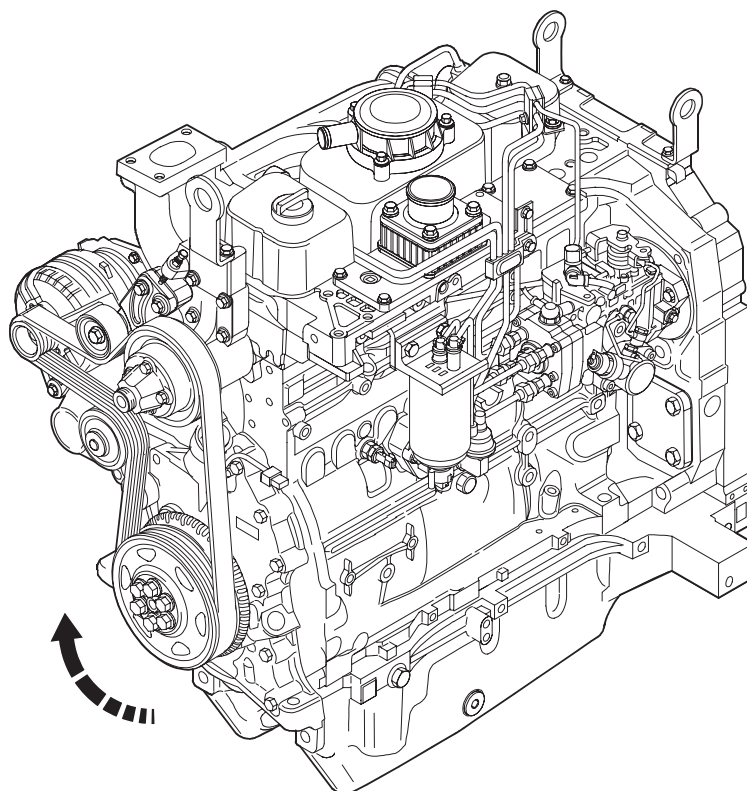


## General specification



103vfm00

Fig. 1

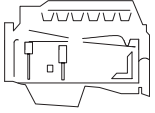
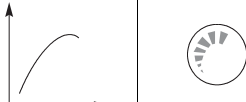
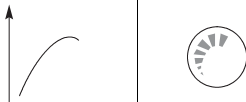
"NEF" engines are 3 or 4 cylinder diesel units with 2 valves per cylinder, and may be atmospheric or turbo-charged. They are equipped with mechanical rotary injection pumps.

***N.B.: The data, characteristics and outputs are only valid if the installer observes the relevant Iveco installation recommendations. Any equipment fitted by the installer must also always respect the torque and power outputs and rpm figures for which the engine was designed.***



## General specification

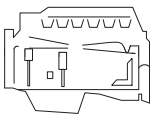
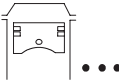
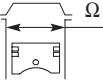
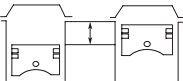
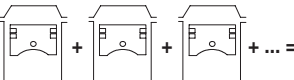
### 3 cylinder engines

|    | Type                                                                                             | CE0304 Atmospheric                                                                      | F4CE0354 Turbo-charged |        |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------|--------|
|                                                                                     |                                                                                                  | B*D6..                                                                                  | A*D6..                 | C*D6.. |
|    | Compression ratio                                                                                | 17,5: 1                                                                                 |                        |        |
|    | Maximum power                                                                                    | *                                                                                       |                        |        |
|    | Maximum torque                                                                                   | *                                                                                       |                        |        |
|    | Rated speed (rpm)                                                                                | *                                                                                       |                        |        |
|   | Tick-over speed                                                                                  | *                                                                                       |                        |        |
|  | Maximum no-load engine rpm                                                                       | *                                                                                       |                        |        |
|  | • Lubrication<br>Oil pressure, hot engine:<br>– At minimum rpm (bar).<br>– At maximum rpm (bar). | Supplied by a lobe pump, via a pressure limiting valve and oil filter<br><br>1,2<br>3,8 |                        |        |
|                                                                                     | • Cooling<br>Water pump drive:<br>Thermostat:<br>– Starts opening at (°C).                       | Liquid<br>Belt driven<br><br>81 ± 2                                                     |                        |        |
|  | Lubricant*                                                                                       | • Capacity (litres)<br>– Engine sump<br><br>*                                           |                        |        |

\* Refer to the user manual.



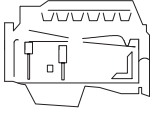
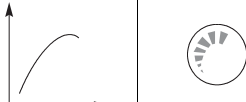
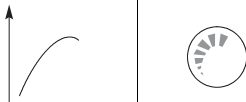
## General specification

|  | Type                   | CE0304 Atmospheric | F4CE0354 Turbo-charged |        |
|-----------------------------------------------------------------------------------|------------------------|--------------------|------------------------|--------|
|                                                                                   |                        | B*D6..             | A*D6..                 | C*D6.. |
|  | Number of cylinders    | 3                  |                        |        |
|  | Bore (mm)              | 104                |                        |        |
|  | Stroke (mm)            | 132                |                        |        |
|  | Overall capacity (cm³) | 3 364              |                        |        |

