

WRANGLER 2625 DB

IMPORTANT SAFETY INSTRUCTIONS



WARNING: Failure to observe these instructions can cause personal injury to machine operator or bystanders



WARNING: Fire or explosion hazard. **NEVER** operate this machine in an explosive atmosphere (grain dust, flammable liquids or fumes, etc.).



WARNING: Fire or explosion hazard. **NEVER** attempt to pick up flammable or combustible materials or use such materials in tank.

INTENDED USE

This machine is intended for commercial use, scrubbing floors in an indoor environment. NSS does not recommend using this machine for any other purpose.

FOR SAFETY:

- **ALWAYS** read and understand all instructions before operating or servicing machine.
- **ALWAYS** use this machine **ONLY** as described in this manual.
- **NEVER** attempt to operate this machine unless you have been trained in its operation.
- **NEVER** allow an untrained person to operate this machine.
- **NEVER** attempt to operate this machine if it is not working properly or has been damaged in any manner.
- **NEVER** disconnect or modify any switches or safety devices (circuit breaker).
- **NEVER** drop or insert any object into any machine opening.
- **NEVER** operate this machine with any air opening blocked. Keep all air openings free of dust, lint, hair, etc.
- **NEVER** pick up anything that is burning or smoking, such as cigarettes, matches or hot ashes.
- **NEVER** spray this machine with water or any liquids.
- **NEVER** allow the vacuum motor or battery-charging plug to get wet or a short may occur.
- **NEVER** operate this machine when the battery charger is plugged in.
- **NEVER** operate this machine with the side skirt removed.
- **NEVER** allow this machine to be used as a toy. Close attention is necessary when used by or near children.
- **ALWAYS** wear clean tennis shoes or “non-slip” shoes. Leather soled shoes will become extremely slippery when wet.
- **ALWAYS** keep face, fingers, hair or any other body part or loose clothing away from any machine opening or moving part (revolving brush, pad driver, or vacuum motor).
- **ALWAYS** turn the machine off when attaching pads or brushes.
- **ALWAYS** remove keys when this machine is left unattended.
- **ALWAYS** be sure that the ramp is secured to the vehicle before attempting to load/unload.
- **ALWAYS** use extreme caution when operating the machine on a ramp or loading/unloading this machine into or out of a truck/trailer. Use extreme caution if the ramp is wet, oily, or covered with cleaning chemicals.
- **NEVER** stop or turn the machine on a ramp or incline.
- **NEVER** attempt to climb a grade or operate this machine on a ramp or incline of more than 8 degrees.
- **NEVER** park or store the machine near a dock, on ramps, near a furnace, boiler, open flame, or other high heat source.
- **NEVER** allow this machine to freeze.
- **NEVER** expose the machine to rain, snow, or extreme temperatures.
- **NEVER** store any items on this machine.
- **ALWAYS** store this machine indoors in a dry, cool area.

ALL REPAIR SERVICE MUST BE PERFORMED BY AN NSS AUTHORIZED DISTRIBUTOR/ SERVICE STATION USING ONLY NSS ORIGINAL EQUIPMENT PARTS.



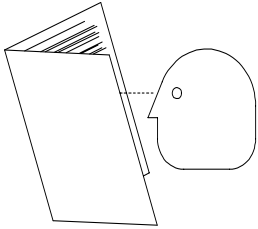
SAVE THESE INSTRUCTIONS

IMPORTANT SAFETY INSTRUCTIONS

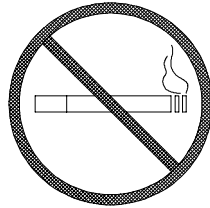
BATTERY POWERED EQUIPMENT WITH ON BOARD CHARGERS



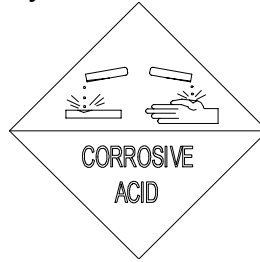
WARNING: Failure to observe these instructions can cause personal injury to machine operator or bystanders



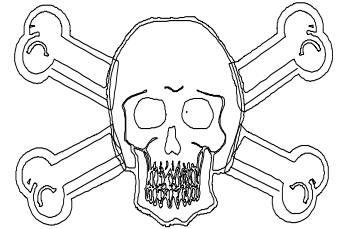
Read and understand all instructions before installing or charging batteries.



No smoking, open flames, or sparks while working with batteries.



Contains acid. Avoid contact



Poison. Causes severe burns. Avoid contact.



