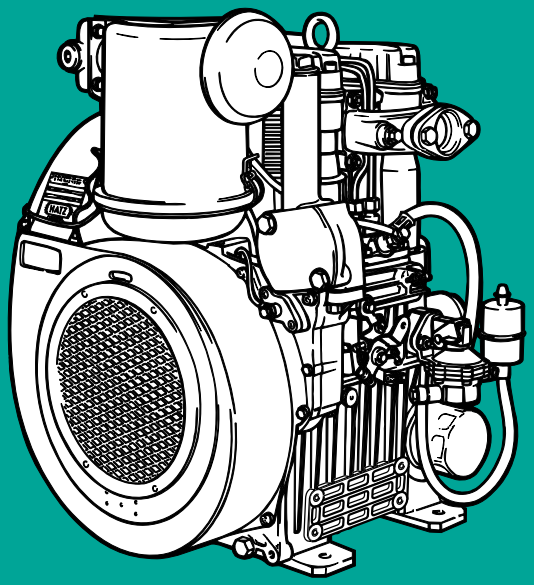
Translation of the
ORIGINAL INSTRUCTION BOOK



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

Always have service work performed by qualified specialists. To this effect, we recommend that you consult one of the 500 HATZ service stations. There, your engine is repaired by staff who constantly undergo training and who use both original HATZ spare parts and HATZ tools. The world-wide HATZ service network is also available to you for consultation and spare parts supply.
For the address of your nearest HATZ service station, please refer to the attached list or the internet under: www.hatz-diesel.com

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Original-Ersatzteile
Original-spare parts
Pièces de rechange d'origine
Repuestos originales

The installation of inappropriate spare parts may cause problems. We cannnot accept any liability for damage or consequential damage resulting therefrom.
Thus, we recommend that you use original HATZ spare parts. These parts are manufactured following the strict HATZ specifications and ensure, thanks to their perfect fit and function, maximum operating reliability. For the reference number, please consult the attached spare part list or the internet under: www.hatz-diesel.com. Please take the complete spare parts kits in Table M 00 into account.

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

MOTORENFABRIK HATZ GMBH & CO KG

Contents

This symbol identifies important safety precautions.
Please comply with these most carefully in order to avoid any risk of injury to persons or damage to materials.
General legal requirements and safety regulations issued by the competent authorities or industrial accident insurers must also be complied with.

1. Important notes on safe operation of the engine

HATZ diesel engines are economical, stronly built and long-lasting. They are therefore frequently chosen for commercially and industrially operated equipment and machinery.
Since the engine forms part of the finished equipment or machine, its manufacturer will take all the applicable safety regulations into account.
Nevertheless, we give below certain additional comments on operating safety, and would recommend you to note them carefully.
Depend 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 against accidental contact when the engine is installed in other equipment or machinery.
  Guards are available from HATZ to protect belt drives to 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.
- 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 trainig.
- Keep the ignition key out of reach of unauthorized persons.
- Do not run the engine in closed or badly ventilated rooms.
  Do not breath in emissions – danger of poisoning!
- Also fuel and lubricants could contain poisonous components. Please follow the instructions of the mineral oil producer (safety data sheets).

Important notes on safe operation of the engine

- Stop the engine before performing any maintenance, cleaning- or repair work.
- Stop the engine before refuelling.
  Never add fuel near a naked flame or a source of sparks.
  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 a running engine.
  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. In case a label has come off or is no longer clearly legible, it must be replaced immediately. To this effect, please contact the HATZ service station in your area.
- Note that any unauthorized modification to the engine absolves its manufacturer from liability for the consequences.

Regular servicing in accordance with the details provided in this instruction book is essential to keep the engine operating reliably.

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

2. Description of the engine

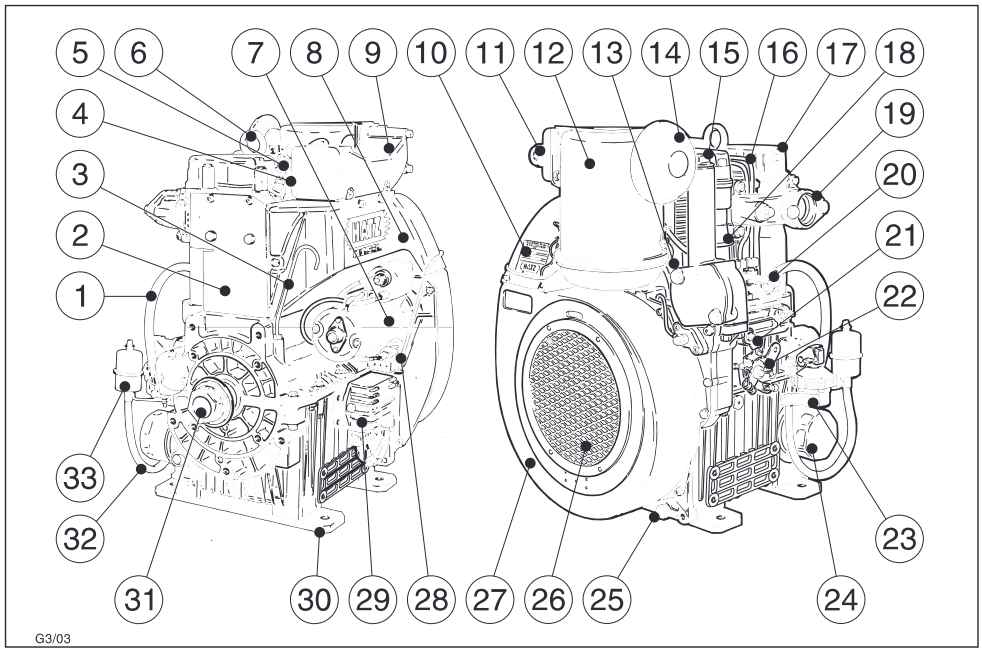


Fig. 1

1 Fuel line (feed pump – fuel-injection pump)
2 Air deflector
3 Oil dipstick
4 Fuel return line
5 Injector
6 Lifting eyebolt
7 Starter motor
8 Air guide
9 Air intake pipe
10 Type plate
11 Glow plug (additional equipment)
12 Oilbath air cleaner
13 Oil pressure switch
14 Rainproof cap
15 Oil filler cap
16 Fuel pressure pipe
17 Cylinder head cover
18 Engine oil line
19 Exhaust manifold
20 Fuel injection pump
21 Stop lever
22 Speed control lever
23 Fuel feed pump
24 Engine oil filter
25 Oil drain plug
26 Guard
27 Air guide housing
28 Separable connector
29 Voltage regulator
30 Engine mount
31 Crankshaft, power-take-off
32 Fuel line (fuel filter - feed pump
33 Fuel filter

