

OPERATING MANUAL BMS-220 ADB UC

VERSION 1.4

**EC DECLARATION OF CONFORMITY**

in accordance with Appendix II sub A of Directive 2006/42/EC

DIAMATIC USA

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We declare under our sole responsibility that the machine as described below conforms with the Health and Safety requirements of the European Directive for machine Safety.

In case of changes to the machine without our written authorization this declaration loses its validity.

Model: Diamatic

**BMS-220ADB-0600
BMS-220ADB-0700**

**Serial number: xxxxxB
Serial number: xxxxxB**

1. satisfies the conditions set out in the Machine Directive (Directive 2006/42/EC); Low voltage directive (2006/95/EC, as last amended; EMC directive 2004/108/EC, as last amended)
2. satisfies the following harmonized standards:
NEN-EN 292-1, NEN-EN 60335-1, NEN-EN 60335-2-69, NEN-EN 55014, NEN-EN 55014-2 and NEN-EN 61000-3-2

Nieuwegein 27-01-2014


Michiel Kalisvaart



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1. Introduction

It is important that all persons who are working or maintaining this machine read the manual carefully and understand it fully.

Keep this manual near to the machine, so it can always be consulted.

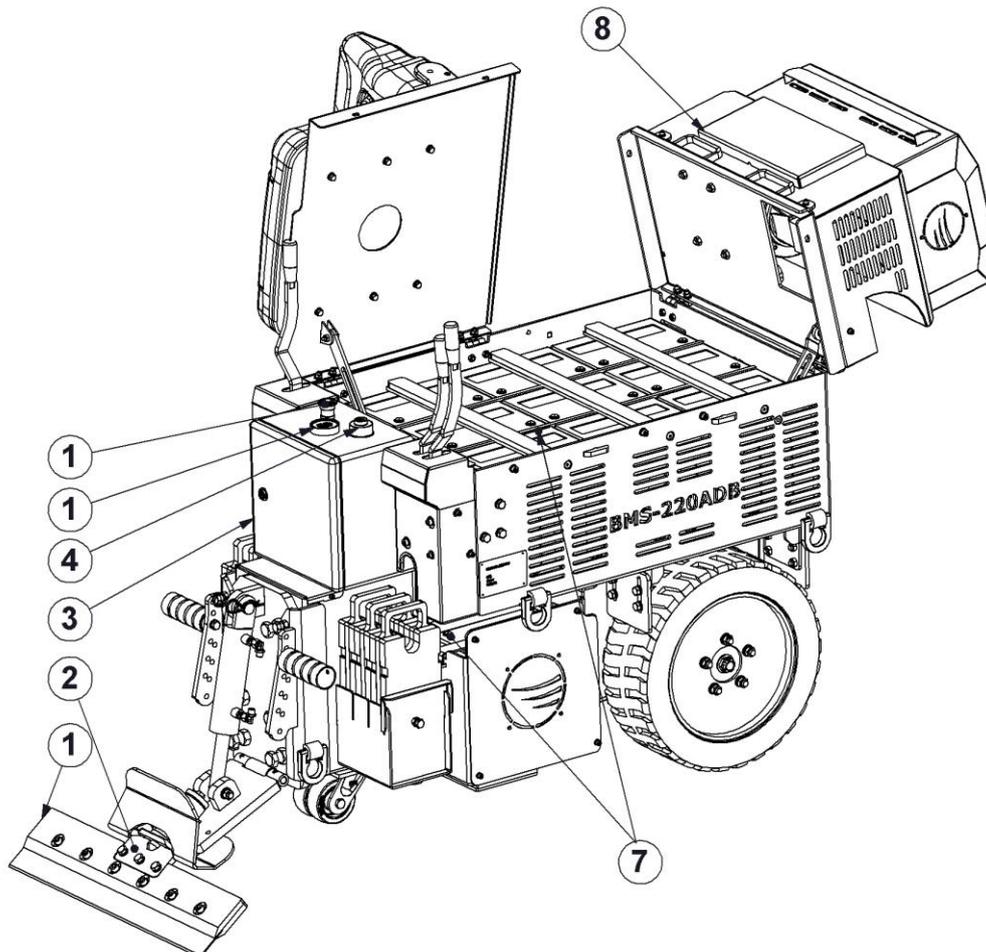
Only authorized and trained personnel may operate this machine.

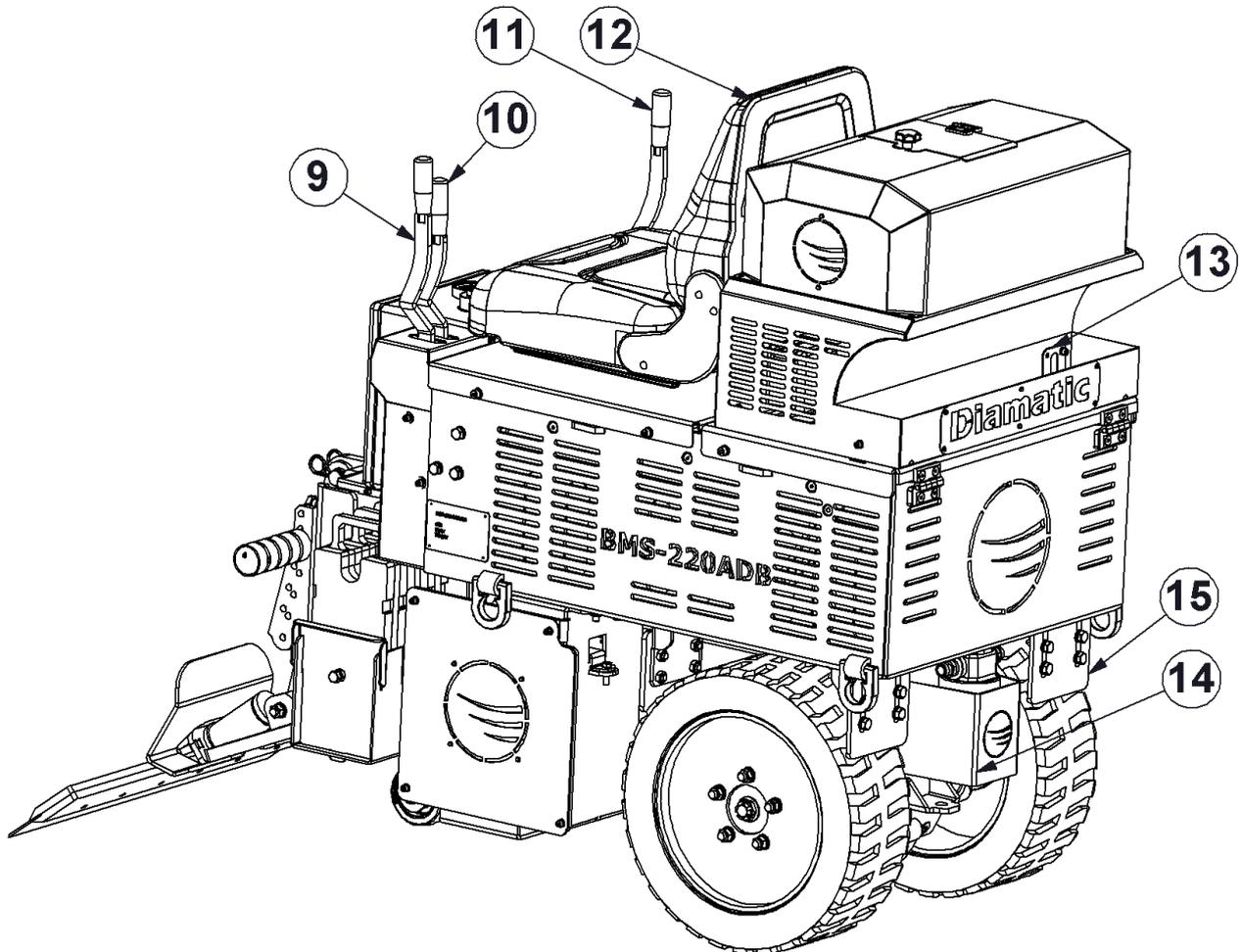
2. Machine description

The Diamatic BMS-220ADB ride-on stripper is ideally suited for medium and large sized applications with the added benefit of being battery operated for increased versatility. It is very maneuverable with zero turn radius, non-mark tires and complete hydraulic control.

Main assets of BMS-220ADB:

- fast and easy removal of all kind of flooring material
- very compact, goes through standard doors & elevators
- zero turn radius, ergonomic design for safe maneuvering, non -marking tires
- very versatile, total freedom of movement, no electric cable.
- complete hydraulic control (drive and tool control)
- powered by a high-duty battery, running time up to 10 hours
- very high output compared to manual material removal.





1	Tool holder	9	Left wheel handle
2	Blade holder	10	Tool position handle
3	Electro box	11	Right wheel steer handle
4	ON/Off key	12	Adjustable seat
5	Battery discharge indicator/hour meter	13	Charger connection
6	Emergency shut down	14	Oil filter
7	Batteries set	15	Wheel scrapers
8	Box with drive unit (motor with pumps)		

3. Safety

It is important that all persons who are working with or maintaining this machine must read the manual carefully and understand it fully.

Keep this manual always with the machine, to enable it to be referred to at any time

Safety precautions

- Make sure that persons who are not operating the machine are not in the surrounding area of 5 meter of the machine.
- Make sure that there is nothing standing or situated on the surface to be treated
- Make sure that there are no cables or hoses in the driving direction of the machine.
- Always drive backwards when driving up to a ramp or grade, and forwards when driving of the ramp.
- Don't get disturbed during the activities.

