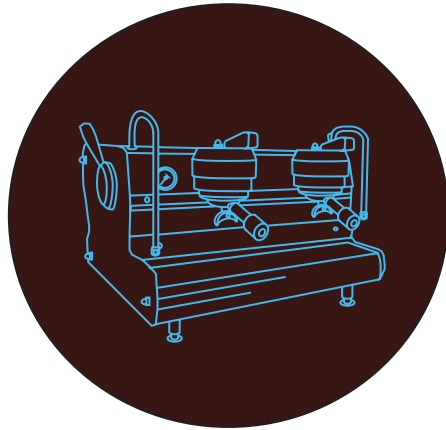


# SYNESSO INC.



## **Cyncra Technical Manual 2009**

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## SAFETY AND TOOLS

### Safety Precautions:

Espresso machines have numerous potential hazards, and it is of paramount importance to Synesso that people servicing our machines take all necessary precautions to ensure their personal safety. Please note and follow the safety stickers on the machine.

When working on the machine's boilers (unless otherwise instructed in the directions):

- Turn the machine off and shut off the incoming water supply.
- Depressurize the boilers (the steam boiler can be depressurized by opening both steam wands, and the coffee boilers can be depressurized by shutting off the water and heating element breaker and turning the group top to the pre-infuse position.

When working on any electrical wiring (unless checking voltage or amperage readings or otherwise instructed in the directions) ensure that the machine is switched off at the electrical box and the machine is unplugged.

### **Tools and recommended items required to fully diagnose, service and maintain the Cyncra™**

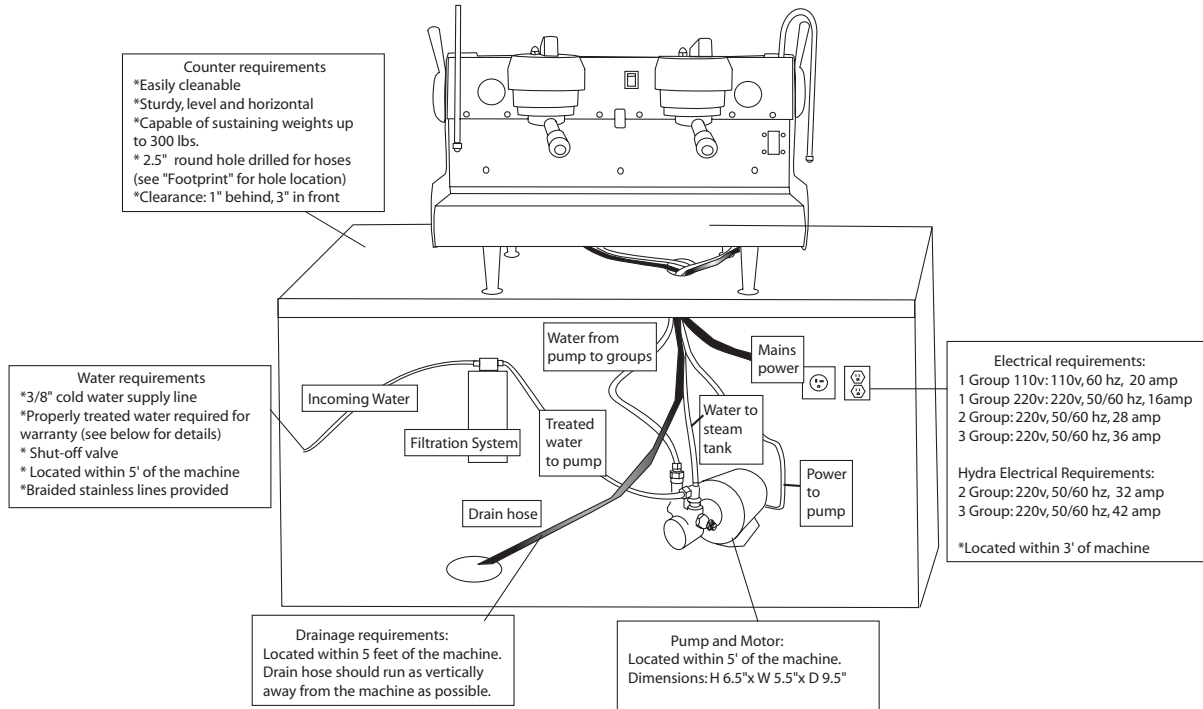
- Multi Meter – reads volts, amps and ohms. The Fluke T5-600 is an excellent tool
- Heat Shrink Gun or Torch
- Vacuum with a Hose
- Compressed Air
- Descaler – Citric Acid
- Flashlight
- Box Knife
- Thread Sealant – Red and Blue Loctite
- Food Grade Grease
- Tube Bender
- Flair Tool - 45°
- Tube Cutter
- Brass Bristle Brush
- Socket Wrench with 1/2" and 9/16" sockets
- Hammer
- Wire Stripper / Crimper
- Small Punch and Chisel
- Small Files – Round and Triangular
- Small Picks – Straight and Curved (great for replacing portafilter gaskets)

- Die and Tap, 1/8" NPT and 1/4" NPT
- Tap for Threads, 10 - 32 and 3/8 - 16
- Set of Allen Wrenches – 3/32" is for the brass flow jet, 9/64" for the brew valves, 1/4" for steam valve seat
- Wrenches: 11/32, 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 12mm & 7mm + 1 extra 9/16 and 5/8
- Large, Medium and Small Adjustable Wrenches (Crescent Wrenches)
- Pliers: Channel Lock, Standard and Side Cutters
- Philips Head Screwdrivers: #2 short, #2 long and #1
- Flat Head Screwdrivers: #2 short, #2 medium, #2 long, #1 and large screwdriver to use as a pry bar
- Pen and paper
- Hand cleaner
- Towels



# SYNESSO INC.

## INSTALLATION DIAGRAM

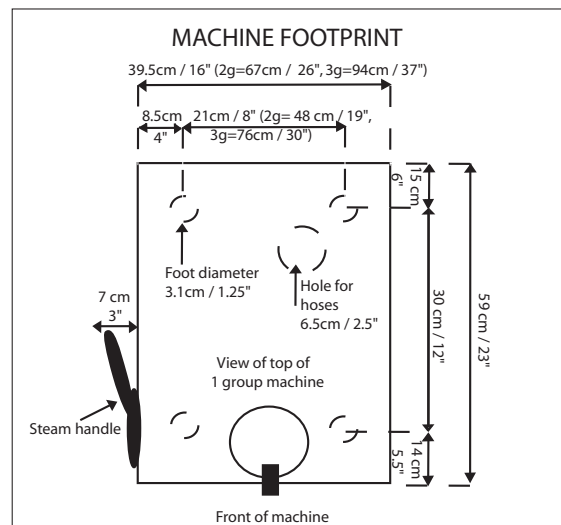


### Water Requirements

Proper water filtration and regular filter changes are a requirement to keep your factory warranty valid and your machine functioning properly. It is highly recommended that you contact a professional water filtration specialist in your area and have your water tested to determine the proper filtration system. It is important to note that many municipalities change their water sources throughout the year, so periodic water tests may be necessary.

Water Standards to keep your warranty valid:

- Total Dissolved Solids (TDS) 30 to 200 ppm (parts per million)
- Total Hardness - in ppm Less than 85 ppm
- Total Hardness - in grains 3 to 5 grains (divide ppm by 17.1 to get grains)
- pH 6 pH to 8 pH
- Chloride 0 ppm - any Chlorides can be corrosive and harmful
- Total Alkalinity Less than 100 ppm
- Chlorine 0 ppm
- Iron 0 ppm



## INSTALLATION

**To maintain the warranty, an authorized espresso service representative must perform the installation of the Cyncra™ espresso machine.**

### Site Preparation

The Cyncra must be placed on a level horizontal surface that can be easily cleaned and is capable of sustaining the weight of the machine, grinders, and associated equipment (see specifications for actual weights of machines).

The surface depth should allow for a minimum clearance of 1" behind the Cyncra and 3" in front.

Make a 2 ½" round hole through the countertop, 4" from the back center of the machine. This should provide ample room for the hoses and electrical lines.

A 3/8" cold water supply line with a shut off valve is needed within 5' of the machine, preferably located directly underneath the Cyncra.

A proper water filtration or softening system must be installed for this espresso machine. Types and sizes of the water treatment systems will vary. It is important to use a system designed to match the needs of your specific area. Most water filtration systems require periodic maintenance, cartridge or filter replacement. This is vital to the proper functioning of the machine and the quality of the espresso served. Follow the instructions provided by your water treatment system for proper installation.

Note: Improper water filtration can result in water damage inside the machine causing scale and corrosion. THIS WILL VOID YOUR WARRANTY.

There must be adequate room underneath the Cyncra to locate the motor and pump. This should be within 5' of the cold water supply line. The pump may need periodic adjustment, so easy access should be available. The pump and motor should have proper ventilation and a minimum of 3" clearance on all sides.

Dimensions of the pump and motor are:  
6 ½" Height x 5 ½" Width x 9 ½" Depth

A floor drain or sink should be readily available. The best location is directly under the installation site of the machine.

An electrical receptacle and matching plug, rated at the proper voltage and amperage is required within 3' of the location of the machine.

## Plumbing Instructions

This equipment is to be installed to comply with the applicable federal, state or local plumbing codes.

Connect the 3/8" compression fitting of the provided stainless steel braided hose to the connection from the filtered, cold water line.

Fittings on the hoses are 3/8" compression type fittings, thread sealant or Teflon tape is not necessary. Make connections snug, but do not over tighten.

Turn water ON and check for leaks.

The 3/4" inside diameter clear vinyl ribbed hose connects the outlet fitting of the drain box to the drain (located on the right hand, bottom, rear corner). Run this hose to the floor drain or floor sink.

NOTE: The Cyncra requires a minimum of 35 PSI of line pressure to have the steam tank auto-filling system function properly.

## Electrical Instructions

After you make sure your receptacle and circuit are for the proper voltage and amperage rating (see specifications chart on page 9) for your model, install a matching plug on the power cord provided with the Cyncra.

### **North American Configuration**

Green	Ground
White	110 V
Black	110 V

### **Outside of North America**

Green	Ground
White	220 V
Black	Neutral

Make sure that the On/Off electronics switch (red rocker) and the heating element breaker on the Cyncra are in the OFF (0) position, then plug the power cord into the receptacle.

**IMPORTANT** - If the voltage on the receptacle used is less than 210 Volts, it may be necessary to install an inline Buck-Boost transformer to increase this voltage.

- 1 and 2 Group 220 Volt Machines require a 1.0 KVA transformer
- 3 Group 220 Volt Machines require a 1.5 KVA transformer.



