Sierra
Installation & Troubleshooting

βeta

Presentation Objectives

- This presentation is intended for both experienced field personnel familiar with warewashing installations, as well as new field service personnel who have only a rudimentary knowledge of accessing triggers and conductivity control.
- The objective is to train the installer to be able to install Sierra on either a door or conveyor dishwashing machine, and troubleshoot any unusual conditions they may encounter. To train new installers, we recommend using this presentation in conjunction with an actual installation or at least a lab installation followed by a site visits to see typical conveyor and door machine installations.
- Excluded from this presentation is detailed training on electrical safety, which should always be performed prior to attempting any high voltage installations. In brief, however, power to the dishwasher and dispenser should be shut off at the source prior to opening them, and a voltmeter should be used to verify the power's off prior to doing wiring.

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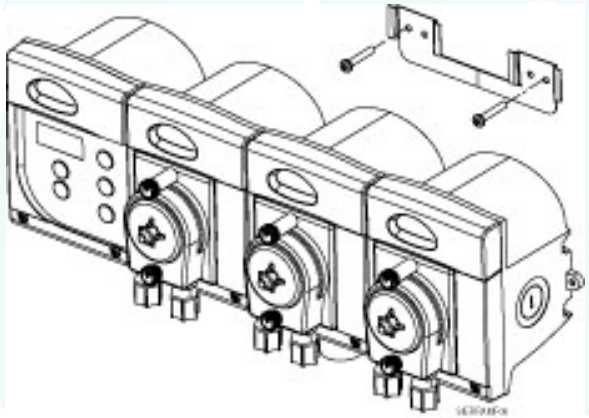
This presentation is comprised of the following sections

- Physical installation: mounting, tubing, solenoid water supply
- Wiring: power connection, trigger/signal wiring
- Programming
- System alarms and troubleshooting

Sierra Mounting Location

- Pick a spot to the pumpbox(s) on the wall over the dish tray counter or behind the washer; the former is preferred so it's easy for the dishwashers to see and react to alarms.
- Put one screw in bracket, hold level on top to ensure it's level and add second screw
- Slide Sierra onto bracket, securing in place with screws on either side of Sierra if desired. (Don't add them until the system is fully installed)
- For solid or powder detergent capsule bowls, be sure to install in a location where it's easy for the dishwashers to check and replace the capsule.



Don't install pumpbox such that the screen can't be seen; screen alarms help the account prevent washer downtime and do maintenance by themselves, saving you from trouble calls!

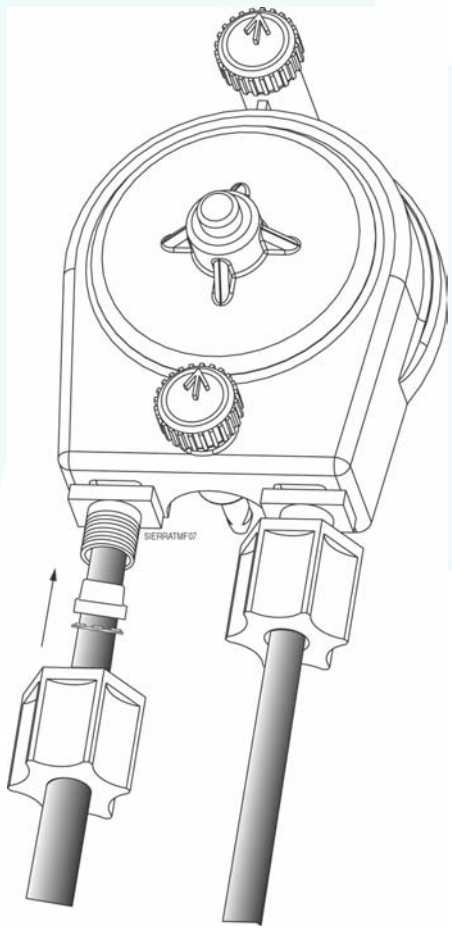
TUBING:
Chemical Pickup Lance Connection

035623 Detergent 1/4″ ID 18″ long CPVC standpipe

050572Rinse 1/8″ ID 18″ long CPVC standpipe

- Connect tubes to standpipes as shown at left. The standpipes come with nut fittings to connect to standard 1/4” ID detergent and 1/8” ID rinse polyflow transport tubing
- For installations requiring a low level alarm lance, you can either use a separate low level lance, or a low level suction lance such as 1201071 which clamps onto the side of the drum

TUBING:
Pump Connection



- The left side of the pump is the suction side which should be connected to the chemical supply
- The right side of the pump is the chemical discharge side which will be connected to injection fittings on the washer
- Loosen tube nuts, insert tubes, and tighten nuts as shown

TUBING:
Injection Fittings

- Mount the detergent bulkhead fitting in a 7/8” hole above the water line, just below where the probe will be located. Make sure the area has plenty of water circulation, such as an area near the wash pump strainer inlet so the detergent will get circulated immediately
- Add rinse injector to rinse line, in a location away from large amounts of steam or moving parts which can induce thermal or physical fatigue on injector plastic over time. If using a pressure switch or a sanitizer, an injector with two connections is required, one for the rinse and one for the sanitizer or copper tubing line to the pressure switch. We recommend using a stainless steel injection fitting if installing in a remote location, since they are impervious to thermal and physical fatigue
- Tubes connect to the detergent bulkhead fitting and rinse injection fitting just like they do to the pump nuts.

Don’t use an old hole if it’s in the wrong spot! Making a new hole during installation always takes less time than getting a trouble call and making a new hole on a separate trip

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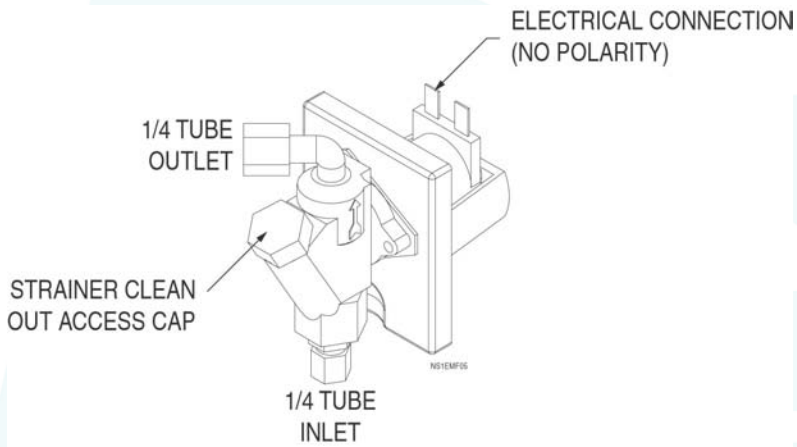
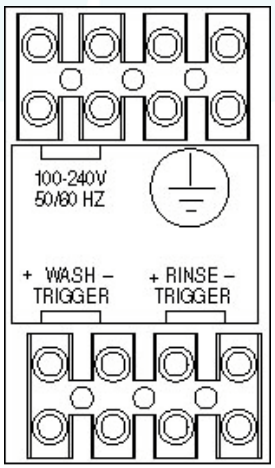
Solenoid & Bowl



