

NEF ENGINES

Mechanical Injection

- Industrial applications

Technical and Repair manual

This publication provides the features, data and correct method of repair operations that can be performed on every single component of the engine.

Following the instructions given and using the special tools will ensure correct repairing, within the scheduled times, while also protecting operators against possible accidents.

Before starting any repair work, make sure that all accident-prevention equipment is close at hand and in efficient conditions.

Therefore, check and wear the items specified by the rules of safety: goggles, helmet, gloves, shoes.

Before use, check all the working, hoisting and handling equipment.

The possibility exists that the information given in this manual may not be up to date as a result of modifications adopted by the Manufacturer at any time for reasons of a technical or commercial nature or to adjust to the laws in force in the different Countries.

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PREFACE TO USER'S GUIDELINE MANUAL

Section 1 describes the NEF 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.

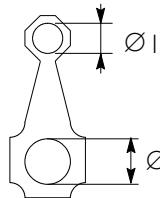
The appendix reports general safety prescriptions to be followed by all operators whether being in-charge of installation or maintenance, in order to avoid serious injury.

SPECIAL REMARKS

Where possible, the same sequence of procedures has been followed for easy reference.

Diagrams and symbols have been widely used to give a clearer and more immediate illustration of the subject being dealt with, (see next page) instead of giving descriptions of some operations or procedures.

