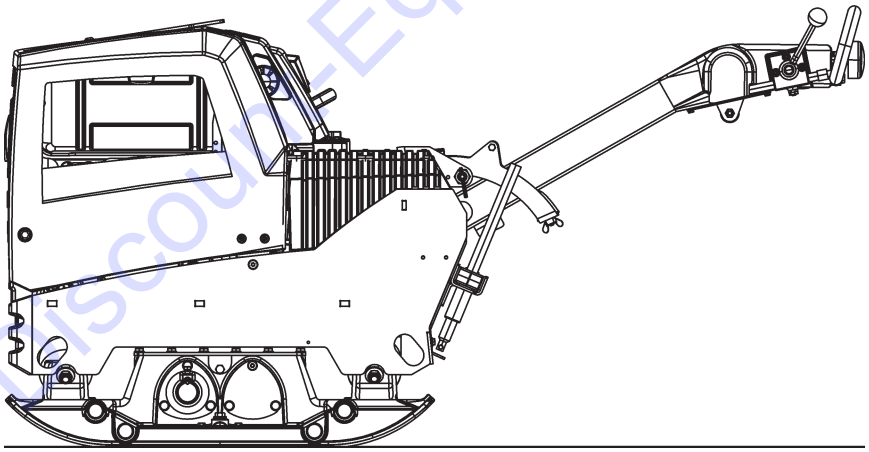
APH 60/85
APH 65/85

PLATE COMPACTOR

HATZ 1D90E (EPA)



ORIGINAL OPERATING INSTRUCTIONS

For your safety!

Follow these instructions for proper and safe use. Keep for future reference.

ISSUE OF THE PUBLICATION 12/2021 EN
From production number 3018888

AMMANN

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Preface

Purpose of the operating instructions

You must read these operating instructions before you operate the plate compactor for the first time or when you are instructed to perform other work on the plate compactor.

Using and handling the plate compactor described below is not a matter of course. It is explained in detail in the accompanying technical documentation.

Pay particular attention to the chapter on safety instructions.

Operating instructions

These instructions are to be considered a part of the machine. They must be kept carefully near the machine during the entire service life of the machine. These instructions must also be passed on to subsequent owners or users of the machine.

Using these instructions

- makes it easier to get familiar with the machine
- avoids malfunctions caused by improper operation.

Observing the maintenance instructions

- increases the reliability of the machine during its utilization on the construction site
- increases the service life of the machine
- reduces repair costs and downtimes.

Residual risks

The operating instructions inform and warn you of residual risks against which risk reduction by design and protective measures is not or not completely effective.

Keep these instructions always at the place where the machine is used. Operate the machine only after instruction and in compliance with these instructions.

Orientation in the operating instructions

Representation of general information icons

These operating instructions contain the following general information icons to guide you, the reader, through the operating instructions and to provide you with essential information.

Pictogram	Meaning
	Caution - material damage possible This pictogram tells you that the machine can be damaged during an action if the specified actions are not observed and carried out correctly.
	Important information This pictogram indicates essential additional information.
	Information about the documentation This pictogram tells you that parts of the documentation require special or additional attention (such as supplier instructions, etc.)

Representation of warnings

Potentially dangerous operations must be performed when working with the machine. These actions are preceded by warnings that must be observed.

	**IMPORTANT INFORMATION ON THE WARNINGS IN THE OPERATING INSTRUCTIONS** • Observe all warnings on the machine and in the documentation, and be particularly careful in these cases. Also, communicate all warnings to other users. • Warnings (as well as requirements and prohibitions) are for your personal protection!

Organization of the warnings in the operating instructions

Preceding warnings and warnings on the product:

DANGER!	
	Identifies an imminent hazard that will cause serious or fatal injuries if not avoided.

WARNING!	
	Identifies a hazard that can result in serious or fatal injuries if not avoided.

CAUTION!	
	Identifies a hazard that can cause light injuries if not avoided.

NOTE	
	Identifies a situation that can cause material damage to the machine if not avoided

Embedded warnings within an action (example):

1. Action
2. Action
3. **WARNING!** Danger of suffocation from exhaust fumes. Start the engine only outdoors or in well-ventilated areas.
4. Action
5. Action

Symbols and pictograms used in the document

The warnings are always used together with an icon or a pictogram. These icons and pictograms often identify the source of danger and warn of hazardous areas, risks or obstacles. They also inform the user about the recommended personal protective equipment, requirements and prohibitions.

Pictogram	Meaning
	**Warning of a dangerous point**
	**Warning of hot surfaces**
	**Warning of chemical burns**
	**Warning of a suspended load**
	**Warning of crushing injuries**
	**Warning of toxic vapors and gases**
	**Warning of fire hazard**
	**Prohibition of smoking, sparks or naked flames**
	**Explosion hazard**

Pictogram	Meaning
	**Caution - material damage possible**
	**Warning of environmental damage**
	**Wear hearing protection**
	**Wear working gloves**
	**Wear protective goggles**
	**Wear working shoes**
	**Wear respiratory protection**
	**Read the operating instructions**

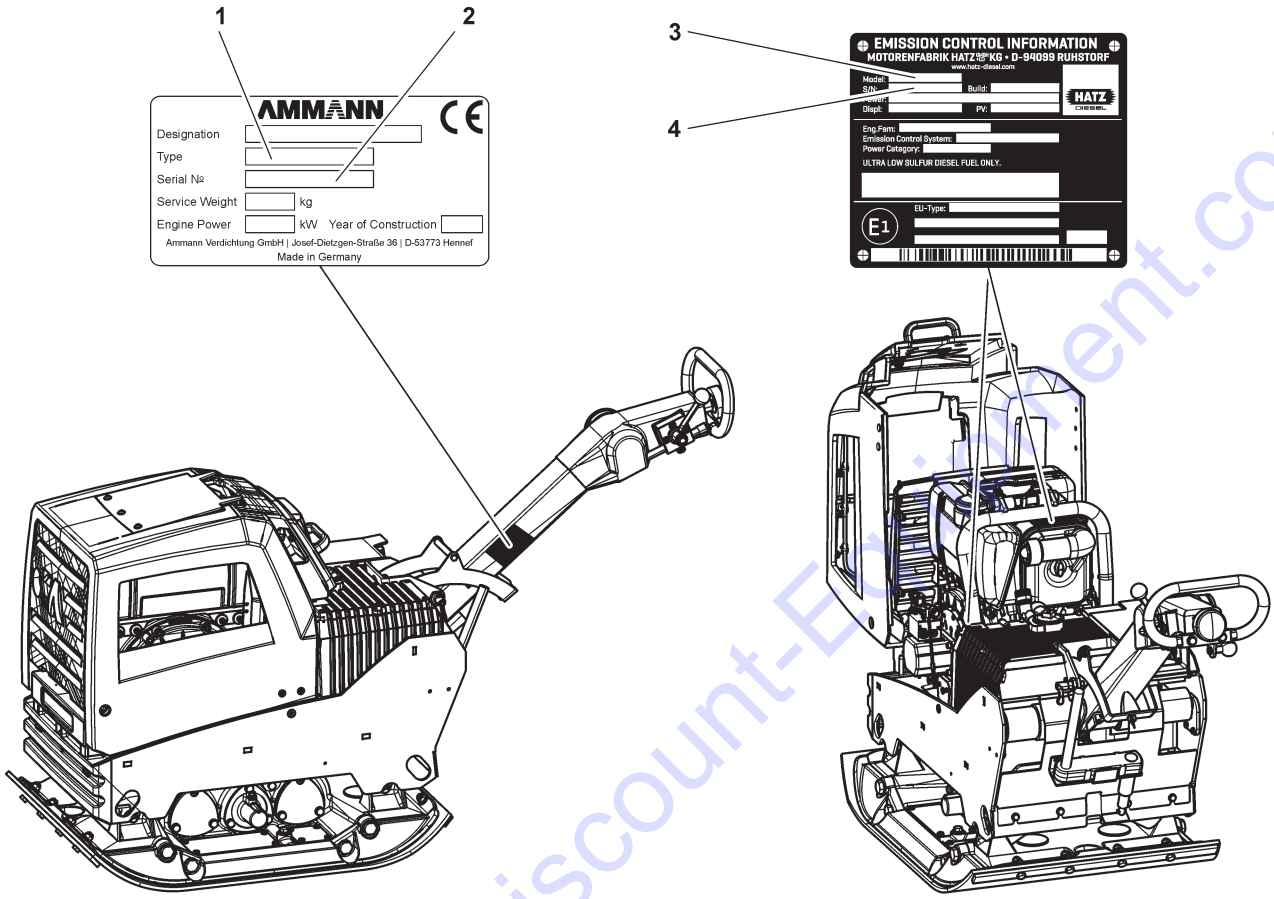
Content

[1)] Special accessories

1. Identification

1.1 Machine identification

Enter the following information in the operating instructions. This permits the instructions to be clearly allocated to the appropriate machine. The specifications can be found on the rating plate of the machine and the rating plate of the engine.



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1. Machine type: _____

2. Machine no: _____

3. Engine type: _____

4. Engine no: _____

1.2 Manufacturer specifications

Intended use

This machine may only be used for:

Any compaction work in civil engineering and road construction. Compacting is possible with all soil materials, such as sand, gravel, slag, crushed stone.

Any other utilization is not in accordance with the intended use and is therefore improper. The safety of the personnel working with the machine can be impaired in such a case. The manufacturer accepts no liability for any damage resulting from such use.

The operational safety of the machine is only ensured if the machine is used as intended.

Intended use also includes compliance with all the information in these instructions.

Foreseeable misuse

Foreseeable misuse (abuse) includes:

- Operation by personnel who have not been instructed in using the machine
- Weighting the machine
- Riding on the machine
- Using the machine as an attachment
- Operation in inclined positions of more than 30°
- Noncompliance with these instructions
- Noncompliance with the safety instructions
- Using on:
  - Hard concrete
  - Set bituminous pavement
  - Heavily frozen soil
  - Ground that is not able to support the machine

Conversion and modification

Any unauthorized modifications, additions or conversions to the machine are not permitted for safety reasons.

Spare parts and special equipment not supplied by us are not approved by us either. Installing and/or using such material can impair the handling and operating safety of the machine.

Any liability of the manufacturer is excluded for damage caused by using non-genuine parts or special equipment.

Operating personnel

Only trained, instructed persons over 18 years of age who have been authorized to do so are allowed to move and operate the machine. The responsibilities must be clearly defined and adhered to during operation.

In deviation from this, young people may be employed to the extent necessary to achieve their training objective and provided that their safety is ensured by a supervisor.

Persons under the influence of alcohol, medication or drugs are not allowed to operate, maintain or repair the machine.

Maintenance and repair, especially of hydraulic systems and electronic components, require special knowledge and may only be carried out by skilled personnel (mechanics for construction machinery, agricultural machinery).

Inspection

Road rollers, trench rollers and plate compactors must undergo a safety inspection by an expert as required by the conditions of use and the operating conditions, but at least once a year.

Residual risks

Although this Ammann machine was built in accordance with the current state of the art and the applicable rules of technology, it can still pose a risk to persons and property if

- it is not used as intended
- it is operated by untrained and unsuitable personnel
- it is improperly modified or converted
- the safety regulations are not observed

Consequently, each person involved in operation, maintenance or repair of the machine must read and observe the operating instructions and, in particular, the safety regulations. If necessary, the operating company must request this to be confirmed by a signature.

In addition, the following must be instructed and complied with:

- Applicable regulations for the prevention of accidents
- Generally recognized safety rules
- Country-specific regulations

1. Safety regulations

Residual hazards in individual life phases and tasks

Transportation

During the transportation of the machine, the dead weight of the machine poses a crushing hazard. Incorrect handling can cause crushing of limbs and serious injuries. Consequently, observe the following instructions:

- Always switch off the engine when you load or transport the machine.
- Observe the transportation instructions in this document.
- Only use suitable means of transport and lifting gear of sufficient load-bearing capacity.
- Attach suitable slings to the lashing points provided.
- Secure the machine against tilting or slipping.
- Never stay under a suspended load. There is danger to life!
- Secure the machine also on the transport vehicle against rolling, slipping and overturning.

Operation

During the operation of the machine, there are various residual hazards that arise from the intended use of the machine and cannot be eliminated by the design. Consequently, observe the following instructions:

Prior to starting

- Wear personal protective equipment (safety shoes, sound-insulating equipment, etc.).
- Familiarize yourself with the operating and control elements and with the operation of the machine.
- Check to ensure that all safety devices are properly in place.
- Never start the machine with defective instruments or control elements. There is a risk of injury!
- Look at your work environment and prepare it for working on it. This includes, among other things:
  - Removing obstacles from the working area.
  - Checking the load-bearing capacity of the ground.
  - Providing necessary protection elements.
  - The points listed here are frequently occurring activities in connection with the field of application of the machine. The list is not exhaustive and depends on the particular working environment. Therefore, always adapt it to your working environment.

Starting

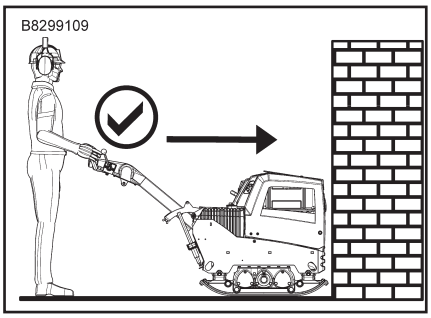
- Starting and operating the machine in potentially explosive atmospheres is prohibited!
- Strictly observe the procedures to switch the machine on and off and the control indicators explained in the operating instructions.
- A machines with an electrical starter may only be started and operated from the control panel. Non-compliance will result in damage to the electronic system.
- Starting with battery jumper cables:
  - ***NOTE:*** Always connect the ground cable last and disconnect it first! Connect “Plus” to “Plus” and “Minus” to “Minus” (ground cable). Incorrect connection will cause serious damage to the electrical system.

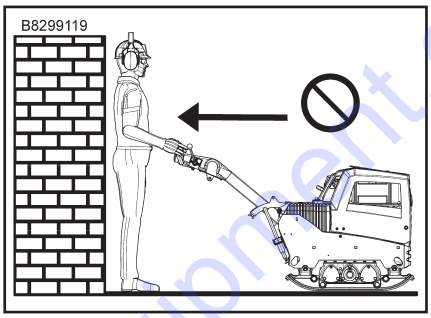
Starting in closed rooms, tunnels, galleries or deep trenches

- **WARNING!** Engine exhaust gases are dangerous to life! When operating the machine in a closed room, tunnel, gallery or deep trench, make sure that there is sufficient breathable air to ensure good health. Wear respiratory protection!

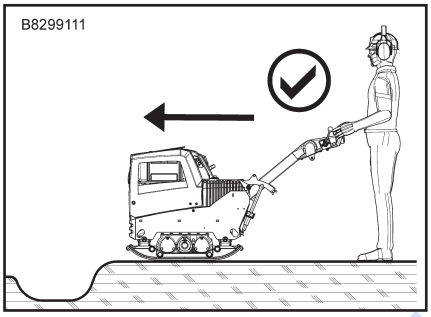
Guiding the machine

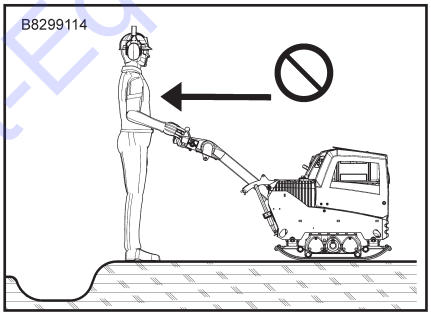
- Prior to starting the operation, check the effectiveness of the safety devices and brakes. Inoperative protective devices and brakes
- you discover any defects on the safety devices or other defects that affect the safe operation of the machine, stop machine operation immediately and eliminate the defect.
- Never fasten operating devices that are intended to adjust themselves automatically when released.
- When compacting near buildings or over pipelines or similar objects, check the effect of the vibration on the building or pipelines and stop compaction work if necessary.
- Always:
  - Guide the machine such that the machine operator can not suffer crushing injuries (between the machine and obstacles such as buildings, walls or objects)





  - Guide the machine such that there is no risk for the machine operator to fall (in trenches, construction pits or on embankments)





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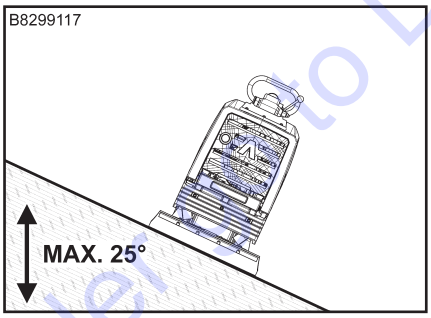
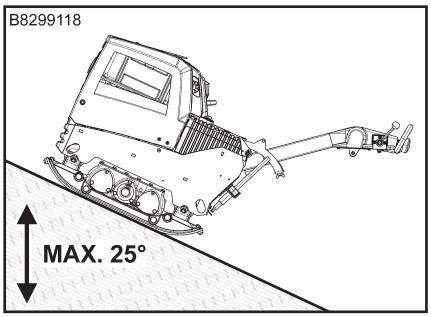
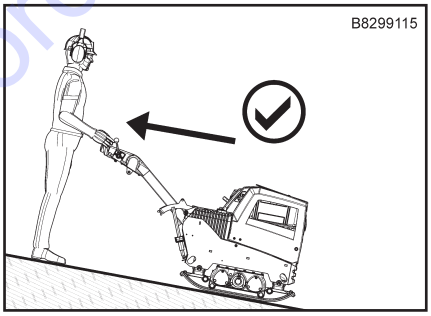
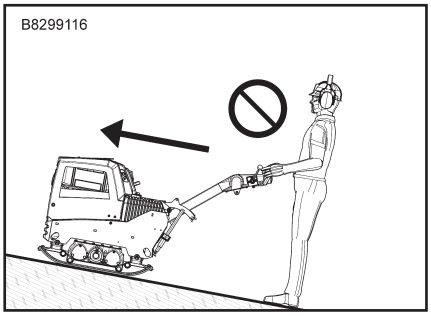




  - Refrain from any mode of operation which impairs the stability of the machine





  - Move carefully on slopes, always in a direct upward direction
  - On steep slopes, move uphill in reverse to prevent the machine from tilting onto the machine operator.

Parking the machine

- After work, park the machine on a level surface, stop the drive, secure it against unintentional movement and unauthorized use (remove the key).
- If available, close the fuel cock.
- ***NOTE:*** Never park or store a machine with an integrated carriage on the carriage. The carriage is only designed for the transport of the device. There is a risk of machine damage.

Refueling

- Wear respiratory protection and protective gloves during the refueling process. Fuels are harmful to health.
- To refuel the machine, you must open the engine hood. When the engine hood is open and the engine is running at the same time, there are hot surfaces and other hazardous areas inside the machine that can be reached. There is a risk of injury. Therefore, switch off the machine before you open the engine hood.
- Naked flames and smoking are prohibited during the refueling process. A naked flame can ignite the fuel-air mixture. There is a fire hazard!
- Use a funnel to fill the fuel into the tank. Do not spill any fuel. Spilled fuel must be recovered immediately. It must not seep into the soil.
- After refueling, check the seat of the tank cap. It must be tight and sit firmly on the tank. A leaking fuel tank can be the cause of explosions. It must therefore be replaced immediately.

Maintenance and repair work

Properly performed maintenance, inspection and adjustment activities are essential components in the safety concept of the machine. If this work is not done properly, there is a great risk of injury from non-functioning safety devices. Consequently, observe the following points:

- Observing the related deadlines, perform the maintenance, inspection and adjustment activities specified in the operating instructions, including the information on the replacement of parts.
- Only qualified and authorized persons are allowed to carry out maintenance work.
- Spare parts must comply with the technical requirements specified by the manufacturer. Consequently, use only genuine spare parts.
- To replace larger assemblies and individual parts, use only suitable and technically faultless hoisting gear and load handling equipment of sufficient load-bearing capacity. Carefully attach and secure the parts at the hoisting gear! Dropping parts can cause serious injuries.
- Reinstall and check all safety devices properly after maintenance and repair work has been completed.

Maintenance of hydraulic lines

- Only persons with special knowledge and experience in hydraulics are allowed to work on hydraulic equipment!
- Prior to working on hydraulic lines, ensure that they are pressureless. Escaping pressurized hydraulic oil can cause serious injuries!
- Hydraulic oil must be drained at operating temperature - there is a risk of scalding! Wear protective gloves.
- ***NOTE:*** Never start the engine when the hydraulic oil is drained. There is a risk of machine damage!
- Once all work has been finished, check (with the system still depressurized) all connections and screw fittings for leaks.
- Replace hydraulic hose lines that show external damage. Replace hydraulic hoses generally at appropriate intervals (depending on the time they have been used), even if no safety-relevant defects are apparent.

Battery maintenance

- Secure the removed battery against overturning, short-circuiting, slipping and damage during transportation. Non-observance can cause short-circuits, battery acid to leak, and fire.
- Smoking and naked flames are prohibited when working on the battery. There is a risk of fire and explosion!
- Dispose of used batteries in accordance with the applicable laws and regulations.
- Never put any tools on top of the battery. Tools can bridge contacts and cause short circuits. There is a risk of injury.

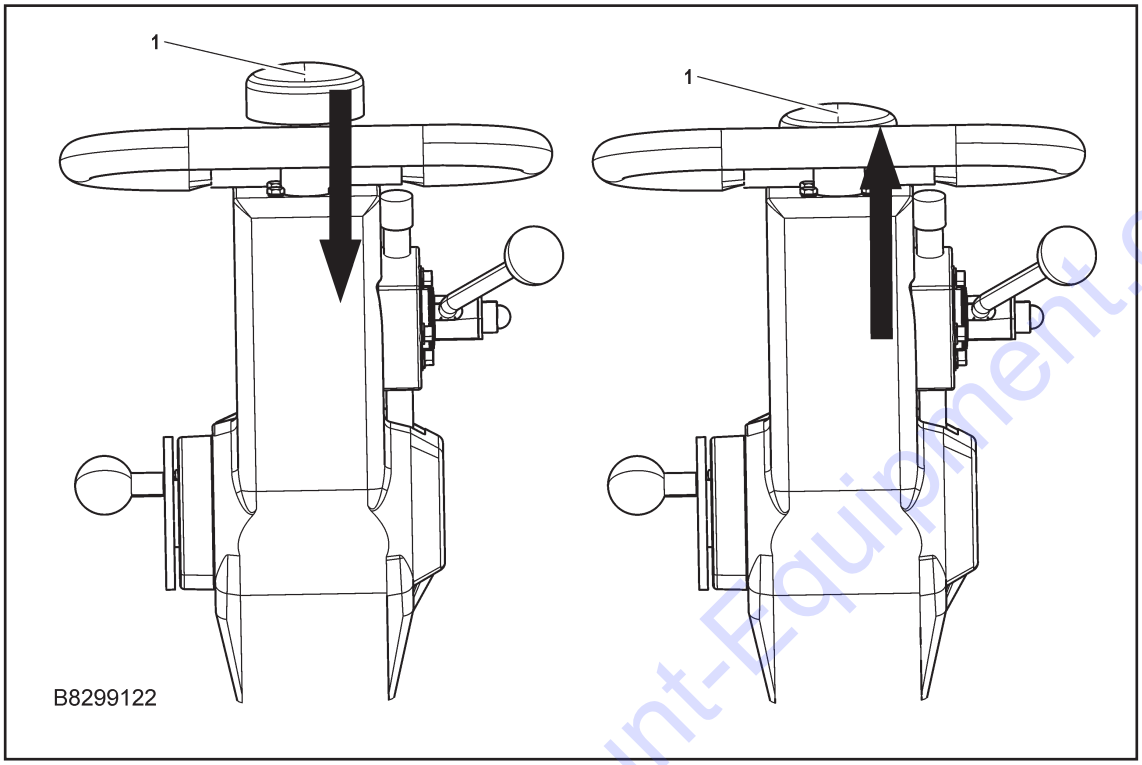
When handling acid-filled batteries:

- Transport filled batteries upright to avoid spilling acid.
- Wear protective gloves. Battery acid causes chemical burns. Do not allow acid to get on hands or clothing. In case of injuries caused by acid, rinse with clear water and consult a doctor!
- Highly explosive oxyhydrogen gas can form and accumulate in the battery during the charging process. There is a risk of explosion when a critical quantity is exceeded. When charging the battery, remove the sealing plug to allow the gas to escape and evaporate.

1.1 Safety devices

1.1.1 Emergency off actuator[1)]

The machine has an emergency off actuator (1) on the drawbar. It engages when activated and must be pulled out to deactivate it.



The emergency off actuator is used to

- stop the machine immediately in a dangerous situation
- shut down the machine immediately
- shut down the exciter immediately

When the button is pressed, power transmission is interrupted and the machine stops immediately. However, the motor continues to run.

After the button has been actuated during operation:

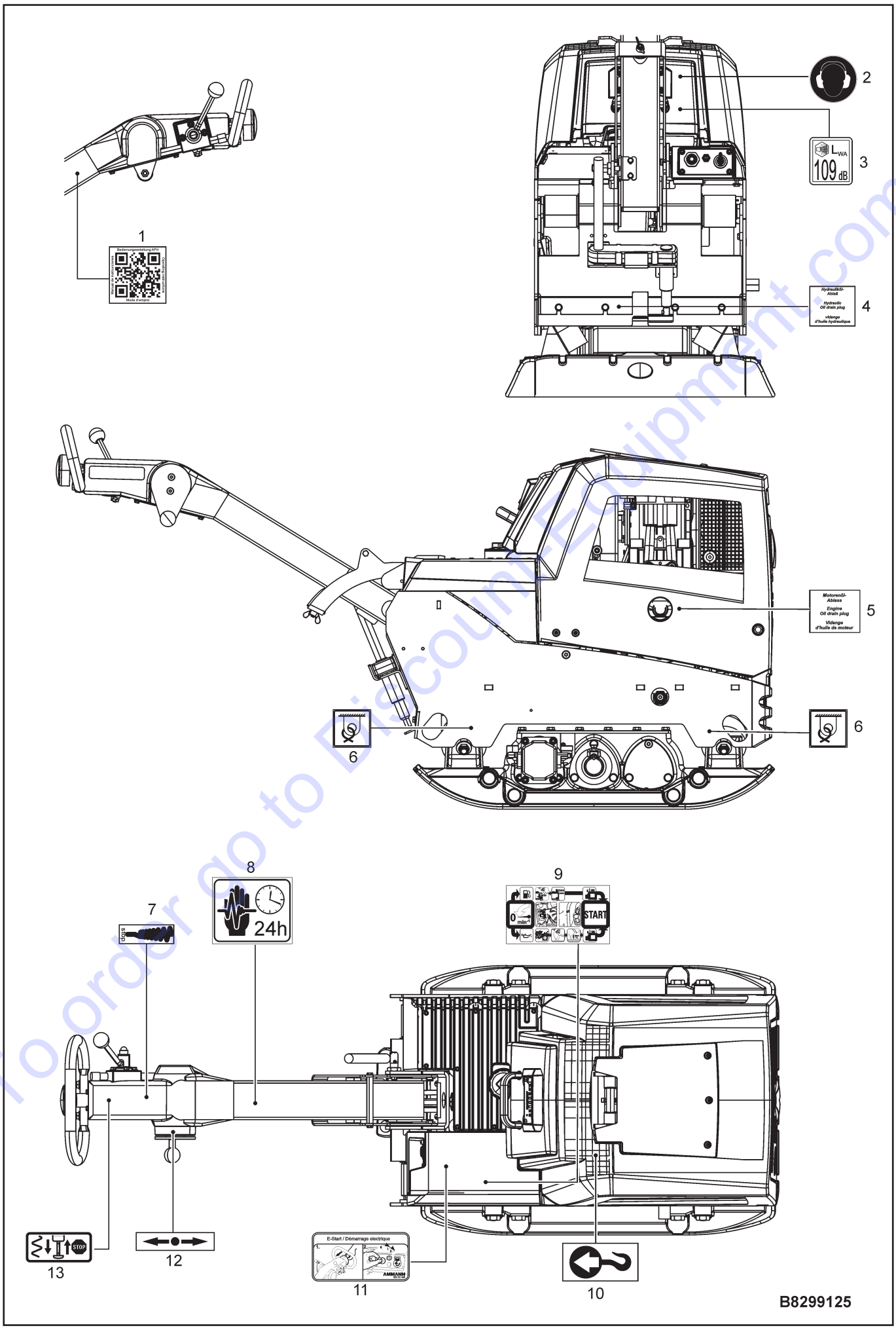
- Pull out the button to unlock it.
- Normal operation can be resumed immediately. (Direction of movement and speed do not have to be selected again.)