3. General remarks

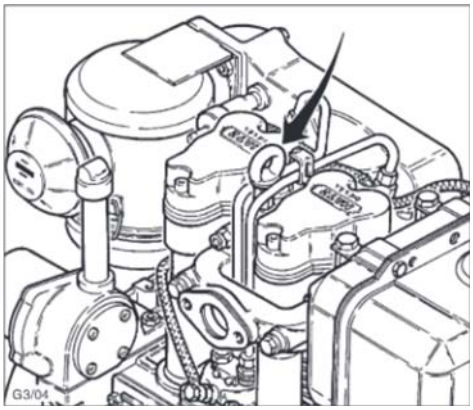
3.1. Technical data

Type		2G40 / 2G40H			
Design		Air-cooled four-stroke diesel engine			
Combustion system		Direct injection			
Number of cylinders		2			
Bore/stroke	mm	92 / 75			
Displacement	cm^3	997			
Engine oil content incl. filter renewal	l approx.	2.5 excl. sump [1] 3.0 incl. sump [1]			
Difference between „max" and „min" levels	l approx.	0.8 [1]			
Engine oil pressure	min.	1 bar at 900 rpm. engine speed			
Engine oil consumption (after running-in period)	approx.	1% of fuel consumption at full bad			
Direction of rotation, power take-off end		anti-clockwise			
Valve clearances at 10 - 30 °C Inlet/exhaust	mm	0.10			
Max. permissible perm. inclination Angle of inclination in ° without oil sump with oil sump		Exhaust low high 30 [2] 17 [2] 30 [2] 17 [2]		Flywheel low high 25 [2] 25 [2] 30 [2] 25 [2]	
Weight (incl. fuel tank, air-cleaner, exhaust silencer and electric starter)	kg approx.	106			
Battery capacity	min / max	12 V - 45 / 88 Ah • 24 V - 36 / 55 Ah			

[1] These values are intended as an approximate guide. The max. marking on the dipstick is the determining factor, Fig. 6.

[2] Exceeding these limits causes engine breakdown.

3.2. Transport



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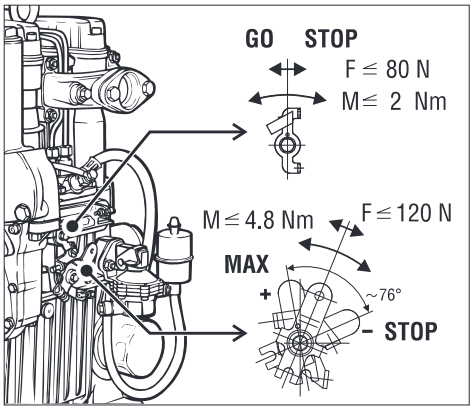

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⚠ The lifting eyebolt provided as standard equipment is intended for safe movement of the engine.
It is not intended for lifting complete machinery to which the engine is attached, and this is strictly forbidden.

3.3. Instructions for installation

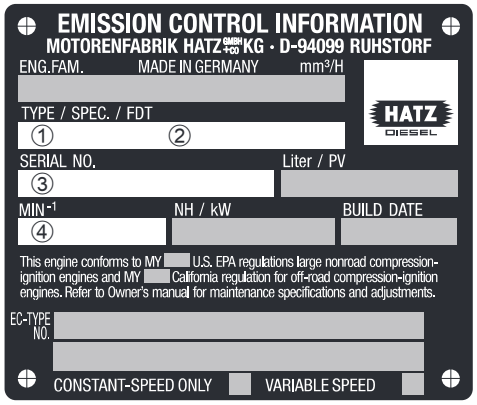
If you have an engine which is not yet installed in a machine and still has to be installed, make sure that the Assembly Instructions for HATZ Diesel Engines are complied with prior to installation. These Assembly Instructions contain important information about safe assembly of the engine and are available from your the HATZ service center in your area.
Pending complete installation, the engine must not be started!
Moreover, we would like to point out that in this case, commissioning of the machine is also prohibited until it has been verified that the machine into which this engine is to be incorporated complies with all the safety precautions and regulations provided by law.
Refer also to the Declaration for Incorporation at the end of these Operating Instructions.

⚠ The permitted loads and elements on the speed adjusting lever and the stop lever should be observed as an exess can lead to damage to the contacts and inner governor parts.

3.4. Load on engine

Operating the engine for a lengthy period off-load or at very low loads can affect its running quality.
We therefore recommend a minimum engine load of 15 %. If operated at such low loads, it is best to operate the engine at a significantly higher load for a short period before switching it off.

3.5. Type plate



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The type plate is placed on the air guide (Fig. 1, pos. 10) and includes the following engine information:

① engine type
② code (only for special equipment)
③ engine number
④ max. engine speed

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

4. Operation

4.1. Before initial start-up

Engines are normally delivered without fuel and oil.

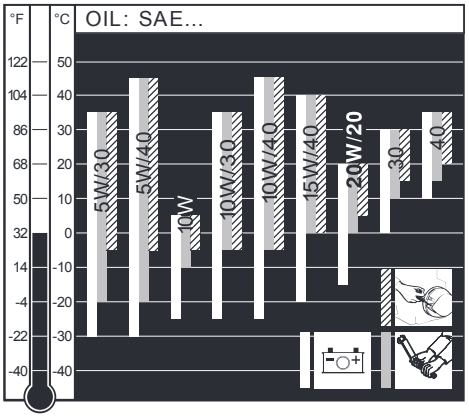
4.1.1. Engine oil

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 oil of a poorer quality is used, reduce oil change intervals to 150 hours of operation.

Oil viscosity



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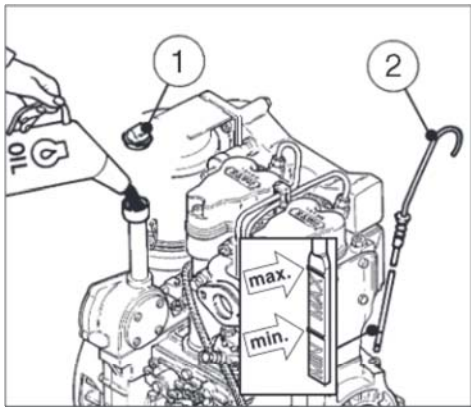
Please select the recommended viscosity depending on the ambient temperature at which the engine is operated.

Inappropriate engine oil may shorten the engine's service life significantly.

When adding oil or checking the level, the engine must be in a horizontal position.



