BOMAG
FAYAT GROUP

Service - Manual

BW 100 AD-4 / BW 100 AC-4

BW 120 AD-4 / BW 120 AC-4

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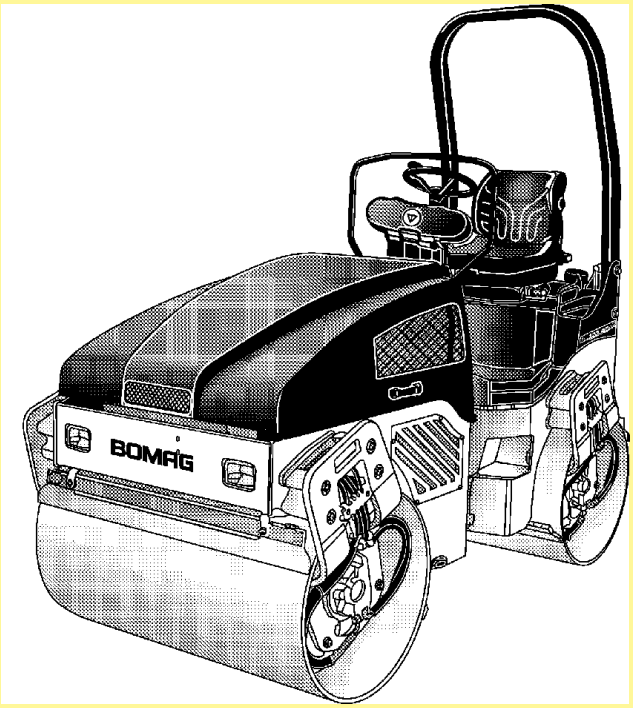

Tandem Vibratory Roller

Combination Roller

Catalogue number.
008 915 61

12/2012

880714

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1 General

1.1 Introduction

This manual addresses the professionally qualified personnel or the after sales service of BOMAG, and should be of help and assistance in correct and efficient repair and maintenance work.

This manual describes the disassembly, dismantling, assembly, installation and repair of components and assemblies. The repair of components and assemblies is only described as this makes sense under due consideration of working means and spare parts supply.

Documentation

For the BOMAG machines described in this manual the following documentation is additionally available:

1 **Operating and maintenance instructions**
2 **Spare parts catalogue**
3 **Service information**

Use only genuine BOMAG spare parts.

Spare parts needed for repairs can be taken from the spare parts catalogue for the machine.

This manual is not subject of an updating service; for this reason we would like to draw your attention to our additional "Technical Service Bulletins".

In case of a new release all necessary changes will be included.

In the course of technical development we reserve the right for technical modifications without prior notification.

⚠ Danger

These safety regulations must be read and applied by every person involved in the repair /maintenance of this machine. The applicable accident prevention instructions and the safety regulations in the operating and maintenance instructions must be additionally observed.

BOMAG GmbH

Printed in Germany

Important notes

These safety regulations must be read and applied by every person involved in the repair /maintenance of this machine. The applicable accident prevention instructions and the safety regulations in the operating and maintenance instructions must be additionally observed.

Repair work shall only performed by appropriately trained personnel or by the after sales service of BOMAG.

Workshop equipment and facilities as well as the use and waste disposal of fuels and lubricants, cleaning agents and solvent as well as gases and chemicals are subject to legal regulations, which are intended to provide a minimum on safety. It is obviously your own responsibility to know and adhere to these regulations.

This manual contains headers like "Note", "Attention", "Danger" and "Environment", which must be strictly complied with in order to inform about and avoid dangers to persons, property and the environment.

i Note

Paragraphs marked like this contain technical information for the optimal economical use of the machine.

⚠ Caution

Paragraphs marked like this highlight possible dangers for machines or parts of the machine.

⚠ Danger

Paragraphs marked like this highlight possible dangers for persons.

Environment

Paragraphs marked like this point out practices for safe and environmental disposal of fuels and lubricants as well as replacement parts.

Observe the regulations for the protection of the environment.

General

- For repair and maintenance work move the machine on a firm base and shut it down.
- Always secure the machine against unintended rolling.
- Secure the engine reliably against unintentional starting.
- Mark a defective machine and a machine under repair by attaching a clearly visible warning label to the dashboard.
- Block the articulated joint with the articulation lock.
- Use protective clothes like hard hat, safety boots and gloves.
- Keep unauthorized persons away from the machine during repair work.
- Tools, lifting gear, lifting tackle, supports and other auxiliary equipment must be fully functional and in safe condition.
- Use only safe and approved lifting gear of sufficient load bearing capacity to remove and install parts or components from and to the machine.
- Do not use easily inflammable or harmful substances, such as gasoline or paint thinners for cleaning.
- Do not smoke or use open fire and avoid sparks when cleaning or repairing a tank.
- When performing welding work strictly comply with the respective welding instructions.

Transport work with cranes and lifting tackle

i Note

Cranes must only be operated by instructed persons who had been trained in handling cranes.

- Follow the operating instructions of the manufacturer when working with cranes.
- Follow the operating instructions of the operator when working with cranes.
- Always comply with the applicable accident prevention instructions when working with cranes and lifting tackle.

Precautions and codes of conduct for welding work

Welding work must only be carried out by properly trained personnel.

⚠ Danger

Electric shock!

Sparks, fire hazard, burning of skin!

Infrared or ultraviolet radiation (arc), flashing of eyes!

Health hazard caused by welding work on highly alloyed work pieces, metal coatings, paint coatings, plastic coatings, oil containing dirt deposits, grease or solvent residues, etc.!

- Check welding equipment and cables for damage before use (also the validity of inspection stickers).
- Ensure good conductivity between ground cable and workpiece, avoid joints and bearings.

- Start the extraction fan before starting work and guide with the progressing work as required.
- Always isolate the burner when laying it down (remove possible electrode residues).
- Protect cables from being damaged, use cables with insulated couplings.
- Ensure sufficient fire protection, keep a fire extinguisher at hand.
- Welding work in areas where there is a risk of fire or explosion, must only be carried out with welding permission.
- Remove any combustible materials from the welding area or cover such items appropriately.
- Name a fire watch during and after welding work.
- Place welding rod holders and inert gas welding guns only on properly insulated bases.
- Place the inert gas bottles in a safe place and secure them against falling over.
- Use a protective screen or hand shield with welding filter, wear welding gloves and clothes.
- Switch the welding unit off before connecting welding cables.
- Check electrode holders and electric cables at regular intervals.

Behaviour in case of faults

- In case of faults on the welding unit switch of the welding unit immediately and have it repaired by expert personnel.
- In case of failure of the extraction system switch the system off and have it repaired by expert personnel.

Maintenance; waste disposal

- Replace damaged insulating jaws and welding rod holders immediately.
- Replace the welding wire reels only in de-energized state.

What to do in case of accidents; First Aid

- Keep calm.
- Call first air helpers.
- Report the accident.
- In case of an electric accident: Interrupt the power supply and remove the injured person from the electric circuit. If breathing and heart have stopped apply reactivation measures and call for an emergency doctor.

Operation of high-voltage systems

i Note

The rules and statutory regulations valid in the corresponding do apply in addition to the notes given here.

⚠ Caution

The high-voltage system must only be operated and serviced by qualified and authorized personnel.

Before starting operation the operator must check the proper condition of the system.

⚠ Danger

Possibility of injury or even death caused by electric shock:

- **if persons come into contact with live parts,**
- **in case of faulty insulation of live parts,**
- **inadequate, unsuitable insulation,**
- **if melted parts flake off in case of short circuits.**

Old oils

Prolonged and repetitive contact with mineral oils will remove the natural greases from the skin and causes dryness, irritation and dermatitis. Moreover, used engine oils contain potentially hazardous contaminants, which could cause skin cancer. Appropriate skin protection agents and washing facilities must therefore be provided.

- Wear protective clothes and safety gloves, if possible.
- If there is a risk of eye contact you should protect your eyes appropriately, e.g. chemistry goggles or full face visor; a facility suitable for rinsing the eyes should also be available.
- Avoid longer and repetitive contacts with oils. In case of open incisions and injuries seek medical advice immediately.
- Apply protective cream before starting work, so that oil can be easier removed from the skin.
- Wash affected skin areas with water and soap (skin cleansers and nail brushes will help). Lanolin containing agents will replace natural skin oils that were lost.
- Do not use gasoline, kerosene, diesel, thinner or solvents to wash the skin.
- Do not put oil soaked cloths into your pockets.
- Avoid clothes getting soiled by oil.
- Overalls must be washed at regular intervals. Dispose of non-washable clothes environmentally.
- If possible degrease components before handling.