WARNING: Batteries emit hydrogen, which can cause fire or explosion. **NEVER** smoke, light a match, or cause a spark during operation or charging. **ALWAYS** charge in a well-ventilated area away from open flame.

GENERAL

- **ALWAYS** read and understand all instructions before installing or charging batteries.
- **NEVER** attempt to install or charge batteries unless you have been trained to do so.
- **NEVER** allow an untrained person to install or charge batteries.
- **ALWAYS** remove all jewelry when working on or near the batteries.
- **ALWAYS** turn off all switches during installation and service.
- **ALWAYS** disconnect the battery leads before performing any service or repair.
- **ALWAYS** wear eye protection and protective clothing to avoid contact with battery acid.
- **NEVER** lay anything on top of batteries as arcing may occur.
- **IF CONTACT WITH BATTERY ACID OCCURS**, follow these instructions:
 - SKIN – rinse area with water.
 - EYES – Flush with water for 15 minutes.
 - INTERNAL – Drink water or milk. Follow with Milk of Magnesia, beaten egg or vegetable oil. Call a physician immediately.

BATTERY INSTALLATION

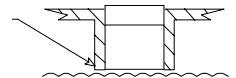
- **ALWAYS** use two people to install, as batteries are heavy.
- **ALWAYS** turn off all machine switches.
- **ALWAYS** position batteries as shown on the machine installation decal to maintain machine balance.
- **ALWAYS** connect batteries as shown on the machine installation decal to avoid shorting out the batteries and the electrical system.

BATTERY CHARGING

- **ALWAYS** read instructions on charger carefully.
- **ALWAYS** use the NSS supplied charger with proper voltage rating.

For lead acid batteries only, (does not apply to gel cell or maintenance free batteries).

- **ALWAYS** check to ensure the battery water level covers the battery plates before charging.
- **ALWAYS** check water level after charging and add water if necessary to bring level to the bottom of the fill hole.
- **NEVER** overfill batteries as battery and machine damage may result.
- **ALWAYS** wipe any acid from the top of batteries using a soap solution.
- **ALWAYS** study battery manufacturers' specific precautions such as recommended rates of charge.
- **ALWAYS** reattach caps to batteries. Do not charge with caps loose or removed.
- **ADD** only distilled or treated city water. Not well water.
- **NEVER** charge a frozen battery.
- **ALWAYS** plug the charger into an earthed socket outlet.
- **NEVER** touch uninsulated portion of output connector or uninsulated battery terminal.
- **ALWAYS** disconnect the AC supply before making or breaking the connections to the battery while charging.
- **NEVER** open or disassemble charger.
- **NEVER** operate charger if the AC supply cord is damaged or if the charger has received a sharp blow, been dropped, or otherwise damaged in any way.



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NOISE AND VIBRATION

NOISE

Sound pressure level at Operator position 80 dB(A)

VIBRATION

Weighted RMS acceleration value (ISO 5349) .281 m/s²

MACHINE INSPECTION

- Now that the machine is unpacked remember to recycle all packing materials.
- Inspect machine for damage or missing components. If damage is found, contact the local freight company to file a freight claim.

MACHINE COMPONENTS

Solution Tank

The solution tank is the lower part of the machine body. It has a capacity of **25 gallons (95 liters)**.

- The amount of water in the tank is measured by the solution gage, which is located in the clear plastic tube at the right rear corner of the tank. This tube is also used to empty the tank.

Recovery Tank

The recovery tank is the upper part of the machine body. It has a capacity of **27 gallons (102 liters)**.

- The recovery tank is closed by a round, clear view lid assembly.
- The recovery tank has a foam sensitive float shut-off assembly. As the water level rises, the float ball will rise into the tube and shut off the airflow of the vacuum. NOTE: The float shut-off assembly does not shut off the vacuum motor.

Operator Control Panel

The operator control panel is located at the upper rear area of the machine. This panel has components that control various machine functions.

- In the middle of the panel are two (2) rubber twist grips. These grips rotate forward and backward to control the direction and speed of the machine. The farther the grips are rotated, the faster the machine will move. These twist grips have a feature that returns the machine to the neutral position when the handles are released.
- The first *toggle* switch on the left turns on and off the brush motor.
- The next *toggle* switch turns on and off the vacuum motor.
- The red button is the master power switch; it controls the power to all components. *Power ON is indicated by the green light.*

Battery Meter

The battery meter is located on the right side of the operator control panel and shows the state of charge of batteries during operation and recharge.

- Work Range - This is the green area in the middle of the meter. It shows the approximate amount of "power" available in the batteries. Observe this reading when operating the Wrangler.
- Recharge Range - This is the red area on the left of the meter. It shows when the batteries need to be recharged. Continued machine operation in this area will cause battery damage and potential machine damage.

