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Receiving the machine

Immediately check, when receiving the machine, that all the materials indicated on delivery documents have been received and also that the machine has not been damaged in transit. If it has been damaged, this damage must be immediately reported to the shipper and also to our customer service department. Only acting promptly in this manner will make it possible to receive missing material and to be compensated for damage.

Foreword

This is a single-brush machine that uses the mechanical action of a disk-shaped pad to polish a wide range of floors and types of dirt, vacuuming the dust that is created as it moves forward into a disposable filter-bag.

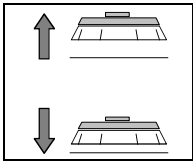
The machine must only be used for this function. Even the best machines will only operate efficiently and work with profit if they are used properly and kept in perfect operating order. Read this instruction booklet carefully and consult it every time problems arise with machine operation. Remember that, if necessary, our service organization, in collaboration with our dealers, is always available for helpful hints or direct intervention.



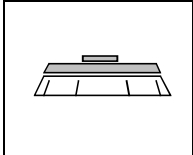
TECHNICAL DESCRIPTION	U/M	CM 70 hs
Working width	mm	690
Work capacity, up to	m ² /h	4140
Disk brush (No. 1)	Ø mm	690
Brush revolutions	RPM	1300
Brush motor	W	5000
Pressure on the brush	kg	15
Traction motor	W	600
Traction wheel	Ø mm	250
Forward speed	km/h	0÷6
Maximum slope when fully loaded	%	10
Elastic front wheels	Ø mm	300x90
Bin capacity	l	0.6
Turning circle	mm	2040
Machine length	mm	1700
Machine height	mm	1250
Machine width	mm	780
Battery compartment	mm	560x640xH480
Rated battery voltage	V	36
Battery capacity (C5)	Ah	320
Battery weight	kg	306
Machine weight (empty and without batteries)	kg	336



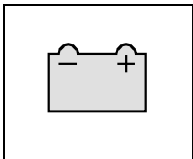
SYMBOLS USED ON THE MACHINE



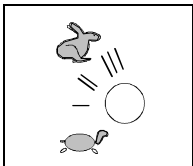
Base lift-lower symbol
Used to indicate the base lift-lower switch



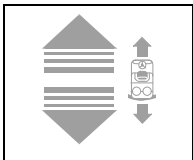
Symbol showing the polishing pad is working.
Used to indicate the switch that starts the polishing pad motor.



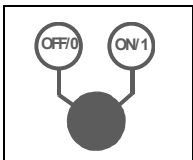
Battery charge level symbol



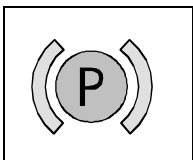
Forward/reverse speed selector symbol



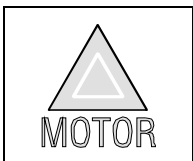
Forward/reverse selector symbol



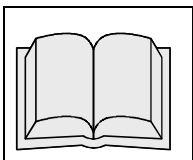
Main switch symbol (key-operated switch)



Brake symbol
Used to indicate the signal lamp of the engaged hand brake
Used above the emergency brake lever



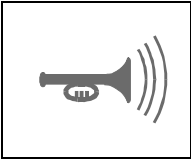
Ampere monitoring symbol for the polishing pad motor (red signal lamp).
The signal lamp turns on when the motor is under stress.



Open book symbol
Tells the worker to read the manual before operating the machine



SYMBOLS USED ON THE MACHINE



Symbol indicating the horn push-button

SYMBOLS USED IN THE MANUAL

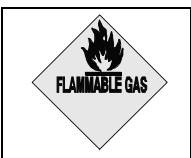


Warning symbol

Read sections preceded by this symbol with care: they concern the safety of the operator and the machine



Indicates danger of gas fumes and leakage of corrosive liquids



Indicates danger of fire

Do not approach with open flames



PREPARING THE MACHINE

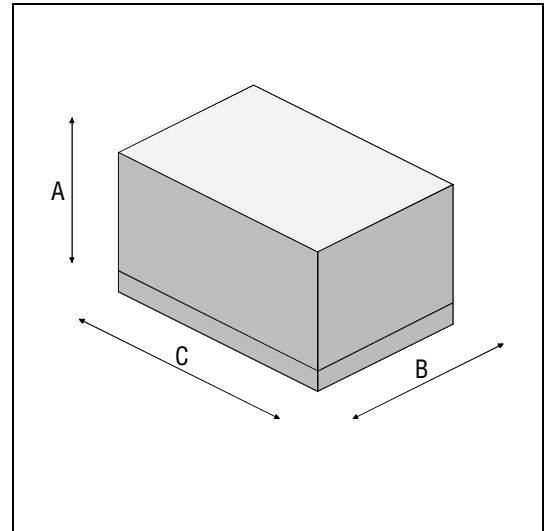
1. MOVING THE PACKAGED MACHINE

The machine is contained in specific packing with a platform so that it can be moved by a fork-lift. Packings cannot be stacked.

