
SECTION 1

ENGINE

SECTION 1A

ENGINE GENERAL INFORMATION

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DESCRIPTION AND OPERATION

CLEANLINESS AND CARE

An automobile engine is a combination of many machined, honed, polished and lapped surfaces with tolerances that are measured in the ten-thousandths of an inch. When any internal engine parts are serviced, care and cleanliness are important. A liberal coating of engine oil should be applied to friction areas during assembly, to protect and lubricate the surfaces on initial operation. Proper cleaning and protection of machined surfaces and friction areas is part of the repair procedure. This is considered standard shop practice even if not specifically stated.

Whenever valve train components are removed for service, they should be kept in order. They should be installed in the same locations, and with the same mating surfaces, as when they were removed.

Battery cables should be disconnected before any

major work is performed on the engine. Failure to disconnect cables may result in damage to wire harness or other electrical parts.

ON-ENGINE SERVICE

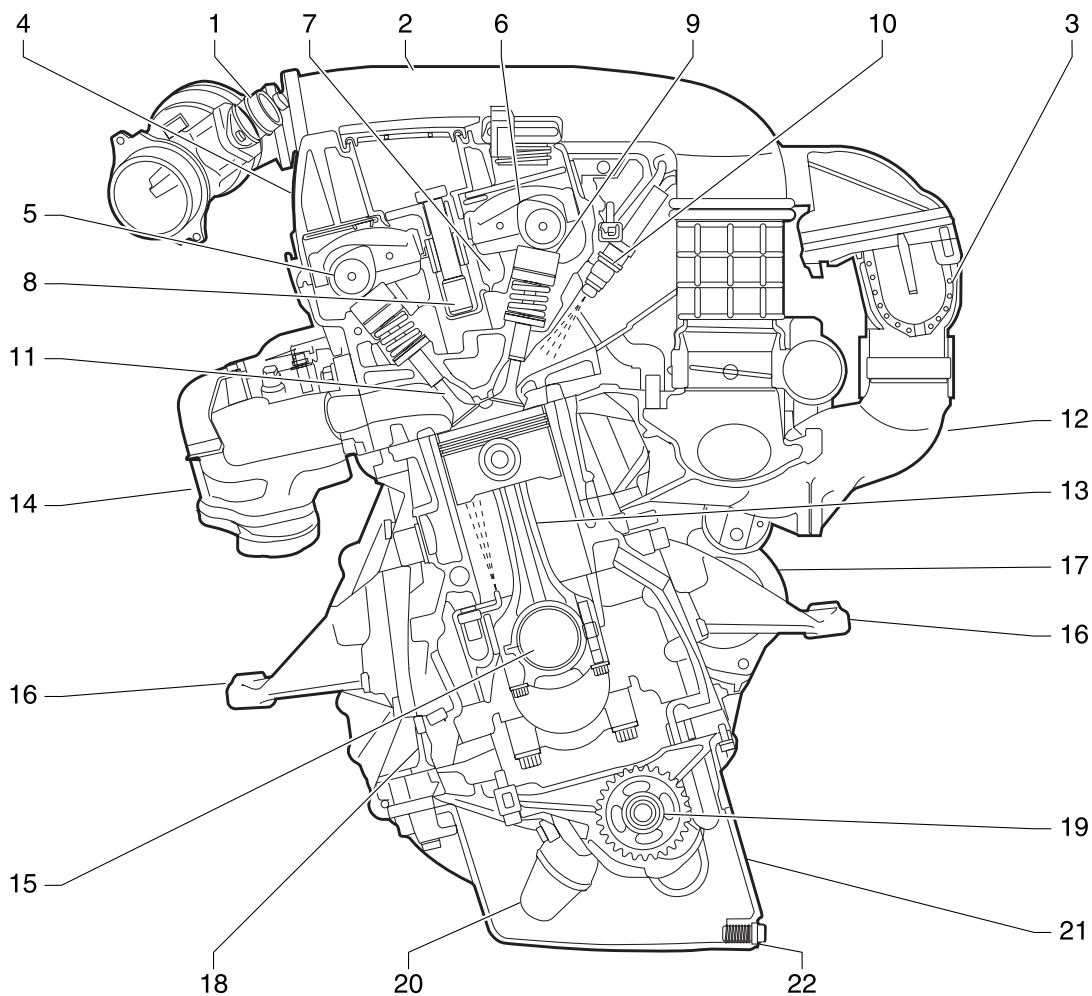
Caution: *Disconnect the negative battery cable before removing or installing any electrical unit, or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.*

Notice: Any time the air cleaner is removed, the intake opening should be covered. This will protect against accidental entrance of foreign material, which could follow the intake passage into the cylinder and cause extensive damage when the engine is started.

COMPONENT LOCATOR

M162 ENGINE

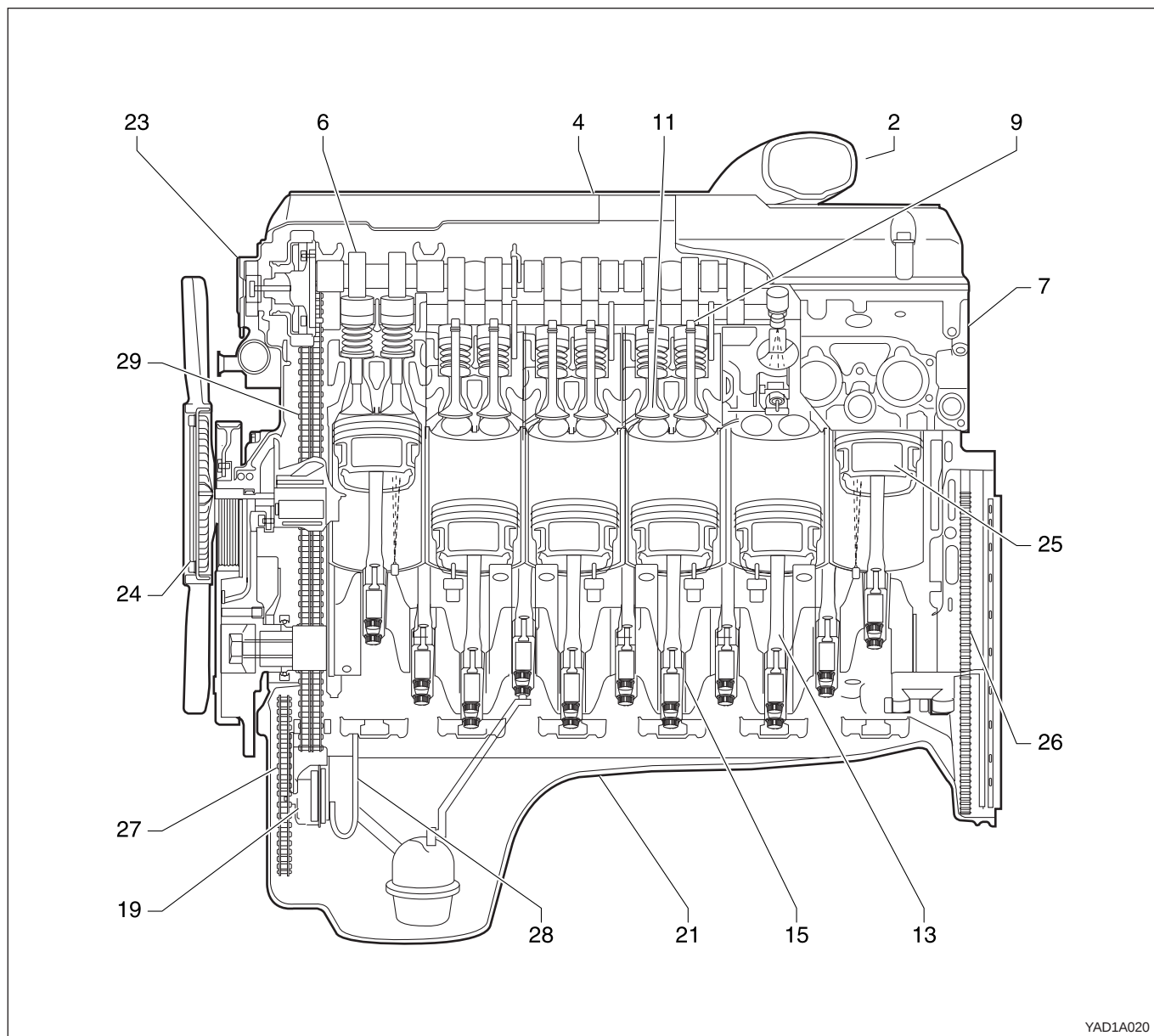
Front View



YAD1A010

- | | |
|------------------------|----------------------------|
| 1 HFM Sensor | 12 Intake Manifold |
| 2 Intake Air Duct | 13 Connecting Rod |
| 3 Resonance Flap | 14 Exhaust Manifold |
| 4 Cylinder Head Cover | 15 Crankshaft |
| 5 Exhaust Camshaft | 16 Engine Mounting Bracket |
| 6 Intake Camshaft | 17 Starter |
| 7 Cylinder Head | 18 Crankcase |
| 8 Spark Plug Connector | 19 Oil Pump Sprocket |
| 9 Valve Tappet | 20 Oil Strainer |
| 10 Injector | 21 Oil Pan |
| 11 Exhaust Valve | 22 Drain Plug |

