



Minuteman[®]

Instruction Manual

Minuteman KS 28 B (6403.21)

Minuteman KS 28 G (6403.xx)

Introduction

Preface

Dear customer,

We hope that the excellent qualities of the machine justify the faith you have shown in us by purchasing the product. Your safety, and that of others, is dependent on your ability to control the machine. Please read this translation of the original manual before using the machine for the first time, act according to the information contained and keep it in a safe place for future reference or subsequent owners. In order to ensure that you can work with the machine safely, please read the chapter on safety before starting it up.

The operating manual contains all the important information you need to operate, maintain and service the machine. Sections of this operating manual which are relevant to safety are marked by the hazard label. If you have any questions with regard to the machine or operating manual, you can contact your Minuteman service partner at any time.

We would like to emphasize that no legal claims can be asserted in respect of any work described in this manual. Ensure only original spare parts are used should any repairs be necessary. Only such original spare parts warrant that the equipment is reliably ready to use at all times. We reserve the right to make technical improvements.

Valid from: March 2011

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Intended use

The Minuteman KS 28 is a manually operated vacuum sweeper for industrial/commercial use and serves to clean up dry and wet waste from indoor and outdoor areas such as production plants, warehouses, car parks, parking blocks, pedestrian precincts, market squares, railway stations and filling stations. The Minuteman KS 28 can clean all types of industrial floor, concrete, asphalt and tar, paving and interlocking stone paving. It is not permitted for use on public roads with motor traffic. The Minuteman KS 28 B can be upgraded with a carpet kit so it can also be used to clean dry waste from carpets. 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.

Introduction

The Minuteman KS 28 may only be operated, serviced and repaired by personnel who are familiar with the work involved and are aware of the risks. Based on the conception, design and construction of the model introduced onto the market by us, the machine complies with the applicable basic safety and health requirements stipulated in the EC directives (refer to the Declaration of Conformity). The EC Declaration of Conformity is no longer considered valid in the event of modifications to the machine not authorized by us. The manufacturer is not deemed liable for any damage resulting from unauthorized modifications to the machine.

Information on the warranty

As a fundamental rule, the regulations in the purchase agreement apply. There are no rights to claims for compensation under the terms of warranty when the damage is a result of failure to observe the stipulations concerning service and maintenance. Maintenance work must be completed by an authorized Minuteman service center and confirmed in the "maintenance log-book"; this serves as proof of rights to

claims under the terms of warranty. The following are excluded from the terms of warranty: normal wear and tear and damage caused by overuse, defective fuses, improper handling or unauthorized modifications. Claims under the terms of warranty are also annulled when damage occurs to the machine as the result of the use of parts and accessories not explicitly approved by us or to failure to observe maintenance procedures.

Handover of the machine

Inspect the vehicle immediately on delivery for signs of transport damage. Replacement will be made when confirmation is provided immediately by the freight carrier with regard to the damage and the damage report is sent to our authorized sales partner together with the consignment note.

Disposing of the machine

Render the machine inoperable. It must not represent a source of risks to children.

Dispose of the machine in accordance with the applicable local regulations. For further information on disposal and

recycling, contact the authorized Minuteman dealer where you purchased the machine.

Disposing of batteries

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. The 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

The following warning symbols appear in the operating manual in those sections in which your safety, the safety of the machine and environment could be affected:

Symbol	Damage to ...	Definition
Safety information 	persons or property	Safety symbol to indicate dangerous situations arising through failure to follow instructions or prescribed work procedures precisely or through ignoring them altogether.
Note 	the machine	Important information on handling the machine to maintain its functioning ability.
Risk to environment 	the environment	Risks to the environment through using substances which represent a 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 machine for the first time, read the operating manual supplied with it thoroughly as well as any separate manuals provided with additional or attachment devices and observe all the information during work.
- The equipment 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 machine and ensuring trouble-free operation.
- The operating manual must always be kept at the operating location of the machine and, as a result, should be kept in a safe place on the equipment.
- 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 machine provide important information concerning safe operation. Illegible or missing labels must be replaced by new ones.
- For reasons of safety, always use original spare parts.

1.3 Operating information

- The machine is not suitable for clearing up fluids, dust or substances which represent a health hazard, are flammable or explosive. No burning items may be cleared up, e.g. glowing cigarettes. In addition, it is forbidden to clean up wood dust, e.g. beech and oak dust - health hazard!
- When the machine is in vacuum-sweeping mode, it must not be driven through puddles of water.
- Before starting the machine up for the first time, the battery to be used must be fully charged, properly, by implementing the initial battery charge routine (only Minuteman KS 28 B). Minuteman assumes no liability for damage to the battery caused by a fault when the battery is charged for the first time.
- The machine together with the working equipment must be checked in terms of proper condition and operational safety each time prior to use. Clear any faults immediately! The machine must not be used when not in a sound condition.
- Only start the machine when the hood is closed and locked and the lever of the shaking device has been pushed in.
- All protective devices must be properly fitted before the machine can be taken into operation.
- 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 machine is actually in operation!
- Always wear heavy duty, non-slip footwear when working with the machine.
- The machine may only be used on those surfaces which have been approved by the contractor or person appointed by him.
- The manner of driving must be adapted to the local conditions.
- It is forbidden to use the machine in

Safety Information

- potentially explosive atmospheres.
 - Do not let the engine run indoors! Risk of poisoning (only Minuteman KS 28 G)! Ensure sufficient ventilation when working indoors.
 - When using the machine, pay strict attention to any persons in the close vicinity.
 - Pay attention to hot parts of the engine, risk of burns.
 - It is prohibited to transport passengers.
 - Accelerate the machine immediately after switching on the rotary brush, otherwise imprints of the brush could be produced on the floor.
 - Never leave the machine unattended as long as the engine is running.
 - Remove the ignition key to prevent unauthorized use of the machine.
 - Never leave batteries in a discharged state but recharge them as soon as possible (only Minuteman KS 28 B).
 - When transporting the machine, switch the engine off and raise the side brush.
 - The Minuteman KS 28 can be used on surfaces with a maximum gradient of 2%.
 - Steps or curbs up to a maximum of 1.6 in 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.
 - The machine 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.
 - The machine must be switched off prior to cleaning or servicing it or to replacing parts.
 - Suitable tools must be used for cleaning and maintenance work.
 - When working with the hood raised, it must be opened up fully to prevent it from accidentally dropping or slamming shut.
 - When working on the electrical system, always disconnect the battery cable (only Minuteman KS 28 B).
 - Battery may only be handled and changed by properly skilled maintenance personnel (only Minuteman KS 28 B).
 - Pay attention that the insulation of the charger cable is not damaged and cannot be damaged during the charging process. The cable must not chafe against anything. In the case of defective insulation, do not use the on-board charger (only Minuteman KS 28 B).
 - Check the exhaust system at regular intervals (only Minuteman KS 28 G).
 - It is prohibited to clean the machine with a pressure washer or steam blaster.
 - It is prohibited to use aggressive and corrosive cleaning agents.
 - Allow the machine to dry properly af-

Safety Information

ter being cleaned.

- Do not store the machine with liquid remaining in the tanks especially during times of inactivity e.g. over the weekend.
- Do not carry out any welding, drilling, sawing or grinding work on the frame sections. Damaged parts may only be changed at an authorized Minuteman service center.

1.5 Particular risks

Electric system

- In case of malfunction of the electric-system, shut the machine down immediately and have it serviced.
- Only qualified personnel are authorised to work on the electrical installations and only according to electro-technical rules.
- Inspect/check the electrical equipment of the machine at regular intervals. Clear up any defects immediately, such as loose connections or damaged cables.

Refueling

(only Minuteman KS 28 G)

- Take the utmost care when handling fuel: Increased risk of fire! Never refuel near open flames or incendiary

sparks! Never smoke when refueling!

- Never refuel indoors!
- Before refueling, switch off the engine and remove the ignition key.
- Wipe up spilled fuel immediately!

Batteries

(only Minuteman KS 28 B)

- Follow the operating instructions of the battery manufacturer.
- To prevent creeping currents, always keep the batteries clean and dry, protect from soiling such as by metal dust.
- Never lay any metallic objects or tools on batteries. Risk of short circuit and deflagration!
- When charging the batteries, there must be sufficient ventilation in the charging area. Otherwise, there is a risk of explosion!
- Batteries must not be connected or disconnected when conducting electricity.
- Wash your hands thoroughly after working on batteries.

Health hazard

- The shaking device for cleaning the panel air filter may only be actuated when the dirt hoppers are in the ma-

chine and have been raised.

- It is forbidden to eat, drink and smoke in battery charging rooms.

Safety equipment

- Never operate the Minuteman KS 28 without the hood being closed and locked (safety equipment)!
- Do not open the hood when the engine is running!

1.6 Environmental protection

- Sufficient factual knowledge is required in order to use substances which could represent a risk to health and the environment, e.g. oil and lubricants.
- Observe the applicable laws and local regulations when disposing of waste and cleaning agents.
- Observe the applicable laws and local regulations when disposing of waste oil (only Minuteman KS 28 G).
- Used batteries with the recycling symbol must not be disposed of in household waste, refer to Section Disposing of batteries.

Safety Information

1.7 Labels on the machine

The following safety and warning labels are attached to the machine where easily legible.



Missing or illegible labels must be replaced immediately.

Choke (Fig. 1/1)
(only Minuteman KS 28 G)



Lock, dirt hopper
(Fig. 1/2)



Company logo (Fig. 1/3)

Minuteman[®]