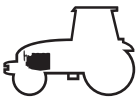


## General specification

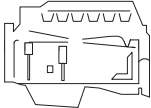
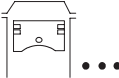
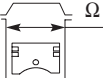
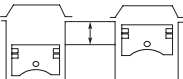
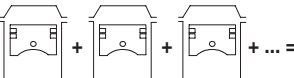
### 4 cylinder engines

|    | Type                                                                                             | F4CE0404<br>Atmospheric                                                                 | F4CE0454<br>Turbo-charged |        |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------|--------|
|                                                                                     |                                                                                                  | A*D6..                                                                                  | A*D6..                    | C*D6.. |
|    | Compression ratio                                                                                | 17,5: 1                                                                                 |                           |        |
|    | Maximum power                                                                                    | *                                                                                       |                           |        |
|    | Maximum torque                                                                                   | *                                                                                       |                           |        |
|    | Rated speed                                                                                      | *                                                                                       |                           |        |
|  | Tick-over speed                                                                                  | *                                                                                       |                           |        |
|  | Maximum no-load engine rpm                                                                       | *                                                                                       |                           |        |
|  | • Lubrication<br>Oil pressure, hot engine:<br>– At minimum rpm (bar).<br>– At maximum rpm (bar). | Supplied by a lobe pump, via a pressure limiting valve and oil filter<br><br>1,2<br>3,8 |                           |        |
|                                                                                     | • Cooling<br>Water pump drive:<br>Thermostat:<br>– Starts opening at (°C).                       | Liquid<br>Belt driven<br><br>81 ± 2                                                     |                           |        |
|  | Lubricant*                                                                                       | • Capacity (litres)<br>– Engine sump                                                    |                           |        |

\* Refer to the user manual.



**General specification**

|  | Type                   | F4CE0404 | F4CE0454 |        |
|-----------------------------------------------------------------------------------|------------------------|----------|----------|--------|
|                                                                                   |                        | A*D6..   | A*D6..   | C*D6.. |
|  | Number of cylinders    | 4        |          |        |
|  | Bore (mm)              | 104      |          |        |
|  | Stroke (mm)            | 132      |          |        |
|  | Overall capacity (cm³) | 4 485    |          |        |

*The data, characteristics and outputs are only valid if the installer observes the relevant Iveco installation recommendations.*

*Any equipment fitted by the installer must also always respect the torque and power outputs and rpm figures for which the engine was designed.*

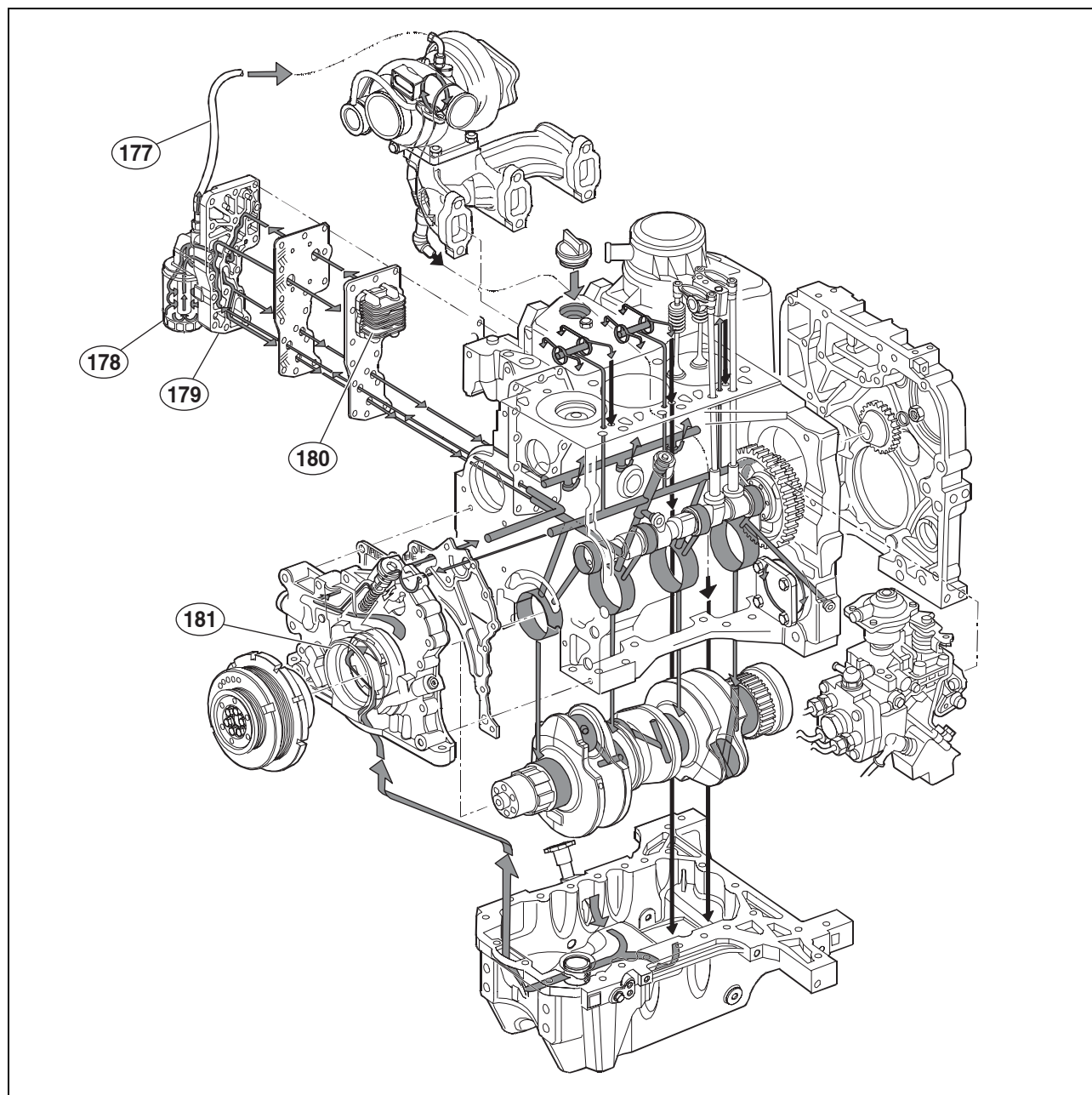
## Lubrication

### Operation

The pressurised lubrication system uses a lobe oil pump located at the front of the block, driven by the splined ring attached to the crankshaft cone. Oil is pumped from the

crankcase to the crankshaft, the camshaft and the cylinder head (oil cooler, turbocharger).