**Specifications for the Cyncra Line of Semi Automatic Espresso Machines**

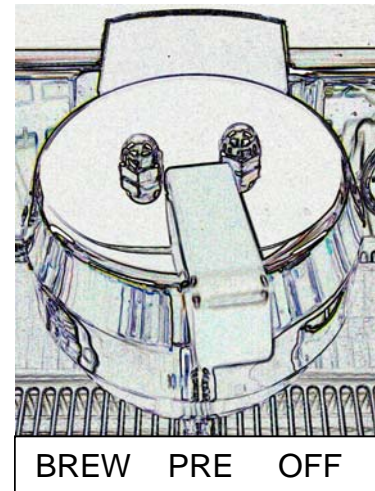
<b>Model</b>	<b>1 Group</b>	<b>1 Group</b>	<b>2 Group</b>	<b>3 Group</b>
Voltage	110	220	220	220
Hertz	60	50 / 60	50 / 60	50 / 60
Amps - max draw	20	16	28	36
<b>Brew and Steam Specifications:</b>				
Watts per Element, Steam Tank	1000	1000 x 2	2000 x 2	2500 x 2
Total Steam Element Wattage	1000	2000	4000	5000
Steam Tank Capacity (Liters)	3.2	3.2	7.7	12.3
Watts per Element, Brew Tank	700	700	700 x 2	700 x 3
Brew Tank Capacities (Liters)	1.9	1.9	1.9 x 2	1.9 x 3
<b>Machine Dimensions:</b>				
	<b>Inches / mm</b>	<b>Inches / mm</b>	<b>Inches / mm</b>	<b>Inches / mm</b>
Height (Steam Wand 21", Handle 20.5")	18" / 457	18" / 457	18" / 457	18" / 457
Width (Steam Handle to Handle add 3")	18" / 457	18" / 457	29" / 736	40" / 1016
Depth	23" / 584	23" / 584	23" / 584	23" / 584
<b>Weights &amp; Dimensions:</b>				
	<b>Lbs / Kgs</b>	<b>Lbs / Kgs</b>	<b>Lbs / Kgs</b>	<b>Lbs / Kgs</b>
Machine Weight, Empty	106 / 48	106 / 48	154 / 70	190 / 86
Machine Weight, Full of Water	115 / 52	115 / 52	173 / 77	215 / 98
Shipping Weight (approximate)	175 / 80	175 / 80	225 / 103	270 / 123
Boxed Dimensions: L" x W" x H"	20"x30"x31"	20"x30"x31"	41"x32"x31"	49"x32"x31"
Boxed Dimensions: L x W x H m/m	508x762x787	508x762x787	1042x762x787	1245x813x787
<b>Plumbing (Compression)</b>	3/8" OD	3/8" OD	3/8" OD	3/8" OD

- Certified by ETL for Sanitation to NSF / ANSI Standard 4
- Certified by ETL for Electrical Safety to ANSI / UL Standard 197
- Certified by ETL for Electrical Safety to CSA Standard C22.2 No. 109
- CE Compliant (By request)
- C-Tick Compliant (By request)



## Start-Up Instructions

1. To fill the coffee brew tanks, turn the water ON.
2. Switch the electronics On/Off switch to ON. This activates the machine's water auto-fill feature for the steam tank and the electronics, but NOT the heating elements.
3. The water level sight glass for the steam tank is located on the right side of the machine. As the tank fills, the water level will rise in the sight glass and will automatically stop when the preset level is reached.
4. Turn the brew group to the BREW position, (see sketch on the right) allow the air to escape and return the brew group to the OFF position.
5. Make sure the water level in the sight glass reads at least  $\frac{1}{2}$  full and then turn the heating element breaker to the ON or (1) position.
6. To adjust the pump pressure, activate the pump infusion by turning the brew group to the BREW position.
7. Locate and read the pump pressure / brew gauge.
8. Set the pump pressure to 9 Bar. To do this, locate the pump adjusting screw on the right side of the brass pump housing. Loosen the lock nut and turn screw with a screwdriver.
  - Clockwise to INCREASE pressure
  - Counterclockwise to DECREASE pressure
9. Please allow at least  $\frac{1}{2}$  hour of "warm up" time before using your Cyncra espresso machine to brew shots or steam milk. The steam gauge should read a minimum of 1.1 Bar.



## Unplugging EMC Compliant Machines (C-Tick for Australia and NZ, CE for Europe)

To comply with EMC (Electromagnetic Compatibility) regulations, Synesso is required to install a capacitor in the electronics box across the main power IN. **To avoid an electric shock from the charge held in the capacitor, leave the electronics ON/OFF red rocker switch in the ON position when unplugging the machine.** When the electronics "go dark" or OFF, the charge has dissipated.

# Hydraulic System

## Overview

The hydraulic system in the Synesso is comprised of all parts through which water flows starting with where it enters the machine from the water treatment/filtration system. This chapter will detail the flow of water and some of the associated electrical componentry.

### **Water requirements:**

**Proper water filtration and regular filter changes are a requirement to keep your factory warranty valid and your machine functioning properly.** It is highly recommended that you contact a professional water filtration specialist in your area and have your water tested to determine the proper filtration system. Good water treatment systems will remove tastes and odors as well as particulate matter that can block valves and cause issues with the machine. Hard water will cause scale to develop inside the machine which adversely affect the water flow and heating processes, so it is vital to have water hardness in the recommended range. It is important to note that many municipalities change their water sources throughout the year, so additional water tests may become necessary.

Water Standards to keep your warranty valid:

Total Dissolved Solids (TDS) 30 to 200 ppm (parts per million)

Total Hardness -(in ppm) Less than 85 ppm

Total Hardness – (in grains per gallon) 3 to 5 grains (divide ppm by 17.1 to get gpg)

pH 6 pH to 8 pH – above 8 is very harmful

Chloride 0 ppm – any Chlorides can be corrosive and harmful

Total Alkalinity Less than 100 ppm

Chlorine 0 ppm

Iron 0 ppm

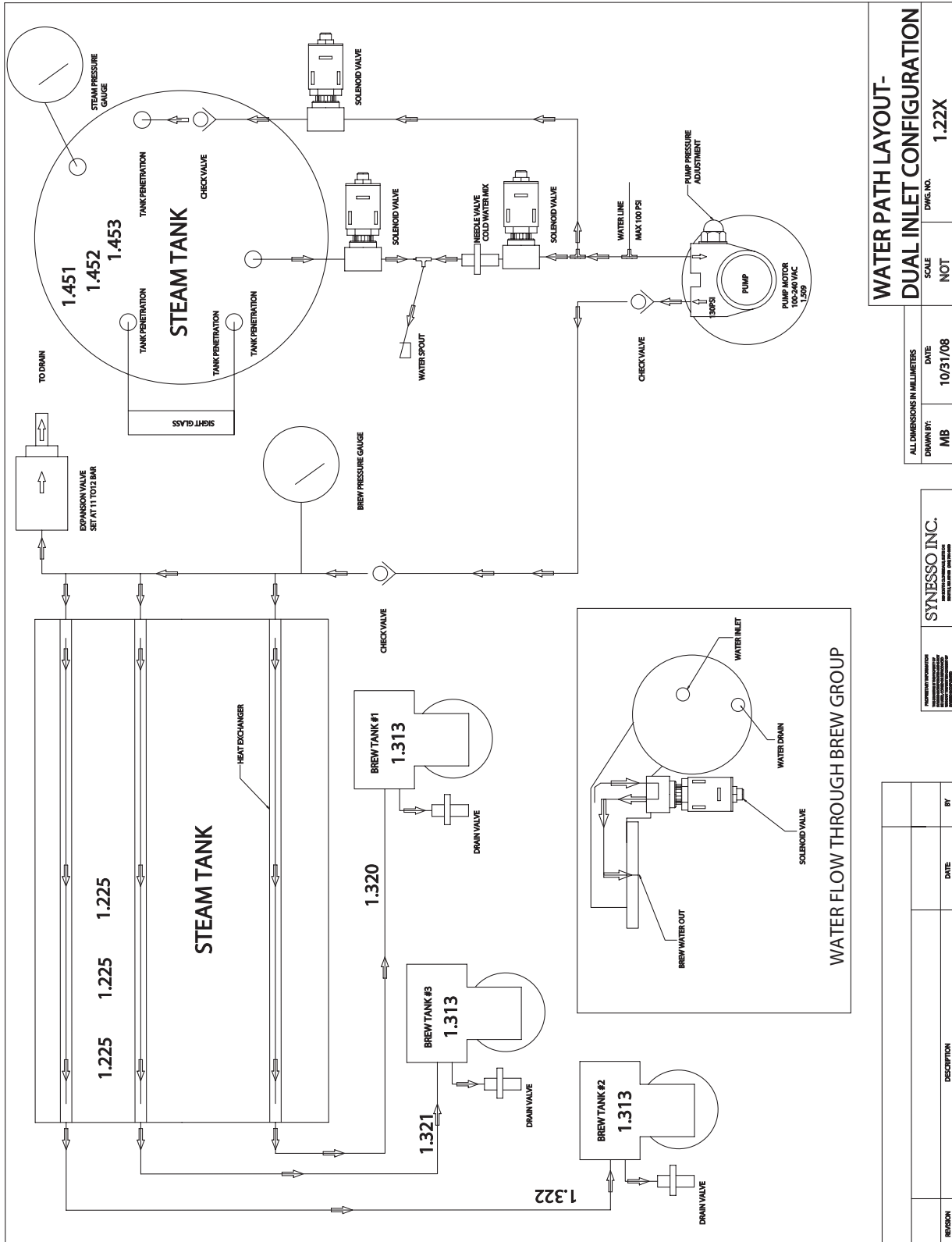
Synessos utilize 3/8” braided stainless hoses (supplied with machine) to connect to the water treatment system. Once the machine is set up and the water quality is checked, the machine is ready to be connected to the water treatment system. The water then passes to the pump and motor.

On single inlet machines, the water then travels through one hose to the machine and supplies both the coffee boiler system and the steam boiler.

On dual inlet machines, the water splits off at the pump: the water for the coffee boiler goes through the pump and the water for the steam boiler splits off and goes through a separate line to fill the steam boiler. The next 3 pages show the dual, single, and Hydra inlet water paths.