Total weight is 400 kg (without batteries)

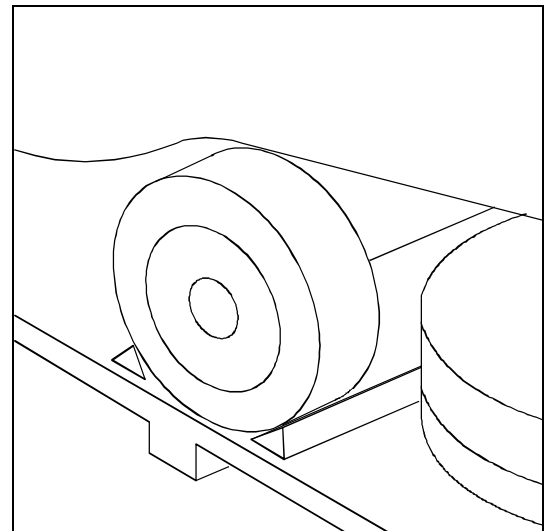
Packing dimensions are:

- A: 1550 mm
- B: 1000 mm
- C: 1740 mm

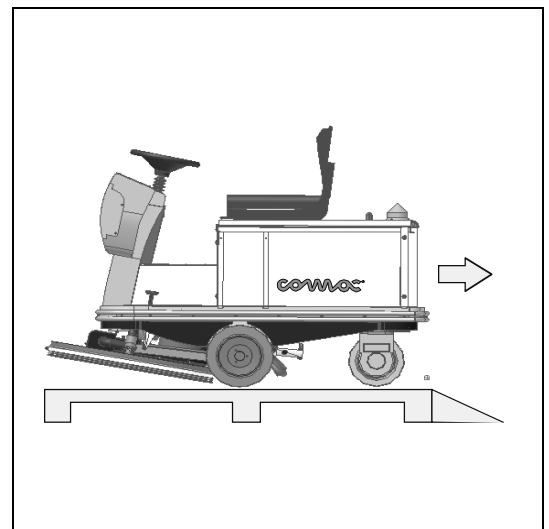


2. HOW TO UNPACK THE MACHINE

1. Remove the outer packing.
2. The machine is fastened to its platform by wedges that clamp its wheels.
3. Remove the wedges.



4. Use a ramp to lower the machine off the platform, pushing it in reverse.
5. Keep the platform since it may be necessary to transport the machine again.





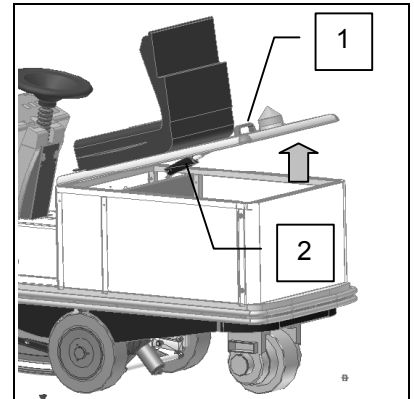
PREPARING THE MACHINE

3. PUTTING THE BATTERIES IN THE MACHINE

The batteries must be housed in the battery compartment below the seat panel and must also comply with the requirements given in CEI 21-5 standards. Battery compartment dimensions are: 540x640 H480 mm.

When inserting the battery:

1. Lift the seat panel using handle (1) and set up safety prop (2).
2. Position the batteries



4. TYPE OF BATTERY

The machine must be powered using:

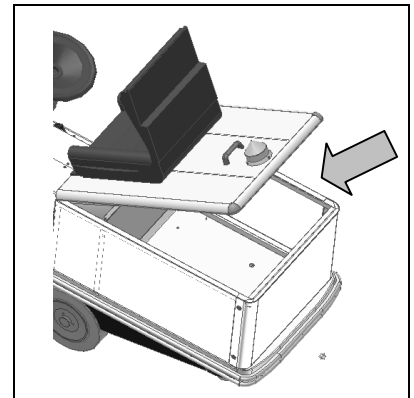
- flat or tubular plate lead-acid traction batteries with free electrolyte;
- gel-technology gas recombination hermetically sealed traction batteries.

NO OTHER TYPES CAN BE USED.

Each battery is composed of DIN cells connected in series and supplying 6V voltage across the terminals.

