CHEMICAL SANITIZING UPRIGHT DOOR DISHMACHINE

Manufactured in the United States by:

Jackson

INSTALLATION & OPERATION MANUAL

FOR ECOLAB MODELS:

APEX TSC
APEX TSC-V

ECOLAB®

October 15, 2007
P/N 7610-003-13-00 (Revision C)

www.ecolab.com

REVISION/ PAGE	REVISION DATE	MADE BY	APPLICABLE ECN	DETAILS
A	11-07-05	MAW	7576	Release to market test production.
B	07-02-07	MAW	7910	Release to production.
Pgs. 50, 63 & 64	07-25-07	MAW	Process	Updated schematic to revision C. Changed part number for door switch.
63 & 70	08-07-07	MAW	Process	Updated schematic.
C	10-15-07	MAW	Process	Updated fuse chart. Updated detergent screen number. Updated schematic.

NOMENCLATURE FOR THE MODELS COVERED IN THIS MANUAL

APEX TSC-V

APEX TSC- Chemical sanitizing, upright door dishmachine
V - Vapor Vent Option

Model:_____

Serial No.:_____

Installation Date:_____

Service Rep. Name:_____

Phone No.:_____

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SECTION 1:
SPECIFICATION INFORMATION

SECTION 1: SPECIFICATION INFORMATION

SPECIFICATIONS for APEX TSC

PERFORMANCE/CAPABILITIES

OPERATING CAPACITY (RACKS/HOUR)

RACKS PER HOUR (NSF RATED)	46
DISHES PER HOUR	1150
GLASSES PER HOUR	1150

OPERATING CYCLE (SECONDS)

LIGHT CYCLE

WASH TIME	42
RINSE TIME	15
TOTAL CYCLE TIME	72

NORMAL CYCLE

WASH TIME	48
RINSE TIME	25
TOTAL CYCLE TIME	90

HEAVY CYCLE

WASH TIME	118
RINSE TIME	15
TOTAL CYCLE TIME	150

SUPER HEAVY CYCLE

WASH TIME	208
RINSE TIME	15
TOTAL CYCLE TIME	240

TANK CAPACITY (GALLONS)

WASH TANK (MINIMUM)	1.2

WASH PUMP CAPACITY

GALLONS PER MINUTE	61

TEMPERATURES

WASH---°F (MINIMUM)	120
WASH---°F (RECOMMENDED)	140
RINSE---°F (MINIMUM)	120
RINSE---°F (RECOMMENDED)	140

ELECTRICAL REQUIREMENTS

WASH PUMP MOTOR HORSEPOWER	3/4

NOTE: Typical Electrical Circuit is based upon (1) 125% of the full amperage load of the machine and (2) typical fixed-trip circuit breaker sizes as listed in the NEC 2002 Edition. Local codes may require more stringent protection than what is displayed here. Always verify with your electrical service contractor that your circuit protection is adequate and meets all applicable national and local codes. These numbers are provided in this manual simply for reference and may change without notice at any given time.

VOLTS	PH	HZ	TOTAL AMPS	TYPICAL ELECTRICAL CIRCUIT
115	1	60	9	15 AMP

WATER REQUIREMENTS

INLET TEMPERATURE (Minimum)	120°F
INLET TEMPERATURE (Recommended)	140°F
WATER LINE SIZE I.P.S. (Minimum)	1/2”
DRAIN LINE SIZE I.P.S. (Minimum)	2”
FLOW PRESSURE P.S.I.	20 ± 5
MINIMUM CHLORINE REQUIRED (PPM)	50

FRAME DIMENSIONS

WIDTH	25 1/4”
DEPTH	25 1/4”
HEIGHT	66 1/4”
STANDARD TABLE HEIGHT	34”
MAXIMUM CLEARANCE	17”

NOTE: Always refer to the machine data plate for specific electrical and water requirements. The material provided on this page is for reference only and may be subject to change without notice.

SECTION 1: SPECIFICATION INFORMATION

SPECIFICATIONS for APEX TSC-V

PERFORMANCE/CAPABILITIES

OPERATING CAPACITY (RACKS/HOUR)

RACKS PER HOUR (NSF RATED)	34
DISHES PER HOUR	850
GLASSES PER HOUR	850

OPERATING CYCLE (SECONDS) (*Total time extended by 30 seconds for vent option)

LIGHT CYCLE	
WASH TIME	42
RINSE TIME	15
TOTAL CYCLE TIME	102
NORMAL CYCLE	
WASH TIME	48
RINSE TIME	25
TOTAL CYCLE TIME	120
HEAVY CYCLE	
WASH TIME	118
RINSE TIME	15
TOTAL CYCLE TIME	180
SUPER HEAVY CYCLE	
WASH TIME	208
RINSE TIME	15
TOTAL CYCLE TIME	270

TANK CAPACITY (GALLONS)

WASH TANK (MINIMUM)	1.2

WASH PUMP CAPACITY

GALLONS PER MINUTE	61

TEMPERATURES

WASH---°F (MINIMUM)	120
WASH---°F (RECOMMENDED)	140
RINSE---°F (MINIMUM)	120
RINSE---°F (RECOMMENDED)	140

ELECTRICAL REQUIREMENTS

WASH PUMP MOTOR HORSEPOWER	3/4

NOTE: Typical Electrical Circuit is based upon (1) 125% of the full amperage load of the machine and (2) typical fixed-trip circuit breaker sizes as listed in the NEC 2002 Edition. Local codes may require more stringent protection than what is displayed here. Always verify with your electrical service contractor that your circuit protection is adequate and meets all applicable national and local codes. These numbers are provided in this manual simply for reference and may change without notice at any given time.

VOLTS	PH	HZ	TOTAL AMPS	TYPICAL ELECTRICAL CIRCUIT
115	1	60	9	15 AMP

WATER REQUIREMENTS

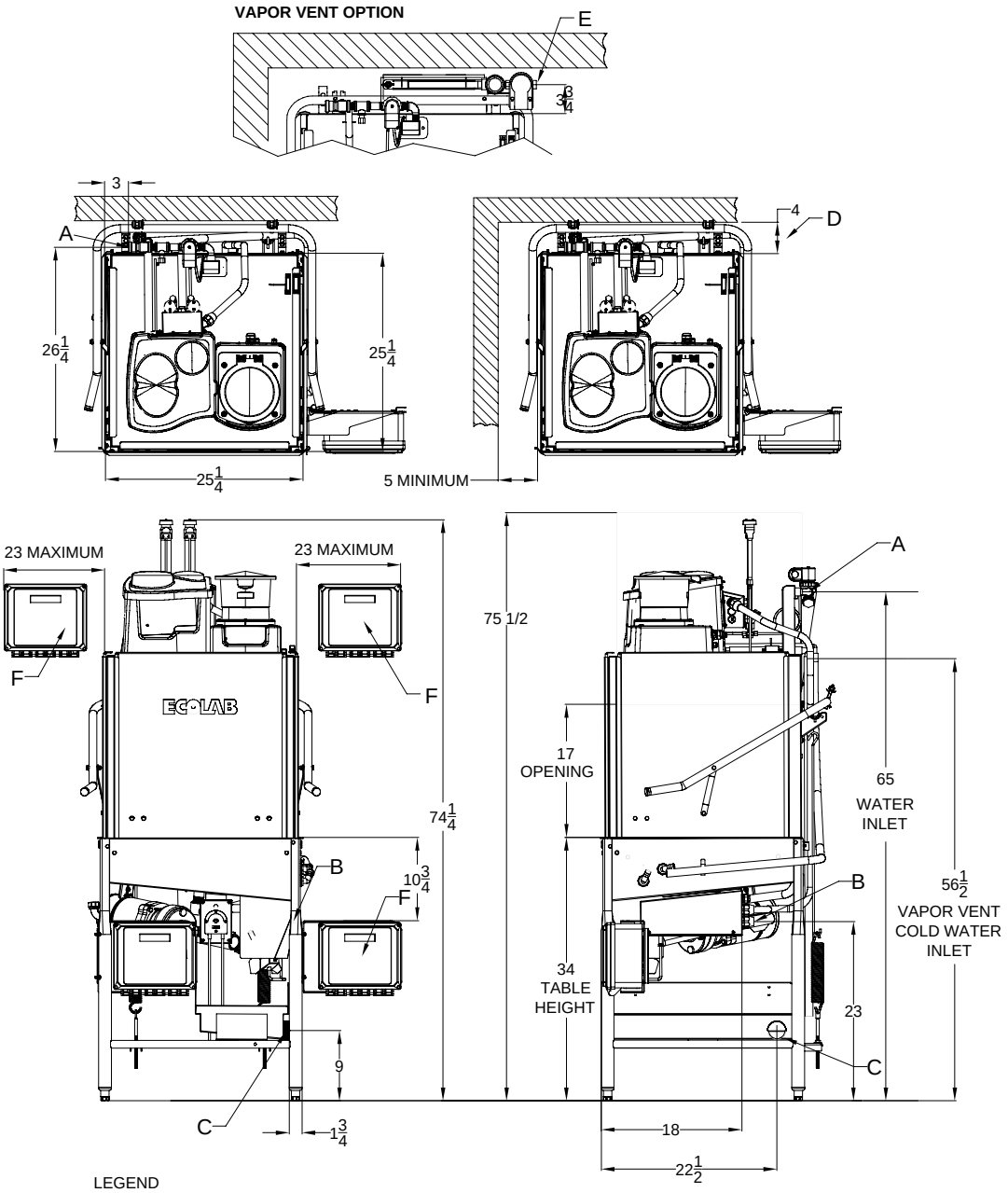
INLET TEMPERATURE (Minimum)	120°F
INLET TEMPERATURE (Recommended)	140°F
WATER LINE SIZE I.P.S. (Minimum)	1/2”
DRAIN LINE SIZE I.P.S. (Minimum)	2”
FLOW PRESSURE P.S.I.	20 ± 5
MINIMUM CHLORINE REQUIRED (PPM)	50

FRAME DIMENSIONS

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DIMENSIONS



LEGEND

ALL DIMENSIONS ARE IN INCHES

A - WATER INLET (1/2" IPS)
B - ELECTRICAL CONNECTION POINT
C - DRAIN (2" IPS)
D - WALL CLEARANCE (4" MINIMUM)

E - VAPOR VENT COLD WATER INLET (3/8" IPS)
F - ALTERNATE CONTROL BOX LOCATIONS (FIELD MODIFICATION)

ALL DIMENSIONS ARE +/- 1/2" DUE TO ADJUSTABLE FEET.

SECTION 2: INSTALLATION/OPERATION INSTRUCTIONS

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INSTALLATION INSTRUCTIONS

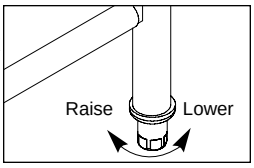
VISUAL INSPECTION: Before installing the unit, check the container and machine for damage. A damaged container indicates that there may be some damage to the machine. If there is damage to both the container and machine, do not throw away the container. The dishmachine has been inspected and packed at the factory and is expected to arrive to you in new, undamaged condition. However, rough handling by carriers or others may damage the unit while in transit. If this situation occurs, do not return the unit to Ecolab; contact the carrier and ask them to inspect the damage to the unit and to complete an inspection report. You must contact the carrier within 48 hours of receiving the machine. Also, contact your Ecolab representative.

UNPACKING THE DISHMACHINE: Remove the machine from the container, and inspect for missing parts. If an item is missing, contact your Ecolab representative immediately to report the missing item.

MOVING CONTROL BOX TO OTHER LEG OR WALL MOUNTING:

The control box for the APEX TSC machine is designed so that it can be easily mounted in alternate locations to match the requirements of the installation. The machine is manufactured with the control box attached to the inside of the front left frame leg and the control box is within the footprint of the frame. Before placing the machine in it's final position, decide what mounting location best suits the installation. For corner installations, the control box can be mounted to the outside of the front right frame leg. The control box can also be wall-mounted to either side of the machine using a wall mounting bracket. The correct orientation of the wall mounting bracket is such that a gap exists between the back of the control box and the wall. Make sure that the ventilation fan at the back of the control box is not covered by the wall mounting bracket. When moving the control box to any of the alternate locations, it is not necessary to disconnect any of the electrical wires leading into the control box.

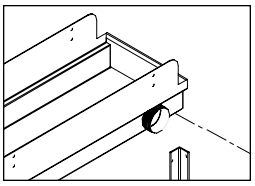
LEVEL THE DISHMACHINE: Ensure that the unit is level from side to side and from front to back before making any connections. The unit comes with adjustable bullet feet, which can be turned using a pair of pliers or by hand if the unit can be raised safely. Failure to level the dishmachine may cause premature wear or decrease washing performance.



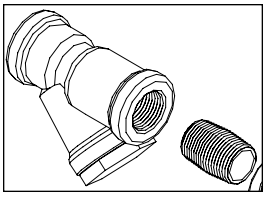
Frame with Adjustable Foot

PLUMBING THE DISHMACHINE: All plumbing connections must comply with all applicable local, state, and national plumbing codes. The plumber is responsible for flushing the incoming water line prior to connecting it to remove all foreign debris that may get trapped in the valves or cause an obstruction. Any valves that are fouled by matter left in the water line and the expenses resulting are not the responsibility of the manufacturer.

CONNECTING THE DRAIN LINE: The APEX TSC drain requires a minimum of 2" I.P.S. piping that is pitched at least 1/4" per foot. There must also be an air gap between the machine drain line and the floor sink or drain. If a grease trap is required by code, it should have a flow capacity of 5 gallons per minute. (Note: The drain pan is reversible so that the drain connection can be made to either side of the drain pan.)


Drain Connection

WATER SUPPLY CONNECTION: Read the section entitled "PLUMBING THE DISHMACHINE" above before proceeding. Install the water supply line (1/2" pipe size minimum) to the dishmachine line Y-strainer using copper pipe. It is recommended that a water shut-off valve be installed between the main supply and the machine to allow access for service. The water supply line must be capable of supplying water at the minimum temperature indicated on the data plate. It is recommended that the water supply line be capable of supplying water at 20 ± 5 PSI "flow" pressure.


Y-Strainer

Note: The optional Vapor Vent system must be connected to the COLD water line.

In areas where the water pressure fluctuates or is greater than the recommended pressure, it is suggested that a water pressure regulator be installed. The APEX TSC does not come with a water pressure regulator as standard equipment. Please notify your Ecolab representative if you have any questions.

Do not confuse static pressure with flow pressure. Static pressure is the line pressure in a "no flow" condition (all valves and services are closed). Flow pressure is the pressure in the fill line when the fill valve is opened during the cycle.

It is also recommended that a shock absorber (not supplied with the APEX TSC) be installed in the incoming water line. This prevents line hammer (hydraulic shock), induced by the solenoid valve, from causing damage to the equipment.

PLUMBING CHECK: Slowly turn on the water supply to the machine after connecting the incoming fill line and the drain line. Check for leaks and repair as required. Leaks must be repaired prior to placing the machine in operation.

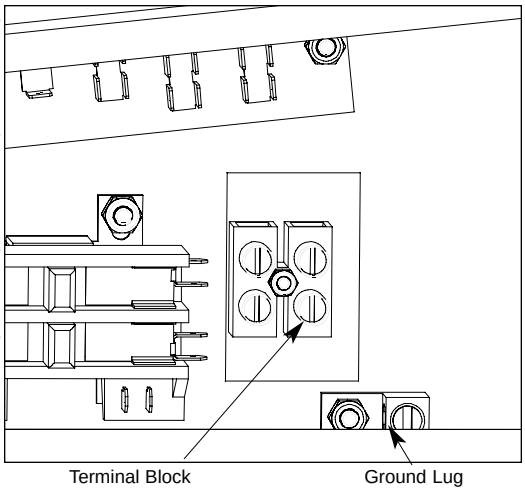
ELECTRICAL POWER CONNECTION: Electrical and grounding connections must comply with the applicable portions of the National Electrical Code ANSI/NFPA 70 (latest edition) and/or other electrical codes.

Disconnect electrical power supply and lockout the disconnect switch to indicate that you are working on the circuit.

The dishmachine data plate is located on the right side front of the machine. Refer to the data plate machine voltage, total amperage load and serial number.

To install the incoming power lines, open the control box by removing the control box lid. Install 3/4" conduit into the pre-punched holes in the back of the control box. Route power wires and connect to power block and grounding lug. Install the service wires (L1 & N) to the appropriate terminals as they are marked on the terminal block. Install the grounding wire into the lug provided.

It is recommended that "DE-OX" or another similar anti-oxidation agent be used on all power connections.



Electrical Connection

VOLTAGE CHECK: Apply power to the dishmachine. Check the incoming power at the terminal block and ensure it corresponds to the voltage listed on the data plate. If not, contact a qualified service agency to examine the problem. Do not run the dishmachine if the voltage is too high or low. Shut off the service breaker and mark it as being for the dishmachine. Advise all personnel of any problems and of the location of the service breaker. Replace the control box cover and tighten the screws.

SECTION 2: INSTALLATION/OPERATION INSTRUCTIONS

OPERATING INSTRUCTIONS

OPERATIONAL START-UP & CHECK: Before proceeding with start-up, verify the following:

1. Open the doors and verify that the sump strainer is correctly installed in the sump.

2. Verify that the drain stopper is in position.

3. Check that the plugs are securely screwed into the ends of all wash arms.

4. Check that the wash arms are securely screwed into the stationary bases and that they rotate freely.

QUICK START GUIDE: After the initial installation of the machine:

1. Load solid detergent block into dispenser.

2. Pour rinse aid starter solution into rinse additive product holder.

3. Load solid rinse aid block into dispenser.

4. Load sanitizer tablets into dispenser.

5. Turn on machine.

6. "ADD PRODUCT" indicator lights on dispensers should be off and display should indicate "OPEN DOOR/NORMAL"

7. Run a few machine cycles to verify the correct operation of the machine. Check for water leaks. Verify that wash and rinse temperatures are 120°F minimum.

8. Titrate and adjust chemical concentrations.

Note: It is possible to program different concentration values for the rinse aid for each of the four wash cycle programs. For example, the operator may choose to wash glass ware using the LIGHT wash cycle, and it may be beneficial to use a higher amount of rinse additive for this cycle type. Conversely, the SUPER HEAVY wash cycle can be selected to wash pots & pans, and it may not be necessary to use any rinse aid for this cycle type.

Tip: When you press and hold any prime button, the controller records how long the button was pushed. Use this feature to determine how long it takes for a pump to dispense a particular value. Example: If you know you want 1.5 ml of rinse aid dispensed, with a graduated cylinder collecting the output of the pump, press and hold the rinse aid prime button until 1.5 ml is dispensed. The display will indicate how long the button was pressed. Enter this time for the appropriate cycle(s) in the PROGRAM CHEMICAL section in the programming mode.

9. Install wall charts and instruct machine operators on proper operation and cleaning.

The APEX TSC machine is shipped from the factory with default programmed settings, which are appropriate for typical installation conditions. To optimize the performance of the machine, the following changes should be made.

TO OPTIMIZE THE WATER USAGE OF THE MACHINE: Check the water volume in the machine after the first few seconds of the rinse sequence. The water level should be above the level of the sump in the wash tank, between the two lines on the drain stopper tube. Too little water will starve the pump and cause cavitation, too much water increases operating costs.

TO OPTIMIZE THE DETERGENT CONCENTRATION: Collect water that is drained from the machine after the wash sequence.

The detergent concentration is changed changing the program value of DET. SPRAY TIME. Increase this value to increase the detergent concentration, decrease this value to decrease the detergent concentration.

The APEX TSC machine can be customized to fit the customer's needs by making the following programming changes:

TO CHANGE THE DEFAULT CYCLE TYPE: After the completion of each wash program, the machine will select the default cycle type for the next cycle. This can be manually changed by the operator before the start of the next wash cycle. If the customer wishes to have a different wash cycle as the default cycle, this can be changed in the program, in the SYSTEM programming section.

TO MAKE CERTAIN WASH CYCLES ACTIVE OR INACTIVE: If the customer wishes to make certain wash cycles unavailable to the operator, this can also be done in the SYSTEM programming section. Select ACTIVE or INACTIVE for each wash cycle type.

VAPOR VENT OPTION: If the APEX TSC machine is fitted with the optional vapor vent system, it will be shipped from the factory with the VENT and VENT MAINTENANCE times preset for a typical installation. Run several cycles to confirm that the vapor vent is functioning properly. At the end of the VENTING sequence, there should be only a small amount of vapor released from the machine when the door interlock retracts and the machine doors are opened. Adjust the VENT TIME in the SYSTEM programming section as necessary to be long enough to remove the vapor from the machine, but not too long as to use water unnecessarily.

Note: The optional Vapor Vent system must be connected to the COLD water line. In general, installations with lower water pressure and/or warmer cold water supplies will require a longer venting cycle to adequately remove the hot water vapors.

USING THE MACHINE WITH LIQUID RINSE AID PRODUCTS:

1. Connect tubing to liquid rinse aid bottle
   a. Disconnect the rinse aid tubing from the inlet side of the dispensing pump.
   b. Connect new tubing with pick-up probe (tube stiffener) to the inlet side of the dispensing pump.
   c. Prime the rinse aid dispensing pump to fill the supply tube completely with rinse aid.

2. Disable the float switch in the solid product reservoir. This will prevent the "RINSE AID FLOAT SWITCH ERROR" message from being displayed.
   a. Remove the product guide from the dispenser to gain access to the float switch.
   b. Drain all liquid from the rinse aid sump.
   c. Cut one of the yellow float switch wires.
   d. Use wire nuts to cap off each of the two loose ends of the yellow wires.
   e. Use wire ties to secure the loose ends of the yellow wires so that they do not interfere with other dispenser components.

3. Disable the low product sensor for the solid rinse aid. This will prevent the CHECK/REFILL RINSE AID" message from being displayed.
   a. Remove one of the infrared (IR) sensors from the side of the solid rinse aid product holder. Reinstall it backwards so that the IR beam will be blocked.

GENERAL OPERATION SEQUENCE:

> **CAUTION:** Water must be in the wash tank sump while the wash pump is running in order to avoid damage to the pump seal.

Close the machine's doors. Turn the machine on by pressing the red ON/OFF button on the keypad. The machine will fill automatically with water to the level preset at the factory (FILLING will be indicated on the display). The minimum water level should be just at the lower line on the drain stopper tube. To adjust the water level, see programming instructions.

NOTE: It is important to check the water level at the **beginning of the rinse sequence** (just after the completion of the fill sequence) because additional water from the solid detergent dispenser is added at the end of each rinse sequence. The water level must be adjusted before the additional water is added at the end of the rinse sequence.

After the initial fill is complete, the display will indicate START DELAY, while a dose of detergent is fed into the wash sump for the first cycle.

OPEN DOOR will be displayed. Open the doors and insert a soiled rack of dishes. The display will indicate CLOSE DOOR.

Close the doors to begin the wash cycle.

When the doors are closed, the wash cycle will begin. During the first five seconds of the wash cycle, SELECT CYCLE will be displayed on the first line of the display. The second line of the display will indicate which cycle has been selected (the NORMAL cycle is the default cycle). Select the desired cycle during this five-second period by pressing the appropriate blue button on the keypad (NORMAL, LIGHT, HEAVY or SUPER HEAVY).

During the wash cycle, WASHING and the time remaining will be displayed on the first line of the display. The wash cycle selected and the temperature of the water in the wash tank will be displayed on the second line of the display.

Also at the start of the wash cycle, if the float switch in the rinse aid reservoir indicates that the reservoir is empty, the water solenoid valve supplying the rinse aid reservoir will be turned on. If the rinse aid product holder is empty, this water solenoid valve will not be turned on. After five wash cycles, if the reservoir is not filled, an error message (RINSE AID FLOAT SWITCH ERROR) will be displayed at the end of the cycle (see "Error Messages" section.

At the completion of the wash cycle, the machine will drain the wash water, and refill the sump with fresh water for the rinse cycle. The display will indicate DRAINING, FLUSH, and FILLING and the time remaining for each sequence. The sanitizer tablet is dispensed into the wash tank at the beginning of the fill, followed by the water fill.

During the rinse cycle, RINSING and the time remaining will be displayed on the first line of the display. Rinse aid is dispensed into the wash tank at the beginning of the rinse cycle. The wash cycle selected and the temperature of the water in the wash tank will be displayed on the second line of the display.

The completion of the rinse is the end of the cycle and the display indicates OPEN DOOR. Open the doors, remove the clean dishes, load a rack of dirty dishes, and close the door to begin the next cycle. If the door is opened and closed before the detergent dispenser has completed dispensing detergent for the next cycle, START DELAY and the time remaining before the cycle can begin will be displayed. The wash cycle will automatically begin at the end of the START DELAY.

If the machine is equipped with the vapor vent option, the machine sequence will have the following changes. When the doors are closed to start the wash cycle, a door interlock will be activated which prevents the doors from being opened until the end of the cycle. At the end of the rinse cycle, the venting sequence will begin. The vent water valve will be turned on to activate the initial vent cycle (VENTING will be displayed). At the completion of this initial vent cycle, the door interlock will be turned off and the display will indicate OPEN DOOR. If the doors remain closed, additional venting cycles will be run every thirty seconds until the MAINTENANCE VENT cycle is completed. When the operator opens the doors during the maintenance venting cycle, the venting cycle is stopped, and the machine will start at the beginning of the wash cycle when the doors are closed. See programming instructions for adjusting the length of the VENT and MAINTENANCE VENT cycles.