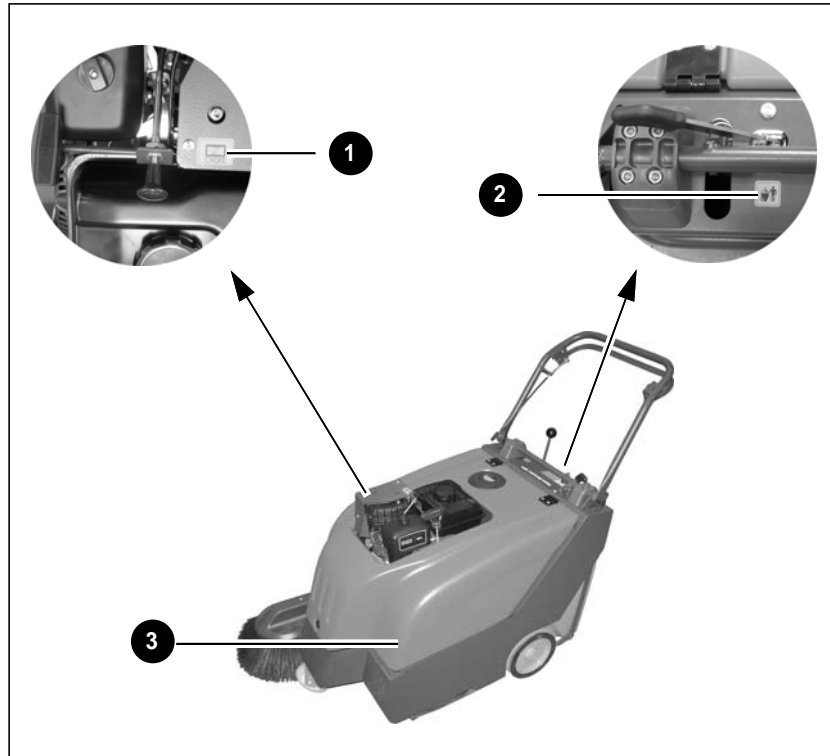


Fig. 1

Safety Information

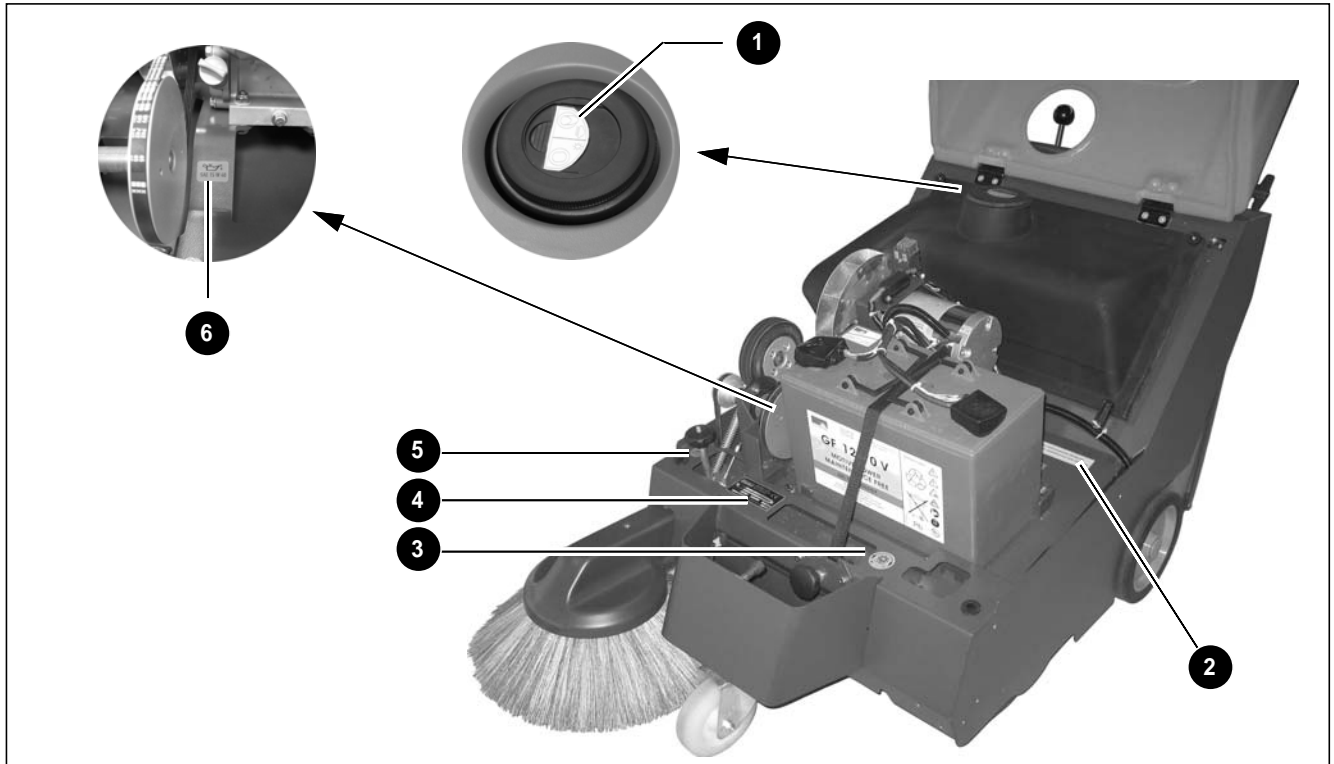
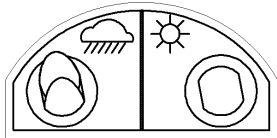


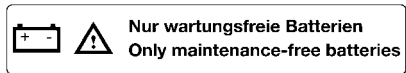
Fig. 2

Safety Information

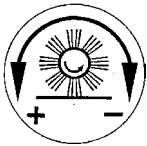
Bypass flap (Fig. 2/1)



Only use maintenance-free batteries (Fig. 2/2) (only Minuteman KS 28 B)



Wear compensator for rotary brush (Fig. 2/3)



Rating plate (Fig. 2/4)



Wear compensator for side brush (Fig. 2/5)



Oil label (Fig. 2/6) (only Minuteman KS 28 G)



Engine oil, only use SAE 15 W 40.

Safety Information

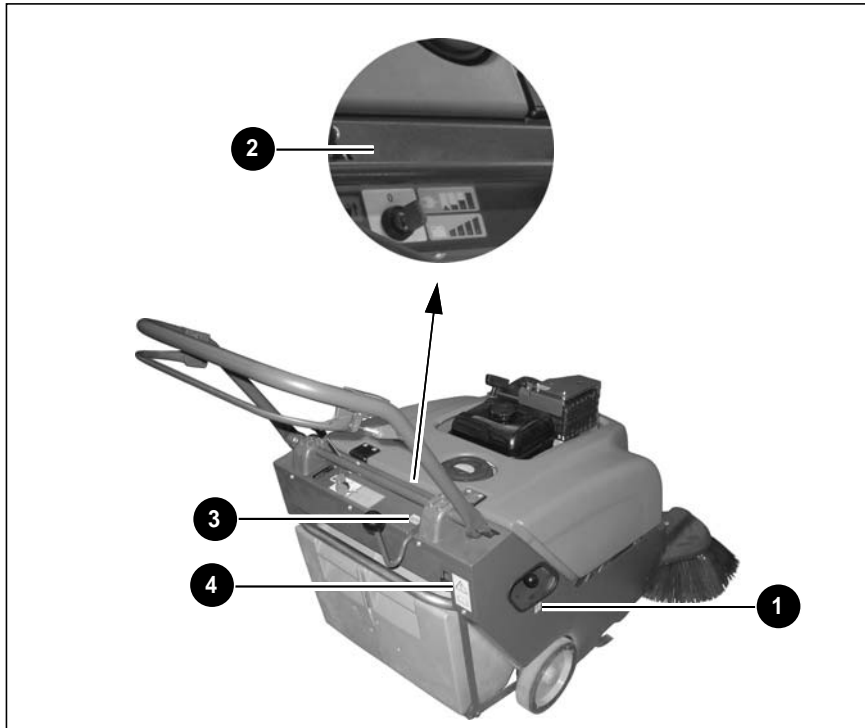


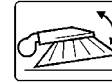
Fig. 3

Shaking device (Fig. 3/1)



Type of machine (Fig. 3/2)
Minuteman KS 28

Lower/Raise side brush (Fig. 3/3)



Read and observe the operating manual (Fig. 3/4)



2 Starting Up

2.1 Before starting up for the first time

2.1.1 Unpacking

Remove the packaging, open the fastening straps and take the Minuteman KS 28 from the pallet. For reasons of packaging, the handlebar of the Minuteman KS 28 is pivoted forwards. First of all, pivot the handlebar to its operating position.

Pivoting the handlebar to its operating position

1. Loosen the wing bolts (Fig. 4/1) on the right and left sides of the handlebar (Fig. 4/2) a few revolutions until the handlebar (Fig. 4/2) can be straightened up.
2. Pivot the handlebar (Fig. 4/2) towards the rear and set it to a height convenient for the user.
3. Tighten the wing bolts (Fig. 4/1) on the right and left sides of the handlebar (Fig. 4/2).

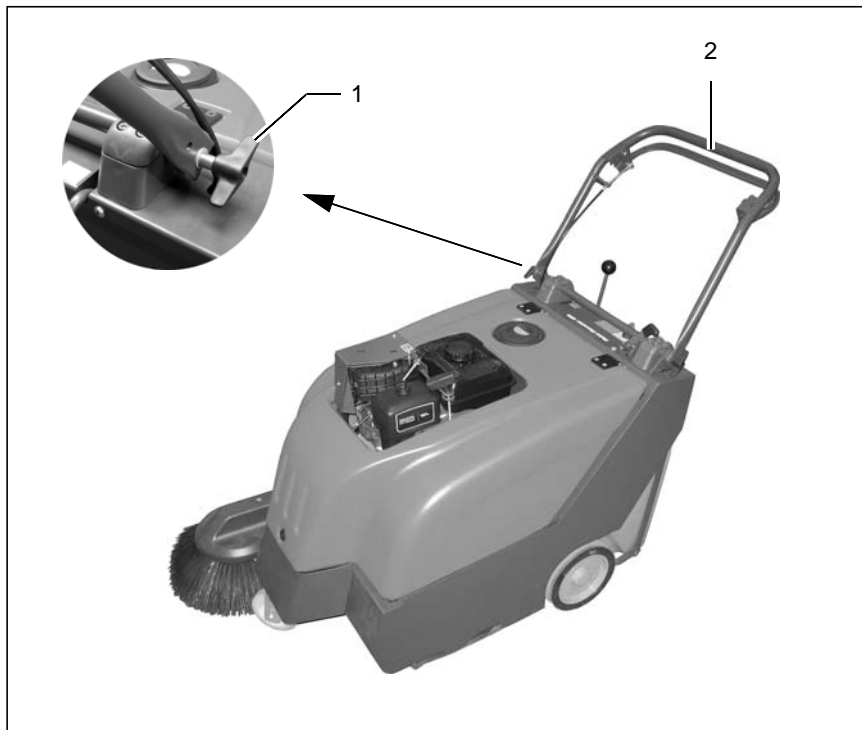


Fig. 4

Starting Up

2.1.2 Refueling the engine (only Minuteman KS 28 G)

Unscrew the fuel tank cap (Fig. 7/5) and fill approx. 2.5 l gasoline. Screw the fuel tank cap back on.



Only refuel the machine when the engine has cooled down. Otherwise, any spilled gasoline can evaporate if it lands on hot machine parts. Health hazard through inhaling vapors!



Refueling must not be carried out in closed rooms.



Refueling may only be carried out when the engine is switched off! Remove the ignition key.



It is forbidden to smoke or use fire when refueling or working on or near components containing fuel.



Wipe up any spilled fuel!



Wipe up spilled fuel with a cloth and dispose of the cloth according to the applicable environmental laws.

2.1.3 Checking the oil level (only Minuteman KS 28 G)

Engine oil is filled at the factory. As a precaution, however, check the oil level again on site, refer to Section 5.4.1.

2.1.4 Connecting the battery (only Minuteman KS 28 B)

Before starting up for the first time, connect the positive cable of the device as illustrated in Figure 5 to the positive pole (Fig. 5/1) of the battery in the device.

2.1.5 Initial battery charge (only Minuteman KS 28 B)

Before starting up the machine for the first time, the batteries used must be fully charged by completing the initial battery charge, refer to Section 5.5.1. Minuteman assumes no liability for damage to the battery resulting from failing to carry out the initial battery charge properly.



Risk of explosion! When charging the battery, there must be sufficient ventilation in the charging area.

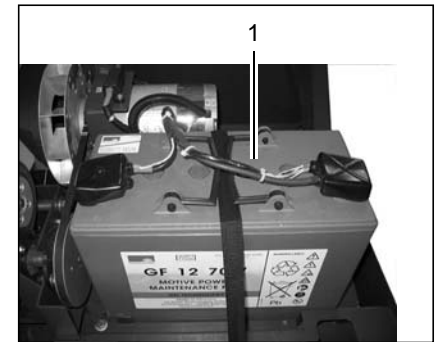


Fig. 5

Starting Up

2.1.6 Instruction

Operators must receive instruction before putting the machine into service. Only technicians from your local, authorized Minuteman dealer are allowed to provide initial instruction on how to use the machine. The manufacturing plant notifies the dealer immediately after delivering the machine and the dealer will contact you to arrange a date for providing the initial instruction.

2.2 Before starting up each day

Carry out the following checks before starting the machine:

1. Check the parking space for signs of leaks.
2. Only Minuteman KS 28 G:
Check the engine oil level with the dipstick and refill, if necessary; refer to Section 5.4.2.
3. Only Minuteman KS 28 G:
Check the fuel supply and refill fuel, if necessary, refer to refer to Section 2.1.2.
4. Only Minuteman KS 28 B:
Check the charge status of the battery and recharge, if necessary.
5. Check the fill level of the dirt hopper and empty them, if necessary.
6. Check the levels of wear on the rotary brush and side brush.
7. Check the ergonomic position of the handlebar and readjust it, if necessary.

3 Operation

3.1 Method of operation

The Minuteman KS 28 is a manually operated vacuum sweeper machine with a drive for the dry cleaning of hard floors and carpets.