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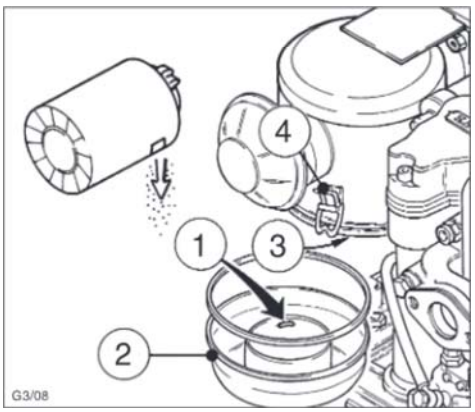
– Remove oil filler screw „1" and dipstick „2".

– Add engine oil up to the max. mark on the dipstick.
Lubricating oil capacity: see Chapter 3.1.

– Insert the oil filler screw and tighten it (hand-tight only).

Attention!
If the engine is operated while the oil level is below the min. mark or above the max. mark, it can cause damage to the engine.

4.1.2. Oilbath air cleaner



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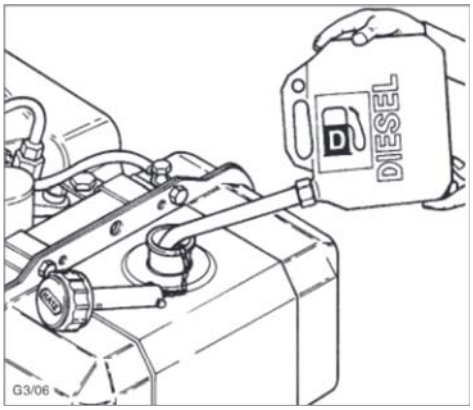
If a cyclone-type dust trap is fitted, make sure that the dust outlet is pointing in the correct direction.

– Fill the oil tank up to mark „1" with engine oil.

– Attach oil tank „2", making sure that sealing ring „3" is correctly seated and clips „4" are fastened securely.

4.1.3. Fuel



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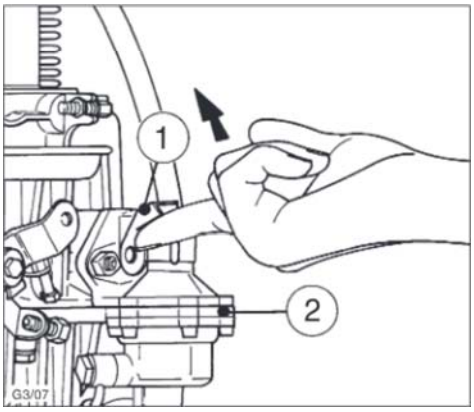
⚠ Stop the engine before refuelling. Never add fuel near a naked flame or a source of sparks. Don't smoke. Use only pure fuel and clean filling equipment. Take care not to spill fuel.

Diesel fuel complying with the minimum requirements of the following specifications may be used:

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

Important!
The use of fuels of different specifications requires the prior written consent of the HATZ headquarters.



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Before starting for the first time or if the fuel system was run dry, prime it by operating lever „1" on feed pump „2" until fuel is heard to flow back into the fuel tank through the return line.

At temperatures below 0 °C, winter-grade fuel should be used or paraffin added to the fuel well in advance.

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 %

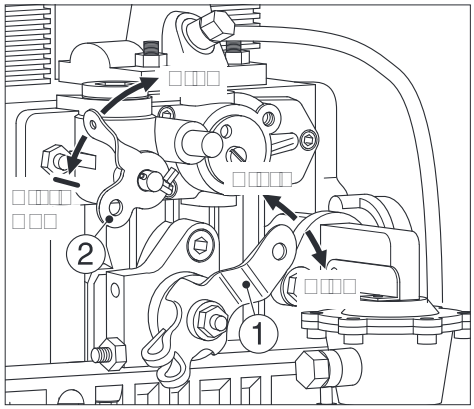
4.2. Starting the engine

⚠ Do not run the engine in closed or badly ventilated rooms – danger of poisoning!

Before starting the engine, make sure that no one is within the danger area near the engine or the machinery it is driving, and that all the necessary guards are installed.

4.2.1. Preparations for starting

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



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– Depending on operation conditions and requirements, set speed control lever „1" to either the 1/2 START or max. START position.

– Make sure that stop lever „2" is in the off position „START".

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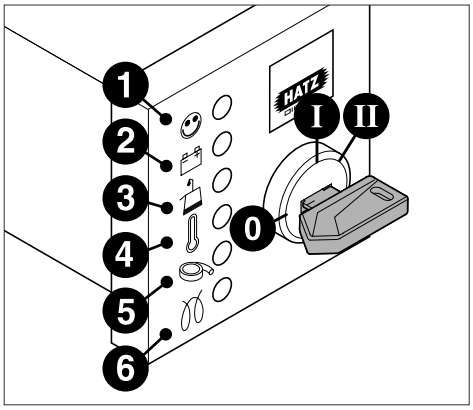
⚠ Never use starting aids in the form of aerosols or sprays!

4.2.2. Electric starter

– For starting preparations, see Chapter 4.2.1.



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– Insert the start key to its stop and turn it to position I.
Battery charge telltale „2" and oil pressure warning light „3" will come on.

– Turn start key to position II

– 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 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, chapter 7.

– The air cleaner maintenance indicator „5" (additional equipment) only lights up during operation if the air cleaner element needs to be cleaned or renewed (chapter 5.4.2.).

– 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 fitted, the key must be turned back to position 0 for at least 8 seconds if the engine fails to start, before a second attempt of starting can be made.

Note:
Start for max. 30 seconds. If the engine does not run after this time, turn starter key back to position 0 and eliminate the cause, Chapter 7.

Preheating device with automatic heating timer (additional equipment)

The preheating light „6" lights up additionally at temperatures below 0° Celsius (Fig. 12).

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

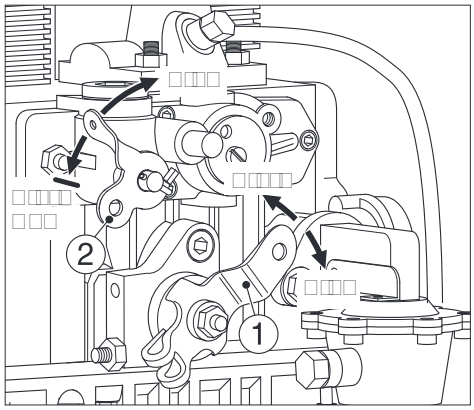
Automatic shut-down function (additional equipment)

This is characterized by a brief flashing of all pilot lamps once the starter key has been turned to position I (Fig. 12).

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. 12, positions 2 - 4) 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.).