If the doors are opened any time during a cycle, PAUSE will be displayed. The cycle will restart from the beginning of the wash cycle when the doors are closed again.

The cycle counter will only increment when cycles are fully completed. To display the number of cycles completed, ensure that the machine is idle (between cycles), press the red CYCLE COUNT button on the keypad.

SHUT DOWN AND CLEANING: To turn off the machine, press the red ON/OFF button. The machine will automatically drain (TURNING OFF will be displayed) and then turn off (OFF will be displayed).

Remove, clean and reinstall the upper and lower wash arms.

Remove, clean and reinstall the sump strainer.

Remove, clean and reinstall the accumulator strainer.

PRIMING THE CHEMICAL DISPENSING PUMP: To prime the peristaltic pump that dispenses the rinse aid chemical, press and hold the green RINSE AID PRIME button on the keypad. The machine must be idle (between cycles) for this prime button to be active.

Tip: When you press and hold the prime button, the controller records how long the button was pushed. Use this feature to

determine how long it takes for a pump to dispense a particular value. Example: If you know you want 1.5 ml of rinse aid dispensed, with a graduated cylinder collecting the output of the pump, press and hold the rinse aid prime button until 1.5 ml is dispensed. The display will indicate how long the button was pressed. Enter this time for the appropriate cycle(s) in the PROGRAM CHEMICAL section in the programming mode.

SERVICE ACCESS TO THE SOLID PRODUCT DISPENSER

1. Disconnect the water feed tubing from the back of the rinse aid dispenser. To release the tubing from the connector, push in on the ferrule on the connector while pulling on the tubing. To reconnect the tubing, insert the tubing firmly into the connector, and then pull back on the tubing to seal it properly.

2. Disconnect the water feed tubing for the detergent dispenser by removing the tubing nut on the vacuum breaker's short nipple. Also need to disconnect the clear drain tubing at the black elbow.

3. Lift the product guide out of the dispenser. The wires can be disconnected at the connector, or the wires are long enough so that the product guide can be placed in front of the dispenser, without having to disconnect the wires.

SOLID RINSE AID DISPENSER: The APEX TSC converts the solid rinse aid into a liquid by spraying water onto the block. The rinse aid solenoid valve is activated for 15 seconds or until the float in the sump rises, whichever comes first. The rinse aid spray sequence occurs at the beginning of each wash cycle. If the float does not rise within five wash cycles the water spray is stopped and the message, RINSE AID FLOAT SWITCH ERROR, will be displayed at the end of the dishmachine cycle.

Whenever the infrared sensors in the rinse aid product holder indicate that the dispenser is empty (CHECK/REFILL RINSE AID message), then the water will not be allowed to spray into the dispenser.

The amount of rinse aid injected into the rinse water each cycle is adjusted in the programming menu (PROG CHEMICAL). The amount of rinse aid for all 4 machine cycles (NORMAL, LIGHT, HEAVY, SUPER HEAVY) can be adjusted from 0 to 15 seconds. Measure the amount of rinse aid injected and adjust dispense time accordingly.

SOLID DETERGENT DISPENSER: The APEX TSC uses a solid detergent which is dispensed from the detergent reservoir on top of the machine. At the completion of each rinse sequence, the detergent dispenser water valve is opened. The water valve will not be opened if the dispenser lid is open (DISPENSER LID OPEN is displayed). Water is directed through a spray nozzle to the underside of the solid detergent block and then the detergent solution drains into the wash tank by gravity. The length of this spray time controls the detergent concentration. Infrared sensors in the detergent product holder indicate when the dispenser needs to be refilled (CHECK/REFILL DETERGENT message is displayed).

For the HEAVY and SUPER HEAVY wash cycle types, an extra dose of detergent is added during the wash sequence.

Note: The detergent solution will automatically dispense to the wash tank at the end of the rinse cycle when OPEN DOOR is displayed. If the dishmachine door is opened and closed to start a new cycle before the machine has had time to complete this process, START DELAY will appear on the display and the machine will pause momentarily until the detergent solution has had time to dispense into the wash tank.

DETERGENT DISPENSER FLUSH: The green DET(ERGENT) FLUSH button on the keypad manually turns on the solenoid water valve that controls the flow of water to the detergent dispenser. This feature is useful when the detergent dispenser must be cleaned by first removing dried detergent buildup, and then flushing the dispenser with water by depressing the DET(ERGENT) FLUSH button.

SANITIZER TABLET DISPENSER: The APEX TSC dispenses a solid sanitizer tablet at the start of the FILL. The dispenser runs until a tablet is dispensed, up to a maximum of forward for 12 seconds, reverse for 2 seconds, then forward for 12 seconds. If a tablet has not been dispensed, the FILL and RINSE continue and the ADD SANITIZER LED will illuminate and CHECK/REFILL SANITIZER will be displayed at the end of the cycle. The LED will remain lit until a tablet is dispensed on a subsequent cycle, or until the machine is turned off.

NOTE: If the LED blinks on and off, this is an indication that the infrared sensor for the tablet dispenser is blocked. Inspect the infrared sensor.

OPERATING INSTRUCTIONS (CONTINUED)

REFILL TANK: Pressing the green REFILL TANK button on the keypad will cause the controller to execute a wash tank refill sequence. The incoming water solenoid valve will be turned on for the programmed FILL time, and then a detergent siphon sequence will be executed to dispense detergent into the wash tank. This feature is useful after the operator has performed maintenance or cleaning inside the wash tank and needs to refill the tank for the next wash cycle. If the button is pressed when the doors are open, the tank refill sequence is run as soon as the doors are closed (a new wash cycle will not be started until the doors are re-opened and closed). The button may also be pressed after a wash cycle has been started. This will help prevent running the pump without water in the wash tank, which could cause pump seal failure.

DELIMING OPERATIONS: The APEX TSC machine has a pre-programmed delime sequence which will lead the operator through the steps required to properly delime the machine.

To begin, the machine must be OFF. Press and hold the green DELIME button on the keypad. The machine will automatically fill with fresh water (FILLING will be indicated on the display). The display will then indicate to OPEN DOOR - ADD LIME-A-WAY (delime chemical agent). Open the doors and add the delime chemical agent. The display will indicate CLOSE DOOR START DELIME. When the doors are closed, the wash pump will turn on to circulate the delime agent throughout the machine. At any time, the doors can be opened in order to inspect the inside of the machine. The wash pump will restart when the doors are closed. The display will indicate PRESS DELIME TO STOP CYCLE. When the green DELIME button on the keypad is pressed, the water in the sump will be drained (DRAINING is displayed). The sump will then be filled with fresh water (FILLING is displayed), and the wash pump will be turned on in order to rinse the inside of the machine (RINSING is displayed). At the completion of this rinse cycle, the sump will again be drained (FINAL DRAIN is displayed), and the machine turned off.

OPERATING INSTRUCTIONS ERROR MESSAGES

ERROR MESSAGES: When a problem occurs, an error message is displayed at the end of the cycle. Once the doors have been opened, the error message is replaced with the normal displays until the completion of the next cycle, and the error message will again be displayed. The following error messages exist:

1. CHECK/REFILL SANITIZER - This message indicates that the supply of sanitizer is empty, or a problem exists with the sanitizer dispenser such that it is not dispensing sanitizer tablets. The message is displayed when the sanitizer delivery infrared switch has not detected a tablet dispense during the dispensing sequence or there is a blockage of the infrared sensor beam.

2. DISPENSER LID OPEN - This message indicates that the lid for the detergent & rinse aid dispenser is open. When this lid is open, detergent will not be dispensed (the detergent dispenser water solenoid valve will not be turned on).

3. CHECK/REFILL DETERGENT - This message indicates that the supply of solid detergent blocks in the detergent product holder needs replenishment. The message is displayed when there is enough room to add one complete block into the product holder.

4. RINSE AID FLOAT SWITCH ERROR - At the start of each wash cycle, if the float switch in the rinse aid reservoir indicates that the reservoir is empty, the water solenoid valve supplying the rinse aid reservoir will be turned on. If the reservoir is not filled after five wash cycles, this error message is displayed. This indicates that there is a problem with either the float switch or with the water solenoid valve supplying the rinse aid reservoir.

5. CHECK/REFILL RINSE AID - This message indicates that the supply of solid rinse aid blocks in the rinse aid product holder needs replenishment. The message is displayed when there is enough room to add one complete block into the product holder.

6. WASH PROBE ERROR (SHORT or OPEN) - This message indicates that there is a problem with the wash tank temperature probe or with the electrical circuit where the probe is connected. See trouble shooting section.

SECTION 2: INSTALLATION/OPERATION INSTRUCTIONS

PROGRAMMING INSTRUCTIONS (ECOLAB REPRESENTATIVES ONLY)

To access the programming mode, press and hold the P (PROGRAM) button on the keypad for two seconds. The display will prompt for the access CODE. Press the NORMAL, LIGHT, HEAVY and NORMAL buttons on the keypad. Once in the programming mode, the P (PROGRAM) button is used to scroll between the programming categories and the E (ENTER) button is used to scroll between the options within a category. To change the value of a parameter, use the SUPER HEAVY (DOWN arrow) button to decrease the value of a parameter, and the HEAVY (UP arrow) button to increase the value of the parameter. Once you change a value and move to the next option (by pressing either the E or P buttons), the value is saved. To revert back to a previous setting, you must return to that option and change the parameter back to the previous setting.

Once in the programming mode, if there have been no keypad inputs for approximately 45 seconds, the system will automatically exit out of the programming mode. Any changes to parameters will be saved when the programming mode is automatically exited.

All time adjustments are in minutes and seconds. Refer to the flow chart for the default values (factory settings).

The following parameters can be adjusted in the programming mode:

1. In the PROGRAM DRAIN/FILL section:

a. DRAIN TIME - Time that the drain is open at the completion of the wash cycle (1-20 sec).

b. FLUSH TIME - Time that the drain and fill valves are simultaneously open at the completion of the drain cycle (0-19 sec).

c. FILL TIME - Length of the fill cycle. The minimum water level should be between the two score lines on the drain stopper tube (1-40 sec).

2. In the PROGRAM CHEMICAL section:

a. DET. DISPENSER SPRAY (or FLOOD) - Use this variable to specify the type of solid detergent dispenser used on the machine. The default type is SPRAY.

b. RINSE AID - The run time of the rinse aid spray dispenser which controls the amount of rinse aid dispensed. The rinse aid pump run time can be individually set for each of the four cycles (NORMAL, LIGHT, HEAVY, SUPER HEAVY) (0-15 sec).

Tip: It is possible to program different concentration values for the rinse aid for each of the four wash cycle programs. For example, the operator may choose to wash glass ware using the LIGHT wash cycle, and it may be beneficial to use a higher amount of rinse aid for this cycle type. Conversely, the SUPER HEAVY wash cycle can be selected to wash pots & pans, and it may not be necessary to use any rinse aid for this cycle type.

c. DET. SPRAY TIME - The amount of time that the detergent dispenser water valve is opened at the end of the rinse sequence. When the valve is opened, water is sprayed on the underside of the solid detergent block and then drains into the wash tank by gravity. Increase this time to increase the detergent concentration; decrease this time to decrease the detergent concentration.

d. AUDIBLE ALARM OFF (or ON) - Use this option to specify if the audible out-of-product alarm is to be turned ON or OFF. The default setting is OFF.

e. ONE (or TWO) TABLET DISPENSE - Use this option to specify if ONE or TWO sanitizer tablets are to be dispensed during each cycle. One sanitizer tablet will produce 50 ppm chlorine with 2.4 gallons of rinse water; two tablets will produce 100 ppm chlorine with 2.4 gallons of rinse water. Adjust the number of tablets used and/or the amount of rinse water used to obtain the desired chlorine concentration to comply with local health department codes. The amount of rinse water is adjusted by changing the FILL TIME in the PROGRAM DRAIN/FILL section.

3. In the SYSTEM section:

a. DISPLAY IN FAHRENHEIT or CELSIUS - Selects the units of measurement for water temperature display. The selection options are FAHRENHEIT of CELSIUS.

b. DEFAULT CYCLE - Press the SUPER HEAVY button to scroll through the four wash cycle types until the desired default cycle is indicated.

The APEX TSC is pre-programmed to have four active wash cycle programs (NORMAL, LIGHT, HEAVY, SUPER HEAVY). The NORMAL cycle is the default cycle. At the completion of a cycle, the controller selects the default cycle to be run for the next machine cycle. The operator has the option to override this default cycle by pressing the appropriate cycle type button on the keypad. This can be done while the machine is idle between cycles, or during the first five seconds after the doors have been closed to start a cycle. In the SYSTEM section of the programming mode, the default cycle type can be changed. Also, the LIGHT, HEAVY and SUPER HEAVY cycles can be made inactive, which prevents the operator from selecting them. The NORMAL cycle is always active.

c. ACTIVE/INACTIVE - For the LIGHT, HEAVY and SUPER HEAVY cycles, press the SUPER HEAVY button to indicate whether each cycle is to be made ACTIVE or INACTIVE.

d. VENT TIME - For machines equipped with the vapor vent option, this is the time that the vapor vent water valve will be opened at the end of the rinse cycle to remove water vapors from the wash chamber (0-1:00).

e. VENT MAINTENANCE TIME - For machines equipped with the vapor vent option, this is the time that the vapor vent will be continued to be cycled after the completion of the initial vapor vent cycle. Once the initial vapor vent cycle has completed, the vapor vent water valve will be turned on every 30 seconds until the VENT MAINTENANCE TIME has expired, or the operator has opened the doors to remove the dish rack from the machine (0-5:00).

f. EXHAUST FAN TIME - For machines equipped with the optional external exhaust fan output, this is the length of time that the fan output will remain on past the end of the machine cycle. It is also the time that the exhaust fan output will remain on whenever the machine doors are opened. The exhaust fan output will run continuously during the machine cycle when the doors are closed (0-5:00).

4. The DIAGNOSTICS section is used when trouble-shooting problems with the machine. In the DIAGNOSTICS section:

a. APEX TSC REVISION - This indicates the software revision level.

b. PRESS UP ARROW TO RUN PUMP - Press and hold the UP ARROW (HEAVY) button to turn on the wash pump motor. Release the button to stop the pump.

c. PRESS UP ARROW TO OPEN DRAIN - Press and hold the UP ARROW (HEAVY) button to energize the drain solenoid. Release the button to de-energize the drain solenoid.

d. PRESS UP ARROW TO OPEN FILL - Press and hold the UP ARROW (HEAVY) button to open (energize) the incoming water solenoid valve. Release the button to close the valve.

e. PRESS UP ARROW TO RUN VENT - Press and hold the UP ARROW (HEAVY) button to open (energize) the vapor vent water solenoid valve. Release the button to close the valve.

f. PRESS UP ARROW TO RUN EXHAUST - Press and hold the UP ARROW (HEAVY) button to energize the external exhaust fan output. Release the button to de-energize the output.

g. PRESS UP ARROW TO RUN INTERLOCK - Press and hold the UP ARROW (HEAVY) button to energize the door interlock solenoid. Release the button to de-energize the interlock solenoid.

h. PRESS UP ARROW TO OPEN DET VLV - Press and hold the UP ARROW (HEAVY) button to open (energize) the water solenoid valve for the detergent dispenser. Release the button to close the valve.

i. PRESS UP ARROW TO OPEN RA VALVE - Press and hold the UP ARROW (HEAVY) button to open (energize) the water solenoid valve for the rinse aid dispenser. Release the button to close the valve.

j. PRESS UP ARROW TO RUN RA PUMP - Press and hold the UP ARROW (HEAVY) button to run (energize) the rinse aid dispensing pump motor. Release the button to stop the motor.

k. PRESS UP ARROW RUN TBL DISP CW - Press and hold the UP ARROW (HEAVY) button to turn on the tablet dispenser motor in the clockwise direction. Release the button to stop the motor.

l. PRESS UP ARROW RUN TBL DISP CCW - Press and hold the UP ARROW (HEAVY) button to turn on the tablet dispenser motor in the counter-clockwise direction. Release the button to stop the motor. NOTE: Running tablet dispenser in reverse for longer than a few seconds may cause jamming/broken tablets if hopper is full.

m. DOOR SWITCH OPEN (or CLOSED) - The display indicates the current state of the door switch.

n. RA FLOAT SWITCH UP (or DOWN) - The display indicates the current state of the float switch which senses the fluid level of the rinse aid reservoir.

o. RA PRODUCT SWITCH CLEAR (or BLOCKED) - The display indicates the current state of the infrared switch in the rinse aid product holder.

p. DETERGENT PRODUCT SWITCH CLEAR (or BLOCKED) - The display indicates the current state of the infrared switch in the detergent product holder.

q. SANITIZER DELIVERY SWITCH CLEAR (or BLOCKED) - The display indicates the current state of the infrared switch in the sanitizer tablet dispenser.

r. DET. DISP. LID CLOSED (or OPEN) - The display indicates the current state of the detergent & rinse aid dispenser lid switch.

s. PRESS UP ARROW TO CYCLE DET/RA LED - Press and hold the UP ARROW (HEAVY) button to change the state of the detergent/rinse aid out-of-product LED (if the LED is currently off, pressing and holding the UP ARROW button will turn it on).

t. PRESS UP ARROW TO CYCLE SAN LED - Press and hold the UP ARROW (HEAVY) button to change the state of the sanitizer out-of-product LED (if the LED is currently off, pressing and holding the UP ARROW button will turn it on).

u. TOTAL WASH CYCLES - This counter accumulates the total number of cycles which the machine has been run. It is the total of all four wash cycle types, and it cannot be reset.

v. WASH TANK TEMPERATURE - Displays the current temperature that is measured by the wash tank temperature probe. "LOW" indicates that the temperature is less than 100ºF (38ºC). "OPEN" or "SHORT" indicates a problem with the temperature probe.

5. MACHINE TYPE - The MACHINE TYPE section is used to select the type of machine the board is installed in and the language that is displayed during operation.

To change the current setting, first scroll through the list to the desired setting using the up and down arrow keys (APEX ENGLISH, APEX SPANISH, INFERNO ENGLISH, INFERNO SPANISH, APEX TSC ENGL, APEX TSC SPAN). Then press E to select the displayed machine type, or press P to abort the machine type selection process. When you exit from programming mode, the machine type will be changed to the new setting. Changing the machine type will also reset all programming parameters to the factory default values.

6. RESET COUNTS - The system will prompt CLEAR COUNTS? E(YES) OR P(NO) to confirm that the cycle counter is to be reset. Press the E (ENTER) button on the keypad to reset the counter, press the P (PROGRAM) button to exit without resetting the counter.

7. EXIT - Press the E (ENTER) button on the keypad to exit the programming mode.

PROGRAMMING FLOWCHART

GENERAL GUIDELINES:

· Machine can be ON or OFF to enter programming mode.

· To enter programming mode, press and hold the P (Program) button for two seconds. The display will then indicate "CODE?". Press NORMAL, LIGHT, HEAVY, NORMAL.

· P button = Program, E button = Enter. In general, the P button is used to jump between the various programming sections and the E button is used to move between the variables within a programming section.

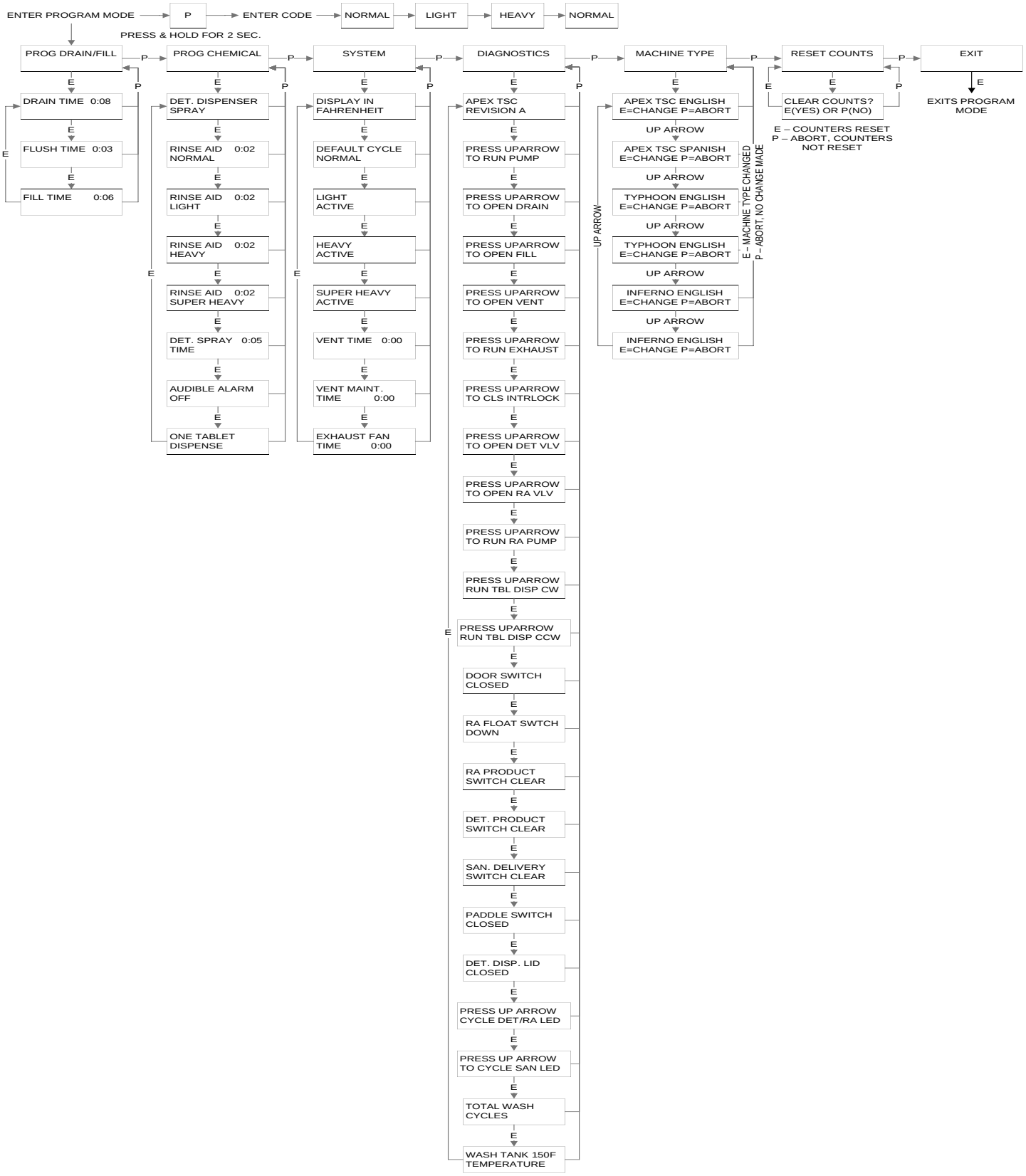
· Use UP arrow (on HEAVY button) to increase a value, use DOWN arrow (on SUPER HEAVY button) to decrease a value.

· Once you are in the programming mode, if you don't press any key for 45 seconds, you will be automatically logged out of the programming mode.

· See the PROGRAMMING section of the manual for detailed descriptions of each of these programming variables.

· Where applicable, the default program values (factory settings) are indicated on the flowchart below.

PROGRAMMING FLOWCHART (CONTINUED)



SECTION 3:
PREVENTATIVE MAINTENANCE

SECTION 3: PREVENTATIVE MAINTENANCE

PREVENTATIVE MAINTENANCE

The dishmachines covered in this manual are designed to operate with a minimum of interaction with the operator. However, this does not mean that some items will not wear out in time.

There are many things that operators can do to prevent catastrophic damage to the dishmachine. One of the major causes of component failure has to do with prescrapping procedures. A dishmachine is not a garbage disposal; any large pieces of material that are put into the machine shall remain in the machine until they are either broken up (after spreading out on your ware!) or physically removed. Strainers are installed to help catch debris, but they do no good if they are clogged. Have operators regularly inspect the pan strainers to ensure (1) that they are free of soil and debris and (2) they are laying flat in the tub.

When cleaning out strainers, do NOT beat them on waste cans. The strainers are made of metal and can be forgiving; but once severe damage is done, it is next to impossible for the strainer to work in the way it was designed to. Wipe out strainers with a rag and rinse under a faucet if necessary. For stubborn debris, a toothpick should be able to dislodge any obstructions from the perforations. Always ensure that strainers are placed back in the machine before operation and that they lay flat in the tub.

You may wish to contact your Ecolab representative in order to learn more about how your water hardness will effect the performance of your machine. Hard water makes dishmachines work harder and decreases efficiency.

Again, it is important to remind operators that trying to perform corrective maintenance on the dishmachine could lead to larger problems or even cause harm to the operator. If a problem is discovered; secure the dishmachine using proper shut down procedures as listed in this manual and contact your Ecolab representative.

