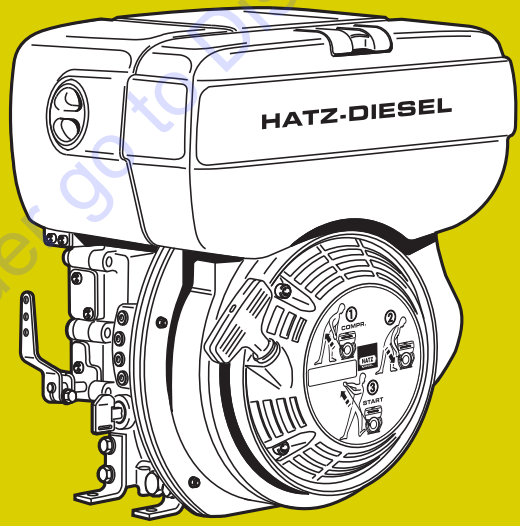
Translation of the ORIGINAL INSTRUCTION BOOK

HATZ DIESEL

INCLUDES SUPPLEMENTAL INFORMATION TO THE OWNER'S MANUAL FOR MODEL YEAR 2011 EPA CERTIFIED NONROAD COMPRESSION-IGNITION ENGINES

INCLUDES SUPPLEMENTAL INFORMATION TO THE OWNER'S MANUAL FOR MODEL YEAR 2011 CALIFORNIA REGULATIONS FOR HEAVY-DUTY OFF-ROAD ENGINES



1B20
1B27
1B30
1B40
1B50

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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 follow all maintenance references carefully including the schedule for Model Year 2011 EPA certified nonroad compression-ignition engines and for Model Year 2011 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.

HATZ DIESEL SERVICE

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**.

HATZ DIESEL

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.

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 safety notes when operating the engine

HATZ diesel engines are efficient, strong and durable. For this reason they are frequently installed on equipment used for commercial purposes.
The manufacturers of such equipment must observe any relevant equipment safety regulations when the engine forms part of an overall system.
A few general points concerning operating safety should none the less be noted.
Depending on the engine's operating and installation conditions, equipment manufacturers and their users may have to fit safety or protective devices in order to prevent improper use. Examples:

– 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.

– Incorrect wiring or improper operation of the electrical system may cause sparking and must therefore be avoided.

– Provide protection against contact with rotating parts once the engine is connected to the driven equipment or machine.
HATZ protective guards are available for the belt drive of the cooling fan and alternator drive systems.

– Always observe the start-up information in the operating instructions before starting the engine: **this is particularly important when starting an engine with the recoil starter**.

– Mechanical starting devices should not be operated by children or persons deficient in physical strength.

– Check that all safety devices are in place before starting the engine.

– Ensure that operation, maintenance and repair of the engine are undertaken by suitably trained personnel only.

– Protect the starter key against unauthorised use.

– 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 safety notes when operating the engine

– The engine must be stopped before performing any maintenance, cleaning- or repair work.

– Stop the engine before refilling the fuel tank.
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.

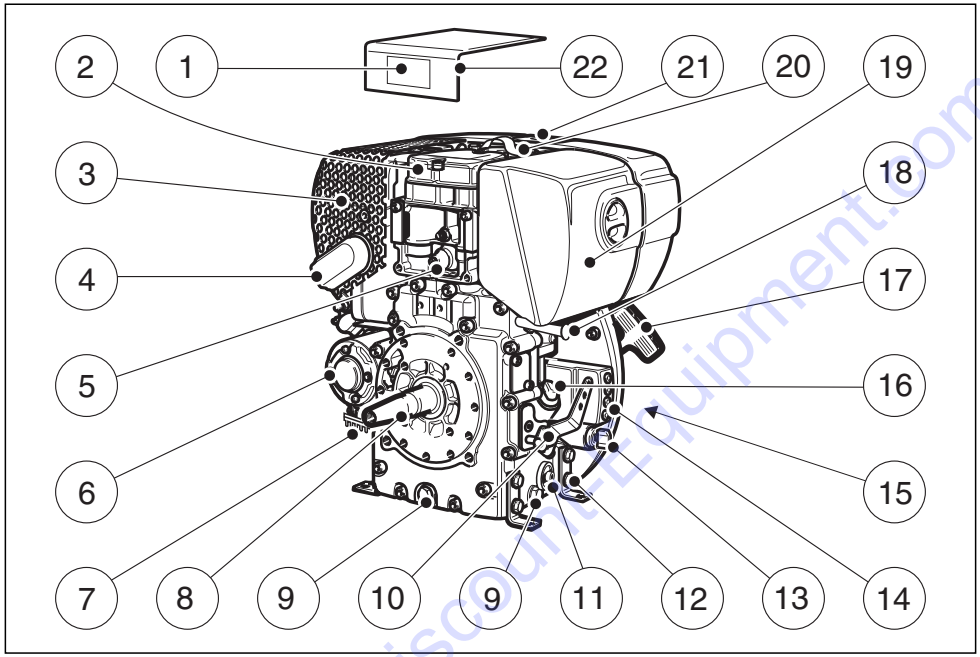
– Please pay attention to all advice- and warning stickers placed on the engine and keep them in legible condition. In case a label has come off or is no longer clearly legible, it must be replaced immediately. To this effect, please contact Discount-equipment.

– We accept no liability for damage resulting from improper modifications to the engine.

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.

When in doubt, consult Discount-equipment before starting the engine.

2. Description of the engine



1

1 Type plate
2 Cylinder head cover
3 Exhaust silencer
4 Exhaust mesh insert
5 Oil pressure switch
6 Starter motor
7 Voltage regulator
8 Crankshaft - power take-off
9 Oil drain plug
10 Speed adjustment lever
11 Oil filter
12 Engine mountings
13 Ignition key
14 LED display
15 Intake opening for cooling and combustion air
16 Oil filler pipe and dipstick
17 Recoil starter
18 Engine shutdown pin
19 Dry-type air cleaner
20 Suspension lug (see also Fig 42, Pos. 1)
21 Fuel tank cap
22 Noise insulating hood

3. General notes

3.1. Technical data

Type		1B20	1B27	1B30	1B40	1B50
Design		Air-cooled four-stroke diesel engine				
Combustion system		Direct injection				
Number of cylinders		1	1	1	1	1
Bore / stroke	mm	69 / 62	74 / 62	80 / 69	88 / 76	93 / 76
Displacement	cm^3	232	267	347	462	517
Lubricating oil capacity without oil sump with oil sump	 l, approx. l, approx.	 0.9 [1] 2.6 [1]	 0.9 [1] –	 1.1 [1] 2.8 [1]	 1.5 [1] 3.2 [1]	 1.5 [1] –
Difference between "max" and "min" levels without oil sump with oil sump	 l, approx. l, approx.	 0.5 [1] 1.6 [1]	 0.5 [1] –	 0.5 [1] 1.8 [1]	 0.8 [1] 2.2 [1]	 0.8 [1] –
Lubricating oil consumption (after running in)	max.	1 % of fuel consumption at full load				
Lubricating oil pressure (oil temperature 100 °C)	approx.	2.5 bars at 3000 r.p.m.				
Direction of rotation, power take-off end		anti-clockwise				
Valve clearance 10 - 30 °C Inlet and exhaust valve	mm	0.20	0.10	0.10	0.10	0.10
		or automatically [2]				
Max. tilt angle in operation, in direction		Flywheel 25° down [3] all other directions 35° [3]				
Weight (incl. fuel tank, air-cleaner, exhaust silencer, recoil starter and electric starter)	kg, approx.	33	34	40	55	56
Battery capacity	min / max	12 V - 36 / 60 Ah • 24 V - 24 / 44 Ah				

[1] These values are intended as an approximate guide. The **max.** marking on the dipstick is the determining factor, Fig. 7.

[2] Depending on model (see maintenance charts, chapter 5.1).

[3] Exceeding these limits causes engine breakdown.

Tightening torques

Item	Nm
Oil drain plug	50

3.2. Transport

A suspension lug „20“ is provided as standard equipment, so that the engine can be lifted safely, chap. 2. It is not suitable or approved for lifting the complete equipment to which the engine is attached.

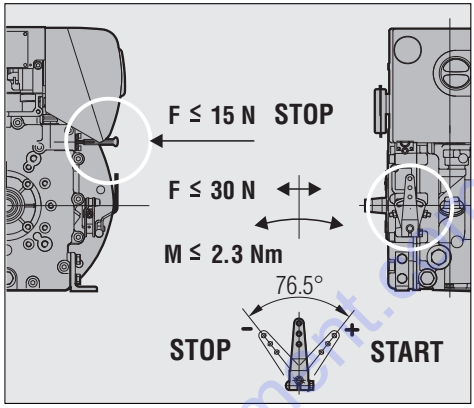
3.3. Notes on installation

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.



2

Do not exceed the forces and torques indicated on the speed adjustment lever and the stop pin, otherwise you may damage the stops and internal governor components, Fig. 2.

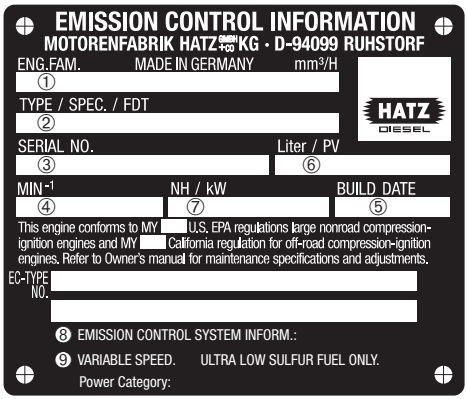
3.4. Load on engine

See supplemental information for EPA certified engines, Page 41; resp. supplemental information for California regulations for off road engines, Page 51.

3.5. EPA/CARB-type plate and fuel label

The layout of the EPA/CARB-type plate depends on the engine application and is placed on the noise insulating hood (Chap. 2).
It includes the following emission control information (Figure 3a):

Type plate



3a

① EPA/CARB-Engine Family Number
② engine type/spec. (only for special equipment) /Fuel Delivery Timing
③ engine number
(also stamped on crankcase, Fig. 4)
④ max. engine rated speed
⑤ build date
⑥ displacement
⑦ rated power
⑧ emission control system information
(see page 44 and 54)
⑨ “variable speed” or “constant speed only”
(if requested)

The type plate also states the applicable emission-related **power category** of the engine.