The side brush (Fig. 6/4), located on the right-hand side of the machine, sweeps the dirt away from corners and edges into the path of the rotary brush (Fig. 6/3). The rotary brush (Fig. 6/3) sweeps the dirt into the dirt hopper (Fig. 6/2) using the overhead throw method. The particulate matter (depicted gray in Fig. 6) is forced against the panel air filter (Fig. 6/1) by the suction turbine (Fig. 6/5) and filtered out there. Only dust-free air is fed back into the ambient air.

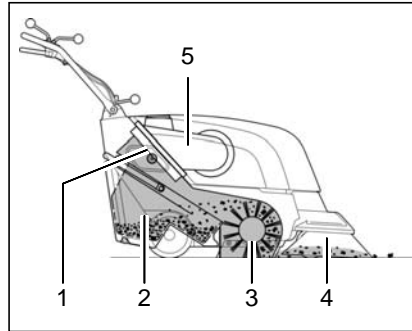


Fig. 6

- 1 Panel air filter
- 2 Dirt hoppers
- 3 Rotary brush
- 4 Side brushes
- 5 Suction turbine

Minuteman KS 28 G

The Minuteman KS 28 G is equipped with a gasoline engine and is filled with approx. 2.5 l gasoline.

Minuteman KS 28 B

To charge the battery, the Minuteman KS 28 B is equipped with a corresponding, fully automatic on-board charger. To protect the battery against total discharge, the Minuteman KS 28 B is provided with a total discharge signal transducer (TSG) which indicates the battery status during the charging process and discharging.

Operation

3.2 Operating and indicator elements

3.2.1 Operating elements

- 1 Side brush lever
- 2 Hood
- 3 Hood lock
- 4 Bypass flap
- 5 Fuel tank cap
(only Minuteman KS 28 G)
- 6 Choke
(only Minuteman KS 28 G)
- 7 Recoil starter
(only Minuteman KS 28 G)

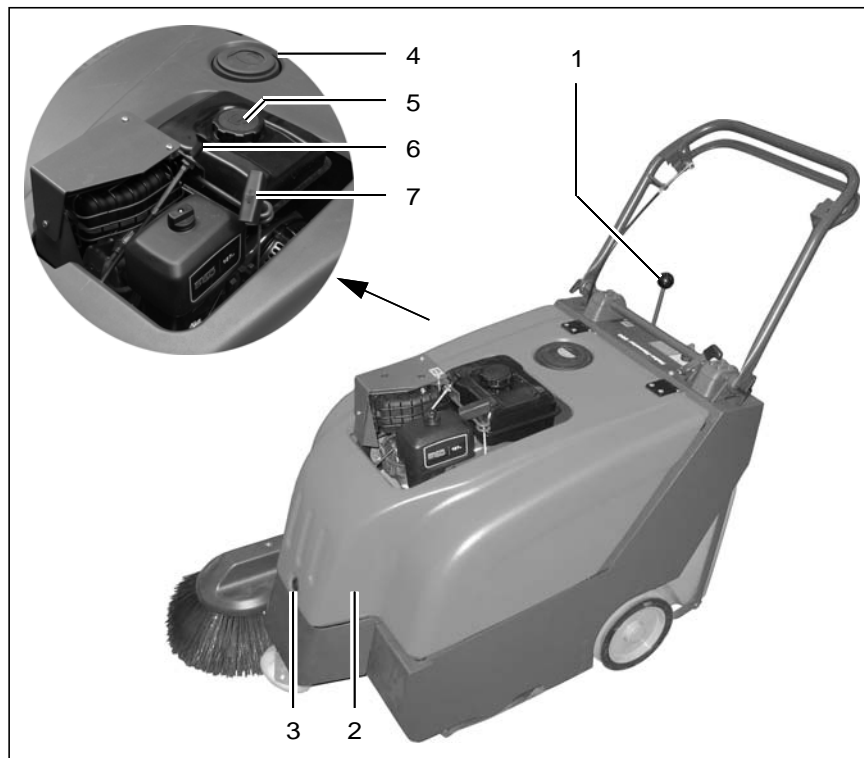


Fig. 7

Operation

Side brush lever (Fig. 7/1)

Use the lever to lower or raise the side brush.

Lever forward: Side brush is lowered.

Lever to rear: Side brush is raised.

Hood with lock

(Fig. 7/2)



Only operate the machine with the hood closed!

The hood should only be opened for maintenance and repair work. In this case, unlock the lock (Fig. 7/3) using a square wrench and pivot the hood up.

Bypass flap (Fig. 7/4)

On opening the bypass flap, the vacuum operation is interrupted. If necessary, open up the bypass flap by hand.



Vacuumping should be interrupted when wet waste could be vacuumed up.

Fuel tank cap (Fig. 7/5)

Only for Minuteman KS 28 G with gasoline engine. The fuel tank cap closes the fuel tank.

Choke (Fig. 7/6)

Only for Minuteman KS 28 G with gasoline engine. The choke must be pulled out before cold starting the engine.

Recoil starter (Fig. 7/7)

Only for Minuteman KS 28 G with gasoline engine. The engine is then started by pulling the recoil starter after having set the key switch to Position 1 beforehand.

Operation

- 1 Drive bar
- 2 Handlebar
- 3 Operating panel
- 4 Wing bolt for handlebar
- 5 Charger cable
- 6 Shaking device lever
- 7 Dirt hopper
- 8 Dirt hopper lock

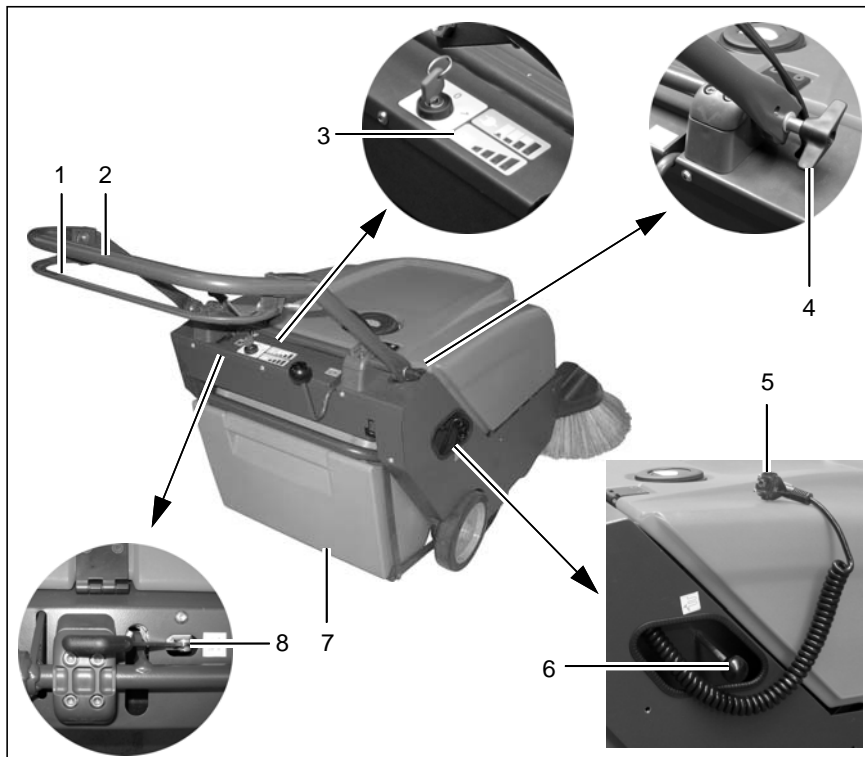


Fig. 8

Operation

Drive bar (Fig. 8/1)

The drive bar serves to activate and deactivate the wheel drive. The drive bar must be pulled up towards the handlebar with the fingers so that the wheel drive operates and the machine moves forward. If the drive bar is released, the machine stops (safety circuit).

Handlebar (Fig. 8/2)

The machine is guide/steered via the handlebar.



Release the drive bar when turning sharp corners.

The two wing bolts (Fig. 8/4) serve to adjust the handlebar to an optimal position for the user.

Operating panel (Fig. 8/3)

Refer to Section 3.2.2.

Charger cable (Fig. 8/5)

The charger cable of the Minuteman KS 28 B is located in the recess which also contains the shaking device lever.

Shaking device lever (Fig. 8/6)

To clean the panel air filter, pull the shaking device lever out then push back in again; repeat this several times.

Dirt hopper lock (Fig. 8/8)

To remove the dirt hopper, move the locking lever to the right (when facing the front) and, at the same time pivot the handlebar forwards. The frame of the dirt hoppers is lowered as a result so that the hopper can be removed towards the rear. To lock the hopper, pull the handlebar to the rear until the lock audibly engages.

Operation

3.2.2 Operating panel

Minuteman KS 28 G

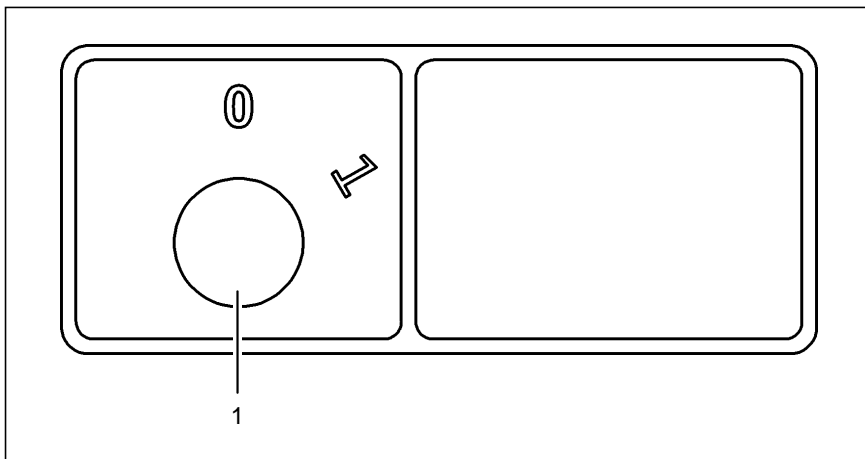


Fig. 9

1 Key switch

Key switch (Fig. 9/1)

The key switch serves to secure the machine against unauthorized use.

Key switch positions

Position 0: Off

Position 1: On (engine ready to start)

Operation

Minuteman KS 28 B

- 1 Key switch
- 2 Charge control indicator
- 3 Battery discharge status indicator

Key switch (Fig. 10/1)

The key switch serves to switch the drive motor on and off and secure the machine against unauthorized use.

Key switch positions

- Position 0: Off
- Position 1: On (engine on)

Charge control indicator (Fig. 10/2)

During the charging process, the machine electronics indicates the charge status via four green LEDs.



The Minuteman KS 28 B can only be charged when the key switch is in Position 0.

As the charge level increases, it is indicated by the LEDs which light up progressively from left to right.

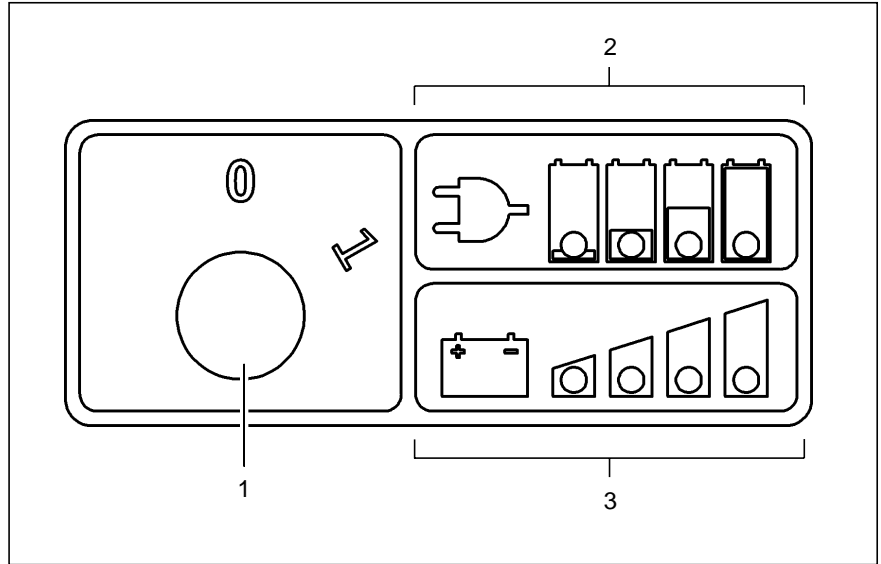


Fig. 10

Operation



Flashing or individually lit LEDs indicate an error status, also refer to the charger operating manual.