### Oil system layout (3-cylinder engine)



221vfm00

Fig. 3

### Nomenclature

**177** Turbocharger oil return line.

**178** Oil filter.

**179** Oil cooler element.

**180** Oil cooler.

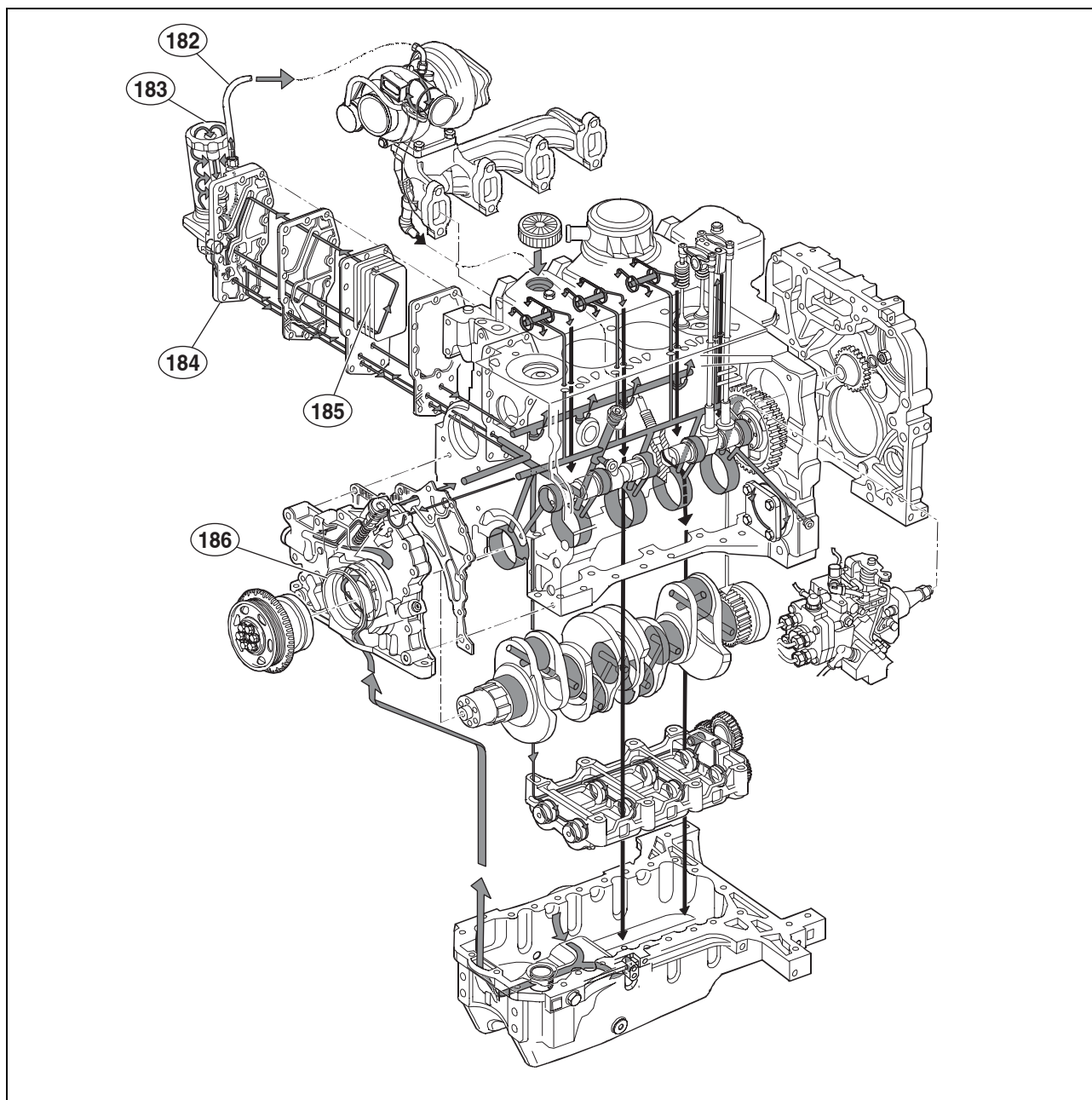
**181** Oil pump.

— Oil pressure feed.

— Oil gravity return route.

## Lubrication

### Oil system layout (4-cylinder engine)



221vfm01

Fig. 4

#### Nomenclature

**182** Turbocharger oil return line.

**183** Oil filter.

**184** Oil cooler element.

**185** Oil cooler.

**186** Oil pump.

— Oil pressure feed.

— Oil gravity return route.