Example



$\varnothing 1$ = housing for connecting rod small end bush





































$\varnothing 2$ = housing for connecting rod bearings



Tighten to torque

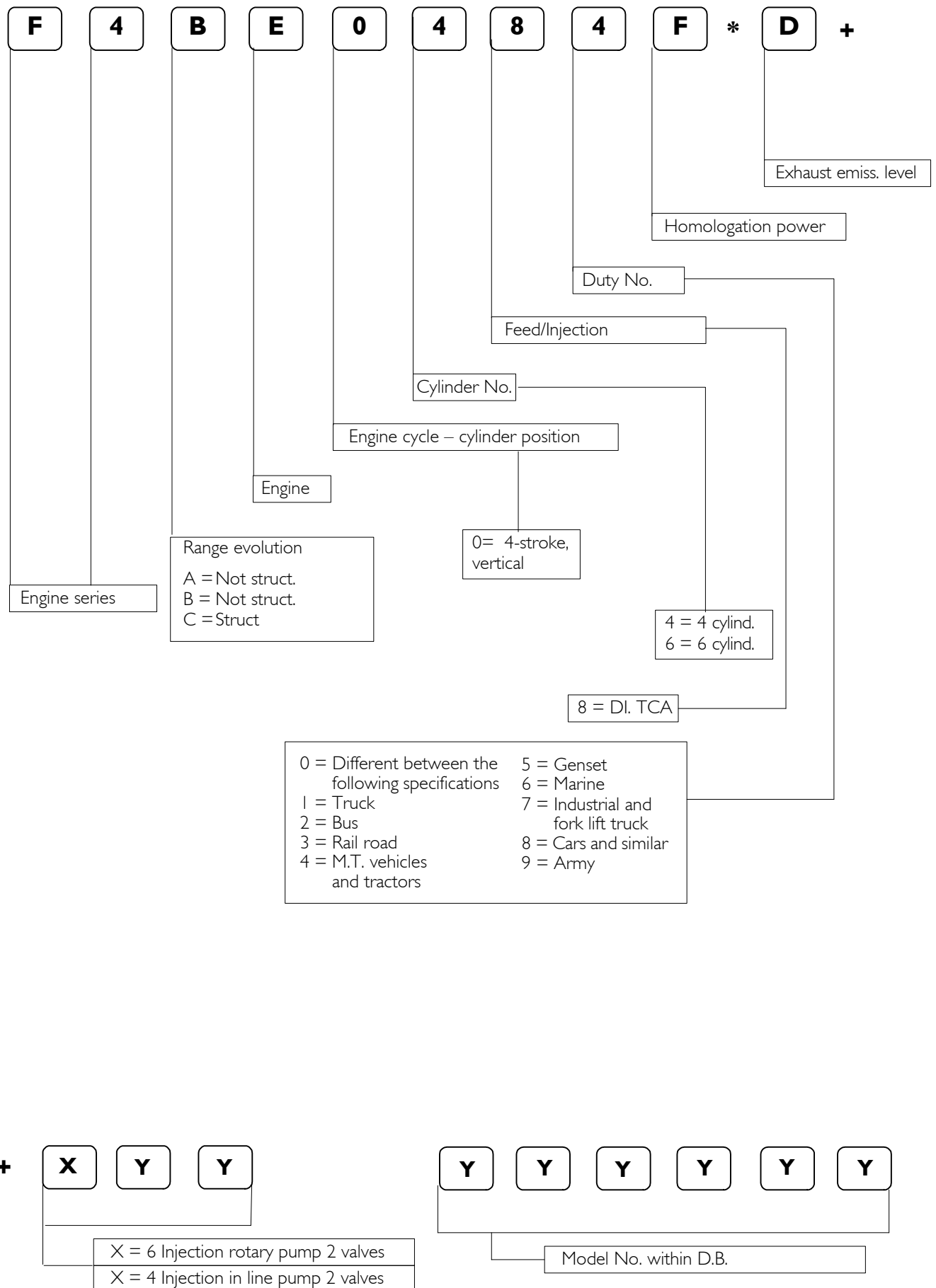
Tighten to torque + angular value

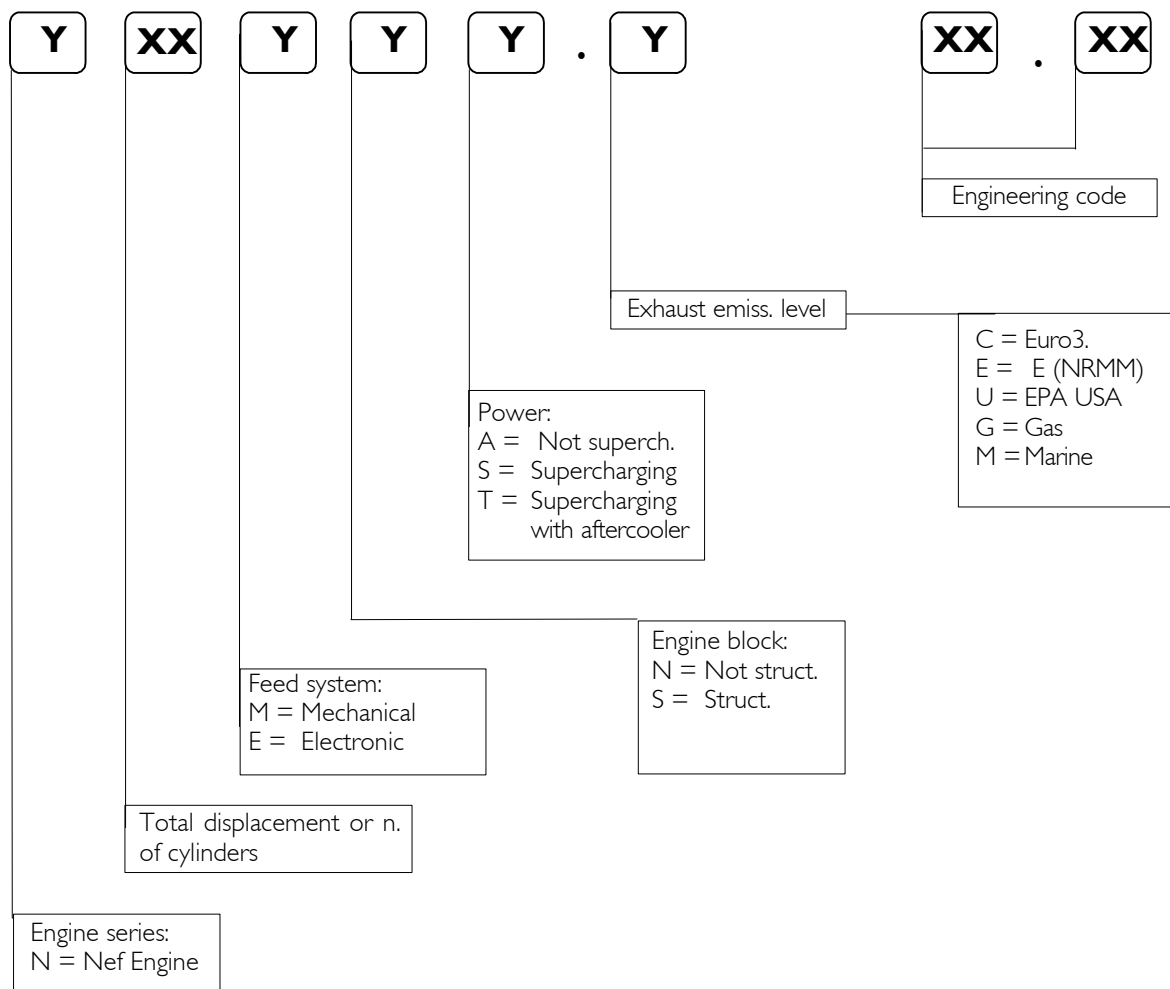
Graph and symbols

	Removal Disconnection		Intake
	Refitting Connection		Exhaust
	Removal Disassembly		Operation
	Fitting in place Assembly		Compression ratio
	Tighten to torque		Tolerance Weight difference
	Tighten to torque + angle value		Rolling torque
