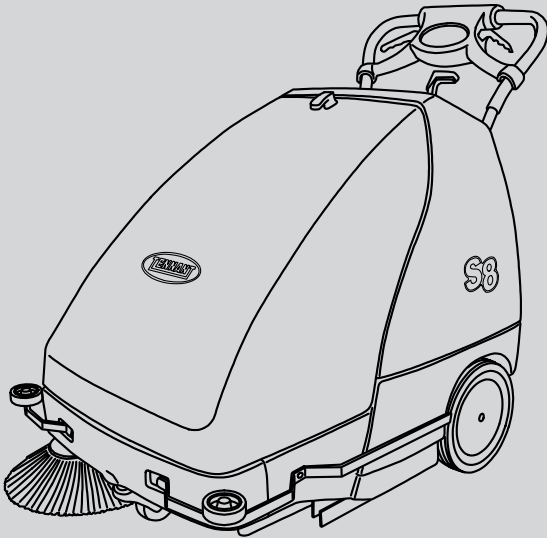




S8

Battery Sweeper Operator Manual **EN**



Model Part No.:
MS85004
MS85904 UK



9001217
Rev. 02 (11-11)

TENNANT N.V.

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Technical features and specifications

DESCRIPTION	S8	
<i>Maximum width with side brush</i>	838 mm	33 in
<i>Maximum length with side brush</i>	1219 mm	48 in
<i>Maximum height with handlebar</i>	1010 mm	39.75 in
<i>Actual cleaning width with main brush</i>	520 mm	20,5 in
<i>Actual cleaning width with side brush</i>	711 mm	28 in
Weight	89 kg	196 lbs
<i>Capacity of the front waste bin</i>	32 Lt	1,1 cu.ft
<i>Capacity of the back waste bin</i>	18 Lt	0,63 cu.ft
Run time	3,5 h	3,5 h
Filtering surface	1.1 m ²	11.8 sq.ft
Theoretical productivity	1858m ² /h	20,000 sq.ft./h
Installed power/Current drawn	21A on carpet 18.5A on hard floor	21A on carpet 18.5A on hard floor
Battery type	12v 70Ah/5h	12v 70Ah/5h
Noise level at operator ear	65 dB	65 dB
Vibrations	2.5 m/Sec ²	2.5 m/Sec ²

SAFETY PRECAUTIONS:

This machine is intended for commercial use only. It is designed to pick up dirt, dry debris and dust from dry hard floor or carpeted surfaces in an indoor environment. It is not constructed for any other use. The pick up of any type of liquid substance or dangerous/toxic materials is prohibited.

All operators must read, understand and practice the following safety precautions.

The following warning alert symbol and the "FOR SAFETY" heading are used throughout this manual as indicated in their description:



WARNING: To warn of hazards or unsafe practices which could result in severe personal injury or death.

FOR SAFETY: To identify actions which must be followed for safe operation of equipment.

Failure to follow these warnings may result in: personal injury, electrocution, electric shock, fire or explosion:



WARNING: Do Not Operate Machine In Or Near Flammable Liquids, Vapors Or Combustible Dusts.

This machine is not equipped with explosion proof motors. The electric motors will spark upon start up and during operation which could cause a flash fire or explosion if machine is used in an area where flammable vapors/liquids or combustible dusts are present.



WARNING: Do Not Pick Up Flammable Or Toxic Material, Burning Or Smoking Debris.



WARNING: Do Not Charge Batteries With Damaged Power Cord. Do Not Modify Plug.

If the charger supply cord is damaged or broken, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid a hazard.



WARNING: Disconnect Battery Cables and Unplug Charger Power Cord Before Servicing Machine.



WARNING: Do Not Use Outdoors Or On Wet Surfaces. Do Not Expose To Rain. Store Indoors.

The following information signals potentially dangerous conditions to the operator or equipment:

FOR SAFETY:

1. Do not operate machine:
 - In flammable or explosive areas.
 - Unless trained and authorized.
 - Unless operation manual is read and understood.
 - If not in proper operating condition.
 - Without hopper and/or filters in place.
2. Before starting machine:
 - Make sure all safety devices are in place and operate properly.
3. When using machine:
 - Do not pick up burning or smoking debris, such as cigarettes, matches or hot ashes.
 - Do not operate in standing water.
 - Report machine damage or faulty operation immediately.
 - Go slow on inclines and slippery surfaces.
 - Do not leave unattended or on an unlevel surface.
 - Do not pick up cables, strings, wires or other similar material.
 - Make sure area is illuminated.
 - Never allow children to play on or around.
 - Do not transport riders or objects.
 - Wear a dust mask, protective glasses and gloves in dusty environments.
4. Before leaving or servicing machine:
 - Stop on level surface.
 - Turn off machine.
5. When servicing machine:
 - Avoid moving parts. Do not wear loose jackets, shirts, or sleeves.
 - Disconnect battery connection and charger plug before working on machine.
 - Use manufacturer supplied or approved replacement parts.
 - All repairs must be performed by a qualified service person.
 - Do not modify the machine from its original design.
 - Wear protection gloves and safety glasses when handling battery or battery cables.
 - Avoid contact with battery acid.
 - Do not operate machine on inclines that exceed a 2% grade
6. When transporting machine:
 - Turn machine off.
 - Get assistance when lifting machine.
 - Use a recommended ramp when loading/unloading into/off truck or trailer.
 - Use tie-down straps to secure machine to truck or trailer.

1.1 -SAFETY LABELS

The safety label appears on the machine in the location indicated.
Replace label if it is missing or if it becomes damaged or illegible.