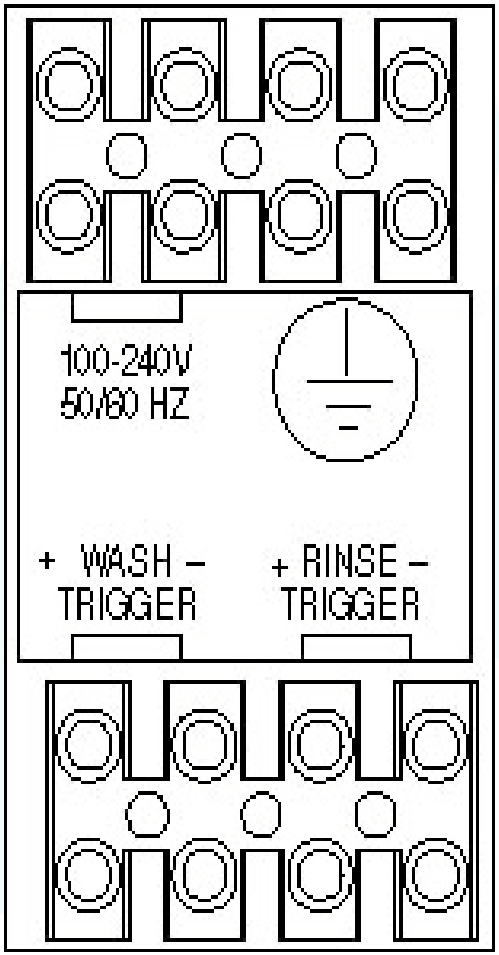
- Connect water supply tube to water inlet on bottom of solenoid. Be sure to verify which way the arrows point on the solenoid, since standard warewash solenoids have the water inlet on the bottom whereas OPL solenoids have it on the top.
- Connect outlet to bowl
- Mount bowl in a location where it will be easy for the dishwashers to replace the detergent capsule

WIRING:
Main Power

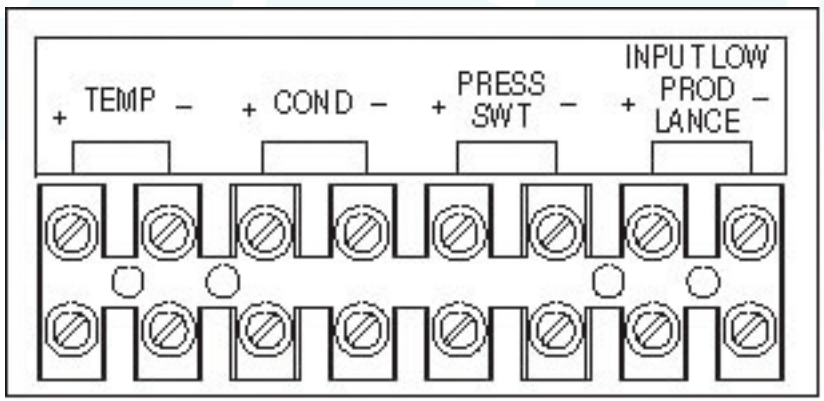
- To access the terminal block under the pump shown at right, put a small screwdriver under the left or right side of the sliding white door over the pump, pry it off gently and then undo the four screws
- Attach a constant source of 100-240 VAC 50/60 Hz power to the right and left white terminal block connectors.
- Crimp a 10-12 GA (4mm^2) ground wire to the ground connection next to the power input
- Run power and ground wires through a strain relief such as 090369 or conduit connection on bottom of unit. Replace cover so it supports the surface around the knockouts prior to knocking them out
- Never run the probe wire next to the power or trigger wires; the electrical noise they emit can interfere with getting a correct probe reading



WIRING:
Trigger Connection



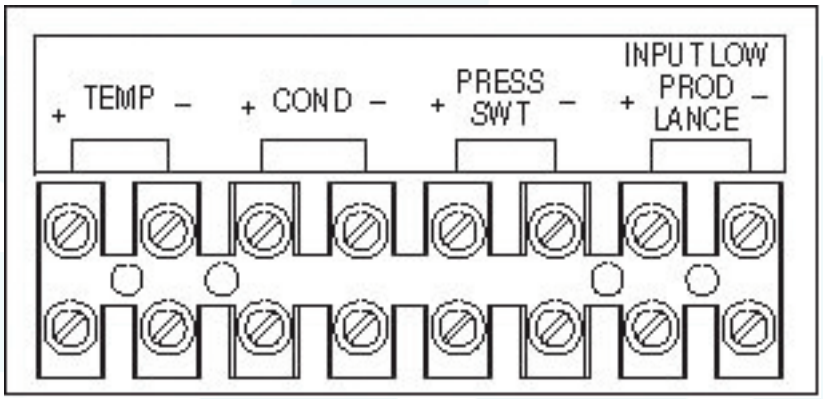
- Connect detergent trigger wires to “WASH TRIGGER” and rinse solenoid wires to “RINSE TRIGGER”
- If using a pressure switch, connect it to the PRESS SWT connection on the terminal block behind the rinse pump

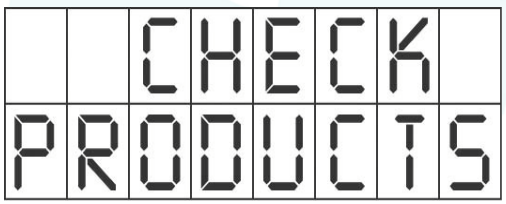


Keep dishwasher and main power off at all times while the pumpbox is open!

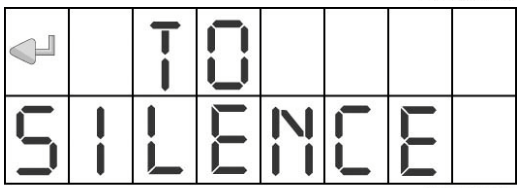
OPTIONAL WIRING:
Low Level Alarm

- Put any low level drum lances(#1201188 or 1202071) into the chemical drums
- Connect wires from the lance sensor to INPUT LOW PROD LANCE on the terminal block
- Sierra will automatically sound an alarm and display the screen shown at right on the display when the low level alarm has a contact closure
- The alarm can be silenced by pressing the action button



