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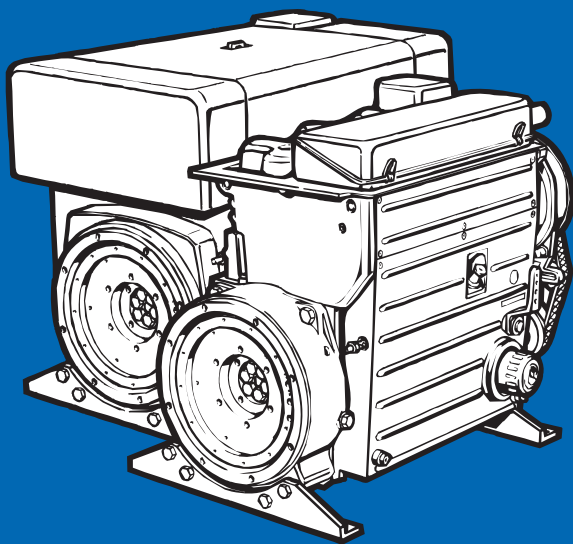
A large, dark blue, semi-transparent graphic of interlocking gears is positioned on the right side of the page, extending from the top right corner towards the bottom.

INSTRUCTION BOOK



INCLUDES SUPPLEMENTAL INFORMATION TO THE
OWNER'S MANUAL FOR 2008 AND LATER EPA CERTIFIED
NONROAD COMPRESSION-IGNITION ENGINES

INCLUDES SUPPLEMENTAL INFORMATION TO THE
OWNER'S MANUAL FOR 2008 AND LATER CALIFORNIA
REGULATIONS FOR HEAVY-DUTY OFF-ROAD ENGINES



2-4L41C

2-4M41.

4L42C

4M42

433 416 06-USA-EPA IV-CARB

1.08-0.1

Printed in Germany

A new HATZ Diesel engine - working for you

This engine is intended only for the purpose determined and tested by the manufacturer of the equipment in which it is installed. Using it in any other manner contravenes the intended purpose. For danger and damage due to this, Motorenfabrik HATZ assumes no liability. The risk is with the user only. Use of this engine in the intended manner presupposes compliance with the maintenance and repair instructions laid down for it. Noncompliance leads to engine breakdown.

Please do not fail to read this operating manual before starting the engine. This will help you to avoid accidents, ensure that you operate the engine correctly and assist you in complying with the maintenance intervals in order to ensure long-lasting, reliable performance.

Please follow all maintenance references carefully including the schedule for 2008 and later EPA certified nonroad compression-ignition engines and for 2008 and later CARB certified Heavy-Duty off-road engines to prevent our environment.

Please pass this Instruction Manual on to the next user or to the following engine owner.



The worldwide **HATZ Service Network** is at your disposal to advise you, supply with spare parts and undertake servicing work.

You will find the address of your nearest **HATZ service station** in the enclosed list.



Original - Ersatzteile

Original-spare parts

Pièces de rechange d'origine

Repuestos originales

Use only **original spare parts from HATZ**. Only these parts guarantee a perfect dimensional stability and quality. The order numbers can be found in the enclosed spare parts list. Please note the spare part kits shown in Table M00.

We reserve the right to make modifications in the course of technical progress.

MOTORENFABRIK HATZ GMBH & CO KG

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This symbol draws attention to important safety precautions.

Please comply with them most carefully in order to avoid any risk of injury to persons or damage to materials.

General legal requirements or safety regulations issued by the competent authorities or industrial accident insurers are also applicable.

1. Important notes on safe operation of the engine



HATZ diesel engines are economical, strongly built and long-lasting. They are therefore frequently chosen for commercially and industrially operated equipment and machinery.

If the engine forms part of the finished equipment or machine, its manufacturer will take all the applicable safety regulations into account.

Nevertheless, we would like you to note certain additional comments on operating safety which follow. Depending on the manner in which the engine is installed and its intended application, the equipment manufacturer or operator may have to attach additional safety devices and prohibit potentially hazardous aspects of operation, for example:

- Exhaust system components as well as the surface of the engine will naturally be hot and must not be touched while the engine is running or until it has cooled down after being stopped.
- Faulty wiring or incorrect operation of electrical equipment may lead to sparks forming, and must be avoided as a potential fire hazard.
- Rotating parts must be shielded so that they cannot be touched accidentally when the engine is installed in other equipment or machinery.
Guards are available from HATZ to protect belt drives for cooling fans and generators.
- Before attempting to start the engine it is essential to have studied the starting information in the Instruction Book.
- Mechanical starting devices must not be used by children or persons of insufficient physical strength.
- In order to benefit from the advantages of the starting handle with kick-back damping, it must be used precisely as recommended in this Instruction Book.
- Before starting the engine, ensure that all the specified protective guards are in place.
- The engine must only be operated, serviced or repaired by persons who have received the appropriate training.
- Keep the starting handle and the key out of reach of unauthorized persons.
- Do not run the engine in closed or badly ventilated rooms.
Do not breathe in emissions – danger of poisoning!
- Also fuel and lubricants could contain poisonous components. Please follow the instructions of the mineral oil producer.

Important notes on safe operation of the engine



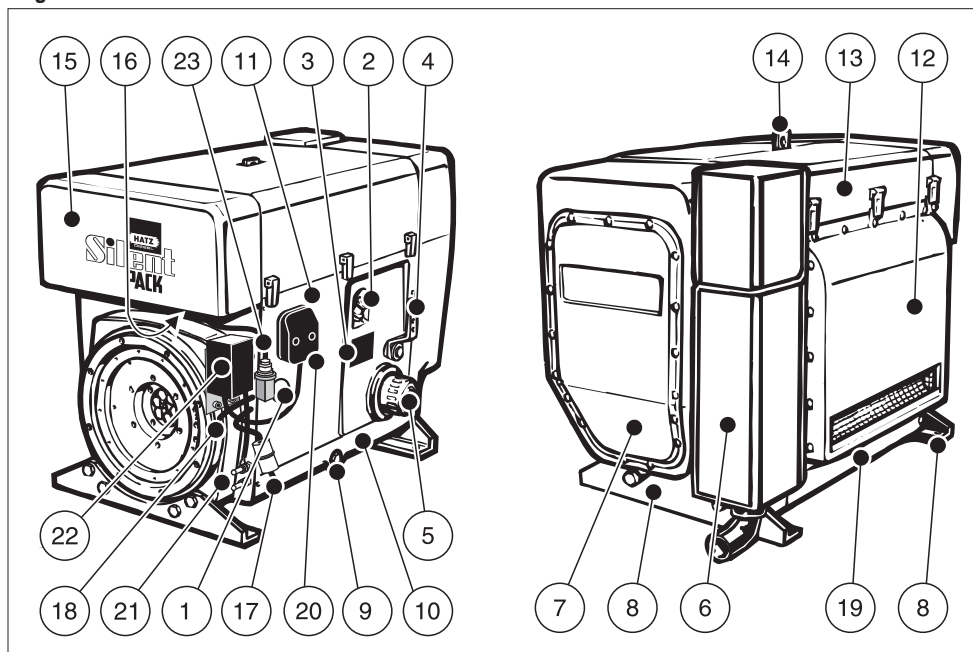
- Stop the engine before performing any maintenance, cleaning- and repair work.
- Stop the engine before refuelling.
Never refuel near a naked flame or sparks which could start a fire. Don't smoke. Don't spill fuel.
- Keep explosive materials as well as flammable materials away from the engine because the exhaust gets very hot during operation.
- Wear close-fitting clothing when working on the engine while it is running.
Please don't wear necklaces, bracelets or any other things which you could get caught with.
- Please pay attention to all advice- and warning stickers placed on the engine and keep them in legible condition. Contact your next **HATZ service station**, if a sticker comes off or is illegible and ask for a new one.
- Note that any unauthorized modifications to the engine absolve its manufacturer from liability for the consequences.

Regular servicing in accordance with the details provided in this Instruction Book is essential to keep the operating reliably and to ensure the exhaust quality of the engine.

In case of doubt, always consult your nearest **HATZ service station** before starting the engine.

2. Description of engine

Fully encapsulated „Silent Pack“ version Engine 2...4L41C

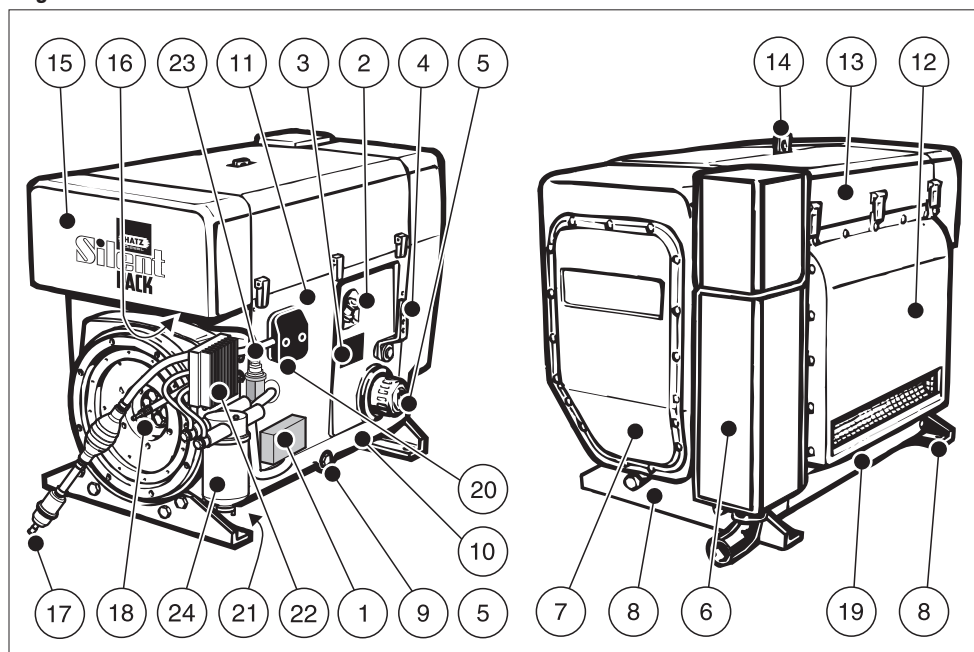


1

- | | |
|---|--|
| 1 Access cover for fuel delivery pump | 12 Air outlet duct |
| 2 Oil filler pipe and dipstick | 13 Capsule hood |
| 3 Type plate | 14 Suspension lug (retractable),
max. load 5000 N |
| 4 Speed control lever | 15 Air intake duct for capsule |
| 5 Replaceable-element oil filter | 16 Combustion air intake aperture |
| 6 Exhaust silencer (in capsule) | 17 Fuel feed line with fuel pre-filter |
| 7 Cover for air guide housing
(Access to fan drive belt) | 18 Fuel return line |
| 8 Engine support feet | 19 Cover plate, air outlet side |
| 9 Oil drain plug | 20 Central plug for electrical system |
| 10 Cover plate, control side | 21 Battery connections |
| 11 Side panel | 22 Power-Box |
| | 23 Electrical maintenance switch for
air cleaner |

Description of engine

Fully encapsulated „Silent Pack“ version Engine 4L42C



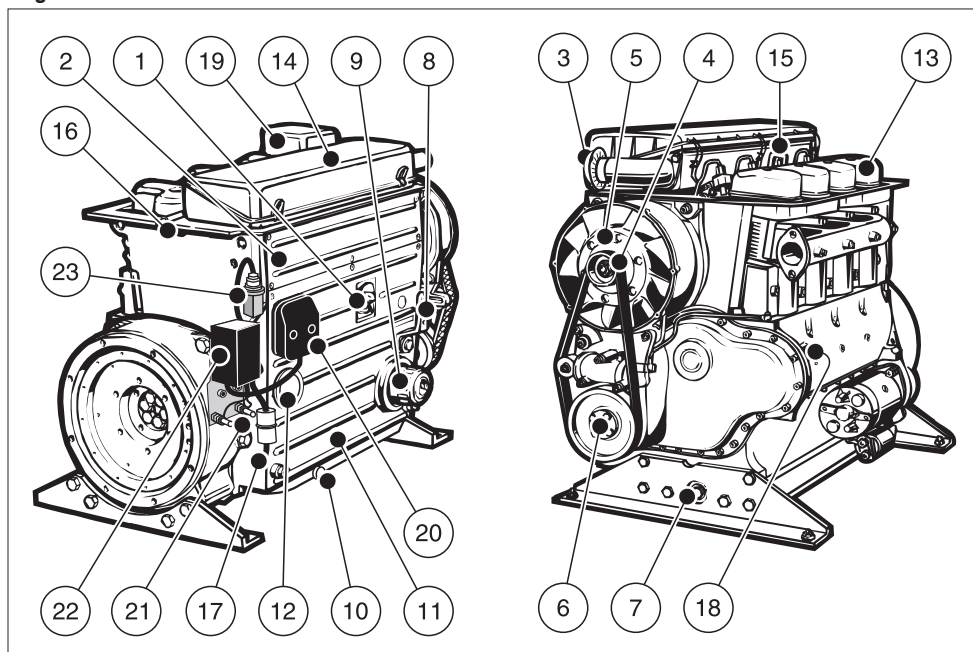
2

- | | |
|---|--|
| 1 Electronic control unit | 14 Suspension lug (retractable),
max. load 5000 N |
| 2 Oil filler pipe and dipstick | 15 Air intake duct for capsule |
| 3 Type plate | 16 Combustion air intake aperture |
| 4 Speed control lever | 17 Fuel feed line with fuel pre-filter and
manual fuel pump |
| 5 Replaceable-element oil filter | 18 Fuel return line |
| 6 Exhaust silencer (in capsule) | 19 Cover plate, air outlet side |
| 7 Cover for air guide housing
(Access to fan drive belt) | 20 Central plug for electrical system |
| 8 Engine support feet | 21 Battery connections |
| 9 Oil drain plug | 22 Power-Box |
| 10 Cover plate, control side | 23 Electrical maintenance switch for
air cleaner |
| 11 Side panel | 24 Fuel filter |
| 12 Air outlet duct | |
| 13 Capsule hood | |

Description of engine

Standard version

Engine 2...4M41 • 2...4M41Z

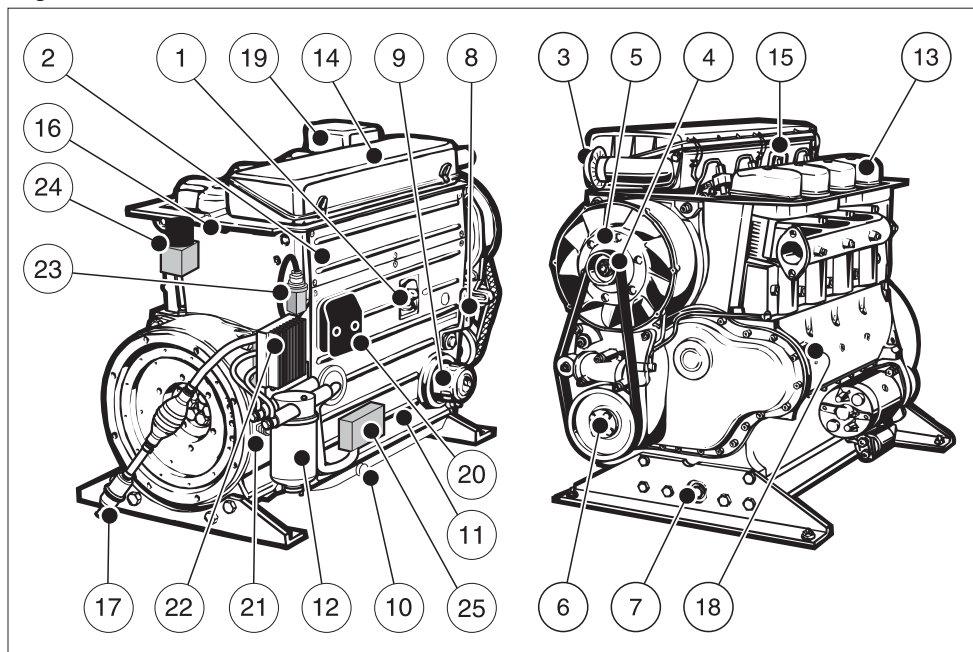


3

- | | |
|---|--|
| 1 Oil filler pipe and dipstick | 13 Cylinder head cover |
| 2 Side panel | 14 Air cleaner cover |
| 3 Combustion air intake aperture | 15 Suspension lug, max. load 5000 N |
| 4 Cooling fan drive belt | 16 Fuel return line |
| 5 Cooling fan with alternator attached | 17 Fuel feed line with fuel pre-filter |
| 6 1/2-inch intl. hex socket for turning over engine | 18 Type plate |
| 7 Oil drain plug | 19 Exhaust silencer |
| 8 Speed control lever | 20 Central plug for electrical system |
| 9 Replaceable-element oil filter | 21 Battery connections |
| 10 Oil drain plug (if sump is fitted) | 22 Power-Box |
| 11 Cooling air duct for engine oil cooler | 23 Electrical maintenance switch for air cleaner |
| 12 Access cover for fuel delivery pump | |

Description of engine

Standard version Engine 4 M 42



4

- | | |
|---|---|
| 1 Oil filler pipe and dipstick | 14 Air cleaner cover |
| 2 Side panel | 15 Suspension lug, max. load 5000 N |
| 3 Combustion air intake aperture | 16 Fuel return line |
| 4 Cooling fan drive belt | 17 Fuel feed line with fuel pre-filter and manual fuel pump |
| 5 Cooling fan with alternator attached | 18 Type plate |
| 6 1/2-inch intl. hex socket for turning over engine | 19 Exhaust silencer |
| 7 Oil drain plug | 20 Central plug for electrical system |
| 8 Speed control lever | 21 Battery connections |
| 9 Replaceable-element oil filter | 22 Power-Box |
| 10 Oil drain plug (if sump is fitted) | 23 Electrical maintenance switch for air cleaner |
| 11 Cooling air duct for engine oil cooler | 24 Exhaust gas return valve (EGR) |
| 12 Fuel filter | 25 Electronic control unit |
| 13 Cylinder head cover | |

3. General information

3.1. Technical data

		2 L 41 C 2 M 41.	3 L 41 C 3 M 41.	4 L 41 C / 4 L 42 C 4 M 41. / 4 M 42.
Type		Air-cooled, four-stroke diesel engine		
Combustion method		Direct fuel injection		
Number of cylinders		2	3	4
Bore/stroke	mm	102 / 105	102 / 105	102 / 105
Displacement	cm ³	1716	2574	3432
Engine oil pressure Oil temperature 100 ± 20°C		min. 0.6 bar at 850 r.p.m.		
Consumption of lubrication oil after running-in period		max. 1 % of fuel consumption at full-load		
Direction of rotation		Counterclockwise, looking at flywheel		
Valve clearance (at 10 - 30 °C) Inlet/exhaust	mm	0.10		
Net weight Standard version .M41 Version 4M42 Version .M41 Z Version .L41 C Version 4L42 C	approx. kg	258 263 303	308 315 363	373 378 388 433 438
Max. angle from vertical in any direction (in continuous operation) Control side Air outlet side Timing gear side Flywheel side		with and without sump 30° ¹⁾ 30° ¹⁾ 30° ¹⁾ 30° ¹⁾	with without sump 30° ¹⁾ 25° ¹⁾ 30° ¹⁾ 30° ¹⁾ 25° ¹⁾ 25° ¹⁾ 22° ¹⁾ 25° ¹⁾	only with sump 25° ¹⁾ 30° ¹⁾ 15° ¹⁾ 18° ¹⁾

¹⁾ Exceeding these limits causes engine breakdown.