4.3. Stopping the engine



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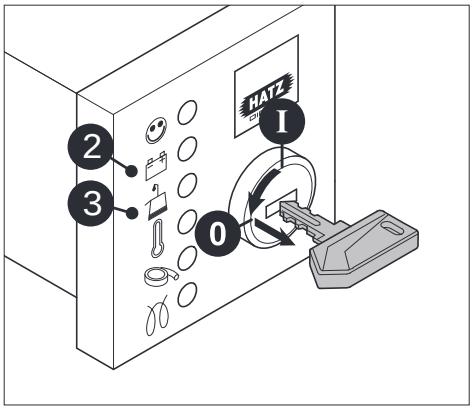

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– Move speed control lever „1" back to the „STOP" position.

– On engines with the lower idling speed out of use, move speed control lever „1" back, then move stop lever „2" towards STOP and hold it there until the engine has come to a standstill.

– Once the engine is not running any longer, release the stop lever. The stop lever is returned automatically to its operating position START via a spring.

– The battery charge telltale light „2" and the oil pressure warning light „3" come on.

– Turn the starter key back to position „0" and pull it out. The telltale and warning lights must go out.

Note:
Engines with an automatic electrical shutdown system can also be stopped by turning the starter key back to positon „0".

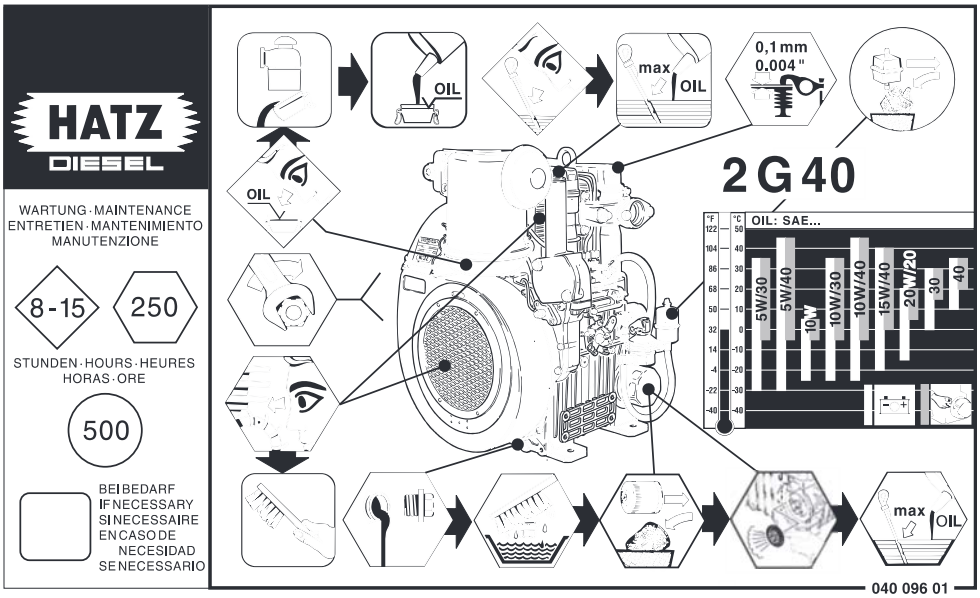
⚠ During breaks in operation or at the end of the work session, pull out the starter key and keep in a safe place where it cannot be reached by unauthorized persons.

5. Maintenance

⚠ The engine must be stopped before any maintenace work is attempted.
Comply with legal requirements when handling and disposing of old oil, filters and cleaning materials.
Keep the engine's starting key and starting handle out of reach of unauthorized persons.
To immobilize engines with an electric starter, disconnect the negative battery terminal.
At the end of the maintnance 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 no-one is in the danger area (engine or driven machinery).

5.1. Maintenance summary

	Maintenance interval	Maintenance work required	Chap.
8-15	Every 8 – 15 operating hours or before daily starting	Check oil level. Check area around combustion air input. Check cooling air system. Check that the oil level in the lower part of the oilbath air cleaner is correct and that the oil is not contaminated.	5.2.1. 5.2.2. 5.2.3. 4.1.2. 5.3.1.
250	Every 250 operating hours	Maintenance of air filter/oilbath air filter. Replace engine oil and oil filter. Check and adjust valve clearances. Clean cooling air system. Examine screw connections.	5.3.1. 5.3.2. 5.3.3. 5.3.4. 5.3.5.
500	Every 500 operation hours	Renew fuel filter. Maintenance of air filter/dry-air filter	5.4.1. 5.4.2.



The above maintenance chart is supplied with every engine. This label should be affixed to the engine or equipment in an easily visible position. The maintenance chart governs the maintenance intervals.

For new or reconditioned engines, the following must always be carried out after the first 25 operating hours.

- Replace engine oil and oil filter, chap. 5.3.2.
- Check tappet clearance, and adjust if necessary, chap. 5.3.3.
- Examine screw connections, chap. 5.3.5.

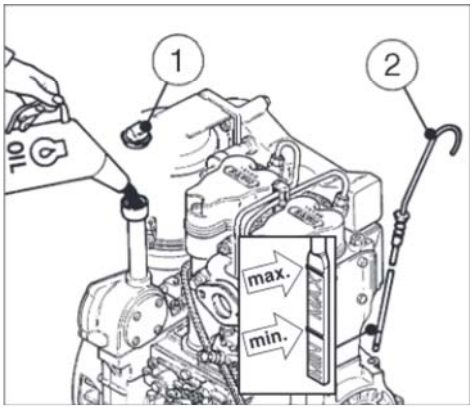
For short operating periods: replace engine oil and oil filter after 12 months at the latest, regardless of the number of operating hours.

5.2. Maintenance work every 8 – 15 operating hours

5.2.1. Check engine oil level

When the oil level is checked, the engine must be stopped and in a horizontal position.

– Remove any dirt in the dipstick area.



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– For oil level inspection, remove the dipstick „2" and wipe it dry using a lint-free, clean piece of cloth; then insert it to its stop and pull it out again.

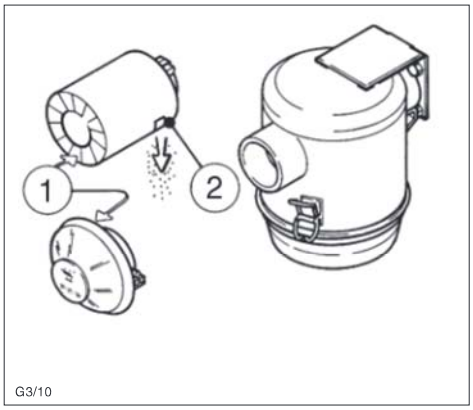
– Check oil level at the dipstick; top up if necessary as far as the „max" mark (see Chapter 4.1.1.).