Some problems, however, may having nothing to do with the machine itself and no amount of preventative maintenance is going to help. A common problem has to do with temperatures being too low. Verify that the water temperatures coming to your dishmachine match the requirements listed on the machine data plate. There can be a variety of reasons why your water temperature could be too low and you should discuss it with your Ecolab representative to determine what can be done.

By following the operating and cleaning instructions in this manual, you should get the most efficient results from your machine. As a reminder, here are some steps to take to ensure that you are using the dishmachine the way it was designed to work:

1. Ensure that the water temperatures match those listed on the machine data plate.
2. Ensure that all strainers are in place before operating the machine.
3. Ensure that all wash and/or rinse arms are secure in the machine before operating.
4. Ensure that drains are closed/sealed before operating.
5. Remove as much soil from dishes by hand as possible before loading into racks.
6. Do not overfill racks.
7. Ensure that glasses are placed upside down in the rack.
8. Ensure that all chemicals being injected to machine have been verified as being at the correct concentrations.
9. Clean out the machine at the end of every workday as per the instructions in the manual.
10. Always contact your Ecolab representative whenever a serious problem arises.
11. Follow all safety procedures, whether listed in this manual or put forth by local, state or national codes/regulations.

SECTION 4:
TROUBLESHOOTING

SECTION 4: TROUBLESHOOTING

TROUBLESHOOTING GUIDE

The APEX TSC dishmachine uses a microprocessor-based electronic controller to control function of the machine. The microprocessor is pre-programmed at the factory to run a machine that is installed in a typical application. A LCD display is used to indicate the status of the machine.

The electronic controller board with LCD display controls all timing functions. The controller board is connected to the interface board. It sends signals to the interface board to turn components on and off. The remaining electrical control components in the machine are connected to the interface board.

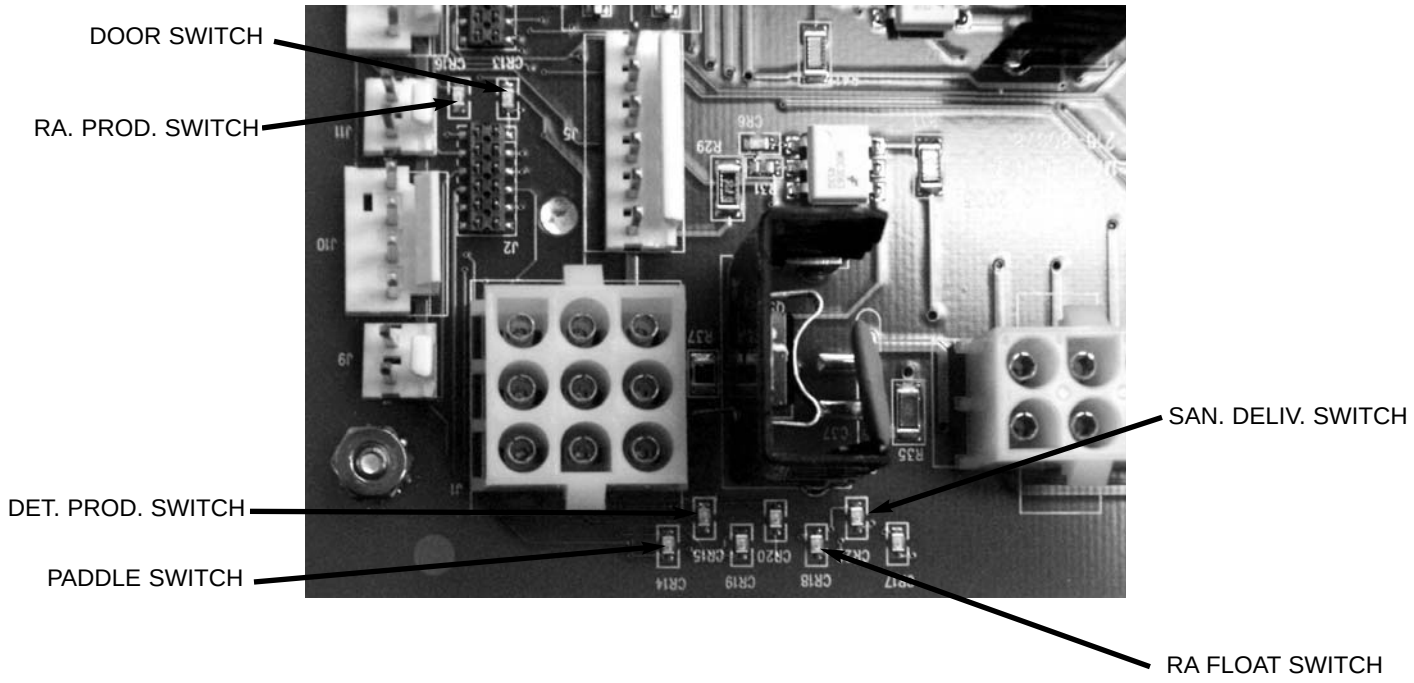
To aid in troubleshooting, the interface board contains red LED (light emitting diodes) which are illuminated whenever the output signal to the corresponding control item is ON.

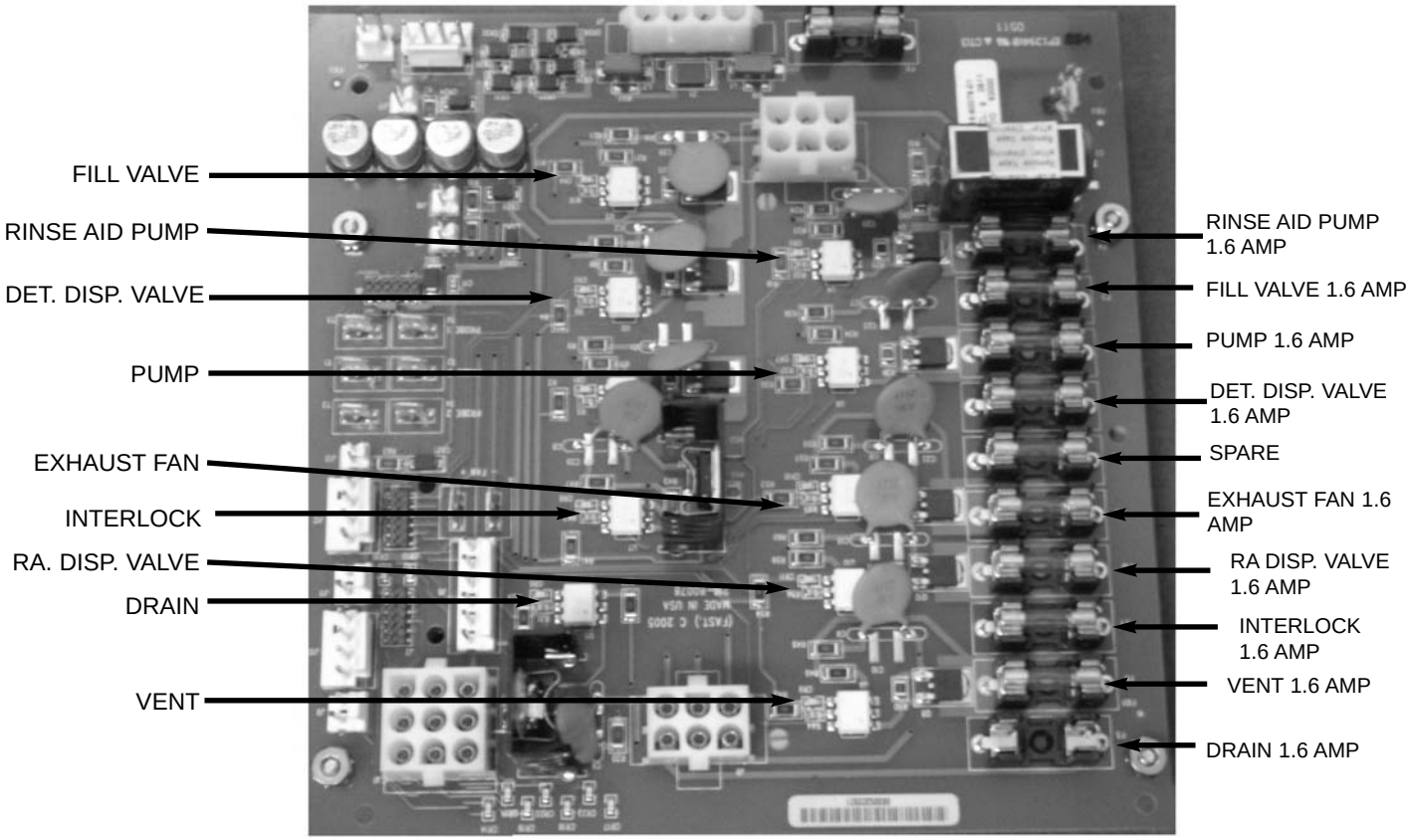
You can also use the DIAGNOSTICS section in the programming mode to manually turn on/off any of the output controls, instead of running complete cycles with the machine. See programming instructions.

The interface board contains triacs, which are essentially electronic relays. Use a multimeter to verify that the interface board output is supplying voltage to a control item (solenoid valve, peristaltic pump, motor contactor, etc.). During any troubleshooting, it is critical to remember that a 120 volt signal will always be measured at the outputs of the interface board if the corresponding load (solenoid valve, peristaltic pump, motor contactor, etc.) is **not** connected to the output. To avoid false readings, the control item that is being tested must be connected to the interface board output, regardless if the output triac is turned on or off.

The interface board also contains red LED (light emitting diodes) corresponding to each of the switch-type inputs to the interface board. When any of these switch inputs are in a closed state, the corresponding LED will be illuminated. To aid in trouble shooting, manually change the state of a switch and watch for the LED to turn on or off. This confirms that the switch is working and a signal is returning back to the interface board. If the LED does not change state, check the switch using an ohmmeter. If the switch is good, first check that there are no breaks in the wiring from the switch to the interface board, and if there are none, replace the interface board.

You can also use the DIAGNOSTICS section in the programming mode to display the current state of a switch input. See programming instructions.


DOOR SWITCH
RA. PROD. SWITCH
SAN. DELIV. SWITCH
DET. PROD. SWITCH
PADDLE SWITCH
RA FLOAT SWITCH


FILL VALVE
RINSE AID PUMP
DET. DISP. VALVE
PUMP
EXHAUST FAN
INTERLOCK
RA. DISP. VALVE
DRAIN
VENT
RINSE AID PUMP 1.6 AMP
FILL VALVE 1.6 AMP
PUMP 1.6 AMP
DET. DISP. VALVE 1.6 AMP
SPARE
EXHAUST FAN 1.6 AMP
RA DISP. VALVE 1.6 AMP
INTERLOCK 1.6 AMP
VENT 1.6 AMP
DRAIN 1.6 AMP

SECTION 4: TROUBLESHOOTING

COMMON PROBLEMS

This trouble-shooting guide will help identify failed components. Before replacing a component that has been identified as faulty, double-check the wiring to and from the component, to ensure that the problem is not first caused by a loose or open connection.

Inspection, testing and repair of electrical equipment should be performed only by qualified service personnel. Certain procedures in this section require electrical tests or measurements while power is applied to the machine. Exercise extreme caution at all times. If test points are not easily accessible, disconnect power, attach test equipment and reapply power to test. When replacing electrical parts, disconnect power at source circuit breaker.

Before performing any trouble-shooting steps related to PC boards, check the machine incoming voltage, the PC board incoming voltage and the function of the cooling fan (in this order).

1. Check to make sure that the proper AC line voltage exists at the terminal block in the lower control box.
   a. If line voltage (115VAC) does not exist, the circuit breaker for the dish machine circuit is tripped or there is a problem with the wiring circuit.
2. Check the voltage going to the PC boards (voltage coming out of power supply). Remove the connector at the lower right corner of the PC board and measure the voltage across the two yellow wires. The voltage should be 22-26VAC.
   a. If no voltage exists or if the voltage is above or below this range, replace the power supply.
3. Check to see if the cooling fan is running. Place a tissue at the inlet to the fan and confirm that the tissue is pulled against the inlet (the cooling fan forces air into the control box). This can be done at the end of the inlet hose to the fan, or by removing the hose and checking for airflow at the inlet to the fan housing. The airflow is very low, so avoid using a heavy paper towel or napkin to perform this test.

a. If the fan is not running, check the fuse on the PC board next to the fan connections and make sure it is not blown.
b. If the fuse is not blown, check the DC voltage at the fan connections on the PC board. It should read 24VDC.
c. If 24VDC exists, replace the fan. If no voltage exists (and the fuse is not blown), replace the PC board.

If, after performing the above Steps 1-3, the display is on when power is applied to the machine and a particular output device (motor contactor, peristaltic pump, water valve, drain, etc.) is not turning on during the cycle, then perform the following steps (in order):

4. Check the fuse for the output device and make sure it is not blown.
5. Measure the voltage at the output device when the PC board turns the device on (this can be done manually using the engineering section in the programming mode, or can be done by running a cycle).

Important: To avoid false voltage readings, the output device must be electrically connected to its circuit!

6. If line voltage exists when the output device is turned on by the PC board, check to make sure that the coil on the output device is not open or shorted by measuring the resistance between the two terminals of the device. It should be greater than zero (open), but less than infinity (shorted). If the coil is good, replace the PC boards.
7. If line voltage does not exist, first make sure that all connections between the PC boards and the output device are continuous (no loose wires or connections). It is recommended that you disconnect each of the two 6-wire connectors at the top-center and bottom-center of the PC board. Then reconnect them, making sure that they snap fully into place. These two connectors are where the output devices are connected to the PC boards. If the output device still does not work, replace the PC boards.

If, after performing the above Steps 1-3, a particular output device (motor contactor, peristaltic pump, water valve, drain, etc.) is running all of the time, then perform the following steps (in order):

8. Measure the voltage at the output device when the PC board turns the device on (this can be done manually using the engineering section in the programming mode, or can be done by running a cycle).

Important: To avoid false voltage readings, the output device must be electrically connected to its circuit!

9. If line voltage exists only when the PC board turns on the output device, there is mechanical or electrical failure in the output device (for example, a motor contactor with contacts that are welded closed or a solenoid water valve with damage to the coil or plunger). Replace the output device.

If line voltage exists all of the time (even when the PC board indicates that the device should be off), replace the PC boards.

SECTION 4: TROUBLESHOOTING

COMMON PROBLEMS

Problem: Machine will not turn on. The display on the upper control box is blank.

1. No power to dishmachine.
   a. Check that service disconnect supplying power to the machine is ON.
   b. Measure voltage at terminal block in lower control box. If no voltage exists, or the voltage does not match the voltage indicated on the machine's dataplate, seek the assistance of a qualified electrician.
2. No power to the controller PC board display.
   a. Measure voltage at secondary side of power supply at the connection to the interface board. If 24 VAC does not exist, replace power supply.
3. Controller board is faulty.

Problem: Machine runs with the doors open. Display does not indicate CLOSE DOOR when doors are open.

1. Door switch or interface board is faulty. Disconnect the door switch leads from the interface board and check for open circuit between the two leads when the doors are open. If closed circuit, replace door switch. If open circuit, replace interface board.

Problem: Machine will not turn on when the ON/OFF button is pressed. The display on the upper control box indicates OFF.

1. The keypad is faulty, or the connection between the keypad and the controller board is loose or incorrect. Remove the controller board and inspect the connection between the keypad and the controller board. Make sure that the sockets on the keypad connector are aligned with the pins on the interface board connector (make sure there are no exposed pins on the interface board connector). If the connection is correct, the keypad is faulty and must be replaced.

Problem: Display indicates WASH PROBE ERROR

Note: If a problem exists with the wash temperature probe, the function of the machine will continue normally. OPEN or SHORT will be displayed instead of a temperature value during the wash or rinse cycle.

1. Inside the lower control box, disconnect the white and black probe wires from their connection wires.
2. Measure the resistance between the black and white wires on the temperature probe. If the resistance is infinity (open circuit) or zero (short circuit), the probe is bad and needs to be replaced. The resistance should measure between 1,000 and 6,000 Ohms, depending on the temperature of the probe.
3. If the probe resistance is good, reconnect the probe wires to their connection wires. Inside the upper control box, disconnect the probe connection wires from the interface board. Measure the resistance between the two connection wires. It should measure approximately the same as the resistance measured in step #2. If it is infinity (open circuit) or zero (short circuit), there is a problem in the connections from the lower control box to the upper control box, and these connections must be checked.
4. If all of the probe connections are correct, then the interface and control board assembly must be replaced.

Problem: Machine will not fill when the display indicates FILLING

1. The incoming water line is blocked, preventing water from entering the machine. Check and, if necessary, clean the Y-strainer on the incoming water line.
2. The incoming water solenoid valve is faulty, or the control circuit for the valve is faulty. Using the DIAGNOSTICS section in the programming mode, manually attempt to open the incoming water solenoid valve (use PRESS UP ARROW TO OPEN FILL). Observe the red LED on the interface board corresponding to the output for the incoming water solenoid valve. If the LED does not illuminate when the valve is opened manually, replace the interface board. If the LED is illuminated, first check the fuse corresponding to the output circuit for the solenoid valve. Replace fuse if blown. If fuse is not blown, replace solenoid valve.

SECTION 4: TROUBLESHOOTING

COMMON PROBLEMS

Problem: Wash pump motor will not run when the display indicates WASHING.

1. A problem exists in the control circuit for the wash pump motor.
a. Using the DIAGNOSTICS section in the programming mode, manually attempt to run the wash pump motor (use PRESS UP ARROW TO RUN PUMP). Observe the red LED on the interface board corresponding to the output for the wash pump motor.
b. If the LED does not illuminate when the pump is run manually, replace the interface board. If the LED is illuminated, you should hear the motor contactor engage when you try to manually run the pump (using PRESS UP ARROW TO RUN PUMP). If the contactor does not engage, first check the fuse corresponding to the output circuit for the wash pump motor. Replace fuse if blown. If fuse is not blown, contactor is faulty and must be replaced.
2. The wash pump motor is faulty. If you hear the contactor engage when you try to manually run the pump (using PRESS UP ARROW TO RUN PUMP) and the pump does not run, the pump motor is faulty and must be replaced. The motor contains integral thermal overload protection devices. If the motor becomes hot from excessive loads, these devices open the electrical circuit within the motor and prevent the motor from running. Before replacing the motor, allow it to cool so that the overload devices can reset themselves, and then re-test the motor. If the motor still does not run, replace the motor.

Problem: Machine will not drain when DRAINING is indicated on the display. Drain mechanism does not move up or down.

1. The drain solenoid is faulty, or the control circuit for the drain solenoid is faulty.
a. Using the DIAGNOSTICS section in the programming mode, manually attempt to run the drain solenoid (use PRESS UP ARROW TO OPEN DRAIN). Observe the red LED on the interface board corresponding to the output for the drain. If the LED does not illuminate when the drain is opened manually, replace the interface board.
b. If the LED is illuminated, first check the fuse corresponding to interface board output circuit for the drain valve. Replace fuse if blown.
c. If fuse is not blown, check that voltage is getting to the drain solenoid. With the lead wires connected to the terminals at the drain solenoid, measure the voltage across these two terminals when the drain is opened manually (use PRESS UP ARROW TO OPEN DRAIN, in the programming mode). If line voltage exists, the drain solenoid is faulty and must be replaced.

Problem: Add sanitizer LED illuminated even though there are sanitizer tablets in the dispenser. (NOTE: Following repair, LED will remain illuminated until a tablet is dispensed on a subsequent cycle, or until the machine is powered off.)

1. The sanitizer dispenser is jammed, the sanitizer dispenser motor is faulty, or the speed control board is faulty. Using the DIAGNOSTICS section in the programming mode, attempt to manually run the tablet dispenser motor forward and reverse (PRESS UP ARROW RUN TBL DISP FWD (and REV). If the motor does not run (if tablet motion in the dispenser is not seen):
a. Remove the hopper from the lower static plastic disc. Using DIAGNOSTICS, attempt to manually run the dispenser motor. If the motor shaft rotates, check for and clear a jammed tablet: transfer tablets to a container, turn the hopper assembly over, and rotate disks to see if jam is present. Clear jam and reassemble. Discard broken tablets before replacing in hopper.
b. If the motor shaft does not rotate, removed mounting plate from base. Remove connectors from motor and check voltage while using the DIAGNOSTICS menu to manually run the dispenser motor. If voltage is around 10 volts or greater, replace the motor and reassemble.
c. If voltage is not present, check fuse on speed control board in controller and replace if necessary. If voltage is still not present, replace speed control board.
2. If dispenser motor does run, the sanitizer delivery switch IR sensor may be misaligned or faulty.
a. Remove the mounting plate from the base of the dispenser. Check and make sure that sanitizer deliver switch emitter and receiver are positioned firmly against the bottom ridge of the sensor bracket.
b. Using the DIAGNOSTICS section in the programming mode, check the function of the sanitizer delivery switch by observing the screen while blocking the sensor beam by putting a screwdriver or other object in the sensor mount tube (SAN DELIVERY SW CLEAR (or BLOCKED)). If the sensor does not function properly, check the sensor fuse on the board in the controller and replace if necessary. If the sensor still does not function properly, replace the sensor emitter and/or receiver.

SECTION 4: TROUBLESHOOTING

COMMON PROBLEMS - ERROR MESSAGES

ERROR MESSAGES: When a problem occurs, an error message is displayed at the end of the cycle. Once the doors have been opened, the error message is replaced with the normal displays until the completion of the next cycle, and the error message will again be displayed. The following error messages exist:

1. CHECK/REFILL SANITIZER - This message indicates that the supply of sanitizer is empty, or a problem exists with the sanitizer dispenser pump such that it is not dispensing sanitizer. The message is displayed when the sanitizer delivery infrared switch has not detected a tablet dispense during the dispensing sequence.

2. CHECK/REFILL DETERGENT - This message indicates that the supply of solid detergent blocks in the detergent product holder needs replenishment. The message is displayed when there is enough room to add one complete block into the product holder.

3. RINSE AID FLOAT SWITCH ERROR - At the start of each wash cycle, if the float switch in the rinse aid reservoir indicates that the reservoir is empty, the water solenoid valve supplying the rinse aid reservoir will be turned on. If the reservoir is not filled within 15 seconds, this error message is displayed. This indicates that there is a problem with either the float switch or with the water solenoid valve supplying the rinse aid reservoir.

4. CHECK/REFILL RINSE AID - This message indicates that the supply of solid rinse aid blocks in the rinse aid product holder needs replenishment. The message is displayed when there is enough room to add one complete block into the product holder.

5. WASH PROBE ERROR (SHORT or OPEN) - This message indicates that there is a problem with the wash tank temperature probe or with the electrical circuit where the probe is connected. See trouble shooting section.

6. DETERGENT LID OPEN - When you see this message, the detergent lid's magnet might not be aligned with the reed switch inside the base. For troubleshooting, use a door magnet and slide it around by the 2 screws which hold the reed switch in place, and see if the error message goes away. If it does, there is an alignment problem or parts missing. If the message doesn't go away, there is a problem with the reed switch and needs to be replaced.

SECTION 5:
SERVICE PROCEDURES

RINSE SOLENOID VALVE REPAIR PARTS KIT

These dishmachines are equipped with electrical solenoid valves to allow for automatic fill and rinse. These valves are designed to specific tolerances and design aspects that must be met in order to function properly.

Ecolab offers repair kits for replacing some of the wear items associated with solenoid valves which will allow you to save money in that replacement of these parts can take place *without* removing the solenoid valve from the plumbing assembly.

The instructions provided here are for maintenance personnel only. Unauthorized persons should not attempt any of the steps contained in these instructions.

Warning: many of the instructions and steps within this document require the use of tools. Only authorized personnel should ever perform any maintenance procedure on the dishmachine!

PREPARATION

1. Power must be secured to the unit at the service breaker. Tag or lock out the service breaker to prevent accidental or unauthorized energizing of the machine.

2. Ensure that incoming water to the machine is secured either by use of a shut-off valve or disconnecting the incoming water line.

TOOLS REQUIRED

The following tools will be needed to perform this maintenance evolution:

1. Small flathead screwdriver
2. Medium flathead screwdriver
2. Needle nose pliers
3. 5/16” nutdriver
4. Channel locks
5. 12” pipe wrench

TIME REQUIRED

It is estimated that it will take (1) person twenty minutes to perform this task, not including all of the items indicated in the section entitled “PREPARATION”.

IMPORTANT NOTES

1. Read these instructions thoroughly before attempting this maintenance evolution. Become familiar with the parts and what actions need to be taken. This will save time in the long run!

2. The procedures demonstrated in this manual are shown being performed on an ES-4400 rack conveyor dishmachine. The actual maintenance steps, however, apply to any Parker style solenoid valve found on a Ecolab dishmachine.