BATTERY CHARGE LABEL – PLACED BY THE SIDE OF THE BATTERY CHARGER

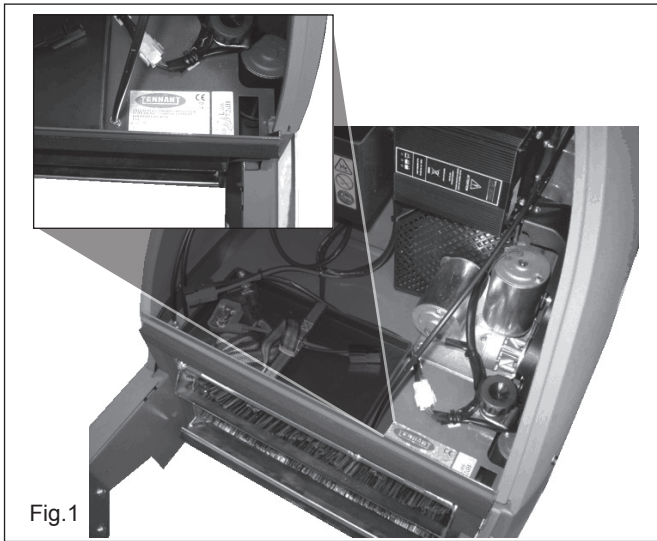


WARNING:
Fire Or Explosion Hazard.
Batteries Emit Hydrogen Gas. Keep Sparks And
Open Flame Away. Keep Battery Compartment
Open When Charging.



1.2 -SERIAL NUMBER AND CE MARKING

Always ensure that the machine is provided with a rating plate giving the serial number and CE marking in the position shown in Fig.1. If this is not the case, notify your dealer immediately.



1.3 -INTRODUCTION

The purpose of this manual is to inform the operator of the basic rules, safety rules and criteria which must be observed when using, adjusting and maintaining the machine. The machine has been designed and manufactured to ensure an excellent performance and the utmost comfort and ease of operation in a variety of working conditions. Before delivery, the machine has been checked at our factory and by our dealer to make sure it is handed over to you in perfect working order. To maintain the machine in this condition and ensure problem free operation, it is essential to follow the routine maintenance instructions given in this handbook.

1.4 -UNPACKING THE MACHINE

Unpack the machine with the utmost care; avoid carrying out any operation that could damage it. Once it has been unpacked, check whether it is damaged. If you notice that it is not in correct working order, DO NOT use it and inform your dealer.

For packaging and transport purposes, some parts and accessories are supplied disconnected from the machine. To assemble them, carefully follow the instructions given in the relevant sections.

Contents of package:

- 1 Machine.
- 1 Side brush.
- 1 Instruction manual
- 2 Bumper Wheels and mounting hardware

Tool Kit Package: (p/n 9001420):

- 1x 4mm Allen Wrench – To remove the rear shroud in order to access bolts for handle adjustment
- 1x 5mm Allen Wrench – To adjust the height of the side brush
- 2x 10/13mm Wrench - To attach handle from shipping position.
- To install the side brush and to attach cables to battery posts.
- 2x M8screw and nut
- 2x Ignition key
- 1x Charger LED label

In the case in which one of the above mentioned parts is missing, please inform your dealer right away.

Take care to keep the packaging materials (bags, cartons, pallets, hooks, etc) out of the reach of children.

NOTE

For security reason during the transport, the starting keys are included in the envelop with the documents.

1.5 -CONSUMABLES

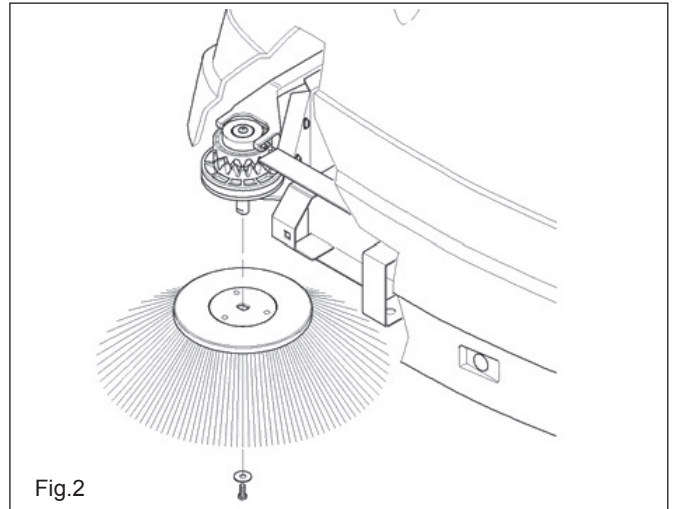
Reduction gear: MOVIBLAK 300 lithium grease with similar characteristics.

Battery: Distilled water.

2.1 -PREPARING THE MACHINE FOR OPERATION

2.1.1 -Mounting the side brush

- Switch the brush lift lever (1 Fig.3), to OFF.
- Screw out the screw from the side brush shaft.
- Fit the brush on the shaft (Fig.2).
- Screw on the screw and washer.

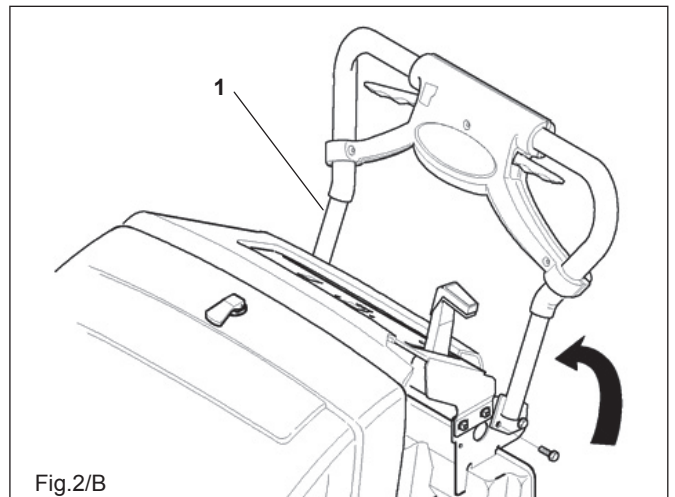


2.1.2 - Mounting the handlebar

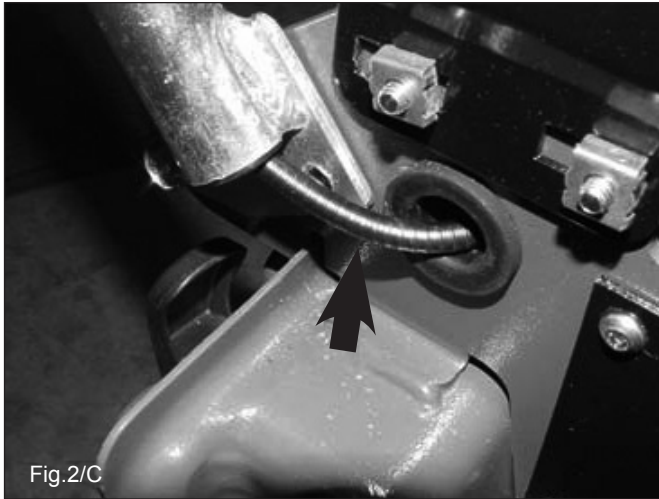
- Remove the shroud to access the handlebar mounting screws. 4mm Allen wrench required, supplied with machine (Fig.2/A).