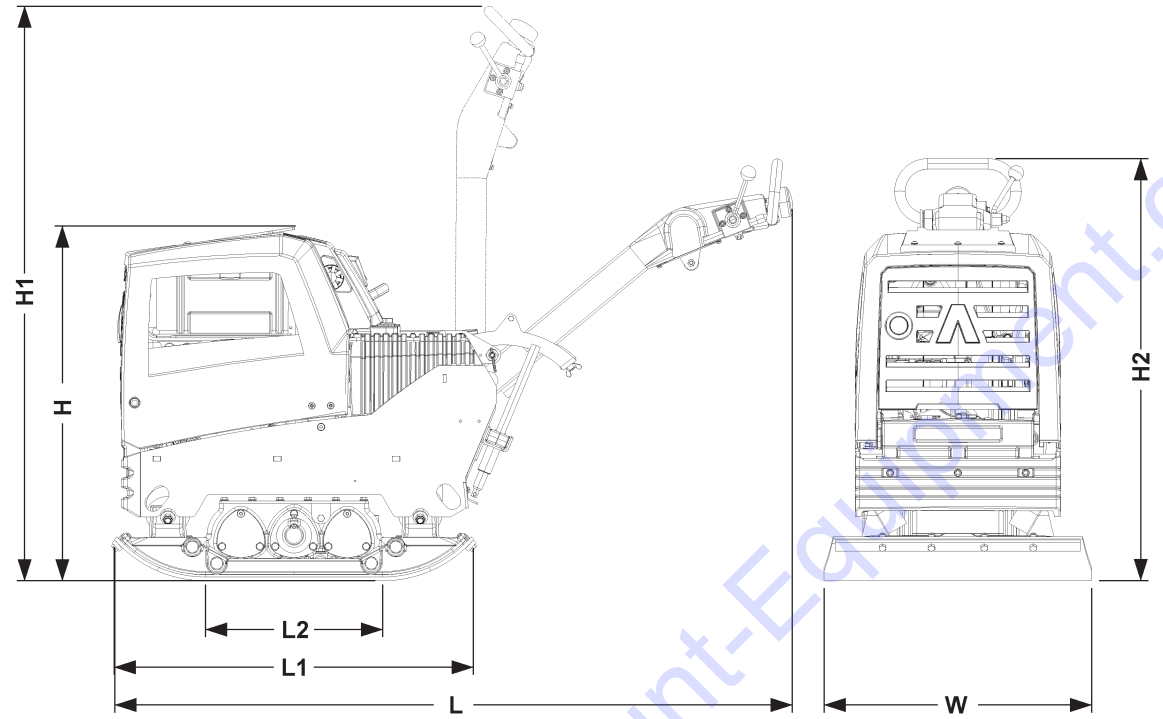
1.1.2 Labeling on the machine

The following information, safety and warning signs are attached to the machine.

Item	Article no.	Quantity	Designation
1	2-00209008	1	QR code label
2	2-00204129	1	Wear hearing protection film
3	2-00202603	1	109 dB sign
4	2-00202180	4	<Hydraulic Oil Drain Plug> film re
5	2-00202061	1	Engine oil outlet film
6	2-00202011	1	<Bracing point> sign (on both sides of the machine)
7	2-00202090	1	Note red film
8	2-00202057	1	HAV 24h note film
9	51-05126802	1	Engine start film
10	2-00202260	1	Central point suspension film
11	2-00202490	1	Ignition film
12	2-00202088	1	Note red film
13	2-00202270	1	Emergency off actuator film

1. Safety regulations





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	APH 60/85	APH 65/85
1. Dimensions		
W	550 mm	
W1 (with mounting brackets 75 mm)	700 mm	
W2 (with mounting brackets 150 mm)	850 mm	
L	1840 mm	
L1	930 mm	
L2	470 mm	
H	905 mm	
H1	1000 mm	
H2	1500 mm	
2. Weights		
Base unit	483 kg	490 kg
with mounting brackets 75 mm	+ 21.9 kg	+ 21.9 kg
with mounting brackets 150 mm	+ 33.9 kg	+ 33.9 kg
E-start	--	--
ACE system	+ 18.0 kg	+ 18.0 kg
3. Drive		
Engine type	HATZ 1D90E	
Type of construction	1 cyl., 4-stroke diesel	
Output	10.8 kW (14.68 PS)	
at	3000 rpm	
Cooling	Air	
Cooling water antifreeze mixture	--	
Fuel tank volume	7.0 l	
Consumption	2.5 l/h	

1. Technical data

	APH 60/85	APH 65/85
max. inclination	25°	
max. climbing ability	36%	
Drive type	--	--
• Manual start	via centrifugal clutch + hydraulic power transmission	
• E-start	--	
Control forw./rearw.	Hydraulic	
4. Working speed		
	0 - 28 m/min	0 - 32 m/min
5. Vibration		
Vibration force	65 kN	
Vibration frequency	69 Hz	55 Hz
6. Area performance		
Base unit	up to 924 m²/h	1056 m²/h
with mounting bracket 75 mm	up to 1176 m²/h	1344 m²/h
with mounting bracket 150 mm	up to 1428 m²/h	1632 m²/h
7. Special accessories		
Vulkollan plate	X	
Mounting bracket 75 mm	X	
Mounting bracket 150 mm	X	
Hood	X	
Operating hours counter	X	
Electrical starter	X	
Emergency off actuator	X	
ACE system	X	
	X = special accessories | S = series | — = not available	
8. Noise and vibration specifications		
The following noise and vibration data in accordance with the EC Machinery Directive in the version (2006/42/EC) were determined taking into account the harmonized standards and directives listed below. In practical operation, the values can deviate from these values, depending on the prevailing conditions.		
8.1 Noise specification[1)] The noise specification required in accordance with Annex 1, section 1.7.4.u of the EC Machinery Directive is specified as follows for		
Sound pressure level at the place of work L_{PA}	95 dB	
Measured sound power level $L_{WA,m}$	107 dB	
Guaranteed sound power level $L_{WA,g}$	109 dB	
The noise values were determined taking the following guidelines and standards into account: Directive 2000/14/EC / EN ISO 3744 / EN 500-4		
8.2 Vibration specification The noise specification required in accordance with Annex 1, section 1.7.4.u of the EC Machinery Directive is specified as follows for		
Total vibration value of the acceleration a_{hv}	< 2.5 m/s²	
Uncertainty	1.0 m/s²	
The acceleration value was determined taking the following guidelines and standards into account: EN 500-4 / DIN EN ISO 5349		

[2)]Since the admissible rating sound level of 85 dB (A) can be exceeded with this machine, sound protection devices must be worn by the operator.

1.1 Description

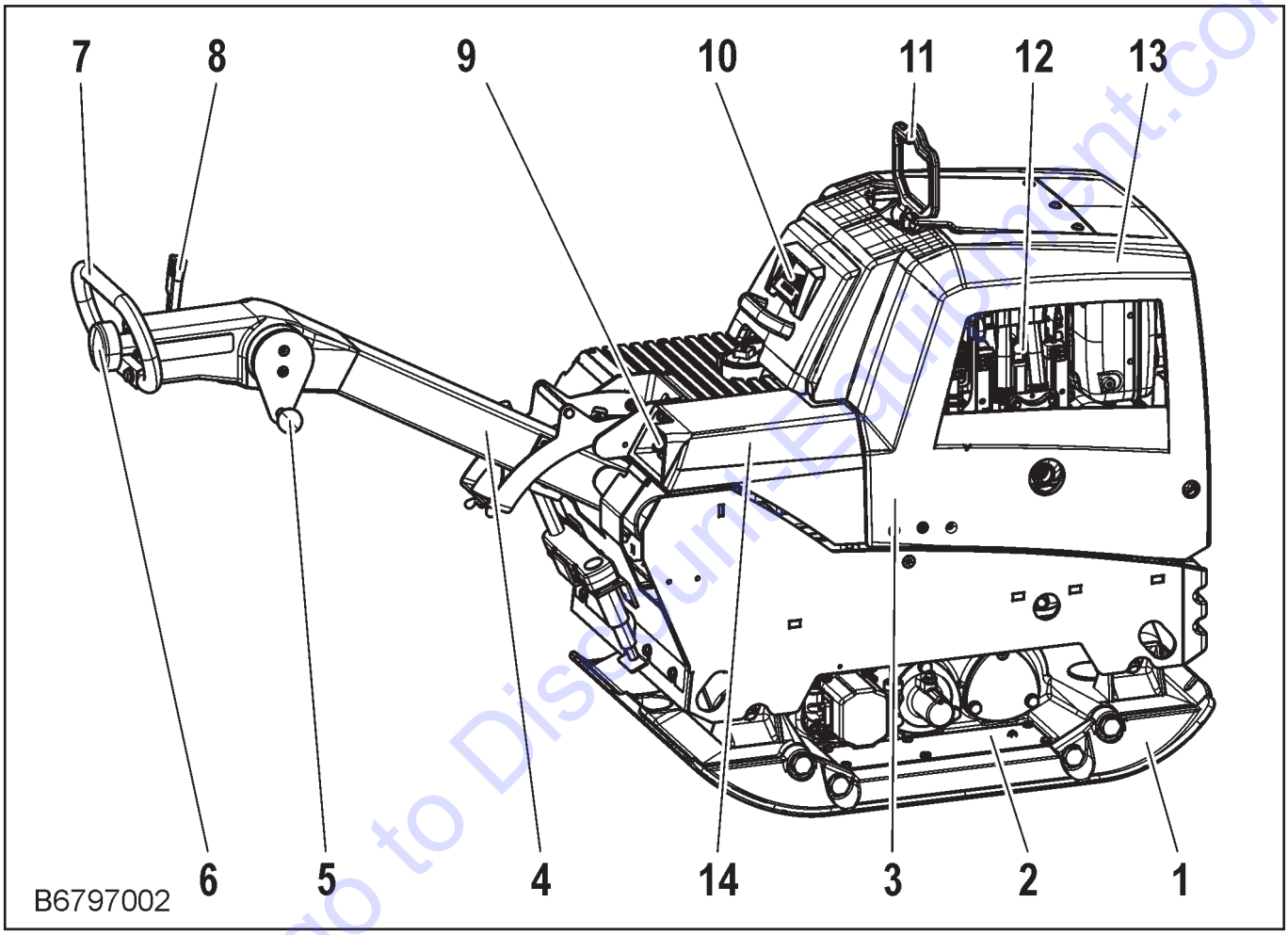
The machines of the APH series are reversible vibration plates that use the 2-shaft or 3-shaft vibrating system. The engine drives the exciter on the base plate via hydraulic components.

Using the integrated unbalance elements, the exciter generates the vibrations required for compaction.

The machine is guided at the drawbar handle. The machine is operated via the control elements of the drawbar.

The APH series is suitable for all compaction work in civil engineering and road construction. Compacting is possible with all soil materials, such as sand, gravel, light cohesive soils, slag, crushed stone.

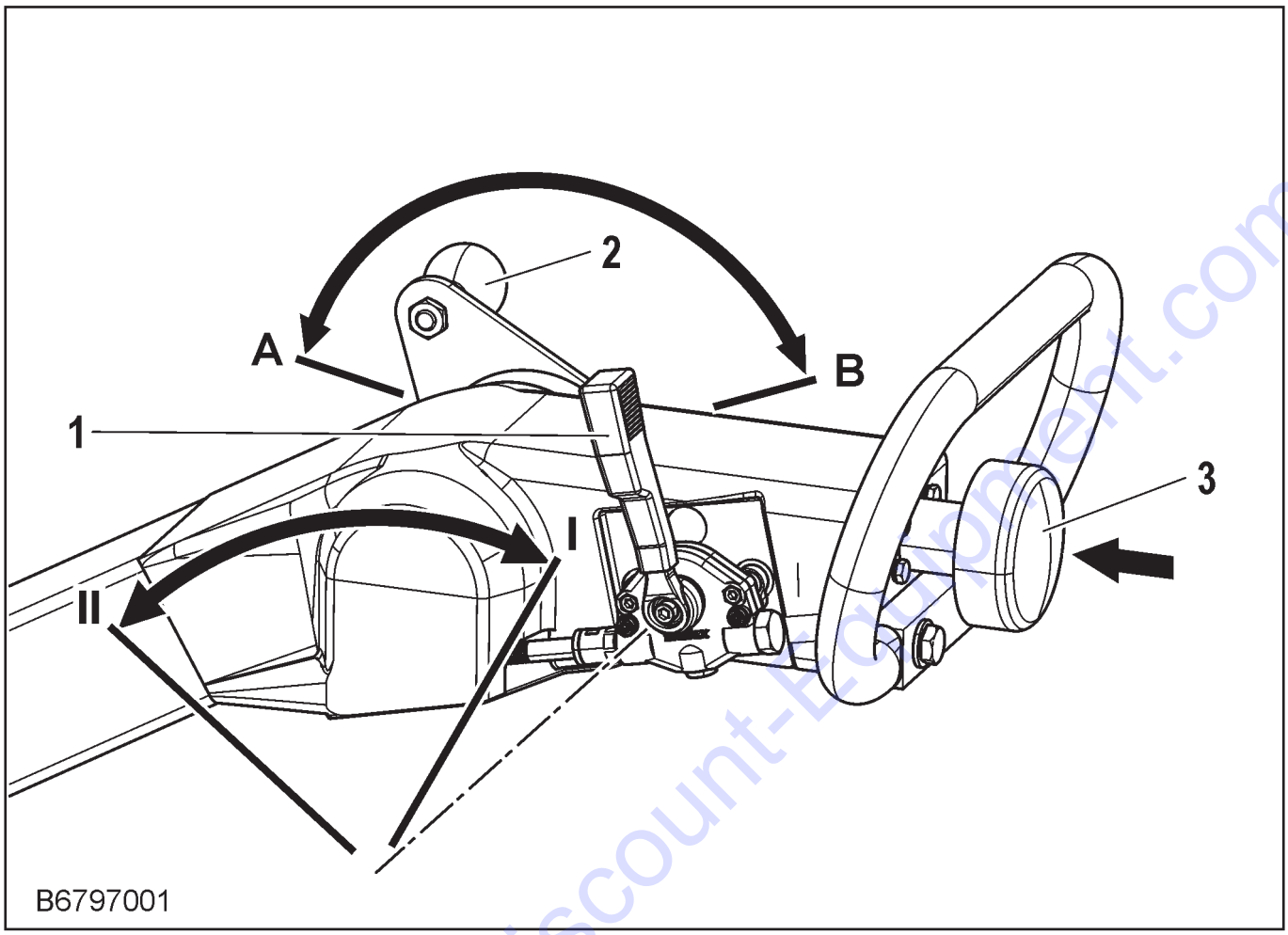
1.1.1 Device overview



1 Mounting bracket[1)]
2 Base plate with exciter
3 Operating hours counter[1)]
4 Drawbar
5 Control lever
6 Emergency off actuator[1)]
7 Drawbar handle
8 Speed control lever
9 Start panel[1)]
10 ACE display[1)]
11 Central point suspension
12 Diesel engine
13 Hood

[1)]Special accessories

1.2 Control elements



1 **Speed control lever**

I Idle (detent position)

II Full load

The motor speed is adjusted continuously at the speed control lever.

2 **Control lever**

A Forward

B Rearward

The control lever is used for adjusting the unbalance elements in the exciter and thus for continuous regulation of

- the direction of movement
  - Forward **(A)**
  - Rearward **(B)**
- the velocity

3 **Emergency off actuator**

1.3 Before startup

DANGER!	
	Danger to life, risk of injury or risk of material damage due to non-compliance with these instructions and all safety instructions contained therein. ♦ Carefully read and observe these instructions, and in particular the safety instructions. ♦ Read the engine operating instructions. Read and observe the information on safety, operation and maintenance given there.

WARNING!	
	Missing or unsuitable personal protective equipment (PPE) poses a risk of damage to health and injury. ♦ Personal protective equipment includes, for example: - Hearing protection - Safety shoes - Working gloves - Respiratory protection ♦ Determine and provide personal protective equipment for the specific work assignments. ♦ Use only personal protective equipment that is in a proper condition and provides effective protection. ♦ Adapt the personal protective equipment to the person concerned (e.g. body size).

Use the following procedure to start up the machine:

1. Park the machine on a level surface.
2. Check
   - Engine oil level (see chapter „7.1 General information“ 35).
   - Hydraulic oil level (see chapter „9.1 Hydraulic system“ 58).
   - Fuel level (see chapter "8.3.4 Checking the level, filling up fuel" on page 41).
   - Filter (see chapter „8.2.1 Checking, cleaning“ on page 46).
   - Tight fit of screw connections (see chapter „9.2.2 Checking the screw connections“ on page 51).
   - Condition of engine and machine (visual inspection).
3. Add missing lubricants as specified in the lubricant table.
4. Adjust and lock the drawbar.

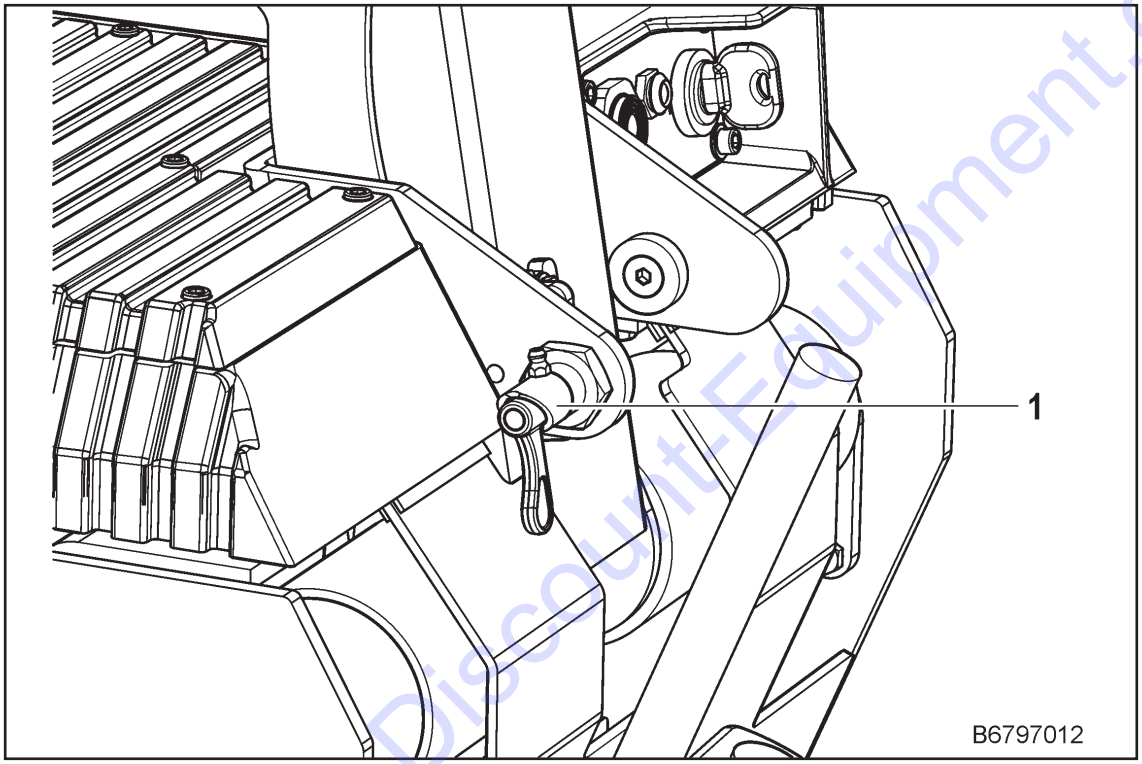
✓ Startup is completed, the engine can be started.

1.4 Adjusting and locking the drawbar

1.4.1 Locking the drawbar

NOTE	
	**RISK OF MATERIAL DAMAGE.** *The parts of the locking device can be damaged when the drawbar is locked during normal operation.* ♦ Never lock the drawbar during normal operation. ♦ Locking the drawbar is only intended to make machine transportation easier.

- The drawbar can be locked in a vertical position **(1)**.

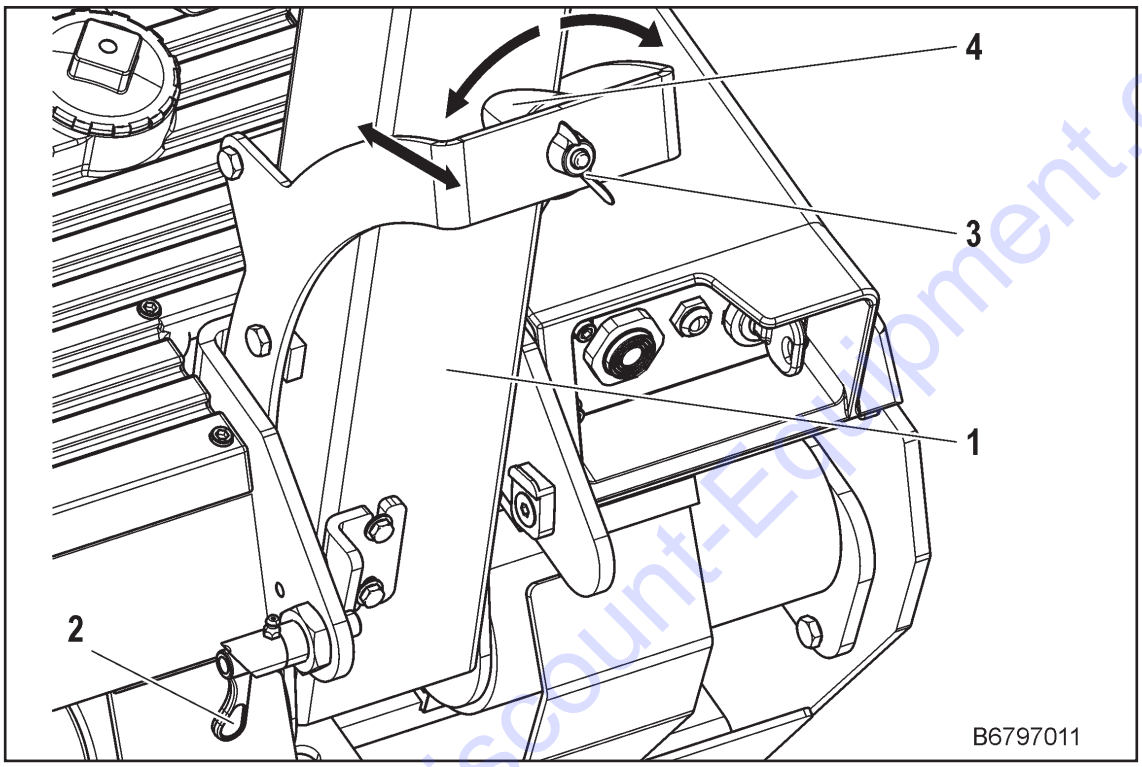


- With a locked drawbar, handling the machine during the loading process is easier.

1.4.2 Adjusting the working height

⚠ CAUTION!	
⚠	**Risk of injury!** A freely moving drawbar can tilt when the drawbar height is adjusted, and hit and injure bystanders. ♦ Lock the drawbar before adjusting the height.

The optimal working height of the machine can be adjusted via the stop buffer. You can thus avoid injuries and tension caused by incorrect postures.



Use the following procedure to adjust to the optimal working height:

1. Move the drawbar **(1)** to a vertical position. Rotate the locking latch **(2)** to lock it.
✓ The locking latch **(2)** engages with a click.
2. Loosen the wing nut **(3)**.
✓ The stop buffer **(4)** can be rotated freely.
✓ Clockwise rotation pushes the drawbar towards the engine hood. This increases the working height.
✓ Counterclockwise rotation moves the drawbar away from the engine hood. This reduces the working height.
3. Adjust the stop buffer **(4)** to obtain optimal working height.
4. Tighten the wing nut **(3)** to lock the stop buffer position **(4)**.
5. Hold the drawbar **(1)** . Unlock the locking latch **(2)**.
✓ Slowly lower the drawbar until the selected working height is reached.
✓ The working height is adjusted.

1.5 Engine operation

DANGER!

Danger to life from inhaling exhaust fumes.

In closed or poorly ventilated rooms, the toxic engine exhaust fumes can cause unconsciousness and even death.

- Wear respiratory protection in poorly ventilated areas (e.g. construction pits).
- Never operate the unit in closed or poorly ventilated rooms.
- Never inhale exhaust fumes.

WARNING!

Risk of injury / danger to life from operation in a potentially explosive atmosphere!

Starting and operating the machine in areas subject to explosion and fire hazards can cause serious injuries or death.

- Never start or operate the machine in areas subject to explosion or fire hazards.

WARNING!

Risk of injury from damage and defects on the machine.

Damage and defects on the machine, especially on safety devices, are sources of danger. Damaged machines can injure the machine operator or bystanders.

- Perform a visual inspection for damage before each start-up.
- Never put the machine into operation if you localize and identify any damage.
- Replace defective components.

WARNING!

Risk of injury and engine damage from using starting aid sprays.

Using starting aid sprays can cause uncontrolled ignitions in the engine. Uncontrolled ignitions can injure persons and damage the engine.

- Never use starting aid sprays.

NOTE

Risk of engine damage due to low-load operation.

Operating the machine for a long time without load or with very low load can affect the running behavior of the engine.

- Ensure an engine utilization of at least 15 %.
- After low-load operation, operate the engine at a significantly increased load for a short time before shutting it down.

ENGINE START ASSISTANCE

The speed setting can be the reason that the engine does not start after several attempts.

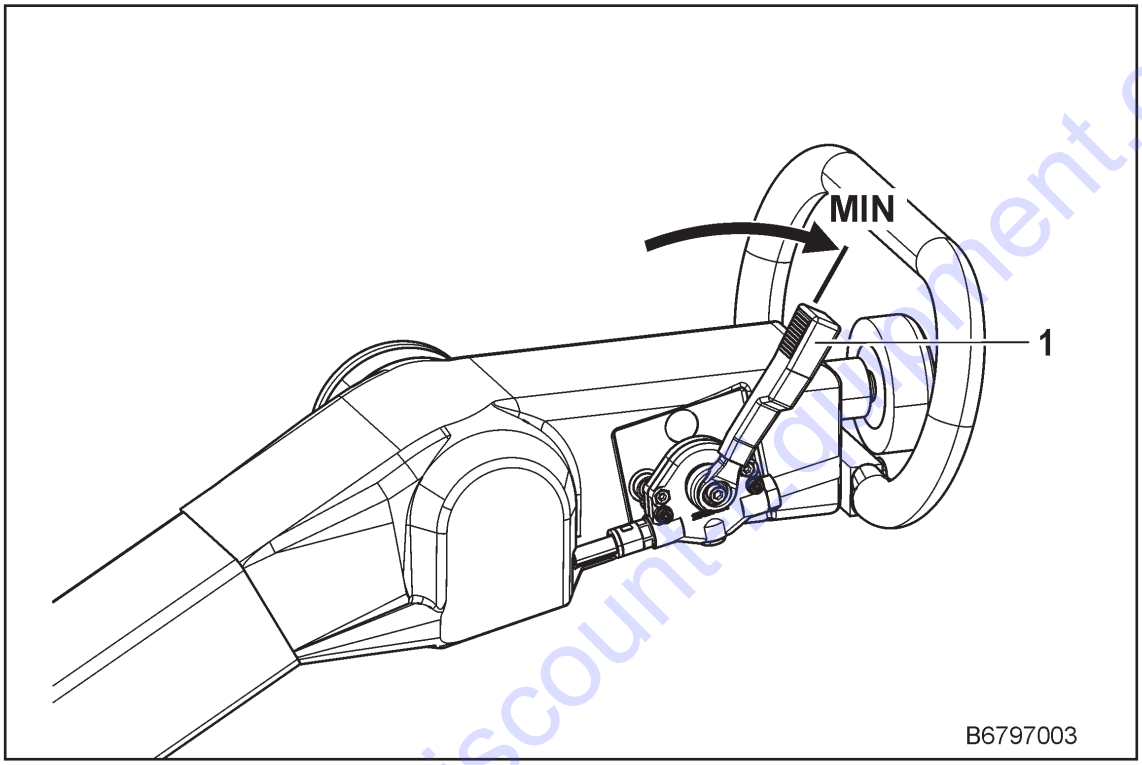
- Set the speed control lever to about 1/3 of the way towards "MAX".

1.5.1 Starting the engine

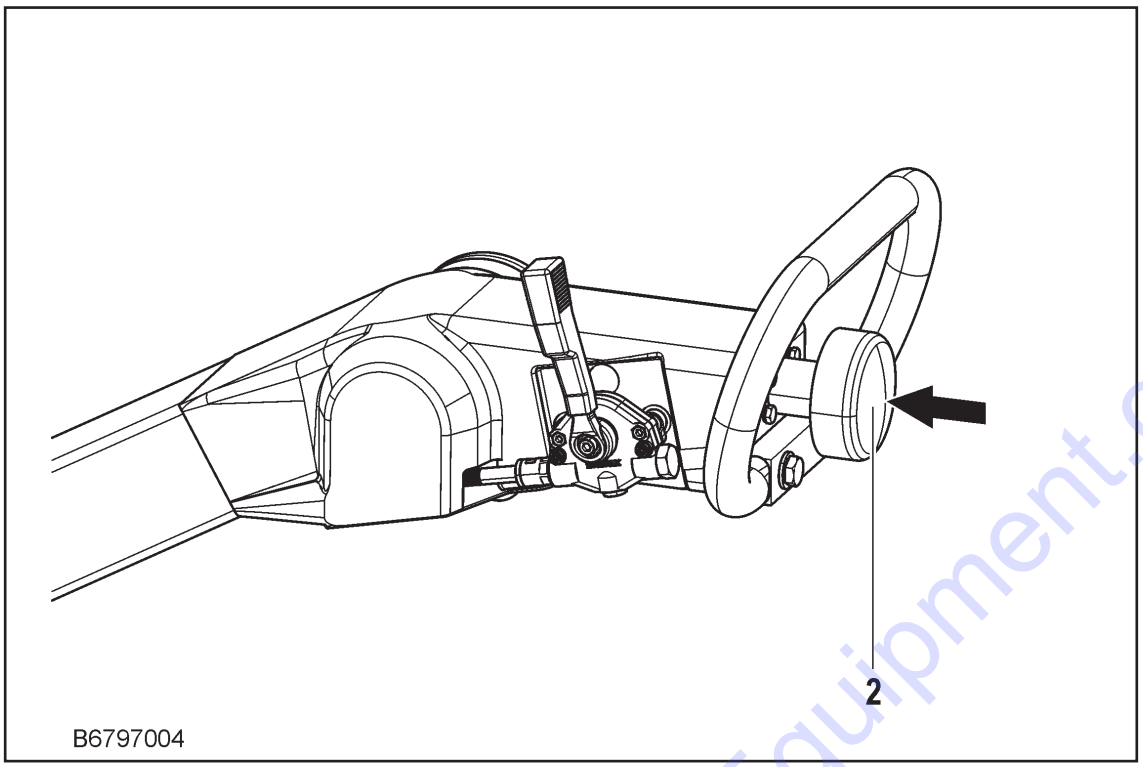
ENGINE START ASSISTANCE

- Actuate the starter for max. 30 seconds. If the engine does not run after this time, turn the start key back to position "0" and eliminate the cause (see chapter "11. Help in case of malfunctions").
- Before each new attempt to start the engine, turn the start key back to position "0".
- The repeat lock in the ignition lock prevents the starter from engaging while the engine is running, which could cause damage.