Environment

It is strictly prohibited to drain off oil into the soil, the sewer system or into natural waters. Old oil must be disposed of according to applicable environmental regulations. If in doubt you should consult your local authorities.

Hydraulics

- Always relieve the pressure in the hydraulic system before disconnecting any lines. Hydraulic oil escaping under pressure can penetrate the skin and cause severe injury.
- Always make sure that all screw fittings have been tightened properly and that hoses and pipes are in mint condition before pressurizing the system again.
- Hydraulic oil leaking out of a small opening can hardly be noticed, therefore please use a piece of cardboard or wood when checking for leaks. When injured by hydraulic oil escaping under pressure consult a physician immediately, as otherwise this may cause severe infections.
- Do not step in front of or behind the drums, wheels or crawler tracks when performing adjustment work in the hydraulic system while the engine is running. Block drums, wheels or crawler tracks with wedges.

Reattach all guards and safety installations after all work has been completed.

Environment

It is strictly prohibited to drain off oil into the soil, the sewer system or into natural waters. Oil oil must be disposed of according to applicable environmental regulations. If in doubt you should consult your local authorities.

Fuels

⚠ Danger

Repair work shall only performed by appropriately trained personnel or by the after sales service of BOMAG.

Follow the valid accident prevention instructions when handling fuels.

The following notes refer to general safety precautions for danger free handling of fuel.

Fuel vapours not only are easily inflammable, but also highly explosive inside closed rooms and toxic; dilution with air creates an easily inflammable mixture. The vapours are heavier than air and therefore sink down to the ground. Inside a workshop they may easily become distributed by draft. Even the smallest portion of spilled fuel is therefore potentially dangerous.

- Fire extinguishers charged with FOAM, CO^2 GAS or POWDER must be available wherever fuel is stored, filled in, drained off, or where work on fuel systems is performed.
- The vehicle battery must always be disconnected, BEFORE work in the fuel system is started. Do not disconnect the battery while working on the fuel system. Sparks could cause explosion of the fuel fumes.
- Wherever fuel is stored, filled, drained off or where work on fuel systems is carried out, all potential ignition sources must be extinguished or removed. Search lights must be fire proof and well protected against possible contact with running out fuel.

Hot fuels

Please apply the following measures before draining of fuel to prepare for repair work:

- Allow the fuel to cool down, to prevent any contact with a hot fluid.
- Vent the system, by removing the filler cap in a well ventilated area. Screw the filler cap back on, until the tank is finally emptied.

Synthetic rubber

Many O-rings, hoses, etc. are made of synthetic material, a so-called fluorocarbon elastomer. Under normal operating conditions this material is safe and does not impose any danger to health.

However, if this material becomes damaged by fire or extreme heat, it may decompose and form highly caustic hydrofluoric acid, which can cause severe burns in contact with skin.

- If the material is in such a state it must only be touched with special protective gloves. The protective gloves must be disposed of according to applicable environmental regulations immediately after use.
- If the material has contacted the skin despite these measures, take off the soiled clothes and seek medical advice immediately. In the meantime cool and wash the affected area of skin over a sufficient time with cold water or lime water.

Poisonous substances

Some of the fluids and substances used are toxic and must under no circumstances be consumed.

Skin contact, especially with open wounds, must be avoided.

These fluids and substances are, amongst others, anti-freeze agents, hydraulic oils, fuels, washing additives, refrigerants, lubricants and various bonding agents.

Engine

⚠ Danger

Do not work on the fuel system while the engine is running. (Danger to life!)

Once the engine has stopped wait approx. 1 minutes for the system to depressurize. The systems are under high pressure. (Danger to life!)

Keep out of the danger zone during the initial test rung. Danger caused by high pressure in case of leaks. (Danger to life!)

When performing work on the fuel system make sure that the engine cannot be started unintentionally during repair work. (Danger to life!)

- Maintenance and cleaning work on the engine must only be performed with the engine stopped and cooled down. Make sure that the electric system is switched off and sufficiently secured against being switched on again (e.g. pull off ignition key, attach a warning label).
- Observe the accident prevention regulations for electric systems (e.g. -VDE-0100/-0101/-0104/-0105 Electric precautions against dangerous contact voltages).
- Cover all electric components properly before wet cleaning.

Battery

- Always wear goggles and protective clothing to service or clean batteries! Battery acid can cause severe injury by cauterization when coming in contact with skin.
- Work only well ventilated rooms (formation of oxyhydrogen gas).
- Do not lean over the battery while it is under load, being charged or tested (danger of explosion).
- Keep ignition sources away from the battery. Burning cigarettes, flames or sparks can cause explosion of the battery
- Use battery chargers etc. only in strict compliance with the operating instructions.
- After an accident with acid flush the skin with a sufficient amount of water and seek medical advice.
- Do not allow children access to batteries.
- When mixing battery fluid always pour acid into water, never vice-versa.

Special safety regulations

- Use only genuine BOMAG spare parts for repair and maintenance work. Genuine spare parts and original accessories were specially developed, tested and approved for the machine.
- The installation and use of non-genuine spare parts or non-genuine accessories may therefore have an adverse effect on the specific characteristics of the machine and thereby impair the active and/or passive driving safety. The manufacturer explicitly excludes any liability for damage caused by the use of non-original parts or accessories.
- Unauthorized changes to the machine are prohibited for safety reasons.
- Do not perform any cleaning work while the engine is running.
- If tests on the articulated joint need to be performed with the engine running, do not stand in the articulation area of the machine (danger of crushing!).
- If tests must be performed with the engine running do not touch rotating parts of the engine (danger of injury!).
- Always ensure an adequate supply of fresh air when starting in closed rooms. Exhaust gases are highly dangerous!
- Refuel only with the engine shut down. Ensure strict cleanliness and do not spill any fuel.
- Always ensure an adequate supply of fresh air when refuelling in closed rooms.
- Dispose of used filters in accordance with applicable environmental regulations.
- When performing repair and maintenance work collect oils and fuels in suitable containers and dispose of in compliance with applicable environmental regulations.
- Do not heat up oils higher than 160 °C because they may ignite.
- Wipe off spilled or overflown oil using suitable cleaning means and dispose of in accordance with applicable environmental regulations.
- Dispose of old batteries according to applicable environmental regulations.
- There is a danger of scalding when draining off engine or hydraulic oil at operating temperature! Allow engine and hydraulic system to cool down to a sufficient level.
- Do not exceed the max. permissible tire pressure.

General

- Before removing or disassembling parts, assemblies, components or hoses mark these parts for easier assembly.
- Before assembling and installing parts, assemblies or components oil or grease all movable parts or surfaces as required and in compliance with the compatibility of materials.

Electrics

General

Due to the fast technical development electric and electronic vehicle systems become more intelligent and more comprehensive day by day, and can hardly be dispensed with in hydraulic and mechanical vehicle systems.

Diagnostics according to plan

Well structured trouble shooting procedures can save time and money.

Random tests have revealed that purely electronic components or control units only very rarely are the actual cause of failures:

- In approx. 10 % of the examined cases the problems were caused by control units.
- In approx. 15 % sensors and actuators were the cause of the problems.

By far the highest proportion of all faults could be traced back to wiring and connections (plugs, etc.).

General:

- Before changing any expensive components, such as control units, you should run a systematic trouble shooting session to eliminate any other possible fault sources. Knowledge in basic electrics is required for this purpose. If a fault was diagnosed without having pulled the plug of the control unit or inspected the wiring, this should be done before changing any parts.
- Check for good cable and ground contacts, therefore keep all mechanical transition points between electric conductors (terminals, plugs) free of oxide and dirt, as far as this is possible.
- Always use the machine related wiring diagram for testing. If one or more faults were detected, these should be corrected immediately.
- Do not disconnect or connect battery or generator while the engine is running.
- Do not operate the main battery switch under load.
- Do not use jump leads after the battery has been removed.
- Sensors and electric actuators on control units must never be connected individually or between external power sources for the purpose of testing, but only in connection with the control unit in question.
- It is not permitted to pull plugs off while the voltage supply is switched on (terminal 15 "ON")! Switch the voltage supply "OFF" first and pull out the plug.
- Even with an existing polarity reversal protection incorrect polarity must be strictly avoided. Incorrect polarity can cause damage to control units!