- Withdraw the handlebar fixing screws.
- Lift the handlebar into the work position (1 Fig.2/B).
- Tighten the handlebar fixing screws.

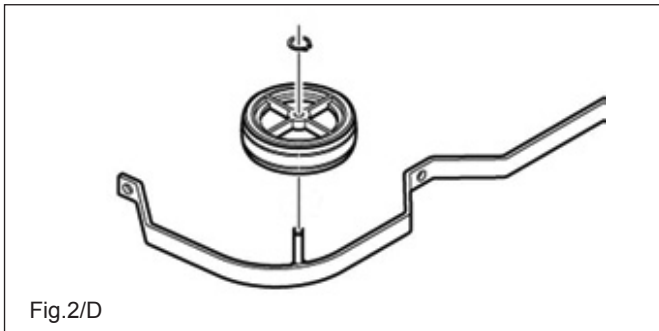


- To ensure that the traction lever works properly make sure the lever cable is positioned as shown before replacing the rear shroud. (Fig.2/C).



2.1.3 -Mounting the Bumper Wheels

- Mount the two mounting wheels as shown and secure with snap ring (Fig.2/D)



2.1.4 -Installing the Battery

FOR SAFETY: Wear protective gloves and eye protection when handling battery and battery cables. Avoid contact with battery acid.

Battery Specifications:
One 12 volt deep cycle battery.

Maximum battery dimensions: 18cm (7.00 in) W x 32 cm (12.50 in) L x 24 cm (9.38 in) H.

IMPORTANT: The on-board battery charger setting MUST be re-configured if changing to a different battery type, WET (lead acid) or SEALED (Gel) battery. See 5.3 CHARGER SETTINGS

To Install Battery:

1. Remove key from machine.
2. Open the front hood to access the battery compartment.
3. Carefully position the battery into the battery tray with battery post towards front of machine and connect cables to battery, RED to POSITIVE (+) and BLACK to NEGATIVE (-) (Fig 2/E).



4. Secure battery with strap.
5. Charge battery. See 5.2.1. BATTERY RECHARGE

3.1 -CONTROLS

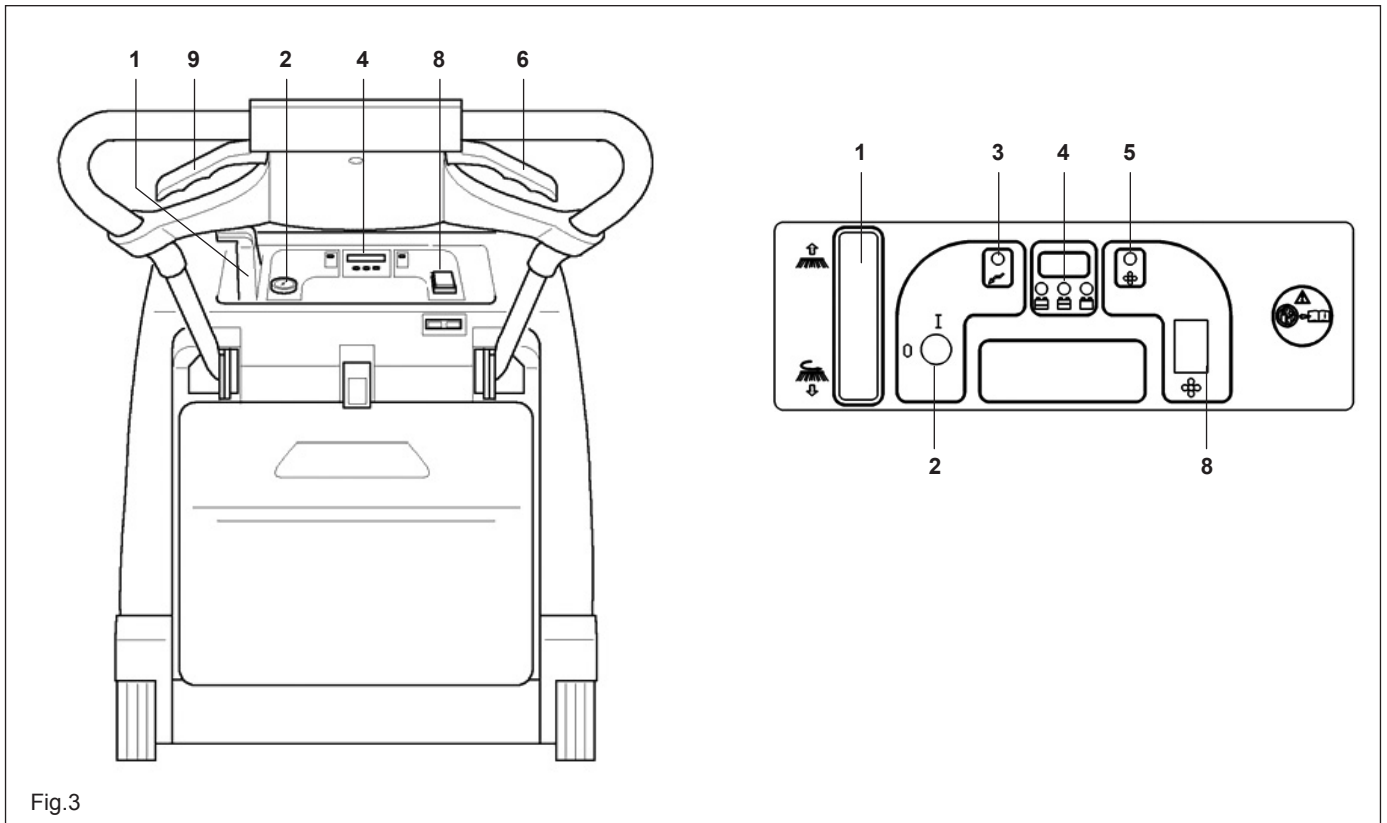


Fig.3

1) Side brush control lever: switch the lever to lower position and the side brush will move into the work position and start spinning. To stop the side brush, switch the lever to **upper position**.