	Press or caulk		Replacement Original spare parts
	Regulation Adjustment		Rotation
	Warning Note		Angle Angular value
	Visual inspection Fitting position check		Preload
	Measurement Value to find Check		Number of revolutions
	Equipment		Temperature
	Surface for machining Machine finish		Pressure
	Interference Strained assembly		Oversized Higher than.... Maximum, peak
	Thickness Clearance		Undersized Less than.... Minimum
	Lubrication Damp Grease		Selection Classes Oversizing
	Sealant Adhesive		Temperature < 0 °C Cold Winter
	Air bleeding		Temperature > 0 °C Hot Summer

SECTION I**General Specifications**

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ENGINE IDENTIFICATION CODE

SPECIFIC ENGINE CODE**EXAMPLES:**

N40ENT.C

N = NEF Engine

40 = 4 liters

E = Electronic

N = Type of Engine block

T = Supercharger with aftercooler

C = Euro3

LUBRICATION

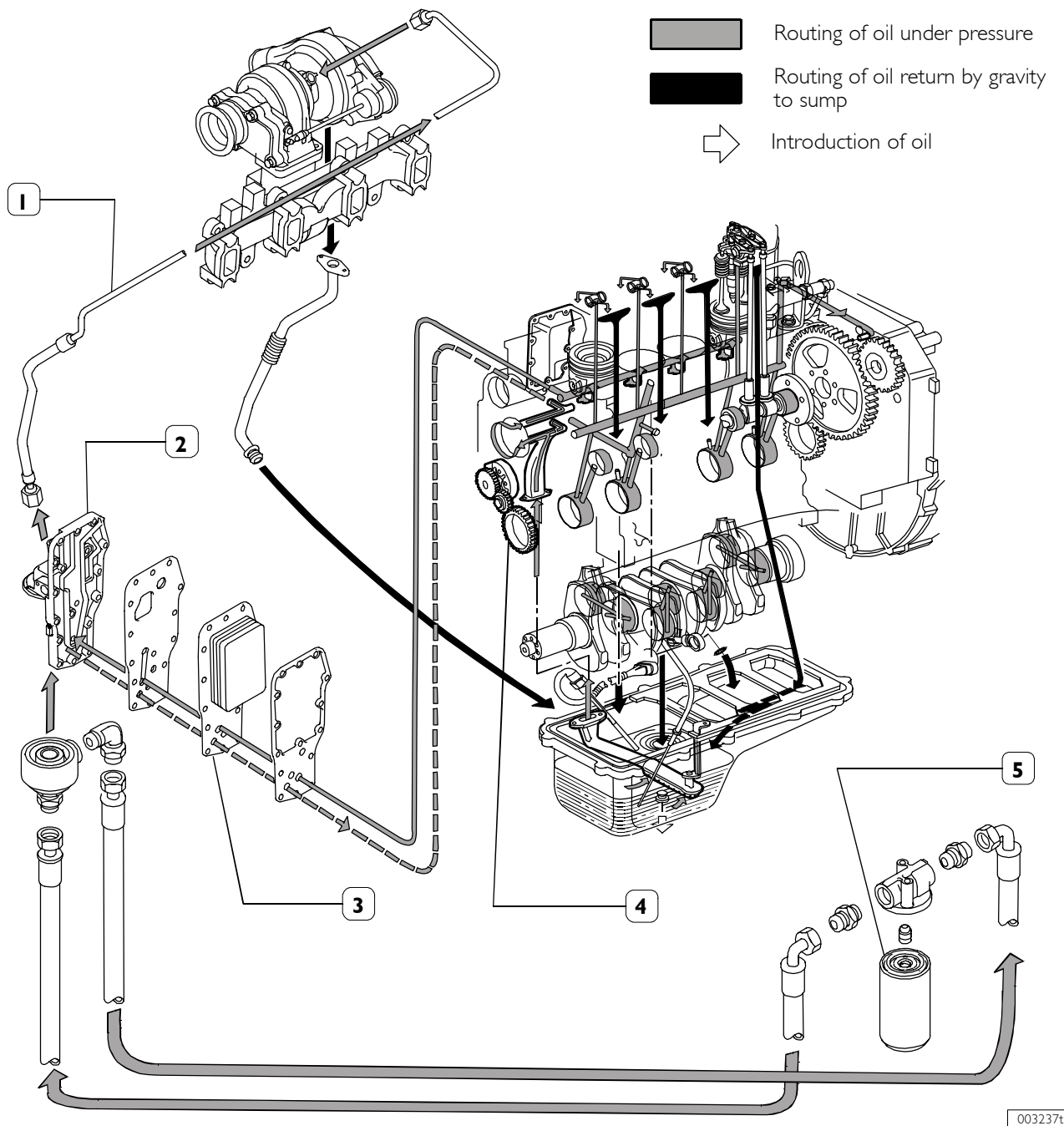
Lubrication by forced circulation is achieved through oil rotary expansion pump (4), placed in the front part of the basement, driven by the straight-tooth gear splined to the shaft's bar hold.