Hour Meter

The hour meter is located on the left rear of the machine. It shows the total working time of the scrub brushes.

Solution Control (Valve) Lever

The solution control lever is located in front of the right hand twist grip. This lever controls the solution valve and the amount of liquids put on the floor when cleaning.

- Pull up on the handle to open the valve.
- Push down on the handle to close the valve.
- The solution solenoid valve is an automatic valve that turns on the solution flow when the brushes are on and the machine is moving. It is located on the frame under the left rear corner of the machine.

Rear Panel

- The left circuit breaker is for the drive motor and is rated at 25 amps.
- The next circuit breaker is for the vacuum motor and is rated at 20 amps.
- The two circuit breakers on the right are for the brush motors and each is rated at 25 amps. The right lift arm is used to raise and lower the brush motor assembly.
- The left lift arm is used to raise and lower the squeegee assembly.
- The right lift arm is used to raise and lower the brush assembly. This arm has three down positions: float, medium pressure, and heavy pressure.

Battery Compartment Drain Hose

This hose is located below the battery-charging plug and behind the squeegee lift arm. The hose uses a pinch clamp to hold the hose closed. This hose collects any spilled liquids from the battery compartment area.

- Inspect hose for liquid level on a weekly basis.
- Dispose of liquids according to local your EPA regulations.

Solution Filter Assembly

Attached to the intake of the solution solenoid valve is a filter assembly design to stop debris from *entering the solution valve.*

If the water and chemical stops flowing:

- There is a metal filter screen *inside the plastic fitting of the solution hose* - open the fitting (by hand), remove and clean the screen.
- Replace the screen and close fitting (by hand). Check for any liquid leaks.

Drive Motor

- This machine is powered forward and reverse by a 24-volt drive motor.
- The speed is electronically controlled for smooth increase and decrease of speed.
- The motor moves the drive wheels through a gearbox and transaxle system.
- This motor has carbon brushes that must be serviced on a regular basis. The carbon brushes have an expected life of 2,000 operating hours. Refer to the maintenance section later in this book.

Brush Gear Motor

This machine has two (2) 24-volt brush motors located at the front of the machine. The motors are attached to a gearbox to turn the pad drivers or brushes.

- The left motor rotates *clockwise*.
- The right motor rotates *counterclockwise*.
- These motors have carbon brushes that must be serviced on a regular basis. The carbon brushes have an expected life of 2,000 operating hours. Refer to the maintenance section later in this book.

Vacuum Motor

This machine has a 24-volt vacuum motor.

- The vacuum motor is enclosed in the body of the control panel behind the metal plate.
- This motor has carbon brushes that must be serviced on a regular basis. The carbon brushes have a maximum expected life of 700 operating hours. Refer to the maintenance section later in this book.

Squeegee Assembly

The squeegee assembly is available in both straight and curved. The straight squeegee uses a dual (2) urethane blade system. The "curved" squeegee has gum rubber rear blades and neoprene front blades.

Side Skirt Assemblies

The machine is equipped with left and right side skirt assemblies. The side skirt assemblies are designed to contain the liquids in the cleaning area *under the machine* and channel them toward the squeegee, and prevent splashing *outside of the machine*.

Battery Package

The Wrangler 26 is a 24 volt system and is available with one battery package:
Four (4) 6 volt, 225 Amp Hour Batteries. Consult your local NSS authorized distributor for application recommendations.

Preparing the machine

To install the batteries:

- Turn off all switches and tilt the recovery tank open to expose battery compartment.
- Batteries are heavy - use two people to install.
- Refer to wiring diagram inside the battery compartment. Align batteries in compartment as shown on diagram.
- Install battery cables as shown on wiring diagram.
- Tighten bolts and hex nuts with a wrench.

Caution: Do not touch two terminals with a wrench.

- Loose or improper battery connections will cause battery or machine damage and possible personal injury.

Battery Charging

- To recharge the batteries plug the charger cord, located at the rear of the machine, into an electrical outlet.
- When the cord is plugged into an outlet the machine will become disabled.

See charging instructions for more details.

Prepare the solution and recovery tanks:

- **Never** use water over $140^{\circ}F$ ($60^{\circ}C$) degrees. Excessively hot water may damage components such as the tanks.
- Put 1 to 2 gallons of clean water into the solution tank first to help dilute the chemicals and prevent excess sudsing. Dilute the cleaning chemicals according to the manufacturer's instructions.
- Fill the tank by pouring the water and cleaning chemicals through the round mesh filter that covers the opening at the front of the solution tank.
- Make sure the drain plug of the recovery tank is closed tightly and in its holding clip.
- **Always** use a defoamer to protect the vacuum motor.
- Consult your local distributor for complete chemical advice.