- Plug-in connectors on control units are only dust and water tight if the mating connector is plugged on! Control units must be protected against spray water, until the mating connector is finally plugged on!
- Unauthorized opening of control electronics (Microcontroller MC), modifications or repairs in the wiring can cause severe malfunctions.
- Do not use any radio equipment or mobile phones in the vehicle cab without a proper aerial or in the vicinity of the control electronics!

Electrics and welding

⚠ Caution

Before starting welding work you should disconnect the negative battery pole or interrupt the electric circuit with the main battery switch, disconnect the generator and pull the plugs off all control units in order to protect the electrical system of the machine.

- Disconnect the minus pole of the battery or interrupt the electric circuit with the main battery switch.
- Isolate the generator and all control units from the electric circuit.
- Always fasten the earth clamp of the welding unit in the immediate vicinity of the welding location.
- When choosing the location for the earth clamp make sure that the welding current will not pass through joints or bearings.

Battery

Rules for the handling of batteries

When removing a battery always disconnect the minus pole before the plus pole. When installing the battery connect the minus pole after the plus pole to avoid short circuits.

Fasten the terminal clamps with a little force as possible.

Always keep battery poles and terminal clams clean to avoid high transition resistances when starting and the related development of heat.

Make sure the battery is properly fastened in the vehicle.

Generator

Before removing the generator you must disconnect the ground cable from the minus pole of the battery while the ignition is switched off. Do not disconnect the generator while the engine is running, because this may cause extremely high voltage peaks in the vehicle wiring system ("Load Dump"), which could possibly damage control units, radios or other electronic equipment.

When disassembling the battery cable, the B+-nut underneath on the generator side may also be loosened. This nut must in this case be retightened.

When connecting e.g. the battery cable to the terminal of the generator you must make sure that the polarity is correct (generator B+ to the + pole of the battery). Mixing up the polarities by mistake causes short circuit and damage to the rectifier elements - the generator will be out of function.

The generator can only be operated with the battery connected. Under special conditions emergency operation without battery is permitted, the lifetime of the generator is in such cases especially limited.

Plus and minus cables must be disconnected during rapid charging of the battery or electric welding on the vehicle.

When cleaning the generator with a steam or water jet make sure not to direct the steam or water jet directly on or into the generator openings or ball bearings. After cleaning the generator should be operated for about 1 - 2 minutes to remove any deposits of water from the generator.

Starter motor

So-called jump starting (using an additional external battery) without the battery connected is dangerous. When disconnecting the cables from the poles high inductivities (arcs, voltage peaks) may occur and destroy the electrical installation.

For purposes like e.g. purging the fuel systems, starters may be operated for maximum 1 minute without interruption. Then you should wait for at least 30 minutes (cooling down) until trying again. During the 1 minute starting period this process should not be interrupted.

Starter motors must not be cleaned with high pressure steam cleaning equipment.

The contacts on starter terminals 30, 45, 50 must be protected against unintended shorting (jump protection).

When replacing the starter the ring gear on the engine flywheel must be checked for damage and its number of teeth - if necessary replace the ring gear.

Always disconnect the battery before starting assembly work in the starter area of the engine or on the starter itself.

Hydraulic system

⚠ Caution

Repair work on hydraulic elements shall only performed by appropriately trained personnel or by the after sales service of BOMAG.

Please note

i Note

Cleanliness is of utmost importance. Dirt and other contaminations must strictly be kept out of the system.

- Connections and screw fittings, filler neck covers and their immediate surrounding areas must be cleaned before removal.
- Before loosening hoses, pipe lines etc. relieve all pressure from the system.
- During repair work keep all openings closed with clean plastic plugs and caps.
- Never run pumps, motors and engines without oil or hydraulic oil.
- When cleaning hydraulic components take care not to damage any fine machine surfaces.
- Chemical and rubber soluble cleansing agents may only be used to clean metal parts. Do not let such substances come in contact with rubber parts.
- Rinse of cleaned parts thoroughly, dry them with compressed air and apply anti-corrosion oil immediately. Do not install parts that show traces of corrosion.
- Avoid the formation of rust on fine machined caused by hand sweat.
- Use new O-rings or seal rings for reassembly.
- Use only hydraulic oil as sliding agent when reassembling. Do not use any grease!
- Use only the specified pressure gauges. Risk of damaging the pressure gauges under too high pressure.
- Check the hydraulic oil level before and after the work.
- Fill in only clean oil as specified in the maintenance instructions.
- Check the hydraulic system for leaks, if necessary find and rectify the cause.
- Before taking new hydraulic components into operation fill these with hydraulic oil as specified in the operating and maintenance instructions.
- After changing a hydraulic component thoroughly flush, refill and bleed the complete hydraulic system.
- Perform measurements at operating temperature of the hydraulic oil (approx. 40 ¯C).
- After changing a component perform a high and charge pressure test, if necessary check the speed of the exciter shaft.
- The operating pressure of the exciter shaft to a great extent depends on the base under the vibrating drum. On hard ground place the drums on a suitable base and check the drum pressure. Do not activate the vibration on a hard, concreted base, danger of bearing damage.
- After the completion of all tests perform a test run and then check all connections and fittings for leaks with the engine still stopped and the hydraulic system depressurized.

Before commissioning

- Fill the housings of hydraulic pumps and motors with hydraulic oil. Use only hydraulic oils according to the specification in the maintenance instructions.
- After changing a component flush the hydraulic system as described in the flushing instructions.

Taking into operation

- Bleed the hydraulic circuits.
- Start up the hydraulic system without load.
- Check the hydraulic oil level in the tank, if necessary top up with hydraulic oil as specified in the operating and maintenance instructions or drain oil off into a suitable container.

After taking into operation

- Check fittings and flanges for leaks.
- After each repair check all adjustment data, system pressures, rotational speeds and nominal values in the hydraulic system, adjust if necessary.
- Do not adjust pressure relief valves and control valves to values above their specified values.

Fuel hoses

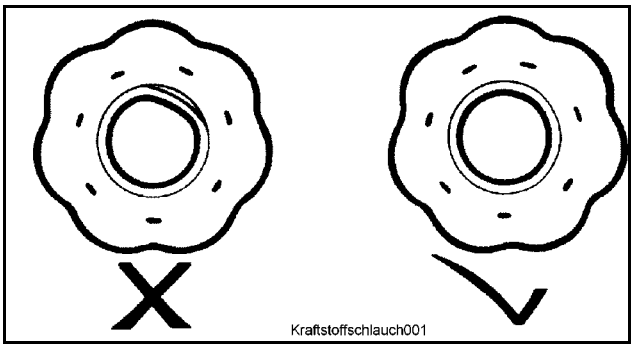

Fig. 1

⚠ Caution

All fuel hoses have two layers of material, a reinforced rubber coating outside and an internal Viton hose. If a fuel hose has come loose one must make absolutely sure that the internal Viton layer has not been separated from the reinforced outer layer. In case of a separation the hose needs to be replaced.

Gaskets and mating surfaces

Leaking sealing faces can mostly be traced back to incorrect assembly of seals and gaskets.

- Before assembling a new seal or gasket make sure that the sealing surface is free of pitting, flutes, corrosion or other damage.
- Inappropriately stored or handled seals (e.g. hanging from hooks or nails) must under no circumstances be used.
- Assemble seals and gaskets only with sealing compound, grease or oil, if this is specifically specified in the repair instructions.
- If necessary remove any old sealing compound before assembling. For this purpose do not use any tools that could damage the sealing surfaces.
- Sealing compound must be applied thin and evenly on the corresponding surfaces; take care that the compound does not enter into oil galleries or blind threaded bores.
- Examine the contact faces for scratches and burrs, remove these with a fine file or an oilstone; take care that no grinding dust and dirt enters into tapped bores or enclosed components.
- Blow out lines, ducts and gaps with compressed air, replace any O-rings and seals that have been dislodged by the compressed air.

Assembly of radial seals

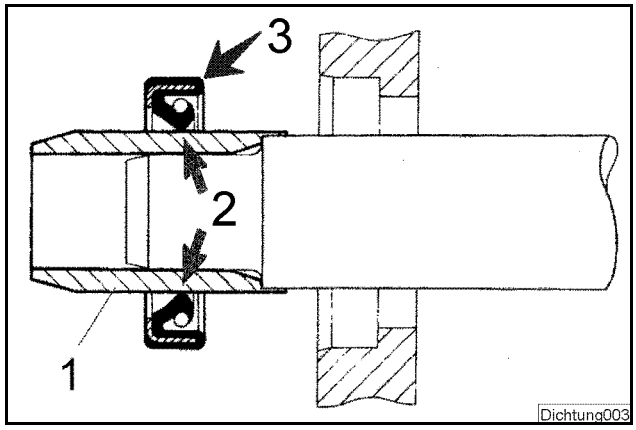

Fig. 2

- Lubricate the sealing lips (2) (Fig. 2) with clean grease; in case of double seals fill the space between the sealing lips with a generous amount of grease.
- Slide the seal over the shaft, with the lip facing towards the fluid to be sealed.

i Note

If possible, use an assembly sleeve (1 (Fig. 2)), ***to protect the lip from being damaged by sharp edges, threads or splines.*** *If no assembly sleeve is avail-*

able, you should use a plastic tube or adhesive tape to prevent the sealing lip from being damaged.