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):

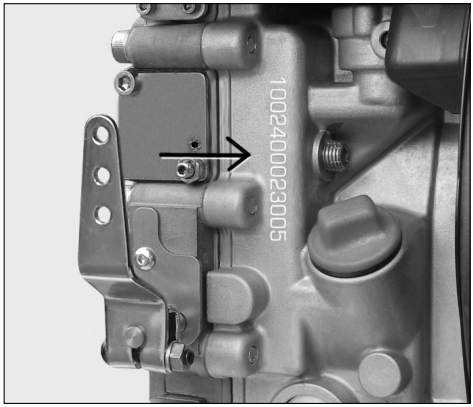
② engine type/spec.
(only for special equipment)
③ engine number
④ max. engine rated speed

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

Fuel label

3b

The engine must be operated with “ULTRA LOW SULFUR FUEL ONLY”.
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.



4

Engine serial number on crankcase

3.6. EMISSION-RELATED INSTALLATION INSTRUCTIONS

See supplemental information for EPA certified engines, Page 41; resp. supplemental information for California regulations for off road engines, Page 51.

3.7. Closed crankcase ventilation system

Please note that the engine has a closed crankcase ventilation system.
Exceeding the maximum admissible tilt angle (see chapter 3.1. Technical data) can cause damage to the engine.
In cases where the maximum angle is exceeded, the engine must be stopped immediately.
Before restarting, the engine must be in a horizontal position and the air filter and inlet manifold must be checked for any oil contamination.
If there are any oil contamination, please consult Discount-equipment.

4. Operation

4.1. Before starting up for the first time

Engines are normally supplied dry, i.e. not containing fuel or oil.

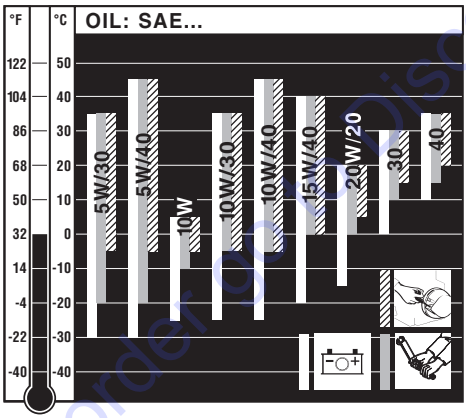
4.1.1. Engine oil

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

Oil viscosity



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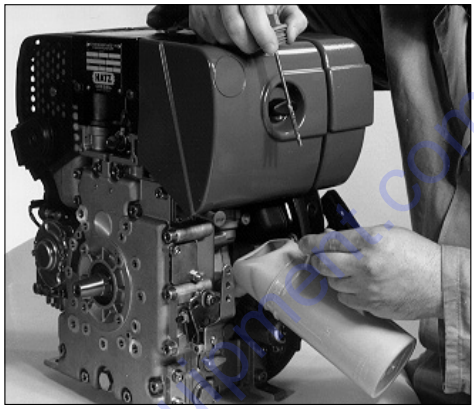
Please select the recommended viscosity depending on the ambient temperature at which the engine is operated.

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

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



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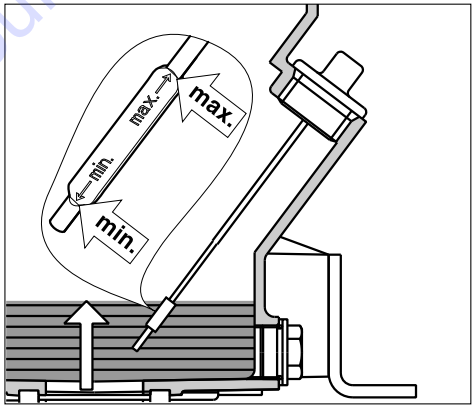
– Remove oil filler screw and add engine oil.
Lubricating oil capacity: see Chapter 3.1.

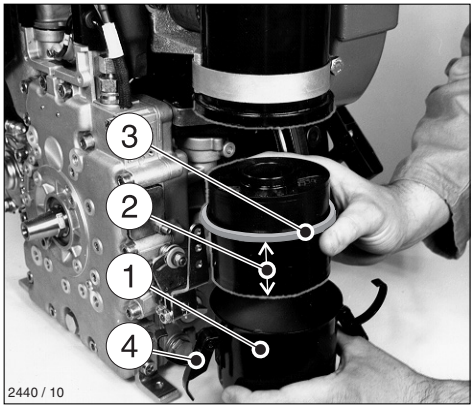


7

– To check the oil level, remove the dipstick, clean it - then screw it back in and finally remove it again.
Check the oil level on the dipstick and, if necessary, top up to the **max.** level.

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. Version with oilbath air cleaner



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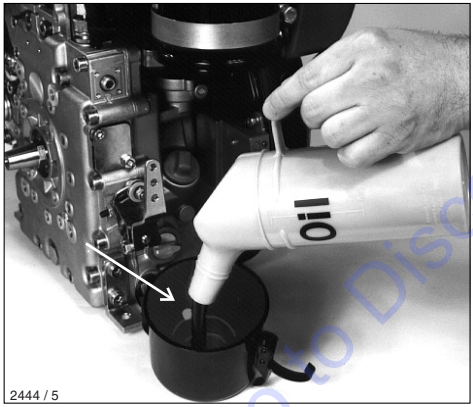


9

– Take off oil reservoir „1“ and fill with engine oil as far as the mark, Figs. 8 and 9.

– Insert the filter element into the oil reservoir with the long end „2“ leading, Fig. 8.

– Attach the oil reservoir, making sure that sealing ring „3“ is correctly seated and fasteners „4“ are tight.

4.1.3. 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 fuels which satisfy the following specifications are suitable:

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.

10

– Remove fuel tank cap.

11

– Before the first start or if the fuel tank has been run dry, completely fill the fuel tank with diesel. The bleeding of the fuel system is automatically.

Note:
If a **double fuel filter system** is provided (Chapter 5.4.1), wait for a short time after replenishing fuel (approx. 1 to 2 minutes) for automatic bleeding to be completed.

12

– Close and fix fuel tank cap.

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 %

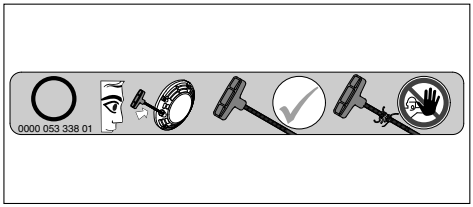
4.2. Starting

Do not run the engine in closed or badly ventilated rooms – danger of poisoning! Before starting the engine, ensure that no-one is in the danger area close to the engine or equipment, and that all protective guards are fitted.

4.2.1. Preparations for starting

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

Recoil starter



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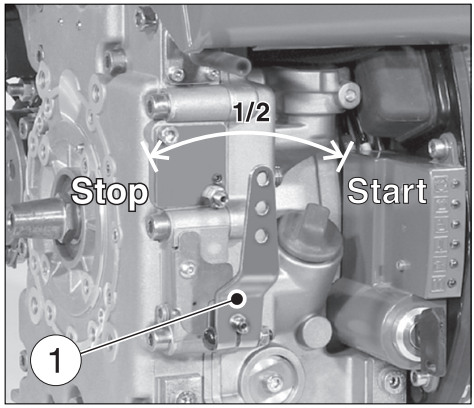
Check the starter rope for chafing and, if necessary, replace it.
A damaged rope may break during starting, and cause injury.

Speed adjuster, standard version



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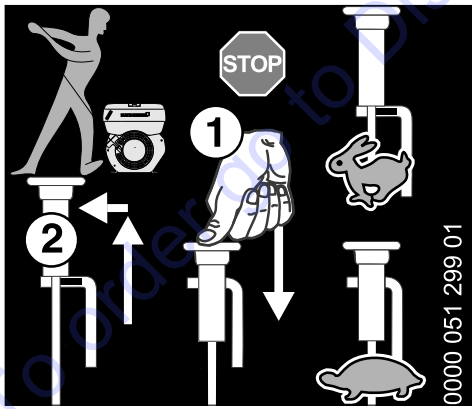
– First, set the engine speed adjustment lever „1“ to STOP position. Next, set it either to ½ START or max. START, as practical or required.
Starting at a lower speed will help to prevent exhaust smoke.

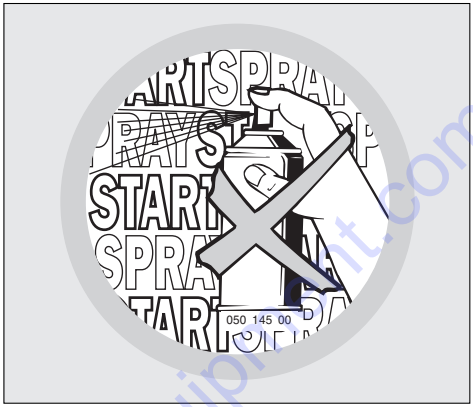
Speed adjuster with pull rod



15

– Press the engine speed adjusting device first to STOP position „1“. Then set it to START position „2“.

Now, the engine is ready for starting.



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Never use starting sprays!

Important!
After long-time standstill (approx. 6 months or even longer) or first operation, operate engine with low adjusted speed and without load for approx. 20 sec. after start. This measure assures a lubrication of all bearings before increasing speed and load.
It also prevents an insufficient lubrication.

4.2.2. Recoil starter (down to –6 °C)

– For starting preparations, see Chapter 4.2.1.

Starting procedure

17

– Pull the starting cable out by the handle until you feel a slight resistance.

– Let the cable run back; in this way the entire length of the starting cable can be used to start the engine.

– Devices which are not securely fastened should be restrained with the foot.

18

– Grip the handle with both hands.

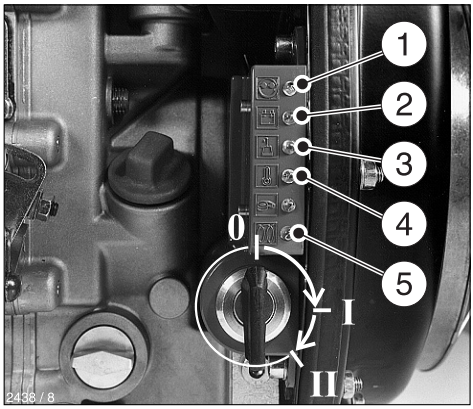
19

– Commence pulling the starting cable vigorously and at an increasing speed (do not jerk it violently) until the engine starts

Note:
If after several attempts of starting the exhaust begins to emit white smoke, move the speed adjustment lever to the STOP position and pull the starting cable out slowly 5 times.
Repeat the starting procedure, Chapter 4.2.1.