To install a pad driver and pad:

- There is a wide range of pads or brushes available for the many cleaning applications. Consult your local NSS authorized distributor for application recommendations.
- Turn the pad drivers upside down on the floor and remove the pad holding cup.
- Remove the center cutout of the 13" (33 cm.) pad. Place the pad on the face of the pad driver.
- The pad **must** be centered on the driver to prevent wobbling or bouncing.
- Install and secure the pad holding cup to the pad driver. Turn the pad driver over so that the pad faces the floor.
- Raise the brush motors into the transport position.
- Align the lugs of the pad driver with the slots of the drive casting.
- Turn the lug of the pad driver toward the latch; close the latch around the lug to lock onto the drive casting.

To install a brush:

- Raise the brush motors into the transport position.
- Align the lugs of the brush with the slots on the drive casting.
- Turn the lugs of the brush toward the latch; close the latch around the lug to lock onto the drive casting.

To install the squeegee assembly:

- Place the squeegee lift arm in the storage (up) position.
- The squeegee assembly mounts to a metal bracket at the bottom center of the machine, using two (2) mounting knobs. Loosen the mounting knobs and slide the squeegee assembly onto the mounting plate.
- The squeegee assembly has two (2) small wheels to prevent "rollover" while in reverse. The roller wheels must face the operator. Hand-tighten the mounting knobs. **Do not** use pliers to tighten knobs, as this will defeat the "break-away" design.
- **Do not** add any weights or other pressure to the squeegee mechanism. This will not improve the performance and will shorten the life of the blades.

To install the side skirts:

- Position the skirts at the left/right side of the machine.
- Remove the skirt retaining pins from the mount bracket.
- Align the side skirt holes with mount bracket holes, insert and secure retaining pins. Close side skirts around machine and secure with skirt latch.

Operating the Machine

The Wrangler 26 has the brush motors offset to the right side of the machine. This offset allows you to clean the edge of the floor or obstructed areas (walls or shelving) with the right side of the machine.

Normal Cleaning

- Sweep and dust mop the floor to remove dirt and debris before scrubbing. Accumulations of dirt or debris on the floor will reduce cleaning performance.
- You may also need to preclean some types of spills or stains before scrubbing.
- Plan your work so that you make long, straight paths with the fewest amount of turns possible, overlapping each cleaning path about 2 in. (5 cm.) to prevent streaking and dirty areas.
- Move machine to area to be cleaned.
- Place warning signs "Wet Floor" in area.
- Turn on master switch.
- Turn on brush and vacuum motor switches.

- Place brush motors and squeegee assembly in operating position on floor.
- Lift solution valve handle to adjust liquid flow to floor. Adjust amount of flow as needed. Close the solution valve completely 10 ft. (3m.) before you turn at the end of each cleaning path. This will reduce the amount of liquid on the floor when you make the turn.
- Reopen the solution valve when you have started your next cleaning path. Repeat this procedure on each path.
- Watch the level of liquid in the recovery tank and listen for the float shut-off to change the sound of the vacuum motor. When the vacuum airflow stops, you must turn off the vacuum motor and then empty the recovery tank.
- Take the machine to an approved disposal drain and turn off all switches.
- Raise the rubber flap at the front of the Wrangler and pull out the flexible rubber drain hose.
- Raise the end of the hose above the level of the recovery tank, loosen and remove the hose drain plug. Carefully lower and direct the drain hose into the drain.
- When the recovery tank is empty, replace and tighten the drain plug. Place the drain hose back into the machine and secure the plug end in the clamp. Do not obstruct the lift mechanism or brush motors.

Special Cleaning

The Wrangler may be used to perform special cleaning jobs other than "normal" scrubbing.

Double Scrubbing

- This procedure provides deeper cleaning on heavily soiled floors. One or more cleaning passes are made before picking up the chemicals with the squeegee. Best results are achieved by placing the brush motors in the heavy scrub position.

Caution: The floor surface becomes extremely slippery in this operation. The Wrangler should be operated only in low to medium speed and great care should be taken when walking on this wet surface.

Stripping

- This procedure is used to remove moderate build-up of floor finish from the floor. The most aggressive pads or grit brushes are used in this procedure.
- The stripper solution is applied to the floor with a mop and then double scrubbed as above. Stripping solution should not be put into the solution tank. Clean water from the solution tank is applied to the floor to keep the chemicals and finish in a "liquid" condition. The floor surface becomes extremely slippery in this operation. The Wrangler should be operated only in low to medium speed and great care should be taken when walking on this wet surface.

