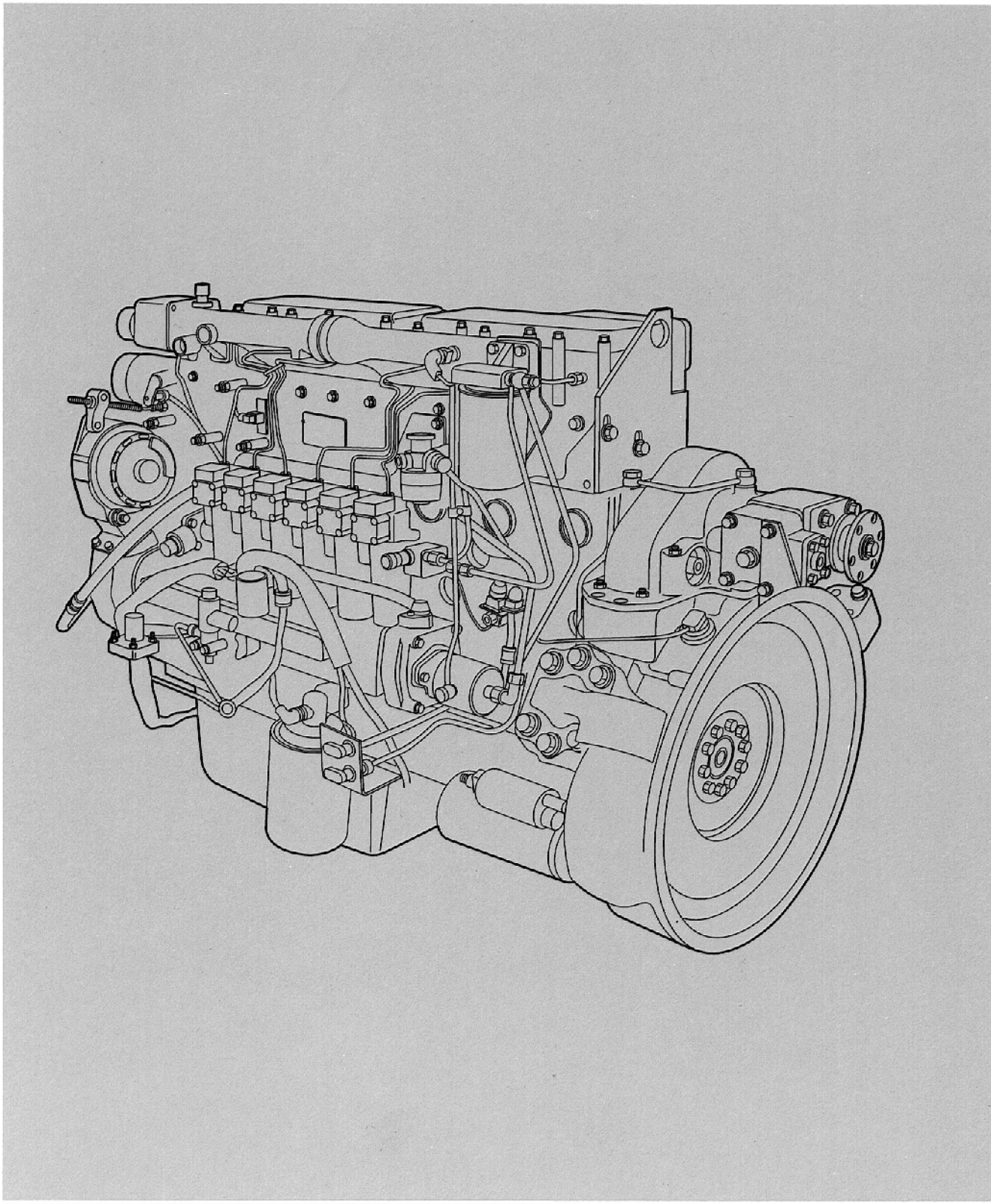
Component Manual
PE engine



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SAFETY PRECAUTIONS

Warning symbol
When text is accompanied by the warning symbol shown here, this indicates that the information provided is essential for the health and personal safety of the mechanic.
In addition, this warning symbol is also shown if there are conditions in which damage can be caused to the component or parts thereof.

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Safety precautions
To ensure that the mechanic's health is not endangered, the following safety precautions must be strictly observed.