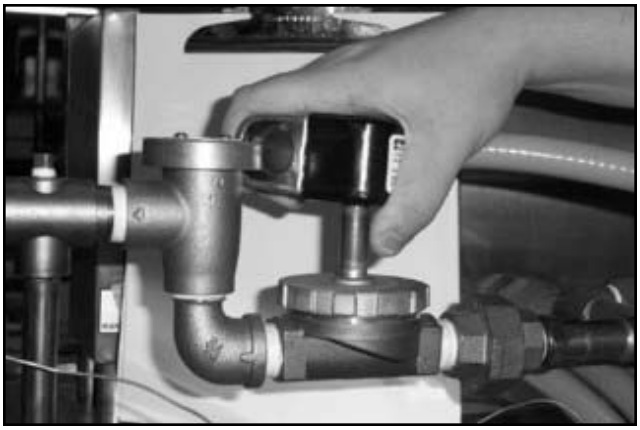
STEPS

1. Remove the top screw with the 5/16” nutdriver. Remove the screw and the data plate and set to the side.



Removing the top screw

2. With the top screw and data plate removed, grasp the solenoid coil and gently pull up. The coil should slide up, allowing you to remove it from the valve bonnet. If you are wanting to replace the coil, continue on with Step 3. If you are wanting to replace some of the internal components of the valve, proceed to step 12.



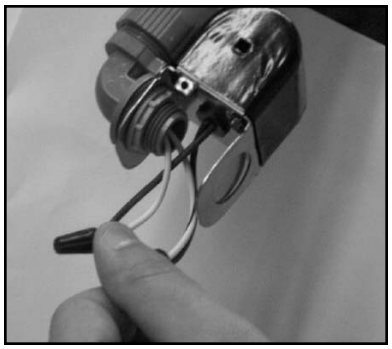
Removing the coil

3. **NOTE:** Replacing the solenoid coil requires working with the wiring of your machine. It is important that all wiring maintenance be performed by qualified personnel. Always verify the wiring steps presented in this instruction with the schematic that shipped with the unit. A current schematic can also be found in the unit’s installation manual. Before beginning any step that involves working with wiring, ensure that the steps located in the section entitled “Preparation” have been performed. Power must be secured to the machine at the service breaker. Failure to do so could result in severe injury to maintenance personnel.



Prying open the coil wire cover

4. When replacing the coil, ensure that when removing the coil wire cover that care is taken not to damage the wires inside. Using the medium flathead screwdriver, gently use it to open the cover enough to where it could be pulled off.



Straightening the wires

5. Once the coil wire cover has been removed and set to the side, take the internal wires and pull them out straight.



Removing the wire nuts

6. Remove the wire nuts from the wires and separate them.



Loosening the conduit nut

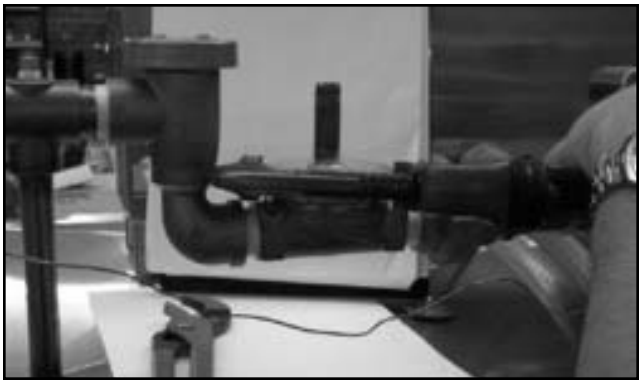
7. Using a pair of channel locks, gently loosen the conduit retaining ring for the conduit nut. Once it is loosened, use your fingers to unscrew and remove it.

8. Pull the conduit away and discard the bad coil. Take the new coil and attach the conduit, reinstall & tighten the conduit nut, and pull the wires through so that you will be able to wire the valve back up.

9. Reconnect the wires from the conduit to the wires from the solenoid as they had been connected previously. Ensure that the wire nuts are on tight.

10. Slide the coil wire cover back on, taking care not to damage the wires.

11. If you are done performing maintenance on the valve, continue on to step 23. Otherwise, please go on to step 12.L



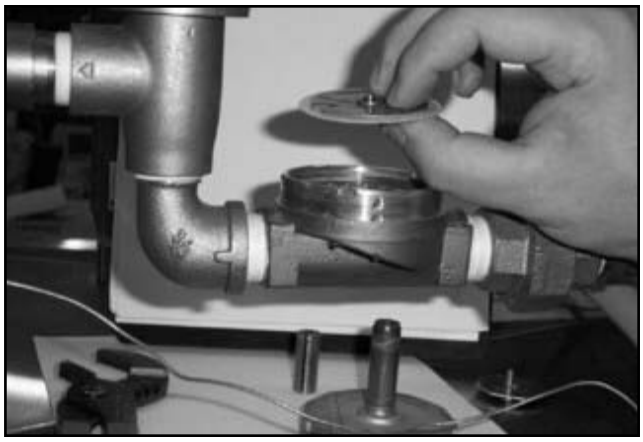
Loosening the valve bonnet

12. To remove the valve bonnet, grasp it with the jaws of the pipe wrench and turn to the left. **Note:** on some models you may have to remove the valve in order to perform this and any further steps. Be careful not to damage the plumbing assembly. Only use the pipe wrench enough to where you can spin the valve bonnet off with your hand.



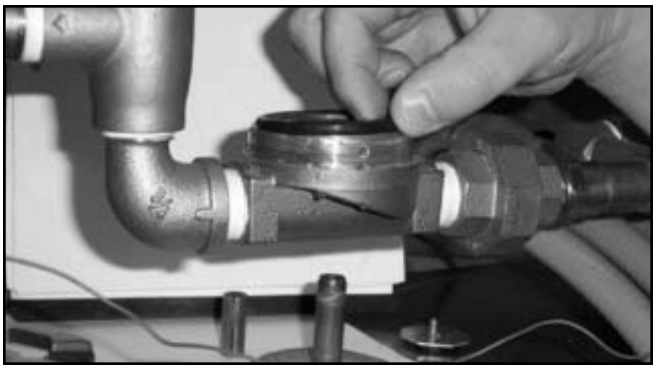
Removing the valve bonnet

13. Slowly remove the valve bonnet. **Note:** The spring for the plunger is located directly under the bonnet and may come free if you are not careful. Remove the plunger, spring and valve bonnet and place to the side.



Removing the diaphragm

17. Remove the diaphragm retainer and then the diaphragm itself. Many problems associated with a solenoid valve can be traced to a clogged pilot port in the diaphragm.

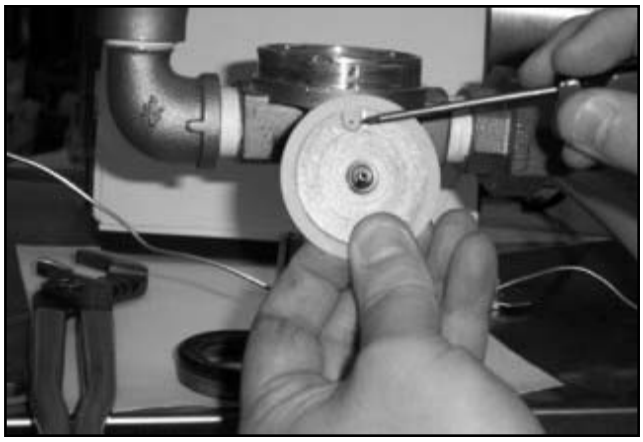


Removing the O-ring

14. Remove the O-ring and inspect it. If it has any tears or cuts or excessive flat spaces, it should be replaced.

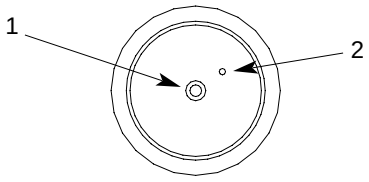
15. Examine the threads for the valve bonnet. Check them for scoring or signs of damage. Take a cloth and clean them out to remove any foreign particles that might get lodged in the threads and cause a leak. Severely damage threads should not be repaired; instead it is recommended that the entire valve should be replaced. These instructions do not provide information on replacing the solenoid valve.

16. **Note:** Even though an O-ring may not appear damaged, it is a good idea to go ahead and replace it if you have a new one. This will help ensure that your valve remains leak-free in the future!



Pointing out the extension hole

18. As indicated in the photo above, the extension hole can become clogged. If it is difficult to clean out, you can use a heated straight pin to push through the hole. The center hole, the pilot port, must also be clear. If the diaphragm is torn or bent in any way, it must be replaced.



Diaphragm showing (1) pilot port and (2) extension hole



Removing the screen retainer

19. Using the small flathead screwdriver, lift out the screen retainer. Verify that the holes in it are free of clogs and debris.



Removing the mesh strainer screen

20. Again using the small flathead screwdriver, carefully remove the mesh screen from inside the valve body. The screen should be taken and rinsed out to remove any debris fouling it.



View inside the solenoid valve body

21. With the mesh screen removed, look down into the valve and verify it is not clogged. Remove any foreign objects from the valve body that would obstruct flow.

22. Reassemble the valve, reversing the steps needed to take it apart. Replace defective replacement parts with new parts from ordered kits. Ensure that components are sufficiently tightened to prevent leakage.

AFTER MAINTENANCE ACTIONS

Reconnect the incoming water (if disconnected) and turn on. Then restore power to the unit. Run the unit for at least 10 minutes to ensure there are no leaks. If any problems arise please contact your Ecolab representative.

SPECIAL PARTS

Repair kit includes: Plunger, Spring, O-ring, and Diaphragm.

1/2” Repair Kit
Ecolab No.: 85283489
Mfg. No.: N/A

3/4” Repair Kit
Ecolab No.: 85283406
Mfg. No.: N/A

110/240 Volt Coil & Housing Only
Ecolab No.: 85289411
Mfg. No.: N/A

1/2” 110/240 Volt Solenoid Valve Complete Assembly
Ecolab No.: 96580683
Mfg. No.: N/A

3/4” 110/240 Volt Solenoid Valve Complete Assembly
Ecolab No.: 85260511
Mfg. No.: N/A

VACUUM BREAKER REPAIR PARTS KIT

These dishmachines are equipped with vacuum breakers to serve as back-flow prevention devices. ASSE requirements specify what type of back-flow prevention is necessary on dishmachines. Vacuum breakers, unlike air gaps, have certain parts that have specific tolerances and design aspects that must be met in order to function properly.

Ecolab offers repair kits for replacing some of the wear items associated with vacuum breakers which will allow you to save money in that replacement of these parts can take place *without* removing the vacuum breaker from the plumbing assembly.

The instructions provided here are for maintenance personnel only. Unauthorized persons should not attempt any of the steps contained in these instructions.

Warning: many of the instructions and steps within this document require the use of tools. Only authorized personnel should ever perform any maintenance procedure on the dishmachine!

PREPARATION

1. Power must be secured to the unit at the service breaker. Tag or lock out the service breaker to prevent accidental or unauthorized energizing of the machine.

2. Ensure that incoming water to the machine is secured either by use of a shut-off valve or disconnecting the incoming water line.

TOOLS REQUIRED

The following tools will be needed to perform this maintenance evolution:

1. Small flathead screwdriver
2. Needle nose pliers

TIME REQUIRED

It is estimated that it will take (1) person twenty minutes to perform this task, not including all of the items indicated in the section entitled “PREPARATION”.

IMPORTANT NOTES

1. Read these instructions thoroughly before attempting this maintenance evolution. Become familiar with the parts and what actions need to be taken. This will save time in the long run!

STEPS

1. **Note:** These instructions only apply to vacuum breakers (1/2” NPT and 3/4” NPT) as pictured below. The repair kits indicated in these instructions will only work on those style of back-flow preventers. If you have a machine with a different style of vacuum breaker, contact your Ecolab representative about replacement components.



Vacuum breaker

2. **Note:** Even though the photos in these instructions show a vacuum breaker that has been removed from the plumbing assembly, these maintenance steps could be performed with it installed so long as the requirements in the section entitled “PREPARATION” have been met.

3. Remove the top cap by gripping firmly and turning to the left. The cap should come off after a few turns.



Removing the cap

4. Set the cap to the side.

5. Using the needle nose pliers, gently lift out the plunger and set to the side. Examine the brass seating surface inside the vacuum breaker. The plunger is required to sit flat on this surface so it must be free of defects, imperfections and the like. If there is debris, remove it. If it is chipped or cracked then the vacuum breaker must be replaced. Failure to do so may result in the vacuum breaker not working according to its design and could result in damage to the dishmachine.



Removing the plunger

6. Your repair kit comes with a new plunger. Examine the old one and ensure that the mating surface is not damaged or cut. Also inspect the rubber seal on the top of the plunger to ensure it is in good condition and not torn.



Examining the seal ring on the plunger

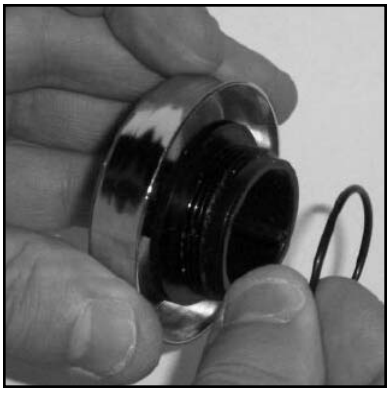


Examining the plunger seating surface

7. If any of these conditions are present, replace the old plunger with the new one from your kit. Verify that the new plunger is also free from defects. If it is not, contact your Ecolab representative immediately.

8. The plunger should drop into the vacuum breaker and seat. Ensure it is not flipped upside down (the orange seal ring should be up towards the top of the vacuum breaker).

9. Pick up the cap and examine it. With a soft towel, remove any grit, grime or debris that may have gotten caught in the threads of both the cap retainer or the vacuum breaker body. There is an O-ring that should be present on the cap retainer as well. Regardless of the condition of the plunger, this O-ring should be replaced once the cap is removed. Using a small flathead screwdriver, remove the old O-ring.



Replacing the O-ring

10. With the new O-ring in place, screw the cap back on the vacuum breaker body. The cap needs to only be hand tight (snug).

AFTER MAINTENANCE ACTIONS

1. Reconnect the incoming water (if disconnected) and turn on. Then restore power to the unit. Run the unit for at least 10 minutes to ensure there are no leaks. If any problems arise please contact your Ecolab representative.

SPECIAL PARTS

To order the kit with components and instructions:

Components of 1/2” Repair Kit
Ecolab No.: 85284156
Mfg. No.: 04820-001-60-56

Components of 3/4” Repair Kit
Ecolab No.: 85284164
Mfg. No.: 04820-001-60-57

SECTION 6:
PARTS SECTION

HARDWARE- Stainless Steel

Ecolab No.	Description	Jackson No.
96023832	SCREW 4-40X1/4"	05305-002-32-38
96584354	SCREW 4-40X3/8"	N/A
88120365	SCREW 4-40X1/2"	N/A
96570478	SCREW 4-40X3/4"	N/A
96028436	SCREW 4-40 X 1"	N/A
88125554	SCREW 6-32X3/8"	N/A
88120068	SCREW 6-32X1/2"	N/A
96025010	SCREW 6-32X3/4"	05305-011-37-05
96032883	SCREW 6-32X1-1/2"	N/A
88120639	SCREW 8-32X3/8"	05305-172-02-00
88123740	SCREW 8-32X1/2"	05305-172-07-00
88120175	SCREW 8-32X5/8"	N/A
88122254	SCREW 8-32X3/4"	05305-172-06-00
88120878	SCREW 10-32X3/8"	05305-173-12-00
88120142	SCREW 10-32X1/2"	N/A
88120217	SCREW 10-32X3/4"	05305-011-62-17
88120282	SCREW 10-32X1"	N/A
88120936	SCREW 10-32X1-1/2"	N/A
88120753	SCREW 10-24X3/8"	05305-173-03-00
88120746	SCREW 10-24X1/2"	N/A
88120191	SCREW 10-24X3/4"	N/A
88120019	SCREW 10-24X1"	N/A
88120000	SCREW 10-24X6"	N/A
88220007	SCREW SOCKET 1/4-20X3/8"	N/A
88020433	SCREW 1/4-20X1/2"	05305-274-02-00
88000013	SCREW 1/4-20X5/8"	05305-274-24-00
88020458	SCREW 1/4-20X3/4"	05305-274-04-00
88030069	SCREW 1/4-20X1-1/2"	05305-274-23-00
88000104	SCREW 1/4-20X2-1/2"	05305-274-13-00
88021027	SCREW 3/8-16X3/4"	05306-011-71-60
88021050	SCREW 3/8-16X1-1/4"	05305-276-10-00
88926002	SCREW SOCKET 3/8-16X1-1/2"	N/A
88021076	SCREW 3/8-16X1-3/4"	05306-011-36-94
88420047	NUT HEX 4-40	N/A
88420062	NUT HEX 6-32	N/A
88420070	NUT HEX 8-32	N/A
88420088	NUT HEX 10-32	N/A
88420120	NUT HEX 10-24	N/A
88420104	NUT HEX 1/4-20	05310-274-01-00
88422043	NUT HEX 5/16-18	05310-275-01-00
88422068	NUT HEX 3/8-16	05310-276-01-00
88429121	NUT LOCK 4-40	N/A
88460050	NUT LOCK 6-32	05310-373-03-00
88429105	NUT LOCK 8-32	05310-272-02-00
88460068	NUT LOCK 10-32	05310-373-02-00
88429063	NUT LOCK 10-24	05310-373-01-00

88429113	NUT LOCK 1/4-20	05310-374-01-00
88419056	NUT LOCK 5/16-18	N/A
88419007	NUT LOCK 3/8-16	05310-011-72-55
88520000	WASHER FLAT 1/4	05311-002-78-93
88530597	WASHER FLAT 5/16	05311-175-01-00
88530605	WASHER FLAT 3/8	05311-176-01-00
88521059	WASHER LOCK #8	05311-272-01-00
88521075	WASHER LOCK #10	N/A
88521083	WASHER LOCK 1/4	05311-274-01-00
88521117	WASHER LOCK 5/16	05311-275-01-00
88521109	WASHER LOCK 3/8	05311-276-01-00
88520069	WASHER LOCK 1/2	05311-011-71-93
88500000	WASHER BEV 3/8 SQUARE	05311-011-35-36
88900733	PIN COTTER 1/16X1/2"	05315-011-68-56
96027495	PIN COTTER 3/32X3/4"	05315-207-01-00
88900501	PIN COTTER 1/8X3/4"	05315-011-60-09
88930581	PIN COTTER 1/8X1-1/2"	05315-002-05-86
88920087	PIN COTTER 3/16X1-3/4"	N/A
96035241	HAIRPIN	05315-002-15-39

HARDWARE MISC.

83109041	CABLE TIE 7"	005975-602-05-16
83109199	CABLE TIE 15" 100PK	N/A
83109025	CABLE TIE W/SCREW HOLE	N/A
89990121	GREASE SILICONE 3OZ TUBE	N/A
89992176	SILICONE CAULK WHITE 3OZ TUBE	N/A
89991996	TEFLON TAPE ROLL	N/A
83109125	ELECTRICAL TAPE	N/A
96022447	ENDCAP, DOOR HANDLE	005340-011-35-00
96552336	DOOR GUIDE, PLASTIC, 23 1/2” Long	05700-111-33-59

ELECTRICAL

83300541	CONDUIT 1/2"	05975-111-46-57
83312017	NUT, CONDUIT 1/2"	N/A
83311506	CONNECTOR, CONDUIT 1/2"	05975-011-45-13
83311753	ELBOW, 90DEG, CONDUIT 1/2"	05975-111-01-00
83311852	ELBOW 45DEG, CONDUIT 1/2"	05975-011-45-23
83115003	PLUG, PLASTIC 1/2"	N/A
96540067	PLUG, METAL 1/2"	N/A
83199570	PLUG, RUBBER 1/2"	N/A
83116814	PLUG, METAL 1-1/2"	N/A
87301412	HANGER, CONDUIT METAL	N/A
96203153	TERMINAL FEMALE 1/4" W/PIGGY BACK	N/A
83100002	TERMINAL FEMALE 1/4" 14-8GA	N/A
83102269	TERMINAL FEMALE 1/4" 16-14GA	N/A
83102244	TERMINAL FEMALE 1/4" 22-18GA	N/A
83101022	CONNECTOR BUTT SPLICE 16-14GA	N/A
83101014	CONNECTOR BUTT SPLICE 22-18GA	N/A
83102152	TERMINAL SPADE #8HOLE 16-14GA	N/A
83102129	TERMINAL SPADE #8HOLE 22-16GA	N/A

96570221	TERMINAL SPADE #10HOLE 14-16GA	N/A
96032271	TERMINAL SPADE .25HOLE 12-10GA	N/A
96032701	TERMINAL SPADE .25HOLE 16-14GA	N/A
83100073	TERMINAL EYELET #8HOLE 16-14GA	N/A
83100339	TERMINAL EYELET #10HOLE 16-14GA	N/A
83101113	WIRE NUT 18-12GA	N/A
83101089	WIRE NUT 14-10GA CRIMP	N/A

PLUMBING

89009138	THERMOMETER, SCREW-IN, ES2000/4000	06685-111-35-30
96021316	THERMOMETER, 96"LEAD, CONVEYOR	06685-111-68-49
85390193	GAUGE PRESSURE 0-30PSI, BOTTOM MOUNT	06685-011-64-29
96582086	GAUGE PRESSURE 0-100PSI, BOTTOM MOUNT	06685-111-88-34
85390417	GAUGE PRESSURE 0-100PSI, BACK MOUNT	06685-011-48-32
96022421	WASH ARM PRESSURE TEST KIT	N/A
85230191	NEEDLE VALVE, 1/4" PIPE	N/A
85250587	VALVE BALL 1/2"PIPE	N/A
85200269	VALVE GLOBE 1/2"PIPE	04820-100-15-00
85250595	VALVE BALL 3/4"PIPE	N/A
85221018	REGULATOR WATER 1/4"PIPE, 180F	04820-011-69-05
85220077	REGULATOR WATER 1/2"PIPE, 140F	04820-100-04-07
85220010	REGULATOR WATER 3/4"PIPE, 180F	04820-100-01-06
85284214	REPAIR KIT 3/4" WATER REGULATOR	N/A
96027024	STRAINER Y 1/2" PIPE	04730-217-01-10
85300325	STRAINER Y 3/4" PIPE	04730-717-02-06
85300301	SCREEN, COARSE 3/4”	N/A
85300333	SCREEN, FINE 3/4”	N/A

TUBING

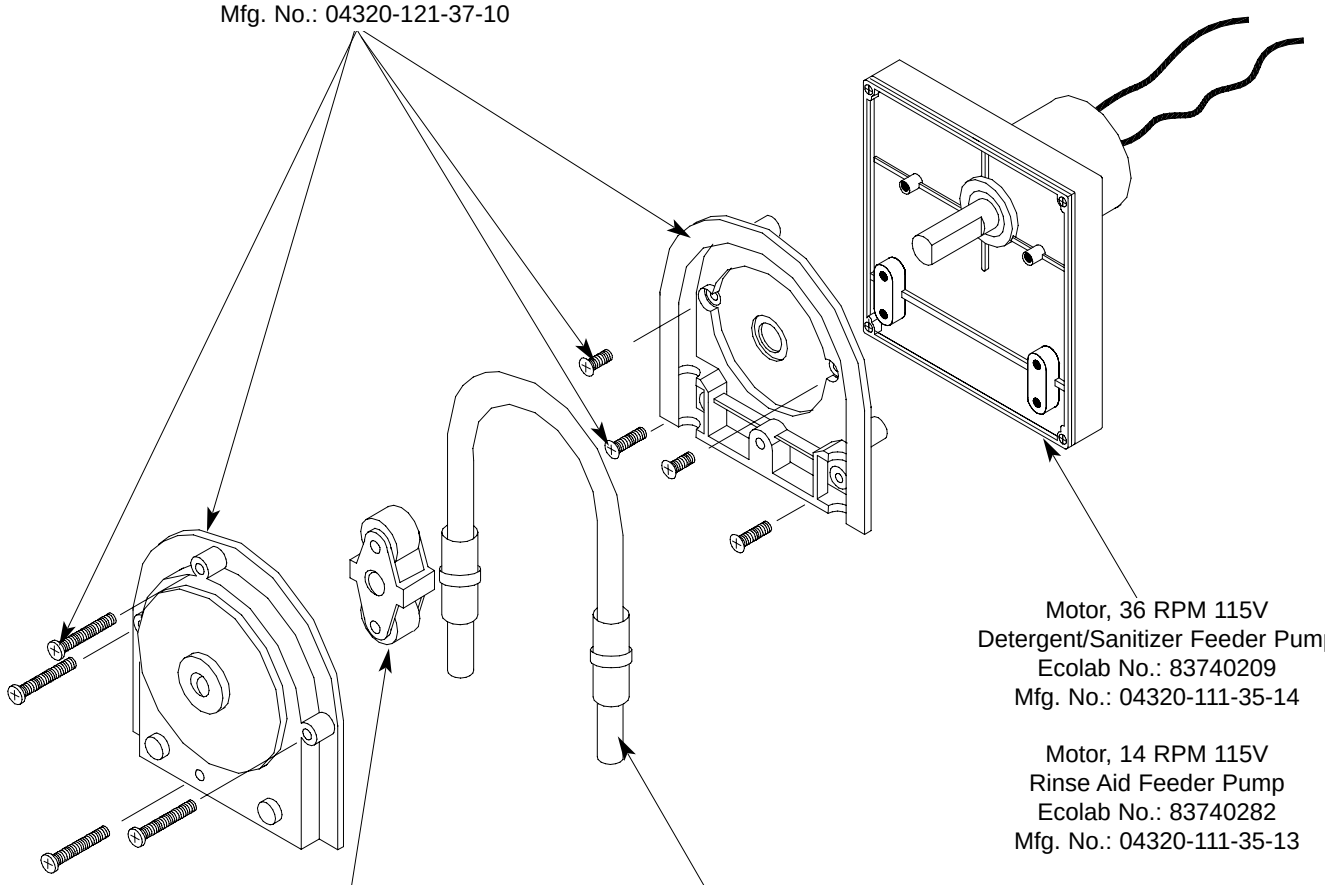
85015105	TUBING 1/4" CLEAR	05700-011-37-12
85015097	TUBING 1/4" RED	05700-011-37-14
85015089	TUBING 1/4" BLUE	05700-011-37-16
92661024	COPPER TUBE 1/4" 50 FT	N/A
92661016	COPPER TUBE 3/8" 25 FT	N/A
92661032	COPPER TUBE 1/2" 50 FT	N/A

TUBING MISC.