4.2.3. Electric starter

– For starting preparations, see Chapter 4.2.1.



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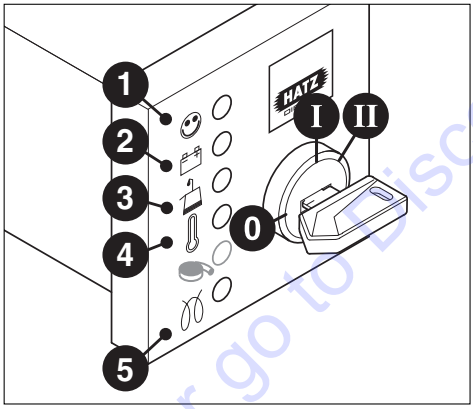

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– Insert the key **to its stop** and turn it to **position I**, Fig. 20 and Fig. 21.

Depending upon the model, the battery charge telltale „2“ and the oil pressure warning light „3“ will come on.
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 6.

– Turn the key to **position II**.

– Release the key as soon as the engine runs. The starting key must spring back to **position I** and remain there during engine operation.

– The battery charge and oil pressure lights should extinguish directly after the engine starts. The display lamp „1“ lights up to show that the engine is running.

– Prior to starting up again, the key has to be returned to **position 0**. When the engine is running the starter repeat lock in the ignition switch will prevent the starter from engaging and suffering damage.

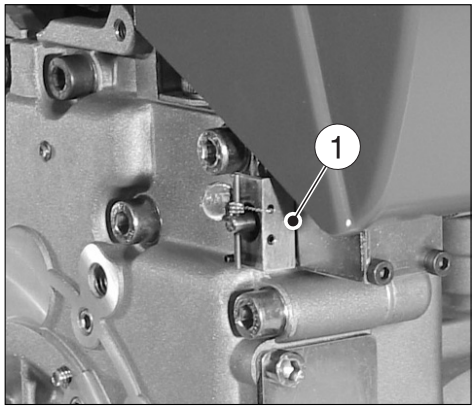
Note:
Start for max. 30 seconds. If the engine does not run after this time, turn starter key back to **position 0** and eliminate the cause, Chapter 6.

Preheater system (optional extra)

When starting a **cold** engine, the preheat indicator „5“ will light, Fig. 20 and Fig. 21.

– Start the engine immediately after the light goes out.

Fuel shut-off valve, stop solenoid
(additional equipment)



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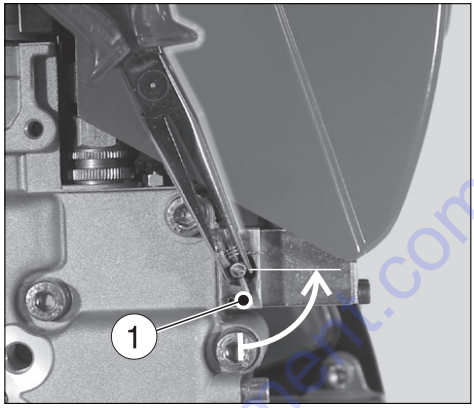
As soon as the starting key is at **Position I**, **fuel shut-off valve** „1“ is **electrically released**. The fuel feed to the injection pump is then open and the engine is ready to start.
When the engine is running, turning the starting key to **position 0 closes** the **cut-off valve** and interrupts the fuel supply to the injection pump, so that the **engine stops**; Chapter 4.3.
This shut-off valve is also used for the automatic electrical shutdown system.

Emergency start

If the **shut-off valve** is blocking the fuel supply as a result of an **electrical fault** and the **engine therefore cannot be started**, an emergency start can be attempted.
Proceed as follows for this:



23

– For emergency starting, turn the lever at fuel shut-off solenoid „1“ anti-clockwise by at least 90° using suitable pliers. The lead seal wire will break off.

– As soon as the emergency start lever is in the starting position, the electric starter or recoil starter can be used; Chapter 4.2.2.
The oil level must always be checked before an emergency start, as insufficient oil pressure can lead to complete damage of the engine within a very short time.

⚠ After this, the engine can only be stopped with the starting key in the emergency operating mode if the emergency starting lever is first turned back **clockwise** to the stop position.

Immediately after a period of emergency running, ascertain the cause of the fault and have it rectified; Chapter 6.
Have the emergency-starting lever sealed once again by a **HATZ service point**.

When the automatic electrical shutdown system is used, the emergency start described above means that liability for risks must be accepted by the operator **(Motorenfabrik HATZ assumes no liability)**.
In case of difficulty contact Discount-equipment

Automatic electrical shutdown system
(additional equipment)

Model <u>with</u> error memory
This is characterized by a brief flashing of all pilot lamps once the starter key has been turned to **position I** (Fig. 20 and 21).

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. 20 and Fig. 21, 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 6.2).

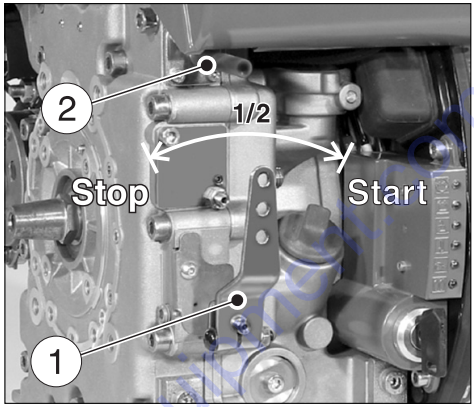
The display light goes out when the engine is next started.

Model <u>without</u> error memory
This model has no specific characteristic which appears externally. If the engine stops immediately after starting, this indicates a reaction of a monitoring element of the automatic shut-off feature. Before performing further starting attempts, locate and eliminate the malfunction (Chapter 6.2).

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

Speed adjuster, standard version

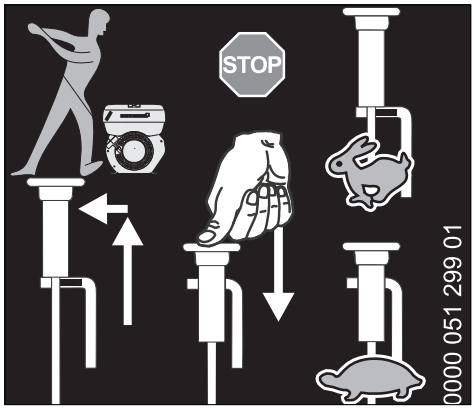


24

– Move the speed adjustment lever „1“ back to the STOP position. The engine cuts out.

Note:
Engines with a **fixed lower idling speed** cannot be switched off using the speed adjustment lever. See the paragraph entitled „Other ways of switching off the engine“.

Speed adjuster with pull rod (optional extra)

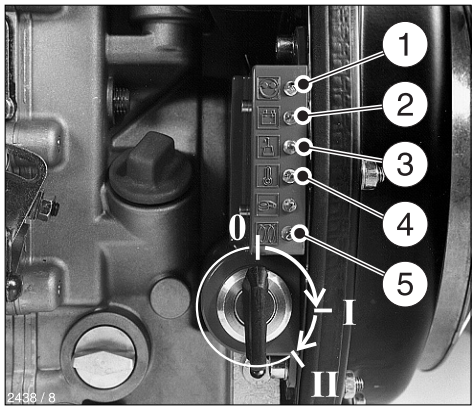


25

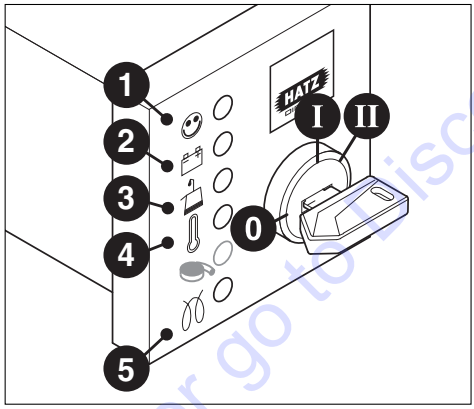
– Move the speed adjuster to the „STOP“ position and press it until the engine cuts out.

Other ways of switching off the engine

1. Fuel shut-off valve, stop solenoid
(optional extra)



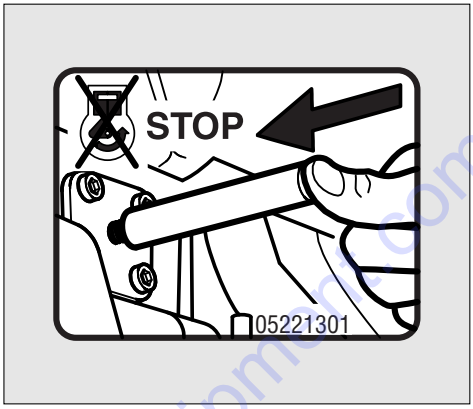
26



27

– Turn ignition key to the **0 position**. The engine cuts out, Fig 26 and Fig. 27.

2. Stop pin (optional extra)



28

– Press the stop pin until the engine cuts out, also see Fig. 24, position 2.

– Once the engine has cut out, release the pin „2“ and ensure that it returns to its initial position.

Depending upon the model, the battery charge indicator „2” and oil pressure warning indicator „3“ will come on again after the engine comes to a stop, Fig. 26 and Fig. 27.

– Turn the key to **position 0** and remove it. All the indicator lights must go out, Fig. 26 and Fig. 27.

Note:
Failure to return the starter key to **position 0** may result in the battery being totally discharged.

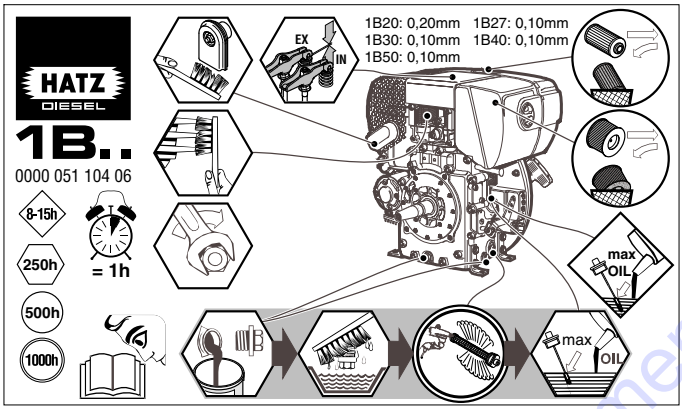
If operation of the engine is interrupted for any reason, or at the end of the working day, the starter key should be kept out of reach of unauthorised persons.