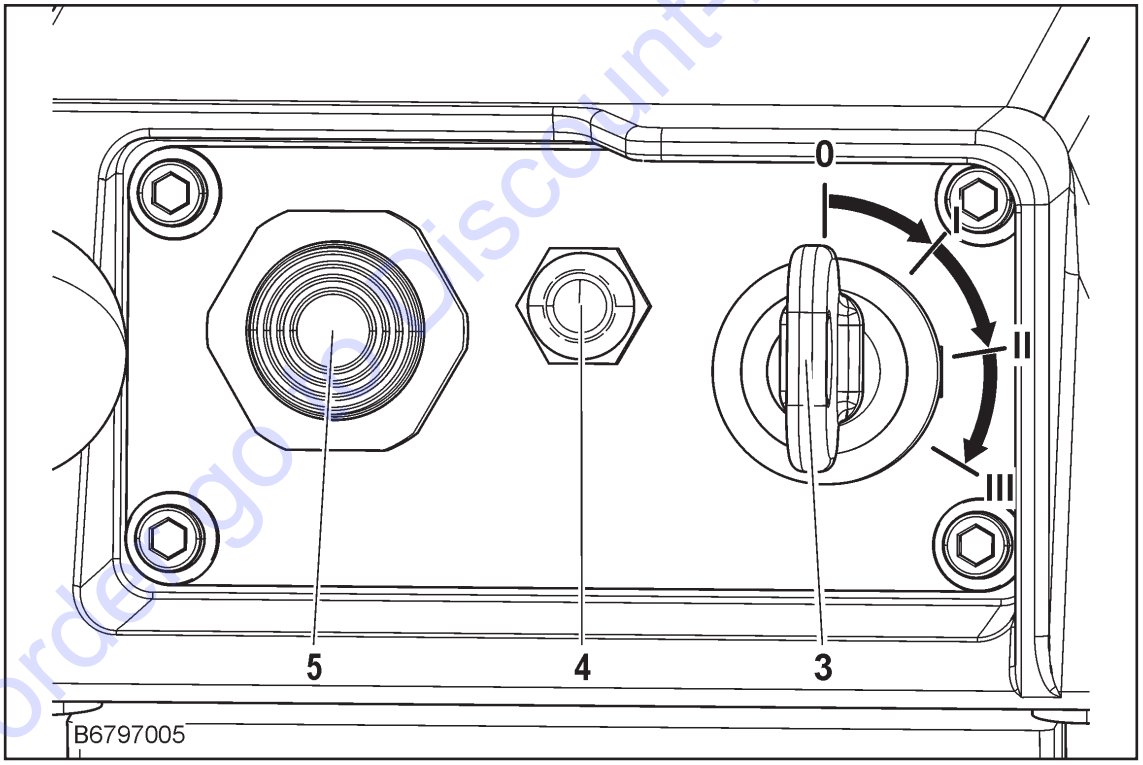
Use the following procedure to start the engine:



1. Set the speed control lever **(1)** to "MIN".



2. Press the emergency off actuator **(2)**.



3. Insert the start key **(3)** fully into the lock and set it to position "I".

✓ A signal **(5)** sounds and the charge indicator lamp **(4)** shines.

4. Turn the start key to position "III" and hold it there until the engine starts.

5. ***NOTE:*** Actuate the starter for max. 30 seconds. If the engine does not run after this time, turn the start key back to position "0" and eliminate the cause (see chapter "11. Help in case of malfunctions").

✓ The engine starts. Follow now the instructions in the next chapter „4.5.2 After the engine has started“ auf Seite 19.

1.5.2 After the engine has started

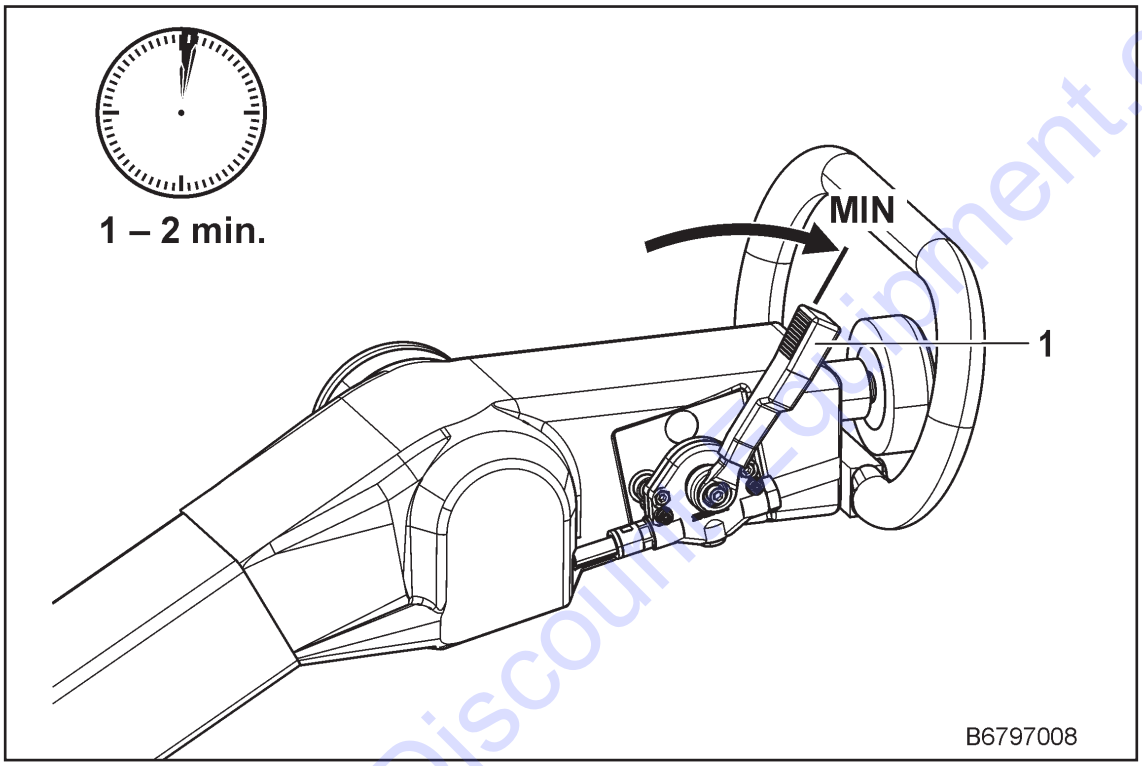
1. Release the start key.

✓ The start key jumps to position "I" and remains in this position during operation.

✓ The sound **(5)** is off and the charge indicator lamp **(4)** must go out.

✓ The charge indicator lamp **(4)** shines to indicate a malfunction.

2. If there are any irregularities:
   - Switch off the engine immediately.
   - Identify and eliminate the fault.
   - Details on troubleshooting can be found in chapter "11. Help in case of malfunctions".



3. Set the speed control lever **(1)** to "MIN".
4. Allow the engine to warm up for 1 ... 2 minutes.
5. If starting fails, return the speed control lever to its initial position and repeat the starting process.

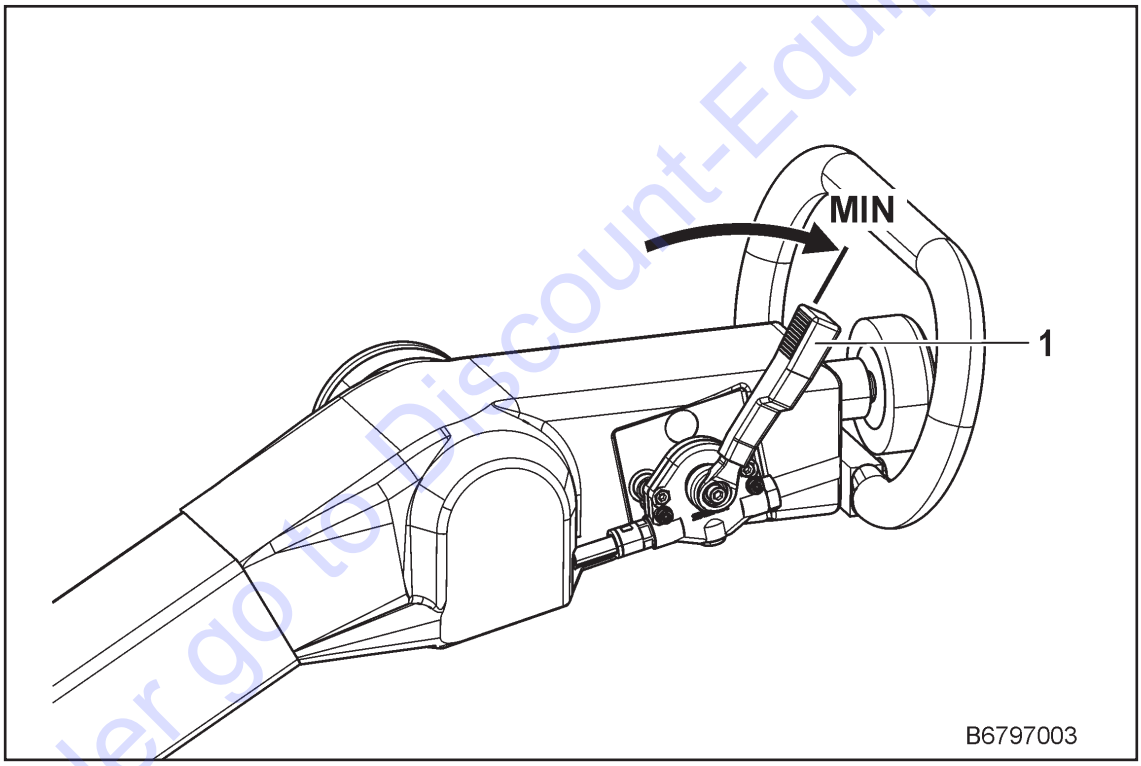
✓ The machine is ready for operation.

1.5.3 Shutting down the engine

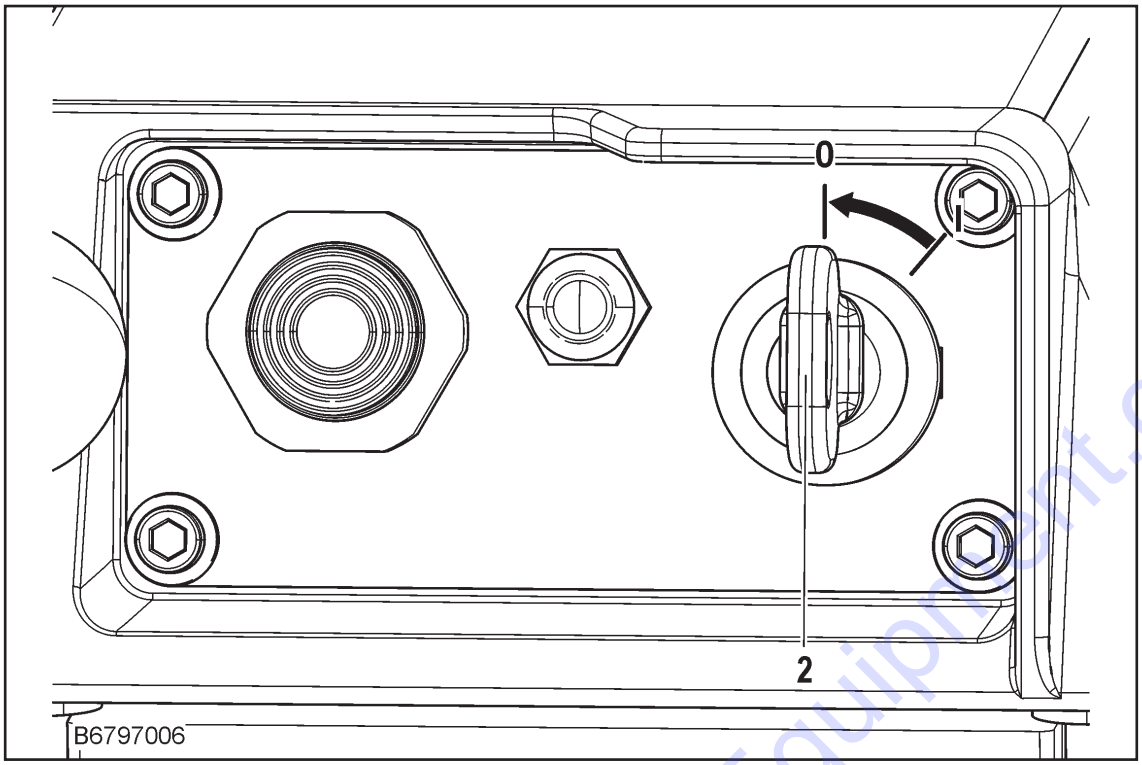
WARNING!	
	Risk of injury from unauthorized access. If the machine is left unattended with the engine running, there is a risk of unauthorized persons using the machine and injuring themselves and others. ♦ Shut down the machine at the end of the work. ♦ When you interrupt operation and/or at the end of the work, remove the start key and protect it against unauthorized access.

NOTE	
	Risk of engine damage due to incorrect handling *The engine is equipped with a decompression lever for manual start. If used incorrectly, it can also be used to force the engine to stop. However, the engine is not designed for this handling. Repeated use will damage the engine.* ♦ *Follow the instructions below to shut down the engine.* ♦ *Never shut down the engine at the decompression lever.*

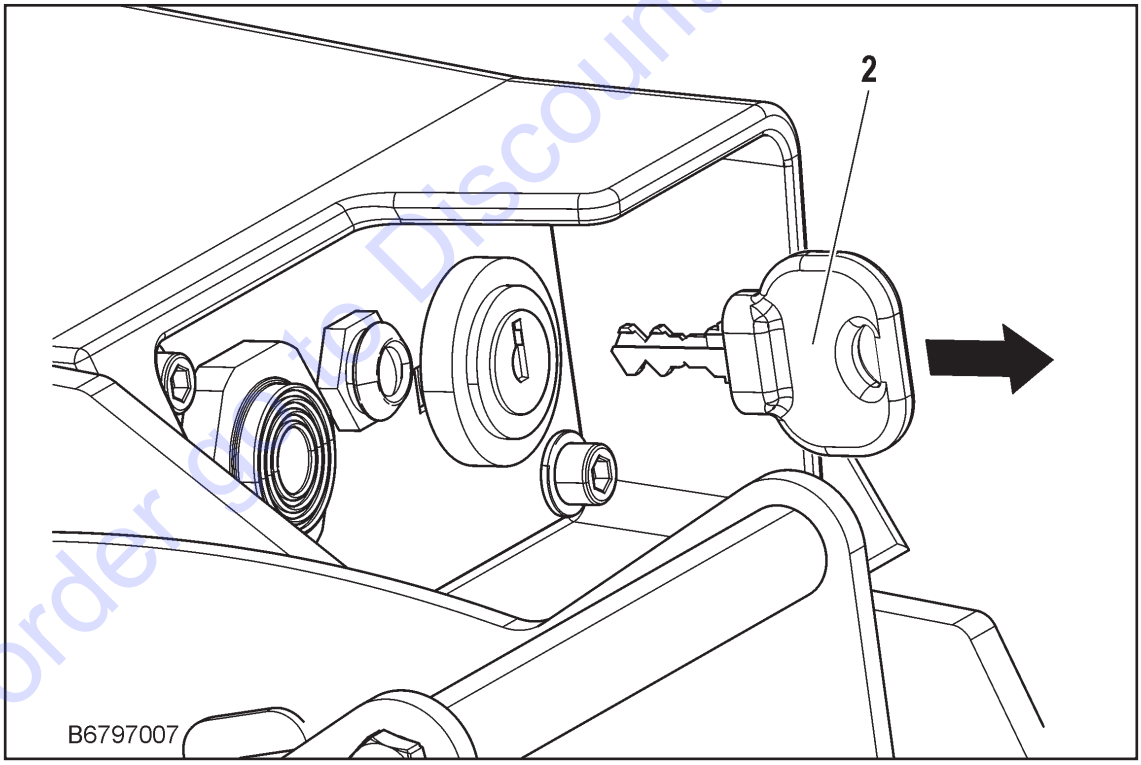
Use the following procedure to shut down the engine:



1. Set the speed control lever to "MIN".



2. Turn the start key to "0".
✓ The engine goes off.



3. Remove the start key **(2)** and keep it at a safe place.
✓ The engine is shut down.

1.6 Starting the engine (manual start)

DANGER!

Danger to life from inhaling exhaust fumes.

In closed or poorly ventilated rooms, the toxic engine exhaust fumes can cause unconsciousness and even death

- Wear respiratory protection in poorly ventilated areas (e.g. construction pits).
- Never operate the unit in closed or poorly ventilated rooms.
- Never inhale exhaust fumes.

WARNING!

Risk of injury and engine damage from using starting aid sprays.

Using starting aid sprays can cause uncontrolled ignitions in the engine. Uncontrolled ignitions can injure persons and damage the engine.

- Never use starting aid sprays.

WARNING!

Risk of injury due to inadequate cranking handle.

A damaged or broken handle tube can cause injuries. A worn-out cranking pin can slip out of the cranking device during the cranking process and also cause injuries.

- Check the cranking handle for a broken handle tube, worn-out cranking pin, etc.; replace it if necessary.

WARNING!

Risk of injury from engine kickback.

There is a kickback when the cranking handle is used. The operator is injured.

- Use a cranking handle with kickback damper.
- Hold the handle tube such that it cannot twist. Turn the crank briskly so that the frictional connection between the engine and the crank is guaranteed without interruption.
- If a kickback occurs due to hesitant cranking, which may cause the engine to start in the opposite sense of rotation (smoke emerging from the air filter), release the cranking handle immediately and shut down the engine.
- To repeat the starting process, wait until the engine stops before you repeat the starting preparations.

WARNING!

Risk of injury due to kickback or rotation of the cranking handle.

- Using a cranking handle without kickback damper is not permitted in the countries of the European Union.

NOTE

Risk of engine damage.

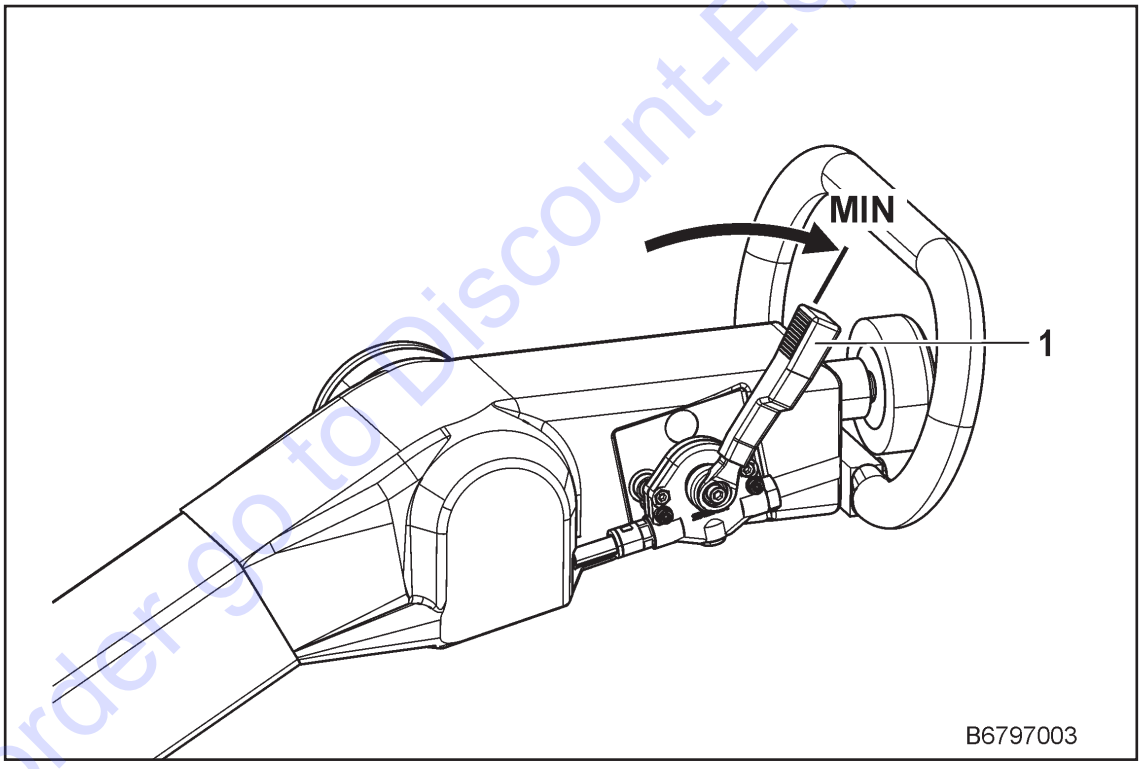
- In a machine with electric starter, never perform a manual start when the battery is disconnected; this would destroy the governor immediately.
- Start manually only if electric starting is not possible, e.g. if the battery is low.

1.6.1 Prerequisite for performing an emergency manual start

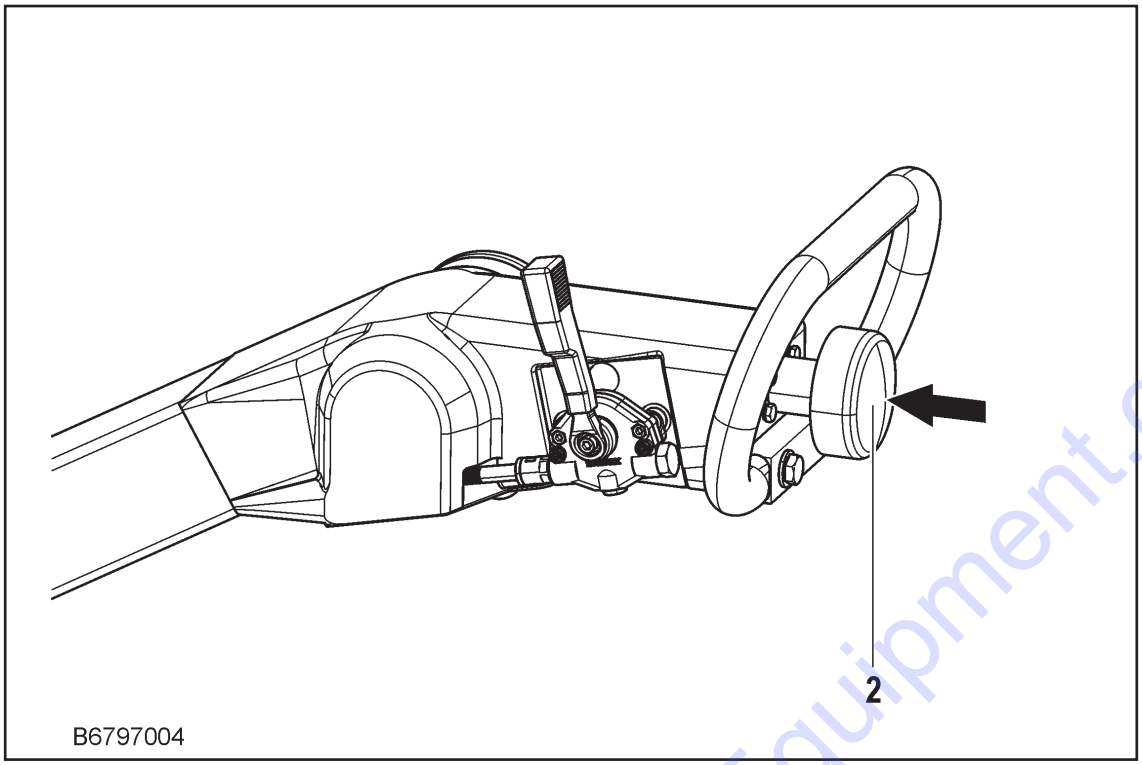
- The battery has enough residual voltage so that the signal can sound and the charge indicator lamp **(4)** shine.
- Turn the start key to "I".
- Only trained, instructed persons over 18 years of age are allowed to perform an emergency manual start.
- Wear personal protective equipment,
  - safety shoes,
  - hearing protection,
  - working clothes.
- Ambient temperature: 5°C | 41°F or higher.

1.6.2 Checking the machine before the start

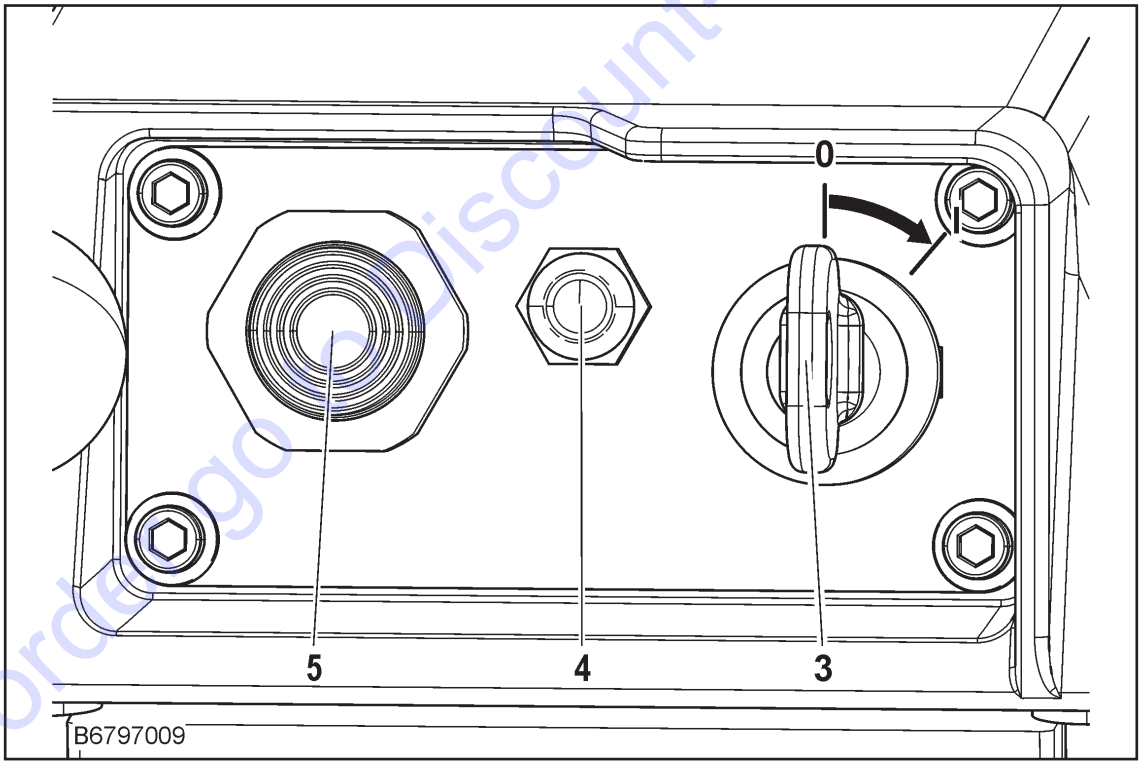
1. The machine:
   - Never install it in closed rooms
   - Park it on a level surface
   - Secure it against rolling or slipping away
2. Persons are not allowed to stay in the danger zone of machine and engine.
3. Check the level in the fuel tank. Top up if necessary (see chapter „8.3.4 Checking the level, filling up fuel“ on page 41).
4. Check the engine oil level. Top up if necessary (see chapter „8.4 Engine oil level“ on page 42).
5. Check the proper functioning of the crank handle.
6. Lightly grease the sliding surface between crank handle and guide sleeve.
7. Check function and completeness of the safety devices.