Attention!
If the engine is operated while the oil level is below the min. mark or above the max. mark, it can cause damage to the engine.

5.2.2. Check combustion air intake area

Heavy contamination is an indication that increased dust accumulation necessitates a correspondingly shorter maintenance interval, Chapter 5.3.1. and 5.4.2.

With oilbath air cleaner:



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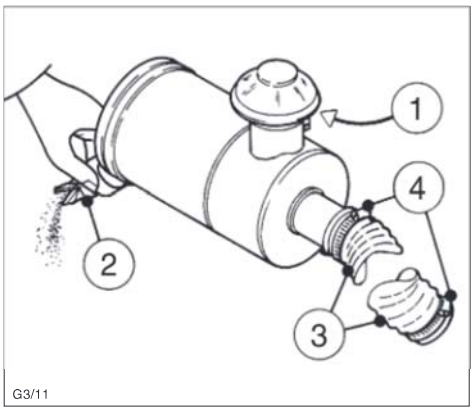
– Inspect air inlets „1" (depending on version) for severe dirt and dust deposits, and clean if necessary.

– Make sure that dust outlet „2" on the cyclone-type dust trap (depending on version) is not obstructed, and clean if necessary (chap. 5.3.1.).

With dry-type air cleaner:



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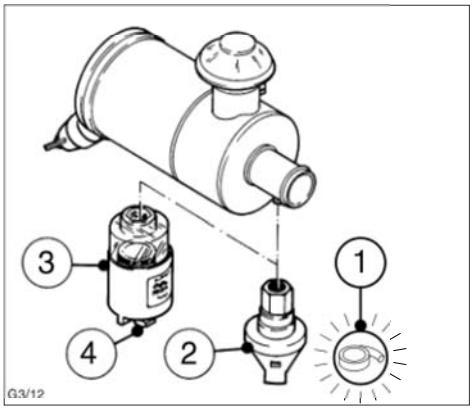
– Inspect air inlets „1" and clean if necessary.

– Check that dust discharge valve „2" is not obstructed; eliminate dust blockage by pressing together as shown.

– Check that connecting hose „3" and hose clips „4" are in good condition and not leaking (fig. 17).



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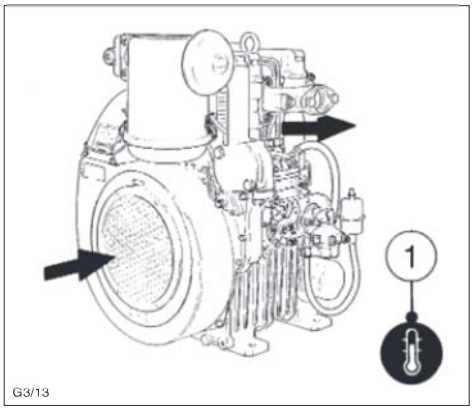
– Run the engine up to maximum speed briefly and check that indicator lamp „1" (depending on version) comes on briefly or that the red zone is visible in maintenance indicator „3".

5.2.3. Check the cooling air system

Heavy contamination is an indication that increased dust accumulation necessitates a correspondingly shorter maintenance interval.



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– Inspect air inlets and outlets for coarse soiling such as leaves, dust accumulation etc., clean if necessary (chap. 5.3.4.).

The temperature indicator „1" – if installed – will light up as soon as the engine becomes too hot.
Shut down the engine immediately!

5.3. Maintenance work every 250 operating hours

5.3.1. Maintenance work on oilbath air cleaner

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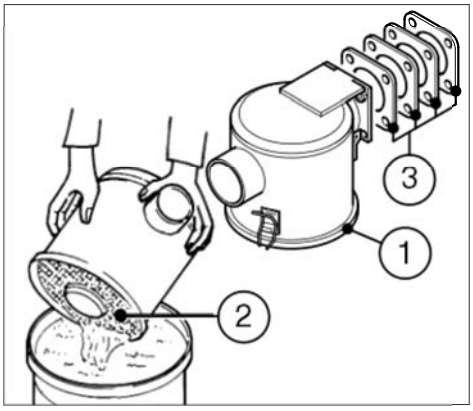
Trap the old oil and dispose of it in accordance with local legislation.

- Take off the oil tank „1".
- Remove contaminated oil and sludge from the oil tank, and clean it out.
- Take off rain cap „2" or cyclone-type dust trap „3", and clean.
- Clean right through intake pipe „4"
- Check condition of sealing ring „5" and renew if necessary.
- Add engine oil to the oil tank up to mark „6" and re-assemble the oilbath air cleaner (fig. 20, chap. 4.1.2.).

If the filter packing is severely contaminated with dust and dirt, the upper part of the air cleaner must also be cleaned as follows:



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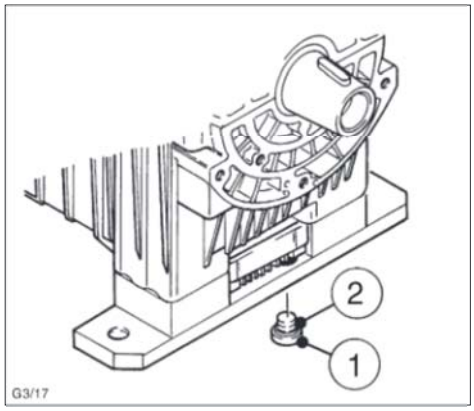
- Detach upper part of air cleaner „1" from engine and rinse in diesel fuel.
- Allow the diesel fuel drip off thoroughly, or wipe it off, before re-assembling.
- Install a new filter packing if the sealing surface is uneven, the body of the filter is cracked and/or filter wool is missing.
- Install the upper part of the air cleaner, using a new flange gasket „3".
- Re-assemble the remaining parts of the air cleaner and fill with oil to prepare for further operation (chap. 4.1.2.).

5.3.2. Engine oil change and oil filter renewal

The engine must be stopped and in a horizontal position.
Drain the engine oil only when the engine is warm.

Danger of scalding from hot oil!
Trap the old oil and dispose of it in accordance with local legislation.