5. Maintenance

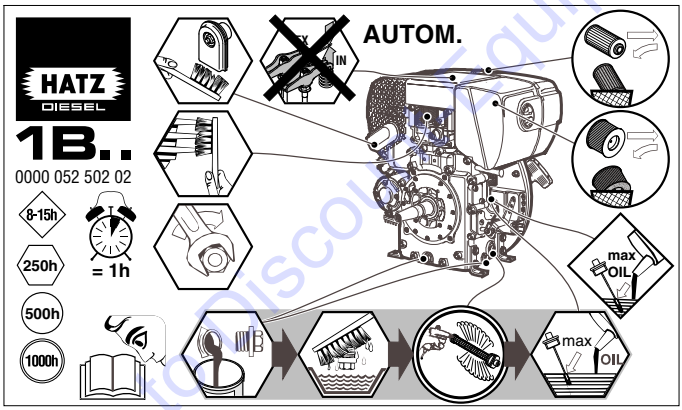
Only carry out maintenance work with the engine switched off.
Observe all relevant laws and regulations governing the handling and disposal of used oil, filters and cleaning agents.
Protect the starting key against unauthorised use.
On engines with an electric starter, disconnect the battery's negative terminal.
When maintenance work has been completed, check that all tools have been removed from the engine and all protective guards fitted again.
Before starting the engine, ensure that there are no persons in the danger area close to the engine or equipment.

5.1. Maintenance chart

	Maintenance interval	Maintenance work required	Chap.
8-15	Every 8 – 15 operating hours, or before each daily start-up	Check oil level. Examine the lower section of the oilbath air cleaner to ensure correct oil level and freedom from contamination; change the oil if it contains sludge. On version with cyclone-type dust trap, empty the dust collector. Check combustion and cooling air intake zone. Check air-cleaner maintenance indicator. Check the water trap.	5.2.1. 4.1.2. 5.3.1. 5.3.1. 5.2.2. 5.2.3. 5.2.4.
250	Every 250 operating hours	Oilbath air cleaner maintenance. Change engine oil. Check and adjust valve clearances. (Not applicable with automatic self adjusting valve clearance models, see next page) Clean cooling air area. Check screw connections. Clean mesh insert for exhaust.	5.3.1. 5.3.2. 5.3.3. 5.3.4. 5.3.5. 5.3.6.
500	Every 500 operating hours	Change fuel filter element. Dry-type air cleaner maintenance.	5.4.1. 5.4.2.
1000	Every 1000 operating hours	Clean the oil filter.	5.5.1.



Model **without** automatic valve clearance adjustment.



Model **with** automatic valve clearance adjustment.

Depending whether the engine is equipped with or without automatic valve clearance adjustment one of the illustrated maintenance plans is included. This label should be affixed to the engine or equipment in an easily visible position. The maintenance chart governs the maintenance intervals.

On **new** or **reconditioned engines, after the first 25 operating hours**, always

– Change engine oil, Chapter 5.3.2.

– Check valve clearances and adjust if necessary, Chapter 5.3.3.

– Examine screw connections, chapter 5.3.5. **Do not tighten the cylinder head fastening.**

If the engine is not used frequently, change the engine oil after **12 months at the latest**, regardless of the actual number of hours it has been in operation.

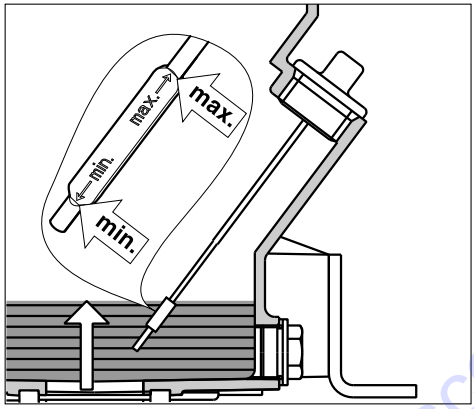
5.2. Maintenance every 8–15 operating hours

5.2.1. Checking engine oil level

To check the oil level, the engine must be standing level and be switched off.

– Remove any dirt from the oil dipstick area.

– Remove dipstick and clean it.



29

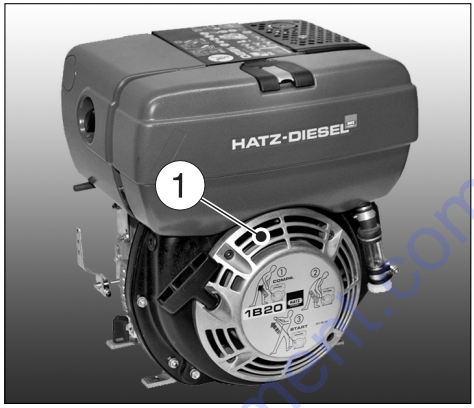
– To check the oil, screw the dipstick back in and then remove it again.

– Check the dipstick oil level and, if necessary, add oil to the **max.** mark, 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.

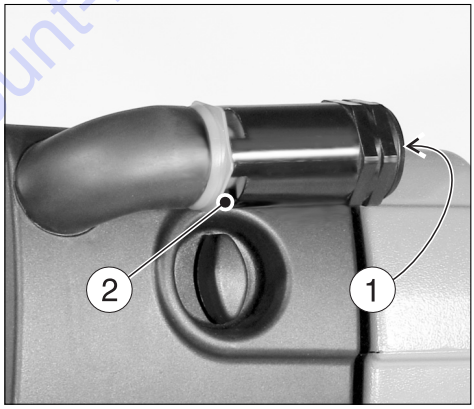
5.2.2 Check air intake area for combustion and cooling

Heavy contamination is an indication that increased dust accumulation necessitates a correspondingly shorter maintenance interval, Chapter 5.3.1., 5.3.4. and 5.4.2.



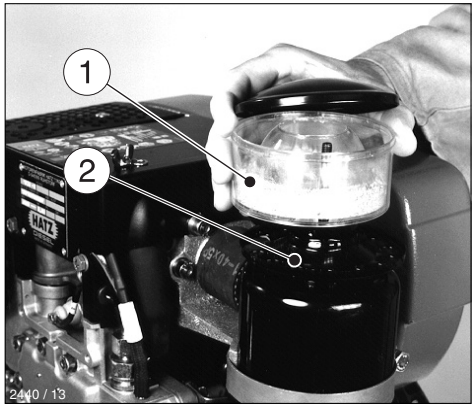
30

– Check air intake points for severe blockage due to leaves, heavy dust accumulation etc., and if necessary clean them.



31

– For models fitted with cyclone, additionally check if inlet point „1“ is clear. Make sure that dust outlet „2“ is not blocked and clean if necessary.

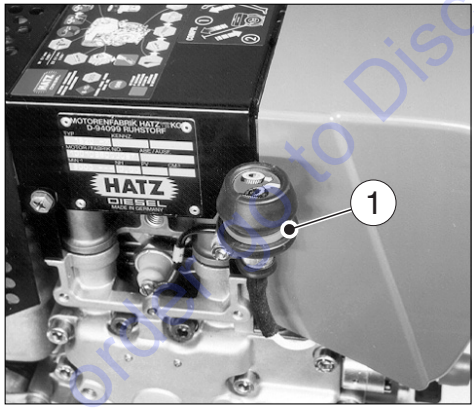


32

– On version with oilbath air cleaner, also check air intake area „2“.

5.2.3. Check air cleaner maintenance indicator (optional extra)

Mechanical service indicator

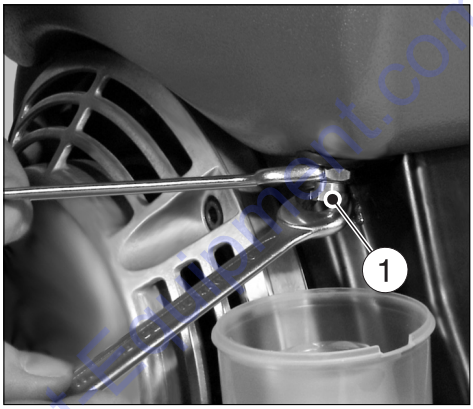


33

– Increase the speed of the engine briefly to the maximum.
If the **rubber bellows shrinks** and covers the green area „1“, the air cleaner system should be serviced, Chapter 5.4.2.
Under dusty conditions, check the rubber bellows several times per day.

5.2.4. Checking the water trap

The intervals at which you should check the water trap depend entirely on the amount of water in the fuel and the care taken when refuelling. The normal interval is once a week.



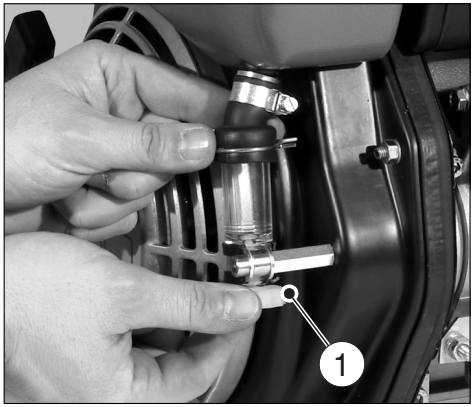
34

– Loosen hexagon screw „1“ with approx. 3-4 rotations.

– Trap the drops which emerge in a transparent vessel. Since water has a greater specific gravity than diesel fuel, the water emerges before the diesel fuel. The two substances separate at a clearly visible line.

– As soon as diesel only emerges at screw „1“, this can be tightened again.

If an external water trap is attached, check its water content every day, when the engine oil level is checked. The water which has collected is separated at a clearly visible line from the diesel fuel above it.



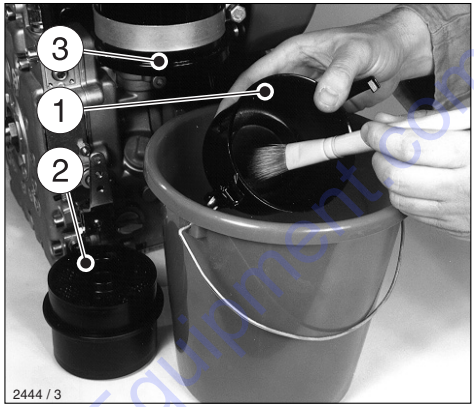
35

– Open drain plug „1“ and drain the water out into a suitable vessel.

– If the drain plug is difficult to reach, an extension hose can be attached to it.

5.3. Maintenance every 250 operating hours

5.3.1. Oilbath air cleaner maintenance



36

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.

– Rinse out filter element „2“ in diesel oil; allow it to drip thoroughly and wipe it down before re-assembling the air cleaner.

