



Electronic Service Manuals

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Minuteman[®]

Instruction Manual

Kleensweep KS 32 R (6400.40)

Introduction

Preface

Dear Customer,

We are certain that the excellent qualities of the vehicle will justify the faith you have shown in us through your purchase.

Please read the Chapter "Safety Information" prior to starting the vehicle to ensure it is operated and used safely. Your safety, and that of others, basically lies in your ability to control and operate the vehicle. Before using the equipment for the first time, read this original manual thoroughly, act according to the information contained and keep it in a safe place for future reference or subsequent owners. The operating manual contains all the most important information regarding operation, maintenance and service.

Throughout this operating manual, sections which concern safety are indicated by corresponding warning symbols. Should you have any questions in respect of the vehicle or operating manual, your authorized Minuteman dealer is available to provide help at any time.

We would like to point out, explicitly, that you cannot base any legal claims on the information contained in this manual. Please note that only original spare parts should be used for any necessary maintenance and repair work. Only original spare parts can guarantee long, reliable operation of your machine. Subject to modification as required by technical advancement.

Valid as of: June 2012

Minuteman International Inc.
111 South Rohlwing Road
ADDISON, IL. 60101-4244
U.S.A.

Intended use

The Kleensweep KS 32 R is a Sweeper designed for industrial/ commercial use and serves to clean up dry and wet refuse from indoor and outdoor areas such as production plants, warehouses, car parks, parking blocks, pedestrian precincts, market squares, railway stations and filling stations. The Kleensweep KS 32 R can clean all types of industrial floors, concrete, asphalt and tar, paving and interlocking stone paving. It is not permitted to drive the machine on public roads for motor traffic. Any use beyond this is regarded as improper use. The manufacturer is not considered liable for any damage resulting from improper use; the user is solely responsible for all the risks. Intended use also includes maintaining and observing the operating, maintenance and repair conditions prescribed by the manufacturer.

The Kleensweep KS 32 R may only be operated, serviced and repaired by personnel who are familiar with the work involved and are aware of the risks. It is essential to observe the applicable accident prevention regulations as well as any other generally accepted industrial

Introduction

health and safety directives.

Notes on warranty

The terms defined in the purchase agreement apply. Claims for compensation related to damage are excluded from the terms of warranty when the damage is the result of failure to observe regulations concerning service and maintenance. Maintenance work must be performed by authorized Minuteman service centers and confirmed in the "Maintenance Report" which serves as a warranty logbook.

The following are excluded from the terms of warranty: wear and tear through overuse, defective fuses, improper handling and use or unauthorized modifications. Claims under the terms of warranty are also annulled when damage occurs to the vehicle resulting from the use of parts or accessories not explicitly approved by us or from failure to observe maintenance regulations.

Acceptance of the machine

Inspect the vehicle immediately on delivery for signs of transport damage. Replacement will be made when the damage is confirmed by the carrier immediately and the damage report is sent to us together with the consignment note.

Introduction

Disposal of the machine

Render the machine inoperable. It must not represent a potential source of danger for children.

Dispose of the machine according to the applicable local regulations. For further information on handling and recycling, please contact your authorized Minuteman dealer where you purchased the machine.

Used batteries with the recycling symbol contain reusable commodities.

However, the heavy metals contained also represent a major risk to human health and to the environment. Never open or damage batteries. Never touch, inhale or swallow the content matter of batteries. Health hazard! Do not allow batteries to pollute the environment.

There is a risk of contaminating the ground and water! In accordance with the symbol with the crossed out bin, these batteries must not be disposed of in domestic waste. Return and recycling of old batteries must be agreed on with the authorized Minuteman dealer in accordance with national requirements.

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Safety Information

1 Safety Information

1.1 Safety and warning symbols

All sections related to personal safety, safety of the vehicle and environmental protection are assigned the following symbols throughout the operating manual:

Symbol		Risks to	Definition
Safety information		persons or property	Safety information on preventing hazardous situations caused by failure to follow instructions or prescribed working procedures accurately or at all.
Note		the machine	Important information on handling the machine in order to maintain its functionality.
Ecological hazard		the environment	Ecological hazard through the use of substances which represent a potential risk to health and the environment.

Safety Information

1.2 General information

- In addition to the information provided in this operating manual, all the legally applicable health and safety provisions must be observed.
- Before starting up the vehicle for the first time, read the operating manual supplied with it thoroughly as well as any separate manuals provided with additional or attachment equipment and observe all the information during work.
- The machine may only be operated, serviced and repaired by personnel trained by Minuteman technical experts.
- Particular attention should be paid to the information regarding safety. Technical expertise is the key to preventing errors when operating the equipment and ensuring trouble-free operation.
- The operating manual must always be kept at the operating location of the vehicle and, as a result, should be kept in a safe place on the vehicle.

- If the equipment is sold or rented out, these documents should be transferred to the new owner/ operator. The transfer should be confirmed!
- The warning labels attached to the equipment provide important information concerning safe operation. Labels which are illegible or missing must be replaced.
- Original spare parts must be used to ensure safety.
- It is forbidden to move into the hazard area represented by the vehicle.
- A mobile phone may only be used when the vehicle has been stopped.

1.3 Operating information

- The vehicle is not suitable for clearing up fluids, dust or substances which are hazardous to health, inflammable or explosive. No burning items may be swept up, such as glowing cigarettes. It is also forbidden to sweep up wood dusts, e.g. beech and oak dust - health hazard!
- The vehicle must not be driven through puddles of water when operating in vacuum-sweeping mode.

- Before starting up the vehicle for the first time, the battery to be used must be fully charged according to the prescribed initial battery charge process. Minuteman assumes no liability for damage to batteries resulting from failing to complete the initial battery charge process.
- The vehicle and its equipment must be checked in terms of perfect working condition and operational safety before being put to use. Clear any faults immediately! The vehicle must not be used if it is not in a proper working condition.
- Before putting the vehicle into operation, adjust the driver's seat so that you have a perfect view of the front and rear path of travel and working area!
- For safety reasons, the driver's seat is equipped with a seat contact switch. The vehicle can only be started when the operator is sitting on the driver's seat. The function of the seat contact switch must not be bypassed.
- Always switch off all the drives before switching the vehicle on.

Safety Information

- The vehicle must only be started, put into motion and stopped from the seat.
- Ensure there is sufficient ventilation when sweeping in closed spaces (dust).
- The driving speed must always be adapted to the ambient conditions and load status.
Three-wheel vehicles are less stable than four-wheel vehicles, therefore: avoid sudden steering movements when driving at higher speeds, taking corners at too high a speed could cause the vehicle to tip. Only use the vehicles on level surfaces, never on gradients. Drive up and down inclines in straight lines. When driving up, down or across slopes, avoid turning corners suddenly or in jerks. There is a risk of tipping when in an inclined position!
- Do not drive the vehicle on slopes with a gradient steeper than the limit gradient indicated on the vehicle.
- The approved gross total weight and permissible axle loads must never be exceeded. Check the fill level of the dirt hopper at frequent intervals.
- Only put the vehicle into operation when the seat console is closed and the shaking device lever has been pushed in.
- Before starting work, the operator must be fully familiar with all adjustment, operating and control elements as well as their respective function. It is too late to do this when the vehicle is actually in operation!
- Always wear heavy duty, non-slip footwear when working with the vehicle.
- The vehicle may only be driven on and the equipment used on those surfaces which have been approved by the contractor or person appointed by him.
- Adapt your manner of driving according to the local characteristics.
- It is forbidden to use the vehicle in potentially explosive atmospheres.
- When using the vehicle, it is essential to pay attention to third parties, especially children.
- It is forbidden to transport people on the vehicle.
- Drive away immediately after switching on the cylindrical broom, otherwise the broom may leave impressions on the contact surface.
- Never leave the vehicle unattended while it is in operation.
- Remove the key from the key switch to prevent unauthorized use of the vehicle.
- Never leave the batteries in a discharged state but recharge them as soon as possible.
- The filter may only be shaken when the dirt hopper has been closed.
- Never exceed the max. load capacity of the hoppers! This could increase the stopping distance. Caution, particularly when sweeping up iron filings for example!
- Only empty the contents of the dirt hopper from a low height in order to avoid causing dust. Where appropriate, pay attention to the wind direction and evade clouds of dust. Health hazard!
- When transporting the vehicle, the vehicle must be switched off and the side broom raised.

Safety Information

- The Kleensweep KS 32 R is designed for use on level ground with a maximum gradient of 16%.
- Steps or curbs with a maximum height of 1.5" can be driven over.
- It is forbidden to manipulate switches and safety equipment.

1.4 Maintenance information

- The maintenance work and maintenance intervals prescribed in the operating manual must be adhered to.
- Operating personnel must complete the necessary daily and weekly maintenance work. All other maintenance work must be completed at your nearest Minuteman service center.
- Pay attention to any rotating parts before starting cleaning and maintenance work. They represent a risk of crushing!
- The vehicle must be inspected by a recognized technical expert in respect of operational safety, within the terms of the applicable accident prevention laws, at reasonable intervals (we recommend at least once a year) and following modification or repairs.
- Spare parts must comply with the minimum technical requirements stipulated by the manufacturer! This is ensured by the use of original spare parts.
- When completing any maintenance and repair work, switch the machine off via the key switch to prevent the drive being started up inadvertently.
- Suitable tools must be used for cleaning and maintenance work.
- If the seat console must be raised to complete work, it must be held in place by the safety support to prevent it accidentally falling or slamming shut.
- It is not permitted to clean the vehicle with a pressure washer or steam blaster.
- The dirt hoppers must be cleaned regularly to prevent the accumulation of bacteria.
- It is not permitted to use aggressive, corrosive cleaning agents.
- Let the machine dry thoroughly after cleaning, e.g. over the weekend.
- When transporting the vehicle, the vehicle must be switched off.
- If the Kleensweep KS 32 R is jacked up with a jack, it must be properly supported.
- No persons may be on the Kleensweep KS 32 R when it is jacked or raised.
- When changing wheels, the vehicle must be additionally secured from rolling away by placing wheel chocks against the wheels. Always change wheels on level, solid ground, where possible.
- Do not remove or replace tires or repair one on a rim. Always go to a proper workshop for work on tires and rims because they have specially trained personnel and special safety tools.
- Do not carry out any welding, drilling, sawing or grinding work on frame parts. Damaged parts may only be replaced by specialist workshops approved by Minuteman.

Safety Information

1.5 Particular risks

Electronics

- In the case of defects in the electrical installation, always switch the vehicle off and clear the fault.
- Work on the electrical installation may only be carried out by electricians who have received the necessary training and in accordance with the electrical engineering regulations.
- The vehicle's electrical equipment must be inspected/checked at regular intervals. Defects, such as loose connection, loose nuts of conductive bolts, electrical components and damaged cables, must be rectified immediately.
- Observe the information in the operating manual provided by the battery manufacturer.
- Always disconnect the battery cable when working on the electrical installation.
- Only use original fuses with the prescribed amperage. Using fuses which are too powerful could damage the electrical installation and lead to fires.

- Pay attention that the insulation on the charger cable shows no signs of damage and is not damaged during the charging process. The cable must not rub against anything. If the insulation is defective, do not use the on-board charger.
- To prevent current leaks, always keep batteries clean and dry and protect them from soiling by metallic dust, for example.
- Never lay any metallic objects or tools on batteries. Risk of short circuit and deflagration!
- Ensure sufficient ventilation in the charging area when charging the batteries. Otherwise there is a risk of explosion!
- Batteries must not be connected or disconnected when switched on.
- After finishing work on the batteries, wash your hands thoroughly.

Health risks

- The shaking device to clean the panel air filter may only be activated when the dirt hoppers are in the machine.
- It is forbidden to eat, drink and smoke in battery charging rooms.

Safety equipment

- Never operate the Kleen-sweep KS 32 R without the seat console being closed (safety equipment)!

Safety Information

1.6 Environmental protection

- A certain factual expertise is required in order to use substances which could represent a risk to health and the environment.
- Always observe legal regulations and local directives when disposing of cleaning agents.
- Used batteries bearing the recycling symbol must not be disposed of in household waste, refer to the Section "Disposal".

Safety Information

1.7 Labels on the vehicle

The following safety and warning labels are attached to the vehicle where easily legible. Missing or illegible labels must be replaced immediately.