## Cooling

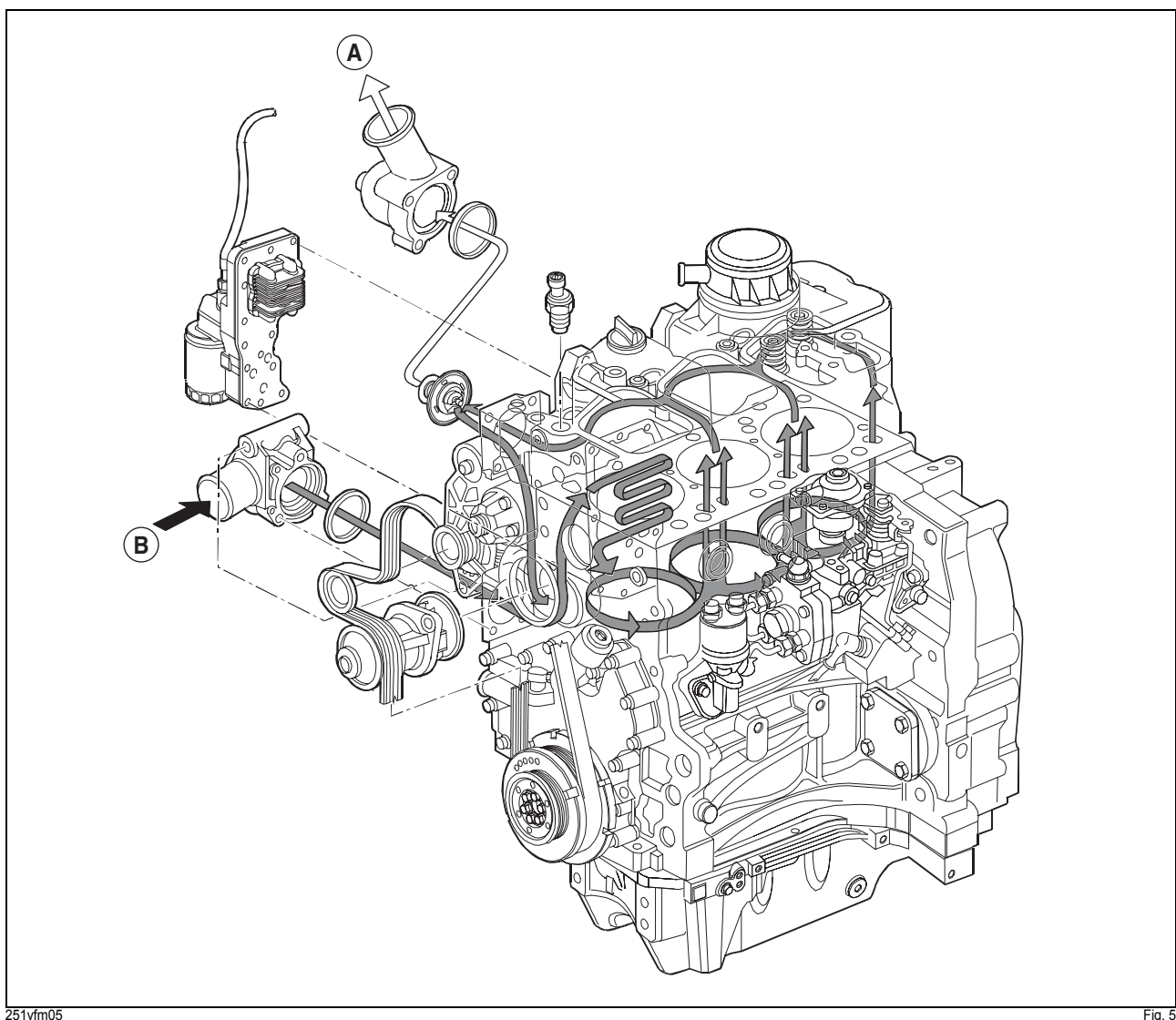
### Operation

The pressurised closed circuit engine cooling system has the following components:

- Expansion tank.
- Radiator, to dissipate the heat extracted from the engine by the coolant fluid.
- Visco-static cooling fan to increase the radiator's heat dissipation capability, that also forms part of the engine's specific build.

- An oil cooler to cool the lubricant oil
- A centrifugal-type water pump located at the front of the engine block.
- A thermostat that controls the circulation of the coolant fluid.