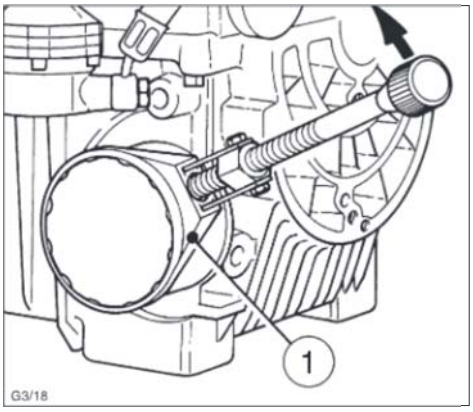
22



23

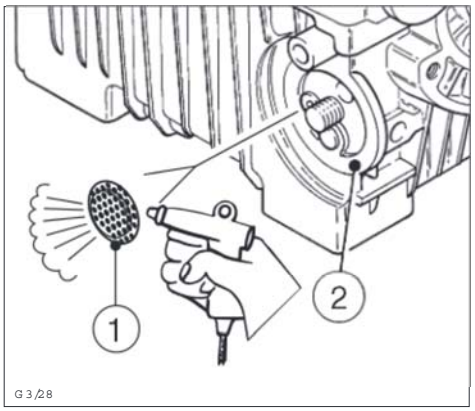
– Take out drain plug „1" and allow the oil to drain out completely (fig. 22 without oil sump, fig. 23 with oil sump).

– Insert oil drain plug „1" with a new sealing ring „2" and tighten.



24

– Slacken off and unscrew the throw away engine oil filter using HATZ strap wrench „1", Order No. 620 307 01, or a similar tool.



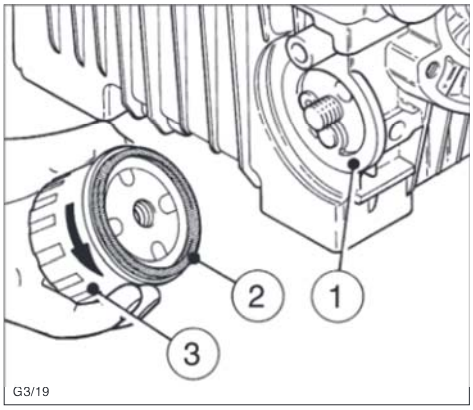
25

– Use a screwdriver to lift mesh screen „1", which is located behind the filter element, away from the oil pressure relief valve. Do not damage contact face „2".

– Clean mesh screen „1" from the inside by blowing through with compressed air.

⚠ Persons handling compressed air must wear protective goggles. Never direct the jet to animals, persons or yourself!

– After cleaning, press the mesh screen back on to the oil pressure relief valve.



26

– Clean sealing face „1" thoroughly.

– Never re-use the throwaway filter element. Oil sealing ring „2" on the new filter element lightly.

– Screw in throwaway filter element „3" handtight.

– Add engine oil (chap. 4.1.1.).

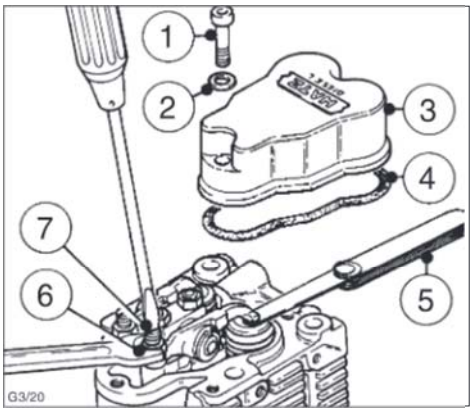
– Run the engine briefly to check that there are no leaks at the oil filter; take up slack if necessary.

– Check the oil level; add oil if necessary (chap. 5.2.1.).

5.3.3. Check and adjust valve clearances

– Adjust only when the engine is cold (10 - 30 °C).

– Remove any dirt from the area where the cover is attached to the cylinder head.



27

– Remove screws „1" and take off cover „3" complete with sealing rings „2" and „4". Never re-use these sealing rings.

Adjusting procedure:

– Cylinder 1 is at the flywheel end; clockwise rotation.
Cylinder 2 is at the power take-off end; anti-clockwise rotation.

– Turn the engine in its normal direction of rotation until the valves in cylinder 2 are in the overlap position (exhaust valve not yet closed, inlet valve starts to open).

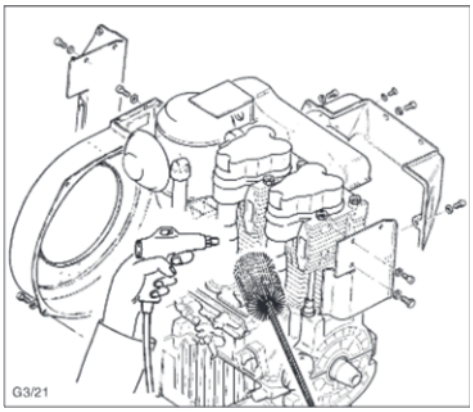
– Turn the crankshaft through 180 degrees in the normal direction of rotation, then check valve clearances for cylinder 1 and adjust if necessary.

– Turn the crankshaft through a further 180 degrees; check valve clearances for cylinder 2 and adjust if necessary.

Adjusting:

- Measure valve clearance with 0.10 mm feeler gauge „5" (fig. 27, chapt. 3.1.).
- If adjustment is necessary, slacken off hex nut „6", turn adjusting screw „7" and retighten nut „6". It should then be possible to pull feeler gauge „5" through with just perceptible resistance to movement (fig. 27).
- Replace the cover in position and tighten it down uniformly.
- Run the engine briefly to check that there are no leaks at the cover.

5.3.4. Clean the cooling air system



28

- Take off all air guides.

If dirt deposits are dry:
- Clean all air guides and the entire cooling air system including cylinder heads, cylinders and flywheel blades without making them wet, and blow them through with compressed air.

⚠ Persons handling compressed air must wear protective goggles. Never direct the jet to animals, persons or yourself!

If dirt deposits are damp or oily:
- Disconnect the battery.
- Apply a detergent solution (cold cleaner or similar) to the entire system in accordance with the manufacturer's instructions, then spray off with a powerful water jet.
  Do not splash electrical device with water jet or pressure jet during engine cleaning.
- Establish the cause of contamination with oil and have any leaks repaired.

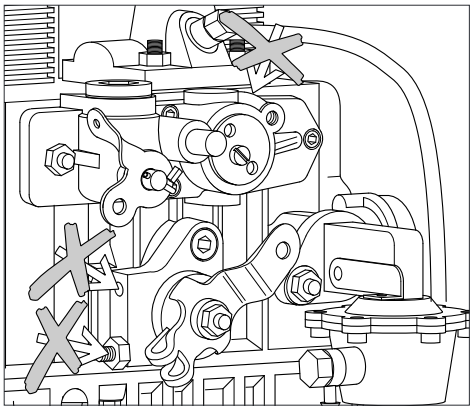
Re-attach all air guides.

⚠ The engine must never be run without the air guides.

- Run the engine immediately after re-assembly until it is warm; this will prevent rust from forming.

5.3.5. Check threaded connections

Check the condition and tightness of all threaded connections, pipes and lines, hose clips and other fastenings on the engine or its mountings which can be reached during maintenance work. Do not tighten the cylinder head bolts.