Company logo (front chassis / rear cover panel) (Fig. 1/1 and (Fig. 2/7)

Minuteman[®]

Rating plate (under the foot mat) (Fig. 1/2)



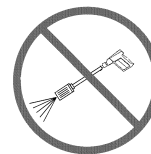
Shaking device label (Fig. 1/3)



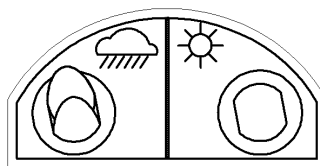
Read and observe the operating manual (Fig. 1/4)



High-pressure washer label (Fig. 1/7)



Bypass label (Fig. 1/5)



Risk of crushing label (Fig. 1/6)



Safety Information

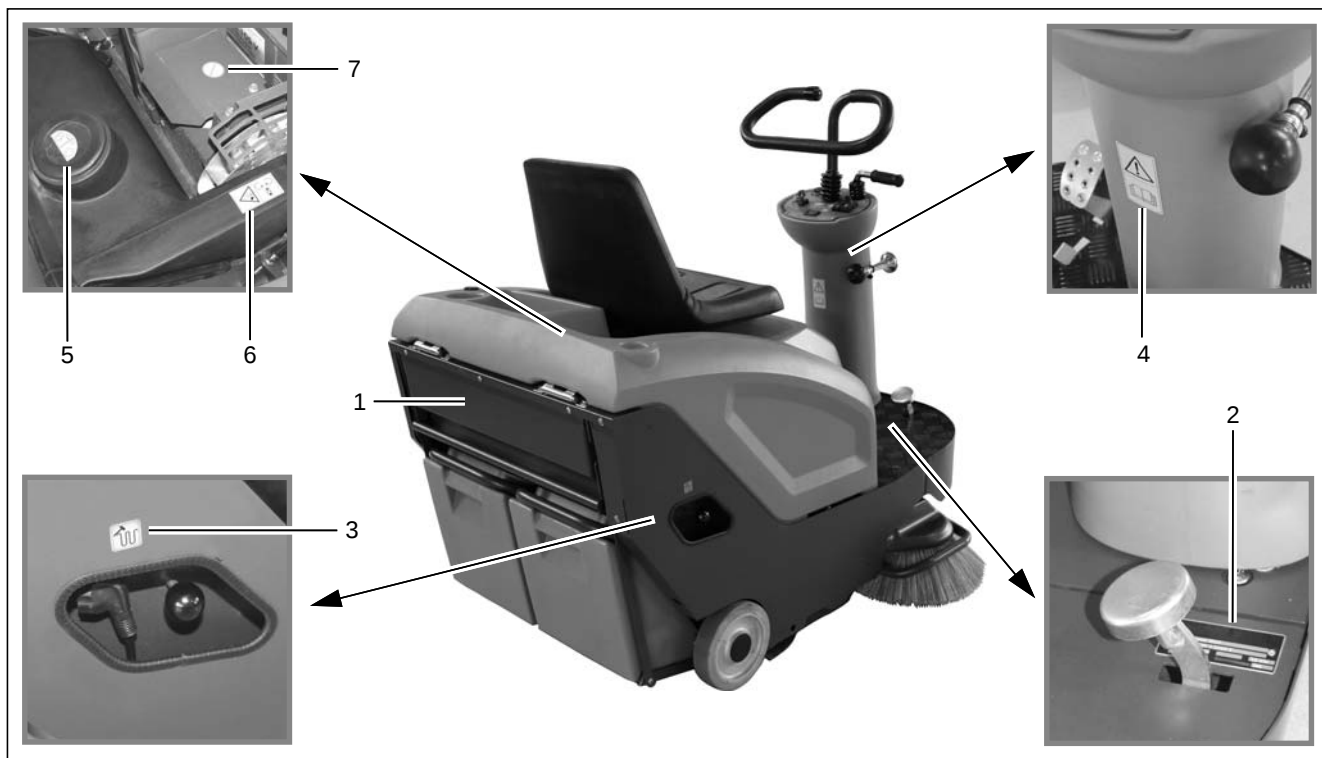


Fig. 1

Safety Information

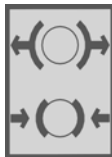
Side broom label (Fig. 2/1)



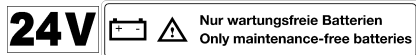
Parking brake label (Fig. 2/4)



Brake label (Fig. 2/2)



Maintenance-free batteries label
(Fig. 2/5)



Folding apron label (Fig. 2/3)



Cylindrical broom label (Fig. 2/6)



Safety Information

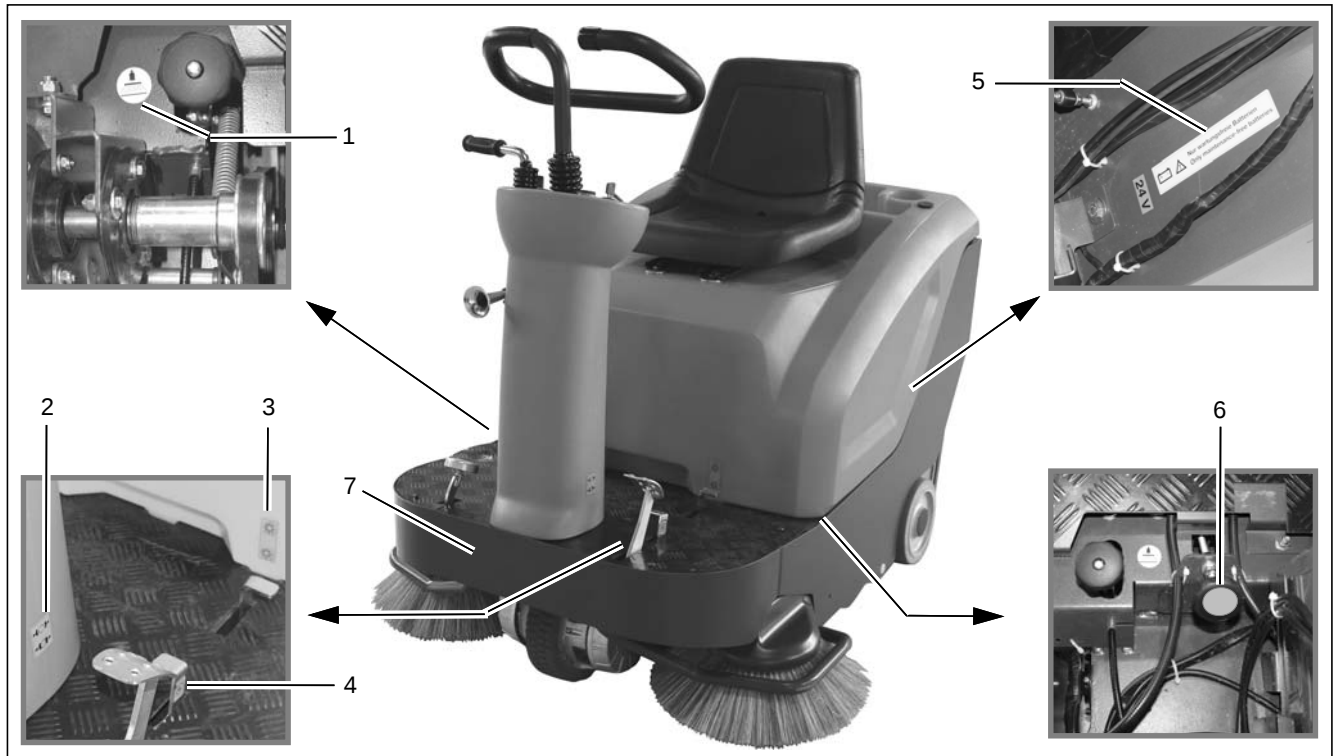


Fig. 2

2 Operation

2.1 Overview

- 1 Operating panel
- 2 Steering column
- 3 Pedals
- 4 Side broom
- 5 Drive
- 6 Larger debris flap
- 7 Sealing strips, broom space
- 8 Cylindrical broom
- 9 Dirt hoppers
- 10 Panel air filter
- 11 Seat console
- 12 Driver's seat
- 13 Flashing light (option)

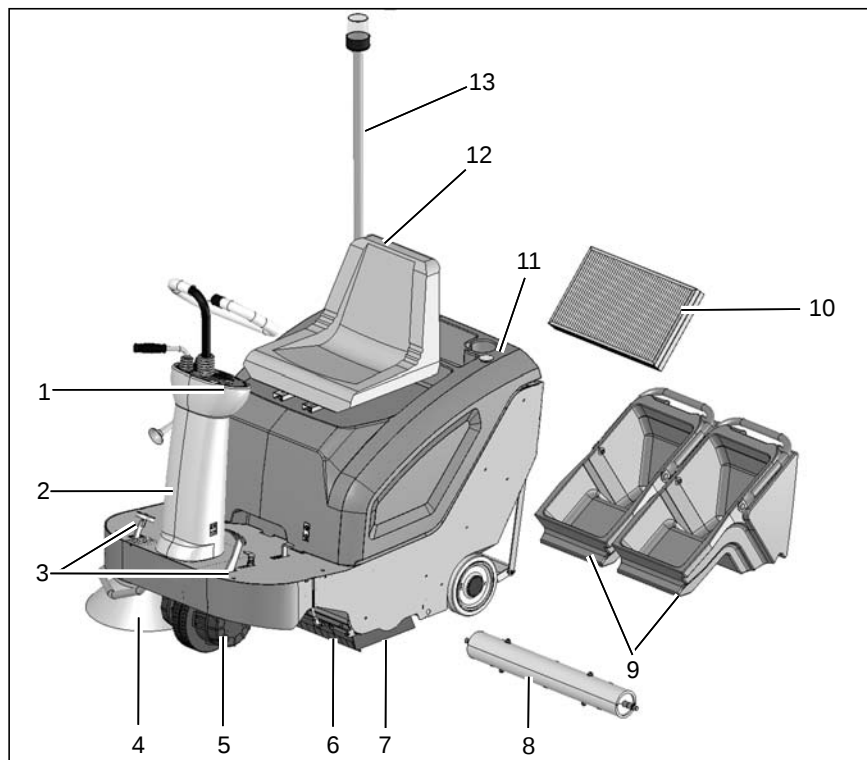


Fig. 3

Operation

2.2 Function description

The Kleensweep KS 32 R is a sweeper exclusively designed for sweeping up dry and wet waste from floor surfaces as in production plants, warehouses, car parks and pedestrian precincts.

Side broom, right

The side broom (Fig. 3/4) sweeps the dirt from corners and edges in front of the cylindrical broom. The side broom can be lowered and raised using a hand lever. The sweeping pattern can be adjusted. It is driven by the central motor via a drive belt.

Cylindrical broom

The cylindrical broom (Fig. 3/8) sweeps the dirt according to the overhead throwing principle into the dirt hoppers (Fig. 3/9). In the case of larger debris, the folding apron (Fig. 3/6) can be opened. The sweeping pattern of the cylindrical broom and the sealing strips (Fig. 3/7) in the broom space can be adjusted. It is driven by the central motor via a drive belt.

Filter system

The fine dust swirled up by the cylindrical broom is forced into the panel air filter (Fig. 3/10) by a suction turbine and is filtered out. The particulate matter settles on the outside of the filter ribs and drops into the two dirt hoppers (Fig. 3/9). The panel air filter can be cleaned by means of the shaking device. The suction turbine is driven by the central motor.

Dirt hopper

The refuse is ejected into the two dirt hoppers (Fig. 3/9) via the cylindrical broom and the panel air filter. The fill quantity is approx. 55 lb per dirt hopper.

Drive

The Kleensweep KS 32 R is equipped with a continuously variable adjustment electric drive (Fig. 3/5).

Operation

Seat console

The seat console (Fig. 3/11) can be pivoted up for maintenance work. The seat console is provided with a safety support.

Driver's seat

The driver's seat (Fig. 3/12) is adjustable and equipped with a seat contact switch.

Operating panel

The most important operating elements are arranged within reach of the operator. The operating panel (Fig. 3/1) is located on the steering column (Fig. 3/2). The pedals (Fig. 3/3) are assigned the functions service brake, parking brake and accelerator.

Battery system

The Kleensweep KS 32 R is equipped with maintenance-free batteries and an integrated charger. The batteries are monitored by a total discharge signal transducer.

2.2.1 Special equipment

The basic vehicle can be upgraded by adding various special equipment. The order numbers for these components are listed in the table.

Special equipment	Order no.:
Flashing light	640060
Side broom, left	640050

Flashing light

It is possible to install an optional flashing light on the seat console. The holder for the flashing light is inserted in the seat console and fixed in place with a screw. The plug for the electrical connection is in the cable duct of the seat contact switch.

Side broom, left

The side broom left option can only be supplied ex works and cannot be retrofitted.

