



TAMMIHOLMA PREMIUM

KÄYTTÖOHJEET / MANUAL EN



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Important!



This symbol attracts attention to important safety regulations which must be applied to avoid injury or damage to your property or that of others.

Before starting work with your motor-sweeper, read all the instructions in this manual and the engine manual carefully, and follow them to the letter.

For optimum efficiency and the longest machine working life, comply in full with the routine maintenance table.

Thank you for your preference; please do not hesitate to contact us for any requirements



Caution!

1. **This machine is intended for use as a sweeper only. We therefore accept no responsibility for any damage deriving from its use for any other purpose. All risks are for the user's account.**
2. **This motor-sweeper is not suitable for sweeping toxic substances. It is a U class machine.**
3. **The motor-sweeper must only be used by trained and authorised personnel.**
4. **Always park the motor-sweeper on a surface on which it stands perfectly stable.**
5. **Keep all bystanders, and particularly children, well clear of the motor-sweeper when in use.**
6. **Make sure that the motor is stopped before opening the bonnet.**
7. **When transporting the sweeper make sure that it is well secured to the vehicle.**
8. **Refuse disposal must be carried out in accordance with national laws.**

PRELIMINARY INFORMATION



Caution!

Highlights procedures to be complied with in order to avoid damage to the machine and the creation of hazards.



Danger!

Highlights the presence of hazards which cause residual risks requiring attention from the operator in order to prevent injury and/or damage.

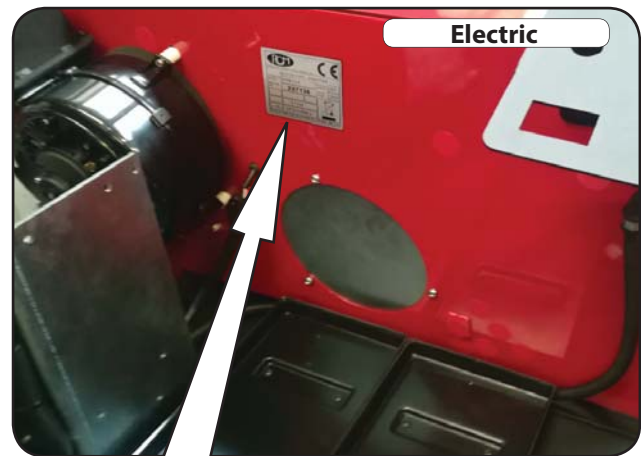
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GENERALITIES (FIG.1)

Data for motor-sweeper identification

Motor-sweeper type plate



CALLING IN THE AFTER-SALES SERVICE

Before calling in the after-sales service, make a careful analysis of the problems and their causes. When calling, please state:

- Hours of operation.
- Serial number.
- The details of the defects encountered.
- The checks carried out.
- The adjustments made and their effects.
- Alarms displayed (in the case of electronic management).
- Any errors of use.
- Any other relevant information.

Always contact the authorised service network only.

SPARE PARTS

When replacing parts, use only ORIGINAL SPARE PARTS, tested and approved by the manufacturer. Never wait until the components are worn out by use; replacing a component at the right time means better machine performance and gives savings, since more serious damage is avoided.

TECHNICAL FEATURES (1/3)

Versions		Atom.3 H (petrol)	Atom.3 E (electric)
PERFORMANCES			
Max. cleaning capacity (with 2 side brushes)	m ² /h	7315	
Cleaning width Main brush	mm	700	
Cleaning width Main brush + Right side brush	mm	990	
Cleaning width Main brush + 2 side brushes	mm	1330	
Max. transfer speed	Km/h	6	
Max. reverse speed	Km/h	4	3
Max. working speed	Km/h	5,5	
Max. working gradient	%	15	
Max. gradient	%	18	
NOISE LEVEL (EN ISO 11201/2010)			
Sound pressure level in operating position	dB(A)	78	71
VIBRATION (EN ISO 13754/2008)			
Frequency weighted acceleration value	m/s ²	< 0,5	
BRUSHES			
Main brush (length)	mm	700	
Side brush (diameter)	Ømm	430	
DUST VACUUM SYSTEM			
Fan	nr./type	1/centrifugal	
Fan diameter	Ømm	230	250
Suction cut-off	type	mechanical	electric
DUST FILTERING SYSTEM			
Filtering system	nr./type	6/cartridges	
Filtering surface	m ²	6	
Filtering material	type	cellulose	
Dust filtering shaker with automatic closing	nr./type	1/electric 12V	1/electric 24V
REFUSE CONTAINER			
Refuse container capacity	L	95	
Refuse container emptying	type	manual	
STEERING			
Steering wheel		on front wheel	
Minimum "U"-turn space	mm	2370	
DIMENSIONS			
Machine dimensions (Lu x La x H) "without brushes"	mm	1460 x 1015 x 1220	
Packing dimensions (Lu x La x H)	mm	1660 x 1070 x 1418	



TECHNICAL FEATURES (2/3)

Versions	Atom.3 H (petrol)	Atom.3 E (electric)
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ELECTRIC MOTORS

Drive motor:

Model	type		MRP9D
Nominal power	rpm		140
	nr./V/W		1/24/400

Suction motor:

Model	type		EVC004
Nominal power	rpm		2900
	nr./V/W		1/24/130

Main brush motor

Model	type		S114SE
Nominal power	rpm		2800
	nr./V/W		1/24/400

RH Side brush motor

Model	type	AOMP140	AOMP140
Nominal power	rpm	75	80
	nr./V/W	1/12/90	1/24/60

Total power	W	90	990
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BATTERY

Quantity and capacity of the battery	nr./V/Ah		2/12/118 (1)
			4/6/205 (2)
12V-118Ah Battery dimension (length x width x height) (1)	mm		340 x 170 x 285
6V-205Ah Battery dimension (length x width x height) (2)	mm		244 x 190 x 274
Battery water	type		distilled
Autonomy (1)			2h 30'
Autonomy (2)			4h

Caution! Autonomy depends on the type of battery and the use of the machine

ENGINE

Make		Honda	
Model	type	GX 160	
Cylinders	nr.	1	
Bore	mm	68	
Stroke	mm	45	
Displacement	cm ³	163	
Max. Power	rpm	3600	
	KW/HP	3,6/4,8	
Max.setting power	rpm	2900	
	KW/HP	3,3/4,5	
Fuel consumption	L/h	1,4	
Cooling		air	
Oil sump capacity <i>Supply with oil..</i>	L	0,6	
	type	Q8 T400	
Fuel tank capacity <i>Supply with..</i>	L	3,1	
		unleaded petrol	
Autonomy		2h 10'	

TECHNICAL FEATURES (3/3)

Versions		Atom.3 H (petrol)	Atom.3 E (electric)
DRIVE			
Drive on wheel	position	front	rear
TRANSMISSION			
Transmission system	type	hydraulic	electric
WHEELS			
Front and Rear	Ømm	250	250
BRAKES			
Service and Parking brake	type	mechanical	
SUSPENSION			
Front and Rear	type	rigid	
WEIGHT			
Machine weight in working condition without operator	Kg	300	285
Battery weight (1)	Kg		75
INSTRUMENTS			
Battery warning light			√
Electronic control unit alarm diagnostic LED			√
STANDARD EQUIPMENT			
Service and Parking brake		mechanical	
Side brushes with electrical gear-motors		√	√
Side brushes swinging arm		√	√
Main brush driving control		mechanical	electric
Side brushes driving control		electric	
Main brush and side brush/es lifting		mechanical	
Filter shaker		electric	
Suction cut-off		mechanical	
Liftable flap		√	√
LED flashing lights		√	√
Horn		√	√
Reverse warning signal			√
Cellulose dust filters		√	√
Side brush resettable fuse		√	√
Front LED light assembly		√	√
Choke		√	
Easy Handle (refuse container unlocking system)		√	√
4 fixing points for transport		√	√
Brush and suction motors timed shutdown			√
Side roll-bumpers		√	√
OPTIONALS			
Left side brush		√	√
Vaccum cleaner kit			√
Polyester dust filter		√	√
Reverse warning signal		√	
Front dust conveyor		√	√
On-board battery charger			√
Pails for refuse container		√	√
Hourmeter		√	√

CONTROLS AND COMPONENTS (FIG.3)

(1A) Suction shut-off and filter shaking lever (petrol vers.)

1B) Suction shut-off and filter shaking button (electric vers.)

It serves to shut off suction on wet floors and to activate the filter shaker motor.

- A = Suction ON
- C = Suction shut OFF
- V = Filter shaker on

(2) Main brush lifting/lowering lever

It serves to:

- Pull this lever up, to raise the main brush for sweeper transfer purposes or when you finish work.
- Push the lever down to lower the main brush to start sweeping.
- The lever features an adjuster to regulate the height to which the brush is lowered and compensate for brush wear (see maintenance" - Main brush – Adjusting the main brush).

- A = Brush DOWN
- S = Brush UP

(3) Starter key-switch

(petrol sweeper)

The position for the starter key-switch is:

- 0 = Engine stopped, key can be removed.
- 1 = Electric system energised.
- 2 = Starter motor engaged.



Caution!

Never leave the key in the position 1 when the engine is not running.

(electric sweeper)

The position for the starter key-switch is:

- 0 = Engine stopped, key can be removed.
- 1 = Electric system energised.

(4) Choke

(petrol sweeper)

Facilitates starting from cold, particularly in cold weather. Use the choke always when starting a cold engine (see Fig.6).

(5) Brushes motor button

Operate this button to switch on the main and side brush motor.

- Pos.A = The brushes do not turn
- Pos.B = Turning of the main and side brushes

(6) Side brush lifting/lowering lever

it serves to:

- Lift the side brush for sweeper transfer purposes or when you finish work.
- Lower the side brush to start sweeping.
- Adjust the side brush when it is worn (see "Maintenance" - side brush - adjust teh side brush)

- A = Brush DOWN
- S = Brush UP

(7) Drive pedal

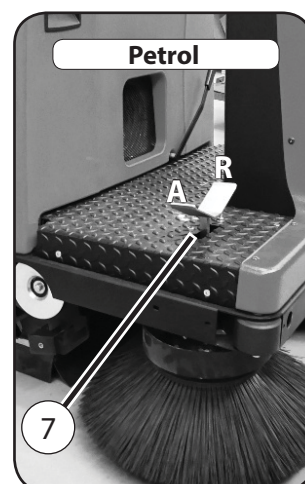
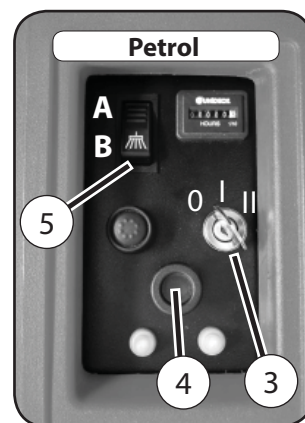
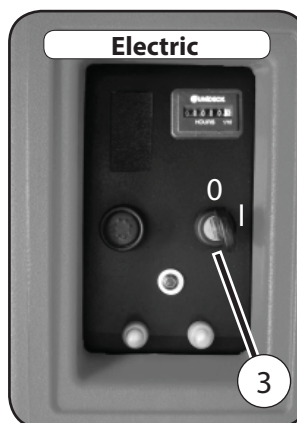
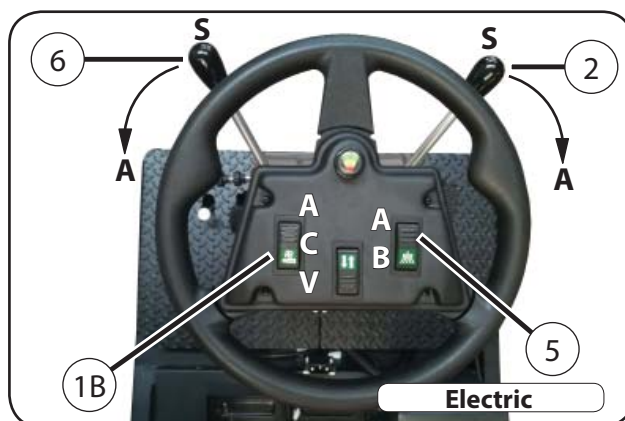
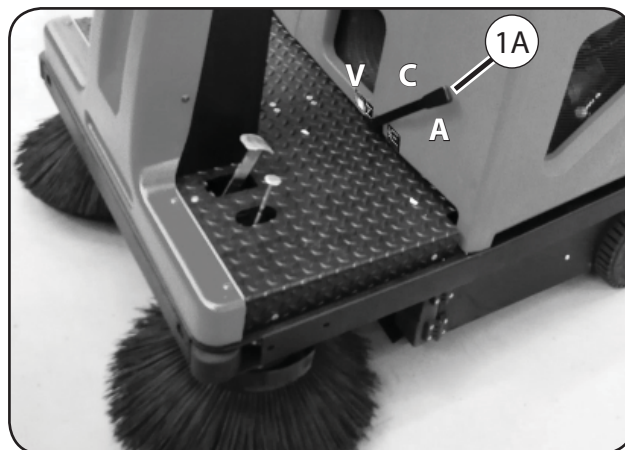
The pedal controls the speed of the sweeper.