Safety regulations

- Never change anything from the safety devices on the machine!
- Persons who are not operating the machine must not be permitted to stay in the surrounding area of 5 meter of the machine.
- Don't change anything on the machine. Always use cables for charger which are approved and safety earthed, including extension cables. The charger is always equipped with an earthed connection, do not change this and use always earthed cables with an earthed plug.
- Connect the main power supply cable of charger to an installation with an earth leakage circuit breaker.
- Inspect and test the electrical components regularly. The electrical components have to satisfy to the requirements which apply to these components.
- Always call a skilled electrician or your distributor when you have questions about the safety of the electrical components.
- Work on electrical equipment or operating materials may only be undertaken by a skilled electrician or by trained persons under the guidance and supervision of a skilled electrician as well as in accordance with the electrical engineering regulations.
- Pull out the main plug of the charger and the electrical panel during inspections and repairing on the machine.

The following sticker is placed on the machine.



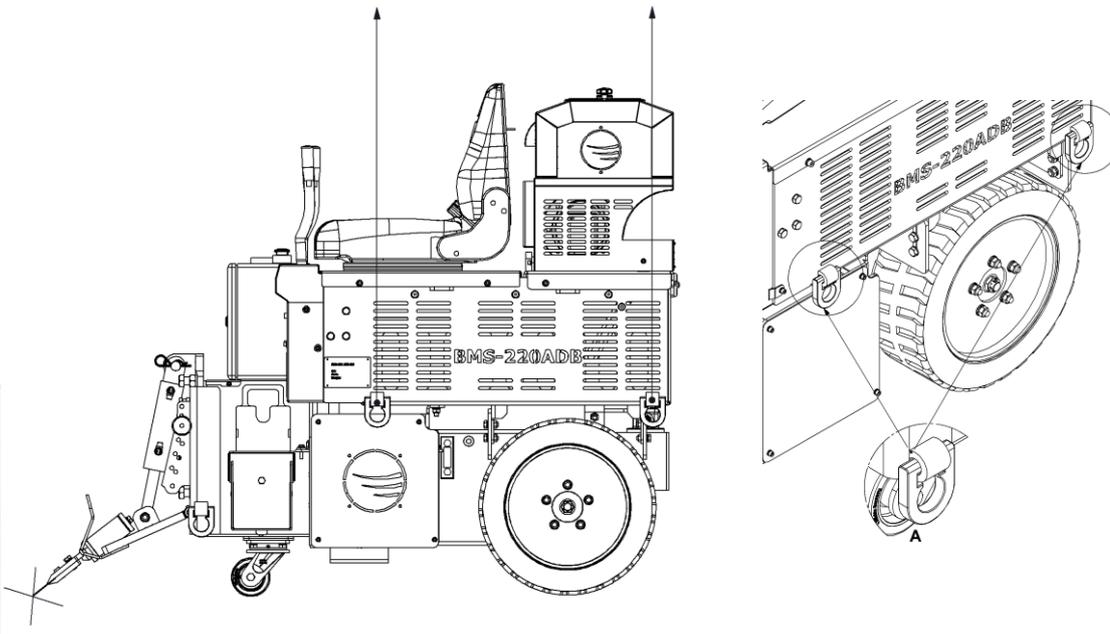
Meanings of these symbols are:

- Ear protection is obliged
- Safety glasses with lateral protection are obliged
- CE-mark on this machine
- Safety shoes obliged
- Consult the manual before operating the machine

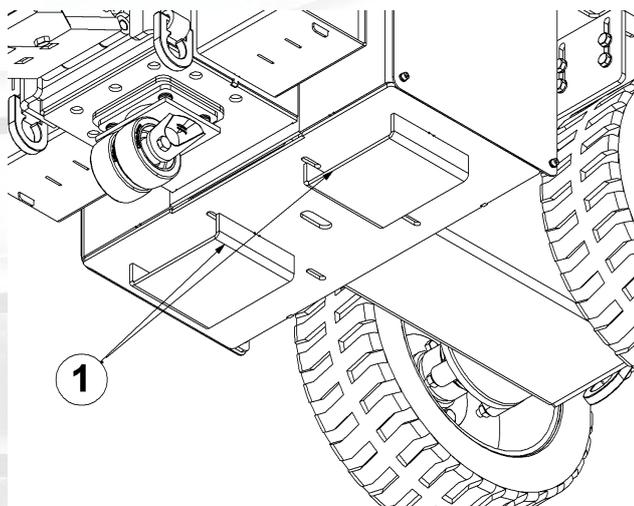
Personnel must tie back long hair and not wear loose clothing or jewellery including rings.
Wear gloves and dust mask during operating the machine.

Safety instructions

- Turn key to OFF and press Emergency shut down when changing the blade or during repairs on the machine.
- Turn key to OFF and press Emergency shut down when machine is parked.
 - Park the machine always on a flat horizontal and levelled surface.
 - Cover the sharp blade or remove it when park the machine.
- Make sure the machine is clean and that the footrests are dry and free of grease and oil.
- NEVER lift machine with mounted tool! This sharp tool can be very dangerous!
- The weight of the BMS-220 is 1080 kilogram. Use preferably appropriate appliances as a lift or crane. Use the existing lifting points to lift the machine.

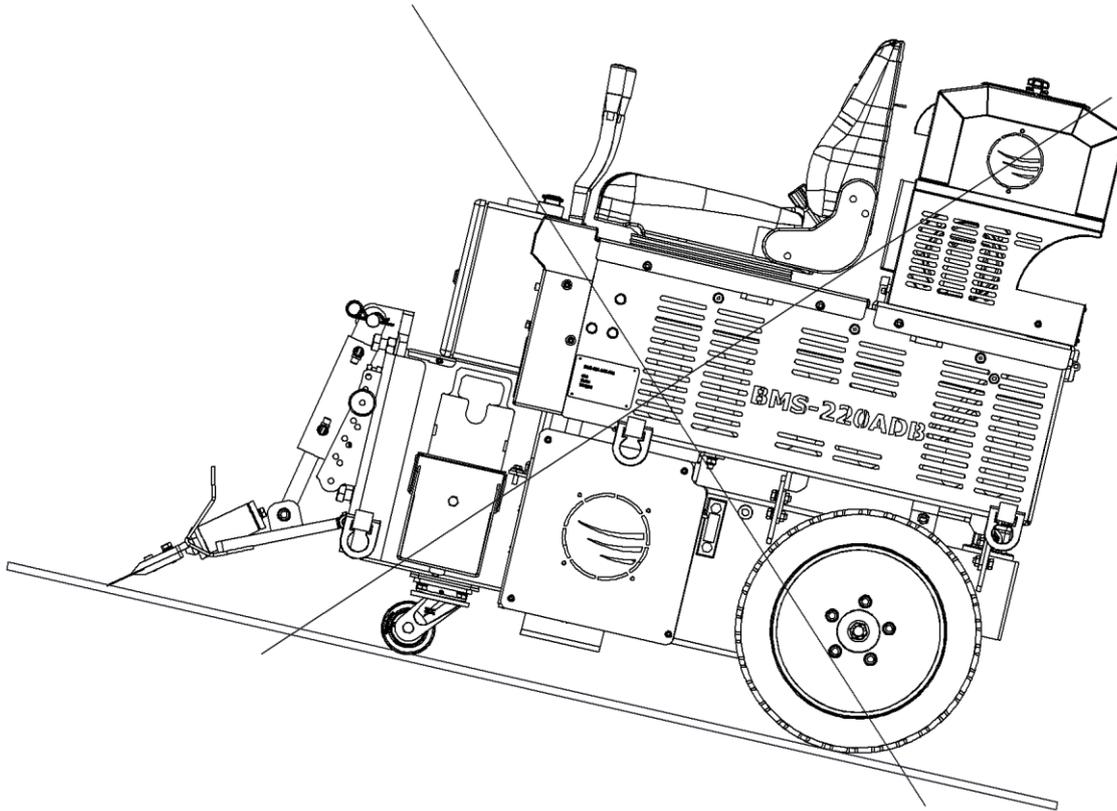


- Chock wheels for transport and keep control handles in neutral position.
- Don't leave the machine unsecured on jobsites.
- Machine can be lifted by a forklift. For this use prepared bracket (1) on bottom of machine:





- Be aware of your surroundings and machine operating level. Do not side hill, do not run on steep incline, this could cause machine to tip over.
- Always drive backwards when driving up to a ramp or grade, and forwards when driving of the ramp.
- Do not run the machine in unsafe environments.
-



4. Initial operation

Before using the machine it is essential to inspect the machine every day.
It is not permitted to use the machine if the machine safety is not according the checkpoints below.

Checkpoints of electrical safety:

- Check if the power supply cable of the charger is unplugged and the cable is stored into the machine.
- Any damage to electric cables is not permitted