2.2.2 Spare part requirements

Spare part	Order no.:
Universal cylindrical broom	01136350
Side broom PES (indoors)	01270920
Side broom PA (outdoors)	01270970

Operation

2.3 Operating panel

- 1 Key switch
- 2 Charge control indicator
- 3 Charge status indicator
- 4 Operating hour counter
- 5 Sweeping functions switch
- 6 Drive direction switch
- 7 Steering
- 8 Horn
- 9 Side broom lever

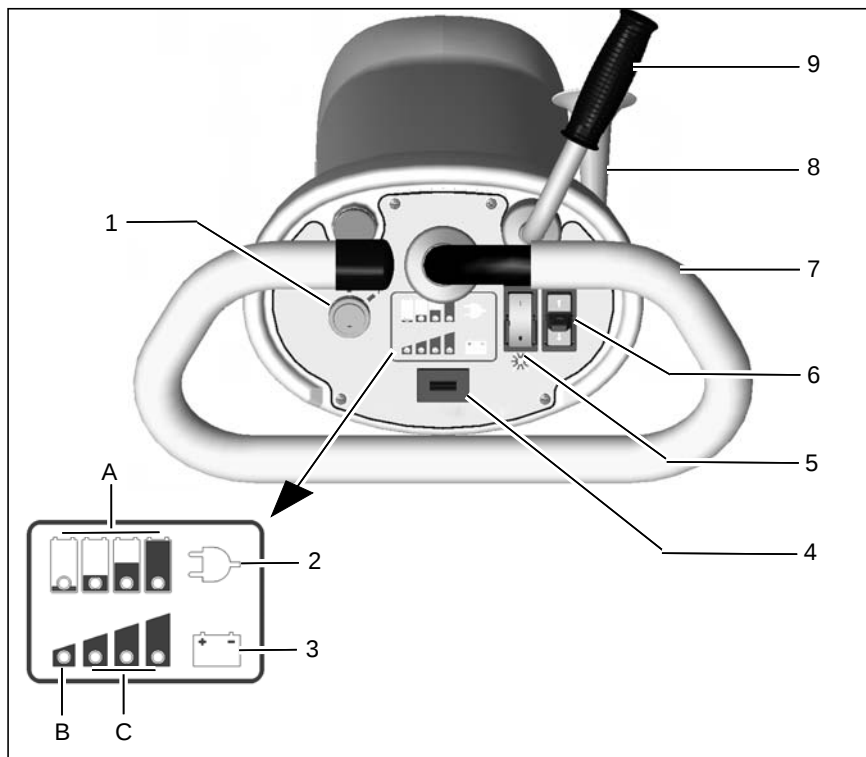


Fig. 4

Operation

Key switch (Fig. 4/1)

The key switch serves to switch the electric drive on and off.



Remove the key to protect the vehicle against unauthorized use.

Key switch positions:

Position 0: off

Position 1: on (engine on)

Charge control indicator (Fig. 4/2)

During the charging process, the vehicle's electronic system indicates the charge status via four green LEDs (Fig. 4/2A) .



The Kleensweep KS 32 R can only perform the charging process when the key switch is in Position 0.

As charging progresses, the LEDs light up successively from left to right. If the LEDs flash or light up individually, it indicates an error status; refer to the charger operating manual.

Charge status indicator (Fig. 4/3)

While the vehicle is in operation, the vehicle's electronic system indicates the discharge status of the batteries by means of a red LED (Fig. 4/3B) and three green LEDs (Fig. 4/3C). When all three green LEDs light up, the batteries are fully charged. As the battery power increasingly discharges, the LEDs go out from right to left. When the last green LED goes out, the red LED starts to flash (early warning of imminent shut-down). After a time, the red LED lights up continuously and indicates the "Battery empty" status. Shortly afterwards, the electric drive is automatically switched off to protect the battery from a total discharge. The vehicle should only be restarted with a fully charged battery.

Operation

Operating hour counter (Fig. 4/4)

It serves to display the operating hours. The counter only works when the driver is seated in the seat and the ignition is switched on.

Sweeping functions switch (Fig. 4/5)

It serves to switch the cylindrical broom, side broom and suction turbine on and off.

Position 0: side broom, cylindrical broom and suction turbine switched off
Middle position: Zero position
Position 1: side broom, cylindrical broom and suction turbine switched on



When sweeping wet surfaces or wet refuse, open the bypass flap.

Drive direction switch (Fig. 4/6)

This serves to select the driving direction. Control lever forward = forward drive

Control lever O = neutral position
Control lever back = reverse drive

To change the driving direction, stop the vehicle by applying the service brake, select the new direction and accelerate again.

Steering (Fig. 4/7)

The steering transmission from the steering wheel to the front wheel is performed by a fork head. The small turning circle enables sufficient maneuverability to steer away from the wall.

Horn (Fig. 4/8)

An acoustic signal is issued on actuating the horn.

Side broom lever (Fig. 4/9)

The side broom can be lowered and raised using the hand lever.

Lever to front: side broom is lowered.
Lever to rear: side broom is raised.



If the left-hand side broom option is installed, it is also lowered and raised with the lever (Fig. 4/9).

Operation

2.4 Operating elements on the vehicle

- 1 Driver's seat adjustment lever
- 2 Charger power cable
- 3 Shaking device lever
- 4 Accelerator
- 5 Folding apron pedal
- 6 Parking brake
- 7 Service brake

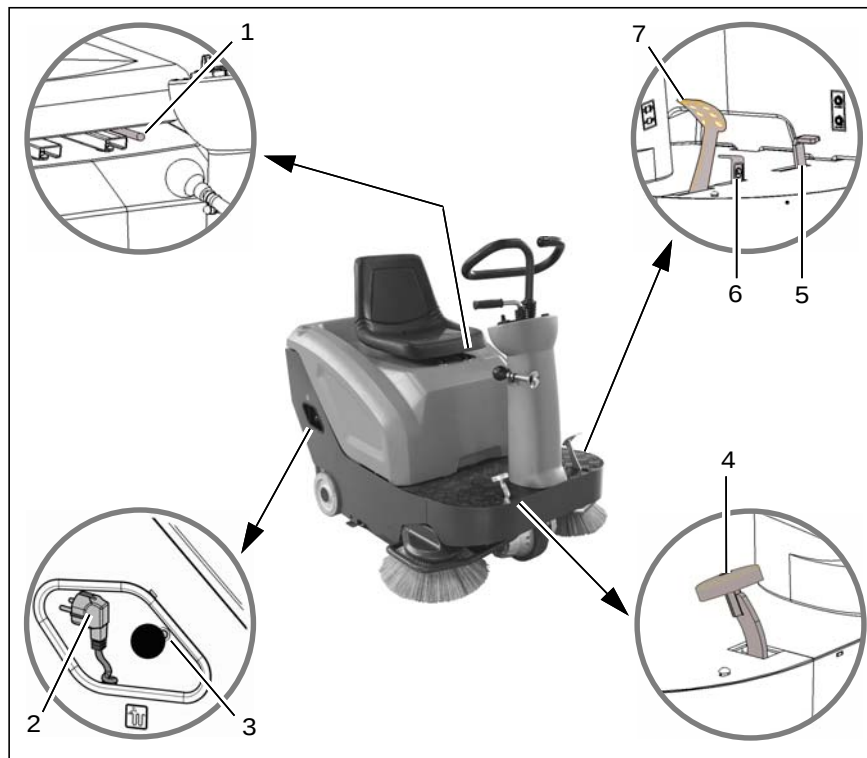


Fig. 5

Operation

Driver's seat adjustment lever

(Fig. 5/1)

The lever is used to adjust the seat position of the driver's seat.

Pull the lever upwards and slide the driver's seat to the required seat position.

Charger power cable (Fig. 5/2)

The power cable of the charger is located beside the shaking device. In order to charge the batteries, connect the power cable to the power supply system.

Shaking device lever (Fig. 5/3)

To clean the panel air filter, pull the shaking device lever out and push in again several times. Driving with the parking brake applied will soon lead to overheating

Accelerator (Fig. 5/4)

It serves for the continuously variable regulation of the vehicle speed when driving forward or in reverse.



Set the driving direction beforehand using the drive direction switch.

If the pedal is released, it automatically returns to its zero position and the vehicle comes to a stop.

Folding apron pedal (Fig. 5/5)

The pedal is used to open and close the folding apron to sweep up larger debris.

Parking brake lever (Fig. 5/6)

This is used to apply the parking brake. The lever locks in place after being raised.

Service brake (Fig. 5/7)

When the accelerator is retracted (forward or reverse drive), the vehicle comes to a halt due to the braking effect of the electric drive. If this braking effect is insufficient, you can also apply the service brake to decelerate more quickly.

Operation

- 1 Bypass flap
- 2 Adjusting bolt for right-hand side broom
- 3 Adjusting bolt for left-hand side broom (option)
- 4 Adjusting bolt for cylindrical broom
- 5 Safety support for seat console

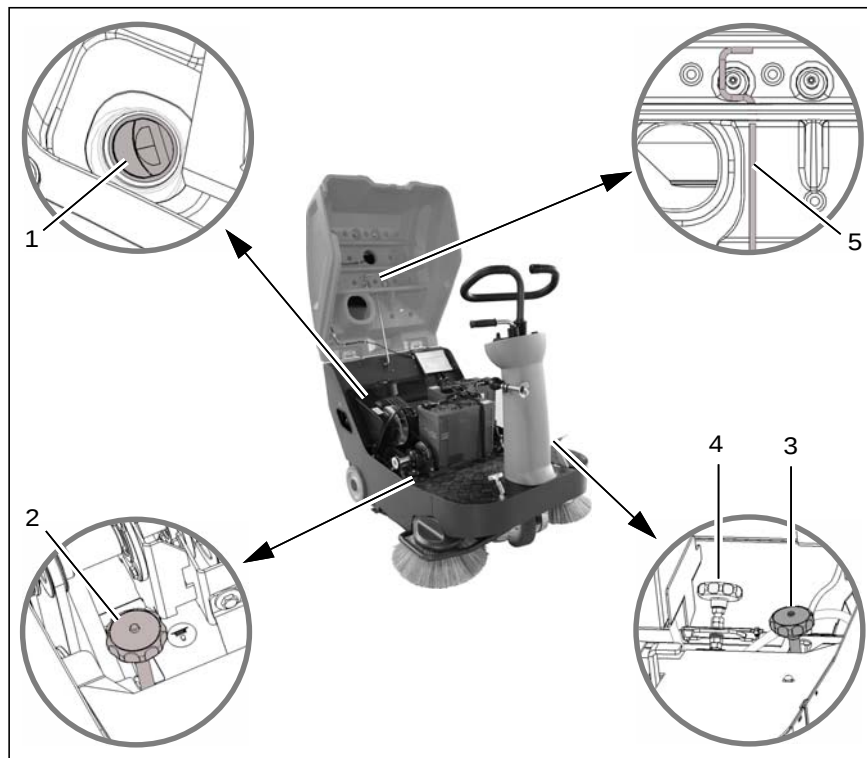


Fig. 6

Operation

Bypass flap (Fig. 6/1)

When sweeping wet surfaces or wet refuse, open the bypass flap. Close the bypass flap again to sweep dry surfaces.

Adjusting bolt for right-hand side broom (Fig. 6/2)

This adjusting bolt is used to adjust the sweeping pattern of the right-hand side broom.

Adjusting bolt for left-hand side broom (option) (Fig. 6/3)

This adjusting bolt is used to adjust the sweeping pattern of the left-hand side broom.

Adjusting bolt for cylindrical broom (Fig. 6/4)

This adjusting bolt is used to adjust the sweeping pattern of the cylindrical broom.

Safety support for seat console (Fig. 6/5)



Only operate the vehicle when the seat console is closed.

Only open the seat console for maintenance and repair work. Take hold of the handle and pivot the seat console up until the safety support locks in place. Unlock the safety support in order to close the seat console.

Operation

Dirt hopper lock (Fig. 7/1)

The lock serves to secure the dirt hoppers. To empty the dirt hoppers (Fig. 7/2), pivot the lock lever (Fig. 7/1) up and remove the dirt hoppers.

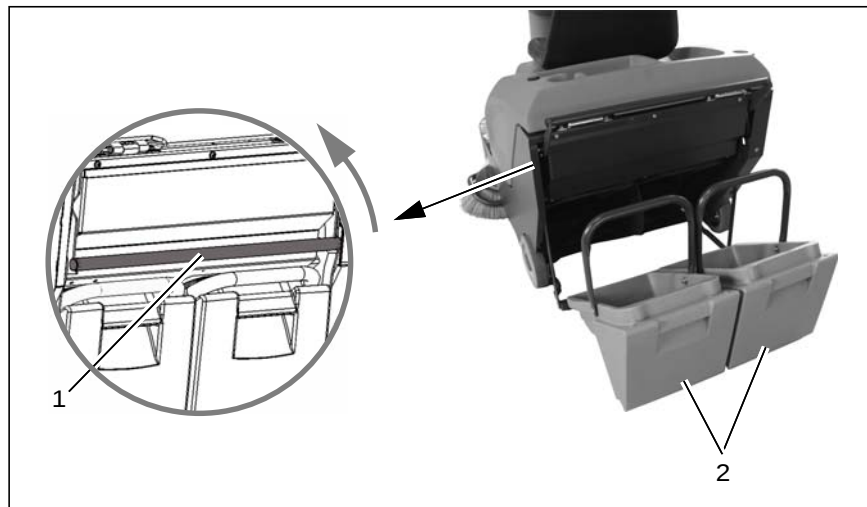


Fig. 7

3 Operation

3.1 Unpacking

1. Remove the packaging and tightening straps.
2. Park the machine by applying the parking brake.
3. Remove the wooden chock.
4. Remove the rear skirting panel and assemble it under the front one.
5. Release the parking brake and push the machine from the pallet.