MACHINE MAINTENANCE

Routine maintenance is critical to ensure proper machine operation and cleaning performance. Perform all maintenance procedures as follows.

Always turn OFF all machine switches before performing any maintenance.

To adjust the squeegee assembly:

- Turn the vacuum motor ON and open the water valve slightly.
- Squeegee blades should lay over slightly (like a window squeegee) when the machine is moving.
- If adjustment is required adjust the blade angle by turning the wing nut (or knob) on the pivot arm clockwise or counterclockwise.

To adjust side skirt wiper blades:

- Install the side skirts on the machine.
- Loosen the retaining strip screws.
- Pull down evenly on the entire length of wiper blade so that it firmly touches the floor.
- Tighten all screws and test run machine for splashing under the blades.
- DO NOT adjust blades too low, as it will cause damage and excessive wear to the blades.

To replace side skirt wiper blades:

- Remove the side skirt assembly from the machine.
- Remove the retaining strip and screws.
- Remove the old wiper blade and replace with a new blade.
- Replace the retaining strip and screws; do not tighten.
- Pull down evenly on the entire length of wiper blade so that it firmly touches the floor.
- Tighten all screws and test run machine for liquid splashing under the blades.
- DO NOT adjust blades too low, as it will cause damage and excessive wear to the blades.

Daily Maintenance

- You must recharge the batteries when indicated by the battery meter. Read the battery meter while the machine is in use.
- See battery charger operation instructions.
- Consult your local authorized NSS distributor or service center for assistance.

Battery Electrolyte (Liquid) Level

Inspect the electrolyte level of at least one cell in each battery before charging. The liquid must be visible above the internal plates. Do not charge the batteries if the liquid is below the plates.

- Add only water to the cell of a battery to adjust the liquid level. Distilled water preferred, **Do Not** use well water. Before charging, add only enough water to cover the top of the internal plates. After charging add only enough water to bring the level to the bottom of the fill tube.
- **Do not** overfill the battery liquid level, this will cause electrolyte (acid) spill. Spilled electrolyte (acid) can cause machine damage and personal

injury. Clean up and dispose of all spills immediately.

- See the battery-warning sheet (page 2) for more details.
- If machine is equipped with battery Auto-Fill system fill batteries prior to charging.

Solution and Recovery Tanks

- The recovery tank is emptied through a large rubber hose at the front of the machine. Remove the plug and drain the liquids according to your local EPA regulations.
- **Every time** you empty the recovery tank, we recommend that you add at least 4 to 6 ounces of defoamer chemical into the recovery tank before resuming work. Vacuum the defoamer into the empty recovery tank through the squeegee Vac hose.
- At the end of the day empty all liquids from both solution and recovery tanks. Rinse both tanks with clean water to prevent chemical residue build-up allow to air-dry to prevent odors.
- Remove any residue from screen and float ball to ensure proper operation. Replace float assembly on tube in recovery tank.
- Check clear lid for airtight seal - leave lid open to allow tank to air dry.
- Check the drain hose for damage.

Pad Drivers or Brushes

- Remove both pad drivers (or brushes) from machine after use.
- Rinse with clean water to prevent chemical residue build-up.
- Inspect for wear or damage. Repair or replace as needed.
- Allow to air dry on a shelf or rack.

Squeegee Assembly

- Remove squeegee assembly from machine.
- Rinse with clean water to prevent chemical residue build-up.
- Inspect the squeegee assembly, linkage, and vacuum hose, for wear, damage or obstruction. Repair or replace as needed.
- Remove debris from squeegee hose and entrance to recovery tank.
- Allow to air dry on a shelf or rack.

Weekly Maintenance (25 hours)

- Verify all daily maintenance has been performed.
- Check all battery terminal and cable connections. Tighten as needed. Loose connections are dangerous and can cause personal injury and machine damage.
- Clean any corrosion from battery terminals and cables.
- Drain all liquids from battery compartment. Dispose of according to local EPA regulations.
- Check solution flow to pad drivers / brushes. Remove, inspect and clean the solution filter assembly.
- Flush clean solution tank and hoses with a mixture of 8 oz. (250ml.) white vinegar to one-gallon (4 liter) warm water.
- Repair or replace any worn or damaged components as needed.