- Lubricate the outer rim (arrow 3 (Fig. 2)) of the seal and press it flat on the housing seat.

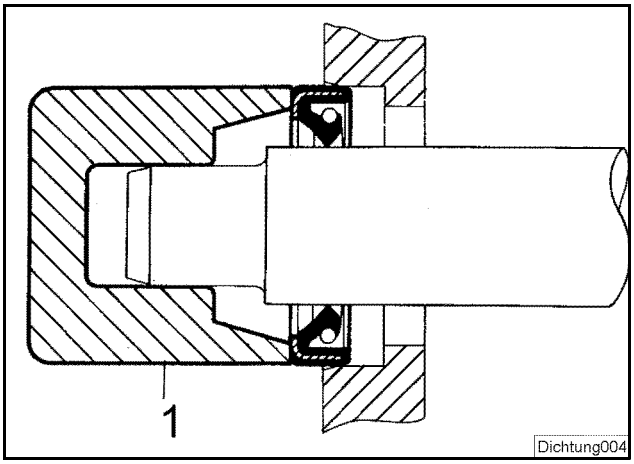

Fig. 3

- Press or knock the seal into the housing, until it is flush with the housing surface.

i Note

*If possible, use a "bell" (1 (Fig. 3)), to make sure **that the seal will not skew.** In some cases it may be advisable to assemble the seal into the housing first, before sliding it over the shaft. Under no circumstances should the full weight of the shaft rest on the seal.*

If you have no proper service tools at hand, use a suitable drift punch with a diameter which is about 0,4 mm smaller than the outer diameter of the seal. Use VERY LIGHT blows with the hammer if no press is available.

Feather keys and keyways

⚠ Caution

Feather keys may only be reused if they are free of damage.

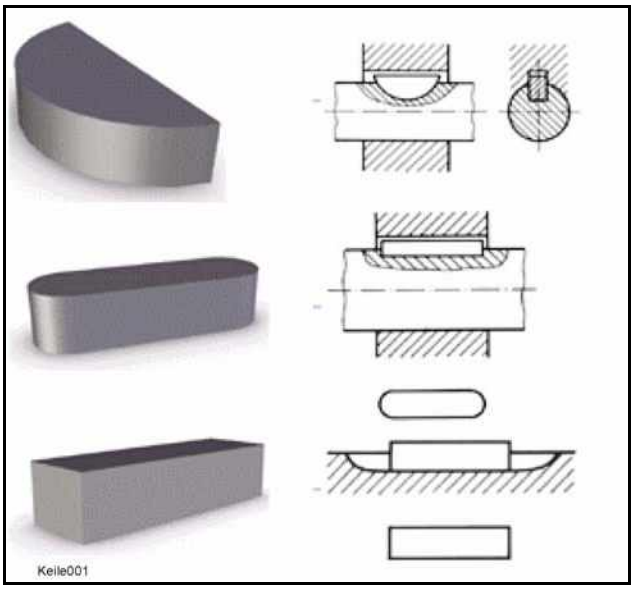

Fig. 4

- Clean and thoroughly examine the feather key.
- Deburr and thoroughly clean the edges of the keyway with a fine file before reassembling.

Ball and roller bearings

⚠ Caution

Ball and roller bearings may only be reused if they are free of damage and do not show any signs of wear.

Fig. 5

- If a ball or roller bearing of a bearing pair shows defects, both ball or roller bearings need to be replaced.
- Remove any lubricant residues from the ball or roller bearing to be examined by washing it with gasoline or any other appropriate degreasing agent. Ensure strict cleanliness.
- Check balls or rollers, running surfaces, outer faces of outer races and inner faces of inner races for visible damage. Replace the ball or roller bearing if necessary.
- Check the ball or roller bearing for clearance and resistance between the inner and outer races, replace if necessary.
- Lubricate the ball or roller bearing with the recommended type of grease before assembly or reassembly.
- On greased bearings (e.g. wheel bearings) fill the space between ball or roller bearing and outer seal with the recommended type of grease before assembling the seal.
- Check shaft and bearing housing for discolouration or other signs of movement between ball or roller bearing and seats.
- Make sure that shaft and housing are free of burrs before assembling the ball or roller bearing.
- Always mark the individual parts of separable ball or roller bearings (e.g. taper roller bearings) to enable correct reassembling. Never assemble the rollers to an outer race that has already been used, replace the complete ball or roller bearing instead.

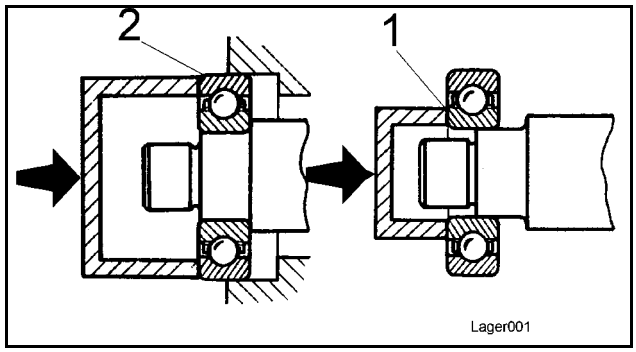

Fig. 6

⚠ Caution

When assembling the ball or roller bearing to the shaft load must only be applied to the inner race 1 (Fig. 6).

When fitting the bearing into the housing load must only be applied to the outer race (2).

Screws and nuts

Tightening torque

⚠ Caution

Tighten nuts or screws with the tightening torques specified in the following tables of tightening torques. Tightening torques deviating from the ones in the table are specially mentioned in the repair instructions.

Damaged screws must under no circumstances be used any longer. Recutting threads with thread cutters or taps adversely affects the strength and leak tightness of the screw joint. Damaged or corroded thread pitches can cause incorrect torque value readings.

Self-locking nuts must generally be replaced after disassembly.

The use of screws with too high strength can cause damage!

- Nut of a higher strength can generally be used instead of nuts of a lower strength classification.
- When checking or retightening screw joints to the specified tightening torque you should first relieve by a quarter turn and then tighten to the correct torque.
- Before tightening you should lightly oil the thread, in order to ensure low friction movement. **The same applies for self-locking nuts.**
- Make sure that no oil or grease will enter into blind tapped bores. The hydraulic power generated when turning in the screw could cause breakage of the effected part.

Strength classes, metric screws

The strength classes (from 3.6 to 12.9) are specified for all strength classes from a nominal diameter of 5mm. The corresponding identification can be found where allowed for by the shape of the screw.

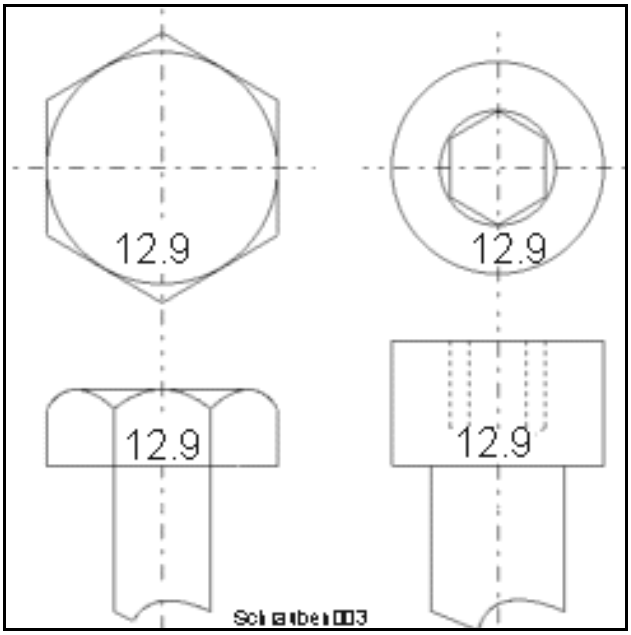

Fig. 7 Identification of screws

Example: A screw is identified with 12.9.

The first number corresponds with 1/100 of the nominal tensile strength (minimum tensile strength) in N/mm^2.