# HYDRAULIC SCHEMATIC--DUAL INLET

**HYDRAULIC SYSTEM**

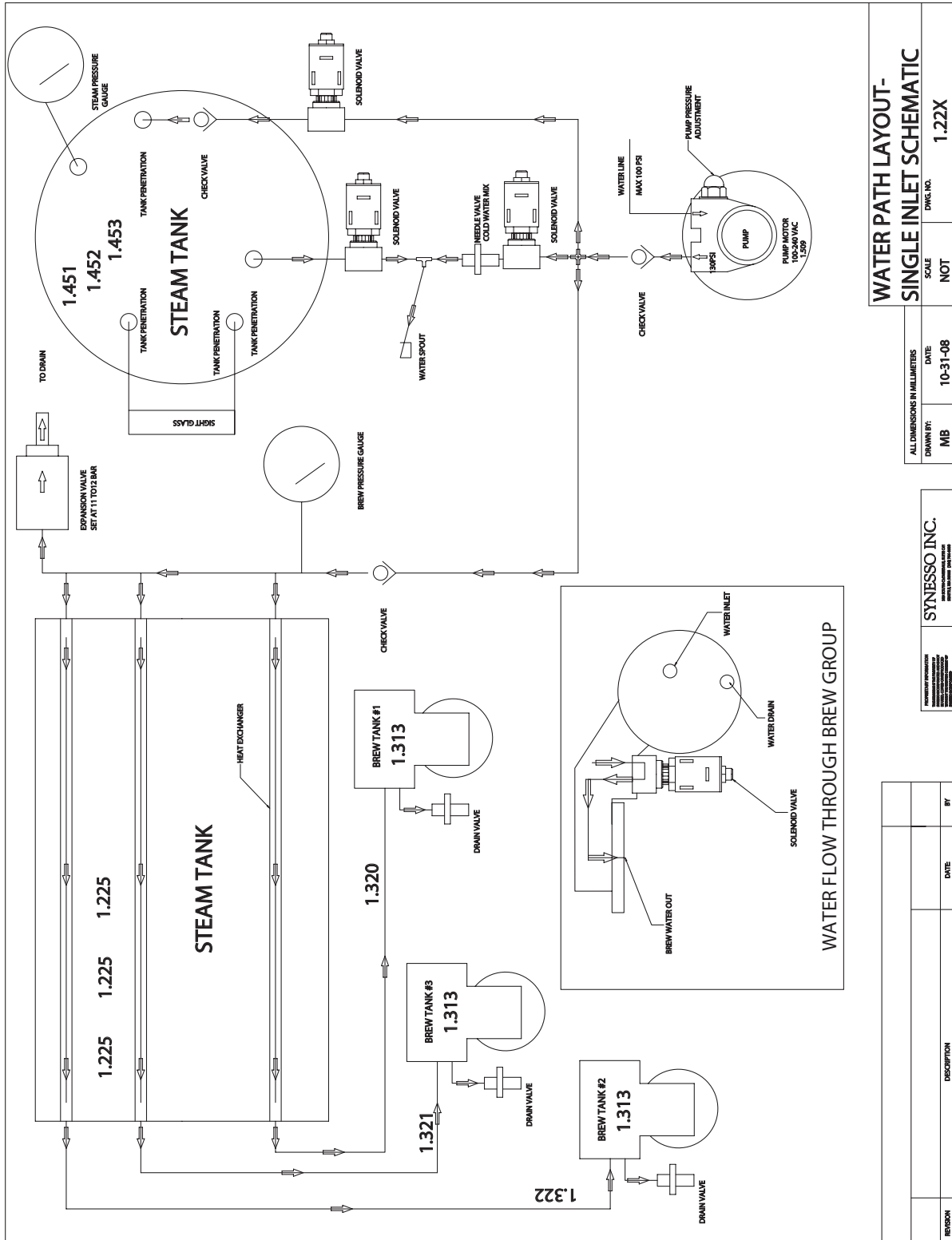


REVISION	DESCRIPTION	DATE	BY

SYNESSO INC. 10000 W. 10TH AVE. SUITE 100 DENVER, CO 80202		DATE: 10/31/08	
ALL DIMENSIONS IN MILLIMETERS	SCALE: NOT	DWG. NO.: 1.22X	
DRAWN BY: MIB			

# HYDRAULIC SCHEMATIC--SINGLE INLET

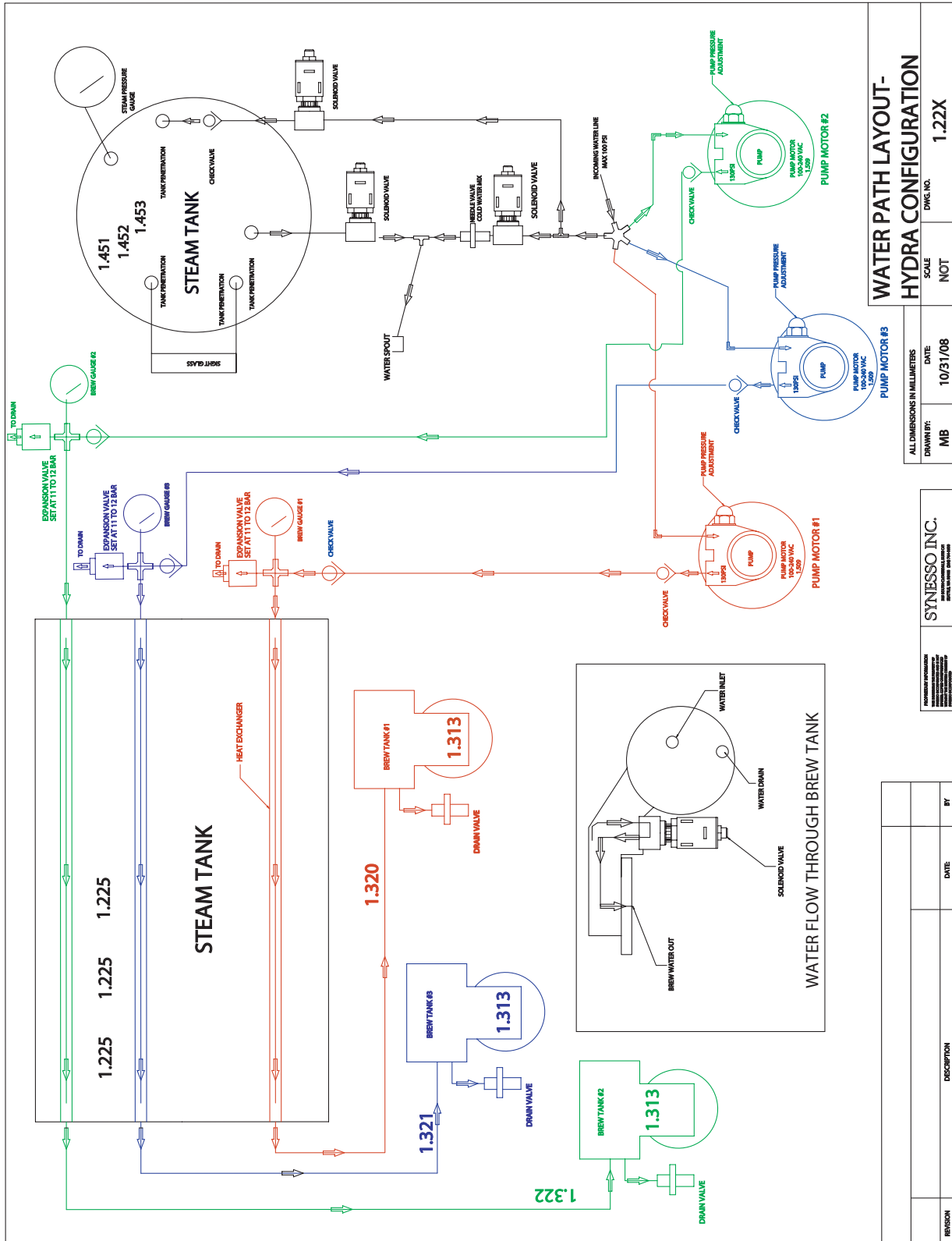


**WATER PATH LAYOUT-  
SINGLE INLET SCHEMATIC**

REVISION	DESCRIPTION	DATE	BY
SYNESSO INC.		DATE	10-31-08
ALL DIMENSIONS IN MILLIMETERS		SCALE	NOT
DRAWN BY	IMB	DWG. NO.	1.22X

# HYDRAULIC SCHEMATIC--HYDRA

**HYDRAULIC SYSTEM**



SYNESSO INC.		SYNESSO INC.	
REASON	DESCRIPTION	DATE	BY
ALL DIMENSIONS IN MILLIMETERS		DATE	10/31/08
DRAWN BY:	MB	SCALE	NOT
WATER PATH LAYOUT- HYDRA CONFIGURATION		DWG. NO.	1.22X



**Pump and Motor:**

Synesso uses a Fluid-o-tec rotary vane pump which boosts incoming water pressure to 9 bar when the motor is activated. Pressure can be adjusted by loosening the nut on the right side fitting and then turning the adjustment screw clockwise (increasing pressure) or counter-clockwise (decreasing pressure).

**Pump configurations:**

Until serial number 356, Synessos had a single inlet configuration as the standard. After 356, the dual inlet configuration is the standard. Hydras have a separate pump and motor per group, therefore all Hydras come equipped with single inlet style pumps.



**Water Inlet control valves:**

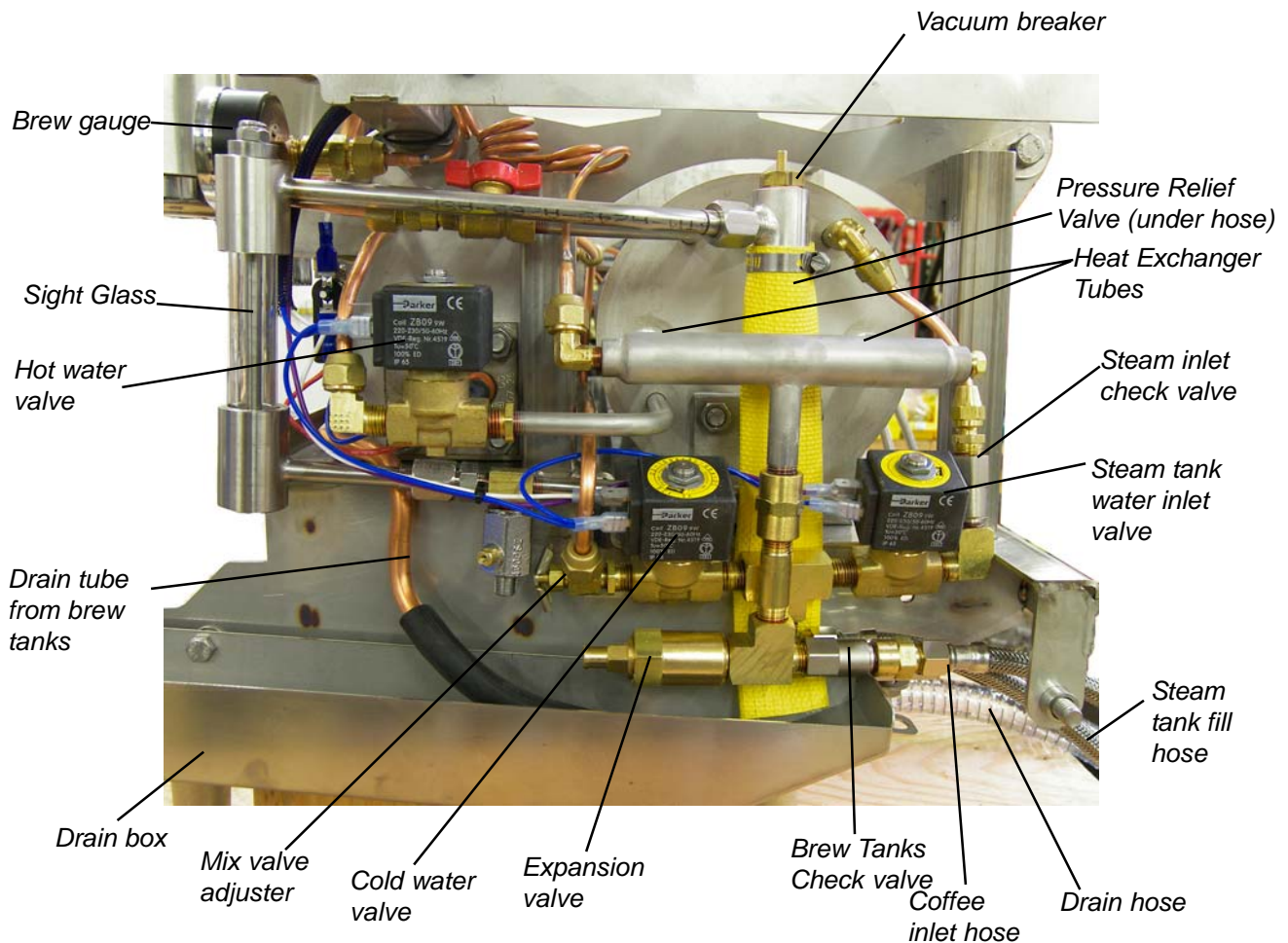
Serial numbers 1-340 feature the Skinner-style valves shown in the upper part of the picture on the left. These were replaced on serial number 341 onwards with the Parker ZB09 for ease of repair or replacement.