Monthly Maintenance (100 hours)

- Verify all daily and weekly maintenance has been performed.
- Inspect vacuum motor exhaust filter behind metal plate at rear of battery compartment. Clean or replace as necessary.
- Check casters for wear or damage.
- Grease the caster axle and swivel bearing. Use a hand held grease gun and a high grade of water resistant lithium base grease.
- Inspect all mechanical linkages, pivot points and ball joints for freedom of movement. Use a penetrating spray lubricant that is water resistant. Do not use WD 40 lubricant.
- Inspect all fasteners (bolts, screws, nuts) at mechanical linkages, pivot points and ball joints for tightness. Tighten as needed.
- Repair or replace any worn or damaged components.

Mandatory Periodic Maintenance

It is important for you to read the hour meter for hours used in order to perform this machine maintenance.

It is **mandatory** that the following maintenance procedure be performed at the described interval. Failure to perform this procedure may result in poor machine performance, machine component damage and failure. This procedure should be performed by an NSS authorized distributor or service center. Repairs performed by an unauthorized company will void the machine warranty. If you require assistance finding an authorized service center, please contact NSS Enterprises, Inc.

After every **450-500 hours** of operation you must inspect vacuum motor carbon brushes for wear. Replace the vacuum motor carbon brushes when they are 7/16in. (11mm) in length.

After every **650-700 hours** of operation you must inspect drive motor (transaxle) carbon brushes for wear. Replace the drive motor (transaxle) carbon brushes when they are 3/8in. (9mm) in length.

After every **650-700 hours** of operation you must inspect brush motor carbon brushes for wear. Replace the brush motor carbon brushes when they are 1/2in. (13mm) in length.

Battery charger

Operating instructions

1. Connect charger power cord to a properly grounded outlet. When using an extension cord, avoid excessive voltage drop and extended charge times by using a grounded 3-wire 12 AWG cord for 50' lengths or shorter and 10AWG for greater than 50' lengths.
2. If a minimum battery voltage is not detected, a trickle current will be applied until a minimum voltage is reached.
3. Once a minimum battery voltage is detected, the charger will enter the bulk charging constant-current stage. The current bar graph will indicate the current to the battery as the charger moves through its charge profile. The length of charge time will vary by how large and how depleted the battery pack is.
4. When the yellow 80% LED is lit, the charger has completed the bulk stage of the charge and the battery is at approximately 80% of charge. The charging could be terminated at this point if the machine requires immediate usage, however, it is highly recommended to wait until the green 100% charge LED illuminates to ensure maximum battery capacity and battery life.
5. When the green 100% LED is continuously on, the batteries are completely charged. The charger may now be unplugged from AC power (always pull on plug and not cord to reduce risk of damage to the cord). If left plugged in, the charger will automatically restart a complete charge cycle if the battery pack voltage drops on average below 2.1 volts-per-cell or 30 days has elapsed.
6. If a fault occurred anytime during charging, the red FAULT LED will flash with a code corresponding to the error. To indicate which error, the FAULT LED will flash a number of times at a rate of two times per second, pause 0.5 seconds, then repeat.
[1 FLASH] Battery Voltage High: auto-recover
[2 FLASH] Battery Voltage Low: auto-recover
[3 FLASH] Charge Timeout: the charge did not complete in the allowed time. This may indicate a problem with the battery pack (voltage not attaining the required level), or that the charger output was reduced due to high ambient temperatures.
[4 FLASH] Check Battery: the battery pack could not be trickle charged up to the minimum level required for the charge to be started. This may indicate that one or more cells in the battery pack are shorted or damaged.
[5 FLASH] Over-Temperature: auto-recover. Charger has shutdown due to high internal temperature. Charger will restart and charge to completion if temperature comes within accepted limits, but the fault LED indication will remain until the charger has been reset (AC removed).
[6 FLASH] QuiQ Fault: an internal fault has been detected. If Fault 6 is again displayed after interrupting AC power for at least 10 seconds, the charger must be brought to a qualified service depot.

Maintenance Instructions

1. For flooded lead-acid batteries, regularly check water levels of each battery cell after charging and add water as required to level specified by battery manufacturer. Follow the safety instructions recommended by the battery manufacturer.
2. Make sure charger connections to battery terminals are tight and clean.
3. Do not expose charger to oil or to direct heavy water spraying when cleaning machine.

DC Battery Connection Procedure:

1. The green wire outputs a battery voltage when the charger is not plugged in to AC to provide an Interlock function.
2. Securely fasten the black ring terminal from the charger to the negative terminal ("-", "NEG", "NEGATIVE") of the battery pack.
3. Select Charge Algorithm if battery type is other than factory default.