Maximum weight and dimensions are:

width 178 mm, length 295 mm, height 424 mm; weight 51kg



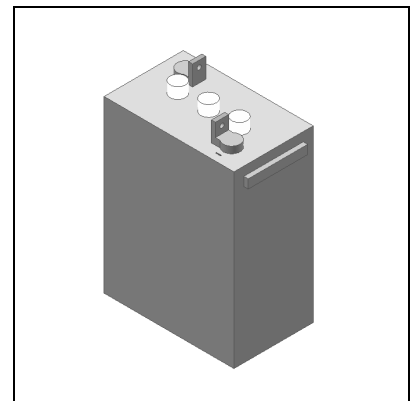
These must be handled using transport and hoisting equipment suitable for their size and weight.

Lift using the handles on the top.

They must be housed in the battery compartment with connection terminals directed towards the rear of the machine.

They must be connected in series together in order to have a 36V voltage across terminals.

Electrical connections must be made by trained and specialized personnel from the COMAC Service Center.



5. BATTERY MAINTENANCE

Comply with the battery manufacturer's instructions for battery maintenance and recharging.

Pay special attention when selecting the battery charger: it differs according to battery type and capacity.



PREPARING THE MACHINE

6. DISPOSAL METHODS

When the battery is run down it must be disconnected by trained and specialized personnel and then lifted using the handles on it and suitable hoisting equipment to remove it from the battery compartment.

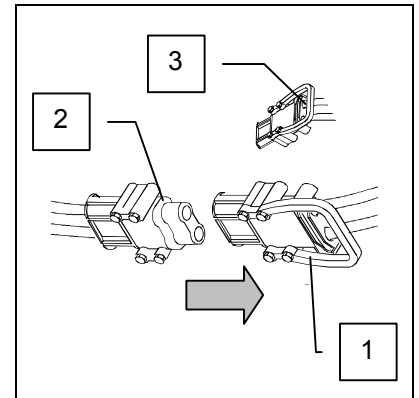
RUN-DOWN BATTERIES ARE CLASSIFIED AS HAZARDOUS WASTE AND MUST BE GIVEN TO A LEGALLY AUTHORIZED DISPOSAL AGENCY.

7. CONNECTING THE BATTERY CHARGER

The connector is located low down compared to the driver's seat. Left part (1), connected to the batteries, must be detached from machine connector (2) and hooked up to the battery charger connector (3) for charging. Hook-up connector (3) is delivered inside the bag that contains this instruction booklet. It must be first connected to battery charger cables according to instructions (refer to the battery charger manual).



WARNING! This procedure must be done by qualified personnel. A mistaken or imperfect cable connection to the connector can cause severe damage to persons or property

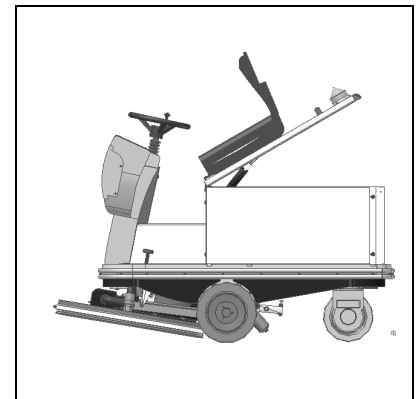


8. BATTERY RECHARGING

Prevent permanent damage to the batteries by making sure they are never totally discharged. Recharge them just a few minutes after the flashing battery discharged signal starts to flash.



NOTE: Never leave the batteries totally discharged even if the machine is not being used. Keep the seat panel raised using safety prop as illustrated when recharging the batteries. Make sure the battery charger is suitable for the type and capacity of the batteries that are installed.



Danger of gas fumes and leakage of corrosive liquids.



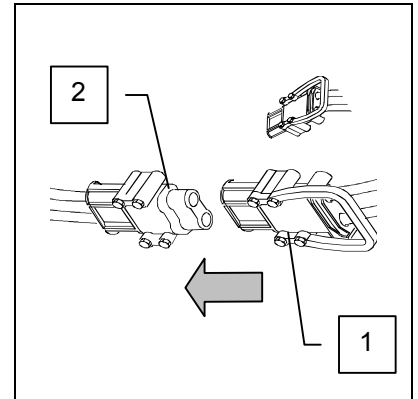
Danger of fire: Do not approach with open flames



PREPARING THE MACHINE

9. CONNECTING THE BATTERY CONNECTOR

Battery connector (1) must be connected to machine connector (2)

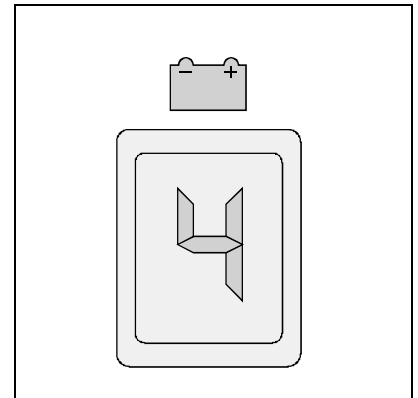


10. BATTERY CHARGE LEVEL GAUGE

The battery charge level gauge is a digital unit with 4 fixed and one flashing position.