3.2. Transport



A suspension lug is provided as standard equipment, so that the engine and its auxiliaries can be lifted safely. It is not suitable for lifting complete machines or similar to which the engine has been attached, and this is strictly prohibited. (See Chapter 2.)

3.3. Instructions for installation

The „Manual for Selection and Installation of Engines“ contains all the information you need if your engine has not yet been installed on or in the equipment it is intended to drive, or set up in its correct operating position. You can obtain a copy of this manual from your nearest HATZ service station.

3.4. Load on engine

See supplemental information for EPA certified engines, Page 47; resp. supplemental information for California regulations for off road engines, Page 65.

3.5. EPA/CARB-type plates and fuel label

There are two EPA/CARB- type plates applied for the identification of the engine. The type plates are placed on the crankcase resp. on the capsule (chapt. 2).

They include the following emission control information (Figure 5a):

Label 1/2

EMISSION CONTROL INFORMATION			
MOTORENFABRIK HATZ <small>AG</small> KG · D-94099 RUHSTORF			
ENG.FAM.		MADE IN GERMANY	
①			
TYPE / SPEC. / FDT		HATZ DIESEL	
②			
SERIAL NO.		CM 3 / PV	Label 1/2
③		⑥	
MIN ⁻¹	NH / kW	BUILD DATE	
④	⑦	⑤	
This engine conforms to MY <input type="text"/> U.S. EPA regulations large nonroad compression-ignition engines and MY <input type="text"/> California regulation for off-road compression-ignition engines. Refer to Owner's manual for maintenance specifications and adjustments.			
EC-TYPE NO. <input type="text"/>			
CONSTANT-SPEED ONLY ⑧		VARIABLE SPEED ⑨	

5a

- ① EPA/CARB-Engine Family Number
- ② engine type/spec. (only for special equipment) /Fuel Delivery Timing
- ③ engine number
- ④ max. engine rated speed
- ⑤ build date
- ⑥ displacement
- ⑦ rated power
- ⑧ “constant speed only” (if requested)
- ⑨ “variable speed” (if requested)

Every engine is equipped with an additional loose engine type plate. If the original type plate on the engine is not readily visible after the engine is installed in the equipment then the second loose type plate must be attached on the equipment in such a manner that it is readily visible to an average person.

For any offer as well as spare parts orders it is necessary to mention the following data (also see spare parts list, page 1):

- ② engine type/spec.
(only for special equipment)
- ③ engine number
- ④ max. engine rated speed

The layout is identical for constant-speed and variable speed application.

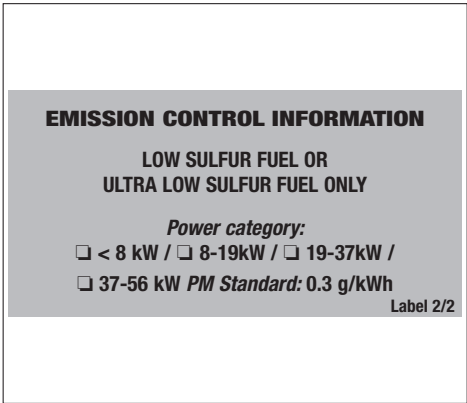
Attention:

If the engine was certified for constant-speed application and shall be used so, the field "constant-speed only" is marked with "X".

If the engine was certified for variable speed application and shall be used so, the field "variable speed" is marked with "X".

Always install the engine for its intended application in order to comply with EPA and CARB emission regulation requirements.

Label 2/2

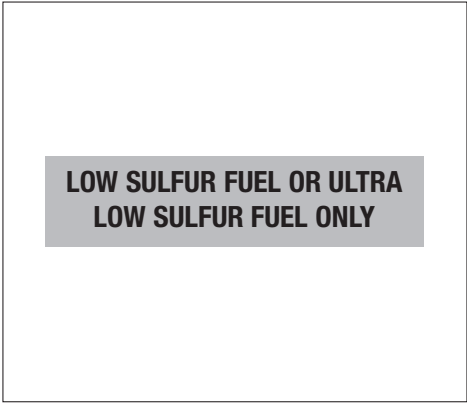


5b

The engine must be operated with "LOW SULFUR FUEL OR ULTRA LOW SULFUR FUEL ONLY".

The label also states the applicable emission-related power category of the engine.

Fuel label



5c

The fuel label is placed nearby the fuel inlet. If there was no fuel tank mounted to the engine, the label has to be permanently attached to the equipment near the fuel inlet.

**3.6. EMISSION-RELATED
INSTALLATION INSTRUCTIONS**

See supplemental information for EPA certified engines, Page 47; resp. supplemental information for California regulations for off road engines, Page 65.

4. Operation

4.1. Before first start-up

Engines are normally delivered without any fuel or oil.

4.1.1. Engine oil

Oil quality

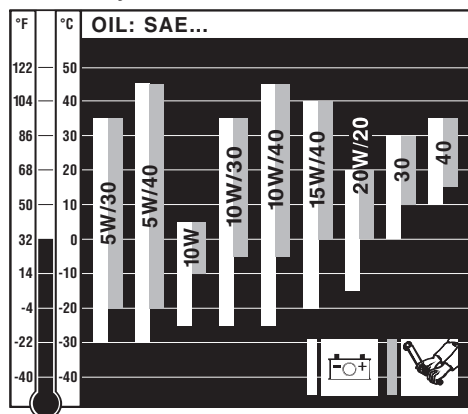
Qualified are all trademark oils which fulfil at least one of the following specifications:

ACEA – B2 / E2 or more significant

API – CD / CE / CF / CF-4 / CG-4 or more significant.

If engine oils with low quality standard are being used, the intervals of changing the engine oil have to be reduced from 250 to 150 resp. 500 to 250 hours of operation, see chapter 5.1.

Oil viscosity



6

Choose a suitable oil viscosity according to the ambient temperature when the engine is started from cold (Figure 6).

Engine oil quantities and dipstick markings

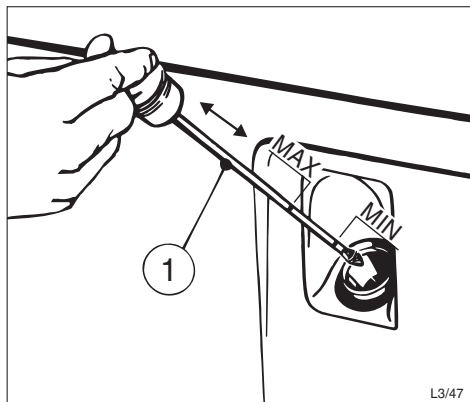
Engine type	Sump	Oil content (liter)	dipstick marking (Figure 7, item 2)
2 L 41 C, 2 M 41 Z	Yes	7.5	C
	No	4.5	A
2 M 41	Yes	8.5	C
	No	5.5	A
3 L 41 C, 3 M 41 Z	Yes	10.5	D
	No	8.0	A
3 M 41	Yes	11.0	D
	No	8.5	A
4 L 41 C, 4 L 42 C, 4 M 41 Z	Yes	13.0	D
	No	–	–
4 M 41, 4 M 42	Yes	14.0	D
	No	–	–

Note:

The **engine oil contents** stated here are to be regarded as **approximate**.

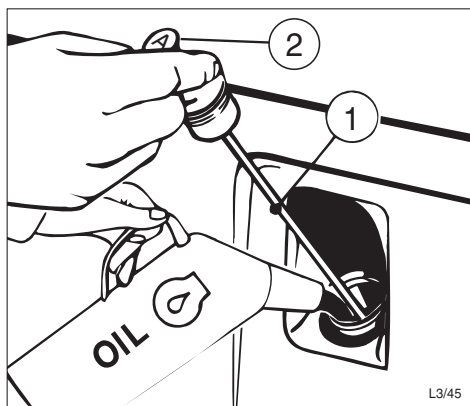
In all cases, the **MAX** marking on the dipstick **should be complied with**.

The engine should be in a horizontal position before adding oil or checking the oil level.



7

– Pull out dipstick „1“ (fig. 7).



8

- Add engine oil up to the **MAX** mark on dipstick „1“ (Figures 7 and 8).
- Run the engine for a short time, then check oil level again and correct if necessary.

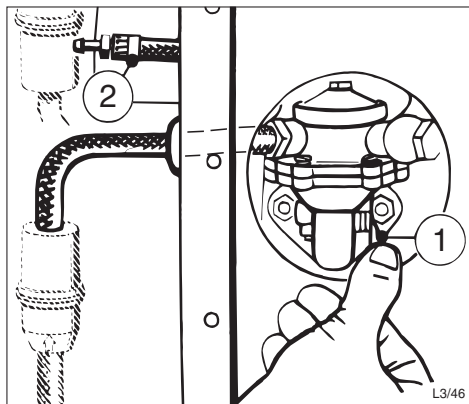
4.1.2. Fuel



Stop the engine before refilling the fuel tank. Never refuel near a naked flame or sparks which could start a fire. Don't smoke. Use only pure fuel and clean filling equipment. Take care not to spill fuel.

All diesel oils sold as fuel and complying with the following minimum specifications can be used:

**EN 590 or
BS 2869 A1 / A2 or
ASTM D 975 - 1D / 2D**



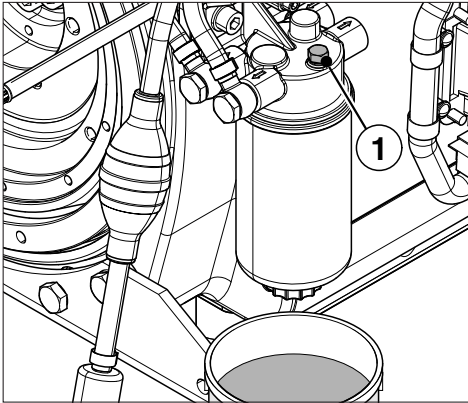
9

- Before the engine is first started, or if the fuel system was run dry, prime the fuel delivery pump at lever „1“ until fuel is heard to flow back through the return line „2“ to the fuel tank.

Important !

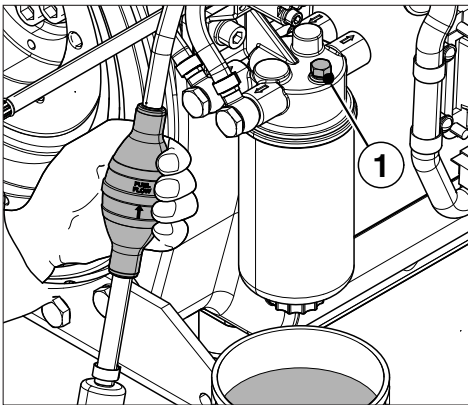
Remember to replace the access cover for the fuel delivery pump in the side panel of the engine enclosure after priming the pump (Chap. 2).

**Models with manual fuel pump
(On 4L42C and 4M42 engines only)**



10

- Place a suitable vessel under the filter to trap escaping fuel.
- Open the vent screw **1** by approx. one turn.



11


- Compress and release rubber ball repeatedly, until fuel escapes from the vent screw **1**.
- Close vent screw **1**, **then** actuate rubber ball **another two times**.

Low temperature resistance

At low temperatures, the viscosity of Diesel fuel increases. This may result in clogging of the fuel system. Thus, winter fuel must be used at outside temperatures below 0 °C, or petroleum must be added in time.

Lowest ambient temperature when starting, in °C	Paraffin content for:	
	Summer fuel	Winter fuel
0 up to -10	20 %	–
-10 up to -15	30 %	–
-15 up to -20	50 %	20 %
-20 up to -30	–	50 %

4.2. Starting

 **Do not run the engine in closed or badly ventilated rooms – danger of poisoning! Before the engine is started, always make sure that nobody is in the danger area (moving parts on engine or machinery) and that all safety guards are in place.**

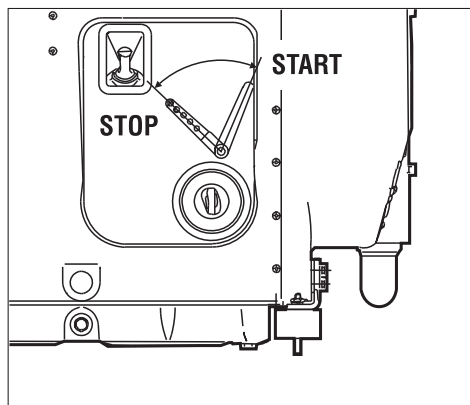


12

Never use any spray starting aids

If possible, disengage the engine from any driven equipment.
The auxiliary equipment should always be placed in neutral.

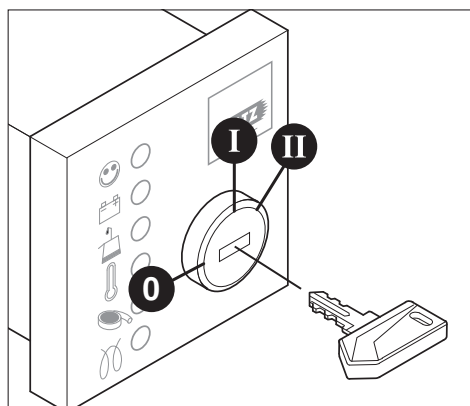
4.2.1. Starting with the electric starter



13

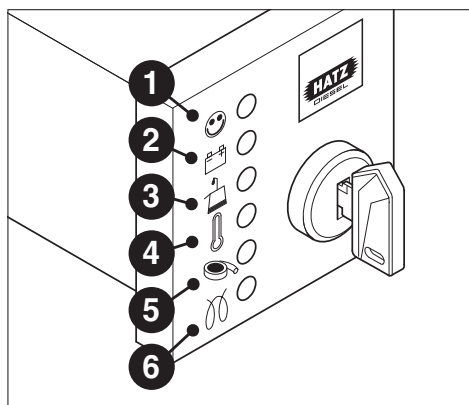
– Move the speed control lever to the 1/2 START or max. START position, according to requirements and starting conditions.

Note that a lower speed setting will cause less exhaust smoke when starting.



14

– Insert the key **to its stop** and turn it to **position I**.



15

– Battery charge telltale „2“ and oil pressure warning „3“ must light up.

– Turn start key to **position II** (Fig. 14).

– As soon as the engine runs, release the start key. It must return to **position I** by itself and remain in this position during operation.

The battery charge telltale and oil pressure warning must go out immediately after starting. Indicator light „1“ is on when the engine is in operation.

– The air cleaner maintenance indicator „5“ only lights up during operation if the air cleaner element needs to be cleaned or renewed (Fig. 15, see chapter 5.4.2.).

– The engine temperature display „4“ (additional equipment) lights up if the temperature at the cylinder head becomes too high.

Switch off the engine and trace and eliminate the cause of the problem, see chapter 7.

– Always turn the start key back to **position 0** before re-starting the engine. The repeat lock in the ignition lock prevents the starter motor from engaging and possibly being damaged while the engine is still running.

Important!

If a starter protection module is installed, the start key has to be returned to **position 0** for at least 8 seconds after the engine has failed to start or after switching it off before a further attempt can be made to start the engine.

Preheating device with automatic heating timer (additional equipment)

The preheating light „6“ lights up additionally at temperatures below 0° Celsius (Fig. 15).

- After the light has gone out, start the engine without delay.

Automatic shut-down function

(additional equipment)

This is characterized by a brief flashing of all pilot lamps once the starter key has been turned to **position I**, figure 15.

Important!

If the engine cuts out immediately after starting or switches off by itself during operation, a monitoring element in the automatic shutdown system has tripped. The corresponding indicator light (Fig. 15, positions 2 - 5) will come on. After the engine has stopped, the display continues to glow for about 2 minutes.

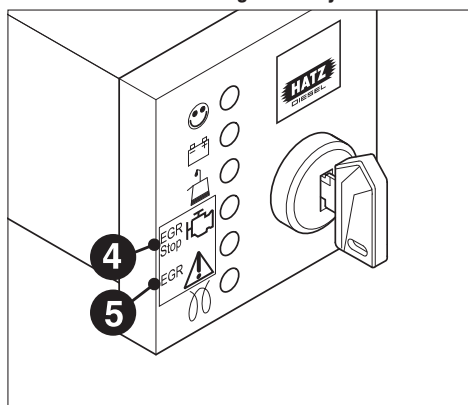
The electrical device then switches itself off automatically. The display lights up again after the start key has been turned back to **position 0** and then to **position I** again.