Both valve styles feature electronic coils which, when energized, move a piston which allows water flow through the valve. When deactivated, the piston's presence in the valve stops the flow of water.

The picture on the right shows the steam tank autofill configuration. All 3 of the water control valves are now Parker ZB09. Upgrade kits are available through Synesso.



## Major Components of the Water Inlet System



### Water Inlet Components:

- Brew Gauge:** The brew gauge reflects the pressure in the brewing system. On a standard Cynkra, there is one gauge for the entire brewing system; on a Hydra, each brew tank has its own brew gauge. The gauge normally moves between 3-5 bar (resting pressure) to 9 bar (brewing pressure) and up to 12 bar (expansion pressure) at which point the *expansion valve* opens and releases the excess pressure.
- Brew Tanks Check Valve:** Check valves prevent water going the wrong way in the hydraulic system. Water flow should only go one direction and the check valve ensures that pressurized water from inside the tanks cannot overwhelm the incoming water pressure and go backwards.
- Coffee Inlet Fill Line:** (Single inlet machines would have this line only ) Supplies the brew tanks with water, passing first through the heat exchangers.



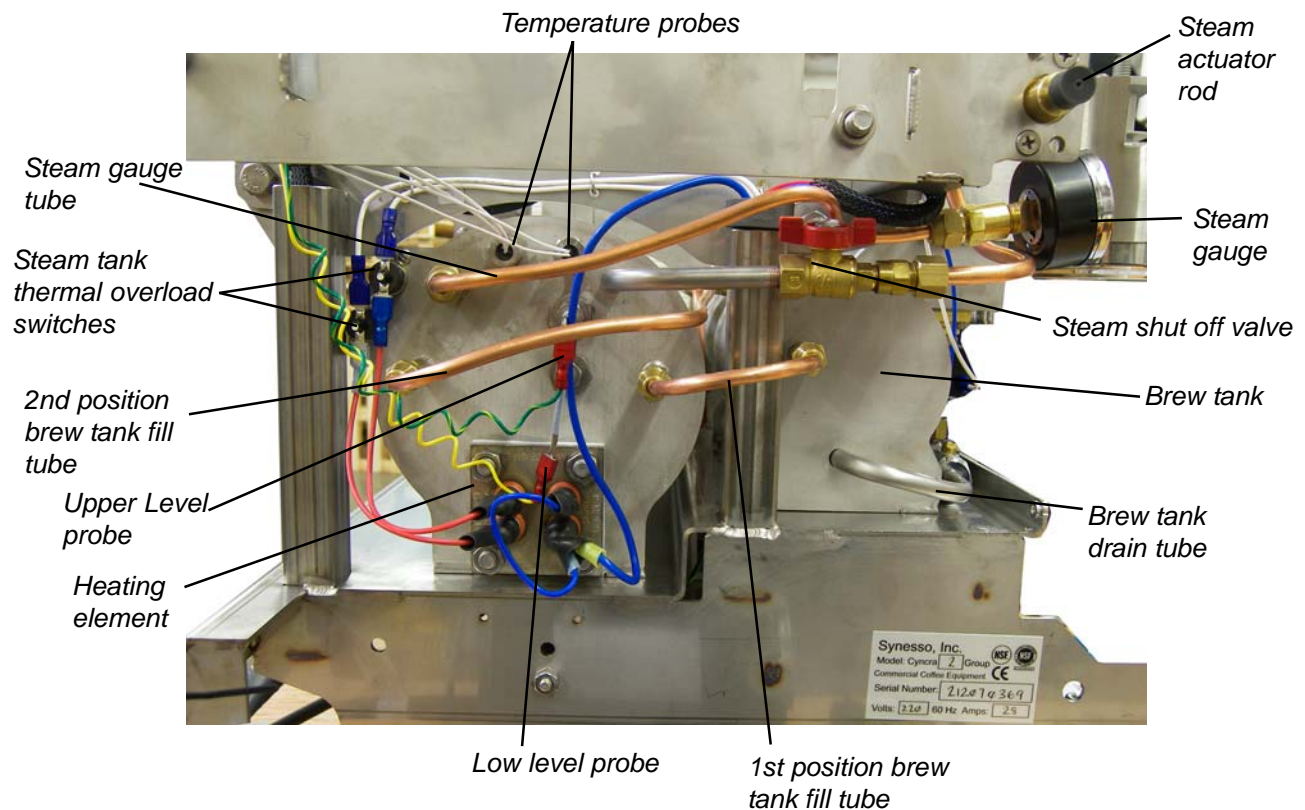
## Water Inlet Components (cont.):

- Cold Water Valve:* Synesso has 2 valves which provide water to the Americano (tea) spout: the hot water valve and this cold water valve. The cold water input allows the user to moderate the temperature at the spout to make drinks appropriate temperatures for their customers.
- Drain box:* Water flows into this box prior to going through the drain hose to the floor drain. It is important to periodically pour small quantities of hot water down this drain box to clear any build up of coffee oils inside the box.
- Drain Hose:* Waste water and some grounds go down this tube to the drain. It's important to keep this free of clogs and should run in a steeply vertical path to the floor drain.
- Drain tube from brew tanks:* This copper manifold allows water from the brew valves to discharge safely down the drain after shots are completed. It also is directly connected to the drain system on the left hand group, allowing the user to drain the left tank easily after depressurizing the system.
- Expansion valve:* The brew tanks are completely saturated with water, and when they are heating, the pressure increases as the water expands. The expansion valve allows this pressurizing water to release safely into the drain box. The release point is 12 bar and is adjustable by turning the end of the valve with a wrench clockwise (increase) or counter clockwise to decrease.
- Heat Exchanger tubes:* In order to maintain extremely stable brewing temperatures, Synesso incorporates heat exchanger tubes which run from the water inlet side through the steam tank and then go to each separate coffee boiler. The internal diameter of the heat exchangers are precisely designed and aid in the energy efficiency and thermal stability of the Synesso.
- Hot Water Valve:* This valve supplies hot water from the steam tank (which is mixed with cold water from the cold water valve) to the Americano (tea) spout.
- Mix Valve Adjuster:* This butterfly valve allows the user to increase or decrease the amount of cold water (from the cw valve above) going to the Americano (tea) spout. Turning this valve completely clockwise shuts the cold water off completely, and turning it ccw allows more cold water in. Synesso sets our machines to have a steady flow of water at approximately 200° F at bench test.

**Water Inlet Components (cont.):**

- Pressure Relief Valve:* The PRV is a safety release for the steam boiler which opens and releases pressure if the boiler goes above 3.5 bar (50 psi). The PRV is housed inside the yellow tubing which would direct any releases to the drain box, minimizing spray on the electronic valves.
- Sight Glass:* Connected by two stainless tubes to the steam tank, the sight glass provides a visual representation of the level of water in the steam tank. It should be about 1/2 to 2/3 full during normal operation. This is a safety feature which enables the user to ensure that they have sufficient water levels in their steam system.
- Steam Inlet Check Valve:* See *Brew tanks check valve description*.
- Steam Inlet Water Control Valve:* When the *upper level probe* detects an absence of water, it sends a signal to the CPU to open this valve and allow water into the steam tank. The water then fills the tank until the probe grounds out on the water, and the valve is then closed.
- Steam Tank Inlet Fill Line:* (*Dual inlet machines only*) This is the incoming 3/8" steel braided line which supplies the steam tank with water.
- Vacuum breaker:* Allows steam pressure to build above atmospheric pressure. As the element heats the water in the steam tank, the pressure from the steam pushes an internal rod and o-ring up, sealing the steam inside the tank. Pressure continues to build until the temperature probes sense the temperatures are to the set points and then keep this pressure inside for use in heating milk, maintaining a hot water supply, and pre-heating the brew water in the *heat exchanger tubes*.

## Major Components of the Water Outlet Side



**1st and 2nd position brew tank fill tubes:**

After travelling through the steam boiler, the heat exchangers exit on the left side of the machine and copper tube (these were stainless steel until serial number 352) deliver the pre-heated water to the brew tanks.

**Brew tank:**

Synesso's brew tanks are solid stainless steel, welded internally and externally in order to be leak-proof and thermally stable. Each brew tank has its own isolated system, from the water inlet on, and this allows the user to set different temperatures on each group, as well as function without a group in the system if something has gone wrong with the group. There is a 3-way brew valve which controls the flow of water to the group head.

**Brew tank drain tube:**

Each group head is fitted with a drain tube and ball valve to easily drain the tank. The 1st position (left-most) brew tank's drain valve is directly hooked up to the drain manifold. The center and right brew tanks will need to have a suitable 3/8" rubber line hooked up and extended to the drain prior to opening the valve.

## Water Outlet Components (cont.):

<i>Heating element:</i>	A 2-leg incoloy and stainless steel heating element which provides the heat for the steam boiler. It is controlled by the 2 thermal probes and will be shut off in the case of over-heating or low water levels.
<i>Low level probe:</i>	This probe detects when the water level has dropped below the height of the probe in the tank. It sends signal to the CPU which immediately cuts power to the heating element, starts an “alarm” light flashing on the display and begins an audible alarm to alert the operator to the problem.
<i>Steam actuator rod:</i>	This is pushed in when the steam handle is activated. The rod opens the seal, releasing steam through the valve.
<i>Steam gauge:</i>	Displays the amount of steam pressure in the steam tank. The gauge reads between 0 and 4 bar (0-60psi) and normal operating pressure is 1.5 bar. The pressure is set to 1.3 in test.
<i>Steam shut-off valve:</i>	Safety device for service agents: turning this ball valve shuts off steam to the valve for protection during repairs.
<i>Steam tube:</i>	Delivers steam from the upper part of the steam tank to the steam valve to heat and foam milk.
<i>Steam tank thermal overload switch:</i>	Cuts power to the element if the temperature exceeds 280° F.
<i>Thermal probes:</i>	2K ohm probes have been part of the Synesso machines since serial number 229 (prior to this, 100 ohm probes were standard). These probes are highly sensitive and send thermal data to the PID controller to control the temperature within the steam tank. Since the steam tank has two independently controlled legs on the element, there are two thermal probes on the steam tank.
<i>Upper level probe:</i>	Detects whether the desired water level has been reached. A small amount of VAC travels through this probe in an open circuit. When water touches the probe, the circuit is closed (grounded) and the <i>steam inlet water control valve</i> closes. Both probes are adjustable by turning the entire probe clockwise to increase or ccw to decrease the water level. The bend in the probe is identical inside the tank, so the level of the water inside is where the probe connects to the wire on the outside.

## Electrical System

The electrical system in a Cyncra is relatively straightforward. This chapter will cover the fundamentals of the electrical layout and function of the electrical features of the machine.