The numbers on the display give an approximate idea of the state of charge:

4 = maximum charge, **3** = 3/4 charge, **2** = 2/4 charge, **1** = 1/4 charge, **0**= batteries discharged (flashing)



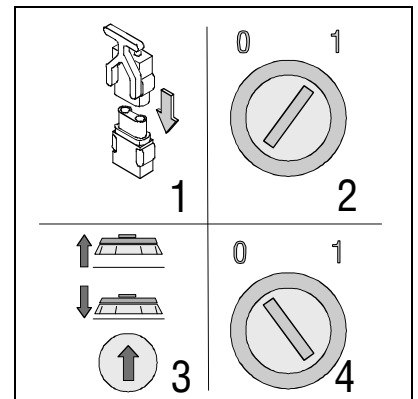
WARNING! The pad motor automatically turns off a few seconds after the flashing "0" appears. The remaining charge can be used to move the machine to the recharging point.

11. INSTALLING THE PAD

1. Connect the battery connector
2. Turn the key to "1"
3. Operate the lever to lift the base
4. Turn the key to "0" and pull it out from the dashboard



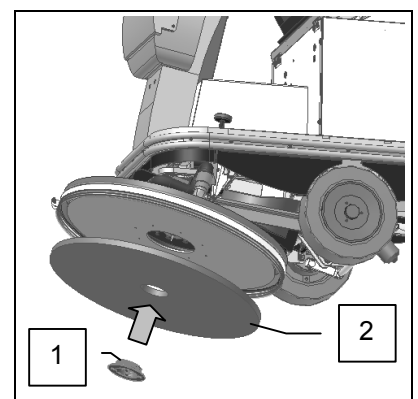
WARNING! Make sure no persons or objects are in the vicinity of the pad base when doing this.



5. Keep the base in its raised position. Unscrew (rotating counterclockwise) ring (1). Install pad (2) on the disk drive plate. Use one hand to support the pad and the other to tighten the fastening ring (rotating it clockwise).



WARNING! Wear suitable safety gloves before installing the pad.





GENERAL SAFETY REGULATIONS

Follow these regulations carefully to avoid harm to the operator and damage to the machine.

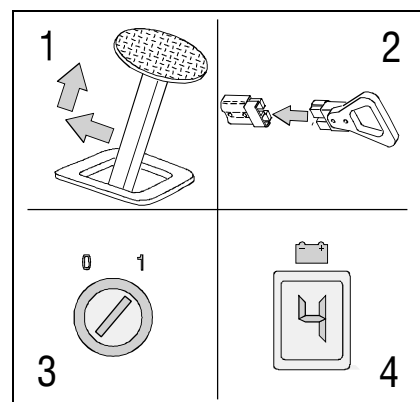
- Read the labels on the machine carefully. Never cover them for any reason and immediately replace them if they are damaged
- The machine must be used exclusively by authorized and trained personnel
- When operating the machine be careful of other persons and of children in particular
- Never mix different types of detergents: this could generate noxious gases
- Never set containers of liquid on the machine
- Machine storage temperature must be between -25°C and $+55^{\circ}\text{C}$
- Operating conditions: room temperature between 0°C and 40°C with relative humidity between 30 and 95%.
- Never use the machine in an explosive environment
- Never use the machine to transport goods
- Never use acid solutions which could damage the machine and/or persons
- Avoid running the pads with the machine stopped: this could damage the floor
- Never suck flammable liquids
- Never use the appliance to collect dangerous powders.
- Use a powder fire extinguisher in case of fire. Do not use water
- Do not hit against shelving or scaffolding when there is a danger of falling objects
- Suit operating speed to traction conditions
- Do not use the appliance on surfaces with a slope higher than the one indicated on the name-plate.
- Whenever you park the machine remove the key and apply the parking brake
- Whenever the machine has operating troubles make sure these are not due to insufficient ordinary maintenance. If this is not the case then enquire with your nearest **COMAC** service center
- When replacing machine parts always ask for ORIGINAL spare parts from your Authorized **COMAC** dealer and/or Retailer
- Use only original **COMAC** polishing pads
- Immediately engage the emergency lever in case of danger (connector placed below the machine operator)
- Always cut off the electric power supply to the machine whenever maintenance is performed
- Restore all electrical connections after terminating any maintenance procedures
- Never remove guards that require tools for removal
- Never wash the machine with direct or pressurized jets of water or with corrosive substances
- Have your nearest **COMAC** service center check the machine every 200 operating hours
- Before you use the machine make sure that all doors and covers are positioned as shown in this operating and maintenance manual
- Dispose of consumables in accordance with currently applicable laws and codes
- When, after years of precious work, your **COMAC** machine is ready to be retired all of its component materials must be properly disposed of: they contain oils, batteries and electronic components. Remember that the machine itself was built using totally recyclable materials.



