

OPERATION MANUAL
CHAMP 2929 RB

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 tanks.

INTENDED USE

This machine is intended for commercial use, scrubbing floors in an indoor environment. NSS does not recommend using these machines 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 be 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.
- **NEVER** turn on machine unless sitting in the operators seat.
- **NEVER** climb on machine when it is turned on.
- **NEVER** use machine to transport passengers other than the operator.
- **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 the 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

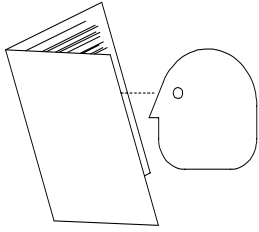


IMPORTANT SAFETY INSTRUCTIONS

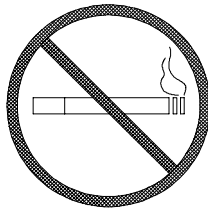
BATTERY POWERED EQUIPMENT WITH ON BOARD CHARGERS



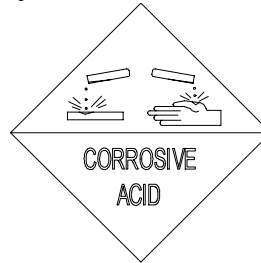
WARNING: Failure to observe these instructions can cause personal injury to machine operator or bystanders.



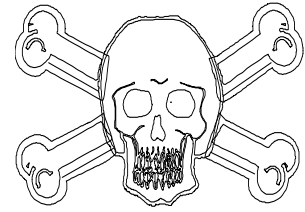
Read and understand all instructions before installing or charging batteries.



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

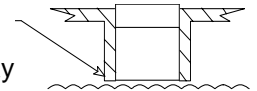
- **ALWAYS** use two people to install, as batteries are heavy.
- **ALWAYS** turn off all machine switches.
- **ALWAYS** position batteries as shown on the machine installation decal to maintain machine balance.
- **ALWAYS** connect batteries as shown on the machine installation decal to avoid shorting 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 70 dB(A)

VIBRATION

Weighted RMS acceleration value .507 m/s²
(ISO 5349)

MACHINE INSPECTION

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

MACHINE COMPONENTS

CONTROL PANEL

The operator control panel is located to the left of the operator's seat. This panel has components that control various machine functions. See diagram below.

Key Switch - key must be turned to the right to activate machine.

Brush Switch - 3 positions, 3 functions:

- Up is on, lowering brushes to light pressure.
- Middle is off, raising brushes.
- Down is on, lowering brushes to heavy pressure.
- Brushes only come on when machine is moving in forward or reverse.

Traction Speed Switch - 2 Positions:

- Down is high speed.
- Up is low speed.

Push Button - Toggles between display screens. Defaults to screen 1 when turned on.

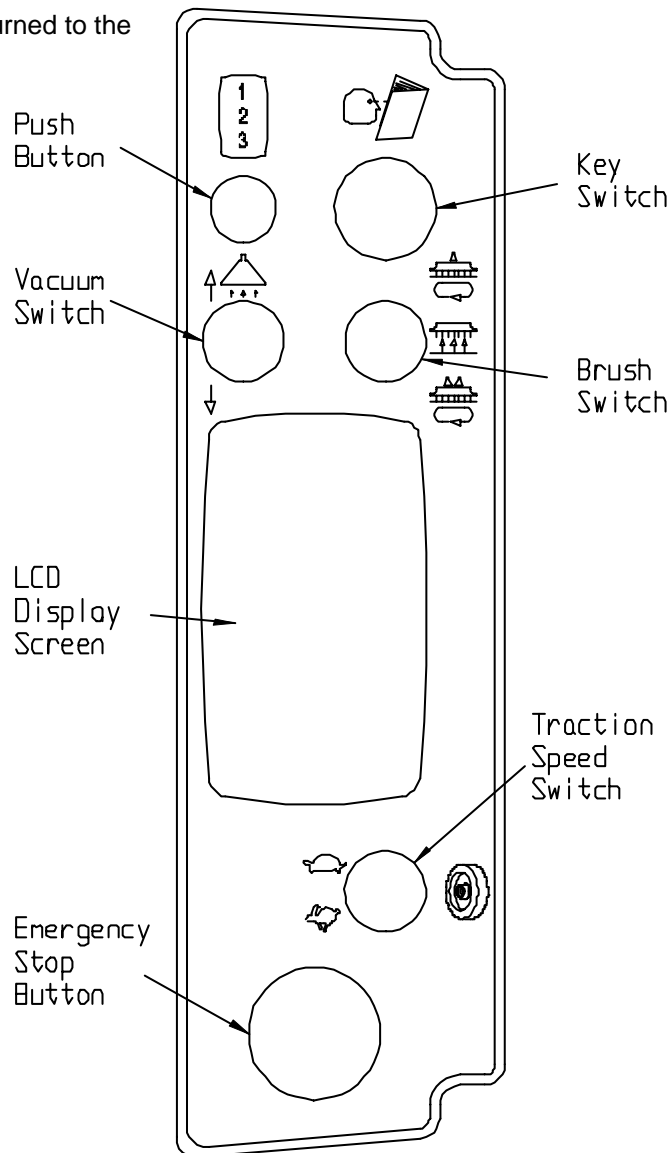
Vacuum Switch - 2 positions; 2 functions:

- Up is on, lowering squeegee.
- Down is off, raising squeegee.
- Squeegee automatically rises in reverse.

LCD Display Screen - brightly lit to work in all lighting situations.

Emergency Stop Button

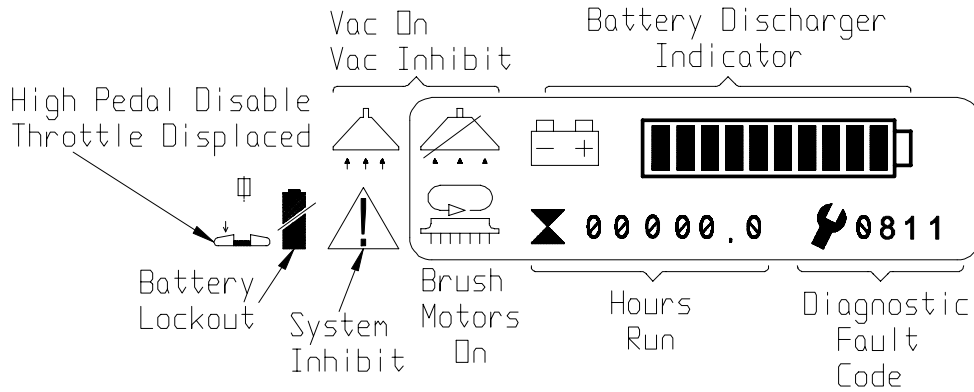
- Push for off.
- Turn for on.



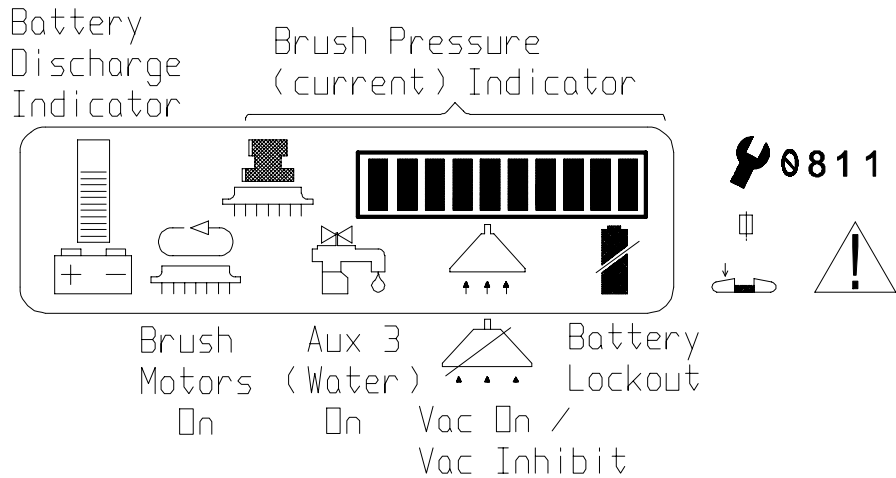
THE DISPLAY SCREENS

There are many symbols that can be displayed on the LCD. Therefore, the LCD Push Button can be used to toggle between pre-defined screens (see Control Panel for Details).

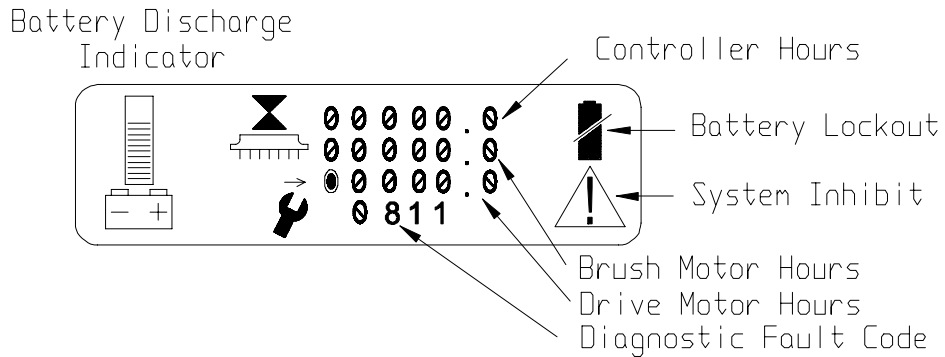
Screen 1



Screen 2



Screen 3



MACHINE OPERATION

General Information

The CHAMP 2929 is very maneuverable and is designed to clean as you drive the machine. Follow these steps to prepare the machine for daily operation.