(petrol sweeper)

- Direction A = FORWARD
- Direction R = BACK (reverse)

(electric sweeper)

Push on the switch 8, Fig.3 to select the direction of the sweeper. Act on pedal 7 for the transfer.



(8) Forward/reverse drive switch

(electric sweeper)

The switch 8 selects the direction of the sweeper FORWARD OR REVERSE.

- Position I = FORWARD
- Position II = BACK (reverse)
- Position 0 = Neutral

Act on pedal 7 for the transfer.

(9-11) Service brake pedal and parking brake handle

The pedal and lock ball grip operate the service brake and parking brake respectively.

Press down on pedal 9 to apply the brake block to the rear wheels. Apply the lock handle 11 to hold the brake on to park the machine. For brake adjustment see chapter "Service and parking brakes".

(10) Flap lifting pedal

Press this pedal down to lift the front flap in order to pass it over rubbish. Which would otherwise be pushed in front of the machine

(12) Battery charge indicator

(electric sweeper)

This indicator lights 12 show the current condition of charge of the batteries. The colour of the indicator changes from green to yellow to red as the level of battery charge diminishes.

- GREEN LIGHT = batteries fully charged
- YELLOW LIGHT = batteries partly charged
- RED LIGHT = batteries discharged

(13) Horn button

Press on button 13 to operate the horn.

(14) Hour meter (optional)

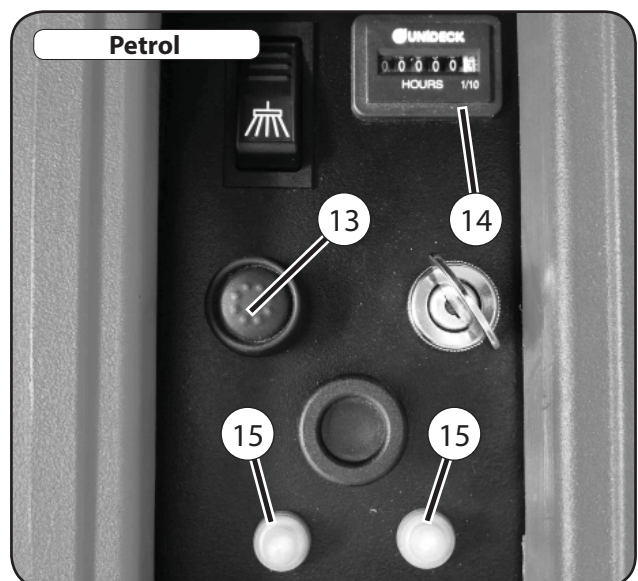
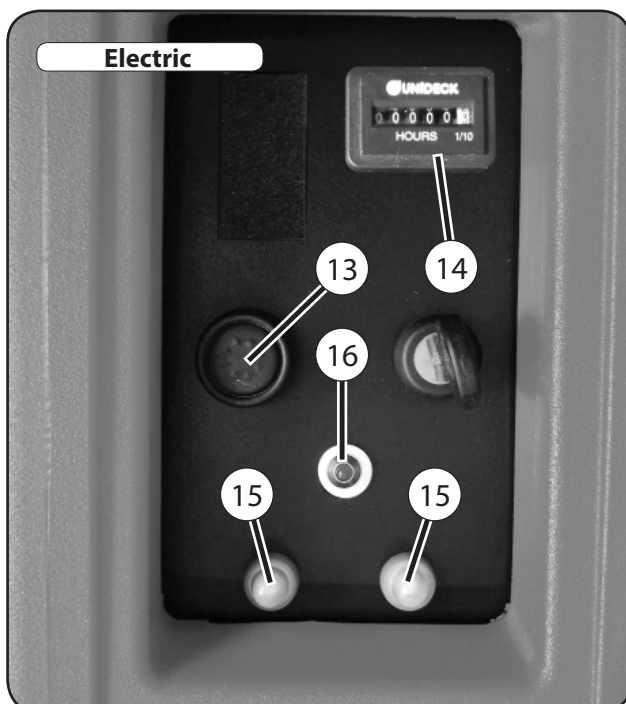
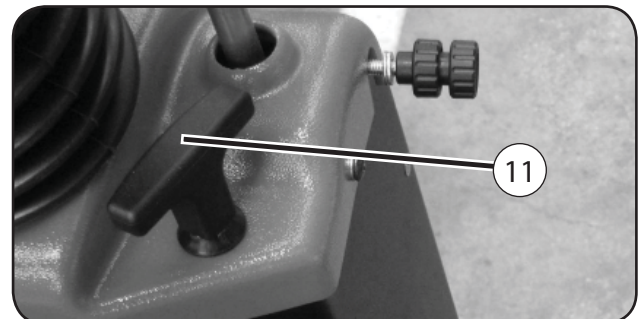
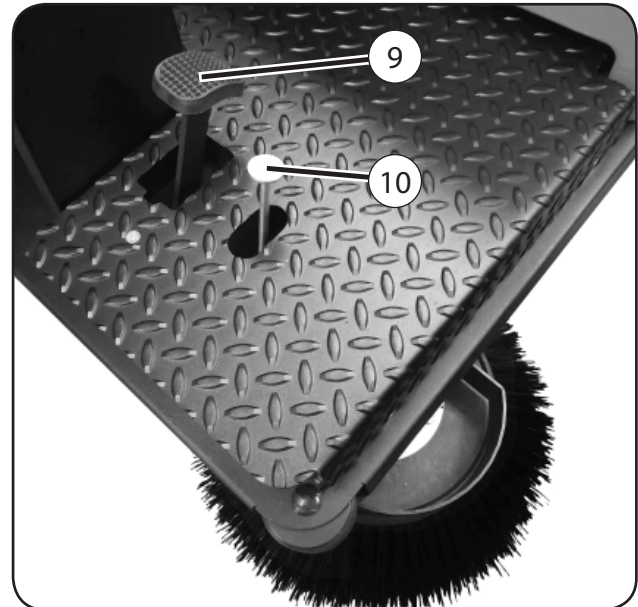
It indicates the number of worked hours.

(15) Resettable fuses for side brushes

The resettable fuses are used to protect the electrical system and the brush motors; incorrect operation of the motors or incorrect manoeuvres by the operator can cause the fuses to be cut out. Reset the fuses by pressing on them.

(16) Electronic control unit diagnostic LED

The flashes of the LED indicate the anomalies of the machine. See "ALARM DESCRIPTION" LED diagnostics.



GENERAL SAFETY REGULATIONS



The machine described in this manual has been constructed in accordance with the Machinery Directive 2006/42/EC. The person in charge of the machine is responsible for complying with directives and local regulations on the working environment to ensure the health and safety of operatives. Always perform the preliminary checks before starting the machine.



Caution!

The machine may only be used by the authorized operator. Avoid the use of the machine by unauthorized persons.

Never carry out modifications, transformations or applications on the machine which might impair its safety.

Before switching on and starting up the machine, check that its operation will not put anyone in danger.

Never work in any way which may impair the stability of the machine.

It is obligatory to wear protection gloves and glasses while working in outdoor areas in case of low temperature or with oil topping up, etc.



Danger!

Apart from the regulations envisaged, the person in charge of the machine must inform the operators of the rules which follow:

- The fixed or moving housings and safety devices including hood and seat support must always be left in place, correctly secured.
- If the housings are removed, or the safety devices either disconnected or short-circuited, for any reason, they must be restored before the machine is put back into operation.
- Only use the machine in technically correct conditions which conform to its intended use.
- Compliance with the intended use also requires operation in accordance with the instructions for use and maintenance, and the specified inspection and maintenance conditions.
- Use of the machine to suck up inflammable and/or toxic liquids and dusts is absolutely forbidden.
- Touching the moving parts of the machine is hazardous and absolutely forbidden. If access to these parts is absolutely necessary, first remove the key from the dashboard.
- The machine is not equipped with cabin, therefore it is prohibited to use it in dangerous areas and with toxic fumes and vapours.
- It is forbidden the transport of people further the operator.

OPERATING THE SWEEPER (FIG.4)

Precautions

- The motor-sweeper should only be used by competent and authorised personnel.
- Always remove the key and apply brake 9, (fig.3) when leaving the motor-sweeper unattended.
- Never park the motor-sweeper on a slope.

Perform the following checks before operating the motor-sweeper:
(petrol sweeper)

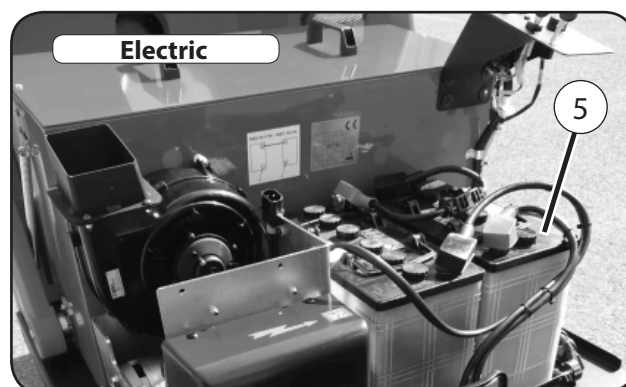
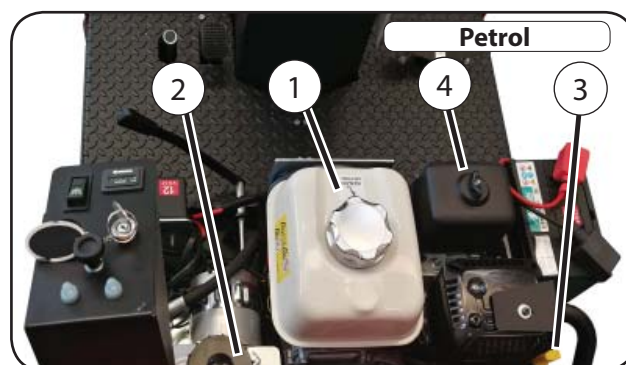
- Engine oil level 3.
- Engine air filter 4.
- Hydraulic fluid level 2.
- Fuel level 1.

(electric sweeper)



Caution!

Check the level of electrolyte in the batteries 5 before starting to use the sweeper.



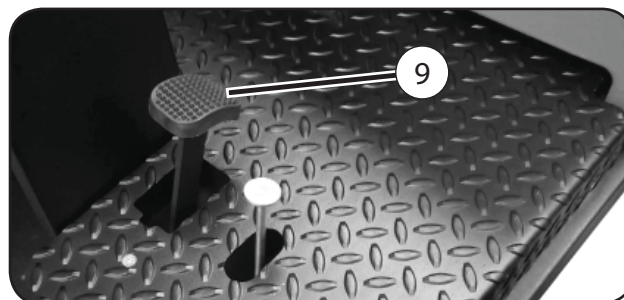
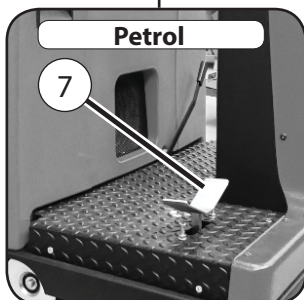
STARTING WORK (FIG.5)

Proceed as follows:

- Check that the brushes are raised off the floor (levers 2, 6).
- Release the brake pedal 9.
- Insert the key 3 in the key switch and turn it clockwise.