Trace and eliminate the cause of the operating fault before trying to restart the engine (see chapter 7).

The display light goes out when the engine is next started.

Even with automatic shutdown monitoring the oil level must be checked every 8 – 15 operating hours (Chapter 5.2.1.).

On 4L42C and 4M42 engines only



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These engines are equipped with an exhaust gas recirculation valve (EGR). This results in the following changes regarding the pilot lamps:

- The engine diagnosis indicator „4“ goes on as soon as the cylinder head temperature exceeds the admissible range.

Stop the engine and eliminate the cause as described in Chapter 7.

- The pilot lamp „5“ flashes during operation only if there is a problem in conjunction with the exhaust gas recirculation system. This also includes a contaminated air cleaner. This is indicated by the following flashing code of pilot lamp „5“:

7 short flashes (approx. 0.5 seconds) and
1 long flash (approx. 1.5 seconds)

The flashing code indicates that the air cleaner must be cleaned or replaced, chapter 5.4.2.

For troubleshooting regarding other flashing codes, please contact immediately your nearest HATZ service station.

Problems in the exhaust gas recirculation system may impair the engine's exhaust gas values.

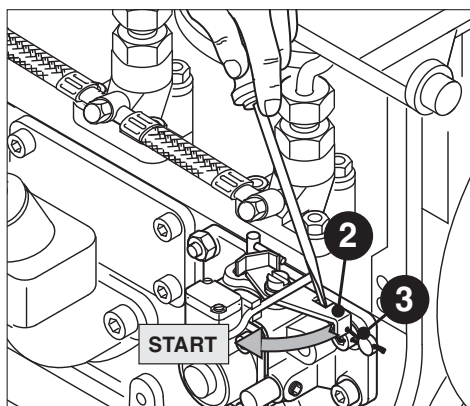
4.2.2. Emergency starting

If the engine has been stopped by the automatic shutdown system because of an electrical fault signal or inadequate oil pressure, an emergency start can be attempted, though in this case the manufacturer will accept no liability for consequential damage.

An emergency start could for example be unavoidable if the engine is used to power a vehicle which has come to a halt in a potentially dangerous area (for example on a rail crossing or road junction).

Proceed as follows:

- Detach the hood of enclosure „13“ (Figures 1 and 2) or side panel „2“ (Figures 3 and 4).



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- Place a suitable tool, for example a screw driver, behind emergency start lever „2“ and pull sharply outwards. This will break the lead seal „3“ between the emergency start lever and the screw on the engine block.
- As soon as the emergency start lever is in the starting position, the engine can be started again.

Important:

If the emergency start lever is used, the automatic shutdown system ceases to operate and the warranty is invalidated. For this reason, run the engine only in a genuine emergency and for a very short time (a few seconds) after operating the emergency start lever. Make sure before restarting the engine that there is sufficient oil in the engine; if oil pressure is too low, irreparable engine damage may occur very quickly.

Immediately after running the engine in an emergency, locate the origin of the fault signal and rectify the fault (see Chapter 7).

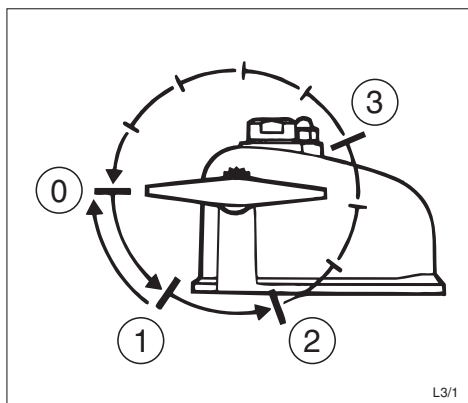
If any problems arise, please contact the nearest **HATZ service point**.

4.2.3. Starting with handle

(on 2-4 M 41 engines only)

Preparations

- Move the speed control lever to START position (Fig. 13).



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- Turn all decompression levers (1 on two-cylinder engines, 3 on three-cylinder engines, 4 on four-cylinder engines) to position 1.

Important !

Turn decompression levers only in the direction shown by the arrow.

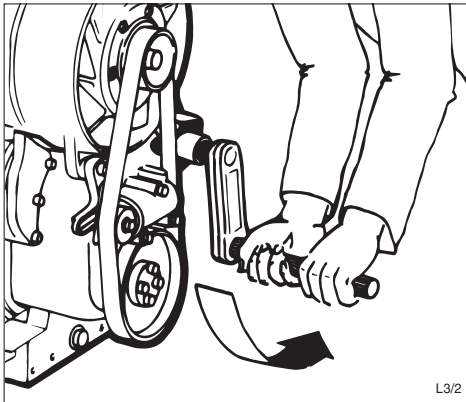
Exception:

the lever can be moved back directly from position „1“ to „0“.



Never operate the automatic decompression system when the engine is running.

- Check that the starting handle is in correct working order, without a broken tubular handle worn engagement dogs or similar faults.
- Lightly grease the sliding-contact area between the starting handle and the guide sleeve.



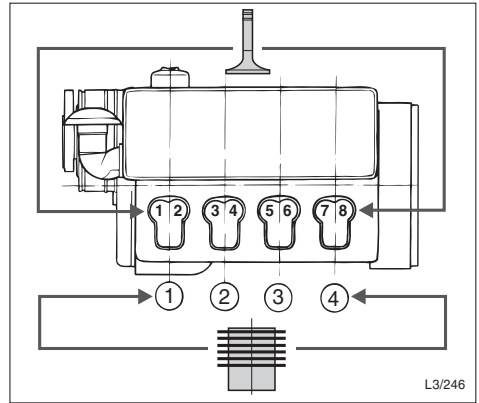
19

- Insert the starting handle, hold it with both hands and stand in the correct position in relation to the engine.
- Turn the engine over until it is felt to move more freely.

2M41 two-cylinder engines

- Turn the decompression lever to position „2“ (Figure 18).

3M41 three-cylinder engines



20

- Turn the decompression levers for cylinders 1 and 3 (counting from the fan end) to position „2“ (Figures 18 and 20).
- Turn the decompression lever for cylinder 2 to position „3“.

4M41 four-cylinder engines

- Turn the decompression levers for cylinders 1, 3 and 4 (counting from the fan end) to position „2“ (Figures 18 and 20).
- Turn the decompression lever for cylinder 2 to position „3“.

Starting procedure

- Turn the starting handle with both hands at an increasing speed.

The maximum speed of rotation must have been reached by the time the decompression lever has returned to **position „0“**.

- As soon as the engine has started, pull the starting handle out of the guide sleeve.

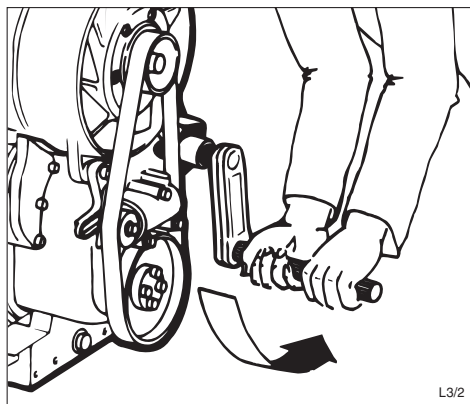
- If the engine backfires during starting because it was not turned over with sufficient force (the engine could even start to run backwards in certain circumstances), release the starting handle immediately and move the speed control lever to the STOP position (Chapt. 4.3.).



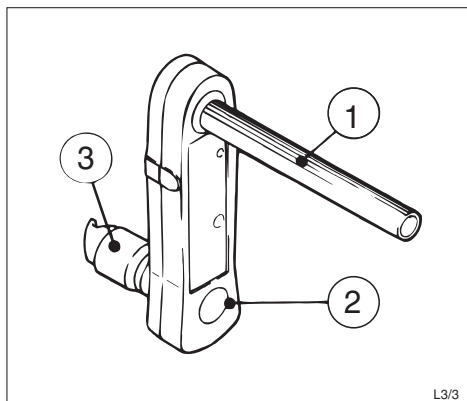
The starting handle could be driven round by the engine and cause injury.

- Wait until the engine has come to a standstill before repeating the preparatory procedure and making another attempt to start it.

4.2.4. Starting with the handle with kick-back damping



21



L3/3

22

- Preparations for starting the engine and the hand starting procedure are precisely the same as with the standard handle. Always hold tubular grip „1“ with both hands (Figures 21 and 22).
- Turn the handle slowly at first, until the pawl engages in the ratchet, then increase turning force to build up speed. The highest speed must have been reached by the time the decompression lever returns to position „0“. As soon as the engine has started, pull the starting handle out of the guide sleeve.



You must hold the tubular grip firmly to maintain contact all the time between the starting handle and the engine. Maintain turning force during the entire hand starting operation.

- If backfiring should occur while hand starting the engine too soft, the brief reversal of movement disengages the pawl between the crankshaft „2“ and the drive dog „3“ (Fig. 22).
- If backfiring occurred and the engine starts running backwards (smoke from airfilter), release crankhandle immediately and move speed control lever into STOP-position, chapt. 4.3.

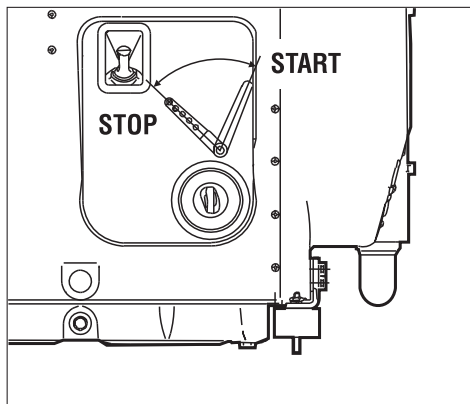
- To repeat the starting attempt, wait for the engine to cease rotating, reset the automatic decompression device and turn the starting handle in the correct starting direction again.

4.3. Stopping the engine



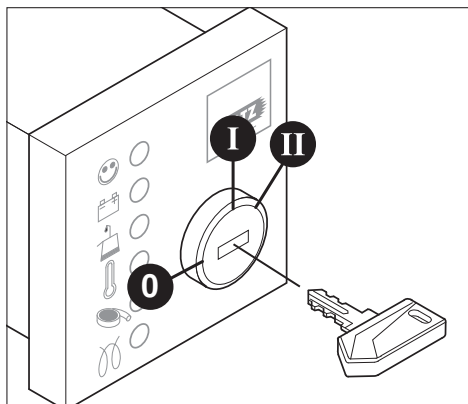
If the engine is shut down for a short period, or at the end of the working day or shift, keep the key and the starting handle in a safe place, out of reach of unauthorized persons.

Engines with electric starter



23

- Move the speed control lever to the stop position; the engine will be shut down.



24

- Turn the starter key to the **0 position** and pull it out. The pilot lamp lights must then go out.

Note:

Engines with an automatic shut-down function can also be switched off by turning the start key back to **position 0**.

Engines with starting handle

- Move the speed control lever to the stop position; the engine will be shut down (Picture 23).



Never stop the engine by moving the decompression lever.

5. Maintenance



The engine must be stopped before any maintenance work is attempted.





Comply with legal requirements when handling and disposing of old oil, filters and cleaning materials.

Keep the engine's starting key out of reach of unauthorized persons.

Disconnect the negative battery terminal.

At the end of the maintenance work, check that all tools have been removed from the engine and all safety guards, covers etc. replaced in their correct positions. Before starting the engine, make sure that nobody is in the danger area (engine or driven machinery).

5.1. Maintenance summary

	Maintenance intervals	Maintenance work required	Chap.
	Every 8 – 15 hours of operation, or before each daily start-up	Check oil level. Check combustion air intake area. Check the cooling air system	5.2.1. 5.2.2. 5.2.3.
	Every 250 hours of operation	Engine oil change (2M41 without sump, 2...4 L41 and 4 L42 in general). Clean fan, cooling fins and oil cooler. Check tightness of threaded connections. Cleaning of mesh insert in exhaust pipe. Check water trap Check for contamination of fuel pre -filter, renew if necessary.* Checking operation of air cleaner maintenance indicator. Do not tighten the cylinder head nuts.	5.3.1. 5.3.2. 5.3.3. 5.3.4. 5.3.5. 5.4.1. 6.1.
	Every 500 hours of operation	Renew the fuel pre -filter. Air cleaner maintenance. Check and adjust valve clearances. Engine oil change (2M41 with sump, 3...4 M41 and 4 M42 in general). Renew the oilfilter.	5.4.1. 5.4.2. 5.4.3. 5.4.4. 5.4.5.
	Every 1000 hours of operation	Renew the fuel filter	5.5.1.

* Fuel **pre**-filter renewal intervals depend on the degree of fuel contamination, the care taken when refuelling and the amount of contamination inside the fuel tank.

HATZ DIESEL

WARTUNG · MAINTENANCE
ENTRETIEN · MANTENIMIENTO
MANUTENZIONE

8-15

250

STUNDEN · HOURS · HEURES
HORAS · ORE

500

1000

BEI BEDARF
IF NECESSARY
SI NECESSAIRE
EN CASO DE
NECESIDAD
SE NECESSARIO

2M41

°C	°F	SAE
122	250	5W/30
104	217	5W/40
86	187	10W/30
68	154	10W/40
50	122	15W/40
32	90	20W/20
14	57	30
-4	25	40
-22	-8	
-40	-40	

040 389 01

25

2M41 without oil pan

HATZ DIESEL

WARTUNG · MAINTENANCE
ENTRETIEN · MANTENIMIENTO
MANUTENZIONE

8-15

250

STUNDEN · HOURS · HEURES
HORAS · ORE

500

1000

BEI BEDARF
IF NECESSARY
SI NECESSAIRE
EN CASO DE
NECESIDAD
SE NECESSARIO

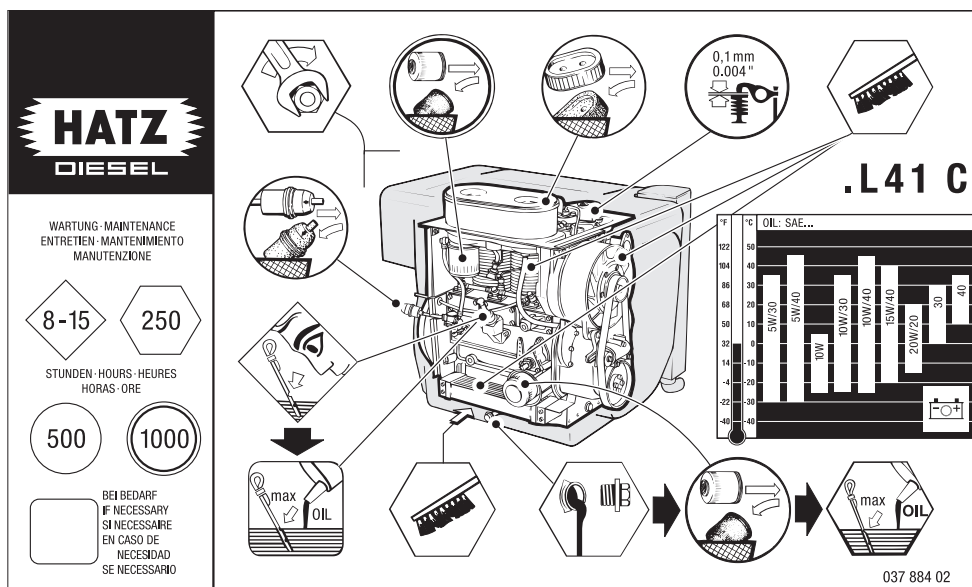
.M41

°C	°F	SAE
122	250	5W/30
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86	187	10W/30
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50	122	15W/40
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14	57	30
-4	25	40
-22	-8	
-40	-40	

037 882 02

26

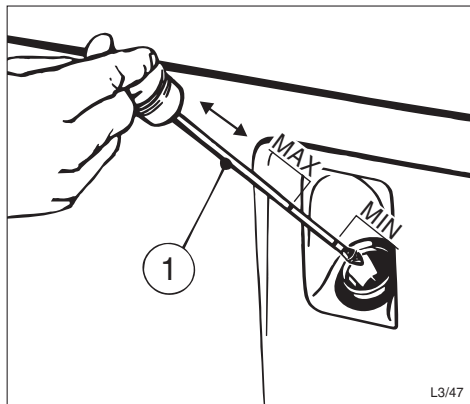
2M41 with oil pan; 3 - 4M41 in all cases



5.2 Maintenance every 8 – 15 hours of operation

5.2.1. Check engine oil level

When checking the oil level, the engine should be standing level, and must not be running.

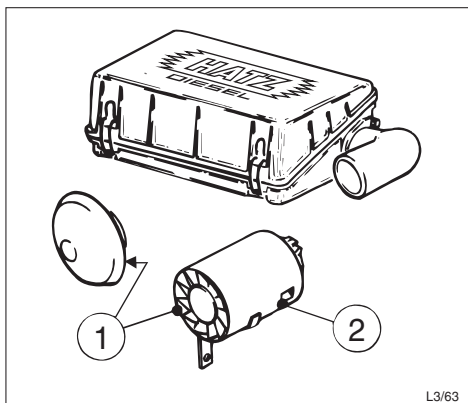


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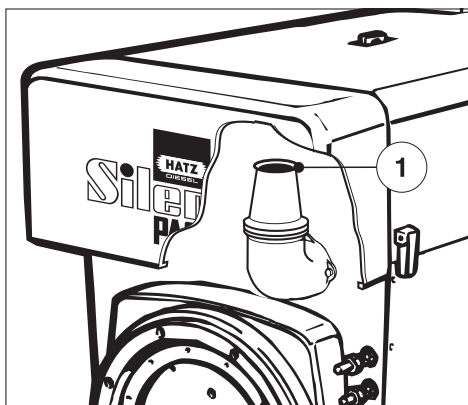
- Check oil **level** at the dipstick. Add oil up to the **MAX mark** on dipstick „1“ if necessary (Chapter 4.1.1.).