8. Set the speed control lever **(1)** to "MIN".

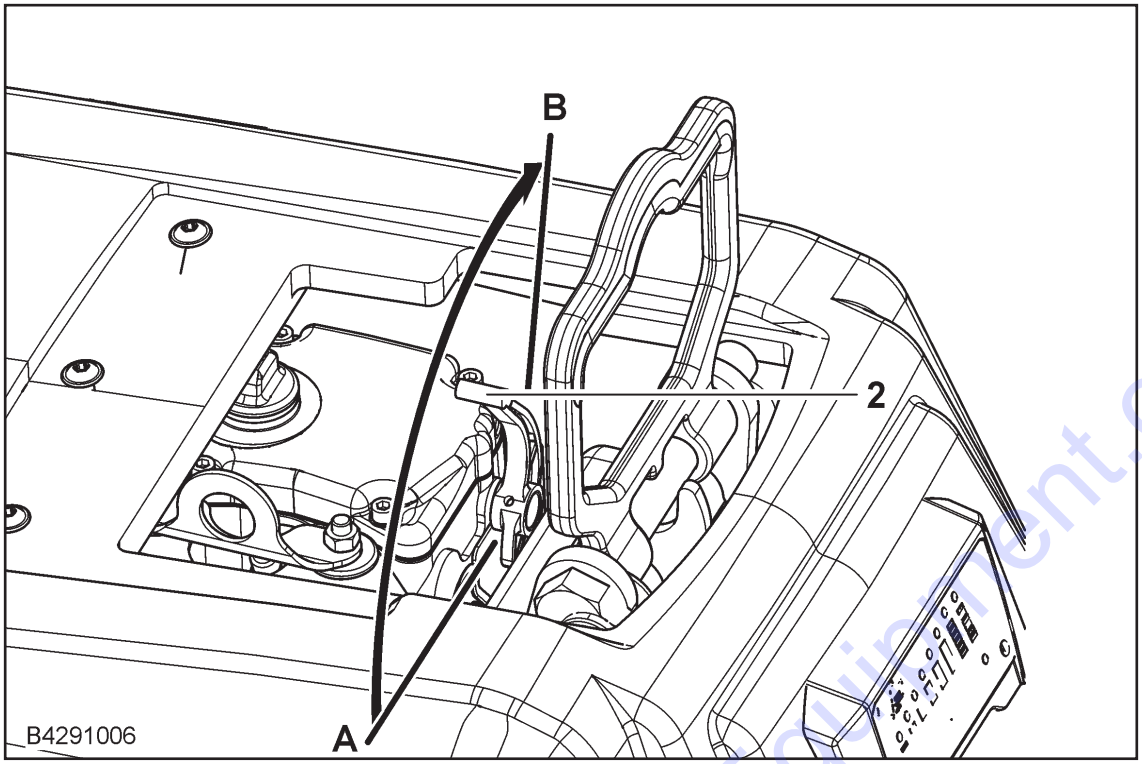


9. Press the emergency off actuator **(2)**.

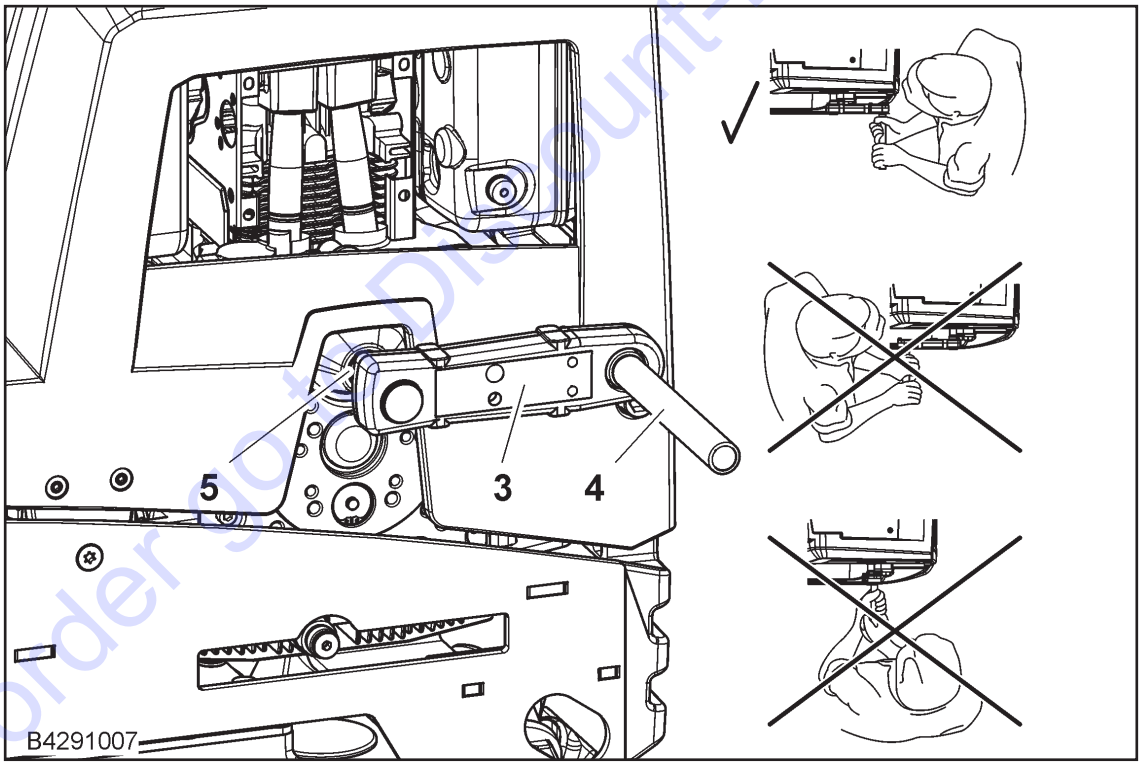


10. Insert the start key fully into the lock and set it to position "I".

✓ A signal (5) sounds and the charge indicator lamp (4) shines.



11. Move the decompression lever **(2)** up to the stop to start position "B".



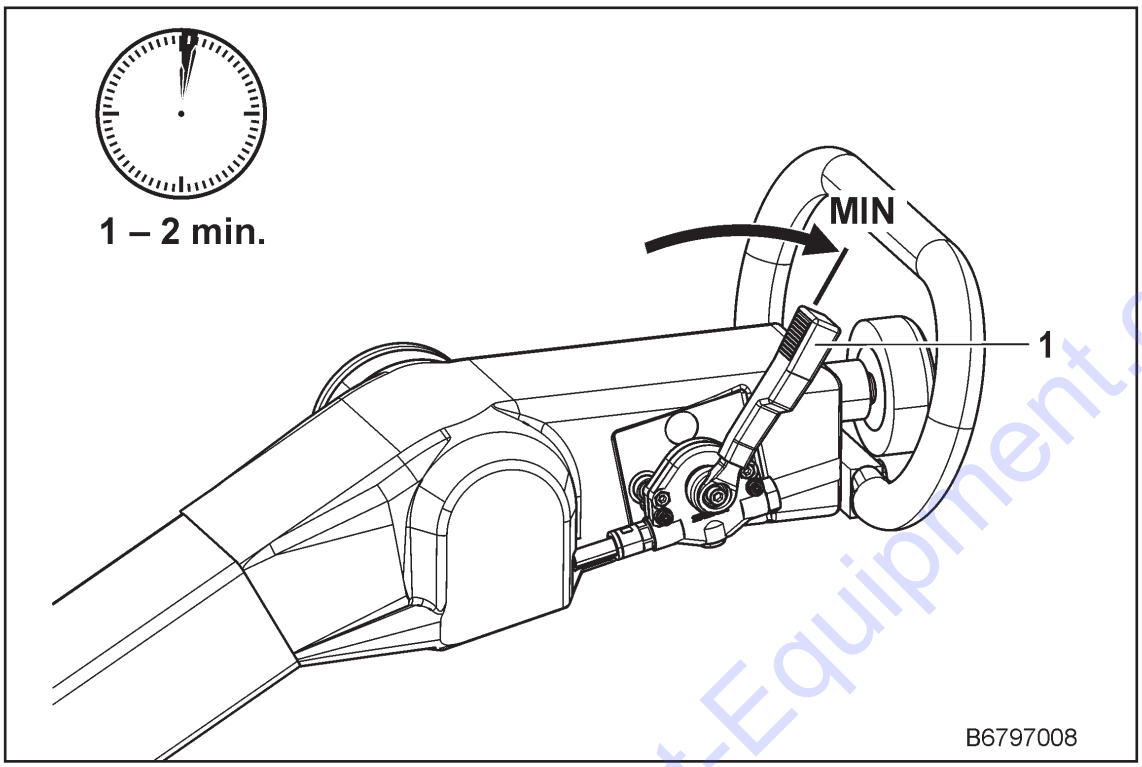
12. Insert the cranking handle **(3)**.
13. Hold the handle tube **(4)** with both hands.
14. At the beginning, turn the cranking handle slowly until the cranking claw **(5)** and the pawl mechanism of the cranking handle engage.
15. As the speed increased, turn the cranking handle vigorously.

✓ The highest possible speed must be reached when the decompression lever engages in position "A" (compression).

✓ The engine starts. Follow now the instructions in the next chapter "4.6.3 After the engine has started" on page 34After the engine has started

1. Pull the cranking handle out of the guide sleeve.

✓ The sound must stop and the engine fault indicator lamp must go out.



2. Set the speed control lever (1) to "MIN".
3. Allow the engine to warm up for 1 .to 2 minutes.

✓ If starting fails, return the decompression lever to its initial position and repeat the starting process.

1.7 Operation

⚠ DANGER!	
	**Danger to life from the machine tilting or slipping.** Slipping material, unstable edges and slippery surfaces can cause the machine to overturn or slip. This can cause serious or even fatal injuries. ♦ Move carefully on slopes, always in a direct upward direction. ♦ On steep slopes, move uphill in reverse to prevent the machine from tilting. ♦ On ditch edges and shoulders as well as in front of obstacles, guide the machine such that there is no risk of the machine operator falling or being crushed. ♦ When reversing, guide the machine at the side to avoid crushing injuries to the machine operator. ♦ Keep sufficient distance from the edges of construction pits and slopes. ♦ Refrain from any mode of operation which impairs the stability of the machine! ♦ Never move the machine on hard concrete, set bituminous pavement, heavily frozen soil or on ground that is not able to support the machine.

NOTE	
	**Risk of engine damage.** *Prolonged idling can cause engine damage.* ♦ *Shut down the engine during longer breaks.*

NOTE	
	***Difficulties in starting up the exciter.*** Under unfavorable conditions, it can be difficult for the exciter to start up. The engine can not reach its rated speed in such a case. ♦ Actuate the control lever repeatedly.

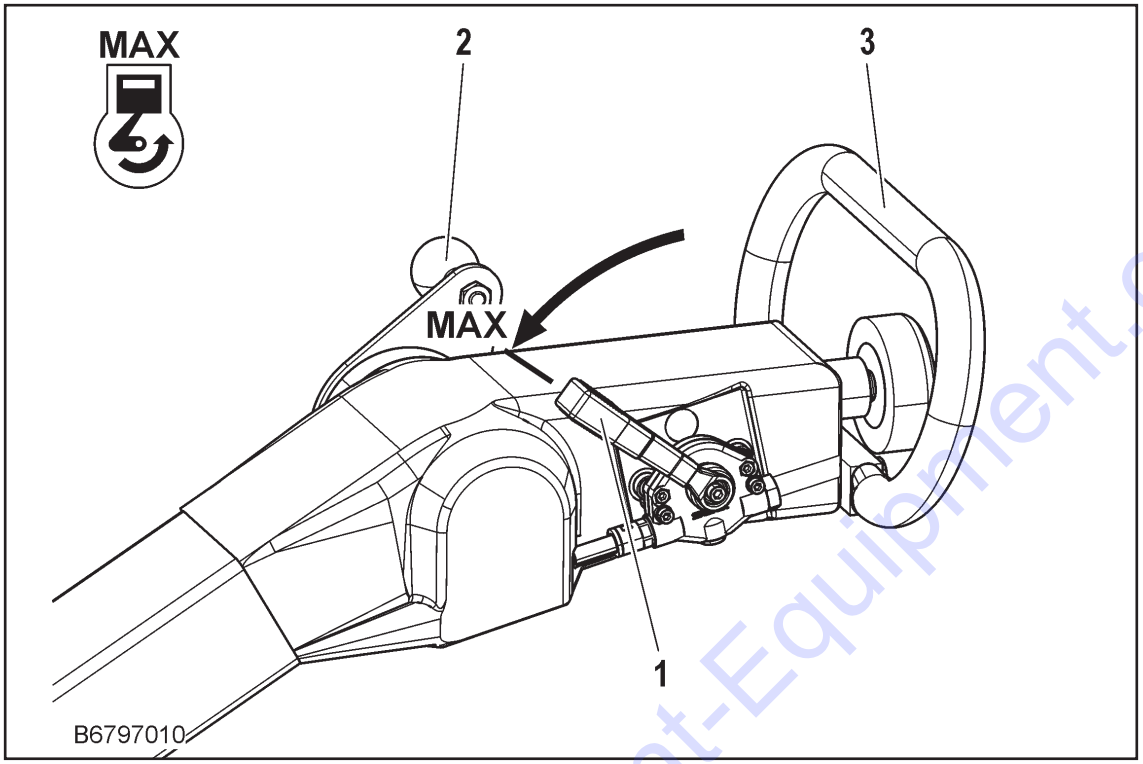
NOTE	
	***Beware of material damage.*** ♦ *When compacting interlocking pavement, using wear protection plates (special accessories) is recommended to prevent damage to machine and compaction material.*

1. Operation

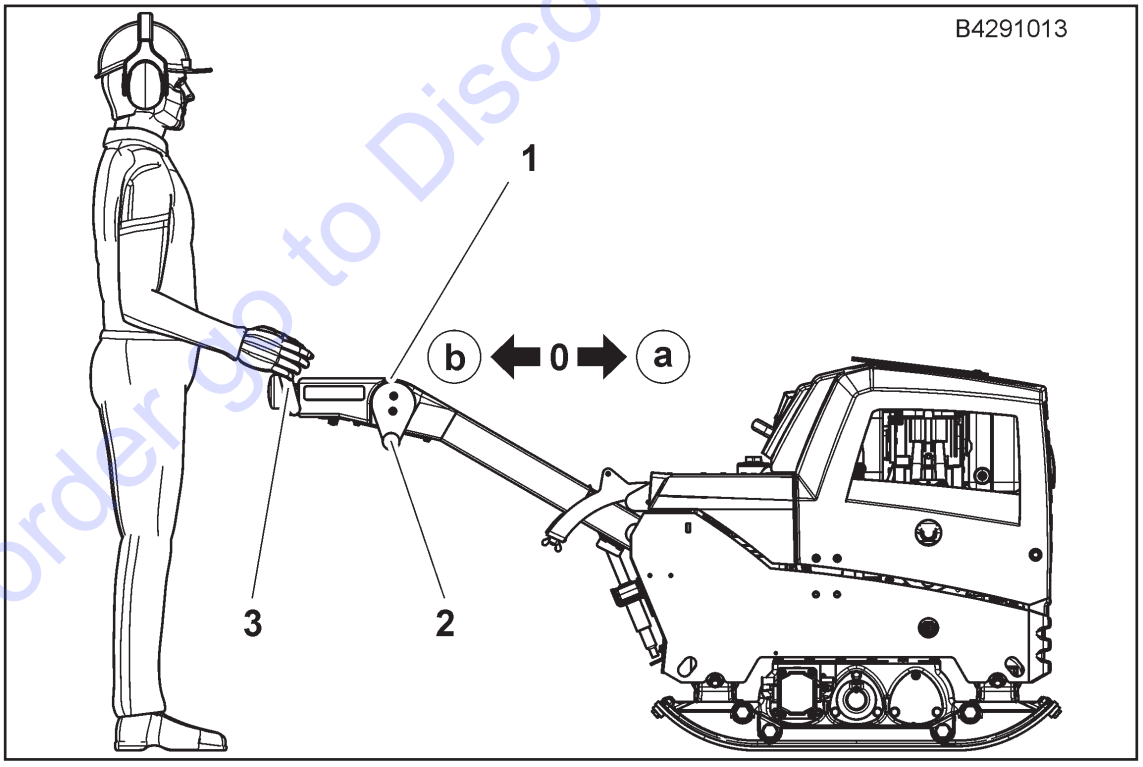
Use the following procedure to start work:

1. Start the engine (see section "4.5.1 Starting the engine" on page 25)

- Set the speed control lever **(1)** to "MAX".



2. Set the direction and the speed of travel on the control lever **(2)**

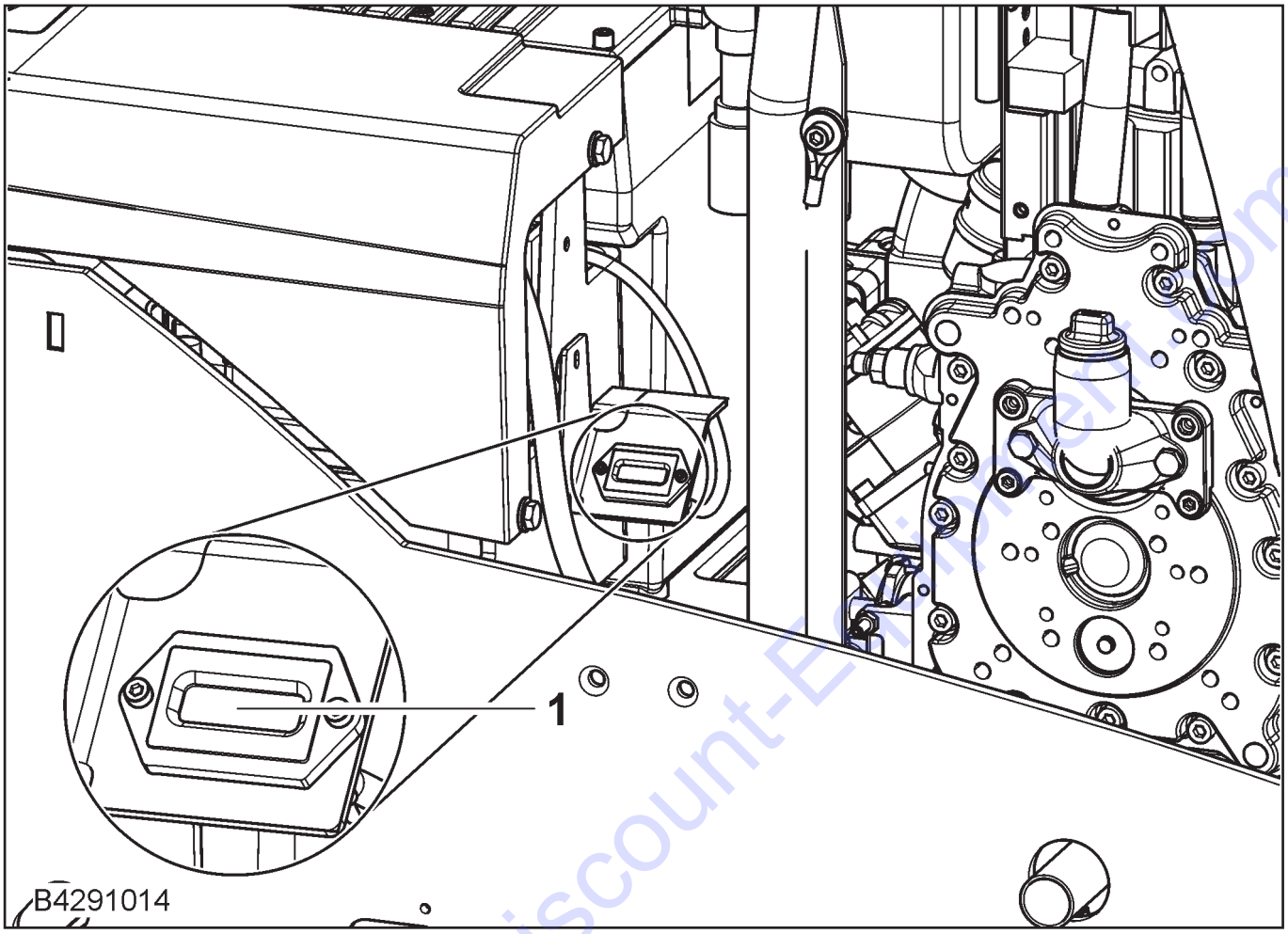


✓ The place intended for the operator to be is behind the machine.

3. Guide and steer the machine by the drawbar handle **(3)**; the operator walks sideways next to the drawbar.
4. To stop the machine, actuate the vibration stop. The machine stops, the motor continues running.
5. During short breaks, actuate the vibration stop and set the throttle lever to "MIN". The machine then continues running at idle speed.
6. For longer breaks and after work
   - actuate the vibration stop,
   - set the throttle lever to "STOP" and leave it in this position. The engine is shut down (see section "4.5.3 Shutting down the engine" on page 28).

✓ Remove the start key.

1.8 Operating hours counter[1)]



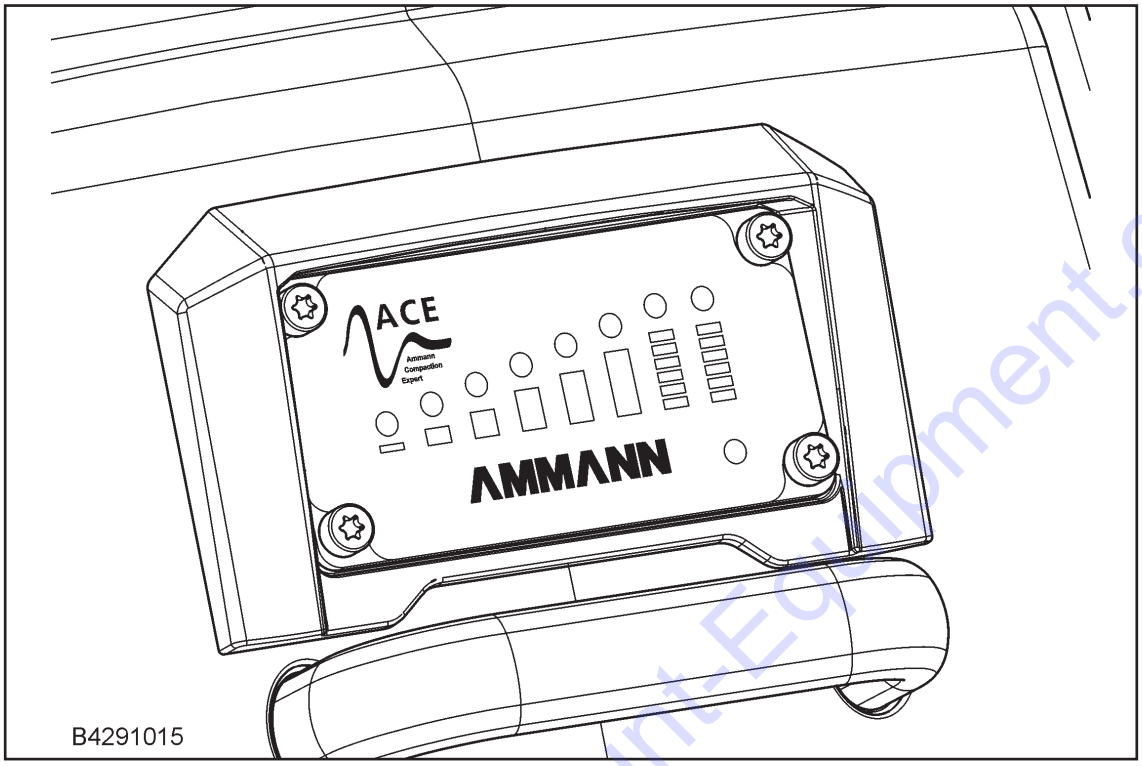
- The operating hours counter **(1)** permits several pieces of information to be retrieved:
  - Operating hours in full hours.
  - Engine oil and air filter change intervals are shown:

Engine oil and air filter change intervals				
	1st service alarm	**2nd service alarm**	**3rd service alarm**	**4th service alarm**
Display	CHG OIL	CHG OIL	Serv Air Filter	CHG Air Filter
Interval	20 h	200 h	50 h	250 h
Countdown	----	15 h before	----	25 h before
Blinking time 2 h				

[1)]Special accessories.

1.1 General

1.1.1 Description



The ACE system [1)] permits area-wide compaction checks to be performed. The dynamic ground stiffness is determined for this purpose.

An integrated sensor measures the feedback of the ground to the vibrating base plate. An LED display in the field of vision of the operator continuously shows the measured values.

This control option provides several benefits for the user. For example:

- Permanent control of the compaction progress achieved, and whether the final compaction is reached.
- Imperfect areas in the compaction can be found and be re-compacted.
- Over-compaction, material loosening and destruction can be avoided.
- Superfluous transitions or tampering on already compacted ground are avoided; i.e. more efficient and considerate use of the machine.

[1)]Special accessories.

1.1.2 Function

The ACEecon system consists of the display and an acceleration sensor on the base plate.

The integrated sensor converts the acceleration of the base plate into voltage signals. These signals are transmitted to the control system. The parameters for compaction are calculated in the control system and shown on the display.

1.1.3 Operation

The ACE system is particularly suitable for granular soils with low fines content.

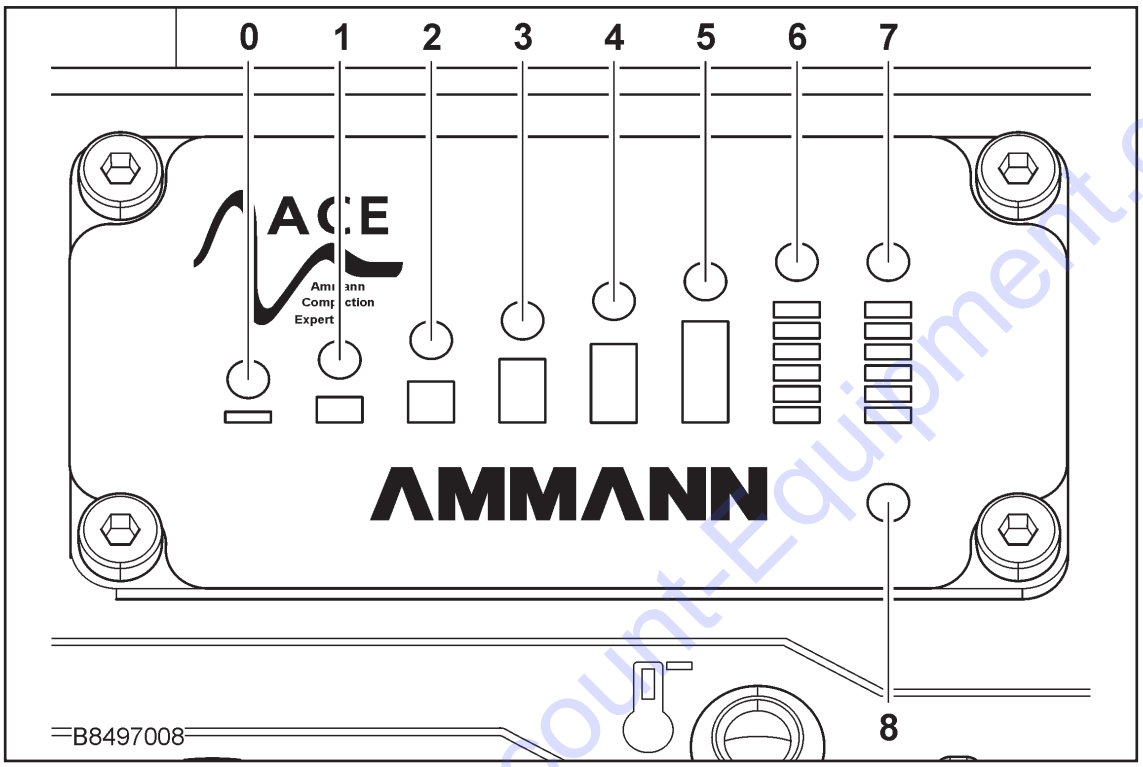
Degree of compaction and compaction quality depend on the existing ground conditions. If the maximum degree of compaction is not shown in the display despite an adequate number of transitions, check the compaction suitability of the soil and, if necessary, initiate measures to improve compaction. Due to different soil stiffness values, the maximal value cannot always be obtained.

1.2 Operation

IMPORTANT INFORMATION ABOUT THE MEASURED VALUES

♦ *Correct measured values can only be obtained when moving forward and backward at maximum speed.*

The individual operating states are displayed on the control panel as follows:



- The system starts automatically when the machine is switched on. First, the system initializes itself:
  - The status LED (8) blinks; the LEDs (0 - 7) light up one after the other from 0 to 7 and go out again.
- The status LED (8) shines after successful initialization. The system is now ready for operation.
- The LEDs show the relative compaction value as follows. The number of shining LEDs symbolically reflects the increasing compaction of the soil.

	LED							
DC	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
0 – 19 %	●							
20 – 40 %	●	●						
41 – 60 %	●	●	●					
61 – 80 %	●	●	●	●				
81 – 100 %	●	●	●	●	●			
101 – 120 %	●	●	●	●	●	●		
121 – 140 %	●	●	●	●	●	●	●	
141 – 150 %	●	●	●	●	●	●	●	●

● → red

DC → Degree of compaction

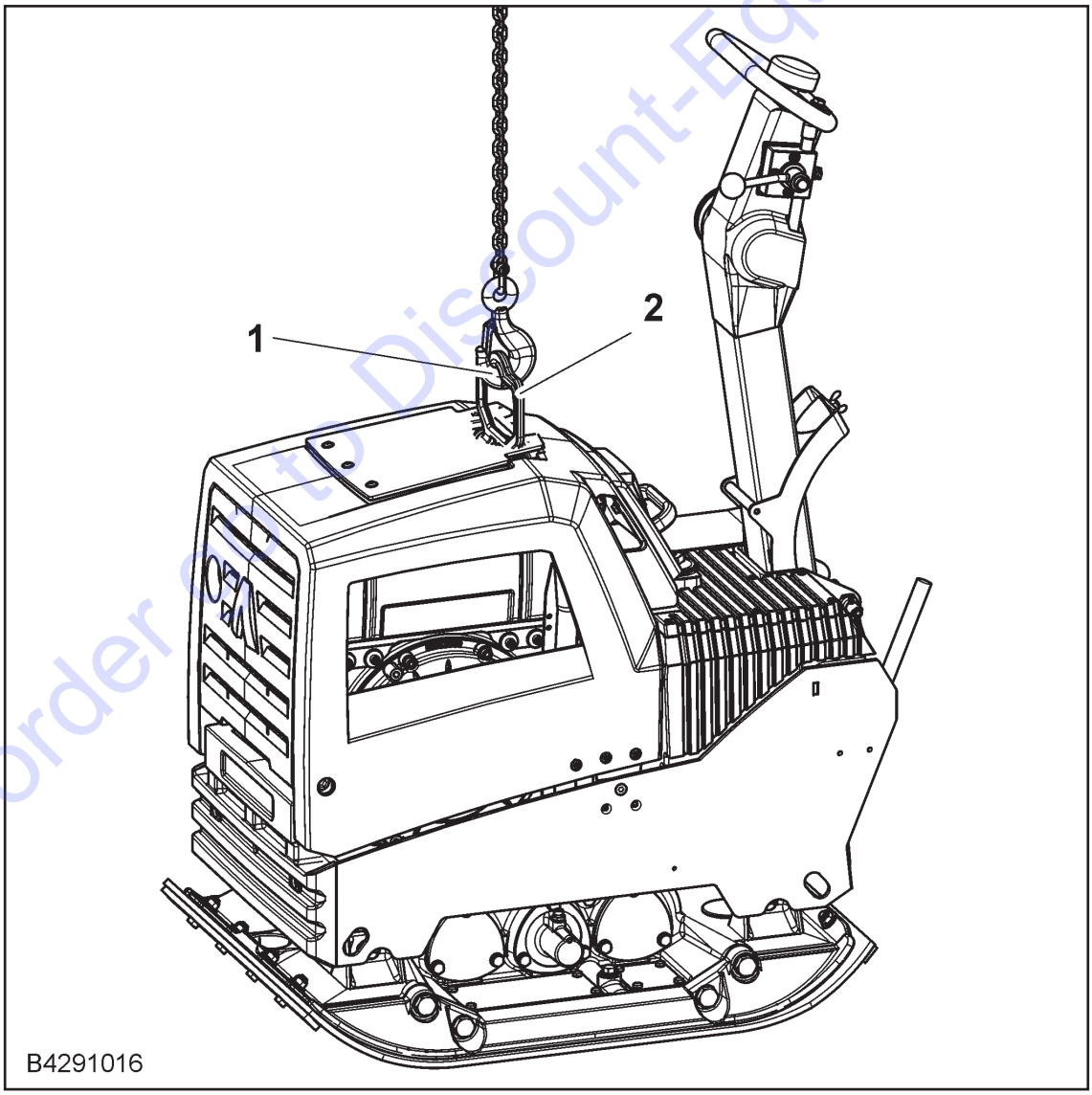
- The vibration frequency is too high or too low when the status LED shines steadily and the 0 LED is blinking. A measured value cannot be calculated.
- There is a malfunction in the measuring system when LED 0 shines steadily and the status LED is blinking. Contact Discount-equipmente in this case.