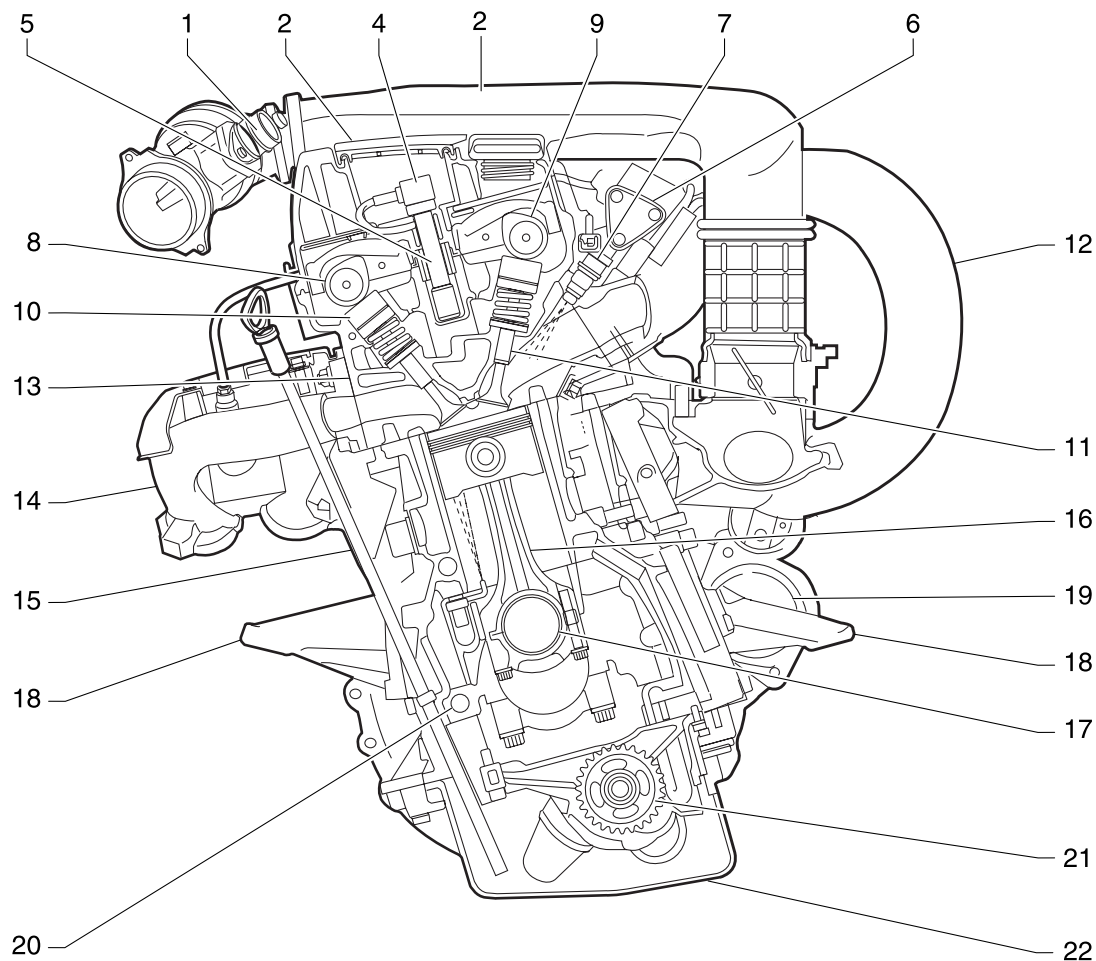
Side View



YAD1A020

- 23 Camshaft Adjuster
- 24 Cooling Fan and Viscous Clutch
- 25 Piston
- 26 Flywheel of Drive Plate

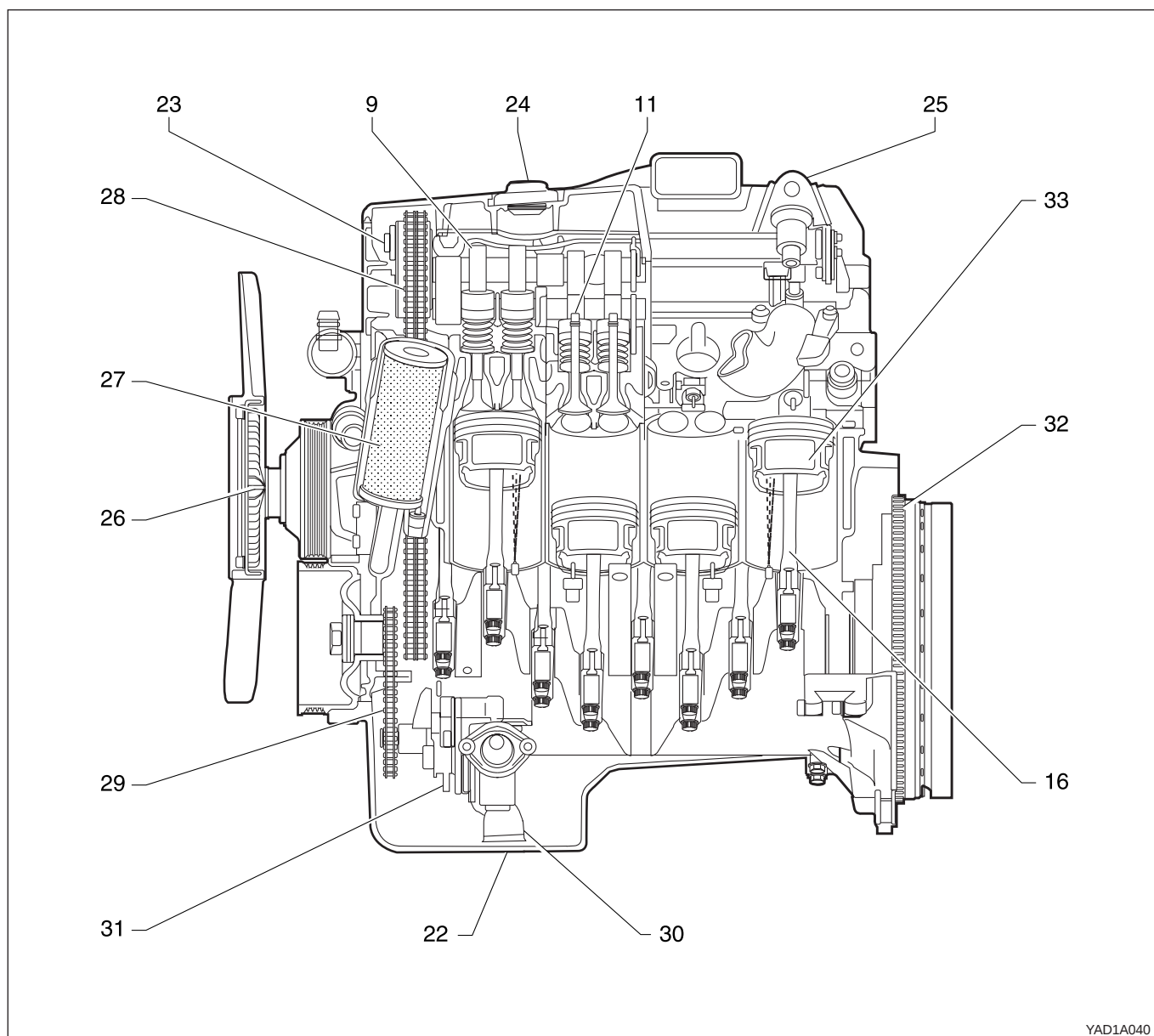
- 27 Oil Pump Drive Chain
- 28 Oil Return Pipe
- 29 Timing Chain
- 30 Oil Pump

M161 ENGINE**Front View**

YAD1A030

- | | |
|------------------------|----------------------------------|
| 1 HFM Sensor | 12 Intake Manifold |
| 2 Intake Air Duct | 13 Cylinder Head |
| 3 Cylinder Head Cover | 14 Exhaust Manifold |
| 4 Ignition Coil | 15 Dipstick Guide Tube and Gauge |
| 5 Spark Plug Connector | 16 Connecting Rod |
| 6 Fuel Distributor | 17 Crankshaft |
| 7 Injector | 18 Engine Mounting Bracket |
| 8 Exhaust Camshaft | 19 Starter |
| 9 Intake Camshaft | 20 Crankcase |
| 10 Valve Tappet | 21 Oil Pump Sprocket |
| 11 Intake Valve | 22 Oil Pan |