5.2.2. Check combustion air intake area

Severe contamination is a sign that the air contains a high level of dust, and that the maintenance intervals should be shortened accordingly (Chapter 5.4.2.).



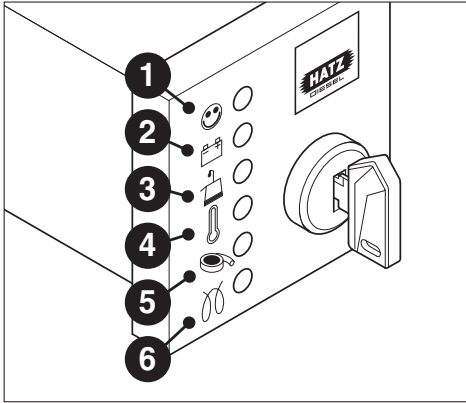
29



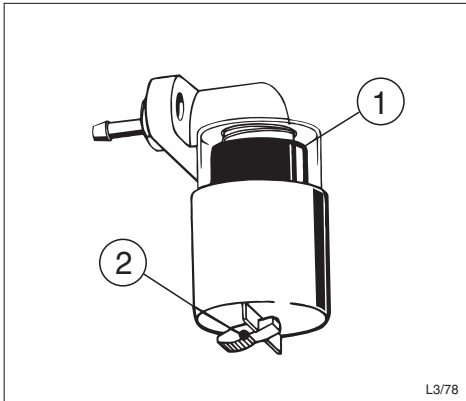
30

- Inspect intake opening „1“ on the rain protection cap or cyclone separator for severe blockage with dirt, for instance leaves, heavy dust deposits etc., and clean if necessary. (Figures 29 and 30).
- Check for free airflow at dust outlet hole „2“ on the underside of the housing, and clean if necessary (Picture 29).
With oily contamination remove cyclone and clean it.

On 2-4L41 and 2-4M41 engines only



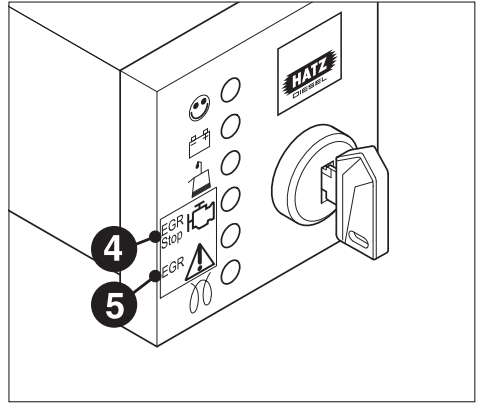
31



32

- Run the engine at full speed briefly once a day, shortly after starting it. Check that indicator light „5“ comes on briefly or, depending on version, red zone „1“ is seen in the mechanical maintenance indicator (Figures 31 and 32, Chapter 5.4.2.).

On 4L42C and 4M42 engines only



33

- Increase the engine speed briefly to maximum level and watch out for the pilot lamp „5“ to flash. The following flashing code indicates that maintenance work is required on the air cleaner (Chapter 5.4.2).

7 short flashes (approx. 0.5 seconds) and 1 long flash (approx. 1.5 seconds)

5.2.3. Check the cooling air system

Severe contamination with dirt is a sign that the air contains a high level of dust, and that the maintenance intervals should be shortened accordingly.

- Inspect the air inlet and outlet areas for severe blockage with dirt, for instance leaves, heavy dust deposits etc., and clean if necessary (see Chapter 5.3.2.).

Temperature display „4“ (if fitted) resp. engine diagnosis indicator „4“ lights up as soon as the engine starts to overheat (Fig. 31 and 33).

Stop the engine immediately. (Chap. 5.3.2.).

5.3. Maintenance every 250 hours of operation

5.3.1. Engine oil change

(see Chapter 5.1.)

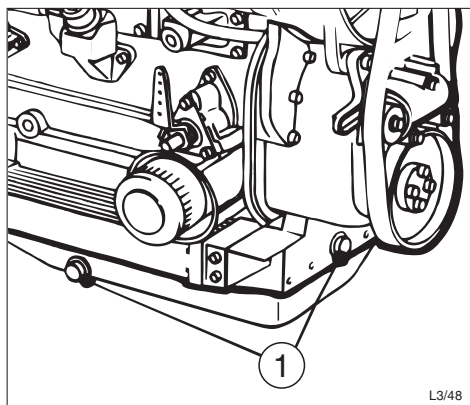
The dipstick mark will indicate whether or not the engine has a sump (see Chapter 4.1.1.). The engine must be stopped, and should be standing on a flat, level surface.

– Drain the engine oil only when it is warm.



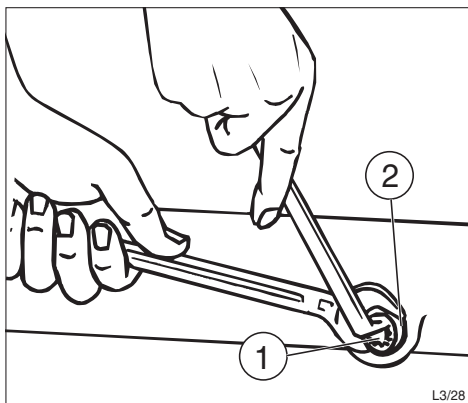
Risk of scalding from hot oil.

Trap the old oil and dispose of it in an environmentally acceptable manner.



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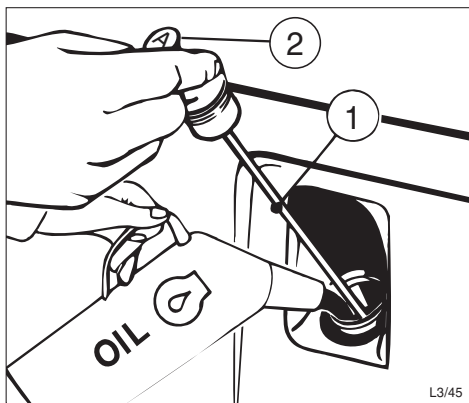
- Unscrew oil drain plugs „1“ and allow all the oil to drain out.
- Attach a new seal and insert and tighten the oil drain plug.



35

Important !

When unscrewing and removing drain plug „1“, make sure that drain tube „2“ is not accidentally loosened. If necessary, prevent it from turning with a suitable open-ended wrench.



36

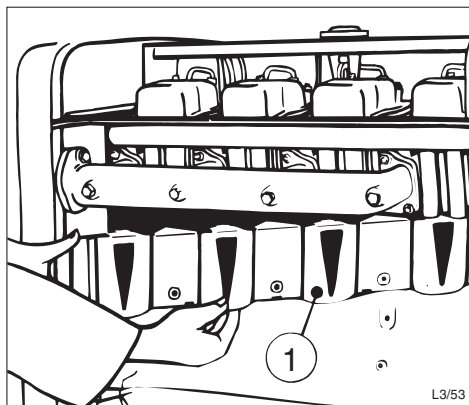
- Add **lubricating oil** of suitable quality and viscosity up to the **MAX. mark** on the dipstick. (Chapter 4.1.1.).
- Run the engine for a short period, then check the oil level again and top up if necessary.

5.3.2. Cleaning cooling fan, cooling fins and oil cooler



Before cleaning, the engine must be stopped and allowed to cool down.

- On encapsulated engines, unscrew and remove the hood, side panel with speed control lever, cover plate on operating side and air outlet duct and cover plate on air outlet side (see Chapter 2).
- On non-encapsulated engines, take off the side trim and the air duct to the engine oil cooler.



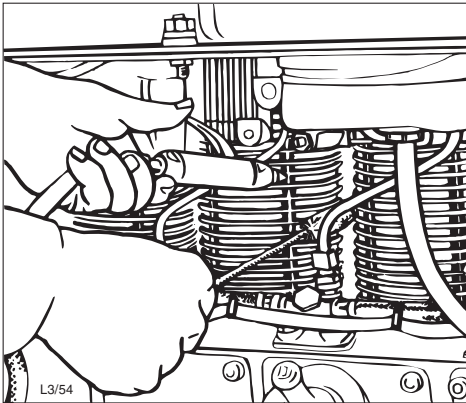
37

- Unscrew and remove baffle plate „1“.

Removing dry dirt

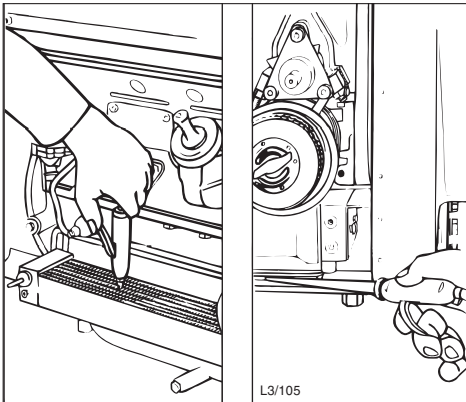


Persons handling compressed air must wear protective goggles.



38

- Clean the cooling fan, cylinder head and cylinders with a suitable brush.



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Note:

On the encapsulated engine, also clean the area between the baseplate and the crankcase.

- Blow out the entire cooling area zone with compressed air.

- Clean the engine oil cooler only by blowing out with compressed air. In this case, do not direct a powerful air jet against the easily damaged cooling fins (Figure 39).

Removing damp or oily dirt

- Disconnect the negative lead at the battery.
- Manually clean alternator and regulator.
- Shield the alternator with attached voltage regulator; do not spray it directly.
- Clean the complete area with a suitable detergent solution in accordance with its manufacturer's instructions, then spray down with a powerful water jet.
Do not splash electrical system with water jet or pressure jet during engine cleaning.

Note:

Do not use petrol (gasoline) or acid cleaning agents.

- Dry the engine with a compressed air jet.
- Trace the cause of any contamination with oil and have the leak eliminated by a HATZ service station.
- Install the capsule or air guide elements previously removed.
- Run the engine until warm, to prevent residual moisture from causing rust.



The engine must never be run without all guards and covers in position.

5.3.3. Checking threaded connections

Check the tightness of all threaded connections and take up slack if necessary, provided that these can be reached during maintenance work.

Note:

Do not tighten the cylinder head nuts.

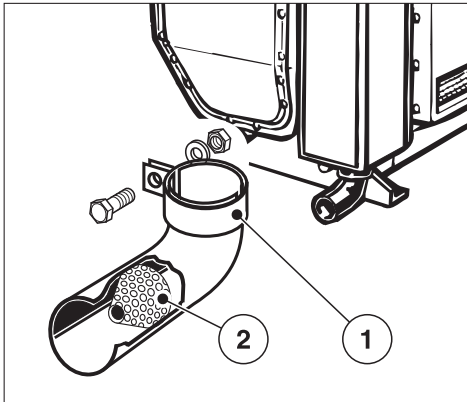


The adjusting screws at the engine governor and on the injection system are sealed with lacquer or with lead and are not to be tightened or adjusted.

5.3.4. Cleaning of mesh insert in exhaust pipe (additional equipment)



Exhaust system components will naturally be hot and must not be touched while the engine is running or until it has cooled down after being stopped.



40

- Loosen pipe clip „1“ and remove with exhaust pipe.
- Remove deposits in mesh insert „2“.
- Check mesh insert on chinks or fractures, replace if necessary.

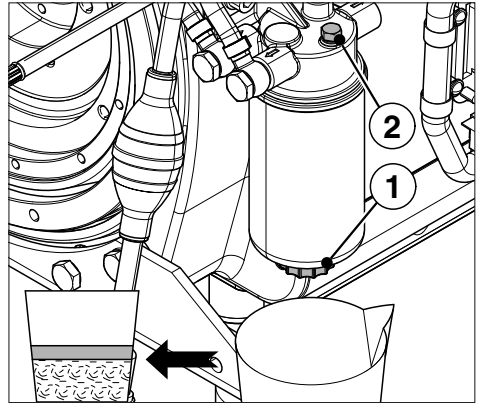
Remark:

Engine operation for a longer period of time without load or with less load can lead to deposits in the mesh insert. Shorten maintenance interval.

5.3.5. Check water trap

(On 4L42C and 4M42 engines only)

The water trap inspection interval depends exclusively on the water contained in the fuel and on the care applied in refuelling. It may be admissible to extend the intervals, or it may be necessary to considerably shorten the intervals.



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- Release the drain plug „1“ and collect the liquid in a transparent vessel.
If the drain plug is not easily accessible, an extension piece of hose can be slipped on the plug.
- If an insufficient amount of liquid leaves the tank, release additionally plug „2“.

As water is heavier than diesel fuel, first the water, then the fuel will escape. This is indicated by the clearly visible separating line.

- If finally only fuel leaves through the port, the drain plug „1“ can be closed again.
- Subsequently, re-tighten plug „2“.

Note:

If starting appears difficult, bleed the injection system using the manual fuel pump (Chapter 4.1.2.)

5.4. Maintenance every 500 hours of operation

5.4.1. Replace fuel pre-filter



Do not smoke and never bring a naked flame near the fuel system when working on it.

Important !

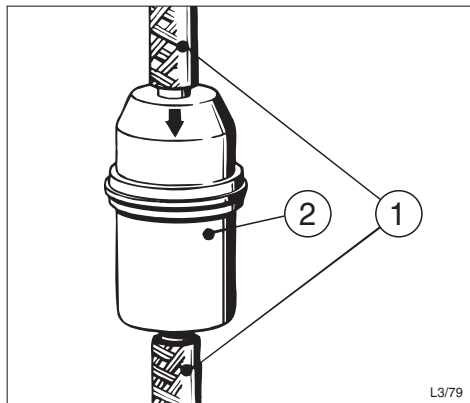
Maximum cleanliness is required to prevent dirt from entering the fuel system. Fuel particles may damage the injection system.

- Place a suitable vessel under the filter to trap escaping fuel.
- Close the fuel supply line.

Note:

Fuel pre-filter maintenance intervals depend on the purity of the fuel used in the engine and should be reduced to 250 hours if necessary.

Replace fuel pre-filter



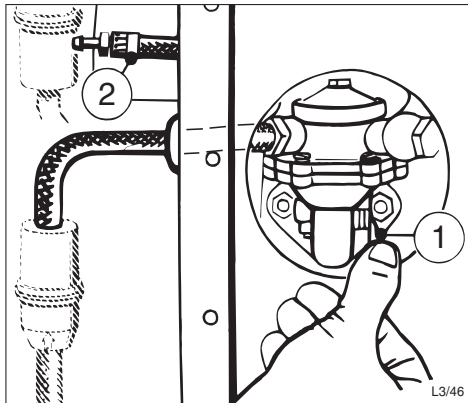
42

- Pull fuel supply line „1“ off fuel pre-filter „2“ at both sides.
- Insert the new pre-filter.

Important !

When installing a new filter, note the arrow indicating the correct flow direction (depends on whether the tank is mounted HIGH or LOW. The pre-filter's installed position (direction of flow) should be as vertical as possible.

- Open the fuel supply line.



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Note:

On 2-4L41 C and 2-4M41 engines

To make starting easier, it is best to prime the fuel delivery pump at lever „1“ until fuel is heard to flow back through return line „2“ and into the fuel tank.

- Operate the lever to check for leaks.

On 4L42 C and 4M42 engines

If starting appears difficult, bleed the injection system by means of the manual fuel pump (Chapter 4.1.2.)

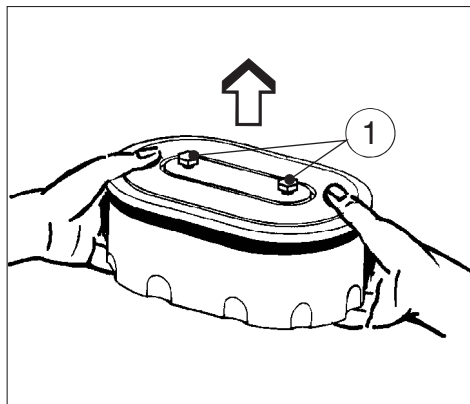
5.4.2. Air cleaner maintenance

It is best to clean the filter cartridge (two pcs. on four-cylinder engines) only when the maintenance indicator displays the appropriate signal. Apart from this, the cartridge should be renewed after 500 hours of operation.

Removing the air filter cartridge

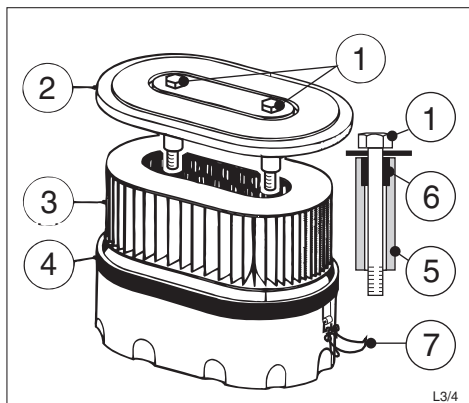
(on 2..4 L 41. engines)

- Take off the capsule hood. chap. 2.
- Remove dirt adhering in the region of the air cleaner housing.



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- Slacken of screws „1“ only sufficiently to enable the complete air cleaner housing to be lifted off.
- Cover the opening in the intake pipe so that no dirt or other foreign bodies can enter.



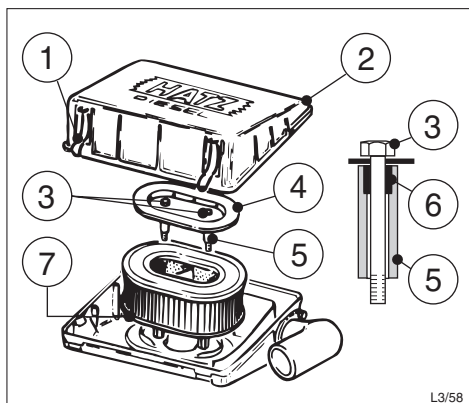
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- After this, open the air cleaner housing and take out element „3“.
- With 3-cyl. engines the cover „2“ is additionally fixed with clamp „7“.
- Clean the housing and the cover.
- Spacer „5“ is attached to screw „1“ by flexible bushing „6“, so that it cannot drop into the intake pipe during dismantling and assembly work.
- If the spacer is loose, renew bushing „6“

Removing the air filter cartridge

(on 2..4 M41 engines)



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- Release clips „1“ and take off the cover of air cleaner housing „2“ (Figure 46).
- Remove dirt adhering in the air cleaner area.
- Slacken off screws „3“ only sufficiently to enable cover „4“ with the filter element to be lifted off.
- Blank off the intake pipe opening with cloths so that dirt or other foreign bodies cannot enter.
- Clean filter housing and cover.