Battery discharge status (Fig. 10/3)

During operation, the machine electronics indicates the discharge status of the battery by means of a red LED (left) and three green LEDs (right).

When all three green LEDs light up, the batteries are fully charged. As the batteries become progressively discharged, the LEDs go out in succession from right to left. When the last green LED goes out, the red LED starts to flash (early warning of imminent shutdown). After a certain time, the red LED lights up continuously indicating the "battery empty" status. Shortly afterwards, the drive motor is automatically switched off to protect the battery from a total discharge.

The machine should only be restarted when the battery have been charged.

3.3 Operation



The Minuteman KS 28 must not be used in domestic or office areas.



Practice all the operating steps in a training area and only use the machine in the areas specified for deployment when you are familiar with all the operations.

3.3.1 Switching on



The motor must not be started when the hood is open! Risk of injury through belt drive and rotating fan!

Minuteman KS 28 G



Before starting the Minuteman KS 28 G, pay attention to the following:

1. Set the key switch (Fig. 10/1) to Position 1.
2. Pull out the choke (Fig. 7/6) in the case of a cold start.
3. Pull the recoil starter cord (Fig. 7/7) until the starter clutch perceptibly en-

gages (slight resistance) and then pull the starter cord (Fig. 7/7) hard and fast to start the engine.

4. Release the starter cord (Fig. 7/7) and let it recoil back into the housing.
5. Then push the choke (Fig. 7/6) back in, slowly.



If the engine does not start immediately, use the starter cord again exactly as described above.

The engine and sweeping functions are activated.

Minuteman KS 28 B

Set the key switch to Position 1.

Operation

3.3.2 Accelerating

When the engine is running:

1. Use your fingers to pull the drive bar (Fig. 11/1) against the handlebar (Fig. 11/2).
2. Steer the machine with the handlebar (Fig. 11/2) in the required direction.

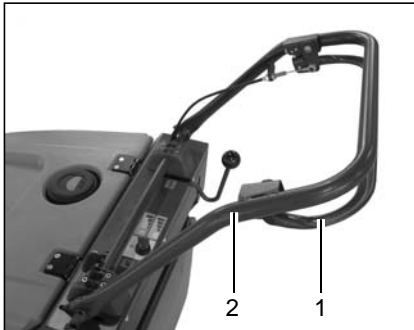


Fig. 11

3.3.3 Stopping

1. Release the drive bar (Fig. 11/1). The machine decelerates and comes to a stop.



Do not park the machine on carpets while the engine is running. Risk of fire through the flooring overheating due to the rotating rotary brush!
Exception: The machine is equipped with a carpet kit (option) which automatically switches the rotary brush off when stopping the machine.

3.3.4 Vacuumsweeping



Ensure sufficient ventilation when sweeping indoors!



It is forbidden to sweep up dust which represents a health hazard!

1. Check the machine, refer to Section 2.2.
2. Open the bypass flap if damp waste is to be cleared up.
3. Switch the machine on, refer to Section 3.2.2. The engine and sweeping functions are activated.



Drive away immediately after switching on the machine otherwise it is possible that marks will be produced on the floor by the rotating rotary brush.

Operation

4. Lower the side brush: Move the lever (Fig. 7/1) forwards.
5. Accelerating: pull the drive bar up, refer to Section 3.2.2.
6. Drive to the ground surface to be cleaned.



Steps and curbs up to a height of 1.6 in can be driven over, carefully. When driving over thresholds, release the drive bar and tip the machine back a little so that the front roller can negotiate the step.

7. Operate the shaking device occasionally, refer to Section "Operating the shaking device".

8. Check the contents of the dirt hopper regularly and empty as necessary, refer to Section "Emptying the dirt hopper".



Do not overload the dirt hopper! This can affect the stopping distance. Caution, particularly when sweeping up dirt such as metallic chippings!



Tip out the dirt hopper from a low height when emptying to prevent dust swirling around! If necessary, pay attention to the wind direction and evade any clouds of dust! Health hazard!

3.3.5 Switching off

Turn the key switch to Position 0.



Remove the ignition key when leaving the machine to prevent unauthorized use.

Operation

3.3.6 After finishing work

1. Operate the shaking device.
2. Empty the dirt hopper.
3. Check the brush area for any residual waste and remove it if necessary, refer to Section "Cleaning the brush space".
4. Clean the machine, if necessary.



Warning - do not clean electrical components with liquids! Risk of electric shock!



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

Operating the shaking device

Push and pull the lever (Fig. 8/6) in and out several times in succession to clean dust from the panel air filter.



Only operate the shaking device when the engine is switched off.

Emptying the dirt hopper

1. Move the locking lever (Fig. 8/8) to the right (looking to the front) and, at the same time, tip the handlebar (Fig. 8/2) to the front.
2. Remove the dirt hopper (Fig. 12/2) from the machine and empty it.



Carry the dirt hopper (Fig. 12/2) by the handles (Fig. 12/1).

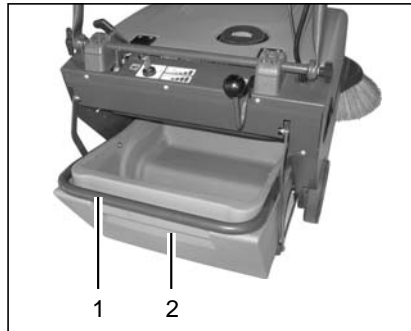


Fig. 12



Observe the applicable laws and local regulations when disposing of waste.

3.3.7 Loading and transportation



When loading the machine and transporting it to its area of deployment, the side brush must be raised.

Loading

When loading the machine, take its weight into account, refer to Section "Technical Data".

Transporting



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

When transporting on a vehicle or trailer, the machine must be secured against rolling away: Lash down the machine securely at the front and rear.

Operation

- Secure the machine at the front with a strap which must be fed through the two openings (Fig. 13/1) near the front wheel (Fig. 13/2).
- At the rear, thread a strap around the bottom ends of the handlebar and fix the strap to the transporter.

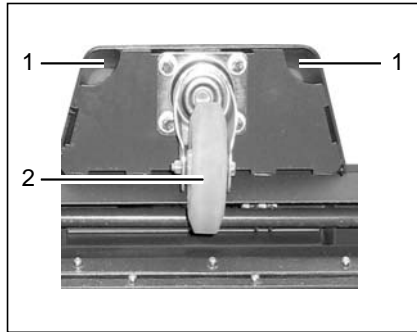


Fig. 13

3.4 Function faults

- If the machine is overloaded, the engine speed drops. Set the key switch to Position 0. Check the side brush, rotary brush and brush area for residual waste and remove the waste, if necessary. Ensure that there is sufficient fuel in the tank (only Minuteman KS 28 G) or that the battery is sufficiently charged (only Minuteman KS 28 B). Start the machine. If the fault occurs again, contact a Minuteman service center.



If the machine cannot be switched off, pay attention to the rotating fan when you disconnect the cable or pull out the spark plug connector! Risk of injury!

3.5 Options

The basic machine can be upgraded by adding further components. The order and spare parts numbers for these components are provided in brackets.

- **Carpet kit (6460)**

By fitting the carpet kit on the Minuteman KS 28 B, the machine is converted for clearing up dry waste from carpets.



Please refer to the spare parts catalogue on our internet site at <http://ezparts.sysonline.com/minuteman> for accessories, such as rotary brushes, side brushes etc.

Technical Data

4 Technical Data

Machine length	in	43.3
Machine height (handlebar folded forward)	in	28.4
Machine width (including side brush)	in	27.2
Working width (with / without side brush)	in	27.2 / 28.0
Rotary brush width	in	20.1
Rotary brush diameter	in	9.8
Side brush diameter	in	15.8
Theoretical area coverage (with / without side brush)	ft ² /h	37943 / 27179
Sweeping speed	mph	3.1
Dirt hopper volume	gallon	9.2
Load capacity, dirt hopper (Maximum 55 lb!)	lb	55
Filter surface	ft ²	16
Power output (Minuteman KS 28 G / Minuteman KS 28 B)	hp	4.4 / 1.0
Weight, ready to use (Minuteman KS 28 G / Minuteman KS 28 B)	lb	225 / 269
Climbing capacity	%	2
Ambient temperature		
Minuteman KS 28 G	°F	+14 to +104
Minuteman KS 28 B	°F	+32 to +104

Technical Data

<p>Noise emission value</p> <p>The sound power level (L_{WA}) measured in accordance with EN 60335-2-72 at maximum working conditions: Minuteman KS 28 G Minuteman KS 28 B</p> <p>The sound pressure level (L_{pA}) (at the ear of the operator) measured according to DIN IEC 60335-2-72 under normal working conditions: Minuteman KS 28 G Minuteman KS 28 B</p> <p>Measurement inaccuracy (K_{pA}):</p>	<p>dB (A) dB (A) dB (A) dB (A) dB (A)</p>	<p>92 85 77 68 2</p>
<p>Vibration</p> <p>The weighted effective value of acceleration, measured in accordance with DIN EN ISO 5349, to which the upper parts of the body (hand-arm) are exposed under normal working conditions: Minuteman KS 28 G Minuteman KS 28 B</p>	<p>m/s² m/s²</p>	<p>2.6 Max. 2.5</p>

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 machine is always ready to be put into operation. Maintenance and repair work necessary on a daily and weekly basis can be carried out by an operator trained to complete the work, all other Minuteman system maintenance may only be completed by personnel who are correspondingly qualified and trained. 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 in the case of inquiries and spare parts orders, refer to section 1.7 - Rating plate.

5.1 Minuteman system maintenance

The Minuteman system maintenance:

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

Minuteman system maintenance is arranged into individual modules explaining the special technical work to be carried out and prescribes the intervals at which the work should be performed. Parts to be replaced for the individual maintenance tasks are defined and provided in spare parts kits.

Minuteman 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 proper instruction when the machine is delivered.

Minuteman one-off system maintenance

After the first four weeks or the first 20 operating hours.

Minuteman system maintenance I

Six-monthly.

To be completed by skilled personnel from an authorized Minuteman service center according to the machine-specific system maintenance with spare parts kit.

Minuteman system maintenance II

Annually.

To be completed by skilled personnel from an authorized Minuteman service center according to the machine-specific system maintenance with spare parts kit - including safety check.

Maintenance and Service

5.2 Maintenance report

<p style="text-align: center;">Handover</p> <p>Upgrading Test drive Handover to customer Instruction completed on:</p> <p>at _____ operating hours</p>	<p style="text-align: center;">Minuteman System Maintenance after 4 weeks Workshop Stamp</p> <p>completed on: at _____ operating hours</p>	<p style="text-align: center;">Minuteman System Maintenance I six-monthly Workshop Stamp</p> <p>completed on: at _____ operating hours</p>	<p style="text-align: center;">Minuteman System Maintenance II/S annually Workshop Stamp</p> <p>completed on: at _____ operating hours</p>
<p style="text-align: center;">Minuteman System Maintenance I six-monthly Workshop Stamp</p> <p>completed on: at _____ operating hours</p>	<p style="text-align: center;">Minuteman System Maintenance II/S annually Workshop Stamp</p> <p>completed on: at _____ operating hours</p>	<p style="text-align: center;">Minuteman System Maintenance I six-monthly Workshop Stamp</p> <p>completed on: at _____ operating hours</p>	<p style="text-align: center;">Minuteman System Maintenance II/S annually Workshop Stamp</p> <p>completed on: at _____ operating hours</p>
<p style="text-align: center;">Minuteman System Maintenance I six-monthly Workshop Stamp</p> <p>completed on: at _____ operating hours</p>	<p style="text-align: center;">Minuteman System Maintenance II/S annually Workshop Stamp</p> <p>completed on: at _____ operating hours</p>	<p style="text-align: center;">Minuteman System Maintenance I six-monthly Workshop Stamp</p> <p>completed on: at _____ operating hours</p>	<p style="text-align: center;">Minuteman System Maintenance II/S annually Workshop Stamp</p> <p>completed on: at _____ operating hours</p>

Maintenance and Service

5.3 Maintenance Plan Minuteman system maintenance, customer

The following maintenance work must be completed by the customer. The

maintenance intervals must be observed.