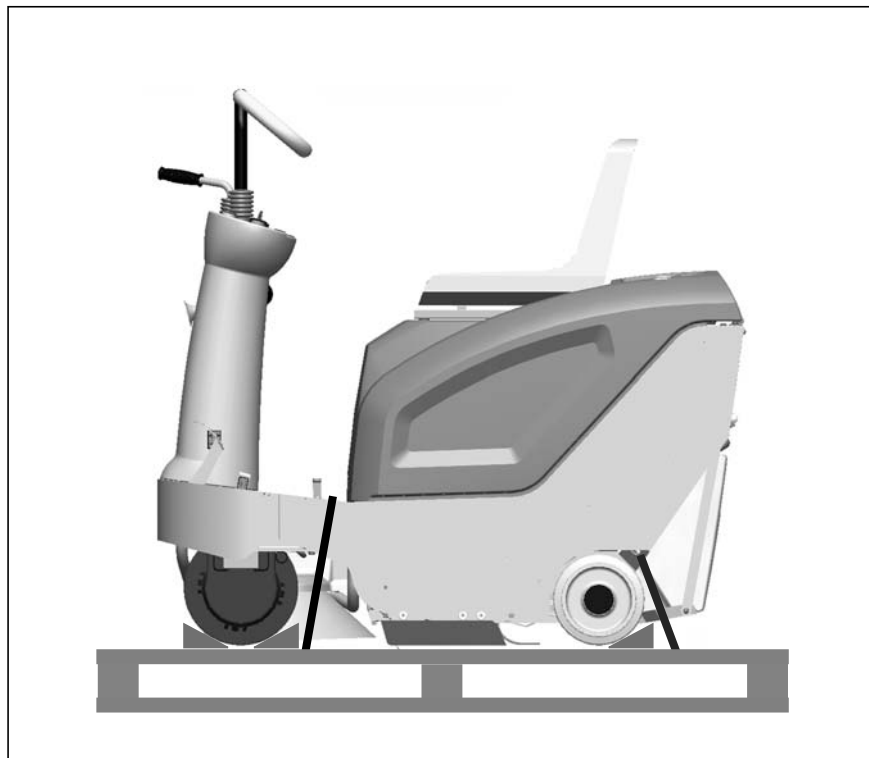


Fig. 8

Operation

3.2 Before starting up for the first time

3.2.1 Initial instruction

Instructions to operators are required before putting the machine into service. Only technicians from your local authorized Minuteman dealer are allowed to provide initial instruction on the machine. The manufacturing plant will notify the dealer immediately after delivering the vehicle and the dealer will contact you to arrange a date.



Practice all the operating steps in a large area of space and only use the machine when you are familiar with its operation.

3.2.2 Initial battery charge

Before starting up the vehicle for the first time, the battery to be used must be fully charged according to the prescribed initial battery charge process. Also observe the information in the operating manual enclosed with the charger and the operating manual supplied by the battery manufacturer in this case. Minuteman assumes no liability for damage to batteries resulting from failing to complete the initial battery charge process properly.

Operation

3.3 Adjusting the driver's seat

The driver's seat (Fig. 9/1) must be adjusted so that the driver is seated comfortably and can reach all the operating elements with ease.

Pull the lever (Fig. 9/2) upwards and slide the driver's seat to the required seat position.



The machine is equipped with a seat contact switch. The machine can only be operated when an operator is sitting on the driver's seat.

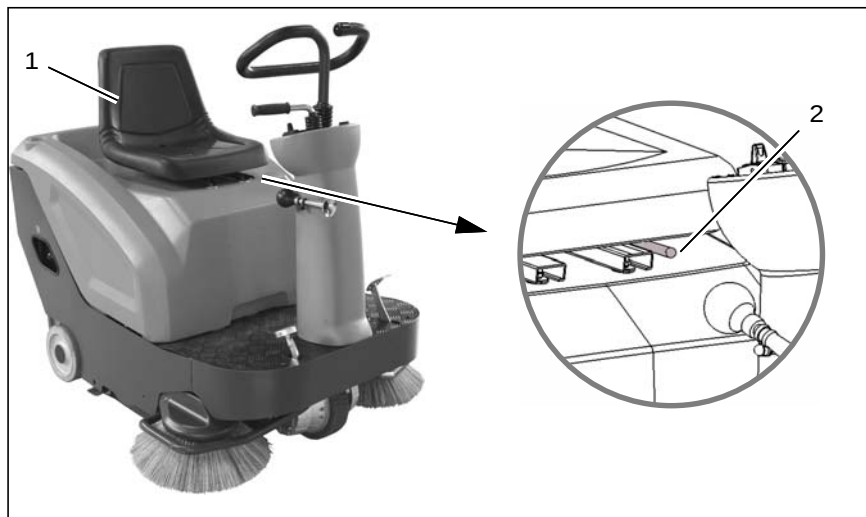


Fig. 9

Operation

3.4 Switching the vehicle on



For safety reasons, the driver's seat is equipped with a seat contact switch. The machine can only be put into operation when an operator is sitting on the driver's seat. The function of the seat contact switch must not be bypassed.

1. Make sure that all control levers are at their off or zero position.
2. The vehicle's parking brake must be applied (Fig. 10/1).
3. Switch the vehicle on with the key switch (Fig. 10/2).

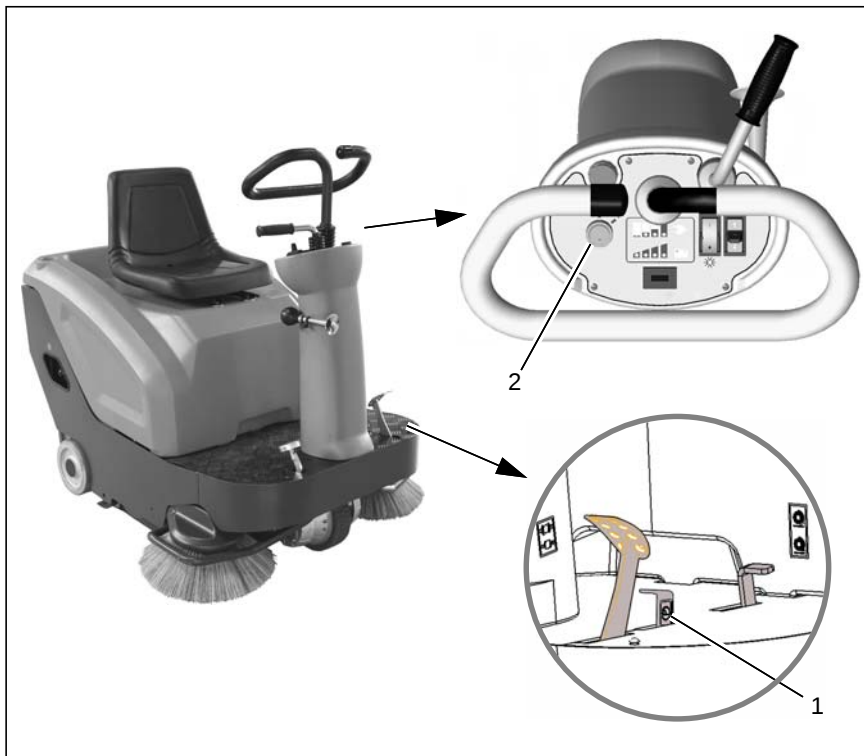


Fig. 10

Operation

3.5 Stopping and switching off the vehicle

1. Move the accelerator (Fig. 11/1) slowly to its zero setting. The vehicle slows down to a stop.



If this braking effect is insufficient, you can also apply the service brake (Fig. 11/2) to decelerate more quickly.

2. Apply the parking brake (Fig. 11/3) to its end position and lock in place.
3. Switch off the sweeping functions with the button (Fig. 11/4).
4. Switch the vehicle off with the key switch (Fig. 11/5).



Remove the key when getting off the vehicle to prevent unauthorized use.

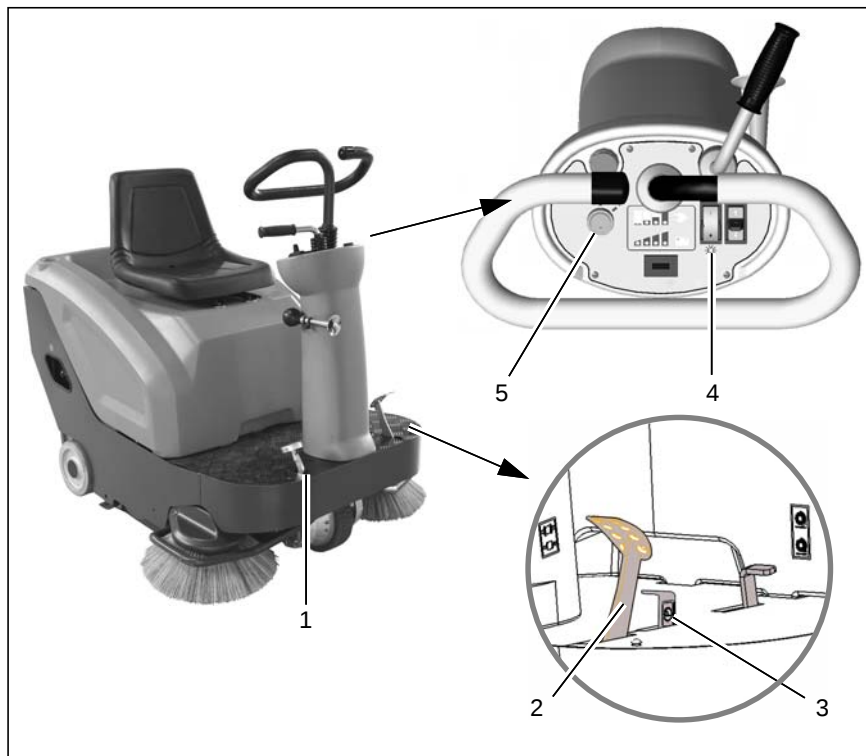


Fig. 11

Operation

3.6 Sweeping operation

- 1 Charge status indicator
- 2 Shaking device
- 3 Dirt hoppers
- 4 Bypass flap
- 5 Driver's seat
- 6 Key switch
- 7 Side broom lever
- 8 Sweeping functions switch
- 9 Drive direction switch
- 10 Accelerator

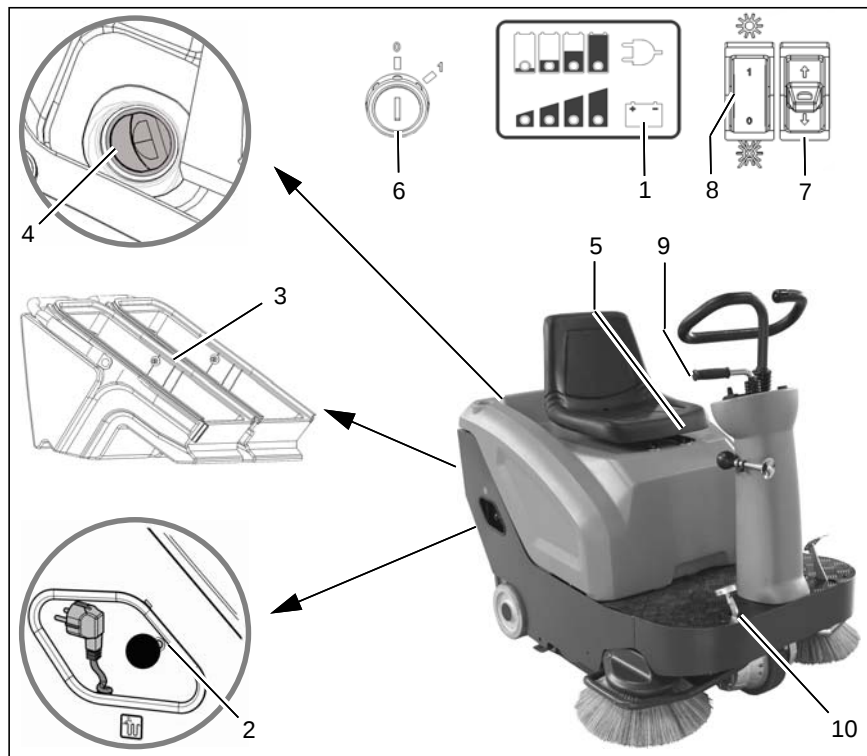


Fig. 12

Operation

Check prior to sweeping operation

- Check the charge status indicator (Fig. 12/1) of the batteries
- Clean the filters using the shaking device (Fig. 12/2)
- Empty the dirt hoppers (Fig. 12/3)
- Open the bypass flap (Fig. 12/4) in the case of wet refuse.
- Check the adjustment of the driver's seat (Fig. 12/5)

Starting sweeping operation



Ensure there is sufficient ventilation when sweeping in closed spaces.