Side View

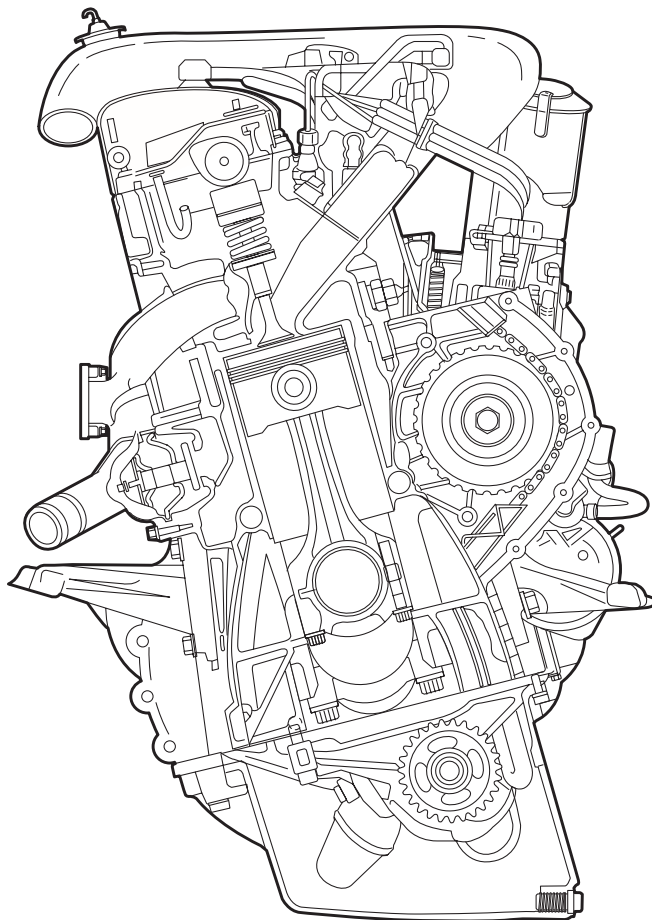


YAD1A040

- | | |
|-----------------------------------|--|
| 23 Camshaft Adjuster | 29 Oil Pump Drive Chain |
| 24 Oil Filler Cap | 30 Oil Strainer |
| 25 Engine Hanger Bracket | 31 Oil Pump |
| 26 Cooling Fan and Viscous Clutch | 32 Ring Gear and Flywheel of Drive Plate |
| 27 Oil Filter | 33 Piston |
| 28 Timing Chain | |

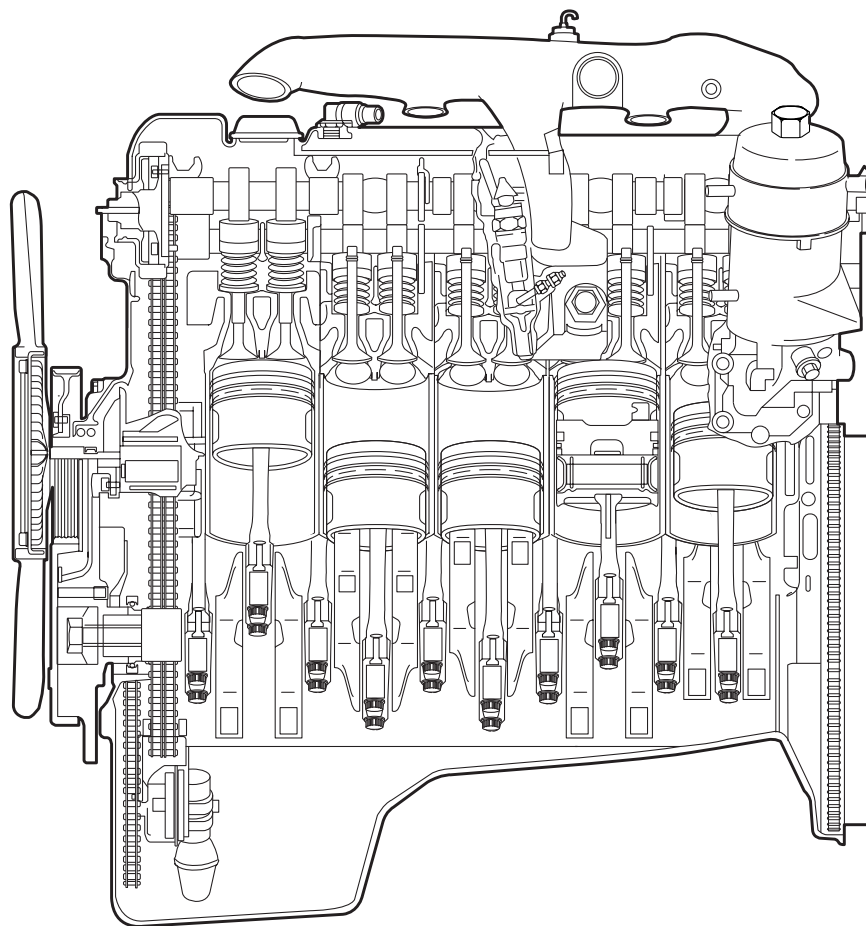
DIESEL ENGINE

Front View



YAD1A050

Side View



YAD1A060

DIAGNOSTIC INFORMATION AND PROCEDURE

OIL LEAK DIAGNOSIS

Most fluid oil leaks are easily located and repaired by visually finding the leak and replacing or repairing the necessary parts. On some occasions a fluid leak may be difficult to locate or repair. The following procedures may help you in locating and repairing most leaks.

Finding the Leak

1. Identify the fluid. Determine whether it is engine oil, automatic transmission fluid, power steering fluid, etc.
2. Identify where the fluid is leaking from.
 - 2.1 After running the vehicle at normal operating temperature, park the vehicle over a large sheet of paper.
 - 2.2 Wait a few minutes.
 - 2.3 You should be able to find the approximate location of the leak by the drippings on the paper.
3. Visually check around the suspected component. Check around all the gasket mating surfaces for leaks. A mirror is useful for finding leaks in areas that are hard to reach.
4. If the leak still cannot be found, it may be necessary to clean the suspected area with a degreaser, steam or spray solvent.
 - 4.1 Clean the area well.
 - 4.2 Dry the area.
 - 4.3 Operate the vehicle for several miles at normal operating temperature and varying speeds.
 - 4.4 After operating the vehicle, visually check the suspected component.
 - 4.5 If you still cannot locate the leak, try using the powder or black light and dye method.

Powder Method

1. Clean the suspected area.
2. Apply an aerosol-type powder (such as foot powder) to the suspected area.
3. Operate the vehicle under normal operating conditions.
4. Visually inspect the suspected component. You should be able to trace the leak path over the white powder surface to the source.

Black Light and Dye Method

A dye and light kit is available for finding leaks. Refer to the manufacturer's directions when using the kit.

1. Pour the specified amount of dye into the engine oil fill tube.
2. Operate the vehicle normal operating conditions as directed in the kit.
3. Direct the light toward the suspected area. The dyed fluid will appear as a yellow path leading to the source.

Repairing the Leak

Once the origin of the leak has been pinpointed and traced back to its source, the cause of the leak must be determined in order for it to be repaired properly. If a gasket is replaced, but the sealing flange is bent, the new gasket will not repair the leak. The bent flange must be repaired also. Before attempting to repair a leak, check for the following conditions and correct them as they may cause a leak.

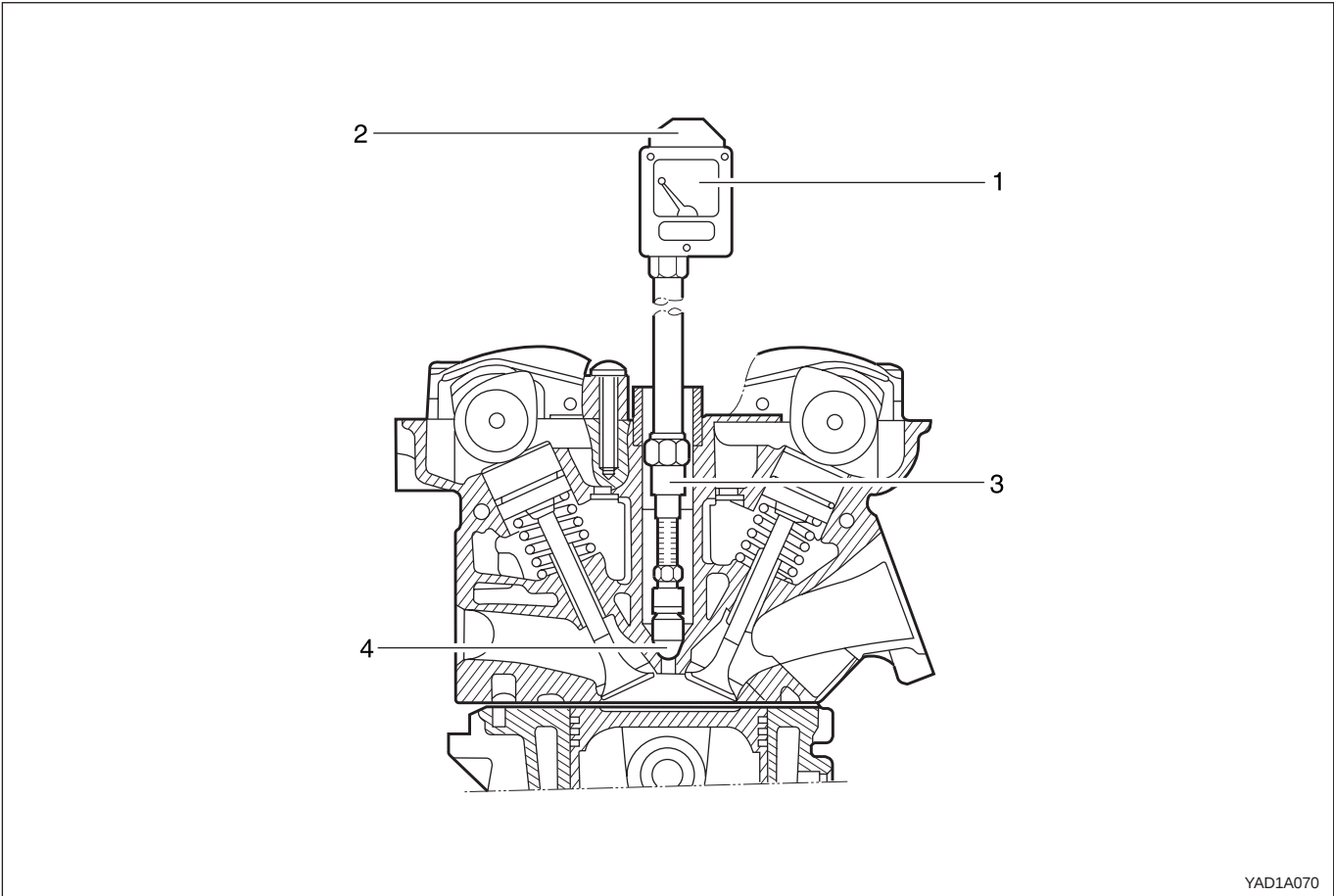
Gaskets

- The fluid level/pressure is too high.
- The crankcase ventilation system is malfunctioning.
- The fasteners are tightened improperly or the threads are dirty or damaged.
- The flanges or the sealing surface is warped.
- There are scratches, burrs or other damage to the sealing surface.
- The gasket is damaged or worn.
- There is cracking or porosity of the component.
- An improper seal was used (where applicable).