Activity	Interval	
	Daily	Weekly
Check the battery charge, recharge if necessary (only Minuteman KS 28 B)	o	o
Check the engine oil level, refill engine oil if necessary (only Minuteman KS 28 G)	o	o
Empty the dirt hoppers	o	o
Clean the brush space	o	o
Clean the panel air filter in the dust vacuum using the shaking device, check it for damage and replace if necessary	o	o
Check the rotary brush and side brush; clean or replace as necessary	o	o
Check sealing strips (2 side aprons, 1 rear apron) for wear and clearance, replace if necessary		o
Clean the air filter (only Minuteman KS 28 G)		o
Check the function of the suction turbine		o
Check the filter system (panel air filter) for leaks		o
Check the seals on the dirt hopper		o
Check the dirt hopper lock		o
Check the sweeping pattern; readjust, if necessary		o
Test drive and function test		o

Maintenance and Service

Minuteman one-off system maintenance

After the first four weeks or the first 20 operating hours the

Minuteman KS 28 G must be subject to an engine oil change at an authorized Minuteman service center.

Activity	Once after the first 4 weeks or after 20 operating hours
Engine oil change (only Minuteman KS 28 G)	o

Minuteman system maintenance I

The following maintenance work must

be completed by an authorized Minuteman service center.

Activity	Interval
	Six-monthly
All the maintenance work in accordance with the weekly Minuteman system maintenance customer	o
Check the drive belt for signs of wear and its tension, replace or readjust as necessary	o
Engine oil change (only Minuteman KS 28 G)	o or every 100 operating hours
Change the air filter (only Minuteman KS 28 G)	o
Check the condition of the tires	o
Test drive and function test	o

Maintenance and Service

Minuteman system maintenance II

The following maintenance work must be completed annually at an authorized Minuteman service center.

Activity	Interval
	Annually
All maintenance work in accordance with Minuteman system maintenance I	o
Check the function of the operating panel	o
Check the function of the on-board charger (only Minuteman KS 28 B)	o
Check the Bowden cables for signs of wear; change, if necessary	o
Check the suction turbine for signs of wear; change, if necessary	o
Check the rotary brush bearing in terms of play and for signs of wear; change, if necessary	o
Check the steering castor in respect of its running surface and bearing play; change, if necessary	o
Check the rear wheels for bearing clearance and signs of wear of the running surface; replace the wheel bearings and rear wheels, if necessary	o
Change the spark plug	o
Clean the drive motor from carbon dust, check the carbon brushes run smoothly and for signs of wear; change the carbon brushes, if necessary	o
Test drive and function test	o

Maintenance and Service

5.4 Engine



Before starting any maintenance and repair work, set the key switch to Position 0 to prevent starting the machine inadvertently! Remove the ignition key.

- 1 Spark plug cable
- 2 Screw plug with dipstick and oil filling neck
- 3 Oil drain bolt
- 4 Vessel for engine oil change (not part of scope of delivery)
- 5 Fastening nut for air filter cover
- 6 Air filter cover
- 7 Air filter
- 8 Fastening nut for air filter
- 9 Threaded pin

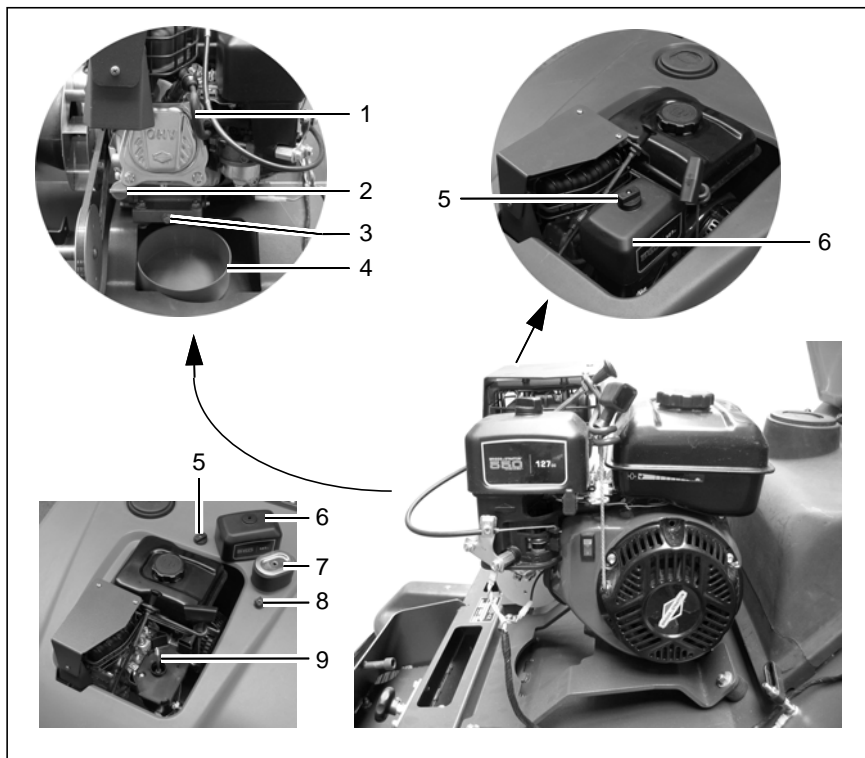


Fig. 14

Maintenance and Service

5.4.1 Checking the engine oil level

1. Park the machine on a level piece of ground.
2. Leave it to stand still for a time.



Do not check the engine oil level directly after the machine has been in operation.

3. Open the hood.
4. Clean the area around the oil filling neck (Fig. 14/2).
5. Unscrew the screw plug with dipstick (Fig. 14/2) counterclockwise and check the oil level. The oil level must be in the range between FULL and ADD.
6. If the oil level is near the ADD mark or below, refill engine oil, refer to Section 5.4.2.
7. If the oil level is considerably above the FULL mark, drain off some engine oil, refer to Section 5.4.3.
8. Screw the screw plug with dipstick (Fig. 14/2) back in, clockwise.
9. Close the hood.

5.4.2 Refilling engine oil




Only use SAE 15 W 40 engine oil. The engine has a max. volume of 0.6 l engine oil.

1. Park the machine on a level piece of ground.
2. Leave it to stand still for a time.
3. Open the hood.
4. Clean the area around the oil filling neck (Fig. 14/2).
5. Turn the screw plug with dipstick (Fig. 14/2) counterclockwise to remove it.
6. Pour the oil (SAE 15 W 40) slowly in the oil filling neck.
7. Check the new engine oil level, refer to Section 5.4.1.
8. Top up with more engine oil, if necessary, and check the engine oil level again.
9. Screw the screw plug with dipstick (Fig. 14/2) back in, clockwise.
10. Close the hood.

5.4.3 Changing/Draining the engine oil change



Change the oil when the engine is warm but switched off.

1. Open the hood.
 2. Position an appropriate collecting vessel (Fig. 14/4) under the oil drain bolt (Fig. 14/3).
 3. Unscrew the oil drain bolt (Fig. 14/3) and collect the escaping oil in the vessel (Fig. 14/4).
 4. Clean the oil drain bolt (Fig. 14/3) with a clean cloth.
 5. Remove the collecting vessel (Fig. 14/4) and dispose of the waste oil.
-  Observe the applicable laws and local regulations when disposing of waste oil and oily cloths.
6. Screw the oil drain bolt (Fig. 14/3) back in.
 7. Fill up with engine oil SAE 15 W 40, refer to Section 5.4.2.

Maintenance and Service

5.4.4 Disassembling the air filter

1. Open the hood.
2. Unscrew the fastening nut (Fig. 14/5) securing the air filter cover (Fig. 14/6).
3. Remove the air filter cover (Fig. 14/6).
4. Unscrew the fastening nut (Fig. 14/8) securing the air filter.
5. Pull the air filter (Fig. 14/7) from the threaded pin (Fig. 14/9).

5.4.5 Cleaning the air filter

1. Disassemble the air filter, refer to Section 5.4.4.
2. Beat the air filter lightly on a level, solid surface.
3. If necessary, vacuum the air filter carefully using a vacuum cleaner.



Do not damage the filter ribs!

4. If the air filter cannot be cleaned sufficiently, replace the old air filter with a new one.

5.4.6 Installing the air filter

1. Install the cleaned or new air filter (Fig. 14/7) on the threaded pin (Fig. 14/9).
2. Fix the air filter (Fig. 14/7) by screwing the fastening nut (Fig. 14/8) for the air filter on the threaded pin (Fig. 14/9).
3. Replace the air filter cover (Fig. 14/6).
4. Screw the fastening nut (Fig. 14/5) for the air filter cover (Fig. 14/6) on the threaded pin (Fig. 14/9).
5. Close the hood.

Maintenance and Service

5.5 Battery system

Only Minuteman KS 28 B.



Before starting any maintenance and repair work, set the key switch to Position 0 to prevent starting the machine inadvertently!



Only batteries approved by Minuteman may be used.



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



Only maintenance-free batteries may be used.

- 1 Charger cable
- 2 On-board charger (housing disassembled)
- 3 Operating panel
- 4 Connection diagram
- 5 Hood
- 6 Block battery
- 7 Handle

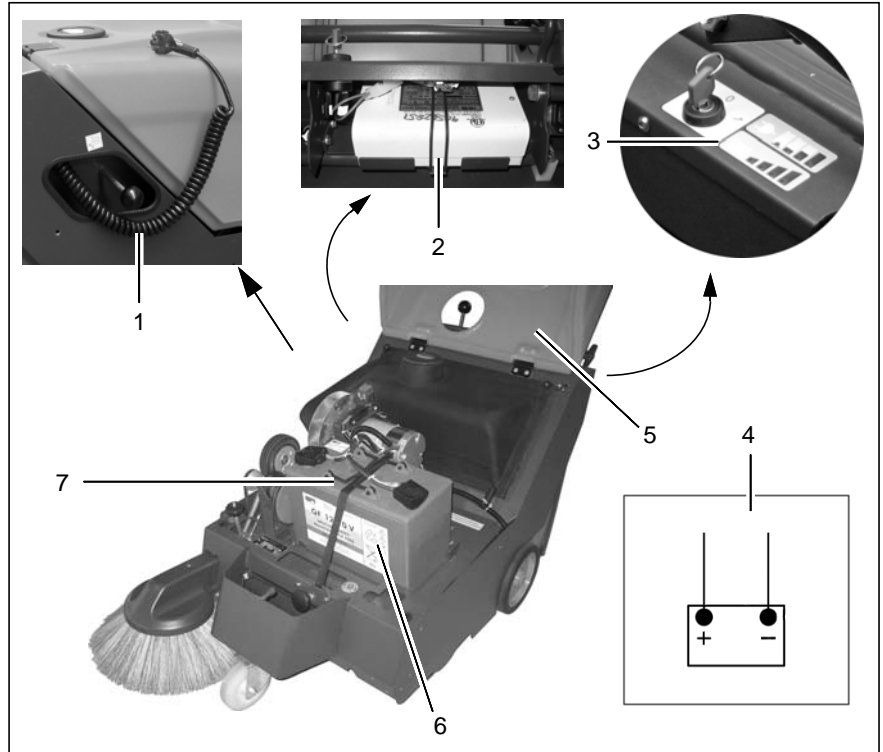


Fig. 15

Maintenance and Service

5.5.1 Charging battery



Before starting the machine up for the first time, the battery to be used must be fully charged, properly, by implementing the initial battery charge routine. Minuteman assumes no liability for damage to the battery caused by a fault when the battery is charged for the first time.