For the **"petrol version"**, see "starting the engine".

- **"Electric version"** Switch on the suction fan by the button 1 and main brush, side brush motors, pushing the button 5.
- Lower the main and side brushes by means of levers 2 and 6.
- **"Electric version"**, select the transfer direction of the machine by the switch 8.
- Press gradually on pedal 7.



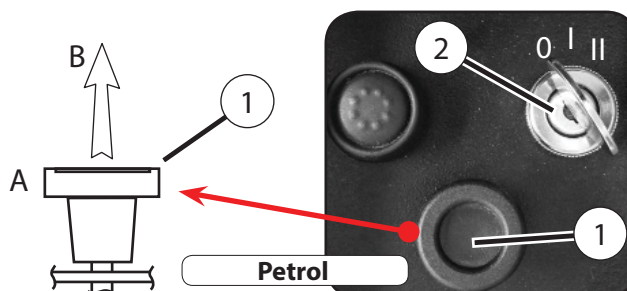
STARTING THE ENGINE "PETROL VERSION" (FIG.6)



Caution!

Make sure that the drive pedal 7, (fig.3) is in neutral.

- Pull the starter 1 to pos.B.
- Also apply the STARTER to start the engine when it is hot!
- Turn the starter key 3 to position II and hold it until the engine starts.
- Leave the key return to position I as soon as the engine starts.
- Gradually return the choke to OFF (position A) as the engine warms up.



Caution!

Do not use the electric start for longer than 5 seconds each time. If the engine does not start, release the switch and wait 10 seconds before trying the starter again.

STARTING THE SWEEPER

- Press on pedal 9, fig.3 and release handle 11 (Fig.3) from its notch to disengage the brake.

(Petrol version)

- Press on the right side (pos. A) of the drive pedal 7, fig.3 to move forward.
- Press on the left side of the same pedal to move backwards.

(Electric version)

- Push on the switch 8, fig.3 to select the direction of the sweeper. Act on pedal 7 (fig.3) for the transfer.

Position I = FORWARD,
Position II = BACK (reverse),
Position 0 = NEUTRAL

Switching off the engine

- Turn the ignition key to position 0.
- Apply the parking brake lock (see "parking brake" chapter).
- Lift the main and side brush of the floor.

REGULATIONS TO BE FOLLOWED DURING OPERATION

- Never sweep up ropes, wire, straps, water, etc.
- To pick up large but light objects (such as paper, leaves, etc.), raise the front flap of the machine by the pedal 10, fig.3 slightly for just the time necessary to sweep the objects up.
- Shake the filters from time to time using the lever 1A (petrol sweeper) and button 1B (electric sweeper) on pos. V fig.3.
- If the ground to be swept is wet, shut off the vacuum using the same lever 1A or button 1B on pos. C, fig.3 as otherwise the vacuum filter may be clogged.
- Never pick up glowing cigarette ends or red hot material.
- In presence of a lot of dust it is need to execute afirst phase of cleaning using the main brush only.
- Do not allow outsiders to approach the machine,especially children.
- The machine must only be used by operators authorised by the person in charge of the machine, who are familiar with the contents of this manual.
- These operators must be physically and mentally suitable, and must not be under the influence of alcohol, drugs or medication.

Make sure that:

- There are no foreign bodies (such as tools, rags, equipment, etc.) on the machine;
- The machine does not make strange noises after switch-on; in this case, stop it immediately and trace the cause;
- All safety housings are properly closed, hood and seat support included.

Maintenance regulations

During cleaning and maintenance of the machine or the replacement of parts, always switch off the motor. Do not use naked flames, do not cause sparks and do not smoke close to the fuel tank when the filler cap is open, and close to the batteries during charging. Remove the starting key.



Caution!

All maintenance, overhaul or repair work must only be carried out by specialised staff or an authorised service centre.

MAINTENANCE (FIG. 7 - 8 - 9 - 10)

(Petrol version)

Engine

Carefully follow the instructions in the HONDA GX 160 OPERATING AND MAINTENANCE manual for all engine maintenance operations.

Always check the oil level in the engine before starting it up, using the dipstick 3, fig.4.

Drain the engine oil from the sump drain hose (fig.7) every 50 hours work and refill with clean oil.



Caution!

Change the engine oil initially after the first 5 hours work.

If the engine oil level drops below the minimum, a device inside the engine cuts out the spark to the plug and stops the engine. If the engine stops unexpectedly, check the oil level and top up if low.

Cleaning and replacing the engine air filter element

Check that the air filter element 1, fig.8 are in good working order every time you use the motor-sweeper. Clean the element 1, every 25 hours work.



Caution!

Clean the air filter elements more frequently if you are working in particularly dusty areas.

Follow the instructions in the HONDA GX 160 OPERATING AND MAINTENANCE manual to clean the filter elements.

(Electric and petrol version)

Side brush

The side brush sweep dirt from the edges of floors and from corners, and direct it to the centre of the sweeper where it can be picked up by the main brush.

Adjusting the side brush

Check that the shape of the trace "T" left by the side brush, as shown in picture.

As the bristles of the side brush wear down, adjust the height of the brush from the floor to maintain this trace.

Proceed as follows to adjust the side brush:

- Slacken off nut 3, fig.9.
- Turn the knob 2 anticlockwise until the trace "T" left by the side brush is as shown in figure.
- Retighten the nut 3.
- Run the brush and check it if works and leaves a trace "T".

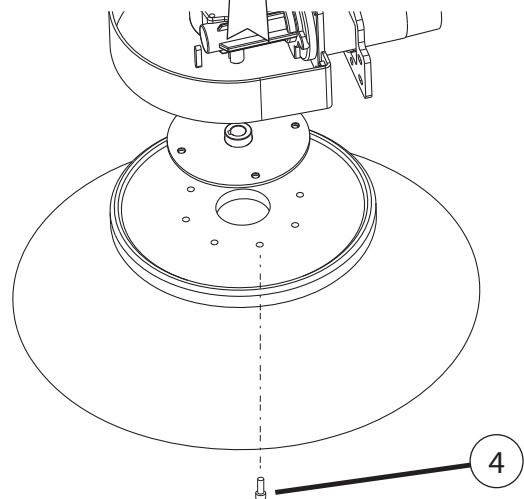
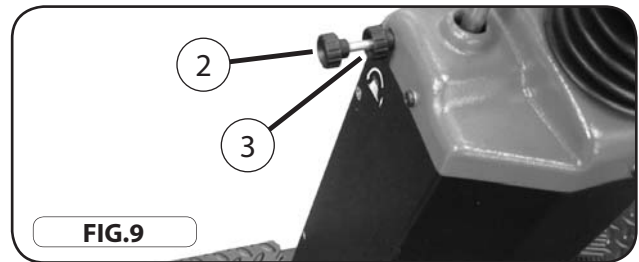
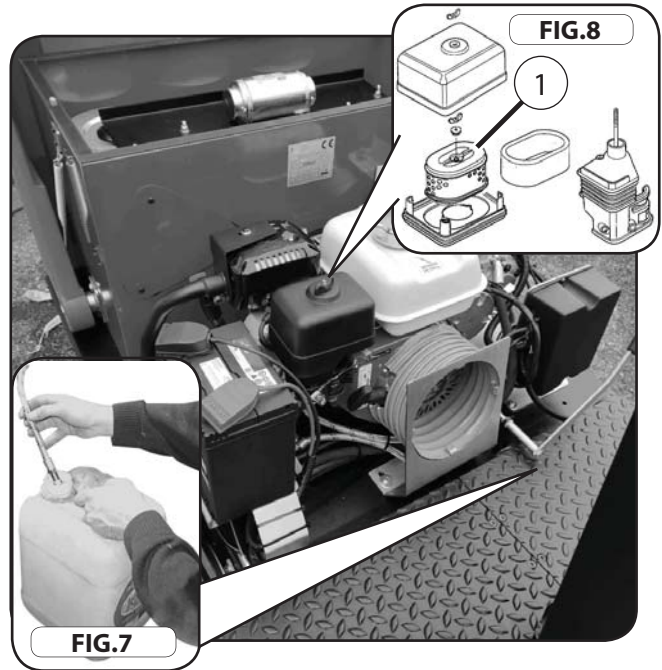
Replacing the side brush

- Remove the three bolts 4, fig.10 which fix the brush to the hub, and remove the old brush.
- Fit a new brush and adjust for height.



Caution!

when the motor-sweeper is at rest, the side brush must always be lifted above the ground to avoid deformations (bending of the brush's bristles).



MAINTENANCE (FIG.11 - 12)

Main brush

The main brush sweeps dust and refuse into the bin at the rear of the motor-sweeper.



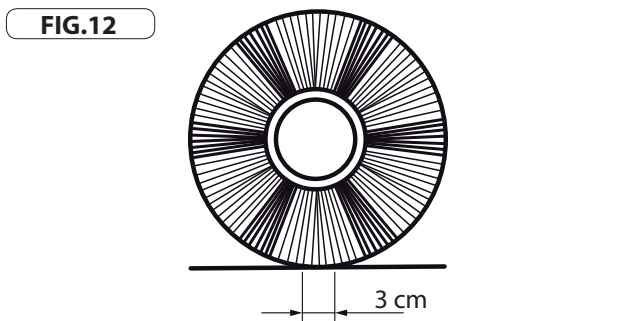
Caution!

Never sweep up string, wire, etc., which can become entangled in the brush and damage the bristles.

Adjusting the main brush

The main brush is raised and lowered by lever 2, fig. 3. The main brush is mounted in a floating mechanism. The main brush should just touch the floor, leaving a trace 3 cm wide when it rotates (fig.12). If the main brush leaves lines of dirt, it has worn down and must be lowered. Proceed as follows to lower the main brush:

- Undo the nut 2, fig. 11.
- Turn the knob 1 anti-clockwise until the trail left by the main brush measures about 3 cm.
- Retighten thenut 2.
- Check the width of the trace as shown in fig. 12.



MAINTENANCE (FIG.13)

Checking tension and replacing the belt of the main brush

Every 100 - 150 hours work, check the condition of the primary brush drive belt 6.

Belt tension is registered by tensioner 5.

If the belt 6 is visibly worn fit a new belt as follows:

- Remove the right-hand side cover 1.
- Back off the belt stretcher 2 of the transmission belt 3 (petrol version).
- Remove the transmission belt 3 from the pulley 4.
- Back off the belt stretcher 5 of the main brush drive belt 6.
- Replace the main brush belt 6.
- Tension the belt 6 using the belt stretcher 5.
- Replace the belt 3 on the pulley 4.
- Tension the belt 3 using the belt stretcher 2 (petrol version).
- Replace the side cover 1.



Caution!