It is not permitted to sweep up dusts which are considered a health hazard.

1. Switch the vehicle on with the key switch (Fig. 12/6).
2. Select the driving direction with the drive direction switch (Fig. 12/7). Release parking brake.
3. Switch on the sweeping functions with the switch (Fig. 12/8).
4. Lower the side broom using the lever (Fig. 12/9).
5. Actuate the accelerator (Fig. 12/10) and drive over the area to be

cleaned.



After switching on the sweeping functions, drive off straight away to avoid the risk of the cylindrical or side broom marking the floor following rotation.

After sweeping operation

1. Drive to an appropriate service area.
2. Actuate the shaking device.
3. Empty the dirt hoppers.
4. Inspect the broom space for foreign bodies and remove them as necessary.
5. Clean the machine as necessary.



Do not wet clean electrical components! Risk of electric shock!

Pay attention that the dust filter does not get wet.

Before cleaning, close the bypass and install the dirt hoppers.

It is not permitted to clean the vehicle with a pressure washer or steam blaster.

Operation

3.7 Charging batteries

- 1 Charge status indicator
- 2 Key switch
- 3 Power cable
- 4 Charge control indicator

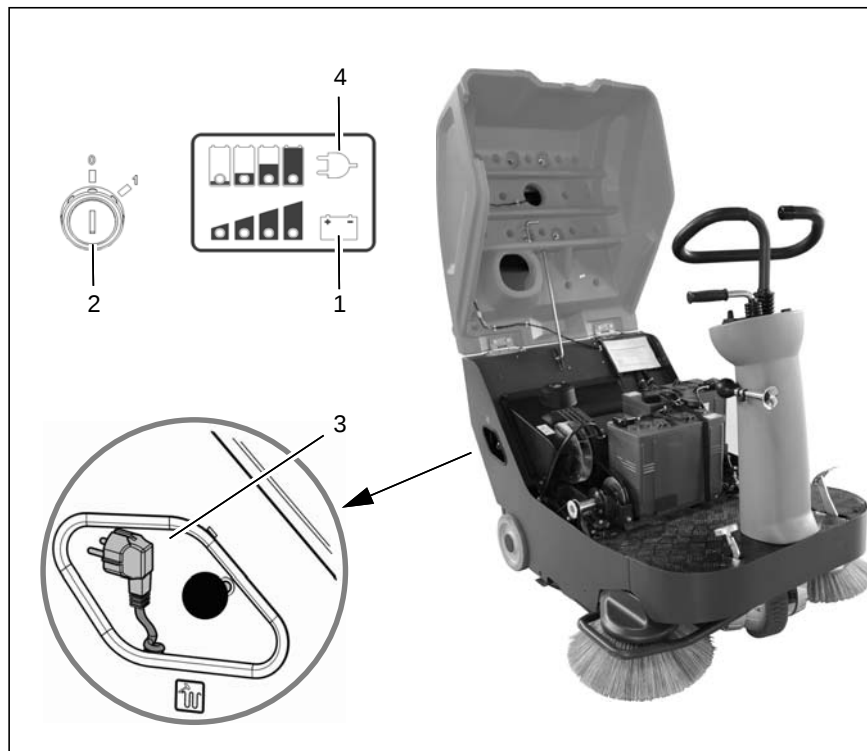


Fig. 13

Operation

During operation, the charge status indicator (Fig. 13/1) displays the discharge status of the batteries. When the red LED lights up, the battery must be charged immediately.

1. Switch the vehicle off using the key switch (Fig. 13/2) and secure with the parking brake. Remove the key.
2. Take the power cable (Fig. 13/3) from the opening and plug it into a power outlet (110-230 VAC).
3. While the battery is being charged, the charge control indicator (Fig. 13/4) lights up. When all three green LEDs light up, the batteries are fully charged.



If the key switch is actuated during the charging, the charging process is interrupted.

4. When the charging process is completed, disconnect the power cable from the power outlet and return it safely in the machine.

Operation

3.8 Operating the shaking device

Pull and push the lever (Fig. 14/1) in and out quickly, several times in succession in order to clean the dust from the panel air filter.



Only operate the shaking device when the electric drive is switched off.

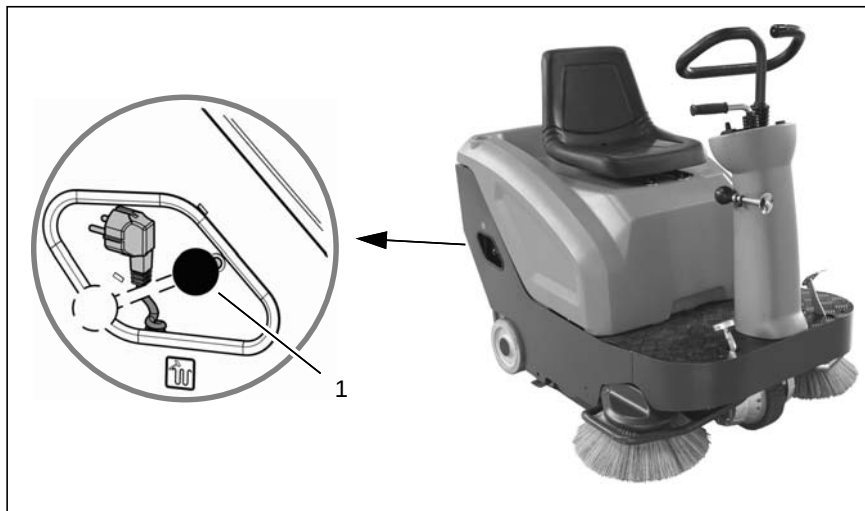


Fig. 14

Operation

3.9 Emptying the dirt hoppers

Check the contents of the dirt hoppers regularly and empty as necessary. Pivot the lock lever (Fig. 15/1) upwards and remove the dirt hoppers (Fig. 15/2). Transport the dirt hoppers using the handles (Fig. 15/3).



Risk of injury!

For reasons of health, each dirt hopper should only be filled to a maximum of 55 lb!



When disposing of refuse, observe the applicable legal requirements and local directives.

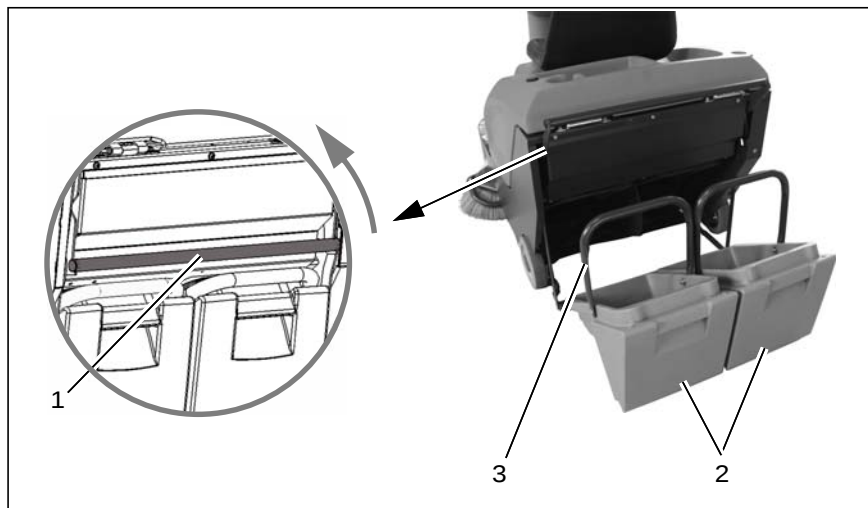


Fig. 15

Operation

3.10 Fault location

Switch the vehicle off and remove the key before starting to locate faults.

Problem	Cause	Solution
Poor cleaning results	Side broom or cylindrical broom worn	Adjust or change the side broom or cylindrical broom
	Panel air filter soiled	Clean the panel air filter
	Dirt hoppers full	Empty the dirt hoppers
	Drive belt defective	Change the drive belt
	Drive motor defective	Contact Minuteman service
Machine swirls dust	Sealing strips on broom space worn	Adjust or change the sealing strips
	Panel air filter soiled	Clean the panel air filter
	Bypass still open	Close the bypass
Vehicle or sweeping function cannot be activated	Seat contact switch has tripped	The operator must be seated in the seat during operation
	Start sequence not maintained	Driver on driver's seat Drive direction switch in neutral position Accelerator in zero position
Drive motor is too hot or stops	Foreign bodies tangled in the side broom, cylindrical broom or suction turbine	Remove the foreign bodies

Operation

3.11 Loading and transporting



When the vehicle is loaded and transported to the location of use, the side broom must be raised.

Loading

Take the weight of the machine into account when loading, refer to Section "Technical Data".

Transporting



The vehicle must be properly secured. It must not slip or tip during transportation. Risk of injury!

When transported on another vehicle or trailer, the machine must be secured against rolling away: lash the machine securely at the front and rear.

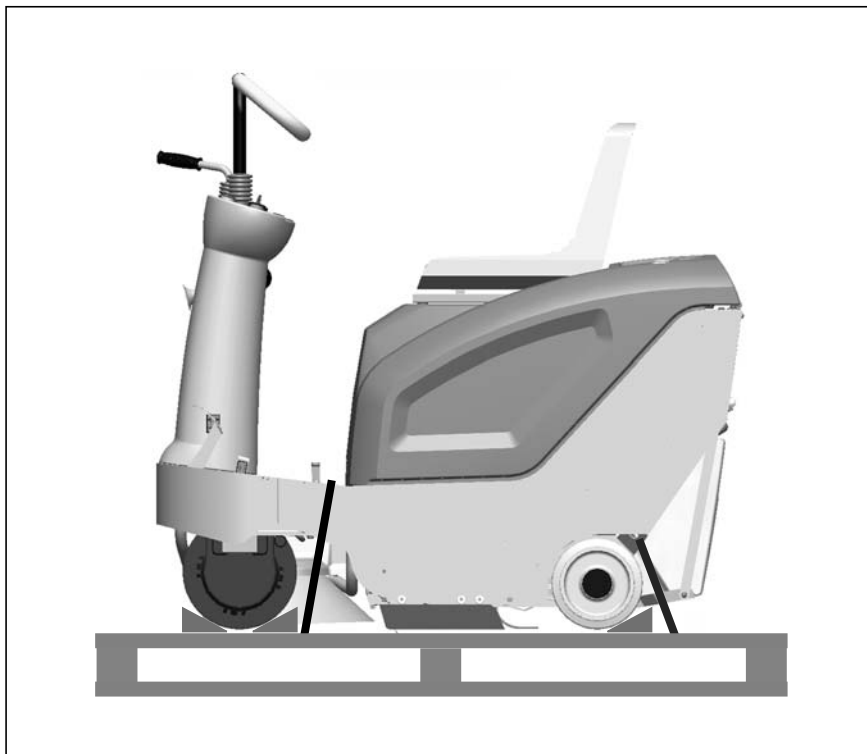


Fig. 16

Technical Data

4 Technical Data

Vehicle length (with side broom)	in	50.4
Vehicle height (over steering wheel)	in	48
Vehicle width (with right-hand side broom)	in	35
Working width (with right-hand side broom)	in	35
Cylindrical broom width	in	26.4
Cylindrical broom diameter	in	9.8
Cylindrical broom speed	rpm	500
Side broom diameter	in	15.7
Side broom speed	rpm	100
Area coverage, theoretical (with right-hand side broom)	ft ² /h	57479
Sweeping speed	mph	3.8
Turning circle	in	61
Dirt hopper volume (max. load capacity: 2x55 lb)	gal	2x7.9
Filter surface	ft ²	15
Battery	V / Ah	2 x 12 / 105
Nominal power input, drive motor	kW	0.75
Gross total weight	lb	992
Weight, transport mode with battery and driver	lb	794
Maximum climbing capacity (duration: max. 1 minute)	%	16
Operating voltage	V	24
Power supply, charger	VAC	100-230

Technical Data

Noise emission values The sound power level (LwAd) measured according to EN 60335-2-72 under maximum working conditions is: The sound pressure level (LpA) (at the ear of the driver) measured according to EN 60335-2-72 under normal working conditions is: Measurement inaccuracy (KpA):	dB (A) dB (A) dB (A)	82 66 3.5
Vibration The weighted, effective value of the acceleration, established in accordance with ISO 5349, to which the upper limbs (hand-arm) are exposed under normal working conditions is:	ft/s²	Max. 8.2

5 Maintenance and Service

General information



It is essential to pay attention to the information in Chapter "Safety Information" before completing any service or maintenance work!