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

Lubrication involves the heat exchanger (2,3) as well, the supercharged (through pipe 1) and the eventual compressor for any eventual compressed air system.

All these components may often vary according to the specific duty.

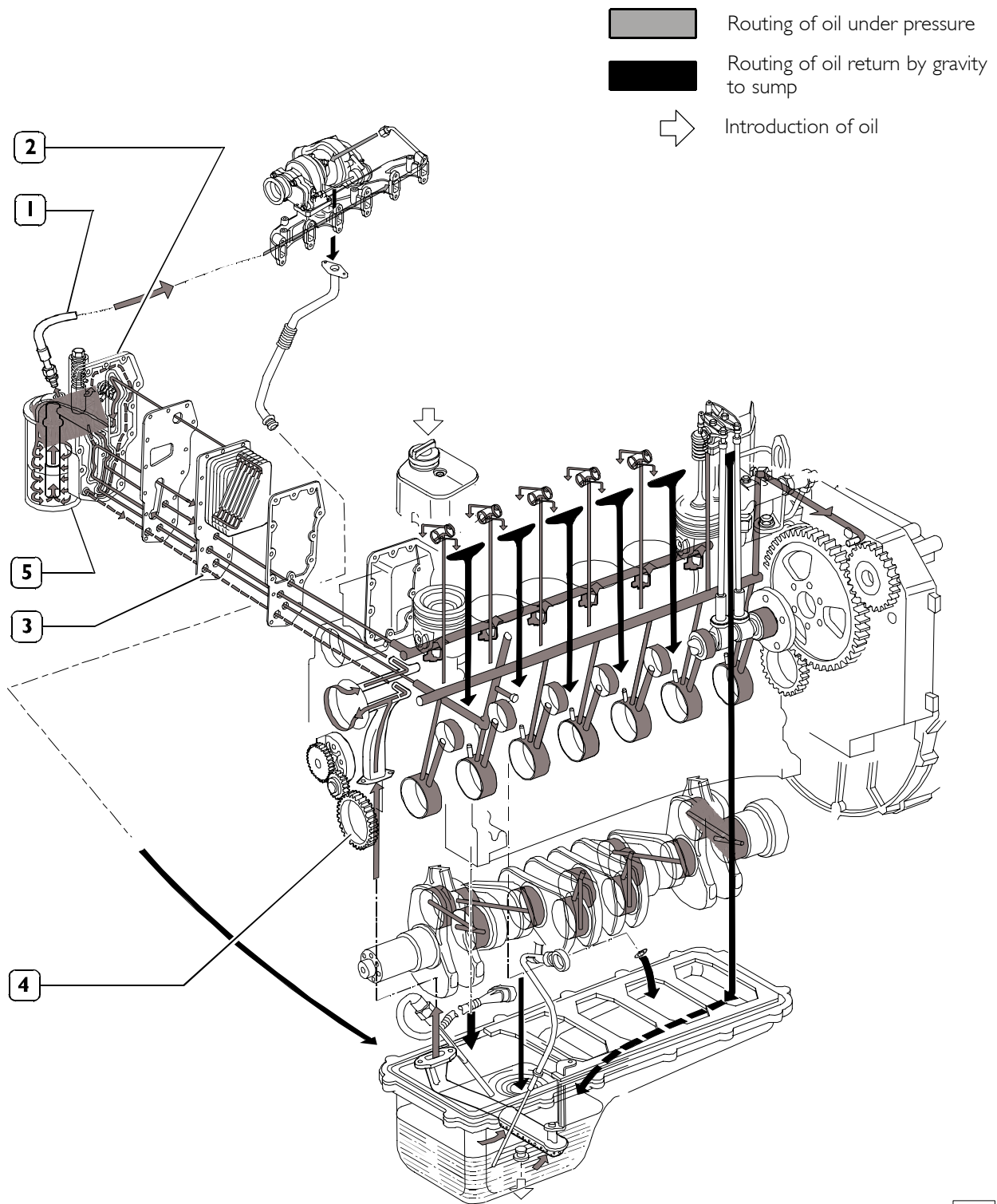
Figure 1



LUBRICATION SYSTEM LAYOUT (4 cyl. engines)

1. Lubrication oil pipe to supercharger - 2. Heat exchanger body - 3. Heat exchanger - 4. Oil rotary expansion pump - 5. Oil filter

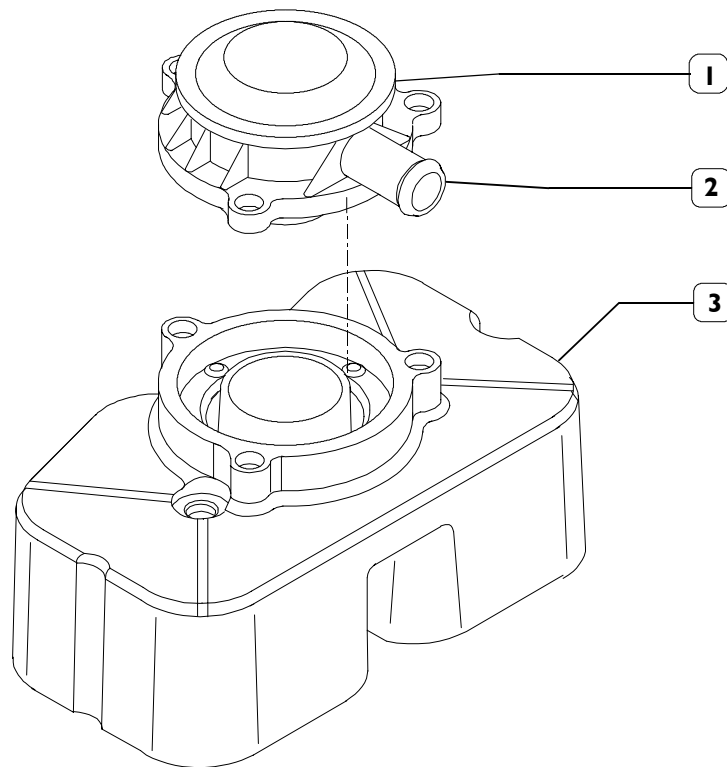
Figure 2



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LUBRICATION SYSTEM LAYOUT (6 cyl. engines)

1. Lubrication oil pipe to supercharger - 2. Heat exchanger body - 3. Heat exchanger - 4. Oil rotary expansion pump - 5. Oil filter

OIL VAPOUR RECIRCULATING SYSTEM**Figure 3**

003240t

1. Valve - 2. Breather pipe - 3. Tappet Cap

On the tappet cap (3) there is a valve (1) whose duty is to condense oil vapour inducing these to fall down because of gravity, to the Tappet cap underneath.