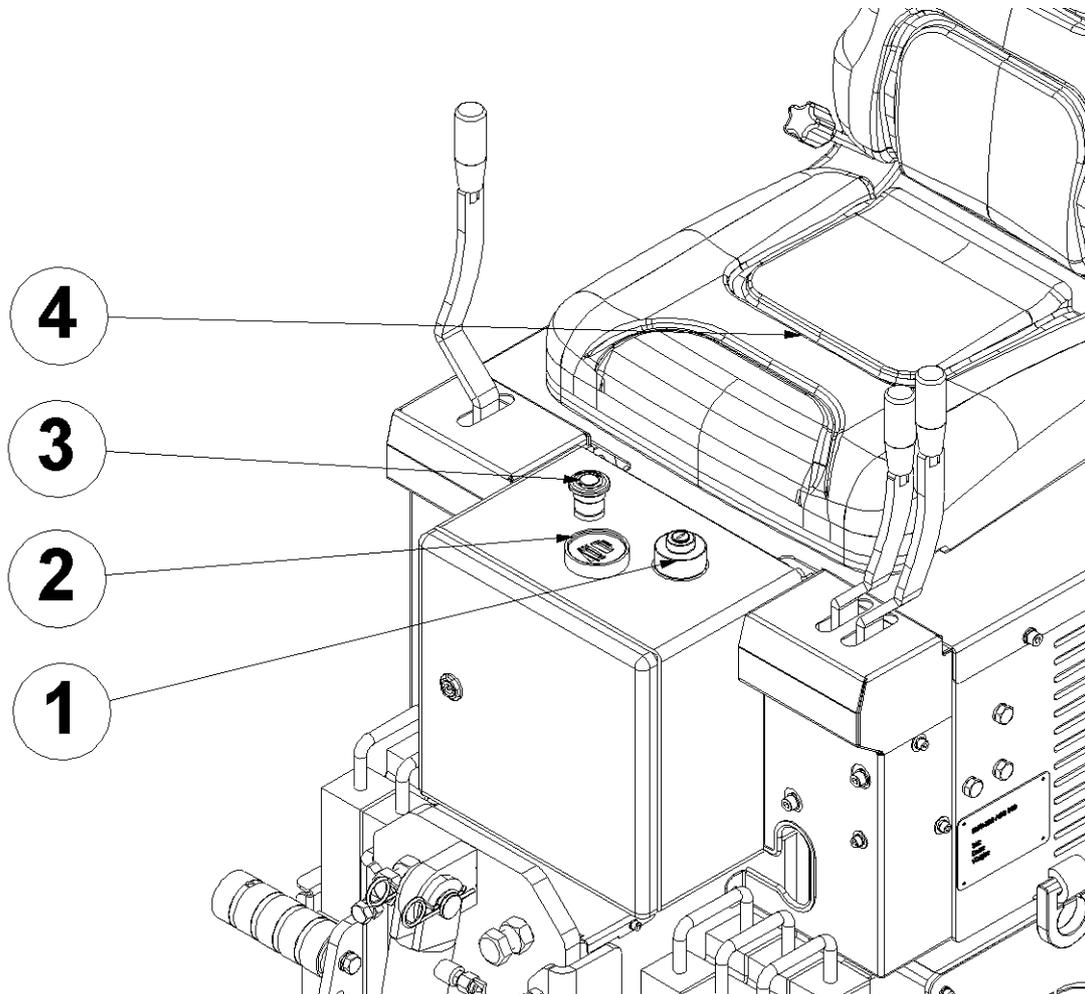
Checkpoints of machine safety:

Check if:

- Control levers should be in neutral position .
- All hydraulic hose connections are tightened and there is no leakage of oil.
- The safety functions and operating functions work correct.
- There are not any loose nuts or bolts.

5. Operation

During operating the BMP-4000, the following additional safety instructions must be followed closely.



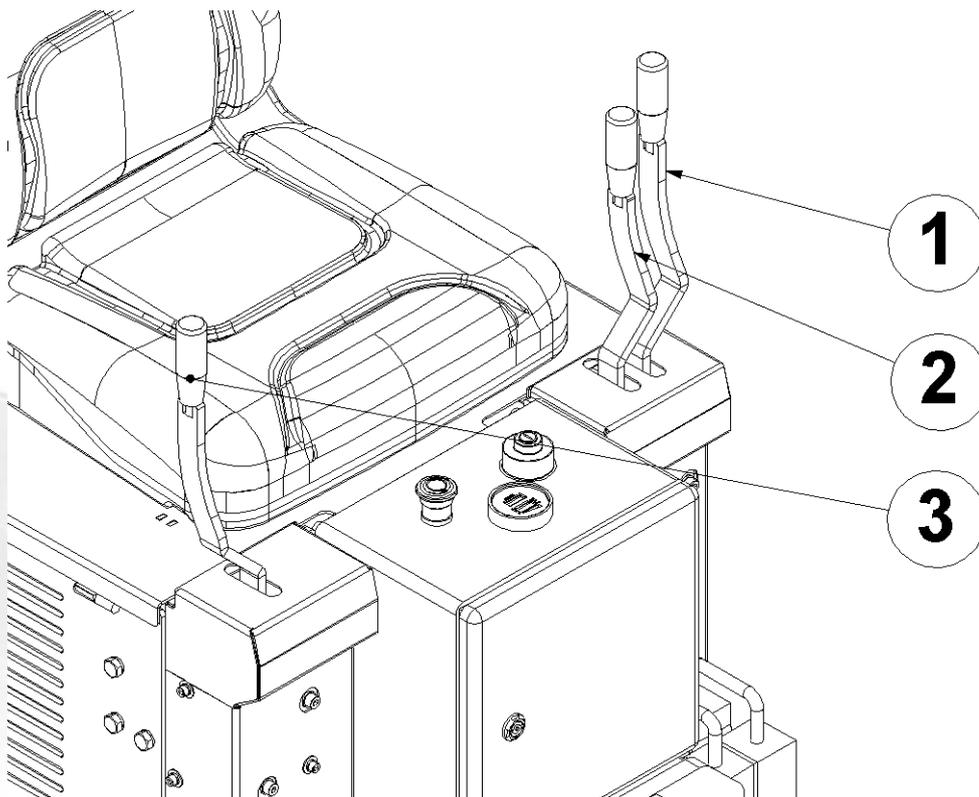
Switching on the machine

- Take place on the seat (4) and put feet on the footrests. Operating the machine is not possible because of the safety switch of the seat.
- Pull out the emergency switch (3).
- Turn the key contact switch (1) to the right.
- Check battery power on discharge meter.



Driving the machine

The drive of the machine is controlled by the two outside handles (1 and 3). Pushing both handles forwards, the machine drive forwards. Pulling both handles backwards, the machine drive backwards. The driving speed depends on the position of the handles. Pushing the right handle forwards the machine turns to the left. Pushing one handle forwards and pulling another handle backwards the machine will turn around its axis. Correcting direction while moving is accomplished by slightly reducing pressure on one handle or the other while moving.

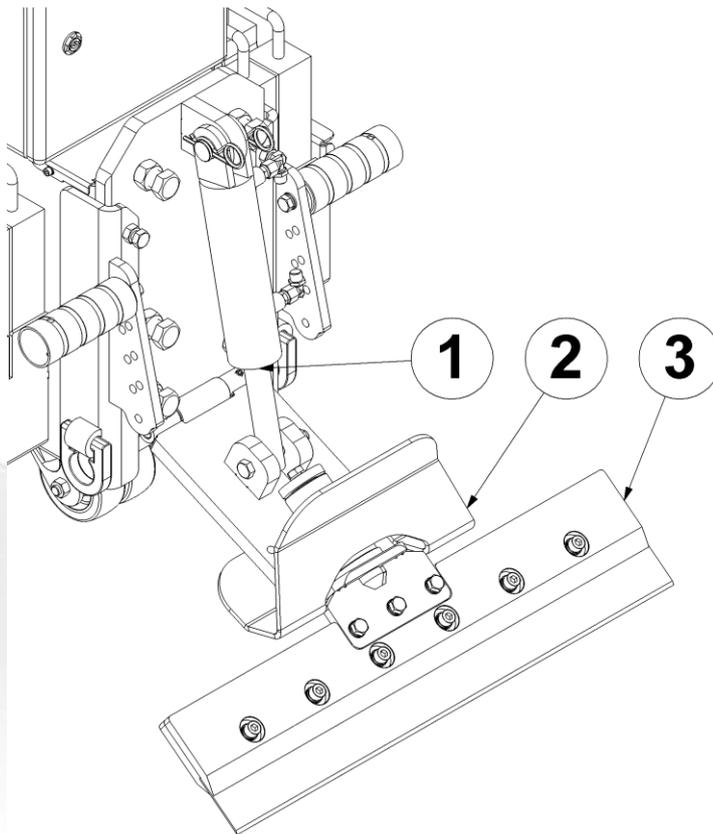


- 1) Left wheel control handle.
- 2) Tool positioning control handle.
- 3) Right wheel control handle.



Controlling tool position cylinder

The tool position cylinder is controlled by left inner handle. Push the handle to lower the tool and pull the handle to lift the tool to proper cutting angle. Continuing to push the handle will jack up the front of the machine. This will need to be done when doing maintenance on the machine. When doing the machine maintenance, place blocks under the machine. Never use the cutting head only.