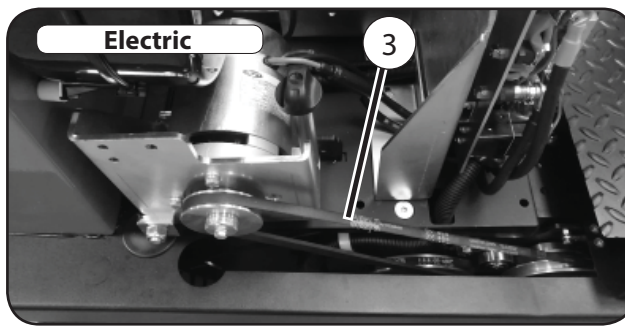
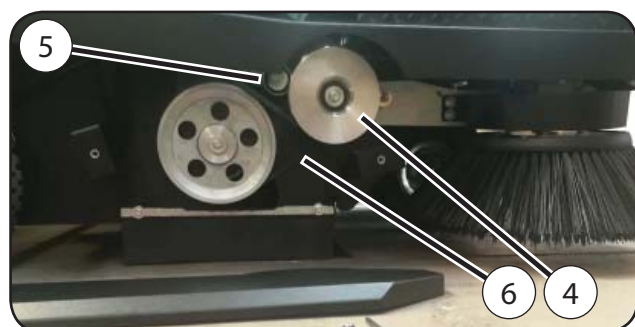
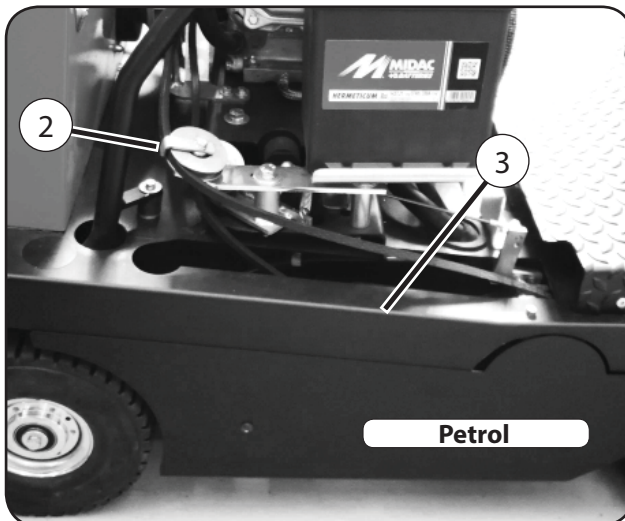
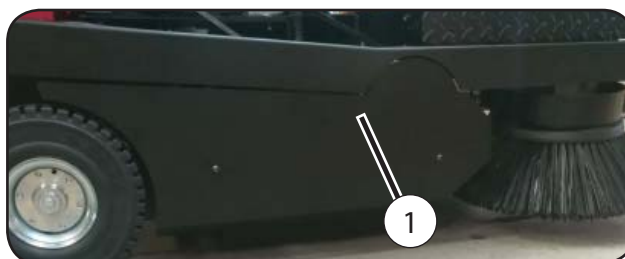
The belt tension must be set correctly! It must not be too taut as this will generate excessive loads.



Caution!

When the belt 6 is replaced, the brush drive belts 3 should also be checked.

If belts show signs of wear, replace them to avoid further down-times for more dismantling of parts.



MAINTENANCE (FIG.14)

Removing and replacing the main brush

The main brush can be removed from the left side of the motor-sweeper. Proceed as follows to remove and replace the main brush:

- Open the brush inspection hatch 1.
- Remove the brush protection (P).
- Remove cotter pin 2 by means of its cable and knob 5.
- Disconnect the drive lever and roller 3.
- Remove the brush 4.
- Fit the main brush and centre the notches with the fins on the right-hand side drive support.
- Fit the assembly 3 on the brush.
- Restore knob 5 and cotter pin 2.
- Fit the brush protection (P).
- Close the inspection hatch 1.



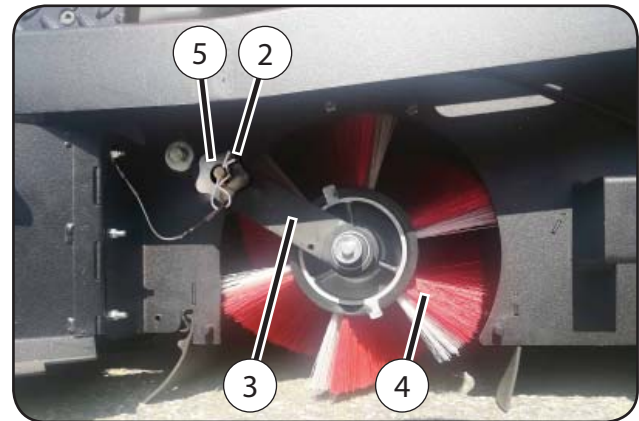
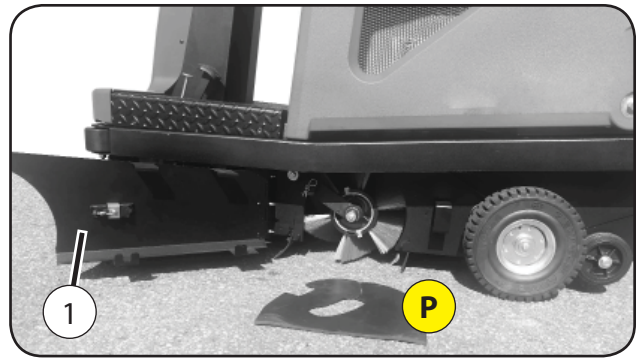
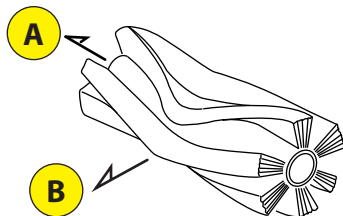
Caution!

Whenever the main brush is removed, remember to adjust the position of the brush to ensure perfect contact with the ground.



Caution!

When fitting the main brush, follow the assembly direction (see fig. "A" - "B").



MAINTENANCE (FIG.15)

Transmission belt

Every 40 working hours, check the belt 3A (electric machine) or 3B (petrol machine). If the belt is slack, tension it proceeding as follows:

Transmission belt tension (petrol machine)

- Back off the screws 2 of the belt stretcher 1.
- Move the belt stretcher towards the belt until the correct tension is obtained.
- Retighten the screws 2 of the belt stretcher.

Transmission belt tension (electric machine).

- Loosen counter nut 4 of the belt stretcher 1.
- Turn clockwise the belt stretcher to tension the belt 3A.
- Tighten counter nut 4.



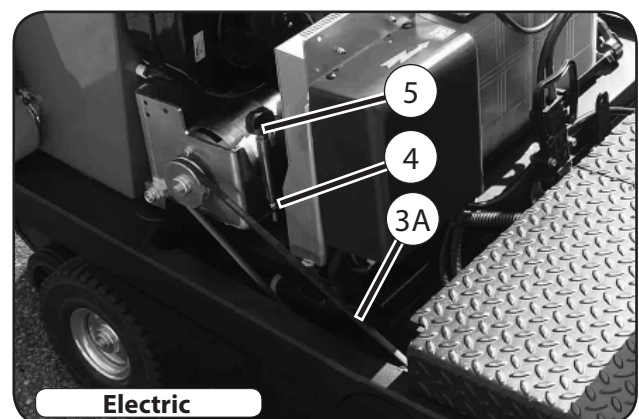
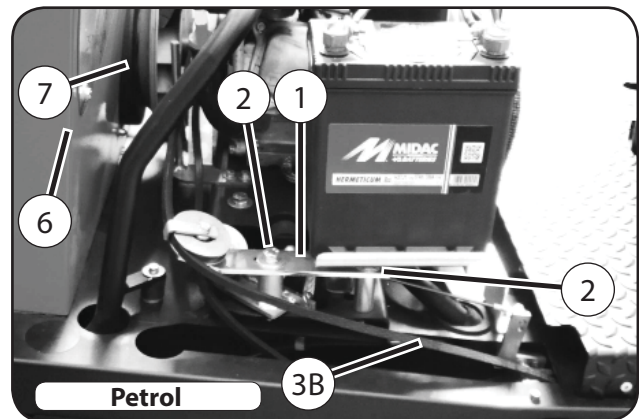
Caution!

The belt tension must be set correctly. It must not be too taut as this will generate excessive loads on the bearings.

Replacing the transmission belt

To replace this belt, proceed as follows:

- Lift the hood to reach the interior of the filter container 6.
- From inside the filter container, undo the screws which fix the fan centring conveyor 7 (petrol machine only).
- Back off the belt stretcher 5 (electric machine) 1 (petrol machine).
- Replace the belt 3A and 3B.
- Return the belt 3A and 3B to the correct tension using the belt stretcher 1 (petrol machine) and 5 (electric machine).
- Replace the fan centring conveyor 7 (petrol machine only).
- Low the hood.



MAINTENANCE (FIG.16)

Checking and adjusting the tension of the pump drive belt (petrol sweeper)

Every 40 hours work check the tension of the belt 1 which drives the pump.
Proceed as follows to tension the belt if it is too slack.

- Slacken off the bolts fixing the pump to its mounting bracket 2.
- Slacken off nut 3.
- Slacken off adjuster bolt 4 and slide the mounting bracket forwards to increase the tension of belt 1.
- Re-tighten nut 3 and bolts.



Caution!
Do not overtighten the belt. Excess tension can damage the pulley bearings.

Replacing the pump drive belt (petrol version)

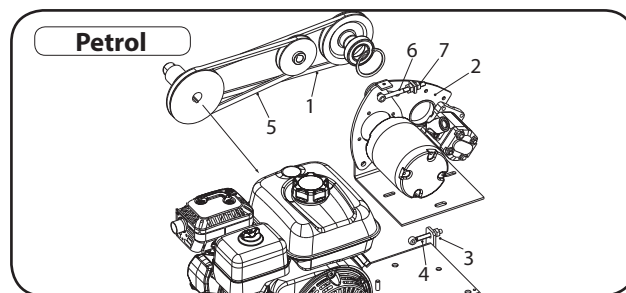
Proceed as follows to replace the pump drive belt:

- Lift the hood
- From inside the filter container, undo the screws which fix the fan centering conveyor 7 (fig.15A).
- Slacken off bolts..
- Slacken off nut 3 and slacken off adjuster bolt 4.
- Slide the pump mounting bracket 2 towards the motor.
- Remove belt 1.
- Insert the new belt over the suction fan and pump pulley.



Caution!
Take this opportunity to examine the condition of the brush drive belt 3B, (fig.15) and the dynamo belt 1 (fig.15A). Fit a new belt if any wear is visible to avoid having to repeat the same operations later.

- Tension belt 1, (see the section checking and adjusting the tension of the pump drive belt).
- Refit the conveyor 7 (Fig.15A) and low the hood.



Dynamo drive belt tension (petrol sweeper)

Every 40 working hours, check the dynamo drive belt 5. If the belt is slack, stretch it by proceeding as follows :

- Undo the lock-nut 6.
- Screw in the nut 7 and the dynamo unit will move, stretching the belt 5.



Caution!
Do not overtighten the belt. Excess tension can damage the pulley bearings.

Changing the dynamo drive belt (petrol sweeper)

Proceed as described in the « replacing the pump drive belt » section and stretch the belt as explained in the previous point « dynamo drive belt tension ».



Caution!
Do not overtighten the belt. Excess tension can damage the pulley bearings.

When the belt is replaced, the belts 1 and 3B (fig.15A) should also be checked.

DRIVE SYSTEM (FIG.17)

(petrol sweeper)

The motor-sweeper is driven by an internal combustion engine and a fixed displacement pump 1 in a combined mechanical-hydraulic drive system. Forward and reverse direction are selected by pressing on the different sides of drive pedal 7 (fig. 3).

(electric sweeper)

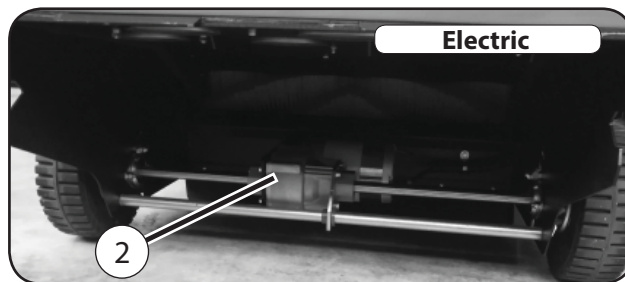
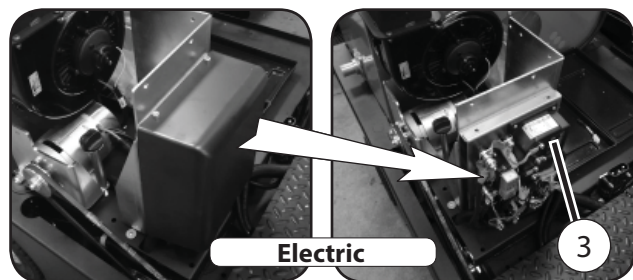
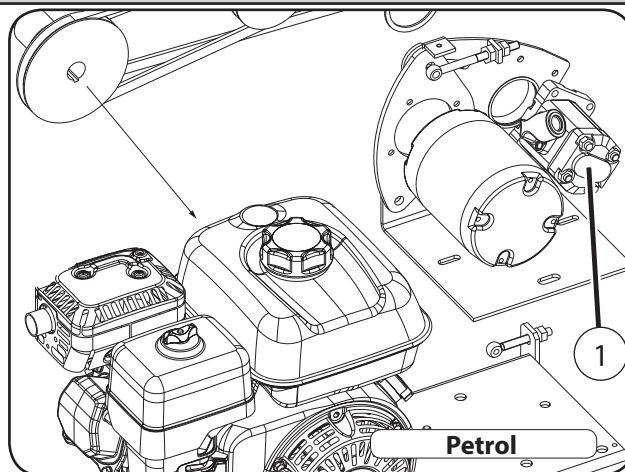
The motor-sweeper drive system comprises an electric motor 2, which drives the rear wheels and a control unit 3 which controls forward/reverse direction.