- **Always** sweep or dust mop the floor of debris before scrubbing. 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 as possible.
- Remove as many obstacles as possible from the area to be cleaned.
- Place "Wet Floor" warning signs in area being cleaned.
- Consult your local NSS distributor for more complete procedures and chemical advice.

Preparing the Machine for use

Prepare the Solution Tank:

- Never use water over 140° F (60° C).
- Pour all liquids through the mesh filter at the left side of the solution tank.
- Fill with clean water, up to 29 gallons.
- Add the cleaning chemicals to the solution tank.

Prepare the Recovery Tank:

- Always use a defoamer to protect the vacuum motor of this machine. We recommend that you add at least 4 to 6 ounces of defoamer chemical.
- Vacuum the defoamer into the recovery tank through the vac hose.
- Make sure that the drain plug of the recovery tank hose is closed tightly.

Install a Pad Driver and Pad:

- There is a wide range of pads or brushes available for the many cleaning applications of this machine. See the "Accessories" page in the Parts List manual.
- Pull pin and open skirt.
- Turn the pad driver upside down on the floor and remove the pad holding cup.
- Remove the center cutout of the 15" pad and 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 motor into the transport position (center position of switch).
- Align the lugs of the pad driver with notches of the drive casting.
- Turn the pad driver to lock onto the drive casting.
- Close the locking latch.
- Close the skirt.
- Repeat for the other side.

Install a Brush:

- Pull pin and open skirt.
- Raise the brush motor into the transport position.
- Align the lugs of the brush with the notches of the drive casting.
- Turn the brush to lock onto the drive casting.
- Close the locking latch.
- Close the skirt.

Install the Squeegee Assembly:

- Loosen the two mounting knobs and slide the squeegee assembly onto the mounting plate.
- Hand-tighten the mounting knobs. Do **not** use pliers to tighten the knobs, as this will defeat the "breakaway" design.
- As the machine is used, the squeegee blades wear out, and need to be replaced due to damage.
- Squeegee blades should lie over (like a window squeegee) whenever the machine is moving forward.
- Do not add any weights or other pressure to the squeegee mechanism; it will not improve the performance or service life.
- The squeegee rises automatically when the machine is in reverse.
- Squeegee springs add pressure to floor. There are 3 adjustments available by moving the end of the spring closest to the frame from hole to hole. More pressure is added the further away the hole is from the center point. When changing the pressure always move **both** sides, using the same distance (hole) on each side.

NOTE: Remove squeegee, brushes or pad drivers, and side skirts if transporting to different places or loading / unloading into a truck or trailer.

MACHINE MAINTENANCE

Daily Maintenance

- Recharge the batteries when indicated by the Battery Discharge Indicator.
- Empty and rinse clean the recovery tank.
- Remove and rinse clean the squeegee assembly.
- Remove and rinse clean the pad driver and / or brush.
- Inspect the machine components for wear or damage. Call authorized service center for repairs.
- Wipe machine down; **NEVER** spray this machine with water or any liquids.

Weekly Maintenance (Every 25 Hours)

- Verify that all daily maintenance has been performed.
- Inspect the battery liquid level; using only water, adjust to the proper level as needed.
- NOTE: If optional auto fill system is installed, follow the directions that come with this system.
- Check all battery terminal and cable connections. Tighten as deemed necessary.
- Clean any corrosion from the battery terminals and cables.
- Check the solution flow to the pad driver and / or brush. Flush clean the solution tank and hose with a mixture of 8 oz. (250ml.) of white vinegar to 1 gallon (4 liter) of warm water.
- Inspect filters.

Monthly Maintenance (Every 100 Hours)

- Verify that all daily and weekly maintenance has been performed.
- Clean filters by rinsing with cool, clear water. Dry Completely.

After every 750 Hours of Operation:

- Inspect the drive motor carbon brushes for wear. Replace the brushes when they are 3/8 in. (9mm.) in length.
- Inspect the brush drive motor carbon brushes for wear. Replace the brushes when they are 1/2 in. (13mm.) in length.
- Inspect the vacuum motor carbon brushes for wear. Replace the brushes when they are 7/16 in. (11mm.) 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 taken 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 / White ring terminal from the battery charger to the negative terminal ("-", "NEG", "NEGATIVE") of the battery pack.
3. Securely fasten the Red wire ring terminal from the battery charger to the positive ("+", "POS", "POSITIVE") of the battery pack.
4. 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 are 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.