29

⚠ 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.

5.4. Maintenance work every 500 hours of operation

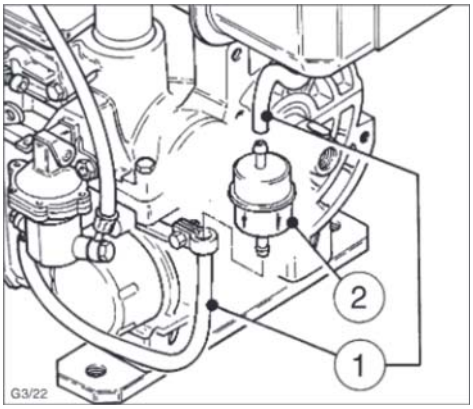
5.4.1. Renew the fuel filter

The maintenance intervals for the fuel filter are dependent upon the purity of the diesel oil being used and, if necessary, may have to be reduced to 250 hours.

⚠ When working on the fuel system, do not expose it to naked flames; do not smoke.

Important!
Keep the entire area clean so that no dirt reaches the fuel. Fuel particles may damage the injection system.

– Shut off the fuel supply.



30

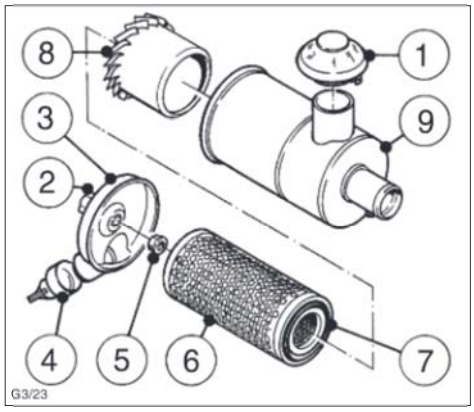
– Pull fuel feed line „1" off fuel filter „2" at both sides, and insert a new filter. Make sure that the direction of fuel flow is as shown by the arrows.

– Open up the fuel supply again and if necessary operate the priming pump (chap. 4.1.3.).

– Run the engine briefly to check that there are no leaks at the fuel filter and fuel lines.

5.4.2. Dry-type air cleaner maintenance

It is best to clean the filter cartridge only when the maintenance indicator displays the appropriate signal. This is only the case if the maintenance indicator functions properly (chap. 6.1.). Apart from this, the cartridge should be renewed after 500 hours of operation.



31

– Take off rain cap „1" and clean it.

– Slacken off wingnut „2" and remove cover „3" with dust discharge valve „4".

– Examine the cover and dust discharge valve for distortion, aging and cracks; renew if necessary.

– Unscrew and remove collar nut „5".

– Carefully pull out filter element „6".

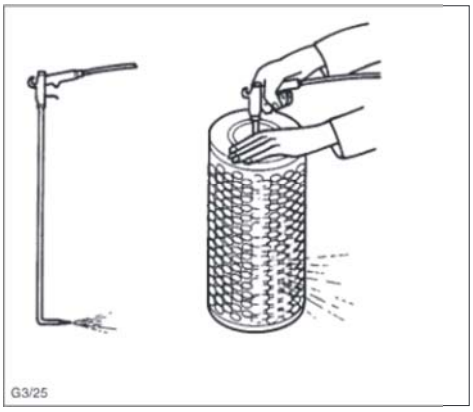
– The cartridge may no longer be used if there is damage to the filter „6" or in the area of the lip seal „7".

– Pull guide „8" out of filter housing „9".

– Clean all parts except the filter element. Make sure that dirt or other foreign matter cannot enter the engine air intake port.

Cleaning the filter cartridge

Dry contamination



32

– Using a compressed-air pistol with a bent tube insert, blow through the cartridge from the inside with dry compressed air, moving up and down, until no more dust is emitted.

Important!
The pressure must not exceed max. 5 bar.

⚠ Persons handling compressed air must wear protective goggles. Never direct the jet to animals, persons or yourself!

Wet or oily contamination
Replace the filter cartridge.

– Assembly is carried out in reverse order.

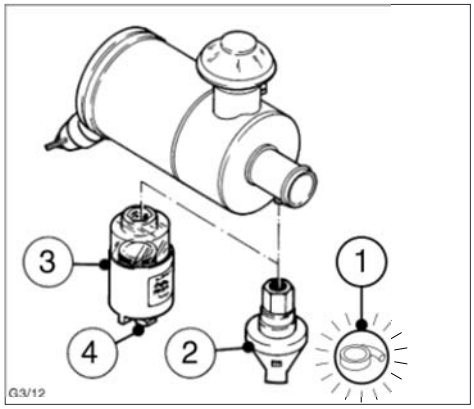
Check the seal insert of collar nut „5", replace the collar nut if the seal insert is missing. Ensure that the dust extractor valve is correctly positioned downwards (fig. 31).

– When the filter has been installed, unlock maintenance indicator „3" – if installed – by pressing reset button „4" (fig. 33).

6. Functional test

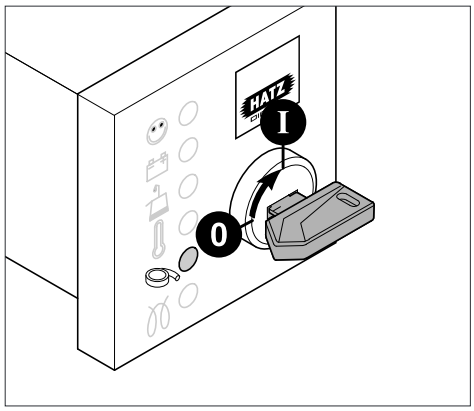
6.1. Air filter maintenance indicators (only on version with Dry-type air cleaner)

For electrical indicator



33

– Unscrew maintenance switch „2" then reconnect to the on-board electric system.



34

– Turn the ignition key to position I.

– Create a vacuum at the maintenance switch with powerful suction, indicator lamp „1" must light up (fig. 33).

– If there is no reaction, check cable connectors and replace filament lamp and/or maintenance switch if necessary.

For mechanical indicator

– Unscrew maintenance indicator „3" (fig. 33).

– Create a vacuum at the maintenance indicator with powerful suction, the visible red area must latch in, replace maintenance indicator if necessary.