- Comply with all the warnings and safety precautions given in this workshop manual. First read the instructions and warnings on the labels and stickers which are affixed to the various components and comply with them. They have been put there for your health and safety, so do not ignore them!
- Wear clean, fitted clothes and apply protective cream to unprotected parts of your body, if necessary.
- Ensure proper extraction of hazardous substances from the work area.
- Maintain a safe distance from rotating and/or moving parts.
- Avoid unnecessary contact with drained oil. Frequent contact damages the skin.
- Various sorts of oil and lubricants used on the vehicle may constitute a health hazard. So avoid both inhaling and direct contact with these.
- Exercise caution when working with springs under pressure. Inadvertently released springs may cause serious injuries. Small springs and small circlips may also cause injuries when inadvertently released (wear goggles).

- If necessary, support the component in a suitable manner.
- Always use the appropriate lifting gear (gearbox jack) or approved lifting gear or hoists when removing and installing heavy components. Attach the component securely to the lifting or hoisting gear.
- After a fire it is possible that hazardous residues may remain from the plastics used in some oil seals and sealing rings. Wear protective, acid-resistant clothing and PVC gloves when removing such fire residues. Immerse such fire residues in, or sprinkle them amply with, a calcium hydroxide solution (slaked lime and water). Thoroughly clean protective clothing after use. Treat the gloves as chemical waste.

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CONTENTS

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1. GENERAL

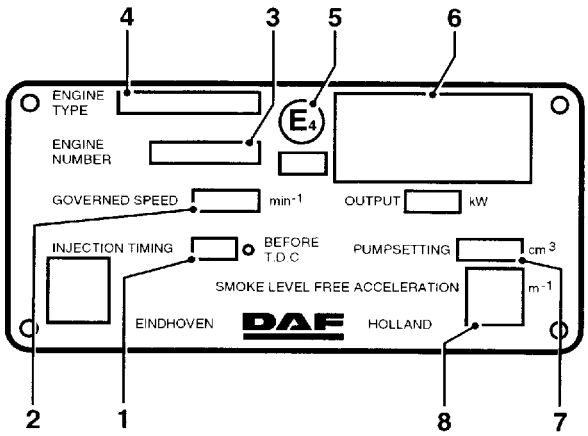
1.1 ENGINE TYPE DESIGNATION

New engine version with changed type designation
Three new engine types were introduced in week 13 2001. These engines have the designation **PE 183 C1**
PE 228 C
PE 265 C

Type plates

Types **PE 183 C**
PE 212 C
PE 235 C

1. (Injection timing)
2. Max. governed engine speed
3. Engine number
4. Engine type
5. Country number
6. Emission certificate number
7. (max. pump output)
8. Smoke level free acceleration



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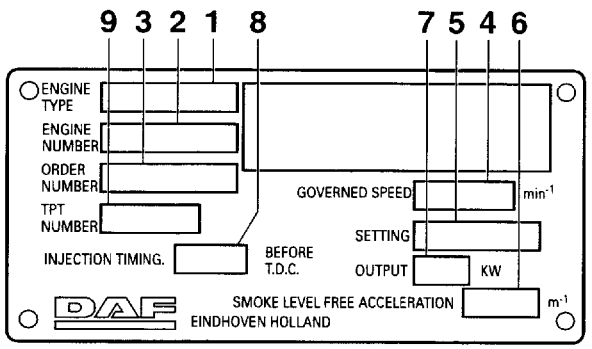
Types **PE 183 C1**
PE 228 C
PE 265 C

1. Engine type
2. Engine number
3. Order number
4. Max. governed engine speed
5. Homologation number
6. Smoke level free acceleration
7. Engine output
8. (Injection timing)
9. Transport number for production



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1.2 ENGINE DATA

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Types	PE 183 C PE 212 C PE 235 C
Design	Euro 3 (C), water-cooled, four-stroke diesel engine with direct fuel injection, 4 valves per cylinder, turbocharger intercooling.
Number of cylinders	6
Bore x stroke	118 x 140 mm
Swept volume	9.2 litres
Compression ratio	16.3 : 1
Firing order	1-5-3-6-2-4
Emission level	Euro 3
Weight	approx. 860 kg

Types	PE 183 C1 PE 228 C PE 265 C
Design	Euro 3 (C), water-cooled, four-stroke diesel engine with direct fuel injection, 4 valves per cylinder, turbocharger intercooling.
Number of cylinders	6
Bore x stroke	118 x 140 mm
Swept volume	9.2 litres
Compression ratio	17.4 : 1
Firing order	1-5-3-6-2-4
Emission level	Euro 3
Weight	approx. 860 kg

ENGINE TYPE	P (kW) at rpm	M (Nm) at rpm
PE 183 C	183 at 2300	1050 at 1150 -1600
PE 212 C	212 at 2300	1130 at 1150 -1700
PE 235 C	235 at 2300	1275 at 1200 -1700