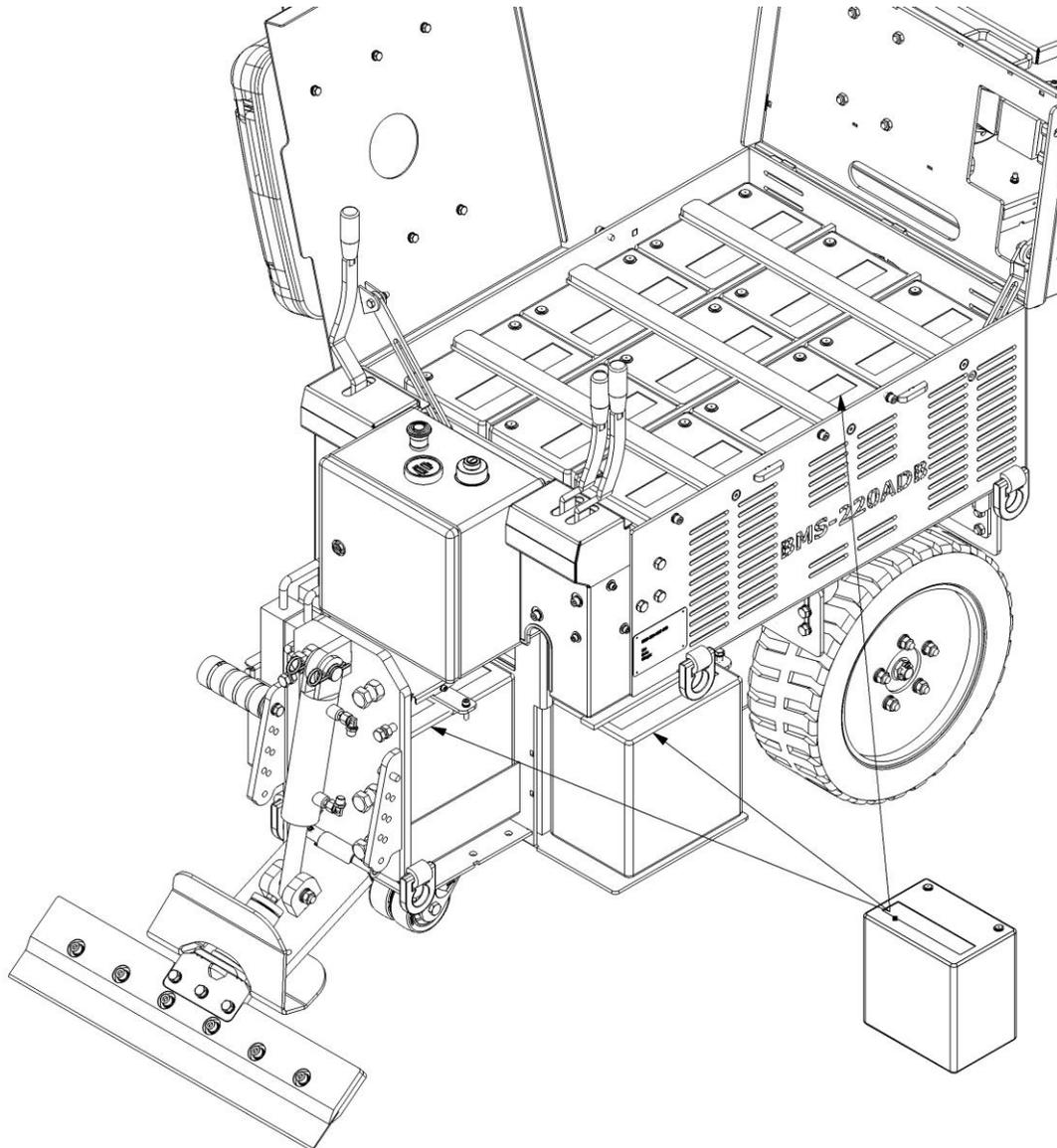


- 1) Hydraulic cylinder
- 2) Debris deflector
- 3) Cutting head - set



Battery operation

Machine is equipped with twelve batteries 4GBV 180 EV 8Volt, 180 Ah.



Batteries do not take a memory allowing recharge at any state. Do not over discharge, this could cause damage to batteries.

IMPORTANT Every service work on batteries should only be done by trained personnel. High amperage exist and can cause serious injury or death.

For work with the batteries need to be removed all metal jewelry like rings, watches, necklaces. They can be a cause of serious burns. Batteries are heavy (around 37kg) so for removing them is good to ask about help or use lifting device. Do not drop.

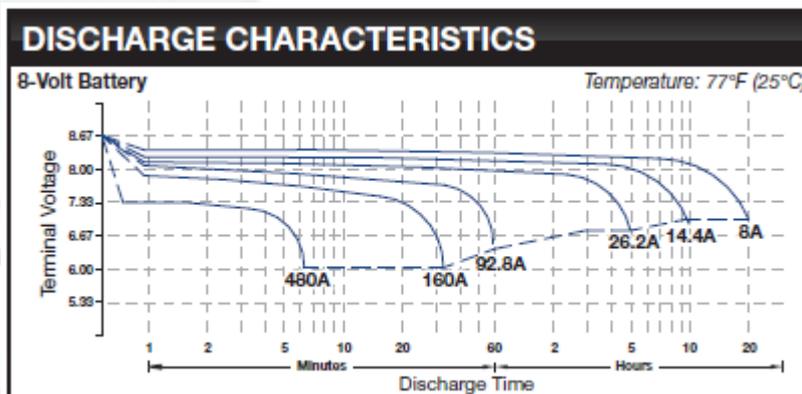
To ensure the longest possible battery life is ordered to make small brake after charging. In this time batteries can cool down to the room temperature.



Information about safety and maintenance form producer:

Parameter which is important for batteries is the temperature in which they work. Optimum range is from -10° C to 45° C . Batteries may not be left in minimum temperature for long time. The low temperature can make the battery freezing what can damage them. More characteristics in the table below.

CHARACTERISTICS		
Capacity 77°F (25°C)	20 Hour Rate (8A to 7.0 Volts)	160AH
	10 Hour Rate (14.4A to 7.0 Volts)	144AH
	5 Hour Rate (26.2A to 6.8 Volts)	131AH
Internal Resistance	Full charged Battery 77°F (25°C)	2.4m Ω
Capacity Affected by Temperature (20 Hour Rate)	104°F (40°C)	102%
	77°F (25°C)	100%
	32°F (0°C)	85%
	5°F (-15°C)	65%
Self-Discharge 77°F(25°C)	Capacity after 3 month storage	91%
	Capacity after 6 month storage	82%
	Capacity after 12 month storage	64%
Max. Discharge Current 77°F (25°C)	2000A (5s)	
Terminal	Standard	M8
Charging (Constant Voltage)	Cycle	Initial Charging Current $\leq 0.2 \times C20$ 9.67 V ~ 9.93 V/77°F (25°C)
	Float	9.06 V ~ 9.2 V/77°F (25°C)



CONSTANT CURRENT DISCHARGE (Amps)											
CUT OFF VOLTAGE V/cell	30M	45M	1H	2H	3H	5H	8H	10H	12H	20H	24H
1.75V	150	110	90.2	56.1	39.2	25.7	17.4	14.4	12.3	8.0	6.8

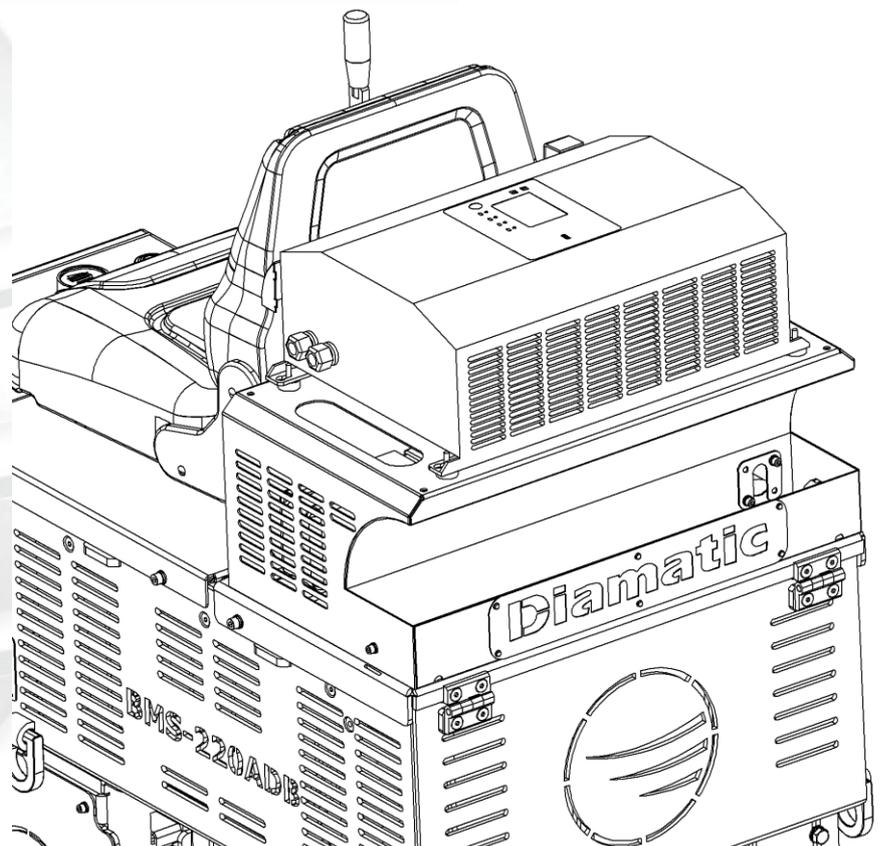
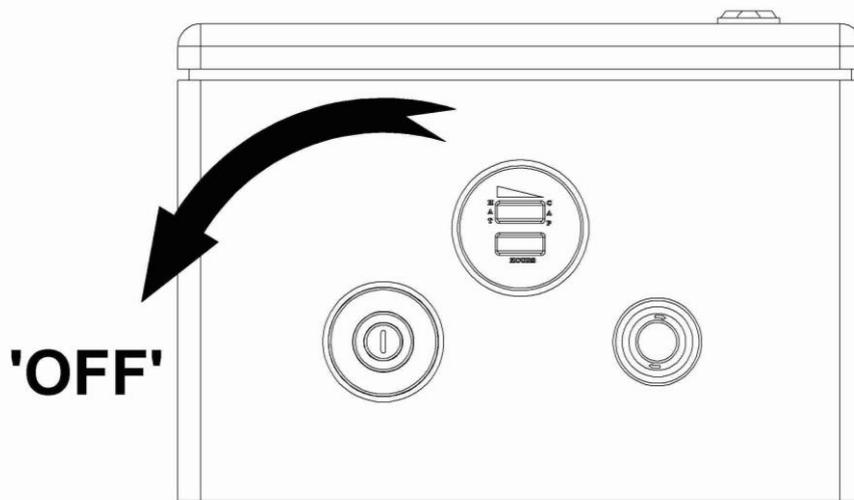
RESERVE CAPACITY	
@25 AMPS	@56 AMPS
315 Minutes	112 Minutes



Charger operation

The BMS-220 is equipped with a HF E 48-30 high frequency traction-battery charger. It is mounted on the back on machine to have a easy access.