By adhering to the maintenance work recommended by us, you can be sure that the vehicle is always ready to be put into operation.

Maintenance and repair work necessary on a daily and weekly basis can be carried out by a driver trained to complete the work, all other Minuteman system maintenance may only be completed by personnel who are correspondingly qualified and trained. In case of doubt, please contact your nearest Minuteman service center or authorized Minuteman dealer. Failure to observe this annuls any rights to claims under the terms of guarantee in respect of resulting damage or consequential damage.

Always specify the serial number, indicated on the rating plate, when making

any inquiries and orders for spare parts, refer to Section 1.7 - Rating plate.

5.1 Minuteman system maintenance

Minuteman system maintenance:

- ensures the Minuteman working vehicle is always ready for operation (preventive maintenance),
- minimizes operating costs, maintenance and repair costs,
- ensures the vehicle has a long service life.

The Minuteman system maintenance describes the specific technical work necessary for the individual modules and defines the intervals for the maintenance tasks. Individual parts which must be changed during maintenance tasks are defined and stipulated in spare parts kits.

System maintenance, customer:

Work to be carried out by the customer according to the service and maintenance instructions in the operating manual (daily and weekly). The driver/operator receives detailed instruction when the vehicle is delivered.

System maintenance I:

(Every 125 operating hours)
Must be completed by a skilled technician in an authorized Minuteman service center according to the vehicle-specific system maintenance with a spare parts kit.

System maintenance II:

(Every 250 operating hours)
Must be completed by a skilled technician in an authorized Minuteman service center according to the vehicle-specific system maintenance with a spare parts kit.

System maintenance III/S:

(Every 500 operating hours, safety check)
Must be completed by a skilled technician in an authorized Minuteman service center according to the vehicle-specific system maintenance with a spare parts kit.

Maintenance and Service

5.2 Maintenance report

Handover Upgrade Test drive Handover to customer Instruction completed on: at _____ operating hours	System Maintenance I 125 operating hours Workshop Stamp completed on: at _____ operating hours	System Maintenance II 250 operating hours Workshop Stamp completed on: at _____ operating hours	System Maintenance I 375 operating hours Workshop Stamp completed on: at _____ operating hours
System Maintenance III/S 500 operating hours Workshop Stamp completed on: at _____ operating hours	System Maintenance I 625 operating hours Workshop Stamp completed on: at _____ operating hours	System Maintenance II 750 operating hours Workshop Stamp completed on: at _____ operating hours	System Maintenance I 875 operating hours Workshop Stamp completed on: at _____ operating hours
System Maintenance III/S 1000 operating hours Workshop Stamp completed on: at _____ operating hours	System Maintenance I 1125 operating hours Workshop Stamp completed on: at _____ operating hours	System Maintenance II 1250 operating hours Workshop Stamp completed on: at _____ operating hours	System Maintenance I 1375 operating hours Workshop Stamp completed on: at _____ operating hours

Maintenance and Service

5.3 Maintenance plan

System maintenance, customer

The following maintenance work must be completed by the customer at the intervals stipulated.

Activity	Interval	
	Daily	Weekly
Check battery charge; charge battery, if necessary	o	o
Clean broom space of cylindrical broom	o	o
Clean panel air filter using shaking device	o	o
Empty the dirt hopper	o	o
Check side broom for signs of wear and damage; change, if necessary		o
Check cylindrical broom for signs of wear and damage; change, if necessary		o
Check sweeping pattern of side broom; adjust, if necessary		o
Check sweeping pattern of cylindrical broom; adjust, if necessary		o
Check seals in broom space of cylindrical broom for signs of wear and damage; change, if necessary		o
Check seals on dirt hoppers; change, if necessary		o
Check seals of dust vacuum; change, if necessary		o
Cleaning the vehicle		o

Maintenance and Service

System maintenance I

The following maintenance work must be completed by an authorized Minute-man service center.

Activity	Interval
	Every 125 operating hours
Check battery and charger	0
Check side broom for signs of wear and damage; change, if necessary	0
Check cylindrical broom for signs of wear and damage; change, if necessary	0
Check sweeping pattern of side broom; adjust, if necessary	0
Check sweeping pattern of cylindrical broom; adjust, if necessary	0
Check seals in broom space of cylindrical broom for signs of wear and damage; change, if necessary	0
Check seals of dirt hoppers; change, if necessary	0
Check seals of dust vacuum; change, if necessary	0
Check the function of the parking brake and service brake	0
Check dust vacuum; clean or change panel air filter, if necessary	0
Check the electric system (lighting, fuses, relays and control lamps)	0
Check the visual appearance of the vehicle	0
Test drive and function test	0

Maintenance and Service

System maintenance II

The following maintenance work must be completed by an authorized Minute-man service center.

Activity	Interval
	Every 250 operating hours
All maintenance work in accordance with System maintenance I	o
Check fan belt; adjust belt tension or change fan belt, if necessary	o
Check the visual appearance of the vehicle	o
Test drive and function test of all safety-related components	o

Maintenance and Service

HSYSTEM maintenance III/S:

The following maintenance work must be completed by an authorized Minute-man service center.

Activity	Interval
	Every 500 operating hours
All maintenance work in accordance with System maintenance I and II	0
Check electrical systems (operating panel, on-board charger, battery poles, cables, seat contact switch, lighting, fuses, relays and control lamps)	0
Check the carbon brushes of the drive motor and central motor for ease of movement and signs of wear; change, if necessary	0
Check the retaining screws; retighten, if necessary	0
Check actuating lever for folding apron, cylindrical broom, side broom, brake pedal, parking brake and accelerator; spray with oil to ease movement. if necessary	0
Check brake linings and Bowden cables in the brake system for signs of wear; change, if necessary	0
Check side broom for signs of wear and damage; change, if necessary	0
Check cylindrical broom for signs of wear and damage; change, if necessary	0
Test drive and function test of all safety-related components	0

5.4 Battery system



When completing any maintenance and repair work, switch the machine off via the key switch to prevent the drive being started up inadvertently!



Only batteries approved by Minuteman may be installed.



Batteries may only be handled and changed by properly skilled maintenance personnel.



Only maintenance-free batteries may be used.

- 1 Seat console
- 2 Safety support
- 3 Grab handle
- 4 Batteries
- 5 Retaining strap
- 6 Connection diagram

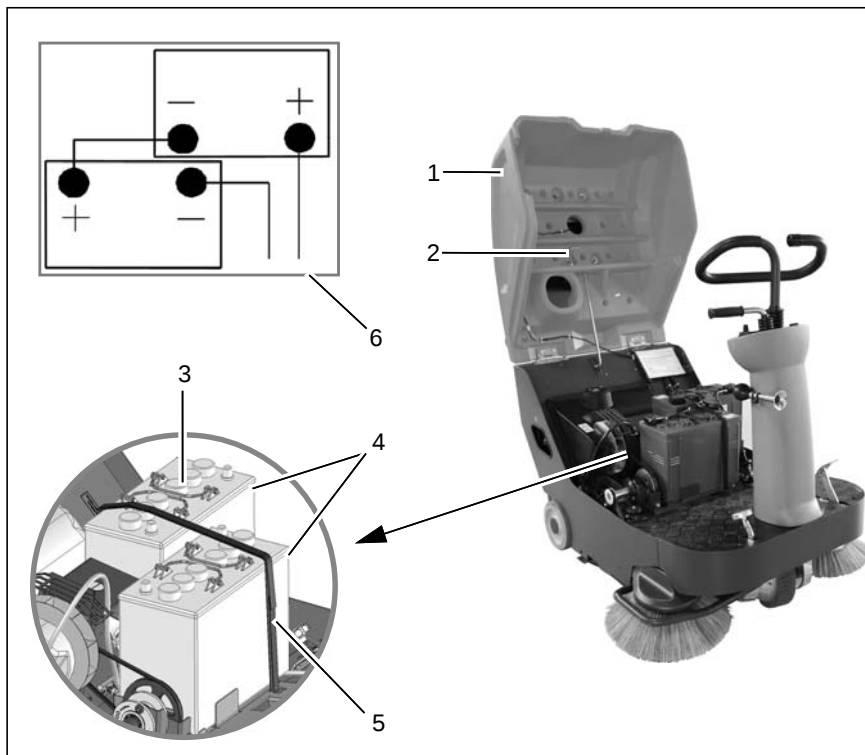


Fig. 17

Maintenance and Service

5.4.1 Removing the batteries



Sparking may occur when changing the batteries! When disconnecting, remove the negative cable first. When connecting, connect the positive cable first.

1. Switch the vehicle off using the key switch and secure with the parking brake.
2. Open the seat console (Fig. 17/1) and secure with the safety support (Fig. 17/2).
3. Disconnect the connection cables to the batteries (Fig. 17/4).
4. Loosen the retaining strap (Fig. 17/5).
5. Remove the batteries from the vehicle using the grab handle (Fig. 17/3).

5.4.2 Inserting the batteries



Only the special, maintenance-free batteries approved by Minuteman may be installed and at the intended position.

1. Switch the vehicle off using the key switch and secure with the parking brake.
2. Open the seat console (Fig. 17/1) and secure with the safety support (Fig. 17/2).
3. Pick up the batteries (Fig. 17/4) using the grab handle (Fig. 17/3) and insert them in the vehicle.
4. Secure the batteries in place with the retaining strap (Fig. 17/5).
5. Connect the batteries in accordance with the connection diagram (Fig. 17/6).
6. Unlock the safety support (Fig. 17/2) and close the seat console (Fig. 17/1).

5.4.3 Battery care

Never leave batteries in a discharged state, always recharge them straight away!



For more information on caring for driving batteries, also refer to supplementary sheet 88-60-2556 regarding "Information on driving batteries".

5.4.4 Setting the battery type



Adjustments to the total discharge signal transducer may only be completed at an authorized Minuteman service center.

The total discharge signal transducer (Fig. 18/1) is located under the operating panel (Fig. 18/3). The various battery types can be setup using the fourfold DIP Switch (Fig. 18/2).

DIP1	DIP2	DIP3	DIP4	TYP
ON	OFF	OFF	OFF	Crown
ON	ON	OFF	ON	GiS
ON	OFF	ON	OFF	PzS
OFF	ON	ON	OFF	GiV
ON	ON	ON	OFF	PzV
OFF	OFF	OFF	ON	AGM
ON	ON	ON	ON	GiV*
ON	ON	ON	ON	PzS**

* X1-6...X1-7 - open

** X1-6...X1-7 - jumper

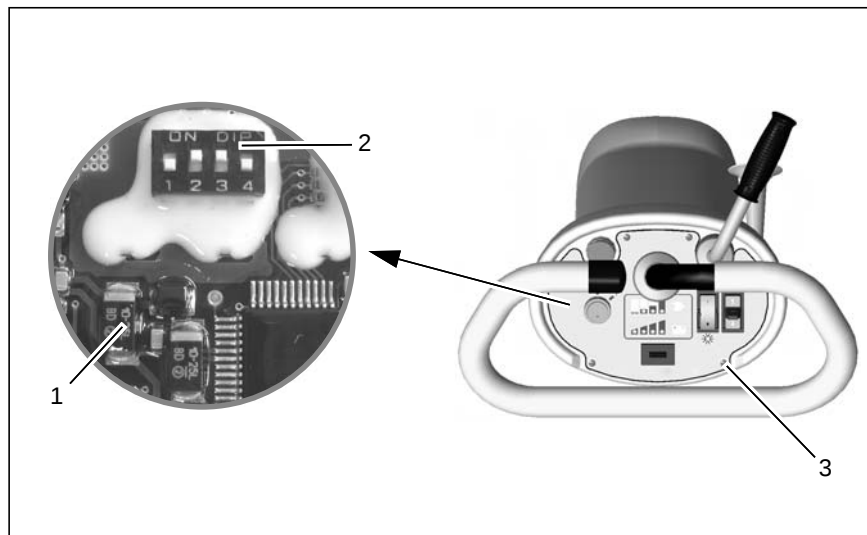


Fig. 18

The two settings for GiV are equivalent. The DIP setting OFF-ON-ON-OFF is the preferred setting.

When battery sizes other than 100 Ah to 117 Ah, the on-board charger must be adjusted by Minuteman service technicians.

Maintenance and Service

5.5 Side brooms



When completing any maintenance and repair work, switch the machine off via the key switch to prevent the drive being started up inadvertently!

- 1 Seat console
- 2 Safety support
- 3 Adjusting bolt, side broom, right
- 4 Side broom
- 5 Retaining screws, side broom

Side broom, left (option)



The work to adjust and change the optional left-hand side broom must be completed in the same sequence as for the right-hand side broom.