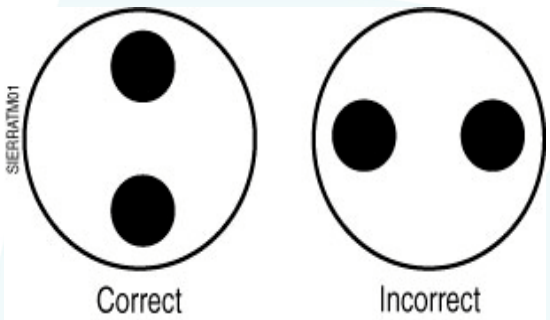


SIERRAMS33.1

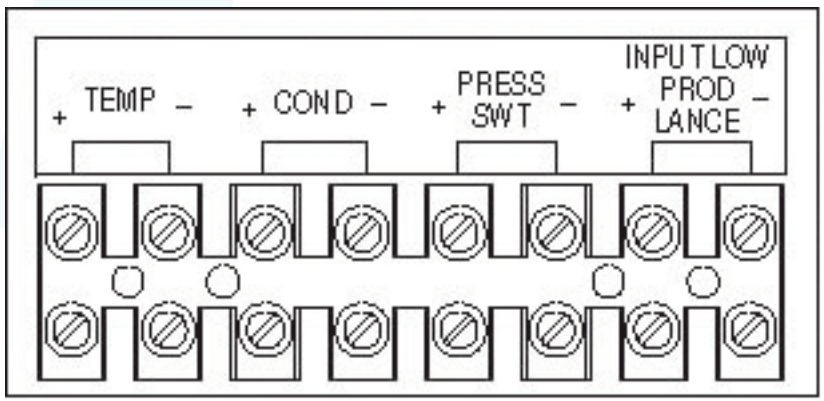


SIERRAMS36.1

WIRING:
Probe Connection



Be sure you do not mount the probe in an old hole that's a bad location, since that can produce bad probe readings or subject the probe to too much thermal shock



- Mount conductivity probe 3-4 inches (8-10 cm) from the bottom of the wash tank, about 3"-5"/7-12cm over the detergent injection point and as close to the wash pump intake strainer as possible. The terminals should be vertically oriented as shown.
- Ensure the probe location is not close to heater elements, corners, or in the path of moving mechanical components. Ensure the probe location is in an area with plenty of circulation
- Connect probe wires to COND input. If using a temperature compensated probe, run the thermistor/temperature wires to the TEMP input
- Probe wires can be run out of the pumpbox with low level wires since they don't emit electrical noise, but they must be separated from noisy power and trigger wires

PROGRAMMING:
Key Functions

+ or – keys change the value of the blinking number or letter. Allows dishwasher to toggle run mode screens you've made available for them to view

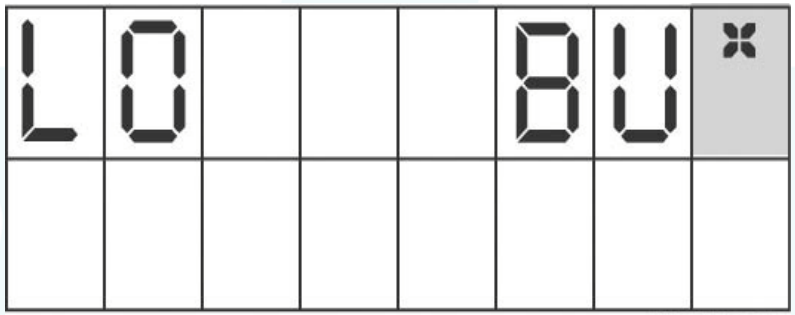
CURSOR key: Moves the cursor around the screen, changing which field is selected.

ACTION key: Initiates an action such as priming or cancels alarm. Does not change settings.

MENU key: Advances to the next menu screen. Pressing menu+action simultaneously takes you back to the run screen.

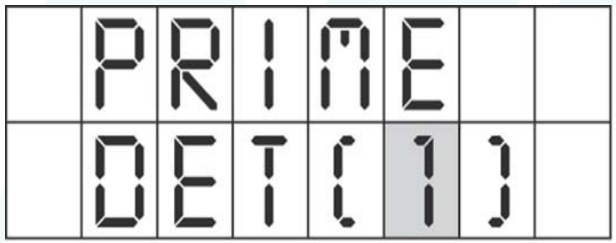
PROGRAMMING:
Run Screen

- The run screen is the default screen that appears in normal operation.
- On powerup, the software version is displayed, followed by the run screen.



SIERRAMS24.1

PROGRAMMING:
Prime Screen



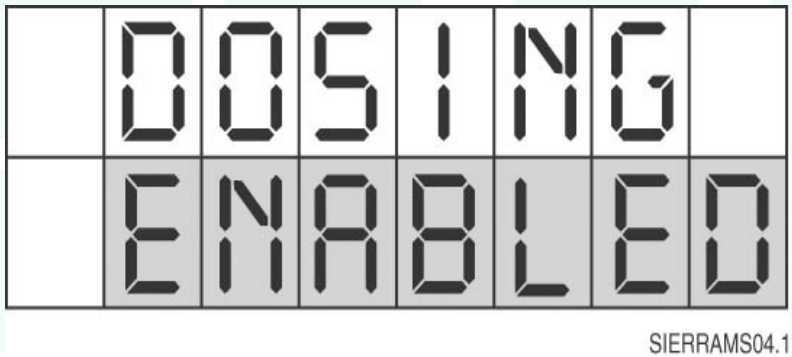
- Press the menu key from the run screen to reach the prime screen

- Press +/- to change the pump number

- Hold down the action key to prime

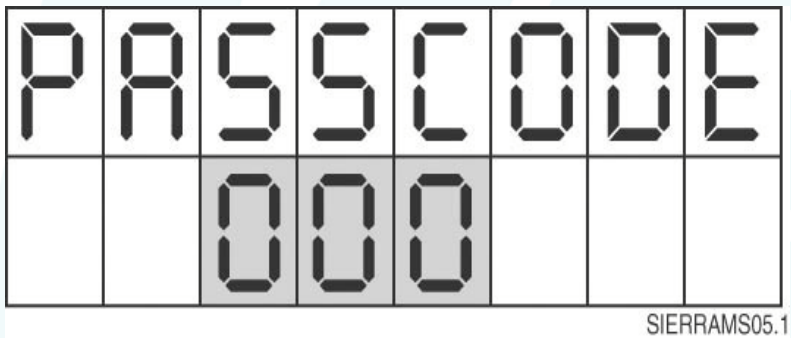
PROGRAMMING:
Disable Pump Screen

- Press +/- to change from dosing enabled to disabled in order to do maintenance.



- Press then menu button to proceed to the next screen

PROGRAMMING:
Password Screen



- The default Password is 000
- Press the menu key to proceed to the other programming screens
- If a Password's already been entered, change the 000 to the correct Password using +/- to change the number and the right arrow cursor key to switch from number to number

- Once the password's been entered, press the menu button to proceed to the next programming screen

PROGRAMMING:
Detergent Dose Mode

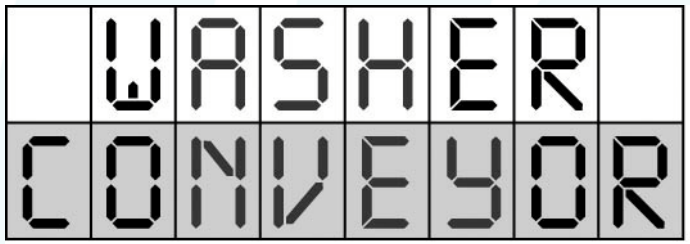
- Use +/- to change from probe mode to time mode

- Press the menu button to proceed to the next screen; there's no need to press a 'save' button or anything like that after changing a setting

SIERRAMS07.1

Only screens associated with the mode and washer type you select will appear on Sierra, but for the purposes of this presentation all of them will be shown