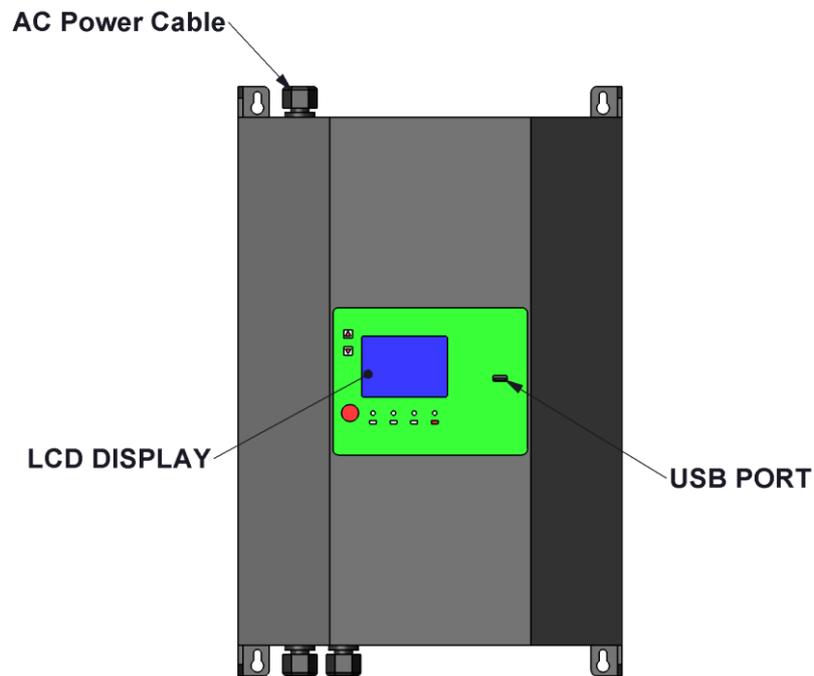
Turn the contact switch to 'OFF' when charging. Batteries will not charge when contact switch is in 'ON' position.





Operator must be familiar with the control panel of the charger. The panel shows the status of charging of the batteries and a red light if there a fault occurs. On the picture below is shown charger system and panel.

The charger starts and stops automatically when the contact switch is off and the plug is in. You can charge the batteries all night long, when the batteries are full the charger stops automatically.



6. Maintenance

Pay attention to Chapter 3 "**Safety**" during maintenance and repair works.

Failures due to inadequate or incorrect maintenance may generate very **high repair costs** and long standstill periods of the dust collector. **Regular** maintenance therefore is imperative.

Operational safety and service life of the stripper depend, among other things, on proper maintenance.

The following table shows recommendations about time, inspection and maintenance for the normal use of the stripper.

TECHNICAL DATA	
12 h after repairing	Check all accessible screw connections for tight seat.
Daily and prior to starting work	Check all safety devices working adequate. Check the function of the residual current operated device. Check the hose connections for tightness and fixed seat. Check the electric connections for sediments of dirt or foreign bodies. Check the electric motors for dirt and other contaminants.
Annually	Full overhaul and cleaning of the complete machine.

The time indications are based on uninterrupted operation. When the indicated number of working hours is not achieved during the corresponding period, the period can be extended. However a full overhaul must be carried out at least once a year.

Due to different working conditions it can't be foreseen how frequently inspections for wear check's, inspection, maintenance and repair works ought to be carried out. Prepare a suitable inspection schedule considering your own working conditions and experience.

Our specialists will be happy to assist you with more advice.

Further is advised:

Store the cleaned and dry machine in a dry and humid free room. Protect the electrical motors from moisture, heat, dust and shocks.

All repair work must to be done by qualified Diamatic personnel, this to guarantee a safe and reliable machine.

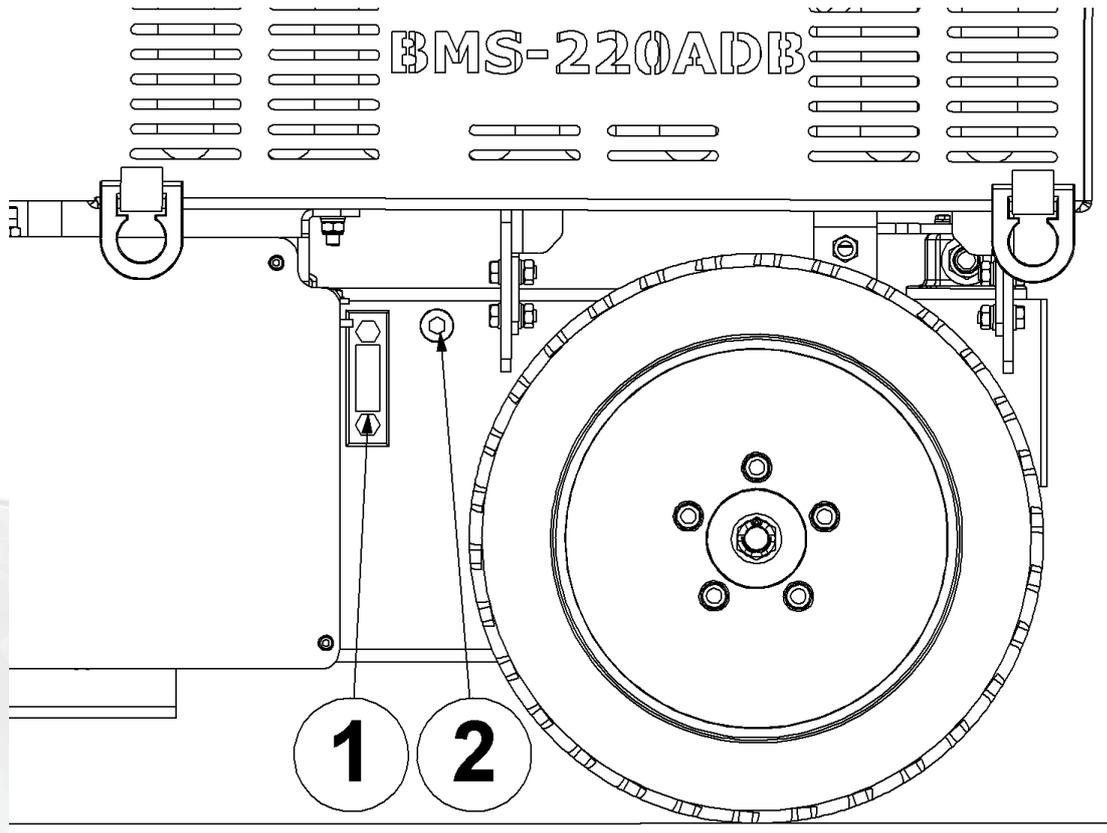
Any guarantee on the machine is expired when:

- Non original Diamatic parts have been used
- Repair work is not done by qualified Diamatic personnel
- Changes, add one's or conversions are undertaken without written permission of Diamatic USA



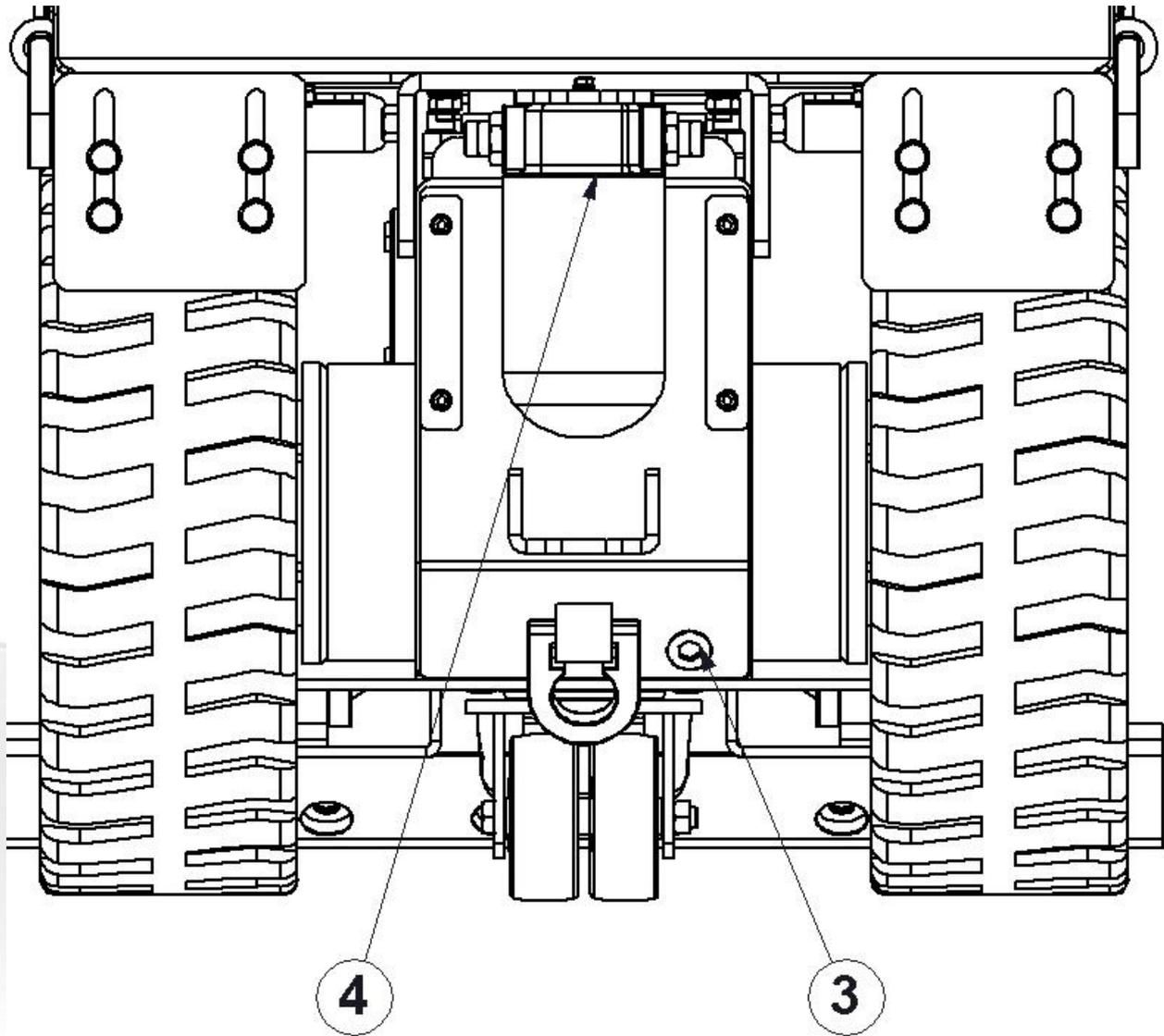
Hydraulic system instruction

To check oil level on the side of tank is installed indicator. Level should be half the glass of the level indicator. If you don't see the oil in the indicator, the level is too low. If the level is above the glass, the level is too high. Next to it is mounted plug which close the hole by which oil can be refill. For refill the oil you need HV46 hydraulic oil. (Part number E00481 – Hydraulic oil)



- 1) Oil level indicator
- 2) Plug to refill oil in tank

At least one time during year oil from system and filter should be replace. For this operation charger need to be disconnected from power. To remove oil drain plug need to be removed. It is located at the bottom of tank on backside.