**SAFETY NOTE: Please use caution when working on any part of the Synesso electrical system. Live current poses the risk of electrical shock, harm, permanent injury or death. Take all appropriate precautions, including turning off the machine, breaker, and/or unplugging the unit prior to working on the machine.**

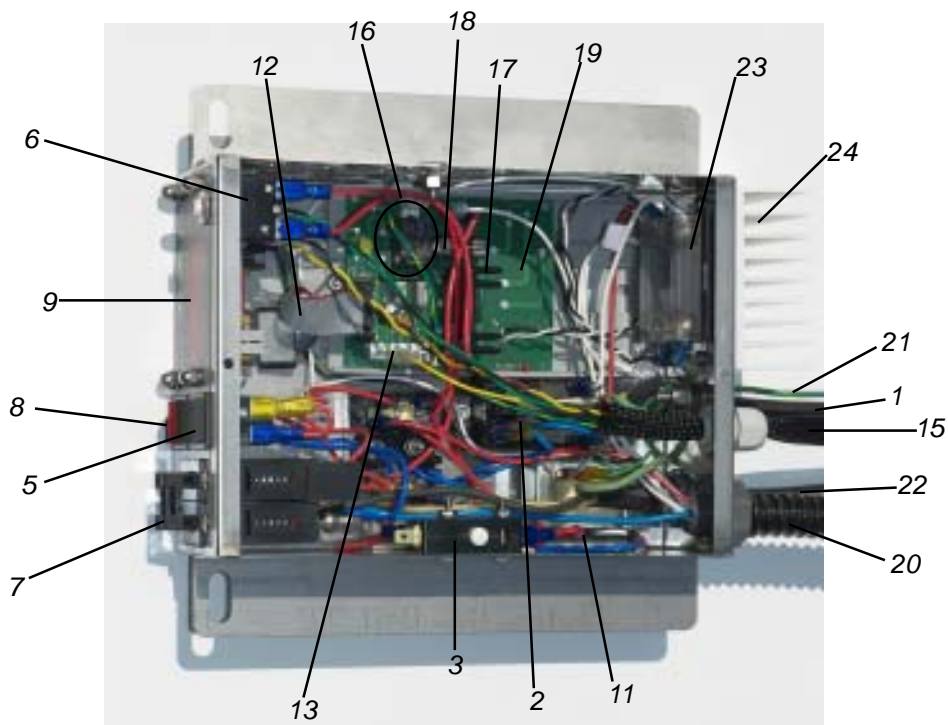
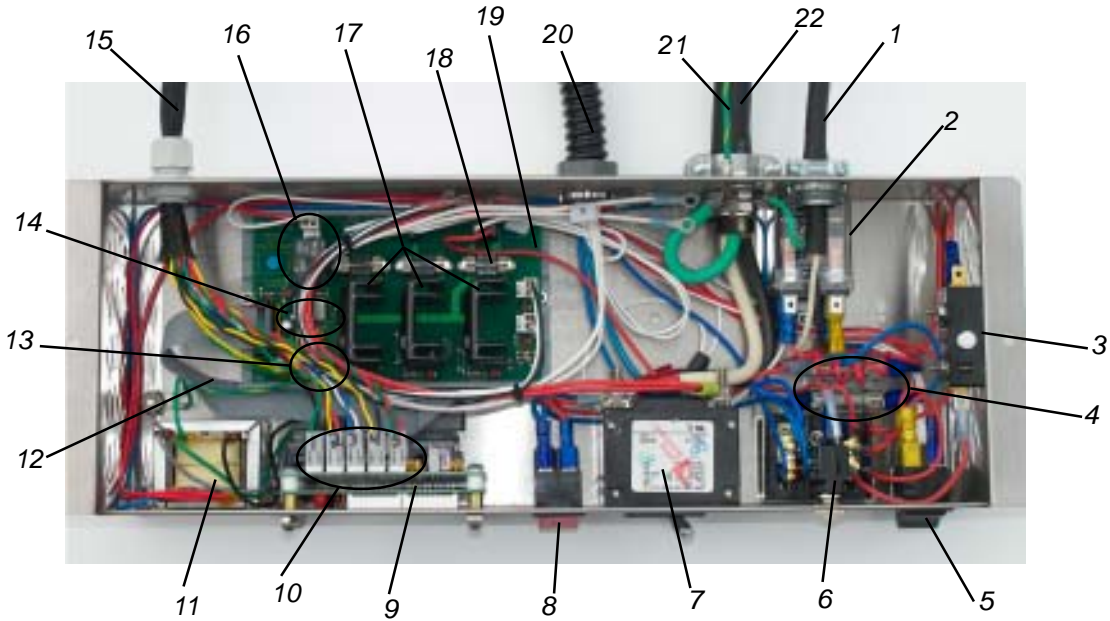
The major components of the electrical system can be broken down into the following functional categories:

1. Heating components (temperature probes, elements, thermal resets, and various parts of the CPU)
2. Water control (water inlet valves, brew valves, mix and hot water valves, water level probes and various parts of the CPU, rocker and brew/preinfusion switches, pump and motor)
3. Operator feedback (visual display)

The locations and descriptions of the components above were covered in the last chapter “Hydraulic System,” with the exception of the CPU and display, which will be covered in this chapter.

## ELECTRICAL BOX:

The electronics box, located underneath the machine, contains all the power coming in and going out to various components. Since the 2 boxes (pictured top: 3 group box, bottom 1 group) have many of the same components, they have been labeled with numbers for matching components and the descriptions follow in the next pages.



ELECTRONIC SYSTEM



1. *Pump wire:* Carries 220v to the pump motor from the electrical box. Contains 3 wires: black (110v), white (110v) and green (ground).
2. *Pump relay:* Controls voltage to the pump motor.
3. *Lid safety switch:* Safety device which cuts all power to the electrical box when the lid is removed from the box.
4. *16 amp pump fuses:* Protect the pump in case of electrical spikes. (3 group machines only)
5. *Manual fill switch:* This switch, when activated, opens the steam boiler fill valve and allows water to fill the steam tank. The autofill function in the machine ordinarily does this automatically; the manual fill switch allows the operator to fill the tank independently.
6. *10amp pump breaker switch:* A reset switch for the pump motor.
7. *Element breaker:* Controls voltage to all elements in the machine.
8. *Electronics power switch:* Turns the machine off and on. If the machine is plugged into an electrical source, the light will be lit red in the "On" position.
9. *Display board:* Visual interface for the user to observe temperatures and change settings in the programming.
10. *Temperature probe connections:* Connect temp probes to display board (under the 10amp breaker switch in 1 groups)
11. *Transformer:* Converts incoming 220v power to low voltage (12v/ 24v) for relays and the CPU.
12. *Ribbon cable:* Transfers signals from display board to power board
13. *Level probe connectors:* Connect level probes to power board and ground
14. *Level probe and low level probe adjustment potentiometers:* Used to adjust the sensitivity of the probe system

- |   |  |
|---|--|
| 15. <i>Temperature probe wire bundle:</i>       | Contains temperature and level probe wires   |
| 16. <i>Steam tank fill connector and relay:</i> | Wires and circuit which control the steam tank fill valve  |
| 17. <i>Brew relays:</i>                         | Control voltage to the brew tank heating elements  |
| 18. <i>Brew relay fuse:</i>                     | Protects the electronics in case of a short in the brew element                                    |
| 19. <i>Power board:</i>                         | Controls heating elements and level/fill system  |
| 20. <i>High voltage conduit:</i>                | Tube containing 220v power lines to elements and valves  |
| 21. <i>Ground wire:</i>                         | Connects electrical box to earth ground and machine frame  |
| 22. <i>Power wire:</i>                          | Provides 220v power to machine   |
| 23. <i>Steam tank element relay:</i>            | Controls voltage to steam tank heating elements (located on lid in 2 & 3 group machines)           |
| 24. <i>Heat sink:</i>                           | Dissipates heat produced by the steam tank element relays (located on lid in 2 & 3 group machines) |

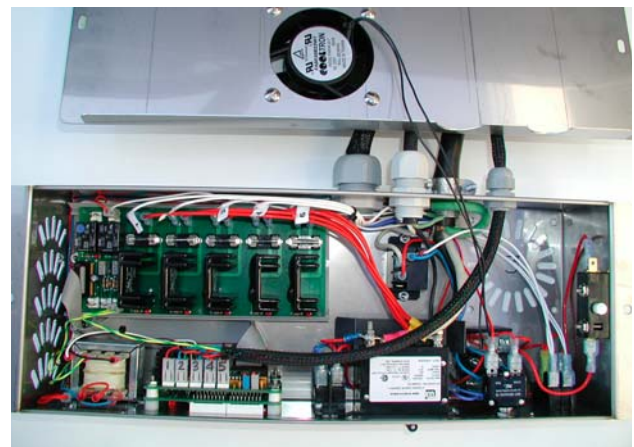


## Cyncra Electrical Box Progression as of October 1, 2008

<u>Date</u>	<u>Starting S/N</u>	<u>Change</u>
By Feb 05		Pump relay moved from side to bottom mounting position
By April 05		3 Gp machines, 2 amp glass transformer fuses and 16 amp pump fuses installed
11-01-05	0079	Individual "Off Set" for each group
12-30-05	0093	3 Gp machines, SPF relays for zones 4 & 5
3-15-06	0114	2 & 3 Gp, SPF relays zones 4 & 5
5-16-06	0134	Tyco pump relay replaces Hasco/Picker relay
9-21-06	0177	Fanless lid, Low Volt lid mounted relays
3-22-07	0229	2k ohm Computer/Displays and Probes
4-15-07	0249	2 brew zone relay power board for 2 Gp machines (3 Gp machines have 3 relays)
By June 07		Removed 2 amp glass fuses for the transformer
2-1-08	0376	Acorn Nuts used for CPU mounting
6-15-08	0454	Deltrol pump relay replaces Tyco
7-31-08	0479	Starting with 3 Gp, Power Bd. supports single red wire per relay
By Sept. 08		Changed hole location for pump cord & probes. Added knockouts for 3 Phase conversion



3 Gp Electrical Box, Nov 2004



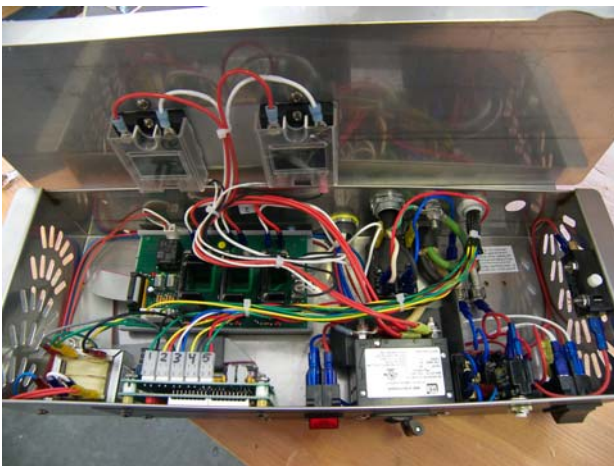
3 Gp, Feb 2005: Ground bolt added, pump relay moved



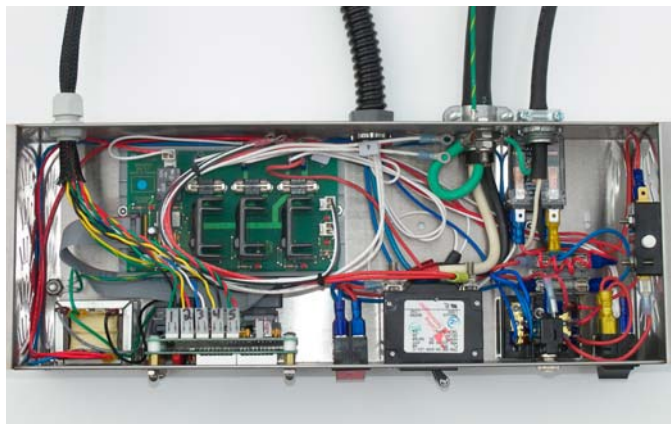
3 Gp, Feb 2006: SPF relays on zones 4 & 5 on 3 gp machines, 2a transformer fuses, 16a pump reset fuses on 3 gp only