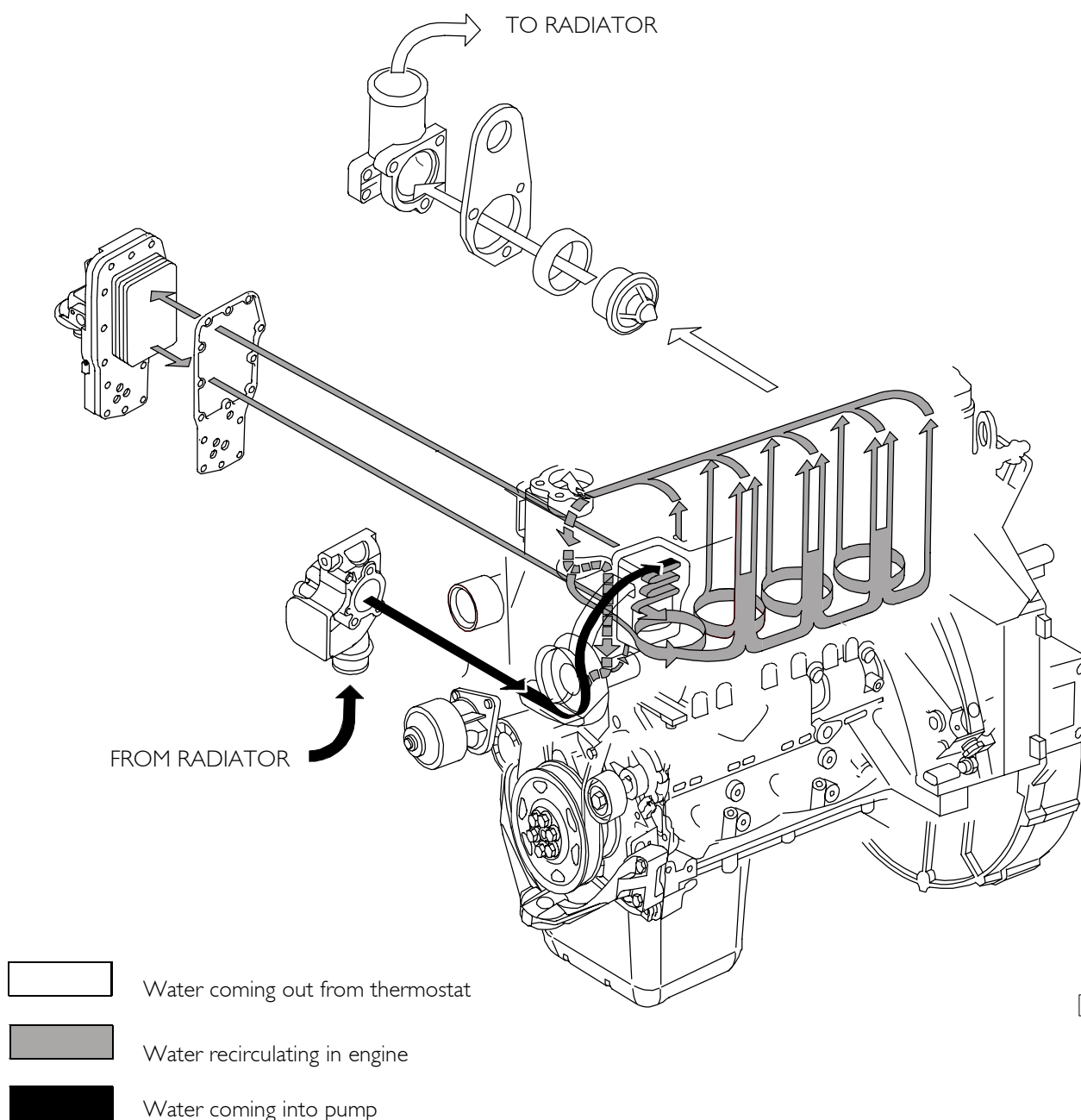
The remaining non-condensed vapours shall be properly conveyed through the breather pipe (2), by suction as an example (connection towards these vapours shall be designed by the Engineer).

COOLING SYSTEM

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.
- ☐ Visc 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.