2) Key switch: turns power to the machine on.

3) Power indicator light .

4) Charge indicator light this light indicates the state of the battery during operation.

5) Vacuum indicator light.

6) Traction lever: By pulling this lever, the machine will start moving forward

7) Filter shaker lever: this lever operates the filter shaker to clean the filter (see the section on filter maintenance).

8) Vacuum fan switch.

9) Lever for the dust flap for bulky debris

4.1 -OPERATING MACHINE

FOR SAFETY: Do not operate machine unless trained and authorized. When using machine, do not pick up liquids or leave unattended. Before leaving machine remove key and never allow children to play on or around.

To start the machine carry out the following operations:

- Make sure the side brush pos.1 Fig.3 is 0.
- Turn the switch pos.2 Fig.3 to position I. Wait 10 seconds before operating machine.
- Before operating machine, check the indicator pos.4 Fig.3, to assess whether the battery is fully charged. If it is not, proceed to recharge it.
- Pull the traction lever pos.6 Fig.3, to start cleaning.

If necessary, operate lever pos.1 Fig.3, by turning it to I position, to start the side brush. If you have been using the side brush, at the end of your work remember to turn it to 0 position. Switch off the machine and remove the key from the control panel.

An automatic device will prevent you from using the machine beyond a certain battery discharge limit.

When this limit is reached, the machine will stop and the battery must be recharged.

4.2 -WHILE OPERATING

After starting the machine, you are ready to start using the sweeper. To obtain best results, you should always take certain precautions. These will help you to get the best from your machine and reduce the risk of damage to a minimum.

In particular:

- **FOR SAFETY: When using machine, do not pick up cables, strings, wires or other similar materials**
- When using the machine on light but bulky material (sheets of paper, leaves, etc.), raise the front part of the machine by pressing down the handlebar so that the machine can tackle the rubbish.
- Use the dust flap lever to pick up bulky debris
- Operate the filter shaker at the end of your work (see the Panel filter section).
- Make sure the center brush is correctly adjusted (see the section on adjusting the center brush).

4.3 -CLEANING THE WASTE BINS

Before carrying out this operation, make sure the machine is turned off completely.

(*ATTENTION: WASTE MUST BE DISPOSED OF STRICTLY IN ACCORDANCE WITH THE LAW.

4.3.1 -Front bin (fig.4)

- Lift and turn the two bin locks.
- Grasp the handle/s and remove the bin by pulling it upwards.
- Empty the bin (*).

To put the bin back in place:

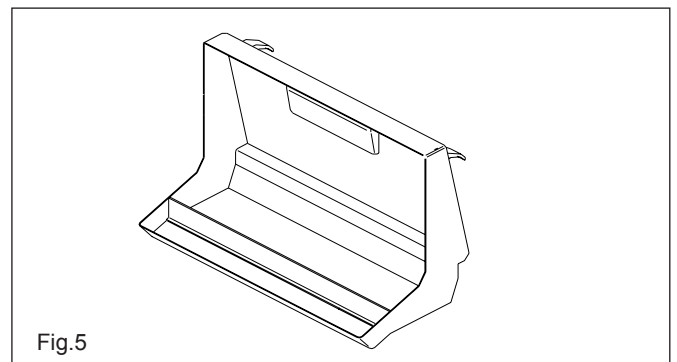
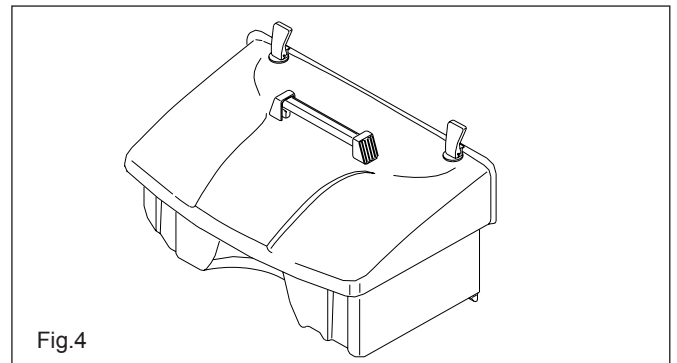
- Put the bin back in the machine from the top.
- Turn and lower the two locks.

4.3.2 -Rear bin (fig.5)

- Lift and turn the two bin locks.
- Grasp the handle and pull the bin out of the machine.
- Empty the bin (*).

To put the bin back in place:

- Fit the bin back into the machine.
- Turn and press the two locks.



5.1 -ROUTINE MAINTENANCE

FOR SAFETY: When servicing machine all repairs must be performed by an authorized service person. Use manufacturer supplied or approved replacement parts



WARNING: Disconnect Battery Cables and Unplug Charger Power Cord Before Servicing Machine

CHECK	On delivery	Every 10 hours	Every 50 hours	Every 100 hours	Every 200 hours
Check the battery liquid WET (lead acid) Battery	X	X			
The belts for slackening				X	
Tightness of nuts and screws			X		
The brushes for wear			X		
The gaskets for wear and leakages		X			
If all the functions are in working order	X	X	X	X	
Replace the filter					X



Fig.5.2.1

5.2 -BATTERY MAINTENANCE

The battery must be kept clean and dry. Keep the terminals and poles clean. For Wet (lead acid) Battery - Every 10 hours, remove the caps and check the electrolyte level. If necessary add distilled water. The battery should be serviced in a properly ventilated area. During this procedure, do not expose the battery to open flames and do not smoke.