3) Drain plug

4) Oil filter

For all standard job with hydraulic system like:

- Hose
- Pump
- Motor
- Valve
- Filter
- Cylinder

Before doing any maintenance disconnect power and block machine in stable position. Because most of fittings in machine is O-ring style it is important is to know how to solve O-ring leaks. Fittings should be tighten with proper wrench size. Over tightening could damage O-rings. If a leak still persists, remove fitting and replace O-ring.



Cutting head & blades

Weight vs. sharpness

The most common way to compensate for a dull blade is to add more weight and raise the blade angle (see re-scrape setting). Weight allows dull blades to be used to a point. Weight also causes blades to dull and break easier. Blades of any thickness tend to catch cracks and expansion joints and will bend or break the blade if set at a high angle. For best results, run a small ditching blade at a low angle to identify as many cracks and joints as possible. If blades are breaking, you are misunderstanding the conditions.

Cutting head angle

Set the cutting head angle to where the material comes up the easiest. The lowest is usually the best.

Steep cutting head angle

A steep angle is only used for re-scraping. The slide plate has to be raised so the bottom of the slide plate is higher or even with the bottom of the guide channels. Not raising the slide plate when operating the machine at a steep angle will cause the machine to jump and buck. It does not give the operator a clear vision of the cutting head and it raises the machine to operate at a unsafe operating height. Failure to raise the slide plate could cause machine damage and/or bodily injury.

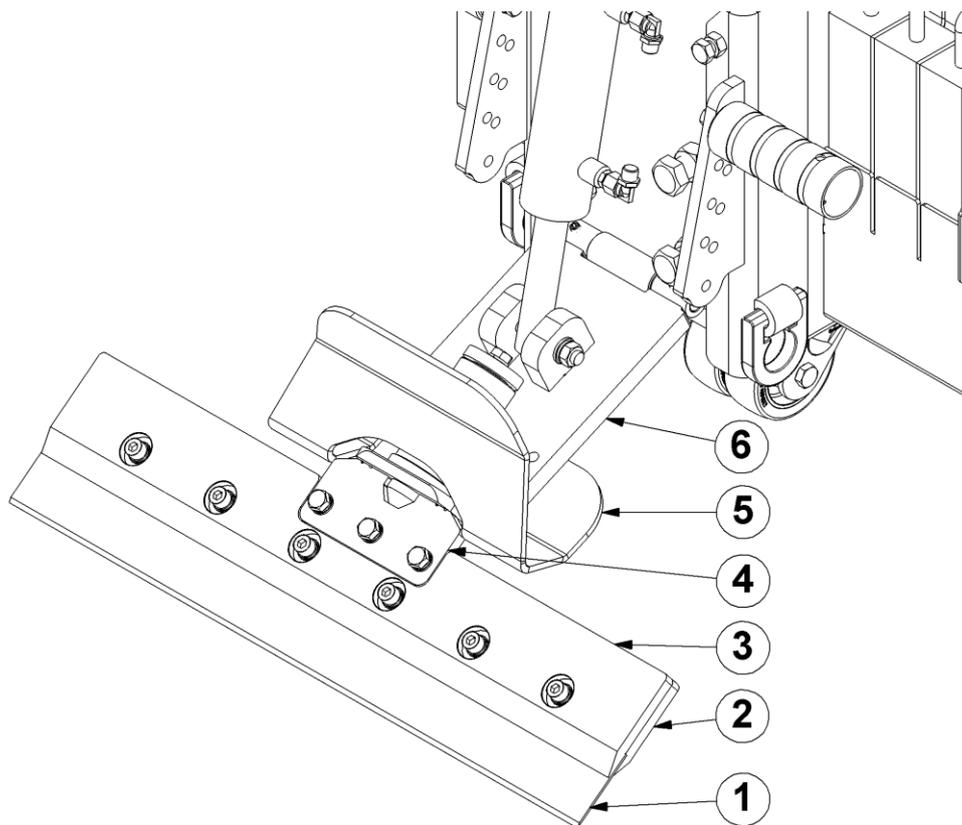
Swivel head

The swivel head keeps the blade in contact with the floor even when the floor is uneven. When using a flat blade, by swiveling the head over 180° allows another sharp edge on the blade without having to replace the blade.

Saving time with extra cutting heads

The machine is supplied with one cutting head. Having additional cutting heads will save time on the job. Insert blades into the extra cutting heads before starting a job. When the blade is dull, instead of taking the time to replace it or sharpen it on the job, take out the cutting head and replace it with another. Or, when a different type or size of blade is needed, you have them ready to use.





- 1) Tool – depending of the needs
- 2) Tool holder – lower part
- 3) Tool holder – upper part
- 4) Tool holder
- 5) Debris deflector – new holder shape
- 6) Universal lower cutting head support

Cutting head insertion

With machine off, insert desired cutting head into cutting head holder. Secure with cutting head clip.

Shank blade insertion

Shank blades do not require a cutting head. Insert desired shank blade into cutting head holder. Secure with cutting head clip.

Blade setting

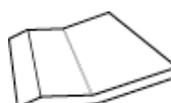
- Dull blades greatly reduce cutting ability. Re-sharpen or replace as needed.
- Proper blade size and placement, depending on material and sub-floor type, affects performance.
- The harder a job comes up, for best results, use a smaller blade.
- Start with a narrow blade, then increase blade size to optimize cutting pass. Narrower blades work easier than wider blades and usually clean the floor better. Wider is not always better or faster.
- Normally bevel on blade is up for concrete. Bevel down for wood and shoe blades for soft sub-floors.
- KEEP BLADES SHARP.
- Dull blades greatly affect the performance of the machine and reduce cutting ability, resharpen or replace as needed.
- Keep your work area clean and clear of debris.
- After you have removed a portion of material, remove it out of the way. This will give the machine maximum performance and help to keep the work area safe.
- Always wear gloves when handling blades.
- Everyone in work area should wear eye protection.