PROGRAMMING:
Dishwasher Type



SIERRAMS08.1

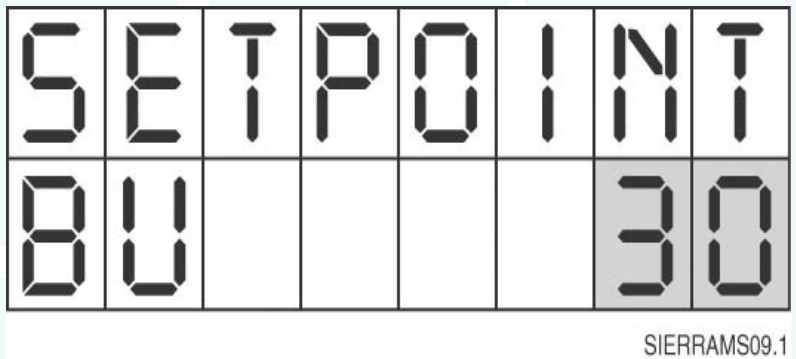
- Use +/- to change from door to conveyor
- Only screens associated with the mode you select will appear, but for the purposes of this presentation they'll all be shown

- Press the menu button to proceed to the next screen

PROGRAMMING:

Setpoint (*only appears when probe mode is selected)*

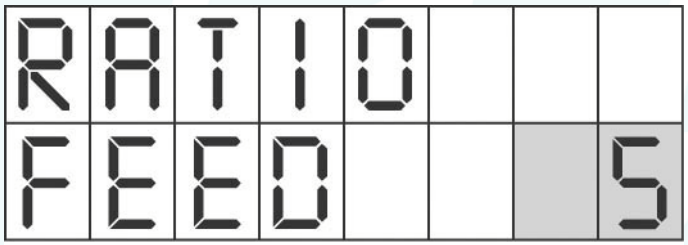
- Use +/- to change setpoint from default value of 30 Beta Units
- Setpoint range is 0-70 Beta Units
- If unsure of BU setting, titrate tank, check BU reading at correct concentration, and then enter that BU reading as setpoint



- Press the menu key to proceed to the next screen.

PROGRAMMING:

Pulse Feed Rate (*only appears when probe mode is selected*)



SIERRAMS10.1

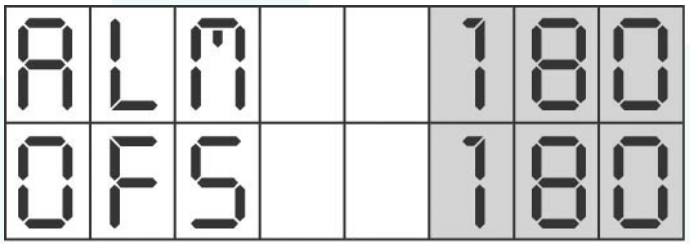
- Use +/- to change feed rate from default 5 seconds on, 5 seconds off
- If a value of 6 is selected, the detergent will run for 6 seconds on 4 seconds off

Detergent feed rate "pulse" reduces the % on time of the detergent pump once the wash tank concentration rises to within 5 Beta Units of setpoint, to prevent overshoot/over dosing

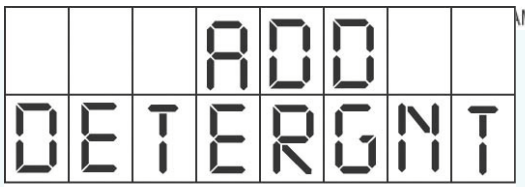
PROGRAMMING:

Detergent Alarms (*only appears when probe mode is selected)*

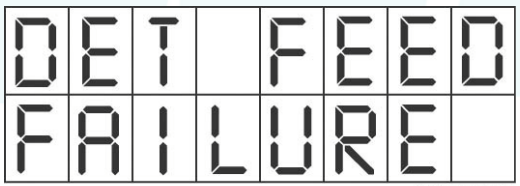
- **ALM=alarm timeout in seconds**; once the detergent pump or solenoid runs for the alarm timeout limit, the screen will flash “ADD DETERGENT” and the sonic alarm will sound, but the pump will continue to run until the overfeed stop time or setpoint is reached.
- **OFS=overfeed stop in seconds**; once the detergent pump or solenoid has run for the overfeed stop duration, thescreen will flash “DET FEED FAILURE”, the feed will be stopped, and the alarm will remain on until setpoint is reached or the probe input is shorted high
- Use +/- to change the settings, using a higher number for the overfeed stop time
- Press the action key to cancel an alarm



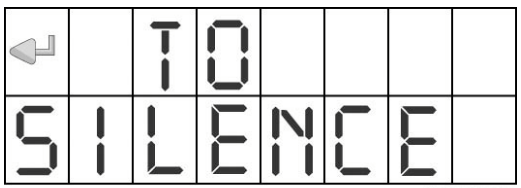
AMS11.1



SIERRAMS11.2



SIERRAMS11.3

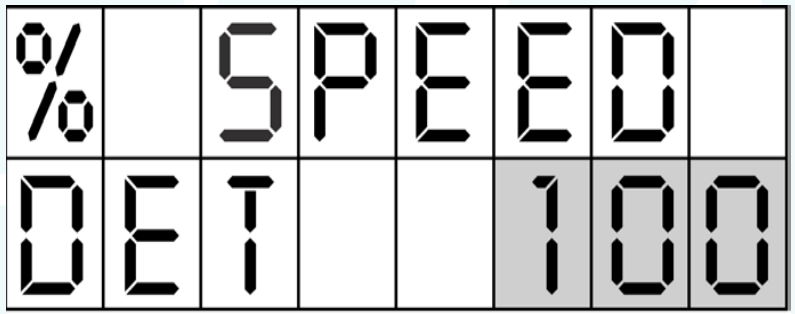


SIERRAMS36.1

PROGRAMMING:
Pump Speeds

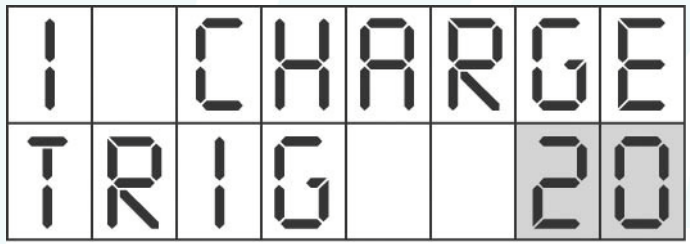
- Use +/- to change which pump is selected

- Use the cursor key to select the pump speed digits and the +/- to change the speed
- Default speeds are 100% for detergent, 20% for rinse, and 30% for sanitizer
- **Never use a speed of less than 100% with a solenoid**; doing so can make the solenoid chatter off and on and not produce enough flow for adequate spray into the detergent bowl



PROGRAMMING:

Initial Charge Trigger (*only appears when time mode is selected*)



SIERRAMS13.1

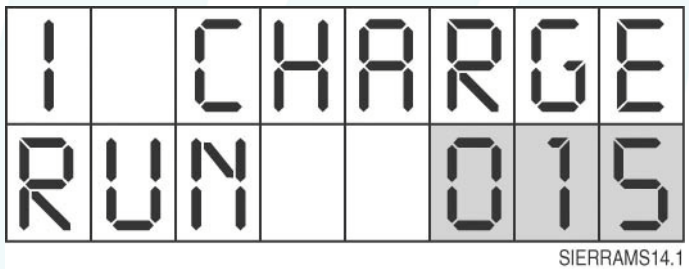
- Use +/- and cursor keys if you need to change the initial charge trigger time.
- The default is 20 seconds and range is 0-240 seconds. For most washers the 20 second default is fine; only very small washers will need a shorter time.