- The nominal tensile strength is 12 X 100 N/mm^2 = 1200 N/mm^2.

The second number specifies 10-times the ration between lower yield point and nominal tensile strength (yield point ratio).

i Note

When exceeding the lower yield point, the material will return to its original shape when being relieved (plastic deformation).

When exceeding the upper yield point the material will not restore its original shape after being relieved.

- The lower tensile strength is 9/10 X 1200 N/mm^2 = 1080 N/mm^2.

i Note

However, these values are by no means identical with the tightening torques, which are to be set on a torque wrench. The corresponding calculation requires a higher effort and, in the end, depends on the materials to be bolted together.

Strength classes of metric nuts

Nuts are differentiated by three load groups. Each load group has a special designation system for the strength class assigned, so that the load group can be clearly identified.

Nuts for screw joints with full load capability (4, 5, 6, 8, 10, 12)

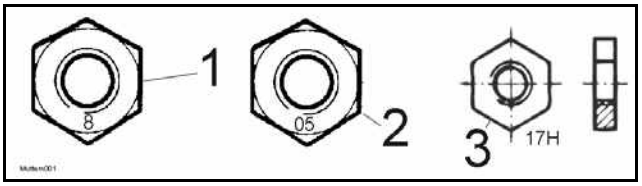

Fig. 8 Identification of nuts

In a connection with a screw, these nuts 1 (Fig. 8) must be able to bear the full pre-load at the yield point.

Nut height above 0.8 d (d = nominal dimension).

Strength class of nut	Strength class of associated screw
4	3.6, 4.6, 4.8
5	3.6, 4.6, 4.8 5.6, 5.8
6	6.8
8	8.8
9	9.8
10	10.8
12	12.8

Nuts for screw joints with limited load factor (04, 05)

The preceding "0" indicates that, due to their low height, nuts 2 (Fig. 8) in this group are only able to withstand the force of a screw to a limited extent.

Nut height below 0,8 d (d = nominal dimension).

Nuts for screw joints without specified load factor (11H, 14H, 17H, 22H)

This standard contains strength classes (hardness classes) for nuts 3 (Fig. 8), for which no load values can be specified, e.g. because of their shape and dimensions, but which can only be classified by their hardness.

Nut height below 0,5 d (d = nominal dimension).

Identification in clock system

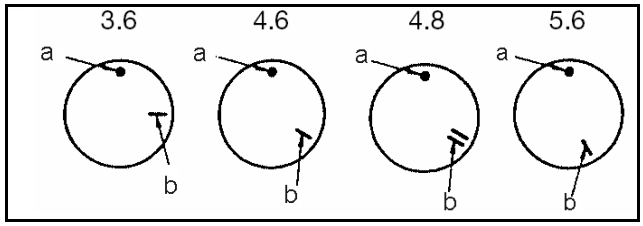

Fig. 9 Identification of nuts in clock system

For small nuts (Fig. 9) the clock system can be used for identification.

- The 12 o'clock position is identified by a dot or the manufacturer's symbol.
- The strength class is identified by a dash (b).

Identification of UNF-threads

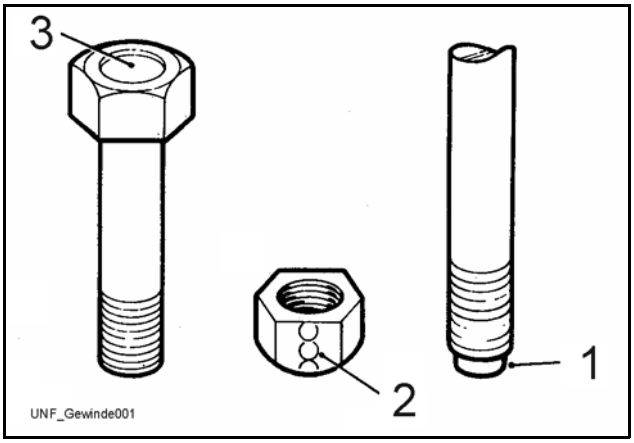

Fig. 10

Screws

The screw head is marked with a stamped in, round cavity 3 (Fig. 10).

Nuts

An uninterrupted series of stamped in circles parallel to the axis of the nut on a hexagon area (2).

Studs and brake rods

At the outmost end a short end of the component is reduced to its core diameter (1).

Cotter pins

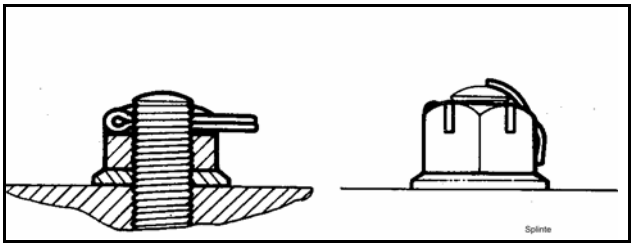

Fig. 11

In places where cotter pins are used, these must be reassembled. Cotter pins must generally be renewed after disassembly.

Cotter pins must be assembled as shown in the illustration, unless specified differently.

The values specified in the table apply for screws:

- black oiled
- with surface protection A4C
- with surface protection DACROMET

i Note

DACROMET is a surface protection that mainly consists of zinc and aluminium in a chromium oxide matrix. DACROMETIZATION provides excellent corrosion protection for metal surfaces by applying a mineral coating with metallic-silver appearance.

Tightening torques for screws with metric unified thread*

Screw dimension	Tightening torques Nm		
	8.8	10.9	12.9
M4	3	5	5
M5	6	9	10
M6	10	15	18
M8	25	35	45
M10	50	75	83
M12	88	123	147
M14	137	196	235
M16	211	300	358
M18	290	412	490
M20	412	578	696
M22	560	785	942
M24	711	1000	1200
M27	1050	1480	1774
M30	1420	2010	2400

* Coefficient of friction μ tot. = 0,14

Tightening torques for screws with metric unified fine thread*

Screw dimension	Tightening torques Nm		
	8.8	10.9	12.9
M8 x 1	26	37	48
M10 x 1.25	52	76	88
M12 x 1,25	98	137	126
M12 x 1.5	93	127	152
M14 x 1.5	152	216	255
M16 x 1.5	225	318	383
M18 x 1.5	324	466	554
M20 x 1.5	461	628	775
M22 x 1.5	618	863	1058
M24 x 2	780	1098	1294
M27 x2	1147	1578	1920
M30 x 2	1568	2254	2695

* Coefficient of friction μ tot. = 0,14

Tightening torques for screws treated with anti-seizure paste OKS 240* (copper paste)

Screw dimension	Tightening torques Nm		
	8.8	10.9	12.9
M16	169	240	287
M16 x 1.5	180	255	307
M18	232	330	392
M18 x 1.5	260	373	444
M20	330	463	557
M20 x 1.5	369	502	620
M22	448	628	754
M22 x 1.5	495	691	847
M24	569	800	960
M24 x 2	624	879	1036
M27	840	1184	1520
M27 X 2	918	1263	1536
M30	1136	1608	1920
M30 x 2	1255	1804	2156
3/4“ - 10 UNC	276	388	464
3/4“ - 16 UNC	308	432	520

* Anti-seizure paste (copper paste) is used for the assembly of screw connections, which are exposed to high temperatures and corrosive effects. Prevents seizure and corrosion.

Tightening torques for wheel nuts (fine thread) * **

Thread diameter	Tightening torques Nm
	10.9
M12x1.5	100
M14x1.5	150
M18x1.5	300 - 350
M20x1.5	400 - 500
M22x1.5	500 - 600

* Coefficient of friction μ tot. = 0,14

** These values result in a 90% utilization of the yield point

The values specified in the table apply for screws:

- black oiled
- with surface protection A4C
- with surface protection DACROMET

i Note

The difference between Withworth and UNF/UNC threads is the fact that UNF and UNC threads have 60° flanks, as the metric ISO-thread, whereas Withworth has a flank of only 55°.

DACROMET is a surface protection that mainly consists of zinc and aluminium in a chromium oxide matrix. DACROMETIZATION provides excellent corrosion protection for metal surfaces by applying a mineral coating with metallic-silver appearance.