**BEVEL UP
CONCRETE FLOORS**

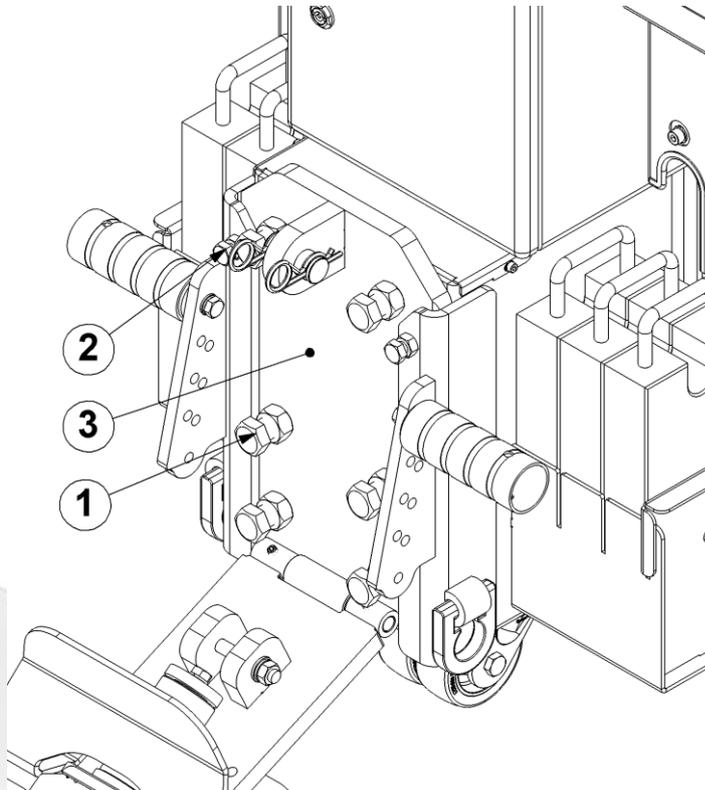


**BEVEL DOWN OR
SHOE BLADES
WOOD FLOORS**



**SHOE BLADE
SOFT SUB-FLOORS**

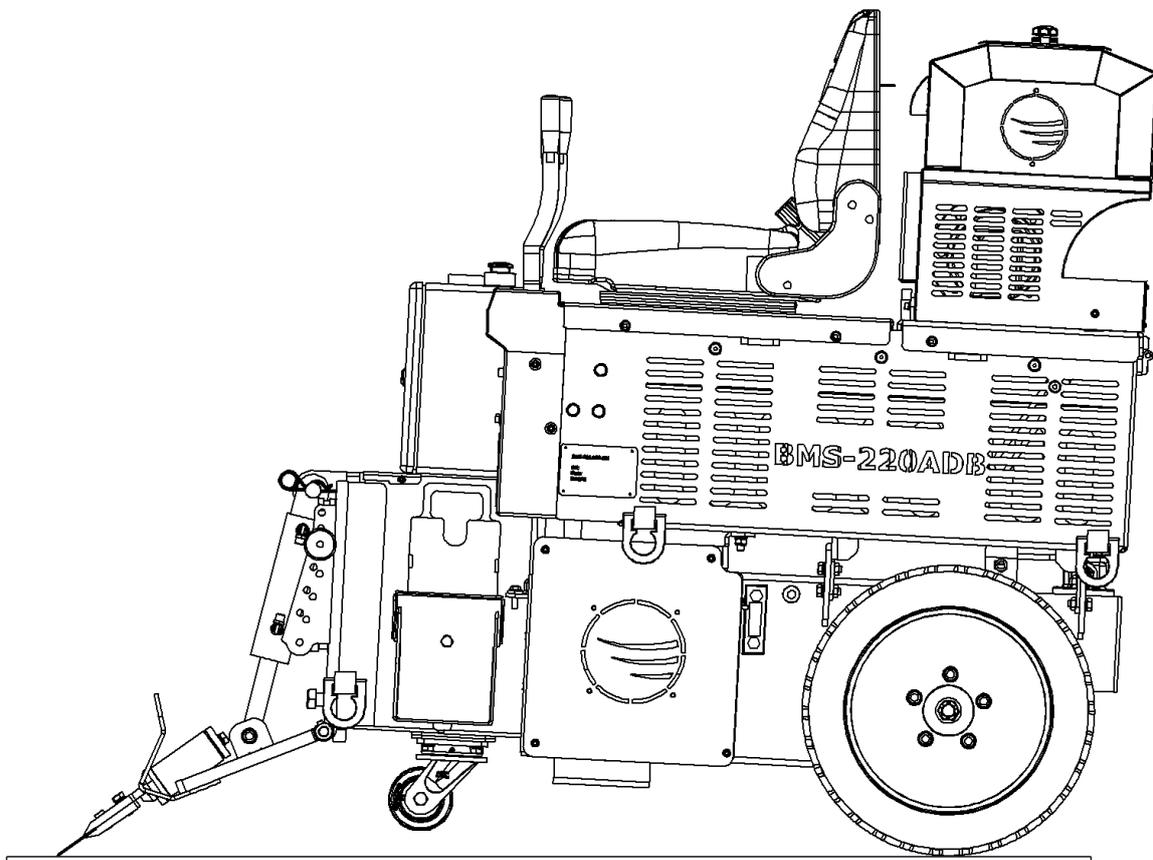




- 1) M20 bolt with securing nut
- 2) M12 bolt with securing bolt
- 3) Slide plate

7. Blades application

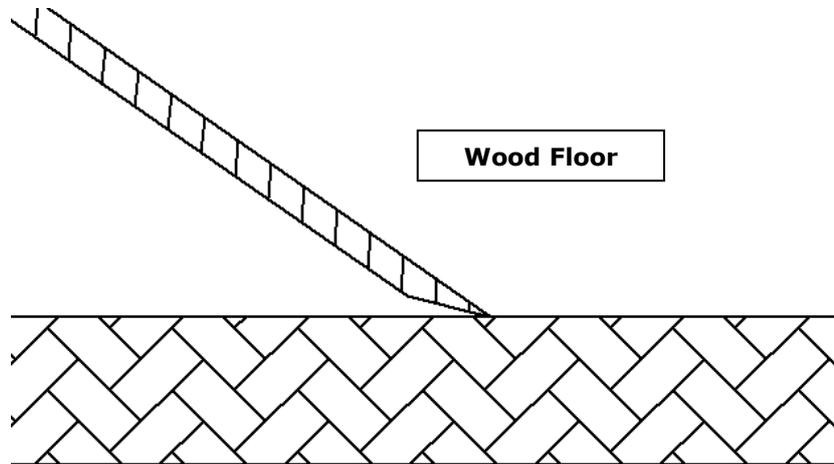
Efficient and fast work can be reached by using correct blades and settings. Operator must remember to prepare correct angle and also keep blade sharp. During work blade start to be dull. To reduce this process operator can add extra weight or change angle to the ground. But that action make blades more potential to brake. Important is to notice that when the blades are braking some of the conditions of using are not correct. In many cases angle between tool and ground can't be to big because machine can jump and even takeover to the back.



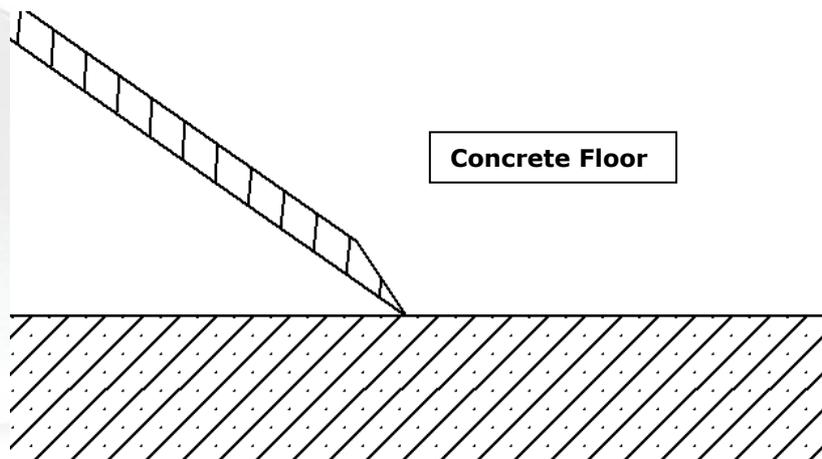
When blade is dull necessary is to make it back sharp or replace. In that operation helpful can be second cutting head. It save important time. When machine is running on second set of tools. First set can be service.

Different parameters of coat or material which will be scratch fore to use blades about different geometry. For example a small blade is perfect to the hard job. But when material is soft used can be wide blade. The best

solution is start with a narrow blade and during work change it when operator will see for this possibility. Speaking about geometry of blade we need to mention that mostly for wood floors beveled is on the down side:



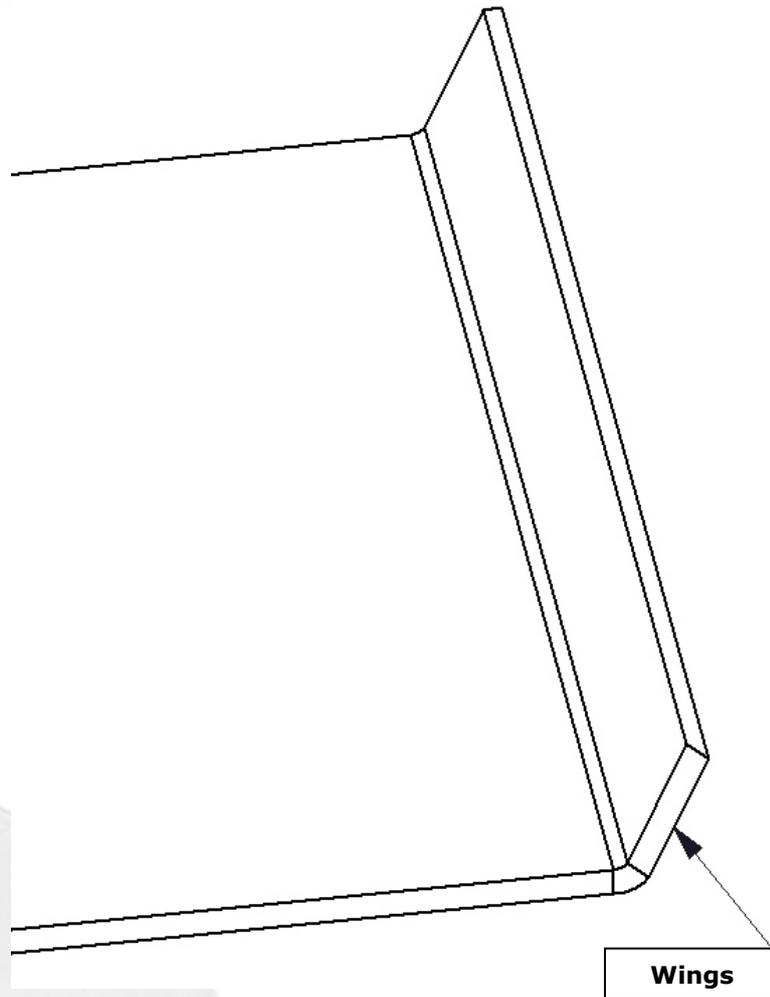
On the concrete beveled must be face upwards:



Working place should be keep clean. When some part of material is removed before second run always is better to make floor clean. Debris and dirt can make blade dull really quick.

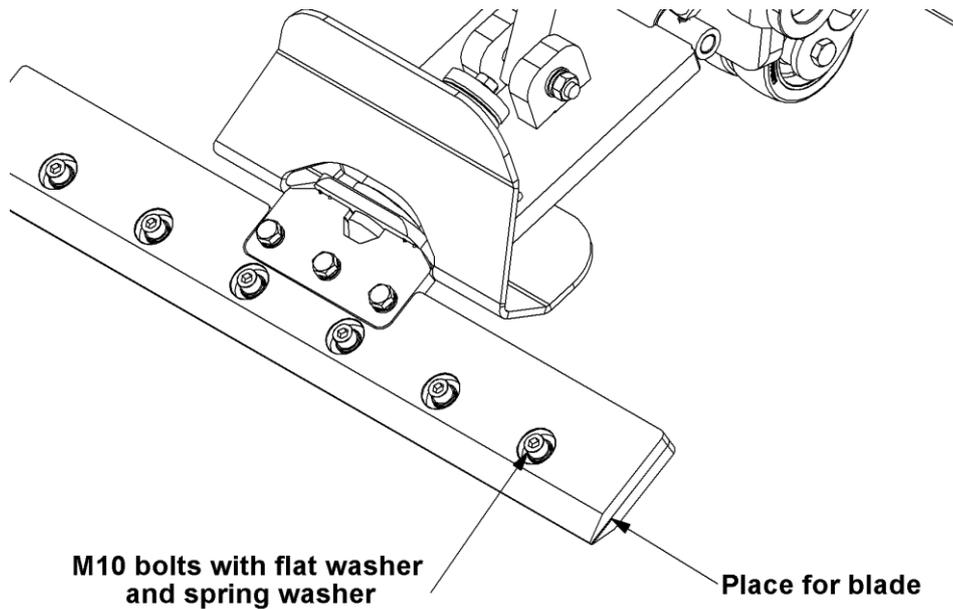
Dull blades can be sharpening by using electric grinder with disc 120 grit of finer. Also can be used tooth hand file. Caution is required during sharpening.