The battery runtime should last about 3 hours; if you notice that it is much shorter, check that:

- the brushes are not obstructed;
- the battery is completely charged.

5.2.1 -BATTERY RECHARGE

The length of time the battery charge lasts will depend on its routine maintenance and on its discharge level. Do not allow the battery charge to drop below the limit signalled by the indicator lights pos.4 Fig.3. Once the max. discharge level has been reached, the machine stops and must be recharged in order to restart working.

Machine Panel Charge Indicator Lights

Green light: The battery is charged.

Yellow light: The battery is running out; recharge as soon as possible.

Red Light: The battery has run out. DO NOT continue to operate the machine, recharge immediately.

To Recharge Battery:



WARNING: Batteries Emit Hydrogen Gas. Keep Sparks And Open Flame Away. Keep Battery Compartment Open When Charging.

WET(lead acid) Battery - Before recharging, check the electrolyte level in each cell. If necessary add distilled water.

FOR SAFETY: When Servicing machine avoid contact with battery acid. Wear protective gloves and eye protection when handling batteries or battery cable.

1. Park machine in a well-ventilated area.
2. With the machine turned off, connect battery charger cord (Fig. 5.2.1.). Make sure the rated input voltage of the charger suits the available supply voltage.
3. Before charging, make sure battery charger settings are properly set. The battery charger is factory set for a sealed (GEL) battery. (See 5.3 CHARGER SETTINGS).
4. If the battery charger detects a problem, the charger will display an error code (See 5.4 CHARGER TROUBLESHOOTING AND ERROR CODES).
5. Once the charging cycle begins, the charger's indicator LED lights will progress from the red, yellow to green. At the end of the charge cycle, when the green indicator is on, disconnect the charger cord.



WARNING: Never disconnect the battery while charging. This could cause a spark.

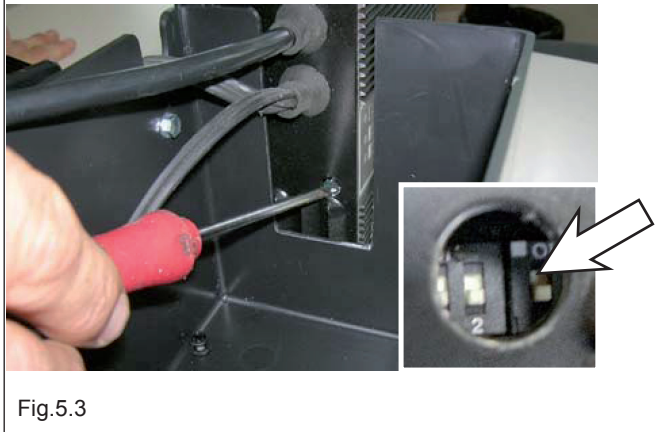
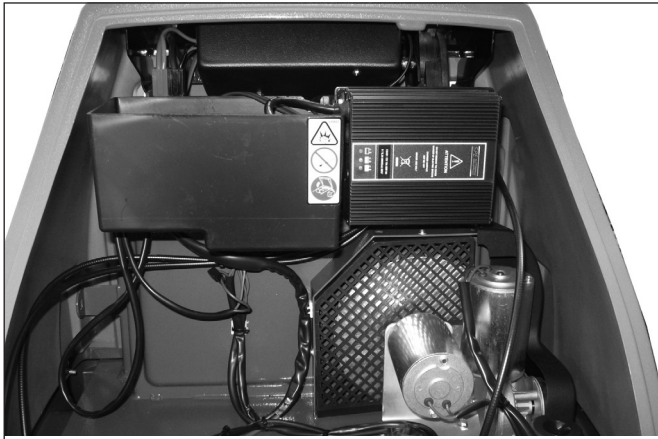
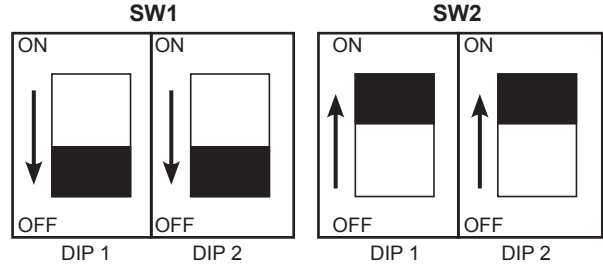


Fig.5.3

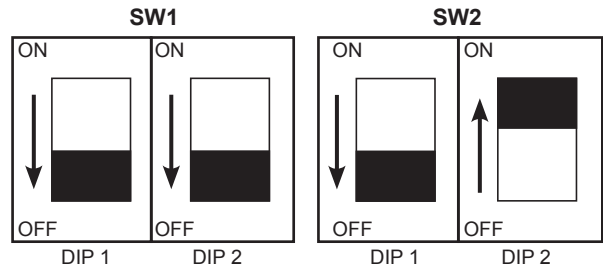
5.3 -CHARGER SETTINGS

IMPORTANT: The on-board battery charger is factory set to accommodate a SEALED (GEL) battery. To use a WET (lead acid) battery with the machine, the charger's internal dip-switches must be reconfigured as shown below. Failure to follow these instructions will result in battery damage.

WET (lead acid) BATTERY DIPSWITCH PANEL CONFIGURATION



SEALED (GEL) BATTERY DIPSWITCH CONFIGURATION



The DIP switches are located behind the round black cover (See Fig. 5.3).

5.4 -CHARGER TROUBLESHOOTING AND ERROR CODES

INDICATION	MEANING
Steady red LED light	First normal charging phase
Steady yellow LED light	Second normal charging phase
Steady green LED light	Charging terminated or maintenance phase
ANOMALIES	
Blinking yellow LED light	Either the wrong battery or it is not connected or there is a short circuit in output
Blinking red LED light	Safety timer exceeded, internal short circuit
INITIAL TEST	
Green LED with two blinks	Battery charger configured for charging Gel or AGM batteries
Red LED with two blinks	Battery charger configured for charging lead-acid traction batteries

5.5 -FILTER MAINTENANCE

Cleaning the filter

The filter is one of the machine's main components. It is essential to achieve the best results from your machine. If you notice that dust forms when the machine is at work, check the filter.