– If severely contaminated, clean filter housing „3“.

Never attempt to repair the oilbath air cleaner by welding, brazing etc., as this could damage the filter beyond repair and cause engine damage.

– Re-attach parts previously removed from the air cleaner and add oil so that it is ready for use, Chapter 4.1.2.

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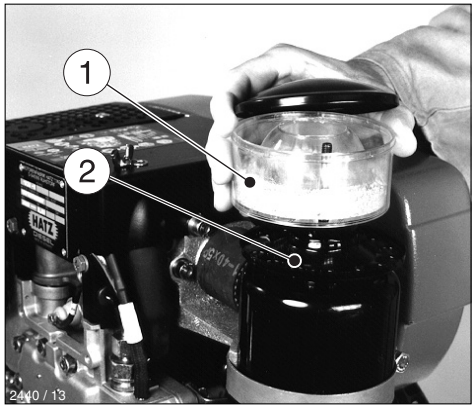
Version with cyclone-type dust trap



37

– Take off dust collector „1“, empty it and wipe clean (dust collector must remain dry).

– Clean intake aperture „2“ (also keeping it dry).

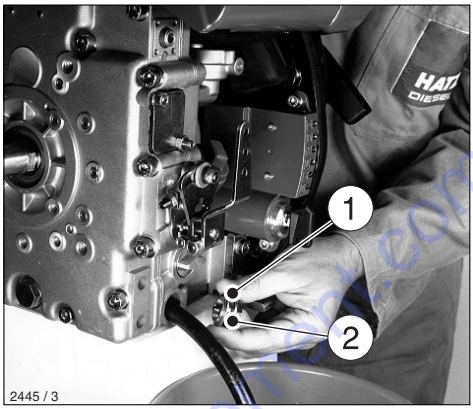
Important:
Do not add any oil to the dust collector.

– Attach the cyclone-type dust trap and secure with the wing nut.

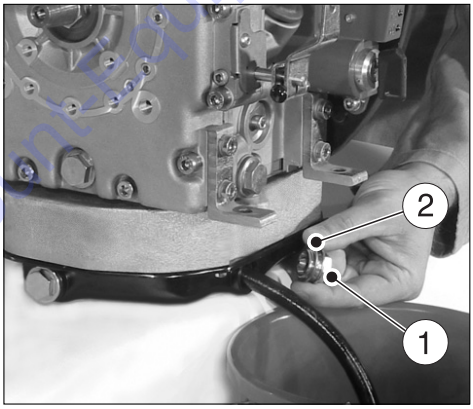
5.3.2. Changing engine oil

The engine must be standing level and be switched off.
Only change the oil when the engine is warm.

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



38



39

– Take out oil drain plug „1“ and allow the oil to drain out, Fig. 38 without oil sump, Fig. 39 with oil sump.

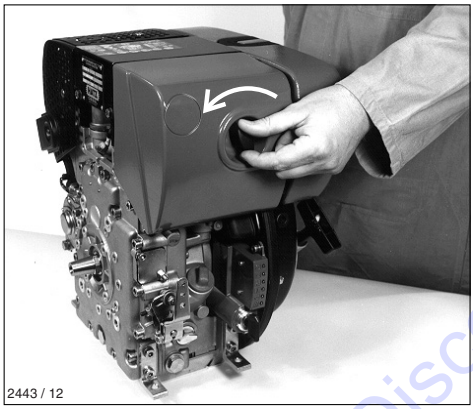
– Clean the oil drain plug „1“, fit a **new** washer „2“, insert and tighten.
Tightening torque: 50 Nm.

– Add engine oil, Chapter 4.1.1.

5.3.3. Checking and adjusting valve clearances

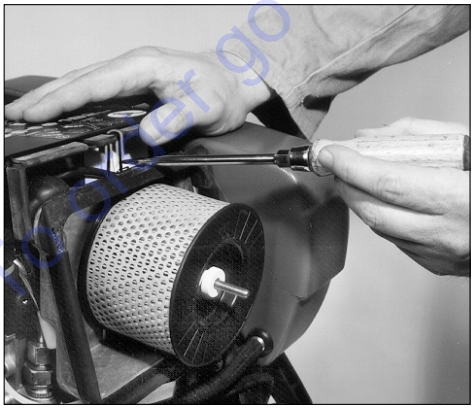
Remark:
Following steps are inapplicable in case equipment is with automatic tappet clearance compensation.
Identification characteristic is maintenance plan, chapter 5.1.

Only carry out adjustments when the engine is cold (10 - 30 °C).



40

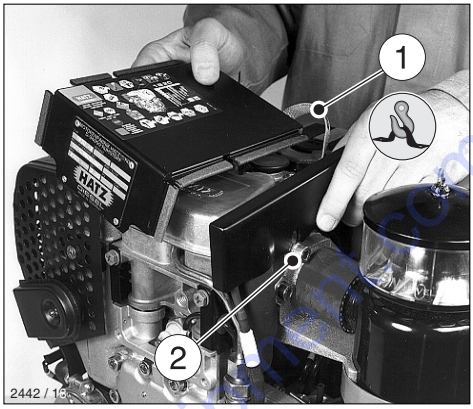
– Remove cover to air filter.



41

– Remove noise insulating hood.

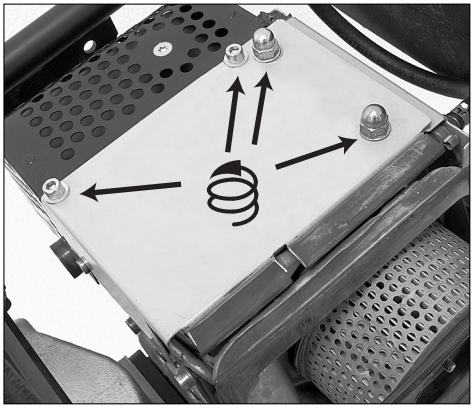
Version with oilbath air cleaner



42

– On version with oilbath air cleaner, remove screw „2“ and take off cover plate with noise-insulating hood.

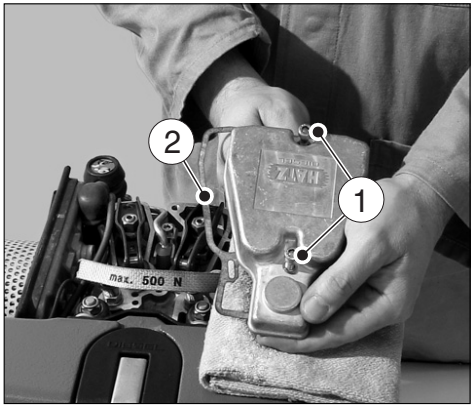
Model for rammer operation (1B20 R)
– Remove cover of air cleaner, Fig. 40.



43

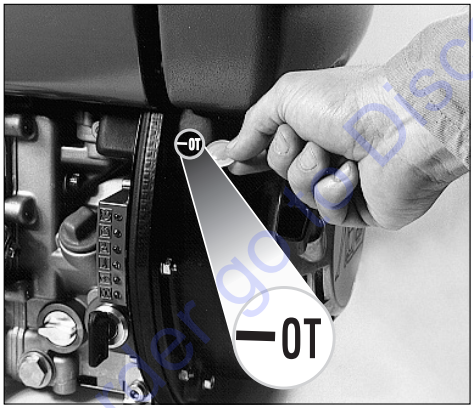
– After having removed the screws and nuts, remove the noise insulating hood.

– Remove any contamination adhering to the cover for the cylinder head.



44

– Remove screws „1“ and take off the cylinder head cover with gasket „2“.

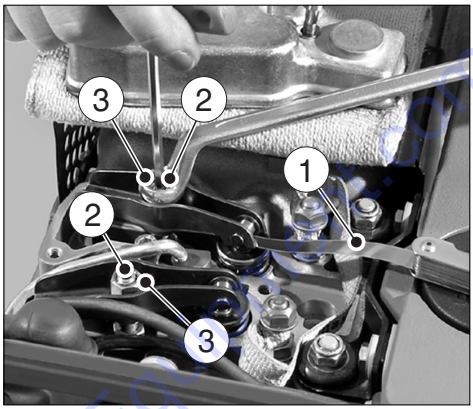


45

– Remove rubber cap from the inspection hole cover.

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

– Turn the crankshaft through 360° in the normal direction of rotation and align exactly to the **OT**-marking.



46

– Check valve clearances with feeler gauge „1“. For the setting, refer to Chapter 3.1.

– If valve clearances require adjusting, slacken off screw „2“ and turn hex nut „3“ until feeler gauge „1“ can be pulled through with just slight resistance when screw „2“ is retightened.

– Fit cover for cylinder head and tighten evenly, always using a new gasket.

– Re-attach parts previously removed from engine.
Do not forget: replace the rubber cap at the inspection hole cover.

– Carry out a brief test run, then check the cover for leaks.

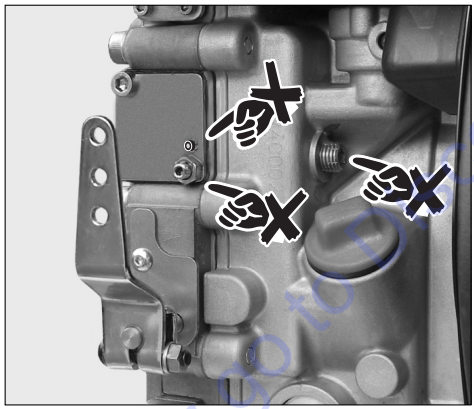
5.3.4. Cleaning cooling air area

The engine must be switched off and cooled down before cleaning!

– If severely contaminated, clean the cooling fins on the cylinder and cylinder head, and also the fan blades in the flywheel. If necessary, contact Discount-equipment.

5.3.5. Checking screw connections

– Check the tightness of all threaded connections and take up slack if necessary, provided that these can be reached during maintenance work.
Do not tighten the cylinder head bolts.

