Product Information. N57 Engine.

Rear-mounted chain drive system Vacuum pump in sump Complies with EURO 5 and EURO 6



Notes on this Product Information

Symbols used

The following symbols are used in this Product Information to improve understanding and to highlight important information:

△ contains important safety guidance and information that is necessary for proper system functioning and which it is imperative to follow.

◄ identifies the end of a note.

Information status and national variants

BMW vehicles satisfy the highest requirements of safety and quality. Changes in terms of environmental protection, customer benefits and design render necessary continuous development of systems and components. Consequently, there may be differences between the details provided in this Product Information and the vehicles available during the training course.

This document essentially refers to left-hand-drive vehicles. On right-hand-drive vehicles, some controls and components are arranged differently from what is shown in the illustrations in this Product Information. There may also be other differences due to variations in equipment between individual countries or markets.

Additional sources of information

Further information on the individual topics can be found in the following:

- the Owner's Handbook
- the Integrated Service Technical Application.

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Product Information and reference work for practical purposes

General information

This Product Information is intended to provide you with information on the design and function of the N57 engine.

This Product Information is designed as a working reference and complements the specified content of the technical training course. The Product Information is also suitable for private study.

As preparation for the technical training course, this Product Information provides an

Existing SIPs

• Diesel Engine Basics.

insight into the new N57 6-cylinder diesel engine. In conjunction with practical exercises carried out in the training course, the Product Information will enable course participants to carry out servicing work on the N57 engine.

Previous technical and practical knowledge of the current range of BMW diesel engines will make it easier for you to understand the systems described here and their functions.



Please remember to work through the SIP (Service Information Programme) on Diesel Engine Basics. The basic knowledge it provides will facilitate understanding of this Product Information.

Models. N57 Engine.

Engine variants

Models with N57 engine as at autumn 2008.

Model	Series	Engine	Engine capacity in cm ³	Stroke/bore in mm	Power output in kW/bhp at rpm	Torque in Nm at rpm
330d	E90	N57D30O0	2,993	90/84	180/245 4,000	520 1,750 - 3,000
330d	E91	N57D30O0	2,993	90/84	180/245 4,000	520 1,750 - 3,000
330d	E92	N57D30O0	2,993	90/84	180/245 4,000	520 1,750 - 3,000
730d	F01	N57D30O0	2,993	90/84	180/245 4,000	540 2,000 - 2,750



The list of models shows in which vehicles which engine variants are currently used and have been used in the past.

History

Figures marked *, *1, etc. relate to the similarly marked model series.

6-cylinder diesel engine

	Engine	M21D24S
	Series	E28* E30
	Models	324d 524d
	Power output in kW/ bhp at rpm	60/82 63/86* 4,600
	Torque in Nm at rpm	152 2,500
	Number of cylinders and configuration	In-line 6
	Engine capacity in cm ³	2,443
0	Stroke/bore in mm	81/80
TD8-0419	Compression ratio	22 : 0 23 : 0*
	Valves/cylinder	2
	Period used	9/85 - 12/90 09/86 - 12/87*
	Engine management	Mechanical DDE2

	Engine	M21D24T
	Series	E28 E30* E34
	Models	324td 524td
	Power output in kW/ bhp at rpm	85/115 4,800
	Torque in Nm at rpm	210 2,400 222* 1,750*
	Number of cylinders and configuration	In-line 6
	Engine capacity in cm ³	2,443
	Stroke/bore in mm	81/80
F	Compression ratio	24 : 1* 25 : 1
	Valves/cylinder	2
	Period used	9/83 - 9/91
	Engine management	Mechanical DDE1
	<u> </u>	



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Engine	M51D25UL
Series	E34 E36
Models	325td 525td
Power output in kW/ bhp at rpm	85/115 4,800
Torque in Nm at rpm	222 1,900
Number of cylinders and configuration	In-line 6
Engine capacity in cm ³	2,497
Stroke/bore in mm	82.8/80
Compression ratio	22 : 1
Valves/cylinder	2
Period used	9/91 - 12/95
Engine management	DDE2 DDE2.1

	Engine	M51D25OL
	Series	E34 E36
	Models	325tds 525tds
	Power output in kW/ bhp at rpm	105/143 4,800
	Torque in Nm at rpm	260 2,200
	Number of cylinders and configuration	In-line 6
	Engine capacity in cm ³	2,497
-0424	Stroke/bore in mm	82.8/80
TDOB	Compression ratio	22:1
	Valves/cylinder	2
	Period used	9/91 - 12/95
	Engine management	DDE2 DDE2.1