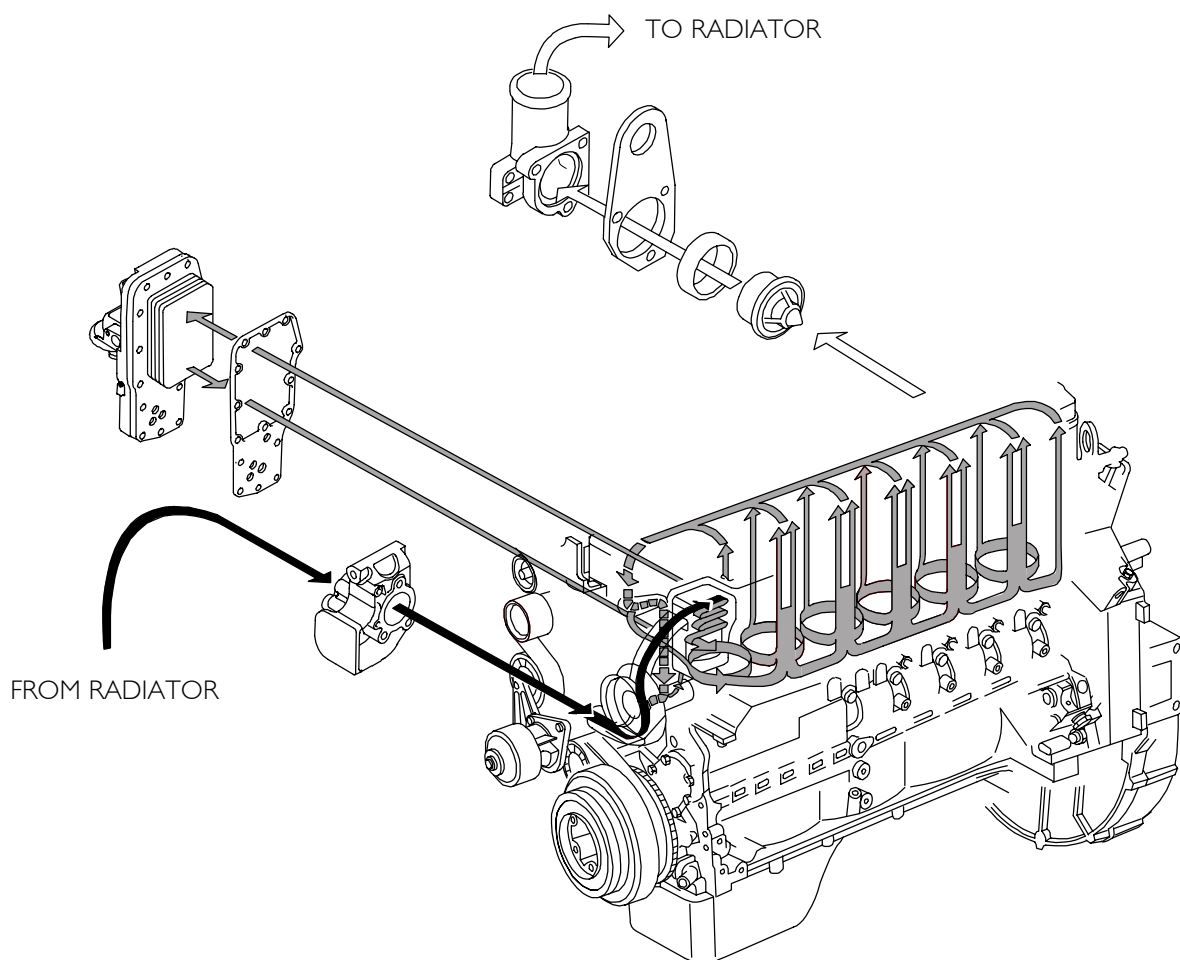
Figure 4



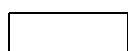


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COOLING SYSTEM LAYOUT (4 cyl. engines)