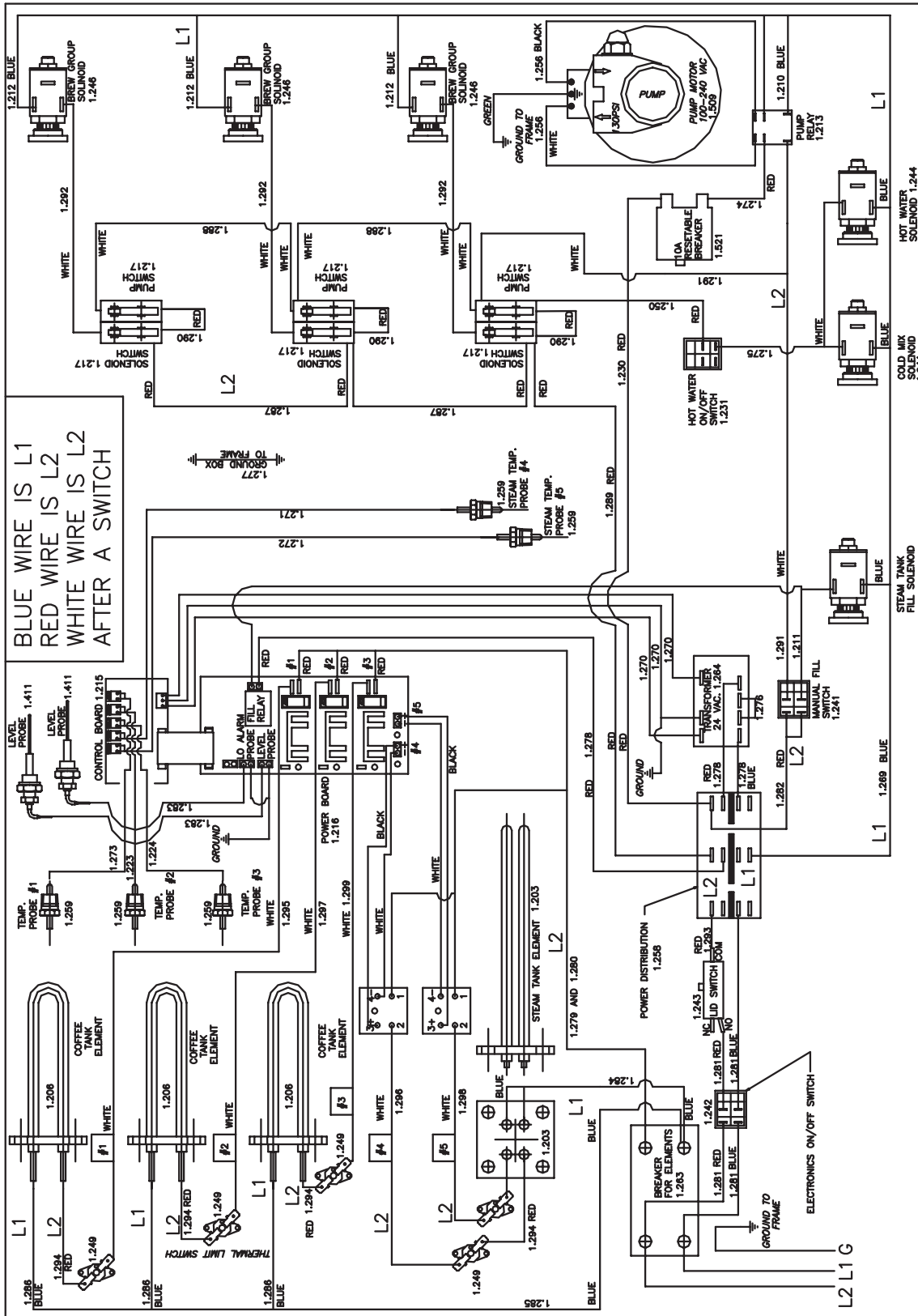
3 Gp, June 2006: Tyco pump relay, SPF relays on zones 4 & 5 for 2 gp machines



3 Gp, September 2006: New low volt, fanless lid assembly



3 Gp, Sept 2008: Deltrol pump relay, hole pattern for cords changed, box cutouts added to face, added acorn nuts for CPU



BLUE WIRE IS L1  
 RED WIRE IS L2  
 WHITE WIRE IS L2  
 AFTER A SWITCH

<p>REVISION</p>		<p>DATE</p>	<p>BY</p>
<p>DESCRIPTION</p>		<p>DATE</p>	<p>BY</p>
<p>SYNESSO INC.                  1000 W. 10th St. Suite 100                  Denver, CO 80202                  Phone: 303.733.8888</p>		<p>SCALE</p>	<p>DWG. NO.</p>
<p>ALL DIMENSIONS IN MILLIMETERS</p>		<p>DATE</p>	<p>1.2261</p>
<p>DRAWN BY: MB</p>		<p>02-12-08</p>	<p>N/A</p>
<p>TITLE</p>			
<p>ELECTRICAL LAYOUT</p>			
<p>3 GROUP</p>			

## Troubleshooting

### General Notes:

**Many problems can be prevented or minimized by installing the proper water filtration system, changing your filters often and regularly cleaning the dust and debris away from the pump motor and inside the electrical box.**

**Synesso recommends changing your portafilter gaskets every 3 to 4 months.** See the changing portafilter gaskets procedure.

Every nut, bolt, screw and connection is assembled using Red Loctite, Blue Loctite or Food Grade Grease.

- Red Loctite: Seals very quickly and the seal is permanent until heated to at least 500° F. To release this sealant, the safest heat source is a Heat Shrink Gun.
- Blue Loctite: Seals quickly and holds firm but can be broken without the use of heat.

**Red sealant is used on:** pipe threads – all brass that is not connected to a copper tube and 6/32” threads

**Blue sealant is used on:** nuts, screws, and brass flow jets

**Food Grade Grease is used on:** all tube fittings (flared) stainless steel and brass, any moving parts (steam valves, steam wand, steam actuators, brew and pump switch rollers) and all stainless steel nuts and bolts 5/16” or larger – this will keep them from galling. Reapply when disassembly and reassembly is needed.

**\*\*SPECIAL NOTE: VARIOUS TECH BULLETINS ARE REFERRED TO IN THE FOLLOWING TROUBLESHOOTING SECTION, I.E. “SEE TEST LEVEL PROBE,” etc. PLEASE CONTACT SYNESSO TECH SUPPORT TO OBTAIN THESE AND ANY OTHER TECH BULLETINS YOU REQUIRE.\*\***



Category	Symptom	Possible Reasons and Solutions
Brew Pressure or Flow	1. Brew Gauge Reads 11 to 12 Bar when Machine is Not Brewing	1A. This is normal. When the brew tanks heat, the water expands and the expansion valve is set to relieve excess water pressure at 11 to 12 Bar.
	2. Brew Pressure is Low	2A. [SINGLE INLET MACHINES ONLY] see "Brew pressure drops when steam tank fills / Section 3" below
		2B. [SINGLE PUMP MACHINES ONLY] When brewing on one group and another group is activated some water will be diverted to the second (or third) group. This will slightly reduce available brew pressure.
		2C. Expansion valve may be set too loose. Check that the pressure in the brew system reaches 10-12 bar while heating from a cold state. If the pressure does not exceed brew pressure, the expansion valve will need to be tightened, cleaned, or rebuilt.
		2D. Check pump to make sure pressure is properly set.
		2E. Water supply hose to the pump may be kinked
		2F. Water filter may be plugged. Check and Replace if necessary
	3. Brew Pressure Drops when Steam Tank fills [SINGLE INLET MACHINES ONLY]	3A. This is common to all single inlet espresso machines. The water source is the same for the steam and brew tanks. The pump is configured for a set amount of pressure and when the steam tank fills, it diverts water and pressure away from the brewing process and into the steam tank. If this is an unacceptable situation, there are a few things you can do to minimize or eliminate the pressure drop.
		3B. There is an auto fill probe delay setting in the programming that is set at the factory to 5 seconds. This means that the auto fill probe waits to fill until it senses a continuous signal to fill for 5 seconds, and it does not stop filling until it senses a continuous signal to stop filling for 5 seconds. This stops the auto fill valve from turning off and on if the water in the steam tank is making intermittent contact with the probe (due to internal water movement).
		3C. Minimize: Increase your auto fill probe delay setting to 10 seconds. This will reduce the number of times that your steam tank fills. It will also increase the fill time each time the valve opens. The water level in the steam tank will vary more.
3d. Resolve: If you can provide 2 separate sources of water (a steam tank source and source run through the pump for brewing), it is possible to custom-plumb your machine so that this issue is eliminated. This takes time, skill and extra parts. All machines made in 2008 and after have this dual inlet system as a standard feature. Retrofit kits are available, check with your dealer, service provider, or the Synesso factory for more information		
4.No Brew Pressure, Pump Motor is Running	4A. Failed pump, needs to be replaced	
	4B. The line between the pump and the water supply may be collapsed or kinked.	
	4C. Water filter may be plugged. Check and Replace if necessary.	
5. No Brew Pressure, Pump Motor is Not Running	5A. Check that the pump reset button on the face of the control box (white button with "1 0" on it) is not tripped (popped out).	
	5B. Check the pump switch in the group top to make sure it is engaging and has not failed. See Brew Switch Adjustment (Tech Addendum #1)	
	5C. Check that the pump relay in the electrical box functions correctly.	
	5D. [3 GROUP MACHINES ONLY] Check that the pump fuses are not blown.	
	5E. Check all wire connections	
6. No Water Flow From Individual Group while Pump is on	6A. Check in the group top that the brew solenoid switch is engaging and has not failed. See Brew Switch Adjustment (T.A. #1 for more info.)	
	6B. Brew Solenoid is stuck closed (may be caused by soap residue not fully flushed after cleaning).	
	6C. Brew Solenoid coil may have failed. Check that coil magnetizes when group is in preinfuse and brew	
	6D. Jet may be plugged. See Jet Clearing Procedure (T.A. #2)	
	6E. Water filter may be clogged and should be changed	
7. Slow Water Flow (more than 10 seconds to pour 2 ounces of water)	7A. Debris is stuck in the water flow restrictor jet. See Jet Cleaning Procedure.	
	7B. Water filter may be clogged and should be changed	
8. Brew Gauge Flutters or Vibrates	8A. Water is in the gauge or tube. Remove the gauge and tube, blow out the water, and reinstall. Machines made after #240 use a thinner, longer gauge tube which eliminates flutter. If your machine is made before #240 and this issue becomes unacceptable, contact your dealer, service provider, or the Synesso factory to purchase a retrofit tube.	
Brew Temperature	9. Readout for Brew Water Temperature Varies by a Few Degrees	9A. The control must detect a temperature one increment (0.5°F on original machines, or 0.1°F on current machines) above the set point before it sends a signal to turn off the heating element. This will allow the electronics to show a reading just above the set point. The energy from the heating element and the tube for the preheated incoming water are within 1" (25mm) from the location of the temperature probe in the brew tank. The pick up tube for brew water is at the top of the brew group and is in the most temperature stable water in the tank. The readout can show a temperature of a few degrees above your set point, but your brew water is actually at the set point.