Fore soft materials like carpet vinyl, membrane it possible to use self-scoring blades:



It's important to keep the "wings" sharp. They can be sharpening by the same way like other blades. Sometimes it happened that job need be made quite quick. To save time on jobsite good to have many tools and only replace them. All service (sharpening) can be done in that case on workshop.

Cutting heads are use to mount blades. They are make in different size to adjust them to material which we want remove. Changing blade in that part is easy and quick:



Top part with bottom are screw together by M10 bolts. The cutout on lower plate ensures a accurate and reliable fixation of the tool.

Types of blades

For different materials need to be mounted special tools. The shape and width are define by many years of experience. Below are describe a few of types :

- **Self-scoring blades** used to vinyl, carpet tiles, soft to medium PVC, soft cork, linoleum, enhancer and unbond hot melts. In that kind of blades scoring is made automatically by the "wings".
- **Heavy duty blades** are prepared to work on wood, thin ceramic, tile, VCT, VAT, re-scraping thin set, glued ceramic, elastomeric coating, rubber epoxy. After some work period the blades need be sharpening.
- **Shoe blades/angle shank blades** for ceramic, thin set, wood, decorative concrete, mud set. They are made in special process to give them long living time.
- **Extra heavy duty blades** for wood, VCT,VAT, thin ceramic, re-scraping, all carpets, elastomeric coatings, cork, rubber and urethane coatings. They are extremely hard.
- **Premium high tempered blades** for VCT, VAT, rubber tile, cork, all glued carpets, elastomeric coatings. They have long blade life between sharpening. Made from special hard steel.
- **Razor/ scraper blades** for thin mil coatings (urethane paint), thin epoxies, poured elastomeric, hard to remove adhesive.
- **Shoe blades/angle shank blades with carbide tips** for wood, ceramic, elastomeric coatings and epoxy. This blades

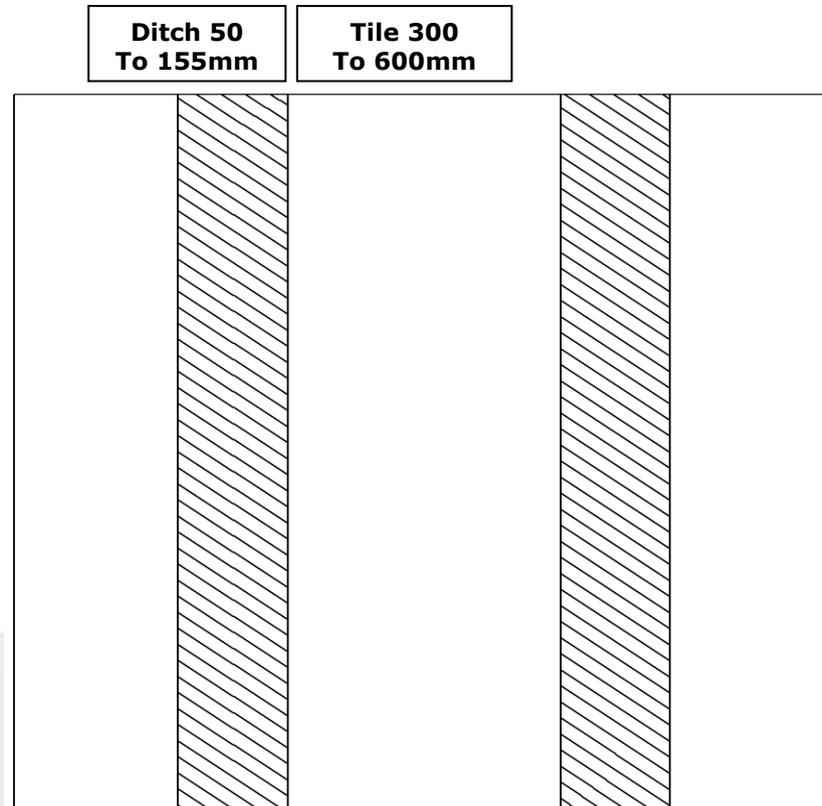


Using correct blades is a only half of success. Second is put tool in optimal geometry to the ground. Information to the most popular materials:

- **VCT tiles** : slide plate with distance between 6 to 12mm from floor. It's better to start with narrow cutting head. If it possible can be used wide one. The best should be Premium Hight Tempered blades.
- **Foam back carpet set-up** : slide plate with distance from 6 to 12mm to the floor. Is possible to use cutting head from 250 to 350mm. But in some situation good choice can be also cutting head from 350 to 700mm.
- **Ceramic set-up** : slide plate form 6 to 12mm. Best working blades are Shank Blade or Shank blade with a carbide.
- **Secondary backing carpet set-up** : slide plate with distance from 6 to 12mm to the floor. Proposed seta are cutting head from 255 to 685mm with Heavy Duty Blades or a cutting head (255 to 355mm) with Self Scoring Blade.
- **Double stick carpet set-up** : slide plate with distance from 6 to 12mm from floor. In this case it good to start with cutting head (255 to 355mm) with Self Scoring Blade. Important is to have sharp blades.
- **Wood set-up** : slide plate with distance from 6 to 12mm to the floor. Preferred are Shank Blades, Shank Blades with carbide tips or a cutting head (150 to 205mm) with Shoe Blades, Bent Shoe Blades or Heavy Duty Blades. Machine need have angle 45° to the grain of the wood.
- **Thin coating set-up** : slide plate with distance from 150 to 205mm to the floor or from 6 to 12mm off the wood. Correct distance need to be set after tests. Preferred application is cutting head (200 to 685mm) with Razor Blades. But it is possible also to work with cutting head (200 to 360mm) with standard blade.
- **Re- scraping set-up** : slide plate with distance from 150 to 205mm. Cutting head (200 to 685mm) with Scraper Blades can be used. Good to remember that blade should be one step bigger than the cutting head.
- **Working over concrete** : most important is to install blade bevel up. Because with this kind of material can be really different conditions. The best way is test different settings. If machine works ok operator can use wider blade.
- **Working over soft sub-floor** : slide plate with distance from 6 to 12mm from floor. Preferred are Extra Heavy Duty Blade or regular blade. Blades need to be install bevel up and the position need be flat as is possible. On regular blade operator can try bend up the corners. This should help to digging into the floor.
- **Working over wood** : in this case important is to know if floor is strong enough to put machine on it. Before better is to take out the weights and not necessary equipment. Distance between slide plate and floor should be from 6 to 12mm. Preferred are Extra Heavy Duty Blades, shoe blades or regular. Always mounted bevel up. Important is also to keep the blades as flat as possible to the floor.

Ditching

Cross room ditching



**Run the machine the
same direction that the
ditches are made**

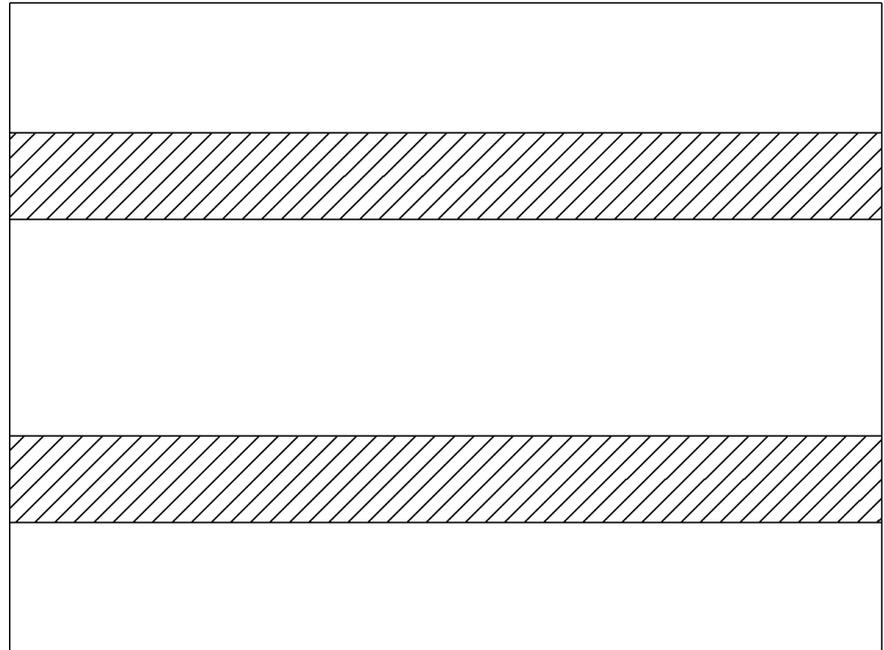
When removing hard to remove ceramic, Vct or vat, cross-room ditching will help to make the removal easier. Using a blade 50 to 155mm in width, make ditches 300 to 600mm apart in the same direction the machine will be removing the goods. The "relieves" the pressure holding the tiles together. If ditching helps and the goods are coming up easy, try using a wider blade to ditch with.



Checker board ditching

**Ditch should be wide
As much as possible**

**Carpet wide from
1200 to 1800mm**



**Run the machine
crossways from the
directions that the
ditches are made**

To make carpet removal and debris cleanup easier, checker board ditching is very helpful. Using as wide of a self-scoring blade as possible, make ditches apart crossways from the way the machine will be removing the goods. Running the machine crossways from the ditches will make smaller pieces of debris to be hauled away. Instead of large gummy rolls of carpet, there are small squares that can be rolled, palletized, put on a dolly or folded with the sticky side in. This makes removing the debris easier and reduces the amount of debris.

9. Technical data

BMS-220ADB-0600	
Working width	152-690mm (depending of type of blade)
Motor power	4,0kW
Battery power	12x 8V batteries / Running time up to 10 hours
Drive system/ Speed	Electrical / Up to 23 m/min
Machine type	Ride-on
Application	Hardwood parquet / ceramics / linoleum / vinyl / carpet / adhesives / glue / tiles etc...
Length	1550 mm
Width	685 mm
Height	1350 mm
Weight	960/1080 kg

Design and specifications are subject to change without notice by Diamatic USA



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