Seals

- The fluid level/pressure is too high.
- The crankcase ventilation system is malfunctioning.
- The seal bore is damaged (scratched, burred or nicked).
- The seal is damaged or worn.
- Improper installation is evident.
- There are cracks in the components.
- The shaft surface is scratched, nicked or damaged.
- A loose or worn bearing is causing excess seal wear.

COMPRESSION PRESSURE TEST (GASOLINE ENGINE)



YAD1A070

- 1 Compression Pressure Tester
- 2 Diagram Sheet
- 3 Adaptor
- 4 Sealing Cone

Standard Service Data

Application	M162 Engine	M161 Engine
Compression Ratio	10 : 1	10.4 : 1
Normal Engine Temperature	80 °C (176 °F)	←
Normal Compression Pressure	Min. 10 bar, Max. 14 bar	Min. 11 bar, Max. 15 bar
Permissible Pressure Difference Between Individual Cylinders	Max. 1.5 bar	←

Tools Required

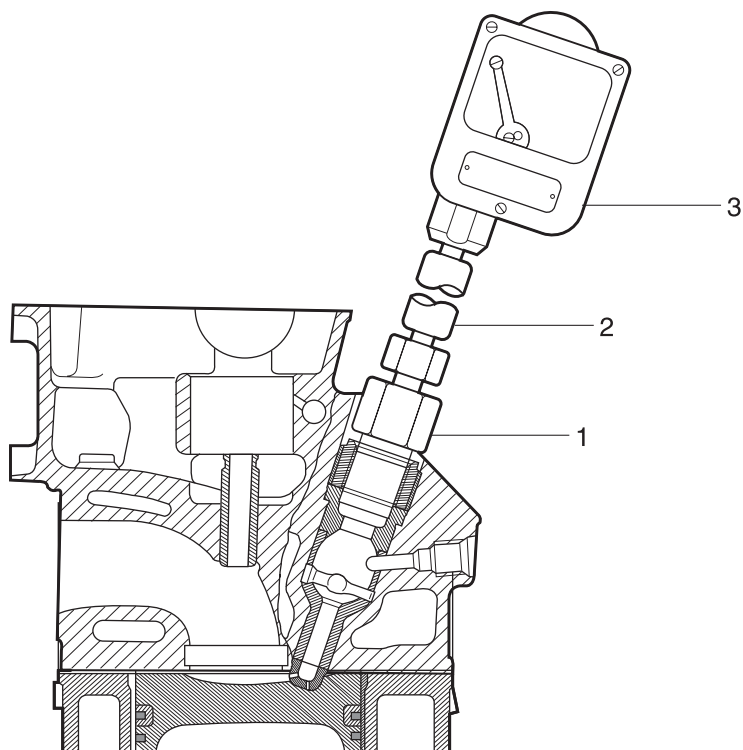
001 589 76 21 00 Compression Pressure Tester
119 589 01 09 00 Spark Plug Wrench

Measuring Procedure

1. Warm the engine up to normal operating temperature.
2. Remove the spark plugs using the spark plug wrench 119 589 01 09 00.
3. Place the diagram sheet to compression pressure tester 001 589 76 21 00.
4. Connect the adaptor to compression pressure tester 001 589 76 21 00 and install it into the spark plug hole.
5. Crank the engine approx. eight revolutions by using the start motor.
6. Compare the measurements of compression pressure tester 001 589 76 21 00 with the specifications.
7. Measure the compression pressure of the other cylinders in the same way.
8. If measured value is not within the specifications, perform the cylinder pressure leakage test.

Notice:

- Discharge the combustion residues in the cylinders before testing the compression pressure.
- Apply the parking brake before cranking the engine.

COMPRESSION PRESSURE TEST (DIESEL ENGINE)

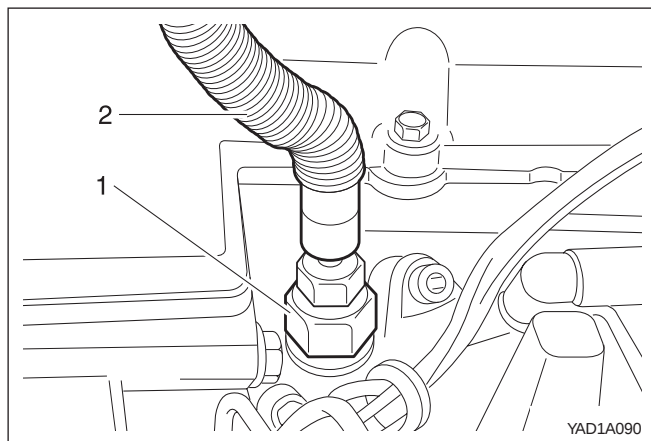
YAD1A080

- 1 Test Adaptor
- 2 Flexible Connector

- 3 Compression Pressure Tester

Standard Service Data

Compression Ratio	22 : 1
Normal Engine Temperature	80 °C (176 °F)
Normal Compression Pressure	28bar
Minimum Compression Pressure	Approx.18bar
Permissible Pressure Difference Between Individual Cylinders	Max. 3bar



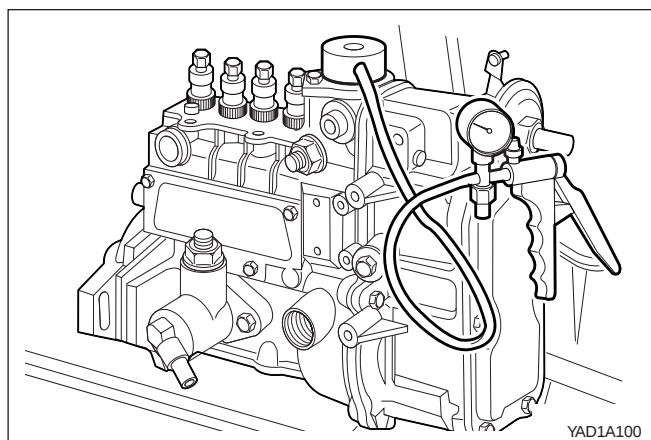
Tools Required

- 001 589 76 21 00 Compression Pressure Tester
- 001 589 73 21 00 Hand Vacuum Pump
- 601 589 65 09 00 Socket

Measuring Procedure

Notice: Ensure that no gear is engaged and that the vehicle is protected from rolling.

1. Run the engine to be the coolant temperature 80 °C (176 °F).
2. Remove the fuel injection nozzle.
3. Install the test adapter (1) and connect the flexible connector (2) to the compression pressure tester 001 589 76 21 00.



4. Disconnect the vacuum line from the stop unit and connect the hand vacuum pump 001 589 73 21 00 to the stop unit.
5. Pump the hand vacuum pump 001 589 73 21 00 and make the fuel injection pump in stop position.