92630000	WASH TANK CONNECTOR, 45DEG 1/2" HOSE	04730-002-69-80
92002008	WASH TANK CONNECTOR, 18DEG 5/8" HOSE	04730-011-45-21
92630000	WASH TANK CONNECTOR, 45DEG 5/8" HOSE	04730-011-45-21
92180538	CHECK VALVE, ELBOW, RINSE LINE	04820-111-51-14
92171271	RINSE INJECTOR CHECK VALVE KIT	N/A
96572573	PICK-UP TUBE STIFFENER	05700-002-66-49
87301149	CLAMP, HOSE 7/32-5/8"	05700-000-35-06
87301131	CLAMP, HOSE 5/16-7/8"	04730-011-36-05
96020078	CLAMP, HOSE 11/16-1.5"	N/A
87301362	CLAMP, HOSE 7/8-2.75"	04730-719-01-37
87301503	CLAMP, HOSE 4.75-6.5"	04730-011-34-90

SECTION 6: PARTS SECTION

CHEMICAL FEEDER PUMP ASSEMBLY



Squeeze Tube Lubricant
Ecolab No.: 89990121

Housing Kit (Red roller)
Ecolab No.: 96562871
Mfg. No.: 04320-121-37-10

Motor, 36 RPM 115V
Detergent/Sanitizer Feeder Pump
Ecolab No.: 83740209
Mfg. No.: 04320-111-35-14

Motor, 14 RPM 115V
Rinse Aid Feeder Pump
Ecolab No.: 83740282
Mfg. No.: 04320-111-35-13

Motor, 36 RPM 240V
Detergent/Sanitizer Feeder Pump
Ecolab No.: 96029293
Mfg. No.: 04320-111-47-47

Motor, 14 RPM 240V
Rinse Aid Feeder Pump
Ecolab No.: 96029897
Mfg. No.: 04320-111-47-46

Motor, 14 RPM 24V
Rinse Aid Feeder Pump
Ecolab No.: 96030317
Mfg. No.: 04320-011-63-33

Roller, Red (Detergent/Sanitizer)
Ecolab No.: 96037924
Mfg. No.: 04320-111-36-70

Roller, White (Rinse Aid)
Ecolab No.: 84800041
Mfg. No.: 04320-002-82-28

Roller, Black
Ecolab No.: 96029533
Mfg. No.: 04320-111-65-27

Squeeze Tube, Detergent/Sanitizer
(Use with the red roller.)
Ecolab No.: 96562673
Mfg. No.: 05700-111-35-29

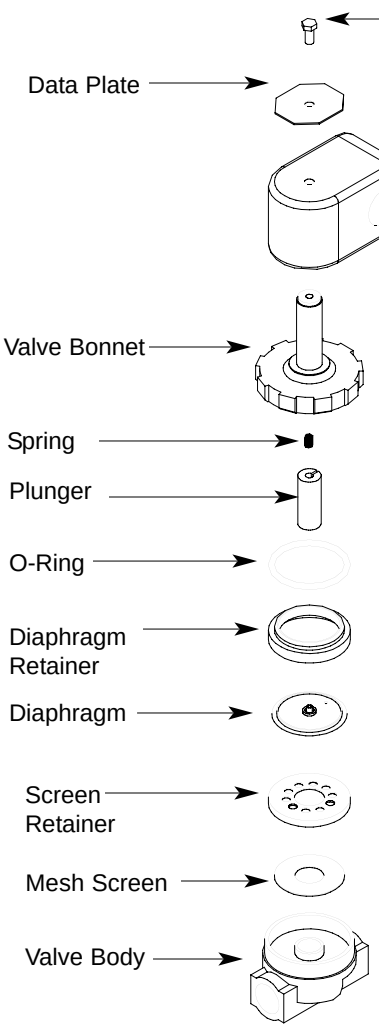
Clear Squeeze Tube, Rinse Aid
(Use with the white roller.)
Ecolab No.: 85017119
Mfg. No.: 05700-011-76-41

Tube, Small 7/32”
(Use with the black roller.)
Ecolab No.: 85016079
Mfg. No.: 05700-011-65-21

1/4” Sight Tube	Ecolab No.: 92001017	Mfg. No.: N/A
3/8” Sight Tube	Ecolab No.: 96569496	Mfg. No.: 05700-111-35-33

SECTION 6: PARTS SECTION

SOLENOID VALVE REPAIR PARTS KITS



Repair kit includes: Plunger, Spring, O-ring, and Diaphragm.

1/2” Repair Kit
Ecolab No.: 85283489
Mfg. No.: N/A

3/4” Repair Kit
Ecolab No.: 85283406
Mfg. No.: N/A

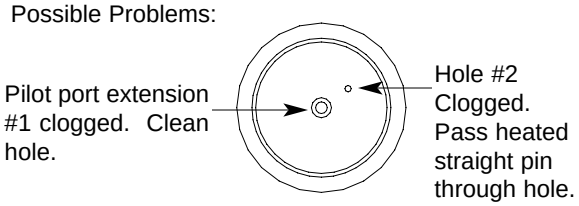
1/2” 110/240 Volt Solenoid Valve
Complete Assembly
Ecolab No.: 96580683
Mfg. No.: 04810-100-12-18

3/4” 110/240 Volt Solenoid Valve
Complete Assembly
Ecolab No.: 85260511
Mfg. No.: 04810-100-53-00

TO DISASSEMBLE - These valves may be taken apart by unscrewing the bonnet and the enclosing tube assembly from the valve body assembly. After unscrewing, carefully lift off the bonnet and enclosing tube assembly. Don’t drop the plunger. The o-ring seal and diaphragm cartridge can now be lifted out. Be careful not to damage the machined faces while the valve is apart.

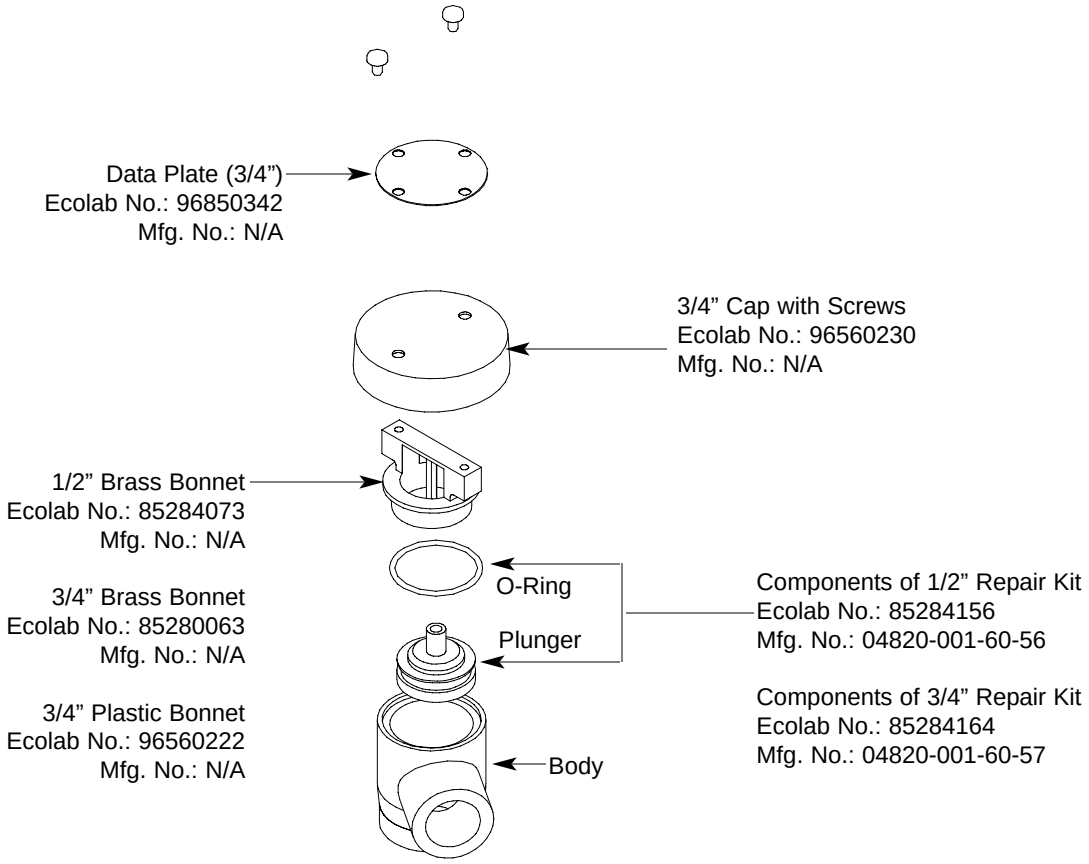
TO REASSEMBLE - Place the diaphragm cartridge in the body with the pilot port extension UP. Hold the plunger with the synthetic seat against the pilot port. Make sure the o-ring is in place, then lower the bonnet and enclosing tube assembly over the plunger. Screw the bonnet assembly snugly down on the body assembly.

Possible Problems:



SECTION 6: PARTS SECTION

VACUUM BREAKER REPAIR PARTS KITS



1/2" Complete Vacuum Breaker Assembly
Ecolab No.: 85242543
Mfg. No.: 04820-003-06-13

3/4" Complete Vacuum Breaker Assembly
Ecolab No.: 85242626
Mfg. No.: 04820-002-53-77

1/4" Complete Vacuum Breaker Assembly
Ecolab No.: 85242501
Mfg. No.: 04810-011-51-62

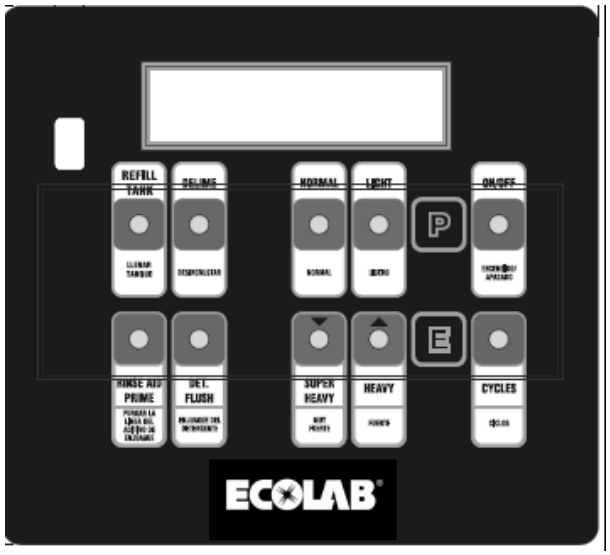
1/4" Complete Vacuum Breaker Assembly
Bottom Inlet & Outlet
Ecolab No.: 85242000
Mfg. No.: N/A

3/8" Complete Vacuum Breaker Assembly
Ecolab No.: 85242527
Mfg. No.: 04820-002-75-73

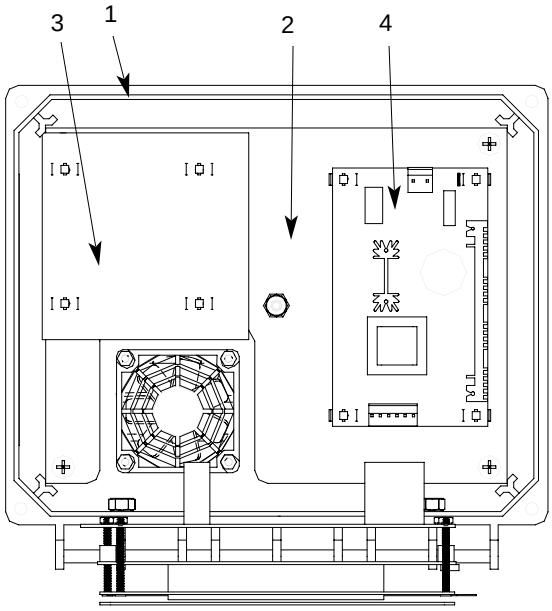
SECTION 6: PARTS SECTION

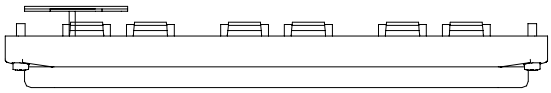
UPPER CONTROL BOX ASSEMBLY

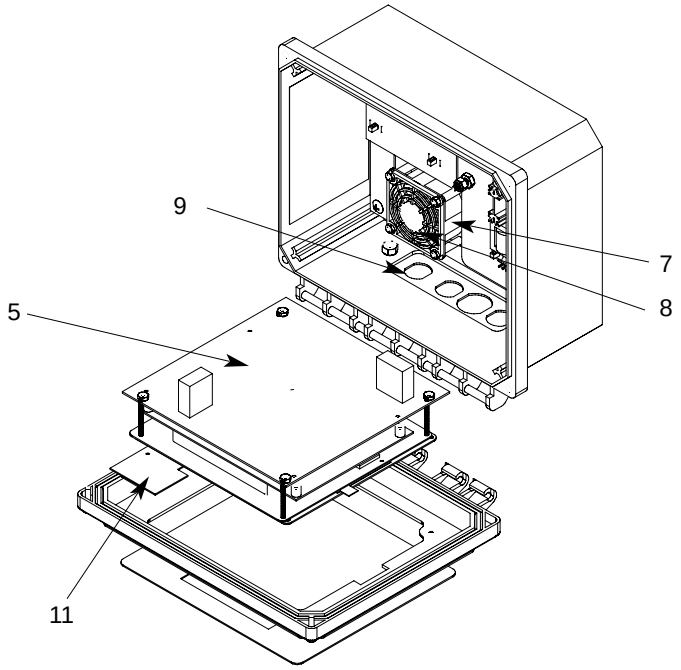
* Represents an item not visible.

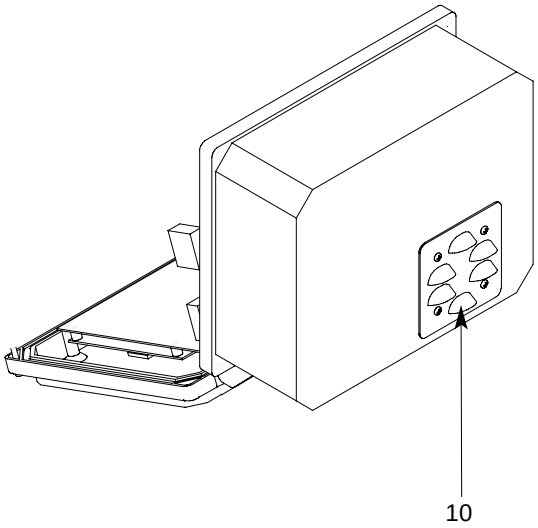


Decal, Keypad
Ecolab No.: 96633732
Mfg. No.: 09905-003-37-32









UPPER CONTROL BOX ASSEMBLY CONTINUED

ITEM	QTY	DESCRIPTION	ECOLAB No.	Mfg. No.
1	1	Control Box	N/A	05999-002-98-57
2	1	Panel, Control Box Inner	N/A	05700-002-99-10
3	1	Board, Speed Control	96630099	06680-003-00-99
	4	Holder, Circuit Board	96028337	05940-002-21-87
4	1	Power Supply	96629354	05950-002-93-54
	4	Holder, Circuit Board	96028337	05940-002-21-87
5	1	Interface/Controller Board	96630097	06680-003-00-97
*	10	Fuse, 1.6 AMP, 5 x 20 mm, Fast Acting	83900705	05920-002-80-25
*	2	Fuse, .5 AMP, 5 x 20 mm, Fast Acting	83900703	
	4	Screw, 10-32 x 1-1/2”	N/A	05305-003-11-33
6	1	Adapter, Control Panel (Located Behind Keypad)	N/A	05700-003-02-07
7	1	Exhaust/Cooling Fan	96039423	05999-002-47-12
8	1	Fan Finger Guard	96631292	05999-003-12-92
9	1	Plate, Control Box Support	N/A	05700-003-04-90
	2	Locknut, 1/4”-20 Hex with Nylon Insert	N/A	05311-374-01-00
10	1	Plate, Vent	N/A	05700-003-11-28
11	1	IRDA communications board	96633661	05945-003-36-61
12	1	Keypad	96028287	05945-002-16-79

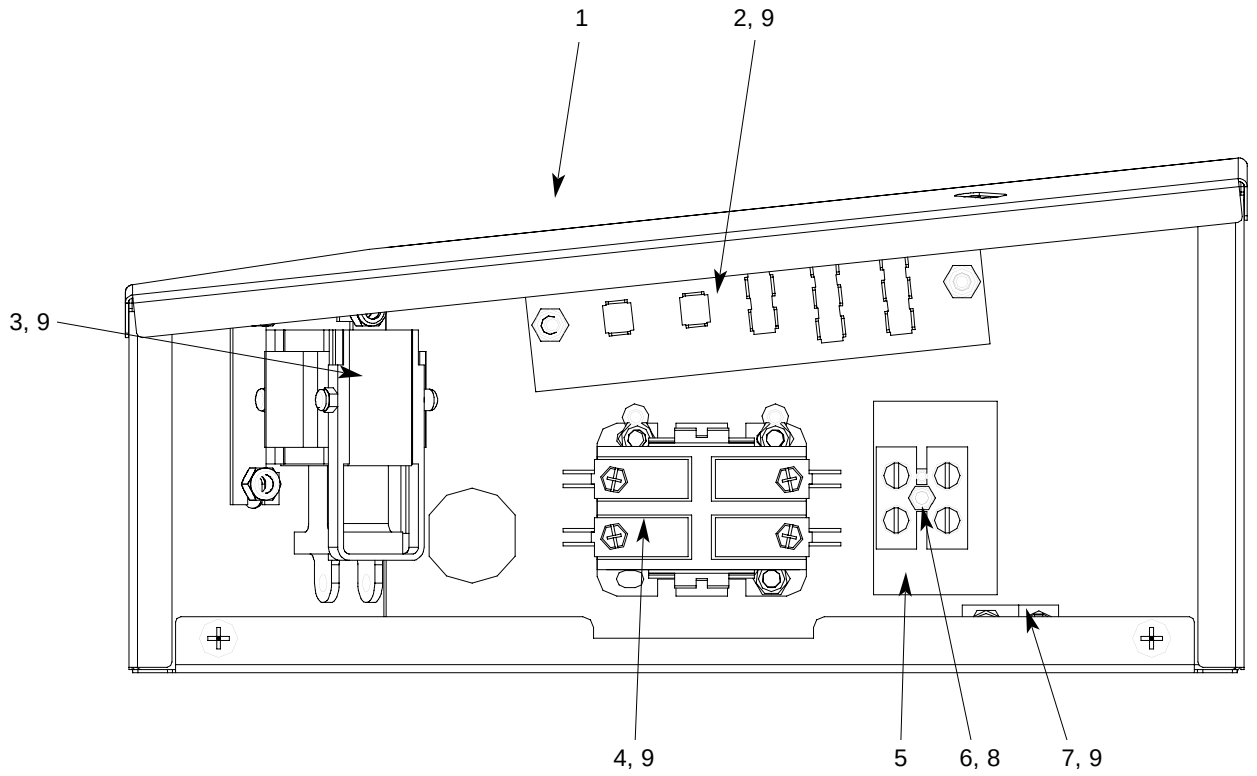
* Represents an item not visible.

APEX TSC FUSE CHART	
FUSE	CONTROL DEVICE
F1	SPARE
F2	DETERGENT SOLENOID 1.6A
F3	FILL SOLENOID 1.6A
F4	RINSE AID PUMP 1.6A
F5	DRAIN SOLENOID 1.6A
F6	WASH MOTOR CONTACTOR 1.6A
F7	DOOR INTERLOCK SOLENOID 1.6A
F8	VAPOR VENT SOLENOID 1.6A
F9	EXHAUST FAN 1.6A
F10	RINSE AID SOLENOID 1.6A
F11	VENTILATION FANS/ IRDA BOARD 1.6A
F12	DET/RINSE IR SENSORS 0.5A
F13	SANITIZER IR SENSORS 0.5A
NA	SPEED CONTROL BOARD FUSE 1.6A

9915-003-05-93C

SECTION 6: PARTS SECTION

LOWER CONTROL BOX ASSEMBLY

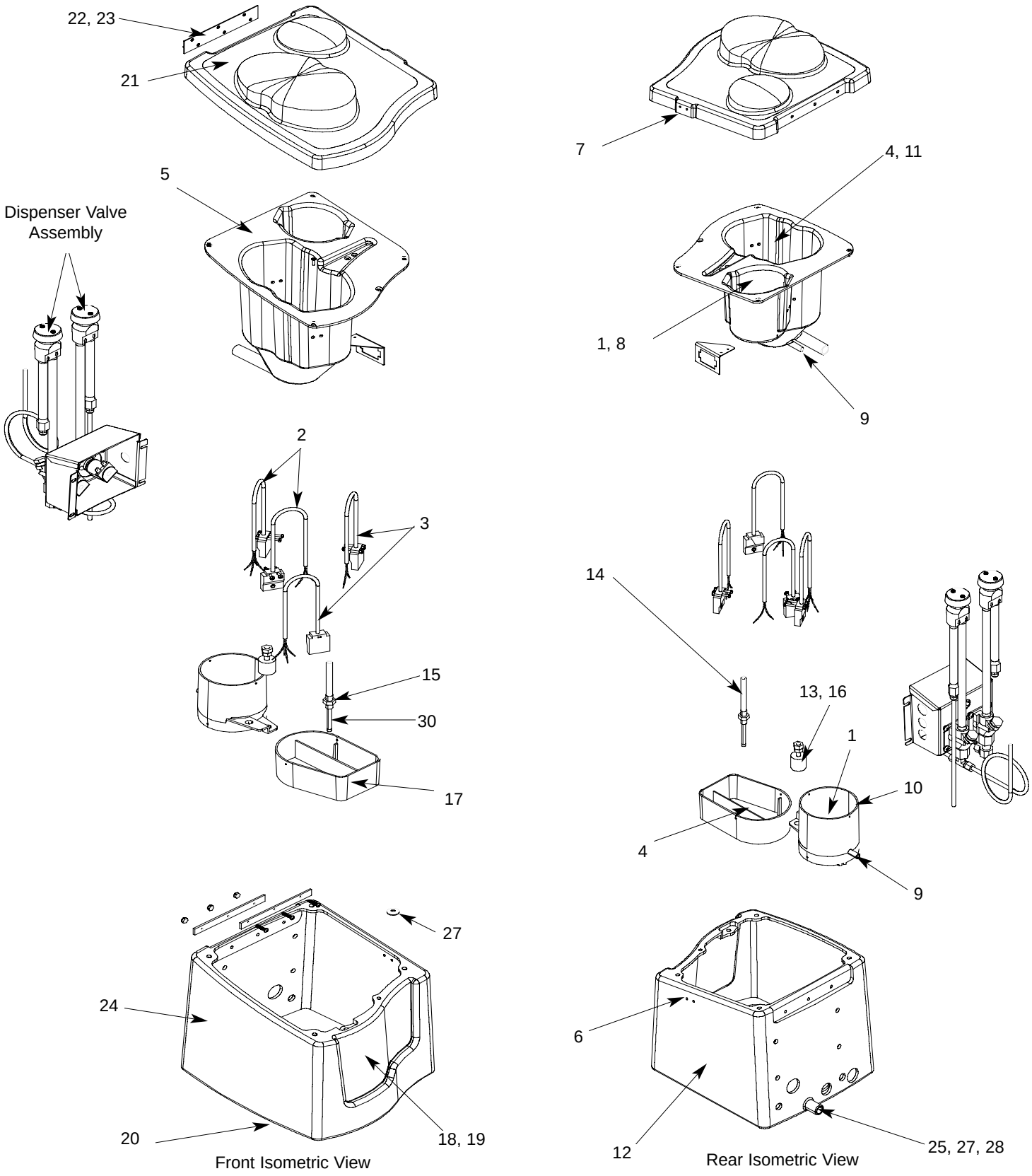


ITEM	QTY	DESCRIPTION	ECOLAB No.	Mfg. No.
1	1	Lower Control Box Weldment	N/A	05700-003-38-28
2	1	Terminal Board	96021134	05940-002-78-97
3	1	Drain Solenoid	83999078	04810-200-11-00
4	1	Motor Contactor	83008250	05945-109-05-69
5	1	Terminal Block Spacer	96025127	05700-011-40-05
6	1	Terminal Block, 2 pole	96025119	05940-500-09-61
7	1	Ground Lug	83118000	05940-200-76-00
8	1	Locknut, 6-32 Hex with Nylon Insert	88460050	05310-373-03-00
9	12	Locknut, 10-24 Hex with Nylon Insert	88429063	05310-373-01-00
10*	1	Cover, Lower Control Box	96040522	05700-003-02-22
11*	1	Decal, Power Connection	96028402	09905-011-47-64
12*	1	Decal, Copper Conductors	96021365	09905-011-47-35

`

* Represents an item not shown.

