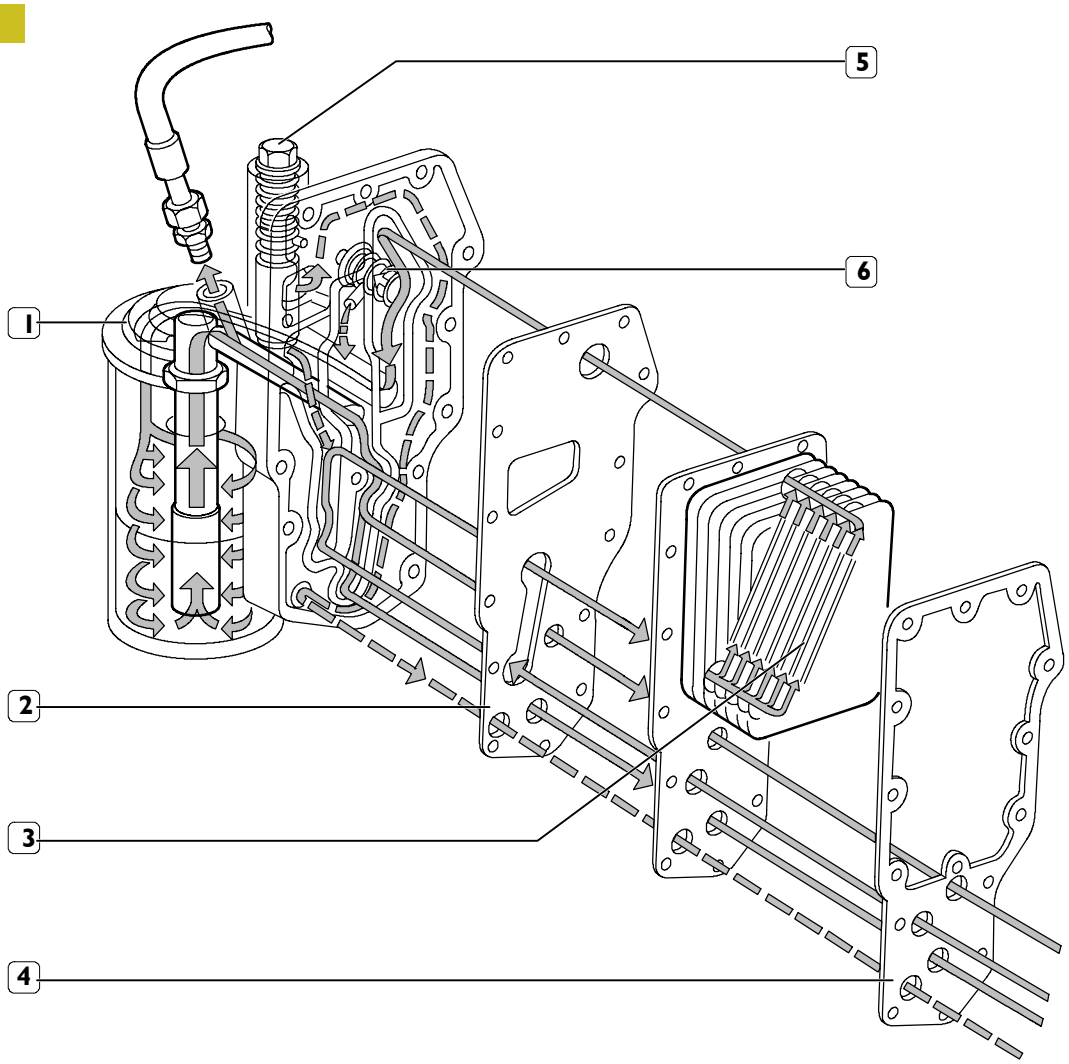
HEAT EXCHANGER

Figure 4



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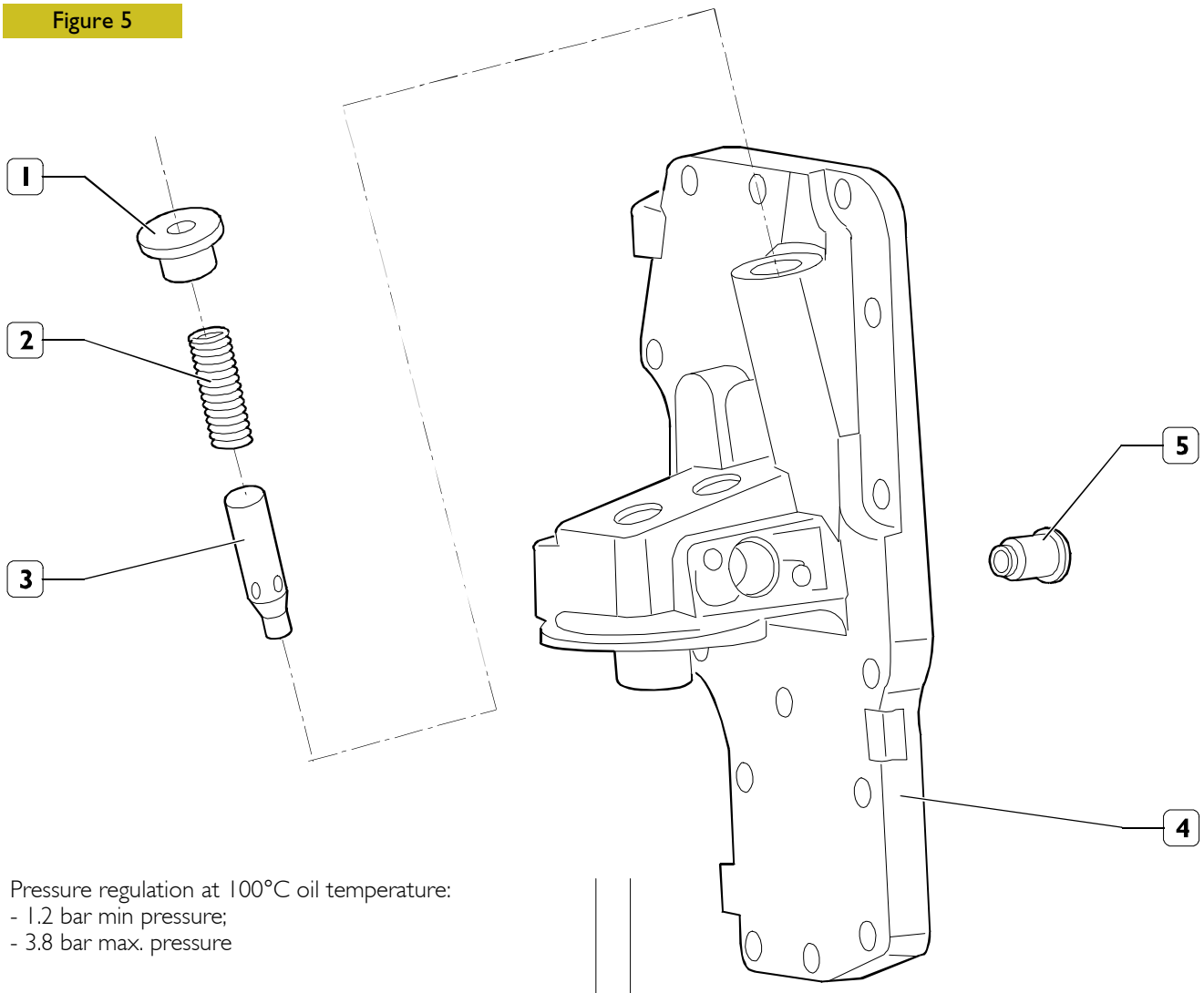
1. Heat exchanger body with filter support - 2. Internal gasket - 3. Water-oil heat exchanger - 4. Gasket between heat exchanger unit and engine block - 5. Oil pressure relief valve - 6. By-pass valve to cut out clogged oil filter.

Oil pressure relief valve

Figure 5



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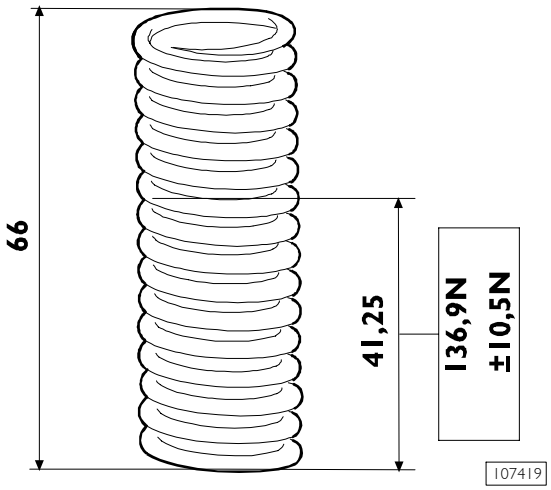
Pressure regulation at 100°C oil temperature:
- 1.2 bar min pressure;
- 3.8 bar max. pressure

By-pass valve to cut out clogged oil filter.