The initial charge trigger time is the amount of time the trigger must be on before the Sierra begins to dose initial charge.

Sierra doses recharge immediately upon receipt of the detergent trigger, and initial charge once the detergent trigger's been on the amount of time specified in this menu. Always use a duration longer than the rinse cycle, to prevent erroneous initial charges.

PROGRAMMING: Detergent Initial Charge

(*only appears when time mode is selected*)

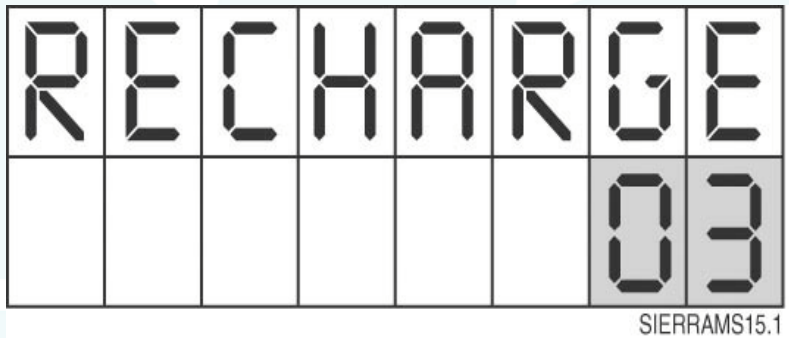


- Use +/- and cursor keys to increase the initial charge time, which puts detergent in the tank as it fills
- The default is 50 seconds and range is 0-240 seconds.
- You'll use a longer initial charge time for larger tanks, less for smaller tanks.

PROGRAMMING: Detergent Initial Charge

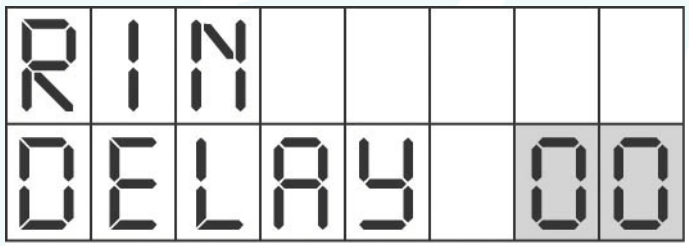
(*only appears when time mode is selected*)

- Use +/- to change the detergent recharge time
- Default time is 3 in a range is 0-24 seconds
- The recharge is the amount of detergent pumped into the dishwasher with each rack so the rinse water doesn't further dilute the tank concentration



PROGRAMMING:

Rinse Delay (*only appears when door machine is selected*)

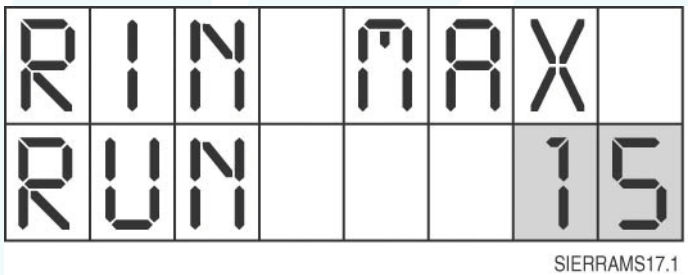


SIERRAMS16.1

- Use +/- to add a rinse delay time if desired
- Default rinse delay time is 0, range is 0-20 seconds

PROGRAMMING:

Max Rinse Time (*only appears when door machine is selected*)



- Use +/- to change the max rinse runtime if desired
- Default rinse delay time is 15, range is 0-20 seconds

Having a maximum rinse runtime prevents rinse aid from being wasted if there's a problem such as having the solenoid trigger stuck on. In a fixed-cost per rack account, this eliminates one of the potential causes of lost revenue

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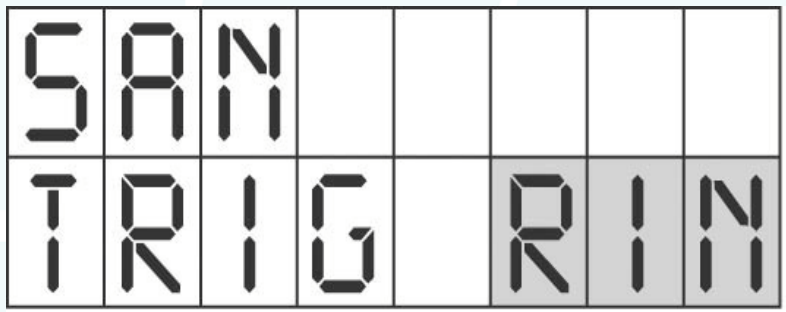
PROGRAMMING:
Sanitizer Trigger

- The sanitizer pump runs for the duration the rinse trigger or the detergent trigger is on
- Use +/- to change from the default of running sanitizer when the rinse signal is received to run it when the detergent signal is received

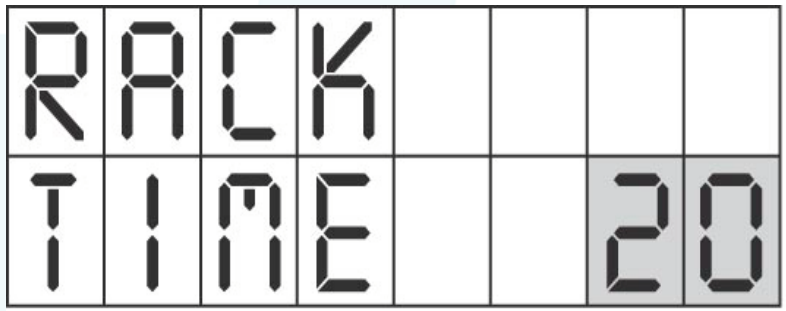


SIERRAMF18.1

PROGRAMMING:

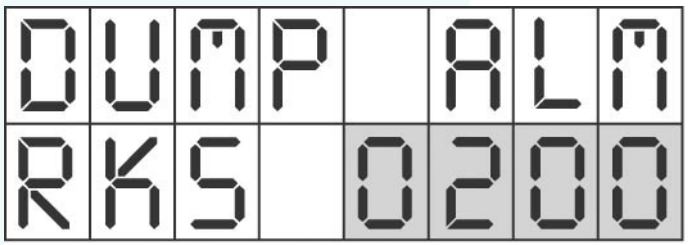
Rack Time (*only appears when door machine is selected*)

- Use +/- to change rack time from default 20 seconds
- Range is 0-99 seconds
- Conveyor machines typically have the rinse trigger on continuously over the course of several racks, so you have to divide the amount of on time by the time per rack to count racks, instead of counting the number of times the trigger comes on to get a rack count as with a door machine.
- If unsure about the amount of time per rack, run a bunch of racks through the conveyor, dividing the on time by the number of racks