– Before putting into operation, unlock maintenance indicator „3" with reset button „4"

7. Malfunctions – causes and remedies

Malfunctions	Possible causes	Remedy	Chap.
The engine does not start or not immediately, can however be turned over with the starter motor.	Speed adjustment lever in the stop or idle position.	Move the lever in START position.	4.2.1.
	Stop lever in stop position.		
	No fuel at the fuel-injection pump.	Fill up with fuel.	4.1.3.
		Check the complete fuel supply system systematically. If no result, check:	
		- fuel supply line to the engine.	
		- fuel filter.	5.4.1.
		- function of the feed pump.	4.1.3.
	Insufficient compression:		
	- Wrong valve clearances	Check valve clearances, adjust if necessary.	5.3.3.
	- Worn out cylinders and/or piston rings.	See workshop manual.	
	Unserviceable injector jets.	See workshop manual.	
At low temperatures.	Below the start-limit temperatures.	Operate glow-plug equipment (additional equipment).	4.2.2.
	Device not disengaged.	Disengage the engine from the device - if possible.	
	Glow-plug equipment defective (additional equipment).	See workshop manual.	
	Fuel flocculent due to inadequate cold stability.	Pull out the return line and check whether clear, unclouded fuel comes out when operating the feed pump.	4.1.3.
		If the fuel is flocculent, either warm up the engine or drain off the complete fuel supply system. Refill with temperature-resistant fuel mixture.	4.1.3.

Malfunctions	Possible causes	Remedy	Chap.
At low temperatures.	Starting speed too low:		
	- Oil too viscous.	Replace and fill up with oil.	5.3.2. 4.1.1.
	- Battery inadequately charged.	Check the battery, if necessary contact a service station.	8.
Starter motor does not operate or engine does not turn over.	Descrepancies in the electrical system:		
	- Battery and/or other cable connections wrongly connected. - Loose and/or oxidized cable connections. - Battery defective and/or not charged. - Stater motor defective. - Defective relays, monitoring elements etc.	Check the electical system and its components or contact HATZ service station !	8.
Engine ignites, but stops running as soon as the starter motor is disengaged.	Speed control lever not located far enough in the start direction.	Move the lever to START position.	4.2.1.
	Device not disengaged.	Disengage the engine from the device if possible.	
	Fuel filter blocked.	Replace fuel filter.	5.4.1.
	Fuel supply interrupted.	Check the entire fuel supply systematically.	
In addition, if automatic electrical engine shutdown is installed.	Stop signal from monitoring element for automatic shutdown system (optional extra):		
	- oil pressure lost	Check oil level.	5.2.1.
	- cylinder head temperature too high.	Clean cooling air system.	5.3.4.
	- alternator has failed.	See workshop manual.	

Malfunctions	Possible causes	Remedy	Chap.
Engine shuts down independently during operation.	Fuel supply interrupted:		
	- Tank run dry	Fill up with fuel.	4.1.3.
	- Fuel filter blocked.	Replace fuel filter.	5.4.1.
	- Fuel feed pump defective.	Check the entire fuel supply system.	4.1.3.
	Mechanical malfunctions.	Contact a HATZ service station.	
In addition, if automatic electrical 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.	5.3.4.
	- alternator has failed.	See workshop manual.	
	Malfunction signal from overvoltage and polarity reversal protection in voltage regulator:		
	- Battery and/or other cable connections incorrectly connected.	Check electrical equipment and the components thereof.	
	- Cable connections loose.		
Drop off in performance and speed of the engine.	Fuel supply detrimentally affected:		
	- Tank run dry.	Fill up with fuel.	4.1.3.
	- Fuel filter blocked.	Replace fuel filter.	5.4.1.
	- Inadequate tank ventilation.	Ensure adequate ventilation of the tank.	
	- Line connections leaky.	Check the line screw-connections for leaks.	
	- The speed control lever does not remain in the required position.	Block the speed control.	

Malfunctions	Possible causes	Remedy	Chap.
Drop off in engine performance and speed, black smoke from the exhaust.	Air filter contaminated.	Clean air filter.	5.3.1. 5.4.2.
	Incorrect valve clearances.	Adjust valve clearances.	5.3.3.
	Injector jets unserviceable.	See workshop manual.	
Engine runs very hot, the indicator lamp for cylinder head temperatur (additional equipment) comes on.	Too much oil in the engine.	Drain off oil to the upper mark on the dipstick.	5.3.2.
	Inadequate cooling:		
	- Contamination in the entire area for the air guides.	Clean the area of cooling air.	5.3.4.
	- Insufficiently enclosed air guides.	Check that the air guides and shafts are complete and that they are sealed.	

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 (–) pole of the battery before working on the electric device.

- 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 life 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 electrical components.
- Do not splash electrical device 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 was not carried out acc. 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.

Extended manufacturer's declaration / Declaration of Incorporation
EC Machinery Directive 98/37/EC or 2006/42/EC*)

The manufacturer: **Motorenfabrik Hatz GmbH & Co.KG**
Ernst-Hatz-Straße 16
D-94099 Ruhstorf a. d. Rott

hereby declares that the incomplete machine: product description: **Hatz diesel engine**
Type designation and as of serial number:
2G40=09121

satisfies the following basic safety and health protection requirements in acc. with Annex I to the above-mentioned Directive.

- Annex I, General principles no. 1
  - Nr. 1.1.2., 1.1.3., 1.1.5., 1.2.1., 1.2.2., 1.2.3., 1.2.4.1., 1.2.4.2., 1.3.1., 1.3.2., 1.3.3., 1.3.4., 1.3.7., 1.3.9., 1.4.1., 1.5.1., 1.5.8., 1.5.9., 1.6.1., 1.6.2., 1.6.4., 1.7.

All relevant basic safety and health protection requirements down to the interfaces described
- ☒ in the operating manual
- ☒ in the enclosed data sheets
- ☒ in the enclosed technical documents

have been complied with.

The special technical documents in acc. with Annex VII B of the Directive 2006/42/EC have been prepared **).

The following standards have been used (completely or partially):
- EN 1679-1: 051998
- EN ISO 12100-1: 042004
- EN ISO 13857: 062008
- EN ISO 14121-1: 122007
- EN ISO 12100-2: 042004

I will submit the above-mentioned specific technical documents electronically to the competent government authority, if applicable**)

The Operating Manual has been enclosed to the incomplete machine and the Assembly Instructions have been provided to the customer electronically together with the order confirmation.

Commissioning has been prohibited until it has been established, if applicable, that the machine into which the above-mentioned incomplete machine is to be incorporated, satisfies the provisions of the Machinery Directive.

Wolfgang Krautloher / see "Manufacturer"
Name / address of EC documentation officer **)

01/12/2009	Krautloher / Directives official	Krautloher
Date	Signature and information on the undersigned	Signature

*) The machine satisfies the substantial requirements of both directives 98/37/EC shall apply until 28.12.2009; 2006/42/EC shall apply as of 29.12.2009
**) applies only to the Directive 2006/42/EC

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.

Technical Library

http://engine.od.ua