### Cooling (3-cylinder engine)



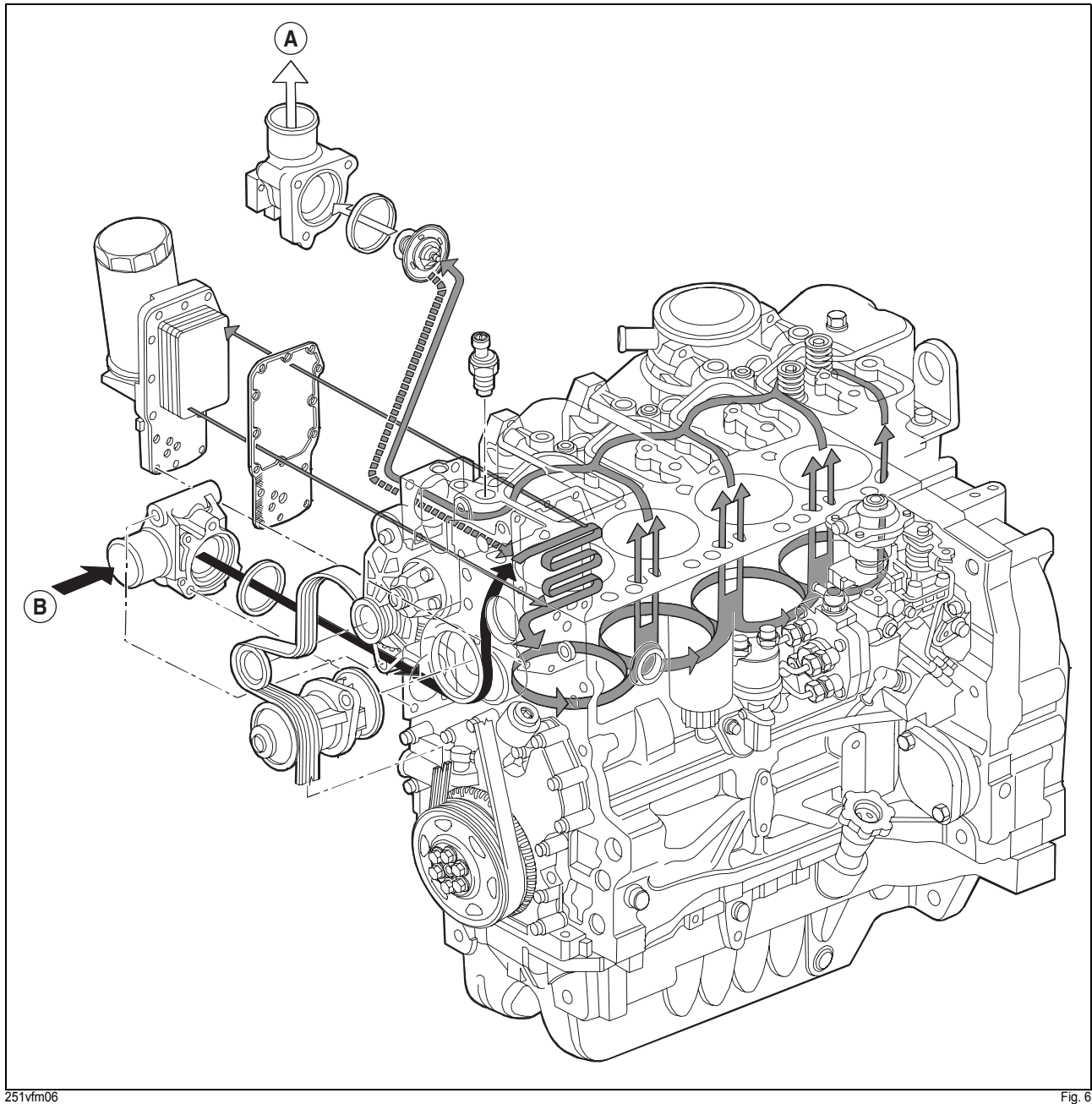
#### Nomenclature

- A** Radiator inlet.  
**B** Radiator outlet.

- Coolant leaving the thermostat.      — Coolant entering the water pump.  
 — Coolant recirculating within the engine.

## Cooling

### Cooling system (4-cylinder engine)



251vfm06

Fig. 6

#### Nomenclature

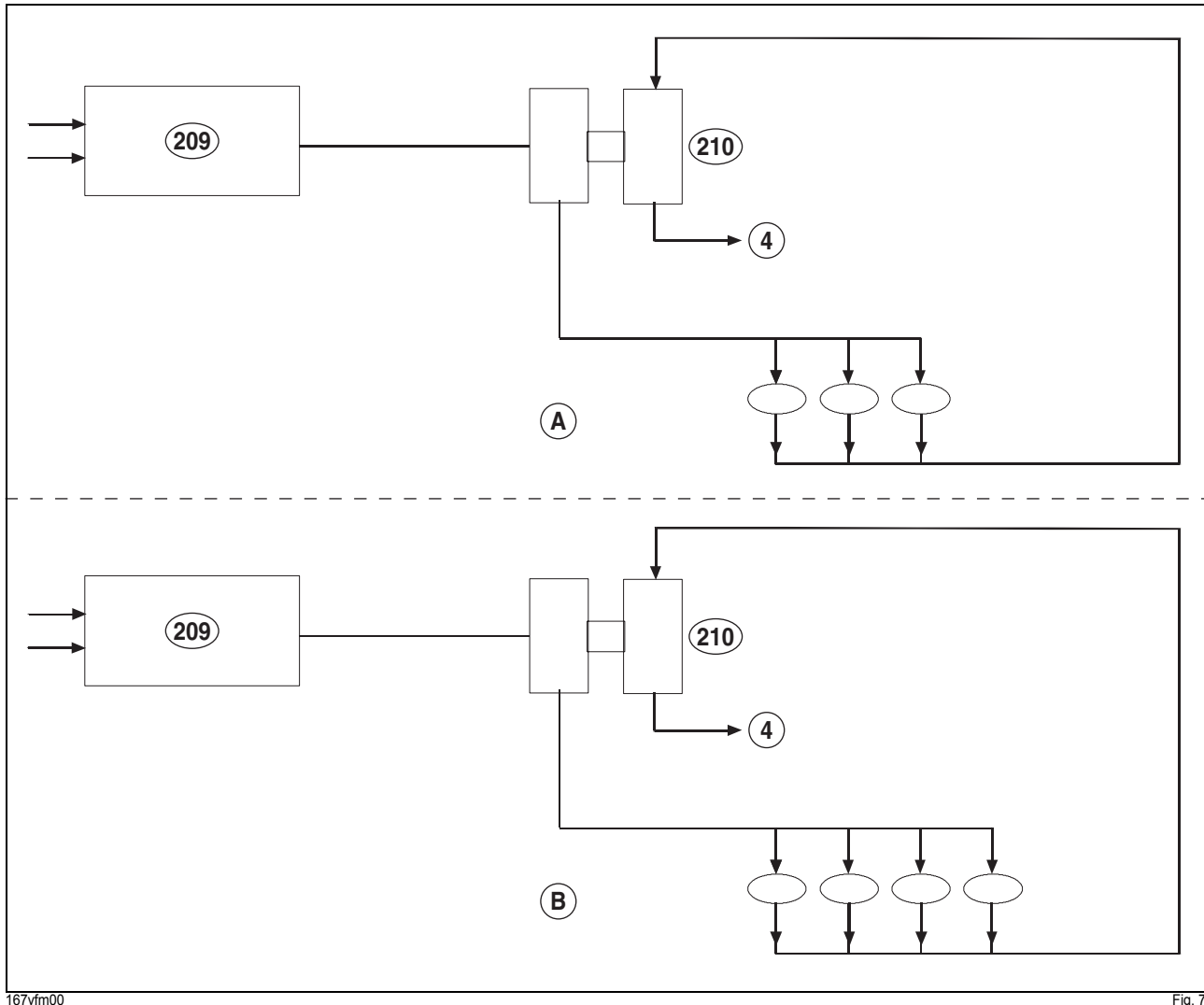
- A** Radiator inlet.
- B** Radiator outlet.