The filter is cleaned as follows:

Press and release the lever of the appropriate filter shaker pos.7 Fig. 3. The lever operates a rod that will unclog the filter. Repeat this operation 5 or 6 times.

ATTENTION: the filter features an arrow that shows you the direction in which it should be fitted (4 Fig.6).

Dusty environments

If you are using the machine in a particularly dusty environment it is wise to use the filter shaker more frequently.

Replacing the filter

Every 200 hours of work, the filter must be replaced.

Follow the fig.6:

- open the handles **1**
- turn of 180° the holders **2**
- replace the filter **3**
- arrow **4** must follow the air flow "from the external to the internal of the machine"

After the filter has been assembled, make sure the gasket and filter are dust tight.

WASTE MUST BE DISPOSED OF IN ACCORDANCE TO THE LAW.

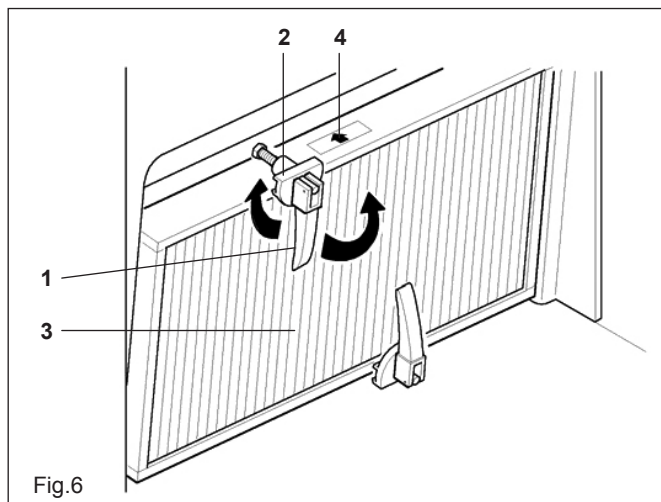


Fig.6

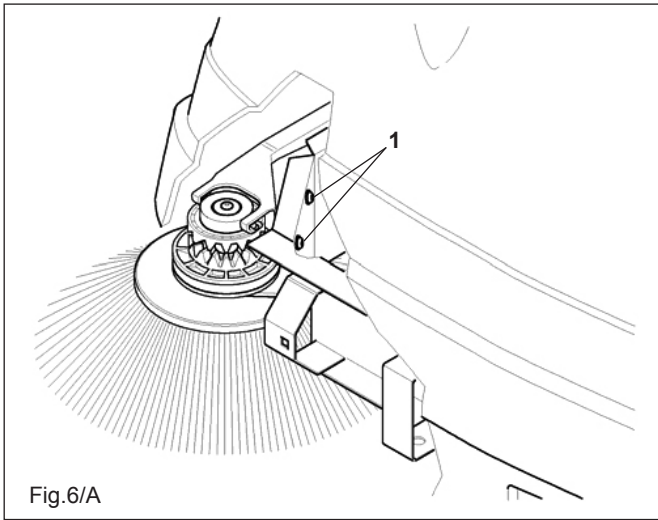
5.6 -REPLACING AND ADJUSTING THE SIDE BRUSH

Replacing

After lifting the front part of the machine, replace the side brush by removing the brush fixing screw Fig. 2, and removing the brush. Replace the brush and secure the new one in place with the screw and its washer.

Adjusting

The side brush is adjusted by slackening the screws pos.1 Fig.6/A and using the slots to position the brush at the required height. Once you have positioned it, tighten the two screws.



5.7 -REPLACING AND ADJUSTING THE MAIN BRUSH

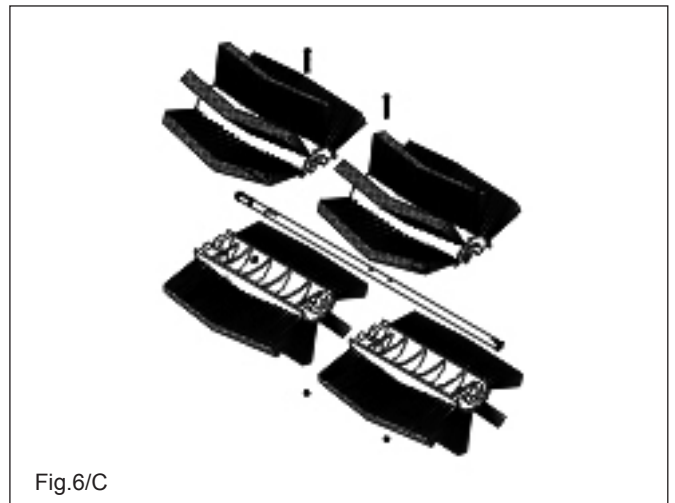
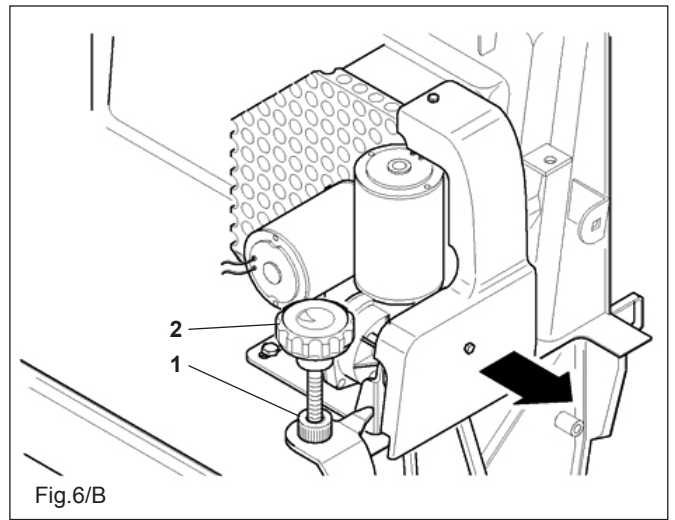
Replacing (Fig.6/C)

To replace the main brush, remove the front bin and slacken the four fixing screws to remove the brush.

When mounting a new brush, pay attention to the direction in which the brush will spin: it must direct dirt toward the centre of the machine.