Spacer „5“ is attached to screw „3“ by flexible bushing „6“, so that it cannot drop into the intake pipe during dismantling and assembly work.

- If the spacer is loose, renew bushing „6“.

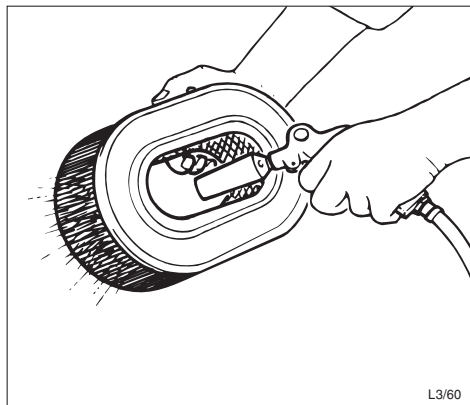
The filter cartridge is either renewed or, depending on the degree of contamination, checked and cleaned as follows:

Cleaning the air filter cartridge

Dry contamination



Persons handling compressed air must wear protective goggles.



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- Blow through the filter cartridge from the inside outwards with dry compressed air until no more dust emerges.

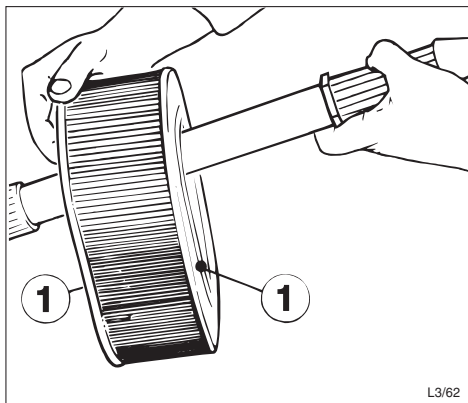
Important

Air pressure must not exceed 5 bar, and the compressed air jet must be held approx. 150 mm (6 in) away from the filter cartridge.

Damp or oily contamination

- Renew the filter cartridge

Checking the air filter cartridge



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- Examine sealing faces „1“ on the filter cartridge for damage.
- Hold the air filter cartridge at an angle against the light or shine a lamp through it to detect any cracks or other damage to the paper element.

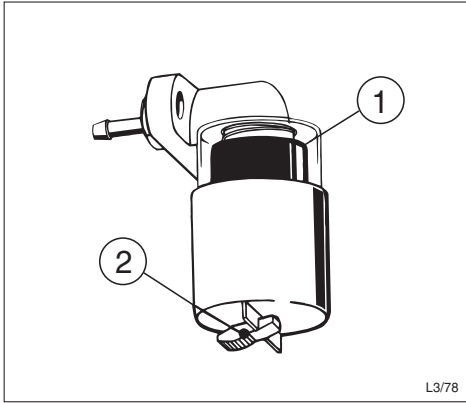
Important:

If there is the slightest damage in these areas, the filter cartridge should not be re-used.

Installing the air filter cartridge

- Assemble all parts in succession, making sure that they seat firmly and make a reliable seal.

Mechanical contamination indicator

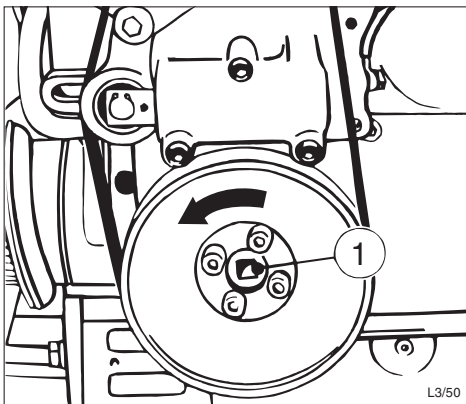


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After the air cleaner has been re-assembled, the red zone „1“ visible in the maintenance indicator must be cancelled by pressing reset knob „2“.

5.4.3. Checking and adjusting valve clearances

- On the encapsulated engine, take off the capsule hood (see Chapter 2).
- Unscrew the hex nuts and take off the cylinder head cover (Figure 3, Item 13).
- Take off the covers for the air guide housing and belt guard (see Chapter 2).



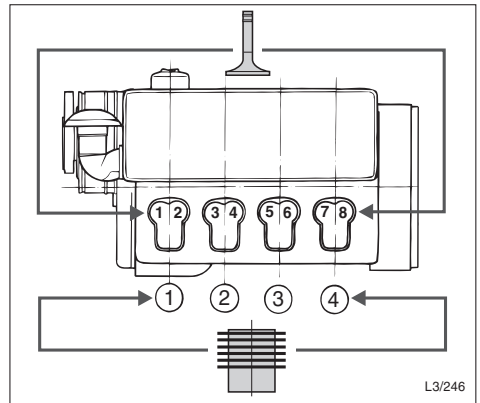
50

- Insert a ratchet wrench or a 1/2" T-piece with the necessary extension into square hole „1“ (Figure 50).

Important !

Turn the engine over in the normal direction of rotation.
This is counter-clockwise in either case – at the flywheel or timing gear end.

Adjusting method for two-cylinder engines



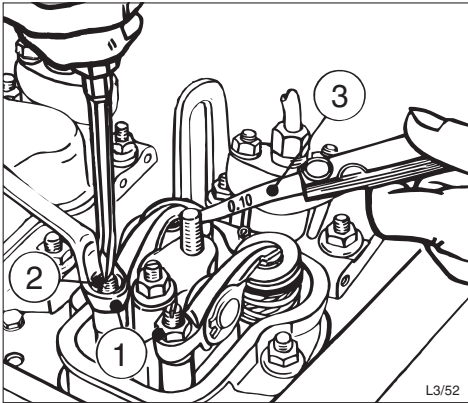
51

- The valves in cylinder 1 (at the fan end) must be in the overlap position (exhaust valve not yet closed, inlet valve just starting to open).
- Turn the crankshaft through 180 degrees in the normal direction of rotation, and check valve clearances at cylinder 2.
- Turn the crankshaft a further 180 degrees in the same direction as before, and check the valve clearances at cylinder 1.

Adjusting method for three- and four-cylinder engines (Fig. 51)

Type	Valve No. ... fully open	Check valves at cyl. No.
3-cylinder	1	3
	5	2
	3	1
4-cylinder	1	3
	5	4
	7	2
	3	1

- Check valve clearances with a feeler gauge.
- Valve clearances (inlet and exhaust valves)
= 0.10 mm **with engine cold**.



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- If valve clearance is incorrect, slacken off hex nut „1“. Turn adjusting screw „2“ until feeler gauge „3“ can just be pulled through between the rocker and the valve stem, with slight resistance to its movement, after nut „1“ has been retightened.

Important !

Repeat the procedure for all valves, noting the adjusting method described above.

- Attach the cover to the cylinder head again; always use new sealing rings.
 - Do not use the nuts securing the cover to the cylinder head more than twice before renewing them.
- Tightening torque: 10 Nm.**
- Run the engine briefly and check that the cover is not leaking at the cylinder head.

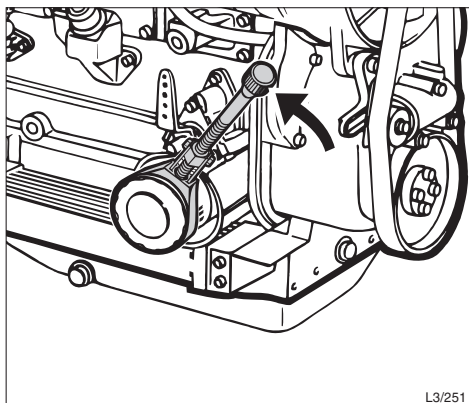
5.4.4. Engine oil change

(see Chapters 5.3.1. and 5.1.)

5.4.5. Renewing oil filter



Risk of scalding from hot oil.
Trap the old oil and dispose of it in an environmentally acceptable manner.



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- Using a strap wrench, unscrew the engine oil filter with replaceable element and pull it out. Order number for strap wrench: 620 307 01.
- Wipe escaping oil out of the oil trap plate.
- Oil the sealing lip of the new filter element lightly. Insert the **filter element** and **screw up handtight**.
- Add **engine** oil of a suitable specification and viscosity up to the **MAX mark** on the dipstick (See Chapter 4.1.1.).
- After running the engine for a short time, check the oil level again and correct it if necessary.
- Check the filter element for leaks and tighten by hand.

5.5. Maintenance every 1000 hours of operation

5.5.1. Renewing the fuel filter



Do not smoke and never bring a naked flame near the fuel system when working on it.

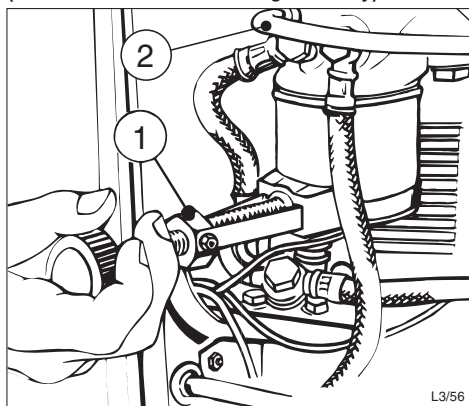
- On the encapsulated engine, take off the capsule hood (see Chapter 2).
- On non-encapsulated engines, take off the side trim.
- Place an absorbent cloth or wadding under the filter to trap escaping fuel.
- Close the fuel supply line.

Note:

Fuel filter maintenance intervals depend on the purity of the fuel used in the engine and should be reduced to 500 hours if necessary.

Renewing the fuel filter

(On 2-4L41 and 2-4M41 engines only)

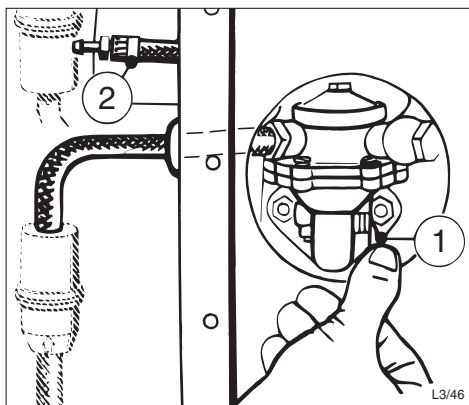


L3/56

54

- Push on strap wrench „1“ and unscrew the replaceable filter element by turning to the left. Order number for strap wrench: 620 307 01.
- Oil the sealing lip of the new filter element lightly.

- Install the **filter element** and **screw up handtight**.
- Open the fuel supply line again.



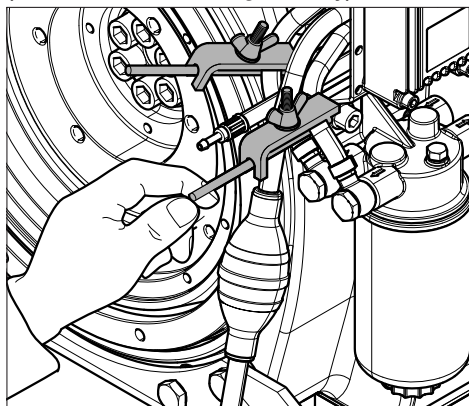
55

Note:

To make starting easier, it is best to prime the fuel delivery pump at lever „1“ until fuel is heard to flow back through return line „2“ and into the fuel tank.

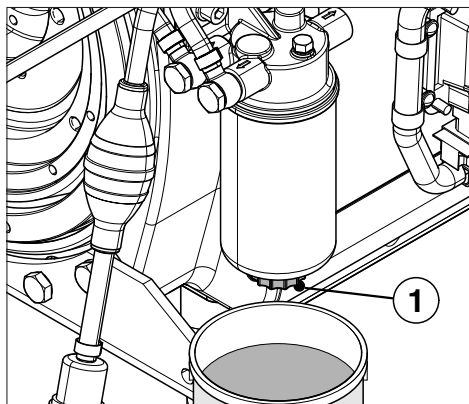
- Operate the lever to check for leaks.
- Install the enclosure and air guide elements again.

**Renewing the fuel filter
(On 4L42C and 4M42 engines only)**



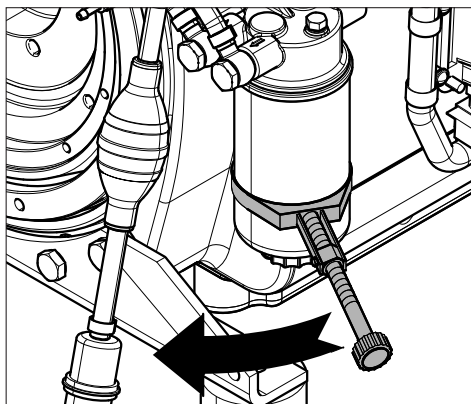
56

- Close the fuel lines at the filter housing.



57

- Place a suitable vessel under the filter to trap escaping fuel.
- Release drain plug „1“ to drain the fuel.



58

- Release the fuel filter using a strap wrench or a similar tool, and remove it.



59

- Slightly grease the seal „1“ of the new replaceable-cartridge filter
- Assemble **replaceable-cartridge filter** and tighten it **by hand**.
- Bleed the injection system by means of the manual fuel pump (Chapter 4.1.2).
- After a short test run, check fuel filter for leakage; if necessary, re-tighten it by hand.

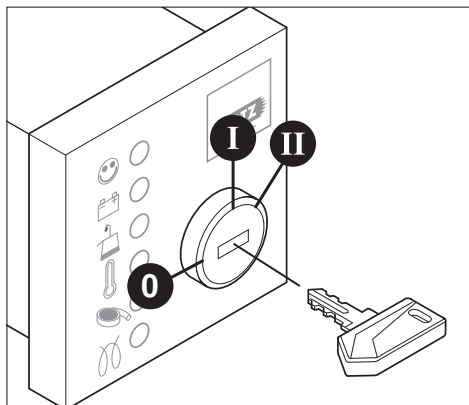
6. Operating checks and repair work

6.1. Checking operation of air cleaner maintenance indicator

Every 250 hours of operation, perform a routine check on the maintenance indicator or maintenance switch and the display light.

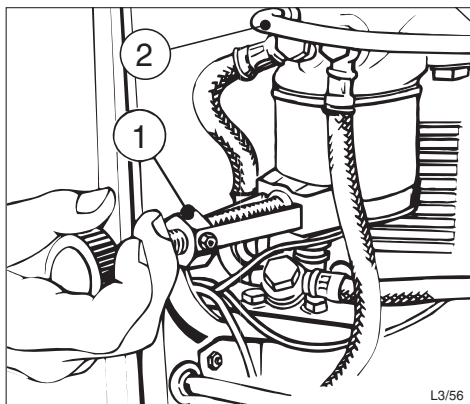
- Detach the capsule hood or side trim (see Chapter 2).

Electric maintenance switch



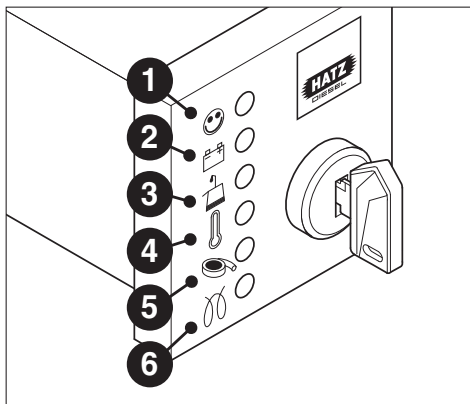
60

- Turn switch key to **position I**.



61

- Pull hose „2“ off air intake pipe and build up a strong vacuum at the open end.



62

Indicator light „5“ will come on.

If this response is not obtained, check the following points:

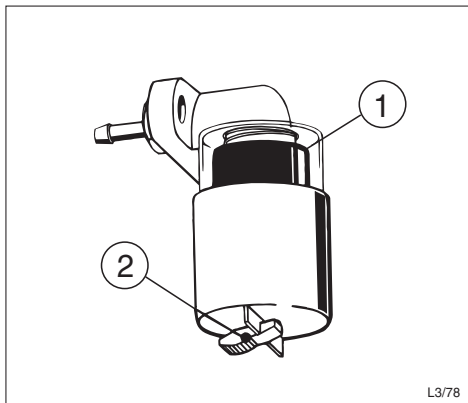
- electrical section: cable connections etc.
- Indicator light
- function of maintenance switch.

Note:

This function test cannot be performed for the engine types 4L42 and 4M42.

Mechanical maintenance indicator

- Pull hose „2“ off air intake pipe and build up a strong vacuum at the open end (Figure 61).

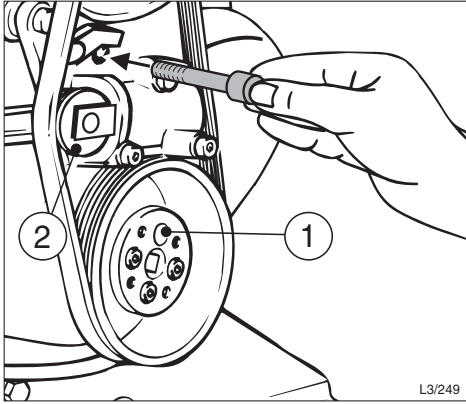


63

- Red zone „1“ will appear and engage in position.
- After the functional check, release red zone „1“ by pressing reset knob „2“.

Renew any defective components without delay.