1.1. Loading and transporting

DANGER!	
	**Danger to life from a suspended load!** The machine has a heavy dead weight. The machine can drop and cause serious injuries if it is not lifted and transported properly. ♦ Persons must never - step under a suspended load. - stay under a suspended load! - ride on a suspended load. ♦ Ensure that nobody can be injured! ♦ To load the machine on a vehicle, use only stable loading ramps that are able to support the weight. ♦ Prior to using the suspension points (brackets, lifting lugs), check them for damage and wear. Replace damaged parts immediately. ♦ Secure the machine against rolling, slipping and tilting. ♦ Always use the suspension points provided to load, lash and lift the machine. ♦ Lock the drawbar after loading.

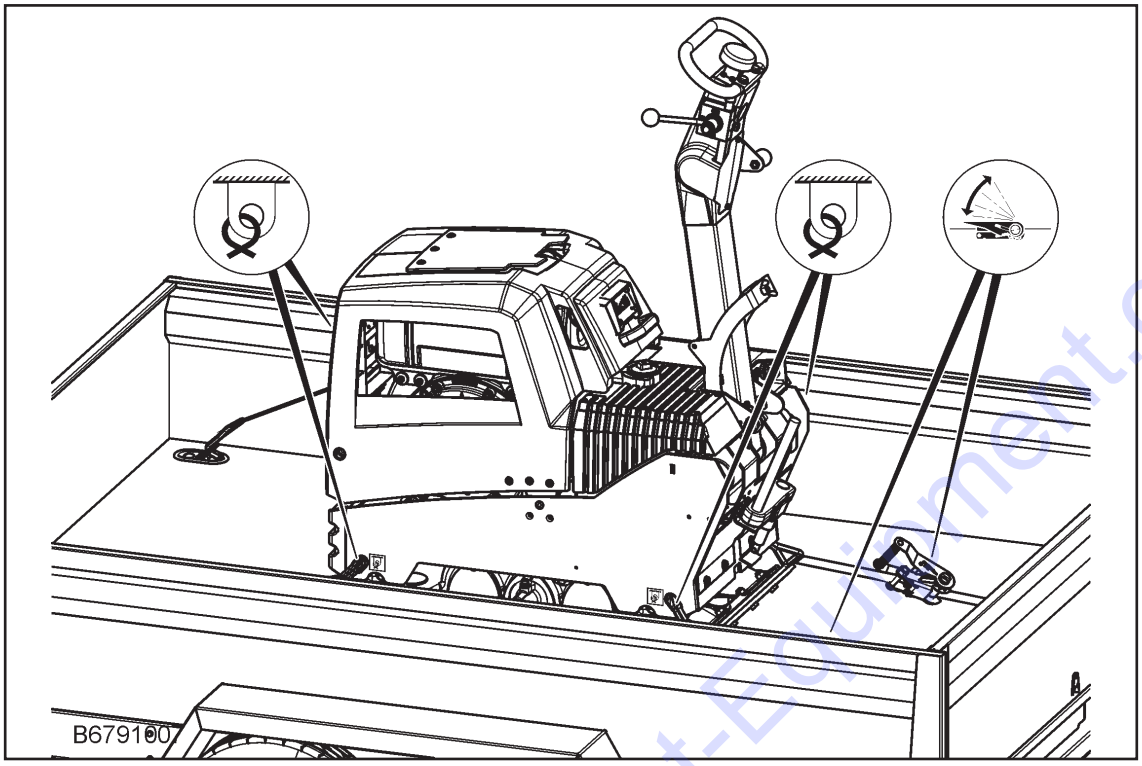
Use the following procedure to transport the machine or to lift it with a crane:

1. Lock the drawbar (see chapter „DANGER!“on page 33)



2. Engage the crane hook **(1)** in the central point suspension **(2)**.

3. Load the machine on the transport vehicle.
4. Disengage the crane hook from the central point suspension.



5. Using lashing straps, secure the machine to the transport lugs and arrange the load correctly.
6. Release the transport locks at the destination.
7. Engage the crane hook in the central point suspension.
8. Using a crane, lift and unload the machine.
9. Put the machine down on a level surface and prepare it for operation (see chapter „4.3 Before startup“ on Page 13).

✓ The transportation of the machine is completed.

1.1 General information

Thorough maintenance:

- ⇨ Longer service life.
- ⇨ Greater functional safety.
- ⇨ Shorter downtimes.
- ⇨ Higher reliability.
- ⇨ Lower repair costs.

- **Observe the safety regulations!**
- **Perform maintenance work only when the engine is switched off.**
- **Disconnect the spark plug connector before you start maintenance work.**
- **Clean engine and machine before you start maintenance work.**
- **Park the machine on a level surface. Secure it against rolling away and slipping.**
- **Ensure safe and environmentally compatible disposal of operating fluids and replacement parts.**
- **Avoid short circuits on live cables at all costs.**
- **Never spray directly on electrical components when you clean the machine with a high-pressure water jet.**
- **After washing, use compressed air to blow the components dry to avoid leakage currents.**

1.2 Maintenance overview

Intervals / Work	Daily	20 h	50 h	100 h	250 h	400 h	as re-quired
Cleaning the machine	•						
Checking the engine oil level[1)]	•						
Changing the engine oil[1)]		•[3)]			•		
Changing the engine oil filter[1)]		•[3)]			•		
Checking, cleaning the air filter[1)]	•						
Changing the air filter insert[1)]			•		•		•
Checking the intake openings[1)]	•						
Emptying the water separator (fuel tank)[1)]		•					
Changing the fuel filter[1)]					•		
Checking the tappet clearance[1)]		•[3)]			•		
Exciter: Checking the oil level			•				
Exciter: Changing the oil[2)]				•[3)]	•		
Replacing the shifting piston seal					•		
Checking the hydraulic oil level	•						
Changing the hydraulic oil[2)]					•[3)]	•	
Changing the return filter element[2)]		•[3)]			•		
Changing the breather filter[2)]					•[3)]	•	
Cleaning the intake opening at the cyclone pre-separator[1)2)]					•[3)]	•	
Checking the hydraulic hose lines				•			
Checking the rubber buffers				•			
Checking the screw connections for tight seat		•[3)]		•			

[1)]Observe engine operating instructions.
[2)]At least 1x yearly.
[3)]First time.

Prohibition crane hook Prohibition crane hook Prohibition crane hook

1.3 Lubrication plan

Lubrication point	Quantity	Change intervals [operating hours]	Lubricant	Order no.
1) Engine				
APH 60/85 APH 65/85	1.8 l	first time after 20 h then every 250 h	Engine oil API SG-CE SAE 10W40	2-80601100
2) Exciter				
APH 60/85 APH 65/85	1.8 l	first time after 100 h then every 250 h or 1x yearly	Gear oil to JDM J20C	2-80601110
3) Hydraulic system				
APH 60/85 APH 65/85	1.8 l	first time after 250 h then every 1000 h	Hydr. oil HVLP 46	2-80601070
4) Return flow filter				
APH 60/85 APH 65/85	--	first time after 20 h then every 250 h	--	2-80199160
5) Breather filter				
APH 60/85 APH 65/85	--	upon each hydraulic oil change	--	2-80199153
6) Cleaning suction filter				
APH 60/85 APH 65/85	--	upon each hydraulic oil change	--	2-80226327

1.4 Company-alternative lubricant table

	Engine oil API SG-CE SAE 10W40	Engine oil API SJ-CE SAE 10W30	Gear oil to JDM J20C	Spec. hydr. oil ISO-VG 32	Hydr. oil HVLP 46	ATF oil
ARAL	Extra Turboral SAE 10W40	-----	Fluid HGS	Vitam GF 32	Vitam HF 46	ATF 22
BP	Vanellus C6 Global Plus SAE 10W40	-----	Hydraulic TF-JD	Energol HLP-HM 32	Bartran HV 46	Autran MBX
CASTROL	Tection SAE 10W40	Castrol Power 1 Racing 4T 10W-30	Agri Trans Plus	Hyspin SP 32	Hyspin AVH-M 46	TQ-D
ESSO	Ultra 10W40	-----	Torque Fluid 56	Univis N 32	Univis N 46	ATF 21611 II-D
FUCHS	Titan Unic MC	TITAN CARGO SAE 10W-30	Agrifarm UTTO MP	a) Renolin ZAF520 b) Plantohyd 32 S[2)]	Renolin B 46 HVI	Titan ATF 3000
HONDA	-----	4 Stroke Oil 10W30 API/SJ	-----	-----	-----	-----
KLEENOIL PANOLIN	-----	-----	-----	Panolin HLP Synth 322	-----	-----
LIQUI MOLY	-----	SPECIAL TEC AA 10W-30	-----	-----	-----	-----
MOBIL	Mobil Delvac MX Extra 10W40	-----	a) Mobilfluid 424 b) Mobilfluid 426	Mobil DTE 24	Univis N 46	ATF 220
SHELL	Engine Oil DG 1040	-----	Donax TD	Tellus T32	Tellus T 46	a) Donax TA b) Donax TX
TOTAL	Rubia Polytrafic 10W-40	-----	Transmission MP	Azolla ZS 32	Equivis ZS 46	Fluide ATX

[1)]Semi-synthetic low-friction oil
[2)]Biodegradable ester-based multigrade hydraulic oil; miscibility and compatibility with mineral oil-based as well as with biodegradable hydraulic oils should be tested in each individual case.
The residual mineral oil content should be reduced in accordance with VDMA standard sheet 24 569.

TAB01003EN_B&S

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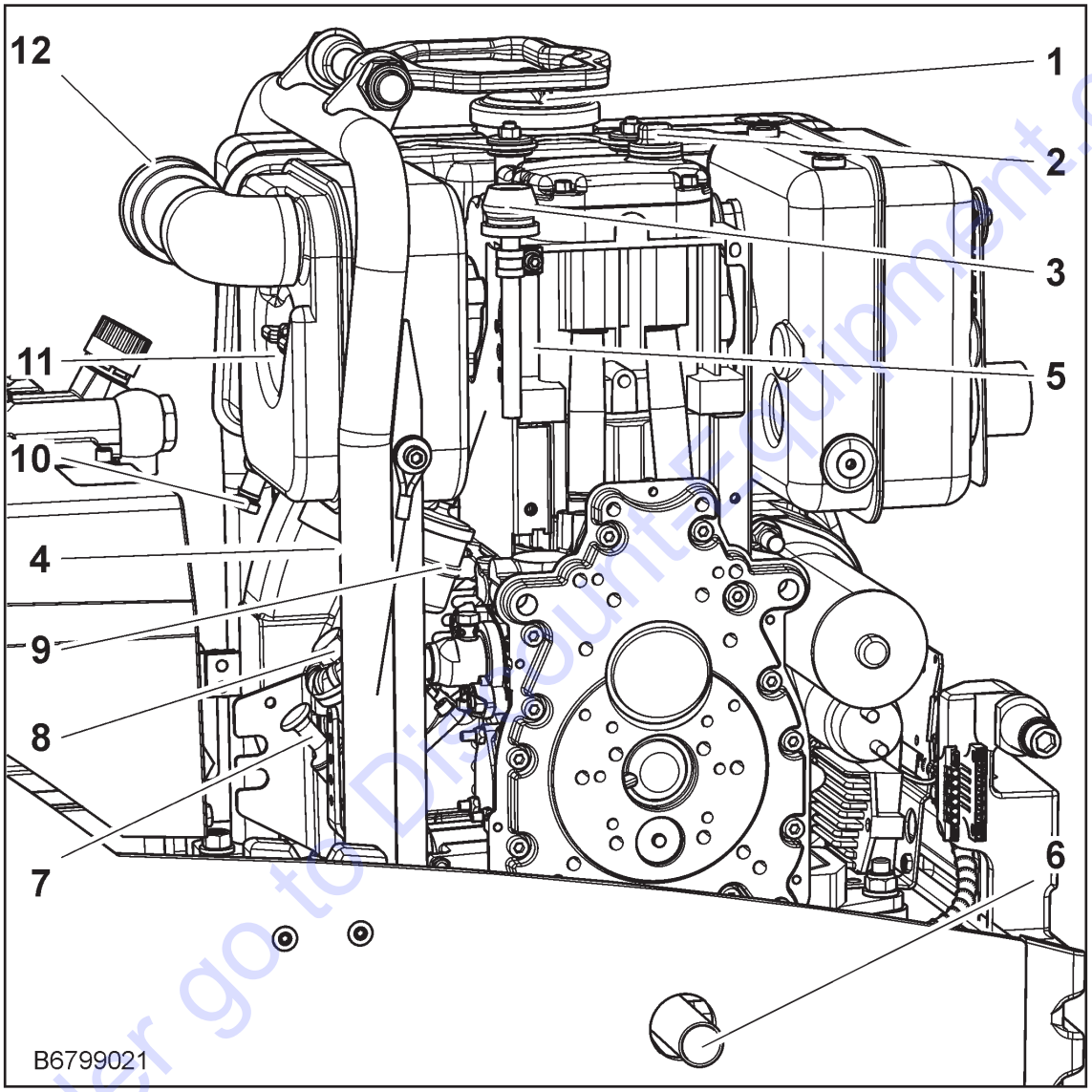
1.1 General

INFORMATION ABOUT THE DOCUMENTATION

Only the daily engine maintenance tasks are listed in these operating instructions. Please observe the operating instructions for the engine and the maintenance instructions and intervals listed there.

1.2 Overview



1 Fuel filler neck
2 Oil filler neck
3 Air filter maintenance indicator
4 Cooling air inlet
5 Cooling air outlet
6 Oil drain
7 Oil dipstick
8 Oil filter
9 Fuel filter
10 Water drain (fuel tank)
11 Air filter
12 Combustion air intake opening

1.3 Fuel system

1.3.1 Fuel

NOTE	
	***Risk of engine damage from fuel of inferior quality.*** *Using fuel that does not satisfy the specifications stated here can damage the engine.* ♦ *Use only diesel fuel that satisfies the minimum requirements ASTM D 975-09a 1-D S15 or 2-D S15.*

1.3.2 Winter fuel

At outside temperatures below 0 °C use winter fuel or add proper additives in time:

Lowest ambient temperature at start		Additive content [%] at	
		Summer fuel	Winter fuel
0 to -10 °C	32 to 14 °F	20	
-10 to -15 °C	14 to 5 °F	30	
-15 to -20 °C	5 to - 4 °F	50	20
-20 to -30 °C	- 4 to -22 °F		50

1.3.3 Fuel filling volume

Machine type	Engine type	[Liter]	[US gal]
APH 60/85	HATZ 1D90E	7.0	1,849
APH 65/85	HATZ 1D90E	7.0	1,849

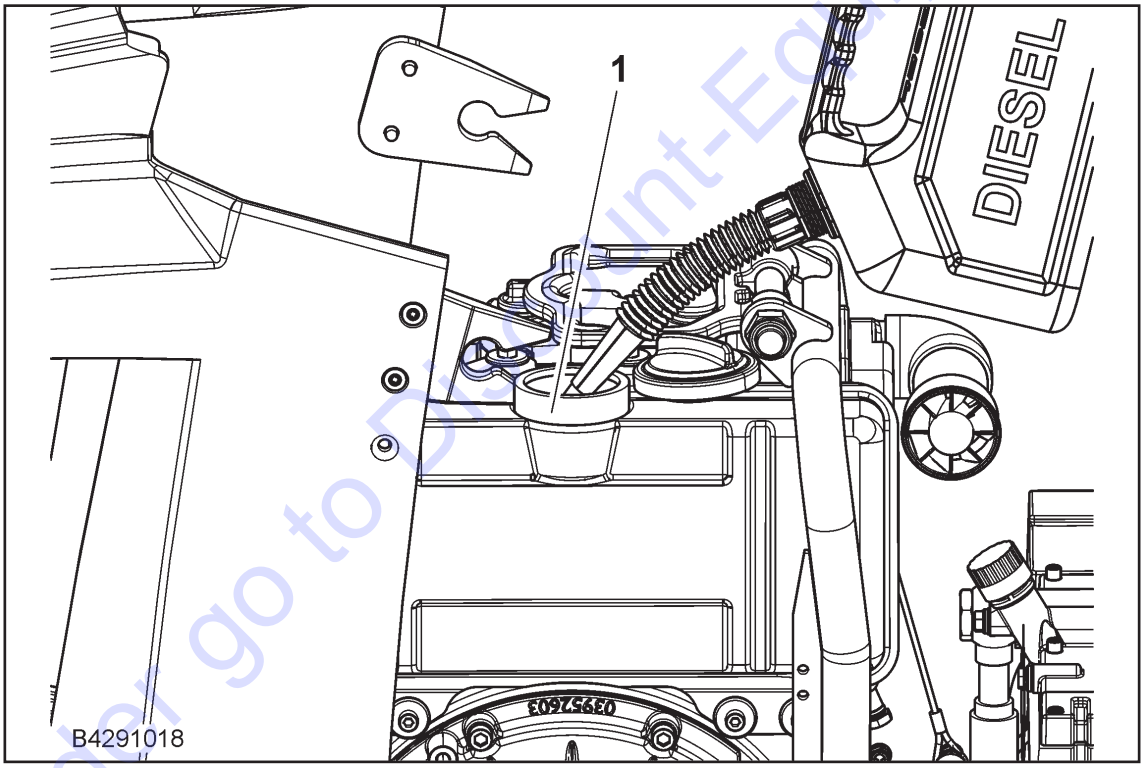
1.3.4 Checking the level, filling up fuel

WARNING!
Fire hazard from fuel. *Leaking or spilled fuel can ignite and cause serious burns.* ♦ *Refuel only when the engine is switched off.* ♦ *Never refuel in the proximity of naked flames or sparks.* ♦ *Never smoke.* ♦ *Never refuel in closed rooms.* ♦ *Do not inhale fuel vapors.*

NOTE
***Risk of* environmental pollution from spilled fuel.** ♦ *Do not overfill the fuel tank and do not spill fuel.* ♦ Collect escaping fuel and dispose of it in accordance with the local environmental regulations.

Use the following procedure to check the fuel level or to refuel:

1. Park the machine on a level solid surface.
2. Shut down the engine.



3. Clean the environment of the fuel filler neck **(1)**.
4. Open the tank cap.
5. Visually check the fuel level.
6. Top up fuel if necessary.
7. Close the tank cap firmly.

✓ Fuel level checked / refueled.

1.4 Engine oil level

1.4.1 Checking, topping up

CAUTION!	
	**Risk of burns!** There is a risk of burns when working on the hot engine. ♦ Allow the engine to cool down. ♦ Wear protective gloves.

CAUTION!	
	**Risk of injury!** Prolonged contact with engine oil can irritate the skin. ♦ Wear protective gloves. ♦ In case of skin contact, wash affected skin areas thoroughly with soap and water.

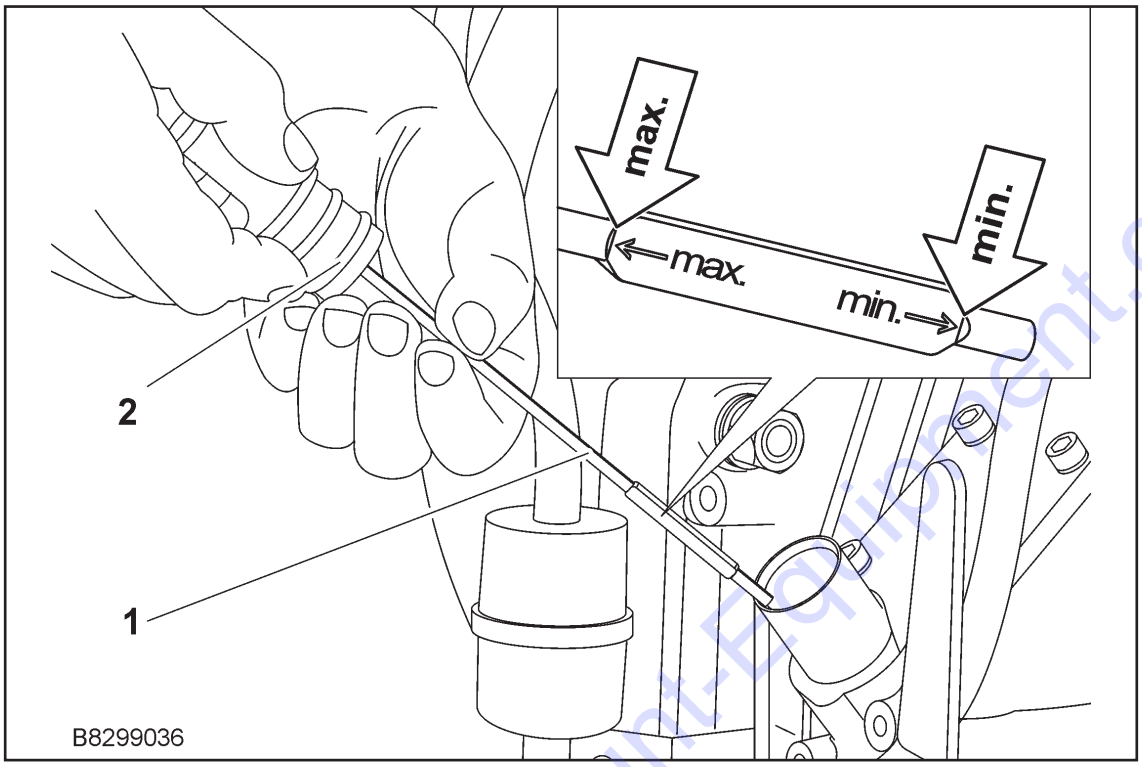
NOTE	
	***Risk of* environmental pollution from operating fluids.** ♦ *Collect used oil and dispose of it in an environmentally compatible way.* ♦ *Never allow any oil to seep into the soil or the sewer system.* ♦ *Replace defective seals immediately.*

NOTE	
	***Risk of engine damage.*** Operating the engine with an oil level below the "Min" mark or above the "Max" mark can damage the engine. ♦ When checking the oil level, the engine must be in a horizontal position and switched off for a few minutes.

Use the following procedure to check the engine oil level or to top up engine oil:

1. Park the machine on a level solid surface.
2. Shut down the engine.

► With the engine warm, wait a few minutes to allow the oil to flow back into the sump.



3. Clean the area around the dipstick.
4. Pull out the dipstick **(1)** and wipe it with a clean, lint-free cloth.
5. Check the O-ring **(2)** at the dipstick. Replace a damaged O-ring.
6. Insert the dipstick until it hits the stop and pull it out again.
7. Check the oil level.
8. If necessary, top up engine oil through the oil filler neck.

► Fill in engine oil gradually to avoid exceeding the "Max" mark. Wait for 1 ... 2 minutes. Check the oil level again and top up if necessary.

✓ Engine oil level checked / engine oil topped up.

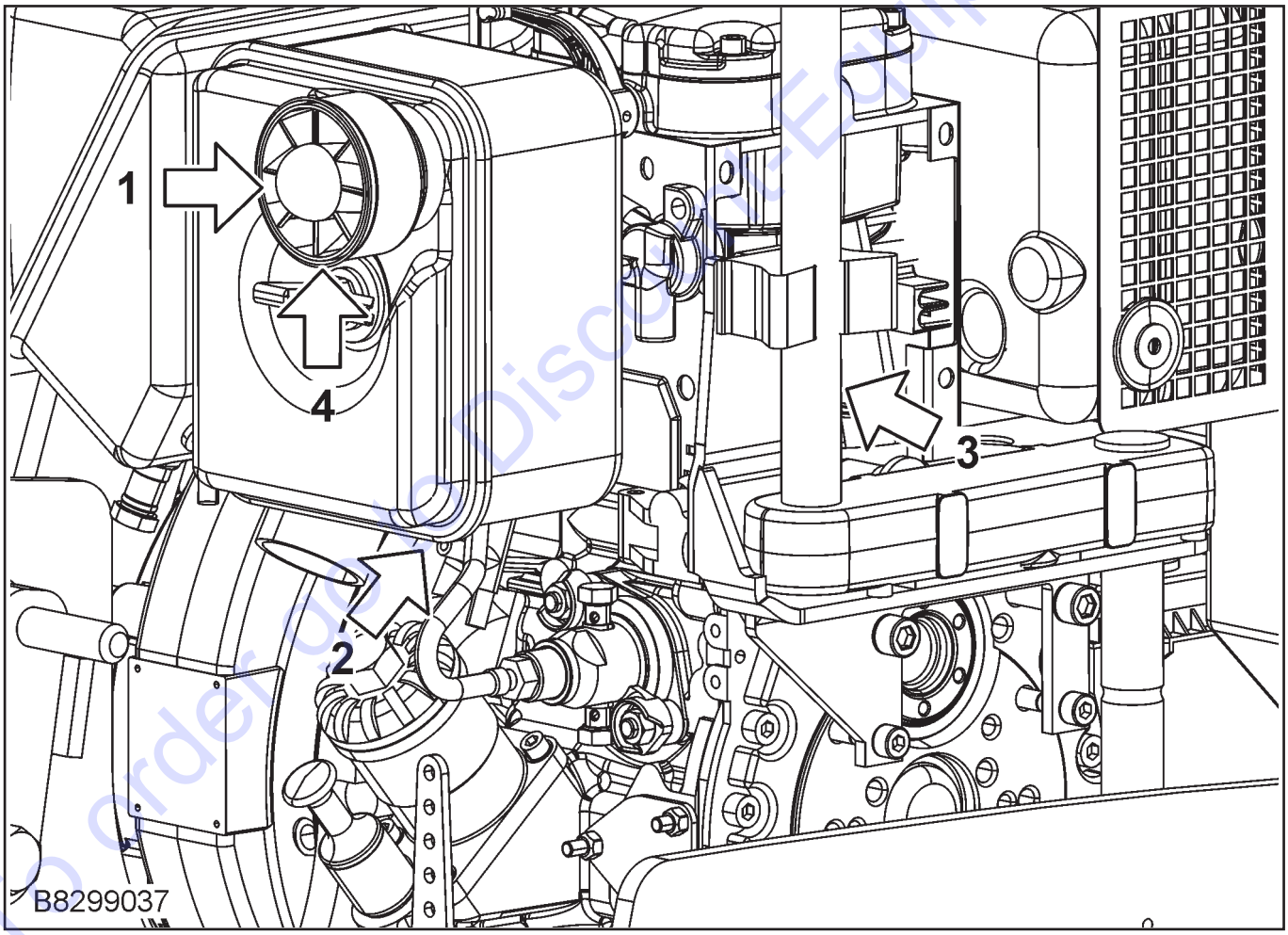
1. Maintenance (engine)

1.1 Air intake area

1.1.1 Checking the intake / cooling air openings

CAUTION!	
	**Risk of burns!** There is a risk of burns when working on the hot engine. ♦ Allow the engine to cool down. ♦ Wear protective gloves.

	**IMPORTANT INFORMATION** Shorten the maintenance intervals accordingly if contamination is heavy.



Use the following procedure to check the intake and cooling air openings:

1. Check the intake openings for combustion air **(1)** and the cooling air openings **(2) + (3)**.
2. Remove coarse dirt, such as leaves and earth.
3. Check whether the passage of the dust outlet opening **(4)** on the cyclone pre-separator is free. Clean it if necessary.

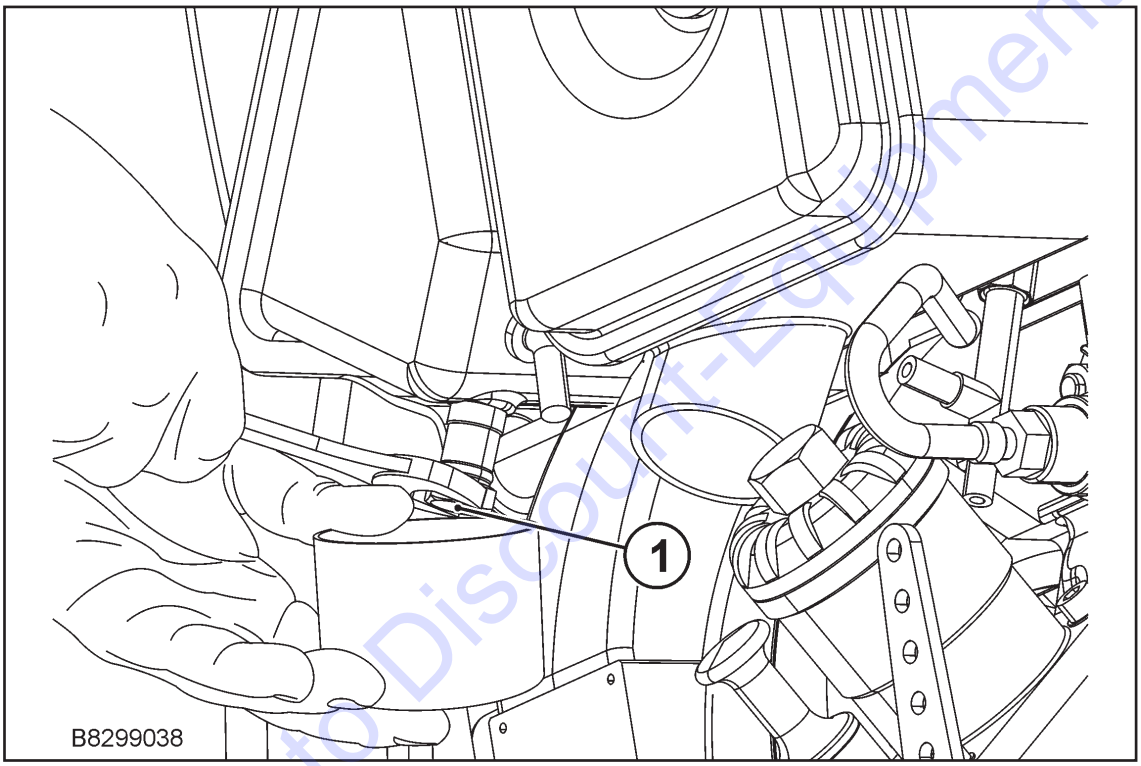
✓ Intake and cooling air openings checked.