During operation, the battery discharge indicator in the operating panel (Fig. 15/3) indicates the discharge status of the battery, refer to Section 3.2.2, Section "Battery discharge status (Fig. 10/3)". The battery must be charged immediately the red LED lights up. The battery (Fig. 15/6) is recharged using the integrated on-board charger (Fig. 15/2):

1. Set the key switch to Position 0.



The battery cannot be charged in Position 1.

2. Remove the charger cable (Fig. 15/1) from the recess on the right-hand side of the machine.
3. Plug the charger cable (Fig. 15/1) in a 230 V power outlet.

While the battery is charging, the charge control indicator lights up in the operating panel (Fig. 15/3), refer to Section 3.2.2, Section "Charge control indicator (Fig. 10/2)".



When the charging process has been completed, disconnect the plug from the power outlet and return safely to the recess.

5.5.2 Total discharge signal transducer (TSG)

The machine is equipped with a total discharge signal transducer to protect the battery against total discharge. The total discharge signal transducer is integrated in the electronics.

5.5.3 Servicing the drive batteries

Never leave discharged batteries lying around; recharge them immediately!



Notes on servicing drive batteries is also provided in supplementary sheet 88-60-2556 "Information on Drive Batteries".

5.5.4 Removing battery



Before the Minuteman KS 28 B is tipped for any reason, the battery must be removed!

Maintenance and Service

1. Unlock the hood (Fig. 15/5) using a square wrench and open the hood (Fig. 15/5).



Ensure the engine has stopped before opening the hood. Risk of injury through belt drive and rotating fan!

2. Disconnect the negative cable from the battery (Fig. 15/6).
3. Disconnect the positive cable from the battery (Fig. 15/6).
4. Release the retaining strap.
5. Take hold of the battery (Fig. 15/6) by their handles (Fig. 15/7) and lift them out.

5.5.5 Inserting batteries



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

1. Unlock the hood (Fig. 15/5) using a square wrench and open the hood (Fig. 15/5).



Ensure the engine has stopped before opening the hood. Risk of injury through belt drive and rotating fan!

2. Take hold of the battery (Fig. 15/6) by their handles (Fig. 15/7) and install them at their prescribed positions in the machine, refer to Figure 15.
3. Secure the battery using the retaining straps.
4. Connect the battery (Fig. 15/6) in accordance with the connection diagram (Fig. 15/4).
5. Connect the negative cable of the machine to the battery (Fig. 15/6) installed in the machine.
6. Connect the positive cable of the machine to the battery (Fig. 15/6) installed in the machine, refer to Section 2.1.4.



Sparks could be produced when connecting the battery!

7. Close the hood (Fig. 15/5) so that it audibly locks.

5.5.6 Disposing of batteries

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. The return and recycling of old batteries must be agreed on with the authorized Minuteman dealer in accordance with national requirements.

5.6 Drives

- 1 Suction turbine fan
- 2 Belt drive for rotary brush and machine drive
- 3 Drive shaft (for rotary brush, side brush and machine drive)
- 4 Belt drive for side brush and rotary brush
- 5 Tension pulley for rotary brush drive
- 6 Friction wheel crank
- 7 Screw connection, friction wheel bearing
- 8 Belt drive for machine drive
- 9 Friction wheel



Before starting any maintenance and repair work, set the key switch to Position 0 to prevent starting the machine inadvertently!



Ensure the engine has stopped before opening the hood. Risk of injury through running belt drives (Fig. 16/2+4+8) and rotating fan (Fig. 16/1)!

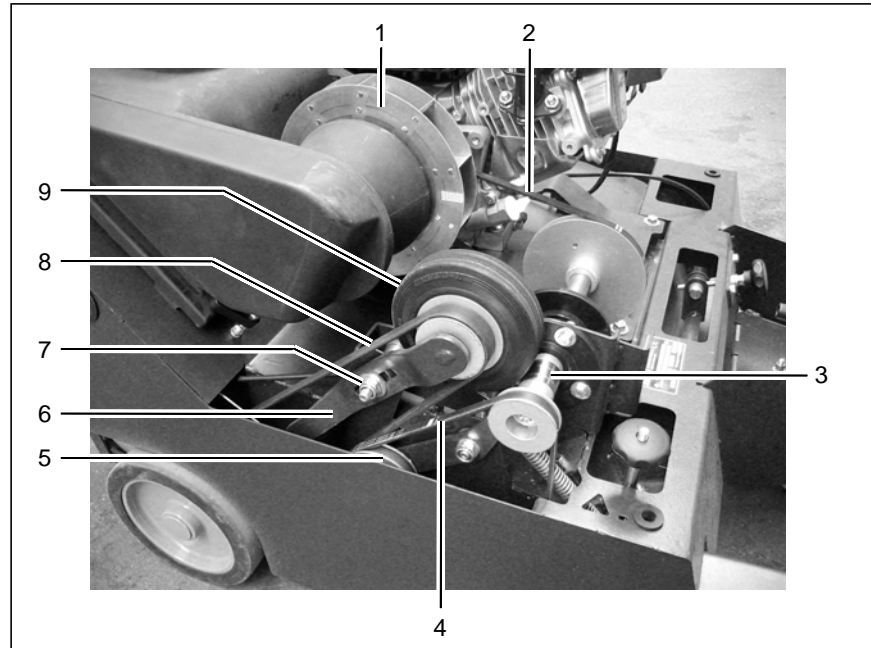


Fig. 16

Maintenance and Service

5.6.1 Adjusting the drive belt

If you notice that the rear wheel shaft is no longer driven properly, it is possible that the tension of the drive belts (Fig. 16/2+8) is no longer sufficient or the running surface of the friction wheel (Fig. 16/9) is worn (distance between wheel and running surface > 0.04 in).

1. Loosen the screw connection (Fig. 16/7) in the friction wheel crank (Fig. 16/6).
2. Tension the belt (Fig. 16/8) which leads to the rear wheel shaft by moving the friction wheel crank (Fig. 16/6) in the slot using an appropriate tool.



The friction wheel (Fig. 16/9) thereby lies against the drive shaft (Fig. 16/3).

3. Tighten the screw connection (Fig. 16/7) in the friction wheel crank (Fig. 16/6).
4. Check the belt tension with an appropriate measuring instrument (belt tension 95 ± 5 Hz).

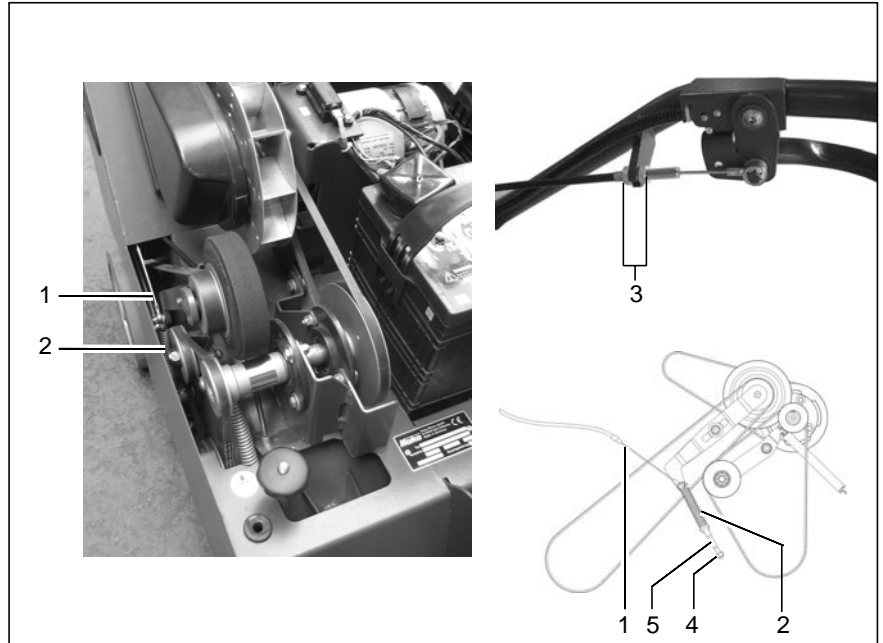


Fig. 17

- 1 Bowden cable
- 2 Tension spring
- 3 Adjusting nuts for Bowden cable

- 4 Hexagon nut
- 5 Eye bolt

Maintenance and Service

5. Turn the hexagon nut (Fig. 17/4) so far on the eye bolt (Fig. 17/5) until the tension spring (Fig. 17/2) tensions and the friction wheel retracts 0.04 - 0.08 in from the drive shaft (Fig. 16/3).
6. Turn the hexagon nuts (Fig. 17/4) one revolution further.
7. Complete any fine adjustment using the Bowden cable adjusting nuts (Fig. 17/3) on the handlebar: turn the adjusting nuts (Fig. 17/3) so that the distance between friction wheel and drive shaft is between 0.02 and 0.04 in.

Maintenance and Service

5.7 Side brush

- 1 Side brush control knob (underneath the hood)
- 2 Hood
- 3 Screws, plastic housing
- 4 Plastic housing
- 5 Side brush
- 6 Hexagon head bolt
- 7 Washer
- 8 Side brush holder
- 9 Hexagon nut



Before starting any maintenance and repair work, set the key switch to Position 0 to prevent starting the machine inadvertently!

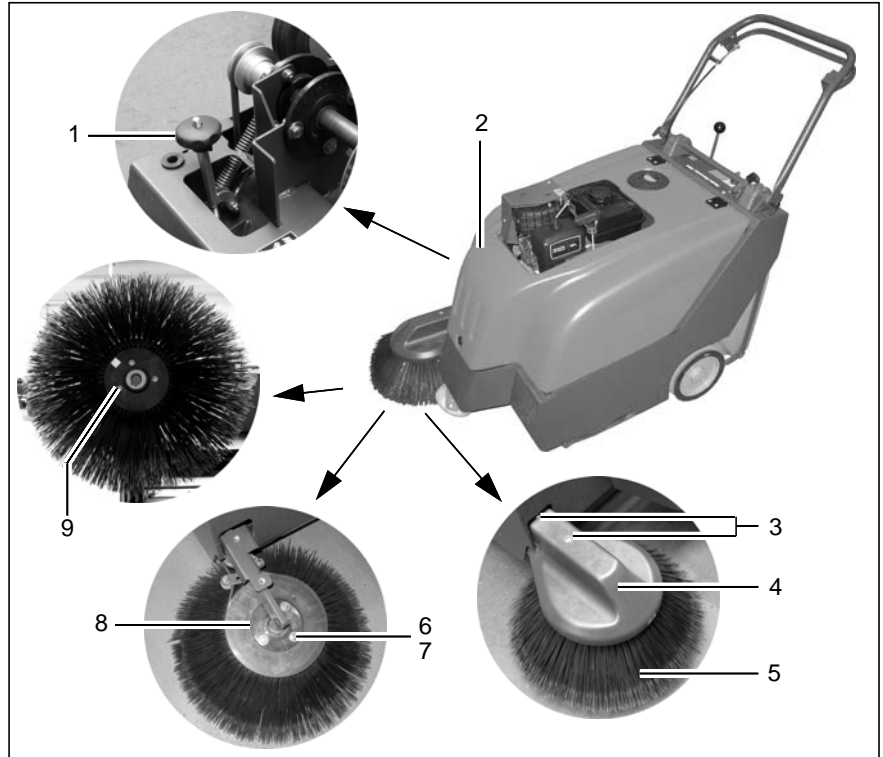


Fig. 18

Maintenance and Service

5.7.1 Side brush wear, readjustment

1. Unlock the hood (Fig. 18/2) using a square wrench and open the hood (Fig. 18/2).



Ensure the engine has stopped before opening the hood (Fig. 18/2). Risk of injury through belt drive and rotating fan!

2. Turn the side brush control knob (Fig. 18/1) to adjust the height of the side brush.
3. Close the hood (Fig. 18/2) so that it audibly locks.