By pushing the switch 8 (fig.3) placed on the steering wheel, the operator selects the direction (forward or reverse) of the machine.

By pressing on the pedal 7 (fig.3) the speed of travel is chosen (from 0 to 6,5 km/h).



Caution!
For safety reasons the motor-sweeper only functions with an operator on board. An integrated microswitch under the seat detects the presence of an operator and activates the electrical circuits.



STEERING SYSTEM (FIG.18)

The motor-sweeper is steered by means of steering wheel 1.
The steering wheel requires no adjustment.

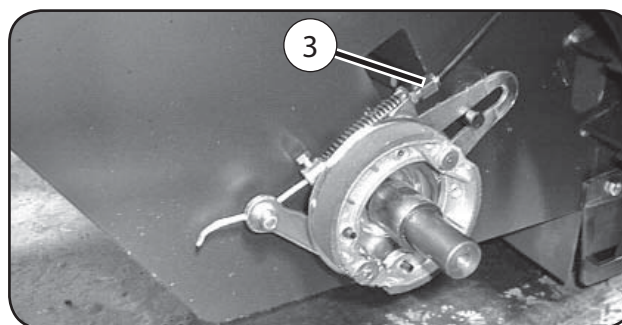
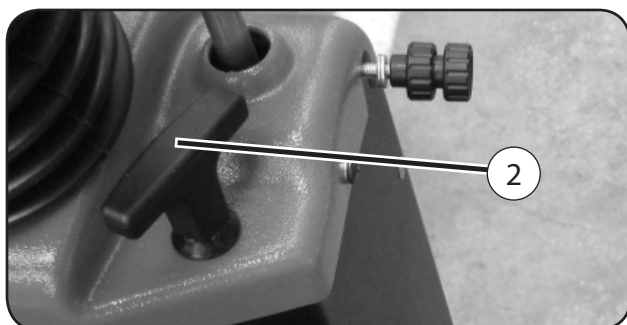
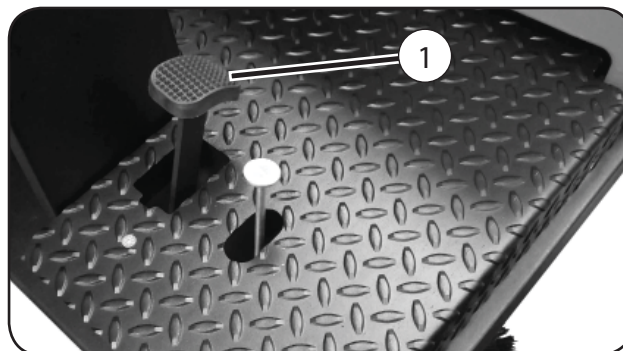


SERVICE AND PARKING BRAKES (FIG.19)

The brake is used to stop the motor-sweeper when it is moving and to keep it stationary on slopes.
The braking effect is provided by drums acting on the rear wheels.
The pedal control 1 is of mechanical type.

To lock the pedal in the parking position, proceed as follows:

- Push the pedal 1 fully down.
- Pull the handle 2.
- To release the brake, press on the pedal. When the brake tends not to stop the motor-sweeper, adjust the brake using the adjusting 3 placed on the rear wheels.



VACUUM FAN (FIG.20)

The vacuum fan 1 generates the suction which removes the dust lifted by the brushes.

To access to the vacuum fan, tilt the bonnet 3.

On the "Petrol version", the fan 1 is driven by the motor 2.

On the "Electric version", the fan 1 is activated by the switch 1B on position "A" fig.3.

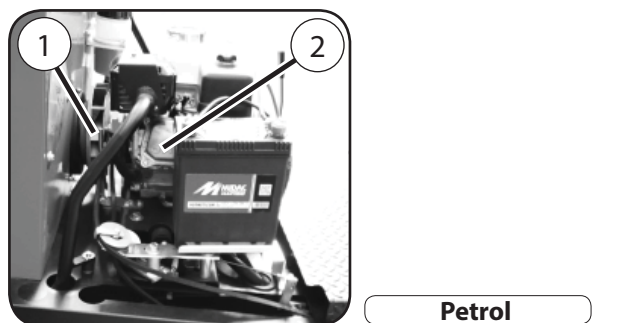
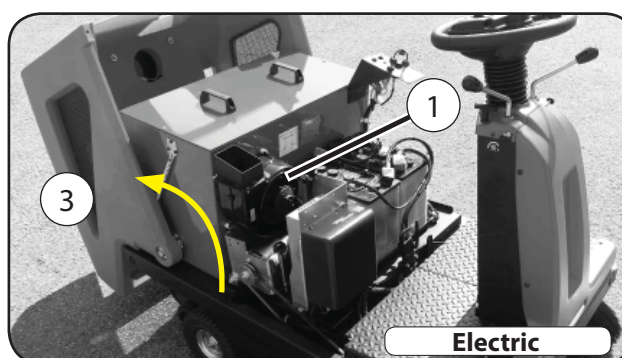


Caution!

Shut off the suction with switch 1B (electric version) or lever 1A (petrol version) on pos."C", see fig.3, when driving over wet floors.

When driving the sweeper from one place to another without sweeping, proceed as follows:

- For the "electric sweeper" stop the rotation of brushes by the switch 5 on pos."A" (fig. 3).
- Lift the brushes by the levers 2-6 fig.3, for the "petrol sweeper" stop its rotation.
- Shut off the suction by switch 1B (electric version) or lever 1A (petrol version) on pos."C", see fig.3.

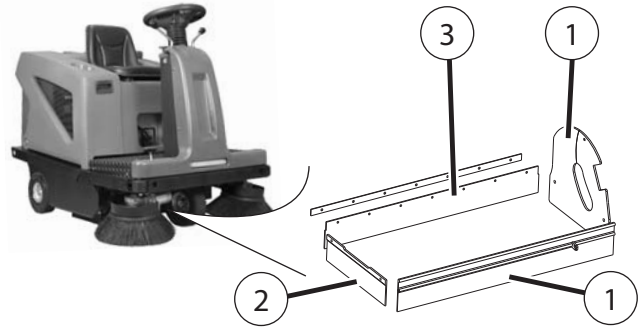


DUST FLAPS (FIG.21)

The dust flaps prevent the dust raised by the brushes from blowing out from under the motor-sweeper. They must therefore be kept in peak condition and replaced if they become worn or damaged.

Replacing the flaps

- Remove the fixing bolts and remove the worn or damaged flap.
- Fit a new flap 1-2-3-4 and secure it in position with the same bolts. The side and rear flaps should ride at about 3 - 4 mm above floor level.
- Restore all fixing bolts.



DUST FILTERS (FIG.22)

The cartridge filters 2 remove the dust from the air sucked through the motor sweeper. The filters must be kept permanently efficient.



Caution!

If dust starts blowing out from the sweeper, the filters are dirty and must be cleaned.

Cleaning the filters

Whenever the sweeper raises dust during sweeping, the filters must be cleaned. The cleaning procedure is as follows:

- Using the automatic shaker 1, by means of the lever 1A (petrol version) or switch 1B (electric version) on pos. V (fig.3) on pos. V for about 10 seconds.

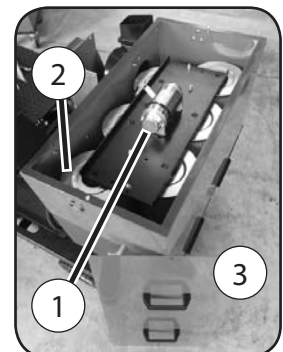
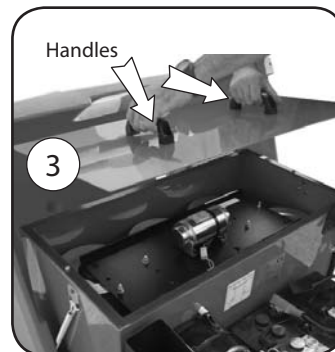
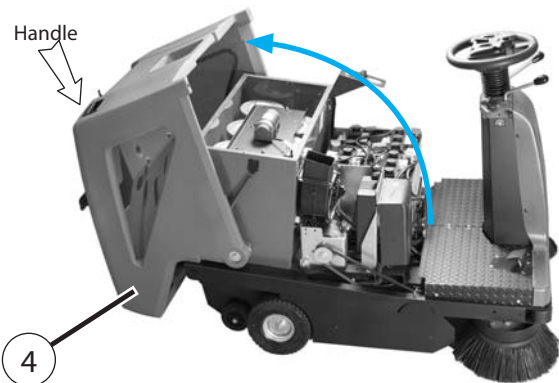


Caution!

Do not use the filter shaker for a long time as this may cause damage to the electrical system.

- About once a month, to keep the machine cleaner and ensure better service, remove the filters and clean them thoroughly with an air jet or preferably with a vacuum cleaner, starting from the inside where more dust accumulates. When replacing the filters, take care that the rubber seal is in place in the lower part.

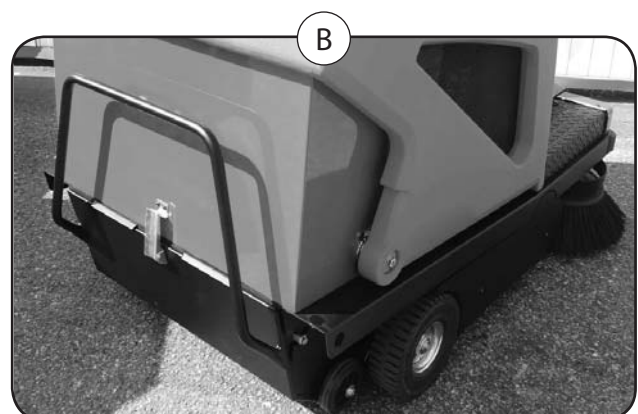
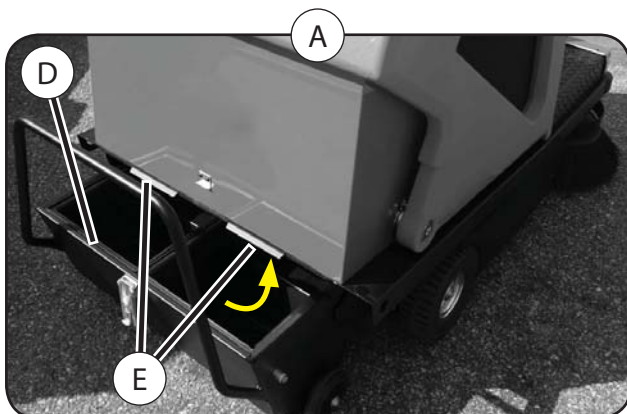
To access to the filters compartment, tilt the bonnet 4 and remove cover 3 by means of the handles.