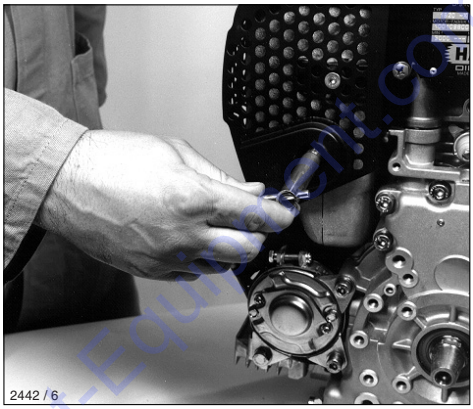


47

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

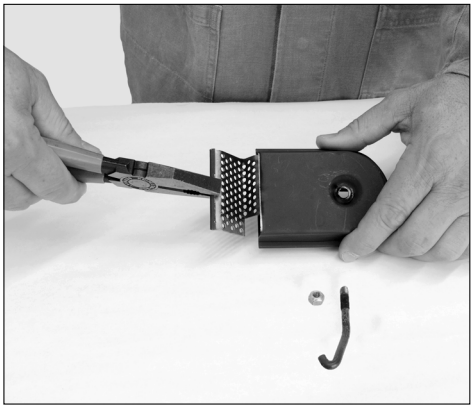
5.3.6. Cleaning the exhaust mesh inlet

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.



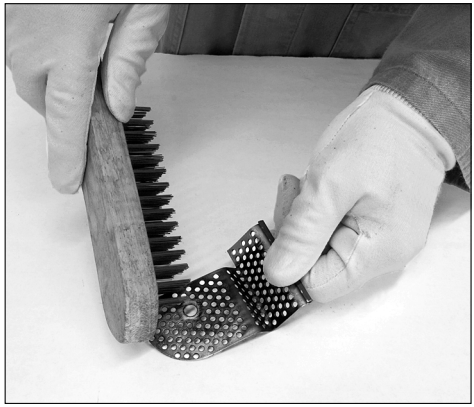
48

– Release hex. nut and remove exhaust manifold.



49

– Remove hex. nut and clip, then pull strainer insert out.



50

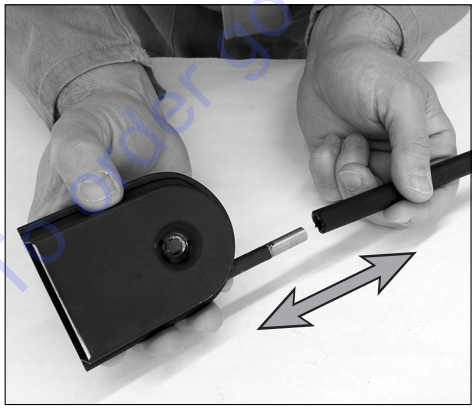
Risk of injury!
Wear protective gloves.

– Eliminate deposited matter from the strainer insert using a suitable steel brush.

– Subsequently, check the strainer insert for cracks or breaks; if necessary, replace.

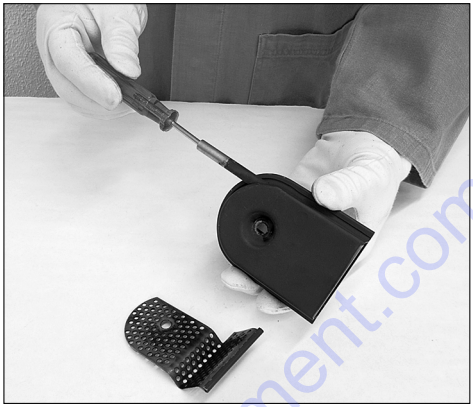
– Remount the strainer insert and the clip.

Model for rammer operation (1B20 R)
In addition to the maintenance work described above, the model for rammer operation requires that the inlet of the crankcase ventilation into the exhaust manifold is checked for free passage.



51

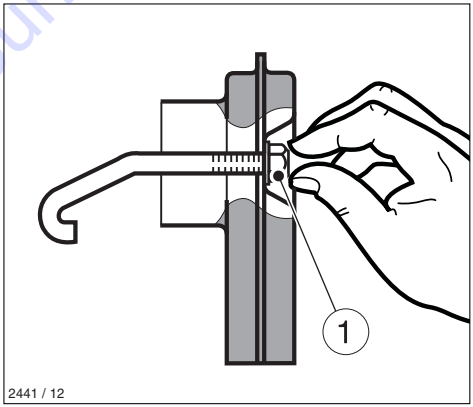
– Remove the hose from the manifold.



52

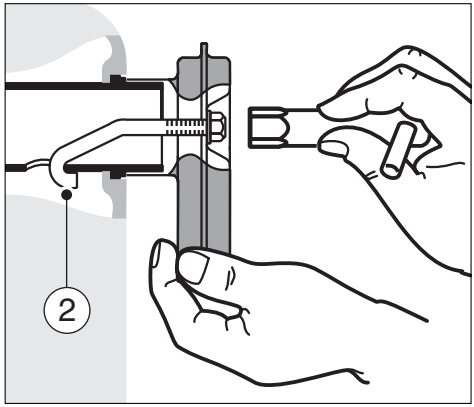
– Check the pipe socket for free passage. Eliminate deposited matter using a screwdriver or a similar tool.

– Subsequently, remount the hose.



53

– Screw on hexagon nut „1“ by approx. 1 turn.



54

– Insert exhaust manifold with hook „2“ into hole, then pull outwards again so that the hook is retained.

– Tighten the hexagon nut fully.

5.4. Maintenance every 500 operating hours

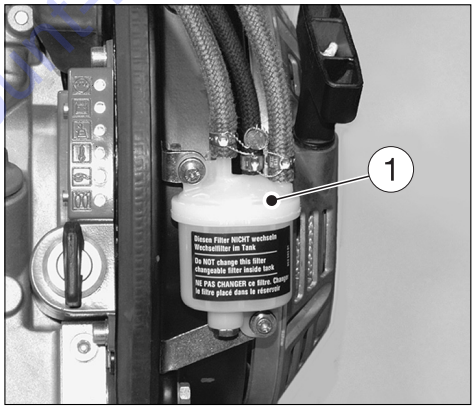
5.4.1. Renewing fuel filter

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.

Model with double fuel filter system

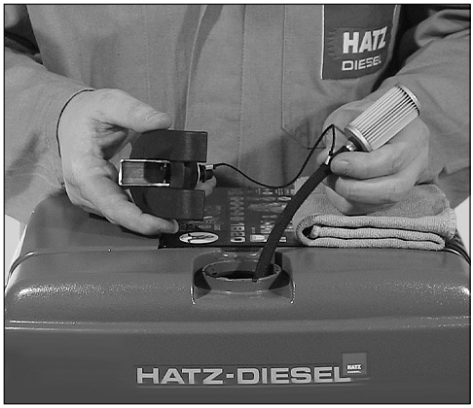


55

This system consists of a maintenance-free external filter „1“ (Fig. 55) and a replaceable-cartridge filter which is installed in the tank (Fig. 56). The advantage of this system consists in retaining dirt particles which might get into the fuel system on filter replacement, upstream of the following external filter, so that they cannot endanger the injection system.

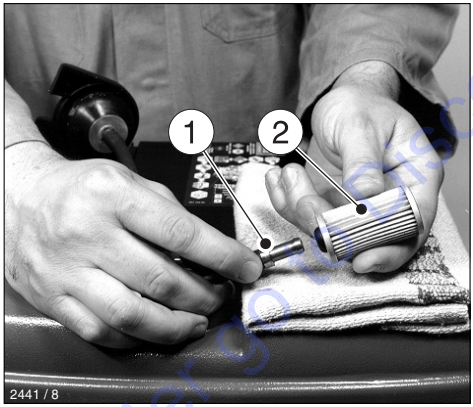
Important!
This external filter must not be replaced. Only replace the fuel filter installed in the tank!

Model with fuel filter in fuel tank



56

– Open the tank cover and pull the fuel filter out of the tank by its cord.



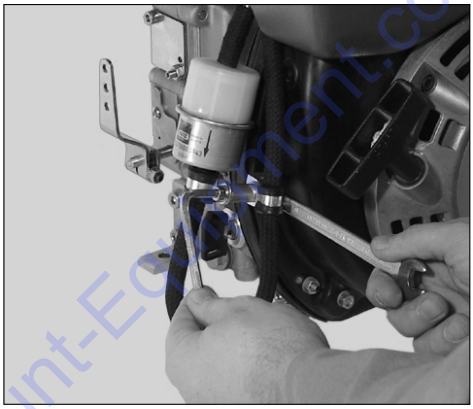
57

– Pull fuel supply line „1“ off fuel filter „2“ and insert a new filter.

– Fit the fuel filter again and close the tank cap. Bleeding of the fuel injection system takes place automatically.

Model with external fuel filter
(no fuel filter in the tank)

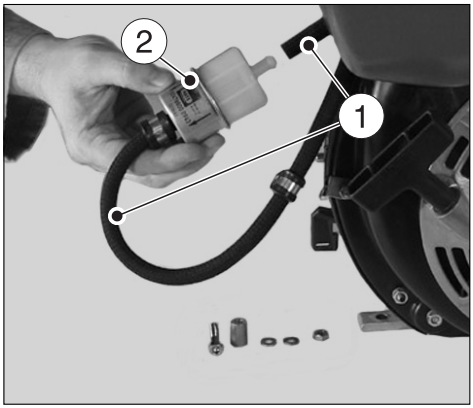
– Empty the fuel tank by taking out screw „1“, Fig. 34 or Fig. 35 and allow the fuel to drain into a clean vessel. This fuel can be re-used later.



58

– Unscrew the fuel filter from its mount.

– Place a suitable vessel under the filter to trap the residual fuel.



59

– Pull off fuel supply line „1“ at both ends of fuel filter „2“ and insert the new filter.

– Always renew the fuel filter. Note the arrows indicating the correct direction of flow.

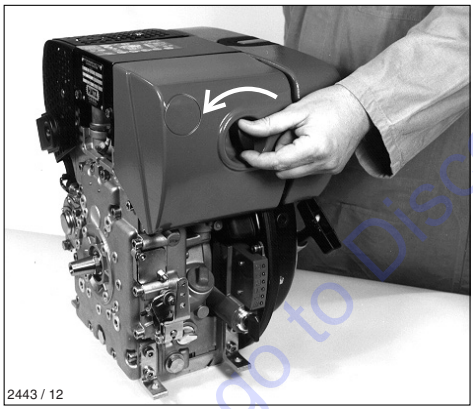
– Secure the filter to its mount.

– Fill the fuel tank with diesel fuel; Chapter 4.1.3. Air is vented from the fuel system automatically.

– Check the fuel filter and lines for leaks after a short test run.