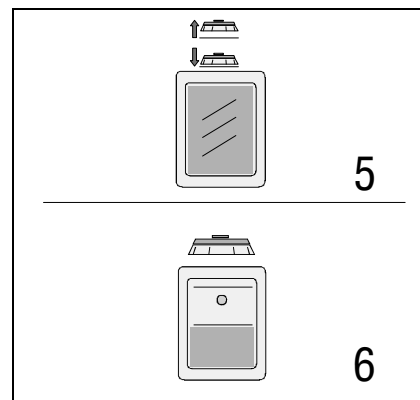
OPERATION

PREPARING TO WORK

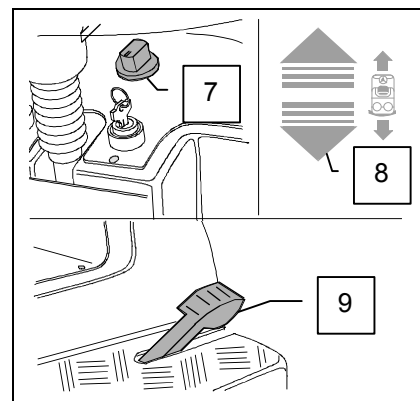
1. Prepare the machine for operation
2. Sit in the driver's seat
3. Check that the parking brake is released (1)
4. Connect the battery connector (2)
5. Turn main switch key (3) clockwise to "1". Display (4) on the dashboard will immediately turn on and indicate the level of the battery charge and the hour counter.



6. Press base lift-lower switch (5) down to lower the base; press polishing pad switch (6) (green signal lamp on).

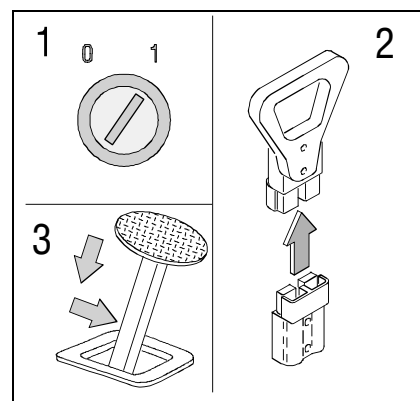


7. Select forward speed turning knob (7). The selector has three positions, indicated by symbols: turtle = slow speed, middle position = normal speed, rabbit = fast speed
8. Select the drive direction on switch (8)
9. The machine starts to move when you press accelerator pedal (9). The base will start to lower and the polishing pad will start to rotate when it is totally lowered down (the base lifts up a few centimeters and the pad stops when the accelerator pedal is released)
10. Check work quality during the first few meters of work.



Whenever problems arise during operation turn off key (1), quickly detach emergency lever (2) placed below the operator and set the emergency brake by pushing lever (3) down and pulling it towards yourself until it hooks up. These procedures will block all machine movements. To start working again, after you have solved the problem, reconnect connector (2), turn key (1) and release parking brake lever (3).

The machine will not move if the operator is not firmly seated on the seat.

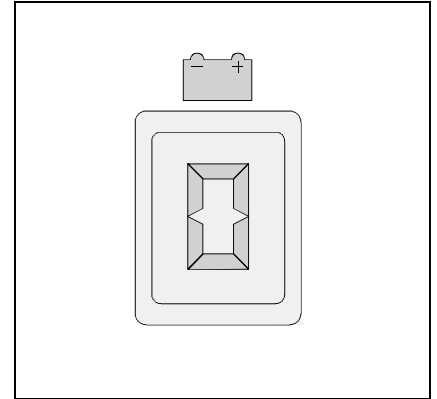




OPERATION

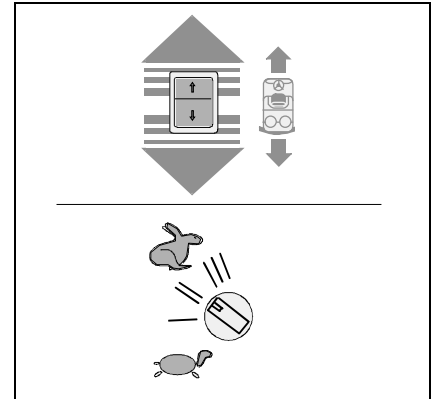
A “flashing zero” appears on the display when the battery charge level is getting too low. The pad motor automatically turns off. Batteries must be recharged as soon as possible.

A residual charge remains so as to move the machine to the recharging point.