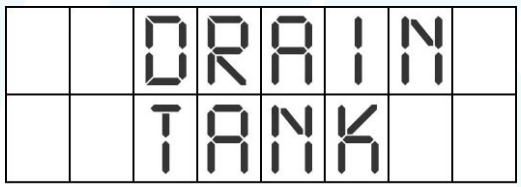
SIERRAMF19.1

PROGRAMMING:
Drain Tank Alarm



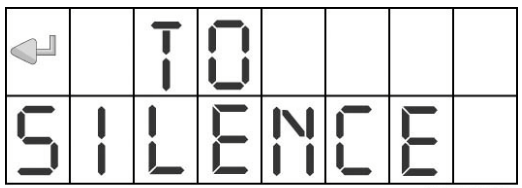
SIERRAMS21.1

- When the number of racks washed equals that in the DUMP ALM screen, the DRAIN TANK alarm comes on



SIERRAMS34.1

- Use +/- to change the number of racks within the range of 0010-9999, or select ---- to keep the alarm disabled

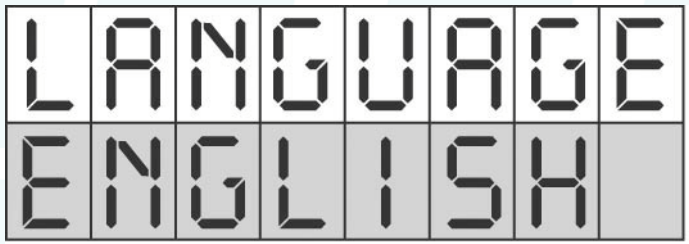


SIERRAMS36.1

- Pressing the action key will cancel the alarm

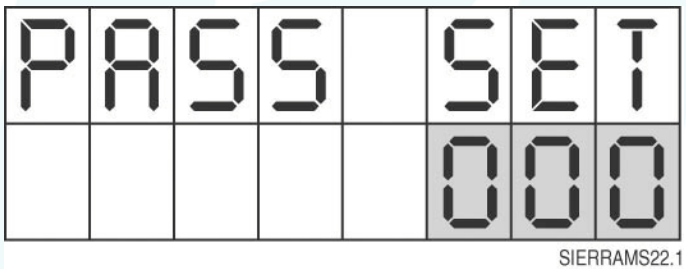
PROGRAMMING:
Language Selection

- Use +/- to change the language used in the menus from English to French or Spanish.
- We don't recommend selecting "Numeric", as this will make the menus incomprehensible. If you do select numeric, press the menu key to scroll to 1.16, where Numeric is shown on the bottom line, and press +/- to change it



SIERRAMS20.1

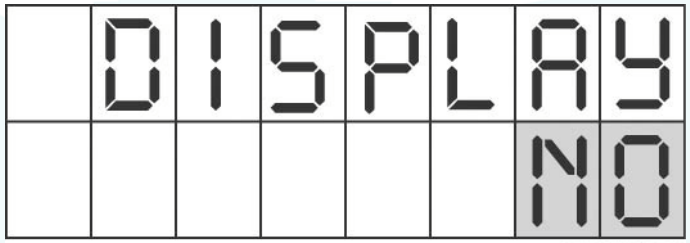
PROGRAMMING:
Change Password



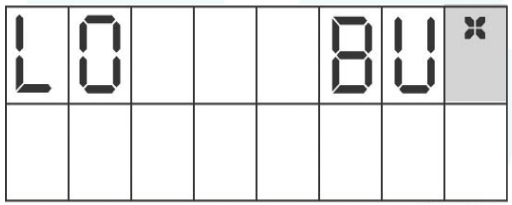
- Use +/- to change the Password from the default 000.
- Be sure to write the Password down in a secure place, and give it to any coworkers who may service the account

PROGRAMMING:
Configure Run Mode Display?

- Use +/- to change the NO to YES if you wish to view data screens and/or configure which are visible in run mode without a Password. If the menu button is pressed without changing the no to yes, the next screen to appear will be the exit programming screen
- The following screens are made viewable in run mode without a Password by pressing +/- to add an asterisk to the top right corner of the screen
- When in run mode, the other data screens that have been turned on can be viewed by pressing +/-
- By default the only information shown on the run screen is the wash tank conductivity as shown at right

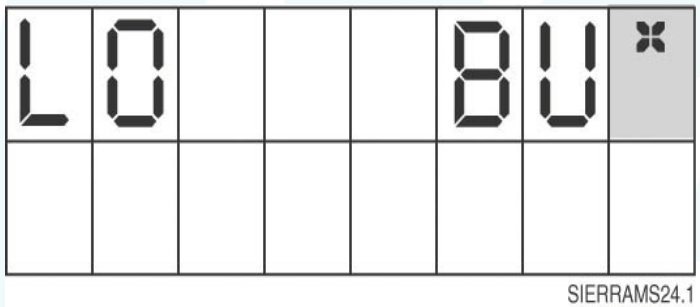


SIERRAMS37.1



SIERRAMS24.1

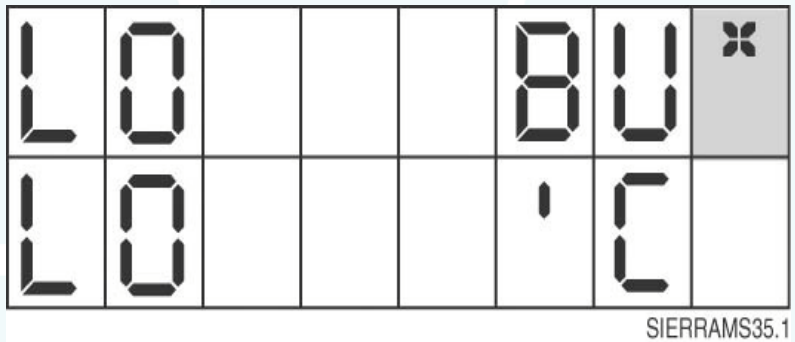
PROGRAMMING:
Conductivity Status



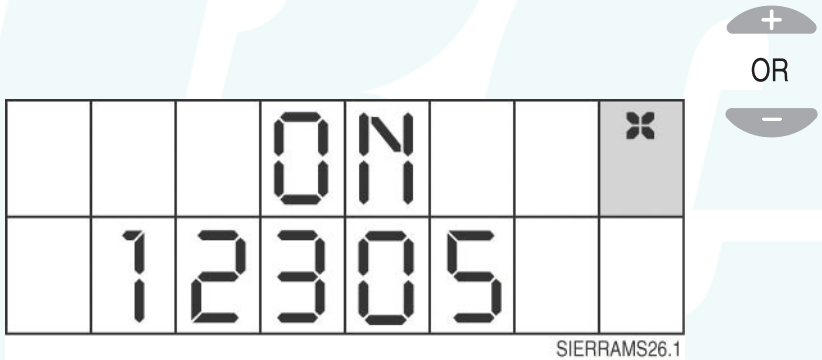
- This screen shows the current conductivity reading
- Use +/- to turn the asterisk on/off; if the asterisk is shown on the screen, this screen will be viewable by users via the +/- button.
- This screen will appear by default in run mode if all the other data screens are turned off so they don't appear in run mode
- Be sure to turn the asterisk on this screen off and turn another screen such as *Racks Since Drain* on if running in time mode, so the run mode screen doesn't show this screen