Tightening torques for screws with UNC thread, * UNC Unified Coarse Thread Series, American Unified Coarse Thread

Screw dimension	Tightening torques Nm		
	8.8	10.9	12.9
1/4“ - 20	11	15	19
5/16“ - 18	23	32	39
3/8“ - 16	39	55	66
7/16“ - 14	62	87	105
1/2“ - 13	96	135	160
9/16“ - 12	140	200	235
5/8“ - 11	195	275	330
3/4“ - 10	345	485	580
7/8“ - 9	560	770	940
1“ - 8	850	1200	1450
1 1/8“ - 7	1200	1700	2000
1 1/4“ - 7	1700	2400	2900
1 3/8“ - 6	2200	3100	3700
1 1/2“ - 6	3000	4200	5100

* Coefficient of friction μ tot. = 0,14

Tightening torques for screws with UNF thread, * UNF Unified National Fine Thread Series, American Unified Fine Thread

Screw dimension	Tightening torques Nm		
	8.8	10.9	12.9
1/4“ - 28	13	18	22
5/16“ - 24	25	35	42
3/8“ - 24	45	63	76
7/16“ - 20	70	100	120
1/2“ - 20	110	155	185
9/16“ - 18	155	220	260
5/8“ - 18	220	310	370
3/4“ - 16	385	540	650
7/8“ -14	620	870	1050

Tightening torques for screws with UNF thread, * UNF Unified National Fine Thread Series, American Unified Fine Thread

Screw dimension	Tightening torques Nm		
	8.8	10.9	12.9
1“ - 12	930	1300	1600
1 1/8“ - 12	1350	1900	2300
1 1/4“ - 12	1900	2700	3200
1 3/8“ - 12	2600	3700	4400
1 1/2“ - 12	3300	4600	5600

* Coefficient of friction μ tot. = 0,14

2 Technical data

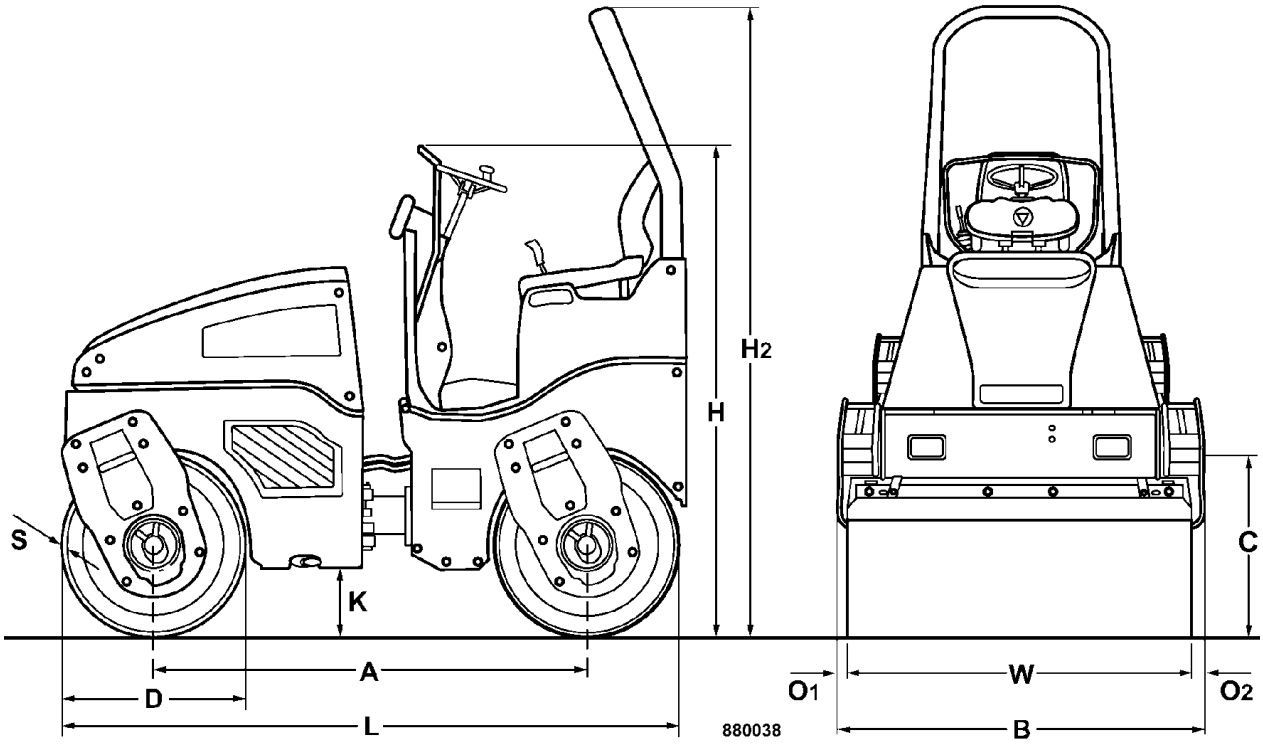

Fig. 12

Dimensions in mm	A	B	C	D	H	H2	K	L	O	S	W
BW 100 AD-4	1728	1076	475	700	1800	2475	255	2475	38	13	1000
BW 120 AD-4	1728	1276	474	700	1800	2475	255	2475	38	13	1200
BW 125 AD-4	1728	1276	474	700	1800	2475	255	2475	38	23	1200

*		**BW 100 AD-4**	**BW 120 AD-4**	**BW 125 AD-4**
Weights				
Operating weight with ROPS (CECE)	kg	2400	2600	3150
Operating weight with ROPS (CECE) and empty chip spreader**	kg	2520	2730	3150
Mean axle load (CECE)	kg	1200	1300	1575
Mean static linear load (CECE)	kg/cm	12.0	10.8	13.1
Max. operating weight	kg	2950	3150	3400
Dimensions				
Inner track radius	mm	2720	2620	2620
Length with chip spreader**	mm	3250	3250	-
Width with chip spreader**	mm	1180	1276	-
Travel characteristics				
Working speed with vibration	km/h	0 – 6.5	0 – 6.5	0 – 6.5
Travel speed	km/h	0 – 12	0 – 12	0 – 12
Max. gradability without/with vibration (soil dependent)	%	40/30	40/30	40/30
Drive				
Engine manufacturer		Kubota	Kubota	Kubota
Type		D 1703-M-EU34	D 1703-M-EU34	D 1703-M-EU34

*		BW 100 AD-4	BW 120 AD-4	BW 125 AD-4
Cooling		Water	Water	Water
Number of cylinders		3	3	3
Rated power ISO 9249	kW	24.3	24.3	24.3
Rated power SAE J 1349	hp	32.6	32.6	32.6
Rated speed	min^{-1}	2600	2600	2600
Fixed engine speed 1	min^{-1}	2400	2400	2400
Fixed engine speed 2	min^{-1}	2600	2600	2600
Electrical equipment	V	12	12	12
Brake				
Service brake		hydrost.	hydrost.	hydrost.
Parking brake		hydro-mech.	hydro-mech.	hydro-mech.
Steering				
Type of steering		Oscill.-articul.	Oscill.-articul.	Oscill.-articul.
Steering operation		hydrost.	hydrost.	hydrost.
Steering/oscillation angle	+/- °	30/7	30/7	30/7
Exciter system				
Vibrating drum		front + rear	front + rear	front + rear
Drive system		hydrost.	hydrost.	hydrost.
Frequency 1/2	Hz	70/55	70/55	60/50
Amplitude	mm	0.50	0.51	0.40
Centrifugal force 1/2	kN	37/23	45/28	41/29
Water sprinkler system				
Type		Gravity feed	Gravity feed	Gravity feed
Filling capacities				
Fuel (diesel)	l	approx. 40	approx. 40	approx. 40
Water tank capacity	l	approx. 220	approx. 220	approx. 220
Hydraulic oil	l	approx. 28	approx. 32	approx. 32
Engine oil	l	approx. 6,5	approx. 6,5	approx. 6,5