DETERGENT DISPENSER ASSEMBLY

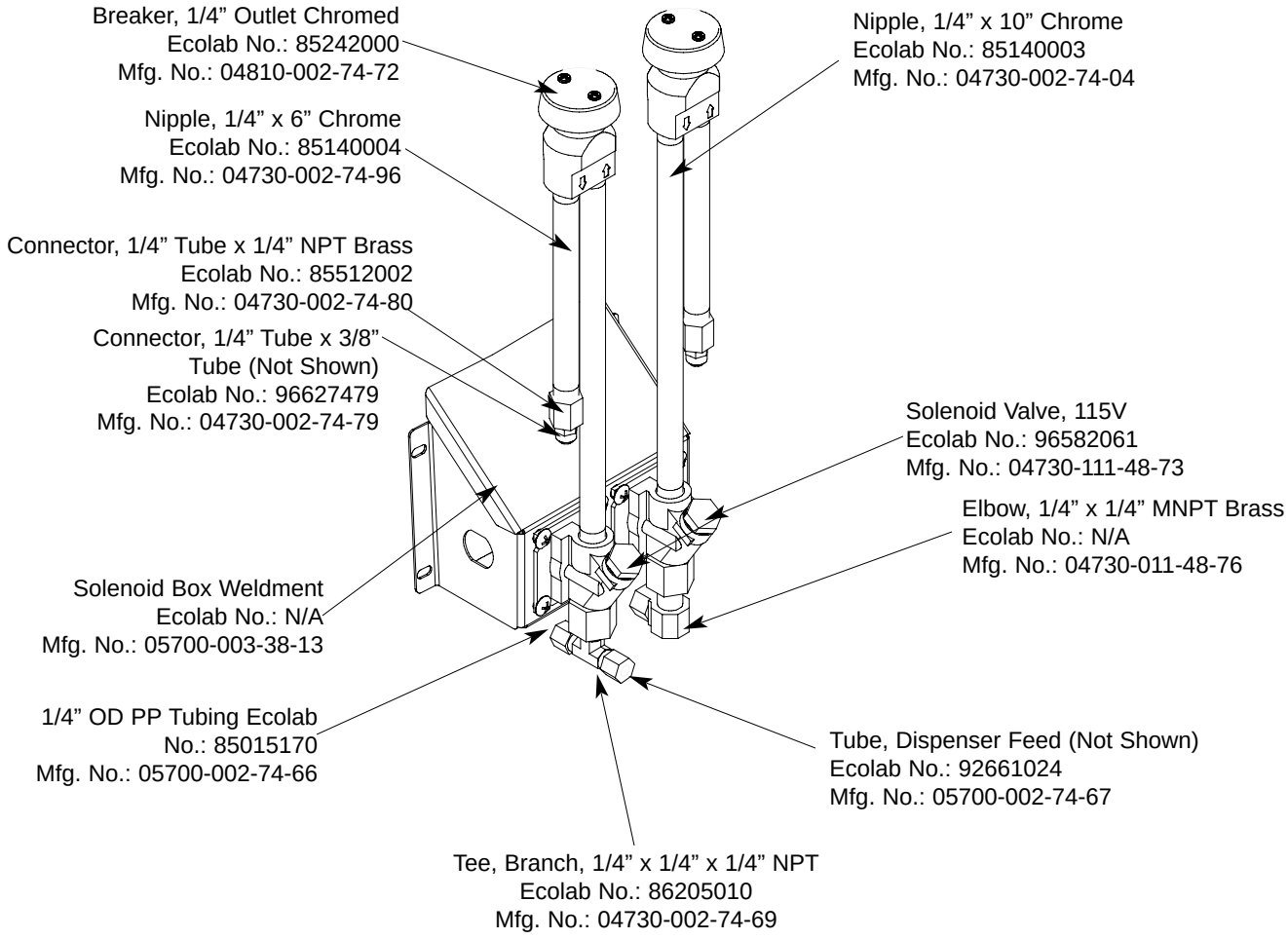


DETERGENT DISPENSER ASSEMBLY (CONTINUED)

ITEM	QTY	DESCRIPTION	ECOLAB No.	Mfg. No.
		Complete Assembly	N/A	05700-003-04-71
*1	1	Rinse Screen	96200324	05700-011-48-91
2	2	Low Product Sensor Receiver	96627389	05945-002-73-89
3	2	Low Product Sensor Emitter	96627390	05945-002-73-90
4	1	Detergent Screen	96633494	04320-003-34-94
5	1	Product Guide	96630150	09330-002-72-36
6	1	Lid Switch	96633520	05930-003-35-20
7	1	Lid Magnet	96633522	05930-003-35-22
*8	1	Rinse Spray Nozzle	85312098	04730-002-74-00
9	2	Connector, 1/4” Tube x 3/8” Tube	96627479	04730-002-74-79
10	1	Rinse Spray Housing	96627238	09330-002-72-38
11	1	4.3W, Detergent Spray Nozzle	85312726	04320-003-35-15
*12	1	Gasket, Detergent To Tablet Dispenser	N/A	05330-003-02-49
13	1	Nut, Lock	92109164	05310-002-74-02
14	1	Flow Indicator	92183086	05700-011-50-14
15	1	Foot, Filter	92232037	04730-002-74-01
16	1	Float Switch	83053082	05930-011-48-98
17	1	Rinse Sump	96627237	09330-002-72-37
*18	1	LED, Red	83440552	05945-002-76-10
*19	1	Decal, Dispenser	96630096	09905-003-03-93
*20	1	Gasket, Dispenser to Hood	N/A	05330-003-02-46
21	1	Dispenser Cover	96630078	09330-003-00-92
22	1	Hinge	96627241	05700-002-72-41
23	1	Hinge Spacer Plate	96627242	05700-002-72-42
24	1	Dispenser Base	96630091	09330-003-00-91
*25	1	Hose, 5/8” x 45”	96627868	05700-002-78-68
*26	1	Elbow, 3/4” Hosebarb	N/A	04730-002-78-12
27	1	Washer, Bonded Sealing 1/4” x 3/4” OD	N/A	05311-002-77-79
*28	1	Hose, 5/8” x 9 1/2”	N/A	05700-003-04-89
*29	1	Connector, 15 Pin Cap	N/A	05999-002-77-84
30	1	Insert, PP 1/4” Tube	96582248	04730-011-48-88
*31	1	Seal, 15 Pin Blue Wire	N/A	05999-002-77-86
*32	1	Plug, Sealing	N/A	05999-002-77-90

* Represents an item not shown

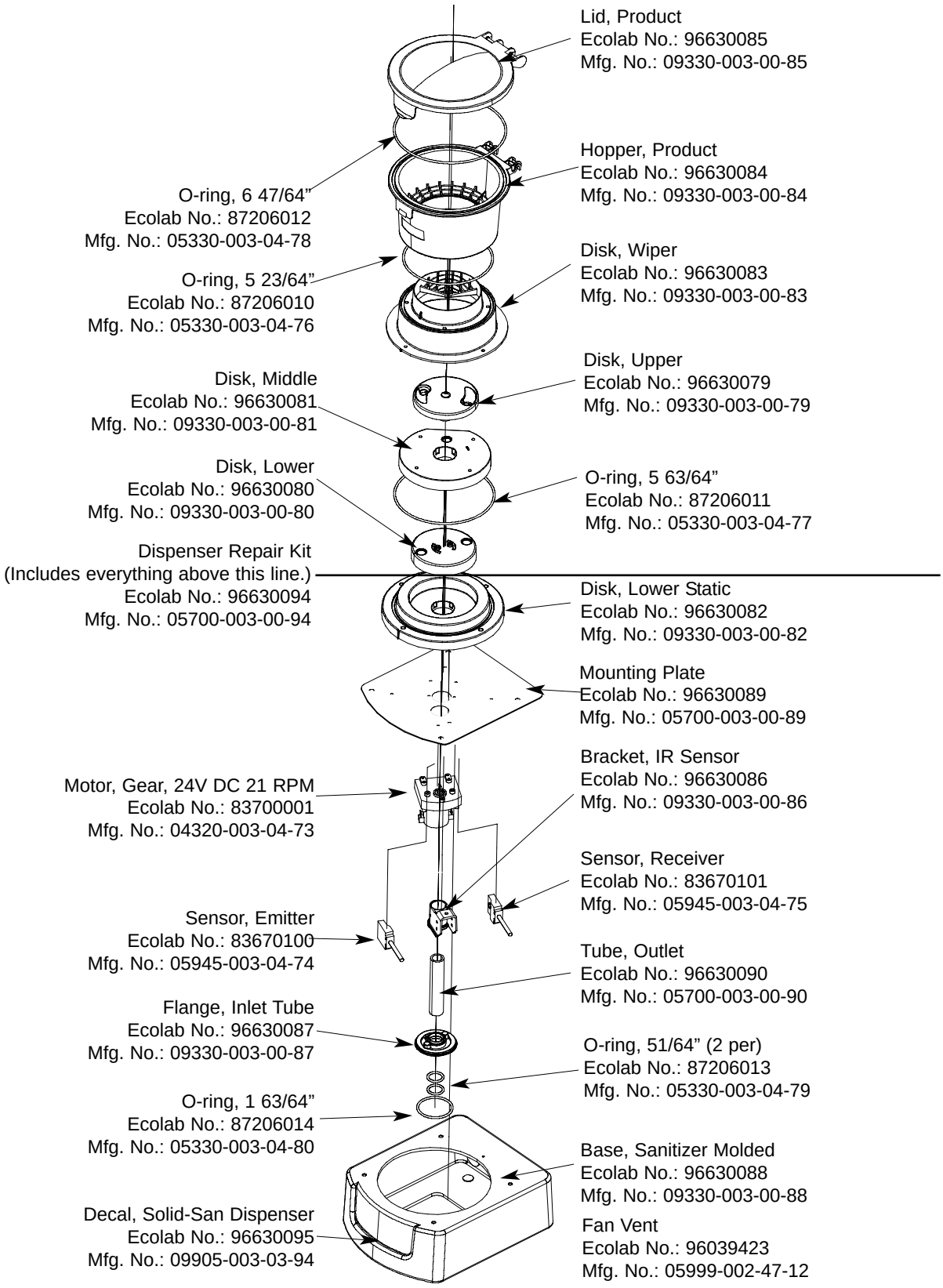
DISPENSER VALVE ASSEMBLY (CONTINUED)



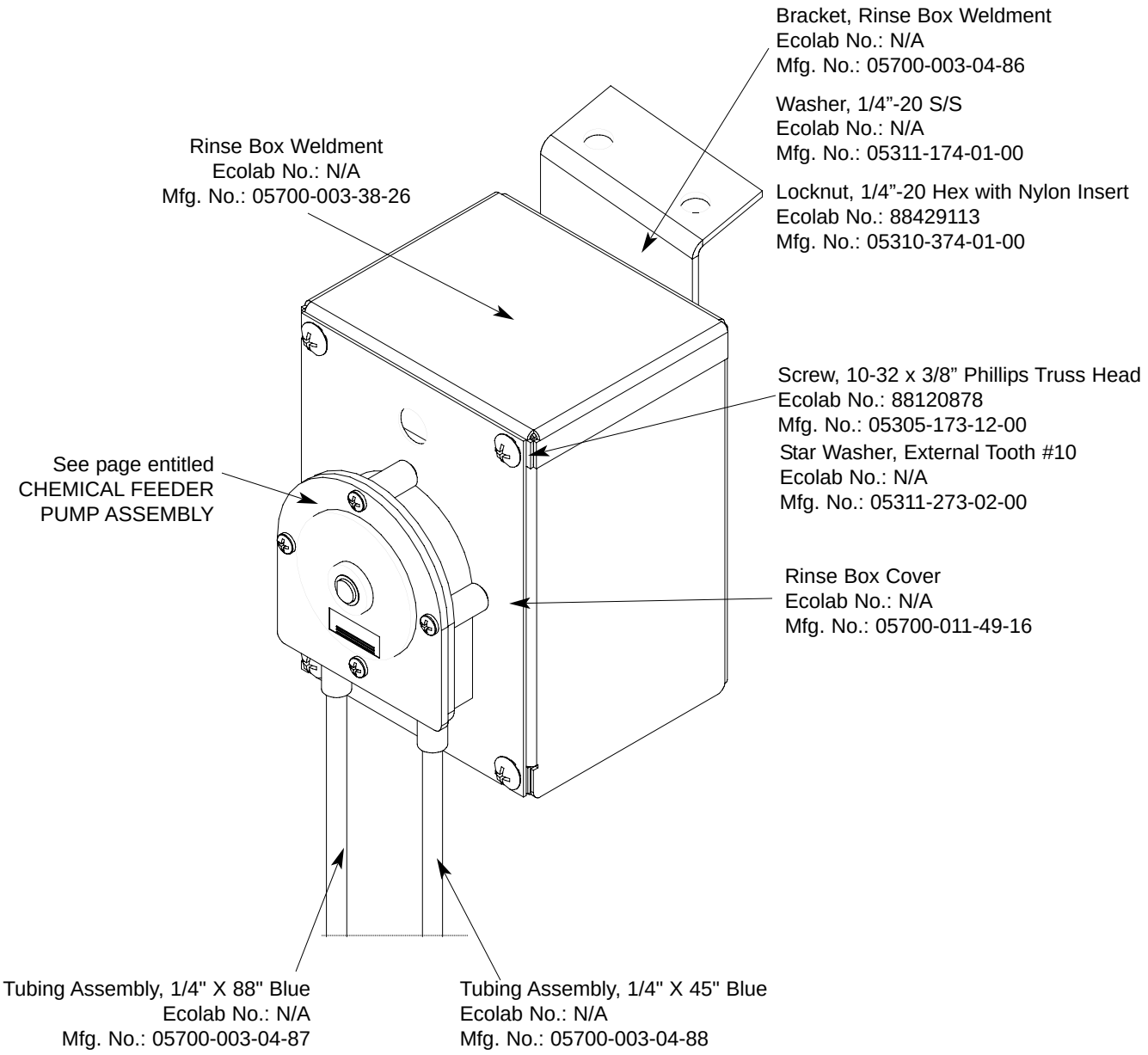
QTY	DESCRIPTION	ECOLAB No.	Mfg. No.
16	Screw, 6-32 x 7/8” Rd. Head Phillips	N/A	05305-171-10-00
20	Locknut, 6-32 Hex with Nylon Insert	88460050	05310-373-03-00
3	Screw, 1/4”-20 x 1 1/8” Hex	96020698	05305-274-21-00
3	Lockwasher, 1/4” Spring	88521083	05311-274-01-00
3	Nut, Hex 1/4”-20	88420104	05310-274-01-00
14	Screw, 6-32 x 1/2” SST FHMS	N/A	05305-002-74-99
8	Screw, #6 x 3/8” Tap S/S	N/A	05305-002-77-80
6	Nut, Hex 10-32 S/S	88420088	05310-273-01-00
3	Screw, 8-32 x 3/4” Rd. Head	88122254	05305-172-06-00
3	Screw, 8-32 x 1/2” Phillips Head	88123740	05305-172-07-00
8	Screw, 10-32 x 1/2” Pan Phillips Head	88120886	05305-011-44-52
4	Lockwasher, Internal Tooth #10	N/A	05311-273-03-00
2	Clamp, 2307 Heyco Plastic	N/A	04730-011-66-19
2	Tube, 3/8” x 3” Long	N/A	05700-002-08-54
3	Washer, Bonded Sealing 1/4” x 3/4”	N/A	05311-002-77-79
1	Connector, 15 Pin Cap	N/A	05999-002-77-84
12	Terminal, Sealed Pin	N/A	05999-002-77-88
1	Connector, Wire Seal	N/A	05999-002-77-86
3	Plug, Sealing AMP 7703771	N/A	05999-002-77-90
1	Bracket, Receptacle	N/A	05700-002-75-23
1	Label, Airgap	N/A	09905-002-73-92

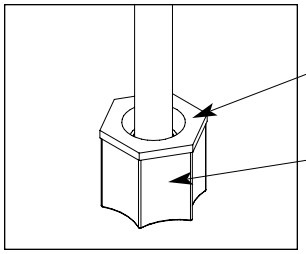
SECTION 6: PARTS SECTION

TABLET DISPENSER ASSEMBLY



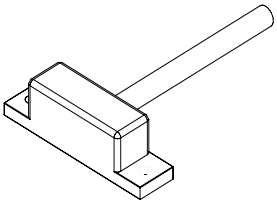
RINSE AID BOX ASSEMBLY



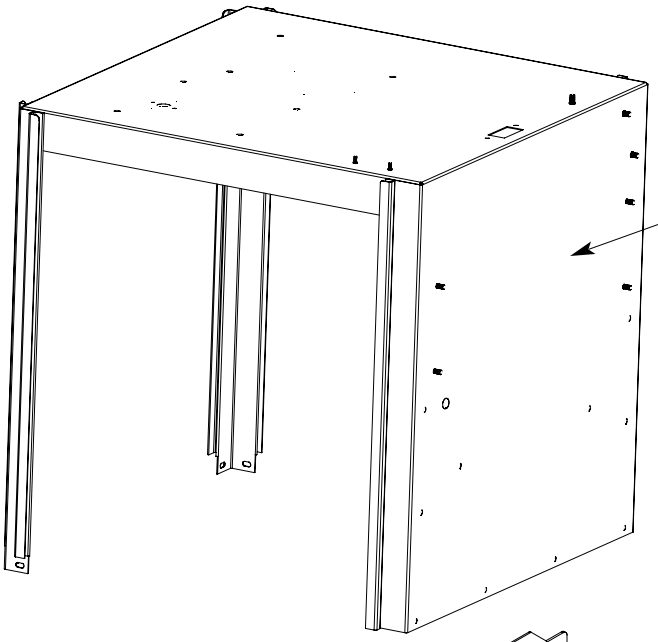


SECTION 6: PARTS SECTION

HOOD ASSEMBLY & ASSOCIATED PARTS



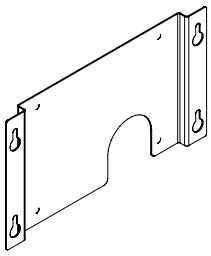
Reed Switch
Ecolab No. : 96633365
Mfg. No.: 05930-003-33-65



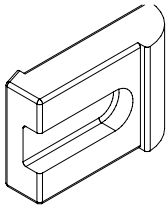
Hood Weldment
with Vapor Vent Option
Ecolab No.: N/A
Mfg. No.: 05700-003-02-58

Hood Weldment (Shown)
Ecolab No.: N/A
Mfg. No.: 05700-003-02-59

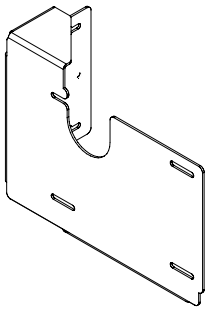
Hood Block Spacer
4 per
Ecolab No.: 96628102
Mfg. No.: 05700-002-81-02



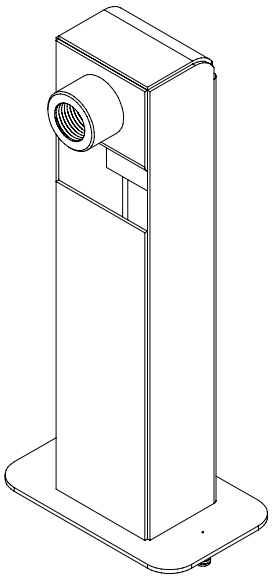
Wall Mount Bracket
Ecolab No.: 96632561
Mfg. No.: 05700-003-25-61



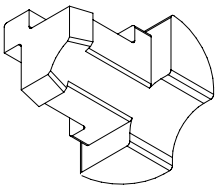
Rear Corner Plug
Ecolab No.: 96040043
Mfg. No.: 05700-002-25-01



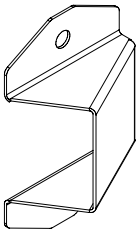
Elec. Box Mount
Ecolab No.: N/A
Mfg. No.: 05700-003-20-15



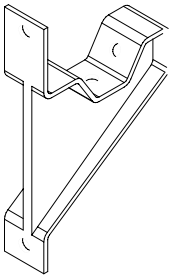
Air Gap Weldment
Ecolab No.: N/A
Mfg. No.: 05700-002-81-70



Front Corner Plug
Ecolab No.: 96040050
Mfg. No.: 05700-002-25-00

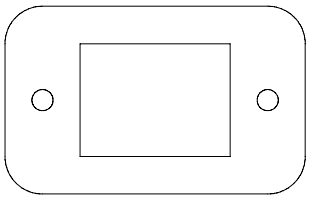


Air Gap Shield
Ecolab No.: 96028139
Mfg. No.: 05700-002-13-35



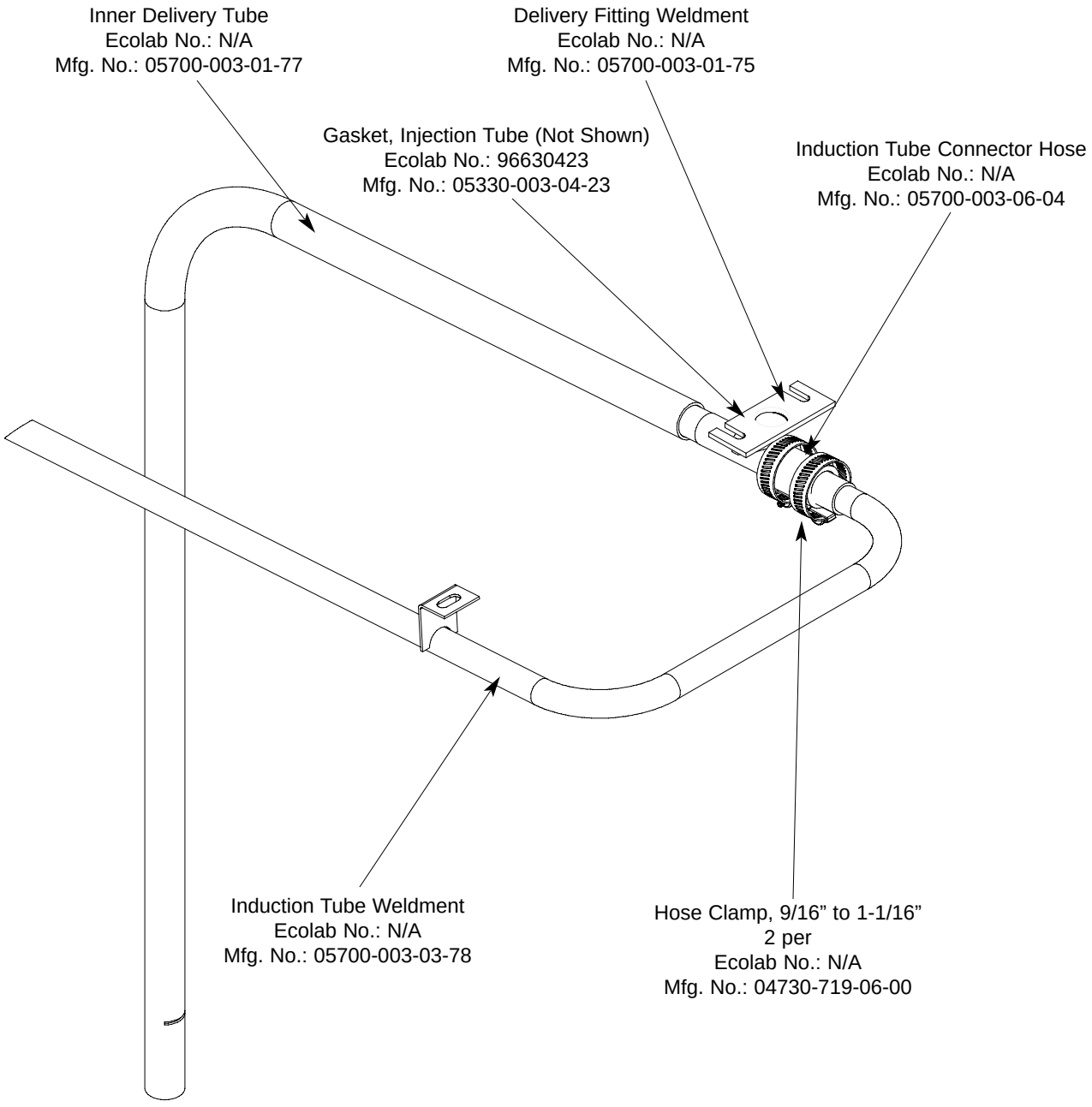
Cantilever Arm Support Bracket
Ecolab No.: 96581244
Mfg. No.: 09515-003-15-64