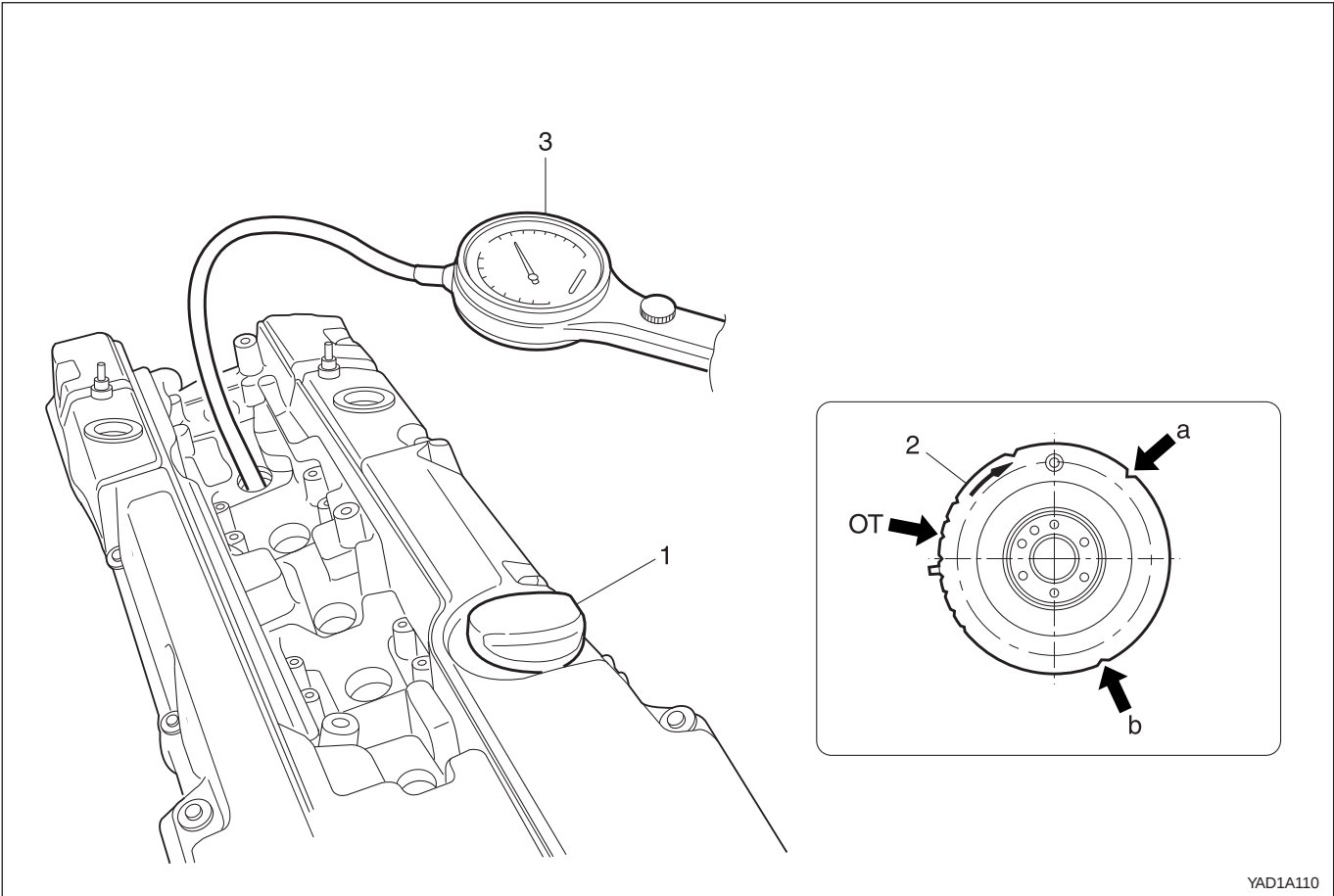
Operating Pressure	Approx. 500bar
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6. Using a starter motor, crank the engine 8 revolutions.
7. Measure the remaining cylinder compression pressure in the same manner and compare it with service data.

Notice: If out of standard, do cylinder pressure leakage test.

8. Remove the compression pressure tester 001 589 76 21 00.
9. Install the fuel injection nozzle.

CYLINDER PRESSURE LEAKAGE TEST (GASOLINE ENGINE)



YAD1A110

- 1 Engine Oil Filler Cap
- 2 Vibration Damper
- 3 Cylinder Pressure Leakage Tester with Connecting Hose

Permissible Pressure Leakage

At Whole Engine	Max. 25 %
At Valve and Cylinder Head Gasket	Max. 10 %
At Piston and Piston Ring	Max. 20 %

Cylinder Number By Mark On Vibration Damper At TDC

TDC Mark (M162 Engine)	OT (TDC)	a (120 °)	b (240 °)
Cylinder Number	1, 6	2, 5	3, 4
TDC Mark (M161 Engine)	OT (TDC)	UT (BDC 180 °)	
Cylinder Number	1, 4	2, 3	

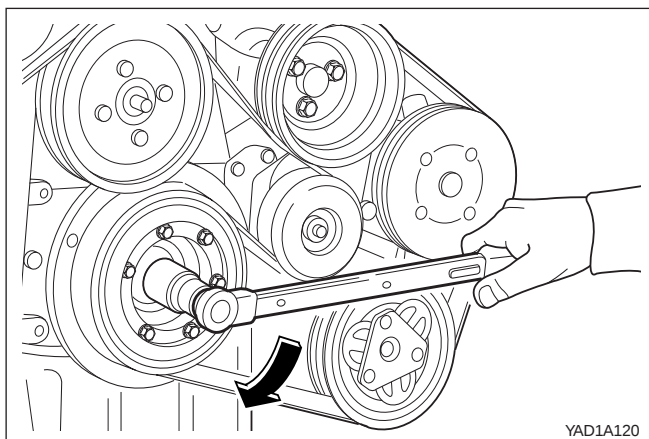
Universal Tool

Cylinder Pressure Leakage Tester	Bosch, EFAW 210A Sun, CLT 228
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Leakage Test

1. Warm the engine up to normal operating temperature.
2. Disconnect the negative battery cable.
3. Remove the spark plugs.
4. Check the coolant level by opening the coolant reservoir cap and replenish if insufficient.
5. Open the engine oil filler cap.
6. Connect the tester to air pressure line and adjust the scale of tester.
7. Install the connecting hose to spark plug hole.

M162 Engine



8. Position the piston of No.1 cylinder at TDC by rotating the crankshaft.

9. Connect the connecting hose to tester and measure the leakage volume after blowing up 5 bar of compressed air.

Notice: Measure the leakage volume in the completely opening condition of throttle valve by pulling the acceleration cable.

10. Perform the pressure test according to the firing order.

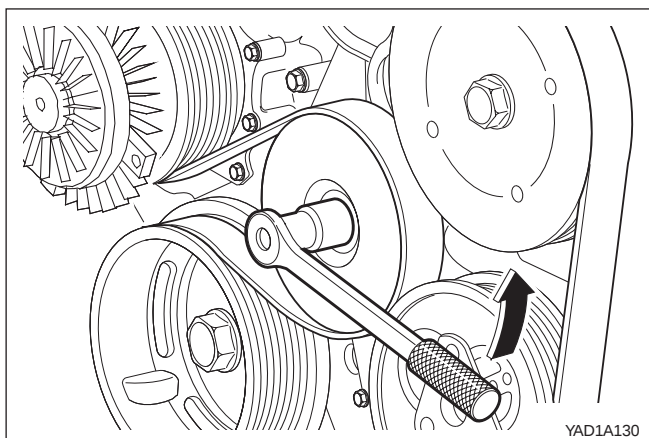
Notice:

Firing Order

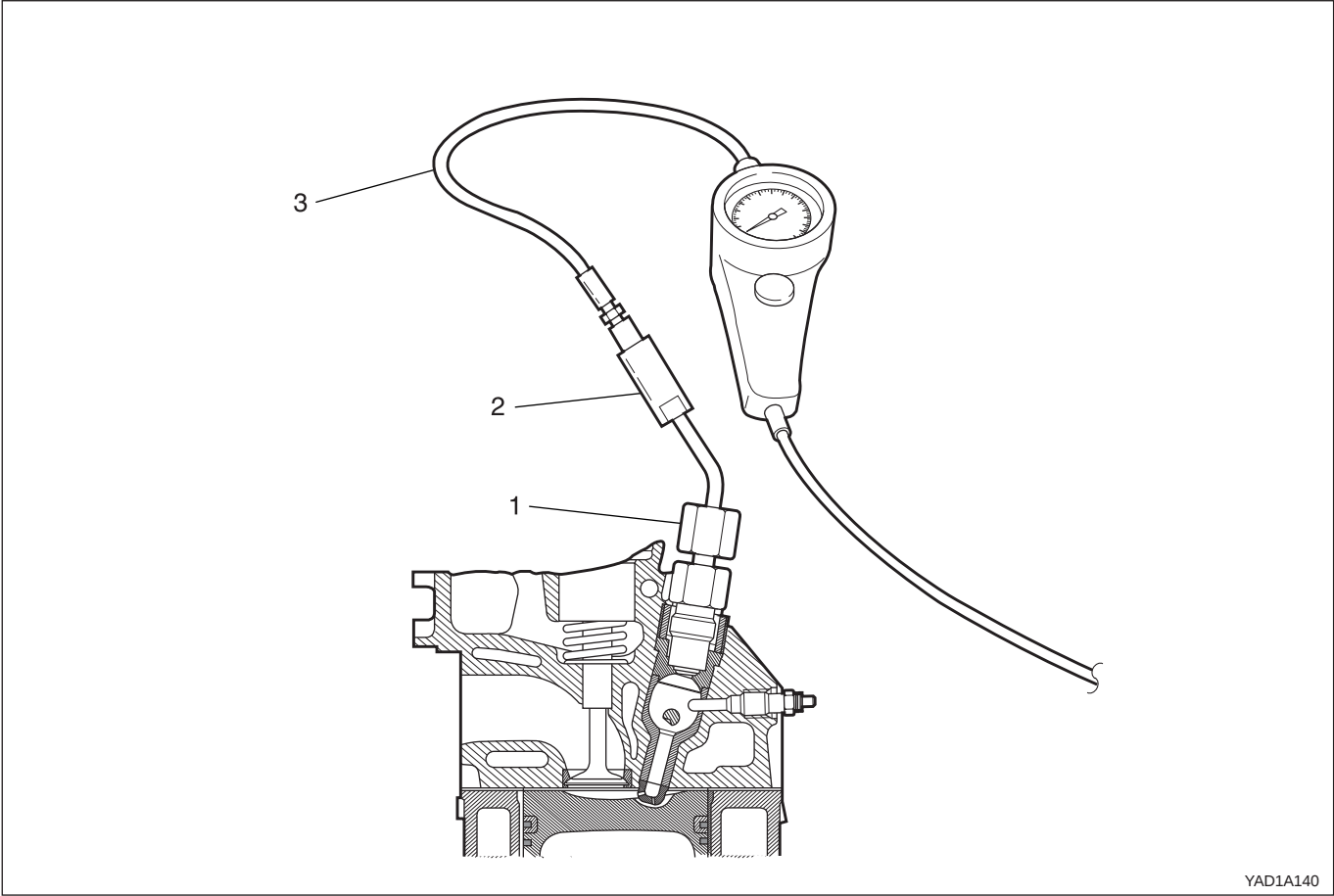
- M162 Engine: 1 - 5 - 3 - 6 - 2 - 4
- M161 Engine: 1 - 3 - 4 - 2