	10. Brew Temperature Reads Low	<p>10A. Be sure to allow 20 - 40 minutes from the time the machine is powered up as the temperatures need to stabilize. Ambient temperature and airflow can change how quickly the machine reaches stability.</p> <p>10B. Check that the element breaker is in the ON position</p> <p>10C. Check that the fuse and relay on the power board are both functioning properly.</p> <p>10D. Check that the brew tank thermal overload switch has not been tripped</p> <p>10E. Check that the connection to the temperature probe is intact and secure.</p> <p>10F. Press and hold the [SET] button on the electrical box to make sure the set point has not been changed</p>
	11. Brew Temperature Reads High	<p>11A. Display temperature will climb during brewing as high temp water from the steam tank heat exchanger enters the brew tank. This is normal, and the water dispensed will be at your set point, not the displayed temperature.</p> <p>11B. Press and hold the [SET] button on the electrical box to make sure the set point has not been changed</p> <p>11C. Check that the relay on the power board is functioning properly.</p> <p>11D. Check that the connection to the temperature probe is intact and secure.</p>
Steam Pressure	12. Steam Pressure is set for 1.8 Bar or Higher	<p>12A. The Cynkra can be set for steam pressure at over 2.0 Bar but there can be side effects in the brewing process. A small amount of water is preheated in the steam tank for brewing. If the temperature in the steam tank is set very high then this could allow the preheated water to be too hot and cause some erratic brew temperature spikes. There are ways to make this work, including insulating the heat exchanger tubes. Contact Synesso for more information, instructions, and parts.</p>
	13. Sudden loss of Steam Pressure	<p>13A. Too much hot water has been used for Tea, Americano, rinsing, or warming cups while still steaming milk. Allow the machine to recover. Check temperature settings on Zone 4 &amp; 5 ( "Steam" zone on a single group machine) to make sure they are high enough to support the usage.</p> <p>13B. Check the DigiZone Control to make sure all Set points, especially Steam zone (zones 4 &amp; 5) settings, are accurate and functioning</p> <p>13C. Check that the element breaker on the electrical box is in the ON position</p>
	14. Steam Tank is overfilling	<p>14A. Debris caught in the water control valve or worn out valve</p> <p>14B. Water level probe (auto fill) needs to be descaled or cleaned. This probe is located behind the left side panel</p> <p>14C. Make sure level probe (auto fill) is working. See Test Level Probe</p> <p>14D. Water is too soft (0 gpg). The water level (auto fill) probe requires a low level mineral content in order to detect the water and relay the information to the CPU. Do not use deionized water in the machine.</p> <p>14E. Make adjustment to the level probe sensitivity control on the power board in the electronics box. See Probe Sensitivity Photo</p>
	15. Steam Valve Stem Seals Leak	<p>15A. Purchase Rebuild Kit (Pt. # 1.7320) and replace interior seals. See Steam Valve Rebuild instructions (included with kit) for more info.</p>
	16. Auto Fill Valve (Solenoid) is turning OFF and On without Filling the Steam Tank	<p>16A. Check that the water to the machine has not been cut off or restricted.</p> <p>16B. Confirm that autofill delay is set to at least 5 seconds. See DigiZone Guide Page (Page 37)</p> <p>16C. If the machine is installed on a boat or other mobile platform, increase the autofill delay as the water may "slosh" inside the tank and confuse the level probe.</p> <p>16D. Working from a static tank and there is no pressure available to fill the steam tank. Dual inlet machines will need a line boost pump or custom plumbing to operate from a static tank with no line pressure.</p> <p>16E. Machine is not level. Check to make sure the surface that holds the machine is level. Slightly adjust leg height to level the machine</p>
	17. The Sight Glass Shows that the Water Level in the Steam Tank is either too High or too Low	<p>17A. Water level probe (auto fill) needs to be de-scaled or cleaned. This probe is located behind the left side</p> <p>17B. The manual fill switch located on the front of the electrical box has been depressed. Use the hot water spout to drain the steam tank until the fill solenoid opens and the tank begins to refill.</p> <p>17C. If you are working from a static tank then you must use a line pressure boost pump to provide the pressure needed to fill the steam tank. Contact your dealer, service provider, or the Synesso factory for more information regarding static tank installations.</p> <p>17D. Machine is not level. Check to make sure the surface that holds the machine is level. Slightly adjust leg height to create a level machine</p> <p>17E. Debris is stuck in the water control fill valve. See Water Control Valves</p>
	18. Steam Tank is Slow to Recover Pressure	<p>18A. Test zone 5 functionality:</p> <p>18A1. Turn down the set point for zone 4 a few degrees below zone 5</p> <p>18A2. Turn up zone 5 by a few degrees and confirm that the temperature rises to the new set point.</p> <p>18A3. If the temperature has risen, then zone 5 is functioning properly.</p> <p>18B. Test zone 4 functionality. See Test zone 5 above for instructions.</p> <p>18C. If either zone is not working properly, then see "Cold Zone" (26) and "Tanks will Not Heat to Full Temperature" (25) in the Electronics section.</p> <p>18D. Calcium and scale buildup can insulate and cause reduced efficiency in heating elements. If calcium and scale buildup is an issue, be sure to descale your machine on a regular basis.</p>

Steam Wand	19 Drip at the Steam Wand Tip	19A. Steam valve seal is worn. Replace by installing steam valve rebuilt kit. 19B. Steam valve handle needs to be adjusted. See Steam Valve Handle Adjustment 19C. Steam valve is filled with milk residue. Disassemble steam valve and clean.
	20. Water bubbles out around wand	20A. Wand ball o-ring is worn, replace with new teflon o-ring from steam valve rebuild kit.
	21. Wand is Hard to Move or Sticky	21A. Remove wand mounting nut, clean and lubricate wand ball with food grade grease, replace wand ball o-ring
	22. Steam Valve does not Open Fully	22A. Steam valve handle needs to be adjusted. See Steam Valve Handle Adjustment
Hot Water Tap	23. No Water Flows When the Switch is On	23A. If there is pressure in the steam tank, and water to the machine is not restricted, this indicates the switch has failed. Replace the switch.
	24. Only Cold Water Flows when Switch is On	24A. Turn the mix valve clockwise until it stops. This will cut off all cold water flow. If no water flows with the mix valve off, the water control valve on the hot side of the mix valve has failed.
	25. Only Hot Water Flows when Switch is on	25A. Check that the mix valve is not fully closed. A fully closed mix valve will only allow steaming water out to the hot water tap. 25B. If the mix valve is open a full turn and a half and the water flow is still steaming and sputtering, the water control valve on the cold side of the mix valve has failed.
Electronics	26. All zones read LO	26A. Check to make sure the element breaker is ON. Zones will read LO until the temperature in that zone reaches 175°F.
	27. An individual zone reads LO	26A. Test the connections at the probe and display.
		27B. Test thermal overload (over temperature) switch
		27C. Test the fuse for that zone. Test continuity between the ends to check for a blown fuse. Test that voltage from ground to the fuse reads 110v.
		27D. [DISCONNECT POWER TO THE MACHINE FOR THIS TEST] Test continuity from the heating element posts to ground, and the resistance between the posts.
		27E. If all these tests prove to be ok and the LED for the relay (on the power board inside the electrical box) is ON, then the relay has failed.
	28. An Individual Zone Reads HI or Above 250°F and the Corresponding Tank is Cooling	28A. Test the connections to the probe
28B. Test probe for failure with ohm meter and compare reading to neighboring probe		
29 Tanks will Not Heat to Full	29A. Clean dust and debris from electronics box. Take a soft brush (clean paint brush) to loosen debris and use a small vacuum hose to remove loose debris.	
30. Cold Zone	30A. Solid State Relays can fail in either the ON or Off position <b>TRAINED OR AUTHORIZED PERSONNEL ONLY:</b>	
	30B. Relay has failed in the ON position: The heating elements will not turn off and they will overheat to a point where the thermal overload switch will trip and break the circuit to the element. With power ON, test for voltage at the fuse: 30B1. If voltage is present and the LED at the relay board is not lit, then the relay has failed ON. 30B2. If voltage is not present: <b>TURN THE POWER OFF TO THE MACHINE</b> and test element leads for continuity to ground and for resistance across the leads.	
	30C. Relay has failed in the OFF position: Heating element turns off because of lack of signal. No other parts should be affected. Remember, when testing for voltage, the solid state relay requires some load to function. A failed open heating element, a tripped switch or a failed fuse will make a solid state relay appear to have failed or be OFF. If the LED at the relay is ON and there is no power at the fuse: 30C1. Test the fuse 30C2. Check the reset switch on the tank 30C3. <b>TURN THE POWER OFF TO THE MACHINE</b> and test element leads for continuity to ground and for resistance across the leads.	
	30D. If all of these tests are ok, the relay has failed OFF	
	31. Display is Blank, No LEDS are lit	31A. If the red power switch is in the ON position and is NOT lit, there is lack of power to the machine. Check your circuit breaker. Check the wall plug if applicable. 31B. If the red power switch is in the ON position and is lit, check that the lid of the electronics box is tightly secured to the box. There is pressure switch on the right side of the box which interrupts power to the electronics when the lid of the electronics box is loose or removed. 31C. If the power switch is lit, the safety switch is properly engaged, and the display is still dark. Either the low voltage transformer has failed (see voltage output table below), or the wires from the transformer to the display have been disconnected.