PROGRAMMING:
Conductivity & Temperature Status

- This screen shows the current conductivity and tank temperature reading
- Use +/- to turn the asterisk on/off; if the asterisk is shown on the screen, this screen will be viewable by users via the +/- button. You may wish to have this screen be viewable when running in probe mode so the account can give you the tank readings over the phone for remote troubleshooting, potentially saving you a trouble call



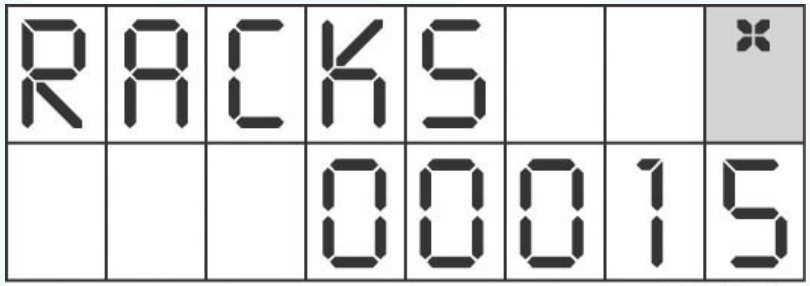
PROGRAMMING: Diagnostics



- Use +/- to turn the asterisk on/off; if the asterisk is shown on the screen, this screen will be viewable by users via the +/- button.
- This screen shows which inputs are active:
  - 1 = wash trigger is on
  - 2 = rinse trigger is on
  - 3 = pressure switch input is on
  - 5 = low product input is on

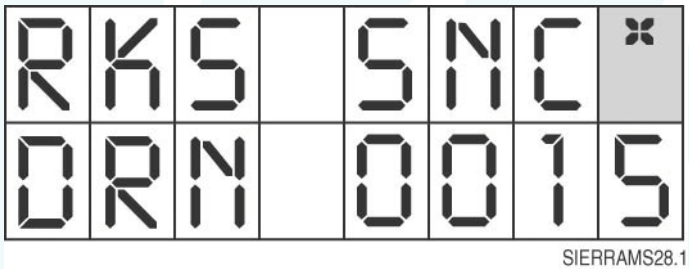
PROGRAMMING:
Rack Count

- Use +/- to turn the asterisk on/off; if the asterisk is shown on the screen, this screen will be viewable by users via the +/- button.
- The rack count screen counts the racks up to 99,999,999. It can not be reset, but rolls over to 0 and then begins counting up again.
- In conveyor mode, the racks are counted by the number of seconds of rinse trigger on time.
- In door machine mode, the racks are counted based upon the number of times the trigger comes on. A rack is counted when the trigger stays on over 3 seconds, so when in time/door mode you need to subtract the total drains from the rack count amount to get the actual number of racks washed since initial fill is also counted.



SIERRAMS27.1

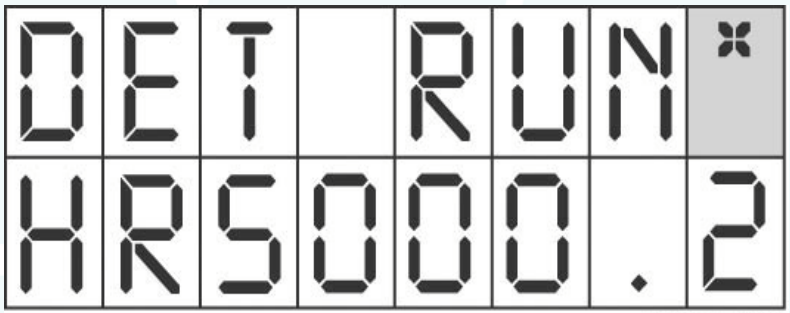
PROGRAMMING:
Racks since Drain



- Use +/- to turn the asterisk on/off; if the asterisk is shown on the screen, this screen will be viewable by users via the +/- button
- This screen shows the number of racks washed since the last drain/tank fill initial charge, up to 9999.

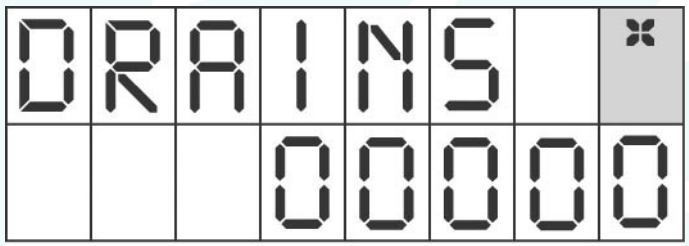
PROGRAMMING:
Detergent Pump On Time

- Use +/- to turn the asterisk on/off; if the asterisk is shown on the screen, this screen will be viewable by users via the +/- button
- This screen displays the number of hours the detergent pump has run, up to 999.9. This time can not be reset.



SIERRAMS29.1

PROGRAMMING:
Total Drains

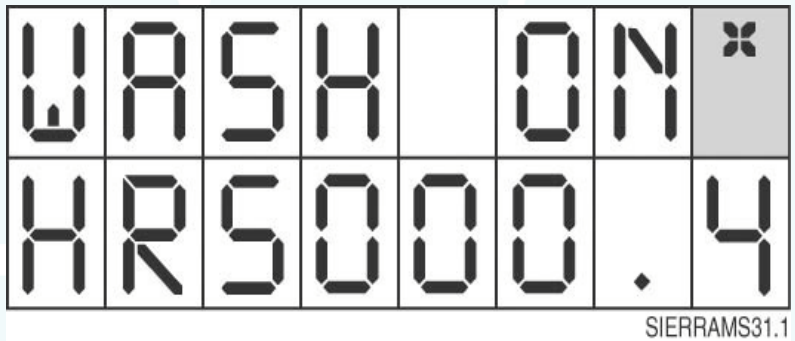


SIERRAMS30.1

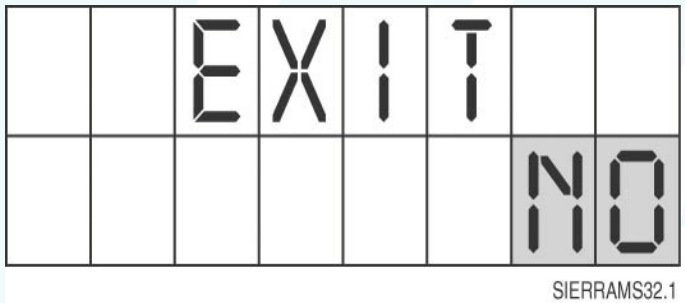
- Use +/- to turn the asterisk on/off; if the asterisk is shown on the screen, this screen will be viewable by users via the +/- button
- This screen displays the total number of drains, by counting the initial charges that occur with tank fill
- The counter can not be reset, and goes up to 99,999,999 prior to rolling over to 0.

PROGRAMMING:
Wash Trigger On Time

- Use +/- to turn the asterisk on/off; if the asterisk is shown on the screen, this screen will be viewable by users via the +/- button
- This screen displays the number of hours the wash trigger has been on, up to 999.9. This time counter can not be reset.