Engine	M51D25UL TU
Series	E36* E39
Models	325td 525td
Power output in kW/ bhp at rpm	85/115 4,800
Torque in Nm at rpm	222*/230 1,900
Number of cylinders and configuration	In-line 6
Engine capacity in cm ³	2,497
Stroke/bore in mm	82.8/80
Compression ratio	22:1
Valves/cylinder	2
Period used	2/96 - 9/02
Engine management	DDE2.1 DDE2.2

	Engine	M51D25OL TU
	Series	E36 E38 E39
	Models	325tds 525tds* 725tds*
	Power output in kW/ bhp at rpm	105/143 4,800/4,600*
	Torque in Nm at rpm	260/280* 2,200
	Number of cylinders and configuration	In-line 6
H428	Engine capacity in cm ³	2,497
0-800	Stroke/bore in mm	82.8/80
	Compression ratio	22:1
	Valves/cylinder	2
	Period used	2/96 - 9/02
	Engino monogomont	
	Engine management	DDE2.1 DDE2.2
		DDE2.1 DDE2.2
	Engine	M57D2500
	Engine Engine Series Modele	DDE2.1 DDE2.2 M57D2500 E39
	Engine Engine Series Models	DDE2.1 DDE2.2 M57D25O0 E39 525d
	Engine Series Models Power output in kW/ bhp at rpm	DDE2.1 DDE2.2 M57D2500 E39 525d 120/163 4,000
	Engine Series Models Power output in kW/ bhp at rpm Torque in Nm at rpm	DDE2.1 DDE2.2 M57D25O0 E39 525d 120/163 4,000 350 2,000-3,000
	Engine Series Models Power output in kW/ bhp at rpm Torque in Nm at rpm Number of cylinders and configuration	DDE2.1 DDE2.2 M57D2500 E39 525d 120/163 4,000 350 2,000-3,000 In-line 6
	Engine Series Models Power output in kW/ bhp at rpm Torque in Nm at rpm Number of cylinders and configuration Engine capacity in cm ³	DDE2.1 DDE2.2 M57D2500 E39 525d 120/163 4,000 350 2,000-3,000 In-line 6 2,497
	Engine management Engine Series Models Power output in kW/ bhp at rpm Torque in Nm at rpm Number of cylinders and configuration Engine capacity in cm ³ Stroke/bore in mm	DDE2.1 DDE2.2 M57D2500 E39 525d 120/163 4,000 350 2,000-3,000 In-line 6 2,497 82.8/80
	Engine management Engine Series Models Power output in kW/ bhp at rpm Torque in Nm at rpm Number of cylinders and configuration Engine capacity in cm ³ Stroke/bore in mm Compression ratio	DDE2.1 DDE2.2 M57D2500 E39 525d 120/163 4,000 350 2,000-3,000 In-line 6 2,497 82.8/80 17.5 : 1
	Engine management Engine Series Models Power output in kW/ bhp at rpm Torque in Nm at rpm Number of cylinders and configuration Engine capacity in cm ³ Stroke/bore in mm Compression ratio Valves/cylinder	DDE2.1 DDE2.2 M57D2500 E39 525d 120/163 4,000 350 2,000-3,000 In-line 6 2,497 82.8/80 17.5 : 1 4

Engine management

DDE4.0

	Engine	M57D30O0
	Series	E38 E39 E46/3 E46/4 E53
	Models	330d 530d 730d* ¹ * ² X5 3.0d* ¹
	Power output in kW/ bhp at rpm	135/184 4,000
8-0429	Torque in Nm at rpm	390/1,750-3,200 410/2,000-3,000* ¹ 430/2,000-2,500* ²
P	Number of cylinders and configuration	In-line 6
	Engine capacity in cm ³	2,926
	Stroke/bore in mm	88/84
	Compression ratio	18:1
	Valves/cylinder	4
	Period used	10/98 - 4/04
	Engine management	DDE4.0 DDE4.1* ^{1*2}
	F uelles	M67D2601
	Engine	
	Series	EOU EO I
	Niodels	525U
	bhp at rpm	4,000
	Torque in Nm at rpm	400 2,000-2,750
	Number of cylinders	In-line