Figure 5



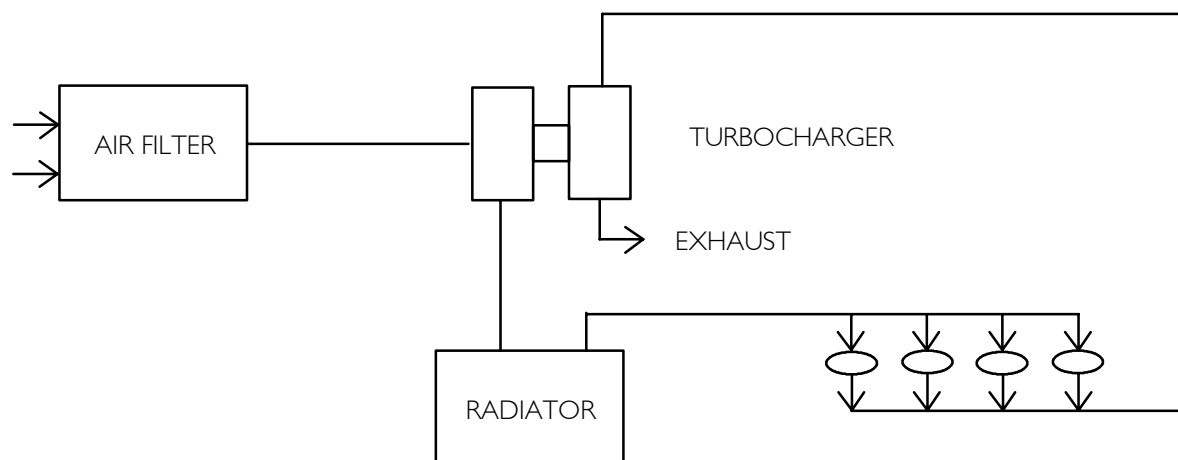
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-  Water coming out from thermostat
-  Water recirculating in engine
-  Water coming into pump

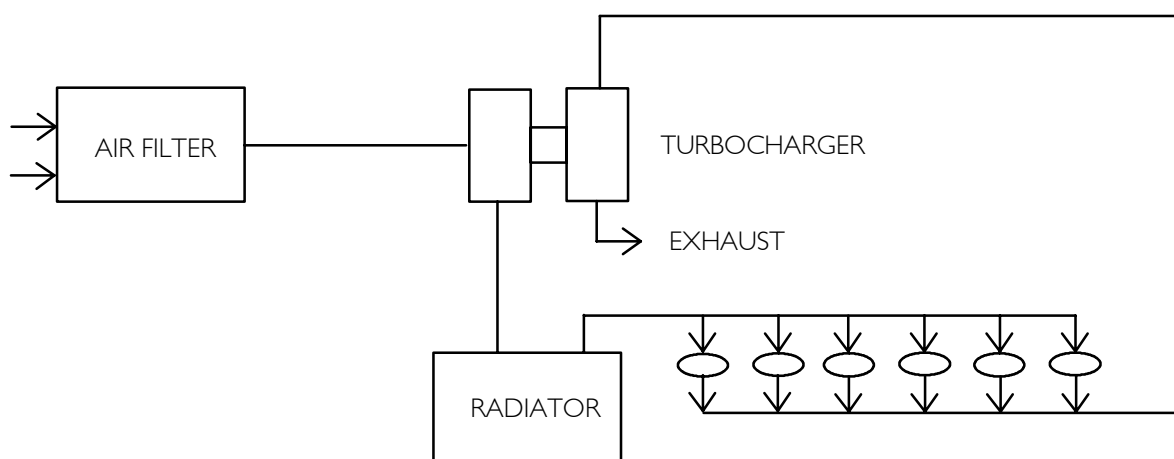
COOLING SYSTEM LAYOUT (6 cyl. engines)

AIR INDUCTION BOOST DIAGRAM

Figure 6



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Description

The turbocharger is composed by the following main parts: one turbine, one transforming valve to regulate the boost feeding pressure, one main body and one compressor.

During engine working process, the exhaust emission flow through the body of the turbine, provoking the turbine disk wheel's rotation.

The compressor rotor, being connected by shaft to the turbine disk wheel, rotates as long as this last one rotates, compressing the sucked air through the air filter.

The above mentioned air is then cooled by the radiator and flown through the piston induction collector.

The turbocharger is equipped with a transforming valve to regulate the pressure, that is located on the exhaust collector before the turbine and connected by piping to the induction collector.

It's duty is to choke the exhaust of the emissions, releasing part of them directly to the exhaust tube when the boost feeding pressure, over the compressor, reaches the prescribed bar value.

The cooling process and the lubrication of the turbocharger and of the bearings is made by the oil of the engine.

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