Check / Change Charging Algorithm:

The charger comes pre-loaded with nine algorithms for Lead Acid batteries as detailed in Table 1. Each time AC power is applied with the battery pack NOT connected, the charger enters an algorithm select/display mode for approximately 11 seconds - this is the only time the algorithm can be changed. In this mode, the present algorithm is displayed on the LED bar graph or 80% LED as shown in Table 1. If the algorithm # is from one to six, it will be displayed on the bar graph with the lowest LED indicating that Algorithm 1 is selected; the second lowest LED indicates that Algorithm 2 is selected, etc. For all algorithm #'s, the algorithm number is also indicated on the 80% LED by the number of blinks separated by a pause. *** Note- algorithms 7-9 is indicated only with the 80% LED indication - no bar graph indication is given.*

Check or change the charging algorithm:

- a. Disconnect the positive connector from battery pack. Apply AC power and after an up/down flash of the LEDs, the algorithm # will display for 11 seconds.
- b. To change algorithm, touch connector during the 11-second display period to the battery pack's positive terminal for 3 seconds and then remove- the algorithm # will advance after 3 seconds. Repeat until desired algorithm # is displayed. A 30 second timeout is extended for every increment. Incrementing beyond algorithm 9 moves back to algorithm 1. After desired algorithm is displayed, touch the charger connector to the battery positive until the output relay is heard to click (~10 seconds)- algorithm is now in permanent memory.
- c. Remove AC power from the charger and reconnect the charger positive connector to the battery pack. It is highly recommended to check a newly changed algorithm by repeating the above steps a) and c).

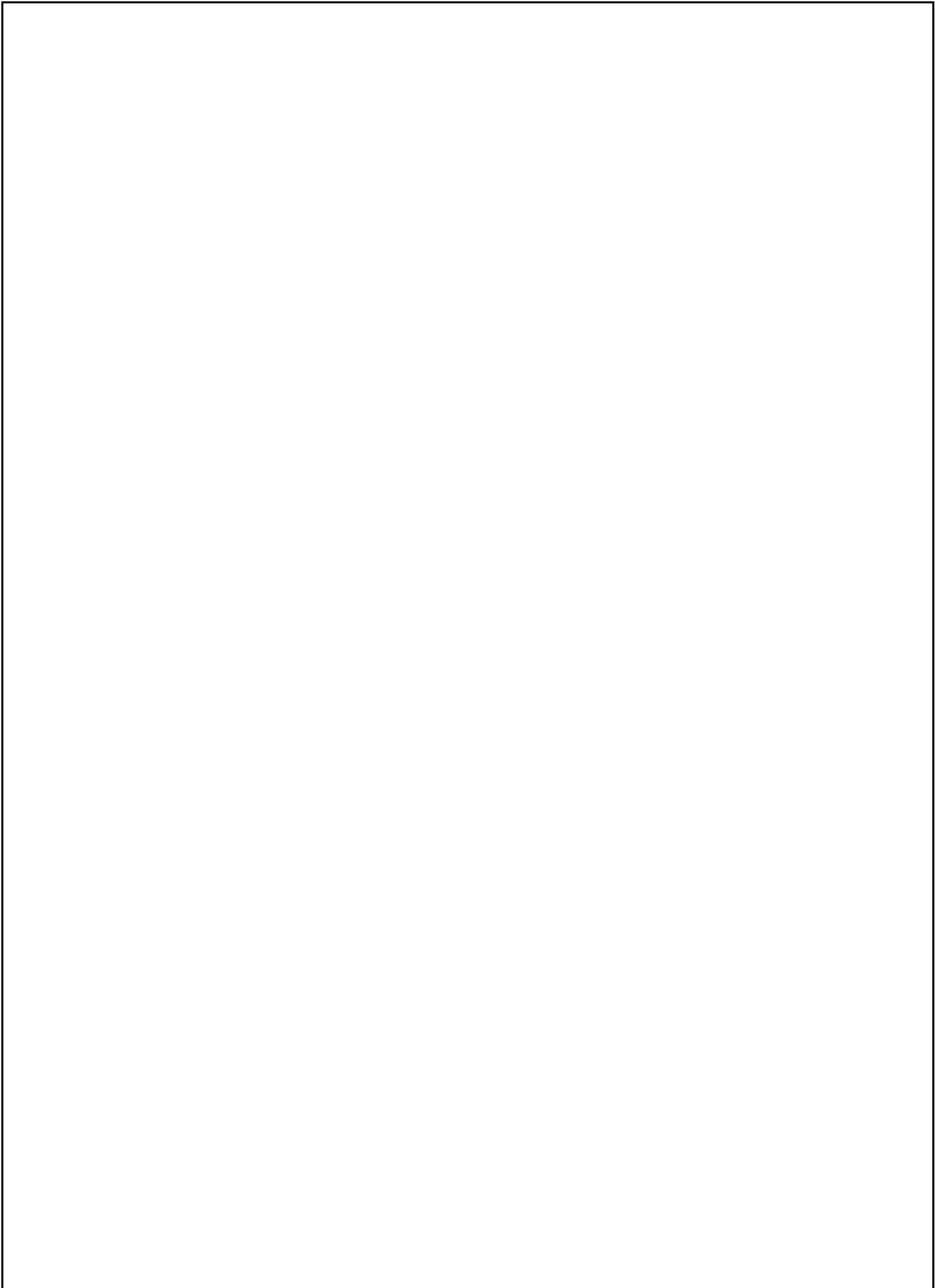
Delta-Q Battery Charger - Battery Types					
NSS Part Number	Crown Part Number	Battery Volts	System Volts	Amp Hour	Recommended Algorithm
4491061	1-1470	12	36	210	# 1
3390361	1-1435	6	24 & 36	225	# 1
2392111	1-1427	12	24	115	# 5
6393651	1-1428	12	24	145	# 5
2392731**	1-12145	12	24	100	# 6
6491931**	1-1437	6	24 & 36	180	# 6
2691501	1-1450	6	36	325	# 7
7691401	1-1460	6	36	395	# 7