5.7.2 Changing the side brush

Check the side brush (Fig. 18/5) weekly and change in the case of wear.

1. Switch the machine off and tip it back, refer to Figure 19.



Before tipping the Minuteman KS 28 B, the battery must be removed, refer to Section 5.5.4!



Before the Minuteman KS 28 can be tipped back, the handlebar must be adjusted to a vertical position.



Fig. 19

2. Remove the screws (Fig. 18/3) from the plastic housing (Fig. 18/4) and remove the plastic housing (Fig. 18/4).
3. Remove the hexagon head bolts (Fig. 18/6), the washers (Fig. 18/7) and hexagon nuts (Fig. 18/9).
4. Pull the old side brush (Fig. 18/5) from the side brush holder (Fig. 18/8).
5. Install the new side brush (Fig. 18/5) on the side brush holder (Fig. 18/8).
6. Fix the side brush (Fig. 18/5) with the hexagon head bolts (Fig. 18/6), washers (Fig. 18/7) and hexagon nuts (Fig. 18/9) to the side brush holder (Fig. 18/8).
7. Assemble the plastic housing (Fig. 18/4) and fix it in place with the screws (Fig. 18/3).

5.8 Rotary brush



Before starting any maintenance and repair work, set the key switch to Position 0 to prevent starting the machine inadvertently! Remove the ignition key.

- 1 Rotary brush
- 2 Rotary brush segment
- 3 Bore holes
- 4 Screw
- 5 Rotary brush shaft
- 6 Guide pin
- 7 Seal, dirt hoppers

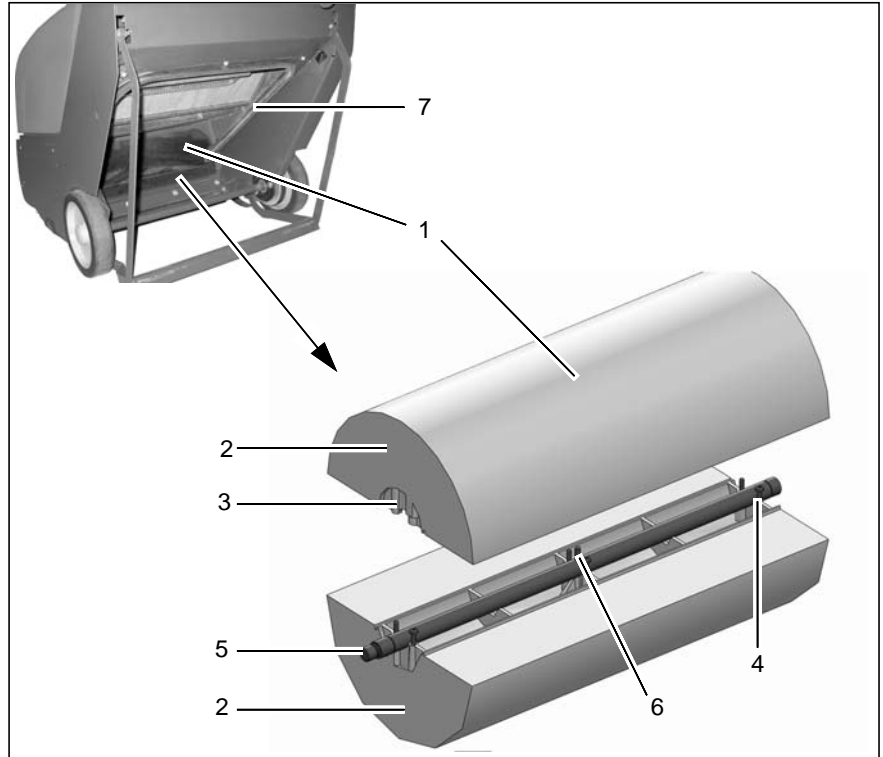


Fig. 20

Maintenance and Service

5.8.1 Cleaning the brush space

The brush space with the rotary brush (Fig. 20/1) and seals for the dirt hopper (Fig. 20/7) must be checked daily for signs of dirt and cleaned as necessary.



Only Minuteman KS 28 B:
Tapes winding around the rotary brush leads shutdown due to overloading!

1. Remove the dirt hopper, refer to Section 5.9.1.
2. Check the brush space - the area between the rotary brush, panel air filter and dirt hopper - for residual waste and damage.
3. Remove any foreign bodies.
4. Clean the brush space, firstly with a hand brush and then with water. Dry the brush space.
5. Change defective dirt hopper seals, refer to Section 5.9.4.

5.8.2 Changing the rotary brush

The rotary brush (Fig. 20/1) must be checked weekly and changed in the case of wear. A new rotary brush has a diameter of 9.9 in. When a rotary brush has a diameter of only 7.9 in, it must be replaced with a new one.

The rotary brush (Fig. 20/1) is comprised of two rotary brush segments (Fig. 20/2) which are fixed to the rotary brush shaft (Fig. 20/5) by the screws (Fig. 20/4). Pay attention that the bristle pattern on the rotary brush (Fig. 20/1) is always arranged in a V-shape in the direction of driving so that the dirt is guided to the center of the rotary brush.

1. Tip the machine to the rear.



Before tipping the Minuteman KS 28 B, the battery must be removed, refer to Section 5.5.4!



Before the Minuteman KS 28 can be tipped back, the handlebar must be adjusted to a vertical position.

2. First of all, disassemble the two adjacent rotary brush segments (Fig. 20/2): Loosen the screws (Fig. 20/4) and remove the rotary brush segments (Fig. 20/2).
3. Then turn the rotary brush shaft (Fig. 20/5) 180° by hand and disassemble the two remaining rotary brush segments (Fig. 20/2).
4. Assemble four new rotary brush segments (Fig. 20/2) in the reverse sequence. When doing so, pay attention that the rotary brush segments (Fig. 20/2) are installed on the guide pins (Fig. 20/6) of the rotary brush shaft (Fig. 20/5) and screw to facing rotary brush segments (Fig. 20/2) firmly to each other.
5. Tip the machine back up again.

Maintenance and Service

6. Install the battery again in the Minuteman KS 28 B, refer to Section 5.5.4.
7. After changing the rotary brush (Fig. 20/1), readjust the sweeping pattern as necessary.

5.8.3 Setting the sweeping pattern

In the case of brush wear, and after changing the rotary brush (Fig. 20/1), the sweeping pattern must be readjusted.

1. Push the machine onto a dusty surface when the engine is switched off.
2. Switch the machine on, refer to Section 3.3.1, and allow the rotary brush to rotate for a short time while at a standstill.
3. Switch the machine off, refer to Section 3.3.5.
4. Tip the machine up at the front a little and pull the machine back a short way.
5. Examine the sweeping pattern (brush stroke) produced on the dusty ground: The width of the sweeping pattern must be approx. 2 in. The borders of the sweeping pattern must be parallel.

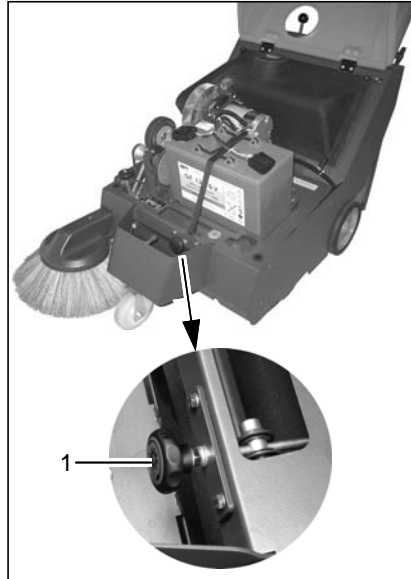


Fig. 21

- 1 Rotary brush height control knob

6. Open the hood.
7. Adjust the height of the rotary brush by means of the control knob (Fig. 21/1).
8. Close the hood.
9. Repeat steps 1 to 8 until the adjustment is correct.

5.8.4 Changing the sealing strips

The rotary brush is surrounded by four sealing strips: a front apron, two rear aprons (front and rear) and two side aprons. The four sealing strips must be checked weekly and changed in the case of wear.

1. Tip the machine to the rear.



Before tipping the Minuteman KS 28 B, the batteries must be removed, refer to Section 5.5.4!



Before the Minuteman KS 28 can be tipped back, the handlebar must be adjusted to a vertical position.

Maintenance and Service

- 1 Side apron, left
- 2 Screw connection side aprons
- 3 Rear apron (back rear apron)
- 4 Screw connection rear apron
- 5 Side apron, right

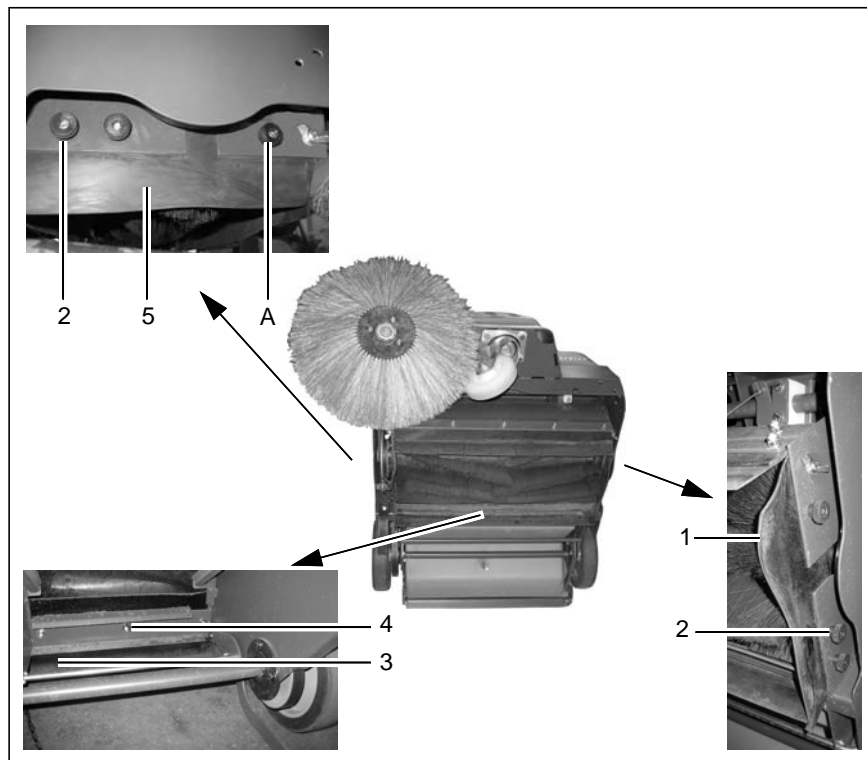


Fig. 22

Maintenance and Service

Changing the side aprons

2. Unscrew the screw connections (Fig. 22/2) in the side aprons (Fig. 22/1+5).
3. Change the sealing strips and adjust the side aprons (Fig. 22/1+5): There must be approx. 0.04 - 0.08 in clearance to the floor.
4. Screw the screw connections (Fig. 22/2) back in the side aprons (Fig. 22/1+5). Also screw the ground of the wing nut at Position A (Fig. 22/A).

Changing the rear aprons

5. Remove the dirt hopper, refer to Section 5.9.1.
6. Unscrew the screw connections (Fig. 22/4) in the rear aprons (Fig. 23/1+2).
7. Change the sealing strip and adjust the rear apron (Fig. 22/3): The clearance of the rear apron (Fig. 23/2) from the ground must be 0.04 - 0.08 in.
8. Screw the screw connections (Fig. 22/4) back in the rear aprons (Fig. 23/1+2).

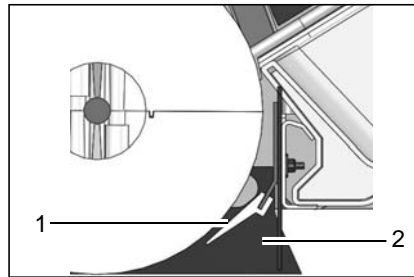


Fig. 23

- 1 Front rear apron
- 2 Back rear apron

Maintenance and Service

5.9 Dirt hopper

- 1 Seal for dirt hopper
- 2 Handle for dirt hopper
- 3 Dirt hopper
- 4 Handlebar
- 5 Locking lever for dirt hopper



Before starting any maintenance and repair work, set the key switch to Position 0 to prevent starting the machine inadvertently!