Engine capacity in cm³

Stroke/bore in mm

Compression ratio

Engine management

Valves/cylinder

Period used

TD08-0430

2,497

75.1/84

17:1

4

4/04-3/07

DDE5.0

	Engine	M57D30O1
	Series	E46/2 E46/3 E46/4 E53 E60 E61 E65 E83
	Models	330d 530d* ¹ 730d X3 3.0d* X5 3.0d*
Contraction of the second s	Power output in kW/ bhp at rpm	150/204 160/218* * ¹ 4,000
2000	Torque in Nm at rpm	410/1,500-3,250 500/2,000-2,750* * ¹
8-0430	Number of cylinders and configuration	In-line 6
DOT	Engine capacity in cm ³	2,993
	Stroke/bore in mm	90/84
	Compression ratio	17:1
	Valves/cylinder	4
	Period used	9/02-9/06
	Engine management	DDE506 DDE508* ¹ DDE509* * ¹
		M67D20U2
	⊏ngine	ND7D3002

	Linginic	NIG/ DOUGL
	Series	E60 E61 E90 E91 E92 E93
	Models	325d 525d
	Power output in kW/ bhp at rpm	145/197 4,000
	Torque in Nm at rpm	400 1,300-3,250
	Number of cylinders and configuration	In-line 6
	Engine capacity in cm ³	2,993
	Stroke/bore in mm	90/84
	Compression ratio	17:1
	Valves/cylinder	4
	Period used	9/06 to date
	Engine management	DDE606

	Engine	M57D30O2
	Series	E60 E61 E65 E66 E70 E83 E90 E91 E92 E93
	Models	330d 530d 630d 730d* ² 730Ld* ² X3 3.0d* X3 xDrive30d* X5 3.0d* ¹ X5 xDrive30d* ¹
T008-043	Power output in kW/ bhp at rpm	160/218* 170/231* ² 173/235* ¹ 4,000
	Torque in Nm at rpm	500/1,750-3,000* 520/2,000- 2,750* ^{1.2}
	Number of cylinders and configuration	In-line 6
	Engine capacity in cm ³	2,993
	Stroke/bore in mm	90/84
	Compression ratio	17:1
	Valves/cylinder	4
	Period used	3/05 to date
	Engine management	DDE626
	Engine	M57D30T1
	Series	F60 F61
2 - and a second	Models	535d
DB0-043C	Power output in kW/ bhp at rpm	200/272 4,400
	Torque in Nm at rpm	560 2,000-2,250
	Number of cylinders and configuration	In-line 6
	Engine capacity in cm ³	2993
	Stroke/bore in mm	90/84
	Compression ratio	16.5 : 1
	Valves/cylinder	4
	Period used	9/04-3/07
	Engine management	DDE606

	Engine	M57D30T2
	Series	E60 E61 E63 E64 E83 E70 E90 E91 E92
	Models	335d 535d 635d X3 3.0sd X3 xDrive35d X5 3.0sd X5 xDrive35d
	Power output in kW/ bhp at rpm	210/286 4,400
	Torque in Nm at rpm	580 1,750-2,250
	Number of cylinders and configuration	In-line 6
	Engine capacity in cm ³	2,993
	Stroke/bore in mm	90/84
	Compression ratio	17:1
	Valves/cylinder	4
	Period used	9/06 to date
	Engine management	DDE626

Highlights

The N57 is a logical development from the N47 engine. For instance, the N47 already featured rear-mounted chain drive system designed to satisfy future pedestrian impact severity reduction requirements and a vacuum pump relocated inside the sump.

Another modification was the repositioning of the auxiliary units on the left-hand side of the engine. By having the auxiliary units all on one side, space is created on the right-hand side of the engine for locating exhaust treatment components close to the engine. There is also sufficient space for the Top model turbocharger assembly (N47 Top engine).

It has also been possible to reduce the height of the cylinder head by 29 mm compared with the predecessor model. The inlet ports now run parallel and the intake system with integral swirl flaps is an ultra-compact design.

Below the sound insulation cover on the F01, sufficient space is allowed at the rear for an air intake muffler and the engine-mounted unfiltered and filtered air ducting. The individual power options vary in this regard only in terms of the size of the filter element.

In order to minimize the complexity of application adaptations, instead of the enginemounted air intake muffler, the E9x models use the unfiltered air ducting and the vehiclemounted air intake muffler from the M57D30T2 engine.

The 3rd-generation common-rail system with an injection pressure of up to 1,800 bar, a new CP4.2 high-pressure pump and piezo-electric fuel injectors complete the fuel-system modifications.