* The right for technical modifications remains reserved
** Optional equipment

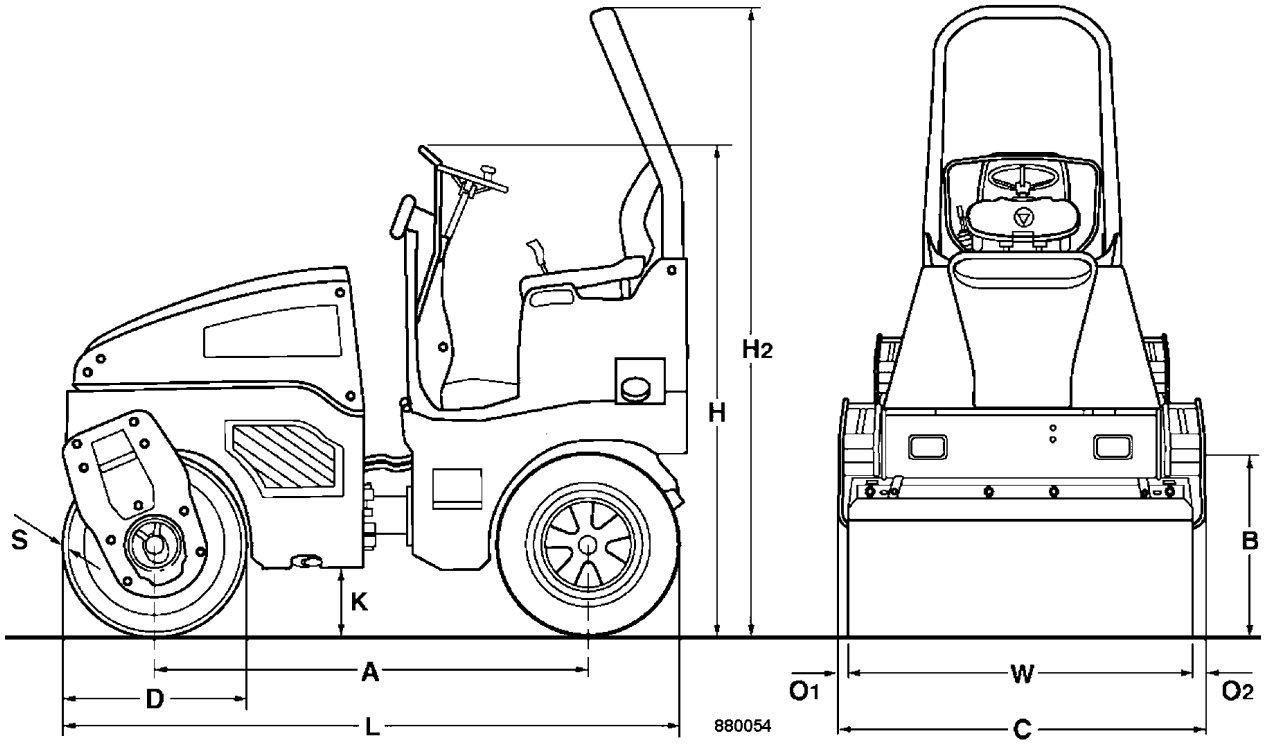

Fig. 13

Dimensions in mm	A	B	C	D	H	H2	K	L	O	S	W
BW 100 AC-4	1728	1076	475	700	1800	2475	255	2475	38	13	1000
BW 120 AC-4	1728	1276	474	700	1800	2475	255	2475	38	13	1200
BW 125 AC-4	1728	1276	474	700	1800	2475	255	2475	38	23	1200

*		BW 100 AC-4	BW 120 AC-4	BW 125 AC-4
Weights				
Operating weight with ROPS (CECE)	kg	2250	2400	2950
Axle load, drum (CECE)	kg	1150	1240	1600
Axle load, wheels (CECE)	kg	1100	1160	1350
Static linear load (CECE)	kg/cm	11.5	10.3	13.5
Wheel load (CECE)	kg	275	290	338
Max. operating weight	kg	2600	2800	3250
Dimensions				
Inner track radius	mm	2720	2620	2620
Travel characteristics				
Working speed with vibration	km/h	0 – 6	0 – 6	0 – 6
Travel speed	km/h	0 – 10	0 – 10	0 – 10
Max. gradability without/with vibration (soil dependent)	%	40/30	40/30	40/30
Drive				
Engine manufacturer		Kubota	Kubota	Kubota
Type		D 1703-M-EU34	D 1703-M-EU34	D 1703-M-EU34
Cooling		Water	Water	Water

*		BW 100 AC-4	BW 120 AC-4	BW 125 AC-4
Number of cylinders		3	3	3
Rated power ISO 9249	kW	24.3	24.3	24.3
Rated power SAE J 1349	hp	32.6	32.6	32.6
Rotary speed (nominal speed)	rpm	2600	2600	2600
Fixed engine speed 1	rpm	2400	2400	2400
Fixed engine speed 2	rpm	2600	2600	2600
Electrical equipment	V	12	12	12
Tires				
Number of tires		4	4	4
Tire size		205/60-15	205/60-15	205/60-15
Brake				
Service brake		hydrost.	hydrost.	hydrost.
Parking brake		hydro-mech.	hydro-mech.	hydro-mech.
Steering				
Type of steering		Oscill.-articul.	Oscill.-articul.	Oscill.-articul.
Steering operation		hydrost.	hydrost.	hydrost.
Steering/oscillation angle	degree	30/7	30/7	30/7
Exciter system				
Vibrating drum		front	front	front
Drive system		hydrost.	hydrost.	hydrost.
Frequency 1/2	Hz	70/55	70/55	60/50
Amplitude	mm	0.50	0.52	0.40
Centrifugal force 1/2	kN	37/23	45/28	42/29
Water sprinkler system				
Type		Pressure	Pressure	Pressure
Interval control		Standard	Standard	Standard
Filling capacities				
Fuel (diesel)	l	approx. 40	approx. 40	approx. 40
Water tank capacity	l	approx. 220	approx. 220	approx. 220
Emulsion	l	approx. 20	approx. 20	approx. 20
Hydraulic oil	l	approx. 28	approx. 28	approx. 28
Engine oil	l	approx. 6,5	approx. 6,5	approx. 6,5

* Subject to technical alterations.

Additional engine data

Combustion principle		4-stroke diesel
Low idle speed	rpm	1200 ± 50
High idle speed	rpm	2700 ± 25
Specific fuel consumption	g/kWh	235
Valve clearance intake	mm	0.2
Valve clearance exhaust	mm	0.2
Injection valves opening pressure	bar	140 + 10

Travel pump

Manufacturer		Sauer
Type		42 R28
System		Axial piston/swash plate
Max. displacement	cm^3/rev	28
Max. flow capacity	l/min	76
High pressure limitation	bar	385
Charge pressure, high idle	bar	20 ± 2

Drum drive motor

Manufacturer		Poclain
Type		MK 04
System		Radial piston
Displacement	cm^3/rev	408
Perm. leak oil rate	l/min	1.5

Wheel motor

Manufacturer		Poclain
Type		MSE 02
System		Radial piston
Displacement	cm^3/rev	408
Perm. leak oil rate	l/min	1.5

Vibration pump

Type		HYZ/11
System		Gear pump
Max. displacement	cm^3/rev	11
Starting pressure	bar	210 ± 20
Operating pressure (soil dependent)	bar	100 ± 60

Vibration motor

Type		HYZ/8
System		Gear motor
Displacement	cm^3/rev	8

Steering/charge pump

Type		HYZ/8
System		Gear pump
Displacement	cm^3/rev	8
Max. steering pressure	bar	160 to 190

Steering valve

Manufacturer	Danfoss
Type	OSPC 80 ON
System	Rotary spool valve

The following noise and vibration data acc. to

- EC Machine Regulation edition 98/37/EC and

- the noise regulation 2000/14/EG, noise protection guideline 2003/10/EC

- Vibration Protection Regulation 2002/44/EC

were determined during conditions typical for this type of equipment and by application of harmonized standards.

During operation these values may vary because of the existing operating conditions.

Noise value

sound pressure level on the operator's stand:

L_{pA} = 85 dB(A), determined acc. to ISO 11204 and EN 500

Guaranteed sound power level:

L_{WA} = 106 dB(A), determined acc. to ISO 3744 and EN 500

⚠ Danger

Wear your personal noise protection means (ear defenders) before starting operation.

Vibration value

Vibration of the entire body (driver's seat)

The weighted effective acceleration value determined according to ISO 7096 is <= 0.5 m/sec^2.

Hand-arm vibration values

The weighted effective acceleration value determined according to EN 500/ISO is <= 2.5 m/sec^2.

3 Maintenance

3.1 General notes on maintenance

When performing maintenance work always comply with the appropriate safety regulations.

Thorough maintenance of the machine guarantees higher functional safety of the unit and prolongs the lifetime of important components. The effort needed for this work is only little compared with the problems that may arise when not observing this rule.

The terms right/left correspond with travel direction forward.

- Always clean machine and engine thoroughly before starting maintenance work.
- For maintenance work stand the machine on level ground.
- Perform maintenance work generally with the engine stopped.
- Relieve hydraulic pressures before working on hydraulic lines.
- Before working on electric parts of the machine disconnect the battery and cover it with insulation material.
- When working in the area of the articulated joint attach the articulation lock (transport lock).

Environment

During maintenance work catch all oils and fuels and do not let them seep into the ground or into the sewage system. Dispose of oils and fuels environmentally.