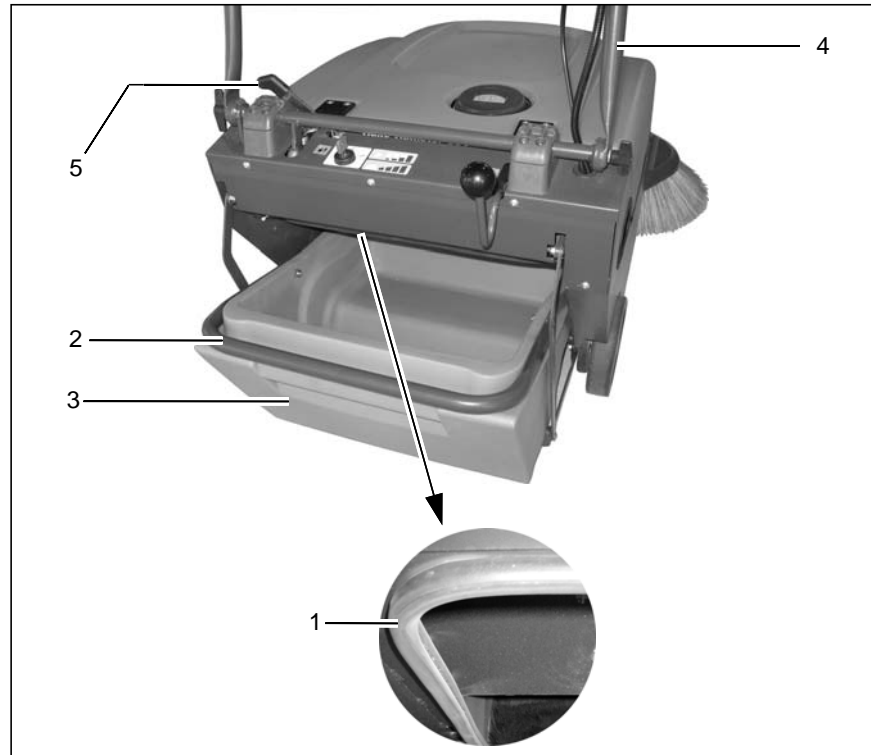


Fig. 24

Maintenance and Service

5.9.1 Removing the dirt hopper

1. Switch the machine off and move the lever (Fig. 24/5) for locking the dirt hopper to the right (looking in drive direction) and, at the same time, pivot the handlebar (Fig. 24/4) for-wards. The frame (Fig. 25/2) of the dirt hopper is lowered.



The engine must be at a standstill before the dirt hopper (Fig. 24/3) is removed. Risk of injury through swirling waste and dust!

2. Hold the dirt hopper (Fig. 24/3) by the handle (Fig. 24/2) and pull it to the rear and out of the machine

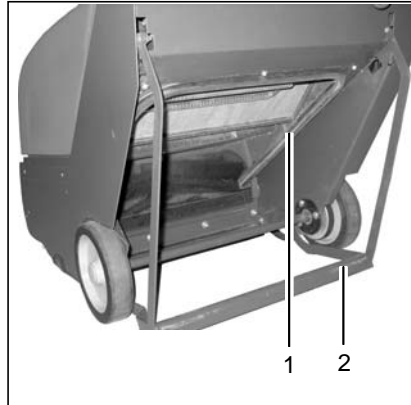


Fig. 25

5.9.2 Emptying the dirt hopper

Check the fill level of the dirt hopper (Fig. 24/3) regularly and empty it regularly and as necessary.



Observe the applicable national laws and local regulations when disposing of waste.

5.9.3 Inserting the dirt hopper

1. Insert the dirt hopper (Fig. 24/3) back in the machine from the rear until they perceptibly engage in the frame (Fig. 25/2).
2. Pivot the handlebar (Fig. 24/4) towards the rear until the lever (Fig. 24/5) for locking the dirt hopper audibly engages.

5.9.4 Changing the seals

Check the dirt hopper seals (Fig. 25/1) for wear on a weekly basis and change the seals as necessary.

1. Remove the dirt hopper, refer to Section 5.9.1.
2. Pull the seals (Fig. 25/1) from the edges.
3. Press new seals (Fig. 25/1) on the edges.
4. Insert the dirt hopper, refer to Section 5.9.3.

Maintenance and Service

5.10 Dust vacuum

- 1 Knurled screws
- 2 Sealing strip
- 3 Fan
- 4 Threaded pin
(for top filter cover lock)
- 5 Panel air filter
- 6 Bottom filter cover lock
- 7 Hood
- 8 Filter cover
- 9 Shaking device lever



Before starting any maintenance and repair work, set the key switch to Position 0 to prevent starting the machine inadvertently!

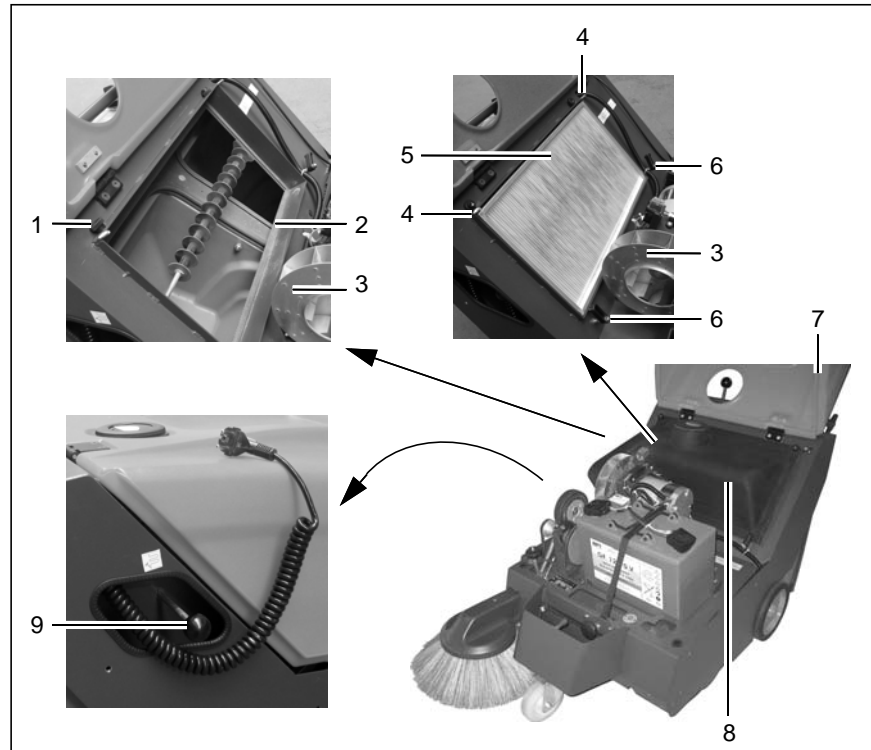


Fig. 26

5.10.1 Clearing dust deposits from panel air filter during operation

Clean the panel air filter (Fig. 24/5) in the dust vacuum regularly and as necessary using the shaking device:

1. When the engine is switched off, pull/push the lever (Fig. 24/9) of the shaking device quickly, several times.

5.10.2 Removing the panel air filter

1. Unlock the hood (Fig. 24/7) using a square wrench and open the hood (Fig. 24/7).



Ensure the engine has stopped before opening the hood (Fig. 24/7). Risk of injury through belt drive and rotating fan (Fig. 24/3)!

2. Release the top filter cover locks: Unscrew the knurled screws (Fig. 24/1) from the threaded pins (Fig. 24/4).

3. Release the bottom filter cover locks: Pivot the hinged locks (Fig. 24/6) outwards.
4. Remove the filter cover (Fig. 24/8).
5. Remove the panel air filter (Fig. 24/5).

5.10.3 Cleaning the panel air filter thoroughly



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

1. Drop the panel air filter (Fig. 24/5) a few times from a small height onto a level, solid surface. Be careful not to damage the filter ribs!



The ground must not have any surface irregularities. Do not drop the panel air filter (Fig. 24/5) onto the ground at a slant.



Never install panel air filters (Fig. 24/5) which have damaged filter ribs!

5.10.4 Replacing the sealing strips

If the panel air filter (Fig. 24/5) is removed, check the self-adhesive sealing strips (Fig. 24/2) for signs of damage. Damaged sealing strips (Fig. 24/2) must be replaced:

1. Pull off the damaged sealing strips (Fig. 24/2).
2. Clean any residual adhesive from the surfaces on which the sealing strips (Fig. 24/2) must be adhered.
3. Adhere the new sealing strips (Fig. 24/2).

Maintenance and Service

5.10.5 Inserting panel air filters

1. Insert the thoroughly cleaned or new panel air filter (Fig. 24/5) from the correct side in the filter support frame.



Pay attention to the labeling on the side of the panel air filter (Fig. 24/5)!

2. Replace the filter cover (Fig. 24/8).
3. Close the bottom filter cover locks: Pivot the hinged locks (Fig. 24/6) over the edge of the filter cover (Fig. 24/8).
4. Close the top filter cover locks: Screw the knurled screws (Fig. 24/1) on the threaded pins (Fig. 24/4).
5. Close the hood (Fig. 24/7) so that it audibly locks.

5.10.6 Checking the suction turbine

1. Switch the machine on, refer to Section 3.3.1.
2. Clean a dusty surface for test purposes, refer to Section 3.3.4.

3. Switch the machine off, refer to Section 3.3.5.
4. Remove the dirt hopper, refer to Section 5.9.1.
5. Check whether dust has accumulated on the inner side of the panel air filter (Fig. 24/5).
6. If you have the impression that the suction turbine does not work or dust escapes from the machine, contact a Minuteman service center.



Do not open the hood (Fig. 24/7) when the engine is running. Risk of injury through belt drive and rotating fan (Fig. 24/3)!

5.10.7 Checking the filter system for leaks



Do not open the hood (Fig. 24/7) when the engine is running. Risk of injury through belt drive and rotating fan (Fig. 24/3)!

1. When the engine is switched off, hood (Fig. 24/7) is open and filter cover (Fig. 24/8) removed, check whether dust escapes at the edges of the panel air filter (Fig. 24/5).
2. If this is the case, check the sealing strips (Fig. 24/2), refer to Section 5.10.4 and replace, if necessary.
3. Check the panel air filter (Fig. 24/5) and replace, if necessary. The frame of the panel air filter (Fig. 24/5) must not be twisted nor show signs of damage. Ensure that the panel air filter (Fig. 24/5) has been inserted true to side, refer to Section 5.10.5.
4. Repeat this test a certain time after cleaning. If dust continues to escape at the edges of the panel air filter (Fig. 24/5), contact a Minuteman service center.

Maintenance and Service

5.11 Special equipment

Name	Description	Order no.
Carpet kit (only Minuteman KS 28 B)	For cleaning carpets	6460

Minuteman International Made Simple Commercial Limited Warranty

Minuteman International Made Simple Commercial Limited Warranty

Minuteman International, Inc. warrants to the original purchaser/user that this 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 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.

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.

Minuteman International Made Simple Commercial Limited Warranty

Cord Electric Group

- three years parts,
- two years labor,
- ninety days travel
(not to exceed two hours)

Exceptions

- Port-A-Scrub, one year parts, six months labor
- MPV 13, one year parts
- MPV 14 and 18, two years parts, one year labor
- Rapid Air blower, one year parts, one year labor
- Pneumatic Vacuums, three years parts, one year labor
- EX 12 and EX 12H, 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)

Replacement parts

- ninety days

Batteries

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

Polypropyl. Plastic Tanks

- ten years
- no additional labor

Minuteman[®]



Excellence Meets Clean

88-10-2960



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