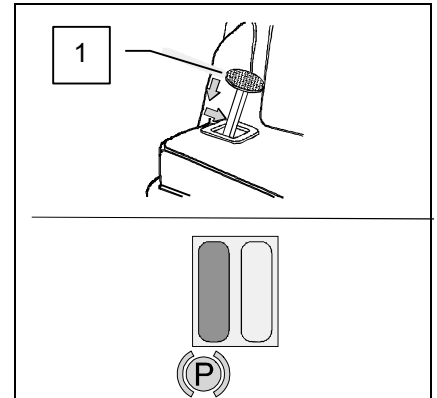
TRACTION

This machine has an electronically controlled traction with three forward and three reverse speeds. To move the machine first turn the key and then move the switch forward (to move forward) or backward (to move in reverse). Press the accelerator pedal and the machine will start to move. Rotate selector to adjust forward movement speed. An audio signal will sound when the machine is moving in reverse.



BRAKES

The machine has an electronic braking system. To brake, in normal conditions, just release the accelerator pedal. Actuate the pedal-operated mechanical brake whenever the service brake operates poorly or whenever necessary (parking, danger, etc.). Actuate by pushing the pedal down and pulling it towards yourself until lever (1) hooks up (the red brake signal lamp turns on when the lever is hooked up).

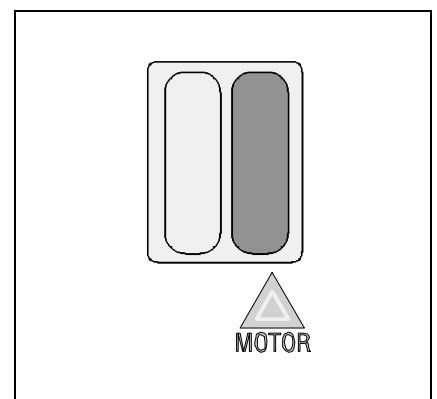


POLISHING PAD MOTOR



WARNING! The pad motor starts only when the machine is moving forward in order to prevent damage to the floors

The pad motor is electronically controlled. The red signal lamp on the dashboard starts to flash when preset overload limits are reached. After a few seconds the motor will stop and the pad switch signal lamp will turn off. To start the motor up again you must turn the main switch key off and on. If the motor stops again you must find the cause of the overload to prevent damage to the motor.

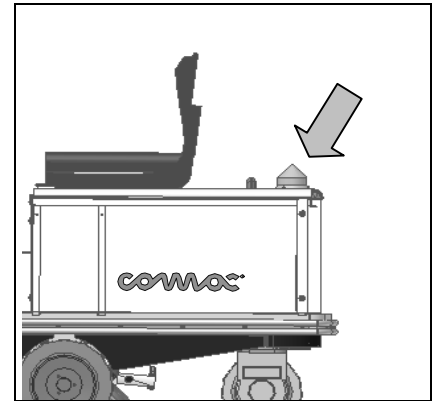




OPERATION

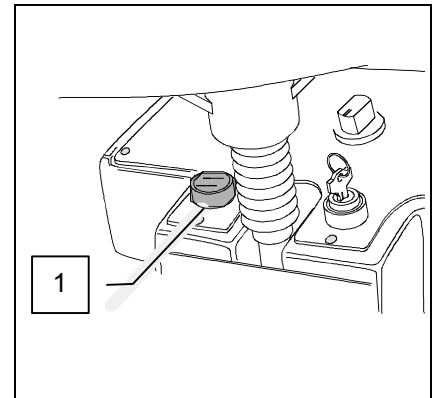
FLASH LIGHT

The machine has a flash light that turns on automatically when the main switch key is turned.



HORN

The machine has a horn actuated by push-button (1) at the left of the steering column. The horn also functions to signal reverse motion. The horn's push-button is deactivated during reverse motion.

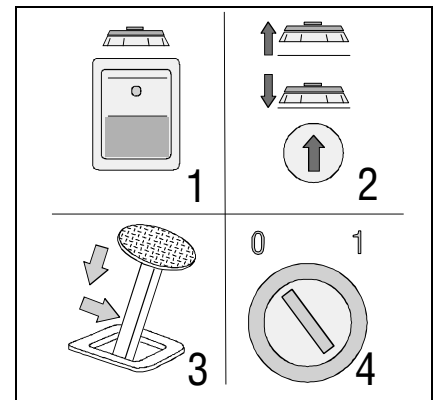




AFTER WORK IS TERMINATED

At the end of the work, before performing any type of maintenance proceed as follows :

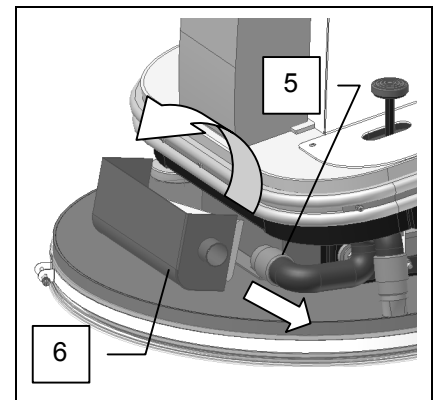
1. Turn pad motor switch (1) off
2. Actuate switch (2) to lift the base
3. Park the machine and actuate the parking brake
4. Turn the key to position "0" to turn the machine off