-  Coolant leaving the thermostat.
-  Coolant entering the water pump.
-  Coolant recirculating within the engine.

# Turbocharger

## Operation

### Turbo-charged version of the engine



167vfm00

Fig. 7

#### Nomenclature

**4** Exhaust.

**210** Turbocharger.

**A** 3 cylinder version.

**209** Air filter.

**B** 4 cylinder version.

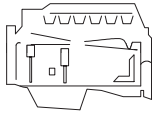
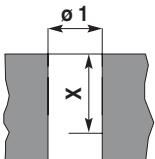
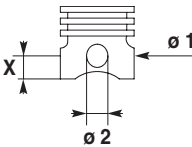
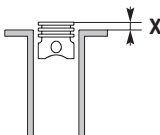
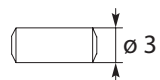
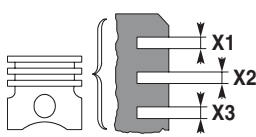
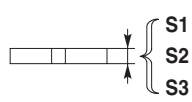
The air intake system consists of an air filter and an exhaust-driven compressor (turbocharger).

Air from the compressor outlet is fed directly to the inlet manifold.



## DIMENSIONS

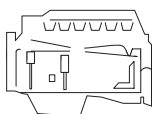
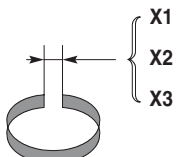
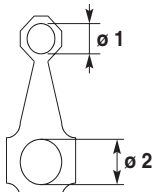
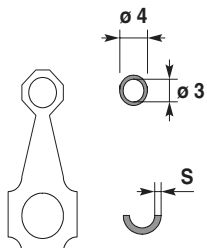
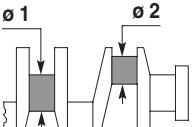
### Dimensions - build clearances

|    | Type                                                                                                         | Atmospheric                                                       | Turbo-charged                                    |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------|
| Engine block and components of the crank drive mechanism                            |                                                                                                              | (mm)                                                              |                                                  |
| Cylinder                                                                            |                                                                                                              |                                                                   |                                                  |
|    | Cylinder liner diameter 1 (machined)                                                                         | 104,000 – 104,024                                                 |                                                  |
| Piston                                                                              |                                                                                                              |                                                                   |                                                  |
|    | Supplied replacement pistons:<br>Measured dimension (X)<br>External diameter (ø 1)<br>Gudgeon pin bore (ø 2) | 52,4<br>103,755 – 103,773<br>38,010 – 38,016                      | 55,9<br>103,730 – 103,748<br>38,010 – 38,016     |
|   | Piston - Cylinder liner clearance                                                                            | 0,227 – 0,269                                                     | 0,252 – 0,294                                    |
|  | Piston diameter (ø 1) (repair size)                                                                          | Ø1 + 0,4                                                          |                                                  |
|  | Piston overtravel height (X)                                                                                 | 0,28 – 0,52                                                       |                                                  |
|  | Gudgeon pins (ø 3)                                                                                           | 37,994 – 38,000                                                   |                                                  |
|  | Gudgeon pin clearance in piston                                                                              | 0,010 – 0,022                                                     |                                                  |
|  | Piston ring grooves<br><br>X1*<br>X2<br>X3                                                                   | 2,600 – 2,620<br>2,550 – 2,570<br>4,030 – 4,050                   | 2,705 – 2,735*<br>2,440 – 2,460<br>4,030 – 4,050 |
|  | Rings<br><br>S1<br>S2<br>S3                                                                                  | S1<br>S2<br>S3<br>2,470 – 2,500<br>2,478 – 2,490<br>3,970 – 3,990 | 2,560 – 2,605<br>2,350 – 2,380<br>3,970 – 3,990  |
|  | Ring clearance - groove<br><br>1<br>2<br>3                                                                   | 0,100 – 0,150<br>0,060 – 0,092<br>0,040 – 0,080                   | 0,100 – 0,175<br>0,060 – 0,110<br>0,040 – 0,080  |
|  | Rings                                                                                                        | + 0,4                                                             |                                                  |

\* Measure across the 101 mm diameter.

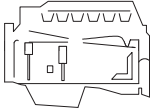
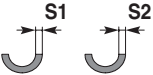
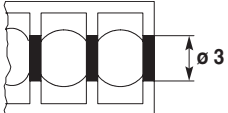
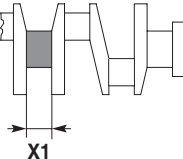
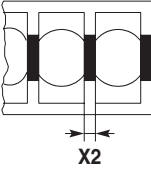