ENGINE TYPE	P (kW) at rpm	M (Nm) at rpm
PE 183 C1	183 at 2200	1050 at 1100 -1700
PE 228 C	228 at 2200	1275 at 1100 -1700
PE 265 C	265 at 2200	1450 at 1100 -1700

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2. THREADED CONNECTIONS

2.1 DIPPED BOLTS

The components can be provided with threaded connections, which have been treated with lubricant (dipped threaded connection). Factory-galvanised bolts and nuts are wax-dipped. Black annealed and phosphates bolts and nuts are oil-dipped. The advantage of using dipped nuts and bolts is that friction during tightening is reduced, so that the specified pre-tension force can be accurately obtained. The result of this is that the tightening torque can be reduced with the same pre-tensioning force.

As this results in a smaller tolerance range of the tightening torques, the specified tightening torques must be adhered to more strictly. So always use a reliable and accurate torque wrench.

Note:
Have torque wrenches regularly inspected and calibrated.

To achieve the correct pre-tension when re-using nuts and bolts, it is important to clean the thread thoroughly. After cleaning, apply one drop of lubricant to the first turn of the screw thread and one drop to the abutting surface of the nut or bolt. If bolts and nuts to be re-used, do not lubricate them with anything other than engine oil. Lubricants other than engine oil and factory-applied grease must not be used under any circumstances.

The reason for this is that the friction coefficients of other lubricants vary too much and are not the same as those of the above-mentioned lubricants.
The use of locking compounds in combination with dipped bolts and nuts creates no problems.

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The following applies to all threaded connections (for both new and used vehicles):

- in the case of standard connections, apply the lubricant before fitting, and tighten/retorque in accordance with the standard for dipped bolts;
- in the case of special connections, apply the lubricant before fitting, and tighten/retorque in accordance with the values specified in the instructions.

The instructions for using a lubricant also apply to new bolts supplied from the warehouse. Dry threaded connections are no longer permitted because of their highly variable friction coefficients.

2.2 LOCKING COMPOUNDS AND SEALANTS

Certain cleaning agents have a negative effect on the functioning of locking compounds. The general rule is therefore that fasteners and components which have been cleaned with a cleaning agent must be treated with a cleaning liquid to ensure that the locking compound functions properly.

OVERVIEW OF LOCKING COMPOUNDS			
Product name	**Properties**	**Applications**	**DAF number**
Loctite 243	- Locking with an average detaching strength - Detachable with normal tools	For locking threaded connections	0068197
Loctite 2701	- Locking with a high detaching strength - Repairs the fit in bearing housings - Seals against leaks - Difficult to detach	Locking of threaded connections, gear lever ball, freeze plugs	1340646
Loctite 638	- Locking with a high detaching strength under dynamic load - Difficult to detach	Locking of cylindrical connections	0645557
Loctite 648	- Locking with an average detaching strength - Resistant to high temperatures	Locking of threaded connections in warm places	1357032
Loctite 262	- Locking with a high detaching strength - Difficult to detach	Locking of threaded connections, such as the pinion nut	1279841

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Application, locking compound

1. Clean both the internal and external thread. De-grease the thread with a suitable de-greasing agent which leaves no residue that could affect proper functioning.
2. Apply one or more drops of locking compound to the thread, depending on the diameter. Never dip the bolt or stud into the locking compound.
3. Apply a drop of oil under the bolt head. Locking compounds also reduce the frictional resistance, which means that applying a drop of oil to the thread is **not** required.
4. Tighten the connection to the specified torque.

OVERVIEW OF SEALING COMPOUNDS			
Product name	**Properties**	**Applications**	**DAF number**
Dirko D	- Temperature-resistant to 180°C - Resistant to oil, coolant	- For sealing surface connections	1345014
Loctite 510	- Temperature-resistant to 200°C - Resistant to oil, brake fluid, coolant	- For sealing surface (flange) connections that are subjected to high operating temperatures, such as the flywheel housing	0697149
Loctite 574	- Resistant to high pressures (up to 350 bar) - Resistant to oil, brake fluid, coolant	- For sealing surface connections against high pressures	1246867
Loctite Blue	- Temperature-resistant from 60 to 260°C - Resistant to oil	- For sealing flexible constructions such as (valve) covers	1242895
Loctite Ultra Grey	- Silicone sealant, good resistance to coolant - Temperature-resistant to 325°C	- For sealing (surface) connections in the cooling system	1284123