Figure 6



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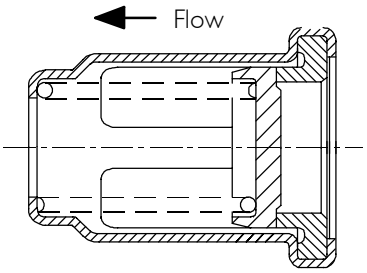
MAIN DATA TO CHECK OIL PRESSURE RELIEF VALVE SPRING

Figure 7



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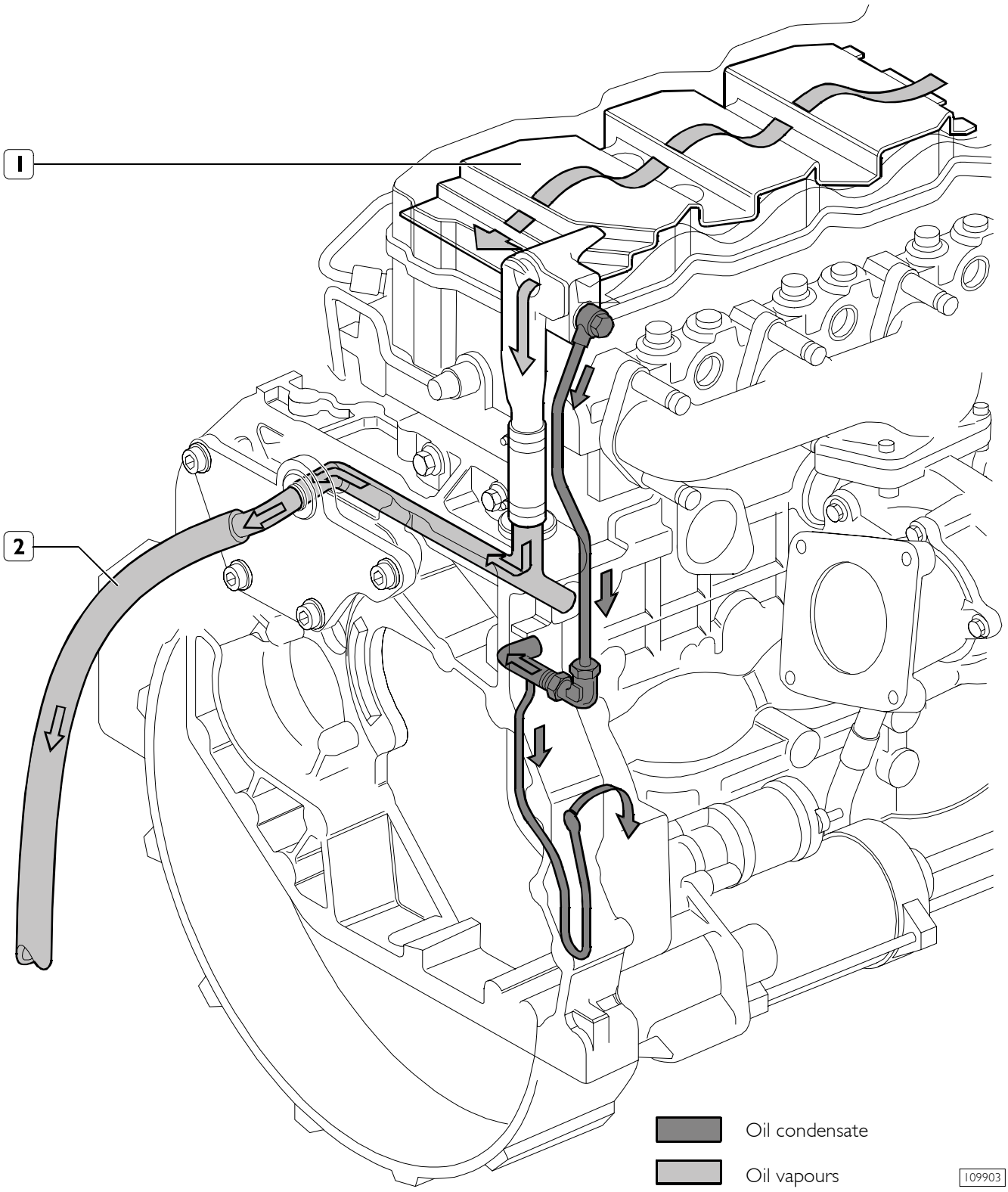
Max blow-by:
20 cm^3/1' at 0.83 bar pressure and at 26.7°C oil temperature.

OIL VAPOUR RECYCLING

Figure 8



1. Pre-separator - 2. Bleeder on side

The tappet cover houses the pre-separator (1), whose shape and position determines an increase in oil vapour outlet speed and condenses a part of vapours at the same time.