Wear Button, 1/2" Dia.
3 per Bracket
Ecolab No.: 96027743
Mfg. No.: 05700-011-88-01



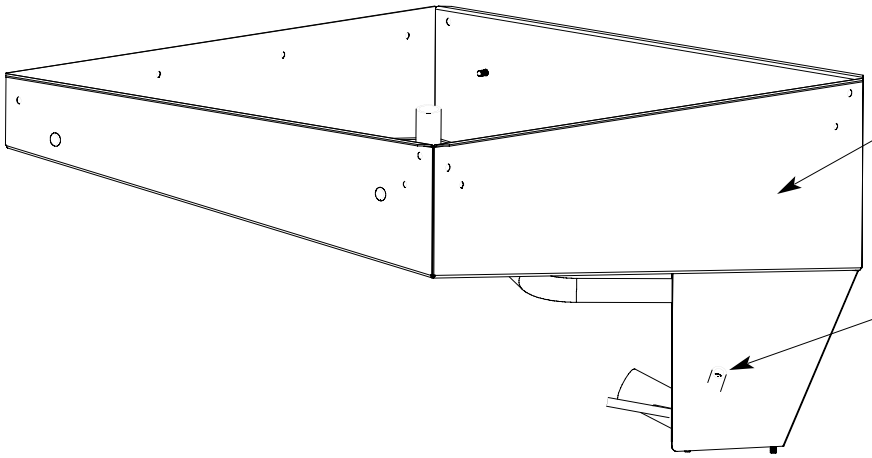
Air Gap Base Gasket
Ecolab No.: 96027925
Mfg. No.: 05330-002-14-48

INDUCTION TUBE ASSEMBLY



SECTION 6: PARTS SECTION

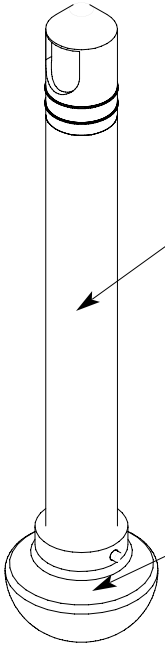
TUB WELDMENT/ASSOCIATED COMPONENTS



Tub Weldment
Ecolab No.: N/A
Mfg. No.: 05700-003-02-51

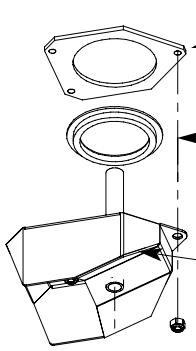
Temperature Probe
Ecolab No.: 96038120
Mfg. No.: 06680-002-16-80

Fitting, 1/4" Imperial Brass
Ecolab No.: 96024344
Mfg. No.: 05310-924-02-05



Stand Pipe Weldment
1 per assembly
Ecolab No.: 96582747
Mfg. No.: 05700-021-33-29

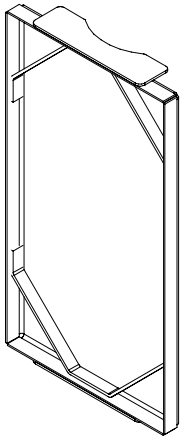
Stand Pipe Stopper
1 per assembly
Ecolab No.: 96557475
Mfg. No.: 05700-121-35-54



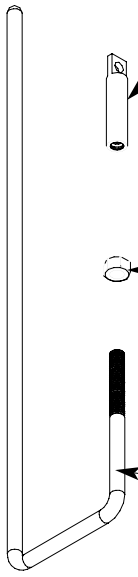
Spillway Gasket
1 per machine
Ecolab No.: 96582903
Mfg. No.: 05700-111-34-52

Drain Seat Insert
1 per machine
Ecolab No.: 96582929
Mfg. No.: 05700-021-34-38

Spillway Weldment
1 per machine
Ecolab No.: 96583000
Mfg. No.: 05700-031-37-86



Intake Strainer Weldment
1 per machine
Ecolab No.: 96633761
Mfg. No.: 05700-003-37-61



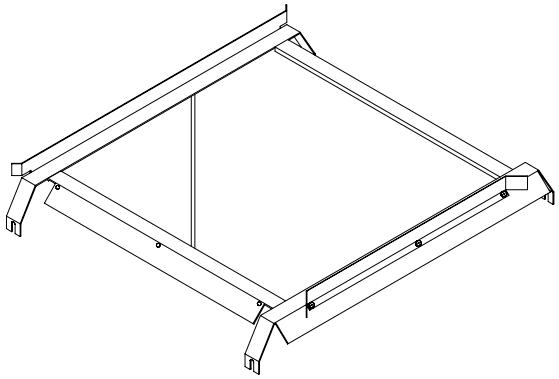
Drain Link Connector
1 per assembly
Ecolab No.: 96028261
Mfg. No.: 05700-002-38-10

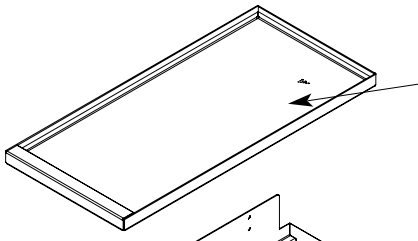
Hairpin, 1/8” x 1 15/16” S/S
Ecolab No.: 96035241
Mfg. No.: 05315-002-15-39

Nut, Hex, 5/16”-18
1 per assembly
Ecolab No.: 88419056
Mfg. No.: 05310-275-01-00

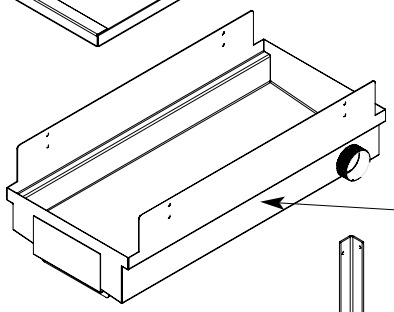
Drain Link
1 per assembly
Ecolab No.: 96582994
Mfg. No.: 05700-031-34-45

Rack Assembly
Ecolab No.: 96582887
Mfg. No.: 05700-031-36-76

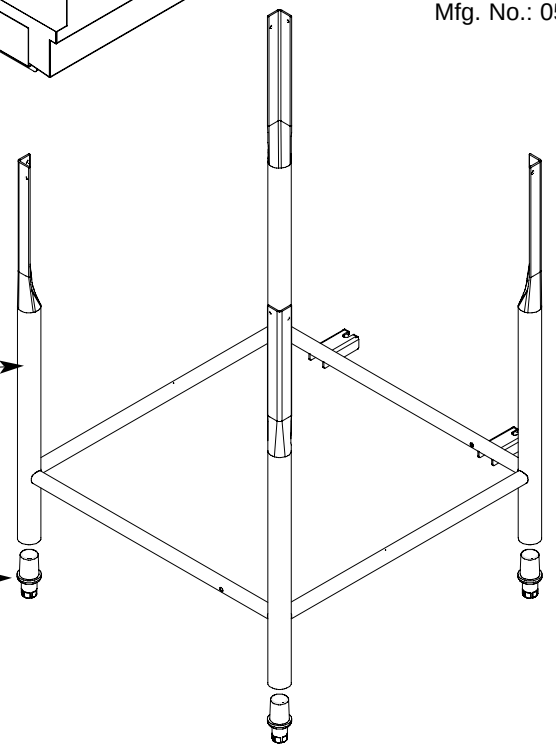




Strainer, Accumulator Weldment
Ecolab No.: 96027404
Mfg. No.: 05700-031-33-13



Accumulator Weldment
Ecolab No.: 96028717
Mfg. No.: 05700-002-19-05

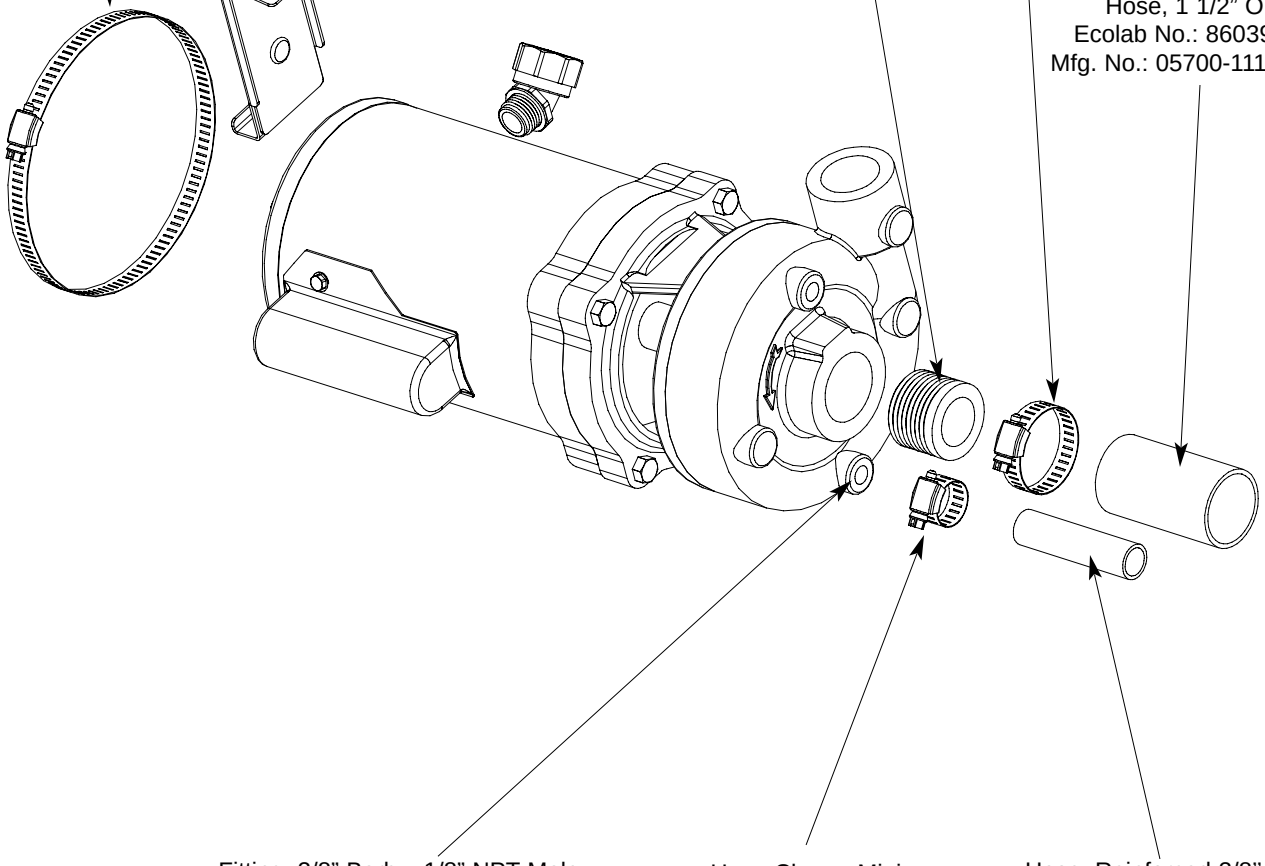


Frame Weldment
Ecolab No.: N/A
Mfg. No.: 05700-003-02-50

Bullet Foot
4 per machine
Ecolab No.: 96552666
Mfg. No.: 05340-108-01-03

SECTION 6: PARTS SECTION

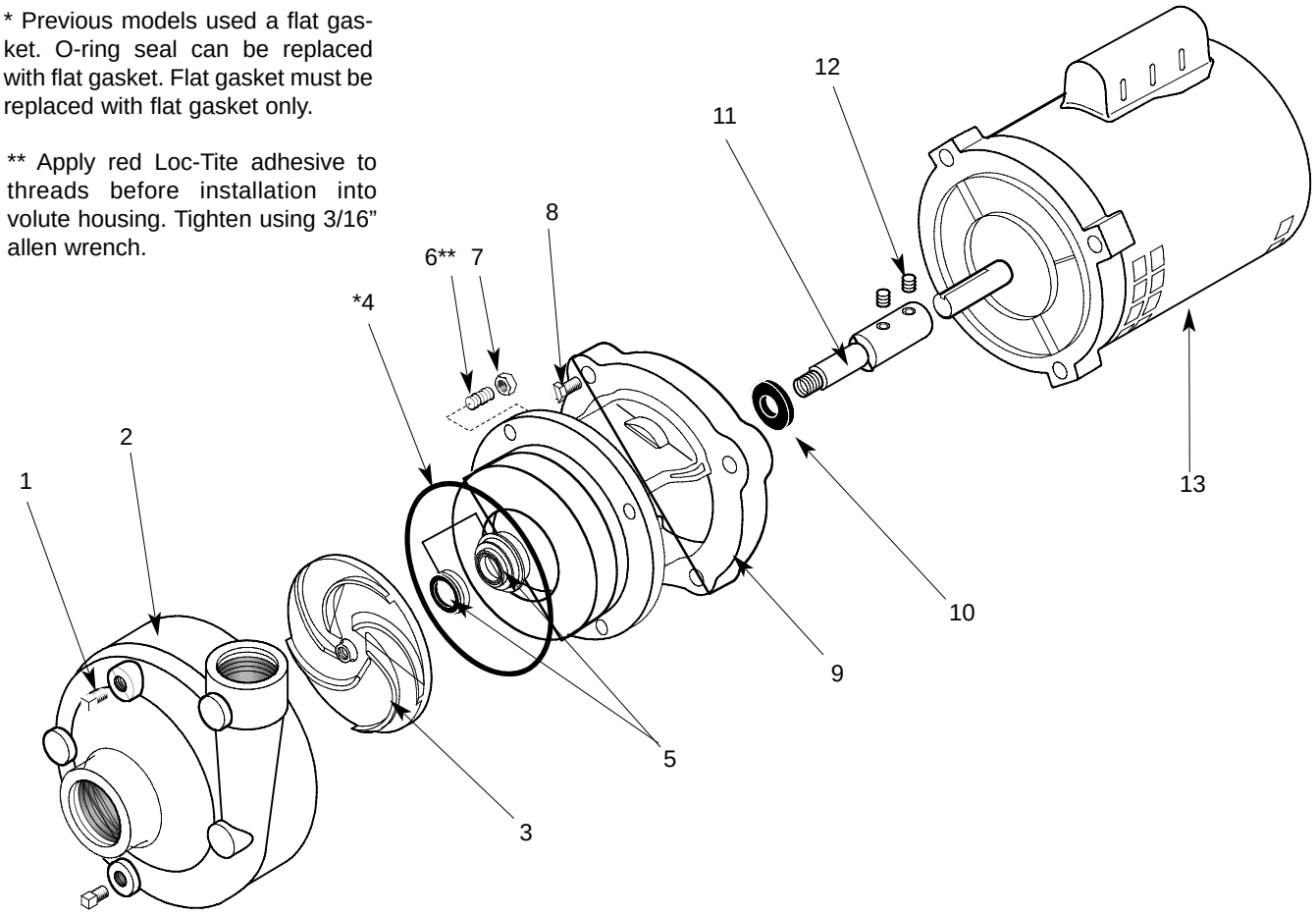
PUMP & MOTOR ASSEMBLY



PUMP & MOTOR ASSEMBLY (CONTINUED)

* Previous models used a flat gasket. O-ring seal can be replaced with flat gasket. Flat gasket must be replaced with flat gasket only.

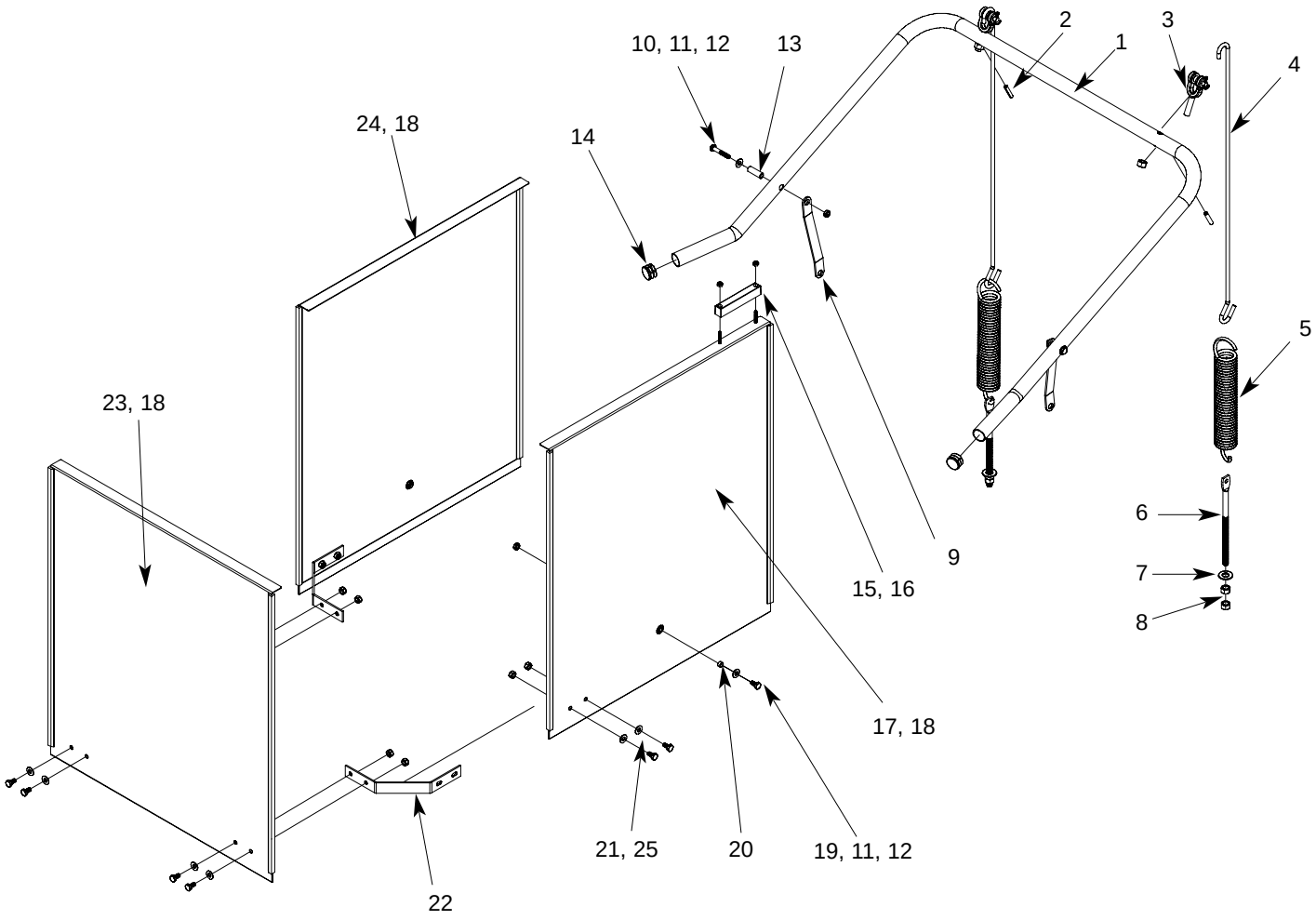
** Apply red Loc-Tite adhesive to threads before installation into volute housing. Tighten using 3/16" allen wrench.



ITEM	QTY	DESCRIPTION	ECOLAB No.	Mfg. No.
1	2	Pipe Plug, 1/4" NPT, Brass	86135019	04730-209-01-00
2	1	Volute (only available as an assembly, see item 15)	N/A	N/A
3	1	Impeller, Stainless	96557780	05700-002-06-19
4	1	O-ring, Housing Seal	87203900	N/A
5	1	Pump Seal	84804723	05330-002-06-21
6	4	Stud, Socket Head 3/8"-16 x 1 1/2"	88926002	N/A
7	4	Nut, Hex, 3/8"-16 S/S	88422068	N/A
8	4	Cap Screw, 3/8"-16 x 1-1/4", S/S	88021050	N/A
9	1	Bracket, Motor to Pump	96583810	N/A
10	1	Slinger, Pump Shaft	96031059	N/A
11	1	Shaft Adapter/Connector	96562764	N/A
12	2	Allen Head Setscrew, 1/4"-20 x 1/4"	88220007	N/A
13	1	Pump Motor	83710418	06105-121-35-18
14	1	Pump Assembly (Items 1-12)	96562715	N/A

SECTION 6: PARTS SECTION

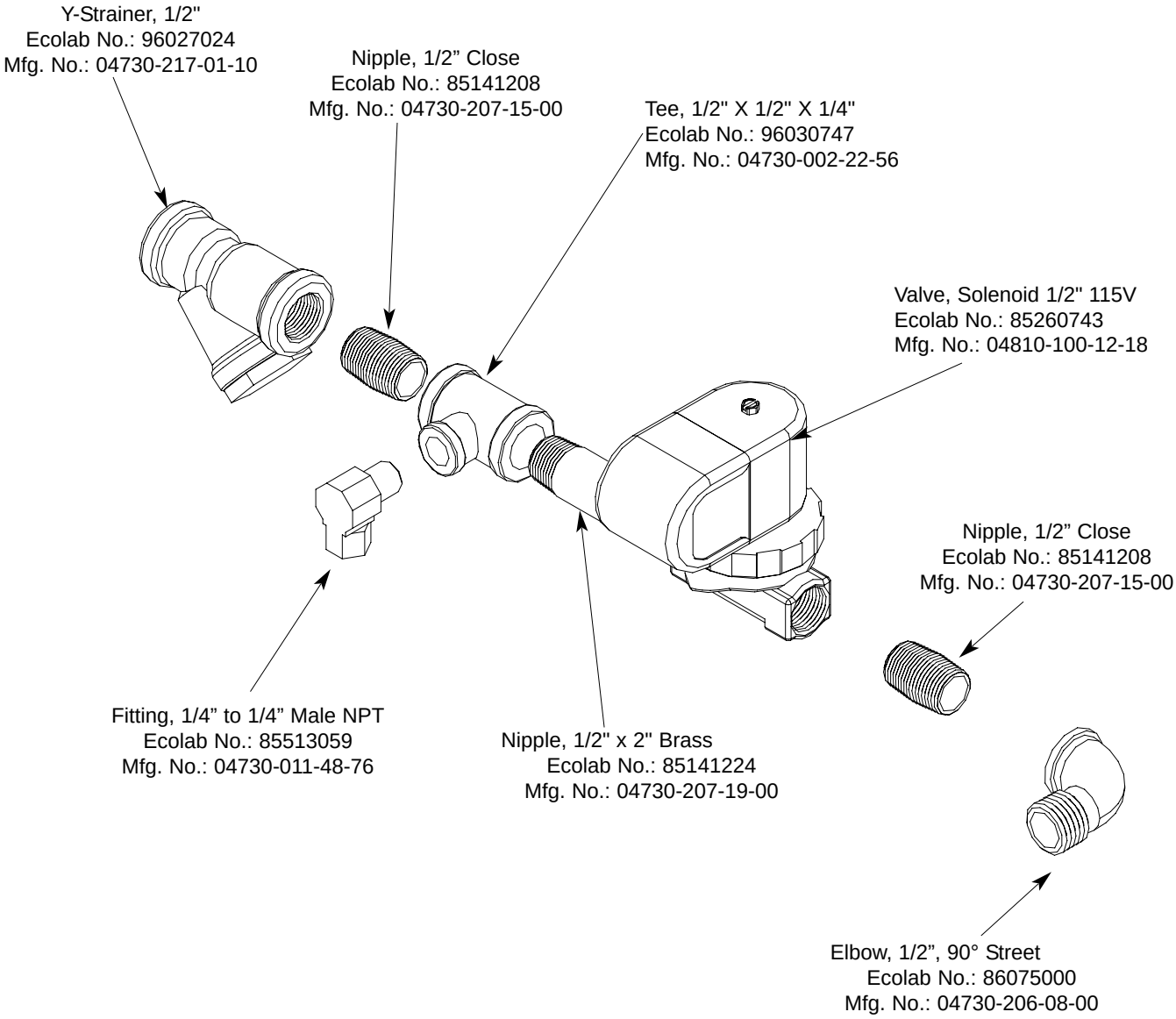
CANTILEVER ARM/DOOR ASSEMBLIES



ITEM	QTY	DESCRIPTION	ECOLAB No.	Mfg. No.
1	1	Arm, Cantilever	96581277	05700-031-50-67
2	1	Spring Pin, 1/4” Dia. x 1 1/8” Long	96039185	05315-407-06-00
3	2	Yoke Assembly	96586615	05700-000-75-77
4	2	Rod, Spring	96584313	05700-002-10-52
5	2	Spring, Cantilever	96581285	05340-109-02-00
6	2	Bolt, Hanger Eye 3/8"-16	96582762	05306-956-05-00
7	2	Washer, Impeller 3/8” I.D. x 7/8” O.D.	96581376	05311-176-02-00
8	4	Nut, 3/8”-16 S/S Hex	88422068	05310-276-01-00
9	2	Cantilever Arm Connector	96582754	05700-011-90-99
10	2	Screw, 1/4"-20 x 1 1/2" Long S/S	88030069	05305-274-23-00
11	2	Washer, 1/4" ID S/S	88530589	05311-174-01-00
12	2	Locknut, 1/4”-20 S/S Hex with Nylon Insert, Low Profile	96026455	05310-374-02-00
13	2	Sleeve, Cantilever Arm	96582770	05700-000-85-69
14	2	Plug, Cantilever Arm	96022447	05340-011-35-00
15	1	Magnet, Reed Switch	N/A	05930-002-68-53
16	2	Locknut, 6-32 S/S Hex with Nylon Insert	88460050	05310-373-03-00
17	1	Right Door Weldment with Studs	96028756	05700-002-22-25
17	1	Right Door Weldment with Studs (Vapor Vent Model)	N/A	05700-002-83-54
18	6	Door, Guides	96552336	05700-111-33-59
19	2	Screw, 1/4"-20 x 1/2" Long S/S	88020433	05305-274-02-00
20	2	Spacer, PB Bolt	96582788	05700-000-29-40
21	4	Locknut, 1/4”-20 S/S Hex with Nylon Insert	88429113	05310-374-01-00
22	2	Door Connector Bracket	96582820	05700-021-33-39
23	1	Door Only, Front	96028766	05700-002-20-09
24	1	Door Only, Left Side	96028741	05700-002-20-08
25*	2	Bracket, Cantilever Arm Support	96581244	05700-031-88-00
26*	6	Wear Button, 1/2" Dia. UHMW	96027743	05700-011-88-01

* Represents an item not shown.