OVERVIEW OF SEALING COMPOUNDS			
Product name	**Properties**	**Applications**	**DAF number**
Loctite ultra copper	- Silicone sealant, good resistance to oil - Temperature-resistant to 350°C	- For sealing surface connections such as hub covers	1284122
Loctite 5910	- Silicone sealant, good resistance to oil - Temperature-resistant to 200°C	- For sealing surface connections, such as front and rear covers of gearboxes, differential housings, hub covers, shaft collars and oil cooler	1360102
Loctite 572	- Seals against low pressure immediately after fitting	- Threaded connections	0292336
Loctite 5205	- Surface sealant, specially designed for sealing aluminium parts - Temperature-resistant to 150°C - Resistant to water, coolant and oil	- Sealing of aluminium parts	1441339
Loctite Form a gasket	- Hardens on contact with metal and on full closure	- For locking, fastening and sealing	1322823
3M SG 4291	- Resistant to high pressures and temperatures - Resistant to oil, brake fluid and coolants - Has a locking function	- Sealing and locking of threaded connections, such as cylinder head bolts	1458018

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OTHER PRODUCTS			
Product name	**Properties**	**Applications**	**DAF number**
Tectyl	- Protects the cavities of the superstructure against corrosion	- For post-treatment of cab parts to protect against corrosion - Can also be used as protection for metal parts	1343888
Contact spray	- Cleaning agent for cleaning and degreasing electronic and electrical connections. Removes moisture and dirt from electrical contacts	- Cleaning of electrical contacts	1387608
Loctite cleaner 7063	- Cleans and degreases - Non-inflammable and not corrosive	- For cleaning/de-greasing of materials to which a locking compound must be applied	1322827
Molykote BR 2 PLUS	- Lubricating grease is heat-resistant from -30°C to + 130°C	- Everywhere where grease lubrication is appropriate and normal - For almost all ball and roller bearings, plain bearings, guides, couplings, splined shafts, threaded spindles, sprocket drives with a low speed	1389512
Molykote P37	- Grease protects against corrosion and is heat-resistant to 1400°C	- For exhaust systems and threaded connections that are exposed to high temperatures	1299453
Copaslip	- Copper paste with an excellent bond, is anti-corrosive and heat-resistant from -35°C to 1100°C - Resistant to water, salts and acids - Prevents wear, oxidation, rust, corroding and locking of metal surfaces	- For connections that are vulnerable to oxidation or corrosion, such as battery terminals, exhaust couplings etc.	1284344
Gleitmo 805	- Protects untreated metals against corrosion	- For parts which are attached with a fit such as wheel hub units	1443160

2.3 THREADED CONNECTIONS

TABLE OF STANDARD TIGHTENING TORQUES, DAF STANDARD 00804-203

The tightening torques in the table below are standard torques and only apply to dipped threaded connections.

The property-class code is stamped on the nut or bolt, except on the clamping flange bolt. The clamping flange bolt is recognised by a constriction between the hexagonal bolt head and the flange. This constriction is absent in standard flange bolts.

M2 00 001

Clamping flange bolt

Standard flange bolt

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TIGHTENING TORQUES FOR DIPPED THREADED CONNECTIONS (NM)

Overview of tightening torques applies to:
- property class bolt 8.8, nut 8
- property class bolt 12.9, nut 12
- clamping flange bolt, property class 12.9/nut 12

Property class 8.8 bolt, nut 8

M4	: 2.8	± 0.2
M5	: 5.5	± 0.4
M6	: 9.6	± 0.7
M8	: 23	± 2
M10	: 46	± 4
M12	: 79	± 6
M14	: 125	± 9
M16	: 195	± 14
M18	: 280	± 20
M20	: 395	± 30
M22	: 540	± 40
M24	: 680	± 50
M27	: 1000	± 70
M30	: 1350	± 100

Property class 12.9 bolt, nut 12

M8	: 32	± 3
M10	: 67	± 5
M12	: 113	± 9
M14	: 178	± 14
M16	: 274	± 22
M18	: 385	± 30
M20	: 550	± 43
M22	: 740	± 60
M24	: 925	± 72
M27	: 1370	± 110

Clamping flange bolt
property class bolt 12.9, nut 12

M12	: 178	± 14
M14	: 274	± 22
M16	: 425	± 35
M18	: 550	± 45

Tightening torques for banjo bolts

M6	: 8	± 0.8 Nm
M8	: 15	± 1.5 Nm
M10	: 30	± 3 Nm
M12	: 40	± 4 Nm
M14	: 50	± 5 Nm
M16	: 60	± 6 Nm
M18	: 70	± 7 Nm