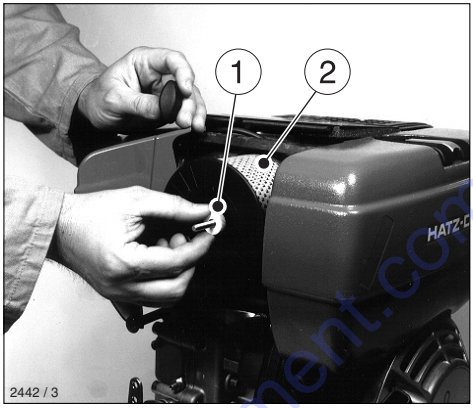
5.4.2. Air cleaner maintenance

The filter cartridge should only be cleaned when the maintenance lamp lights at maximum speed, Chap. 5.2.3.
However, the filter cartridge should always be replaced after 500 operating hours at the latest.



60

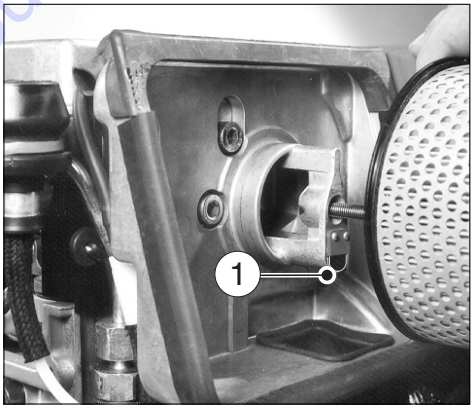
– Remove the air cleaner cover.



61

– Unscrew and remove knurled nut „1“ and take off air cleaner element „2“.

– Clean the filter compartment and the cover. Dirt and other foreign bodies must not be allowed to enter the engine's air inlet points.



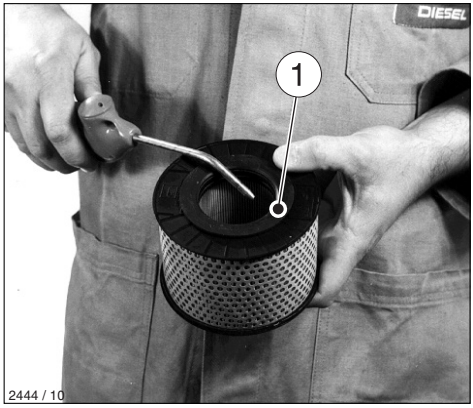
62

– On versions with a mechanical air cleaner service indicator, check the condition and cleanliness of valve plate „1“.

– The filter cartridge should either be renewed or, depending upon the degree of contamination, cleaned, or checked, as follows:

Cleaning the filter cartridge

Dry contamination



63

Use compressed air to blow through the filter cartridge from the inside outwards, until no further dirt emerges.

Important!
The pressure must not exceed 5 bar.

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

Moist or oily contamination
Renew the filter cartridge.

Checking the filter cartridge

– Check filter cartridge's gasket surface „1" for damage, Fig. 63.

– Check the filter cartridge for cracks or any other type of damage to the paper filter by holding it inclined towards the light or by shining a light source through it.

Important!
The slightest damage to the paper filter rules out it being used any longer.

– Re-assemble the filter cartridge in the reverse order of work.

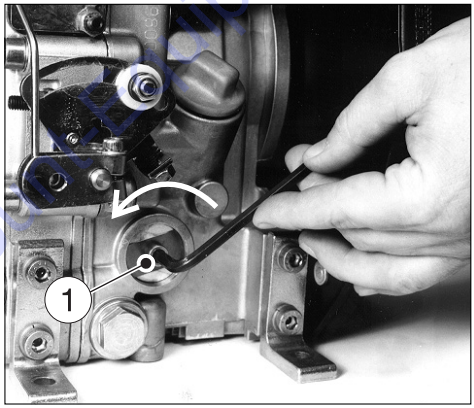
5.5. Maintenance every 1000 operating hours

5.5.1. Cleaning the oil filter

The oil filter should be cleaned at the same time as the engine oil is changed, since oil escapes when the filter is removed.

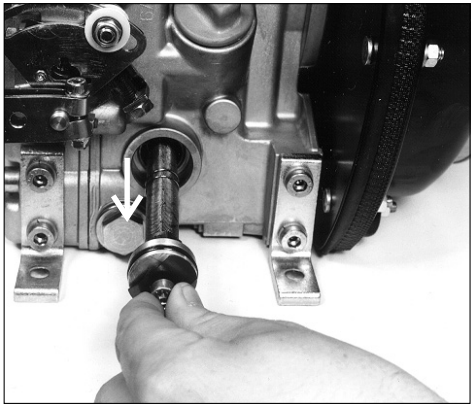
The engine must be standing horizontally and switched off.

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



64

– Loosen screw „1" with approx. 5 rotations.



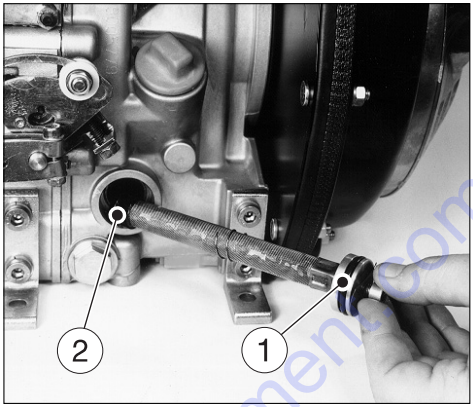
65

– Remove oil filter from housing.

66

– Use an air line to blow out oil filter dirt from the inside outwards.

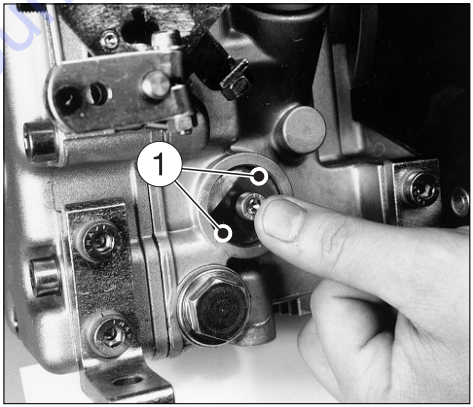
Persons handling compressed air must wear protective goggles. Never direct the jet to animals, persons or yourself!



67

– Check joint washer „1“ whether it is damaged; replacement if necessary.

– Coat packing rings „1“ and „2“ slightly with oil before assembly.



68

– Put in oil filter and press until limit stop.

– Check whether tension springs sit close to oil filter with both ends „1“, before tightening screw.

– Check the oil level and restore to the **max.** level if required, Chapter 4.1.1.

6. Malfunctions – causes and remedies

Malfunctions	Possible causes	Remedy	Chap.
6.1. Engine does not start, or not immediately, but can be turned over easily as usual.	Speed control lever in stop or idle position.	Move lever to START position.	4.2.1.
	Engine shutdown pin in STOP position.	Move to operating position by pulling the pin gently.	4.3.
	No fuel in the injection pump.	Add fuel.	4.1.3.
		Systematically check the entire fuel supply system: If still no fault found, - check engine feed line	
		- check fuel filter	5.4.1.
	Insufficient compression: - Incorrect valve clearance.	Check valve clearances, adjust if necessary.	5.3.3.
	- Cylinders and/or piston rings worn.	See workshop manual.	
	Injector not functioning.	See workshop manual.	
At low temperatures.	Below starting threshold temperature.	Operate preheater (optional extra).	4.2.3.
	Equipment not disengaged.	Disengage engine from equipment, if possible.	
	Preheating system faulty (optional extra).	See workshop manual.	
	Fuel has inadequate resistance to low temperatures.	Check whether clear (not turbid) fuel emerges at the fuel line detached from the injection pump. If turbid or separated - either warm up the engine or drain the complete fuel supply system. Refill with winter-grade fuel to which paraffin has been added.	4.1.3.

Malfunctions	Possible causes	Remedy	Chap.
At low temperatures:	Starting speed below 400 min^{-1} - Viscosity of oil too high.	Change lubricating oil and add oil of the correct viscosity class.	5.3.2. 4.1.1.
	- Battery charge too low.	Check the battery, if necessary contact Discount-equipment.	7.
If equipped with a stop solenoid or automatic electrical shutdown system (additional equipment)	Solenoid faulty and/or fault in the electrical system.	See workshop manual.	
6.2. Engine fires but does not run.	Speed control lever not moved far enough towards „START“.	Move lever to „START“ position.	4.2.1.
	Equipment not disengaged.	Disengage engine from equipment if possible.	
	Fuel filter blocked.	Renew fuel filter.	5.4.1.
Automatic electrical shut-off device (optional extra)	One of the automatic shutdown's monitoring elements has initiated a stop signal. (See also Chapter 6.4.)	Localise the monitoring element responsible and clear the fault, or contact Discount-equipment.	
6.3. Starter motor does not operate or engine does not turn over.	Fault in the electrical system: - Battery and/or other cables incorrectly connected up. - Cable connections loose and/or oxidised. - Battery faulty and/or flat. - Starter motor faulty. - Faulty relays, monitoring element.	Check electrical system and its component. See also the workshop manual.	7.

Malfunctions	Possible causes	Remedy	Chap.
6.4. Engine cuts out of its own accord during operation.	Fuel supply interrupted - Tank has run empty. - Fuel filter blocked. - Tank venting inadequate. - Air in the fuel system.	 Add fuel. Change fuel filter. Ensure adequte tank venting. Check fuel system for penetration of air. Check air vent valve.	 4.1.3. 5.4.1.
	Mechanical faults.	Contact Discount-equipment.	
Automatic electrical shut-off device (optional extra)	One of the automatic shutdown's monitoring elements has initiated a stop signal.	Localise the monitoring element responsible and clear the fault, or contact Discount-equipment.	
	Monitoring element for: - oil pressure too low - engine temperature too high - defective alternator.	 Check oil lubrication. Check air cooling zone for contamination. See workshop manual.	 5.2.1. 5.3.4.
	Malfunction signal from over-voltage and polarity reversal protection in voltage regulator: - Battery and/or other cable connections incorrectly connected. - Cable connections loose.	 Check electrical equipment and the components thereof.	
6.5. Engine output and speed both drop.	Fuel supply interrupted: - Tank has run empty. - Fuel filter blocked. - Tank breathing inadequate. - Air in the fuel system. - Speed control lever does not remain in desired position.	 Add fuel. Change fuel filter. Provide adequate tank breathing. Check fuel system for penetration of air. Check air vent valve. Lock the lever into position.	 4.1.3. 5.4.1.
6.6. Engine output and speed fall, black smoke from exhaust.	Air cleaner contaminated. Valve clearances incorrect. Injector not functioning.	Clean or renew the air cleaner. Adjust valve clearances. See workshop manual.	5.3.1. 5.4.2. 5.3.3.