Table #1

TROUBLE-SHOOTING

PROBLEM	CAUSE	SOLUTION
No solution flow.	Clogged filter.	Clean filter.
	Low battery charge.	Charge the batteries.
	The solution valve is closed.	Open the solution valve.
	Obstruction in the solution hose.	Remove the obstruction.
	Solution valve or linkage damaged.	Repair / replace the valve linkage.
	Solution hose kinked.	Check for kinks at valve and remove.
	Solution tank is empty.	Fill the tank.
Solution flow does not stop.	The solution valve is open.	Close the solution valve
	The solution valve or linkage is damage.	Repair / replace the valve linkage.
	Solution valve is dirty	Clean the solution valve.
	Damaged seat and washer in valve.	Replace valve.
	The valve stem is dirty.	Clean and lubricate valve stem.
Will not pick up any water from floor.	Hose disconnected or damaged.	Reinstall or replace hose.
	Squeegee is up.	Lower squeegee.
	Squeegee hose is off.	Reinstall hose.
	Vac motor switch is off.	Turn vac motor switch "on".
	Recovery tank is full.	Empty tank.
	Vacuum shut-off float is stuck.	Clean screen and remove obstruction.
	Obstruction / damage in the squeegee, squeegee hose or standpipe.	Remove obstruction / repair damage.
	Leaking over gasket.	Remove old gasket / replace.
	Vac motor is not running.	Have authorized serviceman repair.
	Recovery drain hose not plugged in properly.	Install drain hose plug properly.
Will Not Pick Up All Of The Water From The Floor.	Debris on squeegee blades.	Clean squeegee.
	Squeegee blade is worn / damaged.	Reverse / replace squeegee blade.
	Obstruction / damage in the squeegee, squeegee hose, or standpipe.	Remove obstruction / repair damage.
	Squeegee angle needs adjustment.	Adjust angle.
	Vacuum motor worn out.	Repair / replace vac motor.
	Recovery tank drain hose damaged.	Repair / replace recovery drain hose.
	Vac filter clogged.	Clean vac filter under top metal plate.
Batteries Do Not Seem To Run Long Enough.	Over charging batteries. (Charging too frequently).	Monitor run time, and adjust charging frequency accordingly.
	Tops of batteries are dirty / wet.	Clean / dry, charge batteries.
	Battery terminals are dirty / damaged.	Clean terminals and connectors. Replace damaged cables. Charge.
	Electrolyte level is too low.	Add distilled water and charge.
	Batteries are not fully charged.	Charge batteries for 8 hours.
	Charger is damaged.	Have an authorized serviceman repair.
	Battery is defective or worn out.	Check cell voltage while discharging.
Cleaning Is Not Even.	Brush / pad is worn.	Replace brush / pads.
	Damage to brush assembly; casters or solution valve.	Have an authorized serviceman repair.
	Hoses may be kinked or obstructed	Repair / remove obstruction.
Machine does not run.	Battery cables loose or not connected.	Check and connect or tighten.
	Circuit breaker tripped.	Reset circuit breaker.
	Batteries not charged.	Charge batteries.

NOTE: If any problems remain after taking the above steps, contact your local authorized distributor/service station for further evaluation and repair.





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