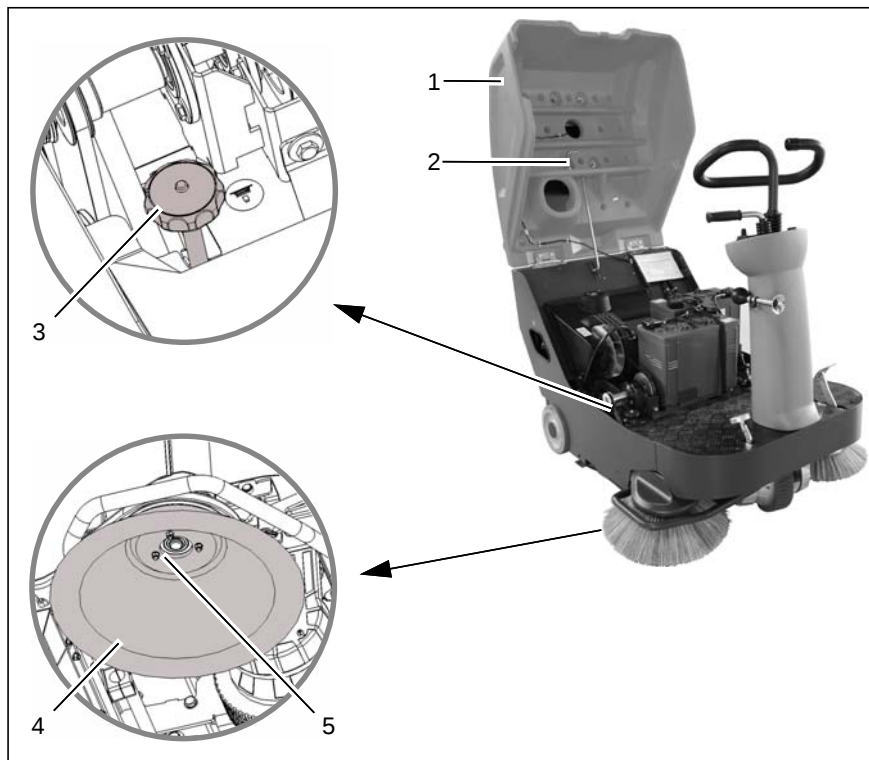


Fig. 19

5.5.1 Changing the side brooms

Check the side broom (Fig. 19/4) every week and change in the case of wear.

1. Switch the vehicle off using the key switch and secure with the parking brake.
2. Open the seat console (Fig. 19/1) and secure with the safety support (Fig. 19/2).
3. Remove the hex nuts on the retaining screws (Fig. 19/5).
4. Remove the old side broom (Fig. 19/4) from the side broom holder and install the new one.

5.5.2 Setting the sweeping pattern

The sweeping pattern must be readjusted in the case of bristle wear and after changing the side broom (Fig. 19/4).



To control the sweeping pattern, mark the floor with chalk.

1. Switch the vehicle off using the key switch and secure with the parking brake.
2. Open the seat console (Fig. 19/1) and secure with the safety support (Fig. 19/2).
3. Turn the adjusting bolt (Fig. 19/3) until the right-hand side broom

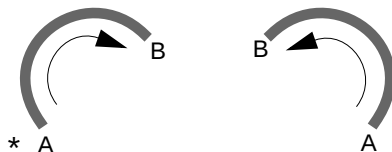
(Fig. 19/4) touches the ground.



For the left-hand side broom (option), use the adjusting bolt (Fig. 20/8).

4. Unlock the safety support and close the seat console.
5. Switch on the vehicle and allow the side broom to rotate briefly while at a standstill.
6. Compare the sweeping pattern with an arc. When adjusted correctly, the sweeping pattern must reflect a sweeping pattern from Point A to point B on the ground when viewing to the front.

* left-hand side broom (option).



7. Repeat the process, if necessary, until the setting is correct.

5.6 Cylindrical broom



When completing any maintenance and repair work, switch the machine off via the key switch to prevent the drive being started up inadvertently!

- 1 Seat console
- 2 Adjusting bolt for cylindrical broom
- 3 Dirt hoppers
- 4 Seals, dirt hoppers
- 5 Broom space
- 6 Sealing strips, broom space
- 7 Cylindrical broom
- 8 Adjusting bolt, left-hand side broom (option)

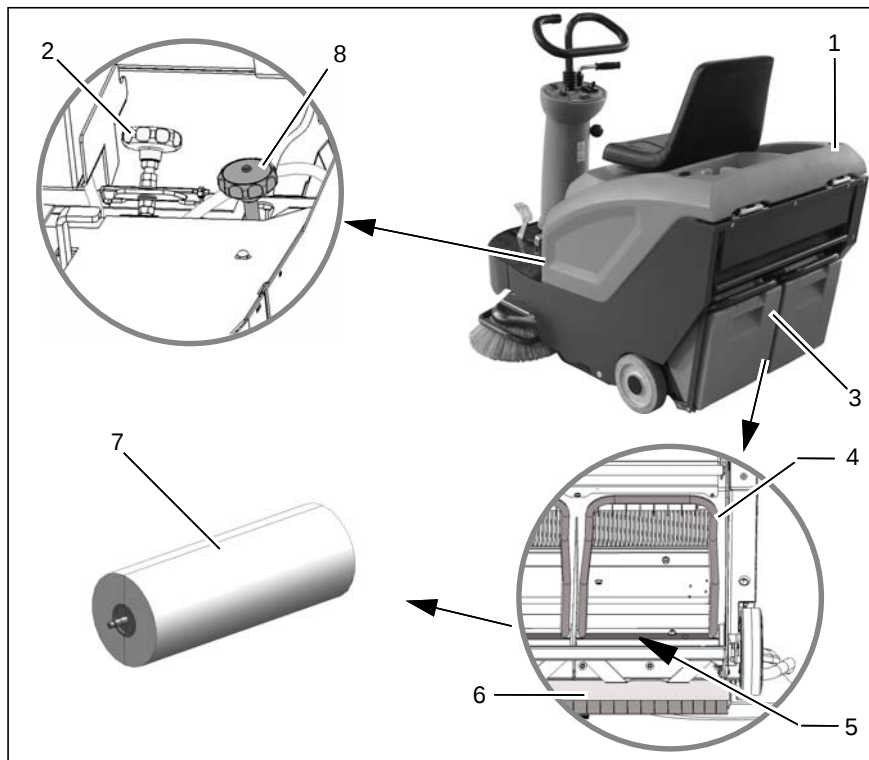


Fig. 20

Maintenance and Service

5.6.1 Cleaning the broom space

Check the broom space (Fig. 20/5) daily for soiling and clean it as necessary.

1. Switch the vehicle off using the key switch and secure with the parking brake.
2. Remove the dirt hoppers (Fig. 20/3) and empty them.
3. Clean the broom space (Fig. 20/5) and check for signs of damage.
5. Switch on the vehicle and allow the cylindrical broom to rotate briefly while at a standstill.
6. When setup correctly, the cylindrical broom must produce a parallel sweeping pattern of approx. $1.8" \pm 0.4"$ on the floor.
7. Repeat the process, if necessary, until the setting is correct.

5.6.2 Setting the sweeping pattern

The sweeping pattern must be readjusted in the case of bristle wear and after changing the cylindrical broom (Fig. 20/7).



To control the sweeping pattern, mark the floor with chalk.

1. Switch the vehicle off using the key switch and secure with the parking brake.
2. Open the seat console (Fig. 20/1) and secure with the safety support.
3. Turn the adjusting bolt (Fig. 20/2) until the cylindrical broom (Fig. 20/7) touches the ground.
4. Unlock the safety support and close the seat console.

5.6.3 Changing the cylindrical broom

Check the cylindrical broom (Fig. 21/3) weekly and change it in the case of wear.

1. Switch the vehicle off using the key switch and secure with the parking brake.
2. Remove the dirt hoppers (Fig. 21/1).
3. Loosen the screws (Fig. 21/2) and remove the first half shell (Fig. 21/3).
4. Then turn the cylindrical broom shaft (Fig. 21/4) 180° by hand and disassemble the second half shell.
5. Assemble the new half shells in the reverse sequence.
6. The sweeping pattern must be readjusted after changing the cylindrical broom.

The half shells are illustrated without any bristles!

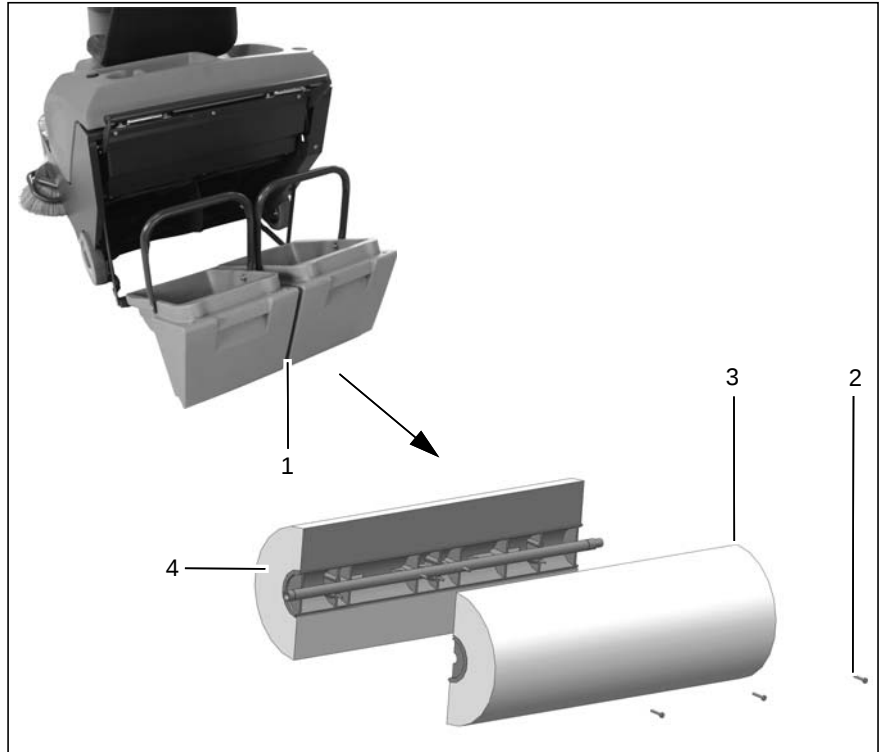


Fig. 21

5.6.4 Changing the sealing strips in the broom space

The broom space is sealed by means of four sealing strips. Check the four sealing strips on a weekly basis and change them in the case of wear.

1. Switch the vehicle off using the key switch and secure with the parking brake.
2. Remove the screws connecting the sealing strips (Fig. 22/1 to 3).
3. Assemble the new sealing strips and set a distance of 0.1" to the floor.

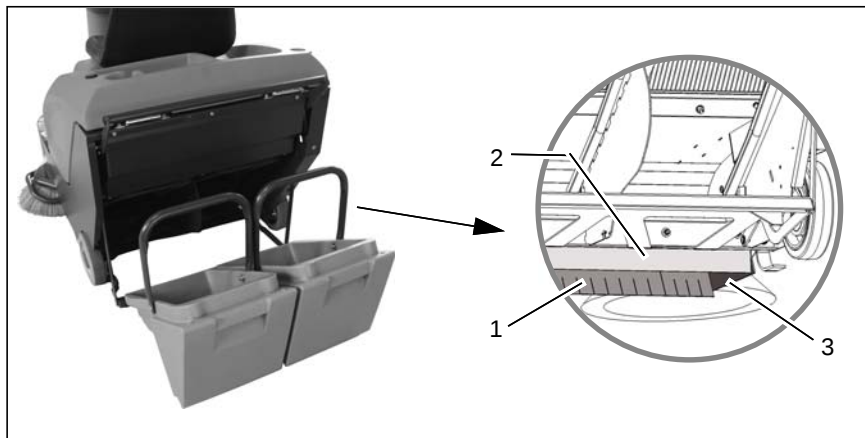


Fig. 22

- 1 Sealing strip, front (folding apron)
- 2 Sealing strip, rear
- 3 Sealing strips, right and left

5.6.5 Changing the seals on the dirt hoppers

There are two seals fitted between the broom space and dirt hoppers. Check the two seals weekly and change in the case of wear.

1. Switch the vehicle off using the key switch and secure with the parking brake.
2. Remove the dirt hoppers (Fig. 23/1) from the vehicle.
3. Pull the seals (Fig. 23/2) from the edges.
4. Press new seals onto the edges.