As on the N47 engine, the exhaust system has an electric EGR valve flange-mounted on the "hot" side and a bypass in the EGR cooler so that the EURO 5 emission limits can be reliably complied with. Thus on volume production launch, the N57 engine will already meet the EURO 5 emission requirements not due to come into force until 01/01/2011.

For compliance with the EURO 6 emission limits, additional use of an active exhaust treatment system will be necessary. Depending on flywheel weight class (vehicle weight) and resistance to motion, either an NOx-accumulator catalytic converter or an SCR (selective catalytic reduction) system supplemented by low-pressure exhaust recirculation will be used. Those two systems are explained in the "M57D30T2 US Engine" documentation and, therefore, are not described in further detail at this point.



Following on from the 4-cylinder diesel engine, a new 6-cylinder diesel engine has now also been introduced. After 10 years and two major upgrades, the 6-cylinder diesel engine is now being replaced by an entirely new design, the N57. The N57 engine has many components that have already been used in volume production on the N47 engine. With even more power and torque combined with lower fuel consumption and lighter weight, it is ideally equipped to continue the success story.

Objectives

- Increased power and torque
- Ability to derive performance versions
- Reduction of CO₂ emissions
- Compliance with EURO 5 and upgradability to EURO 6 and LEVII/Bin5 (USA)
- Reduction of weight and dimensions with a view to compliance with future requirements regarding exhaust treatment and pedestrian impact severity reduction
- Modular design and use of identical components from the N47 models.

i cennical data			
Designation	M57D30O2	M57D30O2	M57D30O2
Model	330d	730d 730Ld	X5 xDrive30d
Configuration	6 inline	6 inline	6 inline
Displacement [cm ³]	2,993	2,993	2,993
Stroke/bore [mm]	90/84	90/84	90/84
Power output [kW/bhp] at [rpm]	170/231 4,000	170/231 4,000	173/235 4,000
Torque [Nm] at [rpm]	500 1,750-3,000	520 2,000-2,750	520 2,000-2,750
Engine speed limit [rpm]	4,600	4,600	4,600
Power output per litre [kW/I]	56.8	56.8	57.8
Compression ratio ϵ	17.0 : 1	17.0:1	17.0 : 1
Cylinder spacing [mm]	91	91	91
Valves/cylinder	4	4	4
Inlet-valve dia. [mm]	25.9	25.9	25.9
Exhaust-valve dia. [mm]	25.9	25.9	25.9
Crankshaft main bearing journal dia. [mm]	60	60	60
Crankshaft big-end bearing dia. [mm]	45	45	45
Engine management	DDE626	DDE626	DDE626
Emissions standard	EURO 4	EURO 4	EURO 4

Technical data

Designation	N57D30O0	N57D30O0	N57D30O0
Model	330d	730d	330d
Configuration	6 inline	6 inline	6 inline
Displacement [cm ³]	2,993	2,993	2,993
Stroke/bore [mm]	90/84	90/84	90/84
Power output [kW/bhp] at [rpm]	180/245 4,000	180/245 4,000	180/245 4,000
Torque [Nm] at [rpm]	520 1,750 - 3,000	540 1,750 - 3,000	520 1,750 - 3,000
Engine speed limit [rpm]	5,000	5,000	5,000
Power output per litre [kW/I]	60.1	60.1	60.1
Compression ratio ϵ	16.5 : 1	16.5 : 1	16.5 : 1
Cylinder spacing [mm]	91	91	91
Valves/cylinder	4	4	4
Inlet-valve dia. [mm]	27.2	27.2	27.2
Exhaust-valve dia. [mm]	24.6	24.6	24.6
Crankshaft main bearing journal dia. [mm]	55	55	55
Crankshaft big-end bearing dia. [mm]	50	50	50
Engine management	DDE7.3	DDE7.3	DDE7.3
Emissions standard	EURO 5	EURO 5	EURO 6

Performance graph

Compared with its predecessor, the N57 engine is distinguished by an increase in

overall performance and a more muscular torque curve.









730d



Summary of design features

Variant structure

The basic concept means that the engine casing components can be developed and produced according to the same standards both for the 4-cylinder and the 6-cylinder diesel engines.

Differentiation is achieved by way of turbocharging, fuel injection and exhaust treatment systems.

Thus the N47 engines and the N57 engine share the following features:

- Standardized combustion chamber
- Same cylinder spacing
- Same engine height
- Same attachment arrangements (e.g. gearbox)
- Standardized auxiliary units.