REFUSE CONTAINER (FIG.23)

Fitting the refuse bin

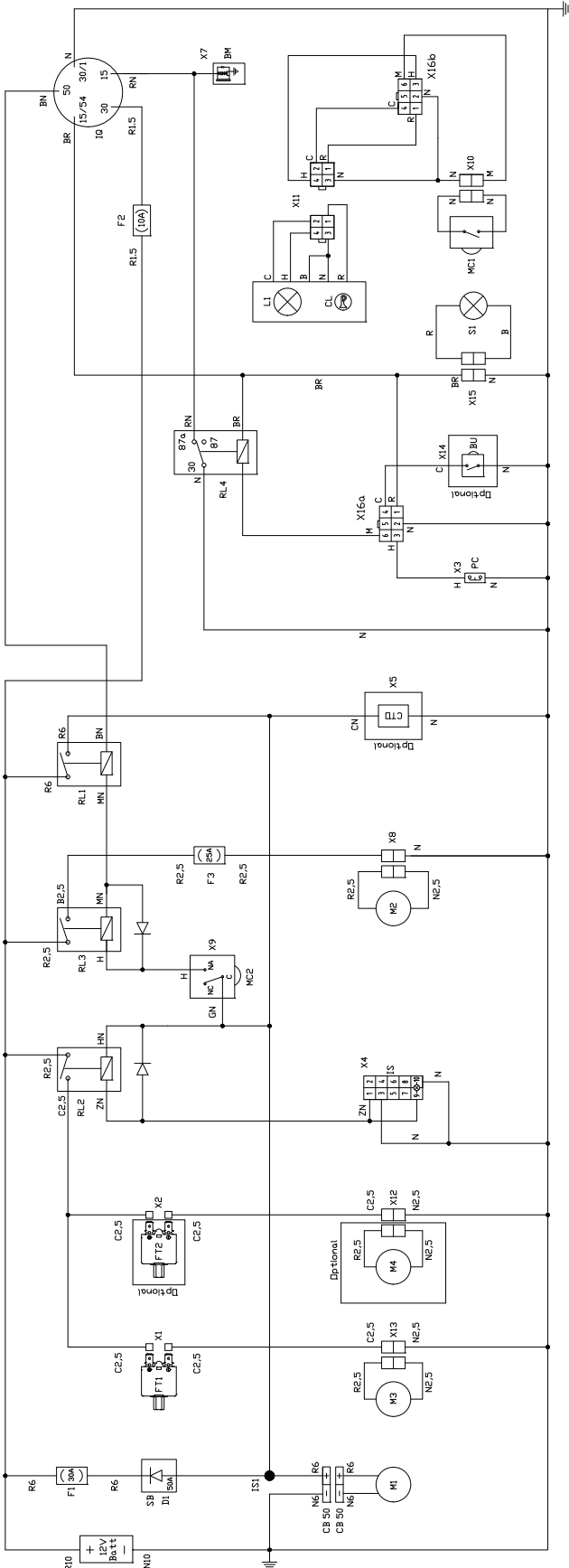
To fit the refuse container, keep its front part raised and push with a foot until completely goes into its seat fig.(A-B). The rear edge (D) of the refuse container must fit into the two upper slides (E). Engage the closing hook. In this position, the refuse container is perfectly airtight.



ELECTRIC SYSTEM "PETROL VERSION" (FIG.24)

The electrical system operates at 12 V and is powered by a battery 12 V - 40 Ah.

Wiring diagram (petrol version)



Wiring diagram description

- F1 - Fuse 30A
- F2 - Fuse 10A
- F3 - Fuse 25A
- F4 -
- FT1 - Thermal switch
- FT2 - Thermal switch (optional)
- M1 - Starting motor
- M2 - Filter shaker
- M3 - RH Brush gearmotor
- M4 - LH Brush gearmotor (optional)
- M5 -
- RL1 - Starting relay
- RL2 - Brush gearmotor relay
- RL3 - Shaker relay
- RL4 - Switch-Off relay
- IQ - Starting key switch
- IS - Brushes switch
- PC - Horn button
- MC1 - Engine switch-off microswitch
- MC2 - Shaker microswitch
- S1 - Front LED light
- L1 - Flashing LED light
- CTO - Hourmeter (optional)
- CL - Horn
- BM - Engine coil
- BU - Reverse sensor
- CB50 - Plug 50A
- D1/SB - Diode 50A
- IS1 - Insulator

Electric cables colors

- A - Light blue
- B - White
- C - Orange
- G - Yellow
- H - Grey
- L - Blue
- M - Brown
- N - Black
- R - Red
- S - Pink
- V - Green
- Z - Violet

decoding example:
BN - White/Black

Electrical system connections (not shown in the diagram)

- X1. Thermal switch connection (resettable fuse FT1)
- X2. Thermal switch connection (resettable fuse FT2)
- X3. Horn connection (CL)
- X4. Brushes switch connection (IS)
- X5. hourmeter connection (CTO)
- X6. -
- X7. Engine coil connection (BM)
- X8. Filter shaker connection (M2)
- X9. Filter shaker microswitch connection (MC2)
- X10. Engine switch-off microswitch connection (MC1)
- X11. Flashing LED light connection (L1)
- X12. LH brush gearmotor connection "optional" (M4)
- X13. RH brush gearmotor connection (M3)
- X14. Reverse drive sensor connection (BU)
- X15. LED Front light connection (S1)
- X16. Extension cable for Flashing LED light (L1) and Engine switch-off microswitch (MC1)

Safety microswitch (MC1)

A safety microswitch integrated inside the seat enables electric circuits only with operator on board.



Position of the microswitch

ELECTRIC SYSTEM "ELECTRIC VERSION" (FIG.25A)

The electrical system operates at 24 V and is powered by two 12 V, 118 Ah batteries (connected in series).
Never continue operating the motor-sweeper until the batteries run completely flat.

When indicator 12 (fig.3) shows yellow, the batteries are starting to run down.

The colour of the indicator 12 (fig.3) changes from green to yellow to red as the level of battery charge diminishes.

Green light = batteries fully charged
Yellow light = batteries partly charged
Red light = batteries discharged.



Caution!

Do not wait for indicator 12 (fig.3) to show red before recharging the batteries as this can cause rapid battery wear.

Proceed as follows to recharge the batteries 1:

- Disconnect plug 2 from socket 3.
- Connect the plug 2 to the socket of the external charger
- Switch on the battery charger.



Caution

During the battery charging phase, keep opened the bonnet 4.

Battery maintenance

To access the battery compartment, tilt the bonnet 4 as indicated on the picture.

Keep the batteries dry and clean. Pay particular attention to the terminals and terminal bolts.

At intervals depending on how much the motor-sweeper is used, check the level of the electrolyte. Top up with distilled water if necessary.

Periodically check the efficiency of the battery charger.

Make sure that the area in which the battery is charged is well ventilated. Keep naked flames well away from the battery, especially while it is being charged.

Autonomy

The motor-sweeper has a working autonomy of about 4 hours.

Perform the following checks if autonomy drops below this value:

- Check that the brush is not pressing too hard on the floor.
- Check that there is no string or wire, etc., entangled in or around the main brush which might cause friction and increase power consumption.
- Check that the battery is fully charged when you start work.



Caution!

When replacing the batteries, connect them as indicated on battery wiring scheme (fig.25A/1).



Caution!

When fitting GEL batteries, connect the terminals 5 of the yellow cable 6 (marked GEL) as shown in the picture.

MAX 24V DC - MAX 140 Ah

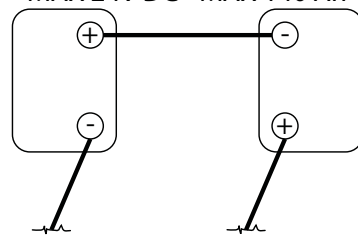
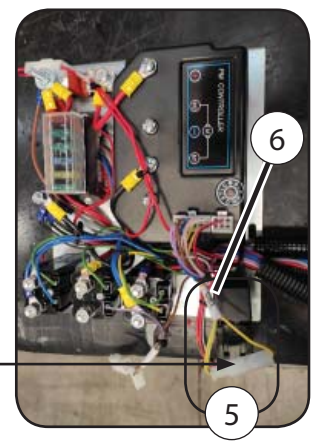
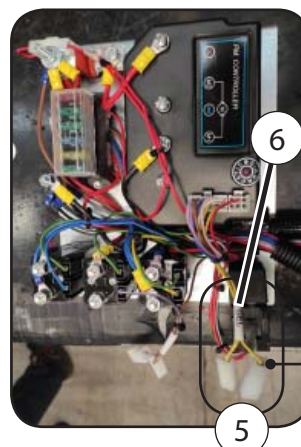
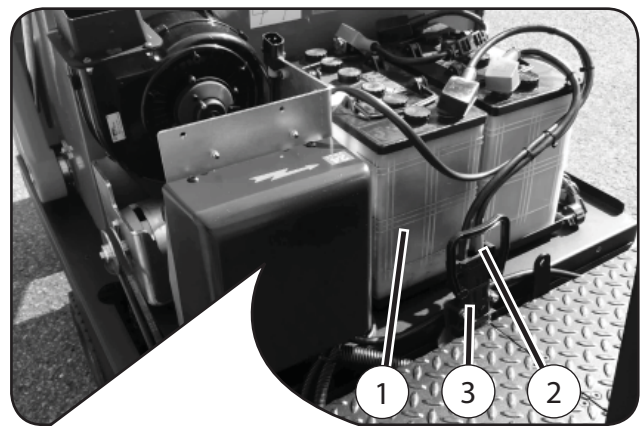
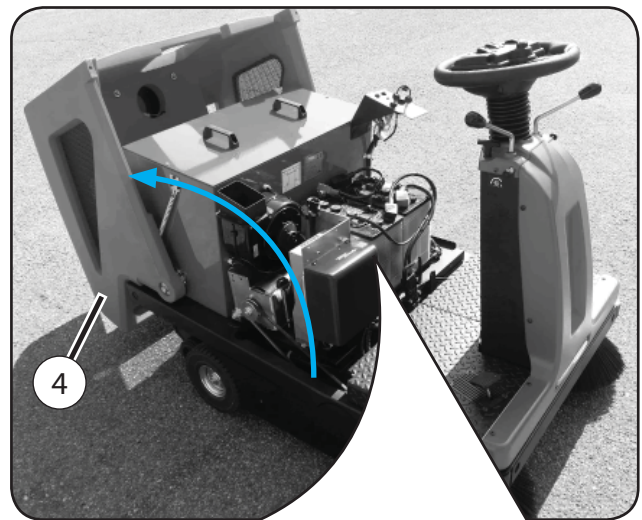
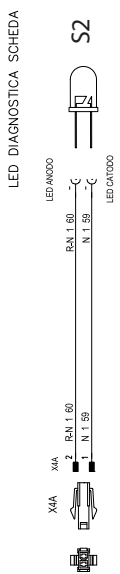
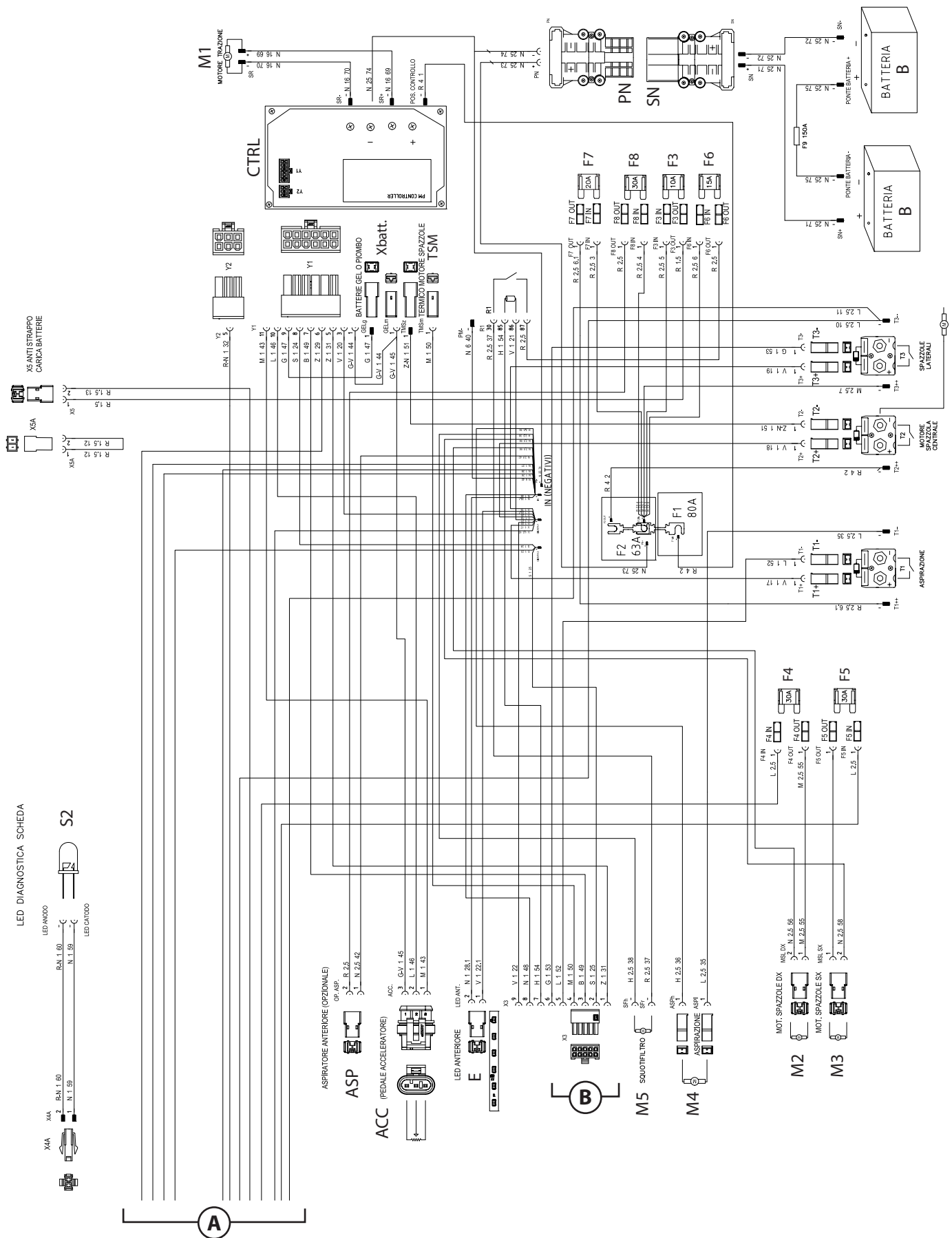