11. Compare the leakage pressure with the specifications.

M161 Engine



CYLINDER PRESSURE LEAKAGE TEST (DIESEL ENGINE)



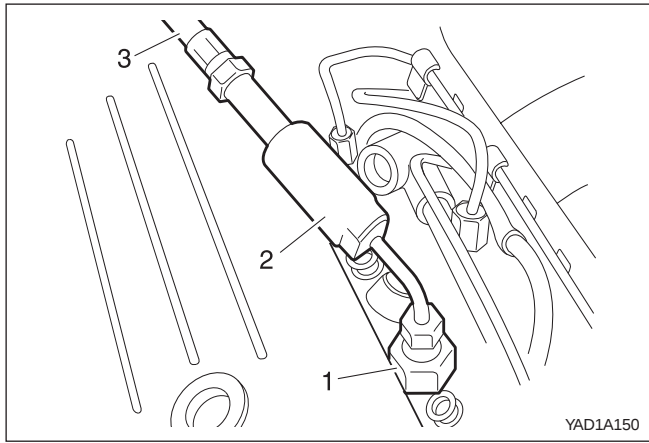
- 1 Connector
- 2 Connection Piece
- 3 Connection Hose

Permissible Pressure Leakage (Engine at Normal Operating Temperature of 80°C)

At Whole Engine	Max. 25 %
At Valve and Cylinder Head Gasket	Max. 10 %
At Piston and Piston Ring	Max. 20 %

Universal Tools

Cylinder Pressure Leakage Tester	Bosch, EFAW 210 A or Sun CLT 228
Connection Piece	Bosch order no. 1 687 010 016



Leakage Test

1. Run the engine to be the coolant temperature 80 °C (176 °F).
2. Remove the fuel injection nozzle.
3. Open the coolant reservoir.
4. Check the coolant level and replenish if necessary.
5. Open the oil filler cap.
6. Remove the air cleaner cover and element.
7. Position the piston at TDC.
8. Install the connector (1) and connection piece (2).
9. Calibrate the tester and connect the connection hose (3)
10. Pressurize with compressed air and compare the pressure changes with permissible pressure leakage.
11. If permissible pressure leakage is out of standard, check followings :
 - Intake and exhaust lines.
 - Sounds in oil filler area.
 - Air bubbles in radiator coolant.
12. Do pressure leakage test for the remaining cylinders according to the firing order.
 - firing order: 1-2-4-5-3
13. Remove the tester.
14. Close the coolant reservoir cap and oil filler cap.
15. Install the air cleaner element and cover.
16. Install the fuel injection nozzle.

GENERAL DIAGNOSIS

Condition		Probable Cause	Correction
Hard Starting (With normal cranking)	Malfunction of Ignition System	• Faulty fuse.	• Replace the fuse.
		• Faulty spark plug.	• Clean, adjust the plug gap or replace.
		• Electric leakage at the high tension cable.	• Replace the cable.
		• Poor connection of the high tension cable or lead wires.	• Replace the cable or wires.
		• Improper ignition timing.	• Adjust the ignition timing.
		• Faulty ignition coil.	• Replace the ignition coil.
	Malfunction of Fuel System	• Lock of fuel in the fuel tank.	• Feed the fuel.
		• Dirty or clogged fuel filter.	• Replace the filter.
		• Clogged fuel pipe.	• Clean the fuel pipe.
		• Malfunction of the fuel pump.	• Replace the fuel pump.
		• Malfunction of the fuel injector.	• Replace the injector.
		• The foreign material in the fuel tank.	• Clean the fuel tank.
	Decline of Compression Pressure	• Poor tightening spark plug.	• Tighten to the specified torque. Compression
		• Cracked cylinder head gasket.	• Replace the gasket.
		• Inadequate the valve clearance.	• Adjust the clearance.
		• Leakage of the valve clearance.	• Repair the valve.
		• Interference of the valve stem.	• Replace the valve or the valve guide.
		• Low elasticity or damage of the valve spring.	• Replace the valve spring.
		• Abnormal interference of pistons and cylinders.	• Replace the piston ring.
		• Excessive wear of pistons, rings, or cylinders.	• Replace the ring or the piston and boring or replace the cylinder.
	Others	• Broken timing belt.	• Replace the belt.
		• Loosening, damage or leakage of the vacuum hose.	• Connect the hose correctly or replace it.
		• Leakage of intake system.	• Replace intake system.
Lack of Engine Power	Decline of Compression Pressure	• Refer to above in this page.	• Refer to above in this page.
	Malfunction of Ignition System	• Improper ignition timing.	• Adjust the ignition timing.
		• Faulty spark plug.	• Adjust or replace the spark plug.
		• Electric leakage or poor connection of the high tension cable.	• Connect the cable correctly or replace it.

General Diagnosis (Cont'd)

Condition		Probable Cause	Correction
Lack of Engine Power	Malfunction of Fuel System	• Clogged fuel pipe.	• Clean the pipe.
		• Clogged or contaminated fuel filter.	• Replace the filter.
	Others	• Clogged exhaust system.	• Check and repair the system.
		• Clogged or contaminated air cleaner element.	• Clean or replace the air cleaner element.
		• Leak of the intake manifold gasket.	• Replace the gasket.
Rough Engine Idling	Decline of Compression Pressure	• Refer to "Page 1A-10".	• Refer to "Page 1A-10".
	Malfunction of Fuel System	• Clogged fuel pipe.	• Clean the pipe.
		• Clogged or contaminated fuel filter.	• Replace the filter.
		• Malfunction of the fuel pressure regulator.	• Replace the regulator.
	Malfunction of Ignition System	• Malfunction of the spark plug.	• Adjust or replace the spark plug.
		• Electric leakage or poor connection of the high tension cable.	• Connect the cable correctly or replace it.
		• Poor ignition timing.	• Adjust the ignition timing.
		• Malfunction of the ignition coil.	• Replace the ignition coil.
	Others	• Clogged or contaminated air cleaner element.	• Clean or replace the air cleaner element.
		• Leak of the intake manifold gasket.	• Replace the gasket.
		• Poor connection or damage or leakage of the vacuum hose.	• Connect the hose correctly or replace it.
Engine Hesitate (Upon pressing accelerating pedal, the engine makes delayed response This situation is remarkable when cruising or starting.)	Decline of Compression Pressure	• Refer to "Page 1A-10".	• Refer to "Page 1A-10".
	Malfunction of Ignition System	• Poor ignition timing.	• Adjust the ignition timing.
		• Poor spark plug or Poor adjustment of the plug gap.	• Replace the plug or adjust the gap.
		• Electric leakage or poor connection of the high tension cable.	• Connect the cable correctly or replace it.
	Others	• Malfunction of the air cleaner system.	• Clean or replace the air cleaner system.
		• Leak of the intake manifold gasket.	• Replace the gasket.

General Diagnosis (Cont'd)

Condition		Probable Cause	Correction
Engine Surging (Engine power makes fluctuation in a fixed speed and speed changes without operating the accelerating pedal.)	Decline of Compression Pressure	Refer to "Page 1A-10".	Refer to "Page 1A-10".
	Malfunction of Fuel System	Clogged fuel pipe.	Clean the pipe.
		Clogged or contaminated fuel filter.	Replace the filter.
		Malfunction of the fuel pressure regulator.	Replace the fuel pressure regulator.
	Malfunction of Ignition System	Malfunction of the spark plug.	Adjust or replace the spark plug.
		Electric leakage or poor connection of the high tension cable.	Connect the cable correctly or replace it.
		Poor ignition timing.	Adjust the ignition timing.
	Others	Leak of the intake manifold gasket.	Clean or replace the gasket.
		Leakage of the vacuum hose.	Connect the hose correctly or replace it.
Excessive Detonation (According to the opening range of Malfunction of metallic is made with abnormal explosion)	Overheated Engine	Refer to "Overheat" in this page.	Refer to "Overheat" in this page.
	Malfunction of Fuel System	Abnormal spark plug.	Replace the spark plug.
		Poor ignition timing.	Adjust the ignition timing
		Electric leakage or poor connection of the high tension cable.	Connect the cable correctly or replace it.
	Malfunction of Ignition System	Clogged or contaminated fuel filter and fuel pipe.	Clean or replace the fuel filter and the fuel pipe.
	Others	Leak of the intake manifold gasket.	Replace the gasket.
		Excessive carbon deposit due to abnormal combustion.	Remove the carbon.
Overheat	Malfunction of Cooling System	Lack of coolant.	Refill coolant.
		Malfunction of the thermostat.	Replace the thermostat.
		Malfunction of the cooling fan.	Check or replace the cooling fan.
		Poor water pump performance.	Replace the pump.
		Clogged or leaky radiator.	Clean, repair or replace the radiator.
	Malfunction of Lubrication System	Poor engine oil.	Replace engine oil with the specified one.
		Blocking oil filter or strainer.	Clean or repair the oil filter or the strainer.
		Lack of engine oil.	Refill oil.
		Poor oil pump performance.	Replace or repair the pump.
	Other	Leakage of oil	Repair.
		Damaged cylinder head gasket.	Replace the gasket.