The table below summarizes the changes implemented on the N57 engine. Distinctions are made in various categories.

- "New development" denotes a technology that was not used on the predecessor engine.
- "Identical component" denotes a component that was designed for the N47 engine and is also used on the N57 engine.
- "Identical concept" denotes a component that is based on the same design concept on the N47 and the N57 engines but which has been adapted for the N57 engine.

Component	New development	Identical component on N47 engine and N57 engine	Identical concept on N47 engine and N57 engine	Remarks
Pistons and connecting rods	•	•		Optimized for new generation of diesel engines
Main and big-end bearings	•	•		Dimensioned for the various performance ratings (e.g. N47TOP)
Valvegear components	•	•		Use of reduced-friction and weight- optimized components
Fuel pump	•	•		The fuel pump is a regulated-pressure design
Fuel filter heater	•	•		The fuel filter heater is controlled by the digital diesel engine management
Fuel injectors and high- pressure fuel lines	•	•		New generation of fuel injectors adapted for the high injection pressures. The higher- performance and the "Top" line models have piezo-electric injectors.

	velopment	al component on N47 engine 7 engine	al concept on gine and N57 engine	
Component	New de	Identic and N5	ldentic N47 en	Remarks
Glow plugs	•	•		Use of ceramic glowplugs with temperatures up to 1,300 °C.
Chain sprockets and guides	•	•		The crankshaft has integral sprockets for driving the timing chain and the oil pump. The guides are identical on the N47 and N57 engines.
Auxiliary unit mounting bracket	•	•		All auxiliary units are positioned on the intake side of the engine. The auxiliary unit mounting bracket is identical on all E9x models. On the F01 a new mounting bracket with sliding bushes is used.
Auxiliary units	•	•		The auxiliary units are adapted to the vehicle concerned.
Drive belts, belt tensioner and guide pulleys	•	•		Different belt tensioners are used according to vehicle model. A two-sided belt is used.
Throttle body and exhaust recirculation valve (EGR valve)	•	•		New-design components are used for both engine casing assemblies (N47 and N57 engines). On the N47 engine, a bypass valve is fitted in some cases dependent on gearbox version and performance rating. The N57 engine always has a bypass valve.
Sensor system	•	•		The same, new-design sensor system is used both on the N47 engine and the N57 engine.
Crankcase	•			The crankcase is an entirely new design and employs an identical concept for both engines. Rigidity has been increased so as to be able to meet future requirements as well. A reinforcing plate further increases strength. The aluminium crankcase has thermally joined cast iron cylinder liners. The crankshaft main bearing caps are provided with a raised profile on the joint face.
Crankshaft drive system	•		•	The crankshaft drive system has been adapted to the higher engine power output. At the same time, however, great emphasis was placed on lightweight design.

Component	New development	Identical component on N47 engine and N57 engine	Identical concept on N47 engine and N57 engine	Remarks
Cylinder head	•		•	For the first time, the cylinder head is a two- piece design.
Valvegear	•		•	For the first time, the valves are parallel with the cylinder axes.
Chain drive system	•		•	The chain drive system on the N47 engine has been moved to the flywheel-end to make space for pedestrian impact severity reduction.
Combined oil and vacuum pump	•		•	By combining the oil and vacuum pumps, it has been possible to reduce the component height in the pedestrian impact severity reduction zone.
Camshafts	•		•	The composite camshafts run on bearings mounted in a separate carrier plate and are manufactured using the Presta process.
Rotational vibration damper	•		•	The rotational vibration damper is adapted to the particular requirements of the engine.
Cylinder head cover	•		•	The cylinder head cover incorporates the pressure-controlled crankcase venting system and spring-plate separator.
Intake manifold	•		•	The intake system is an ultra-compact design and incorporates the electrically operated and monitored swirl flaps.
Oil module	•		•	The oil module is made of plastic and incorporates the oil/coolant heat exchanger. The number of plates in the oil/coolant heat exchanger is dependent on the required cooling capacity.
High-pressure pump	•		•	The model used is the CP4.1 or 4.2. The CP4.1 is a single-piston HP pump, the CP4.2 a twin-piston HP pump. The high-pressure pumps can generate injection pressures up to 2,000 bar.
High-pressure accumulator	•		•	The high-pressure accumulator is designed for the high fuel pressures.
Control unit	•		•	The latest-generation engine management is used.