fig.25A/1



ELECTRIC SYSTEM "ELECTRIC VERSION" (FIG.25B/1)



ELECTRIC SYSTEM "ELECTRIC VERSION" (FIG.25B/2)

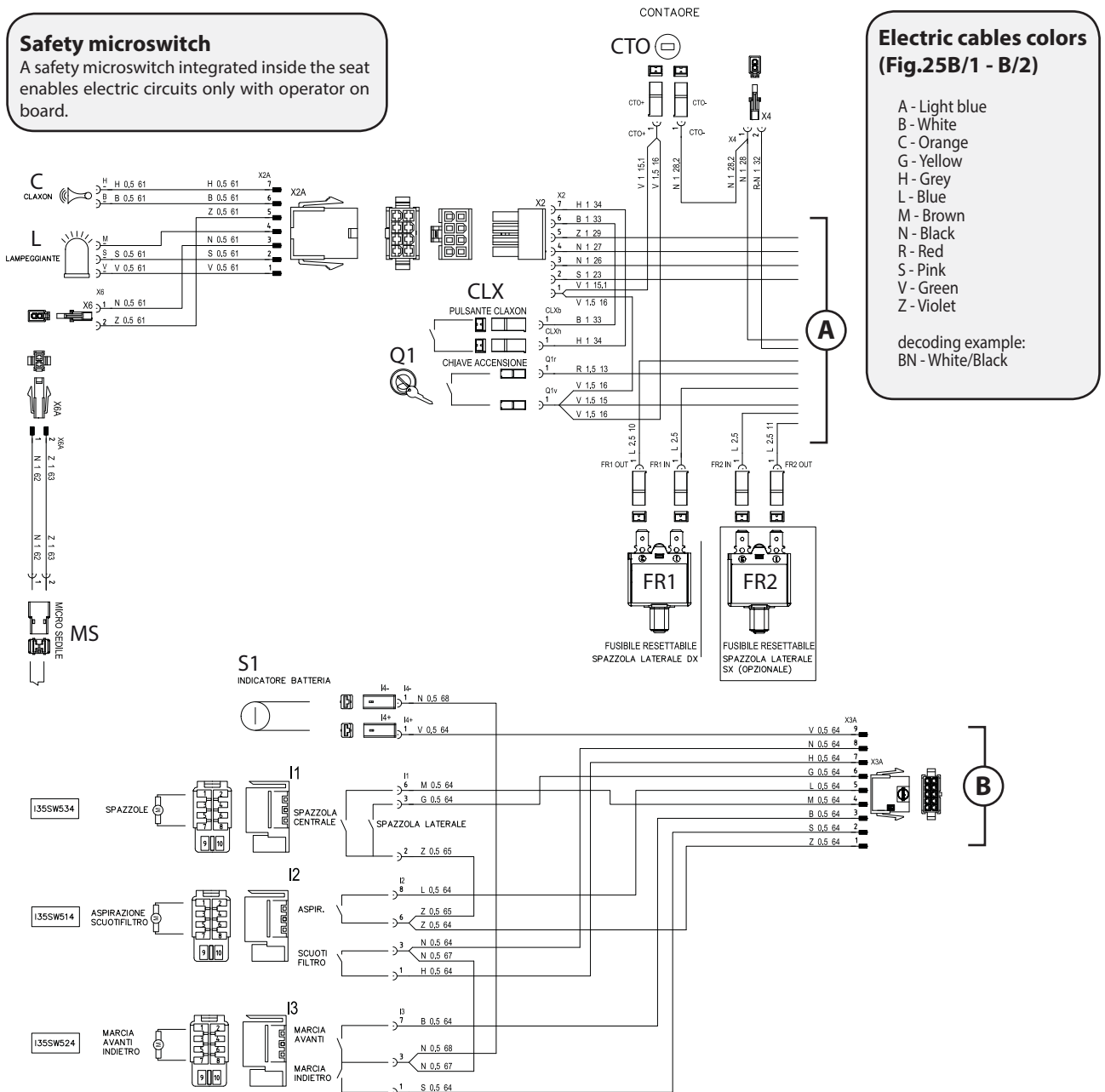
Safety microswitch

A safety microswitch integrated inside the seat enables electric circuits only with operator on board.

Electric cables colors (Fig.25B/1 - B/2)

A - Light blue
 B - White
 C - Orange
 G - Yellow
 H - Grey
 L - Blue
 M - Brown
 N - Black
 R - Red
 S - Pink
 V - Green
 Z - Violet

decoding example:
 BN - White/Black



Wiring diagram description (fig.25B/1-B/2)

B. Battery
 SN. Battery plug
 PN. Electric system/Battery socket

CTRL. Electronic control unit

M1. Drive motor
 M2. RH brush motor
 M3. LH brush motor (optional)
 M4. Vacuum motor
 M5. Dust filter shaker

Y1. E.Control unit connector
 Y2. E.Control unit connector

TSM. Connector for Brush thermal protection

I1. Brushes switch
 I2. Shaker/Vacuum switch
 I3. Front/Reverse drive switch
 Q1. key starting switch

MS. Seat microswitch

S1. Battery warning light
 S2. E.control unit LED warning light

CTO. Hourmeter
 CLX. Horn button

C. Horn
 L. LED emergency flashing light
 E. Front LED light

ACC. Accelerator pedal
 ASP. Frontal vacuum cleaner (optional)

R1. Dust filter shaker Relay
 T1. Vacuum Contactor
 T2. Main brush contactor
 T3. Side brushes contactor

X2. Horn/Emergency Flashing light male connector
 X2A. Horn/Emergency Flashing light female connector

X3. Switches male connector
 X3A. Switches female connector

X4. Diagnostic LED warning light male connector
 X4A. Diagnostic LED warning light female connector

X5. Battery charger male connector
 X5A. Battery charger female connector

X6. Seat microswitch male connector
 X6A. Seat microswitch female connector

Xbatt. Lead-Acid or Gel Battery warning light connector

F1. 80A Main fuse
 F2. 63A Main fuse
 F3. 10A Battery charger fuse
 F4. 30A RH Brush motor fuse
 F5. 30A LH Brush motor fuse (optional)
 F6. 15A Dust filter shaker fuse
 F7. 20A Vacuum contactor fuse
 F8. 30A Frontal vacuum cleaner fuse (optional)
 F9. 150A Battery fuse

FR1. RH Brush motor resettable thermal fuse
 FR2. LH Brush motor resettable thermal fuse (optional)

ALARMS DESCRIPTION

(Diagnostics "LED 16 - Fig.3" electric version) Call the Authorized Service Staff

Nr. Flashes	Alarm description	What to do
1	Drive control already active when turned on: the machine was turned on with the drive control already activated.	Release the drive control to stop the LED flashing. If that does not happen, it may be necessary to recalibrate the acceleration system.
2	Battery too low or undertension caused by a short-circuit. It indicates that the tension read by the system is lower than the minimum threshold for correct operation and that the version of the system is compatible with the installed battery. Otherwise, replace the system.	Check that the battery is not too low and, if it is, recharge it. As an alternative, check that there are no loose electrical connections. If the problem is not solved, it may be necessary to replace the system.
3	Maximum tension on the battery.	It indicates that the battery tension is too high and risks damaging the regulator.
4	Motor not connected or faulty contact on motor circuit. It occurs when the motor brushes do not touch on the armature correctly or if there are loose cables.	Check the connection, functionality and integrity of the motor.
5	Fault inside the regulator or ground on the motor.	There may be a negative current leakage on the motor circuit; otherwise, check the regulator.
6		
7	Power circuit temperature too high; it occurs when the mosfet temperature is above 75°C +/- 5°C, i.e. if the machine has worked in overload conditions, for example on a steep slope, for too long or at ambient temperatures above 40°C. It can also occur in case of damage to the motor windings which causes an abnormal current absorption.	Wait for the temperature to drop.
8	Motor already running at start. The flashing of the LED indicates that the machine (or the motor) is already moving.	First stop the machine and repeat the start-up procedure.
9	Micro controller software anomaly or hardware problem. It occurs in the event of faults on the current and load measuring circuits.	Try to stop and restart the machine; if the fault still appears, the regulator must be checked.
10	Low battery, indicates that the brushes have been blocked.	Recharge the battery.

ON BOARD BATTERY CHARGER "OPTIONAL" (FIG.26A)



Caution!

Read carefully the instructions handbook supplied with the battery charger.

The machine is designed for the installation of an on-board battery charger for systems powered by two 12V batteries or four 6V batteries.

The battery charger is designed to charge lead-acid (standard) or gel batteries (optional).

In the event, a battery charger is installed on the machine with lead-acid batteries and you want to install gel batteries, the battery indicator light 2 for lead batteries, must be replaced with indicator light for gel batteries and the dipswitches 3 located on the battery charger must be configured. See the "Dipswitch configuration table for "battery charger 24V 25A.

Proceed in reverse order in the event gel batteries are installed on the machine.



Caution!

DO NOT INTERVENE on the dipswitches if the batteries are not to be replaced.

The machine must not be used until the batteries run out.

The LEDs of indicator light 2 show the battery efficiency. As the batteries run out, the LEDs switch from green to yellow to red.

Green light = batteries charged.

Yellow Light = batteries semi-charged.

Red Light = batteries discharged.

Recharging Lead-Acid, Gel or Agm batteries.

To recharge the batteries, connect the cable 4 on the charger socket 5 and the plug for the same cable on the 220V socket.

When the charger 1 is switched on, the three LEDs 6 light up, then the green LED flashes to indicate the charging curve of the relevant battery, Lead, Gel or Agm (see the dipswitch configuration table fig.26B).

While the battery charging, LEDs 6 will switch from "Red" (battery discharged) to "Yellow" (battery semi-charged) and, finally, to "Green" (battery charged).

When the batteries are charged, remove the cable 4 from battery charger socket 5 and from the 220V socket and place it in its housing (as shown in the picture).