**** Note: Gell Battery**

TRIO+: Scrubber System Diagnostic Codes

Scrubber System Faults External to TRIO+

Code	Fault Description	Corrective Action
0810	Throttle fault-1.0	For all Throttle Diagnostic Codes:
0811	Throttle max wiper difference error.	1- Check the throttle wiring for shorts or opens. Repair or replace as necessary.
0812	Throttle max pull down difference error.	2- If Diagnostic Code is not cleared, then replace throttle (Potentiometer).
0813	Throttle max pull safe difference error.	" " " "
0814	Throttle reference error.	" " " "
0815	Throttle lo reference error.	" " " "
0816	Throttle hi reference iso error.	" " " "
0817	Throttle lo reference iso error.	" " " "
0818	Throttle error both have readings.	" " " "
1310	Excessive current trip.	High Voltage - Battery Voltage exceeds Controller Parameters.
1311	Soft aux 1 over current occurred.	Brush Lift Actuator exceeded current limit. Check limit switch settings, wiring, or replace.
1312	Soft aux 2 over current occurred.	Squeegee Lift Actuator exceeded current limit. Check limit switch settings, wiring, or replace.
1313	Soft aux 3 over current occurred.	Solution Solenoid exceeded current limit. Check wiring, or replace.
1314	Soft aux 4 over current occurred.	Overhead Light or Head Light exceeded current limit. Check wiring (diodes), or replace device.
1318	Soft brake light over current occurred.	Horn circuit exceeded current limit. Check wiring (diodes) or replace device.
131C	Soft alarm over current occurred.	Beeper circuit exceeded current limit. Check wiring or replace device.
1321	Aux 1 over current 2 occurred.	Brush Lift Actuator exceeded current limit. Check limit switch settings, wiring, or replace.
1322	Aux 2 over current 2 occurred.	Vac Lift Actuator exceeded current limit. Check limit switch settings, wiring, or replace.
1411	Error aux 1 positive shorted - low.	Check Brush Lift Actuator and wiring. Repair or replace as necessary.
1412	Error aux 1 negative shorted - low.	Check Brush Lift Actuator and wiring. Repair or replace as necessary.
1413	Error aux 2 positive shorted - low.	Check Squeegee Lift Actuator and wiring. Repair or replace as necessary.
1414	Error aux 2 negative shorted - low.	Check Squeegee Lift Actuator and wiring. Repair or replace as necessary.
1501	Brake fault 2.	Check Brake circuit wiring and brake. Repair or replace as necessary.
1507	Brake over current error.	Check Brake circuit wiring and brake. Repair or replace as necessary.
1600	High battery error.	Battery is overcharged or damaged. Replace battery.
1D02	Front-end spec change trip.	Drive parameters have been reprogrammed. Cycle power with key switch.
1E03	Inhibit activated.	Fix whatever condition is causing Inhibit signal.
1E04	Inhibit activated 2.	Fix whatever condition is causing Inhibit signal.
1E06	Inhibit input out of range.	Invalid Inhibit signal. Check wiring and device. Repair or replace as necessary.