Component	New development	Identical component on N47 engine and N57 engine	Identical concept on N47 engine and N57 engine	Remarks
Wiring loom	•		•	The wiring loom is optimized and identical for the different transmission variants. Thus a supplementary wiring loom is used according to transmission variant.
Exhaust manifold	•		•	The exhaust manifold has been given an extra connection for a temperature sensor and is an air-gap insulated pressed-steel design.
Turbocharger	•		•	The VNT turbocharger is operated by an electrically actuated charge-pressure adjuster. A Step3 turbocharger is used.
Oxidation catalytic converter and diesel particle filter	•		•	The oxidation catalytic converter and the diesel particulate filter are located in a shared housing close to the engine. These components vary according to engine model but are identical across vehicle models.
Oil level indication		•		The oil level is measured by an oil condition sensor.

System overview.

N57 Engine.

Engine identification

Engine designation

In the technical documentation, the engine designation is used for unique identification of the engine.

The following version of the N57 engine is described:

• N57D30O0.

In the technical documentation you will also find the abbreviated engine designation, i.e. N57, that only indicates the engine type.

This means:

Engine identification code and serial number

The engines are marked on the crankcase with an engine identification code for unique identification. This engine identifier is also required for approval by the authorities. The definitive part of the code is the first seven characters.

With the N47 engine, the engine identifier has, for diesel engines too, been changed so as to comply with the new standard whereby the first six positions are the same as the engine

Index	Explanation
Ν	BMW Group "New Generation"
5	6-cylinder engine
7	Direct diesel injection
D	Diesel engine
30	3.0-litre capacity
0	Upper power output stage
0	New development



For the purposes of unique identification there is an engine identification code marked on the crankcase. In the documentation and descriptions of the engine, the engine designation is used, which differs from the identification code by its last 2 characters.

designation. That new standard also applies to the N57 engine.

The engine serial number is a consecutive number that permits unique identification of every single engine.

The engine identification code and serial number are marked on the crankcase on the bracket for the high-pressure fuel pump.



1 - Engine identification code and serial number on the N57 engine

System components.

N57 Engine.

Engine mechanical system

Overview

The engine mechanicals can be subdivided into three major systems:

Engine casing components

Functions of the engine casing components:

- Containing the forces generated by operation of the engine
- Sealing functions for the combustion chamber, engine oil and coolant
- Holding the crankshaft drive system, valvegear and other components.

By reducing the height and length, space has been created under the bonnet for the purposes of pedestrian impact severity reduction.

Crankshaft drive system

The crankshaft drive system, also known as the power unit, is a function group that converts the combustion chamber pressure into kinetic energy. In the process, the crankshaft converts the linear motion of the pistons into a rotary motion. The crankshaft drive system represents the optimum in terms of work utilization, efficiency and technical practicability for the task in question.

Nevertheless, the following technical limitations and design challenges have to be dealt with:

- Engine speed limitation due to inertial forces
- Uneven power delivery over the course of an operating cycle
- Generation of torsional vibrations that place stresses on the crankshaft and drive train
- Interaction of the various frictional surfaces.

• Valvegear

The valvegear is made up of the following components:

- Camshafts
- Transmitting elements (roller cam followers)
- Valves (complete valve assemblies)
- Hydraulic valve clearance adjustment (HVA).

Like all current BMW diesel engines, the N57 engine has a **DOHC** valvegear layout.

This stands for "double overhead camshaft" and means that the engine has overhead valves with two camshafts located above the cylinders. One camshaft is used for the intake valves, the other for the exhaust valves.

On the N57 engine, as on all current BMW diesel engines, the action of the cams is transferred from the camshaft to the valves by roller lever tappets.

In order that the correct amount of play is maintained between camshaft cam and the cam follower (roller lever tappet), the N57 is equipped with hydraulic valve clearance adjusters (HVA).

Those three systems are in a state of constant interaction with one another. That interaction has a very significant effect on engine characteristics.

Firing order: 1-5-3-6-2-4



The engine mechanical systems can essentially be divided into the three subassemblies, engine casing components, crankshaft drive system and valvegear. Those three subassemblies are closely interlinked and have to be matched to one another.

Engine casing components



Index	Explanation	Index	Explanation
1	Cylinder head cover	6	Sprocket cover gasket
2	Camshaft carrier plate	7	Sprocket cover
3	Cylinder head	8	Sump gasket
4	Cylinder head gasket	9	Sump
5	Crankcase		

Crankshaft drive system



Index	Explanation	Index	Explanation
1	Connecting rod	3	Crankshaft
2	Piston		