PROGRAMMING:
Exit Screen

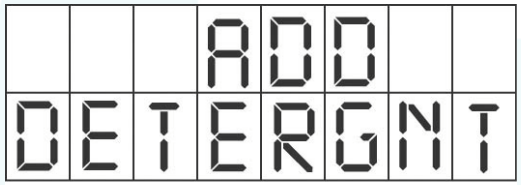


- Use +/- to change the NO to YES and exit to run mode.
- If the menu button is pressed without changing the no to yes, the screen loops back around through the menus, starting with the first screen you see after entering a Password, the detergent mode screen

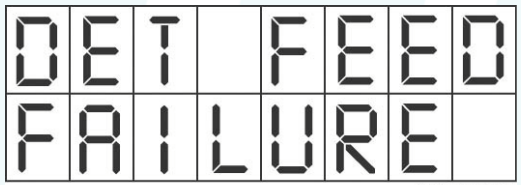
TROUBLESHOOTING: Alarms

the objective of text alarms is to avoid machine downtime by empowering the account to fix the problem

- If ADD DETERGENT or DET FEED FAILURE flashes, check detergent supply, verify probe is submerged, and if phone troubleshooting ask dishwasher to scrub metal knobs sticking out from blue plastic part on tank wall. (Or if installing, troubleshoot probe)

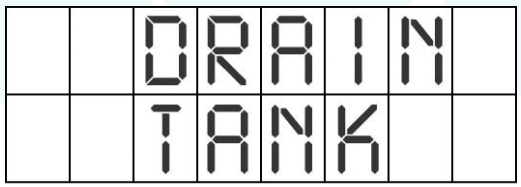


SIERRAMS11.2



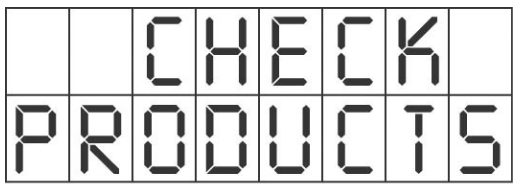
SIERRAMS11.3

- If DRAIN TANK alarm flashes, drain the tank. Change the drain tank setting if the alarm occurs too often



SIERRAMS34.1

- If CHECK PRODUCTS alarm flashes, check all chemical supplies. If chemical supplies are adequate, low level alarm sensor logic is normally closed; change to a normally open sensor that only closes when supply is low.



SIERRAMS33.1

TROUBLESHOOTING:
Probe Diagnosis

Probe Reading	Solution
LO (00)	No reading usually means the wires aren't properly connected. Check all the wire connections, and the wire itself for damage. If everything's hooked up correctly, the problem could be delamination; to check for this detach wires from probe, attach both voltmeter wires (use ohm setting) to one probe post, with one wire on the sensor side, one wire on the screw/wire attachment side to verify continuity. Repeat for the second post. Scrap probe if there's no continuity, and verify probe location meets guidelines before installing a new one
Too low, overdosing	Check tank for extreme scale build up. If there's a lot of scale, clean the probe. (VCP compensates for scale, and usually the account will delime the tank before the scale gets so bad that VCP can't compensate for it.)
Too high, not dosing enough	Replace the probe. This failure should only be seen on pre-Y2K temperature compensated probes. Newer temp comp probes are medical grade and shouldn't fail in this manner. (VCP will also compensate for this problem in most cases.)
HI (99)	This failure usually indicates a short. Check the wires to ensure there's no short, and check the back of the probe for moisture. Sometimes if the probe is wet in back, replacing it and allowing it to dry will allow it to function again. In rare cases moisture may work into the body of the probe; when this occurs the probe can't be dried out and instead must be scrapped.

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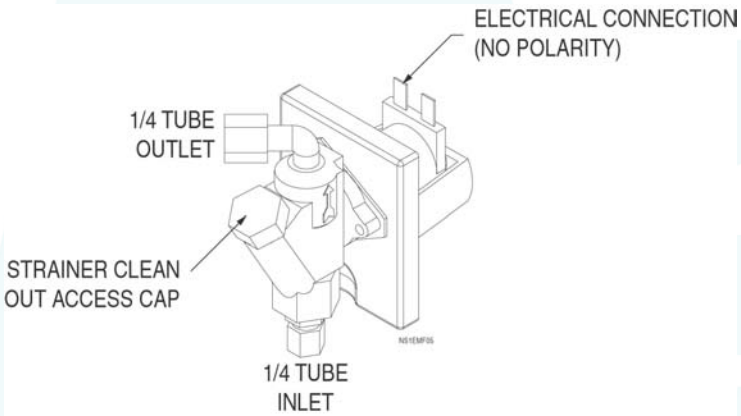
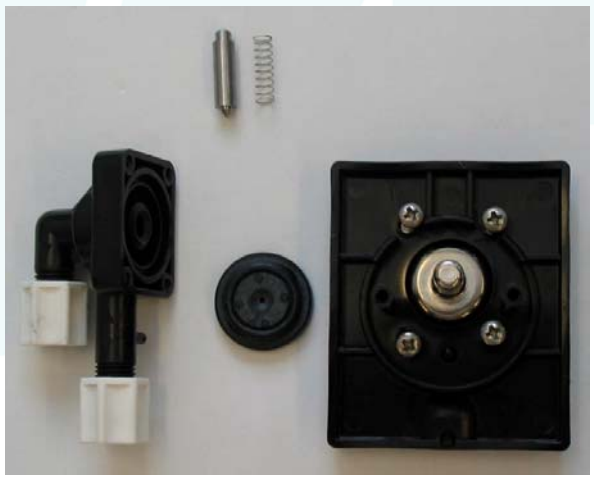
TROUBLESHOOTING:
Solenoid Not Activating





- If the solenoid doesn't make a clicking sound when turned on/off, verify wires are attached and supplying voltage with voltmeter.
- If there's no voltage from the PCB, try supplying voltage by priming. If priming doesn't supply voltage to the solenoid replace the PCB; if it does, correct programming and troubleshoot probe
- If the dispenser is turning on voltage to the solenoid, but it isn't feeding or isn't making a click sound, it's likely clogged.
- If it's a metal solenoid, remove the strainer cap shown at top left, clean the cylinder filter, and reassemble
- If it's a plastic solenoid, disassemble and clean the round rubber diaphragm shown at left; if diaphragm is damaged replace it or the solenoid

TROUBLESHOOTING: Miscellaneous Problems

Issue	Answer
Screen dead	Ensure unit has constant power; Sierra uses constant power so you can program it and read data while the machine is off
How often do I replace tubes?	The Beta rinse flex tube lasts at least 6 times longer than most competing tubes. On a door machine, it should last a minimum of several years as long as it's not injecting into water pressure over 35 PSI. On a typical conveyor machine, it should last 1-3 years. Even in a flight kitchen you can expect a life of 4 months. The norprene detergent tube should last a comperable amount of time.
How do I adjust the alarm?	Push the sliding door over the screen up and adjust the alarm potentiometer (plastic screw) gently with a screwdriver

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