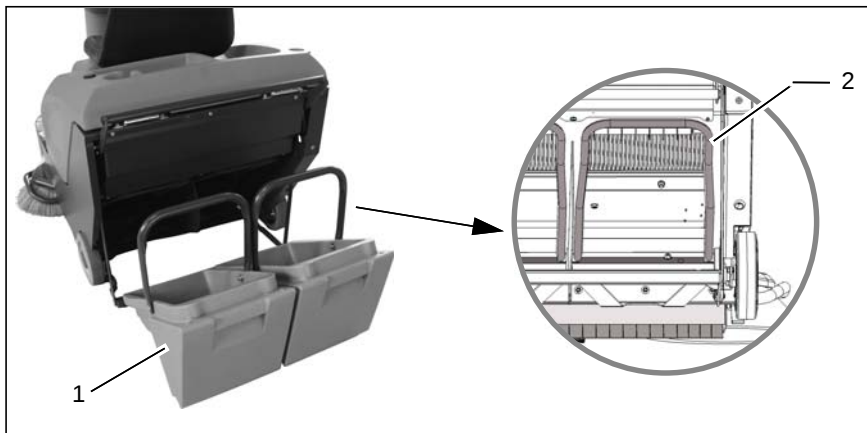


Fig. 23

- 1 Dirt hoppers
2 Seals

5.7 Vacuuming dust



When completing any maintenance and repair work, switch the machine off via the key switch to prevent the drive being started up inadvertently!

- 1 Panel air filter
- 2 Seal
- 3 Hood
- 4 Knurled nuts
- 5 Locking handle
- 6 Lever for shaking device
- 7 Safety support
- 8 Seat console

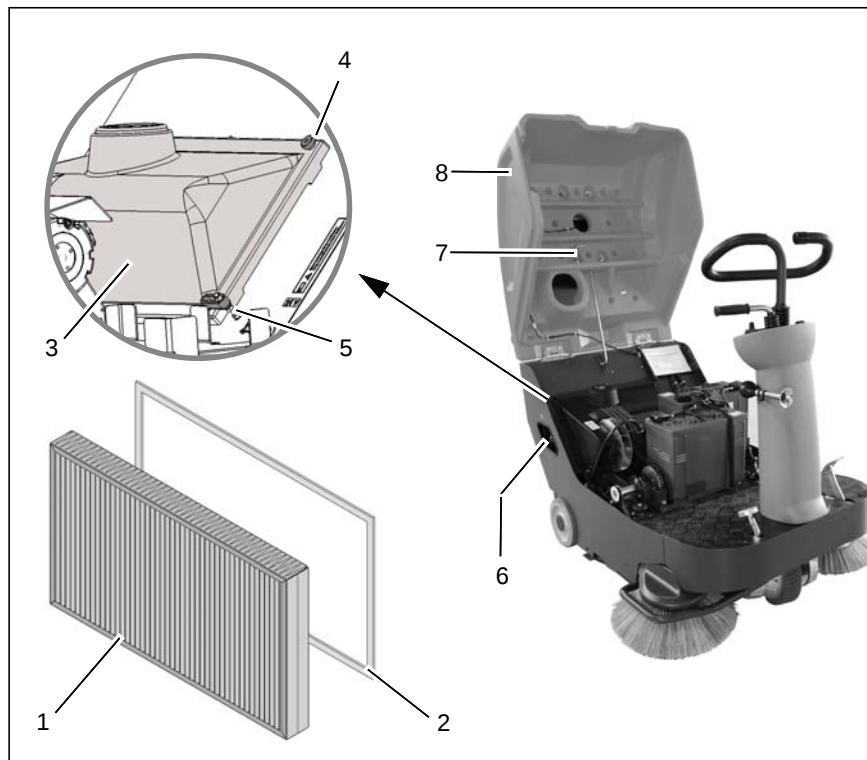


Fig. 24

Maintenance and Service

5.7.1 Shaking the panel air filter

Clean the panel air filter (Fig. 24/1) in the dust vacuum regularly and as necessary using the shaking device:



Do not inhale dust. Health hazard! Wear an appropriate dust mask.

1. Switch the vehicle off using the key switch and secure with the parking brake.
2. Pull and push the lever (Fig. 24/6) of the shaking device in and out several times in succession.

5.7.2 Checking the panel air filter and seal

Check the panel air filter (Fig. 24/1) and seal (Fig. 24/2) on a weekly basis and change them in the case of wear.

1. Switch the vehicle off using the key switch and secure with the parking brake.
2. Open the seat console (Fig. 24/8) and secure with the safety support (Fig. 24/7).
3. Loosen the knurled nuts (Fig. 24/4) and locking handle (Fig. 24/5) and remove the hood (Fig. 24/3).
4. Check the panel air filter (Fig. 24/1)

and seal (Fig. 24/2) and clean or change them as necessary.

5.7.3 Cleaning the panel air filter

Drop the panel air filter (Fig. 24/1) from a minimal height a few times onto a level, solid surface. Be careful not to damage the filter ribs!



The ground surface must not have any undulations.

Do not drop the panel air filter onto the ground at an angle.

Never reinstall panel air filter with damaged filter ribs.

5.8 Drive belt

The drive belt for side broom, cylindrical broom and suction turbine must be checked every 250 operating hours and changed in the case of wear.

5.8.1 Changing the drive belt

1. Switch the vehicle off using the key switch and secure with the parking brake.
2. Open the seat console (Fig. 25/1) and secure with the safety support (Fig. 25/2).
3. Loosen the tension roller (Fig. 25/3) and change the drive belt (Fig. 25/4) for the cylindrical broom.
4. Tension the drive belt again using the tension roller (Fig. 25/3).

To access the drive belt of the side broom (Fig. 25/5), disassemble the cover (Fig. 25/7).

To access the drive belt of the suction turbine (Fig. 25/6), disassemble the panel (Fig. 25/8) of the panel air filter.

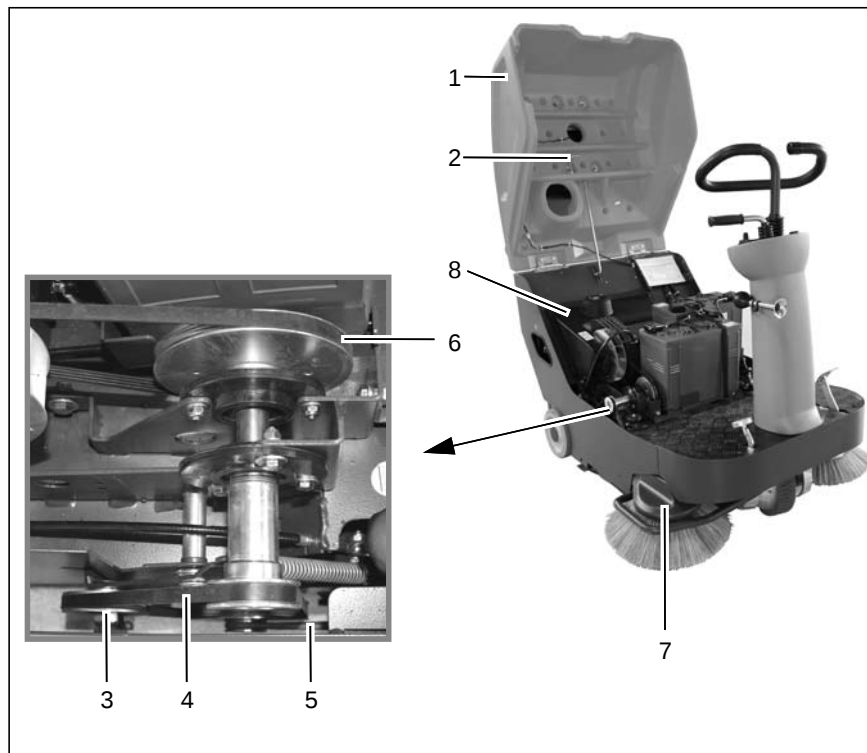


Fig. 25

5.9 Electrical installation

5.9.1 Fuses

F1 Hydraulic motor (70A)

F2 Drive motor (50A)

F3 Key switch (10A)

5.9.2 Relays

K1 Working mode

K2 Drive motor

K3A Enable drive mode

K3B Enable operating mode

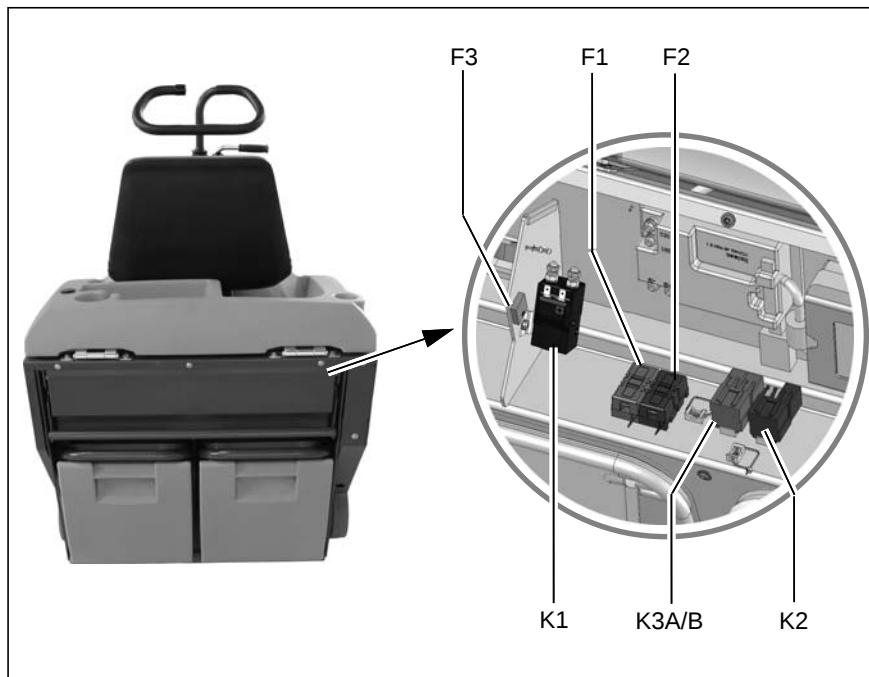


Fig. 26

Minuteman International Made Simple Commercial Limited Warranty

Minuteman International, Inc. warrants to the original purchaser/user that the product is free from defects in workmanship and materials under normal use. Minuteman will, at its option, repair or replace without charge, parts that fail under normal use and service when operated and maintained in accordance with the applicable operation and instruction manuals. All warranty claims must be submitted through and approved by factory authorized repair stations.

This warranty does not apply to normal wear, or to items whose life is dependent on their use and care, such as belts, cords, switches, hoses, rubber parts, electrical motor components or adjustments. Parts not manufactured by Minuteman are covered by and subject to the warranties and/or guarantees of their manufacturers. Please contact Minuteman for procedures in warranty claims against these manufacturers.

Special warning to purchaser -- Use of replacement filters and/or prefilters not manufactured by Minuteman or its designated licensees, will void all warranties expressed or implied. A potential health hazard exists without original equipment replacement.

All warranted items become the sole property of Minuteman or its original manufacturer, whichever the case may be.

Minuteman disclaims any implied warranty, including the warranty of merchantability and the warranty of fitness for a particular purpose. Minuteman assumes no responsibility for any special, incidental or consequential damages.

This limited warranty is applicable only in the U.S.A. and Canada, and is extended only to the original user/purchaser of this product. Customers outside the U.S.A. and Canada should contact their local distributor for export warranty policies. Minuteman is not responsible for costs or repairs performed by persons other than those specifically authorized by Minuteman. This warranty does not apply to damage from transportation, alterations by unauthorized persons, misuse or abuse of the equipment, use of non-compatible chemicals, or damage to property, or loss of income due to malfunctions of the product.

Minuteman International Made Simple Commercial Limited Warranty

If a difficulty develops with this machine, you should contact the dealer from whom it was purchased.

This warranty gives you specific legal rights, and you may have other rights which vary from state to state. Some states do not allow the exclusion or limitation of special, incidental or consequential damages, or limitations on how long an implied warranty lasts, so the above exclusions and limitations may not apply to you.

Cord Electric Group Exceptions

Three years parts, two years labor, ninety days travel (Not to exceed two hours)

Port-A-Scrub, one year parts, six months labor

MPV 13, one year parts

MPV 14 and 18, two years parts, one year labor

RapidAir blower, one year parts, one year labor

Explosion-Proof Vacuum, one year parts, one year labor

Pneumatic Vacuums, three years parts, one year labor

EX 12 and EX12H, one year parts, one year labor

Battery Operated Group

Three years parts, two years labor, ninety days travel

(Not to exceed two hours)

Exceptions

Sweepers, one year parts, one year labor, ninety days travel

(Not to exceed two hours)

Internal Combustion Group

One year parts, one year labor, ninety day travel

(Not to exceed two hours)

Replacement Parts

Ninety days

Batteries

0-3 months replacement, 4-12 months pro-rate

Polypropylene Plastic Tanks

Ten years, no additional labor

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