Adjusting (Fig.6/B)

To adjust the main brush, remove the top guard, slacken the lock nut pos.1 Fig.6/B and turn adjusting handle pos.2 Fig.6/B in the direction required (counter clockwise to increase pressure). Once the brush has been adjusted, tighten the lock nut again.



5.8 -REPLACING AND ADJUSTING THE BELTS

To prepare the machine for belt replacement, carry out the following operations:

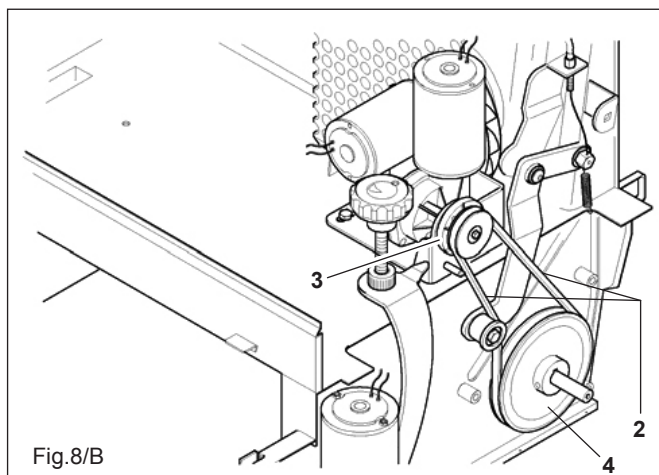
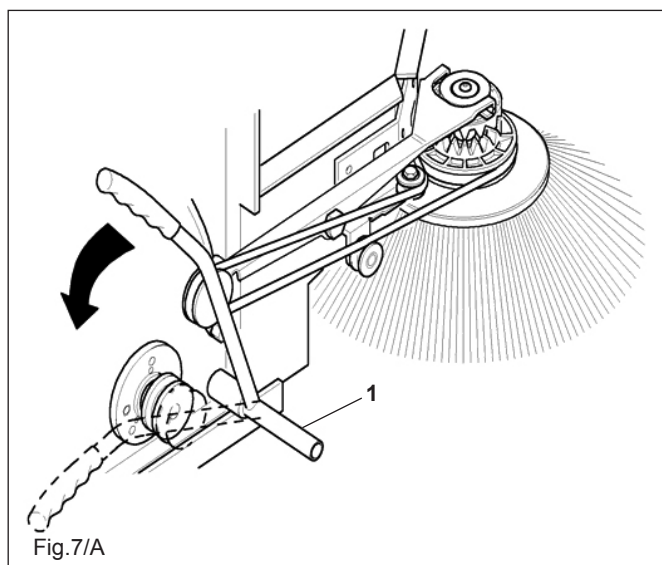
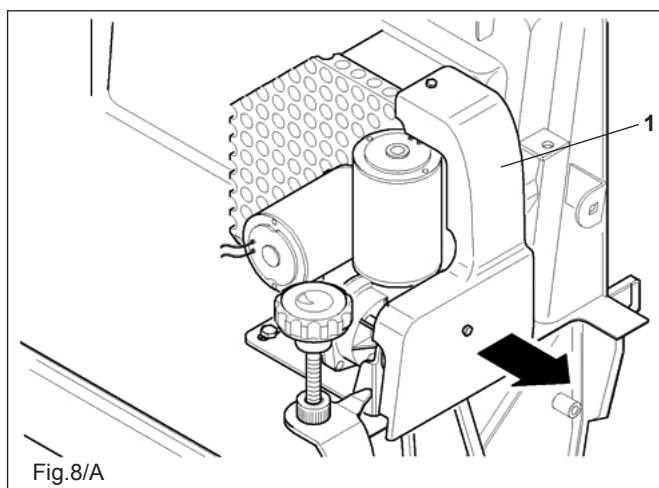
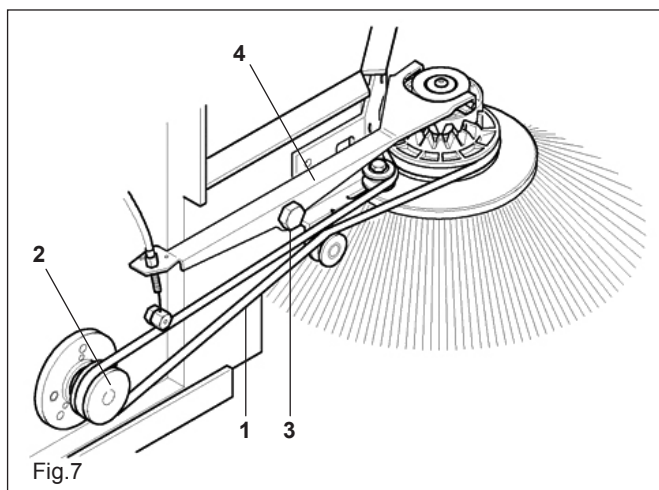
- remove the top cover and the front bin.

5.8.1 -Replacing the side brush belt

- Remove the right wheel, screw out the screws that fix the bumper and the lateral right guard and remove them. Once the machine is disassembled, proceed with the substitution of the broken belt.
- Remove belt pos.1 Fig.7 from pulley pos.2 Fig.7.
- Loosen fixing pin pos.3 Fig.7 and let the hooks of side arm pos.4 Fig.7 come out of the idle toothed ring.
- Remove belt pos.1 Fig.7 from side arm pos.4 Fig.7.
- Replace the belt.
- Hook side arm pos.4 Fig.7 to the idle toothed ring.
- Tighten pin pos.3 Fig.7.
- Using the key cod. 9001451 (not included in the supply) stretch the belt pos.

5.8.2 -Replacing the drive belt

- Remove the left wheel, screw out the screws that fix the bumper and the lateral left guard and remove them. Once the machine is disassembled, proceed with the substitution of the broken belt.
- Remove the guard pos.1 Fig.8/A.
- Remove belt pos.2 Fig.8/B.
- Insert the new belt on the pulleys pos.3-4 Fig.8/B.



5.9 -REPLACING THE FLAPS

5.9.1 -Outer side flaps

To replace the side flaps pos.1 Fig.9, remove the rear wheels and the relevant side guards. Loosen the screws that secure the flaps to frame pos.2 Fig.9 and replace the old flaps with new ones.