Notes on the fuel system

The lifetime of the diesel engine depends to a great extent on the cleanliness of the fuel.

- Keep fuel free of contaminants and water, since this will damage the injection elements of the engine.
- Drums with inside zinc lining are not suitable to store fuel.
- The fuel drum must rest for a longer period of time before drawing off fuel.
- Do not let the hose stir up the slurry at the bottom of the drum.
- Do not draw off fuel from near the bottom of the drum.
- The rest in the drum is not suitable for the engine and should only be used for cleaning purposes.

Notes on the engine performance

On diesel engines both combustion air quantity and fuel injection quantity are thoroughly adapted to each other and determine power, temperature level and exhaust gas quality of the engine.

If you engine has to work permanently in "thin air" (at higher altitudes) and under full load, you should consult the customer service of BOMAG or the customer service of the engine manufacturer.

Notes on the hydraulic system

During maintenance work on the hydraulic system cleanliness is of major importance. Make sure that no dirt or other contaminating substances can enter into the system. Small particles can produce flutes in valves, cause pumps to seize, clog nozzles and pilot bores, thereby making expensive repairs inevitable.

- If, during the daily inspection of the oil level, the hydraulic oil level is found to have dropped, check all lines, hoses and components for leaks.
- Seal external leaks immediately. If necessary inform the responsible customer service.
- Do not store drums with hydraulic oil outdoors, or at least under cover. Water can be drawn in through the bunghole when the weather changes.
- Always use the filling and filtering unit (BOMAG part-no. 007 610 01) to fill the hydraulic system. This unit is fitted with a fine filter to clean the hydraulic oil, thereby prolonging the lifetime of the filter.
- Clean fittings, filler covers and the area around such parts before disassembly to avoid entering of dirt.
- Do not leave the tank opening unnecessarily open, but cover it so that nothing can fall in.

3.2 Fuels and lubricants

Engine oil

In order to assure perfect cold starting it is import to chose the viscosity (SAE-class) of the engine oil according to the ambient temperature.

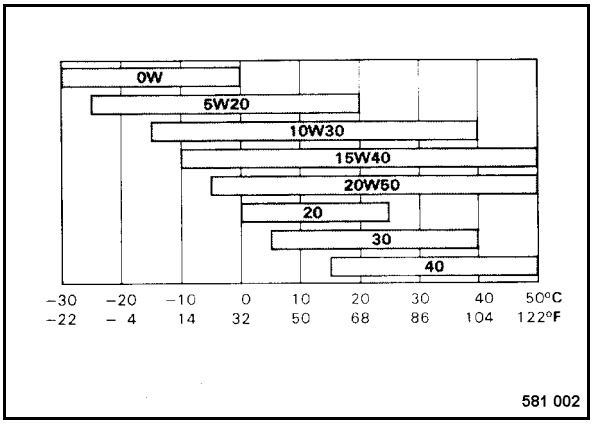

Fig. 14

Lubrication oil with a too high viscosity index causes starting difficulties. The temperature when starting the engine is therefore of highest importance when choosing the viscosity of engine oil for winter operation.

Oil viscosity

Since lubrication oil changes its viscosity with the temperature, the ambient temperature at the operating location of the engine is of utmost importance when choosing the viscosity class (SAE-class) (see diagram).

Occasional falling short of the temperature limit (e.g. use of SAE 15W/40 down to -15°C) may effect the cold starting ability of the engine, but will not cause any engine damage.

Temperature related lubrication oil changes can be avoided by using multi-purpose oils. The following oil change intervals apply also when using multi-purpose oils.

Regular lubrication oil changes

The longest permissible time a lubrication oil should remain in an engine is 1 year. If the following oil change intervals are not reached over a period of 1 year, the oil change should be performed at least once per year, irrespective of the operating hours reached.

Oil quality

Lubrication oil are classified according to their performance and quality class. Specifications according to API* are commonly used.

Permitted API-oils

CF/CF-4/CG-4

In regions where such qualities are not available you should consult the engine manufacturer.

Lubrication oil change intervals

⚠ Caution

These intervals apply only when using a diesel fuel with maximum 0.5 % sulphur by weight and for ambient temperatures higher than -10 °C.

API: CF/CF-4/CG-4 = 250 operating hours

When using fuels with a sulphur content of more than 0,5% to 1% or under ambient temperatures below -10°C the oil change intervals must be halved.

For fuels with a sulphur content of more than 1% you should consult the responsible service agency.

Fuels

Quality

You should only use commercially available brand diesel fuel with a sulphur content below 0.5% and ensure strict cleanliness when filling in. A higher sulphur content has a negative effect on the oil change intervals. Use only winter-grade diesel fuel under low ambient temperatures. The fuel level should always be topped up in due time so that the fuel tank is never run dry, as otherwise filter and injection lines need to be bled.

The following fuel specifications are permitted: DIN/EN 590; DIN 51 601; Nato Codes: F-54, F-75; BS 2869: A1 and A2; ASTM D 975-78: 1-D and 2-D.

Winter fuel

For winter operation use only winter diesel fuel, to avoid clogging because of paraffin separation. At very low temperatures disturbing paraffin separation can also be expected when using winter diesel fuel.

In most cases a sufficient cold resistance can also be achieved by adding flow enhancing fuel additives. Consult the engine manufacturer.

Hydraulic oil

The hydraulic system is operated with hydraulic oil HV 46 (ISO) with a kinematic viscosity of 46 mm^2/s at 40°C. For topping up or for oil changes use only high-quality hydraulic oil, type HVLP according to DIN 51524, part 3, or hydraulic oils type HV according to ISO 6743/3. The viscosity index (VI) should be at least 150 (observe information of manufacturer).

* American Petroleum Institute

Bio-degradable hydraulic oil

On request the hydraulic system can also be filled with synthetic ester based biodegradable hydraulic oil (Panolin HLP Synth. 46). The biologically quickly degradable hydraulic oil meets all demands of a mineral oil based hydraulic oil according to DIN 51524.

In hydraulic systems filled with Panolin HLP Synth. 46 always use the same oil to top up. When changing from mineral oil based hydraulic oil to an ester based biologically degradable oil, you should consult the lubrication oil service of the oil manufacturer for details.

Check the filter more frequently after this change.

Coolant

For the coolant mixture use only clean tap water (drinking water) and anti-freeze agent acc. to SAE J1034 or SAE J814c.

As a protection against frost, corrosion and boiling point anti-freeze agents must be used under any climatic conditions.

The proportion of cooling system protection agent must be between min. 35% and max. 50% to the water.

⚠ Caution

Do not mix different coolants and additives of any other kind.

Observe the instructions of the manufacturer.

3.3 Table of fuels and lubricants

Assembly	Fuel or lubricant		Quantity
	Summer	**Winter**	**Attention** Observe the level marks
Engine			
- Engine oil	Engine oil API: CF, CF-4, CG-4, CH-4 or CI-4 SAE 10W-40 (-20 °C to +40 °C) (BOMAG PN 009 920 06; 20 l) SAE 10W-30 (-15 °C to +30 °C) SAE 15W-40 (-15 °C to + 40 °C)		approx. 6.5 litres
	SAE 30 (+5 °C to +30 °C)	SAE 10 (-30 °C to -5 °C)	
- Fuel	Diesel	Winter diesel fuel (down to -12°C)	approx. 40 litres
- Coolant	Mixture of water and anti-freeze agent (BOMAG PN 009 940 08; 20 l)		approx. 4 litres
Hydraulic system	Hydraulic oil (ISO), HLP 46 (BOMAG PN 009 930 09; 20 l) or ester based biodegradable hydraulic oil		approx. 28 litres
Sprinkler system	Water	Anti-freeze mixture water *	approx. 220 litres
- Rubber tire sprinkler system	Emulsion		approx.20 l

* Mix water and anti-freeze agent by following the instructions of the manufacturer.

3.4 Running-in instructions

i Note

The maintenance plan inside the engine hood of the machine assists you when servicing the machine!

⚠ Caution

Do not retighten the cylinder head fastening of the engine.

Maintenance after 50 operating hours

On new or overhauled machines you should generally:

- Change the engine oil
- Change the engine oil filter
- Check the engine for leaks
- Retighten the fastening screws on air filter, exhaust and other attachments.

Maintenance after 200 operating hours

- New engines normally have a higher oil consumption. It is therefore recommended to check the oil level twice a day during the running-in phase.
- After the running-in phase it is quite sufficient to check the oil level once every day.
- Check screw connections on the machine, retighten as necessary.
- Check for leaks.