6.2. Renewing fan drive belt, checking operation of belt monitor



64

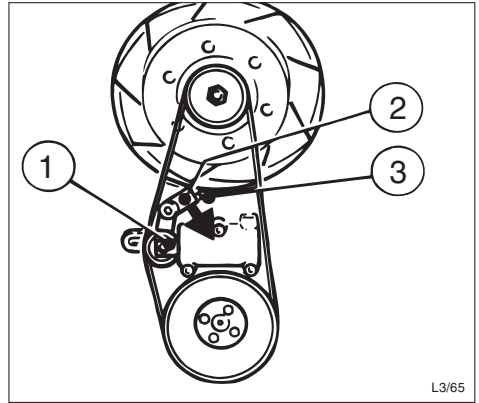
- Remove one machine screw at belt pulley „1“.
- Press back tensioning pulley „2“ and lock it with the machine screw provided.
- Unscrew and remove the belt pulley.
- Take off the Poly-V belt.

Note:

If any grooves on the belt pulley have broken off or are bent, always renew the pulley.

Checking operation of belt monitor

Always check operation of the shutdown device when the belt is renewed.



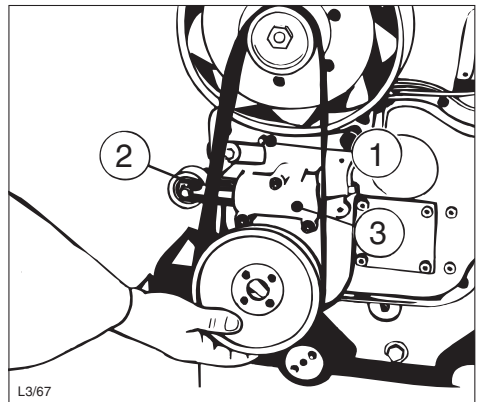
65

- Remove the machine screw to release the piston with tensioning pulley „1“.
- Spring pressure will force the piston with tensioning pulley out of the housing.
- Angled lever „2“ rotates downwards and releases shutdown pin „3“.

Important !

Shutdown pin „3“ must be forced out by spring loading or else automatic shutdown will not take place if the belt breaks.

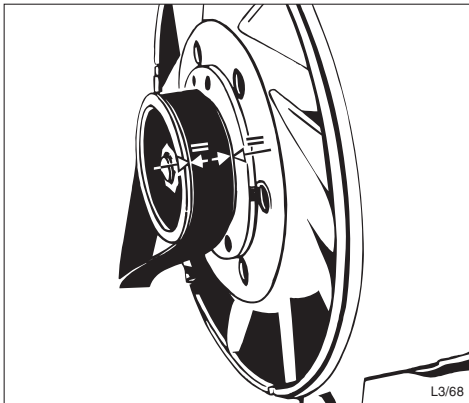
Installing the fan drive belt



66

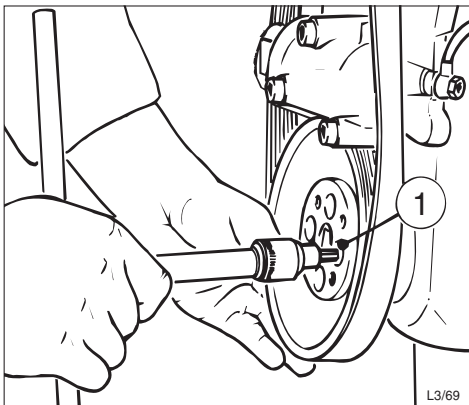
- Push in shutdown pin „1“.

- Push piston with tensioning pulley „2“ into housing „3“ and lock with the machine screw (Figure 66).



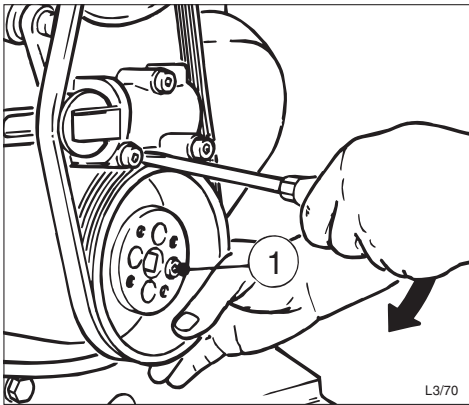
67

- Place the Poly-V belt centrally on the fan pulley and install the tensioning pulley and the lower belt pulley.



68

- Retain the belt pulley with one machine screw „1“ without pushing it fully on to the centering hub.



69

- Insert a large screwdriver between the hydraulic belt tensioner and the belt pulley and press it down until the pulley slides on to the centering hub.
- Insert and tighten the remaining machine screws „1“.

Types of belt

Since the belt pulleys on the **fan side** differ in diameter on various engine types and versions, Poly-V belts of differing lengths are fitted.

Type and engine version	Ident. No.	Belt length (mm)	Fan pulley diameter (mm)
2 L 41 C	502 031 00	920	72
All other types and versions	501 415 00	910	64

Note:

In order to be sure of avoiding mistakes concerning the length of Poly-V belts when ordering them, it is best to measure the diameter of the belt pulley at the fan end and refer to the above table, using this figure as a starting point.

7. Malfunctions – causes and remedies

Kind of trouble	Possibly caused by	Remedy	Chapt.
Engine will not start or is reluctant to start although it can be turned over with the starter.	Speed control lever is in stop or idle position.	Move lever to 1/2 START or max. START position according to operating conditions. Lever must remain fixed in this position.	4.2.1.
	No fuel reaching injection pump.	Add fuel. Prime the delivery pump until fuel is heard to flow back through the return line to the fuel tank.	4.1.2.
		Check through the entire fuel supply system systematically. If there is no improvement, check	
		- feed line to engine	5.4.1.
		- fuel pre-filter	5.5.1.
		- fuel filter	5.5.1.
		- delivery pump function.	
	If the engine is difficult to start after having been out of use for a lengthy period, but the problem can be solved by priming the delivery pump for some time: check that the fuel system is correctly laid out.		3.3.
	<hr/>		
	Compression too low:		
	- incorrect valve clearances.	Check valve clearances and adjust if necessary.	5.4.3.
	- cylinder or piston ring wear	See workshop manual.	
	- fault in automatic decompression device	See workshop manual.	
	Injectors not working correctly.	See workshop manual.	
	Fan drive belt broken.	Renew the Poly-V belt.	6.2.

Kind of trouble	Possibly caused by	Remedy	Chapt.
At low temperatures.	Pre-heat system (optional extra) has a fault.	See workshop manual.	
	Fuel has separated (inadequate low-temperature resistance).	Pull off fuel return line and check that clear (not turbid) fuel emerges. If fuel has separated, heat up the engine or drain the entire fuel supply system. Refill with a fuel mixture that is resistant to low temperatures.	4.1.2.
	Starting speed too low: - oil viscosity is too high.	Change engine oil; use correct viscosity grade.	4.1.1.
	- insufficient battery charge. - engine not declutched from machinery.	Check battery; Contact specialist workshop if necessary. If possible, declutch or otherwise disconnect the engine from the machinery it is used to drive.	8.
Starter motor is not energized, or does not turn the engine over.	Fault in electrical system: - battery and / or other cable connections are not correct. - loose and / or corroded cable connections. - battery defective and / or flat. - starter motor defective. - defective relays, monitoring elements etc.	Check electrical system and its components or contact a HATZ service point.	8.
	Speed control lever not moved far enough in the start direction.	Move lever farther towards „START“.	4.2.1.
Engine fires but does not run after the starter motor is switched off.	Engine not decoupled from machinery.	If possible, declutch or otherwise separate engine from the machinery it drives.	
	Fuel pre-filter or main fuel filter blocked.	Renew the filter.	5.4.1. 5.5.1.
	Fuel supply is interrupted.	Check through complete fuel supply system systematically.	

Kind of trouble	Possibly caused by	Remedy	Chapt.
Engine fires but does not run after the starter motor is switched off.	Stop signal from monitoring element for automatic shutdown system (optional extra):		
	- oil pressure lost	Check oil level.	5.2.1.
	- air cleaner blocked.	Check the amount of dirt adhering to the air filter; clean or if necessary renew.	5.4.2.
	- alternator has failed.	See workshop manual.	
Engine shuts down during operation.	Fuel tank is empty.	Add fuel.	4.1.2.
	Fuel pre-filter or main fuel filter blocked.	Renew filter.	5.4.1.
	Fan drive belt is broken.	Renew the Poly-V belt.	5.5.1
	Mechanical defect.	Contact a HATZ service point.	6.2
In addition, if automatic engine shutdown is installed.	Stop signal from monitoring element because of:	Check engine for:	
	- oil pressure too low.	Engine oil level.	5.2.1.
	- cylinder head temperature too high.	Cooling air passages blocked or cooling system otherwise affected.	5.3.2.
	Faults in electrical system, for instance:		
	- poor contact at cable connections.	Check electrical system and its components, or contact a HATZ service point.	8.
Engine power and speed drop.	Poor fuel supply:		
	- tank is running dry.	Add more fuel.	4.1.2.
	- fuel pre-filter or main fuel filter blocked.	Renew the filter.	5.4.1.
	- inadequate fuel tank venting.	Ensure that tank is properly vented.	5.5.1.
	- leaks at fuel line connections.	Check threaded unions for leaks.	
	- speed control lever does not remain in the selected position.	Tighten the speed control so that it cannot move accidentally.	

Kind of trouble	Possibly caused by	Remedy	Chapt.
Engine power and speed drop, black smoke from exhaust.	Air cleaner is blocked.	Check degree of air cleaner contamination and renew filter element if necessary.	5.4.2
	Valve clearances incorrect.	Adjust valve clearances.	5.4.3.
	Injectors not operating correctly.	See workshop manual.	
Engine runs very hot. Warning light for cylinder head overheating (optional extra) or engine diagnosis indicator (4L42 and 4M42) comes on.	Engine oil level is too high.	Drain off engine oil until level is at upper dipstick mark.	5.3.1.
	Inadequate cooling: - contamination at some point in cooling air supply.	Clean the cooling air path.	5.3.2.
	- missing or loose air guide plates or sections of capsule.	Check that all air guide plates and capsule sections are fitted and not leaking.	

8. Work on the electrical system



Batteries generate explosive gases.

Keep them away from naked flame and sparks which could cause them to ignite. Do not smoke.

Protect eyes, skin and cloth against the corrosive battery acid. Pour clear water over acid splashes immediately. In case of emergency call doctor.

Do not place any tools on top of the battery.

Always disconnect the negative (–) terminal of the battery before working on the electrical system.

- The **positive (+)** and **negative (–)** battery terminals must not be accidentally interchanged.
- When **installing the battery**, connect the **positive lead** first, followed by the **negative lead**. Negative pole to earth (ground) on engine block.
- When **removing the battery**, disconnect the **negative lead** first, followed by the **positive lead**.
- In all circumstances, **avoid short circuits** and shorts to earth (ground) at live cables.
- If electrical faults occur, first **check** for good contact at the **cable connections**.
- Replace a failed indicator light without delay.
- Do not take the key out while the engine is running.
- **Never disconnect the battery** while the engine is running. Electric voltage peaks can cause damage to electronic components.
- Do not splash electrical system with water jet or pressure jet during engine cleaning.

- When carrying out **welding work** on the engine or attached equipment, attach the earth (ground) clip as near as possible to the welding point, and disconnect the battery. If an alternator is fitted, separate the plug connector leading to the voltage regulator.

The relevant circuit diagrams are supplied with engines which have an electrical system. Additional copies of circuit diagrams can be obtained on request.

HATZ assumes no liability for electrical systems which have not been carried out acc. to HATZ circuit diagrams.

9. Protective treatment

A new engine can normally be stored for up to 12 months in a dry place.

If atmospheric humidity is high (or if exposed to sea air), protection is sufficient for about 6 months' storage.

If the engine is to be stored for a longer period, or laid up out of use, please consult the nearest HATZ service point.

**SUPPLEMENTAL INFORMATION
TO THE OWNER'S MANUAL FOR 2008 AND LATER
EPA CERTIFIED
NONROAD COMPRESSION IGNITION ENGINES.**

**EPA EMISSION CONTROL SUPPLEMENTAL
WARRANTY STATEMENT AND
EMISSION-RELATED INSTALLATION
INSTRUCTIONS.**

MAINTENANCE AND WARRANTY.

SUPPLEMENTAL INFORMATION TO THE OWNERS MANUAL FOR 2008 AND LATER EPA CERTIFIED NONROAD COMPRESSION IGNITION ENGINES.

The following supplemental information is furnished for EPA Nonroad Compression Ignition Engines which are certified according to 40 CFR Part 89 and Part 1039.

This information contains the following specific items:

- EPA-related engine parts and engine operating conditions
- Maintenance instructions for EPA-related engine parts
- Emission control system and adjustments
- Warranty statement
- Emission-related installation instructions

ENGINE PARTS AND / OR EQUIPMENT RELATED TO EPA EXHAUST EMISSION REGULATIONS.

Parts which are mandatory for engine operation.

The following parts as manufactured according to HATZ specifications are mandatory for engine operation which meets EPA exhaust emission regulations.

- Fuel Injection pump(s)
- Injection nozzle(s)
- Cold start device
- Intake and exhaust manifold
- EGR valve body (on 4L42C and 4M42 engines)

- EGR rate feedback and control system (on 4L42C and 4M42 engines)
- Crankcase breather valve assembly
- Oil filler cap
- Vacuum switch
- Electronic control unit (on 4L42C and 4M42 engines)
- Oil temperature sensor (on 4L42C and 4M42 engines)
- Governor position sensor (on 4L42C and 4M42 engines)
- Engine speed sensor (on 4L42C and 4M42 engines)
- Solenoids
- Wiring harnesses
- Fuel hoses
- Intake and exhaust gaskets
- Emission Control Information Labels

Only parts manufactured by Hatz and which have passed the Hatz Quality Assurance Program are assured of meeting EPA exhaust emission regulations.

UNUSUAL OPERATING CONDITIONS.

The engine must not be operated at a load factor less than 25 % for an extended period as such operation will cause the fuel injector to foul. If such a condition occurs, you should contact the nearest HATZ authorized Service Center for necessary repairs.

The engine is designed and adjusted to operate most efficiently at the following conditions:

- Air temperature of 25° C (77° F)
- Atmospheric pressure of 100 kPa (14.5 psi)
- Relative humidity of 30 %

Operation of the engine at conditions other than above will affect performance and exhaust emissions. Normally the equipment manufacturer takes this into account during the design of the machine and your equipment will perform within specifications over a wide range of climatic conditions. However if you must operate your equipment under very unusual climatic conditions, please contact your nearest Hatz distributor for advice.

MAINTENANCE SCHEDULE-EPA-RELATED PARTS

The following minimum intervals are being adopted for adjustment, cleaning, repair, or replacement of following components:

At 1,500 hours, and 1,500-hours intervals thereafter:

- Fuel injector tips (cleaning only)

At 3,000 hours, and 3,000-hours intervals thereafter:

- Fuel injectors

Only applicable to the **4L42C** and **4M42** engines:

At 1,500 hours, and 1,500-hours intervals thereafter:

- Fuel injector tips (cleaning only)

At 3,000 hours, and 3,000-hours intervals thereafter:

- Fuel injectors
- Cleaning of EGR pipe and intake manifold

The exhaust quality of the engines can be influenced by the execution (the quality of execution) of above described maintenance work.

Therefore, the maintenance work has to be carried out by a qualified workshop.

Hatz authorised workshops, for example, are qualified workshops.

Hatz Diesel of America will give you respective addresses, if required.

EMISSION CONTROL SYSTEM AND ADJUSTMENTS.

The emission control system for the engine series **2-4L41C** and **2-4M41** is EM (Engine Modification).

No adjustments are needed or possible.

The emission control system for the engine series **4L42C** and **4M42** is EM (Engine Modification) and EGR (Exhaust Gas Recirculation).

No adjustments are needed or possible.

EPA EMISSION CONTROL WARRANTY STATEMENT

YOUR WARRANTY RIGHTS AND OBLIGATIONS.

Motorenfabrik Hatz GmbH & Co. KG warrants the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system includes:

- Fuel Injection pump(s)
- Injection nozzle(s)
- Cold start device
- Intake and exhaust manifold
- EGR valve body (on 4L42C and 4M42 engines)
- EGR rate feedback and control system (on 4L42C and 4M42 engines)
- Crankcase breather valve assembly
- Oil filler cap
- Vacuum switch
- Electronic control unit (on 4L42C and 4M42 engines)

- Oil temperature sensor (on 4L42C and 4M42 engines)
- Governor position sensor (on 4L42C and 4M42 engines)
- Engine speed sensor (on 4L42C and 4M42 engines)
- Solenoids
- Wiring harnesses
- Fuel hoses
- Intake and exhaust gaskets
- Emission Control Information Labels

Where a warrantable condition exists, Motorenfabrik Hatz will repair your engine at no cost to you including diagnosis, parts and labor.

MANUFACTURERS WARRANTY COVERAGE:

The emission control related parts of 2008 and later engines are warranted as follows:

POWER RATING	RATED ENGINE SPEED	WARRANTY PERIOD	
[kW]	[rpm]	[hours]*	[years]*
$37 \leq \text{kW} < 75$	All	3000	5
$19 \leq \text{kW} < 37$	All	3000	5
$19 \leq \text{kW} < 37$	constant speed, ≥ 3000	1500	2
$\text{kW} < 19$	All	1500	2

* Whichever occurs first

If any emission related part on your engine is defective, the part will be repaired or replaced by Motorenfabrik Hatz.

OWNERS WARRANTY RESPONSIBILITIES:

- As the engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. Motorenfabrik Hatz recommends that you retain all receipts covering maintenance on your engine, but Motorenfabrik Hatz cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
- As the engine owner, you should be aware, however, that Motorenfabrik Hatz may deny you warranty coverage if your engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- You are responsible for presenting your engine to a Motorenfabrik Hatz authorized service center as soon as a problem exists. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.
- If you have any questions regarding your warranty rights and responsibilities, you should contact HATZ DIESEL OF AMERICA, Inc. at (262)-544-0254.