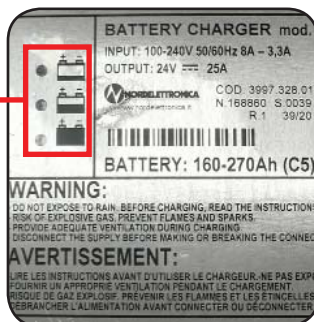
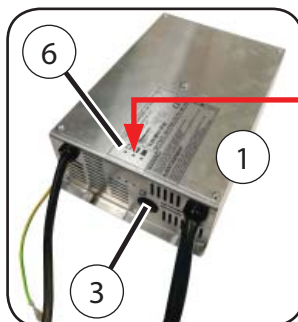
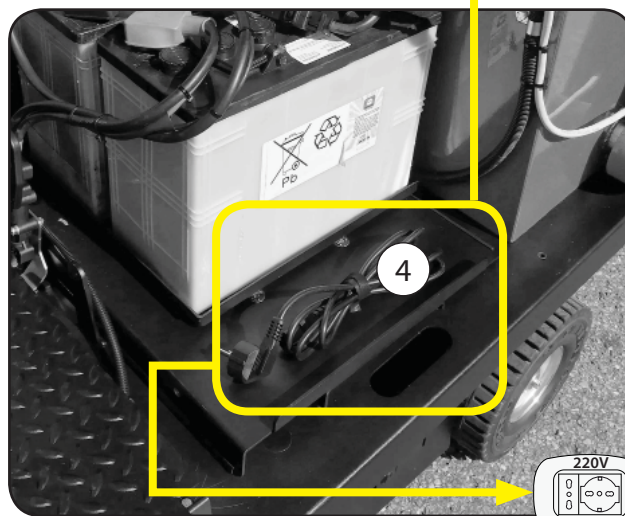
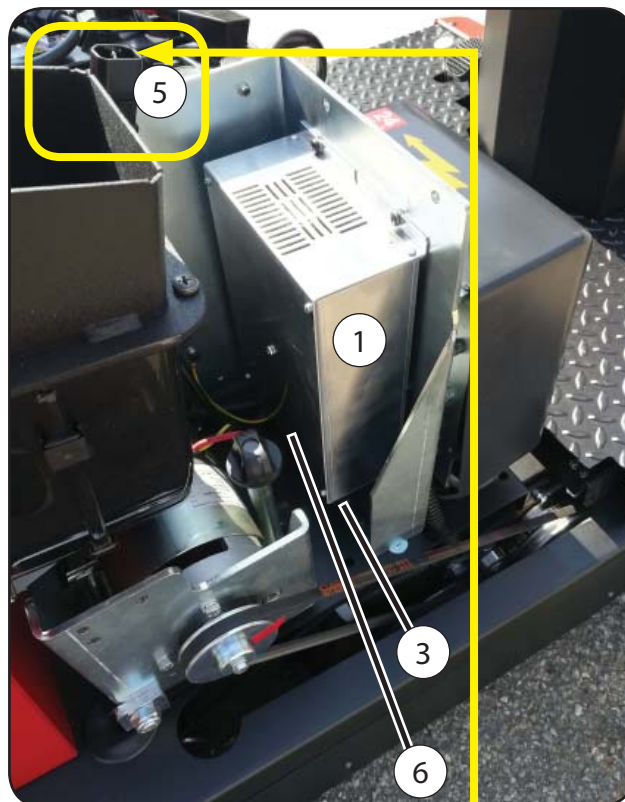
CAUTION!

KEEP THE HOOD OPEN WHILE CHARGING "LEAD-ACID, GEL OR AGM" BATTERIES.



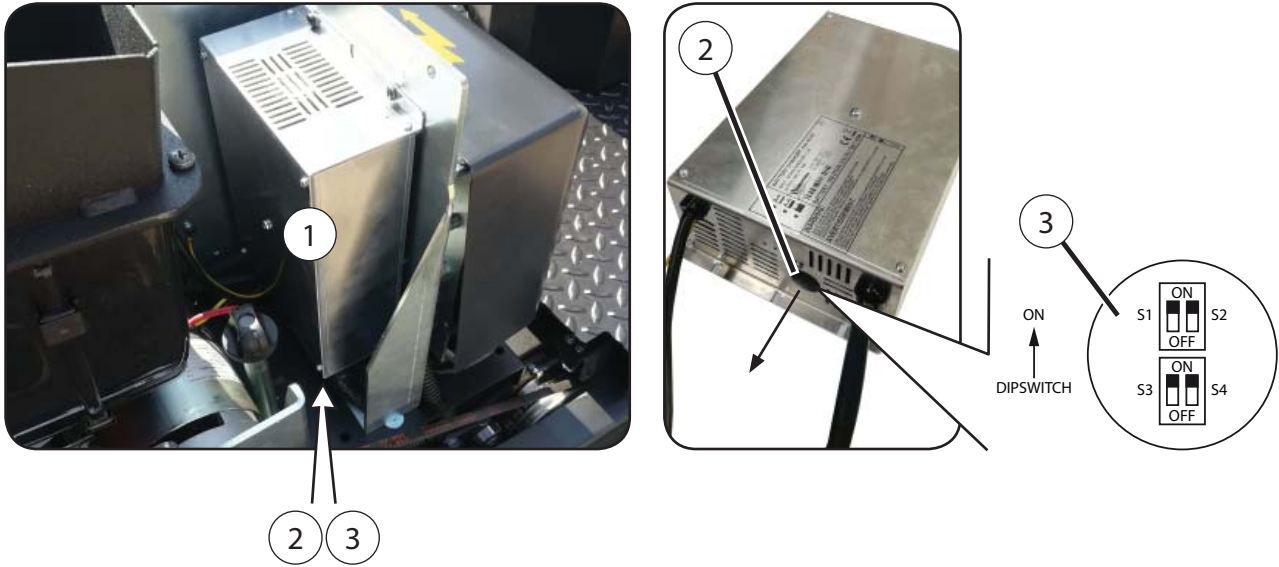
Caution!

For safety reasons, machine operation is disabled while batteries are being charged.



DIPSWITCH CONFIGURATION TABLE FOR BATTERY CHARGER 24V 25A (FIG.26B)

To access to the Dipswitches 3, it is necessary remove the charger 1 from the machine and its cap 2.



In the following table you can find meaning of all different position of dipswitch for programming the battery charger.

S1	S2	S4	Reference DIPSWITCH	Charging curve	Status of the yellow LED at switch on	Number of flashes of the green LED at switch on
OFF	OFF	OFF	1	IUI0-Pb for lead-acid battery	OFF	1
ON	ON	OFF	2	IUIa-Pb for lead-acid battery	OFF	2
OFF	ON	OFF	3	IUIa for AGM Zenith battery	OFF	3
ON	OFF	OFF	4	IUI0 for AGM EV-Discover battery	OFF	4
OFF	OFF	ON	5	IUIoU for GEL AGM battery	ON	1
ON	ON	ON	6	IUIoU for GEL Trojan battery	ON	2
OFF	ON	ON	7	IUI0 for GEL Sonnenschein battery	ON	3
ON	OFF	ON	8	IUIa for GEL Sonnenschein battery	ON	4

S3	Function
unconcerned	none

ROUTINE CONTROL AND MAINTENANCE OPERATIONS AND SAFETY CHECKS

1. The machine must be inspected by a specialist technician who checks its safety or for any damage or defects in the following cases:
 - Before it is put into operation
 - After modifications or repairs
 - At regular intervals, as indicated in the «Routine maintenance and checks» table.
2. Every six months check that the safety devices are in good working conditions; the inspection must be made by authorized specialist staff.

To ensure that the safety devices are properly operating, the machine must be overhauled by specialist staff or skilled workshop every 5 years.

3. The person in responsible of the machine must make an annual check of its condition. During this checking, he must decide whether the machine still complies with the technical safety regulations. After checking it has to apply on the machine a label of checking made.

Periodic maintenance and checks		every hours...					
		8	40	100	150	500	1500
1	check the battery electrolyte level	E	B				
2	check coal brushes of drive and brush motor				E		
3	check that the main brush is not entangled with string,wire,...	E+B					
4	check the dust filter		E+B				
5	replace the dust filter						E+B
6	check traces of side and main brush		E+B				
7	check belt tension		E+B				
8	check the engine oil level	B					
9	check the engine air filter	B					
10	clean the engine air filter		B				
11	replace the engine oil			B			
12	replace the hydraulic oil (with oil Q8 AUTO 18)*						B
E	electric machine						
B	petrol machine						

SAFETY INFORMATION

Cleaning

When cleaning and washing the machine, take care when using aggressive detergents, acids, etc.

Follow the instructions provided by the detergent producer, and wear protective clothing if appropriate (e.g. overalls, gloves, goggles, etc. - See relevant EC Machinery Directive).

Explosive atmosphere

The machine is not constructed to work in environments where there is a risk that there might be explosive gases, dusts or vapours, and so its use in an explosive atmosphere is FORBIDDEN.

Disposal of harmful substances

Comply with the laws in force on waste disposal and treatment when disposing of the material collected, the machine filters and spend material such as batteries, motor oil, etc.

SCRAPPING THE MACHINE



The machine should be consigned to an authorised disposal organisation, which will manage disposal correctly, especially with regard to the oil and fluids, filters, and batteries. ABS and metal parts should be recycled as secondary raw materials. Rubber hoses and gaskets, and ordinary plastic and fibreglass, must be separated and consigned to municipal waste companies.



The packing of the machine is manufactured by recycling materials. Consign the spent materials to operators authorized to dispose.

TROUBLESHOOTING

Problem	Cause	Corrective action
The sweeper fails to pick up large particles of dirt or leaves traces of dirt behind.	Working speed too fast	Reduce working speed
	Brush pressure too light	Adjust brush pressure (trace on floor)
	Brush worn	Replace brush
	Bristles bent or string or wire etc., entangled in brush	Remove string or wire
	Main brush collector encrusted	Clean using an iron spatula
Sweeper leaves dust on floor or dust comes out from flaps.	Vacuum fan broken	Check vacuum fan or replace
	Filters clogged	Clean filters
	Flaps worn	Replace flaps
Sweeper fails to pick up paper, leaves, etc.	Front flap lifting system not working	Repair the flap lifting system
Sweeper throws dirt forwards	Front flap broken	Replace front flap
Rapid brush wear	Excessive brush pressure	Reduce brush pressure (narrower trace)
	Floor very abrasive	-
Main brush noisy	Material wound around brush	Remove entangled material
Main brush fails to turn	Brush drive belt broken	Replace belt
	Belt tightener not working	Repair tightener
Sweeper does not move or move slowly (petrol sweeper)	Hydraulic oil low	Add hydraulic oil
Electric motors for brushes and drive system do not work (electric sweeper)	Fuses blown	Replace fuses
	Coal brushes or motors worn	Replace coal brushes or motors
Dust leaving the vacuum fan and dust present in the filter compartment	Filters dirt or broken	Clean or replace filters
Dust and water come out of refuse container	Refuse container too full	Empty refuse container more frequently
	Refuse container not correctly closed	Close refuse container correctly
	Refuse container seal broken	Replace seal
Neither forward nor reverse drive work	Drive motor cables disconnected (electric version)	Controllare i collegamenti
	Drive pedal defective	Check functioning
	Control unit faulty	Check functioning
	Fuse blown	Replace fuse
Batteries do not maintain their charge (electric sweeper)	Electrolyte level low	Top up electrolyte level
	Battery cells burned out	Replace battery
	Motor over-loaded	Check motor current absorption
	Battery terminals loose	Check and tighten battery terminals
	Material entangled in main brush	Remove entangled material
	Bearing seized	Replace bearings
	Excessive brush pressure	Reduce brush pressure (narrower trace)
Battery discharges quickly (electric sweeper)	Insufficient charge time	Increase charge time
	Battery cells burned out	Replace batteries
The filters shaker does not work	Microswitch faulty	Replace microswitch
	Fuse burned out (electric version)	Replace fuse
	Excessive motor absorption caused by > > worn motor carbon brushes	Replace
	> dirty or worn bearings	Replace
	> armature or windings burned out	Replace
Filter shaker fuse blown (electric sweeper)	Excessive shaker motor absorption	(see above)
	Fuse faulty	Replace
	Short-circuit	Check electric circuit
The vacuum electric fan does not work (electric sweeper)	Electric fan damaged.	Replace
	Fuse blown.	Replace
	Cables disconnected or short-circuit.	Check or repair electric system.
The motor stops when the sweeper is on a slope. (petrol sweeper)	Oil level low (oil alert)	Top up oil level