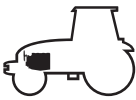
## DIMENSIONS

|    | Type                                                                                                                                | Atmospheric                                                        | Turbo-charged           |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------|
| Engine block and crank assembly                                                     |                                                                                                                                     | (mm)                                                               |                         |
|    | <p>Piston ring gap in cylinder liner:</p> <p>X1<br/>X2<br/>X3</p>                                                                   | <p>X1<br/>X2<br/>X3</p>                                            | <p>X1<br/>X2<br/>X3</p> |
| Connecting rod                                                                      |                                                                                                                                     |                                                                    |                         |
|    | <p>Bush housing in small end (ø 1)</p> <p>Big-end bearing shell housing (ø 2)</p>                                                   | <p>40,987 – 41,013</p> <p>72,987 – 73,013</p>                      |                         |
|   | <p>Small end bush dimensions</p> <p>External (ø 4)</p> <p>Internal (ø 3)</p> <p>Replacement big-end bearing shells supplied (S)</p> | <p>40,987 – 41,013</p> <p>38,019 – 38,033</p> <p>1,955 – 1,968</p> |                         |
|  | Gudgeon pin clearance - bush                                                                                                        | 0,019 – 0,039                                                      |                         |
|  | Big-end bearing shells (repair size)                                                                                                | 0,250 – 0,500                                                      |                         |
| Crankshaft                                                                          |                                                                                                                                     |                                                                    |                         |
|  | <p>Main journals (ø 1)</p> <p>Big-end journals (ø 2)</p>                                                                            | <p>82,990 – 83,010</p> <p>68,987 – 69,013</p>                      |                         |

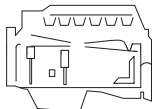
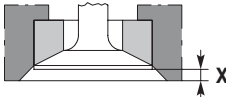


## DIMENSIONS

|    | Type                                                                                    | Atmospheric                        | Turbo-charged |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------|---------------|
| <b>Engine block and crank assembly</b>                                              |                                                                                         | (mm)                               |               |
|    | <b>Crankshaft main bearing shells (S1)</b><br><b>Big-end bearing shells (S2)</b>        | 2,456 – 2,464<br>1,955 – 1,968     |               |
|    | <b>Engine block Main bearing</b><br>N° 1 - 4 (Ø 3)<br>N° 2 - 3 (Ø 3)                    | 87,982 – 88,008<br>87,977 – 88,013 |               |
|    | <b>Set of bearing shells - main bearing</b><br>N° 1 - 4<br>N° 2 - 3                     | 0,064 – 0,095<br>0,059 – 0,100     |               |
|                                                                                     | <b>Set of big-end bearing shells</b>                                                    | 0,033 – 0,041                      |               |
|    | <b>Main bearing shells (repair size)</b><br><b>Big-end bearing shells (repair size)</b> | + 0,250 ; + 0,500                  |               |
|  | <b>Main bearing with thrust shoulder (X1)</b>                                           | 37,475 – 37,550                    |               |
|  | <b>Main bearing with thrust shoulder (X2)</b>                                           | 31,730 – 32,280                    |               |
|  | <b>Thrust bearing shells (X3)</b>                                                       | 37,28 – 37,38                      |               |
|  | <b>Crankshaft thrust bearing end float</b>                                              | 0,095 – 0,270                      |               |

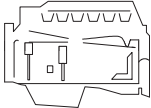
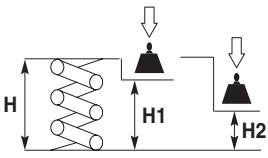
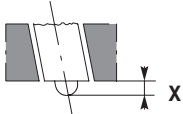
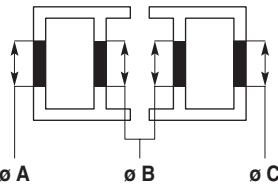
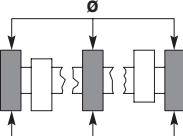


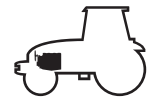
**DIMENSIONS**

|                                                                                    |                                              |                           |               |
|------------------------------------------------------------------------------------|----------------------------------------------|---------------------------|---------------|
|   | Type                                         | Atmospheric               | Turbo-charged |
| Cylinder head - valvegear                                                          |                                              | (mm)                      |               |
| Valve                                                                              |                                              |                           |               |
|   | Valve guide housings in cylinder head        | See detail under "valves" |               |
|   | Valves:                                      | See detail under "valves" |               |
|   | Clearance between valve stem and valve guide | 0,039 – 0,079             |               |
|  | Valve head recess below cylinder head face   |                           |               |
|                                                                                    | Intake (X)                                   | 0,336 – 1,072             |               |
|                                                                                    | Exhaust (X)                                  | 0,104 – 0,840             |               |

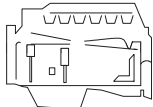
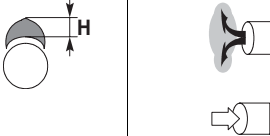
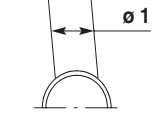
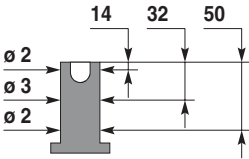
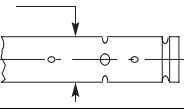
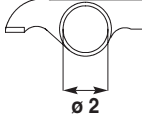
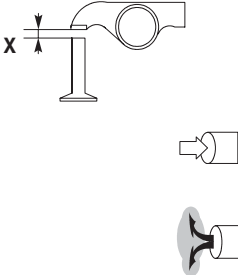