General Diagnosis (Cont'd)

Condition		Probable Cause	Correction
Poor Fuel Consumption	Decline of Compression Pressure	Refer to "Page 1A-10".	Refer to "Page 1A-10".
	Malfunction of Fuel System	Leakage of the fuel tank or the fuel pipe.	Repair or replace the fuel tank or the fuel pipe
	Malfunction of Ignition System	Improper ignition timing.	Adjust the ignition timing.
		Abnormal spark plug (Excessive carbon deposit, inadequate gap, burnt electrode).	Replace the plug.
		Electric leakage or poor connection of the high tension cable.	Connect the cable normally or replace it.
	Malfunction of Cooling System	Malfunction of the thermostat.	Repair the thermostat.
	Others	Improperly installed valve.	Repair or replace the valve.
		Low pressure of tires.	Adjust the pressure of tires.
Excessive Consumption of Engine Oil	Leakage of Engine Oil	Loosened oil drain plug.	Tighten the plug.
		Loosened oil pan bolt.	Tighten the bolt. Engine Oil
		Loosened oil filter.	Tighten the filter.
		Loosened oil pressure switch.	Tighten the switch.
		Leakage of camshaft front oil seal.	Replace the seal.
		Leakage of crankshaft front oil seal.	Replace the seal.
		Leakage at the cylinder head cover gasket.	Replace the gasket.
		Damage of the cylinder head gasket.	Replace the gasket.
	Oil Mixing in Combustion Chamber	Stuck piston ring.	Remove carbon and replace the ring.
		Worn piston or cylinder.	Replace the piston or the cylinder.
		Worn piston ring or ring groove.	Replace the piston or ring.
		Inadequate position of the piston ring cutting part.	Adjust the position.
		Abrasion or damage of the valve system.	Replace the valve system.
Low Oil Pressure	Malfunction of Lubrication System	Inadequate oil viscosity.	Replace with the specified one.
		Loosening of the oil pressure switch.	Tighten the switch.
		Lack of engine oil.	Refill oil.
		Blocking oil strainer.	Clean the strainer.
		Lowered function of the oil pump.	Replace the pump.
		Abrasion or damage of the oil pump relief valve.	Replace the valve.

General Diagnosis (Cont'd)

Condition		Probable Cause	Correction
Engine Noise	Valve Noise	• Inadequate valve clearance	• Adjust the valve clearance.
		• Abrasion of valve stem or guide.	• Replace the valve stem or the guide.
		• Weak valve spring.	• Replace the spring.
	Piston, Ring, Cylinder Noise	• Abrasion of the piston, the ring or the cylinder.	• Boring the cylinder or replace the piston, the ring or the cylinder.
	Connecting Rod Noise	• Abrasion of the connecting rod bearing.	• Replace the bearing.
		• Loosened the connecting rod nut.	• Tighten to the specified torque
	Crankshaft Noise	• Abrasion of the crankshaft bearing.	• Replace the bearing.
		• Abrasion of the crankshaft journal.	• Grind or replace the crankshaft journal.
		• Loosened bearing cap bolt.	• Tighten to the specified torque.
		• Excessive clearance of the crankshaft thrust bearing.	• Adjust or replace.
		• Low oil pressure.	• Refer to "Page 1A-21" in this section.

SPECIFICATIONS

ENGINE SPECIFICATIONS

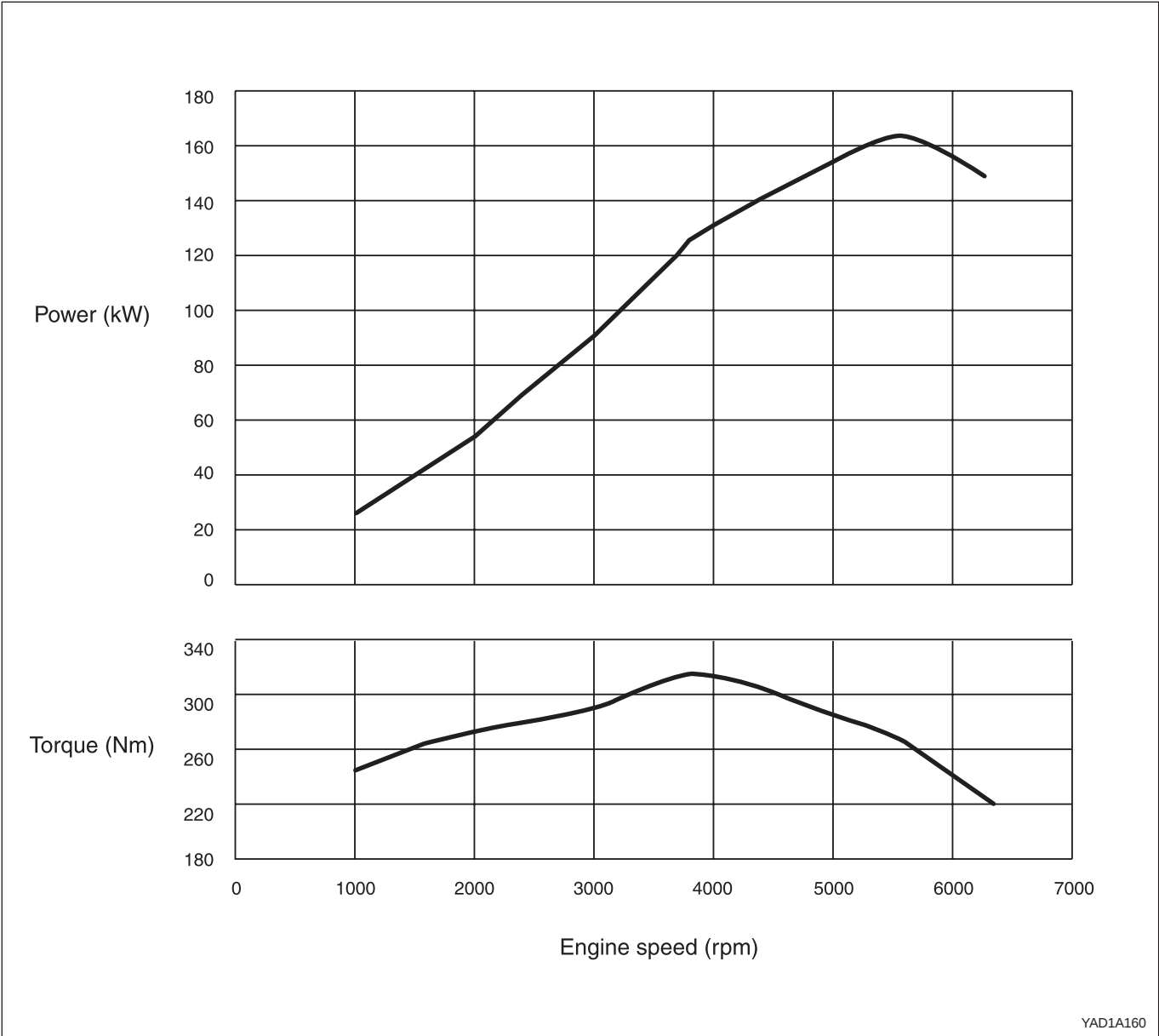
Application			M162 Engine	M161 Engine	Diesel Engine
Engine Model			M162.990	M161.970	Four-Stroke Diesel
Displacement (CC)			3199	2295	2874
Cylinder (Bore x Stroke) (mm)			89.9 x 84.0	90.9 x 88.4	89 x 92.4
Fuel Injection / Ignition System			MSE 3.63D	MSE 3.53D	PES 5 M55 C320 RS 168
Compression Ratio			10 : 1	10.4 : 1	22 : 1
Number of Cylinders			6	4	5
Camshaft Valve Arrangement			DOHC	DOHC	SOHC
Camshaft Drive Type			Chain-Driven	←	←
Max. Output (ps/rpm)			220 / 6000	149 / 5500	120 / 4000
Max. Torque (kg•m/rpm)			31.6 / 3900	22.4 / 4000	25.5 / 4000
Firing Order			1 - 5 - 3 - 6 - 2 - 4	1 - 3 - 4 - 2	1 - 2 - 4 - 5 - 3
Ignition Type			Distributorless Double Ignition	←	-
Ignition Timing			BTDC 8°	BTDC 6° ± 2°	BTDC 18° ± 10°
Valve Timing	Intake	Open/ Close	ATDC 11° / ABDC 34°	ATDC 13.15° / ABDC 13.57°	ATDC 11.33° / ABDC 17°
	Exhaust	Open/ Close	BBDC 31° / BTDC 14°	BBDC 16.58° / BTDC 17.05°	BBDC 28° / BTDC 15.25°
Valve Clearance Adjustment			Automatic Control	←	←
Idle Speed (rpm)			700 ± 50	750 ± 50	720 - 820
Fuel Injection Pressure (kg/cm ²)			3 - 4	3.2 - 4.2	138 - 146
Oil Capacity (liter)			8.2	7.5	8.0 - 9.5
Lubrication Type			Forced by Gear Pump	←	←
Oil Filter Type			Full Flow with Paper Filter	←	Combined Full-Flow and Partial Flow Filter
Fuel			Unleaded Gasoline	←	Diesel