HATZ DIESEL SUPPLEMENTAL WARRANTY FOR 2008 AND LATER EPA CERTIFIED ENGINES.

PARTS WITH SUPPLEMENTAL LIMITED WARRANTY.

The following limited warranty is supplemental to the standard HATZ DIESEL LIMITED ENGINE WARRANTY and covers 2008 and later EPA certified engines and applies to the following exhaust emission-related components:

- Fuel Injection pump(s)
- Injection nozzle(s)
- Cold start device
- Intake and exhaust manifold
- EGR valve body (on 4L42C and 4M42 engines)
- EGR rate feedback and control system (on 4L42C and 4M42 engines)

- Crankcase breather valve assembly
- Oil filler cap
- Vacuum switch
- Electronic control unit (on 4L42C and 4M42 engines)
- Oil temperature sensor (on 4L42C and 4M42 engines)
- Governor position sensor (on 4L42C and 4M42 engines)
- Engine speed sensor (on 4L42C and 4M42 engines)
- Solenoids
- Wiring harnesses
- Fuel hoses
- Intake and exhaust gaskets
- Emission Control Information Labels

SUPPLEMENTAL LIMITED WARRANTY.

Hatz Diesel of America, Inc. hereinafter referred to as “HATZ” warrants each of the above-listed parts when installed in a new engine sold by Hatz to be free from defects in material and workmanship under normal use and service, only under the named warranty coverage conditions, after the date of delivery to the original retail purchaser and Hatz will at their option, repair or replace at Hatz's sales headquarters, or at a point designated by Hatz, any part or parts which shall appear to the satisfaction of Hatz upon inspection at such point, to have been defective in material or workmanship.

- Any warranted part which is scheduled for replacement as required maintenance is warranted for the period of time up to the first scheduled replacement point for that part.
- Any replacement part which is equivalent in performance and durability may be used in non-warranty maintenance or repairs and will not reduce the overall engine warranty obligations of Hatz. However, Hatz is not responsible for failure of such replacement parts or failure of any other parts directly caused by failure of such replacement parts.
- This warranty does not obligate Hatz to bear any transportation charges in connection with the repair or replacement of defective parts. This warranty is transferrable to subsequent owners, only under the named warranty coverage conditions.
- In order to obtain service under this warranty, the retail purchaser should contact Hatz Diesel of America, Inc. at (262)-544-0254 for information and the nearest service center. The retail purchaser will not be charged for diagnostic labor which leads to the determination that a warranted part is defective, nor for the repair or replacement of warranted parts if the work is performed at an authorized Hatz service center. If other engine components are damaged due to a failure of the above-listed warranted parts still under warranty, these other engine components will also be repaired or replaced at no charge.
- This warranty shall not apply to any engine which shall have been installed or operated in a manner not recommended by Hatz, nor to any engine which shall have been repaired, altered, neglected, or used in any way which, in the opinion of Hatz, adversely affects its performance, nor to any engine in which parts not authorized by Hatz have been used, which parts or the use of which have damaged or caused defects in or otherwise adversely affected the engine or its performance, nor to normal maintenance service or replacement of normal service items.

Hatz reserves the right to modify, alter, and improve any engine or parts without incurring any obligation to replace any engine or parts previously sold with such modified, altered, or improved engine or parts.

EMISSION-RELATED INSTALLATION INSTRUCTIONS

“Failing to follow these instructions when installing a certified engine in a piece of nonroad equipment violates federal law (40CFR1068.105(b)), subject to fines or other penalties as described in the Clean Air Act.”

“If you install the engine in a way that makes the engine's emission control information labels hard to read during normal engine maintenance, you must place duplicate labels on the equipment.”

EQUIPMENT-LABELLING REQUIREMENTS: FUEL LABEL (Chapter 3.5)

The fuel label has to be permanently attached to the equipment.

In case of an engine mounted fuel tank, every engine is equipped with an additional fuel label.

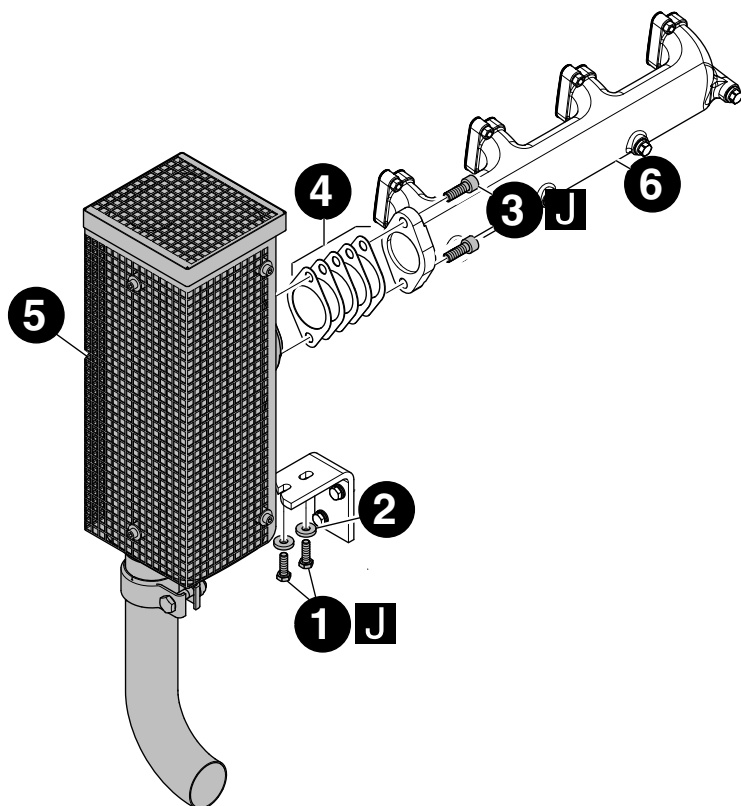
Otherwise, there are two loose fuel labels available with the engine.

If the original fuel label is not readily visible after the engine is installed in the equipment then the second loose fuel label must be attached on the equipment in such a manner that it is readily visible to an average person.

INSTRUCTIONS ON THE INSTALLATION OF THE EXHAUST SYSTEM

Following are the instructions to properly install the exhaust system and related components consistent with the EPA emission regulation requirements.

2-4M41 · 4M42



Exhaust-silencers

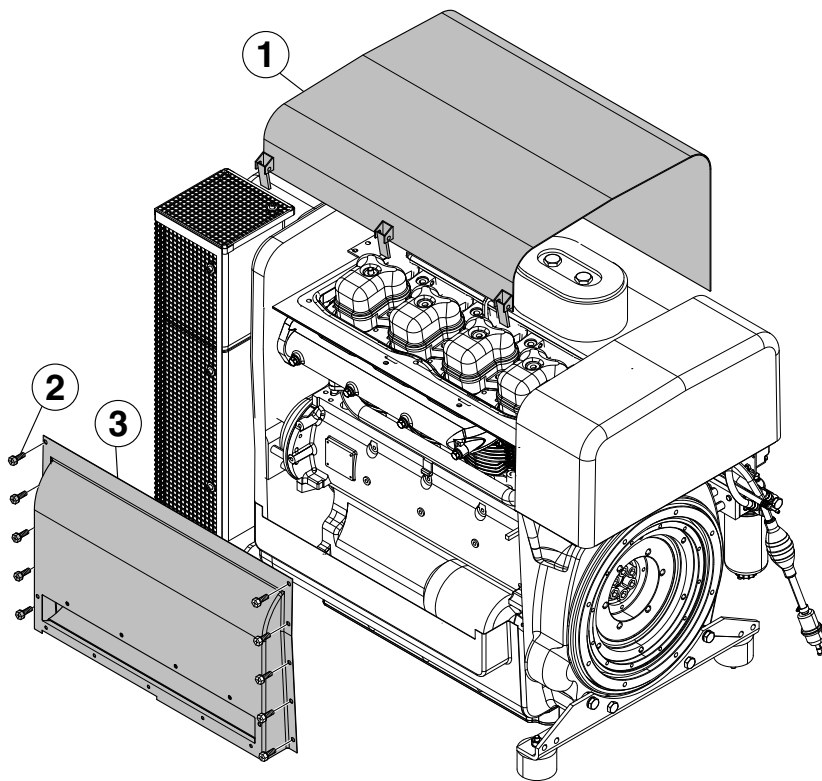
The exhaust silencer is fitted in connection with gaskets.
Fixation is done by hexagon head screws **1** and Allen screws **3**.

Dismantling:

- Remove in numerical sequence **1...5**.

Assembly:

- Assemble in reverse sequence.
- Use anti-seize compound **J** as specified by HATZ.



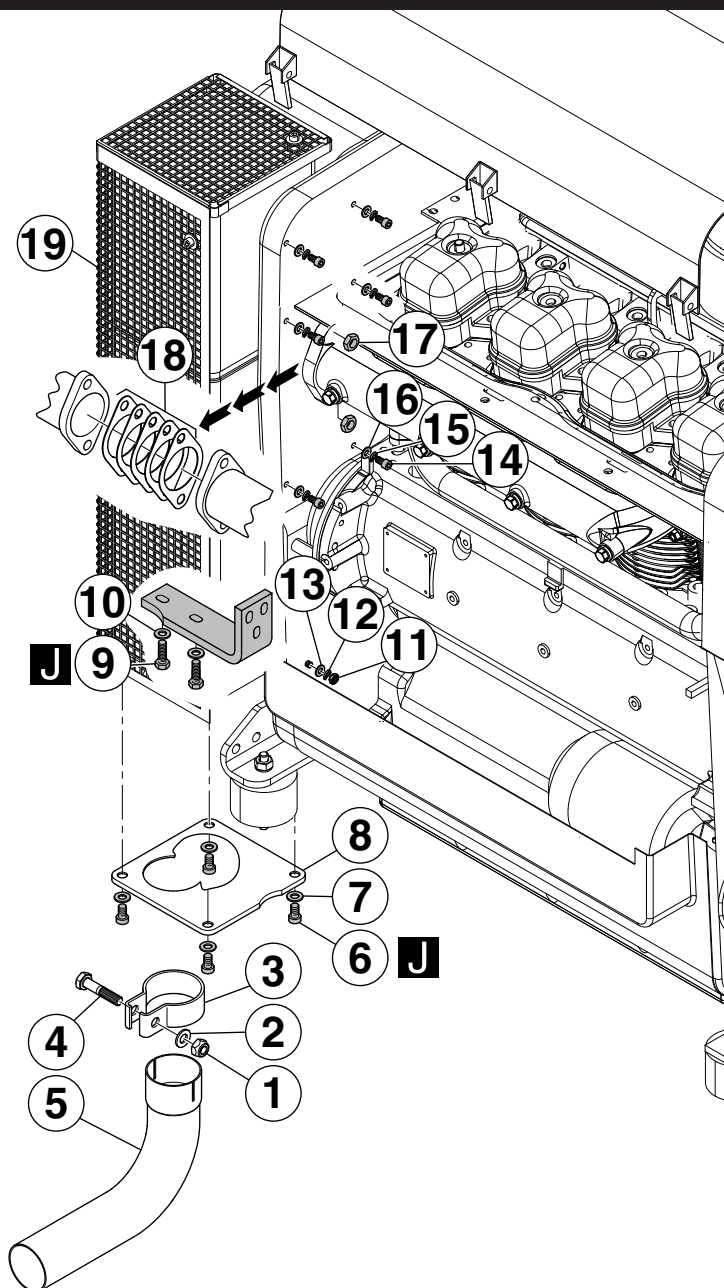
Encapsulated engine

Before dismantling the exhaust system the capsule has to be dismantled:

- Remove the top cover **1** by opening the clips.
- Remove all screws **2** and remove the side cover **3**.

Assembly:

- Assemble in reverse sequence.
- Before tightening the capsule all screws have to be turned in and the different covers have to be correctly adjusted.



Sequence of dismantling the exhaust system:

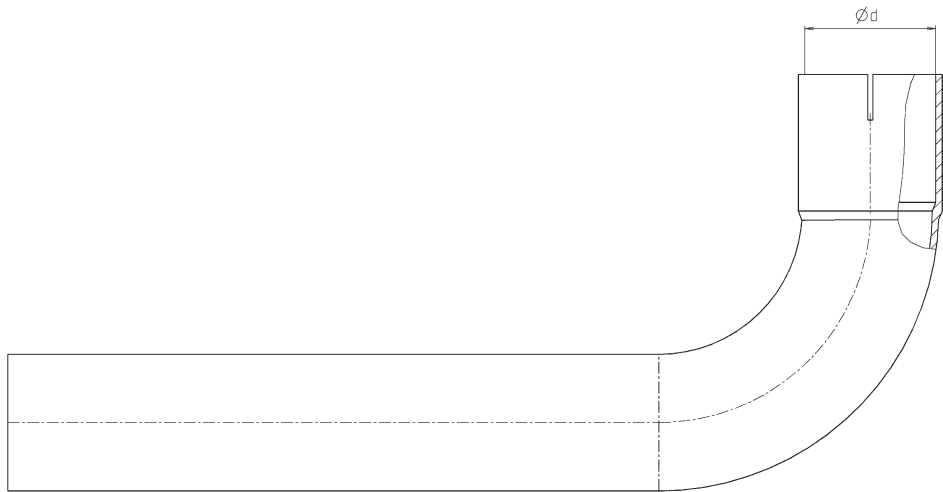
- Open nut **1** and remove in numerical sequence **2...5**.
- Open screws **6** and remove with shims **7** and plate **8**.
- Open screws **9** and remove with shims **10**.
- Open nuts **11** and remove with snap ring **12** and shim **13**.
- Open all Allen screws **14** and remove with snap rings **15** and shims **16**.
- Open and remove both nuts **17**.
- Remove silencer **19** with five identical gaskets **18**.

Assembly:

- Assemble in reverse sequence.
- Make sure that all parts are correctly placed and tightened.
- Use anti-seize compound **J** as specified by HATZ.

SAMPLING OF EXHAUST EMISSIONS

After the engine is installed in the equipment and placed in service, the sampling of exhaust emissions can be performed in a way that prevents diluting the exhaust sample with ambient air as follows:



Specification: Adding a 20-centimeter bended extension to the exhaust pipe

Engine type	Ø d (mm)	HATZ-Ident. Nr.	Clamp HATZ-Ident. Nr.
2L41 C	48	038 775 00	504 103 01
3L41 C	48	038 775 00	504 103 01
4L41 C	48	038 775 00	504 103 01
	55	038 776 00	038 778 00
4L42 C	48	038 775 00	504 103 01
	55	038 776 00	038 778 00
2M41	55	038 776 00	038 778 00
3M41	55	038 776 00	038 778 00
4M41	55	038 776 00	038 778 00
4M42	55	038 776 00	038 778 00

**SUPPLEMENTAL INFORMATION
TO THE OWNER'S MANUAL
FOR 2008 AND LATER
CALIFORNIA REGULATIONS
FOR HEAVY-DUTY OFF-ROAD
ENGINES**

**CALIFORNIA EMISSION CONTROL
WARRANTY STATEMENT AND
EMISSION-RELATED INSTALLATION
INSTRUCTIONS.**

MAINTENANCE AND WARRANTY.

SUPPLEMENTAL INFORMATION TO THE OWNER'S MANUAL FOR 2008 AND LATER CALIFORNIA REGULATIONS FOR HEAVY-DUTY OFF-ROAD ENGINES.

The following supplemental information is furnished for California heavy-duty off-road engines which are certified according to California emission standards and test procedures for new 2008 and later heavy-duty off-road engines, Part I-B.

This information contains the following specific items:

- CARB-related engine parts and engine operating conditions
- Maintenance instructions for CARB-related engine parts
- Emission control system and adjustments
- Warranty statement
- Emission-related installation instructions

ENGINE PARTS AND / OR EQUIPMENT RELATED TO CARB EXHAUST EMISSION REGULATIONS.

Parts which are mandatory for engine operation.

The following parts as manufactured according to HATZ specifications are mandatory for engine operation which meets CARB exhaust emission regulations.

- Fuel Injection pump(s)
- Injection nozzle(s)
- Cold start device
- Intake and exhaust manifold
- EGR valve body (on 4L42C and 4M42 engines)
- EGR rate feedback and control system (on 4L42C and 4M42 engines)

- Crankcase breather valve assembly
- Oil filler cap
- Vacuum switch
- Electronic control unit (on 4L42C and 4M42 engines)
- Oil temperature sensor (on 4L42C and 4M42 engines)
- Governor position sensor (on 4L42C and 4M42 engines)
- Engine speed sensor (on 4L42C and 4M42 engines)
- Solenoids
- Wiring harnesses
- Fuel hoses
- Intake and exhaust gaskets
- Emission Control Information Labels

Only parts manufactured by Hatz and which have passed the Hatz Quality Assurance Program are assured of meeting CARB exhaust emission regulations.

UNUSUAL OPERATING CONDITIONS.

The engine must not be operated at a load factor less than 25 % for an extended period as such operation will cause the fuel injector to foul. If such a condition occurs, you should contact the nearest HATZ authorized Service Center for necessary repairs.

The engine is designed and adjusted to operate most efficiently at the following conditions:

- Air temperature of 25° C (77° F)
- Atmospheric pressure of 100 kPa (14.5 psi)
- Relative humidity of 30 %

Operation of the engine at conditions other than above will affect performance and exhaust emissions. Normally the equipment manufacturer takes this into account during the design of the machine and your equipment will perform within specifications over a wide range of climatic conditions. However if you must operate your equipment under very unusual climatic conditions, please contact your nearest Hatz distributor for advice.

MAINTENANCE SCHEDULE-CARB-RELATED PARTS.