		<p>31D. Proper transformer voltages (to ground):</p> <table border="1"> <tr> <td>Blue</td> <td>110v</td> </tr> <tr> <td>Red</td> <td>110v</td> </tr> <tr> <td>Grey</td> <td>12-15v</td> </tr> <tr> <td>Black</td> <td>12-15v</td> </tr> </table> <p>The green wire is connected to ground and should have no voltage potential</p>	Blue	110v	Red	110v	Grey	12-15v	Black	12-15v													
Blue	110v																						
Red	110v																						
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Black	12-15v																						
Heating Elements	32. Testing Heating Elements	<p><b>DISCONNECT MACHINE FROM POWER SUPPLY BEFORE TESTING</b></p> <p>32A. Test with an ohm meter across the element posts:</p> <table border="1"> <thead> <tr> <th>Voltage</th> <th>Wattage</th> <th>Reading in Ohms</th> </tr> </thead> <tbody> <tr> <td>110</td> <td>700</td> <td>15 to 19</td> </tr> <tr> <td>110</td> <td>1000</td> <td>11 to 13</td> </tr> <tr> <td>220</td> <td>700</td> <td>64 to 72</td> </tr> <tr> <td>220</td> <td>2000</td> <td>46 to 52 each loop</td> </tr> <tr> <td>220</td> <td>4000</td> <td>23 to 26 each loop</td> </tr> <tr> <td>220</td> <td>5000</td> <td>18 to 22 each loop</td> </tr> </tbody> </table> <p>32B. Test the element post to the element body and you should not get a reading of any kind. If you get even a quick flash reading, remove element and inspect.</p>	Voltage	Wattage	Reading in Ohms	110	700	15 to 19	110	1000	11 to 13	220	700	64 to 72	220	2000	46 to 52 each loop	220	4000	23 to 26 each loop	220	5000	18 to 22 each loop
Voltage	Wattage	Reading in Ohms																					
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220	2000	46 to 52 each loop																					
220	4000	23 to 26 each loop																					
220	5000	18 to 22 each loop																					
Leaks	33. Hot Water Tap	<p>33A. If the drip is cold water, the water control valve on the cold side of the mix valve is leaking. Open and clean the cold water valve.</p> <p>33B. If the drip is warm or hot water, the water control valve on the hot side of the mix valve is leaking. Open and clean the hot water valve.</p>																					
	34. Steam Wand	<p>34A. A small amount of water will naturally accumulate in the steam wand between uses if it is allowed to cool. This is normal for any machine. Make a habit of purging the steam wand of all accumulated liquids before and directly after steaming a pitcher of milk.</p> <p>34B. If the steam wand constantly drips warm water and is warm to the touch even after an extended time without use, the valve will require a new seal. Obtain and install a steam valve rebuild kit from your dealer, service representative, or the Synesso factory.</p> <p>34C. Steam and/or water bubbling out from around the steam wand pivot ball indicates that the steam wand ball o-ring needs to be replaced. This o-ring is included in a steam valve rebuild kit. Machines produced before #510 will likely benefit from the new teflon o-ring, which provides an improved seal and wear resistance.</p> <p>34D. If water leaks from the space between the steam wand handle assembly and the side panel, o-rings on the brass pusher rod are worn and need to be replaced. These o-rings are included in the steam valve rebuild kit. The pusher rod can be accessed by removing the side panel and pulling the pusher out from the steam valve.</p>																					
	35. Brew Groups	<p>35A. A leaking diffuser indicates the brew valve is not sealing properly. Open the valve and clean the sealing faces with a soft cloth. Inspect the valve for scale and calcium buildup.</p> <p>35B. If water bypasses the portafilter gasket and leaks out around the portafilter when properly engaged and brewing, the portafilter gasket will need to be cleaned. Use a soft brush and scrub any grounds from the surface of the gasket. Rinse with hot water. If the issue persists, replace the portafilter gasket.</p>																					
	36. General	<p>36A. Dirty / brown water under the machine indicates the drain box is clogged or overloaded. Remove the right side panel and clear any obstructions in the drain box. Be sure the drain hose has an even, steady slope toward the floor drain. Kinks, dips, or flat runs will slow or stop the flow of waste water from the machine drain.</p> <p>36B. A small amount of water may splash between frame panels during a steam wand purge, or when rinsing the drip pan. The water will then drip onto the countertop or frame of the machine. This is normal.</p> <p>36C. Clean water under the machine or on top of the electrical box indicates an internal leak. Remove the side panels and facias until the source of the leak is determined. Contact your dealer, service representative, or the Synesso factory for more info on fixing your specific leak.</p>																					
General	37. Coffee Crema is Thin with Large Bubbles & Tastes Astringent	<p>37A. Grinder burrs are dull. Replace immediately</p> <p>37B. Coffee is old</p> <p>37C. Brew temperature may be set too low</p>																					
	38. Vacuum Breaker	38A. See Vacuum Breaker Explanation																					
	39. Portafilter	39A. Portafilter "ears" will wear over time allowing the handle to swing further before the basket is fully engaged. Use of thicker gaskets (8.5mm or even 9.0mm) will extend the usable life of the portafilter. Ask your dealer, service provider, or the Synesso factory for more info.																					
	40. Diffuser Screen is Loose	40a. This is most likely caused by overfilling the portafilter basket with coffee. This causes the expanding coffee puck to push against and flatten the diffuser and bend the screw contact point away from the screw.																					

TROUBLESHOOTING



## Periodic Maintenance

### Cleaning and Maintenance

Proper and regularly scheduled cleaning and maintenance procedures are CRITICAL for trouble free and optimum quality performance from your Cyncra espresso machine.

#### Back-Flushing

1. Replace the filter basket with the provided blind filter basket (a single solid basket without holes) in one of the portafilters.
2. Engage the portafilter in one of the brew groups, turn the head to the BREW position and leave it there for 3-5 seconds. Repeat several times. This procedure should be performed on EACH brew group daily.
3. This process forces water through the inlet tube and drain system.
4. When using an approved espresso industry detergent during back flushing, follow the manufacturer's instructions. It is extremely important to thoroughly rinse the blind filter basket and repeat back flushing several times with clean water to clear the system of any detergent residue.

#### Cleaning

1. Clean the surface of the machine using a soft damp cloth. Avoid using abrasive cleaners or cleansing pads. Take extra care on the mirror finish stainless steel surfaces.
2. Make sure the steam wands and tips are free of milk built-up. It is always best to clean the steam wand and tip after each use. Approved espresso industry cleaners can be used to help dissolve milk built-up.
3. The drip tray, drip tray grates, cup tray grates and portafilters should be removed and cleaned every day. If you clean the portafilters in the dishwasher, first remove the filter baskets and insert springs before placing all items in the dishwasher.

## Periodic Maintenance

### Maintenance Schedule

#### Daily

1. Back-flush each brew group a few times, without detergent.
2. Wipe down the entire machine.
3. Remove portafilters, baskets and springs, drip tray and grates, cup tray grates and clean thoroughly. These items are all dishwasher safe.
4. Slowly pour a pitcher of hot water down the drain.

#### Weekly

1. Back-flush each brew group using an espresso industry approved detergent.
2. Soak portafilters and the removed filter baskets in an approved espresso industry detergent and water solution overnight.
3. Rinse thoroughly before reassembling and using your portafilters.
4. Carefully remove screens from each brew group using a short handled screwdriver and soak overnight in a similar solution as the portafilters.
5. Rinse screens thoroughly before installing and using. Make sure you install the screens before brewing any shots of espresso. Failure to do so may plug the drain lines with coffee grounds. Do NOT over-tighten the screws. Turn them until they are snug, but not past that point.

#### Monthly

1. Check your water filtration system and make sure the cartridges and filters are changed as needed. In areas of high mineral content, hard water, high particulate count or in very busy locations – the filtration systems will need to be checked more often.

#### Quarterly

1. Change portafilter gaskets, closely inspect diffuser screens and filter baskets – change if showing wear. Call an authorized repair representative to perform routine maintenance.
2. **Please disconnect machine from the power supply;** Check inside the electronics box and gently remove any build up of dust or debris by using a soft brush and vacuum. It is also important to keep dust and debris out of the vented ends of your pump motor. Lack of airflow will shorten the life of the motor.

Important: Machine service and repair procedures must be performed by authorized service personnel.

\*\*This is the form that Synesso uses when performing Preventative Maintenance visits.

## Preventative Maintenance Visit Checklist

Customer: \_\_\_\_\_ Phone: \_\_\_\_\_ Date: \_\_\_\_\_  
 Serial Number: \_\_\_\_\_

### Basic Service--Operational Inspection

- Inspect or rebuild steam valves
- Inspect or rebuild water control valves
- Clean, adjust, lube steam valve acutators
- Inspect all tube connections
- Retorque element flange
- Inspect drain system for leaks, clogs
- Lube & adjust roller switches
- Grease brass on brew switch threads
- Inspect and clean autofill probe
- Assess water hardness \_\_\_gpg
- Inspect for scale buildup
- Test brew pressure gauge
- Clean steam wand tips

- Replace the following parts:
- Portafilter Gaskets 8.0 8.6 9.0
  - Vacuum breaker  VB o-ring
  - Sight glass o-rings
  - Hot water switch
  - Diffuser screens
  - Pump relay

- Inspect and replace if necessary:
- Pump and motor
  - Expansion valve  EV rebuild
  - Hot water tap aerator
  - Braided steel hoses
  - Steam tube ball valves

#### Electrical inspection

- Ensure electrical box is clean and dry
- Inspect & clean temp probe connections
- Check amp draw on all zones:  
 Z1\_\_\_ Z2\_\_\_ Z3\_\_\_ Z4\_\_\_ Z5\_\_\_

\*A checkmark in a box indicates that this item was inspected, but not replaced. If a number is present in the box, that indicates the quantity of this part that was replaced.

**Other parts used:** \_\_\_\_\_

**Technician comments / Suggested maintenance:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

PERIODIC MAINTENANCE

## Setting the DigiZone™ Temperatures

1. Select the desired zone by pressing the ZONE button. Press and hold the SET button to check the current set point.
2. To adjust a zone temperature, use the ZONE button to cycle to the zone you want to adjust.
3. Press and hold the SET button while using the ARROW keys to adjust up or down to the desired temperature.
4. On all models except the 110v 1 group, the heating element has 2 separate coils. It is recommended that you set the temperature to read about 1.2 to 1.4 Bar (approximately 250°F – 255°F) on the steam gauge.

### Toggle Display Between C and °F

Press and hold the Down Arrow and the Zone Button until you hear a beep. It is encouraged to set and adjust your temperatures in °F as it is the more accurate scale. (\* for s/n 0303 forward)

### Steam Tank Pressure & the Relationship to Temperature

- Pressure = Bar or PSI (pounds per square inch)
- 1 Bar = 1 Atmosphere = 14.7 PSI at sea level

### Temperature as it Relates to Pressure (at sea level) in the Steam Tank:

Temperature	Bar	PSI
230°	.40 to .50	6 to 8
240°	.75 to .85	10 to 12
250°	1.10 to 1.20	15 to 17
260°	1.40 to 1.60	23 to 25
270°	1.80 to 2.00	30 to 32

## DigiZone™ Control Reset & Reboot Guide

If your electronics are out of the parameters you set and you are unable to make any adjustments, follow these steps to reset the electronics:

### Section A – Reset DigiZone™ Electronics

1. Turn the red on/off **power switch** OFF, then back ON
  2. Scroll the **zones** and press **set** to check the set points, reset if required
  3. Press and hold the **up arrow**, then press and hold the **zone** button, hold both buttons together for 5 seconds to enter the common parameter adjusting mode.
    - 1st parameter is the **high alarm**, set to 275° F – holding the **set** button and using the **up** and **down arrow** keys. Press **zone** to go to the next parameter
    - 2nd parameter is the **low alarm**, set to 125° F
    - 3rd parameter is the **auto fill probe delay**, factory setting is 5 seconds
    - 4th - 8th parameters are the **temperature offset for Zone 1, 2, 3, 4 & 5 respectively**. The factory offsets for this machine are located on page 2 of your Owner's Manual under the serial number
  4. Press **zone** button to return to the operational mode
- If the electronics do not respond to the above procedure, then a total system reboot is required

### Section B – Total System Reboot

1. Turn red on/off **power switch** OFF and then turn the **element breaker** OFF
2. (This step may require assistance): press and hold **zone**, **up arrow**, **down arrow** and **set** buttons simultaneously, and turn the **power switch** ON. Continue to hold all buttons during the start up process and wait until the electronics **turn on** momentarily, **then off** and **then on** again BEFORE you release the buttons. If 2 **ON** cycles are not achieved, please try again.
3. Release all 4 buttons
4. This is a total system reboot and all of your parameters and your temperature set points will need to be reentered. The electronics will show the factory temperature set points. Follow steps 1 through 4 in section A to program your set points.
5. Turn the **element breaker** ON

### Section C – Fill in your Temperature Set Points for Reference

Temperature	1 Group	2 Group	3 Group	Factory
Zone 1	_____	_____	_____	203°F
Zone 2	N/A	_____	_____	203°F
Zone 3	N/A	OFF	_____	203°F
Zone 4	_____	_____	_____	250°F
Zone 5	N/A	_____	_____	250°F

- On a 2 group machine, lower the temperature setting for zone 3 until it reads OFF

Section C - Scroll Mode

- Turn ON by pressing **up & down arrows** together until scrolling starts
- Turn OFF scroll mode by pressing either the **set** or **zone** button