1.1 Water separator (fuel tank)

1.1.1 Checking

NOTE	
	**Risk of environmental pollution from spilled fuel.** *There is also a small amount of fuel running out when you drain the water from the water separator.* ♦ Do not overfill the fuel tank and do not spill fuel. ♦ Collect the drained water-fuel mixture and dispose of it in accordance with the local environmental regulations.

Check the fuel tank once a week for water deposits to prevent water from getting into the injection system.



Use the following procedure to check the fuel tank for water deposits:

1. Unscrew the screw **(1)** at the water drain (fuel tank) except for one thread.
2. Collect emerging drops in a transparent container.
3. Visually check to see whether water has settled on the bottom of the container.
4. Close the screw as soon as fuel flows out.

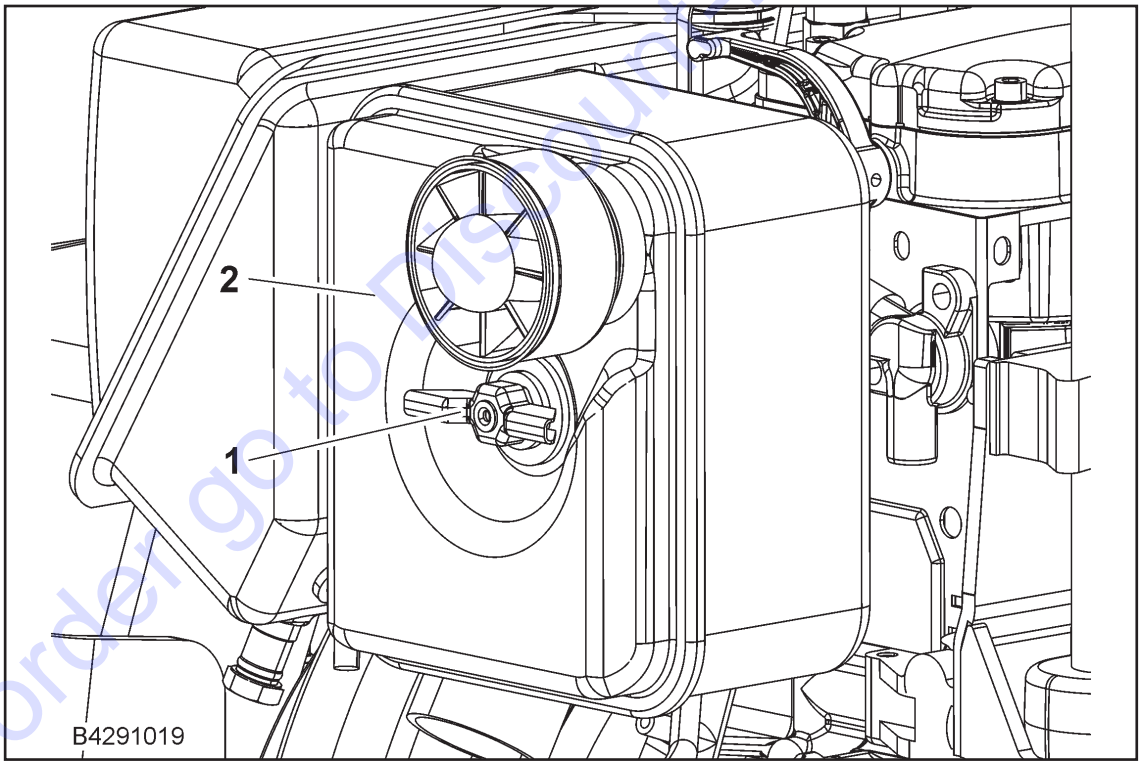
✓ Fuel tank checked for water deposits.

1.2 Air filter

1.2.1 Checking, cleaning

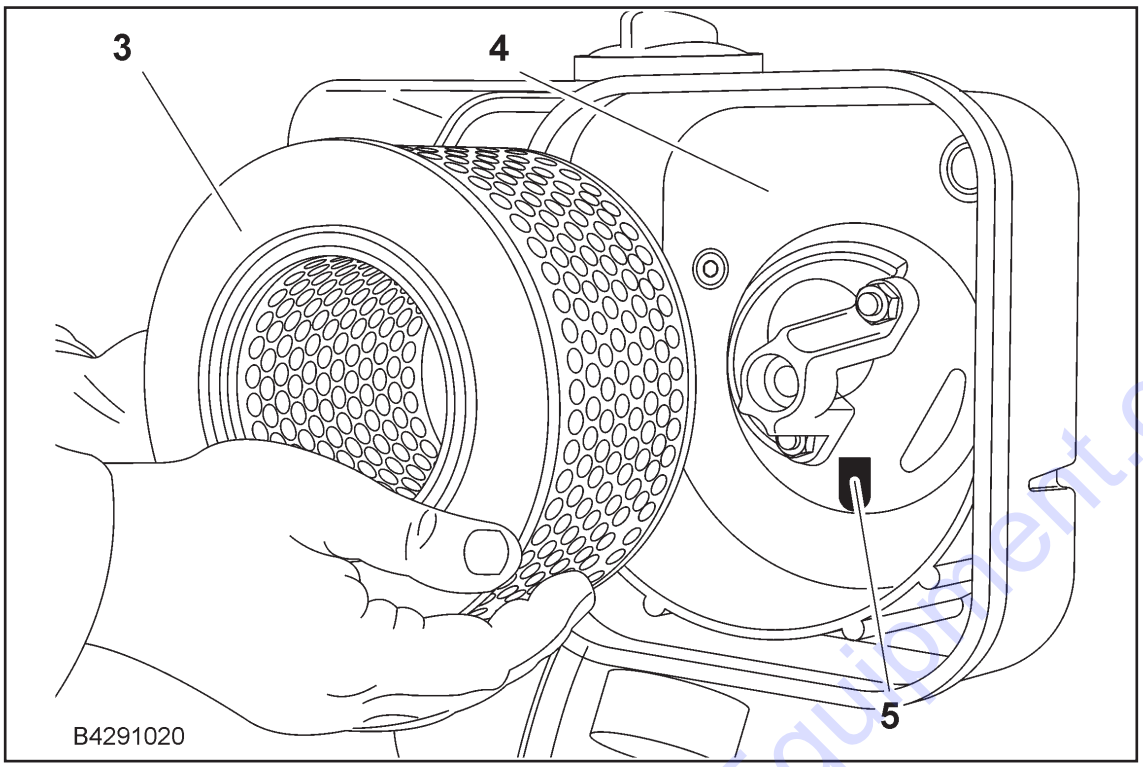
CAUTION!	
	**Risk of injury!** There is a risk of foreign bodies getting into your eyes when you work with compressed air. ♦ Wear protective goggles. ♦ Never point the compressed air jet at a person or at yourself.

NOTE	
	***Risk of engine damage from missing or malfunctioning air filter.*** ♦ *Replace the filter insert* - if there is the slightest damage in the areas of sealing surface, filter paper and filter cartridge, - if there is soot-containing precipitation, - if there is damp and oily contamination, - if the engine power decreases or the color of the exhaust gas changes, - at least once a year. ♦ *Never operate the engine without air filter insert.* ♦ *The pressure must not exceed 5 bars (500 kPa).*



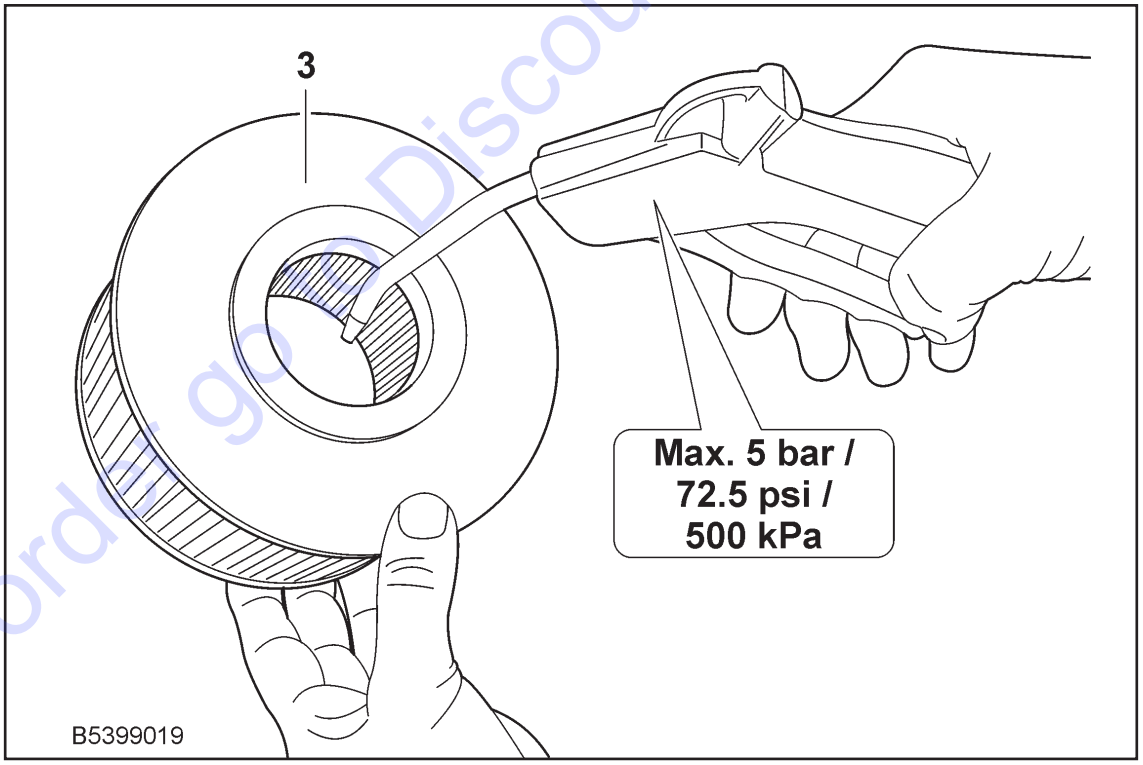
Use the following procedure to check or to clean the air filter:

1. Loosen the wing screw **(1)**.
2. Remove the filter cover **(2)**.



3. Carefully pull out the filter cartridge **(3)**.
4. Check the filter cartridge for contamination.

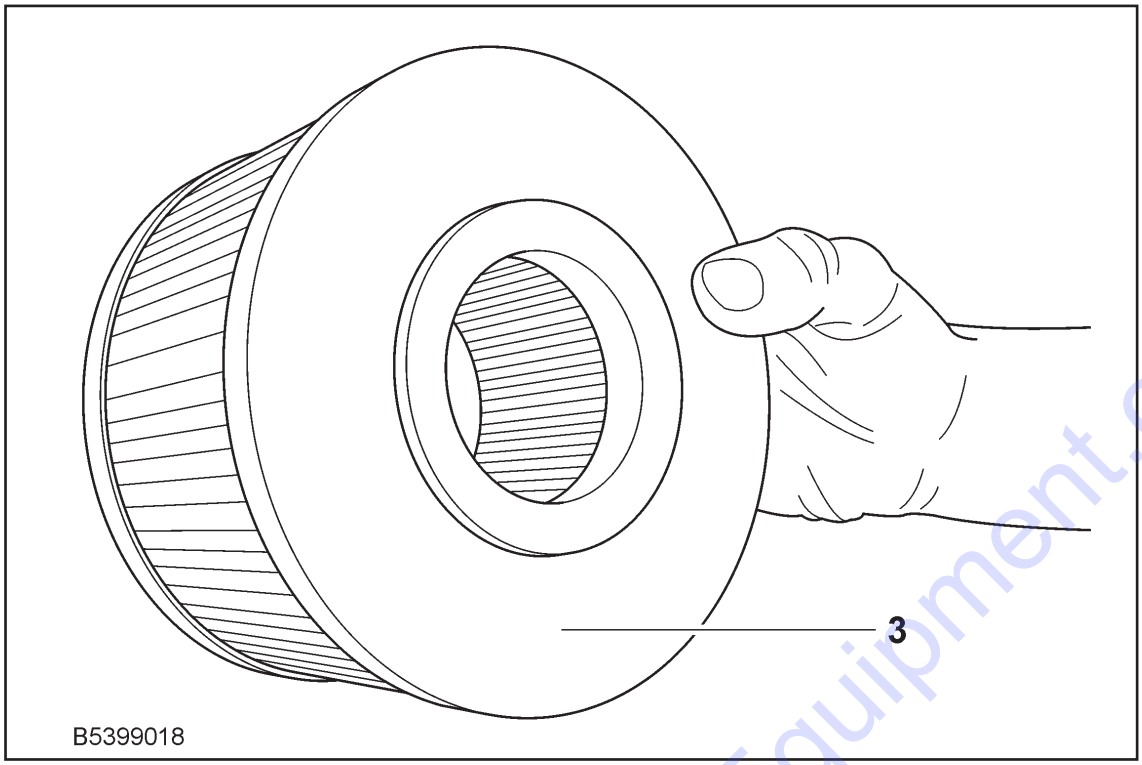
► **With dry contamination:**



4a. Using dry compressed air (max. 5 bars | 500 kPa), blow out the filter cartridge **(3)** with steady upward and downward movements until no more dust escapes.

► **With damp and oily contamination:**

4b. Replace the filter cartridge **(3)**.



5. Hold the filter cartridge at an angle against the light or let a lamp shine through it to check for cracks or other damage.

► Replace the filter cartridge if there are any cracks or other damage.

6. Clean filter cover **(2)** and filter housing **(4)**.
7. Check state and cleanliness of the valve lamella in the air filter maintenance indicator **(5)**.
8. Carefully insert the filter cartridge.
9. Mount the filter cover.

✓ Air filter checked / cleaned.

1.1 Cleaning

⚠ WARNING!

Fire and explosion hazard due to flammable substances.

Flammable substances can cause serious burns.

- Never use naphtha or cleaning solutions with a low flash point for cleaning.
- Never use flammable or aggressive substances for cleaning.

NOTE

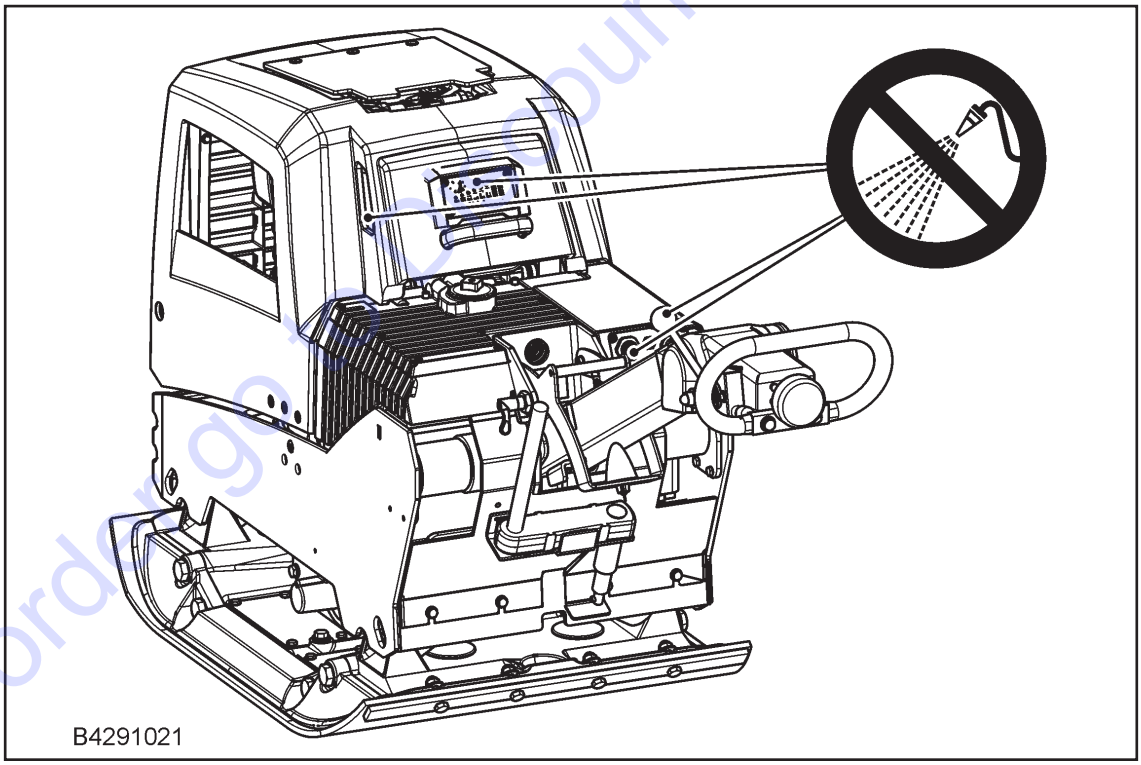
Risk of environmental pollution from spilled cleaning agents.

- *To avoid any contamination of soil and ground water, clean the machine only at a workplace with a collection system for cleaning agents.*
- *NEVER use banned cleaning agents.*

NOTE

Risk of material damage on the machine from penetrating water.

- *Ensure that the hood is closed when you wash the machine with a high-pressure cleaner.*
  - Never direct the water jet at the hood opening.
  - Never spray water on the engine or the engine control unit.
  - Never spray water on electrical components.
  - Never direct the water jet directly in the air filter.
  - Leave the battery cover on the battery.



Use the following procedure to clean the machine:

1. Spray the surface of the machine with a high-pressure cleaner.

► Clean the machine daily.

2. After cleaning, check cables, hoses, lines and screw connections for leaks, loose connections, chafing points and other damage.

► Eliminate any detected defects immediately.

✓ Machine cleaned.

1.2 Screw connections

IMPORTANT INFORMATION
Replace self-locking nuts after each disassembly.

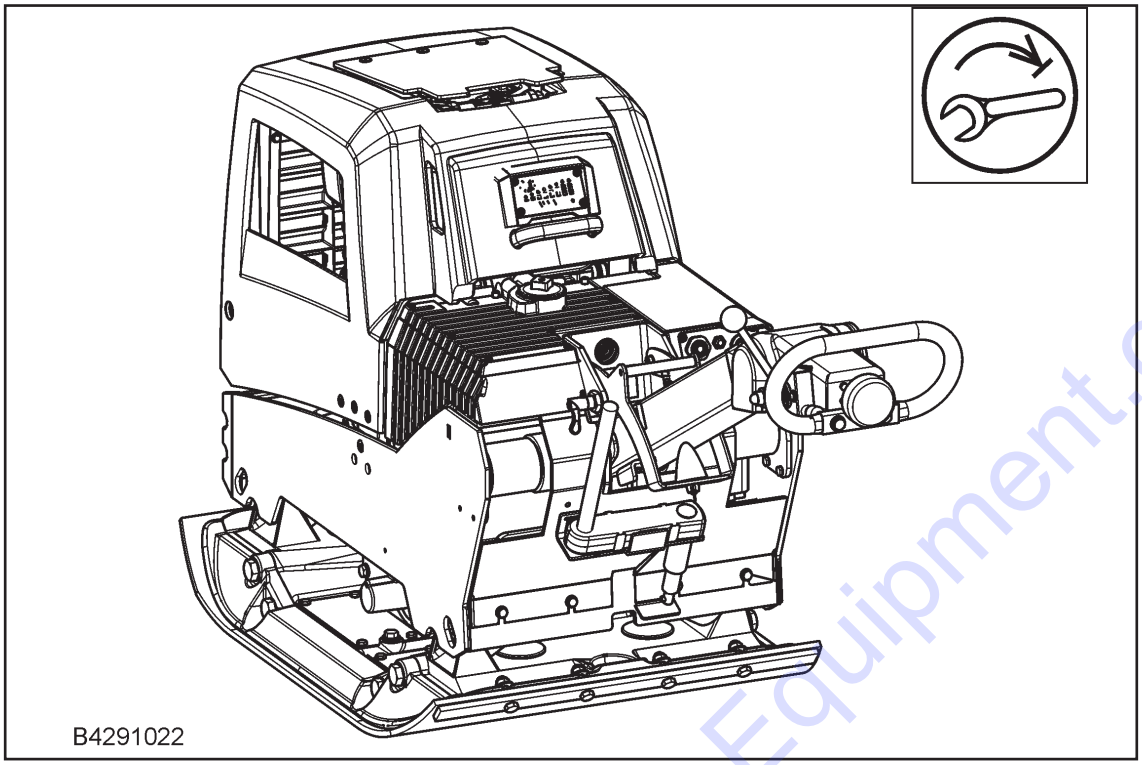
1.2.1 Tightening torques

Ø	8.8		10.9		12.9	
	Nm	ft lb	Nm	ft lb	Nm	ft lb
M 4	3	2	4,4	3	5	4
M 5	6	4	8,7	6	10	7
M 6	10	7	15	11	18	13
M 8	25	18	36	26	43	31
M 10	49	36	72	53	84	61
M 12	85	62	125	92	145	106
M 14	135	99	200	147	235	173
M 16	210	154	310	228	365	269
M 18	300	221	430	317	500	368
M 20	425	313	610	449	710	523
M 22	580	427	830	612	970	715
M 24	730	538	1050	774	1220	899
M 27	1050	774	1480	1092	1774	1308
M 30	1420	1047	2010	1482	2400	1770

TAB01001.cdr

- Property classes for bolts with untreated, unlubricated surface.
- The values result in a 90% utilization of the yield strength; with a coefficient of friction μ_{total} = 0.14.
- Adherence to the tightening torques is checked with a torque wrench.
- The specified values are not valid when MoS2 lubricant is used.

1.2.2 Checking the screw connections



Checking the tight seat of the screw connections at intervals (see: „7.2 Maintenance overview“on page 36) is essential for vibrating equipment.

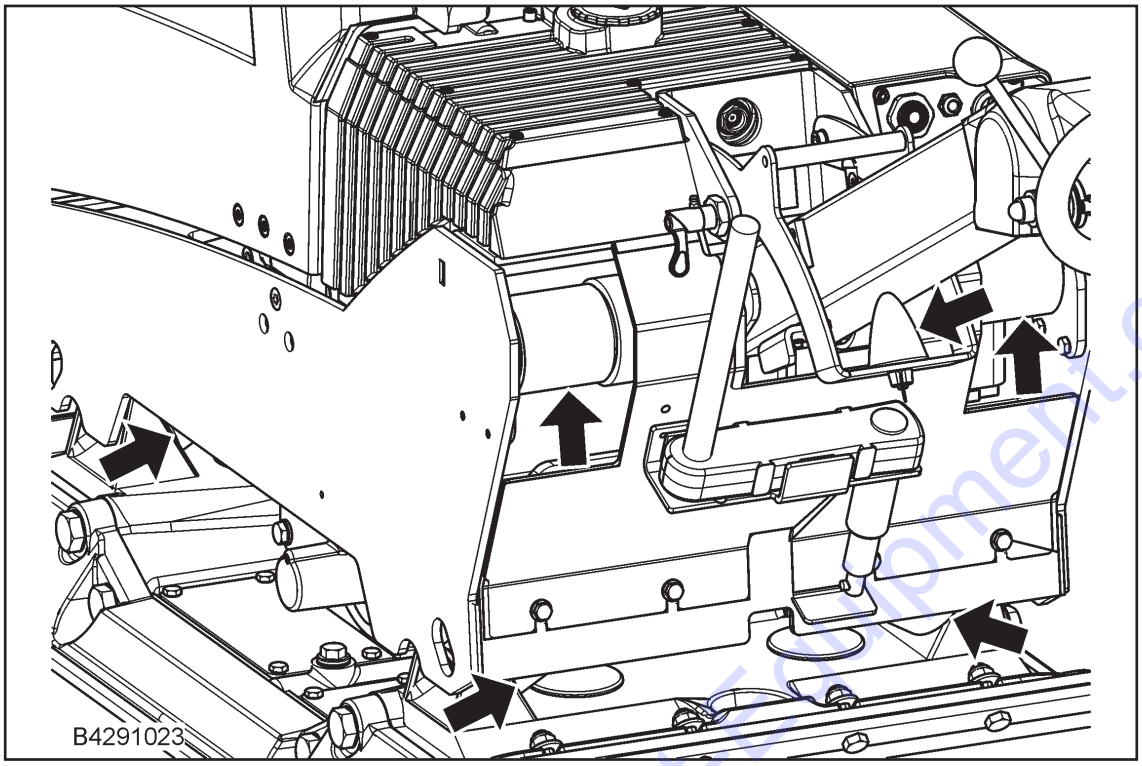
To do this, use the following procedure:

1. Check the tight seat of all screw connections.
2. Retighten the screw connections if necessary.

► Observe the tightening torques.

✓ Screw connections checked.

1.3 Checking the rubber buffers



Use the following procedure to check the rubber buffers:

1. Check the locations with rubber buffers for:

- Cracks and chipping as well as
- tight fit.

► Replace damaged rubber buffers immediately.

✓ Rubber buffers checked.

1.4 Exciter

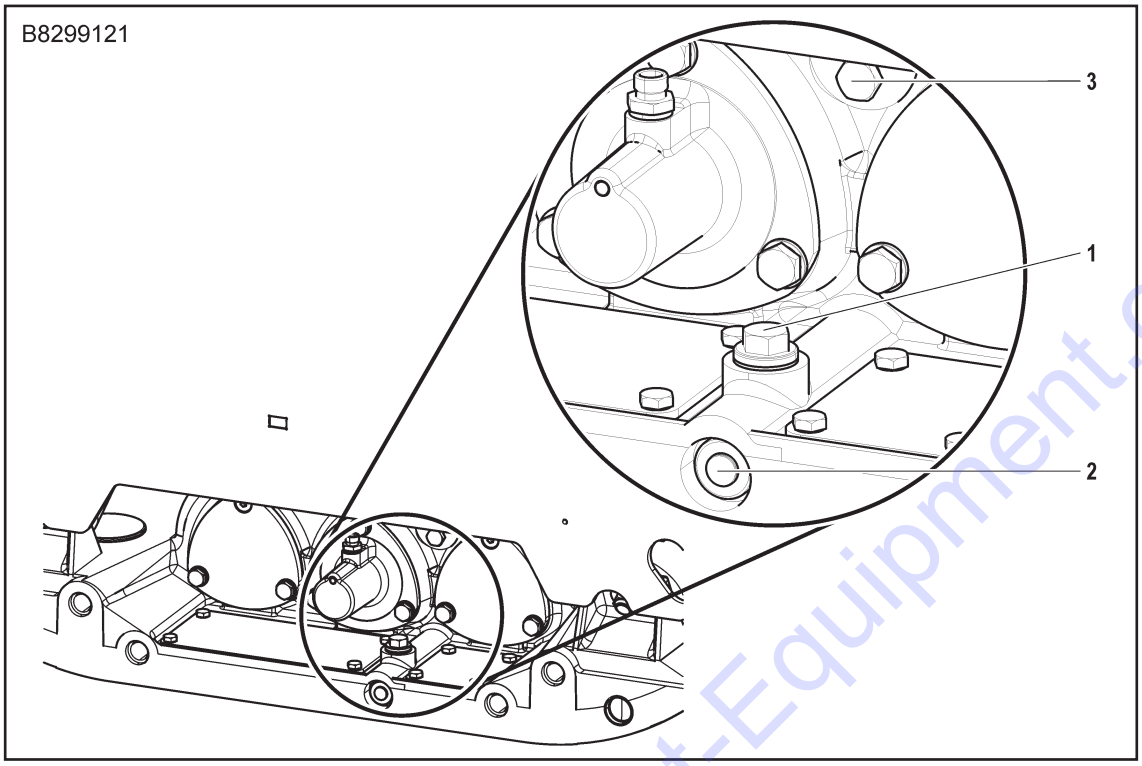
CAUTION!	
	**Risk of burns from hot oil.** When working on the exciter, there is a risk of burns from hot oil. ♦ Wear protective gloves. ♦ Open the oil drain plug slowly and carefully to release the pressure.