## DIMENSIONS

|    | Type                                                                                                                                                                                                                                                                                                                                                               | Atmospheric                                                            | Turbo-charged   |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------|
| <b>Cylinder head - valvegear</b>                                                    |                                                                                                                                                                                                                                                                                                                                                                    | (mm)                                                                   |                 |
|    | <b>Valve spring height</b><br><b>Spring unloaded: H</b><br><b>Spring under a load of:</b><br><b>32,9 daN (H1)</b><br><b>64,1 daN (H2)</b>                                                                                                                                                                                                                          | 63,50<br><br>49,02<br>38,20                                            |                 |
| <b>Injector</b>                                                                     |                                                                                                                                                                                                                                                                                                                                                                    |                                                                        |                 |
|    | Injector protrusion (X)                                                                                                                                                                                                                                                                                                                                            |                                                                        | Not adjustable  |
| <b>Camshaft</b>                                                                     |                                                                                                                                                                                                                                                                                                                                                                    |                                                                        |                 |
|   | <b>Camshaft bearing housings:</b><br>– Rear bearing diameter C (3-cylinder engine).<br>– Rear bearing diameter C and front bearing diameter A (4-cylinder engine).<br><br><b>Camshaft bearing housings:</b><br>– 2 intermediate bearings diameter B and front bearing diameter A (3-cylinder engine).<br>– 3 intermediate bearings diameter B (4-cylinder engine). | 59,222 – 59,248<br><br><br><br><br><br><br><br><br><br>54,089 – 54,139 |                 |
|  | Camshaft bearings:                                                                                                                                                                                                                                                                                                                                                 | <br><br><br><br><br><br><br><br><br><br>Ø                              | 53,995 – 54,045 |
|  | Bearing internal diameter (Ø)                                                                                                                                                                                                                                                                                                                                      | 54,083 – 54,147                                                        |                 |



## DIMENSIONS

|    | Type                                        | Atmospheric     | Turbo-charged |
|-------------------------------------------------------------------------------------|---------------------------------------------|-----------------|---------------|
| Cylinder head - valvegear                                                           |                                             | (mm)            |               |
|    | Clearance between bearings and camshaft     | 0,038 – 0,152   |               |
|                                                                                     | Clearance between bearings and engine block | 0,044 – 0,144   |               |
|    | Effective valve lift:                       |                 |               |
|                                                                                     | Exhaust (H)                                 | 11,02           |               |
|                                                                                     | Intake (H)                                  | 10,74           |               |
| Cam followers                                                                       |                                             |                 |               |
|    | Cam follower housing in block (ø 1)         | 16,000 – 16,030 |               |
|  | Cam follower external diameter:             |                 |               |
|                                                                                     | Ø2                                          | 15,929 – 15,959 |               |
|                                                                                     | Ø3                                          | 15,965 – 15,980 |               |
|  | Clearance between cam follower and housing  | 0,020 – 0,065   |               |
| Rockers                                                                             |                                             |                 |               |
|  | Rocker shaft (ø 1)                          | 18,963 – 18,975 |               |
|  | Rockers (ø 2)                               | 19,000 – 19,026 |               |
|  | Clearance between rockers and rocker shaft  | 0,025 – 0,063   |               |
|  | Adjusting the valve rockers                 |                 |               |
|                                                                                     | Inlet valves x (mm)                         | 0,25 ± 0,05     |               |
|                                                                                     | Exhaust valves x (mm)                       | 0,50 ± 0,05     |               |

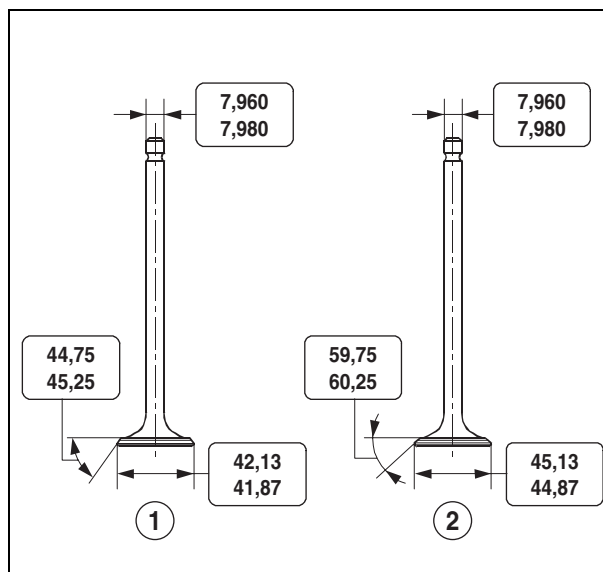
## DIMENSIONS

### Valves

Inlet and exhaust valve dimensions (in mm).

#### Nomenclature

- 1 Exhaust valve.
- 2 Intake valve.



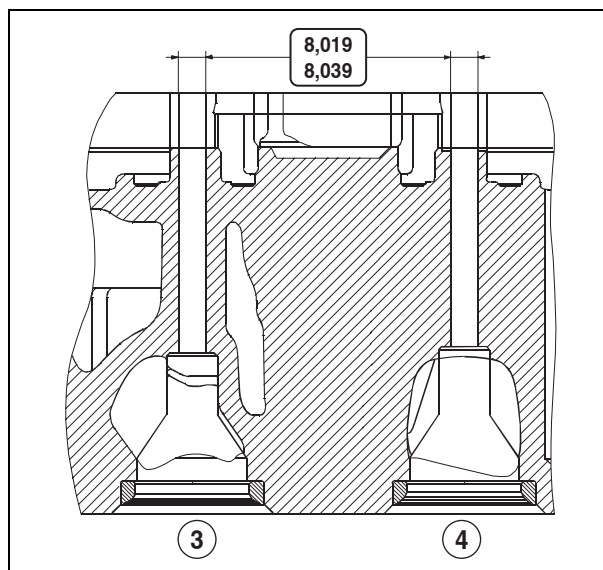
131vfm00

Fig. 8

### Valve guide/seat dimensions

#### Nomenclature

- 3 Intake.
- 4 Exhaust.



131vfm09

Fig. 9

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