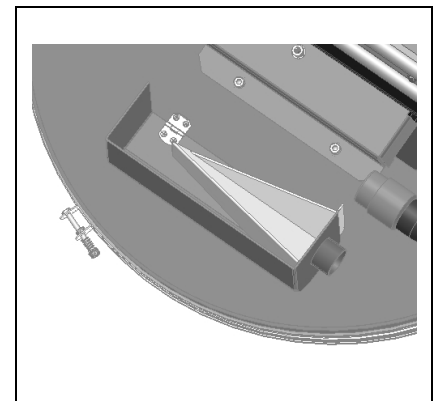
5. Pull suction tube (5) out and lift the cover that accesses disposable filter (6).



WARNING! Always wear gloves when doing this to protect yourself from contact with hazardous solutions.



6. Replace disposable filter (7)
7. Lower the cover
8. Insert the suction tube
9. Remove the brushes and clean them with a jet of compressed air (see "REMOVING BRUSHES" for instructions on how to remove the brushes).





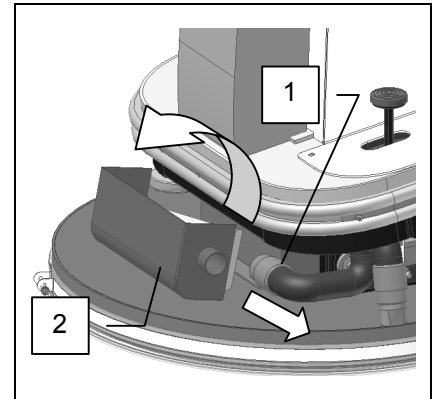
DAILY MAINTENANCE

REPLACING THE DUST COLLECTION FILTER

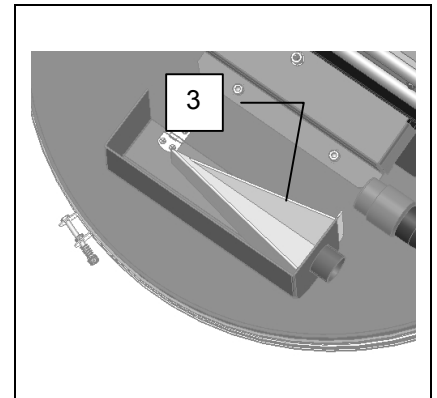
10. Pull out suction tube (1) and lift cover that accesses the disposable filter (2)



WARNING! Use gloves when doing this to protect yourself against contact with dangerous liquids.



11. Replace disposable filter (3)
12. Lower the cover
13. Insert suction tube (1) into cover (2)

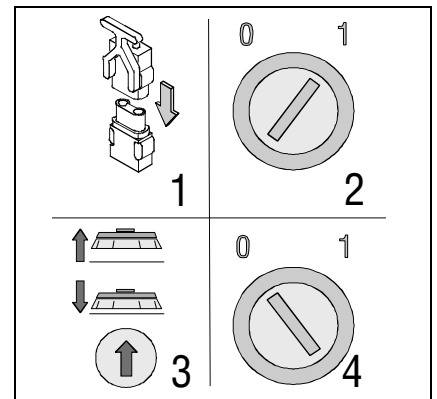


REMOVING THE PAD DISK

1. Connect the battery connector if it is not connected
2. Turn the key to position "1"
3. Use the control switch to lift the base (if it isn't already lifted)
4. Turn the key to "0" and pull it out from the dashboard (hand injuries may be caused if the brush is removed with power on)

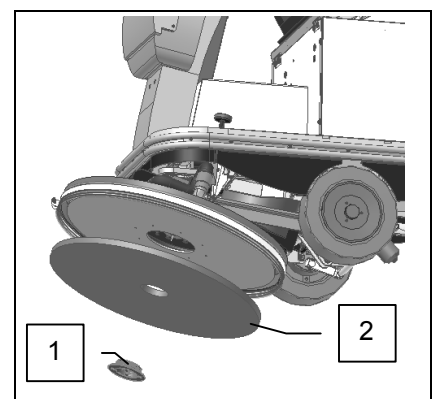


WARNING! Make sure there are no objects or persons in the vicinity of the brush when doing this.



6. Keep the base in its raised position. Unscrew ring (1) (rotating counterclockwise), remove pad (2) from the drive disk, retighten the disk fastening ring (rotating clockwise).

WARNING! Wear gloves when doing this to protect yourself against possible contact with dangerous materials and liquids.