NOTE	
	***Risk of environmental pollution from operating fluids.*** ♦ *Collect used oil and dispose of it in an environmentally compatible way.* ♦ *Never allow any oil to seep into the soil or the sewer system.*

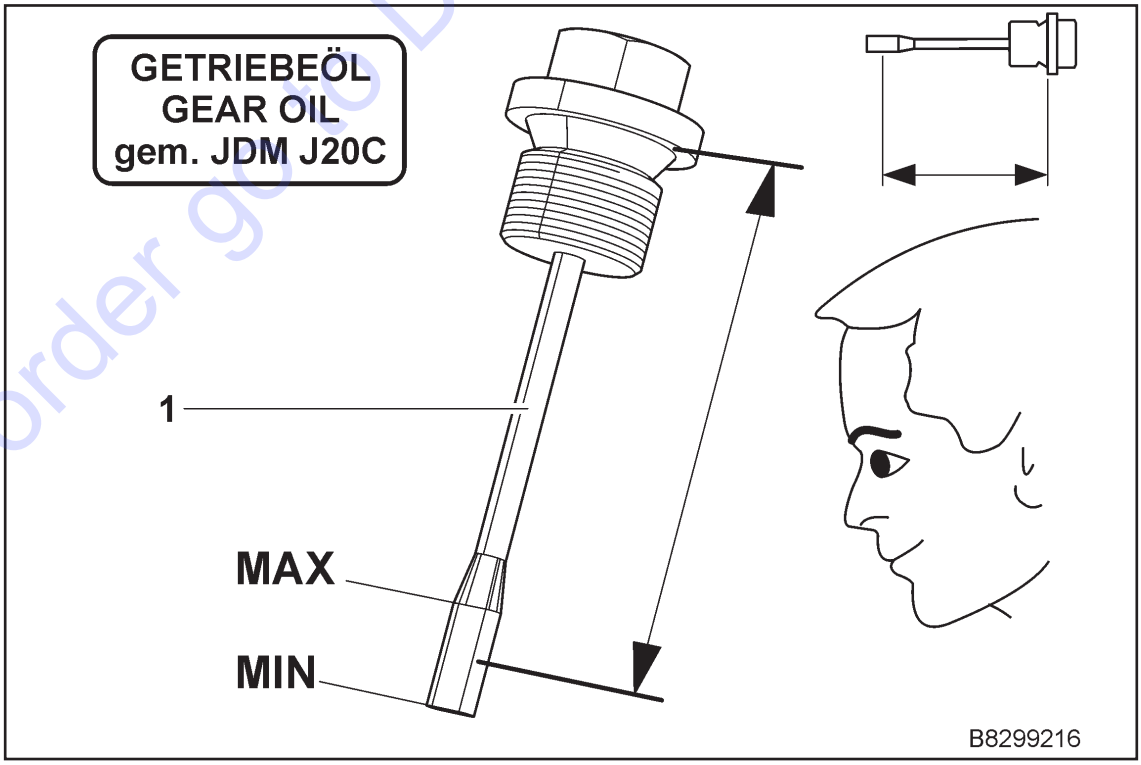
	**IMPORTANT INFORMATION** ♦ *Change the oil when the gear oil is warm.* ♦ *With the dipstick screwed in, the optimal oil level should be between the marks "MIN" and " MAX".*

1.4.1 Oil level / oil change

Use the following procedure to check the oil level:



1. Unscrew the vent screw **(3)** to release the pressure.
2. Unscrew the oil filler plug/dipstick **(1)**.
3. Check the oil level.
4. Top up oil if necessary.
5. Screw in the oil filler plug/dipstick **(1)**.
6. Oil level checked.



Use the following procedure to change the oil at the exciter:

1. Unscrew the vent screw **(3)** to release the pressure.
2. Unscrew the oil filler plug/dipstick **(1)** and the oil drain plug **(2)**.

► Allow the used oil to drain into a container, and dispose of it in accordance with the local regulations.

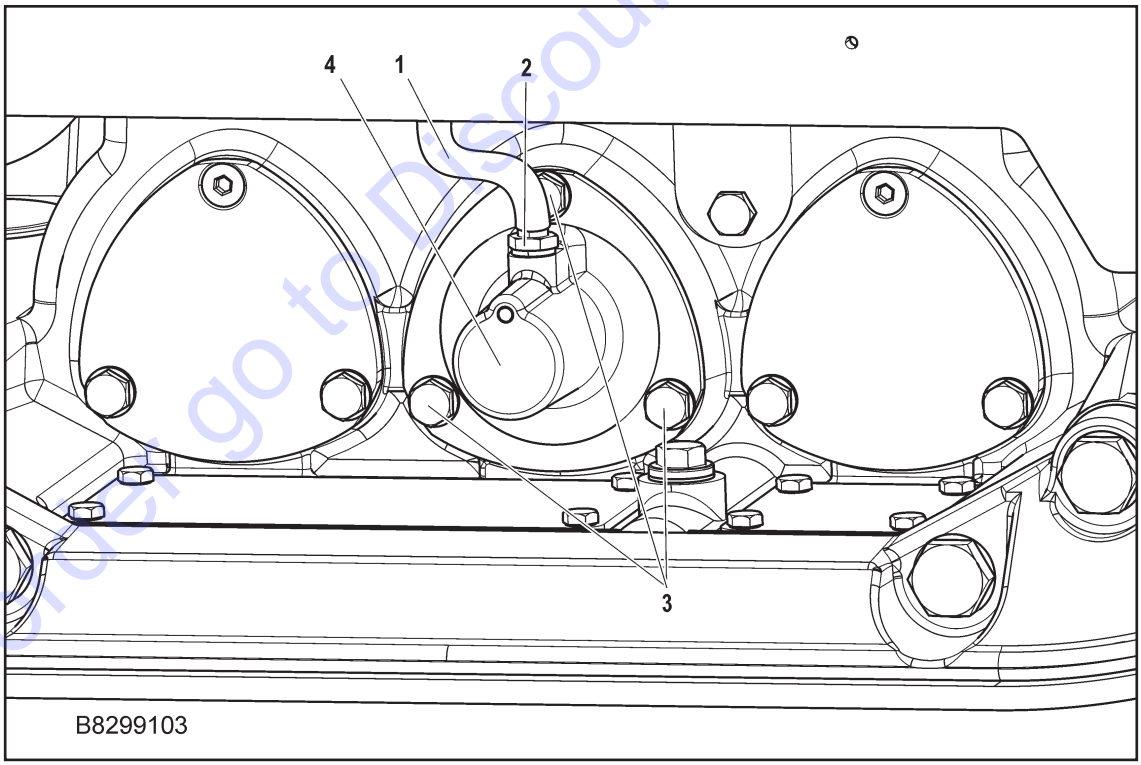
3. Screw the oil drain plug **(2)** back in.
4. Fill in fresh oil through the oil filler hole **(1)**. Oil volume and grade (see 7.3 Lubrication plan).
5. Screw the oil filler plug/dipstick **(1)** and the vent screw **(3)** back in.
6. Unscrew the oil filler plug/dipstick **(1)**.
7. Check the oil level again. Top up oil if necessary.

✓ Oil at exciter changed.

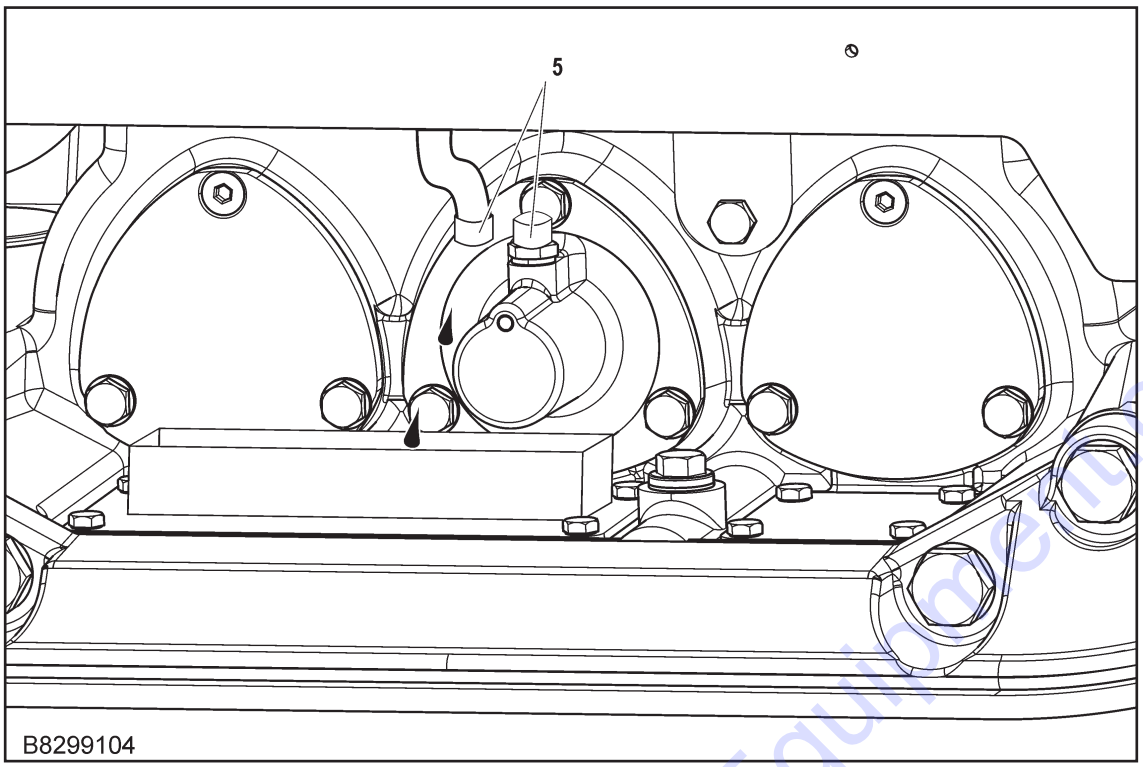
1.1.1 Changing shifting piston seal and shifting piston bearing

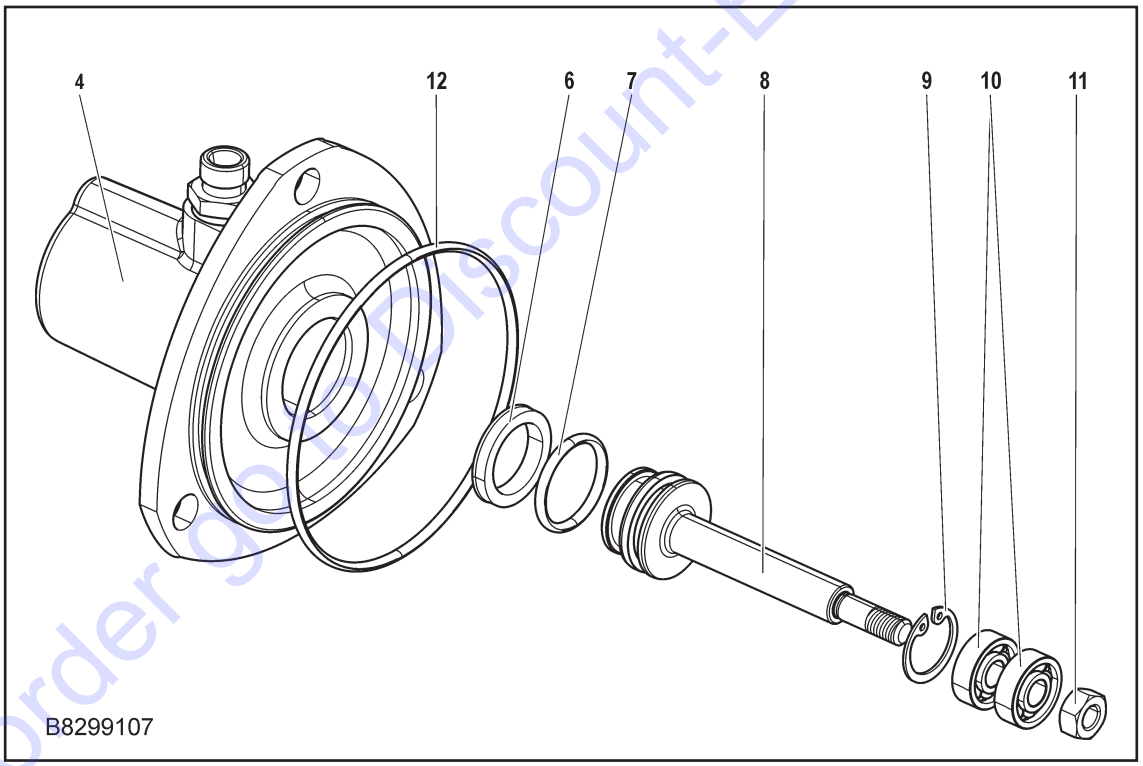
NOTE	
	***Risk of environmental pollution from operating fluids.*** ♦ *Collect used oil and dispose of it in an environmentally compatible way.* ♦ *Never allow any oil to seep into the soil or the sewer system.*

	**IMPORTANT INFORMATION** ♦ *Perform the procedure always on both sides.*



1 Hydraulic oil line
2 Oil connection
3 Screws
4 Piston cover
5 Caps

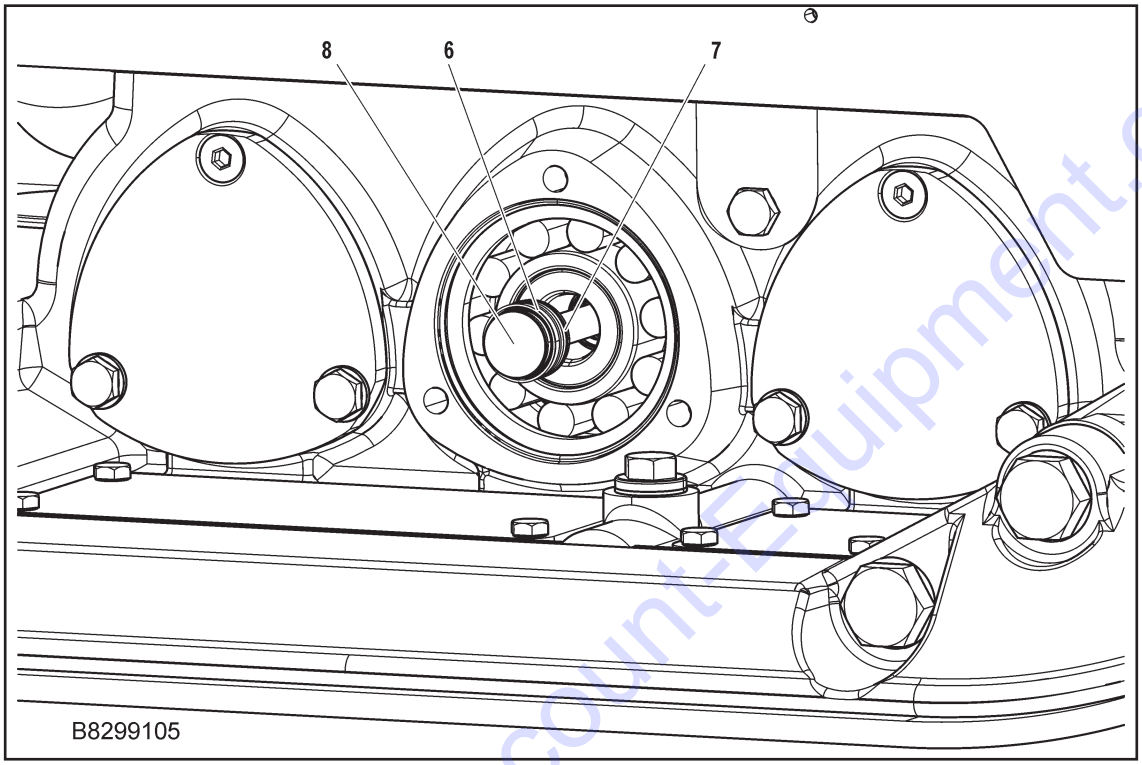




6 Seal
7 O-ring
8 Shifting piston
9 Retaining ring
10 Bearing
11 Nut
12 Seal

Use the following procedure to change the shifting piston seal:

1. Place the oil collection container under the shifting piston.
2. Unscrew the hydraulic oil line **(1)** from the piston cover.
3. Secure the caps **(5)** on oil connection **(2)** and hydraulic oil line **(1)**.
4. Loosen the screws **(3)**.
5. Unscrew the screws **(3)**.
6. Remove the piston cover **(4)**.



7. Remove seal **(6)** and O-ring **(7)**.
8. Install a new O-ring **(7)** and a new seal **(6)**.

✓ Shifting piston seal changed.

Use the following procedure to change the shifting piston bearing:

9. Remove the retaining ring **(9)**.
10. Pull out the shifting piston **(8)**.
11. Unscrew the nut **(11)**.
12. Pull off the bearing **(10)**
13. Mount a new bearing **(10)**.
14. Tighten the nut **(11)**.
15. Push in the shifting piston **(8)**.
16. Mount the retaining ring **(9)**.

✓ Shifting piston bearing changed.

17. Replace the seal **(12)** of the piston cover **(4)** .
18. Mount the piston cover **(4)**.
19. Screw in the screws **(3)** with washers.
20. Tighten the screws **(3)**.
21. Remove the caps **(5)** from oil connection **(2)** and hydraulic oil line **(1)**.
22. Screw the hydraulic oil line **(1)** on the oil connection **(2)** on the shifting piston.

✓ Shifting piston seal and shifting piston bearing changed.

1.1 Hydraulic system

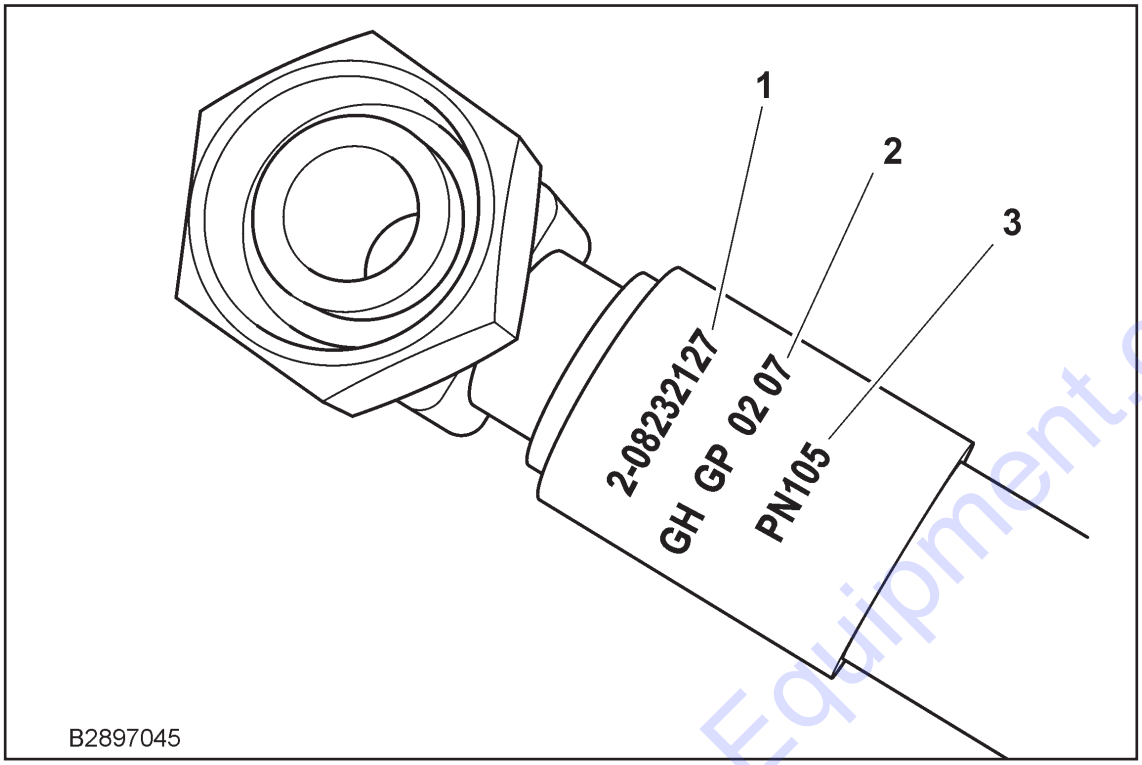
WARNING!	
	**Risk of injury from hydraulic fluid escaping under high pressure.** Hydraulic fluid escaping under high pressure can penetrate the body through the skin and cause serious injuries. ♦ Depressurize the system before you start working on the hydraulic system. ♦ Contact a qualified specialist workshop immediately if you suspect a pressure system to be damaged.

CAUTION!	
	**Risk of burns from hot oil.** When working on the hydraulic system, there is a risk of burns from hot oil. ♦ Wear protective gloves.

NOTE	
	***Risk of environmental pollution from operating fluids.*** ♦ *Collect used oil and dispose of it in an environmentally compatible way.* ♦ *Never allow any oil to seep into the soil or the sewer system.*

	**IMPORTANT INFORMATION** ♦ *Change the hydraulic oil when the oil is warm and in accordance with the lubrication plan and the lubricant table.* ♦ *Never start the engine when the hydraulic oil is drained.* ♦ *Change the hydraulic oil also after each major repair of the hydraulic system.* ♦ *Replace damaged seals immediately.* ♦ *Change return filter element and breather filter upon each change of the hydraulic oil.*

1.1.1 Hydraulic hose lines



1 Ammann article no.
2 Manufacturer / month and year of manufacture
3 Max. working pressure

The proper functioning of hydraulic hose lines must be checked at regular intervals (at least once a year) by an expert.

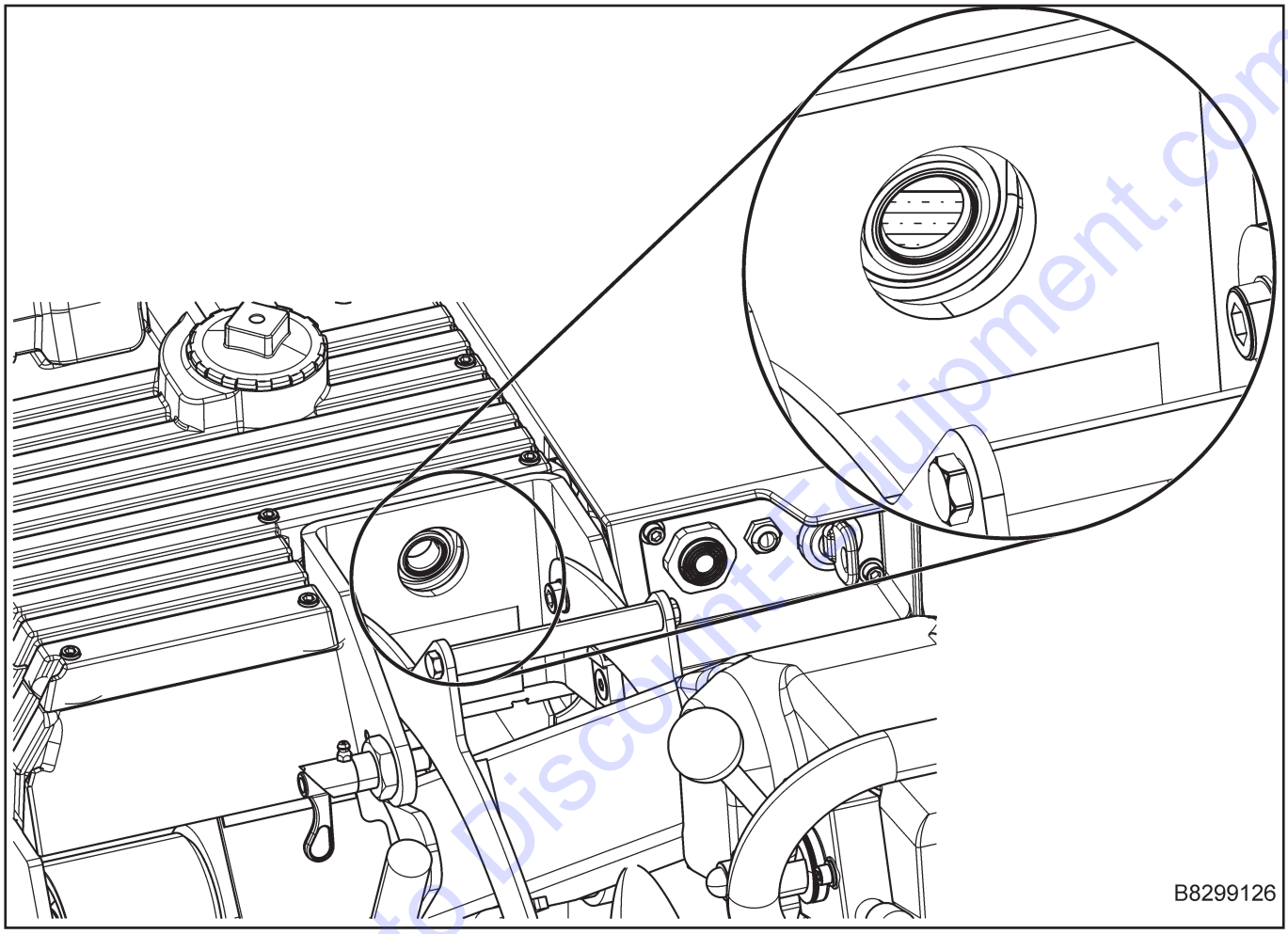
Hose lines must be replaced immediately when they show:

- Outer layer damaged down to the liner (chafing, tears, cuts, etc.).
- Embrittlement of the outer layer (cracking of the hose cover).
- Deformations that do not correspond to the natural shape of the hose line. This applies both to unpressurized and pressurized state (e.g. separation of the layers, formation or bubbles, pinched areas, kinks).
- Leaking areas.
- Damaged or deformed hose fittings (impaired sealing function).
- Hose moving out of the fitting.
- Corrosion of the fitting (reduced function and strength).
- Improper installation.
- Utilization time of max. 6 years exceeded.

1.1.2 Checking the hydraulic oil level

IMPORTANT INFORMATION

- *Check the hydraulic oil level at operating temperature.*
- *If you notice during the daily check of the hydraulic oil level that hydraulic oil is missing, immediately check all units, hoses and lines for leaks.*



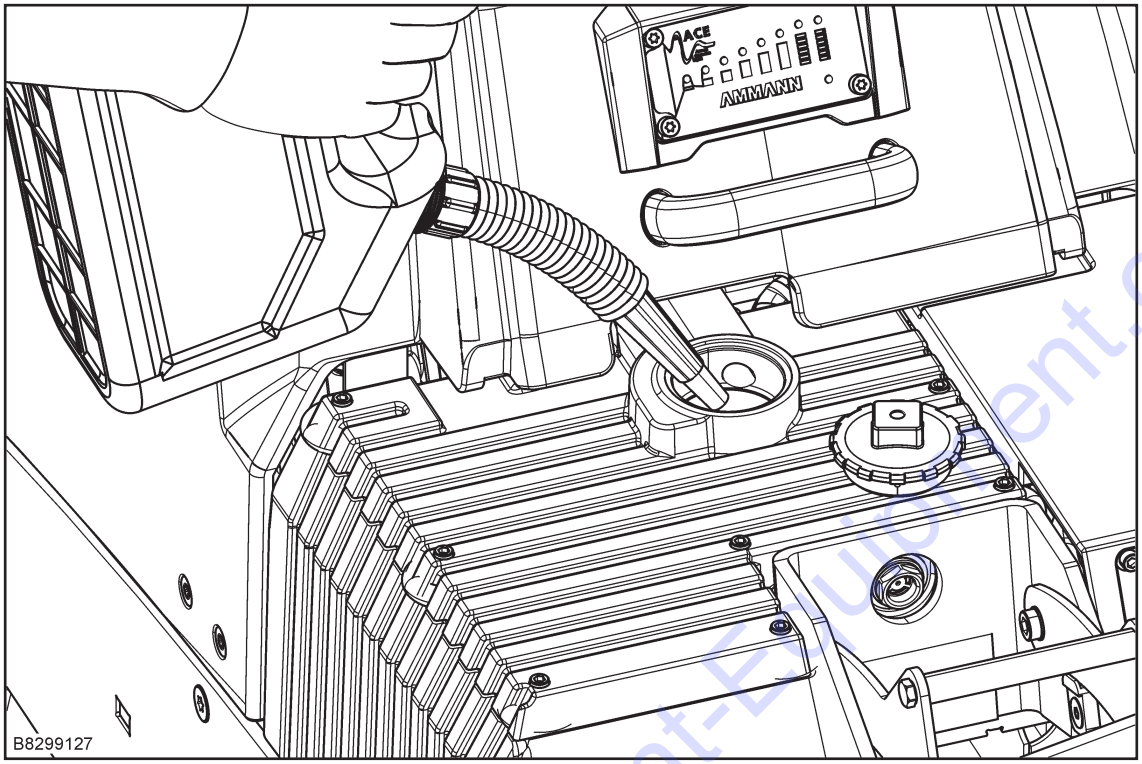
Use the following procedure to check the hydraulic oil level:

1. Check the oil level at the oil sight glass.
2. If necessary, top up oil until the oil level is in the upper sight glass area.

✓ Hydraulic oil level checked.

Use the following procedure to top up hydraulic oil:

1. Using a 27-mm wrench, loosen and unscrew the filter cover **(1)**.
2. Top up hydraulic oil.

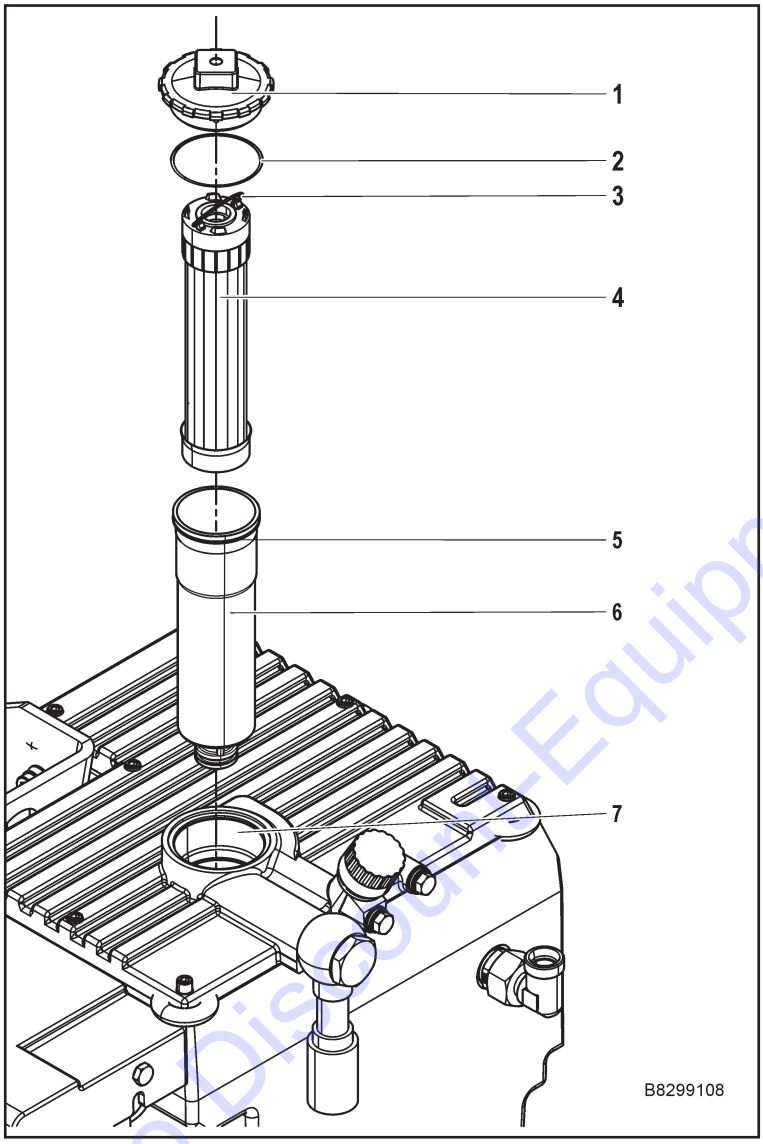


► Oil grade see lubrication plan.