5.9.2 -Inner side flaps

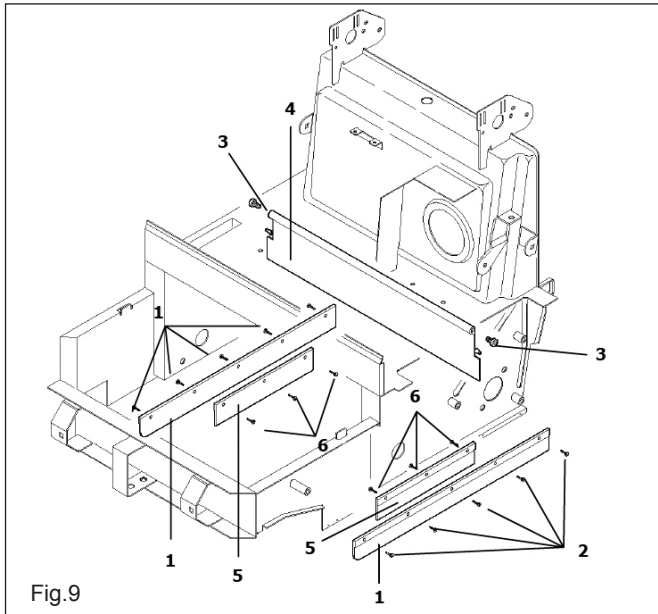
To replace the inner side flaps pos.5 Fig.9, lift the front part of the machine and loosen screws pos.6 Fig.9 that secure the flaps to the frame. Replace the old flaps with new ones.

5.9.3 -Center flaps

- Remove the rear wheels and the relevant side guards.
- Remove the rear door.
- Loosen the two flap fixing pins pos.3 Fig.9, located on the sides of the frame.
- Grasp flap pos.4 Fig.9 and pull it outwards.

Remounting:

- Fit the flaps in the same direction in which they are removed.
- Insert the two references in their holes.
- Tighten the two fixing pins and reassemble the machine.



5.10 -REPLACING THE TRACTION CABLE

5.10.1 -Remove the traction cable as follows

To replace the traction cable proceed as follows:

- Remove the upper bonnet of the machine.
- Loosen the security dowel located on the cable fixing pin.
- Pull the cable out of the fixing pin and remove the adjusting screw mounted on the handle.

To remount the cable:

- Fit one end of the cable into the adjustment screw of the handle (i.e. the end without the blocking ball).
- Insert the cable into its sheath.
- Hook the blocking ball to the handle.
- Slot the cable through the turned adjustment screw secured to the machine frame and then through the fixing pin.
- Tighten the security dowel.

The position of the cable is adjusted by acting on the two adjustment screws.

5.10.2 -Replacing the side brush lifting cable

To replace the side brush lifting cable, proceed as follows:

- Remove the upper bonnet and the front bin of the machine.
- Remove the front bumper, the right wheel and the right hand side guard.
- Loosen the cable clamp.
- Loosen the security dowel on the fixing pin.
- Remove the handle from the support and open it up.
- Pull the cable out of the two sheaths.

To remount the cable:

- Put the cable inside the handle.
- Close up the handle and fix it to its support.
- Insert the cables into their sheaths.
- Secure one end of the cables in place with the clamp and the other end with the fixing pin.

The position of the cable is adjusted by acting on the two adjustment screws.

6.2 -TROUBLESHOOTING

FAULT	CAUSE	REMEDY
The main brush is not spinning	The belt is broken	Replace
	The reduction gear has burnt out	Rivolgersi al centro assistenza
	A wire is detached	Rivolgersi al centro assistenza
The side brush is not spinning	The belt is broken	Replace
The battery does not stay charged	The liquid is insufficient (for lead acid battery)	Top up
	The terminal is loose	Tighten
Dust given off while the machine is in operation	The filter is broken	Replace
	The filter is in the wrong position	Position correctly
	The gaskets are worn	Replace
The brushes wear out too quickly	The brushes are too low	Adjust
Dust given off while the machine is in operation	The flaps are worn	Replace
	Clogged filter	Clean
The vacuum motor does not work	The motor has burnt out	Contact service center
	The wire is disconnected	Contact service center
The machine does not come on	The battery terminals are disconnected	Check
	The battery is discharged	Recharge

NOTE

In case of other malfunctions, contact the Authorized Service Center

6.3 -SCRAPPING THE MACHINE

In the event the machine must be scrapped, please remember that batteries are not common waste materials. They must be disposed of in accordance with the relevant laws. The machine is composed of different parts. Dismantle it and prepare the waste for disposal in accordance to their type.

**DO NOT USE THE SCRAP PIECES AS SPARE PARTS.
KEEP SCRAPS OUT OF REACH OF CHILDREN.**



DECLARATION OF CONFORMITY FOR MACHINERY



EN

(according to Annex II A of the Machinery Directive)

We: **TENNANT N.V.**
Address: Industrielaan 6 5405 AB
P.O.Box 6 5400 AA
Uden - THE NETHERLANDS

Herewith declares, on our own responsibility, that the machinery

S8 SWEEPER WALKBEHIND EU

- is in conformity with the provisions of the Machinery Directive (2006/42/EC), as amended and with national implementing legislation
- is in conformity with the provisions of the Electro Magnetic Compatibility Directive 2004/108/EC
- is in conformity with the provisions concerning noise emission for outdoor use (Directive 2000/14/CE) and with national implementing legislation -

and that

- the following harmonized standards or parts of these standards have been applied: EN ISO 14121-1, EN 1037, EN 60335-1, EN 60204-1, EN ISO 13849-1, EN ISO 13849-2, EN 60529, EN ISO 4413, EN 349, EN 55012, EN 61000-6-2, EN ISO 11201, EN ISO 4871, EN ISO 3744*, EN ISO 13059*, EN ISO 3450, EN 60335-2-72.
- the following national standards or parts of these standards have been used:

Uden 21-10-2011

Mark Morrison
Director of International Operations

*if applicable