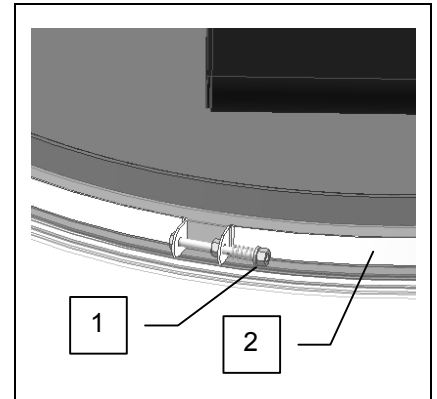


EXTRAORDINARY MAINTENANCE

REPLACING THE BASE SPLASHGUARDS

Periodically check the state of wear of the base splashguards. To replace them proceed as follows:

1. Lift the base
2. Install the pad
3. Lower the base until it touches the floor
4. Turn the key to "0" and pull it out from the dashboard
5. Loosen nut (1) and pull out the splashguard blade (2)
6. Remove the splashguard rubber and replace it
7. Reinstall everything by performing these procedures in reverse order. Make sure the rubber touches the floor

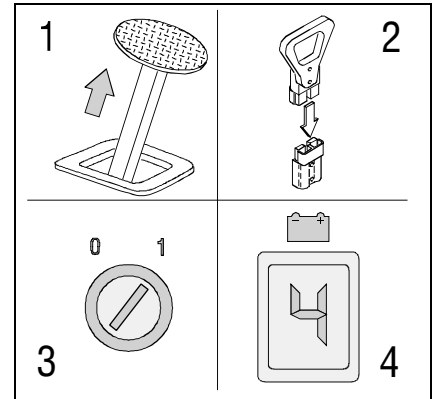




SOLUTION FOR THE MOST FREQUENT TROUBLES

MACHINE DOES NOT START

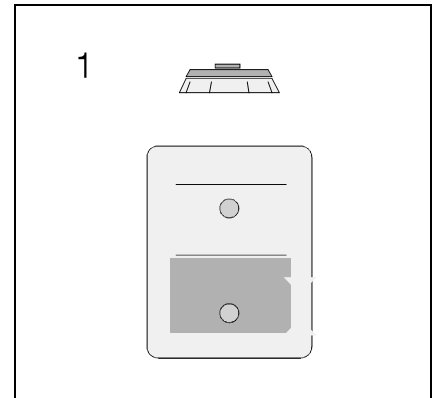
1. The operator must be seated on the driver's seat
2. Check that parking brake pedal (1) is released
3. Check that connector (2) is connected to the batteries
4. Check that key-operated switch (3) is on
5. Check signal device (4) to make sure the batteries are charged
6. Check that no thermal cutout has tripped (see ELECTRICAL FUSES AND THERMAL CUTOUTS)



BRUSH MOTOR DOES NOT OPERATE

WARNING The motor only starts when the machine is moving forward in order to prevent damage to the floors

1. Check that the base is lowered down
2. Check that the motor signal lamp is on (1)
3. Check the signal device to make sure the batteries are charged
4. Check that no thermal cutout has tripped.



HORN DOES NOT OPERATE

Check that a thermal cutout has not tripped (see ELECTRICAL FUSES AND THERMAL CUTOUTS).

IMPOSSIBLE TO LIFT OR LOWER THE BASE

Check that a thermal cutout has not tripped (see ELECTRICAL FUSES AND THERMAL CUTOUTS)



SOLUTION FOR THE MOST FREQUENT TROUBLES

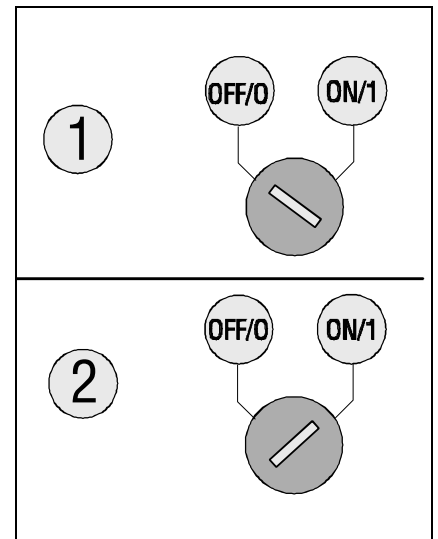
ELECTRICAL FUSES AND THERMAL CUTOUTS

The machine is equipped with the following electrical protection systems:

- Power fuses placed on the machine left side to protect against short-circuits. Whenever a fuse blows check for the causes of the malfunction carefully and eliminate them before replacing the fuse.
- Low-current resettable fuses to protect:
 - General services
 - Horn
 - Traction control system

When a resettable fuse trips first turn the key to OFF (1), wait a few seconds and then turn the key to ON (2).

Turn to your authorized COMAC Service Center if the problem persists.





SELECTING AND USING POLISHING PADS

POLISHING PAD

Machine	No. of Pads	Pad diameter	
CM 70hs	1	686	