3. Insert the filter cup **(6)** with the filter element **(4)** into the head segment. Ensure that the O-ring **(5)** sits properly.
4. Screw on the filter cover **(1)** and tighten it with your hand.
5. Perform a test run to check the filter for leaks.

✓ Hydraulic oil topped up.

1.1.3 Changing the return filter element



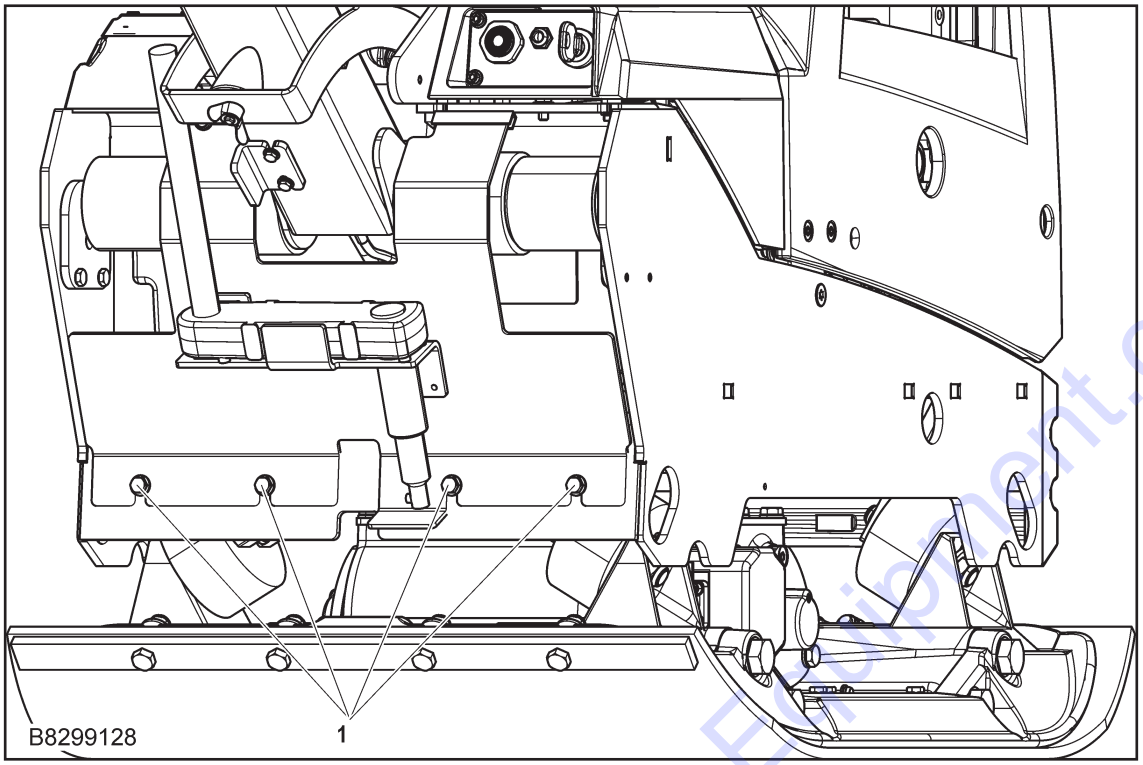
1 Filter cover
2 Gasket
3 Filter element

Use the following procedure to change the return filter element:

1. Using a 27-mm wrench, loosen and unscrew the filter cover **(1)**. Allow the oil in the filter housing to drain through the filter element **(4)** into the tank.
2. Hold the filter element **(4)** at the bracket **(3)** and, together with the filter cup **(6)**, pull it out of the head segment **(7)**.
3. Rotate the filter element **(4)** and, at the same time, pull and remove it from the filter cup **(6)**. Dispose of it in an environmentally compatible way.
4. Pour the residual oil from the filter cup into a used oil container and dispose of it in an environmentally compatible way.
5. Clean the filter bowl **(6)** with cleaner's naphta or diesel oil.
6. Check the O-rings **(2 + 5)**. Replace them if necessary.
7. Insert a new filter element **(4)** in the filter cup **(6)**.
8. Insert the filter cup **(6)** with the filter element **(4)** into the head segment. Ensure that the O-ring **(5)** sits properly.
9. Screw on the filter cover **(1)** and tighten it with your hand.
10. Perform a test run to check the filter for leaks.

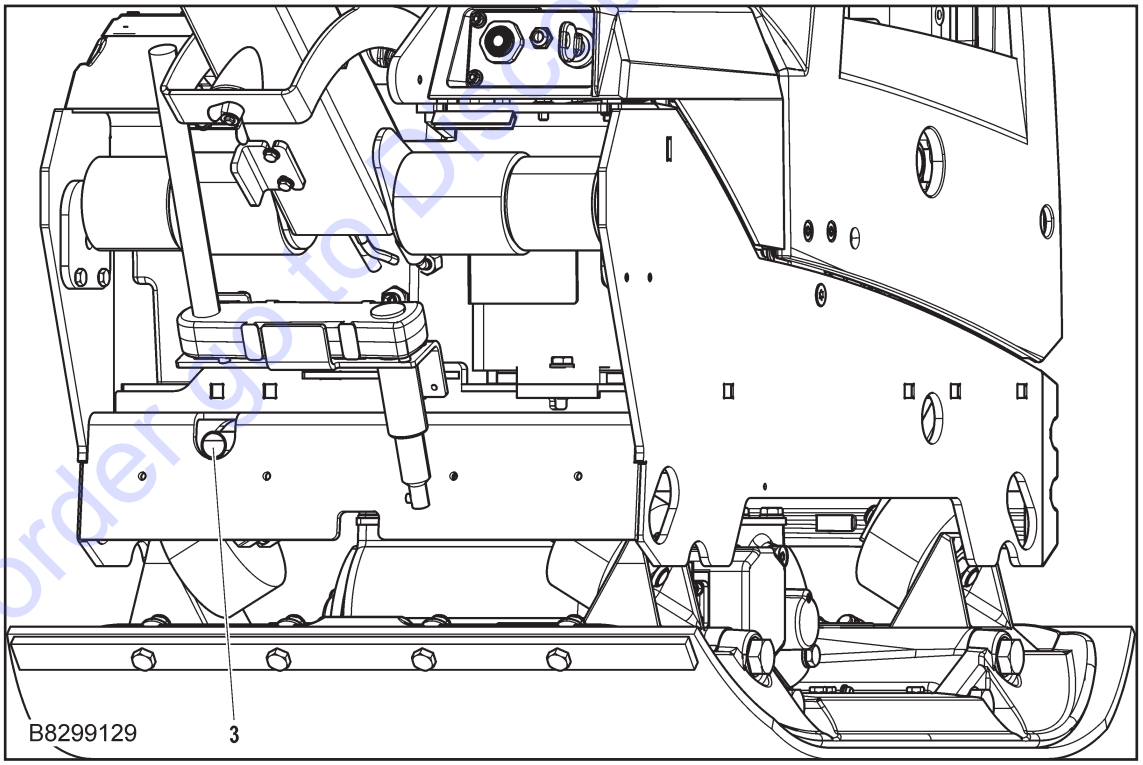
✓ Return filter element changed.

1.1.4 Changing the hydraulic oil



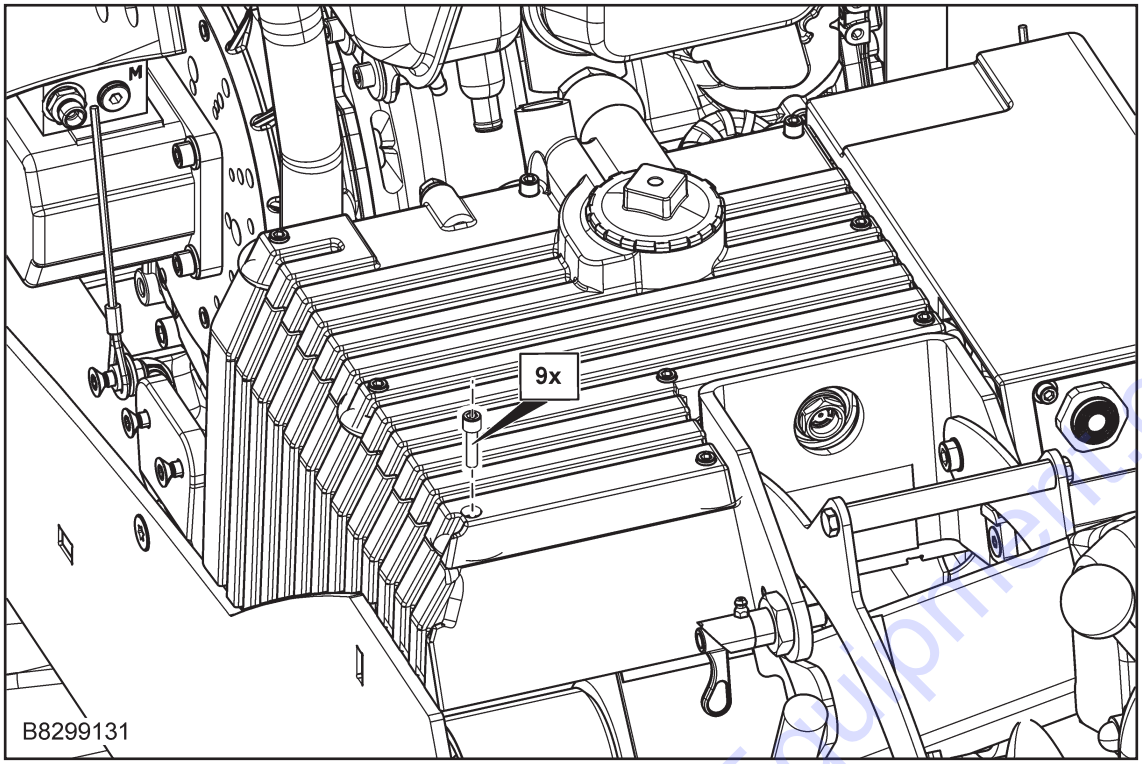
Use the following procedure to change the hydraulic oil:

1. Loosen the screws **(1)** at the cladding.
2. Remove the cladding **(2)** at the upper part.

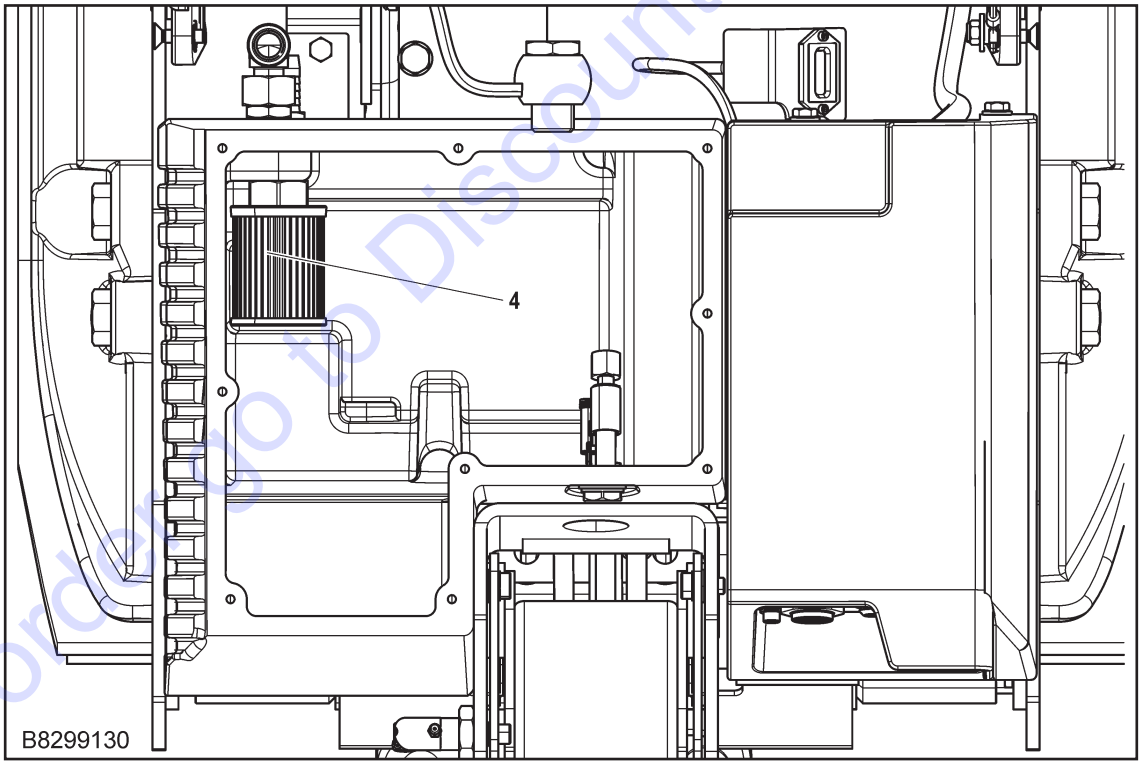


3. Open the oil drain plug **(3)**.

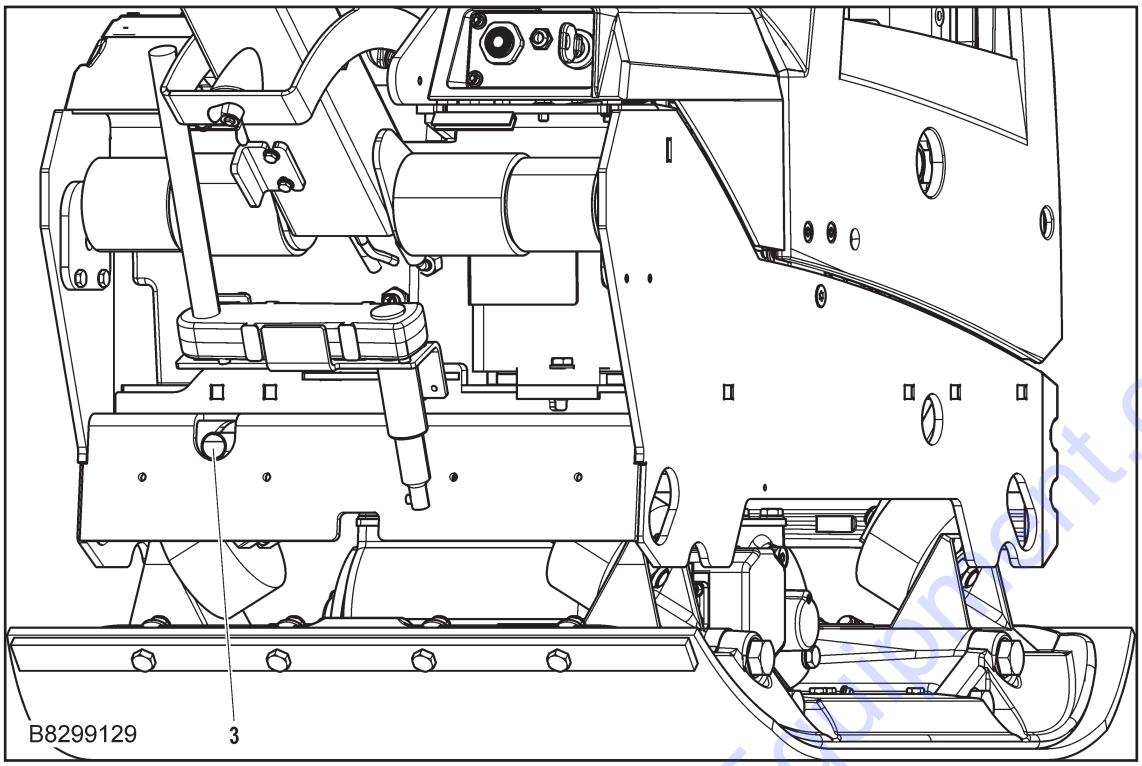
► Drain the oil and dispose of it in an environmentally compatible way.



4. Remove the screws from the hydraulic tank lid.
5. Remove the hydraulic tank lid.



6. Loosen the intake filter **(4)** in the tank and unscrew it.
7. Wash out the suction filter in cold cleaner or cleaner's naphta, and blow it out with compressed air.
8. Clean the hydraulic tank thoroughly.
9. Install the intake filter **(4)**.
10. Carefully remove sealant residues from the sealing surfaces.
11. Do not allow sealant residues to get into the tank.
12. Apply fresh sealant.



13. Screw in the oil drain plug **(3)**.
14. Fill in fresh oil.

► Oil volume and grade see lubrication plan.

15. Put on the hydraulic tank lid.
16. Mount the screws on the hydraulic tank lid.
17. Replace the breather filter **(5)**. Ensure that the O-ring sits properly.
18. Perform a test run. Check the oil level. Top up oil if necessary.

✓ Hydraulic oil changed.

1. Battery

⚠ WARNING!

Explosion hazard due to a highly explosive oxyhydrogen gas mixture in batteries.
Charging batteries produces a highly explosive mixture of oxyhydrogen gases. Fire, sparks, naked flames and smoking can ignite this mixture and cause explosions.

- Avoid the formation of sparks when handling cables and electrical equipment.
- Avoid short circuits.
- Avoid electrostatic discharge.
- Smoking, fire, sparks and naked flames are prohibited when handling batteries.

⚠ WARNING!

Risk of burns from battery acid.
Battery acid is highly corrosive and can cause serious injuries.

- Always wear protective gloves and eye protection when working on the battery.
- Do not tilt the battery. Acid can escape from the degassing openings.
- Do not expose the unprotected battery to direct daylight. The housing becomes brittle.
- Battery acid in discharged batteries can freeze. Freezing point of the acid with a fully charged battery is -70 °C | -94 °F, at 50% state of charge it is -15 °C | 5 °F. Housing starts leaking then.
- Keep children away from acid, batteries and chargers.
- Neutralize acid splashes on skin or clothing immediately with acid neutralizer or soapy water. Rinse with plenty of water.
- Immediately rinse your eye with clean water for several minutes if acid splashes get into your eye. Afterwards, seek medical attention immediately.
- Seek medical advice immediately if you swallowed acid.

IMPORTANT INFORMATION

- Dispose of used batteries at a collection point.
- For transportation, observe the instructions listed below.
- Never dispose of used batteries in the household waste.
- Transport damaged batteries in suitable containers (acid leakage).
- Observe the instructions on the battery and in these operating instructions.

1.1.1 Storage and transportation

- Unfilled batteries do not require any maintenance.
- Ensure that a filled battery is always charged and stored in a cool place (but not in the refrigerator or freezer).
- Check the charge condition at regular intervals or use a trickle charger.
- Recharge a filled battery at the latest at an acid density of 1.21 kg/l or 12.3 V open-circuit voltage or after the charging request of the visual charge condition indicator (see section 10.1.4).
- Transport and store filled batteries always in an upright position, protected against tipping and short-circuit. Failure to do so can cause acid to leak.

1.1.2 Start-up

- Observe the safety instructions.
- Batteries filled on delivery are ready for operation. Install only sufficiently charged batteries, min. 12.50 V open-circuit voltage.
- Remove the inspection plugs. Fill the individual cells of the battery with sulfuric acid of density 1.28 kg/l up to the max. acid level mark.
- Allow the battery to rest for at least 15 minutes. Tilt the battery slightly several times. Top up acid if necessary.
- Firmly screw on / press in the inspection plugs.
- Wipe off any acid splashes.
- Recharge the battery if it does not provide sufficient starting power due to low temperature or unfavorable storage conditions (see section 10.1.4).

1.1.3 Installation and removal

- Prior to removing the battery, switch off the engine and all power consumers.
- To remove the battery, first disconnect the negative terminal (-), then the positive terminal (+).
- Clean battery poles and terminals and apply acid-free grease on them.
- Brace the battery firmly (use original fastening devices).
- Remove the protective cap from the positive terminal only in the vehicle when you connect the battery. Put the cap on the terminal of the replaced battery to avoid short circuits and sparking.
- During installation, first connect the positive terminal (+), then the negative terminal (-).
- Ensure that the pole terminals are firmly seated.
- Take the mounting parts, such as pole covers, bracket, hose connection, filler plugs and pole terminal holder (if any) from the replaced battery and mount them in the same way as before.
- Leave at least 1 gas outlet open, otherwise there is a risk of explosion. This is also important for the return transport of the old battery.

1.1.4 External charging

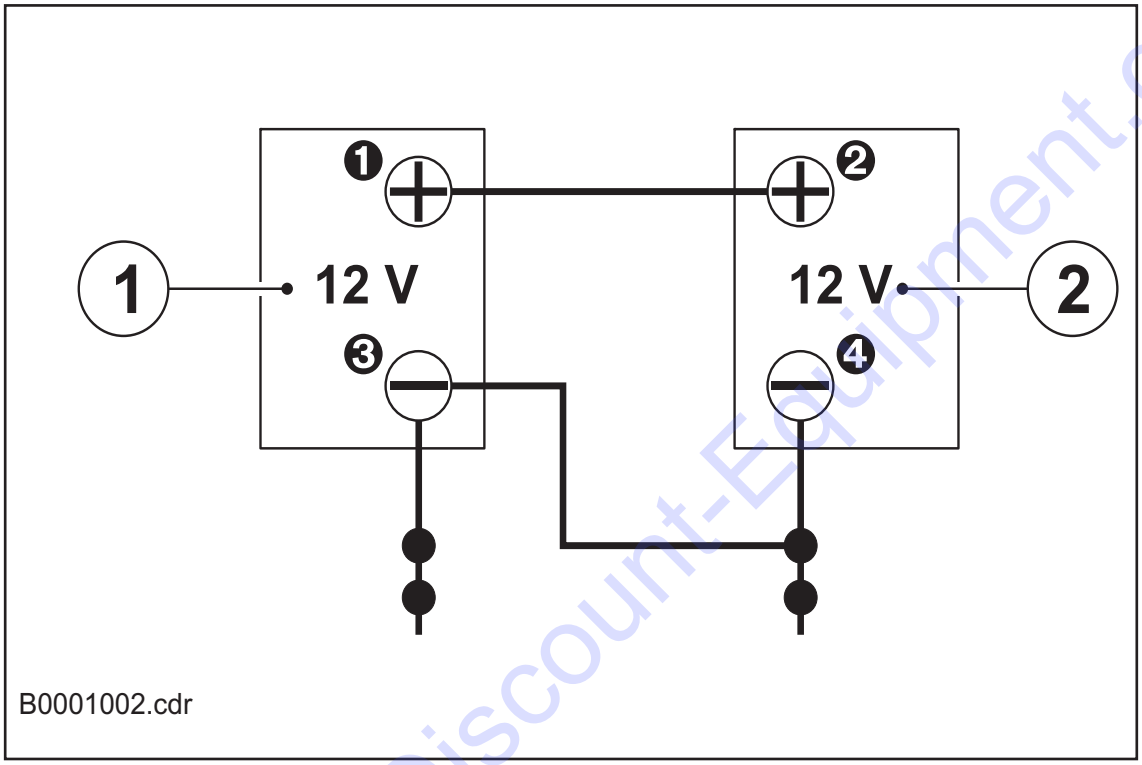
- Read and observe the operating instructions of the charger manufacturer.
- Prior to charging, check the electrolyte level. Adjust it if necessary (see section 10.1.5 "Maintenance").
- Use only a suitable, voltage-regulated charger of the same nominal voltage to charge the battery. If this is not possible, ensure that the battery is disconnected / removed. Recommendation:
- Charging current: Max. 4 amps. Charging voltage: 14.4 V
- Never charge a frozen battery or a battery that is hotter than 45 °C | 113 °F.
- Connect the positive terminal (+) of the battery to the positive terminal of the charger and the negative terminal (-) of the battery to the negative terminal of the charger.
- Switch on the charger only after the battery has been connected.
- At the end of charging, first switch off the charger.
- Interrupt charging if the acid temperature exceeds 55 °C | 131 °F.
- Interrupt charging if the battery becomes hot or if acid leaks!
- The battery is fully charged when:
  - Current and voltage remain constant when a voltage-regulated charger is used.
  - The charging voltage of a current-controlled charger no longer increases within 2 hours, the automatic charger switches off or switches to trickle charging.
- Ensure good ventilation during the charging process.

1.1.5 Maintenance

- Keep the battery surface clean and dry. Clean it only with a damp or antistatic cloth.
- Protect poles / terminals against corrosion (as described in section 10.1.3).
- Check the electrolyte level (observe the inner or outer markings on the box or the visual level indicator in the cover).
- If necessary, fill up with demineralized or distilled water up to the maximum acid level mark (never add acid, foreign substances or so-called conditioners).
- See a specialist workshop if there is a significant loss of electrolytes.
- Check the battery if the starting power is insufficient. Recharge the battery if necessary (see section 10.1.4).

1.1.6 Jump start

- Only use standardized jumper cables.
- Observe the operating instructions of the jumper cable manufacturer.
- Use only batteries of the same nominal voltage.
- Engine of the helper vehicle **(1)** off.
- Connect the jumper cable to the positive terminal (+) of the helper battery **(A)** and to the positive terminal (+) **(B)** of the plate compactor.
- Only then connect the jumper cable to the negative terminal (-) of the helper battery **(C)** and to a sturdy, bare ground of the vibration tamper **(D)** (do not use the negative terminal of the receiving battery as a connection point).



- Start the receiving vehicle **(2)**.
- If the 1st start attempt failed, the helper vehicle can be started BEFORE the 2nd start attempt.
- Disconnect the jumper cables in reverse order.

1.1 General information

- Observe the safety regulations.
- Only qualified and authorized persons are allowed to carry out repair work.
- In case of a malfunction, check again the operating and maintenance instructions to ensure correct operation and mainte-nance.
- Please contact Discount-equipment if you are unable to identify or eliminate the cause of the malfunction yourself.
- Always start with checking the most accessible causes, or those that are easiest to check (fuses, LEDs, etc.).
- Never come into contact with rotating parts.

1.2 MIL-lamp flash code error list

Error	Flash
Low oil pressure	1
Overheated engine	2
Loading control	3
RPM too high	8
Excess RPM	8
Oil temp. Too high St.1 (130°C)	2
Oil temp. Too high St.2 (137°C)	2
Oil temp. Cable break	2
Oil temp. Short circuit	2
Analog target value too high	4
Analog target value too low	4
TSC1 reception error	4
CM1 reception error	4
Battery voltage Too high	3
Battery voltage Too low	3
RPM signal interrupted	8
5V sensor voltage Too high	3
5V sensor voltage Low	3
barometric pressure too high (> 1103 mbar)	5
barometric pressure too low (< 572 mbar)	5
Fuel pump output short circuit Vbat	7
Fuel pump output short circuit ground	7
Glow plug output short circuit Vbat	7
Glow plug output short circuit ground	7
Injector power circuit open/low side short circuit ground	7
Injector shorted coil	7
Injector high side short circuit ground	7
Injector low side short circuit Vbat	7
Maintenance interval due	6
Processor failure	9

1.1 List of malfunctions

Possible cause	Remedial action	Comments
Engine does not start		
• Speed lever in "STOP" position	• Set the lever to the full load position	
• Lack of fuel		
- Tank empty	• Fill in fuel	
- Fuel filter obstructed	• Replace the fuel filter	
- Fuel supply pump defective	• Check the fuel supply system	• Activate oil pressure monitoring system
• No oil pressure	• Check the oil level, top up oil if necessary	
• Insufficient compression	• Contact Discount-equipment	
Engine stalls during operation		
• Fuel supply interrupted	• Fill in fuel	
- Tank empty	• Replace the fuel filter	
- Fuel filter obstructed	• Check the fuel supply system	
- Fuel supply pump defective	• Check the oil level, top up oil if necessary	• Activate oil pressure monitoring system
• Lack of oil, mech. defects	• Contact Discount-equipment	
Engine power decreases		
• Fuel supply impaired	• Fill in fuel	
- Tank empty	• Replace the fuel filter	
- Fuel filter obstructed	• Ensure adequate ventilation	
- Tank ventilation inadequate	• Check screw connections	
- Line connections leaking, air filter contaminated, incorrect tappet clearance	• Clean / replace the air filter, adjust the tappet clearance	
• Too much oil in the engine	• Correct the engine oil level	
• Too much oil in the exciter	• Check the exciter oil level	• Contact Discount-equipment
• Fault in hydraulic system	• Contact Discount-equipment	
Engine is running, machine does not move forward		
• Linings of the centrifugal clutch worn out	• Replace springs and linings	
• Too much oil in the exciter	• Check the exciter oil level	• Contact Discount-equipment
• Fault in hydraulic system	• Contact Discount-equipment	

1.1.1 Storing the machine

If you want to shut down the machine for a longer period of time (longer than 6 weeks), park it on a pallet on a level, solid surface such that it is in a stable position.

- The storage location should be dry and protected.
- The ambient temperature should be between 0 °C | 32 °F and 45 °C | 113 °F.
- Prior to storing the machine:
  - Clean it thoroughly
  - Check it for leaks and damage, eliminate detected defects
  - Cover it with a protective tarpaulin

1.1.2 Putting the machine back into operation

- Prior to putting the machine back into operation:
  - Check the machine for leaks,
  - defective or leaking hydraulic hoses or
  - other damage.
- Eliminate detected defects.
- Check and retighten all screw connections.

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