The following minimum intervals are being adopted for adjustment, cleaning, repair, or replacement of following components:

At 1,500 hours, and 1,500 hours intervals thereafter:

- Fuel injector tips (cleaning only)

At 3,000 hours, and 3000 hours intervals thereafter:

- Fuel Injectors

Only applicable to the **4L42C** and **4M42** engines:

At 1,500 hours, and 1,500-hours intervals thereafter:

- Fuel injector tips (cleaning only)

At 3,000 hours, and 3,000-hours intervals thereafter:

- Fuel injectors
- Cleaning of EGR pipe and intake manifold

The exhaust quality of engines can be influenced by the execution (the quality of execution) of above described maintenance work.

Therefore, the maintenance work has to be carried out by a qualified workshop. Hatz authorised workshops, for example, are qualified workshops. Hatz Diesel of America will give you respective addresses, if required

EMISSION CONTROL SYSTEM AND ADJUSTMENTS.

The emission control system for the engine series **2-4L41C** and **2-4M41** is EM (Engine Modification).

No adjustments are needed or possible.

The emission control system for the engine series **4L42C** and **4M42** is EM (Engine Modification) and EGR (Exhaust Gas Recirculation).

No adjustments are needed or possible.

**CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT.
YOUR WARRANTY RIGHTS AND OBLIGATIONS.**

The **California Air Resources Board** and Motorenfabrik Hatz GmbH & Co. KG are pleased to explain the **emission control system warranty** on your **2008 and later** engine. In California, new heavy-duty off-road engines must be designed, built, and equipped to meet the State’s stringent anti-smog standards. The Motorenfabrik Hatz GmbH & Co. KG must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel-injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, the Motorenfabrik Hatz GmbH & Co. KG will repair your heavy-duty off-road engine at no cost to you including diagnosis, parts, and labor.

MANUFACTURER’S WARRANTY COVERAGE.

The 2008 and later heavy-duty off road engines are warranted as follows:

POWER RATING	RATED ENGINE SPEED	WARRANTY PERIOD	
[kW]	[rpm]	[hours]*	[years]*
$37 \leq \text{kW} < 75$	All	3000	5
$19 \leq \text{kW} < 37$	All	3000	5
$19 \leq \text{kW} < 37$	constant speed, ≥ 3000	1500	2

*Whichever occurs first

If any emission-related part on your engine is defective, the part will be repaired or replaced by Motorenfabrik Hatz GmbH & Co. KG.

OWNER'S WARRANTY RESPONSIBILITIES.

- As the heavy-duty off-road engine owner, you are responsible for the performance of the **required maintenance listed in your owner's manual**. Motorenfabrik Hatz GmbH & Co. KG recommends that you retain all receipts covering maintenance on your heavy-duty off-road engine, but Motorenfabrik Hatz GmbH & Co. KG cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
- As the heavy-duty off-road engine owner, you should however be aware that Motorenfabrik Hatz GmbH & Co. KG may deny you warranty coverage if your heavy-duty off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- Your engine is designed to operate on low sulfur diesel fuel or ultra-low sulfur diesel fuel only. Use of any other fuel may result in your engine no longer operating in compliance with California's emissions requirements.
- You are responsible for initiating the warranty process. The ARB suggests that you present your heavy-duty off-road engine to a Motorenfabrik Hatz authorised dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible.

If you have any questions regarding your warranty rights and responsibilities, you should contact Hatz Diesel of America, Inc. at **(262)-544-0254**.

HATZ DIESEL SUPPLEMENTAL WARRANTY FOR 2008 AND LATER CALIFORNIA CERTIFIED HEAVY-DUTY OFF-ROAD ENGINES.

PARTS WITH SUPPLEMENTAL LIMITED WARRANTY.

The following limited warranty is supplemental to the standard HATZ DIESEL LIMITED ENGINE WARRANTY and covers 2008 and later California certified Heavy-Duty off-road engines and applies to the following exhaust emission-related components:

- Fuel Injection pump(s)
- Injection nozzle(s)
- Cold start device
- Intake and exhaust manifold

- EGR valve body (on 4L42C and 4M42 engines)
- EGR rate feedback and control system (on 4L42C and 4M42 engines)
- Crankcase breather valve assembly
- Oil filler cap
- Vacuum switch
- Electronic control unit (on 4L42C and 4M42 engines)
- Oil temperature sensor (on 4L42C and 4M42 engines)
- Governor position sensor (on 4L42C and 4M42 engines)
- Engine speed sensor (on 4L42C and 4M42 engines)
- Solenoids
- Wiring harnesses
- Fuel hoses
- Intake and exhaust gaskets
- Emission Control Information Labels

SUPPLEMENTAL LIMITED WARRANTY.

Hatz Diesel of America, Inc. hereinafter referred to as "HATZ" warrants each of the above-listed parts when installed in a new engine sold by Hatz to be free from defects in material and workmanship under normal use and service, for a period of twenty-four (24) months after the date of delivery to the original retail purchaser and Hatz will at their option, repair or replace at Hatz's sales headquarters, or at a point designated by Hatz, any part or parts which shall appear to the satisfaction of Hatz upon inspection at such point, to have been defective in material or workmanship.

- Any warranted part which is scheduled for replacement as required maintenance is warranted for the period of time up to the first scheduled replacement point for that part.
- Any replacement part which is equivalent in performance and durability may be used in non-warranty maintenance or repairs and will not reduce the overall engine warranty obligations of Hatz. However, Hatz is not responsible for failure of such replacement parts or failure of any other parts directly caused by failure of such replacement parts.
- This warranty does not obligate Hatz to bear any transportation charges in connection with the repair or replacement of defective parts. This warranty is transferrable to subsequent owners within the original twenty-four (24) months time period.
- In order to obtain service under this warranty, the retail purchaser should contact Hatz Diesel of America, Inc. at (262) 544-0254 for information and the nearest service center. The retail purchaser will not be charged for diagnostic labor which leads to the determination that a warranted part is defective, nor for the repair or replacement of warranted parts if the work is performed at an authorized Hatz service center. If other engine components are damaged due to a failure of the above-listed warranted parts still under warranty, these other engine components will also be repaired or replaced at no charge.
- This warranty shall not apply to any engine which shall have been installed or operated in a manner not recommended by Hatz, nor to any engine which shall have been repaired, altered, neglected, or used in any way which, in the opinion of Hatz, adversely affects its performance, nor to any engine in which parts not authorized by Hatz have been used, which parts or the use of which have damaged or caused defects in or otherwise adversely affected the engine or its performance, nor to normal maintenance service or replacement of normal service items.

Hatz reserves the right to modify, alter, and improve any engine or parts without incurring any obligation to replace any engine or parts previously sold with such modified, altered, or improved engine or parts.

EMISSION-RELATED INSTALLATION INSTRUCTIONS

“Failing to follow these instructions when installing a certified engine in a piece of nonroad equipment violates federal law (40CFR1068.105(b)), subject to fines or other penalties as described in the Clean Air Act.”

“If you install the engine in a way that makes the engine's emission control information labels hard to read during normal engine maintenance, you must place duplicate labels on the equipment.”

EQUIPMENT-LABELLING REQUIREMENTS: FUEL LABEL (Chapter 3.5)

The fuel label has to be permanently attached to the equipment.

In case of an engine mounted fuel tank, every engine is equipped with an additional fuel label.

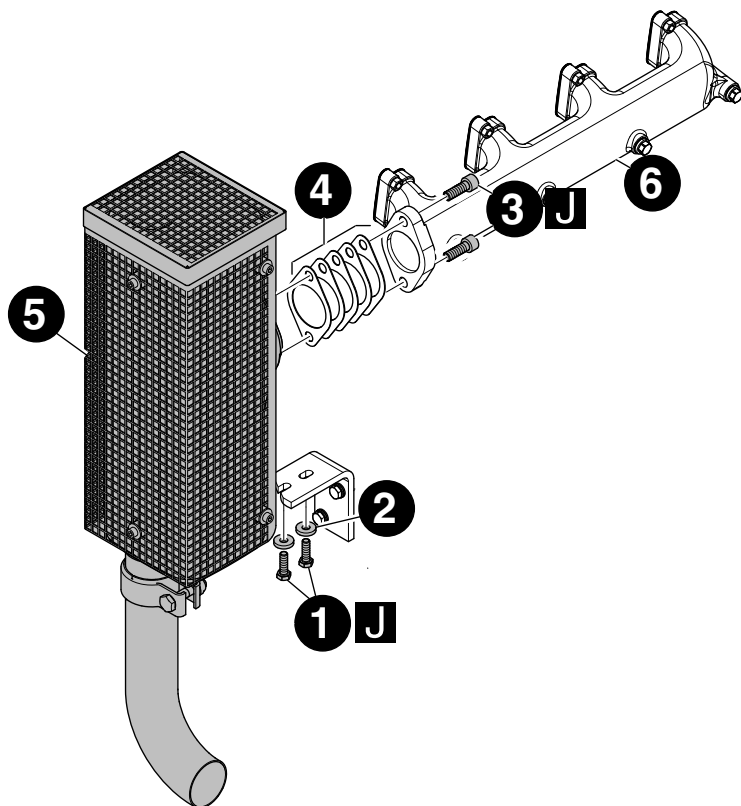
Otherwise, there are two loose fuel labels available with the engine.

If the original fuel label is not readily visible after the engine is installed in the equipment then the second loose fuel label must be attached on the equipment in such a manner that it is readily visible to an average person.

INSTRUCTIONS ON THE INSTALLATION OF THE EXHAUST SYSTEM

Following are the instructions to properly install the exhaust system and related components consistent with the EPA emission regulation requirements.

2-4M41 · 4M42



Exhaust-silencers

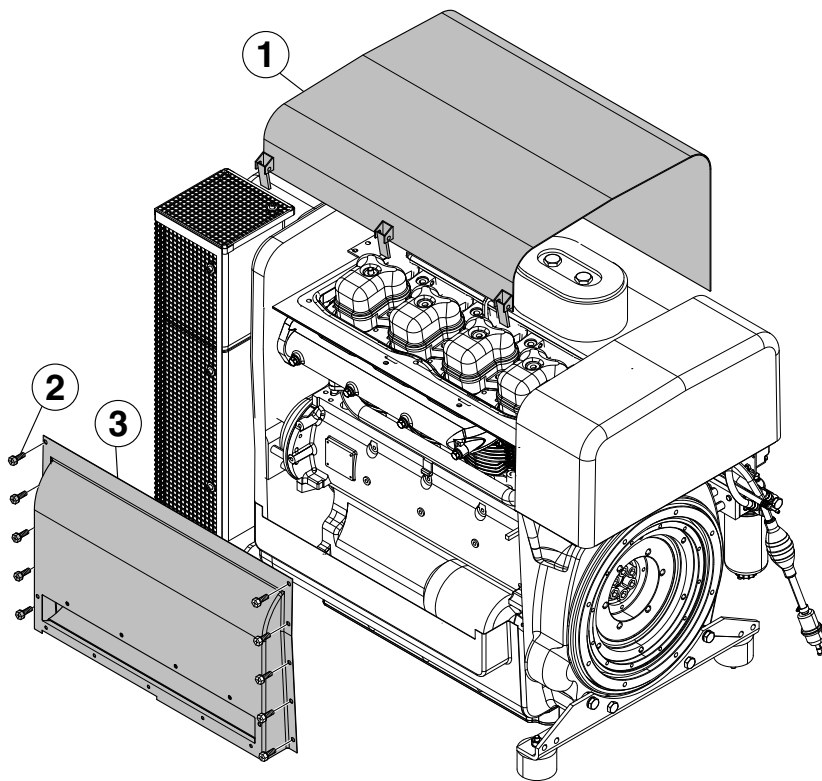
The exhaust silencer is fitted in connection with gaskets.
Fixation is done by hexagon head screws 1 and Allen screws 3.

Dismantling:

- Remove in numerical sequence **1...5**.

Assembly:

- Assemble in reverse sequence.
- Use anti-seize compound **J** as specified by HATZ.



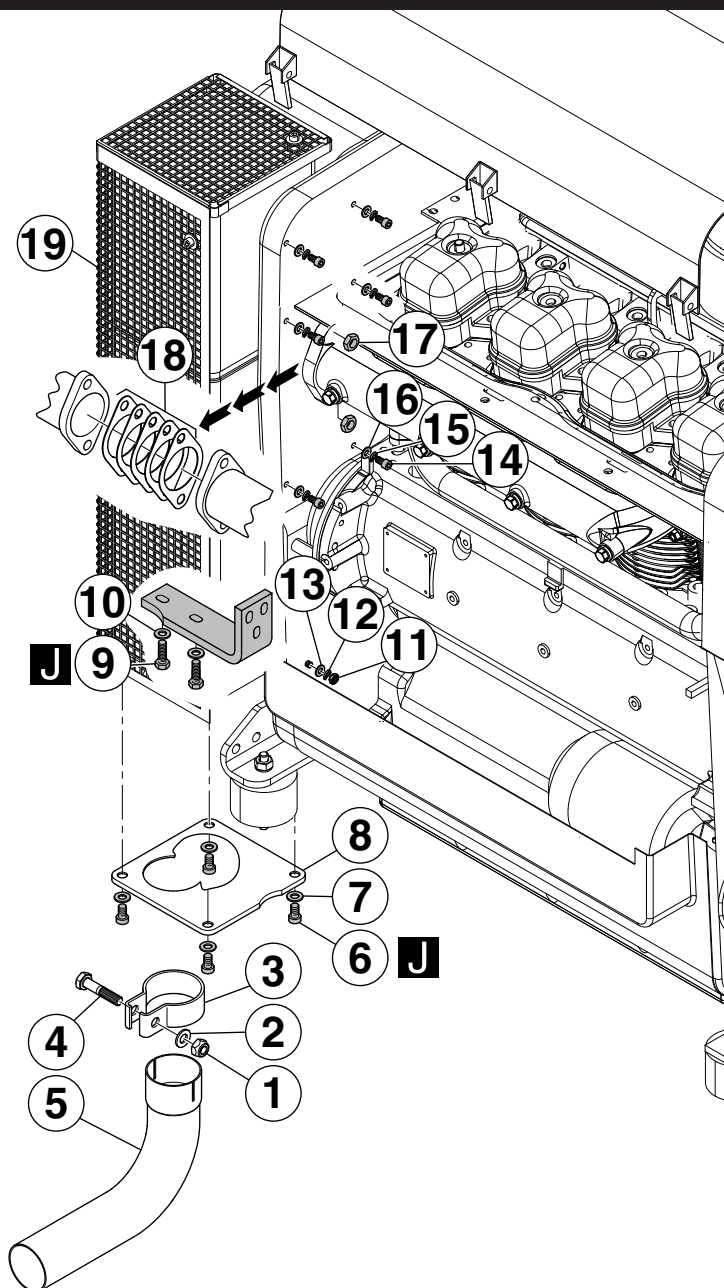
Encapsulated engine

Before dismantling the exhaust system the capsule has to be dismantled:

- Remove the top cover **1** by opening the clips.
- Remove all screws **2** and remove the side cover **3**.

Assembly:

- Assemble in reverse sequence.
- Before tightening the capsule all screws have to be turned in and the different covers have to be correctly adjusted.



Sequence of dismantling the exhaust system:

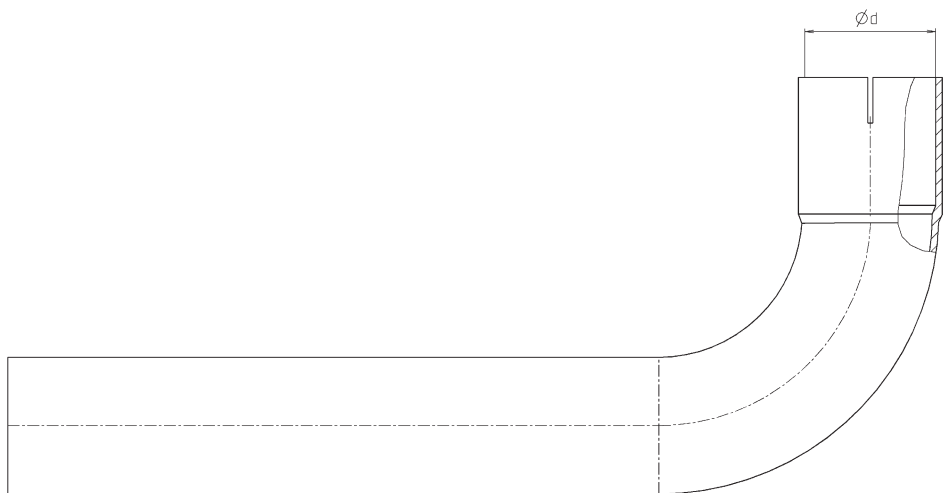
- Open nut **1** and remove in numerical sequence **2...5**.
- Open screws **6** and remove with shims **7** and plate **8**.
- Open screws **9** and remove with shims **10**.
- Open nuts **11** and remove with snap ring **12** and shim **13**.
- Open all Allen screws **14** and remove with snap rings **15** and shims **16**.
- Open and remove both nuts **17**.
- Remove silencer **19** with five identical gaskets **18**.

Assembly:

- Assemble in reverse sequence.
- Make sure that all parts are correctly placed and tightened.
- Use anti-seize compound **J** as specified by HATZ.

SAMPLING OF EXHAUST EMISSIONS

After the engine is installed in the equipment and placed in service, the sampling of exhaust emissions can be performed in a way that prevents diluting the exhaust sample with ambient air as follows:



Specification: Adding a 20-centimeter bended extension to the exhaust pipe

Engine type	Ø d (mm)	HATZ-Ident. Nr.	Clamp HATZ-Ident. Nr.
2L41 C	48	038 775 00	504 103 01
3L41 C	48	038 775 00	504 103 01
4L41 C	48	038 775 00	504 103 01
	55	038 776 00	038 778 00
4L42 C	48	038 775 00	504 103 01
	55	038 776 00	038 778 00
2M41	55	038 776 00	038 778 00
3M41	55	038 776 00	038 778 00
4M41	55	038 776 00	038 778 00
4M42	55	038 776 00	038 778 00

CALIFORNIA
Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.