2C00	Low battery error.	Battery Charge too low. Recharge battery.
2C01	Low battery error 2.	Battery Charge too low. Recharge battery.
2C02	Soft battery lockout occurred.	Battery Charge too low. Recharge battery.
2C03	Soft battery lockout 2 occurred.	Battery Charge too low. Recharge battery.
2F01	Tiller displaced error.	Throttle displaced on Power-up. Release throttle and then re-engage throttle. Check Potentiometer settings (neutral).
3A00	Bad settings.	Illegal program parameter settings.
7000	Startup with push selected.	N/A
7001	Push activated in drive mode.	N/A
7500	Tiller comms timeout.	Problem with LCD Module or wiring. Check cable connection between controller and LCD. Repair or replace as necessary.
7600	Soft brush motor disconnected error.	Check Brush Motor wiring and connections.
7601	Soft brush current fold back.	Check Brush Motor for excessive amp draw. Check for locked rotor conditions (debris caught in brushes, gear box locked up, etc.). Repair or Replace as necessary.
7602	Soft brush current fold back 2.	Check Brush Motor for excessive amp draw. Check for locked rotor conditions (debris caught in brushes, gear box locked up, etc.). Repair or Replace as necessary.
7603	Soft brush current fold back 3.	Check Brush Motor for excessive amp draw. Check for locked rotor conditions (debris caught in brushes, gear box locked up, etc.). Repair or Replace as necessary.
7604	Soft brush inhibit.	Check Brush Motor for excessive amp draw when starting. Repair or Replace as necessary.
7605	Brush startup over current detection.	Check Brush Motor for excessive amp draw. Check for locked rotor conditions (debris caught in brushes, gear box locked up, etc.). Repair or Replace as necessary.
7700	Soft vacuum motor disconnected error	Check Vac Motor wiring, connections and carbon brushes.
7701	Soft vacuum current fold back.	Check Vac Motor for excessive amp draw. Repair or Replace as necessary.
7702	Soft vacuum current fold back 2.	Check Vac Motor for excessive amp draw. Repair or Replace as necessary.
7703	Soft vacuum current fold back 3.	Check Vac Motor for excessive amp draw. Repair or Replace as necessary.
7800	Traction motor fault -1.	Check Drive Motor wiring, connections.
7801	Traction motor over current error.	Check Drive Motor for excessive amp draw. Release Parking Break. Replace as necessary.
7802	Soft traction motor in fold back state.	Traction Motor being overloaded or Fold back parameters set too low.
7803	Motor line voltages instability timeout.	Check Drive Motor wiring, Controller wiring, connections.
7880	Traction speed input out of range.	Check Drive Motor wiring, Controller wiring, connections.
7900	Emergency stop error.	N/A
7901	Soft belly button activated.	N/A
8000	Service mode.	N/A
9000	Brushes not fitted.	N/A

Possible Internal TRIO+ Faults

Code	Code	Code	Code	Corrective Action
0003	1800	3104	3603	For All Internal TRIO + Diagnostic Codes:
0100	1802	3105	3608	1 - Turn Off Key switch and disconnect batteries.
0204	1B20	3200	3609	2 - Wait 1 minute.
0705	1B21	3201	360a	3 - Reconnect Batteries and turn On Key switch.
0706	2102	3210	360b	4 - If Diagnostic Code is not cleared, then replace TRIO+.
0A01	2103	3211	360c	
0B02	2D01	3212	360d	
0B0B	3100	3213	360e	
1704	3101	3214	7501	
1705	3102	3601		
1706	3103	3602		

TROUBLE SHOOTING

PROBLEM	CAUSE	SOLUTION
No Solution Flow.	The solution valve is closed.	Open the solution valve.
	Water solenoid valve not open.	Charge the battery.
	Obstruction in the solution hose.	Remove the obstruction.
	Solution valve or cable damaged.	Repair / replace the valve cable.
	Solution tank is empty.	Fill the tank.
	Solution valve is dirty.	Clean the solution valve.
	Damaged seat and washer in valve.	Replace valve.
Will Not Pick Up Any Water From The Floor.	Squeegee is up.	Lower squeegee.
	Vac motor switch is "off".	Turn vac motor switch "on".
	Recovery tank is full.	Empty tank.
	Vacuum shut-off float is stuck.	Remove obstruction.
	Hole in squeegee hose.	Replace hose.
	Vac motor is not running.	Have an authorized serviceman repair.
	Drain plug not in tight.	Tighten drain plug.
	Porthole cover is missing.	Replace porthole cover.
	Squeegee blade is worn / damaged.	Reverse / replace squeegee blade.
	Obstruction / damage in the squeegee, squeegee hose or standpipe	Remove obstruction / repair damage.
Batteries Do Not Seem To Run Long Enough.	Tops of batteries are dirty / wet.	Clean / dry, charge batteries.
	Battery terminals are dirty / damaged.	Clean terminals, and connectors, replace damaged cables.
	Electrolyte level is too low.	Add water and charge.
	Batteries are not fully charged.	Charge batteries for 8 hours.
	Charger is damaged.	Have an authorized serviceman repair.
	Battery is defective.	Check cell voltage while discharging.
	Wrong size battery.	Replace with larger batteries.
	Batteries have memory — recharging prematurely will result in a loss of battery capacity.	Don't recharge batteries until "Battery Re-charger" indicator is displayed.
	Battery tray full.	Drain battery tray.
Cleaning Is Not Even.	Brush / pads are worn.	Replace.
	Damage to brush assembly or solution valve.	Have an authorized serviceman repair.
	Motor is not running.	Check circuit breakers. Reset if necessary, replace carbon brushes, repair wiring, replace switch.
	Not enough or uneven water.	Check solution hose for blockage.
Machine Does Not Run.	Check circuit breaker.	Reset circuit breaker. Check battery connections.
	Code on control panel.	Contact authorized repair service center.

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



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