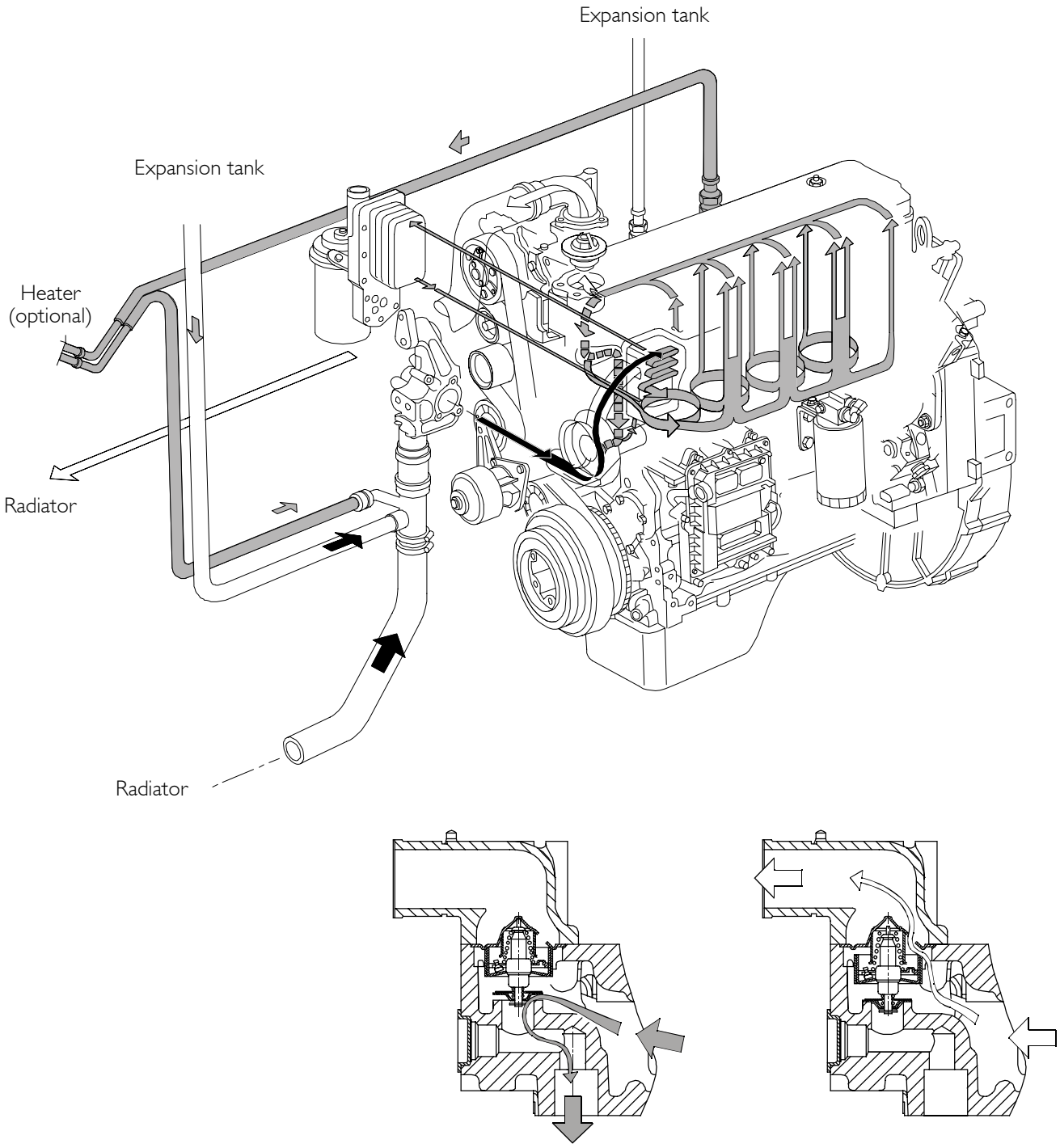
The condensed oil returns to the oil sump, whereas the residual vapour is conveyed, collected and discharged into the open air through the bleeder on the side (2).

COOLING SYSTEM (4 CYLINDERS)

The engine cooling system, closed circuit forced circulation type, generally incorporates the following components:

- ❑ Expansion tank; placement, shape and dimensions are subject to change according to the engine's equipment.
- ❑ Radiator, which has the duty to dissipate the heat subtracted to the engine by the cooling liquid. Also this component will have specific peculiarities based on the equipment developed, both for what concerns the placement and the dimensions.
- ❑ Viscous pusher fan, having the duty to increase the heat dissipating power of the radiator. This component as well will be specifically equipped based on the engine's development.
- ❑ Heat exchanger to cool the lubrication oil: even this component is part of the engine's specific equipment.
- ❑ Centrifugal water pump, placed in the front part of the engine block.
- ❑ Thermostat regulating the circulation of the cooling liquid.
- ❑ The circuit may eventually be extended to the compressor, if this is included in the equipment.

Figure 9



COOLING SYSTEM LAYOUT

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