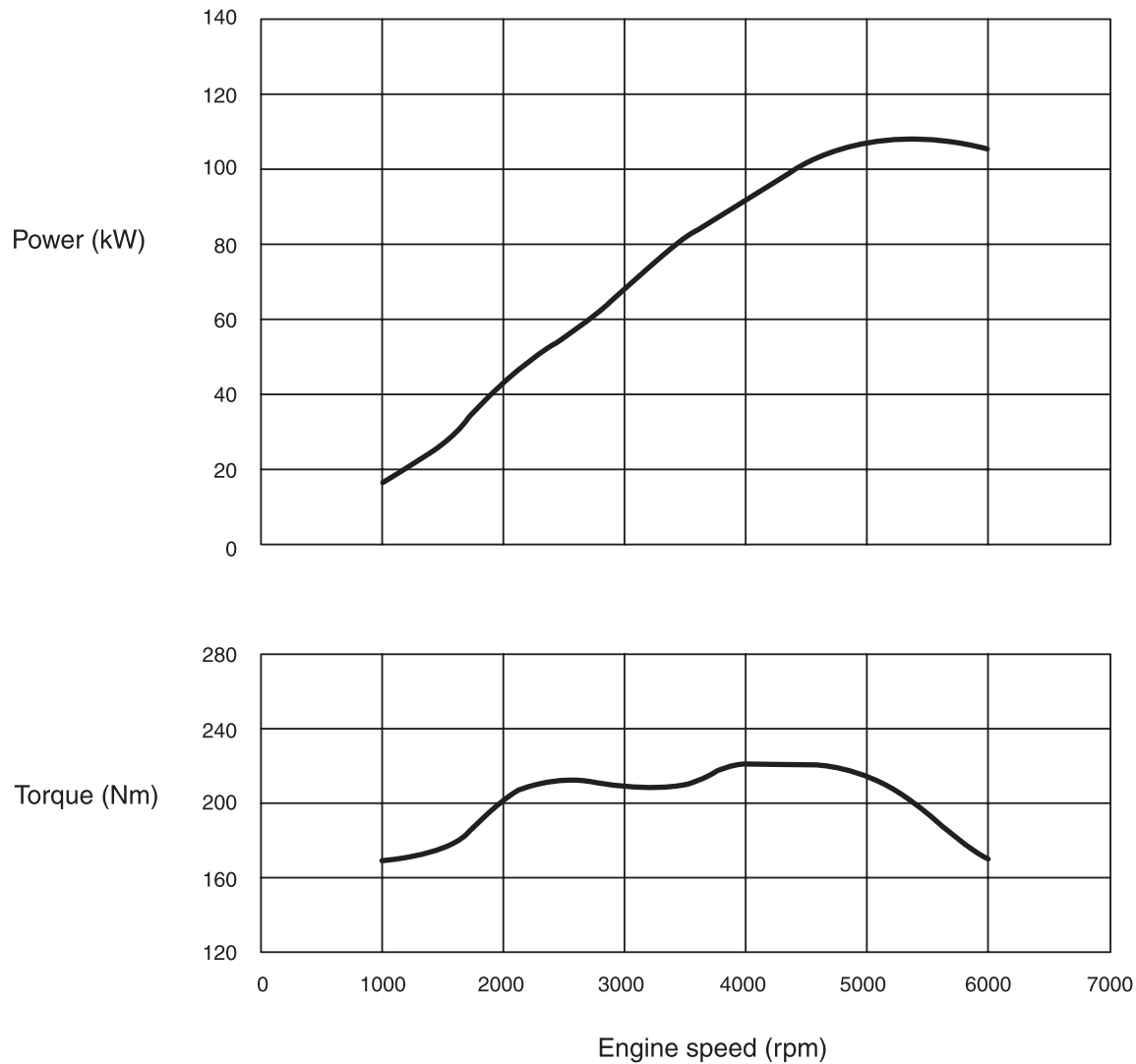
MSE : Engine Control Module

3.63D : 6 Cylinder Version

3.53D : 4 Cylinder Version

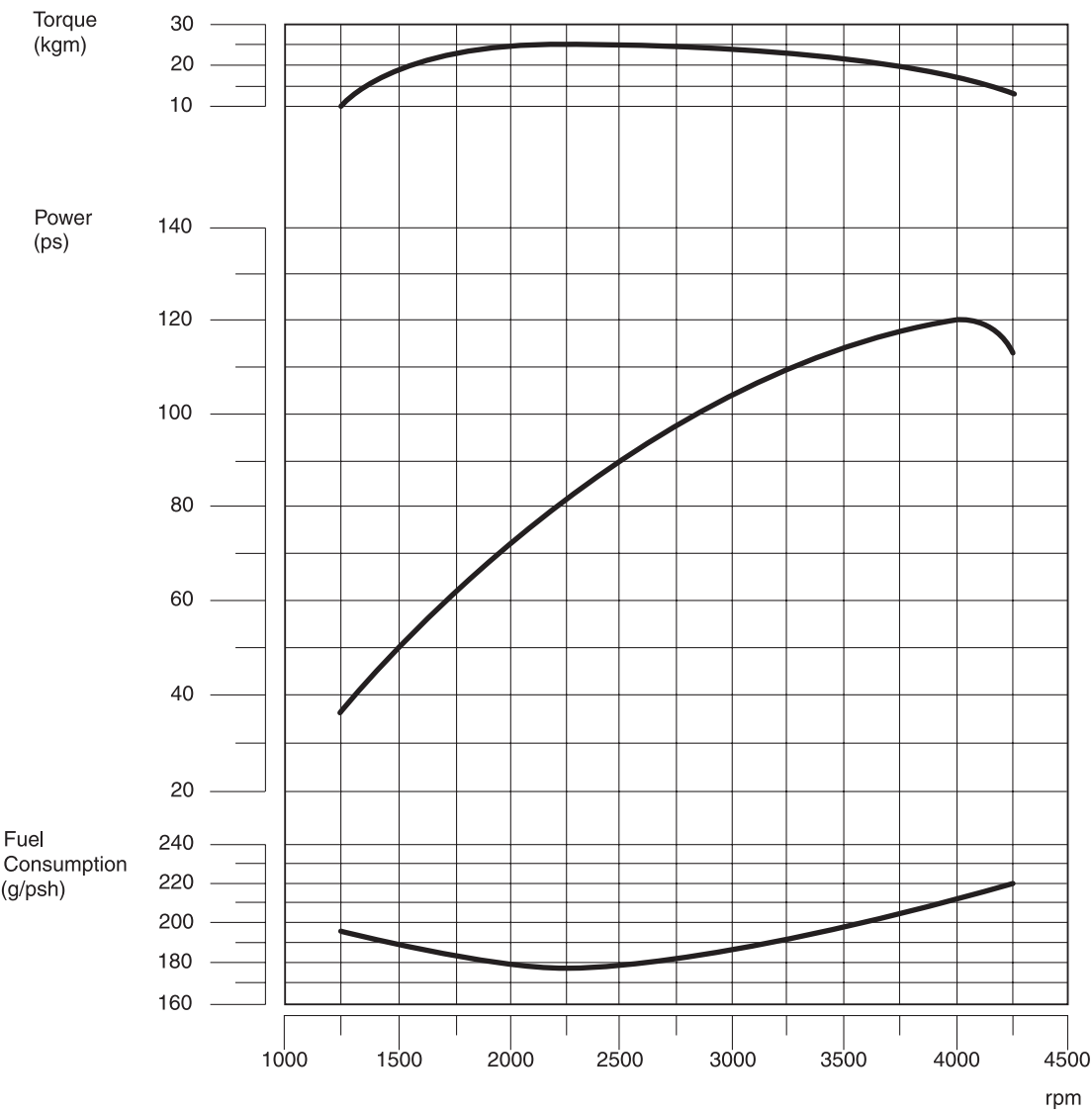
PERFORMANCE CURVE
M162 Engine



M161 Engine

YAD1A170

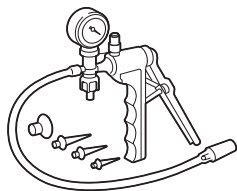
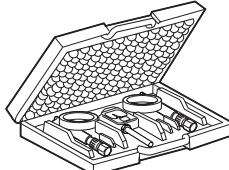
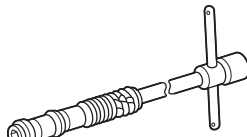
Diesel Engine



YAD1A180

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS TABLE

 YAD1A190	001 589 73 21 00 Hand Vacuum Pump	 YAD1A210	001 589 76 21 00 Compression Pressure Tester
 YAD1A220	120 589 02 09 00 Spark Plug Wrench	 YAD1A200	610 589 65 09 00 Socket