Malfunctions	Possible causes	Remedy	Chap.
6.7. Engine becomes very hot. Indicator lamp for cylinder temperature (optional extra) comes on.	Too much lubricating oil in engine.	Drain off lubricating oil as far as upper mark on dipstick.	5.3.2.
	Inadequate cooling: - Contamination of entire cooling air zone.	Clean cooling air zone.	5.3.4.
	- Air duct panels not properly sealed.	Check cooling air deflector plates and shafts for completeness and airtight seal.	
6.8. Moisture condensate emerging from exhaust.	Operation off load for a prolonged period.	Operate the machine at about 70 % load until moisture no longer emerges from the exhaust.	

7. 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.

– Do not confuse the **positive (+)** and **negative (–)** terminals of the battery.
– When **fitting** the battery, first connect up the **positive lead**, then the **negative lead**. **Negative terminal to earth = engine block.**
– When **removing**, first disconnect the **negative lead**, then the **positive lead**.
– Always take care to **avoid short-circuits** and earth (ground) contact of live cables.
– If malfunctions occur, first of all **check** that **cable connections** make good contact.
– Replace a failed indicator light without delay.
– **Do not remove the ignition key** while the engine is running.
– **Do not disconnect the battery** while the engine is running.
Electric voltage peaks can cause damage to electrical components.
– In case of an **emergency start in manual mode**, leave the battery (which might be discharged) connected to the engine.
– Before starting **emergency operation without battery**, proceed as follows before starting:
- disconnect plug-connection to voltage regulator for engine models with **mounted instrument box (picture 26)**.Turn key to **off-position (0)** and remove.
- disconnect plug-connection to instrument box for engine models with **external instrument box (picture 27).**
– **Do not** splash electrical device with water jet or pressure jet during engine cleaning.
– When carrying out **welding work** on the engine or equipment, fit the earth clip of the welding equipment as close to the welding point as possible and **disconnect the battery**. The connecting plug for the voltage regulator must be removed.

The relevant circuit diagrams are enclosed with the engine if it is equipped with an electrical system. Additional circuit diagrams can be supplied to order.

HATZ assumes no liability for electrical systems which was not carried out acc. HATZ circuit diagrams.

8. Storage out of use

The new engine can normally be stored dry for up to one year.
In very humid climates or coastal regions, the protective treatment is sufficient for up to about 6 months.
For longer periods of storage, please contact Discount-equipment.

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:
1B20=10031; 1B20 NON EPA=30031; 1B20V=11121; 1B20V NON EPA=30121; 1B20R=14410;
1B27=12510; 1B27 NON EPA=30810;
1B30=10125; 1B30 NON EPA=30225; 1B30V=11216; 1B30V NON EPA=30316;
1B40=11014; 1B40 NON EPA=30414; 1B40V=11714; 1B40V NON EPA=30514;
1B50=12411; 1B50 NON EPA=30611; 1B50V=12611; 1B50V NON EPA=30711

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., 1.5.3., 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 **).

Conformity with the provisions of the following, other EC Directives, i.e.
- **2004/108/EG Electromagnetic Compatibility** (EMC), dated 15.12.2004

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 **)

29/10/2009	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

SUPPLEMENTAL INFORMATION
TO THE OWNER'S MANUAL FOR MODEL YEAR 2011
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 MODEL YEAR 2011 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
- Injection nozzle
- Bimetallic strip
- Crankcase breather valve assembly
- Air cleaner housing

- Oil filler cap
- Intake and exhaust gaskets at head interfaces
- 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 Discount-equipment 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 Discount-equipment 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 injector

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 this engine is DI (Direct Injection) and EM (Engine Modification).
No adjustments are needed or possible.

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)

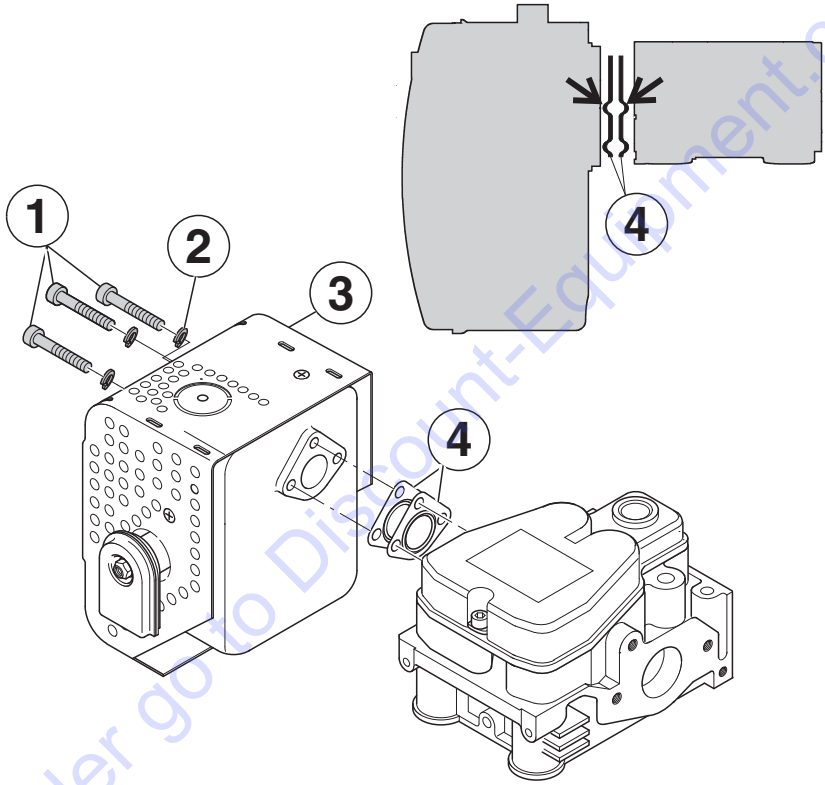
The fuel label has to be permanently attached to the equipment.
In case of an engine mounted fuel tank, every engine is equipped with an additional fuel label nearby the fuel inlet.
Otherwise, there are two loose fuel labels available with the engine.

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.

1B20 · 1B27 · 1B30 · 1B40 · 1B50



Exhaust-silencers and protection guard

The exhaust silencer is fitted in connection with flat washers.
Fixation is done by Allen screws.

Dismantling:

- Remove in numerical sequence **1...4**.

Assembly:

- Assemble in reverse sequence.
- Ensure gasket-kit is fitted in correct sequence i.e. the creased gaskets **4** face towards exhaust silencer and cylinder head.

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:

- Remove the exhaust mesh insert, if so fitted, as described in chapter 5.3.6.
- The sampling probe for measuring the emissions can be put into the exhaust silencer outlet. There are no additional pipes or clamps needed for measuring the undiluted exhaust sample.

SUPPLEMENTAL INFORMATION TO THE OWNER´S MANUAL FOR MODEL YEAR 2011 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 MODEL YEAR 2011 CALIFORNIA REGULATIONS FOR HEAVY-DUTY OFF-ROAD ENGINES.

The following supplemental information is furnished for California Heavy-Duty Off-Road Engines.

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 injector
- Fuel injection pump
- Bimetallic Strip
- Intake manifold
- Exhaust manifold
- Crankcase breather valve
- Oil filler Cap

- Intake and exhaust gaskets at head interfaces
- 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 Discount-equipment 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 Discount-equipment 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

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

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Hatz authorised workshops, for example, are qualified workshops.
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EMISSION CONTROL SYSTEM AND ADJUSTMENTS.

The emission control system for this engine is DI (Direct Injection) and EM (Engine Modification). No adjustments are needed or possible.

CALIFORNIA EMISSION CONTROL SYSTEM 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 **Model Year 2011** 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.

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.”

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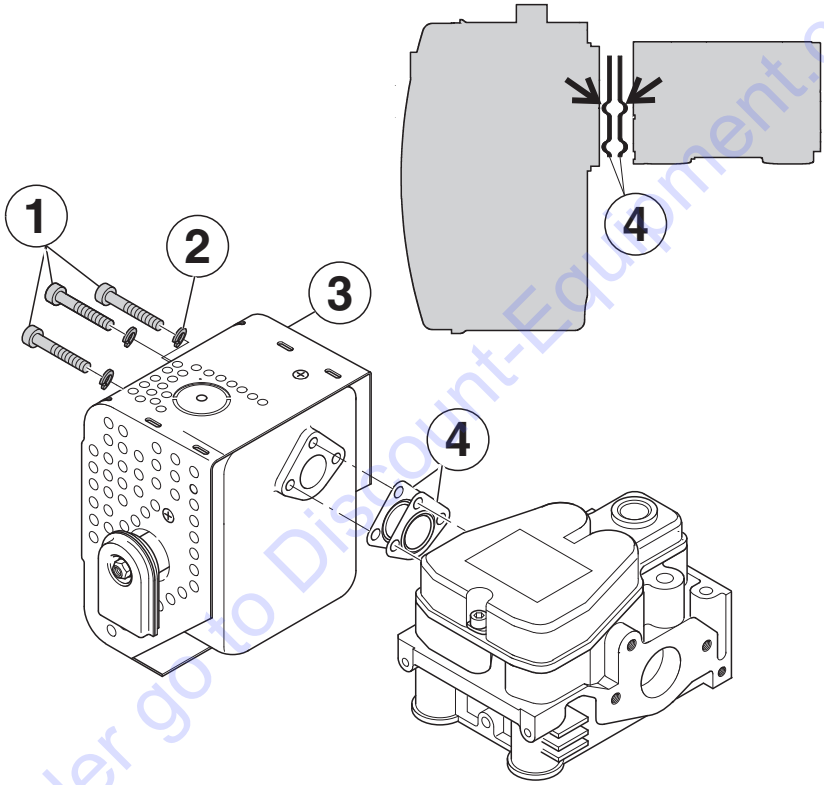
1B20 · 1B27 · 1B30 · 1B40 · 1B50



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The exhaust silencer is fitted in connection with flat washers.
Fixation is done by Allen screws.

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- Remove in numerical sequence **1...4**.

Assembly:

- Assemble in reverse sequence.
- Ensure gasket-kit is fitted in correct sequence i.e. the creased gaskets **4** face towards exhaust silencer and cylinder head.

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:

- Remove the exhaust mesh insert, if so fitted, as described in chapter 5.3.6.
- The sampling probe for measuring the emissions can be put into the exhaust silencer outlet. There are no additional pipes or clamps needed for measuring the undiluted exhaust sample.

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