INCOMING PLUMBING ASSEMBLY

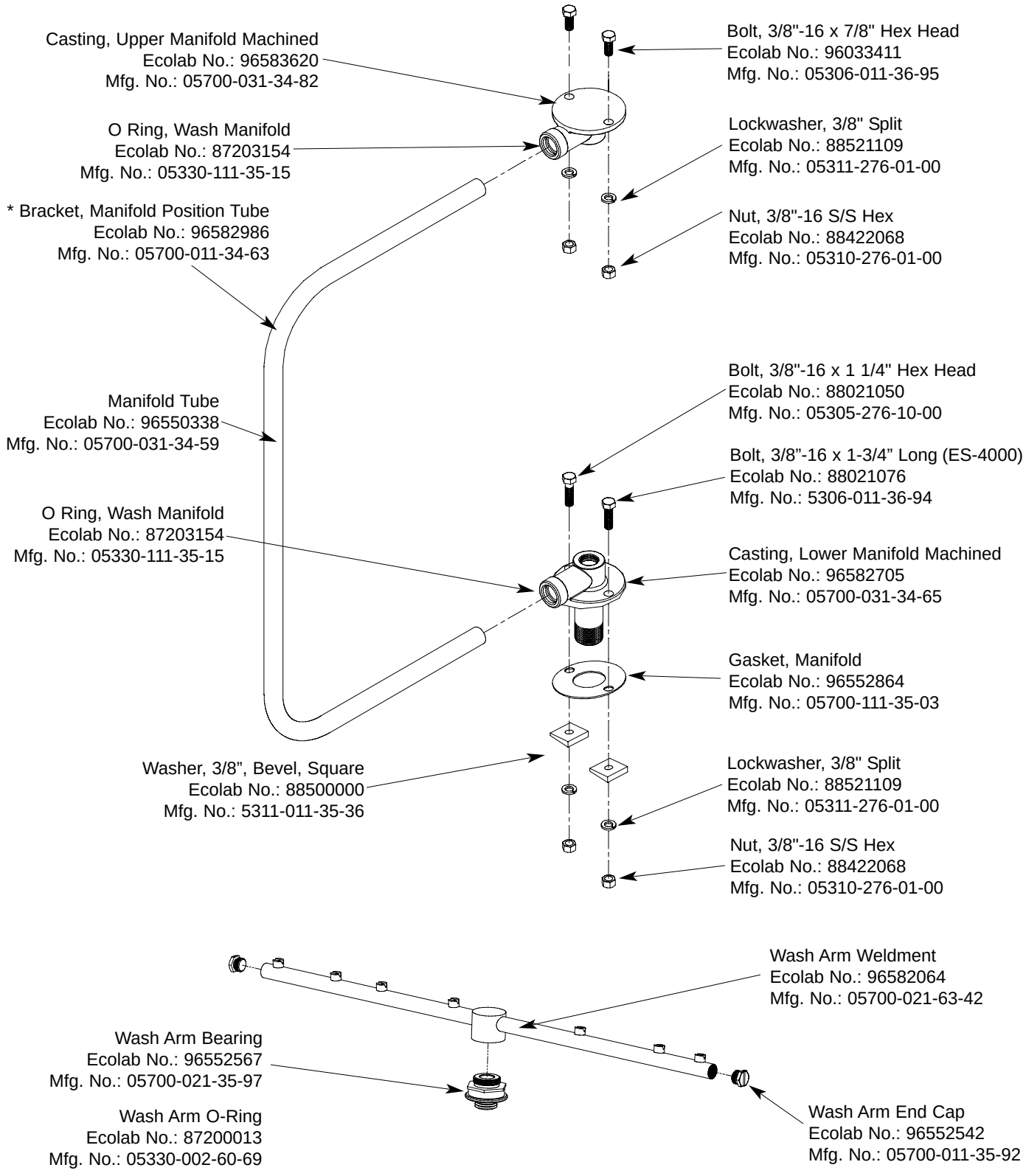


* Bracket, Plumbing Support
Ecolab No.: 96028816
Mfg. No.: 05700-002-28-95

* Plug, Heyco
2 per
Ecolab No.: 96024567
Mfg. No.: 05975-011-47-81

* Represents an item not shown.

WASH MANIFOLD/WASH ARM ASSEMBLY



* Represents an item not shown.

VAPOR VENT OPTION ASSEMBLY

Vapor Vent Complete Assembly, 115V
1 per assembly
Ecolab No.: 96627582
Mfg. No.: 05700-002-75-82

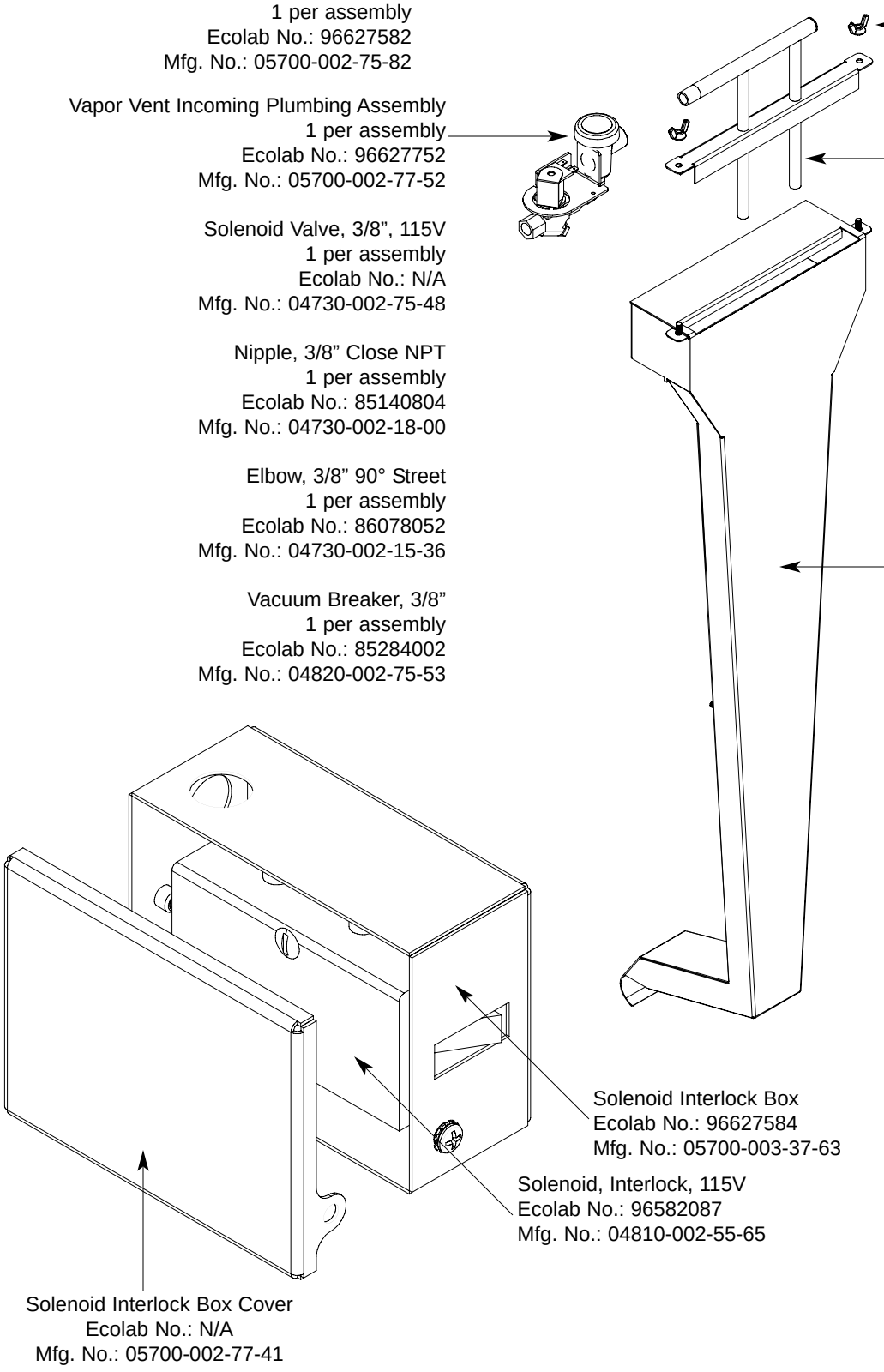
Vapor Vent Incoming Plumbing Assembly
1 per assembly
Ecolab No.: 96627752
Mfg. No.: 05700-002-77-52

Solenoid Valve, 3/8", 115V
1 per assembly
Ecolab No.: N/A
Mfg. No.: 04730-002-75-48

Nipple, 3/8" Close NPT
1 per assembly
Ecolab No.: 85140804
Mfg. No.: 04730-002-18-00

Elbow, 3/8" 90° Street
1 per assembly
Ecolab No.: 86078052
Mfg. No.: 04730-002-15-36

Vacuum Breaker, 3/8"
1 per assembly
Ecolab No.: 85284002
Mfg. No.: 04820-002-75-53



Nut, Wing, Nylon, 1/4"-20
2 per assembly
Ecolab No.: 96024005
Mfg. No.: 05310-994-01-00

Vapor Vent Top Weldment
1 per assembly
Ecolab No.: N/A
Mfg. No.: 05700-002-75-46

Jet, Full 1/8", HHSS6HQ
2 Per Assembly
Ecolab No.: 96034681
Mfg. No.: 04730-216-06-05

Gasket, Vapor Vent
1 per assembly
Ecolab No.: 96627506
Mfg. No.: 05330-002-75-06

Vapor Vent, Plastic
1 per assembly
Ecolab No.: 96582090
Mfg. No.: 05700-002-69-48

Bracket, Stand Off
1 per assembly
Ecolab No.: 96627216
Mfg. No.: 05700-002-72-16

Solenoid Interlock Box
Ecolab No.: 96627584
Mfg. No.: 05700-003-37-63

Solenoid, Interlock, 115V
Ecolab No.: 96582087
Mfg. No.: 04810-002-55-65

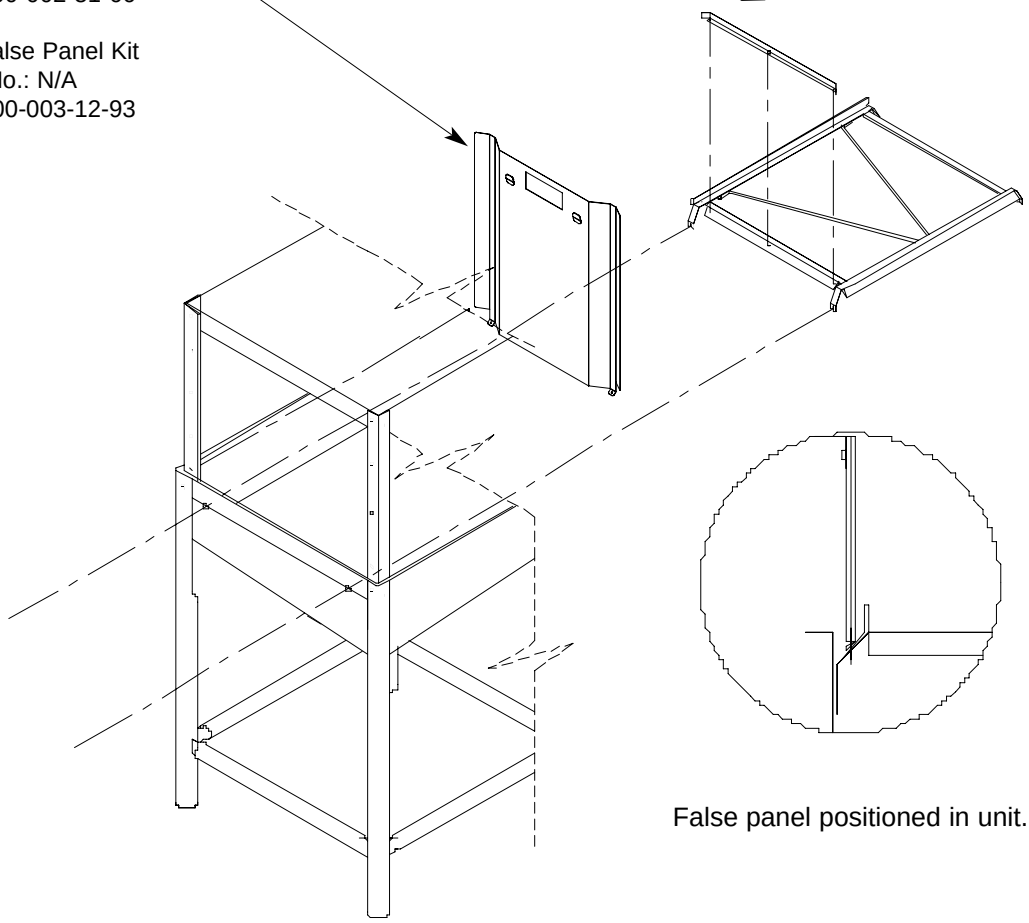
Solenoid Interlock Box Cover
Ecolab No.: N/A
Mfg. No.: 05700-002-77-41

FALSE PANEL INSTALLATION

Left & Right False Panel Weldment
Ecolab No.: 96580394
Mfg. No.: 05700-002-51-66

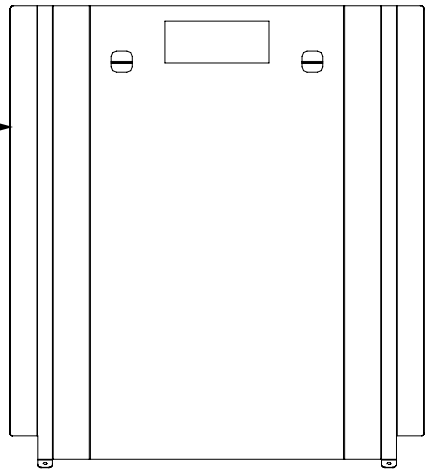
Left & Right False Panel Kit
Ecolab No.: N/A
Mfg. No.: 05700-003-12-93

Rack rail removed & repositioned for a corner operation.



False panel positioned in unit.

Insert this side first.



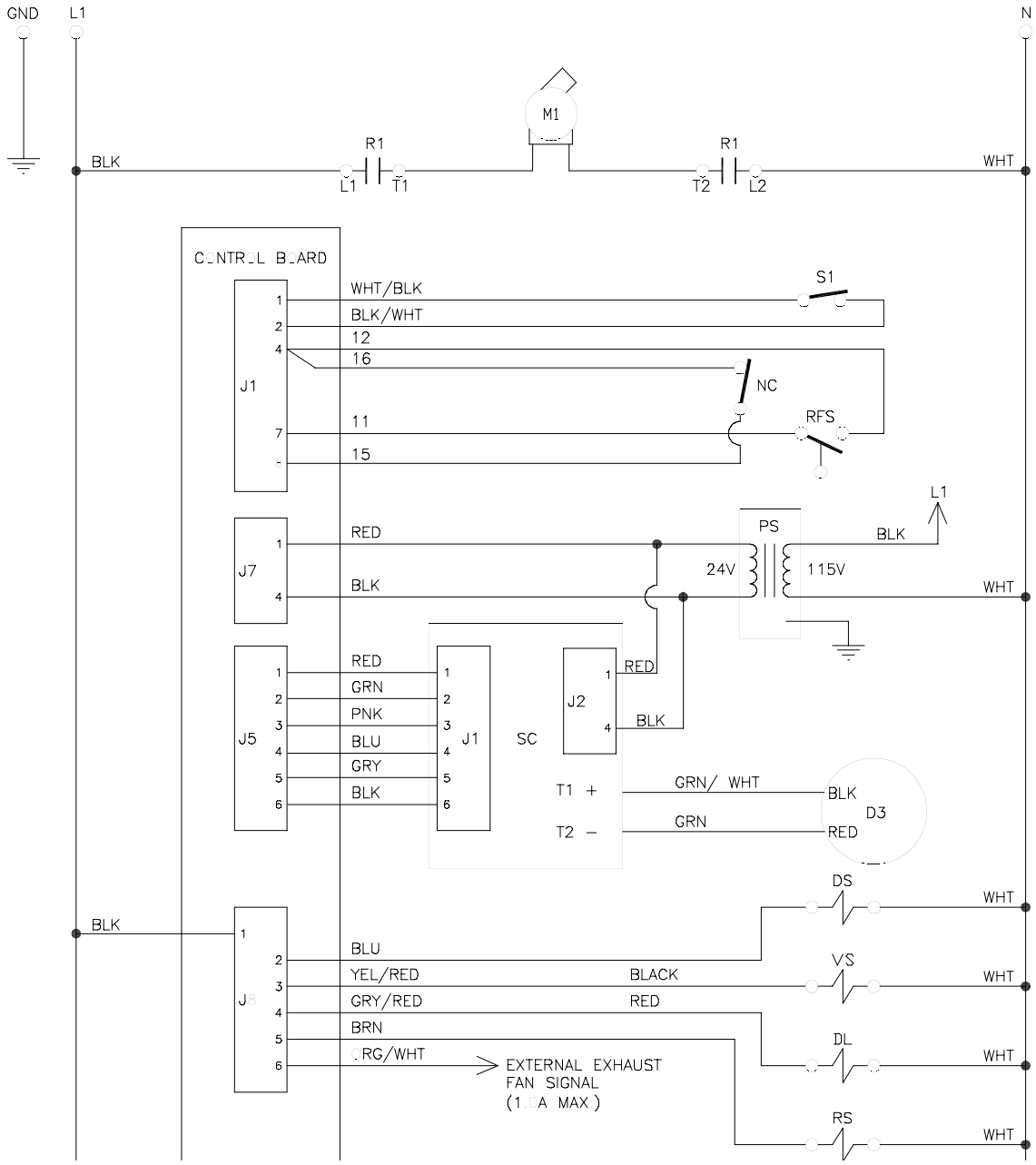
Bottom of side panel.

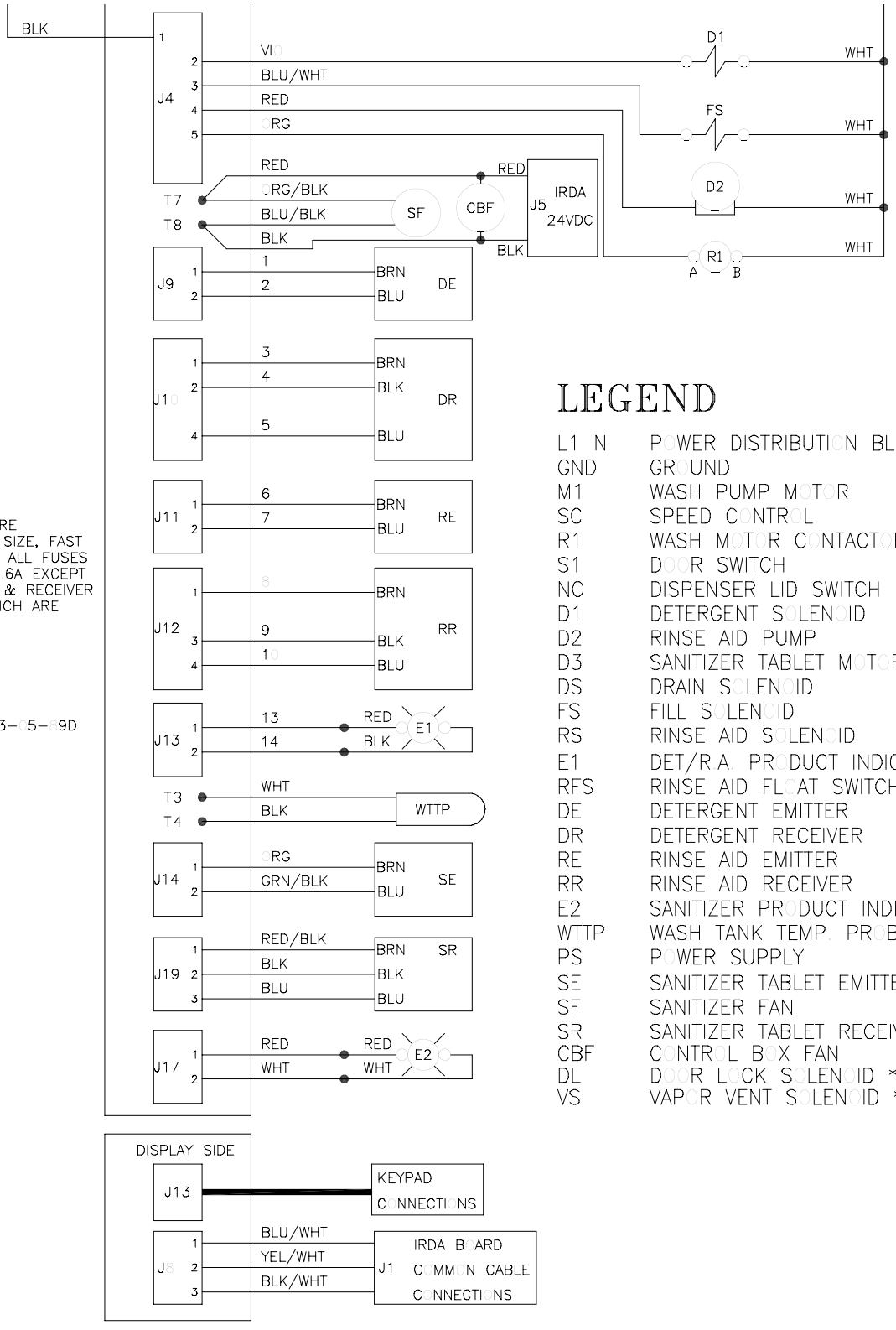
1. Loosen the rack assembly from the unit.
2. False panel will mount to the rack; inside the dishmachine.
3. Position panel in unit on side to be closed.
4. Hold panel against side of dishmachine and push up.
5. Panel will clip inside the unit under the edge of the hood.
6. Holes in false panel will ine up with rack assembly holes.
7. Re-install screws for rack assembly which will secure false panel to unit.
8. Re-assemble the rack track in an “L” shape for a corner operation.

SECTION 7:
ELECTRICAL SCHEMATICS

SECTION 7: ELECTRICAL SCHEMATICS

APEX TSC MACHINE & OPTIONAL VAPOR VENT 120 VOLT - 60 HERTZ - SINGLE PHASE





ALL FUSES ARE 5 X 20 mm SIZE, FAST ACTING TYPE. ALL FUSES ARE RATED 1.6A EXCEPT FOR EMITTER & RECEIVER CIRCUITS, WHICH ARE RATED .5A.

9905-003-05-09D

LEGEND

L1 N	POWER DISTRIBUTION BLOCK
GND	GROUND
M1	WASH PUMP MOTOR
SC	SPEED CONTROL
R1	WASH MOTOR CONTACTOR
S1	DOOR SWITCH
NC	DISPENSER LID SWITCH (NC)
D1	DETERGENT SOLENOID
D2	RINSE AID PUMP
D3	SANITIZER TABLET MOTOR
DS	DRAIN SOLENOID
FS	FILL SOLENOID
RS	RINSE AID SOLENOID
E1	DET/RA PRODUCT INDICATOR
RFS	RINSE AID FLOAT SWITCH
DE	DETERGENT EMITTER
DR	DETERGENT RECEIVER
RE	RINSE AID EMITTER
RR	RINSE AID RECEIVER
E2	SANITIZER PRODUCT INDICATOR
WTTP	WASH TANK TEMP. PROBE
PS	POWER SUPPLY
SE	SANITIZER TABLET EMITTER
SF	SANITIZER FAN
SR	SANITIZER TABLET RECEIVER
CBF	CONTROL BOX FAN
DL	DOOR LOCK SOLENOID *
VS	VAPOR VENT SOLENOID *

*MACHINES EQUIPPED WITH VAPOR VENT OPTION